

APPENDIX "B"

TERMS OF REFERENCE (TOR)

TABLE OF CONTENTS

	Page
1.0 Introduction.....	4
2.0 Background.....	5
3.0 Role of Transport Canada (TC), Public Services and Procurement Canada (PSPC) and Contractor.....	6
4.0 Description of the Pump-and-Treat Facility.....	7
5.0 Overview of Services Required.....	9
6.0 Required Site Monitoring Activities.....	13
7.0 Options to Operate Facility in Containment Mode.....	18
8.0 Anticipated and Routine Problems of Pump-and-Treat Operation.....	18
9.0 Insurance, Health and Safety.....	19
10.0 Expected Contractor Conduct.....	19
11.0 Provisional Allowance.....	19
12.0 Contract Performance Objectives.....	19
13.0 Restrictions on Site Use and Access.....	18
14.0 Personnel Replacement.....	19
15.0 Field Vehicle Insurance.....	21
16.0 Damages to Material/Vehicle/Real Property.....	21
17.0 Site Regulations.....	22

18.0 List of Background Documents	22
19.0 Travel and Living Expenses.....	23
20.0 Mandatory Requirements.....	22
21.0 Rated Requirements-Technical/Managerial Proposal.....	26
22.0 Cost Proposals (Compliant Bids Only).....	28

Table 1 - Technical/Managerial Rated Requirements

Table 2 - Professional Services and Associated Costs

Figure 1- Site Location

Figure 2 - Shallow Well Locations

Figure 3 - Deep Well Locations

Appendix A - 2019-20 Sampling Schedule

1.0 Introduction

The present Gloucester Operations and Maintenance contract will end on March 31, 2021. Transport Canada (TC) requires the services of a Contractor, from April 1, 2021 until March 31, 2022, to conduct surface water and groundwater monitoring, prepare an annual groundwater monitoring report and perform routine/preventative maintenance of the monitoring well network. The contractor is not expected to be on-site during the period between January 1, 2022 and March 31, 2022, unless conducting sample analysis or operation of the treatment system (containment mode only) is required.

Operation of the treatment system (containment mode only) may be required if triggered by the site's Risk Management Plan and is an optional item in this Terms of Reference. Containment mode only refers to operation through the use of select extraction wells and the equalization and effluent tanks. If operation of the system is required, the Contractor is required to perform routine/preventative maintenance of the treatment system and prepare an annual operations report.

There is an option to extend the contract by ten (1) one-year periods. The period for these ten option years are as follows:

Option Year 1 - April 1, 2022 to March 31, 2023
Option Year 2 - April 1, 2023 to March 31, 2024
Option Year 3 - April 1, 2024 to March 31, 2025
Option Year 4 - April 1, 2025 to March 31, 2026
Option Year 5 – April 1, 2026 to March 31, 2027
Option Year 6 – April 1, 2027 to March 31, 2028
Option Year 7 – April 1, 2028 to March 31, 2029
Option Year 8 – April 1, 2029 to March 31, 2030
Option Year 9 – April 1, 2030 to March 31, 2031
Option Year 10 – April 1, 2031 to March 31, 2032

TC reserves the right to modify the contract from conducting surface water and groundwater monitoring and analysis to full-time work (8 hours per day, Monday to Friday) for the two (2) plant operators if either Partial or Full operation option is required. The proposed two plant operators must be the same individuals for the duration of the full-time work for the initial contract duration and any option year periods.

The previous contract was held by Geosyntec Consultants International Incorporated from April 1, 2015 until March 31, 2021 and Headwater Environmental Services Corporation from October 1, 2005 until June 30, 2014.

The purpose of this Terms of Reference is to outline the required services, activities and contractor qualifications required to perform the work. Additional details on specific work activities are provided in Section 5.0.

2.0 Background

The Gloucester Landfill is located on Transport Canada property south of the Ottawa Macdonald-Cartier International Airport at 2300 Leitrim Road as shown on Figure 1. The Gloucester Landfill served as a municipal waste disposal site from 1957 to 1980. Between 1969 and 1980, a portion of the site was used for the disposal of wastes. These wastes, predominantly oils and cleaning liquid solvents were disposed in a Special Waste Compound of the municipal landfill. From 1987 to 1989, impacted soils and waste materials from the Special Waste Compound were removed. Following the removal of wastes, additional studies were completed to determine the extent of groundwater impacts.

The main source of volatile organic compounds (VOCs) in the subsurface is believed to be chemicals disposed of in the Special Waste Compound. The plume emanating from this source is known as the Special Waste Plume (SWP). It is the most clearly defined source where known disposal of such compounds occurred. The second source appears to be the Municipal Waste Landfill area that generates the Municipal Waste Plume (MWP) with some VOCs present. The third source is located southwest of the corner of Leitrim Road and the former Canadian Pacific Railway tracks and is referred to as the Leitrim/CPR Plume (LCP).

Various groundwater remedial options were evaluated. The preferred option was a pump-and-treat system to contain the groundwater plume migration and aid in the clean-up of the groundwater. The pump-and-treat system was commissioned in 1991 to contain the groundwater contaminant plumes and to treat (degrade) the organic chemicals.

The initial treatment system was in operation until February 2013, excluding plant shutdowns for routine maintenance, equipment failures and repairs, and a monitored natural attenuation study conducted in 2007. The initial treatment system included an equalization (i.e. influent) tank, an effluent tank, and 3 chemical tanks (caustic soda, hydrogen peroxide, and sulphuric acid). Due to the results of a tank assessment report, all three chemical tanks (caustic soda, hydrogen peroxide and sulfuric acid) and the equalization and effluent tanks were drained, cleaned and inspected. Findings of the tank inspection concluded that several of the tanks are at the end of their lifecycle and need to be replaced. Two new 10,000 L (equalization and effluent) tanks, for containment purposes only, were installed in March 2015.

Initially, the pump and treat system was commissioned to remediate contamination at the site. After more than a decade of managing the site, the site management approach has changed from treatment to a containment approach (i.e. control the movement of groundwater preventing migration). This containment approach consists of pumping groundwater from select extraction wells through the equalization and effluent tanks and reinjecting the groundwater to select injection wells. This containment approach will not consist of treating the extracted groundwater using the existing ultraviolet photo-oxidation (i.e. pump-and-treat) system or associated chemical tanks (hydrogen peroxide, sulfuric acid, sodium hydroxide) until further evaluation of contaminant trends under non-pumping conditions is known.

Results of an Area Wide Risk Assessment (AWRA), conducted in 2003, indicate that the existing environmental conditions in the vicinity of the former Gloucester Landfill do not represent a risk to human health or the environment. A companion document to the AWRA, a

Gloucester Risk Management Plan (RMP), was developed. The Gloucester RMP is currently being implemented at the site.

Due to the age of the pump and treat system, it was known that a replacement system would be required. As a result, Transport Canada undertook a bioremediation study of the deep groundwater plume associated with the Special Waste Compound in 2016. Study results were successful and a full-scale bioremediation system was installed in 2018. Two molasses injections and associated performance monitoring was undertaken in 2019. Three injections are planned for 2020. There are another 3 years of injections and monitoring to be conducted to reach site objectives. Activities associated with the bioremediation system have been contracted separately and are outside of this request for proposal.

The success of the in-situ bioremediation project may determine the level of effort for conducting groundwater sampling (i.e. the number and frequency of monitoring events would decrease) denoted in this Terms of Reference (TOR). Further, this may necessitate changes to the existing Risk Management Plan. An option to undertake changes to the Risk Management Plan is included in this TOR.

Operation of the pump-and-treat system is expected to remain shut down at this time, with the exception of operating the treatment system, in containment mode only, if required as part of the site's Risk Management Plan.

Since the treatment system was shut down in February 2013, TC has been monitoring the three various contaminant plumes as they return to non-pumping conditions (i.e. trends and chemical migration/rebound).

3.0 Role of Transport Canada (TC), Public Services and Procurement Canada (PSPC) and Contractor

3.1 Role of TC

Transport Canada owns the property and associated buildings, equipment and materials at the Gloucester site. TC is responsible for the operation and maintenance of the Gloucester pump-and-treat facility and monitoring well network. TC manages the facility through a Specific Service Agreement with PSPC.

3.2 Role of PSPC

Public Services and Procurement Canada (PSPC) provides base facility maintenance and procurement services on behalf of Transport Canada. Facility maintenance activities include snow removal, heating, ventilation, and air conditioning (HVAC), electrical/mechanical equipment, security system, sanitary, office cleaning and garbage disposal. Procurement activities include supplying/replacing laboratory chemicals, mechanical parts, laboratory instruments and glassware etc. PSPC also tenders/supervises well development, new structural and mechanical/electrical projects. PSPC provides a 24-hour building related emergency service.

3.3 Role of Contractor

The contractor is responsible for operating and maintaining the field sampling equipment, on-site laboratory and monitoring well network. If operation of the treatment system is required due to being triggered by the site's RMP, the contractor will be responsible for operating and maintaining the treatment system (containment mode only). All other base facility operation and maintenance requirements such as HVAC, security system, sanitary system, etc. are the responsibility of PSPC.

The Contractor will report directly to TC. All requests for equipment, material and services by the Contractor shall be provided solely to TC.

4.0 Description of the Pump-and-Treat Facility

The overall facility consists of:

- Two buildings (main building approximately 13.5 m x 25.5 m in area; control building approximately 3.5 m x 4.5 m) which house the treatment facility;
- 7 deep extraction wells intersecting the deep aquifer from which contaminated groundwater is extracted for treatment;
- 22 shallow extraction wells intersecting the shallow aquifer from which contaminated groundwater is extracted for treatment;
- 4 injection wells to receive treated water;
- A lagoon to receive overflow from the injection wells; and
- Approximately 350 monitoring wells.

The main building houses permanent office space. Computer and office equipment are supplied (property of TC). A small on-site analytical laboratory is also present, for groundwater sample preparation and analysis. All instruments, glassware, chemicals, bottled and cylinder gases, etc that are required for laboratory analytical work are supplied and/or maintained/replaced by TC (PSPC on behalf of TC).

The treatment system includes:

- Two holding tanks for both equalization and effluent treated groundwater;
- Bulk chemical storage tanks (18,000L each) for hydrogen peroxide, sulfuric acid and caustic soda;
- 7 influent water lines from the 7 wells intersecting the deep aquifer, with associated pumps;
- 1 large water line (shallow well header) from the control building delivering the combined water influent from the 22 wells intersecting the shallow aquifer;
- The ultra violet photo-oxidation system designed by Peroxidation Systems Inc.(PSI);
- A computerized pump and treatment system control unit which is used to control pumping rates from individual wells, pumping rate to the PSI unit, pumping rate to the injection wells and lagoon;

- Facility equipment such as the Programmable Logic Controller (PLC)- Siemens S5 115 CPU 943 with Siemens Step5 programming software, Windows 95 computer with Citect Explorer 5.0 interface software;and
- A high voltage transformer to provide power to the PSI photo-oxidation unit.

The system is also designed to maintain a database of information concerning extraction and injection rates, pump performance, etc.

The control building contains the lines receiving water from the 22 shallow wells. Water from the 22 shallow wells are combined at this point and then pumped to the main treatment facility through a single water line.

4.1 Current Status of Pump-and-Treat Facility

- The treatment system (pump-and-treat) is currently shut down.
- Bulk chemical storage tanks (18,000L each) for hydrogen peroxide, sulfuric acid and caustic soda have been decommissioned.
- Two new 10,000 L (equalization and effluent) tanks were installed in March 2015 to operate the system in containment mode only.
- Deep Extraction Well 1 was not operating at its full potential prior to the treatment system shut down and may fail in the near future.

4.2 Description of Field Equipment

The following is supplied by TC:

- A 2010 Ford Explorer 4x4 with trailer hitch.
- A trailer used to transport the sampling equipment to the wells and is equipped with a secured 1000 L stainless steel holding tank, Honda EZ 2500 generator, and two washing barrels.
- A Hydrolab MiniSonde 4A with sealable flow-through cell equipped with the following temperature, conductance, dissolved oxygen and oxidation-reduction probes.
- Submersible and peristaltic pumps and controllers and other associated field equipment (i.e. water level meter, sample tubing, decontamination materials).
- An ARI financial card for the purchase of gas, windshield washer fluid, oil, etc. for the site vehicle.

4.3 Description of On-Site Laboratory Equipment

The following is supplied by TC:

- An on-site purge & trap Gas Chromatograph (GC) system consisting of a Hewlett Packard 5890 Series II gas chromatograph equipped with a split/splitless injector, a Flame Ionization Detector (FID) and an Electron Capture Detector (ECD) coupled to a Tekmar 3000 Concentrator, a Tekmar Cryofocuser, and one Tekmar autosampler (Model 2016).
- An Oakton Ion 2700 Bench-Top pH Meter.

- A Zero Air Generator and other Gas Chromatograph (GC) gases such as helium, hydrogen, nitrogen.

5.0 Overview of Services Required

5.1 General

Expected services during the contract time period will include undertaking surface water and groundwater sampling events, performing on-site laboratory analysis of the samples, sending duplicate target, trend, and surface water samples to an external laboratory, performing routine/preventative maintenance of the monitoring well network and preparing an annual groundwater monitoring report.

Operation of the treatment system (containment mode only) through use of select wells and equalization and effluent tanks will only be required if triggered by the site's Risk Management Plan. Operations include performing routine/preventative maintenance of the treatment system and preparation of an annual operation report. Partial and Full operation of the pump-and-treat facility have been included as options to the contract.

From April 1, 2021 to March 31, 2022, the contractor is to conduct sampling, and analysis at the on-site laboratory of target, trend, and performance monitoring wells and surface water in target ditches for both Spring (Task #1) and Fall (Task #2). As well, sampling of approximately 112 monitoring wells on a plume-by-plume basis (i.e. SWP, MWP and LCP) considered as Task #4. The contractor is not expected to be on-site during the period between January 1, 2022 and March 31, 2022. unless conducting sample analysis or operation of the treatment system (containment mode only) is required.

There is an option to extend the contract by ten (1) one-year periods. For these option years, the Contractor is to conduct surface water and groundwater sampling and analysis for the target, trend, and performance monitoring wells and target ditches for both Spring and Fall monitoring periods and monitoring of approximately 112 of the 350 monitoring wells. The period for these ten option years are denoted in section 1.0. On an annual basis, the contractor is not expected to be on site during the period between January and March unless conducting sample analysis or operation of the treatment system (containment mode only) is required.

The Contractor shall establish a team consisting of a project manager, senior scientist, hydrogeologist, and two plant operators to provide the following activities. It is acceptable for the senior scientist or hydrogeologist to perform the duties of the project manager, however, the mandatory services of the project manager (section 5.2.1) must be met in addition to the mandatory services of the senior scientist or hydrogeologist (sections 5.2.2 or 5.2.3). The project manager, senior scientist or hydrogeologist need not be located on site or in Ottawa but occasional meetings with TC and presentations to TC in Ottawa will be required from time to time.

5.2 Project Team

5.2.1 Project Manager

The services of a project manager will include, but not be limited to:

- act as the main point of contact between TC and the Contractor;
- supervise the team;
- ensure protection of health and safety;
- direct and supervise surface water and groundwater sampling and analysis activities in conjunction with the hydrogeologist;
- prepare an annual groundwater monitoring report;
- meet the field monitoring performance objectives described in section 12.0;
- develop, maintain and update site databases;
- update existing operation manuals and other related site documents (i.e. Material Safety Data Sheets), if required;
- prepare other reports such as provision of groundwater sampling results for private property owners as required by TC;
- undertake other tasks such as assess and maintain groundwater monitoring wells as required by TC; and
- present activities and findings to other government departments and/or consultants/contractors, on occasion.
- assist City of Ottawa consultants regarding potential impacts to Gloucester site from Light Rail Transit or Leitrim Road re-alignment developments.

Option – Partial and Full Operation (containment mode only) - Required Services

If partial or full operation is required, the project manager will be expected to perform the above services plus the following services:

- oversee operations of the treatment system;
- meet the Option-Partial and Full Operation performance objectives described in section 12.0; and
- prepare an annual operations report.

5.2.2 Senior Scientist

The service of a senior scientist will include, but not be limited to:

- direct and supervise the on-site analytical laboratory for groundwater sampling and analysis of VOCs including Quality Control and Quality Assurance practices/procedures such as sample analysis, data quality validation, verification and reporting are conducted in accordance with industry standards;
- interpret and report chemical analyses results;
- develop, maintain and update site chemical databases;
- assist the project manager in the preparation of an annual groundwater monitoring report; and
- meet the laboratory performance objectives described in section 12.0.

Option – Partial and Full Operation (containment mode only) - Required Services

If partial or full operation is required, the senior scientist will be expected to perform the above services plus the following services:

- assist the project manager in preparation of an annual operations report.

5.2.3 Hydrogeologist

The services of a hydrogeologist will include, but not be limited to:

- provide direction to plant operators on the collection of surface water and groundwater sampling and analysis;
- plot and interpret the groundwater elevation data collected for the site monitoring program to establish the seasonal groundwater flow patterns;
- analyze the groundwater sampling data and mapping of well and plume capture zones;
- prepare hydrogeological interpretation of the groundwater flow, capture zones, and contaminant transfer;
- interpret data on groundwater hydrology and subsurface contaminant concentrations
- analyze groundwater contaminant fate and transport mechanisms;
- assess natural attenuation indicators;
- evaluate contaminant trends (i.e. rebound monitoring);
- recommend wells to be decommissioned;
- recommend additional subsurface characterization as required;
- prepare an annual groundwater monitoring report;
- update existing site conceptual model and cross sections;
- assess non-pumping groundwater conditions and evaluate plume stability; and
- continue implementation of the site's Risk Management Plan and reporting.

Option – Partial and Full Operation (containment mode only) - Required Services

If partial or full operation is required, the Hydrogeologist will be expected to perform the above services plus the following services:

- assess the efficiency of the treatment system's pumping system (containment mode only) to ensure containment of contaminants of concern;
- analyze groundwater extraction and injection flow rates and efficiency;
- analyze contaminant data from influent water lines and the groundwater monitoring program to:
 - advise plant operators on appropriate adjustments to the rates of groundwater extraction;
 - advise plant operators on groundwater pumping strategy;
 - advise plant operators on the priorities for extraction between wells intersecting the same aquifer and intersecting the shallow aquifer and the deep aquifer; and
- prepare an annual operations report.

5.2.4 Plant Operators

One or two plant operators are to undertake all work activities including surface water and groundwater monitoring.

The services of one or two plant operators will include, but not be limited to:

- conduct all surface water and groundwater sample collection and analysis, through usage of the on-site field and laboratory (gas chromatograph) equipment and sending select target, trend and performance well samples to an outside laboratory;
- collect groundwater elevation measurements;
- monitor natural attenuation indicators in the municipal waste plume;
- assist in the preparation of an annual operations report;
- test the efficacy of system components to ensure working properly;
- implement and maintain an adequate analytical laboratory QA/QC program including routine instrument calibration with surrogate standards, as well as analysis of spiked, split and duplicate samples;
- implement and maintain an adequate field QA/QC program including field, trip, and equipment blanks;
- receive and handle gases and chemicals used for the on-site laboratory;
- conduct purge and trap sample preparation and GC/FID and GC/ECD chemical analysis;
- conduct monitoring well maintenance;
- conduct testing and maintenance on facility system to ensure working properly since two new lower volume water tanks installed;
- oversee decommissioning of monitoring wells;
- locate missing monitoring wells;
- liaise with private property owners and investigate property ownership changes concerning TC wells located on their property;
- perform brush clearing that has impeded access to wells;
- troubleshoot well and treatment facility equipment;
- operate extraction well(s) to induce groundwater drawdown (only if necessary) in support of the bioremediation system, that has been contracted separately;
- conduct site tours for other government departments and/or consultants/contractors;
- provide technical advice to PSPC and/or TC consultants/contractors; and
- other related tasks such as sourcing/acquisition of equipment parts, assisting City of Ottawa consultants regarding potential impacts to Gloucester site from Light Rail Transit or Leitrim Road re-alignment developments may be required from time to time.

Since the plant and groundwater wells are located in an unpopulated area, if one plant operator undertakes work alone, a check-in procedure must be established to ensure that regular contact (visually or verbally) is kept with the operator while they are working. Tasks should be scheduled during normal business hours. Higher risk tasks should be conducted when another operator, is capable of helping in an emergency.

Option – Partial and Full Operation (containment mode only) - Required Services

If partial or full operation is required, the Plant Operators will be expected to perform the above services plus the following services:

- monitor and maintain operations of the pump-and-treat system (containment mode only) including servicing of all extraction and injection wells and associated system components (i.e. PLC, etc.);
- undertake routine/preventative maintenance of the treatment system to ensure it remains functional. This includes extraction wells , all pumps, lines, gauges and associated mechanical equipment;
- undertake routine re-programming of the Programmable Logic Controller (PLC, Siemens Inc.) and the interface program (Citech), or similar system, to alter wells pumped and/or rates of extraction and injection in response to equipment malfunctions or altered priority of wells for extraction. The rate of extraction from each well (and therefore the relative proportion of total raw water arising from each well and aquifer) is controlled by the plant operator using the PLC and is routinely adjusted to account for:
 - Contaminant concentrations in each well
 - Apparent plume migration
 - Water extraction efficiency from each well
 - Routine and/or emergency servicing of wells and pumps should blockage or breakdown occur.
- shut down the system after normal business hours to prevent damage in the event of sudden electrical storms (response time dependent on operator judgment). If operation of the treatment system (containment mode only) is required, an operator will be required to report and liaise with PSPC within a maximum 4-hour response time in the event of an after-hours emergency. Unmanned operation of the facility is maintained during night, weekend and holiday periods.
- assist in the preparation of an annual operations report.

Major service and maintenance requirements beyond the technical capabilities of the plant operators, and outside of existing maintenance contracts with equipment manufacturers, will be discussed with TC and arranged/purchased by TC under separate contract with PSPC on a case-by-case basis.

Within 60 days of contract initiation, the Contractor will submit, for approval by TC, a facility occupational health and safety plan. The plan is to include Covid-19 health and safety measures. This plan will identify all health and safety concerns, provide appropriate mitigative actions for these concerns, detail emergency response actions, and provide emergency contacts and phone numbers.

6.0 Required Site Monitoring Activities

As part of the site's Risk Management Plan (RMP), sampling of target and trend wells, and target ditches is conducted twice a year, in Spring and Fall. The purpose of this risk management measure is to monitor the status of surface water and groundwater concentrations as an early detection system for containment. If concentrations are observed to be greater than the Risk Based Environmental Quality (RBEQ) criteria at the target wells,

contingency measures are to be implemented. Trend wells are monitored to evaluate concentration trends over time since historically concentrations have approached the RBEQ for certain compounds. Further, a component of the RMP includes monitoring a set of performance wells within the Municipal Waste Plume area to monitor the effectiveness of monitored natural attenuation processes.

Groundwater samples are collected from deep and shallow monitoring wells, multi-level wells, bedrock monitoring wells and deep and shallow extraction wells. Surface water is collected from target ditches in the vicinity of the site. Specific target wells, target ditches, trend wells and up to 112 of the 350 monitoring wells sampled in 2019-2020 listed in Appendix A. The following are the site monitoring requirements of the RMP, as well as, additional required monitoring activities not included in the RMP. The requisite site monitoring requirements are categorized according to tasks as described below. These tasks also correspond to information bidders are to provide in Table 2-Professional Services and Associated Costs.

The extra wells (i.e. 112) to sample is provided as a benchmark number (i.e. same number of wells) for contracting purposes in order for each vendor to be provided with the same criterion on which to determine the total hours of work and associated cost related to this task for their proposal. This consistent criterion will be used to compare vendor proposals to ensure each proposal is evaluated in a fair and transparent manner.

The RMP includes a requirement to submit duplicate samples of all target and trend wells, as identified in Table 2-1, to an independent accredited commercial laboratory to assess on-site laboratory analytical performance. If the contractor recommends additional target, trend, and performance wells to be sampled and sent to an accredited laboratory, the contractor should indicate the additional wells with associated cost in their proposal. The accredited laboratory is not selected by the contractor. The accredited laboratory is selected and contracted with PSPC through their existing procurement standing offer for specific accredited laboratories. PSPC pays the accredited laboratory directly for its services. The laboratory services will be available upon contract award.

In addition, gases (e.g. helium, hydrogen, and liquid nitrogen) for the gas chromatograph are provided and associated cost is paid directly by PSPC. The gases will be available upon contract award.

6.1 Risk Management Plan Monitoring

6.1.1 Task 1 –Target, Trend and Performance Monitoring (Spring and Fall 2021, as well as, Option Years 1 to 10.

- groundwater sampling and on-site laboratory analysis from 31 target, 35 trend, and 7 performance monitoring wells for the 18 compounds of the Risk Based Environmental Quality (RBEQ) Criteria. Duplicate samples of the target, trend and performance wells are to be sent to an external independent laboratory for confirmatory analysis and performance validation. External laboratory procurement for duplicate analysis is provided by PSPC, on behalf of TC;
- surface water sampling and on-site laboratory analysis from 8 nearby target ditches for the 18 compounds of the Risk Based Environmental Quality (RBEQ) Criteria. Duplicate

samples are to be sent to an external independent laboratory for confirmatory analysis and performance validation. External laboratory procurement for duplicate analysis is provided by PSPC, on behalf of TC;

- groundwater from the 7 performance monitoring wells are to be analyzed in the field for dissolved oxygen (DO), pH, and oxidation-reduction potential (ORP) to monitor “natural attenuation” indicators in the Municipal Waste Plume.
- groundwater samples from the 7 performance monitoring wells are to be collected and analyzed for ammonia, nitrite, nitrate, ferrous iron, sulphate, sulphide, and alkalinity concentrations;
- specific target and trend wells identified in the RMP may need to be modified annually depending on sample results. The Contractor will make recommendations for changes, to TC, prior to sampling;
- groundwater elevation measurements and flow direction interpretation for all sampled wells;
- record changes in land use, construction activities, or other activities which may affect groundwater conditions; and
- sampling and analysis is to be conducted with appropriate QA/QC and chain of custody protocols for field and laboratory.

6.1.2 Task 2- Other Tasks (Year 2021-22, as well as, Option Years 1 to 10).

- test the efficacy of system components to ensure they are working properly;
- conduct testing and maintenance on facility system to ensure they are working properly;
- liaise with private property owners and investigate property ownership changes concerning TC wells located on their property;
- perform brush clearing that has impeded access to wells;
- troubleshoot well and treatment facility equipment;
- operate extraction well(s) to induce groundwater drawdown (only if necessary) in support of the bioremediation system, that has been contracted separately;
- conduct site tours for other government departments and/or consultants/contractors;
- provide technical advice to PSPC and/or TC consultants/contractors; and
- other related tasks that may be required from time to time.

6.2 Other Requirements – Not included in the RMP

6.2.1 Task 3 – Decommission and locate missing monitoring wells (Optional)

Task 3 is identified as “optional” since this task may or may not be able to be performed depending on available resources in a given year. A cost is requested from contractors in case TC decides to exercise this option. For bidding purposes only, the number of wells to be decommissioned is 51 and services are required to locate 4 missing wells.

- locate 4 monitoring wells that cannot be found in order that they may be properly decommissioned.
- decommission 51 wells on TC property that are no longer required, in use, or are damaged in accordance with ASTM International document Standard Guide for Decommissioning of Groundwater Wells, Vadose Zone Monitoring Devices, Boreholes, and other Devices for

Environmental Activities (ASTM D5299 – 99(2012)e1) to ensure they do not act as conduits for contaminants from one aquifer to the next.

- decommission wells that are no longer in use or are damaged off-site of TC property in accordance with the MOECP Ontario Well Water Regulation 903.
- the type of decommissioning method to be used for both on-site and off-site wells must be approved by TC prior to commencement of any decommissioning work.

6.2.2 Task 4 - Groundwater Sampling and Analysis –once per year (Year 2021-22 and Option Years 1 to 10)

- conduct groundwater sampling and on-site laboratory analysis of 112 of the 350 monitoring wells to evaluate groundwater quality trends and chemical migration/rebound under non-pumping conditions;
- the contractor may choose which wells to sample dependent on available time and accessibility as long as the chosen wells are representative of the various plumes in order to obtain the status of each plume at the Gloucester site; and
- conduct groundwater level measurements of approximately 112 of the 350 monitoring wells.

6.2.3 Task 5 – Update Risk Management Plan (RMP) (Optional)

- review the current RMP and provide an updated strategy with activities for monitoring, controlling and preventing human health and environmental risks;
- review the 18 compounds of the Risk Based Environmental Quality (RBEQ) criteria to determine if changes are required because of updates to toxicological information;
- update site monitoring activities including well locations and sampling frequency of target, trend, performance wells and surface water ditches based on current groundwater data and well conditions (i.e. damaged, decommissioned, etc.);
- incorporate the use of the in-situ bioremediation system as a risk management measure in the RMP;
- evaluate whether the necessity of using former pump-and-treat in containment mode only (not treatment) is required for contingency plan purposes;
- update the plan with any new site information or activities (i.e. level of risk) taken place since last revised RMP conducted in 2007 and ensure an equivalent level of protection is preserved;
- conduct evaluation and interpretation of the groundwater and surface water sampling and data analysis;
- assess whether other data aspects such as performance of natural attenuation processes is still required;
- update contingency, risk reduction and risk communication plans, if required; and
- provide evidence of stable and/or decreasing plumes to below risk based target criteria to enable site closure.

6.3 Site Monitoring/Laboratory Expectations:

- Analytical methods and procedures including quality assurance and quality control must comply with standardized scientific principles of good laboratory practice (i.e. International Standards Organization (ISO) 17025).
- Analytical techniques must be appropriate for the sample matrix and sensitive enough to measure for the type of analyte (i.e. U.S. EPA Method 624).

Groundwater sampling and analysis must be conducted in accordance with the 2016 CCME Guidance Manual for Environmental Site Characterization in Support of Environmental and Human Health Risk Assessment - Volumes 1 to 4.

6.4 Annual Groundwater Monitoring Report Expectations:

- A summary of surface water and groundwater monitoring activities including field collection activities and methodologies, field water quality and elevation measurements, laboratory analysis and methodologies, quality control and quality assurance procedures/results, etc.
- A description of the geology, hydrogeology and groundwater flow direction interpretation.
- A comparison of sample analysis to the RBEQ criteria and identify any changes and trends from the historical concentration data set.
- Identify VOC degradation products and any changes to historical degradation concentrations.
- Recommend improvements concerning the current monitoring program (i.e. identify redundant well sample locations that could be removed from the monitoring program).
- Determine status of groundwater flow direction, demonstrate plume stability and evaluate potential impacts for non-pumping conditions (i.e. contaminant movement, chemical concentration increases, rebound, etc.).
- Evaluate natural attenuation (MNA) parameters in the Municipal Waste Plume to confirm on-going attenuation of contaminants of concern.
- Update existing groundwater flow maps/contours based on groundwater level measurements.
- Update cross-sections of plumes.
- Evaluate concentration trends in the shallow and deep aquifers and compare to historical data set.

Option - Partial and Full Operation (containment mode only)- Annual Operations Report Expectations:

The report shall include all of the above annual groundwater monitoring report expectations, as well as, but not limited to the following.

- A summary of “containment only mode” methodology, operations, maintenance and monitoring.
- An evaluation of the performance of the containment approach in meeting risk management plan objectives.
- Confirm containment of contaminants of concern.
- Recommend improvements to optimize containment approach.

7.0 Options to Operate Facility in Containment Mode

Operation of the treatment system (containment mode only) through use of select wells and the equalization and effluent tanks will only be required if triggered by the site's Risk Management Plan.

Partial and Full operation of the treatment system have been included as options to the contract as described below.

TC reserves the right to modify the contract from conducting surface water and groundwater sampling and analysis to full-time work (8 hours per day, Monday to Friday) for the two (2) plant operators if either Partial or Full operation option is required. The proposed two plant operators must be the same individuals for the duration of the full-time work for the initial contract duration and any option year periods.

7.1 Option 1- Full Operation – Operate the Treatment System for the Deep and Shallow Aquifer (if required as part of the site's risk management plan) with approval by the TC Project Manager.

The contractor will provide an option to operate the pump and treat facility for the deep and shallow aquifers. Select shallow and deep extraction wells will be turned on to contain contamination in the shallow and deep aquifers.

7.2 Option 2 – Partial Operation – Operate the Treatment System for the Shallow Aquifer only (if required as part of the site's risk management plan) with approval by the TC Project Manager.

The contractor will provide an option to operate the treatment system for the shallow aquifer only. Select shallow extraction wells (SW13, SW15, SW16 and SW17) will be turned on to contain contamination in the shallow aquifer. In order for the system to operate and not shut down due to insufficient volume of tank water, two deep wells (DW3 and DW7), may need to be turned on in conjunction with select shallow extraction wells.

8.0 Anticipated and Routine Problems of Pump-and-Treat Operation

Operation of the treatment facility and well operations are routinely interrupted due to a variety of recurrent problems.

These problems include, but may not be limited to, the following:

- Well components and well pump failures - at shallow, deep, extraction and injection wells;
- Iron deposits (iron bacteria deposits) clogging wells, flow meters and pumps which require cleaning (bleach is frequently required to remove iron deposits);
- Decrease of the well water level to below its specific low level set point;
- Decrease of the well extraction rate to below its specific low level set point;
- Increase in water volume in the equalization tank to above high water set point of 80%;

- Shut down of the PSI system;
- PLC operational issues;
- Power Failures -- Lightning strikes causing damage to electrical components, computer components, well depth transducers; and
- Prolonged shut down of the treatment system may result in unanticipated problems.

Replacement parts and equipment for routine problems will be identified and requested by the plant operators in consultation with TC, but will be purchased by TC under separate arrangements with PSPC.

9.0 Insurance, Health and Safety

The Contractor shall be responsible for ensuring the health and safety of its employees. All work will conform to applicable Health and Safety legislation and/or Codes. The Contractor shall provide all necessary equipment and material such as personal protective equipment (PPE) to safeguard its employees. The equipment and materials must comply with Occupational Safety & Health Act requirements.

The Government of Canada shall not be held liable for bodily injury and/or property damage caused by the Contractor or its employees.

10.0 Expected Contractor Conduct

In performing requisite building, maintenance and procurement services, PSPC engages independent contractors to perform work at the site. The Contractor shall conduct their business in a manner that does not impede the undertaking or progress of duties or responsibilities by any other parties or by Government employees.

The Contractor will report directly to TC. All requests for equipment, material and services by the Contractor shall be provided solely to TC.

The Contractor and its employees must not represent themselves to the public, media or others as speaking on behalf of TC unless they are expressly authorized to do so by TC.

11.0 Provisional Allowance

A provisional allowance of \$5000 per year is provided in the contract for acquisition of small items such as duct tape, office supplies, hoses, small equipment components and emergency material. The Contractor must seek approval from TC for procurement of larger items such as computer and laboratory parts. Receipts must be provided by the Contractor to TC for reimbursement of all acquisition expenses.

12.0 Contract Performance Objectives

Laboratory Performance

For laboratory analytical performance, reproducibility will be measured to ensure analyses are accurate. Reproducibility is calculated by determining the relative percent difference (RPD) of duplicate samples sent to an independent outside laboratory for comparison. The acceptable RPD for aqueous samples analyzed is 25% or less. In addition, the reproducibility of the duplicate samples by an external laboratory comparison will serve as evidence.

Field Monitoring Performance

For groundwater sampling performance objectives, appropriate quality control procedures and analysis by collecting field, trip and equipment blanks to ensure there is no cross-contamination between wells or samples. Performance will be measured by evidence of no detectable concentrations found in the field, trip or equipment blank samples.

The ability of the Contractor to meet or exceed the field monitoring and analytical performance objectives will be taken into account with respect to possible four (1) one-year extensions of the contract.

Option- Partial and Full Operation Performance (if triggered by the site's RMP)

The overall objective of the treatment facility is to continue to contain contamination on Transport Canada's property (i.e. prevent contamination from migrating off-site). Overall containment efficiency is a function of maintaining optimal operation of the system, taking necessary steps to prevent its prolonged shutdown or damage, and fine-tuning the system to achieve the greatest containment efficiency possible. Past experience has indicated that the system can be maintained operational about 80% of the time, with shutdowns for routine maintenance, equipment malfunctions, and deliberate shutdowns to prevent damage by electrical storms.

The ability of the Contractor to meet or exceed the operational performance objectives will be taken into account with respect to possible four (1) one-year extensions of the contract.

13.0 Restrictions on Site Use and Access

There is to be no use of the Gloucester Landfill Treatment facility, associated offices, phones, equipment and properties other than to undertake the tasks and duties required to meet the obligations of this contract. Non-contract personnel must have the express permission of TC to be on site. Requests must be provided to TC a minimum of 24 hours in advance.

Storage of personal items such as camper trailers, vehicles, etc. is not permitted on-site.

14.0 Personnel Replacement

Personnel replacement may be undertaken by the Contractor, but **only** with the prior written approval of TC. In advance of the date upon which any replacement personnel are to commence work, the Contractor shall notify TC, in writing, of the reason for the unavailability of the named resource. The Contractor shall then provide to TC the name and detailed Curriculum Vitae (CV) of the qualifications and experience of the proposed personnel.

The contractor shall have two (2) working days from receipt of verbal notice to provide a replacement. If a contractor is unable to provide a suitable replacement, further services for that requirement may be terminated at no cost to Her Majesty. Should any contract personnel be unsuitable, TC may request alternate resources be provided.

Any cost associated with the replacement of resources shall be entirely at the Contractor's expense.

14.1 Plant Operator Replacement

If partial or full operation is required, plant operator replacement staff must be provided to cover vacation periods, sick leave or other absences of more than 5 consecutive working days. Replacement staff need not meet all qualifications of plant operators unless both full time operators are replaced concurrently.

Should both plant operators be absent at the same time, one of the proposed replacement personnel must meet or exceed the mandatory requirements specified in Section 19.0. TC reserves the right to refuse the proposed replacement personnel.

15.0 Field Vehicle Insurance

A field vehicle is supplied to facilitate the monitoring program. Although maintenance of the vehicle and a fuel allowance will be provided by TC, the contractor must provide for insurance coverage and maintain it in force throughout the duration of the contract and any subsequent option years.

The insurance policy must include the following:

- (a) Third Party Liability - \$2,000,000 Minimum Limit per Accident or Occurrence
- (b) Accident Benefits - all jurisdictional statutes
- (c) Uninsured Motorist Protection
- (d) Direct Compensation Property Damage (DCPD), \$300 deductible
- (e) Collision (\$500 deductible)
- (f) Comprehensive (\$300 deductible)
- (e) Notice of Cancellation: The Contractor's Insurer will endeavour to provide TC thirty (30) days written notice of cancellation.

The vehicle is a 2010 Ford Explorer 4X4, driven approximately 5,000 km/year. Should the contractor not decide to purchase collision coverage, the Contractor shall be responsible for any loss or damage to the vehicle if it was involved in a collision.

The field vehicle is to be used exclusively on-site, with the exception of parcel pick-up/delivery or vehicle fueling/maintenance. The vehicle is not for personal use.

16.0 Damages to Material/Vehicle/Real Property

The Contractor is liable for any loss of or damage to Material, Vehicle or Real Property that is supplied or placed in the care, custody and control of the Contractor for use in connection with

the Contract, except for such loss or damage attributable to causes beyond the Contractor's control.

The Contractor is not liable for any loss or damage to Material, Vehicle or Real Property if the loss or damage results from and is directly attributable to reasonable wear and tear.

When the Contractor fails to make good any loss or damage for which the Contractor is liable, within a reasonable time, the Crown may cause the loss or damage to be made good at the Contractor's expense, and the Contractor shall thereupon be liable to the Crown for the cost thereof and shall, on demand, pay to the Crown an amount equal to that cost.

17.0 Site Regulations

The Contractor undertakes and agrees to comply with all standing orders or other regulations, in force on the site where the work is to be performed, relating to the safety of persons on the site or the protection of property against loss or damage from any and all causes including fire.

18.0 List of Background Documents

- Risk Management Plan, Former Gloucester Landfill Site (Revised 2007)

19.0 Travel and Living Expenses

The Contractor will be reimbursed for the authorized travel (including travel time) and living expenses reasonably and properly incurred in the performance of the Work, at cost, without any allowance for overhead or profit, in accordance with the meal, private vehicle and incidental expense allowances specified in Appendices B, C and D of the National Joint Council Travel Directive, as amended.

All payments are subject to government audit.

SELECTION AND EVALUATION CRITERIA

20.0 Mandatory Requirements

Proposals that fail to meet the following mandatory requirements will be discarded at this stage without further consideration and the bidder's proposal will be considered to be non-responsive.

20.1 Mandatory Requirement Checklist

Requirements	Meets	Does not meet
A. CORPORATE QUALIFICATIONS		
1. The firm must have a minimum of 5 years previous work experience in: <ul style="list-style-type: none"> ➤ operating and conducting modifications to groundwater 		

<p>treatment systems (fixed and/or mobile) for containment of groundwater contamination with volatile organics or, for mobile systems, demonstrate experience with the resolution of technical obstacles associated with long term operation.</p> <p>Pilot and/or bench scale studies/systems, mobile drinking water disinfection/ purification systems, and landfill leachate systems are not considered groundwater remediation systems and do not meet the demonstrated <u>previous</u> experience requirement.</p>		
<p>2. The firm must demonstrate that they have a minimum of 5 years previous work experience in conducting groundwater monitoring for volatile organic compounds (VOCs).</p>		
B. TEAM QUALIFICATIONS		
B.1 PROJECT MANAGER		
<p>1. The proposed resource must have a post secondary education from a recognized university in business administration, economics, environmental science, chemistry, engineering, hydrogeology or other discipline relevant to the tasks of the position. TC reserves the right to request proof of education.</p>		
<p>2. The proposed resource must have a minimum of 5 years previous work experience with groundwater remediation of volatile organic compounds (VOCs).</p>		
<p>3. The proposed resource must have a minimum of 5 years previous work experience in managing projects of similar dollar value, complexity, scope and size of this requirement.</p>		
<p>4. The proposed resource must have a minimum of 5 years previous work experience in leading a team and in the management of human, financial and material resources. A team is considered at least 2 individuals, excluding the Project Manager.</p>		
<p>5. The proposed resource must have a minimum of 2 years previous work experience in groundwater database creation and maintenance.</p>		
<p>6. The proposed resource must have a minimum of 5 years previous work experience in preparing a groundwater monitoring and operations annual report.</p>		
B.2 SENIOR SCIENTIST		
<p>1. The proposed resource must have a post secondary education from a recognized university in analytical chemistry. TC reserves the right to request proof of education.</p>		
<p>2. The proposed resource must have a minimum of 5 years previous work experience in:</p>		

<ul style="list-style-type: none"> ➤ analytical chemistry and directing/managing an analytical laboratory for groundwater sampling and analysis of VOCs including ensuring practices/procedures such as Quality Control and Quality Assurance, sample analysis, data quality validation, verification and reporting in accordance with industry standards. 		
B.3 HYDROGEOLOGIST		
<p>1. The proposed resource must have a graduate degree from a recognized university in geology, hydrogeology, environmental engineering, environmental science or other discipline relevant to the tasks of the position. TC reserves the right to request proof of education.</p>		
<p>2. The proposed resource must have a minimum of 5 years previous work experience in hydrogeology pertaining to volatile organic compounds (VOCs) in groundwater.</p>		
<p>3. The proposed resource must have a minimum of 5 years previous work experience in:</p> <ul style="list-style-type: none"> ➤ operating and conducting modifications to groundwater treatment systems (fixed and/or mobile) for containment of groundwater contamination with volatile organics or, for mobile systems, demonstrating experience with the resolution of technical obstacles associated with long term operation. 		
<p>4. The proposed resource must have a minimum of 5 years previous work experience in the analysis and interpretation of data relating to:</p> <ul style="list-style-type: none"> - groundwater flow rates and direction; - contaminant plume migration; - determination of design requirements respecting groundwater extraction rates and related specifications for groundwater treatment systems. 		
<p>5. The proposed resource must have a minimum of 5 years previous work experience in the analysis and interpretation of data relating to well and plume capture zones.</p>		
<p>6. The proposed resource must have a minimum of 5 years previous work experience in the analysis and interpretation of data relating to groundwater contaminant fate and transport mechanisms.</p>		
<p>7. The proposed resource must have a minimum of 5 years previous work experience in the analysis and interpretation of data relating to natural attenuation indicators.</p>		
<p>8. The proposed resource must have a minimum of 5 years previous work experience in the analysis and interpretation of data relating to evaluation of contaminant containment.</p>		
<p>9. The proposed resource must have a minimum of 5 years previous work experience in recommending additional</p>		

characterization as required.		
10. The proposed resource must have a minimum of 5 years previous work experience in the analysis and interpretation of data relating to evaluation of contaminant trends (i.e. rebound monitoring).		
11. The proposed resource must have a minimum of 5 years previous work experience in preparing a groundwater monitoring and operations report.		
B.4 PLANT OPERATORS		
1. The proposed resources must have, as a minimum, a diploma from a recognized Canadian college (or equivalent) in environmental technology; other relevant post-secondary education and training is also acceptable, including a B.Sc., etc. Proof of education must be provided in the bidder's proposal at time of bid closure.		
2. The proposed resources must have a minimum of 5 years previous work experience in: <ul style="list-style-type: none"> ➤ operating and conducting modifications to groundwater treatment systems (fixed and/or mobile) for containment of groundwater contamination with volatile organics or, for mobile systems, demonstrate experience with the resolution of technical obstacles associated with long term operation. 		
3. The proposed resources must have a minimum of 2 years previous work experience with the Ladder Logic programming language (Siemens Step 5) or a similar system.		
4. The proposed resources must have a minimum of 5 years previous work experience in the operation and maintenance of the Hewlett Packard HP 5890 Series II Gas Chromatograph with FID/ECD Detection (FID-Flame Ionization Detector/ECD-Electron Capture Detector) or a similar system.		
5. The proposed resources must have a minimum of 5 years previous work experience in purge and trap sample preparation for Gas Chromatography (GC) analysis of volatile organic compounds		
6. The proposed resources must have a minimum of 2 years previous work experience in sampling and analyzing surface water and groundwater samples for volatile organic compounds.		
7. The proposed resources must have a minimum 40 hours of training in an industry standard Occupational Safety and Health (OSH) program regarding hazardous materials incident response, hazardous materials handling and occupational safety and health. An 8 hour OSH refresher course taken within the last 2 years is acceptable. Proof of OSH training must be provided in the bidder's proposal at time of bid		

closure.		
8. The proposed resources must have training in Workplace Hazardous Material Information System (WHMIS). Proof of WHMIS training must be provided in the bidder's proposal at time of bid closure.		
9. The proposed resources must have First Aid training (St. John Ambulance or equivalent). Proof of First Aid training must be provided in the bidder's proposal at time of bid closure..		
10. The proposed resources must have a Valid driver's license. Proof of Valid driver's license must be provided in the bidder's proposal at time of bid closure.		
11. The proposed resources must have practical knowledge of and a minimum of 2 years previous work experience with appropriate software for word processing, spreadsheets and databases (including Microsoft ACCESS).		
12. The proposed resources must have a minimum of 5 years previous work experience with the preparation of technical reports.		

Up to date training in OSH, first aid, and WHMIS are essential requirements at time of bid submission for the plant operators and will be rated within the proposal. **It is the responsibility of the contractor to provide employee training at their own expense.**

▲ OSH, First Aid, and WHMIS Training must be maintained and be valid for the duration of the contract and any subsequent option year periods.

■ It is acceptable for the senior scientist or hydrogeologist to perform the duties of the project manager, however, the mandatory qualifications described in section B.1 must be met in addition to the services in either B.2 or B3. The project manager, senior scientist or hydrogeologist need not be located on-site or in Ottawa but occasional meetings with TC will be required from time to time.

21.0 Rated Requirements Technical/Managerial Proposal

21.1 Evaluation of Proposals

Proposals meeting all Mandatory Criteria will be evaluated and rated against the Point-Rated Criterion (R1-R4) in Table 1 below. For the technical proposal the total score will be established as follows:

Technical	Criterion R1:	Comprehension of the Scope of Work and Clarity of the Proposal	20 points
Technical	Criterion R2:	Firm Approach and Service	25 points

		Delivery Methodology	
Managerial	Criterion R3:	Corporate Capabilities	25 points
Managerial	Criterion R4:	Project Management	30 points

Total Maximum

100 points (pass-mark 75 points)

A bidder's proposal **is to** meet or exceed a minimum score pass-mark of 75% (75/100) on the Point-Rated Criterion in order to be evaluated on the basis of the Bidder's Cost Proposal. Proposals failing to meet the minimum score pass-mark will result in the proposal being deemed non-compliant and no further consideration will be given.

21.2 Rated Requirements (R1-R4)

Criterion R1 - Comprehension of the Scope of Work and Clarity of the Proposal

Bidders are advised that in evaluating Criterion R1, attention will be focused on an understanding of the various activities, scheduling and deliverables. Provision of a one page (11" x 17") work plan (i.e. GANTT, Microsoft Project) illustrating the various tasks/activities, duration of tasks/activities, start and end dates, deliverables, and milestones as indicated in the Terms of Reference will be utilized to evaluate this component. The firm is to include the total number of hours of work for each worker within their work plan.

Criterion R2 – Firm Approach and Service Delivery

Bidders are advised that in evaluating Criterion R2, proponents will be rated on the appropriateness/logic of the proposed approach, methodology and identification and mitigation of risks relating to the separate tasks. Bidders are not expected and should not completely reiterate or delineate the Terms of Reference (TOR). Rather, bidders are expected to present their overall understanding of the work required and demonstrate their understanding of the specific issues and risks associated with each task.

Criterion R3 - Corporate Capabilities

Bidders are advised that in the event that references cannot be contacted, an alternative reference must be provided, no points will be awarded to any personnel qualification category for which that reference was used for corroboration. Personal qualifications claimed which cannot be verified through the background information or reference checks will not be considered for the purpose of this evaluation.

Criterion R4 - Project Management

In this section, details should be provided regarding the qualifications, relevant experience and expertise of the proposed personnel. The experience of the proposed resource must be clearly identified by providing a summary/description of the previous projects worked on and indicating when the work was carried out, the dollar value and the client.

Bidders are advised that only listing experience without providing any supporting data to describe responsibilities, duties and relevance to the requirements will not be considered "demonstrated" for the purpose of this evaluation. The bidder should provide complete details as to where, when (month and year) and how (through which activities/responsibilities) the stated qualifications/experience were obtained. Experience gained during formal education shall not be considered work experience. All requirements for work experience shall be obtained in a legitimate work environment as opposed to an educational setting. Co-op terms are considered work experience provided they are related to the required services.

Bidders are also advised that the month(s) of experience listed for a project, whose timeframe overlaps that of another referenced projects, will only be counted once. For example: Project 1 timeframe is July 2015 to December 2015; project 2 timeframe is October 2015 to January 2016; the total months of experience for these two project references are seven (7) months.

22.0 Cost Proposal (Compliant Bids Only)

It is understood by the parties submitting proposals that only those proposals meeting all the mandatory requirements and achieving an overall minimum score of 75% or better in the rated requirements will have their cost proposal considered and evaluated.

The compliant proposal with the lowest bid for Team resources will be assigned 20 points. Other compliant firms' bids will then be assigned on a pro rata basis using the formula below.

$$\text{Points Awarded} = \frac{\text{Lowest bid for Team Resources}}{\text{Other Firms' Bid for Team Resources Points}} \times 20 + \text{Technical Proposal}$$

The cost will be evaluated using the Estimated Hours per year and the quoted hourly rates.

This total cost score will be added to the Technical Score received to determine the successful proponent.

TABLE 1 –TECHNICAL/MANAGERIAL RATED REQUIREMENTS- 100 POINTS

Rated Criteria	Max	Rating/Points		Evaluation Factors
<p>R1. Comprehension of the Scope of Work and Clarity of the Proposal</p> <p>A maximum of four (8 1/2" x 11") pages are to be submitted for this criteria, excluding the one page work plan.</p> <p>If more than four pages are provided, only the first four pages will be evaluated.</p>	20 points	Points will be allocated as follows:		<p>Information to be supplied for R1.</p> <ul style="list-style-type: none"> • The Bidder should provide a brief narrative demonstrating that the proponent understands the work required in the Terms of Reference and the way the services are to be delivered. Assessment will be made on the thoroughness of the firm’s understanding and the suitability of the services offered by the firm to meet the scope of work. Clarity of the proposal will be assessed through an evaluation of the conciseness and completeness of the proposal. • The Bidder should provide a brief narrative demonstrating comprehension of the current containment approach, Risk Management Plan (RMP), and the on-going risk management measures. • The Bidder should provide a brief narrative of the roles of key groups (PSPC, TC, and Contractor). • The Bidder should provide a detailed list of services and a description of the services
		20 points	The proposal demonstrates an excellent understanding of the work required, current state of the facility, current remedial approach, risk management plan, list of services, and work scheduling. Response provided is very clear, concise and complete.	
		15 points	The proposal demonstrates a very good understanding of the work required, current state of the facility, current remedial approach, risk management plan, list of services, and work scheduling. Response provided is clear, concise and complete.	
		10 points	The proposal demonstrates a	

			satisfactory understanding of the work required, current state of the facility, current remedial approach, risk management plan, list of services, and work scheduling. Response provided is moderately clear, concise and complete.	<p>(deliverables) to be provided as indicated in the TOR.</p> <ul style="list-style-type: none"> The Bidder should provide a one page (11" x 17") work plan (i.e. GANTT, Microsoft Project) to evaluate the Contractor's understanding of the various tasks/activities, schedule (duration of tasks/activities), start and end dates, deliverables, and milestones as indicated in the Terms of Reference. The firm is to include the total number of hours of work for each worker within their work plan.
		5 points	The proposal demonstrates little understanding of the work required, current state of the facility, current remedial approach, risk management plan, list of services, and work scheduling. Response provided is not clear, concise and complete.	
		0 points	The proposal demonstrates a lack of understanding of the work required, current state of the facility, current remedial approach, risk management plan, list of services, and work scheduling. Response provided is poor, not clear, concise and complete.	
R2. Firm Approach and Service Delivery	25 points	Points will be allocated as follows:		Information to be supplied for R2.

<p>Methodology</p> <p>A maximum of four (8 1/2" x 11") pages are to be submitted for this criteria.</p> <p>If more than four pages are provided, only the first four pages will be evaluated.</p>		25 points	The proposal demonstrates a superior approach and methodology.	<ul style="list-style-type: none"> • The Bidder should provide a brief narrative of the firm's management and organization structure. How the team will be organized and how the team fits in the context of the existing structure of the firm. • The Bidder should provide a brief description of the firm's approach and methodology to meet the requirements in the TOR including: <ul style="list-style-type: none"> ✓ A brief narrative to describe how the firm will undertake the work and the approach to deal with anticipated problems as well as tasks in order to provide the required services; ✓ A brief narrative of the potential risks involved in meeting the objectives and how those risks will be mitigated; ✓ A brief narrative of the quality control of the delivery of services.
		20 points	The proposal demonstrates a very good approach and methodology.	
		15 points	The proposal demonstrates a good approach and methodology	
		10 points	The proposal demonstrates a satisfactory approach and methodology.	
		5 points	The proposal demonstrates a poor approach and methodology.	
		0 points	The proposal demonstrates a lack of approach or methodology.	
R3. Corporate Capabilities	(25 points)	Points will be allocated as follows:		Information to be supplied for R3.
	10 points	10 points	Sample projects directly related	<ul style="list-style-type: none"> • The Bidder should provide a brief

<p>1. Past Performance</p> <p>A maximum of one side of an 8 1/2" x 11" page per project - two sides if photographs or illustrations are used. If more than one written page per project is provided, only the first page will be considered.</p> <p>TC reserves the right to contact references to confirm the Contractor's past project performance with respect to the quality of workmanship, similar operational and overall management of project and performance.</p> <p>The Contractor must ensure that all references provided are currently available and can be contacted.</p>			to the requirements.	<p>description of significant and comparable projects (maximum of three) related to containment of groundwater contamination with VOCs completed over the last five to eight years by the firm. If more than 3 projects are provided, only the first 3 projects will be considered. Include the names of senior personnel and project personnel who were involved as a member of the project teams and their project role, as well as the scope, budget, date and cost of completion of the selected projects.</p> <ul style="list-style-type: none"> • The Bidder should provide a brief summary of the services provided for these projects; and • The Bidder should provide the name, address and telephone number of client contacts at the working level for reference purposes for each project.
		5 points	Sample projects generally related to the requirements.	
<p>2. Firm Experience</p> <p>A maximum of six (8 1/2" x 11") pages are to be submitted for this criteria, excluding the one page work plan.</p>	15 points	0 points	Sample projects not related to the requirements.	<ul style="list-style-type: none"> • The Bidder should demonstrate that the firm and project team have the requisite experience in operating and conducting modifications to groundwater treatment systems (fixed and/or mobile) for containment of groundwater contamination with volatile organics or, for mobile systems,
		15 points	Strong firm/team - highly knowledgeable and experienced - has worked successfully together on comparable projects.	

If more than six pages are provided, only the first six pages will be evaluated.			
	10 points	Firm/team has acceptable level of knowledge and experience and will likely meet requirements.	<p>demonstrate experience with the resolution of technical obstacles associated with long term operation.</p> <ul style="list-style-type: none"> • Pilot and/or bench scale studies/systems for VOCs, mobile drinking water disinfection/ purification systems, and landfill leachate systems are not considered groundwater remediation systems and do not meet the demonstrated <u>previous</u> experience requirement. • The Bidder should demonstrate that the firm and project team have the requisite experience in conducting surface water and groundwater monitoring, operating an analytical laboratory including sampling and analysis using gas chromatography techniques for VOCs and provide documented evidence of reproducible results from an external laboratory. • The Bidder should demonstrate that the firm and project team have the requisite knowledge of and experience in: <ul style="list-style-type: none"> ➢ analytical chemistry and hydrogeology; ➢ determining contaminant plume migration; ➢ determining design requirements respecting groundwater extraction rates and related specifications for groundwater treatment systems;
	5 points	Firm/team does not have an acceptable level of knowledge and overall experience is weak.	
	0 points	Firm/team is not likely to be able to meet the knowledge and experience requirements.	

			<ul style="list-style-type: none"> ➤ determining groundwater plume flow direction and plume stability; ➤ well and plume capture zone analysis; ➤ subsurface characterization techniques; ➤ groundwater contaminant fate and transport mechanisms; and ➤ natural attenuation indicators and contaminant trend evaluations (i.e. rebound monitoring). 	
<p>R4. Project Management (Project Manager, Senior Scientist, Hydrogeologist and Plant Operators Expertise and Experience)</p> <p>A maximum of eighteen (8 1/2" x 11") pages are to be submitted for this criteria.</p> <p>If more than 18 pages are provided, only the first 18 pages will be evaluated.</p> <p>The plant operators' qualifications such as proof of education, training in OSH, first aid, WHMIS and a valid driver's license are in addition to the 18 pages.</p>	30 points	Points will be allocated as follows	<p>Information to be supplied for R4.</p> <ul style="list-style-type: none"> • The Bidder should demonstrate that it has a project manager, senior scientist, hydrogeologist and plant operators with the capability, capacity and expertise for each of the mandatory qualifications listed in Section 19.0 of the TOR. • The Bidder should provide a curriculum vitae (c.v.'s) for each project personnel. These c.v.'s must clearly indicate the years of experience that each of the project personnel has in the provision of the Mandatory Qualifications specified in the Terms of Reference; • The Bidder should identify the project personnel's years of experience, the number of years with the firm and their respective responsibilities, if any, for those 	
		30 points		Information provided demonstrates project personnel highly qualified and experienced.
		25 points		Information provided demonstrates project personnel are very qualified and experienced.
		20 points		Information provided demonstrates project personnel are qualified and experienced.
		15 points		Information provided demonstrates project personnel have an acceptable level of qualifications and experience.
		10 points		Information provided demonstrates project personnel have little qualifications and experience.
5 points	Information provided			

			demonstrates project personnel do not possess qualifications and experience.	3 past projects listed in the Corporate Capabilities section.
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TABLE 2 –PROFESSIONAL SERVICES AND COSTS

It is acceptable to recreate the cost table so that it fits on the page correctly. However, no changes are to be made to the table format.

1. SITE MONITORING

Hourly rates must be stated in Canadian funds, and must not include taxes (i.e. GST/HST).

2021-22				
<u>Activity</u>	<u>Task</u>	<u>Category of Labour</u>	<u>Estimated Number of Hours</u>	<u>Hourly Rate</u>
Spring (May/June) Monitoring	<u>Task 1</u> Target, Trend and Performance Monitoring	<u>Project Manager</u>		
		<u>Senior Scientist</u>		
		<u>Hydrogeologist</u>		
		<u>Plant Operator 1</u>		
		Total Hours of Sampling (includes taking water levels and field measurements)		
		Total Hours of Laboratory Analysis		
		<u>Plant Operator 2</u>		
		Total Hours of Sampling (includes taking water levels and field measurements)		
		Total Hours of Laboratory Analysis		

	<u>Total Task 1 (Spring)</u>							
<u>Activity</u>	<u>Task</u>	<u>Category of Labour</u>	<u>Estimated Number of Hours</u>	<u>Hourly Rate</u>				
Fall Monitoring (September/October)	<u>Task 1</u> Target, Trend and Performance Monitoring	<u>Project Manager</u> <u>Senior Scientist</u> <u>Hydrogeologist</u> <u>Plant Operator 1</u> <table border="1"> <tr> <td>Total Hours of Sampling (includes taking water levels and field measurements)</td> </tr> <tr> <td>Total Hours of Laboratory Analysis</td> </tr> </table> <u>Plant Operator 2</u> <table border="1"> <tr> <td>Total Hours of Sampling (includes taking water levels and field measurements)</td> </tr> <tr> <td>Total Hours of Laboratory Analysis</td> </tr> </table>	Total Hours of Sampling (includes taking water levels and field measurements)	Total Hours of Laboratory Analysis	Total Hours of Sampling (includes taking water levels and field measurements)	Total Hours of Laboratory Analysis		
Total Hours of Sampling (includes taking water levels and field measurements)								
Total Hours of Laboratory Analysis								
Total Hours of Sampling (includes taking water levels and field measurements)								
Total Hours of Laboratory Analysis								
	<u>Total Task 1 (Fall)</u>							
<u>Activity</u>	<u>Task</u>	<u>Category of Labour</u>	<u>Estimated Number of Hours</u>	<u>Hourly Rate</u>				
<u>Other Tasks</u>	<u>Task 2</u>	<u>Project Manager</u>						

	See section 6.1.2 in Terms of Reference	<u>Senior Scientist</u> <u>Hydrogeologist</u> <u>Plant Operator 1</u> <u>Plant Operator 2</u>		
	<u>Total Task 2</u>			
Decommission Wells (Optional)	<u>Task 3</u>	<u>Project Manager</u> <u>Senior Scientist</u> <u>Hydrogeologist</u> <u>Plant Operator 1</u> <u>Plant Operator 2</u>		
	<u>Total Task 3</u>			
<u>Activity</u>	<u>Task</u>	<u>Category of Labour</u>	<u>Estimated Number of Hours</u>	<u>Hourly Rate</u>
Other Monitoring (April to December)	<u>Task 4</u> Groundwater Sampling and Analysis for 112 of the 350 wells	<u>Project Manager</u> <u>Senior Scientist</u> <u>Hydrogeologist</u> <u>Plant Operator 1</u>		
		Total Hours of Sampling (includes		

		taking water levels and field measurements Total Hours of Laboratory Analysis Plant Operator 2 Total Hours of Sampling (includes taking water levels and field measurements Total Hours of Laboratory Analysis		
	Total Task 4			
Activity	Task	Category of Labour	Estimated Number of Hours	Hourly Rate
Update Risk Management Plan (Optional)	Task 5	Project Manager Senior Scientist Hydrogeologist Plant Operator 1 Plant Operator 2		
	Total Task 5			

Option Years 1 (2022) to 10 (2031)													
Activity	Task	Category of Labour	Estimated Number of Hours	Hourly Rate Option Year 1 2022	Hourly Rate Option Year 2 2023	Hourly Rate Option Year 3 2024	Hourly Rate Option Year 4 2025	Hourly Rate Option Year 5 2026	Hourly Rate Option Year 6 2027	Hourly Rate Option Year 7 2028	Hourly Rate Option Year 8 2029	Hourly Rate Option Year 9 2030	Hourly Rate Option Year 10 2031
Spring Monitoring (May/June)	Task 1 Target, Trend and Performance Monitoring	<u>Project Manager</u>											
		<u>Senior Scientist</u>											
		<u>Hydrogeologist</u>											
		<u>Plant Operator 1</u>											
		Total Hours of Sampling (includes taking water levels, and field measurements)											
		Total Hours of Laboratory Analysis											
		<u>Plant Operator 2</u>											
	<u>Total Task 1 (Spring)</u>												
Fall Monitoring (September/October)	Task 1 Target, Trend and Performance Monitoring	<u>Project Manager</u>											
		<u>Senior Scientist</u>											
		<u>Hydrogeologist</u>											
		<u>Plant Operator 1</u>											
		Total Hours of Sampling (includes taking water levels and field measurements.											
		Total Hours of Laboratory Analysis											
		<u>Plant Operator 2</u>											

		Total Hours of Sampling (includes taking water levels and field measurements.)												
		Total Hours of Laboratory Analysis												
	Total Task 1 (Fall)													
Option Years 1 (2022) to 10 (2031)														
Activity	Task	Category of Labour	Estimated Number of Hours	Hourly Rate Option Year 1 2022	Hourly Rate Option Year 2 2023	Hourly Rate Option Year 3 2024	Hourly Rate Option Year 4 2025	Hourly Rate Option Year 5 2026	Hourly Rate Option Year 6 2027	Hourly Rate Option Year 7 2028	Hourly Rate Option Year 8 2029	Hourly Rate Option Year 9 2030	Hourly Rate Option Year 10 2031	
Other Tasks	Task 2 See section 6.1.2 in Terms of Reference	Project Manager Senior Scientist Hydrogeologist Plant Operator 1 Plant Operator 2												
	Total Task 2													
Decommission Wells (Optional)	Task 3	Project Manager Senior Scientist Hydrogeologist Plant Operator 1 Plant Operator 2												
	Total Task 3													

Other Monitoring (April –December)	Task 4 Groundwater Sampling and Analysis for 112 of the 350 wells	<u>Project Manager</u>											
		<u>Senior Scientist</u>											
		<u>Hydrogeologist</u>											
		<u>Plant Operator 1</u>											
		Total Hours of Sampling (includes taking water levels and field measurements.											
		Total Hours of Laboratory Analysis											
		<u>Plant Operator 2</u>											
		Total Hours of Sampling (includes taking water levels and field measurements.											
		Total Hours of Laboratory Analysis											
	Total Task 4												
Update Risk Management Plan (Optional)	Task 5	<u>Project Manager</u>											
		<u>Senior Scientist</u>											
		<u>Hydrogeologist</u>											
		<u>Plant Operator 1</u>											
		<u>Plant Operator 2</u>											
	Total Task 5												

TRAVEL COSTS													
Activity	Category of Labour	Unit Price	Year 2021-22	Option Year 1 2022	Option Year 2 2023	Option Year 3 2024	Option Year 4 2025	Option Year 5 2026	Option Year 6 2027	Option Year 7 2028	Option Year 8 2029	Option Year 9 2030	Option Year 10 2031
Travel (to attend one client meeting)	travel time, travel fare, for project manager												
	travel time, travel fare, for hydrogeologist or senior scientist												

2. PARTIAL AND FULL OPERATION

If operation of the facility (containment mode only) is required, Transport Canada reserves the right to implement either Option 1 or Option 2. Transport Canada does not guarantee a minimum or maximum number of hours for the following activities. The estimated hours below are provided for bidding purposes only. Costs for professional services will only be reimbursed for actual work hours incurred at the hourly rate.

Hourly rates must be stated in Canadian funds, and must not include taxes (i.e. GST/HST).

Activity	Category of Labour	Estimated Number of Hours	Hourly Rate Year 1 (2021)	Hourly Rate Option Year 1 (2022)	Hourly Rate Option Year 2 (2023)	Hourly Rate Option Year 3 (2024)	Hourly Rate Option Year 4 (2025)	Hourly Rate Option Year 5 (2026)	Hourly Rate Option Year 6 (2027)	Hourly Rate Option Year 7 (2028)	Hourly Rate Option Year 8 (2029)	Hourly Rate Option Year 9 (2030)	Hourly Rate Option Year 10 (2031)
Option 1- Full Operation	Project Manager	250											
	Hydrogeologist	200											
	Plant Operator 1	650 hours											
	Plant Operator 2	650 hours											
Total Option 1													
Option 2 – Partial Operation	Project Manager	187											
	Hydrogeologist	150											
	Plant Operator 1	488 hours											
	Plant Operator 2	488 hours											
Total Option 2													

Note: Option Years that the department may exercise are at its own discretion.

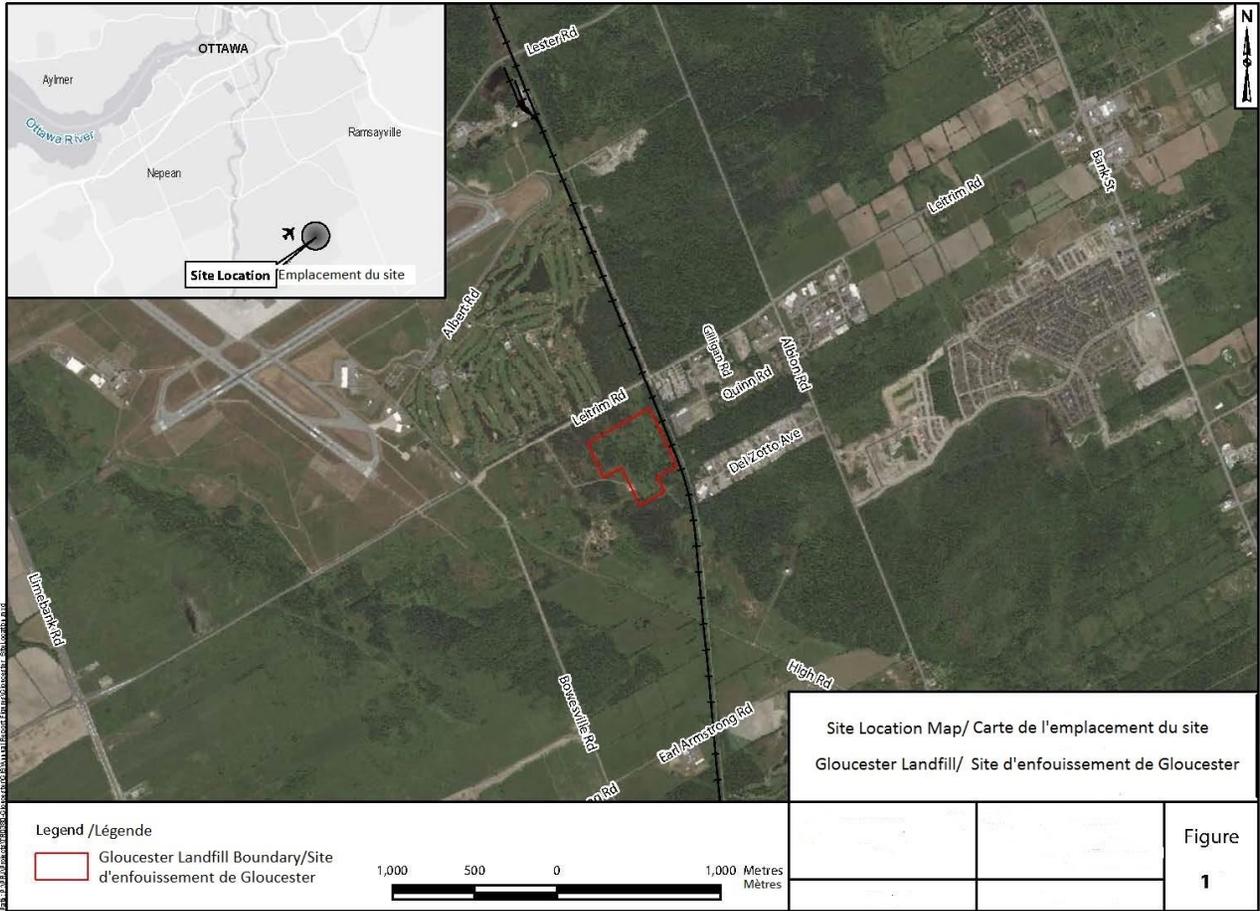


Figure 2	Figure 2
Distribution du chloroéthène Emplacements des puits peu profonds	Distribution of Vinyl Chloride Shallow Well Locations
Ancienne voie ferrée du Canadien Pacifique	Former Canadian Pacific Rail Line
Site d'enfouissement de Gloucester	Gloucester Landfill Boundary
INSTALLATION POUR LES DÉCHETS SPÉCIAUX	Special Waste Compound
Aire de stationnement incitatif	Park and Ride Area
Passage à niveau du CP au chemin Leitrim	Leitrim CP Rail Crossing
Zone de puits d'extraction peu profond	Shallow Extraction Well Area
RUE LEITRIM	Leitrim Road
RUE QUINN	Quinn Road
RUE ALBION	Albion Road
Légende	Legend
Teneur	Concentration
Échantillons d'avril à août 2019	Samples from April to August 2019
Échantillons de sept. à nov. 2019	Samples from Sept to Nov. 2019
Observations : Les symboles représentent la teneur maximale à chaque emplacement. Critères de qualité environnementale fondés sur le risque (QEFR): 2ug/L	Notes : Symbols represent the maximum concentration at each location. Risk-based environmental quality criteria (RBEQ) criterion: 2u/g/L
septembre 2020	September 2020
Transports Canada	Transport Canada

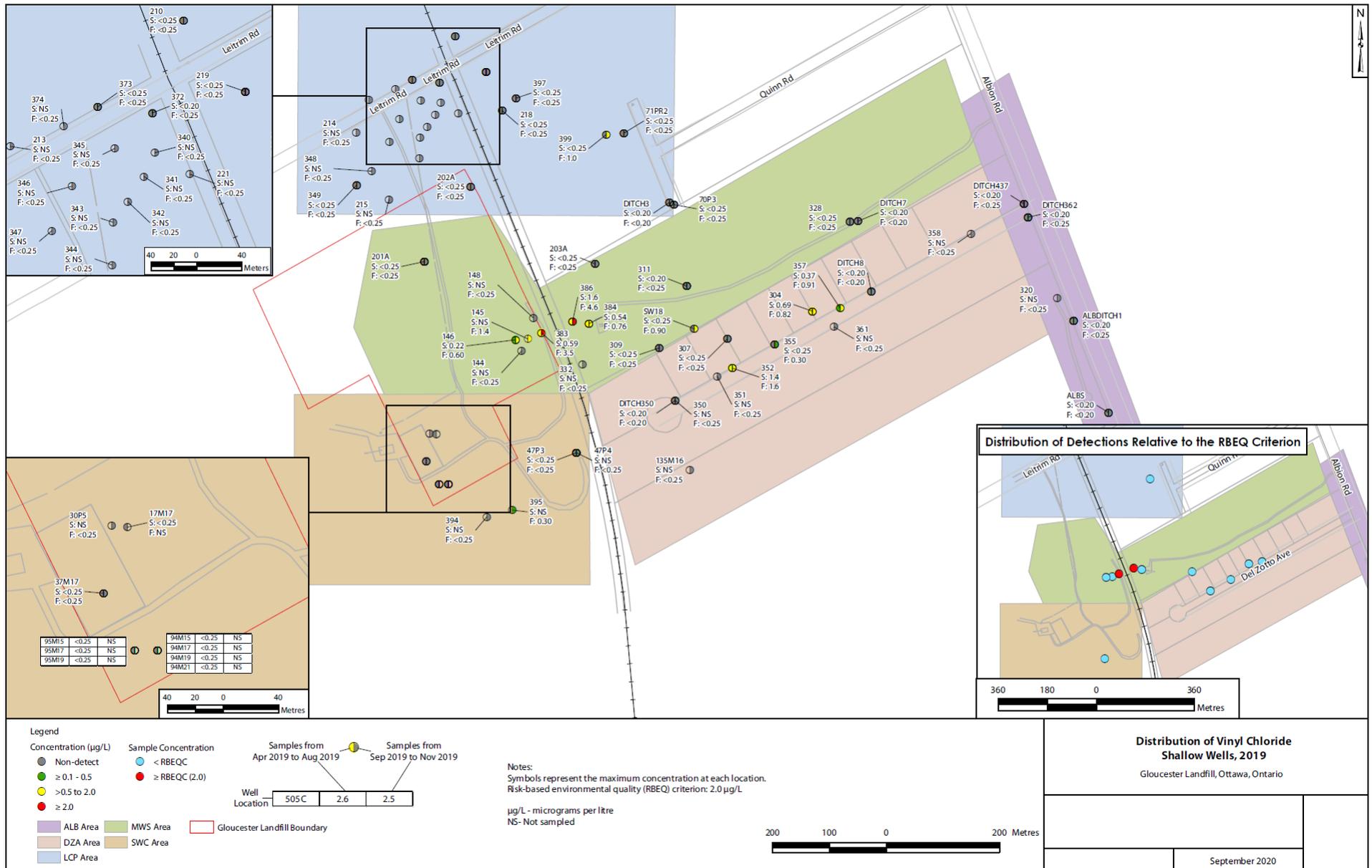
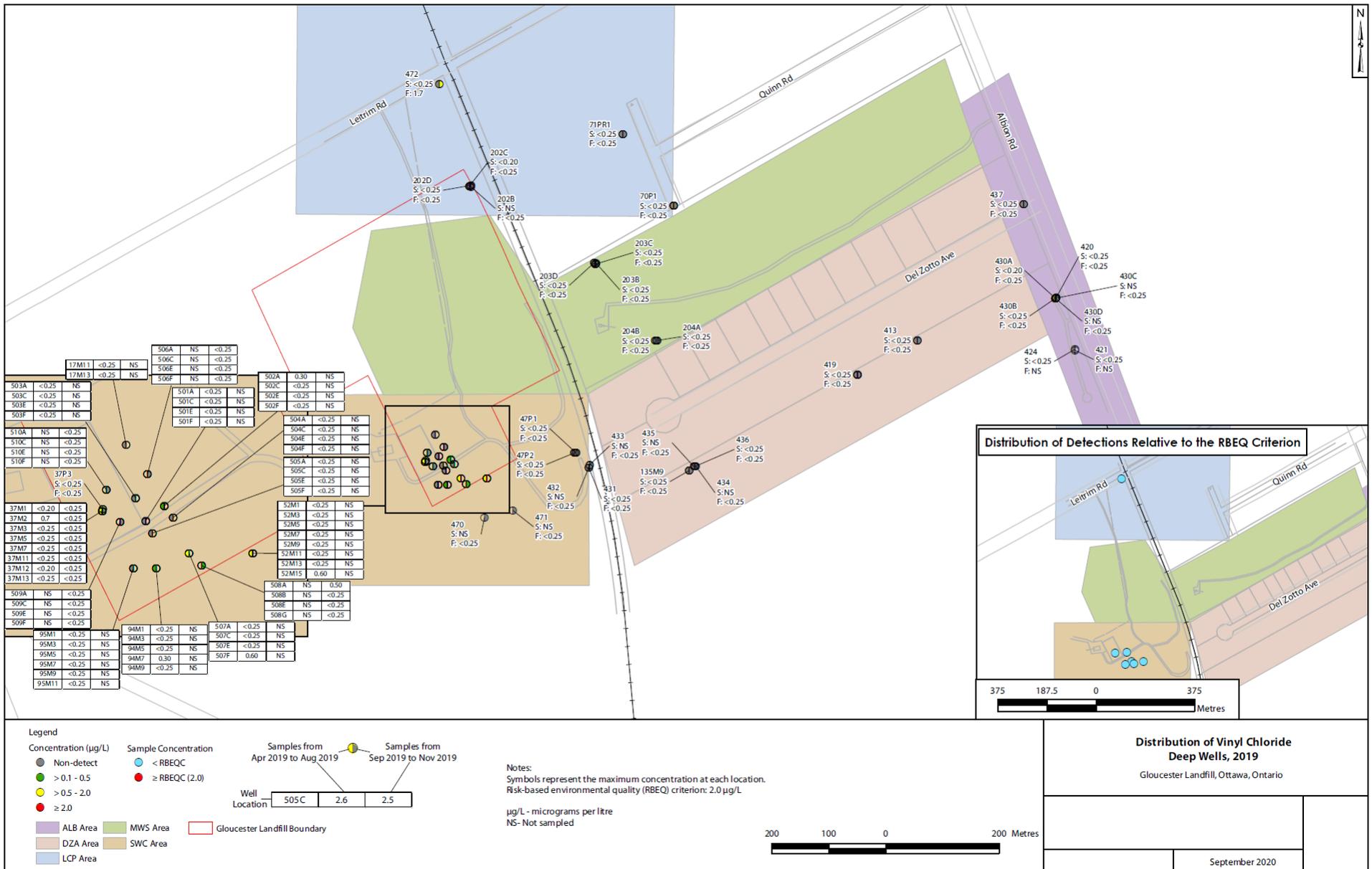


Figure 3	Figure 3
Emplacements des puits profonds Distribution du chloroéthène	Deep Well Locations Distribution of Vinyl Chloride
Ancienne voie ferrée du Canadien Pacifique	Former Canadian Pacific Rail Line
Site d'enfouissement de Gloucester	Gloucester Landfill Boundary
INSTALLATION POUR LES DÉCHETS SPÉCIAUX	Special Waste Compound
Aire de stationnement incitatif	Park and Ride Area
Passage à niveau du CP au chemin Leitrim	Leitrim CP Rail Crossing
Zone de puits d'extraction profond	Deep Extraction Well Area
RUE LEITRIM	Leitrim Road
RUE QUINN	Quinn Road
RUE ALBION	Albion Road
Légende	Legend
Teneur	Concentration
Échantillons d' avril à août 2019	Samples from April to August 2019
Échantillons de sept. à nov. 2019	Samples from Sept to Nov. 2019
Observations : Les symboles représentent la teneur maximale à chaque emplacement. Critères de qualité environnementale fondés sur le risque (QEFR): 2ug/L	Notes : Symbols represent the maximum concentration at each location. Risk-based environmental quality criteria (RBEQ) criterion: 2u/g/L
septembre 2020	September 2020
Transports Canada	Transport Canada



Appendix A-2019-20 Sampling Schedule

Well Type	Area	Well Name	Category	Well Level	Groundwater Elevation		Analytical									Comment
					Spring	Fall	Spring			Summer			Fall			
							Date	Lab	FP	Date	Lab	FP	Date	Lab	FP	
Shallow Target Wells	MWS	328	Monitoring	S	x	x	22-Jun-19	G	x				20-Sep-19	G	x	
	LCP	210	Monitoring	S	x	x	21-Jun-19	G	x				24-Oct-19	G		
	LCP	218	Monitoring	S	NS	x	18-Jun-19	G	x				19-Nov-19	G	x	
	LCP	219	Monitoring	S	x	x	18-Jun-19 18-Jun-19	B G	 x				18-Nov-19 18-Nov-19	B G	 x	
	LCP	399	Monitoring	S	x	x	16-Jun-19	G	x				20-Nov-19	G	x	See Note (1)
	LCP	70P3	Monitoring	S	x	x	16-Jun-19 16-Jun-19	G G	 x				20-Oct-19 20-Oct-19	G G	 x	
	LCP	71PR2	Monitoring	S	x	x	16-Jun-19	G	x				20-Nov-19	G	x	See Note (1)
	DZA	357	Monitoring	S	x	x	19-Jun-19 19-Jun-19	B G	 x				20-Oct-19 20-Oct-19	B G	 x	
DZA	135M16	ML	S			31-May-19	G					11-Nov-19	G			
Deep Target Wells	LCP	472	Monitoring	D	x	x	21-Jun-19	G	x				20-Nov-19	G	x	
	LCP	70P1	Monitoring	D	x	x	16-Jun-19 16-Jun-19	B G	 x				20-Oct-19 20-Oct-19	B G	 x	
	LCP	71PR1	Monitoring	D	x	x	16-Jun-19	G	x				28-Nov-19	G	x	See Note (1)
	DZA	413	Monitoring	D			18-Jun-19	G					24-Oct-19	G		
	DZA	419	BR	D			18-Jun-19 18-Jun-19	B G	 				24-Oct-19 24-Oct-19	B G	 	
	DZA	434	BR	D			31-May-19	G	x				11-Nov-19	G	x	
	DZA	435	BR	D			31-May-19	G	x				11-Nov-19	G	x	
	DZA	436	BR	D			28-Jun-19	G	x				11-Nov-19	G	x	
	DZA	135M9	ML	D			28-Jun-19	G					11-Nov-19	G		
	ALB	420	Monitoring	D	x	x	20-Jun-19	G	x				19-Sep-19	G	x	
	ALB	421	Monitoring	D	x	x	20-Jun-19	G	x				NS			See Note (2)
	ALB	424	BR	D	x	x	20-Jun-19	G	x				NS			See Notes (2) and (7)
	ALB	437	Monitoring	D	x	x	16-Jun-19	G	x				20-Oct-19	G	x	
	ALB	430A	BR	D			31-May-19 31-May-19	B G	 x				19-Sep-19	G	x	
ALB	430B	BR	D			20-Jun-19	G	x				19-Sep-19	G	x		
ALB	430C	BR	D			31-May-19	G	x				19-Sep-19	G	x		
ALB	430D	BR	D			31-May-19	G	x				19-Sep-19	G	x		
Target Ditches	MWS	DITCH7	Ditch	SL			02-Jun-19	B					24-Oct-19	B		
	LCP	DITCH3	Ditch	SL			02-Jun-19	B					24-Oct-19	B		
	DZA	DITCH350	Ditch	SL			02-Jun-19	B					24-Oct-19	B		
	DZA	DITCH8	Ditch	SL			02-Jun-19	B					24-Oct-19	B		
	ALB	ALBDITCH1	Ditch	SL			02-Jun-19	B					24-Oct-19 24-Oct-19	B G		
	ALB	ALBS	Ditch	SL			02-Jun-19	B					24-Oct-19	B		
	ALB	DITCH362	Ditch	SL			02-Jun-19	B					24-Oct-19 24-Oct-19	B G		
	ALB	DITCH437	Ditch	SL			02-Jun-19	B					24-Oct-19 24-Oct-19	B G		

Well Type	Area	Well Name	Category	Well Level	Groundwater Elevation		Analytical									Comment
					Spring	Fall	Spring			Summer			Fall			
							Date	Lab	FP	Date	Lab	FP	Date	Lab	FP	
Shallow Trend Wells	SWC	37M17	ML	S			19-Jun-19	G					12-Nov-19	G		
	MWS	309	Monitoring	S	x	x	19-Jun-19	G					12-Nov-19	G		
	MWS	383	Monitoring	S	x	x	29-Jun-19	G	x				25-Oct-19	G	x	
	MWS	386	Monitoring	S	x	x	21-Jun-19	B	x				20-Oct-19	B		
							21-Jun-19	G				20-Oct-19	G	x		
	MWS	203A	Monitoring	S	x	x	1-Jun-19	B					20-Oct-19	B		
							1-Jun-19	G	x			20-Oct-19	G	x		
	LCP	317	Monitoring	S	x	x	1-Jun-19	G					20-Oct-19	G		
	LCP	344	Monitoring	S	x	x	29-Jun-19	G					25-Oct-19	G		
	LCP	349	Monitoring	S	x	x	NS						NS			See Note (8)
	LCP	372	Monitoring	S	x	x	01-Jun-19	G	x				20-Sep-19	G	x	
	LCP	373	Monitoring	S	x	x	17-Jun-19	G	x				20-Sep-19	G	x	
	LCP	397	Monitoring	S	NS	x	1-Jun-19	B					20-Nov-19	G		
	LCP	202A	Monitoring	S	x	x	1-Jun-19	G	x				24-Oct-19	G		
DZA	304	Monitoring	S	x	x	21-Jun-19	G	x				19-Nov-19	G	x		
DZA	307	Monitoring	S	x	x	18-Jun-19	G	x				21-Sep-19	G	x		
DZA	355	Monitoring	S	NS	NS	19-Jun-19	B					18-Nov-19	B		See Notes (7) and (10)	
SWC	47P3	Monitoring	S	x	x	19-Jun-19	G	x				18-Nov-19	G	x	See Notes (7) and (10)	
						28-Jun-19	G	x			18-Nov-19	G	x	See Notes (7) and (10)		
Deep Trend Wells	SWC	431	BR	D			28-Jun-19	G	x				19-Nov-19	G	x	See Note (6)
	SWC	432	BR	D			28-Jun-19	G	x				19-Nov-19	G	x	See Note (6)
	SWC	433	BR	D			28-Jun-19	G	x				19-Nov-19	G	x	See Note (6)
	SWC	37M1	ML	D			17-Jun-19	B					26-Oct-19	B		See Note (3)
							17-Jun-19	G	x			26-Oct-19	G	x	See Note (3)	
	SWC	37M2	ML	D			22-Jun-19	G	x				20-Sep-19	G	x	
	SWC	37M3	ML	D			30-May-19	G	x				20-Sep-19	G	x	
	SWC	37M5	ML	D			30-May-19	G	x				20-Sep-19	G	x	
	SWC	37M7	ML	D			4-Jun-19	B					12-Nov-19	B		
	SWC	37M11	ML	D			4-Jun-19	G					12-Nov-19	G		
	SWC	37M12	ML	D			4-Jun-19	G					12-Nov-19	G		
	SWC	37M13	ML	D			4-Jun-19	G					12-Nov-19	G		
	SWC	37P3	BR	D			19-Jun-19	G					12-Nov-19	G		
	MWS	203B	Monitoring	D			21-Jun-19	G	x				25-Oct-19	G	x	
MWS	203C	Monitoring	D			29-Jun-19	G					25-Oct-19	G			
						19-Jun-19	B				25-Oct-19	B				
MWS	203D	Monitoring	D	x	x	21-Jun-19	G					25-Oct-19	G			

Well Type	Area	Well Name	Category	Well Level	Groundwater Elevation		Analytical									Comment
							Spring			Summer			Fall			
					Spring	Fall	Date	Lab	FP	Date	Lab	FP	Date	Lab	FP	
Deep Trend Wells (cont.)	MWS	204A	Monitoring	D			28-Jun-19	G	x				25-Oct-19	G	x	
	MWS	204B	Monitoring	D	x	x	28-Jun-19	G	x				25-Oct-19	G	x	
	LCP	202B	Monitoring	D			30-May-19	G	x				21-Sep-19	G	x	
	LCP	202C	Monitoring	D			30-May-19	B					25-Oct-19	B		
	LCP	202D	Monitoring	D	x	x	30-May-19	G	x				25-Oct-19	G	x	
	LCP	202D	Monitoring	D	x	x	22-Jun-19	G	x				21-Sep-19	G	x	
	SWC	47P1	Monitoring	D	x	x	17-Jun-19	G	x				26-Oct-19	G	x	See Note (3)
SWC	47P2	Monitoring	D			17-Jun-19	G	x				26-Oct-19	G	x	See Note (3)	
Performance Wells	MWS	146	Monitoring	S	x	x	18-Jun-19	B	x				26-Oct-19	B	x	
	MWS	311	Monitoring	S	x	x	18-Jun-19	G					26-Oct-19	G		
	MWS	311	Monitoring	S	x	x	1-Jun-19	B					25-Oct-19	B		
	MWS	311	Monitoring	S	x	x	1-Jun-19	G	x				25-Oct-19	G	x	
	MWS	384	Monitoring	S	x	x	1-Jun-19	B					24-Oct-19	B		
	MWS	384	Monitoring	S	x	x	1-Jun-19	G	x				24-Oct-19	G	x	
MWS	201A	Monitoring	S	x	x	1-Jun-19	G					24-Oct-19	G			
MWS	201A	Monitoring	S	x	x	18-Jun-19	B	x				26-Oct-19	B	x	See Note (4)	
MWS	201A	Monitoring	S	x	x	18-Jun-19	G					26-Oct-19	G			
MWS	SW18	Extraction	S			21-Jun-19	B					24-Oct-19	B			
MWS	SW18	Extraction	S			21-Jun-19	G	x				24-Oct-19	G	x		
MWS	SW18	Extraction	S			21-Jun-19	G					24-Oct-19	G			
DZA	352	Monitoring	S	x	x	19-Jun-19	B					18-Nov-19	B			
DZA	352	Monitoring	S	x	x	19-Jun-19	G	x				18-Nov-19	G	x		
DZA	352	Monitoring	S	x	x	19-Jun-19	G					18-Nov-19	G			
Other Wells	SWC	394	Monitoring	S	x	x					15-Sep-19	G	x			
	SWC	395	Monitoring	S	x	x					15-Sep-19	G	x			
	SWC	470	Monitoring	D	x	x					15-Sep-19	G	x			
	SWC	471	Monitoring	D	x	x					15-Sep-19	G	x			
	SWC	124P	Monitoring	D	x	x										
	SWC	128P	Monitoring	D	x	x										See Note (7)
	SWC	14P1	Monitoring	D	x	x										See Note (13)
	SWC	30P2	Monitoring	D	x	x										
	SWC	30P5	Monitoring	S							19-Sep-19	G				
	SWC	30P5	Monitoring	S							19-Sep-19	G	x			
	SWC	30P6	Monitoring	S	x	x										
	SWC	32P2	Monitoring	D	x	x										
	SWC	32P6	Monitoring	S	x	x										
	SWC	33P2	Monitoring	D	x	x										
	SWC	33P4	Monitoring	S	x	x										
SWC	34P2	Monitoring	D	x	x											
SWC	34P7	Monitoring	S	x	x											
SWC	40P1	Monitoring	D	x	x											
SWC	40P3	Monitoring	S	x	x											

Well Type	Area	Well Name	Category	Well Level	Groundwater Elevation		Analytical									Comment
							Spring			Summer			Fall			
					Spring	Fall	Date	Lab	FP	Date	Lab	FP	Date	Lab	FP	
Other Wells (continued)	SWC	41P	Monitoring	D	x	x										
	SWC	45P1	Monitoring	D	x	x										
	SWC	46P1	Monitoring	D	x	x										
	SWC	46P3	Monitoring	S	x	x										
	SWC	47P4	Monitoring	S						26-Oct-19	G	x				
										26-Oct-19	G					
	SWC	48P1	Monitoring	D	x	x										
	SWC	49W	Monitoring	D	x	NS										
	SWC	4P1	Monitoring	D	x	NS										
	SWC	4P3	Monitoring	S	x	x										
	SWC	50W	Monitoring	D	NS	x										
	SWC	55P	Monitoring	D	x	x										
	SWC	60P	Monitoring	S	x	x										
	SWC	61P	Monitoring	D	x	x										
	SWC	77P1	Monitoring	D	x	x										
	SWC	77P2	Monitoring	S	x	x										
	SWC	17M1	ML	D												
	SWC	17M3	ML	D												
	SWC	17M5	ML	D												
	SWC	17M7	ML	D												
	SWC	17M9	ML	D												
	SWC	17M11	ML	D						14-Aug-19	G					
	SWC	17M13	ML	D						14-Aug-19	G					
	SWC	17M17	ML	S						14-Aug-19	G					
	MWS	18M1	ML	D												
	MWS	18M4	ML	D												
	MWS	18M6	ML	D												
	MWS	18M7	ML	D												
	MWS	18M10	ML	D												
	MWS	18M11	ML	D												
	MWS	18M15	ML	S												
	SWC	34M2	ML	D												
	SWC	34M4	ML	D												
	SWC	34M5	ML	D												
SWC	34M7	ML	D													
SWC	34M9	ML	D													
SWC	34M11	ML	D													
SWC	34M13	ML	D													
SWC	34M14	ML	S													
SWC	34M17	ML	S													
SWC	501A	ML	D						23-Jul-19	G						
SWC	501C	ML	D						23-Jul-19	G						
SWC	501E	ML	D						23-Jul-19	G						
SWC	501F	ML	D						23-Jul-19	G						

Well Type	Area	Well Name	Category	Well Level	Groundwater Elevation		Analytical									Comment
							Spring			Summer			Fall			
					Spring	Fall	Date	Lab	FP	Date	Lab	FP	Date	Lab	FP	
Other Wells (continued)	SWC	502A	ML	D						24-Jul-19	G					
	SWC	502C	ML	D						24-Jul-19	G					
	SWC	502E	ML	D						24-Jul-19	G					
	SWC	502F	ML	D						24-Jul-19	G					
	SWC	503A	ML	D						23-Aug-19	G					
	SWC	503C	ML	D						23-Aug-19	G					
	SWC	503E	ML	D						23-Aug-19	G					
	SWC	503F	ML	D						23-Aug-19	G					
	SWC	504A	ML	D						24-Aug-19	G					
	SWC	504C	ML	D						24-Aug-19	G					
	SWC	504E	ML	D						24-Aug-19	G					
	SWC	504F	ML	D						24-Aug-19	G					
	SWC	505A	ML	D						25-Jul-19	G					
	SWC	505C	ML	D						25-Jul-19	G					
	SWC	505E	ML	D						25-Jul-19	G					
	SWC	505F	ML	D						25-Jul-19	G					
	SWC	506A	ML	D						04-Sep-19	G					
	SWC	506C	ML	D						04-Sep-19	G					
	SWC	506E	ML	D						04-Sep-19	G					
	SWC	506F	ML	D						04-Sep-19	G					
	SWC	507A	ML	D						23-Aug-19	G					
	SWC	507C	ML	D						23-Aug-19	G					
	SWC	507E	ML	D						23-Aug-19	G					
	SWC	507F	ML	D						23-Aug-19	G					
	SWC	508A	ML	D						03-Sep-19	G					
	SWC	508B	ML	D						03-Sep-19	G					
	SWC	508E	ML	D						03-Sep-19	G					
	SWC	508G	ML	D						03-Sep-19	G					
	SWC	509A	ML	D						16-Sep-19	G	x				
	SWC	509C	ML	D						16-Sep-19	G	x				
	SWC	509E	ML	D						16-Sep-19	G	x				
	SWC	509F	ML	D						16-Sep-19	G	x				
SWC	510A	ML	D						16-Sep-19	G	x					
SWC	510C	ML	D						16-Sep-19	G	x					
SWC	510E	ML	D						16-Sep-19	G	x					
SWC	510F	ML	D						16-Sep-19	G	x					
SWC	52M1	ML	D						15-Aug-19	G						
SWC	52M3	ML	D						15-Aug-19	G						
SWC	52M5	ML	D						15-Aug-19	G						

Well Type	Area	Well Name	Category	Well Level	Groundwater Elevation		Analytical									Comment
					Spring	Fall	Spring			Summer			Fall			
							Date	Lab	FP	Date	Lab	FP	Date	Lab	FP	
Other Wells (continued)	SWC	52M7	ML	D						15-Aug-19	G					
	SWC	52M9	ML	D						15-Aug-19	G					
	SWC	52M11	ML	D						15-Aug-19	G					
	SWC	52M13	ML	D						15-Aug-19	G					
	SWC	52M15	ML	D						15-Aug-19	G					
	SWC	94M1	ML	D						11-Aug-19	G					
	SWC	94M3	ML	D						11-Aug-19	G					
	SWC	94M5	ML	D						11-Aug-19	G					
	SWC	94M7	ML	D						11-Aug-19	G					
	SWC	94M9	ML	D						11-Aug-19	G					
	SWC	94M15	ML	S						11-Aug-19	G					
	SWC	94M17	ML	S						11-Aug-19	G					
	SWC	94M19	ML	S						11-Aug-19	G					
	SWC	94M21	ML	S						11-Aug-19	G					
	SWC	95M1	ML	D						01-Aug-19	G					
	SWC	95M3	ML	D						01-Aug-19	G					
	SWC	95M5	ML	D						01-Aug-19	G					
	SWC	95M7	ML	D						01-Aug-19	G					
	SWC	95M9	ML	D						01-Aug-19	G					
	SWC	95M11	ML	D						01-Aug-19	G					
	SWC	95M15	ML	S						01-Aug-19	G					
	SWC	95M17	ML	S						01-Aug-19	G					
	SWC	95M19	ML	S						01-Aug-19	G					
	SWC	95M21	ML	S						01-Aug-19	G					
	MWS	141	Monitoring	S		x	x									
	MWS	144	Monitoring	S		x	x			15-Sep-19	G	x				
	MWS	145	Monitoring	S		x	x			26-Sep-19	G	x				
	MWS	147	Monitoring	S		x	x									
	MWS	148	Monitoring	S		x	x			15-Sep-19 15-Sep-19	G G	x				
	MWS	151	Monitoring	S		x	x									
	MWS	152	Monitoring	S		x	x									
	MWS	157	Monitoring	S		x	x									
MWS	158	Monitoring	S		x	x										
MWS	162	Monitoring	S		x	x										
MWS	163	Monitoring	S		x	x										
MWS	164	Monitoring	S		x	x										
MWS	301	Monitoring	S		x	x										
MWS	302	Monitoring	S		x	x										
MWS	303	Monitoring	S		x	x										
MWS	310	Monitoring	S		x	x										
MWS	312	Monitoring	S		x	x										

Well Type	Area	Well Name	Category	Well Level	Groundwater Elevation		Analytical									Comment
							Spring			Summer			Fall			
					Spring	Fall	Date	Lab	FP	Date	Lab	FP	Date	Lab	FP	
Other Wells (continued)	MWS	332	Monitoring	S	x	x				24-Oct-19	G	x				
	MWS	333	Monitoring	S	x	x										
	MWS	334	Monitoring	S	x	x										
	MWS	335	Monitoring	S	x	x										
	MWS	336	Monitoring	S	x	x										
	MWS	337	Monitoring	S	x	x										
	MWS	380	Monitoring	S	x	x										
	MWS	381	Monitoring	S	x	x										See Note (7)
	MWS	382	Monitoring	S	x	NS										
	MWS	385	Monitoring	S	x	x										
	MWS	401	Monitoring	D	x	x										
	MWS	461	Monitoring	D												
	MWS	10P1	Monitoring	D	x	x										
	MWS	10P2	Monitoring	S	x	x										
	MWS	11P1	Monitoring	D	x	x										
	MWS	11P2	Monitoring	S												
	MWS	11P3	Monitoring	S	x	x										
	MWS	18P1	Monitoring	D	x	x										
	MWS	18P3	Monitoring	S	x	x										
	MWS	201B	Monitoring	D	x	x										
	MWS	22P2	Monitoring	D	x	x										
	MWS	22P4	Monitoring	D	x	x										
	MWS	6P1	Monitoring	D	x	x										
MWS	6P2	Monitoring	S	x	x											
LCP	72P2	Monitoring	S	x	x										See Note (5)	
MWS	73P2	Monitoring	S	x	x											
LCP	153	Monitoring	S	x	x											
LCP	154	Monitoring	S	x	x										See Note (7)	
LCP	212	Monitoring	S	x	x											

Well Type	Area	Well Name	Category	Well Level	Groundwater Elevation		Analytical									Comment
							Spring			Summer			Fall			
					Spring	Fall	Date	Lab	FP	Date	Lab	FP	Date	Lab	FP	
Other Wells (continued)	LCP	213	Monitoring	S	x	x				18-Sep-19	G					
	LCP	214	Monitoring	S	x	x				17-Sep-19	G	x				
	LCP	215	Monitoring	S	x	x				18-Sep-19	G	x				
	LCP	216	Monitoring	S	x	x										
	LCP	217	Monitoring	S	x	x										
	LCP	221	Monitoring	S	x	x				19-Sep-19	G	x				
	LCP	316	Monitoring	D	x	x										
	LCP	340	Monitoring	S	x	x				16-Sep-19	G	x				
	LCP	341	Monitoring	S	NS	NS				16-Sep-19	G	x				
	LCP	342	Monitoring	S	x	x				17-Sep-19	G	x				
	LCP	343	Monitoring	S	x	x				17-Sep-19 17-Sep-19	G G	 x				
	LCP	345	Monitoring	S	x	x				17-Sep-19	G	x				
	LCP	346	Monitoring	S	x	x				17-Sep-19	G	x				
	LCP	347	Monitoring	S	x	x				17-Sep-19	G	x				
	LCP	348	Monitoring	S	x	x				17-Sep-19	G	x				
	LCP	374	Monitoring	S	x	x				18-Sep-19	G					
	DZA	135M5	ML	D												
	DZA	135M7	ML	D												
	DZA	135M11	ML	D												
	DZA	135M13	ML	D												
	DZA	306	Monitoring	S	x	x										
	DZA	350	Monitoring	S	x	x				18-Sep-19	G	x				
	DZA	351	Monitoring	S	x	x				18-Sep-19	G	x				
	DZA	353	Monitoring	S	x	x										
	DZA	354	Monitoring	S	x	x										
	DZA	358	Monitoring	S	x	x				20-Sep-19	G	x				See Note (9)
	DZA	360	Monitoring	S	x	x										
DZA	361	Monitoring	S	x	x				18-Sep-19	G	x					
DZA	402	Monitoring	D	x	x											
DZA	403	Monitoring	D	x	x											
DZA	404	Monitoring	D	NS	x											
DZA	417	Monitoring	D	NS	AR										See Note (11)	

Well Type	Area	Well Name	Category	Well Level	Groundwater Elevation		Analytical									Comment
					Spring	Fall	Spring			Summer			Fall			
							Date	Lab	FP	Date	Lab	FP	Date	Lab	FP	
Other Wells (continued)	DZA	134P	Monitoring	D	x	x										
	ALB	320	Monitoring	S	x	x				19-Sep-19	G	x				
	ALB	321	Monitoring	S	x	x										
	ALB	362	Monitoring	S	x	x										
	ALB	422	Monitoring	D	NS	NS										See Note (12)
	ALB	438	Monitoring	D	x	x										

Notes:

- Blank - location not sampled for this parameter
- ALB - Albion Road Area
- AR - Well is artesian. Water level reported as >TOC
- B - Maxxam Lab
- D - Deep Level
- DZA - Del Zotto Road Area
- Ext - Extraction Well
- FP - field paramaters
- G - On-site Lab
- LCP - Leitrim Road and Former CP Rail line Area
- m - metre
- ML - Multi-Level Well
- Monitoring - Monitoring Well
- MWS - Municipal Waste Site Area
- NS - not sampled
- S - Shallow Level
- SL - Surface Location
- SWC - Special Waste Compound Area
- TOC - Top of Casing
- VOC - Volatile Organic Compound

- (1) - Elevation of TOC at wells 71PR1, 71PR2, and 399 are estimated. Wells need to be surveyed (or re-surveyed).
- (2) - Samples were not analyzed due exceeded hold time of 14-days. Locations to be resampled in 2020 sampling event.
- (3) - 47P1, 47P2 and 47P3 are designated as replacement Trend Wells for 47M as of 2017.
- (4) - Sampling tubing is stuck in Performance Well 201A. Well assessed as viable but sampling completed using peristaltic pump.
- (5) - Shallow Trend Well 72P2 is compromised, only water levels available in 2019. Moved to list of Other wells. No replacement currently.
- (6) - Shallow Trend Well 355 reported damaged in 2017. In 2018 reported as reparable. Water levels not viable. VOC sampling is viable.
- (7) - Other wells 128P, 154, 304, 307, 381, and 424 are damaged and require repair/re-survey. Water levels are considered to be an estimate.
- (8) - Shallow Trend Well 317 is blocked. Only accessible for water levels.
- (9) - Other well 358 was sampled in summer 2019. It will replace Shallow Target Well 318 and sampled in spring and fall 2020.
- (10) - Other wells 304 and 307 are sitting above the casing. Casings need to be repaired and wells resurveyed.
- (11) - Other well 417 is usually artesian. In spring of 2019, access was not possible due to flooded conditions in this area.
- (12) - Other well 422 (located on Albion Rd.) continues to be blocked by a fallen tree. The tree needs to be removed by a professional.
- (13) - Other well 14P1 does not have a screen but is gauged as a Deep level well. Groundwater elevation is an estimate.

The following wells have been removed from the sampling program permanently as of 2019/2020:

- Shallow Target Well 318 is damaged beyond repair. Added to 2017 decommissioning list (Appendix J). Well 358 potential replacement in 2019.
- Shallow Target Wells 211, 314 and 315, which were on City property, were removed. Added to 2019 decommissioning list.
- Deep Target Well 423 is artesian and the pressure cap will not seal. No replacement currently. Added to 2017 decommissioning list.
- Deep Trend Well 47M is damaged beyond repair. 47P1, P2 and P3 are now used as replacement locations.
- Other Wells 14P2 and 14P3 (gauged for deep water levels) are damaged beyond repair. Added to decommissioning list in 2018.
- Other Wells 390 and 391 removed at the request of the property owner. Added to decommissioning list.
- Other Wells 319 and 356 removed, as they are damaged beyond repair. Added to decommissioning list.
- Other Well 341 is damaged beyond repair. Added to 2019 decommissioning list.
- Other Wells 222 and 382, which were on City of Ottawa property, were decommissioned by the City. Added to 2019 decommissioning list.