Hydrogeological Data Report

Highway 400 – Highway 404 Link (Bradford Bypass)

Ontario Ministry of Transportation

60636190

June 19, 2023

Delivering a better world

Statement of Qualifications and Limitations

The attached Report (the "Report") has been prepared by AECOM Canada Ltd. ("AECOM") for the benefit of the Client ("Client") in accordance with the agreement between AECOM and Client, including the scope of work detailed therein (the "Agreement").

The information, data, recommendations and conclusions contained in the Report (collectively, the "Information"):

- is subject to the scope, schedule, and other constraints and limitations in the Agreement and the qualifications contained in the Report (the "Limitations")
- represents AECOM's professional judgement in light of the Limitations and industry standards for the preparation of similar reports
- may be based on information provided to AECOM which has not been independently verified
- has not been updated since the date of issuance of the Report and its accuracy is limited to the time period and circumstances in which it was collected, processed, made or issued
- must be read as a whole and sections thereof should not be read out of such context
- was prepared for the specific purposes described in the Report and the Agreement, and
- in the case of subsurface, environmental or geotechnical conditions, may be based on limited testing and on the assumption that such conditions are uniform and not variable either geographically or over time.

AECOM shall be entitled to rely upon the accuracy and completeness of information that was provided to it and has no obligation to update such information. AECOM accepts no responsibility for any events or circumstances that may have occurred since the date on which the Report was prepared and, in the case of subsurface, environmental or geotechnical conditions, is not responsible for any variability in such conditions, geographically or over time.

AECOM agrees that the Report represents its professional judgement as described above and that the Information has been prepared for the specific purpose and use described in the Report and the Agreement, but AECOM makes no other representations, or any guarantees or warranties whatsoever, whether express or implied, with respect to the Report, the Information or any part thereof.

Without in any way limiting the generality of the foregoing, any estimates or opinions regarding probable construction costs or construction schedule provided by AECOM represent AECOM's professional judgement in light of its experience and the knowledge and information available to it at the time of preparation. Since AECOM has no control over market or economic conditions, prices for construction labour, equipment or materials or bidding procedures, AECOM, its directors, officers and employees are not able to, nor do they, make any representations, warranties or guarantees whatsoever, whether express or implied, with respect to such estimates or opinions, or their variance from actual construction costs or schedules, and accept no responsibility for any loss or damage arising therefrom or in any way related thereto. Persons relying on such estimates or opinions do so at their own risk.

Except (1) as agreed to in writing by AECOM and Client; (2) as required by-law; or (3) to the extent used by governmental reviewing agencies for the purpose of obtaining permits or approvals, the Report and the Information may be used and relied upon only by Client.

AECOM accepts no responsibility, and denies any liability whatsoever, to parties other than Client who may obtain access to the Report or the Information for any injury, loss or damage suffered by such parties arising from their use of, reliance upon, or decisions or actions based on the Report or any of the Information ("improper use of the Report"), except to the extent those parties have obtained the prior written consent of AECOM to use and rely upon the Report and the Information. Any injury, loss or damages arising from improper use of the Report shall be borne by the party making such use.

This Statement of Qualifications and Limitations is attached to and forms part of the Report and any use of the Report is subject to the terms hereof.

AECOM: 2015-04-13

Quality Information

Prepared by

Brian Holden, M. Sc., P. Geo.
Hydrogeologist, Environment

Reviewed and Approved by

Sergiy N. Tchernikov, M.Sc., P.Geo., QP (ESA-O Reg 153-04)
Senior Environmental Geoscientist/Hydrogeologist
Senior Project Manager

Revision History

Rev #	Revision Date	Revised By:	Revision Description
1	April 24, 2023	AECOM	Draft Hydrogeological Data Report
2	May 23, 2023	AECOM	Draft Hydrogeological Data Report
3	June 16, 2023	AECOM	Draft Hydrogeological Data Report
4	June 19, 2023	AECOM	Final Hydrogeological Data Report

Distribution List

# Hard Copies	PDF Required	Association / Company Name
-	✓	Ministry Of Transportation Ontario
-	✓	AECOM Canada Ltd.

Prepared for:

Ontario Ministry of Transportation
159 Sir William Hearst Avenue, 4th Floor
Downsview, ON M3M 0B7

Prepared by:

Brian Holden, P.Geo.
Hydrogeologist, Environment
Brian.Holden@aecom.com

AECOM Canada Ltd.
50 Sportsworld Crossing Road, Suite 290
Kitchener, ON N2P 0A4 Canada

T: 519.650.5313
F: 519.650.3424
www.aecom.com

Table of Contents

Figures

Tables

Appendices

1. Overview of Undertaking

1.1 Project Overview

The Ontario Ministry of Transportation (the Ministry) has retained AECOM Canada Ltd. (AECOM) to undertake a Preliminary Design and project-specific assessment of environmental impacts for the proposed Highway 400 to Highway 404 Link (Bradford Bypass). The Bradford Bypass (the project) is being assessed in accordance with Ontario Regulation 697/21 (the Regulation).

The Bradford Bypass is part of Ontario's plan to expand highways and public transit across the Greater Golden Horseshoe to fight congestion, create jobs and prepare for the massive population growth expected in the next 30 years. Simcoe County's population is expected to increase to 416,000 by 2031, with the Regional Municipality of York growing to 1.79 million by 2041. The Bradford Bypass has been proposed as a response to this dramatic growth in population and travel demand in the area and the forecasted increase in congestion on key roadways linking Highway 400 to Highway 404.

The Bradford Bypass is a proposed 16.3 kilometre controlled access freeway that will extend from Highway 400 between 8th Line and 9th Line in Bradford West Gwillimbury, will cross a small portion of King Township, and will connect to Highway 404 between Queensville Sideroad and Holborn Road in East Gwillimbury. There are proposed full and partial interchanges, as well as grade separated crossings at intersecting municipal roads and watercourses, including the Holland River and Holland River East Branch. This project also includes the design integration for the replacement of the 9th Line structure on Highway 400, which will accommodate the proposed future ramps north of the Bradford Bypass corridor. The Ministry is considering an interim four-lane configuration and an ultimate eight-lane design for the Bradford Bypass. The interim condition will include two general purpose lanes in each direction and the ultimate condition will include four lanes in each direction (one high-occupancy vehicle lane and three general purpose travel lanes in each direction). This Report and its findings are based on the project footprint identified within this Report. Should the footprint change or be modified in any way, a review of the changes shall be undertaken, and the report will be updated to reflect the changes, impacts, mitigation measures, and any commitments to future work.

This *Hydrogeological Data Report* (this Report) was prepared for the Ministry in support of the Highway 400 – Highway 404 Link (Bradford Bypass) Project (the project) for the intent of characterizing the local physical and hydrogeological setting, quantifying potential source water protection areas of concern, and determining preliminary groundwater hydraulic conductivity and groundwater quality with the Study Area. This Report was prepared in accordance with the requirements of O. Reg. 697/21, Section 23, in order to support the Groundwater Protection and Well Monitoring Plan. It is recommended that this Report be updated based on the data gaps identified during the subsequent Detail Design of the project.

1.2 Study Area

As illustrated in **Figure 1**, the proposed highway will extend from Highway 400 between 8th Line and 9th Line in Bradford West Gwillimbury, will cross a small portion of King Township, and will connect to Highway 404 between Queensville Sideroad and Holborn Road in East Gwillimbury.

1.3 Objectives

The objective of this hydrogeological investigation is to provide a technical assessment and characterization

of local geological and hydrogeological conditions based on a review of available background information, along with the results of a hydrogeological field investigation program comprised of groundwater level monitoring, single well response testing, and groundwater quality sampling.

1.4 Scope of Work

The scope of the assignment commenced with a review of available reports, mapping, and other published documentation pertaining to the Study Area. Examples of information reviewed included, but was not limited to: physiography, surficial geology, quaternary geology, and bedrock geology mapping available from Ontario Geological Survey (OGS), and the results *Geotechnical Investigation* completed by Golder/WSP in 2022 as part of the project.

Stemming from the results of the preliminary background information review, a hydrogeological field investigation program was developed and implemented for the project with this report presenting data collected between February and August 2022. The field program is still ongoing. Tasks relating to hydrogeological aspects of the investigation program included:

- Development of 13 groundwater monitoring wells installed by Golder/WSP in 2022 as part of a project related geotechnical engineering investigation
- Measurement of groundwater levels within each of the 13 monitoring wells
- Single well response in each of the 13 monitoring wells
- Collection of groundwater samples for laboratory geochemical analysis from all 13 monitoring wells, and
- Evaluation of potential impacts associated with project related dewatering activities related to source water protection areas.

Some of the installed monitoring wells could not be accessed during our hydrogeological investigation due to access issues related to safety concerns due to proximity to major highways, damaged wells after construction or encampments, as shown in **Table 1**.

Additionally, approximately 7 monitoring wells were installed after August 2022 by Golder/WSP which are to be assessed during Detail Design. It is expected that each unassessed monitoring wells will continue to be monitored and assessed during the subsequent Detail Design phase of the project, as shown in **Figure 1**.

1.5 Background Information

The following background data and reports were reviewed and considered in the preparation of this Report:

- Door To Door Water Well Report – Highway 400 to Highway 404 Link (Bradford Bypass) (GWP 2008-21-00) by AECOM Canada Ltd, 2023
- Groundwater Protection and Well Monitoring Program – Highway 400 to Highway 404 Link (Bradford Bypass) (GWP 2008-21-00) by AECOM Canada Ltd, 2023
- Golder Associates Ltd., A Member of WSP (Golder/WSP). September 2022. Preliminary Foundation Investigation and Design Report – Bradford Bypass and Highway 404 Interchange Ramp Structures. Highway 400 to Highway 404 Link (Bradford Bypass). Simcoe County and York Region. Assignment No. 2019-E-0048. Golder/WSP Golder/WSP Project No. 19136074

- Golder Associates Ltd., A Member of WSP (Golder/WSP). October 2022. Preliminary Foundation Investigation and Design Report – Holland River (West Branch) Structure. Highway 400 to Highway 404 Link (Bradford Bypass). Simcoe County and York Region. Assignment No. 2019-E-0048. Golder/WSP Project No. 19136074
- Golder Associates Ltd., A Member of WSP (Golder/WSP). October 2022. Preliminary Foundation Investigation and Design Report – Holland River (East Branch) Structure. Highway 400 to Highway 404 Link (Bradford Bypass). Simcoe County and York Region. Assignment No. 2019-E-0048. Golder/WSP Project No. 19136074
- Golder Associates Ltd., A Member of WSP (Golder/WSP). January 2023. Preliminary Foundation Investigation and Design Report – 10th Sideroad Underpass Structure. Highway 400 to Highway 404 Link (Bradford Bypass). Simcoe County and York Region. Assignment No. 2019-E-0048. Golder/WSP Project No. 19136074
- MECP Water Well Information System (WWIS), Permit To Take Water (PTTW), and Environmental Activity and Sector Registry (EASR) Databases within the PSA, and
- Ontario Geological Survey (OGS) and Geological Survey of Canada (GSC) Physiography, Surficial Geology, Quaternary Overburden Geology, and Bedrock Geology Mapping.

2. Methodology

This section describes the methods and specific procedures that were followed during completion of the hydrogeological field investigation program.

2.1 Borehole Drilling and Monitoring Well Installation

AECOM followed behind a project-related geotechnical (subsurface) field investigation completed by Golder/WSP within the Study Area in 2022. As part of the works, boreholes were advanced using a track or truck-mounted drilling rig depending on the drilling location using 210 mmØ hollow-stem augers and mud rotary. Soil samples retrieved during drilling were logged and visually classified in the field by a member of Golder/WSP's geotechnical engineering team. In-situ tests completed during the advancement of each borehole included Standard Penetration Testing (SPT) at a regular interval and field shear vane testing within cohesive soils.

A monitoring well subsequently was installed by Golder/WSP within selected boreholes to allow for the measurement of stabilized groundwater levels, and to facilitate related hydrogeological testing / sampling. **Table 1** provides details for the 13 monitoring wells installed within the Study Area, including their depths, and screened intervals in both metres Below Ground Surface (mBGS) and metres Above Sea Level (mASL). Groundwater level monitoring data for each well is provided in **Section 4.1**.

Borehole records received by the writing of this report from Golder/WSP describing the encountered soils and monitoring well/piezometer construction details for each of the borehole locations discussed herein are contained in **Appendix A**.

Table 1: Monitoring Well Construction Details

MW ID	Ground Elevation (mASL)	Well Depth[1] (mBGS)	Well Bottom Elevation (mASL)	Screened Interval (mBGS)		Screen Interval Elevation (mASL)		Screened Geologic Materials
				Top	Bottom	Top	Bottom	
BH 9-1	275.6	9.37	266.23	6.1	9.1	269.5	266.5	Silty Sand (SM), trace clay, trace gravel to gravelly
BH 10-1	283.0	9.18	273.82	6.1	9.1	276.9	273.9	Clayey Silt (CL), some sand to sandy, trace to some gravel / Silty Sand (SM), trace grave, some clay, contains clayey silt layers
BH 10-4	282.3	6.36	275.94	3.1	6.1	279.2	276.2	Sandy Clayey Silt (CL), some gravel / Silty Sand (SM), some clay, trace gravel
BH PDD-1[2]	-	-	-	-	-	-	-	-
BH PDC-6	-	-	-	-	-	-	-	-
BH PDC-7	-	-	-	-	-	-	-	-
BH AIP-3	224.8	3.07	221.73	1.5	3.0	223.3	221.8	Sandy Clayey Silt (CL) to Clayey Silt-Silt (CL-ML), trace sand, trace gravel

MW ID	Ground Elevation (mASL)	Well Depth[1] (mBGS)	Well Bottom Elevation (mASL)	Screened Interval (mBGS)		Screen Interval Elevation (mASL)		Screened Geologic Materials
				Top	Bottom	Top	Bottom	
BH CN-1	222.4	4.64	217.76	3.1	4.6	219.3	217.8	Sandy Silt (ML) to Silty Sand (SM, some clay, trace gravel
BH CN-3	219.8	4.75	215.05	1.5	4.5	218.3	215.3	Sandy Silt (ML) to Silty Sand (SM), trace to some clay, trace gravel
BH HRW-1	219.0	4.54	214.46	3.1	4.6	215.9	214.4	Silty Sand (SM), trace clay, trace gravel
BH HRW-4	217.4	2.80	214.60	1.5	3.0	215.9	214.4	Sandy Peat / Silty Sand (SM) to Sandy Silt (ML) / Clayey Silt (CL) to Clayey Silt-Silt (CL-ML), trace sand
BH HRE-3	220.0	3.94	218.06	2.5	5.5	217.5	214.5	Silty Sand (SM)
BH 2-1	220.4	9.10	211.30	6.2	9.2	214.2	211.2	Clayey Silt (CL), trace sand, trace gravel

NOTE: 1 As measured by AECOM Hydrogeological personnel. Cells that include NA indicates that the monitoring well was not visited by AECOM.

2 Monitoring well not assessed as part of the program due to access issues, safety concerns due to proximity to major highways, damaged wells after construction or encampments.

"-" Borehole Log has not yet been provided.

Monitoring wells were each constructed using either a 1.50 or 3.05 m length of 50 mmØ PVC Schedule 40 (10-slot) commercially manufactured well screen with solid riser pipe to ground surface. The sand pack at each monitoring well extends from a short distance below the base of the screen to a minimum height of 0.5 m above the top of the screened interval and is topped with a dry bentonite plug (Holeplug). Cement-bentonite grout was utilized to seal the wellbore annulus above the bentonite plug continuously to a depth of approximately 1.5 mBGS. A 1.2 m thick bentonite seal (Holeplug) was placed atop the grout and each monitoring well was finished at surface using up to 0.3 m of concrete. Holeplug was used to seal the remaining borehole annulus below the sand pack to the terminal depth of 15.80 mBGS at each location. Monitoring wells are completed in a monument or flush-mount configuration depending on the Study Area location with commercially manufactured protective covers.

Further details regarding the investigation methodologies employed by Golder/WSP for borehole drilling, geotechnical field testing, soil sampling, and logging, as well as associated physical laboratory testing of collected soil samples, are provided in Golder/WSPs *Preliminary Foundation Investigation and Design Reports (FIDR)* (2022 -2023) under 14 separate covers, 4 of which were provided prior to writing this report. The reader is referred to these reports for further information and details.

2.2 Monitoring Well Development

All the monitoring wells installed, development of the 13 monitoring wells was completed by AECOM between February 4, 2022, and May 25, 2023, for the purposes of removing sediment, rectifying possible damage caused to the target formation during the drilling process, and to improve hydraulic properties of the filter pack installed around the well screen at each location. The well development process also entails that collected groundwater samples are representative of in situ conditions for the screened geologic formation(s).

Appropriate well development methods were employed by AECOM on a location-by-location basis, based on the total well depth, local groundwater conditions / water column height, and sediment content of the pumped water.

Specifically, the well development process implemented for this project included:

- Pumping of a minimum three wellbore volumes of water from each monitoring well using dedicated equipment (e.g., fitted Waterra foot valves and tubing)
- During the development process, repetitive measurements of field parameters within the discharged water were obtained; including: pH, temperature, conductivity, and visual appearance, and
- Each monitoring well was developed until a visual improvement was observed in the turbidity level of the purged water, or until field parameters stabilized.

2.3 Groundwater Level Monitoring

Following the completion of well development and recovery, stabilized groundwater level measurements were obtained manually by AECOM at all monitoring well locations between February 4, 2022, and May 31, 2023.

The groundwater level measurement process employed for this project was as follows:

- Measurements were obtained using an electronic water level indicator
- The electronic water level indicator was lowered into the riser pipe of each monitoring well until the water was encountered, as indicated by the instrument signal. The water level was then measured with respect to a fixed “top-of-casing” reference point and entered on the field log
- Two additional water level measurements were obtained immediately thereafter to verify the initial reading, and
- Following the completion of groundwater level measurement at each monitoring well, the electronic water level tape was cleaned and decontaminated to eliminate the possibility of cross-contamination between monitoring well locations.

2.4 Single Well Response Testing

Single Well Response Testing (SWRT) was completed by AECOM at 11 monitoring wells between February 16, 2022, and May 25, 2023, to provide an estimate of the hydraulic conductivity (K) of the screened geologic material(s) at each monitoring well location. The SWRT methodology involved invoking a rapid change in the hydraulic head and measuring the groundwater level (recovery) response within each monitoring well. SWRT methods included one or a combination of rising head or falling head tests, depending on the position of the static groundwater level within the monitoring well being tested. Monitoring wells BH PDD-1 and BH HRW-4 were damaged after well development and hydraulic conductivity testing could not be completed.

Specifically, the SWRT process employed for this project was as follows:

- Immediately prior to each SWRT, the static groundwater level was measured within the target monitoring well
- An electronic pressure transducer (datalogger) was installed in the monitoring well below the groundwater level and configured to measure absolute pressure (water pressure + atmospheric pressure) at a regular interval (i.e., 0.5 seconds)

- Falling head tests were carried out using a solid slug of known volume introduced into the monitoring well, and the reverse technique was also carried out (i.e., slug removal) for a corresponding rising head test
- Immediately following introduction of the solid slug into the monitoring well, manual groundwater level measurements were collected to supplement the datalogger readings, and recovery of the groundwater level was timed
- As the static groundwater level was positioned within the riser pipe above the top of the screen and sand pack interval within each monitoring well, both falling head and rising head test methods were conducted. For rising head tests, care was taken as to not lower the groundwater level to within the screen interval to avoid complexities associated with partially submerged conditions, and
- Testing was concluded when a minimum of 85% recovery of the static water level was achieved in each well (>90% preferred).

2.5 Groundwater Quality Sampling

During project construction, groundwater pumped to dewater excavations is planned to be discharged directly to the natural environment or to the nearest sanitary and storm sewer. As such, the chemical quality of the pumped water will need to conform with the requirements of the Provincial Water Quality Objectives (PWQO), Town of Bradford West Gwilliumbury's Sewer Use By-Law (#2013-68), the York Region Sewer Use By-Law (2021-102) as required in the Town of East Gwillimbury's Sewer Use By-Law 2008-54 and King Township's Sewer Use By-Law 2014-072.

Groundwater quality data are required to assess possible treatment needs for dewatering effluent generated during construction. To this end, groundwater samples were collected by AECOM at 12 monitoring well locations in accordance with the following methodology:

- Industry-standard QA/QC protocols were followed for bottle preparation, sample collection, and transportation, as outlined within MECP guidance documents (MOE, 1999)
- The initial groundwater sample was collected manually using dedicated equipment (i.e., fitted Waterra foot valves and tubing) following the completion of well development to confirm that the groundwater samples were representative of the source within the screened well interval at the monitoring well location. The groundwater sample was collected as soon as practically possible following the completion of well development
- Clean nitrile gloves were worn by AECOM staff during sample collection
- Samples were collected unfiltered (as per requirements for comparison against municipal sewer by-law discharge standards)
- A small aliquot of the sampled water was placed into a clean container to facilitate field measurement of pH, temperature, and specific conductance, and
- Each groundwater sample was examined in the field for visual and olfactory evidence of impact then immediately placed in laboratory-supplied sample bottles prepared in advance with the appropriate preservatives, sealed, labelled, and stored on ice to maintain a sample temperature of 10°C or lower during transportation under a chain of custody documentation to a CALA-accredited environmental analytical laboratory within the specified sample analyte holding times.

BH PDD-1 was not sampled as it was inaccessible after well development and was damaged upon return to the location.. A summary of the groundwater sampling program is presented in **Table 2**.

Table 2: Groundwater Sampling Program Summary

Monitoring Well	Sampling Date	Date Samples Received by Laboratory	Date Analysis Reported by Laboratory	Town of Bradford West Gwillimbury Limits for Sanitary (Table 1) and Storm (Table 2) Sewers	PWQO	Laboratory Certificate of Analysis Number(s)
BH 9-1	February 8th, 2022	February 8th, 2022	February 25th / 16th, 2022	√	√	22T861751 / 22T861744
BH 10-1	February 8th, 2022	February 8th, 2022	February 16th, 2022		√	22T861744
BH 10-4	February 8th, 2022	February 8th, 2022	February 25th / 16th, 2022	√		22T861752
BH PDC-6	May 31st, 2023	June 1st, 2023	June 8th, 2023		√	23T030999
BH PDC-7	May 31st, 2023	June 1st, 2023	June 12th, 2023	√		23T030993
BH AIP-3	February 8th, 2022	February 8th, 2022	February 25th, 2022	√		22T861747
BH CN-1	February 8th, 2022	February 8th, 2022	February 16th, 2022		√	22T861744
BH CN-3	May 13th, 2022	May 13th, 2022	May 25th, 2022	√		22T895412
BH HRW-1	May 12th, 2022	May 12th, 2022	May 25th, 2022		√	22T894872
BH HRW-4	May 13th, 2022	May 13th, 2022	May 25th, 2022	√		22T895413
BH HRE-3	May 13th, 2022	May 13th, 2022	May 25th, 2022	√		22T895413
BH 2-1	May 12th, 2022	May 12th, 2022	May 25th, 2022		√	22T894872

3. Site Physiographical, Geological, and Hydrogeological Setting

Existing local and regional-scale geological and hydrogeological conditions were established based on a review of available physiography, surficial geology, Quaternary geology, and Paleozoic bedrock geology mapping published by OGS, in addition to a search of MECP's WWIS database. Borehole logs prepared in relation to Golder's (WSP), geotechnical (subsurface) investigations also were reviewed and considered herein.

3.1 Physiography, Topography, and Drainage

The Study Area crosses in an approximate northeast to southwest direction by a fluvial terrace that serves as a divide between the Schomberg Clay Plains (west) and the Simcoe Lowlands (east) physiographic regions, as described by Chapman and Putnam (1984). A brief discussion of each region is provided below.

The Schomberg Clay Plains encompass three distinct areas near Schomberg, Newmarket, and to the north of Lake Scugog, covering a total area of approximately 1,230 km^2. Within the Schomberg and Newmarket areas, the region is characterized generally by a muted drumlinized till plain that is overlain predominantly by a varying thickness of surficial clay (glaciolacustrine) soils. Some of the larger drumlins have escaped complete burial; however, where present, the clay may extend well up their side slopes.

The Simcoe Lowlands border on the shorelines of Lake Simcoe and Georgian Bay and encompass a combined area of approximately 2,850 km^2. The component of this region that borders on Lake Simcoe is aptly termed the Lake Simcoe Basin given that approximately half of its area is occupied by the lake's waters. Within the vicinity of the Site, the Simcoe Lowlands present as a broad valley between high morainic hills that extends generally southwestward over a distance of about 24 km from the present-day limits of Cook's Bay (Lake Simcoe). Historically, this low-lying area represented a shallow southward extension of Lake Simcoe, that is now occupied predominantly by marshland and the meandering channel of the Holland River. Occurrences of peat within the marshland area is common.

Ground surface topography within the Study Area ranges significantly with 283 mASL on the western side (Highway 400), down to 217 mASL within the Holland River Lands and back up to 250 mASL near eastern side (Highway 404), with a total relief of up to about 67 m, based on a review of ground surface elevations reported upon the various borehole logs contained in **Appendix A**. Drainage is primarily towards the Holland River Lands towards the West and East Holland Rivers.

3.2 Geological Conditions

3.2.1 Overburden Geology

Four Quaternary overburden geology units being reported to occur within the Study Area, as shown in **Figures 2a** to **2e**. These deposits include (chronologically from oldest to youngest):

- **Unit 13**: Newmarket Till (sandy silt to silt matrix, moderate to high matrix carbonate content, clast content moderate to high)
- **Unit 24**: Glaciolacustrine Deposits (silt and clay, minor sand, derived from basin and quiet water deposits)
- **Unit 25**: Glaciolacustrine Deposits (sand, gravelly sand and gravel, derived from nearshore and beach deposits), and
- **Unit 32**: Organic Deposits (peat, muck and marl).

Glaciofluvial outwash deposits, comprising gravel and sand (proglacial river and deltaic deposits) are reported to occur north of the site.

Soil stratigraphy within the Study Area has not been interpreted based on the results of Golder/WSPs recent geotechnical (subsurface) investigation (**Appendix A**). It is recommended that the reader refer to the FIDRs generated by Golder/WSP. A detailed breakdown will be provided once all borehole logs have been received during subsequent Detail Design phases.

3.2.2 Bedrock Geology

OGS mapping (2010) indicates that bedrock within the Study Area is composed of limestone, dolostone, shale, arkose sandstone of the Bass Island Formation and shale, limestone and dolostone of the Stooping River Formation, as shown in **Figure 3**.

4. Field Investigation Results

4.1 Groundwater Level Monitoring

Groundwater level monitoring was undertaken for eleven monitoring well locations between February 4 and August 23, 2022, by AECOM. The remaining wells were not accessible or available for development during AECOM's assessment Collected (manual) groundwater level depth and elevation data for each monitoring well are summarized in **Table 3**.

Table 3: Summary of Groundwater Level Measurements

MW ID	Ground Elevation (mASL)	Well Depth (mBGS)	Well Bottom Elevation (mASL)	Monitoring Date	Depth to Groundwater (mBGS)	Groundwater Elevation (mASL)
BH 9-1	276.50	9.10 *(BH Log)* 9.37 *(AECOM Measured)*	267.1	8-Feb-2022	2.53	273.97
				16-Feb-2022	2.57	273.93
				12-May-2022	1.93	274.57
BH 10-1	283.00	9.10 *(BH Log)* 9.18 *(AECOM Measured)*	273.8	8-Feb-2022	0.61	282.39
				16-Feb-2022	0.56	282.44
				12-May-2022	0.51	282.49
BH 10-4	282.30	6.00 (BH Log) 6.36 *(AECOM Measured)*	275.9	8-Feb-2022	0.91	281.39
				16-Feb-2022	0.88	281.42
				12-May-2022	0.89	281.41
BH PDD-1[1]	-	7.84 *(AECOM Measured)*	-	7-Feb-2022	0.42	-
BH PDC-6	-	13.61 *(AECOM Measured)*	-	31-May-2023	5.63	-
BH PDC-7	-	10.80 *(AECOM Measured)*	-	31-May-2023	1.83	-
BH AIP-3	224.80	3.00 (BH Log) 3.07 *(AECOM Measured)*	221.7	8-Feb-2022	1.36	223.44
				16-Feb-2022	1.29	223.51
				12-May-2022	1.43	223.37
BH CN-1	222.40	4.50 (BH Log) 4.64 *(AECOM Measured)*	217.8	8-Feb-2022	1.56	220.84
				16-Feb-2022	1.58	220.82
				12-May-2022	1.27	221.13
BH CN-3	219.80	4.50 (BH Log) 4.75 *(AECOM Measured)*	215.1	13-May-2022	0.78	219.02
				23-Aug-2022	0.83	218.97
BH HRW-1	219.00	4.50 (BH Log) 4.54 *(AECOM Measured)*	214.5	12-May-2022	0.69	218.31
				13-May-2022	0.67	218.33

MW ID	Ground Elevation (mASL)	Well Depth (mBGS)	Well Bottom Elevation (mASL)	Monitoring Date	Depth to Groundwater (mBGS)	Groundwater Elevation (mASL)
BH HRW-4[2]	217.40	3.00 (BH Log) 2.80 *(AECOM Measured)*	214.6	13-May-2022	0.55	216.85
BH HRE-3	220.00	5.40 (BH Log) 3.94 *(AECOM Measured)*	216.1	13-May-2022	0.97	219.03
				23-Aug-2022	1.79	218.21
BH 2-1	220.4	9.10 (BH Log) 9.24 *(AECOM Measured)*	211.2	12-May-2022	0.77	219.63
				13-May-2022	0.81	219.59

Note: [1] – BH PDD-1 was inaccessible due to encampment in the area after initial visit.
[2] – BH HRW-4 was damaged and redrilled in April 2022, could not be located in August due to agricultural operations.

Based on the monitoring that has been completed to-date, from the western edge near Highway 400 the groundwater elevations within the Study Area have been found to range from 274.57 mASL (1.93 mBGS) at BH 9-1 to 282.49 mASL (0.51 mBGS) at BH 10-1 near County Road 10. Within the Holland River lands, the groundwater elevations range from 223.51 mASL (1.29 mBGS) at BH AIP-3 to 216.8 mASL (0.55 mBGS) at BH HRW-4. Significant data gaps currently exist with the monitoring wells installed after AECOM's assessment and access issues previously discussed. It is recommended that the additional groundwater level measurements at the above and missing groundwater assessments from the monitoring wells listed in **Table 1** and in **Section 1.4** be obtained during subsequent Detail Design.

It is anticipated that seasonal fluctuations in groundwater levels will occur that have not been fully captured given the snapshot readings of the monitoring wells completed as part of the current hydrogeological investigation. It is recommended that additional groundwater level measurements be obtained during subsequent Detail Design phases and that dataloggers be installed within all monitoring wells to obtain the seasonal fluctuations within the groundwater table.

4.2 Single Well Response Testing

Single Well Response Testing (SWRT) was conducted by AECOM at eleven monitoring wells between February 16, 2022, and May 25, 2023, as mentioned in Section 2.4. The collected data was analyzed using the AQTESOLV Professional® (Version 4.5) software package to provide an estimate of the hydraulic conductivity (K) of the geologic formation(s) surrounding each respective monitoring well screen. The analysis model selected for each data set was dependent on the observed heterogeneity within the screened geologic materials, the position of the groundwater table with respect to the screened interval, and nature of the groundwater level response to slug insertion and/or removal.

Data collected from BH CN-3 were analyzed using the Hvorslev (1951) solution that is applicable to unconfined or confined aquifer systems and monitoring wells with fully or partially submerged screens.

Data collected from BH 9-1, BH 10-1, BH 10-4, BH AIP-3, BH CN-1, BH HRW-1, and BH 2-1were analyzed using the Kansas Geological Survey (KGS) model (Hyder *et al.*, 1994) to provide an estimate of K for the geologic

materials within the well screen interval. The KGS model is highly recommended by professionals working in the field of aquifer testing and data interpretation methods (Butler *et al.*, 2000).

Data collected from BH HRE-3, BH PDC-6, and BH PDC-7 were analyzed using the Bouwer and Rice (1976) solution that is appliable to aquifer systems and monitoring wells with fully or partially submerged screens.

SWRT results are presented in **Table 4**, with the individual analysis reports contained in **Appendix B**.

Table 4: Summary of Single Well Response Testing Results

MW ID	Test Date	Analytical Method	Top of Test Interval (mBGS)	Bottom of Test Interval (mBGS)	Test Type	Hydraulic Conductivity (m/sec)	Geological Material
BH 9-1	16-Feb-2022	KGS Model	6.32	9.37	Falling Head	$5.61x10^{-7}$	Silty Sand (SM), trace clay, trace gravel to gravelly
					Rising Head	$5.23x10^{-7}$	
BH 10-1	16-Feb-2022	KGS Model	6.13	9.18	Falling Head	$1.23x10^{-7}$	Clayey Silt (CL), some sand to sandy, trace to some gravel / Silty Sand (SM), trace grave, some clay, contains clayey silt layers
					Rising Head	$2.03x10^{-7}$	
BH 10-4	16-Feb-2022	KGS Model	3.31	6.36	Falling Head	$1.12x10^{-6}$	Sandy Clayey Silt (CL), some gravel / Silty Sand (SM), some clay, trace gravel
					Rising Head	$2.04x10^{-6}$	
BH PDC-6	25-May-2023	Bouwer and Rice	10.56	13.61	Rising Head	$9.95x10^{-8}$	-
BH PDC-7	25-May-2023	Bouwer and Rice	7.76	10.80	Falling Head	$2.89x10^{-6}$	-
					Rising Head	$8.56x10^{-6}$	
BH AIP-3	16-Feb-2022	KGS Model	1.55	3.07	Falling Head	$1.59x10^{-5}$	Sandy Clayey Silt (CL) to Clayey Silt-Silt (CL-ML), trace sand, trace gravel
					Rising Head	$3.07x10^{-5}$	
BH CN-1	16-Feb-2022	KGS Model	3.12	4.64	Falling Head	$5.34x10^{-7}$	Sandy Silt (ML) to Silty Sand (SM, some clay, trace gravel
					Rising Head	$8.65x10^{-7}$	
BH CN-3	23-Aug-2022	Hvorslev	1.70	4.75	Falling Head	$5.25x10^{-8}$	Sandy Silt (ML) to Silty Sand (SM), trace to some clay, trace gravel
					Rising Head	$8.63x10^{-8}$	
BH HRW-1	12-May-2022	KGS Model	3.02	4.54	Falling Head	$5.46x10^{-6}$	Silty Sand (SM), trace clay, trace gravel
					Rising Head	$4.69x10^{-6}$	
BH HRE-3	12-Aug-2022	Bouwer and Rice	1.79	3.94	Rising Head	$2.75x10^{-7}$	Silty Sand (SM)
BH 2-1	13-May-2022	KGS Model	6.19	9.24	Falling Head	$1.94x10^{-6}$	Not Available
					Rising Head	$2.74x10^{-6}$	

4.3 Groundwater Quality

During construction of the project, groundwater pumped to dewater excavations is planned to be discharged directly to the natural environment, or to the nearest sanitary and storm sewer, or it may need to be treated off site. As such, the chemical quality of the pumped water will need to conform with the requirements of the Provincial Water Quality Objectives (PWQO), Town of Bradford West Gwilliumbury's Sewer Use By-Law (#2013-68), the York Region Sewer Use By-Law (2021-102) as required in the Town of East Gwillimbury's Sewer Use By-Law 2008-54 and King Township's Sewer Use By-Law 2014-072.

Raw (unfiltered) groundwater samples were obtained by AECOM at 12 monitoring well locations as described in **Section 2.5** and submitted to AGAT (Mississauga, ON) for geochemical analysis. Results of the analyses were compared against the following standards:

- **Town of Bradford West Gwillimbury Sewer Use By-Law (#2013-68):** Sanitary Sewer (Table 1) and Storm Sewer (Table 2) discharge
- **York Region Sewer Use By-Law (2021-102):** Sanitary Sewer (Schedule A) and Storm Sewer (Schedule B) discharge, and
- **Provincial Water Quality Objectives (PWQO).**

As required under the Municipal Sewer Use By-Law's and PWQO criteria, the samples were not filtered and are therefore representative of raw groundwater quality prior to any treatment processes.

The analytical results received from AGAT Laboratories indicate that the tested groundwater samples were generally below most of the criteria limits for the applicable standards, with the exception of those parameters summarized in **Table 5**, **Table 6** and **Table 7**. Certificates of Analysis provided by AGAT Laboratories are included in **Appendix C**. It is recommended that additional sampling be completed during Detail Design at all unassessed groundwater monitors listed listed in **Section 1.4**

The concentration of Un-ionized Ammonia provided in the certificates of analysis was calculated by the laboratory for each groundwater sample based on measured pH and temperature when the samples were received, rather than the field-measured parameters of pH and temperature at the time of sample collection. As a result, the laboratory calculated and reported Un-ionized Ammonia values do not accurately reflect the actual concentration within each sampled well.

Ammonia is highly soluble in water and its speciation is affected by a wide variety of environmental parameters including pH, temperature, and ionic strength. In aqueous solutions, an equilibrium exists between Un-ionized (NH3) and Ionized (NH4+) Ammonia species (Canadian Council of Ministers of the Environment, 2010). The equilibrium constant for this reaction is a function of temperature and solution pH (Florida Department of Environmental Protection, 2001). Thus, if the equilibrium constant is known for a particular temperature and the pH of the solution is also known, the fraction of Un-ionized Ammonia can be calculated. The Un-ionized Ammonia concentration can be calculated if the Total Ammonia concentration is also known from laboratory analysis (Florida Department of Environmental Protection, 2001).

Field measurements of pH and temperature together with the laboratory-derived concentration of Total Ammonia (mg/L) were utilized to calculate the Un-ionized Ammonia concentration for selected sampled monitoring wells. The calculation process followed the procedure and equations provided in Emerson et.al.,1975, and the calculation parameters are presented in **Appendix C**. The calculated concentration of Un-ionized Ammonia for selected sampled well was compared to the PWQO criteria of 0.02 mg/L. Results indicate that none of the 7 monitoring wells sampled for PWQO were found to contain a concentration of Un-ionized Ammonia in excess of the PWQO criteria.

Table 5: Summary of Parameters Exceeding the Town of Bradford West Gwillimbury Storm and Sanitary Sewer By-Law

Parameter →		Phenols	Total Copper	Total Kjeldahl Nitrogen	Total Manganese	Total Phosphorus	Total Zinc	Total Suspend-ed Solids
Unit →		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Reported Detection Limit (RDL) →		0.001	0.002	0.10	0.0001	0.002	0.020	10
Storm Sewer Limits →		0.008	0.05	1	0.15	0.40	0.04	15
Sanitary Sewer Limits →		1	3	100	5	10	2	350
Sampled Wells	BH 9-1	**0.014**	<0.002	0.2	0.042	<0.02	<0.020	15
	BH 10-4	**0.041**	<0.002	**1.28**	**0.716**	0.03	<0.020	10
	BH AIP-3	**0.036**	0.003	0.16	0.125	0.06	<0.020	**308**
	BH CN-3	**0.021**	0.011	**1.86**	**0.282**	0.14	0.022	**544**
	BH HRW-3	**0.064**	**0.065**	**2.27**	**1.86**	**1.29**	**0.104**	**2600**
	BH PDC-7	**0.006**	<0.002	0.11	0.033	0.03	<0.020	**26**

Notes: mg/L = milligrams per Litre

Bolded/Shaded = indicates parameter does not meet the Town of Bradford West Gwillimbury Sanitary Sewer Discharge (Bylaw 2013-68)

Bolded = indicates parameter does not meet the Town of Bradford West Gwillimbury Storm Sewer Discharge (Bylaw 2013-68)

Table 6: Summary of Parameters Exceeding the York Region Storm and Sanitary Sewer By-Law

Parameter →		Phenols	Total Copper	Total Kjeldahl Nitrogen	Total Manganese	Total Phosphorus	Total Zinc	Total Suspended Solids
Unit →		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Reported Detection Limit (RDL) →		0.001	0.002	0.10	0.0001	0.002	0.020	10
Storm Sewer Limits →		0.008	0.05	1	0.15	0.40	0.04	15
Sanitary Sewer Limits →		1	3	100	5	10	2	350
Sampled Wells	BH 9-1	**0.014**	<0.002	0.2	0.042	<0.02	<0.020	15
	BH 10-4	**0.041**	<0.002	**1.28**	**0.716**	0.03	<0.020	10
	BH AIP-3	**0.036**	0.003	0.16	0.125	0.06	<0.020	**308**
	BH CN-3	**0.021**	0.011	**1.86**	**0.282**	0.14	0.022	**544**
	BH HRW-3	**0.064**	**0.065**	**2.27**	**1.86**	**1.29**	**0.104**	**2600**

Notes: mg/L = milligrams per Litre

Bolded/Shaded = indicates parameter does not meet the York Region Sanitary Sewer Discharge (Bylaw 2021-102)

Bolded = indicates parameter does not meet the York Region Storm Sewer Discharge (Bylaw 2021-102)

Table 7: Summary of Parameters Exceeding PWQO Guidelines

Parameter →		Total Iron	Total Cobalt	Total Copper	Total Nickel	Total Thallium	Total Uranium	Total Vanadium	Total Zinc	Total Zirconium
Unit →		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Reported Detection Limit (RDL) →		0.01	0.0005	0.0001	0.0001	0.0003	0.002	0.0001	0.01	0.004
PWQO Guideline →		0.3	0.0009	0.005	0.025	0.0003	0.005	0.006	0.3	0.004
Sampled Wells	BH 10-1	**0.398**	<0.0005	0.001	<0.003	<0.0003	**0.012**	0.002	<0.020	<0.004
	BH HRW-1	**43.5**	**0.0178**	**0.05**	**0.04**	**0.0005**	0.003	**0.07**	**0.1**	**0.01**
	BH HRE-3	**1.2**	**0.0013**	0.003	<0.003	<0.0003	0.003	<0.002	<0.020	<0.004
	BH 201	**55.3**	**0.0186**	**0.034**	**0.031**	<0.0003	<0.002	**0.044**	**0.068**	**0.009**
	BH PDC-6	**3.07**	**0.0012**	**0.004**	**0.004**	<0.0003	<0.002	**0.006**	**0.023**	<0.004

Notes: mg/L = milligrams per Litre

Bolded = indicates parameter does not meet the PWQO Guidelines

As shown in **Table 5** and **Table 6**, phenols, total copper, total Kjeldahl nitrogen, total manganese, total phosphorus, total titanium and zinc suspended solids exceed the York Region and Town of Bradford West Gwilliumbury's Storm Sewer By-Law limits.

As shown in **Table 7**, total iron, total cobalt, total copper, total nickel, total thallium, total uranium, total vanadium, total zinc and total zirconium exceeded the PWQO guidelines limits.

Given these exceedances, the use of water treatment prior to the discharge to the respective municipal storm sewer system or the natural environment should be included as part of the dewatering plan. Additionally, it is the responsibility of the Detail Design and Construction team to identify alternate plans to treat and/or manage water if it exceeds guidelines and by-law limits should there not be a nearby municipal storm sewer system to discharge to after treatment etc.

5. Permitting Requirements

Where construction dewatering volumes between 50,000 and 400,000 L/day are expected, filing of the project on MECP's Environmental Activity and Sector Registry (EASR) system is required in accordance with Ontario Regulation 63/16 (as amended). Where expected construction dewatering volumes that exceed 400,000 L/day, a PTTW (Category 3) will be required from MECP in accordance with Section 34 of the *Ontario Water Resources Act* (RSO, 1990). Permitting requirements will be determined during the subsequent Detail Design phase once the overall design is advanced to a level of detail that makes it appropriate to complete dewatering calculations for excavated areas.

6. Environmental Considerations

6.1 Groundwater Resources

A search of the MECP WWIS database was conducted for the Study Area, which identified a total of 413 well records, as shown in **Figures 4a to 4e**. The search identified records for 230 domestic wells, four municipal wells, four industrial wells, one public well, eight commercial wells, 19 livestock wells, and 33 monitoring/observation/test wells. In addition, 42 well records are listed with other and/or not used status and 72 records with unknown status or use. A summary table of the search results, including the above-mentioned categories, is provided in **Appendix D1**.

The Study Area includes a variety of agricultural, industrial, commercial, residential and institutional properties within a municipally serviced area.

With the records of supply wells within or near to the Study Area. A water well survey was completed and is summarized in the *Door To Door Water Well Survey Report* (AECOM Canada Ltd. 2022B) under a separate cover.

6.2 PTTW/EASR Database Review

A query of MECP's PTTW and EASR databases was conducted for the Study Area. The search results identified nine PTTWs and five EASRs records, as indicated in **Figures 4a to 4e**. A summary table of the search results, including the issue and expiry dates for each PTTW and EASR, is provided in **Appendix D2 & D3**.

Three of the identified PTTW's are registered to the Town of Bradford West Gwillimbury and one is registered to the Regional Municipality of York for water supply purposes. One PTTW is registered to the Silver Lake Golf and Country Club for commercial purposes. Four PTTWs are registered for agriculture purposes (from surface water) with unknown permit owners.

It is noted that all three PTTW's registered to the Town of Bradford West Gwillimbury have expired and other PTTW's are identified as active.

Five EASRs were identified within the Study Area as related to air emissions, heating system, and automotive refinishing facility, and thus are not relevant to the current hydrogeological assessment.

6.3 Source Protection Information

As noted above in this Report, the Study Area is located within the South Georgian Bay Lake Simcoe Source Protection Region and Nottawasaga Valley Source Protection Area (Lake Simcoe Region Conservation Authority, 2021).

A review of MECP's *Source Protection Information Atlas* indicates that the Study Area is not situated within an identified Wellhead Protection Area-E - Groundwater Under Direct Influence, Q_1 or Q_2), Issue Contributing Area (ICA), or an Event Based Area (EBA).

The Study Area includes lands that have been delineated as a Highly Vulnerable Aquifer (HVA) and Significant Groundwater Recharge Areas (SGRAs), as is shown in **Figure 5**. A HVA is an aquifer that can be easily changed or affected by contamination from both human activities and natural processes. SGRAs are surfaces on the landscape that allow a high volume of water to penetrate the surface – higher than the average for the entire

watershed, with levels of low, medium and high found throughout the Study Area, especially the Holland River Lands.

Wellhead Protection Areas (WHPAs) are shown near the Holland River Lands and near Highway 404 in **Figure 5**, these are areas of groundwater flow with zones of travel times of potential contamination in relation to proximity to Municipal water supply wells. The categories are:

- WHPA-A is a 100-metre circle around the well
- WHPA-B is the 2-year time-of-travel zone
- WHPA-C is the 5-year time-of-travel zone, and
- WHPA-D is the 25-year time-of-travel zone.

From a surface water perspective, the Study Area is located within an Intake Protection Zone 3 (IPZ-3) within the Holland River Lands where a spill of a chemical or pathogen contaminant could reach a surface water intake.

Implementation of best management practices is required during Detail Design and Construction to alleviate the potential for spills and/or other potentially deleterious effects during construction of the project.

7. Dewatering Discharge

7.1 General Information – Return of Dewatering Water to the Natural Environment

Per initial data gathered during this Preliminary Design assignment, several inorganic/metal parameters exceeded the Provincial Water Quality Objectives (PWQO) in the groundwater samples collected from groundwater monitoring wells in the vicinity of the proposed groundwater taking locations.

During Detail Design, a pre-construction groundwater sampling program should be conducted for the groundwater monitoring wells located in the vicinity of the proposed dewatering locations (at least one well at one dewatering location) to confirm the groundwater quality in the areas. The collected groundwater samples have to be analyzed for general inorganic parameters (including total suspended solids (TSS) and turbidity), metals, and volatile organic compounds (VOCs). Based on the pre-construction groundwater analytical results, there will be two anticipated options:

Option 1:

If the concentrations of the analyzed parameters in dewatering groundwater have been confirmed to be above the applicable standards (i.e., sewer by-law or PWQO), the groundwater needs to be pre-treated prior to being re-used or discharged to the municipal sewer system (if one exists) or nearby drainage ditch. Onsite groundwater treatment may require operating a mobile groundwater treatment unit. The mobile groundwater treatment unit usually consists of a series of containers/tanks containing different types of treatment media, which are customized to remove specific contaminants identified in the groundwater.

If the desired groundwater quality could not be met through the treatment processes, the collected water must be disposed properly off-site at an MECP approved facility by the Contractor.

Option 2:

If the treated groundwater meets the PWQO, the groundwater is recommended to be re-used on site for construction purposes (i.e., dust control etc.) as a water conservation measure. The excess groundwater may be discharged to the municipal sewer system (if one exists) or nearby drainage ditch. During Detail Design and Construction, erosion and sediment control measures and a groundwater monitoring program will be developed and implemented to maintain the environmental quality of the water discharged, both chemical parameters and physical parameters, meet the municipal sewer by-law (if discharged to the sewer), or the PWQO (if discharged to the natural environment), and the requirements provided in Ontario Regulation 387/04 and Ontario Regulation 63/16.

Deliverables:

A Construction Dewatering Plan (Water Discharge/Management) shall be prepared during Detail Design and Construction, as well as an Erosion and Sediment Control Plan and a Groundwater Quality Monitoring Program. The Construction Dewatering Plan, which shall include details on where and when all groundwater is obtained, stored, transferred, used and returned to the environment (if applicable) and the proper decommissioning of the dewatering wells upon the completion of the construction, must be implemented prior to the discharge to the natural environment. These three reports should be prepared during the subsequent Detail Design prior to the commencement of the dewatering activities and submitted to MECP when finalizing the draft permit to take water (if one is determined to be required during subsequent Detail Design and Construction phases).

The preferable discharging method for the dewatering groundwater is to the municipal sewer system in the vicinity of the study area if one exists. However, given the nature of the study area opportunities to connect to municipal sewer systems may be limited and challenging.

7.2 Dewatering Discharge in the Town of Bradford West Gwillimbury

Dewatering effluent shall be directed to the Town of Bradford West Gwillimbury's sanitary or storm sewer system for dewatering near existing roadways. Any discharge of water would be subject to the terms and conditions of all required permits obtained during the subsequent Detail Design based on the actual conditions encountered during construction. Sewer discharge requires by-law authorization from the Town.

The results of the baseline water quality sampling completed within the Study Area indicates that dewatering effluent may not fulfill the water quality requirements under the Town of Bradford West Gwillimbury's Sewer Use Bylaw 2013-68 for Storm Sewer Discharge without pre-treatment for the exceeded parameters identified by AECOM sampling in 2021 and 2022 (AECOM, 2022A). As a result, it will be the responsibility of the dewatering contractor to maintain that any discharge to the local sewer system occurs in full compliance with the Town's Sewer Use By-Law (By-Law 2013-68). The Contractor shall make sure that all control measures implemented, and all materials collected or trapped by those measures are recovered and properly disposed of when they are no longer engaging in the activity or discharge to the sanitary sewer. Expected treatment options for the dewatering discharge potentially include sedimentation tanks and filtration.

7.3 Dewatering Discharge in the Town of East Gwillimbury

Dewatering effluent shall be directed to the Town of East Gwillimbury's sanitary sewer system for dewatering near existing roadways. Any discharge of water shall be subject to the terms and conditions of all required permits obtained during Detail Design based on the actual conditions encountered during construction. Sewer discharge requires by-law authorization from the Town.

The results of the baseline water quality sampling completed within the Study Area indicates that dewatering effluent may not fulfill the water quality requirements under the York Region Sewer Use By-Law (2021-102) as required in the Town of East Gwillimbury's Sewer Use By-Law 2008-54 for Storm Sewer Discharge without pre-treatment for the exceeded parameters identified by AECOM sampling in 2021 and 2022 (AECOM, 2022A). As a result, it will be the responsibility of the dewatering contractor to maintain that any discharge to the local sewer system occurs in full compliance with York Region Sewer Use By-Law (By-Law 2021-102). The Contractor shall make sure that all control measures implemented, and all materials collected or trapped by those measures are recovered and properly disposed of when they are no longer engaging in the activity or discharge to the sanitary sewer. Expected treatment options for the dewatering discharge potentially include sedimentation tanks and filtration.

7.4 Dewatering Discharge in King Township

Dewatering effluent shall be directed to the King Township's sanitary sewer system for dewatering near existing roadways. Any discharge of water shall be subject to the terms and conditions of all required permits obtained by the Detail Design designer based on the actual conditions encountered during construction. Sewer discharge requires by-law authorization from the Township.

The results of the baseline water quality sampling completed within the Study Area indicates that dewatering effluent may not fulfill the water quality requirements under the York Region Sewer Use By-Law (2021-102) as required in the King Township's Sewer Use By-Law 2014-072 for Storm Sewer Discharge without pre-treatment for the exceeded parameters identified by AECOM sampling in 2021 and 2022 (AECOM, 2022A). As a result, it will be the responsibility of the dewatering Contractor to comply that any discharge to the local sewer system occurs in full compliance with York Region Sewer Use By-Law (By-Law 2021-102). The Contractor shall make sure that all control measures implemented, and all materials collected or trapped by those measures are recovered and properly disposed of when they are no longer engaging in the activity or discharge to the sanitary sewer. Expected treatment options for the dewatering discharge potentially include sedimentation tanks and filtration.

If the collected groundwater from dewatering activities is expecting to be discharged to the natural environment (only in areas of no previous development) this water must be tested for Provincial Water Quality Objectives (PWQO) and be in compliance with these objectives. Given the variability in geological material encountered throughout the proposed ROW, it is suggested that the dewatering Contractor be prepared to potentially deal with treatment for suspended solids prior to discharge to the sanitary sewer. Given the Highly Vulnerable Aquifer (HVA), Significant Groundwater Recharge Areas (SGRA), and Wellhead Protection Areas (WHPA) present within the Study Area, discharge to the natural environment is unlikely to be an option.

The results described above are representative of the condition at the sampled monitoring well at the time of sampling and do not necessarily reflect conditions that will be present at the time of construction. Confirmation of local groundwater levels and groundwater quality shall be completed during Detail Design prior to construction activities.

Prior to discharging any dewatering effluent, the Contractor will be required to check that all necessary discharge permits have been secured and that the Water Taking Plan, Discharge Plan, a Water Treatment Process and Sampling Plan has been designed and implemented in accordance with the terms and conditions of any such permits and the contract documents. Further information can be found in the Groundwater Protection and Well Monitoring Plan (AECOM, 2023A)

8. Summary of Environmental Commitments

8.1 2002 Approved Environmental Assessment Commitments

The 2002 Approved Environmental Assessment identified a number of proposed mitigation and commitments to future work for the project. **Table 8-1** below identifies the groundwater commitments carried forward through to Preliminary Design and describes any applicable changes to the 2002 Approved Environmental Assessment commitment. Commitments identified in the 2002 Approved Environmental Assessment are to be carried forward to the subsequent Detail Design phase unless otherwise stated in **Table 8-1** below.

Table 8-1: 2002 Approved Environmental Assessment Commitments and Description of Changes Carried Forward Through Preliminary Design

Factor / Criterion	Issue	Concerned Group / Agency	Potential Net Environmental Effect (as taken from 2002 Approved Environmental Report)	Proposed Mitigation / Commitments to Future Work (as taken from 2002 Approved Environmental Report)	Changes to Mitigation/ Protection/ Monitoring (Yes/No/NA)	Description of Commitment Carried Forward through Preliminary Design for Mitigation, Protection and Monitoring
Groundwater	■ Potential well impacts and contamination of/interference with groundwater resources	■ Ministry of Transportation, local municipalities, property owners	■ 24 domestic wells are potentially affected either directly (i.e., removal) or indirectly (i.e., potential interference) by the proposed Link. In the area of sandy soils associated with the Holland River, shallow perched groundwater system is susceptible to contamination and/or interference. The Bradford municipal well west of the Holland River will be avoided and otherwise unaffected by the proposed roadway.	■ Tilling of soil in non-vegetated areas prior to restoration to re-establish infiltration along access roads, storage areas, or other well travelled areas where soil compaction has occurred in areas that previously permitted infiltrating ■ Backfilling of excavations that intercept existing groundwater flow with porous granular material to maintain existing groundwater linkage particularly at river crossings ■ Detailed stormwater management plans which address both quantity and quality ■ A well monitoring program which will involve pre-construction testing, investigation of complaints during construction, and provision of an alternate water supply, and ■ Use of appropriate dewatering and spills avoidance management techniques.	■ Yes	■ Proposed mitigation measure outlined in 2002 shall be complied with such as: ○ Tilling of soil in non-vegetated areas prior to restoration to re-establish infiltration along access roads, storage areas, or other well travelled areas where soil compaction has occurred in areas that previously permitted infiltrating ○ Backfilling of excavations that intercept existing groundwater flow with porous granular material to maintain existing groundwater linkage particularly at river crossings ○ Detailed stormwater management plans which address both quantity and quality ○ A well monitoring program which will involve pre-construction testing, investigation of complaints during construction, and provision of an alternate water supply, and ○ Use of appropriate dewatering and spills avoidance management techniques. ■ The Ministry shall complete and prepare a Stormwater Management Plan and a Groundwater Protection and Well Monitoring Plan per the Regulation, and ■ As a result of the project-specific assessment of environmental impacts, during subsequent Detail Design and Construction phases, design and construction plans will consider erosion and sediment control requirements, access management, clearing and grubbing, earth management and landscape and ecological restoration.

8.2 Preliminary Design Commitments

Impacts to groundwater and the hydrogeological system and proposed mitigation measures, monitoring activities and commitments identified in this Report are summarized in **Table 8-2** below.

Table 8-2: Summary of Environmental Concerns and Commitments

ID	Issues / Concerns / Potential Effects	Concerned Agencies	ID	Mitigation, Protection, Monitoring, and Commitments
Groundwater and Hydrogeology				
GW-1.00	Dewatering Effluent Discharge	■ Ministry of Environment Conservation and Parks, and ■ Lake Simcoe Conservation Authority.	GW-1.01	■ It is recommended that dewatering effluent be directed to the local Town sanitary or storm sewer, if applicable. Any discharge of water would be subject to the terms and conditions of all required permits obtained by the Contractor based on the actual conditions encountered during construction. Sewer discharge requires by-law authorization from the Town. Due to the close proximity of the construction to agricultural drains, it is suggested that the discharge be directed away from the drains to reduce overland flow and promote infiltration, and ■ Discharge the natural environment will be allowed with previously undeveloped areas assuming that the discharge meets PWQO. Further discharge restrictions may occur based on proximity within or nearby SGRA and WHPAs. Supplemental sampling during dewatering will be required to maintain discharge compliance.
			GW-1.02	■ Prior to discharging any dewatering effluent, the Contractor will be required to check that all necessary discharge permits have been secured and that the Water Taking Plan, Discharge Plan, a Water Treatment Process and Sampling Plan has been designed and implemented in accordance with the terms and conditions of any such permits and the contract documents developed during Detail Design, and ■ Regular sampling and testing of the discharge and residential wells by the Contractor will be required during construction to verify that the effluent quality continues to comply.
			GW-1.03	■ A visual inspection must be completed by the Contractor along with the collection of in-field turbidity and temperature measurements (both untreated and treated effluent discharge streams) on a daily basis during periods of active discharge for the duration of the dewatering system(s) operation. A visual inspection of terrestrial changes or sedimentation within the HVA area and surface water features within the proposed construction area are also required ■ In the event that a sample is determined to be 'unacceptable' based on the applicable water quality standards, field turbidity and/or temperature monitoring activities, additional effluent samples must be obtained by the Contractor immediately upon receipt of the initial laboratory results for verification purposes. In the event of "unacceptable" results, the local Public Health agencies (Simcoe Muskoka Public Health, York Region Public Health) will be notified immediately, and ■ Where the verification sampling is confirmed, immediate action should be taken by the Contractor to assess and potentially modify their dewatering approach / methodology, rate / duration of pumping, and/or provide additional / alternative pre-treatment prior to resuming any further discharge. Prior to resuming any effluent discharge, a confirmatory sample should be obtained by the Contractor confirming adherence with the applicable water quality standards.
GW-2.00	Potential conflicts with monitoring wells	■ Ministry of Environment Conservation and Parks ■ Ministry of Transportation ■ Lake Simcoe Conservation Authority, and ■ Nottawasaga Valley Conservation Authority	GW-2.01	■ Should the location of any existing monitoring wells be in conflict with the location(s) of project construction or damaged as a result of project construction activities, it is recommended that a Ministry of the Environment, Conservation and Parks licenced water well contractor be retained by the Contractor to decommission those locations in accordance with Ontario Regulation 903 (Wells), as amended. It is further recommended that replacement well(s) be installed by a licenced environmental drilling contractor to replace any decommissioned monitoring wells and/or piezometers.
			GW-2.02	■ A pre-construction groundwater sampling program should be conducted for the groundwater monitoring wells located in the vicinity of the proposed dewatering locations (at least one well at one dewatering location) to confirm the groundwater quality in the areas. The collected groundwater samples have to be analyzed for general inorganic parameters (including total suspended solids (TSS) and turbidity), metals, hydrocarbons, and VOCs.
			GW-2.03	■ The monitoring wells listed in **Table 1** were completed during the Preliminary Design program, are considered as part of the proposed monitoring program within the potential dewatering ROI and is to be monitored during Detail Design, for each excavation and proposed structure. If the design changes during Detail Design, additional monitoring wells may need to be installed that reflect the revised proposed excavation areas.
GW-3.00	Potential impacts to private wells	■ Ministry of Environment Conservation and Parks ■ Lake Simcoe and Muskoka Public Health, and ■ York Region Public Health	GW-3.01	■ Prior to any construction dewatering occurring the properties listed Door to Door Water Well Survey Report shall be contacted for monitoring and sampling of the residential well during and after construction to confirm that there is no effect on the water quality from the baseline assessed. The Door-to-Door Water Well Survey provides a baseline for the water wells prior to the proposed construction to determine existing water quality and quantity of each property. Additional mailing of letters to all properties within 500 m of the study limits is recommended to maintain all concerned homeowners are monitored during and after construction to capture and confirm potential well issues are addressed and monitored.
			GW-3.02	■ Prior to the initiation of the monitoring and sampling of the residential properties listed above, the Contractor will contact local public health (Simcoe Muskoka Public Health, York Region Public Health) to allow for involvement as requested/required.
			GW-3.03	■ Where the monitoring completed above identifies a significant amount of water level drawdown (i.e., in excess of 0.3 m at a monitored location more than 40 m ROI from the dewatering area), immediate action should be taken by the Contractor to assess and potentially modify their dewatering approach / methodology, and/or rate / duration of pumping, so as to limit the dewatering radius of impact (R) and alleviate the observed groundwater level impact. It is recommended that dataloggers be installed during Detail Design in each identified residential water well and monitoring well and left for the duration of the dewatering period, and ■ Monthly hydrographs will be provided to the MTO, MECP, Simcoe Muskoka Public Health, and York Region Public Health showing the changes to the local groundwater levels as a result of the proposed construction by the Contractor.
			GW-3.04	■ Residential wells should be sampled for a representative raw (untreated) water sample for analysis of general water quality (pH; total hardness; total alkalinity; calcium, magnesium, sodium; potassium; iron, manganese; chloride; sulphate; nitrate [NO3-N]; nitrite [NO2-N], ammonia / ammonium [NH3-N]; electrical conductivity; total dissolved solids [TDS]; total suspended solids [TSS]; tannins and lignins); hydrocarbons and microbiological (E. coli, faecal coliforms, total coliforms) parameters, and ■ Sodium sampling results will be provided to local Public Health Agencies (Simcoe Muskoka Public Health, York Region Public Health) as received by the Detail Design Designer. Adequate pre-treatment shall be provided by the Contractor at each dewatering location to achieve compliance prior to any off-site discharge occurring. Establishing treatment methodology (settling tank) is the responsibility of the Contractor and may be further informed by the raw (pumped) water quality and confirmatory sampling results obtained by the Contractor during construction.

ID	Issues / Concerns / Potential Effects	Concerned Agencies	ID	Mitigation, Protection, Monitoring, and Commitments
GW-4.00	Assumed Excavation Parameters and Radius of Influence	■ Ministry of Environment Conservation and Parks, and ■ Ministry of Transportation	GW-4.01	■ All groundwater plans should assume the potential for groundwater interference to be limited to those areas where the deeper road alignment (trenches, ditches, and bridge support structures) will cut 1 m to 15 m into the subsurface locally and will extend below the existing groundwater table.
			GW-4.02	■ The calculated radius of influence at each dewatering locations shall be summarized and reported on by the subsequent Contractor. If the deep monitoring wells (over 15 m) are at risk of being affected during Detail Design reporting, additional mitigation measures may need to be considered (domestic well monitoring, caissons, etc.).
			GW-4.03	■ Mitigation plans should be generated for any excavation and structure construction with areas of medium to high significant groundwater recharge areas (SGRA) as shown near the Holland River and Holland River East Branch as shown in **Figure 5**. Dewatering discharge should be directed away from Well Head Protection (WHPA) areas if excavation and dewatering activities are occurring within them, as shown in **Figure 5**.
			GW-4.04	■ Based on AECOM's understanding of the regional hydrogeology, the potential effect of road salt runoff from the highway on the shallow groundwater system and shallow surficial materials is considered high. These areas of high aquifer vulnerability could potentially be impacted by saline runoff. As such, berms around the excavated areas are required during dewatering to limit runoff.
GW-5.00	Potential Groundwater Contamination	■ Ministry of Environment Conservation and Parks ■ Ministry of Transportation ■ Lake Simcoe Conservation Authority ■ Nottawasaga Valley Conservation Authority	GW-5.01	■ The use of best management practices for handling of hydrocarbons according to the Ministry of Environment, Conservation and Parks (MECP) and the Technical Standards and Safety Authority (TSSA) of the Ministry of Government Services will reduce the potential of environmental adverse effects associated with petroleum product handling and uses. Spillage of petroleum products must be immediately remediated according to these standards such that groundwater quality is not impacted.
			GW-5.02	■ The effect of road salt can result in the direct increase of shallow groundwater salinity, or in the case of deeper wells, an increase in water hardness over time. The susceptibility of the soils to infiltration is reflected by the Highly Vulnerable Aquifers (HVA) designation areas along the entire project construction area. Any runoff and dewatering discharge should be directed away from these areas unless they meet the Provincial Water Quality Objectives (PWQO).
GW-6.00	Ongoing Monitoring	■ Ministry of Environment Conservation and Parks, and ■ Ministry of Transportation	GW-6.01	■ All monitoring wells listed in **Table 1** should continue be assessed again during Detail Design under the following gaps or design changes: – Additional groundwater monitors installed by Golder/WSP during Detail Design will be developed, tested, monitored and sampled for the required discharge option – If design changes, the representation of the groundwater monitors to the zone of construction dewatering will be assessed. Additional groundwater monitors may need to be installed, and – Well abandonment will be carried out in compliance with O. Reg. 903 Wells (as amended) for any damaged or deemed unnecessary.

9. Recommendations and Conclusions

This Report was completed for the intended purpose of characterizing the local physical and groundwater setting, assessing possible impacts to local water wells and groundwater dependent environmental features. This Report was prepared in accordance with the requirements of O. Reg. 697/21, Section 23. It is recommended that this Report be updated based on the additional field investigation that will be completed during subsequent Detail Design of the project.

As part of the Report, AECOM reviewed the MECP Water Well Database that identifies water wells within the Bradford Bypass corridor that may be impacted by the project. Approximately 260 domestic, livestock, commercial, industrial, or public water supply wells within the Study Area were identified.

A series of groundwater monitoring wells have been installed along the highway corridor within the Study Area to track groundwater quality and quantity before and after construction. A pre-construction groundwater sampling program will be conducted to establish baseline data which will enable effective monitoring of changes within groundwater levels and quality related to construction activities. Assessment of some of the groundwater monitoring wells installed by Golder/WSP were not completed due to accessibility and installation after AECOM's assessment had been completed as listed in **Table 1**. It is expected that additional well development, hydraulic conductivity testing, water quality testing and continued groundwater elevation monitoring, be completed during subsequent Detail Design of the project once the design is finalized. Additional groundwater monitors may need to be installed if the currently installed groundwater monitors no longer reflect the current excavated areas. It is recommended that dataloggers be installed in all groundwater monitoring wells to capture seasonal variations in the groundwater elevations during subsequent Detail Design of the project.

Dewatering discharge will be managed consistent with best management practices employed by the Ministry and applied to all highway construction projects. Any runoff or dewatering discharge from construction will be directed away from any environmentally sensitive areas identified along the entire length of the highway unless on-site testing indicates that satisfactory provincial water quality standards are met. Any uncontrolled release of dewatering effluent during construction will be treated with the same urgency as a chemical spill and managed using best practices, as well as protocols in the contractor's Spill Prevention and Response Plan. If the spill impacts the natural environment, it will also be reported to the MECP Spills Action Centre.

The results of WSP/Golder's Geological Investigation were relied upon by AECOM in the completion of this Preliminary Design Plan. AECOM has assumed that all information provided was factual and accurate. Judgement has been used by AECOM in the interpretation of the field information collected. However, it is recognized that subsurface physical and chemical characteristics may vary between or beyond borehole locations given the variability observed in local geological and hydrogeological conditions. If variability in geologic and/or hydrogeologic conditions is observed at the time of construction, in comparison to the information presented in this Report, AECOM should be contacted to review the conditions present and assess the potential implications. Additionally, should further works be completed by Golder for the project, or other project components be added which were not factored into this Report, they shall be considered beyond the scope of this Report and be assessed and documented in the subsequent Detail Design phase.

10. References

AECOM Canada Ltd. 2023A:
Draft Groundwater Protection and Well Monitoring Plan – Highway 400 to Highway 404 Link (Bradford Bypass) (GWP 2008-21-00).

AECOM Canada Ltd. 2023B:
Door To Door Water Well Report – Highway 400 to Highway 404 Link (Bradford Bypass) (GWP 2008-21-00).

Bouwer, H. and R.C. Rice, 1976:
A Slug Test Method for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially Penetrating Wells, Water Resources Research, vol. 12, no. 3, pp. 423-428.

Butler, J.J., Jr., and E.J. Garnett, 2000:
Simple Procedures for Analysis of in Formations of High Hydraulic Conductivity Using Spreadsheet and Graphics Software, Kansas Geological Survey, Open-File Report 2000.
http://www.kgs.ku.edu/Hydro/Publications/OFR00_40/index.html

Chapman, L.J. and D.F. Putnam, 1984:
The Physiography of Southern Ontario. Ontario Geological Survey, Special Volume 2, 270 pp. Accompanied by Map P.2715 (coloured), scale 1:600,000.

Golder Associates Ltd., A Member of WSP (Golder/WSP). September 2022. Preliminary Foundation Investigation and Design Report – Bradford Bypass and Highway 404 Interchange Ramp Structures. Highway 400 to Highway 404 Link (Bradford Bypass). Simcoe County and York Region. Assignment No. 2019-E-0048. Golder/WSP Golder/WSP Project No. 19136074;

Golder Associates Ltd., A Member of WSP (Golder/WSP). October 2022. Preliminary Foundation Investigation and Design Report – Holland River (West Branch) Structure. Highway 400 to Highway 404 Link (Bradford Bypass). Simcoe County and York Region. Assignment No. 2019-E-0048. Golder/WSP Project No. 19136074;

Golder Associates Ltd., A Member of WSP (Golder/WSP). October 2022. Preliminary Foundation Investigation and Design Report – Holland River (East Branch) Structure. Highway 400 to Highway 404 Link (Bradford Bypass). Simcoe County and York Region. Assignment No. 2019-E-0048. Golder/WSP Project No. 19136074;

Golder Associates Ltd., A Member of WSP (Golder/WSP). January 2023. Preliminary Foundation Investigation and Design Report – 10th Sideroad Underpass Structure. Highway 400 to Highway 404 Link (Bradford Bypass). Simcoe County and York Region. Assignment No. 2019-E-0048. Golder/WSP Project No. 19136074;

Hvorslev, M.J., 1951:
Time Lag and Soil Permeability in Groundwater Observations, Bull No. 36, Waterways Experiment Station Corps of Engineers, U.S. Army, Vicksburg, Mississippi, p.1-50.

Lake Simcoe Region Conservation Authority, 2021:
South Georgian Bay, Lake Simcoe Source Protection Plan.

Ontario Geological Survey (OGS), 2010:
Surficial geology of Southern Ontario; Ontario Geological Survey, Miscellaneous Release--Data 128-REV ISBN 978-1-4435-2482-7 [zip file].

Ontario Geological Survey (OGS), 1991:
Bedrock Geology of Ontario, Southern Sheet; Ontario Geological Survey, Map 2544, scale 1:1 000 000.

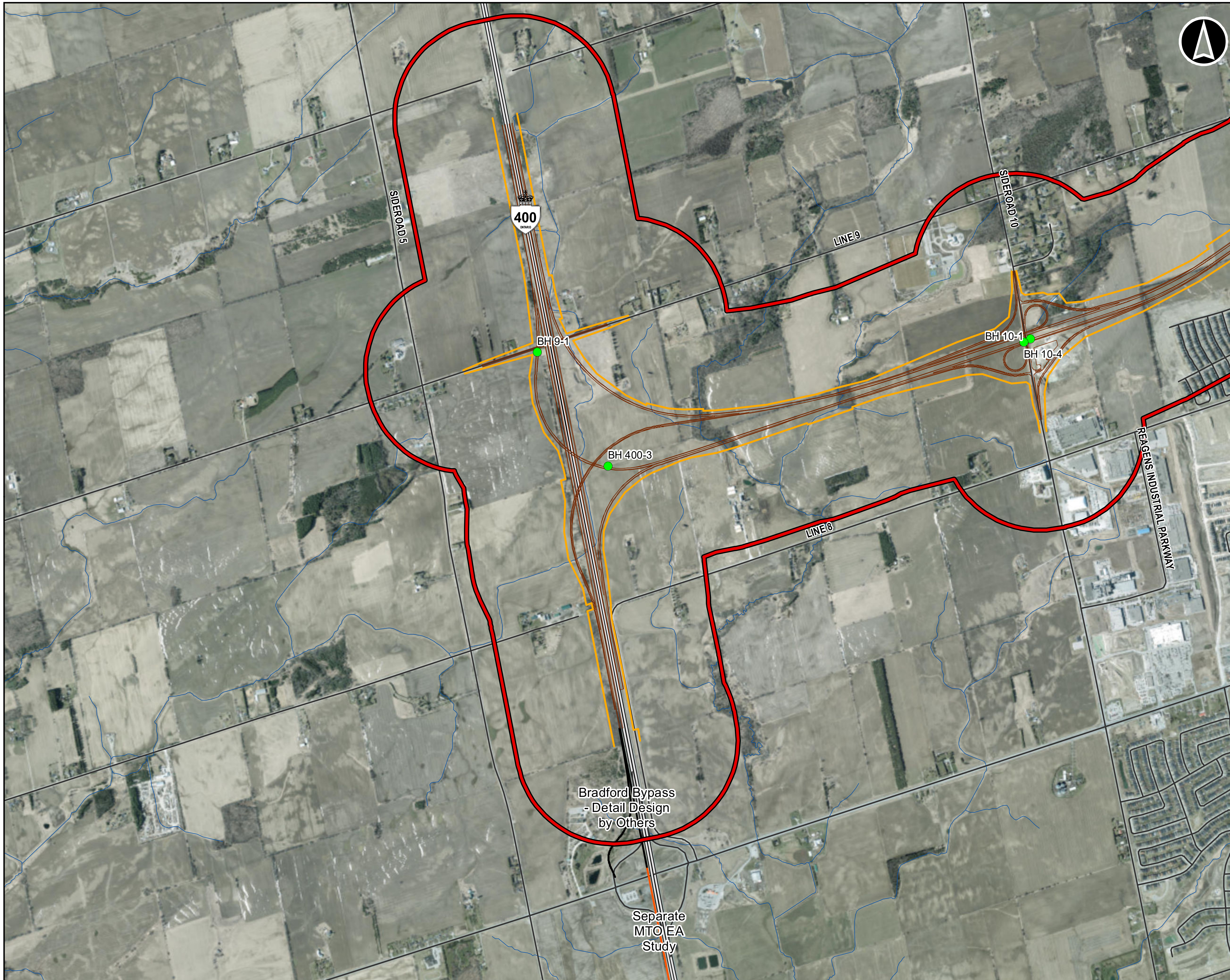
Ontario Geological Survey, 1997:
Quaternary geology, seamless coverage of the province of Ontario: Ontario Geological Survey, Data Set 14

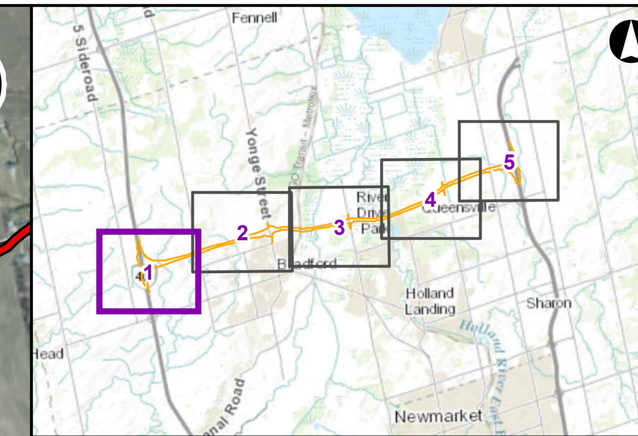
Ontario Geological Survey (OGS), 2003:
Surficial Geology of Southern Ontario. Ontario Geological Survey, MRD128..

Ontario Ministry of the Environment and Climate Change (MECP), 2018d:
Water Well Information System (WWIS).

Sichart, W. and W. Kyrieleis, 1930:
Grundwasser Absekungen bei Fundierungsarbeiten. Berlin, Germany.

Figures





Legend

- Well Location
- Bradford Bypass - MTO Right-Of-Way
- Bradford Bypass Preliminary Design
- Bradford Bypass/Detail Design (by Others)
- Separate MTO EA Study
- Study Area (500m)

Roads

- Provincial Highway
- Other
- Municipality Boundary
- Waterbody
- Watercourses

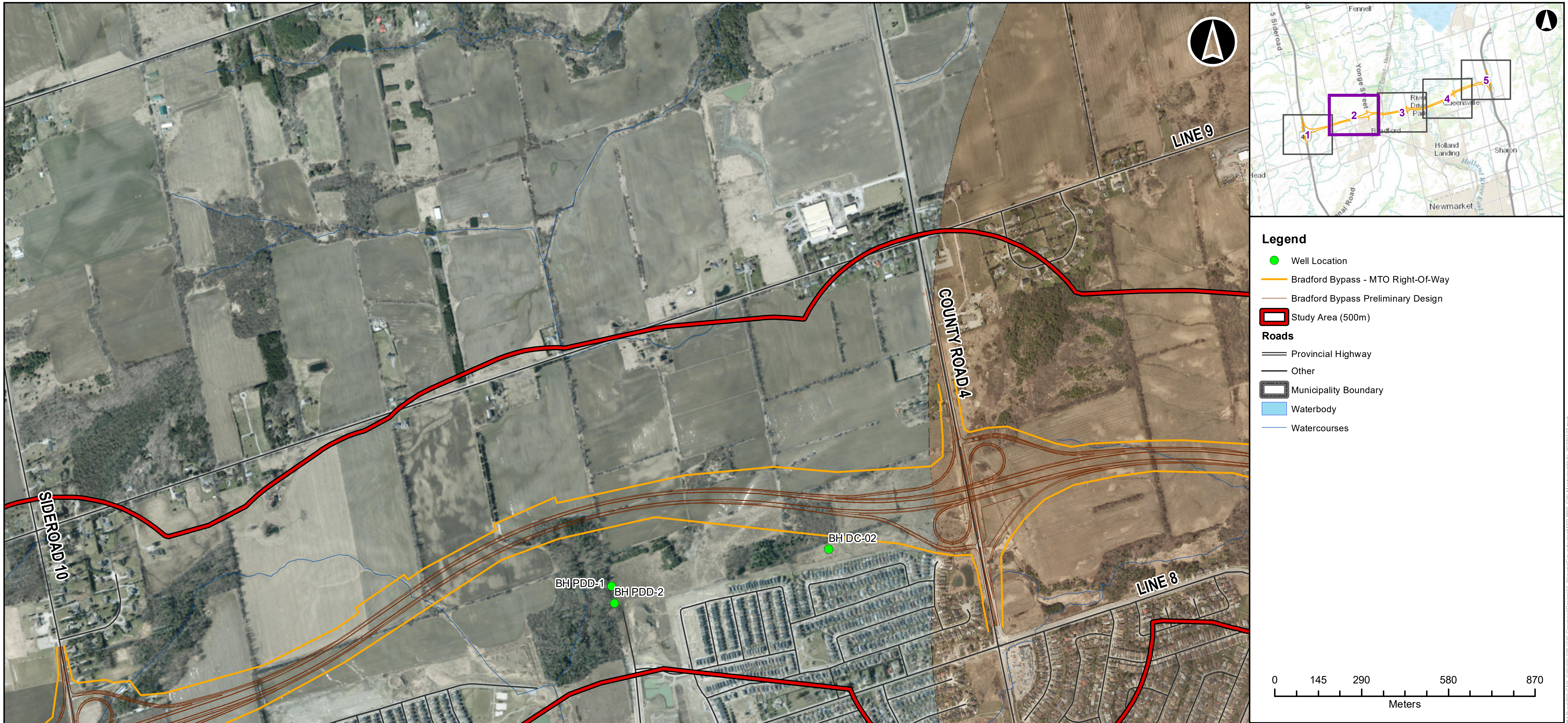
0 215 430 860 1,290

Meters

Bradford Bypass Project

Monitoring Well Locations

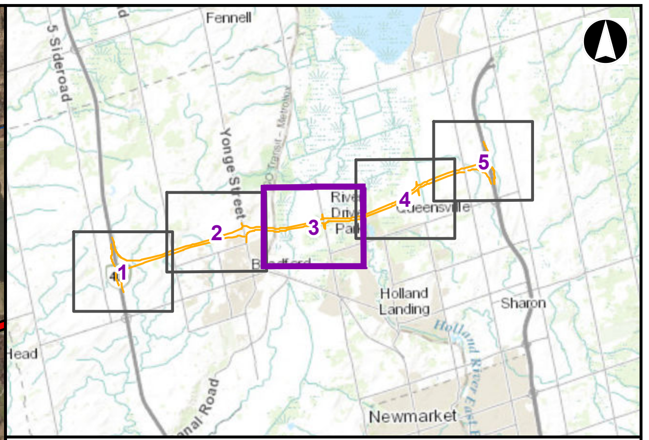
Jan, 2023	1:19,000 * when printed 11"x17"	Datum: NAD 1983 UTM Zone 17N Source: Imagery Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN,
	V: Study Area	
AECOM		Figure 1a



Bradford Bypass Project

Monitoring Well Locations

Jan, 2023	1:12,500 * when printed 11"x17"	Datum: NAD 1983 UTM Zone 17N Source: Imagery Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN,
	V: Study Area	
AECOM		Figure 1b



Legend

- Well Location
- Bradford Bypass - MTO Right-Of-Way
- Bradford Bypass Preliminary Design
- Study Area (500m)

Roads

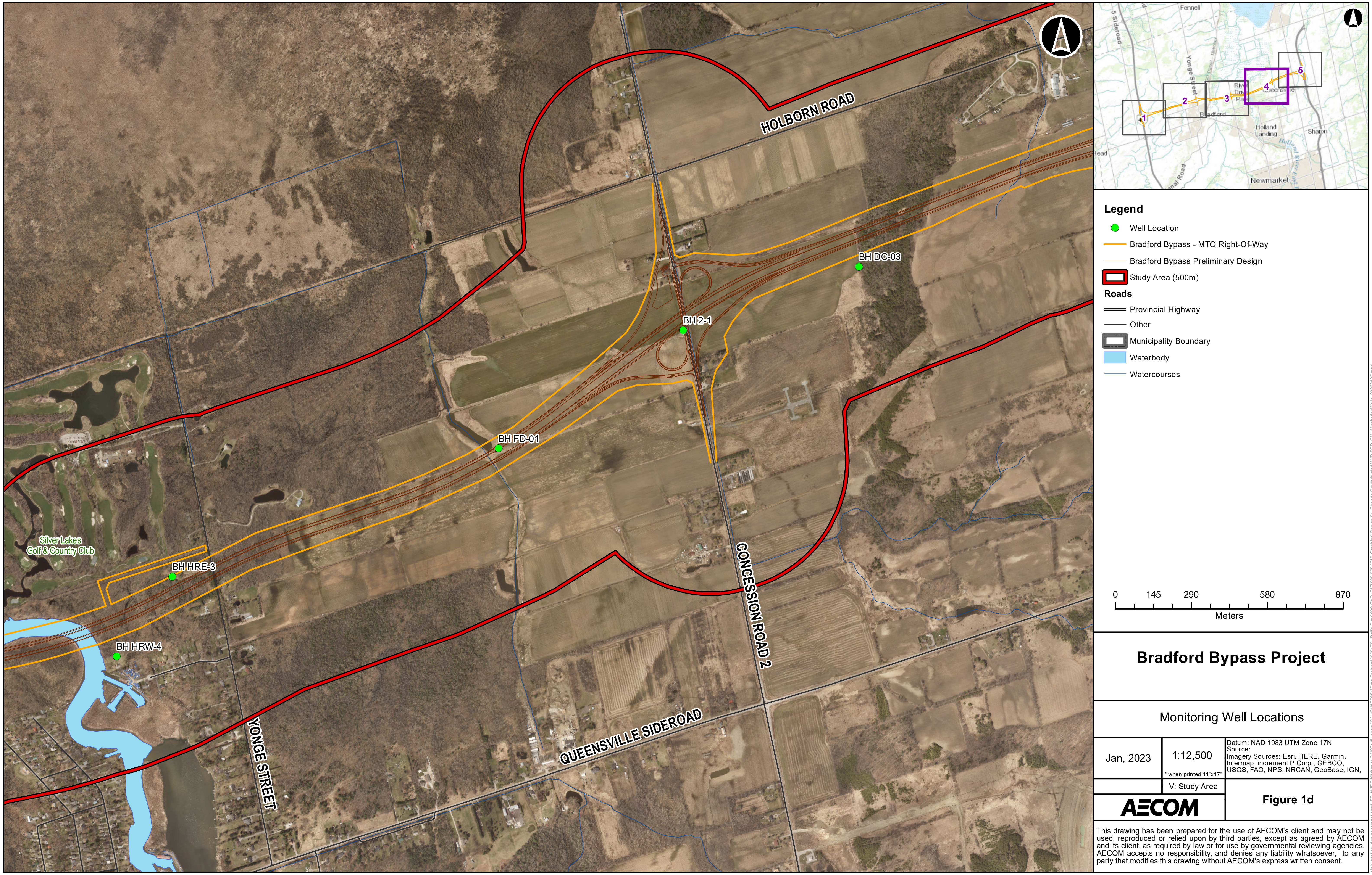
- Provincial Highway
- Other
- Municipality Boundary
- Waterbody
- Watercourses

0 145 290 580 870
Meters

Bradford Bypass Project

Monitoring Well Locations

Jan, 2023	1:12,500 * when printed 11"x17"	Datum: NAD 1983 UTM Zone 17N Source: Imagery Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN,
AECOM	V: Study Area	Figure 1c



Legend

- Well Location
- Bradford Bypass - MTO Right-Of-Way
- Bradford Bypass Preliminary Design
- Study Area (500m)

Roads

- Provincial Highway
- Other
- Municipality Boundary
- Waterbody
- Watercourses

Bradford Bypass Project

Monitoring Well Locations

Jan, 2023

1:12,500

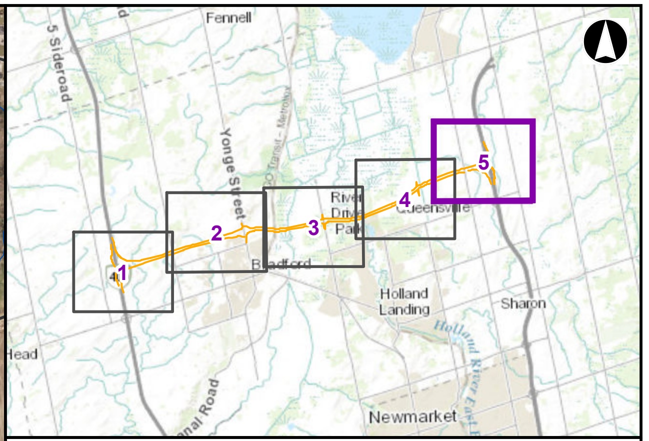
* when printed 11"x17"

V: Study Area

Datum: NAD 1983 UTM Zone 17N
Source:
Imagery Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN,

AECOM

Figure 1d



Legend

- Well Location
- Bradford Bypass - MTO Right-Of-Way
- Bradford Bypass Preliminary Design
- Separate MTO EA Study
- Study Area (500m)

Roads

- Provincial Highway
- Other
- Municipality Boundary
- Waterbody
- Watercourses

0 185 370 740 1,110

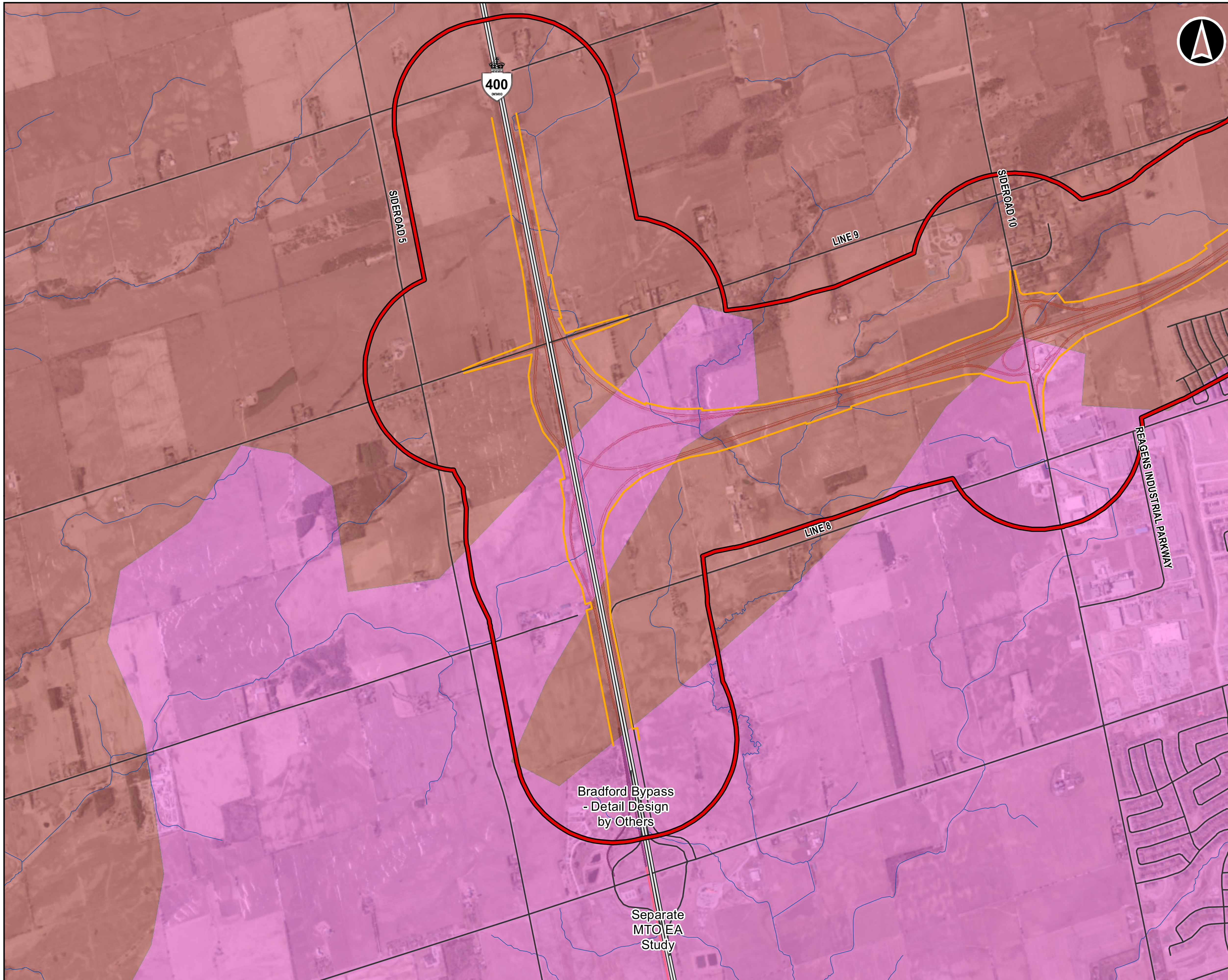
Meters

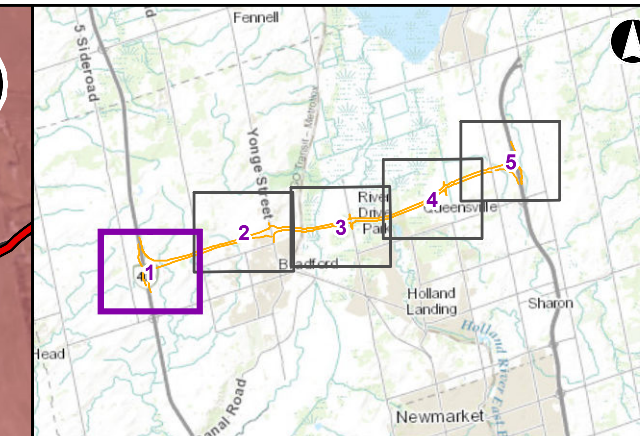
Bradford Bypass Project

Monitoring Well Locations

Jan, 2023	1:16,000 * when printed 11"x17"	Datum: NAD 1983 UTM Zone 17N Source: Imagery Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN,
	V: Study Area	Figure 1e

AECOM





Legend

- Bradford Bypass - MTO Right-Of-Way
- Bradford Bypass Preliminary Design
- Bradford Bypass/Detail Design (by Others)
- Separate MTO EA Study
- Study Area (500m)
- Watercourses
- Waterbody

Quaternary Geology

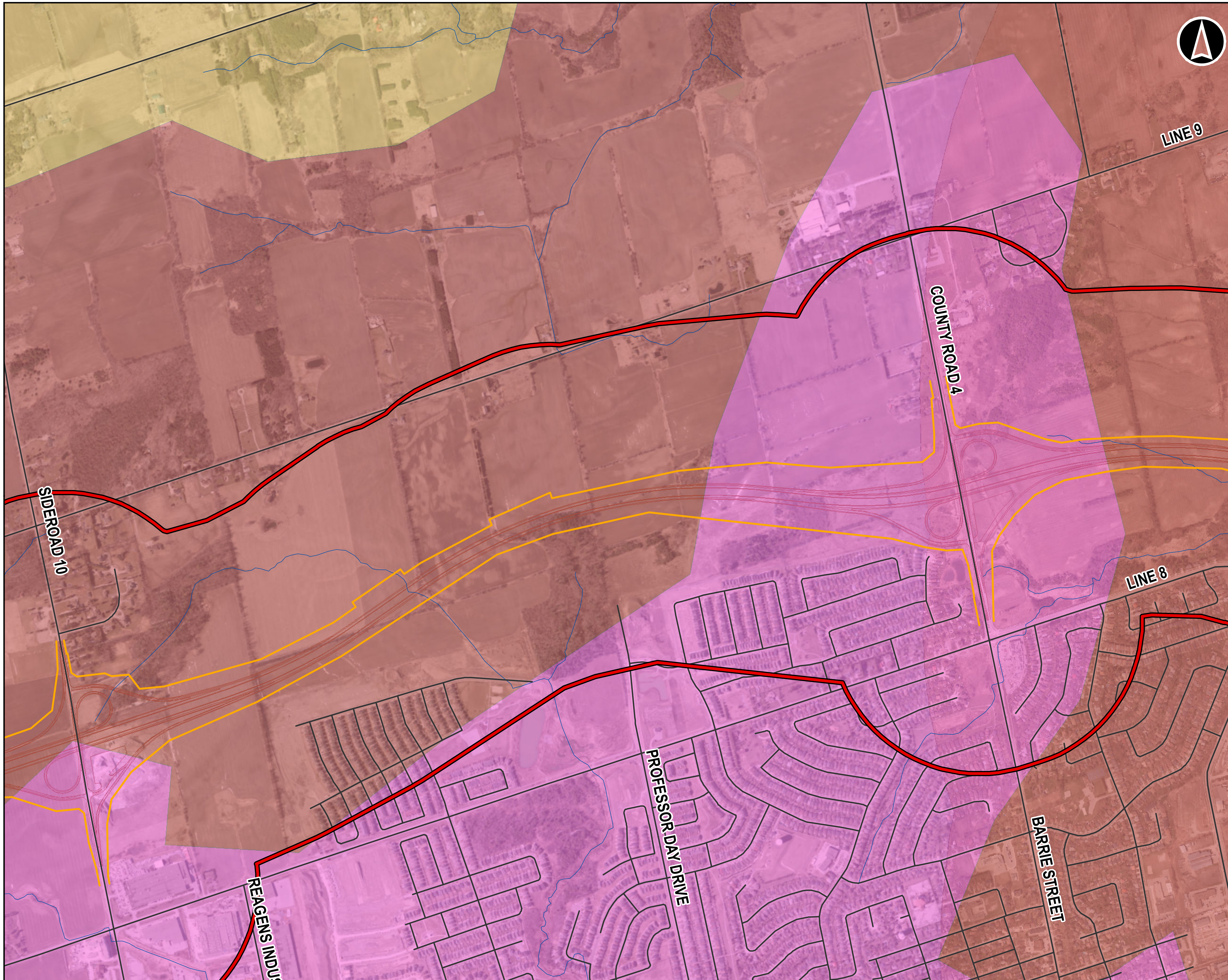
- 2: Bedrock, post-Precambrian
- 13: Sandy Silt to Silt (Newmarket Till)
- 16: Silt to Silty clay (Kettleby Till)
- 22 and 23: Gravel and Sand (Ice-contact/Outwash Deposits)
- 24: Silt and Clay (Glaciolacustrine basin and quiet water deposits)
- 25: Sand and Gravel (Glaciolacustrine nearshore and beach deposits)
- 32: Peat, Muck and Marl (Recent Organic deposits)

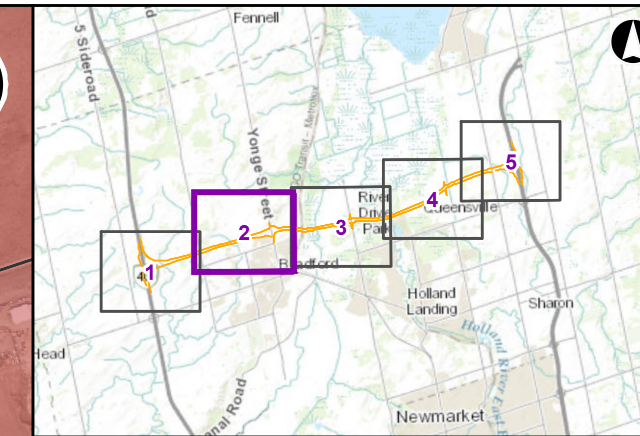
0 215 430 860 1,290
Meters

Bradford Bypass Project

Quaternary Geology

Jan, 2023	1:19,000 * when printed 11"x17"	Datum: NAD 1983 UTM Zone 17N Source: Imagery Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN,
	V: Study Area	
AECOM		Figure 2a





Legend

- Bradford Bypass - MTO Right-Of-Way
- Bradford Bypass Preliminary Design
- Study Area (500m)
- Watercourses
- Waterbody

Quaternary Geology

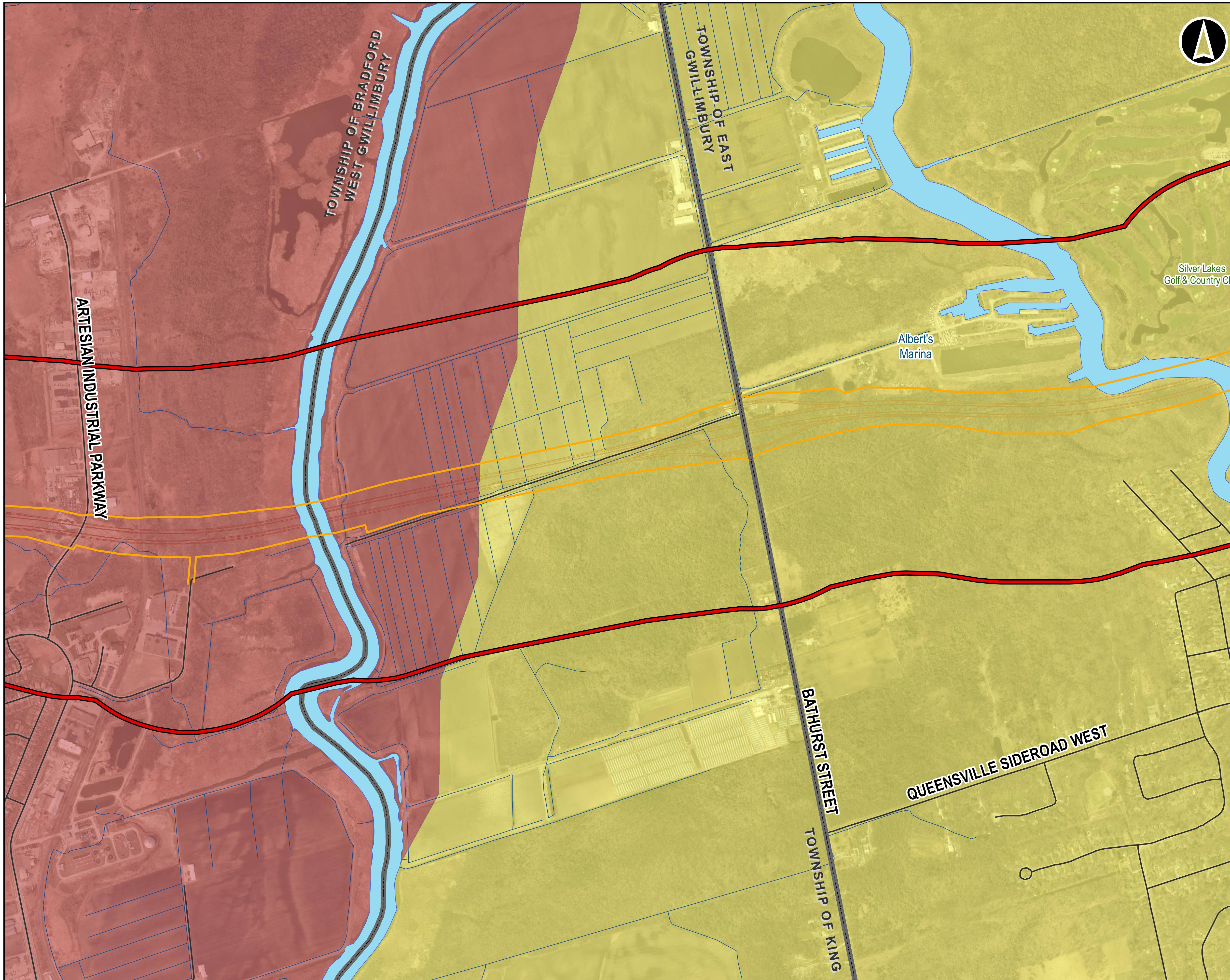
- 2: Bedrock, post-Precambrian
- 13: Sandy Silt to Silt (Newmarket Till)
- 16: Silt to Silty clay (Kettleby Till)
- 22 and 23: Gravel and Sand (Ice-contact/Outwash Deposits)
- 24: Silt and Clay (Glaciolacustrine basin and quiet water deposits)
- 25: Sand and Gravel (Glaciolacustrine nearshore and beach deposits)
- 32: Peat, Muck and Marl (Recent Organic deposits)

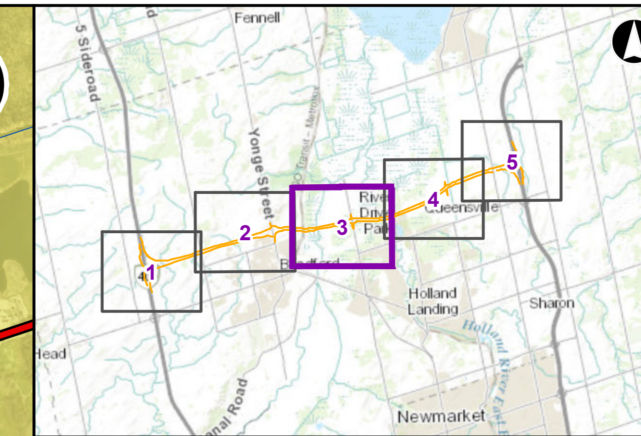
0 145 290 580 870
Meters

Bradford Bypass Project

Quaternary Geology

Jan, 2023	1:12,500 * when printed 11"x17"	Datum: NAD 1983 UTM Zone 17N Source: Imagery Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN,
	V: Study Area	Figure 2b
AECOM		





Legend

- Bradford Bypass - MTO Right-Of-Way
- Bradford Bypass Preliminary Design
- Study Area (500m)
- Watercourses
- Waterbody

Quaternary Geology

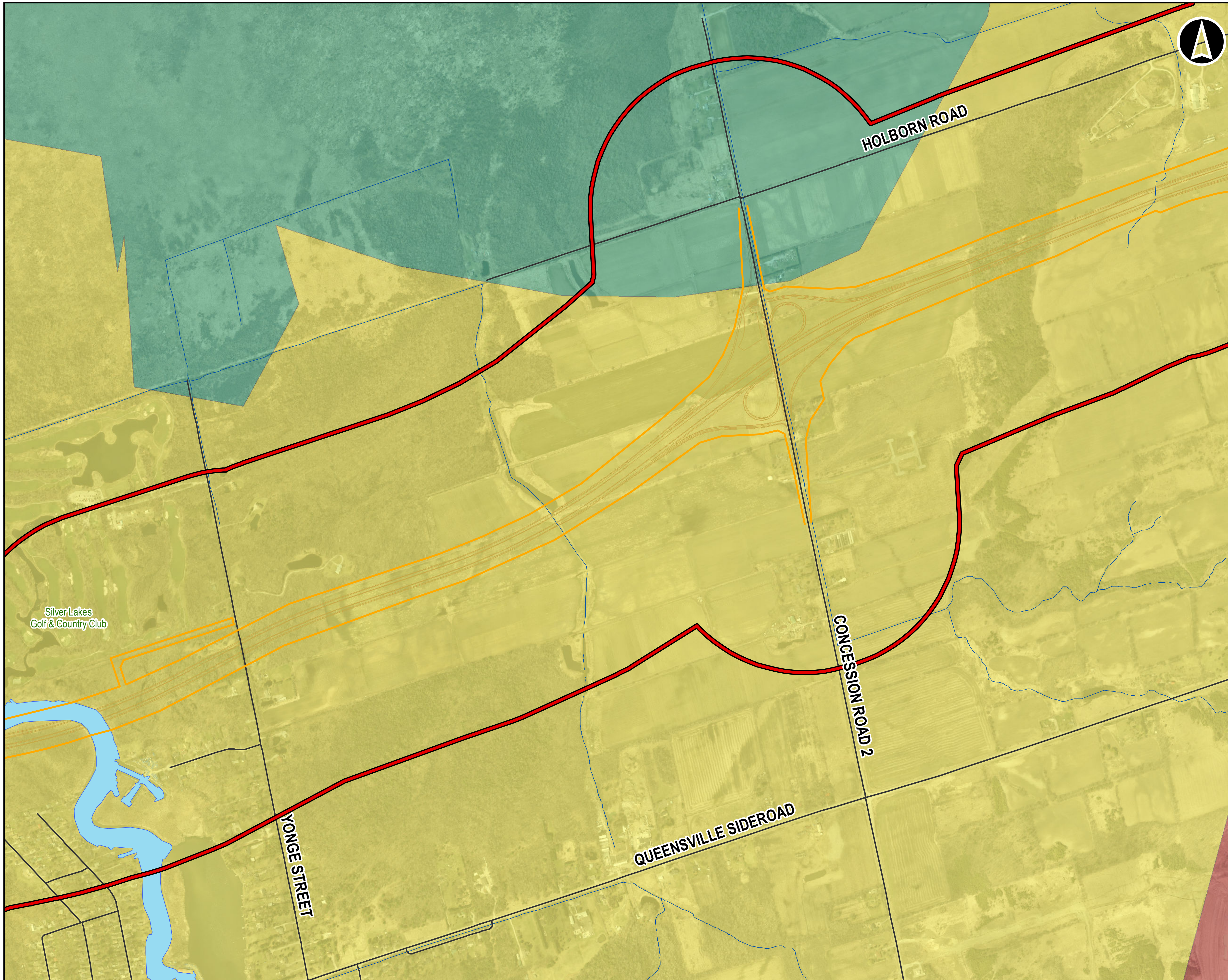
- 2: Bedrock, post-Precambrian
- 13: Sandy Silt to Silt (Newmarket Till)
- 16: Silt to Silty clay (Kettleby Till)
- 22 and 23: Gravel and Sand (Ice-contact/Outwash Deposits)
- 24: Silt and Clay (Glaciolacustrine basin and quiet water deposits)
- 25: Sand and Gravel (Glaciolacustrine nearshore and beach deposits)
- 32: Peat, Muck and Marl (Recent Organic deposits)

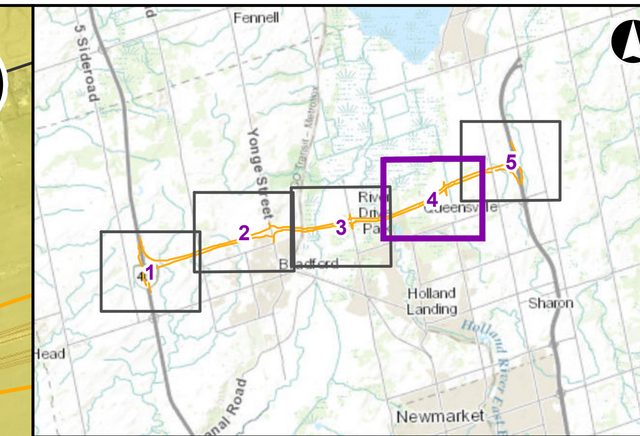
0 145 290 580 870
Meters

Bradford Bypass Project

Quaternary Geology

Jan, 2023	1:12,500 * when printed 11"x17"	Datum: NAD 1983 UTM Zone 17N Source: Imagery Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN,
	V: Study Area	
AECOM		Figure 2c





Legend

- Bradford Bypass - MTO Right-Of-Way
- Bradford Bypass Preliminary Design
- Study Area (500m)
- Watercourses
- Waterbody

Quaternary Geology

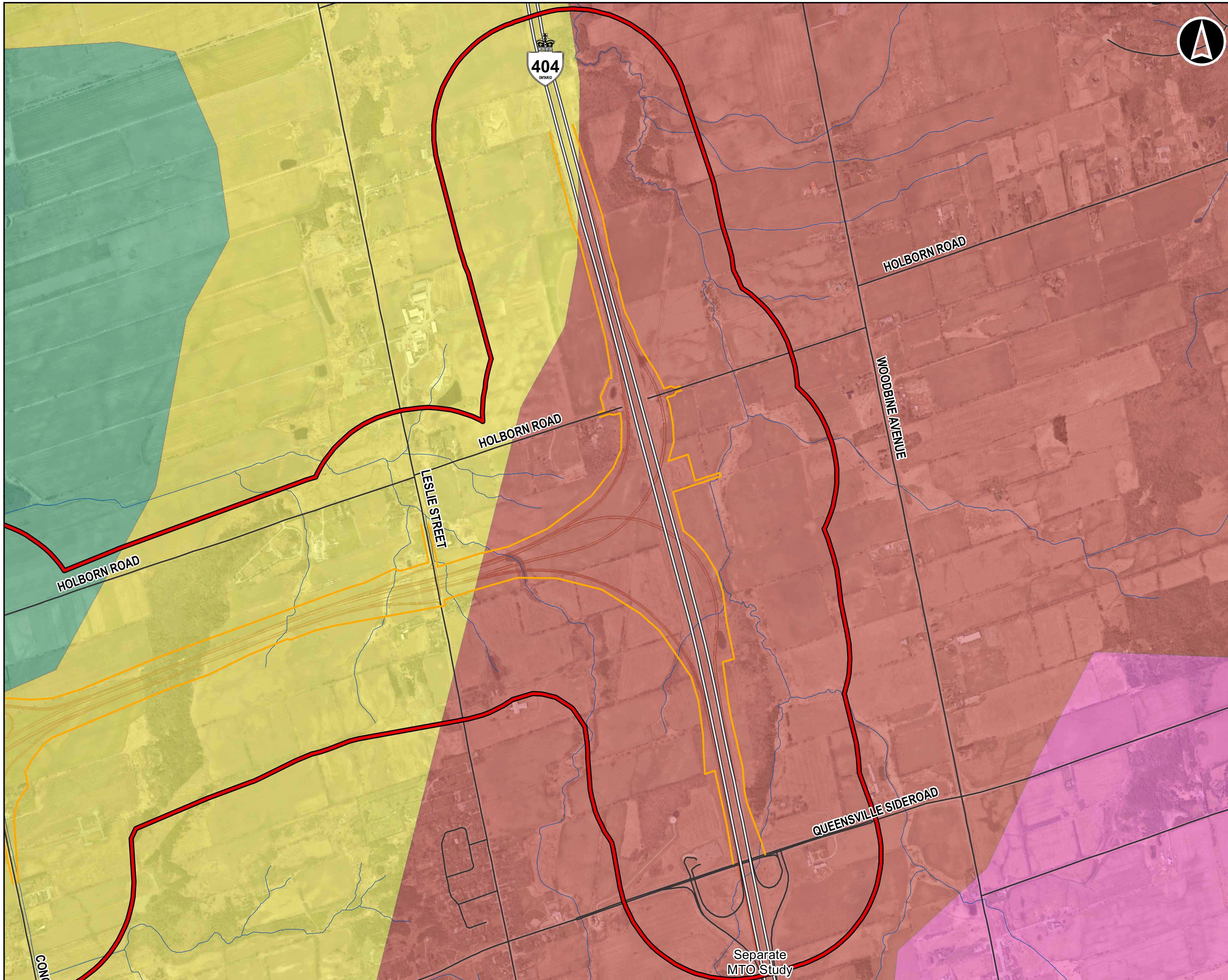
- 2: Bedrock, post-Precambrian
- 13: Sandy Silt to Silt (Newmarket Till)
- 16: Silt to Silty clay (Kettleby Till)
- 22 and 23: Gravel and Sand (Ice-contact/Outwash Deposits)
- 24: Silt and Clay (Glaciolacustrine basin and quiet water deposits)
- 25: Sand and Gravel (Glaciolacustrine nearshore and beach deposits)
- 32: Peat, Muck and Marl (Recent Organic deposits)

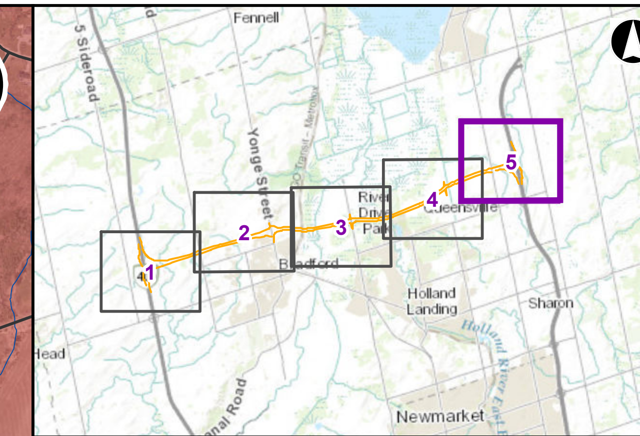
0 145 290 580 870
Meters

Bradford Bypass Project

Quaternary Geology

Jan, 2023	1:12,500 * when printed 11"x17"	Datum: NAD 1983 UTM Zone 17N Source: Imagery Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN,
	V: Study Area	
AECOM		Figure 2d





Legend

- Bradford Bypass - MTO Right-Of-Way
- Bradford Bypass Preliminary Design
- Separate MTO EA Study
- Study Area (500m)
- Watercourses
- Waterbody

Quaternary Geology

- 2: Bedrock, post-Precambrian
- 13: Sandy Silt to Silt (Newmarket Till)
- 16: Silt to Silty clay (Kettleby Till)
- 22 and 23: Gravel and Sand (Ice-contact/Outwash Deposits)
- 24: Silt and Clay (Glaciolacustrine basin and quiet water deposits)
- 25: Sand and Gravel (Glaciolacustrine nearshore and beach deposits)
- 32: Peat, Muck and Marl (Recent Organic deposits)

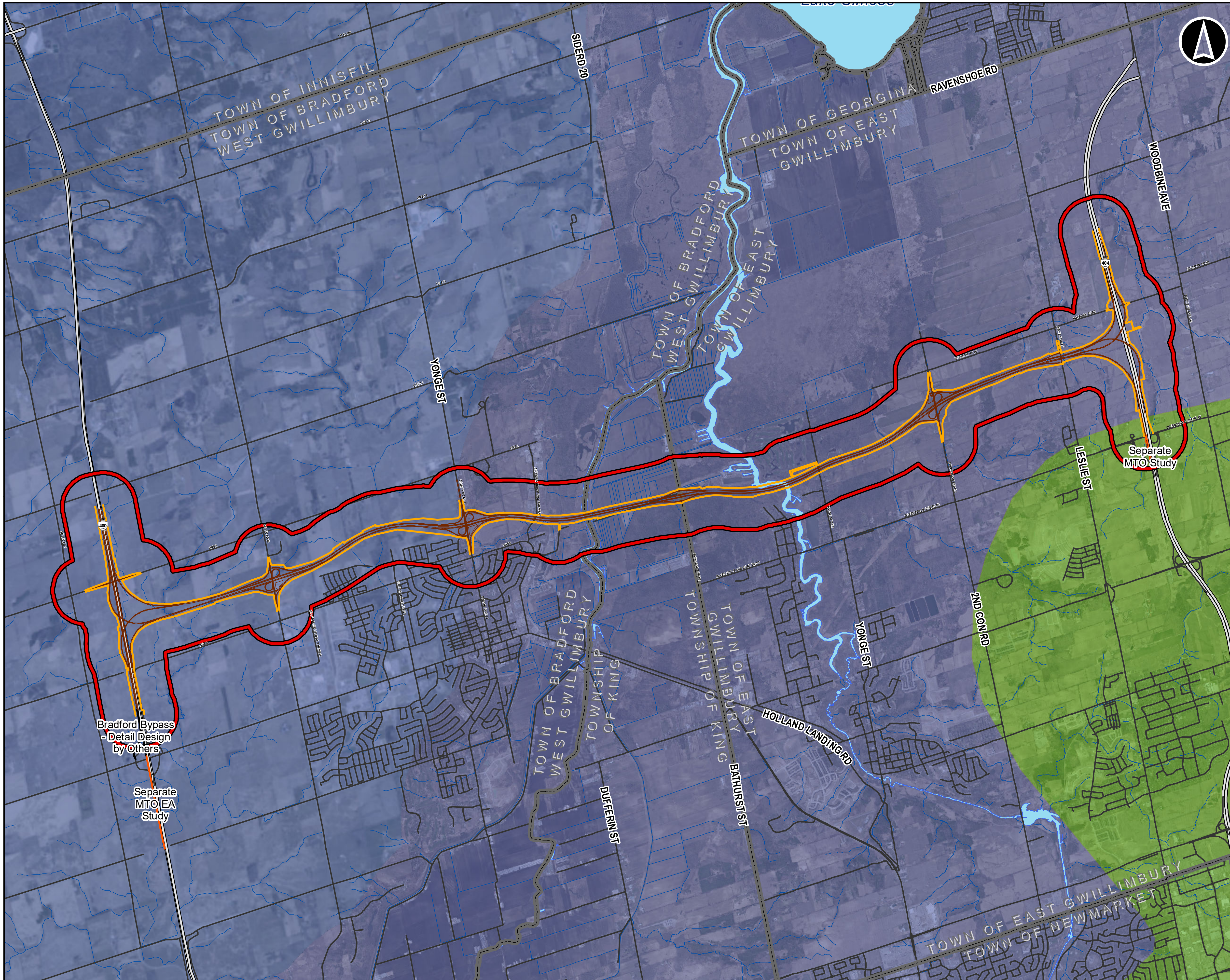
0 185 370 740 1,110
Meters

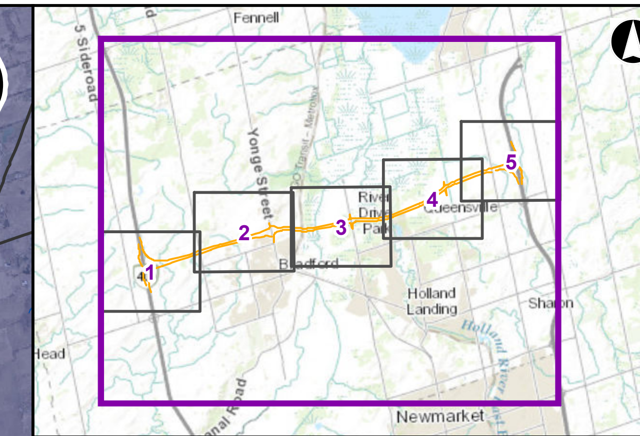
Bradford Bypass Project

Quaternary Geology

Jan, 2023	1:16,000 * when printed 11"x17"	Datum: NAD 1983 UTM Zone 17N Source: Imagery Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN,
	V: Study Area	Figure 2e

AECOM





Legend

- Bradford Bypass - MTO Right-Of-Way
- Bradford Bypass Preliminary Design
- Bradford Bypass/Detail Design (by Others)
- Separate MTO EA Study
- Study Area (500m)

Roads

- Provincial Highway
- Other
- Municipality Boundary
- Waterbody
- Watercourses

Bedrock Geology

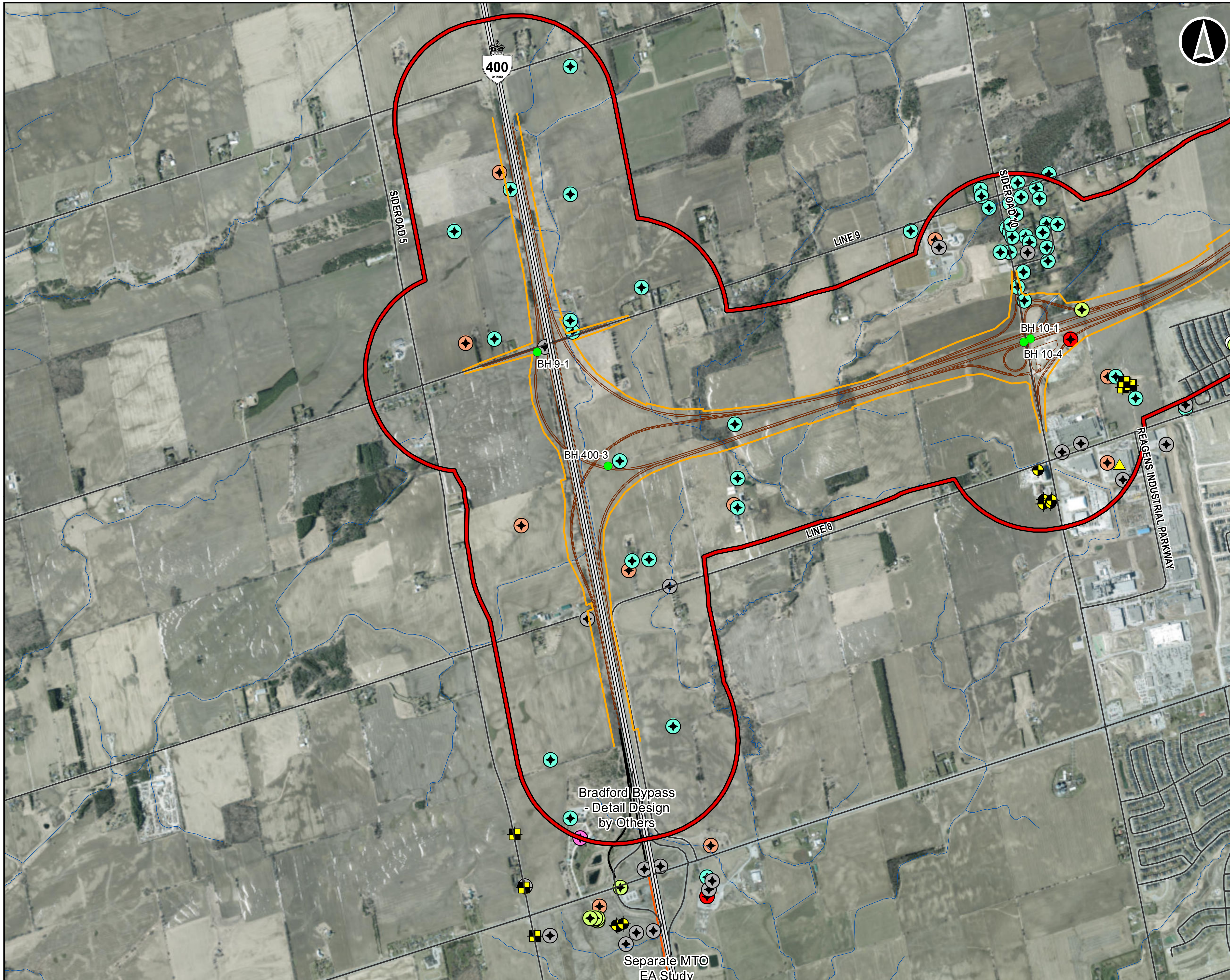
- 54a: Limestone, dolostone, shale, arkose, sandstone (Bass Islands Fm)
- 55b: Shale, limestone, dolostone

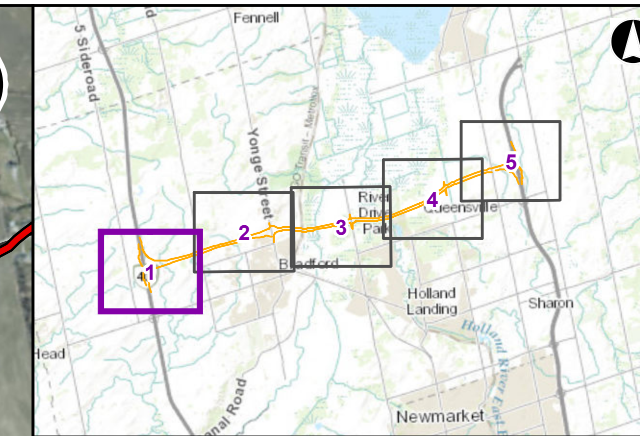
0 650 1,300 2,600 3,900
Meters

Bradford Bypass Project

Bedrock Geology

Jan, 2023	1:57,106 * when printed 11"x17"	Datum: NAD 1983 UTM Zone 17N Source: Imagery Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN,
	V: Study Area	
AECOM		Figure 3





Legend

- Bradford Bypass - MTO Right-Of-Way
- Bradford Bypass Preiminary Design
- Bradford Bypass /Detail Design (by Others)
- Separate MTO EA Study
- Study Area (500m)

Roads

- Provincial Highway
- Other
- Municipality Boundary
- Waterbody
- Watercourses
- Monitoring Well Location
- EASR

PTTW Purpose

- Agricultural
- Commercial
- Water Supply

MECP Water Wells

- Commerical
- Domestic
- Industrial
- Livestock
- Monitoring
- Not Used
- Other
- Public
- Test Hole
- Unknown

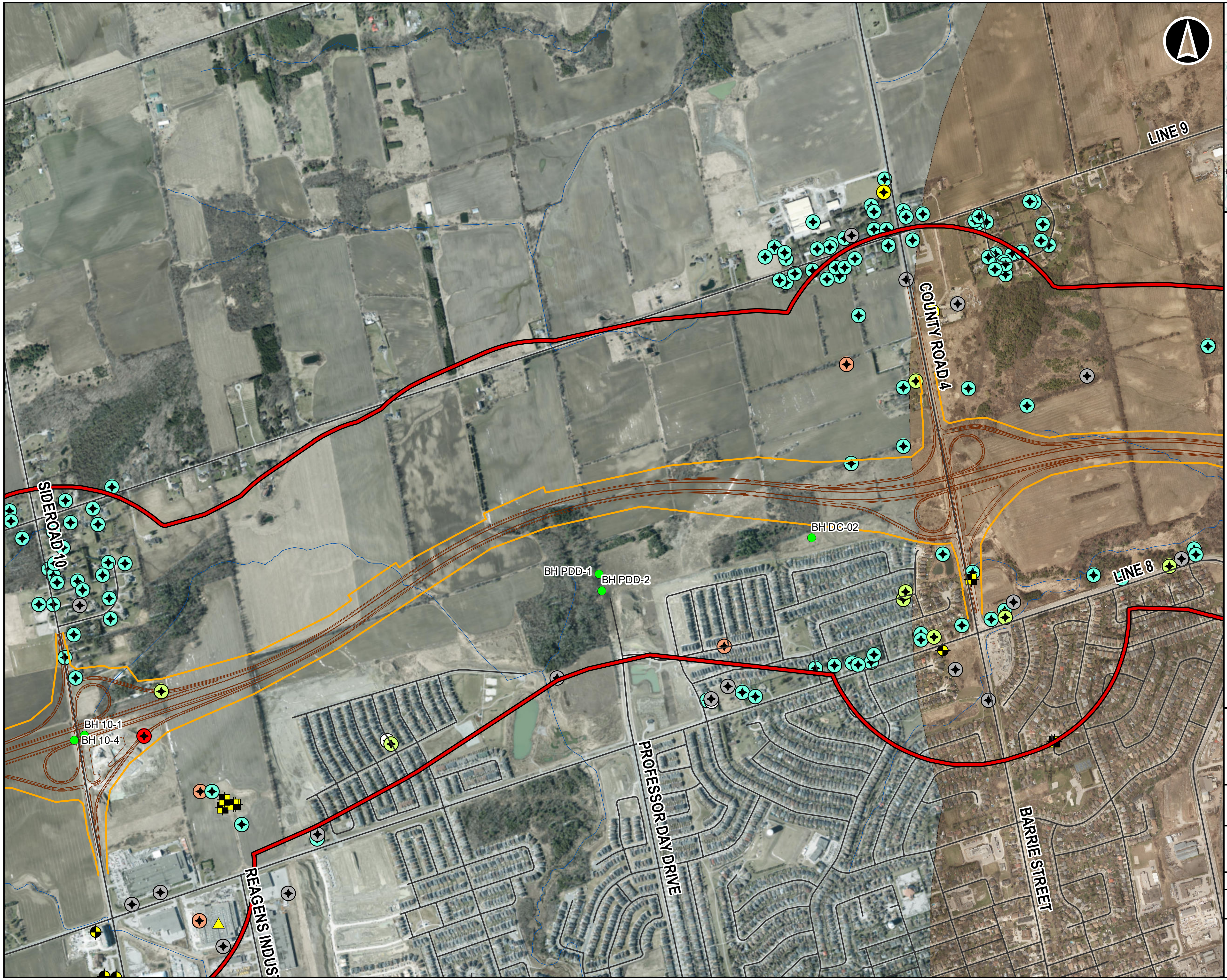
0 215 430 860 1,290

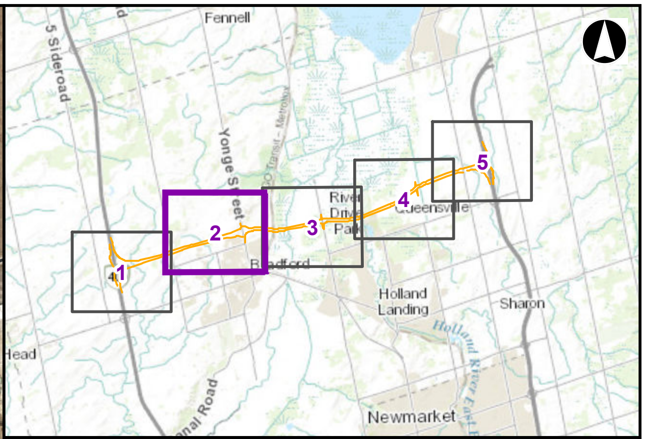
Meters

Bradford Bypass Project

MECP Water Wells, PTTWs and EASR

Apr, 2023	1:19,000 * when printed 11"x17"	Datum: NAD 1983 UTM Zone 17N Source: Imagery Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN,
	V: Study Area	
AECOM		Figure 4a





Legend

- Bradford Bypass - MTO Right-Of-Way
- Bradford Bypass Preiminary Design
- Study Area (500m)

Roads

- Provincial Highway
- Other
- Municipality Boundary
- Waterbody
- Watercourses
- Monitoring Well Location
- EASR

PTTW Purpose

- Agricultural
- Commercial
- Water Supply

MECP Water Wells

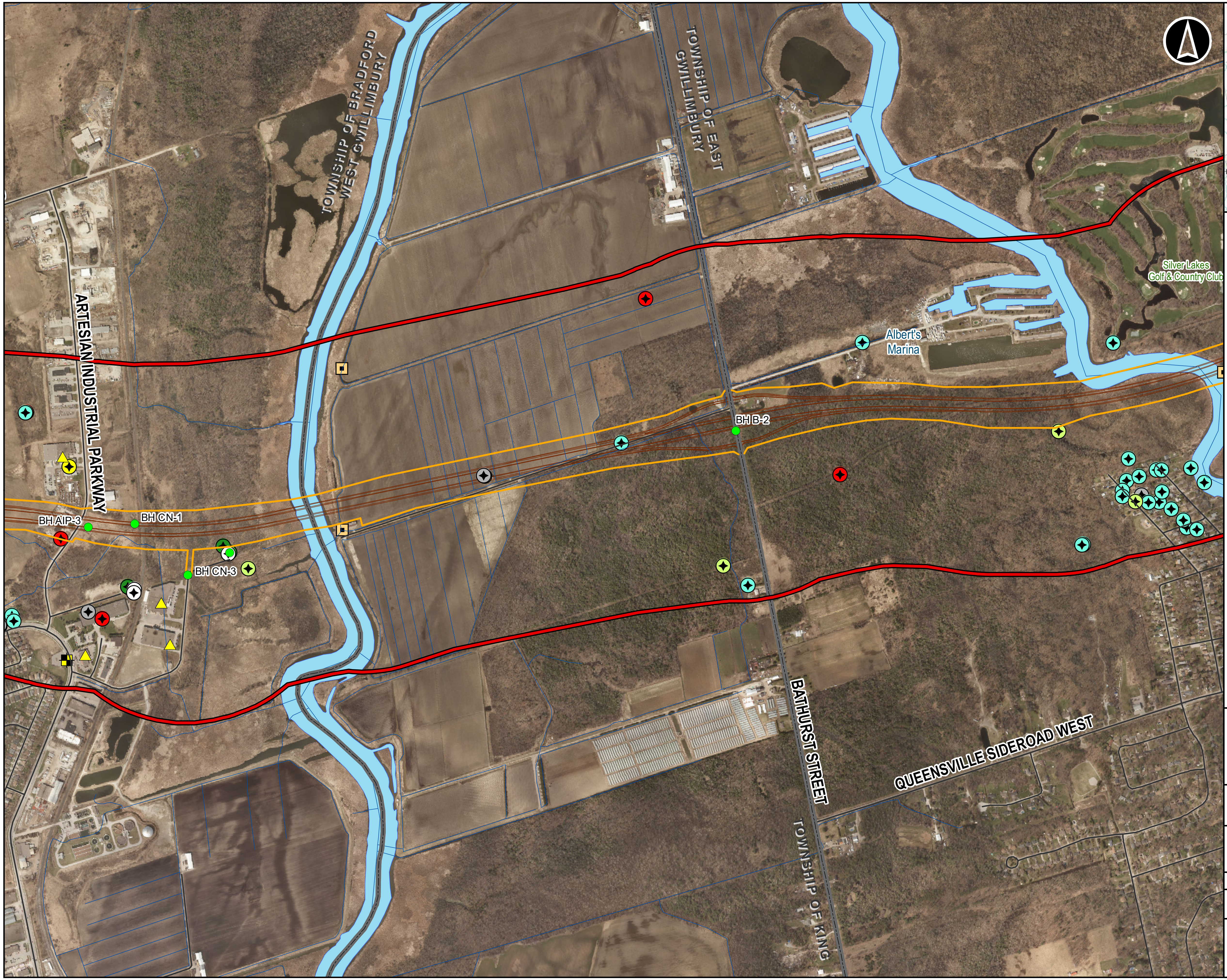
- Commerical
- Domestic
- Industrial
- Livestock
- Monitoring
- Not Used
- Other
- Test Hole
- Unknown

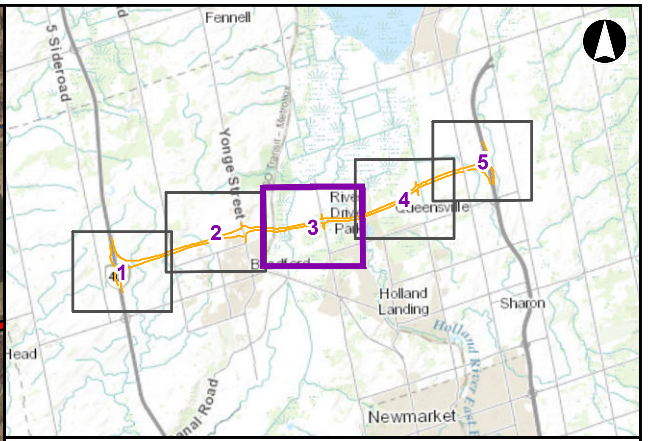
0 145 290 580 870
Meters

Bradford Bypass Project

MECP Water Wells, PTTWs and EASR

Apr, 2023	1:12,500 * when printed 11"x17"	Datum: NAD 1983 UTM Zone 17N Source: Imagery Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN,
	V: Study Area	
AECOM		Figure 4b





Legend

- Bradford Bypass - MTO Right-Of-Way
- Bradford Bypass Preiminary Design
- Study Area (500m)

Roads

- Provincial Highway
- Other
- Municipality Boundary
- Waterbody
- Watercourses
- Monitoring Well Location
- EASR

PTTW Purpose

- Agricultural
- Commercial
- Water Supply

MECP Water Wells

- Commerical
- Domestic
- Industrial
- Municipal
- Not Used
- Other
- Test Hole
- Unknown

0 145 290 580 870
Meters

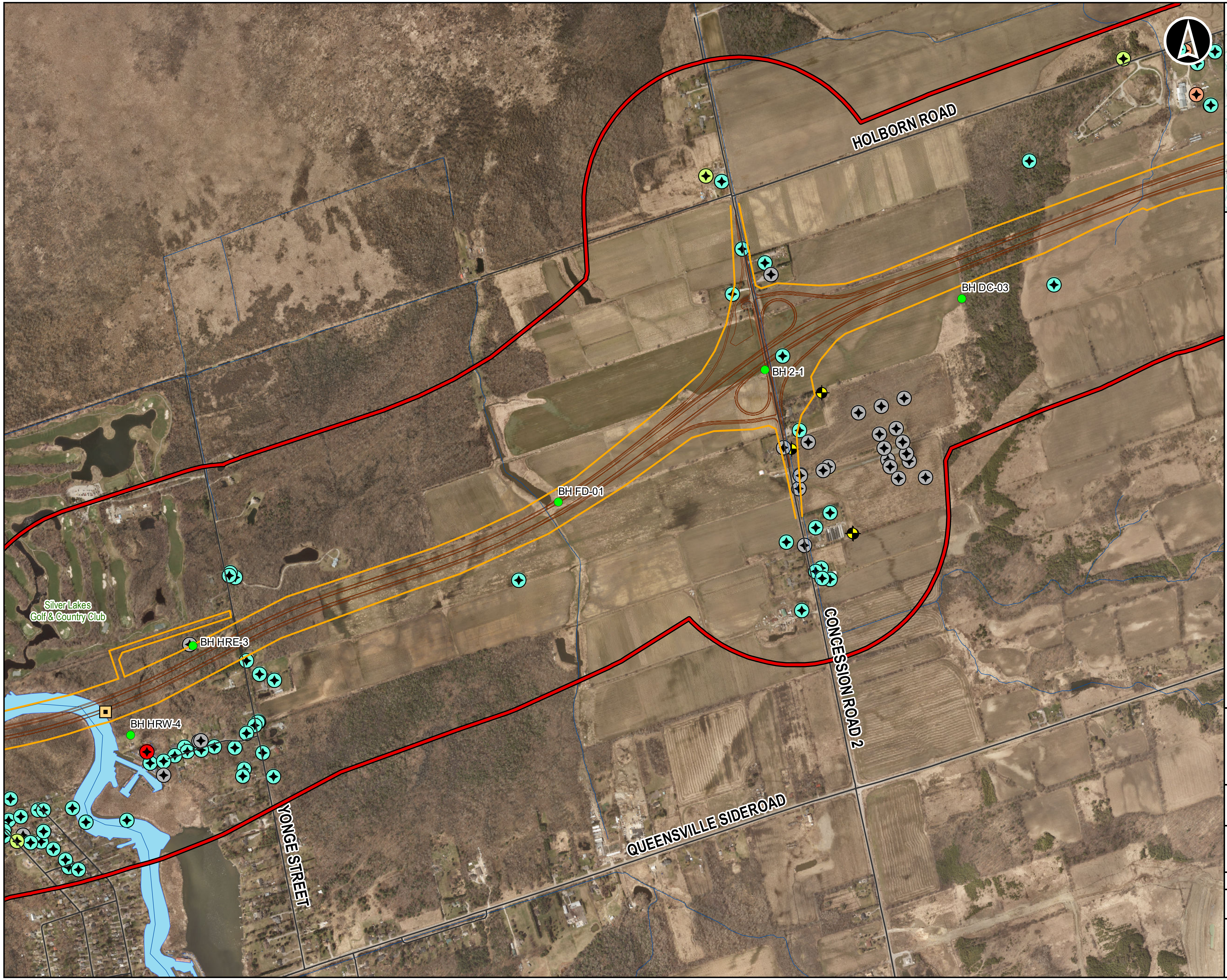
Bradford Bypass Project

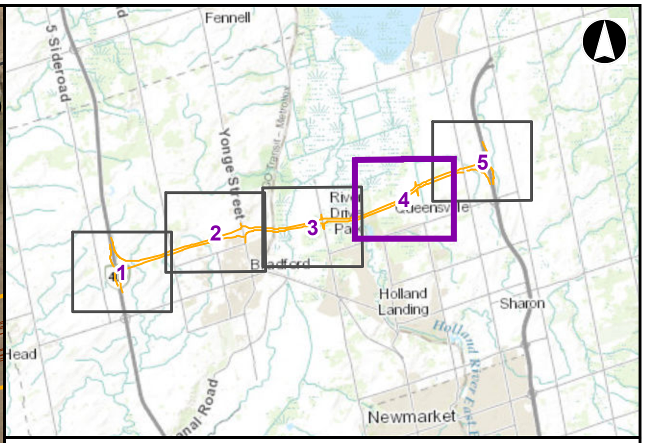
MECP Water Wells, PTTWs and EASR

Apr, 2023	1:12,500 * when printed 11"x17"	Datum: NAD 1983 UTM Zone 17N Source: Imagery Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN,
	V: Study Area	

AECOM

Figure 4c





Legend

Bradford Bypass - MTO Right-Of-Way
Bradford Bypass Preiminary Design
Study Area (500m)

Roads

Provincial Highway
Other
Municipality Boundary
Waterbody
Watercourses
Monitoring Well Location
EASR

PTTW Purpose

Agricultural
Commercial
Water Supply

MECP Water Wells

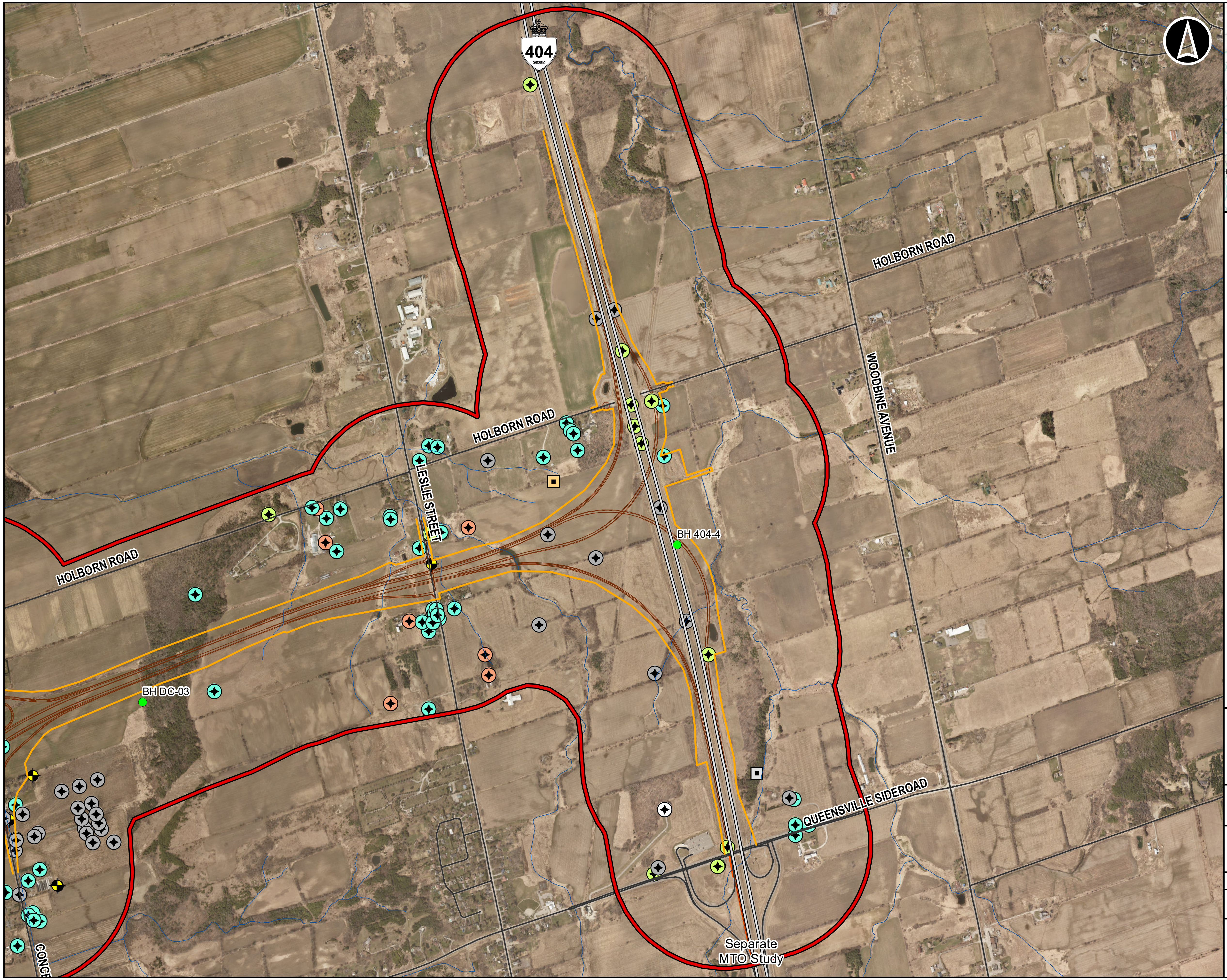
Commerical
Domestic
Livestock
Monitoring
Not Used
Unknown

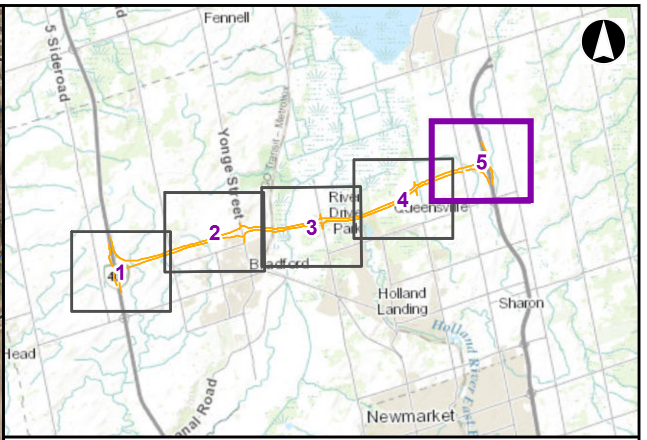
0 145 290 580 870
Meters

Bradford Bypass Project

MECP Water Wells, PTTWs and EASR

Apr, 2023	1:12,500 * when printed 11"x17"	Datum: NAD 1983 UTM Zone 17N Source: Imagery Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN,
	V: Study Area	
AECOM		Figure 4d





Legend

- Bradford Bypass - MTO Right-Of-Way
- Bradford Bypass Preiminary Design
- Separate MTO EA Study
- Study Area (500m)

Roads

- Provincial Highway
- Other
- Municipality Boundary
- Waterbody
- Watercourses
- Monitoring Well Location
- EASR

PTTW Purpose

- Agricultural
- Commercial
- Water Supply

MECP Water Wells

- Domestic
- Livestock
- Monitoring
- Not Used
- Other
- Unknown

0 185 370 740 1,110

Meters

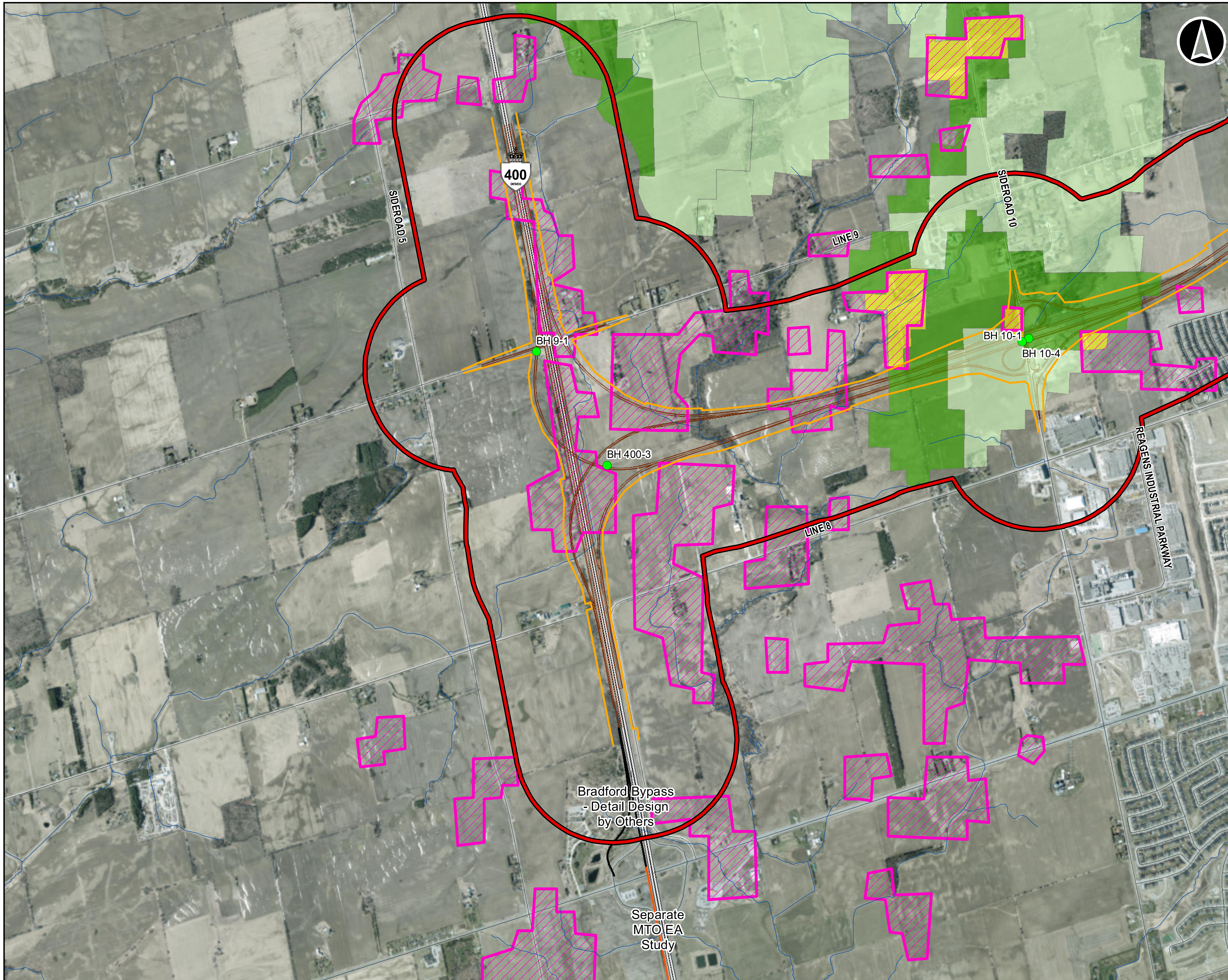
Bradford Bypass Project

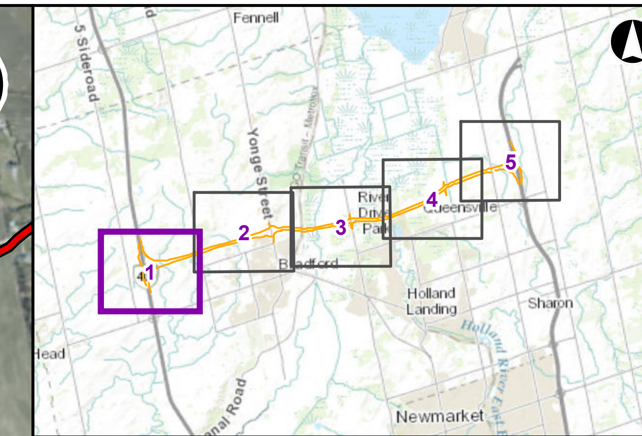
MECP Water Wells, PTTWs and EASR

Apr, 2023	1:16,000 * when printed 11"x17"	Datum: NAD 1983 UTM Zone 17N Source: Imagery Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN,
	V: Study Area	

AECOM

Figure 4e





Legend

Bradford Bypass- MTO Right-Of-Way
Bradford Bypass/Detail Design (by Others)
Separate MTO EA Study
Bradford Bypass Preliminary Design
Study Area (500m)

Roads

Provincial Highway
Other
Municipality Boundary
Waterbody
Watercourses
Monitoring Well Location
Highly Vulnerable Aquifer

Wellhead Protection Areas

WHPA-A
WHPA-B
WHPA-C
WHPA-C1
WHPA-D

SGRA Vulverability Level

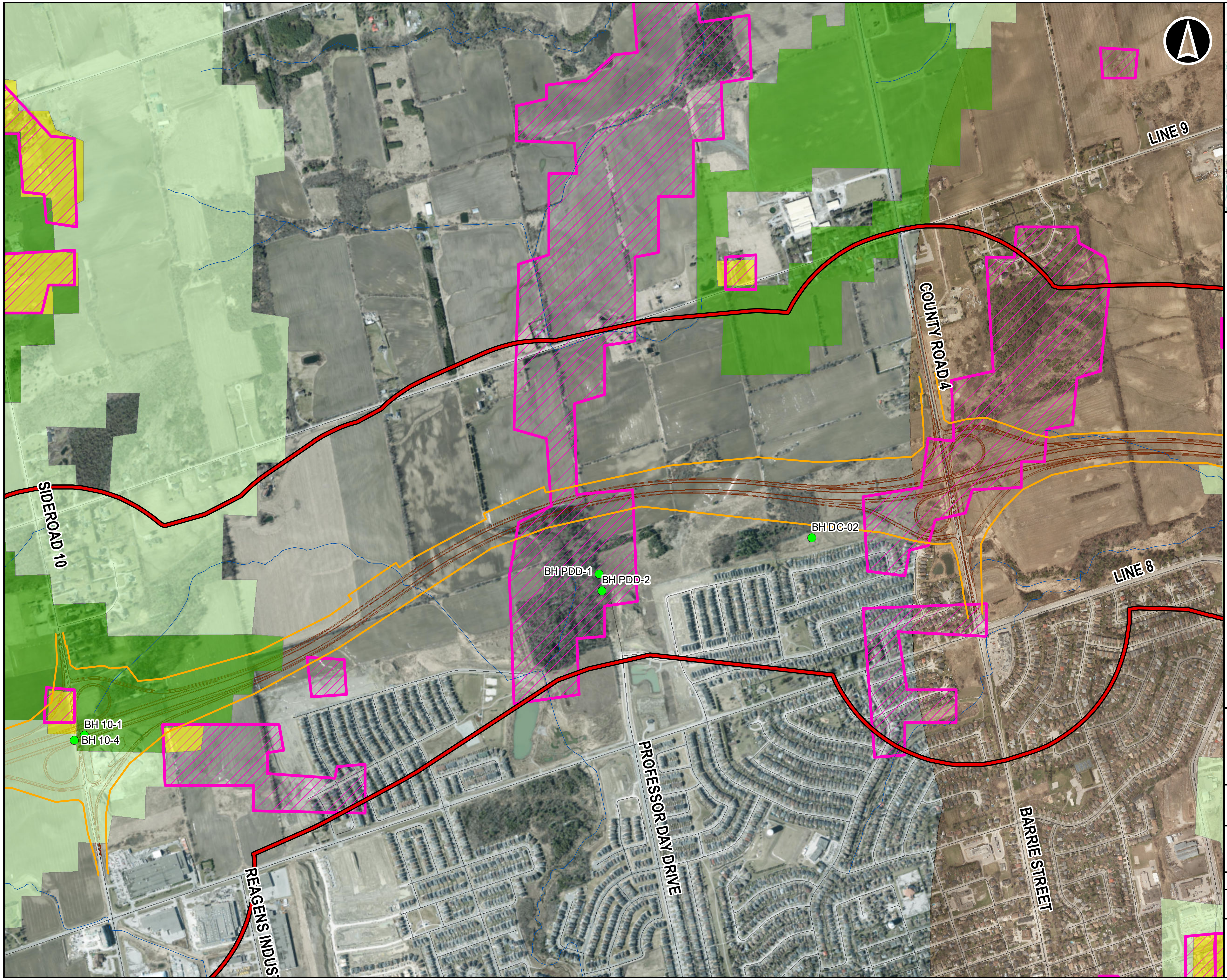
High
Medium
Low

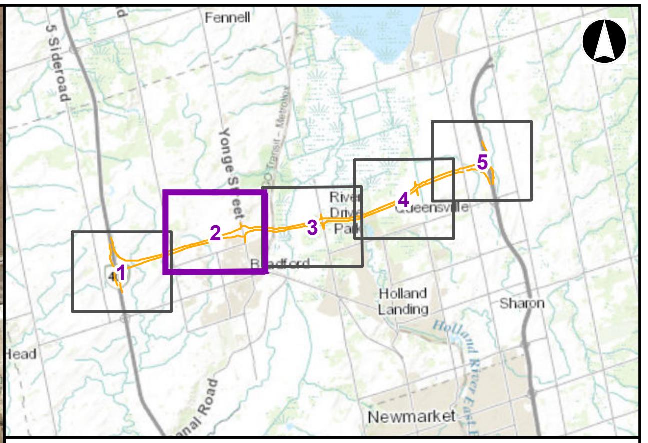
0 215 430 860 1,290
Meters

Bradford Bypass Project

Wellhead Protection Areas, Highly Vulnerable Aquifers and Significant Groundwater Recharge Areas

Apr, 2023	1:19,000 * when printed 11"x17"	Datum: NAD 1983 UTM Zone 17N Source: Imagery Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN,
	V: Study Area	Figure 5a
AECOM		





Legend

- Bradford Bypass- MTO Right-Of-Way
- Bradford Bypass Preliminary Design
- Study Area (500m)

Roads

- Provincial Highway
- Other
- Municipality Boundary
- Waterbody
- Watercourses
- Monitoring Well Location
- Highly Vulnerable Aquifer

Wellhead Protection Areas

- WHPA-A
- WHPA-B
- WHPA-C
- WHPA-C1
- WHPA-D

SGRA Vulverability Level

- High
- Medium
- Low

0 145 290 580 870

Meters

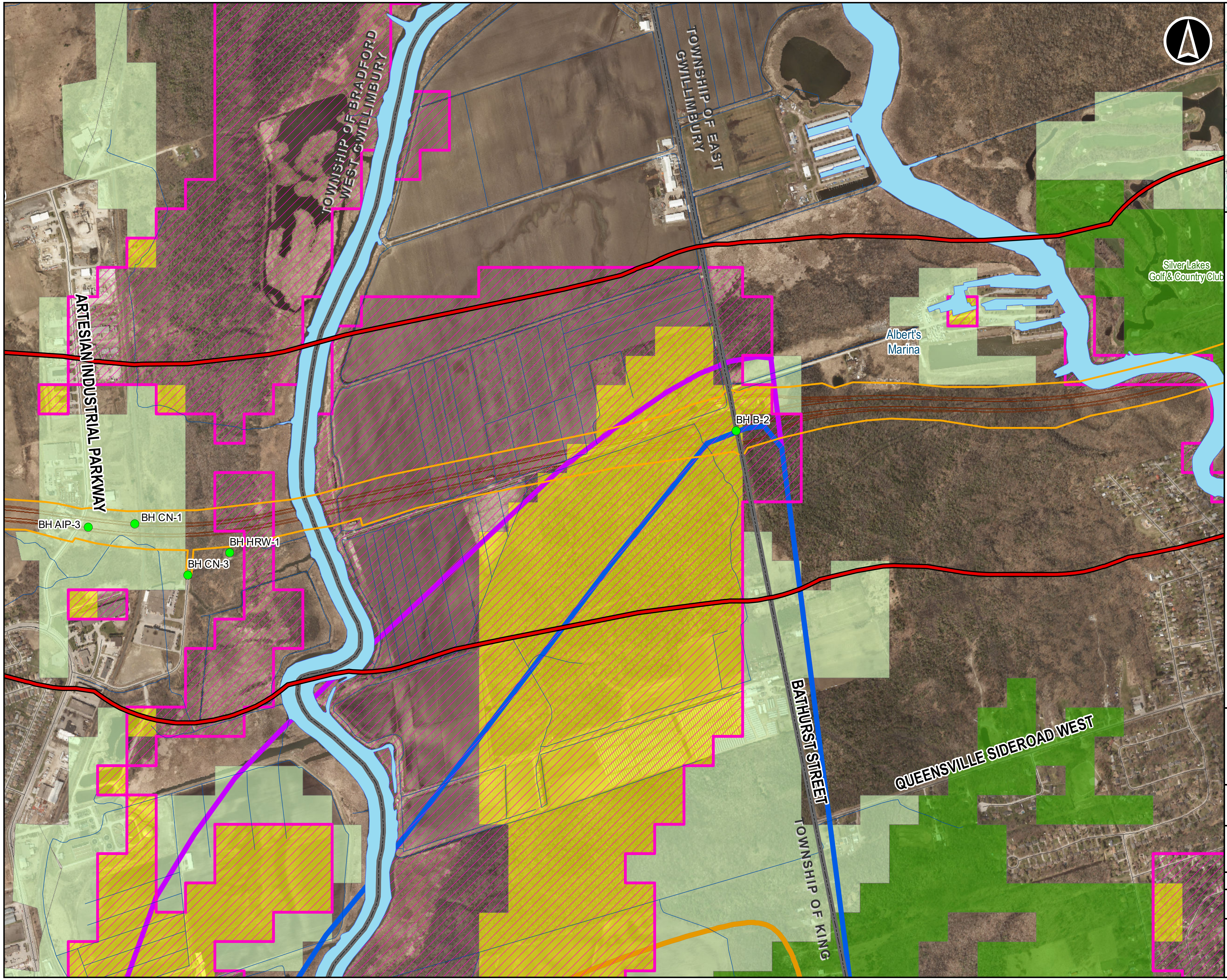
Bradford Bypass Project

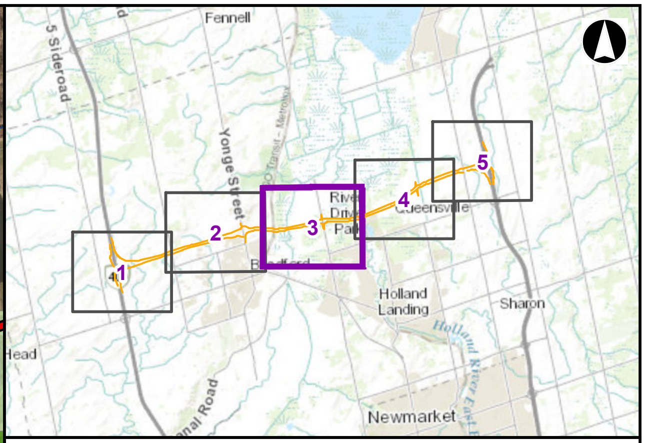
Wellhead Protection Areas, Highly Vulnerable Aquifers and Significant Groundwater Recharge Areas

Apr, 2023	1:12,500 * when printed 11"x17"	Datum: NAD 1983 UTM Zone 17N Source: Imagery Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN,
	V: Study Area	

AECOM

Figure 5b





Legend

- Bradford Bypass- MTO Right-Of-Way
- Bradford Bypass Preliminary Design
- Study Area (500m)

Roads

- Provincial Highway
- Other
- Municipality Boundary
- Waterbody
- Watercourses
- Monitoring Well Location
- Highly Vulnerable Aquifer

Wellhead Protection Areas

- WHPA-A
- WHPA-B
- WHPA-C
- WHPA-C1
- WHPA-D

SGRA Vulverability Level

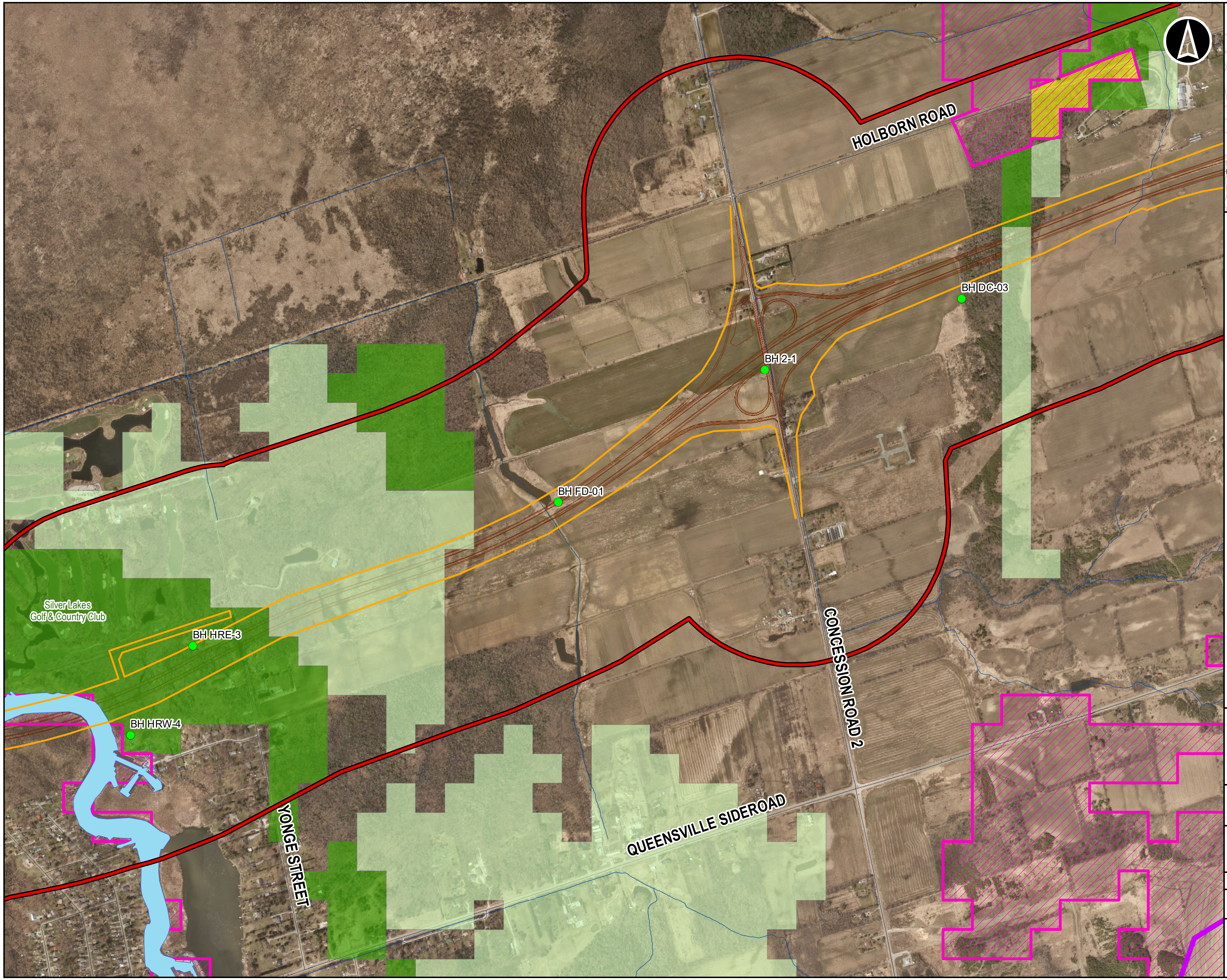
- High
- Medium
- Low

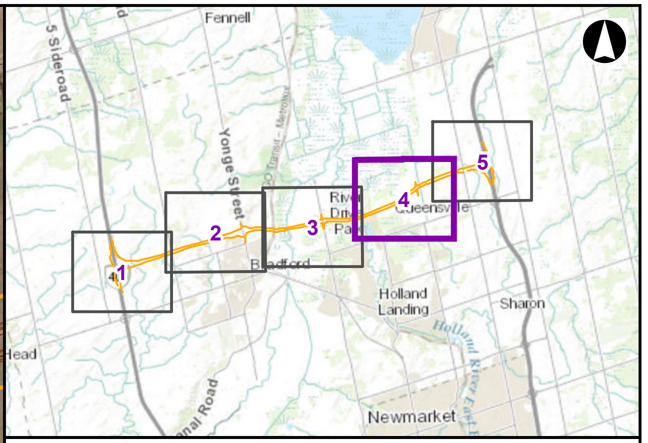
0 145 290 580 870
Meters

Bradford Bypass Project

Wellhead Protection Areas, Highly Vulnerable Aquifers and Significant Groundwater Recharge Areas

Apr, 2023	1:12,500 * when printed 11"x17"	Datum: NAD 1983 UTM Zone 17N Source: Imagery Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN,
	V: Study Area	
AECOM		Figure 5c





Legend

- Bradford Bypass- MTO Right-Of-Way
- Bradford Bypass Preliminary Design
- Study Area (500m)

Roads

- Provincial Highway
- Other
- Municipality Boundary
- Waterbody
- Watercourses
- Monitoring Well Location
- Highly Vulnerable Aquifer

Wellhead Protection Areas

- WHPA-A
- WHPA-B
- WHPA-C
- WHPA-C1
- WHPA-D

SGRA Vulverability Level

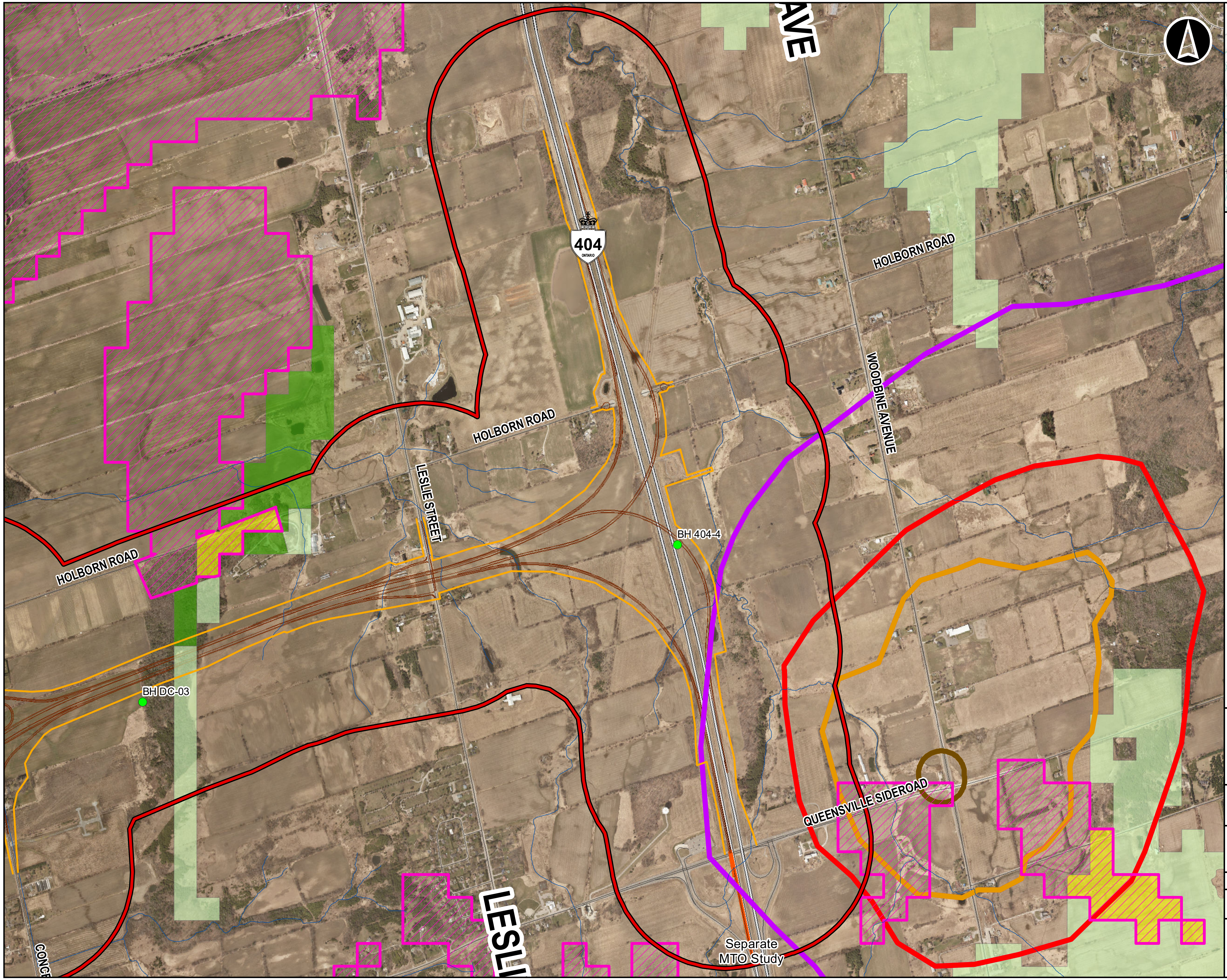
- High
- Medium
- Low

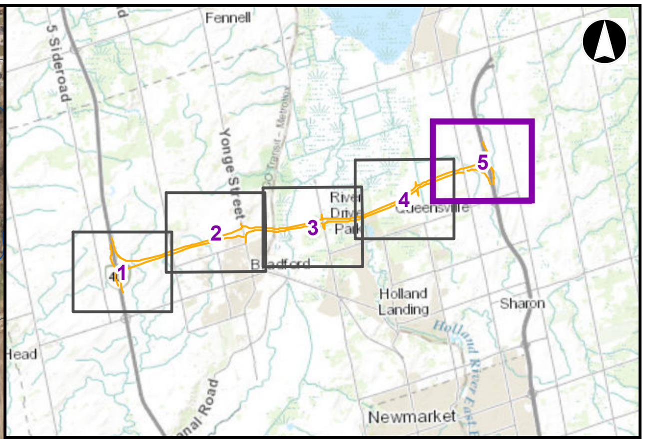
0 145 290 580 870
Meters

Bradford Bypass Project

Wellhead Protection Areas, Highly Vulnerable Aquifers and Significant Groundwater Recharge Areas

Apr, 2023	1:12,500 * when printed 11"x17"	Datum: NAD 1983 UTM Zone 17N Source: Imagery Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN,
	V: Study Area	
AECOM		Figure 5d





Legend

- Bradford Bypass- MTO Right-Of-Way
- Bradford Bypass Preliminary Design
- Separate MTO EA Study
- Study Area (500m)

Roads

- Provincial Highway
- Other
- Municipality Boundary
- Waterbody
- Watercourses
- Monitoring Well Location
- Highly Vulnerable Aquifer

Wellhead Protection Areas

- WHPA-A
- WHPA-B
- WHPA-C
- WHPA-C1
- WHPA-D

SGRA Vulverability Level

- High
- Medium
- Low

0 185 370 740 1,110
Meters

Bradford Bypass Project

Wellhead Protection Areas, Highly Vulnerable Aquifers and Significant Groundwater Recharge Areas

Apr, 2023	1:16,000 * when printed 11"x17"	Datum: NAD 1983 UTM Zone 17N Source: Imagery Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN,
	V: Study Area	
AECOM		**Figure 5e**

Date Saved: 4/26/2023 12:55:47 PM User Name: michael.w.collins

Appendix A

Borehole Logs

Ontario

DRAFT

wsp

PROJECT 19136074 **RECORD OF BOREHOLE No. 9-1** Sheet 1 of 4 **METRIC**

G.W.P. Assignment No 2019-E-0048 LOCATION N 4887082.5; E 293780.6 NAD83 / MTM Zone 10 (LAT. 44.123655; LONG. -79.637689) ORIGINATED BY SS

DIST Central HWY BBP - 9th Line BOREHOLE TYPE Hollow Stem Auger, Mud Rotary with Casing COMPILED BY MCK

DATUM CGVD28 Surface Elevation:275.6 m DATE Apr 12, 2021 - Apr 13, 2021 CHECKED BY MTI/KJB

SOIL PROFILE			SAMPLES			GROUNDWATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa) (Field Vane, Remoulded, Pocket Pen, Quick Triaxial, Unconfined) 20 40 60 80 100	WATER CONTENT (%) PL W_p NMC W LL W_l NP Nonplastic 20 40 60	UNIT WEIGHT γ kN/m³	GR	SA	SI	CL	REMARKS
ELEV. / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" VALUES										
0.0	Sandy CLAYEY SILT (CL), trace gravel, trace organics, (FILL) Stiff Brown Moist		1	SS	8		275								
274.9															
0.7	SILTY SAND (SM), trace clay, trace gravel to gravelly, (TILL) Loose to very dense Brown to Grey, iron oxide staining Moist to wet		2	SS	7										
			3	SS	14		274								
	- 2.3 m: Slow augering and grinding.		4	SS	17		273				4	50	37	9	
			5	SS	13		272								
			6	SS	20										
			7	SS	36		271								
							270								
			8	SS	72						26	43	26	5	
							269								
	- 7.6 m: Slow augering and grinding		9	SS	15		268								
							267								
			10	SS	12		266								

Continued on Next Page

+³, x³ : Numbers refer to Sensitivity o³% STRAIN AT FAILURE

Ontario

PROJECT 19136074

RECORD OF BOREHOLE No. 9-1

Sheet 2 of 4

METRIC

G.W.P. Assignment No 2019-E-0048 LOCATION N 4887082.5; E 293780.6 NAD83 / MTM Zone 10 (LAT. 44.123655; LONG. -79.637689) ORIGINATED BY SS

DIST Central HWY BBP - 9th Line BOREHOLE TYPE Hollow Stem Auger, Mud Rotary with Casing COMPILED BY MCK

DATUM CGVD28 Surface Elevation:275.6 m DATE Apr 12, 2021 - Apr 13, 2021 CHECKED BY MTI/KJB

ELEV. / DEPTH	DESCRIPTION	STRATA PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES	GROUNDWATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa) (Field Vane, Remoulded, Pocket Pen, Quick Triaxial, Unconfined) 20 40 60 80 100	WATER CONTENT (%) PL W_p NMC W LL W_l NP Nonplastic 20 40 60	UNIT WEIGHT γ kN/m³	GR	SA	SI	CL	REMARKS
265.4	SILTY SAND (SM), trace clay, trace gravel to gravelly, (TILL)														
10.2	Loose to very dense Brown to Grey, iron oxide staining Moist to wet						265								
	CLAYEY SILT (CL), some sand, trace gravel, (TILL) Stiff Grey Moist - 11.0 m: Sand seam encountered within sample		11	SS	11				⊢⊕⊣		0	15	46	39	
263.8							264								
11.7	SAND (SP), trace gravel Compact Grey Moist		12	SS	25		263								
262.2															
13.4	SILTY SAND (SM), trace clay, some gravel (TILL) Compact Grey Moist		13	SS	20		262		◐		12	44	37	7	
260.8							261								
14.8	SAND (SP), trace gravel Compact Grey Wet		14 A	SS	20				○						
259.9			14 B				260								
15.7	Sandy CLAYEY SILT (CL), trace gravel Very Stiff Grey Wet						259								
	- 16.8 to 18.3 m: Slow drilling.														
258.5															
17.1	CLAYEY SILT (CL), trace sand, trace gravel; Hard Grey Wet		15	SS	53		258		○						
							257								
							256								

Continued on Next Page

+³, x³ : Numbers refer to Sensitivity o³% STRAIN AT FAILURE

Ontario

PROJECT 19136074

RECORD OF BOREHOLE No. 9-1

Sheet 3 of 4

METRIC

G.W.P. Assignment No 2019-E-0048 LOCATION N 4887082.5; E 293780.6 NAD83 / MTM Zone 10 (LAT. 44.123655; LONG. -79.637689) ORIGINATED BY SS

DIST Central HWY BBP - 9th Line BOREHOLE TYPE Hollow Stem Auger, Mud Rotary with Casing COMPILED BY MCK

DATUM CGVD28 Surface Elevation:275.6 m DATE Apr 12, 2021 - Apr 13, 2021 CHECKED BY MTI/KJB

ELEV. / DEPTH	DESCRIPTION	STRATA PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES	GROUNDWATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa) (Field Vane, Remoulded, Pocket Pen, Quick Triaxial, Unconfined) 20 40 60 80 100	WATER CONTENT (%) PL W_p NMC W LL W_l NP Nonplastic 20 40 60	UNIT WEIGHT γ kN/m³	GR	SA	SI	CL	REMARKS
	CLAYEY SILT (CL), trace sand, trace gravel; Hard Grey Wet						255								
254.9 20.7	SILTY CLAY (CI) Very stiff to hard Grey Moist to wet		16	SS	25		254				0	0	44	56	
							253								
							252								
			17	SS	42		251								
							250								
249.4 26.2	CLAYEY SILT (CL) containing laminations Hard Moist Grey						249								
			18	SS	40		248								
	- 28.0 m: contains silt seams/layers						247								
245.7 29.9	Sandy SILT (ML), trace clay Very Dense Grey Wet						246								

Continued on Next Page

+³, x³ : Numbers refer to Sensitivity o³% STRAIN AT FAILURE

Ontario

PROJECT 19136074

RECORD OF BOREHOLE No. 9-1 Sheet 4 of 4 METRIC

G.W.P. Assignment No 2019-E-0048 LOCATION N 4887082.5; E 293780.6 NAD83 / MTM Zone 10 (LAT. 44.123655; LONG. -79.637689) ORIGINATED BY SS

DIST Central HWY BBP - 9th Line BOREHOLE TYPE Hollow Stem Auger, Mud Rotary with Casing COMPILED BY MCK

DATUM CGVD28 Surface Elevation:275.6 m DATE Apr 12, 2021 - Apr 13, 2021 CHECKED BY MTI/KJB

ELEV. / DEPTH	DESCRIPTION	STRATA PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES	GROUNDWATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa) ⊕ Field Vane, ■ Remoulded, ● Pocket Pen, ○ Quick Triaxial, × Unconfined; 20 40 60 80 100	WATER CONTENT (%) PL W_p NMC W LL W_l; NP Nonplastic; 20 40 60	UNIT WEIGHT γ kN/m³	GR	SA	SI	CL	REMARKS
	Sandy SILT (ML), trace clay Very Dense Grey Wet														
			19	SS	100/0.15		245		o			0	32	64	4
							244								
							243								
241.7			20	SS	102/0.22		242								
33.9	End of Borehole Note: 1. Water level not recorded upon completion of drilling due to introduction of drilling mud. 2. A monitoring well was installed approximately 3 m north of Borehole 9-1. 3. Water level in standpipe piezometer measured at a depth of 1.5 m on December 10, 2021.						241								
							240								
							239								
							238								
							237								
							236								

+³, x³ : Numbers refer to Sensitivity o³% STRAIN AT FAILURE

Ontario

GOLDER

PROJECT 19136074

RECORD OF BOREHOLE No. 10-1

Sheet 1 of 3

METRIC

G.W.P. Assignment No 2019-E-0048 LOCATION N 4887105.4; E 296308.4 NAD83 / MTM Zone 10 (LAT. 44.123894; LONG. -79.606104) ORIGINATED BY SS

DIST Central HWY BBP- 10th SR Line BOREHOLE TYPE Hollow Stem Auger, Mud Rotary and Casing COMPILED BY AY

DATUM CGVD28 Surface Elevation:283.0 m DATE Apr 29, 2021 - Apr 30, 2021 CHECKED BY KJB

SOIL PROFILE			SAMPLES			GROUNDWATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa) (Field Vane, Remoulded, Pocket Pen, Quick Triaxial, Unconfined) 20 40 60 80 100	WATER CONTENT (%) PL W_p NMC W LL W_l NP Nonplastic 20 40 60	UNIT WEIGHT γ kN/m³	GR	SA	SI	CL	REMARKS
ELEV. / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" VALUES										
0.0	TOPSOIL (200mm)														
282.8 / 0.2	SILTY SAND (SM), trace organics Loose to compact Brown Moist to wet		1	SS	7										
			2	SS	14		282								
281.5 / 1.4	CLAYEY SILT (CL), trace sand, trace gravel Very stiff Brown to grey, iron oxide staining Moist		3	SS	17		281				0	3	48	49	
			4	SS	16										
280.0 / 3.0	CLAYEY SILT (CL), some sand to sandy, trace to some gravel (TILL) Stiff to very stiff Grey Moist		5	SS	14		280								
			6	SS	15		279								
			7	SS	17		278				2	19	54	25	
			8	SS	17		277								
275.8 / 7.2	SILTY SAND (SM), trace gravel, some clay, contains clayey silt layers, (TILL) Dense to very dense Grey Moist						276								
			9	SS	57		275								
							274								
			10	SS	100						9	50	28	13	

Continued on Next Page

+³, x³ : Numbers refer to Sensitivity o³% STRAIN AT FAILURE

Ontario

WSP GOLDER

PROJECT 19136074

RECORD OF BOREHOLE No. 10-1 Sheet 2 of 3 METRIC

G.W.P. Assignment No 2019-E-0048 LOCATION N 4887105.4; E 296308.4 NAD83 / MTM Zone 10 (LAT. 44.123894; LONG. -79.606104) ORIGINATED BY SS

DIST Central HWY BBP- 10th SR Line BOREHOLE TYPE Hollow Stem Auger, Mud Rotary and Casing COMPILED BY AY

DATUM CGVD28 Surface Elevation:283.0 m DATE Apr 29, 2021 - Apr 30, 2021 CHECKED BY KJB

SOIL PROFILE			SAMPLES				ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa) (Field Vane, Remoulded, Pocket Pen, Quick Triaxial, Unconfined) 20 40 60 80 100	WATER CONTENT (%) PL W_p NMC W LL W_l NP Nonplastic 20 40 60	UNIT WEIGHT γ kN/m³	GR	SA	SI	CL	REMARKS
ELEV. / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" VALUES	GROUNDWATER CONDITIONS									
	SILTY SAND (SM), trace gravel, some clay, contains clayey silt layers, (TILL) Dense to very dense Grey Moist						273								
	- 10.7 m: Slow augering and grinding		11	SS	54/0.09		272								
			12	SS	82		271		CH		6	51	30	13	
							270								
	- 13.7 m: Slow augering		13	SS	47		269								
							268								
	- 15.2 m: Slow augering to 15.24 m - 15.3 m: Contains clayey silt layers		14	SS	93										
							267								
265.3			15	SS	100/0.28		266		CH		7	50	30	13	
17.7	SILTY SAND (SM), trace to some gravel (TILL) Very dense Grey Moist														
	- 18.3 m: Slow augering to 18.29 m		16	SS	79		265		O						
							264								

Continued on Next Page

+³, x³ : Numbers refer to Sensitivity o³% STRAIN AT FAILURE

Ontario

WSP GOLDER

PROJECT 19136074

RECORD OF BOREHOLE No. 10-1

Sheet 3 of 3 **METRIC**

G.W.P. Assignment No 2019-E-0048 LOCATION N 4887105.4; E 296308.4 NAD83 / MTM Zone 10 (LAT. 44.123894; LONG. -79.606104) ORIGINATED BY SS

DIST Central HWY BBP- 10th SR Line BOREHOLE TYPE Hollow Stem Auger, Mud Rotary and Casing COMPILED BY AY

DATUM CGVD28 Surface Elevation:283.0 m DATE Apr 29, 2021 - Apr 30, 2021 CHECKED BY KJB

SOIL PROFILE			SAMPLES			GROUNDWATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa)	WATER CONTENT (%) PL W_p NMC W LL W_l	UNIT WEIGHT γ kN/m³	GR SA SI CL	REMARKS
ELEV. / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" VALUES			Field Vane, Remoulded, Pocket Pen, Quick Triaxial, Unconfined; 20 40 60 80 100	NP Nonplastic; 20 40 60			
	SILTY SAND (SM), trace to some gravel (TILL) Very dense Grey Moist						263					
							262					
			17	SS	74							
							261					
259.8							260					
23.2	Gravelly SAND (SP), some silt Very Dense Grey Wet - 23.2 to 24.4 m: Slow augering and grinding											
			18	SS	100/0.25		259					
							258					
257.0												
26.0	- 26.0 to 27.4 m: Slow augering and grinding CLAYEY SILT-SILT (CL-ML) trace sand, trace gravel, (TILL) Hard Grey Moist						257					
							256					
			19	SS	100/0.25				o			
255.2												
27.8	End of Borehole Notes: 1. Water level measured at a depth of 0.6 m (Elev. 282.4 m) prior to introducing water for mud rotary . 2. Water Level measured at a depth of 0.9 m (El. 282.1 m) after the installation of monitoring well.						255					
							254					

+³, x³ : Numbers refer to Sensitivity o³% STRAIN AT FAILURE

Ontario

WSP GOLDER

PROJECT 19136074

RECORD OF BOREHOLE No. 10-4

Sheet 1 of 4

METRIC

G.W.P. Assignment No 2019-E-0048 LOCATION N 4887087.9; E 296272.1 NAD83 / MTM Zone 10 (LAT. 44.123737; LONG. -79.606558) ORIGINATED BY SS

DIST Central HWY BBP- 10th SR Line BOREHOLE TYPE Hollow Stem Auger, Mud Rotary and Casing COMPILED BY AY

DATUM CGVD28 Surface Elevation:282.3 m DATE May 03, 2021 - May 04, 2021 CHECKED BY KJB

ELEV. / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" VALUES	GROUNDWATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa) (Field Vane, Remoulded, Pocket Pen, Quick Triaxial, Unconfined) 20 40 60 80 100	WATER CONTENT (%) PL W_p NMC W LL W_l NP Nonplastic 20 40 60	UNIT WEIGHT γ kN/m³	GR	SA	SI	CL	REMARKS
0.0	Topsoil-ORGANIC SILT (OL) Soft Black Moist		1	SS	3		282								
281.6															
0.7	CLAYEY SILT (CL), some organic silt pockets in the upper zone Firm to stiff Brown, iron oxide staining Moist		2	SS	4										
			3	SS	7		281								
			4	SS	13		280								
279.3															
3.0	Sandy CLAYEY SILT (CL), some gravel (TILL) Stiff to hard Brown to grey, iron oxide staining Moist		5	SS	19		279								
	- 3.8 to 4.4 m: Silty sand seams encountered within sample.		6	SS	33		278					16	49	27	8
	- 4.6 to 5.2 m: Slow augering and grinding.		7	SS	14		277								
276.7															
5.6	- 5.6 to 7.6 m: Slow Augering SILTY SAND (SM), some clay, trace gravel (TILL) Dense to very dense Grey Moist - 6.2 to 9.1 m: Slow Augering		8	SS	48		276								
			9	SS	72		275								
							274								
			10	SS	63		273					3	51	32	14

Continued on Next Page

+³, x³ : Numbers refer to Sensitivity o³% STRAIN AT FAILURE

Ontario

WSP GOLDER

PROJECT 19136074

RECORD OF BOREHOLE No. 10-4

Sheet 2 of 4

METRIC

G.W.P. Assignment No 2019-E-0048 LOCATION N 4887087.9; E 296272.1 NAD83 / MTM Zone 10 (LAT. 44.123737; LONG. -79.606558) ORIGINATED BY SS

DIST Central HWY BBP- 10th SR Line BOREHOLE TYPE Hollow Stem Auger, Mud Rotary and Casing COMPILED BY AY

DATUM CGVD28 Surface Elevation:282.3 m DATE May 03, 2021 - May 04, 2021 CHECKED BY KJB

SOIL PROFILE			SAMPLES			GROUNDWATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa)	WATER CONTENT (%) PL W_p NMC W LL W_l	UNIT WEIGHT γ kN/m³	GR	SA	SI	CL	REMARKS
ELEV. / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	NP Nonplastic 20 40 60						
	SILTY SAND (SM), some clay, trace gravel (TILL) Dense to very dense Grey Moist						272								
			11	SS	62/0.15										
							271								
			12	SS	58/0.15		270								
							269								
			13	SS	98										
							268								
			14	SS	73		267		CH		4	50	34	12	
							266								
			15	SS	87										
							265								
			16	SS	76		264								
							263								

Continued on Next Page

+³, x³ : Numbers refer to Sensitivity o³% STRAIN AT FAILURE

Ontario

wsp GOLDER

PROJECT 19136074	**RECORD OF BOREHOLE No. 10-4** Sheet 3 of 4		**METRIC**
G.W.P. Assignment No 2019-E-0048	LOCATION N 4887087.9; E 296272.1 NAD83 / MTM Zone 10 (LAT. 44.123737; LONG. -79.606558)		ORIGINATED BY SS
DIST Central HWY BBP- 10th SR Line	BOREHOLE TYPE Hollow Stem Auger, Mud Rotary and Casing		COMPILED BY AY
DATUM CGVD28 Surface Elevation:282.3 m	DATE May 03, 2021 - May 04, 2021		CHECKED BY KJB

ELEV. / DEPTH	DESCRIPTION (SOIL PROFILE)	NUMBER	TYPE	"N" VALUES	ELEVATION SCALE	WATER CONTENT (%)	GR	SA	SI	CL
	SILTY SAND (SM), some clay, trace gravel (TILL) Dense to very dense Grey Moist				262					
	- 20.7 to 21.3 m: Grinding of casing and slow advancement				261					
		17	SS	80						
	- 22.0 to 24.4 m: Grinding of casing and slow advancement				260					
					259					
					258					
		18	SS	91		o-|	6	56	26	12
					257					
256.1 / 26.2	- 26.2 to 27.4 m: Grinding of casing and slow advancement				256					
	SILTY SAND (SM), some gravel, (TILL) Very dense Grey Moist, slow augering				255					
		19	SS	100						
					254					
					253					

Chart column headings: STRATA PLOT; GROUNDWATER CONDITIONS; DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100); SHEAR STRENGTH (kPa): ○ Unconfined, ● Quick Triaxial, ■ Pocket Pen, ⊕ Remoulded, × Field Vane; WATER CONTENT (%): PL W_p, NMC W, LL W_l (20 40 60), NP Nonplastic; UNIT WEIGHT γ kN/m³; REMARKS

Continued on Next Page

+³, x³ : Numbers refer to Sensitivity o³% STRAIN AT FAILURE

Ontario

WSP GOLDER

PROJECT 19136074

RECORD OF BOREHOLE No. 10-4

Sheet 4 of 4

METRIC

G.W.P. Assignment No 2019-E-0048 LOCATION N 4887087.9; E 296272.1 NAD83 / MTM Zone 10 (LAT. 44.123737; LONG. -79.606558) ORIGINATED BY SS

DIST Central HWY BBP- 10th SR Line BOREHOLE TYPE Hollow Stem Auger, Mud Rotary and Casing COMPILED BY AY

DATUM CGVD28 Surface Elevation:282.3 m DATE May 03, 2021 - May 04, 2021 CHECKED BY KJB

SOIL PROFILE			SAMPLES			GROUNDWATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa)	WATER CONTENT (%) PL W_p NMC W LL W_l	UNIT WEIGHT γ kN/m³	GR SA SI CL	REMARKS
ELEV. / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" VALUES			○ Field Vane ⊕ Remoulded ■ Pocket Pen ● Quick Triaxial × Unconfined; 20 40 60 80 100	NP Nonplastic; 20 40 60			
	SILTY SAND (SM), some gravel, (TILL) Very dense Grey Moist, slow augering						252					
251.6			20	SS	100/0.17							
30.7	End of Borehole Notes: 1. Water level measured at a depth of 2.24 m (Elev. 280.1 m) prior to introducing water for mud rotary . 2. Water Level measured at a depth of 0.61 m (El. 281.7 m) after the installation of monitoring well.						251 250 249 248 247 246 245 244					

+³, x³ : Numbers refer to Sensitivity o³% STRAIN AT FAILURE

Ontario

DRAFT

wsp

PROJECT 19136074

RECORD OF BOREHOLE No. AIP-3 Sheet 1 of 3 METRIC

G.W.P. Assignment No 2019-E-0048 LOCATION N 4887967.2; E 300371.1 NAD83 / MTM Zone 10 (LAT. 44.131686; LONG. -79.555347) ORIGINATED BY MTI

DIST Central HWY BBP - AIP BOREHOLE TYPE 210 mm Hollow Stem Auger, Mud Rotary and casing COMPILED BY PT

DATUM CGVD28 Surface Elevation:224.8 m DATE Nov 19, 2021 - Nov 21, 2021 CHECKED BY

ELEV. / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" VALUES	GROUNDWATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa) (Field Vane, Remoulded, Pocket Pen, Quick Triaxial, Unconfined) 20 40 60 80 100	WATER CONTENT (%) PL W_p NMC W LL W_l NP Nonplastic 20 40 60	UNIT WEIGHT γ kN/m³	GR	SA	SI	CL	REMARKS
0.0	CLAYEY SILT (CL), trace sand, trace gravel, some rootlets (FILL) Stiff Brown Moist		1	SS	11										
224.1															
0.7	SILT (ML) and sand, trace gravel, trace rootlets (FILL) Compact Brown to blackish brown Moist		2	SS	13		224				2	42	49	7	
223.4															
1.4	Sandy CLAYEY SILT (CL) to CLAYEY SILT-SILT (CL-ML), trace sand, trace gravel, Stiff to hard Brown to mottled grey / brown Moist - 2.1 m: -trace organics above 2.1 m bgs -resembles glacial till below a depth of 2.29 m		3	SS	10		223								
			4	SS	11		222				4	26	52	18	
			5	SS	21										
			6	SS	100/0.15		221								
			7	SS	100/0.13		220								
219.2															
5.6	CLAYEY SILT (CL), trace gravel, trace sand Very stiff to Hard Grey Moist		8	SS	52		219								
							218								
			9	SS	45		217				0	0	57	43	
	- 8.1 m: -silt seam (25 mm thick)														
			10	SS	22		216								
							215								

Continued on Next Page

+³, x³ : Numbers refer to Sensitivity o³% STRAIN AT FAILURE

Ontario

PROJECT 19136074

RECORD OF BOREHOLE No. AIP-3 Sheet 2 of 3 METRIC

G.W.P. Assignment No 2019-E-0048 LOCATION N 4887967.2; E 300371.1 NAD83 / MTM Zone 10 (LAT. 44.131686; LONG. -79.555347) ORIGINATED BY MTI

DIST Central HWY BBP - AIP BOREHOLE TYPE 210 mm Hollow Stem Auger, Mud Rotary and casing COMPILED BY PT

DATUM CGVD28 Surface Elevation:224.8 m DATE Nov 19, 2021 - Nov 21, 2021 CHECKED BY

SOIL PROFILE			SAMPLES			GROUNDWATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa)	WATER CONTENT (%)	UNIT WEIGHT	GR SA SI CL	REMARKS
ELEV. / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" VALUES			Field Vane, Remoulded, Pocket Pen, Quick Triaxial, Unconfined; 20 40 60 80 100	PL W_p NMC W LL W_l; NP Nonplastic; 20 40 60	γ kN/m³		
214.6	CLAYEY SILT (CL), trace gravel, trace sand Very stiff to Hard Grey Moist											
10.2	SILTY CLAY (CI), trace sand Firm to very stiff Grey Moist		11	SS	6		214					
			12	TO			213					C
212.3			13a	SS	29						0 1 31 68	
12.5	Sandy SILT (ML), trace gravel Compact to Dense Grey Moist		13b				212					
			14	SS	33		211					
210.0												
14.8	CLAYEY SILT (CL), trace to some sand, trace gravel (TILL) Hard Grey Moist		15	SS	71		210				0 9 53 38	
			16	SS	40		209					
			17	SS	39		208					
							207					
							206					
							205					

Continued on Next Page

+³, x³ : Numbers refer to Sensitivity o³% STRAIN AT FAILURE

Ontario

PROJECT 19136074

RECORD OF BOREHOLE No. AIP-3 Sheet 3 of 3 METRIC

G.W.P. Assignment No 2019-E-0048 LOCATION N 4887967.2; E 300371.1 NAD83 / MTM Zone 10 (LAT. 44.131686; LONG. -79.555347) ORIGINATED BY MTI

DIST Central HWY BBP - AIP BOREHOLE TYPE 210 mm Hollow Stem Auger, Mud Rotary and casing COMPILED BY PT

DATUM CGVD28 Surface Elevation:224.8 m DATE Nov 19, 2021 - Nov 21, 2021 CHECKED BY

SOIL PROFILE			SAMPLES			GROUNDWATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa)	WATER CONTENT (%) PL W_p NMC W LL W_l	UNIT WEIGHT γ kN/m³	GR	SA	SI	CL	REMARKS
ELEV. / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	NP Nonplastic 20 40 60						
	CLAYEY SILT (CL), trace to some sand, trace gravel (TILL) Hard Grey Moist						204								
			18	SS	107/0.10		203								
201.8							202								
23.0	SILT (ML), some clay, trace sand Very Dense Grey Moist - 23.0 to 24.7 m: -contains sand seams						201								
200.1			19	SS	100/0.13				○ NP		0	3	86	11	
24.7	End of Borehole Notes: 1. Hollow stem augers to 2.3 m depth and then switched to mud rotary. 2. Groundwater first encountered at 1.7 m (Elev. 222.2 m) below ground surface before introducing water for mud rotary. 3. Standpipe piezometer (50 mm pipe) installed1.5 m north of borehole location. Groundwater level measurement(s) in piezometer: Date Depth (m) Elev. (m) Dec 23, 2021 1.52 222.4						200 199 198 197 196 195								

+³, x³ : Numbers refer to Sensitivity o³% STRAIN AT FAILURE

Ontario

DRAFT

wsp

PROJECT 19136074

RECORD OF BOREHOLE No. CN-1

Sheet 1 of 2

METRIC

G.W.P. Assignment No 2019-E-0048 LOCATION N 4887976.1; E 300530.2 NAD83 / MTM Zone 10 (LAT. 44.131768; LONG. -79.553359) ORIGINATED BY MTI

DIST Central HWY BBP - CN Rail BOREHOLE TYPE 210 mm Hollow Stem Auger; Mud Rotary COMPILED BY MA/MTI

DATUM CGVD28 Surface Elevation:222.4 m DATE Nov 17, 2021 CHECKED BY MH

ELEV. / DEPTH	DESCRIPTION	STRATA PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES	GROUNDWATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa) (Field Vane, Remoulded, Pocket Pen, Quick Triaxial, Unconfined) 20 40 60 80 100	WATER CONTENT (%) PL W_p NMC W LL W_l NP Nonplastic 20 40 60	UNIT WEIGHT γ kN/m³	GR	SA	SI	CL	REMARKS
0.0	CLAYEY SILT (CL), trace sand, trace organics, trace gravel, Soft Dark Brown Moist		1	SS	4		222								
221.7															
0.7	SILTY SAND (SM) to Sandy SILT (ML), trace organics, trace gravel Loose to compact Brown, contains oxidation staining Moist		2	SS	4										
							221								
			3	SS	10				○ NP						
220.2															
2.2	CLAYEY SILT (CL), some sand, trace organics, trace gravel Very stiff Brown, contains oxidation staining Moist		4	SS	16		220		IC I		7	18	46	29	
219.4															
3.0	Sandy SILT (ML) to SILTY SAND (SM), some clay, trace gravel Compact to very dense Light brown to grey, contains oxidation staining Moist to wet		5	SS	11		219								
			6	SS	41				○		1	29	58	12	
							218								
			7	SS	52				○ NP		11	54	29	6	
							217								
			8	SS	104				○		0	32	62	6	
							216								
215.2															
7.2	SILT (ML) to CLAYEY SILT-SILT (CL-ML), some sand, trace gravel, (TILL) Very Dense Grey Moist						215								
			9	SS	102/0.05										
							214								
	- 9.1 to 9.4 m: gravel fragments encountered in sample		10	SS	101/0.13				○ NP						
							213								

Continued on Next Page

+³, x³ : Numbers refer to Sensitivity o³% STRAIN AT FAILURE

Ontario

PROJECT 19136074

RECORD OF BOREHOLE No. CN-1 Sheet 2 of 2 METRIC

G.W.P. Assignment No 2019-E-0048 LOCATION N 4887976.1; E 300530.2 NAD83 / MTM Zone 10 (LAT. 44.131768; LONG. -79.553359) ORIGINATED BY MTI

DIST Central HWY BBP - CN Rail BOREHOLE TYPE 210 mm Hollow Stem Auger; Mud Rotary COMPILED BY MA/MTI

DATUM CGVD28 Surface Elevation:222.4 m DATE Nov 17, 2021 CHECKED BY MH

ELEV. / DEPTH	DESCRIPTION	STRATA PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES	GROUNDWATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa) ○ Unconfined ● Quick Triaxial ■ Pocket Pen ⊕ Remoulded × Field Vane 20 40 60 80 100	WATER CONTENT (%) PL W_p NMC W LL W_l NP Nonplastic 20 40 60	UNIT WEIGHT γ kN/m³	GR	SA	SI	CL	REMARKS
	SILT (ML) to CLAYEY SILT-SILT (CL-ML), some sand, trace gravel, (TILL) Very Dense Grey Moist						212								
			11	SS	100/0.15										
							211								
			12	SS	101/0.11		210		○						
							209								
208.4			13	SS	100/0.15				○			0	16	73	11
14.0	End of Borehole Note: 1. Hollow stem augers to 3.0 m (Elev. 219.4 m) and then switched to mud rotary. 2. Water level measured at a depth of 2.07 m during drilling and prior to mud rotary. 3. Water level in piezometer measured as follows: Depth(m) El. (m) Date 1.23 221.2 12/23/21 1.55 220.9 02/04/22 1.56 220.8 02/08/22 1.58 220.8 02/16/22 1.27 221.1 05/12/22						208 207 206 205 204 203								

+³, x³ : Numbers refer to Sensitivity o³% STRAIN AT FAILURE

Ontario

DRAFT

WSP

PROJECT 19136074

RECORD OF BOREHOLE No. CN-3 Sheet 1 of 2 METRIC

G.W.P. Assignment No 2019-E-0048 LOCATION N 4887798.4; E 300708.3 NAD83 / MTM Zone 10 (LAT. 44.130169; LONG. -79.551132) ORIGINATED BY MTI

DIST Central HWY BBP - CN Rail BOREHOLE TYPE 210 mm Hollow Stem Auger; Mud Rotary COMPILED BY MA/MTI

DATUM CGVD28 Surface Elevation:219.8 m DATE Mar 08, 2022 - Mar 09, 2022 CHECKED BY MH

ELEV. / DEPTH	DESCRIPTION	STRATA PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: "N" VALUES	GROUNDWATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa)	WATER CONTENT (%) PL W_p NMC W LL W_l	UNIT WEIGHT γ kN/m³	GR	SA	SI	CL	REMARKS
0.0	Gravelly SILTY SAND (SM), trace rootlets, (FILL) Very Dense Brown Moist		1	SS	109										
219.2															
0.6	CLAYEY SILT-SILT (CL-ML), trace sand, trace gravel Stiff Grey Moist		2	SS	10		219								
218.4															
1.4	Sandy SILT (ML) to SILTY SAND (SM), trace to some clay, trace gravel, trace to some rootlets/organics, Very loose to dense Dark brown to grey Moist		3	SS	5		218								
			4A	SS	2		217				4	37	42	17	
	- 3.5 to 3.8 m: Organic layer encountered		4B							MC= 92	2	37	55	6	
			5	SS	5		216								
	- 4.6 to 5.2 m: Less than 25 mm of sample recovered within split spoon.		6	SS	13		215								
			7	SS	25		214								
			8	SS	30		213				19	39	35	7	
211.1							212								
8.7	SILT (ML) to CLAYEY SILT-SILT (CL-ML), some sand, trace gravel, (TILL) Very Dense Grey Moist to wet		9	SS	100/0.24		211								
							210								

Continued on Next Page

+³, x³ : Numbers refer to Sensitivity o³% STRAIN AT FAILURE

Ontario

PROJECT 19136074

RECORD OF BOREHOLE No. CN-3 Sheet 2 of 2 METRIC

G.W.P. Assignment No 2019-E-0048 LOCATION N 4887798.4; E 300708.3 NAD83 / MTM Zone 10 (LAT. 44.130169; LONG. -79.551132) ORIGINATED BY MTI

DIST Central HWY BBP - CN Rail BOREHOLE TYPE 210 mm Hollow Stem Auger; Mud Rotary COMPILED BY MA/MTI

DATUM CGVD28 Surface Elevation:219.8 m DATE Mar 08, 2022 - Mar 09, 2022 CHECKED BY MH

SOIL PROFILE			SAMPLES			GROUNDWATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa) ○ Field Vane ⊕ Remoulded ■ Pocket Pen ● Quick Triaxial × Unconfined	WATER CONTENT (%) PL W_p NMC W LL W_l NP Nonplastic	UNIT WEIGHT γ kN/m³	GR SA SI CL	REMARKS
ELEV. / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	20 40 60			
	SILT (ML) to CLAYEY SILT-SILT (CL-ML, some sand, trace gravel, (TILL) Very Dense Grey Moist to wet - 10.1 m: Auger grinding						209					
			10	SS	100/0.25							
							208					
207.2			11	SS	100/0.26				○			
12.6	End of Borehole Note: 1. Hollow stem augers to 3.0 m (Elev. 216.8 m) and then switched to mud rotary. 2. Water level measured at a depth of 2.44 m prior to mud rotary. 3. Water level in piezometer measured as follows: Depth(m) El. (m) Date 0.80 219.0 05/12/22 0.78 219.0 05/13/22						207 206 205 204 203 202 201 200					

+³, x³ : Numbers refer to Sensitivity o³% STRAIN AT FAILURE

Ontario

WSP GOLDER

PROJECT 19136074

RECORD OF BOREHOLE No. HRW-1

Sheet 1 of 5

METRIC

G.W.P. Assignment No 2019-E-0048 LOCATION N 4887870.6; E 300852.7 NAD83 / MTM Zone 10 (LAT. 44.13082; LONG. -79.549328) ORIGINATED BY AM

DIST Central HWY BBP BOREHOLE TYPE 210 mm Hollow Stem Auger; Mud Rotary COMPILED BY MA/MTI

DATUM CGVD28 Surface Elevation:219.0 m DATE Nov 11, 2021 - Nov 15, 2021 CHECKED BY KJB

ELEV. / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" VALUES	GROUNDWATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa) (Field Vane, Remoulded, Pocket Pen, Quick Triaxial, Unconfined) 20 40 60 80 100	WATER CONTENT (%) PL W_p NMC W LL W_l NP Nonplastic 20 40 60	UNIT WEIGHT γ kN/m³	GR	SA	SI	CL	REMARKS
0.0	SANDY SILT (ML), trace clay, trace organic includes roots, (TOPSOIL)		1A						NP						
218.8 0.2	Loose Brown Moist		1B	SS	11										
	SILTY SAND (SM) to SAND (SP), trace gravel (FILL)														
218.2	Compact to loose		2A												
0.8	Brown		2B						NP						
218.1 0.9	Moist to wet		2C	SS	4		218								
	PEAT (PT), sandy Very loose Blackish brown Wet														
	SILTY SAND to SANDY SILT (SM-ML), contains clay seams Very loose to loose Brown		3	SS	1				NP						
216.8	Wet						217								
2.2	CLAYEY SILT-SILT (CL-ML), some sand Stiff to Very Stiff Brown Moist		4	SS	15						0	14	66	20	
216.0							216								
3.0	SILTY SAND (SM), trace clay, trace gravel Loose to dense Brown to grey Wet		5	SS	8										
	- 3.9 m: 75mm clay layer (Elev. 215.1 m)		6	SS	17		215								
			7	SS	23		214								
			8	SS	23		213				1	82	15	2	
							212								
	- 7.9 m: silt seams encountered (Elev. 211.1 m).		9	SS	27		211								
							210								
	- 9.1 m: tricone grinding noted		10	SS	43										
	- 9.8 m: gravel seam / layer at tip of spoon														

Continued on Next Page

+³, x³ : Numbers refer to Sensitivity o³% STRAIN AT FAILURE

Ontario

WSP GOLDER

PROJECT 19136074

RECORD OF BOREHOLE No. HRW-1

Sheet 2 of 5

METRIC

G.W.P. Assignment No 2019-E-0048 LOCATION N 4887870.6; E 300852.7 NAD83 / MTM Zone 10 (LAT. 44.13082; LONG. -79.549328) ORIGINATED BY AM

DIST Central HWY BBP BOREHOLE TYPE 210 mm Hollow Stem Auger; Mud Rotary COMPILED BY MA/MTI

DATUM CGVD28 Surface Elevation:219.0 m DATE Nov 11, 2021 - Nov 15, 2021 CHECKED BY KJB

ELEV. / DEPTH	DESCRIPTION	STRATA PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES	GROUNDWATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa) (Field Vane, Remoulded, Pocket Pen, Quick Triaxial, Unconfined) 20 40 60 80 100	WATER CONTENT (%) PL W_p NMC W LL W_l NP Nonplastic 20 40 60	UNIT WEIGHT γ kN/m³	GR	SA	SI	CL	REMARKS
	SILTY SAND (SM), trace clay, trace gravel Loose to dense Brown to grey Wet - 10.0 to 12.0 m: gravelly silty sand encountered. Difficulties advancing tricone.						209								
			11	SS	31		208		○		32	56	11	1	
							207								
			12	SS	24				○						
							206								
	- 13.7 to 14.3 m: no sample recovered		13	SS	19		205		○						
203.8							204								
15.2	CLAYEY SILT (CL) to CLAYEY SILT-SILT (CL-ML), trace to some sand, trace to some gravel Soft to stiff Moist Grey		14	SS	3		203	⊕ ×							
	- 16.8 to 17.4 m: no sample recovered in shelby tube. Obtained disturbed sample with split spoon. Contains sand seams/ layers		15	TO			202		⊢⊖⊣						
							201								
	- 18.3 m: contains sand layers/seams		16	SS	9				○⊣		12	20	54	14	
							200								

Continued on Next Page

+³, x³ : Numbers refer to Sensitivity o³% STRAIN AT FAILURE

Ontario

WSP GOLDER

PROJECT 19136074

RECORD OF BOREHOLE No. HRW-1

Sheet 3 of 5

METRIC

G.W.P. Assignment No 2019-E-0048 LOCATION N 4887870.6; E 300852.7 NAD83 / MTM Zone 10 (LAT. 44.13082; LONG. -79.549328) ORIGINATED BY AM

DIST Central HWY BBP BOREHOLE TYPE 210 mm Hollow Stem Auger; Mud Rotary COMPILED BY MA/MTI

DATUM CGVD28 Surface Elevation:219.0 m DATE Nov 11, 2021 - Nov 15, 2021 CHECKED BY KJB

SOIL PROFILE			SAMPLES			GROUNDWATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa)	WATER CONTENT (%) PL W_p NMC W LL W_l	UNIT WEIGHT γ kN/m³	GR	SA	SI	CL	REMARKS
ELEV. / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	NP Nonplastic 20 40 60						
21.3	CLAYEY SILT (CL) to CLAYEY SILT-SILT (CL-ML), trace to some sand, trace to some gravel Soft to stiff Moist Grey						199								
197.7	SILTY SAND (SM), trace clay, trace gravel Very dense Grey Wet		17	SS	106		198		o		0	76	21	3	
			18	SS	121/0.26		197								
			19	SS	101/0.23		196								
							195								
							194								
							193								
							192								
							191								
							190								

Continued on Next Page

+³, x³ : Numbers refer to Sensitivity o³% STRAIN AT FAILURE

Ontario

WSP GOLDER

PROJECT 19136074

RECORD OF BOREHOLE No. HRW-1

Sheet 4 of 5

METRIC

G.W.P. Assignment No 2019-E-0048 LOCATION N 4887870.6; E 300852.7 NAD83 / MTM Zone 10 (LAT. 44.13082; LONG. -79.549328) ORIGINATED BY AM

DIST Central HWY BBP BOREHOLE TYPE 210 mm Hollow Stem Auger; Mud Rotary COMPILED BY MA/MTI

DATUM CGVD28 Surface Elevation:219.0 m DATE Nov 11, 2021 - Nov 15, 2021 CHECKED BY KJB

ELEV. / DEPTH	DESCRIPTION	STRATA PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES	GROUNDWATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa) (Field Vane, Remoulded, Pocket Pen, Quick Triaxial, Unconfined) 20 40 60 80 100	WATER CONTENT (%) PL W_p NMC W LL W_l NP Nonplastic 20 40 60	UNIT WEIGHT γ kN/m³	GR	SA	SI	CL	REMARKS
	SILTY SAND (SM), trace clay, trace gravel Very dense Grey Wet						189								
			20	SS	100		188		o		0	60	36	4	
							187								
							186								
185.4	- 33.5 m: gravelly silty sand layer encountered (Elev. 185.5 m).														
33.6	CLAYEY SILT-SILT (CL-ML), trace sand, trace gravel Hard Grey Moist		21	SS	100/0.26		185		o⊢		1	16	73	10	
							184								
							183								
			22	SS	100/0.05		182		o						
							181								
							180								

Continued on Next Page

+³, x³ : Numbers refer to Sensitivity o³% STRAIN AT FAILURE

Ontario

WSP GOLDER

PROJECT 19136074

RECORD OF BOREHOLE No. HRW-1

Sheet 5 of 5

METRIC

G.W.P. Assignment No 2019-E-0048 LOCATION N 4887870.6; E 300852.7 NAD83 / MTM Zone 10 (LAT. 44.13082; LONG. -79.549328) ORIGINATED BY AM

DIST Central HWY BBP BOREHOLE TYPE 210 mm Hollow Stem Auger; Mud Rotary COMPILED BY MA/MTI

DATUM CGVD28 Surface Elevation:219.0 m DATE Nov 11, 2021 - Nov 15, 2021 CHECKED BY KJB

SOIL PROFILE			SAMPLES										
ELEV. / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" VALUES	GROUNDWATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa) ⊕ Field Vane, ■ Remoulded, ● Pocket Pen, ○ Quick Triaxial, × Unconfined; 20 40 60 80 100	WATER CONTENT (%) PL W_p NMC W LL W_l; NP Nonplastic; 20 40 60	UNIT WEIGHT γ kN/m³	GR SA SI CL	REMARKS
39.9	CLAYEY SILT-SILT (CL-ML), trace sand, trace gravel Hard Grey Moist		23	SS	100/0.13							
179.1	End of Borehole						179					
	Notes: 1. Hollow stem augers to 2.4 m (Elev. 216.6) and then switched to mud rotary. 2. Water level measured at a depth of 1.98 m after completion of drilling. 3. Water level in piezometer measured as follows: Depth(m) El. (m) Date 0.44 218.6 02/07/22 0.67 218.3 05/013/22						178					
							177					
							176					
							175					
							174					
							173					
							172					
							171					

+³, x³ : Numbers refer to Sensitivity o³% STRAIN AT FAILURE

Ontario

WSP GOLDER

PROJECT 19136074

RECORD OF BOREHOLE No. HRW-4 Sheet 1 of 5 METRIC

G.W.P. Assignment No 2019-E-0048 LOCATION N 4888043.9; E 301230.5 NAD83 / MTM Zone 10 (LAT. 44.132381; LONG. -79.544608) ORIGINATED BY AM

DIST Central HWY BBP BOREHOLE TYPE 210 mm Hollow Stem Auger; Mud Rotary COMPILED BY MA/MTI

DATUM CGVD28 Surface Elevation:217.4 m DATE Oct 04, 2021 - Oct 08, 2021 CHECKED BY KJB

ELEV. / DEPTH	DESCRIPTION	STRATA PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES	GROUNDWATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa) 20 40 60 80 100	WATER CONTENT (%) PL W_p NMC W LL W_l NP Nonplastic 20 40 60	UNIT WEIGHT γ kN/m³	GR	SA	SI	CL	REMARKS
0.0	TOPSOIL														
217.2 / 0.2	SILTY SAND (SM), trace clay (FILL) Compact Brown		1	SS	12		217								
216.7 / 0.7	Dry ORGANIC SILT (OL)														
216.4 / 0.9	Loose Brown Moist		2A 2B	SS	10				O		0	44	48	8	
215.9 / 1.4	SANDY SILT (ML), trace clay Compact Brown						216								
215.7 / 1.7	Wet Sandy PEAT (PT)		3A 3B	SS	2										
215.5 / 1.8	SILTY SAND (SM) to SANDY SILT (ML) Very loose Brown Wet		3C						H O		0	2	74	24	
	CLAYEY SILT (CL) to CLAYEY SILT-SILT (CL-ML), trace sand Stiff to very stiff Brown Moist to wet		4	TO			215	>95.8							
	- 3.3 m: 75 mm thick sandy layer encountered (Elev. 214.1 m).		5	SS	11		214								
			6	SS	7		213		H O		0	3	64	33	
			7	SS	12										
			8	TO			212			19.8					c
			9	SS	18		211	>95.8							
							210								
			10	SS	10				H O		0	2	77	21	
							209								
			11	SS	11		208								
							207								

Continued on Next Page

+³, x³ : Numbers refer to Sensitivity o³% STRAIN AT FAILURE

Ontario

WSP GOLDER

PROJECT 19136074

RECORD OF BOREHOLE No. HRW-4 Sheet 2 of 5 METRIC

G.W.P. Assignment No 2019-E-0048 LOCATION N 4888043.9; E 301230.5 NAD83 / MTM Zone 10 (LAT. 44.132381; LONG. -79.544608) ORIGINATED BY AM

DIST Central HWY BBP BOREHOLE TYPE 210 mm Hollow Stem Auger; Mud Rotary COMPILED BY MA/MTI

DATUM CGVD28 Surface Elevation:217.4 m DATE Oct 04, 2021 - Oct 08, 2021 CHECKED BY KJB

ELEV. / DEPTH	DESCRIPTION	STRATA PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES	GROUNDWATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa) 20 40 60 80 100	WATER CONTENT (%) PL W_p NMC W LL W_l NP Nonplastic 20 40 60	UNIT WEIGHT γ kN/m³	GR	SA	SI	CL	REMARKS
	CLAYEY SILT (CL) to CLAYEY SILT-SILT (CL-ML), trace sand Firm to stiff Brown Moist to wet		12	SS	14		206		○						
205.6															
11.7	SANDY SILT (ML), trace clay Dense to very dense Brown Moist to wet		13	SS	34		205		○		0	21	70	9	
							204								
			14	SS	35				○						
							203								
			15	SS	74		202				0	23	69	8	
201.0															
16.3	Sandy CLAYEY SILT (CL) to CLAYEY SILT (CL) Very stiff Grey Moist to wet		16	SS	17		201		○						
199.5							200								
17.8	CLAYEY SILT (CL) to CLAYEY SILT-SILT (CL-ML), trace to some sand Stiff Grey Wet		17	SS	12		199		⊖		0	1	71	28	
							198	>95.8 ×							
							197								

Continued on Next Page

+³, x³ : Numbers refer to Sensitivity o³% STRAIN AT FAILURE

Ontario

WSP GOLDER

PROJECT 19136074

RECORD OF BOREHOLE No. HRW-4 Sheet 3 of 5 METRIC

G.W.P. Assignment No 2019-E-0048 LOCATION N 4888043.9; E 301230.5 NAD83 / MTM Zone 10 (LAT. 44.132381; LONG. -79.544608) ORIGINATED BY AM

DIST Central HWY BBP BOREHOLE TYPE 210 mm Hollow Stem Auger; Mud Rotary COMPILED BY MA/MTI

DATUM CGVD28 Surface Elevation:217.4 m DATE Oct 04, 2021 - Oct 08, 2021 CHECKED BY KJB

ELEV. / DEPTH	DESCRIPTION	STRATA PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES	GROUNDWATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa) (Field Vane, Remoulded, Pocket Pen, Quick Triaxial, Unconfined) 20 40 60 80 100	WATER CONTENT (%) PL W_p NMC W LL W_l NP Nonplastic 20 40 60	UNIT WEIGHT γ kN/m³	GR	SA	SI	CL	REMARKS
	CLAYEY SILT (CL) to CLAYEY SILT-SILT (CL-ML), trace to some sand Stiff Grey Wet - 21.5 m: 75 mm thick wet silt layer encountered		18	SS	13		195								
							194								
							193								
			19	SS	8				H O		0	14	60	26	
			20	TO			192	⊕ ⨯							
							191								
							190								
	- 27.4 to 28.0 m: contains silty sand seams/ layers (up to 25 mm thick)		21	SS	13										
							189								
							188								
							187								
			22	SS	11										
							186	⊕ ⨯							

Continued on Next Page

+³, x³ : Numbers refer to Sensitivity o³% STRAIN AT FAILURE

Ontario

WSP GOLDER

PROJECT 19136074

RECORD OF BOREHOLE No. HRW-4

Sheet 4 of 5

METRIC

G.W.P. Assignment No 2019-E-0048 LOCATION N 4888043.9; E 301230.5 NAD83 / MTM Zone 10 (LAT. 44.132381; LONG. -79.544608) ORIGINATED BY AM

DIST Central HWY BBP BOREHOLE TYPE 210 mm Hollow Stem Auger; Mud Rotary COMPILED BY MA/MTI

DATUM CGVD28 Surface Elevation:217.4 m DATE Oct 04, 2021 - Oct 08, 2021 CHECKED BY KJB

SOIL PROFILE			SAMPLES			GROUNDWATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa)	WATER CONTENT (%) PL W_p NMC W LL W_l	UNIT WEIGHT γ kN/m³	GR	SA	SI	CL	REMARKS
ELEV. / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	NP Nonplastic 20 40 60						
	CLAYEY SILT (CL) to CLAYEY SILT-SILT (CL-ML), trace to some sand Stiff Grey Wet						185								
							184								
	- 33.5 m: contains silt seams/ pockets		23	SS	13				○						
182.3							183								
35.0	CLAYEY SILT-SILT (CL-ML), some sand to sandy, trace to some gravel, (TILL) Very stiff to hard Grey Moist to wet														
			24	SS	31		182								
							181								
							180								
							179								
							178								
	- 40.0 to 42.0 m: tricone grinding noted		25	SS	17				~~○~~		2	25	53	20	
							177								
							176								
							175								

Continued on Next Page

+³, x³ : Numbers refer to Sensitivity o³% STRAIN AT FAILURE

Ontario

WSP GOLDER

PROJECT 19136074

RECORD OF BOREHOLE No. HRW-4 Sheet 5 of 5 METRIC

G.W.P. Assignment No 2019-E-0048 LOCATION N 4888043.9; E 301230.5 NAD83 / MTM Zone 10 (LAT. 44.132381; LONG. -79.544608) ORIGINATED BY AM

DIST Central HWY BBP BOREHOLE TYPE 210 mm Hollow Stem Auger; Mud Rotary COMPILED BY MA/MTI

DATUM CGVD28 Surface Elevation:217.4 m DATE Oct 04, 2021 - Oct 08, 2021 CHECKED BY KJB

SOIL PROFILE			SAMPLES			GROUNDWATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa) ○ Unconfined ● Quick Triaxial ■ Pocket Pen ⊕ Remoulded × Field Vane	WATER CONTENT (%) PL W_p NMC W LL W_l NP Nonplastic	UNIT WEIGHT γ kN/m³	GR SA SI CL	REMARKS
ELEV. / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	20 40 60			
	CLAYEY SILT-SILT (CL-ML), some sand to sandy, trace to some gravel, (TILL) Very stiff to hard Grey Moist to wet		26	SS	100		174					
							173					
							172					
			27	SS	15		171					
170.1												
47.2	Sandy SILT (ML), some gravel to gravelly, trace to some clay Very dense Grey Wet - 48.0 to 48.8 m: tricone grinding noted						170					
							169					
168.1			28	SS	103				○ NP		20 20 50 10	
49.2	End of Borehole Notes: 1. Water level measured at a depth of 1.67 m (Elev. 215.7) prior to introducing water for mud rotary. 2. Water level measured at a depth of 0.55 m (Elev. 216.9) on May 13, 2022.						168					
							167					
							166					
							165					
							164					

+³, x³ : Numbers refer to Sensitivity o³% STRAIN AT FAILURE

Ontario

WSP GOLDER

PROJECT 19136074

RECORD OF BOREHOLE No. HRE-3

Sheet 1 of 6

METRIC

G.W.P. Assignment No 2019-E-0048 LOCATION N 4888657.1; E 304531.7 NAD83 / MTM Zone 10 (LAT. 44.13791; LONG. -79.503353) ORIGINATED BY DP

DIST Central HWY BBP BOREHOLE TYPE 210 mm Hollow Stem Auger; Mud Rotary COMPILED BY MA/ MTI

DATUM CGVD28 Surface Elevation:220.0 m DATE Jan 13, 2022 - Jan 25, 2022 CHECKED BY KJB

ELEV. / DEPTH	DESCRIPTION	STRATA PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: "N" VALUES	GROUNDWATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa) (Field Vane, Remoulded, Pocket Pen, Quick Triaxial, Unconfined)	WATER CONTENT (%) PL W_p NMC W LL W_l NP Nonplastic	UNIT WEIGHT γ kN/m³	GR	SA	SI	CL	REMARKS
0.0	SILTY SAND (SM), trace organics including rootlets, (TOPSOIL)														
219.8															
0.2	Dark Brown Dry to moist		1	SS	6										
	SILTY SAND (SM), trace clay, trace gravel, trace organics (FILL) Loose Brown Dry to moist		2	SS	6		219				0	80	16	4	
1.8															
218.2	CLAYEY SILT-SILT (CL-ML), trace sand Firm Brown Moist		3	SS	5		218								
217.7															
2.3	SILTY SAND (SM) Compact to loose Brown to grey Moist to wet		4	SS	26						0	65	29	6	
			5	SS	7		217								
			6	SS	8		216				0	47	50	3	
	- 4.8 m: sample contains silt seams		7	SS	22		215				0	82	16	2	
							214								
213.5			8A	SS	14										
6.5	SANDY SILT (ML), trace clay Compact to very dense Grey Moist		8B				213								
			9	SS	21		212								
							211								
			10	SS	38										

Continued on Next Page

+³, x³ : Numbers refer to Sensitivity o³% STRAIN AT FAILURE

Ontario

WSP GOLDER

PROJECT 19136074

RECORD OF BOREHOLE No. HRE-3 Sheet 2 of 6 METRIC

G.W.P. Assignment No 2019-E-0048 LOCATION N 4888657.1; E 304531.7 NAD83 / MTM Zone 10 (LAT. 44.13791; LONG. -79.503353) ORIGINATED BY DP

DIST Central HWY BBP BOREHOLE TYPE 210 mm Hollow Stem Auger; Mud Rotary COMPILED BY MA/ MTI

DATUM CGVD28 Surface Elevation:220.0 m DATE Jan 13, 2022 - Jan 25, 2022 CHECKED BY KJB

SOIL PROFILE			SAMPLES			GROUNDWATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa)	WATER CONTENT (%) PL W_p NMC W LL W_l	UNIT WEIGHT γ kN/m³	GR	SA	SI	CL	REMARKS
ELEV. / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	NP Nonplastic 20 40 60						
	SANDY SILT (ML), trace clay Compact to very dense Grey Moist						210								
			11	SS	61		209								
							208								
			12	SS	33				■ ○		0	21	71	8	
							207								
			13	SS	39		206		■ ○						
							205								
			14	SS	64				○		0	19	76	5	
							204								
			15	SS	33		203		○						
202.1															
17.8	CLAYEY SILT-SILT (CL-ML), some sand Hard Grey Wet - 18.3 to 18.9 m: lenses of clayey silt-silt						202								
			16	SS	32										
201.1															
18.9	SILTY SAND (SM), trace clay Dense to compact Grey Wet						201								

Continued on Next Page

+³, x³ : Numbers refer to Sensitivity o³% STRAIN AT FAILURE

Ontario

WSP GOLDER

PROJECT 19136074

RECORD OF BOREHOLE No. HRE-3

Sheet 3 of 6

METRIC

G.W.P. Assignment No 2019-E-0048 LOCATION N 4888657.1; E 304531.7 NAD83 / MTM Zone 10 (LAT. 44.13791; LONG. -79.503353) ORIGINATED BY DP

DIST Central HWY BBP BOREHOLE TYPE 210 mm Hollow Stem Auger; Mud Rotary COMPILED BY MA/ MTI

DATUM CGVD28 Surface Elevation:220.0 m DATE Jan 13, 2022 - Jan 25, 2022 CHECKED BY KJB

SOIL PROFILE			SAMPLES			GROUNDWATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa) ⊕ Field Vane, ■ Remoulded, ● Pocket Pen, ○ Quick Triaxial, × Unconfined	WATER CONTENT (%) PL W_p NMC W LL W_l	UNIT WEIGHT γ kN/m³	GR	SA	SI	CL	REMARKS
ELEV. / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	NP Nonplastic 20 40 60						
	SILTY SAND (SM), trace clay Dense to compact Grey Wet						200								
							199								
			17	SS	32				○		0	75	24	1	
							198								
							197								
							196								
195.4			18 A	SS	21										
24.6	CLAYEY SILT (CL), trace to some sand Stiff to very stiff Grey Moist to wet		18 B				195								
							194								
							193								
			19	SS	17										
							192								
							191								

Continued on Next Page

+³, x³ : Numbers refer to Sensitivity o³% STRAIN AT FAILURE

Ontario

WSP GOLDER

PROJECT 19136074

RECORD OF BOREHOLE No. HRE-3 Sheet 4 of 6 METRIC

G.W.P. Assignment No 2019-E-0048 LOCATION N 4888657.1; E 304531.7 NAD83 / MTM Zone 10 (LAT. 44.13791; LONG. -79.503353) ORIGINATED BY DP

DIST Central HWY BBP BOREHOLE TYPE 210 mm Hollow Stem Auger; Mud Rotary COMPILED BY MA/ MTI

DATUM CGVD28 Surface Elevation:220.0 m DATE Jan 13, 2022 - Jan 25, 2022 CHECKED BY KJB

SOIL PROFILE			SAMPLES			GROUNDWATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa)	WATER CONTENT (%) PL W_p NMC W LL W_l	UNIT WEIGHT γ kN/m³	GR	SA	SI	CL	REMARKS
ELEV. / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	NP Nonplastic 20 40 60						
	CLAYEY SILT (CL), trace to some sand Stiff to very stiff Grey Moist to wet						190								
			20	SS	26		189								
							188								
							187								
			21	SS	10		186								
	- 35.0 m: attempted to obtain shelby tube sample but no recovery						185								
							184								
			22	SS	11		183				0	0	67	33	
							182								
			23	TO			181								

Continued on Next Page

+³, x³ : Numbers refer to Sensitivity o³% STRAIN AT FAILURE

Ontario

WSP GOLDER

PROJECT 19136074

RECORD OF BOREHOLE No. HRE-3

Sheet 5 of 6

METRIC

G.W.P. Assignment No 2019-E-0048 LOCATION N 4888657.1; E 304531.7 NAD83 / MTM Zone 10 (LAT. 44.13791; LONG. -79.503353) ORIGINATED BY DP

DIST Central HWY BBP BOREHOLE TYPE 210 mm Hollow Stem Auger; Mud Rotary COMPILED BY MA/ MTI

DATUM CGVD28 Surface Elevation:220.0 m DATE Jan 13, 2022 - Jan 25, 2022 CHECKED BY KJB

SOIL PROFILE			SAMPLES			GROUNDWATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa)	WATER CONTENT (%) PL W_p NMC W LL W_l	UNIT WEIGHT γ kN/m³	GR SA SI CL	REMARKS
ELEV. / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" VALUES			⊕ Field Vane, ■ Remoulded, ● Pocket Pen, ○ Quick Triaxial, × Unconfined; 20 40 60 80 100	NP Nonplastic; 20 40 60			
	CLAYEY SILT (CL), trace to some sand Stiff to very stiff Grey Moist to wet						180					
			24	SS	3			⊕ ×				
							179					
							178					
			25	SS	14		177					
							176					
							175					
			26	SS	14		174					
							173					
							172					

Continued on Next Page

+³, x³ : Numbers refer to Sensitivity o³% STRAIN AT FAILURE

Ontario

WSP GOLDER

PROJECT 19136074

RECORD OF BOREHOLE No. HRE-3 Sheet 6 of 6 METRIC

G.W.P. Assignment No 2019-E-0048 LOCATION N 4888657.1; E 304531.7 NAD83 / MTM Zone 10 (LAT. 44.13791; LONG. -79.503353) ORIGINATED BY DP

DIST Central HWY BBP BOREHOLE TYPE 210 mm Hollow Stem Auger; Mud Rotary COMPILED BY MA/ MTI

DATUM CGVD28 Surface Elevation:220.0 m DATE Jan 13, 2022 - Jan 25, 2022 CHECKED BY KJB

SOIL PROFILE			SAMPLES			GROUNDWATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa) ○ Field Vane ⊕ Remoulded ■ Pocket Pen ● Quick Triaxial × Unconfined	WATER CONTENT (%) PL W_p NMC W LL W_l NP Nonplastic	UNIT WEIGHT γ kN/m³	GR SA SI CL	REMARKS
ELEV. / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	20 40 60			
	CLAYEY SILT (CL), trace to some sand Stiff to very stiff Grey Moist to wet		27	SS	18		170					
169.7												
50.3	CLAYEY SILT (CL), some sand to sandy, trace to some gravel Hard Grey Wet						169					
			28	SS	166/0.28		168					
52.2												
167.7	End of Borehole Notes: 1. Groundwater level was measured at 1.5 m (El. 218.5 m) inside hollow stem auger during drilling. 2. Groundwater level was measured at 1.0 m (El. 219.0 m) inside the monitoring well on May 13, 2022.						167					
							166					
							165					
							164					
							163					
							162					

+³, x³ : Numbers refer to Sensitivity o³% STRAIN AT FAILURE

Ontario

DRAFT

wsp

PROJECT 19136074

RECORD OF BOREHOLE No. 2-1

METRIC

G.W.P. Assignment No 2019-E-0048 | LOCATION N 4889552.2; E 306525.9 NAD83 / MTM Zone 10 (LAT. 44.145964; LONG. -79.478427) | ORIGINATED BY MTI

DIST Central HWY BBP - 2nd Concession | BOREHOLE TYPE Hollow Stem Auger, Mud Rotary | COMPILED BY DP

DATUM CGVD28 Surface Elevation:220.4 m | DATE Dec 21, 2021 - Dec 22, 2021 | CHECKED BY KJB

ELEV. / DEPTH	DESCRIPTION	NUMBER	TYPE	"N" VALUES	ELEVATION SCALE	WATER CONTENT (%)	GR	SA	SI	CL	REMARKS
0.0	CLAYEY SILT (CL), trace sand, trace rootlets Soft to firm Brown and Grey Moist Oxidation staining	1	SS	5	220						
		2	SS	6	219						
		3	SS	4			0	2	86	12	
218.2 / 2.2	SILTY SAND to SAND (SM-SP), trace clay, trace gravel Compact to Dense Grey Moist	4	TO		218						See Note 4.
		5	SS	42	217		0	89	10	1	
		6	SS	18	216						
		7	SS	18	215	NP					
214.8 / 5.6	CLAYEY SILT (CL), trace sand, trace gravel Stiff to very stiff Grey Moist	8	SS	17	214						
	- 8.0 m: Silty Sand layer (100 mm thick)	9	SS	16	213, 212						
	- 9.6 m: Silty Sand layer (100 mm thick)	10	SS	12	211		0	0	69	31	

Column headings also printed: SOIL PROFILE; STRATA PLOT; SAMPLES; GROUNDWATER CONDITIONS; DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100); SHEAR STRENGTH (kPa): ○ Unconfined, ● Quick Triaxial, ■ Pocket Pen, ⊕ Remoulded, × Field Vane; WATER CONTENT (%): PL W_p, NMC W, LL W_l (20 40 60), NP Nonplastic; UNIT WEIGHT γ kN/m³.

Continued on Next Page

+³, x³ : Numbers refer to Sensitivity   o³% STRAIN AT FAILURE

Ontario

PROJECT 19136074

RECORD OF BOREHOLE No. 2-1

Sheet 2 of 4

METRIC

G.W.P. Assignment No 2019-E-0048 LOCATION N 4889552.2; E 306525.9 NAD83 / MTM Zone 10 (LAT. 44.145964; LONG. -79.478427) ORIGINATED BY MTI

DIST Central HWY BBP - 2nd Concession BOREHOLE TYPE Hollow Stem Auger, Mud Rotary COMPILED BY DP

DATUM CGVD28 Surface Elevation:220.4 m DATE Dec 21, 2021 - Dec 22, 2021 CHECKED BY KJB

ELEV. / DEPTH	DESCRIPTION	STRATA PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES	GROUNDWATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa) (Field Vane, Remoulded, Pocket Pen, Quick Triaxial, Unconfined) 20 40 60 80 100	WATER CONTENT (%) PL W_p NMC W LL W_l NP Nonplastic 20 40 60	UNIT WEIGHT γ kN/m³	GR SA SI CL	REMARKS
210.3	CLAYEY SILT (CL), trace sand, trace gravel											
10.1	Stiff to very stiff Grey Moist						210					
	SILTY SAND (SM), Compact Grey Moist		11 A	SS	26							
209.5			11 B									
10.9	CLAYEY SILT (CL), contains sand seams/layers Stiff to very stiff to hard Grey Moist						209					
			12	SS	11		208		o			
							207					
	- 13.8 m: Silty Sand layer (25 mm thick)		13	SS	16		206					
204.9			14 A	SS	36		205					
15.5	SILT (ML), trace sand Compact to Dense Grey Moist		14 B									
							204					
			15	SS	12				H O			
202.6							203					
17.8	CLAYEY SILT (CL), trace sand, trace gravel Firm to stiff Grey Moist											
			16	SS	10		202					
							201					

Continued on Next Page

+³, x³ : Numbers refer to Sensitivity o³% STRAIN AT FAILURE

Ontario

PROJECT 19136074

RECORD OF BOREHOLE No. 2-1 Sheet 3 of 4 METRIC

G.W.P. Assignment No 2019-E-0048 LOCATION N 4889552.2; E 306525.9 NAD83 / MTM Zone 10 (LAT. 44.145964; LONG. -79.478427) ORIGINATED BY MTI

DIST Central HWY BBP - 2nd Concession BOREHOLE TYPE Hollow Stem Auger, Mud Rotary COMPILED BY DP

DATUM CGVD28 Surface Elevation:220.4 m DATE Dec 21, 2021 - Dec 22, 2021 CHECKED BY KJB

SOIL PROFILE			SAMPLES				ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa)	WATER CONTENT (%) PL W_p NMC W LL W_l	UNIT WEIGHT γ kN/m³	GR	SA	SI	CL	REMARKS
ELEV. / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" VALUES	GROUNDWATER CONDITIONS		⊕ Field Vane, ■ Remoulded, ● Pocket Pen, ○ Quick Triaxial, × Unconfined; 20 40 60 80 100	NP Nonplastic; 20 40 60						
	CLAYEY SILT (CL), trace sand, trace gravel Firm to stiff Grey Moist						200								
			17	SS	8		199		o		0	1	80	19	
	- 22.1 m: Attempted Shelby Tube sample but no recovery.		18	TO			198								
							197								
			19	SS	4		196		⊢o						
			20	TO			195								C
							194								
			21	SS	5		193								
							192								
							191								

Continued on Next Page

+³, x³ : Numbers refer to Sensitivity o³% STRAIN AT FAILURE

Ontario

RECORD OF BOREHOLE No. 2-1

METRIC

PROJECT	19136074				
G.W.P.	Assignment No 2019-E-0048	LOCATION	N 4889552.2; E 306525.9 NAD83 / MTM Zone 10 (LAT. 44.145964; LONG. -79.478427)	ORIGINATED BY	MTI
DIST	Central HWY BBP - 2nd Concession	BOREHOLE TYPE	Hollow Stem Auger, Mud Rotary	COMPILED BY	DP
DATUM	CGVD28 Surface Elevation:220.4 m	DATE	Dec 21, 2021 - Dec 22, 2021	CHECKED BY	KJB

ELEV. / DEPTH	DESCRIPTION	STRATA PLOT	SAMPLE NUMBER	SAMPLE TYPE	"N" VALUES	GROUNDWATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa)	WATER CONTENT (%)	UNIT WEIGHT γ kN/m³	GR SA SI CL	REMARKS
	CLAYEY SILT (CL), trace sand, trace gravel Firm to stiff Grey Moist						190					
			22	SS	4			× > 96 kPa				
							189					
							188					
							187					
			23	SS	6				○		0 2 31 67	
186.3 34.1	End of Borehole						186					
							185					
							184					
							183					
							182					
							181					

Legend: ✕ Field Vane; ⊕ Remoulded; ■ Pocket Pen; ● Quick Triaxial; ○ Unconfined. Shear strength scale: 20 40 60 80 100. Water content: PL W_p, NMC W, LL W_l; NP Nonplastic; scale 20 40 60.

Note:
1. Hollow stem augers to 2.3 m (Elev. 218.1 m) and then switched to mud rotary.
2. Water level measured at a depth of 0.1 m (Elev. 220.3 m) prior to mud rotary.
3. Water level in standpipe piezometer measured as follows:

Depth(m)	El. (m)	Date
0.77	219.6	May 12. 22
0.81	219.6	May 13, 22
0.47	219.9	Feb 01, 23

4. Attempted shelby tube sample but limited recovery of silty sand.

+³, x³ : Numbers refer to Sensitivity o³% STRAIN AT FAILURE

Ontario

DRAFT

WSP

PROJECT 19136074

RECORD OF BOREHOLE No. 2-2

Sheet 1 of 6

METRIC

G.W.P. Assignment No 2019-E-0048 LOCATION N 4889636.3; E 306541.2 NAD83 / MTM Zone 10 (LAT. 44.146721; LONG. -79.478236) ORIGINATED BY PT

DIST Central HWY BBP - 2nd Concession BOREHOLE TYPE Hollow Stem Auger, Mud Rotary COMPILED BY MCK

DATUM CGVD28 Surface Elevation:221.3 m DATE Oct 27, 2022 - Nov 02, 2022 CHECKED BY KJB

SOIL PROFILE			SAMPLES			GROUNDWATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa) (Field Vane, Remoulded, Pocket Pen, Quick Triaxial, Unconfined) 20 40 60 80 100	WATER CONTENT (%) PL W_p NMC W LL W_l NP Nonplastic 20 40 60	UNIT WEIGHT γ kN/m³	GR	SA	SI	CL	REMARKS
ELEV. / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" VALUES										
0.0	SILT (ML), some sand, trace rootlets, (FILL) Firm Brown to grey Moist		1	SS	7		221								
220.6															
0.7	CLAYEY SILT (CL) Firm Mottled grey and brown, oxidation staining Moist		2	SS	8		220								
219.9															
1.4	SILT (ML), trace sand Loose Brown to grey, oxidation staining Wet		3	SS	4	▼									
219.1							219								
2.2	CLAYEY SILT (CL), contains silty sand layers Stiff Brown to grey, oxidation staining Moist		4	SS	15										
218.3															
3.0	SILTY SAND (SM) Compact to Dense Grey Wet		5	SS	39	▽	218				0	79	(21)		
			6	SS	39		217								
			7	SS	27										
215.7							216								
5.6	CLAYEY SILT-SILT (CL-ML), trace sand, trace gravel, contains silt and sand seams/layers Stiff to very stiff Grey Moist		8	SS	13		215				0	2	82	16	
			9	SS	14		214								
			10	SS	11		213								
							212								

Continued on Next Page

+³, x³ : Numbers refer to Sensitivity o³% STRAIN AT FAILURE

Ontario

PROJECT 19136074

RECORD OF BOREHOLE No. 2-2

Sheet 2 of 6

METRIC

G.W.P. Assignment No 2019-E-0048 LOCATION N 4889636.3; E 306541.2 NAD83 / MTM Zone 10 (LAT. 44.146721; LONG. -79.478236) ORIGINATED BY PT

DIST Central HWY BBP - 2nd Concession BOREHOLE TYPE Hollow Stem Auger, Mud Rotary COMPILED BY MCK

DATUM CGVD28 Surface Elevation:221.3 m DATE Oct 27, 2022 - Nov 02, 2022 CHECKED BY KJB

ELEV. / DEPTH	DESCRIPTION	STRATA PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES	GROUNDWATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa) (Field Vane, Remoulded, Pocket Pen, Quick Triaxial, Unconfined) 20 40 60 80 100	WATER CONTENT (%) PL W_p NMC W LL W_l NP Nonplastic 20 40 60	UNIT WEIGHT γ kN/m³	GR	SA	SI	CL	REMARKS
	CLAYEY SILT-SILT (CL-ML), trace sand, trace gravel, contains silt and sand seams/layers Stiff to very stiff Grey Moist						211								
			11	SS	26		210								
209.6															
11.7	Sandy SILT (ML), trace clay Compact to dense Grey Wet		12	SS	30		209		o		0	31	61	8	
208.1															
13.3	CLAYEY SILT (CL) Stiff Grey Moist		13	SS	8		208		o						
							207	> 96 kPa ×							
206.5															
14.8	CLAYEY SILT-SILT (CL-ML), trace sand to sandy Very stiff to hard Grey Wet to moist		14	SS	23		206		o		0	8	80	12	
							205								
			15	SS	30		204								
203.5															
17.8	CLAYEY SILT (CL) to SILTY CLAY (CI), trace sand Firm to stiff Grey Moist		16	SS	7		203								

Continued on Next Page

+³, x³ : Numbers refer to Sensitivity o³% STRAIN AT FAILURE

Ontario

PROJECT 19136074

RECORD OF BOREHOLE No. 2-2

Sheet 3 of 6

METRIC

G.W.P. Assignment No 2019-E-0048 LOCATION N 4889636.3; E 306541.2 NAD83 / MTM Zone 10 (LAT. 44.146721; LONG. -79.478236) ORIGINATED BY PT

DIST Central HWY BBP - 2nd Concession BOREHOLE TYPE Hollow Stem Auger, Mud Rotary COMPILED BY MCK

DATUM CGVD28 Surface Elevation:221.3 m DATE Oct 27, 2022 - Nov 02, 2022 CHECKED BY KJB

SOIL PROFILE			SAMPLES			GROUNDWATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa)	WATER CONTENT (%) PL W_p NMC W LL W_l	UNIT WEIGHT γ kN/m³	GR SA SI CL	REMARKS
ELEV. / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" VALUES			Field Vane, Remoulded, Pocket Pen, Quick Triaxial, Unconfined; 20 40 60 80 100	NP Nonplastic; 20 40 60			
	CLAYEY SILT (CL) to SILTY CLAY (CI), trace sand Firm to stiff Grey Moist		16 A	TO			202	> 96 kPa				C
							201					
			17	SS	10		200					
							199	> 96 kPa				
							198					
	- 24.4 to 25.0 m: No soil recovery in sample #18.		18	SS	9		197					
							196					
							195					
			19	SS	11		194					
							193					

Continued on Next Page

+³, x³ : Numbers refer to Sensitivity o³% STRAIN AT FAILURE

Ontario

PROJECT 19136074

RECORD OF BOREHOLE No. 2-2

Sheet 4 of 6

METRIC

G.W.P. Assignment No 2019-E-0048 LOCATION N 4889636.3; E 306541.2 NAD83 / MTM Zone 10 (LAT. 44.146721; LONG. -79.478236) ORIGINATED BY PT

DIST Central HWY BBP - 2nd Concession BOREHOLE TYPE Hollow Stem Auger, Mud Rotary COMPILED BY MCK

DATUM CGVD28 Surface Elevation:221.3 m DATE Oct 27, 2022 - Nov 02, 2022 CHECKED BY KJB

ELEV. / DEPTH	DESCRIPTION	STRATA PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES	GROUNDWATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa) (Field Vane, Remoulded, Pocket Pen, Quick Triaxial, Unconfined) 20 40 60 80 100	WATER CONTENT (%) PL W_p NMC W LL W_l NP Nonplastic 20 40 60	UNIT WEIGHT γ kN/m³	GR	SA	SI	CL	REMARKS
	CLAYEY SILT (CL) to SILTY CLAY (CI), trace sand Firm to stiff Grey Moist						192								
							191								
			20	SS	9										
							190	> 96 kPa							
							189								
							188								
			21	SS	14										
							187								
186.0 35.4	Sandy CLAYEY SILT (CL), trace to some gravel Stiff to very stiff Grey Moist						186								
							185								
			22	SS	11						3	21	48	28	
							184								
							183								

Continued on Next Page

+³, x³ : Numbers refer to Sensitivity o³% STRAIN AT FAILURE

Ontario

PROJECT 19136074

RECORD OF BOREHOLE No. 2-2

Sheet 5 of 6

METRIC

G.W.P. Assignment No 2019-E-0048 LOCATION N 4889636.3; E 306541.2 NAD83 / MTM Zone 10 (LAT. 44.146721; LONG. -79.478236) ORIGINATED BY PT

DIST Central HWY BBP - 2nd Concession BOREHOLE TYPE Hollow Stem Auger, Mud Rotary COMPILED BY MCK

DATUM CGVD28 Surface Elevation:221.3 m DATE Oct 27, 2022 - Nov 02, 2022 CHECKED BY KJB

SOIL PROFILE			SAMPLES				ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa)	WATER CONTENT (%) PL W_p NMC W LL W_l	UNIT WEIGHT	GR SA SI CL	REMARKS
ELEV. / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" VALUES	GROUNDWATER CONDITIONS		Field Vane, Remoulded, Pocket Pen, Quick Triaxial, Unconfined; 20 40 60 80 100	NP Nonplastic; 20 40 60	γ kN/m³		
	Sandy CLAYEY SILT (CL), trace to some gravel Stiff to very stiff Grey Moist						182					
			23	SS	18		181					
179.9							180					
41.5	CLAYEY SILT (CL) Very stiff Grey Moist						179					
			24	SS	25		178					
176.8							177					
44.5	SILT (ML), some sand Very dense Grey Wet						176					
175.3			25 A	SS	83							
46.0	SAND (SP), trace silt Very dense Grey Wet		25 B				175					
173.8							174					
47.5	CLAYEY SILT-SILT (CL-ML) Hard Grey Moist											

Continued on Next Page

+³, x³ : Numbers refer to Sensitivity o³% STRAIN AT FAILURE

Ontario

PROJECT 19136074

RECORD OF BOREHOLE No. 2-2 Sheet 6 of 6 METRIC

G.W.P. Assignment No 2019-E-0048 LOCATION N 4889636.3; E 306541.2 NAD83 / MTM Zone 10 (LAT. 44.146721; LONG. -79.478236) ORIGINATED BY PT

DIST Central HWY BBP - 2nd Concession BOREHOLE TYPE Hollow Stem Auger, Mud Rotary COMPILED BY MCK

DATUM CGVD28 Surface Elevation:221.3 m DATE Oct 27, 2022 - Nov 02, 2022 CHECKED BY KJB

ELEV. / DEPTH	DESCRIPTION	STRATA PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES	GROUNDWATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa) (Field Vane, Remoulded, Pocket Pen, Quick Triaxial, Unconfined) 20 40 60 80 100	WATER CONTENT (%) PL W_p NMC W LL W_l NP Nonplastic 20 40 60	UNIT WEIGHT γ kN/m³	GR SA SI CL	REMARKS
	CLAYEY SILT-SILT (CL-ML) Hard Grey Moist						173					
			26	SS	72				⊖			
171.9							172					
49.4	End of Borehole Note: 1. Hollow stem augers to 3.0 m (Elev. 218.3 m) and then switched to mud rotary. 2. Water level measured at a depth of 3.2 m (Elev. 218.1 m) prior to mud rotary. 3. Water level in standpipe piezometer measured as follows: Depth(m) El. (m) Date 0.73 220.6 Nov 03, 22 2.63 218.7 Nov 04 22 1.98 219.3 Feb 01, 23 2.77 218.5 Feb 28, 23						171 170 169 168 167 166 165 164					

+³, x³ : Numbers refer to Sensitivity o³% STRAIN AT FAILURE

Ontario

WSP GOLDER

PROJECT 19136074

RECORD OF BOREHOLE No. 404-2

Sheet 1 of 4

METRIC

G.W.P. 2008-21-00 LOCATION N 4890800; E 309464.1 NAD83 / MTM Zone 10 (LAT. 44.157182; LONG. -79.441689) ORIGINATED BY MM

DIST Central HWY BBP - Hwy 404 BOREHOLE TYPE 210 mm Hollow Stem Auger; Mud Rotary COMPILED BY MA

DATUM CGVD28 Surface Elevation:252.5 m DATE Jun 15, 2021 - Jun 16, 2021 CHECKED BY KJB

SOIL PROFILE			SAMPLES			GROUNDWATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa)	WATER CONTENT (%) PL W_p NMC W LL W_l	UNIT WEIGHT γ kN/m³	GR	SA	SI	CL	REMARKS
ELEV. / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	NP Nonplastic 20 40 60						
0.0	Sandy Gravelly SILT (ML), some clay (FILL) Compact Brownish grey; Moist		1	SS	12		252		○		24	25	37	14	
251.8															
0.7	Sandy Gravelly CLAYEY SILT (CL) (FILL) Hard Brownish grey Moist		2	SS	31				◑⊢						
251.1															
1.4	CLAYEY SILT (CL), trace sand, trace gravel Hard Brownish grey to grey Moist		3	SS	52		251								
			4	SS	40		250								
			5	SS	60				○		0	4	56	40	
			6	SS	42		249								
			7	SS	46		248								
			8	SS	54		247		⊢⊖⊣						
245.4							246								
7.2	CLAYEY SILT (CL) to CLAYEY SILT -SILT (CL-ML), trace sand Very stiff to hard Grey Wet		9	SS	44		245		⊢⊖⊣						
			10	SS	36		244								
							243								

Continued on Next Page

+³, x³ : Numbers refer to Sensitivity o³% STRAIN AT FAILURE

Ontario

WSP GOLDER

PROJECT 19136074

RECORD OF BOREHOLE No. 404-2

Sheet 2 of 4

METRIC

G.W.P. 2008-21-00 LOCATION N 4890800; E 309464.1 NAD83 / MTM Zone 10 (LAT. 44.157182; LONG. -79.441689) ORIGINATED BY MM

DIST Central HWY BBP - Hwy 404 BOREHOLE TYPE 210 mm Hollow Stem Auger; Mud Rotary COMPILED BY MA

DATUM CGVD28 Surface Elevation:252.5 m DATE Jun 15, 2021 - Jun 16, 2021 CHECKED BY KJB

SOIL PROFILE			SAMPLES			GROUNDWATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa) ⊕ Field Vane ■ Remoulded ● Pocket Pen ○ Quick Triaxial × Unconfined	WATER CONTENT (%) PL W_p NMC W LL W_l NP Nonplastic	UNIT WEIGHT γ kN/m³	GR	SA	SI	CL	REMARKS
ELEV. / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	20 40 60						
	CLAYEY SILT (CL) to CLAYEY SILT -SILT (CL-ML), trace sand Very stiff to hard Grey Wet						242								
			11	SS	23										
							241								
			12	SS	39		240		○		0	0	62	38	
							239								
			13	SS	67										
							238								
			14	SS	19		237								
							236								
			15	SS	26										
							235								
			16	SS	43		234		⊣○						
							233								

Continued on Next Page

+³, x³ : Numbers refer to Sensitivity o³% STRAIN AT FAILURE

Ontario

WSP GOLDER

PROJECT 19136074

RECORD OF BOREHOLE No. 404-2

Sheet 3 of 4

METRIC

G.W.P. 2008-21-00 LOCATION N 4890800; E 309464.1 NAD83 / MTM Zone 10 (LAT. 44.157182; LONG. -79.441689) ORIGINATED BY MM

DIST Central HWY BBP - Hwy 404 BOREHOLE TYPE 210 mm Hollow Stem Auger; Mud Rotary COMPILED BY MA

DATUM CGVD28 Surface Elevation:252.5 m DATE Jun 15, 2021 - Jun 16, 2021 CHECKED BY KJB

SOIL PROFILE			SAMPLES			GROUNDWATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa) ○ Field Vane ⊕ Remoulded ■ Pocket Pen ● Quick Triaxial × Unconfined	WATER CONTENT (%) PL W_p NMC W LL W_l NP Nonplastic	UNIT WEIGHT γ kN/m³	GR SA SI CL	REMARKS
ELEV. / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	20 40 60			
	CLAYEY SILT (CL) to CLAYEY SILT -SILT (CL-ML), trace sand Very stiff to hard Grey Wet						232					
			17	SS	42		231					
							230					
							229					
			18	SS	59		228					
							227					
							226					
			19 A	SS	46		225					
224.6												
27.9	CLAYEY SILT -SILT (CL-ML) to SILT (ML) with slight plasticity, trace to some sand Hard Grey Moist		19 B				224					

Continued on Next Page

+³, x³ : Numbers refer to Sensitivity o³% STRAIN AT FAILURE

Ontario

WSP GOLDER

PROJECT 19136074

RECORD OF BOREHOLE No. 404-2

Sheet 4 of 4

METRIC

G.W.P. 2008-21-00 LOCATION N 4890800; E 309464.1 NAD83 / MTM Zone 10 (LAT. 44.157182; LONG. -79.441689) ORIGINATED BY MM

DIST Central HWY BBP - Hwy 404 BOREHOLE TYPE 210 mm Hollow Stem Auger; Mud Rotary COMPILED BY MA

DATUM CGVD28 Surface Elevation:252.5 m DATE Jun 15, 2021 - Jun 16, 2021 CHECKED BY KJB

SOIL PROFILE			SAMPLES			GROUNDWATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa) ○ Field Vane ⊕ Remoulded ■ Pocket Pen ● Quick Triaxial × Unconfined	WATER CONTENT (%) PL W_p NMC W LL W_l NP Nonplastic	UNIT WEIGHT γ kN/m³	GR SA SI CL	REMARKS
ELEV. / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	20 40 60			
	CLAYEY SILT -SILT (CL-ML) to SILT (ML) with slight plasticity, trace to some sand Hard Grey Moist						223					
							222					
221.6			20	SS	81/0.28				HO			
30.9	End of Borehole Note: 1. Water level not measured due to introduction of water during drilling operations.						221					
							220					
							219					
							218					
							217					
							216					
							215					
							214					

+³, x³ : Numbers refer to Sensitivity o³% STRAIN AT FAILURE

Ontario

WSP GOLDER

PROJECT 19136074

RECORD OF BOREHOLE No. 404-4 Sheet 1 of 4 METRIC

G.W.P. Assignment No.: 2019-E-0048 LOCATION N 4890426.9; E 309549.5 NAD83 / MTM Zone 10 (LAT. 44.153824; LONG. -79.440624) ORIGINATED BY MM

DIST Central HWY BBP - Hwy 404 BOREHOLE TYPE 210 mm Hollow Stem Auger; Mud Rotary COMPILED BY MA

DATUM CGVD28 Surface Elevation:252.1 m DATE Jun 10, 2021 - Jun 15, 2021 CHECKED BY KJB

ELEV. / DEPTH	DESCRIPTION	STRATA PLOT	NUMBER	TYPE	"N" VALUES	GROUNDWATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa) (Field Vane, Remoulded, Pocket Pen, Quick Triaxial, Unconfined) 20 40 60 80 100	WATER CONTENT (%) PL W_p NMC W LL W_l NP Nonplastic 20 40 60	UNIT WEIGHT γ kN/m³	GR	SA	SI	CL	REMARKS
0.0	Sandy SILTY GRAVEL (GM), some fines (FILL) Compact Moist to dry		1	SS	14		252								
251.4															
0.7	Sandy SILT (ML), trace gravel (FILL) Compact Moist to dry		2	SS	12		251				1	27	59	13	
250.6															
1.4	CLAYEY SILT (CL), trace sand Stiff to hard Brown to grey, iron oxide staining Moist.		3	SS	14		250								
			4	SS	20										
			5	SS	22		249								
			6	SS	33		248								
			7	SS	32		247				0	1	54	45	
246.5															
5.6	CLAYEY SILT-SILT (CL-ML), trace sand (TILL) Hard Grey Moist to wet		8	SS	31		246								
			9	SS	36		245								
							244								
			10	SS	40		243								

Continued on Next Page

+³, x³ : Numbers refer to Sensitivity o³% STRAIN AT FAILURE

Ontario | WSP GOLDER

PROJECT	19136074	RECORD OF BOREHOLE No. 404-4	Sheet 2 of 4	METRIC
G.W.P.	Assignment No.: 2019-E-0048	LOCATION	N 4890426.9; E 309549.5 NAD83 / MTM Zone 10 (LAT. 44.153824; LONG. -79.440624)	ORIGINATED BY MM
DIST	Central HWY BBP - Hwy 404	BOREHOLE TYPE	210 mm Hollow Stem Auger; Mud Rotary	COMPILED BY MA
DATUM	CGVD28 Surface Elevation:252.1 m	DATE	Jun 10, 2021 - Jun 15, 2021	CHECKED BY KJB

ELEV. / DEPTH	DESCRIPTION	SAMPLE NUMBER	TYPE	"N" VALUES	ELEVATION SCALE	WATER CONTENT	GR	SA	SI	CL
	CLAYEY SILT-SILT (CL-ML), trace sand (TILL) Hard Grey Moist to wet				242					
241.9 10.2	CLAYEY SILT (CL) Very stiff to hard Grey Moist									
		11	SS	26	241	PL–W–LL plotted near 20	0	0	55	45
		12	SS	29	240 / 239					
		13	SS	40	238					
14.8 237.3	Sandy SILT (ML) to SILT (ML), some sand Very dense Grey Wet.				237					
		14	SS	55/0.10	236					
		15	SS	100/0.28	235	W plotted near 20	0	15	74	11
		16	SS	40/0.08	234 / 233					

Column headings: SOIL PROFILE; STRATA PLOT; SAMPLES; GROUNDWATER CONDITIONS; DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100); SHEAR STRENGTH (kPa): ○ Unconfined, ● Quick Triaxial, ■ Pocket Pen, ⊕ Remoulded, X Field Vane; WATER CONTENT (%) PL W_p, NMC W, LL W_l (20 40 60), NP Nonplastic; UNIT WEIGHT γ kN/m³; REMARKS.

Continued on Next Page

+³, x³ : Numbers refer to Sensitivity o³% STRAIN AT FAILURE

Ontario

WSP GOLDER

PROJECT 19136074

RECORD OF BOREHOLE No. 404-4 Sheet 3 of 4 METRIC

G.W.P. Assignment No.: 2019-E-0048 LOCATION N 4890426.9; E 309549.5 NAD83 / MTM Zone 10 (LAT. 44.153824; LONG. -79.440624) ORIGINATED BY MM

DIST Central HWY BBP - Hwy 404 BOREHOLE TYPE 210 mm Hollow Stem Auger; Mud Rotary COMPILED BY MA

DATUM CGVD28 Surface Elevation:252.1 m DATE Jun 10, 2021 - Jun 15, 2021 CHECKED BY KJB

ELEV. / DEPTH	DESCRIPTION	STRATA PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES	GROUNDWATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa) (Field Vane, Remoulded, Pocket Pen, Quick Triaxial, Unconfined) 20 40 60 80 100	WATER CONTENT (%) PL W_p NMC W LL W_l NP Nonplastic 20 40 60	UNIT WEIGHT γ kN/m³	GR	SA	SI	CL	REMARKS
232.2	Sandy SILT (ML) to SILT (ML), some sand Very dense Grey Wet.														
19.9	CLAYEY SILT (CL), trace sand, trace gravel, silt layers Hard Grey Moist to wet						232								
							231								
			17	SS	69										
							230								
228.8							229								
23.3	CLAYEY SILT-SILT (CL-ML), trace sand Hard Grey Moist to wet						228								
			18	SS	53				H ⊖		0	0	85	15	
							227								
							226								
							225								
			19	SS	69				H ⊖						
							224								
222.7	CLAYEY SILT (CL), trace sand, trace gravel Hard Grey Moist to wet						223								
29.4	Continued on Next Page														

+³, x³ : Numbers refer to Sensitivity o³% STRAIN AT FAILURE

Ontario | WSP GOLDER

PROJECT	19136074	RECORD OF BOREHOLE No. 404-4	Sheet 4 of 4	METRIC
G.W.P.	Assignment No 2019-E-0048	LOCATION: N 4890426.9; E 309549.5 NAD83 / MTM Zone 10 (LAT. 44.153824; LONG. -79.440624)	ORIGINATED BY	MM
DIST	Central HWY BBP - Hwy 404	BOREHOLE TYPE: 210 mm Hollow Stem Auger; Mud Rotary	COMPILED BY	MA
DATUM	CGVD28 Surface Elevation:252.1 m	DATE: Jun 10, 2021 - Jun 15, 2021	CHECKED BY	

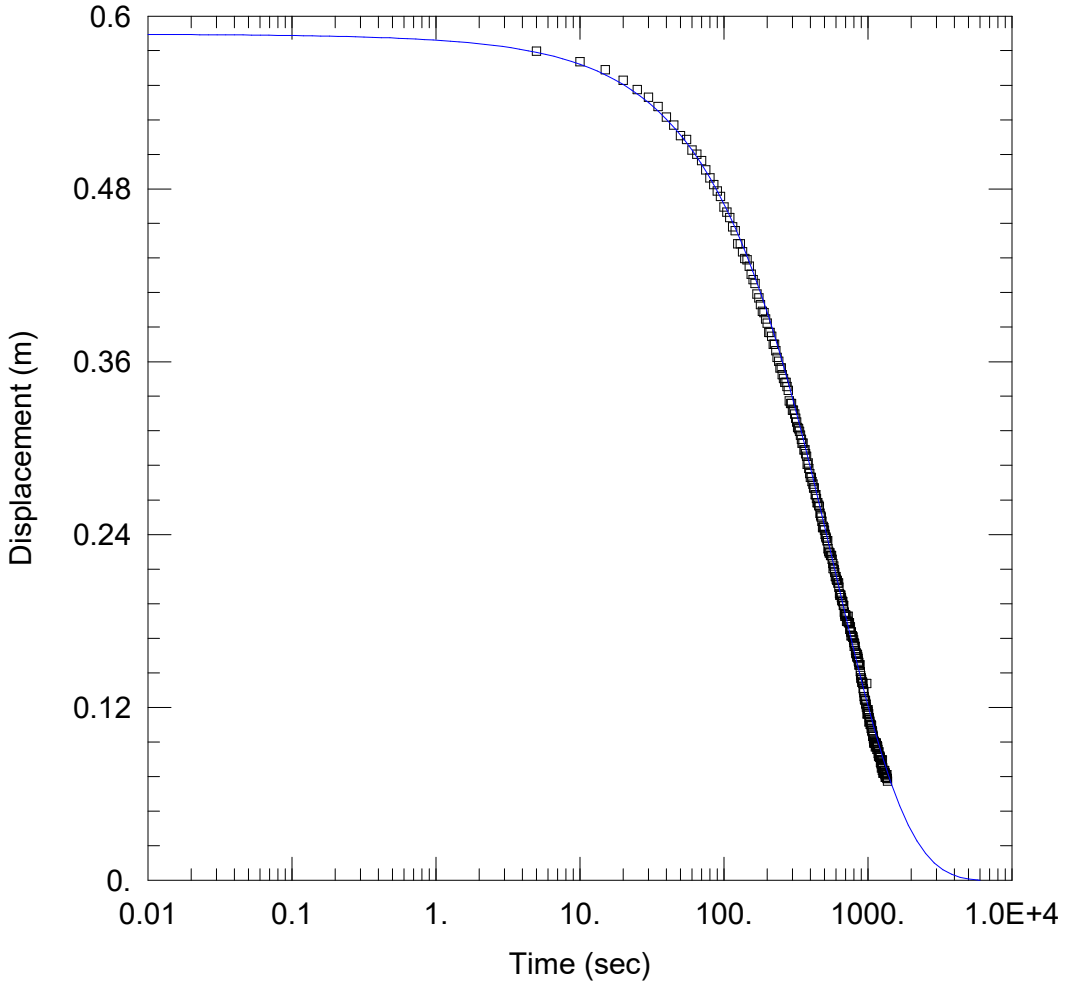
ELEV. / DEPTH	DESCRIPTION (SOIL PROFILE)	STRATA PLOT	NUMBER	TYPE	"N" VALUES	GROUNDWATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH (kPa)	WATER CONTENT (%)	UNIT WEIGHT γ kN/m³	GR SA SI CL	REMARKS
	CLAYEY SILT (CL), trace sand, trace gravel Hard Grey Moist to wet						222					
221.1			20	SS	38							
31.0	End of Borehole Note: 1. Water level measured at a depth of 3.0 m (Elev. 249 m) prior to introducing water for mud rotary . 2. Water level measured at a depth of 4.2 m (El. 247.9 m) on March 22, 2022.						221					
							220					
							219					
							218					
							217					
							216					
							215					
							214					
							213					

Shear strength legend: X Field Vane; ⊕ Remoulded; ■ Pocket Pen; ● Quick Triaxial; ○ Unconfined. DCPT scale: 20 40 60 80 100. Water content: PL (W_p), NMC (W), LL (W_l); NP Nonplastic; scale 20 40 60.

+³, x³ : Numbers refer to Sensitivity o³% STRAIN AT FAILURE

Appendix B

Hydraulic Conductivity Testing



BRADFORD BYPASS (BBP) - BH9-1 - FALLING HEAD TEST

Data Set: C:\...\BH9-1 FHT.aqt
Date: 03/04/22 Time: 10:45:48

PROJECT INFORMATION

Company: AECOM Canada Ltd.
Client: MTO
Project: 60636190
Location: 9th Line and Highway 400
Test Well: BH9-1
Test Date: 2022-02-16

AQUIFER DATA

Saturated Thickness: 6.8 m

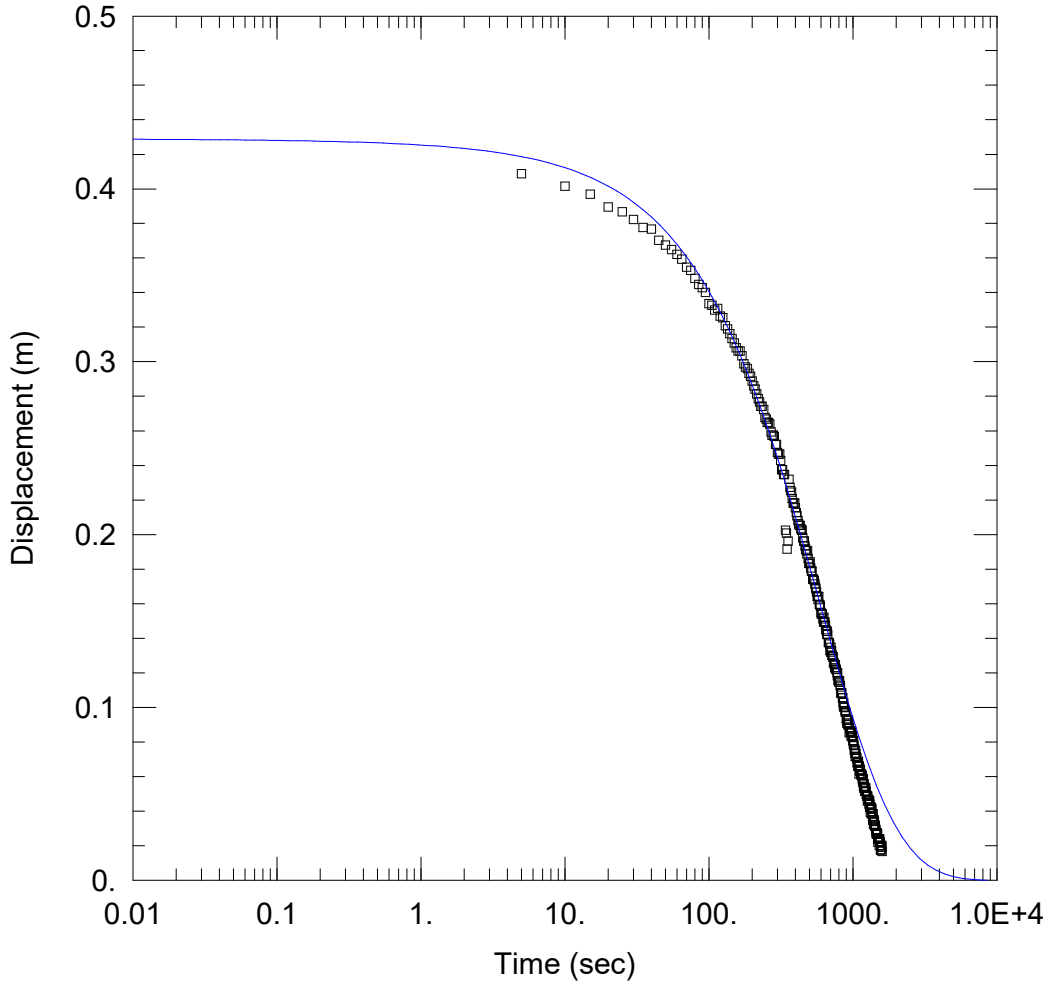
WELL DATA (BH9-1)

Initial Displacement: 0.5876 m
Total Well Penetration Depth: 6.8 m
Casing Radius: 0.025 m
Static Water Column Height: 6.8 m
Screen Length: 3.05 m
Well Radius: 0.105 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 5.608E-7 m/sec
Kz/Kr = 1.
Ss = 3.197E-5 m^{-1}



BRADFORD BYPASS (BBP) - BH9-1 - RISING HEAD TEST

Data Set: C:\...\BH9-1 RHT.aqt
Date: 03/04/22 Time: 10:49:45

PROJECT INFORMATION

Company: AECOM Canada Ltd.
Client: MTO
Project: 60636190
Location: 9th Line and Highway 400
Test Well: BH9-1
Test Date: 2022-02-16

AQUIFER DATA

Saturated Thickness: 6.8 m

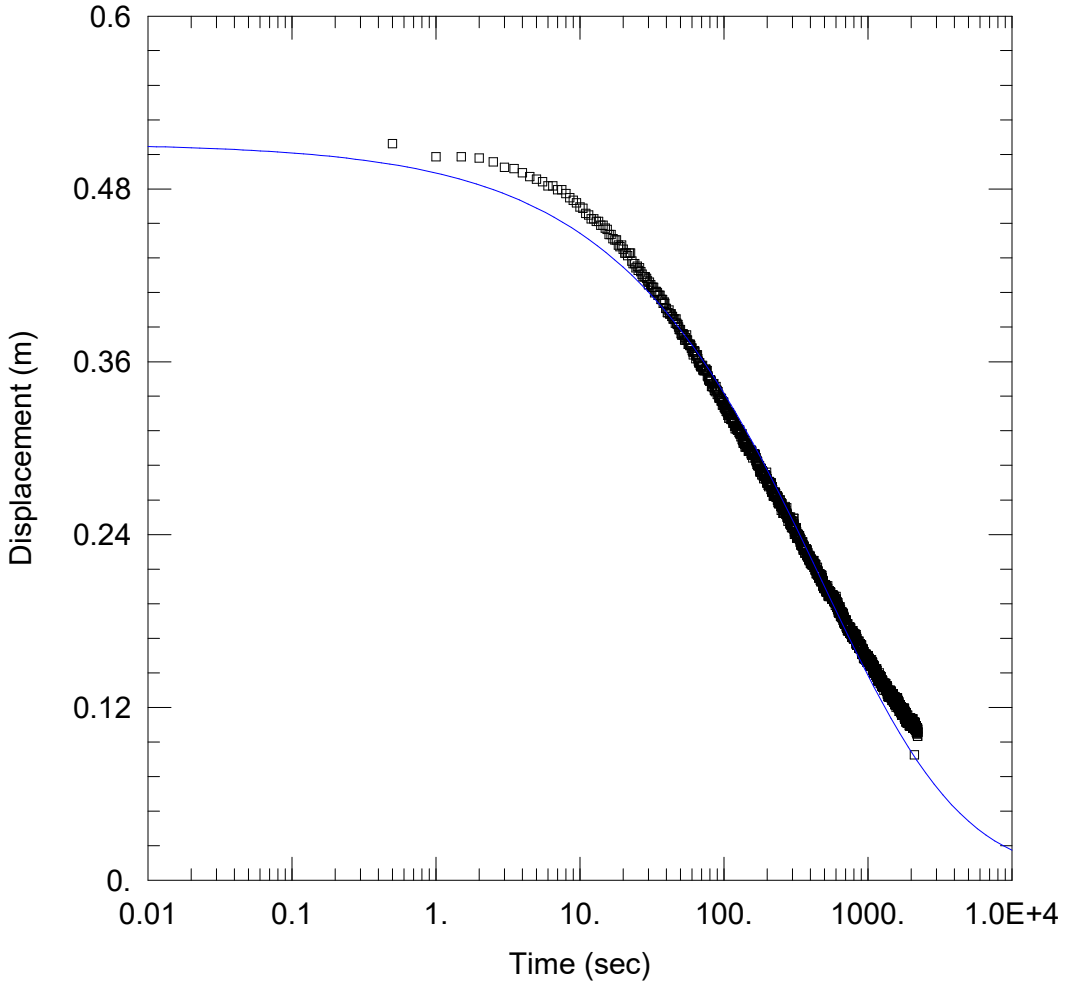
WELL DATA (BH9-1)

Initial Displacement: 0.429 m
Total Well Penetration Depth: 6.8 m
Casing Radius: 0.025 m
Static Water Column Height: 6.8 m
Screen Length: 3.05 m
Well Radius: 0.105 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 5.234E-7 m/sec
Kz/Kr = 1.
Ss = 5.367E-5 m^{-1}



BRADFORD BYPASS (BBP) - BH10-1 - FALLING HEAD TEST

Data Set: C:\...\BH10-1 FHT.aqt
Date: 06/02/22 Time: 12:02:19

PROJECT INFORMATION

Company: AECOM Canada Ltd.
Client: MTO
Project: 60636190
Location: 10 Sideroad, Town of Bradford
Test Well: BH10-1
Test Date: 2022-02-16

AQUIFER DATA

Saturated Thickness: 8.62 m

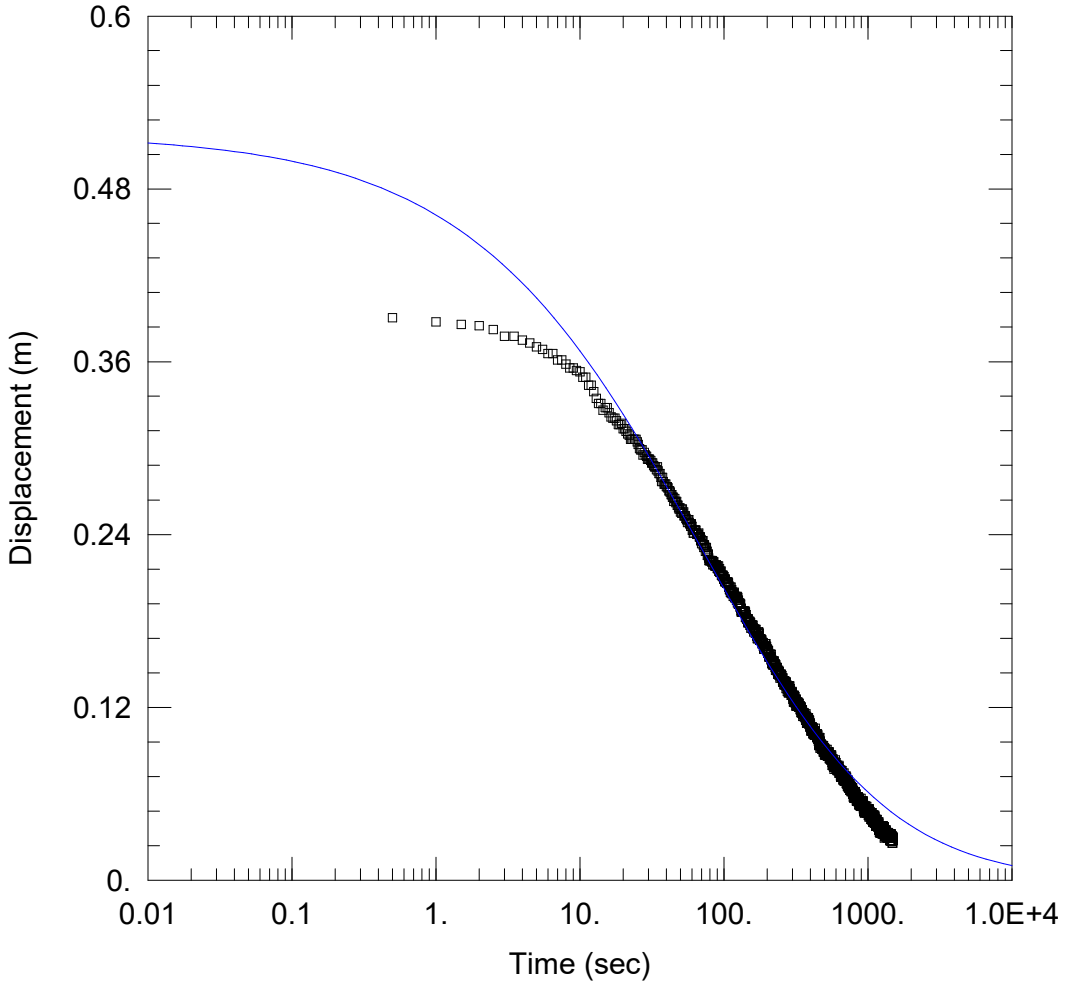
WELL DATA (BH10-1)

Initial Displacement: 0.5115 m
Total Well Penetration Depth: 8.62 m
Casing Radius: 0.025 m
Static Water Column Height: 8.62 m
Screen Length: 3.05 m
Well Radius: 0.105 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 1.227E-7 m/sec
Kz/Kr = 1.
Ss = 0.009994 m^{-1}



BRADFORD BYPASS (BBP) - BH10-1 - RISING HEAD TEST

Data Set: C:\...\BH10-1 RHT.aqt
Date: 06/02/22 Time: 12:20:34

PROJECT INFORMATION

Company: AECOM Canada Ltd.
Client: MTO
Project: 60636190
Location: 10 Sideroad, Town of Bradford
Test Well: BH10-1
Test Date: 2022-02-16

AQUIFER DATA

Saturated Thickness: 8.62 m

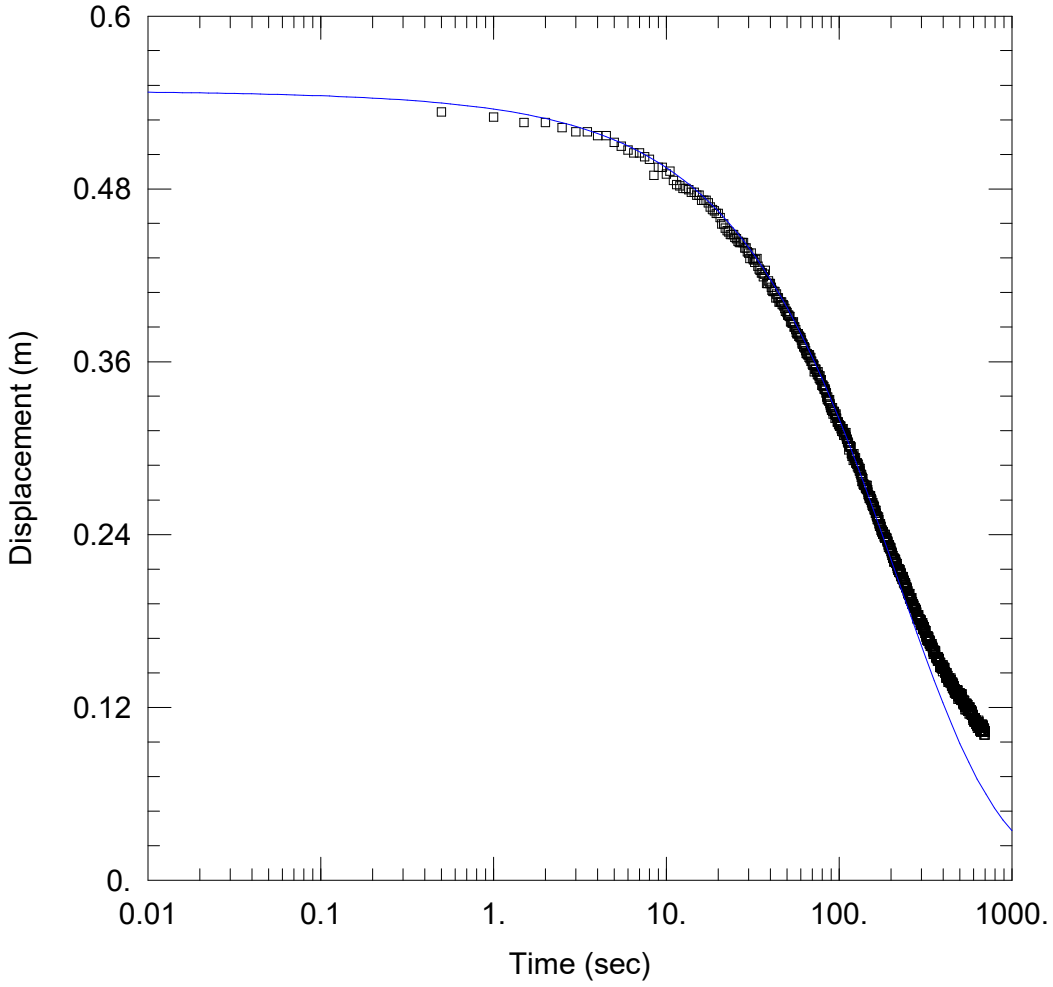
WELL DATA (BH10-1)

Initial Displacement: 0.5179 m
Total Well Penetration Depth: 8.62 m
Casing Radius: 0.025 m
Static Water Column Height: 8.62 m
Screen Length: 3.05 m
Well Radius: 0.105 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 2.031E-7 m/sec
Kz/Kr = 1.
Ss = 0.05009 m^{-1}



BRADFORD BYPASS (BBP) - BH10-4 - FALLING HEAD TEST

Data Set: C:\...\BH10-4 FHT.aqt
Date: 06/02/22 Time: 12:56:49

PROJECT INFORMATION

Company: AECOM Canada Ltd.
Client: MTO
Project: 60636190
Location: 10 Sideroad, Town of Bradford
Test Well: BH10-4
Test Date: 2022-02-16

AQUIFER DATA

Saturated Thickness: 5.48 m

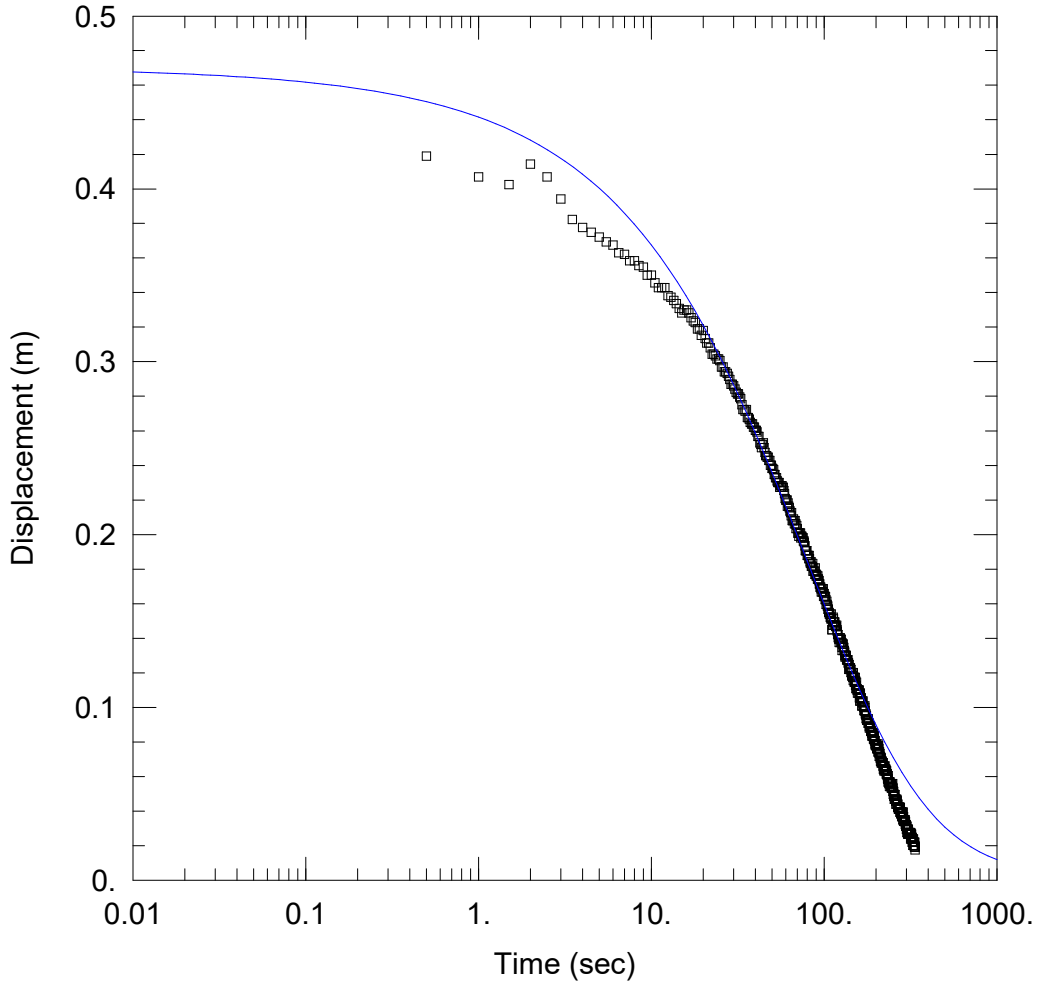
WELL DATA (BH10-4)

Initial Displacement: 0.5482 m
Total Well Penetration Depth: 5.48 m
Casing Radius: 0.025 m
Static Water Column Height: 5.48 m
Screen Length: 3.05 m
Well Radius: 0.105 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 1.119E-6 m/sec
Kz/Kr = 1.
Ss = 0.000229 m^{-1}



BRADFORD BYPASS (BBP) - BH10-4 - RISING HEAD TEST

Data Set: C:\...\BH10-4 RHT.aqt
Date: 06/02/22 Time: 13:01:13

PROJECT INFORMATION

Company: AECOM Canada Ltd.
Client: MTO
Project: 60636190
Location: 10 Sideroad, Town of Bradford
Test Well: BH10-4
Test Date: 2022-02-16

AQUIFER DATA

Saturated Thickness: 5.48 m

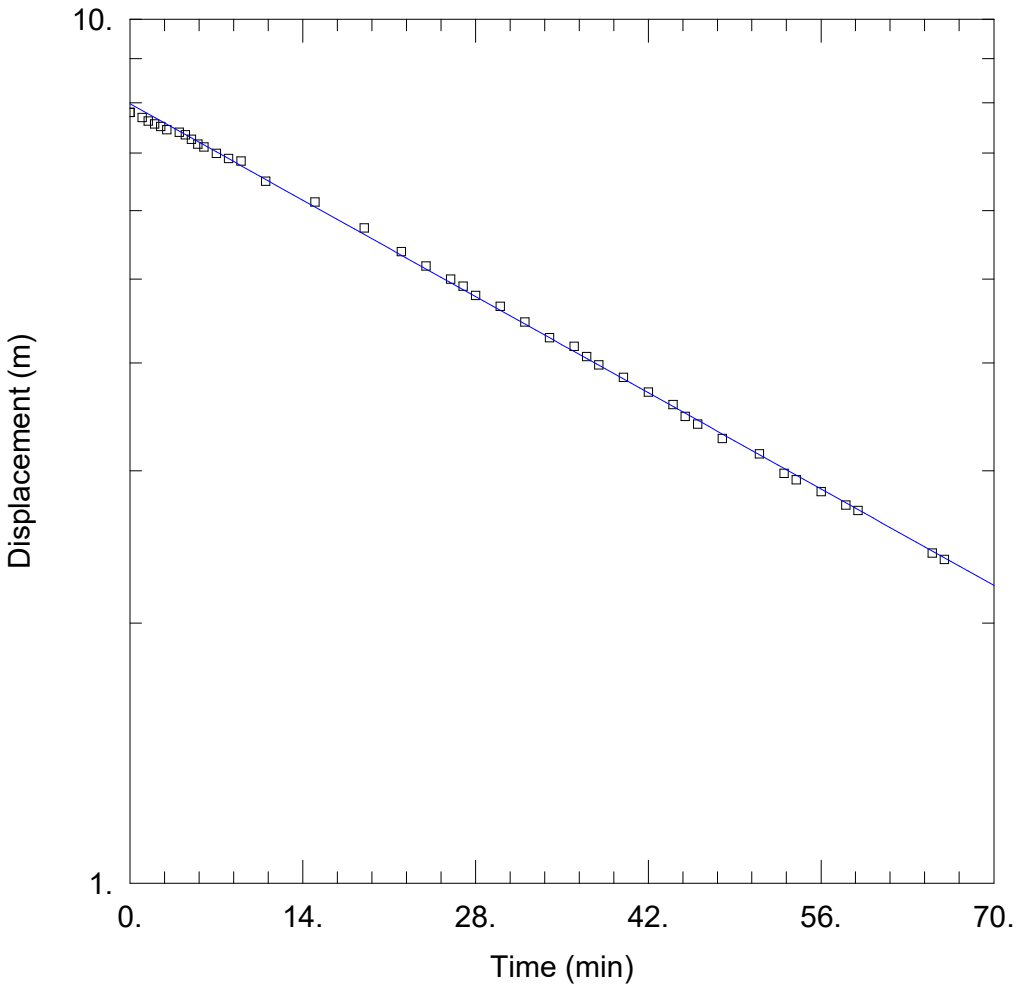
WELL DATA (BH10-4)

Initial Displacement: 0.4703 m
Total Well Penetration Depth: 5.48 m
Casing Radius: 0.025 m
Static Water Column Height: 5.48 m
Screen Length: 3.05 m
Well Radius: 0.105 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 2.04E-6 m/sec
Kz/Kr = 1.
Ss = 0.001083 m^{-1}



WELL RESPONSE TEST

Data Set: C:\Users\HackbuschS\Desktop\BBP Slug Test\Attempt\PDC6 Well Response Test.aqt
Date: 06/12/23 Time: 13:15:27

PROJECT INFORMATION

Company: AECOM
Project: 60636190
Location: Bradford
Test Well: PDC6
Test Date: 05/25/23

AQUIFER DATA

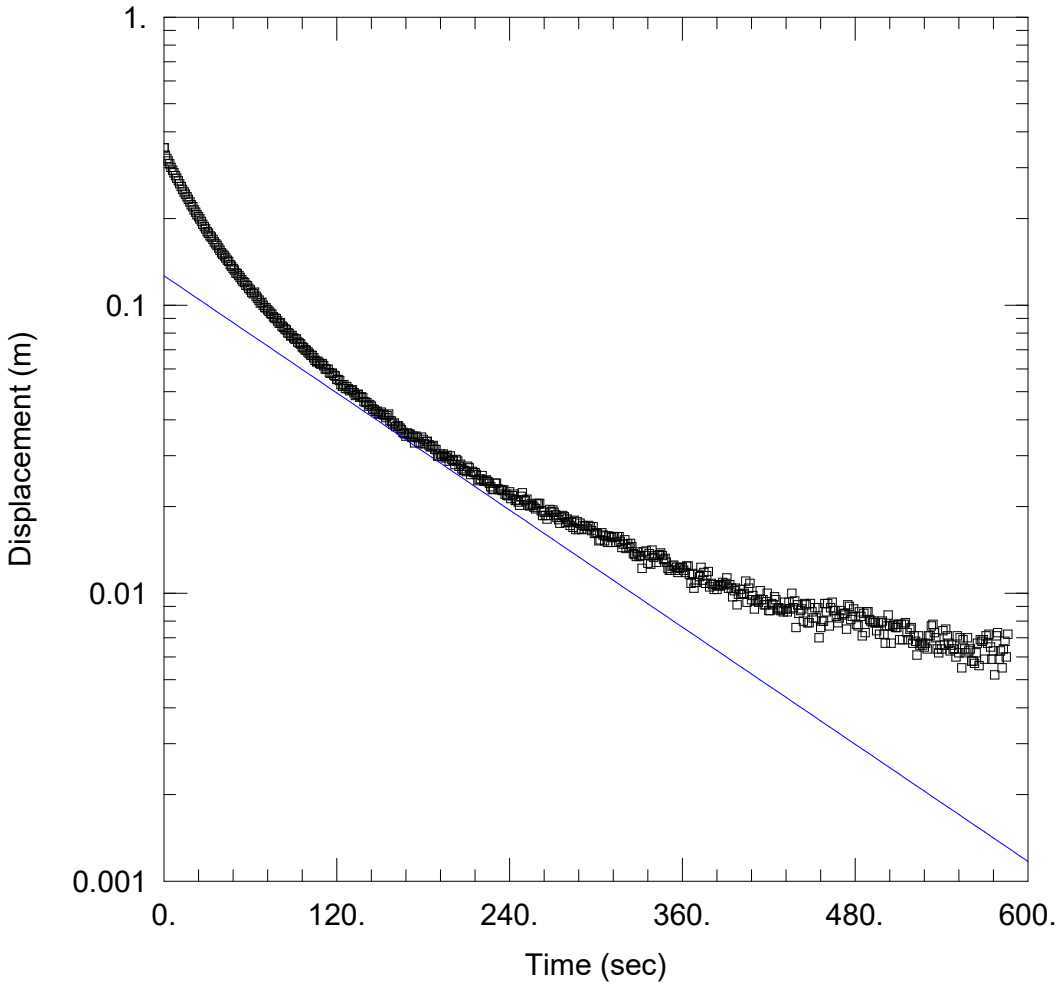
Saturated Thickness: 8.83 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (New Well)

Initial Displacement: 7.8 m
Total Well Penetration Depth: 8.83 m
Casing Radius: 0.025 m
Static Water Column Height: 8.83 m
Screen Length: 3.048 m
Well Radius: 0.105 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 9.95E-8 m/sec
y0 = 7.982 m



WELL TEST ANALYSIS

Data Set: C:\Users\HackbuschS\Desktop\BBP Slug Test\Final\PDC7 Falling Head Test_Bouwer .aqt
Date: 06/12/23 Time: 13:49:46

PROJECT INFORMATION

Company: AECOM
Project: 60636190
Location: Bradford
Test Well: PDC7
Test Date: 05/25/23

AQUIFER DATA

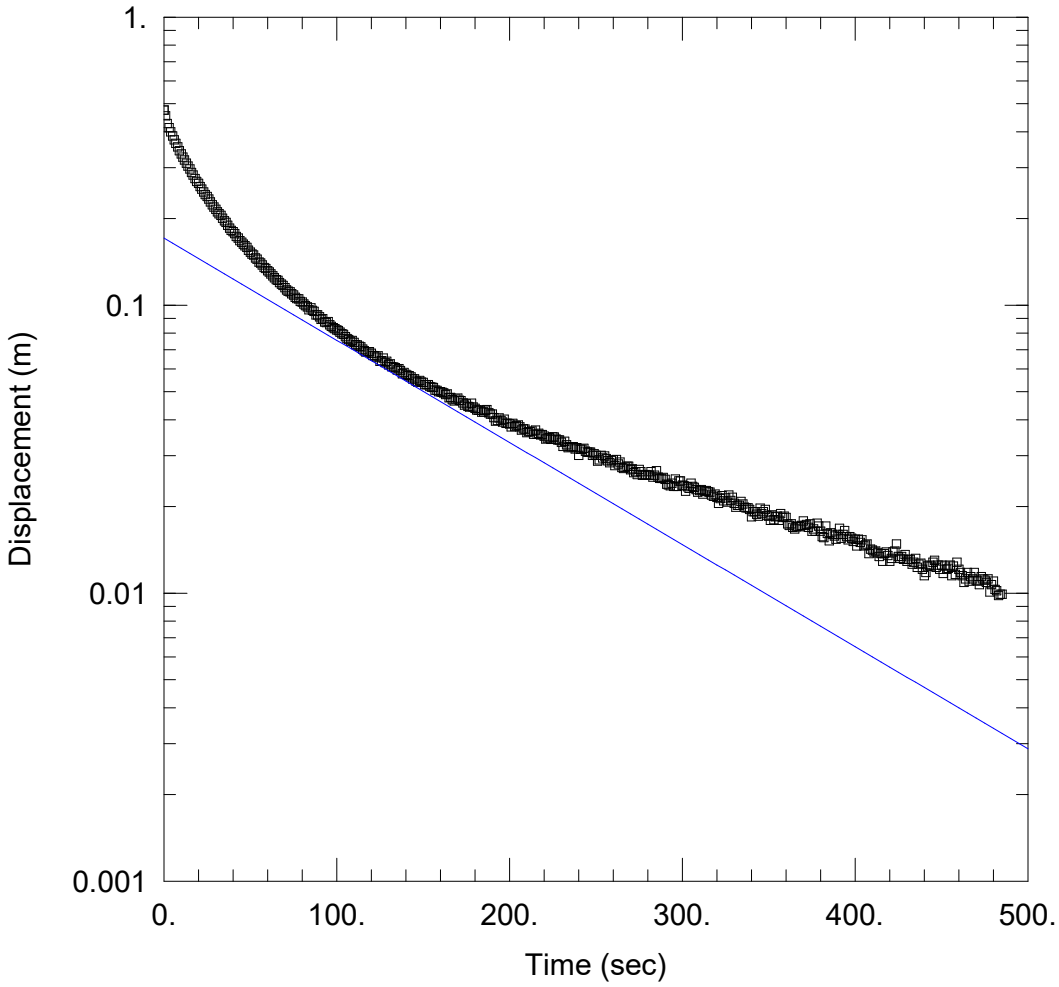
Saturated Thickness: 8.97 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PDC7)

Initial Displacement: 0.3519 m
Total Well Penetration Depth: 8.968 m
Casing Radius: 0.025 m
Static Water Column Height: 8.97 m
Screen Length: 3.048 m
Well Radius: 0.105 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 2.888E-6 m/sec
y0 = 0.1264 m



RISING HEAD TEST

Data Set: C:\Users\HackbuschS\Desktop\BBP Slug Test\Final\PDC7 Rising Head Test_Bouwer.aqt
Date: 06/12/23 Time: 13:50:07

PROJECT INFORMATION

Company: AECOM
Project: 60636190
Location: Bradford
Test Well: PDC7
Test Date: 05/25/23

AQUIFER DATA

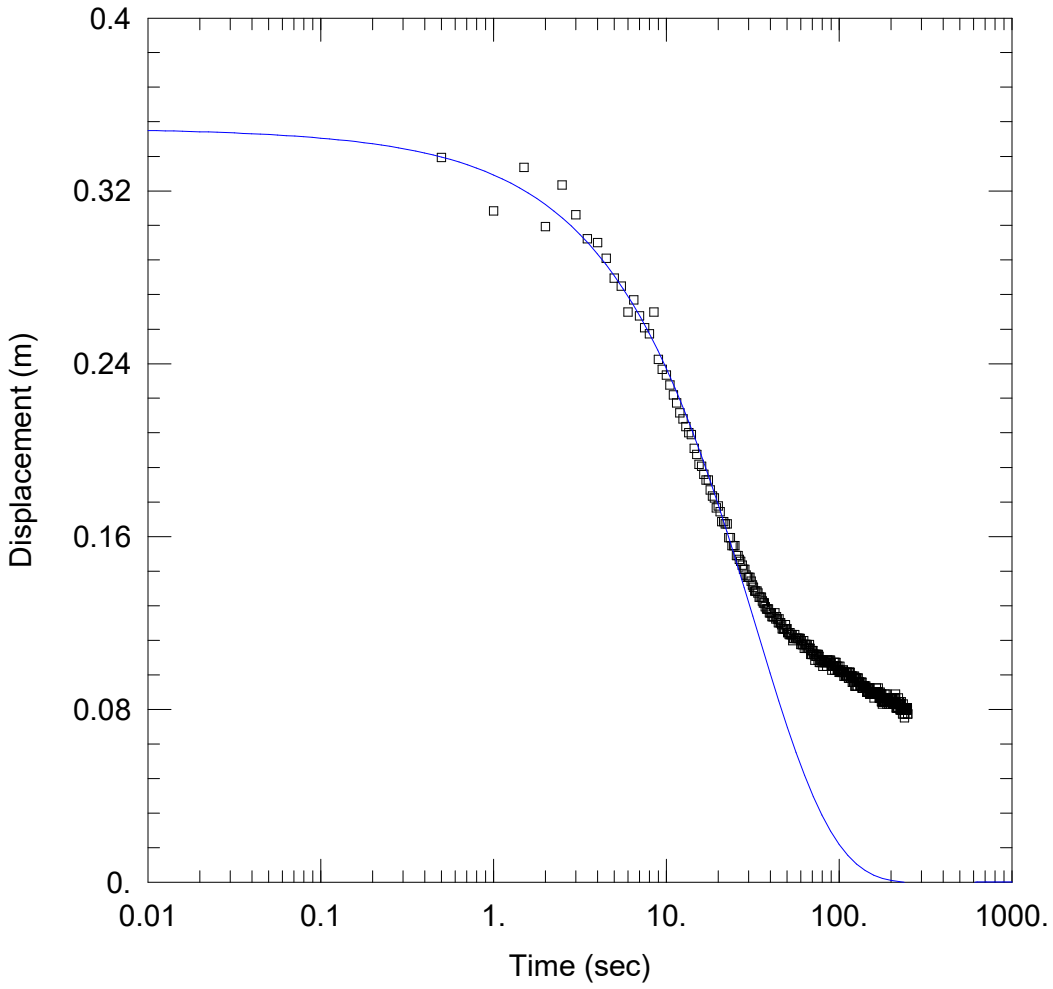
Saturated Thickness: 8.97 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PDC7)

Initial Displacement: 0.4752 m
Total Well Penetration Depth: 8.97 m
Casing Radius: 0.025 m
Static Water Column Height: 8.97 m
Screen Length: 3.048 m
Well Radius: 0.105 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = -8.558E-6 m/sec
y0 = 0.1707 m



BRADFORD BYPASS (BBP) - AIP-3 - FALLING HEAD TEST

Data Set: C:\...\AIP-3 FHT.aqt
Date: 06/02/22 Time: 13:07:01

PROJECT INFORMATION

Company: AECOM Canada Ltd.
Client: MTO
Project: 60636190
Test Well: AIP-3
Test Date: 2022-02-16

AQUIFER DATA

Saturated Thickness: 1.78 m

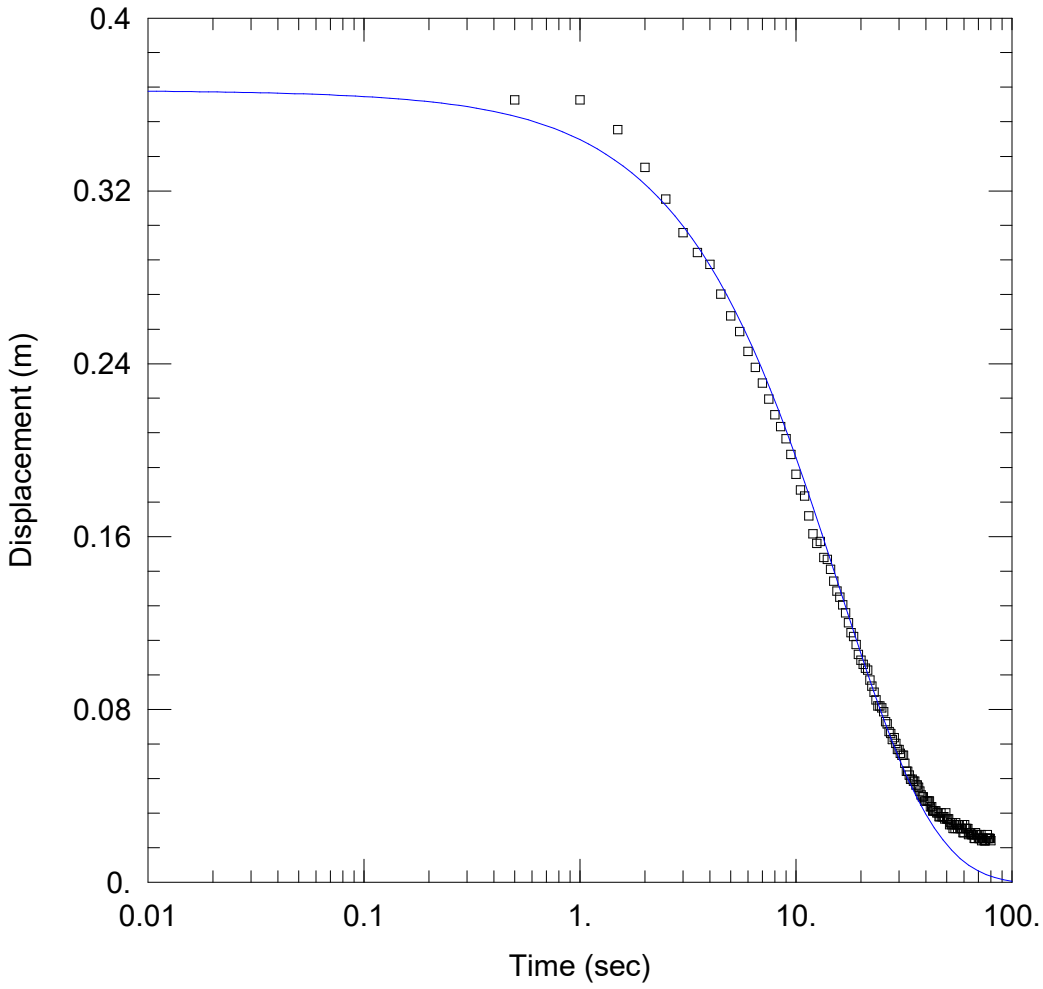
WELL DATA (AIP-3)

Initial Displacement: 0.3493 m
Total Well Penetration Depth: 1.78 m
Casing Radius: 0.025 m
Static Water Column Height: 1.78 m
Screen Length: 1.52 m
Well Radius: 0.105 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 1.594E-5 m/sec
Kz/Kr = 1.
Ss = 0.0001994 m^{-1}



BRADFORD BYPASS (BBP) - AIP-3 - RISING HEAD TEST

Data Set: C:\...\AIP-3 RHT.aqt
Date: 06/02/22 Time: 13:08:53

PROJECT INFORMATION

Company: AECOM Canada Ltd.
Client: MTO
Project: 60636190
Test Well: AIP-3
Test Date: 2022-02-16

AQUIFER DATA

Saturated Thickness: 1.78 m

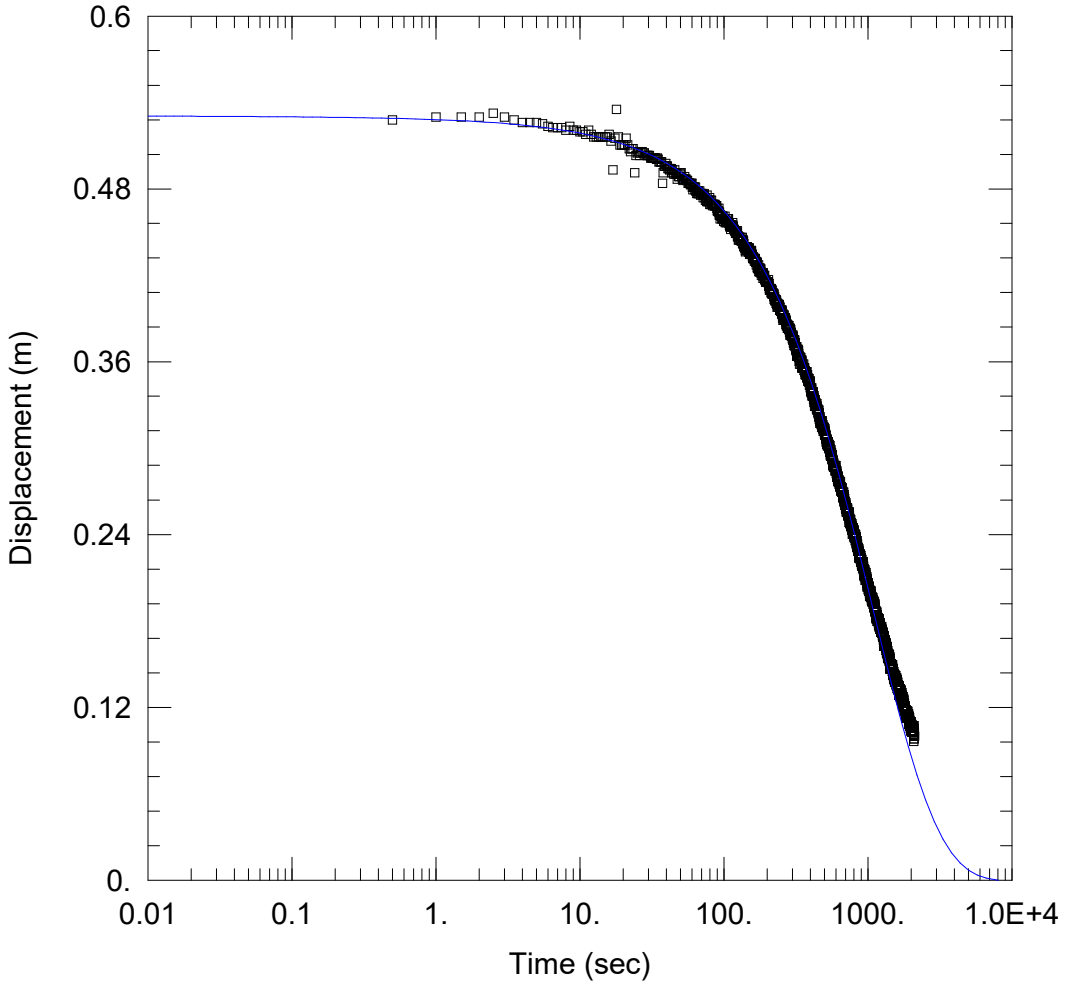
WELL DATA (AIP-3)

Initial Displacement: 0.3667 m
Total Well Penetration Depth: 1.78 m
Casing Radius: 0.025 m
Static Water Column Height: 1.78 m
Screen Length: 1.52 m
Well Radius: 0.105 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 3.069E-5 m/sec
Kz/Kr = 1.
Ss = 5.62E-6 m^{-1}



BRADFORD BYPASS (BBP) - CN-1 - FALLING HEAD TEST

Data Set: C:\...\CN-1 FHT.aqt
Date: 06/02/22 Time: 13:15:58

PROJECT INFORMATION

Company: AECOM Canada Ltd.
Client: MTO
Project: 60636190
Test Well: CN-1
Test Date: 2022-02-16

AQUIFER DATA

Saturated Thickness: 3.06 m

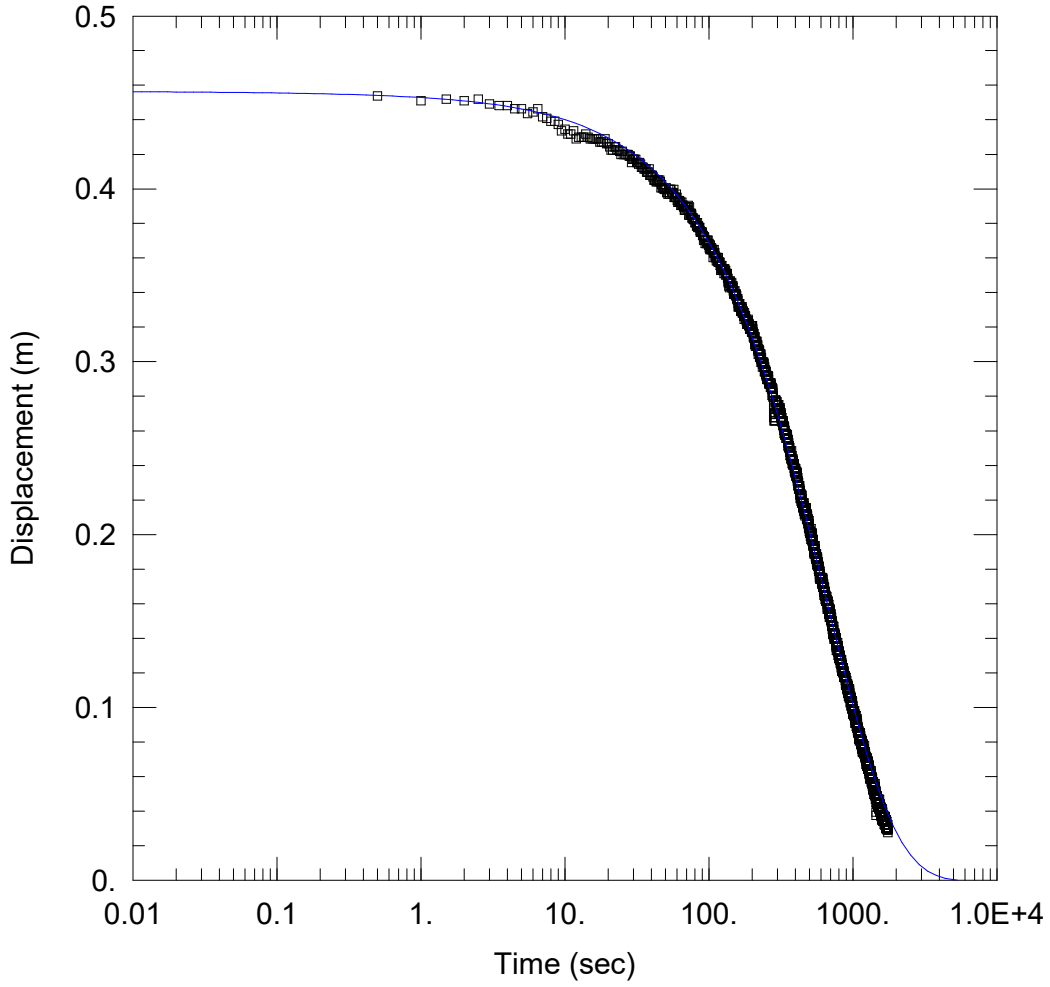
WELL DATA (CN-1)

Initial Displacement: 0.5308 m
Total Well Penetration Depth: 3.06 m
Casing Radius: 0.025 m
Static Water Column Height: 3.06 m
Screen Length: 1.52 m
Well Radius: 0.105 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 5.335E-7 m/sec
Ss = 7.939E-5 m^{-1}
Kz/Kr = 1.



BRADFORD BYPASS (BBP) - CN-1 - RISING HEAD TEST

Data Set: C:\...\CN-1 RHT.aqt
Date: 03/04/22 Time: 15:46:52

PROJECT INFORMATION

Company: AECOM Canada Ltd.
Client: MTO
Project: 60636190
Test Well: CN-1
Test Date: 2022-02-16

AQUIFER DATA

Saturated Thickness: 3.06 m

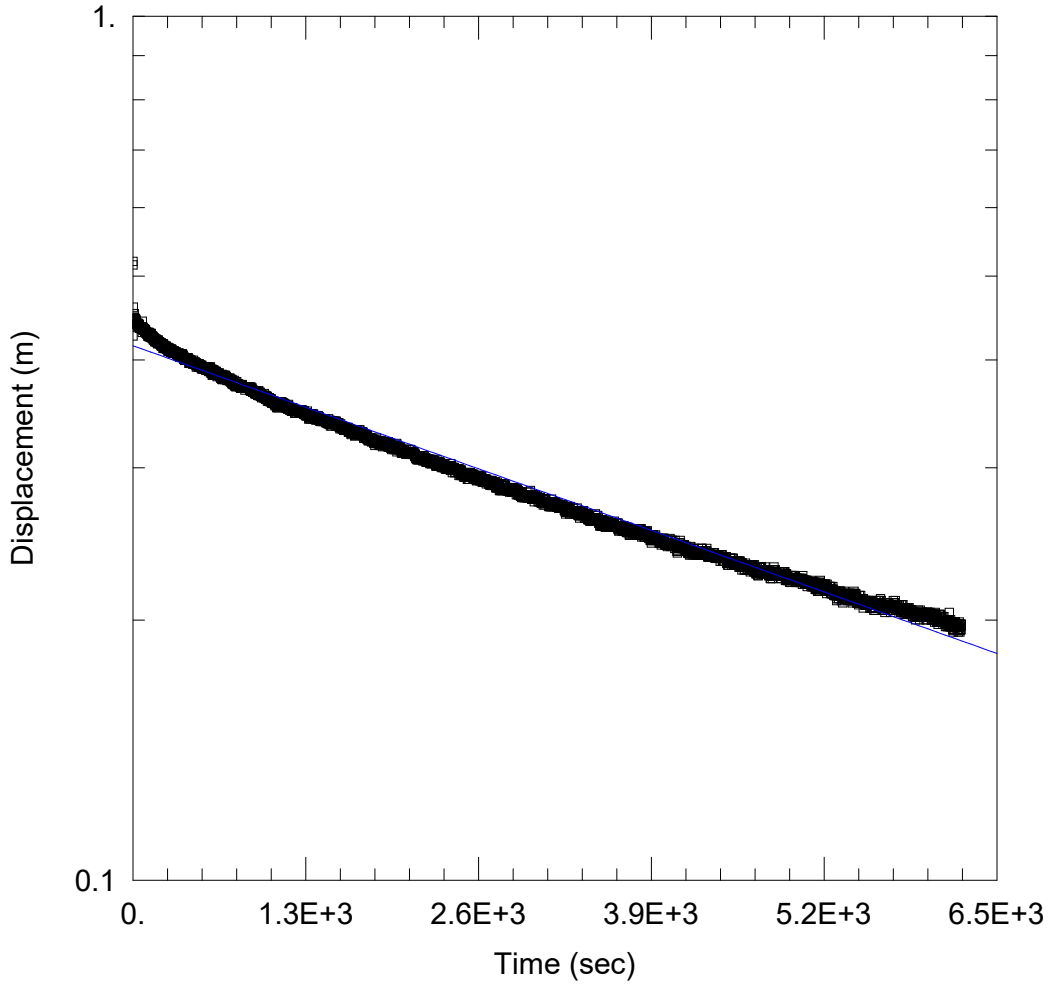
WELL DATA (CN-1)

Initial Displacement: 0.4565 m
Total Well Penetration Depth: 3.06 m
Casing Radius: 0.025 m
Static Water Column Height: 3.06 m
Screen Length: 1.52 m
Well Radius: 0.105 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 8.652E-7 m/sec
Kz/Kr = 1.
Ss = 0.0001258 m^{-1}



BRADFORD BYPASS (BBP) - CN-3 - FALLING HEAD TEST

Data Set: C:\...\CN-3 FHT.aqt
Date: 08/29/22 Time: 11:53:42

PROJECT INFORMATION

Company: AECOM Canada Ltd.
Client: MTO
Project: 60636190
Test Well: CN-3
Test Date: 2022-08-23

AQUIFER DATA

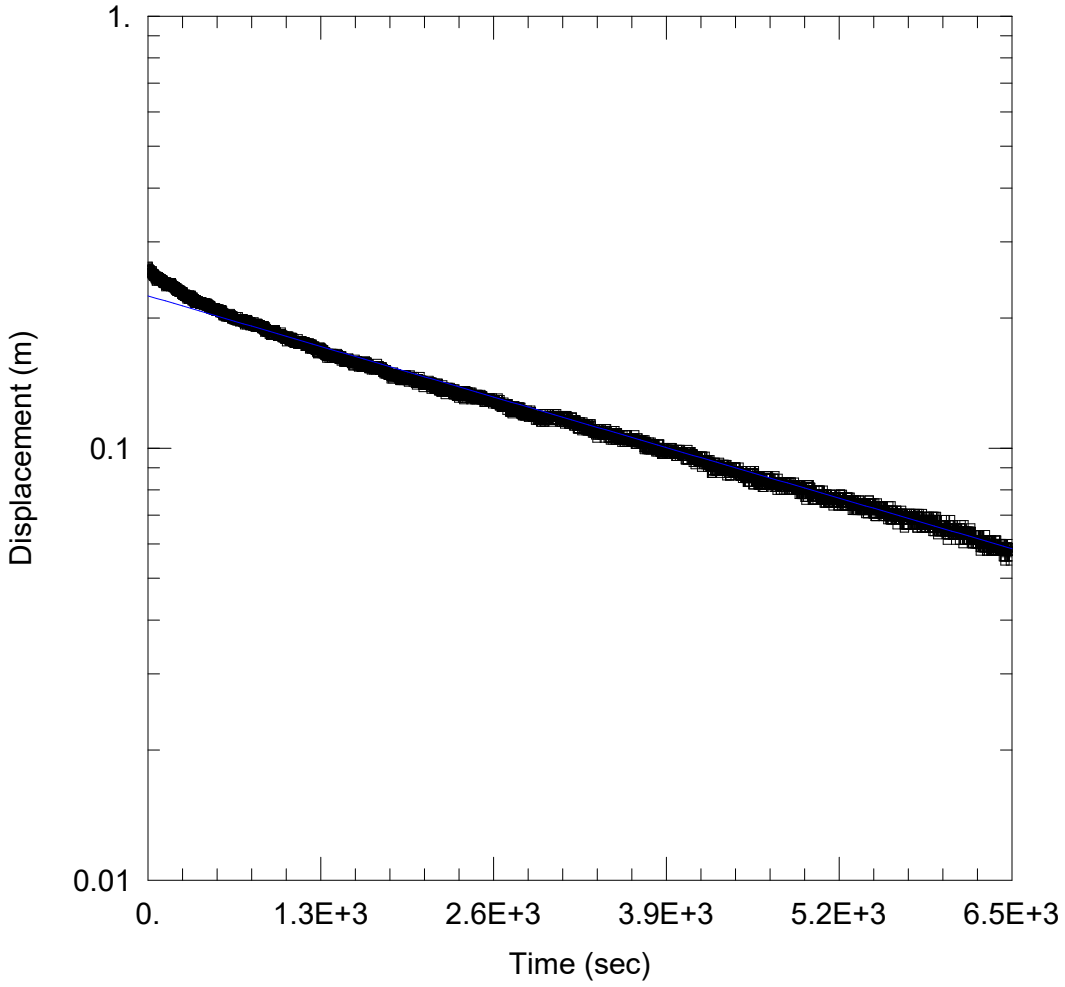
Saturated Thickness: 3.92 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (CN-3)

Initial Displacement: 0.52 m
Total Well Penetration Depth: 3.92 m
Casing Radius: 0.025 m
Static Water Column Height: 3.92 m
Screen Length: 3.05 m
Well Radius: 0.105 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev
K = 5.252E-8 m/sec
y0 = 0.4154 m



BRADFORD BYPASS (BBP) - CN-3 - RISING HEAD TEST

Data Set: C:\...\CN-3 RHT.aqt
Date: 08/29/22 Time: 12:23:36

PROJECT INFORMATION

Company: AECOM Canada Ltd.
Client: MTO
Project: 60636190
Test Well: CN-3
Test Date: 2022-08-23

AQUIFER DATA

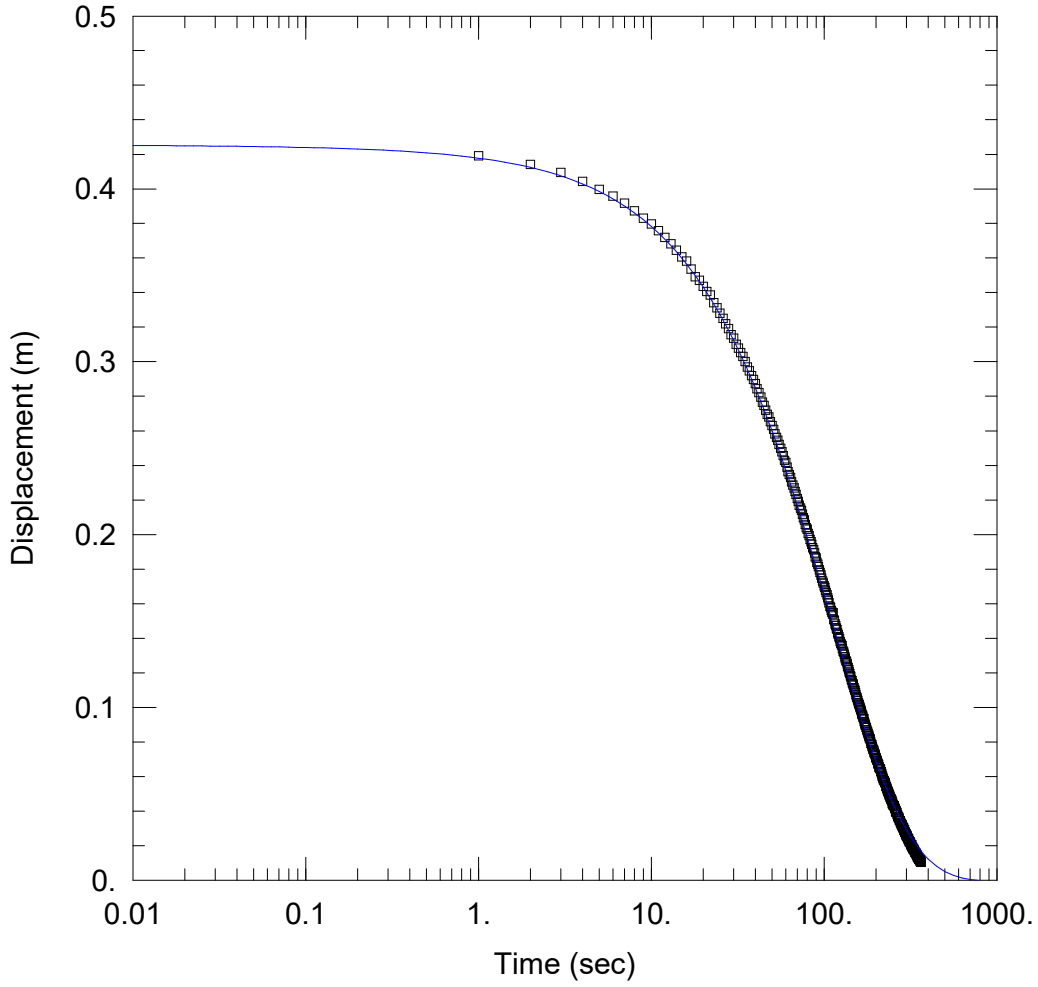
Saturated Thickness: 3.92 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (CN-3)

Initial Displacement: 0.26 m
Total Well Penetration Depth: 3.92 m
Casing Radius: 0.025 m
Static Water Column Height: 3.92 m
Screen Length: 3.05 m
Well Radius: 0.105 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev
K = 8.631E-8 m/sec
y0 = 0.2252 m



BRADFORD BYPASS (BBP) - BH HWR-1 - FALLING HEAD TEST

Data Set: C:\...\HWR-1 FHT.aqt
Date: 06/02/22 Time: 09:09:06

PROJECT INFORMATION

Company: AECOM Canada Ltd.
Client: MTO
Project: 60636190
Test Well: BH HWR-1
Test Date: 2022-05-12

AQUIFER DATA

Saturated Thickness: 3.85 m

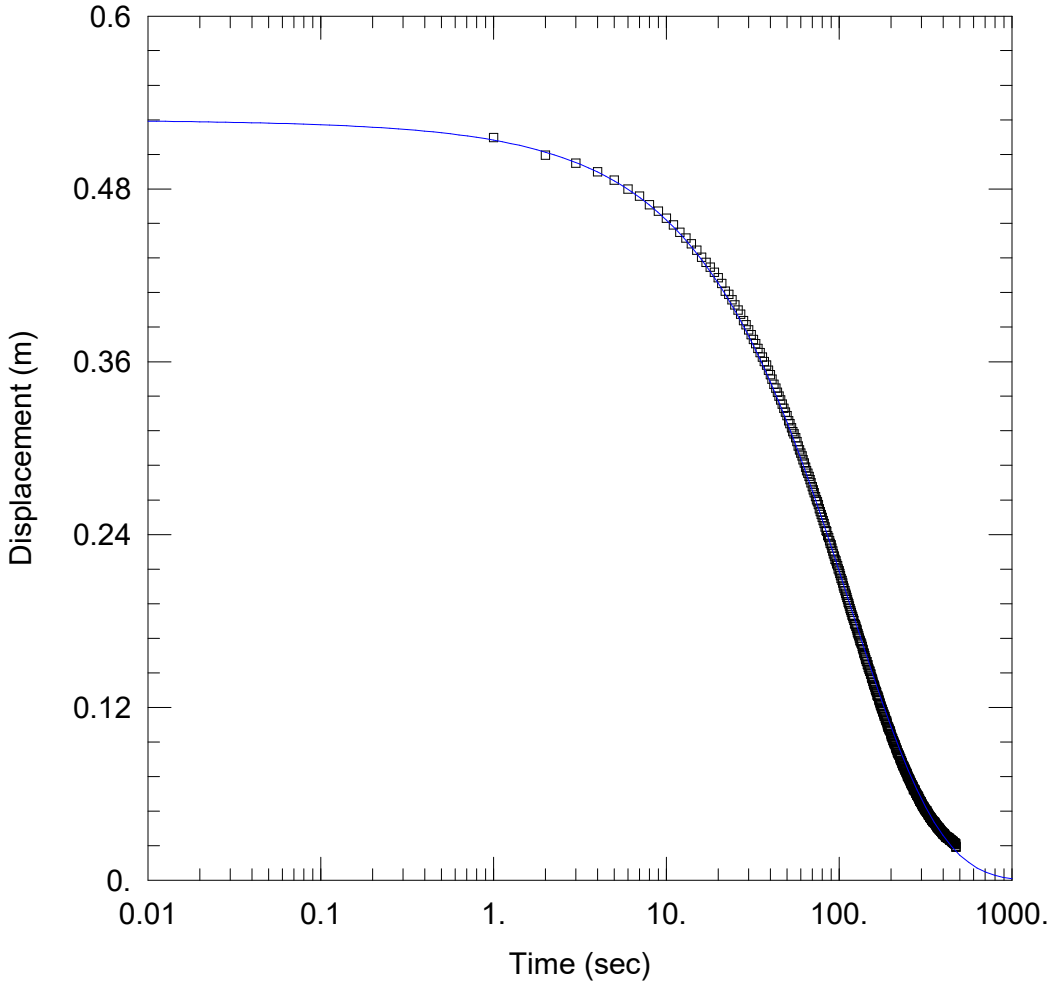
WELL DATA (BH HWR-1)

Initial Displacement: 0.4255 m
Total Well Penetration Depth: 3.85 m
Casing Radius: 0.025 m
Static Water Column Height: 3.85 m
Screen Length: 1.52 m
Well Radius: 0.105 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 5.46E-6 m/sec
Kz/Kr = 1.
Ss = 3.197E-5 m^{-1}



BRADFORD BYPASS (BBP) - BH HWR-1 - RISING HEAD TEST

Data Set: C:\...\HWR-1 RHT.aqt
Date: 06/02/22 Time: 09:04:56

PROJECT INFORMATION

Company: AECOM Canada Ltd.
Client: MTO
Project: 60636190
Test Well: BH HWR-1
Test Date: 2022-05-12

AQUIFER DATA

Saturated Thickness: 3.85 m

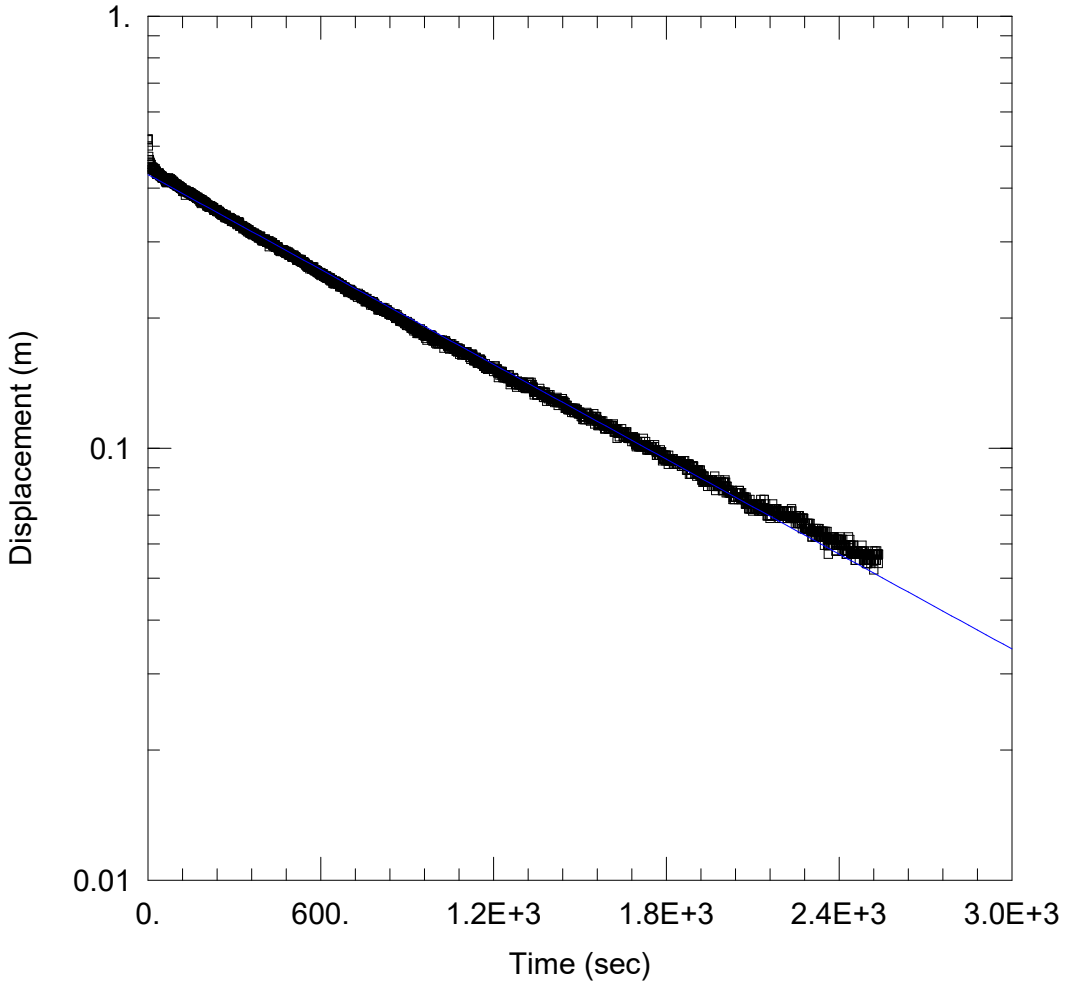
WELL DATA (BH HWR-1)

Initial Displacement: 0.528 m
Total Well Penetration Depth: 3.85 m
Casing Radius: 0.025 m
Static Water Column Height: 3.85 m
Screen Length: 1.52 m
Well Radius: 0.105 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 4.688E-6 m/sec
Kz/Kr = 1.
Ss = 0.0001861 m^{-1}



BRADFORD BYPASS (BBP) - HRE-3 - RISING HEAD TEST

Data Set: C:\...\HRE-3 RHT.aqt
Date: 08/29/22 Time: 13:31:52

PROJECT INFORMATION

Company: AECOM Canada Ltd.
Client: MTO
Project: 60636190
Test Well: HRE-3
Test Date: 2022-08-23

AQUIFER DATA

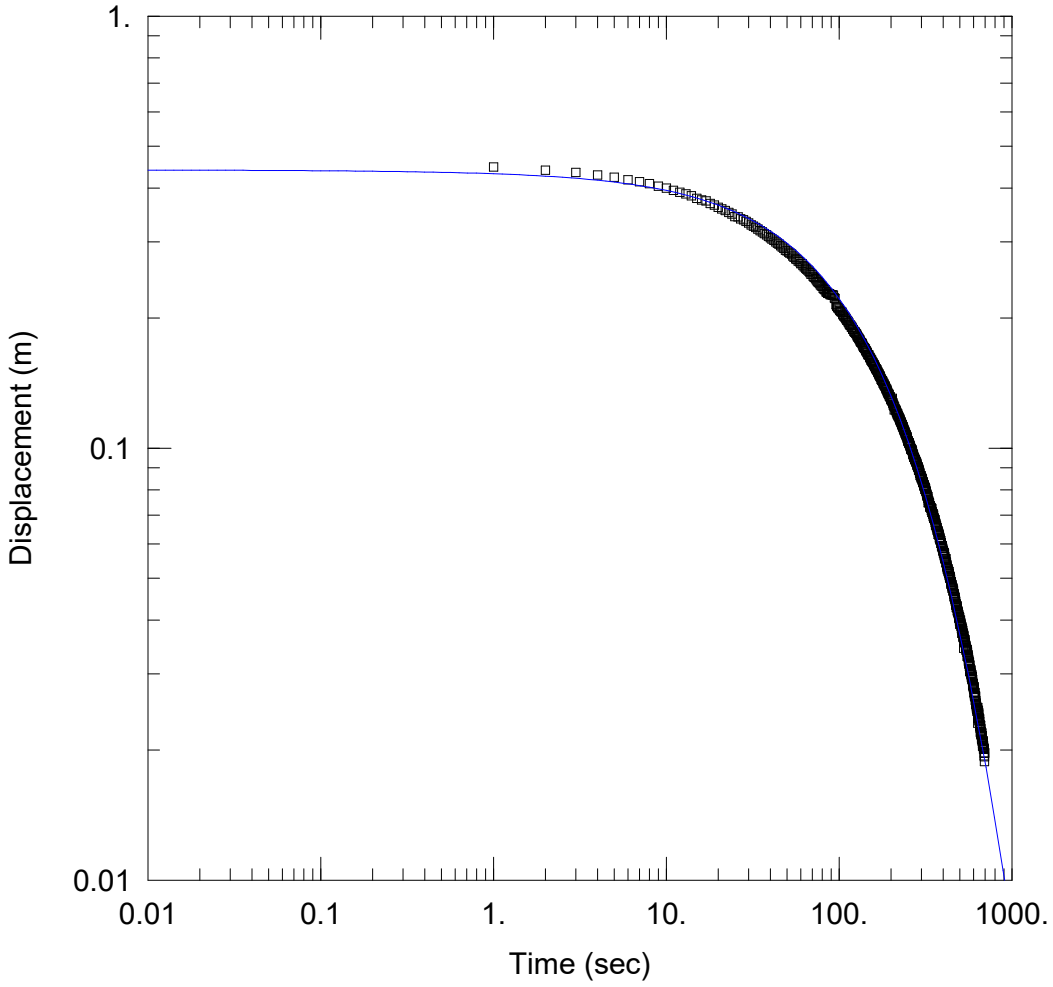
Saturated Thickness: 2.15 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (HRE-3)

Initial Displacement: 0.52 m
Total Well Penetration Depth: 2.15 m
Casing Radius: 0.025 m
Static Water Column Height: 2.15 m
Screen Length: 2.15 m
Well Radius: 0.105 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 2.746E-7 m/sec
y0 = 0.4297 m



BRADFORD BYPASS (BBP) - BH 2-1 - FALLING HEAD TEST

Data Set: C:\...\BH 2-1 FHT.aqt
Date: 06/02/22 Time: 09:43:33

PROJECT INFORMATION

Company: AECOM Canada Ltd.
Client: MTO
Project: 60636190
Test Well: BH 2-1
Test Date: 2022-05-13

AQUIFER DATA

Saturated Thickness: 8.43 m

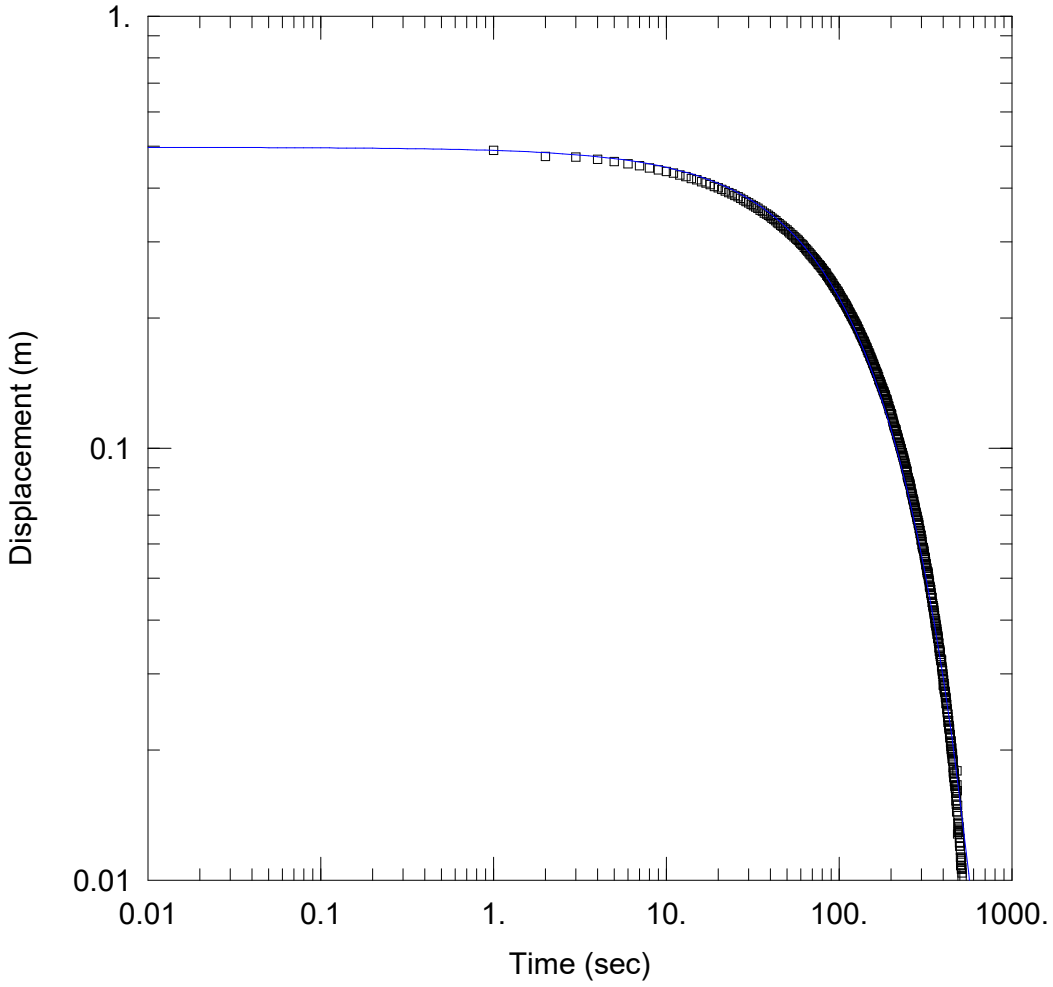
WELL DATA (BH 2-1)

Initial Displacement: 0.4408 m
Total Well Penetration Depth: 8.43 m
Casing Radius: 0.025 m
Static Water Column Height: 8.43 m
Screen Length: 3.05 m
Well Radius: 0.105 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 1.937E-6 m/sec
Kz/Kr = 1.
Ss = 6.603E-5 m^{-1}



BRADFORD BYPASS (BBP) - BH 2-1 - RISING HEAD TEST

Data Set: C:\...\BH 2-1 RHT.aqt
Date: 06/02/22 Time: 09:46:43

PROJECT INFORMATION

Company: AECOM Canada Ltd.
Client: MTO
Project: 60636190
Test Well: BH 2-1
Test Date: 2022-05-13

AQUIFER DATA

Saturated Thickness: 8.43 m

WELL DATA (BH 2-1)

Initial Displacement: 0.4971 m
Total Well Penetration Depth: 8.43 m
Casing Radius: 0.025 m
Static Water Column Height: 8.43 m
Screen Length: 3.05 m
Well Radius: 0.105 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 2.736E-6 m/sec
Kz/Kr = 1.
Ss = 1.258E-5 m^{-1}

Appendix C

Water Quality Testing Results

AGAT Work Order ID#			22T861744 / 22T861751	22T861744	22T861752	23T030999	23T030993	22T861747	22T861744	22T895412	22T894872	22T895413	22T895413	22T894872
Sampling Date			8-Feb-22	8-Feb-22	8-Feb-22	31-May-23	31-May-23	8-Feb-22	8-Feb-22	13-May-22	12-May-22	13-May-22	13-May-22	12-May-22
Well Location ID			BH 9-1	BH 10-1	BH 10-4	PDC-6	PDC-7	BH AIP-3	BH CN-1	BH CN-3	BH HRW-1	BH HRW-4	BH HRE-3	BH 2-1
Parameters	**Units**	**RDL**												
Organics														
Oil and Grease (animal/vegetable) in w	mg/L	0.5	<0.5	-	<0.5	-	<0.5	<0.5	-	1.12	-	2.33	-	-
Oil and Grease (mineral) in water	mg/L	0.5	<0.5	-	<0.5	-	<0.5	<0.5	-	<0.5	-	<0.5	-	-
Methylene Chloride	µg/L	0.3	<0.3	-	<0.3	-	<0.3	<0.3	-	<0.3	-	<0.3	-	-
cis- 1,2-Dichloroethylene	µg/L	0.2	<0.2	-	<0.2	-	<0.2	<0.2	-	<0.2	-	<0.2	-	-
Chloroform	µg/L	0.2	<0.2	-	<0.2	-	<0.2	<0.2	-	<0.2	-	<0.2	-	-
Benzene	µg/L	0.2	<0.2	-	<0.2	-	<0.2	<0.2	-	<0.2	-	<0.2	-	-
Trichloroethylene	µg/L	0.2	<0.2	-	<0.2	-	<0.2	<0.2	-	<0.2	-	<0.2	-	-
trans-1,3-Dichloropropene	µg/L	0.30	<0.30	-	<0.30	-	<0.30	<0.30	-	<0.30	-	<0.30	-	-
Toluene	µg/L	0.2	<0.2	-	<0.2	-	<0.2	<0.2	-	<0.2	-	<0.2	-	-
Tetrachloroethene	µg/L	0.1	<0.1	-	<0.1	-	<0.1	<0.1	-	<0.1	-	<0.1	-	-
Ethylbenzene	µg/L	0.1	<0.1	-	<0.1	-	<0.1	<0.1	-	<0.1	-	<0.1	-	-
1,1,2,2-Tetrachloroethane	µg/L	0.1	<0.1	-	<0.1	-	<0.1	<0.1	-	<0.1	-	<0.1	-	-
1,4-Dichlorobenzene	µg/L	0.1	<0.1	-	<0.1	-	<0.1	<0.1	-	<0.1	-	<0.1	-	-
1,2-Dichlorobenzene	µg/L	0.1	<0.1	-	<0.1	-	<0.1	<0.1	-	<0.1	-	<0.1	-	-
Xylenes (Total)	µg/L	0.2	<0.2	-	<0.2	-	<0.2	<0.2	-	<0.2	-	<0.2	-	-
Toluene-d8	% Recovery	1	96	-	98	-	100	101	-	98	-	70	-	-
4-Bromofluorobenzene	% Recovery	1	102	-	83	-	86	80	-	80	-	93	-	-
PCBs	µg/L	0.2	<0.2	-	<0.2	-	<0.2	<0.2	-	<0.2	-	<0.2	-	-
Decachlorobiphenyl	%	1	84	-	106	-	114	110	-	75	-	77	-	-
Di-n-butyl phthalate	ug/L	0.5	<0.5	-	<0.5	-	<0.5	<0.5	-	0.69	-	<0.5	-	-
Bis(2-éthylhexyl)phthalate	µg/L	0.5	<0.5	-	<0.5	-	<0.5	<0.5	-	0.59	-	<0.5	-	-
2,4,6-Tribromophenol	%	1	89	-	89	-	79	89	-	83	-	78	-	-
Chrysene-d12	%	1	78	-	78	-	89	74	-	74	-	79	-	-
Inorganics														
Biochemical Oxygen Demand, Carbona	mg/L	2.00	<2.00	-	<6.00	-	<2	<2.00	-	4	-	2	-	-
pH	pH Units	NA	7.75	-	7.52	-	8.02	7.44	-	7.91	-	7.76	-	-
Total Suspended Solids	mg/L	10	15	-	10	-	26	**308**	-	**544**	-	**2600**	-	-
Fluoride	mg/L	0.05	<0.05	-	<0.05	-	<0.05	<0.05	-	<0.05	-	<0.05	-	-
Sulphate	mg/L	0.10	37.6	-	10.6	-	86.5	14.8	-	2.79	-	2.03	-	-
Total Cyanide	mg/L	0.002	<0.002	-	<0.002	-	<0.002	<0.002	-	<0.002	-	<0.002	-	-
Phenols	mg/L	0.001	0.014	-	0.041	-	0.006	0.036	-	0.021	-	0.064	-	-
Total Kjeldahl Nitrogen	mg/L	0.10	0.2	-	**1.28**	-	0.11	0.16	-	**1.86**	-	**2.27**	-	-
Total Aluminum	mg/L	0.010	0.167	-	0.124	-	0.488	1.63	-	3.88	-	32.5	-	-
Total Antimony	mg/L	0.020	<0.020	-	<0.020	-	<0.020	<0.020	-	<0.020	-	<0.040	-	-
Total Arsenic	mg/L	0.015	<0.015	-	<0.015	-	<0.015	<0.015	-	<0.015	-	<0.030	-	-
Total Cadmium	mg/L	0.005	<0.010	-	<0.010	-	<0.010	<0.010	-	<0.010	-	<0.020	-	-
Total Chromium	mg/L	0.020	<0.015	-	<0.015	-	<0.015	<0.015	-	<0.015	-	0.044	-	-

AGAT Work Order ID#			22T861744 / 22T861751	22T861744	22T861752	23T030999	23T030993	22T861747	22T861744	22T895412	22T894872	22T895413	22T895413	22T894872
Sampling Date			8-Feb-22	8-Feb-22	8-Feb-22	31-May-23	31-May-23	8-Feb-22	8-Feb-22	13-May-22	12-May-22	13-May-22	13-May-22	12-May-22
Well Location ID			BH 9-1	BH 10-1	BH 10-4	PDC-6	PDC-7	BH AIP-3	BH CN-1	BH CN-3	BH HRW-1	BH HRW-4	BH HRE-3	BH 2-1
Parameters	**Units**	**RDL**												
Total Cobalt	mg/L	0.020	<0.010	-	<0.010	-	<0.010	<0.010	-	<0.010	-	0.022	-	-
Total Copper	mg/L	0.015	<0.002	-	<0.002	-	<0.002	0.003	-	0.011	-	**0.065**	-	-
Total Lead	mg/L	0.020	<0.020	-	<0.020	-	<0.020	<0.020	-	<0.020	-	<0.040	-	-
Total Manganese	mg/L	0.020	0.042	-	**0.716**	-	0.033	0.125	-	**0.282**	-	**1.86**	-	-
Total Mercury	mg/L	0.0002	<0.020	-	<0.020	-	<0.020	<0.0002	-	0.03	-	<0.040	-	-
Total Molybdenum	mg/L	0.020	<0.0002	-	<0.0002	-	<0.0002	<0.020	-	<0.0002	-	<0.0002	-	-
Total Nickel	mg/L	0.015	<0.015	-	<0.015	-	<0.015	<0.015	-	<0.015	-	0.044	-	-
Total Phosphorus	mg/L	0.02	<0.02	-	0.03	-	0.03	0.06	-	0.14	-	**1.29**	-	-
Total Selenium	mg/L	0.002	<0.002	-	<0.002	-	<0.002	<0.002	-	<0.002	-	<0.004	-	-
Total Silver	mg/L	0.020	<0.010	-	<0.010	-	<0.010	<0.010	-	<0.010	-	<0.020	-	-
Total Tin	mg/L	0.025	<0.020	-	<0.020	-	<0.020	<0.020	-	<0.020	-	<0.040	-	-
Total Titanium	mg/L	0.010	0.012	-	<0.010	-	0.014	0.046	-	0.193	-	1.14	-	-
Total Zinc	mg/L	0.020	<0.020	-	<0.020	-	<0.020	<0.020	-	0.022	-	**0.104**	-	-
Nonylphenol and Nonylphenol Ethoxylates (Ontario, mg/L)														
Total Nonylphenol	mg/L	0.001	<0.001	-	<0.001	-	<0.001	<0.001	-	0.029	-	<0.001	-	-
NP1EO	mg/L	0.001	<0.001	-	<0.001	-	-	<0.001	-	<0.001	-	<0.001	-	-
NP2EO	mg/L	0.0003	<0.0003	-	<0.0003	-	-	<0.0003	-	<0.0003	-	<0.0003	-	-
Total Nonylphenol Ethoxylates	mg/L	0.001	<0.001	-	<0.001	-	<0.01	<0.001	-	<0.001	-	<0.001	-	-

AGAT Work Order ID#			22T861744 / 22T861751	22T861744	22T861752	23T030999	23T030993	22T861747	22T861744	22T895412	22T894872	22T895413	22T895413	22T894872
Sampling Date			8-Feb-22	8-Feb-22	8-Feb-22	31-May-23	31-May-23	8-Feb-22	8-Feb-22	13-May-22	12-May-22	13-May-22	13-May-22	12-May-22
Well Location ID			**BH 9-1**	**BH 10-1**	**BH 10-4**	**PDC-6**	**PDC-7**	**BH AIP-3**	**BH CN-1**	**BH CN-3**	**BH HRW-1**	**BH HRW-4**	**BH HRE-3**	**BH 2-1**
Parameters	**Units**	**RDL**												

Comments: RDL: Reported Detection Limit; Bold - Exceeds Storm Sewer; Shaded - Exceeds Sanitary Sewer

Standards: Table 1: Full Depth Background Site Condition Standards - Ground Water - All Types of Property Uses
The Regional Municipality of York - Limits for Sanitary Sewer Discharge [BY-LAW NO.2011-56]

Metals analysis completed on a filtered sample.

DDT total is a calculated parameter. The calculated value is the sum of op'DDT and pp'DDT.

DDD total is a calculated parameter. The calculated value is the sum of op'DDD and pp'DDD.

DDE total is a calculated parameter. The calculated value is the sum of op'DDE and pp'DDE.

Endosulfan total is a calculated parameter. The calculated value is the sum of Endosulfan I and Endosulfan II.

Chlordane total is a calculated parameter. The calculated value is the sum of Alpha-Chlordane and Gamma-Chlordane.

PCB total is a calculated parameter. The calculated value is the sum of Aroclor 1242, Aroclor 1248, Aroclor 1254 and Aroclor 1260.

The calculated parameters are non-accredited. The parameters that are components of the calculation are accredited.

Note: The result for Benzo(b)Fluoranthene is the total of the Benzo(b)&(j)Fluoranthene isomers because the isomers co-elute on the GC column.

PAHs: *2- and 1-Methyl Naphthalene is a calculated parameter. The calculated value is the sum of 2-Methyl Naphthalene and 1-Methyl Naphthalene. The calculated parameter is non-accredited. The parameters that are components of the calculation are accredited.*

AGAT Work Order ID#			22T861744 / 22T861751	22T861744	22T861752	23T030999	23T030993	22T861747	22T861744	22T895412	22T894872	22T895413	22T895413	22T894872
Sampling Date			8-Feb-22	8-Feb-22	8-Feb-22	31-May-23	31-May-23	8-Feb-22	8-Feb-22	13-May-22	12-May-22	13-May-22	13-May-22	12-May-22
Well Location ID			BH 9-1	BH 10-1	BH 10-4	PDC-6	PDC-7	BH AIP-3	BH CN-1	BH CN-3	BH HRW-1	BH HRW-4	BH HRE-3	BH 2-1
Parameters	**Units**	**RDL**												
Organics														
Oil and Grease (animal/vegetable) in w	mg/L	0.5	<0.5	-	<0.5	-	-	<0.5	-	1.12	-	2.33	-	-
Oil and Grease (mineral) in water	mg/L	0.5	<0.5	-	<0.5	-	-	<0.5	-	<0.5	-	<0.5	-	-
Methylene Chloride	µg/L	0.3	<0.3	-	<0.3	-	-	<0.3	-	<0.3	-	<0.3	-	-
cis- 1,2-Dichloroethylene	µg/L	0.2	<0.2	-	<0.2	-	-	<0.2	-	<0.2	-	<0.2	-	-
Chloroform	µg/L	0.2	<0.2	-	<0.2	-	-	<0.2	-	<0.2	-	<0.2	-	-
Benzene	µg/L	0.2	<0.2	-	<0.2	-	-	<0.2	-	<0.2	-	<0.2	-	-
Trichloroethylene	µg/L	0.2	<0.2	-	<0.2	-	-	<0.2	-	<0.2	-	<0.2	-	-
trans-1,3-Dichloropropene	µg/L	0.30	<0.30	-	<0.30	-	-	<0.30	-	<0.30	-	<0.30	-	-
Toluene	µg/L	0.2	<0.2	-	<0.2	-	-	<0.2	-	<0.2	-	<0.2	-	-
Tetrachloroethene	µg/L	0.1	<0.1	-	<0.1	-	-	<0.1	-	<0.1	-	<0.1	-	-
Ethylbenzene	µg/L	0.1	<0.1	-	<0.1	-	-	<0.1	-	<0.1	-	<0.1	-	-
1,1,2,2-Tetrachloroethane	µg/L	0.1	<0.1	-	<0.1	-	-	<0.1	-	<0.1	-	<0.1	-	-
1,4-Dichlorobenzene	µg/L	0.1	<0.1	-	<0.1	-	-	<0.1	-	<0.1	-	<0.1	-	-
1,2-Dichlorobenzene	µg/L	0.1	<0.1	-	<0.1	-	-	<0.1	-	<0.1	-	<0.1	-	-
Xylenes (Total)	µg/L	0.2	<0.2	-	<0.2	-	-	<0.2	-	<0.2	-	<0.2	-	-
Toluene-d8	% Recovery	1	96	-	98	-	-	101	-	98	-	70	-	-
4-Bromofluorobenzene	% Recovery	1	102	-	83	-	-	80	-	80	-	93	-	-
PCBs	µg/L	0.2	<0.2	-	<0.2	-	-	<0.2	-	<0.2	-	<0.2	-	-
Decachlorobiphenyl	%	1	84	-	106	-	-	110	-	75	-	77	-	-
Di-n-butyl phthalate	ug/L	0.5	<0.5	-	<0.5	-	-	<0.5	-	0.69	-	<0.5	-	-
Bis(2-éthylhexyl)phthalate	µg/L	0.5	<0.5	-	<0.5	-	-	<0.5	-	0.59	-	<0.5	-	-
2,4,6-Tribromophenol	%	1	89	-	89	-	-	89	-	83	-	78	-	-
Chrysene-d12	%	1	78	-	78	-	-	74	-	74	-	79	-	-
Inorganics														
Biochemical Oxygen Demand, Carbona	mg/L	2.00	<2.00	-	<6.00	-	-	<2.00	-	4	-	2	-	-
pH	pH Units	NA	7.75	-	7.52	-	-	7.44	-	7.91	-	7.76	-	-
Total Suspended Solids	mg/L	10	15	-	10	-	-	**308**	-	**544**	-	**2600**	-	-
Fluoride	mg/L	0.05	<0.05	-	<0.05	-	-	<0.05	-	<0.05	-	<0.05	-	-
Sulphate	mg/L	0.10	37.6	-	10.6	-	-	14.8	-	2.79	-	2.03	-	-
Total Cyanide	mg/L	0.002	<0.002	-	<0.002	-	-	<0.002	-	<0.002	-	<0.002	-	-
Phenols	mg/L	0.001	**0.014**	-	**0.041**	-	-	**0.036**	-	**0.021**	-	**0.064**	-	-
Total Kjeldahl Nitrogen	mg/L	0.10	0.2	-	**1.28**	-	-	0.16	-	**1.86**	-	**2.27**	-	-
Total Aluminum	mg/L	0.010	0.167	-	0.124	-	-	1.63	-	3.88	-	32.5	-	-
Total Antimony	mg/L	0.020	<0.020	-	<0.020	-	-	<0.020	-	<0.020	-	<0.040	-	-
Total Arsenic	mg/L	0.015	<0.015	-	<0.015	-	-	<0.015	-	<0.015	-	<0.030	-	-
Total Cadmium	mg/L	0.005	<0.010	-	<0.010	-	-	<0.010	-	<0.010	-	<0.020	-	-
Total Chromium	mg/L	0.020	<0.015	-	<0.015	-	-	<0.015	-	<0.015	-	0.044	-	-

AGAT Work Order ID#			22T861744 / 22T861751	22T861744	22T861752	23T030999	23T030993	22T861747	22T861744	22T895412	22T894872	22T895413	22T895413	22T894872
Sampling Date			8-Feb-22	8-Feb-22	8-Feb-22	31-May-23	31-May-23	8-Feb-22	8-Feb-22	13-May-22	12-May-22	13-May-22	13-May-22	12-May-22
Well Location ID			BH 9-1	BH 10-1	BH 10-4	PDC-6	PDC-7	BH AIP-3	BH CN-1	BH CN-3	BH HRW-1	BH HRW-4	BH HRE-3	BH 2-1
Parameters	**Units**	**RDL**												
Total Cobalt	mg/L	0.020	<0.010	-	<0.010	-	-	<0.010	-	<0.010	-	0.022	-	-
Total Copper	mg/L	0.015	<0.002	-	<0.002	-	-	0.003	-	0.011	-	**0.065**	-	-
Total Lead	mg/L	0.020	<0.020	-	<0.020	-	-	<0.020	-	<0.020	-	<0.040	-	-
Total Manganese	mg/L	0.020	0.042	-	**0.716**	-	-	0.125	-	**0.282**	-	**1.86**	-	-
Total Mercury	mg/L	0.0002	<0.020	-	<0.020	-	-	<0.0002	-	0.03	-	<0.040	-	-
Total Molybdenum	mg/L	0.020	<0.0002	-	<0.0002	-	-	<0.020	-	<0.0002	-	<0.0002	-	-
Total Nickel	mg/L	0.015	<0.015	-	<0.015	-	-	<0.015	-	<0.015	-	0.044	-	-
Total Phosphorus	mg/L	0.02	<0.02	-	0.03	-	-	0.06	-	0.14	-	**1.29**	-	-
Total Selenium	mg/L	0.002	<0.002	-	<0.002	-	-	<0.002	-	<0.002	-	<0.004	-	-
Total Silver	mg/L	0.020	<0.010	-	<0.010	-	-	<0.010	-	<0.010	-	<0.020	-	-
Total Tin	mg/L	0.025	<0.020	-	<0.020	-	-	<0.020	-	<0.020	-	<0.040	-	-
Total Titanium	mg/L	0.010	0.012	-	<0.010	-	-	0.046	-	0.193	-	1.14	-	-
Total Zinc	mg/L	0.020	<0.020	-	<0.020	-	-	<0.020	-	0.022	-	**0.104**	-	-
Nonylphenol and Nonylphenol Ethoxylates (Ontario, mg/L)														
Total Nonylphenol	mg/L	0.001	<0.001	-	<0.001	-	-	<0.001	-	0.029	-	<0.001	-	-
NP1EO	mg/L	0.001	<0.001	-	<0.001	-	-	<0.001	-	<0.001	-	<0.001	-	-
NP2EO	mg/L	0.0003	<0.0003	-	<0.0003	-	-	<0.0003	-	<0.0003	-	<0.0003	-	-
Total Nonylphenol Ethoxylates	mg/L	0.001	<0.001	-	<0.001	-	-	<0.001	-	<0.001	-	<0.001	-	-

AGAT Work Order ID#			22T861744 / 22T861751	22T861744	22T861752	23T030999	23T030993	22T861747	22T861744	22T895412	22T894872	22T895413	22T895413	22T894872
Sampling Date			8-Feb-22	8-Feb-22	8-Feb-22	31-May-23	31-May-23	8-Feb-22	8-Feb-22	13-May-22	12-May-22	13-May-22	13-May-22	12-May-22
Well Location ID			**BH 9-1**	**BH 10-1**	**BH 10-4**	**PDC-6**	**PDC-7**	**BH AIP-3**	**BH CN-1**	**BH CN-3**	**BH HRW-1**	**BH HRW-4**	**BH HRE-3**	**BH 2-1**
Parameters	**Units**	**RDL**												

Comments: RDL: Reported Detection Limit; Bold - Exceeds Storm Sewer; Shaded - Exceeds Sanitary Sewer

Standards: Table 1: Full Depth Background Site Condition Standards - Ground Water - All Types of Property Uses
The Regional Municipality of York - Limits for Sanitary Sewer Discharge [BY-LAW NO.2011-56]

Metals analysis completed on a filtered sample.

DDT total is a calculated parameter. The calculated value is the sum of op'DDT and pp'DDT.

DDD total is a calculated parameter. The calculated value is the sum of op'DDD and pp'DDD.

DDE total is a calculated parameter. The calculated value is the sum of op'DDE and pp'DDE.

Endosulfan total is a calculated parameter. The calculated value is the sum of Endosulfan I and Endosulfan II.

Chlordane total is a calculated parameter. The calculated value is the sum of Alpha-Chlordane and Gamma-Chlordane.

PCB total is a calculated parameter. The calculated value is the sum of Aroclor 1242, Aroclor 1248, Aroclor 1254 and Aroclor 1260.

The calculated parameters are non-accredited. The parameters that are components of the calculation are accredited.

Note: The result for Benzo(b)Fluoranthene is the total of the Benzo(b)&(j)Fluoranthene isomers because the isomers co-elute on the GC column.

PAHs: *2- and 1-Methyl Naphthalene is a calculated parameter. The calculated value is the sum of 2-Methyl Naphthalene and 1-Methyl Naphthalene. The calculated parameter is non-accredited. The parameters that are components of the calculation are accredited.*

AGAT Work Order ID#			22T861744 / 22T861751	22T861744	22T861752	23T030999	23T030993	22T861747	22T861744	22T895412	22T894872	22T895413	22T895413	22T894872
Sampling Date			8-Feb-22	8-Feb-22	8-Feb-22	31-May-23	31-May-23	8-Feb-22	8-Feb-22	13-May-22	12-May-22	13-May-22	13-May-22	12-May-22
Well Location ID			BH 9-1	BH 10-1	BH 10-4	PDC-6	PDC-7	BH AIP-3	BH CN-1	BH CN-3	BH HRW-1	BH HRW-4	BH HRE-3	BH 2-1
Parameters	**Units**	**RDL**												
Water Quality Assessment - PWQO (mg/L)														
Electrical Conductivity	µS/cm	2	762	589	-	282	-	-	1050	-	1010	-	636	1350
pH	pH Units	NA	7.68	7.81	-	7.96	-	-	7.66	-	7.83	-	7.89	7.52
Saturation pH (Calculated)			6.75	7.5	-	7.39	-	-	6.59	-	6.13	-	6.79	6.13
Langelier Index (Calculated)			0.934	0.309	-	0.571	-	-	1.07	-	1.7	-	1.1	1.39
Hardness (as CaCO3) (Calculated)	mg/L	0.5	394	128	-	205	-	-	460	-	1840	-	337	1270
Total Dissolved Solids	mg/L	10	418	280	-	160	-	-	564	-	568	-	368	924
Alkalinity (as CaCO3)	mg/L	5	330	167	-	135	-	-	437	-	315	-	351	469
Bicarbonate (as CaCO3)	mg/L	5	330	167	-	135	-	-	437	-	315	-	351	469
Carbonate (as CaCO3)	mg/L	5	<5	<5	-	<5	-	-	<5	-	<5	-	<5	<5
Hydroxide (as CaCO3)	mg/L	5	<5	<5	-	<5	-	-	<5	-	<5	-	<5	<5
Fluoride	mg/L	0.05	<0.05	0.37	-	0.24	-	-	<0.05	-	<0.05	-	<0.05	<0.05
Chloride	mg/L	0.10	30.3	61.6	-	8.07	-	-	78.9	-	189	-	2.72	200
Nitrate as N	mg/L	0.05	3.9	1.66	-	<0.05	-	-	<0.05	-	<0.05	-	<0.05	<0.05
Nitrite as N	mg/L	0.05	<0.05	0.93	-	<0.05	-	-	<0.05	-	<0.05	-	<0.05	<0.05
Bromide	mg/L	0.05	<0.05	<0.05	-	<0.05	-	-	<0.05	-	<0.05	-	<0.05	<0.05
Sulphate	mg/L	0.10	37.6	31.8	-	19	-	-	24	-	7.69	-	13.1	5.87
Ortho Phosphate as P	mg/L	0.10	<0.10	<0.10	-	<0.10	-	-	<0.10	-	<0.10	-	<0.10	<0.10
Ammonia as N	mg/L	0.02	0.06	0.08	-	<0.02	-	-	<0.02	-	0.02	-	<0.02	0.64
Ammonia-Un-ionized (Calculated)	mg/L	0.000002	0.00157	0.0028	-	<0.000002	-	-	<0.000002	-	0.000829	-	<0.000002	0.0133
Total Phosphorus	mg/L	0.02	<0.02	0.03	-	0.12	-	-	<0.02	-	1.38	-	<0.02	1.72
Total Organic Carbon	mg/L	0.5	1.3	1.2	-	7.1	-	-	2.7	-	5.5	-	4.6	13.1
True Colour	TCU	5	<5	<5	-	<2.50	-	-	<5	-	<5.00	-	<5.00	18.5
Turbidity	NTU	0.5	5.2	10	-	59.9	-	-	2	-	1430	-	45.1	645
Total Calcium	mg/L	0.32	107	23.4	-	61	-	-	145	-	626	-	128	455
Total Magnesium	mg/L	0.34	30.8	16.8	-	12.7	-	-	23.9	-	66.2	-	4.27	31.5
Total Potassium	mg/L	1.15	4.42	2.14	-	5.06	-	-	3.44	-	9.73	-	<1.15	6.39
Total Sodium	mg/L	0.45	22	82.9	-	44.9	-	-	58.4	-	102	-	20.9	92
Aluminum-dissolved	mg/L	0.004	<0.004	0.007	-	0.025	-	-	<0.004	-	<0.004	-	<0.004	<0.004
Total Antimony	mg/L	0.001	<0.001	0.002	-	<0.001	-	-	<0.001	-	<0.001	-	<0.001	<0.001
Total Arsenic	mg/L	0.003	<0.003	0.003	-	<0.003	-	-	<0.003	-	0.029	-	<0.003	0.008
Total Barium	mg/L	0.002	0.091	0.051	-	0.079	-	-	0.078	-	0.45	-	0.024	0.196
Total Beryllium	mg/L	0.001	<0.001	<0.001	-	<0.001	-	-	<0.001	-	0.001	-	<0.001	<0.001
Total Boron	mg/L	0.010	0.018	0.097	-	0.103	-	-	0.028	-	0.092	-	0.065	0.053
Total Cadmium	mg/L	0.0001	<0.0001	<0.0001	-	0.0002	-	-	<0.0001	-	0.0002	-	<0.0001	0.0001
Total Chromium	mg/L	0.003	<0.003	<0.003	-	0.005	-	-	<0.003	-	0.045	-	<0.003	0.026
Total Cobalt	mg/L	0.0005	<0.0005	<0.0005	-	**0.0012**	-	-	0.0005	-	**0.0178**	-	**0.0013**	**0.0186**
Total Copper	mg/L	0.001	0.001	0.001	-	**0.004**	-	-	<0.001	-	**0.05**	-	0.003	**0.034**

AGAT Work Order ID#			22T861744 / 22T861751	22T861744	22T861752	23T030999	23T030993	22T861747	22T861744	22T895412	22T894872	22T895413	22T895413	22T894872
Sampling Date			8-Feb-22	8-Feb-22	8-Feb-22	31-May-23	31-May-23	8-Feb-22	8-Feb-22	13-May-22	12-May-22	13-May-22	13-May-22	12-May-22
Well Location ID			BH 9-1	BH 10-1	BH 10-4	PDC-6	PDC-7	BH AIP-3	BH CN-1	BH CN-3	BH HRW-1	BH HRW-4	BH HRE-3	BH 2-1
Parameters	**Units**	**RDL**												
Total Iron	mg/L	0.010	0.163	**0.398**	-	**3.07**	-	-	0.143	-	**43.5**	-	**1.2**	**55.3**
Total Lead	mg/L	0.001	<0.001	<0.001	-	0.002	-	-	<0.001	-	0.022	-	<0.001	0.014
Total Manganese	mg/L	0.002	0.044	0.021	-	0.125	-	-	0.7	-	1.51	-	0.714	6.54
Dissolved Mercury	mg/L	0.0001	<0.0001	<0.0001	-	<0.0001	-	-	<0.0001	-	<0.0001	-	<0.0001	<0.0001
Total Molybdenum	mg/L	0.002	0.01	0.034	-	0.017	-	-	0.002	-	0.004	-	<0.002	0.003
Total Nickel	mg/L	0.003	<0.003	<0.003	-	**0.004**	-	-	0.004	-	**0.04**	-	<0.003	**0.031**
Total Selenium	mg/L	0.002	0.003	<0.002	-	<0.002	-	-	<0.002	-	0.01	-	<0.002	0.009
Total Silver	mg/L	0.0001	<0.0001	<0.0001	-	<0.0001	-	-	<0.0001	-	<0.0001	-	<0.0001	<0.0001
Total Strontium	mg/L	0.005	0.297	0.426	-	0.314	-	-	0.449	-	1.42	-	0.32	1.04
Total Thallium	mg/L	0.0003	<0.0003	<0.0003	-	<0.0003	-	-	<0.0003	-	**0.0005**	-	<0.0003	0.0003
Total Tin	mg/L	0.002	<0.002	0.005	-	0.014	-	-	0.002	-	<0.002	-	0.007	<0.002
Total Titanium	mg/L	0.010	<0.010	0.03	-	0.201	-	-	<0.010	-	1.39	-	0.042	0.957
Total Tungsten	mg/L	0.010	<0.010	<0.010	-	<0.010	-	-	<0.010	-	<0.010	-	<0.010	<0.010
Total Uranium	mg/L	0.002	<0.002	**0.012**	-	<0.002	-	-	<0.002	-	0.003	-	0.002	<0.002
Total Vanadium	mg/L	0.002	<0.002	0.002	-	**0.006**	-	-	<0.002	-	**0.07**	-	<0.002	**0.044**
Total Zinc	mg/L	0.020	<0.020	<0.020	-	**0.023**	-	-	<0.020	-	**0.1**	-	<0.020	**0.068**
Total Zirconium	mg/L	0.004	<0.004	<0.004	-	**<0.004**	-	-	<0.004	-	**0.01**	-	<0.004	**0.009**

AGAT Work Order ID#			22T861744 / 22T861751	22T861744	22T861752	23T030999	23T030993	22T861747	22T861744	22T895412	22T894872	22T895413	22T895413	22T894872
Sampling Date			8-Feb-22	8-Feb-22	8-Feb-22	31-May-23	31-May-23	8-Feb-22	8-Feb-22	13-May-22	12-May-22	13-May-22	13-May-22	12-May-22
Well Location ID			**BH 9-1**	**BH 10-1**	**BH 10-4**	**PDC-6**	**PDC-7**	**BH AIP-3**	**BH CN-1**	**BH CN-3**	**BH HRW-1**	**BH HRW-4**	**BH HRE-3**	**BH 2-1**
Parameters	**Units**	**RDL**												

Comments: RDL: Reported Detection Limit; Bold - Exceeds Storm Sewer; Shaded - Exceeds Sanitary Sewer

Standards: Table 1: Full Depth Background Site Condition Standards - Ground Water - All Types of Property Uses
The Regional Municipality of York - Limits for Sanitary Sewer Discharge [BY-LAW NO.2011-56]

Metals analysis completed on a filtered sample.

DDT total is a calculated parameter. The calculated value is the sum of op'DDT and pp'DDT.

DDD total is a calculated parameter. The calculated value is the sum of op'DDD and pp'DDD.

DDE total is a calculated parameter. The calculated value is the sum of op'DDE and pp'DDE.

Endosulfan total is a calculated parameter. The calculated value is the sum of Endosulfan I and Endosulfan II.

Chlordane total is a calculated parameter. The calculated value is the sum of Alpha-Chlordane and Gamma-Chlordane.

PCB total is a calculated parameter. The calculated value is the sum of Aroclor 1242, Aroclor 1248, Aroclor 1254 and Aroclor 1260.

The calculated parameters are non-accredited. The parameters that are components of the calculation are accredited.

Note: The result for Benzo(b)Fluoranthene is the total of the Benzo(b)&(j)Fluoranthene isomers because the isomers co-elute on the GC column.

PAHs: *2- and 1-Methyl Naphthalene is a calculated parameter. The calculated value is the sum of 2-Methyl Naphthalene and 1-Methyl Naphthalene. The calculated parameter is non-accredited. The parameters that are components of the calculation are accredited.*

Appendix C1: Unionized Ammonia Calculations

BH ID	Sampling Date	Water Temperature °C (Field)*1	pH (Field)*5	Total Ammonia From Laboratory Certificate of Analysis (mg/L)	Ambient Water Temperature in Kelvin (T)	pKa	*f*	Ammonia Un-ionized (Calculated) (mg/L)*4
				0.02*2				0.02*3
BH2-1	5/12/2022	10.60	7.25	0.02	283.76	9.70	0.003506	0.0001
BH HRW-1	5/12/2022	9.40	7.02	0.64	282.56	9.74	0.001882	0.0012
BH HRE-3	5/13/2022	11.70	7.21	<0.02	284.86	9.67	0.003483	-
BH9-1	2/8/2022	6.40	7.68	0.06	279.56	9.85	0.006745	0.0004
BH10-1	2/8/2022	3.90	7.81	0.08	277.06	9.94	0.007424	0.0006
BH PDC-6	5/31/2023	13.90	8.34	<0.02	287.05	9.59	0.052839	-
BH CN-1	2/8/2022	4.70	7.66	<0.02	277.86	9.91	0.005620	-

Notes:

*1 Water Temperature values obtained at the time of sample collection.

*2- Laboratory Reporting Detection Limit (RDL) for Total Ammonia = 0.02 mg/L.

*3- PWQO Threshold for Un-Ionized Ammonia = 0.02 mg/L.

*4- N/A = Un-Ionized Ammonia was not calculated for the sample of wells BH HRE-3 and BH CN-1 where the Total Ammonia Concentration was found to be below the Laboratory RDL.

*5 Due to water quality instrument malfunction, pH values obtained from laboratory results.

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: AECOM CANADA LTD
105 Commerce Valley Drive West 7th Floor
MARKHAM, ON L3T7W3
(905) 886-7022
ATTENTION TO: Brian Holden
PROJECT: 60636190
AGAT WORK ORDER: 22T861744
WATER ANALYSIS REVIEWED BY: Yris Verastegui, Report Reviewer
DATE REPORTED: Feb 16, 2022
PAGES (INCLUDING COVER): 10
VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

Notes

Disclaimer:

- *All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.*
- *All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.*
- *AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.*
- *This Certificate shall not be reproduced except in full, without the written approval of the laboratory.*
- *The test results reported herewith relate only to the samples as received by the laboratory.*
- *Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.*
- *All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.*

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 22T861744

PROJECT: 60636190

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Brian Holden

SAMPLING SITE:

SAMPLED BY:

Water Quality Assessment - PWQO (mg/L)

DATE RECEIVED: 2022-02-08

DATE REPORTED: 2022-02-16

SAMPLE DESCRIPTION:				BH9-1	BH10-1		BHCN-1
SAMPLE TYPE:				Water	Water		Water
DATE SAMPLED:				2022-02-08 09:30	2022-02-08 10:45		2022-02-08 13:00
Parameter	Unit	G / S	RDL	3495250	3495271	RDL	3495272
Electrical Conductivity	µS/cm		2	762	589	2	1050
pH	pH Units	6.5-8.5	NA	7.68	7.81	NA	7.66
Saturation pH (Calculated)				6.75	7.50		6.59
Langelier Index (Calculated)				0.934	0.309		1.07
Hardness (as CaCO3) (Calculated)	mg/L		0.5	394	128	0.5	460
Total Dissolved Solids	mg/L		10	418	280	10	564
Alkalinity (as CaCO3)	mg/L		5	330	167	5	437
Bicarbonate (as CaCO3)	mg/L		5	330	167	5	437
Carbonate (as CaCO3)	mg/L		5	<5	<5	5	<5
Hydroxide (as CaCO3)	mg/L		5	<5	<5	5	<5
Fluoride	mg/L		0.05	<0.05	0.37	0.05	<0.05
Chloride	mg/L		0.10	30.3	61.6	0.12	78.9
Nitrate as N	mg/L		0.05	3.90	1.66	0.05	<0.05
Nitrite as N	mg/L		0.05	<0.05	0.93	0.05	<0.05
Bromide	mg/L		0.05	<0.05	<0.05	0.05	<0.05
Sulphate	mg/L		0.10	37.6	31.8	0.10	24.0
Ortho Phosphate as P	mg/L		0.10	<0.10	<0.10	0.10	<0.10
Ammonia as N	mg/L		0.02	0.06	0.08	0.02	<0.02
Ammonia-Un-ionized (Calculated)	mg/L	0.02	0.000002	0.00157	0.00280	0.000002	<0.000002
Total Phosphorus	mg/L	*	0.02	<0.02	0.03	0.02	<0.02
Total Organic Carbon	mg/L		0.5	1.3	1.2	0.5	2.7
True Colour	TCU		5	<5	<5	5	<5
Turbidity	NTU		0.5	5.2	10.0	0.5	2.0
Total Calcium	mg/L		0.32	107	23.4	0.32	145
Total Magnesium	mg/L		0.34	30.8	16.8	0.34	23.9
Total Potassium	mg/L		1.15	4.42	2.14	1.15	3.44
Total Sodium	mg/L		0.45	22.0	82.9	0.45	58.4
Aluminum-dissolved	mg/L	*	0.004	<0.004	0.007	0.004	<0.004
Total Antimony	mg/L	0.020	0.001	<0.001	0.002	0.001	<0.001

Certified By: Iris Verástegui

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 22T861744

PROJECT: 60636190

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Brian Holden

SAMPLING SITE:

SAMPLED BY:

Water Quality Assessment - PWQO (mg/L)

DATE RECEIVED: 2022-02-08

DATE REPORTED: 2022-02-16

SAMPLE DESCRIPTION:				BH9-1	BH10-1		BHCN-1
SAMPLE TYPE:				Water	Water		Water
DATE SAMPLED:				2022-02-08 09:30	2022-02-08 10:45		2022-02-08 13:00
Parameter	Unit	G / S	RDL	3495250	3495271	RDL	3495272
Total Arsenic	mg/L	0.1	0.003	<0.003	0.003	0.003	<0.003
Total Barium	mg/L		0.002	0.091	0.051	0.002	0.078
Total Beryllium	mg/L	*	0.001	<0.001	<0.001	0.001	<0.001
Total Boron	mg/L	0.2	0.010	0.018	0.097	0.010	0.028
Total Cadmium	mg/L	0.0002	0.0001	<0.0001	<0.0001	0.0001	<0.0001
Total Chromium	mg/L		0.003	<0.003	<0.003	0.003	<0.003
Total Cobalt	mg/L	0.0009	0.0005	<0.0005	<0.0005	0.0005	0.0005
Total Copper	mg/L	0.005	0.001	0.001	0.001	0.001	<0.001
Total Iron	mg/L	0.3	0.010	0.163	**0.398**	0.010	0.143
Total Lead	mg/L	*	0.001	<0.001	<0.001	0.001	<0.001
Total Manganese	mg/L		0.002	0.044	0.021	0.002	0.700
Dissolved Mercury	mg/L	0.0002	0.0001	<0.0001	<0.0001	0.0001	<0.0001
Total Molybdenum	mg/L	0.040	0.002	0.010	0.034	0.002	0.002
Total Nickel	mg/L	0.025	0.003	<0.003	<0.003	0.003	0.004
Total Selenium	mg/L	0.1	0.002	0.003	<0.002	0.002	<0.002
Total Silver	mg/L	0.0001	0.0001	<0.0001	<0.0001	0.0001	<0.0001
Total Strontium	mg/L		0.005	0.297	0.426	0.005	0.449
Total Thallium	mg/L	0.0003	0.0003	<0.0003	<0.0003	0.0003	<0.0003
Total Tin	mg/L		0.002	<0.002	0.005	0.002	0.002
Total Titanium	mg/L		0.010	<0.010	0.030	0.010	<0.010
Total Tungsten	mg/L	0.030	0.010	<0.010	<0.010	0.010	<0.010
Total Uranium	mg/L	0.005	0.002	<0.002	**0.012**	0.002	<0.002
Total Vanadium	mg/L	0.006	0.002	<0.002	0.002	0.002	<0.002
Total Zinc	mg/L	0.030	0.020	<0.020	<0.020	0.020	<0.020
Total Zirconium	mg/L	0.004	0.004	<0.004	<0.004	0.004	<0.004
Lab Filtration mercury				2022/02/10	2022/02/10		2022/02/10
Lab Filtration Aluminum Dissolved				2022/02/10	2022/02/10		2022/02/10

Certified By: Iris Verástegui

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 22T861744

PROJECT: 60636190

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Brian Holden

SAMPLING SITE:

SAMPLED BY:

Water Quality Assessment - PWQO (mg/L)

DATE RECEIVED: 2022-02-08

DATE REPORTED: 2022-02-16

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to PWQO * Variable - refer to guideline reference document
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

3495250-3495272 Diss.Al and Diss.Hg analysis completed on a lab filtered sample.

Dilution required, RDL has been increased accordingly.

Un-ionized Ammonia detection limit is a calculated RDL. The calculation of Un-ionized Ammonia is based on lab measured parameters (ammonia as N, pH and temperature).Values are reported as calculated.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: Iris Verástegui

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Exceedance Summary

AGAT WORK ORDER: 22T861744

PROJECT: 60636190

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Brian Holden

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
3495271	BH10-1	ON PWQO	Water Quality Assessment - PWQO (mg/L)	Total Iron	mg/L	0.3	0.398
3495271	BH10-1	ON PWQO	Water Quality Assessment - PWQO (mg/L)	Total Uranium	mg/L	0.005	0.012

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: AECOM CANADA LTD

AGAT WORK ORDER: 22T861744

PROJECT: 60636190

ATTENTION TO: Brian Holden

SAMPLING SITE:

SAMPLED BY:

Water Analysis

RPT Date: Feb 16, 2022

PARAMETER	Batch	Sample Id	DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
			Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Water Quality Assessment - PWQO (mg/L)															
Electrical Conductivity	3495924		868	868	0.0%	< 2	97%	90%	110%						
pH	3495924		7.48	7.52	0.5%	NA	102%	90%	110%						
Total Dissolved Solids	3495250	3495250	418	424	1.4%	< 10	98%	80%	120%						
Alkalinity (as CaCO3)	3495924		78	79	1.3%	< 5	97%	80%	120%						
Bicarbonate (as CaCO3)	3495924		78	79	1.3%	< 5	NA								
Carbonate (as CaCO3)	3495924		<5	<5	NA	< 5	NA								
Hydroxide (as CaCO3)	3495924		<5	<5	NA	< 5	NA								
Fluoride	3494437		<0.05	<0.05	NA	< 0.05	101%	70%	130%	102%	80%	120%	104%	70%	130%
Chloride	3494437		109	118	7.9%	< 0.10	97%	70%	130%	109%	80%	120%	107%	70%	130%
Nitrate as N	3494437		1.10	1.19	7.9%	< 0.05	94%	70%	130%	104%	80%	120%	102%	70%	130%
Nitrite as N	3494437		0.06	<0.05	NA	< 0.05	95%	70%	130%	93%	80%	120%	100%	70%	130%
Bromide	3494437		<0.05	<0.05	NA	< 0.05	104%	70%	130%	101%	80%	120%	103%	70%	130%
Sulphate	3494437		175	188	7.2%	< 0.10	97%	70%	130%	103%	80%	120%	NA	70%	130%
Ortho Phosphate as P	3494437		<0.10	<0.10	NA	< 0.10	94%	70%	130%	97%	80%	120%	96%	70%	130%
Ammonia as N	3496875		<0.02	<0.02	NA	< 0.02	106%	70%	130%	102%	80%	120%	92%	70%	130%
Total Phosphorus	3496363		14.2	14.1	0.7%	< 0.02	97%	70%	130%	97%	80%	120%	NA	70%	130%
Total Organic Carbon	3495250	3495250	1.3	1.2	NA	< 0.5	96%	90%	110%	98%	90%	110%	96%	80%	120%
True Colour	3484205		<5	<5	NA	< 5	98%	90%	110%						
Turbidity	3495250	3495250	5.2	5.3	1.9%	< 0.5	99%	80%	120%						
Total Calcium	3501486		43.3	39.1	10.2%	< 0.10	99%	70%	130%	99%	80%	120%	104%	70%	130%
Total Magnesium	3501486		6.33	5.72	10.1%	< 0.10	101%	70%	130%	102%	80%	120%	106%	70%	130%
Total Potassium	3501486		4.25	3.16	29.4%	< 0.50	99%	70%	130%	100%	80%	120%	106%	70%	130%
Total Sodium	3501486		694	640	8.1%	< 0.10	98%	70%	130%	98%	80%	120%	NA	70%	130%
Aluminum-dissolved	3495250	3495250	<0.004	<0.004	NA	< 0.004	108%	70%	130%	112%	80%	120%	103%	70%	130%
Total Antimony	3501728		2.41	2.50	3.7%	< 0.001	100%	70%	130%	101%	80%	120%	103%	70%	130%
Total Arsenic	3501728		0.110	0.112	1.8%	< 0.003	95%	70%	130%	95%	80%	120%	91%	70%	130%
Total Barium	3501728		0.016	0.016	0.0%	< 0.002	99%	70%	130%	102%	80%	120%	99%	70%	130%
Total Beryllium	3501728		<0.002	<0.002	NA	< 0.001	105%	70%	130%	98%	80%	120%	79%	70%	130%
Total Boron	3501728		13.7	14.3	4.3%	< 0.010	105%	70%	130%	98%	80%	120%	87%	70%	130%
Total Cadmium	3501728		27.4	28.1	2.5%	< 0.0001	99%	70%	130%	96%	80%	120%	91%	70%	130%
Total Chromium	3501728		0.610	0.619	1.5%	< 0.003	102%	70%	130%	97%	80%	120%	110%	70%	130%
Total Cobalt	3501728		0.325	0.325	0.0%	< 0.0005	104%	70%	130%	99%	80%	120%	106%	70%	130%
Total Copper	3501728		0.959	0.955	0.4%	< 0.001	101%	70%	130%	99%	80%	120%	99%	70%	130%
Total Iron	3501728		136	138	1.5%	< 0.010	102%	70%	130%	96%	80%	120%	113%	70%	130%
Total Lead	3501728		3.76	3.88	3.1%	< 0.001	101%	70%	130%	94%	80%	120%	100%	70%	130%
Total Manganese	3501728		2.94	2.89	1.7%	< 0.002	105%	70%	130%	100%	80%	120%	99%	70%	130%
Dissolved Mercury	3495250	3495250	<0.0001	<0.0001	NA	< 0.0001	101%	70%	130%	99%	80%	120%	99%	70%	130%
Total Molybdenum	3501728		0.027	0.027	0.0%	< 0.002	106%	70%	130%	101%	80%	120%	113%	70%	130%
Total Nickel	3501728		8.52	8.65	1.5%	< 0.003	105%	70%	130%	98%	80%	120%	96%	70%	130%

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: AECOM CANADA LTD

AGAT WORK ORDER: 22T861744

PROJECT: 60636190

ATTENTION TO: Brian Holden

SAMPLING SITE:

SAMPLED BY:

Water Analysis (Continued)

RPT Date: Feb 16, 2022			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Total Selenium	3501728		0.159	0.134	17.1%	< 0.002	103%	70%	130%	103%	80%	120%	89%	70%	130%
Total Silver	3501728		0.0058	0.0058	0.0%	< 0.0001	102%	70%	130%	100%	80%	120%	98%	70%	130%
Total Strontium	3501728		0.456	0.465	2.0%	< 0.005	104%	70%	130%	97%	80%	120%	108%	70%	130%
Total Thallium	3501728		0.134	0.135	0.7%	< 0.0003	100%	70%	130%	96%	80%	120%	97%	70%	130%
Total Tin	3501728		0.388	0.392	1.0%	< 0.002	95%	70%	130%	93%	80%	120%	108%	70%	130%
Total Titanium	3501728		0.081	0.070	14.6%	< 0.010	103%	70%	130%	95%	80%	120%	111%	70%	130%
Total Tungsten	3501728		<0.020	<0.020	NA	< 0.010	94%	70%	130%	84%	80%	120%	98%	70%	130%
Total Uranium	3501728		<0.004	<0.004	NA	< 0.002	104%	70%	130%	97%	80%	120%	108%	70%	130%
Total Vanadium	3501728		0.030	0.030	0.0%	< 0.002	105%	70%	130%	98%	80%	120%	110%	70%	130%
Total Zinc	3501728		8.05	8.10	0.6%	< 0.020	109%	70%	130%	115%	80%	120%	113%	70%	130%
Total Zirconium	3501728		0.012	0.011	NA	< 0.004	103%	70%	130%	99%	80%	120%	109%	70%	130%

Comments: NA signifies Not Applicable.
Duplicate NA: results are under 5X the RDL and will not be calculated.
Matrix spike NA: Spike level < native concentration. Matrix spike acceptance limits do not apply and are not calculated.

Certified By: Iris Verástegui

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Method Summary

CLIENT NAME: AECOM CANADA LTD

AGAT WORK ORDER: 22T861744

PROJECT: 60636190

ATTENTION TO: Brian Holden

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Electrical Conductivity	INOR-93-6000	modified from SM 2510 B	PC TITRATE
pH	INOR-93-6000	modified from SM 4500-H+ B	PC TITRATE
Saturation pH (Calculated)		SM 2320 B	CALCULATION
Langelier Index (Calculated)		SM 2330B	CALCULATION
Hardness (as CaCO3) (Calculated)	MET-93-6105	modified from EPA SW-846 6010C & 200.7 & SM 2340 B	CALCULATION
Total Dissolved Solids	INOR-93-6028	modified from EPA 1684,ON MOECC E3139,SM 2540C,D	BALANCE
Alkalinity (as CaCO3)	INOR-93-6000	Modified from SM 2320 B	PC TITRATE
Bicarbonate (as CaCO3)	INOR-93-6000	modified from SM 2320 B	PC TITRATE
Carbonate (as CaCO3)	INOR-93-6000	modified from SM 2320 B	PC TITRATE
Hydroxide (as CaCO3)	INOR-93-6000	modified from SM 2320 B	PC TITRATE
Fluoride	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Chloride	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Nitrate as N	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Bromide	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Ortho Phosphate as P	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-93-6059	modified from SM 4500-NH3 H	LACHAT FIA
Ammonia-Un-ionized (Calculated)		MOE REFERENCE, PWQOs Tab 2	CALCULATION
Total Phosphorus	INOR-93-6022	modified from SM 4500-P B and SM 4500-P E	SPECTROPHOTOMETER
Total Organic Carbon	INOR-93-6049	modified from SM 5310 B	SHIMADZU CARBON ANALYZER
True Colour	INOR-93-6074	modified from SM 2120 B	LACHAT FIA
Turbidity	INOR-93-6044	modified from SM 2130 B	NEPHELOMETER
Total Calcium	MET-93-6105	modified from EPA 6010D	ICP/OES
Total Magnesium	MET-93-6105	modified from EPA 6010D	ICP/OES
Total Potassium	MET-93-6105	modified from EPA 6010D	ICP/OES
Total Sodium	MET-93-6105	modified from EPA 6010D	ICP/OES
Aluminum-dissolved	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Total Antimony	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Arsenic	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Barium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Beryllium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Boron	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Cadmium	MET -93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Chromium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Cobalt	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Copper	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Iron	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Method Summary

CLIENT NAME: AECOM CANADA LTD

AGAT WORK ORDER: 22T861744

PROJECT: 60636190

ATTENTION TO: Brian Holden

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Total Lead	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Manganese	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Dissolved Mercury	MET-93-6100	modified from EPA 245.2 and SM 3112 B	CVAAS
Total Molybdenum	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Nickel	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Selenium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Silver	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Strontium	INOR-93-6003	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Thallium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Tin	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Titanium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Tungsten	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Uranium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Vanadium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Zinc	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Zirconium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Lab Filtration mercury	SR-78-9001		FILTRATION
Lab Filtration Aluminum Dissolved	SR-78-9001		FILTRATION

AGAT Laboratories
5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water consumed by humans)

Report Information:

Company: AECOM Canada Ltd
Contact: Brian Holden / Dhwanish Parikh
Address: 105 Commerce Valley Dr W, 7th Floor
Markham, ON
Phone: 416 620 5590 Fax:
Reports to be sent to:
1. Email: dhwanish.parikh@aecom.com
2. Email: Brian.Holden@aecom.com

Project Information:

Project: 60636190
Site Location: Bradford Bypass (BBP)
Sampled By: Dhwanish Parikh
AGAT Quote #: PO:
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☒ No ☐
Company:
Contact:
Address:
Email:

Regulatory Requirements:

(Please check all applicable boxes)

☐ Regulation 153/04
Table _____ *Indicate One*
☐ Ind/Com
☐ Res/Park
☐ Agriculture
Soil Texture *(Check One)*
☐ Coarse
☐ Fine

☐ Excess Soils R406
Table _____ *Indicate One*
☐ Regulation 558
☐ CCME

☐ Sewer Use
☐ Sanitary ☐ Storm
_____ *Region*
☒ Prov. Water Quality Objectives (PWQO)
☐ Other
_____ *Indicate One*

Is this submission for a **Record of Site Condition?** ☐ Yes ☒ No

Report Guideline on *Certificate of Analysis* ☒ Yes ☐ No

Laboratory Use Only

Work Order #: 22T861744
Cooler Quantity: 1 Med Blue Tree ice
Arrival Temperatures: 1.8 / 1.3 / 1.9
Custody Seal Intact: ☐ Yes ☐ No ☐ N/A
Notes:

Turnaround Time (TAT) Required:

Regular TAT ☒ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day

OR Date Required (Rush Surcharges May Apply):

Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

For 'Same Day' analysis, please contact your AGAT CPM

Sample Matrix Legend

B	Biota
GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI, DOC Y/N	O. Reg 153: Metals & Inorganics	O. Reg 153: Metals - ☐ CrVI, ☐ Hg, ☐ HWSB	O. Reg 153: BTEX, F1-F4 PHCs Analyze F4G if required ☐ Yes ☐ No	O. Reg 153: PAHs	O. Reg 153: PCBs	O. Reg 153: VOC	O. Reg 558: Landfill Disposal Characterization TCLP: ☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐ PCBs	O. Reg 406: Excess Soils SPLP Rainwater Leach SPLP: ☐ Metals ☐ VOCs ☐ SVOCs	O. Reg 406: Excess Soils Characterization Package pH, ICPMS Metals, BTEX, F1-F4	Salt - EC/SAR	WBM (PWQO)	Potentially Hazardous or High Concentration (Y/N)
BH 9-1	Feb 8, 2022	9:30 AM PM	8	GW												X	
BH 10-1		10:45 AM PM														X	
BH CN-1		1:00 AM PM														X	
		AM PM															
		AM PM															
		AM PM															
		AM PM															
		AM PM															
		AM PM															
		AM PM															
		AM PM															

Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time
Dhwanish Parikh	Feb 8, 2022	3:00	Neil Ramnarain		

'22 FEB 8 4:38PM

Page _____ of _____

Nº: T 130722

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: AECOM CANADA LTD
50 SPORTSWORLD CROSSING RD UNIT 290
KITCHENER, ON N2P0A4
(519) 650-5313

ATTENTION TO: Brian Holden

PROJECT: Bradford Bypass (60636190)

AGAT WORK ORDER: 23T030999

WATER ANALYSIS REVIEWED BY: Nivine Basily, Inorganics Report Writer

DATE REPORTED: Jun 08, 2023

PAGES (INCLUDING COVER): 10

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

Notes

Disclaimer:

- *All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.*
- *All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.*
- *AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.*
- *This Certificate shall not be reproduced except in full, without the written approval of the laboratory.*
- *The test results reported herewith relate only to the samples as received by the laboratory.*
- *Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.*
- *All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.*
- *For environmental samples in the Province of Quebec: The analysis is performed on and results apply to samples as received. A temperature above 6°C upon receipt, as indicated in the Sample Reception Notification (SRN), could indicate the integrity of the samples has been compromised if the delay between sampling and submission to the laboratory could not be minimized.*

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 23T030999

PROJECT: Bradford Bypass (60636190)

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Brian Holden

SAMPLING SITE:Bradford

SAMPLED BY:Sebastian Hackbusch

Water Quality Assessment - PWQO (mg/L)

DATE RECEIVED: 2023-06-01

DATE REPORTED: 2023-06-08

		SAMPLE DESCRIPTION:		PDC6
		SAMPLE TYPE:		Water
		DATE SAMPLED:		2023-05-31 14:00
Parameter	Unit	G / S	RDL	5032248
Electrical Conductivity	µS/cm		2	282
pH	pH Units	6.5-8.5	NA	7.96
Saturation pH (Calculated)				7.39
Langelier Index (Calculated)				0.571
Hardness (as CaCO3) (Calculated)	mg/L		0.5	205
Total Dissolved Solids	mg/L		10	160
Alkalinity (as CaCO3)	mg/L		5	135
Bicarbonate (as CaCO3)	mg/L		5	135
Carbonate (as CaCO3)	mg/L		5	<5
Hydroxide (as CaCO3)	mg/L		5	<5
Fluoride	mg/L		0.05	0.24
Chloride	mg/L		0.10	8.07
Nitrate as N	mg/L		0.05	<0.05
Nitrite as N	mg/L		0.05	<0.05
Bromide	mg/L		0.05	<0.05
Sulphate	mg/L		0.10	19.0
Ortho Phosphate as P	mg/L		0.10	<0.10
Ammonia as N	mg/L		0.02	<0.02
Ammonia-Un-ionized (Calculated)	mg/L	0.02	0.000002	<0.000002
Total Phosphorus	mg/L	*	0.02	0.12
Total Organic Carbon	mg/L		0.5	7.1
True Colour	TCU		2.50	<2.50
Turbidity	NTU		0.5	59.9
Total Calcium	mg/L		0.20	61.0
Total Magnesium	mg/L		0.10	12.7
Total Potassium	mg/L		0.50	5.06
Total Sodium	mg/L		0.10	44.9
Aluminum-dissolved	mg/L	*	0.004	0.025
Total Antimony	mg/L	0.020	0.001	<0.001

Certified By:

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 23T030999

PROJECT: Bradford Bypass (60636190)

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Brian Holden

SAMPLING SITE:Bradford

SAMPLED BY:Sebastian Hackbusch

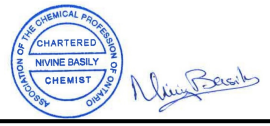
Water Quality Assessment - PWQO (mg/L)

DATE RECEIVED: 2023-06-01

DATE REPORTED: 2023-06-08

		SAMPLE DESCRIPTION:		PDC6
		SAMPLE TYPE:		Water
		DATE SAMPLED:		2023-05-31 14:00
Parameter	Unit	G / S	RDL	5032248
Total Arsenic	mg/L	0.1	0.003	<0.003
Total Barium	mg/L		0.002	0.079
Total Beryllium	mg/L	*	0.001	<0.001
Total Boron	mg/L	0.2	0.010	0.103
Total Cadmium	mg/L	0.0002	0.0001	0.0002
Total Chromium	mg/L		0.003	0.005
Total Cobalt	mg/L	0.0009	0.0005	**0.0012**
Total Copper	mg/L	0.005	0.001	0.004
Total Iron	mg/L	0.3	0.010	**3.07**
Total Lead	mg/L	*	0.001	0.002
Total Manganese	mg/L		0.002	0.125
Dissolved Mercury	mg/L	0.0002	0.0001	<0.0001
Total Molybdenum	mg/L	0.040	0.002	0.017
Total Nickel	mg/L	0.025	0.003	0.004
Total Selenium	mg/L	0.1	0.002	<0.002
Total Silver	mg/L	0.0001	0.0001	<0.0001
Total Strontium	mg/L		0.005	0.314
Total Thallium	mg/L	0.0003	0.0003	<0.0003
Total Tin	mg/L		0.002	0.014
Total Titanium	mg/L		0.010	0.201
Total Tungsten	mg/L	0.030	0.010	<0.010
Total Uranium	mg/L	0.005	0.002	<0.002
Total Vanadium	mg/L	0.006	0.002	0.006
Total Zinc	mg/L	0.030	0.020	0.023
Total Zirconium	mg/L	0.004	0.004	<0.004
Lab Filtration Aluminum Dissolved				2023/06/05
Lab Filtration mercury				2023/06/05

Certified By:



AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 23T030999

PROJECT: Bradford Bypass (60636190)

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Brian Holden

SAMPLING SITE:Bradford

SAMPLED BY:Sebastian Hackbusch

Water Quality Assessment - PWQO (mg/L)

DATE RECEIVED: 2023-06-01 **DATE REPORTED: 2023-06-08**

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to PWQO * Variable - refer to guideline reference document
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

5032248 Diss.Al and Diss.Hg analysis completed on a lab filtered sample.

The calculation of Un-ionized Ammonia was based on lab measured parameters (pH and temperature) rather than the field parameters; these were not provided to the lab. The temperature is recorded at the time of pH measurement. Values are reported as calculated.

Un-ionized Ammonia detection limit is a calculated RDL

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Exceedance Summary

AGAT WORK ORDER: 23T030999

PROJECT: Bradford Bypass (60636190)

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Brian Holden

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
5032248	PDC6	ON PWQO	Water Quality Assessment - PWQO (mg/L)	Total Cobalt	mg/L	0.0009	0.0012
5032248	PDC6	ON PWQO	Water Quality Assessment - PWQO (mg/L)	Total Iron	mg/L	0.3	3.07

AGAT Laboratories
5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: AECOM CANADA LTD
AGAT WORK ORDER: 23T030999
PROJECT: Bradford Bypass (60636190)
ATTENTION TO: Brian Holden
SAMPLING SITE:Bradford
SAMPLED BY:Sebastian Hackbusch

Water Analysis

RPT Date: Jun 08, 2023

PARAMETER	Batch	Sample Id	DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
			Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Water Quality Assessment - PWQO (mg/L)															
Electrical Conductivity	5030464		867	869	0.2%	< 2	99%	90%	110%						
pH	5030464		7.98	8.04	0.7%	NA	100%	90%	110%						
Total Dissolved Solids	5032412		402	412	2.5%	< 10	100%	80%	120%						
Alkalinity (as CaCO3)	5030464		354	356	0.6%	< 5	102%	80%	120%						
Bicarbonate (as CaCO3)	5030464		354	356	0.6%	< 5	NA								
Carbonate (as CaCO3)	5030464		<5	<5	NA	< 5	NA								
Hydroxide (as CaCO3)	5030464		<5	<5	NA	< 5	NA								
Fluoride	5029184		<0.05	<0.05	NA	< 0.05	100%	70%	130%	105%	80%	120%	100%	70%	130%
Chloride	5029184		68.7	68.7	0.0%	< 0.10	94%	70%	130%	104%	80%	120%	103%	70%	130%
Nitrate as N	5029184		0.56	0.57	1.8%	< 0.05	95%	70%	130%	102%	80%	120%	98%	70%	130%
Nitrite as N	5029184		<0.05	<0.05	NA	< 0.05	100%	70%	130%	98%	80%	120%	99%	70%	130%
Bromide	5029184		<0.05	<0.05	NA	< 0.05	107%	70%	130%	98%	80%	120%	94%	70%	130%
Sulphate	5029184		31.6	31.5	0.3%	< 0.10	97%	70%	130%	105%	80%	120%	100%	70%	130%
Ortho Phosphate as P	5029184		<0.10	<0.10	NA	< 0.10	105%	70%	130%	102%	80%	120%	105%	70%	130%
Ammonia as N	5034058		<0.02	<0.02	NA	< 0.02	100%	70%	130%	103%	80%	120%	103%	70%	130%
Total Phosphorus	5033578		<0.02	<0.02	NA	< 0.02	99%	70%	130%	104%	80%	120%	97%	70%	130%
Total Organic Carbon	5034641		2.1	2.1	NA	< 0.5	92%	90%	110%	102%	90%	110%	93%	80%	120%
True Colour	5030079		17.6	17.2	2.3%	< 2.5	95%	90%	110%						
Total Calcium	5032248	5032248	61.0	62.8	2.9%	< 0.20	97%	70%	130%	104%	80%	120%	97%	70%	130%
Total Magnesium	5032248	5032248	12.7	12.8	0.8%	< 0.10	104%	70%	130%	101%	80%	120%	101%	70%	130%
Total Potassium	5032248	5032248	5.06	4.49	11.9%	< 0.50	98%	70%	130%	104%	80%	120%	103%	70%	130%
Total Sodium	5032248	5032248	44.9	45.3	0.9%	< 0.10	106%	70%	130%	108%	80%	120%	115%	70%	130%
Aluminum-dissolved	5035208		0.008	0.007	NA	< 0.004	108%	70%	130%	92%	80%	120%	110%	70%	130%
Total Antimony	5032248	5032248	<0.001	<0.001	NA	< 0.001	98%	70%	130%	101%	80%	120%	103%	70%	130%
Total Arsenic	5032248	5032248	<0.003	<0.003	NA	< 0.003	100%	70%	130%	104%	80%	120%	110%	70%	130%
Total Barium	5032248	5032248	0.079	0.084	6.1%	< 0.002	99%	70%	130%	99%	80%	120%	102%	70%	130%
Total Beryllium	5032248	5032248	<0.001	<0.001	NA	< 0.001	93%	70%	130%	92%	80%	120%	92%	70%	130%
Total Boron	5032248	5032248	0.103	0.102	1.0%	< 0.010	101%	70%	130%	103%	80%	120%	98%	70%	130%
Total Cadmium	5032248	5032248	0.0002	0.0002	NA	< 0.0001	99%	70%	130%	101%	80%	120%	102%	70%	130%
Total Chromium	5032248	5032248	0.005	0.006	NA	< 0.003	105%	70%	130%	95%	80%	120%	95%	70%	130%
Total Cobalt	5032248	5032248	0.0012	0.0011	NA	< 0.0005	90%	70%	130%	102%	80%	120%	96%	70%	130%
Total Copper	5032248	5032248	0.004	0.004	NA	< 0.001	98%	70%	130%	98%	80%	120%	100%	70%	130%
Total Iron	5032248	5032248	3.07	3.08	0.3%	< 0.010	94%	70%	130%	104%	80%	120%	103%	70%	130%
Total Lead	5032248	5032248	0.002	0.002	NA	< 0.001	97%	70%	130%	96%	80%	120%	99%	70%	130%
Total Manganese	5032248	5032248	0.125	0.140	11.3%	< 0.002	94%	70%	130%	99%	80%	120%	99%	70%	130%
Dissolved Mercury	5032248	5032248	<0.0001	<0.0001	NA	< 0.0001	99%	70%	130%	98%	80%	120%	100%	70%	130%
Total Molybdenum	5032248	5032248	0.017	0.015	12.5%	< 0.002	99%	70%	130%	104%	80%	120%	105%	70%	130%
Total Nickel	5032248	5032248	0.004	0.004	NA	< 0.003	91%	70%	130%	98%	80%	120%	94%	70%	130%
Total Selenium	5032248	5032248	<0.002	<0.002	NA	< 0.002	99%	70%	130%	94%	80%	120%	97%	70%	130%

AGAT Laboratories
5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: AECOM CANADA LTD
AGAT WORK ORDER: 23T030999
PROJECT: Bradford Bypass (60636190)
ATTENTION TO: Brian Holden
SAMPLING SITE:Bradford
SAMPLED BY:Sebastian Hackbusch

Water Analysis (Continued)

RPT Date: Jun 08, 2023			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Total Silver	5032248	5032248	<0.0001	<0.0001	NA	< 0.0001	92%	70%	130%	97%	80%	120%	95%	70%	130%
Total Strontium	5032248	5032248	0.314	0.325	3.4%	< 0.005	102%	70%	130%	110%	80%	120%	120%	70%	130%
Total Thallium	5032248	5032248	<0.0003	<0.0003	NA	< 0.0003	99%	70%	130%	100%	80%	120%	104%	70%	130%
Total Tin	5032248	5032248	0.014	0.015	6.9%	< 0.002	98%	70%	130%	99%	80%	120%	105%	70%	130%
Total Titanium	5032248	5032248	0.201	0.166	19.1%	< 0.010	106%	70%	130%	105%	80%	120%	106%	70%	130%
Total Tungsten	5032248	5032248	<0.010	<0.010	NA	< 0.010	97%	70%	130%	102%	80%	120%	108%	70%	130%
Total Uranium	5032248	5032248	<0.002	<0.002	NA	< 0.002	97%	70%	130%	100%	80%	120%	105%	70%	130%
Total Vanadium	5032248	5032248	0.006	0.006	NA	< 0.002	94%	70%	130%	96%	80%	120%	98%	70%	130%
Total Zinc	5032248	5032248	0.023	<0.020	NA	< 0.020	99%	70%	130%	97%	80%	120%	99%	70%	130%
Total Zirconium	5032248	5032248	<0.004	<0.004	NA	< 0.004	104%	70%	130%	105%	80%	120%	114%	70%	130%

Comments: NA signifies Not Applicable.
Duplicate NA: results are under 5X the RDL and will not be calculated.

Certified By:

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Method Summary

CLIENT NAME: AECOM CANADA LTD

AGAT WORK ORDER: 23T030999

PROJECT: Bradford Bypass (60636190)

ATTENTION TO: Brian Holden

SAMPLING SITE:Bradford

SAMPLED BY:Sebastian Hackbusch

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Electrical Conductivity	INOR-93-6000	modified from SM 2510 B	PC TITRATE
pH	INOR-93-6000	modified from SM 4500-H+ B	PC TITRATE
Saturation pH (Calculated)		SM 2320 B	CALCULATION
Langelier Index (Calculated)		SM 2330B	CALCULATION
Hardness (as CaCO3) (Calculated)	MET-93-6105	modified from EPA SW-846 6010C & 200.7 & SM 2340 B	CALCULATION
Total Dissolved Solids	INOR-93-6028	modified from EPA 1684,ON MOECC E3139,SM 2540C,D	BALANCE
Alkalinity (as CaCO3)	INOR-93-6000	Modified from SM 2320 B	PC TITRATE
Bicarbonate (as CaCO3)	INOR-93-6000	modified from SM 2320 B	PC TITRATE
Carbonate (as CaCO3)	INOR-93-6000	modified from SM 2320 B	PC TITRATE
Hydroxide (as CaCO3)	INOR-93-6000	modified from SM 2320 B	PC TITRATE
Fluoride	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Chloride	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Nitrate as N	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Bromide	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Ortho Phosphate as P	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-93-6059	modified from SM 4500-NH3 H	LACHAT FIA
Ammonia-Un-ionized (Calculated)		MOE REFERENCE, PWQOs Tab 2	CALCULATION
Total Phosphorus	INOR-93-6022	modified from SM 4500-P B and SM 4500-P E	SPECTROPHOTOMETER
Total Organic Carbon	INOR-93-6049	modified from SM 5310 B	SHIMADZU CARBON ANALYZER
True Colour	INOR-93-6074	modified from SM 2120 B	LACHAT FIA
Turbidity	INOR-93-6000	modified from SM 2130 B	PC TITRATE
Total Calcium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP/MS
Total Magnesium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP/MS
Total Potassium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP/MS
Total Sodium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP/MS
Aluminum-dissolved	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Total Antimony	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Arsenic	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Barium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Beryllium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Boron	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Cadmium	MET -93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Chromium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Cobalt	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Method Summary

CLIENT NAME: AECOM CANADA LTD

AGAT WORK ORDER: 23T030999

PROJECT: Bradford Bypass (60636190)

ATTENTION TO: Brian Holden

SAMPLING SITE:Bradford

SAMPLED BY:Sebastian Hackbusch

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Total Copper	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Iron	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Lead	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Manganese	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Dissolved Mercury	MET-93-6100	modified from EPA 245.2 and SM 3112 B	CVAAS
Total Molybdenum	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Nickel	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Selenium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Silver	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Strontium	INOR-93-6003	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Thallium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Tin	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Titanium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Tungsten	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Uranium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Vanadium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Zinc	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Zirconium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Lab Filtration Aluminum Dissolved	SR-78-9001		FILTRATION
Lab Filtration mercury	SR-78-9001		FILTRATION

AGAT Laboratories

Have feedback? Scan here for a quick survey!

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water consumed by humans)

Report Information:

Company: AECOM Canada LTD
Contact: Brian Holden
Address: 290-50 Sportsworth Crossing Rd, Kitchener
Phone: Fax:
Reports to be sent to:
1. Email: Brian.Holden@aecom.com
2. Email:

Project Information:

Project: Bradford Bypass (60636190)
Site Location: Bradford
Sampled By: Sebastian Hackbusch
AGAT Quote #: PO:
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☑ No ☐

Company: AECOM Canada LTD
Contact: Brian Holden
Address: 290-50 Sportsworth Crossing Rd,
Email: Brian.Holden@aecom.com Kitchener

Regulatory Requirements:

(Please check all applicable boxes)

☐ Regulation 153/04
Table _____ *Indicate One*
☐ Ind/Com
☐ Res/Park
☐ Agriculture
Soil Texture *(Check One)*
☐ Coarse
☐ Fine

☐ Regulation 406
Table _____ *Indicate One*
☐ Regulation 558
☐ CCME

☐ Sewer Use
☐ Sanitary ☐ Storm
_____ *Region*
☑ Prov. Water Quality Objectives (PWQO)
☐ Other
_____ *Indicate One*

Is this submission for a Record of Site Condition? ☐ Yes ☐ No

Report Guideline on *Certificate of Analysis* ☐ Yes ☐ No

Sample Matrix Legend

GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

Laboratory Use Only

Work Order #: 23T030999

Cooler Quantity: 1 Small
Arrival Temperatures: 9.1 | 9.4 | 9.0
Custody Seal Intact: ☐ Yes ☐ No ☑ N/A
Notes: bagged in

Turnaround Time (TAT) Required:

Regular TAT ☐ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day

OR Date Required (Rush Surcharges May Apply):

Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

For 'Same Day' analysis, please contact your AGAT CPM

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI, DOC (Y/N)	O. Reg 153: Metals & Inorganics	O. Reg 153: Metals - ☐ CrVI, ☐ Hg, ☐ HWSB	O. Reg 153: BTEX, F1-F4 PHCs	VOC	PAHs	PCBs	PCBs: Aroclors ☐	O. Reg 558: Landfill Disposal Characterization TCLP: ☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐ PCBs	O. Reg 406: Regulation 406 SPLP Rainwater Leach SPLP: ☐ Metals ☐ VOCs ☐ SVOCs	O. Reg 406: Regulation 406 Characterization Package pH, ICPMS Metals, BTEX, F1-F4	Corrosivity: ☐ Moisture ☐ Sulphide	PWQO						Potentially Hazardous or High Concentration (Y/N)
1. PDC6	05/31/23	2:00 AM/PM	8	GW		N												X						
2.		AM/PM																						
3.		AM/PM																						
4.		AM/PM																						
5.		AM/PM																						
6.		AM/PM																						
7.		AM/PM																						
8.		AM/PM																						
9.		AM/PM																						
10.		AM/PM																						
11.		AM/PM																						

Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
Sebastian Hackbusch	06/01/23	10:30 AM	T. Pham	Jun 1	10:41 AM
Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time

Page _____ of _____

Nº: T - 144427

Pink Copy - Client | Yellow Copy - AGAT | White Copy - AGAT

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: AECOM CANADA LTD
50 SPORTSWORLD CROSSING RD UNIT 290
KITCHENER, ON N2P0A4
(519) 650-5313

ATTENTION TO: Brian Holden

PROJECT: Bradford Bypass (60636190)

AGAT WORK ORDER: 23T030993

TRACE ORGANICS REVIEWED BY: Radhika Chakraberty, Trace Organics Lab Manager

WATER ANALYSIS REVIEWED BY: Nivine Basily, Inorganics Report Writer

DATE REPORTED: Jun 12, 2023

PAGES (INCLUDING COVER): 12

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

Notes

Disclaimer:

- *All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.*
- *All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.*
- *AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.*
- *This Certificate shall not be reproduced except in full, without the written approval of the laboratory.*
- *The test results reported herewith relate only to the samples as received by the laboratory.*
- *Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.*
- *All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.*
- *For environmental samples in the Province of Quebec: The analysis is performed on and results apply to samples as received. A temperature above 6°C upon receipt, as indicated in the Sample Reception Notification (SRN), could indicate the integrity of the samples has been compromised if the delay between sampling and submission to the laboratory could not be minimized.*

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 23T030993

PROJECT: Bradford Bypass (60636190)

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Brian Holden

SAMPLING SITE:Bradford

SAMPLED BY:Sebastian Hackbusch

Sewer Use - Bradford Sanitary - Organics (2015)

DATE RECEIVED: 2023-06-01 **DATE REPORTED: 2023-06-12**

					SAMPLE DESCRIPTION:	POC7
					SAMPLE TYPE:	Water
					DATE SAMPLED:	2023-05-31 12:45
Parameter	**Unit**	**G / S: A**	**G / S: B**	**RDL**	**5032384**	
Oil and Grease (animal/vegetable) in water	mg/L	100		0.5	<0.5	
Oil and Grease (mineral) in water	mg/L	15		0.5	<0.5	
Methylene Chloride	µg/L	2000	5.2	0.3	<0.3	
cis- 1,2-Dichloroethylene	µg/L	4000	5.6	0.2	<0.2	
Chloroform	µg/L	40	2	0.2	<0.2	
Benzene	µg/L	10	2	0.2	<0.2	
Trichloroethylene	µg/L	400	8	0.2	<0.2	
trans-1,3-Dichloropropene	µg/L	140	5.6	0.30	<0.30	
Toluene	µg/L	270	2	0.2	<0.2	
Tetrachloroethene	µg/L	1000	4.4	0.1	<0.1	
Ethylbenzene	µg/L	160	2	0.1	<0.1	
1,1,2,2-Tetrachloroethane	µg/L	1400	17	0.1	<0.1	
1,4-Dichlorobenzene	µg/L	80	6.8	0.1	<0.1	
1,2-Dichlorobenzene	µg/L	50	5.6	0.1	<0.1	
Xylenes (Total)	µg/L	1400	4.4	0.2	<0.2	
PCBs	µg/L	1	0.4	0.2	<0.2	
Di-n-butyl phthalate	ug/L	80	15	0.5	<0.5	
Bis(2-éthylhexyl)phthalate	µg/L	12	8.8	0.5	<0.5	
Nonylphenols	ug/L	20		1	<1	
Nonylphenol Ethoxylates	ug/L	200		10	<10	
Surrogate	**Unit**		**Acceptable Limits**			
Toluene-d8	% Recovery		50-140		100	
4-Bromofluorobenzene	% Recovery		50-140		86	
Decachlorobiphenyl	%		50-140		114	
2,4,6-Tribromophenol	%		50-140		79	
Chrysene-d12	%		50-140		89	

Certified By: R. Chakraberty

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 23T030993

PROJECT: Bradford Bypass (60636190)

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Brian Holden

SAMPLING SITE:Bradford

SAMPLED BY:Sebastian Hackbusch

Sewer Use - Bradford Sanitary - Organics (2015)

DATE RECEIVED: 2023-06-01 **DATE REPORTED: 2023-06-12**

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: A Refers to ON Bradford SN, B Refers to ON Bradford SM
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

5032384 Oil and Grease animal/vegetable is a calculated parameter. The calculated value is the difference between Total O&G and Mineral O&G.
Xylenes total is a calculated parameter. The calculated value is the sum of m&p-Xylene and o-Xylene.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: R. Chakraberty

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 23T030993

PROJECT: Bradford Bypass (60636190)

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Brian Holden

SAMPLING SITE:Bradford

SAMPLED BY:Sebastian Hackbusch

CBOD5

DATE RECEIVED: 2023-06-01

DATE REPORTED: 2023-06-12

				SAMPLE DESCRIPTION:	POC7
				SAMPLE TYPE:	Water
				DATE SAMPLED:	2023-05-31 12:45
Parameter	**Unit**	**G / S**	**RDL**	**5032384**	
Biochemical Oxygen Demand, Carbonaceous	mg/L		2	<2	

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 23T030993

PROJECT: Bradford Bypass (60636190)

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Brian Holden

SAMPLING SITE:Bradford

SAMPLED BY:Sebastian Hackbusch

Sewer Use - Bradford Sanitary Sewer Use By-Law - Inorganics (2015)

DATE RECEIVED: 2023-06-01

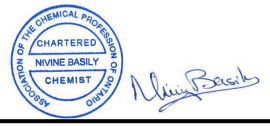
DATE REPORTED: 2023-06-12

					SAMPLE DESCRIPTION:	POC7
					SAMPLE TYPE:	Water
					DATE SAMPLED:	2023-05-31 12:45
Parameter	**Unit**	**G / S: A**	**G / S: B**	**RDL**		**5032384**
pH	pH Units	6.0-9.5	6.0-9.5	NA		8.02
Total Suspended Solids	mg/L	350	15	10		26[B-A]
Fluoride	mg/L	10		0.05		<0.05
Sulphate	mg/L	1500		0.10		86.5[<A]
Cyanide, SAD	mg/L	2	0.02	0.002		<0.002
Phenols	mg/L	1	0.008	0.002		0.006[<B]
Total Kjeldahl Nitrogen	mg/L	100	1	0.10		0.11[<B]
Total Aluminum	mg/L	50		0.010		0.488[<A]
Total Antimony	mg/L	5		0.020		<0.020
Total Arsenic	mg/L	1	0.02	0.015		<0.015
Total Cadmium	mg/L	0.7	0.008	0.010		<0.010
Total Chromium	mg/L	2	0.08	0.015		<0.015
Total Cobalt	mg/L	5		0.010		<0.010
Total Copper	mg/L	3	0.05	0.002		<0.002
Total Lead	mg/L	1	0.12	0.020		<0.020
Total Manganese	mg/L	5	0.15	0.020		0.033[<B]
Total Molybdenum	mg/L	5		0.020		<0.020
Total Mercury	mg/L	0.010		0.0002		<0.0002
Total Nickel	mg/L	2	0.08	0.015		<0.015
Total Phosphorus	mg/L	10	0.4	0.02		0.03[<B]
Total Selenium	mg/L	1	0.02	0.002		<0.002
Total Silver	mg/L	5	0.12	0.010		<0.010
Total Tin	mg/L	5		0.020		<0.020
Total Titanium	mg/L	5		0.010		0.014[<A]
Total Zinc	mg/L	2	0.04	0.020		<0.020

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: A Refers to ON Bradford SN, B Refers to ON Bradford SM
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:



AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Exceedance Summary

AGAT WORK ORDER: 23T030993

PROJECT: Bradford Bypass (60636190)

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Brian Holden

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
5032384	POC7	ON Bradford SM	Sewer Use - Bradford Sanitary Sewer Use By-Law - Inorganics (2015)	Total Suspended Solids	mg/L	15	26

AGAT Laboratories
5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: AECOM CANADA LTD

AGAT WORK ORDER: 23T030993

PROJECT: Bradford Bypass (60636190)

ATTENTION TO: Brian Holden

SAMPLING SITE:Bradford

SAMPLED BY:Sebastian Hackbusch

Trace Organics Analysis

RPT Date: Jun 12, 2023			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Sewer Use - Bradford Sanitary - Organics (2015)															
Oil and Grease (animal/vegetable) in water	5029315		< 0.5	< 0.5	NA	< 0.5	86%	70%	130%	91%	70%	130%	111%	70%	130%
Oil and Grease (mineral) in water	5029315		< 0.5	< 0.5	NA	< 0.5	90%	70%	130%	87%	70%	130%	80%	70%	130%
Methylene Chloride	5020774		<0.3	<0.3	NA	< 0.3	80%	50%	140%	87%	60%	130%	75%	50%	140%
cis- 1,2-Dichloroethylene	5020774		<0.2	<0.2	NA	< 0.2	116%	50%	140%	108%	60%	130%	111%	50%	140%
Chloroform	5020774		<0.2	<0.2	NA	< 0.2	98%	50%	140%	103%	60%	130%	109%	50%	140%
Benzene	5020774		<0.2	<0.2	NA	< 0.2	117%	50%	140%	91%	60%	130%	111%	50%	140%
Trichloroethylene	5020774		<0.2	<0.2	NA	< 0.2	90%	50%	140%	101%	60%	130%	115%	50%	140%
trans-1,3-Dichloropropene	5020774		<0.30	<0.30	NA	< 0.30	92%	50%	140%	76%	60%	130%	92%	50%	140%
Toluene	5020774		<0.2	<0.2	NA	< 0.2	108%	50%	140%	83%	60%	130%	106%	50%	140%
Tetrachloroethene	5020774		<0.1	<0.1	NA	< 0.1	116%	50%	140%	87%	60%	130%	114%	50%	140%
Ethylbenzene	5020774		<0.1	<0.1	NA	< 0.1	106%	50%	140%	81%	60%	130%	104%	50%	140%
1,1,2,2-Tetrachloroethane	5020774		<0.1	<0.1	NA	< 0.1	99%	50%	140%	92%	60%	130%	101%	50%	140%
1,4-Dichlorobenzene	5020774		<0.1	<0.1	NA	< 0.1	117%	50%	140%	95%	60%	130%	115%	50%	140%
1,2-Dichlorobenzene	5020774		<0.1	<0.1	NA	< 0.1	110%	50%	140%	92%	60%	130%	111%	50%	140%
PCBs	5034430		< 0.2	< 0.2	NA	< 0.2	93%	50%	130%	100%	50%	140%	100%	50%	140%
Di-n-butyl phthalate	5032384	5032384	< 0.5	< 0.5	NA	< 0.5	85%	50%	140%	84%	50%	140%	106%	50%	140%
Bis(2-éthylhexyl)phthalate	5032384	5032384	< 0.5	< 0.5	NA	< 0.5	79%	50%	140%	85%	50%	140%	79%	50%	140%

Comments: When the average of the sample and duplicate results is less than 5x the RDL, the Relative Percent Difference (RPD) will be indicated as Not Applicable (NA).

Certified By: R. Chakraborty

AGAT Laboratories
5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: AECOM CANADA LTD
AGAT WORK ORDER: 23T030993
PROJECT: Bradford Bypass (60636190)
ATTENTION TO: Brian Holden
SAMPLING SITE:Bradford
SAMPLED BY:Sebastian Hackbusch

Water Analysis

RPT Date: Jun 12, 2023			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Sewer Use - Bradford Sanitary Sewer Use By-Law - Inorganics (2015)															
pH	5034862		7.94	8.01	0.9%	NA	100%	90%	110%						
Total Suspended Solids	5032876		<10	<10	NA	< 10	96%	80%	120%						
Fluoride	5029184		<0.05	<0.05	NA	< 0.05	100%	70%	130%	105%	80%	120%	100%	70%	130%
Sulphate	5029184		31.6	31.5	0.3%	< 0.10	97%	70%	130%	105%	80%	120%	100%	70%	130%
Cyanide, SAD	5032355		<0.002	<0.002	NA	< 0.002	93%	70%	130%	96%	80%	120%	90%	70%	130%
Phenols	5028686		0.003	0.004	NA	< 0.002	101%	90%	110%	99%	90%	110%	94%	80%	120%
Total Kjeldahl Nitrogen	5032384	5032384	0.11	0.10	NA	< 0.10	101%	70%	130%	96%	80%	120%	89%	70%	130%
Total Aluminum	5032248		2.77	2.79	0.7%	< 0.010	94%	70%	130%	99%	80%	120%	116%	70%	130%
Total Antimony	5032248		<0.020	<0.020	NA	< 0.020	98%	70%	130%	101%	80%	120%	103%	70%	130%
Total Arsenic	5032248		<0.015	<0.015	NA	< 0.015	100%	70%	130%	104%	80%	120%	110%	70%	130%
Total Cadmium	5032248		<0.010	<0.010	NA	< 0.010	99%	70%	130%	101%	80%	120%	102%	70%	130%
Total Chromium	5032248		<0.015	<0.015	NA	< 0.015	105%	70%	130%	95%	80%	120%	95%	70%	130%
Total Cobalt	5032248		<0.010	<0.010	NA	< 0.010	90%	70%	130%	102%	80%	120%	96%	70%	130%
Total Copper	5032248		0.004	0.004	NA	< 0.002	98%	70%	130%	98%	80%	120%	100%	70%	130%
Total Lead	5032248		<0.020	<0.020	NA	< 0.020	97%	70%	130%	96%	80%	120%	99%	70%	130%
Total Manganese	5032248		0.125	0.140	11.3%	< 0.020	94%	70%	130%	99%	80%	120%	99%	70%	130%
Total Molybdenum	5032248		<0.020	<0.020	NA	< 0.020	99%	70%	130%	104%	80%	120%	105%	70%	130%
Total Mercury	5032384	5032384	<0.0002	<0.0002	NA	< 0.0002	100%	70%	130%	101%	80%	120%	95%	70%	130%
Total Nickel	5032248		<0.015	<0.015	NA	< 0.015	91%	70%	130%	98%	80%	120%	94%	70%	130%
Total Phosphorus	5033578		<0.02	<0.02	NA	< 0.02	99%	70%	130%	104%	80%	120%	97%	70%	130%
Total Selenium	5032248		<0.002	<0.002	NA	< 0.002	99%	70%	130%	94%	80%	120%	97%	70%	130%
Total Silver	5032248		<0.010	<0.010	NA	< 0.010	92%	70%	130%	97%	80%	120%	95%	70%	130%
Total Tin	5032248		<0.020	<0.020	NA	< 0.020	98%	70%	130%	99%	80%	120%	105%	70%	130%
Total Titanium	5032248		0.201	0.166	19.1%	< 0.010	106%	70%	130%	105%	80%	120%	106%	70%	130%
Total Zinc	5032248		0.023	<0.020	NA	< 0.020	99%	70%	130%	97%	80%	120%	99%	70%	130%
CBOD5															
Biochemical Oxygen Demand, Carbonaceous	5032267		53	56	5.5%	< 2	75%	70%	130%						

Comments: NA signifies Not Applicable.
Duplicate NA: results are under 5X the RDL and will not be calculated.

Certified By:

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Method Summary

CLIENT NAME: AECOM CANADA LTD

AGAT WORK ORDER: 23T030993

PROJECT: Bradford Bypass (60636190)

ATTENTION TO: Brian Holden

SAMPLING SITE:Bradford

SAMPLED BY:Sebastian Hackbusch

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Oil and Grease (animal/vegetable) in water	VOL-91-5011	EPA SW-846 1664A & SM 5520	BALANCE
Oil and Grease (mineral) in water	VOL-91-5011	EPA SW-846 1664A & SM 5520	BALANCE
Methylene Chloride	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
cis- 1,2-Dichloroethylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Chloroform	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Benzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Trichloroethylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
trans-1,3-Dichloropropene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Toluene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Tetrachloroethene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Ethylbenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,1,2,2-Tetrachloroethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,4-Dichlorobenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,2-Dichlorobenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Xylenes (Total)	VOL-91-5001	modified from EPA 5030B & EPA 8260D	CALCULATION
Toluene-d8	VOL-91- 5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
4-Bromofluorobenzene	VOL-91- 5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
PCBs	ORG-91-5112	EPA SW-846 3510 & 8082	GC/ECD
Decachlorobiphenyl	ORG-91-5112	EPA SW-846 8081A & 8082	GC/ECD
Di-n-butyl phthalate	ORG-91-5114	EPA SW-846 3510C & 8270E	GC/MS
Bis(2-éthylhexyl)phthalate	ORG-91-5114	EPA SW-846 3510C & 8270E	GC/MS
2,4,6-Tribromophenol	ORG-91-5114	modified from EPA 3510C, 8270E & ON MOECC E3265	GC/MS
Chrysene-d12			GC/MS
Nonylphenols	ORG-91-5122	modified ASTM D7485-16	CALCULATION
Nonylphenol Ethoxylates	ORG-91-5122	modified ASTM D7485-16	CALCULATION

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Method Summary

CLIENT NAME: AECOM CANADA LTD

AGAT WORK ORDER: 23T030993

PROJECT: Bradford Bypass (60636190)

ATTENTION TO: Brian Holden

SAMPLING SITE:Bradford

SAMPLED BY:Sebastian Hackbusch

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Biochemical Oxygen Demand, Carbonaceous	INOR-121-6023	SM 5210 B	INCUBATOR
pH	INOR-93-6000	modified from SM 4500-H+ B	PC TITRATE
Total Suspended Solids	INOR-93-6028	modified from EPA 1684,ON MOECC E3139,SM 2540C,D	BALANCE
Fluoride	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Cyanide, SAD	INOR-93-6051	modified from MOECC E3015; SM 4500-CN- A, B, & C	SEGMENTED FLOW ANALYSIS
Phenols	INOR-93-6072	modified from SM 5530 D	LACHAT FIA
Total Kjeldahl Nitrogen	INOR-93-6048	modified from EPA 351.2 and SM 4500-NORG D	LACHAT FIA
Total Aluminum	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Antimony	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Arsenic	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Cadmium	MET -93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Chromium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Cobalt	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Copper	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Lead	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Manganese	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Molybdenum	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Mercury	MET-93-6100	modified from EPA 245.2 and SM 3112 B	CVAAS
Total Nickel	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Phosphorus	INOR-93-6022	modified from SM 4500-P B and SM 4500-P E	SPECTROPHOTOMETER
Total Selenium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Silver	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Tin	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Titanium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Zinc	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS

AGAT Laboratories

Have feedback? Scan here for a quick survey!

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water consumed by humans)

Laboratory Use Only

Work Order #: 23T030993

Cooler Quantity: 1 large

Arrival Temperatures: 9.5 | 9.7 | 9.0

Custody Seal Intact: ☐Yes ☐No ☑N/A

Notes: bagged ice

Report Information:

Company: AECOM Canada LTD
Contact: Brian Holden
Address: 290-50 Sportsworld Crossing Rd, Kitchener
Phone: Fax:
Reports to be sent to:
1. Email: Brian.Holden@aecom.com
2. Email:

Regulatory Requirements:
(Please check all applicable boxes)

☐ Regulation 153/04 — Table (Indicate One): ☐Ind/Com ☐Res/Park ☐Agriculture; Soil Texture (Check One): ☐Coarse ☐Fine
☐ Regulation 406 — Table (Indicate One)
☐ Regulation 558
☐ CCME
☑ Sewer Use: ☐Sanitary ☑Storm — East Gwillimbury (Region)
☐ Prov. Water Quality Objectives (PWQO)
☐ Other (Indicate One)

Is this submission for a Record of Site Condition? ☐ Yes ☐ No

Report Guideline on Certificate of Analysis ☐ Yes ☐ No

Turnaround Time (TAT) Required:

Regular TAT ☑ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)
☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day

OR Date Required (Rush Surcharges May Apply):

Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

For 'Same Day' analysis, please contact your AGAT CPM

Project Information:

Project: Bradford Bypass (60636190)
Site Location: Bradford
Sampled By: Sebastian Hackbusch
AGAT Quote #: PO:
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information: Bill To Same: Yes ☑ No ☐

Company: AECOM Canada LTD
Contact: Brian Holden
Address: 290-50 Sportsworld Crossing, Kitchener
Email: Brian.Holden@aecom.com

Sample Matrix Legend

GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI, DOC (Y/N)	O. Reg 153: Metals & Inorganics	Metals - ☐ CrVI, ☑ Hg, ☐ HWSB	BTEX, F1-F4 PHCs	VOC	PAHs	PCBs	PCBs: Aroclors ☐	O. Reg 558: Landfill Disposal Characterization TCLP: TCLP: ☐M&I ☐VOCs ☐ABNs ☐B(a)P ☐PCBs	O. Reg 406: Regulation 406 SPLP Rainwater Leach SPLP: ☐Metals ☐VOCs ☐SVOCs	Regulation 406 Characterization Package pH, ICPMS Metals, BTEX, F1-F4	Corrosivity: ☐ Moisture ☐ Sulphide	East Gwillimbury Sewer Use						Potentially Hazardous or High Concentration (Y/N)
1. PDC7	05/31/23	12:45 PM	21	SW		N	[illegible]	X		[illegible]		[illegible]						X						
2.		AM PM																						
3.		AM PM																						
4.		AM PM																						
5.		AM PM																						
6.		AM PM																						
7.		AM PM																						
8.		AM PM																						
9.		AM PM																						
10.		AM PM																						
11.		AM PM																						

Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time
Sebastian Hackbusch [signature]	06/01/23	10:30 AM	[signature]	June 1	10:41 Am

Page ____ of ____

Nº: T - 144426

Pink Copy - Client | Yellow Copy - AGAT | White Copy - AGAT

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: AECOM CANADA LTD
105 Commerce Valley Drive West 7th Floor
MARKHAM, ON L3T7W3
(905) 886-7022
ATTENTION TO: Brian Holden
PROJECT: 60636190
AGAT WORK ORDER: 22T861747
TRACE ORGANICS REVIEWED BY: Neli Popnikolova, Senior Chemist
ULTRA TRACE REVIEWED BY: Emmanuelle St-Pierre, chimiste
WATER ANALYSIS REVIEWED BY: Yris Verastegui, Report Reviewer
DATE REPORTED: Feb 25, 2022
PAGES (INCLUDING COVER): 13
VERSION*: 2

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

Notes

VERSION 2:Version 2 supersedes work order 22T861747 Version 1, issued February 18, 2022. Complete.
VERSION 1:February 18, 2022 - Partial (excluding NP/NPE)

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 22T861747

PROJECT: 60636190

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Brian Holden

SAMPLING SITE:Bradford Bypass (BPP)

SAMPLED BY:Dhwanish Parikh

Sewer Use - Bradford Sanitary/Storm - Organics (2015)

DATE RECEIVED: 2022-02-08

DATE REPORTED: 2022-02-25

					SAMPLE DESCRIPTION:	BH AIP-3
					SAMPLE TYPE:	Water
					DATE SAMPLED:	2022-02-08 13:45
Parameter	**Unit**	**G / S: A**	**G / S: B**	**RDL**		**3495536**
Oil and Grease (animal/vegetable) in water	mg/L	100		0.5		<0.5[<A]
Oil and Grease (mineral) in water	mg/L	15		0.5		<0.5[<A]
Methylene Chloride	µg/L	2000	5.2	0.3		<0.3[<B]
cis- 1,2-Dichloroethylene	µg/L	4000	5.6	0.2		<0.2[<B]
Chloroform	µg/L	40	2	0.2		<0.2[<B]
Benzene	µg/L	10	2	0.2		<0.2[<B]
Trichloroethylene	µg/L	400	8	0.2		<0.2[<B]
trans-1,3-Dichloropropene	µg/L	140	5.6	0.30		<0.30[<B]
Toluene	µg/L	270	2	0.2		<0.2[<B]
Tetrachloroethene	µg/L	1000	4.4	0.1		<0.1[<B]
Ethylbenzene	µg/L	160	2	0.1		<0.1[<B]
1,1,2,2-Tetrachloroethane	µg/L	1400	17	0.1		<0.1[<B]
1,4-Dichlorobenzene	µg/L	80	6.8	0.1		<0.1[<B]
1,2-Dichlorobenzene	µg/L	50	5.6	0.1		<0.1[<B]
Xylenes (Total)	µg/L	1400	4.4	0.2		<0.2[<B]
PCBs	µg/L	1	0.4	0.2		<0.2[<B]
Di-n-butyl phthalate	ug/L	80	15	0.5		<0.5[<B]
Bis(2-éthylhexyl)phthalate	µg/L	12	8.8	0.5		<0.5[<B]
Surrogate	**Unit**		**Acceptable Limits**			
Toluene-d8	% Recovery		50-140			101
4-Bromofluorobenzene	% Recovery		50-140			80
Decachlorobiphenyl	%		50-140			110
2,4,6-Tribromophenol	%		50-140			89
Chrysene-d12	%		50-140			74

Certified By: N Popnikolof

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 22T861747

PROJECT: 60636190

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Brian Holden

SAMPLING SITE:Bradford Bypass (BPP)

SAMPLED BY:Dhwanish Parikh

Sewer Use - Bradford Sanitary/Storm - Organics (2015)

DATE RECEIVED: 2022-02-08 **DATE REPORTED: 2022-02-25**

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: A Refers to ON Bradford SN, B Refers to ON Bradford SM
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

3495536 Oil and Grease animal/vegetable is a calculated parameter. The calculated value is the difference between Total O&G and Mineral O&G.
Xylenes total is a calculated parameter. The calculated value is the sum of m&p-Xylene and o-Xylene.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: N Popnikolof

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 22T861747

PROJECT: 60636190

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Brian Holden

SAMPLING SITE:Bradford Bypass (BPP)

SAMPLED BY:Dhwanish Parikh

Nonylphenol and Nonylphenol Ethoxylates (Ontario, mg/L)

DATE RECEIVED: 2022-02-08

DATE REPORTED: 2022-02-25

				SAMPLE DESCRIPTION:	BH AIP-3
				SAMPLE TYPE:	Water
				DATE SAMPLED:	2022-02-08 13:45
Parameter	**Unit**	**G / S**	**RDL**		**3495536**
Total Nonylphenol	mg/L	20	0.001		<0.001
NP1EO	mg/L		0.001		<0.001
NP2EO	mg/L		0.0003		<0.0003
Total Nonylphenol Ethoxylates	mg/L	0.2	0.001		<0.001

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to ON Bradford SN
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

Analysis performed at AGAT Montréal (unless marked by *)

Certified By:

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 22T861747

PROJECT: 60636190

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Brian Holden

SAMPLING SITE:Bradford Bypass (BPP)

SAMPLED BY:Dhwanish Parikh

CBOD5

DATE RECEIVED: 2022-02-08

DATE REPORTED: 2022-02-25

				SAMPLE DESCRIPTION:	**BH AIP-3**
				SAMPLE TYPE:	**Water**
				DATE SAMPLED:	**2022-02-08 13:45**
Parameter	**Unit**	**G / S: A**	**G / S: B**	**RDL**	**3495536**
Biochemical Oxygen Demand, Carbonaceous	mg/L	300	15	2.00	<2.00[<B]

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: A Refers to ON Bradford SN, B Refers to ON Bradford SM
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: Iris Verástegui

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 22T861747

PROJECT: 60636190

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Brian Holden

SAMPLING SITE:Bradford Bypass (BPP)

SAMPLED BY:Dhwanish Parikh

Sewer Use - Bradford Sanitary/Storm Sewer Use By-Law - Inorganics (2015)

DATE RECEIVED: 2022-02-08

DATE REPORTED: 2022-02-25

					SAMPLE DESCRIPTION:	BH AIP-3
					SAMPLE TYPE:	Water
					DATE SAMPLED:	2022-02-08 13:45
Parameter	**Unit**	**G / S: A**	**G / S: B**	**RDL**		**3495536**
pH	pH Units	6.0-9.5	6.0-9.5	NA		7.44
Total Suspended Solids	mg/L	350	15	10		308[B-A]
Fluoride	mg/L	10		0.05		<0.05[<A]
Sulphate	mg/L	1500		0.19		14.8[<A]
Total Cyanide	mg/L	2	0.02	0.002		<0.002[<B]
Phenols	mg/L	1	0.008	0.002		0.036[B-A]
Total Kjeldahl Nitrogen	mg/L	100	1	0.10		0.16[<B]
Total Aluminum	mg/L	50		0.010		1.63[<A]
Total Antimony	mg/L	5		0.020		<0.020[<A]
Total Arsenic	mg/L	1	0.02	0.015		<0.015[<B]
Total Cadmium	mg/L	0.7	0.008	0.010		<0.010[<A]
Total Chromium	mg/L	2	0.08	0.015		<0.015[<B]
Total Cobalt	mg/L	5		0.010		<0.010[<A]
Total Copper	mg/L	3	0.05	0.002		0.003[<B]
Total Lead	mg/L	1	0.12	0.020		<0.020[<B]
Total Manganese	mg/L	5	0.15	0.020		0.125[<B]
Total Molybdenum	mg/L	5		0.020		<0.020[<A]
Total Mercury	mg/L	0.010		0.0002		<0.0002[<A]
Total Nickel	mg/L	2	0.08	0.015		<0.015[<B]
Total Phosphorus	mg/L	10	0.4	0.02		0.06[<B]
Total Selenium	mg/L	1	0.02	0.002		<0.002[<B]
Total Silver	mg/L	5	0.12	0.010		<0.010[<B]
Total Tin	mg/L	5		0.020		<0.020[<A]
Total Titanium	mg/L	5		0.010		0.046[<A]
Total Zinc	mg/L	2	0.04	0.020		<0.020[<B]

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: A Refers to ON Bradford SN, B Refers to ON Bradford SM
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

3495536 Dilution required, RDL has been increased accordingly.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: Iris Verástegui

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Exceedance Summary

AGAT WORK ORDER: 22T861747

PROJECT: 60636190

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Brian Holden

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
3495536	BH AIP-3	ON Bradford SM	Sewer Use - Bradford Sanitary/Storm Sewer Use By-Law - Inorganics (2015)	Phenols	mg/L	0.008	0.036
3495536	BH AIP-3	ON Bradford SM	Sewer Use - Bradford Sanitary/Storm Sewer Use By-Law - Inorganics (2015)	Total Suspended Solids	mg/L	15	308

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: AECOM CANADA LTD

AGAT WORK ORDER: 22T861747

PROJECT: 60636190

ATTENTION TO: Brian Holden

SAMPLING SITE:Bradford Bypass (BPP)

SAMPLED BY:Dhwanish Parikh

Trace Organics Analysis

RPT Date: Feb 25, 2022			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Sewer Use - Bradford Sanitary/Storm - Organics (2015)															
Oil and Grease (animal/vegetable) in water	3478434		0.98	0.94	NA	< 0.5	101%	70%	130%	107%	70%	130%	102%	70%	130%
Oil and Grease (mineral) in water	3478434		0.73	0.71	NA	< 0.5	81%	70%	130%	83%	70%	130%	80%	70%	130%
Methylene Chloride	3501675		<0.3	<0.3	NA	< 0.3	76%	50%	140%	105%	60%	130%	105%	50%	140%
cis- 1,2-Dichloroethylene	3501675		<0.2	<0.2	NA	< 0.2	81%	50%	140%	90%	60%	130%	81%	50%	140%
Chloroform	3501675		<0.2	<0.2	NA	< 0.2	89%	50%	140%	94%	60%	130%	89%	50%	140%
Benzene	3501675		<0.2	<0.2	NA	< 0.2	97%	50%	140%	79%	60%	130%	109%	50%	140%
Trichloroethylene	3501675		<0.2	<0.2	NA	< 0.2	99%	50%	140%	103%	60%	130%	71%	50%	140%
trans-1,3-Dichloropropene	3501675		<0.30	<0.30	NA	< 0.30	102%	50%	140%	98%	60%	130%	92%	50%	140%
Toluene	3501675		0.6	0.6	NA	< 0.2	110%	50%	140%	98%	60%	130%	89%	50%	140%
Tetrachloroethene	3501675		<0.1	<0.1	NA	< 0.1	110%	50%	140%	112%	60%	130%	99%	50%	140%
Ethylbenzene	3501675		<0.1	<0.1	NA	< 0.1	116%	50%	140%	76%	60%	130%	82%	50%	140%
1,1,2,2-Tetrachloroethane	3501675		<0.1	<0.1	NA	< 0.1	116%	50%	140%	108%	60%	130%	76%	50%	140%
1,4-Dichlorobenzene	3501675		<0.1	<0.1	NA	< 0.1	112%	50%	140%	117%	60%	130%	106%	50%	140%
1,2-Dichlorobenzene	3501675		<0.1	<0.1	NA	< 0.1	110%	50%	140%	111%	60%	130%	98%	50%	140%
PCBs	3476343		< 0.2	< 0.2	NA	< 0.2	98%	50%	130%	103%	50%	140%	98%	50%	140%
Di-n-butyl phthalate	3480144		< 0.5	< 0.5	NA	< 0.5	74%	50%	140%	75%	50%	140%	99%	50%	140%
Bis(2-éthylhexyl)phthalate	3480144		< 0.5	< 0.5	NA	< 0.5	78%	50%	140%	89%	50%	140%	89%	50%	140%

Comments: When the average of the sample and duplicate results is less than 5x the RDL, the Relative Percent Difference (RPD) will be indicated as Not Applicable (NA).

Certified By: N Popnikolof

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: AECOM CANADA LTD

AGAT WORK ORDER: 22T861747

PROJECT: 60636190

ATTENTION TO: Brian Holden

SAMPLING SITE:Bradford Bypass (BPP)

SAMPLED BY:Dhwanish Parikh

Ultra Trace Analysis

RPT Date: Feb 25, 2022			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Nonylphenol and Nonylphenol Ethoxylates (Ontario, mg/L)															
Total Nonylphenol	1	3498740	0.002	0.002	NA	< 0.001	NA	60%	140%	95%	60%	140%	NA	60%	140%
NP1EO	1	3498740	0.004	0.004	NA	< 0.001	NA	60%	140%	80%	60%	140%	NA	60%	140%
NP2EO	1	3498740	0.0012	0.0011	NA	< 0.0003	NA	60%	140%	99%	60%	140%	NA	60%	140%

Certified By:

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: AECOM CANADA LTD

AGAT WORK ORDER: 22T861747

PROJECT: 60636190

ATTENTION TO: Brian Holden

SAMPLING SITE:Bradford Bypass (BPP)

SAMPLED BY:Dhwanish Parikh

Water Analysis

RPT Date: Feb 25, 2022			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Sewer Use - Bradford Sanitary/Storm Sewer Use By-Law - Inorganics (2015)															
pH	3495924		7.48	7.52	0.5%	NA	102%	90%	110%						
Total Suspended Solids	3495335		15	16	NA	< 10	98%	80%	120%						
Fluoride	3494437		<0.05	<0.05	NA	< 0.05	101%	70%	130%	102%	80%	120%	104%	70%	130%
Sulphate	3494437		175	188	7.2%	< 0.10	97%	70%	130%	103%	80%	120%	NA	70%	130%
Total Cyanide	3490367		0.004	0.004	NA	< 0.002	106%	70%	130%	104%	80%	120%	112%	70%	130%
Phenols	3495924		<0.002	<0.002	NA	< 0.002	101%	90%	110%	103%	90%	110%	105%	80%	120%
Total Kjeldahl Nitrogen	3497301		45.5	41.2	9.9%	< 0.10	100%	70%	130%	99%	80%	120%	94%	70%	130%
Total Aluminum	3501486		1.35	1.29	4.5%	< 0.010	106%	70%	130%	98%	80%	120%	109%	70%	130%
Total Antimony	3501486		<0.020	<0.020	NA	< 0.020	104%	70%	130%	93%	80%	120%	87%	70%	130%
Total Arsenic	3501486		<0.015	<0.015	NA	< 0.015	95%	70%	130%	95%	80%	120%	83%	70%	130%
Total Cadmium	3501486		<0.010	<0.010	NA	< 0.010	100%	70%	130%	95%	80%	120%	86%	70%	130%
Total Chromium	3501486		<0.015	<0.015	NA	< 0.015	100%	70%	130%	91%	80%	120%	89%	70%	130%
Total Cobalt	3501486		<0.010	<0.010	NA	< 0.010	101%	70%	130%	93%	80%	120%	89%	70%	130%
Total Copper	3501486		0.113	0.112	0.9%	< 0.002	100%	70%	130%	95%	80%	120%	84%	70%	130%
Total Lead	3501486		<0.020	<0.020	NA	< 0.020	99%	70%	130%	91%	80%	120%	82%	70%	130%
Total Manganese	3501486		0.146	0.150	2.7%	< 0.020	102%	70%	130%	93%	80%	120%	85%	70%	130%
Total Molybdenum	3501486		<0.020	<0.020	NA	< 0.020	107%	70%	130%	97%	80%	120%	95%	70%	130%
Total Mercury	3495335		<0.0002	<0.0002	NA	< 0.0002	103%	70%	130%	99%	80%	120%	99%	70%	130%
Total Nickel	3501486		<0.015	<0.015	NA	< 0.015	101%	70%	130%	94%	80%	120%	90%	70%	130%
Total Phosphorus	3495536	3495536	0.06	0.07	NA	< 0.02	104%	90%	110%	99%	90%	110%	100%	80%	120%
Total Selenium	3501486		<0.002	<0.002	NA	< 0.002	97%	70%	130%	100%	80%	120%	84%	70%	130%
Total Silver	3501486		<0.010	<0.010	NA	< 0.010	101%	70%	130%	95%	80%	120%	86%	70%	130%
Total Tin	3501486		<0.020	<0.020	NA	< 0.020	101%	70%	130%	91%	80%	120%	86%	70%	130%
Total Titanium	3501486		<0.010	<0.010	NA	< 0.010	102%	70%	130%	96%	80%	120%	94%	70%	130%
Total Zinc	3501486		0.026	0.033	NA	< 0.020	103%	70%	130%	97%	80%	120%	85%	70%	130%

Comments: NA signifies Not Applicable.
If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.
Matrix spike: Spike level < native concentration. Matrix spike acceptance limits do not apply.

CBOD5

Biochemical Oxygen Demand, Carbonaceous	3495321		<6.00	<6.00	NA	< 2	95%	70%	130%						

Comments: NA signifies Not Applicable.
If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.

Certified By: Iris Verástegui

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Method Summary

CLIENT NAME: AECOM CANADA LTD

AGAT WORK ORDER: 22T861747

PROJECT: 60636190

ATTENTION TO: Brian Holden

SAMPLING SITE:Bradford Bypass (BPP)

SAMPLED BY:Dhwanish Parikh

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Oil and Grease (animal/vegetable) in water	VOL-91-5011	EPA SW-846 1664A & SM 5520	BALANCE
Oil and Grease (mineral) in water	VOL-91-5011	EPA SW-846 1664A & SM 5520	BALANCE
Methylene Chloride	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
cis- 1,2-Dichloroethylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Chloroform	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Benzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Trichloroethylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
trans-1,3-Dichloropropene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Toluene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Tetrachloroethene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Ethylbenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,1,2,2-Tetrachloroethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,4-Dichlorobenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,2-Dichlorobenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Xylenes (Total)	VOL-91-5001	modified from EPA 5030B & EPA 8260D	CALCULATION
Toluene-d8	VOL-91- 5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
4-Bromofluorobenzene	VOL-91- 5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
PCBs	ORG-91-5112	EPA SW-846 3510 & 8082	GC/ECD
Decachlorobiphenyl	ORG-91-5112	EPA SW-846 8081A & 8082	GC/ECD
Di-n-butyl phthalate	ORG-91-5114	EPA SW-846 3510C & 8270E	GC/MS
Bis(2-éthylhexyl)phthalate	ORG-91-5114	EPA SW-846 3510C & 8270E	GC/MS
2,4,6-Tribromophenol	ORG-91-5114	modified from EPA 3510C, 8270E & ON MOECC E3265	GC/MS
Chrysene-d12			GC/MS
Ultra Trace Analysis			
Total Nonylphenol	TOX-151-19003F	ASTM D7065-6	LCMSMS
NP1EO	TOX-151-19003F	ASTM D7065-6	LCMSMS
NP2EO	TOX-151-19003F	ASTM D7065-6	LCMSMS
Total Nonylphenol Ethoxylates	TOX-19003F	ASTM D7065-6	LCMSMS

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Method Summary

CLIENT NAME: AECOM CANADA LTD

AGAT WORK ORDER: 22T861747

PROJECT: 60636190

ATTENTION TO: Brian Holden

SAMPLING SITE:Bradford Bypass (BPP)

SAMPLED BY:Dhwanish Parikh

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Biochemical Oxygen Demand, Carbonaceous	INOR-121-6023	SM 5210 B	INCUBATOR
pH	INOR-93-6000	modified from SM 4500-H+ B	PC TITRATE
Total Suspended Solids	INOR-93-6028	modified from EPA 1684,ON MOECC E3139,SM 2540C,D	BALANCE
Fluoride	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Total Cyanide	INOR-93-6051	modified from MOECC E3015; SM 4500-CN- A, B, & C	TECHNICON AUTO ANALYZER
Phenols	INOR-93-6072	modified from SM 5530 D	LACHAT FIA
Total Kjeldahl Nitrogen	INOR-93-6048	modified from EPA 351.2 and SM 4500-NORG D	LACHAT FIA
Total Aluminum	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Antimony	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Arsenic	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Cadmium	MET -93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Chromium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Cobalt	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Copper	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Lead	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Manganese	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Molybdenum	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Mercury	MET-93-6100	modified from EPA 245.2 and SM 3112 B	CVAAS
Total Nickel	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Phosphorus	INOR-93-6022	SM 4500-P B&E	SPECTROPHOTOMETR
Total Selenium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Silver	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Tin	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Titanium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Zinc	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS

AGAT Laboratories

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

Laboratory Use Only

Work Order #: 22T861747
Cooler Quantity: 1 BITS (Free ice)
Arrival Temperatures: 1.1 | 11.8 | 12.3
Custody Seal Intact: ☐Yes ☐No ☐N/A
Notes:

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water consumed by humans)

Report Information:

Company: AECOM Canada Ltd
Contact: Brain Holden / Dhwanish Parikh
Address: 105 Commerce Valley Dr W, 7th floor Markham, ON
Phone: 416 420 5590 Fax:
Reports to be sent to:
1. Email: dhwanish.Parikh@aecom.com
2. Email: Brian.Holden@aecom.com

Regulatory Requirements:

(Please check all applicable boxes)

☐ Regulation 153/04
Table ____ Indicate One
☐Ind/Com
☐Res/Park
☐Agriculture
Soil Texture (Check One)
☐Coarse
☐Fine

☐ Excess Soils R406
Table ____ Indicate One
☐ Regulation 558
☐ CCME

☑ Sewer Use
☐Sanitary ☑Storm
Bradford
Region
☐ Prov. Water Quality Objectives (PWQO)
☐ Other
Indicate One

Turnaround Time (TAT) Required:

Regular TAT ☑ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day

OR Date Required (Rush Surcharges May Apply):

Please provide prior notification for rush TAT
*TAT is exclusive of weekends and statutory holidays

For 'Same Day' analysis, please contact your AGAT CPM

Project Information:

Project: 60636190
Site Location: Bradford By-Pass (BN)
Sampled By: Dhwanish Parikh
AGAT Quote #: PO:
Please note: If quotation number is not provided, client will be billed full price for analysis.

Is this submission for a Record of Site Condition? ☐ Yes ☑ No

Report Guideline on Certificate of Analysis ☑ Yes ☐ No

Invoice Information:

Bill To Same: Yes ☒ No ☐
Company:
Contact:
Address:
Email:

Sample Matrix Legend

B	Biota
GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI, DOC (Y/N)	O. Reg 153: Metals & Inorganics	O. Reg 153: Metals - ☐ CrVI, ☐ Hg, ☐ HWSB	O. Reg 153: BTEX, F1-F4 PHCs / Analyze F4G if required ☐ Yes ☐ No	PAHs	PCBs	VOC	O. Reg 558: Landfill Disposal Characterization TCLP: TCLP: ☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐ PCBs	O. Reg 406: Excess Soils SPLP Rainwater Leach SPLP: ☐ Metals ☐ VOCs ☐ SVOCs	O. Reg 406: Excess Soils Characterization Package pH, ICPMS Metals, BTEX, F1-F4	Salt - EC/SAR	Bradford Sewer Use							Potentially Hazardous or High Concentration (Y/N)
BH AIP-3	Feb 8, 2022	1:45 PM	4	GW													✓							
		AM PM																						
		AM PM																						
		AM PM																						
		AM PM																						
		AM PM																						
		AM PM																						
		AM PM																						
		AM PM																						
		AM PM																						
		AM PM																						

Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
Dhwanish Parikh [signature]	Feb 8, 2022	3:00	Neil Ramnarain [signature]		

22FEB 8 4:41PM

Page ____ of ____

Nº: T 130730

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: AECOM CANADA LTD
105 COMMERCE VALLEY DR.W 7TH FLOOR
MARKHAM, ON L3T7W3
(905) 886-7022

ATTENTION TO: Brian Holden

PROJECT: 60636190

AGAT WORK ORDER: 22T861751

TRACE ORGANICS REVIEWED BY: Neli Popnikolova, Senior Chemist

ULTRA TRACE REVIEWED BY: Emmanuelle St-Pierre, chimiste

WATER ANALYSIS REVIEWED BY: Yris Verastegui, Report Reviewer

DATE REPORTED: Feb 25, 2022

PAGES (INCLUDING COVER): 13

VERSION*: 2

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

Notes

VERSION 2:Version 2 supersedes work order 22T861751 Version 1, issued February 18, 2022. Complete.
VERSION 1:February 18, 2022 - Partial (excluding NP/NPE)

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 22T861751

PROJECT: 60636190

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Brian Holden

SAMPLING SITE:Bradford Bypass (BPP)

SAMPLED BY:Dhwanish P.

Sewer Use - Bradford Sanitary/Storm - Organics (2015)

DATE RECEIVED: 2022-02-08 **DATE REPORTED: 2022-02-25**

					SAMPLE DESCRIPTION:	BH 9-1
					SAMPLE TYPE:	Water
					DATE SAMPLED:	2022-02-08 10:00
Parameter	**Unit**	**G / S: A**	**G / S: B**	**RDL**	**3495335**	
Oil and Grease (animal/vegetable) in water	mg/L	100		0.5	<0.5[<A]	
Oil and Grease (mineral) in water	mg/L	15		0.5	<0.5[<A]	
Methylene Chloride	µg/L	2000	5.2	0.3	<0.3[<B]	
cis- 1,2-Dichloroethylene	µg/L	4000	5.6	0.2	<0.2[<B]	
Chloroform	µg/L	40	2	0.2	<0.2[<B]	
Benzene	µg/L	10	2	0.2	<0.2[<B]	
Trichloroethylene	µg/L	400	8	0.2	<0.2[<B]	
trans-1,3-Dichloropropene	µg/L	140	5.6	0.30	<0.30[<B]	
Toluene	µg/L	270	2	0.2	<0.2[<B]	
Tetrachloroethene	µg/L	1000	4.4	0.1	<0.1[<B]	
Ethylbenzene	µg/L	160	2	0.1	<0.1[<B]	
1,1,2,2-Tetrachloroethane	µg/L	1400	17	0.1	<0.1[<B]	
1,4-Dichlorobenzene	µg/L	80	6.8	0.1	<0.1[<B]	
1,2-Dichlorobenzene	µg/L	50	5.6	0.1	<0.1[<B]	
Xylenes (Total)	µg/L	1400	4.4	0.2	<0.2[<B]	
PCBs	µg/L	1	0.4	0.2	<0.2[<B]	
Di-n-butyl phthalate	ug/L	80	15	0.5	<0.5[<B]	
Bis(2-éthylhexyl)phthalate	µg/L	12	8.8	0.5	<0.5[<B]	
Surrogate	**Unit**		**Acceptable Limits**			
Toluene-d8	% Recovery		50-140		96	
4-Bromofluorobenzene	% Recovery		50-140		102	
Decachlorobiphenyl	%		50-140		84	
2,4,6-Tribromophenol	%		50-140		89	
Chrysene-d12	%		50-140		78	

Certified By: N Popnikolof

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 22T861751

PROJECT: 60636190

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Brian Holden

SAMPLING SITE:Bradford Bypass (BPP)

SAMPLED BY:Dhwanish P.

Sewer Use - Bradford Sanitary/Storm - Organics (2015)

DATE RECEIVED: 2022-02-08 **DATE REPORTED: 2022-02-25**

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: A Refers to ON Bradford SN, B Refers to ON Bradford SM
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

3495335 Oil and Grease animal/vegetable is a calculated parameter. The calculated value is the difference between Total O&G and Mineral O&G.
Xylenes total is a calculated parameter. The calculated value is the sum of m&p-Xylene and o-Xylene.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: N Popnikolof

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 22T861751

PROJECT: 60636190

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Brian Holden

SAMPLING SITE:Bradford Bypass (BPP)

SAMPLED BY:Dhwanish P.

Nonylphenol and Nonylphenol Ethoxylates (Ontario, mg/L)

DATE RECEIVED: 2022-02-08

DATE REPORTED: 2022-02-25

			SAMPLE DESCRIPTION:	BH 9-1
			SAMPLE TYPE:	Water
			DATE SAMPLED:	2022-02-08 10:00
Parameter	**Unit**	**G / S**	**RDL**	**3495335**
Total Nonylphenol	mg/L	20	0.001	<0.001
NP1EO	mg/L		0.001	<0.001
NP2EO	mg/L		0.0003	<0.0003
Total Nonylphenol Ethoxylates	mg/L	0.2	0.001	<0.001

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to ON Bradford SN
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

Analysis performed at AGAT Montréal (unless marked by *)

Certified By:

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 22T861751

PROJECT: 60636190

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Brian Holden

SAMPLING SITE:Bradford Bypass (BPP)

SAMPLED BY:Dhwanish P.

CBOD5

DATE RECEIVED: 2022-02-08

DATE REPORTED: 2022-02-25

				SAMPLE DESCRIPTION:	**BH 9-1**
				SAMPLE TYPE:	**Water**
				DATE SAMPLED:	**2022-02-08 10:00**
Parameter	**Unit**	**G / S: A**	**G / S: B**	**RDL**	**3495335**
Biochemical Oxygen Demand, Carbonaceous	mg/L	300	15	2.00	<2.00[<B]

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: A Refers to ON Bradford SN, B Refers to ON Bradford SM
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: Iris Verástegui

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 22T861751

PROJECT: 60636190

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Brian Holden

SAMPLING SITE:Bradford Bypass (BPP)

SAMPLED BY:Dhwanish P.

Sewer Use - Bradford Sanitary/Storm Sewer Use By-Law - Inorganics (2015)

DATE RECEIVED: 2022-02-08

DATE REPORTED: 2022-02-25

					SAMPLE DESCRIPTION:	BH 9-1
					SAMPLE TYPE:	Water
					DATE SAMPLED:	2022-02-08 10:00
Parameter	Unit	G / S: A	G / S: B	RDL		3495335
pH	pH Units	6.0-9.5	6.0-9.5	NA		7.75
Total Suspended Solids	mg/L	350	15	10		15[B]
Fluoride	mg/L	10		0.05		<0.05[<A]
Sulphate	mg/L	1500		0.10		37.6[<A]
Total Cyanide	mg/L	2	0.02	0.002		<0.002[<B]
Phenols	mg/L	1	0.008	0.002		0.014[B-A]
Total Kjeldahl Nitrogen	mg/L	100	1	0.10		0.20[<B]
Total Aluminum	mg/L	50		0.010		0.167[<A]
Total Antimony	mg/L	5		0.020		<0.020[<A]
Total Arsenic	mg/L	1	0.02	0.015		<0.015[<B]
Total Cadmium	mg/L	0.7	0.008	0.010		<0.010[<A]
Total Chromium	mg/L	2	0.08	0.015		<0.015[<B]
Total Cobalt	mg/L	5		0.010		<0.010[<A]
Total Copper	mg/L	3	0.05	0.002		<0.002[<B]
Total Lead	mg/L	1	0.12	0.020		<0.020[<B]
Total Manganese	mg/L	5	0.15	0.020		0.042[<B]
Total Molybdenum	mg/L	5		0.020		<0.020[<A]
Total Mercury	mg/L	0.010		0.0002		<0.0002[<A]
Total Nickel	mg/L	2	0.08	0.015		<0.015[<B]
Total Phosphorus	mg/L	10	0.4	0.02		<0.02[<B]
Total Selenium	mg/L	1	0.02	0.002		<0.002[<B]
Total Silver	mg/L	5	0.12	0.010		<0.010[<B]
Total Tin	mg/L	5		0.020		<0.020[<A]
Total Titanium	mg/L	5		0.010		0.012[<A]
Total Zinc	mg/L	2	0.04	0.020		<0.020[<B]

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: A Refers to ON Bradford SN, B Refers to ON Bradford SM
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: Iris Verástegui

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Exceedance Summary

AGAT WORK ORDER: 22T861751

PROJECT: 60636190

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Brian Holden

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
3495335	BH 9-1	ON Bradford SM	Sewer Use - Bradford Sanitary/Storm Sewer Use By-Law - Inorganics (2015)	Phenols	mg/L	0.008	0.014

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: AECOM CANADA LTD

AGAT WORK ORDER: 22T861751

PROJECT: 60636190

ATTENTION TO: Brian Holden

SAMPLING SITE:Bradford Bypass (BPP)

SAMPLED BY:Dhwanish P.

Trace Organics Analysis

RPT Date: Feb 25, 2022			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Sewer Use - Bradford Sanitary/Storm - Organics (2015)															
Oil and Grease (animal/vegetable) in water	3478434		0.98	0.94	NA	< 0.5	101%	70%	130%	107%	70%	130%	102%	70%	130%
Oil and Grease (mineral) in water	3478434		0.73	0.71	NA	< 0.5	81%	70%	130%	83%	70%	130%	80%	70%	130%
Methylene Chloride	3497709		<0.3	<0.3	NA	< 0.3	117%	50%	140%	91%	60%	130%	99%	50%	140%
cis- 1,2-Dichloroethylene	3497709		<0.2	<0.2	NA	< 0.2	98%	50%	140%	111%	60%	130%	99%	50%	140%
Chloroform	3497709		8.3	7.8	6.1%	< 0.2	107%	50%	140%	116%	60%	130%	102%	50%	140%
Benzene	3497709		<0.2	<0.2	NA	< 0.2	109%	50%	140%	97%	60%	130%	112%	50%	140%
Trichloroethylene	3497709		<0.2	<0.2	NA	< 0.2	86%	50%	140%	116%	60%	130%	112%	50%	140%
trans-1,3-Dichloropropene	3497709		<0.30	<0.30	NA	< 0.30	81%	50%	140%	88%	60%	130%	80%	50%	140%
Toluene	3497709		<0.2	<0.2	NA	< 0.2	87%	50%	140%	102%	60%	130%	85%	50%	140%
Tetrachloroethene	3497709		<0.1	<0.1	NA	< 0.1	86%	50%	140%	109%	60%	130%	89%	50%	140%
Ethylbenzene	3497709		<0.1	<0.1	NA	< 0.1	73%	50%	140%	87%	60%	130%	71%	50%	140%
1,1,2,2-Tetrachloroethane	3497709		<0.1	<0.1	NA	< 0.1	113%	50%	140%	105%	60%	130%	111%	50%	140%
1,4-Dichlorobenzene	3497709		<0.1	<0.1	NA	< 0.1	118%	50%	140%	87%	60%	130%	101%	50%	140%
1,2-Dichlorobenzene	3497709		<0.1	<0.1	NA	< 0.1	116%	50%	140%	116%	60%	130%	119%	50%	140%
PCBs	3476343		< 0.2	< 0.2	NA	< 0.2	98%	50%	130%	103%	50%	140%	98%	50%	140%
Di-n-butyl phthalate	3480144		< 0.5	< 0.5	NA	< 0.5	74%	50%	140%	75%	50%	140%	99%	50%	140%
Bis(2-éthylhexyl)phthalate	3480144		< 0.5	< 0.5	NA	< 0.5	78%	50%	140%	89%	50%	140%	89%	50%	140%

Comments: When the average of the sample and duplicate results is less than 5x the RDL, the Relative Percent Difference (RPD) will be indicated as Not Applicable (NA).

Certified By: N Popnikolof

AGAT Laboratories
5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: AECOM CANADA LTD

AGAT WORK ORDER: 22T861751

PROJECT: 60636190

ATTENTION TO: Brian Holden

SAMPLING SITE:Bradford Bypass (BPP)

SAMPLED BY:Dhwanish P.

Ultra Trace Analysis

RPT Date: Feb 25, 2022			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Nonylphenol and Nonylphenol Ethoxylates (Ontario, mg/L)															
Total Nonylphenol	1	3498740	0.002	0.002	NA	< 0.001	NA	60%	140%	95%	60%	140%	NA	60%	140%
NP1EO	1	3498740	0.004	0.004	NA	< 0.001	NA	60%	140%	80%	60%	140%	NA	60%	140%
NP2EO	1	3498740	0.0012	0.0011	NA	< 0.0003	NA	60%	140%	99%	60%	140%	NA	60%	140%

Certified By:

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: AECOM CANADA LTD

AGAT WORK ORDER: 22T861751

PROJECT: 60636190

ATTENTION TO: Brian Holden

SAMPLING SITE:Bradford Bypass (BPP)

SAMPLED BY:Dhwanish P.

Water Analysis

RPT Date: Feb 25, 2022			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Sewer Use - Bradford Sanitary/Storm Sewer Use By-Law - Inorganics (2015)															
pH	3495924		7.48	7.52	0.5%	NA	102%	90%	110%						
Total Suspended Solids	3495335	3495335	15	16	NA	< 10	98%	80%	120%						
Fluoride	3494437		<0.05	<0.05	NA	< 0.05	101%	70%	130%	102%	80%	120%	104%	70%	130%
Sulphate	3494437		175	188	7.2%	< 0.10	97%	70%	130%	103%	80%	120%	NA	70%	130%
Total Cyanide	3490367		0.004	0.004	NA	< 0.002	106%	70%	130%	104%	80%	120%	112%	70%	130%
Phenols	3495924		<0.002	<0.002	NA	< 0.002	101%	90%	110%	103%	90%	110%	105%	80%	120%
Total Kjeldahl Nitrogen	3497301		45.5	41.2	9.9%	< 0.10	100%	70%	130%	99%	80%	120%	94%	70%	130%
Total Aluminum	3501486		1.35	1.29	4.5%	< 0.010	106%	70%	130%	98%	80%	120%	109%	70%	130%
Total Antimony	3501486		<0.020	<0.020	NA	< 0.020	104%	70%	130%	93%	80%	120%	87%	70%	130%
Total Arsenic	3501486		<0.015	<0.015	NA	< 0.015	95%	70%	130%	95%	80%	120%	83%	70%	130%
Total Cadmium	3501486		<0.010	<0.010	NA	< 0.010	100%	70%	130%	95%	80%	120%	86%	70%	130%
Total Chromium	3501486		<0.015	<0.015	NA	< 0.015	100%	70%	130%	91%	80%	120%	89%	70%	130%
Total Cobalt	3501486		<0.010	<0.010	NA	< 0.010	101%	70%	130%	93%	80%	120%	89%	70%	130%
Total Copper	3501486		0.113	0.112	0.9%	< 0.002	100%	70%	130%	95%	80%	120%	84%	70%	130%
Total Lead	3501486		<0.020	<0.020	NA	< 0.020	99%	70%	130%	91%	80%	120%	82%	70%	130%
Total Manganese	3501486		0.146	0.150	2.7%	< 0.020	102%	70%	130%	93%	80%	120%	85%	70%	130%
Total Molybdenum	3501486		<0.020	<0.020	NA	< 0.020	107%	70%	130%	97%	80%	120%	95%	70%	130%
Total Mercury	3495335	3495335	<0.0002	<0.0002	NA	< 0.0002	103%	70%	130%	99%	80%	120%	99%	70%	130%
Total Nickel	3501486		<0.015	<0.015	NA	< 0.015	101%	70%	130%	94%	80%	120%	90%	70%	130%
Total Phosphorus	3495536		0.06	0.07	NA	< 0.02	104%	90%	110%	99%	90%	110%	100%	80%	120%
Total Selenium	3501486		<0.002	<0.002	NA	< 0.002	97%	70%	130%	100%	80%	120%	84%	70%	130%
Total Silver	3501486		<0.010	<0.010	NA	< 0.010	101%	70%	130%	95%	80%	120%	86%	70%	130%
Total Tin	3501486		<0.020	<0.020	NA	< 0.020	101%	70%	130%	91%	80%	120%	86%	70%	130%
Total Titanium	3501486		<0.010	<0.010	NA	< 0.010	102%	70%	130%	96%	80%	120%	94%	70%	130%
Total Zinc	3501486		0.026	0.033	NA	< 0.020	103%	70%	130%	97%	80%	120%	85%	70%	130%

Comments: NA signifies Not Applicable.
If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.
Matrix spike: Spike level < native concentration. Matrix spike acceptance limits do not apply.

CBOD5

Biochemical Oxygen Demand, Carbonaceous	3495321		<6.00	<6.00	NA	< 2	95%	70%	130%						

Comments: NA signifies Not Applicable.
If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.

Certified By: Iris Verástegui

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Method Summary

CLIENT NAME: AECOM CANADA LTD

AGAT WORK ORDER: 22T861751

PROJECT: 60636190

ATTENTION TO: Brian Holden

SAMPLING SITE:Bradford Bypass (BPP)

SAMPLED BY:Dhwanish P.

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Oil and Grease (animal/vegetable) in water	VOL-91-5011	EPA SW-846 1664A & SM 5520	BALANCE
Oil and Grease (mineral) in water	VOL-91-5011	EPA SW-846 1664A & SM 5520	BALANCE
Methylene Chloride	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
cis- 1,2-Dichloroethylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Chloroform	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Benzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Trichloroethylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
trans-1,3-Dichloropropene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Toluene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Tetrachloroethene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Ethylbenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,1,2,2-Tetrachloroethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,4-Dichlorobenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,2-Dichlorobenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Xylenes (Total)	VOL-91-5001	modified from EPA 5030B & EPA 8260D	CALCULATION
Toluene-d8	VOL-91- 5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
4-Bromofluorobenzene	VOL-91- 5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
PCBs	ORG-91-5112	EPA SW-846 3510 & 8082	GC/ECD
Decachlorobiphenyl	ORG-91-5112	EPA SW-846 8081A & 8082	GC/ECD
Di-n-butyl phthalate	ORG-91-5114	EPA SW-846 3510C & 8270E	GC/MS
Bis(2-éthylhexyl)phthalate	ORG-91-5114	EPA SW-846 3510C & 8270E	GC/MS
2,4,6-Tribromophenol	ORG-91-5114	modified from EPA 3510C, 8270E & ON MOECC E3265	GC/MS
Chrysene-d12			GC/MS
Ultra Trace Analysis			
Total Nonylphenol	TOX-151-19003F	ASTM D7065-6	LCMSMS
NP1EO	TOX-151-19003F	ASTM D7065-6	LCMSMS
NP2EO	TOX-151-19003F	ASTM D7065-6	LCMSMS
Total Nonylphenol Ethoxylates	TOX-19003F	ASTM D7065-6	LCMSMS

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Method Summary

CLIENT NAME: AECOM CANADA LTD

AGAT WORK ORDER: 22T861751

PROJECT: 60636190

ATTENTION TO: Brian Holden

SAMPLING SITE:Bradford Bypass (BPP)

SAMPLED BY:Dhwanish P.

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Biochemical Oxygen Demand, Carbonaceous	INOR-121-6023	SM 5210 B	INCUBATOR
pH	INOR-93-6000	modified from SM 4500-H+ B	PC TITRATE
Total Suspended Solids	INOR-93-6028	modified from EPA 1684,ON MOECC E3139,SM 2540C,D	BALANCE
Fluoride	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Total Cyanide	INOR-93-6051	modified from MOECC E3015; SM 4500-CN- A, B, & C	TECHNICON AUTO ANALYZER
Phenols	INOR-93-6072	modified from SM 5530 D	LACHAT FIA
Total Kjeldahl Nitrogen	INOR-93-6048	modified from EPA 351.2 and SM 4500-NORG D	LACHAT FIA
Total Aluminum	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Antimony	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Arsenic	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Cadmium	MET -93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Chromium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Cobalt	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Copper	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Lead	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Manganese	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Molybdenum	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Mercury	MET-93-6100	modified from EPA 245.2 and SM 3112 B	CVAAS
Total Nickel	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Phosphorus	INOR-93-6022	SM 4500-P B&E	SPECTROPHOTOMETR
Total Selenium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Silver	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Tin	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Titanium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Zinc	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS

AGAT Laboratories

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water consumed by humans)

Report Information:

Company: AECOM Canada Ltd
Contact: Brian Holden / Dhanvish Parilla
Address: 105 Commerce Valley Dr W, 7th floor
Markham, ON
Phone: 416 478 5590 Fax:
Reports to be sent to:
1. Email: Dhanvish.Parilla@aecom.com
2. Email: Brian.Holden@aecom.com

Regulatory Requirements:

(Please check all applicable boxes)

- ☐ Regulation 153/04
  - Table _____ *Indicate One*
  - ☐ Ind/Com
  - ☐ Res/Park
  - ☐ Agriculture
  - Soil Texture *(Check One)*: ☐ Coarse ☐ Fine
- ☐ Excess Soils R406
  - Table _____ *Indicate One*
- ☐ Regulation 558
- ☐ CCME
- ☑ Sewer Use ☑ Sanitary ☐ Storm
  - Bradford *Region*
- ☐ Prov. Water Quality Objectives (PWQO)
- ☐ Other
  - _____ *Indicate One*

Is this submission for a **Record of Site Condition?** ☐ Yes ☒ No

Report Guideline on *Certificate of Analysis* ☑ Yes ☐ No

Project Information:

Project: 60636990
Site Location: Bradford Bypass (BPB)
Sampled By: Dhanvish Parilla
AGAT Quote #: _____ PO: _____
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☑ No ☐

Company:
Contact:
Address:
Email:

Sample Matrix Legend

B	Biota
GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

Laboratory Use Only

Work Order #: 22T861751
Cooler Quantity: 1 Large
Arrival Temperatures: 2 4 2 8 3 9
Custody Seal Intact: ☐ Yes ☐ No ☐ N/A
Notes: Free Zeb

Turnaround Time (TAT) Required:

Regular TAT ☑ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day

OR Date Required (Rush Surcharges May Apply): _____

Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

For 'Same Day' analysis, please contact your AGAT CPM

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI, DOC Y/N	O. Reg 153: Metals & Inorganics	O. Reg 153: Metals - ☐ CrVI, ☐ Hg, ☐ HWSB	O. Reg 153: BTEX, F1-F4 PHCs Analyze F4G if required ☐ Yes ☐ No	O. Reg 153: PAHs	O. Reg 153: PCBs	O. Reg 153: VOC	O. Reg 558: Landfill Disposal Characterization TCLP: ☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐ PCBs	O. Reg 406: Excess Soils SPLP Rainwater Leach SPLP: ☐ Metals ☐ VOCs ☐ SVOCs	O. Reg 406: Excess Soils Characterization Package pH, ICPMS Metals, BTEX, F1-F4	Salt - EC/SAR	Rush (next Business Day)	Potentially Hazardous or High Concentration (Y/N)
BH 9-1	Feb 8, 2022	10:00 AM PM	21	GW													X	
		AM PM																
		AM PM																
		AM PM																
		AM PM																
		AM PM																
		AM PM																
		AM PM																
		AM PM																
		AM PM																
		AM PM																

'22 FEB 8 4:43pm

Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time	
Dhanvish Parilla	Feb 8, 2022	3:00	ATRAE			
Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time	Page _____ of _____
Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time	№: T 130738

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: AECOM CANADA LTD
105 Commerce Valley Drive West 7th Floor
MARKHAM, ON L3T7W3
(905) 886-7022
ATTENTION TO: Brian Holden
PROJECT: 60636190
AGAT WORK ORDER: 22T861752
TRACE ORGANICS REVIEWED BY: Neli Popnikolova, Senior Chemist
ULTRA TRACE REVIEWED BY: Emmanuelle St-Pierre, chimiste
WATER ANALYSIS REVIEWED BY: Yris Verastegui, Report Reviewer
DATE REPORTED: Feb 25, 2022
PAGES (INCLUDING COVER): 13
VERSION*: 2

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

Notes

VERSION 2:Version 2 supersedes work order 22T861752 Version 1, issued February 18, 2022. Complete.
VERSION 1:February 18, 2022 - Partial (excluding NP/NPE)

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 22T861752

PROJECT: 60636190

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Brian Holden

SAMPLING SITE:Bradford Bypass (BPP)

SAMPLED BY:Dhwanish Parikh

Sewer Use - Bradford Sanitary/Storm - Organics (2015)

DATE RECEIVED: 2022-02-08

DATE REPORTED: 2022-02-25

				SAMPLE DESCRIPTION:	**BH 10-4**
				SAMPLE TYPE:	**Water**
				DATE SAMPLED:	**2022-02-08 11:30**
Parameter	**Unit**	**G / S: A**	**G / S: B**	**RDL**	**3495321**
Oil and Grease (animal/vegetable) in water	mg/L	100		0.5	<0.5[<A]
Oil and Grease (mineral) in water	mg/L	15		0.5	<0.5[<A]
Methylene Chloride	µg/L	2000	5.2	0.3	<0.3[<B]
cis- 1,2-Dichloroethylene	µg/L	4000	5.6	0.2	<0.2[<B]
Chloroform	µg/L	40	2	0.2	<0.2[<B]
Benzene	µg/L	10	2	0.2	<0.2[<B]
Trichloroethylene	µg/L	400	8	0.2	<0.2[<B]
trans-1,3-Dichloropropene	µg/L	140	5.6	0.30	<0.30[<B]
Toluene	µg/L	270	2	0.2	<0.2[<B]
Tetrachloroethene	µg/L	1000	4.4	0.1	<0.1[<B]
Ethylbenzene	µg/L	160	2	0.1	<0.1[<B]
1,1,2,2-Tetrachloroethane	µg/L	1400	17	0.1	<0.1[<B]
1,4-Dichlorobenzene	µg/L	80	6.8	0.1	<0.1[<B]
1,2-Dichlorobenzene	µg/L	50	5.6	0.1	<0.1[<B]
Xylenes (Total)	µg/L	1400	4.4	0.2	<0.2[<B]
PCBs	µg/L	1	0.4	0.2	<0.2[<B]
Di-n-butyl phthalate	ug/L	80	15	0.5	<0.5[<B]
Bis(2-éthylhexyl)phthalate	µg/L	12	8.8	0.5	<0.5[<B]
Surrogate	**Unit**		**Acceptable Limits**		
Toluene-d8	% Recovery		50-140		98
4-Bromofluorobenzene	% Recovery		50-140		83
Decachlorobiphenyl	%		50-140		106
2,4,6-Tribromophenol	%		50-140		89
Chrysene-d12	%		50-140		78

Certified By: N Popnikolof

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 22T861752

PROJECT: 60636190

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Brian Holden

SAMPLING SITE:Bradford Bypass (BPP)

SAMPLED BY:Dhwanish Parikh

Sewer Use - Bradford Sanitary/Storm - Organics (2015)

DATE RECEIVED: 2022-02-08 **DATE REPORTED: 2022-02-25**

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: A Refers to ON Bradford SN, B Refers to ON Bradford SM
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

3495321 Oil and Grease animal/vegetable is a calculated parameter. The calculated value is the difference between Total O&G and Mineral O&G.
Xylenes total is a calculated parameter. The calculated value is the sum of m&p-Xylene and o-Xylene.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: N Popnikolof

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 22T861752

PROJECT: 60636190

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Brian Holden

SAMPLING SITE:Bradford Bypass (BPP)

SAMPLED BY:Dhwanish Parikh

Nonylphenol and Nonylphenol Ethoxylates (Ontario, mg/L)

DATE RECEIVED: 2022-02-08

DATE REPORTED: 2022-02-25

			SAMPLE DESCRIPTION:	BH 10-4
			SAMPLE TYPE:	Water
			DATE SAMPLED:	2022-02-08 11:30
Parameter	**Unit**	**G / S**	**RDL**	**3495321**
Total Nonylphenol	mg/L	20	0.001	<0.001
NP1EO	mg/L		0.001	<0.001
NP2EO	mg/L		0.0003	<0.0003
Total Nonylphenol Ethoxylates	mg/L	0.2	0.001	<0.001

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to ON Bradford SN
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

Analysis performed at AGAT Montréal (unless marked by *)

Certified By:

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 22T861752

PROJECT: 60636190

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Brian Holden

SAMPLING SITE:Bradford Bypass (BPP)

SAMPLED BY:Dhwanish Parikh

CBOD5

DATE RECEIVED: 2022-02-08

DATE REPORTED: 2022-02-25

				SAMPLE DESCRIPTION:	**BH 10-4**
				SAMPLE TYPE:	**Water**
				DATE SAMPLED:	**2022-02-08 11:30**
Parameter	**Unit**	**G / S: A**	**G / S: B**	**RDL**	**3495321**
Biochemical Oxygen Demand, Carbonaceous	mg/L	300	15	6.00	<6.00[<B]

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: A Refers to ON Brantford SN, B Refers to ON Bradford SM
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

3495321 RDL for BOD is raised due to insufficient DO depletion at selected dilution levels.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By: Iris Verástegui

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 22T861752

PROJECT: 60636190

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Brian Holden

SAMPLING SITE:Bradford Bypass (BPP)

SAMPLED BY:Dhwanish Parikh

Sewer Use - Bradford Sanitary/Storm Sewer Use By-Law - Inorganics (2015)

DATE RECEIVED: 2022-02-08

DATE REPORTED: 2022-02-25

					SAMPLE DESCRIPTION:	BH 10-4
					SAMPLE TYPE:	Water
					DATE SAMPLED:	2022-02-08 11:30
Parameter	Unit	G / S: A	G / S: B	RDL		3495321
pH	pH Units	6.0-9.5	6.0-9.5	NA		7.52
Total Suspended Solids	mg/L	350	15	10		10[<B]
Fluoride	mg/L	10		0.05		<0.05[<A]
Sulphate	mg/L	1500		0.38		10.6[<A]
Total Cyanide	mg/L	2	0.02	0.002		<0.002[<B]
Phenols	mg/L	1	0.008	0.002		0.041[B-A]
Total Kjeldahl Nitrogen	mg/L	100	1	0.10		1.28[B-A]
Total Aluminum	mg/L	50		0.010		0.124[<A]
Total Antimony	mg/L	5		0.020		<0.020[<A]
Total Arsenic	mg/L	1	0.02	0.015		<0.015[<B]
Total Cadmium	mg/L	0.7	0.008	0.010		<0.010[<A]
Total Chromium	mg/L	2	0.08	0.015		<0.015[<B]
Total Cobalt	mg/L	5		0.010		<0.010[<A]
Total Copper	mg/L	3	0.05	0.002		<0.002[<B]
Total Lead	mg/L	1	0.12	0.020		<0.020[<B]
Total Manganese	mg/L	5	0.15	0.020		0.716[B-A]
Total Molybdenum	mg/L	5		0.020		<0.020[<A]
Total Mercury	mg/L	0.010		0.0002		<0.0002[<A]
Total Nickel	mg/L	2	0.08	0.015		<0.015[<B]
Total Phosphorus	mg/L	10	0.4	0.02		0.03[<B]
Total Selenium	mg/L	1	0.02	0.002		<0.002[<B]
Total Silver	mg/L	5	0.12	0.010		<0.010[<B]
Total Tin	mg/L	5		0.020		<0.020[<A]
Total Titanium	mg/L	5		0.010		<0.010[<A]
Total Zinc	mg/L	2	0.04	0.020		<0.020[<B]

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: A Refers to ON Bradford SN, B Refers to ON Bradford SM
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

3495321 Dilution required, RDL has been increased accordingly.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: Iris Verástegui

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Exceedance Summary

AGAT WORK ORDER: 22T861752

PROJECT: 60636190

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Brian Holden

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
3495321	BH 10-4	ON Bradford SM	Sewer Use - Bradford Sanitary/Storm Sewer Use By-Law - Inorganics (2015)	Phenols	mg/L	0.008	0.041
3495321	BH 10-4	ON Bradford SM	Sewer Use - Bradford Sanitary/Storm Sewer Use By-Law - Inorganics (2015)	Total Kjeldahl Nitrogen	mg/L	1	1.28
3495321	BH 10-4	ON Bradford SM	Sewer Use - Bradford Sanitary/Storm Sewer Use By-Law - Inorganics (2015)	Total Manganese	mg/L	0.15	0.716

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: AECOM CANADA LTD

AGAT WORK ORDER: 22T861752

PROJECT: 60636190

ATTENTION TO: Brian Holden

SAMPLING SITE:Bradford Bypass (BPP)

SAMPLED BY:Dhwanish Parikh

Trace Organics Analysis

RPT Date: Feb 25, 2022			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Sewer Use - Bradford Sanitary/Storm - Organics (2015)															
Oil and Grease (animal/vegetable) in water	3478434		0.98	0.94	NA	< 0.5	101%	70%	130%	107%	70%	130%	102%	70%	130%
Oil and Grease (mineral) in water	3478434		0.73	0.71	NA	< 0.5	81%	70%	130%	83%	70%	130%	80%	70%	130%
Methylene Chloride	3497709		<0.3	<0.3	NA	< 0.3	117%	50%	140%	91%	60%	130%	99%	50%	140%
cis- 1,2-Dichloroethylene	3497709		<0.2	<0.2	NA	< 0.2	98%	50%	140%	111%	60%	130%	99%	50%	140%
Chloroform	3497709		8.3	7.8	6.1%	< 0.2	107%	50%	140%	116%	60%	130%	102%	50%	140%
Benzene	3497709		<0.2	<0.2	NA	< 0.2	109%	50%	140%	97%	60%	130%	112%	50%	140%
Trichloroethylene	3497709		<0.2	<0.2	NA	< 0.2	86%	50%	140%	116%	60%	130%	112%	50%	140%
trans-1,3-Dichloropropene	3497709		<0.30	<0.30	NA	< 0.30	81%	50%	140%	88%	60%	130%	80%	50%	140%
Toluene	3497709		<0.2	<0.2	NA	< 0.2	87%	50%	140%	102%	60%	130%	85%	50%	140%
Tetrachloroethene	3497709		<0.1	<0.1	NA	< 0.1	86%	50%	140%	109%	60%	130%	89%	50%	140%
Ethylbenzene	3497709		<0.1	<0.1	NA	< 0.1	73%	50%	140%	87%	60%	130%	71%	50%	140%
1,1,2,2-Tetrachloroethane	3497709		<0.1	<0.1	NA	< 0.1	113%	50%	140%	105%	60%	130%	111%	50%	140%
1,4-Dichlorobenzene	3497709		<0.1	<0.1	NA	< 0.1	118%	50%	140%	87%	60%	130%	101%	50%	140%
1,2-Dichlorobenzene	3497709		<0.1	<0.1	NA	< 0.1	116%	50%	140%	116%	60%	130%	119%	50%	140%
PCBs	3476343		< 0.2	< 0.2	NA	< 0.2	98%	50%	130%	103%	50%	140%	98%	50%	140%
Di-n-butyl phthalate	3480144		< 0.5	< 0.5	NA	< 0.5	74%	50%	140%	75%	50%	140%	99%	50%	140%
Bis(2-éthylhexyl)phthalate	3480144		< 0.5	< 0.5	NA	< 0.5	78%	50%	140%	89%	50%	140%	89%	50%	140%

Comments: When the average of the sample and duplicate results is less than 5x the RDL, the Relative Percent Difference (RPD) will be indicated as Not Applicable (NA).

Certified By: N Popnikolof

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: AECOM CANADA LTD

AGAT WORK ORDER: 22T861752

PROJECT: 60636190

ATTENTION TO: Brian Holden

SAMPLING SITE:Bradford Bypass (BPP)

SAMPLED BY:Dhwanish Parikh

Ultra Trace Analysis

RPT Date: Feb 25, 2022			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Nonylphenol and Nonylphenol Ethoxylates (Ontario, mg/L)															
Total Nonylphenol	1	3498740	0.002	0.002	NA	< 0.001	NA	60%	140%	95%	60%	140%	NA	60%	140%
NP1EO	1	3498740	0.004	0.004	NA	< 0.001	NA	60%	140%	80%	60%	140%	NA	60%	140%
NP2EO	1	3498740	0.0012	0.0011	NA	< 0.0003	NA	60%	140%	99%	60%	140%	NA	60%	140%

Certified By:

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: AECOM CANADA LTD

AGAT WORK ORDER: 22T861752

PROJECT: 60636190

ATTENTION TO: Brian Holden

SAMPLING SITE:Bradford Bypass (BPP)

SAMPLED BY:Dhwanish Parikh

Water Analysis

RPT Date: Feb 25, 2022			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Sewer Use - Bradford Sanitary/Storm Sewer Use By-Law - Inorganics (2015)															
pH	3495924		7.48	7.52	0.5%	NA	102%	90%	110%						
Total Suspended Solids	3495335		15	16	NA	< 10	98%	80%	120%						
Fluoride	3494437		<0.05	<0.05	NA	< 0.05	101%	70%	130%	102%	80%	120%	104%	70%	130%
Sulphate	3494437		175	188	7.2%	< 0.10	97%	70%	130%	103%	80%	120%	NA	70%	130%
Total Cyanide	3490367		0.004	0.004	NA	< 0.002	106%	70%	130%	104%	80%	120%	112%	70%	130%
Phenols	3495924		<0.002	<0.002	NA	< 0.002	101%	90%	110%	103%	90%	110%	105%	80%	120%
Total Kjeldahl Nitrogen	3497301		45.5	41.2	9.9%	< 0.10	100%	70%	130%	99%	80%	120%	94%	70%	130%
Total Aluminum	3501486		1.35	1.29	4.5%	< 0.010	106%	70%	130%	98%	80%	120%	109%	70%	130%
Total Antimony	3501486		<0.020	<0.020	NA	< 0.020	104%	70%	130%	93%	80%	120%	87%	70%	130%
Total Arsenic	3501486		<0.015	<0.015	NA	< 0.015	95%	70%	130%	95%	80%	120%	83%	70%	130%
Total Cadmium	3501486		<0.010	<0.010	NA	< 0.010	100%	70%	130%	95%	80%	120%	86%	70%	130%
Total Chromium	3501486		<0.015	<0.015	NA	< 0.015	100%	70%	130%	91%	80%	120%	89%	70%	130%
Total Cobalt	3501486		<0.010	<0.010	NA	< 0.010	101%	70%	130%	93%	80%	120%	89%	70%	130%
Total Copper	3501486		0.113	0.112	0.9%	< 0.002	100%	70%	130%	95%	80%	120%	84%	70%	130%
Total Lead	3501486		<0.020	<0.020	NA	< 0.020	99%	70%	130%	91%	80%	120%	82%	70%	130%
Total Manganese	3501486		0.146	0.150	2.7%	< 0.020	102%	70%	130%	93%	80%	120%	85%	70%	130%
Total Molybdenum	3501486		<0.020	<0.020	NA	< 0.020	107%	70%	130%	97%	80%	120%	95%	70%	130%
Total Mercury	3495335		<0.0002	<0.0002	NA	< 0.0002	103%	70%	130%	99%	80%	120%	99%	70%	130%
Total Nickel	3501486		<0.015	<0.015	NA	< 0.015	101%	70%	130%	94%	80%	120%	90%	70%	130%
Total Phosphorus	3495536		0.06	0.07	NA	< 0.02	104%	90%	110%	99%	90%	110%	100%	80%	120%
Total Selenium	3501486		<0.002	<0.002	NA	< 0.002	97%	70%	130%	100%	80%	120%	84%	70%	130%
Total Silver	3501486		<0.010	<0.010	NA	< 0.010	101%	70%	130%	95%	80%	120%	86%	70%	130%
Total Tin	3501486		<0.020	<0.020	NA	< 0.020	101%	70%	130%	91%	80%	120%	86%	70%	130%
Total Titanium	3501486		<0.010	<0.010	NA	< 0.010	102%	70%	130%	96%	80%	120%	94%	70%	130%
Total Zinc	3501486		0.026	0.033	NA	< 0.020	103%	70%	130%	97%	80%	120%	85%	70%	130%

Comments: NA signifies Not Applicable.
If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.
Matrix spike NA: Spike level < native concentration. Matrix spike acceptance limits do not apply and are not calculated.

CBOD5

Biochemical Oxygen Demand, Carbonaceous	3495321	3495321	<6.00	<6.00	NA	< 2	95%	70%	130%

Comments: If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.

Certified By: Iris Verástegui

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Method Summary

CLIENT NAME: AECOM CANADA LTD

AGAT WORK ORDER: 22T861752

PROJECT: 60636190

ATTENTION TO: Brian Holden

SAMPLING SITE:Bradford Bypass (BPP)

SAMPLED BY:Dhwanish Parikh

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Oil and Grease (animal/vegetable) in water	VOL-91-5011	EPA SW-846 1664A & SM 5520	BALANCE
Oil and Grease (mineral) in water	VOL-91-5011	EPA SW-846 1664A & SM 5520	BALANCE
Methylene Chloride	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
cis- 1,2-Dichloroethylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Chloroform	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Benzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Trichloroethylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
trans-1,3-Dichloropropene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Toluene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Tetrachloroethene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Ethylbenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,1,2,2-Tetrachloroethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,4-Dichlorobenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,2-Dichlorobenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Xylenes (Total)	VOL-91-5001	modified from EPA 5030B & EPA 8260D	CALCULATION
Toluene-d8	VOL-91- 5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
4-Bromofluorobenzene	VOL-91- 5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
PCBs	ORG-91-5112	EPA SW-846 3510 & 8082	GC/ECD
Decachlorobiphenyl	ORG-91-5112	EPA SW-846 8081A & 8082	GC/ECD
Di-n-butyl phthalate	ORG-91-5114	EPA SW-846 3510C & 8270E	GC/MS
Bis(2-éthylhexyl)phthalate	ORG-91-5114	EPA SW-846 3510C & 8270E	GC/MS
2,4,6-Tribromophenol	ORG-91-5114	modified from EPA 3510C, 8270E & ON MOECC E3265	GC/MS
Chrysene-d12			GC/MS
Ultra Trace Analysis			
Total Nonylphenol	TOX-151-19003F	ASTM D7065-6	LCMSMS
NP1EO	TOX-151-19003F	ASTM D7065-6	LCMSMS
NP2EO	TOX-151-19003F	ASTM D7065-6	LCMSMS
Total Nonylphenol Ethoxylates	TOX-19003F	ASTM D7065-6	LCMSMS

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Method Summary

CLIENT NAME: AECOM CANADA LTD

AGAT WORK ORDER: 22T861752

PROJECT: 60636190

ATTENTION TO: Brian Holden

SAMPLING SITE:Bradford Bypass (BPP)

SAMPLED BY:Dhwanish Parikh

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Biochemical Oxygen Demand, Carbonaceous	INOR-121-6023	SM 5210 B	INCUBATOR
pH	INOR-93-6000	modified from SM 4500-H+ B	PC TITRATE
Total Suspended Solids	INOR-93-6028	modified from EPA 1684,ON MOECC E3139,SM 2540C,D	BALANCE
Fluoride	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Total Cyanide	INOR-93-6051	modified from MOECC E3015; SM 4500-CN- A, B, & C	TECHNICON AUTO ANALYZER
Phenols	INOR-93-6072	modified from SM 5530 D	LACHAT FIA
Total Kjeldahl Nitrogen	INOR-93-6048	modified from EPA 351.2 and SM 4500-NORG D	LACHAT FIA
Total Aluminum	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Antimony	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Arsenic	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Cadmium	MET -93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Chromium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Cobalt	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Copper	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Lead	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Manganese	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Molybdenum	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Mercury	MET-93-6100	modified from EPA 245.2 and SM 3112 B	CVAAS
Total Nickel	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Phosphorus	INOR-93-6022	SM 4500-P B&E	SPECTROPHOTOMETR
Total Selenium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Silver	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Tin	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Titanium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Zinc	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS

AGAT Laboratories

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water consumed by humans)

Laboratory Use Only

Work Order #: 22T861752.

Cooler Quantity: 1 BK (Chec ice) -

Arrival Temperatures: 1.6 | 1.8 | 1.4

Custody Seal Intact: ☐Yes ☐No ☐N/A

Notes:

Report Information:

Company: AECOM Canada Ltd.

Contact: Brian Holden / Dhwanish Parikh

Address: 105 Commerce Valley Dr W, 7th Floor Markham, ON

Phone: 416 422 5590 Fax:

Reports to be sent to:

1. Email: dhwanish.parikh@aecom.com
2. Email: Brian.holden@aecom.com

Regulatory Requirements:

(Please check all applicable boxes)

☐ Regulation 153/04 — Table (Indicate One): ☐Ind/Com ☐Res/Park ☐Agriculture

Soil Texture (Check One): ☐Coarse ☐Fine

☐ Excess Soils R406 — Table (Indicate One)

☐ Regulation 558

☐ CCME

☑ Sewer Use — ☐Sanitary ☐Storm — Bradford (Region)

☐ Prov. Water Quality Objectives (PWQO)

☐ Other (Indicate One)

Is this submission for a Record of Site Condition? ☐ Yes ☑ No

Report Guideline on Certificate of Analysis ☑ Yes ☐ No

Turnaround Time (TAT) Required:

Regular TAT ☑ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day

OR Date Required (Rush Surcharges May Apply):

Please provide prior notification for rush TAT

**TAT is exclusive of weekends and statutory holidays*

For 'Same Day' analysis, please contact your AGAT CPM

Project Information:

Project: 60636190

Site Location: Bradford Bypass (BBP)

Sampled By: Dhwanish Parikh

AGAT Quote #: PO:

Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☑ No ☐

Company:

Contact:

Address:

Email:

Sample Matrix Legend

B	Biota
GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

Analysis columns: Field Filtered - Metals, Hg, CrVI, DOC (Y/N); O. Reg 153: Metals & Inorganics; Metals - ☐ CrVI, ☐ Hg, ☐ HWSB; BTEX, F1-F4 PHCs; Analyze F4G if required ☐ Yes ☐ No; PAHs; PCBs; VOC; O. Reg 558: Landfill Disposal Characterization TCLP: TCLP: ☐ M&I ☐VOCs ☐ABNs ☐B(a)P ☐PCBs; O. Reg 406: Excess Soils SPLP Rainwater Leach SPLP: ☐Metals ☐VOCs ☐SVOCs; Excess Soils Characterization Package pH, ICPMS Metals, BTEX, F1-F4; Salt - EC/SAR; Bradford Sewer Use; Potentially Hazardous or High Concentration (Y/N)

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Y/N	Bradford Sewer Use
BH 10-4	Feb 8, 2022	11:30 AM	2	GW			X
		AM PM					
		AM PM					
		AM PM					
		AM PM					
		AM PM					
		AM PM					
		AM PM					
		AM PM					
		AM PM					
		AM PM					

Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
Dhwanish Parikh [signature]	Feb 8, 2022	3:00	Neil Romanoicz [signature]		

'22 FEB 8 4:43PM

Page ___ of ___

Nº: T 130731

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: AECOM CANADA LTD
105 COMMERCE VALLEY DR.W 7TH FLOOR
MARKHAM, ON L3T7W3
(905) 886-7022
ATTENTION TO: Dhwanish Parikh
PROJECT: 60636190
AGAT WORK ORDER: 22T894872
WATER ANALYSIS REVIEWED BY: Amanjot Bhela, Inorganic Lab Manager
DATE REPORTED: May 25, 2022
PAGES (INCLUDING COVER): 10
VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

Notes

Disclaimer:

- *All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.*
- *All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.*
- *AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.*
- *This Certificate shall not be reproduced except in full, without the written approval of the laboratory.*
- *The test results reported herewith relate only to the samples as received by the laboratory.*
- *Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.*
- *All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.*

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 22T894872

PROJECT: 60636190

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Dhwanish Parikh

SAMPLING SITE:BPP

SAMPLED BY:Dhwanish Parikh

Water Quality Assessment - PWQO (mg/L)

DATE RECEIVED: 2022-05-12

DATE REPORTED: 2022-05-25

		SAMPLE DESCRIPTION:		BH2-1		HRW-1
		SAMPLE TYPE:		Water		Water
		DATE SAMPLED:		2022-05-12 11:45		2022-05-12 12:45
Parameter	Unit	G / S	RDL	3851210	RDL	3851283
Electrical Conductivity	µS/cm		2	1010	2	1350
pH	pH Units	6.5-8.5	NA	7.83	NA	7.52
Saturation pH (Calculated)				6.13		6.13
Langelier Index (Calculated)				1.70		1.39
Hardness (as CaCO3) (Calculated)	mg/L		0.5	1840	0.5	1270
Total Dissolved Solids	mg/L		10	568	10	924
Alkalinity (as CaCO3)	mg/L		5	315	5	469
Bicarbonate (as CaCO3)	mg/L		5	315	5	469
Carbonate (as CaCO3)	mg/L		5	<5	5	<5
Hydroxide (as CaCO3)	mg/L		5	<5	5	<5
Fluoride	mg/L		0.05	<0.05	0.05	<0.05
Chloride	mg/L		0.12	189	0.12	200
Nitrate as N	mg/L		0.05	<0.05	0.05	<0.05
Nitrite as N	mg/L		0.05	<0.05	0.05	<0.05
Bromide	mg/L		0.05	<0.05	0.05	<0.05
Sulphate	mg/L		0.10	7.69	0.10	5.87
Ortho Phosphate as P	mg/L		0.10	<0.10	0.10	<0.10
Ammonia as N	mg/L		0.02	0.02	0.02	0.64
Ammonia-Un-ionized (Calculated)	mg/L	0.02	0.000002	0.000829	0.000002	0.0133
Total Phosphorus	mg/L	*	0.02	1.38	0.06	1.72
Total Organic Carbon	mg/L		0.5	5.5	0.5	13.1
True Colour	TCU		5.00	<5.00	5.00	18.5
Turbidity	NTU		0.9	1430	0.5	645
Total Calcium	mg/L		0.32	626	0.32	455
Total Magnesium	mg/L		0.34	66.2	0.34	31.5
Total Potassium	mg/L		1.15	9.73	1.15	6.39
Total Sodium	mg/L		0.45	102	0.45	92.0
Aluminum-dissolved	mg/L	*	0.004	<0.004	0.004	<0.004
Total Antimony	mg/L	0.020	0.001	<0.001	0.001	<0.001

Certified By:

Amanjot Bhela

ASSOCIATION OF THE CHEMICAL PROFESSION OF ONTARIO
CHARTERED
AMANJOT BHELA
CHEMIST

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 22T894872

PROJECT: 60636190

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Dhwanish Parikh

SAMPLING SITE:BPP

SAMPLED BY:Dhwanish Parikh

Water Quality Assessment - PWQO (mg/L)

DATE RECEIVED: 2022-05-12

DATE REPORTED: 2022-05-25

		SAMPLE DESCRIPTION:		BH2-1		HRW-1
		SAMPLE TYPE:		Water		Water
		DATE SAMPLED:		2022-05-12 11:45		2022-05-12 12:45
Parameter	Unit	G / S	RDL	3851210	RDL	3851283
Total Arsenic	mg/L	0.1	0.003	0.029	0.003	0.008
Total Barium	mg/L		0.002	0.450	0.002	0.196
Total Beryllium	mg/L	*	0.001	0.001	0.001	<0.001
Total Boron	mg/L	0.2	0.010	0.092	0.010	0.053
Total Cadmium	mg/L	0.0002	0.0001	0.0002	0.0001	0.0001
Total Chromium	mg/L		0.003	0.045	0.003	0.026
Total Cobalt	mg/L	0.0009	0.0005	**0.0178**	0.0005	**0.0186**
Total Copper	mg/L	0.005	0.001	**0.050**	0.001	**0.034**
Total Iron	mg/L	0.3	0.10	**43.5**	0.10	**55.3**
Total Lead	mg/L	*	0.001	0.022	0.001	0.014
Total Manganese	mg/L		0.002	1.51	0.002	6.54
Dissolved Mercury	mg/L	0.0002	0.0001	<0.0001	0.0001	<0.0001
Total Molybdenum	mg/L	0.040	0.002	0.004	0.002	0.003
Total Nickel	mg/L	0.025	0.003	**0.040**	0.003	**0.031**
Total Selenium	mg/L	0.1	0.002	0.010	0.002	0.009
Total Silver	mg/L	0.0001	0.0001	<0.0001	0.0001	<0.0001
Total Strontium	mg/L		0.005	1.42	0.005	1.04
Total Thallium	mg/L	0.0003	0.0003	**0.0005**	0.0003	0.0003
Total Tin	mg/L		0.002	<0.002	0.002	<0.002
Total Titanium	mg/L		0.10	1.39	0.010	0.957
Total Tungsten	mg/L	0.030	0.010	<0.010	0.010	<0.010
Total Uranium	mg/L	0.005	0.002	0.003	0.002	<0.002
Total Vanadium	mg/L	0.006	0.002	**0.070**	0.002	**0.044**
Total Zinc	mg/L	0.030	0.020	**0.100**	0.020	**0.068**
Total Zirconium	mg/L	0.004	0.004	**0.010**	0.004	**0.009**
Lab Filtration Aluminum Dissolved				5/13/2022		5/13/2022
Lab Filtration mercury				5/13/2022		5/13/2022

Certified By:

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 22T894872

PROJECT: 60636190

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Dhwanish Parikh

SAMPLING SITE:BPP

SAMPLED BY:Dhwanish Parikh

Water Quality Assessment - PWQO (mg/L)

DATE RECEIVED: 2022-05-12

DATE REPORTED: 2022-05-25

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to PWQO * Variable - refer to guideline reference document
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

3851210-3851283 Diss.Al and Diss.Hg completed on a lab filtered sample.
Un-ionized Ammonia RDL is a calculated detection limit. The calculation of Un-ionized Ammonia was based on lab measured parameters (pH and temperature) rather than the field parameters, these were not provided to the lab. The temperature is recorded at the time of pH measurement. Values are reported as calculated.
Dilution required, RDL has been increased accordingly.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Exceedance Summary

AGAT WORK ORDER: 22T894872

PROJECT: 60636190

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Dhwanish Parikh

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
3851210	BH2-1	ON PWQO	Water Quality Assessment - PWQO (mg/L)	Total Cobalt	mg/L	0.0009	0.0178
3851210	BH2-1	ON PWQO	Water Quality Assessment - PWQO (mg/L)	Total Copper	mg/L	0.005	0.050
3851210	BH2-1	ON PWQO	Water Quality Assessment - PWQO (mg/L)	Total Iron	mg/L	0.3	43.5
3851210	BH2-1	ON PWQO	Water Quality Assessment - PWQO (mg/L)	Total Nickel	mg/L	0.025	0.040
3851210	BH2-1	ON PWQO	Water Quality Assessment - PWQO (mg/L)	Total Thallium	mg/L	0.0003	0.0005
3851210	BH2-1	ON PWQO	Water Quality Assessment - PWQO (mg/L)	Total Vanadium	mg/L	0.006	0.070
3851210	BH2-1	ON PWQO	Water Quality Assessment - PWQO (mg/L)	Total Zinc	mg/L	0.030	0.100
3851210	BH2-1	ON PWQO	Water Quality Assessment - PWQO (mg/L)	Total Zirconium	mg/L	0.004	0.010
3851283	HRW-1	ON PWQO	Water Quality Assessment - PWQO (mg/L)	Total Cobalt	mg/L	0.0009	0.0186
3851283	HRW-1	ON PWQO	Water Quality Assessment - PWQO (mg/L)	Total Copper	mg/L	0.005	0.034
3851283	HRW-1	ON PWQO	Water Quality Assessment - PWQO (mg/L)	Total Iron	mg/L	0.3	55.3
3851283	HRW-1	ON PWQO	Water Quality Assessment - PWQO (mg/L)	Total Nickel	mg/L	0.025	0.031
3851283	HRW-1	ON PWQO	Water Quality Assessment - PWQO (mg/L)	Total Vanadium	mg/L	0.006	0.044
3851283	HRW-1	ON PWQO	Water Quality Assessment - PWQO (mg/L)	Total Zinc	mg/L	0.030	0.068
3851283	HRW-1	ON PWQO	Water Quality Assessment - PWQO (mg/L)	Total Zirconium	mg/L	0.004	0.009

AGAT Laboratories
5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: AECOM CANADA LTD
AGAT WORK ORDER: 22T894872
PROJECT: 60636190
ATTENTION TO: Dhwanish Parikh
SAMPLING SITE:BPP
SAMPLED BY:Dhwanish Parikh

Water Analysis

RPT Date: May 25, 2022			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Water Quality Assessment - PWQO (mg/L)															
Electrical Conductivity	3861980		849	853	0.5%	< 2	100%	90%	110%	NA			NA		
pH	3861980		7.79	7.87	1.0%	NA	101%	90%	110%	NA			NA		
Total Dissolved Solids	3854516		332	334	0.6%	< 10	100%	80%	120%	NA			NA		
Alkalinity (as CaCO3)	3861980		395	407	3.0%	< 5	90%	80%	120%	NA			NA		
Bicarbonate (as CaCO3)	3861980		395	407	3.0%	< 5	NA			NA			NA		
Carbonate (as CaCO3)	3861980		<5	<5	NA	< 5	NA			NA			NA		
Hydroxide (as CaCO3)	3861980		<5	<5	NA	< 5	NA			NA			NA		
Fluoride	3867019		<0.05	<0.05	NA	< 0.05	105%	70%	130%	105%	80%	120%	103%	70%	130%
Chloride	3867019		197	197	0.0%	< 0.10	89%	70%	130%	102%	80%	120%	NA	70%	130%
Nitrate as N	3867019		2.09	2.10	0.5%	< 0.05	96%	70%	130%	102%	80%	120%	102%	70%	130%
Nitrite as N	3867019		<0.05	<0.05	NA	< 0.05	100%	70%	130%	108%	80%	120%	113%	70%	130%
Bromide	3867019		<0.05	<0.05	NA	< 0.05	96%	70%	130%	99%	80%	120%	96%	70%	130%
Sulphate	3867019		16.4	16.5	0.6%	< 0.10	101%	70%	130%	105%	80%	120%	104%	70%	130%
Ortho Phosphate as P	3867019		<0.10	<0.10	NA	< 0.10	105%	70%	130%	104%	80%	120%	104%	70%	130%
Ammonia as N	3864487		23.0	22.9	0.4%	< 0.02	101%	70%	130%	101%	80%	120%	108%	70%	130%
Total Phosphorus	3861920		1.20	1.21	0.8%	< 0.02	95%	70%	130%	102%	80%	120%	NA	70%	130%
Total Organic Carbon	3851038		1.0	1.1	NA	< 0.5	97%	90%	110%	95%	90%	110%	93%	80%	120%
True Colour	3854513		<5.00	<5.00	NA	< 5	102%	90%	110%	NA			NA		
Turbidity	3851035		0.8	0.8	NA	< 0.5	100%	80%	120%	NA			NA		
Total Calcium	3851035		102	99.2	2.8%	< 0.10	94%	70%	130%	94%	80%	120%	93%	70%	130%
Total Magnesium	3851035		17.9	17.2	4.0%	< 0.10	94%	70%	130%	94%	80%	120%	95%	70%	130%
Total Potassium	3851035		1.93	1.69	NA	< 0.50	93%	70%	130%	93%	80%	120%	93%	70%	130%
Total Sodium	3851035		27.3	26.2	4.1%	< 0.10	95%	70%	130%	94%	80%	120%	96%	70%	130%
Aluminum-dissolved	3851210	3851210	<0.004	<0.004	NA	< 0.004	95%	70%	130%	96%	80%	120%	92%	70%	130%
Total Antimony	3851035		<0.001	<0.001	NA	< 0.001	105%	70%	130%	102%	80%	120%	106%	70%	130%
Total Arsenic	3851035		<0.003	<0.003	NA	< 0.003	96%	70%	130%	96%	80%	120%	102%	70%	130%
Total Barium	3851035		0.090	0.091	1.9%	< 0.002	101%	70%	130%	103%	80%	120%	105%	70%	130%
Total Beryllium	3851035		<0.001	<0.001	NA	< 0.001	96%	70%	130%	97%	80%	120%	102%	70%	130%
Total Boron	3851035		0.013	0.013	NA	< 0.010	96%	70%	130%	95%	80%	120%	96%	70%	130%
Total Cadmium	3851035		<0.0001	<0.0001	NA	< 0.0001	103%	70%	130%	102%	80%	120%	105%	70%	130%
Total Chromium	3851035		<0.003	<0.003	NA	< 0.003	100%	70%	130%	101%	80%	120%	104%	70%	130%
Total Cobalt	3851035		<0.0005	<0.0005	NA	< 0.0005	98%	70%	130%	106%	80%	120%	100%	70%	130%
Total Copper	3851035		0.002	0.001	NA	< 0.001	96%	70%	130%	104%	80%	120%	95%	70%	130%
Total Iron	3851035		0.222	0.217	2.3%	< 0.010	98%	70%	130%	106%	80%	120%	99%	70%	130%
Total Lead	3851035		<0.001	<0.001	NA	< 0.001	100%	70%	130%	99%	80%	120%	98%	70%	130%
Total Manganese	3851035		0.020	0.021	4.7%	< 0.002	100%	70%	130%	107%	80%	120%	102%	70%	130%
Dissolved Mercury	3860252		<0.0001	<0.0001	NA	< 0.0001	100%	70%	130%	99%	80%	120%	93%	70%	130%
Total Molybdenum	3851035		<0.002	<0.002	NA	< 0.002	100%	70%	130%	104%	80%	120%	108%	70%	130%
Total Nickel	3851035		<0.003	<0.003	NA	< 0.003	96%	70%	130%	104%	80%	120%	97%	70%	130%

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: AECOM CANADA LTD

AGAT WORK ORDER: 22T894872

PROJECT: 60636190

ATTENTION TO: Dhwanish Parikh

SAMPLING SITE:BPP

SAMPLED BY:Dhwanish Parikh

Water Analysis (Continued)

RPT Date: May 25, 2022			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Total Selenium	3851035		0.002	<0.002	NA	< 0.002	106%	70%	130%	98%	80%	120%	99%	70%	130%
Total Silver	3851035		<0.0001	<0.0001	NA	< 0.0001	94%	70%	130%	105%	80%	120%	95%	70%	130%
Total Strontium	3851035		0.222	0.232	4.3%	< 0.005	98%	70%	130%	108%	80%	120%	102%	70%	130%
Total Thallium	3851035		<0.0003	<0.0003	NA	< 0.0003	98%	70%	130%	104%	80%	120%	105%	70%	130%
Total Tin	3851035		<0.002	<0.002	NA	< 0.002	99%	70%	130%	102%	80%	120%	103%	70%	130%
Total Titanium	3851035		<0.010	<0.010	NA	< 0.010	106%	70%	130%	95%	80%	120%	107%	70%	130%
Total Tungsten	3851035		<0.010	<0.010	NA	< 0.010	93%	70%	130%	91%	80%	120%	94%	70%	130%
Total Uranium	3851035		0.002	0.002	NA	< 0.002	97%	70%	130%	104%	80%	120%	106%	70%	130%
Total Vanadium	3851035		<0.002	<0.002	NA	< 0.002	102%	70%	130%	110%	80%	120%	107%	70%	130%
Total Zinc	3851035		<0.020	<0.020	NA	< 0.020	99%	70%	130%	100%	80%	120%	106%	70%	130%
Total Zirconium	3851035		<0.004	<0.004	NA	< 0.004	100%	70%	130%	99%	80%	120%	100%	70%	130%

Comments: NA Signifies Not Applicable
Duplicate NA: results are under 5X the RDL and will not be calculated.
Matrix spike NA: Spike level < native concentration. Matrix spike acceptance limits do not apply and are not calculated.

Certified By:

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Method Summary

CLIENT NAME: AECOM CANADA LTD

AGAT WORK ORDER: 22T894872

PROJECT: 60636190

ATTENTION TO: Dhwanish Parikh

SAMPLING SITE:BPP

SAMPLED BY:Dhwanish Parikh

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Electrical Conductivity	INOR-93-6000	modified from SM 2510 B	PC TITRATE
pH	INOR-93-6000	modified from SM 4500-H+ B	PC TITRATE
Saturation pH (Calculated)		SM 2320 B	CALCULATION
Langelier Index (Calculated)		SM 2330B	CALCULATION
Hardness (as CaCO3) (Calculated)	MET-93-6105	modified from EPA SW-846 6010C & 200.7 & SM 2340 B	CALCULATION
Total Dissolved Solids	INOR-93-6028	modified from EPA 1684,ON MOECC E3139,SM 2540C,D	BALANCE
Alkalinity (as CaCO3)	INOR-93-6000	Modified from SM 2320 B	PC TITRATE
Bicarbonate (as CaCO3)	INOR-93-6000	modified from SM 2320 B	PC TITRATE
Carbonate (as CaCO3)	INOR-93-6000	modified from SM 2320 B	PC TITRATE
Hydroxide (as CaCO3)	INOR-93-6000	modified from SM 2320 B	PC TITRATE
Fluoride	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Chloride	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Nitrate as N	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Bromide	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Ortho Phosphate as P	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-93-6059	modified from SM 4500-NH3 H	LACHAT FIA
Ammonia-Un-ionized (Calculated)		MOE REFERENCE, PWQOs Tab 2	CALCULATION
Total Phosphorus	INOR-93-6022	modified from SM 4500-P B and SM 4500-P E	SPECTROPHOTOMETER
Total Organic Carbon	INOR-93-6049	modified from SM 5310 B	SHIMADZU CARBON ANALYZER
True Colour	INOR-93-6074	modified from SM 2120 B	LACHAT FIA
Turbidity	INOR-93-6044	modified from SM 2130 B	NEPHELOMETER
Total Calcium	MET-93-6105	modified from EPA 6010D	ICP/OES
Total Magnesium	MET-93-6105	modified from EPA 6010D	ICP/OES
Total Potassium	MET-93-6105	modified from EPA 6010D	ICP/OES
Total Sodium	MET-93-6105	modified from EPA 6010D	ICP/OES
Aluminum-dissolved	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Total Antimony	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Arsenic	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Barium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Beryllium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Boron	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Cadmium	MET -93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Chromium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Cobalt	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Copper	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Iron	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Method Summary

CLIENT NAME: AECOM CANADA LTD

AGAT WORK ORDER: 22T894872

PROJECT: 60636190

ATTENTION TO: Dhwanish Parikh

SAMPLING SITE:BPP

SAMPLED BY:Dhwanish Parikh

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Total Lead	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Manganese	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Dissolved Mercury	MET-93-6100	modified from EPA 245.2 and SM 3112 B	CVAAS
Total Molybdenum	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Nickel	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Selenium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Silver	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Strontium	INOR-93-6003	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Thallium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Tin	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Titanium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Tungsten	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Uranium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Vanadium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Zinc	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Zirconium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Lab Filtration Aluminum Dissolved	SR-78-9001		FILTRATION
Lab Filtration mercury	SR-78-9001		FILTRATION

AGAT Laboratories

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water consumed by humans)

Laboratory Use Only

Work Order #: 22T894872

Cooler Quantity: 1 large blk

Arrival Temperatures: 3.6 | 2.7 | 4.0

Custody Seal Intact: ☐ Yes ☐ No ☐ N/A

Notes: free ice

Report Information:

Company: AECOM Canada Ltd.
Contact: Dhwanish Parikh / Brian Holden
Address: 105 Commerce Valley Dr W, 7th floor
Markham, ON
Phone: 416 420 5590 Fax:
Reports to be sent to:
1. Email: dhwanish.parikh@aecom.com
2. Email: Brian.holden@aecom.com

Regulatory Requirements:

(Please check all applicable boxes)

☐ Regulation 153/04
Table (Indicate One) ☐ Ind/Com ☐ Res/Park ☐ Agriculture
Soil Texture (Check One) ☐ Coarse ☐ Fine

☐ Excess Soils R406
Table (Indicate One)
☐ Regulation 558
☐ CCME

☐ Sewer Use ☐ Sanitary ☐ Storm
(Region)
☑ Prov. Water Quality Objectives (PWQO)
☐ Other
(Indicate One)

Is this submission for a **Record of Site Condition**? ☐ Yes ☒ No

Report Guideline on *Certificate of Analysis* ☑ Yes ☐ No

Turnaround Time (TAT) Required:

Regular TAT ☑ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day

OR Date Required (Rush Surcharges May Apply):

Please provide prior notification for rush TAT
*TAT is exclusive of weekends and statutory holidays

For 'Same Day' analysis, please contact your AGAT CPM

Project Information:

Project: 60636490
Site Location: BPP
Sampled By: Dhwanish Parikh
AGAT Quote #: PO:
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☑ No ☐

Company:
Contact:
Address:
Email:

Sample Matrix Legend

B	Biota
GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI, DOC (Y/N)	O. Reg 153: Metals & Inorganics	O. Reg 153: Metals - ☐ CrVI, ☐ Hg, ☐ HWSB	O. Reg 153: BTEX, F1-F4 PHCs, Analyze F4G if required ☐ Yes ☐ No	O. Reg 153: PAHs	O. Reg 153: PCBs	O. Reg 153: VOC	O. Reg 558: Landfill Disposal Characterization TCLP: ☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐ PCBs	O. Reg 406: Excess Soils SPLP Rainwater Leach ☐ Metals ☐ VOCs ☐ SVOCs	O. Reg 406: Excess Soils Characterization Package pH, ICPMS Metals, BTEX, F1-F4	Salt - EC/SAR	(ABN) + ABN							Potentially Hazardous or High Concentration (Y/N)
BH 2-1	May 12, 22	11:45 AM/PM	8	GW													X							
MW-1	May 12, 22	12:45 AM/PM	8	GW													X							
		AM/PM																						
		AM/PM																						
		AM/PM																						
		AM/PM																						
		AM/PM																						
		AM/PM																						
		AM/PM																						
		AM/PM																						
		AM/PM																						

Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time
Dhwanish Parikh	May 12, 2022	3:30	Amber D.		
Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time
Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time

'22 MAY 12 4:44PM

Page of

N°: T 130923

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: AECOM CANADA LTD
105 COMMERCE VALLEY DR.W 7TH FLOOR
MARKHAM, ON L3T7W3
(905) 886-7022
ATTENTION TO: Dhwanish Parikh
PROJECT: 60636190
AGAT WORK ORDER: 22T895412
TRACE ORGANICS REVIEWED BY: Neli Popnikolova, Senior Chemist
ULTRA TRACE REVIEWED BY: Roza Makhtari, Chimiste, AGAT Montréal
WATER ANALYSIS REVIEWED BY: Yris Verastegui, Report Reviewer
DATE REPORTED: May 25, 2022
PAGES (INCLUDING COVER): 12
VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

Notes

Disclaimer:

- *All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.*
- *All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.*
- *AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.*
- *This Certificate shall not be reproduced except in full, without the written approval of the laboratory.*
- *The test results reported herewith relate only to the samples as received by the laboratory.*
- *Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.*
- *All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.*

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 22T895412

PROJECT: 60636190

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Dhwanish Parikh

SAMPLING SITE:BPP

SAMPLED BY:Dhwanish Parikh

Bradford Sanitary - Organics (2015)

DATE RECEIVED: 2022-05-13

DATE REPORTED: 2022-05-25

				SAMPLE DESCRIPTION:	**BH CN-3**
				SAMPLE TYPE:	**Water**
				DATE SAMPLED:	**2022-05-13 14:45**
Parameter	**Unit**	**G / S: A**	**G / S: B**	**RDL**	**3856457**
Oil and Grease (animal/vegetable) in water	mg/L	100		0.5	1.12[<A]
Oil and Grease (mineral) in water	mg/L	15		0.5	<0.5
Methylene Chloride	µg/L	2000	5.2	0.3	<0.3
cis- 1,2-Dichloroethylene	µg/L	4000	5.6	0.2	<0.2
Chloroform	µg/L	40	2	0.2	<0.2
Benzene	µg/L	10	2	0.2	<0.2
Trichloroethylene	µg/L	400	8	0.2	<0.2
trans-1,3-Dichloropropene	µg/L	140	5.6	0.30	<0.30
Toluene	µg/L	270	2	0.2	<0.2
Tetrachloroethene	µg/L	1000	4.4	0.1	<0.1
Ethylbenzene	µg/L	160	2	0.1	<0.1
1,1,2,2-Tetrachloroethane	µg/L	1400	17	0.1	<0.1
1,4-Dichlorobenzene	µg/L	80	6.8	0.1	<0.1
1,2-Dichlorobenzene	µg/L	50	5.6	0.1	<0.1
Xylenes (Total)	µg/L	1400	4.4	0.2	<0.2
PCBs	µg/L	1	0.4	0.2	<0.2
Di-n-butyl phthalate	ug/L	80	15	0.5	0.69[<B]
Bis(2-éthylhexyl)phthalate	µg/L	12	8.8	0.5	0.59[<B]
Surrogate	**Unit**		**Acceptable Limits**		
Toluene-d8	% Recovery		50-140		98
4-Bromofluorobenzene	% Recovery		50-140		80
Decachlorobiphenyl	%		50-140		75
2,4,6-Tribromophenol	%		50-140		83
Chrysene-d12	%		50-140		74

Certified By: N Popnikolof

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 22T895412

PROJECT: 60636190

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Dhwanish Parikh

SAMPLING SITE:BPP

SAMPLED BY:Dhwanish Parikh

Bradford Sanitary - Organics (2015)

DATE RECEIVED: 2022-05-13

DATE REPORTED: 2022-05-25

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: A Refers to ON Bradford SN, B Refers to ON Bradford SM
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

3856457 Oil and Grease animal/vegetable is a calculated parameter. The calculated value is the difference between Total O&G and Mineral O&G.
Xylenes total is a calculated parameter. The calculated value is the sum of m&p-Xylene and o-Xylene.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: N Popnikolof

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 22T895412

PROJECT: 60636190

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Dhwanish Parikh

SAMPLING SITE:BPP

SAMPLED BY:Dhwanish Parikh

Nonylphenol and Nonylphenol Ethoxylates (Ontario, mg/L)

DATE RECEIVED: 2022-05-13

DATE REPORTED: 2022-05-25

				SAMPLE DESCRIPTION:	BH CN-3
				SAMPLE TYPE:	Water
				DATE SAMPLED:	2022-05-13 14:45
Parameter	**Unit**	**G / S**	**RDL**	**3856457**	
Total Nonylphenol	mg/L	20	0.001	0.029	
NP1EO	mg/L		0.001	<0.001	
NP2EO	mg/L		0.0003	<0.0003	
Total Nonylphenol Ethoxylates	mg/L	0.2	0.001	<0.001	

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to ON Bradford SN
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

Analysis performed at AGAT Montréal (unless marked by *)

Certified By:

CHIMISTE Roza Mokhtari 2013-120 QUÉBEC

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 22T895412

PROJECT: 60636190

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Dhwanish Parikh

SAMPLING SITE:BPP

SAMPLED BY:Dhwanish Parikh

Bradford Sanitary Sewer Use By-Law - Inorganics (2015)

DATE RECEIVED: 2022-05-13

DATE REPORTED: 2022-05-25

				SAMPLE DESCRIPTION:	**BH CN-3**
				SAMPLE TYPE:	**Water**
				DATE SAMPLED:	**2022-05-13 14:45**
Parameter	**Unit**	**G / S: A**	**G / S: B**	**RDL**	**3856457**
pH	pH Units	6.0-9.5	6.0-9.5	NA	7.91
CBOD (5)	mg/L	300	15	2	4[<B]
Total Suspended Solids	mg/L	350	15	10	544[>A]
Fluoride	mg/L	10		0.05	<0.05
Sulphate	mg/L	1500		0.10	2.79[<A]
Total Cyanide	mg/L	2	0.02	0.002	<0.002
Phenols	mg/L	1	0.008	0.002	0.021[B-A]
Total Kjeldahl Nitrogen	mg/L	100	1	0.10	1.86[B-A]
Total Aluminum	mg/L	50		0.010	3.88[<A]
Total Antimony	mg/L	5		0.020	<0.020
Total Arsenic	mg/L	1	0.02	0.015	<0.015
Total Cadmium	mg/L	0.7	0.008	0.010	<0.010
Total Chromium	mg/L	2	0.08	0.015	<0.015
Total Cobalt	mg/L	5		0.010	<0.010
Total Copper	mg/L	3	0.05	0.002	0.011[<B]
Total Lead	mg/L	1	0.12	0.020	<0.020
Total Manganese	mg/L	5	0.15	0.020	0.282[B-A]
Total Molybdenum	mg/L	5		0.020	0.030[<A]
Total Mercury	mg/L	0.010		0.0002	<0.0002
Total Nickel	mg/L	2	0.08	0.015	<0.015
Total Phosphorus	mg/L	10	0.4	0.02	0.14[<B]
Total Selenium	mg/L	1	0.02	0.002	<0.002
Total Silver	mg/L	5	0.12	0.010	<0.010
Total Tin	mg/L	5		0.020	<0.020
Total Titanium	mg/L	5		0.010	0.193[<A]
Total Zinc	mg/L	2	0.04	0.020	0.022[<B]

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: A Refers to ON Bradford SN, B Refers to ON Bradford SM
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: Iris Verástegui

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Exceedance Summary

AGAT WORK ORDER: 22T895412

PROJECT: 60636190

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Dhwanish Parikh

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
3856457	BH CN-3	ON Bradford SM	Bradford Sanitary Sewer Use By-Law - Inorganics (2015)	Phenols	mg/L	0.008	0.021
3856457	BH CN-3	ON Bradford SM	Bradford Sanitary Sewer Use By-Law - Inorganics (2015)	Total Kjeldahl Nitrogen	mg/L	1	1.86
3856457	BH CN-3	ON Bradford SM	Bradford Sanitary Sewer Use By-Law - Inorganics (2015)	Total Manganese	mg/L	0.15	0.282
3856457	BH CN-3	ON Bradford SM	Bradford Sanitary Sewer Use By-Law - Inorganics (2015)	Total Suspended Solids	mg/L	15	544
3856457	BH CN-3	ON Bradford SN	Bradford Sanitary Sewer Use By-Law - Inorganics (2015)	Total Suspended Solids	mg/L	350	544

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: AECOM CANADA LTD

AGAT WORK ORDER: 22T895412

PROJECT: 60636190

ATTENTION TO: Dhwanish Parikh

SAMPLING SITE:BPP

SAMPLED BY:Dhwanish Parikh

Trace Organics Analysis

RPT Date: May 25, 2022			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Bradford Sanitary - Organics (2015)															
Oil and Grease (animal/vegetable) in water	3842894		< 0.5	< 0.5	NA	< 0.5	102%	70%	130%	104%	70%	130%	105%	70%	130%
Oil and Grease (mineral) in water	3842894		< 0.5	< 0.5	NA	< 0.5	84%	70%	130%	81%	70%	130%	83%	70%	130%
Methylene Chloride	3870416		<0.3	<0.3	NA	< 0.3	119%	50%	140%	111%	60%	130%	90%	50%	140%
cis- 1,2-Dichloroethylene	3870416		<0.2	<0.2	NA	< 0.2	100%	50%	140%	82%	60%	130%	104%	50%	140%
Chloroform	3870416		<0.2	<0.2	NA	< 0.2	102%	50%	140%	88%	60%	130%	114%	50%	140%
Benzene	3870416		<0.2	<0.2	NA	< 0.2	87%	50%	140%	77%	60%	130%	97%	50%	140%
Trichloroethylene	3870416		<0.2	<0.2	NA	< 0.2	100%	50%	140%	80%	60%	130%	96%	50%	140%
trans-1,3-Dichloropropene	3870416		<0.30	<0.30	NA	< 0.30	110%	50%	140%	101%	60%	130%	80%	50%	140%
Toluene	3870416		<0.2	<0.2	NA	< 0.2	101%	50%	140%	109%	60%	130%	107%	50%	140%
Tetrachloroethene	3870416		<0.1	<0.1	NA	< 0.1	73%	50%	140%	76%	60%	130%	92%	50%	140%
Ethylbenzene	3870416		<0.1	<0.1	NA	< 0.1	80%	50%	140%	84%	60%	130%	89%	50%	140%
1,1,2,2-Tetrachloroethane	3870416		<0.1	<0.1	NA	< 0.1	107%	50%	140%	106%	60%	130%	113%	50%	140%
1,4-Dichlorobenzene	3870416		<0.1	<0.1	NA	< 0.1	113%	50%	140%	119%	60%	130%	102%	50%	140%
1,2-Dichlorobenzene	3870416		<0.1	<0.1	NA	< 0.1	110%	50%	140%	98%	60%	130%	102%	50%	140%
PCBs	3862608		3.22	3.12	3.2%	< 0.2	102%	50%	130%	105%	50%	140%	102%	50%	140%
Di-n-butyl phthalate	3870416		< 0.5	< 0.5	NA	< 0.5	74%	50%	140%	84%	50%	140%	84%	50%	140%
Bis(2-éthylhexyl)phthalate	3870416		< 0.5	< 0.5	NA	< 0.5	71%	50%	140%	78%	50%	140%	74%	50%	140%

Comments: When the average of the sample and duplicate results is less than 5x the RDL, the Relative Percent Difference (RPD) will be indicated as Not Applicable (NA).

Certified By: N Popnikolof

AGAT Laboratories
5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: AECOM CANADA LTD

AGAT WORK ORDER: 22T895412

PROJECT: 60636190

ATTENTION TO: Dhwanish Parikh

SAMPLING SITE:BPP

SAMPLED BY:Dhwanish Parikh

Ultra Trace Analysis

RPT Date: May 25, 2022			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Nonylphenol and Nonylphenol Ethoxylates (Ontario, mg/L)															
Total Nonylphenol	1	NA	NA	NA	0.0%	< 0.001	NA	60%	140%	85%	60%	140%	NA	60%	140%
NP1EO	1	NA	NA	NA	0.0%	< 0.001	NA	60%	140%	75%	60%	140%	NA	60%	140%
NP2EO	1	NA	NA	NA	0.0%	< 0.0003	NA	60%	140%	89%	60%	140%	NA	60%	140%

Certified By:

CHIMISTE Roza Mokhtari 2013-120 QUÉBEC

AGAT Laboratories
5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: AECOM CANADA LTD
PROJECT: 60636190
SAMPLING SITE:BPP

AGAT WORK ORDER: 22T895412
ATTENTION TO: Dhwanish Parikh
SAMPLED BY:Dhwanish Parikh

Water Analysis

RPT Date: May 25, 2022			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Bradford Sanitary Sewer Use By-Law - Inorganics (2015)															
pH	3854680		7.67	7.77	1.3%	NA	102%	90%	110%						
CBOD (5)	3856457	3856457	4	4	NA	< 2	100%	75%	125%						
Total Suspended Solids	3866570		26400	27400	3.7%	< 10	98%	80%	120%						
Fluoride	3862718		<0.05	<0.05	NA	< 0.05	106%	70%	130%	105%	80%	120%	114%	70%	130%
Sulphate	3862718		51.6	52.8	2.3%	< 0.10	100%	70%	130%	105%	80%	120%	105%	70%	130%
Total Cyanide	3834137		<0.002	<0.002	NA	< 0.002	91%	70%	130%	106%	80%	120%	105%	70%	130%
Phenols	3860260		<0.002	<0.002	NA	< 0.002	95%	90%	110%	98%	90%	110%	105%	80%	120%
Total Kjeldahl Nitrogen	3854132		0.12	0.12	NA	< 0.10	103%	70%	130%	100%	80%	120%	102%	70%	130%
Total Aluminum	3854128		0.061	0.064	4.8%	< 0.010	104%	70%	130%	111%	80%	120%	101%	70%	130%
Total Antimony	3854128		<0.020	<0.020	NA	< 0.020	95%	70%	130%	101%	80%	120%	97%	70%	130%
Total Arsenic	3854128		<0.015	<0.015	NA	< 0.015	97%	70%	130%	99%	80%	120%	101%	70%	130%
Total Cadmium	3854128		<0.010	<0.010	NA	< 0.010	101%	70%	130%	99%	80%	120%	104%	70%	130%
Total Chromium	3854128		<0.015	<0.015	NA	< 0.015	105%	70%	130%	100%	80%	120%	104%	70%	130%
Total Cobalt	3854128		<0.010	<0.010	NA	< 0.010	103%	70%	130%	103%	80%	120%	103%	70%	130%
Total Copper	3854128		<0.002	<0.002	NA	< 0.002	103%	70%	130%	99%	80%	120%	99%	70%	130%
Total Lead	3854128		<0.020	<0.020	NA	< 0.020	103%	70%	130%	103%	80%	120%	93%	70%	130%
Total Manganese	3854128		0.055	0.060	NA	< 0.020	102%	70%	130%	100%	80%	120%	101%	70%	130%
Total Molybdenum	3854128		<0.020	<0.020	NA	< 0.020	105%	70%	130%	102%	80%	120%	108%	70%	130%
Total Mercury	3861810		<0.0002	<0.0002	NA	< 0.0002	102%	70%	130%	99%	80%	120%	98%	70%	130%
Total Nickel	3854128		<0.015	<0.015	NA	< 0.015	103%	70%	130%	103%	80%	120%	102%	70%	130%
Total Phosphorus	3852324		0.04	0.04	NA	< 0.02	95%	70%	130%	102%	80%	120%	97%	70%	130%
Total Selenium	3854128		0.004	0.008	NA	< 0.002	101%	70%	130%	105%	80%	120%	100%	70%	130%
Total Silver	3854128		<0.010	<0.010	NA	< 0.010	95%	70%	130%	103%	80%	120%	96%	70%	130%
Total Tin	3854128		<0.020	<0.020	NA	< 0.020	99%	70%	130%	100%	80%	120%	94%	70%	130%
Total Titanium	3854128		<0.010	<0.010	NA	< 0.010	104%	70%	130%	108%	80%	120%	99%	70%	130%
Total Zinc	3854128		0.022	0.028	NA	< 0.020	105%	70%	130%	98%	80%	120%	97%	70%	130%

Comments: NA signifies Not Applicable.
If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.

Certified By: Iris Verástegui

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Method Summary

CLIENT NAME: AECOM CANADA LTD

AGAT WORK ORDER: 22T895412

PROJECT: 60636190

ATTENTION TO: Dhwanish Parikh

SAMPLING SITE:BPP

SAMPLED BY:Dhwanish Parikh

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Oil and Grease (animal/vegetable) in water	VOL-91-5011	EPA SW-846 1664A & SM 5520	BALANCE
Oil and Grease (mineral) in water	VOL-91-5011	EPA SW-846 1664A & SM 5520	BALANCE
Methylene Chloride	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
cis- 1,2-Dichloroethylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Chloroform	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Benzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Trichloroethylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
trans-1,3-Dichloropropene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Toluene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Tetrachloroethene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Ethylbenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,1,2,2-Tetrachloroethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,4-Dichlorobenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,2-Dichlorobenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Xylenes (Total)	VOL-91-5001	modified from EPA 5030B & EPA 8260D	CALCULATION
Toluene-d8	VOL-91- 5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
4-Bromofluorobenzene	VOL-91- 5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
PCBs	ORG-91-5112	EPA SW-846 3510 & 8082	GC/ECD
Decachlorobiphenyl	ORG-91-5112	EPA SW-846 8081A & 8082	GC/ECD
Di-n-butyl phthalate	ORG-91-5114	EPA SW-846 3510C & 8270E	GC/MS
Bis(2-éthylhexyl)phthalate	ORG-91-5114	EPA SW-846 3510C & 8270E	GC/MS
2,4,6-Tribromophenol	ORG-91-5114	modified from EPA 3510C, 8270E & ON MOECC E3265	GC/MS
Chrysene-d12			GC/MS
Ultra Trace Analysis			
Total Nonylphenol	TOX-151-19003F	ASTM D7065-6	LCMSMS
NP1EO	TOX-151-19003F	ASTM D7065-6	LCMSMS
NP2EO	TOX-151-19003F	ASTM D7065-6	LCMSMS
Total Nonylphenol Ethoxylates	TOX-19003F	ASTM D7065-6	LCMSMS

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Method Summary

CLIENT NAME: AECOM CANADA LTD

AGAT WORK ORDER: 22T895412

PROJECT: 60636190

ATTENTION TO: Dhwanish Parikh

SAMPLING SITE:BPP

SAMPLED BY:Dhwanish Parikh

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
pH	INOR-93-6000	modified from SM 4500-H+ B	PC TITRATE
CBOD (5)	INOR-93-6006	Modified from SM 5210 B	DO METER
Total Suspended Solids	INOR-93-6028	modified from EPA 1684,ON MOECC E3139,SM 2540C,D	BALANCE
Fluoride	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Total Cyanide	INOR-93-6051	modified from MOECC E3015; SM 4500-CN- A, B, & C	TECHNICON AUTO ANALYZER
Phenols	INOR-93-6072	modified from SM 5530 D	LACHAT FIA
Total Kjeldahl Nitrogen	INOR-93-6048	modified from EPA 351.2 and SM 4500-NORG D	LACHAT FIA
Total Aluminum	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Antimony	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Arsenic	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Cadmium	MET -93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Chromium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Cobalt	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Copper	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Lead	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Manganese	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Molybdenum	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Mercury	MET-93-6100	modified from EPA 245.2 and SM 3112 B	CVAAS
Total Nickel	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Phosphorus	INOR-93-6022	modified from SM 4500-P B and SM 4500-P E	SPECTROPHOTOMETER
Total Selenium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Silver	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Tin	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Titanium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Zinc	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS

AGAT Laboratories

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water consumed by humans)

Report Information:

Company: AECOM Canada Ltd.
Contact: Dhwanish Parikh / Brian Holden
Address: 105 Commerce Valley Dr W, 7th Floor
Markham, ON
Phone: 416 420 5590 Fax:
Reports to be sent to:
1. Email: dhwanish.parikh@aecom.com
2. Email: Brian.Holden@aecom.com

Project Information:

Project: 60636190
Site Location: BFP
Sampled By: Dhwanish Parikh
AGAT Quote #: PO:
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☑ No ☐
Company:
Contact:
Address:
Email:

Regulatory Requirements:

(Please check all applicable boxes)

☐ Regulation 153/04
Table _____ *Indicate One*
☐ Ind/Com
☐ Res/Park
☐ Agriculture
Soil Texture *(Check One)*
☐ Coarse
☐ Fine

☐ Excess Soils R406
Table _____ *Indicate One*
☐ Regulation 558
☐ CCME

☑ Sewer Use
☐ Sanitary ☑ Storm
Bradford
Region
☐ Prov. Water Quality Objectives (PWQO)
☐ Other
Indicate One

Is this submission for a **Record of Site Condition?** ☐ Yes ☒ No

Report Guideline on *Certificate of Analysis* ☑ Yes ☐ No

Laboratory Use Only

Work Order #: 22T895412
Cooler Quantity: 1 Blk Cfile (qc)
Arrival Temperatures: 9.4 9.2 9.0
Custody Seal Intact: ☐ Yes ☐ No ☐ N/A
Notes:

Turnaround Time (TAT) Required:

Regular TAT ☑ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day

OR Date Required (Rush Surcharges May Apply):

Please provide prior notification for rush TAT
**TAT is exclusive of weekends and statutory holidays*

For 'Same Day' analysis, please contact your AGAT CPM

Sample Matrix Legend

B	Biota
GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI, DOC Y/N	O. Reg 153: Metals & Inorganics	O. Reg 153: Metals - ☐ CrVI, ☐ Hg, ☐ HWSB	O. Reg 153: BTEX, F1-F4 PHCs Analyze F4G if required ☐ Yes ☐ No	O. Reg 153: PAHs	O. Reg 153: PCBs	O. Reg 153: VOC	O. Reg 558: Landfill Disposal Characterization TCLP: ☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐ PCBs	O. Reg 406: Excess Soils SPLP Rainwater Leach ☐ Metals ☐ VOCs ☐ SVOCs	O. Reg 406: Excess Soils Characterization Package pH, ICPMS Metals, BTEX, F1-F4	Salt - EC/SAR	Bradford - Sewer Use (Storm & Sanitary)	Potentially Hazardous or High Concentration (Y/N)
BH CN-3	May 13, 22	2:45 AM/PM	2	GW													X	
		AM/PM																
		AM/PM																
		AM/PM																
		AM/PM																
		AM/PM																
		AM/PM																
		AM/PM																
		AM/PM																
		AM/PM																
		AM/PM																

Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
1 Dhwanish Parikh	May 13, 2022	4:55	Neil Ramnarain		
Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time

'22 MAY 13 5:03PM

Page _____ of _____

Nº: T 132716

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: AECOM CANADA LTD
105 Commerce Valley Drive West 7th Floor
MARKHAM, ON L3T7W3
(905) 886-7022
ATTENTION TO: Dhwanish Parikh
PROJECT: 60636190
AGAT WORK ORDER: 22T895413
TRACE ORGANICS REVIEWED BY: Neli Popnikolova, Senior Chemist
ULTRA TRACE REVIEWED BY: Roza Makhtari, Chimiste, AGAT Montréal
WATER ANALYSIS REVIEWED BY: Nivine Basily, Inorganics Report Writer
DATE REPORTED: May 25, 2022
PAGES (INCLUDING COVER): 18
VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

Notes

Disclaimer:

- *All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.*
- *All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.*
- *AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.*
- *This Certificate shall not be reproduced except in full, without the written approval of the laboratory.*
- *The test results reported herewith relate only to the samples as received by the laboratory.*
- *Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.*
- *All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.*

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 22T895413

PROJECT: 60636190

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Dhwanish Parikh

SAMPLING SITE:

SAMPLED BY:

Bradford Sanitary - Organics (2015)

DATE RECEIVED: 2022-05-13

DATE REPORTED: 2022-05-25

				SAMPLE DESCRIPTION:	**BH HRW-4**
				SAMPLE TYPE:	**Water**
				DATE SAMPLED:	**2022-05-13 10:45**
Parameter	**Unit**	**G / S: A**	**G / S: B**	**RDL**	**3856467**
Oil and Grease (animal/vegetable) in water	mg/L	100		0.5	2.33[<A]
Oil and Grease (mineral) in water	mg/L	15		0.5	<0.5[<A]
Methylene Chloride	µg/L	2000	5.2	0.3	<0.3[<B]
cis- 1,2-Dichloroethylene	µg/L	4000	5.6	0.2	<0.2[<B]
Chloroform	µg/L	40	2	0.2	<0.2[<B]
Benzene	µg/L	10	2	0.2	<0.2[<B]
Trichloroethylene	µg/L	400	8	0.2	<0.2[<B]
trans-1,3-Dichloropropene	µg/L	140	5.6	0.30	<0.30[<B]
Toluene	µg/L	270	2	0.2	<0.2[<B]
Tetrachloroethene	µg/L	1000	4.4	0.1	<0.1[<B]
Ethylbenzene	µg/L	160	2	0.1	<0.1[<B]
1,1,2,2-Tetrachloroethane	µg/L	1400	17	0.1	<0.1[<B]
1,4-Dichlorobenzene	µg/L	80	6.8	0.1	<0.1[<B]
1,2-Dichlorobenzene	µg/L	50	5.6	0.1	<0.1[<B]
Xylenes (Total)	µg/L	1400	4.4	0.2	<0.2[<B]
PCBs	µg/L	1	0.4	0.2	<0.2[<B]
Di-n-butyl phthalate	ug/L	80	15	0.5	<0.5[<B]
Bis(2-éthylhexyl)phthalate	µg/L	12	8.8	0.5	<0.5[<B]

Surrogate	**Unit**	**Acceptable Limits**	
Toluene-d8	% Recovery	50-140	70
4-Bromofluorobenzene	% Recovery	50-140	93
Decachlorobiphenyl	%	50-140	77
2,4,6-Tribromophenol	%	50-140	78
Chrysene-d12	%	50-140	79

Certified By: N Popnikolof

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 22T895413

PROJECT: 60636190

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Dhwanish Parikh

SAMPLING SITE:

SAMPLED BY:

Bradford Sanitary - Organics (2015)

DATE RECEIVED: 2022-05-13

DATE REPORTED: 2022-05-25

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: A Refers to ON Bradford SN, B Refers to ON Bradford SM
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

3856467 Oil and Grease animal/vegetable is a calculated parameter. The calculated value is the difference between Total O&G and Mineral O&G.
Xylenes total is a calculated parameter. The calculated value is the sum of m&p-Xylene and o-Xylene.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: N Popnikolof

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 22T895413

PROJECT: 60636190

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Dhwanish Parikh

SAMPLING SITE:

SAMPLED BY:

Nonylphenol and Nonylphenol Ethoxylates (Ontario, mg/L)

DATE RECEIVED: 2022-05-13

DATE REPORTED: 2022-05-25

			SAMPLE DESCRIPTION:	BH HRW-4
			SAMPLE TYPE:	Water
			DATE SAMPLED:	2022-05-13 10:45
Parameter	**Unit**	**G / S**	**RDL**	**3856467**
Total Nonylphenol	mg/L	20	0.001	<0.001
NP1EO	mg/L		0.001	<0.001
NP2EO	mg/L		0.0003	<0.0003
Total Nonylphenol Ethoxylates	mg/L	0.2	0.001	<0.001

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to ON Bradford SN
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

Analysis performed at AGAT Montréal (unless marked by *)

Certified By:

CHIMISTE Roza Mokhtari 2013-120 QUÉBEC

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 22T895413

PROJECT: 60636190

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Dhwanish Parikh

SAMPLING SITE:

SAMPLED BY:

Bradford Sanitary Sewer Use By-Law - Inorganics (2015)

DATE RECEIVED: 2022-05-13

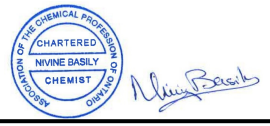
DATE REPORTED: 2022-05-25

					SAMPLE DESCRIPTION:	BH HRW-4
					SAMPLE TYPE:	Water
					DATE SAMPLED:	2022-05-13 10:45
Parameter	Unit	G / S: A	G / S: B	RDL		3856467
pH	pH Units	6.0-9.5	6.0-9.5	NA		7.76
CBOD (5)	mg/L	300	15	2		2[<B]
Total Suspended Solids	mg/L	350	15	10		2600[>A]
Fluoride	mg/L	10		0.05		<0.05[<A]
Sulphate	mg/L	1500		0.10		2.03[<A]
Total Cyanide	mg/L	2	0.02	0.002		<0.002[<B]
Phenols	mg/L	1	0.008	0.002		0.064[B-A]
Total Kjeldahl Nitrogen	mg/L	100	1	0.10		2.27[B-A]
Total Aluminum	mg/L	50		0.10		32.5[<A]
Total Antimony	mg/L	5		0.040		<0.040[<A]
Total Arsenic	mg/L	1	0.02	0.030		<0.030[<A]
Total Cadmium	mg/L	0.7	0.008	0.020		<0.020[<A]
Total Chromium	mg/L	2	0.08	0.030		0.044[<B]
Total Cobalt	mg/L	5		0.020		0.022[<A]
Total Copper	mg/L	3	0.05	0.004		0.065[B-A]
Total Lead	mg/L	1	0.12	0.040		<0.040[<B]
Total Manganese	mg/L	5	0.15	0.040		1.86[B-A]
Total Molybdenum	mg/L	5		0.040		<0.040[<A]
Total Mercury	mg/L	0.010		0.0002		<0.0002[<A]
Total Nickel	mg/L	2	0.08	0.030		0.044[<B]
Total Phosphorus	mg/L	10	0.4	0.02		1.29[B-A]
Total Selenium	mg/L	1	0.02	0.004		<0.004[<B]
Total Silver	mg/L	5	0.12	0.020		<0.020[<B]
Total Tin	mg/L	5		0.040		<0.040[<A]
Total Titanium	mg/L	5		0.020		1.14[<A]
Total Zinc	mg/L	2	0.04	0.040		0.104[B-A]

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: A Refers to ON Bradford SN, B Refers to ON Bradford SM
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:



AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 22T895413

PROJECT: 60636190

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Dhwanish Parikh

SAMPLING SITE:

SAMPLED BY:

Water Quality Assessment - PWQO (mg/L)

DATE RECEIVED: 2022-05-13

DATE REPORTED: 2022-05-25

		SAMPLE DESCRIPTION:		BH HRE-3
		SAMPLE TYPE:		Water
		DATE SAMPLED:		2022-05-13
Parameter	Unit	G / S	RDL	3856468
Electrical Conductivity	µS/cm		2	636
pH	pH Units	6.5-8.5	NA	7.89
Saturation pH (Calculated)				6.79
Langelier Index (Calculated)				1.10
Hardness (as CaCO3) (Calculated)	mg/L		0.5	337
Total Dissolved Solids	mg/L		10	368
Alkalinity (as CaCO3)	mg/L		5	351
Bicarbonate (as CaCO3)	mg/L		5	351
Carbonate (as CaCO3)	mg/L		5	<5
Hydroxide (as CaCO3)	mg/L		5	<5
Fluoride	mg/L		0.05	<0.05
Chloride	mg/L		0.10	2.72
Nitrate as N	mg/L		0.05	<0.05
Nitrite as N	mg/L		0.05	<0.05
Bromide	mg/L		0.05	<0.05
Sulphate	mg/L		0.10	13.1
Ortho Phosphate as P	mg/L		0.10	<0.10
Ammonia as N	mg/L		0.02	<0.02
Ammonia-Un-ionized (Calculated)	mg/L	0.02	0.000002	<0.000002
Total Phosphorus	mg/L	*	0.02	<0.02
Total Organic Carbon	mg/L		0.5	4.6
True Colour	TCU		5.00	<5.00
Turbidity	NTU		0.5	45.1
Total Calcium	mg/L		0.32	128
Total Magnesium	mg/L		0.34	4.27
Total Potassium	mg/L		1.15	<1.15
Total Sodium	mg/L		0.45	20.9
Aluminum-dissolved	mg/L	*	0.004	<0.004
Total Antimony	mg/L	0.020	0.001	<0.001
Total Arsenic	mg/L	0.1	0.003	<0.003

Certified By:

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 22T895413

PROJECT: 60636190

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Dhwanish Parikh

SAMPLING SITE:

SAMPLED BY:

Water Quality Assessment - PWQO (mg/L)

DATE RECEIVED: 2022-05-13

DATE REPORTED: 2022-05-25

		SAMPLE DESCRIPTION:		BH HRE-3
		SAMPLE TYPE:		Water
		DATE SAMPLED:		2022-05-13
Parameter	Unit	G / S	RDL	3856468
Total Barium	mg/L		0.002	0.024
Total Beryllium	mg/L	*	0.001	<0.001
Total Boron	mg/L	0.2	0.010	0.065
Total Cadmium	mg/L	0.0002	0.0001	<0.0001
Total Chromium	mg/L		0.003	<0.003
Total Cobalt	mg/L	0.0009	0.0005	**0.0013**
Total Copper	mg/L	0.005	0.001	0.003
Total Iron	mg/L	0.3	0.010	**1.20**
Total Lead	mg/L	*	0.001	<0.001
Total Manganese	mg/L		0.002	0.714
Dissolved Mercury	mg/L	0.0002	0.0001	<0.0001
Total Molybdenum	mg/L	0.040	0.002	<0.002
Total Nickel	mg/L	0.025	0.003	<0.003
Total Selenium	mg/L	0.1	0.002	<0.002
Total Silver	mg/L	0.0001	0.0001	<0.0001
Total Strontium	mg/L		0.005	0.320
Total Thallium	mg/L	0.0003	0.0003	<0.0003
Total Tin	mg/L		0.002	0.007
Total Titanium	mg/L		0.010	0.042
Total Tungsten	mg/L	0.030	0.010	<0.010
Total Uranium	mg/L	0.005	0.002	0.002
Total Vanadium	mg/L	0.006	0.002	<0.002
Total Zinc	mg/L	0.030	0.020	<0.020
Total Zirconium	mg/L	0.004	0.004	<0.004
Lab Filtration Aluminum Dissolved				2022/5/16
Lab Filtration mercury				2022/5/16

Certified By:

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 22T895413

PROJECT: 60636190

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Dhwanish Parikh

SAMPLING SITE:

SAMPLED BY:

Water Quality Assessment - PWQO (mg/L)

DATE RECEIVED: 2022-05-13

DATE REPORTED: 2022-05-25

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to PWQO * Variable - refer to guideline reference document
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

3856468 Dilution required, RDL has been increased accordingly.

The calculation of Un-ionized Ammonia was based on lab measured parameters (pH and temperature) rather than the field parameters; these were not provided to the lab. The temperature is recorded at the time of pH measurement. Values are reported as calculated.

Un-ionized Ammonia detection limit is a calculated RDL

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Exceedance Summary

AGAT WORK ORDER: 22T895413

PROJECT: 60636190

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Dhwanish Parikh

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
3856467	BH HRW-4	ON Bradford SM	Bradford Sanitary Sewer Use By-Law - Inorganics (2015)	Phenols	mg/L	0.008	0.064
3856467	BH HRW-4	ON Bradford SM	Bradford Sanitary Sewer Use By-Law - Inorganics (2015)	Total Copper	mg/L	0.05	0.065
3856467	BH HRW-4	ON Bradford SM	Bradford Sanitary Sewer Use By-Law - Inorganics (2015)	Total Kjeldahl Nitrogen	mg/L	1	2.27
3856467	BH HRW-4	ON Bradford SM	Bradford Sanitary Sewer Use By-Law - Inorganics (2015)	Total Manganese	mg/L	0.15	1.86
3856467	BH HRW-4	ON Bradford SM	Bradford Sanitary Sewer Use By-Law - Inorganics (2015)	Total Phosphorus	mg/L	0.4	1.29
3856467	BH HRW-4	ON Bradford SM	Bradford Sanitary Sewer Use By-Law - Inorganics (2015)	Total Suspended Solids	mg/L	15	2600
3856467	BH HRW-4	ON Bradford SM	Bradford Sanitary Sewer Use By-Law - Inorganics (2015)	Total Zinc	mg/L	0.04	0.104
3856467	BH HRW-4	ON Bradford SN	Bradford Sanitary Sewer Use By-Law - Inorganics (2015)	Total Suspended Solids	mg/L	350	2600
3856468	BH HRE-3	ON PWQO	Water Quality Assessment - PWQO (mg/L)	Total Cobalt	mg/L	0.0009	0.0013
3856468	BH HRE-3	ON PWQO	Water Quality Assessment - PWQO (mg/L)	Total Iron	mg/L	0.3	1.20

AGAT Laboratories
5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: AECOM CANADA LTD

AGAT WORK ORDER: 22T895413

PROJECT: 60636190

ATTENTION TO: Dhwanish Parikh

SAMPLING SITE:

SAMPLED BY:

Trace Organics Analysis

RPT Date: May 25, 2022			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Bradford Sanitary - Organics (2015)															
Oil and Grease (animal/vegetable) in water	3842894		< 0.5	< 0.5	NA	< 0.5	102%	70%	130%	104%	70%	130%	105%	70%	130%
Oil and Grease (mineral) in water	3842894		< 0.5	< 0.5	NA	< 0.5	84%	70%	130%	81%	70%	130%	83%	70%	130%
Methylene Chloride	3870416		<0.3	<0.3	NA	< 0.3	119%	50%	140%	111%	60%	130%	90%	50%	140%
cis- 1,2-Dichloroethylene	3870416		<0.2	<0.2	NA	< 0.2	100%	50%	140%	82%	60%	130%	104%	50%	140%
Chloroform	3870416		<0.2	<0.2	NA	< 0.2	102%	50%	140%	88%	60%	130%	114%	50%	140%
Benzene	3870416		<0.2	<0.2	NA	< 0.2	87%	50%	140%	77%	60%	130%	97%	50%	140%
Trichloroethylene	3870416		<0.2	<0.2	NA	< 0.2	100%	50%	140%	80%	60%	130%	96%	50%	140%
trans-1,3-Dichloropropene	3870416		<0.30	<0.30	NA	< 0.30	110%	50%	140%	101%	60%	130%	80%	50%	140%
Toluene	3870416		<0.2	<0.2	NA	< 0.2	101%	50%	140%	109%	60%	130%	107%	50%	140%
Tetrachloroethene	3870416		<0.1	<0.1	NA	< 0.1	73%	50%	140%	76%	60%	130%	92%	50%	140%
Ethylbenzene	3870416		<0.1	<0.1	NA	< 0.1	80%	50%	140%	84%	60%	130%	89%	50%	140%
1,1,2,2-Tetrachloroethane	3870416		<0.1	<0.1	NA	< 0.1	107%	50%	140%	106%	60%	130%	113%	50%	140%
1,4-Dichlorobenzene	3870416		<0.1	<0.1	NA	< 0.1	113%	50%	140%	119%	60%	130%	102%	50%	140%
1,2-Dichlorobenzene	3870416		<0.1	<0.1	NA	< 0.1	110%	50%	140%	98%	60%	130%	102%	50%	140%
Di-n-butyl phthalate	3870416		< 0.5	< 0.5	NA	< 0.5	74%	50%	140%	84%	50%	140%	84%	50%	140%
Bis(2-éthylhexyl)phthalate	3870416		< 0.5	< 0.5	NA	< 0.5	71%	50%	140%	78%	50%	140%	74%	50%	140%

Comments: When the average of the sample and duplicate results is less than 5x the RDL, the Relative Percent Difference (RPD) will be indicated as Not Applicable (NA).

Certified By: N Popnikolof

AGAT Laboratories
5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: AECOM CANADA LTD

AGAT WORK ORDER: 22T895413

PROJECT: 60636190

ATTENTION TO: Dhwanish Parikh

SAMPLING SITE:

SAMPLED BY:

Ultra Trace Analysis

RPT Date: May 25, 2022			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Nonylphenol and Nonylphenol Ethoxylates (Ontario, mg/L)															
Total Nonylphenol	1	NA	NA	NA	0.0%	< 0.001	NA	60%	140%	85%	60%	140%	NA	60%	140%
NP1EO	1	NA	NA	NA	0.0%	< 0.001	NA	60%	140%	75%	60%	140%	NA	60%	140%
NP2EO	1	NA	NA	NA	0.0%	< 0.0003	NA	60%	140%	89%	60%	140%	NA	60%	140%

Certified By:

CHIMISTE Roza Mokhtari 2013-120 QUÉBEC

AGAT Laboratories
5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: AECOM CANADA LTD

AGAT WORK ORDER: 22T895413

PROJECT: 60636190

ATTENTION TO: Dhwanish Parikh

SAMPLING SITE:

SAMPLED BY:

Water Analysis

RPT Date: May 25, 2022			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Bradford Sanitary Sewer Use By-Law - Inorganics (2015)															
pH	3854680		7.67	7.77	1.3%	NA	102%	90%	110%						
CBOD (5)	3856457		4	4	NA	< 2	100%	75%	125%						
Total Suspended Solids	3866570		26400	27400	3.7%	< 10	98%	80%	120%						
Fluoride	3862718		<0.05	<0.05	NA	< 0.05	106%	70%	130%	105%	80%	120%	114%	70%	130%
Sulphate	3862718		51.6	52.8	2.3%	< 0.10	100%	70%	130%	105%	80%	120%	105%	70%	130%
Total Cyanide	3834137		<0.002	<0.002	NA	< 0.002	91%	70%	130%	106%	80%	120%	105%	70%	130%
Phenols	3860260		<0.002	<0.002	NA	< 0.002	95%	90%	110%	98%	90%	110%	105%	80%	120%
Total Kjeldahl Nitrogen	3854132		0.12	0.12	NA	< 0.10	103%	70%	130%	100%	80%	120%	102%	70%	130%
Total Aluminum	3854128		0.061	0.064	4.8%	< 0.010	104%	70%	130%	111%	80%	120%	101%	70%	130%
Total Antimony	3854128		<0.020	<0.020	NA	< 0.020	95%	70%	130%	101%	80%	120%	97%	70%	130%
Total Arsenic	3854128		<0.015	<0.015	NA	< 0.015	97%	70%	130%	99%	80%	120%	101%	70%	130%
Total Cadmium	3854128		<0.010	<0.010	NA	< 0.010	101%	70%	130%	99%	80%	120%	104%	70%	130%
Total Chromium	3854128		<0.015	<0.015	NA	< 0.015	105%	70%	130%	100%	80%	120%	104%	70%	130%
Total Cobalt	3854128		<0.010	<0.010	NA	< 0.010	103%	70%	130%	103%	80%	120%	103%	70%	130%
Total Copper	3854128		<0.002	<0.002	NA	< 0.002	103%	70%	130%	99%	80%	120%	99%	70%	130%
Total Lead	3854128		<0.020	<0.020	NA	< 0.020	103%	70%	130%	103%	80%	120%	93%	70%	130%
Total Manganese	3854128		0.055	0.060	NA	< 0.020	102%	70%	130%	100%	80%	120%	101%	70%	130%
Total Molybdenum	3854128		<0.020	<0.020	NA	< 0.020	105%	70%	130%	102%	80%	120%	108%	70%	130%
Total Mercury	3861810		<0.0002	<0.0002	NA	< 0.0002	102%	70%	130%	99%	80%	120%	98%	70%	130%
Total Nickel	3854128		<0.015	<0.015	NA	< 0.015	103%	70%	130%	103%	80%	120%	102%	70%	130%
Total Phosphorus	3852324		0.04	0.04	NA	< 0.02	95%	70%	130%	102%	80%	120%	97%	70%	130%
Total Selenium	3854128		0.004	0.008	NA	< 0.002	101%	70%	130%	105%	80%	120%	100%	70%	130%
Total Silver	3854128		<0.010	<0.010	NA	< 0.010	95%	70%	130%	103%	80%	120%	96%	70%	130%
Total Tin	3854128		<0.020	<0.020	NA	< 0.020	99%	70%	130%	100%	80%	120%	94%	70%	130%
Total Titanium	3854128		<0.010	<0.010	NA	< 0.010	104%	70%	130%	108%	80%	120%	99%	70%	130%
Total Zinc	3854128		0.022	0.028	NA	< 0.020	105%	70%	130%	98%	80%	120%	97%	70%	130%

Comments: NA signifies Not Applicable.
Duplicate NA: results are under 5X the RDL and will not be calculated.

Water Quality Assessment - PWQO (mg/L)															
Electrical Conductivity	3854680		629	641	1.9%	< 2	103%	90%	110%						
pH	3854680		7.67	7.77	1.3%	NA	102%	90%	110%						
Total Dissolved Solids	3866735		450	454	0.9%	< 10	102%	80%	120%						
Alkalinity (as CaCO3)	3854680		359	373	3.8%	< 5	89%	80%	120%						
Bicarbonate (as CaCO3)	3854680		359	373	3.8%	< 5	NA								
Carbonate (as CaCO3)	3854680		<5	<5	NA	< 5	NA								
Hydroxide (as CaCO3)	3854680		<5	<5	NA	< 5	NA								
Fluoride	3862718		<0.05	<0.05	NA	< 0.05	106%	70%	130%	105%	80%	120%	114%	70%	130%
Chloride	3862718		809	807	0.2%	< 0.10	91%	70%	130%	102%	80%	120%	NA	70%	130%

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: AECOM CANADA LTD

AGAT WORK ORDER: 22T895413

PROJECT: 60636190

ATTENTION TO: Dhwanish Parikh

SAMPLING SITE:

SAMPLED BY:

Water Analysis (Continued)

RPT Date: May 25, 2022			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Nitrate as N	3862718		2.17	2.19	0.9%	< 0.05	94%	70%	130%	102%	80%	120%	102%	70%	130%
Nitrite as N	3862718		<0.11	<0.11	NA	< 0.05	106%	70%	130%	108%	80%	120%	109%	70%	130%
Bromide	3862718		<0.11	<0.11	NA	< 0.05	101%	70%	130%	99%	80%	120%	96%	70%	130%
Sulphate	3862718		51.6	52.8	2.3%	< 0.10	100%	70%	130%	105%	80%	120%	105%	70%	130%
Ortho Phosphate as P	3862718		<0.26	<0.26	NA	< 0.10	106%	70%	130%	104%	80%	120%	112%	70%	130%
Ammonia as N	3852325		<0.02	<0.02	NA	< 0.02	106%	70%	130%	104%	80%	120%	96%	70%	130%
Total Phosphorus	3852324		0.04	0.04	NA	< 0.02	95%	70%	130%	102%	80%	120%	97%	70%	130%
Total Organic Carbon	3867073		1.3	1.4	NA	< 0.5	101%	90%	110%	94%	90%	110%	93%	80%	120%
True Colour	3854657		<5.00	<5.00	NA	< 5	102%	90%	110%						
Turbidity	3856468	3856468	45.1	44.3	1.8%	< 0.5	101%	80%	120%						
Total Calcium	3851035		97.4	99.4	2.0%	< 0.10	95%	70%	130%	96%	80%	120%	96%	70%	130%
Total Magnesium	3851035		16.6	17.3	4.1%	< 0.10	95%	70%	130%	96%	80%	120%	97%	70%	130%
Total Potassium	3851035		1.64	1.77	NA	< 0.50	96%	70%	130%	97%	80%	120%	96%	70%	130%
Total Sodium	3851035		26.2	27.2	3.7%	< 0.10	95%	70%	130%	99%	80%	120%	99%	70%	130%
Aluminum-dissolved	3854513		<0.004	<0.004	NA	< 0.004	98%	70%	130%	102%	80%	120%	93%	70%	130%
Total Antimony	3854128		<0.001	<0.001	NA	< 0.001	95%	70%	130%	101%	80%	120%	97%	70%	130%
Total Arsenic	3854128		0.004	0.004	NA	< 0.003	97%	70%	130%	99%	80%	120%	101%	70%	130%
Total Barium	3854128		0.243	0.243	0.0%	< 0.002	105%	70%	130%	105%	80%	120%	107%	70%	130%
Total Beryllium	3854128		<0.001	<0.001	NA	< 0.001	102%	70%	130%	108%	80%	120%	104%	70%	130%
Total Boron	3854128		0.173	0.172	0.6%	< 0.010	101%	70%	130%	100%	80%	120%	99%	70%	130%
Total Cadmium	3854128		0.0002	0.0004	NA	< 0.0001	101%	70%	130%	99%	80%	120%	104%	70%	130%
Total Chromium	3854128		<0.003	<0.003	NA	< 0.003	105%	70%	130%	100%	80%	120%	104%	70%	130%
Total Cobalt	3854128		<0.0005	<0.0005	NA	< 0.0005	103%	70%	130%	103%	80%	120%	103%	70%	130%
Total Copper	3854128		0.002	0.002	NA	< 0.001	103%	70%	130%	99%	80%	120%	99%	70%	130%
Total Iron	3854128		7.03	7.16	1.8%	< 0.010	99%	70%	130%	102%	80%	120%	93%	70%	130%
Total Lead	3854128		<0.001	<0.001	NA	< 0.001	103%	70%	130%	103%	80%	120%	93%	70%	130%
Total Manganese	3854128		0.055	0.060	8.7%	< 0.002	102%	70%	130%	100%	80%	120%	101%	70%	130%
Dissolved Mercury	3849717		<0.0001	<0.0001	NA	< 0.0001	102%	70%	130%	99%	80%	120%	95%	70%	130%
Total Molybdenum	3854128		<0.002	<0.002	NA	< 0.002	105%	70%	130%	102%	80%	120%	108%	70%	130%
Total Nickel	3854128		<0.003	<0.003	NA	< 0.003	103%	70%	130%	103%	80%	120%	102%	70%	130%
Total Selenium	3854128		0.004	0.008	NA	< 0.002	101%	70%	130%	105%	80%	120%	100%	70%	130%
Total Silver	3854128		<0.0001	<0.0001	NA	< 0.0001	95%	70%	130%	103%	80%	120%	96%	70%	130%
Total Strontium	3854128		2.12	2.15	1.4%	< 0.005	98%	70%	130%	99%	80%	120%	100%	70%	130%
Total Thallium	3854128		<0.0003	<0.0003	NA	< 0.0003	98%	70%	130%	108%	80%	120%	96%	70%	130%
Total Tin	3854128		<0.002	<0.002	NA	< 0.002	99%	70%	130%	100%	80%	120%	94%	70%	130%
Total Titanium	3854128		<0.010	<0.010	NA	< 0.010	104%	70%	130%	108%	80%	120%	99%	70%	130%
Total Tungsten	3854128		<0.010	<0.010	NA	< 0.010	92%	70%	130%	94%	80%	120%	90%	70%	130%
Total Uranium	3854128		<0.002	<0.002	NA	< 0.002	99%	70%	130%	110%	80%	120%	105%	70%	130%
Total Vanadium	3854128		<0.002	<0.002	NA	< 0.002	102%	70%	130%	103%	80%	120%	106%	70%	130%

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Quality Assurance

CLIENT NAME: AECOM CANADA LTD

AGAT WORK ORDER: 22T895413

PROJECT: 60636190

ATTENTION TO: Dhwanish Parikh

SAMPLING SITE:

SAMPLED BY:

Water Analysis (Continued)

RPT Date: May 25, 2022			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Total Zinc	3854128		0.022	0.028	NA	< 0.020	105%	70%	130%	98%	80%	120%	97%	70%	130%
Total Zirconium	3854128		<0.004	<0.004	NA	< 0.004	104%	70%	130%	102%	80%	120%	104%	70%	130%

Comments: NA signifies Not Applicable.
Duplicate NA: results are under 5X the RDL and will not be calculated.

Matrix spike NA: Spike level < native concentration. Matrix spike acceptance limits do not apply and are not calculated.

Certified By:

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Method Summary

CLIENT NAME: AECOM CANADA LTD

AGAT WORK ORDER: 22T895413

PROJECT: 60636190

ATTENTION TO: Dhwanish Parikh

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Oil and Grease (animal/vegetable) in water	VOL-91-5011	EPA SW-846 1664A & SM 5520	BALANCE
Oil and Grease (mineral) in water	VOL-91-5011	EPA SW-846 1664A & SM 5520	BALANCE
Methylene Chloride	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
cis- 1,2-Dichloroethylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Chloroform	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Benzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Trichloroethylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
trans-1,3-Dichloropropene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Toluene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Tetrachloroethene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Ethylbenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,1,2,2-Tetrachloroethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,4-Dichlorobenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,2-Dichlorobenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Xylenes (Total)	VOL-91-5001	modified from EPA 5030B & EPA 8260D	CALCULATION
Toluene-d8	VOL-91- 5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
4-Bromofluorobenzene	VOL-91- 5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
PCBs	ORG-91-5112	EPA SW-846 3510 & 8082	GC/ECD
Decachlorobiphenyl	ORG-91-5112	EPA SW-846 8081A & 8082	GC/ECD
Di-n-butyl phthalate	ORG-91-5114	EPA SW-846 3510C & 8270E	GC/MS
Bis(2-éthylhexyl)phthalate	ORG-91-5114	EPA SW-846 3510C & 8270E	GC/MS
2,4,6-Tribromophenol	ORG-91-5114	modified from EPA 3510C, 8270E & ON MOECC E3265	GC/MS
Chrysene-d12			GC/MS
Ultra Trace Analysis			
Total Nonylphenol	TOX-151-19003F	ASTM D7065-6	LCMSMS
NP1EO	TOX-151-19003F	ASTM D7065-6	LCMSMS
NP2EO	TOX-151-19003F	ASTM D7065-6	LCMSMS
Total Nonylphenol Ethoxylates	TOX-19003F	ASTM D7065-6	LCMSMS

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Method Summary

CLIENT NAME: AECOM CANADA LTD

AGAT WORK ORDER: 22T895413

PROJECT: 60636190

ATTENTION TO: Dhwanish Parikh

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
pH	INOR-93-6000	modified from SM 4500-H+ B	PC TITRATE
CBOD (5)	INOR-93-6006	Modified from SM 5210 B	DO METER
Total Suspended Solids	INOR-93-6028	modified from EPA 1684,ON MOECC E3139,SM 2540C,D	BALANCE
Fluoride	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Total Cyanide	INOR-93-6051	modified from MOECC E3015; SM 4500-CN- A, B, & C	TECHNICON AUTO ANALYZER
Phenols	INOR-93-6072	modified from SM 5530 D	LACHAT FIA
Total Kjeldahl Nitrogen	INOR-93-6048	modified from EPA 351.2 and SM 4500-NORG D	LACHAT FIA
Total Aluminum	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Antimony	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Arsenic	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Cadmium	MET -93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Chromium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Cobalt	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Copper	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Lead	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Manganese	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Molybdenum	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Mercury	MET-93-6100	modified from EPA 245.2 and SM 3112 B	CVAAS
Total Nickel	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Phosphorus	INOR-93-6022	modified from SM 4500-P B and SM 4500-P E	SPECTROPHOTOMETER
Total Selenium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Silver	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Tin	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Titanium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Zinc	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Electrical Conductivity	INOR-93-6000	modified from SM 2510 B	PC TITRATE
Saturation pH (Calculated)		SM 2320 B	CALCULATION
Langelier Index (Calculated)		SM 2330B	CALCULATION
Hardness (as CaCO3) (Calculated)	MET-93-6105	modified from EPA SW-846 6010C & 200.7 & SM 2340 B	CALCULATION
Total Dissolved Solids	INOR-93-6028	modified from EPA 1684,ON MOECC E3139,SM 2540C,D	BALANCE

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Method Summary

CLIENT NAME: AECOM CANADA LTD

AGAT WORK ORDER: 22T895413

PROJECT: 60636190

ATTENTION TO: Dhwanish Parikh

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Alkalinity (as CaCO3)	INOR-93-6000	Modified from SM 2320 B	PC TITRATE
Bicarbonate (as CaCO3)	INOR-93-6000	modified from SM 2320 B	PC TITRATE
Carbonate (as CaCO3)	INOR-93-6000	modified from SM 2320 B	PC TITRATE
Hydroxide (as CaCO3)	INOR-93-6000	modified from SM 2320 B	PC TITRATE
Chloride	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Nitrate as N	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Bromide	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Ortho Phosphate as P	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-93-6059	modified from SM 4500-NH3 H	LACHAT FIA
Ammonia-Un-ionized (Calculated)		MOE REFERENCE, PWQOs Tab 2	CALCULATION
Total Organic Carbon	INOR-93-6049	modified from SM 5310 B	SHIMADZU CARBON ANALYZER
True Colour	INOR-93-6074	modified from SM 2120 B	LACHAT FIA
Turbidity	INOR-93-6044	modified from SM 2130 B	NEPHELOMETER
Total Calcium	MET-93-6105	modified from EPA 6010D	ICP/OES
Total Magnesium	MET-93-6105	modified from EPA 6010D	ICP/OES
Total Potassium	MET-93-6105	modified from EPA 6010D	ICP/OES
Total Sodium	MET-93-6105	modified from EPA 6010D	ICP/OES
Aluminum-dissolved	MET-93-6103	modified from EPA 200.8 and EPA 3005A	ICP-MS
Total Barium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Beryllium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Boron	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Iron	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Dissolved Mercury	MET-93-6100	modified from EPA 245.2 and SM 3112 B	CVAAS
Total Strontium	INOR-93-6003	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Thallium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Tungsten	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Uranium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Vanadium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Zirconium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Lab Filtration Aluminum Dissolved	SR-78-9001		FILTRATION
Lab Filtration mercury	SR-78-9001		FILTRATION

AGAT Laboratories

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
webearth.agatlabs.com

Laboratory Use Only

Work Order #: 22T895413

Cooler Quantity: 1 Blk (free ice)

Arrival Temperatures: 7.5 | 7.2 | 7.6

Custody Seal Intact: ☐Yes ☐No ☐N/A

Notes:

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water consumed by humans)

Report Information:

Company: AECOM Canada Ltd.

Contact: Dhawanish Parikh / Brian Holden

Address: 105 Commerce Valley Dr W, 7th Floor, Markham, ON

Phone: 416 420 5540 Fax:

Reports to be sent to:

1. Email: dhawanish.parikh@aecom.com
2. Email: Brian.Holden@aecom.com

Regulatory Requirements:

(Please check all applicable boxes)

☐ Regulation 153/04 — Table ___ *Indicate One* ☐Ind/Com ☐Res/Park ☐Agriculture

Soil Texture *(Check One)* ☐Coarse ☐Fine

☐ Excess Soils R406 — Table ___ *Indicate One*

☐ Regulation 558

☐ CCME

☑ Sewer Use ☑Sanitary ☑Storm — Bradford (Region)

☑ Prov. Water Quality Objectives (PWQO)

☐ Other ___ *Indicate One*

Turnaround Time (TAT) Required:

Regular TAT ☑ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day

OR Date Required (Rush Surcharges May Apply):

Please provide prior notification for rush TAT

*TAT is exclusive of weekends and statutory holidays

For 'Same Day' analysis, please contact your AGAT CPM

Project Information:

Project: 60636190

Site Location: BPP

Sampled By: Dhawanish Parikh

AGAT Quote #: PO:

Please note: If quotation number is not provided, client will be billed full price for analysis.

Is this submission for a Record of Site Condition? ☐ Yes ☑ No

Report Guideline on Certificate of Analysis ☑ Yes ☐ No

Invoice Information: Bill To Same: Yes ☐ No ☐

Company:

Contact:

Address:

Email:

Sample Matrix Legend

B	Biota
GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

Analysis columns: Field Filtered - Metals, Hg, CrVI, DOC (Y/N); O. Reg 153: Metals & Inorganics; Metals - ☐ CrVI, ☐ Hg, ☐ HWSB; BTEX, F1-F4 PHCs; Analyze F4G if required ☐ Yes ☐ No; PAHs; PCBs; VOC; O. Reg 558: Landfill Disposal Characterization TCLP: TCLP: ☐ M&I ☐VOCs ☐ABNs ☐B(a)P ☐PCBs; O. Reg 406: Excess Soils SPLP Rainwater Leach SPLP: ☐ Metals ☐ VOCs ☐ SVOCs; Excess Soils Characterization Package pH, ICPMS Metals, BTEX, F1-F4; Salt - EC/SAR; Bradford Sewer Use (Storm & Sanitary); PWQO (WQO); Potentially Hazardous or High Concentration (Y/N)

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Bradford Sewer Use (Storm & Sanitary)	PWQO (WQO)
BH HRW-4	May 13 22	10:45 AM	21	GW		X	
BH HRE-3	May 13, 22	12:45 PM	8	GW			+
		AM PM					
		AM PM					
		AM PM					
		AM PM					
		AM PM					
		AM PM					
		AM PM					
		AM PM					
		AM PM					

Samples Relinquished By (Print Name and Sign)	Date	Time	Samples Received By (Print Name and Sign)	Date	Time
Dhawanish Parikh	May 13, 22	4:55	Neil Ramnarain		

22 MAY 13 5:00

Page ___ of ___

Nº: T 130719

Appendix D

MECP Water Well Records, PTTWs and EASR Summary

TABLE D-1

WATER WELL RECORDS

Well I.D.	Construction Date	Well Depth (m)	Water Kind	Static Level (m)	UTM Zone	Easting	Northing	Final Status	Primary Water Use
5700298	9/25/1946	69.80	-		17	614605.4	4886697	Test Hole	-
5705276	10/23/1965	71.32	FRESH	34.44240189	17	611912.4	4885944	Water Supply	Livestock
5705281	11/23/1966	18.29	FRESH	9.753600121	17	611032.4	4887084	Water Supply	Livestock
5705282	10/17/1964	9.75	FRESH	2.43840003	17	611916.4	4886385	Water Supply	Livestock
5705283	9/22/1966	22.56	FRESH	12.80160046	17	611548.4	4887351	Water Supply	Domestic
5705284	9/11/1967	12.19	FRESH	1.828799963	17	611398.4	4887145	Water Supply	Domestic
5705287	10/12/1964	15.85	FRESH	4.87680006	17	613703.4	4886880	Water Supply	Livestock
5705288	5/3/1961	17.07	FRESH	6.096000195	17	614514.4	4886953	Water Supply	Domestic
5705289	8/3/1962	6.10	FRESH	1.828799963	17	614014.4	4886806	Water Supply	Domestic
5705290	8/3/1962	5.49	FRESH	1.828799963	17	614079.4	4886816	Water Supply	Domestic
5705291	10/1/1963	7.62	FRESH	2.43840003	17	614384.4	4886912	Water Supply	Domestic
5705292	10/28/1964	12.80	FRESH	2.43840003	17	614121.4	4887843	Water Supply	Livestock
5705293	6/7/1966	8.53	Not stated	1.828799963	17	614204.4	4886827	Water Supply	Domestic
5705294	4/20/1967	10.67	FRESH	4.87680006	17	614096.4	4888144	Water Supply	Domestic
5705295	2/10/1966	10.67	FRESH		17	614660.4	4887003	Water Supply	Domestic
5705300	3/6/1959	14.94	FRESH	8.83920002	17	608629.4	4886557	Water Supply	Livestock
5705301	5/1/1965	14.33	FRESH	4.572000027	17	608802.4	4887429	Water Supply	Livestock
5705306	11/26/1961	14.02	FRESH	6.096000195	17	614070.4	4888254	Water Supply	Domestic
5705307	6/3/1966	14.63	FRESH	12.19200039	17	614205.4	4888385	Water Supply	Domestic
5705308	8/23/1963	14.63	FRESH	11.27760029	17	614250.4	4888475	Water Supply	Domestic
5705413	7/29/1968	9.45	FRESH	4.267199993	17	614084.4	4888173	Water Supply	Domestic
5705414	7/8/1968	9.45	FRESH	4.267199993	17	614054.4	4888133	Water Supply	Domestic
5705458	7/9/1968	11.89	FRESH	2.43840003	17	611454.4	4886843	Water Supply	Domestic
5705471	5/8/1968	12.19	FRESH	3.352800131	17	609176.6	4886614	Water Supply	Domestic
5705763	10/4/1968	13.11	FRESH	6.096000195	17	614214.4	4888303	Water Supply	Domestic
5705984	8/1/1968	8.53	FRESH	5.486400127	17	613914.4	4888203	Water Supply	Domestic
5706117	11/25/1968	8.84	FRESH	3.352800131	17	614314.4	4887563	Water Supply	Domestic
5706124	9/21/1968	21.64	FRESH	14.6303997	17	609884.4	4883983	Water Supply	Livestock
5706125	10/23/1968	8.53	FRESH	3.657599926	17	614004.4	4888163	Water Supply	Domestic
5706692	7/2/1969	15.85	FRESH	10.36320019	17	611496.6	4887103	Water Supply	Domestic
5707014	10/25/1969	15.24	FRESH	4.572000027	17	614374.4	4886923	Water Supply	Domestic
5707015	10/31/1969	15.24	FRESH	4.267199993	17	614374.4	4886903	Water Supply	Domestic
5707030	9/24/1969	17.37	FRESH	6.705600262	17	609464.4	4885393	Water Supply	Livestock
5707042	12/11/1969	17.37	FRESH	10.36320019	17	614214.4	4886853	Water Supply	Domestic
5707572	9/30/1970	11.58	Not stated	7.315199852	17	611414.4	4887273	Water Supply	Domestic
5707747	11/12/1970	110.64	FRESH	6.400800228	17	609864.4	4883723	Water Supply	Commerical
5707770	7/31/1970	10.97	FRESH	7.315199852	17	613914.4	4888123	Water Supply	Domestic
5708033	5/7/1971	11.89	FRESH	9.448800087	17	614064.4	4888243	Water Supply	Domestic
5708661	11/15/1971	13.41	FRESH	8.534399986	17	614214.4	4888363	Water Supply	Domestic
5708749	12/23/1971	10.67	FRESH	3.657599926	17	614139.4	4886823	Water Supply	Domestic
5709152	5/4/1972	8.23	FRESH	4.267199993	17	613944.4	4888153	Water Supply	Domestic
5709159	6/9/1972	13.41	FRESH	8.534399986	17	614114.4	4888173	Water Supply	Domestic
5709180	7/7/1972	11.58	FRESH	8.534399986	17	614114.4	4888273	Water Supply	Domestic
5709181	7/8/1972	10.67	FRESH	5.486400127	17	613874.4	4888243	Water Supply	Domestic
5709444	10/16/1972	7.32	FRESH	5.486400127	17	611614.4	4887423	Water Supply	Domestic
5709446	8/10/1972	15.85	FRESH	12.80160046	17	614314.4	4887763	Water Supply	Domestic
5710485	10/19/1973	16.76	FRESH	11.88720036	17	615307.4	4887212	Water Supply	Domestic
5710718	9/13/1973	17.07	FRESH	4.87680006	17	611484.4	4886920	Water Supply	Domestic
5711354	6/25/1974	15.24	FRESH	7.924799919	17	608777.4	4886579	Water Supply	Domestic
5711738	8/13/1974	12.80	FRESH	6.705600262	17	613843.4	4888209	Water Supply	Domestic
5711739	3/19/1974	15.24	FRESH	10.97280025	17	613910.4	4888224	Water Supply	Domestic
5711907	11/15/1974	9.75	FRESH	4.267199993	17	611489.4	4886773	Water Supply	Domestic
5711925	8/16/1974	8.23	FRESH	4.267199993	17	611264.4	4887343	Water Supply	Domestic
5713983	9/27/1976	14.02	FRESH	5.486400127	17	611414.4	4887023	Water Supply	Domestic
5714081	3/21/1977	68.58	FRESH	18.28800011	17	609164.4	4884123	Water Supply	Domestic
5715129	4/12/1978	50.90	FRESH	15.84959984	17	614964.4	4887123	Water Supply	Domestic
5715181	3/31/1978	108.20	FRESH	7.315199852	17	616114.4	4887373	Observation Wells	Not Used
5716038	1/8/1979	24.99	Not stated	18.89760017	17	609314.4	4883673	Water Supply	Livestock
5716219	6/5/1979	16.76	FRESH	9.144000053	17	614414.4	4888023	Water Supply	Industrial
5716593	9/13/1979	13.72	SALTY	2.133599997	17	608914.4	4885623	Water Supply	Livestock
5716598	9/24/1979	15.24	FRESH	3.657599926	17	609164.4	4886673	Water Supply	Domestic
5716611	11/19/1979	43.28	FRESH	29.26079941	17	611364.4	4887023	Water Supply	Domestic
5716995	6/9/1980	12.50	FRESH	5.486400127	17	611514.4	4887073	Water Supply	Domestic
5717000	6/16/1980	13.72	FRESH	4.572000027	17	614614.4	4886973	Water Supply	Domestic
5717319	11/4/1980	13.41	FRESH	2.43840003	17	609164.4	4887973	Water Supply	Domestic
5717528	8/11/1981	104.24	FRESH	9.144000053	17	609864.4	4883823	Water Supply	Domestic
5718149	6/14/1982	107.29	FRESH	24.38400078	17	609214.4	4884023	Water Supply	Public
5718237	3/5/1982	11.28	Not stated	3.048000097	17	609064.4	4884423	Water Supply	Domestic
5718402	10/18/1982	18.59	Not stated	6.096000195	17	611414.4	4887123	Water Supply	Domestic
5719105	11/19/1983	17.37	Not stated	6.096000195	17	613764.4	4886723	Water Supply	Domestic
5719351	6/2/1983	9.75	FRESH	0	17	612314.4	4886223	Water Supply	Domestic
5720665	6/20/1985	15.24	Not stated	4.572000027	17	614737.4	4887702	Water Supply	Domestic
5721141	4/14/1986	108.51	FRESH	56.69280243	17	614536	4887760	Water Supply	Domestic
5721375	3/10/1986	17.07	Not stated	6.096000195	17	611307	4887249	Water Supply	Domestic
5721377	4/30/1986	22.25	Not stated	6.096000195	17	614737.4	4887702	Water Supply	Domestic
5721577	9/6/1986	15.54	Not stated	6.096000195	17	614263	4888247	Water Supply	Domestic
5721640	11/10/1986	20.12	Not stated	3.048000097	17	608858.5	4887343	Water Supply	Domestic

TABLE D-1

WATER WELL RECORDS

Well I.D.	Construction Date	Well Depth (m)	Water Kind	Static Level (m)	UTM Zone	Easting	Northing	Final Status	Primary Water Use
5722073	7/20/1986	20.42	FRESH	0	17	609164.4	4887319	Water Supply	Domestic
5722617	10/8/1987	16.76	Not stated	3.048000097	17	611426	4887099	Water Supply	Domestic
5722789	12/11/1987	91.44	FRESH	39.92879868	17	615356.4	4887906	Water Supply	Domestic
5722790	12/4/1987	140.21			17	615356.4	4887906	-	-
5723028	8/13/1987	133.20	FRESH	113.0808029	17	614247.6	4888431	Water Supply	Industrial
5723565	6/8/1988	12.19	Not stated	8.534399986	17	609419.4	4885953	Water Supply	Domestic
5723566	6/13/1988	52.12	FRESH		17	615313.6	4887193	Water Supply	Domestic
5724025	9/29/1988	41.76	FRESH	18.28800011	17	615060.6	4887113	Water Supply	Domestic
5724233	9/20/1988	17.07	Not stated	3.048000097	17	614762	4888397	Water Supply	Domestic
5724485	10/26/1988	21.64	Not stated	1.524000049	17	611456	4887377	Water Supply	Domestic
5724486	10/24/1988	19.20	Not stated	9.144000053	17	614566.6	4888323	Water Supply	Domestic
5724780	2/10/1989	21.34	Not stated	15.23999977	17	608571.4	4887127	Water Supply	Domestic
5724784	1/29/1989	21.34	Not stated	9.144000053	17	615356.4	4887906	Water Supply	Domestic
5724930	4/1/1989	17.07	Not stated	9.144000053	17	614162.6	4888010	Water Supply	Domestic
5725215	4/28/1989	17.37	Not stated	3.048000097	17	611270	4887308	Water Supply	Domestic
5725216	3/10/1989	11.89	Not stated	3.048000097	17	613892.6	4888131	Water Supply	Domestic
5725332	7/19/1989	70.41	FRESH	35.96640015	17	614811.6	4888250	Water Supply	Domestic
5725334	7/26/1989	42.06	FRESH	6.096000195	17	615475	4887474	Water Supply	Commerical
5725415	6/2/1989	52.43			17	611782.4	4886727	Observation Wells	Not Used
5725416	5/24/1989	48.77	FRESH	16.76399994	17	611782.4	4886727	Observation Wells	Not Used
5725701	10/3/1989	86.26	FRESH	53.34000015	17	614598.6	4888328	Water Supply	Domestic
5725793	7/20/1989	17.07	Not stated	6.096000195	17	614664	4888150	Water Supply	Domestic
5725796	7/20/1989	17.07	Not stated	6.096000195	17	614785	4888265	Water Supply	Domestic
5726072	12/1/1989	82.60	FRESH	42.97679901	17	614685.6	4888220	Water Supply	Domestic
5726116	12/8/1989	76.81	FRESH	39.01440048	17	614719.6	4888225	Water Supply	Domestic
5726158	3/1/1989	19.51	Not stated	9.144000053	17	614628.6	4888219	Water Supply	Domestic
5726159	12/10/1989	22.56	Not stated	6.096000195	17	614559	4888334	Water Supply	Domestic
5726341	2/22/1990	74.37	FRESH	28.65120125	17	614657.6	4888192	Water Supply	Domestic
5726406	3/30/1990	92.96	FRESH	54.86400223	17	614605.6	4888208	Water Supply	Domestic
5726435	3/8/1990	93.27	FRESH	21.33600044	17	616050	4887428	Water Supply	Municipal
5726774	5/25/1990	36.58	FRESH	2.133599997	17	615356.4	4887906	Water Supply	Domestic
5726775	3/21/1990	25.60			17	615356.4	4887906	Unfinished	Not Used
5727068	8/13/1990	79.25	FRESH	55.77840042	17	614791	4888320	Water Supply	Domestic
5727102	4/2/1990	24.38	Not stated	6.096000195	17	614314	4888367	Water Supply	Domestic
5727105	3/15/1990	24.38	Not stated	10.66800022	17	614346	4888266	Water Supply	Domestic
5727173	8/17/1990	79.25	FRESH	48.76800156	17	614746	4888398	Water Supply	Domestic
5727174	8/27/1990	91.74	FRESH	57.91200256	17	615356.4	4887906	Water Supply	Commerical
5727932	12/15/1990	102.11			17	609423.6	4883770	Test Hole	-
5727933	12/20/1990	38.10	FRESH	2.743200064	17	609420.6	4883770	Water Supply	Not Used
5728079	5/20/1991	23.77	Not stated	7.010400295	17	614572.6	4888347	Water Supply	Domestic
5728081	5/19/1991	29.57	Not stated	12.19200039	17	611418	4887163	Water Supply	Domestic
5728146	9/19/1990	51.82	FRESH	5.486400127	17	615502	4887721	Water Supply	Industrial
5728225	6/21/1991	50.29	FRESH	15.23999977	17	611601.6	4887166	Water Supply	Domestic
5728634	9/9/1991	53.34	FRESH		17	611582.6	4887124	Water Supply	Domestic
5729040	3/13/1992	76.20	FRESH	42.67200089	17	614551.6	4887133	Water Supply	Domestic
5729093	3/24/1992	67.36	FRESH	5.486400127	17	609419.4	4885953	Water Supply	Domestic
5729685	9/16/1992	51.82	FRESH	29.56559944	17	611659	4887164	Water Supply	Domestic
5729716	10/21/1992	12.19	FRESH	3.048000097	17	610907.6	4887131	Water Supply	Domestic
5730035	4/8/1993	97.54	FRESH	58.82640076	17	614006.6	4888328	Water Supply	Domestic
5730093	7/23/1993	45.11	FRESH	15.5447998	17	615616	4887202	Water Supply	Commerical
5730441	11/3/1993	67.67	FRESH	29.56559944	17	611472.6	4887303	Water Supply	Domestic
5730719	5/5/1994	96.01	FRESH	59.43600082	17	614324	4888346	Water Supply	Domestic
5730801	2/25/1994	100.58	FRESH	11.58240032	17	609691.4	4884595	Water Supply	Industrial
5731304	11/7/1994	112.78	FRESH	27.73680115	17	615707.6	4887307	Test Hole	Municipal
5731305	11/9/1994	35.97	FRESH		17	615702.6	4887311	Test Hole	Municipal
5731308	12/21/1994	86.87	FRESH	59.43600082	17	614381.6	4888356	Water Supply	Domestic
5731750	8/16/1995				17	609691.4	4884595	Abandoned-Quality	Domestic
5731783	7/19/1995	23.77	FRESH	0	17	611610	4886975	Water Supply	Domestic
5731785	7/4/1995	12.19	FRESH	8.83920002	17	609691.4	4884595	Water Supply	Domestic
5732097	12/15/1995	61.57	FRESH	33.52799988	17	614449	4887195	Water Supply	Domestic
5732627	11/22/1996	96.62	Not stated		17	616028	4887449	Abandoned-Supply	Municipal
5732750	9/2/1996	14.63	Not stated	3.048000097	17	611956	4886385	Water Supply	Domestic
5734015	1/5/1999	91.44	FRESH	38.10000229	17	614160	4886818	Water Supply	Domestic
5734100	3/9/1999	100.58	FRESH	54.86400223	17	613810	4886710	Water Supply	Domestic
5734245	6/16/1999	97.54	FRESH	54.86400223	17	613644	4886697	Water Supply	Domestic
5734465	8/23/1999	23.16	FRESH	10.97280025	17	614020	4888236	Water Supply	Domestic
5734495	8/24/1999	44.20	FRESH		17	609529	4886841	Water Supply	Domestic
5734872	10/5/1999	92.05	FRESH	61.26480103	17	614137	4887505	Water Supply	Domestic
5734873	9/23/1999	137.77			17	614357	4887786	Abandoned-Quality	Not Used
5734920	9/10/1999	18.90	FRESH	7.924799919	17	612057	4886273	Water Supply	Domestic
5734969	12/17/1999	92.05	FRESH	64.61759949	17	614258	4888304	Water Supply	Domestic
5735993	4/2/2001	91.44			17	611505	4887020	Abandoned-Supply	-
5735994	4/13/2001	20.73	FRESH	1.524000049	17	611604	4887045	Water Supply	Domestic
5736280	8/28/2001	73.15	FRESH	26.82240105	17	609567	4885448	Water Supply	Domestic
5736334	8/16/2001				17	614315	4887041	Abandoned-Other	Not Used
5736335	7/16/2001				17	614323	4887066	Abandoned-Other	Not Used
5736514	11/22/2001	108.20			17	615353.6	4887905	Abandoned-Other	Not Used

TABLE D-1

WATER WELL RECORDS

Well I.D.	Construction Date	Well Depth (m)	Water Kind	Static Level (m)	UTM Zone	Easting	Northing	Final Status	Primary Water Use
5736515	11/22/2001	77.72			17	615353.6	4887905	Abandoned-Other	Not Used
5736566	12/31/2001	17.68	FRESH		17	610006.6	4886141	Water Supply	Domestic
5737202	7/9/2002	72.54	FRESH	37.79520035	17	615353.6	4887905	Water Supply	Domestic
5739594	3/7/2005	42.70		20.37000084	17	611724	4886575	Water Supply	Commerical
5739664	4/13/2005	52.10	FRESH	29.70000076	17	611448	4887218	Water Supply	Domestic
5739993	6/24/2005				17	614419	4886913	Abandoned-Other	Not Used
5740281	10/3/2005	5.00			17	613134	4886773	-	-
5740630	4/5/2006	60.96		31.89999962	17	611567	4887297	Water Supply	Domestic
6900164	6/1/1963	6.10	FRESH	1.524000049	17	621883.5	4888534	Water Supply	Domestic
6900172	11/2/1962	33.22	FRESH	9.144000053	17	623447.5	4889448	Water Supply	Livestock
6900173	6/3/1960	9.14	FRESH	1.524000049	17	623527.5	4889807	Water Supply	Livestock
6900174	12/10/1962	7.01	FRESH	3.048000097	17	623632.5	4889858	Water Supply	Domestic
6900175	10/5/1966	44.81	FRESH	10.66800022	17	623227.4	4890297	Water Supply	Domestic
6900176	1/5/1967	49.68	FRESH	9.144000053	17	623227.4	4890297	Water Supply	Domestic
6900177	5/3/1967	14.94	FRESH	7.619999886	17	623167.4	4890256	Water Supply	Domestic
6900178	10/2/1967	4.57	FRESH	0.609600008	17	623163.4	4890151	Water Supply	Livestock
6900327	4/12/1955	12.19	FRESH	3.657599926	17	625273.5	4888917	Water Supply	Domestic
6900344	8/18/1962	10.97	FRESH	4.572000027	17	623876.5	4889571	Water Supply	Livestock
6900345	8/19/1965	15.24	FRESH	7.924799919	17	623860.5	4889661	Water Supply	Livestock
6900346	12/18/1958	6.71	FRESH	3.048000097	17	623786.5	4890215	Water Supply	Livestock
6900347	5/22/1960	10.67	FRESH	3.048000097	17	624636.5	4890749	Water Supply	Domestic
6900348	9/25/1967	10.67	FRESH	3.048000097	17	624642.5	4890528	Water Supply	Domestic
6900759	5/29/1964	15.85	FRESH	1.219200015	17	621817.5	4888390	Water Supply	Domestic
6900819	4/16/1964	6.71	FRESH	2.43840003	17	619883.5	4887921	Water Supply	Domestic
6900821	7/9/1963	4.57	FRESH	1.828799963	17	619222.5	4887600	Water Supply	Domestic
6901688	9/24/1962	12.19	FRESH	3.048000097	17	617387.4	4887802	Water Supply	Domestic
6902668	4/10/1959	3.66	FRESH		17	617734.5	4887382	Abandoned-Quality	Not Used
6902669	3/10/1948	57.30	FRESH		17	617469.4	4888293	Water Supply	Commerical
6909019	9/9/1968	12.19	FRESH	6.096000195	17	624264.5	4890553	Water Supply	Domestic
6909021	5/15/1968	72.85	FRESH	0.914399981	17	619514.5	4887673	Water Supply	Domestic
6909373	8/20/1969	66.14	FRESH	-0.914399981	17	621544.4	4889853	Water Supply	Domestic
6909515	10/2/1969	70.71	FRESH	3.657599926	17	619064.5	4888143	Water Supply	Domestic
6909832	5/2/1970	18.90	FRESH	0.914399981	17	619884.5	4888503	Water Supply	Domestic
6910580	10/26/1971	12.80	FRESH	9.753600121	17	623614.5	4889763	Water Supply	Domestic
6910848	1/12/1972	6.40	FRESH	1.828799963	17	619914.5	4887848	Water Supply	Domestic
6910968	4/23/1971	3.35	FRESH	1.828799963	17	621489.4	4889873	Observation Wells	Not Used
6911493	5/22/1973	23.47			17	619161.7	4887623	Abandoned-Quality	-
6911499	5/21/1973	17.07	FRESH	3.657599926	17	619186.7	4887598	Water Supply	Domestic
6911657	6/20/1973	8.84	FRESH	1.828799963	17	620017.8	4888151	Water Supply	Domestic
6911658	6/19/1973	8.84	FRESH	1.524000049	17	619967.8	4888172	Water Supply	Domestic
6911787	10/8/1973	14.63	FRESH	1.219200015	17	619111.7	4887673	Water Supply	Domestic
6911801	12/7/1973	6.40	FRESH	4.267199993	17	621914.5	4888496	Water Supply	Domestic
6912025	4/22/1974	79.25	FRESH	6.705600262	17	619375.7	4887667	Water Supply	Domestic
6912042	5/27/1974	17.07	FRESH	0.609600008	17	619316.7	4887513	Water Supply	Domestic
6912147	6/12/1974	16.15	FRESH	0.914399981	17	619305.7	4887538	Water Supply	Domestic
6912158	7/24/1974	16.15	FRESH	0.914399981	17	619350.8	4887506	Water Supply	Domestic
6912408	10/31/1974	73.15	FRESH	10.66800022	17	617818.7	4887315	Water Supply	Domestic
6912418	11/8/1974	65.84	Not stated	0	17	621809.5	4889004	Water Supply	Domestic
6912423	3/23/1974	76.20	Not stated	1.828799963	17	619329.7	4887715	Water Supply	Domestic
6912424	2/26/1974	29.26	Not stated	6.705600262	17	619117.7	4887747	Water Supply	Domestic
6912425	1/16/1974	71.63	Not stated	9.144000053	17	619096.7	4887639	Water Supply	Domestic
6912505	9/11/1974	14.94	FRESH	0.914399981	17	619153.7	4887687	Water Supply	Domestic
6912621	4/8/1975	71.32	FRESH	3.657599926	17	618132.7	4887694	Water Supply	Commerical
6912875	8/29/1975	65.53	FRESH	0.609600008	17	621752.4	4889258	Water Supply	Domestic
6912879	5/25/1975	19.20	FRESH	2.133599997	17	619096.5	4887619	Water Supply	Domestic
6912890	2/14/1975	15.54	FRESH	4.572000027	17	619264.5	4887576	Water Supply	Domestic
6913093	12/1/1975	14.63	FRESH	2.43840003	17	619231.5	4887635	Water Supply	Domestic
6913132	9/16/1975	13.72	FRESH	1.828799963	17	619212.5	4887709	Water Supply	Domestic
6913133	9/16/1975	13.72	FRESH	2.133599997	17	619230.5	4887709	Water Supply	Domestic
6913143	12/17/1975	10.67	FRESH	3.657599926	17	623725.5	4889863	Water Supply	Domestic
6914054	8/9/1977	73.15	Not stated		17	622914.4	4890273	Test Hole	Not Used
6914136	6/13/1977	8.84	FRESH	0.304800004	17	623614.4	4890573	Water Supply	Domestic
6914137	6/23/1977	8.23	FRESH	3.048000097	17	623584.5	4889803	Water Supply	Domestic
6914561	6/22/1978	15.54	FRESH	2.133599997	17	621764.5	4888623	Water Supply	Domestic
6914630	5/31/1978	40.84	FRESH	6.096000195	17	624114.5	4890523	Water Supply	Domestic
6914737	6/6/1978	9.14	FRESH	3.048000097	17	623614.4	4890573	Water Supply	Domestic
6914742	9/8/1978	21.34	FRESH	7.619999886	17	625214.5	4888873	Water Supply	Domestic
6914824	10/31/1978	15.24	FRESH	2.43840003	17	621864.5	4888523	Water Supply	Domestic
6915013	2/23/1979	37.49	FRESH	10.66800022	17	624214.5	4890673	Water Supply	Domestic
6915104	5/29/1979	13.72	FRESH	4.572000027	17	623614.5	4889423	Water Supply	Domestic
6915115	8/17/1979	59.13	FRESH	0.304800004	17	621914.5	4888723	Water Supply	Domestic
6915372	3/20/1980	59.74	Not stated	7.010400295	17	619814.2	4887924	Water Supply	Domestic
6915374	4/22/1980	62.79	Not stated	6.400800228	17	619711.8	4887923	Water Supply	Domestic
6915429	9/6/1979	17.07	FRESH	3.048000097	17	621864.5	4888673	Water Supply	Domestic
6915520	6/19/1980	64.31	Not stated	6.705600262	17	619761.8	4887923	Water Supply	Domestic
6915560	7/17/1980	6.40	FRESH	1.219200015	17	621614.4	4889623	Water Supply	Domestic
6917112	6/21/1984	66.45	FRESH	9.144000053	17	620014.5	4887823	Water Supply	Domestic

TABLE D-1

WATER WELL RECORDS

Well I.D.	Construction Date	Well Depth (m)	Water Kind	Static Level (m)	UTM Zone	Easting	Northing	Final Status	Primary Water Use
6917280	11/6/1984	70.10	FRESH	10.66800022	17	619867	4888518	Water Supply	Domestic
6917379	6/6/1984	60.05	FRESH	7.924799919	17	618210	4888144	Water Supply	Domestic
6917777	11/15/1985	84.43	FRESH	14.02080059	17	623123.81	4890298.9	Water Supply	Livestock
6918208	8/18/1986	16.15	FRESH	2.743200064	17	619923	4888218	Water Supply	Domestic
6918570	8/23/1986	28.96	FRESH	7.619999886	17	623639	4889840	Water Supply	Domestic
6919029	9/6/1987	128.02	FRESH	58.21680069	17	623647	4889859	Water Supply	Domestic
6919030	9/12/1987	129.54	FRESH	57.91200256	17	623647	4889859	Water Supply	Domestic
6919418	4/6/1988	71.63	FRESH	0	17	623104	4890304	Water Supply	Domestic
6919423	7/30/1987	19.20	FRESH	1.219200015	17	619864	4888508	Water Supply	Domestic
6919429	4/13/1988	80.47	FRESH	29.87039948	17	625214.5	4888917	Water Supply	Domestic
6919715	8/8/1988	20.73	FRESH	1.219200015	17	619964	4888011	Water Supply	Domestic
6919838	6/29/1988	12.19	Not stated	1.828799963	17	619765	4887926	Water Supply	Domestic
6920602	8/14/1989	17.98	FRESH	3.352800131	17	619722	4887909	Water Supply	Domestic
6920796	10/26/1989	16.15	FRESH	1.219200015	17	619766	4887918	Water Supply	Domestic
6920798	11/18/1989	16.76	FRESH	1.828799963	17	619679	4887895	Water Supply	Domestic
6920839	1/11/1990	23.77	FRESH	7.619999886	17	623659	4889818	Water Supply	Domestic
6921153	7/5/1990	49.38	FRESH	5.181600094	17	619962	4888009	Water Supply	Domestic
6921530	7/11/1991	16.15	FRESH	2.43840003	17	619769	4887914	Water Supply	Domestic
6921569	9/11/1991	15.24	FRESH	2.133599997	17	619952	4887998	Water Supply	Domestic
6921996	8/19/1982	84.73	FRESH	16.76399994	17	624234	4890638	Water Supply	Domestic
6921997	8/22/1992	85.34	FRESH	12.19200039	17	623652	4890568	Water Supply	Domestic
6921998	8/14/1992	85.34	FRESH	13.71600056	17	623574	4890508	Water Supply	Domestic
6922219	4/28/1993	15.85	FRESH	1.219200015	17	619924	4887970	Water Supply	Domestic
6922291	6/30/1993	27.13	FRESH	0.304800004	17	619595	4887869	Water Supply	Domestic
6922348	9/10/1993	22.86	FRESH	2.133599997	17	618963	4887455	Water Supply	Domestic
6922378	9/9/1993	73.76	FRESH		17	619641	4887875	Water Supply	Domestic
6922460	12/10/1993	71.02	FRESH	10.05840015	17	623573.13	4890126.76	Water Supply	Domestic
6922975	11/15/1994	52.73	FRESH	4.267199993	17	621887.5	4888499.82	Water Supply	Domestic
6923707	9/18/1996	41.45	FRESH	7.619999886	17	624246	4890627	Water Supply	Domestic
6923976	7/11/1997	3.05			17	619141	4887602	Abandoned-Other	Not Used
6924522	7/28/1998	70.71	FRESH	7.619999886	17	621692	4889576	Water Supply	Domestic
6924647	10/19/1998	79.86	FRESH	18.59280014	17	623667	4890196	Water Supply	Domestic
6924966	7/23/1999		FRESH	0.304800004	17	624878	4888738	Water Supply	Domestic
6925001	9/17/1999	8.23	FRESH	2.743200064	17	619978	4887904	Water Supply	Domestic
6925015	9/20/1999	87.78	FRESH	23.77440071	17	623631.75	4889801.97	Water Supply	Domestic
6925018	9/29/1999	89.00	FRESH	21.94560051	17	623652	4889833	Water Supply	Domestic
6925785	10/29/1991	10.67		1.706879973	17	623617	4890190	Observation Wells	Not Used
6925885	6/4/2001	16.15	FRESH	6.400800228	17	622677.6	4889501	Water Supply	Domestic
6925921	8/16/2001	21.03	FRESH	1.828799963	17	618959.7	4887454	Water Supply	Domestic
6925949	7/28/2001	76.50	FRESH	13.71600056	17	624459.6	4890989	Water Supply	Domestic
6925950	8/21/2001				17	624459.6	4890989	Abandoned-Quality	Not Used
6926293	2/4/2002	64.92	FRESH	30.47999954	17	622593.6	4889923	Water Supply	Domestic
6926709	10/22/2002	15.54	FRESH	2.43840003	17	620852.7	4888493	Water Supply	Domestic
6926787	11/8/2002				17	618879.7	4887841	Abandoned-Other	Not Used
6927136	6/27/2003				17	624542.6	4890584	Abandoned-Other	Not Used
6928251	8/19/2004	88.69	FRESH	22.86000061	17	623211	4890113	Water Supply	Domestic
6928252	8/26/2004	61.26	FRESH	3.349999905	17	623212	4890113	Water Supply	Domestic
6930273	4/25/2006	9.10	FRESH		17	624134	4890186	Observation Wells	-
6930644	6/22/2006				17	619729	4888274		-
7035810	9/18/2006	12.10	FRESH		17	624624	4890304	Observation Wells	-
7039486	1/6/2007				17	616920	4887689	Abandoned-Other	-
7039488	1/6/2007				17	616918	4887691	Abandoned-Other	-
7045963	5/28/2007				17	621712	4889536		-
7046038	6/18/2007	75.29	FRESH	9.509759903	17	623871	4890508		-
7103547	10/25/2007	78.64	Untested	24.24379349	17	609482	4885442	Water Supply	Domestic
7103557	1/25/2008				17	609306	4883600	Abandoned-Other	Not Used
7103558	1/25/2008			1.799999952	17	609306	4883600	Abandoned-Other	Not Used
7103559	1/25/2008			1.74000001	17	609292	4883605	Abandoned-Other	Not Used
7103560	1/25/2008			3.400000095	17	609306	4883612	Abandoned-Other	Not Used
7103561	1/25/2008			8.199999809	17	609293	4883612	Abandoned-Other	Not Used
7103562	1/25/2008			1.139999986	17	609266	4883612	Abandoned-Other	Not Used
7105437	4/23/2008	21.33	FRESH		17	610003	4885729	Water Supply	Livestock
7107247	4/14/2008	30.50			17	610022	4885864	Abandoned-Supply	Domestic
7107248	4/10/2008	102.10			17	610022	4885714	Abandoned-Supply	Domestic
7109739	7/22/2008	23.16	FRESH	3.404616117	17	623446	4890264	Water Supply	Domestic
7114467	9/30/2008				17	619640	4887827		-
7121278	1/11/2009	70.41	FRESH	15.63624001	17	619584	4887907	Water Supply	Commerical
7123256	4/23/2009	81.08	FRESH	35.05200195	17	625208	4889029	Water Supply	Domestic
7131129	8/31/2009				17	624875	4888737	Abandoned-Other	Not Used
7139928	1/7/2010	6.10			17	615495	4887058	Test Hole	Test Hole
7140470	11/5/2009	6.10	Untested	1.889760017	17	612554	4886559	Abandoned-Other	Other
7140471	11/5/2009	7.01	Untested	1.889760017	17	612567	4886547	Abandoned-Other	Not Used
7140952	6/10/2009				17	613660	4886693	Abandoned-Supply	Other
7140953	5/28/2009				17	613659	4886702	Abandoned-Other	-
7148108	5/20/2010	10.97		1.828799963	17	624513	4890659	Abandoned-Other	Not Used
7148109	5/20/2010	46.63	Untested	21.67127991	17	624588	4890769	Abandoned-Other	Not Used
7148110	5/20/2010	78.03	Untested		17	624498	4890752	Abandoned-Other	Not Used

TABLE D-1

WATER WELL RECORDS

Well I.D.	Construction Date	Well Depth (m)	Water Kind	Static Level (m)	UTM Zone	Easting	Northing	Final Status	Primary Water Use
7148111	5/14/2010	9.14	Untested	3.048000097	17	624918	4888820	Abandoned-Other	Not Used
7148502	4/29/2010				17	614690	4887031	Abandoned-Other	-
7153416	10/1/2010	4.60			17	614547	4887108	Test Hole	Test Hole
7153637	8/18/2010				17	624598	4888704	Abandoned-Other	Not Used
7153638	8/18/2010				17	624615	4888730	Abandoned-Other	-
7154911	11/11/2010				17	615266	4887178	Abandoned-Supply	-
7154912	11/11/2010				17	615264	4887179	Abandoned-Other	-
7166452	3/31/2011		Untested	0.609600008	17	614662	4886980	Abandoned-Other	Not Used
7171274	10/17/2011	8.75			17	624057	4892150	Observation Wells	Not Used
7171275	10/17/2011	8.68			17	624835	4889662	Observation Wells	Not Used
7172165	8/11/2011				17	624739	4889807		-
7172335	6/23/2010				17	614941	4887803		-
7176515	7/26/2011		Untested	3.048000097	17	615223	4887154	Abandoned-Other	Not Used
7178301	12/16/2011	83.82	FRESH	45.82668304	17	614664	4888184	Water Supply	Domestic
7182552	4/19/2012				17	624425	4891167		-
7183033	6/12/2012	9.14			17	624644	4888984	Observation Wells	Monitoring
7184407	7/18/2012				17	624644	4888984	Abandoned-Other	Other
7190075	10/12/2012				17	623448	4890252	Abandoned-Supply	Domestic
7198799	5/30/2012				17	619761	4887944		-
7203592	6/6/2013				17	613716	4886744	Abandoned-Other	-
7204260	6/4/2013	6.10			17	621812	4888854	Observation Wells	-
7208408	6/11/2013				17	609874	4883760	Abandoned-Other	-
7211014	3/27/2013				17	619767	4887945		-
7212332	6/11/2013				17	609874	4883760	Abandoned-Other	-
7220941	5/9/2013	85.34	FRESH	48.50891876	17	614627	4888167	Water Supply	Domestic
7225772	7/13/2014				17	611994	4885857		-
7227551	8/25/2014				17	624346	4891128		-
7236241	12/17/2014				17	615725	4887301	Abandoned-Other	Other
7236242	12/18/2014				17	615723	4887290	Abandoned-Other	Other
7236243	12/15/2014				17	616045	4887424	Abandoned-Other	Other
7237658	12/4/2014				17	609673	4885311		-
7239188	11/3/2014				17	621840	4888964		-
7241686	12/3/2014	6.10			17	608932	4883777		-
7243635	5/1/2015				17	611779	4886041		-
7243636	6/1/2015	7.62			17	611776	4886038	Observation Wells	Monitoring and Test Hole
7251673	8/20/2015	15.85	FRESH	1.828799963	17	619910	4887824	Water Supply	Domestic
7254463	11/25/2015	9.14	Untested		17	609065	4883523	Monitoring and Test Hole	Monitoring and Test Hole
7260179	11/26/2015				17	614500	4888050		-
7262975	4/28/2016	4.50			17	611558	4885906	Observation Wells	Monitoring
7282693	1/12/2017	65.23	FRESH	1.524000049	17	621580	4889470	Water Supply	Domestic
7286172	9/20/2016				17	609890	4883802		-
7291854	7/20/2017				17	611051	4887045	Abandoned-Other	-
7294550	7/28/2017				17	612216	4886037		-
7296474	8/2/2017	6.10			17	611992	4886328	Monitoring and Test Hole	Test Hole
7296475	8/1/2017	5.18			17	612034	4886339	Monitoring and Test Hole	Test Hole
7296476	8/1/2017	5.49			17	612028	4886340	Monitoring and Test Hole	Test Hole
7296477	8/1/2017	6.10			17	611999	4886356	Monitoring and Test Hole	Test Hole
7300962	11/7/2017		Untested		17	614449	4886866	Observation Wells	Monitoring
7301874	11/9/2017				17	614139	4888282	Abandoned-Other	-
7302531	10/27/2017	28.65	FRESH	9.083040237	17	614150	4888203	Water Supply	Domestic
7304976	1/12/2018	6.10			17	608929	4883767	Observation Wells	Test Hole
7306613	8/18/2017	4.60	Untested		17	614831	4886554	Observation Wells	Test Hole
7306810	1/23/2018	6.10	Untested		17	608879	4884039	Monitoring and Test Hole	Test Hole
7309267	2/27/2018	1.83			17	625189	4889035	Abandoned-Other	-
7310386	2/2/2018	4.90			17	608983	4883519		Test Hole
7314497	4/6/2018				17	614492	4886802		-
7320841	6/27/2018				17	609060	4883524	Abandoned-Other	-
7338306	6/21/2019		Untested		17	612315	4886240	Abandoned-Other	-
7346733	10/30/2019		Untested		17	609590	4883547	Abandoned-Other	-
7346734	10/31/2019		Untested		17	609502	4883538	Abandoned-Other	-
7346735	10/31/2019		Untested		17	609450	4883480	Abandoned-Other	-
7349701	11/4/2019	12.19			17	615001	4887092	Monitoring and Test Hole	Monitoring and Test Hole
7349764	11/7/2019	6.10			17	615127	4887173	Monitoring and Test Hole	Monitoring and Test Hole
7349765	11/6/2019	12.19			17	615086	4887119	Monitoring and Test Hole	Monitoring and Test Hole
7349766	11/5/2019	3.66			17	615002	4887173	Monitoring and Test Hole	Monitoring and Test Hole
7349767	11/5/2019	6.10			17	615017	4887132	Monitoring and Test Hole	Monitoring and Test Hole
7355668	2/26/2020		Untested		17	622147	4888841	Abandoned-Other	-
7355669	2/25/2020		Untested		17	622166	4889114	Abandoned-Other	-
7355670	2/26/2020		Untested		17	622239	4888843	Abandoned-Other	-
7355671	2/25/2020		Untested		17	622011	4889064	Abandoned-Other	-
7355672	2/25/2020		Untested		17	622088	4889086	Abandoned-Other	-
7355673	2/26/2020		Untested		17	622161	4888965	Abandoned-Other	-
7355674	2/24/2020		Untested		17	622140	4889011	Abandoned-Other	-
7355675	2/24/2020		Untested		17	622184	4888900	Abandoned-Other	-
7355676	2/24/2020		Untested		17	622174	4888925	Abandoned-Other	-
7355677	2/28/2020		Untested		17	622111	4888904	Abandoned-Other	-
7355678	2/28/2020		Untested		17	622098	4888944	Abandoned-Other	-

TABLE D-1

WATER WELL RECORDS

Well I.D.	Construction Date	Well Depth (m)	Water Kind	Static Level (m)	UTM Zone	Easting	Northing	Final Status	Primary Water Use
7355679	2/28/2020		Untested		17	622082	4888991	Abandoned-Other	-
7355680	2/28/2020		Untested		17	622119	4888880	Abandoned-Other	-
7355681	2/28/2020		Untested		17	621907	4888880	Abandoned-Other	-
7355682	2/27/2020		Untested		17	621808	4888806	Abandoned-Other	-
7355683	2/27/2020		Untested		17	621812	4888850	Abandoned-Other	-
7355684	2/26/2020		Untested		17	621890	4888867	Abandoned-Other	-
7355712	2/28/2020	7.62	Untested		17	621782	4888940	Observation Wells	Monitoring
7355713	2/24/2020	15.24	Untested		17	621885	4889133	Observation Wells	Monitoring
7355714	2/27/2020	14.94	Untested		17	621994	4888652		Monitoring
7355715	2/25/2020	7.62	Untested		17	621991	4888654	Observation Wells	Monitoring
7357115	3/17/2020	1.86			17	611588	4885756	Observation Wells	Monitoring
7357116	3/17/2020	6.10			17	611584	4885733	Observation Wells	Monitoring
7357117	3/17/2020	6.10			17	611623	4885737	Observation Wells	Monitoring
7357118	3/17/2020	6.10			17	611628	4885752	Observation Wells	Monitoring
7358302	4/28/2020				17	623625	4890057	Abandoned-Other	Monitoring
7358303	4/28/2020				17	623625	4890057	Abandoned-Other	Monitoring
7360267	6/1/2020		Untested		17	609252	4885145	Abandoned-Other	-
7365424	7/29/2020				17	611682	4885999		-
7367430	8/10/2020				17	621826	4888612		-
7367431	8/10/2020				17	621756	4888946		-
7370507	7/20/2020				17	615568	4887225		-
7373980	3/24/2020	9.14	Untested		17	609409	4883570	Observation Wells	Monitoring
7377569	10/8/2020				17	614324	4888132		-
7379049	12/10/2020				17	624601	4889580		-
7379050	12/10/2020				17	624096	4889791		-
7379051	12/10/2020				17	624343	4890084		-
7380053	3/23/2020	9.14	Untested		17	609402	4883575	Observation Wells	Monitoring
7380054	3/23/2020	9.14	Untested		17	609434	4883584	Observation Wells	Monitoring

TABLE D-2

PERMIT TO TAKE WATER (PTTW)

PermitNo	Permit Owner	Purpose	Issued	Expiry	Type	UTM Zone	Easting	Northing	Max. (L/day)	Max. (Days/year)	Max. (Hrs/day)	Max. (L/min)
2071-BPDQUN	-	Agricultural	5/15/2020	11/30/2029	Surface Water	17	616434	4887505	5184000	150	24	3600
2558-9HTJP9	-	Agricultural	5/27/2014	5/27/2024	Surface Water	17	619442	4888043	1362960	15	12	1893
2584-ATBPLB	Silver Lakes Golf & Country Club Ltd.	Commercial	12/5/2017	11/24/2027	Ground Water	17	619214	4888674	1963440	180	12	2727
3707-BLWM8E	-	Agricultural	2/18/2020	2/18/2030	Surface Water	17	616433	4888056	3270585	20	24	2271
6538-AUQLDJ	-	Agricultural	2/23/2018	1/8/2028	Surface Water	17	624158	4890418	3815000	10	24	2650
3015-99WEWA	The Corporation of the Town of Bradford West Gwillimbury	Water Supply	8/23/2013	12/31/2021	Ground Water	17	616050	4887415	1637280	365	24	1137
4046-8DMRUW	The Corporation of the Town of Bradford West Gwillimbury	Water Supply	2/10/2011	12/31/2021	Ground Water	17	616050	4887415	1637280	365	24	1137
5377-8PYNCG	The Corporation of the Town of Bradford West Gwillimbury	Water Supply	1/9/2012	12/31/2021	Ground Water	17	616050	4887415	1637280	365	24	1137
6728-9NLQ2F	The Regional Municipality of York	Water Supply	9/12/2014	12/31/2023	Ground Water	17	625047	4889143	6546384	365	24	4546.1

= Information is not available.

TABLE D-3

ENVIRONMENTAL SECTOR AND REGISTRY (EASR)

EASR No.	Registrant Name	Address	Municipality	Date	Approval Type
R-010-5110578003	AGC AUTOMOTIVE CANADA INC	120 ARTESIAN INDUSTRIAL PKY	BRADFORD	11/19/2021 1:40:45 PM	EASR-Air Emissions
R-001-9110519558	Assured Automotive (2017) Inc.	435 DISSETTE ST	BRADFORD	7/6/2018 3:29:01 PM	EASR-Automotive Refinishing Facility
R-003-7424328975	MITEK CANADA, INC	100 INDUSTRIAL RD	BRADFORD	6/12/2014 4:09:31 PM	EASR-Heating System
R-003-4626787321	ROYAL WOODWORKING CO LIMITED	ROYAL WOODWORKING CO LIMITED	BRADFORD	8/18/2016 2:55:39 PM	EASR-Heating System
R-010-2113130806	AURORA CANNABIS ENTERPRISES INC.	100 REAGEN'S INDUSTRIAL PKY	BRADFORD	4/21/2021 5:51:14 PM	EASR-Air Emissions

Brian Holden, P.Geo.
Hydrogeologist, Environment
Brian.Holden@aecom.*com*

AECOM Canada Ltd.
50 Sportsworld Crossing Road, Suite 290
Kitchener, ON N2P 0A4 Canada

T: 519.650.5313
F: 519.650.3424
www.aecom.com