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PROJECT TITLE PORT STANLEY HARBOUR LANDS
 SOIL CAPPING PROJECT
 PORT STANLEY, ONTARIO

PROJECT NUMBER R.013137.007

PROJECT DATE 2017-03-31

END

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PART 1 - GENERAL

1.1 SECTION INCLUDES

- .1 Title and description of Work.

1.2 PRECEDENCE

- .1 For Federal Government projects, Division 01 Sections take precedence over technical specification sections in other Divisions of this Project Manual.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

- .1 Work of this Contract comprises the implementation of risk management measures by means of importing and placing a clean soil cover within the work area located within the East Headlands of the Port Stanley Harbour lands identified as PWGSC Project Number R.013137.007. The site is located on the east side of Port Stanley Harbour in the Municipality of Central Elgin, Ontario. The work area within the Port Stanley Harbour is as identified on Drawing C-04.
- .2 Work will entail clearing and grubbing (as required), excavation and regrading of impacted soils, placement of a non-woven geotextile over the area to be covered with a clean soil cover, importing of clean soil cover borrow and topsoil material, placement and compaction of imported borrow material (including granular and topsoil materials) to a minimum thickness of 500 mm, application of grass seed, and supply and placement of an erosion control blanket to facilitate the growth of grasses.

1.4 WORK SCHEDULE

- .1 Provide schedule for completion of the site works. All field work under this contract is to be completed within 80 working days of Contract Award date. All work under this contract is to begin within 15 working days of contract award date.

1.5 COMBINED PRICE CONTRACT

- .1 "Bid and Acceptance Form - Combined Price" and the Unit Price Table.
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PART 2 - PRODUCTS

2.1 NOT USED

.1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not used.

PART 1 - GENERAL

1.1 MINIMUM STANDARDS

- .1 Execute work to meet or exceed:
 - .1 Rules and regulations of authorities having jurisdiction.
 - .2 Occupational Health and Safety Act and Regulations for Construction Projects, Revised Statutes of Ontario 1990, Chapter O.1 as amended, Workplace Safety and Insurance Act and municipal statutes and authorities.
 - .3 Environmental Protection Act, Revised Statutes of Ontario 1990, Chapter E19 as amended, O. Reg. 102/94, Waste Audits and Waste Reduction Work Plans, O. Reg. 103/94, Industrial, Commercial and Institutional Source Separation Programs, O. Reg. 153-04, as amended, O. Reg. 347 as amended, and Ontario Water Resource Act, R.R.O.1990, Reg.903 as amended.
 - .4 CCME (Canadian Council of Ministers of the Environment) Contaminated Sites, Contaminated Soil and Groundwater, and Remediation of Contaminated Sites most current publications.
 - .5 Canadian Environmental Protection Act (New Substance Notification Regulations).
 - .6 Transportation of Dangerous Goods Act.
 - .7 Fisheries Act.
 - .8 Migratory Birds Convention Act.
 - .9 Migratory Birds Regulations.
 - .10 MOECC Table 1 Standards "Full Depth Background Condition Standards" under "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act" dated April 15, 2011 of the Ontario Regulation ("O. Reg.") 153/04 as amended.

1.2 AUTHORITIES HAVING JURISDICTION

- .1 Kettle Creek Conservation Authority is the authority having jurisdiction over this project with regards to work within the Kettle Creek Flood Plain.
 - .2 All work areas are within lands owned by MCE.
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1.3 ROAD LOAD RESTRICTIONS

- .1 Comply with posted restrictions. Acquire and submit to Departmental Representative copies of all necessary permits.
- .2 Access to the bridge on Bridge St. is prohibited for all haulage vehicles and equipment floats for the duration of the project.

1.4 TAXES

- .1 Pay applicable Federal, Provincial and Municipal taxes.

1.5 FEES, PERMITS, CERTIFICATES AND LETTERS

- .1 Provide authorities having jurisdiction with information requested.
- .2 Pay fees and obtain certificates, permits and letters required.
- .3 Furnish certificates, permits and letters when requested.
- .4 Departmental Representative to provide Contractor with a copy of the Kettle Creek Conservation Authority (KCCA) permit for the Work.
- .5 Comply with the terms and conditions of the KCCA permit.

1.6 EXAMINATION

- .1 Attend an on-Site kick off meeting with Departmental Representative.
 - .2 Examine existing conditions and determine conditions affecting work.
 - .3 Notify Departmental Representatives in writing of any discrepancies between contract documents and site conditions.
-

1.7 DOCUMENTS

- .1 Keep on site one copy of each of the following:
 - .1 Contract drawings.
 - .2 Specifications.
 - .3 Amendments and addenda.
 - .4 Change orders.
 - .5 Reviewed shop drawings, product data, and samples.
 - .6 Other modifications to Contract.
 - .7 Copy of approved Work schedule.
 - .8 Field test records.
 - .9 Inspection certificates.
 - .10 Manufacturer's certificates.
 - .11 Manufacturers' installation and application instructions.
 - .12 Labour conditions and wage schedules.
 - .13 Material Safety Data Sheets.
 - .14 Labour and Material Bonds.
 - .15 All applicable permits.
- .2 Specifications shall govern over drawings.
- .3 Maintain documents in clean, dry, legible condition.
- .4 Make documents available at all times for inspection by Departmental Representative.

1.8 ELECTRONIC SUBMITTALS

- .1 Submit number of hard copies specified for each type and format of submittal and also submit in electronic format as pdf files. Forward pdf, MS Word, MS Excel, MS Project and Autocad dwg files; on USB compatible with PWGSC encryption requirements or through email or alternate electronic file sharing service such as ftp, as directed by Departmental Representative.
 - .2 Comply with Section 01 33 00.
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1.9 CONTRACTOR'S AS-BUILT DRAWINGS, SPECIFICATIONS AND AERIAL
PHOTOGRAPHS

- .1 As work progresses, neatly record significant deviations from the Contract drawings and specifications using fine, red marker on full size white prints and specifications. Make the same changes on the electronic files.
 - .2 Neatly print lettering and numbers in size to match original. Lines may be drawn free-hand but shall be neat and accurate. Add at each title block note: "AS BUILT". Also circle on List of Drawings/Photographs each title and number of drawing/photograph marked with "AS-BUILT" information. Circle on Table of Contents each specification section number and title of specification sections marked with "AS-BUILT" information.
 - .3 Departmental Representative will provide one electronic set of drawings, schedules, and specifications for as-built drawing and specification purposes.
 - .1 Drawings are in Autocad.
 - .2 Specifications are in MS Word.
 - .3 Amendments and addenda are in MS Word.
 - .4 Record following significant deviations:
 - .1 Depths for various elements and foundations.
 - .2 Horizontal and vertical location of underground utilities and appurtenances referenced to permanent surface improvement.
 - .3 Location of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of structure.
 - .4 Field changes of dimension.
 - .5 Other significant deviations which are concealed in construction and cannot be identified by visual inspection.
 - .6 Alternative materials and systems installed replacing original materials and systems specified by trade name.
 - .7 Full top of subgrade, top of fill and top of topsoil.
 - .5 Turn one set, paper copy and electronic copy, of AS-BUILT drawings and specifications over to Departmental Representative on completion of work.
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- .6 If project is completed without significant deviations from Contract drawings and specifications submit to Departmental Representative one set of drawings and specifications marked "AS-BUILT".

1.10 CONSTRUCTION PHOTOGRAPHS

- .1 Submit electronic copy of colour digital photography in jpg format, standard resolution.
- .2 Identification: name and number of project and date of exposure indicated.
- .3 Number of viewpoints and location of viewpoints determined by Departmental Representative.
- .4 Frequency: 1) before the site construction commences, 2) at completion of subgrade grading work, 3) at completion of installation of clean soil cover, and 4) at completion of all works.
- .5 Photograph site works to demonstrate compliance with the mitigation measures as outlined in Appendices 2 and 3.

1.11 SHOP DRAWINGS

- .1 To Section 01 33 00.

1.12 PROOF OF CLEAN QUALITY OF THE IMPORTED MATERIAL

- .1 Clean Fill meeting the MOECC Table 1 Standards (April 15, 2011) under O.Reg.153/04 as amended will be used as surface cover material (500 mm clean fill cap). Departmental Representative will be responsible for quality assurance testing of the imported materials placed as clean cover. Some fill meeting the MOECC standards for Clean Fill will be supplied by the Municipality of Central Elgin (MCE) and the Departmental Representative will be responsible for quality assurance testing of this material (see Appendix 6).
 - .1 Anticipated volume of Clean Fill from MCE is 8,000 m³.
 - .2 Submit proof of the source and quality of the clean backfill material to be used as clean soil within the work
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area on Site. The clean backfill must meet MOECC Table 1 Standards (April 15, 2011) under O.Reg.153/04 as amended in order to be considered as inert fill.

- .1 This clause does not apply for approved backfill supplied by the Municipality of Central Elgin.
- .3 Quality Assurance/Quality Control testing of all fill imported to site will be completed by the Departmental Representative.
- .4 With the exception of MCE supplied fill any fill not conforming to the project specifications will be removed and replaced at the Contractor's cost.

1.13 ADDITIONAL DRAWING/PHOTOGRAPHS

- .1 Departmental Representative may furnish additional drawings to clarify work.
- .2 Such drawings become part of Contract Documents.

1.14 PROTECTION

- .1 Protect existing utilities and infrastructure from damage.
- .2 Replace damaged existing work with material and finish to match original.
- .3 Protect existing trees and plants on adjacent properties. On-site trees may be removed as directed by the Departmental Representative.
- .4 Protect sections of the armour stone breakwater within the work area.
- .5 Protect designated monitoring wells as identified.

1.15 EXISTING

- .1 Establish location, protect and maintain existing utility lines.
 - .2 Connect to existing utilities with minimum disturbance to pedestrian and vehicular traffic.
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1.16 OVERLOADING

- .1 No part of Work shall be loaded with a load which will endanger its safety or will cause permanent deformation.
- .2 Repair to original condition any part of work damaged due to overloading at no additional cost to Contract.

1.17 TEMPORARY FACILITIES AND SERVICES

- .1 Provide and maintain temporary facilities and services required to carry out work.
- .2 Remove temporary facilities and services on completion of work.
- .3 Departmental Representative will have access to temporary facilities as required (eg. Washroom).

1.18 METRIC SIZED MATERIALS

- .1 SI metric units of measurement are used exclusively on the drawings and in the specifications for this project.
 - .2 Provide metric products in the sizes called for in the Contract Documents except where a valid claim can be made that a particular product is not available on the Canadian market.
 - .3 Claims for exemptions from use of metric sized products shall be in writing and fully substantiated with supportive documentation. Promptly submit application to Departmental Representative for consideration and ruling. Non-metric sized products may not be used unless Contractor's application has been approved in writing by the Departmental Representative.
 - .4 Difficulties caused by the Contractor's lack of planning and effort to obtain modular metric sized products which are available on the Canadian market will not be considered sufficient reasons for claiming that they cannot be provided.
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- .5 Claims for additional costs due to provision of specified modular metric sized products will not be considered.

1.19 MATERIAL AND EQUIPMENT

- .1 Use new products unless otherwise specified.
- .2 Deliver and store material and equipment to manufacturer's instructions with manufacturer's labels and seals intact.
- .3 When material or equipment is specified by standard or performance specifications, upon request of Departmental Representative, obtain from manufacturer an independent testing laboratory report, stating that material or equipment meets or exceeds specified requirements.

1.20 ALTERATIONS TO EXISTING SITE

- .1 Remove and recycle, compost or dispose of:
 - .1 Trees, shrubs and other plant material as indicated.
 - .2 Other waste debris encountered on site.
- .2 Remove, temporarily store, clean and reinstall, as required:
 - .1 Site furnishings, benches, planters, and garbage containers.

1.21 INSPECTION AND TESTING

- .1 When initial tests and inspections reveal work not to contract requirements, pay for tests and inspections required by Departmental Representative on corrected work.
- .2 Complete a topographic survey of the site and off-site MCE fill stockpile prior to the remediation program and as required to confirm the quantities of materials being managed on site and to confirm the reinstatement of grades as required.

1.22 SCHEDULING

- .1 On Award of Contract submit bar chart construction schedule for work in accordance with Section 01 32 16.
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- .2 Carry out noise generating work Monday to Friday from 7 am to 7 pm. Weekend work can only be done with the approval of the Departmental Representative and must comply with local noise by-laws.

1.23 CLEANING

- .1 Maintain site and haul roads free of accumulated waste and rubbish.
- .2 Final cleaning:
 - .1 Remove temporary protection.
 - .2 Remove dust, dirt and foreign matter from hard surfaces.

1.24 SPECIAL PROTECTION AND PRECAUTIONS

- .1 Comply with the requirements of the Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and the provision of material safety data sheets acceptable to ESDC - Labour Program.
- .2 In the event of a spill notify the Departmental Representative immediately.

1.25 OPSS AND OPSD

- .1 OPSS Ontario Provincial Standard Specifications and OPSD Ontario Provincial Standard Drawings quoted in these specifications are available online at <http://www.raqsa.mto.gov.on.ca/techpubs/ops.nsf/OPSHomepage>.

1.26 PROJECT MEETINGS

- .1 Administrative:
 - .1 Schedule and administer project meetings throughout the progress of the work at the call of Departmental Representative.
 - .2 Prepare agenda for meetings.
 - .3 Distribute written notice of each meeting four working days in advance of meeting date to Departmental Representative.
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- .4 Provide physical space and make arrangements for meetings.
 - .5 Preside at meetings.
 - .6 Record the meeting minutes. Include significant proceedings and decisions. Identify actions by parties.
 - .7 Reproduce and distribute copies of minutes within three working days after meetings and transmit to meeting participants and affected parties not in attendance.
 - .8 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.
- .2 Preconstruction meeting:
- .1 Within 5 working days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
 - .2 Departmental Representative, Contractor, major Subcontractors, field inspectors and supervisors will be in attendance.
 - .3 Establish time and location of meeting and notify parties concerned minimum 2 working days before meeting.
 - .4 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.
 - .5 Agenda to include:
 - .1 Appointment of official representative of participants in the Work.
 - .2 Schedule of Work: in accordance with Section 01 32 16.
 - .3 Schedule of submission of shop drawings and samples.
 - .4 Requirements for temporary facilities, site sign, offices, storage sheds, utilities and fences.
 - .5 Site security.
 - .6 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
 - .7 Owner provided products.
 - .8 Record drawings, specifications and aerial photographs.
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- .9 Maintenance manuals.
 - .10 Take-over procedures, acceptance, warranties.
 - .11 Monthly progress claims, administrative procedures, photographs, hold backs.
 - .12 Appointment of inspection and testing agencies or firms.
 - .13 Insurances, transcript of policies.
- .3 Construction meetings:
- .1 Every two weeks (ten working days) after preconstruction meeting, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
 - .2 Departmental Representative, Contractor, major Subcontractors, field inspectors and supervisors will be in attendance.
 - .3 Establish time and location of meeting and notify parties concerned minimum 2 working days before meeting.
 - .4 Incorporate mutually agreed variations to Contract Documents into Agreement, prior to signing.
 - .5 Agenda to include:
 - .1 Review progress of work.
 - .2 Schedule of Work: in accordance with Section 01 32 16.
 - .3 Schedule of submission of shop drawings and samples.
 - .4 Health and Safety and site security.
 - .5 Proposed changes, change orders, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
 - .6 Owner provided products.
 - .7 Take-over procedures, acceptance, warranties.
 - .8 Monthly progress claims, administrative procedures, photographs, hold backs.
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PART 2 - PRODUCTS

2.1 NOT USED

.1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not used.

PART 1 - GENERAL

1.1 DEFINITIONS

- .1 Activity: element of Work performed during course of Project. Activity normally has expected duration, and expected cost and expected resource requirements. Activities can be subdivided into tasks.
 - .2 Bar Chart (GANTT Chart): graphic display of schedule-related information. In typical bar chart, activities or other Project elements are listed down left side of chart, dates are shown across top, and activity durations are shown as date-placed horizontal bars. Generally Bar Chart should be derived from commercially available computerized project management system.
 - .3 Baseline: original approved plan (for project, work package, or activity), plus or minus approved scope changes.
 - .4 Construction Work Week: Monday to Friday, inclusive, will provide five day work week and define schedule calendar working days as part of Bar (GANTT) Chart submission.
 - .5 Duration: number of work periods (not including holidays or other nonworking periods) required to complete activity or other project element. Usually expressed as workdays or workweeks.
 - .6 Master Plan: summary-level schedule that identifies major activities and key milestones.
 - .7 Milestone: significant event in project, usually completion of major deliverable.
 - .8 Project Schedule: planned dates for performing activities and the planned dates for meeting milestones. Dynamic, detailed record of tasks or activities that must be accomplished to satisfy Project objectives. Monitoring and control process involves using Project Schedule in executing and controlling activities and is used as basis for decision making throughout project life cycle.
 - .9 Project Planning, Monitoring and Control System: overall system operated by Departmental Representative to enable
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monitoring of project work in relation to established milestones.

1.2 REQUIREMENTS

- .1 Ensure Master Plan and Detail Schedules are practical and remain within specified Contract duration.
- .2 Plan to complete Work in accordance with prescribed milestones and time frame.
- .3 Limit activity durations to maximum of approximately 5 working days, to allow for progress reporting.
- .4 Ensure that it is understood that Award of Contract or time of beginning, rate of progress, Certificate of Substantial Performance and Certificate of Completion as defined times of completion are of essence of this contract.

1.3 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 11 06.
- .2 Submit to Departmental Representative within 10 working days of Award of Contract Bar (GANTT) Chart as Master Plan for planning, monitoring and reporting of project progress.
- .3 Submit Project Schedule to Departmental Representative within 5 working days of receipt of acceptance of Master Plan.

1.4 PROJECT MILESTONES

- .1 Project milestones form interim targets for Project Schedule.
 - .1 Clearing/Grubbing in the East Headlands completed within 20 working days of the Contract Award date.
 - .2 Regrading completed within 28 working days of the Contract Award date.
 - .3 Import, place and compact clean fill cover (including placement of non-woven geotextile) completed within 77 working days of the Contract Award date.
 - .4 Supply and place seed and plantings completed within 80 working days of the Contract Award date.
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- .5 Certificate of Substantial Performance within 85 working days of Contract Award date.
- .6 Work elements can be completed concurrently.

1.5 MASTER PLAN

- .1 Structure schedule to allow orderly planning, organizing and execution of Work as Bar Chart (GANTT).
- .2 Departmental Representative will review and return reviewed schedules within 5 working days.
- .3 Revise impractical schedule and resubmit within 2 working days.
- .4 Accepted revised schedule will become Master Plan and be used as baseline for updates.

1.6 PROJECT SCHEDULE

- .1 Develop detailed Project Schedule derived from Master Plan.
- .2 Ensure detailed Project Schedule includes as a minimum milestone and activity types as follows:
 - .1 Award.
 - .2 Shop Drawings, Samples.
 - .3 Permits.
 - .4 Mobilization.
 - .5 Clearing and Grubbing.
 - .6 Site Demolition Works as required.
 - .7 Risk Management Implementation.
 - .8 Site Restoration.

1.7 PROJECT SCHEDULE REPORTING

- .1 Update Project Schedule on daily basis reflecting activity changes and completions, as well as activities in progress.
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- .2 Include as part of Project Schedule, narrative report identifying Work status to date, comparing current progress to baseline, presenting current forecasts, defining problem areas, anticipated delays and impact with possible mitigation.

1.8 PROJECT MEETINGS

- .1 Discuss Project Schedule at regular site meetings identify activities that are behind schedule and provide measures to regain slippage. Activities considered behind schedule are those with projected start or completion dates later than current approved dates shown on baseline schedule.
- .2 Weather related delays with their remedial measures will be discussed and negotiated.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

- .1 Not used.

PART 1 - GENERAL

1.1 ADMINISTRATIVE

- .1 Submit to Departmental Representative submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
 - .2 Do not proceed with Work affected by submittal until review is complete.
 - .3 Present shop drawings, product data and samples in SI Metric units.
 - .4 Where items or information is not produced in SI Metric units converted values are acceptable.
 - .5 Review submittals prior to submission to Departmental Representative. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.
 - .6 Notify Departmental Representative, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
 - .7 Verify field measurements and affected adjacent Work are co-ordinated.
 - .8 Contractor's responsibility for errors and omissions in submission is not relieved by Departmental Representative's review of submittals.
 - .9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Departmental Representative review.
 - .10 Keep one reviewed copy of each submission on site.
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- .11 Submit number of hard copies specified for each type and format of submittal and also submit in electronic format as pdf files. Forward pdf files on CD or through email.

1.2 SHOP DRAWINGS

- .1 The term "shop drawings" means drawings, AND PRODUCT DATA diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.
 - .2 Submit drawings stamped and signed by professional engineer registered or licensed in Province of Ontario of Canada.
 - .3 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
 - .4 Allow 5 working days for Departmental Representative's review of each submission.
 - .5 Adjustments made on shop drawings by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.
 - .6 Make changes in shop drawings as Departmental Representative may require, consistent with Contract Documents. When resubmitting, notify Departmental Representative in writing of revisions other than those requested.
 - .7 Accompany submissions with transmittal letter, in duplicate, containing:
 - .1 Date.
 - .2 Project title and number.
 - .3 Contractor's name and address.
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- .4 Identification and quantity of each shop drawing, product data and sample.
 - .5 Other pertinent data.
 - .8 Submissions shall include:
 - .1 Date and revision dates.
 - .2 Project title and number.
 - .3 Name and address of:
 - .1 Subcontractor.
 - .2 Supplier.
 - .3 Manufacturer.
 - .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
 - .5 Details of appropriate portions of Work as applicable:
 - .1 Fabrication.
 - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
 - .3 Setting or erection details.
 - .4 Capacities.
 - .5 Performance characteristics.
 - .6 Standards.
 - .7 Operating weight.
 - .8 Wiring diagrams.
 - .9 Single line and schematic diagrams.
 - .10 Relationship to adjacent work.
 - .9 After Departmental Representative's review, distribute copies.
 - .10 Submit three hard copies and one electronic copy of shop drawings for each requirement requested in specification Sections and as Departmental Representative may reasonably request.
 - .11 Submit three hard copies and one electronic copy of product data sheets or brochures for requirements requested in specification Sections and as requested by Departmental Representative where shop drawings will not be prepared due to standardized manufacture of product.
 - .12 Submit three hard copies and one electronic copy of test reports for requirements requested in specification Sections and as requested by Departmental Representative.
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- .1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.
 - .2 Testing must have been within 3 years of date of contract award for project.
 - .13 Submit three hard copies and one electronic copy of certificates for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
 - .2 Certificates must be dated after award of project contract complete with project name.
 - .14 Submit three hard copies and one electronic copy of manufacturers instructions for requirements requested in specification Sections and as requested by Departmental Representative.
 - .1 Pre-printed material describing installation of product, system or material, including special notices and Material Safety Data Sheets concerning impedances, hazards and safety precautions.
 - .15 Submit three hard copies and one electronic copy of Manufacturer's Field Reports for requirements requested in specification Sections and as requested by Departmental Representative.
 - .16 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
 - .17 Delete information not applicable to project.
 - .18 Supplement standard information to provide details applicable to project.
 - .19 If upon review by Departmental Representative, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission
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of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.

- .20 The review of shop drawings by Public Works and Government Services Canada (PWGSC) is for sole purpose of ascertaining conformance with general concept.
 - .1 This review shall not mean that Departmental Representative approves detail design inherent in shop drawings, responsibility for which shall remain with Contractor submitting same, and such review shall not relieve Contractor of responsibility for errors or omissions in shop drawings or of responsibility for meeting requirements of construction and Contract Documents.
 - .2 Without restricting generality of foregoing, Contractor is responsible for dimensions to be confirmed and correlated at job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for co-ordination of Work of sub-trades.

1.3 SAMPLES

- .1 Submit for review samples in duplicate as requested in respective specification Sections. Label samples with origin and intended use.
 - .2 Deliver samples prepaid to Departmental Representative's business address.
 - .3 Notify Departmental Representative in writing, at time of submission of deviations in samples from requirements of Contract Documents.
 - .4 Adjustments made on samples by Departmental Representative are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Departmental Representative prior to proceeding with Work.
 - .5 Make changes in samples which Departmental Representative may require, consistent with Contract Documents.
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- .6 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.
- .7 Supply to Departmental Representative copies of the soil chemistry results for each proposed borrow source a minimum of 10 days prior to start of earthworks.
- .8 Allow one working day for Departmental Representative's review of each soil chemistry submission.

1.4 CERTIFICATES

- .1 Immediately after award of Contract, submit Workers' Safety and Insurance Board Experience Report.
- .2 Submit transcription of insurance immediately after award of Contract.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

- .1 Not used.

PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

- .1 Section 31 23 11 Earthworks for Capping Soil Project.

1.2 REFERENCES

- .1 Ministry of Transportation, Ontario (MTO)
 - .1 Ontario Traffic Manual, Book 7: Temporary Conditions.

1.3 PROTECTION OF PUBLIC TRAFFIC

- .1 Comply with requirements of Acts, Regulations and By-Laws in force for regulation of traffic or use of roadways upon or over which it is necessary to carry out Work or haul materials or equipment.
 - .2 When working on travelled way:
 - .1 Place equipment in position to minimize interference and hazard to travelling public.
 - .2 Keep equipment units as close together as working conditions permit and preferably on same side of travelled way.
 - .3 Do not leave equipment on travelled way overnight.
 - .3 Close lanes of road only after receipt of written approval from Departmental Representative.
 - .1 Before re-routing traffic erect suitable signs and devices to Ontario Traffic Manual, Book 7: Temporary Conditions.
 - .4 Keep travelled way graded, free from pot holes and of sufficient width for required number of lanes of traffic.
 - .1 Provide 7 m wide minimum temporary roadway for traffic in two-way sections through Work and on detours.
 - .2 Provide 5 m wide minimum temporary roadway for traffic in one-way sections through Work and on detours.
 - .5 Provide temporary roads to facilitate passage of traffic around restricted construction area:
 - .1 Grade and maintain as required to ensure traffic flow.
 - .6 Provide and maintain road access and egress to property fronting along Work under Contract and in other areas as indicated, except where other means of road access exist that meet approval of Departmental Representative.
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1.4 INFORMATIONAL AND WARNING DEVICES

- .1 Provide and maintain signs and other devices required to indicate construction activities or other temporary and unusual conditions resulting from Project Work which requires road user response.
- .2 Supply and erect signs, delineators, barricades and miscellaneous warning devices to Ontario Traffic Manual, Book 7: Temporary Conditions.
- .3 Place signs and other devices in locations recommended in Ontario Traffic Manual, Book 7: Temporary Conditions.
- .4 Meet with Departmental Representative prior to commencement of Work to prepare list of signs and other devices required for project. If situation on site changes, revise list to approval of Departmental Representative.
- .5 Continually maintain traffic control devices in use:
 - .1 Check signs daily for legibility, damage, suitability and location. Clean, repair or replace to ensure clarity and reflectance.
 - .2 Remove or cover signs which do not apply to conditions existing from day to day.

1.5 CONTROL OF PUBLIC TRAFFIC

- .1 Provide competent flag personnel, trained in accordance with, and properly equipped to Ontario Traffic Manual, Book 7: Temporary Conditions for situations as follows:
 - .1 When public traffic is required to pass working vehicles or equipment that block all or part of travelled roadway.
 - .2 When it is necessary to institute one-way traffic system through construction area or other blockage where traffic volumes are heavy, approach speeds are high and traffic signal system is not in use.
 - .3 When workmen or equipment are employed on travelled way over brow of hills, around sharp curves or at other locations where oncoming traffic would not otherwise have adequate warning.
 - .4 Where temporary protection is required while other traffic control devices are being erected or taken down.
 - .5 For emergency protection when other traffic control devices
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- are not readily available.
- .6 In situations where complete protection for workers, working equipment and public traffic is not provided by other traffic control devices.
 - .7 At each end of restricted sections where pilot cars are required.
 - .8 Delays to public traffic due to contractor's operators:10 minutes maximum.
- .2 Where roadway, carrying two-way traffic, is restricted to one lane, for 24 hours each day, provide portable traffic signal system.
 - .1 Adjust, as necessary, and regularly maintain system during period of restriction.
 - .2 Ensure signal system meets requirements of Ontario Traffic Manual, Book 7: Temporary Conditions.

1.6 OPERATIONAL REQUIREMENTS

- .1 Maintain existing conditions for traffic throughout period of contract except that, when required for construction under contract and when measures have been taken as specified and approved by Departmental Representative to protect and control public traffic, existing conditions for traffic to be restricted as follows:
 - .1 Section from beach front east of the East Headlands to the intersection of Main Street and the East Headlands parking lot as indicated.
 - .1 One lane closed for 1 km.
 - .2 Speed limit reduced to 30 km/h for 1 km.
 - .2 Maintain existing conditions for traffic crossing right-of-way.
 - .3 Maintain existing conditions for traffic crossing right-of-way except when required for construction. With approval of Departmental Representative, existing conditions for cross traffic restricted.
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PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not Used.

PART 1 - GENERAL

1.1 REFERENCES

- .1 Canadian General Standards Board (CGSB)
 - .1 CGSB 51-GP-51M-81, Polyethylene Sheet for Use in Building Construction.
- .2 Transportation and Dangerous Goods Regulations including SOR/2011-210 (Amendment 10) and SOR/2011-239 (Amendment 8).
- .3 Canadian Council of Ministers of the Environment (CCME) Documentation.

1.2 SUBMITTALS

- .1 Submittals: in accordance with Section 01 11 06 and to include an Environmental Protection Plan.
 - .2 Submit, prior to start of work, plan detailing management of wastes.
 - .3 Submittals for Progress Meetings: make submittals at least 48 hours prior to scheduled progress meetings as follows:
 - .1 Updated progress schedule detailing activities. Include review of progress with respect to previously established dates for starting and stopping various stages of Work, major problems and action taken, injury reports, equipment breakdown, and material removal.
 - .2 Copies of transport manifests, trip tickets, and disposal receipts for waste materials removed from work areas.
 - .3 Weekly copies of site entry and work area logbooks with information on worker and visitor access.
 - .4 Copies of the completed underground locates.
 - .5 Daily logs documenting inspection of erosion and sediment controls.
 - .6 Information on borrow sources being used to supply backfill material.
 - .7 Other information required by Departmental Representative or relevant to agenda for upcoming progress meeting.
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- .4 Complete the Remediation and Risk Management Checklist included in Appendix 2 and following the completion of the work submit a copy of the completed checklist to the Departmental Representative.

- .5 Site Layout: within 7 days after date of Notice to Proceed and prior to mobilization to site, submit site layout drawings showing existing conditions and facilities, construction facilities and temporary controls provided by Contractor including following:
 - .1 Means of ingress, egress and temporary traffic control facilities. Refer to Section 01 35 00 for traffic control and comply with MCE bylaws.
 - .2 Equipment and material staging areas.
 - .3 Truck and vehicle routes, entrances and exits to the Work Sites are to be identified and documented prior to the initiation of construction work at the Work Area.
 - .4 Soil stockpile areas and temporary demolition debris stockpile areas shall be confirmed before construction work begins and any proposed changes to the areas indicated on the enclosed contract drawings will be confirmed by the Departmental Representative. The locations of the stockpiles and debris management areas will be selected based on ability to control potential erosion and the migration of soil and dust. Stockpile locations shall be placed away from areas accessible to or frequented by the public and away from other environmentally sensitive areas. Exclusion Zones, Contaminant Reduction Zones, and other zones specified in Contractor's site-specific Health and Safety Plan.
 - .5 Grading, including contours, required to construct temporary facilities.

1.3 REGULATORY REQUIREMENTS

- .1 Provide erosion and sediment control in accordance with federal, provincial and local regulations.

 - .2 Comply with federal, provincial, and local anti-pollution laws, ordinances, codes, and regulations when disposing of waste materials, debris, and rubbish.
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- .3 Work to meet or exceed minimum requirements established by federal, provincial, and local laws and regulations which are applicable including the mitigation measures outlined in Appendix 3.
 - .1 Contractor: responsible for complying with amendments as they become effective.
- .4 In event that compliance exceeds scope of work or conflicts with specific requirements of contract notify Departmental Representative immediately.

1.4 SEQUENCING AND SCHEDULING

- .1 The Work is to be completed following the sequencing outlined in the Master Plan as reviewed and approved by the Departmental Representative. The sequencing of the Work cannot be amended without the authorization of the Departmental Representative.

1.5 SOIL STOCKPILING FACILITIES

- .1 Not Used.

1.6 IMPACTED WATER STORAGE TANK

- .1 Not Used.

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 as determined by Departmental Representative; transport and place into designated area approved by Departmental Representative. Clean access roads at least once per shift.
 - .2 Departmental Representative 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 Departmental Representative.
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1.8 DUST AND PARTICULATE CONTROL

- .1 Execute Work by methods to minimize raising dust from construction operations.
- .2 Implement and maintain dust and particulate control measures as determined necessary by Departmental Representative during remediation works and in accordance with Province of Ontario regulations.
- .3 Provide positive means to prevent airborne dust from dispersing into atmosphere. Use potable water for water misting system for dust and particulate control.
- .4 Use chemical means for water misting system for dust and particulate control only with Departmental Representative's prior written approval.
- .5 As minimum, use appropriate covers on trucks hauling fine or dusty material. Use watertight vehicles to haul wet materials.
- .6 Prevent dust from spreading to adjacent property sites.
- .7 Departmental Representative will stop work at any time when Contractor's control of dusts and particulates is inadequate for wind conditions present at site, or when air quality monitoring (may be done by others) indicates that release of fugitive dusts and particulates into atmosphere equals or exceeds specified levels as set out by Ministry of Labour or other Authorities Having Jurisdiction.
- .8 If Contractor's dust and particulate control is not sufficient for controlling dusts and particulates into atmosphere, stop work. Contractor must discuss procedures with Departmental Representative that Contractor proposes to resolve problem. Make necessary changes to operations prior to resuming excavation, handling, processing, or other work that may cause release of dusts or particulates.

1.9 POLLUTION CONTROL

- .1 Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from
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discharge of noxious toxic substances and pollutants produced by construction operations.

- .2 Be prepared to intercept, clean up, and dispose of spills or releases that may occur whether on land or water. Maintain materials and equipment required for cleanup of spills or releases readily accessible on site.
- .3 Promptly report spills and releases potentially causing damage to environment to:
 - .1 Authority having jurisdiction or interest in spill or release including conservation authority, water supply authorities, drainage authority, road authority, and fire department.
 - .2 Owner of pollutant, if known.
 - .3 Person having control over pollutant, if known.
 - .4 Departmental Representative.
 - .5 Ontario Ministry of Environment Spills Action Centre (1-800-268-6060).
- .4 Contact manufacturer of pollutant if known and ascertain hazards involved, precautions required, and measures used in cleanup or mitigating action.
- .5 Take immediate action using available resources to contain and mitigate effects on environment and persons from spill or release.
- .6 Provide spill response materials including, containers, adsorbent, shovels, and personal protective equipment. Make spill response materials available at all times in which hazardous materials or wastes are being handled or transported. Spill response materials: compatible with type of material being handled.

1.10 WATER CONTROL

- .1 Prevent surface water runoff from entering the work area.
 - .2 Protect site from puddling or running water. Grade site to drain.
 - .3 Prevent surface water runoff from leaving work areas. During all stages of work, employ storm water runoff management measures to limit the amount of impacted runoff escaping from the Site. The Contractor shall take all
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necessary steps to control and prevent any degradation of storm water runoff from the Site. These measures may include the use of suitable geotextile within local catch basins for filtration, placement of tarps over exposed soil stockpiles and placement of silt fences along the armour stone breakwater at the water's edge of the East Headlands. Consideration shall be given to storm water runoff management for after work periods and weekends.

- .4 Groundwater management is not anticipated.
 - .5 Do not discharge contaminated water, or surface water runoff, or groundwater which may have come in contact with potentially contaminated material, off site or to municipal sewers.
 - .6 Prevent precipitation from infiltrating or from directly running off stockpiled materials. Cover stockpiled materials with an impermeable liner during periods of work stoppage including at end of each working day and as directed by Departmental Representative.
 - .7 Dispose of water in manner not injurious to public health or safety, to property, or to any part of Work completed or under construction.
 - .8 Provide, operate, and maintain necessary equipment appropriately sized to manage any petroleum hydrocarbon impacted water (sheen or free product) within the work area.
 - .9 Have on hand sufficient pumping equipment, machinery, and tankage in good working condition for ordinary emergencies, including power outage, and competent workers for operation of pumping equipment.
 - .10 Contain and collect impacted waters and transfer such collected waters to an off-site disposal facility approved for use by the Departmental Representative.
 - .11 Assist the Departmental Representative, as required, in the testing and classification of the impacted waters prior to discharge.
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1.11 EROSION AND SEDIMENT CONTROL

- .1 Plan and execute construction by methods to control surface drainage from cuts and fills, from stockpiles, staging areas, and other work areas. Prevent erosion and sedimentation.
 - .2 Minimize amount of bare soil exposed at one time. Stabilize disturbed soils as quickly as practical. Strip vegetation, regrade, or otherwise develop 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 Departmental Representative.
 - .3 Provide and maintain temporary measures which may include, silt fences, hay or straw bales, geotextile and 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. Place silt fences immediately adjacent the armour stone wall at the water's edge within the East Headlands.
 - .4 Silt Fence: assembled, ready to install unit consisting of geotextile attached to driveable posts. Geotextile: uniform in texture and appearance, having no defects, flaws, or tears that would affect its physical properties; and contain sufficient ultraviolet ray inhibitor and stabilizers to provide minimum 2-year service life from outdoor exposure.
 - .5 Net Backing: industrial polypropylene mesh joined to geotextile at both top and bottom with double stitching of heavy-duty cord, with minimum width of 750 mm.
 - .6 Posts: sharpened wood, approximately 50 mm square, protruding below bottom of geotextile to allow minimum 450 mm embedment; post spacing 2.4 m maximum. Securely fasten each post to geotextile and net backing using suitable staples.
 - .7 Hay or Straw Bale: wire bound or string tied; securely anchored by at least 2 stakes or rebars driven through bale 300 mm to 450 mm into ground; chinked (filled by
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wedging) with hay or straw to prevent water from escaping between bales; and entrenched minimum of 100 mm into ground.

- .8 Plan construction procedures to avoid damage to work or equipment encroachment onto water bodies or drainage ditch banks. In event of damage, promptly notify Departmental Representative and take action to mitigate effects under the direction of Departmental Representative. Restore affected bank or water body to existing condition.
 - .9 Installation:
 - .1 Construct temporary erosion control items as indicated. Actual alignment and/or location of various items as directed by Departmental Representative.
 - .2 Check erosion and sediment control measures weekly after each rainfall; during prolonged rainfall check daily.
 - .3 Bales and/or silt fence may be removed at beginning of work day, replace at end of work day.
 - .4 Whenever sedimentation is caused by stripping vegetation, regrading, or other development, remove it from adjoining surfaces, drainage systems, and watercourses, and repair damage as quickly as possible.
 - .5 Prior to or during the works, Departmental Representative may require installation or construction of improvements to prevent or correct temporary conditions on site. Improvements may include berms, mulching, sediment traps, grading and other measures appropriate to specific condition. Temporary improvements must remain in place and in operation as necessary or until otherwise directed by Departmental Representative.
 - .6 Only as directed by Departmental Representative, remove temporary erosion and sediment control devices upon completion of Work. Spread accumulated sediments to form a suitable surface for seeding or dispose of, and shape area to permit natural drainage to satisfaction of Departmental Representative. Materials once removed become property of Contractor.
 - .10 Periodically inspect earthwork (minimum of once per working day) to detect evidence of erosion and
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sedimentation; promptly apply corrective measures.

- .11 If soil and debris from site accumulate in low areas, roadways or other areas where in Departmental Representative's determination it is undesirable, remove accumulation and restore area to original condition.

1.12 PROGRESS CLEANING

- .1 Maintain cleanliness of Work and surrounding site to comply with federal, provincial, and local fire and safety laws, ordinances, codes, and regulations, and to the satisfaction of the Departmental Representative.
- .2 Co-ordinate cleaning operations with disposal operations to prevent accumulation of dust, dirt, debris, rubbish, and waste materials.

1.13 FINAL DECONTAMINATION

- .1 Perform final decontamination of construction facilities, equipment, and materials which may have come in contact with potentially contaminated materials prior to removal from site.
- .2 Perform decontamination as specified to satisfaction of Departmental Representative. Departmental Representative will direct Contractor to perform additional decontamination if required at no cost to Canada.

1.14 REMOVAL AND DISPOSAL

- .1 Remove surplus materials and temporary facilities from site.
 - .2 Dispose of non-contaminated waste materials, litter, debris, and rubbish off site.
 - .3 Do not burn or bury rubbish and waste materials on site.
 - .4 Do not dispose of volatile or hazardous wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains.
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- .5 Do not discharge wastes into streams, waterways or local sewers (storm or sanitary).
- .6 Dispose of following materials at appropriate off-site facility identified by Contractor and approved by Departmental Representative:
 - .1 Debris including excess construction material.
 - .2 Non-contaminated litter and rubbish.
 - .3 Disposable PPE worn during final cleaning.
- .7 Dispose of materials in accordance with Section 01 35 43 or as directed by Departmental Representative.
- .8 Minimize generation of hazardous waste to maximum extent practicable. Take necessary precautions to avoid mixing clean and contaminated wastes.

1.15 RECORD KEEPING

- .1 Maintain adequate records to support information provided to Departmental Representative regarding exception reports.
- .2 Maintain bills of lading for minimum of 375 days from date of shipment or longer period required by applicable law or regulation.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

- .1 Not Used.

PART 1 - GENERAL

1.1 REFERENCES

- .1 Province of Ontario:
 - .1 Occupational Health and Safety Act Revised Statutes of Ontario 1990, Chapter O.1 as amended, and Regulations for Construction Projects, O. Reg. 213/91 as amended.
 - .2 O. Reg. 490/09, Designated Substances.
 - .3 Workplace Safety and Insurance Act, 1997.
 - .4 Municipal statutes and authorities.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 11 06.
 - .2 Submit site-specific Health and Safety Plan: Within 5 working days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:
 - .1 Results of site specific safety hazard assessment.
 - .2 Results of safety and health risk or hazard analysis for site tasks and operation found in work plan.
 - .3 Measures and controls to be implemented to address identified safety hazards and risks.
 - .4 Provide a Fire Safety Plan, specific to the work location.
 - .5 Contractor's and Sub-contractor's Safety Communication Plan.
 - .6 Contingency and Emergency Response Plan addressing standard operating procedures specific to the project site to be implemented during emergency situations.
 - .3 Departmental Representative will review Contractor's site-specific Health and Safety Plan and provide comments to Contractor within 2 working days after receipt of plan. Revise plan as appropriate and resubmit plan to Departmental Representative within 2 working days after receipt of comments from Departmental Representative.
 - .4 Departmental Representative's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall
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responsibility for construction Health and Safety.

- .5 Submit names of personnel and alternates responsible for site safety and health.
- .6 Submit records of Contractor's Health and Safety meetings when requested.
- .7 Submit two copies of Contractor's authorized representative's work site health and safety inspection reports to Departmental Representative daily.
- .8 Submit copies of orders, directions or reports issued by health and safety inspectors of the authorities having jurisdiction.
- .9 Submit copies of incident and accident reports.
- .10 Submit Material Safety Data Sheets (MSDS).
- .11 Submit Workplace Safety and Insurance Board (WSIB)- Experience Rating Report.

1.3 FILING OF NOTICE

- .1 File Notice of Project with Provincial authorities prior to commencement of Work.

1.4 WORK PERMIT

- .1 Not used.

1.5 SAFETY ASSESSMENT

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

1.6 MEETINGS

- .1 Schedule and administer Health and Safety meeting with Departmental Representative prior to commencement of Work.
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1.7 REGULATORY REQUIREMENTS

- .1 Comply with the Acts and regulations of the Province of Ontario.
- .2 Comply with specified standards and regulations to ensure safe operations at site.

1.8 PROJECT/SITE CONDITIONS

- .1 Work at site may involve contact with:
 - .1 Benzene or other petroleum product derivatives, VOC chlorinated solvents and metals associated with impacted soil and/or groundwater at all work areas.
- .2 Work Area is adjacent to a water body.

1.9 GENERAL REQUIREMENTS

- .1 Develop written site-specific Health and Safety Plan based on hazard assessment prior to beginning site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.
- .2 Departmental Representative may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns either accepting or requesting improvements.
- .3 Relief from or substitution for any portion or provision of minimum Health and Safety standards specified herein or reviewed site-specific Health and Safety Plan shall be submitted to Departmental Representative in writing.

1.10 COMPLIANCE REQUIREMENTS

- .1 Comply with Ontario Occupational Health and Safety Act, R.S.O. 1990 Chapter 0.1, as amended.

1.11 RESPONSIBILITY

- .1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may
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be affected by conduct of Work.

- .2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.
- .3 Contractor shall be designated "Constructor", as defined by Occupational Health and Safety Act and Regulations for Construction Projects for the Province of Ontario.

1.12 UNFORSEEN HAZARDS

- .1 Should any unforeseen or peculiar safety-related factor, hazard, or condition become evident during performance of Work, immediately stop work and advise Departmental Representative verbally and in writing.
- .2 Follow procedures in place for Employees Right to Refuse Work as specified in the Occupational Health and Safety Act for the Province of Ontario.

1.13 POSTING OF DOCUMENTS

- .1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of Province of Ontario, and in consultation with Departmental Representative.
 - .1 Contractor's Safety Policy.
 - .2 Constructor's Name.
 - .3 Notice of Project.
 - .4 Name, trade, and employer of Health and Safety Representative or Joint Health and Safety Committee members (if applicable).
 - .5 Ministry of Labour Orders and reports.
 - .6 Occupational Health and Safety Act and Regulations for Construction Projects for Province of Ontario.
 - .7 Address and phone number of nearest Ministry of Labour office.
 - .8 Material Safety Data Sheets.
 - .9 Written Emergency Response Plan.
 - .10 Site Specific Safety Plan.
 - .11 Valid certificate of first aider on duty.
 - .12 WSIB "In Case of Injury At Work" poster.
 - .13 Location of toilet and cleanup facilities.
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1.14 CORRECTION OF NON-COMPLIANCE

- .1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction or by Departmental Representative.
- .2 Provide Departmental Representative with written report of action taken to correct non-compliance of health and safety issues identified.
- .3 Departmental Representative may stop Work if non-compliance of health and safety regulations is not corrected.

1.15 BLASTING

- .1 Blasting or other use of explosives is not permitted.

1.16 WORK STOPPAGE

- .1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.
 - .2 Assign responsibility and obligation to Competent Supervisor to stop or start Work when, at Competent Supervisor's discretion, it is necessary or advisable for reasons of health or safety. Departmental Representative may also stop Work for health and safety considerations.
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PART 2 - PRODUCTS

2.1 NOT USED

.1 Not used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not used.

PART 1 - GENERAL

1.1 DEFINITIONS

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

1.2 SUBMITTALS

- .1 Submit in accordance with Section 01 11 06.
 - .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for geosynthetic products used in relation to the Work and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit 2 copies of WHMIS MSDS.
 - .3 Before commencing construction activities or delivery of materials to site, submit Environmental Protection Plan for review and approval by Departmental Representative.
 - .4 Environmental Protection Plan must include comprehensive overview of known or potential environmental issues to be addressed during construction.
 - .5 Address topics at level of detail commensurate with environmental issue and required construction tasks.
 - .6 Include in Environmental Protection Plan:
 - .1 Names of persons responsible for ensuring adherence to Environmental Protection Plan.
 - .2 Names and qualifications of persons responsible for manifesting hazardous waste to be removed from site.
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- .3 Names and qualifications of persons responsible for training site personnel.
 - .4 Descriptions of environmental protection personnel training program.
 - .5 Erosion and sediment control plan identifying type and location of erosion and sediment controls to be provided including monitoring and reporting requirements to assure that control measures are in compliance with erosion and sediment control plan, Federal, Provincial, and Municipal laws and regulations and EPA 832/R-92-005, Chapter 3.
 - .6 Drawings indicating locations of proposed temporary excavations or embankments for haul roads, material storage areas, structures, sanitary facilities, and stockpiles of excess materials including methods to control runoff and to contain materials on site.
 - .7 Traffic Control Plans including measures to reduce erosion of temporary roadbeds by construction traffic, especially during wet weather.
 - .1 Plans to include measures to minimize amount of material transported onto paved public roads by vehicles or runoff.
 - .8 Work area plan showing proposed activity in each portion of area and identifying areas of limited use or non-use.
 - .1 Plan to include measures for marking limits of use areas and methods for protection of features to be preserved within authorized work areas.
 - .9 Spill Control Plan to include procedures, instructions, and reports to be used in event of unforeseen spill of regulated substance.
 - .10 Non-Hazardous solid waste disposal plan identifying methods and locations for solid waste disposal including clearing debris.
 - .11 Air pollution control plan detailing provisions to assure that dust, debris, materials, and trash, are contained on project site.
 - .12 Contaminant Prevention Plan identifying potentially hazardous substances to be used on job site; intended actions to prevent introduction of such materials into air, water, or ground; and detailing provisions for compliance with Federal, Provincial, and Municipal laws and regulations for storage and handling of these materials.
 - .13 Impacted Water Management Plan identifying methods
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and procedures for management and disposal of impacted waters which are directly derived from excavation activities.

- .14 Historical, archaeological, cultural resources biological resources and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands.

1.3 FIRES

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

1.4 DISPOSAL OF WASTE

- .1 Do not bury rubbish and waste materials on site.
 - .2 Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers.
 - .3 Do not discharge wastes into streams or water ways.
 - .4 Separate and dispose of accumulated waste materials off-site in accordance with R.R.O. 1990, Reg. 347 General Waste Management, to MOECC approved disposal facilities or approved transfer stations, including, but not limited to, the following:
 - .1 Debris including excess construction material.
 - .2 Non-contaminated litter and rubbish.
 - .3 Disposable PPE worn during work activities.
 - .5 Appropriate procedures shall be implemented for handling, temporary storage, transport and disposal of impacted soils during all phases of the project. Refer to Land Disposal Restrictions in O.Reg. 347 - General Waste Disposal under Ontario EPA and MOECC Fact Sheet "Summary of Land Disposal Restrictions, Treatment and Notification Requirements for Waste Generators". Off-site disposal will be by licensed haulers to a MOECC-approved disposal facility.
 - .6 Disposal/recycling of other waste generated during the project shall be done in compliance with Ontario Waste
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Regulations and the facilities used will be approved by the Departmental Representative.

1.5 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 as determined by Departmental Representative; transport and place into designated area approved by Departmental Representative. Clean access roads at least once per shift.
 - .2 Departmental Representative may collect soil samples for chemical analyses from travelling 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 Departmental Representative.
- .2 Vehicles/equipment shall be in good working order and not be leaking any fuel or fluids.
- .3 Restrict access of vehicles from creek banks to protect slope stability.
- .4 Vehicles or equipment refueling to be conducted off-site whenever possible and spill prevention measures are to be implemented when on-site refueling is required.
- .5 Refueling of vehicles and equipment shall not be conducted near watercourses.
- .6 Traffic management measures (such as 'flag man') shall be implemented if required at site access points to direct traffic.

1.6 EQUIPMENT DECONTAMINATION

- .1 Decontaminate equipment after working in potentially contaminated work areas and prior to subsequent work or travel on clean areas.
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- .2 At minimum, perform following steps during equipment decontamination: mechanically remove packed dirt, grit, and debris by scraping and brushing without using steam or high-pressure water. Pay particular attention to tire treads, equipment tracks, springs, joints, sprockets, and undercarriages. Scrub surfaces with long handle scrub brushes. Perform assessment as directed by Departmental Representative to determine effectiveness of decontamination.
- .3 Each piece of equipment may be inspected by Departmental Representative after decontamination and prior to removal from site and/or travel on clean areas. Departmental Representative will have right to require additional decontamination to be completed if deemed necessary.
- .4 Transfer soils collected from decontamination procedures to area designated by the Departmental Representative.
- .5 Furnish and equip personnel engaged in equipment decontamination with protective equipment including suitable disposable clothing, respiratory protection, and face shields.
- .6 Decontamination of equipment shall be completed a minimum of 10 m away from any water body.

1.7 DRAINAGE

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

1.8 SURFACE WATER AND GROUNDWATER QUALITY

- .1 Materials and equipment shall be operated and stored in a manner that prevents deleterious substances (e.g. petroleum products, silt, etc.) as defined by the Fisheries Act from entering surface water.
-

1.9 SITE CLEARING AND PLANT PROTECTION

- .1 Protection of trees and plants on site is not required unless instructed by Departmental Representative.
- .2 Protect trees and shrubs adjacent to work areas.
- .3 Minimize stripping of topsoil and vegetation.

1.10 VEGETATION

- .1 Protect vegetation that does not have to be removed by fencing/delineating work areas or storage areas.
- .2 Operating construction machinery in a manner that minimizes damage to adjacent vegetation.

1.11 WORK ADJACENT TO WATERWAYS

- .1 Construction equipment to be operated on land only.
- .2 Use of waterway beds for borrow material is not permitted.
- .3 Waterways to be kept free of excavated fill, waste material and debris.
- .4 Design and construct sediment control structures to avoid erosion to waterways.

1.12 POLLUTION CONTROL

- .1 Maintain temporary erosion and pollution control features installed under this Contract.
 - .2 Implement dust abatement measures as required to control dust.
 - .3 Cover or wet down material stockpiles to prevent blowing dust. Provide dust control as required.
 - .4 Control emissions from equipment and plant in accordance with local authorities' emission requirements.
-

1.13 SPILLS OR RELEASE OF DELTERIOUS SUBSTANCES

- .1 Immediately contain, limit spread and clean up in accordance with provincial regulatory requirements.
 - .2 All workers shall be fully aware of the spill prevention and response procedures including notification of Departmental Representative.
 - .3 The Ontario Ministry of Environment and Climate Change Spills Action Centre by law must be notified immediately at 1-800-268-6060.
 - .4 The Departmental Representative shall be immediately informed of all spills that occur on site.
 - .5 Further information on dangerous goods emergency cleanup and precautions including a list of companies performing this work can be obtained from the Transport Canada 24-hour number (613) 996-6666 collect.
 - .6 Spill kits will be kept on-site during all project phases.
 - .7 Contractor shall take due care to ensure no deleterious materials including sediment-laden runoff leave the worksite, or enter any: surface water, storm water, or sanitary sewers at or near the worksite.
 - .8 Equipment fuelling or lubricating shall occur in an area designated by the Departmental Representative with proper controls to prevent the release of deleterious substances, and shall be conducted away from any surface water drains or collection points.
 - .9 In accordance with the Fisheries Act, approval must be obtained from DFO for use of any paints, corrosion protective coatings, wood preservatives or any other hazardous material that will be applied to surfaces that will have contact with the marine environment.
 - .10 Any equipment remaining on site overnight shall have appropriately placed drip pans.
 - .11 Protect the roadways from tracking of mud, soil, and debris throughout the work.
-

- .12 Prevent discharges containing asphalt, grout, concrete or other waste materials from reaching storm drains or the marine environment. This includes, but is not limited to:
 - .1 Minimizing the washing of sand or gravel from new asphalt, debris from drilling or cutting or other materials into storm drains and the marine environment by sweeping.
 - .2 Application of fog seals, tack coats or other coatings, if required, during periods when rainfall is unlikely to occur during application.
 - .3 Cleaning equipment off site.
 - .4 Protection of drainage structures with filter fences if required.

1.14 NOISE

- .1 All construction equipment shall be operated with exhaust systems in good repair to minimize noise.
- .2 Construction activities that could create excessive noise shall be restricted to daylight hours and adhere to the municipal noise by-law.
- .3 If work is to be undertaken outside the specified period in the local noise by-law, then approval for an exemption to the by-law shall be obtained by the Contractor from the municipality.
- .4 Ensure that noise control devices (i.e. mufflers, silencers) on construction equipment are properly maintained.

1.15 HISTORICAL/ARCHAEOLOGICAL CONTROL

- .1 Provide historical, archaeological, cultural resources, biological resources, and wetlands plan that defines procedures for identifying and protecting historical, archaeological, cultural resources, biological resources and wetlands known to be on project site and identifies procedures to be followed if historical, archaeological, cultural resources, biological resources and wetlands not previously known to be on site or in area are discovered during construction.
-

- .2 Plan: include methods to assure protection of known or discovered resources and identify lines of communication between Contractor personnel and Departmental Representative.
- .3 If archaeological deposits are discovered during the project work shall stop immediately and the Departmental Representative shall be notified immediately.
- .4 Archaeologically significant material, if found on the property, remains the property of the Crown and shall not be removed from the site.
- .5 Management of the archaeological materials will be coordinated through the Departmental Representative.

1.16 NOTIFICATION

- .1 Departmental Representative will notify Contractor in writing of observed noncompliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and other elements of Contractor's Environmental Protection Plan.
- .2 Contractor, after receipt of such notice, shall inform Departmental Representative of proposed corrective action and take such action for approval by Departmental Representative.
- .3 Departmental Representative will issue stop order of work until satisfactory corrective action has been taken.
- .4 No time extensions granted or equitable adjustments allowed to Contractor for such suspensions.

1.17 SPECIES AT RISK

- .1 Should a Species at Risk or its critical habitat be encountered, the Contractor shall stop work and contact the Departmental Representative for direction.
-

1.18 FISH/FISH HABITAT

- .1 All materials and equipment used will be operated and stored in a manner that prevents any deleterious substance (e.g. petroleum products, silt, etc.) as defined by the Fisheries Act from entering the surface water.

1.19 GREEN REMEDIATION

- .1 Energy
 - .1 Select suitably sized power machinery and equipment that operate using clean alternative fuels, are energy efficient or hybrid, and maintain equipment at peak performance to maximize efficiency.
 - .2 Purchase materials from one supplier of locally produced products and select local providers for field operations.
 - .3 Coordinate outside services and service providers to minimize transport of equipment.
 - .4 Employ auxiliary power units to power cab heating and air conditioning when a machine is unengaged.
 - .5 Replace, repower, or retrofit older engines with advanced emission control devices to reduce harmful pollutants.
 - .6 Control nuisance odours associated with diesel emissions from construction equipment.
 - .7 Maintain engines to meet original standards and train operators to run equipment efficiently.
 - .2 Water
 - .1 Minimize fresh water and potable water consumption and maximize use of non-potable water and water reuse during daily operations.
 - .2 Prevent nutrient loading in nearby water bodies.
 - .3 Minimize runoff using open-space preservation methods such as duster development, reduced pavement widths, and shared transportation access.
 - .3 Air Emissions
 - .1 Reduce atmospheric release of toxic or priority pollutants and minimize dust export of contaminants.
 - .2 Consolidate onsite and offsite vehicular trips to reduce fuel consumption.
-

- .3 Cover excavated areas with biodegradable fabric or with synthetic material that can be reused for other purposes.
 - .4 Secure and cover loose, excavated material in open trucks, and reuse with reuseable covers.
 - .5 Revegetate excavated areas as quickly as possible.
 - .6 Limit onsite vehicle speeds to 20 km per hour.
 - .7 Retrofit machinery and heavy equipment for diesel-engine emission control and exhaust treatment technologies such as particulate filters and oxidation catalysts.
 - .8 Maintain engines of vehicles and machinery in accordance with manufacturer recommendations.
 - .9 Modify field operations through combined activity schedules, an idle reduction plan, and using machinery with automatic idle-shutdown devices.
 - .10 Replace conventional engines of existing vehicles and purchase new vehicles equipped for hybrid systems or alternative fuel.
 - .11 Minimize the use of heavy equipment that consumes high volumes of fuel and use cleaner fuels such as ultra-low sulphur diesel.
- .4 Waste
- .1 Minimize waste generation and re-use materials whenever possible.
 - .2 Segregate materials such as metals, concrete, and lumber for reuse or recycling.
 - .3 Select the closest licensed waste receiver.
 - .4 Use products with recycled and bio-based content and recycling potential.
 - .5 Salvage uncontaminated objects with potential recycle, resale, donation, or onsite infrastructure value such as steel, concrete, granite, and storage containers.
 - .6 Reuse or recycle recovered product from remedial activities.
 - .7 Salvage wood scraps for onsite landscaping use, mulch, and erosion control.
- .5 Land and Ecosystems
- .1 Establish efficient traffic patterns to minimize soil compaction in work areas.
-

- .2 Ensure all equipment is clean prior to arrival on site to minimize potential of transporting invasive species.
- .3 Minimize soil and habitat disturbance and reduce noise and lighting disturbance.
- .4 Minimize bioavailability of contaminants through adequate contaminant source and plume controls.
- .5 Use environmentally friendly lubricants for engine maintenance.
- .6 Place decontamination station away from environmentally sensitive areas.
- .7 Use secondary containment to avoid cross-contamination.

1.20 ENVIRONMENTAL MITIGATION MEASURES

- .1 Implement the mitigation measures as outlined in the Mitigation Measures Checklist presented in Appendix 3.
- .2 Submit the completed checklist to the Departmental Representative once all related project activities have been completed.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

- .1 Not Used.

PART 1 - GENERAL

1.1 ABBREVIATIONS AND ACRONYMS

- .1 The abbreviations and acronyms are commonly found in the Project Manual and represent the associated organizations or terms.

1.2 MATERIALS, EQUIPMENT AND METHODS

- .1 A:
- .1 AL: aluminum.
 - .2 AB: anchor bolt.
- .2 B:
- .1 B: base.
 - .2 BAS: benthic assessment of sediment.
 - .3 BH: borehole.
 - .4 BL: bottom layer.
 - .5 BLK: block.
 - .6 BOT: bottom.
 - .7 BMP: best management practice.
 - .8 B PL: base plate.
 - .9 BRG: bearing.
 - .10 BSMT: basement.
 - .11 BTEX: benzene, toluene, ethylbenzene, and xylenes.
- .3 C:
- .1 CB: catch basin.
 - .2 CC: centre to centre.
 - .3 CCN: contemplated change notice.
 - .4 CDF: controlled density fill.
 - .5 CEC: Canadian electrical code.
 - .6 CHS: Canadian hydrographic service.
 - .7 CL: centreline.
 - .8 CLR: clear.
 - .9 COL: column.
 - .10 CONC: concrete.
 - .11 CONC BLK: concrete block.
 - .12 CONT: continuous.
 - .13 COMPL: complete.
 - .14 CPM: critical path method.
 - .15 C/W: complete with.
- .4 D:
- .1 D: deep.
-

- .2 DEG: degree.
 - .3 DIA: diameter.
 - .4 DIM: dimension.
 - .5 DL: dead load.

 - .5 E:
 - .1 EA: each.
 - .2 ECF: engineered containment facility.
 - .3 EE: each end.
 - .4 EF: each face.
 - .5 EL: elevation.
 - .6 ELEC: electric.
 - .7 ENCL: enclosure.
 - .8 EQ: equal.
 - .9 EXIST: existing.
 - .10 EW: each way.

 - .6 F:
 - .1 FC: fuel contributed.
 - .2 FDN: foundation.
 - .3 FEXT: fire extinguisher.
 - .4 FIN: finish.
 - .5 FIP: federal identity program.
 - .6 FLD: field.
 - .7 FRR: fire resistance rating.
 - .8 FTG: footing.

 - .7 G:
 - .1 GALV: galvanized steel.
 - .2 GC: General Conditions.
 - .3 GCL: geosynthetic clay liner.

 - .8 H:
 - .1 HOR: horizontal.
 - .2 HOR EF: horizontal each face.
 - .3 HP: hydro pole.
 - .4 HT: height.
 - .5 HYD: hydrant.

 - .9 I:
 - .1 ID: inside diameter.

 - .10 J:
 - .1 JT: joint.
-

- .11 K:
.1 KCCA: Kettle Creek Conservation Authority.
- .12 L:
.1 LNAPL: Light non-aqueous phase liquid.
- .13 M:
.1 MAS: masonry.
.2 MAX: maximum.
.3 MCE: Municipality of Central Elgin.
.4 MET: metal.
.5 MH: maintenance hole.
.6 MIN: minimum.
.7 MW: monitoring well.
- .14 N:
.1 NBC: national building code.
.2 NF: near face.
.3 NFC: national fire code.
.4 NIC: not in contract.
.5 NTS: not to scale.
- .15 O:
.1 OBC: Ontario building code.
.2 OC: on centre.
.3 OD: outside diameter.
.4 OPNG: opening.
.5 OPSS: Ontario Provincial Standard Specifications.
.6 OPSD: Ontario Provincial Standard Drawings.
.7 O.Reg.: Ontario Regulation.
- .16 P:
.1 PAH: polycyclic aromatic hydrocarbons.
.2 PCC: precast concrete.
.3 PHC: petroleum hydrocarbon compounds.
.4 PL: plate.
.5 PLYWD: plywood.
.6 PR: pair.
.7 PRFL: profile.
.8 PT: paint.
.9 PVC: polyvinyl chloride.
- .17 R:
.1 R: radius.
.2 RC: reinforced concrete.
.3 REINF: reinforced/reinforcing.
-

- .4 REQD: required.
 - .5 REQT: requirement.
 - .6 RO: rough opening.
 - .7 RWL: rain water leader.

 - .18 S:
 - .1 SAN SEW: sanitary sewer.
 - .2 SCHED: schedule.
 - .3 SD: smoke developed.
 - .4 SECT: section.
 - .5 SPEC: specification.
 - .6 SS: stainless steel.
 - .7 STD: standard.
 - .8 STL: steel.
 - .9 STC: sound transmission class.
 - .10 STL PL: steel plate.
 - .11 STN: stone.
 - .12 STR: structure or structural.
 - .13 ST SEW: storm sewer.

 - .19 T:
 - .1 T: top.
 - .2 T&B: top and bottom.
 - .3 TCB: turbidity control plan.
 - .4 TEL: telephone.
 - .5 THKNS: thickness.
 - .6 TRANSV: transverse.
 - .7 TYP: typical.

 - .20 U:
 - .1 UGRD: underground.
 - .2 UOS: unless otherwise specified.
 - .3 U/S: underside.

 - .21 V:
 - .1 VERT: vertical.
 - .2 VERT EF: vertical each face.
 - .3 VOC: volatile organic compounds.

 - .22 W:
 - .1 WD: wood.
 - .2 WHMIS: workplace hazardous materials information system.
 - .3 WSIB: workplace safety and insurance board.
 - .4 WT: weight.
 - .5 WTP: water treatment plant.
-

1.3 STANDARDS ORGANIZATIONS

- .1 Standards writing organizations:
 - .1 AA - Aluminum Association.
 - .2 ACPA - American Concrete Pipe Association.
 - .3 ANSI - American National Standards Institute.
 - .4 ASHRAE - American Society of Heating and Refrigerating and Air-Conditioning Engineers.
 - .5 ASTM - American Society for Testing and Materials.

 - .6 AWPA - American Wood Preservers' Association.
 - .7 AWWA - American Water Works Association.
 - .8 CCDC - Canadian Construction Documents Committee.
 - .9 CCMPA - Canadian Concrete Masonry Producers Association.
 - .10 CGSB - Canadian General Standards Board.
 - .11 CNTA - Canadian Nursery Trades Association.
 - .12 CPCA - Canadian Painting Contractors Association.
 - .13 CSA - Canadian Standards Association.
 - .14 CSC - Construction Specifications Canada.
 - .15 CSI - Construction Specifications Institute.
 - .16 CSSBI - Canadian Sheet Steel Building Institute.
 - .17 EEMAC - Electrical and Electronic Manufacturer's Association of Canada.
 - .18 ESA - Electrical Safety Authority.
 - .19 FFC - Federal Fire Commissioner.
 - .20 FSC - Forest Stewardship Council.
 - .21 IEEE - Institute of Electrical and Electronics Engineers Inc.
 - .22 ISO - International Organization for Standardization.
 - .23 LEED - LEED Canada, Leadership in Energy and Environmental Design.
 - .24 MPI - Master Painters Institute.
 - .25 NAAMM - National Association of Architectural Metal Manufacturers.
 - .26 NCPI - National Clay Pipe Institute.
 - .27 NEMA - National Electrical Manufacturers Association.
 - .28 NFPA - National Fire Protection Association.
 - .29 OPSD - Ontario Provincial Standard Drawings.
 - .30 OPSS - Ontario Provincial Standard Specifications.
 - .31 PPI - Plastics Pipe Institute.
 - .32 SCAQMD - South Coast Air Quality Management District.
 - .33 TIA - Telecommunications Industry Association.
-

- .34 UL - Underwriters Laboratories.
- .35 ULC - Underwriters Laboratories of Canada.
- .36 US EPA - United States Environmental Protection Agency.

1.4 FEDERAL GOVERNMENT DEPARTMENTS AND AGENCIES

- .1 Departments, agencies and crown corporations.
 - .1 CEAA - Canadian Environmental Assessment Agency.
 - .2 CSC - Correctional Service Canada.
 - .3 CRA - Canada Revenue Agency.
 - .4 DND - Department of National Defence.
 - .5 DFO - Department of Fisheries and Oceans.
 - .6 EC - Environment Canada.
 - .7 FHBRO - Federal Heritage Buildings Review Office.
 - .8 HCD - Heritage Conservation Directorate.
 - .9 LC - Labour Canada.
 - .10 PC - Parks Canada.
 - .11 PWGSC - Public Works and Government Services Canada.
 - .12 RCMP - Royal Canadian Mounted Police.
 - .13 TBS - Treasury Board Secretariat.
 - .14 TC - Transport Canada.

1.5 PROVINCIAL GOVERNMENT DEPARTMENTS AND AGENCIES

- .1 MOECC - Ontario Ministry of Environment and Climate Change.
- .2 MOL - Ontario Ministry of Labour.
- .3 MTO and MOT - Ontario Ministry of Transportation.

1.6 INTERNATIONAL GOVERNMENT DEPARTMENTS AND AGENCIES

- .1 DOHMH - New York City Department of Health and Mental Hygiene, USA.
- .2 GSA - Government Services Administration, USA.

1.7 UNITS OF MEASURE METRIC

- .1 The following abbreviations of units of measure are commonly found in the Project Manual:
 - .1 C: Celsius.
 - .2 cm: centimetre.
 - .3 kg: kilogram.
-

- .4 kg/m³: kilogram per cubic metre.
- .5 kN: kilonewton.
- .6 kPa: kilopascals.
- .7 kw: kilowatts.
- .8 l/s: litre per second.
- .9 m: metre.
- .10 m³: cubic metre.
- .11 mg/kg: milligrams per kilogram.
- .12 mg/L: milligrams per litre.
- .13 mm: millimetres.
- .14 MPa: megapascal.
- .15 NTU: nephelometric turbidity unit.
- .16 ppm: parts per million.
- .17 ug/L: micrograms per litre.
- .18 ug/m³ micrograms per cubic metre.
- .19 ug/g: micrograms per gram.

1.8 UNITS OF MEASURE IMPERIAL

- .1 The following abbreviations of units of measure are commonly found in the Project Manual:
 - .1 F: Fahrenheit.
 - .2 ft: foot/feet.
 - .3 ga: gauge.
 - .4 gpm: gallons per minute.
 - .5 in: inches.
 - .6 lbs: pounds.
 - .7 NTU: nephelometric turbidity unit.
 - .8 psi: pounds-force per square inch.
 - .9 ppm: parts per million.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

- .1 Not Used.

PART 1 - GENERAL

1.1 SECTION INCLUDES

- .1 Inspection and testing, administrative and enforcement requirements.

1.2 INSPECTION

- .1 Allow Departmental Representative access to Work. If part of Work is in preparation at locations other than Place of Work, allow access to such Work whenever it is in progress.
- .2 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by Departmental Representative instructions, or law of Place of Work.
- .3 If Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
- .4 Departmental Representative may order any part of Work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction. If such Work is found in accordance with Contract Documents, Departmental Representative shall pay cost of examination and replacement.

1.3 INDEPENDENT INSPECTION AGENCIES

- .1 Independent Inspection/Testing Agencies will be engaged by Departmental Representative for purpose of inspecting and/or testing portions of Work under Section 31 23 11, above and beyond those required of the Contractor. Cost of such services will be borne by Departmental Representative.
 - .2 Notwithstanding Clause 1.3.1 the Contractor is responsible for testing to confirm the environmental quality of the imported clean fill and topsoil prior to
-

shipment to site. Results of borrow source testing are to be provided to Departmental Representative ten days prior to start of earthworks. Sampling frequency must comply with the requirements under Ontario Regulation 153/04.

- .3 Allocated costs: to Section 31 23 11.
- .4 Provide equipment required for executing inspection and testing by appointed agencies.
- .5 Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.
- .6 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Departmental Representative at no cost to Departmental Representative. Pay costs for retesting and re-inspection.

1.4 ACCESS TO WORK

- .1 Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.
- .2 Co-operate to provide reasonable facilities for such access.

1.5 PROCEDURES

- .1 Notify appropriate agency and Departmental Representative in advance of requirement for tests, in order that attendance arrangements can be made.
 - .2 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in an orderly sequence so as not to cause delay in Work.
 - .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.
-

1.6 REJECTED WORK

- .1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by Departmental Representative as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
- .2 Make good other Contractor's work damaged by such removals or replacements promptly.
- .3 If in opinion of Departmental Representative, it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, Departmental Representative may deduct from Contract Amount difference in value between Work performed and that called for by Contract Documents, amount of which shall be determined by Departmental Representative.

1.7 REPORTS

- .1 Submit 4 copies of inspection and test reports to Departmental Representative.
- .2 Provide copies to Subcontractor of work being inspected or tested, and manufacturer or fabricator of material being inspected or tested.

1.8 MILL TESTS

- .1 Submit mill test certificates as required of specification Section 31 32.19.01.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

- .1 Not Used.

PART 1 - GENERAL

1.1 SECTION INCLUDES

- .1 Construction aids.
- .2 Office and sheds.
- .3 Parking.

1.2 REFERENCES

- .1 Canadian Standards Association (CSA International)
 - .1 CAN/CSA-Z321-96(R2006), Signs and Symbols for the Occupational Environment, withdrawn but still available from CSA and CCOHS.
- .2 U.S. Environmental Protection Agency (EPA)/ Office of Water
 - .1 EPA 833-R-06-004, May 2007, Developing Your Stormwater Pollution Prevention Plan - A Guide for Construction Sites.

1.3 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00.

1.4 INSTALLATION AND REMOVAL

- .1 Prepare site plan indicating proposed location and dimensions of area to be fenced and used by Contractor, number of trailers to be used, avenues of ingress/egress to fenced area and details of fence installation.
- .2 Identify areas which have to be gravelled to prevent tracking of mud.
- .3 Indicate use of supplemental or other staging area.
- .4 Provide construction facilities in order to execute work expeditiously.
- .5 Remove from site all such work after use.

1.5 SITE STORAGE/LOADING

- .1 Confine work and operations of employees to areas defined

by Contract Documents. Do not unreasonably encumber work areas or lands adjacent work areas with products.

- .2 Do not load or permit to load any part of Work with a weight or force that will endanger the Work.

1.6 CONSTRUCTION PARKING

- .1 Parking will be permitted on site, as indicated, provided it does not disrupt performance of Work.
- .2 Provide and maintain adequate access to project site.
- .3 Build and maintain temporary roads as required during period of Work.
- .4 If authorized to use existing roads for access to project site, maintain such roads for duration of Contract and make good damage resulting from Contractors' use of roads.

1.7 OFFICES

- .1 Provide office heated to 22°C, lighted and ventilated, of sufficient size to accommodate site meetings and furnished with drawing laydown table.
- .2 Provide a clearly marked and fully stocked first-aid case in a readily available location.
- .3 Subcontractors may provide their own offices as necessary. Direct location of these offices.
- .4 Provide, and maintain in clean condition, a desk and work space for the Departmental Representative.

1.8 EQUIPMENT, TOOL AND MATERIALS STORAGE

- .1 Provide and maintain, in a clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.
 - .2 Locate materials not required to be stored in weatherproof sheds on site in a manner to cause least interference with work activities.
-

1.9 SANITARY FACILITIES

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

1.10 PROTECTION AND MAINTENANCE OF TRAFFIC

- .1 Provide access and temporary relocated roads as necessary to maintain traffic.
 - .2 Maintain and protect traffic on affected roads during construction period except as otherwise specifically directed by Departmental Representative.
 - .3 Provide measures for protection and diversion of traffic, including provision of watch-persons and flag-persons, erection of barricades, placing of lights around and in front of equipment and work, and erection and maintenance of adequate warning, danger, and direction signs.
 - .4 Protect travelling public from damage to person and property.
 - .5 Contractor's traffic on roads selected for hauling material to and from site to interfere as little as possible with public traffic.
 - .6 Verify adequacy of existing roads and allowable load limit on these roads. Contractor: responsible for repair of damage to roads caused by construction operations.
 - .7 Construct access and haul roads necessary.
 - .8 Haul roads: constructed with suitable grades and widths; sharp curves, blind corners, and dangerous cross traffic shall be avoided.
 - .9 Provide necessary lighting, signs, barricades, and distinctive markings for safe movement of traffic.
-

- .10 Dust control: adequate to ensure safe operation at all times.
- .11 Location, grade, width, and alignment of construction and hauling roads: subject to approval by Departmental Representative.
- .12 Lighting: to assure full and clear visibility for full width of haul road and work areas during night work operations.
- .13 Provide snow removal during period of Work.
- .14 Remove, upon completion of work, haul roads designated by Departmental Representative.

1.11 CLEAN-UP

- .1 Remove construction debris, waste materials, packaging material from work site daily.
- .2 Clean dirt or mud tracked onto paved or surfaced roadways.
- .3 Store materials resulting from demolition activities that are salvageable.
- .4 Stack stored new or salvaged material.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 - EXECUTION

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction and Contractor's sediment and erosion control plan, specific to site, that complies with EPA 833-R-06-004 or requirements of authorities having jurisdiction, whichever is more stringent.
-

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

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

PART 1 - GENERAL

1.1 SECTION INCLUDES

- .1 Barriers.
- .2 Environmental Controls.
- .3 Traffic Controls.
- .4 Fire Routes.

1.2 REFERENCES

- .1 Canadian General Standards Board (CGSB):
 - .1 CAN/CGSB-1.189-2000, Exterior Alkyd Primer for Wood.
 - .2 CAN/CGSB-1.59-97, Alkyd Exterior Gloss Enamel.
- .2 Canadian Standards Association (CSA):
 - .1 CSA O121-08(R2013), Douglas Fir Plywood.

1.3 INSTALLATION AND REMOVAL

- .1 Provide temporary controls in order to execute Work expeditiously.
- .2 Remove from site all such work after use.

1.4 HOARDING

- .1 Erect temporary site enclosure using modular freestanding fencing: galvanized, minimum 1.8 m high, chain link or welded steel mesh, pipe rail. Provide one lockable truck entrance gate and at least one pedestrian door as directed and conforming to applicable traffic restrictions on adjacent streets. Equip gates with locks and keys. Maintain fence in good repair.
- .2 Fencing is not required adjacent the water's edge within the East Headlands.

1.5 GUARD RAILS AND BARRICADES

- .1 Provide as required by governing authorities.
-

1.6 ACCESS TO SITE

- .1 Provide and maintain access roads, sidewalk crossings, ramps and construction runways as may be required for access to Work.

1.7 PUBLIC TRAFFIC FLOW

- .1 Provide and maintain competent signal flag operators, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect the public.
- .2 Work in accordance with the provisions outlined in the Contractor's Traffic Control Plan.

1.8 FIRE ROUTES

- .1 Maintain access to property including overhead clearances for use by emergency response vehicles.

1.9 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY

- .1 Protect surrounding private and public property from damage during performance of Work.
- .2 Be responsible for damage incurred.

1.10 PROTECTION OF FINISHES

- .1 Provide protection for armour stone breakwater around the East Headlands during performance of work.
 - .2 Provide necessary screens, covers, and hoardings.
 - .3 Confirm with Departmental Representative locations and installation schedule three working days prior to installation.
 - .4 Be responsible for damage incurred due to lack of or improper protection.
-

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TEMPORARY BARRIERS
AND ENCLOSURES

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PART 2 - PRODUCTS

2.1 NOT USED

.1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

.1 Not Used.

END

PWGSC Ontario	EXAMINATION AND	Section 01 71 00
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PART 1 - GENERAL

1.1 SECTION INCLUDES

- .1 Field engineering survey services to measure and stake site.
- .2 Survey services to establish and confirm grades for Work.
- .3 Recording of subsurface conditions found.

1.2 REFERENCES

- .1 MCE existing survey control points(bench mark)and property limits.

1.3 QUALIFICATIONS OF SURVEYOR

- .1 Qualified registered land surveyor, licensed to practice in Ontario, acceptable to Departmental Representative.

1.4 SURVEY REFERENCE POINTS

- .1 Existing base horizontal and vertical control points are designated on drawings.
- .2 Locate, confirm and protect control points prior to starting site work. Preserve permanent reference points during construction.
- .3 Make no changes or relocations without prior written notice to Departmental Representative.
- .4 Report to Departmental Representative when reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.
- .5 Require surveyor to replace control points in accordance with original survey control.

1.5 SURVEY REQUIREMENTS

- .1 Establish temporary bench marks on site, as required to execute the Work, referenced to established bench marks by survey control points. Record locations, with horizontal and vertical data in Project Record Documents.

- .2 Establish lines and levels, locate and lay out, by instrumentation.
- .3 Stake for grading, fill and topsoil placement and landscaping features.
- .4 Stake slopes and berms.

1.6 EXISTING SERVICES

- .1 Before commencing work, establish location and extent of service lines in area of Work and notify Departmental Representative of findings.

1.7 LOCATION OF EQUIPMENT AND FIXTURES

- .1 Location of equipment, fixtures and outlets indicated or specified are to be considered as approximate.
- .2 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance.
- .3 Inform Departmental Representative of impending installation and obtain approval for actual location.
- .4 Submit field drawings to indicate relative position of various services and equipment when required by Departmental Representative.

1.8 RECORDS

- .1 Maintain a complete, accurate log of control and survey work as it progresses.
 - .2 On completion of site grading and placement of the clean cover in work areas, as set out by the Contractor in their work plan, prepare a certified survey showing dimensions, locations, angles and elevations of Work.
 - .3 Record locations of maintained and abandoned service lines.
-

1.9 SUBMITTALS

- .1 Submit name and address of Surveyor to Departmental Representative.
- .2 On request of Departmental Representative, submit documentation to verify accuracy of field engineering work.
- .3 Submit certificate signed by surveyor certifying and noting those elevations and locations of completed Work that conform with Contract Documents.

1.10 SUBSURFACE CONDITIONS

- .1 Promptly notify Departmental Representative in writing if subsurface conditions at Place of Work differ materially from those indicated in Contract Documents, or a reasonable assumption of probable conditions based thereon.
- .2 After prompt investigation, should Departmental Representative determine that conditions do differ materially, instructions will be issued for changes in Work as provided in Changes and Change Orders.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

- .1 Not Used.

PART 1 - GENERAL

1.1 CONSTRUCTION & DEMOLITION WASTE

- .1 Carefully deconstruct and source separate materials/equipment and divert, from D&C waste destined for landfill to maximum extent possible. Target for this project is 75% diversion from landfill. Reuse, recycle, compost, anaerobic digest or sell material for reuse except where indicated otherwise. On site sales are not permitted.
- .2 Source separate waste and maintain waste audits in accordance with the Environmental Protection Act, Ontario Regulation 102/94 and Ontario Regulation 103/94.
 - .1 Provide facilities for collection, handling and storage of source separated wastes.
 - .2 Source separate the following waste:
 - .1 Brick and Portland cement concrete.
 - .2 Corrugated cardboard.
 - .3 Wood.
 - .4 Steel.
 - .5 Asphalt pavement.
 - .3 Submit a waste reduction workplan indicating the materials and quantities of material that will be recycled and diverted from landfill.
 - .1 Indicate how material being removed from the site will be reused and recycled.
 - .4 Submit proof that all waste is being disposed of at a licensed landfill site or waste transfer site. A copy of the disposal/waste transfer site's license and a letter verifying that said landfill site will accept the waste must be supplied to Departmental Representative prior to removal of waste from the demolition site.

1.2 WASTE PROCESSING SITES

- .1 Province of: Ontario.
 - .1 Ministry of Environment and Climate Change, Public Information Centre, 2nd Floor - MacDonald Block, Suite M2-22 - 900 Bay Street, Toronto, ON, M7A 1N3.
 - .2 General Inquiry: 416-325-4000 or 1-800-565-4923 TTY (for persons who are deaf, deafened or hard of hearing).
-

- .3 Telephone: 416-326-9236 or 1-800-515-2759.
- .4 Fax: 416-323-4682.

- .2 Recycling Council of Ontario: 215 Spadina Avenue, #225, Toronto, ON, M5T 2C7.
 - .1 Telephone: 416-657-2797.
 - .2 Fax: 416-960-8053.
 - .3 Email: rco@rco.on.ca.
 - .4 Internet: <http://www.rco.on.ca/>.

1.3 STORAGE, HANDLING AND PROTECTION

- .1 Unless specified otherwise, materials for removal become Contractor's property.
- .2 Protect, stockpile, store and catalogue salvaged items.
- .3 Separate non-salvageable materials from salvaged items. Transport and deliver non-salvageable items to licensed disposal facility.
- .4 Protect structural components not removed for demolition from movement or damage.
- .5 Support affected structures.
- .6 Protect surface drainage, mechanical and electrical from damage and blockage.
- .7 Separate and store materials produced during dismantling of structures in designated areas.
- .8 Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated facilities.
 - .1 On-site source separation is recommended.
 - .2 Remove co-mingled materials to off-site processing facility for separation.
 - .3 Provide waybills for separated materials.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Do not bury rubbish and waste materials on site.
 - .2 Do not dispose of waste, volatile materials, mineral spirits, oil, paint thinner, into waterways, onto ground,
-

storm, or sanitary sewers, or in other location where it will pose health or environmental hazard.

- .3 All waste materials shall be disposed of in a legal manner at a site approved by Local Authorities.
 - .4 Provide acceptable containers for collection and disposal of waste materials, debris and rubbish.
 - .5 Do not allow deleterious substances to enter the waterway.
 - .6 Keep records of construction waste including:
 - .1 Number and size of bins.
 - .2 Waste type of each bin.
 - .3 Total tonnage generated.
 - .4 Tonnage reused or recycled.
 - .5 Reused or recycled waste destination.
 - .7 Remove from site and dispose of all packaging materials at appropriate recycling facilities.
 - .8 Remove materials from deconstruction as deconstruction/disassembly Work progresses.
 - .9 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.
 - .10 All waste materials including containers and waste fluids associated with vehicle maintenance shall be disposed of in a legal manner at a site approved by Local Authorities.
 - .11 Divert unused metal materials from landfill to metal recycling facility as approved by Departmental Representative.
 - .12 Fold up metal banding, flatten and place in designated area for recycling.
 - .13 Divert unused concrete materials from landfill to local quarry approved by Departmental Representative.
 - .14 Divert unused admixtures and additive materials from landfill to official hazardous material collections site as approved by Departmental Representative.
-

- .15 Unused admixtures and additive materials must not be disposed of into sewer systems, into lakes, streams, onto ground or in other location where it will pose health or environmental hazard.
- .16 Prevent admixtures and additive materials from entering drinking water supplies or streams. Using appropriate safety precautions, collect liquid or solidify liquid with inert, noncombustible material and remove for disposal. Dispose of waste in accordance with applicable local, Provincial and National regulations.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 - EXECUTION

3.1 APPLICATION

- .1 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.

3.2 CLEANING

- .1 Remove tools and waste materials on completion of Work, and leave work area in clean and orderly condition.
- .2 Clean-up work area as work progresses.
- .3 Source separate materials to be reused/recycled into specified sort areas.

3.3 DIVERSION OF MATERIALS

- .1 From following list, separate materials from general waste stream and stockpile in separate piles or containers, as reviewed by Departmental Representative, and consistent with applicable fire regulations.
 - .1 Mark containers or stockpile areas.
 - .2 Provide instruction on disposal practices.
-

- .2 Divert unused paint/coating materials from landfill to official hazardous material collections site approved by Departmental Representative.
- .3 Divert unused metal and wiring materials from landfill to metal recycling facility approved by Departmental Representative.

3.4 CANADIAN GOVERNMENTAL DEPARTMENTS CHIEF RESPONSIBILITY FOR THE ENVIRONMENT

- .1 Government Chief Responsibility for the Environment.

Province	Address	General Inquiries	Fax
Ontario	Ministry of Environment and Climate Change Public Information Centre 2nd Floor - MacDonald Block, Suite M2-22 900 Bay St., M7A 1N3	(416) 325-4000 (800) 565-4923 (416) 326-9236 (800) 515-2759	(416) 325-3159

PART 1 - GENERAL

1.1 SECTION INCLUDES

- .1 As-built, samples, and specifications.
- .2 Final site survey.

1.2 SUBMISSION

- .1 Prepare instructions and data using personnel experienced in maintenance and operation of described products.
- .2 Copy will be returned after final inspection, with Departmental Representative's comments.
- .3 Revise content of documents as required prior to final submittal.
- .4 If requested, furnish evidence as to type, source and quality of products provided.

1.3 FORMAT

- .1 Organize data in the form of an instructional manual.
 - .2 Binders: vinyl, hard covered, 3 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.
 - .3 When multiple binders are used, correlate data into related consistent groupings. Identify contents of each binder on spine.
 - .4 Cover: Identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.
 - .5 Arrange content by work type under Section numbers and sequence of Table of Contents.
 - .6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
 - .7 Text: Manufacturer's printed data, or typewritten data.
-

- .8 Drawings: provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- .9 Provide 1:1 scaled CAD files in dwg format. Forward pdf, MS Word, MS Excel, MS Project and Autocad dwg files on USB compatible with PWGSC encryption requirements or through email or alternate electronic file sharing service such as ftp, as directed by Departmental Representative.

1.4 CONTENTS - EACH VOLUME

- .1 Table of Contents: provide title of project;
 - .1 Date of submission; names,
 - .2 Addresses, and telephone numbers of Contractor with name of responsible parties;
 - .3 Schedule of products and systems, indexed to content of volume.
- .2 For each product or system:
 - .1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.
- .3 Product Data: mark each sheet to clearly identify specific products and component parts, and data applicable to installation; delete inapplicable information.
- .4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.
- .5 Typewritten Text: as required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00.

1.5 AS-BUILTS AND SAMPLES

- .1 In addition to requirements in General Conditions, maintain at the site for Departmental Representative one record copy of:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Amendments and addenda.
-

- .4 Change Orders and other modifications to the Contract.
 - .5 Reviewed shop drawings, product data, and samples.
 - .6 Field test records.
 - .7 Inspection certificates.
 - .8 Manufacturer's certificates.
-
- .2 Store record documents and samples in field office apart from documents used for construction. Provide files, racks, and secure storage.
 - .3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual. Label each document "PROJECT RECORD" in neat, large, printed letters.
 - .4 Maintain record documents in clean, dry and legible condition. Do not use record documents for construction purposes.
 - .5 Keep record documents and samples available for inspection by Departmental Representative.
 - .6 Turn one set, paper copy and electronic copy, of AS-BUILT drawings and specifications over to Departmental Representative on completion of work. Submit unlocked source data/electronic files on USB compatible with PWGSC encryption requirements or through email or alternate electronic file sharing service such as ftp, as directed by Departmental Representative.
 - .7 If project is completed without significant deviations from Contract drawings and specifications submit to Departmental Representative one set of drawings and specifications marked "AS-BUILT".

1.6 RECORDING ACTUAL SITE CONDITIONS

- .1 Record information on set of black line opaque drawings, and in copy of Project Manual, provided by Departmental Representative.
 - .2 Provide felt tip marking pens, maintaining separate colours for each major system, for recording information.
-

- .3 Record information concurrently with construction progress. Do not conceal Work until required information is recorded.
- .4 Contract Drawings and shop drawings: legibly mark each item to record actual construction, including:
 - .1 Field changes of dimension and detail.
 - .2 Changes made by change orders.
 - .3 Details not on original Contract Drawings.
 - .4 References to related shop drawings and modifications.
- .5 Specifications: legibly mark each item to record actual construction, including:
 - .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
 - .2 Changes made by Amendments and change orders.
- .6 Other Documents: maintain manufacturer's certifications and field test records, required by individual specifications sections.

1.7 FINAL SURVEY

- .1 Submit final site survey certificate in accordance with Section 01 71 00, certifying that elevations and locations of completed Work are in conformance, or non-conformance with Contract Documents.
- .2 Surveys to be completed by registered Ontario Land Surveyor.

PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not Used.

PART 3 - EXECUTION

3.1 NOT USED

- .1 Not Used.

PWGSC Ontario	DEMOLITION/	Section 02 41 15
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1.1 DESCRIPTION OF WORK

- .1 Demolition of structures shall include all necessary labour, materials and equipment required for the demolition/deconstruction, removal and disposal as specified and as identified on the drawings.

1.2 MEASUREMENT PROCEDURES

- .1 Demolition, removals and disposal of structure within the limits of the former AST enclosure to limits indicated on the drawings will be measured on a square metre basis, as measured in the field, and shall include all labour, materials and equipment necessary to complete the work.

1.3 REFERENCES

- .1 Canadian Standards Association (CSA) International:
 - .1 CSA S350-M1980(R2003), Code of Practice for Safety in Demolition of Structures.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Sections 01 33 00 and Section 01 74 20.
- .2 Submit copies of certified weigh bills from authorized disposal sites and reuse and recycling facilities for material removed from site upon request of Departmental Representative.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 To Section 01 74 20.

1.6 WORK

- .1 Dispose legally off the site all demolished materials.

1.7 SAFETY CODE

- .1 Unless otherwise specified, carry out demolition work in accordance with CSA S350.
-

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PART 2 - PRODUCTS

2.1 NOT USED

- .1 Not used.

PART 3 - EXECUTION

3.1 EXAMINATION

- .1 Inspect the site with the Departmental Representative and verify the extent and location of items designated for removal, demolition, salvage and items to remain.
- .2 Locate and protect utilities. Preserve active utilities traversing the site in operating condition.

3.2 PROTECTION

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

3.3 PREPARATION

- .1 Do not disrupt active power and service lines entering existing buildings and wharf outlets as per rules and regulations of authorities having jurisdiction. Post warning signs on electrical lines and equipment which must remain energized to serve navigational equipment during period of demolition and removal.

3.4 DEMOLITION, REMOVALS AND DISPOSAL

- .1 Neatly demolish and remove residual infrastructure from former AST area to limits indicated on drawings.
 - .2 At end of each day's work, leave Work in safe and stable condition.
 - .1 Protect parts not to be demolished from exterior elements at all times.
-

- .3 Demolish to minimize dusting. Keep materials wetted as directed by Departmental Representative.
- .4 Prevent demolition debris from entering the waterway.
- .5 Dispose of removed materials to appropriate recycling facilities except where specified otherwise, in accordance with authority having jurisdiction.

3.5 CLEANING

- .1 Progress Cleaning: Leave Work area clean at end of each day.
- .2 Ensure public waterways, storm and sanitary sewers remain free of waste and volatile materials disposal.
- .3 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment off site.
- .4 Waste Management: in accordance with Section 01 74 20.

PART 1 - GENERAL

1.1 MEASUREMENT PROCEDURES

- .1 Measure following items in hectares within limits as indicated:
 - .1 Clearing.
 - .2 Grubbing.
- .2 Measure clearing isolated trees and grubbing isolated tree stumps as number of isolated trees cleared and number of isolated stumps grubbed.
- .3 Payment will be made for:
 - .1 Clearing (excluding isolated trees as noted above).
 - .2 Grubbing.
- .4 Payment includes for labour, equipment and supplies required to clear and grub the work area and include for the disposal of generated waste off-site at an appropriate waste receiving site.

1.2 REFERENCES

- .1 U.S. Environmental Protection Agency (EPA) / Office of Water
 - .1 EPA 833-R-06-004, May 2007, Developing Your Stormwater Pollution Prevention Plan - A Guide for Construction Sites.

1.3 DEFINITIONS

- .1 Clearing consists of cutting off trees and brush vegetative growth to not more than a specified height above ground and disposing of felled trees, previously uprooted trees and stumps, and surface debris.
- .2 Grubbing consists of excavation and disposal of stumps and roots to not less than a specified depth below existing ground surface.

1.4 SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00.
-

1.5 QUALITY ASSURANCE

- .1 Do construction occupational health and safety in accordance with Section 01 35 29.
- .2 Safety Requirements: worker protection.
 - .1 Workers must wear gloves, long sleeved clothing, eye protection and any other protective clothing when completing the work.
 - .2 Workers must not eat, drink or smoke while within the work area.
 - .3 Only workers certified to operate chain saws will be allowed to do so. Provide Departmental Representative with proof of training certificate prior to commencing the work.

1.6 STORAGE AND PROTECTION

- .1 Prevent damage to the armour stone breakwater, bench marks, existing pavement, utility lines, site appurtenances and water courses which are to remain.
 - .1 Repair any damaged items to approval of Departmental Representative.
 - .2 Replace any trees designated to remain, if damaged, as directed by Departmental Representative.

1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 20.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Soil Material for Fill:
 - .1 Excavated soil material: free of debris, roots, wood, scrap material, vegetable matter, refuse, soft unsound particles, deleterious, or objectionable materials.
 - .2 Place and compact site derived fill to backfill any depressions created by the removal of tree or brush rootballs as part of this Work.
-

PART 3 - EXECUTION

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction and Contractor's sediment and erosion control plan, specific to site, that complies with EPA 833-R-06-004 or requirements of authorities having jurisdiction, whichever is more stringent.
- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.2 PREPARATION

- .1 Inspect site and verify with Departmental Representative, items designated to remain.
- .2 Locate and protect utility lines. Preserve in operating condition active utilities traversing site.
- .3 Notify utility authorities before starting clearing and grubbing.
- .4 Keep roads and walks free of dirt and debris.

3.3 APPLICATION

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

3.4 CLEARING

- .1 Clearing includes felling and cutting of trees into sections and satisfactory disposal of trees and other vegetation designated for removal, including downed timber, brush, and rubbish occurring within cleared areas.
-

- .2 Clear as indicated, or as directed by Departmental Representative, by cutting at a height of not more than 300 mm above ground. In areas to be subsequently grubbed, height of stumps left from clearing operations to be not more than 1000 mm above ground surface.

3.5 ISOLATED TREES

- .1 Cut off isolated trees as indicated or as directed by Departmental Representative at height of not more than 300 mm above ground surface.
- .2 Grub out isolated tree stumps.

3.6 GRUBBING

- .1 Remove and dispose of roots larger than 7.5 cm in diameter, matted roots, and designated stumps from indicated grubbing areas.
- .2 Grub out stumps and roots to not less than 300 mm below ground surface.
- .3 Grub out visible rock fragments and boulders, greater than 300 mm in greatest dimension, but less than 0.25 m³.
- .4 Fill depressions made by grubbing with suitable material and to make new surface conform with existing adjacent surface of ground.
- .5 Rock fragments and boulders may remain on-site and be used within the perimeter swales on-site.

3.7 REMOVAL AND DISPOSAL

- .1 Remove cleared and grubbed materials off site to an appropriate disposal site.
 - .2 Cut timber greater than 125 mm diameter to 2400 mm lengths and dispose of off-site to an appropriate disposal site.
 - .3 No burning of waste from clearing and grubbing permitted.
-

- .4 Chipping of cleared and grubbed vegetative material on site is allowed however all derived waste must be removed from site to an appropriate disposal site unless otherwise directed by Departmental Representative.

3.8 FINISHED SURFACE

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

3.9 CLEANING

- .1 Proceed in accordance with Section 01 74 20.
- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

PART 1 - GENERAL

1.1 MEASUREMENT PROCEDURES

- .1 Topsoil imported for use as risk management cap fill will be measured in cubic metres of materials placed and accepted in the work and shall include all labour, materials and equipment necessary to complete the work.
- .2 Material placed beyond the limits indicated will not be measured.

1.2 REFERENCES

- .1 U.S. Environmental Protection Agency (EPA) / Office of Water
 - .1 EPA 833-R-06-004, May 2007, Developing Your Stormwater Pollution Prevention Plan - A Guide for Construction Sites.
- .2 Ontario Provincial Standard OPSS 570 - Construction Specifications for Topsoil.

1.3 RELATED SECTIONS

- .1 Section 31 23 11 - Earthworks for Soil Capping Project.
- .2 Section 01 35 43 - Environmental Procedures.

PART 2 - PRODUCTS

2.1 MATERIAL

- .1 Topsoil: Material comprising fertile loamy soil that is free from roots, vegetation or other debris of such size and quantity that prevents proper placement of the topsoil and free of stones and clods over 25 mm in greatest dimension.
 - .2 Provide name of each topsoil borrow source within five days of Contract Award.
 - .3 Complete soil quality testing at the frequency prescribed in Ontario Regulation 153/04 for material sources and provide proof to Departmental Representative prior to importing to site.
-

- .4 Review with Departmental Representative the parameters to be tested from each borrow source. Parameter testing will include, but may not be limited to, inorganic parameters, petroleum hydrocarbons, volatile organic compounds, pesticides and herbicides.

PART 3 - EXECUTION

3.1 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- .1 Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction and the Contractor's sediment and erosion control plan, specific to site, that complies with EPA 833-R-06-004 or requirements of authorities having jurisdiction, whichever is more stringent.
- .2 Inspect, repair, and maintain erosion and sedimentation control measures during construction until permanent vegetation has been established.
- .3 Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.2 PREPARATION OF GRADE

- .1 Verify that grades are correct. If discrepancies occur, notify Departmental Representative and do not commence work until instructed by Departmental Representative.
 - .1 Grade area only when soil is dry to lessen soil compaction.
 - .2 Grade soil establishing natural contours and eliminating uneven areas and low spots, ensuring positive drainage.

3.3 PLACING OF TOPSOIL

- .1 Supply topsoil sufficient to provide 100 mm of cover over entire work area.
 - .2 Place topsoil only after Departmental Representative has accepted subgrade.
-

- .3 During dry conditions spread topsoil by mechanical means in a uniform layer not exceeding 100 mm, over unfrozen subgrade free of standing water.
- .4 Establish traffic patterns for equipment that will prevent driving on topsoil after it has been spread to avoid compaction.
- .5 Cultivate the soil following spreading procedures and cultivation should not go through topsoil to mix subsoil into topsoil.

3.4 CLEANING

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

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PART 1 - GENERAL

1.1 RELATED SECTIONS

- .1 Section 31 14 13 - Topsoil Placement
- .2 Section 31 32 19.01 - Geotextile

1.2 MEASUREMENT PROCEDURES

- .1 Cut and fill work associated with the general grading of the existing surface post clearing and grubbing will be measured in cubic metres of materials relocated and graded based on topographic survey pre- and post- grading works and shall include all labour, materials and equipment necessary to complete the work. Compaction is considered incidental to the work and will not be measured separately for payment.
 - .2 Clean Fill imported for use as risk management cap will be measured in cubic metres of materials placed and accepted in the work and shall include all labour, materials and equipment necessary to complete the work. Compaction is considered incidental to the work and will not be measured separately for payment.
 - .3 Topsoil imported for use as risk management cap fill will be measured in cubic metres of materials placed and accepted in the work and shall include all labour, materials and equipment necessary to complete the work. Costs for supply and placement of topsoil will be measured under Section 31 14 13.
 - .4 Rip rap imported for use in soak away areas, as indicated, will be measured in tonnes of material placed and accepted in the work and shall include all labour, material and equipment necessary to complete the work.
 - .5 Costs for clearing and grubbing will be measured under Section 31 11 00.
 - .6 Materials removed from beyond limits specified will be measured only when Departmental Representative authorizes additional excavation.
 - .7 Material placed beyond the limits indicated will not be
-

measured.

- .8 Management of ponded water onsite is deemed incidental to the work.

1.3 UTILITY LINES

- .1 Before commencing work, establish location and extent of underground utility lines in area of excavation. Notify Departmental Representative of findings.
- .2 Arrange with appropriate authority for relocation of buried services that interfere with execution of work: pay costs of relocating services.
- .3 Record locations of maintained, re-routed and abandoned underground utility lines.
- .4 Make good damage to existing utility lines resulting from work.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Waste management in accordance with Section 01 74 20.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Clean Fill: Imported borrow material that meets the MOECC Table 1 Standards and will be free of debris, deleterious material and garbage. Only clean fill approved by Departmental Representative shall be used within the clean fill cap.
 - .2 Rip Rap: Import rip rap material meeting the OPSS1004 specification for a R-50 material.
 - .3 Provide to Departmental Representative the name of each borrow source within five days of Contract Award.
 - .4 For Clean Fill complete soil quality testing at the frequency prescribed in Ontario Regulation 153/04 for borrow sources. Provide results to Departmental Representative upon receipt.
 - .5 Review with Departmental Representative the parameters to
-

be tested from each Clean Fill borrow source. Parameter testing will include, but may not be limited to, inorganic parameters, petroleum hydrocarbons, volatile organic compounds, pesticides and herbicides.

PART 3 - EXECUTION

3.1 STOCKPILING

- .1 Stockpiling of all new materials will not be permitted on-site unless authorized by Departmental Representative. Truck and transport materials as required for backfilling.

3.2 PREPARATION/PROTECTION

- .1 Remove obstructions, ice and snow, from surfaces to be excavated or backfilled within limits indicated.
- .2 Protect existing structures and outfalls from damage during Work. Make good all damages at no extra costs to Contract.
- .3 Protect excavated earth from freezing by approved method.
- .4 Breach berms around fenced area prior to start of earthworks to allow for drainage of collected surface water.

3.3 GENERIC EXCAVATING AND GRADING

- .1 Excavate to elevations and dimensions indicated or required for construction of work as indicated.
 - .2 Sidecast, grade and compact excavated material to create positive drainage towards the perimeter swales as indicated.
 - .3 Compact graded materials to a 95% Standard Proctor Maximum Dry Density.
 - .4 Proof-roll with vibrating compactor all areas within the work area and make good any areas identified as being soft. Site derived materials are to be used to stabilize areas of soft soil.
 - .5 Maintain sides and slopes of excavations in safe condition by appropriate methods and in accordance with Health and Safety Act
-

- .6 Do not undermine the existing armour stone wall during excavation activities.
- .7 When complete have Departmental Representative inspect excavations to verify depths and dimensions.
- .8 Correct unauthorized excavation at no extra cost to Contract as directed by Departmental Representative.
- .9 Protect identified monitoring wells and make good any damage to these monitoring wells. Notify Departmental Representative of any damage to the identified monitoring wells and have the Departmental Representative inspect any repairs to the monitoring wells.

3.4 CLEAN CAP PLACEMENT

- .1 Do not commence placement of non-woven geotextile and the clean fill cap until areas of work have been inspected and approved by Departmental Representative.
 - .2 Work areas are to be free from debris, snow, ice, water or frozen ground.
 - .3 Supply and place non-woven geotextile material in accordance with Section 31 32 19.01 prior to the placement of any imported clean fill.
 - .4 Place and compact imported clean fill materials in continuous horizontal layers not exceeding 300 mm loose depth. Use methods to prevent disturbing or damaging any part of the work. Make good any damage.
 - .5 Maintain optimum moisture content to enable compaction to attain specified density.
 - .6 Compact each layer to the clean fill to 95% Standard Proctor Density. Where working space is limited, employ approved mechanical hand operated tamping devices. When such devices are employed, deposit backfill material in layers not exceeding 150 mm in thickness.
 - .7 Supply and place a 100 mm thick layer of clean topsoil over work areas prior to hydraulic seeding.
-

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.8 Apply seed in accordance with Section 32 92 19.13.

3.5 RIP RAP PLACEMENT

- .1 Rip rap is to be placed over top of a non-woven geotextile at the locations identified.
- .2 Place rip rap in a single layer 500 mm deep using methods to prevent disturbing or damaging any part of the work. Make good any damage.
- .3 No seed or top soil cover is to be placed with areas identified as having a rip rap cover.
- .4 Install perimeter plantings around rip rap areas in accordance with Section 32 92 19.13.

PART 1 - GENERAL

1.1 RELATED SECTION

- .1 Section 31 14 13 - Topsoil Placement.
- .2 Section 31 23 11 - Earthworks for Soil Capping Program.

1.2 MEASUREMENT AND PAYMENT

- .1 Measure geotextiles in square metres of surface covered by material as part of the work area to be covered by a clean fill cap within the work area. No allowance will be made for overlaps.
- .2 Measure geosynthetic erosion control blanket in square metres of surface covered by material as part of the work area to be secured to the final surface grade within the work area. No allowance will be made for overlaps.

1.3 REFERENCES

- .1 ASTM International
 - .1 ASTM D4595-11, Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method.
 - .2 ASTM D4751-12, Standard Test Method for Determining Apparent Opening Size of a Geotextile.
 - .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-4.2 No. 11.2-2004, Textile Test Methods - Bursting Strength - Ball Burst Test (Extension of September 1989).
 - .2 CAN/CGSB-148.1-94, Methods of Testing Geotextiles and Complete Geomembranes.
 - .1 No.2-M85, Methods of Testing Geosynthetics - Mass per Unit Area.
 - .2 No.3-M85, Methods of Testing Geosynthetics - Thickness of Geotextiles.
 - .3 No.7.3-92, Methods of Testing Geotextiles and Geomembranes - Grab Tensile Test for Geotextiles.
-

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 11 06.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for geosynthetic materials and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Samples:
 - .1 Submit following samples one week prior to beginning Work.
 - .1 Minimum length of 1 m of roll width of geotextile.
 - .2 Methods of joining.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Storage and Handling Requirements:
 - .1 Store and protect geotextiles from direct sunlight and UV rays.
 - .2 Replace defective or damaged materials with new.

PART 2 - PRODUCTS

2.1 MATERIAL

- .1 Geotextile: non-woven synthetic fiber fabric, supplied in rolls.
 - .1 Width: 3.5 m minimum.
 - .2 Length: 200 m minimum.
 - .3 Composed of: minimum 85% by mass of polypropylene with inhibitors added to base plastic to resist deterioration by ultra-violet and heat exposure for 60 days.
 - .2 Geotextile physical properties:
 - .1 Thickness: to CAN/CGSB-148.1, No.3, minimum 1 mm.
 - .2 Mass per unit area: to CAN/CGSB-148.1, No.2, minimum 64 g/m².
 - .3 Tensile strength and elongation (in any principal
-

- direction): to ASTM D4595.
- .1 Tensile strength: minimum 175 N, wet condition.
 - .2 Elongation at break: minimum 70%.
- .4 Grab tensile strength and elongation: to CAN/CGSB-148.1, No.7.3.
- .1 Breaking force: minimum 330 N, wet condition.
 - .2 Elongation at future: minimum 70%.
- .5 Ball burst strength: to CAN/CGSB-4.2, No.11.2 minimum 1.1 MPa.
- .3 Geotextile hydraulic properties:
- .1 Apparent opening size (AOS): to ASTM D4751, 50 to 150 micrometres.
- .4 Erosion Control Blanket: a coconut fibre double net product with a top and bottom biodegradable Jute netting.
- .1 Width: 2.4 m minimum.
 - .2 Length: 34.3 m minimum.
- .5 Erosion Control Blanket physical properties:
- .1 Thickness: to ASTM D6525, minimum 7.47 mm.
 - .2 Mass per unit area: to ASTM D6525, minimum 307 g/m².
 - .3 Tensile strength and elongation (in any principal direction): to ASTM D6818.
 - .1 Tensile strength: minimum 5.22 kN/m.
 - .2 Elongation at break: minimum 3.2%.
 - .4 Water Absorption: to ASTM D1117, minimum 300%.
 - .5 Bench-Scale Rain Splash: to ECTC Method 2, minimum SLR =25.5 @ 150 mm/hr.
 - .6 Functional Longevity >24 months.

PART 3 - EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for geotextile material installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Departmental Representative.
 - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied.
-

3.2 INSTALLATION OF NON-WOVEN GEOTEXTILE

- .1 Place geotextile material by unrolling onto graded surface within the work area, as indicated, in an orientation and manner that facilitates the work.
- .2 Place geotextile material smooth and free of tension stress, folds, wrinkles and creases.
- .3 Overlap each successive strip of geotextile 500 mm over previously laid strip.
- .4 No sewing or sealing of joints is required.
- .5 Protect installed geotextile material from displacement, damage or deterioration before, during and after placement of material layers.
- .6 Only place enough geotextile to facilitate the work. The Crown will not be responsible for surplus material used without the written confirmation of the Departmental Representative.
- .7 Replace damaged or deteriorated geotextile to approval of the Departmental Representative.
- .8 For installation as part of risk management measures place geotextile prior to placement of clean fill in accordance with Section 31 23 11.

3.3 INSTALLATION OF EROSION CONTROL BLANKET

- .1 Upon acceptance of grass seed placement by Departmental Representative (per Section 32 92 19.13), place erosion control blanket by unrolling onto graded surface in accordance with the manufactures instructions in an orientation and manner that facilitates the work.
 - .2 Place erosion control blanket smooth and free of tension stress, folds, wrinkles and creases.
 - .3 Overlap each successive strip of erosion control blanket 200 mm over previously laid strip.
-

- .4 Secure erosion control blanket to surface as per manufacturer's instructions.
- .5 No sewing or sealing of joins is required, however additional measures may be required to mitigate strong winds at this location given its exposure to on shore winds.
- .6 Protect installed erosion control blanket from displacement, damage or deterioration before, during and after placement of material layers.
- .7 Only place enough erosion control blanket to facilitate the Work. The Crown will not be responsible for surplus material used without the written confirmation of the Departmental Representative.
- .8 Replace damaged or deteriorated erosion control blanket to approval of the Departmental Representative.

3.4 CLEANING

- .1 Upon completion of the risk management program remove from the area of temporary topsoil stockpiles or site and dispose of off-site in accordance with federal, provincial and local regulations for this material.

3.5 PROTECTION

- .1 Vehicular traffic not permitted directly on geotextile products.

PART 1 - GENERAL

1.1 RELATED SECTIONS

- .1 Section 31 14 13 - Topsoil Placement
- .2 Section 31 23 11 - Earthworks for Soil Capping Project
- .3 Section 31 32 19.01 - Geotextiles

1.2 MEASUREMENT AND PAYMENT

- .1 Payment for seeding will be made at unit price bid per hectare of actual surface measurements taken and computed by Departmental Representative. Areas of blending into existing turf grass will not be measured for payment.
- .2 Planting of herbaceous plants around rip rap soak away pits as listed on Drawing C-08 will be measured as a lump sum and shall include all labour, materials and equipment necessary to complete the work.

1.3 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-Construction Meeting: As part of the Pre-Construction meeting conduct pre-installation meeting to verify project requirements, installation instructions and warranty requirements in accordance with Section 01 11 06.
- .2 Scheduling:
 - .1 Schedule seeding to coincide with preparation of soil surface.
 - .2 Schedule seed installation when frost is not present in ground.

1.4 REFERENCES

- .1 Ministry of Transportation Ontario
 - .1 Ontario Provincial Standards Specifications OPSS 572 - Construction Specification for Seed and Cover.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

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

- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for seed, and fertilizer.
 - .2 Submit 2 copies of WHMIS MSDS.

- .3 Samples:
 - .1 Submit 0.5 kg container of each type of fertilizer used.

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

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

1.6 QUALITY ASSURANCE

- .1 Not Used.

1.7 DELIVERY, STORAGE AND HANDLING

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

 - .2 Delivery and Acceptance Requirements:
 - .1 Labelled bags of fertilizer identifying mass in kg, mix components and percentages, date of bagging, supplier's name and lot number.
 - .2 Fertilizer must be dry.

 - .3 Storage and Handling Requirements:
 - .1 Store fertilizer off ground, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Replace defective or damaged materials with new at no additional cost to the Owner.

 - .4 Develop Construction Waste Management Plan related to Work of this Section and in accordance with Section 01 74 20.

 - .5 Packaging Waste Management: remove for reuse and return by manufacturer of pallets, crates, padding and packaging
-

materials as specified in Construction Waste Management Plan in accordance with Section 01 74 20.

1.8 WARRANTY

- .1 For seeding, 12 months warranty period is extended to one full growing season.
- .2 Contractor hereby warrants that seeding will remain free of defects for one full growing season.
- .3 End-of-warranty inspection will be conducted by Departmental Representative.

PART 2 - PRODUCTS

2.1 GRASS SEED

- .1 Canada "Certified" seed, "Canada No. 1 Lawn Grass Mixture" with a composition as noted below.
 - .1 Grass seed mixture.
 - .1 Mixture composition:
 - .1 25% Arrowhead Kentucky Bluegrass.
 - .2 25% Yankee Kentucky Bluegrass.
 - .3 20% Cardinal Creeping Fescue.
 - .4 15% Seana Lateral Spread Perennial Ryegrass.
 - .5 15% Insight Lateral Spread Perennial Ryegrass

2.2 WATER

- .1 Free of impurities that would inhibit germination and growth.
- .2 Obtain all necessary permits to source water from Lake Erie or Kettle Creek.

2.3 FERTILIZER

- .1 To Canada "Fertilizers Act" and Regulations.
 - .2 Complete synthetic fertilizer, slow release with 35% nitrogen content in water-insoluble form.
-

2.4 HERBACEOUS PLANTINGS

- .1 All herbaceous plants as listed on Drawing C-08.

PART 3 - EXECUTION

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrate previously installed under other Sections or Contracts are acceptable for mechanical seeding installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Departmental Representative.
 - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 INSTALLERS

- .1 Use a competent installer in accordance with Contract Documents.

3.3 SEED BED PREPARATION

- .1 Do not perform work under adverse field conditions as determined by Departmental Representative.
 - .2 Remove and dispose of weeds; debris; stones 25 mm in diameter and larger; soil contaminated by oil, gasoline and other deleterious materials; off-site in accordance with Section 01 74 20.
 - .3 Verify that grades are correct. If discrepancies occur, notify Departmental Representative and commence work when instructed by Departmental Representative.
 - .4 Fine grade surface free of humps and hollows to smooth, even grade, to contours and elevations indicated to tolerance of plus or minus 15 mm, surface draining naturally.
-

- .5 Cultivate fine graded surface approved by Departmental Representative to 25 mm depth immediately prior to seeding.

3.4 SEED PLACEMENT

- .1 Ensure seed is placed under the supervision of a competent supervisor in accordance with the Contract Documents.
- .2 For manual seeding:
 - .1 Use manually operated drop seeder ("Cyclone" type or equivalent).
 - .2 Use manually operated, water ballast, landscaping type, smooth steel drum roller. Ballast as directed by Departmental Representative.
 - .3 Use equipment and method acceptable to Departmental Representative.
- .3 On cultivated surfaces, sow seed uniformly at rate of:
 - .1 100 kg/hectare lawn grass mixture.
- .4 Blend applications 150 mm into adjacent grass areas and/or previous applications to form uniform surfaces.
- .5 Sow half of required amount of seed in one direction and remainder at right angles as applicable.
- .6 Incorporate seed by light raking in cross directions.
- .7 Apply erosion control blanket per Section 31 32 19.01 upon acceptance of seed application by Departmental Representative.

3.5 CLEANING

- .1 Progress Cleaning: clean as required to maintain a clean work site.
 - .1 Leave Work area clean at end of each day.
 - .2 Keep pavement and area adjacent to site clean and free from mud, dirt, and debris at all times.
 - .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment as required to maintain a clean work site.
 - .1 Clean and reinstate areas affected by Work.
-

- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 20.
 - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.
 - .2 Divert unused fertilizer from landfill to official hazardous material collections site approved by Departmental Representative.

3.6 PROTECTION

- .1 Protect seeded areas from trespass until plants are established.
- .2 Remove protection devices as directed by Departmental Representative.

3.7 FERTILIZING PROGRAM

- .1 On cultivated surfaces, apply fertilizer at rate of:
 - .1 350 kg/hectare, ratio 8-32-16.

3.8 MAINTENANCE DURING ESTABLISHMENT PERIOD

- .1 Ensure maintenance is carried out under supervision of competent supervisor.
 - .2 Perform following operations from time of seed application until acceptance by Departmental Representative:
 - .1 Water seeded area to maintain optimum soil moisture level for germination and continued growth of grass. Control watering to prevent washouts.
 - .2 Repair and reseed dead or bare spots to allow establishment of seed prior to acceptance.
 - .3 Cut grass to 50 mm whenever it reaches height of 70 mm. Remove clippings which will smother grass as directed by Departmental Representative.
 - .4 Fertilize seeded areas after 10 weeks after germination provided grasses matured in accordance with fertilizing program. Spread half of required amount of fertilizer in one direction and remainder at right angles and water in well.
-

3.9 FINAL ACCEPTANCE

- .1 Seeded areas will be accepted by Departmental Representative provided that:
 - .1 Areas are uniformly established free of rutted, eroded, bare or dead spots and extent of weeds apparent in grass is acceptable.
 - .2 Areas have been mown at least twice.
 - .3 Areas have been fertilized.
- .2 Areas seeded in fall will be accepted in following spring, one month after start of growing season provided acceptance conditions are fulfilled.

3.10 MAINTENANCE DURING WARRANTY PERIOD

- .1 Perform following operations from time of acceptance until end of warranty period.
 - .1 Water seeded area to maintain optimum soil moisture level for continued growth of grass. Control watering to prevent washouts.
 - .2 Repair and reseed dead or bare spots to satisfaction of Departmental Representative.
 - .3 Cut grass to 50 mm whenever it reaches height of 70 mm. Remove clippings which will smother grass as directed by Departmental Representative.
 - .4 Fertilize seeded areas in accordance with fertilizing program. Spread half of required amount of fertilizer in one direction and remainder at right angles and water in well.

3.11 HERBACEOUS PLANTINGS

- .1 Undertake planting to detail shown on Drawing C-08.
- .2 Carryout planting in accordance with commercial landscape industry accepted standard and practice.
- .3 Distribution of herbaceous plant plugs within work areas will be specified by the Departmental Representative at the time of planting.

APPENDIX 1

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APPENDIX 2

Remediation Construction Checklist

RISK MANAGEMENT MEASURES CONSTRUCTION CHECKLIST, PORT STANLEY LANDS, EAST HEADLANDS, MUNICIPALITY OF CENTRAL ELGIN, ONTARIO

This checklist outlines the requirements for risk management measures construction under the R.013137.007 Specifications and is intended to be used as an on-Site tool to ensure that the work is completed as per the tender specifications and design drawings prepared for the site.

Table 1: Risk Management (RM) Construction Checklist

	Checklist Item	Completed Y/N	Comments
1	Locate the underground utilities at the Site before initiating the construction activities in all work areas.		Known utility plans have been provided as part of tender package.
2	Remove organic soil and vegetation from work area.		
3	Excavate soil in areas and to a depth as shown on the attached drawings and as per the Departmental Representative's direction on the site.		No soil verification sampling will be required.
4	Recycle any recyclable material (metal or glass) if present in the excavated soil.		
5	Cover the work area with clean soil or imported fill as shown on drawings and as per the Departmental Representative's direction on the site.		A 500 mm layer of clean fill meeting MOECC Table 1 standards, underlain by a non-woven geotextile, will be used to cap the work area. Backfill will initially comprise of clean fill supplied by MCE then backfilled with clean imported material.
6	Provide proof to the Departmental Representative of the source and quality of the backfill material to be used to reinstate site conditions.		i.e. Analytical results supplied by the source where the material came from

APPENDIX 3

Mitigation Measures Checklist

Environmental Components	Department / Mitigation Measure	Measure Implemented (use a checkmark)	Date	Comments / Notes
Air Quality:	<ul style="list-style-type: none"> • Vehicles, machinery and equipment used for construction and maintenance activities must be kept in good condition to reduce air emissions that contribute to climate change (e.g. carbon dioxide) and particulate matter that contributes to smog; • Limit long-term idling; • Standard best management earth moving practices must be exercised; Construction activities are to comply with requirements of any municipal air quality by-laws; • If the soils are prone to becoming airborne, particularly when windy, or if observed to become airborne, cover or wet down soil materials to prevent dust or sediments from becoming airborne; • Limit construction activities during high wind events if the above measures to prevent dust or sediments from becoming airborne are not effective; • Vehicle loads will be sealed and covered for transport; • Waste material will be removed and appropriately disposed of off-site, according to all applicable laws and regulations; and • Monitor noise and air quality complaints and take appropriate action as required. 	<p><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA</p>		
Soil and Sediment Quality:	<ul style="list-style-type: none"> • Soil from excavated areas intended for subsequent re-application, backfill purposes, or site restoration should be appropriately stored on-site; • All debris should be removed and disposed of at an appropriate waste disposal site to prevent it from washing downstream; and, • Ensure materials are disposed according to applicable legislation. 	<p><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> NA</p> <p><input type="checkbox"/> Yes <input type="checkbox"/> No</p>		

Environmental Components	Department / Mitigation Measure	Measure Implemented (use a checkmark)	Date	Comments / Notes
		___ NA		
Water Quality:	<ul style="list-style-type: none"> • All materials and equipment used for the purpose of site preparation and project completion should be operated and stored in a manner as to prevent the release of silt, sediment or sediment-laden water or any other deleterious substances (e.g. construction waste materials, petroleum products, sediments) into any water body; • Provisions should be made to ensure contaminants do not enter nearby waterbodies during operation and maintenance of structures; • Sediment and erosion control measures should be installed prior to project start up and be maintained during the work phase and until the site has been stabilized to prevent entry of soil, sediment or sediment laden water into the watercourse; • Minimize the extent and footprint of the construction, operation and decommissioning activities; ○ <i>Regarding use of concrete:</i> <ul style="list-style-type: none"> ○ Concrete work should be done primarily during the summer (dry) months in order to reduce contaminated runoff from freshly laid surfaces from entering watercourses; ○ Containment facilities shall be provided at the site for the wash-down water from concrete delivery trucks, concrete pumping equipment, and other tools and equipment, as required; ○ Water used to wash concrete should not be allowed to enter directly into nearby water bodies; ○ The sediment should be allowed to settle out and reach neutral pH before the clarified water is released to the drain system or allowed to percolate into the ground ○ Wash-down material or run-off from exposed cast-in-place concrete should be trapped on-site (e.g. using interceptor dikes, settling ponds, storage lagoons, etc.) ○ Prior to the pouring of concrete, all concrete forms shall be thoroughly 	<p>___ Yes ___ No ___ NA</p>		

Environmental Components	Department / Mitigation Measure	Measure Implemented (use a checkmark)	Date	Comments / Notes
	inspected to ensure that formwork is fully secured and sealed to prevent the release of concrete; ○ Where necessary, freshly placed concrete shall be covered with an appropriate material (e.g. plastic sheeting) as required (e.g. risk of precipitation) to seal the concrete from the environment until the concrete is significantly cured.	___ Yes ___ No ___ NA ___ Yes ___ No ___ NA		
Vegetation and Wildlife:	<ul style="list-style-type: none"> • Extra care should be taken to minimize potential disturbance to shoreline vegetation; • Although SAR have not been identified on the site, should SAR or its critical habitat be encountered, measures are to be implemented to avoid destruction, injury or interference with the species, its residence and/or its habitat (e.g. timing or design changes). If the foregoing cannot be avoided the proponent should cease work and contact the Natural Heritage Information Centre - Ontario Ministry of Natural Resources and Forestry, located at 300 Water St., 2nd Floor North Tower, Peterborough, ON K9J 3C7 by email (NHICrequests@ontario.ca) or phone (705-755-2159) to discuss management options to minimize, reduce or control adverse effects or compensatory mitigation and environmental effects monitoring. PWGSC and Transport Canada should also be advised of occurrence. 	___ Yes ___ No ___ NA ___ Yes ___ No ___ NA		
Archaeological and Cultural Resources:	<ul style="list-style-type: none"> • In the event that archaeological deposits are discovered, the Ontario Ministry of Culture, should be contacted immediately - (416) 314-7123. 	___ Yes ___ No ___ NA		
Public and Worker Safety:	<ul style="list-style-type: none"> • The contractor must apply adequate safety barriers and signage for the safety of workers and public, including the placement of no trespassing signs for the public; • All workers involved in decommissioning, construction and maintenance activities must wear appropriate protective equipment (e.g. safety boots, hard hats, protective eye wear, as required); and • Health and safety measures must be taken according to the <i>Occupational Health and Safety Act</i> during decommissioning, construction and 	___ Yes ___ No ___ NA ___ Yes ___ No ___ NA ___ Yes ___ No ___ NA		

Environmental Components	Department / Mitigation Measure	Measure Implemented (use a checkmark)	Date	Comments / Notes
	maintenance activities.			
<u>Spills and Accidents:</u>	<ul style="list-style-type: none"> • Re-fuelling of equipment and vehicles should be conducted off-site where possible; • Machinery is to arrive on site in a clean condition and is to be maintained free of fluid leaks; • Where on-site re-fuelling is required, a designated re-fueling depot would minimize the potential for extensive impacts at the site due to accidental releases of substances; • Wash, refuel and service machinery and store fuel & other materials for the machinery away from water to prevent deleterious substances from entering the water; • Proper spill management equipment (e.g. spill kit) should be located on site at all times; • In the event of a spill, immediately contain and clean up in accordance with provincial regulatory requirements; • All spills are to be reported to the Ontario Spills Action Centre (1-800-268-6060); and • All materials and equipment used for the purpose of site operation shall be operated and stored in a manner that prevents any deleterious substance (e.g. petroleum products, silt, etc.) from contaminating soils or sediments. • Trucks hauling saturated soils (with potential to drain during transport) will require liners to prevent leakage along the transport route. 	<p>___ Yes ___ No ___ NA ___ Yes ___ No ___ NA</p>		

APPENDIX 4

Boreholes



LOCATION: Port Stanley LOGGED BY: A. Smith GROUND ELEVATION: 175.28 masl NORTHING: 4723291.3
 PROJECT NUMBER: 428450 DRILLER: Profile Drilling Ltd. TOP OF PIPE: 176.107 masl EASTING: 482699.5
 DATE DRILLED: 2012 August 15 DRILLING METHOD: Direct Push VTR 9700 WATER ELEVATION: 174.15 masl MOE WELL TAG#: A136205
 SOIL VAPOUR INSTRUMENT: MiniRae 3000 SN 13830 CALIBRATED?: Yes

DEPTH (m bgs)	SAMPLES				SOIL DESCRIPTION	STRATA PLOT	(masl) ELEV. DEPTH (m bgs)	WELL CONSTRUCTION DETAILS				ORGANIC VAPOUR READING (ppm)							
	Recovery (m)	TYPE	SPT (blows/15cm)	Parameters Analyzed				12	24	36	48								
1	A				Sand: Trace silt, fine, moist to wet.			Stickup casing sealed in cement Bentonite Seal											
1	B							No.2 Silica sand filter pack											
1	C				PHC F1-F4 BTEX (1.22-1.83m) - Wet, no silt.			Machine slotted 2" SCH 40 PVC pipe #10-slot well screen											
2	D																		
2	E				Mtis PAH Inorg (2.44-3.05m) - Very wet.														
3	F																		
4	G																		
4					Clay Till: Trace sand, grey, fine, saturated, non-cohesive.		170.86												
5					End of borehole at 4.57 m bgs.		4.42												
5					Notes: Water level as measured on August 21, 2012		170.71												
5							4.57												
7																			

PORTSTANLEY MW 371326PORTSTANLEY-MW.GPJ 431079 - WALLACE.GDT 12-12-19



LOCATION: Port Stanley LOGGED BY: A. Smith GROUND ELEVATION: 175.27 masl NORTHING: 4723290.3
 PROJECT NUMBER: 428450 DRILLER: Profile Drilling Ltd. TOP OF PIPE: 176.149 masl EASTING: 482699.9
 DATE DRILLED: 2012 August 15 DRILLING METHOD: Direct Push: VTR 970C WATER ELEVATION: 174.17 masl MOE WELL TAG#: A136205
 SOIL VAPOUR INSTRUMENT: MiniRae 3000 SN 13830 CALIBRATED?: Yes

DEPTH (mbgs)	SAMPLES				SOIL DESCRIPTION	STRATA PLOT	(masl) ELEV. DEPTH (mbgs)	WELL CONSTRUCTION DETAILS		ORGANIC VAPOUR READING (ppm)						
	Recovery (m)	TYPE	SPT (blows/15cm)	Parameters Analyzed						12	24	36	48			
1	A			PHC F1-F4 BTEX 0.00-0.61m)	Sand: Trace silt, fine, moist to wet.			Stickup casing sealed in cement Bentonite Seal								
	B			PHC F1-F4 BTEX												
	C				- Wet, no silt.											
	D															
	E				- Very wet.											
	F															
	G															
	H				Mtis PHC F1-F4 BTEX PAH Inorg (27-4.88m)	Clay Till: Trace sand, grey, fine, saturated, non-cohesive.	170.85 4.42									
	I				Mtis PHC F1-F4 BTEX PAH Inorg					No.2 Silica sand filter pack						
	J				Mtis PHC F2-F4 PAH Inorg (45-6.06m)	- No sand, moist, cohesive.				Machine slotted 2" SCH 40 PVG pipe #10-slot well screen						
K				Mtis PHC F2-F4 PAH Inorg												
7					End of borehole at 6.71 m bgs. Notes: Water level as measured on August 21, 2012	168.56 6.71										

PORTSTANLEY MW 371326PORTSTANLEY-MW.GPJ 431079 - WALLACE.GDT 12-12-18



RECORD OF MONITORING WELL: EHL-MW11-15

LOCATION: Port Stanley LOGGED BY: J.Gowing GROUND ELEVATION: 176.39 masl NORTHING: 4723293.0
 PROJECT NUMBER: 428450 DRILLER: PROFILE Drilling TOP OF PIPE: 176.866 masl EASTING: 482765.4
 DATE DRILLED: 2012 January 18 DRILLING METHOD: Power Probe VTR-9700 WATER ELEVATION: 175.606 masl MOE WELL TAG#: A125371
 SOIL VAPOUR INSTRUMENT: MiniRae 3000-1128724 CALIBRATED?: Yes

DEPTH (mbgs)	SAMPLES				SOIL DESCRIPTION	STRATA PLOT	(masl) ELEV. DEPTH (mbgs)	WELL CONSTRUCTION DETAILS		ORGANIC VAPOUR READING (ppm)					
	Recovery (m)	TYPE	SPT (blows/15cm)	Parameters Analyzed						12	24	36	48		
0.37	DPT1				SAND (FILL): Brown, loose, saturated, trace clay.			Stick up casing sealed in cement							
0.37	DPT2			NH4 NO23 SO4 ICPMS PAH PHC TP-Color CPH (1415)	- Grey.			Bentonite seal							
0.31	DPT3			(0.61-1.22m)				No.2 Silica sand filter pack							
0.31	DPT4							Machine slotted 2" SCH 40 PVC pipe, #10-slot well screen							
0.31	DPT5														
0.31	DPT6														
0.31	DPT7				- Grey, fine, trace clay, saturated.										
0.31	DPT8			Grain size FOC (1415) (4.27-4.88m)											
4.88					End of borehole at 4.88 mbgs		171.51 4.88								
Notes: Water level as measured on February 29 - March 1, 2012															

PORTSTANLEY MW 371326PORTSTANLEY-MW.GPJ 431079 - WALLACE.GDT 12-12-19



LOCATION: Port Stanley LOGGED BY: J.Gowing GROUND ELEVATION: 176.38 masl NORTHING: 4723293.0
 PROJECT NUMBER: 428450 DRILLER: PROFILE Drilling TOP OF PIPE: 176.840 masl EASTING: 482765.4
 DATE DRILLED: 2012 January 18 DRILLING METHOD: Power Probe VTR-9700 WATER ELEVATION: 175.58 masl MOE WELL TAG#: A125371
 SOIL VAPOUR INSTRUMENT: MiniRae 3000-1128724 CALIBRATED?: Yes

DEPTH (mbgs)	SAMPLES				SOIL DESCRIPTION	STRATA PLOT	ELEV. (masl) DEPTH (mbgs)	WELL CONSTRUCTION DETAILS		ORGANIC VAPOUR READING (ppm)				
	Recovery (m)	TYPE	SPT (blows/15cm)	Parameters Analyzed						12	24	36	48	
					-See EHL-MW11-15 for Stratigraphy.			Stick up casing sealed in cement Bentonite seal						
5					SAND (FILL): Grey, saturated, fine, trace clay.		171.50 4.88							
7					CLAY TILL: Approximated from drilling resistance, no recovery.		169.67 6.71	No.2 Silica sand filter pack Machine slotted 2" SCH 40 PVC pipe, #10-slot well screen						
	DPT13													

PORTSTANLEY_MW_3713268PORTSTANLEY_MW.GPJ_431079 - WALLACE.GDT_12-12-19



LOCATION: Port Stanley LOGGED BY: J.Gowing GROUND ELEVATION: 176.38 masl NORTHING: 4723293.0
 PROJECT NUMBER: 428450 DRILLER: PROFILE Drilling TOP OF PIPE: 176.840 masl EASTING: 482765.4
 DATE DRILLED: 2012 January 18 DRILLING METHOD: Power Probe VTR-9700 WATER ELEVATION: 175.58 masl MOE WELL TAG#: A125371
 SOIL VAPOUR INSTRUMENT: MiniRae 3000-1128724 CALIBRATED?: Yes

DEPTH (mbgs)	SAMPLES				SOIL DESCRIPTION	STRATA PLOT	ELEV. DEPTH (masl) (mbgs)	WELL CONSTRUCTION DETAILS	ORGANIC VAPOUR READING (ppm)			
	Recovery (m)	TYPE	SPT (blows/15cm)	Parameters Analyzed					12	24	36	48
					End of borehole at 8.53 mbgs Notes: Water level as measured on: February 29 - March 1, 2012		176.85 8.53					
10												
11												
12												
13												
14												
15												

PORTSTANLEY MW_371326PORTSTANLEY-MW.GPJ_431079 - WALLACE.GDT_12-12-19



LOCATION: Port Stanley LOGGED BY: J.Gowing GROUND ELEVATION: 175.58 masl NORTHING: 4723361.2
 PROJECT NUMBER: 428450 DRILLER: PROFILE Drilling TOP OF PIPE: 176.189 masl EASTING: 482639.6
 DATE DRILLED: 2012 February 17 DRILLING METHOD: Deidrich D-50, HSA WATER ELEVATION: 174.739 masl MOE WELL TAG#: A125371
 SOIL VAPOUR INSTRUMENT: MiniRae 3000-1128724 CALIBRATED?: Yes

DEPTH: (mbgs)	SAMPLES				SOIL DESCRIPTION	STRATA PLOT	(masl) ELEV. DEPTH (mbgs)	WELL CONSTRUCTION DETAILS		ORGANIC VAPOUR READING (ppm)			
	Recovery (m)	TYPE	SPT (blows/15cm)	Parameters Analyzed						12	24	36	48
1	.40	SS1	10 10 10 10 10 10	PAH PHC (0.00-0.61m)	SAND (FILL): Brown, loose, dry, some gravel, trace clay and coal debris. - Moist.		174.82 0.76		0.6				
	.37	SS2	17 17 17 17		SAND (FILL): Light brown to grey, loose, moist, fine to medium, trace clay. - Saturated. - Some coarser sand.				0.6				
	.43	SS3	12 11 12 16						0.6				
	.43	SS4	8 10 6 3		- 0.08 m darker soil.				0.6				
	.37	SS8	3 6 9 12	PAH PHC (3.05-3.66m)	CLAY TILL: Grey, moist, some plasticity, trace silt and fine gravel.		172.23 3.95		0.6				
					End of borehole at 3.81 mbgs Notes: Water level as measured on February 29 - March 1, 2012		171.77 3.81						
5													
6													
7													

PORTSTANLEY MW 3713266PORTSTANLEY-MW.GPJ 431079 - WALLACE.GDT 12-12-19



RECORD OF MONITORING WELL: EHL-MW11-31

LOCATION: Port Stanley LOGGED BY: J.Gowing GROUND ELEVATION: 177.25 masl NORTHING: 4723340.1
 PROJECT NUMBER: 428450 DRILLER: PROFILE Drilling TOP OF PIPE: 178.145 masl EASTING: 482795.9
 DATE DRILLED: 2012 February 16 DRILLING METHOD: Deidrich D-50, HSA WATER ELEVATION: 175.645 masl MOE WELL TAG#: A125371
 SOIL VAPOUR INSTRUMENT: MiniRae 3000-1128724 CALIBRATED?: Yes

DEPTH (mbgs)	SAMPLES				SOIL DESCRIPTION	STRATA PLOT	(masl) ELEV. DEPTH: (mbgs)	WELL CONSTRUCTION DETAILS		ORGANIC VAPOUR READING (ppm)			
	Recovery (m)	TYPE	SPT (blows/15cm)	Parameters Analyzed						12	24	36	48
0.31	SS		1		SAND (FILL): Brown, loose, dry, trace clay. - Clay content increase. - Sand becoming finer.			Stick up casing sealed in cement Bentonite seal	0.3				
0.43	SS		2										
0.46	SS		2	PHC DUP (1.52-2.13m)				No.2 Silica sand filter pack Machine slotted 2" SCH 40 PVC pipe, #10-slot well screen	0.6				
0.50	SS		5										
0.60	SS		2		- Grey, saturated, slight odour.								
1.31	SS		1		SAND (FILL): Grey, loose, saturated, fine to medium, some clay.		174.20 3.05		0.4				
1.31	SS		1										
1.31	SS		2	PHC (3.81-4.42m)					0.4				
1.31	SS		8										
1.37	SS		2		CLAY TILL: Grey, moist, some fine sand.		172.68 4.57		0.3				
1.37	SS		12										
1.37	SS		13										
1.37	SS		7										
5.18					End of borehole at 5.18 mbgs		172.07 5.18						
Notes: Water level as measured on February 29 - March 1, 2012													

PORTSTANLEY_MW_371328PORTSTANLEY.MW.GPJ 431079 - WALLACE.GDT 12-12-19

Project: Supplementary Phase II ESA Contract No: 700743-064
 Boring date: 7/3/2016 Supervised by: G.C.Yule
 Borehole Location: Port Stanley, Ontario
 Driller: Profile Drilling Ltd
 Drilling Method: Power Probe 9700 PTO Track

Borehole: EHLBH16-30
 Monitoring Well: Installed

Sheet 1 of 1

Scale (m)	Stratigraphy				Samples						Headspace TOV				Remarks and Sample Analyses	
	Elev. (m) Depth (m)	Description	Symbol	Well Details	Water Level	Sample Type and Number	Condition	Blows/300mm	% Recovery	RQD	Odour	Headspace TOV (ppm)				
												100	200	300		400
		Ground Surface Elevation: 175.46m										Headspace TOV (%LEL)				
												20	40	60	80	
		COAL (FILL), black, wet				SS-1			83		N					
1	174.85 0.61	SAND and GRAVEL (FILL), brown, wet, medium to coarse, some silt				SS-2			83		N					
	174.24 1.22	SAND AND COAL (FILL), black, wet, fine to medium grained, some gravel and silt				SS-3			75		N					
2	173.63 1.83	SANDY SILT (FILL), grey, wet, fine, some to trace clay				SS-4			75		N					
	173.02 2.44	SAND (NATIVE), grey, wet, medium to fine, some to trace silt				SS-5			75		N					
3						SS-6			75		N					
4						SS-7			75		N					
						SS-8			75		N					
5	170.58 4.88	End of Borehole @ 4.88 m Groundwater level @ 1.06 m (el 174.4) on March 8, 2016														
6																

ODOUR:
 N - None
 T - Trace
 M - Moderate
 S - Strong
 VS- Very Strong

Prepared by: B.Nketia
 Checked by: S.Prior
 Date: 22/3/16



Project: Supplementary Phase II ESA Contract No: 700743-064
 Boring date: 7/3/2016 Supervised by: G.C.Yule
 Borehole Location: Port Stanley, Ontario
 Driller: Profile Drilling Ltd
 Drilling Method: Power Probe 9700 PTO Track

Borehole: EHLBH16-31
 Monitoring Well: Installed

Sheet 1 of 1

Scale (m)	Stratigraphy				Samples						Headspace TOV (ppm)				Remarks and Sample Analyses	
	Elev. (m) Depth (m)	Description	Symbol	Well Details	Water Level	Sample Type and Number	Condition	Blows/300mm	% Recovery	RQD	Odour	Headspace TOV (ppm)				
												Headspace TOV (%LEL)				
		Ground Surface Elevation: 176.47m										20	40	60	80	
		SAND (FILL) , brown, wet, medium to fine, some to trace silt, trace gravel				SS-1			83		N					
1						SS-2			83		N					
	174.64 1.83	SILT (FILL) , grey, wet, some fine sand, trace clay				SS-3			88		N					
2						SS-4			88		N					
						SS-5			83		N					
3						SS-6			83		N					
4						SS-7			100		N					
	172.20 4.27	End of Borehole @ 4.27 m														
5		Groundwater level at 0.94 m (el 175.53) on March 8, 2016														
6																

ODOUR:
 N - None
 T - Trace
 M - Moderate
 S - Strong
 VS- Very Strong

Prepared by: B.Nketia
 Checked by: S.Prior
 Date: 22/3/16



Project: Supplementary Phase II ESA Contract No: 700743-064
 Boring date: 7/3/2016 Supervised by: G.C.Yule
 Borehole Location: Port Stanley, Ontario
 Driller: Profile Drilling Ltd
 Drilling Method: Power Probe 9700 PTO Track

Borehole: EHLBH16-33
 Monitoring Well: Installed

Sheet 1 of 1

Scale (m)	Stratigraphy				Samples						Headspace TOV				Remarks and Sample Analyses	
	Elev. (m) Depth (m)	Description	Symbol	Well Details	Water Level	Sample Type and Number	Condition	Blows/300mm	% Recovery	RQD	Odour	Headspace TOV (ppm)				
												Headspace TOV (%LEL)				
		Ground Surface Elevation: 176.32m										20	40	60	80	
		SAND (FILL), brown, medium to fine, trace silt				SS-1			63		N					
1		- becomes grey and wet @ 2.44 m				SS-2			63		N					
						SS-3			63		N					
2						SS-4			63		N					
						SS-5			100		N					
3						SS-6			100		N					
						SS-7			100		N					
4	172.05 4.27	End of Borehole @ 4.27 m														
		Groundwater level @ 1.03 m (el 175.29) on March 8, 2016														
5																
6																

ODOUR:
 N - None
 T - Trace
 M - Moderate
 S - Strong
 VS- Very Strong

Prepared by: B.Nketia
 Checked by: S.Prior
 Date: 22/3/16



Project: PWGSC - TC (Port Stanley) Contract No: 700743-080
 Boring date: 9/8/2016 Supervised by: D. Arnaud
 Borehole Location: East Headlands, Port Stanley, ON
 Driller: Profile Drilling
 Drilling Method: Mobile B45HD w/ HSA

Borehole: EHL-MW16-36

Monitoring Well: Installed

Sheet 1 of 2

Scale (m)	Stratigraphy				Samples						Headspace TOV				Remarks and Sample Analyses	
	Elev. (m) Depth (m)	Description	Symbol	Well Details	Water Level	Sample Type and Number	Condition	Blows/300mm	% Recovery	RQD	Odour	Headspace TOV (ppm)				
												Headspace TOV (%LEL)				
		Ground Surface Elevation: 175.67m										20	40	60	80	
	175.46 0.21	SILTY SAND (FILL) - brown, moist, trace gravel				SS-1		10 28	61		N					
		COAL and SAND (FILL) - black, moist, trace ash, gravel and silt				SS-2		8 9 7 8	56		N					
1						SS-3		3 3 4 4	59		N					
	174.45 1.22	SAND (FILL) - brown to grey, wet, trace coal and gravel				SS-4		0 2 7 11	62		N					
2		SAND (NATIVE) - grey, wet, fine to medium				SS-5		7 7 8 9	87		N					
						SS-6		0 3 5 6	84		N					
3						SS-7		3 6 10 18	85		N					
		- becomes coarse @ 3.66 m				SS-8		6 13 12 19	87		N					
4						SS-9		2 7 14 12	87		N					
5						SS-10		3 4 5 8	33		N					
	170.38 5.29	SILTY CLAY - grey, wet, trace sand				SS-11		1 1 2 6	52		N					
		- becomes moist to wet @ 5.49 m				SS-12		2 4	57		N					

ODOUR:
 N - None
 T - Trace
 M - Moderate
 S - Strong
 VS - Very Strong

Continued

Prepared by: D. Arnaud

Checked by: S. Prior

Date: 25/8/16



Project: PWGSC - TC (Port Stanley) Contract No: 700743-080
 Boring date: 9/8/2016 Supervised by: D. Arnaud
 Borehole Location: East Headlands, Port Stanley, ON
 Driller: Profile Drilling
 Drilling Method: Mobile B45HD w/ HSA

Borehole: EHL-MW16-36
 Monitoring Well: Installed
Sheet 2 of 2

Scale (m)	Stratigraphy				Samples						RQD	Odour	Headspace TOV (ppm)				Remarks and Sample Analyses	
	Elev. (m) Depth (m)	Description	Symbol	Well Details	Water Level	Sample Type and Number	Condition	Blows/300mm	% Recovery	Headspace TOV (ppm)								
										Headspace TOV (%LEL)								
8																		
9																		
10																		
11																	Soil analyzed for conductivity and SAR	
12																	Soil analyzed for conductivity and SAR	
13	163.47 12.20	END of BOREHOLE @ 12.20 m																Groundwater analyzed for PHCs (F1-F4) and BTEX.
		Water level 1.21 mbgs (el. 174.46 m) on 17 August 2016. Water level 1.28 mbgs (el. 174.39 m) on 19 August 2016.																

ODOUR:
 N - None
 T - Trace
 M - Moderate
 S - Strong
 VS- Very Strong

Prepared by: D. Arnaud
 Checked by: S. Prior
 Date: 25/8/16



Project: PWGSC - TC (Port Stanley) Contract No: 700743-080
 Boring date: 11/8/2016 Supervised by: D. Arnaud
 Borehole Location: East Headlands, Port Stanley, ON
 Driller: Profile Drilling
 Drilling Method: Mobile B45HD w/ HSA

Borehole: EHL-MW16-39
 Monitoring Well: Installed
 Sheet 1 of 2

Scale (m)	Stratigraphy				Samples						Headspace TOV (ppm)				Remarks and Sample Analyses	
	Elev. (m) Depth (m)	Description	Symbol	Well Details	Water Level	Sample Type and Number	Condition	Blows/300mm	% Recovery	RQD	Odour	Headspace TOV (ppm)				
												100	200	300		400
		Ground Surface Elevation: 175.80m										Headspace TOV (%LEL)				
												20	40	60	80	
	175.70 0.10	SAND (FILL) - brown, moist				SS-1		4	62		N					
		SAND (FILL) - black and grey, moist, some silt, coal and gravel						18								
								35								
								14								
1						SS-2		6	67		N					
								16								
								19								
								16								
		- becomes grey, wet, trace coal @ 1.35 m				SS-3		8	66		N					
								13								
								16								
								17								
2						SS-4		5	77		N					
								7								
								9								
								10								
	173.36 2.44	SAND (NATIVE) - brown, wet, fine to medium				SS-5		3	64		N					
								7								
								9								
								15								
		- becomes coarse @ 3.66 m				SS-6		0	82		N					
								5								
								12								
								12								
	171.84 3.96	SILTY CLAY - grey, moist				SS-7		4	85		N					
								6								
								11								
								14								
4						SS-8		5	59		N					
								8								
								26								
								25								
	170.92 4.88	SILT - grey, wet, trace clay and sand				SS-9		13	46		N					
								16								
								10								
								10								
5						SS-10		3	52		N					
								6								
								9								
								11								
	170.31 5.49	SILTY CLAY - grey, moist to wet				SS-11		0	41		N					
								2								
								3								
								6								
6						SS-12		3	62		N					
								5								

ODOUR:
 N - None
 T - Trace
 M - Moderate
 S - Strong
 VS - Very Strong

Continued
 Prepared by: D. Arnaud
 Checked by: S. Prior
 Date: 25/8/16



Project: PWGSC - TC (Port Stanley) Contract No: 700743-080
 Boring date: 11/8/2016 Supervised by: D. Arnaud
 Borehole Location: East Headlands, Port Stanley, ON
 Driller: Profile Drilling
 Drilling Method: Mobile B45HD w/ HSA

Borehole: EHL-MW16-39
 Monitoring Well: Installed
Sheet 2 of 2

Scale (m)	Stratigraphy				Samples						Headspace TOV (ppm)				Remarks and Sample Analyses	
	Elev. (m) Depth (m)	Description	Symbol	Well Details	Water Level	Sample Type and Number	Condition	Blows/300mm	% Recovery	RQD	Odour	Headspace TOV (ppm)				
												Headspace TOV (%LEL)				
	168.48 7.32	SILT - grey, moist, some sand				SS-13		8 12	75		N					
8						SS-14		6 16 18 30	49		N					
	166.65 9.15	SILTY CLAY - grey, moist to wet				SS-15		8 12 20 14	0		N					
9						SS-16		8 9 9 10	74		N					
	165.93 9.87	SANDY SILT - grey, moist				SS-17		1 7 12 15	64		N					
10						SS-18		4 19 19 15	64		N					
	165.43 10.37	SILTY CLAY - grey, moist				SS-19		3 7 10 14	74		N					Soil analyzed for conductivity and SAR
11						SS-20		4 9 10 14	72		N					Soil analyzed for conductivity and SAR
12	163.60 12.20	END of BOREHOLE @ 12.20 m						3 7 10 15			N					
13		Water level 5.40 mbgs (el. 170.40 m) on 17 August 2016. Water level 10.71 mbgs (el. 165.09 m) on 19 August 2016.														Groundwater analyzed for PHCs (F1-F4) and BTEX.

ODOUR:
 N - None
 T - Trace
 M - Moderate
 S - Strong
 VS- Very Strong

Prepared by: D. Arnaud
 Checked by: S. Prior
 Date: 25/8/16



APPENDIX 5

Photo Log

Project Photographs

PWGSC – TC
East Headlands,
Port Stanly, ON



Photo: 1

Date:
February 22, 2016.

Description:
Looking North along Kettle
Creek from the South West
corner. Note the hay bales
with dredge material behind.
EHL-MW16-30 Area.

Location:
East Headlands



Photo: 2

Date:
February 22, 2016.

Description:
Looking East across the South
end of the East Headlands.
Note the dredge material.
EHL-MW16-30 Area.

Location:
East Headlands

Project Photographs

PWGSC – TC
East Headlands,
Port Stanly, ON



Photo: 3

Date:

February 22, 2016.

Description:

Looking South West at the entrance way to Kettle Creek from the South West corner.

EHL-MW16-30 Area.

Location:

East Headlands



Photo: 4

Date:

February 22, 2016.

Description:

Looking North East across the dredge material. Material was end dumped in place.

Location:

East Headlands

Project Photographs

PWGSC – TC
East Headlands,
Port Stanly, ON



Photo: 5

Date:
February 22, 2016.

Description:
Looking West across the South edge of the East Headlands. The black AST’s are on the West side of Kettle Creek.
EHL-MW16-33 Area.

Location:
East Headlands



Photo: 6

Date:
February 22, 2016.

Description:
Looking East across the South edge of the East Headlands.
EHL-MW16-33 Area.

Location:
East Headlands

Project Photographs

PWGSC – TC
East Headlands,
Port Stanly, ON



Photo: 7

Date:
February 22, 2016.

Description:
Looking North West across
the East side of the East
Headlands.
EHL-MW16-31 Area.

Location:
East Headlands



Photo: 8

Date:
February 22, 2016.

Description:
Looking North East toward
the Beach Area from the East
side of the East Headlands.
EHL-MW16-31 Area.

Location:
East Headlands

Project Photographs

PWGSC – TC
East Headlands,
Port Stanly, ON



Photo: 9

Date:
July, 2016.

Description:
Looking South from roadway on the North edge of the East Headlands.
Workers laying staging area for excavated soil.

Location:
East Headlands



Photo: 10

Date:
February, 2016.

Description:
Looking North at the South edge of the Parking Lot along Kettle Creek.
EHL-MW16-37 Area.

Location:
East Headlands

Project Photographs

PWGSC – TC
East Headlands,
Port Stanly, ON



Photo: 11
Date:
September, 2016.

Description:
Looking East across North edge of East Headlands after excavation have being completed and site restored.

Location:
East Headlands



Photo: 12
Date:
September, 2016.

Description:
Looking South East after excavation activities have being completed and site regraded.

Location:
East Headlands

Project Photographs

PWGSC – TC
East Headlands,
Port Stanly, ON



Photo: 13

Date:

September, 2016.

Description:

Looking East at the North West corner of the existing fenced area.

Location:

East Headlands



Photo: 14

Date:

September, 2016.

Description:

Looking North West after excavation activities completed and site restored in the North end of the East Headlands.

Location:

East Headlands

Project Photographs

EHL LNAPL Remediation
Port Stanley, Ontario



View looking east of the
East headlands
Site



Workers laying staging
area for excavated soil

Project Photographs

EHL LNAPL Remediation
Port Stanley, Ontario



Trucks carry excavated soil to staging area



Excavated area of the site (Looking north east)

Project Photographs

EHL LNAPL Remediation
Port Stanley, Ontario



View showing excavation of from the north west to the north east with backfill material in the background



View of the site looking to the south east showing excavation activities

Project Photographs

EHL LNAPL Remediation
Port Stanley, Ontario



View of site looking to the north east after excavation have being completed and site restored



View of the site looking to the south west after excavation activities have being completed and site restored

Project Photographs

EHL LNAPL Remediation
Port Stanley, Ontario



Looking to north east
of the entire site



View of site looking to
the northwest after
excavation activities
have being completed
and site restored

Project Photographs

EHL LNAPL Remediation
Port Stanley, Ontario



Picture of site looking to the west from the south east of the site.



Looking to the south east of the site

Project Photographs

EHL LNAPL Remediation
Port Stanley, Ontario



South end of the parking lot with the harbour channel in the background



Section of the north portion of the parking lot

Project Photographs

EHL LNAPL Remediation
Port Stanley, Ontario



Looking south east of
the site towards the
beach



View of the parking lot
looking north with the
channel in the
background

APPENDIX 6
MCE SOIL CHEMISTRY

Your Project #: 702465
 Site Location: MCE - SPRINGWATER & BROUWERS
 Your C.O.C. #: na

Attention: Barry Cooke

ARCADIS Canada Inc
 121 Granton Dr
 Unit 11
 Richmond Hill, ON
 L4B 3N4

Report Date: 2016/02/16
 Report #: R3895644
 Version: 1 - Final

CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B624283

Received: 2016/02/04, 18:33

Sample Matrix: Soil
 # Samples Received: 36

Analyses	Quantity	Date		Laboratory Method	Reference
		Extracted	Analyzed		
Hot Water Extractable Boron	36	2016/02/10	2016/02/10	CAM SOP-00408	R153 Ana. Prot. 2011
Free (WAD) Cyanide	16	2016/02/08	2016/02/12	CAM SOP-00457	OMOE E3015 m
Free (WAD) Cyanide	20	2016/02/09	2016/02/12	CAM SOP-00457	OMOE E3015 m
Conductivity	36	N/A	2016/02/10	CAM SOP-00414	OMOE E3138 v2 m
Hexavalent Chromium in Soil by IC (1)	18	2016/02/09	2016/02/09	CAM SOP-00436	EPA 3060/7199 m
Hexavalent Chromium in Soil by IC (1)	1	2016/02/09	2016/02/10	CAM SOP-00436	EPA 3060/7199 m
Hexavalent Chromium in Soil by IC (1)	10	2016/02/10	2016/02/10	CAM SOP-00436	EPA 3060/7199 m
Hexavalent Chromium in Soil by IC (1)	7	2016/02/10	2016/02/11	CAM SOP-00436	EPA 3060/7199 m
Petroleum Hydro. CCME F1 & BTEX in Soil (2)	16	N/A	2016/02/09	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydro. CCME F1 & BTEX in Soil (2)	20	N/A	2016/02/10	CAM SOP-00315	CCME PHC-CWS m
Petroleum Hydrocarbons F2-F4 in Soil (3)	3	2016/02/09	2016/02/10	CAM SOP-00316	CCME CWS m
Petroleum Hydrocarbons F2-F4 in Soil (3)	10	2016/02/10	2016/02/10	CAM SOP-00316	CCME CWS m
Petroleum Hydrocarbons F2-F4 in Soil (3)	23	2016/02/10	2016/02/11	CAM SOP-00316	CCME CWS m
Strong Acid Leachable Metals by ICPMS	19	2016/02/09	2016/02/09	CAM SOP-00447	EPA 6020A m
Strong Acid Leachable Metals by ICPMS	1	2016/02/09	2016/02/10	CAM SOP-00447	EPA 6020A m
Strong Acid Leachable Metals by ICPMS	5	2016/02/10	2016/02/10	CAM SOP-00447	EPA 6020A m
Strong Acid Leachable Metals by ICPMS	11	2016/02/10	2016/02/11	CAM SOP-00447	EPA 6020A m
Moisture	36	N/A	2016/02/10	CAM SOP-00445	Carter 2nd ed 51.2 m
pH CaCl2 EXTRACT	8	2016/02/09	2016/02/09	CAM SOP-00413	EPA 9045 D m
pH CaCl2 EXTRACT	28	2016/02/10	2016/02/10	CAM SOP-00413	EPA 9045 D m
Sodium Adsorption Ratio (SAR)	1	N/A	2016/02/10	CAM SOP-00102	EPA 6010
Sodium Adsorption Ratio (SAR)	35	N/A	2016/02/11	CAM SOP-00102	EPA 6010
SAR - ICP Metals	36	2016/02/10	2016/02/10	CAM SOP-00408	EPA 6010 m

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.

* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.

Your Project #: 702465
Site Location: MCE - SPRINGWATER & BROUWERS
Your C.O.C. #: na

Attention:Barry Cooke

ARCADIS Canada Inc
121 Granton Dr
Unit 11
Richmond Hill, ON
L4B 3N4

Report Date: 2016/02/16
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CERTIFICATE OF ANALYSIS

MAXXAM JOB #: B624283

Received: 2016/02/04, 18:33

- (1) Soils are reported on a dry weight basis unless otherwise specified.
- (2) No lab extraction date is given for F1BTEX & VOC samples that are field preserved with methanol. Extraction date is the date sampled unless otherwise stated.
- (3) All CCME PHC results met required criteria unless otherwise stated in the report. The CWS PHC methods employed by Maxxam conform to all prescribed elements of the reference method and performance based elements have been validated. All modifications have been validated and proven equivalent following "Alberta Environment's Interpretation of the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Validation of Performance-Based Alternative Methods September 2003". Documentation is available upon request. Modifications from Reference Method for the Canada-wide Standard for Petroleum Hydrocarbons in Soil-Tier 1 Method: F2/F3/F4 data reported using validated cold solvent extraction instead of Soxhlet extraction.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.

Keshani Vijh, Project Manager
Email: KVijh@maxxam.ca
Phone# (905) 817-5700

=====
Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

RESULTS OF ANALYSES OF SOIL

Maxxam ID			BUL214	BUL215		BUL216		BUL217		
Sampling Date			2016/02/04	2016/02/04		2016/02/04		2016/02/04		
COC Number			na	na		na		na		
	UNITS	Criteria	SA-1	SA-2	QC Batch	SA-3	QC Batch	SA-4	RDL	QC Batch
Calculated Parameters										
Sodium Adsorption Ratio	N/A	2.4	0.34	0.26	4371055	0.52	4371055	0.42		4371055
Inorganics										
Conductivity	mS/cm	0.57	0.30	0.22	4376560	0.34	4376585	0.22	0.002	4376560
Free Cyanide	ug/g	0.051	<0.01	<0.01	4375614	<0.01	4375614	<0.01	0.01	4375614
Moisture	%	-	17	16	4376678	14	4376678	13	1.0	4376678
Available (CaCl2) pH	pH	-	7.31	7.44	4375500	7.55	4375500	7.65		4375612
Metals										
Soluble Calcium (Ca)	mg/L	-	41.3	28.8	4376557	40.5	4376567	28.2	0.5	4376557
Soluble Magnesium (Mg)	mg/L	-	4.6	6.0	4376557	5.5	4376567	3.5	0.5	4376557
Soluble Sodium (Na)	mg/L	-	9	6	4376557	13	4376567	9	5	4376557
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Criteria: Ontario Reg. 153/04 (Amended April 15, 2011) Table 1: Full Depth Background Site Condition Standards Soil - Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use										

Maxxam ID			BUL218		BUL219		BUL220		BUL221		
Sampling Date			2016/02/04		2016/02/04		2016/02/04		2016/02/04		
COC Number			na		na		na		na		
	UNITS	Criteria	SA-5	QC Batch	SA-6	QC Batch	SA-7	QC Batch	SA-8	RDL	QC Batch
Calculated Parameters											
Sodium Adsorption Ratio	N/A	2.4	0.39	4371055	0.69	4371055	0.43	4371055	0.54		4371055
Inorganics											
Conductivity	mS/cm	0.57	0.25	4376585	0.38	4376585	0.24	4376585	0.38	0.002	4376585
Free Cyanide	ug/g	0.051	<0.01	4375614	<0.01	4374107	<0.01	4374384	<0.01	0.01	4375614
Moisture	%	-	14	4376678	11	4377557	9.8	4377557	11	1.0	4376678
Available (CaCl2) pH	pH	-	7.60	4375500	7.58	4375167	7.18	4374345	7.63		4375500
Metals											
Soluble Calcium (Ca)	mg/L	-	31.4	4376567	44.7	4376567	28.5	4376567	45.4	0.5	4376567
Soluble Magnesium (Mg)	mg/L	-	4.1	4376567	4.7	4376567	3.8	4376567	5.9	0.5	4376567
Soluble Sodium (Na)	mg/L	-	9	4376567	18	4376567	9	4376567	14	5	4376567
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Criteria: Ontario Reg. 153/04 (Amended April 15, 2011) Table 1: Full Depth Background Site Condition Standards Soil - Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use											

RESULTS OF ANALYSES OF SOIL

Maxxam ID			BUL222	BUL223		BUL224	BUL225		BUL226		
Sampling Date			2016/02/04	2016/02/04		2016/02/04	2016/02/04		2016/02/04		
COC Number			na	na		na	na		na		
	UNITS	Criteria	SA-9	SA-10	QC Batch	SA-11	SA-12	QC Batch	SA-13	RDL	QC Batch

Calculated Parameters											
Sodium Adsorption Ratio	N/A	2.4	0.25	0.48	4371055	1.2	0.69	4371055	0.47		4371055

Inorganics											
Conductivity	mS/cm	0.57	0.24	0.23	4376560	0.51	0.44	4376585	0.33	0.002	4376560
Free Cyanide	ug/g	0.051	<0.01	<0.01	4375614	<0.01	<0.01	4375614	<0.01	0.01	4375614
Moisture	%	-	17	17	4376678	16	11	4376678	13	1.0	4376678
Available (CaCl2) pH	pH	-	7.65	7.67	4375500	7.55	7.59	4375500	7.60		4375500

Metals											
Soluble Calcium (Ca)	mg/L	-	33.2	29.9	4376557	56.1	53.3	4376567	41.8	0.5	4376557
Soluble Magnesium (Mg)	mg/L	-	4.4	2.5	4376557	4.2	5.3	4376567	4.9	0.5	4376557
Soluble Sodium (Na)	mg/L	-	6	10	4376557	34	20	4376567	12	5	4376557

RDL = Reportable Detection Limit
 QC Batch = Quality Control Batch
 Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)
 Table 1: Full Depth Background Site Condition Standards
 Soil - Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use

Maxxam ID			BUL227	BUL228		BUL229		BUL230	BUL231		
Sampling Date			2016/02/04	2016/02/04		2016/02/04		2016/02/04	2016/02/04		
COC Number			na	na		na		na	na		
	UNITS	Criteria	SA-14	SA-15	QC Batch	SA-16	QC Batch	SA-17	SA-18	RDL	QC Batch

Calculated Parameters											
Sodium Adsorption Ratio	N/A	2.4	1.4	0.88	4371055	0.74	4371055	0.75	0.45		4371055

Inorganics											
Conductivity	mS/cm	0.57	0.56	0.48	4376585	0.50	4376585	0.49	0.30	0.002	4376585
Free Cyanide	ug/g	0.051	0.02	<0.01	4374384	<0.01	4374384	<0.01	<0.01	0.01	4374384
Moisture	%	-	16	14	4377557	18	4376805	16	16	1.0	4377557
Available (CaCl2) pH	pH	-	7.31	7.39	4374345	7.44	4374345	7.49	7.57		4374345

Metals											
Soluble Calcium (Ca)	mg/L	-	58.5	56.0	4376567	59.9	4376567	60.1	36.8	0.5	4376567
Soluble Magnesium (Mg)	mg/L	-	4.5	4.7	4376567	5.7	4376567	5.0	4.8	0.5	4376567
Soluble Sodium (Na)	mg/L	-	41	26	4376567	22	4376567	22	11	5	4376567

RDL = Reportable Detection Limit
 QC Batch = Quality Control Batch
 Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)
 Table 1: Full Depth Background Site Condition Standards
 Soil - Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use

RESULTS OF ANALYSES OF SOIL

Maxxam ID			BUL232		BUL233		BUL234		BUL235		
Sampling Date			2016/02/04		2016/02/04		2016/02/04		2016/02/04		
COC Number			na		na		na		na		
	UNITS	Criteria	SA-19	QC Batch	SA-20	QC Batch	SA-21	QC Batch	SA-22	RDL	QC Batch
Calculated Parameters											
Sodium Adsorption Ratio	N/A	2.4	1.2	4371055	0.55	4371055	0.61	4371055	0.71		4371055
Inorganics											
Conductivity	mS/cm	0.57	0.57	4376585	0.41	4376560	0.49	4376560	0.53	0.002	4376585
Free Cyanide	ug/g	0.051	0.01	4374384	<0.01	4374524	<0.01	4375614	<0.01	0.01	4374524
Moisture	%	-	16	4377557	18	4377453	18	4376678	18	1.0	4377453
Available (CaCl2) pH	pH	-	7.41	4374345	7.62	4375500	7.63	4375612	7.62		4375500
Metals											
Soluble Calcium (Ca)	mg/L	-	62.9	4376567	48.6	4376557	56.3	4376557	63.0	0.5	4376567
Soluble Magnesium (Mg)	mg/L	-	4.8	4376567	7.0	4376557	8.4	4376557	6.6	0.5	4376567
Soluble Sodium (Na)	mg/L	-	37	4376567	16	4376557	18	4376557	22	5	4376567
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Criteria: Ontario Reg. 153/04 (Amended April 15, 2011) Table 1: Full Depth Background Site Condition Standards Soil - Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use											

Maxxam ID			BUL236		BUL237		BUL238		BUL239		
Sampling Date			2016/02/04		2016/02/04		2016/02/04		2016/02/04		
COC Number			na		na		na		na		
	UNITS	Criteria	SA-23	QC Batch	SA-24	QC Batch	SA-25	QC Batch	SA-26	RDL	QC Batch
Calculated Parameters											
Sodium Adsorption Ratio	N/A	2.4	0.92	4371055	0.37	4371055	0.40	4371055	0.85		4371055
Inorganics											
Conductivity	mS/cm	0.57	0.78	4376585	0.38	4377291	0.30	4376560	0.30	0.002	4376585
Free Cyanide	ug/g	0.051	<0.01	4374524	<0.01	4374524	<0.01	4374524	<0.01	0.01	4374524
Moisture	%	-	23	4377453	12	4377195	17	4377453	14	1.0	4377453
Available (CaCl2) pH	pH	-	7.59	4375500	7.62	4375500	7.45	4375500	7.59		4375500
Metals											
Soluble Calcium (Ca)	mg/L	-	88.6	4376567	42.8	4377221	42.2	4376557	33.4	0.5	4376567
Soluble Magnesium (Mg)	mg/L	-	9.9	4376567	6.9	4377221	3.9	4376557	3.0	0.5	4376567
Soluble Sodium (Na)	mg/L	-	34	4376567	10	4377221	10	4376557	19	5	4376567
RDL = Reportable Detection Limit QC Batch = Quality Control Batch Criteria: Ontario Reg. 153/04 (Amended April 15, 2011) Table 1: Full Depth Background Site Condition Standards Soil - Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use											

RESULTS OF ANALYSES OF SOIL

Maxxam ID			BUL240	BUL241	BUL242		BUL243		BUL244		
Sampling Date			2016/02/04	2016/02/04	2016/02/04		2016/02/04		2016/02/04		
COC Number			na	na	na		na		na		
	UNITS	Criteria	SA-27	SA-28	SA-29	QC Batch	SA-30	QC Batch	SA-31	RDL	QC Batch

Calculated Parameters											
Sodium Adsorption Ratio	N/A	2.4	0.81	0.67	0.60	4371055	0.81	4371055	0.55		4371055

Inorganics											
Conductivity	mS/cm	0.57	0.46	0.48	0.43	4376560	0.57	4376560	0.40	0.002	4376585
Free Cyanide	ug/g	0.051	<0.01	<0.01	<0.01	4375614	<0.01	4374524	<0.01	0.01	4374524
Moisture	%	-	21	18	17	4376678	20	4377453	16	1.0	4377453
Available (CaCl2) pH	pH	-	7.55	7.60	7.63	4375612	7.61	4375500	7.55		4375500

Metals											
Soluble Calcium (Ca)	mg/L	-	53.3	57.9	52.8	4376557	64.8	4376557	49.4	0.5	4376567
Soluble Magnesium (Mg)	mg/L	-	5.3	5.4	6.6	4376557	6.6	4376557	5.6	0.5	4376567
Soluble Sodium (Na)	mg/L	-	23	20	17	4376557	25	4376557	15	5	4376567

RDL = Reportable Detection Limit
 QC Batch = Quality Control Batch
 Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)
 Table 1: Full Depth Background Site Condition Standards
 Soil - Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use

Maxxam ID			BUL245		BUL246	BUL247		BUL248	BUL249		
Sampling Date			2016/02/04		2016/02/04	2016/02/04		2016/02/04	2016/02/04		
COC Number			na		na	na		na	na		
	UNITS	Criteria	SA-32	QC Batch	DUP#1	DUP#2	QC Batch	DUP#3	DUP#4	RDL	QC Batch

Calculated Parameters											
Sodium Adsorption Ratio	N/A	2.4	0.66	4371055	0.22	0.54	4371055	0.71	0.73		4371055

Inorganics											
Conductivity	mS/cm	0.57	0.56	4376585	0.22	0.36	4376560	0.52	0.55	0.002	4376585
Free Cyanide	ug/g	0.051	<0.01	4375614	<0.01	<0.01	4375614	<0.01	<0.01	0.01	4375614
Moisture	%	-	15	4376678	17	11	4376678	19	13	1.0	4376678
Available (CaCl2) pH	pH	-	7.62	4375612	7.62	7.57	4375612	7.62	7.67		4375612

Metals											
Soluble Calcium (Ca)	mg/L	-	66.2	4376567	30.8	44.1	4376557	61.5	67.0	0.5	4376567
Soluble Magnesium (Mg)	mg/L	-	8.8	4376567	5.1	4.8	4376557	6.0	6.3	0.5	4376567
Soluble Sodium (Na)	mg/L	-	22	4376567	<5	14	4376557	22	23	5	4376567

RDL = Reportable Detection Limit
 QC Batch = Quality Control Batch
 Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)
 Table 1: Full Depth Background Site Condition Standards
 Soil - Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID			BUL214	BUL215		BUL216		BUL217		
Sampling Date			2016/02/04	2016/02/04		2016/02/04		2016/02/04		
COC Number			na	na		na		na		
	UNITS	Criteria	SA-1	SA-2	QC Batch	SA-3	QC Batch	SA-4	RDL	QC Batch

Inorganics										
Chromium (VI)	ug/g	0.66	<0.2	<0.2	4375509	<0.2	4375509	<0.2	0.2	4376779
Metals										
Hot Water Ext. Boron (B)	ug/g	-	0.062	0.055	4376559	0.11	4376578	0.099	0.050	4376559
Acid Extractable Antimony (Sb)	ug/g	1.3	<0.20	<0.20	4376621	<0.20	4375554	<0.20	0.20	4375554
Acid Extractable Arsenic (As)	ug/g	18	3.6	3.6	4376621	3.0	4375554	3.0	1.0	4375554
Acid Extractable Barium (Ba)	ug/g	220	47	91	4376621	79	4375554	74	0.50	4375554
Acid Extractable Beryllium (Be)	ug/g	2.5	0.46	0.64	4376621	0.57	4375554	0.52	0.20	4375554
Acid Extractable Boron (B)	ug/g	36	6.7	10	4376621	12	4375554	8.7	5.0	4375554
Acid Extractable Cadmium (Cd)	ug/g	1.2	<0.10	0.10	4376621	<0.10	4375554	0.14	0.10	4375554
Acid Extractable Chromium (Cr)	ug/g	70	15	21	4376621	21	4375554	17	1.0	4375554
Acid Extractable Cobalt (Co)	ug/g	21	7.3	10	4376621	8.8	4375554	8.6	0.10	4375554
Acid Extractable Copper (Cu)	ug/g	92	18	22	4376621	18	4375554	17	0.50	4375554
Acid Extractable Lead (Pb)	ug/g	120	7.7	9.1	4376621	8.5	4375554	8.3	1.0	4375554
Acid Extractable Molybdenum (Mo)	ug/g	2	<0.50	<0.50	4376621	<0.50	4375554	<0.50	0.50	4375554
Acid Extractable Nickel (Ni)	ug/g	82	15	25	4376621	21	4375554	19	0.50	4375554
Acid Extractable Selenium (Se)	ug/g	1.5	<0.50	<0.50	4376621	<0.50	4375554	<0.50	0.50	4375554
Acid Extractable Silver (Ag)	ug/g	0.5	<0.20	<0.20	4376621	<0.20	4375554	<0.20	0.20	4375554
Acid Extractable Thallium (Tl)	ug/g	1	0.080	0.16	4376621	0.14	4375554	0.14	0.050	4375554
Acid Extractable Uranium (U)	ug/g	2.5	0.46	0.57	4376621	0.55	4375554	0.52	0.050	4375554
Acid Extractable Vanadium (V)	ug/g	86	24	31	4376621	26	4375554	25	5.0	4375554
Acid Extractable Zinc (Zn)	ug/g	290	42	55	4376621	65	4375554	49	5.0	4375554
Acid Extractable Mercury (Hg)	ug/g	0.27	<0.050	<0.050	4376621	<0.050	4375554	<0.050	0.050	4375554

RDL = Reportable Detection Limit
 QC Batch = Quality Control Batch
 Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)
 Table 1: Full Depth Background Site Condition Standards
 Soil - Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID			BUL218		BUL219		BUL220		
Sampling Date			2016/02/04		2016/02/04		2016/02/04		
COC Number			na		na		na		
	UNITS	Criteria	SA-5	QC Batch	SA-6	QC Batch	SA-7	RDL	QC Batch
Inorganics									
Chromium (VI)	ug/g	0.66	<0.2	4375509	<0.2	4375515	<0.2	0.2	4376783
Metals									
Hot Water Ext. Boron (B)	ug/g	-	0.11	4376578	0.11	4376578	0.055	0.050	4376578
Acid Extractable Antimony (Sb)	ug/g	1.3	<0.20	4375554	<0.20	4376660	<0.20	0.20	4376660
Acid Extractable Arsenic (As)	ug/g	18	2.7	4375554	2.7	4376660	1.6	1.0	4376660
Acid Extractable Barium (Ba)	ug/g	220	76	4375554	48	4376660	33	0.50	4376660
Acid Extractable Beryllium (Be)	ug/g	2.5	0.53	4375554	0.41	4376660	0.24	0.20	4376660
Acid Extractable Boron (B)	ug/g	36	8.4	4375554	6.1	4376660	<5.0	5.0	4376660
Acid Extractable Cadmium (Cd)	ug/g	1.2	0.10	4375554	0.11	4376660	<0.10	0.10	4376660
Acid Extractable Chromium (Cr)	ug/g	70	18	4375554	14	4376660	11	1.0	4376660
Acid Extractable Cobalt (Co)	ug/g	21	8.2	4375554	6.6	4376660	4.9	0.10	4376660
Acid Extractable Copper (Cu)	ug/g	92	17	4375554	15	4376660	10	0.50	4376660
Acid Extractable Lead (Pb)	ug/g	120	8.5	4375554	7.6	4376660	5.0	1.0	4376660
Acid Extractable Molybdenum (Mo)	ug/g	2	<0.50	4375554	<0.50	4376660	<0.50	0.50	4376660
Acid Extractable Nickel (Ni)	ug/g	82	19	4375554	14	4376660	9.6	0.50	4376660
Acid Extractable Selenium (Se)	ug/g	1.5	<0.50	4375554	0.86	4376660	<0.50	0.50	4376660
Acid Extractable Silver (Ag)	ug/g	0.5	<0.20	4375554	<0.20	4376660	<0.20	0.20	4376660
Acid Extractable Thallium (Tl)	ug/g	1	0.13	4375554	0.091	4376660	0.072	0.050	4376660
Acid Extractable Uranium (U)	ug/g	2.5	0.52	4375554	0.45	4376660	0.40	0.050	4376660
Acid Extractable Vanadium (V)	ug/g	86	25	4375554	23	4376660	19	5.0	4376660
Acid Extractable Zinc (Zn)	ug/g	290	55	4375554	38	4376660	29	5.0	4376660
Acid Extractable Mercury (Hg)	ug/g	0.27	<0.050	4375554	<0.050	4376660	<0.050	0.050	4376660
RDL = Reportable Detection Limit									
QC Batch = Quality Control Batch									
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)									
Table 1: Full Depth Background Site Condition Standards									
Soil - Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use									

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID			BUL221		BUL222	BUL223		BUL224		
Sampling Date			2016/02/04		2016/02/04	2016/02/04		2016/02/04		
COC Number			na		na	na		na		
	UNITS	Criteria	SA-8	QC Batch	SA-9	SA-10	QC Batch	SA-11	RDL	QC Batch
Inorganics										
Chromium (VI)	ug/g	0.66	<0.2	4375509	<0.2	<0.2	4375509	<0.2	0.2	4375509
Metals										
Hot Water Ext. Boron (B)	ug/g	-	0.085	4376578	0.053	<0.050	4376559	0.27	0.050	4376578
Acid Extractable Antimony (Sb)	ug/g	1.3	<0.20	4375554	<0.20	<0.20	4376621	<0.20	0.20	4375554
Acid Extractable Arsenic (As)	ug/g	18	2.0	4375554	3.8	3.5	4376621	3.3	1.0	4375554
Acid Extractable Barium (Ba)	ug/g	220	39	4375554	63	33	4376621	55	0.50	4375554
Acid Extractable Beryllium (Be)	ug/g	2.5	0.29	4375554	0.55	0.37	4376621	0.52	0.20	4375554
Acid Extractable Boron (B)	ug/g	36	6.0	4375554	8.4	5.2	4376621	6.0	5.0	4375554
Acid Extractable Cadmium (Cd)	ug/g	1.2	<0.10	4375554	<0.10	0.10	4376621	0.20	0.10	4375554
Acid Extractable Chromium (Cr)	ug/g	70	11	4375554	18	13	4376621	15	1.0	4375554
Acid Extractable Cobalt (Co)	ug/g	21	5.1	4375554	9.2	7.1	4376621	7.4	0.10	4375554
Acid Extractable Copper (Cu)	ug/g	92	10	4375554	19	19	4376621	18	0.50	4375554
Acid Extractable Lead (Pb)	ug/g	120	6.1	4375554	8.7	7.0	4376621	11	1.0	4375554
Acid Extractable Molybdenum (Mo)	ug/g	2	<0.50	4375554	<0.50	<0.50	4376621	<0.50	0.50	4375554
Acid Extractable Nickel (Ni)	ug/g	82	11	4375554	20	14	4376621	16	0.50	4375554
Acid Extractable Selenium (Se)	ug/g	1.5	<0.50	4375554	<0.50	<0.50	4376621	<0.50	0.50	4375554
Acid Extractable Silver (Ag)	ug/g	0.5	<0.20	4375554	<0.20	<0.20	4376621	<0.20	0.20	4375554
Acid Extractable Thallium (Tl)	ug/g	1	0.090	4375554	0.10	0.072	4376621	0.087	0.050	4375554
Acid Extractable Uranium (U)	ug/g	2.5	0.46	4375554	0.48	0.42	4376621	0.47	0.050	4375554
Acid Extractable Vanadium (V)	ug/g	86	18	4375554	26	23	4376621	24	5.0	4375554
Acid Extractable Zinc (Zn)	ug/g	290	31	4375554	48	39	4376621	49	5.0	4375554
Acid Extractable Mercury (Hg)	ug/g	0.27	<0.050	4375554	<0.050	<0.050	4376621	<0.050	0.050	4375554
RDL = Reportable Detection Limit										
QC Batch = Quality Control Batch										
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)										
Table 1: Full Depth Background Site Condition Standards										
Soil - Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use										

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID			BUL225		BUL226		BUL227	BUL228		
Sampling Date			2016/02/04		2016/02/04		2016/02/04	2016/02/04		
COC Number			na		na		na	na		
	UNITS	Criteria	SA-12	QC Batch	SA-13	QC Batch	SA-14	SA-15	RDL	QC Batch
Inorganics										
Chromium (VI)	ug/g	0.66	<0.2	4375509	<0.2	4375509	<0.2	<0.2	0.2	4376783
Metals										
Hot Water Ext. Boron (B)	ug/g	-	0.15	4376578	0.12	4376559	0.28	0.18	0.050	4376578
Acid Extractable Antimony (Sb)	ug/g	1.3	<0.20	4375554	<0.20	4376621	<0.20	<0.20	0.20	4376660
Acid Extractable Arsenic (As)	ug/g	18	2.2	4375554	2.2	4376621	3.1	2.9	1.0	4376660
Acid Extractable Barium (Ba)	ug/g	220	47	4375554	45	4376621	52	52	0.50	4376660
Acid Extractable Beryllium (Be)	ug/g	2.5	0.41	4375554	0.34	4376621	0.51	0.47	0.20	4376660
Acid Extractable Boron (B)	ug/g	36	6.2	4375554	6.3	4376621	5.7	6.5	5.0	4376660
Acid Extractable Cadmium (Cd)	ug/g	1.2	0.16	4375554	0.10	4376621	0.22	0.17	0.10	4376660
Acid Extractable Chromium (Cr)	ug/g	70	14	4375554	13	4376621	17	16	1.0	4376660
Acid Extractable Cobalt (Co)	ug/g	21	6.2	4375554	5.8	4376621	7.3	7.1	0.10	4376660
Acid Extractable Copper (Cu)	ug/g	92	14	4375554	13	4376621	18	17	0.50	4376660
Acid Extractable Lead (Pb)	ug/g	120	8.0	4375554	6.8	4376621	11	9.5	1.0	4376660
Acid Extractable Molybdenum (Mo)	ug/g	2	<0.50	4375554	<0.50	4376621	<0.50	<0.50	0.50	4376660
Acid Extractable Nickel (Ni)	ug/g	82	13	4375554	12	4376621	16	15	0.50	4376660
Acid Extractable Selenium (Se)	ug/g	1.5	<0.50	4375554	<0.50	4376621	<0.50	<0.50	0.50	4376660
Acid Extractable Silver (Ag)	ug/g	0.5	<0.20	4375554	<0.20	4376621	<0.20	<0.20	0.20	4376660
Acid Extractable Thallium (Tl)	ug/g	1	0.11	4375554	0.078	4376621	0.11	0.10	0.050	4376660
Acid Extractable Uranium (U)	ug/g	2.5	0.47	4375554	0.43	4376621	0.50	0.48	0.050	4376660
Acid Extractable Vanadium (V)	ug/g	86	24	4375554	21	4376621	25	25	5.0	4376660
Acid Extractable Zinc (Zn)	ug/g	290	40	4375554	39	4376621	49	46	5.0	4376660
Acid Extractable Mercury (Hg)	ug/g	0.27	<0.050	4375554	<0.050	4376621	<0.050	<0.050	0.050	4376660
RDL = Reportable Detection Limit										
QC Batch = Quality Control Batch										
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)										
Table 1: Full Depth Background Site Condition Standards										
Soil - Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use										

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID			BUL229	BUL230	BUL231	BUL232		BUL233		
Sampling Date			2016/02/04	2016/02/04	2016/02/04	2016/02/04		2016/02/04		
COC Number			na	na	na	na		na		
	UNITS	Criteria	SA-16	SA-17	SA-18	SA-19	QC Batch	SA-20	RDL	QC Batch

Inorganics										
Chromium (VI)	ug/g	0.66	<0.2	<0.2	<0.2	<0.2	4376783	<0.2	0.2	4375509
Metals										
Hot Water Ext. Boron (B)	ug/g	-	0.078	0.11	0.060	0.33	4376578	<0.050	0.050	4376559
Acid Extractable Antimony (Sb)	ug/g	1.3	<0.20	<0.20	<0.20	<0.20	4376660	<0.20	0.20	4375554
Acid Extractable Arsenic (As)	ug/g	18	3.3	3.2	3.0	3.3	4376660	3.2	1.0	4375554
Acid Extractable Barium (Ba)	ug/g	220	44	41	44	54	4376660	33	0.50	4375554
Acid Extractable Beryllium (Be)	ug/g	2.5	0.41	0.43	0.40	0.49	4376660	0.35	0.20	4375554
Acid Extractable Boron (B)	ug/g	36	7.6	5.6	6.4	6.0	4376660	5.5	5.0	4375554
Acid Extractable Cadmium (Cd)	ug/g	1.2	<0.10	0.12	<0.10	0.30	4376660	<0.10	0.10	4375554
Acid Extractable Chromium (Cr)	ug/g	70	14	15	14	16	4376660	12	1.0	4375554
Acid Extractable Cobalt (Co)	ug/g	21	7.2	7.0	7.1	6.8	4376660	6.4	0.10	4375554
Acid Extractable Copper (Cu)	ug/g	92	18	17	18	18	4376660	16	0.50	4375554
Acid Extractable Lead (Pb)	ug/g	120	7.7	7.4	7.2	11	4376660	6.6	1.0	4375554
Acid Extractable Molybdenum (Mo)	ug/g	2	<0.50	<0.50	<0.50	<0.50	4376660	<0.50	0.50	4375554
Acid Extractable Nickel (Ni)	ug/g	82	15	15	15	15	4376660	14	0.50	4375554
Acid Extractable Selenium (Se)	ug/g	1.5	<0.50	<0.50	<0.50	0.56	4376660	<0.50	0.50	4375554
Acid Extractable Silver (Ag)	ug/g	0.5	<0.20	<0.20	<0.20	<0.20	4376660	<0.20	0.20	4375554
Acid Extractable Thallium (Tl)	ug/g	1	0.084	0.083	0.083	0.099	4376660	0.072	0.050	4375554
Acid Extractable Uranium (U)	ug/g	2.5	0.46	0.43	0.45	0.53	4376660	0.45	0.050	4375554
Acid Extractable Vanadium (V)	ug/g	86	23	24	23	24	4376660	20	5.0	4375554
Acid Extractable Zinc (Zn)	ug/g	290	39	40	41	49	4376660	36	5.0	4375554
Acid Extractable Mercury (Hg)	ug/g	0.27	<0.050	<0.050	<0.050	<0.050	4376660	<0.050	0.050	4375554

RDL = Reportable Detection Limit
 QC Batch = Quality Control Batch
 Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)
 Table 1: Full Depth Background Site Condition Standards
 Soil - Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID			BUL234		BUL235		BUL236		
Sampling Date			2016/02/04		2016/02/04		2016/02/04		
COC Number			na		na		na		
	UNITS	Criteria	SA-21	QC Batch	SA-22	QC Batch	SA-23	RDL	QC Batch
Inorganics									
Chromium (VI)	ug/g	0.66	<0.2	4376779	<0.2	4375509	<0.2	0.2	4375509
Metals									
Hot Water Ext. Boron (B)	ug/g	-	<0.050	4376559	0.084	4376578	<0.050	0.050	4376578
Acid Extractable Antimony (Sb)	ug/g	1.3	<0.20	4375554	<0.20	4376660	<0.20	0.20	4375554
Acid Extractable Arsenic (As)	ug/g	18	2.4	4375554	3.3	4376660	4.1	1.0	4375554
Acid Extractable Barium (Ba)	ug/g	220	35	4375554	55	4376660	67	0.50	4375554
Acid Extractable Beryllium (Be)	ug/g	2.5	0.34	4375554	0.49	4376660	0.61	0.20	4375554
Acid Extractable Boron (B)	ug/g	36	5.8	4375554	7.2	4376660	8.3	5.0	4375554
Acid Extractable Cadmium (Cd)	ug/g	1.2	<0.10	4375554	0.11	4376660	0.11	0.10	4375554
Acid Extractable Chromium (Cr)	ug/g	70	13	4375554	16	4376660	18	1.0	4375554
Acid Extractable Cobalt (Co)	ug/g	21	6.6	4375554	8.4	4376660	9.8	0.10	4375554
Acid Extractable Copper (Cu)	ug/g	92	17	4375554	19	4376660	20	0.50	4375554
Acid Extractable Lead (Pb)	ug/g	120	6.8	4375554	8.3	4376660	9.2	1.0	4375554
Acid Extractable Molybdenum (Mo)	ug/g	2	<0.50	4375554	<0.50	4376660	<0.50	0.50	4375554
Acid Extractable Nickel (Ni)	ug/g	82	14	4375554	18	4376660	20	0.50	4375554
Acid Extractable Selenium (Se)	ug/g	1.5	<0.50	4375554	<0.50	4376660	<0.50	0.50	4375554
Acid Extractable Silver (Ag)	ug/g	0.5	<0.20	4375554	<0.20	4376660	<0.20	0.20	4375554
Acid Extractable Thallium (Tl)	ug/g	1	0.065	4375554	0.10	4376660	0.12	0.050	4375554
Acid Extractable Uranium (U)	ug/g	2.5	0.45	4375554	0.49	4376660	0.52	0.050	4375554
Acid Extractable Vanadium (V)	ug/g	86	21	4375554	25	4376660	28	5.0	4375554
Acid Extractable Zinc (Zn)	ug/g	290	36	4375554	45	4376660	48	5.0	4375554
Acid Extractable Mercury (Hg)	ug/g	0.27	<0.050	4375554	<0.050	4376660	<0.050	0.050	4375554
RDL = Reportable Detection Limit									
QC Batch = Quality Control Batch									
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)									
Table 1: Full Depth Background Site Condition Standards									
Soil - Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use									

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID			BUL237		BUL238		BUL239		
Sampling Date			2016/02/04		2016/02/04		2016/02/04		
COC Number			na		na		na		
	UNITS	Criteria	SA-24	QC Batch	SA-25	QC Batch	SA-26	RDL	QC Batch
Inorganics									
Chromium (VI)	ug/g	0.66	<0.2	4375509	<0.2	4375509	<0.2	0.2	4375509
Metals									
Hot Water Ext. Boron (B)	ug/g	-	0.076	4376738	0.13	4376559	0.097	0.050	4376578
Acid Extractable Antimony (Sb)	ug/g	1.3	<0.20	4376795	<0.20	4375554	<0.20	0.20	4376660
Acid Extractable Arsenic (As)	ug/g	18	2.6	4376795	3.6	4375554	3.8	1.0	4376660
Acid Extractable Barium (Ba)	ug/g	220	51	4376795	51	4375554	60	0.50	4376660
Acid Extractable Beryllium (Be)	ug/g	2.5	0.37	4376795	0.49	4375554	0.52	0.20	4376660
Acid Extractable Boron (B)	ug/g	36	7.1	4376795	6.0	4375554	8.6	5.0	4376660
Acid Extractable Cadmium (Cd)	ug/g	1.2	<0.10	4376795	0.12	4375554	0.12	0.10	4376660
Acid Extractable Chromium (Cr)	ug/g	70	14	4376795	15	4375554	17	1.0	4376660
Acid Extractable Cobalt (Co)	ug/g	21	6.2	4376795	7.6	4375554	8.1	0.10	4376660
Acid Extractable Copper (Cu)	ug/g	92	14	4376795	18	4375554	19	0.50	4376660
Acid Extractable Lead (Pb)	ug/g	120	7.3	4376795	9.1	4375554	9.1	1.0	4376660
Acid Extractable Molybdenum (Mo)	ug/g	2	<0.50	4376795	<0.50	4375554	<0.50	0.50	4376660
Acid Extractable Nickel (Ni)	ug/g	82	14	4376795	16	4375554	18	0.50	4376660
Acid Extractable Selenium (Se)	ug/g	1.5	<0.50	4376795	<0.50	4375554	<0.50	0.50	4376660
Acid Extractable Silver (Ag)	ug/g	0.5	<0.20	4376795	<0.20	4375554	<0.20	0.20	4376660
Acid Extractable Thallium (Tl)	ug/g	1	0.093	4376795	0.096	4375554	0.096	0.050	4376660
Acid Extractable Uranium (U)	ug/g	2.5	0.52	4376795	0.49	4375554	0.49	0.050	4376660
Acid Extractable Vanadium (V)	ug/g	86	22	4376795	24	4375554	27	5.0	4376660
Acid Extractable Zinc (Zn)	ug/g	290	37	4376795	45	4375554	48	5.0	4376660
Acid Extractable Mercury (Hg)	ug/g	0.27	<0.050	4376795	<0.050	4375554	<0.050	0.050	4376660
RDL = Reportable Detection Limit									
QC Batch = Quality Control Batch									
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)									
Table 1: Full Depth Background Site Condition Standards									
Soil - Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use									

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID			BUL240	BUL241	BUL242		BUL243		
Sampling Date			2016/02/04	2016/02/04	2016/02/04		2016/02/04		
COC Number			na	na	na		na		
	UNITS	Criteria	SA-27	SA-28	SA-29	QC Batch	SA-30	RDL	QC Batch
Inorganics									
Chromium (VI)	ug/g	0.66	<0.2	<0.2	<0.2	4376779	<0.2	0.2	4375509
Metals									
Hot Water Ext. Boron (B)	ug/g	-	0.053	0.062	0.095	4376559	0.071	0.050	4376559
Acid Extractable Antimony (Sb)	ug/g	1.3	<0.20	<0.20	<0.20	4375554	<0.20	0.20	4375554
Acid Extractable Arsenic (As)	ug/g	18	3.5	2.9	2.8	4375554	3.0	1.0	4375554
Acid Extractable Barium (Ba)	ug/g	220	51	44	45	4375554	45	0.50	4375554
Acid Extractable Beryllium (Be)	ug/g	2.5	0.50	0.35	0.44	4375554	0.38	0.20	4375554
Acid Extractable Boron (B)	ug/g	36	<5.0	5.6	6.6	4375554	6.4	5.0	4375554
Acid Extractable Cadmium (Cd)	ug/g	1.2	0.11	0.11	<0.10	4375554	<0.10	0.10	4375554
Acid Extractable Chromium (Cr)	ug/g	70	15	13	15	4375554	13	1.0	4375554
Acid Extractable Cobalt (Co)	ug/g	21	7.8	6.6	7.2	4375554	7.0	0.10	4375554
Acid Extractable Copper (Cu)	ug/g	92	17	17	17	4375554	17	0.50	4375554
Acid Extractable Lead (Pb)	ug/g	120	8.3	7.1	8.3	4375554	7.6	1.0	4375554
Acid Extractable Molybdenum (Mo)	ug/g	2	<0.50	<0.50	<0.50	4375554	<0.50	0.50	4375554
Acid Extractable Nickel (Ni)	ug/g	82	15	13	15	4375554	15	0.50	4375554
Acid Extractable Selenium (Se)	ug/g	1.5	<0.50	<0.50	<0.50	4375554	<0.50	0.50	4375554
Acid Extractable Silver (Ag)	ug/g	0.5	<0.20	<0.20	<0.20	4375554	<0.20	0.20	4375554
Acid Extractable Thallium (Tl)	ug/g	1	0.097	0.074	0.095	4375554	0.083	0.050	4375554
Acid Extractable Uranium (U)	ug/g	2.5	0.44	0.44	0.50	4375554	0.47	0.050	4375554
Acid Extractable Vanadium (V)	ug/g	86	26	21	23	4375554	21	5.0	4375554
Acid Extractable Zinc (Zn)	ug/g	290	54	39	43	4375554	41	5.0	4375554
Acid Extractable Mercury (Hg)	ug/g	0.27	<0.050	<0.050	<0.050	4375554	<0.050	0.050	4375554
RDL = Reportable Detection Limit									
QC Batch = Quality Control Batch									
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)									
Table 1: Full Depth Background Site Condition Standards									
Soil - Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use									

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID			BUL244		BUL245		BUL246	BUL247		
Sampling Date			2016/02/04		2016/02/04		2016/02/04	2016/02/04		
COC Number			na		na		na	na		
	UNITS	Criteria	SA-31	QC Batch	SA-32	QC Batch	DUP#1	DUP#2	RDL	QC Batch

Inorganics										
Chromium (VI)	ug/g	0.66	<0.2	4375509	<0.2	4376779	<0.2	<0.2	0.2	4376779
Metals										
Hot Water Ext. Boron (B)	ug/g	-	0.13	4376578	0.16	4376578	<0.050	0.13	0.050	4376559
Acid Extractable Antimony (Sb)	ug/g	1.3	<0.20	4375554	0.39	4375554	<0.20	<0.20	0.20	4375554
Acid Extractable Arsenic (As)	ug/g	18	3.0	4375554	3.1	4375554	3.9	2.2	1.0	4375554
Acid Extractable Barium (Ba)	ug/g	220	66	4375554	70	4375554	84	45	0.50	4375554
Acid Extractable Beryllium (Be)	ug/g	2.5	0.53	4375554	0.54	4375554	0.65	0.38	0.20	4375554
Acid Extractable Boron (B)	ug/g	36	7.6	4375554	7.6	4375554	11	6.3	5.0	4375554
Acid Extractable Cadmium (Cd)	ug/g	1.2	0.14	4375554	0.14	4375554	0.10	0.13	0.10	4375554
Acid Extractable Chromium (Cr)	ug/g	70	18	4375554	17	4375554	20	13	1.0	4375554
Acid Extractable Cobalt (Co)	ug/g	21	8.0	4375554	7.9	4375554	9.8	6.1	0.10	4375554
Acid Extractable Copper (Cu)	ug/g	92	18	4375554	17	4375554	21	13	0.50	4375554
Acid Extractable Lead (Pb)	ug/g	120	9.1	4375554	9.5	4375554	9.5	7.8	1.0	4375554
Acid Extractable Molybdenum (Mo)	ug/g	2	<0.50	4375554	<0.50	4375554	<0.50	<0.50	0.50	4375554
Acid Extractable Nickel (Ni)	ug/g	82	18	4375554	17	4375554	22	13	0.50	4375554
Acid Extractable Selenium (Se)	ug/g	1.5	<0.50	4375554	<0.50	4375554	<0.50	<0.50	0.50	4375554
Acid Extractable Silver (Ag)	ug/g	0.5	<0.20	4375554	<0.20	4375554	<0.20	<0.20	0.20	4375554
Acid Extractable Thallium (Tl)	ug/g	1	0.11	4375554	0.12	4375554	0.17	0.093	0.050	4375554
Acid Extractable Uranium (U)	ug/g	2.5	0.50	4375554	0.54	4375554	0.58	0.46	0.050	4375554
Acid Extractable Vanadium (V)	ug/g	86	26	4375554	26	4375554	30	22	5.0	4375554
Acid Extractable Zinc (Zn)	ug/g	290	51	4375554	49	4375554	55	38	5.0	4375554
Acid Extractable Mercury (Hg)	ug/g	0.27	<0.050	4375554	<0.050	4375554	<0.050	<0.050	0.050	4375554

RDL = Reportable Detection Limit
 QC Batch = Quality Control Batch
 Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)
 Table 1: Full Depth Background Site Condition Standards
 Soil - Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use

ELEMENTS BY ATOMIC SPECTROSCOPY (SOIL)

Maxxam ID			BUL248	BUL249		
Sampling Date			2016/02/04	2016/02/04		
COC Number			na	na		
	UNITS	Criteria	DUP#3	DUP#4	RDL	QC Batch
Inorganics						
Chromium (VI)	ug/g	0.66	<0.2	<0.2	0.2	4376779
Metals						
Hot Water Ext. Boron (B)	ug/g	-	0.094	0.16	0.050	4376578
Acid Extractable Antimony (Sb)	ug/g	1.3	<0.20	<0.20	0.20	4375554
Acid Extractable Arsenic (As)	ug/g	18	3.2	2.8	1.0	4375554
Acid Extractable Barium (Ba)	ug/g	220	40	47	0.50	4375554
Acid Extractable Beryllium (Be)	ug/g	2.5	0.36	0.41	0.20	4375554
Acid Extractable Boron (B)	ug/g	36	5.7	6.3	5.0	4375554
Acid Extractable Cadmium (Cd)	ug/g	1.2	<0.10	0.12	0.10	4375554
Acid Extractable Chromium (Cr)	ug/g	70	13	15	1.0	4375554
Acid Extractable Cobalt (Co)	ug/g	21	6.6	6.6	0.10	4375554
Acid Extractable Copper (Cu)	ug/g	92	17	16	0.50	4375554
Acid Extractable Lead (Pb)	ug/g	120	6.9	8.7	1.0	4375554
Acid Extractable Molybdenum (Mo)	ug/g	2	<0.50	<0.50	0.50	4375554
Acid Extractable Nickel (Ni)	ug/g	82	14	14	0.50	4375554
Acid Extractable Selenium (Se)	ug/g	1.5	<0.50	<0.50	0.50	4375554
Acid Extractable Silver (Ag)	ug/g	0.5	<0.20	<0.20	0.20	4375554
Acid Extractable Thallium (Tl)	ug/g	1	0.074	0.093	0.050	4375554
Acid Extractable Uranium (U)	ug/g	2.5	0.39	0.47	0.050	4375554
Acid Extractable Vanadium (V)	ug/g	86	22	22	5.0	4375554
Acid Extractable Zinc (Zn)	ug/g	290	39	43	5.0	4375554
Acid Extractable Mercury (Hg)	ug/g	0.27	<0.050	<0.050	0.050	4375554
RDL = Reportable Detection Limit						
QC Batch = Quality Control Batch						
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)						
Table 1: Full Depth Background Site Condition Standards						
Soil - Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use						

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID			BUL214	BUL215	BUL216	BUL217	BUL218	BUL219		
Sampling Date			2016/02/04	2016/02/04	2016/02/04	2016/02/04	2016/02/04	2016/02/04		
COC Number			na	na	na	na	na	na		
	UNITS	Criteria	SA-1	SA-2	SA-3	SA-4	SA-5	SA-6	RDL	QC Batch
BTEX & F1 Hydrocarbons										
Benzene	ug/g	0.02	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	4376409
Toluene	ug/g	0.2	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	4376409
Ethylbenzene	ug/g	0.05	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	4376409
o-Xylene	ug/g	-	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	4376409
p+m-Xylene	ug/g	-	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	0.040	4376409
Total Xylenes	ug/g	0.05	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	0.040	4376409
F1 (C6-C10)	ug/g	25	<10	<10	<10	<10	<10	<10	10	4376409
F1 (C6-C10) - BTEX	ug/g	25	<10	<10	<10	<10	<10	<10	10	4376409
F2-F4 Hydrocarbons										
F2 (C10-C16 Hydrocarbons)	ug/g	10	<10	<10	<10	<10	<10	<10	10	4377183
F3 (C16-C34 Hydrocarbons)	ug/g	240	<50	<50	<50	<50	<50	<50	50	4377183
F4 (C34-C50 Hydrocarbons)	ug/g	120	<50	<50	<50	<50	<50	<50	50	4377183
Reached Baseline at C50	ug/g	-	Yes	Yes	Yes	Yes	Yes	Yes		4377183
Surrogate Recovery (%)										
1,4-Difluorobenzene	%	-	100	100	101	100	100	99		4376409
4-Bromofluorobenzene	%	-	101	101	100	101	100	100		4376409
D10-Ethylbenzene	%	-	83	80	92	83	88	86		4376409
D4-1,2-Dichloroethane	%	-	102	102	102	102	101	101		4376409
o-Terphenyl	%	-	102	103	101	103	100	102		4377183
RDL = Reportable Detection Limit										
QC Batch = Quality Control Batch										
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)										
Table 1: Full Depth Background Site Condition Standards										
Soil - Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use										

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID			BUL220	BUL221	BUL222	BUL223	BUL224	BUL225		
Sampling Date			2016/02/04	2016/02/04	2016/02/04	2016/02/04	2016/02/04	2016/02/04		
COC Number			na	na	na	na	na	na		
	UNITS	Criteria	SA-7	SA-8	SA-9	SA-10	SA-11	SA-12	RDL	QC Batch
BTEX & F1 Hydrocarbons										
Benzene	ug/g	0.02	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	4376409
Toluene	ug/g	0.2	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	4376409
Ethylbenzene	ug/g	0.05	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	4376409
o-Xylene	ug/g	-	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	4376409
p+m-Xylene	ug/g	-	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	0.040	4376409
Total Xylenes	ug/g	0.05	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	0.040	4376409
F1 (C6-C10)	ug/g	25	<10	<10	<10	<10	<10	<10	10	4376409
F1 (C6-C10) - BTEX	ug/g	25	<10	<10	<10	<10	<10	<10	10	4376409
F2-F4 Hydrocarbons										
F2 (C10-C16 Hydrocarbons)	ug/g	10	<10	<10	<10	<10	<10	<10	10	4377183
F3 (C16-C34 Hydrocarbons)	ug/g	240	<50	<50	<50	<50	<50	<50	50	4377183
F4 (C34-C50 Hydrocarbons)	ug/g	120	<50	<50	<50	<50	<50	<50	50	4377183
Reached Baseline at C50	ug/g	-	Yes	Yes	Yes	Yes	Yes	Yes		4377183
Surrogate Recovery (%)										
1,4-Difluorobenzene	%	-	99	100	99	100	98	100		4376409
4-Bromofluorobenzene	%	-	99	101	99	102	101	100		4376409
D10-Ethylbenzene	%	-	88	91	78	83	80	86		4376409
D4-1,2-Dichloroethane	%	-	101	102	101	102	103	101		4376409
o-Terphenyl	%	-	103	101	102	102	102	101		4377183
RDL = Reportable Detection Limit										
QC Batch = Quality Control Batch										
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)										
Table 1: Full Depth Background Site Condition Standards										
Soil - Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use										

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID			BUL226	BUL227	BUL228	BUL229	BUL230	BUL231		
Sampling Date			2016/02/04	2016/02/04	2016/02/04	2016/02/04	2016/02/04	2016/02/04		
COC Number			na	na	na	na	na	na		
	UNITS	Criteria	SA-13	SA-14	SA-15	SA-16	SA-17	SA-18	RDL	QC Batch
BTEX & F1 Hydrocarbons										
Benzene	ug/g	0.02	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	4376409
Toluene	ug/g	0.2	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	4376409
Ethylbenzene	ug/g	0.05	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	4376409
o-Xylene	ug/g	-	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	4376409
p+m-Xylene	ug/g	-	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	0.040	4376409
Total Xylenes	ug/g	0.05	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	0.040	4376409
F1 (C6-C10)	ug/g	25	<10	<10	<10	<10	<10	<10	10	4376409
F1 (C6-C10) - BTEX	ug/g	25	<10	<10	<10	<10	<10	<10	10	4376409
F2-F4 Hydrocarbons										
F2 (C10-C16 Hydrocarbons)	ug/g	10	<10	<10	<10	<10	<10	<10	10	4377183
F3 (C16-C34 Hydrocarbons)	ug/g	240	<50	<50	<50	<50	<50	<50	50	4377183
F4 (C34-C50 Hydrocarbons)	ug/g	120	<50	<50	<50	<50	<50	<50	50	4377183
Reached Baseline at C50	ug/g	-	Yes	Yes	Yes	Yes	Yes	Yes		4377183
Surrogate Recovery (%)										
1,4-Difluorobenzene	%	-	100	99	101	100	99	100		4376409
4-Bromofluorobenzene	%	-	99	100	100	101	99	100		4376409
D10-Ethylbenzene	%	-	85	82	84	86	83	88		4376409
D4-1,2-Dichloroethane	%	-	100	102	103	102	100	101		4376409
o-Terphenyl	%	-	102	102	104	100	102	102		4377183
RDL = Reportable Detection Limit										
QC Batch = Quality Control Batch										
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)										
Table 1: Full Depth Background Site Condition Standards										
Soil - Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use										

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID			BUL232	BUL233		BUL234	BUL235	BUL236		
Sampling Date			2016/02/04	2016/02/04		2016/02/04	2016/02/04	2016/02/04		
COC Number			na	na		na	na	na		
	UNITS	Criteria	SA-19	SA-20	QC Batch	SA-21	SA-22	SA-23	RDL	QC Batch
BTEX & F1 Hydrocarbons										
Benzene	ug/g	0.02	<0.020	<0.020	4376409	<0.020	<0.020	<0.020	0.020	4375550
Toluene	ug/g	0.2	<0.020	<0.020	4376409	<0.020	<0.020	<0.020	0.020	4375550
Ethylbenzene	ug/g	0.05	<0.020	<0.020	4376409	<0.020	<0.020	<0.020	0.020	4375550
o-Xylene	ug/g	-	<0.020	<0.020	4376409	<0.020	<0.020	<0.020	0.020	4375550
p+m-Xylene	ug/g	-	<0.040	<0.040	4376409	<0.040	<0.040	<0.040	0.040	4375550
Total Xylenes	ug/g	0.05	<0.040	<0.040	4376409	<0.040	<0.040	<0.040	0.040	4375550
F1 (C6-C10)	ug/g	25	<10	<10	4376409	<10	<10	<10	10	4375550
F1 (C6-C10) - BTEX	ug/g	25	<10	<10	4376409	<10	<10	<10	10	4375550
F2-F4 Hydrocarbons										
F2 (C10-C16 Hydrocarbons)	ug/g	10	<10	<10	4377183	<10	<10	<10	10	4377198
F3 (C16-C34 Hydrocarbons)	ug/g	240	<50	<50	4377183	<50	<50	<50	50	4377198
F4 (C34-C50 Hydrocarbons)	ug/g	120	<50	<50	4377183	<50	<50	<50	50	4377198
Reached Baseline at C50	ug/g	-	Yes	Yes	4377183	Yes	Yes	Yes		4377198
Surrogate Recovery (%)										
1,4-Difluorobenzene	%	-	99	100	4376409	99	100	100		4375550
4-Bromofluorobenzene	%	-	99	99	4376409	102	102	102		4375550
D10-Ethylbenzene	%	-	86	85	4376409	75	81	82		4375550
D4-1,2-Dichloroethane	%	-	98	99	4376409	105	104	105		4375550
o-Terphenyl	%	-	100	103	4377183	104	103	104		4377198
RDL = Reportable Detection Limit										
QC Batch = Quality Control Batch										
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)										
Table 1: Full Depth Background Site Condition Standards										
Soil - Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use										

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID			BUL237	BUL238	BUL239	BUL240	BUL241	BUL242		
Sampling Date			2016/02/04	2016/02/04	2016/02/04	2016/02/04	2016/02/04	2016/02/04		
COC Number			na	na	na	na	na	na		
	UNITS	Criteria	SA-24	SA-25	SA-26	SA-27	SA-28	SA-29	RDL	QC Batch
BTEX & F1 Hydrocarbons										
Benzene	ug/g	0.02	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	4375550
Toluene	ug/g	0.2	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	4375550
Ethylbenzene	ug/g	0.05	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	4375550
o-Xylene	ug/g	-	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.020	4375550
p+m-Xylene	ug/g	-	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	0.040	4375550
Total Xylenes	ug/g	0.05	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	0.040	4375550
F1 (C6-C10)	ug/g	25	<10	<10	<10	<10	<10	<10	10	4375550
F1 (C6-C10) - BTEX	ug/g	25	<10	<10	<10	<10	<10	<10	10	4375550
F2-F4 Hydrocarbons										
F2 (C10-C16 Hydrocarbons)	ug/g	10	<10	<10	<10	<10	<10	<10	10	4377198
F3 (C16-C34 Hydrocarbons)	ug/g	240	<50	<50	<50	<50	<50	<50	50	4377198
F4 (C34-C50 Hydrocarbons)	ug/g	120	<50	<50	<50	<50	<50	<50	50	4377198
Reached Baseline at C50	ug/g	-	Yes	Yes	Yes	Yes	Yes	Yes		4377198
Surrogate Recovery (%)										
1,4-Difluorobenzene	%	-	98	99	99	98	99	101		4375550
4-Bromofluorobenzene	%	-	102	101	101	99	102	101		4375550
D10-Ethylbenzene	%	-	74	69	75	71	71	77		4375550
D4-1,2-Dichloroethane	%	-	105	104	105	104	106	106		4375550
o-Terphenyl	%	-	111	102	105	104	105	103		4377198
RDL = Reportable Detection Limit										
QC Batch = Quality Control Batch										
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)										
Table 1: Full Depth Background Site Condition Standards										
Soil - Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use										

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID			BUL243	BUL244		BUL245	BUL246		BUL247		
Sampling Date			2016/02/04	2016/02/04		2016/02/04	2016/02/04		2016/02/04		
COC Number			na	na		na	na		na		
	UNITS	Criteria	SA-30	SA-31	QC Batch	SA-32	DUP#1	QC Batch	DUP#2	RDL	QC Batch

BTEX & F1 Hydrocarbons

Benzene	ug/g	0.02	<0.020	<0.020	4375550	<0.020	<0.020	4375550	<0.020	0.020	4375550
Toluene	ug/g	0.2	<0.020	<0.020	4375550	<0.020	<0.020	4375550	<0.020	0.020	4375550
Ethylbenzene	ug/g	0.05	<0.020	<0.020	4375550	<0.020	<0.020	4375550	<0.020	0.020	4375550
o-Xylene	ug/g	-	<0.020	<0.020	4375550	<0.020	<0.020	4375550	<0.020	0.020	4375550
p+m-Xylene	ug/g	-	<0.040	<0.040	4375550	<0.040	<0.040	4375550	<0.040	0.040	4375550
Total Xylenes	ug/g	0.05	<0.040	<0.040	4375550	<0.040	<0.040	4375550	<0.040	0.040	4375550
F1 (C6-C10)	ug/g	25	<10	<10	4375550	<10	<10	4375550	<10	10	4375550
F1 (C6-C10) - BTEX	ug/g	25	<10	<10	4375550	<10	<10	4375550	<10	10	4375550

F2-F4 Hydrocarbons

F2 (C10-C16 Hydrocarbons)	ug/g	10	<10	<10	4375582	<10	<10	4377198	<10	10	4375582
F3 (C16-C34 Hydrocarbons)	ug/g	240	<50	<50	4375582	<50	<50	4377198	<50	50	4375582
F4 (C34-C50 Hydrocarbons)	ug/g	120	<50	<50	4375582	<50	<50	4377198	<50	50	4375582
Reached Baseline at C50	ug/g	-	Yes	Yes	4375582	Yes	Yes	4377198	Yes		4375582

Surrogate Recovery (%)

1,4-Difluorobenzene	%	-	99	100	4375550	99	98	4375550	99		4375550
4-Bromofluorobenzene	%	-	101	101	4375550	101	100	4375550	100		4375550
D10-Ethylbenzene	%	-	76	82	4375550	79	72	4375550	72		4375550
D4-1,2-Dichloroethane	%	-	105	106	4375550	107	106	4375550	105		4375550
o-Terphenyl	%	-	103	103	4375582	101	103	4377198	103		4375582

RDL = Reportable Detection Limit

QC Batch = Quality Control Batch

Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)

Table 1: Full Depth Background Site Condition Standards

Soil - Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use

PETROLEUM HYDROCARBONS (CCME)

Maxxam ID			BUL248	BUL249		
Sampling Date			2016/02/04	2016/02/04		
COC Number			na	na		
	UNITS	Criteria	DUP#3	DUP#4	RDL	QC Batch
BTEX & F1 Hydrocarbons						
Benzene	ug/g	0.02	<0.020	<0.020	0.020	4375550
Toluene	ug/g	0.2	<0.020	<0.020	0.020	4375550
Ethylbenzene	ug/g	0.05	<0.020	<0.020	0.020	4375550
o-Xylene	ug/g	-	<0.020	<0.020	0.020	4375550
p+m-Xylene	ug/g	-	<0.040	<0.040	0.040	4375550
Total Xylenes	ug/g	0.05	<0.040	<0.040	0.040	4375550
F1 (C6-C10)	ug/g	25	<10	<10	10	4375550
F1 (C6-C10) - BTEX	ug/g	25	<10	<10	10	4375550
F2-F4 Hydrocarbons						
F2 (C10-C16 Hydrocarbons)	ug/g	10	<10	<10	10	4377198
F3 (C16-C34 Hydrocarbons)	ug/g	240	<50	<50	50	4377198
F4 (C34-C50 Hydrocarbons)	ug/g	120	<50	70	50	4377198
Reached Baseline at C50	ug/g	-	Yes	Yes		4377198
Surrogate Recovery (%)						
1,4-Difluorobenzene	%	-	99	99		4375550
4-Bromofluorobenzene	%	-	100	98		4375550
D10-Ethylbenzene	%	-	78	74		4375550
D4-1,2-Dichloroethane	%	-	105	106		4375550
o-Terphenyl	%	-	103	105		4377198
RDL = Reportable Detection Limit						
QC Batch = Quality Control Batch						
Criteria: Ontario Reg. 153/04 (Amended April 15, 2011)						
Table 1: Full Depth Background Site Condition Standards						
Soil - Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use						

GENERAL COMMENTS

Sample BUL215-01 : SAR Analysis: Sodium was not detected. To report SAR the sodium detection limit was used in the calculation. This value represents a maximum ratio.

Sample BUL222-01 : SAR Analysis: Sodium was not detected. To report SAR the sodium detection limit was used in the calculation. This value represents a maximum ratio.

Sample BUL246-01 : SAR Analysis: Sodium was not detected. To report SAR the sodium detection limit was used in the calculation. This value represents a maximum ratio.

Results relate only to the items tested.

QUALITY ASSURANCE REPORT

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
4375550	1,4-Difluorobenzene	2016/02/09	99	60 - 140	101	60 - 140	99	%				
4375550	4-Bromofluorobenzene	2016/02/09	103	60 - 140	102	60 - 140	100	%				
4375550	D10-Ethylbenzene	2016/02/09	75	60 - 140	77	60 - 140	76	%				
4375550	D4-1,2-Dichloroethane	2016/02/09	104	60 - 140	106	60 - 140	104	%				
4375582	o-Terphenyl	2016/02/10	112	60 - 130	105	60 - 130	105	%				
4376409	1,4-Difluorobenzene	2016/02/10	99	60 - 140	98	60 - 140	100	%				
4376409	4-Bromofluorobenzene	2016/02/10	101	60 - 140	99	60 - 140	101	%				
4376409	D10-Ethylbenzene	2016/02/10	79	60 - 140	100	60 - 140	86	%				
4376409	D4-1,2-Dichloroethane	2016/02/10	103	60 - 140	108	60 - 140	102	%				
4377183	o-Terphenyl	2016/02/10	105	60 - 130	103	60 - 130	104	%				
4377198	o-Terphenyl	2016/02/10	105	60 - 130	105	60 - 130	101	%				
4374107	Free Cyanide	2016/02/12	107	75 - 125	102	80 - 120	<0.01	ug/g	NC	35		
4374345	Available (CaCl2) pH	2016/02/09			98	97 - 103			2.1	N/A		
4374384	Free Cyanide	2016/02/12	102	75 - 125	101	80 - 120	<0.01	ug/g	NC	35		
4374524	Free Cyanide	2016/02/12	103	75 - 125	101	80 - 120	<0.01	ug/g	NC	35		
4375167	Available (CaCl2) pH	2016/02/09			98	97 - 103			0.74	N/A		
4375500	Available (CaCl2) pH	2016/02/10			98	97 - 103			0.028	N/A		
4375509	Chromium (VI)	2016/02/09	80	75 - 125	98	80 - 120	<0.2	ug/g	NC	35	90	75 - 125
4375515	Chromium (VI)	2016/02/10	98	75 - 125	94	80 - 120	<0.2	ug/g	NC	35	82	75 - 125
4375550	Benzene	2016/02/09	80	60 - 140	89	60 - 140	<0.020	ug/g				
4375550	Ethylbenzene	2016/02/09	85	60 - 140	91	60 - 140	<0.020	ug/g				
4375550	F1 (C6-C10) - BTEX	2016/02/09					<10	ug/g	NC	30		
4375550	F1 (C6-C10)	2016/02/09	89	60 - 140	95	80 - 120	<10	ug/g	NC	30		
4375550	o-Xylene	2016/02/09	89	60 - 140	96	60 - 140	<0.020	ug/g				
4375550	p+m-Xylene	2016/02/09	80	60 - 140	86	60 - 140	<0.040	ug/g				
4375550	Toluene	2016/02/09	82	60 - 140	90	60 - 140	<0.020	ug/g				
4375550	Total Xylenes	2016/02/09					<0.040	ug/g				
4375554	Acid Extractable Antimony (Sb)	2016/02/09	94	75 - 125	97	80 - 120	<0.20	ug/g	NC	30		
4375554	Acid Extractable Arsenic (As)	2016/02/09	99	75 - 125	101	80 - 120	<1.0	ug/g	NC	30		
4375554	Acid Extractable Barium (Ba)	2016/02/09	NC	75 - 125	101	80 - 120	<0.50	ug/g	0.0066	30		
4375554	Acid Extractable Beryllium (Be)	2016/02/09	100	75 - 125	98	80 - 120	<0.20	ug/g	NC	30		

QUALITY ASSURANCE REPORT(CONT'D)

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
4375554	Acid Extractable Boron (B)	2016/02/09	91	75 - 125	96	80 - 120	<5.0	ug/g	NC	30		
4375554	Acid Extractable Cadmium (Cd)	2016/02/09	101	75 - 125	97	80 - 120	<0.10	ug/g	NC	30		
4375554	Acid Extractable Chromium (Cr)	2016/02/09	NC	75 - 125	97	80 - 120	<1.0	ug/g	1.8	30		
4375554	Acid Extractable Cobalt (Co)	2016/02/09	98	75 - 125	99	80 - 120	<0.10	ug/g	0.22	30		
4375554	Acid Extractable Copper (Cu)	2016/02/09	NC	75 - 125	100	80 - 120	<0.50	ug/g	5.6	30		
4375554	Acid Extractable Lead (Pb)	2016/02/09	98	75 - 125	99	80 - 120	<1.0	ug/g	1.3	30		
4375554	Acid Extractable Mercury (Hg)	2016/02/09	102	75 - 125	103	80 - 120	<0.050	ug/g	NC	30		
4375554	Acid Extractable Molybdenum (Mo)	2016/02/09	101	75 - 125	98	80 - 120	<0.50	ug/g	NC	30		
4375554	Acid Extractable Nickel (Ni)	2016/02/09	NC	75 - 125	101	80 - 120	<0.50	ug/g	4.7	30		
4375554	Acid Extractable Selenium (Se)	2016/02/09	104	75 - 125	106	80 - 120	<0.50	ug/g	NC	30		
4375554	Acid Extractable Silver (Ag)	2016/02/09	99	75 - 125	98	80 - 120	<0.20	ug/g	NC	30		
4375554	Acid Extractable Thallium (Tl)	2016/02/09	96	75 - 125	99	80 - 120	<0.050	ug/g	NC	30		
4375554	Acid Extractable Uranium (U)	2016/02/09	102	75 - 125	101	80 - 120	<0.050	ug/g	2.4	30		
4375554	Acid Extractable Vanadium (V)	2016/02/09	NC	75 - 125	99	80 - 120	<5.0	ug/g	2.1	30		
4375554	Acid Extractable Zinc (Zn)	2016/02/09	NC	75 - 125	102	80 - 120	<5.0	ug/g	10	30		
4375582	F2 (C10-C16 Hydrocarbons)	2016/02/10	112	50 - 130	99	80 - 120	<10	ug/g	NC	30		
4375582	F3 (C16-C34 Hydrocarbons)	2016/02/10	110	50 - 130	97	80 - 120	<50	ug/g	NC	30		
4375582	F4 (C34-C50 Hydrocarbons)	2016/02/10	113	50 - 130	98	80 - 120	<50	ug/g	NC	30		
4375612	Available (CaCl2) pH	2016/02/10			99	97 - 103			0.32	N/A		
4375614	Free Cyanide	2016/02/12	108	75 - 125	102	80 - 120	<0.01	ug/g	NC	35		
4376409	Benzene	2016/02/10	81	60 - 140	107	60 - 140	<0.020	ug/g	NC	50		
4376409	Ethylbenzene	2016/02/10	86	60 - 140	104	60 - 140	<0.020	ug/g	NC	50		
4376409	F1 (C6-C10) - BTEX	2016/02/10					<10	ug/g	NC	30		
4376409	F1 (C6-C10)	2016/02/10	81	60 - 140	92	80 - 120	<10	ug/g	NC	30		
4376409	o-Xylene	2016/02/10	91	60 - 140	108	60 - 140	<0.020	ug/g	NC	50		
4376409	p+m-Xylene	2016/02/10	81	60 - 140	95	60 - 140	<0.040	ug/g	NC	50		
4376409	Toluene	2016/02/10	84	60 - 140	103	60 - 140	<0.020	ug/g	NC	50		
4376409	Total Xylenes	2016/02/10					<0.040	ug/g	NC	50		
4376557	Soluble Calcium (Ca)	2016/02/10			100	80 - 120	<0.5	mg/L	0.43	30		
4376557	Soluble Magnesium (Mg)	2016/02/10			99	80 - 120	<0.5	mg/L	1.7	30		
4376557	Soluble Sodium (Na)	2016/02/10			104	80 - 120	<5	mg/L	NC	30		

QUALITY ASSURANCE REPORT(CONT'D)

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
4376559	Hot Water Ext. Boron (B)	2016/02/10	92	75 - 125	90	75 - 125	<0.050	ug/g	NC	40		
4376560	Conductivity	2016/02/10			101	90 - 110	<0.002	mS/cm	0.34	10		
4376567	Soluble Calcium (Ca)	2016/02/10			98	80 - 120	<0.5	mg/L	1.1	30		
4376567	Soluble Magnesium (Mg)	2016/02/10			96	80 - 120	<0.5	mg/L	0.24	30		
4376567	Soluble Sodium (Na)	2016/02/10			103	80 - 120	<5	mg/L	NC	30		
4376578	Hot Water Ext. Boron (B)	2016/02/10	94	75 - 125	92	75 - 125	<0.050	ug/g	NC	40		
4376585	Conductivity	2016/02/10			100	90 - 110	<0.002	mS/cm	1.0	10		
4376621	Acid Extractable Antimony (Sb)	2016/02/10	92	75 - 125	98	80 - 120	<0.20	ug/g	NC	30		
4376621	Acid Extractable Arsenic (As)	2016/02/10	94	75 - 125	100	80 - 120	<1.0	ug/g	NC	30		
4376621	Acid Extractable Barium (Ba)	2016/02/10	NC	75 - 125	99	80 - 120	<0.50	ug/g	2.0	30		
4376621	Acid Extractable Beryllium (Be)	2016/02/10	97	75 - 125	96	80 - 120	<0.20	ug/g	NC	30		
4376621	Acid Extractable Boron (B)	2016/02/10	89	75 - 125	92	80 - 120	<5.0	ug/g	NC	30		
4376621	Acid Extractable Cadmium (Cd)	2016/02/10	96	75 - 125	98	80 - 120	<0.10	ug/g	NC	30		
4376621	Acid Extractable Chromium (Cr)	2016/02/10	95	75 - 125	101	80 - 120	<1.0	ug/g	8.5	30		
4376621	Acid Extractable Cobalt (Co)	2016/02/10	96	75 - 125	102	80 - 120	<0.10	ug/g	2.7	30		
4376621	Acid Extractable Copper (Cu)	2016/02/10	NC	75 - 125	102	80 - 120	<0.50	ug/g	1.7	30		
4376621	Acid Extractable Lead (Pb)	2016/02/10	95	75 - 125	96	80 - 120	<1.0	ug/g	3.6	30		
4376621	Acid Extractable Mercury (Hg)	2016/02/10	103	75 - 125	103	80 - 120	<0.050	ug/g	NC	30		
4376621	Acid Extractable Molybdenum (Mo)	2016/02/10	96	75 - 125	101	80 - 120	<0.50	ug/g	NC	30		
4376621	Acid Extractable Nickel (Ni)	2016/02/10	95	75 - 125	100	80 - 120	<0.50	ug/g	2.8	30		
4376621	Acid Extractable Selenium (Se)	2016/02/10	97	75 - 125	100	80 - 120	<0.50	ug/g	NC	30		
4376621	Acid Extractable Silver (Ag)	2016/02/10	94	75 - 125	98	80 - 120	<0.20	ug/g	NC	30		
4376621	Acid Extractable Thallium (Tl)	2016/02/10	94	75 - 125	96	80 - 120	<0.050	ug/g	NC	30		
4376621	Acid Extractable Uranium (U)	2016/02/10	97	75 - 125	95	80 - 120	<0.050	ug/g	2.4	30		
4376621	Acid Extractable Vanadium (V)	2016/02/10	NC	75 - 125	99	80 - 120	<5.0	ug/g	NC	30		
4376621	Acid Extractable Zinc (Zn)	2016/02/10	NC	75 - 125	99	80 - 120	<5.0	ug/g	12	30		
4376660	Acid Extractable Antimony (Sb)	2016/02/11	90	75 - 125	99	80 - 120	<0.20	ug/g	NC	30		
4376660	Acid Extractable Arsenic (As)	2016/02/11	99	75 - 125	99	80 - 120	<1.0	ug/g	NC	30		
4376660	Acid Extractable Barium (Ba)	2016/02/11	NC	75 - 125	97	80 - 120	<0.50	ug/g	4.3	30		
4376660	Acid Extractable Beryllium (Be)	2016/02/11	100	75 - 125	95	80 - 120	<0.20	ug/g	NC	30		
4376660	Acid Extractable Boron (B)	2016/02/11	86	75 - 125	93	80 - 120	<5.0	ug/g	NC	30		

QUALITY ASSURANCE REPORT(CONT'D)

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
4376660	Acid Extractable Cadmium (Cd)	2016/02/11	99	75 - 125	96	80 - 120	<0.10	ug/g	NC	30		
4376660	Acid Extractable Chromium (Cr)	2016/02/11	NC	75 - 125	99	80 - 120	<1.0	ug/g	1.6	30		
4376660	Acid Extractable Cobalt (Co)	2016/02/11	102	75 - 125	99	80 - 120	<0.10	ug/g	2.3	30		
4376660	Acid Extractable Copper (Cu)	2016/02/11	NC	75 - 125	101	80 - 120	<0.50	ug/g	3.3	30		
4376660	Acid Extractable Lead (Pb)	2016/02/11	99	75 - 125	100	80 - 120	<1.0	ug/g	2.6	30		
4376660	Acid Extractable Mercury (Hg)	2016/02/11	112	75 - 125	111	80 - 120	<0.050	ug/g	NC	30		
4376660	Acid Extractable Molybdenum (Mo)	2016/02/11	99	75 - 125	97	80 - 120	<0.50	ug/g	NC	30		
4376660	Acid Extractable Nickel (Ni)	2016/02/11	NC	75 - 125	99	80 - 120	<0.50	ug/g	0.37	30		
4376660	Acid Extractable Selenium (Se)	2016/02/11	99	75 - 125	99	80 - 120	<0.50	ug/g	NC	30		
4376660	Acid Extractable Silver (Ag)	2016/02/11	98	75 - 125	99	80 - 120	<0.20	ug/g	NC	30		
4376660	Acid Extractable Thallium (Tl)	2016/02/11	97	75 - 125	98	80 - 120	<0.050	ug/g	NC	30		
4376660	Acid Extractable Uranium (U)	2016/02/11	102	75 - 125	101	80 - 120	<0.050	ug/g	4.0	30		
4376660	Acid Extractable Vanadium (V)	2016/02/11	NC	75 - 125	100	80 - 120	<5.0	ug/g	0.041	30		
4376660	Acid Extractable Zinc (Zn)	2016/02/11	NC	75 - 125	99	80 - 120	<5.0	ug/g	0.99	30		
4376678	Moisture	2016/02/10							14	20		
4376738	Hot Water Ext. Boron (B)	2016/02/10	93	75 - 125	91	75 - 125	<0.050	ug/g	NC	40		
4376779	Chromium (VI)	2016/02/10	73 (1)	75 - 125	92	80 - 120	<0.2	ug/g	NC	35	75	75 - 125
4376783	Chromium (VI)	2016/02/11	82	75 - 125	95	80 - 120	<0.2	ug/g	NC	35	79	75 - 125
4376795	Acid Extractable Antimony (Sb)	2016/02/11	99	75 - 125	103	80 - 120	<0.20	ug/g	NC	30		
4376795	Acid Extractable Arsenic (As)	2016/02/11	97	75 - 125	98	80 - 120	<1.0	ug/g	NC	30		
4376795	Acid Extractable Barium (Ba)	2016/02/11	NC	75 - 125	103	80 - 120	<0.50	ug/g	5.6	30		
4376795	Acid Extractable Beryllium (Be)	2016/02/11	98	75 - 125	102	80 - 120	<0.20	ug/g	NC	30		
4376795	Acid Extractable Boron (B)	2016/02/11	91	75 - 125	99	80 - 120	<5.0	ug/g	NC	30		
4376795	Acid Extractable Cadmium (Cd)	2016/02/11	102	75 - 125	103	80 - 120	<0.10	ug/g	NC	30		
4376795	Acid Extractable Chromium (Cr)	2016/02/11	NC	75 - 125	99	80 - 120	<1.0	ug/g	0.84	30		
4376795	Acid Extractable Cobalt (Co)	2016/02/11	95	75 - 125	96	80 - 120	<0.10	ug/g	1.4	30		
4376795	Acid Extractable Copper (Cu)	2016/02/11	NC	75 - 125	96	80 - 120	<0.50	ug/g	0.21	30		
4376795	Acid Extractable Lead (Pb)	2016/02/11	96	75 - 125	99	80 - 120	<1.0	ug/g	0.65	30		
4376795	Acid Extractable Mercury (Hg)	2016/02/11	101	75 - 125	104	80 - 120	<0.050	ug/g	NC	30		
4376795	Acid Extractable Molybdenum (Mo)	2016/02/11	101	75 - 125	102	80 - 120	<0.50	ug/g	NC	30		
4376795	Acid Extractable Nickel (Ni)	2016/02/11	NC	75 - 125	97	80 - 120	<0.50	ug/g	0.97	30		

QUALITY ASSURANCE REPORT(CONT'D)

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
4376795	Acid Extractable Selenium (Se)	2016/02/11	98	75 - 125	102	80 - 120	<0.50	ug/g	NC	30		
4376795	Acid Extractable Silver (Ag)	2016/02/11	99	75 - 125	101	80 - 120	<0.20	ug/g	NC	30		
4376795	Acid Extractable Thallium (Tl)	2016/02/11	94	75 - 125	99	80 - 120	<0.050	ug/g	NC	30		
4376795	Acid Extractable Uranium (U)	2016/02/11	99	75 - 125	102	80 - 120	<0.050	ug/g	4.2	30		
4376795	Acid Extractable Vanadium (V)	2016/02/11	NC	75 - 125	97	80 - 120	<5.0	ug/g	NC	30		
4376795	Acid Extractable Zinc (Zn)	2016/02/11	NC	75 - 125	98	80 - 120	<5.0	ug/g	2.7	30		
4376805	Moisture	2016/02/10							1.3	20		
4377183	F2 (C10-C16 Hydrocarbons)	2016/02/10	98	50 - 130	97	80 - 120	<10	ug/g	NC	30		
4377183	F3 (C16-C34 Hydrocarbons)	2016/02/10	100	50 - 130	100	80 - 120	<50	ug/g	NC	30		
4377183	F4 (C34-C50 Hydrocarbons)	2016/02/10	104	50 - 130	102	80 - 120	<50	ug/g	NC	30		
4377195	Moisture	2016/02/10							5.1	20		
4377198	F2 (C10-C16 Hydrocarbons)	2016/02/10	95	50 - 130	95	80 - 120	<10	ug/g	NC	30		
4377198	F3 (C16-C34 Hydrocarbons)	2016/02/10	100	50 - 130	99	80 - 120	<50	ug/g	NC	30		
4377198	F4 (C34-C50 Hydrocarbons)	2016/02/10	106	50 - 130	104	80 - 120	<50	ug/g	NC	30		
4377221	Soluble Calcium (Ca)	2016/02/10			95	80 - 120	<0.5	mg/L	0.055	30		
4377221	Soluble Magnesium (Mg)	2016/02/10			93	80 - 120	<0.5	mg/L	1.1	30		
4377221	Soluble Sodium (Na)	2016/02/10			93	80 - 120	<5	mg/L	0.16	30		
4377291	Conductivity	2016/02/10			100	90 - 110	<0.002	mS/cm	0.17	10		
4377453	Moisture	2016/02/10							7.2	20		

QUALITY ASSURANCE REPORT(CONT'D)

QC Batch	Parameter	Date	Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard		
			% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits	
4377557	Moisture	2016/02/10								NC	20		

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spiked amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than 2x that of the native sample concentration).

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (one or both samples < 5x RDL).

(1) The matrix spike recovery was below the lower control limit. This may be due in part to the reducing environment of the sample. The matrix spike was reanalyzed to confirm result.

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).



Brad Newman, Scientific Specialist

Maxxam has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per section 5.10.2 of ISO/IEC 17025:2005(E), signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

