

Green Line Implementation Park on Macpherson Avenue Specifications

Re-Issued for Tender
2026-02-20



Project Directory

1.1 Project Directory

.1 The Owner:

City of Toronto

55 John Street
Toronto, Ontario
M5V 3C6

Contact: Nancy Chater

.2 Prime Consultant / Landscape Architect (Contract Administrator):

DTAH Architects Limited

425 Adelaide St. W., Suite 600
Toronto, Ontario
M5V 3C1

Tel: 416-968-9479

Fax: 416-968-0687

.3 Civil Engineer:

TYLin

8800 Dufferin Street Suite 200
Vaughan, ON
L4K 0C5

.4 Electrical Engineer:

DPM Energy Inc.

277 Cityview Blvd Unit 7
Vaughan, ON
L4H 5A4

.5 Structural Engineer:

Rimkus

2121 Argentia Rd. 4th Floor,
Mississauga, ON
L5N 2X4

.6 Arborist:

Urban Forest Innovations

1331 Northaven Drive
Mississauga, ON
L5G 4E8

.7 Environmental Consultant:

WSP Canada Inc.

701 Rossland road East, Suite 201
Whitby, Ontario, Canada
L1N 8Y9

Tel: 905-435-3751

.8 Indigenous Consultant:

Two Row Architects

1804 Sixth Line
Ohsweken, ON
N0A 1M0

Tel: 519-445-2137

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REFERENCE DOCUMENTS

APPENDIX A	Arborist Report, Macpherson Avenue Park, Urban Forest Innovations Inc., April 23, 2025
APPENDIX B	Soil and Groundwater Management Plan – Davenport Lands (Parcel 28B, 29 and 30, WSP, July 2024
APPENDIX C	Contaminant Health and Safety Plan – 28B, 29 and 30 Green Line Trail, WSP, July 2024
APPENDIX D	City of Toronto Tree Protection Policy and Specifications for Construction Near Trees, July 2016
APPENDIX E	Geotechnical Investigation for Macpherson Avenue Park, October 31, 2022
APPENDIX F	Hydro One General Conditions for Secondary Land Uses, Hydro One, January 2023
APPENDIX G	General Requirements for Construction Work by External Parties in the Vicinity of Hydro One 115,000 and 230,000 Volt Underground Plant, Hydro One, January 2024

END OF SECTION

1.1 Information Available for Review

- .1 The following documents are made available for review:
 - .1 APPENDIX A - Arborist Report, Macpherson Avenue Park, prepared by Urban Forest Innovations Inc., dated April 23, 2025.
 - .2 APPENDIX B - Soil and Groundwater Management Plan – Davenport Lands (Parcel 28B, 29 and 30, prepared by WSP, dated July 2024.
 - .3 APPENDIX C - Contaminant Health and Safety Plan – 28B, 29 and 30 Green Line Trail, prepared by WSP, dated July 2024.
 - .4 APPENDIX D - City of Toronto Tree Protection Policy and Specifications for Construction Near Trees, dated July 2016.
 - .5 APPENDIX E - Geotechnical Investigation for Macpherson Avenue Park, dated October 31, 2022.
 - .6 APPENDIX F - Hydro One General Conditions for Secondary Land Uses, prepared by Hydro One, dated January 2023.
 - .7 APPENDIX G - General Requirements for Construction Work by External Parties in the Vicinity of Hydro One 115,000 and 230,000 Volt Underground Plant, prepared by Hydro One, dated January 2024.
- .2 The accuracy of the information contained in the above listed documents has not been independently verified by the Contract Administrator.

END OF SECTION

General Instructions

PART 1 - GENERAL

1.1 Related Requirements

- .1 Appendix F - Hydro One General Conditions for Secondary Land Uses.
- .2 Appendix G - General Requirements for Construction Work by External Parties in the Vicinity of Hydro One 115,000 and 230,000 Volt Underground Plant.

1.2 The Agreement, Drawings, Schedules, and Specifications

- .1 The Agreement, Drawings, Schedules, and Specifications have been arranged into various divisions, sections, drawings, and schedules for the purpose of presenting the Work in a logical and organized form and to enable ease of reference and interpretation, and are not intended to be an arrangement of precise and independent Subcontractors, or jurisdiction of responsibility for the various parts of the Work. The Contractor shall be solely responsible for coordinating the execution of the Work of this Contract in accordance with the requirements of the Agreement, Drawings, Schedules, and Specifications.
- .2 As a result, the Contract Administrator shall not be required to decide on questions arising with regard to agreements or contracts between the Contractor and Subcontractors or Suppliers, nor to the extent of the parts of the Work assigned thereto.
- .3 Further, no extra will be allowed as a result of the failure to coordinate and allocate the Work such that the Work is Provided in accordance with the Agreement, Drawings, Schedules, and Specifications.
- .4 The Agreement, Drawings, Schedules, and Specifications may specify, indicate, or schedule requirements that exceed the requirements of the building code, other applicable codes, requirements of authorities having jurisdiction, and standards cited in the Agreement, Drawings, Schedules, and Specifications. In such cases, the requirements specified, indicated, or scheduled in the Agreement, Drawings, Schedules, and Specifications shall govern.
- .5 This section coordinates, relates, and governs the work of other sections of the specifications.

1.3 Laws, Notices, Permits and Fees

- .1 The building code - Ontario Regulation 332/12, including amendments, shall govern the Work.
- .2 Comply with codes, by-laws, and regulations of authorities having jurisdiction over the Place of the Work. Codes and regulations form an integral part of the Agreement, Drawings, Schedules, and Specifications.
- .3 Arrange for inspection, testing and acceptance of the Work required by the authorities having jurisdiction. Be responsible for necessary preparations, provisions and pay costs.
- .4 Obtain permits required to execute work on municipal rights of way. Obtain damage deposits for sidewalks, roads and services, unless otherwise indicated.

General Instructions

1.4 Examination of the Place of the Work, Documents, Surfaces and Conditions

- .1 Examine the Place of the Work and investigate matters relating to the nature of the Work, means of access and egress, obstacles, rights and interests of other parties which may be interfered with during the execution of the Work, conditions and limitations including obstructions, existing structures or facilities, local conditions, actual levels, character and nature of the Work, and other consideration which may affect performance of the Work.
- .2 Examine the extent of work to be performed and matters which are referred to in the Agreement, Drawings, Schedules, and Specifications prior to start of the Work.
- .3 Examine work to which work is to be applied, anchored or connected, and relevant as-built conditions.
- .4 Each work operation following on a previous work operation of a differing Subcontractor, as in the case of finishing and surfacing work, shall include a thorough examination of the condition of the previous work. Conditions found unacceptable, either for the commencement of the new work or its satisfactory completion, shall be reported in writing to the Contract Administrator.
- .5 Do not commence work until unsatisfactory conditions are corrected. Commencement of work implies acceptance of surfaces, tolerances, and conditions and existing conditions will not be accepted as a contributing factor to subsequent failure or acceptability of the Work.

1.5 Quantity of Items

- .1 Where a component, device, item or part of materials or equipment is referred to in the singular number, such reference shall require the provision of as many components, devices, items or parts of material or equipment necessary to complete the Work.

1.6 Discrepancies and Clarifications

- .1 Advise Contract Administrator of discrepancies discovered in requirements of the Agreement, Drawings, Schedules, and Specifications and request clarification in written form.
- .2 Advise Contract Administrator when clarifications are required pertaining to meaning or intent of requirements of Agreement, Drawings, Schedules, and Specifications and request clarification from Contract Administrator in written form.
- .3 Do not proceed with related work until written clarification is provided by Contract Administrator.
- .4 Failure to notify Contract Administrator shall result in Contractor incurring responsibility for resulting deficiencies and expense at no additional cost to the Owner.
- .5 Written instructions issued by Contract Administrator for the purpose of clarification, implicitly supersede applicable and relevant aspects of the Agreement, Drawings, Schedules, and Specifications irrespective of whether or not these documents are explicitly or specifically cited in clarification requests or clarification instructions.

1.7 Use of Premises and the Place of the Work

- .1 Make good roads, soft landscaping, walkways, curbs, sidewalks, possessions and property, soiled or damaged due to the Work, to requirements of authorities having jurisdiction and requirements of the Company, as applicable.

General Instructions

- .2 Fully protect adjacent site improvements, services, landscaping, and other works using suitable covering and support framing, to prevent damage by construction related activities.

1.8 Public Utilities and Services

- .1 Verify limitations imposed on the Work by presence of utilities and services, and ensure no damage occurs to them.
- .2 Notify service authorities concerned so that they protect, remove, relocate, or discontinue them, as they may require.
- .3 Make arrangements and pay for connection charges for services required for the Work.
- .4 Locate new poles, pipes, conduit, wires, fill pipes, vents, regulators, meters, and sanitary services in inconspicuous locations. If not indicated in Agreement, Drawings, Schedules, and Specifications, verify location with Contract Administrator before commencing installation.

1.9 Work on Public Property

- .1 Include curb cuts and making good of existing property to Provide fully paved and finished approaches to requirements of authorities having jurisdiction.
- .2 Include making good of existing curbs, walks, paving and soft landscaping on adjacent property.

1.10 Setting Out the Work

- .1 Assume full responsibility for and execute complete layout of the Work to required locations, lines and elevations.
- .2 Arrange meeting with Contract Administrator to discuss critical setting out assumptions for the Work and establish limiting conditions for setting out the Work. Contractor shall chair and prepare minutes of the meeting, and prepare and submit sketches recording understanding of key setting out principles.
- .3 Provide devices needed to lay out and construct the Work.
- .4 Establish existing bench marks, grades, lines, levels, and temporary, widely separated bench marks. Employ the services of a firm of registered land surveyors licensed in the Place of the Work.
- .5 Surveyor shall verify grades, lines, levels at the Place of the Work critical setting out points specified herein, and dimensions shown and report discrepancies in levels or dimensions before commencing Work. Where discrepancies between intended layout and existing conditions are found to exist, prepare and submit a detailed report to Contract Administrator, including schematic digital layout of conflicting conditions, in format compatible with currently licensed edition of AutoCAD/Revit software for Contract Administrator's use in reconciling these issues.
- .6 Preserve bench marks, reference points and stakes.
- .7 Prepare and submit record survey documents and survey logs for incorporation into project record documents in accordance with Section 01 77 00.
- .8 Work adjacent to public property:

General Instructions

- .1 Verify before commencing portions of the Work adjacent to public and private properties, that no plans for altering clearances, set-backs, easements, grades, or otherwise have been established by authorities having jurisdiction, subsequent to issuance of the building permit.

1.11 Documents at the Place of the Work

- .1 In addition to the documents listed in GC 3.10, maintain at the Place of the Work, one copy of each of following:
 - .1 'Reviewed' or 'Reviewed as Noted' shop drawings.
 - .2 Construction and submittal schedules.
 - .3 Supplemental Instructions, proposed Change Orders, Change Orders, and Change Directives.
 - .4 RFI responses.
 - .5 Field Test Reports.
 - .6 Contract Administrator's field review reports and deficiency reports.
 - .7 Reports by authorities having jurisdiction.
 - .8 Building and other applicable permits, and related permit documents.
 - .9 Daily log including:
 - .1 Weather (precipitation, high and low temperatures, wind, and visibility).
 - .2 Pertinent site conditions (muddy, flooded, frozen ground, water level).
 - .3 Number of workers actively working at the Place of the Work by each subcontract.
 - .4 Subcontractors working at the Place of the Work.
 - .5 Parts of the Work being worked on.
 - .6 Working hours worked at the Place of the Work.
 - .7 Activities with intermittent progress.
 - .8 Time lost and explanation for such time lost.
 - .9 Difficulties (work scheduled to start but did not with the reason why, delays, labour inefficiencies, labour shortage, weather).
 - .10 Products and materials delivered.
 - .11 Equipment mobilized and/or demobilized.
 - .12 Demolition conditions.
 - .13 Start and finish date of each part of the Work.
 - .10 As-built drawings recording as-built conditions, instructions, changes for structure, equipment, wiring, plumbing, and the like, as called for in Section 01 77 00 and Divisions 21, 22, and 23 and Divisions 26, 27, and 28, prior to being concealed.
- .2 Make above material available to Contract Administrator upon request.

General Instructions

1.12 Trademark and Labels

- .1 Trademarks and labels, including applied labels, shall not be visible in finished work in finished areas, unless otherwise accepted or indicated by Contract Administrator.
- .2 The exceptions to this requirement are trademarks and labels which are essential to identify materials, systems, assemblies, and equipment for maintenance and replacement purposes, and for life safety, fire resistance and temperature rise ratings.

1.13 Survey Location Devices

- .1 Replace, at no additional cost to the Owner, any iron pins and survey bars, monuments, geodetic datum and similar reference markers, which are disturbed, moved, or lost in course of construction.

1.14 Waste Audits/Plans for Waste Reduction

- .1 Comply with requirements of authorities having jurisdiction.
- .2 Deliver to nearest appropriate depot materials accepted for recycling by region or municipality having jurisdiction over the Place of the Work, including but not limited to cardboard, paper, plastic, aluminum, steel, and glass. Deliver to nearest appropriate depot scrap for recycling. Costs for this work are included in the Contract Price.

1.15 Interferences

- .1 Coordinate placement of equipment to ensure that components will be properly accommodated within spaces provided prior to commencement of the Work.
- .2 Take complete responsibility for remedial work that results from failure to coordinate aspects of work prior to its fabrication/installation.
- .3 Ensure that accesses and clearance required by jurisdictional authorities and/or for easy maintenance of equipment are provided in layout of equipment and services; notify Contract Administrator if indicated clearances are in conflict.

1.16 Not In Contract Items and Items Supplied by Company

- .1 NIC (Not In Contract) shall be used to designate various items of equipment that require coordination for installation although are not Provided as part of the Work.
- .2 SBC (Supplied and installed by Owner) shall be used to designate various items of equipment that will be supplied and installed by the Company.
 - .1 List of SBC items:
 - .1 Waste and recycling receptacles.

1.17 Publicity Releases and Photographs

- .1 No press or publicity releases will be permitted without prior written approval of the Owner.
- .2 No photographs of the Place of the Work or of any portion of the Work will be permitted without written approval of the Owner, except as provided by the Agreement, Drawings, Schedules, and Specifications.

General Instructions

1.18 Electronic Files

- .1 In the event that the Contractor, a Subcontractor, or a Supplier requests AutoCAD files from the Contract Administrator, the Contract Administrator will be allowed to use their discretion whether or not they will provide the files requested. The Contract Administrator will require a copyright and liability waiver to be signed. A fee paid to the Contract Administrator for preparing the electronic files of plans will be required; such fee shall be payable to the Contract Administrator, is not included in the Contract Price, and may not be charged to the Owner as a change in the Work. The fee required shall be as follows:
 - .1 Landscape Architectural drawings: \$250.00 (+ HST) per sheet.
 - .2 Structural drawings: \$250.00 (+ HST) per sheet.
 - .3 Mechanical drawings: \$250.00 (+ HST) per sheet.
 - .4 Electrical drawings: \$250.00 (+ HST) per sheet.

PART 2 - PRODUCTS

Not applicable.

PART 3 - EXECUTION

Not applicable.

END OF SECTION

WORK RESTRICTIONS

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 01 35 43 – Environmental Procedures.
 - .1 In case of conflict between the environmental requirements and procedures specified in this section and those specified in Section 01 35 43, the more stringent shall govern. Refer any conflicts or discrepancies to the Contract Administrator who shall provide direction.
- .2 Appendix F - Hydro One General Conditions for Secondary Land Uses.
- .3 Appendix G - General Requirements for Construction Work by External Parties in the Vicinity of Hydro One 115,000 and 230,000 Volt Underground Plant.

1.2 SPECIAL REQUIREMENTS

- .1 Noise control:
 - .1 Restrictions for work involving major noise emitting activities shall be in accordance with the requirements of authorities having jurisdiction.
 - .1 Major noise emitting activities shall include activities that generate noise levels above those normally generated by construction activities, such as pile driving, demolition, and the like.
 - .2 Record complaints, document actions taken to mitigate against future disturbances, and submit quarterly updates.
 - .2 Carry out noise generating work Monday to Saturday in accordance with City of Toronto Bylaw Chapter 591.
- .2 Site Access:
 - .1 Preferred access to the work site shall be as follows:
 - .1 Macpherson Avenue Parks: Access shall be from Macpherson Avenue.
 - .2 Designated HONI access routes shall not be obstructed by construction activities beyond active construction periods. Designated routes to be left clear outside of active construction hours.
 - .3 Keep within limits of work and avenues of ingress and egress.
 - .4 Any damages to utilities or services require immediate notification to the Contract Administrator and the City.
- .3 Hydro One Networks Inc. (HONI) Restrictions and Requirements in accordance with Appendix F and Appendix G.

Part 2 Products

- .1 Not Used.

WORK RESTRICTIONS

Part 3 Execution

.1 Not Used.

END OF SECTION

Product Substitution Procedures

PART 1 - GENERAL

1.1 Related Requirements

- .1 Appendix F - Hydro One General Conditions for Secondary Land Uses.
- .2 Appendix G - General Requirements for Construction Work by External Parties in the Vicinity of Hydro One 115,000 and 230,000 Volt Underground Plant.

1.2 Approved Alternates and Approved Equals

- .1 Named Products alternates or equals, indicated by the phrases "or approved alternate by XYZ Manufacturing" or "or approved equal by XYZ Manufacturing", shall be interpreted to mean that named Product alternate or equal, if selected for use in lieu of indicated or specified Product, meets or exceeds performance, appearance, general arrangement, dimensions, availability, code and standards compliance, and colour of specified Product. Be responsible for costs and modifications associated with the inclusion of named Product alternate or equal at no additional cost to the Owner.
- .2 The process for proposing and approving alternates or equals shall be the same process as for proposing and approving substitutions (refer to paragraph 1.2 below).
- .3 Confirm delivery of specified items prior to proposing alternates or equals.

1.3 Substitutions

- .1 Submission of substitutions:
 - .1 Proposals for substitutions of Products and materials must be submitted in accordance with GC 3.9.4 as supplemented by this section.
 - .2 Contract Administrator may review submissions, if directed by Owner, but in any case with the understanding that the Contract Time will not be altered due to the time required by the Contract Administrator to review the submission and by the Contractor to implement the substitution in the Work.
- .2 Submission requirements:
 - .1 Description of proposed substitution, including detailed comparative specification of proposed substitution with the specified Product. Sample Substitution Request Form is appended to this Section.
 - .2 Manufacturer's Product data sheets for proposed Products.
 - .3 Respective costs of items originally specified and the proposed substitution.
 - .4 Confirmation of proposed substitution delivery, in writing by Product manufacturer.
 - .5 Compliance with the building codes and requirements of authorities having jurisdiction.
 - .6 Affect concerning compatibility and interface with adjacent building materials and components.
 - .7 Compliance with the intent of the Agreement, Drawings, Schedules, and Specifications.
 - .8 Effect on Contract Time.

Product Substitution Procedures

- .9 Reasons for the request.
- .10 Detailed availability of maintenance services and sources of replacement materials and parts, including associate costs and time frames.
- .3 Substitutions submitted on shop drawings without following requirements of this section prior to submission of the affected shop drawings will cause the shop drawings to be rejected.
- .4 Proposed substitutions shall include costs associated with modifications necessary to other adjacent and connecting portions of the Work.
- .5 Contract Administrator's decision concerning acceptance or rejection of proposed substitutions is final.

PART 2 - PRODUCTS

Not applicable.

PART 3 - EXECUTION

Not applicable.

END OF SECTION

Substitution Request Form

From: _____ **RFS No:** _____
To: _____ *(RFS No. To be completed by Consultant)*
Copies: _____ **Issue Date:** _____

Product, Material or Equipment Required of the Contract Documents:

Specification Section: _____ Drawing No./Detail: _____

Description: _____

Requested Substitute Product, Material or Equipment:

Description: _____

Attachments Included: ☐ Drawings ☐ Product Data ☐ Samples ☐ Test Reports

☐ Other: _____

Reason for Substitution: _____

Expected Lifespan: _____ Warranty Duration _____

Maintenance Regime: _____

Has this item been used in a similar application? ☐ Yes ☐ No

Describe Application: _____

Describe Results: _____

Owner Contact and Location: _____

Comparisons of the Specified Item and the Proposed Substitution:

Compare significant qualities of size, weight, durability, performance and visual effect:

Describe any changes required in other elements of the Work to accommodate the proposed substitution, including work performed by the Owner and separate contractors:

What effect will the proposed substitution have on the work schedule in comparison to the work schedule without approval of the proposed substitution?

Cost comparison of the proposed substitution to the originally specified item, including correlating modifications required to other work:

Substitution Request Form

Net cost to the Owner: _____

Changes in contract time: _____

Signatures:

Permission to make any substitution after award of contract shall be effected by Change Order. It shall not relieve the Contractor, any subcontractor, or manufacturer, fabricator, or supplier from the responsibility for any deficiency that may exist in the substituted product or any departures or deviations from the Contract Documents as modified by such Change Order.

Except as otherwise expressly specified by the Contractor in the Request for Substitution and expressly approved in such Change Order, the Contractor shall be deemed to warrant, by his request, that the proposed substitute will satisfy all standards and requirements satisfied by the original product, material or equipment specified and the Change Order shall not be deemed to modify the Contract Documents with respect thereto.

If any substitution will affect a correlated function, adjacent construction, or the work of other trades or contractors, the necessary changes and modifications to the affected work shall be considered as an essential part of the proposed substitution, to be accomplished by the Contractor without additional time or expense to the Owner if and when accepted.

Contractor's Signature: _____ Date: _____

Substitution Request Form

Consultants' Action:

Consultant's Name: _____

Consultant's Signature: _____ Date: _____

☐ Accepted ☐ Rejected ☐ More information required.

Comments: _____

Consultant's Name: _____

Consultant's Signature: _____ Date: _____

☐ Accepted ☐ Rejected ☐ More information required.

Comments: _____

Consultant's Name: _____

Consultant's Signature: _____ Date: _____

☐ Accepted ☐ Rejected ☐ More information required.

Comments: _____

Consultant's Name: _____

Consultant's Signature: _____ Date: _____

☐ Accepted ☐ Rejected ☐ More information required.

Comments: _____

Consultant's Name: _____

Consultant's Signature: _____ Date: _____

☐ Accepted ☐ Rejected ☐ More information required.

Comments: _____

Requests for Interpretation

PART 1 - GENERAL

1.1 Related Requirements

- .1 Appendix F - Hydro One General Conditions for Secondary Land Uses.
- .2 Appendix G - General Requirements for Construction Work by External Parties in the Vicinity of Hydro One 115,000 and 230,000 Volt Underground Plant.

1.2 Request for Interpretation – RFI

- .1 A request for interpretation (RFI) is a formal process used during the Work to obtain an interpretation of the Agreement, Drawings, Schedules, and Specifications pursuant to GC 2.2.7 through 2.2.10 (inclusive).
 - .1 An RFI shall not constitute notice of claim for a delay.
- .2 Submittal procedures:
 - .1 RFI form:
 - .1 Submit RFI on “Request for Interpretation” in form acceptable to the Contract Administrator, an example of which is appended to this section. The Contract Administrator shall not respond to an RFI except as submitted on the form accepted by the Contract Administrator.
 - .2 Where RFI form does not provide sufficient space for complete information to be provided thereon, attach additional sheets as required.
 - .3 Submit with RFI form necessary supporting documentation. The Contract Administrator shall not respond to an RFI where necessary information is missing, insufficient, unclear, or ambiguous.
 - .2 Submit RFI form as follows:
 - .1 Submit RFIs sufficiently in advance of affected parts of the Work so as not to cause delay in the performance of the Work. Costs resulting from failure to do this will not be paid by the Owner.
 - .2 RFIs shall be submitted only to the Contract Administrator.
 - .3 RFIs shall be submitted only by Contractor. RFIs submitted by Subcontractors or Suppliers shall not be accepted.
 - .4 Number RFIs consecutively in one sequence in order submitted.
 - .5 Submit one distinct RFI per RFI form.
 - .3 RFI log:
 - .1 Maintain log of RFIs sent to and responses received from the Contract Administrator, complete with corresponding dates.
 - .2 Submit updated log of RFIs with each progress draw submittal.
 - .4 Contract Administrator shall review RFIs from the Contractor submitted in accordance with this section, with the following understandings:

Requests for Interpretation

- .1 Contract Administrator's response shall not be considered as a Change Order or Change Directive, nor does it authorize changes in the Contract Price or Contract Time or changes in the Work.
- .2 Only the Contract Administrator shall respond to RFIs. Responses to RFIs received from entities other than the Contract Administrator shall not be considered.
- .5 Allow 10 Working Days for review of each RFI by the Contract Administrator.
 - .1 Contract Administrator's review of RFI commences on date of receipt by the Contract Administrator of RFI submittal and extends to date RFI returned by Contract Administrator.
 - .2 When the RFI submittal is received by Contract Administrator before noon, review period commences that day; when RFI submittal is received by Contract Administrator after noon, review period begins on the next Working Day.
 - .3 If, at any time, the Contractor submits a large enough number of RFIs such that the Contract Administrator cannot process these RFIs within 10 Working Days, the Contract Administrator, will confer with the Contractor within 1 Working Day of receipt of such RFIs, and the Contract Administrator and the Contractor will jointly prepare an estimate of the time necessary for processing same as well as an order of priority between the RFIs submitted. The Contractor shall accommodate such necessary time at no increase in the Contract Time and at no additional cost to the Owner.
- .6 Contractor shall satisfy itself that an RFI is warranted by undertaking a thorough review of the Agreement, Drawings, Schedules, and Specifications to determine that the claim, dispute, or other matters in question relating to the performance of the Work or the interpretation of the Agreement, Drawings, Schedules, and Specifications cannot be resolved by direct reference to the Agreement, Drawings, Schedules, and Specifications. Contractor shall describe in detail this review on the RFI form as part of the RFI submission. RFI submittals that lack such detailed review description, or where the detail provided is, in the opinion of the Contract Administrator, insufficient, shall not be reviewed by the Contract Administrator and shall be rejected.

PART 2 - PRODUCTS

Not applicable.

PART 3 - EXECUTION

Not applicable.

END OF SECTION

Contractor's Request for Interpretation**Contract Administrator's Supplemental Instructions**

Date	# of Pages
To	From
Co.	Co.
Phone #	Phone #
Fax #	Fax #
Email	Email

Project: _____

Owner: _____

To: _____

(Contract
Administrator's
Representative)

Project No.: _____

Contract
Administrator's
Fax No.: _____

RFI No.: _____

Date of

Request: _____

Contractor: _____

Contractor's
Representative: _____

Fax No.: _____

Interpretation Requested: (Description of request for interpretation and references to relevant portions of Agreement, Drawings, Schedules, and Specifications)

Attachments: _____

Requested by: _____

Contract Administrator's Supplemental Instruction:

Attachments: _____

Reply By: _____

The work shall be carried out in accordance with these Supplemental Instructions issued in accordance with the Agreement, Drawings, Schedules, and Specifications without change in Contract Price or Contract Time. Prior to proceeding with these instructions, indicate acceptance of these instructions as being consistent with the Agreement, Drawings, Schedules, and Specifications by returning a signed copy to the Contract Administrator.

Supplemental Instruction Issued:

By: _____

Supplemental Instruction Accepted:

By: _____

Cc: ☐ Contract Administrator ☐ Date
☐ Company ☐ Consultant ☐ Contractor☐ Contractor ☐ Date
☐ Field ☐ Other:

PART 1 - GENERAL

1.1 Related Requirements

- .1 Appendix F - Hydro One General Conditions for Secondary Land Uses.
- .2 Appendix G - General Requirements for Construction Work by External Parties in the Vicinity of Hydro One 115,000 and 230,000 Volt Underground Plant.

1.2 General

- .1 Provide the Work in accordance with the Agreement, Drawings, Schedules, and Specifications and be responsible for delays or costs resulting from failure to properly inspect or coordinate the Work, and for replacement or corrective work required.

1.3 Identification of Systems

- .1 Provide identification of electrical and mechanical system installations and other automated systems or equipment in compliance with Agreement, Drawings, Schedules, and Specifications.

1.4 Commissioning and Systems Demonstrations

- .1 Provide testing, adjusting, balancing and certification and commissioning of mechanical and electrical installations and other automated systems or equipment in accordance with Section 01 77 00.
- .2 Instruct Owner's designated representatives in operation and maintenance of mechanical and electrical installations and other automated systems or equipment, in accordance with Section 01 77 00.

1.5 Superintendence

- .1 Provide superintendent and necessary supporting staff personnel who shall be in attendance at the Place of the Work while Work is being performed, with proven experience in erecting, supervising, testing and adjusting projects of comparable nature and complexity.
- .2 The Contractor shall appoint a superintendent at the Place of the Work who shall have overall authority at the Place of the Work and shall speak for the Contractor and represent the Contractor's interest and responsibilities at meetings at the Place of the Work and in dealings with the Contract Administrator and the Owner.

1.6 Dimensions

- .1 Verify dimensions at the Place of the Work before commencing shop drawings. Before fabrication commences report discrepancies to Contract Administrator in writing. Incorporate accepted variances on shop drawings and as-built records.

1.7 Coordination

- .1 Coordinate and ensure workers, Subcontractors, and Suppliers cooperate to ensure that the Work will be carried out expeditiously and in proper sequence.
- .2 Make adjustments to allow adjustable work fit to fixed work.

1.8 Dimension, Templates, Built-ins, and Coordination

- .1 Take necessary dimensions for the proper execution of the Work. Assume complete responsibility for the accuracy and completeness of such dimensions, and for coordination.
- .2 Provide forms, templates, anchors, sleeves, inserts and accessories required to be fixed to or inserted in the Work and set in place or instruct separate Subcontractors as to their location.
- .3 Supply items to be built in, as and when required together with templates, measurements, shop drawings and other related information and assistance.
- .4 Pay the cost of extra work and make up time lost as a result of failure to provide necessary information and items to be built in.
- .5 Verify that the Work, as it proceeds, is executed in accordance with dimensions and positions indicated which maintain levels and clearances to adjacent work, as set out by requirements of the Agreement, Drawings, Schedules, and Specifications, and ensure that work installed in error is rectified before construction resumes.
- .6 Check and verify dimensions referring to interfacing of services. Verify such dimensions with interconnected portions of the Work.
- .7 Do not scale directly from drawings. Obtain clarification from Contract Administrator if there is ambiguity or lack of information.
- .8 Details and measurements of any work which is to fit or to conform with work installed shall be taken at the Place of the Work.
- .9 Advise Contract Administrator of discrepancies and omissions in the Agreement, Drawings, Schedules, and Specifications that affect aesthetics, or that interfere with services, equipment or surfaces. Do not proceed with work affected by such items without clarification from Contract Administrator.
- .10 Prepare and submit setting drawings, templates and other information necessary for the location and installation of material, holes, sleeves, inserts, anchors, accessories, fastenings, connections and access panels.
- .11 Subcontractors shall direct related Subcontractors on site of specific locations required for sleeves and openings. The Contractor shall be responsible for coordinating such activity to ensure no interruption in the progress of the Work.

PART 2 - PRODUCTS

Not applicable.

PART 3 - EXECUTION

Not applicable.

END OF SECTION

Project Meetings

PART 1 - GENERAL

1.1 Related Requirements

- .1 Appendix F - Hydro One General Conditions for Secondary Land Uses.
- .2 Appendix G - General Requirements for Construction Work by External Parties in the Vicinity of Hydro One 115,000 and 230,000 Volt Underground Plant.

1.2 Administrative

- .1 The Contract Administrator shall schedule meetings as specified herein, unless indicated otherwise.
 - .1 Such scheduling shall be in consultation both with the Owner and with the Contractor.
- .2 The Contract Administrator shall prepare agendas for meetings specified herein, unless indicated otherwise.
 - .1 Agendas shall include, as a minimum, the agenda items specified in the Agreement, Drawings, Schedules, and Specifications.
- .3 The Contract Administrator shall distribute written notice of each meeting specified herein, complete with meeting agenda, 3 Working Days in advance of meeting date to the Contractor and the Owner and other affected parties, unless indicated otherwise.
- .4 The Contract Administrator shall chair and record the minutes of meetings specified herein.
 - .1 Contract Administrator shall distribute copies of minutes to the Owner, the Contractor, and all others in attendance within 5 Working Days after date of meeting.
- .5 Representatives of parties attending meetings shall be authorized to act on behalf of the parties they represent.
- .6 Subcontractors and Suppliers shall attend meetings only when directed by the Contract Administrator, or when specifically called for in the Agreement, Drawings, Schedules, and Specifications.
- .7 The Contractor shall prepare, and distribute to the Contract Administrator and the Owner 4 days in advance of next progress meeting date, the following:
 - .1 Monthly progress reports containing updated Work Schedule, submittal logs, requests for interpretation logs, and budget.

1.3 Contract Start-Up Meeting

- .1 Within 5 days after award of Contract, the Contractor shall request a meeting of parties in Contract to discuss and resolve administrative procedures and responsibilities prior to the commencement of the Work.
- .2 Attendees at Contract start-up meeting shall include the following:
 - .1 Contractor.
 - .2 Contractor's site superintendent(s).

Project Meetings

- .3 Contract Administrator.
- .4 Owner.
- .5 Independent inspection and testing company.
- .3 Agenda to include the following:
 - .1 Appointment of official representative of participants in the Project.
 - .2 Status of permits, fees and requirement of authorities having jurisdiction. Action required.
 - .3 Establishing a schedule for progress meetings.
 - .4 Requirements for Contract modification and interpretation procedures, including, but not limited to: requests for interpretation, contemplated change orders, Change Orders, Change Directives, Supplemental Instructions, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, and administrative requirements.
 - .5 Submittal requirements and procedures.
 - .6 Schedule of submission of samples, colour chips, and items for Owners and/or Contract Administrator's consideration.
 - .7 Work Schedule and progress scheduling.
 - .8 Delivery schedule of specified equipment.
 - .9 Appointment of independent inspection and testing agencies or firms.
 - .10 Requirements for notification for reviews. Allow a minimum of 48 hours' notice to Contract Administrator for review of the Work.
 - .11 Requirements for temporary facilities, signs, offices, storage sheds, utilities, fences.
 - .12 Security requirements at and for the Place of the Work.
 - .13 Owner supplied Products.
 - .14 As-built documents.
 - .15 Operation and maintenance manuals.
 - .16 Take-over procedures, acceptance, warranties.
 - .17 Publication to be used for publishing certificate of substantial performance.
 - .18 Progress claims, administrative procedures, holdbacks.
 - .19 Insurances, transcripts of policies.
 - .20 Contractor's safety procedures.
 - .21 Cleaning area for vehicles.
 - .22 Workplace Safety and Insurance Board Certificate.

Project Meetings

1.4 Pre-Installation Meetings

- .1 During the course of the Work prior to Substantial Performance of the Work, schedule pre-installation meetings as required by the Agreement, Drawings, Schedules, and Specifications and coordinated with the Contract Administrator.
- .2 As far as possible, pre-installation meetings shall be scheduled to take place on the same day as regularly scheduled progress meetings.
- .3 Attendees at pre-installation meetings shall include the following:
 - .1 Contractor.
 - .2 Subcontractors affected by the work for which the pre-installation meeting is being conducted.
 - .3 Contract Administrator.
 - .4 Manufacturer's representatives, as applicable.
 - .5 Independent inspection and testing company, as applicable.
- .4 Agenda to include the following:
 - .1 Appointment of official representatives of participants in the Project.
 - .2 Review of existing conditions and affected work, and testing thereof as required.
 - .3 Review of installation procedures and requirements.
 - .4 Review of environmental and site condition requirements.
 - .5 Schedule of the applicable portions of the Work.
 - .6 Schedule of submission of submittals, samples, mock-ups, and items for Contract Administrator's consideration.
 - .7 Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences.
 - .8 Requirements for notification for reviews. Allow a minimum of 48 hours' notice to Contract Administrator for review of the Work.
 - .9 Requirements for inspections and tests, as applicable. Schedule and undertake inspections and tests.
 - .10 Delivery schedule of specified equipment.
 - .11 Special safety requirements and procedures.
 - .12 Publication to be used for publishing certificate of substantial performance.

1.5 Progress Meetings

- .1 During the course of the Work prior to Substantial Performance of the Work, schedule progress meetings as directed by the Contract Administrator.
- .2 Attendees at progress meetings shall include the following:
 - .1 Contractor.
 - .2 Contractor's site superintendent(s).
 - .3 Contract Administrator.

Project Meetings

.4 Owner.

.3 Agenda to include the following:

- .1 Review, approval of proceedings of previous meeting.
- .2 Review of items arising from proceedings.
- .3 Review of progress of the Work since previous meeting and Contractor's monthly progress report.
- .4 Field observations, problems, conflicts.
- .5 Update Work Schedule.
- .6 Problems that impede compliance with Work Schedule.
- .7 Review of off-site fabrication delivery schedules.
- .8 Review material delivery dates/schedule.
- .9 Corrective measures and procedures to regain Work Schedule.
- .10 Revisions to Work Schedule.
- .11 Progress, schedule, during subsequent period of the Work.
- .12 Review submittal schedules.
- .13 Review status of submittals.
- .14 Maintenance of quality standards.
- .15 Pending changes and substitutions.
- .16 Review of Contract modifications and interpretations including, but not limited to: requests for interpretation and log, contemplated change orders, Change Orders, Change Directives, Supplemental Instructions, for effect on construction schedule and on Contract Time.
- .17 Review of status of as-built documents.
- .18 Other business.

1.6 Pre-Takeover Meeting

- .1 Prior to application for Substantial Performance of the Work, schedule a pre-takeover meeting.
 - .1 Allow sufficient time for review and correction of deficiencies prior to application for Substantial Performance of the Work.
- .2 Agenda to include the following:
 - .1 Review, approval of proceedings of previous meeting.
 - .2 Review of items arising from proceedings.
 - .3 Review of procedures for Substantial Performance of the Work, completion of the Contract, and handover of the Work.
 - .4 Field observations, problems, conflicts.

Project Meetings

- .5 Review of outstanding Contract modifications and interpretations including, but not limited to: requests for interpretation and log, contemplated change orders, Change Orders, Change Directives, Supplemental Instructions, for effect on construction schedule and on Contract Time.
- .6 Problems which impede Substantial Performance of the Work.
- .7 Review of procedures for deficiency review. Corrective measures required.
- .8 Review of arrangements for hydro, heating, and other services.
- .9 Progress, schedule, during succeeding period of the Work.
- .10 Review submittal requirements for warranties, manuals, and all demonstrations and documentation required for Substantial Performance of the Work.
- .11 Review of keying and hardware requirements.
- .12 Review of status of as-built documents and record drawings.
- .13 Status of commissioning and training.
- .14 Review Contractor's deficiency list and status.
- .15 Cleaning for occupancy.
- .16 Other business.

1.7 Post-Construction Meeting

- .1 Prior to application for completion of Contract, schedule a post-construction meeting. 5 Working Days prior to date for meeting, Contract Administrator shall confirm a date for meeting based on evaluation of completion requirements.
- .2 Agenda to include the following:
 - .1 Review, approval of proceedings of previous meeting.
 - .2 Confirmation that no business is arising from proceedings.
 - .3 Confirmation of completion of the Contract, and handover of reviewed documentation from the Contract Administrator to the Owner.
 - .4 Confirmation of completion of contemplated change orders, Change Orders, Change Directives, and Supplemental Instructions.
 - .5 Problems that impede Contract completion.
 - .6 Identify unresolved issues or potential warranty problems.
 - .7 Confirmation of completion of deficiencies.
 - .8 Corrective measures required.
 - .9 Confirmation of arrangements for hydro, heating and other services.
 - .10 Confirm submittal requirements for warranties, manuals, and demonstrations and documentation for Contract completion are in order.
 - .11 Review of procedures for communication during post-construction period.
 - .12 Handover of reviewed record documents by the Contractor to the Owner.
 - .13 Submission of final application for payment.

Project Meetings

- .14 Review and finalize outstanding claims, pricing, and allowance amounts.
- .15 Status of commissioning and training.
- .16 Demobilization and the Place of the Work restoration.
- .17 Review of requests for interpretation log.
- .18 Other business.

1.8 Special Meetings

- .1 Owner and/or Contract Administrator reserve the right to require special meetings which may be held on short notice and at which attendance by Contractor and representatives of affected Subcontractors and Suppliers is mandatory. Contractor shall keep detailed and accurate meeting notes and distribute copies within 3 Working Days to all in attendance and those affected by agreements made at such meetings.

PART 2 - PRODUCTS

Not applicable.

PART 3 - EXECUTION

Not applicable.

END OF SECTION

Construction Progress Documentation

PART 1 - GENERAL

1.1 Related Requirements

- .1 Appendix F - Hydro One General Conditions for Secondary Land Uses.
- .2 Appendix G - General Requirements for Construction Work by External Parties in the Vicinity of Hydro One 115,000 and 230,000 Volt Underground Plant.

1.2 General

- .1 Schedules required:
 - .1 Work Schedule.
 - .2 Product delivery schedule.
 - .3 Inspection and testing schedule.
- .2 Format:
 - .1 Prepare schedules in the form of a PERT or GANTT or Microsoft Project chart method.
 - .2 Include horizontal time scale identifying the first Working Day of each week.
 - .3 Format for listings: The chronological order of the start of each item or part of the Work.
 - .4 Identification of listings: By systems description.
- .3 Work schedule:
 - .1 Include the complete sequence of construction activities, including provision for climate and weather.
 - .2 Include the dates for the commencement and completion of each major element of the Work parallel to the sections of the specifications.
 - .3 Show projected percentage of completion for each item as of the first Working Day of each week.
 - .4 Submit draft schedule for review, and incorporate responses to comments identified by Contract Administrator and/or Owner.
 - .5 Show dates for the commencement and completion of inspection and testing.
 - .6 Show dates for the commencement and completion of mock-ups and dates required for review of mock-ups by Contract Administrator.
 - .7 At each date of submission of schedule, indicate progress of each activity.
 - .1 Show changes occurring since previous submission of the Work Schedule:
 - .1 Major changes in scope.
 - .2 Change Orders and Change Directives.
 - .3 Activities modified since previous submission.
 - .4 Revised projections of progress and completion.

Construction Progress Documentation

- .5 Other identifiable changes.
- .2 Include a narrative report to define:
 - .1 Problem areas, anticipated delays, and the impact on the schedule.
 - .2 Corrective action recommended and its impact on the schedule.
 - .3 Include cash flow projection with minimum look ahead as directed by the Contract Administrator.
- .8 Submit revised Work Schedule with each application for payment.
- .4 Product delivery schedule:
 - .1 Include dates for delivery of Products, equipment, finish items, factory-finished manufactured items. Show last dates for order, shipment, and delivery in order to meet construction schedule.
- .5 Inspection and testing schedule:
 - .1 Prepare schedule for inspection and testing by advance discussion with the selected independent inspection and testing company to determine the time required for the independent inspection and testing company to perform its tests and to issue each of its findings, and allow for required time in the construction schedule.
 - .2 Refer to Section 01 45 00 for additional requirements for inspection and testing scheduling.

PART 2 - PRODUCTS

Not applicable.

PART 3 - EXECUTION

Not applicable.

END OF SECTION

PART 1 - GENERAL

1.1 Related Requirements

- .1 Appendix F - Hydro One General Conditions for Secondary Land Uses.
- .2 Appendix G - General Requirements for Construction Work by External Parties in the Vicinity of Hydro One 115,000 and 230,000 Volt Underground Plant.

1.2 General

- .1 Provide photographic documentation in digital format and in accordance with procedures and submission requirements specified in this section.

1.3 Digital Photographs

- .1 Equipment: Provide photographs using minimum 10 megapixel digital camera.
- .2 Submit the required photographs to the Contract Administrator and to the Owner.
- .3 Output: Supply date stamped maximum resolution colour photos to Contract Administrator in JPEG format, on USB Flash Drive format or via file transfer.
- .4 Number of photos required:
 - .1 Prior to construction: Provide necessary number of photographs, as required to document existing conditions and verify damage to adjacent streets and property that may have existed prior to construction or demolition work: Minimum 50 photos.
 - .2 Each Progress draw: Provide 24 construction photographs each month to accompany each application for progress draw to document the stage of the Work from points selected by the Contract Administrator showing as much as possible of the Work installed during the previous month.
 - .3 Provide minimum of 8 photographs on each meeting report and for each progress meeting.
 - .4 Completion: When the Work is completed, arrange to take final photographs of the Work from a minimum of 8 points of view.

PART 2 - PRODUCTS

Not applicable.

PART 3 - EXECUTION

Not applicable.

END OF SECTION

Submittals

PART 1 - GENERAL

1.1 Related Requirements

- .1 Appendix F - Hydro One General Conditions for Secondary Land Uses.
- .2 Appendix G - General Requirements for Construction Work by External Parties in the Vicinity of Hydro One 115,000 and 230,000 Volt Underground Plant.

1.2 General Requirements

- .1 Submit submittals as requested by the Agreement, Drawings, Schedules, and Specifications, as specified herein, and in accordance with the conditions of the Contract.
- .2 In addition to submittals specifically requested by the Agreement, Drawings, Schedules, and Specifications, submit other submittals as may be reasonably requested by the Contract Administrator, or as are required to coordinate the Work and to provide the Owner with choices available, within the scope of Agreement, Drawings, Schedules, and Specifications.
- .3 Procedures and requirements for Contract closeout submittals shall be in accordance with the following sections:
 - .1 Section 01 77 00 - Contract Closeout Procedures and Submittals.
 - .2 Section 01 78 36 – Extended Warranties.
- .4 Contractor's review of submittals:
 - .1 Review submittals for conformity to Agreement, Drawings, Schedules, and Specifications before submitting to Contract Administrator. Submittals shall bear stamp of Contractor and signature of a responsible official in Contractor's organization indicating in writing that such submittals have been checked and coordinated by Contractor. Contractor's review shall be performed by qualified personnel who have detailed understanding of those elements being reviewed and of the conditions at the Place of the Work proposed for installation.
 - .2 Check and sign each submittal and make notations considered necessary before submitting to Contract Administrator for review. Where submittal is substantially and obviously in conflict with requirements of Agreement, Drawings, Schedules, and Specifications, reject submittal without submitting to Contract Administrator and request resubmission. Note limited number of reviews of each submittal covered under Contract Administrator's services as specified below.
 - .3 Contractor shall assume sole responsibility for any conflicts occurring in the Work that result from lack of comparison and coordination of submittals required for the Work.
 - .4 Submittals that have not been reviewed, checked, and coordinated by Contractor prior to submission to Contract Administrator, or that do not bear the stamp and signature of Contractor as described above, will be stamped "REVISE AND RESUBMIT" and returned.

Submittals

- .5 Notify Contract Administrator in writing of changes made on submittals from Agreement, Drawings, Schedules, and Specifications. Contract Administrator's review of submittals shall not relieve Contractor of responsibility for changes made from Agreement, Drawings, Schedules, and Specifications not covered by written notification to Contract Administrator.
- .5 Contract Administrator's review of submittals:
 - .1 Review of submittals by Contract Administrator is for the sole purpose of ascertaining conformance with the general design concepts and the general intent of the Agreement, Drawings, Schedules, and Specifications. This review shall not mean that Contract Administrator approves the detail design inherent in the submittals, responsibility for which shall remain with the Contractor. Such review shall not relieve the Contractor of responsibility for errors or omissions in the submittals, or responsibility for meeting requirements of Agreement, Drawings, Schedules, and Specifications.
 - .2 Contractor shall be responsible for dimensions to be confirmed and correlated at the Place of the Work for information that pertains solely to fabrication processes or to techniques of construction and installation, and for coordination of the Work.
 - .3 As part of their scope of work, Contract Administrator shall review shop drawings no more than twice. Should three or more reviews be required due to reasons of Contractor omissions causing resubmission requests, then Contractor shall reimburse the Contract Administrator for time expended in these extra reviews. Time shall be invoiced to the Owner (to be deducted from monies due to the Contractor and paid to Contract Administrator by Owner) at rates recommended by Contract Administrator's professional association and disbursements shall be invoiced at Contract Administrator's cost. The Contractor shall cover directly costs and administration associated with courier services and the like for these extra shop drawing reviews.
 - .4 Contract Administrator's review and markings on submittals do not authorize changes in the Work or the Contract Time, and will be accommodated at no additional cost to the Owner. If, in the opinion of the Contractor, the Contract Administrator's markings on submittals constitute a change in the Work or will effect a change in the Contract Time, then the Contractor shall so notify the Contract Administrator in writing and request an interpretation following the procedures for requests for interpretation in accordance with Section 01 26 00. If the Contract Administrator finds that the Contract Administrator's markings on submittals do constitute a change in the Work or will effect a change in the Contract Time, then a Change Order will be prepared therefore. The time taken to process such a request for interpretation shall not, in and of itself, constitute a change in the Work nor increase the Contract Time.
 - .5 Submittals which are not required by the Agreement, Drawings, Schedules, and Specifications or not requested by the Contract Administrator will not be reviewed by the Contract Administrator and will be marked 'NOT REVIEWED' by the Contract Administrator and returned to the Contractor.
- .6 Make submittals with reasonable promptness and in an orderly sequence so as to cause no delay in the Work. Be responsible for delays, make up time lost and pay added costs, at no additional cost to the Owner, incurred because of not making submittals in due time to permit proper review by Contract Administrator.

Submittals

- .1 Once submitted, a submittal shall not be re-submitted until original submission has been reviewed by Contract Administrator and returned to Contractor.
- .7 Submittals that contain substitutions will be rejected. Substitutions are permitted only on substitution submittals as specified in Section 01 25 00.
- .8 Do not proceed with work affected by a submittal, including ordering of Products, until relevant submittal has been reviewed by Contract Administrator.
- .9 Prepare submittals using SI (metric) units.
- .10 Contractor's responsibility for deviations in submittal from requirements of Agreement, Drawings, Schedules, and Specifications is not relieved by Contract Administrator's review of submittal, unless Contract Administrator gives written acceptance of specific deviations.
- .11 Engineered submittals:
 - .1 Submittals for items required to be sealed by professional engineer (engineered) shall be duly prepared, sealed, and signed under the direct control and supervision of a qualified professional engineer licensed in the jurisdiction in which the Place of the Work is located, having in force professional liability insurance with minimum coverage limit of \$1,000,000 per claim and annual aggregate.
 - .2 Include with engineered submittal, proof of insurance identifying insurer, policy number, policy term, and limit of liability, on duly signed letterhead and / or certificates of insurance.
 - .3 Design includes life safety, sizing of supports, anchors, framing, connections, spans, and as additionally required to meet or exceed requirements of applicable codes, standards, regulations, authorities having jurisdiction, and design requirements of the Agreement, Drawings, Schedules, and Specifications.
 - .4 Engineered submittals shall include design calculations, complete with references to codes and standards used in such calculations, supporting the proposed design represented by the submittal.
 - .5 Professional engineer responsible for the preparation of engineered submittals shall undertake periodic field review, including review of associated mock-ups where applicable, at locations wherever the work as described by the engineered submittal is in progress, during fabrication and installation of such work, and shall submit a field review report after each visit. Field review reports shall be submitted to the Contract Administrator, to authorities having jurisdiction as required, and in accordance with the building code.
 - .6 Field reviews shall be at intervals as necessary and appropriate to the progress of the work described by the submittal to allow the engineer to be familiar with the progress and quality of such work and to determine if the work is proceeding in general conformity with the Agreement, Drawings, Schedules, and Specifications, including reviewed shop drawings and design calculations.

Submittals

- .7 Upon completion of the parts of the Work covered by the engineered submittal, the professional engineer responsible for the preparation of the engineered submittal and for undertaking the periodic field reviews described above, shall prepare and submit to the Contract Administrator and authorities having jurisdiction, as required, a letter of general conformity for those parts of the Work, certifying that they have been Provided in accordance with the requirements both of the Agreement, Drawings, Schedules, and Specifications and of the authorities having jurisdiction over the Place of the Work.
- .8 Costs for such field reviews and field review reports and letters of general conformity are included in the Contract Price.
- .12 Keep copies of reviewed submittals at the Place of the Work in an organized condition. Only submittals that have been reviewed by the Contract Administrator and are marked with Contract Administrator's review stamp, as applicable, are permitted at the Place of the Work.
- .13 The Work shall conform to reviewed submittals subject to the requirements of this section. Remove and replace materials or assemblies not matching reviewed submittals at no increase in the Contract Time and at no additional cost to the Owner.

1.3 Schedule of Submittals

- .1 Before commencement of the Work, submit to the Contract Administrator a detailed schedule of submittals required by the Agreement, Drawings, Schedules, and Specifications.
- .2 Indicate dates for submitting, review time, resubmission time, float time, and last date for meeting Work Schedule.
- .3 Contract Administrator will review submittal schedule and advise Contractor if volume and timing of submittals will permit timely review and response. Contract Administrator may require modifications to submittals schedule in order to allow adequate time for review of submittals. Adjust submittals schedule and construction schedule as required to comply with Contract Administrator's needs.
- .1 Make provisions in schedule for at least 10 Working Days for Contract Administrator's review of submittals. When submittals have to be reviewed by one or more of Contract Administrator's subconsultants, add 5 more Working Days for a total 15 Working Day review period.
- .2 If the Contract Administrator requires resubmission of submittals, allow for an additional 10 Working Days review for each resubmission.
- .3 If, at any time, the Contractor submits a large enough number of submittals such that the Contract Administrator cannot process these submittals within 10 Working Days, the Contract Administrator, in consultation with the Contractor, within 3 Working Days of receipt of such submittal, will provide the Contractor with an estimate of the time necessary for processing same. The Contractor shall accommodate such necessary time at no increase in the Contract Time and at no additional cost to the Owner.
- .4 The Contractor shall periodically resubmit the submittal schedule to correspond to changes in the construction schedule. Such resubmissions shall maintain the minimum 10 Working Day period for the Contract Administrator's review.

Submittals

- .5 Schedule submissions of submittals well in advance of scheduled dates for installation, to provide lead time for reviews and possible resubmissions and for placing orders and securing delivery so as to avoid delays in the Work.

1.4 Submission Procedures

- .1 Coordinate each submittal with requirements of the Work and Agreement, Drawings, Schedules, and Specifications. Individual submittals shall include related information.
- .2 Distribute copies of submittals to parties whose work is affected by submittals except Contract Administrator and Owner before final submission for review by Contract Administrator.
- .3 Accompany submittals with transmittal letter containing:
 - .1 Date.
 - .2 Project title and number.
 - .3 Contractor's name and address.
 - .4 Contractor's review stamp.
 - .5 Identification and quantity of each submittal.
 - .6 Other pertinent data.
- .4 Each submittal shall be identified numerically by relevant specification section number with a numeric indicator for multiple submittals by that section followed by revisions number, for example 04 05 19-01-R0.
- .5 Submit original PDF documents only: scanned documents shall not be accepted.
- .6 Make any changes in submittal that Contract Administrator may require, consistent with Agreement, Drawings, Schedules, and Specifications, and resubmit as directed by Contract Administrator.
- .7 Notify Contract Administrator, in writing, when resubmitting, of any revisions other than those requested by Contract Administrator.
- .8 After Contract Administrator's review, distribute copies to affected parties.

1.5 Product Data Sheets

- .1 Submit product data sheets as follows:
 - .1 1 copy digitally in pdf format to Contract Administrator using the Contract Administrator's document management system.
- .2 Submit Product data sheets as called-for by the Agreement, Drawings, Schedules, and Specifications or as the Contract Administrator may reasonably request where shop drawings will not be prepared due to a standardized manufacture of a Product. Manufacturers' catalogue cuts will be acceptable in such cases, providing that they are 213 mm x 275 mm (8-1/2" x 11") originals, and that they indicate choices including sizes, colours, model numbers, options and other pertinent data, including installation instructions. Submissions showing only general information are not acceptable.
- .3 Where requirements of Agreement, Drawings, Schedules, and Specifications are more stringent than design proposed on Product data sheets, the requirements of the Agreement, Drawings, Schedules, and Specifications take priority.

Submittals

- .4 Upon completion of review by Contract Administrator, 1 marked set of Product data sheets will be returned to Contractor in digital format for reproduction and distribution.
- .5 Retain 1 complete set of prints of reviewed Product data sheets for issuance to Owner immediately prior to Substantial Performance of the Work, in an acceptable, bound manner and in accordance with Section 01 77 00.

1.6 Shop Drawings

- .1 Submit shop drawings as follows:
 - .1 1 copy digitally in pdf format to Contract Administrator using the Contract Administrator's document management system.
- .2 Lettering on shop drawings shall be not less than 3mm (1/8") high.
- .3 Where requirements of Agreement, Drawings, Schedules, and Specifications are more stringent than design proposed on shop drawings, the requirements of the Agreement, Drawings, Schedules, and Specifications take priority.
- .4 Contract Administrator markings and resulting action required:
 - .1 Shop drawings requiring no changes will be marked 'REVIEWED', and shall be submitted for as-built drawings purposes.
 - .2 Shop drawings requiring several changes will be marked 'REVIEWED as NOTED' and shall be revised and submitted for as-built drawings purposes.
 - .3 Shop drawings requiring substantial changes will be marked 'REVISE AND RE-SUBMIT' and shall be revised and resubmitted until Contract Administrator stamps drawings with 'REVIEWED' or 'REVIEWED as NOTED'.
- .5 Shop drawing size shall be multiple of 213 mm and 275 mm (8-1/2" and 11") excluding 38 mm (1-1/2") binding margin and not larger than 838 mm x 1117 mm (33" x 44"). Leave minimum 150 mm x 100 mm (6" x 4") clear space for Contract Administrator's comments.
- .6 Upon completion of review by Contract Administrator, 1 marked set of shop drawings will be returned to Contractor in digital format for reproduction and distribution.
- .7 Retain 1 complete set of prints of reviewed shop drawings for issuance to Owner immediately prior to Substantial Performance of the Work, in an acceptable, bound manner and in accordance with Section 01 77 00.
- .8 Submit copies of reviewed shop drawings to authorities having jurisdiction as required.
- .9 Shop drawings shall include:
 - .1 Fabrication and erection dimensions.
 - .2 Plans, sections, elevations, arrangements and sufficient full size details which indicate complete construction, components, methods of assembly as well as interconnections with other parts of the Work.
 - .3 Design calculations for items that require design calculations.
 - .4 Clear definition of the division of responsibility for the work described thereon. No Products, items or equipment, or description of work, shall be indicated to be supplied, or work to be done, "By Others" or "By Purchaser". Shop drawings marked with either of these phrases will be rejected without having been reviewed by the Contract Administrator.

Submittals

- .5 Location and type of exposed anchors, attachments and locations and types of fasteners, including concealed reinforcements to accept mounted fasteners.
- .6 Adhesives, joinery methods and bonding agents.
- .7 Kinds and grades of materials, their characteristics relative to their purpose, detailed description of finishes and other fabrication information.
- .8 Configurations, types and sizes required; identify each unit type on drawing and on Product.
- .9 Descriptive names of equipment and mechanical and electrical characteristics when applicable.
- .10 Data verifying that superimposed loads will not affect function, appearance and safety or work shown on shop drawings, as well as other interconnected work.
- .11 Assumed design loadings, dimensions of elements and material specifications for load-bearing members.
- .12 Proposed chases, sleeves, cuts and holes in structural members.
- .13 Location and types of welds. For structural welds use AWS symbols and clearly show net weld lengths and sizes.
- .14 Materials, gauges, and sizes being supplied including connections, attachments, reinforcement, anchorage and locations of exposed fastenings.
- .15 Installation instructions and details for Products to be installed by separate Subcontractors, including function of each part.
- .16 A list of Products covered by, or included on, the shop drawing. List of Products shall be complete and show manufacturer's name, Product name, generic description, standard certification where specified, manufacturer's complete installation data and precautions against wrong installation, operation and maintenance.
- .17 Refer to individual sections of the specifications for more particular requirements for shop drawings.
- .18 Compatibility statement: Include with each shop drawing a statement that each Product and material indicated on the shop drawing is compatible with each Product and material with which it comes into contact.

1.7 Certificates and Certification Submittals

- .1 Certificates and certifications submittals: Provide a statement that includes signature of entity responsible for preparing certification.

1.8 Engineered Judgements

- .1 When an engineered judgement is required by authorities having jurisdiction, such engineered judgement shall be prepared as an engineered submittal in accordance with Section 01 33 00.

1.9 Samples

- .1 Submit a minimum of 3 samples unless a greater amount is specified.

Submittals

- .2 Deliver samples to the following location with expenses, including carrying costs, prepaid, unless otherwise instructed:
 - .1 Contract Administrator's office.
- .3 Identify samples or assemblies by Project number and name, name of Contract Administrator, Contractor and Subcontractor, and date of submission. Identify location, specified material reference and any other pertinent information. Show construction by layered method if necessary, clearly displaying textures and patterns.
- .4 Resubmit samples until written acceptance is obtained from Contract Administrator.

PART 2 - PRODUCTS

Not applicable.

PART 3 - EXECUTION

Not applicable.

END OF SECTION

ENVIRONMENTAL PROCEDURES – DAVENPORT LANDS

Part 1 General

1.1 REFERENCES

- .1 Ontario Regulation 153/04 (as amended) Records of Site Condition – Part XV.1 of the Act.
- .2 Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011
- .3 Ontario Regulation 406/19 (as amended) On-Site and Excess Soil Management, made under the Environmental Protection Act.
- .4 Rules for Soil Management and Excess Soil Quality Standards
- .5 City of Toronto PF&R Tree Protection Policy and Specifications for Construction Near Trees
- .6 Environmental Documentation:
 - .1 Soil and Groundwater Management Plan – Green Line Trail Parcels 28B, 29 and 30, WSP 2024
 - .2 Health and Safety Plan – Green Line Trail Parcels 28B, 29 and 30, WSP 2024
- .7 Activities are to comply with applicable regulatory requirements administered through various agencies and public bodies at the federal, provincial, and municipal levels.
- .8 Appendix A – Arborist Report, Macpherson Avenue Park, Urban Forest Innovations Inc., April 23, 2025
- .9 Appendix F – Hydro One General Conditions for Secondary Land Uses, Hydro One, January 2023
- .10 Appendix G – General Requirements for Construction Work by External Parties in the Vicinity of Hydro One 115,000 and 230,000 Volt Underground Plant, Hydro One, January 2024

1.2 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.
- .3 Consultant: The City's Qualified Person, herein referred to as the QP_{PL}, or Contract Administrator

1.3 ACTIONS AND INFORMAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Prior to commencing onsite Work prepare plans for site control measures, including a spill prevention and contingency plan and erosion and sediment control plan that will be employed to protect against environmental pollution and damage.
- .3 Product Data:
 - .1 Submit WHMIS Safety Data Sheets (SDS) in accordance with Section [01 47 15 - Sustainable Requirements: Construction] and Section [02 81 00 - Hazardous Materials].

ENVIRONMENTAL PROCEDURES – DAVENPORT LANDS

- .4 Submit Environmental Protection Plan (EPP) for review by Consultant prior to commencing construction activities. EPP shall address topics at level of detail commensurate with environmental issue and required construction task. EPP shall include overview of known or potential environmental issues to be addressed on site during construction for the following items:
 - .1 Air Quality and Dust Management, with provisions to ensure that dust, debris, materials, and trash, are contained within the project site.
 - .2 Contaminated and Excess Soils Management to comply with Soil and Groundwater Management Plan (prepared by WSP). To ensure compliance with the SGMP, daily records shall be kept by the Contractor and submitted to the Consultant weekly. Daily records shall include:
 - .1 Weather conditions;
 - .2 Locations and depths of excavation activities;
 - .3 Soil movement details (stockpiling or off-site disposal);
 - .4 Soil tracking and dust control measures (i.e., soil wetting, tire cleaning, street cleaning, inspections of erosion and sediment control measures such as fencing silt socks, and covers on catch basins and sewers);
 - .5 Groundwater and surface water management;
 - .6 Names of Site Visitors, Consultants, and Sub-contractors present on site;
 - .7 Unexpected site conditions or incidents (e.g., unidentified or new contamination, spills, etc.); and,
 - .8 Complaints
 - .3 Copies of transport manifests trip tickets, soil tracking information and disposal receipts for all waste materials and soil removed from the Work area and any soil imported to the Work area.
 - .4 Erosion and Sediment Control, identifying the type and location of ESC measures to be provided. Include monitoring and reporting requirements to ensure that ESC measures maintain adequate site drainage and siltation control for the duration of the Contract. Controls must include protection of sediment migration from stockpiles of soil and topsoil.
 - .5 Fuel and Lubricants Management, including a Spill Prevention and Contingency Plan (SPCP).
 - .6 Noise and Vibration Management.
 - .7 Waste Management for non-hazardous solid wastes,
 - .8 Groundwater, Stormwater and Surface Water Management, identifying methods and procedures for management and discharge of waste waters directly derived from construction activities, such as concrete curing water, clean-up water, dewatering of groundwater, disinfection water, hydrostatic test water, and water used in flushing of lines.
 - .9 Vegetation Management.
 - .10 Wildlife Management.

1.4 REGULATORY REQUIREMENTS

ENVIRONMENTAL PROCEDURES – DAVENPORT LANDS

- .1 Pre-construction requirements for excess soil management set out in Section 31 00 99-Earthworks for Minor Works and the SGMP.
- .2 Provide soil and groundwater management and contaminant health and safety controls in accordance with applicable regulations.
- .3 Comply with federal, provincial, and local anti-pollution laws, ordinances, codes, and regulations when disposing of waste materials, debris, and rubbish.
- .4 Work to meet or exceed minimum requirements established by federal, provincial, and local laws and regulations which are applicable.
- .5 Contractor: responsible for complying with amendments as they become effective.

1.5 SEQUENCING AND SCHEDULING

- .1 Do not commence work involving contact with potentially contaminated materials until methods to decontaminate equipment are operation.
- .2 No offsite management of excess soil without written approval from the Consultant.

1.6 EQUIPMENT DECONTAMIANION FACILITY

- .1 Prior to commencing work involving equipment coming in contact with potentially contaminated materials, construct equipment decontamination pad to accommodate largest piece of on-site potentially contaminated equipment.
- .2 Provide, operate, and maintain suitable portable, high-pressure, low-volume decontamination wash unit.
- .3 Provide, operate, and maintain necessary equipment to collect and contain equipment decontamination wastewater and sediment.

1.7 VEHICULAR ACCESS AND PARKING

- .1 Maintenance and Use:
 - .1 Prevent contamination of access roads. Immediately scrape up debris or material on access roads which is suspected to be contaminated; transport and place into designated area, transport and dispose of in appropriate off-site disposal facility.
 - .2 Project Leader's QP may collect soil samples for chemical analyses from traveling surfaces of constructed and existing access routes prior to, during, and upon completion of Work. Excavate and dispose of clean soil contaminated by Contractor's activities at no additional cost to the City.

1.8 ENVIRONMETNAL AWARENESS TRAINING

- .1 Mandatory environmental awareness training for construction personnel shall be performed as part of orientation to, or shortly after, personnel begin work at the Place of Work. At that time, construction personnel shall receive the "Checklist for Environmental Compliance".

1.9 WATER CONTROL AND DRAINAGE

- .1 Ensure that the ESC measures are provided and that its recommendations are followed on site, in accordance with the EPPs, at all times during construction.

ENVIRONMENTAL PROCEDURES – DAVENPORT LANDS

- .2 Maintain excavations free of water. Provide temporary drainage and pumping as required to keep excavations on site free of standing water.
 - .1 Ensure pumped water into waterways, sewer or drainage systems is free of suspended materials and in accordance with applicable permits, including, but not limited to, municipal sewer discharge permits.
 - .2 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with the requirements of authorities having jurisdiction.
 - .3 Incorporate spill responses suitable to address an accidental release of any liquids that may be onsite for the Work.
 - .4 Prevent precipitation from infiltrating or from directly running off stockpiled waste materials. Cover stockpiled waste materials with a suitable tarp or liner during periods of work stoppage including at end of each working day.
 - .5 Provide, operate, and maintain necessary equipment appropriately sized to keep excavations, staging pads, and other work areas free from water.
 - .6 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.
 - .7 Incorporate spill responses suitable to address an accidental release of any liquids that may be onsite for the Work.

1.10 EROSION AND SEDIMENT CONTROL

- .1 Plan and execute construction by methods to control surface drainage from cuts and fills, stockpiles, staging areas, and other work areas. Prevent erosion and sedimentation in accordance with Soil and Groundwater Management Plan.
- .2 Minimize amount of impacted soil exposed at one time. Stabilize disturbed soils as quickly as practical and conduct work in such a way as to minimize erosion. Remove accumulated sediment resulting from construction activity from adjoining surfaces, drainage systems, and water courses, and repair damage caused by soil erosion and sedimentation as directed by Consultant.
- .3 Place stockpiled materials on polyethylene sheeting, cover with polyethylene sheeting, berm or fence stockpiles to minimize sediment runoff.
- .4 Provide and maintain temporary measures which may include, but are not limited to, silt fences, ditches, geotextiles, temporary drainage piping, sedimentation basins, and any other construction required to prevent erosion and migration of silt, mud, sediment, and other debris off site or to other areas of site where damage might result, or that might otherwise be required by Laws and Regulations. Make sediment control measures available during construction.
- .5 Check erosion and sediment control measures weekly, and after each rainfall; during prolonged rainfall check daily.
- .6 Unless indicated or directed by Consultant, remove temporary erosion and sediment control devices upon completion of Work. Materials once removed become property of Contractor.

ENVIRONMENTAL PROCEDURES – DAVENPORT LANDS

1.11 SITE CLEARING AND PLANT PROTECTION

- .1 Protect trees and plants on site and adjacent properties in accordance with Tree Removal and Preservation Plan and Arborist Report, including tree protection zones as identified in Contract Drawings.
- .2 Minimize stripping of topsoil and vegetation.
- .3 Restrict tree removal to areas indicated in Contract Drawings. Obtain permits before tree removal in accordance with the requirements of the authorities having jurisdiction.

1.12 FIRES

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

1.13 POLLUTION CONTROL

- .1 Maintain temporary erosion and pollution control features installed under this Contract in accordance with the EPPs and site-specific plans.
- .2 Control emissions from equipment and plant in accordance with local authorities' emission requirements. Check with local authorities for any environmental compliance requirements.
- .3 Prevent materials from contaminating air and waterways beyond construction area.
- .4 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

1.14 HISTORICAL CONTROL – NOT USED

1.15 NOTIFICATION – NOT USED

1.16 ENVIRONMENTAL AWARENESS TRAINING

- .1 Mandatory environmental awareness training for construction personnel shall be performed as part of orientation to, or shortly after, personnel begin work at the Place of Work. At that time, construction personnel shall receive the “Checklist for Environmental Compliance”.

Part 2 Products

2.1 MATERIALS- NOT USED

Part 3 Execution

3.1 CLEANING

- .1 Keep Work area clean and free of debris at all times.
- .2 Minimize materials brought to the site and waste generated during Work.
- .3 Burying rubbish and waste materials on site is not permitted.
- .4 Ensure public waterways, storm and sanitary sewers remain free of waste and volatile materials disposal.
- .5 Proceed with final cleaning upon completion and removal of surplus materials, rubbish, tools and equipment in accordance with Section [01 74 00 - Cleaning].

ENVIRONMENTAL PROCEDURES – DAVENPORT LANDS

- .6 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 50 00 - Temporary Facilities and Control.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.2 RECORD KEEPING

- .1 The Contractor shall retain all records related to transportation of excess soil for a period of at least two years from the last date of soil movement. The Contractor shall retain all other reports, information and data related to excess soil management and the implementation of soil barriers on the project for a period of at least seven years after substantial completion of the Contract and provide these records to the City as requested at any time during this retention period.

END OF SECTION

Quality Control

PART 1 - GENERAL

1.1 Related Requirements

- .1 Appendix F - Hydro One General Conditions for Secondary Land Uses.
- .2 Appendix G - General Requirements for Construction Work by External Parties in the Vicinity of Hydro One 115,000 and 230,000 Volt Underground Plant.

1.2 Section Includes

- .1 General administrative and procedural requirements for quality assurance and quality control as specified elsewhere in the Agreement, Drawings, Schedules, and Specifications.

1.3 Related Requirements

- .1 Pre-installation meetings: in accordance with Section 01 31 19.
- .2 Materials and workmanship quality assurance and reference standards: in accordance with Section 01 60 00.
- .3 Balancing and testing of systems - under Divisions 21, 22, and 23, and Divisions 26, 27, and 28.

1.4 Contractor's Quality Assurance Program

- .1 Within thirty (30) Days after the Effective Date, submit to the Owner and the Contract Administrator for their information, a quality assurance program (the "QA/QC Plan").
- .2 The QA/QC Plan shall meet the requirements of Canadian Standards Association CSA Z299.3 or such other requirements as set out in the Agreement, Drawings, Schedules, and Specifications.
 - .1 The QA/QC Plan shall be designed so that quality requirements are obtained by progressive implementation of the controls and inspection functions stated in the QA/QC Plan.
 - .2 The Contractor shall make any modifications to the QA/QC Plan as reasonably requested by the Owner and/or the Contract Administrator.
 - .3 The QA/QC Plan shall include, but shall not be limited to, the following:
 - .1 A system by which changes to the Agreement, Drawings, Schedules, and Specifications and correspondence with Subcontractor and other correspondence is handled in a controlled manner.
 - .2 A system for purchased or manufactured materials to be identified, inspected to the specified standard, and covered by a material test report.
 - .3 A system by which measuring and testing equipment is properly stored, handled, and calibrated to a known standard.
 - .4 A system by which incoming materials are: inspected to the specified standard; accepted; allocated safe storage; and properly recorded.
 - .5 A system by which process inspection requirements shall be clearly stated for operations and carried out by qualified personnel.

Quality Control

- .6 A system by which final inspections will be carried out and accepted by authorized personnel prior to release for shipping or major assembly.
 - .7 A system by which non-conformance to requirements of the Agreement, Drawings, Schedules, and Specifications shall be recorded and solutions proposed by the Owner or the Contract Administrator are also recorded.
 - .8 A system by which instructions for handling and storage of equipment shall be given.
 - .9 A system by which Owner Supplied Material items can be inspected and received in a manner which allows replacement or correction.
 - .10 A system by which a record of quality inspections, tests, and actions shall be kept.
 - .11 A system by which the Owner and the Contract Administrator shall be afforded access to manufacturing areas and quality records and issued with copies of pertinent drawings and manufacturing schedules.
- .3 The Contractor shall provide the Owner and the Contract Administrator with regular Quality Assurance Reports for their information according to an agreed schedule.

1.5 Contractor's Field Quality Control

- .1 The Contractor is responsible for field quality control of the Work including quality control of Subcontractors and material Suppliers.
- .2 Ensure that the only specified or approved Products and materials are used.
- .3 Provide and maintain an effective quality control program, in accordance with the QA/QC Plan, and perform sufficient inspections and tests of all items of work, including those of Subcontractors, to ensure compliance with Agreement, Drawings, Schedules, and Specifications.
- .4 Furnish appropriate facilities, instruments, and testing devices required for performance of the quality control function.
- .5 Required certificates of inspection testing or approval shall be secured by the Contractor and delivered to the Owner in such time as not to delay progress of the Work.
- .6 The Contractor shall develop a field quality control manual covering both factory and field installation. The form of the manual shall be reviewed and accepted by the Contract Administrator. This manual will document quality control practices of the Contractor, Subcontractors, and major Suppliers. The manual shall include, but not be limited to, specific criteria related to:
 - .1 Concrete slab moisture and pH testing and surface preparation, including flatness and levelness.
 - .2 Surface preparation.
 - .3 Fastener and anchor installation.
 - .4 Air barrier continuity: identify continuity of air barrier systems, including joints and overlapping of dissimilar systems.
 - .5 Air barrier, adhesion testing.
 - .6 Sealant mixing, tack time, set time.

Quality Control

- .7 Sealant staining of porous substrate testing.
 - .8 Sealant adhesion testing, including butterfly tests where applicable.
 - .9 Painting, verification and adhesion testing where required.
 - .10 Material compatibility testing.
 - .11 On line fabrication quality control practices.
 - .12 Shipping.
 - .13 Field installation.
 - .14 Field inspection and testing (by Contractor).
 - .15 Field inspection and testing (independent).
- .7 Inspection and testing shall be performed by company qualified to perform the inspections or tests specified or required.
- .8 The Contractor is to maintain a logbook (copies to be provided to the Contract Administrator at completion of fabrication) documenting date, time, results, and significance of in-plant testing carried out, where applicable, linked to daily production. The form of this logbook shall be reviewed and accepted by the Contract Administrator.

1.6 Independent Inspection and Testing – Owner’s Quality Assurance

- .1 Independent inspection and testing services will be used to verify compliance with requirements of the Agreement, Drawings, Schedules, and Specifications. These services do not relieve the Contractor of responsibility for compliance with the Agreement, Drawings, Schedules, and Specifications.
- .1 Specified tests, inspections, and related actions do not limit the Contractor’s other quality assurance and control procedures that facilitate compliance with the Agreement, Drawings, Schedules, and Specifications requirements.
 - .2 Requirements for the Contractor to provide quality control services required by Contract Administrator, Owner, or authorities having jurisdiction are not limited by provisions of this section.
 - .3 Inspections and tests specified or required that are not specified as independent inspection and testing are the responsibility of the Contractor and are not covered under the Owner’s quality assurance requirements.
- .2 Additional testing services required because of changes in materials, proportions of mixes requested by Contractor or Subcontractors as well as additional testing services for materials occasioned by lack of identification or by failure of such materials being replaced to meet requirements of the Agreement, Drawings, Schedules, and Specifications or testing of structure or elements including load testing, shall be carried out at no additional cost to the Owner.
- .3 Inspection and testing required by codes or ordinances, or by an authority having jurisdiction, and made by a legally constituted authority, shall be the responsibility of the Contractor and shall be paid for by the Contractor and not be paid by Owner, unless otherwise specified in the Agreement, Drawings, Schedules, and Specifications.
- .4 Inspection or testing performed exclusively for Contractor’s convenience shall be sole responsibility of Contractor, and will not be paid by Owner.

Quality Control

- .5 Independent inspection and testing shall be performed by company qualified to perform the inspections or tests specified or required.
- .6 Requirements of regulatory companies:
 - .1 Testing shall be conducted in accordance with requirements of the building code.
 - .2 Obtain certification where required by the building code and standards.
- .7 Cooperation with independent inspection and testing companies:
 - .1 Provide independent inspection and testing companies with materials and installation information as required and /or requested.
 - .2 Provide access to the Work for representatives of independent inspection and testing companies.
 - .3 Cooperate with independent inspection and testing companies and give adequate notification of any changes in source of supply, additional work shifts and other proposed changes.
 - .4 Permit access to the Work for independent inspection and testing companies wherever the Work is in progress, or wherever Products, materials, or equipment are stored prior to shipping.
 - .5 Supply labour required to assist independent inspection and testing companies in sampling and making tests.
 - .6 Repair work damaged as a result of inspection and testing work.
 - .7 Inspection and testing company services do not relieve the Contractor of responsibility for normal shop and site inspection, and quality control of manufacturing and installation.
- .8 Where evidence exists that defective workmanship may have occurred, or that the Work may have been carried out incorporating defective materials, or tests demonstrate that installed conditions do not comply with the requirements of the Agreement, Drawings, Schedules, and Specifications, the Contract Administrator reserves the right to have appropriate inspections, tests, and surveys performed, analytical calculation of structural strength made and the like in order to help determine the extent of defect and whether such work must be replaced. Inspections, tests, and surveys carried out under these circumstances will be made at the Contractor's expense, and will not be paid by Owner, unless the results indicate that the work so tested, inspected or surveyed is not defective or that, in Contract Administrator's opinion, the work so tested, inspected, or surveyed may be accepted, in which case tests, inspections or surveys will be paid by Owner.
- .9 Prepare schedule for independent inspection and testing company services in accordance with Section 01 33 00 and as follows:
 - .1 Establishing schedule:
 - .1 By advance discussion with the independent inspection or testing company, determine the appropriate time necessary to perform the required services and to issue related reports.
 - .2 Allow for required time within construction schedule.
 - .2 Adherence to schedule:

Quality Control

- .1 Contractor shall advise independent inspection and testing companies in advance when inspection and testing of the Work is required.
 - .1 Amount of advance notice shall be as required by the independent inspection and testing company, but shall be no less than 5 days.
- .2 When independent inspection and testing company is ready to perform inspection and testing according to predetermined schedule, but is prevented from inspection and testing or taking specimens due to incompleteness of the parts of the Work scheduled for inspection and testing, extra costs for inspection and testing attributable to the delay may be back-charged to Contractor at no additional cost to the Owner.
- .3 Notify independent inspection and testing company at least 3 Working Days before work required to be inspected commences, and arrange for a meeting at the Place of the Work, to be held 1 Working Day before the work starts with the following present:
 - .1 The Contractor, and the Subcontractor responsible for the work to inspected and/or tested, the independent inspection and testing company representatives, the product manufacturer's representative when required, and the Contract Administrator.
- .4 Give 2 Working Days' prior notice to independent inspection and testing company of the commencement of each phase of the Work requiring inspection, and provide independent inspection and testing company with materials and installation information.
- .10 Reports and documents:
 - .1 Independent inspection and testing company shall submit shop inspection and site inspection reports within 5 Working Days of each inspection.
 - .2 Distribute reports as follows:
 - .1 Owner; 2 copies.
 - .2 Contract Administrator; 1 copy.
 - .3 Contractor; 2 copies.
 - .4 Consulting engineers, as applicable; 1 copy each.
 - .3 Independent inspection and testing companies shall submit a written report for each inspection or test, including pertinent data such as conditions at the Place of the Work, dates, test references, locations of tested materials, actual Product identification, testing methodology, procedures, and descriptions, site instructions given, recommendations and/or any other information required by standard applicable to reporting of tests and inspections.
 - .1 Report shall clearly indicate failure of Product or procedures to meet applicable standards, give recommendations for retesting or correction. Inspector shall contact Contractor and Contract Administrator immediately when Product or Product assembly fails to meet requirements of the Agreement, Drawings, Schedules, and Specifications.

Quality Control

- .4 Upon completion of portions of the Work subject to independent inspection and testing, submit to the Contract Administrator duplicate certificates of acceptance of the installation issued by the independent inspection and testing company.
- .11 Inspection and test specimens:
 - .1 Inspection and testing will, generally, consist of procedures listed in the following paragraphs, but additional tests may be performed as required to verify conformance to Agreement, Drawings, Schedules, and Specifications.
 - .2 Specimens and samples for testing, unless otherwise specified in the Agreement, Drawings, Schedules, and Specifications, will be taken by the independent inspection and testing company; sampling equipment and personnel will be provided by the independent inspection and testing company; and deliveries of specimens and samples to the testing company will be performed by the testing company unless otherwise specified.
 - .3 Independent inspection and testing company shall take samples necessary to verify quality as specified. Taking of samples shall not endanger the structure or life safety, and shall be taken so as to best represent the Work as a whole.
 - .4 Samples shall be handled, packaged, stored and delivered in accordance with specified tests. Sample handling where required shall duplicate conditions at the Place of the Work (such as site-cured concrete cylinders).

1.7 Mock-Ups

- .1 Provide field or shop erected example of work complete with specified materials and workmanship.
- .2 Erect mock-ups at locations as specified and as acceptable to Contract Administrator. Do not proceed with work for which mock-ups are required prior to Contract Administrator's review of mock-ups.
- .3 Protect and maintain mock-ups until directed to be removed. Commence work demonstrated in mock-up only after review and acceptance of workmanship. If possible, mock-up may become part of finished work, at sole discretion, and with prior written acceptance of Contract Administrator and unless otherwise indicated in Contract Documents.
- .4 Reviewed and accepted mock-ups will become standards of workmanship and material against which installed work will be compared.
- .5 Remove and replace materials or assemblies not matching reviewed mock-ups.
- .6 Resubmit mock-ups until written acceptance is obtained from Contract Administrator.

1.8 Manufacturer's Field Review

- .1 Where manufacturer's field review is specified, manufacturer's representative shall review the relevant parts of the work at the Place of the Work, or wherever such affected work is in progress, to ensure that work is being executed in accordance with manufacturer's written recommendations and verify its product to be fit-for-purpose intended.

Quality Control

- .2 Manufacturer's field review is to ensure that the Products specified are being used in the Work and are being applied on surfaces prepared in accordance with their recommendations and the requirements of the Agreement, Drawings, Schedules, and Specifications.
- .3 Unless otherwise indicated, manufacturer's representative shall undertake a minimum of 1 field review, with additional reviews as deemed necessary by the manufacturer, to determine that the work of such sections is in accordance with the manufacturer's written recommendations.
- .4 Manufacturer's representative shall submit a type-written report on manufacturer's letterhead within 2 Working Days after each field review. Report shall document manufacturer's representative's field observations and recommendations.
- .5 Manufacturer's field review reports shall be prepared and distributed following the procedures specified for preparation and submittal of inspection and testing reports given above.

PART 2 - PRODUCTS

Not applicable.

PART 3 - EXECUTION

Not applicable.

END OF SECTION

Temporary Facilities and Controls

PART 1 - GENERAL

1.1 Related Requirements

- .1 Appendix F - Hydro One General Conditions for Secondary Land Uses.
- .2 Appendix G - General Requirements for Construction Work by External Parties in the Vicinity of Hydro One 115,000 and 230,000 Volt Underground Plant.

1.2 General Instructions

- .1 Arrange, obtain and pay cost for permits required for temporary facilities and controls.
- .2 Provide and maintain temporary facilities and controls for the Work and remove them from the Work upon issuance of certificate of Substantial Performance of the Work.
- .3 Arrange and pay for required temporary services, unless otherwise indicated by Contract Administrator.
- .4 Do not use permanent conveying, mechanical, or electrical systems, except standpipe for firefighting, during the course of the Work unless specific written permission is provided by the Contract Administrator. Use of permanent facilities or services for temporary construction service shall not prejudice warranties.
- .5 Provide connection and disconnection of temporary services and facilities required in the Work.

1.3 Temporary Electrical Services

- .1 Provide and maintain an adequate temporary electrical service for performance of the Work including, but not limited to, operation of electric pumps, motors, vibrators and other power tools, hoisting and related construction and general illumination during the Work.
- .2 Provide and maintain any components and equipment necessary to transform supply power to necessary temporary power voltage.

1.4 Temporary Water Supply

- .1 Provide and maintain a temporary supply of water for use in the Work.
- .2 Extend supply pipe or pipes from nearest available sources and maintain in good condition until permanent system is installed and ready for use.

1.5 Temporary Sanitary Facilities

- .1 Provide and maintain temporary sanitary facilities for use by workers.

1.6 Temporary Site Offices

- .1 Provide heated, lighted, air conditioned and ventilated site office, of sufficient size to accommodate site meetings for 12 people, and furnished with drawing layout table, filing cabinets, telephone, and Wi-Fi as described below.

Temporary Facilities and Controls

1.7 Temporary Telephone and Wi-Fi

- .1 Provide and maintain a telephone in temporary site office for exclusive use of Contract Administrator, Contractor, and Subcontractors. Pay phone is not acceptable.
- .2 Superintendent shall be equipped with mobile telephone device.
- .3 Long distance charges shall be paid by party making call.
- .4 Provide and maintain internet access for the Contract Administrator and other guests through a high bandwidth Wi-Fi hub capable of supporting traffic with 50 connected devices simultaneously.

1.8 Temporary Heating and Ventilation

- .1 Provide and pay for temporary heating, cooling and ventilating required for the Work, including attendance, maintenance and fuel.
- .2 Provide temporary heat and ventilation as required to:
 - .1 Facilitate continuous uninterrupted progress of the Work.
 - .2 Protect the Work and Products against damage and defacement caused by weather, harmful levels of temperature, humidity, and moisture.
 - .3 Provide ambient temperatures and humidity levels for proper storage, installation and curing of materials, in accordance with specified standards and manufacturer's requirements.
 - .4 Provide adequate ventilation to meet health regulations for safe working environment.
- .3 Solid fuel salamanders will not be permitted.
- .4 Furnish other temporary heating as required by various sections of the specifications or by Product manufacturers.
- .5 Replace with new, any work damaged due to failure to provide adequate heat at no cost to Owner.

1.9 Signs and Notices

- .1 Project sign:
 - .1 Company shall provide a Construction Notice Sign. Contractor shall attach the sign to construction hoarding.
 - .2 Location of sign: In prominent location to Contract Administrator acceptance.

1.10 Site Storage

- .1 Handle and store materials so as to prevent damage or defacement to the Work and surrounding property.

Temporary Facilities and Controls

- .2 Construct weather-tight storage sheds for storage of materials that may be damaged or defaced by weather. Provide floors raised 150 mm (6") clear of ground for storage of Products.
- .3 Owner is not responsible for securing Products or materials at the Place of the Work.

1.11 Protection of the Public

- .1 Provide fencing, barricades, hoarding, notices and warning boards and maintain lights and signals for protection of workers engaged on the Work, for protection of adjoining property and for protection of the public.
- .2 Where any special hazard exists from which it is not possible to protect the public safety by other means, watchpersons shall be employed to preserve public safety until the area of special hazard no longer poses a risk to public safety.

1.12 Protection of the Work

- .1 Protect the Work from damage, discolouring, and defacement. Maintain protection until the Work is complete.
- .2 Protect completed work from soiling, abrasion, punctures, damage, and defacement, and maintain protection until the surrounding or overhead work is complete.
- .3 Keep surfaces free of oils, grease or other materials that may damage or deface them or affect bond of applied Products.
- .4 Remove and replace materials damaged or defaced as a result of failure to provide adequate protection.
- .5 Have damaged or defaced work corrected by workers meeting qualification requirements of the Agreement, Drawings, Schedules, and Specifications.

1.13 Temporary Drainage and Dewatering

- .1 The Work includes the removal of collected groundwater and surface water accumulating from precipitation and groundwater infiltration throughout the course of the Work until date of Substantial Performance of the Work.
- .2 Keep drainage lines and gutters open. No flow of water shall be directed across or over pavements except through pipes or properly constructed troughs. Keep portions of the Work properly and efficiently drained during construction and until completion. Be responsible for disturbances, dirt and damage which may be caused by or result from water backing up or flowing over, through, from or along any part of the Work, or due to operations which may cause water to flow elsewhere.
- .3 Keep trenches and other excavations free of water. Remove water in a manner that will prevent loss of soil, and maintain the stability of existing soils.
- .4 Dispose of such water in a manner that will not be hazardous to public health and safety, private property, or to the Work.

Temporary Facilities and Controls

- .5 Drainage of trenches or other excavation through storm drainage pipe will be allowed only with the express permission of the authority having jurisdiction.
- .6 When drainage is permitted in writing to be directed to existing catch basins, regularly and at Substantial Performance of the Work inspect such catch basins and remove accumulated debris and sediment.

1.14 Snow Removal

- .1 Allow no accumulation of ice and snow within the Place of the Work. There shall be no use of salt for de-icing in areas of building work.

1.15 Pest Control

- .1 Provide rodent control and other pest control programs during the Work in accordance with the requirements of authorities having jurisdiction.

1.16 Vehicle Cleaning

- .1 Establish a designated vehicle loading point at the Place of the Work on a gravel base to minimize tracking of soil off the Place of the Work. If the loading point becomes contaminated, it shall be cleaned and replaced.
- .2 Vehicles leaving the Place of the Work shall be cleaned of loose soil and dust, including tire washing, and sweeping or washing of exteriors and tailgates by a designated labourer.
- .3 Keep a daily log of each vehicle leaving the Place of the Work, including time of cleaning and name of cleaner.
- .4 Tarp vehicles containing indigenous soil or debris leaving the Place of the Work.

1.17 Waste Management

- .1 Comply with waste management and disposal requirements of authorities having jurisdiction.
- .2 Do not bury rubbish and waste materials at the Place of the Work.
- .3 Do not dispose of waste into waterways or storm or sanitary sewers.
- .4 Do not burn waste materials at the Place of the Work.
- .5 Remove waste material from the Place of the Work daily. If waste is collected in bins, bins to be removed from site once full.
- .6 Arrange and pay for removal of debris and waste from the Place of the Work.
- .7 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris. Pay fees.
- .8 Separate waste materials for reuse and recycling where possible.

Temporary Facilities and Controls

- .9 Excess soil and waste soil to be managed in accordance with Section 01 35 43 and Earthworks and Minor Works and the Soil and Groundwater Management Plan (WSP, 2024).

1.18 Control of Dust, Debris and Noise

- .1 Cover or wet down dry materials and rubbish to prevent blowing dust and debris.
- .2 Control dust and dirt produced during the Work to prevent dispersion beyond the immediate work areas.
- .3 Prevent materials from contaminating air beyond application area, by providing temporary enclosures and ventilation/filtration.
- .4 Limit noise levels in accordance with requirements of authorities having jurisdiction and the Owner.
- .5 Prevent abrasive-blasting, pressure-washing spray, and other extraneous materials from contaminating air beyond application area.

1.19 Traffic Control and Road Maintenance

- .1 Do not block roads or impede traffic. Keep construction traffic to designated roads only. Provide flagperson to direct traffic as required.
- .2 Provide a hard surface area at the Place of the Work for cleaning down trucks prior to entry onto municipal roads or private roads outside of the Place of the Work.
- .3 Keep public and private roads free of dust, mud and debris resulting from truck, machinery and vehicular traffic related specifically to this Project, for the duration of Work.
- .4 Clean roads regularly, public or private. Wash down and scrape flush roads at least daily when earth moving operations take place. Maintain public property in accordance with requirements of authorities having jurisdiction.

1.20 Security

- .1 The Contractor shall be solely responsible for securing the Place of the Work and the Work, and for securing areas used for the storage of Products or construction machinery and equipment. The Owner shall have no responsibility in this regard.
- .2 Provide and maintain security lighting.
- .3 Provide and maintain temporary locks. Premises to be locked after working hours.

Temporary Facilities and Controls

1.21 Design and Safety Requirements for Temporary Facilities

- .1 Be responsible for design, erection, operation, maintenance and removal of temporary structural and other temporary facilities. Engage and pay for registered professional engineering personnel skilled in the appropriate disciplines to perform these functions where required by law or by the Agreement, Drawings, Schedules, and Specifications; and in cases where such temporary facilities and their method of construction are of such a nature that professional engineering skill is required to produce safe and satisfactory results.
- .2 Engage and pay for professional engineer(s) registered in Place of the Work to design and supervise construction and maintenance of hoardings, covered ways, protective canopies and project sign(s). Designs provided by Contract Administrator or Owner for such work cover general appearance only.

PART 2- PRODUCTS

Not applicable.

PART 3 - EXECUTION

Not applicable.

END OF SECTION

Product Requirements

PART 1 - GENERAL

1.1 Related Requirements

- .1 Appendix F - Hydro One General Conditions for Secondary Land Uses.
- .2 Appendix G - General Requirements for Construction Work by External Parties in the Vicinity of Hydro One 115,000 and 230,000 Volt Underground Plant.

1.2 Availability of Products

- .1 In the event of delays in supply of Products, and should it subsequently appear that the Work may be delayed for such reason, Contract Administrator reserves the right to substitute more readily available Products of similar character, at no additional cost to the Owner.

1.3 Product Handling

- .1 Handle and store Products in a manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturers' and Supplier's recommendations and so as to ensure preservation of their quality and fitness for the Work, and protect from vandalism and theft.
- .2 Store packaged or bundled Products in original and undamaged condition with manufacturer's seals and labels intact, facing to outside. Do not remove from packaging or bundling until required in the Work.
- .3 Store materials susceptible to environmental damage in a weathertight enclosure raised clear of ground so that they are protected from weather, dampness and deterioration. Do not use such materials which have been damaged by exposure to moisture.
- .4 Keep sand, when used as ingredients for grout, mortar or similar mixed materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.
- .5 Store sheet materials, lumber and other Products susceptible to deterioration on flat, solid supports and keep clear of ground or slab. Slope to shed moisture.
- .6 Handle materials to preclude damaging existing surfaces and work of others.
- .7 Remove damaged Products and replace with new undamaged Products.
- .8 Transportation:
 - .1 Pay cost of transportation of Products required in performance of Work.
 - .2 Transportation cost of Products supplied by Owner will be paid for by Owner. Unload, handle and store such Products at the Place of the Work.
 - .3 Reject Products damaged during transport.

Product Requirements

- .4 Transportation of Products must be undertaken to suit construction schedule. Contractor is responsible for determining mode of transport to ensure delivery, obtaining shop drawings, placement of orders, and on-time premium costs, air freight, and the like.

PART 2 - PRODUCTS

2.1 Product Requirements and Quality

- .1 Compatibility of options: If given option of selecting between two or more Products, select Product compatible with products previously selected, even if previously selected products were also options.
- .2 Products and Product installation shall be in compliance with building code, regulations and requirements of authorities having jurisdiction.
- .3 Specified options: The Work is based on materials, Products and systems specified by manufacturer's catalogued trade names, references to standards, by prescriptive specifications and by performance specifications.
 - .1 Where only one manufacturer's trade name is specified for a Product, the Product is single sourced and shall be supplied by the specified manufacturer.
 - .2 Where more than one manufacturer's trade name is specified for a Product, supply one Product from list of Products specified.
 - .3 When a Product is specified by reference to a standard, select one Product from manufacturer that meets or exceeds the requirements of the standard and manufacturer's written application directions.
 - .4 When a Product or system is specified by prescriptive or performance specifications, Provide one Product or system which meets or exceeds the requirements of the prescriptive or performance specifications and manufacturer's written application directions.
 - .5 The onus is on the Contractor to prove compliance with governing published standards, prescriptive specifications and with performance specifications.
 - .6 Visual selection specification:
 - .1 Where specifications include the phrase "as selected by Contract Administrator from manufacturer's full range" or similar phrase, select a product that complies with requirements. Contract Administrator will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.
 - .7 Visual matching specification:

Product Requirements

- .1 Where specifications require "match Contract Administrator's sample", provide a product that complies with requirements and matches Contract Administrator's sample. Contract Administrator's decision will be final on whether a proposed product matches.
- .4 Products, materials, equipment and articles (referred to as Products throughout the Agreement, Drawings, Schedules, and Specifications) incorporated in the Work shall be new, not damaged or defective, and of the quality standards specified, for the purpose intended. If requested, furnish evidence as to type, source and quality of Products Provided.
- .5 Basis of design:
 - .1 Where Agreement, Drawings, Schedules, and Specifications list "basis of design", this indicates the Product or system that was used in the preparation of the design included in the Agreement, Drawings, Schedules, and Specifications, and which may be deemed as an acceptable Product.
 - .2 The basis of design establishes the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products from other manufacturers.
 - .3 This does not preclude the use of other Products or systems in the Work, provided the proposed Product or system complies with the design and performance requirements contained in the Agreement, Drawings, Schedules, and Specifications, and Products or systems proposed for use in the work that are not the named basis of design follow procedures for product substitutions specified under Section 01 25 00.
- .6 Where Agreement, Drawings, Schedules, and Specifications list acceptable Products or acceptable manufacturers, select as applicable, one Product meeting performance of specifications and manufacturer's written application directions.
- .7 Where Agreement, Drawings, Schedules, and Specifications require design of a Product or system, and minimum material requirements are specified, the design of such Product or system shall employ materials specified within applicable section. Where secondary materials or components are not specified, augment with materials meeting applicable code limitations, and incorporating compatibility criteria with adjacent work.
- .8 Defective Products, whenever identified prior to completion of the Work, will be rejected, regardless of previous reviews. Review of the Work by the Contract Administrator or independent inspection and testing companies does not relieve the Contractor of the responsibility for executing the Work in accordance with the requirements of the Agreement, Drawings, Schedules, and Specifications, but is a precaution against oversight or error.

Product Requirements

- .9 Should dispute arise as to quality or fitness of Products, the decision rests strictly with Contract Administrator based upon the requirements of the Agreement, Drawings, Schedules, and Specifications.
- .10 Unless otherwise indicated in the Agreement, Drawings, Schedules, and Specifications, maintain uniformity of Product and manufacturer for any like item, material, equipment or assembly for the duration of the Work.
- .11 Products exposed in the finished work shall be uniform in colour, texture, range, and quality, and be from one production run or batch, unless otherwise indicated.
- .12 Permanent labels, trademarks and nameplates on Products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical, electrical, machinery or like rooms.
- .13 Owner retains right to select from choices available within specified Products for colours, patterns, finishes or other options normally made available. Submit full range of Product options in accordance with 01 33 00 for such selection.
- .14 Quality control:
 - .1 Implement a system of quality control to ensure compliance with Agreement, Drawings, Schedules, and Specifications.
 - .2 Notify Contract Administrator of defects in the Work or departures from intent of Agreement, Drawings, Schedules, and Specifications that may occur during construction. Contract Administrator will recommend appropriate corrective action in accordance with requirements of the Contract.

2.2 Inserts, Anchors, and Fasteners

- .1 Use only factory made, threaded or toggle type inserts as required for supports and anchors, properly sized for load to be carried.
- .2 Where inserts cannot be placed, use factory made expansion shields for light weights only.
- .3 Supply and locate inserts, holes, anchor bolts and sleeves during placement or fabrication of structural elements.
- .4 Fasteners stressed in withdrawal are not acceptable, except where otherwise indicated.
- .5 Metal fastenings shall be uniform to metals materials and components being anchored or of a metal which will not set up a galvanic action causing damage to the fastening or metal component under moist conditions.
- .6 Fastenings for prefinished materials shall be of concealed type unless otherwise indicated, and when exposed finish is required, of matching prefinishing materials.
- .7 Metal fastenings and accessories shall be same texture, colour and finish as material on which they occur, as selected by Contract Administrator.
- .8 Power actuated fasteners:

Product Requirements

- .1 Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 10 times design load, as determined by testing per ASTM E1190-11(2018) conducted by a qualified independent testing agency.
- .2 Do not use power actuated fasteners which are stressed in withdrawal in finished work.
- .3 Do not use power actuated fasteners within 100 mm (4") of the edge of concrete or masonry, unless otherwise accepted in writing by Contract Administrator.
- .4 Do not use power actuated fasteners in post-tensioned concrete.

PART 3 - EXECUTION

3.1 Manufacturer's Instructions

- .1 Unless otherwise indicated in the Agreement, Drawings, Schedules, and Specifications, install or erect Products in accordance with manufacturer's written requirements. Do not rely on labels or enclosures supplied with Products. Obtain written requirements directly from manufacturers.
- .2 Notify Contract Administrator in writing, of conflicts between the Agreement, Drawings, Schedules, and Specifications and manufacturer's requirements.
- .3 Improper installation or erection of Products, due to failure in complying with these requirements, authorizes Contract Administrator to require removal and re-installation at no additional cost to the Owner.
- .4 Manufacturers' representatives shall have access to the Work at all times. Contractor shall render assistance and facilities for such access in order that the manufacturers' representatives may properly perform their function.

3.2 Overloading

- .1 Protect the Work from loads which may cause permanent deformation.

3.3 Galvanic/Dissimilar Metal Corrosion

- .1 Insulate dissimilar metals from each other by suitable plastic strips, washers or sleeves to prevent galvanic corrosion where conductive liquid or electrolyte (rainwater or condensation) exists.

3.4 Product Installation Requirements

- .1 General:
 - .1 Execute the Work using workers experienced and skilled in the respective duties for which they are employed.
 - .2 Do not employ an unfit person or anyone unskilled in their required duties.

Product Requirements

- .3 Upon request by the Contract Administrator, submit proof, in the form of Certificate of Recognition (COR) or equivalent OHS Certification to verify Subcontractor's qualifications and experience meet or exceed the requirements of the Agreement, Drawings, Schedules, and Specifications.
 - .1 If, upon review of the COR or equivalent OHS Certification, it is found that the Subcontractor does not meet the qualification requirements specified in the Agreement, Drawings, Schedules, and Specifications pertaining to the parts of the Work for which the Subcontractor has been retained, the Contractor shall replace the unqualified Subcontractor with a qualified Subcontractor, satisfactory to the Contractor and the Owner, at no additional cost to the Owner and at no increase in the Contract Time.
- .4 Remove Products or materials that have been broken, chipped, cracked, discoloured, abraded, or damaged during construction period and Provide undamaged Products or materials meeting the requirements of the Agreement, Drawings, Schedules, and Specifications.
- .2 Coordination:
 - .1 Ensure cooperation of workers in layout of the Work. Maintain efficient and continuous supervision.
 - .2 Be responsible for coordination and placement of openings, sleeves and accessories.
- .3 Cutting and remedial work:
 - .1 Perform cutting and remedial work required to make parts of the Work come together. Coordinate the Work to ensure this requirement is maintained. Obtain permission from Contract Administrator before commencing any cutting. Refer also to requirements of Section 01 73 29.
- .4 Location of fixtures:
 - .1 Consider location of fixtures, access panels, outlets and mechanical and electrical items indicated as approximate only. Locate fixtures, and the like approximately; Architectural drawings will relate these items to known dimensions, such as ceiling tile grid or wall locations and the like.
 - .2 Obtain Contract Administrator's acceptance for precise locations of fixtures, access panels, outlets, mechanical, and electrical items.
 - .3 Contract Administrator reserves the right to relocate electrical outlets and mechanical fixtures at a later date, but prior to installation, without cost, provided that the relocation per outlet does not exceed 3050 mm (10') from the original location.
 - .4 Inform Contract Administrator of conflicting installations. Install only as directed by Contract Administrator.

Product Requirements

.5 Protection of work in progress:

- .1 Take reasonable and necessary measures, including those required by authorities having jurisdiction, to Provide protection.
- .2 Adequately protect parts of the Work completed or in progress. Parts of the Work damaged or defaced due to failure in providing such protection is to be removed and replaced, or repaired, as directed by the Contract Administrator, at no additional cost to the Owner.
- .3 Protect work of other Subcontractors from damage while doing subsequent work. Damaged work shall be made good by appropriate Subcontractors but at expense of those causing damage.
- .4 Protect existing buildings, curbs, roads and lanes. If, during the Work, any buildings, curbs, roads or lanes are damaged, bear costs for repairs.

.6 Existing utilities:

- .1 When breaking into or connecting to existing services or utilities, execute the Work at times approved by Owner, with a minimum of disturbance to Owner's ongoing operations, the Work, and traffic.
- .2 Protect, relocate or maintain existing active services. When inactive services are encountered, cap off in a manner approved by authority having jurisdiction and stake or otherwise record location of capped service.

.7 Protection of mechanical and electrical Products or materials:

- .1 Wrap in protective plastic and seal mechanical and electrical items of mechanical and electrical equipment prior to and during shipment, storage at the Place of the Work and after installation.
- .2 Remove protective coverings only to the extent required for installation of the items. Re-install protection immediately following installation.
- .3 Remove protective coverings in stages, as work areas are completed, or when directed by Contract Administrator.

.8 Operational requirements:

- .1 Operable Products shall be Provided fully operational and ready for intended use.
- .2 Adjust operating hardware and accessories for a tight fit at contact points and weather stripping for smooth operation and weathertight closure. Lubricate hardware and moving parts for smooth squeak-free function, in accordance with manufacturer's requirements.

END OF SECTION

Cutting and Patching

PART 1 - GENERAL

1.1 Related Requirements

- .1 Appendix F - Hydro One General Conditions for Secondary Land Uses.
- .2 Appendix G - General Requirements for Construction Work by External Parties in the Vicinity of Hydro One 115,000 and 230,000 Volt Underground Plant.

1.2 Cutting, Patching and Remedial Work

- .1 Submittal Items:
 - .1 Comply with administrative requirements of Section 01 33 00.
 - .2 Submit written request in advance of cutting, coring, and alteration that affects:
 - .1 Structural integrity of any element of Work.
 - .2 Integrity of weather-exposed or moisture-resistant elements.
 - .3 Efficiency, maintenance, or safety of any operational element.
 - .4 Visual qualities of sight-exposed elements.
 - .5 Owner or work of other contractors.
 - .3 Include in request:
 - .1 Identification of Project.
 - .2 Location and description of affected work.
 - .3 Statement on necessity for cutting or alteration.
 - .4 Description of proposed work, and Products to be used.
 - .5 Alternatives to cutting and patching.
 - .6 Effect on Owner or work of other contractors.
 - .7 Written permission of affected separate contractor.
 - .8 Date and time work will be performed.
 - .4 Do not commence cutting, patching, or remedial work until request has been reviewed by Contract Administrator.
- .2 Preparation:
 - .1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.
 - .2 After uncovering, inspect conditions affecting performance of the Work.
 - .3 Beginning of cutting or patching means acceptance of existing conditions.
 - .4 Provide supports to assure structural integrity of surroundings; devices and methods to protect other portions of the Work from damage.
 - .5 Provide protection from elements for areas which may be exposed by uncovering work; maintain excavations free of water.

Cutting and Patching

- .6 Where uncovering of area exposes local deterioration, cracking, evidence of water infiltration, structural settlement, previous modifications, or other unexpected conditions, advise Contract Administrator immediately in writing and leave conditions exposed until receipt of Contract Administrator's written instructions. If area is exposed to the exterior, Provide temporary protection from inclement weather.
- .3 Execution:
 - .1 Execute cutting, fitting, and patching to complete the Work. Under no circumstances will overcutting of corners of opening be accepted. Ensure corners of openings to be cut are predrilled or sawed.
 - .2 Remove and replace defective and non-conforming work.
 - .3 Remove samples of installed work for testing if directed by Contract Administrator.
 - .4 Shop drawings identifying precise locations and size of openings to be cored and cut are to be submitted for review by Contract Administrator. Provide non-destructive structural survey of structural concrete to be cored or cut, for Contract Administrator review. Coring and cutting work locations shall be reviewed by Contract Administrator for acceptance before proceeding.
 - .5 Provide openings in non-structural elements of the Work for penetrations of mechanical and electrical work.
 - .6 Perform work by methods to avoid damage to other work, and which will Provide proper surfaces to receive patching and finishing.
 - .7 Employ qualified installer with at least 3 years of relevant experience to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.
 - .8 Restore work with new Products in accordance with requirements of Agreement, Drawings, Schedules, and Specifications.
 - .9 Refinish surfaces to match adjacent finishes. Refinish continuous surfaces to nearest intersection. Refinish entire assembly units.

PART 2 - PRODUCTS

Not applicable.

PART 3 - EXECUTION

Not applicable.

END OF SECTION

Progressive Cleaning

PART 1 - GENERAL

1.1 Related Requirements

- .1 Appendix F - Hydro One General Conditions for Secondary Land Uses.
- .2 Appendix G - General Requirements for Construction Work by External Parties in the Vicinity of Hydro One 115,000 and 230,000 Volt Underground Plant.

1.2 Environmental Controls

- .1 Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws, and Section 01 35 43.
- .2 Store volatile wastes in covered metal containers, and remove from Place of the Work daily.
- .3 Prevent accumulation of wastes which create hazardous conditions.
- .4 Provide adequate ventilation during use of volatile or noxious substances.

PART 2 - PRODUCTS

2.1 Materials

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

PART 3 - EXECUTION

3.1 Cleaning During Construction

- .1 Clean-up the Place of the Work daily. Maintain clean and clear egress routes.
- .2 Maintain Place of the Work, grounds and public properties free from accumulations of waste materials and rubbish.
- .3 Provide containers at the Place of the Work for collection of waste materials and rubbish. Remove waste materials and rubbish from the Place of the Work when containers become full.
- .4 Vacuum and clean interior building areas when ready to receive finish painting, and continue vacuum cleaning on an as-needed basis until Substantial Performance of the Work.
- .5 Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not fall on wet, newly painted surfaces.
- .6 Promptly as the Work proceeds, on a daily basis and upon completion, clean up and remove rubbish, surplus materials and equipment.
- .7 Remove as the work of this section progresses, corrosive and foreign materials which may set or become difficult to remove at time of final cleaning or which may damage members.
- .8 Wash exposed surfaces with a cleaning solution approved by Product manufacturers.
- .9 Debris and waste not permitted within cavities of Work.

END OF SECTION

Contract Closeout Procedures and Submittals

PART 1 - GENERAL

1.1 Related Requirements

- .1 Appendix F - Hydro One General Conditions for Secondary Land Uses.
- .2 Appendix G - General Requirements for Construction Work by External Parties in the Vicinity of Hydro One 115,000 and 230,000 Volt Underground Plant.

1.2 General Instructions

- .1 The procedures for completing Contract and acceptance by the Owner shall be in accordance with the methods described in OAA/OGCA Document 100 (July 1, 2018, and reissued January 8, 2019) and any additional requirements described below.
- .2 Stages will be reviewed at the Contract start-up meeting to ensure that parties understand their responsibilities. Refer to Section 01 31 19 for procedures and requirements for Contract start-up meeting.
- .3 Within 4 weeks of commencement of the Work, submit to the Contract Administrator a list of closeout submittals required by the Agreement, Drawings, Schedules, and Specifications.

1.3 Cleaning Prior to Substantial Performance of the Work

- .1 Immediately prior to Contract Administrator's review to determine if Substantial Performance of the Work has been achieved, remove surplus Products and construction machinery and equipment not required for the performance of the remaining Work and clean as described under paragraph 1.3 - Final Cleaning to the greatest extent practicable given work remaining to be completed. Cleaning shall be to a sufficient extent to permit the Contract Administrator's review to be performed properly and reasonably.

1.4 Final Cleaning

- .1 Environmental controls:
 - .1 Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws and in accordance with Section 01 35 43.
 - .2 Store volatile wastes in covered metal containers, and remove from Place of the Work daily.
 - .3 Prevent accumulation of wastes which create hazardous conditions.
 - .4 Provide adequate ventilation during use of volatile or noxious substances.
- .2 Materials:
 - .1 Use only cleaning materials recommended by manufacturer of surface to be cleaned and as recommended by cleaning material manufacturer.
- .3 Final cleaning:
 - .1 Remove waste Products and debris other than that caused by the Owner, and leave the Work clean and suitable for occupancy by Owner.
 - .2 When the Contract is completed, remove surplus Products, tools, construction machinery and equipment.

Contract Closeout Procedures and Submittals

- .3 Remove stains, spots, marks and dirt from decorative parts of the Work, electrical and mechanical fixtures.
- .4 Remove non-permanent labels.
- .5 Remove dirt and residue from surfaces.
- .6 Inspect finishes, fittings and equipment and ensure specified workmanship and operation.
- .7 At completion of the Work, remove protective coatings, clean surfaces and remove excess compounds and sealant materials. Make good defective, scratched or damaged work.
- .8 Broom clean and wash exterior walks, steps and surfaces.
- .9 Remove dirt and other disfigurations from exterior surfaces.
- .10 Sweep and wash clean paved areas at the Place of the Work.
- .11 Remove seal wrap on mechanical and electrical Products and materials and clean as required.
- .12 Clean and/or replace lamps, light fixtures, lenses and grilles.
- .13 Remove protective covering and labels from lamps, hardware, and speciality items.
- .14 Under the direction of the Contract Administrator, aim adjustable luminaires .
- .15 Clean architectural concrete to remove surface discolouration, efflorescence and the like. Use a suitable cleaning agent which will not itself stain the surfaces or mar the texture through chemical reaction.
- .16 Clean architectural metal surfaces to remove surface discolouration and rust staining.

1.5 Closeout Submittals

- .1 Collect reviewed submittals, and assemble required closeout submittals executed by Subcontractors, Suppliers, and manufacturers. Prior to submitting closeout submittals to the Contract Administrator, undertake the following:
 - .1 Review maintenance manual contents (operating, maintenance instructions, as-built drawings, materials) for completeness.
 - .2 Review supply and completeness of spare parts required by Agreement, Drawings, Schedules, and Specifications and manufacturers.
 - .3 Review in relation to Contract Price, Change Orders, Change Directives, holdbacks and other adjustments to the Contract Price.
 - .4 Review inspection and testing reports to verify conformance to intent of Agreement, Drawings, Schedules, and Specifications and that changes, repairs or replacements have been completed.
 - .5 Execute transition of performance bond and labour and materials payment bond to warranty period requirements.

Contract Closeout Procedures and Submittals

- .6 Submit a final statement of accounting giving total adjusted Contract Price, previous payments, and monies remaining at time of application for completion of the Contract. Contract Administrator will issue a final change order reflecting approved adjustments to Contract Price not previously made.
- .2 No later than 10 Working Days prior to submitting request for Contract Administrator's review to determine if Substantial Performance of the Work has been achieved, submit to the Contract Administrator the closeout submittals specified in this section, including, but not limited to, reviewed shop drawings, Product data sheets, samples, operating instructions, as-built records, fully executed warranties and guarantees, reports recording demonstration and instruction provided to Owner for operation and maintenance of building systems, software required for operation and maintenance of building systems, maintenance materials, and keys.
- .3 For equipment put into use with Owner's permission during the Work, submit required closeout submittals within 10 Working Days after start-up.
- .4 For items of the Work delayed materially beyond date of *Substantial Performance of the Work*, provide updated closeout submittals within 10 Working Days after acceptance, listing date of acceptance as start of warranty period.
- .5 Neither the Contract Administrator's review to determine if Substantial Performance of the Work has been achieved, nor acceptance of the Work, will take place until receipt, by the Contract Administrator, of acceptable copies of the closeout submittals required herein and by the Agreement, Drawings, Schedules, and Specifications.
- .6 As-built documents:
 - .1 Owner will provide 1 set of Agreement, Drawings, Schedules, and Specifications to the Contractor for as-built documentation purposes.
 - .2 Accurately document as-built conditions and deviations from Agreement, Drawings, Schedules, and Specifications as the Work progresses.
 - .3 Mark changes in red ink.
 - .4 Document, without being limited to, the following:
 - .1 Survey of as-built conditions and survey logs prepared by the registered land surveyor responsible for setting out the work and field engineering.
 - .2 Horizontal and vertical location of utilities and appurtenances referenced to permanent surface improvement.
 - .3 Other underground installations and services set beneath slabs-on-grade referenced to visible and accessible features of structure.
 - .4 'As-built' elevations of paving, sidewalks, manholes and catchbasins.
 - .5 Changes by Change Orders, Change Directives, and Supplemental Instructions.
 - .6 Elevations and location depths of services. Identify type and size of service and materials used.
 - .5 As-built documentation:
 - .1 Submit copies as described in GC 3.10.2.
- .7 Operation and maintenance manuals:

Contract Closeout Procedures and Submittals

- .1 Submit operation and maintenance manuals, consisting of the following general components:
 - .1 Operation and maintenance documents.
 - .2 Shop drawing documents.
 - .3 Warranty documents.
 - .4 Project data documents.
- .2 Submit operation and maintenance manuals as follows:
 - .1 Submit digital copies ("PDF" files) of operation and maintenance manuals. Submit using digital storage medium or transfer process acceptable to the Contract Administrator and the Owner.
- .3 Operation and maintenance documents shall contain operating and maintenance data and information specified below for supplied Products, in English, and shall be made up as follows:
 - .1 Charts, diagrams and reports identified in Division 26 of the specifications.
 - .2 Description, operation and maintenance instructions for equipment and parts list. Indicate nameplate information such as make, size, capacity, serial number.
 - .3 Neatly type lists and notes. Use clear drawings, diagrams of manufacturers' literature.
- .4 Shop drawing documents:
 - .1 Submit one copy of each final accepted shop drawing issued for the Work on which have been recorded changes made during fabrication and installation caused by unforeseen conditions.
 - .2 Engineered shop drawings shall include copies of the certificate of insurance, the engineer's field review reports, and the engineer's letters of general conformity that were provided as part of the engineered submittal in accordance with Section 01 33 00 appended to the pertinent engineered shop drawing in the shop drawing manual.
- .5 Warranty documents:
 - .1 Submit copies of bonds, guarantees, warranties and extended warranties together in one report binder, complete with an indexed summary list of warranties and expiration dates. Warranties to be in accordance with Section 01 78 36.
- .6 Project data documents: shall include the following information supplemented by additional required data specified elsewhere in the Agreement, Drawings, Schedules, and Specifications:
 - .1 Maintenance instructions for finished surfaces and materials.
 - .2 Copy of hardware and paint schedules.
 - .3 Names, addresses and phone numbers of Subcontractors and Suppliers, as applicable.

Contract Closeout Procedures and Submittals

- .4 Additional material used in the Work listed under various sections showing name of manufacturer and source of supply.
- .5 Report recording demonstration and instruction provided to Owner for operation and maintenance of building systems as described below in this section.
- .6 Key construction photos.
- .7 Permits and forms:
 - .1 Workplace Safety & Insurance Board certificate of clearance.
 - .2 Certificates of approval of the Work by local building department (if available).
 - .3 Electrical authority certificate of inspection.
- .8 Maintenance materials:
 - .1 Provide overage, extra stock, and maintenance materials. For required materials, see individual sections of specifications. Deliver to a location and at a time specified by the Owner, and as follows:
 - .1 Use unbroken cartons, or if not supplied in cartons, material shall be strongly packaged.
 - .2 Clearly mark cartons or packaging as to contents, project name, and Supplier.
 - .3 If applicable give colour and finish, room number or area where material is used.
 - .4 Include necessary information for re-ordering of materials as part of packaging of materials.
 - .2 Replace incorrect or damaged maintenance materials delivered to Owner, including damage through shipment.
 - .3 Provide a typed inventory list of maintenance materials prior to Substantial Performance of the Work application. List all items, complete with quantities, and storage locations.
 - .4 Establish a master list identifying maintenance materials and maintain a log of when materials are turned over to Owner and signing authority for acceptance of materials on behalf of Owner.

1.6 System Demonstration and Project Commissioning

- .1 Refer also to requirements of Divisions 21, 22, and 23 and Divisions 26, 27, and 28 with respect to commissioning for mechanical / electrical systems.
- .2 Perform system demonstration and commissioning work no later than 10 Working Days prior to submitting request for Contract Administrator's review to determine if Substantial Performance of the Work has been achieved.
- .3 Submit required certificates of approval or acceptance from authorities having jurisdiction.
- .4 Meet with other consultants; to coordinate demonstration, instruction, commissioning and completion.

Contract Closeout Procedures and Submittals

- .5 Review condition of equipment such as lighting, elevators and heating system, which has been used in the course of the Work to ensure turning over at completion in "as new condition" with warranties dated and certified from time specified.
- .6 When partial occupancy of uncompleted project is required by Owner, coordinate Owner's uses, requirements, access, and the like, with Contractor's requirements to complete the Work.
- .7 Demonstration and instruction:
 - .1 Demonstrate operation of each system to Owner and Contract Administrator.
 - .2 Instruct Owner's personnel in operation, adjustment and maintenance of equipment and systems, using operation and maintenance data provided as the basis for instructions. Arrange and coordinate instruction of Owner's staff in care, maintenance and operation of building systems and finishes
 - .3 Contractor, manufacturer's representatives, and responsible personnel from Subcontractors whose work is being demonstrated shall be present at these demonstrations.
 - .4 Instruct Owner's representative on use of software required for operation and maintenance of building systems and provide a toll-free telephone number or website address for further assistance to the Owner.
 - .5 Prepare and insert additional data in the operation and maintenance data manuals when the need for additional data becomes apparent during demonstration or instruction.
 - .6 Demonstration and instruction report: Submit a written report of such demonstration, instruction, and commissioning to the Contract Administrator as part of the contract closeout submittals described earlier in this section. Report shall include time and date of each demonstration, instruction, and commissioning activity, complete with a list of persons present.
- .8 Correct deficiencies and defects identified during demonstration, instruction, or commissioning.
- .9 Attend 'end-of-work' testing and break-in or start-up demonstration.

1.7 Substantial Performance of the Work

- .1 Deficiency review:
 - .1 Neither Owner nor Contract Administrator will be responsible for preparation or issuance of extensive lists of deficiencies. Contractor assumes prime responsibility for ensuring that items shown and described in the Agreement, Drawings, Schedules, and Specifications are complete. Any reviews to approve the certificate of Substantial Performance of the Work will be immediately cancelled if it becomes obvious to the Contract Administrator that extensive deficiencies are outstanding.
 - .2 The Contractor shall conduct an inspection of the Work to identify deficiencies and defects, which shall be repaired. When the Contractor considers that the Work is substantially performed, the Contractor shall prepare and submit to the Contract Administrator a comprehensive list of items to be completed or corrected (the deficiency list) and apply for a review of the Work by the Contract Administrator to determine if Substantial Performance of the Work has been achieved.

Contract Closeout Procedures and Submittals

- .3 The Contractor's request described above shall include a statement by Contractor that the Work to be reviewed by Contract Administrator for deficiencies is, to the best of the Contractor's knowledge, in compliance with Agreement, Drawings, Schedules, and Specifications, reviewed shop drawings, and samples, and that deficiencies and defects previously noted by Contract Administrator have been repaired.
- .4 No later than 10 Working Days after the receipt of the Contractor's request described above, but contingent upon the prior receipt, by the Contract Administrator, of the closeout submittals in the manner and form specified in this section, the Contract Administrator and the Contractor will review the Work to identify any defects or deficiencies. If necessary, the Contractor shall tabulate a list of deficiencies to be corrected prior to Substantial Performance of the Work being certified by the Contract Administrator. During review, the Contract Administrator and the Contractor will decide which deficiencies or defects must be rectified before Substantial Performance of the Work can be certified, and which defects are to be treated as warranty items.
- .5 Provide a schedule of planned deficiency review having regard to the foregoing.
- .2 Certification of Substantial Performance of the Work:
 - .1 When the Contract Administrator considers that the deficiencies and defects have been completed and that it appears that the requirements of the Agreement, Drawings, Schedules, and Specifications have been substantially performed, the Contract Administrator shall issue a certificate of Substantial Performance of the Work to the Contractor, stating the date of Substantial Performance of the Work.
 - .2 The certificate of Substantial Performance of the Work shall be prepared and issued in accordance with the Construction Act.
 - .1 Inform Owner, Contract Administrator, Subcontractors, and Suppliers which publication is to be used for publishing certificate of substantial performance in accordance with Section 01 31 19.
- .3 Final Inspection for completion of the Contract:
 - .1 Deficiencies and defects shall be made good before the Contractor submits a written request for final review of the Work and before the Contract is considered complete.
 - .2 When Contractor is satisfied that the Work is complete, and after the Contractor has reviewed the Work to verify its completion in accordance with the requirements of the Agreement, Drawings, Schedules, and Specifications, the Contractor shall submit a written request for a final review by the Contract Administrator, who in turn will notify the Owner.
 - .3 If there are any deficiencies identified as a result of this review, they shall be listed by the Contract Administrator and submitted to the Contractor. This list shall be recognized as the final deficiency list for purposes of acceptance of the Work under the Contract.

Contract Closeout Procedures and Submittals

- .4 Such deficiencies shall be corrected by a date mutually agreed upon between Contract Administrator and the Contractor, unless a specific date is required by Contract, and a further review by the Contract Administrator shall be called for by the Contractor following his own review to take place within 7 days from date of request.
- .5 Contractor shall thereafter submit invoice for final payment.
- .6 Money shall be withheld for deficiency work and will be released only when all deficiencies have been completed. No partial payment to be recognized until all work is completed.

1.8 Warranty Period

- .1 Provide on-going review and attendance to building call-back, maintenance and repair problems during the warranty periods.

PART 2 - PRODUCTS

Not applicable.

PART 3 - EXECUTION

Not applicable.

END OF SECTION

Extended Warranties

PART 1 - GENERAL

1.1 Extended Warranties

- .1 Extended warranties shall be in accordance with GC 9.3.6 and as follows:
 - .1 Where specifically identified in the Agreement, Drawings, Schedules, and Specifications, extended warranties shall be furnished by individual manufacturer for particular product/system/assembly.
 - .2 Extended warranties shall include for proper performance of the portion of the Work as defined by the scope of the applicable specification section to the extent that the design and Agreement, Drawings, Schedules, and Specifications permit such performance.
 - .3 The Owner shall promptly give the warrantor notice in writing of observed defects and deficiencies which occur during the warranty period.
 - .4 Extended warranties shall commence at date of Substantial Performance of the Work.
 - .5 Extended warranties specified shall be in addition to, and run concurrent with, other warranties required by the Agreement, Drawings, Schedules, and Specifications. Manufacturer's disclaimers and limitations on product warranty do not relieve Contractor of obligations under requirements of the Agreement, Drawings, Schedules, and Specifications.
 - .6 Submit extended warranty on form acceptable to the Owner specifically endorsed by the warrantor to the Owner and shall include the following information:
 - .1 Name and address of Project.
 - .2 Warranty commencement date (date of Substantial Performance of the Work).
 - .3 Warranty period.
 - .4 Specific warranty terms as required in applicable portion of Agreement, Drawings, Schedules, and Specifications.
 - .5 Name and title of authorized signing officer and seal of warrantor.

PART 2 - PRODUCTS

Not applicable.

PART 3 - EXECUTION

Not applicable.

END OF SECTION

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Part 1 General

1.1 REFERENCES

- .1 Soil and Groundwater Management Plan – Green Line Trail Parcels 28B, 29 and 30, WSP 2024
- .2 Contaminant Health and Safety Plan – Green Line Trail Parcels 28B, 29 and 30, WSP 2024
- .3 Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011
- .4 Certificate of Property Use # 7631-BZWMLT for 315 Macpherson Avenue, Toronto, Ontario, April 2021.
- .5 Ontario Regulation 347, General – Waste Management
- .6 Ontario Regulation 213, Construction
- .7 Ontario Regulation 860, Workplace Hazardous Materials Information System
- .8 Ontario Underground Infrastructure Notification System Act, 2012
- .9 Ontario Regulation 903, Wells
- .10 Ontario Regulation 406/19 On-Site and Excess Soil Management, made under the Environmental Protection Act
- .11 Appendix F – Hydro One General Conditions for Secondary Land Uses, Hydro One, January 2023
- .12 Appendix G – General Requirements for Construction Work by External Parties in the Vicinity of Hydro One 115, 000 and 230,000 Volt Underground Plant, Hydro One, January 2024

1.2 DEFINITIONS

- .1 MECP Table 3: Full depth generic site condition standards established in Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 2011 for residential, parkland or institutional (RPI) land use in non-potable groundwater conditions with coarse textured soil (MECP Table 3).
- .2 O. Reg. 406/19 Table 3.1: Full depth excess soil quality standards in a non-potable groundwater condition (volume independent) for RPI property uses.
- .3 Contaminated Soil: Soil or a mixture of soil and debris with measured concentrations of contaminants that exceed MECP Table 3 standards.
- .4 Fill Cap: a barrier covering contaminated soil consisting of soil meeting MECP Table 3 and O. Reg. 406/19 Table 3.1 standards.
 - .1 All areas where deep-rooting trees and/or shrubs are to be planted require a fill cap of 1.5 m.
 - .2 All areas where plantings with shallower roots are to be planted require a fill cap of 1.0 m.
 - .3 All grassed areas that do not contain any trees, shrubs, or plantings with deeper roots require a fill cap of 0.5 m (1.0 m in Parcel 30 MGRA Lands).
 - .4 All utilities constructed below the hard cap and fill cap must be placed within a corridor (trench) of un-impacted soil/material, that extends 0.5 m around the utility.

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- .5 Areas with existing trees that will remain require a total cap of 0.15 m of mulch, wood bark or similar material at a minimum 1.2 m to max of dripline or 2.4 m radius around the trunk of the tree. Thickness to be feathered in the approach to the tree trunk, in accordance with landscape design detail.

- .6 100 mm of crushed rock (as per HONI requirements)

- .5 Hard Cap: a barrier covering contaminated soil consisting of at least 75 mm of hard surface consisting of hot mix asphalt, concrete, concrete pavers, stone pavers or brick or other surface treatment not required to support vegetative growth underlain by at least 150 mm of granular. Hard caps can include park features such as bike paths and walkways. In Parcel 30, areas where permeable pavers are used, will require a 1.0 m fill cap barrier.

1.3 DESCRIPTION

- .1 The Contractor shall prepare site for excavation and final placement of fill caps and hard caps by removing existing structures as specified.

1.4 STRUCTURES

- .1 Removal of existing structures shall consist of monitoring wells (8 onsite wells), which are designated to be removed. Note that MW3 on Parcel 28B was decommissioned, but the other wells identified in Figures included in the Soil and Groundwater Management Plan could not be located for decommissioning.

1.5 SUBMITTALS

- .1 Contractor shall provide the Consultant with well decommissioning records.

1.6 EROSION AND SEDIMENT CONTROL

- .1 Plan and execute construction by methods to control surface drainage from excavations, backfilling, stockpiles, staging areas, and other work areas. Prevent erosion and sedimentation.
- .2 Minimize amount of impacted soil exposed at one time. Stabilize disturbed soils as quickly as practical and conduct work in such a way as to minimize erosion. Remove accumulated sediment resulting from construction activity from adjoining surfaces, drainage systems, and water courses, and repair damage caused by soil erosion and sedimentation as directed by Consultant.
- .3 Provide and maintain temporary measures which may include, but are not limited to, silt fences, ditches, geotextiles, temporary drainage piping, sedimentation basins, and any other construction required to prevent erosion and migration of silt, mud, sediment, and other debris off site or to other areas of site where damage might result, or that might otherwise be required by Laws and Regulations. Make sediment control measures available during construction.
- .4 Check erosion and sediment control measures weekly, and after each rainfall; during prolonged rainfall check daily.
- .5 Unless indicated or directed by Consultant, remove temporary erosion and sediment control devices upon completion of Work. Materials once removed become property of Contractor.

1.7 ENVIRONMENTAL PROTECTION

- .1 Develop and establish the following Environmental Protection Plans (EPP).
- .2 EPPs as well as Monthly Update Reports (MURs) are to be prepared by the Contractor and submitted to the City of Toronto.

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- .3 The EPPs are to be developed and submitted before start of construction.
- .4 The MUR is to report on Implementation, Monitoring, Control, and Mitigation.
- .5 EPPs are required for each of the following conditions:
 - .1 Air Quality and Dust Management
 - .2 Contaminated and Excess Soils Management; and,
 - .3 Erosion and Sediment Control.

Part 2 Products

2.1 MATERIALS- NOT USED

Part 3 Execution

3.1 EXECUTION

- .1 Confirm locations for fill and hard cap placement, based on Capping Plan.
- .2 Before commencing work, verify locations of buried services on and adjacent to site.
- .3 Tree protection fencing shall be provided (as required) in accordance with the City of Toronto Tree Protection Policy.
- .4 Trees and plants on adjacent properties are not to be damaged during the course of the Work.
- .5 Waste materials and excess soils as defined in O. Reg 347 and O. Reg. 406/19 are handled and disposed of in accordance with the regulation.
- .6 Do not commence Work involving contact with potentially contaminated materials until methods to decontaminate equipment are operational.

3.2 REMOVAL OF EXISTING STRUCTURES

- .1 Decommissioning of monitoring wells to be done in accordance with O. Reg. 903 by a licensed well contractor. All monitoring wells to be decommissioned before fill caps are installed. Notify the Consultant if any wells cannot be located.
- .2 Provide documentation of well decommissioning to the City's Qualified Person, within two weeks of well removal and prior to start of fill cap placement.
- .3 Existing structures shall become the property of the Contractor and shall be removed from the site unless otherwise specified.

END OF SECTION

SELECTIVE SITE DEMOLITION

Part 1 General

1.1 SECTION INCLUDES

- .1 Labour, materials, tools, and equipment, required for selective site demolition and removals.
- .2 Work included: Requirements for demolishing, salvaging, recycling and removing wholly or in part the various items designated on the drawings or required to be removed or partially removed for the receipt of the Work of this Contract, including but not limited to:
 - .1 Cutting and removing concrete, asphalt, and interlocking pavement.
 - .2 Cutting and removing curbs.
 - .3 Removal of precast block planter walls, fencing, and other site elements.
 - .4 Salvage of existing items to be reinstated or stockpiled.
 - .5 Removal shall mean removal from site and safe disposal in a legal manner.
 - .6 Refer to HONI Infrastructure Site Coordination and Access Routes drawings and notes.
 - .7 Refer to demolition drawings and notes.

1.2 RELATED WORK

- .1 Section 01 14 00 – Work Restrictions
- .2 Section 01 74 13 – Progressive Cleaning
- .3 Section 02 20 00 – Site Preparation – Davenport Lands
- .4 Section 31 00 99 – Earthwork for Minor Works – Davenport Lands
- .5 Section 31 11 00 – Clearing and Grubbing
- .6 Section 32 01 90 – Tree and Shrub Preservation
- .7 Section 32 71 00 – Habitat Structures

1.3 REFERENCES

- .1 All referenced standards shall be the current edition or edition referenced by the Ontario Building Code currently in force.
- .2 City of Toronto Construction Standards:
 - .1 City of Toronto Tree Protection Policy and Specifications for Construction Near Trees
 - .2 City of Toronto Tree Pruning Guidelines.
- .3 City of Toronto Municipal Code:
 - .1 Chapter 658, Ravine and Natural Feature Protection (RNFP) by-Law
 - .2 Chapter 813, Trees bylaw
- .4 Ontario Provincial Standard Specifications (OPSS):

SELECTIVE SITE DEMOLITION

- .1 OPSS. MUNI 180, The Management of Excess Materials
- .2 OPSS 491, Preservation, Protection and Reconstruction of Existing Facilities
- .3 OPSS 510, Removal
- .5 Ontario Ministry of the Environment, Conservation and Parks (MECP):
 - .1 Soil, ground water and sediment standards for use under Part XV.1 of the Environmental Protection Act, R.S.O. 1990, c. E.19
 - .2 O. Reg. 406/19: On-site and Excess Soil Management
- .6 Reference Documents:
 - .1 Appendix A - Arborist Report, Macpherson Avenue Park, Urban Forest Innovations Inc., April 23, 2025
 - .2 Appendix B - Soil and Groundwater Management Plan – Davenport Lands (Parcel 28B, 29 and 30, WSP, July 2024
 - .3 Appendix C - Contaminant Health and Safety Plan – 28B, 29 and 30 Green Line Trail, WSP, July 2024
 - .4 Appendix D - City of Toronto Tree Protection Policy and Specifications for Construction Near Trees, July 2016
 - .5 Appendix E – Geotechnical Investigation for Macpherson Avenue Park, October 31, 2022
 - .6 Appendix F – Hydro One General Conditions for Secondary Land Uses, Hydro One, January 2023
 - .7 Appendix G -General Requirements for Construction Work by External Parties in the Vicinity of Hydro One 115,000 and 230,000 Volt Underground Plant, Hydro One, January 2024

1.4 SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Action Submittals: Provide the following submittals before starting any work of this Section:
 - .1 Inventory: Prior to start of removals, prepare typed inventory of units to be salvaged and cross-reference to drawing showing existing elevations. Inventory shall designate size of units, face setting bed, or natural setting bed. Provide temporary marking to salvaged units correlated to this inventory.
 - .2 Existing conditions documentation: Prior to start of removals, document existing conditions and any adjoining construction or site improvements, including pre-existing damage to finish surfaces that might be misconstrued as damage caused by demolition operations.
 - .3 Pre-demolition Photographs: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by demolition operations. Submit before Work begins.
- .3 Closeout Submittals: Submit a list of items that have been removed and salvaged, including photographic documentation.

SELECTIVE SITE DEMOLITION

1.5 QUALITY ASSURANCE

- .1 Regulatory Requirements: ensure Work is performed in compliance with applicable Municipal, Provincial and Federal regulations, and with all site-specific environmental and soil management plans.
- .2 Comply with hauling and disposal regulations of Authority Having Jurisdiction.
- .3 Pre-demolition meeting:
 - .1 Schedule a pre-demolition meeting following the procedures specified for preinstallation meetings in accordance with Section 01 31 19.
 - .1 Verify project requirements.
 - .2 Review existing conditions and removal requirements.
 - .3 Co-ordination with other building subtrades.
 - .4 Review Owner's salvage, storage and reinstatement and temporary support requirements.
 - .5 Review site-specific environmental, soil and water management requirements.
 - .6 Review site-specific requirements for working in the vicinity of Hydro One Network Inc. (HONI) infrastructure.
 - .7 Examine adjacent properties to determine extent of protection required.
 - .2 Arrange for site visit with contract Administrator to examine existing site conditions adjacent to demolition work, prior to start of Work.
 - .3 Commencement of demolition work will be considered to be acceptance of existing conditions at the Place of the Work and removal of such items.
- .4 Qualifications:
 - .1 The work of this section shall be executed by a Subcontractor having a minimum of 5 years specialized demolition experience and able to deploy adequate equipment and skilled personnel to complete work expediently in an efficient and orderly manner.

1.6 WASTE MANAGEMENT AND DISPOSAL

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

1.7 SITE CONDITIONS

- .1 Site Environmental Requirements.
 - .1 Perform work in accordance with applicable Provincial and Federal regulation and in accordance with site-specific environmental reports.
 - .2 Ensure that selective demolition work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air and noise pollution.
 - .3 Do not dispose of waste of volatile materials including but not limited to, mineral spirits, oil, petroleum-based lubricants, or toxic cleaning solutions into watercourses, storm or sanitary sewers.

SELECTIVE SITE DEMOLITION

- .1 Ensure proper disposal procedures are maintained throughout the project.
- .4 Do not pump water containing suspended materials into storm or sanitary sewers or onto adjacent properties.
- .5 Control disposal or runoff of water containing suspended materials or other harmful substances as directed by the Contract Administrator.
- .6 Protect trees, plants and foliage on site and adjacent properties where indicated.
- .2 Hydro One Network Inc. (HONI) Requirements:
 - .1 Some portions of the site fall within HONI jurisdiction.
 - .2 Comply with the requirements of the following:
 - .1 HONI Infrastructure - Site Coordination and Access Route drawings and notes.
 - .2 Appendix F – Hydro One General Conditions for Secondary Land Uses, Hydro One, January 2023.
 - .3 Appendix G -General Requirements for Construction Work by External Parties in the Vicinity of Hydro One 115,000 and 230,000 Volt Underground Plant, Hydro One, January 2024.

Part 2 Products

2.1 MATERIALS

- .1 All materials requiring removal shall become the Contractor's property and shall be removed and disposed of from the site, as the work progresses, unless indicated otherwise.
- .2 Salvaged materials:
 - .1 Coordinate items to be salvaged with the Contract Administrator as indicated on drawings.
 - .2 Salvaged materials shall not be chipped, cracked, split, stained, or damaged.
 - .3 Store materials on site in such a way as to prevent deterioration or loss or impairment of essential properties in dry environments, protected from the elements, as per Section 01 50 00.

2.2 EQUIPMENT

- .1 The Contractor shall provide all relevant equipment and materials to complete required for demolition and site preparation activities.

Part 3 Execution

3.1 EXAMINATION

- .1 Work Within Hydro One Network Inc. (HONI) - All work within exclusion zones and in proximity to HONI infrastructure shall be in accordance with Section 01 14 00 – Work Restrictions, Appendix F, and Appendix G
- .2 Verify that utilities have been disconnected and capped before starting selective demolition operations.

SELECTIVE SITE DEMOLITION

- .3 Survey of Existing Conditions: Record existing conditions by use of measured drawings and pre-demolition photographs or video. Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage operations.
- .4 The Contract Administrator does not guaranty that existing conditions are the same as those indicated in Project Record Documents.
- .5 When unanticipated mechanical, electrical or structural elements are encountered, investigate and measure the nature and extent of the element. Promptly submit a written report to the Contract Administrator.

3.2 PREPARATION

- .1 Inspect site with the Contract Administrator and verify extent and location of items designated for removal, disposal, alternative disposal, recycling, salvage, and items to remain.
- .2 Locate and protect utilities. Preserve active utilities traversing site in operating condition.
- .3 Complete associated investigative work i.e. utility surveys, daylighting, hand digging etc. to confirm accurately delineate the required limits and extents of demolition and removal. The Contractor shall note that the accuracy and completeness of existing utilities shown on the Contract Drawings is not guaranteed and should not be relied upon.

3.3 PROTECTION

- .1 Prevent movement, settlement or damage of adjacent structures, services, walks, paving, trees, landscaping and adjacent grades.
- .2 Repair damage caused by demolition as directed by the Contract Administrator.
- .3 Support affected structures and, if safety of structure being demolished or adjacent structures or services appears to be endangered, take preventative measures, stop Work and immediately notify the Contract Administrator. Provide temporary support during removals and excavation to existing exposed or adjacent items to remain including but not limited to:
 - .1 Utility poles
 - .2 Aerial cables
 - .3 Catchbasins, manholes, pipes, ducts, conduits, valves and outfalls
 - .4 Gas meters
- .4 Maintain vehicular access to roadways, driveways and building maintenance locations during work in accordance with the Contract Documents and as directed by the Contract Administrator.
- .5 Maintain pedestrian access in accordance with the Contract Documents and as directed by the Contract Administrator.
- .6 Maintain and protect existing landscaping, street furniture, mechanical services and meters, building components in accordance with the Contract Documents and as directed by the Contract Administrator.
- .7 Prevent debris from blocking surface drainage system, mechanical and electrical systems which must remain in operation.

3.4 TREE REMOVALS AND SELECTION OF SALVAGED LOGS

SELECTIVE SITE DEMOLITION

- .1 Tree removal shall be in accordance with the requirements of Appendix A - Arborist Report, Macpherson Avenue Park, Urban Forest Innovations Inc., September 9, 2022, and Section =s 31 11 00 and 32 01 90.
- .2
- .3 Salvaged logs are to be selected from trees to be removed from the site, as identified on the Tree Preservation and Removals Drawings and in accordance with Section 32 71 00 – Habitat Structures.
 - .1 Notify the Contract Administrator prior to start of tree removal work for selection of suitable trees.
 - .2 Notify the Contract Administrator after selected trees have been felled, and prior to any further cutting or removal of large branches. Do not notch or otherwise damage the length of the trunk and ensure that trees are felled in a manner that preserves the trunk and any major branching unions.
- .4 Any unused salvaged logs, not selected for reuse on site, are to be disposed of in accordance with regulatory requirements.

3.5 DISPOSAL AND REMOVAL FROM SITE

- .1 Remove items as indicated.
- .2 Disruption of items designated to remain in place is not permitted.
- .3 Restore areas and existing works outside areas of demolition to conditions that existed prior to beginning of Work unless otherwise stipulated in the Contract Documents.
- .4 Dispose of materials not designated for salvage as applicable and in accordance with regulatory requirements.
- .5 Remove tree as outlined within the Project Record Documents during demolition. Ensure all required permits are in place prior to commencing work.

3.6 RESTORATION AND CLEANING

- .1 Progressive Cleaning: clean in accordance with Section 01 74 13 – Progressive Cleaning
- .2 Restore all disturbed areas outside the limits of work prescribed by the Contract documents to pre-construction conditions and as directed by the Contract Administrator.

END OF SECTION

METAL FABRICATIONS

Part 1 General

1.1 SECTION INCLUDES

- .1 Supply and installation of materials and components for metal fabrications, including the following:
 - .1 Steel platform benches.
 - .2 Galvanized steel components for feature art wall.
 - .3 Galvanized steel metal paver edge.
 - .4 Finishes and shop applied coatings.
 - .5 Miscellaneous metal components indicated on drawings and specified herein.

1.2 RELATED WORK

- .1 Section 01 33 00 – Submittals
- .2 Section 01 45 00 – Construction Quality Control
- .3 Section 03 10 00 – Concrete Formwork
- .4 Section 03 30 00 – Cast-in-Place Concrete
- .5 Section 06 15 01 – Timber and Woodwork
- .6 Section 32 14 40 – Landscape Stone
- .7 Section 32 33 00 – Exterior Site Furnishings
- .8 Refer to structural drawings and notes

1.3 REFERENCES

- .1 All referenced standards shall be the current edition or edition referenced by the Ontario Building Code currently in force.
- .2 Ontario Provincial Standard Specifications (OPSS)
 - .1 [OPSS.MUNI 904](#), Construction Specification for Concrete Structures
- .3 CSA Group (CSA):
 - .1 [CSA G40.20/G40.21-13](#), General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel
 - .2 [CSA G164-18](#), Hot Dip Galvanizing of Irregularly Shaped Articles
 - .3 [CSA S16-19](#), Design of Steel Structures
 - .4 [CSA W47.1-19](#), Certification of companies for fusion welding of steel
 - .5 [CSA W48-23](#), Filler Metals and Allied Materials for Metal Arc Welding
 - .6 [CSA W55.3-08](#), Certification of companies for resistance welding of steel and aluminum

METAL FABRICATIONS

- .7 [CSA W59-18](#), Welded Steel Construction
- .4 Canadian General Standards Board (CGSB)
 - .1 [CAN/CGSB-1.181-99](#), Ready-Mixed Organic Zinc-Rich Coating.
- .5 American Society for Testing and Materials International (ASTM)
 - .1 [ASTM A53/A53M-22](#), Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
 - .2 [ASTM A90/A90M-21](#), Standard Test Method for Weight Mass of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings
 - .3 [ASTM A123/A123M-17](#), Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
 - .4 [ASTM A153/A153M-16a](#), Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
 - .5 [ASTM A240/A240M-23](#), Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
 - .6 [ASTM A269/A269M-15a](#), Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service
 - .7 [ASTM A276-13a](#), Standard Specification for Stainless Steel Bars and Shapes
 - .8 [ASTM A307-21](#), Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength
 - .9 [ASTM A314-23](#), Standard Specification for Stainless Steel Billets and Bars for Forging
 - .10 [ASTM A380/A380M-17](#), Standard Practice for Cleaning, Descaling, and Passivation of Stainless Steel Parts, Equipment, and Systems
 - .11 [ASTM A480/A480M-23](#), Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip
 - .12 [ASTM A500/A500M-20](#), Standard Specification for Cold Formed Welded and Seamless Carbon Steel Structural Tubing in Round Shapes
 - .13 [ASTM A554-21](#), Standard Specification for Welded Stainless Steel Mechanical Tubing
 - .14 [ASTM A555/A555M-22](#), Standard Specification for General Requirements for Stainless Steel Wire and Wire Rods
 - .15 [ASTM A641/A641M-09a](#), Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire
 - .16 [ASTM A653/A653M-22](#), Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
 - .17 [ASTM A780/A780M-20](#), Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings

METAL FABRICATIONS

- .18 [ASTM A787/A787M-20a](#) – Standard Specification for Electric-Resistance-Welded Metallic-Coated Carbon Steel Mechanical Tubing
- .19 [ASTM F3125/F3125M-22](#), Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength
- .6 Nickel Institute, Tel. 416-591-7999, Contact: Jack McGurn, Email jmcgurn@nidi.org.
- .7 American Iron and Steel Institute (AISI)
 - .1 Steel Product Manual; Stainless and Heat Resisting Steel, current edition
- .8 International Organization for Standardization (ISO):
 - .1 ISO 12944, Corrosion Protection of Steel Structures by protective paint system
- .9 The Master Painters Institute (MPI):
 - .1 Architectural Painting Specification Manual (ASM), current edition
 - .2 Approved Products List (APL), current edition
- .10 Reference Documents:
 - .1 Appendix A - Arborist Report, Macpherson Avenue Park, Urban Forest Innovations Inc., April 23, 2025
 - .2 Appendix B - Soil and Groundwater Management Plan – Davenport Lands (Parcel 28B, 29 and 30, WSP, July 2024
 - .3 Appendix C - Contaminant Health and Safety Plan – 28B, 29 and 30 Green Line Trail, WSP, July 2024
 - .4 Appendix D - City of Toronto Tree Protection Policy and Specifications for Construction Near Trees, July 2016
 - .5 Appendix E – Geotechnical Investigation for Macpherson Avenue Park, October 31, 2022
 - .6 Appendix F – Hydro One General Conditions for Secondary Land Uses, Hydro One, January 2023
 - .7 Appendix G -General Requirements for Construction Work by External Parties in the Vicinity of Hydro One 115,000 and 230,000 Volt Underground Plant, Hydro One, January 2024

1.4 SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Action Submittals: Submit the following before starting work of this Section:
 - .1 Product Data: Submit product data for each type of manufactured material and product indicated. Include product characteristics, performance criteria, physical size, finish and limitations in use,
 - .2 Submit manufacturer's available range of colours for specified powdercoating finish.

METAL FABRICATIONS

- .3 Shop Drawings: Submit electronic shop drawings for Contract Administrator review, prior to fabrication.
 - .1 Shop drawings shall include plans, sections and large-scale details, and shall indicate components and methods of assembly, materials and their characteristics, fastenings, metal finishes, welds, and their structural characteristics relative to their purpose, and other fabrication information required.
 - .1 Digital artwork file for platform bench graphics and feature art wall street tag plaques to be provided by the Contract Administrator for the preparation of shop drawings and mock-ups.
 - .2 Shop Drawings shall be coordinated with other appropriate Sections of the specifications to ensure proper scheduling for fabrication and installation of the work specified herein.
 - .3 Indicate proposed site connections and methods.
 - .4 Indicate metal finishes.
 - .5 Indicate grain direction for stainless steel work.
 - .6 Shop drawings for work of this Section shall bear seal of qualified Professional Engineer licensed to practice in the Province of Ontario.
 - .7 Alternative details may be considered by the Contract Administrator. Full details of any alternatives to be shown on shop drawings.
 - .8 Submit design calculations for work of this Section bearing the seal of qualified Professional Engineer licensed to practice in the Province of Ontario.
- .4 Samples for initial selection:
 - .1 Submit samples of powdercoated metal for platform bench with specified colour.
 - .1 Allow up to 3 additional colour variations for Contract Administrator's initial selection.
 - .2 Samples shall be 50mm x 50mm or manufacturer's standard colour chip.
 - .2 Submit a sample of metal for feature art wall street tag plaque demonstrating each specified finish and paint colours.
 - .1 Allow up to 3 additional colour variations for Contract Administrator's initial selection.
 - .2 Samples shall be 50mm x 50mm or manufacturer's standard colour chip.
 - .3 Submit a 300 x 300 section of galvanized welded wire mesh for feature art wall.
 - .1 Submit sample concurrently with submission of feature art wall stone and glass samples required under Section 32 14 40 – Landscape Stone.
- .5 Samples
 - .1 Submit a 300x300mm section of powdercoated steel demonstrating green colour with painted white lettering. Sample to capture letters 'GRE' for review of size, finish and colour.

METAL FABRICATIONS

- .2 Submit one street tag plaque demonstrating metal finish, paint colour, welds and laser etched text.
- .3 Submit a 300mm section showing welds and material finishes for the following:
 - .1 HSS structural frame for the Wood Platform Bench
 - .2 Galvanized Steel Metal Paver Edger
- .3 Informational Submittals: Submit the following submittals during the course of the Work:
 - .1 Mock-ups:
 - .1 Construct a full-size mock-up of the wood platform bench demonstrating the metal frame, front panel and supports and wood slats and fasteners as well as all other metal components.
 - .1 Coordinate the mock-up with requirements of Section 06 15 01 – Timber and Woodwork.
 - .2 Construct mock-up at Metal Fabricators shop. Accepted Mock-ups may be retained as part of final installation work at the discretion of the Contract Administrator. Acceptance of workmanship shall establish a basis for acceptance of remainder of work.
 - .2 Construct a full-size mock-up of one panel of the feature art wall, including posts, frame, mesh, internal panels, street tag plaques as well as all other metal components.
 - .1 Construct mock-up at Metal Fabricators shop. Accepted Mock-ups may be retained as part of final installation work at the discretion of the Contract Administrator. Acceptance of workmanship shall establish a basis for acceptance of remainder of work.
 - .3 The purpose of the mock-ups is to evaluate the proposed details and to assess the fabricator's workmanship.
 - .4 Mock-ups shall be modified as many times as necessary to obtain acceptance by the Contract Administrator. Proceed with fabrication work only upon acceptance of Contract Administrator.
 - .5 When accepted, mock-ups shall demonstrate the minimum standard for the Work.

1.5 QUALITY ASSURANCE

- .1 Execute Work only by company with adequate plant, equipment, and skilled workers to perform Work expeditiously, having been responsible for a high standard of workmanship in similar installation to that specified using architectural metals during a period of at least the immediate past 5 years. Specialized experience and capabilities are mandatory for work indicated herein. Capability in managing fine detailing will be required with respect to the following:
 - .1 Accuracy of metalwork
 - .2 Neatness of workmanship
 - .3 Hairline joinery
 - .4 Possessing proper equipment and know-how for the work

METAL FABRICATIONS

- .5 Possessing keen understanding of cleanliness of shop, tools, methods, cleaning, blasting, and brushing work, so as to finish work with clean, consistent finishes free of staining.
- .2 All materials, components and workmanship to conform to building and local by-laws. Contractor to obtain all necessary permits and approvals.
- .3 Weld structural components in steel, to conform to requirements of CSA Standard W59-M, and by a fabricator fully certified by the Canadian Welding Bureau to conditions of CSA Standard W47.1 and W55.3, and other current applicable standards.
- .4 Manufacturer's Qualification: Powdercoating manufacturer shall regularly engage, for at least 10 years in manufacturing shop-applied coating systems of similar type and for similar projects to that specified

1.6 DESIGN REQUIREMENTS

- .1 Design Work of this Section by qualified Professional Engineer registered in the Province of Ontario and covered by a minimum \$1,000,000 professional liability insurance.
- .2 Design, fabricate, and install in accordance with the building code and requirements of all other governing authorities.
- .3 Exterior metal fabrication items shall be designed to withstand expansion and contraction of the component parts at an ambient temperature range of 80°C without causing harmful buckling, opening of joints, overstressing of fasteners, or other harmful effects.
- .4 Design, fabricate, and install in accordance with the building code and requirements of all other governing authorities.
- .5 Design assemblies and connections to withstand own dead load, super-imposed dead loads, and fabrication forces, without permanent distortions or deformation.
- .6 Design assemblies and connections to withstand own dead load, super-imposed dead loads, and fabrication forces, without permanent distortions or deformation, to maximum allowable deflection of L/360, within the following construction tolerances.
 - .1 Maximum variation from plumb in vertical lines: 3.2 mm (1/8") in 3 m (10 ft).
 - .2 Maximum variation from level: 3.2 mm (1/8") in 9 m (30 ft).
 - .3 Maximum variation from straight: 3.2 mm (1/8") in 3 m (10 ft.) under a 3 m (10 ft.) straight edge.
 - .4 Maximum variation from angle indicated: 10 seconds.

1.7 COORDINATION

- .1 Coordinate the work in this Section with other appropriate Sections of the specifications to ensure proper scheduling for fabrication and installation of the work specified herein.
- .2 Field measurements:
 - .1 Verify dimensions in the field prior to fabrication to assure proper fit. Perform Work to suit site dimensions and conditions.

METAL FABRICATIONS

- .2 Detailed field measurements of structure dimensions and anchorage locations shall be undertaken prior to any fabrication. The Contractor shall adjust any dimensions on the drawings as necessary to ensure proper fit.
- .3 Provide cut-outs, templates, anchors, inserts, and other accessories which are required for coordination of work of other trades including, but not limited to, precast concrete, and as indicated on Drawings.
- .4 Be responsible for extra Work caused by, and time lost as a result of failure to provide necessary cooperation, information or items to be fixed to or built in, in adequate tune as determined by the project.

1.8 DELIVERY, STORAGE AND HANDLING

- .1 Store products in manufacturer's unopened packaging until ready for installation.
- .2 Label, tag or otherwise mark Work supplied for installation by other Sections to indicate its function, location in project and shop drawing designation.
- .3 Protect Work from damage during delivery, storage and handling. Handle with fabric slings, store and transport on non-staining wood blocking. Protect against scuffing during shipment.
- .4 Store products according to manufacturer's recommendations. Leave products wrapped or otherwise protected and under clean and dry storage conditions until required for installation.
- .5 Deliver Work to location designated by the Contractor and to meet requirements of construction schedule.
- .6 Exercise care not to scratch, mark, dent, or bend metal components during delivery, storage, and installation.

1.9 PROJECT CONDITIONS

- .1 Verify actual site dimensions by field measurements before fabrication; show recorded measurements on shop drawings.
- .2 Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.

1.10 WASTE MANAGEMENT

- .1 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .2 Divert unused metal materials from landfill to metal recycling facility.

1.11 SITE REVIEW

- .1 Professional Engineer responsible for the production of the shop drawings and design calculations shall provide periodic site review during fabrication and installation and shall submit periodic site review reports.
- .2 Include cost of shop and field review.

1.12 WARRANTY

- .1 Warrant labour, materials and workmanship against defects and deficiencies for a period of 2 years from date of Substantial Performance of the Work.

METAL FABRICATIONS

Part 2 Products**2.1 MATERIALS - GENERAL**

- .1 Include materials, products, accessories, and supplementary parts necessary to complete assembly and installation of Work of this Section.
- .2 Incorporate only metals that are free from defects which impair strength or durability, or which are visible. Install only new metals, and free from scratches, surface contaminants, rust, waves, buckles, and that are clean, straight, and with sharply defined profiles.
- .3 Be responsible for structural design, member sizes, arrangement, supports, connections, and anchoring of Work of this Section. Coordinate and maintain materials, dimensions, layout and appearance.

2.2 STEEL

- .1 Steel, structural shapes, plate, bars: hot-rolled, to meet specified requirements of CAN/CSA-G40.21, Steel plates to be Universal Mill Plates Grade 300 W.
- .2 Steel, hollow structural sections: hot-formed, seamless, to meet specified requirements of CAN/CSA-G40.21, Grade 350W, Class H.
- .3 Steel, sheet: cold rolled, stretcher levelled, fully pickled, to meet specified requirements of ASTM A366 or SAE Specification 1010.
- .4 Steel Pipe: ASTM A53, Type E or S, Grade A or B, standard weight, Schedule 40 seamless black or AISI MT 1010/1015, or acceptable alternative.

2.3 GALVANIZED STEEL

- .1 Hot Dip Galvanizing: to ASTM A123/A123M-17, minimum zinc coating of 600 g/m², Coating Grade 85.
- .2 Fabricate steel to be galvanized in accordance with ASTM A123/A123M-17. Avoid fabrication techniques that could cause distortion or embrittlement of steel.
- .3 Remove welding slag, splatter, burrs, grease, oil, paint, lacquer, and other deleterious material prior to galvanizing.
- .4 Remove by blast cleaning or other methods surface contaminants and coatings not removable by normal chemical cleaning process in the galvanizing operation.
- .5 Hot dip galvanize steel members, fabrications, and assemblies after fabrication and all welding is complete, in accordance with ASTM A123/A123M-17. Use air cooling method (no water or chromate dipping treatment permitted).
- .6 Hot dip galvanize A325 and A490 bolts, nuts, washers, and hardware components in accordance with ASTM A123/A123M-17. Oversize holes to allow for zinc alloy growth. Shop assemble bolts, nuts and washers with special lubricant and test in accordance with ASTM A123/A123M-17.
- .7 Galvanize components of bolted assemblies separately before assembly.
- .8 Welding on galvanized surfaces is not permitted.

2.4 STAINLESS STEEL

METAL FABRICATIONS

- .1 Stainless steel sheet and plate: ASTM A167, Type 316, Type 316L at welded fabrications.
- .2 Stainless steel sheet: AISI Type 316, Type 316L at welded fabrications).
- .3 Stainless steel bar and angle: ASTM A276, Type 316, Type 316L at welded fabrications.

2.5 WELDING MATERIALS

- .1 Steel: to CAN/CSA W59.

2.6 FASTENERS

- .1 Metal fasteners shall be uniform to metal materials and components being anchored or of a metal which will not set-up a galvanic action causing damage to the fastening or metal component under moist conditions.
- .2 Fasteners for pre-finished materials shall be of concealed type unless otherwise indicated, and when exposed finish is required, of matching pre-finishing materials.
- .3 Metal fastenings and accessories shall be of same texture, colour, and finish as material on which they occur, as selected by the Contract Administrator.
- .4 Bolts, nuts, washers, screws: Type 304 stainless steel to ASTM A314-23.
- .5 High strength bolts: to ASTM F3125/F3125M-23.
- .6 All exposed fasteners to be tamper-proof.
- .7 Where noted, anti-seize paste will be applied to fasteners

2.7 FINISHES

- .1 Galvanizing; hot dip after fabrication metal work: for irregular sections, zinc coating to meet specified requirements of CAN/CSA-G164. Use air cooling method (no water or chromate dipping treatment permitted).
- .2 Stainless steel: AISI No. 4 brushed finish, grain direction as indicated on drawings. Where grain direction is not indicated, verify with Contract Administrator prior to fabrication.

2.8 SHOP-APPLIED COATINGS

- .1 Powdercoat: Polyester TGIC-Free super durable powder coating with excellent weather resistance properties for high performance architectural exterior applications, as supplied by Tiger-drylac Canada (www.tiger-coatings.com/ca-en/), or approved equivalent.
 - .1 Colour: Kelly Green 138/50017 RAL 6017 smooth / glossy.
 - .2 Powdercoat finish shall be free of all defects.
 - .3 Digital artwork file for lettering to be provided by the Contract Administrator.
- .2 'The Green Line' text painting applied to the powder coated steel to adhere to the powder coated finish. Colour to be selected by Contract Administrator.

METAL FABRICATIONS

Part 3 Execution

3.1 GENERAL

- .1 Coordinate installation with work of other appropriate Sections to ensure proper scheduling for fabrication and installation of the work specified herein.
- .2 Assemble items in the shop to the greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.
- .3 Incorporate means for fastenings of other Work secured to Work of this Section.
- .4 Make templates for cast in anchorages.
- .5 Joints shall be milled to a close fit. Corner joints shall be coped or mitred, well formed, and in true alignment.
- .6 Protection against galvanic action shall be provided wherever dissimilar metals are in contact. Protection shall be by application of an appropriate gasket, neoprene spacer or other approved galvanic isolator.

3.2 EXAMINATION

- .1 Verify condition and dimensions of previously installed work, related work, and conditions under which this work is to be performed.
- .2 Notify the Contract Administrator in writing of all deficiencies and conditions detrimental to the proper completion of this work.
- .3 Proceed with installation only after unsatisfactory conditions have been corrected. Commencement of work means Installer accepts substrate, previously installed work, and existing conditions.

3.3 PREPARATION

- .1 Thoroughly clean and suitably pre-treat steel prior to finishing.
- .2 Remove loose mill scales, rust, oil grease, dirt and other foreign matter by solvent cleaning, wire brushing, power wire brushing, or abrasive blasting.
- .3 Grind sharp projections until smooth.

3.4 FABRICATION - FEATURE ART WALL

- .1 All steel fabrication for the feature art wall to be supplied by Monte Metals inc. (<https://www.montemetals.com/>), or approved equal.
- .2 Refer to drawings and notes for feature art fence fabrication requirements and installation sequence.

3.5 FABRICATION

- .1 Take site measurements to ensure that Work is fabricated to fit surrounding construction, around obstructions and projections in place.
- .2 Construction:

METAL FABRICATIONS

- .1 Fabricate metal components with machinery and tools specifically designed for the intended manufacturing processes and by skilled tradesmen.
- .2 Shop fabricate to designs indicated on Drawings and to meet performance requirements specified.
- .3 Shop fabricate fittings, interfacing parts and assemblies so that field cutting adjustments are not necessary.
- .4 Fabricate Work with materials, component sizes, metal gauges, reinforcing, anchors, and fasteners of adequate strength to withstand intended use..
- .5 Ensure that Work will remain free of warping, buckling, opening of joints and seams, distortion, and permanent deformation.
- .6 Drill drainage holes at metal fabrications to permit drainage of trapped moisture.
- .3 Welding:
 - .1 Do welding work in accordance with CSA W59 and CSA W59.2, as applicable, unless specified otherwise.
 - .2 Welding shall be done by qualified welders. No welding will be permitted on site.
 - .3 Provide continuous welds, where exposed to view unless otherwise indicated. Weld and grind welds to provide flat flush and finish to match adjacent finish, where exposed to view
- .4 Bolting:
 - .1 Bolt holes in 10mm or thinner material may be drilled or punched to finished size. In material thicker than 10mm, the holes shall be drilled to finished size or sub-punched smaller than the nominal diameter of the fastener and reamed to size. The finished diameter of holes shall not be more than seven percent greater than the nominal diameter of the fastener except:
 - .1 Slotted holes for expansion purposes shall be provided as required on the plans.
 - .2 Holes for anchor bolts shall have a diameter of not less than the nominal diameter plus 5mm and not greater than the nominal bolt diameter plus 10mm.
 - .2 Holes shall not be drilled in such a manner as to distort the metal, but holes only slightly misaligned may be reamed to render a reasonable fit.
 - .3 In all bolts the finished shank shall be long enough to provide full bearing and washers shall be used under the nuts to give full grip when the nuts are tightened.
- .5 Cutting:
 - .1 Material 10mm thick or less may be sheared, sawn or cut with a router. Materials more than 10mm thick shall be sawn or routed.
 - .2 Cut edges shall be true and smooth, and free from excessive burrs or ragged breaks.
 - .3 Re-entrant cuts shall be avoided wherever possible. If used, they shall be filleted by drilling prior to cutting.
- .6 Assembly

METAL FABRICATIONS

- .1 Fit and assemble metal fabrications in shop. When this is not possible, make a trial shop assembly.
- .2 Accurately cut, machine and fit joints, corners, copes and miters so that junctions between components fit together tightly and in true planes.
- .3 Fasten Work with concealed methods unless otherwise indicated on Drawings.
- .4 Weld connections where possible, bolt where not possible, and cut off bolts flush with nuts. Countersink bolt heads, and incorporate method to prevent loosening of nuts. Ream holes drilled for fastenings.
- .5 Provide continuous welds, where exposed to view unless otherwise indicated. Weld and grind welds to provide flat flush and finish to match adjacent finish, where exposed to view.
- .6 Provide for differential movements within assemblies and at junctions of assemblies with surrounding Work.
- .7 Drainage
 - .1 Provide 6 mm drainage holes at bottom of all vertical hollow members and on underside of horizontal hollow members (min 600 mm o.c.) to ensure complete drainage of all
- .7 Finish work:
 - .1 Prefinish work at the factory, except where specified or indicated otherwise
 - .2 Incorporate holes and connections for work installed under other sections.
 - .3 Cleanly and smoothly finish exposed edges of materials including holes. Ease 90° corners of exposed metals.
 - .4 Cap open ends of sections exposed to view, such as pipes, channels, angles, and other similar work. End caps shall be fitted to all exposed ends of rails or posts.
 - .5 Mill joints to a tight, hairline fit. Cope or mitre corner joints. Form joints exposed to weather to exclude water penetration.
 - .6 Finish exposed surfaces to smooth, sharp, well-defined lines and arises.
 - .7 For welded stainless steel fabrications continuous weld, grind welds smooth and flat where exposed to view and polish to match metal finish.
 - .8 For galvanized steel, remove all grind smooth all sharp edges prior to galvanizing.
 - .9 Galvanizing:
 - .1 Galvanize metal fabrications following fabrication.
 - .10 Powdercoating:
 - .1 Apply powdercoating following fabrication.
 - .2 Follow powdercoating manufacturer's specifications for cleaning and preparation prior to powdercoating.
 - .11 Painting:

METAL FABRICATIONS

- .1 Prepare metal surfaces to receive paint finishes in accordance with MPI ASM.
- .2 Apply paint following fabrication and powdercoating.
- .3 Apply paint following manufacturer's specifications for cleaning and preparation of powdercoated surface, prior to painting.

3.6 INSTALLATION

- .1 Install metal fabrications in accordance with reviewed shop drawings and to accommodate work of others.
- .2 Verify alignment, support dimensions, and tolerances are correct.
- .3 Inventory components to ensure all required items are available for installation. Inspect components for damage. Remove damaged components from site and replace.
- .4 Anchorage devices, such as concrete inserts, anchor bolts, and metal items having integral anchors that are to be embedded in cast-in-place concrete construction, shall be delivered to the project site in time to be installed before the start of cast-in-place concrete operations. Setting drawings, templates, instructions, and directions for the installation of the anchorage items shall be provided.
- .5 Install metal fabrications plumb, true, square, straight, level, and accurately and tightly fitted together and fit to surrounding work.
- .6 Make field connections with bolts or weld as indicated to CAN/CSA-S16.1.
- .7 Do welding work in accordance with CAN/CSA-S16.1.
- .8 Provide suitable means of anchorage acceptable to Contract Administrator such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.
- .9 Attach work to site concrete and masonry with epoxy injected adhesive and threaded inserts, to support load with a safety factor of three (3).
- .10 Insulate between dissimilar metals, or between metal and masonry or concrete, with bituminous paint, or as otherwise noted on Drawings, to prevent electrolytic action.
- .11 Grout metal posts, pickets, balusters, and the like, in metal sleeves into concrete, with non-shrink quick setting epoxy anchor cement, unless detail otherwise.
- .12 Exposed fastening devices to match finish and be compatible with material through which they pass.
- .13 Hand items over for casting into concrete or building into masonry to appropriate trades together with setting templates.
- .14 Minimize on-site welding of galvanized steel. Welding of galvanized steel only permitted where accepted by Contract Administrator on accepted shop drawings.
- .15 Repair galvanized surfaces as per ASTM A-780.

3.7 ADJUSTMENT AND CLEANING

- .1 Touch-up, repair or replace damaged products as directed by Contract Administrator.
- .2 Repair damaged factory-applied finish as directed by Contract Administrator.

METAL FABRICATIONS

- .3 Remove damaged, dented, defaced, defectively finished, or tool marked components and replace with new.
- .4 Clean and polish acrylic and metal surfaces after installation is complete. Use only materials that won't scratch, or mar finished surfaces and as approved by material manufacturers.
- .5 Do not use abrasive cleaners.

3.8 PROTECTION

- .1 Maintain protection of Work of this Section from time of installation until final finishes are applied or to final cleanup.
- .2 Protect finished surfaces from damage.

END OF SECTION

TIMBER AND WOODWORK

Part 1 General

1.1 SECTION INCLUDES

- .1 This Section includes fabrication, supply and installation of materials and components for complete installation of platform benches and as indicated on Drawings and specified herein.

1.2 RELATED WORK

- .1 Section 02 41 13 – Selective Site Demolition
- .2 Section 03 10 00 – Concrete Formwork
- .3 Section 03 30 00 – Cast-in-Place Concrete
- .4 Section 05 50 00 – Metal Fabrications
- .5 Section 32 33 00 – Exterior Site Furnishings
- .6 Refer to structural drawings and notes

1.3 REFERENCES

- .1 All referenced standards shall be the current edition or edition referenced by the Ontario Building Code currently in force.
- .2 Ontario Provincial Standard Specifications (OPSS):
 - .1 OPSS.MUNI 904, Construction Specification for Concrete Structures
- .3 CSA Group (CSA):
 - .1 CSA O80 Series:21, Wood Preservation
 - .2 CSA O80.20-97, Fire-Retardant Treatment of Lumber by Pressure Processes.
 - .3 CSA O86:19, Engineering design in wood
 - .4 CSA O141:23, Canadian standard lumber
 - .5 CSA B111-1974, Wire Nails, Spikes and Staples
 - .6 CAN/CSA-S16-01, Limit States Design of Steel Structures
 - .7 CSA W59-18, Welded Steel Construction (Metal Arc Welding)
 - .8 CSA Z809:16, Sustainable forest management
- .4 National Lumber Grades Authority (NLGA):
 - .1 NLGA Standard Grading Rules for Canadian Lumber, 2017
- .5 ASTM International(ASTM):
 - .1 ASTM A480/A480M-23b, Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip

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- .2 ASTM A641/A641M-19, Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire
- .3 ASTM D7612-21, Standard Practice for Categorizing Wood and Wood-Based Products According to Their Fiber Sources
- .4 ASTM F593-22, Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs
- .6 Environmental Choice Program (ECP):
 - .1 ECP-76-98, Surface Coatings.
- .7 Forest Stewardship Council (FSC):
 - .1 FSC-STD-01-001-v5-3, FSC Principle and Criteria for Forest Stewardship
- .8 Architectural Woodwork Institute (AWI):
 - .1 Architectural Woodwork Standards, Current Edition
- .9 Reference Documents:
 - .1 Appendix A - Arborist Report, Macpherson Avenue Park, Urban Forest Innovations Inc., April 23, 2025
 - .2 Appendix B - Soil and Groundwater Management Plan – Davenport Lands (Parcel 28B, 29 and 30, WSP, July 2024
 - .3 Appendix C - Contaminant Health and Safety Plan – 28B, 29 and 30 Green Line Trail, WSP, July 2024
 - .4 Appendix D - City of Toronto Tree Protection Policy and Specifications for Construction Near Trees, July 2016
 - .5 Appendix E – Geotechnical Investigation for Macpherson Avenue Park, October 31, 2022
 - .6 Appendix F – Hydro One General Conditions for Secondary Land Uses, Hydro One, January 2023
 - .7 Appendix G -General Requirements for Construction Work by External Parties in the Vicinity of Hydro One 115,000 and 230,000 Volt Underground Plant, Hydro One, January 2024

1.4 SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Action Submittals: Submit the following submittals before starting any work of this Section:
 - .1 Product Data: Submit product data for each type of manufactured material and product indicated. Include product characteristics, performance criteria, physical size, finish and limitations in use.
 - .1 Submit product data for clear non-toxic sealant
 - .2 Shop Drawings: Submit electronic shop drawings for Contract Administrator review, prior to fabrication.
 - .1 Shop drawings shall include plans, sections and large-scale details, and shall indicate components and methods of assembly, materials and their characteristics, fastenings,

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metal finishes, welds, and their structural characteristics relative to their purpose, and other fabrication information required.

- .2 Shop Drawings shall be coordinated with other appropriate Sections of the specifications to ensure proper scheduling for fabrication and installation of the work specified herein.
- .3 Indicate locations and sizes of blocking and nailers.
- .4 Indicate proposed site connections and methods.
- .3 Samples:
 - .1 Submit duplicate, 300 mm (12") long samples of wood slats for platform benches with specified finish including fasteners. Samples shall demonstrate full range of grain variation, colour, texture and finish proposed for wood specified
 - .2 Submit duplicate samples of each type of fastener required.
- .3 Informational Submittals: Submit the following submittals during the course of the Work:
 - .1 Mock-ups:
 - .1 Construct a mock-up of the wood platform bench demonstrating the metal frame, front panel and supports and wood slats and fasteners as well as all other metal components.
 - .1 Coordinate the mock-up with requirements of Section 05 50 00 – Metal Fabrications.
 - .2 Construct mock-up at Metal Fabricators shop. Accepted Mock-ups may be retained as part of final installation work at the discretion of the Contract Administrator. Acceptance of workmanship shall establish a basis for acceptance of remainder of work.
 - .3 The purpose of the mock-up is to evaluate the proposed details and to assess the fabricator's workmanship.
 - .4 Mock-ups shall be modified as many times as necessary to obtain acceptance by the Contract Administrator. Proceed with fabrication work only upon acceptance of Contract Administrator.
 - .5 When accepted, mock-up shall demonstrate the minimum standard for the Work.

1.5 QUALITY ASSURANCE

- .1 General: the work of this section shall be executed only by a supplier who has adequate plant, equipment, and skilled tradespersons to perform work expeditiously, and is known to have been responsible for satisfactory installations similar to that required in the Work during a period of at least the immediate past 5 years.
- .2 All materials, components and workmanship to conform to building and local by-laws. Contractor to obtain all necessary permits and approvals.
- .3 Lumber identification: by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board. Provide industry standard acceptable written certification such as:
 - .1 Certificate of Inspection & Environmental Compliance.
 - .2 FSC Certification or similar approved.

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- .4 Coordinate the work in this Section with other appropriate Sections of the specifications to ensure proper scheduling for fabrication and installation of the work specified herein.
- .5 Reference Standards: unless otherwise indicated, carry out timber and woodwork in accordance with requirements of "Millwork Standards (latest issue) of the Architectural Woodwork Institute (AWI) "Premium Grade".
- .6 Single-source manufacturing and Installation responsibility: Engage a qualified Manufacturer to assume undivided responsibility for Work specified in this section, including fabrication and finishing.
- .7 Requirements of regulatory agencies: the work of this section that functions to resist forces imposed by dead and live loads shall conform to requirements of jurisdictional authorities.

1.6 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver and store materials on site in such a way as to prevent deterioration or loss or impairment of essential properties. Prevent excessive moisture gain of kiln-dried materials.
- .2 Delivery and Acceptance Requirements:
 - .1 Deliver lumber identified by grade with a stamp of an agency certified by the Canadian Lumber Standards Accreditation Board.
 - .2 Deliver materials at least 2 weeks before installation. Allow for proper on-site acclimation.
 - .3 Protect materials to be left exposed in finished Work. Cover materials with waterproof covering. Maintain adequate air circulation and ventilation.
- .3 Storage and Handling Requirements:
 - .1 Use padded, non-marring slings for handling wood sections.
 - .2 Protect corners with wood blocking.
 - .3 Store wood and protect from weather, block off ground and separate with stripping, so air may circulate around all faces of members.
 - .4 Cover wood with opaque moisture resistant membrane if stored outside.
 - .5 Include storage and handling instructions maintenance procedure for finishes or components requiring specific care, noting particularly those procedures or materials which will cause damage to finished surfaces.
- .4 Make adequate provision for delivery and handling stresses.

1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 Wood cut-offs are to be diverted from landfill by disposal into on-site wood recycling bin or at nearest wood recycling facility as approved by Contract Administrator.
- .2 Reusable materials are to be diverted for reuse at nearest used building materials facility or similar type facility.
- .3 Unused preservatives and fire retardant materials are to be diverted from landfill through disposal at a special wastes depot.

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Part 2 Products

2.1 MATERIALS - GENERAL

- .1 Unless detailed or specified otherwise, standard Products will be acceptable if construction details and installation meet intent of the drawings and specifications.
- .2 Include materials, Products, accessories, and supplementary parts necessary to complete assembly and installation of work of this section.
- .3 Incorporate only metals that are free from defects that are visible, or that impair strength or durability. Install only new metals of best quality, and free from rust or waves and buckles, and that are clean, straight, and with sharply defined profiles.

2.2 WOOD SLATS FOR PLATFORM BENCHES:

- .1 Furfurylated American Southern yellow pine wood with a permanently modified cell structure, Kebony, as supplied by North on Sixty (www.northonsixty.com/kebony), or approved equivalent.
 - .1 North on Sixty, Toronto Office
756 Markham Street,
Toronto ON. M6G 2M5,
Phone: (647) 981-6933
- .2 Size: width, depth & length of boards as shown on drawings
- .3 Hardness: minimum 1400lbf measured with the Janka hardness test
- .4 Pre-drill anchor holes as specified on drawings. Pilot Hole to be sized to prevent splitting of boards – confirm with final fastener size.
- .5 Wood slats shall be partially air dried to a moisture content of 15%-25%.
- .6 Surface to be supplied S4S-E4E (Surfaced four sides-eased four edges). Edges shall be eased to a radius of 4m
- .7 Lumber shall be graded four faces, and four edges
- .8 Lumber shall be straight grained and parallel cut without heart center.
- .9 Lumber shall be all heartwood, no sapwood allowed.
- .10 Lumber shall be in sound condition, free from worm holes or knots.
- .11 Allowable Imperfections defined as - Small drying cracks, small end splits (less than 4 mm (5/32") in width), that do not impair the strength of the material or fastening, Discoloration caused by weathering or chemical reaction, Bow or twist which can be removed using normal installation methods and tools, Roey/Scale grain (one face only).
- .12 Not Allowable Imperfections defined as - Longitudinal heart cracks, Internal cracks, Firm or soft sap wood, Fungi Affects - (blue to gray, brown to red, white to yellow, or incipient decay), Bow or twist which cannot be removed by normal installation methods and tools.
- .13 Store wood out of direct sunlight. Allow to acclimate and stabilize to installation environment humidity levels before installation.

2.3 METAL COMPONENTS

- .1 In accordance with Section 05 50 00 – Metal Fabrications.

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2.4 FASTENERS

- .1 All exposed fasteners to be tamper-proof.
- .2 Wood Fasteners:
 - .1 18/8 stainless steel screws – See drawings for details.
 - .2 Driven fasteners, nails, lag bolts, spikes brads and staples: CSA B111-1974, stainless steel, hardened aluminum or hot dip galvanized steel.
 - .3 Screws, washers, nuts, bolts: Nickel-plated or stainless steel.
- .3 Metal Fasteners:
 - .1 Metal fasteners shall be uniform to metal materials and components being anchored or of a metal which will not set-up a galvanic action causing damage to the fastening or metal component under moist conditions.
 - .2 Fasteners for pre-finished materials shall be of concealed type unless otherwise indicated, and when exposed finish is required, of matching pre-finishing materials.
 - .3 Metal fasteners and accessories shall be of same texture, colour, and finish as material on which they occur, as selected by the Contract Administrator.
 - .4 Metal Fasteners, Hardware, Connectors, and Hangers: Galvanized steel in accordance with CSA O86 and manufacturer's recommendations.
 - .5 Where noted, anti-seize paste will be applied to fasteners.

2.5 FABRICATION

- .1 .General:
 - .1 Fabricate metal components with machinery and tools specifically designed for the intended manufacturing processes and by skilled tradesmen.
 - .2 Fabricate woodwork to dimensions, profiles, and details indicated with openings and mortises pre-cut, where possible, to receive hardware and other items of work.
 - .3 Do welding work in accordance with CSA W59.2, as applicable, unless specified otherwise.
- .2 Construction:
 - .1 Fabricate with materials, component sizes, metal gauges, reinforcing, anchors, and fasteners of adequate strength to withstand intended use, and within allowable design factors imposed by jurisdictional authorities.
 - .2 Ensure that components will remain free of warping, buckling, opening of joints and seams, distortion, and permanent deformation.
 - .3 Provide framing for benches, complete with bracing and fastening devices as required for a rigid installation and as required to sustain the imposed loads.
 - .4 Reinforcing shown is minimum. Provide additional reinforcing as required to ensure a rigid assembly. Exposed surfaces shall be free from dents, tool marks, warpage, buckle, glue and open joints, or other defects. Accurately fit all joints, corners and mitres.
- .3 Assembly:

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- .1 Accurately cut, machine and fit joints, corners, copes and mitres so that junctions between components fit together tightly and in true planes.
 - .2 Fasten work with concealed methods unless otherwise indicated.
 - .3 Weld metal connections where possible, bolt where not possible, and cut off bolts flush with nuts. Countersink bolt heads, and incorporate method to prevent loosening of nuts. Ream holes drilled for fastenings.
 - .4 Provide continuous welds, where exposed to view unless otherwise indicated. Weld and grind welds to provide flat flush and finish to match adjacent finish, where exposed to view.
 - .5 Allow for differential movements within assemblies and at junctions of assemblies with surrounding Work.
- .4 Finish work:
- .1 Prefinish work at the factory, except where specified or indicated otherwise.
 - .2 Incorporate holes and connections for work installed under other sections.
 - .3 Cleanly and smoothly finish exposed edges of materials including holes.

Part 3 Execution

3.1 EXAMINATION

- .1 Verify condition and dimensions of previously installed work, related work, and conditions under which this work is to be performed.
- .2 Notify Contract Administrator in writing of all deficiencies and conditions detrimental to the proper completion of this work.
- .3 Proceed with installation only after unsatisfactory conditions have been corrected. Commencement of work means Installer accepts substrate, previously installed work, and existing conditions.

3.2 INSTALLATION

- .1 Coordinate installation with work of Section 05 50 00 – Metal Fabrication.
- .2 Do wood work in accordance with CSA O86 except where specified otherwise.
- .3 All lumber sizes are actual sizes rather than nominal sizes.
- .4 Install metal components plumb, true, square, straight, level, and accurately and tightly fitted together and fit to surrounding work.
- .5 Accurately fit joints in true plane, locate joints over bearing or supporting surfaces.
- .6 Apply grout in accordance with manufacturer's instructions and recommendations.
- .7 Make field connections with bolts or weld as indicated to CAN/CSA-S16.1.
- .8 Include in work of this section rough hardware such as nails, bolts, nuts, washers, screws, clips, and connectors required for complete installations. Unless permitted provide concealed fastening of components.

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- .9 Install fasteners in straight lines with no visual deviation – failure to comply with result in removal and re-installation.
- .10 Exposed fasteners where permitted shall be laid out uniformly, evenly spaced and aligned in both directions. Drive all nail heads below surface of wood; no hammerhead marks will be allowed. Use sufficient size and quantity of nails to ensure a stable, secure structure.
- .11 Screws with blown out threads after installation to be replaced. If screw installation results in thread being blown in bench support, bench support to be removed and new support installed.
- .12 Layout work carefully and to accommodate work of others. Cut and fit accurately. Erect in position indicated. Align, level, square, plumb, and secure work permanently in place.
- .13 Bore holes true to line and to same size as bolts. Drive bolts into place for snug fit and use plates or washers for bolt head and nut bearings. Turn up bolts and lag screws tightly when installed, and again just before concealed by other work or at completion of work.
- .14 Include in work of this section rough hardware such as nails, bolts, nuts, washers, screws, clips, and connectors required for complete installations
- .15 Do not attach work by wood plugs or blocking in concrete or masonry.
- .16 Do not regard nailers, blocking, and such other fastening provision indicated as exact or complete. Install required provisions for fastening, located and secured to suit site conditions, and adequate for intended support.
- .17 Install rails, slats, boards uniformly spaced and in longest practical lengths; accumulation of short pieces not permitted. No edge grain shall be visible; mitre corners. Slope cut intermediate joints. Erect work plumb, in true planes, and fastened rigidly in place.
- .18 Fastenings:
 - .1 Wood shall be pre-drilled for fasteners with countersunk bit.
 - .1 At concealed locations, set fasteners flush with finished face of wood.
 - .2 At exposed locations, countersink fasteners and conceal with glued hardwood dowels.
 - .2 Evenly space fasteners and align in both directions.
 - .3 Fasteners shall not bind or crush wood fibres.

3.3 CLEANING

- .1 Remove tool marks, bruises, and scratches.

3.4 PROTECTION

- .1 After timber and woodwork is installed, it shall be the responsibility of the Contract Administrator to protect it from damage until Substantial Performance.

END OF SECTION

EXTERIOR FITNESS EQUIPMENT

Part 1 General**1.1 SECTION INCLUDES**

- .1 This includes requirements for including delivery, labour, materials, tools, and equipment, required to supply and install outdoor fitness equipment, including all required structural footings, as shown on the drawings.

1.2 RELATED WORK

- .1 Section 01 33 00 - Submittal Procedures
- .2 Section 32 11 23 – Aggregate Base Courses
- .3 Section 32 18 15 – Engineered Wood Fibre Surfacing
- .4 Refer to structural drawings and notes

1.3 REFERENCES

- .1 All referenced standards shall be the current edition or edition referenced by the Ontario Building Code currently in force
- .2 City of Toronto:
 - .1 City of Toronto Accessibility Design Guidelines
- .3 Ontario Regulations:
 - .1 O. Reg. 413/12, Integrated Accessibility Standard
 - .2 AODA, Accessibility for Ontarians with Disability Act
- .4 CSA Group (CSA):
 - .1 [CAN/CSA Z614:20](#), Children's playground equipment and surfacing
- .5 American Society for Testing and Materials (ASTM International):
 - .1 [ASTM E303-22](#), Standard Test Method for Measuring Surface Frictional Properties Using the British Pendulum Tester
 - .2 [ASTM E648-15e1](#), Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source
 - .3 [ASTM F1292-22](#), Standard Specification for Impact Attenuation of Surfacing Materials Within the Use Zone of Playground Equipment
 - .4 [ASTM F3101-21a](#), Standard Specification for Unsupervised Public Use Outdoor Fitness Equipment

1.4 SUBMITTALS

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

EXTERIOR FITNESS EQUIPMENT

.2 Product Data:

- .1 Submit product data for each piece of fitness equipment and individually sourced item specified. Include construction details, material descriptions, dimensions of individual components and profiles, finishes, field-assembly requirements, and installation details.
- .2 Submit manufacturer's instructions, printed product literature and data sheets for each type of manufactured material and product indicated, including description of product, installation methods, and maintenance instructions.
- .3 Submit manufacturer's available range of colours and finishes for each item specified, for Contract Administrator's initial selection and approval prior to ordering.

.3 Shop Drawings:

- .1 Submit shop drawings for each piece of fitness equipment and individually sourced item specified. Indicate dimensions, sizes, assembly, anchorage and installation details for each furnishing item specified.
- .2 Submit scaled and stamped engineering drawings of the fitness equipment, layout, including applicable safety zones in accordance with [ASTM F3101-21a](#). Drawings to include structural footing design bearing the seal of qualified Professional Engineer licensed to practice in the Province of Ontario.
- .3 Do not fabricate or order any equipment until the shop drawings have been reviewed and the proposed equipment approved by the Contract Administrator.

.4 Closeout Submittals:

- .1 Operation and Maintenance Data: Include, in the operation and maintenance manual, manufacturer's maintenance instructions and recommended cleaning materials and methods and methods for repairing damage to the finish.
- .2 Include any keys or tamper proof tools for lockable features.

1.5 QUALITY ASSURANCE

- .1 Fitness equipment shall be installed by a reputable company employing skilled labourers in this type of installation having a minimum of (5) five years, proven experience in this type of work.
- .2 Design, fabricate and install fitness equipment in accordance with [ASTM F3101-21a](#), and Accessibility for Ontarians with Disability Act (AODA), current editions.
- .3 All structures delivered and installed must conform in all respects to the provisions contained in the latest version of [ASTM F3101-21a](#), Accessibility for Ontarians with Disability Act (AODA) and Ontario Regulation 191/11, Integrated Accessibility Standards. Components which are found to not conform will be replaced or made to conform at the Contractor's expense
- .4 All fitness equipment supplied under contract to the Owner shall abide by and comply with the true intent and meaning of the structural certifications and shall not relieve the supplier or Contractor of their responsibilities to provide fitness equipment and installations to the full extent of sound and proper engineering practice and construction standards.
- .5 All additional submittals and required documentation relating to the supplier's products and Contractor installations acquired under contract to the Client shall also meet the same structural design standards referenced above and practiced in the industry.

EXTERIOR FITNESS EQUIPMENT

- .6 The Owner bears no responsibility for the structural correctness of the approved design standards and it is the responsibility of the Contractor and the supplier to not only meet the requirements of [ASTM F3101-21 and CAN/CSA Z614:20a](#), but to also ensure and employ proper, sound engineering practice and construction standards in the execution of the work to be completed in every respect.

1.6 UTILITY LOCATES

- .1 The Contractor is responsible for obtaining and/or verifying all required utility locations prior to the digging of post holes, including subsurface drainage pipe. Make good any damage to utilities or subsurface drainage system.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 All materials are to be delivered to the site free from any damage and are to be installed as soon as possible after delivery. Deliver, store, and handle landscape materials to prevent damage and deterioration.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
- .1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect fitness equipment from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.

1.8 WARRANTY

- .1 All workmanship and material shall be guaranteed for a period of two (2) years, from the date of Substantial Performance of the project and all work must be performed to the satisfaction of the City of Toronto
- .2 The Contractor shall not be responsible for the cost of replacements of correctly installed components resulting from vandalism during the guarantee period.
- .3 The Contractor will be responsible for the cost of replacements at each site of components or work vandalized prior to Substantial Performance by the City of all work at that site.

Part 2 Products

2.1 MATERIALS - GENERAL

- .1 Equipment shall be supported with structural footings, as per manufacturer's requirements and as per contract documents.
- .2 Reference structural drawings.

2.2 OUTDOOR FITNESS EQUIPMENT:

- .1 Outdoor fitness equipment as supplied by PlayPower LT Canada, Inc. www.trekfit.ca.
- .2 Contact: Robb Wilson
PlayPower LT Canada, Inc.
PO BOX 125, Paris, ON.

EXTERIOR FITNESS EQUIPMENT

N3L 3E7
1-800-265-9953

- .3 Equipment:
 - .1 Trekfit Information Panel
 - .2 Trekfit Dip Station
 - .3 Trekfit Long Bench
 - .4 Trekfit Push-Up Bars Triple
 - .5 Trekfit Push-Up Bars Double
- .4 Colour and finishes to be confirmed by Contract Administrator prior to ordering.
- .5 All equipment shall be grounded according to electrical drawings and specifications.
- .6 Installation as per manufacturer's instructions.

2.3 METAL COMPONENTS

- .1 All metal hardware shall be hot dipped galvanized, or cadmium plated and shall be of heavy duty construction.

2.4 FASTENERS

- .1 Fasteners shall be as per manufacturer's requirements.
- .2 A limited number of fastener types are to be used and all fasteners are to be tamper proof and vandal resistant.
- .3 All metal hardware shall be hot dipped galvanized, cadmium plated or equivalent and shall be of heavy duty construction.
- .4 All threaded bolts and fasteners are to be treated with a coloured locking compound, Lock Tight #262 or approved equal, and be peen hammered to prevent removal. Excess thread to be removed and cut field smooth.

2.5 ACCESSORIES

- .1 The Contractor shall provide 1 set of any special tools, which may be required for providing ongoing maintenance to any components.
- .2 The Contractor shall provide 2 copies of installation instructions or drawings and parts catalogues in accordance with the format required in the contract documents.
- .3 The Contractor/ Supplier shall provide the City of Toronto representative with a repair kit, which will include but, not be limited to:
 - .1 Approved fiberglass repair kit where fiberglass components are used;
 - .2 Spare parts hardware and respective tool for removal;
 - .3 Appropriate quantities of touch-up paint.

EXTERIOR FITNESS EQUIPMENT

Part 3 Execution

3.1 INSTALLATION SCHEDULING

- .1 The Contractor shall leave the fitness equipment construction area in a safe and secure state to bar access in accordance with this specification document.

3.2 INSTALLATION

- .1 **All fitness equipment shall be grounded according to electrical drawings and specifications.**
- .2 Assemble and install fitness equipment in accordance with manufacturer's written installation instructions
- .3 Install fitness equipment level, plumb, true, and securely anchored at locations indicated on Drawings, per manufacturer's specifications
- .4 The subsurface area within the fitness area perimeter shall be fine graded to drain at 1.5% (min). All subgrades shall be graded accordingly to drain to the sub-drain system while allowing for the structure to be installed to line and level.
- .5 All posts shall be suitably braced and protected to avoid any movement until concrete footings have set. Posts found not to be plumb, regardless of the cause, shall be removed and reset plumb
- .6 When a post and stinger system is utilized, all new welds must be cleaned and treated with a rust inhibiting paint. The contractor shall not be allowed to plumb fitness equipment with the use of shims.
- .7 Equipment which has been substantially installed shall not be left over weekends without supervision or engineered wood fiber.

3.3 CLEANING

- .1 After completing fitness equipment installation, inspect components. Remove spots, dirt, and debris. Repair damaged finishes to match original finish or replace component
- .2 Surplus and excavated materials and debris shall be removed immediately from site by the contractor.
- .3 Dispose of all rubbish and surplus materials and leave the site in a neat and presentable condition, prior to preliminary acceptance.
- .4 Restore all surfaces used to access the site to their original condition. All sodded areas which have been damaged or disturbed are to be re-sodded.

END OF SECTION

COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.1. SCOPE OF WORK

- 1.1.1. Materials and installation for metered pedestal, park lighting, and GFCI receptacles
- 1.1.2. Materials and installation for duct & cabling from the metered pedestal to the lighting and receptacles.
- 1.1.3. Materials and installation for concrete encased duct from park property line to metered pedestal for THESL service cable
- 1.1.4. Provisions for access to maintain and repair all installed equipment
- 1.1.5. Supply all necessary supports including rentals, fees, permits to City and also to other sub-contractors as required for all installations mentioned above
- 1.1.6. Supporting all the coordination work with landscape architectural requirements including phasing/sequencing of the events/schedules.
- 1.1.7. Allow for ESA inspection work for the approval
- 1.1.8. All the work to result in a finished and operating facility as specified on drawings and all specifications.

1.2. RELATED SECTIONS/DRAWING

- 1.2.1. Section 26 05 21 Wires and Cables
- 1.2.2. Section 26 05 22 Connectors and Terminations
- 1.2.3. Section 26 05 28 Grounding-Secondary
- 1.2.4. Section 26 05 31 Cabinets
- 1.2.5. Section 26 05 34 Conduits, Conduit Fastenings and Conduit Fittings
- 1.2.6. Section 26 05 43.01 Installation of Cables in Trenches and Ducts
- 1.2.7. Section 26 27 19 Multi-Outlet Assemblies
- 1.2.8. Section 26 50 00 Lighting
- 1.2.9. Section 33 65 76 Direct Buried Underground Cable Ducts
- 1.2.10. Applicable sections from Div 1 as related to this contract, specifically 01 31 13 – coordination and 01 31 19 – Project meetings, 01 34 43 Environmental Requirements and Procedures
- 1.2.11. DRAWINGS
 - 1.2.11.1. Macpherson Park – Electrical
 - 1.2.11.2. Macpherson Park – Civil
 - 1.2.11.3. Macpherson Park – Photometrics
 - 1.2.11.4. Macpherson Park – Details – 1
 - 1.2.11.5. Macpherson Park – Details – 2
 - 1.2.11.6. Macpherson Park – Grounding Detail

COMMON WORK RESULTS FOR ELECTRICAL

1.3. REFERENCES

1.3.1. CSA Group

1.3.1.1. CSA C22.1-[12], Canadian Electrical Code, Part 1 (22nd Edition), Safety Standard for Electrical Installations.

1.3.1.2. CSA C22.2

1.3.1.3. CAN3-C235-[83(R2010)], Preferred Voltage Levels for AC Systems, 0 to 50,000 V.

1.3.2. Electrical and Electronic Manufacturer's Association of Canada (EEMAC)

1.3.2.1. EEMAC 2Y-1-1958, Light Gray Colour for Indoor Switch Gear.

1.3.3. Institute of Electrical and Electronics (IEEE)/National Electrical Safety Code Product Line (NESC)

1.3.3.1. IEEE SP1122-[2000], The Authoritative Dictionary of IEEE Standards Terms, 7th Edition.

1.4. DEFINITIONS

1.4.1. Electrical and electronic terms: unless otherwise specified or indicated, terms used in these specifications, and on drawings, are those defined by IEEE SP1122.

1.5. GENERAL REQUIREMENTS

1.5.1. Motors, electric heating, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard.

1.5.1.1. Equipment to operate in extreme operating conditions established in above standard without damage to equipment.

1.5.2. Language operating requirements: provide identification nameplates and labels for control items in English.

1.5.3. Drawings indicate the general character, scope, and arrangements of the electrical Installation. Approval of any change or departure from the drawings must be obtained from the Designer or Owner's Representative.

1.5.4. Equal Products: Those items on the drawings or in these specifications designating particular product numbers limit their use only as to design, workmanship and quality, not manufacturer. Approval for alternate or substitute items shall be secured from the Owner's Representative, and submittals for approval must be accompanied by all necessary descriptions, catalog sheets, etc. Authority over such submittals shall rest with the Owner's Representative.

1.5.5. Workmanship: All work shall be performed by skilled workmen in a manner reflecting the best modern construction practices. It shall present, upon completion, a neat, orderly, finished appearance. All evidence of debris associated with the work shall be removed from the premises.

1.5.6. Coordination with other trades to the fullest of ability in relation with others to result in a professional installation shall be complete, and more specifically, as follows:

1.5.6.1. The drawings and specifications are based on the best information available when prepared. Frequently minor changes occur with respect to the architectural plans, construction, and the requirements of equipment furnished by others. The electrical contractor shall recognize this in bidding, supervising, and in planning construction.

COMMON WORK RESULTS FOR ELECTRICAL

- 1.5.6.2. Before locating conduit runs, boxes, etc., the drawings shall be carefully checked to see that they are in accord with the electrical drawings. Required adjustments shall be made with the General Contractor's superintendent and with the Designer.
- 1.5.6.3. Before proceeding with the wiring for, owner furnished material, each item requiring electrical work shall be reviewed with those responsible for their installation. The electrical contractor shall become well acquainted with their characteristics, location and arrangement for mounting. Changes in wiring arrangements and other adjustments necessary or desirable shall be reviewed with the Owner's Representative for authorization.
- 1.5.7. Allowances for Contingencies: No change in contract price will be allowed for alternate work which requires approximately the same work to adjust or relocate electrical components or devices as part of the construction coordination work. An adequate allowance shall be included in the bid price for such coordination contingencies and for the additional work required by these coordination adjustments.
- 1.5.8. Record Drawings: The job supervisor shall maintain a set of prints on the job to be used to illustrate and note job changes as they occur. This shall include the locations of concealed or underground lines sizes over 1", the type of lighting fixtures provided, and any other information necessary to record the job as actually installed. Upon completion of the prints, the electrical contractor shall furnish to the Designer at the contractor's expense, a set of reproducible drawings containing the above-mentioned field notes.
- 1.5.9. Coordinate the proposed locations of major raceway systems, equipment, and materials. Include the following:
 - 1.5.9.1. Clearances for servicing equipment, including space for equipment disassembly required for periodic maintenance. Comply with code requirements for working space about electrical equipment.
 - 1.5.9.2. Exterior wall and foundation penetrations.
 - 1.5.9.3. Equipment connections and support details.
 - 1.5.9.4. Sizes and location of required concrete pads and bases.
 - 1.5.9.5. Scheduling, sequencing, movement, and positioning of large equipment into the building during construction.
 - 1.5.9.6. Penetrations in floors, walls, and ceilings and their relationship to other penetrations and installations.
- 1.5.10. Materials shall be new and unused and shall bear the CSA Seal where applicable.
- 1.5.11. Final installations shall be provided with Warranty for 12 months after commissioning date.
- 1.5.12. Deliver products to the project properly identified with names, model numbers, types, grades, compliance labels, and other information needed for identification.
- 1.5.13. Retain two sets of all equipment or device installation instructions and submit to the Owner's Representative prior to project completion.
- 1.6. SUBMITTALS**
 - 1.6.1. Submittals: in accordance with Section 01 33 00 Submittals.
 - 1.6.2. Product Data: submit WHMIS MSDS in accordance with Section 01 47 15 - Sustainable Requirements: Construction.

COMMON WORK RESULTS FOR ELECTRICAL

1.6.3. Shop drawings:

- 1.6.3.1. Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario, Canada.
- 1.6.3.2. Submit wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, control panels, accessories, piping, ductwork, and other items that must be shown to ensure coordinated installation.
- 1.6.3.3. Identify on wiring diagrams circuit terminals and indicate internal wiring for each item of equipment and interconnection between each item of equipment.
- 1.6.3.4. Indicate of drawings clearances for operation, maintenance, and replacement of operating equipment devices.
- 1.6.3.5. Submit 3copies of 600 x 600 mm minimum size drawings and product data inspection authorities.
- 1.6.3.6. If changes are required, notify Engineer of these changes in writing before they are made.

1.6.4. Quality Control: in accordance with Section 01 45 00 - Quality Control.

- 1.6.4.1. Provide CSA certified equipment and material. All manufacturers should have been engaged for more than 10 years for all products.
- 1.6.4.2. Where CSA certified equipment and material is not available, submit such equipment and material to inspection authorities for special approval before delivery to site.
- 1.6.4.3. Installers firm shall have more than 5 years experience of successful installation work for products mentioned in this project.
- 1.6.4.4. Submit test results of installed electrical systems and instrumentation.
- 1.6.4.5. Permits and fees: in accordance with General Conditions of contract.
- 1.6.4.6. Submit, upon completion of Work, load balance report as described in PART 3 - LOAD BALANCE.
- 1.6.4.7. Submit certificate of acceptance from authority having jurisdiction, and ESA upon completion of Work to Engineer.

1.7. QUALITY ASSURANCE

1.7.1. Quality Assurance: in accordance with Section 01 45 00 - Quality Control.

1.7.2. Qualifications: electrical Work to be carried out by qualified, licensed electricians who hold valid Master Electrical Contractor license or apprentices in accordance with authorities having jurisdiction respecting manpower vocational training and qualification.

- 1.7.2.1. Employees registered in provincial apprentices program: permitted, under direct supervision of qualified licensed electrician, to perform specific tasks.
- 1.7.2.2. Permitted activities: determined based on training level attained and demonstration of ability to perform specific duties.

1.7.3. Site Meetings:

- 1.7.3.1. In accordance with Section 01 32 17 - Construction Progress Schedule - Critical Path Method (CPM).

COMMON WORK RESULTS FOR ELECTRICAL

- 1.7.4. Health and Safety Requirements: Comply with construction work to occupational health and safety standards and in accordance with Occupational Health and Safety Act of Ontario

1.8. DELIVER, STORAGE AND HANDLING

- 1.8.1. Material Delivery Schedule: provide Engineer with schedule within 2 weeks after award of Contract.
- 1.8.2. Construction/Demolition Waste Management and Disposal: separate waste materials for reuse and recycling in accordance with Section 02 41 13 – Demolition and Removals

1.9. SYSTEM STARTUP

- 1.9.1. Instruct Engineer and operating personnel in operation, care and maintenance of systems, system equipment and components.
- 1.9.2. Arrange and pay for services of manufacturer's factory service engineer to supervise start-up of installation, check, adjust, balance and calibrate components and instruct operating personnel.
- 1.9.3. Provide these services for such period, and for as many visits as necessary to put equipment in operation, and ensure that operating personnel are conversant with aspects of its care and operation.

1.10. OPERATING INSTRUCTIONS

- 1.10.1. Provide for each system and principal item of equipment as specified in technical sections for use by operation and maintenance personnel.
- 1.10.2. Operating instructions to include following:
- 1.10.2.1. Wiring diagrams, control diagrams, and control sequence for each principal system and item of equipment.
 - 1.10.2.2. Start up, proper adjustment, operating, lubrication, and shutdown procedures.
 - 1.10.2.3. Safety precautions.
 - 1.10.2.4. Procedures to be followed in event of equipment failure.
 - 1.10.2.5. Other items of instruction as recommended by manufacturer of each system or item of equipment.
- 1.10.3. Print or engrave operating instructions and frame under glass or in approved laminated plastic.
- 1.10.4. Post instructions where directed.
- 1.10.5. For operating instructions exposed to weather, provide weather-resistant materials or weatherproof enclosures.
- 1.10.6. Ensure operating instructions will not fade when exposed to sunlight and are secured to prevent easy removal or peeling.

PART 2 - PRODUCTS**2.1. SUSTAINABLE REQUIREMENTS**

- 2.1.1. Materials and products in accordance with Section 01 47 15 - Sustainable Requirements: Construction.
- 2.1.2. Do verification requirements in accordance with Section 01 47 17 - Sustainable Requirements: Contractor's Verification.

COMMON WORK RESULTS FOR ELECTRICAL

2.2. MATERIALS AND EQUIPMENT

- 2.2.1. Material and equipment to be CSA certified. Where CSA certified material and equipment are not available, obtain special approval from inspection authorities before delivery to site and submit such approval as described in PART 1 - SUBMITTALS.

2.3. WARNING SIGNS

- 2.3.1. Warning Signs: in accordance with requirements of ESA.
- 2.3.2. Porcelain enamel signs, minimum size 175 x 250 mm.

2.4. WIRING TERMINATIONS

- 2.4.1. Ensure lugs, terminals, screws used for termination of wiring are suitable for either copper or aluminum conductors.

2.5. EQUIPMENT IDENTIFICATION

- 2.5.1. Identify electrical equipment with nameplates and labels as follows:
- 2.5.1.1. Nameplates: lamacoid 3 mm melamine, matt white finish face, black core, lettering accurately aligned and engraved into core mechanically attached with self tapping screws.
- 2.5.1.2. Sizes as follows:

NAMEPLATE SIZES

Size 1	10 x 50 mm	1 line	3 mm high letters
Size 2	12 x 70 mm	1 line	5 mm high letters
Size 3	12 x 70 mm	2 lines	3 mm high letters
Size 4	20 x 90 mm	1 line	8 mm high letters
Size 5	20 x 90 mm	2 lines	5 mm high letters
Size 6	25 x 100 mm	1 line	12 mm high letters
Size 7	25 x 100 mm	2 lines	6 mm high letters

- 2.5.2. Labels: embossed plastic labels with 6mm high letters unless specified otherwise.
- 2.5.3. Wording on nameplates and labels to be approved by Engineer prior to manufacture.
- 2.5.4. There will be two name plates on equipment. One (size 6) for Actual equipment tag and other (size 7) for its connection to other equipment. Allow for minimum of twenty-five (25) letters per nameplate and label.
- 2.5.5. Nameplates for terminal cabinets and junction boxes to indicate system and/or voltage characteristics.
- 2.5.6. Disconnects switches, starters and contactors: Indicate equipment being controlled and voltage rating checked. Indicate system and voltage
- 2.5.7. Terminal cabinets and pull boxes: Indicate system and voltage.
- 2.5.8. Transformers: indicate capacity, Indicate primary and secondary voltages with equipment tags and "connected to" tags.

2.6. WIRING IDENTIFICATION

- 2.6.1. Identify wiring with permanent indelible identifying markings, [numbered] [coloured plastic tapes], on both ends of phase conductors of feeders and branch circuit wiring.

COMMON WORK RESULTS FOR ELECTRICAL

- 2.6.2. Maintain phase sequence and colour coding throughout.
- 2.6.3. Colour coding: to CSA C22.1.
- 2.6.4. Use colour coded wires in communication cables, matched throughout system.

2.7. CONDUIT AND CABLE IDENTIFICATION

- 2.7.1. Colour code conduits, boxes and metallic sheathed cables.
- 2.7.2. Code with plastic tape or paint at points where conduit or cable enters wall, ceiling, or floor, and at 15 m intervals where applicable.
- 2.7.3. Colours: 25 mm wide prime colour and 20 mm wide auxiliary colour.

	Prime	Auxiliary
up to 250 V	Yellow	
up to 600 V	Yellow	Green
up to 5 kV	Yellow	Blue
up to 15 kV	Yellow	Red
Telephone	Green	
Other Communication Systems	Green	Blue
Fire Alarm	Red	
Emergency Voice	Red	Blue
Other Security Systems	Red	Yellow

2.8. FINISHES

- 2.8.1. Shop finish metal enclosure surfaces by application of rust resistant primer inside and outside, and at least two coats of finish enamel.
 - 2.8.1.1. Paint outdoor electrical equipment (colour to be determined)
- 2.8.2. Visible covers, lids and plates to be galvanized steel
 - 2.8.2.1. Control Corrosion: Prevent the risk of bimetallic corrosion by use of isolating materials between dissimilar metals, or from direct contact with incompatible material.
 - 2.8.2.2. Provide samples for approval showing representative finishes and sizes.

PART 3 - EXECUTION**3.1. INSTALLATION**

- 3.1.1. Do complete installation in accordance with CSA C22.1 except where specified otherwise.
- 3.1.2. Do complete overhead and underground systems in accordance with CSA C22.3 No.1 except where specified otherwise.

3.2. NAMEPLATES AND LABELS

- 3.2.1. Ensure manufacturer's nameplates, CSA labels and identification nameplates are visible and legible after equipment is installed.

3.3. CONDUIT AND CABLE INSTALLATION

- 3.3.1. Install conduit and sleeves prior to pouring of concrete.

COMMON WORK RESULTS FOR ELECTRICAL

- 3.3.1.1. Sleeves through concrete: PVC, sized for free passage of conduit, and protruding 50mm.
- 3.3.2. If plastic sleeves are used in fire rated walls or floors, remove before conduit installation.
- 3.3.3. Install cables, conduits and fittings embedded or plastered over, close to building structure so furring can be kept to minimum.
- 3.4. CO-ORDINATION OF PROTECTIVE DEVICES**
- 3.4.1. Ensure circuit protective devices such as overcurrent trips, relays and fuses are installed to required values and settings.
- 3.5. FIELD QUALITY CONTROL**
- 3.5.1. Load Balance:
 - 3.5.1.1. Measure phase current to panelboards with normal loads (lighting) operating at time of acceptance; adjust branch circuit connections as required to obtain best balance of current between phases and record changes.
 - 3.5.1.2. Measure phase voltages at loads and adjust transformer taps to within 2% of rated voltage of equipment.
 - 3.5.1.3. Provide upon completion of work, load balance report as directed in PART 1 - SUBMITTALS: phase and neutral currents on panelboards, dry type transformers and motor control centres, operating under normal load, as well as hour and date on which each load was measured, and voltage at time of test. The original print-outs from the digital equipment must be retained and copied to computer as pdf files for future reference.
- 3.5.2. Conduct following tests in accordance with Section 01 45 00 - Quality Control.
 - 3.5.2.1. Power distribution system including phasing, voltage, grounding and load balancing.
 - 3.5.2.2. Circuits originating from branch distribution panels.
 - 3.5.2.3. Lighting and its control.
 - 3.5.2.4. Insulation resistance testing:
 - 3.5.2.4.1. Megger circuits, feeders and equipment up to 350 V with a 500 V instrument.
 - 3.5.2.4.2. Megger 350-600 V circuits, feeders and equipment with a 1000 V instrument.
 - 3.5.2.4.3. Check resistance to ground before energizing.
- 3.5.3. Carry out tests in presence of Engineer.
- 3.5.4. Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project.
- 3.5.5. Manufacturer's Field Services:
 - 3.5.5.1. Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - SUBMITTALS.

COMMON WORK RESULTS FOR ELECTRICAL

3.5.5.2. Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

3.5.5.3. Schedule site visits, to review Work, as directed in PART 1 - QUALITY ASSURANCE.

3.6. CLEANING

3.6.1. Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original paint.

3.6.2. Clean and prime exposed non-galvanized hangers, racks and fastenings to prevent rusting.

END OF SECTION 26 05 00

WIRES AND CABLES

PART 1 - GENERAL

1.1. SECTION INCLUDES

- 1.1.1. Materials and installation for metered pedestal, lighting, and GCFI receptacles

1.2. RELATED SECTIONS/DRAWING

- 1.2.1. Section 26 05 00 Common Work Results for Electrical
- 1.2.2. Section 26 05 22 Connectors and Terminations
- 1.2.3. Section 26 05 28 Grounding - Secondary
- 1.2.4. Section 26 05 31 Cabinets
- 1.2.5. Section 26 05 34 Conduits, Conduit Fastenings and Conduit Fittings
- 1.2.6. Section 26 05 43.01 Installation of Cables in Trenches and Ducts
- 1.2.7. Section 26 27 19 Multi-Outlet Assemblies
- 1.2.8. Section 26 50 00 Lighting
- 1.2.9. Section 33 65 76 Direct Buried Underground Cable Ducts
- 1.2.10. Applicable sections from Div 1 as related to this contract, specifically 01 31 13 – coordination and 01 31 19 – Project meetings, 01 34 43 Environmental Requirements and Procedures
- 1.2.11. DRAWINGS
 - 1.2.11.1. Macpherson Park – Electrical
 - 1.2.11.2. Macpherson Park – Civil
 - 1.2.11.3. Macpherson Park – Photometrics
 - 1.2.11.4. Macpherson Park – Details – 1
 - 1.2.11.5. Macpherson Park – Details – 2
 - 1.2.11.6. Macpherson Park – Grounding Detail

1.3. REFERENCES

- 1.3.1. CSA 22.1
- 1.3.2. CSA 22.2

1.4. PRODUCT DATA

- 1.4.1. Provide product data in accordance with Section 01 33 00 – Submittal Procedures

1.5. DELIVERY, STORAGE AND HANDLING

- 1.5.1. Packaging Waste Management: remove for reuse by manufacturer of pallets, crates, padding and packaging materials in accordance with Section 01 74 13 Progressive Cleaning.

WIRES AND CABLES

PART 2 - PRODUCTS

2.1. CONDUCTORS

- 2.1.1. 2C-#6 AWG CU 120V RWU90 XLPE PVCJ (BLACK, WHITE) & 1C-#6 RWU90 CU GROUND WIRE (GREEN)

PART 3 - EXECUTION

3.1. FIELD QUALITY CONTROL

- 3.1.1. Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical.
- 3.1.2. Perform tests using method appropriate to site conditions and to approval of Engineer and local authority having jurisdiction over installation.
- 3.1.3. Perform tests before energizing electrical system.

3.2. GENERAL CABLE INSTALLATION

- 3.2.1. Install cable in trenches in accordance with Section 26 05 43.01 Installation of Cables in Trenches and Ducts.
- 3.2.2. Cable Colour Coding: to Section 26 05 00 Common Work Results for Electrical.
- 3.2.3. Conductor length for parallel feeders to be identical.
- 3.2.4. Lace or clip groups of feeder cables at distribution centres, pull boxes, and termination points.
- 3.2.5. Branch circuit wiring for surge suppression receptacles and permanently wired computer and electronic equipment to be 2-wire circuits only, i.e. common neutrals not permitted.
- 3.2.6. Provide numbered wire collars for control wiring. Numbers to correspond to control shop drawing legend. Obtain wiring diagram for control wiring.
- 3.2.7. Do not splice cables unless indicated on the drawing.

END OF SECTION 26 05 21

CONNECTORS AND TERMINATIONS

PART 1 - GENERAL

1.1. RELATED SECTIONS/DRAWING

- 1.1.1. Section 26 05 00 Common Work Results for Electrical
- 1.1.2. Section 26 05 21 Wires and Cables
- 1.1.3. Section 26 05 28 Grounding - Secondary
- 1.1.4. Section 26 05 31 Cabinets
- 1.1.5. Section 26 05 34 Conduits, Conduit Fastenings and Conduit Fittings
- 1.1.6. Section 26 05 43.01 Installation of Cables in Trenches and Ducts
- 1.1.7. Section 26 27 19 Multi-Outlet Assemblies
- 1.1.8. Section 26 50 00 Lighting
- 1.1.9. Section 33 65 76 Direct Buried Underground Cable Ducts
- 1.1.10. Applicable sections from Div 1 as related to this contract, specifically 01 31 13 – coordination and 01 31 19 – Project meetings, 01 34 43 Environmental Requirements and Procedures
- 1.1.11. DRAWINGS
 - 1.1.11.1. Macpherson Park – Electrical
 - 1.1.11.2. Macpherson Park – Civil
 - 1.1.11.3. Macpherson Park – Photometrics
 - 1.1.11.4. Macpherson Park – Details – 1
 - 1.1.11.5. Macpherson Park – Details – 2
 - 1.1.11.6. Macpherson Park – Grounding Detail

1.2. REFERENCES

- 1.2.1. CSA Group
 - 1.2.1.1. CSA C22.1-[12], Canadian Electrical Code, Part 1 (22nd Edition), Safety Standard for Electrical Installations.
 - 1.2.1.2. CSA C22.2 No.41-[13], Grounding and Bonding Equipment (Tri-National Standard, with NMJ-J-590ANCE and UL 467).
 - 1.2.1.3. CSA C22.2 No.65-[13], Wire connectors (Tri-National Standard, with UL 486A-486B NMJ-J-543-ANCE).

1.3. PRODUCT DATA

- 1.3.1. Provide product data in accordance with Section 01 33 00 – Submittal Procedures

1.4. DELIVERY, STORAGE AND HANDLING

CONNECTORS AND TERMINATIONS

- 1.4.1. Packaging Waste Management: remove for reuse by manufacturer of pallets, crates, padding and packaging materials in accordance with Section 02 41 13 Demolition and Removals.

PART 2 - PRODUCTS

2.1. CONNECTORS AND TERMINATIONS

- 2.1.1. Short barrel Copper, Aluminum long barrel compression connectors to CSA C22.2 No.65 as required sized for conductors.
- 2.1.2. Contact aid for aluminum cables where applicable.

PART 3 - EXECUTION

3.1. EXAMINATION

- 3.1.1. Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for connectors and terminations installation in accordance with manufacturer's written instructions.

3.2. INSTALLATION

- 3.2.1. Install stress cones, terminations, and splices in accordance with manufacturer's instructions.
- 3.2.2. Bond and ground as required to CSA C22.2 No.41.

3.3. CLEANING

- 3.3.1. Progress Cleaning: clean in accordance with Section 01 74 13 Progressive Cleaning.
 - 3.3.1.1. Leave Work area clean at end of each day.
- 3.3.2. Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 13 Progressive Cleaning.
- 3.3.3. Waste Management: separate waste materials for recycling/ reuse in accordance with Section 01 35 43 Environmental Requirements
 - 3.3.3.1. Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION 26 05 22

Secondary-Grounding

PART 1 - GENERAL

1.1. SECTION INCLUDES

- 1.1.1. Materials and installation for light poles, and park infrastructure and furniture grounding

1.2. RELATED SECTIONS/DRAWING

- 1.2.1. Section 26 05 00 Common Work Results for Electrical
- 1.2.2. Section 26 05 22 Connectors and Terminations
- 1.2.3. Section 26 05 31 Cabinets
- 1.2.4. Section 26 05 34 Conduits, Conduit Fastenings and Conduit Fittings
- 1.2.5. Section 26 05 43.01 Installation of Cables in Trenches and Ducts
- 1.2.6. Section 26 27 19 Multi-Outlet Assemblies
- 1.2.7. Section 26 50 00 Lighting
- 1.2.8. Section 33 65 76 Direct Buried Underground Cable Ducts
- 1.2.9. Applicable sections from Div 1 as related to this contract, specifically 01 31 13 – coordination and 01 31 19 – Project meetings, 01 34 43 Environmental Requirements and Procedures
- 1.2.10. DRAWINGS
 - 1.2.10.1. Macpherson Park – Electrical
 - 1.2.10.2. Macpherson Park – Civil
 - 1.2.10.3. Macpherson Park – Photometrics
 - 1.2.10.4. Macpherson Park – Details – 1
 - 1.2.10.5. Macpherson Park – Details – 2
 - 1.2.10.6. Macpherson Park – Grounding Detail

1.3. REFERENCES

- 1.3.1. American National Standards Institute/Institute of Electrical and Electronics Engineers (ANSI/IEEE)
 - 1.3.1.1. ANSI/IEEE 837-[02], IEEE Standard for Qualifying Permanent Connections Used in Substation Grounding.
- 1.3.2. Canada Green Building Council (CaGBC)
 - 1.3.2.1. LEED Canada-NC Version 1.0-[2004], LEED (Leadership in Energy and Environmental Design): Green Building Rating System for New Construction and Major Renovations (including Addendum [2007]).
 - 1.3.2.2. LEED Canada-NC-[2009], LEED (Leadership in Energy and Environmental Design): Green Building Rating System for New Construction and Major Renovations 2009.

1.4. PRODUCT DATA

Secondary-Grounding

- 1.4.1. Submit manufacturer's shop drawings & instructions, printed product literature and data sheets for grounding equipment and include product characteristics, performance criteria, physical size,

1.5. DELIVERY, STORAGE AND HANDLING

- 1.5.1. Packaging Waste Management: remove for reuse by manufacturer of pallets, crates, padding and packaging materials in accordance with Section 01 74 13 Progressive Cleaning.

PART 2 - PRODUCTS

2.1. Ground wire and Ground Rod

2.1.1. Connectors

- 2.1.1.1. CU GROUND ROD ¾ INCH TO 2/0 250KCMIL

- 2.1.1.2. CU C TAP 3/0 STR RUN TO 250 TAP

2.1.2. Ground wires.

- 2.1.2.1. 250 37 STR CU SD AS PER ASTM B8

- 2.1.2.2. #2 BARE COPPER

- 2.1.2.3. 4/0 259 STR CU SD AS PER ASTM B173

2.1.3. Ground Rod

- 2.1.3.1. 3/4 INCH BY 10-FEET STEEL GALVANIZED

PART 3 - EXECUTION

3.1. FIELD QUALITY CONTROL

- 3.1.1. Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical.
- 3.1.2. Perform ground continuity and resistance tests using method appropriate to site conditions and to approval of the Consultant and local authority having jurisdiction over installation.
- 3.1.3. Perform tests before energizing electrical system.

3.2. INSTALLATION GENERAL

- 3.2.1. Install complete permanent, continuous grounding system including, electrodes, conductors, connectors, accessories.
- 3.2.2. Install connectors in accordance with manufacturer's instructions.
- 3.2.3. Protect exposed grounding conductors from mechanical injury.

Secondary-Grounding

- 3.2.4. Install separate ground conductor to outdoor lighting standards.
- 3.2.5. Ground secondary service pedestals.

3.3. EQUIPMENT GROUNDING

- 3.3.1. Each fence post requires connection to ground grid.
- 3.3.2. Every 5th post must have a ground rod.

3.4. CLEANING

- 3.4.1. Progress Cleaning: clean in accordance with Section [01 74 11 - Cleaning].
 - 3.4.1.1. Leave Work area clean at end of each day.
- 3.4.2. Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section [01 74 11 - Cleaning]

END OF SECTION 26 05 21

CABINETS

PART 1 - GENERAL

1.1. RELATED SECTIONS/DRAWING

- 1.1.1. Section 26 05 00 Common Work Results for Electrical
- 1.1.2. Section 26 05 21 Wires and Cables
- 1.1.3. Section 26 05 22 Connectors and Terminations
- 1.1.4. Section 26 05 28 Grounding - Secondary
- 1.1.5. Section 26 05 34 Conduits, Conduit Fastenings and Conduit Fittings
- 1.1.6. Section 26 05 43.01 Installation of Cables in Trenches and Ducts
- 1.1.7. Section 26 27 19 Multi-Outlet Assemblies
- 1.1.8. Section 26 50 00 Lighting
- 1.1.9. Section 33 65 76 Direct Buried Underground Cable Ducts
- 1.1.10. Applicable sections from Div 1 as related to this contract, specifically 01 31 13 – coordination and 01 31 19 – Project meetings, 01 34 43 Environmental Requirements and Procedures
- 1.1.11. DRAWINGS
 - 1.1.11.1. Macpherson Park – Electrical
 - 1.1.11.2. Macpherson Park – Civil
 - 1.1.11.3. Macpherson Park – Photometrics
 - 1.1.11.4. Macpherson Park – Details – 1
 - 1.1.11.5. Macpherson Park – Details – 2
 - 1.1.11.6. Macpherson Park – Grounding Detail

1.2. REFERENCES

- 1.2.1. Canadian Standards Association (CSA International)
 - 1.2.1.1. CSA C22.1-[06], Canadian Electrical Code, Part 1, 22nd Edition.

1.3. PRODUCT DATA

- 1.3.1. Provide product data in accordance with Section 01 33 00 – Submittal Procedures

1.4. FINISH

- 1.4.1. Submit representative sample for all visible covers, lids and plates to Consultant for approval.

1.5. DELIVERY, STORAGE AND HANDLING

- 1.5.1. Waste Management and Disposal:

CABINETS

- 1.5.1.1. Separate waste materials for reuse/ recycling in accordance with Section 01 35 43 Environmental Requirements.

PART 2 - PRODUCTS

2.1. CABINETS

- 2.1.1. City of Toronto Standard Park Cabinet components to be supplied and installed per the following Specification Details:
- *'Standard 100 Amp Electrical Panel Box within City Parks'* found on Macpherson Park sheet 'Details – 2
 - *'Footing Detail For Electrical Panel Box within City Parks'* found on Macpherson Park sheet 'Details – 2
 - *'Electrical Panel Box Locking Bar Detail'* found on Macpherson Park sheet 'Details – 2
 - Internal Electrical Components – contractor to submit shop drawings to the Electrical Engineer for review
 - Irrigation Controller & Components – contractor to submit shop drawings to the Irrigation Engineer for review

PART 3 - EXECUTION

3.1. SPLITTERS INSTALLATION

- 3.1.1. Mount plumb, true and square.
- 3.1.2. Extend splitters full length of equipment arrangement except where indicated otherwise.

3.2. CABINETS INSTALLATION

- 3.2.1. Mount cabinets with top not higher than 2 m above finished grade except where indicated otherwise.
- 3.2.2. Install Cabinets in locations as indicated on the Electrical Drawings

3.3. IDENTIFICATION

- 3.3.1. Equipment Identification: to Section [26 05 00- Common Work Results for Electrical].
- 3.3.2. Identification Labels: size 2 indicating system name, voltage and phase or as indicated.

END OF SECTION 26 05 31

CONDUITS, CONDUIT FASTENINGS AND CONDUIT FITTINGS

PART 1 - GENERAL

1.1. RELATED SECTIONS/DRAWING

- 1.1.1. Section 26 05 00 Common Work Results for Electrical
- 1.1.2. Section 26 05 21 Wires and Cables
- 1.1.3. Section 26 05 22 Connectors and Terminations
- 1.1.4. Section 26 05 28 Grounding - Secondary
- 1.1.5. Section 26 05 31 Cabinets
- 1.1.6. Section 26 05 43.01 Installation of Cables in Trenches and Ducts
- 1.1.7. Section 26 27 19 Multi-Outlet Assemblies
- 1.1.8. Section 26 50 00 Lighting
- 1.1.9. Section 33 65 76 Direct Buried Underground Cable Ducts
- 1.1.10. Applicable sections from Div 1 as related to this contract, specifically 01 31 13 – coordination and 01 31 19 – Project meetings, 01 34 43 Environmental Requirements and Procedures
- 1.1.11. DRAWINGS
 - 1.1.11.1. Macpherson Park – Electrical
 - 1.1.11.2. Macpherson Park – Civil
 - 1.1.11.3. Macpherson Park – Photometrics
 - 1.1.11.4. Macpherson Park – Details – 1
 - 1.1.11.5. Macpherson Park – Details – 2
 - 1.1.11.6. Macpherson Park – Grounding Detail

1.2. REFERENCES

- 1.2.1. Canadian Standards Association (CSA International)
 - 1.2.1.1. CAN/CSA C22.2 No. 18 98(R2003), Outlet Boxes, Conduit Boxes, Fittings and Associated Hardware, A National Standard of Canada.
 - 1.2.1.2. CSA C22.2 No. 211.2 [M1984(R2003)], Rigid PVC (Unplasticized) Conduit.
 - 1.2.1.3. CSA C22.2 No. 45-[M1981(R2003)], Rigid Metal Conduit.

1.3. SUBMITTALS

- 1.3.1. Provide submittals in accordance with Section 01 33 00 – Submittal Procedures.
- 1.3.2. Product data: submit manufacturer's printed product literature, specifications and datasheets.
 - 1.3.2.1. Submit cable manufacturing data.

CONDUITS, CONDUIT FASTENINGS AND CONDUIT FITTINGS

1.3.3. Quality assurance submittals:

- 1.3.3.1. Test reports: submit certified test reports.
- 1.3.3.2. Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
- 1.3.3.3. Instructions: submit manufacturer's installation instructions.

1.4. WASTE MANAGEMENT AND DISPOSAL

- 1.4.1. Separate waste materials for [recycling] [reuse] in accordance with Section 01 35 43 Environmental Requirements.
- 1.4.2. Place materials defined as hazardous or toxic waste in designated containers.
- 1.4.3. Ensure emptied containers are sealed and stored safely for disposal away from children.

PART 2 - PRODUCTS**2.1. CABLES AND REELS**

- 2.1.1. Provide cables on reels or coils.
 - 2.1.1.1. Mark or tag each cable and outside of each reel or coil, to indicate cable length, voltage rating, conductor size, and manufacturer's lot number and reel number.
- 2.1.2. Each coil or reel of cable to contain only one continuous cable without splices.
- 2.1.3. Reel and mark shielded cables rated 2,001 volts and above.

2.2. CONDUITS

- 2.2.1. Rigid PVC conduit: to CSA C22.2 No. 211.2.
- 2.2.2. Threaded rods, 6mm diameter, to support suspended channels.

2.3. CONDUIT FITTINGS

- 2.3.1. Fittings: to CAN/CSA C22.2 No. 18, manufactured for use with conduit specified. Coating: same as conduit.
- 2.3.2. Ensure factory "ells" where 90 degrees bends for NPS 125 mm and larger conduits.

2.4. EXPANSION FITTINGS FOR RIGID CONDUIT

- 2.4.1. Weatherproof expansion fittings with internal bonding assembly suitable for from 100 to 200 mm linear expansion.
- 2.4.2. Watertight expansion fittings with integral bonding jumper suitable for linear expansion and 19 mm deflection.
- 2.4.3. Weatherproof expansion fittings for linear expansion at entry to panel.

2.5. FISH CORD

- 2.5.1. Polypropylene.

CONDUITS, CONDUIT FASTENINGS AND CONDUIT FITTINGS

PART 3 - EXECUTION**3.1. MANUFACTURER'S INSTRUCTIONS**

- 3.1.1. Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2. INSTALLATION

- 3.2.1. Use rigid PVC conduit underground.
- 3.2.2. Minimum conduit size for lighting and power circuits: 50mm PVC Type 2 Rigid Conduit
- 3.2.3. Field threads on rigid conduit must be of sufficient length to draw conduits up tight.
- 3.2.4. Install fish cord in empty conduits.
- 3.2.5. Remove and replace blocked conduit sections.
- 3.2.5.1. Do not use liquids to clean out conduits.
- 3.2.6. Dry conduits out before installing wire.

3.3. CONDUITS IN CAST-IN-PLACE CONCRETE

- 3.3.1. Locate to suit reinforcing steel.
- 3.3.1.1. Install in center one third of slab.
- 3.3.2. Protect conduits from damage where they stub out of concrete.
- 3.3.3. Install sleeves where conduits pass through slab or wall.
- 3.3.4. Provide oversized sleeve for conduits passing through waterproof membrane, before membrane is installed.
- 3.3.4.1. Use cold mastic between sleeve and conduit.
- 3.3.5. Conduits in slabs: minimum slab thickness 4 times conduit diameter.
- 3.3.6. Encase conduits completely in concrete with minimum 25 mm concrete cover.
- 3.3.7. Organize conduits in slab to minimize cross overs.

3.4. CONDUITS UNDERGROUND

- 3.4.1. Slope conduits to provide drainage.
- 3.4.2. Waterproof joints (PVC excepted) with heavy coat of bituminous paint.

3.5. CLEANING

- 3.5.1. Proceed in accordance with Section 01 74 13- Progressive Cleaning.
- 3.5.2. On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

INSTALLATION OF CABLES IN TRENCHES AND DUCTS

PART 1 - GENERAL

1.1. RELATED SECTIONS/DRAWING

- 1.1.1. Section 26 05 00 Common Work Results for Electrical
- 1.1.2. Section 26 05 21 Wires and Cables
- 1.1.3. Section 26 05 22 Connectors and Terminations
- 1.1.4. Section 26 05 28 Grounding - Secondary
- 1.1.5. Section 26 05 31 Cabinets
- 1.1.6. Section 26 05 34 Conduits, Conduit Fastenings and Conduit Fittings
- 1.1.7. Section 26 27 19 Multi-Outlet Assemblies
- 1.1.8. Section 26 50 00 Lighting
- 1.1.9. Section 33 65 76 Direct Buried Underground Cable Ducts
- 1.1.10. Applicable sections from Div 1 as related to this contract, specifically 01 31 13 – coordination and 01 31 19 – Project meetings, 01 34 43 Environmental Requirements and Procedures
- 1.1.11. DRAWINGS
 - 1.1.11.1. Macpherson Park – Electrical
 - 1.1.11.2. Macpherson Park – Civil
 - 1.1.11.3. Macpherson Park – Photometrics
 - 1.1.11.4. Macpherson Park – Details – 1
 - 1.1.11.5. Macpherson Park – Details – 2
 - 1.1.11.6. Macpherson Park – Grounding Detail

1.2. REFERENCES

- 1.2.1. Canadian Standards Association, (CSA International)
- 1.2.2. Insulated Cable Engineers Association, Inc. (ICEA)

1.3. WASTE MANAGEMENT AND DISPOSAL

- 1.3.1. Separate and recycle waste materials in accordance with Section 02 41 13 – Demolition and Removals.
- 1.3.2. Remove from site and dispose of all packaging materials at appropriate recycling facilities.
- 1.3.3. Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard packaging material for recycling in accordance with Waste Management Plan.
- 1.3.4. Unused material must not be disposed of into sewer system, into streams, lakes, onto ground or in other location where it will pose health or environmental hazard.

INSTALLATION OF CABLES IN TRENCHES AND DUCTS

- 1.3.5. Divert unused metal and wiring materials from landfill to metal recycling facility as approved by Engineer.
- 1.3.6. Do not dispose of preservative treated wood through incineration.
- 1.3.7. Do not dispose of preservative treated wood with other materials destined for recycling or reuse.
- 1.3.8. Dispose of treated wood, end pieces, wood scraps and sawdust at sanitary landfill approved by Engineer.
- 1.3.9. Fold up metal banding, flatten and place in designated area for recycling.

PART 2 - EXECUTION

2.1. CABLE INSTALLATION IN DUCTS

- 2.1.1. Install cables as indicated in ducts.
- 2.1.2. Do not pull spliced cables inside ducts.
- 2.1.3. Install multiple cables in duct simultaneously.
- 2.1.4. Use CSA approved lubricants of type compatible with cable jacket to reduce pulling tension.
- 2.1.5. To facilitate matching of colour coded multiconductor control cables reel off in same direction during installation.
- 2.1.6. Before pulling cable into ducts and until cables are properly terminated, seal ends of lead covered cables with wiping solder; seal ends of non leaded cables with moisture seal tape.
- 2.1.7. After installation of cables, seal duct ends with duct sealing compound.
- 2.1.8. Requirements for Utility Trench Restoration:
 - 2.1.8.1. The level of compaction of 98% SPMDD must be maintained.
 - 2.1.8.2. Suitable compaction equipment shall be used to compact all areas (i.e. alongside trenches, structures and over top of installed facilities)
 - 2.1.8.3. Trenches shall be restored to original grade, reshaped and compacted.

2.2. FIELD QUALITY CONTROL

- 2.2.1. Perform tests in accordance with Section 26 05 00 - Common Work Results - Electrical.
- 2.2.2. Perform tests using qualified personnel. Provide necessary instruments and equipment.
- 2.2.3. Check phase rotation and identify each phase conductor of each feeder.
- 2.2.4. Check each feeder for continuity, short circuits and grounds. Ensure resistance to ground of circuits is not less than 50 megohms.
- 2.2.5. Acceptance Tests
 - 2.2.5.1. Ensure that terminations and accessory equipment are disconnected.
 - 2.2.5.2. Ground shields, ground wires, metallic armour and conductors not under test.
- 2.2.6. Provide Engineer with list of test results showing location at which each test was made, circuit tested and result of each test.

INSTALLATION OF CABLES IN TRENCHES AND DUCTS

2.2.7. Remove and replace entire length of cable if cable fails to meet any of test criteria.

2.3. CLEANING

2.3.1. Progress Cleaning: clean in accordance with Section 01 74 13 – Progressive Cleaning.

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

2.3.2. Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 13 – Progressive Cleaning.

2.3.3. Waste Management: separate waste materials for reuse/ recycling in accordance with Section 01 35 43 Environmental Requirements.

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

2.4. PROTECTION

2.4.1. Repair damage to adjacent materials caused by cables installation.

END OF SECTION 26 05 43.01

MULTI-OUTLET ASSEMBLIES

PART 1 - GENERAL

1.1. SECTION INCLUDES

- 1.1.1. Materials for 120V, 15A GFCI receptacles and weather-resistant in-use covers.
- 1.1.2. The scope is to provide CSA certified product for outdoor conditions with underground installation which is robust, safe and reliable for the application

1.2. RELATED SECTIONS

- 1.2.1. Section 26 05 00 Common Work Results for Electrical
- 1.2.2. Section 26 05 21 Wires and Cables
- 1.2.3. Section 26 05 22 Connectors and Terminations
- 1.2.4. Section 26 05 28 Grounding - Secondary
- 1.2.5. Section 26 05 31 Cabinets
- 1.2.6. Section 26 05 34 Conduits, Conduit Fastenings and Conduit Fittings
- 1.2.7. Section 26 05 43.01 Installation of Cables in Trenches and Ducts
- 1.2.8. Section 26 50 00 Lighting
- 1.2.9. Section 33 65 76 Direct Buried Underground Cable Ducts
- 1.2.10. Applicable sections from Div 1 as related to this contract, specifically 01 31 13 – coordination and 01 31 19 – Project meetings, 01 34 43 Environmental Requirements and Procedures
- 1.2.11. DRAWINGS
 - 1.2.11.1. Macpherson Park – Electrical
 - 1.2.11.2. Macpherson Park – Civil
 - 1.2.11.3. Macpherson Park – Photometrics
 - 1.2.11.4. Macpherson Park – Details – 1
 - 1.2.11.5. Macpherson Park – Details – 2
 - 1.2.11.6. Macpherson Park – Grounding Detail

1.3. REFERENCES

- 1.3.1. Canadian Standards Association (CSA International).
 - 1.3.1.1. C22.1-02 Canadian Electrical code part I- Latest.

1.4. SUBMITTALS

- 1.4.1. Include complete set of drawings for mounting of the assembly, terminal box and all dimensions for estimating cable bending radii
- 1.4.2. Include single line diagram of the circuits and all details of protection settings including

MULTI-OUTLET ASSEMBLIES

- 1.4.3. Provide time current characteristic curves for breakers with interrupting capacity of 10,000 A symmetrical (rms) and over at system voltage. This is required for system coordination.
- 1.4.4. Provide CSA certifications in details

PART 2 - PRODUCTS

2.1. ELECTRICAL RECEPTACLES

- 2.1.1. Provide sizes of receptacles as indicated on the drawing
- 2.1.2. Weather-resistant in-use covers to be used
- 2.1.3. Provide details of model numbers used with manufacturers

PART 3 - EXECUTION

3.1. INSTALLATION

- 3.1.1. Install multi-outlet assemblies in accordance with manufacturer's instructions.
- 3.1.2. Install supports, elbows, tees, connectors, fittings.
- 3.1.3. Keep number of elbows, offsets and connections to minimum.
- 3.1.4. Install barriers where required.

3.2. WIRING

- 3.2.1. Install receptacle harness as indicated.
- 3.2.2. Fasten wiring with wire clips inside raceway.
- 3.2.3. Install ground wire as required.

3.3. WIRING DEVICES

- 3.3.1. Install wiring devices and cover plates as indicated
- 3.3.2. Install vinyl strip receptacles as indicated.
- 3.3.3. Install identification labels for all electrical outlets.

3.4. CLEANING

- 3.4.1. Clean in accordance with Section 01 74 13 – Progressive Cleaning.
- 3.4.2. Clean installed products in accordance to manufacturer's recommendation.
- 3.4.3. Waste Management: separate waste materials for recycling/ reuse in accordance with Section 01 35 43 Environmental Requirements.

MULTI-OUTLET ASSEMBLIES

END OF SECTION 26 27 19

LIGHTING

PART 1 - GENERAL

1.1. SECTION INCLUDES

- 1.1.1. Materials and installation for park lighting and custom pole bases

1.2. RELATED SECTIONS/DRAWING

- 1.2.1. Section 26 05 00 Common Work Results for Electrical
- 1.2.2. Section 26 05 21 Wires and Cables
- 1.2.3. Section 26 05 22 Connectors and Terminations
- 1.2.4. Section 26 05 28 Grounding - Secondary
- 1.2.5. Section 26 05 31 Cabinets
- 1.2.6. Section 26 05 34 Conduits, Conduit Fastenings and Conduit Fittings
- 1.2.7. Section 26 05 43.01 Installation of Cables in Trenches and Ducts
- 1.2.8. Section 26 27 19 Multi-Outlet Assemblies
- 1.2.9. Section 33 65 76 Direct Buried Underground Cable Ducts
- 1.2.10. Applicable sections from Div 1 as related to this contract, specifically 01 31 13 – coordination and 01 31 19 – Project meetings, 01 34 43 Environmental Requirements and Procedures
- 1.2.11. DRAWINGS
 - 1.2.11.1. Macpherson Park – Electrical
 - 1.2.11.2. Macpherson Park – Civil
 - 1.2.11.3. Macpherson Park – Photometrics
 - 1.2.11.4. Macpherson Park – Details – 1
 - 1.2.11.5. Macpherson Park – Details – 2
 - 1.2.11.6. Macpherson Park – Grounding Detail

1.3. REFERENCES

- 1.3.1. American National Standards Institute (ANSI)
- 1.3.2. American National Standards Institute/Institute of Electrical and Electronics Engineers (ANSI/IEEE)
- 1.3.3. ASTM International Inc.
- 1.3.4. Canadian Standards Association (CSA International)
- 1.3.5. Underwriters' Laboratories of Canada (ULC)

1.4. SUBMITTALS

LIGHTING

- 1.4.1. The contractor shall submit the following in accordance with Section 01 33 00 – Submittal Procedures
- 1.4.2. Product Data:
- 1.4.2.1. Provide manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
 - 1.4.2.2. Materials of construction, type of diffusers, hardware, gasketing, reflector and chassis, finish and ballast.
 - 1.4.2.3. Photometric data
- 1.4.3. Fixtures mounted to the structure, including complete data on mounting accessory material, finish, anchoring and fixture attachment.
- 1.4.4. Quality assurance submittals: provide following in accordance with Section 01 45 00- Quality Control.
- 1.4.4.1. Manufacturer's instructions: provide manufacturer's written installation instructions and special handling criteria, installation sequence and cleaning procedures.

1.5. QUALITY ASSURANCE

- 1.5.1. Exterior lighting system operation shall be demonstrated during the hours of darkness to indicate that fixtures are in proper working order.
- 1.5.1.1. The owner, landscape architect, lighting consultant and contractor must be in attendance for the final lighting demonstration. Notification for demonstration shall be sent 3 weeks prior to all parties listed above.
 - 1.5.1.2. Lighting demonstration shall occur a minimum 2 weeks prior to project acceptance.
- 1.5.2. Lighting fixtures shall be stored in their original cartons from the manufacturer until the time of installation.

1.6. WASTE MANAGEMENT AND DISPOSAL

- 1.6.1. Separate and recycle waste materials in accordance with Section 01 35 43 – Environmental Requirements.
- 1.6.2. Remove from site and dispose of all packaging materials at appropriate recycling facilities.
- 1.6.3. Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard, packaging material in appropriate on site bins for recycling in accordance with Waste Management Plan.
- 1.6.4. Divert unused wiring materials from landfill to metal recycling facility as approved by Engineer.

PART 2 - PRODUCTS**2.1. PARK LIGHTING**

ITEM	SATURN 1 LED
CATALOGUE NUMBER FOR 26W	SA1L-TA-1-L26-30-12-UNV-PCT, S635 BOLT CIRCLE
CATALOGUE NUMBER FOR 50W	SA1L-TA-1-L50-30-12-UNV-PCT, S635 BOLT CIRCLE
MANUFACTURER	SELUX

LIGHTING

- 2.1.1. Saturn LED lights to be manufactured and supplied by Selux, no alternatives or equivalents will be accepted.

2.2. POLE FOUNDATION

ITEM	CUSTOM CONCRETE POLE BASE
CATALOGUE NUMBER	REFER TO STRUCTURAL ENGINEER (IRC) DETAIL
MANUFACTURER	N/A

PART 3 - EXECUTION**3.1. INSTALLATION**

- 3.1.1. Locate and install lights as indicated on drawings
- 3.1.2. All mounting brackets, clips, supports, etc. for mounting the fixtures shall be provided.
- 3.1.3. Lighting fixtures shall be installed plumb and square with exterior building facades and any other adjacent fixtures. In all cases, fixture locations shall be coordinated with work of other trades to prevent obstruction of light from fixtures. Fixtures shall be installed in accordance with the electrical drawings.
- 3.1.4. Disconnect all power sources prior to installation.
- 3.1.5. Follow manufacturer's recommended installation procedures

3.2. CLEANING

- 3.2.1. Lights shall be cleaned just prior to the time specified for the system demonstrations.
- 3.2.2. Progress Cleaning: clean in accordance with Section 01 74 13- Progressive Cleaning.
- 3.2.2.1. Leave Work area clean at end of each day.
- 3.2.3. Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 13- Progressive Cleaning.
- 3.2.4. Waste Management: separate waste materials for reuse/ recycling in accordance with Section 01 35 43 – Environmental Requirements.
- 3.2.4.1. Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION 26 50 00

EARTHWORK FOR MINOR WORKS – DAVENPORT LANDS

Part 1 General**1.0 SCOPE**

Previous environmental investigations have identified contaminants of concern in soil at concentrations above the applicable Soil Quality Standards for the Site. The excavation activities associated with the installation of Risk Management Measures (RMMs) and site redevelopment are anticipated to generate more than 2,000 m³ of excess soil. All excess soil generated at the Site must be managed in accordance with O. Reg. 406/19. Soil that exceeds the applicable Soil Quality Standards for the Site must be managed off-Site as waste soil (disposed at a Ministry of the Environment, Conservation and Parks (MECP) approved facility) or an approved alternate receiving Site.

The contractor is responsible for the management of all rock and soil including both dry and liquid soil associated with the project including excavation, handling, storage, tracking, transportation, placement and disposal whether such rock and soil is reused onsite or brought to the Project Area for use as clean backfill.

The work is to be completed in accordance with Provincial and Federal regulations governing soil management (Contaminated Soil Management and Excess Soil Management), including the Contaminant Health and Safety Plan (HASP), Soil and Groundwater Management Plan (SGMP), O. Reg. 153/04 (as amended) and O. Reg. 406/19 (as amended).

1.1 REFERENCES

- .1 Soil and Groundwater Management Plan – Green Line Trail Parcels 28B, 29 and 30, WSP 2024
- .2 Contaminant Health and Safety Plan – Green Line Trail Parcels 28B, 29 and 30, WSP 2024
- .3 Certificate of Property Use # 7631-BZWMLT for 315 Macpherson Avenue, Toronto, Ontario, April 2021.
- .4 Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011
- .5 Ontario Regulation 347, General – Waste Management
- .6 Ontario Regulation 213 Construction
- .7 Ontario Regulation 860 Workplace Hazardous Materials Information System
- .8 Ontario Underground Infrastructure Notification System Act, 2012
- .9 City of Toronto PF&R Horticultural Topsoil Blend (70:30) – Appendix IV
- .10 Ontario Regulation 406/19 On-Site and Excess Soil Management, made under the Environmental Protection Act.
- .11 Rules for Soil Management and Excess Soil Quality Standards
- .12 Ontario Regulation 153/04 (as amended) Records of Site Condition – Part XV.1 of the Act.
- .13 Appendix F – Hydro One General Conditions for Secondary Land Uses, Hydro One, January 2023
- .14 Appendix G – General Requirements for Construction Work by External Parties in the Vicinity of Hydro One 115,000 and 230,000 Volt Underground Plant, Hydro One, January 2024

1.2 DEFINITIONS

- .1 Consultant: The Design (Project Leaders) Qualified Person, herein referred to as the QP_{PL}.

EARTHWORK FOR MINOR WORKS – DAVENPORT LANDS

- .2 Contaminated Soil: Soil or a mixture of soil and debris with measured concentrations of contaminants that exceed MECP Table 3 residential/parkland/institutional land use standards.
- .3 Contractor's QP: the Qualified Person retained by the Contractor to ensure compliance with the applicable laws and regulations, herein referred to as the QP_{CA}.
- .4 ESDAR: Excess Soil Destination Assessment Report.
- .5 Excess Soil Registry: The Project Area notice required to be filed in the Resource Productivity and Recovery Authority's Excess Soil Registry as required under Section 8 of O. Reg. 406/19
- .6 Fill Cap: a barrier covering contaminated soil consisting of soil meeting MECP Table 3 and O. Reg. 406/19 Table 3.1 standards.
 - .1 All areas where deep-rooting trees and/or shrubs are to be planted require a fill cap of 1.5 m.
 - .2 All areas where plantings with shallower roots are to be planted require a fill cap of 1.0 m.
 - .3 All grassed areas that do not contain any trees, shrubs, or plantings with deeper roots require a fill cap of 0.5 m (1.0 m in Parcel 30 MGRA Lands).
 - .4 All utilities constructed below the hard cap and fill cap must be placed within a corridor (trench) of un-impacted soil/material, that extends 0.5 m around the utility.
 - .5 Areas with existing trees that will remain require a total cap of 0.15 m of mulch, wood bark or similar material at a minimum 1.2 m to max of dripline or 2.4 m radius around the trunk of the tree. Thickness to be feathered in the approach to the tree trunk, in accordance with landscape design detail.
 - .6 100 mm of crushed rock (as per HONI requirements)
- .7 Fill Material: Soil that meets compaction requirements and with measured concentrations of contaminants that do not exceed MECP Table 3 standards.
- .8 Hard Cap: a barrier covering contaminated soil consisting of at least 75 mm of hard surface consisting of hot mix asphalt, concrete, concrete pavers, stone pavers or brick or other surface treatment not required to support vegetative growth underlain by at least 150 mm of granular. Hard caps can include park features such as bike paths and walkways. In Parcel 30, areas where permeable pavers are used, will require a 1.0 m fill cap barrier.
- .9 MECP Table 3: Full depth generic site condition standards established in Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 2011 for residential, parkland or institutional (RPI) land use in non-potable groundwater conditions with coarse textured soil (MECP Table 3).
- .10 MECP Table 3.1: Full Depth Excess Soil Quality Standards in a Non-Potable Ground Water Condition, Volume Independent for Residential / Parkland / Institutional property use ("Table 3.1 ESQS RPI") in Part II, Appendix 1 of the MECP Soil Rules for use under O. Reg. 406/19.
- .11 Operator: The Project Area operator. The City intends to delegate the role of Project Area operator to the Contractor.
- .12 Project Area: The property or adjoining properties on which the work under this Contract takes place and is identified in the Contract.
- .13 Project Leader: The City of Toronto.
- .14 Qualified Person (QP): as defined in Ontario Regulation 153/04 Records of Site Condition.

EARTHWORK FOR MINOR WORKS – DAVENPORT LANDS

- .15 Receiver Site: a Class 1 soil management site, a Class 2 Soil Management Site, a local waste transfer facility, or landfill site or dump operating under Environmental Compliance Approval.
- .16 Soil Rules: Rules for Soil Management and Excess Soil Quality Standards, published by MECP.

1.3 DESIGN AND SUBMISSION REQUIREMENTS

The City as Project Leader retains ultimate decision-making authority relating to soil management on the project. The Contractor is responsible for compliance with O. Reg. 406/19, O. Reg. 153/04 and all other applicable legislation and instruments in the role of operator of the Project Area as described in O. Reg. 406/19. Selected Project Leader responsibilities are delegated to the Contractor as described in the relevant sections of this specification. The contractor shall retain a Qualified Person to oversee and implement all environmental and excess soil management activities and submissions. The Contractor's QP (QP_{CA}) shall review all documents as listed above in the references section. The contractor shall submit in accordance with Section 01 33 00 - Submittal Procedures.

Submittals required prior to proceeding include, but may not be limited to:

- .1 Workplace and Safety Insurance Board certifications
- .2 Proof of Insurance in compliance with the Contract
- .3 Copy of Notice of Project
- .4 Contractor Health and Safety Plan
- .5 Erosion and Sediment Control Plan
- .6 Dust and Water Control Plan
- .7 Spill Response Plan
- .8 Construction Soil Management Plan
- .9 QP_{CA} qualifications and experience
- .10 ESDAR in accordance with the Soil Rules and O. Reg. 406/19, s 13 (1); O. Reg. 555/22, s.5
- .11 Documentation as required under unforeseen circumstances described in O. Reg. 406/19, s 15 (2),
- .12 A plan for excess soil tracking including access to the Contractors excess soil tracking system (if applicable) capable of tracking information described in the Soil Rules and O. Reg. 406/16 s 16; O. Reg. 406/19 s 18 (1).
- .13 Written consent/confirmation from each soil receiving site and the appropriate waste management Certificates of Approval or Environmental Compliance Approvals for each Site.
- .14 Documentation for source and environmental quality of all imported soil (backfill) in accordance with O. Reg. 406/19.
- .15 Copies of weigh bills and soil tracking tickets for all excess soil and/or imported Soil at the Site. .

1.4 MEASUREMENT PROCEDURES

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- .1 Payment for soil removal, stockpiling and replacement are included in the stipulated price. Provisional unit rates apply if the excavations are extended or reduced at the direction of the Project Leaders QP (QP_{PL}) or the City.
- .2 Payment for excavation, temporary stockpiling (if needed), handling and subsequent off-site management (hauling/disposal), of all soil (contaminated and reusable excess soil) is included in the stipulated price. Provisional unit rates apply if excavations are extended or reduced at the direction of the QP_{PL} or the City.

Part 2 Products

2.1 MATERIALS

- .1 Select soil and topsoil for backfill in accordance with design specifications and drawing.
- .2 The City reserves the right to test the soil to confirm composition and chemical requirements.
- .3 Soil and topsoil to be placed in accordance with the City of Toronto PF&R specifications and the SGMP.
- .4 Backfill sources to be approved by QP_{PL} in writing and supported with documentation and confirmatory sampling at the frequency outlined in the SGMP and per Schedule E of O. Reg. 153/04. Only soil meeting the Table 3 and Table 3.1 Standards may be imported to the Site for placement on, in or under the Site.
- .5 Backfill must be unfrozen and free from rocks larger than 75 mm, cinders, ashes, sods, refuse and other deleterious materials.
- .6 Backfill must be placed in lifts not exceeding 300mm loose thickness and each lift shall be compacted to a minimum of 95% of its Standard Proctor Maximum Dry Density.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions:
 - .1 Examine previous environmental reports and documents including the SGMP, HASP, Risk Assessment reports and leachate testing included for reference.
 - .2 If more recent leachate analysis is required by the receiving site, Contractor must notify the QP_{PL} and the QP_{CA} to collect samples (as needed) and allow five (5) business days from time of collection of the sample to receipt of analysis.
 - .3 Before commencing work, verify locations of buried services on and adjacent to site.
- .2 Evaluation and Assessment:
 - .1 Arrange for sampling of backfill source material.
 - .2 Before commencing work, conduct condition survey of the Site and the areas adjacent to the Site, which may be affected by work.
 - .3 Complete ground elevation surveys as required to confirm excavation depths following contaminated soil removal and following site restoration to confirm as built conditions and document soil barrier thicknesses across the Site. Soil barrier thickness to be visually confirmed by QP_{PL}.

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- .4 Arrange for compaction testing to be conducted.

3.2 PREPARATION

- .1 Temporary Erosion and Sedimentation Control:
 - .1 Install, maintain, and remove temporary erosion and sedimentation control measures in accordance with Section 01 35 43 – Environmental Requirements and Soil and Groundwater Management Plan provided as reference.
- .2 Protection of in-place conditions:
 - .1 Keep excavations clean, free of standing water, and loose soil.
 - .2 Protect natural and man-made features, including trees and buried services, required to remain undisturbed.
- .3 The contractor shall be responsible for obtaining the necessary approvals and authorizations from the receiver and/or reuse Sites according to O. Reg. 406/19. The contractor shall have no basis for claim for costs related to delays while obtaining approvals from receiver sites or delays related to the acceptance of excess soil by a receiver site. The City shall not pay costs resulting from a change in receiver sites after approval. Approval for proposed receiver sites will be provided before or during the pre-excavation meeting.
- .4 The QP_{CA} shall provide the information to the City and QP_{PL} in a timely manner.
 - .1 With respect to the Project Area notice contact information, the Contractor shall provide the name, phone number and email address for the contact information of Operator as well as the name, phone number and email address for the Person Responsible for Transportation.
 - .2 Should the Contractor become aware that the Project Area notice is no longer complete or accurate, the Contractor shall provide the City with updated information within 21 Days.

3.3 EXCAVATION

- .1 Prior to construction works, the Contractors QP shall provide a completed ESDAR.
- .2 All subsurface works to be completed in accordance with the Soil and Groundwater Management Plan (SGMP) and project Contaminant Health and Safety Plan (HASP).
- .3 Slope excavations, as may be necessary for the safe removal of contaminated soil to the depths required to install appropriate fill and hard cap barriers and install site utilities and features, protect slopes and banks and perform work in accordance with Provincial and Municipal regulations.
- .4 Excavate in a careful manner to avoid contamination of adjacent soil. Excavation activities to be completed in accordance with the SGMP and the Contractors Soil Management Plan. The QP_{PL} will monitor excavation on a part-time basis.
- .5 For portions of the Site not under development or not in use, these areas shall have a fence barrier to prevent the general public from accessing the Site and a dust control plan to prevent surface soil from impacting the adjacent properties.
- .6 For utility trenches or corridors that can provide a preferential path for groundwater/surface water, shall contain trench plugs, anti-seep collars, trench liner or watertight shoring
- .7 Complete ground elevation surveys as required to confirm excavation depths following contaminated soil removal and following site restoration to confirm as-built conditions and document soil barrier

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thicknesses across the Site. Excavated soils that are planned to be reused at the Site must meet the SGMP including the following requirements:

- .1 Soil excavated and reused as uncompacted fill within the barrier to site soils is to be sampled at the frequency requirements of O. Reg. 153.04, Schedule E, Table 2 and must meet the Table 3 Standards.
- .2 Soils reused at the Site under the fill caps must meet the property specific standards (PSS) (where a PSS has been established).
- .8 If contaminated soil will be stockpiled prior to loading in transport vehicles, place soil on a tarpaulin (polyethylene sheeting) to demarcate the separation between contaminated soil and reusable soil. If a tarpaulin is not used, the Contractor will be required to remove a 5-cm thickness underlying the stockpile for off-site disposal at no cost to the Owner. Soil stockpiling to be completed in accordance with the SGMP within permitted areas.
- .9 Where stockpiling is permitted, stockpiled soil of different quality, from different areas or soil that has not yet been characterized or both, must be segregated from other soil. Soil that has been sampled and analyzed must be kept segregated from soil that has not been sampled. Soil of different qualities intended for different purposes must be kept segregated. Where stockpiling is permitted, soil stockpile sizes shall not exceed 10,000 m³. Stockpiled soil must not be stored at a location:
 - .1 within 30 metres of a waterbody; and
 - .2 within 10 metres of the property line (boundary), unless any of the following apply:
 - .1 500 cubic metres or less of excess soil will be stored at any one time on the project area; .
 - .2 Excess soil storage at the project area will be for a period of time of less than 7 Days;
 - .3 The storage location has a physical barrier, for example concrete wall, between the excess soil and the property boundary; or
 - .4 The storage is taking place in a public road right-of-way.
- .10 Hauling and Disposal
 - .1 Excavated soil that exceeds the Table 3 SCS to be disposed at a MECP licensed waste receiving facility. If excavated soil is considered or intended for re-use at an alternate receiving site (as defined in O. Reg. 406), then the contractor must prepare the required supporting documentation for the QP_{PL} to review prior to soil movement.
- .11 Haul all material designated for disposal in tarped/covered trucks, or other appropriate means.
 - .1 Prevent hauled material from being spilled on the site of Works, roadways, public or private property.
 - .2 Disposal and hauling shall conform to all Provincial, Federal regulations, and Municipal legislation.
 - .3 All vehicles used for haulage of disposal materials must have their current registration available for inspection by the Consultant and the QP_{PL}.
 - .4 The Contractor will provide copies of tipping tickets or tracking information for each truck monthly to the QP_{PL}.

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- .12 Liquid soil, including soil that is generated by hydro excavation activities and hauled using vac trucks, shall be managed in accordance with O. Reg. 406/19, the Soil Rules and O. Reg. 347.
- .13 Liquid soil that is stored at the Project Area shall be managed according to the following:
 - .1 All storage and processing locations of liquid soil, processed, dewatered or solidified soil and process residues shall be readily accessible for inspection by the City.
 - .2 No more than 10,000 m³ of liquid soil, processed or dewatered or solidified soil and process residues may be present at the Project Area at any one time.
 - .3 All liquid soil, processed, dewatered or solidified soil and process residues that are liquid shall be stored in a leakproof container on an impermeable surface in a manner sufficient to contain and prevent the material from escaping into the natural environment.
 - .4 If liquid soil is dewatered or solidified in the Project Area for final deposit at a reuse site, the QP_{CA} shall develop and implement written procedures related to these processing activities and document the activities according to Section 6 of O.Reg.406/19. The QP_{CA} shall provide a copy of the required documents to the reuse site. The Contractor shall be responsible for obtaining any approvals required under the Ontario Water Resources Act.

3.4 HAULING AND DISPOSAL

- .1 All soil transported off site shall be managed in accordance with O. Reg. 347 and/or Section 17 of O. Reg. 406/19.
- .2 A plan for soil tracking must be developed and be capable of tracking the information outlined in Soil Rules Section B, s. 5. and included below:
 - .1 The location at which the excess soil was loaded for transportation.
 - .2 The date and time the excess soil was loaded for transportation.
 - .3 The quantity of excess soil in the load.
 - .4 The name of an individual who may be contacted to respond to inquiries regarding the load, including inquiries regarding the soil quality.
 - .5 The name of the corporation, partnership or firm transporting the excess soil, the name of the driver of the vehicle and the number plates issued for the vehicle under the Highway Traffic Act.
 - .6 The location at which the excess soil is to be deposited.
 - .7 The date and time the load of excess soil was deposited at the Class 1 soil management site, Class 2 soil management site, reuse site, local waste transfer facility, landfilling site or dump.
 - .8 The name and phone number of the individual (Receiving Personnel) at the Class 1 soil management site, Class 2 soil management site, local waste transfer facility, reuse site, and land filling site or dump who acknowledges that the excess soil has been deposited on the date and at the time specified.
 - .9 A declaration by the Receiving Personnel stating that the individual acknowledges the deposit of the excess soil.
- .3 Excess soil that exceeds the MECP Table 3 standards to be disposed at a MECP licensed waste receiving facility. The waste shall be hauled by a licensed transportation contractor to an MECP-approved facility in accordance with O. Reg. 347.

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- .4 Disposal and hauling shall conform to all Provincial, Federal regulations, and Municipal legislation.
- .5 All vehicles used for haulage of disposal materials must have their current registration available for inspection by the QP_{PL}.
- .6 The Contractor will provide copies of tipping tickets or tracking information for each truck monthly to the QP_{PL}.
- .7 The Contractor shall find and secure appropriate receiver sites that are accessible at all times, even during wet weather. The Contractor shall have no basis to claim for additional costs and/or delays arising from closure of disposal sites as a result of wet weather.
- .8 The Contractor shall ensure the person who is transporting the excess soil provides the Receiving Personnel with a copy of their declaration.
- .9 Within 30 Days of the completion of transportation of all soil to any receiver site or reuse site, the Contractor shall provide a copy of the hauling records for all excess soil removed from the Project Area. The City shall be notified immediately if any soil is hauled to a receiver site not approved by the QP_{PL}.
- .10 The contractor shall maintain hauling records for at least two years after the last day that the excess soil was loaded for transportation in accordance with Section 28 of O. Reg. 406/19.

3.5 TRACKING SYSTEM

All excess soil transported within the Project Area and off-site shall be tracked by the Contractor in accordance with Section 16 of O. Reg. 406/19 and the Soil Rules. Prior to any excess soil leaving the Project Area, the Contractor shall ensure all relevant documentation is completed and accurate and a digital tracking system is in place.

The Contractor shall develop and implement a digital tracking system. The Contractor shall implement and provide access to the digital tracking system at no extra cost to the City.

The QP_{CA} shall provide a monthly report describing soil tracking activities include volume of each soil type, destinations, rejected loads, any incidents related to soil haulage or soil being sent to the incorrect destination. No additional costs shall be paid related to development and implementation of the digital tracking system.

3.6 SITE QUALITY CONTROL

- .1 Fill material and spaces to be filled are to be inspected and approved by the City's Qualified Person prior to placement.

3.7 BACKFILLING

- .1 Start backfilling only after inspection and receipt of written approval of fill material and spaces to be filled from the City's Qualified Person.
- .2 Remove snow, ice, construction debris, organic soil and standing water from spaces to be filled.
- .3 Fill excavated areas with appropriate soil barriers and/or soil in accordance with specifications from source site approved by the City's Qualified Person and supported with documentation and chemical analyses.
- .4 Place soil backfill in lifts not more than 300 mm loose thickness and each lift shall be nominally compacted to remove voids to 95% of its Standard Proctor Maximum Dry Density. Add water as required to achieve specified density.

EARTHWORK FOR MINOR WORKS – DAVENPORT LANDS

- .5 Conduct testing of backfill compaction as required and provide a report of final compaction conditions upon completion of the work.
- .6 Use only clean site excavated material or approved backfill to bottom of topsoil.
- .7 If additional fill material is required for the project, the Contractor shall inform the Contract Administrator and the Project Leader's QP and provide sufficient documentation on the suitability of the proposed fill material, such as Assessment of Past Uses Report, Sampling and Analysis Plan, Soil Characterization Report, and such other documentation, including reliance letters after ensuring that the material is geotechnically and environmentally suitable for the Project Area, in accordance with the Contract Documents and O. Reg. 406/19, including meeting the appropriate Soil Quality Standards. Documentation must be provided to the City at least 15 days prior to the receipt of material at the Project Area.
- .8 If alternative fill material is required for the project, the Contractor shall inform the Contract Administrator and the Project Leader's QP and provide sufficient documentation on the suitability of the proposed alternative fill material including the information required for additional fill material described above.

3.8 CLEANING AND RESTORATION

- .1 Install fill cap and hard cap barriers, as defined in this Section, in accordance with geotechnical and environmental requirements for compaction, thickness, and materials.
- .2 Clean in accordance with Section 01 35 43 – Environmental Procedures.
- .3 Upon completion of work, remove surplus materials, rubbish, tools and equipment.
- .4 Restore other damaged surfaces to conditions that were present prior to the start of site work or better.

END OF SECTION

CLEARING AND GRUBBING

Part 1 General

1.1 SECTION INCLUDES

- .1 Requirements for clearing, close cut clearing, grubbing and clearing isolated trees.

1.2 RELATED WORK

- .1 Section 01 14 00 – Work Restrictions
- .2 Section 01 35 43 – Environmental Procedures
- .3 Section 02 20 00 – Site Preparation – Davenport Lands
- .4 Section 02 41 13 – Selective Site Demolition
- .5 Section 31 00 99 – Earthwork for Minor Works – Davenport Lands
- .6 Section 32 01 90 – Tree & Shrub Preservation

1.3 REFERENCES

- .1 City of Toronto Construction Standards
 - .1 City of Toronto PF&R Tree Protection Policy and Specifications for Construction Near Trees
- .2 City of Toronto Municipal Code:
 - .1 Chapter 658, Ravine and Natural Feature Protection (RNFP) by-Law
 - .2 Chapter 813, Trees by-law
- .3 Ontario Provincial Standard Specifications (OPSS)
 - .1 [OPSS 201](#), Clearing, Close Cut Clearing, Grubbing and Removal of Surface Boulder
- .4 Government of Ontario
 - .1 Ontario Endangered Species Act (ESA), 2007
- .5 Ontario Invasive Plant Council
 - .1 Clean Equipment Protocol for Industry, 2016
- .6 Department of Justice Canada (Jus)
 - .1 Reference Federal Species at Risk Act (SARA), S.C. 2002, C.29
 - .2 Federal Species at Risk Act (SARA), S.C. 2002, C.29
- .7 Reference Documents:
 - .1 Appendix A - Arborist Report, Macpherson Avenue Park, Urban Forest Innovations Inc., April 23, 2025
 - .2 Appendix B - Soil and Groundwater Management Plan – Davenport Lands (Parcel 28B, 29 and 30, WSP, July 2024

CLEARING AND GRUBBING

- .3 Appendix C - Contaminant Health and Safety Plan – 28B, 29 and 30 Green Line Trail, WSP, July 2024
- .4 Appendix D - City of Toronto Tree Protection Policy and Specifications for Construction Near Trees, July 2016
- .5 Appendix E – Geotechnical Investigation for Macpherson Avenue Park, October 31, 2022
- .6 Appendix F – Hydro One General Conditions for Secondary Land Uses, Hydro One, January 2023
- .7 Appendix G -General Requirements for Construction Work by External Parties in the Vicinity of Hydro One 115,000 and 230,000 Volt Underground Plant, Hydro One, January 2024

1.4 DEFINITIONS

- .1 Clearing: Consists of cutting off trees and brush vegetative growth to a maximum height of 300 mm height above original ground level, and disposing of felled trees, previously uprooted trees and stumps, and surface debris.
 - .1 Close-cut clearing: Consists of cutting off standing trees, brush, scrub, roots, stumps and embedded logs, removing at, or close to, existing grade and disposing of fallen timber and surface debris.
 - .2 Clearing isolated trees: Consists of cutting off to not more than specified height above ground of designated trees, and disposing of felled trees and debris.
 - .3 Underbrush clearing: Consists of removal from treed areas of undergrowth, deadwood, and trees smaller than 50 mm trunk diameter and disposing of fallen timber and surface debris.
- .2 Grubbing: Consists of excavation and disposal of stumps and roots, boulders and rock fragments of specified size to not less than specified depth below existing ground surface.
- .3 Emerald ash borer (EAB): A non-native, invasive beetle that is highly destructive to ash trees where it occurs.
 - .1 Woodchips in the context of EAB consist of untreated, raw bark and wood fragments broken or shredded from logs or branches. Woodchips are to be less than 2.5 cm in at least any two dimensions.
 - .2 Firewood in the context of EAB consists 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.
 - .3 Logs in the context of EAB consist of untreated, raw wood greater than 1.2 metres in length and greater than 25 cm diameter.
 - .4 Enclosed vehicle in the context of EAB consist of any vehicle transporting regulated wood material that is equipped to preclude the loss of materials or the escape of EAB while in transit.

1.5 STORAGE AND PROTECTION

- .1 Prevent damage to natural features, utility lines, site appurtenances, water courses, root systems of trees, which are to remain.
 - .1 Repair any damage to approval of Contract Administrator.

CLEARING AND GRUBBING

- .2 Replace any trees designated to remain, if damaged, as directed by Contract Administrator.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Cleared and grubbed materials are to be managed on site in a manner that is approved by the Contract Administrator.

Part 2 Products

Not Used

Part 3 Execution

3.1 NESTING SURVEY

- .1 A nesting survey is required to be completed by a qualified avian biologist if clearing and grubbing work is planned to be undertaken between the dates of March 30 and July 23.
- .2 The Contractor shall be responsible for retaining a qualified avian biologist to complete the nesting survey prior to the start of work.
- .3 A copy of the nesting survey shall be delivered to the Contract Administrator no later than two weeks before the commencement of clearing and grubbing work.
- .4 If the nesting survey identifies that nesting bird(s) are present within the limits of clearing and grubbing work, the Contractor shall not proceed with clearing and grubbing the areas where nesting bird(s) are present. The setback from the breeding location to the permissible limits of clearing and grubbing work shall be in accordance with the recommendations of the Contractor's qualified avian biologist.

3.2 PREPARATION

- .1 Inspect site and verify with Contract Administrator, items designated to remain and/or for protection.
- .2 Locate and protect utility lines. Preserve in operating condition active utilities traversing site.
- .3 Notify utility authorities before starting clearing and grubbing.
- .4 Notify Contract Administrator immediately of damage to or when unknown existing utility line(s) are encountered
- .5 When utility lines which are to be removed are encountered within area of operations, notify utility in ample time to minimize interruption of service.
- .6 Keep roads and walks free of dirt and debris.

3.3 TREE REMOVALS AND SALVAGED LOGS

- .1 Salvaged logs for the log play feature and log seating ring are to be selected from trees to be removed from the site, as identified on the Tree Preservation and Removals Drawings.
 - .1 Notify Contract Administrator prior to start of tree removal work for selection of suitable trees.
 - .2 Notify Contract Administrator after selected trees have been felled, and prior to any further cutting or removal of large branches. Do not notch or otherwise damage the length of the trunk

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and ensure that trees are felled in a manner that preserves the trunk and any major branching unions.

- .3 Store materials on site in such a way as to prevent deterioration or loss or impairment of essential properties in dry environments, protected from the elements, as per Section 01 50 00.

3.4 REMOVAL AND DISPOSAL

- .1 Remove all material from clearing and grubbing from site and dispose of off-site at a location arranged by the Contractor.
- .2 There is limited additional pruning or branch removal permitted at the discretion of the Contract Administrator for the purpose of aiding with construction methods which will be included as part of the Contractor's scope of work for clearing and grubbing. The Contractor MUST use equipment as necessary to avoid physical impact to the existing tree canopy, trunks and/or root systems.
- .3 Where tree removals are prescribed, the Contractor shall assume that all stumps and roots shall be removed as per OPSS 201. Existing stumps located within five meters of the existing bottom of bank may remain where directed by the Contract Administrator. The Contractor shall complete a site walk through with the Contract Administrator in advance of tree removals to confirm the location of stumps that are to remain.

3.5 FINISHED SURFACE

- .1 Leave ground surface in condition suitable for immediate grading operations to approval of Contract Administrator.

3.6 CLEANING

- .1 Undertake cleaning in accordance with Section 01 74 13 – Progressive Cleaning.
- .2 Clean and remove debris and sediment from work area drainage devices and dispose of to an approved landfill site
- .3 Do not clean equipment in any waterbody or where the wash-water can enter a waterbody
- .4 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools, and equipment.

END OF SECTION

ROUGH GRADING

Part 1 General

1.1 SECTION INCLUDES

- .1 This section includes requirements to grade the site within the tolerances for finished surfaces.

1.2 RELATED WORK

- .1 Section 01 33 00 - Submittal Procedures
- .2 Section 01 35 43 – Environmental Procedures
- .3 Section 02 20 00 – Site Preparation – Davenport Lands
- .4 Section 31 00 99 – Earthwork for Minor Works – Davenport Lands
- .5 Section 32 11 23 – Aggregate Base Courses
- .6 Section 32 14 40 – Landscape Stone
- .7 Section 32 91 19 – Topsoil Placement and Grading

1.3 REFERENCES

- .1 All referenced standards shall be the current edition or edition referenced by the Ontario Building Code currently in force
- .2 City of Toronto:
 - .1 TS 206, City of Toronto Amendment to OPSS.MUNI 206 – Construction Specification for Grading
 - .2 TS 401, City of Toronto Amendment to OPSS.MUNI 401 – Construction Specification for Trenching, Backfilling and Compacting
 - .3 TS 403, City of Toronto Amendment to OPSS.MUNI 403 – Construction Specification for Rock Excavation for Pipelines, Utilities and Associated Structures in Open Cut
 - .4 TS 501, City of Toronto Amendment to OPSS.MUNI 501 – Construction Specification for CompactionOntario Provincial Standard Specifications (OPSS)
- .3 Ontario Provincial Standard Specifications (OPSS):
 - .1 OPSS.MUNI 206, Construction Specification for Grading
 - .2 OPSS.MUNI 401, Construction Specification for Trenching, Backfilling and Compacting
 - .3 OPSS.MUNI 402, Construction Specification for Excavating, Backfilling, and Compacting for Maintenance Holes, Catch Basins, Ditch Inlets, and Valve Chambers
 - .4 OPSS.MUNI 501, Construction Specification for Compacting
 - .5 OPSS.MUNI 1004, Material Specification for Aggregates - Miscellaneous
 - .6 OPSS.MUNI.1010, Material Specification for Aggregates, Base, Subbase, Select Subgrade, and Backfill Material
 - .7 OPSS.MUNI 1860, Material Specification for Geotextiles

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- .4 Ontario Ministry of the Environment, Conservation and Parks (MECP):
 - .1 Soil, ground water and sediment standards for use under Part XV.1 of the Environmental Protection Act, R.S.O. 1990, c. E.19
 - .2 O. Reg. 406/19: On-site and Excess Soil Management
- .5 Department of Justice Canada (Jus):
 - .1 Canadian Environmental Protection Act (CEPA), 2012
 - .2 Federal Species at Risk Act (SARA), S.C. 2002, C.29
- .6 ASTM International (ASTM):
 - .1 ASTM D698-12, Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³))
 - .2 ASTM D1557-12, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³))
- .7 Reference Documents
 - .1 Appendix A - Arborist Report, Macpherson Avenue Park, Urban Forest Innovations Inc., April 23, 2025
 - .2 Appendix B - Soil and Groundwater Management Plan – Davenport Lands (Parcel 28B, 29 and 30, WSP, July 2024
 - .3 Appendix C - Contaminant Health and Safety Plan – 28B, 29 and 30 Green Line Trail, WSP, July 2024
 - .4 Appendix D - City of Toronto Tree Protection Policy and Specifications for Construction Near Trees, July 2016
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 - .7 Appendix G -General Requirements for Construction Work by External Parties in the Vicinity of Hydro One 115,000 and 230,000 Volt Underground Plant, Hydro One, January 2024

1.4 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Testing Agencies: Testing laboratory certified by ULC will conduct the soil compaction test.

1.5 EXISTING CONDITIONS

- .1 Examine all site-specific environmental and geotechnical reports which form part of the Contract Documents.
- .2 The position of existing pole lines, conduits, watermains, sewers and other underground and aboveground utilities, structures and appurtenances are not necessarily shown on the Contract Drawings, and where shown, the accuracy of the position of such utilities and structure is not guaranteed. The Contractor is responsible for locating all existing services and protecting all utilities

ROUGH GRADING

during construction. The Contractor is to assume all liability for damage to all utilities and structures during the course of construction.

- .3 The Contractor is responsible for protecting, maintaining and/or supporting underground, aboveground, and overhead utilities. Appropriate equipment to be supplied by Contractor at his expense. Contractor must have qualified personnel on site at all times to operate any equipment to support utilities.
- .4 When inactive services are encountered, remove in accordance with Section 02 41 13 – Selective Site Demolition.
- .5 Where Work involves breaking into, connecting to, or disrupting existing services, maintain existing services in occupied areas by carrying out work at times directed by governing authorities, with minimum disturbance to pedestrian, vehicular traffic, and tenant and homeowner operations.

Part 2 Products

2.1 MATERIALS

- .1 All excavated material to remain on site or to be disposed of off-site shall be in accordance with applicable Provincial and Federal regulation and with the requirements of the Soil and Groundwater Management Plan.
- .2 Imported fill is to be supplied by the Contractor and shall be in accordance with applicable Provincial and Federal regulation and with the requirements of the Soil and Groundwater Management Plan.
- .3 Fill material must meet the density requirements as outlined in the Geotechnical Report.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: Verify conditions of substrate previously installed under other Sections or Contracts are acceptable for rough grading.
 - .1 Examine soil for unsuitable conditions such as clods, rocks, snow, frost, frozen, muddy, large roots, litter, toxic substances, and unstable material.
 - .2 Proof roll the subgrade areas indicated on Drawings.
 - .1 Verify the subsoil is free of surface water and not frozen.
 - .3 Verify locations of all underground utilities.
- .2 Inform Contract Administrator of unacceptable conditions immediately upon discovery.
- .3 Proceed with the Work after unacceptable conditions have been remedied.

3.2 PREPARATION

- .1 Remove litter, unsatisfactory and unstable materials.
- .2 Stake and flag locations of utilities.
- .3 Protect existing underground and above head utilities.
- .4 Notify utility companies to remove and relocate utilities as indicated on Drawings.

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- .5 Protect excavations from freezing.
- .6 Keep excavations clean, free of standing water, and loose soil.
- .7 Cover and protect excavations where soil is subject to significant volume change due to change in moisture content in accordance with Geotechnical Reports
- .8 Protect and/or transplant existing fencing, trees, shrubs, vegetation, landscaping, natural features, benchmarks, buildings, pavement, surface or underground utility lines which are to remain using methods approved by the Contract Administrator. If damaged, restore to original or better condition unless directed otherwise.
- .9 Protect buried services that are required to remain undisturbed
- .10 Ensure positive drainage to all stormwater collection basins. Provide temporary on-site swales, ditches, and culverts as required to ensure positive site drainage during construction.
- .11 Conduct construction per occupational health and safety requirements in accordance with Health and Safety Plan.
- .12 Blasting is not permitted.
- .13 Maintain access roads to prevent accumulation of construction related debris on roads.

3.3 GRADING

- .1 Rough grade to levels, profiles, and contours indicated on the drawings allowing for surface treatment as indicated on the Contract drawings.
- .2 Grade so that water drains away from buildings, walls and paved areas, to catch basins, ditch, swale and other disposal areas approved by the Contract Administrator.
 - .1 Grade to be straight line interpolation between finished spot elevations shown on drawings.
- .3 Prior to placing fill over existing ground, scarify surface as indicated in Contract Documents. Maintain fill and existing surface at approximately same moisture content to facilitate bonding.
- .4 Fill material shall be in accordance with applicable Provincial and Federal regulation and in accordance with site-specific environmental reports.
 - .1 Fill material shall contain no frozen lumps, topsoil, organic materials or other objectionable matter.
- .5 Place and compact imported material in low areas and fill to required subgrade elevations.
- .6 For lateral support, maintain even levels of backfill around structures as work progresses, to equalize earth pressures.
- .7 Compact filled and disturbed areas to 95% standard Proctor maximum dry density to ASTM D698, and in accordance with Geotechnical Reports
- .8 Rough grading elevations to be achieved within a tolerance of 50mm. In addition, deviations from specified grades within the required tolerance to be random so that no surplus or deficit of material results. Provide certified as-built drawings of rough grading immediately following Work (sealed by a Professional Engineer or Ontario Land Surveyor).
- .9 If the subgrade soil conditions are unsuitable, additional excavation may be required. Any excavated material not suitable, or not required, shall be hauled away from the site in accordance with

ROUGH GRADING

applicable Provincial and Federal regulation and in accordance with site-specific environmental reports.

- .10 Avoid disturbing soil within the areas of existing trees and shrubs indicated to remain, to maintain their stability and health.

3.4 FIELD QUALITY CONTROL

- .1 Testing of materials and compaction of backfill and fill is to be carried out by a testing laboratory designated by the Contract Administrator.
 - .1 Should tests fail, the cost of subsequent testing shall be the responsibility of the Contractor.
- .2 Do not begin backfilling or filling operations until material has been approved for use.
- .3 Not less than 48 hours before backfilling or filling with approved material, notify Contract Administrator so that compaction tests can be carried out by designated testing agency.

3.5 SHORTAGE AND SURPLUS

- .1 Supply necessary fill to meet grading requirements with minimum rough grade variance.
- .2 Remove and dispose of surplus material in accordance with applicable Provincial and Federal regulation and with the requirements of all site-specific environmental reports.

3.6 TESTING

- .1 Inspection and testing of soil compaction to be carried out by testing laboratory in accordance with the requirements of all site-specific environmental and geotechnical reports.

3.7 CLEANING

- .1 Clean and remove debris and sediment from work area drainage devices and dispose of to an approved landfill site.
- .2 Do not clean equipment in any waterbody or where the wash-water can enter a waterbody.
- .3 Upon completion remove surplus materials, rubbish, tools, and equipment.

3.8 PROTECTION

- .1 Protect existing trees, natural features, benchmarks, buildings, pavement, surface or underground utility lines. If damaged, restore to original or better condition, unless directed otherwise.
- .2 Maintain access roads to prevent accumulation of construction related debris on roads.

END OF SECTION

EXCAVATING TRENCHING AND BACKFILLING

Part 1 General

1.1 SECTION INCLUDES

- .1 This Section includes all general earthworks and rough grading Work with the exception of:
 - .1 Topsoil placement and grading as stipulated in Section 32 91 19.
 - .2 Excavation and trenching that is incidental to components of the Work covered elsewhere in the Contract Documents.
- .2 The Work under this Section shall also include associated removal of all retaining walls, brick gutters, rocks, rubble, roots, stumps and any other items pertaining to general earthwork not measured for payment separately.
- .3 The Contractor is responsible for notifying and obtaining proper approval from the authority having jurisdiction for all work adjacent, directly and indirectly impacting the authority having jurisdiction's structures and operations, prior to the commencement of any and all construction activity.

1.2 RELATED WORK

- .1 Section 01 33 00 - Submittal Procedures
- .2 Section 01 35 43 – Environmental Procedures
- .3 Section 02 20 00 – Site Preparation – Davenport Lands
- .4 Section 31 00 99 – Earthwork for Minor Works – Davenport Lands
- .5 Section 32 05 19 – Geotextiles
- .6 Section 32 11 23 – Aggregate Base Courses
- .7 Section 32 91 19 – Topsoil Placement and Grading

1.3 REFERENCES

- .1 All referenced standards shall be the current edition or edition referenced by the Ontario Building Code currently in force.
- .2 City of Toronto Construction Standards:
 - .1 TS 5.10, City of Toronto Construction Specification for Growing Medium
 - .2 TS 13.10, City of Toronto Construction Specification for Unshrinkable fill
 - .3 TS 206, City of Toronto Amendment to OPSS.MUNI 206 – Construction Specification for Grading
 - .4 TS 401, City of Toronto Amendment to OPSS.MUNI 401 – Construction Specification for Trenching, Backfilling and Compacting
 - .5 TS 403, City of Toronto Amendment to OPSS.MUNI 403 – Construction Specification for Rock Excavation for Pipelines, Utilities and Associated Structures in Open Cut
 - .6 TS 501, City of Toronto Amendment to OPSS.MUNI 501 – Construction Specification for Compaction

EXCAVATING TRENCHING AND BACKFILLING

- .7 City of Toronto Tree Protection Policy and Specifications for Construction Near Trees
- .3 Ontario Provincial Standard Specifications (OPSS):
 - .1 OPSS.MUNI 206, Construction Specification for Grading
 - .2 OPSS.MUNI 212, Construction Specification for Borrow
 - .3 OPSS.MUNI 401, Construction Specification for Trenching, Backfilling and Compacting
 - .4 OPSS.MUNI 402, Construction Specification for Excavating, Backfilling, and Compacting for Maintenance Holes, Catch Basins, Ditch Inlets, and Valve Chambers
 - .5 OPSS.MUNI 501, Construction Specification for Compacting
 - .6 OPSS.MUNI 805, Construction Specification for Temporary Erosion and Sediment Control Measures
 - .7 OPSS.MUNI 902, Construction Specification for Excavating and Backfilling - Structures
 - .8 OPSS.MUNI 1004, Material Specification for Aggregates - Miscellaneous
 - .9 OPSS.MUNI.1010, Material Specification for Aggregates, Base, Subbase, Select Subgrade, and Backfill Material
 - .10 OPSS.MUNI 1860, Material Specification for Geotextiles
- .4 Ontario Ministry of the Environment, Conservation and Parks (MECP):
 - .1 Soil, ground water and sediment standards for use under Part XV.1 of the Environmental Protection Act, R.S.O. 1990, c. E.19
 - .2 O. Reg. 406/19: On-site and Excess Soil Management
- .5 Government of Ontario:
 - .1 Regulations for Construction Projects, O. Reg. 213/91, made under the Occupational and Health Safety Act, Revised Statutes of Ontario 1990 Chapter 0.1.
- .6 CSA Group (CSA):
 - .1 CAN/CSA-A3000- 18, Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005)
 - .2 CSA-A3001- 18, Cementitious Materials for Use in Concrete
 - .3 CSA-A23.1/A23.2- 14, Concrete Materials and Methods of Concrete Construction/Methods of Test and Standard Practices for Concrete
 - .4 Canadian General Standards Board (CGSB):
 - .5 CAN/CGSB-8.1-88, Sieves, Testing, Woven Wire, Inch Series
 - .6 CAN/CGSB-8.2-M88, Sieves, Testing, Woven Wire, Metric
- .7 Department of Justice Canada (Jus):
 - .1 Canadian Environmental Protection Act (CEPA), 2012
 - .2 Federal Species at Risk Act (SARA), S.C. 2002, C.29

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- .8 ASTM International (ASTM):
 - .1 ASTM C117- 17, Standard Test Method for Material Finer than 0.075 mm (No.200) Sieve in Mineral Aggregates by Washing
 - .2 ASTM C136/C136M- 19, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
 - .3 ASTM D422-63 2002, Standard Test Method for Particle-Size Analysis of Soils
 - .4 ASTM D698- 12, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³) (600 kN-m/m³)
 - .5 ASTM D1557- 12, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³) (2,700 kN-m/m³)
 - .6 ASTM D4318- 17e1, Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
- .9 Reference Documents
 - .1 Appendix A - Arborist Report, Macpherson Avenue Park, Urban Forest Innovations Inc., April 23, 2025
 - .2 Appendix B - Soil and Groundwater Management Plan – Davenport Lands (Parcel 28B, 29 and 30, WSP, July 2024
 - .3 Appendix C - Contaminant Health and Safety Plan – 28B, 29 and 30 Green Line Trail, WSP, July 2024
 - .4 Appendix D - City of Toronto Tree Protection Policy and Specifications for Construction Near Trees, July 2016
 - .5 Appendix E – Geotechnical Investigation for Macpherson Avenue Park, October 31, 2022
 - .6 Appendix F – Hydro One General Conditions for Secondary Land Uses, Hydro One, January 2023
 - .7 Appendix G -General Requirements for Construction Work by External Parties in the Vicinity of Hydro One 115,000 and 230,000 Volt Underground Plant, Hydro One, January 2024

1.4 DEFINITIONS

- .1 Common Excavation: excavation of materials of whatever nature, excluding Waste Material.
- .2 Clean Fill Material or Approved Fill Material: Clean, native material, compactable in accordance with OPSS 212 or SSM to OPSS 1010 Table 2.
 - .1 Clean fill Materials shall be in accordance with applicable Provincial and Federal regulation and in accordance with site-specific environmental reports.
- .3 Topsoil:
 - .1 Topsoil shall meet the requirements of TS 5.10 - City of Toronto Construction Specification for Growing Medium.
 - .2 Material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.

EXCAVATING TRENCHING AND BACKFILLING

- .3 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 in any dimension.
- .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 Recycled fill material: material, considered inert, obtained from alternate sources and engineered to meet requirements of fill areas.
- .7 Structure: Any building, foundation, bridge structural component (abutment, wing wall, retaining wall, etc) concrete culvert, pole base, retaining wall, guide-way or sign support.
- .8 Unsuitable materials:
 - .1 Weak, chemically unstable, and compressible materials.
 - .2 Frost susceptible materials:
 - .1 Fine grained soils with plasticity index less than 10 when tested to ASTM D4318, and gradation within limits specified when tested to ASTM D422 and ASTM C136: Sieve sizes to CAN/CGSB-8.2.
 - .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.
- .9 Unshrinkable fill: very weak mixture of cement, concrete aggregates and water that resists settlement when placed in utility trenches, and capable of being readily excavated.

1.5 SUBMITTALS

- .1 All submissions shall be in accordance with Section 01 33 00.
- .2 Action Submittals: Submit the following submittals before starting any work of this Section:
 - .1 Quality control:
 - .1 Submit for review by Contract Administrator proposed dewatering and heave prevention methods as described in PART 3 of this Section.
 - .2 Submit to Contract Administrator written notice at least 7 days prior to excavation work, to ensure cross sections are taken.
 - .3 Submit to Contract Administrator written notice when bottom of excavation is reached.
 - .4 Submit to Contract Administrator testing/inspection results and report as described in paragraph PART 3 of this Section.

EXCAVATING TRENCHING AND BACKFILLING

- .2 Source of Materials: At least two weeks prior to commencing work, submit to the engineer for review a list of proposed sources of fill and backfill materials.
- .3 Material Tests: Include with the list of material sources three copies of gradation analysis and a moisture density relation analysis for granular backfill materials.
- .4 Samples:
 - .1 Inform Contract Administrator at least 4 weeks prior to beginning Work, of all proposed sources of fill materials and provide access for sampling.
 - .2 Ship samples prepaid to Contract Administrator, in tightly closed containers to prevent contamination and exposure to elements.
- .3 Preconstruction Submittals:
 - .1 Submit construction equipment list for major equipment to be used in this section prior to start of Work.
 - .2 Submit records of underground utility locates, indicating: location plan of existing utilities as found in field, clearance record from utility authority, and location plan of relocated and abandoned services, as required.

1.6 QUALITY CONTROL

- .1 All quality control requirements shall be completed in accordance with Section 01 45 00.
- .2 Proof roll road subgrade in the presence of the Contract Administrator.
- .3 Provide quality control for compaction of various materials in accordance with OPSS 501 Table 1 or as specified herein with the following modifications:
 - .1 Pathway subgrade - minimum 1 test per lift per 50 m linear length
 - .2 All other areas - minimum one test per lift and every 100 m³ material placed
 - .3 Submit design and supporting data at least 2 weeks prior to beginning Work.
 - .4 Design and supporting data submitted to bear stamp and signature of qualified professional engineer registered or licensed in Province of Ontario, Canada
 - .5 Keep design and supporting data on site.
 - .6 Engage services of qualified professional Engineer who is registered or licensed in Province of Ontario, Canada in which Work is to be carried out to design and inspect cofferdams, shoring, bracing and underpinning required for Work.
 - .7 Do not use soil material until written report of soil test results are reviewed by Contract Administrator.
 - .8 Testing of materials and compaction of backfill shall be carried out by a certified testing laboratory or testing firm as appropriate and at the Contractor's own cost.

1.7 EXISTING CONDITIONS

- .1 Known underground and surface utility lines and buried objects are as indicated on the Contract Drawings based on available information to date. The extent and/or accuracy of shown utilities cannot be guaranteed. Furthermore additional utilities not shown on the plan(s) may exist.

EXCAVATING TRENCHING AND BACKFILLING

Contractor shall investigate and verify actual locations prior to commencement of construction activities.

- .1 Before commencing work verify location of buried services on and adjacent to site.
- .2 Arrange with appropriate authority for relocation of buried services that interfere with execution of Work: pay costs of relocating services.
- .3 Remove obsolete buried services within 2 m of foundations: cap cut-offs.
- .4 Size, depth and location of existing utilities and structures as indicated are for guidance only. Completeness and accuracy are not guaranteed.
- .5 Prior to beginning excavation Work, notify Contract Administrator and applicable authorities having jurisdiction, establish location and state of use of buried utilities and structures. The Contractor and authorities having jurisdiction to clearly mark such locations to prevent disturbance during Work.
- .6 Confirm locations of buried utilities by careful hand excavations, soil hydrovac.
- .7 Maintain and protect from damage, water, sewer, gas, electric, telephone and other utilities and structures encountered and as indicated., and/or other approved method as agreed upon with Contract Administrator.
- .8 Where utility lines or structures exist in area of excavation, obtain direction of Contract Administrator before removing, re-routing.
- .9 Record location of maintained, re-routed and abandoned underground lines.
- .10 Confirm locations of recent excavations adjacent to area of excavation.
- .2 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 as directed by Contract Administrator.
 - .3 Where required for excavation, cut roots or branches as directed by Contract Administrator.
- .3 Protection
 - .1 Protect natural and man-made features required to remain undisturbed or as directed by the Contract Administrator. Unless otherwise indicated or located in an area to be occupied by new construction, protect existing trees from damage. 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 Protect existing features in accordance with applicable local regulations.
 - .4 Keep excavations clean, free of standing water, and loose soil.
 - .5 Protect buried services that are required to remain undisturbed.

EXCAVATING TRENCHING AND BACKFILLING

Part 2 Products

2.1 MATERIALS

- .1 General Backfill: Clean native or imported soil material suitable for compaction shall be in accordance with applicable Provincial and Federal regulation and in accordance with site-specific environmental reports.
 - .1 Native material must be approved by Engineer prior to use.
- .2 Excavated or graded material existing on site may be suitable to use as fill for grading work. All approved materials shall be screened/processed accordingly to meet gradation requirements for use as required. Applicable test results are to be provided to the Contract Administrator as required.
- .3 Type 1 and Type 2 fill: properties to Section 32 11 23 and the following requirements:
 - .1 Crushed, pit run or screened stone, gravel or sand.
 - .2 Gradations to be within limits specified when tested to ASTM C136 and ASTM C117. Sieve sizes to CAN/CGSB-8.2.
 - .3 Table:

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

- .4 Type 3 fill: selected material from excavations or other sources, approved by the Contract Administrator for use intended, unfrozen and free from rocks larger than 50 mm, cinders, ashes, sods, refuse or other deleterious materials.
- .5 Granular material: to Ontario Provincial Standard Specification 1010 for:
 - .1 Granular A, maximum size 19.0 mm.
 - .2 Granular B, Type I, maximum size 26.5 mm.
 - .3 Granular C, Type I, maximum size 26.5 mm.
 - .4 19mm dia Crusher Run Limestone, maximum size 19.0 mm.
 - .5 50mm dia Crusher Run Limestone, maximum size 50.0 mm.
- .6 Clear stone to OPSS 1004.MUNI Table 2.

EXCAVATING TRENCHING AND BACKFILLING

- .7 Mortar Sand: clean, washed, minimum 100% passing 4.75 mm sieve, maximum 5% passing 0.075 mm sieve to OPSS.MUNI 1004.05.07.
- .8 Select Subgrade Material (SSM) to OPSS 1010 Table 2.
- .9 Unshrinkable fill: proportioned and mixed to provide:
 - .1 Maximum compressive strength of 0.4 MPa at 28 days.
 - .2 Maximum cement content of 25 kg/m³ with 40 % by volume fly ash replacement : to CSA-A3001, Type GU.
 - .3 Minimum strength of 0.07 MPa at 24 h.
 - .4 Concrete aggregates: To CSA-A23.1/A23.2
 - .5 Cement: Type GU.
 - .6 Slump: 160 to 200 mm
- .10 Shearmat: honeycomb type bio-degradable cardboard 100 mm thick, treated to provide sufficient structural support for poured concrete until concrete cured.
- .11 Geotextiles: to Section 32 05 19 - Geotextiles.
- .12 The contractor is solely responsible for ensuring that recovered fill meets the requirements for reuse and shall process, manage and protect fill materials as necessary.

Part 3 Execution

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- .1 Comply with requirements of Section 01 35 43.
- .2 Provide temporary erosion, dust 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, sediment and erosion control drawings, sediment and erosion control plan and specific to site.
- .3 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- .4 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.2 SITE PREPARATION

- .1 Remove obstructions, ice and snow, from surfaces to be excavated within limits indicated.
- .2 Cut pavement or sidewalk neatly along limits of proposed excavation in order that surface may break evenly and cleanly in accordance with Section 02 41 13.

3.3 SURVEYS

- .1 Surveys shall be performed to provide existing conditions and to layout the Work. Ongoing surveys will also be completed to verify and document the limits and extents of Work.

EXCAVATING TRENCHING AND BACKFILLING

- .2 The Contractor shall furnish and/or provide all labour, tools, materials, equipment and services to survey and document the progress of Work. The Contractor shall be responsible for layout of any survey controls, grid coordinate location, lines, grades and elevations necessary for proper construction, documentation and testing of the Work. Survey activities shall include, but not be limited to:
 - .1 Verify existing conditions with pre-construction surveys and bring any discrepancies with the base plan to the Contract Administrator's attention.
 - .2 Permit the Contract Administrator time to do any grading redesign necessary should discrepancies exist.
 - .3 Perform interim surveys including vertical and horizontal limits of all Work.
 - .4 Perform post excavation, re-graded base of excavation and backfill surveys to ensure limits and extents are attained.
- .3 The Contractor is responsible for survey control for construction and documentation. The Contractor shall safeguard all survey point and benchmarks. If any of these points are destroyed, the replacement costs shall be borne by the Contractor. The Contractor shall assume the entire expense for rectifying work improperly constructed due to failure to maintain and protect such established survey points and benchmarks.

3.4 STRIPPING OF TOPSOIL

- .1 Refer to Section 02 41 13.
- .2 Begin topsoil stripping of areas as directed by the Contract Administrator after area has been cleared of brush, weeds and grasses and removed from site.
- .3 Strip topsoil to depths as indicated.
 - .1 Do not mix topsoil with subsoil.
- .4 Manage topsoil to location as directed by the Contract Administrator.
 - .1 Stockpile height not to exceed 2 m and should be protected from erosion.
- .5 Dispose of unused topsoil in accordance with applicable Provincial and Federal regulation and in accordance with site-specific environmental reports.

3.5 STOCKPILE MANAGEMENT

- .1 The Contractor is responsible for the ongoing management of stockpiles for the Work, to the satisfaction of the Contract Administrator. This shall include, but is not limited to, the routine grading and sealing of the stockpile surface to minimize infiltration of precipitation into the stockpiles.
- .2 Stockpile fill materials in areas designated by the Contract Administrator.
 - .1 Stockpile granular materials in manner to prevent segregation.
- .3 Protect fill materials from contamination and effect of weather. Be responsible for any extra cost in failing to protect the fill materials.
- .4 Shape stockpiles of native backfill soils to drain and shed water. Protect stockpiles by covering with tarps or by establishing turf.

EXCAVATING TRENCHING AND BACKFILLING

- .5 Implement sufficient erosion and sediment control measures to prevent sediment release off construction boundaries and into water bodies and drainage channels.

3.6 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.
 - .1 Where conditions are unstable, Contract Administrator to verify and advise methods.
 - .2 Construct temporary Works to depths, heights and locations as indicated and as directed and approved by the Contract Administrator.
 - .3 During backfill operation:
 - .1 Unless otherwise indicated or directed by the Contract Administrator, remove sheeting and shoring from excavations.
 - .2 Do not remove bracing until backfilling has reached respective levels of such bracing.
 - .3 Pull sheeting in increments that will ensure compacted backfill is maintained at elevation.

3.7 EXCAVATION

- .1 Excavate to lines, grades, elevations and dimensions as indicated.
- .2 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.
 - .1 Restrict vehicle operations directly adjacent to open trenches.
 - .2 Where conditions are unstable, Engineer to verify and advise methods.
- .3 Construct temporary Works to depths, heights and locations as indicated and as directed and approved by the Contract Administrator.
- .4 During backfill operation:
 - .1 Unless otherwise indicated or directed by the Contract Administrator, remove sheeting and shoring from excavations.
 - .2 Do not remove bracing until backfilling has reached respective levels of such bracing.
 - .3 Pull sheeting in increments that will ensure compacted backfill is maintained at elevation at least 500 mm above toe of sheeting.
 - .4 When sheeting is required to remain in place, cut off tops at elevations as indicated.
 - .5 Upon completion of substructure construction:
 - .1 Remove cofferdams, shoring and bracing.
 - .2 Remove excess materials from site and restore watercourses as indicated and as directed by the Contract Administrator.
- .6 Remove concrete, masonry, paving, walks, demolished foundations and rubble and other obstructions encountered during excavation in accordance with Section 02 41 13.

EXCAVATING TRENCHING AND BACKFILLING

- .7 Remove unsuitable material from trench bottom including those that extend below required elevations to extent and depth as directed by the Contract Administrator.
 - .1 Dispose of surplus and unsuitable excavated material off site in accordance with applicable Provincial and Federal regulation and in accordance with site-specific environmental reports.
- .8 Excavation shall not interfere with bearing capacity of adjacent foundations.
- .9 Do not disturb soil within branch spread of trees or shrubs that are to remain.
 - .1 If excavating through roots, use root sensitive excavation methods as outlined in Arborist for Report Macpherson Avenue Park, Urban Forest Innovations Inc., September 9, 2022.
- .10 For trench excavation, unless otherwise authorized by the Contract Administrator in writing, do not excavate more than 30 m of trench in advance of installation operations and do not leave open at end of day's operation.
 - .1 Keep excavated and stockpiled materials safe distance away from edge of trench as directed by the Contract Administrator.
 - .2 Restrict vehicle operations directly adjacent to open trenches.
- .11 Dispose of surplus excavated material in approved location on site. Stockpile and protect in approved location(s) on site excavated frost susceptible materials that may be used as backfill.
- .12 Do not obstruct flow of surface drainage or natural watercourses.
- .13 Earth bottoms of excavations to be undisturbed soil, level, free from loose, soft or organic matter.
- .14 Notify the Contract Administrator when bottom of excavation is reached.
- .15 Obtain the Contract Administrator's approval of completed excavation.

3.8 BEDDING AND SURROUND OF UNDERGROUND SERVICES

- .1 Place and compact granular material for bedding and surround of underground services as indicated.
- .2 Place bedding and surround material in unfrozen condition.

3.9 FILL TYPES AND COMPACTION

- .1 Use types of fill as indicated or specified below. Compaction densities are percentages of maximum densities obtained from ASTM D1557.
 - .1 Exterior sides of perimeter walls: use Type 3 fill to subgrade level. Compact to 95% of corrected maximum dry density.
 - .2 Under concrete slabs: provide 150 mm compacted thickness base course of Type 1 fill topped with shearmat filler as indicated to underside of slab. Compact base course to 100%.
 - .3 Retaining walls: use Type 2 fill to subgrade level on high side for minimum 500 mm from wall and compact to 95%. For remaining portion, use Type 3 fill compacted to 95%.
 - .4 Roadways & Trails: use Type 3 fill to subgrade level and compact to 100%.

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- .5 Grassed Areas: use Type 3 fill to subgrade level and compact to 95%.
- .6 Utility Trenches: use Type 3 fill to subgrade level and compact to 100%.
- .7 Place unshrinkable fill in areas as indicated, required or as directed by the Contract Administrator.
- .8 Bridge abutment footings, bridge wing wall footings and bridge retaining wall footings: use Type 3 fill compacted to 100% of corrected maximum dry density.
- .9 Backfilling of bridge abutment walls, bridge wing walls and bridge retaining walls: use Granular B Type '1' compacted to 100% of corrected maximum dry density.
- .2 If, in the opinion of the Contract Administrator, water is required to attain the required fill density as specified in OPSS 501, the Contractor shall pay for and supply such quantities as the Contract Administrator may direct and apply the water from equipment approved for that purpose.

3.10 BACKFILLING

- .1 Do not place, spread or compact any backfill materials during unfavourable weather.
- .2 Do not commence any backfill operation without adequate compaction equipment on site.
- .3 Areas to be backfilled to be free from debris, and water.
- .4 Areas to be backfilled to be free from debris, snow, ice, water and frozen ground.
- .5 Do not disturb soil within branch spread of trees or shrubs to remain.
- .6 No granular materials shall be placed on the sub-grade until the sub-grade has been compacted to the specified density, and accepted by the Contract Administrator.
- .7 Compaction of general backfill to specified maximum density shall be in accordance with OPSS 501 and the following:
 - .1 Do not proceed with backfilling operations until completion of following:
 - .1 Contract Administrator has inspected and accepted installations.
 - .2 Contract Administrator has inspected and accepted construction below finish grade.
 - .3 Inspection, testing, approval, and recording location of underground utilities.
 - .2 Do not use backfill material which is frozen or contains ice, snow or debris.
 - .3 Place backfill material in uniform layers not exceeding 150 mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.
 - .4 Roll each layer with vibratory roller to 95% Standard Proctor Density.
- .8 Compaction of backfill behind earth retaining structures, specified maximum density shall be in accordance with OPSS 501.07.02 and in accordance with the following:
 - .1 Use vibratory compaction equipment.
 - .2 Do not proceed with backfilling operations until completion of following:
 - .1 Contract Administrator has inspected and accepted installations.
 - .2 Contract Administrator has inspected and accepted construction below finish grade.

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- .3 Inspection, testing, approval, and recording location of underground utilities.
- .4 Removal of concrete formwork.
- .5 Removal of shoring and bracing; backfilling of voids with satisfactory soil material.
- .3 Place backfill material in uniform layers not exceeding 150 mm compacted thickness up to grades indicated. Compact each layer before placing succeeding layer.
- .4 Roll each layer with vibratory roller to 95% Standard Proctor Density.
- .5 Place unshrinkable fill in areas as indicated or as directed by the Contract Administrator.
- .1 Consolidate and level unshrinkable fill with internal vibrators.
- .6 Install drainage system in backfill as indicated and/or as directed by Contract Administrator.

3.11 GRADING

- .1 Do site grading work in accordance with Section 31 22 13, Section 32 91 19 and TS 5.10 - City of Toronto Construction Specification for Growing Medium.
- .2 Perform all rough and finish grading and backfilling required to achieve the finished elevations indicated on the drawings.
- .3 Prior to placing fill over existing ground, scarify surface to depth of 150 mm. Maintain fill and existing surface at approximately same moisture content to facilitate bonding.

3.12 RESTORATION

- .1 Upon completion of Work, remove waste materials and debris in accordance to Section 01 47 15. Trim slopes, and correct defects as directed by Contract Administrator.
- .2 Reinstate area disturbed to new elevations as indicated on the Contract documents.
- .3 Where Contract documents are not specific for reinstatement, reinstate disturbed areas to elevation which existed before excavation or as directed by the Contract Administrator.
- .4 Unless otherwise specified on the Contract documents, reinstate pavements and sidewalks disturbed by excavation to thickness, structure and elevation which existed before excavation.
- .5 Clean and reinstate areas affected by Work as directed by Contract Administrator.
- .6 Replace topsoil as directed by Contract Administrator.
- .7 Use temporary plating to support traffic loads over unshrinkable fill for initial 24 hours. Protect newly graded areas from traffic and erosion and maintain free of trash or debris.
- .8 Protect newly graded areas from traffic and erosion and maintain free of trash or debris.

3.13 SHORTAGE AND SURPLUS MATERIAL

- .1 Remove surplus material and material unsuitable for fill, grading or landscaping off site in accordance with applicable Provincial and Federal regulation and in accordance with site-specific environmental reports.
 - .1 All Surplus excess soils generated by the construction of the proposed work shall be removed and disposed at an off-site location arranged by the Contractor and in accordance with the Soil and Groundwater Management Plan.

EXCAVATING TRENCHING AND BACKFILLING

- .2 Additional backfill material, if required, shall be obtained from offsite sources approved by the Contract Administrator. Additional backfill above and beyond what is available at the site and required for backfilling shall be at the Contractor's expense.

3.14 CLEANING

- .1 Leave the site in a neat and orderly condition at the end of each workday.
- .2 Clean and remove debris and sediment from work area drainage devices and dispose of to an approved landfill site.
- .3 Do not clean equipment in any waterbody or where the wash-water can enter a waterbody.
- .4 Upon completion remove surplus materials, rubbish, tools, and equipment.

3.15 PROTECTION

- .1 Protect existing trees, natural features, bench marks, buildings, pavement, surface or underground utility lines. If damaged, restore to original or better condition, unless directed otherwise.
- .2 Maintain access roads to prevent accumulation of construction related debris on roads.

END OF SECTION

PRUNING

Part 1 General

1.1 SECTION INCLUDES

- .1 This section includes requirements for materials and procedures for all pruning to be carried out, including the following:
 - .1 Pruning of existing plant material.
 - .2 Pruning of new plant material.

1.2 RELATED WORK

- .1 Section 01 33 00 - Submittal Procedures
- .2 Section 32 01 90 – Tree and Shrub Preservation

1.3 REFERENCES

- .1 All referenced standards shall be the current edition or edition referenced by the Ontario Building Code currently in force
- .2 City of Toronto Construction Standards:
 - .1 TS 5.30, City of Toronto Construction Specification for Planting
 - .2 City of Toronto Tree Protection Policy and Specifications for Construction Near Trees
 - .3 City of Toronto Tree Pruning Guidelines.
- .3 City of Toronto Municipal Code:
 - .1 Chapter 658, Ravine and Natural Feature Protection (RNFP) by-Law
 - .2 Chapter 813, Trees by-law
- .4 Ontario Ministry of Agriculture, Food and Rural Affairs:
 - .1 Publication 483-2004, Pruning Ornamentals
- .5 Canadian Society of Landscape Architects (CSLA)/ Canadian Nursery Landscape Association (CNLA):
 - .1 Canadian Landscape Standard (CLS), latest edition
 - .2 Canadian Nursery Stock Standard (CNSS), latest edition
- .6 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

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- .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)
- .7 Reference Documents
 - .1 Appendix A - Arborist Report, Macpherson Avenue Park, Urban Forest Innovations Inc., April 23, 2025
 - .2 Appendix B - Soil and Groundwater Management Plan – Davenport Lands (Parcel 28B, 29 and 30, WSP, July 2024
 - .3 Appendix C - Contaminant Health and Safety Plan – 28B, 29 and 30 Green Line Trail, WSP, July 2024
 - .4 Appendix D - City of Toronto Tree Protection Policy and Specifications for Construction Near Trees, July 2016
 - .5 Appendix E – Geotechnical Investigation for Macpherson Avenue Park, October 31, 2022
 - .6 Appendix F – Hydro One General Conditions for Secondary Land Uses, Hydro One, January 2023
 - .7 Appendix G -General Requirements for Construction Work by External Parties in the Vicinity of Hydro One 115,000 and 230,000 Volt Underground Plant, Hydro One, January 2024

1.4 DEFINITIONS

- .1 For the purpose of this specification, the following definitions apply:
 - .1 Branch Collar: The swollen area at the base of a branch.
 - .2 Certified Arborist: Designated and regulated by the International Society of Arboriculture (ISA).
 - .3 Crown: The leaves and branches of a tree measured from the lowest branch on the trunk to the top of the tree.
 - .4 Girdling Root: A root that has become wrapped around the trunk of the plant that over time will inhibit the uptake of nutrients and produce structural failure, eventually leading to death of the plant.
 - .5 Leader: A dominant or co-dominant, upright stem.
 - .6 Limb: A large, prominent branch

1.5 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 All pruning to be undertaken by an International Society of Arboriculture (ISA) Certified Arborist, or equivalent, with minimum 5 years experience.
 - .2 Pruning to be undertaken in the presence of the Contract Administrator.
- .2 All pruning and related work of this Section shall be carried out in accordance with accepted arboricultural practices as defined in the latest version of ANSI A300, and as directed by a Certified Arborist.

PRUNING

- .3 Comply with City of Toronto by-laws and applicable standards.
- .4 Comply with the requirements and recommendations of the Arborist Report as prepared by Urban Forest Innovations Inc., dated September 2022. See Appended.

1.6 PRUNING SEASON

- .1 Prune during plant dormant period except during heavy frost, or after leaves have matured. Avoid pruning during leaf formation, at time of leaf fall, or when seasonal temperature drops below minus 10 degrees C.
 - .1 Prune heavy bleeders such as birch and hard maple when in full leaf.
 - .2 Prune American White Elm (*Ulmus americana*) only during periods of low or no bark beetle activity. Pruning to be done only before first signs of leaf break and after the first frost.
 - .3 Pruning of oak and elm trees is prohibited between the months of April and October to prevent the spread of disease.
 - .4 Prune shrubs that flower on the previous year's growth only after flowering.

1.7 SCHEDULING OF WORK

- .1 Prepare a schedule of tree pruning operations for review by the Contract Administrator.
- .2 Notify Contract Administrator at least 7 days in advance of starting operations.
- .3 Review work with Contract Administrator on site prior to starting work.
- .4 Start no work until sample pruning has been completed to satisfaction of the Contract Administrator.

1.8 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.

Part 2 Products

2.1 DISINFECTANT

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

Part 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 Carry out work under direct on site supervision of the Contract Administrator.

PRUNING

- .2 Notify the Contract Administrator immediately upon discovery of conditions detrimental to health of plant material or operations.
 - .1 Report structural weakness, decayed trunk or branches, split crotches.
 - .2 Report girdling of roots.
 - .3 Notify the Contract Administrator of type of disease encountered and recommend remedial measures in writing.
- .3 Do not:
 - .1 Flush cut branches.
 - .2 Crush or tear bark.
 - .3 Cut behind branch bark ridge.
 - .4 Damage branch collars.
- .4 Damage branches to remain.

3.3 PRUNING

- .1 Use clean sharp tools. Remove dead, dying, diseased, interfering, objectionable, and weak growth in order to promote healthy growth suitable to purpose for which plant material grown.
- .2 Thin out crown of trees and/or shrubs without changing their natural shape or habitat. Do not damage lead branches or remove smaller twigs along main branches unless requested by Contract Administrator.
- .3 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.
- .4 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.
- .5 Remove loose branches, twigs and other debris lodged in tree.
- .6 Remove vines where required, and directed by the Contract Administrator.
- .7 For branches under 50 mm in diameter:

PRUNING

- .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 Certified Arborist.
- .8 For branches greater than 50 mm in diameter:
 - .1 Make first cut on lower side of branch 305 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.
- .9 All cuts shall be smooth and sloping to prevent accumulation of water. Do not leave projecting stumps on trunks or main branches.
- .10 Cuts, bruises, or scars on the bark shall be traced back to living tissue and removed.
- .11 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.
- .12 Remove additional growth designated by Certified Arborist.
- .13 Prune transplanted trees, new trees and shrubs after planting to compensate for loss of roots suffered during transplanting. Postpone pruning of those plants where heavy bleeding may occur, until in full leaf. Trim out crown of trees and shrubs without changing their natural shape.

3.4 CUT BACK

- .1 Eliminate narrow crotches as much as possible, avoid cutting back to small suckers. Remove smaller limbs and twigs to leave foliage evenly distributed.
- .2 When reducing overall size, make symmetrical in appearance to maintain tree like form typical of species.
- .3 When removing bottom branches for under clearance, maintain symmetrical appearance. Do not make large cuts which prevent normal sap flow.
- .4 Do not remove more than one third of total branching at single operation.

3.5 ROOT GIRDLING

- .1 Treat girdling roots visible to eye as follows:
 - .2 Cut root at either end.
 - .3 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.
 - .4 Remove exposed portion of girdling root as directed by Certified Arborist after cleanly cutting root flush with grade on each side of parent root. Do not injure bark or parent root.

3.6 CARE OF WOUNDS

PRUNING

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

3.7 CLEANING

- .1 Collect and dispose of pruned material daily.
- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

TREE AND SHRUB PRESERVATION

Part 1 General

1.1 SECTION INCLUDES

- .1 Requirements for materials and measures for tree protection, including the following:
 - .1 Placement of tree protection barriers
 - .2 Placement of temporary planting bed protection barriers
 - .3 Root zone compaction protection

1.2 RELATED WORK

- .1 Section 02 20 00 – Site Preparation – Davenport Lands
- .2 Section 02 41 13 – Selective Site Demolition
- .3 Section 31 11 00 – Clearing and Grubbing
- .4 Section 32 01 90.23 – Pruning

1.3 REFERENCES

- .1 All referenced standards shall be the current edition or edition referenced by the Ontario Building Code currently in force.
- .2 City of Toronto Construction Standards
 - .1 TS 5.00, City of Toronto Construction Specification for Sodding
 - .2 TS 5.10, City of Toronto Construction Specification for Growing Medium
 - .3 TS 5.30, City of Toronto Construction Specification for Planting
 - .4 City of Toronto PF&R Tree Protection Policy and Specifications for Construction Near Trees
 - .5 City of Toronto Tree Pruning Guidelines
- .3 City of Toronto Municipal Code:
 - .1 Chapter 658, Ravine and Natural Feature Protection (RNFP) by-Law
 - .2 Chapter 813, Trees by-law
- .4 Canadian Society of Landscape Architects (CSLA)/ Canadian Nursery Landscape Association (CNLA)
 - .1 Canadian Landscape Standard (CLS), latest edition
 - .2 Canadian Nursery Stock Standard (CNSS), latest edition

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- .5 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)
- .6 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
- .7 Reference Documents:
 - .1 Appendix A - Arborist Report, Macpherson Avenue Park, Urban Forest Innovations Inc., April 23, 2025
 - .2 Appendix B - Soil and Groundwater Management Plan – Davenport Lands (Parcel 28B, 29 and 30, WSP, July 2024
 - .3 Appendix C - Contaminant Health and Safety Plan – 28B, 29 and 30 Green Line Trail, WSP, July 2024
 - .4 Appendix D - City of Toronto Tree Protection Policy and Specifications for Construction Near Trees, July 2016
 - .5 Appendix E – Geotechnical Investigation for Macpherson Avenue Park, October 31, 2022
 - .6 Appendix F – Hydro One General Conditions for Secondary Land Uses, Hydro One, January 2023
 - .7 Appendix G -General Requirements for Construction Work by External Parties in the Vicinity of Hydro One 115,000 and 230,000 Volt Underground Plant, Hydro One, January 2024

1.4 DEFINITIONS

- .1 For the purpose of this specification, the following definitions apply:
 - .1 Certified Arborist: Designated and regulated by the International Society of Arboriculture (ISA).

1.5 QUALIFICATIONS

TREE AND SHRUB PRESERVATION

- .1 All reports and site work where required will be completed by a Certified Arborist with minimum 5 years experience and shall be consulted for all work that impacts the tree preservation zone. Submit proof of qualifications when requested by the Contract Administrator.
- .2 All work of this Section shall be carried out in accordance with accepted arboricultural practices as defined in the latest version of ANSI A300.
- .3 Comply with City of Toronto Tree Protection By-law and applicable standards.
- .4 Comply with the requirements and recommendations of the Arborist Report prepared by Urban Forest Innovations, dated April 2025.
- .5 No disruption of the understory shall take place within the Tree Protection Zone in accordance with TPP item 2.

1.6 SCHEDULING OF WORK

- .1 A pre-construction meeting shall take place with the Arborist and the Contractor. The Contractor's superintendent, truck drivers and equipment operators shall be in attendance. All equipment and trucks shall follow the designated entrances and exits to the work site.

Part 2 Products

2.1 MATERIALS

- .1 All products and remedial care for protection of the trees as specified are to be as recommended by a Certified Arborist, must comply with references above, with approval of the Contract Administrator.
- .2 Provide tree protection barrier alternative where indicated on the drawings, and subject to the approval by Urban Forestry Services in accordance with TPP item 3.
- .3 Tree protection fence shall be as indicated on drawings and as follows:
 - .1 Plywood barriers: Unless otherwise noted, tree protection barriers shall be constructed as per the City of Toronto TPP detail TP-1, with a solid 2"x4" wood frame clad with plywood sheeting or approved equivalent. Height of barrier shall be up to 2.4m high and a minimum of 1.2m
 - .2 Snow fence barriers: Where additional visibility must be maintained tree protection barriers shall be constructed as per the City of Toronto TPP detail TP-1,] with orange plastic web snow fencing fastened to a wood frame consisting of 2"x4" wood posts, with continuous 2"x4" wood top rails. Height of barrier shall be min. of 1.2m. Provide tree protection barrier alternative where indicated on the drawings
- .4 Where indicated, trunk protection shall be 28 x 89mm wood planks, minimum 1500mm long, secured with two bands metal strapping
- .5 Tree Protection Signs: Minimum of 40cm x 60cm and made of white corrugated plastic board or equivalent material. Signs to be posted on tree protection fence in frequency as required by tree protection by-laws, or as shown on drawings and directed by the Contract Administrator.

TREE AND SHRUB PRESERVATION

Part 3 Execution

3.1 GENERAL

- .1 Examine site before commencement of work and inform Contract Administrator if site conditions will not permit completion of site work performed by this Section and as indicated on Drawings.
- .2 No groundbreaking activities or demolition should occur until all tree preservation requirements have been met. Of primary concern is the erection of proper hoarding to establish the Tree Preservation Zones (TPZ).
- .3 All contractors, trades people and suppliers shall be informed of the tree preservation measures and guidelines at a pre-construction meeting.
- .4 Monitoring of the trees and the tree preservation zone should be conducted by a consulting arborist throughout the duration of the project.
- .5 Tree protection barriers shall remain in place and in good condition during demolition and construction and shall not be altered or moved until authorized by the Contract Administrator.
- .6 The tree preservation zone shall be posted with signs. In accordance with TPP item 2 within the tree preservation zone there will be no:
 - .1 Grade changes
 - .2 Dumping or storage of any materials
 - .3 Use of any machinery without prior to approval
 - .4 Landscaping with heavy machinery
 - .5 Activity of any kind without permission of the arborist
- .7 Efforts should be made to route all underground utilities around the tree preservation zones. If this is not possible, they should be bored or tunneled under the root zone of the trees (minimum 1.6 m). Using traditional trenching methods, there will be significant root damage to the trees that are being preserved. Where possible it is strongly recommended that any installation of underground utilities (water, sewage or hydro) should utilize a non-destructive methodology such as directional boring, Airspade technology or Hydrovac removal of soil.

3.2 TREE PROTECTION

- .1 Protect trees to be preserved from damage during the construction period in accordance with the following specifications and TPP and make good any damage at no expense to Owner.
- .2 Trees to be protected will be indicated on the Drawings and/or by the Contract Administrator. Trees to be protected will be confirmed by the Contract Administrator.
- .3 Tree protection shall remain in place until all site work has been completed, and may not be removed, relocated, or otherwise altered without the written permission of the consulting Arborist.
- .4 Trees shall be fertilized with a deep root application of 30-8-8 fertilizer before construction commences on this project as well as a second fertilization in two years.

TREE AND SHRUB PRESERVATION

- .5 The trees within the protection zones shall be pruned in accordance with Section 32 01 90.23 - PPruning.
- .6 Tree roots are expected to extend beyond the minimum tree protection area. Tree protection hoarding to be installed and inspected by a Certified Arborist prior to construction activity. Exploratory excavation and, if required, root pruning shall be undertaken during clearing and grubbing. All roots shall be inspected and pruned by a Certified Arborist prior to construction activity.
 - .1 The Arborist shall supervise the excavation of soil where roots are to be cut.
 - .2 The Arborist shall undertake proper root pruning when and if roots of retained trees are to be exposed, damaged or severed by construction activities.
 - .3 All roots are to be cut cleanly at the excavation zone and backfilled with an appropriate soil mix.
 - .4 Exposed roots shall be covered with soil or mulch as soon as possible to prevent further damage and desiccation. Root pruning prior to excavation will help prevent unnecessary damage to tree roots
- .7 In areas where mulch may remain following construction the trees shall have 100mm min. of mulch installed over the root system before construction starts and set back from the trunk by rodent guard. Mulch shall be spread evenly under the canopy to the dripline, to the limits of the protection fence, or as shown on the drawings.
- .8 There shall be a source of water provided to ensure that the trees get adequate water during the dry periods. It will be the responsibility of the Arborist to monitor for moisture content in the soil for the duration of the construction.
- .9 **The protection zone shall not be breached in any way. There shall be no material stored in the preservation zones, no grade changes and no parking.**
- .10 Ensure all trees are protected from compaction of roots or damage to trunk or limbs prior to receipt of permits for removal or remedial care as recommended by Arborist.
- .11 Obtain necessary permits, reports, and approvals.
- .12 Proceed with execution of specified work, under direction of the Contract Administrator.
- .13 No rigging cables will be wrapped around or installed in trees. Do not burn waste near trees and do not flush concrete trucks or cement mixing machines over root system.
- .14 A Certified Arborist shall supervise the excavation of soil where roots are to be cut. All roots are to be cut cleanly at the excavation zone and backfilled with an appropriate soil mix.
- .15 The Contractor shall be held responsible for all trees that have been damaged or have died as a result of his own actions. The Contractor will be required to reimburse the Owner at his own expense for damage or dead trees in one of the following forms: trees up to 250mm caliper will be replaced with a specimen of similar species and size, trees greater than 250mm caliper shall be evaluated monetarily according to the standards set out by the Ontario Shade Tree Council.

TREE AND SHRUB PRESERVATION

3.3 TRUNK PROTECTION

- .1 Protect trunks of all deciduous trees within work zone that cannot be protected by tree protection fence.
- .2 Place wood planks around base of trunk at 150mm maximum on centre or to provide full protection from impact and abrasion.
- .3 Do not puncture or damage bark with wood planks or fasteners.
- .4 Arrange wood planks around branches or other irregularities to provide protection without damaging tree.
- .5 Maintain tree protection during construction operations. Remove only when risk of damage has passed and upon acceptance of Contract Administrator.

3.4 ROOTZONE COMPACTION PROTECTION

- .1 Unless otherwise noted, no construction activity including vehicular circulation or access of any kind is permitted within the area identified on the tree protection plan or site plan as a tree protection zone.
- .2 Where traffic or access through the root zone is anticipated, a Root Zone Compaction Protection treatment shall be installed.
 - .1 Where limited non-vehicular access across the root zone is anticipated (e.g., occasional foot traffic, wheelbarrow), a Light Root Zone Compaction Protection specification should be implemented, as described below.
 - .1 Installation of medium-weight non-woven geotextile fabric or landscape cloth over affected area
 - .2 Installation of 150 mm of wood chips over the fabric area
 - .3 Installation of ½" plywood over wood chip mulch, and
 - .4 Installation of appropriate covering material, if desired
 - .2 Where moderate non-vehicular access across the root zone is anticipated (e.g., materials staging) a Moderate Root Zone Compaction Protection specification should be implemented, as described below.
 - .1 100 mm of granular clear stone lain over fabric area
 - .2 Installation of medium-weight non-woven geotextile fabric or landscape cloth over the stone
 - .3 Installation of 150 mm of wood chips over fabric area, and
 - .4 Installation of ½" plywood over wood chip mulch
 - .3 In areas where frequent non-vehicular access or longer-term materials storage in the root zone is anticipated, or in areas where additional measures must be implemented to ensure complete exclusion of excavation activity, a Horizontal Hoarding / Excavation Exclusion specification should be implemented, as described below.

TREE AND SHRUB PRESERVATION

- .1 Installation of medium-weight non-woven geotextile fabric or landscape cloth over affected area
- .2 Installation of 3 stacked and joined courses of 4" x 4" timbers around the area to be protected (including cross-members or joists, as required to maintain structural integrity)
- .3 Installation of wood chip mulch in entire protected area, and
- .4 Installation of 2 layers of $\frac{3}{4}$ " plywood or 1 steel plate over the protected area
- .4 In areas where vehicular access or severe potential root zone compaction are anticipated, such as site access roads, temporary parking areas or heavy machine staging areas, a more robust Heavy Root Zone Compaction Protection specification should be developed and implemented on a site-specific basis. Key elements of such a specification may include multiple steel plates over load-dissipating materials, or modular geocellular systems such as Permavoid ArborRaft, or approved equivalent.

3.5 ROOT-SENSITIVE EXCAVATION

- .1 Unless otherwise noted, no construction activity including, grade changes, surface treatments or excavations of any kind is permitted within the area identified on the tree protection plan or site plan as a tree protection zone.
- .2 Efforts should be made to exclude excavation or grade changes, including cutting or filling, from all tree protection zones. Where this is not possible, and unless otherwise specified, excavation shall utilize a root-sensitive methodology such as hand-digging, hydrovac or pneumatic (e.g., AirSpade) soil excavation, as specified in the Arborist report.
- .3 Root-sensitive excavation must be conducted in advance of excavation using conventional excavation machinery. The objective of root-sensitive excavation is threefold: 1) to determine whether roots will be present beneath areas to be excavated and therefore determine the likely extent of damage to trees to be retained; 2) to finalize decisions about trees for which removal/preservation decisions are contingent upon the extent of roots encountered, and 3) to enable proper root pruning, as described below.
- .4 Unless otherwise specified, root-sensitive excavation shall entail creating a trench approximately 200-300 mm wide between the subject tree (e.g., outside the established tree protection zone) and the area to be excavated, without damaging existing significant roots. Unless otherwise specified, root-sensitive excavation should be undertaken to a minimum depth of 800 mm, unless excavation is proposed to a shallower final depth. If excavation is for exploratory reasons and root pruning is not anticipated, equipment utilized during root-sensitive excavation should be operated at reduced pressures to prevent damage to root bark

3.6 ROOT PRUNING

- .1 Root pruning should be undertaken in conjunction with root-sensitive excavation in advance of conventional excavation, or immediately afterwards if unexpected roots are encountered. Root pruning should only be undertaken by an ISA Certified Arborist, and in the manner outlined below:
 - .1 Roots that are severed, exposed, or diseased and are greater than 2.0 cm in diameter should be properly pruned. All roots must be pruned with clean and sharp hand tools only. Shovels,

TREE AND SHRUB PRESERVATION

picks or other construction tools shall not be used to prune roots. Wound dressings or pruning paint must not be used to cover the ends of any cut.

- .2 Roots should be pruned in a similar fashion as branches, taking care to maintain the integrity of the root bark ridge. Root should be pruned back to native soil; root stubs must not be left upon completion of root pruning.
- .3 Prolonged exposure of tree roots must be avoided – exposed roots should be covered and kept moist with soil, mulch, irrigation, or at least moistened burlap if they are to be exposed for longer than 3 hours. All cut roots should be covered with soil or excavated trenches should be backfilled with native material as soon as possible following root pruning.

3.7 TRENCHING AND TUNNELING FOR UNDERGROUND SERVICES

- .1 Efforts should be made to route all underground utilities around the tree preservation zones.
- .2 Perform excavation and backfilling activities in accordance with Section 31 23 33.01- Excavating, Trenching and Backfilling.
- .3 Utilities should be bored or tunneled under the root zone of the trees at a minimum depth of 1.6 m. Installation of underground utilities (water, sewage or hydro) within the tree protection area should utilize a non-destructive methodology such as directional boring, Airspade technology or Hydrovac removal of soil.
- .4 Where trenching is required, 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.
- .5 Keep roots moist by spraying or covering with moist burlap while the roots are exposed during the excavation and before backfilling.

3.8 PRUNING AND CLEANING

- .1 Broken or damaged limbs incurred as a result of excavation or construction shall be pruned promptly with proper cuts by a Certified Arborist.
- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

3.9 TREE REMOVALS AND SELECTION OF SALVAGED LOGS

- .1 Perform Work in accordance with Section 02 41 13 – Selective Site Demolition.

END OF SECTION

GEOTEXTILES

Part 1 General

1.1 SECTION INCLUDES

- .1 Requirements for supply and installation of geotextile and filter fabric for exterior improvements.

1.2 RELATED WORK

- .1 Section 01 33 00 - Submittal Procedures
- .2 Section 01 35 43 – Environmental Procedures
- .3 Section 02 20 00 – Site Preparation
- .4 Section 32 11 23 – Aggregate Base Courses
- .5 Section 32 14 40 – Landscape Stone
- .6 Section 32 91 19 – Topsoil Placement and Grading

1.3 REFERENCES

- .1 All referenced standards shall be the current edition or edition referenced by the Ontario Building Code currently in force
- .2 City of Toronto:
 - .1 TS 1860, City of Toronto Amendments to OPSS.MUNI 1860 - Material Specification for Geotextiles.
- .3 Ontario Provincial Standard Specifications (OPSS)
 - .1 [OPSS.MUNI 1860](#), Material Specification for Geotextiles.
- .4 Canadian Standards Association (CSA)
 - .1 Current CAN/CSA-G40.20/G40.21, General Requirements for Rolled or Welded Structural Quality Steel.
 - .2 Current CAN/CSA-G164, Hot Dip Galvanizing of Irregularly Shaped Articles.
- .5 Canadian General Standards Board (CGSB)
 - .1 Current CAN/CGSB-4.2, Textile Test Methods.
 - .2 Current CAN/CGSB-148.1, Methods of Testing Geotextiles and Geomembranes.
 - .1 No.2, Mass per Unit Area.
 - .2 No.3, Thickness of Geotextiles.
 - .3 No.7.3, Grab Tensile Test for Geotextiles.
 - .4 No.6.1, Bursting Strength of Geotextiles Under No Compressive Load.

GEOTEXTILES

- .6 American Society for Testing and Materials (ASTM)
 - .1 [ASTM D4491-99a](#), Standard Test Methods for Water Permeability of Geotextiles by Permittivity.
 - .2 [ASTM D4595-17](#), Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method
 - .3 [ASTM D4716/D4716M-22](#), Standard Test Method for Determining the (In-plane) Flow Rate per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head.
 - .4 [ASTM D4751-21a](#), Standard Test Methods for Determining Apparent Opening Size of a Geotextile.
- .7 Reference Documents
 - .1 Appendix A - Arborist Report, Macpherson Avenue Park, Urban Forest Innovations Inc., April 23, 2025
 - .2 Appendix B - Soil and Groundwater Management Plan – Davenport Lands (Parcel 28B, 29 and 30, WSP, July 2024
 - .3 Appendix C - Contaminant Health and Safety Plan – 28B, 29 and 30 Green Line Trail, WSP, July 2024
 - .4 Appendix D - City of Toronto Tree Protection Policy and Specifications for Construction Near Trees, July 2016
 - .5 Appendix E – Geotechnical Investigation for Macpherson Avenue Park, October 31, 2022
 - .6 Appendix F – Hydro One General Conditions for Secondary Land Uses, Hydro One, January 2023
 - .7 Appendix G -General Requirements for Construction Work by External Parties in the Vicinity of Hydro One 115,000 and 230,000 Volt Underground Plant, Hydro One, January 2024

1.4 SAMPLES

- .1 Submit samples in accordance with Section 01 33 00.
- .2 Product Data: Submit product data for each type of manufactured material and product indicated. Include product characteristics, performance criteria, physical size, finish and limitations in use
- .3 Submit a 1m length sample from full roll width of geotextile material to Contract Administrator for approval prior to installation. Indicate manufacturer and source of geotextile.

1.5 STORAGE AND HANDLING

- .1 Deliver, store, and handle landscape materials to prevent damage and deterioration
- .2 Ensure filter fabric is stored in a location that is safe from damage resulting due to the work.
- .3 Protect filter fabric from exposure to sunlight, while being stored
- .4 Ensure that filter fabric is handled in such a way so that is not damaged.
- .5 Replace all damaged sections of filter fabric.

1.6 WASTE MANAGEMENT AND DISPOSAL

GEOTEXTILES

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 13 and Section 10 50 00.

Part 2 Products**2.1 MATERIALS**

- .1 Filter fabric: spun bonded Terrafix 270R or approved equal, supplied in rolls.

Part 3 Execution**3.1 INSTALLATION**

- .1 Examine subgrade, finished surfaces, and installation conditions. Do not start work until unsatisfactory conditions are corrected. Do not begin landscape accessory Work before completion of final grading or surfacing.
- .2 Remove any obstruction, loose material, sharp objects or stones that may damage filter fabric before placing materials.
- .3 Locate and layout filter fabric. Obtain Contract Administrator's acceptance of layout prior to installation.
- .4 Place filter fabric material on sloping surfaces in one continuous length from toe of slope to upper extent of filter fabric.
- .5 Overlap each successive strip of filter fabric 600 mm over previously laid strip.
- .6 Any cuts in filter fabric (e.g. to accommodate building columns) to be covered with an additional sheet of filter fabric. Additional sheet to overlap the cut by 600mm on all sides.
- .7 Pin successive strips of filter fabric with securing pins at interval as recommended by filter fabric manufacturer at mid-point of lap.
- .8 Protect installed filter fabric material from displacement, damage or deterioration before, during and after placement of material layers.
- .9 Replace damaged or deteriorated filter fabric to approval of Contract Administrator.

3.2 CLEANING AND PROTECTION

- .1 Remove from site excess materials, debris, and equipment during installation of the Work.
- .2 The Contractor shall remove all debris, construction equipment and scrap material from all areas within the limit of work prior to the final inspection and acceptance.
- .3 Protect installed products and components from damage during construction.
- .4 No vehicles are permitted directly on geotextile.

END OF SECTION

AGGREGATE BASE COURSES

Part 1 General

1.1 SECTION INCLUDES

- .1 General requirements for supplying and processing of aggregates to be stockpiled or incorporated into sub surface work.

1.2 RELATED WORK

- .1 Section 01 35 43 – Environmental Procedures – Macpherson
- .2 Section 01 14 00 – Work Restrictions
- .3 Section 01 45 00 – Quality Control
- .4 Section 01 74 13 – Progressive Cleaning
- .5 Section 31 22 13 - Rough Grading
- .6 Section 31 23 10 – Excavation Trenching and Backfilling
- .7 Section 32 14 13 – Precast Concrete Unit Pavers
- .8 Section 32 16 15 – Concrete Paving
- .9 Section 32 18 17 – Engineered Wood Fibre Surfacing
- .10 Refer to structural drawings and notes
- .11 APPENDIX E - Geotechnical Investigation for Macpherson Avenue Park, October 31, 2022

1.3 REFERENCES

- .1 All referenced standards shall be the current edition or edition referenced by the Ontario Building Code in force at the time of building permit application and noted on general notes of structural drawings
- .2 City of Toronto Construction Standards:
 - .1 [TS 501](#), City of Toronto Amendment to OPSS.MUNI 501– Construction Specification for Compaction.
 - .2 [TS 1010](#), City of Toronto Amendment to OPSS.MUNI 1010 – Material Specification for Aggregates – Base, Subbase, Select Subgrade, and Backfill Material
- .3 Ontario Provincial Standard Specifications (OPSS)
 - .1 [OPSS.MUNI 1001](#), Material Specification for Aggregates - General.
 - .2 [OPSS.MUNI 1004](#), Material Specification for Aggregates - Miscellaneous
 - .3 [OPSS.MUNI.1010](#), Material Specification for Aggregates, Base, Subbase, Select Subgrade, and Backfill Material

AGGREGATE BASE COURSES

- .4 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.
- .5 American Society for Testing and Materials (ASTM)
 - .1 [ASTM C117](#)- 17, Standard Test Methods for Material Finer Than 0.075 mm (No. 200) Sieve in Mineral Aggregates by Washing.
 - .2 [ASTM C131/C131M](#)- 20, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
 - .3 [ASTM C136/C136M](#)- 19, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregate.
 - .4 [ASTM D698](#)- 12, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft³) (600kN-m/m³).
 - .5 [ASTM D1557](#)- 12, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000ft-lbf/ft³) (2,700kN-m/m³).
 - .6 [ASTM D1883](#)- 16, Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.
 - .7 [ASTM D4318](#)- 17e1, Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils.
- .6 Reference Documents:
 - .1 Appendix A - Arborist Report, Macpherson Avenue Park, Urban Forest Innovations Inc., April 23, 2025
 - .2 Appendix B - Soil and Groundwater Management Plan – Davenport Lands (Parcel 28B, 29 and 30, WSP, July 2024
 - .3 Appendix C - Contaminant Health and Safety Plan – 28B, 29 and 30 Green Line Trail, WSP, July 2024
 - .4 Appendix D - City of Toronto Tree Protection Policy and Specifications for Construction Near Trees, July 2016
 - .5 Appendix E – Geotechnical Investigation for Macpherson Avenue Park, October 31, 2022
 - .6 Appendix F – Hydro One General Conditions for Secondary Land Uses, Hydro One, January 2023
 - .7 Appendix G -General Requirements for Construction Work by External Parties in the Vicinity of Hydro One 115,000 and 230,000 Volt Underground Plant, Hydro One, January 2024

1.4 SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures
- .2 Action Submittals: Submit the following submittals before starting any work of this Section

AGGREGATE BASE COURSES

- .1 Product Data: Submit product data for each type of manufactured material and product indicated.
- .2 Material Certificates: Submit copies of materials certificates signed by the material producer and Contractor, certifying that each material item complies with, or exceeds, specified requirements, at least two weeks prior to the start of work.
- .3 Material Test Reports: From a CCIL accredited testing agency indicating and interpreting test results for compliance with requirements indicated, based on comprehensive testing of current materials
 - .1 The source and quality of the coarse fill material shall be approved by the Contract Administrator prior to delivery of the material to the site and placement.
 - .2 The supplier shall submit grain size analyses results for the coarse fill demonstrating that it meets the gradation requirements given above.
 - .3 Samples shall be taken from both the quarry site stockpiles as well as from the job site stockpiles to ensure consistency.
- .4 Submit samples of imported materials for testing and evaluation and delivery slips.
- .5 Manufacturing Quality Control test results shall be submitted for all materials upon request

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Stockpiling
 - .1 Stockpile aggregates on site in locations as indicated unless directed otherwise by the Contract Administrator. Do not stockpile on completed pavement surfaces.
 - .2 Stockpile aggregates in sufficient quantities to meet Project schedules.
 - .3 Stockpiling sites to be level, well drained, and of adequate bearing capacity and stability to support stockpiled materials and handling equipment.
 - .4 Except where stockpiled on acceptably stabilized areas, provide compacted sand base not less than 300 mm in depth to prevent contamination of aggregate. Stockpile aggregates on ground but do not incorporate bottom 300 mm of pile into Work.
 - .5 Separate different aggregates by strong, full depth bulkheads, or stockpile far enough apart to prevent intermixing.
 - .6 Do not use intermixed or contaminated materials. Remove and dispose of rejected materials as directed by Contract Administrator within 48h of rejection.
 - .7 Stockpile materials in uniform layers of thickness as follows:
 - .1 Max 1.5 m for coarse aggregate and base course materials.
 - .2 Max 1.5 m for fine aggregate and sub-base materials.
 - .3 Max 1.5 m for other materials.
 - .8 Uniformly spot-dump aggregates delivered to stockpile in trucks and build up stockpile as specified.

AGGREGATE BASE COURSES

- .9 Do not cone piles or spill material over edges of piles.
- .10 Do not use conveying stackers.
- .2 During winter operations, prevent ice and snow from becoming mixed into stockpile or in material being removed from stockpile.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 13 – Progressive Cleaning.
- .2 Divert unused granular material from landfill to local facility as approved by Contract Administrator.

Part 2 Products

2.1 MATERIALS

- .1 Granular 'A', in accordance with OPSS.MUNI 1001, OPSS.MUNI 1010, and TS 1010, latest edition.
 - .1 The compacted aggregate subbase/base material shall comprise well graded aggregates intended for use as granular base within the pavement structure as well as for and utility bedding/pipe cover.
 - .2 Thickness of compacted aggregate materials placement shall be as specified on the Construction Drawings and Specifications.
 - .3 Granular A material shall be compacted to minimum 98% SPMDD (or higher in pavement areas) as specified on the Construction Drawings.
 - .4 The source and quality of the aggregate material must be approved by the Contract Administrator prior to delivery of the material to the site and placement. The supplier must submit grain size analyses results for the material demonstrating that it meets the gradation requirements given above
- .2 Granular 'B' – Type I, in accordance with OPSS.MUNI 1001, OPSS.MUNI 1010 and TS 1010, latest edition.
- .3 Granular 'B' – Type II, in accordance with OPSS.MUNI 1001, OPSS.MUNI 1010 and TS 1010, latest edition.
 - .1 Coarse fill materials used as subbase material shall be 100% crushed virgin aggregate material with no recycled content.
 - .2 Shall be comprised of well graded aggregates intended for use as granular subbase within pavement structure and as indicated on Construction Drawings.
 - .3 Thickness of coarse fill materials placement varies and shall be as specified on the Construction Drawings and Specifications.
 - .4 Granular B Type II material shall be compacted to minimum 98% SPMDD or as indicated on Construction Drawings. Placement water content to be within 2 percent of the materials optimum water content. Contractor to moisture-condition or dry the material to meet this moisture requirement.

AGGREGATE BASE COURSES

- .4 Clear Stone in accordance with OPSS.MUNI 1004, Table 2, latest edition.
 - .1 19mm (3/4") clear crushed stone, no fines.
- .5 High Performance Bedding, (HPB), in accordance with OPSS.MUNI 1004, Table 2, latest edition.
 - .1 6.25mm (1/4") crushed, clean, washed limestone, no fines.
- .6 Crushed pit-run or screened stone, gravel or sand consisting of hard, durable, angular particles, free from clay lumps, cementation, organic material, frozen material and other deleterious materials.
- .7 Granular base material shall contain a minimum of 50% recycled content.

Part 3 Execution

3.1 PLACEMENT AND INSTALLATION

- .1 Place granular base after sub-base surface is inspected and approved by Contract Administrator.
- .2 Placing
 - .1 Construct granular base to depth and grade in areas indicated.
 - .2 Ensure no frozen material is placed.
 - .3 Place material only on clean unfrozen surface, free from snow and ice.
 - .4 Begin spreading base material on crown line or on high side of one-way slope.
 - .5 Place material using methods which do not lead to segregation or degradation of aggregate.
 - .6 For spreading and shaping material, use spreader boxes having adjustable templates or screeds which will place material in uniform layers of required thickness.
 - .7 Place material to full width in uniform layers not exceeding 150 mm compacted thickness. Contract Administrator may authorize thicker lifts (layers) if specified compaction can be achieved.
 - .8 Shape each layer to smooth contour and compact to specified density before succeeding layer is placed.
 - .9 Remove and replace that portion of layer in which material becomes segregated during spreading.
- .3 Compaction Equipment
 - .1 Compaction equipment 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 Contract Administrator before use.
 - .3 Equipped with device that records hours of actual work, not motor running hours.
- .4 Compacting
 - .1 Compact to density not less than 100 % corrected maximum dry density.

AGGREGATE BASE COURSES

- .2 Shape and roll alternately to obtain smooth, even and uniformly compacted base.
- .3 Apply water as necessary during compacting to obtain specified density.
- .4 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved by Contract Administrator.
- .5 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.
- .5 Proof rolling
 - .1 For proof rolling use standard roller of 45 400 kg gross mass with four pneumatic tires each carrying 11 350 kg and inflated to 620 kPa. Four tires arranged abreast with centre to centre spacing of 730 mm.
 - .2 Obtain written approval from Contract Administrator to use non standard proof rolling equipment.
 - .3 Proof roll at level in granular base as indicated.
 - .4 Make sufficient passes with proof roller to subject every point on surface to three separate passes of loaded tire.
 - .5 Where proof rolling reveals areas of defective subgrade
 - .1 Remove base, sub-base and subgrade material to depth and extent as directed by Contract Administrator.
 - .2 Backfill excavated subgrade with sub-base material and compact in accordance with Section.
 - .3 Replace base material and compact in accordance with this Section.
 - .6 Where proof rolling reveals defective base or sub-base, remove defective materials to depth and extent as directed by Contract Administrator and replace with new materials in accordance with Section 32 11 16.01 - Granular Sub-base and this Section at no extra cost. .
- .6 Inspection and testing
 - .1 Testing of materials and compaction will be carried out by testing laboratory designated by Owner. Frequency of tests will be determined by the Contract Administrator.
 - .2 Payment for costs for inspection and testing shall be in accordance with Section 01 45 00.

3.2 SITE TOLERANCES

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

3.3 PROTECTION

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

END OF SECTION

PRECAST CONCRETE UNIT PAVING

Part 1 General

1.1 SECTION INCLUDES

- .1 This section includes requirements to supply and install precast concrete unit paving.

1.2 RELATED WORK

- .1 Section 01 33 00 – Submittals
- .2 Section 01 35 43 – Environmental Procedures - Macpherson
- .3 Section 03 30 00 – Cast-in-Place Concrete
- .4 Section 05 50 00 – Metal Fabrications
- .5 Section 32 11 23 – Aggregate Base Courses
- .6 Section 32 13 13 – Concrete Paving

1.3 REFERENCES

- .1 All referenced standards shall be the current edition or edition referenced by the Ontario Building Code currently in force.
- .2 City of Toronto Construction Standards:
 - .1 TS 3.80, City of Toronto Construction Specification for Concrete Unit Pavers.
- .3 Ontario Regulations:
 - .1 O. Reg. 413/12, Integrated Accessibility Standards
 - .2 AODA, Accessibility for Ontarians with Disabilities Act
- .4 CSA Group (CSA):
 - .1 [CSA A23.1-14/A23.2-14](#), Concrete Materials and Methods of Concrete Construction / Test Methods and Standard Practices for Concrete.
 - .2 [CAN/CSA A179-14](#), Mortar and Grout for Unit Masonry
 - .3 [CSA A231.1-14/A231.2-14](#) :19, Precast Concrete Paving Slabs/Precast Concrete Pavers
 - .4 [CSA A283](#):19, Qualification Code for Concrete Testing Laboratories
- .5 ASTM International (ASTM):
 - .1 [ASTM C136](#)-13, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
- .6 Reference Documents:
 - .1 Appendix A - Arborist Report, Macpherson Avenue Park, Urban Forest Innovations Inc., September 9, 2022
 - .2 Appendix B - Soil and Groundwater Management Plan – Green Line Trail Parcels 17B, 17C and 18A, WSP, February 2024

PRECAST CONCRETE UNIT PAVING

- .3 Appendix C - Health and Safety Plan – Green Line Trail Parcels 17B, 17C and 18A, WSP, February 2024
- .4 Appendix E – Geotechnical Investigation for Macpherson Avenue Park, October 31, 2022
- .5 Appendix F – Hydro One General Conditions for Secondary Land Uses, Hydro One, January 2023
- .6 Appendix G -General Requirements for Construction Work by External Parties in the Vicinity of Hydro One 115,000 and 230,000 Volt Underground Plant, Hydro One, January 2024

1.4 SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data: Submit product data for each type of unit paver prior to commencing work.
- .3 Submit manufacturer's instructions, printed product literature and data sheets for each type of precast concrete unit paver and include product characteristics, performance criteria, physical size, finish and limitations
- .4 Samples:
 - .1 Submit full-size sample of each of type of paver, demonstrating size, colour, finish, and texture specified
 - .2 Submit a sample of unit paving blend including a minimum of 6 pavers, or additional quantity sufficient to demonstrate size, colour blend and pattern specified
- .5 Mock-ups:
 - .1 Submit 3m x 3m mock-up of unit pavers demonstrating each paving pattern noted on drawings before the unit paving work is carried out
 - .2 Mock-ups shall demonstrate paving layout, full range of anticipated variation in colour & colour distribution.
 - .3 Location of mock-up to be proposed by Contractor and approved by Contract Administrator on site. Mock-up shall not form part of finished work without prior approval from the Contract Administrator. For in-situ mock-ups, obtain approval from Contract Administrator prior to installation of polymeric sand
 - .4 Mock-up shall not form part of finished work unless previously agreed to with Contract Administrator.
 - .5 The approved mock-up shall establish the standard by which all work shall be assessed. Work that fails to meet the standard set by the mock-up shall be replaced.

1.5 QUALITY ASSURANCE

- .1 All unit paving work shall be carried out by an approved contractor having at least 5 years experience in the work like that specified here.
- .2 Single-source manufacturing responsibility: All required pavers are to be supplied from the same production run and from a single supplier to ensure uniform colour throughout paved area.
- .3 Unit pavers shall be identical in form, colour and construction as approved samples.

PRECAST CONCRETE UNIT PAVING

- .4 Before commencing work, visit site and become familiar with the specifications governing the work of others, particularly drainage, backfill, concrete, mechanical and electrical work.
- .5 Commencement of work will denote acceptance of sub-surfaces and conditions. Subsequent failure of installed work of this Section due to sub-surface defects will be rectified at no cost to the Owner.

1.6 DELIVERY, STORAGE, AND HANDLING

- .1 Delivery and Acceptance Requirements: Deliver materials to site in original factory packaging, labelled with manufacturer's name and address
- .2 Store materials in accordance with manufacturer's recommendations. Do not permit units to contact earth or other staining influences
- .3 Prevent damage to buildings, landscaping, curbs, sidewalks, and adjacent property. Make good any damage.

1.7 WARRANTY

- .1 Work of this Section shall be guaranteed for a period of two (2) years in accordance with the General Conditions of the Contract.

Part 2 Products

2.1 PRECAST CONCRETE UNIT PAVERS

- .1 To [CSA A23.1/A23.2](#) and as follows:
- .2 HEX Paver as supplied by Unilock at <https://unilock.com>, or approved equal
 - .1 Zero-bevel edge
 - .2 Size: 200 mm X 200 mm X 70 mm thick
 - .3 Colours:
 - .1 Dark gray: Scouro (20%)
 - .2 Medium gray: French Grey (30%)
 - .3 Light gray: Winter Marvel (50%)
 - .4 Finish: Umbriano
 - .5 Paving Patterns - see layout plan and details for colour layout and location

2.2 BEDDING AND JOINT MATERIAL

- .1 Granular Base Materials:
 - .1 Compacted Granular 'A' in accordance with Section 32 11 23 - Aggregate Base Courses
 - .2 High Performance Bedding in accordance with Section 32 11 23 - Aggregate Base Courses
- .2 Sand Setting Bed:
 - .1 Clean, non-plastic, free from deleterious or foreign matter, natural or manufactured from crushed rock or gravel. Do not use limestone screenings or stone dust.

PRECAST CONCRETE UNIT PAVING

- .2 Gradation: To [CSA A23.1/A23.2](#), Table 4 - Grading Limits for Fine Aggregate, and [CAN/CSA-A179](#) as follows:

Sieve Designation	% Passing
10mm	[100]
5mm	[95-100]
2.5 mm	[80-100]
1.25 mm	[50-90]
630 microns	[25-65]
315 microns	[10-35]
160 microns	[2-10]

- .3 Joint Material:

- .1 Polymeric sand by Unilock – or approved equal, Colour: Light gray.

2.3 EDGE RESTRAINTS

- .1 Heavy Duty Paver Edge: Galvanized steel angle, 6.4mm thick in accordance with Section 05 50 00 – Metal Fabrications.
- .2 Fasteners as shown on drawings. Metal fasteners shall be uniform to metal materials and components being anchored or of a metal which will not set-up a galvanic action causing damage to the fastening or metal component under moist conditions

Part 3 Execution

3.1 PROJECT CONDITIONS

- .1 Carry out work of this Section only when surfaces are at least 5°C and the temperature is rising
- .2 Carry out the work of this Section involving mortar and grout only when temperature is at or above that recommended by manufacturer.
- .3 Suspend paving operation when temperature falls below specified minimum

3.2 ALLOWABLE TOLERANCES

- .1 Finish paving surfaces within 6mm of established elevations and 3mm of other surfaces at joints between other paving types, manholes and other features within paved areas; and within 3mm under a 3m long straightedge.
- .2 Installation tolerances:
- .1 Face width of joint: Nominal widths as indicated on drawings, to vary not more than +/- 1.5mm (1/16").
- .2 Joint taper: unit edges not out of parallel over 0.6 mm in 300 mm (1/40" per foot) but not more than 3 mm (1/8") in total.
- .3 Faces of adjacent pavers offset not more than 1.5 mm (1/16").
- .4 Edge alignment: alignment of panels edges not to exceed 1.5 mm (1/16").

PRECAST CONCRETE UNIT PAVING

3.3 EXCAVATION AND BACKFILLING

- .1 As per Section 01 35 43 – Environmental Procedures - Macpherson

3.4 GRANULAR BASE

- .1 Place concrete to thickness as indicated on detail drawings.

3.5 INSTALLTION OF EDGE RESTRAINTS

- .1 Install edging true to grade, in location, layout and pattern in accordance with manufacturer's recommendations and as indicated on drawings.

3.6 SAND SETTING BED

- .1 Ensure bedding material is not saturated or frozen at all times until installation is complete
- .2 Spread and screed sand setting bed to compacted thickness as indicated on detail drawings
- .3 Ensure sand setting bed is dry (4-8% moisture content) prior to placement of unit pavers.
- .4 Do not disturb screeded material. Do not use sand setting bedding material to fill depressions in granular or structural subsurface materials.

3.7 LAYOUT AND INSTALLATION OF UNIT PAVING

- .1 Install unit paving true to grade, in location, layout and pattern as indicated on detail drawings. Where required, document layout/ pattern of existing paving, replace pavers to match.
- .2 Stake layout of unit paving for Contract Administrator to approve prior to commencing installation.
- .3 Install edge restraint where pavers meet soft surfaces, per manufacturer's specifications.
- .4 Where required, cut paving units accurately with a concrete saw. Do not damage edges or exposed surfaces.
- .5 On tight radii, cut and fit pavers to maintain alignment. No pavers less than 50% of the original size shall be used.
- .6 Chipped, blemished or defective units shall not be installed.
- .7 Ensure that all grade transition zones are made gently and smoothly.
- .8 Clean surfaces of unit paver and maintain free of abrasive and staining substances.
- .9 All work within 1m of the laying face must be left fully compacted with sand-filled joints at the completion of each day.
- .10 Unit pavers with sand joints.
 - .1 Install pavers with tight butt joints.
 - .2 Tamp down and level pavers with mechanical plate vibrator as recommended by the manufacturer until pavers are true to grade and free of movement.
 - .3 Inspect, remove, and replace chipped, broken and damaged pavers
 - .4 Fill spaces between pavers by sweeping in sand joint filler.

PRECAST CONCRETE UNIT PAVING

- .5 Spread, fill and simultaneously vibrate the sand in the joints. Continue to spread joint sand and tamp down pavers with vibrating plate compactor until joints are completely filled. The vibrating plate compactor must not be used closer than 1 m from the edge of unsecured pavers.
- .6 Complete installation to within 1 m of laying face, with sand-filled joints, at completion of each work day.
- .7 Pass mechanical plate vibrator on sand cushion over surface course to achieve compaction of sand in joints.
- .8 Surface of finished pavement: free from depressions exceeding 3 mm as measured with 3 m straight edge.
- .9 The paved surface should exceed by 3 to 4 mm above catch basin grates, drainage channels and adjacent concrete sleeves.
- .10 Sweep surface course clean.
- .11 After construction traffic is re-established, continue to fill joints for several days to compensate for any settling and further compaction of sand in joints.
- .12 Ensure conformance of final elevations.

3.8 CLEANING

- .1 Carry out cleaning at times and conditions recommended by manufacturer of cleaning compound, immediately before sealing and as directed by Contract Administrator.
- .2 Remove and dispose of loose, extraneous materials from surfaces to be cleaned.
- .3 Apply cleaning compounds appropriate for removal of various contaminants encountered in accordance with manufacturer's recommendations
- .4 Final surface to be free of contamination.

3.9 ADJUSTMENT AND REPLACEMENT

- .1 At time of final acceptance at Project completion, and again at termination of guarantee period, Work of this Section will be inspected by Contract Administrator, and adjustments and replacements shall be made under Work of this Section.
- .2 The warranty period begins after receipt of written acceptance of work of this Section by the Contract Administrator.
- .3 Adjustment and replacement work shall be performed as specified in this Section with materials of same size, variety and quality of material replaced.
- .4 Replacement work shall be done under an additional guarantee of the same length and conditions as described in this Specification. It shall date from time of Contract Administrator's approval of replacement work.

END OF SECTION

LANDSCAPE STONE

Part 1 General

1.1 SECTION INCLUDES

- .1 This section includes requirements for supply and installation of landscape stone, including the following:
 - .1 Granite stones and boulders at amphitheater.
 - .2 Stone for feature art wall.
 - .3 Recycled glass for feature art wall.
 - .4 Non-metallic crushed rock at HONI fence line and monopoles.

1.2 RELATED WORK

- .1 Section 01 35 43 – Environmental Procedures
- .2 Section 01 14 00 – Work Restrictions
- .3 Section 01 74 13 – Progressive Cleaning
- .4 Section 05 50 00 – Metal Fabrications
- .5 Section 02 20 00 – Site Preparation – Davenport Lands
- .6 Section 32 05 19 – Geotextiles
- .7 Section 32 91 19 – Topsoil Placement and Grading

1.3 REFERENCES

- .1 All referenced standards shall be the current edition or edition referenced by the Ontario Building Code currently in force.
- .2 Toronto Standard Construction Specifications (TS)
 - .1 TS 501 , City of Toronto Amendment to OPSS.MUNI 501 – Construction Specification for Compaction
 - .2 TS 1010, City of Toronto Amendment to OPSS.MUNI 1010 – Material Specification for Aggregates – Base, Subbase, Select Subgrade, and Backfill Material
- .3 Ontario Provincial Standard Specifications (OPSS)
 - .1 OPSS.MUNI 1001, Material Specification for Aggregates - General
 - .2 OPSS.MUNI 1004, Material Specification for Aggregates - Miscellaneous
 - .3 OPSS.MUNI.1010, Material Specification for Aggregates, Base, Subbase, Select Subgrade, and Backfill Material
- .4 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.

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- .5 American Society for Testing and Materials (ASTM)
 - .1 ASTM C117-95, Standard Test Methods for Material Finer Than 0.075 mm Sieve in Mineral Aggregates by Washing.
 - .2 ASTM C131-96, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
 - .3 ASTM C136-96a, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - .4 ASTM D422-[63(2007)], Standard Test Method for Particle-Size Analysis of Soils
 - .5 ASTM D698-00a, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400ft-lbf/ft³) (600kN-m/m³).
 - .6 ASTM D1557-00, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000ft-lbf/ft³) (2,700kN-m/m³).
 - .7 ASTM D1883-99, Standard Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.
 - .8 ASTM D4318-00, Standard Test Methods for Liquid Limit, Plastic Limit and Plasticity Index of Soils.

1.4 SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Action Submittals: Submit the following before starting any work of this Section:
 - .1 Submit quarry certification that all stone supplied conforms to this specification.
 - .2 Product data: Submit product data for each type of manufactured material and product. Include product characteristics, performance criteria, physical size, finish and limitations in use.
 - .3 Manufacturer's Instructions: Submit manufacturer's instructions, printed product literature and data sheets for each type of manufactured material and product indicated, including but not limited to the following:
 - .4 Samples for initial selection:
 - .1 Prior to purchasing and supplying stone or glass to the site, the Contractor shall provide samples for the Contract Administrator's review and approval, along with the name and location of the proposed supplier.
 - .2 Submit samples of each stone and glass type for Contract Administrator's selection and approval prior to ordering and supplying material to the site.
 - .3 Submit samples at various sizes, showing finishes and colour specified along with the name and location of the proposed supplier.
 - .4 Samples shall fully demonstrate the full range of anticipated variation in colour, shade, veining, texture and finish.
- .3 Informational Submittals: Submit the following during the course of the Work:
 - .1 Mock-ups:

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- .1 Construct an on-site mock-up of granite boulder arrangement to meet project requirements.
 - .1 Mock-up shall be comprised of a minimum of 3-5 stones, as selected by the Contract Administrator.
 - .2 Stone units for the mock-up shall be selected by the Contract Administrator following delivery of boulders to the place of Work.
 - .3 The Contract Administrator shall be present and guide stone arrangement for mock-up.
 - .4 Mock-up shall be constructed prior to final placement with concrete slurry, to test arrangement, grouping composition and placement of boulders and shall not form part of the finished work.
 - .5 Mock-up shall represent the placement of stones to the full height required for the amphitheater steps
 - .6 Mock-up shall be modified as many times as necessary to obtain acceptance by the Contract Administrator. Proceed with placement of final stone work, including concrete slurry and infill materials, only upon acceptance of Contract Administrator.
 - .7 The accepted mock-up shall represent the standard of visual quality and workmanship for the Work.

1.5 QUALITY ASSURANCE

- .1 Source limitations for granite boulders: obtain stone units through one source from a single quarry to ensure consistent density, colour and grain. The quarry shall have adequate capacity and facilities to meet the specified requirements.
 - .1 The quarry shall have adequate capacity and facilities to meet the specified requirements.
- .2 Source limitations for feature art wall stone infill: The specified supplier for feature art wall stone infill has been pre-selected and shall be as specified. No alternates will be considered.
- .3 Stone colour, texture, and finish shall be within the range of samples approved by the Contract Administrator.
- .4 Installer qualifications:
 - .1 Work of this section to be executed by a skilled stone mason with a minimum of five years experience in similar satisfactory installations, supervised by a foreman OR master stone mason experienced in the type of work specified.
- .5 Provide adequate, acceptable equipment and labour forces to carry out the work expeditiously.
- .6 All stone shall be supplied by a source approved by the Contract Administrator.
- .7 Granite boulders shall be selected at the approved source by the Contract Administrator.
- .8 Stone shall be standard grade, sound and uniform in quality, texture, and strength, and shall free of flaws, reeds, rifts, laminations, cracks, seams, starts, or other defects which may impair its strength, durability, or appearance. Exposed surfaces shall be free from spots, spalls, chips, stains, discolouration, or other defects which would affect its appearance.

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- .9 Colour, texture, and finish shall be within the range of samples approved by the Contract Administrator.

1.6 DESIGN

- .1 Design setting bed for superimposed loads of indicated work. Refer to drawings.
- .2 Design for the effect of movement forces, deflection of the supporting structure, and handling stresses.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Handling
 - .1 Pack and load stone units for shipment and unloading at site in a manner to prevent damage.
 - .2 Use no material for backing of packaging that would stain or discolour exposed surfaces of the stone.
 - .3 Isolate stone from contact with ground and other materials until laid in final location, to prevent staining.
 - .4 Transport, handle and store units to prevent staining, chipping, cracking, spalling, distortion, warping or other physical damage.
 - .5 Lift stone with proper and sufficiently long slings or forks with protection provided so they are not damaged.
 - .6 Protect edges and corners and naturally weathered surfaces to prevent damage.
- .2 Storage
 - .1 Stack stone on timbers or platforms at least 80mm above grade.
 - .2 Do not permit units to contact earth or other staining influences or to rest on corners.
 - .3 Provide necessary means to prevent staining of stone during storage.
 - .4 Place polystyrene or other plastic film between wood and other finished surfaces of stone when stored for an extended period of time.
 - .5 Cover stored stone units if exposed to the weather for an extended period of time.
 - .6 Do not use salt to thaw ice formed on surface of stone units.
- .3 Stockpiling
 - .1 Stockpile aggregates on site in locations as indicated unless directed otherwise by Owner's Representative. Do not stockpile on completed pavement surfaces.
 - .2 Stockpile aggregates in sufficient quantities to meet Project schedules.
 - .3 Stockpiling sites to be level, well drained, and of adequate bearing capacity and stability to support stockpiled materials and handling equipment.
 - .4 Except where stockpiled on acceptably stabilized areas, provide compacted sand base not less than 300 mm in depth to prevent contamination of aggregate. Stockpile aggregates on ground but do not incorporate bottom 300 mm of pile into Work.

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- .5 Separate different aggregates by strong, full depth bulkheads, or stockpile far enough apart to prevent intermixing.
- .6 Do not use intermixed or contaminated materials. Remove and dispose of rejected materials as directed by Contract Administrator within 48h of rejection.
- .7 Stockpile materials in uniform layers of thickness as follows:
 - .1 Max 1.5 m for coarse aggregate and base course materials.
 - .2 Max 1.5 m for fine aggregate and sub-base materials.
 - .3 Max 1.5 m for other materials.
- .8 Uniformly spot-dump aggregates delivered to stockpile in trucks and build up stockpile as specified.
- .9 Do not cone piles or spill material over edges of piles.
- .10 Do not use conveying stackers.
- .4 During winter operations, prevent ice and snow from becoming mixed into stockpile or in material being removed from stockpile.

1.8 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 13 – Progressive Cleaning.
- .2 Divert unused granular material from landfill to local facility as approved by Contract Administrator.

1.9 PROTECTION OF WORK

- .1 During stone installation, cover exposed tops of cut stone work with heavy waterproof sheeting at end of each day's work. Cover partially completed structures when work is not in progress. Extend cover a minimum of 600 mm down both sides and hold cover securely in place.
- .2 Staining: Prevent grout, mortar or soil from staining the face of stone to be left exposed. Remove immediately grout, soil or mortar that comes in contact with such stone. Protect base of walls from rain-splashed mud and mortar splatter by means of coverings spread on ground and over wall surfaces.

Part 2 Products

2.1 MATERIALS - GENERAL

- .1 New stone: units to thickness, length and width dimensions on the drawings. Finish face, sides and rear of stone as shown on the drawings.
- .2 Prior to purchasing and supplying stone to the site, the Contractor shall provide samples for the Contract Administrator's review and approval, along with the name and location of the proposed supplier.

2.2 GRANITE BOULDERS

- .1 Use granite from a single geological area throughout the entire work.

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- .2 Stones are to be inspected and selected by the Consultant at the quarry prior to supply. Make arrangements for approval by the Contract Administrator at a time mutually agreed upon.
- .3 Granite boulders at amphitheater:
 - .1 Stone shall be glacial erratic or naturally weathered and rounded, smooth and free of cut edges and mechanical abrasions, as supplied by L.L. Chappell Farms Inc., 629 Penetanguishene Rd, Barrie, ON L4M 4Y8, or approved equivalent.
 - .1 Contact: Lynn Chappel
Cell: 705 725 3301
Email: garnet3287@gmail.com
 - .2 Stones shall be grey granite, light grey in colour, with a minimum ASTM C241 Abrasive Hardness Value of 10. Softer materials such as sandstone, quartzite and slate shall not be allowed, nor will marble or limestone.
 - .3 Size/shapes/weight, located as follows and as indicated on drawings:
 - .1 Large Boulders: 4-5 tonnes, width to height ratio shall be approximately 3:1;
 - .2 Medium Boulders: 3-4 tonnes, width to height ratio shall be approximately 3:1;
 - .3 Small Boulders: 2-3 tonnes, width to height ratio shall be approximately 3:1;
 - .4 Infill stone: 300mm – 1000mm dia.
 - .4 Finish: Thermal torched finish to expose veins of quartz, feldspar and mica, to the Contract Administrator's approval. Additional glass bead blasting may be required by the Contract Administrator to achieve the specified finish.
 - .5 Sawcut the bottom of stones that exhibit pronounced shapes or protrusions preventing them from sitting flat, as directed by the contract Administrator.
 - .6 Placement as indicated on drawings.

2.3 STONE FOR FEATURE ART WALL

- .1 Stone infill for feature art wall has been pre-selected by the Contract Administrator and shall be supplied by L.L. Chappell Farms Inc., 629 Penetanguishene Rd, Barrie, ON L4M 4Y8.
 - .1 Contact: Lynn Chappel
Cell: 705 725 3301
Email: garnet3287@gmail.com
 - .2 Size/shapes/colour as follows and as indicated on drawings:
 - .1 A1 - 2"-4" Min - Black
 - .2 A2 - 2"-4" Min - White Grey
 - .3 A3 - 2"-4" Min - Pink Orange
 - .4 A4 - 2"-4" Min - Yellow Grey
 - .5 A5 - 2"-4" Min - Pink
 - .6 A6 - 2"-4" Min - Dark Grey

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.7 A7 - 2"-4" Min - Brown Grey

.3 Placement as indicated on drawings.

2.4 RECYCLED GLASS FOR FEATURE ART WALL

.1 Recycled glass for feature art wall, as supplied by Canadian Recycled Glass (<https://crglass.ca/>), or approved equivalent.

.1 Contact: Maida Hewton
226-444-0408
Email: canadianrecycledglass@gmail.com

.2 Size/shapes/colour as follows and as indicated on drawings:

.1 G1 - 4-6" - Crystal Clear

.2 G2 - 4-6" - Blue

.3 Placement as indicated on drawings.

2.5 NON-METALLIC CRUSHED ROCK

.1 Crushed rock shall be non-metallic crushed hard rock, limestone or igneous rock as supplied by HONI provided aggregate supplier list:

.1 HONI Approved Supplier List: Walker Aggregates Inc., Ethier Sand and Gravel Ltd., C Villeneuve Construction, CRH Canada Group Inc., Pioneer construction Inc., Miller Paving Limited, Oxford Sand and Gravel Ltd., Danford Construction Ltd., Custom Concrete, Red Rock Indian Band, RW Tomlinson Ltd., Green Infrastructure, Obish Construction, Lavis Contracting Co Ltd. Cress Contracting Inc.

.2 Crushed rock shall be limited to that pass by a screen with 22.4mm openings and retained on a screen with 16.0mm opening. See chart below for stone gradation requirements:

Sieve Designation	Percent Passing, by mass
22.4mm	100%
19.0mm	65-85%
16.0mm	0-10%

.3 A minimum of 95% by mass of the particles shall be crushed.

.4 The stone shall have a resistivity of greater than 3,000 ohm-meters. This value is based on stone resistivity testing conducted and reported in 1991 by Ontario Hydro (now HONI) Research Division on in-situ stone taken from multiple stations.

.5 The stone shall have a LA Abrasion loss of no more than 50% by weight. Alternatively, the stone shall have a Micro-Deval Abrasion loss of no more than 40% by weight.

.6 Foreign materials, soft rock, shale, slate or any source showing signs of disintegration or rounds will not be accepted.

.7 Blending of materials from more than one source or kind of rock is permitted, provided the final product meets all requirements of this specification.

.8 Stone reference number to provide suppliers: Hydro One's MM #30000063

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2.6 CONCRETE SLURRY SETTING BED

- .1 Refer to structural drawings and notes

2.7 FILTER FABRIC

- .1 In accordance with Section 32 05 19 – Geotextiles
- .2 Deliver, store, and handle filter fabric materials to prevent damage and deterioration.

2.8 FABRICATION

- .1 Size and Dimension: Stone shall be of the sizes and dimensions indicated on the Contract Documents and approved Shop Drawings.
- .2 Finish exposed surfaces as specified and by approved sample.
- .3 Slightly ease or round exposed surfaces to prevent chipping and remove all sharp edges to the approval of the Contract Administrator.
- .4 Finishes:
 - .1 Natural weathered: natural variation as selected in the field.
- .5 Incidental Cutting and Drilling:
 - .1 Panels in excess of 45 kg (100 pounds) may include lifting clamp dimples, Lewis holes, or other provisions as required to accommodate the lifting device(s) utilized by the installer. Lifting holes in shall not be exposed in finished installation and shall be filled with non-expanding grout or high-modulus elastomeric sealant after installation and final alignment.

Part 3 Execution

3.1 EXAMINATION

- .1 Examine areas and conditions for compliance with requirements for correct and level finished grade, mounting surfaces, installation tolerances, and other conditions affecting performance.
- .2 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- .1 Before being set all stone to be clean and free of ice and frost.
- .2 Do not set stone on surfaces or with materials containing frost when ambient temperatures are below 5 degrees C.
- .3 Place material using methods which do not lead to segregation or degradation of aggregate.
- .4 Compact to density not less than 95% corrected maximum dry density.
- .5 In areas not accessible to rolling equipment, compact to specified density with mechanical tampers approved by Contract Administrator.
- .6 Correct surface irregularities by loosening and adding or removing material until surface is within specified tolerance.

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- .7 Finished base surface to be within plus or minus 10 mm of established grade and level.
- .8 For granite boulders at amphitheater:
 - .1 Do not clean boulders with any abrasive tools, high-pressure washers, chemicals or cleaning compounds. Use water only as needed to remove loose surface dirt and debris.
 - .2 Place stones which fit and match well with adjacent stones and allow for on-site adjustment as directed by the Contract Administrator.
 - .3 Set out the placement of stones, including selection of base stones, selecting top and bottom faces, orientation and stone arrangements prior to pouring and placement of stones onto the slurry setting bed.
 - .4 Set stones into wet concrete slurry and ensure that the bottom $\frac{1}{4}$ of base stones are embedded into the slurry. Minimize adjustment of stones once set in to slurry and avoid concrete overspill onto surface of stones.
 - .5 Stones with excessive slurry or concrete overspill shall be replaced with clean stones at the discretion of the Contract Administrator.
 - .6 For boulders adjacent to cast-in place concrete walls, curbs, or steps: Place boulders prior to placement of cast-in place concrete. Concrete shall be poured to meet boulders as shown on drawings.
 - .7 Boulders shall be no higher than 600mm above finished grade and no higher than 150mm above the top of amphitheater seating.
 - .8 Infill all gaps between boulders with limestone screenings. Infill shall maintain the natural surface and shape of the stones while providing a safe and smooth surface at joints that is max. 150mm below surface of the stone. Infill all narrow gaps to eliminate any risk of fingers/hands/feet entrapment.
 - .9 Boulders to be placed in locations as indicated on drawings and as directed on site by Contract Administrator.
- .9 For feature art wall stone and glass infill:
 - .1 Notify the Contract Administrator, a minimum of 5 working days prior to placement of infill material.
 - .2 Refer to drawings and notes for feature art wall fabrication requirements and installation sequence.
 - .3 Coordinate the placement of stone and glass infill with Section 05 50 00 – Metal Fabrications.
 - .4 The Contract Administrator shall be present to observe and guide the placement of each lift of stone for the first panel, and subsequent panels, as required.
 - .5 Do not begin placement of stone and glass infill until the Contract Administrator can be present at the place of Work.
- .10 Do not set stone on surfaces or with materials containing frost when ambient temperatures are below 5 degrees C.
- .11 Set stone in accordance with drawings and final mock-ups and shop drawings and as directed on site by Contract Administrator. Provide. Provide anchors, supports, fasteners, and other attachments shown, specified or necessary to secure stonework in place in accordance with the best practices of

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the trade. Shim and adjust accessories as required for proper setting of stone. Completely fill holes, slots and other sinkages for anchors, dowels, fasteners, and supports with non-shrinking, non-staining mortar during setting of stones.

- .12 Do not allow any petroleum-based fillers or sealants to come into contact with stonework.

3.3 ADJUSTMENT AND CLEANING:

- .1 Upon completion, clean all exposed-to-view surfaces of markings, dust, dirt, finger prints, excessive mortar and grout, grease and other contamination.
- .2 Replace all damaged or marred material and work as directed at no cost to the Owner.
- .3 Do not clean boulders with any abrasive tools, high-pressure washers, chemicals or cleaning compounds. Use water only as needed to remove loose surface dirt and debris. Do not remove surface vegetation on exposed surfaces of stones.

3.4 PROTECTION:

- .1 The Contractor shall obtain, from the installer, advice on the proper procedures required to protect the stonework from deterioration, discoloration or damage during construction and until acceptance of the work. Contractor shall implement all necessary procedures required to protect completed stonework from damage
- .2 Work in progress shall be protected at all times during construction by use of a suitable strong, impervious film or fabric securely held in place.
- .3 Protect until inspection, approval and acceptance of entire project work.
- .4 Make good any settlement that may occur and be responsible for the repair of all damages.
- .5 Protect corners and edges of stone units that are vulnerable to damage by continuing construction. Protect them by means of wood or other rugged materials secured in a manner that will not damage, or stain finished surfaces.
- .6 Remove protection when risk of damage is no longer present and without damage to stone.

END OF SECTION

CONCRETE PAVING

Part 1 General

1.1 SECTION INCLUDES

- .1 Requirements to supply and installation of concrete pavement, including walkways, sidewalks, landscape concrete curbs, decorative concrete textures and finishes..

1.2 RELATED WORK

- .1 Section 01 33 00 - Submittal Procedures
- .2 Section 31 22 13 - Rough Grading
- .3 Section 31 23 10 - Excavating, Trenching and Backfilling
- .4 Section 32 11 23 - Aggregate Base Courses
- .5 Section 32 17 26 - Tactile Warning Surfacing
- .6 Refer to structural drawings and notes

1.3 REFERENCES

- .1 All referenced standards shall be the current edition or edition referenced by the Ontario Building Code in force at the time of building permit application and noted on general notes of structural drawings.
- .2 City of Toronto Construction Standards
 - .1 [TS 3.70](#), City of Toronto Construction Specification for Concrete Sidewalk and Concrete Raised Median.
 - .2 [TS 501](#), City of Toronto Amendment to OPSS.MUNI 501 – Construction Specification for Compaction.
 - .3 [TS 1010](#), City of Toronto Amendment to OPSS.MUNI 1010 – Material Specification for Aggregates – Base, Subbase, Select Subgrade, and Backfill Materials.
 - .4 [TS 1350](#), City of Toronto Amendment to OPSS.MUNI 1350 – Material Specification for Concrete – Materials and Production.
- .3 Ontario Provincial Standard Specifications (OPSS):
 - .1 [OPSS.MUNI.351](#), Construction Specification for Concrete Sidewalk
 - .2 [OPSS.MUNI 353](#), Construction Specification for Concrete Curb and Gutter Systems
 - .3 [OPSS.MUNI 1308](#), Material Specification for Joint Filler in Concrete
 - .4 [OPSS.MUNI 1315](#), Material Specification for White Pigmented Curing Compounds for Concrete
 - .5 [OPSS.MUNI 1350](#), Material Specification for Concrete - Materials and Production
 - .6 [OPSS.MUNI 1440](#), Material Specification for Steel Reinforcement for Concrete

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- .4 Ontario Regulations:
 - .1 O. Reg. 413/12, Integrated Accessibility Standards
 - .2 AODA, Accessibility for Ontarians with Disabilities Act
- .5 CSA Group (CSA):
 - .1 [CSA A23.1-14/A23.2-14](#), Concrete Materials and Methods of Concrete Construction / Test Methods and Standard Practices for Concrete
 - .2 [CSA-A3000](#)-13, Cementitious Materials Compendium
 - .3 [CSA G30.18](#)-09, Carbon Steel Bars for Concrete Reinforcement
 - .4 [CSA G40.20/G40.21](#)-13, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel
 - .5 [CAN/CSA-S6](#), Canadian Highway Bridge Design Code for Ontario(CHBD)
- .6 ASTM International:
 - .1 [ASTM C260/C260M](#)-10a, Standard Specification for Air-Entraining Admixtures for Concrete
 - .2 [ASTM C494/C494M](#)-13, Standard Specification for Chemical Admixtures for Concrete
 - .3 [ASTM C666/C666M](#)-03(2008), Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing
 - .4 [ASTM D698](#)-07e1, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³))
 - .5 [ASTM D1751](#), Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Asphalt Types)
- .7 Reference Documents:
 - .1 Appendix A - Arborist Report, Macpherson Avenue Park, Urban Forest Innovations Inc., April 23, 2025
 - .2 Appendix B - Soil and Groundwater Management Plan – Davenport Lands (Parcel 28B, 29 and 30, WSP, July 2024
 - .3 Appendix C - Contaminant Health and Safety Plan – 28B, 29 and 30 Green Line Trail, WSP, July 2024
 - .4 Appendix D - City of Toronto Tree Protection Policy and Specifications for Construction Near Trees, July 2016
 - .5 Appendix E – Geotechnical Investigation for Macpherson Avenue Park, October 31, 2022
 - .6 Appendix F – Hydro One General Conditions for Secondary Land Uses, Hydro One, January 2023
 - .7 Appendix G -General Requirements for Construction Work by External Parties in the Vicinity of Hydro One 115,000 and 230,000 Volt Underground Plant, Hydro One, January 2024

1.4 SUBMITTALS

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- .1 All submissions shall be in accordance with Section 01 33 00.
- .2 Action Submittals: Submit the following submittals before starting any work of this Section:
 - .1 Product Data: Submit product data for each type of manufactured material and product indicated. Include product characteristics, performance criteria, physical size, finish and limitations in use
 - .2 Manufacturer's Instructions: Submit manufacturer's instructions, printed product literature and data sheets for each type of manufactured material and product indicated, including but not limited to the following:
 - .1 Formworks materials
 - .2 Bond breaker materials
 - .3 Expansion joint materials
 - .4 Concrete products
 - .5 Curing method and materials
 - .6 Admixtures
 - .7 Backer Rod
 - .8 Sealants for expansion joints
 - .9 Welded steel wire fabric reinforcement
 - .10 Epoxy coated dowels
 - .11 Pavement joint sealant colour range
 - .3 Shop Drawings:
 - .1 Submit reinforcement shop drawings and include setting plans and drawings or schedules showing details of fabrication of reinforcement and identifying the material for installation
 - .2 Show main reinforcement, temperature reinforcement, and all accessories
 - .3 Submit complete setting Drawings showing and identifying by mark or otherwise all bars to be incorporated in the Work
 - .4 Submit proposed methods of protection of concrete when air temperatures are expected to be above 25°C or below 5°C
- .3 Informational Submittals: Submit the following submittals during the course of the work:
 - .1 Concrete Mix Design: Submit certified mix designs for each concrete pavement mix at least three (3) weeks prior to the beginning of work, for each class of concrete. Include alternate mix designs when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.
 - .2 Submit certified mill test reports for metal reinforcement and welded wire fabric

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- .3 Field quality-control reports, including but not limited to concrete test and inspection reports. Concrete delivery tickets for each load of concrete delivered to the site showing final mix design, time of loading and delivery and any deviations to the Bond breaker
- .4 Samples and mock-ups:
 - .1 Submit samples for decorative tined sidewalk finish in a two part review process for sample panels and mock-ups to comply with the following requirements, using same concrete mix designs as will be used in the work:
 - .2 Sample panels:
 - .1 Build sample panels to demonstrate aesthetic effects, including tooled edge treatments, for tined finish concrete showing the rake size and effects selection as chosen by the Contract Administrator from samples for initial selection.]
 - .2 Sample panels for tined concrete finish shall be approximately 300mm x 600mm x 30mm thickness placed on cement board; indicate textures and features using contract materials, methods and workmanship.
 - .3 Additional sample panels may be requested where adjustments to finish and texture are required to confirm finishes; allow for a minimum of 3 additional sample panels for each proposed finish after the first reviewed panel until desired appearance is achieved.
 - .4 Obtain Contract Administrator's acceptance of sample panels before casting mock-ups of decorative sidewalk finishes.
 - .5 Sample panels are not intended to form a part of the final work and will be disposed of at completion of the work of this Section.
 - .3 Mock-ups:
 - .1 Contractor to submit a sample mock-up for acceptance of all concrete paving work per the details shown on the drawings. The mock-up shall show the sizes and final installation relationships between the various adjacent materials, and the finishes as specified.
 - .2 Construct mock-ups to verify selections made after review of sample panels to demonstrate aesthetic effects and set quality standards for materials and execution as follows:
 - .1 Mock-ups shall include each type of concrete finish, as well as the accepted sample panel finish in sizes no less than 2.0m wide x 6.0m long x full thickness of sidewalk system. Show a minimum of one (1) expansion joint with sealant and one (1) saw cut control joint.
 - .2 Include broom and tined finish, with trowel edge and various joints when applicable. Incorporate unit paving in mock-up where required.
 - .3 Notify Contract Administrator seven (7) days in advance of dates and times when mock-ups will be constructed.
 - .4 Obtain Contract Administrator's acceptance of mock-ups before starting construction.
 - .5 Maintain acceptable mock-ups during construction in an undisturbed condition as a standard for judging the completed Work.

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- .6 Location of mock-up to be proposed by Contractor and approved by Contract Administrator on site. Acceptable mock-ups may become part of the completed work if undisturbed at time of Substantial Completion.
- .7 The approved mock-ups shall establish the standard by which all work shall be assessed. Work that fails to meet the standard set by the mock-up shall be replaced.

1.5 QUALITY ASSURANCE

- .1 Manufacturer Qualifications
 - .1 Manufacturer of ready-mixed concrete products complying with ASTM C94 requirements for production facilities and equipment.
 - .2 Manufacturer with 10-years' experience in manufacture of specified products
- .2 Installer Qualifications
 - .1 Contractor shall provide a foreman with a minimum of five (5) years' experience, competent and skilled in the work of this section to direct all of the work to be performed, and to be present at all times during the performance of the work.
 - .2 All concrete work must be executed by skilled tradesmen having at least five (5) years experience in this type of work
- .3 Certifications
 - .1 Concrete supplier shall have a valid "Certificate of Ready Mixed Concrete Production Facilities" as issued by the Ready Mixed Concrete Association of Ontario.
 - .2 Submit certification that plant, equipment, and materials to be used in concrete comply with requirements of [CSA A23.1/A23.2](#), and that mix design is adjusted to prevent alkali aggregate reactivity problems.
- .4 Source Limitations
 - .1 Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant and each aggregate from one source.
 - .2 Obtain each specified material from same source and maintain high degree of consistency in workmanship throughout Project.
- .5 Submit proposed quality control procedures for Contract Administrator's approval, including, but not limited to, proposed methods of concrete protection during hot or cold weather conditions
- .6 Prior to pouring concrete obtain the approval of the Contract Administrator of all form work, placement of reinforcing steel, consolidation of subgrade and placement and consolidation of granular base
- .7 Ensure work complies with the Ontario Building Code, [Ontario Bridge Code] and all pertinent local by-laws and regulations. These shall govern in case of conflict with the specifications. Obtain and pay for all necessary permits before starting work.
- .8 Workmanship
 - .1 The Contractor is responsible for correction of concrete work that does not conform to the specified requirements, including strength, tolerances, grading and finishes.

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- .2 Contact Administrator shall have authority to reject or call for improvements in workmanship where he considers that concrete work falls below acceptable standard.
- .3 Contractor shall be given one day notice that all concreting shall cease unless such improvements are made.
- .9 Notification: Contact Administrator shall be notified at least one (1) week before start of Work
- .10 Ensure work complies with the Ontario Building Code and all pertinent local by-laws and regulations. These shall govern in case of conflict with the specifications. Obtain and pay for all necessary permits before starting work.
- .11 Contract Administrator shall have authority to reject or call for improvements in workmanship where he considers that concrete work falls below acceptable standard. Contractor shall be given one day notice that all concreting shall cease unless such improvements are made.

1.6 PREINSTALLATION CONFERENCE:

- .1 A minimum of one (1) week prior to placement of tined finish concrete, a meeting shall be held at the Project Site to discuss the Work and application methods.
- .2 Before submitting design mixtures, review concrete pavement mixture design and examine procedures for ensuring quality of concrete materials and concrete pavement construction practices.
- .3 Require representatives, of each entity directly concerned with concrete pavement, to attend conference.

1.7 QUALITY CONTROL

- .1 Testing:
 - .1 The Contractor shall arrange and pay for testing of the concrete by an independent testing agency approved by the Contract Administrator. Submit all testing reports to the Contract Administrator.
 - .2 Testing frequency in accordance with Table B and Table C of TS-1350.
 - .3 Slump, Air content Compressive strength tests: in accordance with CSA requirements and TS 1350.10.01.
 - .4 Submit the following for quality control:
 - .1 Concrete cylinder compression test results, at 7 and 28 days
 - .2 Concrete mix designs from the concrete plant.
 - .3 Delivery tickets for the concrete, showing final mix design being delivered to the site, time of loading and delivery, any deviations to the specifications.
 - .4 Slump Tests.
 - .5 Submit responses to all site review test reports stating that all reported defects and deficiency items were corrected or stating what action was taken.
 - .5 Additional Test: Testing and inspection agency shall make additional tests of concrete when test results indicate that lump, air entrainment, compressive strengths, or other requirements have not been met, as directed by the Contract Administrator with costs paid by the Contractor.

CONCRETE PAVING

- .2 Minimum testing requirements for Contractor:
 - .1 Minimum compaction requirements for granular base is 100% MDD.
- .3 Concrete curbs:
 - .1 One location per day of construction of concrete curbs.
 - .2 Minimum 3 cylinders per location to break at 7 days and 28 days
 - .3 Slump and air test at each sampling location
 - .4 Conformity to OPSS MUNI 1350 except air to be $7\% \pm 1.5\%$
- .4 Inspection
 - .1 Obtain the acceptance of the Contract Administrator of the layout, compacted sub-grade, compacted granular base, formwork and reinforcing before proceeding with subsequent work.
 - .2 Work not accepted before pouring concrete may be subject to replacement.

1.8 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with CSA A23.1/A23.2 and manufacturer's written instructions.
- .2 Storage and Handling Requirements:
 - .1 Store materials off ground in a dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .1 Store reinforcing steel on racks or skids. Protect from contamination by dirt or other materials. Maintain steel in its fabricated form.
 - .2 Store forms off the ground and sufficiently supported to prevent warping or distortion. Protect from contamination by oil, grease, water, earth, etc.
 - .3 Replace defective or damaged materials with new.
 - .2 All concrete is to be ready mixed at plant and transported to the site by truck in accordance with CSA A23.1/A23.2. Hand mixed concrete is not allowed unless approved in writing by the Contract Administrator prior to starting any work.
 - .3 Convey concrete from the mixer to the place of final deposit as rapidly as possible, with as little re-handling as is practical. Avoid segregation and/or loss of material.
 - .4 Place concrete into final position and at such a rate that it remains plastic at all times and flows readily between reinforcement, into all corners and crevices and around all embedded fixtures. Pour in a continuous operation between expansion joints.
 - .5 Thoroughly clean all equipment, used for mixing or transporting of concrete, of all hardened concrete and foreign material prior to placing concrete.
 - .6 Do not allow concrete to be contaminated by foreign materials. Do not use re-tempered concrete unless approved in writing, by the Contract Administrator.
 - .7 Obtain the approval of the Contract Administrator of the type, number and method of use of mechanical vibrators. Do not operate a vibrator for longer than 10 seconds in any one location.

CONCRETE PAVING

- .8 Maintain constant control to ensure that finished concrete is dense, uniform, free of air holes or honeycombs and that no segregation of aggregates and cement paste occurs.

1.9 JOB CONDITIONS

- .1 Protect all concrete surfaces from damage or harmful effects of weather, water, mechanical shock or trespassers until concrete is properly cured.
- .2 There shall be no concrete pouring in temperatures below 10 deg C without written permission of the Contract Administrator.

1.10 WARRANTY

- .1 Concrete work shall be guaranteed for a period of two years in accordance with the General Conditions of the Contract.

Part 2 Products

2.1 GRANULAR BASE MATERIALS

- .1 Granular A, in accordance with Section 32 11 23 - Aggregate Base Courses and TS 1010 - City of Toronto - Material Specification for Aggregates – Base, Subbase, Select Subgrade, and Backfill Material.

2.2 FORMWORK

- .1 Formwork shall be in accordance with TS 3.70, TS 1350 and with structural drawings and notes.

2.3 REINFORCEMENT MATERIALS

- .1 Reinforcement shall be in accordance with TS 3.70, TS 1350 and with structural drawings and notes.

2.4 CONCRETE

- .1 Concrete materials and mixes shall be in accordance with TS 3.70, TS 1350 and with structural drawings and notes.

2.5 TINGING DEVICES:

- .1 The tining shall be done with a mechanical device such as a wire comb or rake.
- .2 The comb shall have a single row of tines that each has a nominal width of 3.175mm (1/8") to 6.35mm (1/4"). The nominal spacing of the tines shall be 20mm (3/4") to 50 mm (2") center-to-center. The nominal depth of tined groove in the plastic concrete shall be 6.35mm (1/4").

Part 3 Execution

3.1 PROJECT CONDITIONS

- .1 Carry out work of this Section only when surfaces are at least 10°C. There shall be no concrete pouring in temperatures below 10°C. without written permission of the Contract Administrator.
 - .1 Do not place concrete on frozen surface.
 - .2 When concrete has been placed in cold weather and the site temperature is expected to drop below 5 °C, insulating curing blankets or other suitable material shall be placed on the concrete pavement and weighted to prevent movement. Curing to continue until the

CONCRETE PAVING

cumulative number of days, or fraction thereof, during which the temperature of the concrete is above 10 °C, has totalled a minimum of 7 days. Alternatively, if compressive tests of cylinders cured under field conditions achieve at least 70% of the specified compressive strength, curing may be discontinued.

- .3 Concrete pavement placed in cool weather shall experience a minimum of 30 day air-drying period, following final curing, before first application of de-icing salts.
- .4 Suspend paving operation when temperature falls below specified minimum.
- .2 Concrete placed when the ambient temperature is at or above 27 degrees C to be cured by continuous water curing from soaker hoses providing complete coverage of the pavement to minimize the temperature rise of the concrete.
- .3 No concrete shall be placed during rain.
 - .1 When rain appears imminent paving operation should cease. Protect freshly laid concrete from rain damage and adverse weather condition and in accordance with CSA A23.1/A23.2. Extend protective coverings over edges of concrete and arrange so as not to bear on unprotected edges.
- .4 Protect all concrete surfaces from damage or harmful effects of weather, water, mechanical shock or trespassers until concrete is properly cured.

3.2 TOLERANCES

- .1 Finish surfaces to within 3 mm in 3 m as measured with 3 m straightedge placed on surface.
- .2 Horizontal deviations of slab edge from alignment of pavement not to exceed 10 mm.

3.3 EXAMINATION

- .1 Prior to Work of this Section, carefully inspect the installed Work of other trades and verify that such Work is complete to the point where this installation may properly commence.
- .2 Discrepancies:
 - .1 In the event of discrepancy, immediately notify the Contract Administrator.
 - .2 Do not proceed with installation in areas of discrepancy until such discrepancies have been fully resolved.

3.4 GRADE PREPARATION

- .1 Do grade preparation work in accordance with Section 01 35 43, Section 02 20 00, and Section 31 00 99.
- .2 Place granular base material to lines, widths, and depths as indicated.
- .3 Compact subgrade to a minimum 95% of maximum dry density and , in accordance wit TS 501.
- .4 Soft, yielding materials or other portions of subgrade that will not compact to specification shall be removed and replaced with suitable material. Subgrade to be brought to a firm unyielding condition with a uniform density.
- .5 Compact granular base in maximum 100 mm layers to at least 100% of maximum density to ASTM D698-.
- .6 Repair damage to subbase resulting from hauling or equipment operations.

CONCRETE PAVING

- .7 Prior to placing concrete, subbase shall be thoroughly wetted. Wetting shall be carried out, such that standing water is not present on grade.

3.5 FORM PLACEMENT

- .1 Coordinate the installation of forms with placement of reinforcement steel, and in accordance with structural drawings and notes.
- .2 Ensure accurate stepped slabs to receive inlaid stone or concrete unit paving and tree grates. Paver cutting will not be permitted to suit incorrect stepped slabs.
- .3 Remove water, ice, laitance, curing compound, loose soil, and other debris and thoroughly clean form surfaces that will be in contact with concrete or that have been in contact with previously cast concrete, dirt, and other surface contaminants prior to coating surface.
- .4 Set, brace, and secure edge forms, bulkheads, and intermediate screed guides to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.
- .5 Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.
- .6 All concrete edges for all pavement, foundations, curbs and other below grade work shall be formed or contained to prevent over pouring of concrete. Excess concrete shall be removed as directed by the Contract Administrator.
- .7 Form placement and reinforcement to be accepted by Contract Administrator prior to placement of concrete.
 - .1 Notify the Contract Administrator he Contract Administrator at least 72 hours before placement of concrete for review of forms, form liners, and reinforcement.
 - .2 No concrete shall be placed without this review and acceptance.

3.6 PLACEMENT OF REINFORCING STEEL

- .1 Place reinforcing steel and dowels in accordance with structural drawings and notes.
- .2 Steel placement to be approved by the Contract Administrator before placing concrete.

3.7 CONCRETE PLACEMENT

- .1 Obtain Contract Administrator's approval of granular base and reinforcement prior to placing concrete.
- .2 Do concrete work in accordance with CSA-A23.1 and TS 3.70 for measuring, mixing, transporting and placing concrete.
- .3 Place concrete in accordance with CSA A23.1/A23.2,
- .4 Prior to placing of concrete obtain Contract Administrator's approval of proposed method for protection of concrete during placing and curing in adverse weather.
- .5 Prior to placing concrete for slabs on grade, verify that sub-grade and base courses have been compacted and tested.

CONCRETE PAVING

- .6 Prior to placing concrete in the forms, verify that all forms have met all requirements specified: that reinforcing steel, embedded materials are in place and securely anchored; that forms are absolutely clean; and that entire preparation has been approved by the Contract Administrator.
- .7 Cleaning Forms: Immediately prior to placing concrete, clean all form interiors free of foreign material and debris
 - .1 Force debris out of forms prior to closing the last section with a jet stream of compressed air and/or water. Where form openings are not available, collect debris with vacuum cleaners and heavy-duty magnets.
 - .2 Protect cleaned forms if placing does not commence immediately, covering openings with tarpaulins.
 - .3 Protect reinforcing steel so that there is no formation of rust. Coat reinforcing steel if necessary to prevent rust. Rusty reinforcement will be rejected and the Contractor shall replace at no additional cost to the Owner.
- .8 Transport concrete from truck to place of final deposit as rapidly as practicable by means that prevent separation of ingredients
- .9 Do not add water to concrete during delivery, at Project site, or during placement without approval from the Contract Administrator and testing agency.
- .10 Ensure reinforcement and inserts are not disturbed during concrete placement.
- .11 Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place
- .12 Place concrete to lines, grades and depths as indicated.
- .13 Use hand placing where machine spreading is not feasible.
- .14 Spread uniformly with approved equipment to thickness sufficient to allow for proper consolidation and finishing. Do not apply external tractive force to paver.
- .15 Insert tie bars as indicated.
- .16 While placing concrete, compact thoroughly and uniformly by approved means to ensure a dense homogeneous structure free of air pockets, and honeycombs and closely bonded with reinforcement.
 - .1 Consolidate concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures to consolidate concrete according to recommendations in ACI 309R.
 - .2 Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand-spreading and consolidation. Consolidate with care to prevent dislocating reinforcement, dowels, and joint devices.
- .17 Screed pavement surfaces with a straightedge and strike off. Commence initial floating using bull floats or darbies to form an open textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading dry-shake surface treatments.

3.8 CONCRETE FINISHING

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- .1 General: Do not add water to concrete surfaces during finishing operations.
- .2 Float Finish: Begin the second floating operation when bleedwater sheen has disappeared and concrete surface has stiffened sufficiently to permit operations, and as follows:
 - .1 Float surface with power-driven floats or by hand floating if area is small or inaccessible to power units.
 - .2 Finish surfaces to true planes.
 - .3 Cut down high spots and fill low spots.
 - .4 Refloat surface immediately to uniform granular texture.
- .3 Fine-Textured Broom Finish:
 - .1 Draw a soft-bristle broom across float-finished concrete surface, as indicated on Drawings, to provide a uniform, fine-line texture.
 - .2 Eliminate edging tool marks on concrete surfaces by light brooming.
- .4 Medium-Textured Broom Finish:
 - .1 Provide a coarse finish by striating float-finished concrete surface 2mm to 3mm deep with a stiff-bristled broom.
 - .2 After concrete has set sufficiently to prevent coarse aggregate from being torn from surface, but before it has completely set, brooms shall be drawn across the surface to produce a pattern of small parallel grooves.
 - .3 Broomed surface shall be uniform, continuous, with no smooth, unduly rough or porous spots, or other irregularities.
 - .4 Coarse aggregate shall not be dislodged by brooming operation.
- .5 Tined Finish:
 - .1 See Drawings for location, layout, and orientation of tine pattern.
 - .2 Sawcut and expansion joint pattern as shown on Drawings.
 - .3 Texture is enhanced through the placement of directional tined grooves in the surface of the pavement while the concrete is plastic.
 - .4 Transverse tining shall be accomplished by equipment with automated horizontal and vertical controls to ensure straight, uniform depth tined grooves. The texture geometry shall be uniformly imparted throughout the length of the tining comb and between successive passes of the tining comb. Successive passes of the tining comb shall be overlapped the minimum necessary to attain a continuously textured surface.
 - .5 The tining operation shall be done at such time and manner that the desired surface texture will be achieved while minimizing displacement of the larger aggregate particles and before the surface permanently sets. Where abutting pavement is to be placed, the tining shall extend as close to the edge as possible without damaging the edge. If abutting pavement is not to be placed, the 100mm area nearest the edge shall not be tined. Hand-operated tining equipment that produces an equivalent texture may be used only on small or irregularly shaped areas. Tines should be thoroughly cleaned at the end of each day's use, and damaged or worn tines replaced.

CONCRETE PAVING

- .6 When surface corrections for pavement smoothness are made in the hardened concrete, no additional texturing is required.
- .6 Sandblast Finish: Ensure concrete is fully cured and surfaces to be blast finished are blasted at the same age for uniform results.
 - .1 Perform sandblast finish, using the same nozzle type, nozzle pressure and blasting techniques to match the accepted mock-up.
 - .2 Blast corners and edges of concrete carefully using backup boards to maintain uniform corner edge line.
 - .3 Protect all surrounding materials and soil from exposure to blasting and accumulation of dust and grit. Provide protection as required and remove from site at the completion of the work.
 - .4 Repair or replace work damaged by finishing operations.
- .7 Clean-up:
 - .1 Maintain control of concrete chips, dust, and debris in each of the area of work.
 - .2 Clean up and remove such material at the completion of each day of operation.
 - .3 Prevent migration of airborne materials by use of tarpaulins, wind breaks, and similar containing devices.
- .8 Formed surfaces exposed to view to CSA-A23.1.
 - .1 For curbs: Apply smooth wood float finish.
 - .2 For concrete paving within the park (pedestrian and vehicular): fine-textured broom finish perpendicular to road curb or across direction of walking, with trowel edge, NO margins.
 - .3 For concrete paving on municipal sidewalks (pedestrian and vehicular): Medium-textured broom finish perpendicular to road curb or across direction of walking, with trowel edge, NO margins.
- .9 Hand finish areas inaccessible to finishing machines to same quality and surface characteristics as machine finished surfaces.
- .10 Finish concrete surface with approved float at proper time. Operate from edge to edge with wiping motion while advancing, with each succeeding pass overlapping previous one.
- .11 Finish edges of slabs with edging tool to form a smooth radius with no margins.
 - .1 Typical radius to be 5mm unless otherwise noted.
 - .2 Do not patch with cement paste.

3.9 EXPANSION AND CONTRACTION JOINTS

- .1 General:
 - .1 Construct joints plumb, straight and square to details indicated.
 - .2 Transverse joints to coincide with those in adjacent pavement unless indicated or directed otherwise.
 - .3 Install preformed joint filler at locations and to details indicated.

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- .4 Install isolation joints around structures and features that project through, into or against pavement.
- .2 Expansion Joints:
 - .1 Form expansion and isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, other fixed objects, and where indicated.
 - .2 Locate expansion joints at intervals indicated on Drawings.
 - .3 Extend joint fillers full width and depth of joint.
 - .4 Terminate joint filler not less than 13mm or more than 25mm below finished surface if joint sealant is indicated.
 - .5 Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.
 - .6 Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
 - .7 During concrete placement, protect top edge of joint filler with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.
- .3 For sawn joints.
 - .1 Ensure joints are sawn straight. Install end stakes to ensure straight joint alignment across paved area. Mark joint alignment with chalk line or other suitable guide to approval of the Contract Administrator.
 - .2 Saw joints using approved equipment and methods to produce joint dimensions indicated.
 - .3 Restrict speed of saw cutting to ensure proper joint alignment and to avoid damage to concrete.
 - .4 Supply sufficient workers and equipment including standby equipment, to maintain satisfactory sawing schedule.
 - .5 Schedule sawing operations on 24 hours basis and consistent with concrete placing.
 - .6 Make initial saw cuts in progressive manner and as soon as concrete surface has hardened sufficiently to resist ravelling as cut is made and before shrinkage cracks occurs.
 - .7 If cracking occurs ahead of saw cut, stop sawing immediately. Move ahead several joints and cut one or more joints before returning to saw intermediate joints. Where cracking persists, make 1 m saw cut from one edge and complete sawing from opposite edge. Adjust sawing schedule accordingly.
 - .8 If uncontrolled cracking or other surface damage results from inadequate or improper sawing techniques suspend further concrete operations until situation is corrected and immediately remove and replace damaged slabs.
 - .9 Immediately on completion of sawing, flush joints with water to remove laitance.
- .4 Joints in pavement:
 - .1 Install expansion joints and contraction joints as indicated in OPSS.MUNI.351 and OPSS 353.

CONCRETE PAVING

- .2 Expansion and contraction joints to align with jointing pattern as indicated on drawings. Tooled radius on expansion joints; NO margins.
- .5 Joints in curbs:
 - .1 Sawcut control joints to be spaced as per drawing dimensions and layout shape as shown on drawings; tooled radius on expansion joints; NO margins.
 - .2 Provide expansion joints in accordance with CSA A23.1/A23.2 as shown on the drawings and between new concrete and all new or existing structures.
 - .3 No offsets will be allowed between adjacent sections of joint fillers and no plugs of concrete will be permitted anywhere within an expansion joint.

3.10 INSTALLATION OF TACTILE WARNING SURFACE INDICATORS

- .1 Form blockouts in concrete for installation of tiles specified in Section 32 17 26 - Tactile Warning Surfacing.
 - .1 Blockout tolerance for Opening Size: Plus 6mm, no minus.
 - .2 Screed surface of concrete where tiles are to be installed to elevation, so that edges of installed tiles will be flush with surrounding concrete paving.
 - .3 Embed tiles in fresh concrete in accordance with TS 3.70 and Section 32 17 26 - Tactile Warning Surfacing immediately after screeding concrete surface.

3.11 CURING

- .1 Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with CSA A23.1 recommendation for cold or hot weather protection during curing.
- .2 Begin curing after finishing concrete but not before free water has disappeared from concrete surface.
- .3 Cure for a minimum of 7 days by using curing compound as follows:
 - .1 Apply curing compound evenly to form continuous film, in accordance with manufacturer's written requirements.
 - .2 For hand application apply first coat immediately after texturing operations, second coat to be applied immediately after first coat in a perpendicular direction.
 - .3 For machine application curing compound to be applied in accordance with manufacturers' specifications.
 - .4 Spray slab edges immediately after removal of forms.
 - .5 Protect formed or sawed joints from evaporation during curing period.
 - .6 Respray areas where membrane is damaged during curing period.

3.12 BACKFILL

- .1 Allow concrete to cure for a minimum of 7 days prior to backfilling.
- .2 Backfill to designated elevations with material as directed by Contract Administrator.
- .3 Compact and shape to required contours as indicated.

CONCRETE PAVING

3.13 DEFECTIVE CONCRETE

- .1 Concrete is defective when:
 - .1 It contains: honeycombing, embedded debris, uncontrolled shrinkage cracking, or other surface defects.
 - .2 It is damaged by freezing.
 - .3 It is placed at too high temperature.
 - .4 Average 28 day strength of any three consecutive strength tests is less than specified minimum 28 day strength.
 - .5 Any 28 day strength test result is more than 3.5 MPa below the specified minimum 28 day strength.
 - .6 Standard deviation of 28 day strength test results exceeds CSA A23.1/A23.2 requirements.

3.14 REPAIR AND RESTORATION OF DEFECTIVE CONCRETE

- .1 Repair of defective concrete work:
- .2 Remove and replace defective concrete where directed by the Contract Administrator.
 - .1 The full extent of defective pavement shall be removed to the nearest joints, as directed by the Contract Administrator.
 - .2 Remove full panels of defective concrete by saw cutting at a joint as directed by the Contract Administrator. Correction of defective concrete shall not result in additional joints.
 - .3 Protect adjacent surfaces during removals.
 - .4 Replace with new concrete to this specification.
 - .5 Construct contraction joint at boundary between sawn face of existing concrete and new concrete

3.15 PROTECTION

- .1 Protect concrete from damage until final inspection by the Contract Administrator and Substantial Performance of the Work.
 - .1 Exclude traffic from paving for at least 14 days after placement.
 - .2 When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur.
- .2 Maintain concrete paving free of stains, discoloration, dirt, and other foreign material.
- .3 Sweep paving not more than two days before date scheduled for Substantial Performance review.

3.16 CLEANING

- .1 Progressive Cleaning: Leave Work area clean at end of each day and in accordance with Section 01 74 13.
- .2 Final cleaning: The Contractor shall remove all debris, construction equipment and scrap material from all areas within the limit of work prior to the final inspection and acceptance.

CONCRETE PAVING

- .3 The Contractor shall clean all stains from the surface of paving. Paving which cannot be cleaned shall be replaced. The Contract Administrator shall be sole judge of whether staining is apparent and necessitates remediation.
- .4 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

PAVEMENT MARKINGS

Part 1 General

1.1 SECTION INCLUDES

- .1 This section includes requirements to supply and install pavement markings including:
 - .1 Preformed Thermoplastic pavement markings.

1.2 RELATED WORK

- .1 Section 01 33 00 – Submittal Procedures
- .2 Refer to civil drawings and notes for asphalt pavement.

1.3 REFERENCES

- .1 All referenced standards shall be the current edition or edition referenced by the Ontario Building Code currently in force
- .2 City of Toronto Construction Standards
 - .1 TS 3.30, Construction specification for Hot Mix Asphalt Sidewalks, Boulevards and Driveways
 - .2 TS 1003, City of Toronto Material Specification for Aggregates Hot Mixed, Hot Laid Asphaltic Concrete
 - .3 TS 1101, City of Toronto Amendment to OPSS.MUNI 1101 – Material Specification for Performance Graded Asphalt Cement
 - .4 TS 1151, City of Toronto Material Specification for Superpave, Stone Mastic and Warm Mix Asphalt
- .3 Ontario Provincial Standard Specifications (OPSS)
 - .1 [OPSS.MUNI 710](#), Construction Specification for Pavement Marking
 - .2 [OPSS.MUNI 1712](#), Material Specification for Organic Solvent Based Traffic Paint
 - .3 [OPSS.MUNI 1713](#), Material Specification for Thermoplastic Pavement Marking Materials
 - .4 [OPSS.MUNI 1714](#), Material Specification for Field Reacted Polymeric Pavement Marking Materials
 - .5 [OPSS.MUNI 1715](#), Material Specification for Preformed Plastic Pavement Marking Tape
 - .6 [OPSS.MUNI 1716](#), Material Specification for Water-Borne Traffic Paint
 - .7 [OPSS.MUNI 1750](#), Material Specification for Traffic Paint Reflectorizing Glass Beads
- .4 Province of Ontario
 - .1 Ontario Traffic Manual (OTM) Book 11, latest edition.
- .5 Reference Documents:

PAVEMENT MARKINGS

- .1 Appendix A - Arborist Report, Macpherson Avenue Park, Urban Forest Innovations Inc., April 23, 2025
- .2 Appendix B - Soil and Groundwater Management Plan – Davenport Lands (Parcel 28B, 29 and 30, WSP, July 2024
- .3 Appendix C - Contaminant Health and Safety Plan – 28B, 29 and 30 Green Line Trail, WSP, July 2024
- .4 Appendix D - City of Toronto Tree Protection Policy and Specifications for Construction Near Trees, July 2016
- .5 Appendix E – Geotechnical Investigation for Macpherson Avenue Park, October 31, 2022
- .6 Appendix F – Hydro One General Conditions for Secondary Land Uses, Hydro One, January 2023
- .7 Appendix G -General Requirements for Construction Work by External Parties in the Vicinity of Hydro One 115,000 and 230,000 Volt Underground Plant, Hydro One, January 2024

1.4 SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Action Submittals: Submit the following submittals before starting any work of this Section:
 - .1 Product Data: Submit manufacturer's product data for pavement marking materials and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit to Contract Administrator, a Methodology Statement for the installation of each product type at least two (2) weeks prior to commencing work of this Section.
 - .3 Submit manufacturer's available range of colours, for Contract Administrator's initial selection and approval prior to ordering.
 - .4 Samples for initial selection:
 - .1 Submit samples to the Contract Administrator at least two (2) weeks prior to commencing work:
 - .2 Submit samples for each material and colour specified herein. Samples to be no larger than 8.5" x 11".
 - .1 Allow for samples of 3 additional variations of each colour, to Contract Administrator's selection
 - .3 Mark samples with name of project, its location, paint manufacturers name and address, name of paint, CGSB specification number and formulation and batch number.
 - .5 Templates Submit to Contract Administrator, sample templates for each pavement symbol type and size at least two (2) weeks prior to commencing work of this Section.
- .3 Informational Submittals: Submit the following submittals during the course of the Work:
 - .1 Mock-ups:

PAVEMENT MARKINGS

- .1 Submit a mock-up of preformed thermoplastic pavement marking on asphalt for Contract Administrator's review and approval prior to placement of final pavement markings.
 - .1 Mock-up shall be approximately 1.5m x 1.5m and shall include the full range of colors and shall demonstrate application, texture and patterns.
 - .2 Mock-up shall not be incorporated into the work and shall be protected and remain in place until the completion paving work.
 - .3 Location of mock-up shall be proposed by Contractor and accepted by the Contract Administrator.
 - .4 Allow 48 hours for inspection and approval of mock-up by Contract Administrator before proceeding with this work.
 - .5 When accepted, mock-up will demonstrate minimum standard for this work.
- .4 Closeout Submittal: Submit information on materials relative to work of this Section for inclusion in operations and maintenance manual.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .2 Storage and Handling Requirements: Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

1.6 SITE CONDITIONS

- .1 Do not apply pavement markings if the air temperature is below 8°C, with no rain forecast within next 4 hours, or if the weather or pavement conditions are considered unsuitable by the Contract Administrator.

1.7 WARRANTY

- .1 Work of this Section shall be guaranteed for a period of [two (2)] years in accordance with the General Conditions of the Contract

Part 2 Products

2.1 MATERIALS

- .1 Custom pavement markings as shown in the drawings and shall be thermoplastic pavement markings in accordance with OPSS 1713.
- .2 Products:
 - .1 DecoMark thermoplastic asphalt pavement marking system as supplied by HUB Surface Systems, <https://hubss.com/>, or approved equal.
 - .2 Contact: Doug Bain, Hub Surface Systems, 430 Black Drive, Milton ON L9T 6S1, 416 540 9287, doug.bain@hubss.com
- .3 Pattern: Custom, as indicated on Contract Documents.

PAVEMENT MARKINGS

- .4 Colours:
 - .1 Green: PMS 347C (Kelly Green), provide samples
 - .1 Allow for 3 additional variations of green colour, to Contract Administrator's selection
 - .2 White, provide samples
- .5 Thermoplastic markings shall be supplied preformed or precut at a standard thickness of 90 mils (+/- 10%) retro reflective custom pattern.
- .6 Installer to be accredited and licensed for the current calendar year by Integrated Paving Concepts Inc: Hub Surface Systems or approved equivalent
- .7 Digital artwork file to be provided by the Contract Administrator
- .8 Thermoplastic pavement markings to be installed in accordance with manufacturer's specification

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates and surfaces to receive pavement markings acceptable for product installation prior to pavement markings application
- .2 Pavement surface: dry, free from water, frost, ice, dust, oil, grease and other deleterious materials
- .3 Proceed with Work only after unacceptable conditions rectified

3.2 GENERAL

- .1 Pavement markings shall be installed in accordance with the requirements of OPSS.MUNI 710
 - .1 Symbols and letters to dimensions indicated
- .2 Do not begin pavement marking until required submittals and mock-ups have been completed and approved by Contract Administrator.
- .3 Prior to placing pavement markings, obtain Contract Administrator's approval of layout. Provide Contract Administrator with minimum 48 hours of notification for review of layout of proposed pavement markings.
- .4 Thermoplastic pavement markings shall be installed in accordance with manufacturer's requirements
 - .1 Layout pattern for thermoplastic pavement markings on pavement surface and install pavement marking system in accordance with reviewed shop drawings.
 - .2 Shape and area for pattern to be reviewed and approved by Contract Administrator prior to installation
- .5 Thoroughly clean distributor tank before refilling with paint of different colour.
- .6 Where required, apply glass beads at rate of 0.5 kg/L of painted area immediately after application of paint.

3.3 PROTECTION

PAVEMENT MARKINGS

- .1 Protect pavement markings until dry.
- .2 Protect thermoplastic pavement markings until cool and hardened. Do not permit any debris such as dust, water, pollen etc. to come in contact with the melted thermoplastic.
- .3 Do not allow vehicular circulation over pavement markings until thermoplastic has cooled to manufacturer recommendations
- .4 Repair damage to adjacent materials caused by pavement marking application.

3.4 CLEANING

- .1 Leave Work area clean at end of each day
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment

END OF SECTION

TACTILE WALKING SURFACING

Part 1 General

1.1 SECTION INCLUDES

- .1 This section includes requirements to supply and install of tactile walking surface indicators (TWSI) on concrete paving.

1.2 RELATED WORK

- .1 Section 01 33 00 - Submittal Procedures
- .2 Section 32 13 13 - Concrete Paving

1.3 REFERENCES

- .1 All referenced standards shall be the current edition or edition referenced by the Ontario Building Code currently in force
- .2 City of Toronto Construction Standards:
 - .1 [TS 3.70](#), City of Toronto Construction Specification for Concrete Sidewalk and Concrete Raised Median.
- .3 Ontario Regulations:
 - .1 O. Reg. 413/12, Integrated Accessibility Standards.
 - .2 AODA, Accessibility for Ontarians with Disabilities Act
- .4 CSA Group:
 - .1 [CSA B651](#), Accessible Design for the Built Environment.
- .5 ASTM International (ASTM):
 - .1 [ASTM C1028-06](#), Standard Test Method for Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull-Meter Method.
- .6 American National Standards Institute (ANSI) :
 - .1 Cold-Weather Requirements: Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
- .7 Reference Documents:
 - .1 Appendix A - Arborist Report, Macpherson Avenue Park, Urban Forest Innovations Inc., April 23, 2025
 - .2 Appendix B - Soil and Groundwater Management Plan – Davenport Lands (Parcel 28B, 29 and 30, WSP, July 2024
 - .3 Appendix C - Contaminant Health and Safety Plan – 28B, 29 and 30 Green Line Trail, WSP, July 2024
 - .4 Appendix D - City of Toronto Tree Protection Policy and Specifications for Construction Near Trees, July 2016
 - .5 Appendix E – Geotechnical Investigation for Macpherson Avenue Park, October 31, 2022

TACTILE WALKING SURFACING

- .6 Appendix F – Hydro One General Conditions for Secondary Ladh Uses, Hydro One, January 2023
- .7 Appendix G -General Requirements for Construction Work by External Parties in the Vicinity of Hydro One 115,000 and 230,000 Volt Underground Plant, Hydro One, January 2024

1.4 SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures
- .2 Action Submittals: Submit the following submittals before starting any work of this Sections:
 - .1 Product Data: Submit product data for each type of manufactured material and product. Include product characteristics, performance criteria, physical size, finish and limitations in use.
 - .2 Samples for Verification: Submit full-size samples for each type of tactile warning surfacing
- .3 Shop Drawings:
 - .1 Submit shop drawings incorporating plans and details of all work in this Section.
 - .2 Shop drawings shall illustrate tactile warning surfacing panel types, layout and cuts where radial crossings occur.
 - .3 Shop drawings shall include edge and perimeter conditions, and junctions with dissimilar materials, truncated-dome pattern and cross section; with fasteners and anchors
 - .4 Shop drawings shall include fabrication details, setting details, tile placement, and installation methods and materials
- .4 Closeout submittals:
 - .1 Maintenance Data: For tactile warning surfacing, to include in maintenance manuals.

1.5 PROJECT CONDITIONS

- .1 Cold-Weather Protection: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen subgrade or setting beds. Remove and replace unit paver work damaged by frost or freezing.
- .2 Weather Limitations for Mortar and Grout:
 - .1 Cold-Weather Requirements: Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.
 - .2 Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602. Provide artificial shade and windbreaks, and use cooled materials as required. Do not apply mortar to substrates with temperatures of 38 deg C and higher.
 - .3 When ambient temperature exceeds 38 deg C, or when wind velocity exceeds 13 km/h and ambient temperature exceeds 32 deg C, set unit pavers within 1 minute of spreading setting-bed mortar.

1.6 WARRANTY

- .1 Work of this Section shall be guaranteed for a period of two (2) years in accordance with the General Conditions of the Contract

TACTILE WALKING SURFACING

- .2 Special Warranty: Manufacturer agrees to repair or replace components of tactile warning surfaces that fail in materials or workmanship within specified warranty period.
- .3 Failures include, but are not limited to, the following:
 - .1 Deterioration of finishes beyond normal weathering and wear.
 - .2 Separation or delamination of materials and components.

Part 2 Products

2.1 TACTILE WALKING SURFACE INDICATORS (TWSI)

- .1 Cast iron truncated-dome detectable warning tiles.
 - .1 The truncated domes shall be of uniform size and shape. Units shall be uniform in texture, be free from pouring faults, sponginess, cracks, blowholes, and other defects, and have clean-cut and well-defined edges. All surfaces shall be bare, without any coating, and be uniform and free of flaking rust or mounts of rust or debris. Tactile walking surface indicators shall have ribs cast to the underside of the unit, have vent holes, and have a minimum plate thickness of 5 mm.
 - .2 Metal truncated-dome detectable warning tiles shall be configured for setting flush in new concrete walkway surfaces, with slip-resistant surface treatment on domes and field of tile.
 - .3 Product: Detectable Warning Plates; Neenah Enterprises Inc. or approved equal.
 - .4 Shapes and sizes: Square panel (610mm by 610mm), radial tiles, as indicated on drawings
 - .5 Mounting: Cast-in-place. Permanently embedded detectable warning tile wet-set into freshly poured concrete.

2.2 ACCESSORIES

- .1 Sealant for cast iron tiles: Penetrating surface sealer to prevent rust bleed onto adjacent surfaces and as recommended by manufacturer for sealing perimeter of tactile warning surfacing unit.
- .2 Grout: Non-shrink filler grout; epoxy or cementitious grout, non-expanding, high-strength, freeze-thaw stable, weather resistant and salt resistant, for exterior above grade application.
 - .1 Grout depth: 75 mm (3").
 - .2 Grout width: 38 mm (1-1/2")
- .3 Metal fasteners: Metal fasteners shall be uniform to metal materials and components being anchored or of a metal which will not set-up a galvanic action causing damage to the fastening or metal component under moist conditions.

Part 3 Execution

3.1 EXAMINATION

TACTILE WALKING SURFACING

- .1 Verify that pavement is in suitable condition to begin installation according to manufacturer's written instructions. Verify that installation of tactile warning surfacing will comply with accessibility requirements upon completion.
- .2 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF DETECTABLE WARNING SURFACING

- .1 Install tactile warning surfacing in accordance with tactile warning surfacing manufacturer's written requirements and recommendations, to locations indicated, scheduled, or required by authorities having jurisdiction.
- .2 Cast-in-Place:
 - .1 Concrete Paving Installation: Comply with installation requirements in Section 32 13 16 - Concrete Paving. Mix, place, and finish concrete to conditions complying with detectable warning tile manufacturer's written requirements for satisfactory embedment of tile.
 - .2 Set each detectable warning tile accurately and firmly in place and completely seat tile back and embedment in wet concrete by tamping or vibrating. If necessary, temporarily apply weight to tiles to ensure full contact with concrete.
 - .3 Set surface of tile flush with surrounding concrete and adjacent tiles, with variations between tiles and between concrete and tiles not exceeding plus or minus 3 mm from flush.
 - .4 Protect exposed surfaces of installed tiles from contact with wet concrete. Complete finishing of concrete paving surrounding tiles. Remove concrete from tile surfaces.
 - .5 Clean tiles using methods recommended in writing by manufacturer.

3.3 CLEANING AND PROTECTION

- .1 Clean tiles by method recommended by tile manufacturer not less than 4 days prior to inspection for Substantial Performance.
- .2 Remove and replace tactile warning surfacing that is broken or damaged or does not comply with requirements in this Section. Remove in complete sections from joint to joint unless otherwise approved by Contract Administrator. Replace using tactile warning surfacing installation methods acceptable to Contract Administrator.
- .3 Protect tactile warning surfacing from damage and maintain free of stains, discoloration, dirt, and other foreign material.

END OF SECTION

ENGINEERED WOOD FIBRE SURFACING

Part 1 General

1.1 SECTION INCLUDES

- .1 This section includes performance requirements for including submittals, materials, base preparation, layering, installation for Engineered Wood Fibre (EWF) surfacing.

1.2 RELATED WORK

- .1 Section 01 33 00 - Submittal Procedures Section
- .2 Section 01 74 13 – Progressive Cleaning
- .3 Section 11 68 14 – Exterior Fitness Equipment
- .4 Section 32 05 19 – Geotextiles

1.3 REFERENCES

- .1 All referenced standards shall be the current edition or edition referenced by the Ontario Building Code currently in force
- .2 City of Toronto:
 - .1 City of Toronto Accessibility Design Guidelines.
- .3 Ontario Regulations:
 - .1 O. Reg. 413/12, Integrated Accessibility Standards.
 - .2 AODA, Accessibility for Ontarians with Disabilities Act.
- .4 CSA Group (CSA)
 - .1 [CAN/CSA-Z614-14 \(R2019\)](#), Children's playspaces and equipment.
 - .2 [CAN/CSA Z614:20](#), Children's playground equipment and surfacing
- .5 American Society for Testing and Materials (ASTM International)
 - .1 [ASTM E303-22](#), Standard Test Method for Measuring Surface Frictional Properties Using the British Pendulum Tester.
 - .2 [ASTM E648-15e1](#), Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source.
 - .3 [ASTM F1292-22](#), Standard Specification for Impact Attenuation of Surfacing Materials Within the Use Zone of Playground Equipment.
 - .4 [ASTM F1951-21](#), Standard Specification for Determination of Accessibility of Surface Systems Under and Around Playground Equipment.
 - .5 [ASTM F2075-20](#), Standard Specification for Engineered Wood Fiber for Use as a Playground Safety Surface Under and Around Playground Equipment.
- .6 Consumer Product Safety Commission ([CPSC](#))
 - .1 The Handbook for Public Playground Safety (Pub. No. 325).

ENGINEERED WOOD FIBRE SURFACING

.7 Reference Documents:

- .1 Appendix A - Arborist Report, Macpherson Avenue Park, Urban Forest Innovations Inc., April 23, 2025
- .2 Appendix B - Soil and Groundwater Management Plan – Davenport Lands (Parcel 28B, 29 and 30, WSP, July 2024
- .3 Appendix C - Contaminant Health and Safety Plan – 28B, 29 and 30 Green Line Trail, WSP, July 2024
- .4 Appendix D - City of Toronto Tree Protection Policy and Specifications for Construction Near Trees, July 2016
- .5 Appendix E – Geotechnical Investigation for Macpherson Avenue Park, October 31, 2022
- .6 Appendix F – Hydro One General Conditions for Secondary Land Uses, Hydro One, January 2023
- .7 Appendix G -General Requirements for Construction Work by External Parties in the Vicinity of Hydro One 115,000 and 230,000 Volt Underground Plant, Hydro One, January 2024

1.4 QUALITY ASSURANCE

- .1 Installer's Qualifications: Company or individual specializing in work similar to work of this section with 10 years minimum documented experience and who has regularly been engaged in this work on a full time basis

1.5 SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures
- .2 Action Submittals: Submit the following submittals before starting any work of this Section.
 - .1 Product Data: Submit product data for each type of manufactured material and product indicated. Include product characteristics, performance criteria, physical size, finish and limitations in use.
 - .2 Submit manufacturer's instructions, printed product literature and data sheets for each type of manufactured material and product indicated, including description of product, installation methods, base preparation and maintenance instructions.
- .3 Submit test results confirming product has been tested and in compliance with ASTM F-1292 and CAN/CSA Z-614-07
- .4 Submit manufacturer's available range of colours for each type of surfacing specified.
- .5 Manufacturer's Statements of Assurance and Certification:
 - .1 Submit statement from the Manufacturer that the system to be installed shall only be performed by authorized and trained personnel.
 - .2 Submit written statement, signed by EWF surfacing installer stating that Drawings and Specifications have been reviewed by qualified representatives of materials manufacturer, and that they are in agreement that materials and system to be used for EWF surfacing are proper and adequate for applications shown.

ENGINEERED WOOD FIBRE SURFACING

- .3 Substrate Acceptability: Submit a certified statement issued by manufacturer of EWF surfacing materials and countersigned by applicator, attesting that areas and surfaced designated to receive EWF surfacing have been inspected and found satisfactory for reception of work covered under this Section: and are not in conflict with "Warranty" requirements. Application of materials will be constructed as acceptance of surfaces.
- .6 Shop Drawings:
 - .1 Submit detailed shop drawings of EWF surfacing edging details, material thickness and base construction.
- .7 Samples:
 - .1 Submit a 0.5kg samples of engineered wood fibre material for Contract Administrator review.
- .8 Closeout Submittals: Submit certificate accompanying delivery of EWF surface material indicating compliance with the Contract Documents.

1.6 DELIVERY AND STORAGE OF MATERIAL

- .1 All materials for the work of this Section shall be delivered, stored and handled so as to preclude damage of any sort. Materials showing evidence of damage shall not be used and shall be removed from the site
- .2 Materials in manufacturer's unopened containers or bundles must be fully identified with brand, type, grade, date of manufacture, class, lot number, and other qualifying information
- .3 Store materials in original tightly sealed containers or unopened packages. Materials shall be stored out of weather, off the ground, in dry area, in compliance with manufacturer's maximum storage temperature range
- .4 Coarse and fine aggregates shall be stored separately in free draining stockpiles and in such manner as to prevent contamination and segregation.

1.7 JOB CONDITIONS

- .1 Maintain manufacturer's current installation instructions at the job site at all times for EWF surface material to be used on the Project.
- .2 Do not proceed with work during inclement weather. Comply with manufacturer's recommendations for application and curing under specific climatic conditions.
- .3 Coordinate application of EWF surfacing with work of other trades.

1.8 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 13 – Progressive Cleaning.

1.9 WARRANTY

- .1 Work of this Section shall be guaranteed for a period of two (2) years in accordance with the General Conditions of the Contract.

ENGINEERED WOOD FIBRE SURFACING

Part 2 Products

2.1 ENGINEERED WOOD FIBRE (EWF) SURFACING

- .1 Engineered wood fibre material for the fitness area shall conform to CAN/CSA-Z614, Children's Playspaces and Equipment (latest version).
 - .1 Product depth, after installation, shall meet or exceed all current CSA Standards, CSA Z614-13, ASTM F1292 and meet guidelines for critical height as set forth by the Consumer Product Safety Commission for use of wood products for protective surfacing
- .2 Engineered Wood Fibre (EWF) product shall be manufactured of a ground wood fiber comprised of softwoods and/or hardwoods, consisting of randomly sized wood fibers the majority of which do not exceed 50mm (2") in length and no more than 15% fines to aid in compaction.
 - .1 Free of soil, leaves, twigs or other contaminants, which could hasten decomposition.
 - .2 Free of any chemical treatments and/or additives.
 - .3 Free of recycled wood from pallets or construction debris. d. Free of tramp and heavy metals.
 - .4 Products identified as "wood chips", or "double-shredded bark mulch" or, "mulch" are prohibited.
- .3 Acceptable products include:
 - .1 Fibre Top EWF, as supplied by Playcare & Design Inc, 12830 Britannia Rd., Milton, ON. L9T 7G5, www.fibertop.ca / andy@fibertop.ca
 - .2 Fibar System 100, as supplied by ABC Recreation Ltd., Paris Ontario, 1 (800) 267-5753.
 - .3 Wood Carpet, as supplied by Zeager Brothers
 - .4 CG Wood Fibre, as supplied by Grower's Choice, Kitchener, Ontario 1-866-580-4769
 - .5 Bulk Wood Fiber, as supplied by ABC Recreation
 - .6 Cedarweave, as supplied by Playground Planners (1-800-265-9953)
 - .7 Fiber Weave, as supplied by Gro-Bark (905-227-4142)
- .4 Other suppliers are acceptable. If proposing an equivalent, the Contractor must submit the following to the City for review and approval:
 - .1 The name of the manufacturer proposed for substitution.
 - .2 The system/product proposed, noting which products they are intended to replace.
 - .3 Details and product literature for the systems/products.
 - .4 The Contractor and the equivalent's manufacturer are responsible for ensuring that their products conform to the layout plan used in the design of this facility.
 - .5 Only products that meet or exceed the specifications of the pre-approved products shall be considered.

2.2 FILTER FABRIC

- .1 Filter fabric shall be non-woven geotextile. Spun bonded Terrafix 270R or approved equivalent.

ENGINEERED WOOD FIBRE SURFACING

2.3 AGGREGATE FOR DRAINAGE LAYER

- .1 19mm (3/4") clear crushed stone, no fines.

Part 3 Execution**3.1 INSTALLATION - GENERAL**

- .1 Installation of engineered wood fibre (EWF) surfacing shall be as per manufacturer's instructions and as detailed. The surfacing in itself shall not create new hazards.

3.2 SITE PREPARATION

- .1 Stake out all EWF areas.
- .2 Excavate to the minimum specified depth, after compaction with sloped subgrades as detailed.
- .3 Remove all excavated material from the site and dispose of it, unless approved for backfilling.
- .4 Compact subgrade uniformly to a minimum 95% Standard Proctor Density.

3.3 PREPARATION OF SUBGRADE

- .1 Excavate to the proposed subgrade, maintain all required angles of repose of the adjacent materials as shown on drawings.
- .2 Remove all construction debris and material including any construction materials from the subgrade.
- .3 Construct bases as per manufacturer's specifications for various site conditions as listed below. Do not place base materials on wet or frozen subgrade.

3.4 INSTALLATION OF ENGINEERED WOOD FIBRE SURFACE

- .1 Place engineered wood fibre surface material to a minimum compacted depth of 300 mm.
- .2 Surface shall be installed to thicknesses required to meet performance requirements.
- .3 Thicknesses of EWF surfacing shall meet all requirements and codes for fall heights of specified equipment.
- .4 Install wear mats at slide exits, under swings and other wear areas in accordance with manufacturer's instructions.

3.5 CLEANING

- .1 Remove from site excess materials, debris, and equipment during installation of the Work.
- .2 The Contractor shall remove all debris, construction equipment and scrap material from all areas within the limit of work prior to the final inspection and acceptance.

3.6 PROTECTION

- .1 Protect EWF surface from damage, resulting from spillage, dripping, and dropping of mater from time of installation until acceptance of all works.
- .2 Keep the backfill in good repair at all times, correct settlement and erosion, to the satisfaction of the Contract Administrator.
- .3 Protect and maintain all work of this section from time of installation until acceptance of all works.

ENGINEERED WOOD FIBRE SURFACING

3.7 RESTORATION

- .1 Restore all disturbed areas to original state of finish and to the satisfaction of the Contract Administrator.

END OF SECTION

FENCES AND GATES

Part 1 General

1.1 SECTION INCLUDES

- .1 This section includes requirements to supply and install the following on a cast-in-place concrete footing and/or curb:
 - .1 Chain link fences and gates.
 - .2 Chain link fences with wooden posts.
- .2 Work of this Section to be coordinated with electrical grounding details as indicated in Drawings and in accordance with Specifications.

1.2 REFERENCE STANDARDS

- .1 All referenced standards shall be the current edition or edition referenced by the Ontario Building Code currently in force.
- .2 City of Toronto Construction Standards:
 - .1 TS 772, City of Toronto Amendment to OPSS.MUNI 772 – Construction Specification for Chain-Link Fence.
- .3 Ontario Provincial Standard Specifications (OPSS):
 - .1 OPSS.MUNI 772, Construction Specification for Chain-Link Fence
 - .2 OPSS.MUNI 904, Construction Specification for Concrete Structures
 - .3 OPSS.MUNI 1541, Material Specifications for Chain-Link Fence Components
- .4 CSA Group (CSA):
 - .1 [CSA A23.1](#):19/CSA A23.2:19, Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete
 - .2 CSA A3000-18, Cementitious Materials Compendium
 - .3 CSA W59-18, Welded steel construction
- .5 Canadian General Standards Board (CGSB):
 - .1 CAN/CGSB-1.181-99, Ready-Mixed Organic Zinc-Rich Coating
 - .2 CAN/CGSB-138.1-19, Fabric for Chain Link Fence
 - .3 CAN/CGSB-138.2-19, Steel Framework for Chain Link Fence
 - .4 CAN/CGSB-138.3-19, Installation of Chain Link Fence
 - .5 CAN/CGSB-138.4-19, Gates for Chain Link Fence
- .6 ASTM International (ASTM):
 - .1 ASTM A53/A53M-22, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless

FENCES AND GATES

- .2 ASTM A90/A90M-21, Standard Test Method for Weight Mass of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings
- .3 ASTM A123/A123M-17, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
- .4 ASTM A314-23, Standard Specification for Stainless Steel Billets and Bars for Forging
- .5 ASTM A641/A641M-09a, Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
- .6 ASTM A653/A653M-22, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
- .7 ASTM A780/A780M-20, Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.
- .8 ASTM F3125/F3125M-22, Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength
- .9 ASTM F900-11-17, Standard Specification for industrial and commercial swing gates.
- .10 ASTM F1664-08, Standard Specification for Poly(Vinyl Chloride) (PVC) and Other Conforming Organic Polymer-Coated Steel Tension Wire Used with Chain-Link Fence
- .7 National Lumber Grades Authority (NLGA):
 - .1 NLGA Standard Grading Rules for Canadian Lumber.
- .8 Reference Documents:
 - .1 Appendix A - Arborist Report, Macpherson Avenue Park, Urban Forest Innovations Inc., April 23, 2025
 - .2 Appendix B - Soil and Groundwater Management Plan – Davenport Lands (Parcel 28B, 29 and 30, WSP, July 2024
 - .3 Appendix C - Contaminant Health and Safety Plan – 28B, 29 and 30 Green Line Trail, WSP, July 2024
 - .4 Appendix D - City of Toronto Tree Protection Policy and Specifications for Construction Near Trees, July 2016
 - .5 Appendix E – Geotechnical Investigation for Macpherson Avenue Park, October 31, 2022
 - .6 Appendix F – Hydro One General Conditions for Secondary Land Uses, Hydro One, January 2023
 - .7 Appendix G -General Requirements for Construction Work by External Parties in the Vicinity of Hydro One 115,000 and 230,000 Volt Underground Plant, Hydro One, January 2024

1.3 SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Action Submittals: Submit the following submittals before starting any work of this Section:

FENCES AND GATES

- .1 Product Data: Submit manufacturer's instructions, printed product literature, and data sheets for concrete mixes, fences, posts, and gates and include product characteristics, performance criteria, physical size, finish, and limitations.
- .2 Shop Drawings:
 - .1 Take accurate field measurements before preparing shop drawings and fabrication.
 - .2 Submit shop drawings for all fences. Show locations of fence, each gate, posts, rails, and details of gate swing direction, or other operation, hardware, and accessories.
 - .3 Indicate materials, dimensions, sizes, weights, and finishes of components.
 - .4 Include plans, elevations, sections, gate swing direction, and other required installation and operational clearances
 - .5 Include details illustrating and annotating all fence and gate components, including post anchorage, attachment, bracing, hinge, latch, cane bolt, locking mechanisms, and other appurtenances as needed.
 - .6 Include installation recommendations and instructions by manufacturer describing all details for a typical fence and gates.
 - .7 All Shop Drawings shall be stamped and certified by a structural engineer licensed in the Province of Ontario
- .3 Samples:
 - .1 Fence and gate: Submit two (2) samples, for each fence finish product specified, minimum 200mm (8") long or 200mm x 200mm (8" x 8") size.
 - .2 Timber post: Two (2) full posts, with sealant on both ends.
- .3 Closeout Submittals:
 - .1 Operation and Maintenance Data: Include, in the operation and maintenance manual, manufacturer's maintenance instructions and recommended cleaning materials and methods and methods for repairing damage to the finish.

1.4 QUALITY ASSURANCE

- .1 Installer Qualifications: An experienced installer who has completed installation of identified products similar in material, design, and extent to that indicated for this project and whose work has resulted in construction with a record of successful in-service performance.
- .2 Manufacturer Qualifications: A firm experienced in manufacturing identified products similar to those required for this project and with a record of successful in-service performance.
- .3 Source Limitations: Obtain each color, finish, shape and type of bicycle rack from a single source with resources to provide components of consistent quality in appearance and physical properties.
- .4 Product Options: Drawings indicate size, shape and dimensional requirements and are based on the specific systems indicated.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store, and handle materials in accordance with manufacturer's written instructions.

FENCES AND GATES

- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store and protect fence and gate materials from damage.
 - .2 Replace defective or damaged materials.

1.6 PROJECT CONDITIONS

- .1 Verify actual site dimensions by field measurements before fabrication; show recorded measurements on shop drawings.
- .2 Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.

Part 2 Products

2.1 CHAIN LINK FENCES

- .1 Chain-link fence fabric: As indicated on Drawings, and in accordance with OPSS.PROV 1541 and CAN/CGSB 138.1:
 - .1 Chain Link Fabric: Galvanized steel
 - .2 Size: 38mm (1.5 ") opening, 6 gauge with knuckle top and bottom selvage.
 - .3 Gate fabric: To match fence.
- .2 Posts, braces, rails, fittings, and fasteners: in accordance with OPSS.PROV 1541 and CAN/CGSB 138.2.
 - .1 Post finish: galvanized steel to match fence fabric,
 - .2 Provide bottom mid-rail and top rails to CAN/CGSB-138.2
 - .3 Dimensions as indicated on Drawings.
- .3 Gates: to CAN/CGSB-138.4
 - .1 Gate frame: to ASTM A53/A53M, galvanized steel pipe, standard weight 45mm outside diameter pipe for outside frame, 35mm outside diameter pipe for interior bracing.
 - .2 Fabricate gates as indicated with electrically welded joints, and hot-dip galvanized after welding.
 - .3 Fasten fence fabric to gate with knuckled selvage at top and bottom.
 - .4 Furnish single or double swing gate with galvanized malleable iron hinges, latch and latch catch with provision for padlock which can be attached and operated from either side of installed gate
 - .5 Gate fabric: galvanized steel to match fence fabric,
- .4 Vinyl Coating: To ASTM F1664.
 - .1 Minimum 0.045-mm dry film thickness.

FENCES AND GATES

- .5 Hardware and turnbuckles: Galvanized, in accordance with CAN/CGSB-138.2.
- .6 Fence panel height: **As indicated on Drawings.**

2.2 WOOD POSTS

- .1 Provide circular wood fence posts, where indicated on Drawings.
- .2 Timber: Species shall be Eastern White Cedar, processed and stamped at the same mill with appropriate grade marking.
 - .1 Moisture content: 19% or less
 - .2 Posts shall be made out of single timber members and fully machine lathed to diameters indicated on Drawings. Longitudinal face of timbers shall not be painted or stained.
 - .3 Lumber shall be in sound condition, free from deformation (twisting or cupping) which cannot be removed during installation using normal installation methods and tools. Natural drying checks, to a maximum of 4mm will be acceptable.
- .3 End sealer: Immediately after cutting posts to size, treat both ends of timbers with aqueous wax end sealer to reduce checking. End sealer shall be a stable, non-toxic, non-hazardous, hybrid of plant-based polymers and petroleum wax that protects the ends of green logs and kiln dried lumber from end checking.

2.3 CONCRETE FOOTINGS

- .1 Concrete placing, curing, and protection from the elements, in accordance with OPSS.MUNI 904.

2.4 FASTENERS

- .1 Metal fasteners shall be uniform to metal materials and components being anchored or of a metal which will not set-up a galvanic action causing damage to the fastening or metal component under moist conditions.
- .2 Fasteners for pre-finished materials shall be of concealed type unless otherwise indicated, and when exposed finish is required, of matching pre-finishing materials.
- .3 Metal fastenings and accessories shall be of same texture, colour, and finish as material on which they occur, as selected by the Contract Administrator.
- .4 Bolts, nuts, washers, screws: Type 304 stainless steel to ASTM A314-23.
- .5 High strength bolts: to ASTM F3125/F3125M-23.
- .6 All exposed fasteners to be tamper-proof.
- .7 Where noted, anti-seize paste will be applied to fasteners.

2.5 PLANTING / TEMPORARY SNOW FENCE

- .1 Woven wood slat snow fencing consisting of 3/8" thick No. 1 aspen or spruce slats woven with 2-wire strands of 13 steel wire gauge galvanized wire.
- .2 Fence posts: Wood
- .3 Total height of fence and posts shall be 600mm in height above finished grade.
 - .1 Fence can be cut from 4' / 1200mm tall material to achieve required height.

FENCES AND GATES

- .2 Cut posts as required to achieve 600mm height. Posts shall not protrude above fence height.

Part 3 Execution

3.1 EXAMINATION

- .1 Verify condition and dimensions of previously installed work, related work, and conditions under which this work is to be performed.
- .2 Notify Contract Administrator in writing of all deficiencies and conditions detrimental to the proper completion of this work.
- .3 Commencement of work means Installer accepts substrate, previously installed work, and existing conditions.

3.2 CHAIN LINK FENCE INSTALLATION

- .1 Manufacturer's Instructions: Strictly comply with Manufacturer's instructions and recommendations, except where more restrictive requirements are specified in this Section.
- .2 Take site measurements to ensure that Work is fabricated to fit surrounding construction, around obstructions and projections in place.
 - .1 Horizontal and Vertical Layout: Accurately locate fence as indicated on approved Shop Drawings and as approved by the Contract Administrator.
- .3 Protection against galvanic action shall be provided wherever dissimilar metals are in contact. Protection shall be by application of an appropriate gasket, neoprene spacer or other approved galvanic isolator.
- .4 Grading: Remove debris and correct ground undulations along fence line to obtain smooth uniform gradient between posts.
 - .1 Provide clearance between bottom of fence and ground surface of 30mm to 50mm.
- .5 Install Work plumb, true, square, straight, level, and accurately and tightly fitted together and to surrounding Work.
- .6 Install fences as indicated on the Drawings and in accordance and in accordance with OPSS.MUNI 772 and reviewed shop drawings.
- .7 Zinc Coating Repairs: Cut ends, field drilled holes, and damaged areas of hot dip galvanized coatings on galvanized components shall be repaired according to ASTM A780.
- .8 Install grounding rods as indicated on Drawings.

3.3 INSTALLATION OF SWING GATES

- .1 Install gates in locations as indicated on Drawings. Before fence fabric is installed, Contract Administrator may make minor adjustments to exact gate locations that do not alter the quantity of materials.
- .2 Level ground between gate posts and set gate bottom at a maximum of 75 mm above ground surface.
- .3 If applicable, determine position of centre gate rest for double gate.

FENCES AND GATES

- .4 Cast gate rest into concrete.
- .5 Slope upper concrete surface to drain water away from gate rest.
- .6 Install gate stops where indicated on Drawings.

3.4 INSTALLATION OF PLANTING / TEMPORARY SNOW FENCE

- .1 Temporary planting bed protection fence shall be installed prior to substantial performance and shall remain in place for the duration of the warranty period.
- .2 Place temporary planting bed protection fences around all seeded areas, in locations shown on drawings and as directed by the Consultant.
 - .1 Install fence posts, staked minimum 300mm deep into ground, spaced maximum 1m apart.
 - .2 Fasten wood snow fencing to T-posts using plastic ties or T-post clips.
 - .3 Connect fence sections by overlapping slats of each section and connecting with wire strands or ties.
 - .4 Install safety caps on all posts.
- .3 Total height of fence and posts shall be 600mm in height above finish grade. Posts shall not protrude above fence height.
- .4 Maintain temporary fence in good condition during establishment and warranty period.
- .5 Fencing to be removed by the Contractor at the end of the warranty period.

3.5 ADJUSTMENT AND REPAIRS

- .1 Clean and prepare damaged surfaces with wire brush removing loose and cracked coatings, rust, and foreign materials. Prepare damaged surfaces according to paint manufacturer's instructions.
- .2 Touch-up, repair or replace damaged products as directed by the Contract Administrator.
 - .1 Repairs of damaged galvanized surfaces shall be at the discretion of the Contract Administrator, in accordance with ASTM A780. Areas deemed to have extensive or highly visible damage may require replacement and re-galvanizing.
 - .2 Zinc Coating Repairs: Cut ends, field drilled holes, of hot dip galvanized coatings on galvanized components shall be repaired according to ASTM A780.
- .3 Repair damaged factory-applied finish as directed by the Contract Administrator.
- .4 Remove damaged, dented, defaced, defectively finished, or tool marked components and replace with new.

3.6 CLEANING

- .1 Clean fences of all stains or marks.
- .2 Remove and replace components that are broken or damaged or does not comply with requirements in this Section.
- .3 Do not use abrasive cleaners.

3.7 PROTECTION

FENCES AND GATES

- .1 After the fence work is installed, it shall be the responsibility of the Contractor to protect it from damage until Substantial Performance.

END OF SECTION

EXTERIOR SITE FURNISHINGS

Part 1 General

1.1 SECTION INCLUDES

- .1 Labour, materials, tools, and equipment, required to supply and install all site furnishings including benches, picnic tables, bike rings, waste receptacles, bollards, and drinking fountains.
- .2 Installation of fences and gates to be coordinated with electrical grounding details as indicated in Drawings and in accordance with Specifications.

1.2 RELATED WORK

- .1 Section 03 48 00 – Precast Concrete
- .2 Section 05 50 00 – Metal Fabrications
- .3 Section 06 15 01 – Timber and Woodwork
- .4 Section 32 16 15 – Concrete Paving
- .5 Refer to structural drawings and notes
- .6 Reference Documents:
 - .1 Appendix A - Arborist Report, Macpherson Avenue Park, Urban Forest Innovations Inc., April 23, 2025
 - .2 Appendix B - Soil and Groundwater Management Plan – Davenport Lands (Parcel 28B, 29 and 30, WSP, July 2024
 - .3 Appendix C - Contaminant Health and Safety Plan – 28B, 29 and 30 Green Line Trail, WSP, July 2024
 - .4 Appendix D - City of Toronto Tree Protection Policy and Specifications for Construction Near Trees, July 2016
 - .5 Appendix E – Geotechnical Investigation for Macpherson Avenue Park, October 31, 2022
 - .6 Appendix F – Hydro One General Conditions for Secondary Ladh Uses, Hydro One, January 2023
 - .7 Appendix G -General Requirements for Construction Work by External Parties in the Vicinity of Hydro One 115,000 and 230,000 Volt Underground Plant, Hydro One, January 2024

1.3 QUALITY ASSURANCE

- .1 Installer Qualifications: An experienced installer who has completed installation of identified products similar in material, design, and extent to that indicated for this project and whose work has resulted in construction with a record of successful in-service performance.
- .2 Manufacturer Qualifications: A firm experienced in manufacturing identified products similar to those required for this project and with a record of successful in-service performance.
- .3 Source Limitations: Obtain each color, finish, shape and type of bicycle rack from a single source with resources to provide components of consistent quality in appearance and physical properties.

EXTERIOR SITE FURNISHINGS

- .4 Product Options: Drawings indicate size, shape and dimensional requirements and are based on the specific systems indicated.

1.4 SUBMITTALS

- .1 All submissions shall be in accordance with Section 01 33 00.
- .2 Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, finishes, field-assembly requirements, and installation details.
 - .1 Submit powdercoat / paint colours for each item listed in 2.1.
- .3 Shop Drawings:
 - .1 Show installation details for each item listed in 2.1.
- .4 Samples:
 - .1 Submit 600mm length sample of slates for all wood products showing accurate colour and finish.
 - .2 Submit 300m sample of all metal components showing accurate colour and finish.
- .5 Maintenance Data: For each item listed in 2.1.
 - .1 Include recommended methods for maintenance and repairing damage to the finish. Include any keys or tamper proof tools for lockable features

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Manufacturer's recommendations.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect furnishings from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.

1.6 WARRANTY

- .1 Work of this Section shall be guaranteed for a period of two (2) years in accordance with the General Conditions of the Contract.
- .2 The Contractor shall not be responsible for the cost of replacements of correctly installed components resulting from vandalism during the guarantee period.
- .3 The Contractor will be responsible for the cost of replacements at each site of components or work vandalized prior to Substantial Performance by the Consultant of all work at that site.

Part 2 Products

EXTERIOR SITE FURNISHINGS

2.1 MATERIALS

- .1 Bicycle rings:
 - .1 Bike rings shall be City of Toronto standard cast aluminum encapsulated bike ring with galvanized steel post as supplied by Toronto Fabricating & Mfg. Co., 1021 Rangeview Rd., Mississauga, Ontario, L5E 1H2
 - .2 Model: TFMC Style #938DB (direct-buried)
 - .3 Finish: Standard - Galvanized
 - .4 Mounting: In-ground. Extended buried post to accommodate concrete unit paver thickness as required.
- .2 Backed Wood Bench:
 - .1 Backed bench with armrests as supplied by Maglin Site Furniture or approved equal, Contact: sales@maglin.com, 1-800-716-5506, www.maglin.com.
 - .2 Model: MBE-2300-00017 - ICONIC Backed bench with two armrests
 - .3 Wood: Thermally modified ash wood
 - .4 Frame: Aluminum
 - .5 Finish / Colour: Silver 14 Fine Textured (Matte)
 - .6 Mounting: Surface mounted
- .3 Picnic Table
 - .1 Picnic table and benches as supplied by Maglin Site Furniture or approved equal, Contact: sales@maglin.com, 1-800-716-5506, www.maglin.com.
 - .2 Model: MMP-0720-00062, 720 Cluster Seating, 30.9inches high, 500mm edge clearance
 - .3 Wood: Thermally modified ash wood
 - .4 Frame: Steel frame, Cast aluminum ends
 - .5 Finish / Colour: Silver 14 Fine Textured (Matte)
 - .6 Mounting: Surface mounted.
- .4 Lounge Chair:
 - .1 Bloc Sun Bench as supplied by Vestre, Contact: Kristoffer Vestre, +1 212.634.9658 email: kristoffer@vestre.com, www.vestre.com, or approved equivalent.
 - .2 Model: 1556-900 Bloc Sun Bench
 - .3 Wood: Kebony Radiata
 - .4 Steel : Lakk 30 80
 - .5 Finish / Colour: Hot-dip galvanized and powder-coated steel in RAL 6017
 - .6 Mounting: Surface mounted.

EXTERIOR SITE FURNISHINGS

- .7 Orientation of lounge shall be as directed on site by the Contract Administrator.
- .5 Custom Platform Bench:
 - .1 Metal Components:
 - .1 For all metal components, refer to Section 05 50 00 – Metal Fabrications
 - .2 All fasteners to be tamper-proof and uniform to metal materials and components being anchored or of a metal which will not set-up a galvanic action causing damage to the fastening or metal component under moist conditions.
 - .2 Wood: Kebony wood. Refer to Section 06 15 01 – Timber and Woodwork.

Part 3 Execution

3.1 EXAMINATION

- .1 Examine areas and conditions for compliance with requirements for correct and level finished grade, mounting surfaces, installation tolerances, and other conditions affecting performance.
- .2 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- .1 **Site furnishings shall be grounded according to electrical drawings and specifications.**
- .2 Comply with manufacturer's written installation instructions.
- .3 Install site furnishings level, plumb, true, and securely anchored at locations indicated on Drawings, per manufacturer's specifications.

3.3 CLEANING

- .1 After completing site and street furnishing installation, inspect components. Remove spots, dirt, and debris. Repair damaged finishes to match original finish or replace component.

3.4 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by site furnishings installation.

END OF SECTION

HABITAT STRUCTURES

Part 1 General

1.1 SECTION INCLUDES

- .1 Supply all labour, materials and equipment for the complete installation of reclaimed habitat logs as indicated on Drawings and specified herein.

1.2 RELATED WORK

- .1 Section 02 41 13 – Selective Site Demolition
- .2 Section 31 22 13 – Rough Grading
- .3 Section 31 23 10 – Excavating, Trenching and Backfilling
- .4 Reference Documents:
 - .1 Appendix A - Arborist Report, Macpherson Avenue Park, Urban Forest Innovations Inc., April 23, 2025
 - .2 Appendix B - Soil and Groundwater Management Plan – Davenport Lands (Parcel 28B, 29 and 30, WSP, July 2024
 - .3 Appendix C - Contaminant Health and Safety Plan – 28B, 29 and 30 Green Line Trail, WSP, July 2024
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 - .6 Appendix F – Hydro One General Conditions for Secondary Land Uses, Hydro One, January 2023
 - .7 Appendix G -General Requirements for Construction Work by External Parties in the Vicinity of Hydro One 115,000 and 230,000 Volt Underground Plant, Hydro One, January 2024

1.3 QUALITY ASSURANCE

- .1 Provide adequate, acceptable equipment and labour forces to carry out the work expeditiously. Labour force to have a minimum of five years' experience in similar satisfactory installations in the type of work specified.

Part 2 Products

2.1 ANCHORS

- .1 Fasteners: To secure logs use T-bar stake embedded minimum 450 mm into substrate and secure galvanized wire to log end.

2.2 HABITAT LOGS

- .1 Reclaimed habitat logs are to be selected from trees to be removed from the site, as identified on the Tree Preservation and Removals Drawings.
 - .1 Notify Contract Administrator prior to start of tree removal work for selection of suitable trees.

HABITAT STRUCTURES

- .2 Notify Contract Administrator after selected trees have been felled, and prior to any further cutting or removal of large branches. Do not notch or otherwise damage the length of the trunk and ensure that trees are felled in a manner that preserves the trunk and any major branching unions.
- .3 Habitat logs shall have a diameter of 300mm to 600mm and a minimum length of 3 meters, to be approved on-site by Contract Administrator prior to installation.
- .2 Cedar shall not be used for habitat logs.
- .3 Any unused salvaged logs, not selected for reuse on site, are to be disposed of in accordance with regulatory requirements.

Part 3 Execution

3.1 HABITAT LOGS

- .1 Clean logs of all soil and debris and trim all leaves and small branches.
- .2 Additional trimming and shaping of habitat logs may be required to suit site conditions, at the discretion of the Contract Administrator.
- .3 Drilled bee nesting clusters:
 - .1 There shall be a minimum of one drilled bee nesting cluster per habitat log in a location as directed by the Contract Administrator.
 - .2 Trim end of logs or any major branch stumps with a slight taper that will allow rain to drain off and prevent water from filling drilled holes.
 - .3 Drill holes in end of logs and stumps. Holes shall be 100-150 mm (4-6") deep spaced at least 20mm (3/4") apart using a variety of drill bits ranging from 1.5 mm (1/16") up to 10mm (3/8") diameter to provide habitat for a variety of bee species.
 - .4 The quantity of holes shall be determined on site and shall fill at least $\frac{3}{4}$ of the surface of the trimmed end or stump.
- .4 Embed 1/3 diameter of logs into ground at angle shown on plans. Angle of log and depth may vary to suit site conditions.
- .5 Secure each log in place using metal T-bars 1200mm in length driven through pre-drilled holes minimum 2 per log at 1.4m and as required to prevent any dislocation, rolling or shifting.

END OF SECTION

TOPSOIL PLACEMENT AND GRADING

Part 1 General

1.1 SECTION INCLUDES

- .1 This section includes requirements to supply and install growing medium including the following:
 - .1 Mixing and testing of soil components and growing medium.
 - .2 Installation of growing medium and soil amendments.
 - .3 Preparation of substrates, compacting and fine grading of growing medium.

1.2 RELATED WORK

- .1 Section 01 35 43 – Selective Site Demolition
- .2 Section 02 20 00 – Site Preparation
- .3 Section 31 00 99 – Earthwork for Minor Works – Davenport Lands
- .4 Section 32 91 21 – Terraseeding

1.3 REFERENCES

- .1 All referenced standards shall be the current edition or edition referenced by the Ontario Building Code currently in force.
- .2 City of Toronto Construction Standards:
 - .1 TS 5.00, City of Toronto Construction Specification for Sodding
 - .2 TS 5.10, City of Toronto Construction Specification for Growing Medium
 - .3 TS 5.30, City of Toronto Construction Specification for Planting
- .3 Ontario Provincial Standard Specifications (OPSS):
 - .1 OPSS.MUNI 1004, Material Specification for Aggregates - Miscellaneous
 - .2 OPSS.MUNI 1860, Material Specification for Geotextiles
- .4 Province of Ontario Ministry of the Environment:
 - .1 Guideline for the Production of Compost in Ontario
- .5 Province of Ontario's Ministry of Agriculture, Food and Rural Affairs (OMAFRA):
 - .1 Accredited Soil Testing Laboratories in Ontario
- .6 Canadian Society of Landscape Architects (CSLA)/Canadian Nursery Landscape Association (CNLA):
 - .1 Canadian Landscape Standard (CLS), latest edition
 - .2 Canadian Nursery Stock Standard (CNSS), latest edition

TOPSOIL PLACEMENT AND GRADING

- .7 Agriculture and Agri-Food Canada:
 - .1 The Canadian System of Soil Classification, Third Edition, 1998
- .8 Canadian Council of Ministers of the Environment (CCME):
 - .1 PN1340- 2005, Guidelines for Compost Quality
- .9 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
- .10 ASTM International:
 - .1 ASTM C33, Standard Specification for Concrete Aggregates
 - .2 ASTM D698-12, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort
- .11 Reference Documents:
 - .1 Appendix A - Arborist Report, Macpherson Avenue Park, Urban Forest Innovations Inc., April 23, 2025
 - .2 Appendix B - Soil and Groundwater Management Plan – Davenport Lands (Parcel 28B, 29 and 30, WSP, July 2024
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1.4 DEFINITIONS

- .1 For the purpose of this specification, the following definitions apply:
 - .1 Compost: Mixture of soil and decomposing organic matter used as fertilizer, mulch, or soil amendment.
 - .2 Existing Soils: Soils that are present on the site at the time of estimating.

TOPSOIL PLACEMENT AND GRADING

- .3 Growing Medium: Soil produced off-site from off-site sources by homogeneously blending approved topsoil with sand and/or mature and stable compost to produce specified growing medium blends.
- .4 Fertilizer: Amendment used for the purpose of adjusting soil nutrient composition and balance.
- .5 Finish Grade: Elevation of finished surface of growing medium as shown on plans after settlement.
- .6 Scarification: This refers to the breaking down of a hydrophobic layer to increase infiltration rate (not advisable however sometimes necessary in compacted uncovered soils).
- .7 Soil Ped: Soil peds are soil aggregates built over time via natural processes (air, water, microorganisms) that give the soil its structure.
- .8 Structural Soil: Product composed of crushed stone and soil that can be compacted as a pavement base material, while providing air and root space for plant growth and drainage.
- .9 Subgrade: The in-situ soil material that the growing medium will be installed upon.
- .10 Topsoil: Topsoil is a nutrient-rich layer of soil that is naturally occurring and characterized by a high concentration of organic matter and microorganisms. Topsoil, sand and compost are the components of growing medium.

1.5 SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures
- .2 Action Submittals shall be submitted before starting any work of this Section.
 - .1 Submit in accordance with TS 5.10 - City of Toronto Construction Specification for Growing Medium.
 - .2 Submit duplicate 4 liter samples of mulch to the Contract Administrator. Label samples to include the location of the source of the material.
- .3 Informational Submittals shall be submitted during the course of the Work.
 - .1 Submit in accordance with and TS 5.10 - City of Toronto Construction Specification for Growing Medium.

1.6 QUALITY ASSURANCE

- .1 The Contractor is solely responsible for quality control of the Work.
- .2 Obtain Contract Administrator approval of testing agency prior to testing.
- .3 Soil Test Analysis Laboratory Facility Qualifications:
 - .1 An independent laboratory, accredited and certified by the Province of Ontario's Ministry of Agriculture, Food and Rural Affairs (OMAFRA) and acceptable by the Contract Administrator.
 - .2 Compost testing shall be conducted by soil laboratories accredited by The Compost Quality Alliance (CQA) utilizing test methods specified in The Test Methods for Examination of Composting and Compost (TMECC) except as specified herein.
- .4 Installer Qualifications:

TOPSOIL PLACEMENT AND GRADING

- .1 The installer shall be a firm having at least 5 years of successful experience of a scope similar to that required for the Work, including the preparation, mixing and installation of custom growing medium in urban locations.
- .5 Comply with applicable requirements of the laws, codes, ordinances and regulations of federal, provincial and municipal authorities having jurisdiction. Obtain necessary permits and approvals from all such authorities.
- .6 Comply with all requirements for control of silt and sediment during soil installation work as indicated in the contract documents. Use any other methods and procedures requested by the Contract Administrator to control silt and sediment as project conditions warrant.
- .7 Review of work by the Contract Administrator:
 - .1 Provide notice to the Owner's Representative seven (7) days in advance at the following key times in the construction process for field observation. Failure of the Contract Administrator to make field observations does not relieve the Contractor from meeting all the requirements of this specification:
 - .2 Excavation Review: Observe each area of excavation prior to the installation of any growing medium.
 - .3 Drain Line Installation Review: Upon completion of the installation of drain lines and prior to the installation of any growing medium.
 - .4 Growing Medium installation Review: Installation of growing medium.
 - .5 Completion of Fine Grading Review: Upon completion fine grading but prior to the installation of any plants.
 - .6 Completion of Mulch installation review: Upon completion of mulch installation after tree and shrub planting, but prior to the installation of herbaceous plants.
 - .7 The Contractor shall comply with the requirements of the plans and specifications regardless of review or lack of review by the Contract Administrator.
 - .8 Failure of the Contract Administrator to reject unsatisfactory workmanship or to notify the Contractor of their responsibility to repair and/or replace unsatisfactory work shall not constitute acceptance of the work.
 - .9 The Contract Administrator reserves the right to take and analyze, at any time, such additional samples of materials as deemed necessary for verification of conformance to specification requirements. The Contractor shall furnish samples for this purpose upon request and shall perform any additional testing requested.

1.7 DELIVERY STORAGE AND HANDLING

- .1 Do not mix, deliver or place soils in frozen, wet, or muddy conditions.
 - .1 Where construction sequencing requires work during cold weather, protect sub grades and bulk materials from freezing using covers or as needed heated tenting. Sub grades that are sufficiently well drained to preclude the buildup of ice may be installed and built upon during freezing weather provided the surface is cleared of snow and any ice bound material.
 - .2 Harvest topsoil and prepare soil mixes ahead of the scheduled work during periods of warm weather. Protect stockpiles of soil and soil mixes from freezing and saturation. Remove soil from within the interior of the stockpile where soil and soil mixes are not frozen. At the end of

TOPSOIL PLACEMENT AND GRADING

each day cover the exposed working face of the stockpile sufficient to keep the pile from freezing.

- .2 Protect growing medium stockpiles from rain and washing that can separate fines and coarse material. Cover stockpiles with plastic sheeting at the end of each work day.
- .3 Protect growing medium stock piles from contamination by chemicals, dust and debris that may be detrimental to plants or soil drainage.
- .4 Prohibit vehicular or pedestrian traffic on stockpiles of growing medium blends and mulches.
- .5 It is the responsibility of the Contractor to be aware of all surface and sub-surface conditions, and to report any circumstances that will negatively impact soil drainage. Do not proceed with work until unsatisfactory conditions have been corrected. Proceeding with work constitutes acceptance of existing or corrected conditions.

1.8 PROTECTION

- .1 Prevent damage to buildings, landscaping, curbs, sidewalks, and adjacent property. Make good any damage.

Part 2 Products

2.1 MATERIALS

- .1 Growing Medium shall conform to TS 5.10 - City of Toronto Construction Specification for Growing Medium.
- .2 Soil Amendments
 - .1 Compost: Shall be derived from well-composted green organic waste matter. All compost material shall meet the Ontario Ministry of the Environment's Interim Guidelines for the Production and Use of Aerobic Compost in Ontario definition for Type A compost and shall be supplied from composting sites certified to meet the Ontario Ministry of the Environment's Compost Regulation 101.
 - .2 Mulch: Tub ground mulch is preferred, derived from compost overs (the remains of screened green waste and yard clippings) or virgin hardwood. If approved by the Contract Administrator, a clean weed free straw mulch may be used. Mulch must be from local sources.
 - .3 In all instances, soils shall be augmented with the addition of mulch following plantings. Mulch is to be spread on all planting beds areas. Peat moss is not to be used.
 - .4 Fertilizer: natural slow-releasing fertilizer, formula 5-3-8, at 1kg per cubic metre." All fertilizers applied to the site will be of low phosphorous content (less than 1%); no special allowance will be made for the first year of plant growth.
- .3 Mulch:
 - .1 Mulch shall conform to TS 5.30 - City of Toronto Construction Specification for Planting.

Part 3 Execution

3.1 PROJECT CONDITIONS

TOPSOIL PLACEMENT AND GRADING

- .1 Contractor to be aware of all surface and sub-surface conditions, and to report any circumstances that will negatively impact soil drainage. Do not proceed with work until unsatisfactory conditions have been corrected. Proceeding with work constitutes acceptance of existing or corrected conditions.
- .2 Utilities: Determine location of all utilities including vaults, conduits, pipes and wires adjacent to, below or within the areas of work prior to starting any work of this Section. Perform all work in a manner, which will avoid damage to any utility.
- .3 Safety: The Contractor shall be responsible for pedestrian and vehicular safety and control all movement within and around the work site. Provide the necessary barriers, warning devices and ground personnel needed to give safety, warning and protection to persons and vehicular traffic within the area of work including the contractor's equipment and temporary storage within the public right of way.

3.2 EXAMINATION

- .1 Examine the surface grades and soil conditions for any circumstances that might be detrimental to soil drainage, such as uneven sub grades and waterproofing that may hold or pond water, deposits of construction-related waste or soil contamination, storage of material or equipment, soil compaction or poor drainage. Confirm that all utility work and installation of planter drainage has been completed and tested. Examine the grading, verify all elevations.
 - .1 Verify that conditions of substrate previously installed under or other Sections or Contracts are acceptable for growing medium installation.
 - .2 Do not place soil on wet or frozen subgrade.
 - .3 Inform Consultant of unacceptable conditions immediately upon discovery.
 - .4 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.
- .2 Locate utility lines before commencement of work and protect from damage.

3.3 PREPARATION OF SUBGRADE

- .1 Excavate to the proposed subgrade, maintain all required angles of repose of the adjacent materials as shown on drawings.
 - .1 Do not over excavate compacted subgrades of adjacent pavement or structures.
 - .2 Maintain a supporting 1:1 side slope of compacted subgrade material along the edges of all paving and structures where the bottom of the paving or structure is above the bottom elevation of the excavated planting area.
 - .3 Remove debris, roots, branches, stones in excess of 50 mm diameter and other deleterious materials. Remove soil contaminated with calcium chloride, toxic materials and petroleum products. Remove debris which protrudes more than 75 mm above surface. Dispose of removed material off site.
 - .4 Confirm that the subgrade is at the proper elevation and compacted as required. Subgrade elevations shall slope approximately parallel to the finished grade and/or toward the subsurface drain lines as shown on the drawings.
 - .5 Cross cultivate those areas where equipment used for hauling and spreading has compacted soil.

TOPSOIL PLACEMENT AND GRADING

- .2 Do not proceed with the installation of growing medium, until all subsurface utility work in the area has been completed.
- .3 Do not begin growing medium installation until all subsurface drainage, and irrigation main lines shown on the Contract Drawings are viewed and approved by the Consultant.
- .4 Protect adjacent walls, walks and utilities from damage or staining by the soil.
- .5 Clean up any soil or dirt spilled on any paved surface, including at the end of each working day.
- .6 Any damage to adjacent Work shall be repaired by the Contractor at the Contractor's expense.

3.4 PLACING AND SPREADING OF GROWING MEDIUM

- .1 Placing and spreading of growing medium shall be in accordance with TS 5.10 - City of Toronto Construction Specification for Growing Medium and the following:
 - .1 Place growing medium after Contract Administrator has accepted substrate.
 - .2 Spread growing medium in uniform layers not exceeding 150 mm, over unfrozen substrate free of standing water.
 - .3 Over subgrade, spread growing medium full depth to finish elevations indicated on drawings. Elsewhere, spread growing medium to following minimum depths after settlement and 80% compaction:
 - .1 100mm min or as indicated on drawings for terraseeded areas;
 - .2 300mm min or as indicated on drawings for sodded areas;
 - .3 600mm min or as indicated on drawings for perennials and ornamental grasses;
 - .4 600mm min or as indicated on drawings for shrubs;
 - .5 1200mm min or as indicated on drawings for tree planting areas.
 - .4 Manually spread growing medium around trees, shrubs and obstacles. Where seed mixes are to be applied, use a pneumatic blower truck to spread soil - refer to Section 32 91 21 – Terraseeding – spreading of composted organics with seeds to a depth of 25mm (slopes 3:1) and 50mm depths (slopes 3:1 to 2:1). Refer Section 01 14 00 – Work Restrictions.

3.5 SOIL AMENDMENTS

- .1 For planting beds: apply and thoroughly mix soil admixtures and amendments into full specified depth of growing medium in accordance with soil analysis. Supply proof of soil amendment to Contract Administrator.
- .2 Where feasible, a pneumatic blower truck may be used to spread mulch around shrubs and trees in all planting areas with the exception of those having wildflowers and grasses.

3.6 FINISH GRADING

- .1 Finish grading shall be in accordance with TS 5.10 - City of Toronto Construction Specification for Growing Medium and the following:
 - .1 Consolidate growing medium to required bulk density using equipment approved by Contract Administrator. Leave surfaces smooth, uniform and firm against deep foot printing.

TOPSOIL PLACEMENT AND GRADING

- .2 Finished grade of planting beds to be as indicated on drawings.
- .3 Make good any damage caused by growing medium spreading and finish grading activities.

3.7 REPAIR OF SETTLED GROWING MEDIUM

- .1 Repair of settled growing medium shall be in accordance with TS 5.10 - City of Toronto Construction Specification for Growing Medium.

3.8 CLEANING

- .1 During installation, keep pavements clean and work area in an orderly condition.
- .2 Keep the site clear of trash and debris at all times. Immediately dispose of wrappings or waste materials associated with products necessary for the completion of the work.
- .3 All trash and debris shall be kept in a central collection container. Do not bury trash and debris in back-fill.
- .4 Once installation is complete, remove any excess soil from pavements or embedded fixtures.

END OF SECTION

TERRASEEDING

Part 1 General

1.1 SECTION INCLUDES

- .1 This section includes requirements the supply and application of perennial seeding with a pneumatically blown mixture of composted organics and includes the following:
 - .1 Requirements for application equipment.
 - .2 Seed mixes and application rates.
 - .3 Performance measures for acceptance.
 - .4 Regular maintenance of plants for duration of warranty period.

1.2 RELATED WORK

- .1 Section 01 35 43 – Environmental Procedures
- .2 Section 02 20 00 – Site Preparation
- .3 Section 31 00 99 – Earthwork for Minor Works – Davenport Lands
- .4 Section 31 22 13 – Rough Grading
- .5 Section 32 92 19 – Topsoil Placement and Grading

1.3 REFERENCES

- .1 All referenced standards shall be the current edition or edition referenced by the Ontario Building Code currently in force.
- .2 Canadian Food Inspection Agency (CFIA):
 - .1 Canada Seeds Act and Regulations, Weed Seeds Order, 2016
- .3 Canadian Society of Landscape Architects (CSLA) / Canadian Nursery Landscape Association (CNLA):
 - .1 Canadian Landscape Standard, latest edition
 - .2 Canadian Nursery Stock Standard, latest edition
- .4 Reference Documents:
 - .1 Appendix A - Arborist Report, Macpherson Avenue Park, Urban Forest Innovations Inc., April 23, 2025
 - .2 Appendix B - Soil and Groundwater Management Plan – Davenport Lands (Parcel 28B, 29 and 30, WSP, July 2024
 - .3 Appendix C - Contaminant Health and Safety Plan – 28B, 29 and 30 Green Line Trail, WSP, July 2024
 - .4 Appendix D - City of Toronto Tree Protection Policy and Specifications for Construction Near Trees, July 2016
 - .5 Appendix E – Geotechnical Investigation for Macpherson Avenue Park, October 31, 2022

TERRASEEDING

- .6 Appendix F – Hydro One General Conditions for Secondary Land Uses, Hydro One, January 2023
- .7 Appendix G -General Requirements for Construction Work by External Parties in the Vicinity of Hydro One 115,000 and 230,000 Volt Underground Plant, Hydro One, January 2024

1.4 SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Action Submittals: Submit the following submittals before starting any work of this Section:
 - .1 Submit the name, contact information and qualifications of the Installer for approval by the Contract Administrator. Submittal shall include the names and contact information of a minimum of five project references that best represent the firm's qualifications. All representative work shall have been completed within the previous five years.
 - .2 Submit, for approval by the Contract Administrator, the names and contact information of all seed sources. If seeds are to be obtained from a re-wholesale supplier, the name and contact information of the original grower shall be included.
 - .3 Seed Analysis Certificate:
 - .1 Submit a valid Seed Analysis Certificate from a Seed Testing Laboratory approved by the Canadian Food Inspection Agency (CFIA) for all single seed species and all seed mixtures
 - .2 Certificate shall be provided to the Contract Administrator 24 hours prior to any seeding operations.
 - .3 Certificate shall include the following information:
 - .1 The name and address of the seed supplier.
 - .2 The seed species, or the name of the seed mix and the various individual seed species that comprise the seed mix and the percentage by mass.
 - .3 Name of the grade of seed or seed mix
 - .4 The supplier's lot designation number, corresponding to the Seed Analysis Certificate.
 - .5 Germination percentage
 - .6 Purity analysis of seed mixture: percentage of pure seed, variety and weed
 - .7 Year of production
 - .8 Net weight in kilograms [mass]
 - .9 The inoculant type, strain and expiry date (only required for seed mixes containing Crown Vetch or Birdsfoot Trefoil).
 - .4 Seed Mixes
 - .1 All seed and seed mixes shall be in the original sealed package with the original legible label securely attached.

TERRASEEDING

- .2 Labeling shall conform to the requirements of the Canada Seeds Act and Regulations. Each package shall be labeled to show.
 - .1 The name and address of the seed supplier.
 - .2 The seed species, or the name of the seed mix and the various individual seed species that comprise the seed mix and the percentage by mass.
 - .3 Name of the grade of seed or seed mix
 - .4 The supplier's lot designation number, corresponding to the Seed Analysis Certificate.
 - .5 Germination percentage
 - .6 Purity analysis of seed mixture: percentage of pure seed, variety and weed
 - .7 Year of production
 - .8 Net weight in kilograms [mass]
 - .9 The inoculant type, strain and expiry date (only required for seed mixes containing Crown Vetch or Birdsfoot Trefoil).
- .3 Closeout Submittals:
 - .1 Maintenance Instructions: Submit instructions on maintenance procedures to be followed after end of specified maintenance period.

1.5 QUALITY CONTROL

- .1 Installer Qualifications:
 - .1 All work shall be performed by an experienced contractor who has completed work similar in method and scale to that indicated for this project and with a record of successful landscape establishment.
 - .2 The installation Contractor shall have a minimum of 3 years of experience in the application of Terraseeding using a pneumatic blower truck:
- .2 Equipment used for integrated growing medium/seed application shall be purpose-built, with a pneumatic blower unit and computer-calibrated seed injection system capable of simultaneously applying growing medium and seed uniformly over the whole area without significant variation in the mix.
 - .1 The equipment shall be capable of uniformly applying materials and seed at a rate greater than 0.25 cubic meters of material per minute.
 - .2 The equipment shall be equipped with an application hose capable of extended 90 meters from the blower truck unit.

1.6 PLANTING SEASON

- .1 Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with initial maintenance periods to provide required maintenance from date of planting completion.
 - .1 Spring Planting: May – June
 - .2 Fall Planting: September – October.

TERRASEEDING

- .2 Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favourable weather conditions according to manufacturer's written instructions.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 All seeds shall be packed and delivered in original containers in accordance with the Canada Seeds Act and Regulations.
- .2 All seed and inoculant shall be stored in cool, dry location until use.

1.8 WARRANTY

- .1 Seeding shall be guaranteed for a period of two (2) years following written acceptance of the work by the Contract Administrator in accordance with the General Conditions of the Contract and as modified by this Section and shall be alive and in vigorous growth at the end of the warranty period as determined by the Contract Administrator.

Part 2 Products

2.1 SEED

- .1 All seed, supplied either as single seed species, or as a seed mix shall comply with the provisions of the Canada Seeds Act and Regulations and the grade standards for that particular seed kind.

2.2 PERMANENT SEED MIXES

- .1 Mix type 1: Butterfly Hummingbird - Upland & Meadow Mix
 - .1 As supplied by Pickseed Canada, 1 Greenfield Road, Lindsey ON Canada, 1-800-662-4769, or approved equivalent.
 - .2 Composition: As indicated on drawings
 - .3 Seeding Rate: 17 – 25 kg/ha at minimum depth of 50mm.
 - .4 Spot Application: 0.50kg/100m²
 - .5 Seed in fall between between Oct. 15th and Nov. 15th.
 - .6 Seed to be native to Ontario, ideal for upland soil, designed to attract butterflies, hummingbirds and other pollinators
 - .7 Seed as indicated per plan.

2.3 ANNUAL NURSE CROP SEED

- .1 Nurse crop seed shall be a cereal grain such as Annual Ryegrass (*Lolium multiflorum*), Fall Rye Grain, Annual Oats or Winter Wheat Grain unless otherwise approved by the Contract Administrator.
 - .1 Seeding Rate: 22 kg/ha.

2.4 FERTILIZER

- .1 Fertilizer shall not be used in Terraseeding operations.

2.5 COMPOSTED ORGANICS

TERRASEEDING

- .1 Composted organics shall be pre-mixed and shall consist of a minimum 70% compost material. The composted organics may be amended. Amendments shall be added at the discretion of the Contractor to ensure that the composted organics meets the material specification and is suited for distribution by a pneumatic blower.
- .2 Once mixed, composted organic material shall consist of particles where 100% of the material is able to pass through a 25 mm sieve.

2.6 GROWING MEDIUM

- .1 Growing medium shall consist of a suitable and approved homogenous blend of sand and composted organic components.
- .2 Growing medium shall be pre-mixed and shall consist of a minimum 70% compost material. The growing medium may be amended. Amendments shall be added at the discretion of the Contractor to ensure that the growing medium meets the material specification and is suited for distribution by a pneumatic blower.
 - .1 Compost material shall be derived from well composted green waste organic matter produced by a composting site that meets the requirements of the Canadian Council of Ministers of the Environment, Guidelines for Compost Quality definition for Type "A" Compost.
- .3 Once mixed, the growing medium shall consist of particles where 100% of the material is able to pass through a 25 mm sieve.

2.7 WATER

- .1 Water shall be free of any contaminants or impurities that would adversely affect the germination and growth of vegetation.

2.8 EQUIPMENT - PNEUMATIC BLOWER TRUCK

- .1 Equipment used for integrated growing medium/seed application shall be purpose-built, with a pneumatic blower unit and computer-calibrated seed injection system capable of simultaneously applying growing medium and seed uniformly over the whole area without significant variation in the mix.
- .2 The equipment shall be capable of uniformly applying materials and seed at a rate greater than 0.25 cubic meters of material per minute.
- .3 The equipment shall be equipped with an application hose capable of extended 90 meters from the blower truck unit.

2.9 PLANTING / TEMPORARY SNOW FENCE

- .1 In accordance with Section 32 31 13 – Fences and Gates.

Part 3 Execution

3.1 PROJECT CONDITIONS

- .1 Installation of Work of this Section shall be performed under weather conditions and in suitable growth season, and as approved by the Contract Administrator.

3.2 OPERATIONAL CONSTRAINTS

TERRASEEDING

- .1 The composted organics and seeding operation shall not commence until a legible, valid Seed Analysis Certificate and a legible, valid signed declaration from the compost supplier have been provided to the Contract Administrator.
- .2 The composted organics and seeding operation shall not commence until the Contract Administrator has approved the surface preparation and the layout of permanent seed mixes.
- .3 The composted organics and seeding application and/or re-application shall not be carried out under adverse field conditions such as high wind, frozen soil or soil covered with snow, ice or in areas of standing water or a concentrated flow of water. All seeding operations to be completed minimum 60 days before end of growing season.
- .4 The Contractor shall maintain the site and control erosion until conditions permit application or re-application of seed and composted organics.
- .5 The surface to be seeded shall be prepared not more than 7 calendar days before the seeding operation.
- .6 No seeding or composted organics application shall come in contact with the foliage of any trees, shrubs, or other vegetation. No seed or composted organics application shall come in contact with waterbodies.

3.3 SURFACE PREPARATION FOR COMPOSTED ORGANICS AND SEEDING

- .1 At the time of seeding, all surface areas designated for seeding shall be free of erosion and shall have a fine graded uniform surface and shall not have surface stones greater than 50 mm in diameter, weeds or other unwanted vegetation.
- .2 Soil to be loose, friable and appropriate for easy root penetration of the seeded species.

3.4 LAYOUT

- .1 The locations of the different, permanent seed mixes and composted organics shall be staked out on the ground surface in accordance with the contract drawings.
- .2 Stakes shall be used to indicate the limits of each type of seed mix.

3.5 APPLICATION RATES FOR COMPOSTED ORGANICS

- .1 Depending on slope gradation, depth of composted organics shall be as follows unless otherwise indicated on plans:

3:1 slopes and less:	25mm minimum application
3:1 - 2:1 slopes:	35mm minimum application
2:1 slopes and greater:	50mm minimum application

3.6 COMPOSTED ORGANICS AND SEED APPLICATION

- .1 Prior to the application of the composted organics and seeding, the Contractor shall ensure that the pneumatic blower has been properly calibrated to provide the specified amounts of seed and that the blower can adequately uniformly apply composted topsoil and seed at a rate greater than 0.25 cubic meters of material per minute.
- .2 Once the blower has been calibrated, the Contractor shall apply composted organics and seeding uniformly at specified depths to all areas identified for cover in the contract drawings or as directed by the Contract Administrator.
- .3 Composted organics and seed shall overlap the adjoining ground cover by 300 mm.

TERRASEEDING

3.7 INSTALLATION OF PLANTING / TEMPORARY SNOW FENCE

- .1 In accordance with Section 32 31 13 – Fences and Gates.
- .2 temporary planting bed protection fence shall be installed prior to substantial performance and shall remain in place for the duration of the warranty period.
- .3 Place temporary planting bed protection fences around all seeded areas, in locations shown on drawings and as directed by the Contract Administrator.

3.8 CLEAN-UP

- .1 All materials and other debris resulting from seeding operations shall be removed promptly from the job site upon completion of each phase of the project.
- .2 At the completion of the seeding operation, materials applied to areas or objects other than those designated to grow grass shall be removed.
- .3 Clean water shall be used to immediately wash seed or cover materials that have been applied to the foliage of trees, shrubs or other susceptible plant growth.

3.9 MAINTENANCE DURING ESTABLISHMENT AND PRIOR TO FINAL ACCEPTANCE

- .1 Perform the following operations from time of seed application until final acceptance by the Contract Administrator:
 - .1 Maintenance shall include all measures necessary to establish and maintain perennials, grasses and forbs in a vigorous growing condition
 - .2 Repair dead or bare spots to allow establishment of seed prior to acceptance.
 - .3 Regrading and re-seeding shall be carried out when necessary to restore damaged or failing seeded areas.
 - .4 Watering shall be scheduled and carried out when required and with sufficient quantities to prevent seeds and underlying growing media from drying out.
 - .5 Maintain and water seeded areas as required to establish satisfactory growth until acceptance of work, and seed is established.
 - .6 Mow the area to 150mm (6") 2-4 times per year in the first 3 years to keep weeds in check. The first mowing shall not be attempted until:
 - .7 All seed has germinated, and new growth has reached a mowing height of a minimum 75mm-90mm.
 - .8 When establishing a mix of grasses and wildflowers, it is important to note that many wildflowers will not bloom until the second year of growth.
 - .9 Fertilization is not recommended unless the soil conditions are very poor. Supplemental fertilizer only encourages weeds. In the year of establishment, native plantings need to be watered.
 - .10 After the first year's sowing a fall mowing at about 15cm (6") height is beneficial to help keep weeds in check. This should only be done after a hard killing frost or damage to the flower buds or flowering stalks occur.

TERRASEEDING

- .2 All seeded areas shall be protected by temporary barriers from foot traffic, see Section 32 31 13 – Fences and Gates to ensure optimum seed germination and plant growth. Temporary barriers shall be erected and maintained throughout the establishment period and until final acceptance.

3.10 PERFORMANCE MEASURES FOR ACCEPTANCE

- .1 Performance Measure of all areas by the Contract Administrator to ensure compliance with this specification at thirty (30), sixty (60) and ninety (90) day periods following the seeding operation:
 - .1 At the thirty (30) days:
 - .1 Composted organics shall be visually intact and shall form a uniform cohesive mat;
 - .2 Germination of the nurse crop shall be visually evident.
 - .2 At the sixty (60) days:
 - .1 The nurse crop shall be evident at mature height in an evenly dispersed, uniform cover;
 - .2 Germination of the specified, permanent seed species shall be visually evident in an evenly dispersed uniform cover;
 - .3 There shall not be any significant bare areas, both in terms of quantity and size;
 - .4 Non-seeded, non-specified vegetation shall not exceed 20% of the seeded earth area.
 - .3 At the ninety (90) days:
 - .1 The permanent seed species shall be at an average height of 50mm in an evenly dispersed, uniform cover; representative of the specified, permanent seed mixes;
 - .2 There shall not be any significant bare areas, both in terms of quantity and size;
 - .3 Non-seeded, non-specified vegetation shall not exceed 20% of the seeded earth area.
 - .4 No site reviews will be held during the winter dormant period or when site conditions prohibit a visual field inspection. The timing intervals between reviews will be suspended during the winter dormant period.
- .2 If the completed work does not meet the Performance Measure after the thirty-day review, the Contract Administrator shall document the failure areas, notify the Contractor of those areas, and review at the sixty day benchmark.
- .3 If the completed work does not meet the Performance Measure after the sixty or ninety day review, the Contract Administrator shall notify the Contractor in writing. The Contractor shall re-apply the specified materials in accordance with this specification within 14 calendar days of receiving the notification.
- .4 Acceptance of seeded areas by the Contract Administrator shall occur only when the following conditions exist:
 - .1 Composted organics and growing medium quality, fertility levels, depths and surface conditions meet the requirements of this specification, unless specified otherwise.
 - .2 Plants are uniformly established and conforming to the Performance Measure standards at ninety days.

3.11 FAILURE TO MEET PERFORMANCE MEASURE

TERRASEEDING

- .1 If the completed work does not meet the Performance Measure after the thirty-day inspection, the Contract Administrator shall document the failure areas, notify the Contractor of those areas, and re-inspect at the sixty-day inspection.
- .2 If the completed work does not meet the Performance Measure after the sixty or ninety day inspection, the Contract Administrator shall notify the Contractor in writing and the Contractor shall re-apply the specified materials in accordance with this specification within 14 calendar days of receiving the notification.
- .3 The Contractor shall maintain the site and control erosion until conditions permit application or re-application of composted organics and seed.
- .4 All replaced composted organics and seed shall be subject to the Quality Assurance section of this specification.

3.12 DISPUTE RESOLUTION

- .1 Dispute resolution only applies to the germination and growth of the permanent seed mix species.
- .2 Disputes arising from the Performance Measure evaluation shall be settled through referee testing using an actual live seedling count of the specified permanent seed mix species within the seeded earth area.
- .3 An independent Contract Administrator with experience in herbaceous plant identification shall perform the referee testing. Both parties shall agree on the selection of the independent Contract Administrator and both parties shall be bound by the Contract Administrator's evaluation
- .4 The actual count shall be based on minimum germination requirements and minimum levels of acceptability to meet industry standards and federal legislation governing the testing, inspection, quality and sale of seed.
- .5 The various seed mixes specified by the Owner are comprised of different individual commercial seed species expressed as a percentage of the overall seed mix by weight. Industry standards list the number of seeds per unit of weight. For this specification, the mid-range number for each seed species shall be used based on these industry standards. Where there is a difference in estimated number of seeds by weight, the lower figure shall be used.
- .6 The Canada Seeds Act requires a minimum germination rate of 70% for each seed species to be registered and labeled. While several seed species require higher levels of germination, this specification has adopted 70% as the acceptable minimum and has allowed a further 25% reduction to account for variation in seeding application, seedbed quality, seedbed preparation and area cover.
- .7 The Contractor and the Owner may agree to use a simplified analysis, where instead of counting each seedling of each individual seeded perennial species of the mix, only the total number of seedlings of the mix is counted. If the parties cannot agree to the simplified analysis, the default method is a seedling count of each seeded perennial species.
- .8 The field inspection to determine the number of live plant seedlings should only be performed after the ninety-day inspection. Many of the perennial plants in the various seed mixes take several months to grow to an identifiable and measurable size.
- .9 The sampling procedure should be randomized over an area that both parties agree is representative of the seeded contract. The selection and evaluation process is as follows:
 - .1 Select a representative area from the average seeded areas, eliminating the thinnest and thickest growth areas from the analysis.

TERRASEEDING

- .2 Measure its length and depth. Use a random numbers table to generate five sets of X and Y axis coordinates from the area.
- .3 Each axis coordinate is a sampling point. A sampling plot, or quadrant, is set out in a 200 mm by 1000 mm plot with the axis coordinate becoming the lower right-hand corner of each quadrant.
- .4 Each quadrant is divided into 20 sub-sampling units, each being 100 mm by 100 mm.
- .5 The sub-sampling units are numbered from 1 to 20.
- .6 Using a random numbers table, two of the twenty sub-sampling units are randomly selected.
- .7 Live seedlings of each individual seeded perennial species of the mix are counted in the selected sub-sampling units to determine actual plant densities.
- .8 An average seedling density per seeded perennial species, expressed as the number of seedlings per square meter is generated for each sampling plot, or quadrant, based on the data from the two selected sub-sampling units.
- .9 The procedure is repeated for the four other sampling points.
- .10 The average number of seedlings per square meter for each of the seeded perennial species generated from the five sampling points is evaluated against the minimum industry standard benchmark for the seeded mix.
- .10 The results of the referee testing analysis will be binding on both parties, subject to further dispute mechanisms as described in the General Conditions of the contract.
- .11 If the results of the referee testing prove that the seed and cover is unacceptable in meeting the minimum industry standard for germination, then the Contractor shall pay all costs associated with dispute resolution process.
- .12 If the results of the referee testing proves that the seed and cover is acceptable in meeting the minimum industry standard for germination, then the Owner shall pay all costs associated with the dispute resolution process.

END OF SECTION

DIRECT BURIED UNDERGROUND CABLE DUCTS

PART 1 - GENERAL

1.1. RELATED SECTIONS/DRAWING

- 1.1.1. Section 26 05 00 Common Work Results for Electrical
- 1.1.2. Section 26 05 21 Wires and Cables
- 1.1.3. Section 26 05 22 Connectors and Terminations
- 1.1.4. Section 26 05 28 Grounding - Secondary
- 1.1.5. Section 26 05 31 Cabinets
- 1.1.6. Section 26 05 34 Conduits, Conduit Fastenings and Conduit Fittings
- 1.1.7. Section 26 05 43.01 Installation of Cables in Trenches and Ducts
- 1.1.8. Section 26 27 19 Multi-Outlet Assemblies
- 1.1.9. Section 26 50 00 Lighting
- 1.1.10. Applicable sections from Div 1 as related to this contract, specifically 01 31 13 – coordination and 01 31 19 – Project meetings, 01 34 43 Environmental Requirements and Procedures
- 1.1.11. DRAWINGS
 - 1.1.11.1. Macpherson Park – Electrical
 - 1.1.11.2. Macpherson Park – Civil
 - 1.1.11.3. Macpherson Park – Photometrics
 - 1.1.11.4. Macpherson Park – Details – 1
 - 1.1.11.5. Macpherson Park – Details – 2
 - 1.1.11.6. Macpherson Park – Grounding Detail

1.2. REFERENCES

- 1.2.1. Canadian Standards Association (CSA International)
 - 1.2.1.1. CSA 22.1 and CSA 22.2.

1.3. QUALITY ASSURANCE

- 1.3.1. Quality assurance submittals: submit the following
 - 1.3.1.1. Certificates: signed by manufacturer certifying materials comply with specified performance characteristics and physical properties.
 - 1.3.1.2. Manufacturer's Instructions: for installation and special handling criteria, installation sequence, and cleaning procedures.

1.4. DELIVER, STORAGE AND HANDLING

DIRECT BURIED UNDERGROUND CABLE DUCTS

- 1.4.1. Deliver, store and handle materials in accordance with Section with manufacturer's written instructions.
- 1.4.2. Delivery and Acceptance Requirements:
 - 1.4.2.1. Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.
- 1.4.3. Packaging Waste Management: remove for reuse pallets, crate and packaging materials.

PART 2 - PRODUCTS

2.1. PVC DUCTS AND FITTINGS

- 2.1.1. Rigid PVC duct: Type DB2/ES2, with moulded fittings, for direct burial.
 - 2.1.1.1. Nominal length: 6 m plus or minus 12 mm.
- 2.1.2. Rigid PVC split ducts.
- 2.1.3. Rigid PVC bends, couplings, reducers, bell end fittings, plugs, caps, adaptors same product material as duct, to make a complete installation.
- 2.1.4. Rigid PVC 90 degrees, 45 degrees bends and 5 degrees angle couplings as required.

2.2. SOLVENT WELD COMPOUND

- 2.2.1. Solvent cement for PVC duct joints.

2.3. CABLE PULLING EQUIPMENT

- 2.3.1. 6 mm stranded nylon pull rope tensile strength 5 kN.

2.3.2. WARNING TAPE

- 2.3.3. Standard 4-mil polyethylene 76 mm wide tape, yellow with black letters, imprinted with "CAUTION BURIED ELECTRIC CABLE BELOW".

PART 3 - EXECUTION

3.1. MANUFACTURER'S INSTRUCTIONS

- 3.1.1. Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2. INSTALLATION GENERAL

- 3.2.1. Install duct in accordance with manufacturer's instructions and at elevations as indicated.
- 3.2.2. Clean inside of ducts before laying.
- 3.2.3. Install plastic duct spacers and ensure full, even support every 1.5 m and smooth transition throughout duct length.
- 3.2.4. Slope ducts with 1 to 400 minimum slope.
- 3.2.5. Lay ducts on a sand bedding of 75mm and cover with 50mm of sand.

DIRECT BURIED UNDERGROUND CABLE DUCTS

- 3.2.6. Install plugs and cap both ends of ducts to prevent entrance of foreign materials during and after construction.
- 3.2.7. Pull through each duct steel mandrel not less than 300 mm long and of diameter 6 mm less than internal diameter of duct, followed by stiff bristle brush to remove sand, earth and other foreign material.
 - 3.2.7.1. Pull stiff bristle brush through each duct immediately before pulling in cables.
- 3.2.8. Install a pull rope continuous throughout each duct run with 3 m spare rope at each end.
- 3.2.9. Place continuous strip of warning tape 300 mm above duct before backfilling trenches.
- 3.2.10. Install markers as required.
- 3.2.11. Notify the Engineer for field review upon completion of direct buried ducts and obtain acceptance prior to backfill.

3.3. CLEANING

- 3.3.1. Remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION 33 65 76

**Construction Specification for
Concrete Sidewalk and Concrete Raised Median****Table of Contents**

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TS 3.70.01 SCOPE

This specification covers the requirements for the construction of plain or reinforced concrete sidewalks and concrete raised medians.

TS 3.70.02 REFERENCES

This specification refers to the following standards, specifications or publications:

City of Toronto Standard Specifications

TS 310	Construction Specification for Hot Mixed, Hot Laid, Asphaltic Concrete Paving
TS 3.50	Construction Specification for Concrete Curb and Concrete Curb and Gutter
TS 3.80	Construction Specification for Concrete Unit Pavers
TS 4.50	Construction Specification for Utility Adjustments
TS 501	Amendment to OPSS.MUNI 501 – Construction Specification for Compacting
TS 1010	Amendment to OPSS.MUNI 1010 – Material Specification for Aggregates – Base, Subbase, Select Subgrade and Backfill Material
TS 1350	Amendments to OPSS.MUNI 1350 – Material Specification for Concrete – Material and Production

City of Toronto Standard Drawings

T-310.010-1	Location and Detail of Joints for Sidewalk
T-310.010-5	Joints at Sidewalk Openings
T-310.010-6	Construction Stamp Location for New Sidewalk Installation
T-310.010-7	Stamp for Concrete Work by Contractor
T-310.010-11	Stamp for Concrete Work by Utility
T-310.030-7	Signalized Intersection Configurations of Pedestrian Crossings
T-310.030-8	Controlled Non Signalized Intersection Configuration of Pedestrian Crossings
T-310.030-9	Location of Dropped Curbs at Controlled Intersections
T-310.030-10	Tactile Walking Surface Indicator and Curb Ramp Detail
T-310.030-11	Tactile Walking Surface Indicator and Depressed Curb Detail

Ontario Provincial Standard Specifications

OPSS 180	General Specification for the Management of Excess Materials
OPSS 919	Construction Specification for Formwork and Falsework

Canadian Standards Association

A 23.1	Concrete Materials and Methods of Concrete Construction
B 651-12	Accessible Design for the Built Environment

American Society of Testing and Materials

A 48	Standard Specification for Grey Iron Castings
C 174	Standard Test Method for Measuring Thickness of Concrete Elements Using Drilled Concrete Cores
C 501-84	Standard Test Method for Relative Resistance to Wear of Unglazed Ceramic Tile by the Taber Abraser

TS 3.70.03 DEFINITIONS

For the purpose of this specification, the following definitions apply:

Base Course means a layer of specified or selected materials of planned thickness constructed on the subgrade for drainage and to distribute pavement loads.

Contraction Joint means a cut or formed joint to regulate the location and degree of cracking in the plane of the pavement.

Expansion Joint means a physical separation between the concrete and appurtenances, or between arts of the concrete crosswalk, which allows both horizontal and vertical movement.

GU/GUL means general use or general use limestone hydraulic cement.

HE means high early strength hydraulic cement.

Slipform means the placing, consolidating and extruding of plastic concrete in a machine without the use of fixed side forms.

Subgrade means the soil prepared and compacted to support a structure or pavement.

TS 3.70.04 DESIGN AND SUBMISSION REQUIREMENTS

TS 3.70.04.01 General

Any required submissions shall be in writing. All submissions shall be submitted to the City at least three weeks prior to the beginning of the work.

The requirements for submissions and design requirements are given in TS 1350.

TS 3.70.04.02 Materials

Prior to starting the work, the Contractor shall supply the Contract Administrator with material safety data sheets (MSDS) for all the materials to be incorporated in the work.

The Contractor shall be responsible for selecting the concrete materials and for the mix design for the concrete. The concrete mix proportions shall be according to CSA A23.1 and this specification.

The certificate of ready mix facilities and/or the certificate of mobile mix concrete production facilities along with the City of Toronto Form A or B (concrete mix details) shall be submitted as required by TS 1350.

Details of the method of curing and curing materials (including manufacturers' literature, where applicable) shall be submitted to the Contract Administrator.

One copy of the concrete delivery ticket shall be submitted to the Contract Administrator for each load of concrete delivered.

TS 3.70.04.03 Contract Drawings Provided

The Contractor shall provide shop drawings and installation layout details (radius and tangent plate layout) for each radius. The Contractor shall not order any material until shop drawings have been approved. The City is not responsible for restocking or return charges or both for material ordered prior to the approval of the shop drawings.

All costs associated with this Work shall be incidental to all related items of Work. No separate payment shall be made.

TS 3.70.04.04 Contract Drawings Not Provided

The corner radius at the intersections varies from location to location. The City shall neither provide corner locations in advance nor will it supply any radius measurements to the Contractor. It shall be the sole responsibility of the Contractor to conduct survey and make assessment to retrofit corners with appropriate rectangular or radial tactile walking surface indicator plates or both. The Contractor shall provide shop drawings and installation layout details (radius and tangent plate layout) for each radius.

The City is not responsible for restocking or return charges or both for materials.

All costs associated with this Work shall be incidental to all related items of Work. No separate payment shall be made.

TS 3.70.05 MATERIALS

TS 3.70.05.01 Concrete

The materials for and the production of concrete sidewalks shall meet the requirements of TS 1350 and the following:

1) Cement type	Normal Portland GU Portland limestone GUL
2) Minimum 28 day compressive strength	32 MPa
3) Class of exposure	C-2
4) Maximum nominal size of coarse aggregate	19 mm
5) Slump at point of discharge	80 ± 30 mm
6) Air content	6.5 ± 1.5%
7) Maximum water/cementing materials ratio	0.45

For 7 day concrete:

- Minimum 7 day compressive strength: 32 MPa.

For 24-hour concrete:

- Minimum 24-hour compressive strength: 32 MPa.

-
- 24 hour concrete can only be manufactured using high early strength hydraulic cement (HE).

TS 3.70.05.02 Granular Base and Backfill

Granular base and backfill, if required, shall be Granular A and shall be according to TS 1010.

TS 3.70.05.03 Welded Steel Wire Fabric

Welded steel wire fabric shall be according to TS 1350.

All welded steel wire fabric detailed on the Contract Plans or ordered by the City for incorporation in the concrete sidewalk or raised median shall be 152 x 152 - MW 13.3 x MW 13.3 welded steel wire fabric at 1.46 kilograms per square metres.

TS 3.70.05.04 Expansion Joint Material

Expansion joint material shall be bituminous fibreboard having a thickness of 12 mm and shall be according to TS 1350.

TS 3.70.05.05 Tactile Walking Surface Indicators

Tactile walking surface indicators shall be according to drawing T-310.030-10 and T-310.030-11 and made of cast iron according to CSA B651, follow Ontario Regulation 191/11 and meet the following requirements:

Table 1: Tactile walking surface indicators

Standard	Property	Minimum Result
ASTM A 48	tensile strength	class 30 B
ASTM C 1028	slip resistance	dry 0.8 min, wet 0.65 min
ASTM C 501-84	wear resistance	wear index: > 15

The truncated domes shall be of uniform size and shape. Units shall be uniform in texture, be free from pouring faults, sponginess, cracks, blowholes, and other defects, and have clean-cut and well-defined edges. All surfaces shall be bare, without any coating, and be uniform and free of flaking rust or mounts of rust or debris. Tactile walking surface indicators shall have ribs cast to the underside of the unit, have vent holes, and have a minimum plate thickness of 5 mm.

TS 3.70.06 EQUIPMENT

TS 3.70.06.01 Forms

Forms shall be steel, wood or metal plate forms and shall be according to OPSS 919. They shall be of sufficient cross section and strength, and so secured as to resist the pressure of the concrete when placed, and the impact and vibration of any construction equipment they support, without springing or settlement.

Forms shall be pinned or staked in place with not less than three pins for each 3 m length, and with a pin at each side of each form butt joint. The top surface of the formwork shall comply with the specified tolerances. The inside face of the form shall be vertical. The form shall deviate from grade by no more than 3 mm in 3 m, and in alignment by no more than 6 mm in 3 m.

Forms shall be cleaned and coated with form oil before each use.

TS 3.70.06.02 Slipforming Equipment

The equipment shall be designed for slipforming concrete sidewalks and shall have automatic horizontal and vertical controls to be used in conjunction with at least one stringline.

TS 3.70.06.03 Finishing Tools

An aluminum or magnesium float shall be used to float the concrete crosswalk and a small edger shall be used to tool the edges.

TS 3.70.07 CONSTRUCTION

Prior to starting the work, the Contractor shall submit the verification that either the foreman/lead hand or the supervisor of the placing crew has ACI Flatwork Certification.

TS 3.70.07.01 Excavation

TS 3.70.07.01.01 *General*

Excavated material shall be removed from the site and disposed of according to OPSS 180, at the Contractor's expense.

TS 3.70.07.01.02 *Sidewalk*

The excavation for the sidewalk shall be to the lines and grades specified by the Contract Administrator. Care shall be taken to prevent damage to utilities, window openings, areaways, and other appurtenances such as hydrants, water services, poles and gas valves which may be in or under the proposed sidewalk.

The Contractor shall make good all damage caused during the course of the work and return the work to its initial condition at no extra cost to the City.

TS 3.70.07.01.03 *Concrete Raised Median*

Where a raised median is to be placed on an existing pavement, the existing asphalt shall be removed down to the concrete base in the case of a composite pavement, or in the case of a flexible pavement, the asphalt shall be removed to a minimum depth of 75 mm. The existing asphalt shall be removed to form a straight vertical face by saw cutting to the required depth and to a sufficient offset to accommodate framework, but shall not exceed 150 mm from the face of the curb, gutter or median. The asphalt shall be completely removed to the required depth and all loose material swept from the area over which the raised median is to be constructed.

Where a raised median is to be placed, other than as described above, the requirements of the specifications for the individual components shall be used. The individual specifications shall include TS 3.50 and TS 3.80 for concrete curb and concrete curb and gutter, and interlocking pavers.

TS 3.70.07.02 *Subgrade*

The subgrade shall be compacted to a minimum of 95% of maximum dry density according to TS 501.

TS 3.70.07.03 *Granular Base*

The granular base shall be placed to the required lines and grades. The compacted depth of granular base shall be 150 mm or as specified in the Contract Documents. The moisture content and compaction of the granular base shall be uniform and shall be according to TS 1010.

The granular base shall be moistened prior to the placement of concrete, but without any standing water. At the time of placing concrete, the base shall not be wet, soft or frozen.

In areas of underground utilities, polyethylene film (100 µm thick) shall be placed on the base.

TS 3.70.07.04 *Form Placement*

Forms shall be set true to the lines and grades as specified in the Contract Documents and in direct contact with the base.

The crossfall of the sidewalk or raised median shall be at a slope of 2 per cent toward the gutter. When the optimum slope cannot be achieved, the Contract Administrator may instruct the Contractor to adjust the slope to a maximum of 4 per cent.

TS 3.70.07.05 *Utility Adjustment*

All utility adjustments shall be according to TS 4.50, except that no boxouts will be required. The top portion of the frame shall be encased with 12 mm expansion joint material, placed flush with the surface of the concrete and the frame and cover. The fibre shall be vertical and straight in alignment.

TS 3.70.07.06 Utility Isolation

Utility isolations shall be constructed in the concrete sidewalk as shown on drawing T-310.010-5 at the locations as specified in the Contract Documents.

TS 3.70.07.07 Reinforcement

Welded steel wire fabric reinforcement or hook dowels, if necessary, shall be placed in the concrete sidewalk and concrete raised median to the details and location as specified in the Contract Documents.

TS 3.70.07.08 Placing Concrete

Concrete shall be placed and consolidated to meet the requirements of CSA A23.1 and the requirements of this specification. The concrete delivery and spreading operations shall be coordinated so as to provide a uniform rate of progress for the placing operation. Where concrete placing is interrupted for more than 45 minutes, a 12 mm thick bituminous fibre joint filler shall be placed vertically across the sidewalk width, to form an expansion joint, before resuming concrete placement.

The concrete shall be placed to the specified thickness, line and grade. The concrete shall be thoroughly consolidated by the use of 50 mm vibrators and other suitable tools to eliminate voids, honeycombing and entrapped air.

TS 3.70.07.09 Finishing Concrete

The concrete surface shall be finished while it is sufficiently plastic to achieve the desired grades, elevations and texture, with no water on the surface. The surface shall be uniform, dense and free from undulations and projections apart from those specified in the drawings.

The top surface shall be screeded to true grade and cross-section and finished with a magnesium or aluminum float. The final finish shall have a light broom or swirl float texture.

The application of water, neat cement or sand to the surface shall not be permitted. Localized surface imperfections shall be dug out and repaired with fresh concrete before the concrete has set.

Sidewalks on grades of more than 5 per cent shall be broom finished transversely to the slope of the sidewalk.

The concrete adjacent to all formwork shall be finished with a tool that produces a 5 mm rounded edge and a smooth, horizontal surface with a maximum width of 50 mm. All tooling shall be uniform and straight and shall be depressed no more than 1 mm below the adjacent surface. Any ridges along the tooled marks shall be removed. Contraction and expansion joints shall not be finished with a tooled edge.

The surface of the concrete sidewalk shall not have irregularities exceeding 6 mm when checked with a 3 m straight edge placed in any direction.

TS 3.70.07.10 Identification Stamp

The Contractor shall mark with an approved stamp according to T-310.010-7 at each end of the work, at each tenth bay, and all others places directed by the Contract Administrator. The stamp shall be located on the centre of the bay parallel to a transverse joint.

The stamp shall identify the Contractor's name and the year of construction.

The utility shall mark with an approved stamp according to T-310.010-11 at each end of the work, at each tenth bay, and all others places directed by the Contract Administrator. The stamp shall be located on the centre of the bay parallel to a transverse joint.

The stamp shall identify the utility's name and the year of construction.

TS 3.70.07.11 Joints

TS 3.70.07.11.01 Contraction Joints

Contraction joints shall be placed transversely as shown on drawing T-310.010-1. Contraction joints shall also be placed longitudinally—parallel to the curb—and 1.5 m from the curb when the slab is 3 m or more in width. The depth of the contraction joint shall be one quarter the concrete thickness.

The maximum distance between joints in the raised median, shall be 2 m.

TS 3.70.07.11.02 Expansion Joints

Expansion joints shall be constructed to the full thickness of the sidewalk or raised median and shall be a maximum of 6 m apart.

Expansion joints shall be filled with 12 mm wide bituminous fibre expansion joint material. The top surface of the bituminous fibre shall be flush with the concrete surface. The fibre shall be vertical and straight in alignment.

Full depth (isolation) joints shall be formed where the concrete abuts buildings and rigid structures, changes direction, encounters appurtenances and shall be constructed as shown on drawing T-310.010-1. If the face of the structure is rough or irregular, preventing a tight seal, the joint shall be placed 150 to 300 mm from the structure.

TS 3.70.07.11.03 Construction Joints

At the end of each day's work, or in the event of an unavoidable stoppage of concrete placement extending more than 45 minutes, an expansion joint shall be constructed at the planned location of a joint. Any excess concrete is to be removed and disposed of, off the site according to OPSS 180.

TS 3.70.07.12 Concrete Curing

Concrete curing shall be according to TS 1350.

TS 3.70.07.12.01 *Curing with Burlap and Water*

Burlap mats shall be pre-soaked by immersion in water for at least 6 hours immediately prior to placing. The mats shall cover the entire width and edges of the exposed concrete. The mats shall overlap 300 mm and shall be held down to prevent displacement. The mats shall be maintained in place and kept saturated for a minimum period of 7 Days. The Contractor may constantly water the mats or cover them with opaque polyethylene film, or a combination of both, in order to keep the mats saturated.

Alternatively, this method shall be used for a minimum period of 3 Days following which the surface shall be cured with curing compound according to TS 1350.

TS 3.70.07.12.02 *Curing with Geotextile Fabric and Water*

Geotextile fabric shall be pre-soaked by immersion in water for at least 6 hours immediately prior to placing. Two layers of fabric shall be applied to the surface of the concrete and shall cover the entire width and edges of the exposed concrete. Strips shall overlap 100 mm and shall be held down to prevent displacement. The fabric shall be maintained in place and kept saturated for a minimum period of 7 Days. The Contractor may constantly water the mats or cover them with opaque polyethylene film, or a combination of both, in order to keep the mats saturated.

Alternatively, this method shall be used for a minimum period of 3 Days following which the surface shall be cured with curing compound according to TS 1350.

TS 3.70.07.12.03 *Curing with Polyethylene Film*

White, opaque polyethylene film (100 µm thick) shall be placed such that air flow between it and the concrete surface is prevented. The film shall be held down at the edges and laps, and shall be overlapped a minimum of 150 mm, to prevent displacement. The film shall be kept in place for a minimum period of 7 Days.

Alternatively, this method shall be used for a minimum period of 3 Days following which the surface shall be cured with curing compound according to TS 1350.

TS 3.70.07.12.04 *Curing with Membrane Compound*

Immediately prior to application, the curing compound shall be agitated by mechanical means to provide a homogeneous mixture. Curing compound shall be spray applied in two coats to the concrete surface, with the second coat applied at right angle to the first coat, such that the membrane formed is uniform in thickness and colour and is free of breaks and pinholes. The surface shall be maintained in this condition for a minimum period of 7 Days. The rate of application shall not be less than that specified by the manufacturer of the compound.

TS 3.70.07.13 *Concrete Protection*

Concrete protection shall be according to TS 1350.

TS 3.70.07.14 Headers

Wooden headers, 40 mm thick and 160 mm deep shall be placed at all unpaved entrances or driveways. They shall be held in place by 40 mm x 80 mm stakes driven into the ground at least 700 mm at one metre centres and with the tops flush with the surface of the sidewalk.

TS 3.70.07.15 Ramps

Sidewalk accessibility ramps shall be according to drawing T-310.030-7, T-310.030-8, T-310.030-9, T-310.030-10 and T-310.030-11 with tactile walking surface indicator plates at all controlled and uncontrolled pedestrian crossings or as specified in the Contract Documents.

TS 3.70.07.15.01 *Installation of Tactile Walking Surface Indicators*

Tactile walking surface indicators plates shall be assembled prior to installation according to the manufacturer's installation instructions. The plates shall be set and pressed into wet concrete at each sidewalk ramp to the final elevation.

Remove any wet concrete that may spill onto the tactile walking surface indicator surface.

Tactile walking surface indicator plates shall be cut to fit around utility maintenance hole covers, hand wells and other appurtenances at no extra cost to the City.

TS 3.70.07.15.02 *Installation Tolerances of TWSI Plates*

Tactile walking surface indicators plates shall be positioned as close to the back of curb as possible; however, in order to accommodate corner radii, a maximum gap of 100 mm between the back of curb and the plates is acceptable.

TS 3.70.07.16 Restoration of Asphalt

The additional asphalt removed for framework is to be restored shall be according to TS 310. The asphalt shall be placed in lifts not to exceed 50 mm in depth after compaction.

TS 3.70.08 QUALITY ASSURANCE

Quality assurance shall be according to TS 1350.

TS 3.70.08.01 Visibly Defective or Damaged Concrete

Concrete that is visibly defective or damaged is not acceptable and shall be removed and replaced at no extra cost to the City.

Concrete is visibly defective or damaged when:

- The concrete is honeycombed.
- The concrete contains embedded debris.
- The concrete has been damaged by freezing.

-
- The concrete temperature at the time of placement exceeded the requirements of this specification.
 - The concrete surface has been damaged by rain.
 - The concrete contains footprints or other undesirable impressions.
 - The concrete has been subjected to traffic before the concrete attained 20 MPa.
 - The concrete has cracked or separated.
 - The concrete surface has spalled as defined in the *General Conditions of Contract* that the Contract Administrator will be the sole judge to the determination.
 - Expansion and isolation joints are not vertical.
 - The concrete sections have heaved or sunk, from their original position.

TS 3.70.08.02 Concrete Thickness

The thickness of the concrete structure shall be determined by field measurement or in accordance with a thickness measurement method specified in Contract Documents.

The Contract Administrator reserves the right to verify the thickness of the concrete structure for structural integrity check and payment purpose using a non-destructive testing method or by coring.

When a measurement of concrete thickness is carried out by coring, the measurement shall be based on either a 100 mm or 150 mm diameter core. The diameter of the core shall be at least three times the size of the maximum coarse aggregate as per CSA A23.1.

No core shall be taken within 250 mm from the joints or edges. The length of each core shall be determined according to ASTM C 174. Core samples that are broken or obviously damaged shall not be used for concrete thickness determination. The damaged cores shall be replaced by acceptable cores taken from the same subplot(s). Core samples taken for concrete thickness determination shall not be used for compressive strength test.

Regardless of the method used, concrete thickness shall be determined on a lot basis. Each lot shall have four sublots of equal size, where each subplot is represented by a thickness measurement. The Contract Administrator will determine the size of the lot(s) and sublots for the purpose of concrete thickness acceptance and payment.

The concrete thickness for a crosswalk in a lot shall be the average concrete thickness of the lot (Tx). The average concrete thickness for a lot shall be calculated from the following formula:

$$Tx = \frac{T1 + T2 + T3 + T4}{4}$$

Where: Tx is the average concrete thickness for a lot, rounded off to the nearest mm.
T1, T2, T3 and T4 are the concrete thickness for sublots 1, 2, 3 and 4.

For the purpose of the calculation, any individual subplot measurement that is more than 5 per cent above the specified thickness shall be assumed to be equal to the specified thickness plus 5 per cent.

A lot will be accepted, on a thickness basis, if the average concrete thickness of the lot equals or exceeds 100 per cent of the specified thickness. Payment for the lot will be determined according to TS 3.70.10.

At the sole discretion of the Contract Administrator, a lot may be accepted and allowed to remain in place, if the average concrete thickness of the lot is between 95 and 100 percent of the specified thickness. The lot accepted based on the above conditions will not be eligible for full payment. Payment for the lot will be determined according to TS 3.70.10. Adjustment of the Contract Price for the lot shall be based on Table 2.

If the concrete thickness of an individual subplot is less than 95 per cent of the specified thickness, the Contractor shall remove and replace the subplot at their expense even if the average concrete thickness of a lot is more than 95 per cent of the specified thickness.

All replacement lots shall be accepted on the same basis as the original lot.

TS 3.70.09 MEASUREMENT FOR PAYMENT

TS 3.70.09.01 Concrete Sidewalk Concrete Raised Median

Measurement of concrete sidewalk and raised median placed shall be by surface area in square metres (m²), without any deduction for maintenance holes and appurtenances. Concrete sidewalk that is monolithic with concrete curb shall be measured from the edge of the back of the sidewalk to the back of the curb—200 mm from the typical face of the curb.

TS 3.70.09.02 Tactile Walking Surface Indicator

Measurement of the above tender item shall be along the curb edge of the tactile walking surface indicators in linear metres (m).

TS 3.70.09.03 Supplemental Cost for 7 Day Concrete

Measurement of 7 day concrete shall be by surface area placed in square metres (m²). Concrete delivery tickets shall not be used for measurement purposes.

TS 3.70.09.04 Supplemental Cost for 24-hour Concrete

Measurement of 24-hour concrete shall be by surface area placed in square metres (m²). Concrete delivery tickets shall not be used for measurement purposes.

TS 3.70.10 BASIS OF PAYMENT

TS 3.70.10.01 Concrete Sidewalk – Item

Payment at the Contract Price for the above tender item shall be full compensation for all labour, Equipment and Material to do the work. Payment shall include the supplying, placing and removal of the formwork, the supplying, placing, consolidating and finishing of the concrete and the curing and protection of the concrete sidewalk.

At the discretion of the Contract Administrator, payment for the item may be adjusted according to TS 3.70.08.02 and Table 2.

The cost of thickness testing shall be borne by the City unless the results indicate a thickness deficiency of 5 per cent or more, in which case the Contractor shall bear all costs of testing.

TS 3.70.10.02 Concrete Raised Median – Item

Payment at the Contract Price for the above tender item shall be full compensation for all labour, Equipment and Material to do the work. Payment shall include the removal and disposal of the asphalt and granular material, the supplying, placing and removal of the formwork, the supplying, placing, consolidating and finishing of the concrete and the curing and protection of the concrete raised median.

At the discretion of the Contract Administrator, payment for the item may be adjusted according to TS 3.70.08.02 and Table 2.

The cost of thickness testing shall be borne by the City unless the results indicate a thickness deficiency of 5 per cent or more, in which case the Contractor shall bear all costs of testing.

Table 2: Payment adjustment

Thickness Tx	Per cent payment
100 per cent of specified thickness or	100
100 per cent of specified thickness to 95 per cent of specified thickness	$\frac{(Actual\ Thickness)^2}{(Specified\ Thickness)^2} \times 100$
less than 95 per cent of specified	remove and replace at no extra cost to the City

TS 3.70.10.03 Tactile Walking Surface Indicator – Item

Payment at the Contract Price for the above item shall be full compensation for all labour, Equipment and Material to do the work. Payment shall include the supplying, placing and removal of the formwork, the supplying, placing, consolidating and finishing of the concrete, the supplying and placing of tactile walking surface indicators, and the curing and protection of the concrete curb, gutter and sidewalk.

TS 3.70.10.04 Supplemental Cost for 7 Day Concrete – Item

The supplemental cost for 7 day concrete shall be the premium cost in addition to the cost for standard 28 day concrete.

TS 3.70.10.05 Supplemental Cost for 24-hour Concrete – Item

The supplemental cost for 24-hour concrete shall be the premium cost in addition to the cost for 7 day concrete.

Appendix 3.70-A, September 2019

For Use While Designing and Administering City Contracts

Note: This is a non-mandatory commentary appendix intended to provide information to a designer and contract administrator during the design and construction stage of a contract on the use of this TS specification in a City contract. This appendix does not form part of the standard specification. Actions and considerations discussed in this appendix are for information purposes only and do not supersede an owner's design decisions and methodology.

Notes to Designer:

The AODA mandates that tactile walking surface indicators (TWSI's) must be installed at a curb ramp or depressed ramp location when a new sidewalk is being constructed or when the sidewalk at the curb ramp / depressed ramp location is impacted by construction. As such, the designer must specify TWSI's when:

- new sidewalks are constructed;
an existing intersection is being reconstructed, widened or narrowed and impacts the existing sidewalk ramps;
- the existing sidewalk requires replacement due to condition; or,
- the existing sidewalk is being removed and replaced due to new traffic signal installation or other work.

There is no requirement under the AODA to retrofit TWSI's at intersection corners or other pedestrian crossing locations if the existing sidewalks are not impacted by construction. However, the above-noted AODA requirement is a minimum requirement and municipalities may choose to go beyond this minimum requirement.

To that end, Transportation Services division has developed its own operational guidelines for TWSI installation on all road resurfacing and road reconstruction projects, as follows:

- TWSI's are to be installed at all sidewalk ramps within the project limits.
- Typically, limits of projects will be at intersections. For these intersections at project limits, TWSI installation is not required if intersection corners are not impacted by the road work. However, if at least one corner is impacted by construction and requires TWSI's, then all intersection corners should be outfitted with TWSI's, regardless of condition and regardless of whether the pavement rehabilitation extends into the intersection.

Construction Specification for Sodding

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TS 5.00.01 SCOPE

This specification covers the requirements for the supplying, placing, and maintaining sod within the contract limits.

TS 5.00.02 REFERENCES

This specification refers to the following standards, specifications or publications:

City of Toronto Specifications

TS 5.10 Construction Specification for Growing Medium

Canadian Nursery Landscape Association

CNLA Canadian Standards for Nursery Stock

TS 5.00.03 DEFINITIONS – Not Used

TS 5.00.04 DESIGN AND SUBMISSION REQUIREMENTS

TS 5.00.04.01 Delivery and Storage

Schedule deliveries in order to keep storage at job site to a minimum without causing delay.

Deliver and store sod on covered pallets to job site within 24 hours of being lifted.

During wet weather allow sod to dry sufficiently to prevent tearing during lifting and handling.

During dry weather protect sod from drying and water sod as necessary to ensure its vitality and prevent dropping of soil in handling. Dry sod shall be rejected.

Broken, dry, discoloured pieces shall be rejected by the Contract Administrator.

TS 5.00.05 MATERIALS

TS 5.00.05.01 Nursery Sod

The quality and the source of nursery sod supplied shall be according to the specifications for number one grade turf grass nursery sod as set out in the latest edition of *Canadian Standards for Nursery Stock*. It shall be Number One Kentucky Bluegrass or Kentucky Bluegrass/Fine Fescue cultivars or as specified in the Contract Documents.

The source of sod shall be approved by the Contract Administrator before it is used in the Contract. No other source shall be used without the approval of the Contract Administrator.

TS 5.00.05.02 Sod Stakes

Sod stakes shall be wooden pegs 17 x 17 x 300 mm or approved 200 mm long steel staples.

TS 5.00.05.03 Fertilizer

Fertilizer shall be a complete synthetic slow release fertilizer with maximum 35 per cent water soluble nitrogen. Apply fertilizer at rates based on soil analysis recommendations.

TS 5.00.05.04 Water

Potable water shall be used, unless the Contractor provides testing results that demonstrate the water to be used is free of contaminants or impurities that would adversely affect the germination and growth of vegetation

TS 5.00.05.05 Mesh

Mesh shall be jute or synthetic plastic.

TS 5.00.05.06 Herbicide

Type, rate, and method of application subject to approval by the Contract Administrator, and shall be according to Toronto Municipal Code Chapter 612 Pesticides, Use of.

TS 5.00.06 EQUIPMENT – Not Used

TS 5.00.07 EXECUTION

TS 5.00.07.01 Workmanship

Keep site well drained. Clean up immediately any soil and debris spilled onto pavements and dispose of deleterious materials.

TS 5.00.07.02 Preparation of Topsoil Substrate

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

Remove debris, roots, branches, stones in excess of 50 mm diameter and other deleterious materials. Remove soil contaminated with calcium chloride, toxic materials and petroleum products. Remove debris which protrudes more than 75 mm above surface. Dispose of removed material off site.

Cross cultivate those areas where equipment used for hauling and spreading has compacted soil. (See City of Toronto specification TS 5.10, "Construction Specification for Growing Medium" and TS 5.40a, "Construction Specification for Growing Medium within Parkland Areas" for details on topsoil type and compacted site preparation.)

Where new sod is to be installed in existing sodded areas not disturbed by construction, rototill the area, apply a topdressing of topsoil, and install sod as specified.

TS 5.00.07.03 Laying of Sod

Prior to sodding, obtain approval from Contract Administrator that finished grade and depth of topsoil are satisfactory.

Lay sod within 24 hours of being lifted.

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

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.

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

Water sod immediately after laying to obtain moisture penetration into top 75 mm of topsoil/growing medium.

Provide adequate protection of sodded areas against erosion and mechanical damage. Remove protection after lawn areas have been accepted.

TS 5.00.07.04 Layering of Pegged Sod

Place mesh on top of topsoil on slopes steeper than 3H:1V. Secure mesh in place with wooden pegs or staples at maximum intervals of 600 mm. Cover with topsoil/growing medium.

Lay sod sections perpendicular to slopes greater than 4H:1V and secure with wooden pegs. Place pegs 3 per m, 100 mm below top edge of sod roll to prevent shifting of sod. Drive pegs flush with top of sod soil.

TS 5.00.07.05 Maintenance of Sod

Water the sodded areas in sufficient quantities and at frequency required to maintain soil under sod continuously moist to depth of 75 to 100 mm.

Cut grass when height is above 65 mm and maintain to a 60 mm – 100mm height. Remove clippings longer than 20 mm in length.

Maintain sodded areas weed free.

Fertilize sodded areas one month after sodding with fertilizer at rate per soil analysis recommendations. Postpone fertilizing until following spring if application falls within four week period to expected end of growth season.

TS 5.00.07.06 Maintenance Period

The Contractor shall maintain the sod for 60 Days following completion of the sod placement. During this period, the Contractor shall ensure that all placed sod is kept healthy, actively growing and green in leaf colour. At the end of the 60-day period, the Contractor Administrator will inspect the placed sod for defects. Any defective sod shall be replaced at no extra cost to the City.

Maintenance of the placed sod should be suspended during the winter dormant period (November 1 to April 30) and the 60-day maintenance period shall resume in the following spring after the winter dormant period.

The completed sod is subject to a general warranty period as specified in the Contract Documents, notwithstanding the 60-day maintenance period mentioned in this specification.

TS 5.00.08 QUALITY ASSURANCE

TS 5.00.08.01 Performance Measure

Sixty days after installation, the sod shall be green and show evidence of rooting into the underlying soil. Any areas of sod which fail to meet these requirements shall be rejected and the Contractor shall replace the rejected sod at no extra cost to the City.

Sodded areas will be considered meeting the performance measure provided that:

- 1) Sodded areas are properly established, healthy, actively growing, and green in leaf colour.
- 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 40 mm.
- 4) Sodded areas have been cut minimum 2 times.
- 5) All placed sod shall be in the same location as originally placed and shall not have moved, eroded, slipped or slough. Lawns sodded after September 30 shall be accepted in the following spring one month after start of the growing season provided acceptance conditions are fulfilled.

TS 5.00.08.02 Failure to Meet Performance Measure

If the completed work does not meet the performance measures, the Contractor shall re-apply the specified materials according to this specification. All replaced sod shall be subject to a further maintenance period of 60 consecutive days.

If the Contractor cannot apply or re-apply the sod due to site condition of for any reason, the Contractor shall maintain the site and control erosion until conditions permit application of the sod.

TS 5.00.09 MEASUREMENT FOR PAYMENT

TS 5.00.09.01 Nursery Sod

Measurement of nursery sod shall be by area in square meters (m²).

TS 5.00.09.02 Nursery Sod and Stakes

Measurement of nursery sod and stakes shall be by area in square meters (m²).

TS 5.00.09.03 Nursery Sod, Stakes and Mesh

Measurement of nursery sod, stakes and mesh shall be by area in square meters (m²).

TS 5.00.10**BASIS OF PAYMENT****TS 5.00.10.01****Nursery Sod – Item****Nursery Sod and Stakes – Item****Nursery Sod, Stakes and Mesh – Item**

Payment at the Contract Price for the above tender items shall be full compensation for all labour, Equipment and Material to do the work. Payment shall include the supplying and placing of sod, watering, weeding, fertilizing and maintenance until Final Acceptance, as well as, sod replacement and water for sod when no separate item for payment exists for such work.

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Growing Medium****Table of Contents**

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TS 5.10.01 SCOPE

This specification describes the requirements for the following:

- 1) Requirements for reuse of existing site soil as growing medium.
- 2) Mixing and testing of topsoil, coarse sand and compost components to create several different types of growing medium, applicable for the following applications:
 - Type 1 – Standard Mix, for seeding, sodding and trees planted in turf
 - Type 2 – Planting Bed Mix, for planting of shrubs and perennials
 - Type 3 – Boulevard Mix, for trees planted in hardscaped boulevards
 - Type 4 – Bioretention mix, for bioretention and rain gardens requiring high infiltration or pre-treatment.
- 3) Installation of growing medium.
- 4) Compacting and grading of growing medium.
- 5) Adding organic material to the surface layer of growing medium.

TS 5.10.02 REFERENCES

This specification refers to the following standards, specifications or publications:

City of Toronto Standard Specifications

TS 853 Construction Specification for Soil Cells

American Society of Testing and Materials

C33/C33M	Standard Specification for Concrete Aggregates
D422-63(2007)e1	Standard Test Method for Particle-Size Analysis of Soils
D2434	Standard Test Method for Permeability of Granular Soils (Constant Head)
D6913/D6913M	Standard Test Methods for Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis
D7503	Standard Test Method for Measuring the Exchange Complex and Cation Exchange Capacity of Inorganic Fine-Grained Soils
F1632	Standard Test Method for Particle Size Analysis and Sand Shape Grading of Golf Course Putting Green and Sports Field Rootzone Mixes
F1647	Standard Test Methods for Organic Matter Content of Athletic Field Rootzone Mixes
F1815	Standard Test Methods for Saturated Hydraulic Conductivity, Water Retention, Porosity, and Bulk Density of Athletic Field Rootzones

American Society of Agricultural Engineers

EP542 Procedures for Using and Reporting Data with the Soil Cone Penetrometer.

Canadian Council of Ministers of the Environment

Guidelines for Compost Quality (PN 1340) 2005

Compost Quality Alliance

TMECC Test Method for the Examination of Composting and Compost

Ontario Ministry of the Environment

Guideline for the Production of Compost in Ontario, Companion to the Ontario Quality Standards (July 2012)

Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act (April 2011)

TS 5.10.03 DEFINITIONS

For the purpose of this specification, the following definitions apply:

CSSS means Canadian System of Soil Classification

USDA means US Department of Agriculture

Agricultural Soil means manipulated and managed soils for the purposes of maximizing plant growth.

Continuous Soil Trench (CST) means a structure designed and built to contain an adequate volume of continuous growing media to support tree growth to maturity under a paved boulevard.

Scarification means the breaking down of a hydrophobic layer to increase infiltration rate (not advisable however sometimes necessary in compacted uncovered soils).

Soil Fracture means breaking of soil via mechanical or erosive processes.

Soil Ped means soil peds are soil aggregates built over time via natural processes – air, water, microorganisms – that give the soil its structure.

Stormwater Tree Trench (STT) means a continuous soil trench that is designed to capture, infiltrate and filter stormwater runoff from a drainage area beyond the footprint of the trench.

Till means generally, this is the mechanical process by which soil is broken up. Various means can be used to till ranging from hand equipment such as a spade/rake to intensive mechanized equipment. The term is used here to refer to the process of loosening the surface of the native soil so that it mixes with the growing medium.

Topsoil means topsoil is a nutrient-rich layer of soil that is naturally occurring and characterized by a high concentration of organic matter and microorganisms. Topsoil, sand and compost are the components of growing medium.

Tree Protection Zone (TPZ) means an area around a protected tree, the size of which relates to the diameter of the tree trunk. Protection is governed by the City's tree-related bylaws. For more information, refer to www.toronto.ca/services-payments/building-construction/tree-ravine-protection-permits/tree-protection/

Turf means turf, also known as sod, is grassy mat held together by its roots and a thin layer of soil.

TS 5.10.04 DESIGN AND SUBMISSION REQUIREMENTS

TS 5.10.04.01 Submittals

TS 5.10.04.01.01 Checklist

For checklist form, see *Contractors Submittal Checklist* form, at the end of this specification section. This list is a summary of the requirements and is not intended to supplant or modify the detailed descriptions of the requirements below. Note that many of the submittals must be provided a minimum of eight weeks before the installation of growing medium.

TS 5.10.04.01.02 Certificates

Submit certification to the Contract Administrator for approval that all growing medium components and the growing medium meet all environmental standards of the Province of Ontario and the City of Toronto. Certificate shall state that all materials are within the required maximum levels of all biological, metal and chemical contaminants.

TS 5.10.04.01.03 Product Data

Submit manufacturer product data and literature to the Contract Administrator for approval for coarse sand, aggregate, pine bark compost and yard waste compost. Provide submittal as part of the submittal of components for the growing medium prior to the submission of the growing medium.

Submit the manufacturer's particle size analysis, pH and the manufacturer's Fines Modulus Index for coarse sand. Provide manufacturer's identification and location for each coarse sand source.

Submit the manufacturer's pine bark compost and yard waste compost analysis for approval. Chemical and physical testing shall be conducted by soil laboratories accredited by The Compost Quality Alliance (CQA) utilizing test methods specified in The Test Methods for Examination of Composting and Compost (TMECC) except as specified herein.

Samples of each material shall be submitted at the same time as the product data and testing data of that material. Samples and analysis of topsoil, and growing medium must be submitted within 45 days prior to installation.

The compost analysis shall include:

Table 1: Compost analysis

Parameter	Testing Method
pH	TMECC 4.11A
soluble salt (mmhos/cm)	TMECC 4.10-A
% moisture	
% dry weight organic matter	TMECC 5.07-A
carbon: nitrogen	(C:N) ratio
particle size % passing 50 mm and 10 mm	TMECC 2.02-B
Solvita maturity index	Solvita
physical contaminants (% dry weight)	TMECC 3.08-A

Submit testing for chemical and biological contaminants and pathogens as required by local government regulations.

Certified reports shall be from samples taken within four months of the date of the sample submission.

TS 5.10.04.01.04 Material Source Locations

Submit locations of topsoil and growing medium material sources to the Contract Administrator. The City shall have the right to reject any material source. Submit the name, address and telephone number of the source contact, and the location of the soil source including directions to the specific field location on the property.

Include a list of all crops grown on the soil, and any herbicides and pesticides applied, over the previous three years (if applicable).

TS 5.10.04.01.05 Samples

Submit samples of each product and material where required by the specification to the Contract Administrator for approval. Label samples to indicate product, specification number, characteristics, and locations in the Work. Samples shall be reviewed for appearance only. Compliance with all other requirements is the exclusive responsibility of the Contractor. Delivered materials shall closely match the samples.

For in-situ soils, a minimum of three samples shall be analyzed if less than 600 m³ of soil is installed. If more than 600 m³ is installed a minimum of one test will be taken for each 200 m³ above 600 m³.

Submit duplicate samples for each of: topsoil, coarse sand, aggregate, pine bark compost, yard waste compost and growing medium, as described in this clause.

Samples should be labeled to include the location of the source of the material.

Samples of each material shall be submitted at the same time as the product data and testing data of that material. Samples and analysis of topsoil, and growing medium must be submitted within 45 days prior to installation. Contract administrators may request three (3) test results for final mix designs if deemed necessary.

Each test report shall be marked with the following information:

- 1) Date issued;
- 2) Project title and names of Contractor and material supplier;
- 3) Name of material and reference number from TS 5.10.05, herein, identifying the type of material;
- 4) Date, place, and time of sampling;
- 5) Location of material source;
- 6) Testing laboratory name, address, and telephone number, and name(s), as applicable, of each field and laboratory inspector;
- 7) Type(s) of test;
- 8) Results of test(s); Suggested acceptable ranges of the test data for the types of plants to be planted; preference given to laboratories that can provide this range information.
- 9) Recommendations for amendments to bring the growing medium to within these acceptable ranges; Note: This direction does not guarantee subsequent testing will yield results within ranges. This does not necessarily require retest prior to approval.
- 10) Soil testing parameters should reflect parameters identified within specifications.

Samples of growing medium shall be submitted no less than 14 days after the approval of the mix components.

Do not submit samples of growing medium for approval until all mix component testing has been reviewed and approved by the Contract Administrator.

TS 5.10.04.01.06 Testing Reports

Submit soil test analysis report to the Contract Administrator for approval for each sample of topsoil and growing medium from an approved soil-testing laboratory, as below:

The testing laboratory shall be approved by the City in advance. All soil and growing medium tests shall be conducted by soil laboratories accredited by The Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA), except as noted below. Current listing of accredited laboratories can be found at www.omafra.gov.on.ca/english/crops/resource/soillabs.htm. Submit the name of the soil lab for approval prior to starting the testing process. Preference given to laboratories that can provide acceptable test data ranges for the types of plants being planted.

All tests shall be performed in accordance with the current testing standards and protocols of the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA).

Particle size distribution analysis for all topsoil and growing medium including the following gradient of mineral content:

Table 2: Particle size distribution

CSSS/USDA designation	Size (mm)
Gravel	2 – 75
Total sand	0.05 – 2
very coarse sand	1 – 2
coarse sand	0.5 – 1
medium sand	0.25 – 0.5
fine sand	0.1 – 0.25
very fine sand	0.05 – 0.1
Silt	0.002 – 0.05
Clay	< 0.002

Note: Contractors should note that where test results fall outside of specified ranges, the Contract Administrator will examine the extent of variance, as well as any recommendations from the testing laboratory, and determine whether the soil will be accepted, amended or rejected.

Particle size analysis and growing medium to include sand sieve analysis, and shall be according to ASTM D6913/D6913M, (PSD of soil by sieve analysis), ASTM D422 (hydrometer test) or ASTM F1632 (pipette test) or equivalent.

Chemical analysis including the following:

- 1) pH
- 2) Plant available nutrient levels by parts per million including:
 - Phosphorus
 - Potassium
 - Magnesium
 - Calcium

For chemical analysis of Phosphorus, use the Olsen method for alkaline and calcareous soils. Use the Bray or Mehlich I or III method for acidic to slightly alkaline and non-calcareous soils.

Nutrient test shall include the testing laboratory recommendations for supplemental additions to the growing medium:

- 1) Soluble salt by electrical conductivity of a 1:2 soil water sample measured in mmhos/cm;
- 2) Cation Exchange Capacity (CEC) measured in meq/100g (ASTM D7503, Cation Exchange Capacity);
- 3) Percent Organic Matter by dry weight as determined by ignition (Ash Burn Test or Walkley/Black Test, ASTM F1647); and
- 4) Carbon to Nitrogen (C:N) ratio.

For Type 3 – Boulevard Mix, Type 4 – Bioretention Mix, and for soils used in green infrastructure applications Infiltration/Permeability/Hydraulic Conductivity testing shall be done using ASTM D2434 or ASTM F1815. Testing methodology utilized shall reflect desired, in-situ compaction levels.

Report suitability of topsoil or growing medium for growth of applicable planting material. Soil analysis tests shall include recommendations for normal ranges of soil chemical attributes for the type of plants included in the project in the same units as the test data.

The City may request additional growing medium test on different mix component ratios in order to attain results that more closely meet the mix requirements.

Laboratory comments or recommendations regarding amendment requirements or procedures shall not be interpreted to prescribe or dictate procedures or quantities of soil materials for the work of this Contract. Final approval of soil amendment procedures shall be approved by the Contract Administrator.

The City reserves the right to require additional soil analysis at any time such additional samples of materials are deemed necessary for verification of conformance to specification requirements.

Contractor shall furnish samples for this purpose upon request and shall perform and pay for additional testing as requested by the Contract Administrator at no extra cost to the City.

Contractor to arrange for testing at start of project. All testing shall be at the expense of the Contractor.

TS 5.10.04.01.07 In-Situ Compaction Testing

Submit results of all compaction testing required by the specifications to the Contract Administrator for approval.

- 1) Installed growing medium shall be tested in-situ with a cone penetrometer and a soil moisture meter.
 - a) Testing shall be arranged for and paid for by the Contractor.
 - b) Acceptable procedures for performing and interpreting the results of cone penetration tests on soils using a mechanical or electronic static cone penetrometer are provided in the American Society of Agricultural Engineers' Standard EP542.
 - c) Cone penetration tests shall be performed after wetting and allowing a min. of one week settling. Penetration resistance shall be to the full depth of the installed soil profile or 750 mm, whichever is less, when the soil profile is thoroughly wetted and confirmed by in-situ measurements using a soil moisture meter and the following acceptable ranges:

Soil texture	Soil moisture
sand, loamy sand, sandy loam	12–18%
loam, sandy clay, sandy clay loam	27–36%
clay loam, silt loam	31–36%
silty clay, silty clay loam	38–41%

-
- d) One test shall be performed every 25 m² of growing medium surface area. The City may request additional testing locations.
 - 2) Maintain a record log of all compaction testing for submission and approval. The record log shall include the date, location, depth and pressure reading of each test. Test location data shall be plotted on a site plan.
 - 3) Submit the compaction log to the City at the end of installation period. The compaction log shall be kept current and available at the site for review at all times.

TS 5.10.04.02 Sequencing and Scheduling

Prepare a detailed schedule of the installation of growing medium for coordination with other trades, and submit to the City for approval prior to the start of the project.

Sequence delivery and installation of growing medium so that it can be adequately protected from other work at the site.

Schedule all sub-surface utility installation so that it is completed prior to delivery and installation of growing medium.

TS 5.10.04.03 Delivery, Storage and Handling

Do not mix, deliver or place growing medium in frozen, wet, or muddy weather conditions.

Where construction sequencing requires work during cold weather, protect sub grades and bulk materials from freezing using covers or heated tenting as needed. Sub grades that are sufficiently well drained to preclude the buildup of ice may be installed and built upon during freezing weather provided the surface is cleared of snow and any ice bound material.

Harvest topsoil and prepare growing medium ahead of the scheduled work during periods of warm weather.

Stockpiles should not exceed a height of 1.4 m.

Protect stockpiles of topsoil and growing medium from freezing and saturation. Remove topsoil from within the interior of the stockpile where topsoil and growing medium are not frozen. At the end of each day cover the exposed working face of the stockpile sufficient to keep from freezing.

Protect stockpiles from rain and washing that can separate fines and coarse material, and from wind erosion. Cover stockpiles with plastic sheeting at the end of each workday and ensure covering is secured in case of windy conditions. When possible, uncover stockpiles daily during warm dry conditions, to ensure breathability.

Protect growing medium stockpiles from contamination by chemicals, dust and debris that may be detrimental to plants or drainage.

Do not use delivery or installation methods that overly mix the growing medium. Soil blowing equipment shall not be permitted to move growing medium.

TS 5.10.04.04 Site Conditions

It is the responsibility of the Contractor to be aware of all surface and sub-surface conditions, and to report any circumstances that will negatively impact drainage. Do not proceed with the work until unsatisfactory conditions have been corrected.

TS 5.10.04.04.01 Utilities

Determine location of all utilities including vaults, conduits, pipes and wires adjacent to, below or within the areas of work. Perform all work in a manner, which will avoid damage to any utility. Hand excavate near any utility.

For any continuous soil trench or stormwater tree trench, rely only on utility information that has been obtained and described to Quality Level A as defined by the American Society of Civil Engineers standard ASCE 38-02, including certification by a civil engineer, licensed in the province of Ontario.

TS 5.10.04.04.02 Waterproofing

Perform work in a manner, which will avoid damage to waterproofing membrane, protection board or other structural sealing materials.

TS 5.10.04.04.03 Coordination

Coordinate work with that of other trades affecting or affected by work of this section and cooperate to assure the steady progress of work.

TS 5.10.04.04.04 Safety

The Contractor shall be responsible for pedestrian and vehicular safety and control all movement within and around the work site. Provide the necessary barriers, warning devices and ground personnel needed to give safety, warning and protection to persons and vehicular traffic within the area of work including the Contractor's equipment and temporary storage within the public right-of-way. Provide any additional items required by the City.

TS 5.10.04.04.05 Damage

During site preparation, growing medium installation and protection, the Contractor shall be responsible for all damage to existing features above and below ground incurred as a result of work operations. Repairs or replacements or both shall be made to the satisfaction of the Contract Administrator.

Protect all installed material from compaction, contamination and erosion. Install fences; utilize mulch, mats and geo-fabrics over the surface of the soil as required. In the event that any soil becomes compacted, contaminated or eroded, repair the damage by removing and reinstalling the compacted material according to TS 5.10.07.11, herein.

TS 5.10.05 MATERIALS**TS 5.10.05.01 Topsoil Component**

Topsoil shall be naturally occurring soil, harvested from the O or A horizon of the soil profile, suitable for the germination of seeds and the support of vegetative growth, and meet the following requirements:

Soil particle size distribution	
Sand (0.05 – 2 mm)	20 – 70%
Silt (0.002 – 0.05)	<i>Total SSC will sum 100%</i>
Clay (<0.002 mm)	
	15 – 30%
Chemical analysis	
	pH: 5.5 – 7.8 ⁽¹⁾
Plant Available Nutrient Levels (ppm)	
Phosphorous	10 – 60
Potassium	80 – 250
Calcium	< 5000
Magnesium	100 – 300
Soluble salt	< 0.50 mmhos/cm
Sodium Adsorption Ratio	<15
Cation Exchange Capacity (CEC)	> 20 meq/100g
Percent organic matter	2.5 – 5%

Notes: Specifiers should note that the pH maximum of 7.8 will be acceptable for most trees and other plants in the Toronto area. However, if the design team specifies pH sensitive trees or plants, the pH maximum should be lowered to an appropriate level for those plants. Note that lower pH growing medium will cost more due to the lack of availability of lower pH components. Coordinate the specification with the design team regarding plant species requirements.

Contractors should note that where test results fall outside of specified ranges, the Contract Administrator will examine the extent of variance, as well as any recommendations from the testing laboratory, and determine whether the soil will be accepted, amended or rejected.

Topsoil shall retain a significant portion of the soil's ped structure when stockpiled at the supplier's yard. Peds are defined as the clumps of soil naturally aggregated during the soil building process, by clays and soil biology. Peds of any size are permissible.

The Contract Administrator shall evaluate the presence of peds by visual examination of the sample submitted. The addition of coarse sands and organic amendments may reduce the presence of peds.

Topsoil shall not be screened through sieves or screens smaller than 50 mm to avoid eliminating soil peds.

Topsoil shall not contain materials and contaminants at levels that would be detrimental to plant growth; or impair drainage, installation or maintenance of the resulting growing medium; or adversely impact its intended use including containing the following

- Refuse; roots; construction debris; wood or sticks larger than 25 mm in diameter; brush; clumps of root mats of plants and toxic materials
- Lumps of clay or subsoil larger than 50 mm
- Stones larger than 75 mm
- Deleterious substances; plant or soil pests; undesirable grasses including crabgrass or couch grass, noxious or weeds or weed seeds.

The City shall determine if the quantities of any of these materials is sufficient to cause rejection of the topsoil. The aggregate of all the above materials shall not exceed 5 per cent of the total soil volume as assessed by visual inspection.

Topsoil shall be in according to Toronto Municipal Code Chapter 489, Grass and Weeds. The contractor shall be responsible for removing all weeds that germinate during the plant maintenance period.

Topsoil shall be harvested from approved source locations that comply with all regulations governing the removal of topsoil.

Topsoil may be purchased from a source of collected topsoil from development sites provided the sources of the topsoil stockpile is of similar textures and meets the requirements of this specification.

Topsoil shall not be a soil mix including any combination of sand, fertilizer, or organic matter or compost added to mineral soil in order to meet the texture, chemical or organic requirements for topsoil. The organic matter content of the soil shall be residue of long term, natural soil building processes and not from added organic matter or compost.

Submit source location and a list of all crops grown on the soil and any herbicides and pesticides applied over the previous three years, if applicable.

Submit duplicate 4 L samples (total 8 L) from each topsoil source with soil testing results. The sample shall be a mixture of the random samples taken around the source field or stockpile. The delivered sample shall represent the soil ped content in the stockpile.

TS 5.10.05.02 Coarse Sand Component

Coarse sand shall be clean, sharp, mineral sand, and meet the following requirements:

Coarse concrete sand, ASTM C33 with a Fines Modulus Index between 2.5 and 3.5

Table 3: Physical analysis

Sieve size (mm)	Per cent passing
9.5	100
4.75	95 – 100
2.36	80 – 100
1.18	50 – 85
0.60	25 – 65
0.30	5 – 30
0.15	0 – 10
0.075	≤ 3

Note: Contractors should note that where test results fall outside of specified ranges, the Contract Administrator will examine the extent of variance, as well as any recommendations from the testing laboratory, and determine whether the soil will be accepted, amended or rejected.

Chemical analysis shall be as follows:

- 1) pH <8.6
- 2) Soluble Salt < 0.5 mmhos/cm
- 3) Percent Organic Matter < 0.5%
- 4) Local sources preferred

Coarse sand shall not contain toxic substance at levels harmful to plant growth.

Submit duplicate 1 L (total 2 L) samples with manufacturer's literature and material testing certification that the product meets the above requirements.

TS 5.10.05.03 Organic Component

Compost shall be a stable, humus-like material produced from aerobic decomposition, composted and cured until the maturity status complies with indices specified below. Except as specified herein, compost shall be according to the requirements for Category A Compost as defined in the Guidelines for Compost Quality.

- Yard waste compost feedstock shall be yard waste trimmings or source-separated municipal solid waste or both.
- Pine bark compost feedstock shall be 98 per cent pine trees with less than 10 per cent combined pine wood fiber and sawdust content.
- Untreated shredded wood / wood chips.

Compost shall not contain weeds or debris such as sharp objects, plastics, trace elements and foreign matter in excess of that defined for Category A Compost. Total of all stones, recognizable branches, wood chips and roots larger than 25 mm in diameter shall be less than 5 per cent by volume.

Compost shall have moisture content between 35 and 55 per cent when blended or applied.

Compost shall be composted long enough to exhibit a dark brown color, approximately Munsell colour 7.5 R; Value 3 or lower; Chroma 2 or lower. Color shall be determined by visual comparison of the sample to the Munsell Soil Color Chart, most current edition.

Compost shall have a strong aerobic (sweet) odor. Compost lacking a strong aerobic odor or which has an anaerobic (sour) or a strong pine or alcohol odor shall be rejected. Odor may be determined during the submittal sample review and at the time of any inspections of materials by the Contract Administrator by observation of the inspector.

Certification: provide the following documentation to the Contract Administrator:

- 1) A statement that the compost meets all health and safety regulations.
- 2) Feedstock type and percentage in the final compost product.

Testing: Compost shall be tested every 4000 m³ of material intended for use in growing medium. The results of compost analysis shall be provided by the compost supplier for approval. Compost should meet the following criteria as reported by the following laboratory tests:

Physical analysis

Particle size yard waste compost	95% pass through 50 mm screen
	25% pass through 10 mm screen
Particle size pine bark compost	95% pass through 20 mm screen
	25% pass through 6 mm screen

Chemical analysis

Parameter	Range
pH yard waste compost	5.0 – 8.0
pH pine bark compost	4.0 – 6.5
soluble salt	< 3.5 mhos/cm
% moisture	35 – 55%
% organic matter	25 – 55%
Solvita maturity index	Solvita
C:N ratio	15:1 – 25:1 (for Yard Waste only)

Note: Contractors should note that where test results fall outside of specified ranges, the Contract Administrator will examine the extent of variance, as well as any recommendations from the testing laboratory, and determine whether the soil will be accepted, amended or rejected.

Physical contaminants (including man-made inerts) < 1 per cent dry weight basis

Metal content shall comply with Guidelines for the Production and Use of Aerobic Compost in Ontario except for copper and zinc, which must comply with Soil, Ground Water and Sediment Standards for Use under Part XV.1 of the Environmental Protection Act Table 3 (medium to fine textured soils).

Pathogen reduction shall meet Section 6.0 of Guidelines for the Production and Use of Aerobic Compost in Ontario.

Submit duplicate 1 L samples (total 2 L) with manufacturer's literature and material testing certification that the product meets the requirements.

TS 5.10.05.04 Existing Site Soil as Growing Medium

Existing site soil for seeding, sodding and tree planting may be used as growing medium at sites where the existing soil has been analyzed by an agricultural soil scientist and determined to be suitable for its intended purpose. The City may approve the use of existing soils and may require additional amendments for the soil where recommended by the soil report.

Soils that would not be suitable include: subsoils, soils with high clay or silt content, with very high or low pH, contaminated with chemicals and/or salt, or which have been mixed with gravels or unshrinkable fills.

The following are requirements for existing site soil to be used as growing medium.

Soil particle size distribution	
Sand (0.05 – 2 mm)	20 – 70%
Silt (0.002 – 0.05)	<i>Total SSC will sum 100%</i>
Clay (<0.002 mm)	15 – 30%
Gravel (2 – 75 mm)	< 5%
Chemical analysis	pH: 5.5 – 7.8
Plant Available Nutrient Levels (ppm)	<i>If not balanced follow lab recommendations for fertilizer application subsequent to installation</i>
Phosphorous	10 – 60
Potassium	80 – 250
Calcium	< 5000
Magnesium	100 – 300
Soluble salt	< 2 mmhos/cm
Percent organic matter	2.5 – 5%
Infiltration/Permeability/Hydraulic Conductivity	50 –75 mm/hr at 85% Proctor density

Submit duplicate 4 L samples (total 8 L) with material testing certification that the product meets the requirements.

Submit the agricultural soil scientist report for approval. The report shall describe the extent and depth of the soil to be reused, and the soil quality relative to the required parameters. It is understood that obtaining accurate soil information in urban areas is difficult if there is paving over the soil. A preliminary soil report shall be submitted a minimum of eight weeks prior to the installation of the soil. Once the soil has been made accessible by the construction, the soil shall be reevaluated and a final report submitted. Urban Forestry may alter the approval or make additional requirements based on the final soils report.

The depth of the existing topsoil should be checked throughout the site and documented prior to harvesting from the site to help guide soil replacement depths.

- 1) Topsoil salvage limits shall be to a depth of one metre or as specified in the Contract Documents.
- 2) Document the plant communities with which the topsoil is associated.
- 3) Proceed from higher to lower topographic areas when stripping topsoil.
- 4) Remove topsoil as late as possible in the construction sequence.
- 5) Any objects or debris, such as segments of concrete, asphalt, brick or unshrinkable fill, or soil mixed with gravel, dust or other debris, shall be removed, and the soil volume replaced with new topsoil mixed into the existing soil, to the satisfaction of the Contract Administrator.

Existing site soil to be reused shall be excavated to break up compaction and reinstalled at the compaction required for growing medium.

Do not screen topsoil prior to stockpiling. The excavated topsoil should be placed into stockpiles at locations designated on the construction drawings. Stockpiles should be treated with temporary soil stabilization and erosion control measures. Do not cover stockpiles with plastic or other non-breathable materials.

Stockpiles should not exceed 1.4 m in height.

Excavation, moving, stockpiling and installation of existing site soil shall utilize means and methods that preserve soil peds. Large soil peds up to 200 mm in any dimension are acceptable.

Yard waste compost shall be loosely incorporated into the soil at the time of installation at a rate of 20 per cent by volume.

Cover the stockpile with yard waste compost of sufficient volume to roughly equal 20 per cent of the stockpile volume. Using the bucket of a backhoe, drag the pile to approximately one-third its height. Working from the bottom, turn the pile over once. Place in the installation location following the requirements for growing medium.

Fertilizer may be added to the soil if required to meet the chemical requirements of growing medium.

Soil shall not be contaminated with toxic chemicals harmful to humans or plants at levels exceeding provincial or federal limits.

TS 5.10.05.05 Type 1 – Standard Mix

For sodding, sodding and trees planted in turf, a mixture of topsoil, coarse sand and compost components mixed in the appropriate proportions, such that the growing medium shall meet the following parameters:

Soil particle size distribution	
Total sand (0.05 – 2 mm)	50 – 75%
Silt	20 – 40% (<i>Total SSC will sum 100%</i>)
Clay	5 – 20%
Gravel (2 – 75 mm)	>/+/< 5%
Chemical analysis ⁽¹⁾	pH: 6.0 – 7.8 ⁽¹⁾
Plant Available Nutrient Levels (ppm)	
Phosphorous	10 – 60
Potassium	80 – 250
Calcium	< 5000
Magnesium	100 – 300
Soluble salt	< 1.5 mmhos/cm
Percent organic matter (dry weight)	4 – 6%
Infiltration/Permeability/Hydraulic Conductivity	50 –75 mm/hr at 85% Proctor density

Notes: ¹ Specifiers should note that the pH maximum of 7.8 will be acceptable for most trees and other plants in the Toronto area. However, if the design team specifies pH sensitive trees or plants, the pH maximum should be lowered to an appropriate level for those plants. Note that lower pH growing medium will cost more due to the lack of availability of lower pH components. Coordinate the specification with the design team regarding plant species requirements.

² Contractors should note that where test results fall outside of specified ranges, the Contract Administrator will examine the extent of variance, as well as any recommendations from the testing laboratory, and determine whether the soil will be accepted, amended or rejected.

Type 1 Mix does not necessarily require the above coarse sand or organic amendment depending on existing texture and chemical properties. Type 1 Mix reflects test results by weight and not component composition by volume as in Type 2 and 3.

Mix the growing medium with a loader bucket to preserve topsoil peds using the following method:

- Mix the coarse sand and compost together separately;

- Spread a layer of topsoil approximately 300 mm thick and apply the required proportions of coarse sand/compost mix over the topsoil;
- Push the topsoil, coarse sand and compost into a pile and then drag out into a layer mixing the soil with the bucket. Repeat the mixing action a second time to gain an approximate mixture of the material. Do not over mix;

This method assumes that there is additional mixing of the materials as it is moved to the final stockpile, placed into delivery trucks, deposited at the project site, and spread into the installation location.

This method assumes that soil will not be installed using soil blower equipment. If a soil slinger is used for installation, the belt speed should be minimized to reduce velocity such that the soil drops off the belt – water-falling, forming a pile underneath. The soil is not to be projected over a horizontal distance.

Submit duplicate 4 L samples (total 8 L) with material testing certification that the product meets the requirements.

TS 5.10.05.06 Type 2 – Planting Bed Mix

For horticultural beds of shrubs and perennials, a mixture of topsoil, coarse sand and compost mixed to the following proportions, by volume:

Topsoil	50%
Coarse sand	20%
Organic components	30%

The growing medium shall meet the following parameters:

Chemical analysis ⁽¹⁾	pH: 6.0 – 7.8 ⁽¹⁾
Plant Available Nutrient Levels (ppm)	
Phosphorous	10 – 60
Potassium	80 – 250
Calcium	< 5000
Magnesium	100 – 300
Soluble salt	< 1.5 mmhos/cm
Percent organic matter (dry weight)	4-6%
Infiltration/Permeability/Hydraulic Conductivity	50 –75 mm/hr at 85% Proctor density

Notes: ¹ Specifiers should note that the pH maximum of 7.8 will be acceptable for most plants in the Toronto area. However, if the design team specifies pH sensitive trees or plants, the pH maximum should be lowered to an appropriate level for those plants. Note that lower pH growing medium will cost more due to the lack of availability of lower pH components. Coordinate the specification with the design team regarding plant species requirements.

² Contractors should note that where test results fall outside of specified ranges, the Contract Administrator will examine the extent of variance, as well as any recommendations from the testing laboratory, and determine whether the soil will be accepted, amended or rejected.

Submit duplicate 4L samples (total 8 L) with material testing certification that the product meets the requirements.

TS 5.10.05.07 Type 3 – Boulevard Mix

For tree planting in hardscape boulevards, a mixture of topsoil, coarse sand and compost mixed to the following proportions, by volume:

Topsoil	40 – 45%
Coarse sand	40 – 50%
Organic components	12 – 15%

The growing medium shall meet the following parameters:

Soil particle size distribution	
Medium to coarse sand (0.25 – 2 mm) plus gravel (2 – 5 mm)	> 45%
Total combined silt and clay	18 – 40%
Gravel (2 – 75 mm)	> 5%
Chemical analysis ⁽¹⁾	pH: 6.0 – 7.8 ⁽¹⁾
Plant Available Nutrient Levels (ppm)	
Phosphorous	10 – 60
Potassium	80 – 250
Calcium	< 5000
Magnesium	100 – 300
Soluble salt	< 1.5 mmhos/cm
Percent organic matter	2.5 – 5%
Infiltration/Permeability/Hydraulic Conductivity	50 – 75 mm/hr at 85% Proctor density

Notes: ¹ Specifiers should note that the pH maximum of 7.8 will be acceptable for most trees and other plants in the Toronto area. However, if the design team specifies pH sensitive trees or plants, the pH maximum should be lowered to an appropriate level for those plants. Note that lower pH growing medium will cost more due to the lack of availability of lower pH components. Coordinate the specification with the design team regarding plant species requirements.

² Contractors should note that where test results fall outside of specified ranges, the Contract Administrator will examine the extent of variance, as well as any recommendations from the testing laboratory, and determine whether the soil will be accepted, amended or rejected.

All testing must reflect specified parameters, that is to say sand + gravel and silt + clay where each must be tested together and reported accordingly. For example, sand + gravel = 73%, silt + clay = 17%.

Mix the growing medium with a loader bucket to preserve topsoil peds using the following method:

- 1) Mix the coarse sand and compost together separately;
- 2) Spread a layer of topsoil approximately 300 mm thick and apply the required proportions of coarse sand/compost mix over the topsoil; and
- 3) Push the topsoil, coarse sand and compost into a pile and then drag out into a layer mixing the soil with the bucket. Repeat the mixing action a second time to gain an approximate mixture of the material. Do not over mix.

This method assumes that there is additional mixing of the materials as it is moved to the final stockpile, placed into delivery trucks, deposited at the project site, and spread into the installation location.

This method assumes that soil will not be installed using a soil blower. If a soil slinger is used for installation, the belt speed should be minimized to reduce velocity such that the soil drops off the belt–water-falling, forming a pile underneath. The soil is not to be projected over a horizontal distance.

Submit duplicate 4L samples (total 8 L) with material testing certification that the product meets the requirements.

TS 5.10.05.08 Type 4 – Bioretention mix

For bioretention and rain gardens requiring high infiltration or pre-treatment mix to the following proportions, by volume:

Topsoil	2 parts topsoil
Coarse sand	3 parts sand
Organic components	1 part organic soil components (leaf and yard waste compost and/or pine bark fines)

The growing medium shall meet the following parameters:

Media specification	Site-specific goal	
	Infiltration * <i>Above mix proportions may need to be adjusted to accommodate a greater proportion of sand.</i>	Treatment
Soil particle size distribution		
Sand (0.05 – 2 mm.)	75-90%	65-75%
Silt (0.002 - 0.05 mm)	7-22%	13-30%
Clay (< 0.002 mm)	3-15%	3-15%
Gravel (2.0 – 64 mm.)	less than or equal to 10%	
Chemical analysis	pH: 6.0 – 8.0	
Plant Available Nutrient Levels (ppm)		
Phosphorous	10 – 40	
Potassium	80 – 250	
Calcium	< 5000	
Magnesium	100 – 300	
Percent organic matter	3-10%	
Hydraulic conductivity, saturated, sample compacted to 75-85% maximum dry density.	0.0021-0.0083 cm/s (75-300 mm/h)	6.9 x 10-4 -0.0021 cm/s (25-75 mm/ h)
Cation exchange capacity	> 10 meq/100 g	> 10 meq/100 g

Notes: ¹ The component mix above is generated from the Sustainable Technologies Evaluation Program (STEP) for filter media:
[wiki.sustainabletechnologies.ca/wiki/Bioretention: Filter media](http://wiki.sustainabletechnologies.ca/wiki/Bioretention:_Filter_media)

² The media specifications above are generated from the CSA W-200-18 Design of Bioretention Systems.

³ Contractors should note that where test results fall outside of specified ranges, the Contract Administrator will examine the extent of variance, as well as any recommendations from the testing laboratory, and determine whether the soil will be accepted, amended or rejected.

TS 5.10.05.09 Soil Amendments

Chemicals and other materials designed to increase soil fertility as recommended in soil testing report. All products shall be delivered to the site in unopened containers and stored in a dry enclosed space suitable for the material and meeting all environmental regulations. All products shall be freshly manufactured and dated for the season in which the products are to be used.

Fertilizer for planting shall be organic fertilizer, as defined under the *Fertilizers Act*. Submit manufacturer's product literature.

Fertilizer selections shall be based on the recommendations of the soil test.

TS 5.10.06 EQUIPMENT – Not Used**TS 5.10.07 EXECUTION****TS 5.10.07.01 Site Examination**

Examine the surface grades and soil conditions for any circumstances that might be detrimental to soil drainage, such as uneven sub grades and waterproofing that may hold or pond water, deposits of construction-related waste or soil contamination, storage of material or equipment, soil compaction or poor drainage. Confirm that all utility work and installation of planter drainage has been completed and tested. Examine the grading, verify all elevations.

Confirm that all other work in the area of growing medium installation is completed. Notify the Contract Administrator in writing of any unsatisfactory conditions.

TS 5.10.07.02 Coordination with Project Work

The Contractor shall coordinate with all other trades that may impact the completion of the soil installation work. Protect installed growing medium from compaction by other trades.

TS 5.10.07.03 Grade and Elevation Control

Provide grade and elevation control during installation of growing medium. Utilize grade stakes, surveying equipment and other means and methods to assure that grades and contours are as specified on the Contract Drawings.

Maintain grade stakes until the grades have been viewed by the Contract Administrator.

TS 5.10.07.04 Site Preparation

In areas not above structure, excavate to the proposed sub grade. Maintain all required angles of repose of the adjacent materials as shown on the Contract Drawings or as required to support adjacent materials or structures. Do not over excavate compacted subgrades of adjacent pavement or structures. Remove all construction debris and material.

Confirm that the subgrade is at the proper elevation and compacted as required. Subgrade elevations shall slope parallel to the finished grade or toward the subsurface drain lines as shown on the Contract Drawings.

Do not proceed with the installation of growing medium, until all subsurface utility work in the area has been completed.

Do not begin growing medium installation until all subsurface drainage, and irrigation main lines shown on the Contract Drawings are viewed and approved by the City.

Protect adjacent walls, walks and utilities from damage or staining by the soil. Use 12 mm plywood or plastic sheeting or both to cover existing concrete, metal and masonry work and other items as directed during the progress of the work.

- 1) Clean up any soil or other materials spilled on any paved surface, including at the end of each working day.
- 2) Any damage to the paving or architectural work shall be repaired by the Contractor at no extra cost the City.

TS 5.10.07.05 Growing Medium Installation

For installation of soil in soil cells, see TS 853.

Prior to installing any growing medium, the Contract Administrator shall approve the condition of the subgrade and the previously installed sub grade preparation and the installation of subsurface drainage material.

In areas of soil installation above existing subsoil, till the growing medium into the bottom layer of subsoil.

- 1) Loosen or till the subsoil of the subgrade to a depth of 50 to 75 mm with a backhoe or other suitable device.
- 2) Spread a layer of the specified growing medium 50 to 75 mm deep over the subgrade.
- 3) Soil slingers may be used for growing medium delivery/installation; however, the belt speed shall be minimized to reduce velocity such that the soil drops off the belt—water-falling, forming a pile underneath. The soil is not to be projected over a horizontal distance. If access is limited, the growing medium shall be transported in lifts from the delivery pile to the soil installation location by means causing the least amount of disturbance / compaction, for example transport by front-end loader. Growing medium shall not be installed using soil blower equipment.
- 4) Till the native soil to loosen it. A best practice is to use a manual rake to till the excavation and prepare it for growing medium installation. Take care not to over-till as this causes clumping, compaction, and detrimentally affects soil biota, such as earthworms and fungal hyphae. Then, thoroughly till a thin lift of the growing medium and the subgrade together.
- 5) Protect the tilled area from traffic. Do not allow the tilled sub grade to become compacted or wet.

Immediately install the remaining growing medium in 300 to 400 mm lifts to the required depths. Work outward from the installed growing medium such that equipment does not have to pass over the installed soil.

The depths and grades shown on the drawings are the final grades after settlement and shrinkage of the organic material. The Contractor shall install growing medium to a level of at least 50 mm above the finished grades as specified in the Contract Drawings to anticipate this reduction of growing medium volume depending on the typical settling properties of the specified growing medium.

Avoid compacting the growing medium as much effort and cost is needed to rectify such damage.

Utilize grading and earth moving equipment that uses low impact tracks that is rated to exert a static force on the ground of no more than 20 kg/m². All equipment used to install soil shall have buckets equipped with teeth to loosen soil compaction.

When any equipment passes over previously prepared subgrade or installed soil it shall reverse out of the soil area over the same path dragging the teeth of the bucket over the tracks to break surface compaction created by the equipment.

Coordinate the installation of water harvesting system and drain lines within the growing medium.

TS 5.10.07.06 Growing Medium Compaction

Provide adequate equipment to achieve consistent and uniform compaction of the growing medium. Use the smallest equipment that can reasonably perform the task of spreading and compaction.

Maintain moisture conditions within the growing medium during installation to allow for satisfactory compaction. Suspend installation operations if the growing medium becomes wet. Soils are generally identified as wet when soil moisture content exceeds 20 per cent. Moisture contents of 35 to 45 per cent are generally considered to be saturated. Do not place growing medium on wet or frozen sub grade.

Lightly compact each 300 to 400 mm lift to achieve the following test results.

Growing medium compaction shall be tested at each lift using a cone penetrometer to between 70,000 and 140,000 kg/m² when the soil is between 12 and 20 per cent moisture.

Maximum penetration resistance readings that exceed the following values indicate that the soil has been compacted to a degree that limits plant growth and the need to take corrective action to loosen the planting soil through tilling:

- surface resistance for all soil textures 758 kPa
- subsurface resistance for sandy soil textures 1793 kPa
- subsurface resistance for silty soil textures 1793 kPa
- subsurface resistance for silty soil textures 1551 kPa

Compact growing medium under the root balls of all trees to between 200,000 and 250,000 kg/m² when the soil is between 12 and 20 per cent moisture to reduce settlement and provide a stable base for the tree as indicated on the drawings. Take care not to over-compact growing medium during and following the installation process.

At the end of the installation of the growing medium and prior to the installation of additional organic matter and plants, take a minimum of four undisturbed samples from locations selected by the Contract Administrator to determine bulk density. Submit test results for approval.

Confirm that infiltration rate of installed growing medium is 50 to 75 mm/hr.

TS 5.10.07.07 Protection

Protect growing medium from compaction and contamination by dust, debris, and any toxic material harmful to plants or humans after installation. Any area, which becomes compacted, shall be tilled to a depth of 150 mm. Any uneven or settled areas shall be filled and re graded.

Phase the installation of the growing medium such that equipment does not travel over already installed growing medium.

Cover installed growing medium with plywood until construction activity is complete and ready to plant.

Keep newly installed growing medium off-line from irrigation and drainage until planted.

TS 5.10.07.08 Growing Medium Fine Grading

The Contractor Administrator shall view all rough grading prior to the installation of organic matter, fine grading, planting, and mulching.

Set grades at time of installation sufficiently high relative to the type of growing medium and the typical settlement so that the growing medium will be at the correct grade after the 12 month settlement period.

This specification assumes that initial settlement during the first 12 months after installation will be between 10 and 15 per cent of the installed depth. Assure that the grading is mounded sufficiently high to accommodate this settlement.

At the end of the Contract Warrantee Period, if grades have settled more than 5 per cent below the grades as specified in the Contract drawings, reset the grades to the final grades shown on the Grading Plan, taking the observed settlement into account. Carefully remove and protect the plant material before executing any grading. Additional growing medium shall not be placed on planted soil until plants are carefully removed. The additional depth of growing medium can impede oxygen exchange and suffocate the plants.

Adjust the finish grades to meet field conditions.

Provide for positive drainage from all areas toward the existing inlets, drainage structures and or the edges of planting beds. Adjust grades as directed to reflect actual constructed field conditions of paving, wall and inlet elevations. Notify the Contract Administrator of difficulty achieving positive drainage.

Provide smooth transitions between slopes of different gradients and direction. Modify the grade so that the finish grade is flush with all paving surfaces or as directed by the Contract drawings.

Fill all dips and remove any bumps in the overall plane of the slope.

The tolerance for dips and bumps in shrub and ground cover planting areas shall be a 25 mm deviation from the plane in 2000 mm.

Restore all grades after the installation of plants. Remove any excess soil removed during the planting process.

TS 5.10.07.09 Installation of Yard Waste Compost

In all areas of growing medium in open planting beds, after the specified growing medium is installed, and just prior to the installation of tree, shrub or groundcover plantings, spread 100 mm of yard waste compost and till into the top 150 mm of the growing medium. Restore grades after tilling.

TS 5.10.07.10 Clean-up

During installation, keep pavements clean and work area in an orderly condition.

Keep the site clear of trash and debris at all times. Immediately dispose of wrappings or waste materials associated with products necessary for the completion of the work.

All trash and debris shall be kept in a central collection container. Do not bury trash and debris in back-fill.

Once installation is complete, remove any excess soil from pavements or embedded fixtures.

TS 5.10.07.11 Protection during Construction

The Contractor shall protect work and materials from damage including: compaction, contamination, and erosion due to operations by other contractors or trespassers. Maintain protection during installation until acceptance. Treat, repair or replace damaged growing medium installation work immediately.

Till compacted growing medium and replace growing medium that has become contaminated as determined by the Contract Administrator. Growing medium shall be tilled or replaced by the Contractor at no extra cost the City.

TS 5.10.07.12 Repair of Settled Growing Medium

At the end of 12 months following the date of substantial completion of the growing medium installation work, inspect the site and restore any areas where the grades have settled beyond the elevations shown on the drawings by an amount greater than 25 mm.

Settlement of trees below the finished grades shown on the Contract drawings will not be accepted. Where settlement of trees and tree planting areas has occurred, carefully remove and protect the tree and root ball, add the specified growing medium to the final grades shown on the Grading Plan, taking the observed settlement into account, re-plant and re-mulch. Growing medium shall not be placed over a tree's zone of active taper. If the tree was planted too high, that is to say settlement did not proceed as expected over the 12 month settlement period, then the tree must be carefully removed and protected while the grades are re-set.

In shrub planting areas where the settlement is less than 5 per cent below the grades shown on the Contract drawings, remove the mulch, top dress the area with the specified growing medium and re-mulch. All ground cover areas and shrub planting areas where the settlement is greater than 5 per cent below the grades shown on the Contract Drawings, remove the mulch and plants, add the specified growing medium to the final grades shown on the Grading Plan, taking the observed settlement into account, re-plant and re-mulch.

TS 5.10.07.13 Aeration of In-situ Growing Medium around Existing Trees

For instances where compaction of in-situ site soils within the Tree Protection Zone (TPZ) of existing trees exceeds the range specified in TS 5.10.07.06, remediation shall be undertaken to aerate or physically alter soils to provide a more suitable growing condition.

An arborist currently registered with ISA or qualified professional approved by Urban Forestry shall be engaged to determine the most appropriate procedure.

- Core aeration: Pore space in compacted soil may be increased by removing small soil cores to a depth of about 75 mm. This is effective in increasing surface permeability but does not address compaction in deeper soil layers.
- Vertical mulching: Holes 25-50 mm in diameter may be drilled in the compacted soil and filled with perlite, vermiculite, or other amendment material.
- Radial trenching: Trenches 150-200 mm wide and no deeper than the root system or depth of compaction can be dug with trenching equipment. The trenches are dug around the trunk of an existing tree in a bicycle spoke pattern, extending from the trunk and backfilled with a mixture of soil and amendments.
- Air excavation: Alternating pie-shaped wedges of soil around an existing tree can be de-compacted by "tilling" compost into surface soil around roots with an air excavation tool. Air excavation can damage roots if high pressure is used, so soil should be de-compacted in no more than 50 per cent of the root system at a time.

TS 5.10.08 QUALITY ASSURANCE – Not Used

TS 5.10.09 MEASUREMENT FOR PAYMENT

TS 5.10.09.01 Existing Site Soil Mix

Measurement of existing site soil mix shall be measured by volume in cubic metres (m³).

TS 5.10.09.02**Type 1 – Standard Mix****Type 1 – Standard Mix, 100 mm Thick****Type 1 – Standard Mix, 200 mm Thick****Type 1 – Standard Mix, 300 mm Thick**

Measurement of standard mix growing medium shall be measured by area in square metres (m²).

TS 5.10.09.03**Type 2 – Planting Bed Mix****Type 2 – Planting Bed Mix, 100 mm Thick****Type 2 – Planting Bed Mix, 200 mm Thick****Type 2 – Planting Bed Mix, 300 mm Thick**

Measurement of planting bed growing medium shall be measured by area in square metres (m²).

TS 5.10.09.04**Type 3 – Boulevard Mix****Type 3 – Boulevard Mix, 100 mm Thick****Type 3 – Boulevard Mix, 200 mm Thick****Type 3 – Boulevard Mix, 300 mm Thick**

Measurement of boulevard mix growing medium shall be measured by area in square metres (m²).

TS 5.10.09.05**Type 4 – Bioretention Mix****Type 4 – Bioretention Mix, 300 mm Thick****Type 4 – Bioretention Mix, 600 mm Thick****Type 4 – Bioretention Mix, 1000 mm Thick**

Measurement of boulevard mix growing medium shall be measured by area in square metres (m²).

TS 5.10.10**BASIS OF PAYMENT****Existing Site Soil Mix – Item****Type 1 – Standard Mix, 100 mm Thick – Item****Type 1 – Standard Mix, 200 mm Thick – Item****Type 1 – Standard Mix, 300 mm Thick – Item****Type 2 – Planting Bed Mix, 100 mm Thick – Item****Type 2 – Planting Bed Mix, 200 mm Thick – Item****Type 2 – Planting Bed Mix, 300 mm Thick – Item****Type 3 – Boulevard Mix, 100 mm Thick – Item****Type 3 – Boulevard Mix, 200 mm Thick – Item****Type 3 – Boulevard Mix, 300 mm Thick – Item****Type 4 – Bioretention Mix, 300 mm Thick – Item****Type 4 – Bioretention Mix, 600 mm Thick – Item****Type 4 – Bioretention Mix, 1000 mm Thick – Item**

Payment at the Contract Price for the above tender item shall be full compensation for all labour, Equipment and Material to do the work.

Form 1: Contractors submittal checklist

✓	Section #	Item
Certificates		
	TS 5.10.04.01.02	Certification that all growing medium components and the growing medium meet all environmental standards
Product Data		
	TS 5.10.04.01.03	<i>Product data: Coarse sand</i>
	TS 5.10.04.01.03	Product data: Pine bark compost
	TS 5.10.04.01.03	Product data: Yard waste compost
Material Source Locations		
	TS 5.10.04.01.04	Location of all topsoil and growing medium components sources
Samples		
	TS 5.10.04.01.05	Duplicate 4L samples: Topsoil / submitted with required testing results
	TS 5.10.04.01.05	Duplicate 1L samples: Coarse sand / submitted with required testing results
	TS 5.10.04.01.05	Duplicate 1L samples: Pine bark compost / submitted with required testing results
	TS 5.10.04.01.05	Duplicate 1L samples: Yard waste compost / submitted with required testing results
	TS 5.10.04.01.05	Duplicate 4L samples: Growing medium / submitted with required testing results
Testing Reports		
	TS 5.10.04.01.06	Particle size analysis: Topsoil including sand fractions
	TS 5.10.04.01.06	Particle size analysis: Growing medium including sand fractions
	TS 5.10.04.01.06	Chemical analysis: Topsoil
	TS 5.10.04.01.06	Chemical analysis: Growing medium with lab recommendations for fertilizer applications and amendments.
	TS 5.10.04.01.07	In-Situ Compaction Testing: Installed growing medium
	TS 5.10.04.01.06	Infiltration Rate Testing: Installed growing medium
Contractor's Qualifications		
	TS 5.10.04.01.08	Documentation of contractor's qualifications

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Planting****Table of Contents**

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TS 5.30.01 SCOPE

This specification covers the requirements for the supply and installation of trees, shrubs, and perennials, groundcovers, ornamental grasses and the regular maintenance of plant material within the contract limits.

TS 5.30.02 REFERENCES

This specification refers to the following standards, specifications or publications:

City of Toronto Specifications

TS 5.10 Construction Specification for Growing Medium

City of Toronto Standard Drawings

T-850.026 Planting Details and Sample Layouts

Canadian Nursery Landscape Association

CNLA Canadian Standards for Nursery Stock

Agriculture Canada

Plant Hardiness Zone Map – Zone 5

Society for Ecological Restoration – Ontario Chapter

Native Plants Buyers Guidelines

TS 5.30.03 DEFINITIONS

For the purpose of this specification, the following definitions apply:

Certified Arborist means they are designated and regulated by the International Society of Arboriculture (ISA).

Pruning means pruning is the horticultural or arboricultural practice involving the selective removal of certain parts of a plant, such as branches, buds, or roots.

TS 5.30.04 DESIGN AND SUBMISSION REQUIREMENTS

TS 5.30.04.01 Plant Material

Make arrangements for approval of plant material by the Contract Administrator at a time mutually agreed upon according to TS 5.30.07.01 herein. No work shall proceed without approval of the Contract Administrator.

Prior approval shall not invalidate rejection of stock at later inspection at site should it, in the Contract Administrator's opinion, prove defective, damaged or generally inappropriate.

All plants shall be according to the varieties specified in the plant list and be legibly tagged with their proper name and size. No substitutions will be accepted without written approval of the Contract Administrator

Prior to installation, the Contractor shall advise the Contract Administrator in writing if in the Contractor's opinion any of the specified plant material will not perform according to the specifications. The City retains the right to direct the Contractor to proceed with the specified plant material including guarantee and as tendered.

Planting soil mix requirements shall be according to TS 5.10 and Type 4 – Bio Retention Mix, and Contract Documents.

Imported plant material shall be accompanied with the necessary permits and import licenses. Contractor is to conform to all federal and provincial regulations.

Tagged material to be purchased and secured for project.

Any additional expenses for re-sourcing and approval of plant material shall be at no extra cost to the City.

All plant material industry suppliers shall be considered for material supply, not only those having pre-existing or current supply accounts with the landscape contractor.

If plant material is undersized, plant quantities will increase according to the following schedule:

- (1) perennial / groundcover / ornamental grass 9 cm pot = (3) perennial / groundcover / ornamental grass plug (PL50)
- (1) 1 gal container perennial/groundcover = (3) perennial/groundcover 9 cm pots
- (1) 5 gal container shrub = (2) 3 gal container shrubs
- (1) 3 gal container shrub = (2) 2 gal container shrubs
- (1) 2 gal container shrub = (3) 1 gal container shrubs / grasses

Undersize nursery stock for trees will not be accepted.

TS 5.30.04.02 Submittals

Submit affidavits to certify that manufactured or processed materials supplied in bulk meet specified requirements.

Submit instructions on maintenance procedures to be followed after end of specified maintenance period.

Prior to planting, submit the following to be approved by the Contract Administrator and Urban Forestry:

- 1) Plant list including the source, scientific and common name, quantity, caliper, root ball size and root ball packaging specification for each plant
- 2) Plant schedule including dates scheduled for tagging, field digging, delivery and planting
- 3) Certification of plant quality from growing nursery confirming that plants tagged, field dug and shipped meet all requirements of the Canadian Nursery Stock Standard, 9th Edition
- 4) Maintenance plan and schedule for maintenance during warranty period.

Prior to completion of the warranty period, submit the following to be approved by the Contract Administrator and Urban Forestry:

- 1) Maintenance log indicating the date and duration of every maintenance activity completed.
- 2) Plans for any maintenance activity that differ from the submitted maintenance plan and schedule, such as Integrated Pest Management (IPM), fertilizing or soil remediation, prior to undertaking such activities.
- 3) Plant list, plant schedule and certification of plant quality prior to any replacement planting.

TS 5.30.04.03 Product Delivery, Storage and Handling

All materials shall be inspected by the Contractor for damage in transit. No defective material shall be delivered to the site. Material subsequently damaged shall be removed from the site immediately.

Label manufactured, processed or otherwise prepared materials that are packaged to indicate manufacturer, contents, weight, and a detailed description of the material. If delivered in bulk, submit affidavits giving information required as specified for labels and certifying that materials meet specified requirements. Store and protect fertilizer, limestone, bone meal, mulching materials, and similar products to prevent damage from moisture.

No plant shall be accepted when the ball of earth surrounding its root system has been cracked or broken prior to or during planting, or after the burlap, staves, ropes or platform required in transplanting have been removed.

Trees specified as W.B.—wire basket—shall have solid root balls wrapped with 140 gram burlap with no preservatives added. Root balls to have double thickness and be drum laced with 15 mm twine at 200 mm spacing.

Shrubs specified as B & B—ball & burlap—shall have solid root balls wrapped with 140 gram burlap with no preservatives added. Root balls under 460 mm diameter to have single thickness, and between 460 and 900 mm diameter size to have double thickness and be drum laced with 15 mm twine at 200 mm spacing.

Transport plants with branches tied to prevent damage, and padded to avoid abrasion from equipment. Protective materials and burlap wrap tied around base of tree trunk are to be removed from the tree prior to planting.

Trees are to be handled securely and with care to protect the bark and branches from mechanical damage. Trees must not be handled by the trunk.

Prevent drying out of roots, root balls, trunks, branches, and leaves of plants from time of removal at place of origin until they are planted. While temporarily stored at site, protect them with soil, or similar materials and keep moist. If stored for more than one hour between delivery and planting, store in a shaded location approved by the Contract Administrator, cover with soil or mulch, and keep root balls moist through frequent watering until trees are planted.

TS 5.30.04.04 Job Conditions

Field Measurements: Verify actual grade elevations, service and utility locations, irrigation system components, and dimensions of plantings and construction contiguous with new plantings by field measurements before proceeding with planting work.

Installation shall be done under suitable weather conditions and in a suitable growth season for each specified material, as noted below:

Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with maintenance periods to provide required maintenance from date of acceptance.

- 1) Spring Planting: May–June.
- 2) Fall Planting: September–November.

Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions and warranty requirements. Suspend work when the temperature is below 4°C, the wind velocity is over 32 km/hr, the ground or planting soil is frozen or wet, or the continuation of prevailing weather will damage plant materials, including sustained periods of above-normal high temperatures and precipitation.

TS 5.30.05 MATERIALS

TS 5.30.05.01 Plant Material

Type of root preparation, sizing, grading and quality shall be according to the Canadian Standards for Nursery Stock.

Source of plant material shall be grown in Zone 5 according to Agriculture Canada Plant Hardiness Zone Map. Native plants to be sourced from nurseries within 100 km of Toronto, unless otherwise approved by the City.

Plant material shall be freshly dug—at a time of year that is horticulturally acceptable for the species—free of disease, die-back, insects, defects or injuries and structurally sound with strong fibrous root system and densely foliated, root pruned regularly, but not later than one growing season prior to arrival on site.

Trees shall be with straight trunks, well and characteristically branched for species. Container grown trees shall not be permitted for planting, unless approved by the Contract Administrator prior to purchase. Contractor to advise nurseries that trunk flare must be exposed above root ball before arrival on site. Trees that fail to meet this requirement shall be rejected by the Contract Administrator. Where the Contract Administrator approves the removal of any excess soil on top of the root ball shall be at no extra cost to the City and the 2-year warranty remains.

- 1) Provide healthy stock, grown in a nursery and free of die-back, disease, insects, eggs, bores, and larvae. At the time of planting all plants shall have a root system, stem, and branch form that will not restrict normal growth, stability and health for the expected life of the plant.

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- 2) Plants shall be healthy with the color, shape, size and distribution of trunk, stems, branches, buds and leaves normal to the plant type specified.
 - 3) The form and density of the crown shall be typical for a young specimen of the species or cultivar pruned to a central and dominant leader.
 - 4) The size, color, and appearance of leaves shall be typical for the time of year and stage of growth of the species or cultivar. Plants shall not show signs of prolonged moisture stress or over watering as indicated by wilted, shriveled, or dead leaves.
 - 5) Shoot growth – length and diameter – throughout the crown should be appropriate for the age and size of the species or cultivar. Plants shall not have dead, diseased, broken, distorted, or otherwise injured branches.
 - 6) Main branches shall be distributed along the central leader not clustered together. They shall form a balanced crown appropriate for the cultivar/species.
 - 7) Branch diameter shall be no larger than two-thirds (one-half is preferred) the diameter of the central leader measured 25 mm above the branch union.
 - 8) The attachment of the largest branches – scaffold branches – shall be free of included bark.
 - 9) Tree trunks shall be relatively straight, vertical, and free of wounds that penetrate to the wood (properly made pruning cuts, closed or not, are acceptable and are not considered wounds), sunburned areas, conks – fungal fruiting bodies, wood cracks, sap leakage, signs of boring insects, galls, cankers, girdling ties, or lesions – mechanical injury.
 - 10) All graft unions, where applicable, shall be completely closed without visible sign of graft rejection. All grafts shall be visible above the soil line.
 - 11) Roots shall be free of scrapes, broken or split wood.
 - 12) The root system shall be free of injury from biotic (e.g., insects and pathogens) and abiotic (e.g., herbicide toxicity and salt injury) agents.
 - 13) A minimum of three structural roots reasonably distributed around the trunk – not clustered on one side – shall be found in each plant. Root distribution shall be uniform throughout the root ball, and growth shall be appropriate for the species.
 - 14) The root collar shall be within the upper 50 mm of the substrate/soil. Two structural roots shall reach the side of the root ball near the top surface of the root ball.
 - 15) The root system shall be free of stem girdling roots over the root collar or kinked roots from nursery production practices

Measure plants with branches in normal position, finish grade to top of main body of plant, not from branch tip to branch tip or from root base to branch tip. Caliper dimension shall refer to diameter of trunk measured 300 mm above ground in original growing state.

Plants larger than specified shall be accepted without liability to extra charges if approved by the Contract Administrator, and they meet all specified requirements for their size.

Collected plants, those dug from native stands, wood lots, orchards or neglected nurseries, and having received no cultural maintenance, will not be accepted.

Plant varieties are specified in a plant schedule on the plan, and all substitutions must be approved by the Contract Administrator prior to ordering plant material. In case of discrepancy in quantity between the plant schedule or unit price schedule, the plan shall take precedence.

TS 5.30.05.02 Planting Soil

Planting soil shall be according to TS 5.10.

TS 5.30.05.03 Water

Potable water shall be used unless the Contractor provides testing results that demonstrate the water to be used is free of contaminants or impurities that would adversely affect the germination and growth of vegetation.

TS 5.30.05.04 Tree Guards

Suppliers shall install an Arbor Guard™ tree guard, or pre-approved equivalent, around each newly planted tree. If required, use more than one guard to ensure that the entire base of the tree is protected. The cost of installation shall be included in the unit price of the tree. Proof of purchase will be required. The Supplier shall replace or reinstall defective guards for the duration of the warranty period. Tree guards shall remain onsite at the end of the warranty period.

TS 5.30.05.05 Root Barrier

Root barrier—root diversion device—shall be a geo-composite membrane to prevent root penetration under hard boulevard surfaces. The material shall be impermeable and ribbed with a thickness of 1 – 2 mm. Provide sample and proof of source to the Contract Administrator for approval prior to delivery and installation.

TS 5.30.05.06 Mulch

Planting beds shall be a blend of aged bark and compost materials. Provide sample and proof of source to the Contract Administrator for approval prior to delivery and installation. For compost requirements, see TS 5.10.

Tree planting openings or planting beds in hard boulevard surface areas shall be a hardwood blend or finely shredded pine bark mulch pre-blended with an erosion control organic tacifier. Provide sample and proof of source to the Contract Administrator for approval prior to delivery and installation. For compost requirements, see TS 5.10.

A low growing sedum mat or similar low growing, low maintenance groundcover option. Provide sample and proof of source to the Contract Administrator for approval prior to delivery and installation.

For mulch requirements in bioretention areas, see TS 5.10.

TS 5.30.05.07 Soil Amendments

Soil amendments shall refer to soil test report recommendations, according to TS 5.10.

TS 5.30.05.08 Anti-desiccant

Anti-desiccant shall be an emulsion to form permeable film over plant surfaces and mixed according to manufacturer's directions.

TS 5.30.06 EQUIPMENT – Not Used**TS 5.30.07 CONSTRUCTION****TS 5.30.07.01 Pre-planting Operations**

All plant material shall be acceptable to the Contract Administrator. Contractor shall:

- 1) Arrange for nursery approval of trees. Contractor to source trees upon Contract award, as trees are a long lead item.
- 2) Contractor to provide a schedule of suppliers for plant stock showing supplier, species and size, as well as a purchase order showing purchase arrangements.
- 3) All trees must be planted according to the Contract Drawings, approved by Urban Forestry, and must arrive on site in balled and burlapped condition with a minimum caliper of 70 mm or as specified in Contract Drawings.

Unwrap and cut away top one half of jute wrapping and wire basket without damaging root ball. Do not pull burlap or rope from under root ball.

Each tree shall have the burlap and wire cage opened and soil brushed away until the first proper root is found, indicating the top of the root ball. In planting instructions for the tree, this level will be considered the top of root-ball.

- 4) Arrange for approval sample of each shrub type on site, prior to general order and delivery.

Properly prune damaged roots and branches from plant material prior to planting.

Ensure that subgrade preparation and drainage is satisfactory for plant material growth.

Drain test shall ensure adequate subsoil drainage by filling bottom one-third of tree pit with water and checking for complete drainage after 24 hours. Obtain approval of drain test from the Contract Administrator prior to planting and backfilling.

TS 5.30.07.02 Excavation and Preparation of Planting Beds

Preparation of planting beds shall be according to TS 5.10 and as specified in the Contract Documents.

For individual planting holes:

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- 1) Stake out location and obtain approval from the City prior to excavating.
 - 2) Excavate to depth and width as specified in the Contract Documents
 - 3) Scarify sides and break up soil at bottom of planting hole to a depth of 200 mm, or as specified in the Contract Documents.
 - 4) Remove water which enters excavations prior to planting. Notify the Contract Administrator if water source is ground water.

For requirements for using existing topsoil/growing medium for planting, see TS 5.10.

Mix topsoil/growing medium and amendments just before planting, but not when frozen or muddy. Do not stockpile more than two days.

Excavate plant pits to allow at least 150 mm of planting soil under root ball, or as specified in the Contract Drawings.

When planting in late fall or early spring, prevent freezing of bottom of plant pits.

Provide further excavation and additional planting soil to ensure adequate drainage for survival of the plants.

Install root barrier to the full depth of the planting area, and as shown on the Contract Drawings.

Placing of growing medium shall be according to TS 5.10.

Fertilizer shall be applied during the final operation of fine grading, but not longer than one week prior to planting, as per the recommendations in the soil analysis report.

TS 5.30.07.03 Planting

Final placement of shrubs shall be approved by the Contract Administrator prior to backfilling with growing medium.

Final placement of trees shall be approved by the Contract Administrator prior to excavation for tree planting.

Any tree found planted with the first proper root more than 2.5 cm below planting level will be rejected and require replacement or replanting.

For container stock or root balls in non-biodegradable wrapping, remove entire container or wrapping without damaging root ball prior to planting.

Plant material to be planted vertically in locations as indicated.

Trees to be oriented with southern exposure as marked by the nursery, or as directed by the Contract Administrator to give best appearance on site.

Trees to be planted at a level that places trunk flare above finished grade, and as specified in the Contract Drawings.

For trees and shrubs:

- 1) Backfill growing medium in 150 mm lifts. Tamp each lift to eliminate air pockets. When two thirds of depth of planting pit has been backfilled, fill remaining space with water. After water has penetrated into soil, backfill to finish grade.
- 2) Form watering saucer as indicated on details.

Planting details shall be according to T-850.026.

Water plant material thoroughly. After soil settlement has occurred, fill with soil to finish grade. Dispose of burlap, wire and container material off site.

TS 5.30.07.04 Mulching Planting Beds

Ensure soil settlement has been corrected prior to mulching.

Provide continuous layer of mulch for all shrub beds.

Ensure ground is not frozen prior to mulching.

TS 5.30.07.05 Pruning

Any tree pruning must be undertaken by a certified arborist. Prior to pruning, submit the name and credentials of the certified arborist to the Contract Administrator and a copy furnished to urban Forestry.

Shrubs shall be pruned according to proper arboricultural practices. Make pruning cuts smooth and clean just outside the branch collar. Leave no stubs. Cut back cambium to living tissue where cuts are made at bruises, scars and other injuries. Ensure that pruning cuts are shaped to prevent the retention of water.

TS 5.30.07.06 Maintenance During Establishment Period

Perform the following maintenance operations from time of planting:

- 1) Water to maintain soil moisture conditions for optimum establishment, growth and health of plant material without causing erosion.
- 2) For evergreen plant material, water thoroughly in late fall prior to freeze-up to saturate soil around root system.
- 3) Remove weeds monthly.
- 4) Replace or re-spread damaged, missing or disturbed mulch.
- 5) Where mulch is in place, remove and replace in spring after soil thaws and warms up. Top up as necessary to maintain a 25–50 mm layer depth.
- 6) Apply pesticides according to federal, provincial and municipal regulations as and when required to control insects, fungus and disease. Obtain written product approval from Urban Forestry prior to application.

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- 7) Remove dead or broken branches from shrubs and herbaceous material, according to proper horticultural practice.
 - 8) Remove dead or broken branches from trees according to proper arboricultural practice. Any such pruning is to be performed by a certified arborist.
 - 9) Keep trunk protection in proper repair and adjustment.
 - 10) Remove and replace dead plants and plants not in healthy growing condition. Make replacements in same manner as specified for original plantings.

TS 5.30.07.07 Acceptance, Adjustment and Replacement

At time of Final Acceptance and again at termination of Warranty Period, Work shall be inspected by the Contract Administrator and adjustments and replacements shall be made according to the following:

- 1) Commencement of Warranty Period is predicated on written acceptance by the Contract Administrator.
- 2) Adjustment and replacement work shall be performed with materials of same size, variety and quality of material replaced.
- 3) Replacement work shall be done under an additional Warranty Period of the same length and conditions as described in this specification. It shall date from time of the Contract Administrator's approval of replacement work.
- 4) Replace plant stock that in the opinion of the Contract Administrator is dead, or not in satisfactory growing state, or does not meet specification requirements. Remove dead stock immediately. Replace stock at proper time during planting season. At the discretion of the Contract Administrator, unacceptable plant material may be left, its guarantee period extended, and again inspected next planting season. At this time, the Contract Administrator will decide if replacement will be made and the guarantee extended accordingly.
- 5) For repair of settled growing medium, see TS 5.10.

TS 5.30.07.08 Regular Maintenance During Warranty Period

Work shall include maintenance of installations to ensure both satisfactory aesthetic upkeep and a vigorous and healthy growth until the end of the Warranty Period.

For plant material and planting areas such as planters, tree planting areas and beds: pruning; cultivating; hand weeding; mulching; litter and debris removal, resetting to proper grade or to upright positions; spraying to keep free from pests, insects and disease; and barriers to prevent damage by persons or animals.

Inspect protective tree surrounds such as tree fences, tree grates, planter curbs and tree guards for damage or graffiti, and for any discontinuity between planting sites and walking surfaces that could create tripping risks. Repair immediately or secure site until repairs can be made, notify Contract Administrator and record repairs in maintenance log.

Litter removal shall take place every two weeks. Weeds shall not exceed 150 mm in height. Annual spring and fall clean-ups shall be completed, including seasonal pruning and cutting back of vegetation, removal of dead or excess foliage and debris, and general preparation of beds for the upcoming season.

All plant material installed under this section is to be watered for the duration of the Warranty Period to ensure healthy, vigorous plant growth at all times. Watering is to be coordinated in order to prevent over and/or under watering. Contractor is responsible for ensuring adequate watering of plant material during Warranty Period.

Water tree and shrub beds to ensure saturation of full depth of planting soil. Care must be taken to avoid over-watering in the event of slow draining subsoil conditions.

Top up mulch as necessary to maintain a 25–50 mm minimum layer depth.

TS 5.30.08 QUALITY ASSURANCE

TS 5.30.08.01 Warranty

All plants shall be guaranteed for a period of two years following written acceptance in accordance with the General Conditions of the Contract and as modified by this section, and shall be alive and in vigorous growth at the end of the Warranty Period.

Less than 30 Days prior to frost or after October 15, whichever comes first, the start of warranty does not start until the following spring, 30 Days after start of growing season.

All plant material that in the opinion of the Contract Administrator is not in a healthy growing condition shall be replaced by the Contractor at no extra cost to the City, prior to terminating their responsibilities under this Contract.

All plant material that in the opinion of the Contract Administrator has not survived the first winter—based on a site inspection by the Contract Administrator in early spring—shall be replaced by the Contractor within two weeks of notification by the Contract Administrator.

Seasonal timing of all other replacement plantings shall be at the discretion of the Contract Administrator, based on an evaluation of the original planting and replacement planting conditions.

All replacements shall be plants of the same size and variety as specified in the Contract Documents. The cost shall be borne by the Contractor, except for possible replacement resulting from theft, vandalism, or carelessness on the part of others. The Contract Administrator shall be the sole judge in case of dispute regarding responsibility for replacement of plant material.

TS 5.30.09 MEASUREMENT FOR PAYMENT

TS 5.30.09.01 Perennial, Ground Cover, Ornamental Grass, 9 cm Pot

For measurement purposes, a count shall be made of the number of 9 cm pot(s) installed.

TS 5.30.09.02 Perennial and Ground Cover, 1 Gallon

For measurement purposes, a count shall be made of the number of one-gallon containers(s) installed.

TS 5.30.09.03 Shrub, 5 Gallon

For measurement purposes, a count shall be made of the number of 5-gallon containers(s) installed.

TS 5.30.09.04 Shrub, 3 Gallon

For measurement purposes, a count shall be made of the number of 3-gallon containers(s) installed.

TS 5.30.09.05 Shrub, 2 Gallon

For measurement purposes, a count shall be made of the number of 2-gallon containers(s) installed.

TS 5.30.09.06 Tree, 70 mm Caliper

For measurement purposes, a count shall be made of the number of 70 mm caliper tree(s) installed.

TS 5.30.09.07 Mulch

Measurement of mulch shall be measured by area in square metres (m²).

TS 5.30.10 BASIS OF PAYMENT

TS 5.30.10.01 Perennial, Ground Cover, Ornamental Grass, 9 cm Pot – Item
Perennial and Ground Cover, 1 Gallon – Item
Shrub, 5 Gallon – Item
Shrub, 3 Gallon – Item
Shrub, 2 Gallon – Item
Tree, 70 mm Caliper – Item

Payment at the Contract Price for the above tender items shall be full compensation for all labour, Equipment and Material to do the Work.

Arborist Report

Macpherson Avenue Park
Toronto, Ontario

April 23, 2025

Prepared for:

DTAH
50 Park Road
Toronto, ON M4W 2N5

Prepared by:

Urban Forest Innovations Inc.
1331 Northaven Drive
Mississauga, ON L5G 4E8



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NB: This Arborist Report has been prepared using the latest drawings and information provided by the client and/or agents and may be intended for inclusion in a site plan approval or similar planning submission. Any subsequent design or site plan changes affecting trees may require revisions to this report. New drawings and information should be provided to UFI prior to report submission to municipal planning authorities.

Links (URLs) provided to web-based resources are current to the date of the report.

INTRODUCTION

Urban Forest Innovations Inc. (UFI) has been requested to prepare an arborist report for the proposed Macpherson Avenue Park, southwest of the intersection of Davenport Road and Macpherson Avenue in Toronto, Ontario. This arborist report reviews the potential impacts of the proposed site improvements upon 15 trees within or close to the limits of disturbance, and outlines required and recommended tree protection measures and regulatory requirements associated with the proposed development. General tree maintenance recommendations are also provided where appropriate. The report should be read in conjunction with all other servicing, grading and landscaping plans prepared for the project.

SITE OBSERVATIONS

Field observations were made on August 20, 2020, by Anna Mernieks, ISA Certified Arborist ON-2224A and on April 14, 2025, by Yuki Yung, ISA Certified Arborist ON-2540A. There was no construction activity on the site at the time of the field observations. Trees within 6 metres of the potential limits of development are included in the inventory. Trees were located using the latest site drawings and information provided by the client; trees for which no surveyed locations were provided were positioned approximately with the aid of field reference markers. Tree diameter was measured at 1.4 metres above grade (DBH) and trees were assessed for health, structural condition, and risk potential. Approximately 70 trees measuring less than 15cm DBH were excluded from the tree inventory (see figures 4 and 5). Tree groups were identified where appropriate. All trees were assessed from the ground level. No trees were tagged as part of the inventory. A full explanation of tree assessment categories is included in Appendix 2 – Tree Inventory Attributes.

RESULTS AND DISCUSSION

By-laws and Legislation

By-laws and legislation enacted by the City of Toronto and/or the Province of Ontario regulate the injury or destruction of trees depending upon their location, size and other factors.

City of Toronto – Private Trees (Category 1 and 2)

No inventoried trees are regulated pursuant to the City of Toronto private tree by-law, officially known as City of Toronto Municipal Code, Chapter 813, Article III – ‘Private Tree Protection’. This by-law regulates the injury and destruction of all trees equal to or greater than 30 cm diameter at breast height (DBH, or 1.4 m above grade) located on private property.

City of Toronto – Park Trees (Category 3)

No inventoried trees are regulated pursuant to the City of Toronto parks by-law, officially known as City of Toronto Municipal Code Chapter 608 – ‘Parks’, and specifically pursuant to Article VII – ‘Trees’. This by-law regulates injury or destruction of any trees located within municipal parks.

City of Toronto – Ravine Trees (Category 4)

No inventoried trees are regulated pursuant to the City of Toronto ravine and natural feature protection (RNFP) by-law, officially known as City of Toronto Municipal Code Chapter 658 – ‘Ravine and Natural Feature Protection.’ This by-law regulates a number of activities within specially-designated areas, including injury or destruction of trees of *any* diameter.

City of Toronto – Street Trees (Category 5)

Eight inventoried trees (#8-15) are regulated pursuant to the City of Toronto street tree by-law, officially known as City of Toronto Municipal Code, Chapter 813, Article II – ‘Trees on City Streets’. This by-law regulates injury and destruction of all trees within the municipal road right-of-way.

Boundary Trees – Ontario Forestry Act, R.S.O. 1990

The Provincial *Forestry Act, R.S.O. 1990* states:

10. (2) Every tree whose trunk is growing on the boundary between adjoining lands is the common property of the owners of the adjoining lands. 1998, c. 18, Sched. I, s. 21.
- (3) Every person who injures or destroys a tree growing on the boundary between adjoining lands without the consent of the land owners is guilty of an offence under this Act. 1998, c. 18, Sched. I, s. 21.

No inventoried trees appear to be growing on the boundary between the subject site and the adjacent properties.

Endangered, Rare or Protected Species – Endangered Species Act, 2007

The Provincial *Endangered Species Act, 2007* (ESA) provides for the conservation of endangered or threatened species in Ontario. The ESA identifies Species at Risk (SAR) based on the best available scientific information, protects SAR and their habitats, promotes the recovery of species that are at risk, and promotes stewardship activities to assist in the protection and recovery of SAR.

No endangered, rare or otherwise protected tree species were observed within the limits of proposed works.

Tree Removal

Tree removal will be necessary to facilitate the proposed works. Recommendations for tree removal are based upon consideration of the anticipated impacts upon trees due to implementation of the proposed works, the immediate and forecasted health and structural condition of the tree, and the ability of the tree to make continued contributions to the newly modified landscape.

The proposed works will require the removal of trees #6-15.

Tree Retention

All other trees addressed in this report are proposed for retention. This section outlines specific tree preservation and protection measures for retained trees. General tree protection recommendations and specifications are found in Appendix 5.

Tree Protection

Retained trees in proximity to the proposed works shall be protected by restricting access and land use within tree protection zones (TPZs), as through the installation of tree preservation fencing (or hoarding) that satisfies the minimum required distance (TPZ) for each tree, where possible. Minimum required TPZ distances are specified in Appendix 1, and recommended fencing configurations are illustrated in Appendix 4. Fencing is to be established in advance of all proposed works, including but not limited to material and equipment delivery, staging and storage, demolitions, excavation and grading work, and new construction activity. Specifications for the establishment of protection fencing and signage are outlined further in Appendix 5 – Section 5.2.1.1.

In addition to tree protection fencing, trees at Macpherson Parkette require the implementation of the following supplemental tree protection measures:

- **Root-Sensitive Excavation and Root Pruning** – The tree protection zones of 4 inventoried trees (#2-5) will be impacted by excavation to enable the proposed works. All excavation within TPZs shall be accomplished by root-sensitive excavation utilizing hand-digging, hydrovac or pneumatic soil excavation (e.g., Airspade). Excavations must be supervised by a Certified Arborist, who must be enabled to stop works if, during the course of excavation, significant structural or transport roots (greater than approximately 25mm diameter) are encountered, in order to properly prune the roots. Specifications for root-sensitive excavation and root pruning are outlined in Appendix 5 – Sections 5.2.1.4 and 5.2.1.5.

Tree Risk and Required Tree Maintenance

At the time of inspection, there were no immediate risks posed by any trees within the project limits.

By-law and Permit Requirements

City of Toronto

Approval from the City of Toronto may be required to allow for the proposed removal of trees #8-15.

Province of Ontario

Approval from the Province of Ontario may be required to allow the proposed removal of trees #6 and 7.

CONCLUSION

Urban Forest Innovations has assessed 15 trees at the site of the proposed Macpherson Avenue Park, in Toronto, Ontario. The proposed works will require the implementation of specific tree protection measures to ensure effective tree preservation. 8 trees will require removal. With the implementation of the recommendations provided in this report, no significant adverse effects are anticipated as a result of the proposed works upon the long-term health and condition of inventoried trees that have been designated for retention. It is important that good arboricultural practices be undertaken during the entire course of construction. No material storage or construction access shall take place within tree protection zones (TPZs); sensitive excavation and root pruning shall be undertaken, as required; and any necessary branch and/or root pruning shall be undertaken by an ISA Certified Arborist.

APPENDIX 1 – TREE INVENTORY

Table 2: Tree inventory, Macpherson Avenue Park, Dupont Hydro Corridor, Toronto, Ontario. Tree assessments are based upon field observations undertaken on August 20, 2020, by Anna Mernieks, ISA Certified Arborist ON-2224A and on April 14, 2025, by Yuki Yung, ISA Certified Arborist ON-2540A. Attribute definitions are provided in Appendix 2.

Tree	Common Name	Scientific Name	DBH	CW	TI	CS	CV	TPZ	Cat.	Rec.	Loc.	Comments
1	Black Locust	<i>Robinia pseudoacacia</i>	24	7	F	G	G	1.8	-	P	PROV.	
2	Black Locust	<i>Robinia pseudoacacia</i>	25,25,20	10	F	F	G	1.8	-	P	PROV.	Failed branch. DBH estimated.
3	Black Locust	<i>Robinia pseudoacacia</i>	25	8	G	F	G	1.8	-	P	PROV.	DBH estimated.
4	Black Locust	<i>Robinia pseudoacacia</i>	15,12	9	F	F	G	1.8	-	P	PROV.	
5	Black Locust	<i>Robinia pseudoacacia</i>	25	6	F	F	G	1.8	-	P	PROV.	DBH estimated.
6	Black Locust	<i>Robinia pseudoacacia</i>	20,15,15,10,10	7	F	F	G	1.8	-	R	PROV.	DBH estimated.
7	Black Locust	<i>Robinia pseudoacacia</i>	20	8	G	F	G	1.8	-	R	PROV.	DBH estimated.
8	Black Locust	<i>Robinia pseudoacacia</i>	30,25	10	F	F	G	2.4	5	R	ROW	DBH estimated.
9	Black Locust	<i>Robinia pseudoacacia</i>	20	6	G	F	G	1.8	5	R	ROW	DBH estimated.
10	Tree-of-heaven	<i>Ailanthus altissima</i>	25,20	8	F	F	G	1.8	5	R	ROW	DBH estimated.
11	Tree-of-heaven	<i>Ailanthus altissima</i>	20	5	G	F	G	1.8	5	R	ROW	DBH estimated.
12	Tree-of-heaven	<i>Ailanthus altissima</i>	25,20	8	F	F	G	1.8	5	R	ROW	DBH estimated.
13	Tree-of-heaven	<i>Ailanthus altissima</i>	20	6	G	F	G	1.8	5	R	ROW	DBH estimated.
14	Tree-of-heaven	<i>Ailanthus altissima</i>	25	5	F	F	G	1.8	5	R	ROW	DBH estimated.
15	Hawthorn Species	<i>Crataegus</i> sp.	8	2	G	G	G	1.2	5	R	ROW	
Approximately 70 trees were excluded from the survey on the basis that they measured less than 150mm DBH.												
Most excluded, undersized trees are multi-stemmed black locust, Manitoba maple, Siberian elm and tree-of-heaven.												

APPENDIX 2 – TREE INVENTORY ATTRIBUTES

Tree Inventory Attribute Definitions

Species	The common and scientific names are provided for each tree.
Diameter at Breast Height (DBH)	The diameter of each tree, in centimetres, at breast height (1.4 m above grade).
Canopy Width (CW)	An estimation of the average diameter of the tree canopy, in metres.
Trunk Integrity (TI)	An assessment of the tree's trunk for any externally-visible defects or weaknesses. It is rated on an ascending scale of Poor-Fair-Good.
Canopy Structure (CS)	An assessment of the tree's main scaffold branches and the canopy of the tree for defects or weaknesses visible from ground level. It is also rated on an ascending scale of Poor-Fair-Good.
Canopy Vitality (CV)	An assessment of the general health and vigour of the tree, derived partly through a comparison of deadwood and live growth relative to a 100% healthy tree. The size and colour of foliage are also considered in this category. During the leaf-off season, the number and distribution of buds is an important determinant of canopy vitality. This indicator is also rated on an ascending scale of Poor-Fair-Good.
Tree Protection Zone (TPZ)	The tree protection zone, in metres, as measured from the base of the subject tree's stem.
Category (Cat.)	<p>By-laws respecting trees provide for the protection of trees situated on both private and City property. The following five categories are outlined in the City of Toronto 'Guidelines for Completion of an Arborist Report'.</p> <ol style="list-style-type: none"> 1. Trees with diameters of 30 cm or greater, situated on private property on the subject site. 2. Trees with diameters of 30 cm or greater, situated on private property, within 6 m of the subject site. 3. Trees of all diameters situated on City-owned parkland within 6 m of the subject site. 4. Trees of all diameters situated within lands designated under City of Toronto Municipal Code, Chapter 658, Ravine and Natural Feature Protection. 5. Trees of all diameters situated within the City road allowance adjacent to the subject site.
Location (Loc.)	The location of the tree relative to the subject site: on the municipal right-of-way (ROW), or on Provincially-owned land (PROV.).
Recommendation (Rec.)	The recommendation for each tree: Protect (P), Injure (I), or Remove (R). Trees to be preserved with no active tree protection are denoted with a dash (-).
Comments	Comments pertaining to the tree provided as needed.

APPENDIX 3 – SELECTED FIGURES

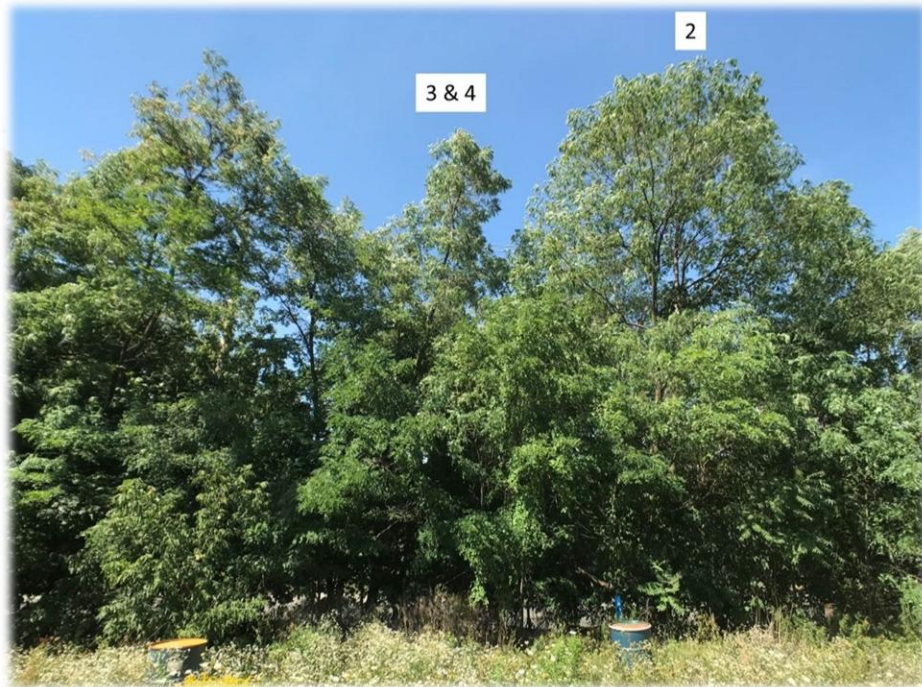


Figure 1: Provincially-owned trees #2-4



Figure 2: Provincially-owned trees #6 and #7.

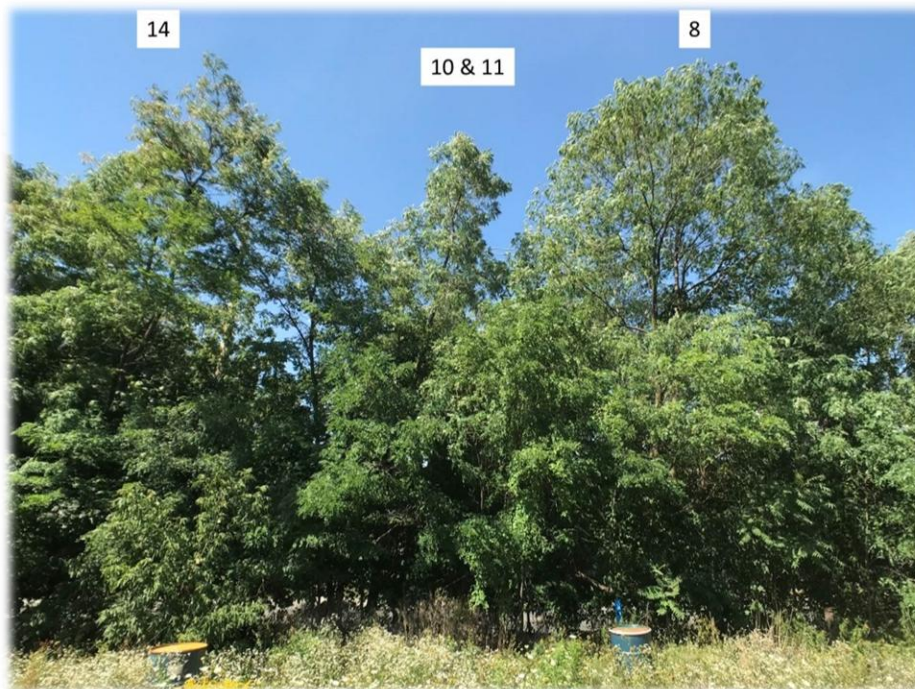


Figure 3: City-owned trees #8, 10, 11 and 14.



Figure 4: Provincially-owned tree groups with stems measuring less than 15cm DBH in the southeast corner of the subject site, typical of those excluded from the inventory.



Figure 5: Close-up of a provincially-owned multi-stemmed tree with all stems below 15cm DBH, typical of those excluded from the inventory.



Figure 6: Tree #15 is proposed for removal.



Figure 7: Overview of the subject site, southwest of the intersection of Davenport Road and Macpherson Avenue, in Toronto.



Figure 8: Overview of the subject site, Davenport Road, in Toronto.

APPENDIX 4 – TREE-RELATED PLANS

Inclusions:

1. Tree Locations Plan, dated April 16, 2025 (1 page)

1. THIS PLAN MUST BE READ IN CONJUNCTION WITH THE MOST RECENT ARBORIST REPORT PREPARED BY URBAN FOREST INNOVATIONS INC (UFI).
2. REFER TO UFI ARBORIST REPORT FOR A FULL INVENTORY OF TREE SPECIES AND REMOVAL REQUIREMENTS.
3. NO GROUNDBREAKING ACTIVITIES OR DEMOLITION SHOULD OCCUR UNTIL ALL TREE PRESERVATION REQUIREMENTS HAVE BEEN MET. OF PRIMARY CONCERN IS THE ESTABLISHMENT OF PROPER HOARDING AT TREE PROTECTION ZONES (TPZ).
4. A UFI CONSULTING ARBORIST SHOULD BE CONSULTED FOR ALL WORK THAT IMPACTS THE TREE PROTECTION ZONE.
5. THE LOCATION OF THE TREE PROTECTION ZONES HAVE BEEN CLEARLY INDICATED ON THE SITE PLAN. FENCING SHALL REMAIN IN PLACE UNTIL ALL SITE WORK HAS BEEN COMPLETED, AND MAY NOT BE REMOVED, RELOCATED, OR OTHERWISE ALTERED WITHOUT THE WRITTEN PERMISSION OF THE CONSULTING ARBORIST.
6. A QUALIFIED ARBORIST WILL UNDERTAKE PROPER ROOT PRUNING WHEN AND IF ROOTS OF RETAINED TREES ARE TO BE EXPOSED, DAMAGED OR SEVERED BY CONSTRUCTION ACTIVITIES. EXPOSED ROOTS WILL BE COVERED WITH SOIL OR MULCH AS SOON AS POSSIBLE TO PREVENT FURTHER DAMAGE AND DESICCATION. ROOT PRUNING PRIOR TO EXCAVATION WILL HELP PREVENT UNNECESSARY DAMAGE TO TREE ROOTS.
7. THE TREE PROTECTION ZONE SHOULD BE POSTED WITH SIGNS. WITHIN THE TREE PROTECTION ZONE THERE WILL BE NO:
- GRADE CHANGES
 - DUMPING OR STORAGE OF ANY MATERIALS
 - USE OF ANY MACHINERY WITHOUT PRIOR APPROVAL
 - LANDSCAPING WITH HEAVY MACHINERY
 - ACTIVITY OF ANY KIND WITHOUT PERMISSION OF THE CONSULTING ARBORIST
7. EFFORTS SHOULD BE MADE TO ROUTE ALL UNDERGROUND UTILITIES AROUND THE TREE PROTECTION ZONES. IF THIS IS NOT POSSIBLE, THEY SHOULD BE BORED OR TUNNELED UNDER THE ROOT ZONE OF THE TREES (MINIMUM 1.6 M). USING TRADITIONAL TRENCHING METHODS, THERE WILL BE SIGNIFICANT ROOT DAMAGE TO THE TREES THAT ARE BEING PRESERVED. WHERE POSSIBLE IT IS STRONGLY RECOMMENDED THAT ANY INSTALLATION OF UNDERGROUND UTILITIES (WATER, SEWAGE OR HYDRO) SHOULD UTILIZE A NON-DESTRUCTIVE METHODOLOGY SUCH AS DIRECTIONAL BORING, AIRSPADE TECHNOLOGY OR HYDROVAC REMOVAL OF SOIL.
8. IF INJURY SHOULD OCCUR TO RETAINED TREES DURING CONSTRUCTION, THE CONSULTING ARBORIST SHOULD EVALUATE THEM SO THAT APPROPRIATE TREATMENTS CAN BE RECOMMENDED AND PERFORMED.
9. ALL CONTRACTORS SHOULD BE INFORMED OF THE TREE PROTECTION MEASURES AND GUIDELINES AT A PRE-CONSTRUCTION MEETING.
10. MONITORING OF THE TREES AND THE TREE PROTECTION ZONE SHOULD BE CONDUCTED BY THE CONSULTING ARBORIST THROUGHOUT THE DURATION OF THE PROJECT.

TREE PROTECTION NOTES

TREE PROTECTION ZONE (TPZ)

No grade changes, storage of materials, equipment or activity of any kind are permitted within this area. This tree protection barrier shall not be removed without the written authorization of the municipal arborist or their designate.

For information or to report encroachment please call
Contact Name: _____ Tel. No. _____

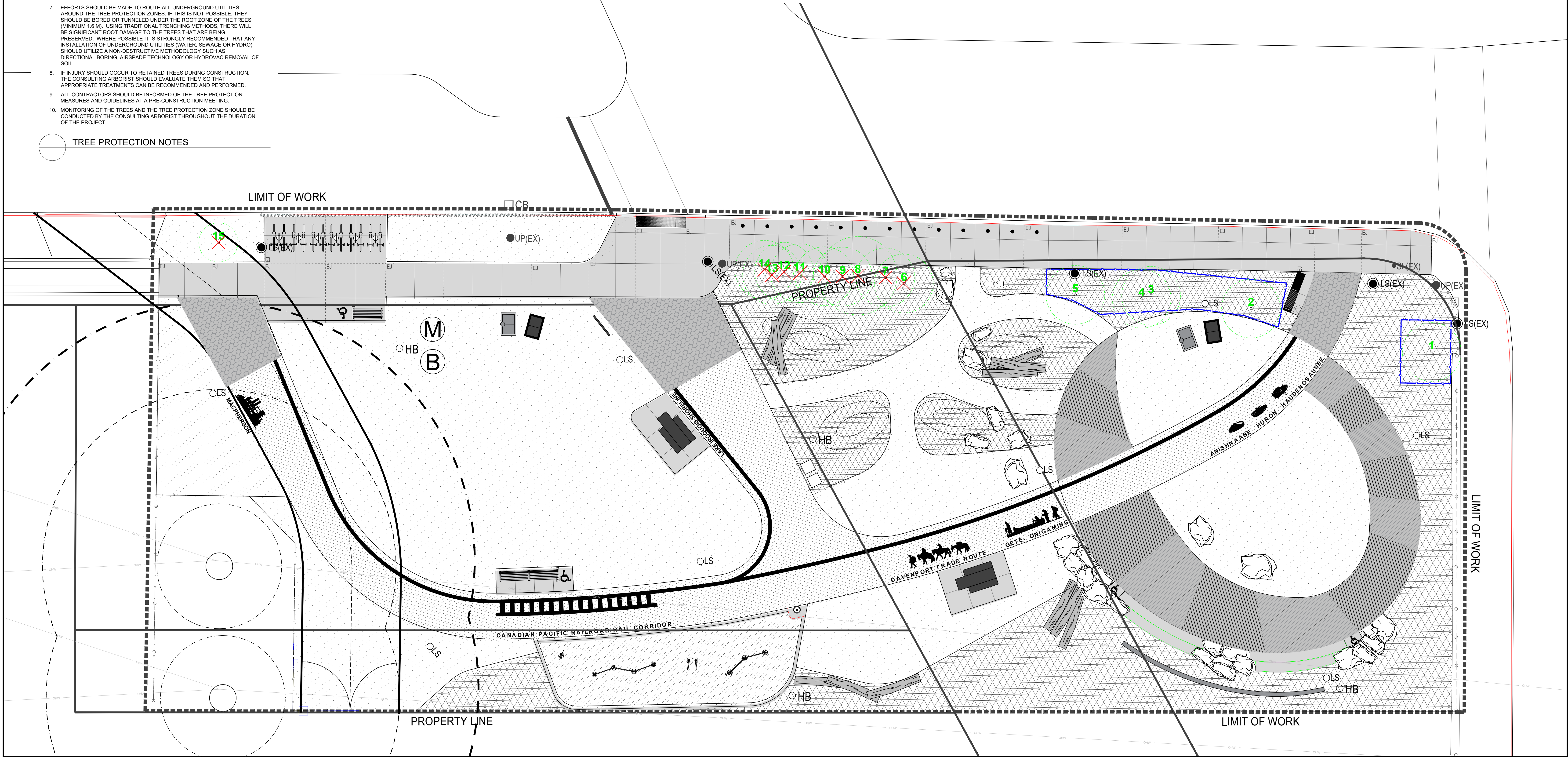
TREE PROTECTION SIGNAGE DETAIL

RAVINE & NATURAL FEATURE PROTECTION BYLAW

THE RAVINE & NATURAL FEATURE PROTECTION BY-LAW, CHAPTER 658 OF THE CITY OF TORONTO MUNICIPAL CODE REGULATES THE INJURY AND DESTRUCTION OF TREES, DUMPING OF REFUSE AND CHANGES TO GRADE WITHIN PROTECTED AREAS DEFINED IN SCHEDULE A.

UNDER THIS BY-LAW PROTECTED TREES MAY NOT BE REMOVED, INJURED OR DESTROYED, AND PROTECTED GRADES MAY NOT BE ALTERED, WITHOUT WRITTEN AUTHORISATION FROM URBAN FORESTRY RAVINE & NATURAL FEATURE PROTECTION, ON BEHALF OF THE GENERAL MANAGER OF PARKS, FORESTRY & RECREATION.

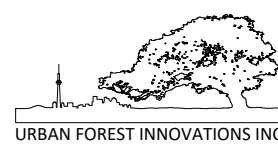
CONVICTIONS OF OFFENCES RESPECTING THE REGULATIONS IN THE RAVINE & NATURAL FEATURE PROTECTION BY-LAW ARE SUBJECT TO FINES, AND THE LANDOWNER MAY BE ORDERED BY THE COURT TO RESTORE THE AREA TO THE SATISFACTION OF THE CITY. A PERSON CONVICTED OF AN OFFENCE UNDER THIS BY-LAW IS LIABLE TO A MINIMUM FINE OF \$500 AND A MAXIMUM FINE OF \$100,000 FOR EACH TREE DESTROYED, A MAXIMUM FINE OF \$100,000 FOR ANY OTHER OFFENCE COMMITTED UNDER THIS CHAPTER, AND/OR A SPECIAL FINE OF \$100,000. A PERSON CONVICTED OF A CONTINUING OFFENCE, INCLUDING FAILURE TO COMPLY WITH RAVINE PERMIT CONDITIONS IS LIABLE TO A MAXIMUM FINE OF NOT MORE THAN \$10,000 FOR EACH DAY OR PART OF A DAY THAT THE OFFENCE CONTINUES. RNFP 0808



- LEGEND
- TREE TO BE RETAINED
 - TREE TO BE REMOVED

- TREE PROTECTION ZONE (TPZ)
- TREE HOARDING/FENCING

No.	DATE	REVISIONS	BY:	CHKD.
1	2022/02/17	ISSUED FOR 50% REVIEW	SJ	--



URBAN FOREST INNOVATIONS INC.
1331 Northaven Drive
Mississauga, Ontario L5G 4E8
T: 905-274-1022
F: 905-274-2170

TREE PROTECTION PLAN
MACPHERSON AVENUE PARK, TORONTO

SCALE N.T.S.
DATE 16/04/2025

FIGURE
TP-1

APPENDIX 5 – TREE PROTECTION SPECIFICATIONS

5.1 Scope and Purpose

This section outlines specifications for tree protection, and **not all recommendations may apply to the subject project**. Refer to the main body of the arborist report for tree-by-tree protection recommendations.

5.2 General Provisions

5.2.1 Tree Protection

Four important tree protection measures should be undertaken on the project site if trees are to be preserved in a manner which will maintain their health over the long term. These include:

1. Establishment of tree protection fencing and/or hoarding around adequately-sized Tree Protection Zones (TPZs) prior to the commencement of any construction activity;
2. Installation of root zone compaction protection where compaction may be caused by construction traffic or materials/equipment storage and staging;
3. Implementation of root-sensitive excavation wherever Tree Protection Zones (TPZs) or significant rooting areas may be encroached upon by excavation and/or grading, and;
4. Root pruning in advance of conventional excavation, on an as-needed basis.

5.2.1.1 Tree Protection Zones (TPZs)

The purpose of a Tree Protection Zone (TPZ) is to prevent root damage, soil compaction and soil contamination, and workers and machinery must not encroach upon Tree Protection Zones in any way.

To prevent access and ensure that the TPZ is effective, the following steps shall be implemented in the establishment of TPZ fencing and/or hoarding.

1. The locations of TPZs should be clearly identified on the project Site Plan and associated tree-related plans. Typically, TPZs are to be shown as circles around tree location points, and drawn to scale in accordance with the minimum required TPZ radius, as specified in Appendix 1.
2. No groundbreaking activities or demolition should occur until all tree protection requirements have been met and the consulting arborist has confirmed the establishment of Tree Protection Zone fencing and/or hoarding.
3. Hoarding shall consist of 4' x 8' sheets of plywood laid lengthwise and supported using "L" shaped supports to prevent root damage. Hoarding shall be affixed to the frame in such a manner as to prevent removal of individual sections or movement of the entire hoarding structure. Construction fencing can be used where pedestrian or motorist sightlines may be obscured by solid hoarding. Framed construction fencing can also be used to frame large Tree Protection Zones or tree groups, with expressed prior approval of the municipal arborist or their designate. Framed

fencing must be supported by a solid 2' × 4' frame. Fencing and/or hoarding shall be maintained intact throughout the duration of the construction project, unless otherwise specified.

4. Upon installation, all tree protection fencing and/or hoarding must be approved by the municipal arborist or their designate.
5. All fencing and/or hoarding is to remain in place in good condition throughout the entire duration of the project. No fencing and/or hoarding is to be removed, relocated or otherwise altered without the written permission of the municipal arborist or their designate.
6. No grade change, excavation, or storage of fill, equipment or supplies is permitted within the TPZ at any time. Any encroachment of the TPZ shall not be undertaken without expressed written permission of the municipal arborist or their designate. TPZ encroachment may constitute Tree Injury as defined by various municipal tree protection policies and by-laws, and may subject the responsible parties to prescribed penalties.
7. All contractors and supervisors should be informed of the tree protection requirements, including potential penalties, at a pre-construction meeting.
8. Trees and TPZs should be regularly monitored by a consulting arborist throughout the duration of the project.
9. If TPZ encroachment should occur at any time during construction, the consulting arborist should evaluate the trees immediately so that appropriate treatment can be performed in a in a timely manner.
10. Signage similar to the figure shown below should be mounted on each side of TPZ fencing and/or hoarding immediately upon establishment and should be maintained for the duration of the project. Every sign should have minimum dimensions of 40 cm × 60 cm.

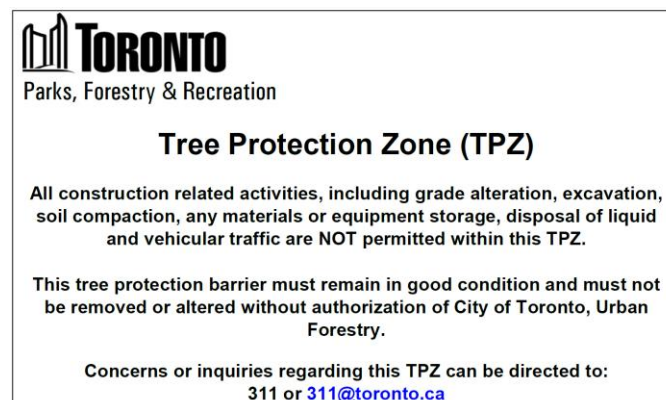


Figure 9: Sample TPZ information sign.

5.2.1.2 Root Zone Compaction Protection

Where traffic or access through the root zone is anticipated, a Root Zone Compaction Protection treatment should be installed.

Where limited non-vehicular access across the root zone is anticipated (e.g., occasional foot traffic, wheelbarrow), a Light Root Zone Compaction Protection specification should be implemented:

- Installation of medium-weight non-woven geotextile fabric or landscape cloth over affected area;
- Installation of 150 mm of wood chips over the fabric area;
- Installation of ½" plywood over wood chip mulch, and;
- Installation of appropriate covering material, if desired.

Where moderate non-vehicular access across the root zone is anticipated (e.g., materials staging) a Moderate Root Zone Compaction Protection specification should be implemented:

- Installation of medium-weight non-woven geotextile fabric or landscape cloth over affected area;
- 100 mm of granular clear stone laid over fabric area;
- Installation of medium-weight non-woven geotextile fabric or landscape cloth over the stone;
- Installation of 150 mm of wood chips over fabric area, and;
- Installation of ½" plywood over wood chip mulch.

In areas where frequent non-vehicular access or longer-term materials storage in the root zone is anticipated, or in areas where additional measures must be implemented to ensure complete exclusion of excavation activity, a Horizontal Hoarding/Excavation Exclusion specification should be implemented:

- Installation of medium-weight non-woven geotextile fabric or landscape cloth over affected area;
- Installation of 3 stacked and joined courses of 4" x 4" timbers around the area to be protected (including cross-members or joists, as required to maintain structural integrity);
- Installation of wood chip mulch in entire protected area, and;
- Installation of 2 layers of ¾" plywood or 1 steel plate over the protected area.

In areas where vehicular access or severe potential root zone compaction are anticipated, such as site access roads, temporary parking areas or heavy machine staging areas, a more robust Heavy Root Zone Compaction Protection specification should be developed and implemented on a site-specific basis. Key elements of such a specification may include multiple steel plates over load-dissipating materials, or modular geocellular systems such as Permavoid ArborRaft.

5.2.1.3 Tree-sensitive Demolition

Trees are often damaged by demolition activities undertaken during the clearing stage of the development process. For trees to be adequately protected during site demolitions, root-sensitive demolition protections must be implemented within Tree Protection Zones, as described below:

1. Prior to the commencement of site demolition, tree protection fencing must be established for retained trees.
2. Hardscape materials shall be broken up by hand or hand-operated machinery only (e.g., a hand-operated jackhammer to break up pavement, building foundations, etc.).
3. Machinery should be operated at shallow angles and broken-up materials should be removed by pulling away radially from the protected tree bases, or parallel to the direction of anticipated or observed root growth.
4. Upon removal of demolished materials, uncovered vertical soil profiles must be maintained in good structural integrity and prevented from disintegration (i.e. crumbling, erosion, fragmentation, etc.). Between the time of demolitions and new construction, exposed vertical soils may require shoring reinforcement, including a layer of burlap between shoring and exposed soil.
5. Following demolitions, affected TPZ areas should be reinstated with a high quality soil, such as triple mix soil, to provide a favourable growing medium for the development of new roots of the injured trees. Soil amendments, such as biochar, may also be considered for backfills inclusion. Soil depth should be sufficient to match existing surrounding soil grades.
6. Any roots exposed by demolition should be inspected and, where necessary, pruned by the supervising Certified Arborist in order to minimize permanent root damage.

5.2.1.4 Root-sensitive Excavation

Efforts should be made to exclude excavation or grade changes, including cutting or filling, from all TPZs. Where this is not possible, and unless otherwise specified, excavation shall utilize a root-sensitive methodology such as hand-digging, hydrovac or pneumatic (e.g., AirSpade) soil excavation, as specified in the arborist report.

Root-sensitive excavation must be conducted in advance of excavation using conventional excavation machinery. The objective of root-sensitive excavation is twofold: 1) to determine whether roots will be present beneath areas to be excavated and therefore determine the likely extent of damage to trees to be retained, and 2) to enable proper root pruning, as described below.

Root-sensitive excavation typically entails the creation of a trench approximately 200-300 mm wide between the subject tree (e.g., outside the established tree protection fencing) and the area to be excavated, without damaging existing significant roots. Unless otherwise specified, root-sensitive excavation should be undertaken to a minimum depth of 800 mm, unless excavation is proposed to a

shallower final depth. If excavation is for exploratory reasons and root pruning is not anticipated, equipment utilized during root-sensitive excavation should be operated at reduced pressures to prevent damage to root bark.

No excavation, whether undertaken by conventional or root-sensitive means shall take place within established tree protection zones without expressed written permission of the municipal arborist or their designate.

5.2.1.5 Root Pruning

Root pruning can help reduce the stresses experienced by a tree with root damage, encourage the growth of new fine and feeder roots, and prevent the spread of decay. Root pruning should be undertaken in conjunction with root-sensitive excavation in advance of conventional excavation, or immediately afterwards if unexpected roots are encountered. Root pruning should only be undertaken by an ISA Certified Arborist, and in the manner outlined below:

1. Roots that are severed, exposed, or diseased and are greater than 2.0 cm in diameter should be properly pruned. All roots must be pruned with clean and sharp hand tools only. Shovels, picks or other construction tools shall not be used to prune roots. Wound dressings or pruning paint must not be used to cover the ends of any cut.
2. Roots should be pruned in a similar fashion as branches, taking care to maintain the integrity of the root bark ridge. Root should be pruned back to native soil; root stubs must not be left upon completion of root pruning.
3. Prolonged exposure of tree roots must be avoided – exposed roots should covered and kept moist with soil, mulch, irrigation, or at least moistened burlap if they are to be exposed for longer than 3 hours. All cut roots should be covered with soil or excavated trenches should be backfilled with native material as soon as possible following root pruning.

5.2.1.6 Crown Pruning

During the course of project works, the branches of retained trees may interfere with project works, including site access, materials storage, and new construction. Where any project works present an unavoidable conflict with the branches of retained trees, appropriate clearance crown pruning shall be performed in the manner outlined below:

1. Wherever possible, branches found to be in conflict with construction and equipment should be temporarily tied back, using non-constricting knots to secure the branch. If branches cannot be safely tied back without causing branch damage, including breaking or bark stripping, pruning should be performed, as required.
2. No branches larger than 10 cm in diameter shall be removed, and no more than 20% of the total live crown volume shall be removed from the tree.

3. Crown pruning shall be conducted by an ISA Certified Arborist in accordance with good arboricultural practice, as detailed in the pruning standard *ANSI A300 Part 1 – Tree, Shrub, and Other Woody Plant Maintenance – Standard Practices, Pruning*, and in the ANSI Z133.1 safety standard.

5.2.2 Post-construction Care

The following recommendations should be implemented upon completion of construction to ensure that the health and condition of retained and newly-planted trees is maintained and improved.

5.2.2.1 Retained Trees

1. Trees which have been retained through the construction process should be regularly monitored by an ISA Certified Arborist for signs of construction-induced stress, which may not be apparent until 3-6 years after site disturbance.
2. Wherever possible, root zone amelioration including watering and mulching should be undertaken. However, treatments such as fertilization should be avoided unless directly specified by the project consulting arborist.
3. Any physical damage to retained trees should be assessed by the project consulting arborist and properly mitigated, as required. If necessary, broken limbs or exposed roots should be pruned, damaged bark should be traced, and soil decompaction and/or decontamination should be undertaken by an ISA Certified Arborist. Stability of trees with significant root zone disturbance should be assessed, and advanced stability assessment or mitigation should be implemented if necessary.

5.2.2.2 New Trees

1. All newly planted trees and shrubs should be provided with a bed of composted woodchip mulch 10-15 cm thick, extending to at least the dripline of the plant. Mulch should be periodically replaced as it decomposes, and weeds should be removed from the mulch bed manually. The mulch must not touch the bark of the tree and under no circumstances should it be mounded up against the stem in a “volcano” style. This is especially damaging for young trees with thin bark.
2. All new plantings should be watered at least once per week during the growing season within the first two years after planting. Watering intensity should be increased during periods of drought. Watering should be deep and slow, ensuring that water penetrates to deep roots. Trees should not be watered directly adjacent to the trunk, but rather in a circular pattern extending from the trunk to at least the dripline. The soil should be allowed to dry in between watering periods to allow air to reach the roots.
3. Minimal pruning should be undertaken in the first two years after planting. Foliage should be retained to allow for the roots to establish. Only dead, crossing and broken branches should be pruned back to an appropriate pruning point at the time of planting.

LIMITATIONS OF ASSESSMENT

It is the policy of Urban Forest Innovations to attach the following clause regarding limitations. We do this to ensure that the client is aware of what is technically and professionally realistic in assessing and retaining trees.

The assessment(s) of the tree(s) presented in this report has been made using accepted arboricultural techniques. These may include, among other factors, a visual examination of: the above-ground parts of the tree(s) for visible structural defects, scars, external indications of decay such as fungal fruiting bodies, evidence of pests or pathogens, discoloured foliage, the condition of any visible root structures, the degree and direction of lean (if any), the general condition of the tree(s) and the surrounding site, and the proximity of property and people. Except where specifically noted, the tree(s) was not cored, probed, climbed or assessed using any advanced methods, and there was no detailed inspection of the root crown(s) involving excavation.

Notwithstanding the recommendations and conclusions made in this report, it must be recognized that trees are living organisms, and their health and vigour constantly change over time. They are not immune to changes in site or weather conditions, or general seasonal variations. Weather events such as wind or ice storms may result in the partial or complete failure of any tree, regardless of assessment results.

While reasonable efforts have been made to accurately assess the overall condition of the subject tree(s), no guarantee or warranty is offered, expressed or implied, that the tree(s) or any of its parts will remain standing or in stable condition. It is both professionally and practically impossible to predict with absolute certainty the behaviour of any single tree or its component parts, regardless of the assessment methodology implemented. Inevitably, a standing tree will always pose some level of risk. Most trees have the potential for failure under adverse weather conditions, and the risk can only be eliminated if the tree is removed.

Although every effort has been made to ensure that this assessment is reasonably accurate, the tree(s) should be re-assessed periodically. The assessment presented in this report is only valid at the time of inspection.

Respectfully submitted by:



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CITY OF TORONTO

SOIL AND GROUNDWATER MANAGEMENT PLAN

DAVENPORT LANDS (PARCEL 28B, 29 AND
30) GREEN LINE TRAIL

JULY 2024



CA-WSP-17M-01909-00





SOIL AND GROUNDWATER MANAGEMENT PLAN

DAVENPORT LANDS (PARCEL 28B, 29 AND 30) GREEN LINE TRAIL

CITY OF TORONTO

PROJECT NO.: CA-WSP-17M-01909-00
DATE: JULY 2024
REVISION 02

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July 30, 2024

Janice Green, CET, Senior Environmental Project Manager, Project Management Office
Corporate Real Estate Management
City of Toronto
Metro Hall – 55 John Street, 2nd Floor
Toronto ON M5V 3C6

Dear Ms. Green:

**Subject: Soil and Groundwater Management Plan – Davenport Lands
Parcel 28B, 29 and 30, Green Line Trail, Toronto, Ontario**

Please find enclosed the Soil and Groundwater Management Plan (SGMP) prepared to support the proposed redevelopment of Parcel 28B, 29 and 30, collectively referred to as the Davenport Lands. The SGMP has been developed for use by all persons involved in the redevelopment of the Subject Property including Contractors, Subcontractors, Consultants, City of Toronto staff, and site visitors during construction.

Yours Sincerely,
WSP Canada Inc.

A handwritten signature in blue ink, appearing to read 'M. Mohammadi'.

Mariam Mohammadi, M.A.Sc., EIT
Engineer in Training

A handwritten signature in blue ink, appearing to read 'a park'.

Amanda Park, P.Geo. QPESA
Principal Geoscientist

WSP ref.: CA-WSP-17M-01909-00



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1 INTRODUCTION

WSP Canada Inc. (WSP) was retained by the City of Toronto (the “City”) to complete a Soil and Groundwater Management Plan for the Lower Davenport Lands (Parcels 28B, 29 and 30), part of the proposed Green Line Trail in Toronto, Ontario (collectively referred to as the “Subject Property” or the “Site”). The location of the Subject Property is shown on **Figure 1** and a Site Plan is provided as **Figure 2**.

The Site is part of the Green Line Trail, a proposed linear park and trail within an existing electrical transmission corridor that spans approximately 5 km from west of Earls Court Park and south of St. Clair Avenue to Davenport Road north of Dupont Street in Toronto, Ontario. The Subject Property includes three land parcels described as:

- Due Diligence Risk Assessment (DDRA) Lands
 - Parcel 28B: a parcel of land within an electrical transmission corridor, located at the southwest corner of Macpherson Avenue and Davenport Road. It consists of a vacant, gravel covered open parking space with a municipal address of 34 Macpherson Avenue, Toronto, Ontario. The proposed redevelopment (Other Land Use to Parkland) does not trigger filing a Record of Site Condition (RSC). As such, a Screening Level Risk Assessment (SLRA) was completed for due diligence purposes.
 - Parcel 29: a parcel of land within an electrical transmission corridor, located immediately east of Parcel 28B, with no municipal address. Parcel 29B is designated as industrial land use under O. Reg. 153/04, as it was historically part of a City Works Yard. The proposed redevelopment to a community land use does not trigger an RSC. As such, a SLRA was completed for due diligence purposes.
- Modified Generic Risk Assessment (MGRA) Lands
 - Parcel 30: a parcel of land within an electrical transmission corridor, located at 315 Macpherson Avenue, Toronto, Ontario. It consists of a vacant plot of land with no onsite buildings. The proposed redevelopment (industrial to parkland) required an RSC (#229263). A modified generic risk assessment (MGRA) was conducted to support RSC filing and a Certificate of Property Use (CPU#7631-BZWMLT) is filed on title for the parcel. The CPU outlines the conditions permitting operations on the Site, based on the environmental history. As part of the CPU, a site-specific Soil and Groundwater Management Plan (SGMP) and Contaminant Health and Safety Plan (HASP) are required.

The Soil and Groundwater Management Plan has been developed for use by all persons involved in the redevelopment of the Subject Property including Contractors, Subcontractors, Consultants, City of Toronto staff, and site visitors during construction. Implementation of the Soil and Groundwater Management Plan shall be overseen by a Qualified Person for Environmental Site Assessment (QP_{ESA}).

This revision incorporates changes in environmental regulations including Ontario Regulation (O. Reg.) 406/19.

2 SOIL AND GROUNDWATER MANAGEMENT PLAN

2.1 ADMINISTRATION AND PLANNING

The roles and responsibilities of the Contractor and the City's Representative should be established at the outset of the Project.

During the execution of excavation activities by or on behalf of the City at the Site, measures will be undertaken by the Contractor to control vehicular traffic, accessibility and the minimization of nuisance dust resulting from excavation and stockpiling of soils and on-Site transportation operations. Employee and visitor vehicles will be restricted to designated parking areas and will not be permitted within the construction areas of the Site, except in the case of emergencies. Locations of the designated parking areas will be determined by the Contractor prior to the commencement of construction. On-site vehicles and construction equipment will be routed to designated roadways or paths established by the Contractor. Vehicle entry and exit points for the various construction projects will be established prior to the commencement of excavation activities.

On areas of public roadways, adjacent to vehicle exit points, the Contractor will ensure that the areas used by construction-related traffic are free of debris and that dirt and dust are minimized. Where an issue is identified by the Contractor, regular road sweeping, and pressure washing will be implemented at a frequency that effectively maintains the off-site roads in a condition that would not result in nuisance dust generation or sediment transport.

Site preparation and administrative activities to be completed by the Contractor shall include but not be limited to the following:

- Installing protective fencing (i.e., wire fence or wooden hoarding with locking gates), where required, around the perimeter of each land parcel for site security and public protection;
- Installing a mud mat at the site entrance and egress locations;
- Obtaining public and private locates to confirm the locations of any buried services;
- Installing a geotextile on perimeter fencing and nearby catch basins and sewer covers, and placing filter socks at the base of fencing for sediment and erosion control to prevent runoff from discharging to City sewers and adjoining properties;
- Preparing a Site-Specific Health and Safety Plan (HASP) identifying expected construction activities and their safe execution along with a plan for spill response;
- Conducting construction activities in accordance with the contaminant HASP prepared for the Subject Property by WSP (under separate cover);
- Retain a Qualified Person, as defined in O. Reg. 153/04, to ensure compliance with the applicable laws and regulations for contaminated site and excess soil management;
- Preparing a Fill Management Plan (FMP) and project schedule that documents analytical and handling requirements for the management of excess soil and/or the importation of fill. Additional detail is provided in Section 2.2. The FMP must be provided to the City's Qualified Person, identified herein as the QP_{PL}, for review at least one week prior to the start of any activities that involve excess soil management and/or the importation of fill material to the Site. The FMP must include a cut/fill plan and the calculated volume of excess soil to be managed offsite. Details including the means/methods associated with soil stockpiling, segregation and management are to be included.
- The Contractor must provide details and assumptions to support the cut/fill estimates provided. No offsite soil management can proceed until authorized by the QP_{PL}.

- The volume of excess soil to be managed offsite is anticipated to be $>2,000 \text{ m}^3$, therefore, the Project Leader (the City) will file a notice to the Excess Soil Registry, as per requirements of O. Reg. 406/19. The Contractor must provide information to support the filing notice, including but not limited to, the intended location and description of the destination sites as which the soil is to be deposited.
- Conducting a site meeting at least three days prior to the start of any activities that involve the management of soil or groundwater. At a minimum, the site meeting must include the excavation contractor, the Contractor Qualified Person (QP_{CA}), the City, and the QP_{PL}.
- Submittals must be sent to the QP_{PL} for review and comment at least one week before the start of the excavation program.
- Excess soil and groundwater generated through the earthwork activities shall be managed in accordance with the requirements identified in this SGMP and the Contractors FMP.

2.2 SOIL MANAGEMENT

Soil management will be handled in accordance with the requirements of O. Reg. 153/04, O. Reg. 406/19 and the conditions outlined under CPU # 7631-BZWMLT. The CPU is registered to Parcel 30, however, conditions and best management practices will also be applied to Parcel 28B and Parcel 29, as applicable and practical.

The CPU is included in Appendix A.

2.2.1 EXISTING SOIL CONDITIONS

The soil stratigraphy at the Site is described as fill consisting of sand and gravel and brown sandy silt topsoil from surface to approximately 0.76 mbgs, underlain by native silty sand and sandy silt with varying depths to a maximum depth of approximately 2.74 mbgs. This layer was generally underlain by silty sand till to 6.10 mbgs. Bedrock was not encountered during this investigation.

Groundwater elevations ranged from 95.97 to 97.39 m above sea level (mASL) during the 2019 investigation and 96.38 to 97.87 mASL during the 2020 investigation.

Environmental investigations completed at the Subject Property have identified elevated concentrations of metals including hydride-forming metals, polycyclic aromatic hydrocarbons (PAHs) and/or salt-related parameters [electrical conductivity (EC) and/or sodium adsorption ratio (SAR)] in soil exceeding the Ontario Ministry of the Environment, Conservation and Parks (MECP) full-depth site condition standards (SCS) for residential/parkland/institutional (RPI) land use with coarse textured soil in a non-potable groundwater setting (the “Table 3 SCS”). Elevated chloride concentrations were identified in groundwater at Parcel 28B; however, for the purpose of the Due-Diligence Risk Assessment (DDRA), it was not found to be a contaminant of concern and was not carried forward for further assessment.

The soil contaminants that exceed the Table 3 SCS and their reasonable estimated maximum concentrations as predicted through the completion of two separate WSP DDRA's (Due Diligence Risk Assessment) on October 11, 2019, and February 28, 2020, and a Modified Generic Risk Assessment (MGRA) on January 29, 2021, are identified in **Table 1**. The inferred extent of the soil/ hard caps to be installed during park construction, are shown on the capping plan (**Appendix B**).

Table 1 Reasonable Estimated Maximums and Site Condition Standards for Contaminants of Concern in Soil

CONTAMINANT OF CONCERN	REASONABLE ESTIMATED MAXIMUM (µg/g)	TABLE 3 SCS (µg/g)
Arsenic	30.4	18
Cadmium	1.70	1.2
Lead	1169	120
Mercury	0.318	0.27
Selenium	3.5	2.4
Acenaphthylene	2.99	0.15
Anthracene	5.70	0.67
Benzo(a)anthracene	15.5	0.5
Benzo(a)pyrene	6.70	0.3
Benzo(b/j)fluoranthene	34.7	0.78
Benzo(ghi)perylene	13.1	6.6
Benzo(k)fluoranthene	10.3	0.78
Chrysene	22.4	7
Dibenzo(a,h)anthracene	3.86	0.1
Fluoranthene	30.2	0.69
Indeno(1,2,3-cd)pyrene	13.2	0.38
1,2-Methylnaphthalene	1.27	0.99
Naphthalene	0.926	0.6
Phenanthrene	23.6	6.2
PHC F3 (C16-C34)	560	300
Electrical Conductivity	1.8	0.7
Sodium Adsorption Ratio	31.4	5

Notes:

The collective data set of the Subject Property (i.e., Lower Davenport Parcels 28B, 29 and 30) was considered when determining the REM for each parameter

Toxicity Characteristic Leaching Procedure (TCLP) results from the 2022 soil sampling report (Sirati, 2022) indicate the soil would meet the Leachate Quality Criteria under R.R.). 1990 Regulation 347: General-Waste Management.

2.2.2 SOIL EXCAVATION

The most appropriate excavation and soil management equipment shall be selected by the Contractor. It is anticipated that standard equipment, including excavators and dump trucks would be used to excavate, load, and transport soil. Trucks shall be loaded within the limits of the Subject Property. No loading shall be conducted on the

public roads. Trucks must be covered with a tarp prior to leaving the Subject Property, to reduce the potential for dust release during transport. Once loaded, the trucks must have excess soil/mud removed from truck tires before exiting the Subject Property. Trucks shall travel on municipally identified truck routes to the intended receiving site and adhere to municipal and provincial weight restrictions. Excess soils must be tracked and documented as per O. Reg. 406/19.

2.2.3 OFF-SITE DISPOSAL/MANAGEMENT OF SOIL

During site redevelopment, all efforts must be made to limit or reduce the quantity of soil to be managed/disposed offsite.

Excess soil management must be completed in full accordance with O. Reg. 406/19, On-Site and Excess Soil Management, the SGMP and CPU. Depending on the volumes of excess soil to be managed, the excess soil reuse planning requirements may include:

- Registration of a notice in the Excess Soil Registry (by the Project Leader);
- Preparation of an excess soil destination report (ESDAR) (to be completed by the Contractor); and
- Application of a soil tracking system (to be completed by the Contractor).

Soil identified to exceed the Table 3 SCS shall be disposed at a Ministry of the Environment, Conservation and Parks (MECP)-licensed waste receiving facility (Class 1 soil management site or to a landfill or dump). Prior to removal of soil from the work area, the Contractor will provide the QP_{PL} with a copy of the Certificate of Authorization (CoA) or Environmental Compliance Approval (ECA) (whichever applies) for any waste transportation system and waste receiving facility selected for the management of soil removed from the work area.

Prior to soil movement, written confirmation must be provided by the receiving site (s) indicating acceptance of the soil based on a review of the laboratory analytical results by the receiving site. If more recent leachate analysis is required by the receiving site, the Contractor shall notify the QP_{PL}, collect the required samples, and submit for chemical analysis.

The hauler must have a valid CoA or ECA for transporting the impacted soil and weigh bills (or similar, to document the volume or weight of the soil) should be provided by the hauler.

If excavated soil is intended for off-site management at a suitable Re-Use Site (as defined in O. Reg. 406/19) then the contractor must prepare the required documentation (excess soil destination report) for the City's Consultant's review prior to soil movement.

2.2.4 RE-USE OF ON-SITE SOIL

Excavated soils that are planned to be reused at the Site are required to meet the following requirements:

- Soil excavated and reused as unimpacted fill within the barrier to Site soils is to be sampled at the frequency as per the requirements of O. Reg. 153/04 Schedule E, Table 2 and concentrations must meet the Table 3 RPI SCS for coarse textured soils.
- Soil reused at the Site under the soil caps, must have concentrations that meet the property specific standards (PSS), included in the DDRA and/or MGRA. Where PSS have not been developed for a parameter, soil reused at the Site must meet the Table 3 RPI SCS for that parameter.

For the onsite reuse of contaminated soils below the Barrier, excavated materials will be inspected for the presence of staining, deleterious materials (e.g. concrete, asphalt, construction debris etc.) and sampled at a frequency of one analyzed sample per 500 m³ to confirm that both soil quality requirements and the PSS are met. Excavated soil intended for offsite management or disposal must be managed, characterized, reported on, and tracked in accordance with O. Reg. 406/19 and O. Reg. 347/00.

Soil analysis must be completed at an accredited laboratory for, at a minimum, metals and inorganics and PAHs.

Measures must be taken to prevent contamination of the land upon which any stockpiled soil is placed. Any impacted soil requiring stockpiling shall be covered by polyethylene sheeting (i.e., plastic tarping) and bermed to prevent soil runoff and dust generation. Stockpiles must be located within the limits of the Subject Property.

2.2.5 IMPORTED FILL REQUIREMENTS

LICENSED PIT AND QUARRY – AGGREGATE

Granular fill materials may be imported to the Site. Materials that are imported directly from a Ministry of Natural Resources (MNR) licensed commercial pit or quarry will be referred to as “virgin” materials. Environmental characterization is not required for virgin materials obtained directly from a licensed pit or quarry operation. Documentation is required to confirm the origin of the materials.

NON-LICENSED SOURCES – EXCESS SOIL

Prior to importing any excess soil for backfilling at the Site, the appropriate documentation must be provided to the City’s Consultant for review and acceptance. The documentation requirements are outlined in O. Reg. 406/19 and include an Assessment of Past Uses report, Sampling and Analysis Plan, a Soil Characterization Report, and an Excess Soil Destination Report.

The sampling frequency of the imported soil should follow requirements of O. Reg. 406/19 to confirm the imported soil meets the more stringent of the applicable site condition standards (Table 3 SCS or Table 3.1 ESQS) for a residential, parkland, or institutional land use and coarse textured soils. Sampling must be compared to both SCS and ESQS and will only be acceptable as imported fill material if both soil quality SCS/ESQS are met.

At a minimum, the soil samples shall be analyzed for PHCs, BTEX, metals, EC/SAR and any other contaminant of concern identified at the source site as well as O. Reg. 406/19 required modified synthetic leaching procedure (m SPLP) analysis.

IN-SITU SAMPLING

- minimum of three soil samples if less than 600 m³ of soil will be excavated;
- If more than 600 m³ of soil will be excavated, at least one soil sample shall be analyzed for each 200 m³ of soil for the first 10,000 m³ to be excavated;
- At least one soil sample for each 450 m³ after the first 10,000 m³ of soil to be excavated;
- At least one sample for each additional 2,000 m³ after the first 40,000 m³ of soil to be excavated.

STOCKPILE SAMPLING

- Sufficient samples at different depths within the stockpile to characterize the depth profile and special variation;
- Sampling in accordance with the minimum stockpile sampling frequencies specified in Table 2 of Schedule E, to O. Reg. 153/04.

IMPORTED TOPSOIL

Topsoil imported for landscaping purposes shall meet the more stringent of the applicable SCS (Table 3 SCS and O. Reg. 406/19 Table 3.1 ESQS) for an RPI land use and coarse textured soils and shall be free from invasive species and deleterious materials (e.g. construction waste/debris, asphalt, wood etc.)

Topsoil sampling and characterization is required at the source Site.

STOCKPILING OF IMPORTED FILL

There may be a requirement for stockpiling of imported fill materials (e.g., aggregate, topsoil, excess soil) on the Subject Property. Stockpiling will be subject to the following requirements:

- Appropriate silt and erosion control measures will be implemented on all stockpiles that will be in place for greater than five days.
- Stockpiles will be wetted, as required, to minimize generation of dust.
- The location, size, and configuration of stockpiles will be determined by the Contractor with QP (Qualified Person) approval based on Site construction activities. The location, size, and configuration of all stockpiles will be noted by the Contractor in the daily Site operation record(s).
- Stockpiles will be kept as flat as practicable and generally limited to heights of less than 5 m, to minimize potential wind and water erosion and dust.
- The condition of each stockpile will be inspected visually daily by the Contractor. Appropriate actions will be taken to control dust, sedimentation, and erosion, as necessary. Records of inspection and appropriate actions will be recorded by the Contractor in a daily site operation record.

RESPONSIBILITY AND REPORTING

A daily field log of onsite soil management activities will be maintained by the Contractor. The log will be prepared daily for all days for which there are onsite soil management activities. The log will present the following information:

- A summary of daily onsite management activities including locations of soil movement, soil stockpiling, and soil placement.
- Background assessment and analysis of analytical results for the soil materials.
- A summary of analysis activities including sample identification and chain of custody forms.
- A summary of weigh bills and/or soil tracking information for imported materials being brought to the Site.
- Details of any rejected loads.

The QP_{PL} will provide part time inspection services during construction activities to confirm compliance with this SGMP and the FMP.

CONTINGENCY MEASURES FOR LOAD REJECTIONS

If the imported fill is not able to be immediately returned to the source site, the material shall be segregated from any onsite stockpiles and returned to the source site as soon as practicable.

The Contractor will immediately report any rejected loads to the QP_{PL}. The source site will be contacted and any additional imported fill from the source site will be thoroughly inspected. If the quality issue persists, importation from the source site is to be suspended until the quality issue is resolved to the satisfaction of the QP_{PL}. Rejections of any loads of imported fill due to visual inspection or review of analytical results will be documented in the daily inspection record.

2.3 SITE RESTORATION AND RISK MANAGEMENT MEASURES

The Site must meet the requirements of the contract governing the site redevelopment. Risk Management Measures (RMMs) are required to mitigate exposures by human and ecological receptors to impacted soil. Based on the identified impacts to soil at the Site, the following RMMs are required for the Site:

BARRIER TO SITE SOILS

- Hard Cap: a barrier covering contaminated soil consisting of at least 75 mm of hard surface consisting of hot mix asphalt, concrete, concrete pavers, stone pavers or brick or other surface treatment not required to support vegetative growth underlain by at least 150 mm of granular. Hard caps can include park features such as bike paths and walkways. In Parcel 30, areas where permeable pavers are used, will require a 1.0 m fill cap barrier.

- Fill Cap: A barrier covering contaminated soil consisting of soil meeting the MECP Table 3 SCS and Table 3.1 ESQS.
 - All areas where deep-rooting trees and/or shrubs are to be planted require a fill cap of 1.5 m.
 - All areas where plantings with shallower roots are to be planted require a fill cap of 1.0 m.
 - All grassed areas that do not contain any trees, shrubs, or plantings with deeper roots require a fill cap of 0.5 m.
 - All utilities constructed below the hard cap and fill cap must be placed within a corridor (trench) of un-impacted soil/material, that extends 0.5 m around the utility.
 - Areas with existing trees that will remain require a total cap of 0.15 m of mulch, wood bark or similar material at a minimum 1.2 m to max of dripline or 2.4 m radius around the trunk of the tree. Thickness to be feathered in the approach to the tree trunk, in accordance with landscape design detail.

The depth and thickness of all site barriers as described above are referenced to finished final grade.

The Contractor must complete ground elevation surveys as required to confirm excavation depths following contaminated soil removal and following site restoration to confirm as built conditions and document soil barrier thicknesses across the Site. Soil barrier thickness to be visually confirmed by the QP_{PL}.

3 SURFACE WATER & GROUNDWATER MANAGEMENT

The Contractor shall maintain excavations free of water. A dewatering program may be required of the Contractor, as part of the excavation works, and must comply with the following conditions:

- Provision, operation, and maintenance of necessary equipment appropriately sized to keep excavations, staging areas, and other work areas free from water;
- Water barriers as necessary to protect the site from soil erosion and from the runoff of surface water from work areas. Control of surface drainage to ensure that water is not directed across or over pavements or sidewalks except through approved pipes or properly constructed troughs, and runoff is intercepted and diverted to suitable outlets; and
- Disposal of water in manner not injurious to public health or safety, to property, or to any part of work completed or under construction. Testing of water (i.e., surface water runoff or infiltrated groundwater) is required prior to discharge to municipal sewers to demonstrate its suitability for such discharge.

Certain water taking activities have been prescribed by the Water Taking Environmental Activity and Sector Registry (EASR) Regulation (Ontario Regulation 63/16) for construction site dewatering involving more than 50,000 L/day and less than 400,000 L/day. If the water taking does not meet the criteria of the EASR, then dewatering would require a permit to take water (PTTW) as prescribed under O. Reg. 387/04.

Elevated chloride concentrations was identified in groundwater at Parcel 28B. If groundwater management is required during construction activities, a minimum of one water sample shall be collected for laboratory analysis to determine appropriate disposal options. The need for additional water samples will be determined by a QP_{ESA} if odorous or visually impacted water is encountered during construction.

The testing requirements for water samples will depend on the proposed management method. If sewer discharge is preferred, water samples shall be analyzed for all parameters governed by the City of Toronto Municipal Code 681 Sanitary and Storm Sewer By-law. The laboratory results shall be compared to the City of Toronto Municipal Code 681 Sanitary and Storm Sewer By-law. If any chemicals are identified exceeding the City criteria, appropriate treatment along with a sewer discharge permit will be required to meet the requirements of the municipal code prior to discharge to City sewer. If the water is to be managed via pumper truck and offsite disposal at a MECP-licensed waste receiving facility, then the facility shall be consulted to confirm the sampling requirements.

4 SPILL RESPONSE

The Contractor must be prepared for spill response in the event of an uncontrolled release associated with site activities (e.g., fluid). The type of materials will be suitable for the liquid contaminants that may be present on-site (e.g. fuels and fluids in trucks and equipment, hydraulic fluid, etc.). In particular, spill response specifications shall include the following requirements:

- Preparation of a Spill Prevention and Contingency Plan;
- Being prepared to intercept, clean up, and dispose of spills or releases that may occur in accordance with the plan for spill response, as required in the Contractor's Health and Safety Plan;
- Immediately report spills and releases potentially causing an adverse effect to the environment to the appropriate delegation of responsibility/specific onsite staff to discuss and confirm other measures that shall be taken such as, but not limited to, mitigation and spill clean-up requirements, and reporting the spill to the MECP Spills Action Centre and any other authorities having jurisdiction (AHJs).

5 STOCKPILING

Stockpiling of potentially unimpacted soil, potentially impacted excavated soil and soil brought to the Site should be separated. Excavated soil containing non-soil debris should be considered potentially impacted. Segregation of potentially unimpacted excavated soil and potentially impacted excavated soil should be completed under the supervision of a QP_{ESA}.

Any potentially impacted excavated soil that must be placed over finished soft cap barriers shall be placed into separate covered bins or stockpiled on 10 mil plastic sheeting. These stockpiles shall be either: 1) tarped or 2) enclosed in silt fencing to prevent erosion. As needed, filter socks for catch-basins and utility covers should be used.

Stockpiles of potentially impacted excavated soil should be maintained in a secure area that precludes public access. Heights of stockpiles should be minimized to reduce the potential for fugitive dust emissions, considering the stockpile locations and the type of stockpiled materials. Stockpile heights shall comply with any municipal by-law requirements, and not exceed 5.0 m in height.

The contractor will install controls to prevent the erosion of stockpiles, particularly the potential for eroded sediment to discharge from the Site, into a water body or storm sewer. Any potentially contaminated runoff shall be contained for further characterization and determine whether discharge to a sanitary sewer or to other approved treatment is required.

6 DUST CONTROL AND SOIL TRACKING

6.1 DUST CONTROL

The following dust control measures shall be implemented by the Contractor to prevent the generation of nuisance dust with the potential to cross the site boundaries.

- On-site vehicles shall obey posted speed limits. As needed, the Contractor may implement further measures to reduce vehicle speeds.
- Dust emissions from construction and demolition, on-site stockpiles, haul roads, exposed soils/surfaces and areas of active excavation should be controlled by means of misting with potable water on an as-required basis. The primary trigger for misting would be observations by the Contractor that on-site vehicular traffic, operating at the posted Site speed limit, is generating excessive dust with the potential to cross the Site boundaries. The quantity and rate of water application should be minimized to prevent generation of surface runoff or the saturation of stockpiled materials.
- Off-site roads used by construction traffic should be kept free of debris, and dust and dirt should be kept to an acceptable level that reduces visible dust emissions to the extent reasonably practicable. Road sweeping and cleaning should be implemented by the Contractor when track-out is observed, or when the potential for nuisance dust generation is observed. If needed as determined by the Contractor or the City, tire washing stations shall be located at each exit from the Site.
- Soil stockpiles should be covered with tarps or be located at a height and in a location such that dust is not generated from the stockpiles to mitigate the generation of unacceptable levels of nuisance dust.
- In the event of high wind conditions that cannot be addressed through these measures, work should be restricted in these areas until conditions are less likely to generate nuisance dust.

In the event that the construction activities generate unacceptable levels of nuisance dust (i.e., dust levels having the potential to reduce visibility, cause irritation of eyes, nose or throat, or which have the potential to accumulate on surfaces), that dust management mitigation measures are ineffective, or the Contractor is not in compliance with prescribed control measures, then construction should cease and a review and implementation of appropriate control measures including water misting, removal of dirt and dust from paved surfaces, or covering exposed soil should be implemented prior to the resumption of work.

When misting is not feasible (e.g., in the winter months), alternative dust suppression methods (e.g., polymer-based dust suppressant such as BASF Envirowet DC-100, SoilTac, Gorilla Snot, or Entac) may be used. Chloride-based dust suppressants should not be used.

Work may be stopped at any time by the QP_{PL} when control of dust and particulates is inadequate for wind conditions present at site, or when visual monitoring indicates that release of dust and particulates into the atmosphere is excessive. Prior to resuming work, the Contractor must propose changes to operations such as any excavation, handling, processing, or any other work that may cause release of dust or particulates. All proposed changes must be discussed with and approved by the QP_{PL} before resuming excavation activities.

6.2 VEHICLE AND EQUIPMENT DECONTAMINATION

A decontamination pad should be constructed at each vehicle exit from the Site for washing all equipment (including heavy equipment) and vehicles to mitigate the movement of contaminated materials. Decontamination should be performed under the supervision of the Contractor when equipment and vehicles:

1. Leave the Site as deemed necessary by the Contractor; and
2. Have completed excavation of soils intended for off-Site disposal.

It is only necessary to decontaminate vehicles whose wheels or tracks are in direct contact with potentially impacted Site soil. Decontamination procedures include visual inspection of equipment (including tracks, tires, and dump truck beds), physical removal of accumulated soil, and washing with a high-pressure washer. Vehicles and equipment should be inspected by the Contractor prior to departure from the Site.

Equipment being brought to the Site should be visually inspected by the Contractor (including tracks, tires, and dump truck beds) to confirm that the equipment is visibly free of accumulated solids, free liquids, or staining. If these conditions are observed, then equipment should be directed to the equipment decontamination pad.

Wash water generated during equipment decontamination should be collected and pumped into temporary storage tanks. Depending on the quantity and quality of decontamination liquid, on-Site treatment, and discharge to the City of Toronto's (hereinafter referred to as the "City") sanitary sewer system, subject to a sanitary sewer discharge agreement with the City, could be used as an alternative to temporary storage tanks. Prior to discharge, a Qualified Person shall be retained to collect samples for waste characterization. For sewer discharge, sampling must be conducted in accordance with the City's sewer discharge requirements. For off-Site disposal, sampling must be conducted in accordance with the receiver's requirements. The results of this testing shall be reviewed by a Qualified Person to confirm that the proposed method of disposal complies with the requirements of the sewer discharge by-law or the requirements of the proposed receiving facility.

Waste characterization results, as well as any notices to the City required under a discharge agreement, or manifests for shipments of liquids to a licensed waste receiver, should be maintained on the Site during construction.

6.3 TRUCK TARPING

Materials having the potential to emit dust at nuisance levels should be transported on- and off-site from the constructed areas within the Site in suitably covered, leak-resistant transport vehicles or containers. Carriers shall be required to cover and secure loads in accordance with the requirements of Ontario Regulation (O. Reg.) 577 under the *Highway Traffic Act*.

6.4 ON-SITE SOIL MANAGEMENT

Stockpiled soil excavated from the Site is to be placed within designated areas at the Site and managed as per details presented in Section 5. The stockpiled areas should also be bermed and/or fenced and runoff should be controlled (e.g. filter socks for catch-basins) to minimize access to the excavated soil.

6.5 SOIL TRACKING

All excess soil transported within the Project Area and off-site shall be tracked by the Contractor in accordance with Section 16 of O. Reg. 406/19 and the Soil Rules. Prior to any excess soil leaving the Project Area, the Contractor shall ensure all relevant documentation is completed and accurate and a digital tracking system is in place.

7 REPORTING

To ensure compliance with the requirements of the Soil and Groundwater Management Plan, daily records shall be kept by the Contractor including:

- Weather conditions;
- Locations and depths of excavation activities;
- Soil movement details (stockpiling or off-site disposal);
- Soil tracking and dust control measures (i.e., soil wetting, tire cleaning, street cleaning, inspections of erosion and sediment control measures such as fencing silt socks, and covers on catch basins and sewers);
- Stockpile management and drainage;
- Groundwater and surface water management;
- Names of Site Visitors, Consultants, and Sub-contractors present on site;
- Unexpected site conditions or incidents (e.g., unidentified, or new contamination, spills, etc.); and,
- Complaints.

Copies of the daily reports shall be provided by the Contractor to the QP_{PL} weekly (at a minimum) during the construction work.

Within 21 Days of the completion of soil movement and barrier installation, the Contractor's QP shall provide an Excess Soil Implementation Report describing the quantity of excess soil removed from the Project Area and deposited at each receiver site and reuse site, the dates of deposit, the quality of each soil type if applicable, details of any rejected loads, any incidents related to soil haulage or soil being sent to the incorrect destination, and any other information required to complete the Project Area notice, as well as any other information requested by the City related to soil storage, processing, treatment, transportation or tracking.

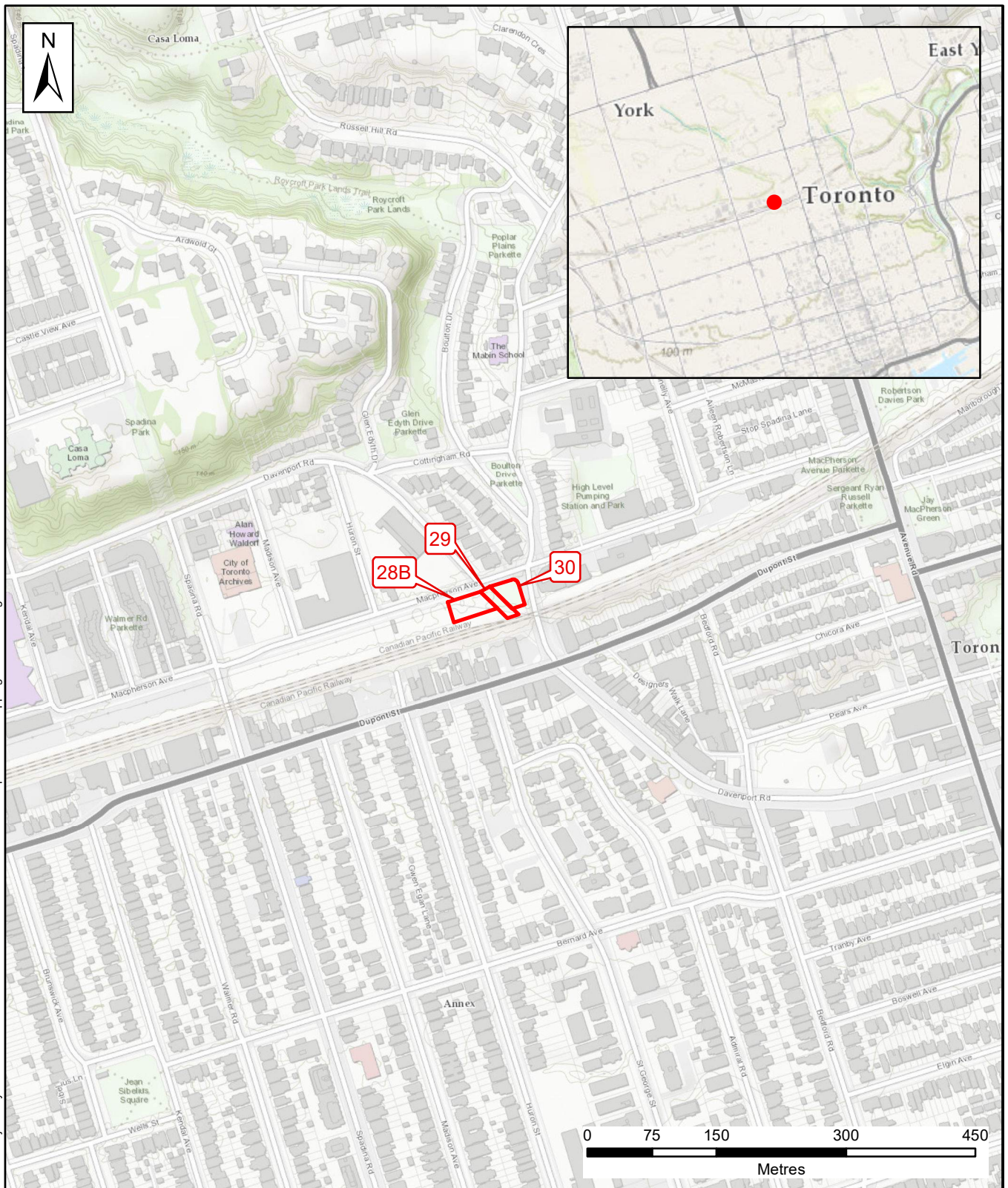
8 REFERENCES

- Ontario Ministry of the Environment, Conservation and Parks, 2011b. Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act. April 15.
- Ontario Regulation 406/19 On-Site and Excess Soil Management, made under the Environmental Protection Act
- Ontario Regulation 153/04 Records of Site Condition – Part XV.1 of the Environmental Protection Act
- WSP Canada Group Limited. 2018a. Phase II Environmental Site Assessment – Davenport Lands – Parcels 28B, Part of Proposed Green Line Trail, Toronto, Ontario. May.
- WSP Canada Group Limited. 2018b. Phase II Environmental Site Assessment – Davenport Lands – Parcels 29 and 30, Part of Proposed Green Line Trail, Toronto, Ontario. May.
- WSP Canada Group Limited. 2020. Phase Two Environmental Site Assessment – Davenport Lands – Parcel 30, Part of Proposed Green Line Trail, Toronto, Ontario. March.
- WSP Canada Group Limited. 2019. Due-Diligence Risk Assessment – Davenport Lands – Parcels 28B, Part of Proposed Green Line Trail, Toronto, Ontario. October.
- WSP Canada Group Limited. 2020. Due-Diligence Risk Assessment – Davenport Lands – Parcel 29, Part of Proposed Green Line Trail, Toronto, Ontario. February.
- WSP Canada Group Limited. 2021. Modified Generic Risk Assessment and Pre-submission Form for Parcel 30, Green Line Trail, 315 MacPherson Avenue, Toronto, Ontario. January.
- WSP Canada Inc. 2024. Health and Safety Plan, Green Line Trail Parcels 28B, 29 and 30, Toronto, Ontario. July.
- Sirati & Partners. 2022. Soil Sampling and Testing Report, Green Line Parks in Toronto, Ontario. August.

APPENDIX

FIGURES

J:\1442 Projects by Job Number\2017\17M-01909-00 Green Line Trail - Davenport Lands\Mapping\MXD\SMP\Figure 1 Site Location.mxd



LEGEND

PARCEL BOUNDARY

Client: **CITY OF TORONTO**

Title: **SITE LOCATION**

Prepared By: **wsp**

17M-01905-85

Scale as Shown

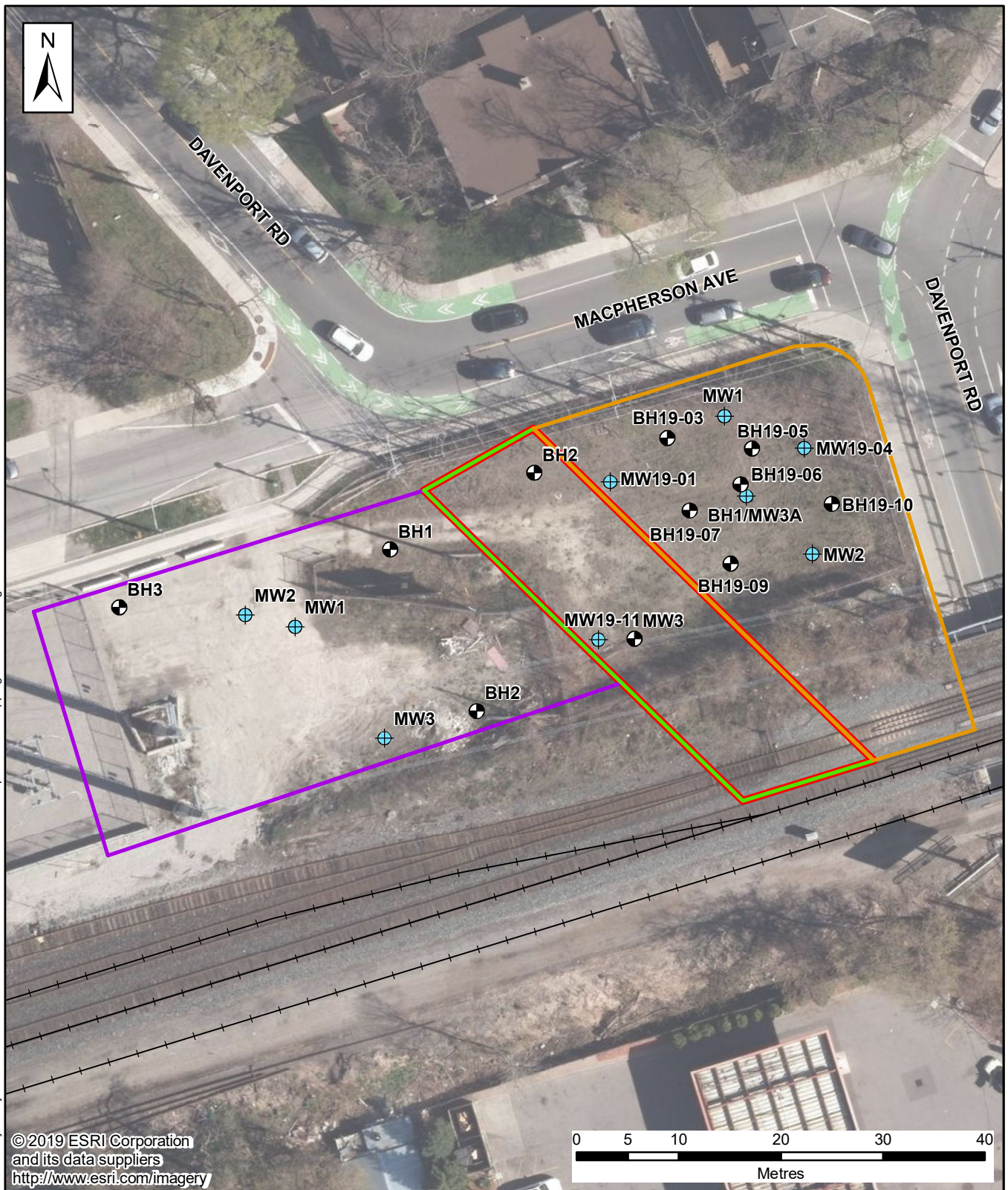
Review: AP

Date: June 2021

Figure: 1

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J:\1442 Projects by Job Number\2017\17M-01909-00 Green Line Trail - Davenport Lands\Mapping\MXD\DDRA\Figure 2 Site Plan - 28B 29 30.mxd



LEGEND

- | | |
|--|--|
| SUBJECT PROPERTY | RAILWAY |
| PARCEL 28B | BOREHOLE |
| PARCEL 29 | MONITORING WELL |
| PARCEL 30 | |

Client: CITY OF TORONTO		
Title: SITE PLAN - PARCEL 28B 29 30		
Prepared By: wsp		
17M-01909-00	Scale as Shown	Review: AR
Date: November 2019	Figure: 2	
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APPENDIX

A

CERTIFICATE OF
PROPERTY USE

Certificate of Property Use

Issued under the authority of the Environmental Protection Act, R.S.O. 1990, c. E.19,
sections 168.6 (CPU) and 197 (Order)

Certificate of Property use number 7631-BZWMLT
Risk Assessment number 0770-BR6RDK

Owner: City of Toronto
204 - 55 John Street
Toronto, ON M5V 3C6

Site: 315 Macpherson Avenue, Toronto, ON

with a legal description as follows:

PT PCL 1 PL 315 AVENUE HILL AS IN EW2130 (SECONDLY), LYING W OF
63BA884 S/T EW2130; S/T CT461482; S/T CT461482; City of Toronto

Being All of PIN 21219-0138 (LT)

This Certificate of Property Use and Section 197 Order set out the requirements regarding the above-noted Property and the Modified Generic Risk Assessment carried out in relation to the Property which was assigned the number noted above and is described in more detail in Part 1 below

Refer to Part 1 of the CPU, Interpretation, for the meaning of all the defined capitalized terms that apply to the CPU.

Part 1: Interpretation

In this CPU, the following capitalised terms have the meanings described below. These terms are also defined in the Approved Model. Not all of these terms may be used in this CPU.

“Act” means the Environmental Protection Act, R.S.O. 1990, c. E.19.

“Active SVIMS” means a soil vapour intrusion mitigation system designed and operated to collect and remove soil vapour from below a Building and convey the soil vapour through vent risers to the outside air by means of one or more electrical fan powered vents drawing air from below the Building.

“Approved Model” has the same meaning as in subsection 1 (1) of Schedule C of O. Reg. 153/04, namely, the data file entitled “Modified Generic Risk Assessment Model” and dated October 19, 2009 as amended from time to time, that is maintained by the Ministry as part of its Brownfield initiative and is available on the Internet and may be available in such other manner as the Minister considers appropriate.

“ASTM” means the American Society for Testing and Materials.

“Barrier” means a Fill Cap Barrier, Hard Cap Barrier or Shallow Soil Cap Barrier.

“Building” means an enclosed structure occupying an area greater than ten square metres consisting of a wall or walls, roof and floor.

“Building Area” means the horizontal area of a Building at Grade within the outside surface of the exterior wall or walls.

“Building Code” means Ontario Regulation 332/12 (Building Code) as amended to January 1, 2017, made under the Building Code Act, 1992, S.O. 1992, c. 23.

“Capping Soil” means,

- a. soil that meets the applicable site condition standards for the Property, or
- b. soil that meets any higher standards for the contaminant or contaminants as generated by the Approved Model without incorporation of risk management measures, and as specified in Schedule ‘A’ of the CPU.

“Certificate of Property Use” or “CPU” means this certificate of property use bearing the number 7631-BZWMLT issued for the Property by the Director under section 168.6 of the Act, as it may be amended from time to time.

“Competent Person” has the same meaning as in the Occupational Health and Safety Act, R.S.O. 1990, c. O.1.

“Contaminant” has the same meaning as in the Act; namely any solid, liquid, gas, odour, heat, sound, vibration, radiation or combination of any of them, resulting directly or indirectly from human activities that causes or may cause an Adverse Effect.

“Contaminants of Concern” has the same meaning as in O. Reg. 153/04, which, for the Property, means one or more contaminants found on, in or under the Property at a concentration that exceeds the applicable site condition standards for the Property, as specified in section 3 of the Risk Assessment report and in Schedule ‘A’ of the CPU.

“Director” means a person in the Ministry appointed as a director for the purpose of issuing a certificate of property use under section 168.6 of the Act.

“Fill Cap Barrier” means cover, above the Property Specific Contaminants of Concern, that, is at least,

- a. 1.0 metre thick, or any greater thickness than 1.0 metre, as specified in section 7 of the Risk Assessment report, or
- b. 1.5 metres thick, where the option to modify the S3 component value in the Approved Model for protection of subsurface workers from direct soil contact has been used in the Risk Assessment, as specified in section 7 of the Risk Assessment report, whichever is applicable, and,

consists of at least 0.5 metres thickness of Capping Soil, and above this, cover consisting of additional Capping Soil or non-soil surface treatment such as asphalt, concrete or concrete pavers, stone pavers, brick or aggregate.

“First Storey” has the same meaning as in the Building Code.

“Grade” has the same meaning as in the Building Code.

“Hard Cap Barrier” means an asphalt or concrete cover layer, above the Property Specific Contaminants of Concern, that is at least 225 millimetres thick, and consists of at least 75 millimetres thickness of hot mix asphalt or poured concrete underlain by Granular “A” aggregate or equivalent material and includes a building slab or building foundation and floor slab meeting these specifications.

“Intrusive Activities” means any intrusive activity undertaken at the Property, such as excavating or drilling into soil or ground water, which may disturb or expose Property Specific Contaminants of Concern at the Property.

“Licenced Professional Engineer” means a person who holds a licence, limited licence or temporary licence under the Professional Engineers Act, R.S.O. 1990, c. P.28.

“Minister” means the Minister of the Ministry.

“Ministry” means the ministry of the government of Ontario responsible for the administration of the Act, currently named the Ministry of the Environment, Conservation and Parks.

“O. Reg. 153/04” means Ontario Regulation 153/04 (Record of Site Condition – Part XV.1 of the Act), as amended, made under the Act.

“Owner” means the owner(s) of the Property, beginning with the person(s) to whom the Certificate of Property Use for the Property is first issued by the Director under section 168.6 of the Act based on the Risk Assessment, and any subsequent owner of the Property.

“Passive SVIMS” means a soil vapour intrusion mitigation system designed and operated to collect and remove soil vapour from below a Building and convey the soil vapour through

vent risers to the outside air by means of natural forces or one or more wind turbines, or solar powered wind turbine operated vents drawing air from below the Building.

“Property” means the property that is the subject of the Risk Assessment.

“Property Management Oversight” means management, on an ongoing basis, of all structural, mechanical, electrical, ventilation and other Building and Property services that relate to the installed Passive SVIMS, or the installed Active SVIMS, as applicable for the Property as set out in section 7 of the Risk Assessment report including oversight of operation, inspection, monitoring, maintenance and repair activities, and of operational and reserve funding for these activities, by a property manager or management company engaged by the Owner or, in the case of collective ownership, by an authorized representative or representatives of the collective ownership of the Building and Property, such as a condominium board.

“Property Specific Contaminants of Concern” means one or more contaminants found on, in or under the Property at a concentration that exceeds the applicable site condition standards for the Property and any higher standards for the contaminant or contaminants as generated by the Approved Model without incorporation of risk management measures, and as specified in section 3 of the Risk Assessment.

“Property Specific Standards” means the standards established as the maximum allowable concentrations for the Property Specific Contaminants of Concern at the Property, as generated by the Approved Model with incorporation of risk management measures, as specified in section 6 of the Risk Assessment report and in Schedule ‘A’ of the CPU.

“Provincial Officer” has the same meaning as in the Act, namely, a person who is designated by the Minister as a provincial officer for the purposes of the Act and the regulations.

“Qualified Person” means a person who meets the qualifications set out in subsection 5 (2) of O. Reg. 153/04.

“Risk Assessment” and “MGRA” means the modified generic risk assessment number 0770-BR6RDK submitted with respect to the Property and accepted by a Director under section 168.5 of the Act on April 9, 2021 and set out in the following documents:

- Report entitled “Modified Generic Risk Assessment and Pre-Submission Form for Parcel 30, Green Line Trail, 315 Macpherson Avenue, Toronto, Ontario” prepared by WSP Canada Inc., dated June 26, 2020;
- Report entitled “Modified Generic Risk Assessment for Parcel 30, Green Line Trail, 315 Macpherson Avenue, Toronto, Ontario” prepared by WSP Canada Inc., dated January 29, 2021; and
- Email entitled “RE: Request for Additional Information -- RE: MGRA2 for 315 Macpherson Avenue, Toronto [MGRA1888-20; IDS#0770-BR6RDK] prepared by WSP Canada Inc., dated April 6, 2021.

"Risk Management Measures" means the risk management measures specific to the Property described in the Risk Assessment and/or Part 4 of the CPU.

"Shallow Soil Cap Barrier" means cover, above the Property Specific Contaminants of Concern, that is at least 0.5 metres thick, and consists of Capping Soil.

"Storage Garage" has the same meaning as in the Building Code.

"SVIMS" means soil vapour intrusion mitigation system

Part 2: Legal Authority

- 2.1 Section 19 of the Act states that a certificate of property use is binding on the executor, administrator, administrator with the will annexed, guardian of property or attorney for property of the person to whom it was directed, and on any other successor or assignee of the person to whom it was directed.
- 2.2 Subsection 168.6(1) of the Act states that if a risk assessment relating to a property has been accepted under clause 168.5(1)(a), the Director may issue a certificate of property use to the owner of the property, requiring the owner to do any of the following things:
 1. Take any action specified in the certificate and that, in the Director's opinion, is necessary to prevent, eliminate or ameliorate any adverse effect that has been identified in the risk assessment, including installing any equipment, monitoring any contaminant or recording or reporting information for that purpose.
 2. Refrain from using the property for any use specified in the certificate or from constructing any building specified in the certificate on the property.
- 2.3 Subsection 168.6(2) of the Act states that a certificate of property use shall not require an owner of property to take any action that would have the effect of reducing the concentration of a contaminant on, in or under the property to a level below the level that is required to meet the standards specified for the contaminant in the risk assessment.
- 2.4 Subsection 168.6(3) of the Act states that the Director may, on his or her own initiative or on application by the owner of the property in respect of which a certificate of property use has been issued under subsection 168.6(1),
 - a. alter any terms and conditions in the certificate or impose new terms and conditions; or
 - b. revoke the certificate.
- 2.5 Subsection 168.6(4) of the Act states that if a certificate of property use contains a provision requiring the owner of property to refrain from using the property for a specified use or from constructing a specified building on the property,
 - a. the owner of the property shall ensure that a copy of the provision is given to every occupant of the property;

- b. the provision applies, with necessary modifications, to every occupant of the property who receives a copy of the provision; and
 - c. the owner of the property shall ensure that every occupant of the property complies with the provision.
- 2.6 Subsection 197(1) of the Act states that a person who has authority under the Act to make an order or decision affecting real property also has authority to make an order requiring any person with an interest in the property, before dealing with the property in any way, to give a copy of the order or decision affecting the property to every person who will acquire an interest in the property as a result of the dealing.
- 2.7 Subsection 197(2) of the Act states that a certificate setting out a requirement imposed under subsection 197(1) may be registered in the proper land registry office on the title of the real property to which the requirement relates, if the certificate is in a form approved by the Minister, is signed or authorized by a person who has authority to make orders imposing requirements under subsection 197(1) and is accompanied by a registrable description of the property.
- 2.8 Subsection 197(3) of the Act states that a requirement, imposed under subsection 197(1) that is set out in a certificate registered under subsection 197(2) is, from the time of registration, deemed to be directed to each person who subsequently acquires an interest in the real property.
- 2.9 Subsection 197(4) of the Act states that a dealing with real property by a person who is subject to a requirement imposed under subsection 197(1) or 197(3) is voidable at the instance of a person who was not given the copy of the order or decision in accordance with the requirement.

Part 3: Background

- 3.1 The Risk Assessment was undertaken for the Property on behalf of the Owner to assess the human health risks and ecological risks associated with the presence or discharge of Contaminants on, in or under the Property and to identify appropriate Risk Management Measures to be implemented to ensure that the Property is suitable for the intended use: “parkland use” as defined in O. Reg. 153/04.
- 3.2 The Contaminants on, in or under the Property that are present above the Residential/ Parkland/Institutional property use standards within Table 3 of the ***Soil, Ground Water and Sediment Standards for Use under Part XV.1 of the Environmental Protection Act*** published by the Ministry and dated April 15, 2011 for coarse textured soils as set out in the Risk Assessment and in Schedule ‘A’ (Contaminants of Concern). The Property Specific Standards for these Contaminants of Concern are also set out in Schedule ‘A’ which is attached to and forms part of the CPU. Also attached to and forming part of the CPU is a copy of a current plan of survey of the Property or a site plan of the Property (if applicable).

- 3.3 I am of the opinion, for the reasons set out in the Risk Assessment that the Risk Management Measures described therein and in Part 4 of the CPU are necessary to prevent, eliminate or ameliorate an Adverse Effect on the Property that has been identified in the Risk Assessment.
- 3.4 I am of the opinion, for the reasons set out in the Risk Assessment, that Contaminants of Concern require on-going pathway elimination and it is necessary to restrict the use of the Property and/or the construction of buildings and/or the notice provisions as outlined in Part 5 of this CPU.
- 3.5 I am of the opinion, that the requirements set out in Part 6 of this CPU are necessary to supplement the Risk Management Measures described in the Risk Assessment and in Part 4 of the CPU.
- 3.6 I believe for the reasons set out in the Risk Assessment that it is also advisable to require the disclosure of this CPU and the registration of notice of the CPU on title to the Property as set out in the order requirements in Part 7 of this CPU.

Part 4: CPU Risk Management Measures and Requirements Relating to the Risk Assessment and the Property

I hereby require the Owner to do or cause to be done the following under the authority of paragraph 168.8(1)1 of the Act:

Risk Management Measures

- 4.0 Implement, and thereafter maintain or cause to be maintained, the following Risk Management Measures and requirements identified in the Risk Assessment and set out in Sections 4.1 to 4.16 as applicable.
- 4.1 Shallow Soil Cap Barrier Risk Management Measure
- N/A
- 4.2 Hard Cap Barrier or Fill Cap Barrier (1.0 metre(s) or specified greater thickness) Risk Management Measure:
- a. Cover all areas of the Property where Property Specific Contaminants of Concern are present at or within 1.0 metre(s) below the soil surface such that a Hard Cap Barrier or Fill Cap Barrier is in place in these areas, so as to prevent exposure to the Property Specific Contaminants of Concern at the Property, in conjunction with any existing Barriers in any other areas of the Property where Property Specific Contaminants of Concern are present below the soil surface; and

- b. Before commencing development of all or any part of the Property, install fence and implement dust control measures for any part of the Property requiring covering but which has not been covered, so as to prevent exposure to the Property Specific Contaminants of Concern at the Property. Fencing and dust control measures shall be maintained until such time as the Hard Cap Barrier or Fill Cap Barrier (s) are installed.

4.3 Hard Cap Barrier or Fill Cap Barrier (modified S3 soil component value) Risk Management Measure:

N/A

4.4 Inspection, maintenance and reporting requirements for all Barriers:

- a. Prepare and implement a written inspection and maintenance program, prepared by a Qualified Person and to be retained by the Owner, and to be available for inspection upon request by a Provincial Officer, so as to ensure the continuing integrity of each Barrier at the Property so long as the Property Specific Contaminants of Concern are present at the Property, including, at a minimum:
 - i. procedures and timing for implementing the program;
 - ii. semi-annual inspections, in spring and fall, of the Barrier;
 - iii. noting any deficiencies in the Barrier observed during the inspections, or at any other time;
 - iv. repairing promptly any such deficiencies, to the original design specifications, with written confirmation that the Barrier has been properly repaired;
 - v. contingency measures, such as fencing, to be implemented if cracks, breaches or any loss of integrity of the Barrier cannot be repaired or addressed in a timely manner, to prevent exposure to the Property Specific Contaminants of Concern in that area of the Property; and
 - vi. recording, in writing, all inspections, deficiencies, repairs and implementation of contingency measures, to be retained by the Owner and be available for inspection upon request by a Provincial Officer;and which is,
 - vii. delivered to the Owner before use of all or any part of the Property begins, or within 90 days following completion of covering of all or any part of the Property, whichever is earlier; and
 - viii. updated and delivered to the Owner within 30 days following making any alteration to the program.
- b. Prepare a site plan of the entire Property, prepared by a Licenced Professional Engineer and to be retained by the Owner, and be available for inspection upon request by a Provincial Officer, showing the Property, any fencing, and the location, type and design of each Barrier at the Property, including cross-sectional drawings of the Barrier showing its design and vertical and lateral extent; and which are,
 - i. delivered to the Owner before use of all or any part of the Property begins, or within 90 days following completion of covering of all or any part of the Property, whichever is earlier; and

- ii. updated and delivered to the Owner within 30 days following making any alteration to the location, design or extent of the Barrier, or other relevant feature shown on the site plan; and
 - c. Prepare and implement written procedures, prepared by a Qualified Person and to be retained by the Owner, and be available for inspection upon request by a Provincial Officer, for written and oral communication to all persons who may be involved in Intrusive Activities at the Property that may disturb a Barrier at the Property, so as to ensure the persons are made aware of the presence and significance of the Barrier and the Property Specific Contaminants of Concern at the Property and the precautions to be taken to ensure the continued integrity of the Barrier when undertaking the Intrusive Activities, and if damaged, to ensure that the Barrier is repaired promptly to the original design specifications, or, if it cannot be repaired promptly, to ensure that the contingency measures are implemented, and records kept, as specified in the inspection and maintenance program; and which are,
 - i. delivered to the Owner before any Intrusive Activities are undertaken at the Property; and
 - ii. updated and delivered to the Owner within 30 days following making any alteration to the procedures.
- 4.5 Building with Storage Garage (intermittent 3.9 Litres/second of Ventilation) Risk Management Measure:
- N/A
- 4.6 Building with Storage Garage (continuous 3.9 Litres/second of Ventilation) Risk Management Measure:
- N/A
- 4.7 Building with Storage Garage (continuous 10.0 Litres/second of ventilation) Risk Management Measure:
- N/A
- 4.8 Building Prohibition Risk Management Measure:
- N/A
- 4.9 Passive soil vapour intrusion mitigation system (SVIMS) or Active soil vapour intrusion mitigation system (SVIMS) Risk Management Measures:
- N/A

4.10 Quality Assurance/Quality Control, Inspections, Maintenance and Reporting Requirements for Passive SVIMS or Active SVIMS:

N/A

4.11 Building with no first storey residential, institutional or parkland use Risk Management Measure:

N/A

4.13 No ground water use Risk Management Measure:

N/A

4.14 Health and Safety Plan:

In addition to any requirements under the Occupational Health and Safety Act, R.S.O. 1990, c. O.1, prepare and implement a written health and safety plan for the Property, prepared by a Competent Person in consultation with a Qualified Person and to be retained by the Owner, and be available for inspection upon request by a Provincial Officer, that includes information concerning the potential hazards and safe work measures and procedures with respect to the Contaminants of Concern at the Property and the communication of this information to all persons who may be involved in Intrusive Activities at the Property, including, at a minimum:

- a. the procedures and timing for implementing the plan, including the supervision of persons implementing the plan; and
- b. all relevant information concerning the presence of, human exposure to, and risk posed by, the Contaminants of Concern through dermal contact, soil or ground water ingestion and inhalation of soil particles or vapour, and concerning any biogenic gases such as methane that may be present at the Property including information in the Risk Assessment; and
- c. all relevant information, measures and procedures concerning protection of the persons from exposure to the Contaminants of Concern and the precautions to be taken when undertaking Intrusive Activities, including the supervision of workers, occupational hygiene requirements, use of personal protective equipment, provision of air flow augmentation in excavations or other areas or situations of minimal air ventilation, and other protective measures and procedures as appropriate; and
- d. all relevant information concerning the presence and significance of the Risk Management Measures and requirements which are being, or have been, implemented at the Property; and
- e. the procedures and timing for implementing emergency response and contingency measures and procedures, including contact information, in the event of a health and safety incident; and
- f. the recording, in writing, of the implementation of the plan and any health and safety incidents that occur, to be retained by the Owner and be available for inspection upon request by a Provincial Officer;

and which is,

- g. delivered to the Owner before any Intrusive Activities are undertaken at the Property; and
- h. updated and delivered to the Owner within 30 days following making any alteration to the plan.

4.15 Soil and Groundwater Management Plan:

Prepare and implement a written soil and groundwater management plan for the Property, prepared by a Qualified Person and to be retained by the Owner, and be available for inspection upon request by a Provincial Officer, for managing excavated soil or soil brought to the Property, and, if any, groundwater from dewatering during Intrusive Activities at the Property, so as to prevent exposure to or uncontrolled movement or discharge of the Property Specific Contaminants of Concern in soil or groundwater at the Property, including, at a minimum:

- a. procedures and timing for implementing the plan, including the supervision of persons implementing the plan;
- b. measures to control dust and prevent tracking of soil by vehicles and persons from the Property, including the cleaning of equipment and vehicles;
- c. measures, in addition to any applicable measures specified in O. Reg. 153/04, to manage soil excavated at the Property and any soil brought to or removed from the Property, including:
 - i. characterizing for contaminant quality all excavated soil and any soil brought to the Property, including determining whether the soil:
 - 1. is Capping Soil;
 - 2. meets the Property Specific Standards; or
 - 3. exceeds the Property Specific Standards;
 - ii. managing excavated soil separately from any soil brought to the Property, including any excavated soil that is to be:
 - 1. used as Capping Soil at the Property;
 - 2. otherwise used as fill at the Property;
 - 3. removed from the Property and
 - iii. stockpiling of excavated soil and any soil brought to the Property in separate designated areas that:
 - 1. reflect the distinctions described in parts ii. 1) and 2);
 - 2. have been lined and covered, as appropriate, to prevent uncontrolled movement
 - 3. have been bermed or fenced, as appropriate, to restrict access by persons; and
 - 4. have storm water runoff controls in place to minimize storm water runoff contacting stockpiled soil, with provision for discharge of storm water runoff to a sanitary sewer or to other approved treatment if needed;
- d. measures to manage storm water and any ground water from dewatering at the Property to prevent the movement of entrained soil within and away from the Property, including, in addition to any applicable measures specified pursuant to other applicable law or other instruments, measures such as silt fences, filter socks for catch-basins and utility covers, and provision for discharge to a sanitary sewer or to other approved treatment if needed; and

- e. recording, in writing, the soil, storm water and any ground water management measures undertaken, in addition to any applicable record keeping requirements specified in O. Reg. 153/04 or pursuant to other applicable law or other instruments, to be retained by the Owner, and be available for inspection upon request by a Provincial Officer, including:
 - i. dates and duration of the Intrusive Activities being undertaken;
 - ii. weather and site conditions during the Intrusive Activities;
 - iii. the location and depth of excavation activities, and dewatering activities, if any;
 - iv. dust control and soil tracking control measures;
 - v. characterization results for excavated soil and any soil brought to or removed from the Property, and for any ground water from dewatering;
 - vi. soil management activities including soil quantities excavated and brought to and removed from the Property, and stockpile management and storm water runoff control;
 - vii. management activities for any ground water from dewatering;
 - viii. names and contact information for the Qualified Persons and on-site contractors involved in the Intrusive Activities;
 - ix. names and contact information for any haulers and receiving sites for soil and any ground water removed from the Property, and for haulers and source sites of any soil brought to the Property; and
 - x. any complaints received relating to the Intrusive Activities, including the soil, storm water and any ground water management activities;and which is,
 - xi. delivered to the Owner before any Intrusive Activities are undertaken at the Property; and
 - xii. updated and delivered to the Owner within 30 days following making any alteration to the plan.

4.16 ANNUAL REPORTS

The Owner shall prepare by March 31 each year, an annual report documenting activities relating to the Risk Management Measures undertaken during the previous calendar year. A copy of this report shall be maintained on file by the Owner and shall be made available upon request by a Provincial Officer. The report shall include, but not be limited to, the following minimum information requirements as applicable:

- a. a copy of all records relating to the inspection and maintenance program for the barrier to site soils;
- b. a copy of all records relating to the soil and groundwater management plan and health and safety plan; and
- c. a copy of signed site plans including any alternations.

Part 5: CPU Restrictions on Property Use, Building Construction and Notice Requirements

I hereby require the Owner to do or cause to be done the following under the authority of paragraph 168.6(1)2 of the Act:

- 5.1 Property Use Restriction:
Refrain from using the Property for any of the following use(s): all property uses except for following uses as defined in O.Reg. 153/04: "parkland use".
- 5.2 Building Construction Restrictions:

N/A
- 5.3 Notice of Restrictions
Pursuant to the requirements of subsection 168.6(4) of the Act, the Owner shall ensure that every occupant of the Property is given notice that the Ministry has issued this CPU and that it contains the provisions noted above in Items 5.1 and 5.2, except where noted N/A, and that every occupant complies with such provisions. For the purposes of this requirement, an occupant means any person with whom the Owner has a contractual relationship regarding the occupancy of all or part of the Property.

Part 6: Additional Requirements

I hereby require the Owner to do or cause to be done the following things under the authority of subsection 168.6(1) of the Act.

- 6.1 Site Changes Affecting Risk Management Measures
In the event of a change in the physical site conditions or receptor characteristics at the Property that may affect the Risk Management Measures and/or any underlying basis for the Risk Management Measures, the Owner shall forthwith notify the Director of such changes and the steps taken, to implement, maintain and operate any further Risk Management Measures as are necessary to prevent, eliminate or ameliorate any Adverse Effect that will result from the presence on, in or under the Property or the discharge of any Contaminant of Concern into the natural environment from the Property. In support of this work, a new risk assessment may need to be completed in accordance with O. Reg. 153/04 and submitted to the Ministry for acceptance. An amendment to the CPU will be issued to address the changes set out in any notice received and any future changes that the Director considers necessary in the circumstances.
- 6.2 Report Retention Requirements
The Owner shall retain a copy of any reports required under the CPU for a period of seven (7) years from the date the report is created and within ten (10) days of the Director or a Provincial Officer making a request for a report, provide a copy to the

requesting Director or Provincial Officer.

6.3 Owner/Occupant Change Notification

While the CPU is in effect, the Owner shall, forthwith report in writing to the Director any changes of ownership, or occupancy except that while the Property is registered under the Condominium Act, 1998, S.O.1998 c.19, as amended, no notice shall be given of changes in the ownership of individual condominium units or any appurtenant common elements on the Property of the Property.

Part 7: Section 197 Order (Property Notice and Certificate of Requirement Registration) Requirements

I hereby order the Owner to do or cause to be done the following under the authority of subsections 197(1) and 197 (2) of the Act:

7.1 Property Notice Requirement

For the reasons set out in the CPU and pursuant to the authority vested in me by subsection 197(1) of the Act I hereby order you and any other person with an interest in the Property, before dealing with the Property in any way, to give a copy of the CPU, including any amendments thereto, to every person who will acquire an interest in the Property as a result of the dealing.

7.2 Certificate of Requirement Registration

Within fifteen (15) days from the date of receipt of a certificate of requirement issued under subsection 197(2) of the Act and as set out in Schedule 'B', register the certificate of requirement on title to the Property, in the appropriate land registry office.

7.3 Verification

Within five (5) days after registering the certificate of requirement provide to the Director a copy of the registered certificate and of the parcel register(s) for the Property confirming that registration has been completed.

Part 8: General Requirements

8.1 The requirements of the CPU are severable. If any requirement of the CPU or the application of any requirement to any circumstance is held invalid, the application of such requirement to other circumstances and the remainder of the CPU shall not be affected thereby.

8.2 An application under section 168.6(3) of the Act to, a) alter any terms and conditions in the CPU or impose new terms and conditions; or b) revoke the CPU; shall be made in writing to the Director, with reasons for the request.

8.3 Subsection 186(3) of the Act provides that non-compliance with the requirements of the CPU constitutes an offence.

- 8.4 The requirements of the CPU are minimum requirements only and do not relieve the Owner from, a) complying with any other applicable order, statute, regulation, municipal, provincial or federal law; or b) obtaining any approvals or consents not specified in the CPU.
- 8.5 Notwithstanding the issuance of the CPU, further requirements may be imposed in accordance with legislation as circumstances require.
- 8.6 In the event that, any person is, in the opinion of the Director, rendered unable to comply with any requirements in the CPU because of,
- a. natural phenomena of an inevitable or irresistible nature, or insurrections,
 - b. strikes, lockouts or other labour disturbances,
 - c. inability to obtain materials or equipment for reasons beyond your control, or
 - d. any other cause whether similar to or different from the foregoing beyond your control,
- the requirements shall be adjusted in a manner defined by the Director. To obtain such an adjustment, the Director must be notified immediately of any of the above occurrences, providing details that demonstrate that no practical alternatives are feasible in order to meet the requirements in question.
- 8.7 Failure to comply with a requirement of the CPU by a date specified does not absolve the Owner from compliance with the requirement. The obligation to complete the requirement shall continue each day thereafter.
- 8.8 The Risk Management Measures identified in the Risk Assessment and also in Part 4 of the CPU and all the other requirements in the CPU shall commence upon the issuance of the CPU and continue in full force and effect in accordance with the terms and conditions of the CPU until such time as the Director alters or revokes the CPU.
- 8.9 The provisions of the CPU shall take precedence in the event of a conflict between the provisions of the CPU and the Risk Assessment save and except for the Part 4 Risk Management Measures.
- 8.10 In the event that the Owner complies with the provisions of Items 7.2 and 7.3 of the CPU regarding the registration of the certificate of requirement on title to the Property, and then creates a condominium corporation by the registration of a declaration and description with respect to the Property pursuant to the *Condominium Act, 1998*, S.O. 1998, c.19, as amended, and then transfers ownership of the Property to various condominium unit owners, the ongoing obligations of the Owner under this CPU can be carried out by the condominium corporation on behalf of the new Owners of the Property.

Part 9: Hearing before the Environmental Review Tribunal

With respect to those provisions relating to my authority in issuing a certificate of property use under section 168.6 and an order under section 197 of the Act:

- 9.1 Pursuant to section 139 of the Act, you may require a hearing before the Environmental Review Tribunal (the "Tribunal"), if within fifteen (15) days after service on you of a copy of the CPU, you serve written notice upon the Director and the Tribunal.
- 9.2 Pursuant to section 142 of the Act, the notice requiring the hearing must include a statement of the portions of the CPU and the grounds on which you intend to rely at the hearing. Except by leave of the Tribunal, you are not entitled to appeal a portion of the CPU, or to rely on a ground, that is not stated in the notice requiring the hearing.
- 9.3 Service of a notice requiring a hearing must be carried out in a manner set out in section 182 of the Act and Ontario Regulation 227/07: *Service of Documents*, made under the Act as they may be amended from time to time. The address, email address and fax numbers of the Director and the Tribunal are:

The Secretary
Environmental Review Tribunal
655 Bay Street, Suite 1500
Toronto, ON, M5G 1E5
Fax: (416) 326-5370
Email: ERTTribunalSecretary@ontario.ca

and

Jimena Caicedo
Ministry of the Environment, Conservation and Parks
5775 Yonge St., 8th Floor
Toronto, ON M2M 4J1
Fax: 416-326-5536
Email: jimena.caicedo@ontario.ca

- 9.4 Unless stayed by application to the Tribunal under section 143 of the Act, the CPU is effective from the date of issue.

Further information on the requirements of the Tribunal regarding an appeal can be obtained directly from the Tribunal by:

Tel: (416) 212-6349 Fax: (416) 326-5370 elto.gov.on.ca

Issued at Toronto this 9th day of April 2021.



Jimena Caicedo
Director, section 168.6 of the Act

Schedule 'A'

Contaminants of Concern, Property Specific Standards, and Capping Soil Concentrations

Media	Contaminants of Concern (COC)	Units	Property Specific Standards	Capping Soil Concentrations
Soil	Benz[a]anthracene	µg/g	1.5	0.5
Soil	Benzo[a]pyrene	µg/g	1.0	0.3
Soil	Benzo[b]fluoranthene	µg/g	1.2	0.78
Soil	Dibenz[a h]anthracene	µg/g	0.16	0.1
Soil	Fluoranthene	µg/g	2.1	0.69
Soil	Indeno[1 2 3-cd]pyrene	µg/g	0.64	0.38
Soil	Lead	µg/g	370	120

SCHEDULE 'B'

CERTIFICATE OF REQUIREMENT

s.197(2)

Environmental Protection Act

This is to certify that pursuant to Item 7.1 of Certificate of Property Use number 7631-BZWMLT issued by Jimena Caicedo, Director of the Ministry of the Environment, Conservation and Parks, under sections 168.6 and 197 of the *Environmental Protection Act*, on April 9, 2021 being a Certificate of Property Use and order under subsection 197(1) of the *Environmental Protection Act* relating to the property municipally known as 315 Macpherson Avenue, Toronto, Ontario, being all of Property Identifier Number 21219-0138 (LT) (the "Property") with respect to a Risk Assessment and certain Risk Management Measures and other preventive measure requirements on the Property

CITY OF TORONTO

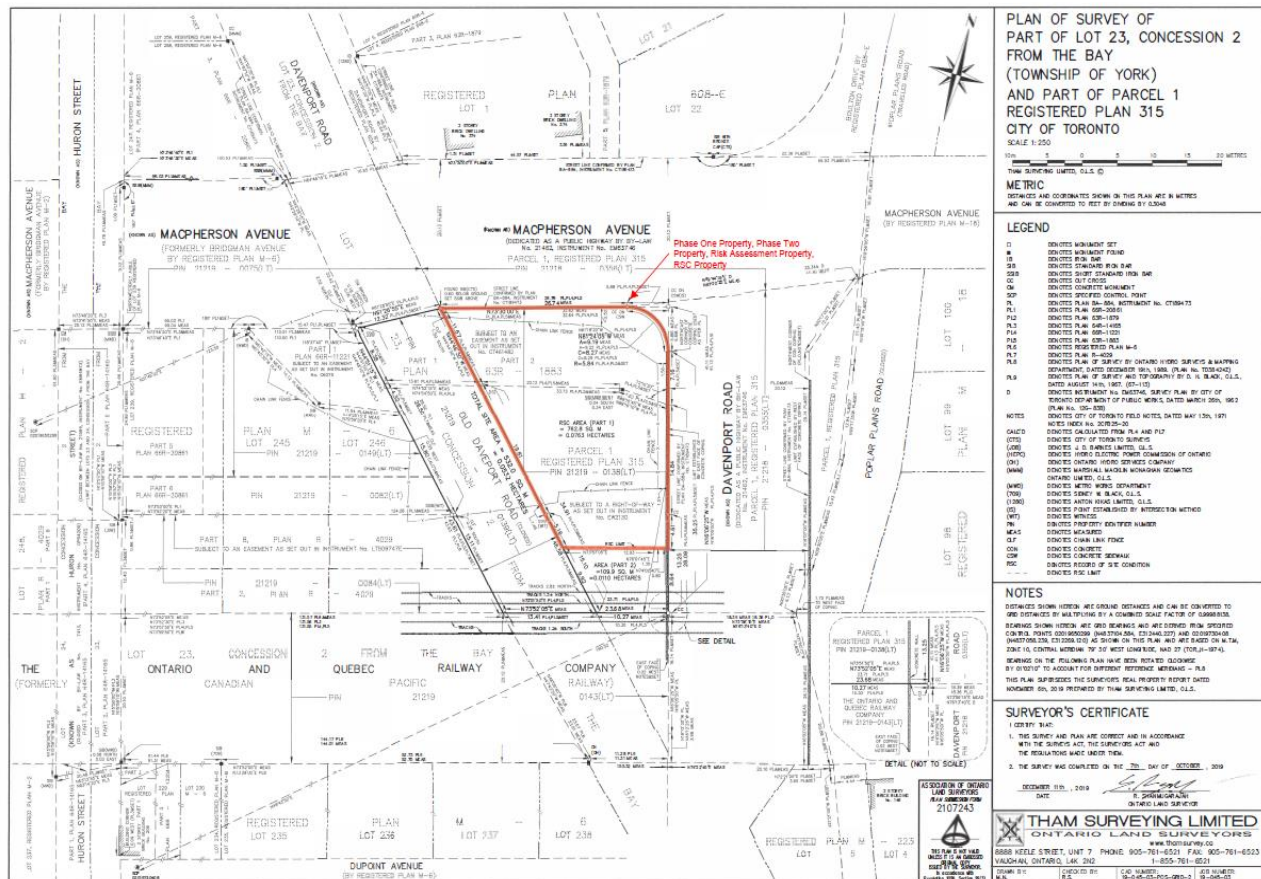
and any other persons having an interest in the Property, are required before dealing with the Property in any way, to give a copy of the Certificate of Property Use, including any amendments thereto, to every person who will acquire an interest in the Property.

Under subsection 197(3) of the *Environmental Protection Act*, the requirement applies to each person who, subsequent to the registration of this certificate, acquires an interest in the Property.

CPU 7631-BZWMLT

2021/04/09

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APPENDIX

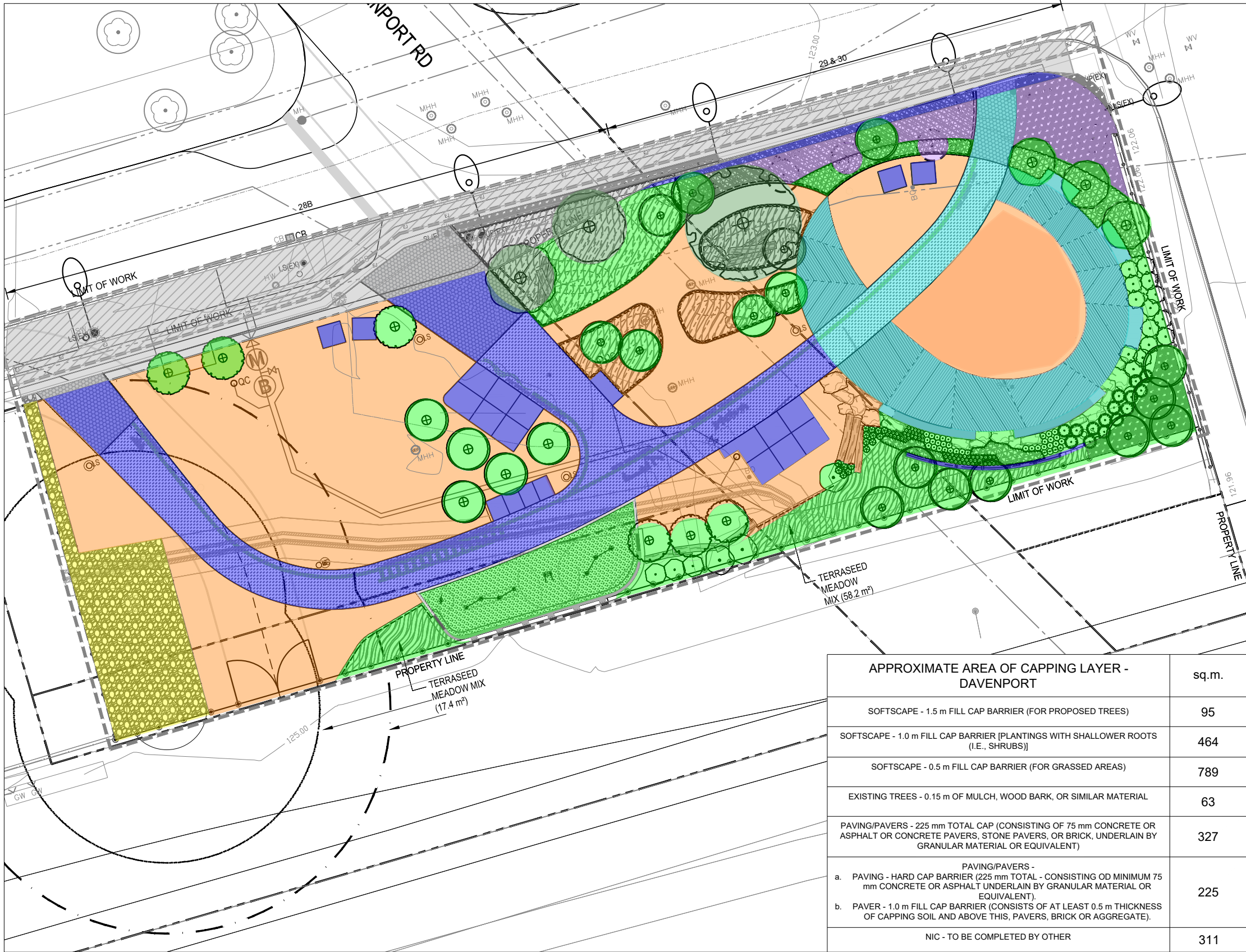
B

CAPPING PLAN
2024 (superceded)

ADDENDUM 1

CAPPING PLAN
2026





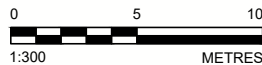
APPROXIMATE AREA OF CAPPING LAYER - DAVENPORT	sq.m.
SOFTSCAPE - 1.5 m FILL CAP BARRIER (FOR PROPOSED TREES)	95
SOFTSCAPE - 1.0 m FILL CAP BARRIER [PLANTINGS WITH SHALLOWER ROOTS (I.E., SHRUBS)]	464
SOFTSCAPE - 0.5 m FILL CAP BARRIER (FOR GRASSED AREAS)	789
EXISTING TREES - 0.15 m OF MULCH, WOOD BARK, OR SIMILAR MATERIAL	63
PAVING/PAVERS - 225 mm TOTAL CAP (CONSISTING OF 75 mm CONCRETE OR ASPHALT OR CONCRETE PAVERS, STONE PAVERS, OR BRICK, UNDERLAIN BY GRANULAR MATERIAL OR EQUIVALENT)	327
PAVING/PAVERS - a. PAVING - HARD CAP BARRIER (225 mm TOTAL - CONSISTING OF MINIMUM 75 mm CONCRETE OR ASPHALT UNDERLAIN BY GRANULAR MATERIAL OR EQUIVALENT). b. PAVER - 1.0 m FILL CAP BARRIER (CONSISTS OF AT LEAST 0.5 m THICKNESS OF CAPPING SOIL AND ABOVE THIS, PAVERS, BRICK OR AGGREGATE).	225
NIC - TO BE COMPLETED BY OTHER	311

CAPPING LEGEND

- NIC - TO BE COMPLETED BY OTHER
- EXISTING TREES - 0.15 m OF MULCH, WOOD BARK, OR SIMILAR MATERIAL
- SOFTSCAPE - 0.5 m FILL CAP BARRIER (FOR GRASSED AREAS)
- SOFTSCAPE - 1.0 m FILL CAP BARRIER [PLANTINGS WITH SHALLOWER ROOTS (I.E., SHRUBS)]
- SOFTSCAPE - 1.5 m FILL CAP BARRIER (FOR PROPOSED TREES)
- PAVING/PAVERS - 225 mm TOTAL CAP (CONSISTING OF 75 mm CONCRETE OR ASPHALT OR CONCRETE PAVERS, STONE PAVERS, OR BRICK, UNDERLAIN BY GRANULAR MATERIAL OR EQUIVALENT)
- PAVING/PAVERS -
a. PAVING - HARD CAP BARRIER (225 mm TOTAL - CONSISTING OF MINIMUM 75 mm CONCRETE OR ASPHALT UNDERLAIN BY GRANULAR MATERIAL OR EQUIVALENT).
b. PAVER - 1.0 m FILL CAP BARRIER (CONSISTS OF AT LEAST 0.5 m THICKNESS OF CAPPING SOIL AND ABOVE THIS, PAVERS, BRICK OR AGGREGATE).
- FENCED IN TOWER

LAYOUT AND MATERIALS LEGEND

- PROPERTY LINE
- LIMIT OF WORK
- IMPACTED SOIL AREA, REFER TO CAPPING PLAN
- GRADING
TC122.36 EXISTING ELEVATION
ELEV+ EXISTING ELEVATION TO MATCH
123.25 EXISTING CONTOUR
122.87 FG PROPOSED ELEVATION
122.87 FG PROPOSED ELEVATION, REFER TO CIVIL DWG
FG FINISH GRADE
TW TOP OF WALL
BW BOTTOM OF WALL
TC TOP OF CURB
BC BOTTOM OF CURB
PAVING
CAST IN PLACE CONCRETE
EXPANSION JOINT & CONTROL JOINT
TINING FINISH
CONCRETE UNIT PAVER
VEHICULAR ASPHALT - REFER TO CIVIL DWGS
ENGINEERED WOOD FIBER
METAL EDGER
WHEELCHAIR SYMBOL FOR ACCESSIBLE SPACE ALLOCATION ONLY
- PLANTING
PROPOSED CANOPY TREE
PROPOSED SMALL TREE / SHRUB
EXISTING TREE TO REMAIN AND BE PROTECTED
SHRUB PLANTING - SEE PLANTING PLAN
TURF - SEE PLANTING PLAN
MEADOW PLANTING - SEE PLANTING PLAN
OTHER
EXISTING HYDRO MAN HOLE - TO REMAIN
EXISTING MAN HOLE - TO REMAIN
WATER METER & BACK FLOW PREVENTOR CHAMBERS - REFER TO CIVIL DWGS
QUICK COUPLER
ELECTRICAL CABINET - REFER TO ELECTRICAL DWGS
LIGHT STANDARD - REFER TO ELECTRICAL DWGS
EXISTING LIGHT STANDARD
EXISTING SIGN
EXISTING UTILITY POLE
EXISTING TRAFFIC SIGN
EXISTING CATCH BASIN
- SITE FURNITURE
WIRE MESH FENCE
CHAIN LINK FENCE
ART FENCE
PARK BENCH
PLATFORM BENCH
ACCESSIBLE PICNIC TABLE
LOUNGE CHAIR
DRINKING FOUNTAIN
BOULDERS
LOG HABITAT
WASTE RECEPTACLE, BY OTHERS



NOTES

- AREA WITH IMPACTED SOIL WILL BE MANAGED BY IMPLEMENTING RISK MANAGEMENT MEASURES (SOIL BARRIERS) INCLUDING SOFT CAPPING AND/OR HARD CAPPING AS OUTLINE IN THE CAPPING PLANS FOR THE PROTECTION OF BOTH HUMAN AND ECOLOGICAL RECEPTORS.
- SOIL BARRIERS MUST BE INSTALLED AT THE THICKNESS SPECIFIED IN THE CAPPING PLANS (IN RELATION TO THE PROPOSED FINISHED FINAL GRADE).
- DURING EXCAVATION WITHIN THE IMPACTED AREAS, CARE MUST BE TAKEN TO PREVENT TRACKING CONTAMINATED SOIL AROUND THE SITE.
- EXCAVATIONS USING HEAVY EQUIPMENT IS PROHIBITED WITHIN 10 METERS OF TOWER FOOTINGS TO PROTECT FOUNDATIONS. WITHIN 10 METERS, EXCAVATION MUST BE CARRIED OUT BY HAND OR BY USE OF A VAC SYSTEM.

GENERAL SITE AND SOIL MANAGEMENT NOTES

- ANY CONSTRUCTION ACTIVITIES POTENTIALLY COMING INTO CONTACT WITH OR EXPOSING SOIL OR GROUNDWATER SHOULD BE COMPLETED IN STRICT ACCORDANCE WITH THE REQUIREMENTS OF THE SOIL AND GROUNDWATER MANAGEMENT PLAN (SGMP)
- IMPORTED SOILS FOR CAPPING OR GRADING PURPOSES MUST BE TESTED IN ACCORDANCE WITH THE REQUIREMENT OF O. Reg. 409/19
- IMPORTED SOIL MUST MEET THE MECP TABLE 3 AND/OR O. Reg. 406/19).
- BACKFILL SOURCE SITES MUST BE APPROVED BY THE CITY'S QUALIFIED PERSON (QP), IN WRITING AND SUPPORTED BY DOCUMENTATION AND VERIFICATION SAMPLING.
- RE-SAMPLING BY THE FINAL RE-USE OR DISPOSAL SITE. ADDITIONAL SAMPLING MUST BE COORDINATED AND/OR APPROVED BY THE CITY OR THE CITY'S OP

CLIENT
CITY OF TORONTO

CONSULTANT



YYYY-MM-DD 2026-02-23
DESIGNED
PREPARED CKC
REVIEWED AP
APPROVED AP

PROJECT
GREEN LINE TRAIL, TORONTO, ONTARIO

TITLE
CAPPING PLAN - DAVENPORT LANDS,
PARCELS 28B, 29 & 30

PROJECT NO. 17M-01905-85 CONTROL 0001 REV. 2 FIGURE 3

CITY OF TORONTO

CONTAMINANT HEALTH AND SAFETY PLAN

PARCEL 28B, 29 & 30, GREEN LINE TRAIL

JULY 2024





CONTAMINANT HEALTH AND SAFETY PLAN

PARCEL 28B, 29 & 30, GREEN LINE TRAIL

CITY OF TORONTO

PROJECT NO.: 17M-01905-51
DATE: JULY 2024

WSP
100 COMMERCE VALLEY DRIVE WEST
THORNHILL, ON
CANADA L3T 0A1

T: +1 905 882-1100
F: +1 905 882-0055
WSP.COM



July 29, 2024

City of Toronto
Janice Green, CET, Senior Environmental Project Manager, Project Management Office
Corporate Real Estate Management
City of Toronto
Metro Hall – 55 John Street, 2nd Floor
Toronto ON M5V 3C6

Attention: Janice Green, CET

Dear Madam:

**Subject: Contaminant Health and Safety Plan, Parcel 28B, 29 & 30, Green Line Trail,
Toronto, Ontario**

Please find enclosed the Contaminant Health and Safety Plan (HASP) prepared to support the proposed redevelopment of Parcel 28B, 29 and 30, collectively referred to as the Davenport Lands. The HASP has been developed for use by all persons involved in the redevelopment of the Subject Property including Contractors, Subcontractors, Consultants, City of Toronto staff, and site visitors during construction.

Yours Sincerely,
WSP Canada Inc.

A handwritten signature in blue ink, appearing to read 'M. Moe'.

Mariam Moe, EIT
Engineer in Training

A handwritten signature in blue ink, appearing to read 'A. Park'.

Amanda Park, P.Geo. QPESA
Principal Geoscientist

WSP ref.: 17M-01905-51

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FIGURES

FIGURE 1: SITE LOCATION
FIGURE 2: SITE PLAN

APPENDICES

APPENDIX A – CAPPING PLAN

1 INTRODUCTION

WSP Canada Inc. (WSP) was retained by the City of Toronto (the “City”) to complete a Contaminant Health and Safety Plan for the Lower Davenport Lands (Parcels 28B, 29 and 30), part of the proposed Green Line Trail in Toronto, Ontario (collectively referred to as the “Subject Property” or the “Site”). The location of the Subject Property is illustrated on **Figure 1** and a site plan is provided as Figure 2.

The Site is part of the Green Line Trail, a proposed linear park and trail within an existing electrical transmission corridor that spans approximately 5 km from west of Earls court Park and south of St. Clair Avenue to Davenport Road north of Dupont Street in Toronto, Ontario. The Subject Property includes three land parcels described as:

Due Diligence Risk Assessment (DDRA) Lands

- Parcel 28B: a parcel of land within an electrical transmission corridor, located at the southwest corner of Macpherson Avenue and Davenport Road. It consists of a vacant, gravel covered open parking space with a municipal address of 34 Macpherson Avenue, Toronto, Ontario. The proposed redevelopment (Other Land Use to Parkland) does not trigger filing a Record of Site Condition (RSC). As such, a Screening Level Risk Assessment (SLRA) was completed for due diligence purposes.
- Parcel 29: a parcel of land within an electrical transmission corridor, located immediately east of Parcel 28B, with no municipal address. Parcel 29B is designated as industrial land use under O. Reg. 153/04, as it was historically part of a City Works Yard. The proposed redevelopment to a community land use does not trigger an RSC. As such, a SLRA was completed for due diligence purposes.

Modified Generic Risk Assessment (MGRA) Lands

- Parcel 30: a parcel of land within an electrical transmission corridor, located at 315 Macpherson Avenue, Toronto, Ontario. It consists of a vacant plot of land with no onsite buildings. The proposed redevelopment (industrial to parkland) required an RSC (#229263). A modified generic risk assessment (MGRA) was conducted to support RSC filing and a Certificate of Property Use (CPU#7631-BZWMLT) is filed on title for the parcel. The CPU outlines the conditions permitting operations on the Site, based on the environmental history. As part of the CPU, a site-specific Soil and Groundwater Management Plan (SGMP) and Contaminant Health and Safety Plan (HASP) are required.

The Contaminant Health and Safety Plan has been developed for use by all persons involved in the redevelopment of the Subject Property including Contractors, Subcontractors, Consultants, City of Toronto staff, and site visitors during construction.

2 BACKGROUND INFORMATION

The Subject Property is part of Green Line Trail, a proposed linear park and trail within an existing electrical transmission corridor that spans approximately 5 km from west of Earls Court Park and south of St. Clair Avenue to Davenport Road north of Dupont Street in Toronto, Ontario. The Subject Property includes three land parcels described as Parcel 28B and Parcel 29 (DDRA Lands) and Parcel 30 (MGRA Lands).

Previous environmental reports and documentation includes

- WSP Canada Group Limited. 2018a. Phase II Environmental Site Assessment – Davenport Lands – Parcels 28B, Part of Proposed Green Line Trail, Toronto, Ontario. May.
- WSP Canada Group Limited. 2018b. Phase II Environmental Site Assessment – Davenport Lands – Parcels 29 and 30, Part of Proposed Green Line Trail, Toronto, Ontario. May.
- WSP Canada Group Limited. 2019. Due-Diligence Risk Assessment – Davenport Lands – Parcels 28B, Part of Proposed Green Line Trail, Toronto, Ontario. October.
- WSP Canada Group Limited. 2020. Phase Two Environmental Site Assessment – Davenport Lands – Parcel 30, Part of Proposed Green Line Trail, Toronto, Ontario. March.
- WSP Canada Group Limited. 2020. Due-Diligence Risk Assessment – Davenport Lands – Parcel 29, Part of Proposed Green Line Trail, Toronto, Ontario. February.
- WSP Canada Group Limited. 2021. Modified Generic Risk Assessment and Pre-submission Form for Parcel 30, Green Line Trail, 315 MacPherson Avenue, Toronto, Ontario. January.
- Certificate of Property Use # 7631-BZWMLT – Parcel 30, 315 Macpherson Avenue, Toronto, Ontario
- WSP Canada Inc. 2024. Soil and Groundwater Management Plan, Green Line Trail Parcels 28B, 29 and 30, Toronto, Ontario. July.

The ESA (Environmental Site Assessment) work identified soil with elevated levels of metals including hydride-forming metals, polycyclic aromatic hydrocarbons (PAHs) and/or salt-related parameters [electrical conductivity (EC) and/or sodium adsorption ratio (SAR)] exceeding the Ontario Ministry of the Environment, Conservation and Parks (MECP) full-depth site condition standards (SCS) for residential/ parkland/ institutional (RPI) land use with coarse textured soil in a non-potable groundwater setting (the “Table 3 SCS”). Elevated chloride concentrations were identified in groundwater at Parcel 28B; however, for the purpose of the Due-Diligence Risk Assessment (DDRA), it was not found to be a contaminant of concern and was not carried forward for further assessment [see DDRA report (WSP, 2019) for rationale].

The risk assessments (DDRA and MGRA) assessed risks to human health and ecological receptors and provided risk management measures (RMMs) to be implemented at the Site during and following construction. The following RMMs are required:

Barrier to Site Soils

- **Hard Cap:** a barrier covering contaminated soil consisting of at least 75 mm of hard surface consisting of hot mix asphalt, concrete, concrete pavers, stone pavers or brick or other surface treatment not required to support vegetative growth underlain by at least 150 mm of granular. Hard caps can include park features such as bike paths and walkways. In Parcel 30, areas where permeable pavers are used, will require a 1.0 m fill cap barrier.
- **Fill Cap:** A barrier covering contaminated soil consisting of soil meeting the MECP Table 3 SCS and Table 3.1 ESQS.
 - All areas where deep-rooting trees and/or shrubs are to be planted require a fill cap of 1.5 m.
 - All areas where plantings with shallower roots are to be planted require a fill cap of 1.0 m.
 - All grassed areas that do not contain any trees, shrubs, or plantings with deeper roots require a fill cap of 0.5 m.
 - All utilities constructed below the hard cap and fill cap must be placed within a corridor (trench) of un-impacted soil/material, that extends 0.5 m around the utility.

- Areas with existing trees that will remain require a total cap of 0.15 m of mulch, wood bark or similar material at a minimum 1.2 m to max of dripline or 2.4 m radius around the trunk of the tree. Thickness to be feathered in the approach to the tree trunk, in accordance with landscape design detail.
- Preparation and implementation of a Soil and Groundwater Management Plan during any activities potentially coming into contact or exposing site soils.

3 CONTAMINANT HEALTH AND SAFETY PLAN

3.1 ADMINISTRATION AND PLANNING

The HASP is an administrative procedure with a performance objective of protecting workers (including consultants, site visitors, and workers) from direct contact with soil (by blocking the direct contact pathway) during the excavation activities. The HASP does not release the worker from other regulated worker health and safety requirements as described by Provincial or other legislation. The roles and responsibilities of the Contractor and City's representatives should be established at the outset of the project.

This contaminant HASP provides direction to effectively manage and mitigate the health and safety risks with contaminants identified in soil at the Subject Property. Items associated with general construction activities are not addressed in this document. Therefore, in addition to this contaminant HASP, the Contractor responsible for the park construction is required to prepare a site-specific construction HASP. The HASP shall be prepared and overseen by a Qualified Person (QP) with expertise in occupational hygiene to review the provisions of the plan with respect to the proposed site work and conduct regular inspections to confirm compliance. The HASP shall comply with applicable Regulations, that includes, at a minimum, the following items:

- Site orientation requirements;
- Worker roles and responsibilities and contact information;
- Description of the activities that will be included in the project;
- Job hazard analysis (JHA) and mitigation plan [including occupational hygiene requirements, personal protective equipment (PPE) requirements];
- Emergency response and contingency plans;
- Communication plan including contact information;
- Training requirements; and,
- Acceptance of the contaminant and construction HASPs by all workers.

The construction HASP must meet the legislative requirements set forth in the following Regulations:

- Ontario Workplace Safety and Insurance Act, 1997; and,
- Ontario Occupational Health and Safety Act, Revised Statutes of Ontario, 1990, as amended and its applicable regulations, such as:
 - Regulation 833 – Control of Exposure to Biological or Chemical Agents;
 - Regulation 213 – Construction Projects;
 - Workplace Hazardous Materials Information System; and,
 - First Aid Requirements.

3.2 CONTAMINANT MANAGEMENT

3.2.1 EXISTING CONDITIONS

The soil stratigraphy at the Site is described as fill consisting of sand and gravel and brown sandy silt topsoil from surface to approximately 0.76 mbgs, underlain by native silty sand and sandy silt with varying depths to a maximum depth of approximately 2.74 mbgs. This layer was generally underlain by silty sand till to 6.10 mbgs. Bedrock was not encountered during this investigation.

Environmental investigations completed at the Subject Property have identified elevated concentrations of metals including hydride-forming metals, polycyclic aromatic hydrocarbons (PAHs) and/or salt-related parameters in soil exceeding the Table 3 SCS. Elevated chloride concentrations were identified in groundwater at Parcel 28B; however, for the purpose of the DDRA, it was not found to be a contaminant of concern and was not carried forward for further.

The soil contaminants that exceed the Table 3 SCS and their reasonable estimated maximum concentrations as predicted through the completion of two separate WSP DDRA's on October 11, 2019, and February 28, 2020, and a MGRA on January 29, 2021, are identified in **Table 1**. The estimated extent of soil contamination, which match the limits of the soil/ hard caps to be installed during park construction, are shown provided in **Appendix A**.

Table 1 Reasonable Estimated Maximums and Site Condition Standards for Contaminants of Concern in Soil

CONTAMINANT OF CONCERN	REASONABLE ESTIMATED MAXIMUM (µg/g)	TABLE 3 SCS (µg/g)
Arsenic	30.4	18
Cadmium	1.70	1.2
Lead	1169	120
Mercury	0.318	0.27
Selenium	3.5	2.4
Acenaphthylene	2.99	0.15
Anthracene	5.70	0.67
Benzo(a)anthracene	15.5	0.5
Benzo(a)pyrene	6.70	0.3
Benzo(b/j)fluoranthene	34.7	0.78
Benzo(ghi)perylene	13.1	6.6
Benzo(k)fluoranthene	10.3	0.78
Chrysene	22.4	7
Dibenzo(a,h)anthracene	3.86	0.1
Fluoranthene	30.2	0.69
Indeno(1,2,3-cd)pyrene	13.2	0.38
1,2-Methylnaphthalene	1.27	0.99
Naphthalene	0.926	0.6
Phenanthrene	23.6	6.2
PHC F3 (C16-C34)	560	300
Electrical Conductivity	1.8	0.7
Sodium Adsorption Ratio	31.4	5

Notes:

The collective data set of the Subject Property (i.e., Lower Davenport Parcels 28B, 29 and 30) was considered when determining the REM for each parameter

3.2.2 RISK MANAGEMENT

In the absence of proper risk management, site visitors (members of the public of all ages), and remediation and construction workers may be exposed to impacted soil via the following exposure pathways:

- Dermal contact with soil;
- Incidental ingestion of soil; and,
- Inhalation of particulate matter arising from soil.

Exposure to site workers, site visitors, and the general public during construction should be mitigated through site security (e.g., wire fence or wooden hoarding with locking gates), dust control, good hygiene, PPE, and decontamination of equipment. Measures intended to provide mitigation of risks associated with the chemicals identified in impacted soil are discussed in Sections 3.2.3 and 3.2.4. Where these involve general construction measures, they must also be addressed in the construction HASP.

3.2.3 MITIGATION MEASURES FOR SITE CONTROL

The Contractor is responsible to maintain site control using measures that include precautions to secure the site to prevent public access, control worker activities with respect to work conducted around site soil and to ensure that contaminants that may be adhered to soil and dust does not migrate beyond site boundaries. Work zones should be clearly defined and marked using physical barriers such as caution tape, pylons, and/or fencing and the work conducted in work zones must employ appropriate mitigation measures to avoid unacceptable exposure to contaminants. The defined work zones should be clearly communicated to workers and visitors in the construction HASP and during site orientation.

In general, workers are not permitted to eat, drink, or smoke within any work zone. Only approved visitors, who have undertaken site orientation and have been provided with appropriate PPE will be allowed within a work zone. Other site controls are discussed in the following paragraphs.

Dust control and soil tracking measures must be implemented by the Contractor when work is being conducted that could create dust or impact off-site properties. Dust control measures protect both site workers as well as the public through mitigating the on-site generation of and off-site migration of particulate matter. All workers are required to visually monitor dust levels and use dust mitigation techniques when their activities may contribute to dust. Dust mitigation techniques include, but are not limited to:

- Excavation using methods to minimize raising dust from construction operations (e.g., limiting size of exposed excavation faces, limiting or slowing down excavation activities during periods of high winds, etc.);
- Installing mud mats at the site entrance and egress locations;
- Limited vehicle speeds onsite to reduce the generation of dust from traffic;
- On-site storage (i.e., tote) and use of potable water to prevent soil from drying and airborne dust from dispersing into atmosphere;
- Appropriate covers on trucks hauling soil;
- Use of watertight trucks to haul wet materials;
- Cleaning of paved surfaces by wet sweeping and/or washing; and
- Cleaning of truck tires and construction equipment before leaving the site.

Visual air monitoring to evaluate the particulates in outdoor air must be carried out by the Contractor to document that dust is being controlled adequately at the Subject Property. If the results of the air monitoring indicate excessive dust is being generated at the Subject Property, the Contractor may be required to stop work, take additional measures such as wetting with potable water to immediately reduce the amount of dust, and/or complete additional air quality monitoring at the site boundaries.

Work that involves the handling of site soils must include methods for decontamination of equipment and vehicles. The Contractor must install a decontamination station to physically remove site soil that may be adhered to equipment and vehicles prior to moving from a work zone where site soils are exposed to an area of the Subject

Property where site soils are capped or when equipment and vehicles leave the Subject Property from an area where site soils are exposed.

Wastewater generated during decontamination of equipment or vehicles must be collected and stored for testing. If the wastewater meets City sewer discharge standards, this water can be discharged to City sewers in accordance with a valid sewer discharge permit. If wastewater is not acceptable to discharge to municipal sewers, it must be removed from site by a MECP licensed waste hauler, to a receiving site that is licensed to accept liquid industrial waste. The Contractor must ensure that the movement of wastewater is documented and manifested, as required under Ontario regulations.

3.2.4 MITIGATION MEASURES FOR WORKER SAFETY

Standard worker PPE consists of coveralls (or tyvek suits), a hardhat, safety glasses, safety boots, and high-visibility stripes on outer layers of clothing. This PPE must meet the applicable standards set by the Canadian Standards Association (CSA). Additionally, task-specific protective gloves must be used as necessary (e.g. chemical-resistant nitrile gloves when handling contaminated soil, or work gloves when using tools). Footwear must be impervious to soil and groundwater and therefore should not leak. Footwear should be replaced when wear and tear reduces the impervious nature of the material. Clothing soiled with site soil should be removed and placed in sealed containers before leaving the construction site and be submitted to a professional laundry for cleaning or disposed with general waste generated at the site. If visible dust generation and/or particulate levels exceed action levels established in the Construction HASP, dust masks or alternate PPE to be implemented.

Hygiene facilities must be provided in areas away from work zones to allow for workers washing up, eating, and drinking. Workers should ensure that their hands, mouths, and food and drink containers are clean and dust-free before eating or drinking.

A heat or cold stress awareness program for the Subject Property must be implemented by the Contractor should weather conditions make this necessary. The heat or cold stress program should include, at a minimum, checking weather reports and monitoring weather conditions throughout the workday; ensuring that all workers are trained to recognize the signs and symptoms of heat and cold stress and regularly check on one another; providing a climate-controlled break area if necessary; providing tools or equipment that will reduce the physical burden of tasks that need to be performed; and provide access to hydration.

3.2.5 CONTINGENCY PLANS

Emergencies must be dealt with in a manner that minimizes the health and safety to site personnel and the public. The following procedures will be implemented in the event of any emergency:

- First aid or other appropriate initial action will be administered by those closest to the accident/incident. This assistance will be coordinated by the ranking individual on site and will be conducted in a manner such that those rendering assistance are not placed in a situation of unacceptable risk. The primary concern is to avoid placing a greater number of workers in jeopardy.
- Employees must report all accidents/incidents immediately.
- Emergency response will be initiated in an efficient, rapid and safe manner.
- Accident/incident reports will be generated.

3.3 ROLES AND RESPONSIBILITIES

3.3.1 CONTRACTOR RESPONSIBILITIES

The Contractor is responsible for the supervision and management of activities being carried out during the redevelopment of the Subject Property. In addition, the Contractor is responsible for:

- Ensuring tasks are conducted in accordance with the requirements of this contaminant HASP and the construction HASP.
 - Prior to initiation of the project (in accordance with the definition in the Occupational Health and Safety Act, as amended), notify the Ministry of Labour (MOL) office of the proposed activities and that the property contains contaminated soils
 - Providing workers with the necessary training and equipment (including occupational hygiene requirements and PPE) to conduct their tasks properly and safely. Documentation of this training should be maintained at the construction site by the Contractor.
 - Ensuring activities potentially exposing site soil or requiring workers to potentially contact site soil be conducted under the guidance and supervision of a QP for Environmental Site Assessment (QP_{ESA}) registered with the MECP. Examples of these activities may include, but are not limited to:
 - Site grading;
 - Site excavation;
 - Planting of vegetation;
 - Installation of new buried services;
 - Repair or replacement of existing buried services; and,
 - Backfilling of excavations.
 - Providing visitors with a site orientation and ensuring they are accompanied by Contractor staff (or a trained delegate) at all times. The Contractor shall ensure visitors have proper PPE, and they abide by the requirements of the HASPs. The Contractor shall keep a log of all site visitors, including their name, affiliation, arrival, and departure times. Visitors may include (but are not limited to) personnel from regulatory bodies (such as the MECP or Ontario MOL), Consultants, or City staff.
-

3.3.2 WORKER RESPONSIBILITIES

All workers must conduct their tasks in a manner that ensures their own health and safety and that of others. Workers must abide by the contaminant and construction HASPs. Workers have the responsibility of informing a supervisor if health and safety procedures, equipment use, or task instructions are not understood or are not being followed. Workers are responsible for inspecting, using, and maintaining their PPE and tools.

3.3.3 CONTRACTOR QUALIFIED PERSON RESPONSIBILITIES

The QP_{ESA} overseeing the excavation program must ensure that precautions in the contaminant HASP account for the identified contaminants that may be present in the soil and that the construction HASP identifies expected construction activities and their safe execution. If work is being carried out at the Subject Property that could potentially disturb site soils, the Consultant will conduct inspections of construction activities and will evaluate such activities with respect to potential risks. Any deficiencies noted during these inspections will be communicated in writing to the Contractor and the Subject Property Owner. The noted deficiencies and methods used to rectify them must be maintained in onsite contract documentation and must be available for review by the MECP and/or the MOL, when requested as well as to the City and the Consultant.

3.4 IMPLEMENTATION AND MONITORING

The Contractor shall appoint a competent health and safety representative in accordance with the Ontario Health and Safety Act and that meets with the approval of the City's QP_{ESA}. This health and safety representative shall be responsible for HASP implementation, both contaminant and construction. As part of this role, he or she shall maintain worker training records, and conduct daily inspections to document compliance with the health and safety requirements for the Subject Property. The training records and daily inspection reports should be maintained on file by the Contractor and shall be made available for review by the City and the Consultant upon request.

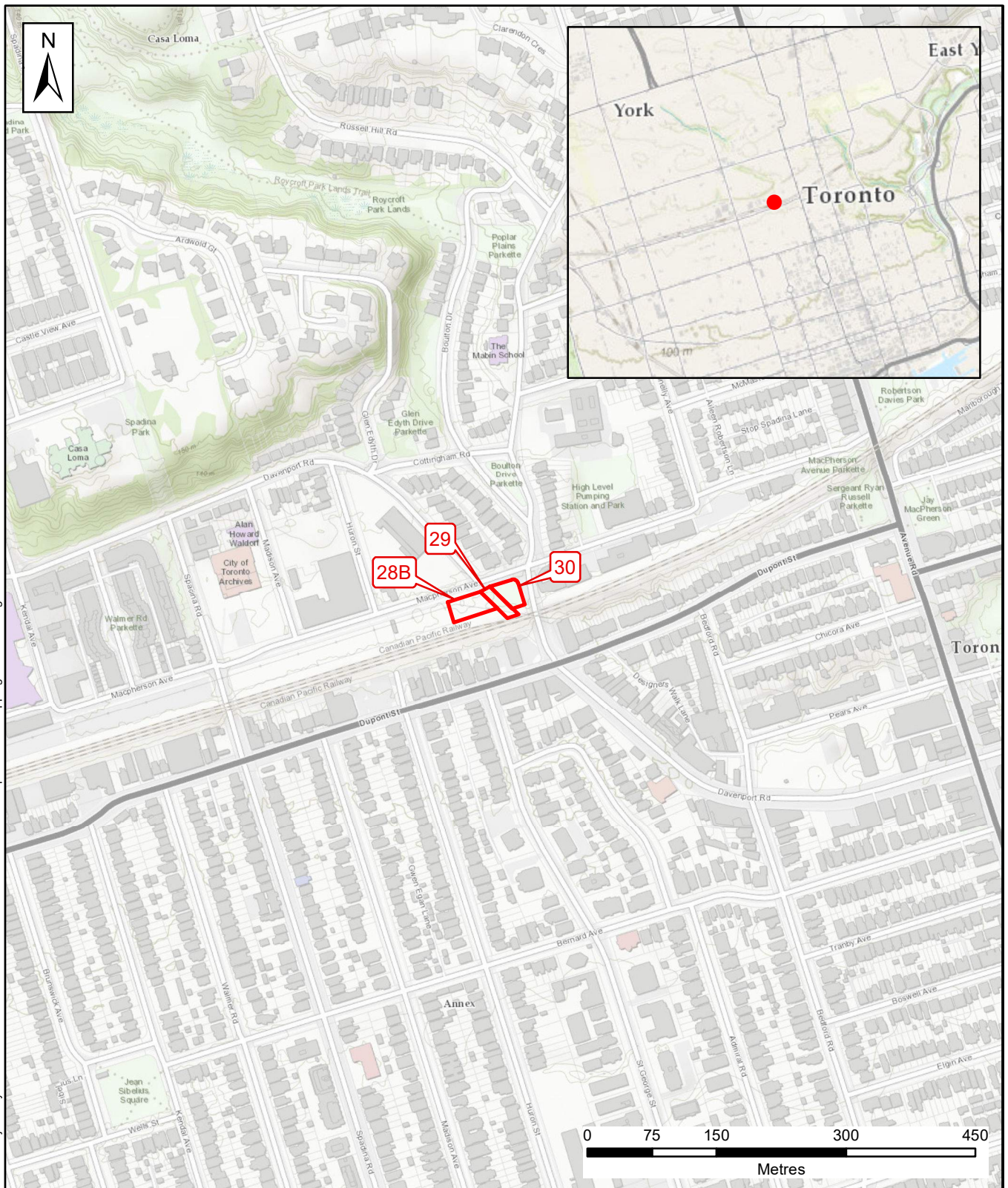
All incidents and near misses must be reported to the Contractor's site supervisor

4 REFERENCES

- Ontario Ministry of the Environment and Climate Change, 2011b. Soil, Groundwater and Sediment Standards for Use Under Part XV.1 of the *Environmental Protection Act*. April 15.
- WSP Canada Group Limited. 2018a. *Phase II Environmental Site Assessment – Davenport Lands – Parcels 28B, Part of Proposed Green Line Trail, Toronto, Ontario*. May.
- WSP Canada Group Limited. 2018b. *Phase II Environmental Site Assessment – Davenport Lands – Parcels 29 and 30, Part of Proposed Green Line Trail, Toronto, Ontario*. May.
- WSP Canada Group Limited. 2019. *Due-Diligence Risk Assessment – Davenport Lands – Parcels 28B, Part of Proposed Green Line Trail, Toronto, Ontario*. October.
- WSP Canada Group Limited. 2020. *Phase Two Environmental Site Assessment – Davenport Lands – Parcel 30, Part of Proposed Green Line Trail, Toronto, Ontario*. March.
- WSP Canada Group Limited. 2020. *Due-Diligence Risk Assessment – Davenport Lands – Parcel 29, Part of Proposed Green Line Trail, Toronto, Ontario*. February.
- WSP Canada Group Limited. 2021. *Modified Generic Risk Assessment and Pre-submission Form for Parcel 30, Green Line Trail, 315 MacPherson Avenue, Toronto, Ontario*. January.
- Certificate of Property Use # 7631-BZWMLT – Parcel 30, 315 Macpherson Avenue, Toronto, Ontario
- WSP Canada Inc. 2024. *Soil and Groundwater Management Plan, Green Line Trail Parcels 28B, 29 and 30, Toronto, Ontario*. July.

FIGURES

J:\1442 Projects by Job Number\2017\17M-01909-00 Green Line Trail - Davenport Lands\Maping\MXD\SMP\Figure 1 Site Location.mxd



LEGEND

PARCEL BOUNDARY

Client: **CITY OF TORONTO**

Title: **SITE LOCATION**

Prepared By: **wsp**

17M-01905-85

Date: June 2021

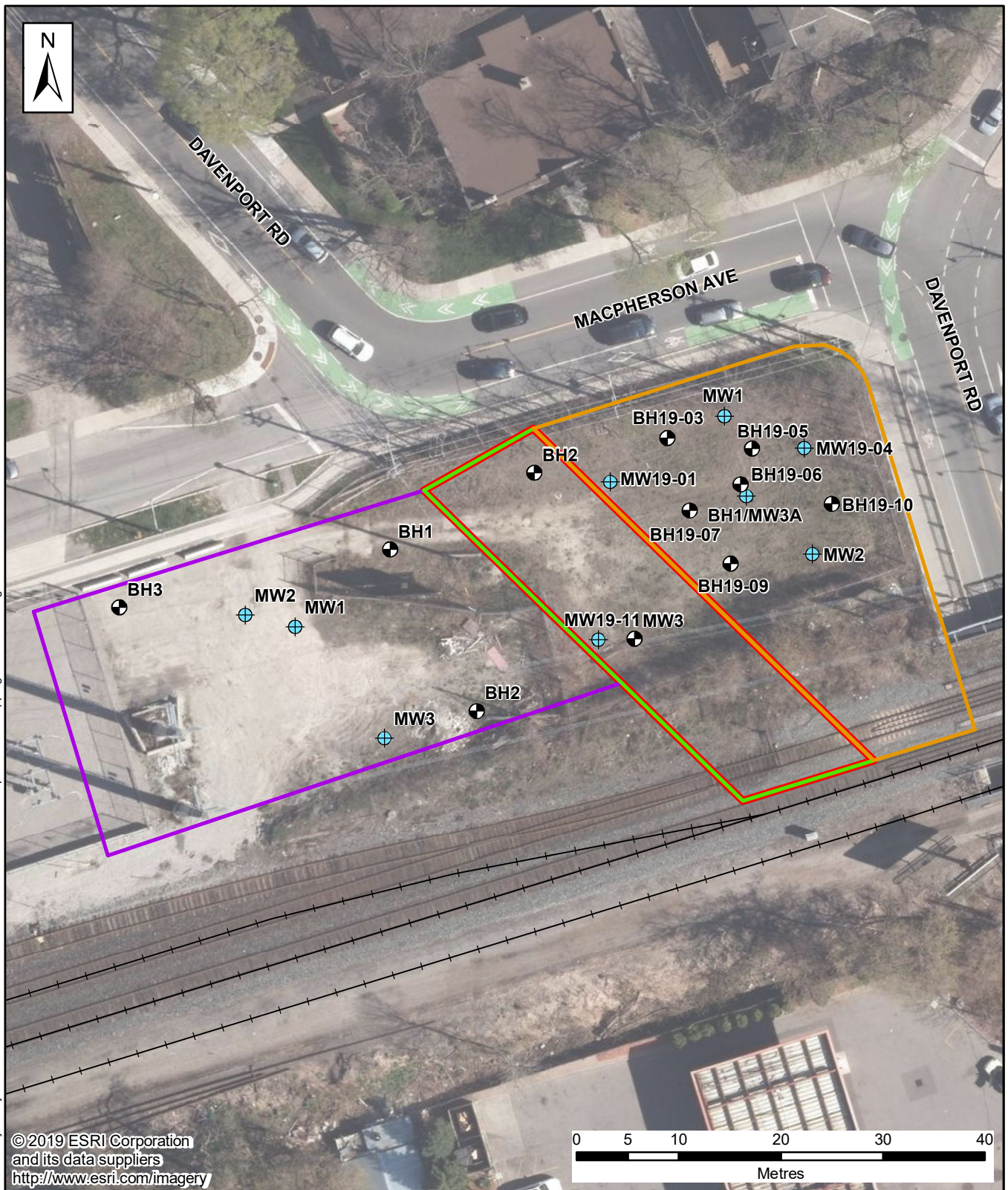
© Queen's Printer for Ontario

Scale as Shown

Review: AP

Figure: 1

J:\1442 Projects by Job Number\2017\17M-01909-00 Green Line Trail - Davenport Lands\Mapping\MXD\DDRA\Figure 2 Site Plan - 28B 29 30.mxd



LEGEND

 	SUBJECT PROPERTY		RAILWAY
 	PARCEL 28B		BOREHOLE
 	PARCEL 29		MONITORING WELL
 	PARCEL 30		

Client:

CITY OF TORONTO

Title:

SITE PLAN - PARCEL 28B 29 30

Prepared By:



17M-01909-00

Scale as Shown

Review: AR

Date: November 2019

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Figure: 2

APPENDIX

A CAPPING PLAN 2024 (superceded)

Path: \\ccap-phw-nr\c\CA\GIS\DWG\CT\Data\GIS\Clients\City of Toronto\Green_Lines_Traill\09_PROD\17M-01905-85\40_PROD\0001_Capping_Plans\1 File Name: 17M-01905-85\40_PROD\0001_Capping_Plans\1 Last Edited By: wds_dement_drawing Date: 2024-08-20 Time: 4:02:16 PM Printed By: wds_dement_drawing Date: 2024-08-21 Time: 11:03:02 AM



CAPPING LEGEND

EXISTING TREES - 0.15 m OF MULCH, WOOD BARK, OR SIMILAR MATERIAL

SOFTSCAPE - 0.5 m FILL CAP BARRIER (FOR GRASSED AREAS)

SOFTSCAPE - 1.0 m FILL CAP BARRIER [PLANTINGS WITH SHALLOWER ROOTS (I.E., SHRUBS)]

SOFTSCAPE - 1.5 m FILL CAP BARRIER (FOR PROPOSED TREES)

PAVING/PAVERS - 225 mm TOTAL CAP (CONSISTING OF 75 mm CONCRETE OR ASPHALT OR CONCRETE PAVERS, STONE PAVERS, OR BRICK, UNDERLAIN BY GRANULAR MATERIAL OR EQUIVALENT)

PAVING/PAVERS -
a. PAVING - HARD CAP BARRIER (225 mm TOTAL - CONSISTING OD MINIMUM 75 mm CONCRETE OR ASPHALT UNDERLAIN BY GRANULAR MATERIAL OR EQUIVALENT).
b. PAVER - 1.0 m FILL CAP BARRIER (CONSISTS OF AT LEAST 0.5 m THICKNESS OF CAPPING SOIL AND ABOVE THIS, PAVERS, BRICK OR AGGREGATE).

FENCED IN TOWER

LAYOUT AND MATERIALS LEGEND

PROPERTY LINE

LIMIT OF WORK

CAST IN PLACE CONCRETE

EJ

EXPANSION JOINT & CONTROL JOINT

TINING FINISH

CONCRETE UNIT PAVER

VEHICULAR ASPHALT - REFER TO CIVIL DWGS

ENGINEERED WOOD FIBER

MULCH

CRUSHED ROCK

NEW ROAD CURB - REFER TO CIVIL DWGS

CURB RAMP

TACTILE WARNING PLATES

DROPPED CURB - SEE CIVIL DWGS

TRANSITION CURB

METAL EDGER

PROPOSED CANOPY TREE

PROPOSED SMALL TREE / SHRUB

EXISTING TREE TO, REMAIN AND BE PROTECTED

TURF - SEE PLANTING PLAN

MEADOW PLANTING - SEE PLANTING PLAN

PERENNIAL/GRASSES - SEE PLANTING PLAN

OTHER

MH

EXISTING HYDRO MAN HOLE - TO REMAIN

MH

EXISTING MAN HOLE - TO REMAIN

M B

WATER METER & BACK FLOW PREVENTOR CHAMBERS - REFER TO CIVIL DWGS

QC

QUICK COUPLER

EC

ELECTRICAL CABINET - REFER TO ELECTRICAL DWGS

LS

LIGHT STANDARD - REFER TO ELECTRICAL DWGS

LS (EX)

EXISTING LIGHT STANDARD

SI (EX)

EXISTING SIGN

UP (EX)

EXISTING UTILITY POLE

WELDED WIRE MESH FENCE

CHAIN LINK FENCE / CHAIN LINK FENCE WITH WOODEN POSTS

EXISTING FENCE - TO REMAIN AND BE PROTECTED

PARK BENCH

GREENLINE BENCH

PLATFORM BENCH

ACCESSIBLE PICNIC TABLE

LOUNGE CHAIR, WITH AND WITHOUT TABLE ATTACHMENT

BOTTLE FILLING STATION WITH PET STEP

OLA LOG PLAY FEATURES AND RECLAIMED WOOD BENCH

EXISTING BIKE RING

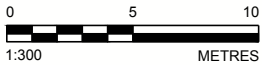
POST AND RING BICYCLE STAND

BOLLARD

PARK BINS, SUPPLIED AND INSTALLED BY CITY OF TORONTO

APPROXIMATE AREA OF CAPPING LAYER - DAVENPORT	sq.m.
SOFTSCAPE - 1.5 m FILL CAP BARRIER (FOR PROPOSED TREES)	325
SOFTSCAPE - 1.0 m FILL CAP BARRIER [PLANTINGS WITH SHALLOWER ROOTS (I.E., SHRUBS)]	233
SOFTSCAPE - 0.5 m FILL CAP BARRIER (FOR GRASSED AREAS)	842
EXISTING TREES - 0.15 m OF MULCH, WOOD BARK, OR SIMILAR MATERIAL	66
PAVING/PAVERS - 225 mm TOTAL CAP (CONSISTING OF 75 mm CONCRETE OR ASPHALT OR CONCRETE PAVERS, STONE PAVERS, OR BRICK, UNDERLAIN BY GRANULAR MATERIAL OR EQUIVALENT)	595
PAVING/PAVERS - a. PAVING - HARD CAP BARRIER (225 mm TOTAL - CONSISTING OD MINIMUM 75 mm CONCRETE OR ASPHALT UNDERLAIN BY GRANULAR MATERIAL OR EQUIVALENT). b. PAVER - 1.0 m FILL CAP BARRIER (CONSISTS OF AT LEAST 0.5 m THICKNESS OF CAPPING SOIL AND ABOVE THIS, PAVERS, BRICK OR AGGREGATE).	225

Superceded



NOTES

- AREA WITH IMPACTED SOIL WILL BE MANAGED BY IMPLEMENTING RISK MANAGEMENT MEASURES (SOIL BARRIERS) INCLUDING SOFT CAPPING AND/OR HARD CAPPING AS OUTLINE IN THE CAPPING PLANS FOR THE PROTECTION OF BOTH HUMAN AND ECOLOGICAL RECEPTORS.
- SOIL BARRIERS MUST BE INSTALLED AT THE THICKNESS SPECIFIED IN THE CAPPING PLANS (IN RELATION TO THE PROPOSED FINISHED FINAL GRADE).
- DURING EXCAVATION WITHIN THE IMPACTED AREAS, CARE MUST BE TAKEN TO PREVENT TRACKING CONTAMINATED SOIL AROUND THE SITE.
- EXCAVATIONS USING HEAVY EQUIPMENT IS PROHIBITED WITHIN 10 METERS OF TOWER FOOTINGS TO PROTECT FOUNDATIONS. WITHIN 10 METERS, EXCAVATION MUST BE CARRIED OUT BY HAND OR BY USE OF A VAC SYSTEM.

GENERAL SITE AND SOIL MANAGEMENT NOTES

- ANY CONSTRUCTION ACTIVITIES POTENTIALLY COMING INTO CONTACT WITH OR EXPOSING SOIL OR GROUNDWATER SHOULD BE COMPLETED IN STRICT ACCORDANCE WITH THE REQUIREMENTS OF THE SOIL AND GROUNDWATER MANAGEMENT PLAN (SGMP)
- IMPORTED SOILS FOR CAPPING OR GRADING PURPOSES MUST BE TESTED IN ACCORDANCE WITH THE REQUIREMENT OF O. Reg. 409/19
- IMPORTED SOIL MUST MEET THE MECP TABLE 3 AND/OR O.Reg. 406/19).
- BACKFILL SOURCE SITES MUST BE APPROVED BY THE CITY'S QUALIFIED PERSON (QP), IN WRITING AND SUPPORTED B Y DOCUMENTATION AND VERIFICATION SAMPLING.
- RE-SAMPLING BY THE FINAL RE-USE OR DISPOSAL SITE. ADDITIONAL SAMPLING MUST BE COORDINATED AND/OR APPROVED BY THE CITY OR THE CITY'S OP

CLIENT
CITY OF TORONTO

CONSULTANT



YYYY-MM-DD	2024-08-21
DESIGNED	
PREPARED	CKC
REVIEWED	AP
APPROVED	AP

PROJECT
GREEN LINE TRAIL, TORONTO, ONTARIO

TITLE
CAPPING PLAN - DAVENPORT LANDS,
PARCELS 28B,29 & 30

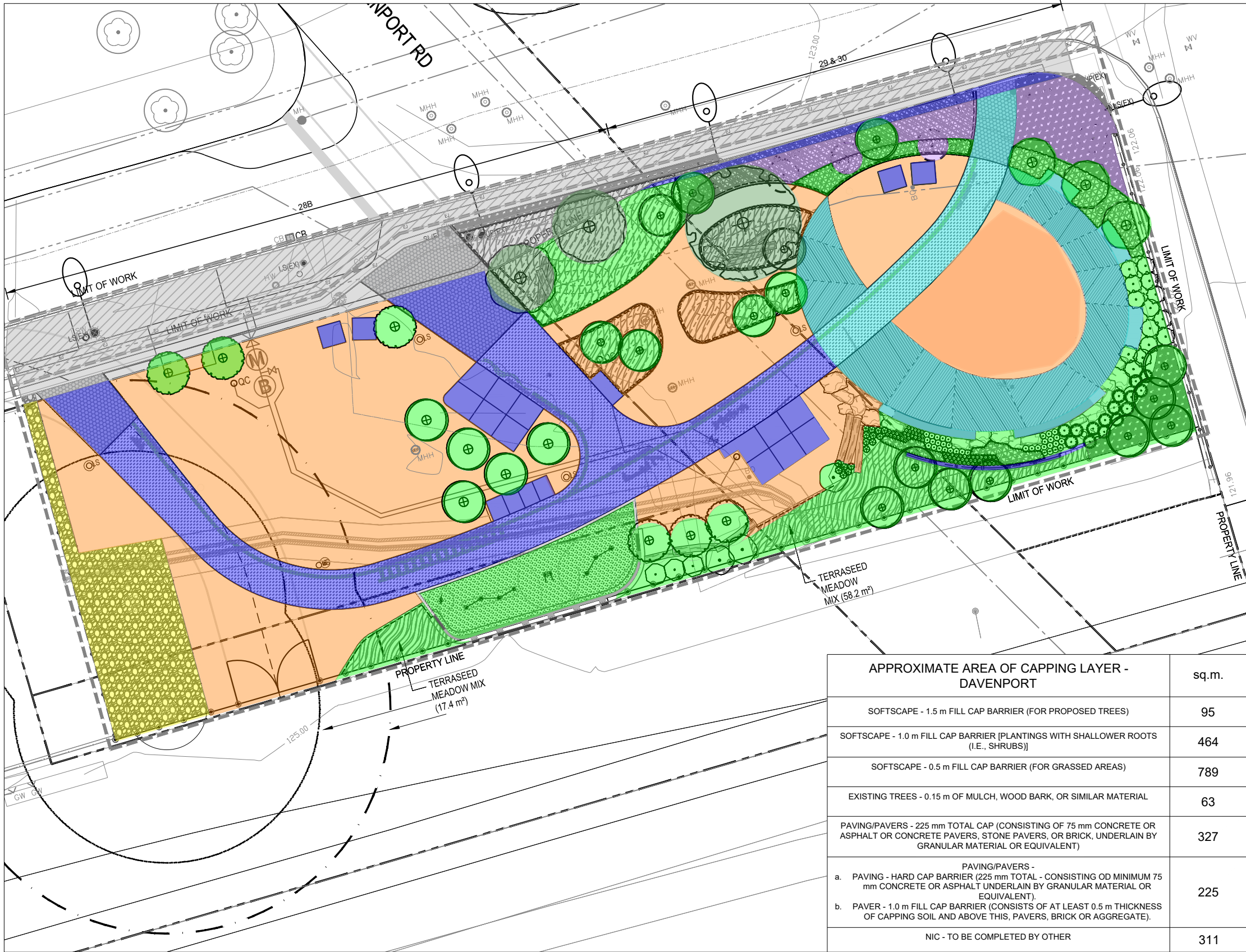
PROJECT NO.	CONTROL	REV.	FIGURE
17M-01905-85	0001	1	3

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM ANSI B

ADDENDUM 1

CAPPING PLAN 2026





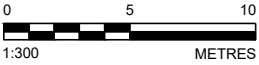
CAPPING LEGEND

- NIC - TO BE COMPLETED BY OTHER
- EXISTING TREES - 0.15 m OF MULCH, WOOD BARK, OR SIMILAR MATERIAL
- SOFTSCAPE - 0.5 m FILL CAP BARRIER (FOR GRASSED AREAS)
- SOFTSCAPE - 1.0 m FILL CAP BARRIER [PLANTINGS WITH SHALLOWER ROOTS (I.E., SHRUBS)]
- SOFTSCAPE - 1.5 m FILL CAP BARRIER (FOR PROPOSED TREES)
- PAVING/PAVERS - 225 mm TOTAL CAP (CONSISTING OF 75 mm CONCRETE OR ASPHALT OR CONCRETE PAVERS, STONE PAVERS, OR BRICK, UNDERLAIN BY GRANULAR MATERIAL OR EQUIVALENT)
- PAVING/PAVERS -
 - a. PAVING - HARD CAP BARRIER (225 mm TOTAL - CONSISTING OD MINIMUM 75 mm CONCRETE OR ASPHALT UNDERLAIN BY GRANULAR MATERIAL OR EQUIVALENT).
 - b. PAVER - 1.0 m FILL CAP BARRIER (CONSISTS OF AT LEAST 0.5 m THICKNESS OF CAPPING SOIL AND ABOVE THIS, PAVERS, BRICK OR AGGREGATE).
- FENCED IN TOWER

LAYOUT AND MATERIALS LEGEND

- PROPERTY LINE
- LIMIT OF WORK
- IMPACTED SOIL AREA, REFER TO CAPPING PLAN
- GRADING
 - TC122.36 EXISTING ELEVATION
 - ELEV+ EXISTING ELEVATION TO MATCH
 - 123.25 EXISTING CONTOUR
 - 122.87 PG PROPOSED ELEVATION
 - 122.87 FG PROPOSED ELEVATION, REFER TO CIVIL DWG
 - FG FINISH GRADE
 - TW TOP OF WALL
 - BW BOTTOM OF WALL
 - TC TOP OF CURB
 - BC BOTTOM OF CURB
 - PAVING
 - CAST IN PLACE CONCRETE
 - EXPANSION JOINT & CONTROL JOINT
 - TINING FINISH
 - CONCRETE UNIT PAVER
 - VEHICULAR ASPHALT - REFER TO CIVIL DWGS
 - ENGINEERED WOOD FIBER
 - METAL EDGER
 - WHEELCHAIR SYMBOL FOR ACCESSIBLE SPACE ALLOCATION ONLY
- PLANTING
 - PROPOSED CANOPY TREE
 - PROPOSED SMALL TREE / SHRUB
 - EXISTING TREE TO REMAIN AND BE PROTECTED
 - SHRUB PLANTING - SEE PLANTING PLAN
 - TURF - SEE PLANTING PLAN
 - MEADOW PLANTING - SEE PLANTING PLAN
- OTHER
 - EXISTING HYDRO MAN HOLE - TO REMAIN
 - EXISTING MAN HOLE - TO REMAIN
 - WATER METER & BACK FLOW PREVENTOR CHAMBERS - REFER TO CIVIL DWGS
 - QUICK COUPLER
 - ELECTRICAL CABINET - REFER TO ELECTRICAL DWGS
 - LIGHT STANDARD - REFER TO ELECTRICAL DWGS
 - EXISTING LIGHT STANDARD
 - EXISTING SIGN
 - EXISTING UTILITY POLE
 - EXISTING TRAFFIC SIGN
 - EXISTING CATCH BASIN
- SITE FURNITURE
 - WIRE MESH FENCE
 - CHAIN LINK FENCE
 - ART FENCE
 - PARK BENCH
 - PLATFORM BENCH
 - ACCESSIBLE PICNIC TABLE
 - LOUNGE CHAIR
 - DRINKING FOUNTAIN
 - BOULDER
 - LOG HABITAT
 - WASTE RECEPTACLE, BY OTHERS

APPROXIMATE AREA OF CAPPING LAYER - DAVENPORT	sq.m.
SOFTSCAPE - 1.5 m FILL CAP BARRIER (FOR PROPOSED TREES)	95
SOFTSCAPE - 1.0 m FILL CAP BARRIER [PLANTINGS WITH SHALLOWER ROOTS (I.E., SHRUBS)]	464
SOFTSCAPE - 0.5 m FILL CAP BARRIER (FOR GRASSED AREAS)	789
EXISTING TREES - 0.15 m OF MULCH, WOOD BARK, OR SIMILAR MATERIAL	63
PAVING/PAVERS - 225 mm TOTAL CAP (CONSISTING OF 75 mm CONCRETE OR ASPHALT OR CONCRETE PAVERS, STONE PAVERS, OR BRICK, UNDERLAIN BY GRANULAR MATERIAL OR EQUIVALENT)	327
PAVING/PAVERS - <ul style="list-style-type: none">a. PAVING - HARD CAP BARRIER (225 mm TOTAL - CONSISTING OD MINIMUM 75 mm CONCRETE OR ASPHALT UNDERLAIN BY GRANULAR MATERIAL OR EQUIVALENT).b. PAVER - 1.0 m FILL CAP BARRIER (CONSISTS OF AT LEAST 0.5 m THICKNESS OF CAPPING SOIL AND ABOVE THIS, PAVERS, BRICK OR AGGREGATE).	225
NIC - TO BE COMPLETED BY OTHER	311



NOTES

- AREA WITH IMPACTED SOIL WILL BE MANAGED BY IMPLEMENTING RISK MANAGEMENT MEASURES (SOIL BARRIERS) INCLUDING SOFT CAPPING AND/OR HARD CAPPING AS OUTLINE IN THE CAPPING PLANS FOR THE PROTECTION OF BOTH HUMAN AND ECOLOGICAL RECEPTORS.
- SOIL BARRIERS MUST BE INSTALLED AT THE THICKNESS SPECIFIED IN THE CAPPING PLANS (IN RELATION TO THE PROPOSED FINISHED FINAL GRADE).
- DURING EXCAVATION WITHIN THE IMPACTED AREAS, CARE MUST BE TAKEN TO PREVENT TRACKING CONTAMINATED SOIL AROUND THE SITE.
- EXCAVATIONS USING HEAVY EQUIPMENT IS PROHIBITED WITHIN 10 METERS OF TOWER FOOTINGS TO PROTECT FOUNDATIONS. WITHIN 10 METERS, EXCAVATION MUST BE CARRIED OUT BY HAND OR BY USE OF A VAC SYSTEM.

GENERAL SITE AND SOIL MANAGEMENT NOTES

- ANY CONSTRUCTION ACTIVITIES POTENTIALLY COMING INTO CONTACT WITH OR EXPOSING SOIL OR GROUNDWATER SHOULD BE COMPLETED IN STRICT ACCORDANCE WITH THE REQUIREMENTS OF THE SOIL AND GROUNDWATER MANAGEMENT PLAN (SGMP)
- IMPORTED SOILS FOR CAPPING OR GRADING PURPOSES MUST BE TESTED IN ACCORDANCE WITH THE REQUIREMENT OF O. Reg. 409/19
- IMPORTED SOIL MUST MEET THE MECP TABLE 3 AND/OR O.Reg. 406/19).
- BACKFILL SOURCE SITES MUST BE APPROVED BY THE CITY'S QUALIFIED PERSON (QP), IN WRITING AND SUPPORTED B Y DOCUMENTATION AND VERIFICATION SAMPLING.
- RE-SAMPLING BY THE FINAL RE-USE OR DISPOSAL SITE. ADDITIONAL SAMPLING MUST BE COORDINATED AND/OR APPROVED BY THE CITY OR THE CITY'S OP

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YYYY-MM-DD	2026-02-23
DESIGNED	
PREPARED	CKC
REVIEWED	AP
APPROVED	AP

PROJECT
GREEN LINE TRAIL, TORONTO, ONTARIO

TITLE
CAPPING PLAN - DAVENPORT LANDS,
PARCELS 28B,29 & 30

PROJECT NO.	CONTROL	REV.	FIGURE
17M-01905-85	0001	2	3

Tree Protection Policy and Specifications for Construction Near Trees

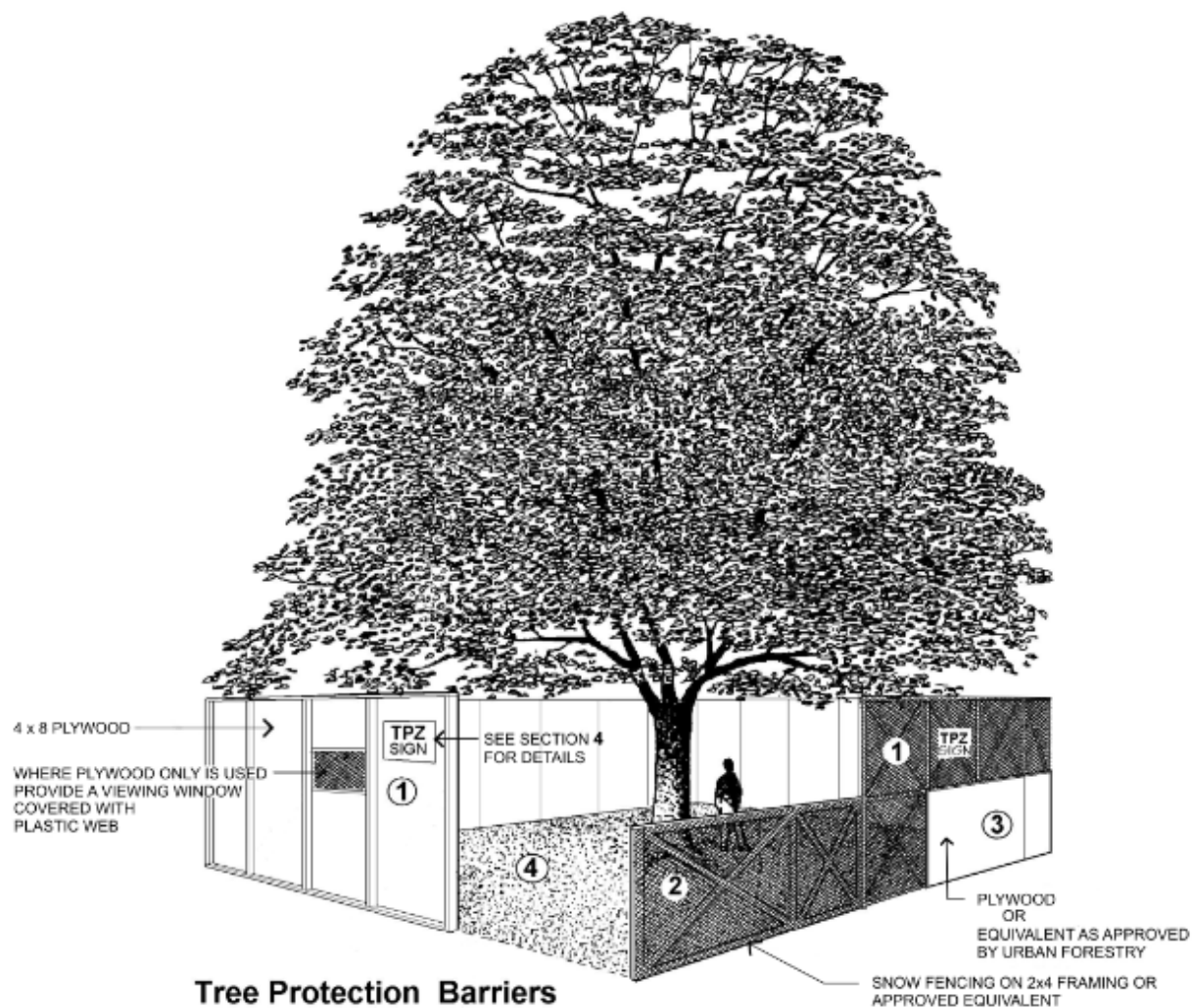


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1. Introduction

Maintenance, growth and enhancement of the urban forest are important goals of the City of Toronto. Preserving and protecting healthy trees can help the City to achieve these goals. Considering tree protection in the initial stages of construction planning may mean the difference between preserving a healthy tree and having to remove it. Plans created with tree protection in mind help protect the city's urban forest.

The tree protection policy and specifications outlined below reflect the policy of Toronto City Council. Anyone failing to adhere to the tree protection policy and specifications will be financially responsible for any resulting damage to trees and may be charged under the provisions of the applicable City of Toronto tree by-law or subject to orders to comply.

Prior to commencing with any demolition or construction activity it is important that an arborist¹ determines the location, species, size and condition of trees on the property and surrounding properties and becomes familiar with the tree protection by-laws that could impact the proposal.

The following by-laws protect trees in the City of Toronto:

- [Street Tree By-law](#), City of Toronto Municipal Code Chapter 813, Article II, protects all trees situated on City streets.
- [Private Tree By-law](#), Article III, Chapter 813 of the City of Toronto Municipal Code protects trees on private property with diameter of 30cm or more and trees of any diameter that were planted as a condition of a permit issued under this bylaw or a site plan agreement.
- The [Ravine & Natural Feature Protection By-law](#), Chapter 658 of the City of Toronto Municipal Code prohibits and regulates the injury and destruction of trees, as well as filling, grading and dumping within designated areas of the City. There is no minimum diameter for a tree to qualify for protection under the Ravine and Natural Feature Protection By-law. Trees of any size located in the designated areas qualify for protection.
- The [Parks By-law](#), Municipal Code Chapter 608, Article VII protects all trees located in a City park.

All above noted by-laws are implemented by Urban Forestry under the authority of the General Manager, Parks, Forestry and Recreation. City of Toronto's tree protection by-laws can be found at www.toronto.ca/trees.

Types of Tree Damage

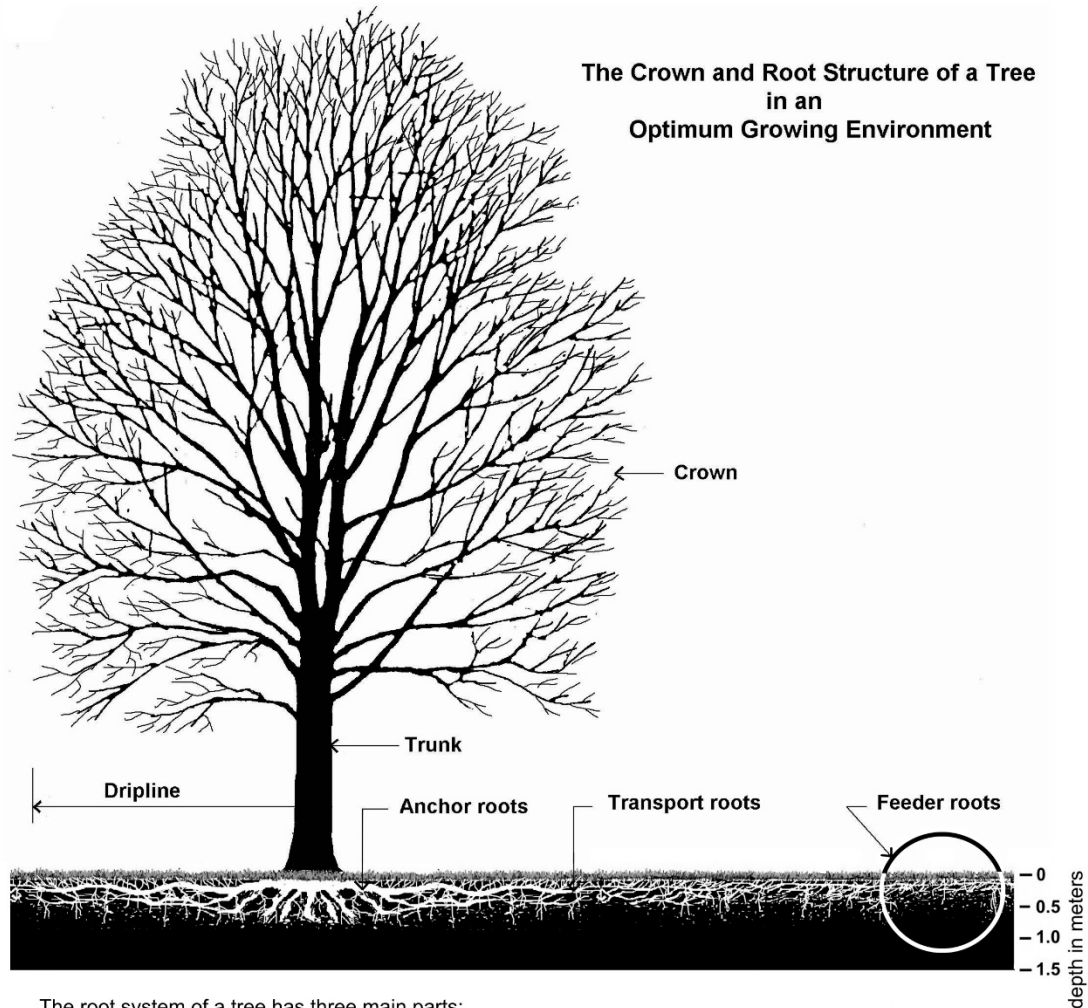
Physical injury to the trunk, crown and roots of a tree will occur if construction equipment is permitted close to trees or if structures are built into the growing space of a tree. Inappropriate pruning may also result in tree injury. Physical injuries are permanent and can be fatal.

¹ Arborist – An expert in the care and maintenance of trees including an arborist qualified by the Ontario Training and Adjustment Board Apprenticeship and Client Services Branch, a certified arborist qualified by the International Society of Arboriculture, a consulting arborist registered with the American Society of Consulting Arborists, a registered professional forester or a person with other similar qualifications as approved by the General Manager, Parks, Forestry and Recreation.

Root cutting is another type of physical injury that can significantly impact the health of a tree. The majority of tree roots are found in the upper 30 to 60 cm of soil. Excavation for foundations or utility installation may cut roots if the excavation is too close to trees. Trees can become destabilized and may fall over if anchor roots are severed.

Compaction of the soil in the tree root zone is one of the leading causes of tree decline in Toronto's urban forest. Soil compaction occurs primarily from vehicles and equipment moving across the root zones. Piling or storing materials or debris on top of the root system can also result in soil compaction. Soil compaction causes the pore spaces in the soil, which contains air and water necessary for root growth, to be reduced. Without space available for oxygen and water, tree roots will suffocate and tree decline will follow. With rutting, a form of intense compaction, roots are severed by the tires of equipment. Root destruction can also be caused by changes to the existing grade. Adding soil on top of tree roots can smother them by reducing the amount of oxygen and water they can receive. Only a few centimetres of added soil can have a detrimental impact on tree health.

The structural elements of a tree in an optimal growing environment are shown on Figure 1. This figure illustrates the terms used in this policy.

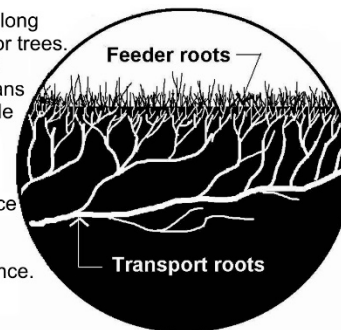


The root system of a tree has three main parts:

Forming the base of the tree are large **anchor roots** from which extend long **transport roots** which together provide the main structural framework for trees. From the transport roots extend a complex network of **feeder roots** that grow outward and upward. These non-woody roots branch out to form fans of thousands of slender roots with fine root hairs. These tiny roots provide the surface where the absorption of air, water and nutrients takes place that sustains the life of the tree.

The root system of a tree grows mainly within the top 60 cm of the surface of good quality, well drained and uncompacted soil.

The root system can extend to more than 2 to 3 times the **dripline** distance.



Urban Forestry

Parks, Forestry and Recreation

November 2015

Detail TP - 3

Figure 1: Urban Forestry Detail TP-3

2. Protecting Trees

There are a number of steps that can be taken to protect trees prior to, during and after any construction project. Hiring an arborist should be the first step. An arborist can advise on current tree maintenance requirements and determine the impact the proposal will have on trees and the surrounding natural environment.

An inventory of trees on subject and adjacent properties that may be impacted by the proposed work should be prepared in accordance with the City tree by-laws so that the project can be designed with tree protection in mind. A tree protection plan prepared by an arborist will identify the location, species, size and condition of all trees within the area of consideration, identify the extent of injury where applicable and outline proposed tree protection measures for the trees identified for protection.

The **area of consideration** for trees protected under the Private Tree By-law (Municipal Code, Chapter 813, Article III) includes the entire area of site disturbance, including construction related traffic and material storage, and extends 6m beyond the limit of site disturbance. For trees protected under Ravine and Natural Feature Protection By-law (Municipal Code, Chapter 658), the area of consideration includes the area of site disturbance and 12m area beyond.

The following chart provides the required distances for determining a **minimum tree protection zone (TPZ)** for trees located on a City street, in parks and on private property subject to Private Tree By-law and for trees located in areas regulated under the Ravine and Natural Feature Protection By-law. The minimum tree protection zones are based on the diameter of the tree. While these guidelines provide minimum protection distances for the anchor and transport roots of a tree, there can still be significant loss of the feeder roots beyond the established tree protection zone. Feeder roots are responsible for water and nutrient absorption and gas exchange. **For this reason, Urban Forestry may require a TPZ larger than the minimum, depending on the tree and the surrounding environment.**

Trunk Diameter (DBH) ¹	Minimum Protection Distances Required ² City-owned and Private Trees	Minimum Protection Distances Required Trees in Areas Protected by the Ravine and Natural Feature Protection By-law
		Whichever of the two is greater:
<10cm	1.2 m	The drip line ⁴ or 1.2 m
10- 29 cm	1.8 m	The drip line or 3.6 m
30 ³ – 40 cm	2.4 m	The drip line or 4.8 m
41 – 50 cm	3.0 m	The drip line or 6.0 m
51 – 60 cm	3.6 m	The drip line or 7.2 m
61 – 70cm	4.2 m	The drip line or 8.4 m
71 – 80cm	4.8 m	The drip line or 9.6 m
81 – 90 cm	5.4 m	The drip line or 10.8 m
91 – 100 cm	6.0 m	The drip line or 12.0 m
>100 cm	6 cm protection for each 1 cm diameter	12cm protection for each 1 cm diameter or the drip line ⁵

Table 1: Minimum Tree Protection Zone (TPZ) Determination

¹Diameter at breast height (DBH) measurement of tree stem taken at 1.4 metres (m) above the ground.

²Minimum Tree Protection Zone distances are to be measured from the outside edge of the tree base.

³Diameter (**30 cm**) at which trees qualify for protection under the Private Tree By-law.

⁴The drip line is defined as the area beneath the outer most branch tips of a tree.

⁵Converted from ISA Arborists' Certification Study Guide, general guideline for tree protection barriers of 1 foot of diameter from the stem for each inch of stem diameter.

The diagram below shows how the TPZ is determined:

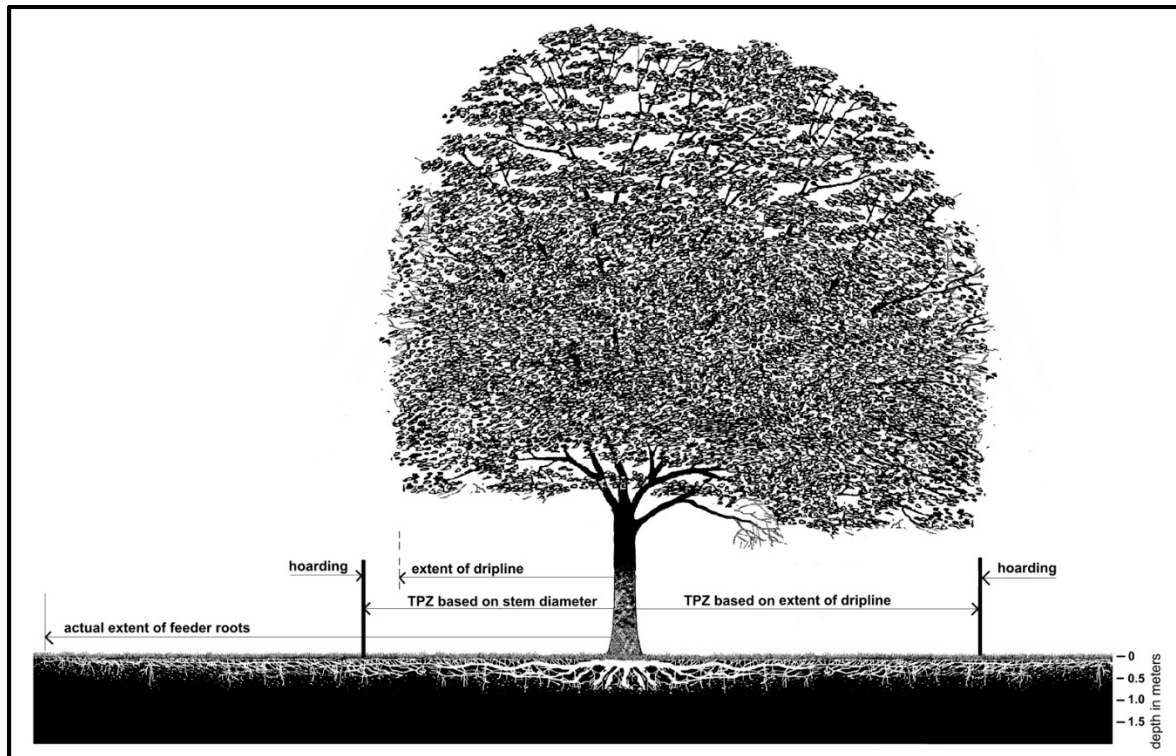


Figure 2: Minimum Tree Protection Zone (TPZ) Determination

In some cases, disturbances in the TPZ may be unavoidable, in which case, the TPZ must be adjusted in consultation with the arborist and Urban Forestry. In these situations, it may be necessary to implement other tree protection measures such as horizontal root protection as noted in section 3 of this document.

In addition to establishing and creating tree protection zones, it may be necessary to implement other protective measures, such as adding mulch to the root zone, aeration of the soil, pruning for deadwood or removing limbs that may be impacted by construction activity. This is also the time to determine the location where new trees can be planted to compliment the construction project and help with the renewal and growth of the urban forest.

Prior to commencing with any excavation, roots approved for pruning by Urban Forestry must first be exposed using pneumatic (air) excavation, by hand digging or by using a low pressure hydraulic (water) excavation. This **exploratory excavation** must be undertaken by an experienced operator under the supervision of a qualified and experienced arborist. The water pressure for hydraulic excavation must be low enough that root bark is not damaged or

removed. This will allow a proper pruning cut and minimize tearing of the roots. The arborist retained to carry out root pruning must contact Urban Forestry no less than three (3) working days prior to conducting any specified work.

Exploratory excavation may also be required for open face cuts outside the minimum tree protection zone (TPZ).

Communication between owners and their designated agents, arborists, contractors and sub-contractors throughout the construction process is critical to ensure that everyone involved is aware of the issues surrounding tree protection, and fully understands the tree protection methodology. Construction damage to trees is often irreversible.

Prohibited Activities Within a TPZ

Except where authorized by Urban Forestry, any activity which could result in injury or destruction of a protected tree or natural feature, or alteration of grade within a Ravine and Natural Feature Protection (RNFP) area, is prohibited within a TPZ, including, but not limited to, any of the following examples:

- demolition, construction, replacement or alteration of permanent or temporary buildings or structures, parking pads, driveways, sidewalks, walkways, paths, trails, dog runs, pools, retaining walls, patios, decks, terraces, sheds or raised gardens
- installation of large stones or boulders
- altering grade by adding or removing soil or fill, excavating, trenching, topsoil or fill scraping, compacting soil or fill, dumping or disturbance of any kind
- storage of construction materials, equipment, wood, branches, leaves, soil or fill, construction waste or debris of any sort
- application, discharge or disposal of any substance or chemical that may adversely affect the health of a tree e.g. concrete sludge, gas, oil, paint, pool water or backwash water from a swimming pool
- causing or allowing water or discharge, to flow over slopes or through natural areas
- access, parking or movement of vehicles, equipment or pedestrians
- cutting, breaking, tearing, crushing, exposing or stripping tree's roots, trunk and branches.
- nailing or stapling into a tree, including attachment of fences, electrical wires or signs
- stringing of cables or installing lights on trees
- soil remediation, removal of contaminated fill
- excavating for directional or micro-tunnelling and boring entering shafts

The above mentioned prohibitions are for area(s) designated as a TPZ. If possible, these prohibitions should also be implemented outside the TPZ in areas where tree roots are located. The roots of a tree can extend from the trunk to approximately 2-3 times the distance of the dripline.

3. Tree and Site Protection Measures

The following are examples of specific tree and site protection measures that may be required by Urban Forestry:

- Plywood tree protection hoarding (minimum 19mm or ¾"), or equivalent barriers, as approved by Urban Forestry, shall be installed in locations as detailed in an Urban Forestry approved Tree Protection Plan. Tree protection barriers must be made of 2.4m (8ft) high plywood hoarding or equivalent as approved by Urban Forestry. Height of hoarding may be less than 2.4m (8ft), to accommodate tree branches that may be lower, or as approved by Urban Forestry. Within a City road allowance where visibility is a consideration, 1.2m (4ft) high orange plastic web snow fencing on a 38 x 89mm (2"x 4") frame should be used. The detail on tree protection barrier construction is shown on Figure 4 in section 7 of this document
- In specific situations where the required full minimum tree protection zone (TPZ) cannot be provided, a **horizontal** (on grade) **root protection**, designed by a qualified professional such as arborist or landscape architect, may be considered, subject to approval by Urban Forestry. Urban Forestry's objective is zero soil compaction within the tree protection zone, therefore best efforts must be made to achieve this objective using materials and best practices available that minimize the vertical loading and spread the loading horizontally.
- Any area designated for stockpiling of excavated soil must be outside of TPZs and be enclosed with sediment control fencing. Sediment control fencing shall be installed in the locations as indicated in an Urban Forestry approved Tree Protection Plan. The sediment control fencing must be installed to Ontario Provincial Standards (OPSD-219.130 – see Section 7, Figure 5) and to the satisfaction of Urban Forestry. When feasible, the sediment control fencing can be attached to the tree protection barrier as shown in Figure 6. Sediment control fencing near trees shall be constructed as per detail shown on Figure 6 of this document

4. Tree Protection Signage

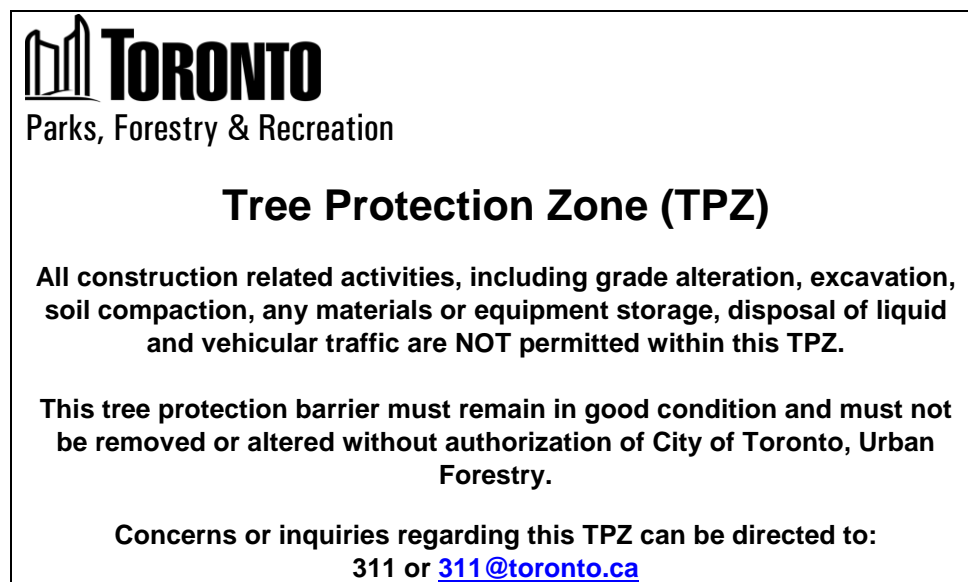


Figure 3: Tree Protection Sign

A sign that is similar to the illustration above may be required to be mounted on all sides of a tree protection barrier for trees protected by the Street Tree By-law and the Private Tree By-law. The sign should be a minimum of 40cm x 60cm and made of white corrugated plastic board or equivalent material. The sign may also be acquired from Urban Forestry Tree Protection and Plan Review (TPPR) district service counters.

5. Tree Protection Plan

All construction related applications must include a Tree Protection Plan that shows details of tree protection, prepared in conjunction with an arborist report or in consultation with an arborist, when protected trees are in proximity to the proposed work. All Tree Protection Plans must be legible, prepared at a usable metric scale and include the following information:

- Show all existing buildings, structures, hard surfaces and all existing trees within the area of consideration (as defined in Section 2 of this document). Depending on the extent of site disturbance, trees on neighbouring properties may need to be included. Note that area of disturbance must include all areas that will be disturbed by the proposed work, including the areas required for over-dig, stockpiling, construction traffic, vehicular access and construction staging
- The extent of the crown (drip line) or the extent of minimum tree protection zone TPZ (whichever is greater) of each existing tree
- Proposed changes on site, including all proposed structures, services, hard surfaces and grade changes
- Indicate vehicular access and construction staging areas. Areas proposed for temporary stockpiling of fill or excavated material shall be fenced with sediment control to prevent sediment runoff
- Indicate location of any excavation that requires root pruning
- Indicate trees proposed to be removed and/or injured
- Highlight and label tree protection barriers and the proposed tree protection zones. (See Table 1 to determine size of tree protection zone. Distances are to be measured from base of tree)
- The extent of proposed tree injury, where applicable.
- Include a comprehensive legend

See Section 6, Tree Protection Plan Notes, and Section 7, Tree Protection Plan Details, for further information.

6. Tree Protection Plan Notes

The following notes are to be included on tree protection plans submitted for construction related applications:

General Notes

- It is the applicants' responsibility to discuss potential impacts to trees located near or wholly on adjacent properties or on shared boundary lines with their neighbours. Should such trees be injured to the point of instability or death the applicant may be held

responsible through civil action. The applicant would also be required to replace such trees to the satisfaction of Urban Forestry

- Tree protection barriers shall be installed to standards as detailed in this document and to the satisfaction of Urban Forestry
- Tree protection barriers must be installed using plywood clad hoarding (minimum 19mm or ¾" thick) or an equivalent approved by Urban Forestry
- Where required, signs as specified in Section 4, Tree Protection Signage must be attached to all sides of the barrier
- Prior to the commencement of any site activity such as site alteration, demolition or construction, the tree protection measures specified on this plan must be installed to the satisfaction of Urban Forestry
- Once all tree/site protection measures have been installed, Urban Forestry staff must be contacted to arrange for an inspection of the site and approval of the tree/site protection requirements. Photographs that clearly show the installed tree/site protection shall be provided for Urban Forestry review
- Where changes to the location of the approved TPZ or sediment control or where temporary access to the TPZ is proposed, Urban Forestry must be contacted to obtain approval prior to alteration
- Tree protection barriers must remain in place and in good condition during demolition, construction and/or site disturbance, including landscaping, and must not be altered, moved or removed until authorized by Urban Forestry
- No construction activities including grade changes, surface treatments or excavation of any kind are permitted within the area identified on the Tree Protection Plan or Site Plan as a minimum tree protection zone (TPZ). No root cutting is permitted. No storage of materials or fill is permitted within the TPZ. No movement or storage of vehicles or equipment is permitted within the TPZ. The area(s) identified as a TPZ must be protected and remain undisturbed at all times
- All additional tree protection or preservation requirements, above and beyond the installation of tree protection barriers, must be undertaken or implemented as detailed in the Urban Forestry approved arborist report and/or the approved tree protection plan and to the satisfaction of Urban Forestry
- If the minimum tree protection zone (TPZ) must be reduced to facilitate construction access, the tree protection barriers must be maintained at a lesser distance and the exposed portion of TPZ must be protected using a horizontal root protection method approved by Urban Forestry
- Any roots or branches indicated on this plan which require pruning, as approved by Urban Forestry, must be pruned by an arborist. All pruning of tree roots and branches must be in accordance with good arboricultural practice. Roots that have received approval from Urban Forestry to be pruned must first be exposed using pneumatic (air) excavation, by hand digging or by a using low pressure hydraulic (water) excavation. The water pressure for hydraulic excavation must be low enough that root bark is not damaged or removed. This will allow a proper pruning cut and minimize tearing of the roots. The arborist retained to carry out crown or root pruning must contact Urban Forestry no less than three working days prior to conducting any specified work
- The applicant/owner shall protect all by-law regulated trees in the area of consideration that have not been approved for removal throughout development works to the satisfaction of Urban Forestry

- Convictions of offences respecting the regulations in the Street Tree By-law and Private Tree By-law are subject to fines. A person convicted of an offence under these by-laws is liable to a minimum fine of \$500 and a maximum fine of \$100,000 per tree, and /or a Special Fine of \$100,000. The landowner may be ordered by the City to stop the contravening activity or ordered to undertake work to correct the contravention
- Prior to site disturbance the owner must confirm that no migratory birds are making use of the site for nesting. The owner must ensure that the works are in conformance with the Migratory Bird Convention Act and that no migratory bird nests will be impacted by the proposed work

The following additional notes shall be added on plans for properties regulated by the Ravine and Natural Feature Protection Bylaw:

- Ravine and Natural Feature Protection By-law (RNFP) note:

Ravine & Natural Feature Protection By-law

The Ravine & Natural Feature Protection By-law, Chapter 658 of the City of Toronto Municipal Code, regulates the injury and destruction of trees, dumping of refuse and changes to grade within protected areas.

Under this by-law protected trees may not be removed, injured or destroyed, and protected grades may not be altered, without written authorisation from Urban Forestry Ravine & Natural Feature Protection, on behalf of the General Manager of Parks, Forestry & Recreation.

Convictions of offences respecting the regulations in the Ravine and Natural Feature Protection By-law are subject to fines, and the landowner may be ordered by the court to restore the area to the satisfaction of the City. A person convicted of an offence under this Bylaw is liable to a minimum fine of \$500 and a maximum fine of \$100,000 for each tree destroyed, a maximum fine of \$100,000 for any other offence committed under this chapter, and /or a Special Fine of \$100,000. A person convicted of a continuing offence, including failure to comply with ravine permit conditions is liable to a maximum fine of not more than \$10,000 for each day or a part of a day that the offence continues.

- The exact location of the limit of the RNFP area must be shown on all pertinent plans including Tree Protection Plan. The applicant/owner shall have this limit marked on their survey or other plans drawn to a suitable scale. This service costs \$72.37 plus tax and can be requested by contacting the City of Toronto, Information and Technology, Geospatial Competency Centre, Map Service Counter at 416-392-2506 or mapsales@toronto.ca. This line may then be transferred onto other plans to be submitted.
- Sediment control fencing shall be installed in the locations as indicated in the Urban Forestry approved sediment control plan. The sediment control fencing must be installed to Ontario Provincial Standards (OPSD-219.130, see Section 7, Figure 5) and to the satisfaction of Urban Forestry. Sediment control near trees and over root zones shall be installed as shown on Figure 6 of this document and to the satisfaction of Urban Forestry.

7. Tree Protection Plan Details

The following diagrams provide details for tree protection barriers and sediment protection barriers:

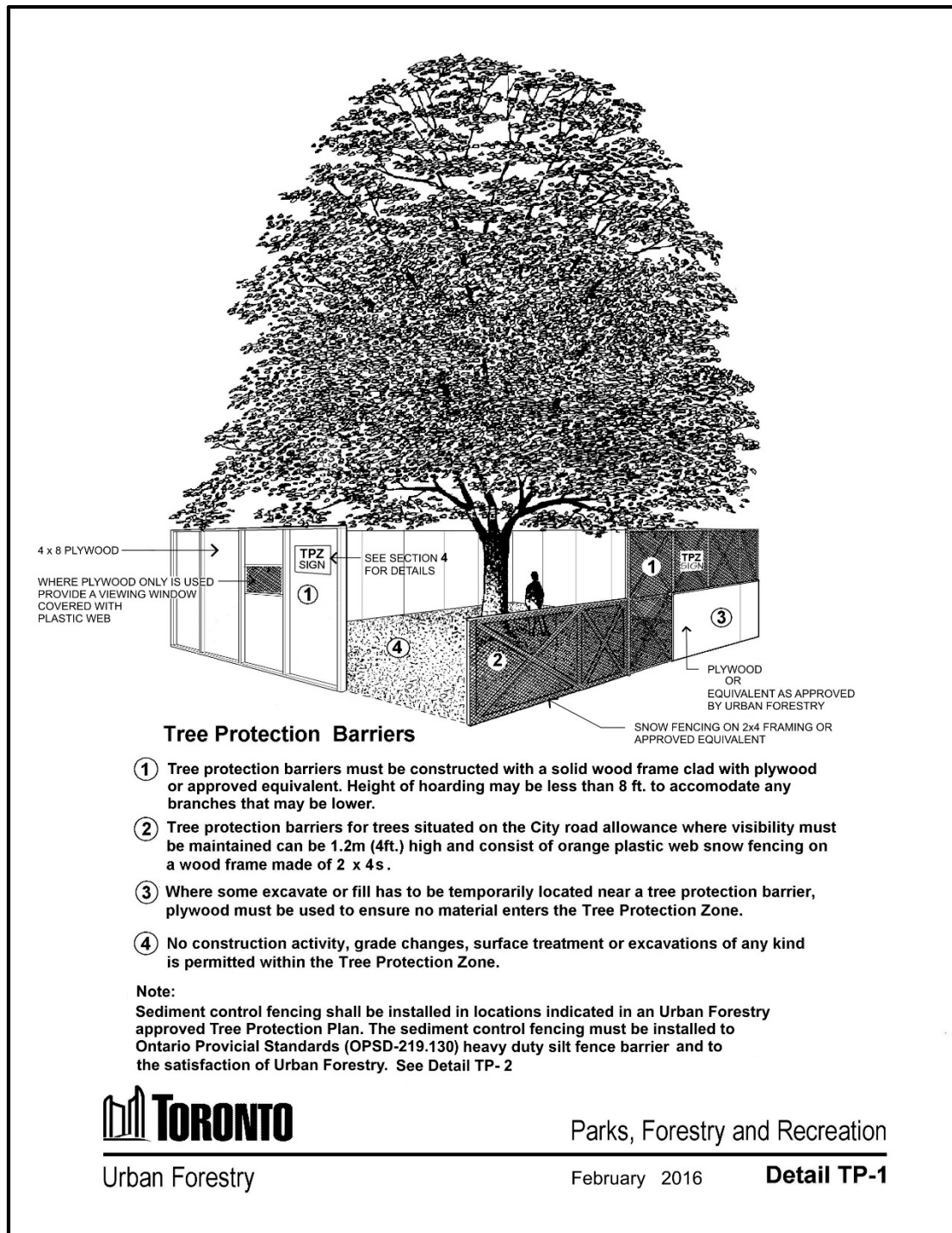


Figure 4: Urban Forestry Detail TP-1

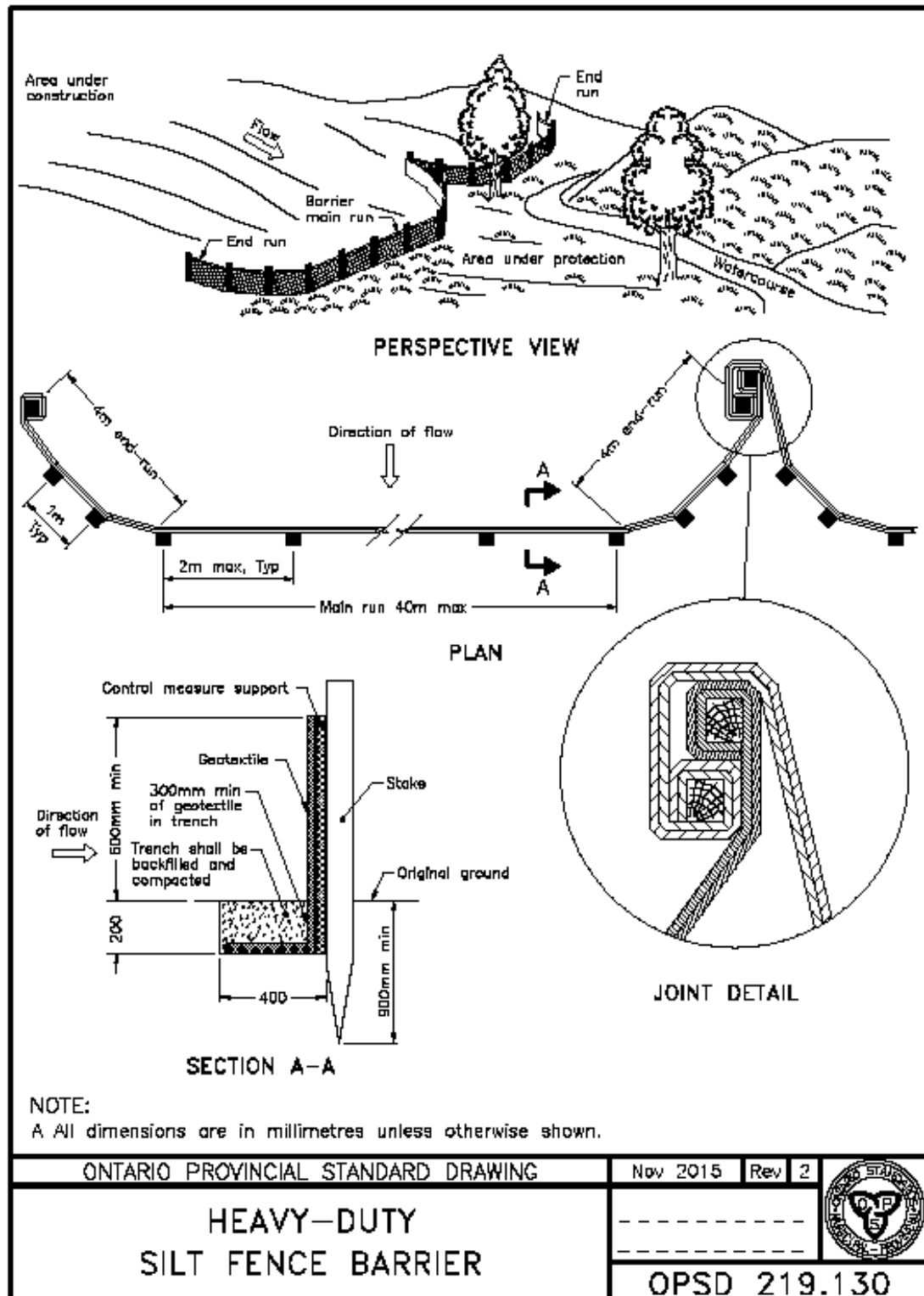


Figure 5: OPSD Detail for Heavy Duty Silt Fence Barrier

The following detail shall be used when constructing sediment protection fencing near trees.

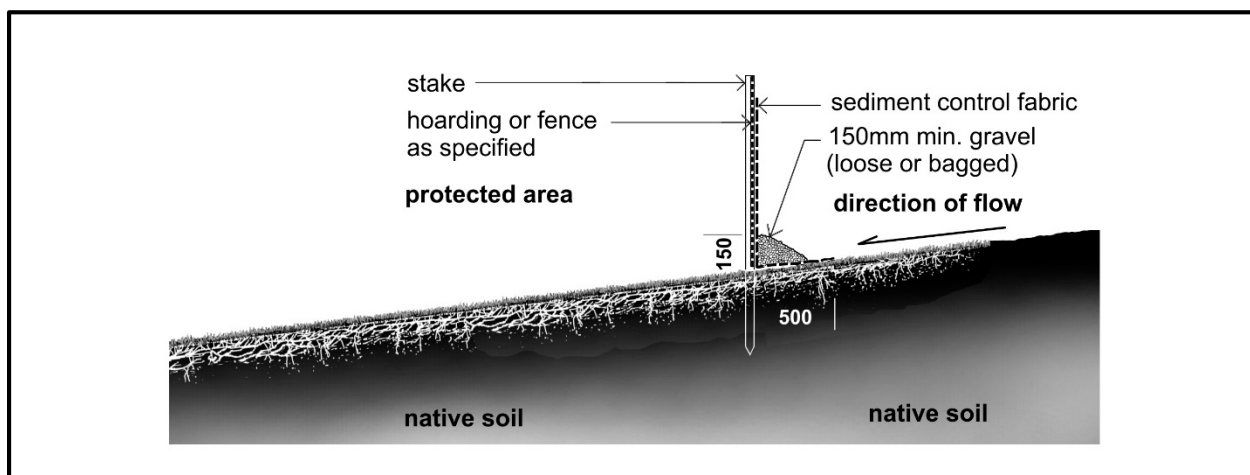


Figure 6: Sediment control barriers for use over tree root zone

8. Permits for Tree Removal or Injury

If the full minimum tree protection zone (TPZ) as identified in Section 2 cannot be provided, a permit to injure the tree must be obtained.

Any requests for removal or injury of a tree protected by City by-laws must be made on the appropriate application forms and submitted to Urban Forestry at the appropriate address. [Permit application forms](#) are available at www.toronto.ca/trees. Any requests for tree relocation will be considered as a tree injury.

If approval is granted for removal of a City-owned tree, applicants will assume all costs involved, which include appraised tree value, removal, and tree replacement costs. If approval is granted for removal of private trees or trees in ravine and natural feature protected areas, the permit will be subject to conditions, including tree replacement. If approval is granted for injury of City-owned, private trees or trees in ravine and natural feature protected areas, the permit will be subject to conditions, including implementation of a Tree Protection Plan, as determined by Urban Forestry.

In some instances, where the tree is healthy and the management of the tree or forest cover has not been addressed to the satisfaction of Urban Forestry, requests received by Urban Forestry may be forwarded to a Community Council and City Council for approval.

Urban Forestry does not have the authority to issue a permit to injure or remove a heritage tree². Such requests would be forwarded to a Community Council and/or City Council for approval.

Butternut (*Juglans cinerea*, L.) is an endangered species. Butternuts and their habitat are protected under [Endangered Species Act](#) (S.O. 2007, c.6) available on the Government of Ontario website at <http://www.ontario.ca/laws/statute/07e06/v1>. A permit to injure or remove a butternut tree must be obtained from the [Ministry of Natural Resources and Forestry Ontario](#).

² Heritage Tree – A tree that has been designated under Part IV of the Ontario Heritage Act or trees recognized as heritage trees by the Ontario Heritage Tree Program of Trees Ontario.

Any person who contravenes any provision of the City's tree protection by-law is guilty of an offence.

More information on tree protection and permit application forms for tree removal and injury are available on Urban Forestry web page at www.toronto.ca/trees.

For additional information regarding the removal or injury of trees protected under City by-laws, please call 311.

9. Tree Guarantee Deposits

Tree Protection Guarantee

Urban Forestry may request a **tree protection guarantee** to secure the protection of trees that may be impacted by work on city streets, or to secure the satisfaction of all conditions of permit issuance. Tree protection guarantees held by the City shall only be released by the City provided that all construction activities are complete, compliance with all permit terms and conditions has been verified, there has been no encroachment into the minimum tree protection zone (TPZ) and the trees are healthy and in a state of vigorous growth.

Where Urban Forestry has confirmed an unauthorized encroachment into the TPZ or the terms and conditions of a permit have not been complied with, Urban Forestry will retain the guarantee until satisfactory compliance.

It is the applicant's responsibility to submit a written request to Urban Forestry for the refund of the tree protection guarantee deposit as soon as construction and landscaping is completed.

Tree Planting Security

Urban Forestry may request a **tree planting security deposit** in an amount equal to the cost of planting and maintenance for two (2) years in order to ensure compliance with approved landscape or replanting plans. The security deposit may be held by the City after the planting of the trees for a period of two (2) years and shall be released by the City provided that the trees have been maintained, are healthy and in a state of vigorous growth upon inspection, two (2) years after planting. It is the applicant's responsibility to advise Urban Forestry that trees have been planted in accordance with approved plans, in order that the two (2) year maintenance period begin.

Prior to release by the City, any dead/dying trees must be replaced, deadwood and sucker growth should be pruned, and mulch should be topped up where necessary. If stakes and ties were used, they must be removed within one (1) year. Any encroachments are to be removed prior to assumption, including walkways, timbers or bricks that result in increased height of soil or mulch around the trees, and lights in trees.

It is the applicant's responsibility to submit a written request to Urban Forestry for the refund of a Tree Guarantee Deposit, two (2) years after the completion of all construction activity and/or two (2) years after tree planting. This request should be made during the growing season, not while

the trees are dormant, so that a site inspection can be arranged to confirm the trees are acceptable. The City will not release security deposits where trees are not in good condition, or if there are encroachments.

Financial securities must be in the form of a certified cheque, letter of credit or an alternative acceptable to Urban Forestry, with amounts payable to the Treasurer, City of Toronto.

10. Emergency Repairs to Utilities

The utility company is responsible for notifying Urban Forestry by calling 311 as soon as possible when by-law regulated trees are involved, so that an inspector can be dispatched. Urban Forestry staff may be contacted after hours by calling 311, and requesting the assistance of an on-call Urban Forestry inspector.

11. Tree Species that are Intolerant of Construction Disturbance

The following tree species are intolerant of construction disturbance, and tree protection plans must take this into account. The tree protection zones required by these species may need to be quite extensive to avoid damage to the roots and crown associated with compaction, excavation or construction above grade that will impact the branches.

Acer rubrum (red maple)
Acer saccharum (sugar maple)
Betula papyrifera (paper birch)
Carya glabra (pignut hickory)
Fagus grandifolia (American beech)
Liriodendron tulipifera (tulip tree)
Ostrya virginiana (ironwood)
Pinus resinosa (red pine)
Pinus strobus (white pine)
Prunus serotina (black cherry)
Quercus alba (white oak)
Quercus velutina (black oak)
Tsuga canadensis (eastern hemlock)
Tilia americana (basswood)

12. Contact Information

Tree Protection and Plan Review (City-owned and Private Trees)

North York District

5100 Yonge Street, 3rd Floor
Toronto, ON, M2N 5V7
Telephone: 416-395-6670
Fax: 416-395-7886
tpprnorth@toronto.ca

Etobicoke York District

399 The West Mall, Main Floor, North Block
Toronto, ON, M9C 2Y2
Telephone: 416-338-6596
Fax: 416-394-8935
tpprwest@toronto.ca

Scarborough District

150 Borough Drive, 5th Floor
Toronto, ON, M1P 4N7
Telephone: 416-338-5566
Fax: 416-396-4170
tppreast@toronto.ca

Toronto and East York District

50 Booth Avenue, 2nd Floor
Toronto, ON, M4M 2M2
Telephone: 416-392-7391
Fax: 416-392-7277
tpprsouth@toronto.ca

Ravine and Natural Feature Protection

General Enquiries

Telephone: 416-392-2513
Fax: 416-392-1915
Email: rnfp@toronto.ca

Office Location

18 Dyas Road, 1st Floor
Toronto, ON, M3B 1V5

Areas regulated under Ravine and Natural Feature Protection By-law can be viewed using the [City's mapping tool](#) available at www.toronto.ca/trees.

**REPORT
GEOTECHNICAL INVESTIGATION FOR
MACPHERSON AVENUE PARK, TORONTO, ONTARIO**

**PREPARED FOR:
THE CORPORATION OF CITY OF TORONTO
C/O DTAH**

**PREPARED BY:
SIRATI & PARTNERS CONSULTANTS LIMITED**



Project: SP22-01054-00-B
October 31, 2022

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Markham, Ontario L3R 9T9
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APPENDIX B: LIMITATIONS OF REPORT

1. INTRODUCTION

Sirati & Partners Consultants Limited (SIRATI) was retained by The Corporation of City of Toronto (the “Client”) to undertake a geotechnical investigation for the proposed improvement works on Macpherson Avenue Park, located at the intersection of Davenport Rd and Macpherson Ave, Toronto, Ontario, as shown in **Figure 1**.

It is understood that the proposed improvement works include pavement for vehicular-load asphalt and concrete unit pavers as well as pedestrian-load concrete sidewalks and concrete pads supporting site furnishings.

The following document was provided to SIRATI:

Ref. 1: Topographic and Baseplan Sketch of Macpherson Avenue #239, 399, 365, 345, 325, 315, Prepared by Tham Surveying Limited – Ontario Land Surveyors, Prepared for City of Toronto, Job No. 19-045, CAD No. 19-45-02-TP-SH2, dated Feb 18th, 2020.

The purpose of this geotechnical investigation was to obtain information about the subsurface conditions at borehole locations and from the findings in the boreholes to provide recommendations pertaining to the proposed improvements.

This report is provided based on the terms of reference presented above and, on the assumption, that the design will be in accordance with the applicable codes and standards. If there are any changes in the design features relevant to the geotechnical analyses, or if any questions arise concerning the geotechnical aspects of the codes and standards, this office should be contacted to review the design. It may then be necessary to carry out additional borings and reporting before the recommendations of this office can be relied upon.

The recommendations follow generally accepted practice for geotechnical consultants in Ontario. The format and contents are guided by client specific needs and economics and do not conform to generalized standards for services. Laboratory testing for most part follows ASTM or CSA Standards or modifications of these standards that have become standard practice.

This report has been prepared for the Client and its architects and designers. Third party use of this report without Sirati & Partners Consultants Limited (SIRATI) consent is prohibited. The limitation conditions presented in **Appendix B** form an integral part of the report and they must be considered in conjunction with this report.

2. FIELD AND LABORATORY WORK

A total of five (5) boreholes (BH-08 through BH-12, see Drawing 1 for location plan) were drilled on July 22, 2022, to depths ranging from 1.9 m and 3.1 m below the existing ground surface (bgs). The borehole locations were selected by the client.

The drilling of all boreholes was conducted by a drilling sub-contractor under the direction and supervision of SIRATI's senior supervisor.

The field work was carried out in accordance with the ASTM D 1586-11 test method – “*The Standard Method of Standard Penetration Testing (SPT)*”. Samples were retrieved continuously with a 50 mm O.D. split-barrel sampler driven with a hammer weighing 624 N/317N and dropping 760 mm in accordance with the Standard Penetration Test (SPT) method. The samples were logged in the field and returned to laboratory for detailed examination by the project engineer and for laboratory testing.

In addition to the visual examination in the laboratory, all soil samples were tested for moisture content. The results of natural moisture contents are presented in respective borehole logs. In addition, four (4) representable soil samples were subjected to grain size analysis and hydrometer analysis. The results of laboratory tests are presented borehole logs and **Figures 7 and 8**.

Water level observations were made during drilling in the open boreholes upon completion of the drilling operation.

The elevations at the borehole locations were surveyed by SIRATI personnel using differential GPS system.

3. SITE AND SUBSURFACE CONDITIONS

The borehole location plan is shown on Drawing 1. Notes on soil descriptions are presented in Drawing 1A. The subsurface conditions in the boreholes are presented in the individual borehole logs (Encl. 2 to 6 inclusive). The subsurface conditions in the boreholes are summarized in the following paragraphs.

3.1 SOIL CONDITIONS

Topsoil: A surficial layer of topsoil was encountered at boreholes BH-10 to BH-12 with a thickness of approximately 50 mm. The thickness of the topsoil in each borehole is shown in the respective borehole log.

It should be noted that the thickness of the topsoil explored at the borehole locations may not be representative for the entire site and should not be relied on to calculate the amount of topsoil needed to be stripped off the site.

Granular Fill: A layer of granular fill composed of sand and gravel was encountered at the location of borehole BH-09 with a thickness of approximately 305 mm.

Fill Material: A layer of fill material was observed at ground surface or underlying the topsoil/ granular fill in all boreholes. The fill material generally consists of silty sand, trace to some gravel. This layer was found to be generally moist and brown/ dark brown in colour, extending to the depths ranging between 0.8 m and 3.1 m (termination depth of BH-08) below existing ground surface (mbgs).

It should be noted that organics and residual materials were observed in the fill layer.

The measured SPT 'N' values in the fill material ranged from 4 to 32 blows for 300 mm sampler penetration, indicating loose to dense condition.

Grain size and hydrometer analyses of one (1) representative sample (BH-08/SS 1) was conducted in the fill layer, and the results are presented in **Figure 7**, with the following fractions:

Clay: 4%
Silt: 35%
Sand: 45%
Gravel: 16%

Cohesionless Soil Deposit: Cohesionless soil deposit, comprising of brown silty sand to sand and silt, was encountered at borehole locations BH-09 to BH12, underlying the fill material. The cohesionless soil deposit extended to the termination depths of boreholes BH-09 to BH12. The above noted borehole locations here terminated between 1.9 to 2.1 mbgs at refusal.

The SPT "N" values in the cohesionless soil deposit were found to be range between 9 and over 50 blows for 300 mm sampler penetration, indicating loose to very dense condition.

Grain size and hydrometer analyses of three (3) representative samples (BH-10/SS 3, BH-11/SS 3, and BH-12/SS 2) were conducted in the cohesionless soil deposit, and the results are presented in **Figures 7 and 8**, with the following fractions:

Clay: 3% to 4%
Silt: 21% to 46%
Sand: 49% to 76%
Gravel: 0% to 2%

3.2 GROUNDWATER CONDITIONS

Groundwater level measurements were conducted within the open boreholes upon completion of drilling. All borehole locations were found to be dry (and open) upon completion.

It should be noted that the groundwater levels can vary and are subject to seasonal fluctuations in response to major weather events.

4. DISCUSSION AND RECOMMENDATIONS

It is understood that the proposed improvements include pavement design for vehicular-load asphalt and concrete unit pavers as well as pedestrian-load concrete sidewalks and concrete pads supporting site furnishings.

The following recommendation should be considered preliminary and will need to be re-assessed by SIRATI once the detailed design of the improvements become available.

4.1 SITE GRADING AND ENGINEERED FILL

Engineered Fill may be required for site grading purposes.

Prior to the construction of engineered fill, all topsoil, unsuitable fill material, weak weathered / disturbed and any other unsuitable materials must be removed in this area. Following the removal of all unsuitable materials, the excavation base consisting of suitable existing fill material and native soil deposits must be inspected and approved by a qualified geotechnical engineer prior to placement of engineered fill. The base of the excavation should be compacted, and proof rolled with heavy compactors (minimum 10,000 kg). During proof rolling, spongy, wet or soft/loose spots should be sub-excavated to stable subgrade and replaced with approved soil, compatible with subgrade conditions, as directed by the geotechnical engineer. It should be noted that TTC may impose limitation on the type of compactor to be used at the site.

The material for engineered fill should consist of approved inorganic soil, compacted to 100 percent of Standard Proctor Maximum Dry Density (SPMDD). Recommendations regarding engineered fill placement are provided in **Appendix A** of this report.

To reduce the risk of improperly placed engineered compacted fill, full-time supervision of the contractor is essential by SIRATI to certify the engineered fill. Please note that SIRATI can only provide certification for material properly placed and compacted under direct supervision. Detailed Engineered fill and inspection requirements to be discussed at the pre-construction meeting with the contractor.

Depending upon the amount of grade raise, there will be consolidation settlement of the underlying soils. Additionally, there will be settlement of the engineered fill under its own weight, approximately 0.5% of the fill height. A waiting period of 3 to 6 months may be required prior to the construction of any structures on engineered fill (such as retaining walls). This should be confirmed during the detail design stage, once the grading plans for the proposed development are available.

4.2 PAVEMENT

The investigation has shown that the predominant subgrade soil at the site, after stripping the topsoil, fill material and any other organic and otherwise unsuitable material is capable to support the pavement structure.

Based on the above and assuming that traffic usage will be residential minor local or local, the following minimum pavement thickness is recommended for pavement:

40 mm SP12.5B
60 mm SP19.0B
150 mm Granular 'A'
150 mm Granular 'B'

These values may need to be adjusted according to the municipality Standards. The pavement structure recommended above assumes that the subgrade has sufficient bearing capacity to accommodate the applied pavement structure and local traffic. The site subgrade and weather conditions (i.e. if wet) at the time of construction may necessitate the placement of thicker granular sub-base layer in order to facilitate the construction. Furthermore, heavy construction equipment may have to be kept off the newly prepared road subgrade before the placement of asphalt and/or immediately thereafter, to avoid damaging the subgrade by heavy truck traffic.

Concrete Unit Pavers: Considering that traffic usage will be low volume passenger cars and occasional garbage removal trucks, the following minimum Granular material thickness is recommended for concrete unit pavers:

Pedestrian Concrete Unit Pavers

70 mm – Concrete Unit Pavers
40 mm - Granular Bedding Material
150 mm – Granular Base
300 mm – Granular Sub-Base

Standard Vehicular Concrete Unit Pavers

80 mm - Concrete Unit Pavers
40 mm - Granular Bedding Material
150 mm – Granular Base (20 mm Crusher Run Limestone)
350 mm – Granular Sub-Base Type 2

Note: Instal a layer of heavy duty triaxial geogrid over the geotextile on prepared subgrade.

Heavy Duty Pavement

100 mm - Concrete Unit Pavers
40 mm - Granular Bedding Material
150 mm – Granular Base (20 mm Crusher Run Limestone)
450 mm – Granular Sub-Base Type 2

Note: Instal two (2) layers of heavy Duty triaxial geogrid, first layer over the geotextile on prepared subgrade and second layer sandwiched in Granular Sub-base layer.

Concrete Unit Pavers: Permeable pavers should confirm to manufacturer specifications. ASTM No. 8 crushed aggregate is recommended for fill material in paver openings. Pavers shall meet the minimum material and physical properties set forth in CAN 3-A231.2.

Bedding: The granular bedding material shall be graded in accordance with the requirements of ASTM C 33 No. 8. The material should be 5 mm diameter stone or as determined by the Design Engineer.

Granular Base: The Granular base material shall be Granular A or 20 mm Crusher Run Limestone (CRL) for the Pedestrian pavement and 20 mm Crusher Run Limestone for Vehicular and Heavy-duty pavement.

Granular Sub-Base: The granular sub-base material shall consist of Granular B Type 1 or Type 2 for the Pedestrian pavement and Granular B Type 2 (50 mm CRL) for Vehicular and Heavy duty pavement.

Geotextile: A layer of monofilament or non-woven needle punched fabric should be used at prepared subgrade prior to placing any granular material. The material specification should confirm to Ontario Provincial Standard Specifications (OPSS) 1860 for Class II geotextile fabrics.

Underdrain Pipes: These should be installed in trench along the lowest point of the pavement subgrade. The pipes should surround with open graded aggregates. The pipes should be perforated and wrapped with filter fabric. The up-gradient end of underdrains in the reservoir layer should be capped. The pipes should be HDPE or equivalent material. The pipe spacing and size should be selected to ensure that the pavement does not flood and become completely saturated during storm events as this can lead to instability and damage under vehicular traffic. The outlet of underdrainage pipes should be addressed in storm water management plan with a positive discharge.

Aggregate material used in the construction of permeable pavements shall be clean, free from any oil and grease.

The above values may need to be adjusted according to the City of Toronto Standards. The pavement structure recommended above assumes that the subgrade has sufficient bearing capacity to accommodate the applied pavement structure and local traffic. The site subgrade and weather conditions (i.e. if wet) at the time of construction may necessitate the placement of thicker granular sub-base layer in order to facilitate the construction. Furthermore, heavy construction equipment may have to be kept off the newly constructed subgrade thereafter, to avoid damaging the weak subgrade by heavy truck traffic

4.3 SIDEWALK DESIGN

The investigation shows that the predominant subgrade soil at the site, after stripping the topsoil, any other organic, loose, wet and otherwise unsuitable material, is capable to support the sidewalk structure. Due to the potential requirements for 'cut' and 'fill' construction to raise the site grade, the placement of additional Granular 'A' material is warranted.

Based on the above, the following minimum sidewalk design is recommended:

150 mm Concrete
150 mm Granular 'A' leveling base (compacted to 100% SPMDD)

The above values may need to be adjusted according to the City of Toronto Engineering Standards. The sidewalk structure recommended above assumes that the subgrade has sufficient bearing capacity to accommodate the applied pavement structure and local pathway traffic use. The site subgrade and weather conditions (i.e. if wet) at the time of construction may necessitate the placement of a thicker granular sub-base layer in order to facilitate the construction. Furthermore, heavy construction equipment may have to be kept off the newly constructed sidewalk area (including boulevard area) before the placement of concrete and/or immediately thereafter, to avoid damaging the weak subgrade by heavy truck traffic.

4.4 CONCRETE PADS AND PAVEMENT SUBGRADE

4.4.1 Stripping, Sub-excavation and Grading

The site should be stripped of all topsoil, weathered/disturbed soils and any organic or otherwise unsuitable soils, both in cut and fill areas. The bottom of the excavations or subgrade should be clear of any disturbed soils, organic soil, residual materials (plastics, cardboards, etc.), and loose or soft soils prior to the installation of the concrete slab and pavement structure.

Following stripping, the site should be graded to the subgrade level and approved. The subgrade should then be proof-rolled, in the presence of the Geotechnical Engineer, by at least several passes of a heavy compactor having a rated capacity of at least 10 tons. Any soft spots thus exposed should be removed and replaced by select fill material, similar to the existing subgrade soil and approved by the Geotechnical Engineer. The subgrade should then be recompacted from the surface to at least 98% of its Standard Proctor Maximum Dry Density (SPMDD). The final subgrade should be cambered or otherwise shaped properly to facilitate rapid drainage and to prevent the formation of local depressions in which water could accumulate.

Proper cambering and allowing the water to escape towards the sides (where it can be removed by means of subdrains) is considered to be beneficial. Otherwise, any water collected in the granular sub-base materials could be trapped thus causing problems due to softened subgrade, differential frost heave, etc. For the same reason damaging the subgrade during and after placement of the granular materials by heavy construction traffic should be avoided. If the moisture content of the local material cannot be maintained at $\pm 2\%$ of the optimum moisture content, imported granular material must be used.

Any fill required for re-grading the site or backfill should be select, clean material, free of topsoil, organic or other foreign and unsuitable matter. The fill should be placed in thin layers and compacted to at least 95% of its SPMDD. The degree of compaction should be increased to 98% within the top 1.0 m of the subgrade, as per City Standards. The compaction of the new fill should be checked by frequent field density tests.

4.4.3 Construction

Once the subgrade has been inspected and approved, the granular base and sub-base course materials should be placed in layers not exceeding 200 mm (uncompacted thickness) and should be compacted to at least 100% of their respective SPMDD. The grading of the material should conform to current OPS Specifications.

The placing, spreading and rolling of the asphalt should be in accordance with OPS Specifications or, as required by the local authorities.

Frequent field density tests should be carried out on both the asphalt and granular base and sub-base materials to ensure that the required degree of compaction is achieved.

4.4.4 Trenching

Trenches may be required to be dug through the fill material and/ or native deposits, as part of the project. Groundwater level measurements were conducted within the open boreholes upon completion of drilling. All borehole locations were found to be dry upon completion. However, groundwater levels can vary and are subject to seasonal fluctuations in response to major weather events.

It is recommended that test pits be undertaken by prospective contractors in order to observe and evaluate soil support and groundwater conditions to assess preferred means of excavation and groundwater control.

In the planning of the trenches' shoring and excavation, the presence of adjacent existing buried service pipes should be considered. In addition to the stability of these existing adjacent pipes, which must be maintained without detrimental settlements, the backfill in these trenches and especially the granular bedding surrounding the existing service pipes, manholes, etc. may be a source of entrapped water, which, if encountered, must be dealt with. All excavations must be carried out in accordance with the most recent Occupational Health and Safety Act (OHSA). In accordance with OHSA, the fill material and native soil can be classified as Type 3 Soil above the groundwater table and Type 4 Soil below the groundwater table. Any excavations in close proximity to the existing structures or utilities shall be reviewed by this office before construction.

4.4.5 Drainage

The City of Toronto requires the installation of full-length subdrains on all roads. The subdrains should be properly filtered to prevent the loss of (and clogging by) soil fines.

All paved surfaces should be sloped to provide satisfactory drainage towards catch basins. As discussed in Section 4.1.1, by means of good planning any water trapped in the granular sub-base materials should be drained rapidly towards subdrains or other interceptors.

5. GENERAL COMMENTS ON REPORT

Sirati & Partners Consultants Limited (SIRATI) should be retained for a general review of the final design and specifications to verify that this report has been properly interpreted and implemented. If not accorded the privilege of making this review, SIRATI will assume no responsibility for interpretation of the recommendations in the report.

The comments given in this report are intended only for the guidance of design engineers. The number of boreholes required to determine the localized underground conditions between boreholes affecting construction costs, techniques, sequencing, equipment, scheduling, etc., would be much greater than has been carried out for design purposes. Contractors bidding on or undertaking the works should, in this light, decide on their own investigations, as well as their own interpretations of the factual borehole results, so that they may draw their own conclusions as to how the subsurface conditions may affect them.

The limitation conditions presented in **Appendix B** form an integral part of the report and they must be considered in conjunction with this report.

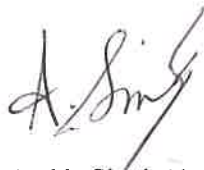
We trust that the information contained in this report is satisfactory. Should you have any questions, please do not hesitate to contact this office.

Yours truly,

SIRATI & PARTNERS CONSULTANTS LIMITED



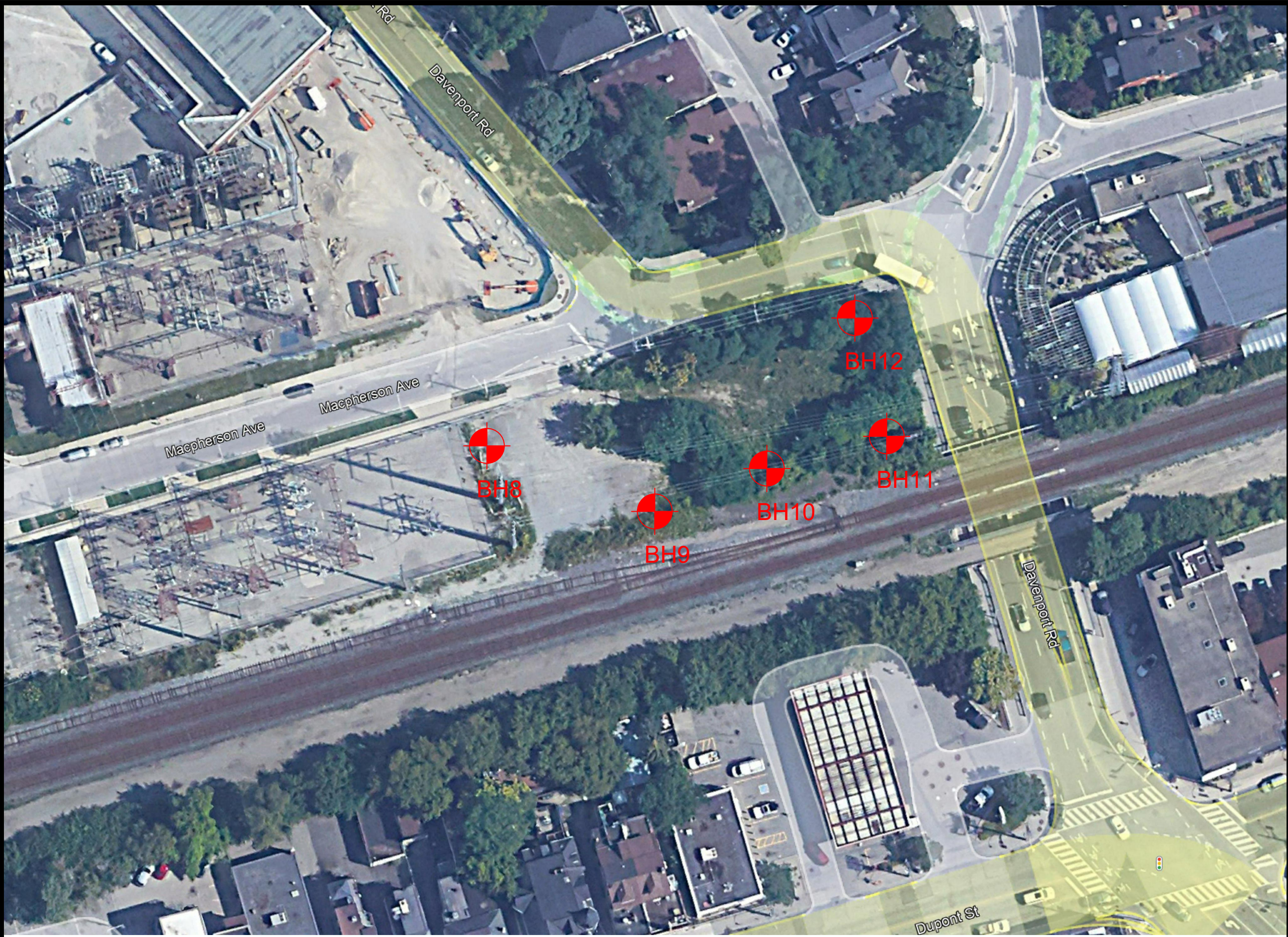
Hamid Sarabadani, M.A.Sc., P. Eng.
Geotechnical Engineer



Archie Sirati, Ph.D., P. Eng.
Principal Geotechnical Engineer



Drawings



Source: Google Map



SIRATI & PARTNERS

12700- Keele Street
King City, ON. L7B 1H5
Phone# 905 833 1582, Fax#905 833 5360

North:



Legend:



Borehole Location

Project Title:

Geotechnical Investigations

Site Location:

Geary and Macpherson Avenue, Ontario

Figure Title:

Borehole Location Plan
(Macpherson Avenue)

Scale:

As Shown

Project Number:

SP22-01054

Date:

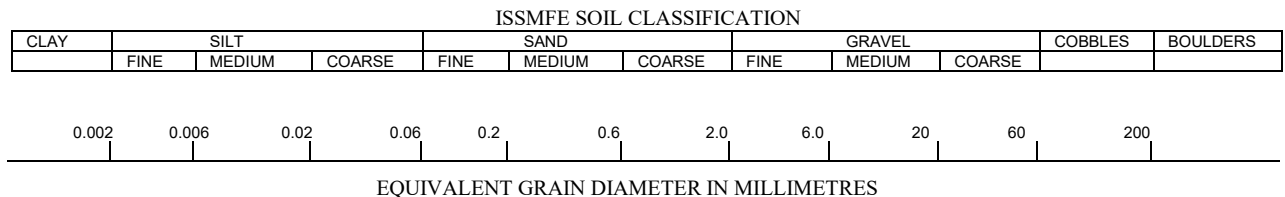
Aug, 2022

Figure Number:

2

Drawing 1A: Notes on Sample Descriptions

- All sample descriptions included in this report follow the Canadian Foundations Engineering Manual soil classification system. This system follows the standard proposed by the International Society for Soil Mechanics and Foundation Engineering. Laboratory grain size analyses provided by Sirati & Partners Consultants Limited also follow the same system. Different classification systems may be used by others; one such system is the Unified Soil Classification. Please note that, with the exception of those samples where a grain size analysis has been made, all samples are classified visually. Visual classification is not sufficiently accurate to provide exact grain sizing or precise differentiation between size classification systems.



CLAY (PLASTIC) TO SILT (NONPLASTIC)	FINE	MEDIUM	CRS.	FINE	COARSE
	SAND			GRAVEL	

UNIFIED SOIL CLASSIFICATION

- Fill: Where fill is designated on the borehole log it is defined as indicated by the sample recovered during the boring process. The reader is cautioned that fills are heterogeneous in nature and variable in density or degree of compaction. The borehole description may therefore not be applicable as a general description of site fill materials. All fills should be expected to contain obstruction such as wood, large concrete pieces or subsurface basements, floors, tanks, etc., none of these may have been encountered in the boreholes. Since boreholes cannot accurately define the contents of the fill, test pits are recommended to provide supplementary information. Despite the use of test pits, the heterogeneous nature of fill will leave some ambiguity as to the exact composition of the fill. Most fills contain pockets, seams, or layers of organically contaminated soil. This organic material can result in the generation of methane gas and/or significant ongoing and future settlements. Fill at this site may have been monitored for the presence of methane gas and, if so, the results are given on the borehole logs. The monitoring process does not indicate the volume of gas that can be potentially generated nor does it pinpoint the source of the gas. These readings are to advise of the presence of gas only, and a detailed study is recommended for sites where any explosive gas/methane is detected. Some fill material may be contaminated by toxic/hazardous waste that renders it unacceptable for deposition in any but designated land fill sites; unless specifically stated the fill on this site has not been tested for contaminants that may be considered toxic or hazardous. This testing and a potential hazard study can be undertaken if requested. In most residential/commercial areas undergoing reconstruction, buried oil tanks are common and are generally not detected in a conventional geotechnical site investigation.
- Till: The term till on the borehole logs indicates that the material originates from a geological process associated with glaciation. Because of this geological process the till must be considered heterogeneous in composition and as such may contain pockets and/or seams of material such as sand, gravel, silt or clay. Till often contains cobbles (60 to 200 mm) or boulders (over 200 mm). Contractors may therefore encounter cobbles and boulders during excavation, even if they are not indicated by the borings. It should be appreciated that normal sampling equipment cannot differentiate the size or type of any obstruction. Because of the horizontal and vertical variability of till, the sample description may be applicable to a very limited zone; caution is therefore essential when dealing with sensitive excavations or dewatering programs in till materials.

PROJECT: GEOTECHNICAL INVESTIGATION

DRILLING DATA

CLIENT: DTAH

Method:

PROJECT LOCATION: Geary and Macpherson Ave, Toronto, ONTARIO

Diameter: 150 mm

REF. NO.: SP22-01054-00

DATUM: Geodetic

Date: Jul-22-2022

ENCL NO.: 2

BH LOCATION: See Drawing 1 N 4837176 E 628650

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT				POCKET PEN (C _u) (kPa)	NATURAL UNIT WT (kN/m ³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
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GROUNDWATER ELEVATIONS

Measurement 1st 2nd 3rd 4th

GRAPH NOTES

+ 3, × 3: Numbers refer to Sensitivity

○ s=3% Strain at Failure

PROJECT: GEOTECHNICAL INVESTIGATION

DRILLING DATA

CLIENT: DTAH

Method:

PROJECT LOCATION: Geary and Macpherson Ave, Toronto, ONTARIO

Diameter: 150 mm

REF. NO.: SP22-01054-00

DATUM: Geodetic

Date: Jul-22-2022

ENCL NO.: 3

BH LOCATION: See Drawing 1 N 4837176 E 628680

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W _P	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W _L	POCKET PEN (C _u) (kPa)	NATURAL UNIT WT (kN/m ³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL			
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS 0.3 m			SHEAR STRENGTH (kPa)											WATER CONTENT (%)		
								○ UNCONFINED	● QUICK TRIAXIAL	+ FIELD VANE & Sensitivity	× LAB VANE	20							40	60	80
124.2							124														
0.0																					
123.9																					
0.3			1	SS	14																
123.1							123														
1.1			2	SS	9																
122.0																					
2.1																					

GROUNDWATER ELEVATIONS

Measurement 1st 2nd 3rd 4th

GRAPH NOTES

+³, ×³: Numbers refer to Sensitivity

○ s=3% Strain at Failure

PROJECT: GEOTECHNICAL INVESTIGATION

DRILLING DATA

CLIENT: DTAH

Method:

PROJECT LOCATION: Geary and Macpherson Ave, Toronto, ONTARIO

Diameter: 150 mm




REF. NO.: SP22-01054-00

DATUM: Geodetic

Date: Jul-22-2022

ENCL NO.: 4

BH LOCATION: See Drawing 1 N 4837179 E 628700

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT			POCKET PEN (C _u) (kPa)	NATURAL UNIT WT (kN/m ³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%)			
(m) ELEV DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS 0.3 m			SHEAR STRENGTH (kPa)					W _P W W _L								
								○ UNCONFINED + FIELD VANE & Sensitivity ● QUICK TRIAXIAL × LAB VANE					WATER CONTENT (%)								
123.7								20	40	60	80	100						GR	SA	SI	CL
123.0	0.8	TOPSOIL: 50mm FILL: silty sand, trace gravel, trace organics, brown, moist, dense		1	SS	32									○						
121.6		SILTY SAND: trace organics, brown, moist, dense		2	SS	32									○						
		sand and silt, compact		3	SS	14									○						2 50 44 4
2.1		END OF BOREHOLE: 1. Borehole was open and dry upon completion of drilling.																			

GROUNDWATER ELEVATIONS

Measurement 1st 2nd 3rd 4th

GRAPH NOTES

+ 3, × 3: Numbers refer to Sensitivity

○ s=3% Strain at Failure

PROJECT: GEOTECHNICAL INVESTIGATION

DRILLING DATA

CLIENT: DTAH

Method:

PROJECT LOCATION: Geary and Macpherson Ave, Toronto, ONTARIO

Diameter: 150 mm

REF. NO.: SP22-01054-00

DATUM: Geodetic

Date: Jul-22-2022

ENCL NO.: 5

BH LOCATION: See Drawing 1 N 4837184 E 628721

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT				POCKET PEN (C _u) (kPa)	NATURAL UNIT WT (kN/m ³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
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GROUNDWATER ELEVATIONS

Measurement 1st 2nd 3rd 4th

GRAPH NOTES

+ 3, × 3: Numbers refer to Sensitivity

○ s=3% Strain at Failure

PROJECT: GEOTECHNICAL INVESTIGATION

DRILLING DATA

CLIENT: DTAH

Method:

PROJECT LOCATION: Geary and Macpherson Ave, Toronto, ONTARIO

Diameter: 150 mm

REF. NO.: SP22-01054-00

DATUM: Geodetic

Date: Jul-22-2022

ENCL NO.: 6

BH LOCATION: See Drawing 1 N 4837194 E 628715

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT					POCKET PEN (C _u) (kPa)	NATURAL UNIT WT (kN/m ³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
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GROUNDWATER ELEVATIONS

Measurement 1st 2nd 3rd 4th

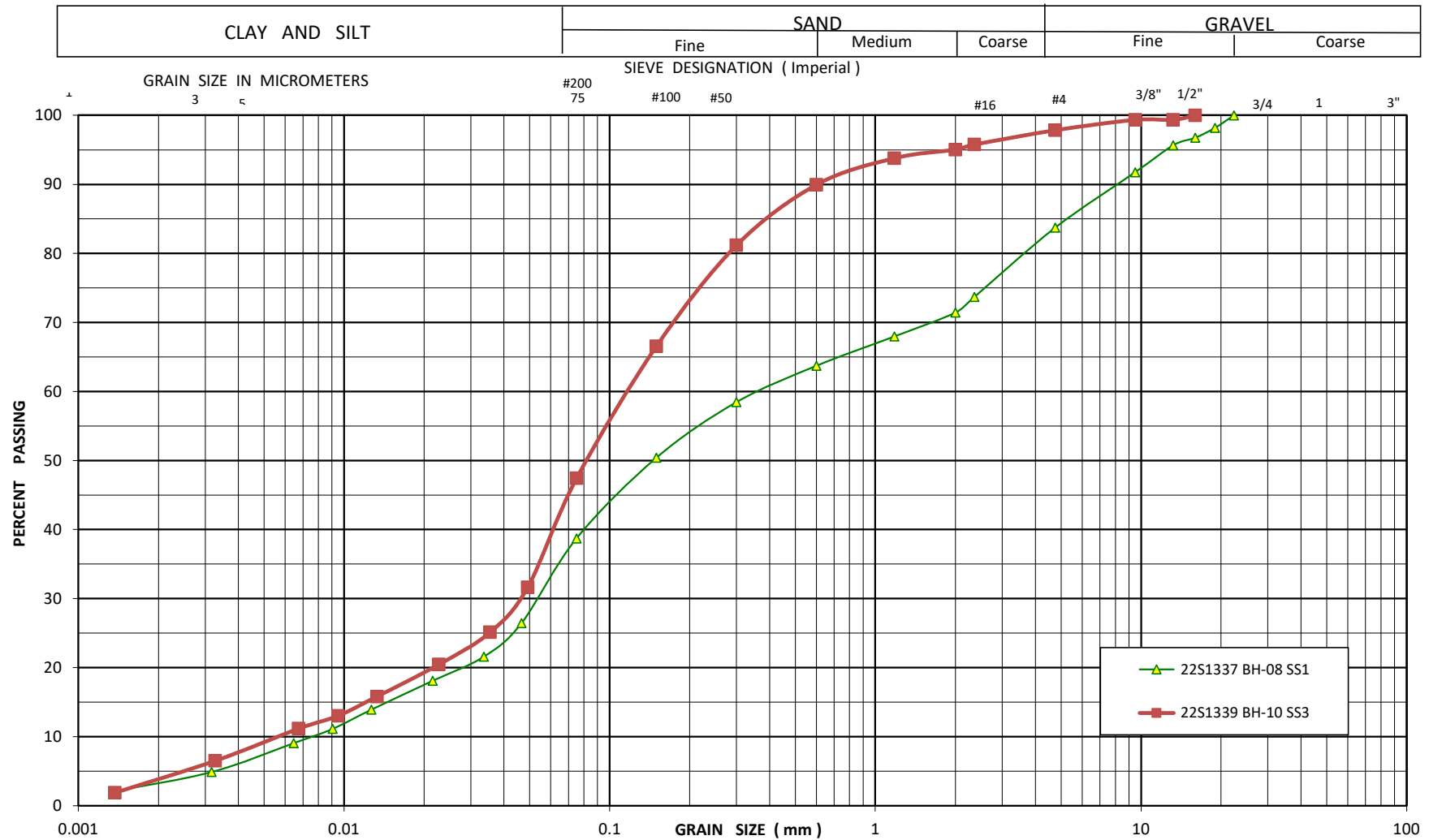
GRAPH NOTES

+ 3, × 3: Numbers refer to Sensitivity

○ s=3% Strain at Failure

GRAIN SIZE DISTRIBUTION

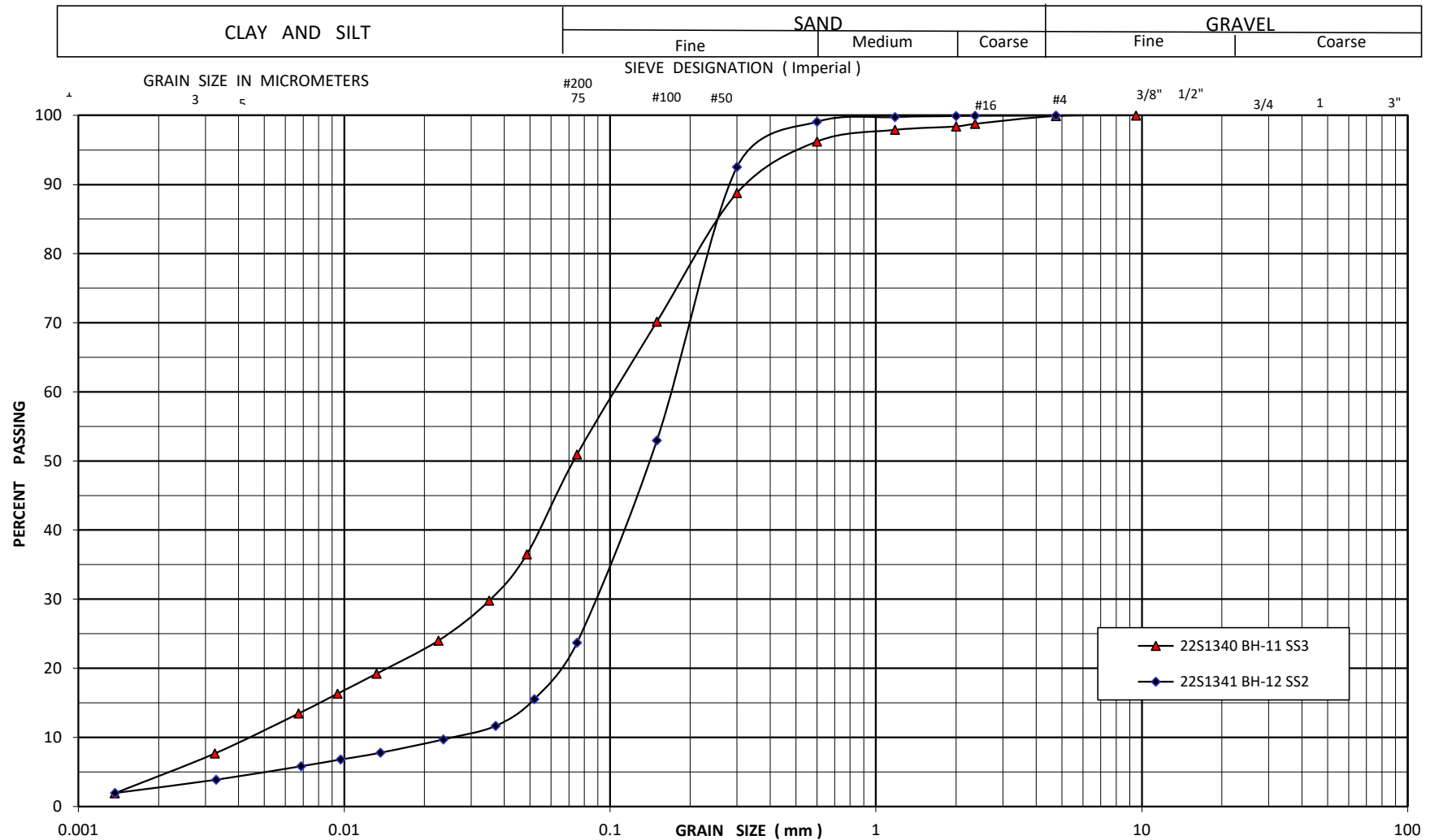
UNIFIED SOIL CLASSIFICATION SYSTEM



Project No.	:	SP22-01054-00
Date	:	11 August 2022
Figure No.	:	7

GRAIN SIZE DISTRIBUTION

UNIFIED SOIL CLASSIFICATION SYSTEM



Project No.	: SP22-01054-00
Date	: 11 August 2022
Figure No.	: 8

APPENDIX A

GUIDELINES FOR ENGINEERED FILL

GENERAL REQUIREMENTS FOR ENGINEERED FILL

Compacted imported soil that meets specific engineering requirements and is free of organics and debris and that has been continually monitored on a full-time basis by a qualified geotechnical representative is classified as engineered fill. Engineered fill that meets these requirements and is bearing on suitable native subsoil can be used for the support of foundations.

Imported soil used as engineered fill can be removed from other portions of a site or can be brought in from other sites. In general, most of Ontario soils are too wet to achieve the 100% Standard Proctor Maximum Dry Density (SPMDD) and will require drying and careful site management if they are to be considered for engineered fill. Imported non-cohesive granular soil is preferred for all engineered fill. For engineered fill, we recommend use of OPSS Granular 'B' sand and gravel fill material.

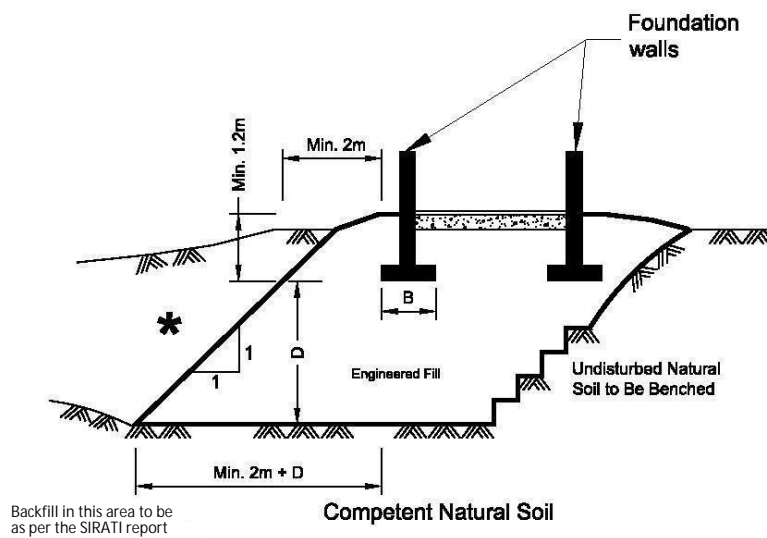
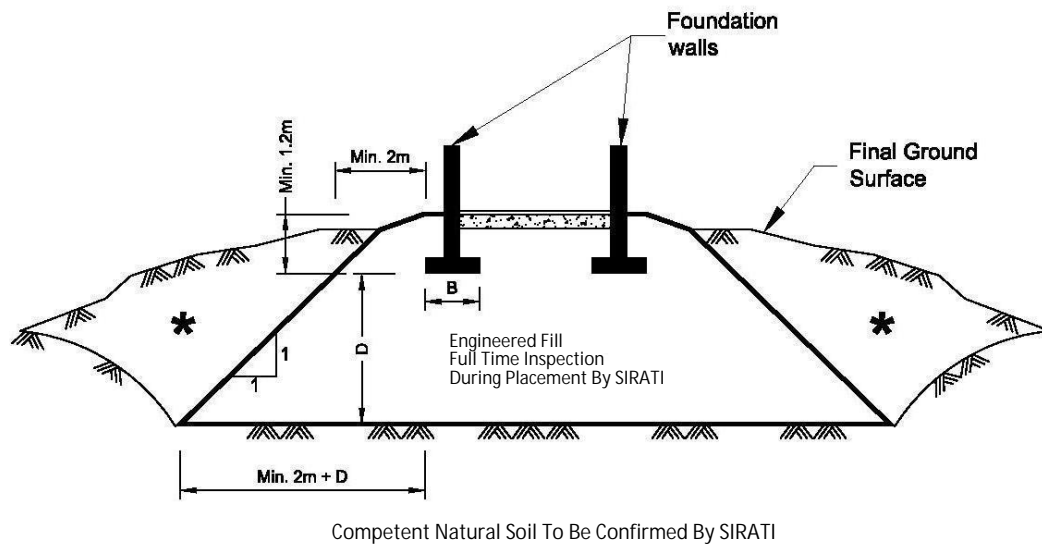
Adverse weather conditions such as rain make the placement of engineered fill to the required degree of density difficult or impossible; engineered fill cannot be placed during freezing conditions, i.e. normally not between December 15 and April 1 of each year.

The location of the foundations on the engineered fill pad is critical and certification by a qualified surveyor that the foundations are within the stipulated boundaries is mandatory. Since layout stakes are often damaged or removed during fill placement, offset stakes must be installed and maintained by the surveyors during the course of fill placement so that the contractor and engineering staff are continually aware of where the engineered fill limits lie. Excavations within the engineered fill pad must be backfilled with the same conditions and quality control as the original pad.

To perform satisfactorily, engineered fill requires the cooperation of the designers, engineers, contractors and all parties must be aware of the requirements. The minimum requirements are as follows; however, the geotechnical report must be reviewed for specific information and requirements.

1. Prior to site work involving engineered fill, a site meeting to discuss all aspects must be convened. The surveyor, contractor, design engineer and geotechnical engineer must attend the meeting. At this meeting, the limits of the engineered fill will be defined. The contractor must make known where all fill material will be obtained from and samples must be provided to the geotechnical engineer for review, and approval before filling begins.
2. Detailed drawings indicating the lower boundaries as well as the upper boundaries of the engineered fill must be available at the site meeting and be approved by the geotechnical engineer.
3. The building footprint and base of the pad, including basements, garages, etc. must be defined by offset stakes that remain in place until the footings and service connections are all constructed. Confirmation that the footings are within the pad, service lines are in place, and that the grade conforms to drawings, must be obtained by the owner in writing from the surveyor and Sirati & Partners Consultants Limited. Without this confirmation, no responsibility for the performance of the structure can be accepted by Sirati & Partners Consultants Limited (SIRATI). Survey drawing of the pre-and post-fill location and elevations will also be required.
4. The area must be stripped of all topsoil and fill materials. Subgrade must be proof-rolled. Soft spots must be dug out. The stripped native subgrade must be examined and approved by a SIRATI engineer prior to placement of fill.

5. The approved engineered fill material must be compacted to 100% Standard Proctor Maximum Dry Density throughout. Engineered fill should not be placed during the winter months. Engineered fill compacted to 100% SPMDD will settle under its own weight approximately 0.5% of the fill height and the structural engineer must be aware of this settlement. In addition to the settlement of the fill, additional settlement due to consolidation of the underlying soils from the structural and fill loads will occur and should be evaluated prior to placing the fill.
6. Full-time geotechnical inspection by SIRATI during placement of engineered fill is required. Work cannot commence or continue without the presence of the SIRATI representative.
7. The fill must be placed such that the specified geometry is achieved. Refer to the attached sketches for minimum requirements. Take careful note that the projection of the compacted pad beyond the footing at footing level is a minimum of 2 m. The base of the compacted pad extends 2 m plus the depth of excavation beyond the edge of the footing.
8. A bearing capacity of 150 kPa at SLS (225 kPa at ULS) can be used provided that all conditions outlined above are adhered to. A minimum footing width of 500 mm (20 inches) is suggested and footings must be provided with nominal steel reinforcement.
9. All excavations must be done in accordance with the Occupational Health and Safety Regulations of Ontario.
10. After completion of the engineered fill pad a second contractor may be selected to install footings. The prepared footing bases must be evaluated by engineering staff from SIRATI prior to footing concrete placements. All excavations must be backfilled under full time supervision by SIRATI to the same degree as the engineered fill pad. Surface water cannot be allowed to pond in excavations or to be trapped in clear stone backfill. Clear stone backfill can only be used with the approval of SIRATI.
11. After completion of compaction, the surface of the engineered fill pad must be protected from disturbance from traffic, rain and frost. During the course of fill placement, the engineered fill must be smooth-graded, proof-rolled and sloped/crowned at the end of each day, prior to weekends and any stoppage in work in order to promote rapid runoff of rainwater and to avoid any ponding surface water. Any stockpiles of fill intended for use as engineered fill must also be smooth-bladed to promote runoff and/or protected from excessive moisture take up.
12. If there is a delay in construction, the engineered fill pad must be inspected and accepted by the geotechnical engineer. The location of the structure must be reconfirmed that it remains within the pad.
13. The geometry of the engineered fill as illustrated in these General Requirements is general in nature. Each project will have its own unique requirements. For example, if perimeter sidewalks are to be constructed around the building, then the projection of the engineered fill beyond the foundation wall may need to be greater.
14. These guidelines are to be read in conjunction with Sirati & Partners Consultants Limited (SIRATI) report attached.



Appendix B: Limitation and Use of the Report

This report is intended solely for the Client named. The material in it reflects our best judgment in light of the information available to Sirati & Partners Consultants Limited (SIRATI) at the time of preparation. Unless otherwise agreed in writing by SIRATI, it shall not be used to express or imply warranty as to the fitness of the property for a particular purpose. No portion of this report may be used as a separate entity, it is written to be read in its entirety.

The conclusions and recommendations given in this report are based on information determined at the borehole locations. The information contained herein in no way reflects on the environment aspects of the project, unless otherwise stated. Subsurface and groundwater conditions between and beyond the boreholes may differ from those encountered at the borehole locations, and conditions may become apparent during construction, which could not be detected or anticipated at the time of the site investigation. The benchmark and elevations used in this report are primarily to establish relative elevation differences between the borehole locations and should not be used for other purposes, such as grading, excavating, planning, development, etc. Professional judgement was exercised in gathering and analyzing data and formulation of recommendations using current industry guidelines and standards. Similar to all professional persons rendering advice, SIRATI cannot act as absolute insurer of the conclusion we have reached. No additional warranty or representation, expressed or implied, is included or intended in this report other than stated herein the report.

The design recommendations given in this report are applicable only to the project described in the text and then only if constructed substantially in accordance with the details stated in this report.

The comments made in this report on potential construction problems and possible methods are intended only for the guidance of the designer. The number of boreholes may not be sufficient to determine all the factors that may affect construction methods and costs. For example, the thickness of surficial topsoil or fill layers may vary markedly and unpredictably. The contractors bidding on this project or undertaking the construction should, therefore, make their own interpretation of the factual information presented and draw their own conclusions as to how the subsurface conditions may affect their work. This work has been undertaken in accordance with normally accepted geotechnical engineering practices.

Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. SIRATI accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

We accept no responsibility for any decisions made or actions taken as a result of this report unless we are specifically advised of and participate in such action, in which case our responsibility will be as agreed to at that time. Any user of this report specifically denies any right to claims against the Consultant, Sub-Consultants, their officers, agents and employees in excess of the fee paid for professional services.

SIRATI engagement hereunder is subject to and condition upon, that SIRATI not being required by the Client, or any other third party to provide evidence or testimony in any legal proceedings pertaining to this finding of this report or providing litigations support services which may arise to be required in respect of the work produced herein by SIRATI. It is prohibited to publish, release or disclose to any third party the report produced by SIRATI pursuant to this engagement and such report is produced solely for the Client own internal purposes and which shall remain the confidential proprietary property of SIRATI for use by the Client, within the context of the work agreement. The Client will and does hereby remise and forever absolutely release SIRATI, its directors, officers, agents and shareholders of and from any and all claims, obligations, liabilities, expenses, costs, charges or other demands or requirements of any nature pertaining to the report produced by SIRATI hereunder. The Client will not commence any claims against any Person who may make a claim against SIRATI in respect of work produced under this engagement.

Hydro One General Conditions for Secondary Land Uses

1. Scope of Approval

- 1.1. Once issued, the approval is valid for one (1) year from the approval date; should the work not take place within one (1) year after the approval date the approval shall be deemed to be void and the party proposing the installation (including, but not limited to their representatives, agents and/or contractors) (collectively, the “Proponent”) will have to resubmit all drawings for further review at an additional charge.
- 1.2. This approval applies only to the plans, drawings and/or documents (collectively, the “Proposal”) submitted by the Proponent to date. Any revisions to the Proposal must be reviewed and approved by Hydro One prior to construction. No work by the Proponent can begin until an occupation agreement has been duly executed by the required parties.
- 1.3. Any future Proposal on the subject land, including but not limited to, modified use of the present Proposal, must be submitted to Hydro One for review and approval.
- 1.4. Once construction has been completed, the Proponent is to contact Hydro One’s Real Estate Coordinator to arrange for a post-construction site inspection to ensure everything was built in accordance with the final approved Proposal
- 1.5. Hydro One corridor lands are not to be used without express written permission from Hydro One. The use of the Hydro One corridor lands must be contained to the lands outlined in the approved Proposal and identified on site by installing temporary fencing to Hydro One’s satisfaction.
- 1.6. Upon termination of the land occupation agreement, the Proponent must restore lands to their original, pre-use condition. For example, if lands are paved over for parking use, the surface must be restored to grass.
- 1.7. If at any time during a site inspection, the listed conditions are not complied with or the lands are used for inappropriate or non-approved purposes, the Proponent’s land occupation agreement will be subject to cancellation upon written notice.

2. Horizontal Clearances Around Hydro One Structures

- 2.1. A three (3) meter radius around Hydro One structures must be left unpaved for access to tower footings if necessary.

2.2. Hydro One requires fifteen (15) meters of clearance on all sides around its transmission structures, as measured from the nearest structure member (base of pole, tower leg footing or structure anchor), in order to carry out maintenance operations. This clearance must be maintained at all times, and storage and/or staging activities are not permitted within this area at any time.

3. Vertical Clearances

3.1. Construction equipment and personnel working underneath the Hydro One conductors must satisfy Occupational Health and Safety Act (Ontario) (“OHSA”) clearance requirements. Transmission lines are dynamic in nature, and factors such as changing loads, ambient temperatures and wind can cause the conductors to lower/rise significantly over short periods. It is the Proponent’s responsibility to monitor/manage these changes and adjust work methods accordingly, in order to adhere to the OHSA clearances.

3.2. All proposed works on the corridor are subject to adequate overhead transmission line clearances from the high voltage conductors to any proposed works including proposed elevation changes to the existing ground. Review and confirmation that sufficient clearances will be present is part of Hydro One’s review of a Proposal.

3.3. All proposed plantings must conform to Hydro One’s approved species list and be reviewed and approved by Hydro One.

4. Corridor Conditions and Access

4.1. No grading/excavation work is to be carried out using heavy machinery within ten (10) metres of the tower footings. Hydro One may permit grading/excavation work within ten (10) meters of the tower footings, provided this work is carried out by hand or by using a vacuum truck (VAC) system. Proponent must seek prior written approval for work with ten (10) meters of the tower footings.

4.2. Access to Hydro One facilities must not be obstructed at any time during construction, or after the Proposal is in service. The site must be kept free of all debris and equipment, which could prohibit access to Hydro One facilities.

4.3. Hydro One requires a minimum of six (6) meter wide route(s) longitudinally along the corridor to access each transmission structure. The access route should not: i) have a slope greater than 10% and ii) a side slope greater than 4%. If the Proponent fails to maintain the required access route(s), it will be liable for any costs incurred by Hydro One in regaining access to perform maintenance or repairs.

- 4.4. Any changes in grade must be submitted for approval.
- 4.5. If the Proponent performs any construction activity within ten (10) meters of any transmission structures, the Proponent must install either a temporary orange snow fence or jersey barriers, to be determined by Hydro One depending on site specific conditions. The fence or jersey barriers must be erected three (3) meters out from the base of the tower footprint. This fence must be maintained in an upright position for the duration of construction.
- 4.6. All buried infrastructure (including roadways/paths) is to be designed as follows:
- a) ability to withstand the transportation of heavy loads outlined by CL-625 truck loading according to the latest version of CAN/CSA-S6. Vehicles to be accommodated include large utility vehicles and cranes;
 - b) ability to withstand mobile cranes set up for work with counterweights in place – 267 KN per tandem axle, dual wheel, 1.53m axle spacing, 360mm tires.

5. Storm Water and Drainage Management

- 5.1. The Proposal shall not interfere with the natural drainage patterns or result in standing water anywhere on the affected stretch of the Hydro One corridor.
- 5.2. The Proponent will be held liable for any damage to Hydro One's facilities, as a result of flooding or standing water caused by the Proposal.
- 5.3. Any proposed catch basins on the Hydro One corridor must be located within a paved or concrete pad surface.

6. Safety & Security

- 6.1. The Proponent is responsible for maintaining security of the site and for the safety of the people working within the Hydro One corridor.

7. Liabilities

- 7.1. The Proponent will assume all liability associated with the Proposal.
- 7.2. Any relocation, modification and/or repair of Hydro One facilities as a result of the Proposal will be carried out by Hydro One at the Proponent's expense.
- 7.3. The Proponent is responsible for arranging all underground locates prior to digging, auguring or performing any excavation works on the Hydro One corridor.
- 7.4. Hydro One is not responsible for any damages or injuries resulting from the effect of adverse weather conditions. This includes any damages or injuries arising from ice falling off overhead structures or conductors.

- 7.5. Hydro One may, at its sole discretion and with minimal or no notice, acting reasonably, interrupt the Proponent's occupation of the Hydro One corridor at any time during construction or post construction, to perform maintenance or emergency repairs. Hydro One will not be liable for any damages to the Proposal or any damages or losses of any kind suffered by the Proponent due to this interruption.
- 7.6. The Proponent is responsible for all other utility permits and permissions, which may be required for the Proposal. The Proponent must circulate plans for review to the various utilities for their review and comment.
- 7.7. All means and methods and safety during and prior to the work are the responsibility of the Proponent to manage at all times.

8. Prohibited Activities

- 8.1. Buildings are not permitted within any Hydro One transmission corridors. This absolute prohibition includes, but is not limited to, temporary structures such as tents and/or construction trailers.
- 8.2. Parking within any 500 kV corridor is not permitted for any vehicles.
- 8.3. No fill material is to be placed on the Hydro One corridor without prior written approval from Hydro One.
- 8.4. There shall be no storage of any material on the Hydro One corridor without prior written approval from Hydro One. Any debris found on the Hydro One corridor shall be removed on an ongoing basis once notified in writing by Hydro One, or by a duly appointed Hydro One representative on site, and at the Proponent's expense
- 8.5. There shall be no storage or tipping of garbage dumpsters on the Hydro One corridor.
- 8.6. There shall be no storage or dispensing of gasoline, or any other combustible substance, on the Hydro One corridor.
- 8.7. Burning of brush or other agricultural, or construction debris is strictly prohibited within the limits of any Hydro One corridor.
- 8.8. No stockpiling of snow on Hydro One corridor lands will be permitted. Ploughing of snow into tower bases is not permitted.
- 8.9. Any topsoil removed from site must be properly disposed of at an appropriate landfill and not redistributed within the Hydro One corridor boundary.

General Requirements for Construction Work by External Parties in the Vicinity of Hydro One 115,000 and 230,000 Volt Underground Plant

External parties constructing, excavating or daylighting within the vicinity of Hydro One Networks Inc. (“Hydro One”) high voltage (115kV - 230kV) underground plant must obey the following requirements. Underground plant includes but is not limited to cables, pipes, backfill, duct banks, protective structures, vaults, manholes, etc. These are general requirements; all projects will be reviewed in detail, on a case-by-case basis, to determine if any, additional project specific requirements are to be satisfied.

1. New or relocated underground installations by external parties must have a minimum vertical and horizontal clearance of one metre from Hydro One’s underground plant.
2. The external party shall provide Hydro One as much advance notice as possible, typically at least three months, prior to the commencement of any construction work in the vicinity of Hydro One’s underground plant. A detailed scope of work and construction plan shall be submitted to Hydro One for review and comment. Depending on the nature of the work (for instance, deep excavation that may affect the plant integrity or there is a risk of mechanical or hydrovac equipment coming within one metre of Hydro One’s underground plant), a circuit outage or support structure(s) may be required.
3. Locates must be performed prior to the start of any construction, excavation or hydrovac work within the vicinity of Hydro One’s underground plant. Excavation after 60 days of the initial locate will require the excavator to re-apply for a second confirming locate.
4. The presence of a Hydro One representative is required for any construction, excavation or hydrovac work occurring within one metre of Hydro One’s underground plant. As such, the external party must provide as much advance notice as possible. The external party must contact Hydro One at 1-888-977-8665 #1, at least 72 hours before any work, to schedule the attendance of a Hydro One representative.
5. The existing 115kV or 230kV cables must be considered live and fully energized at all times. The requirement for circuit outages will be determined by Hydro One on a case-by-case basis from the scope of work and construction plans provided by the external party.
6. If it has been determined during the initial review of the external party’s scope of work and construction plan that a circuit outage is necessary, the external party must coordinate with Hydro One and schedule outage and construction activities. Typically, 60 days’ notice is required to schedule a planned outage.

7. The external party shall ensure that no personnel make direct contact with any Hydro One cable, duct or pipe without wearing appropriately rated personal protective equipment (PPE). Accidental contact with the exposed cable shall be avoided.
8. Follow all applicable safety regulations, the Infrastructure Health & Safety Association (IHSA) safe practice guide, “Excavating with Hydrovacs in the Vicinity of Underground Electrical Plant”, and any other requirements determined by Hydro One at its discretion.
9. The permitted excavation and daylighting methods when near Hydro One’s underground plant are outlined in Table 1.

Table 1 – Excavation and Daylighting Methods

Type of Plant	Excavation and Daylighting Methods
Pipe Type (High-Pressure Liquid-Filled) Cables	Only hand digging is permitted within one metre of the pipe. Mechanical or hydrovac excavation is not permitted within one metre of the pipe.
Direct Buried Cables	Only hand digging is permitted beyond the protective tiles. An outage is required when digging beyond the protective tiles. Mechanical or hydrovac excavation is not permitted beyond the protective tiles.
Duct Bank Installed Cables	Hand digging, mechanical and hydrovac excavation is permitted to expose the concrete duct bank.

10. Ensure that step and touch potentials are controlled by the use of an equipotential work zone prior to operating hydrovac equipment within one metre of the underground plant. The external party must protect the public and workers from these potential electrical hazards.
11. Temporary shoring and bracing must be provided for the sides of the excavation where sides are too steep to be self-supporting.
12. Vibration is a concern during pile driving, auguring, boring, jackhammering, use of vibratory rollers, demolition, and the use of other equipment that create significant vibration. Vibration monitoring is required for any activities within the vicinity of Hydro One’s underground plant, typically within three (3) metres, but could vary on a case-by-case basis as reasonably determined by Hydro One. The vibration values should be measured at the location and depth of the Hydro One cables and should not exceed the levels set out in Table 2 “Prohibited Vibration Levels”:

Table 2 – Prohibited Vibration Levels

Frequency of Vibration (Hertz)	Vibration Peak Particle Velocity (mm/s)
Less than 4	8
4 to 10	15
More than 10	25

13. Exposed underground plant must not be used to support any load. During electrical faults, underground plant may become energized. Insulating blankets for protection against electrical hazards and a wooden box shall be built around the cables to protect against brush contact.
14. Where excavation extends below Hydro One's underground plant, all exposed underground equipment must be temporarily supported at suitable intervals to prevent damage due to its own weight. The temporary support design drawing, bearing the stamp of a Professional Engineer, shall be presented to Hydro One for approval. The external party will need to implement a daily monitoring and recording system (which must be approved by Hydro One) to ensure that there is minimal deflection or settlement of the underground plant. The measurements must be taken relative to a fixed location such as a survey monument. Readings shall be taken at 3-4 metre intervals along the entire length of the exposed plant. All readings shall be provided to Hydro One on a daily basis. On a weekly basis, a Hydro One representative should accompany the external party in the field to witness the readings.
15. Upon completion of the construction, excavation or daylighting work, the external party must reinstate the backfill. Use only backfill that satisfies Hydro One specifications.
16. Prior to replacing the backfill, an on-site Hydro One representative must be provided physical access to inspect the exposed underground plant and deem it satisfactory. A Hydro One representative shall be on-site to witness the backfilling process.
17. If any Hydro One underground plant is compromised, the external party shall immediately respond to remediate to Hydro One's specification and contact Hydro One. The external party may be liable for any damages incurred to the underground plant.