Hydrogeological Assessment, Strohvest Subdivision, Township of Wellesley, Ontario

FINAL REPORT

January 2022

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Sign-off Sheet

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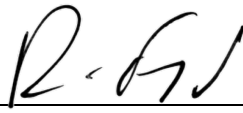
Reviewed by 

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Abbreviations

AMSL	above mean sea level
AO	Aesthetic Objective
Applicant Lands	Lands Owned by the Applicant (Strohvest Ontario Inc.)
ASTM	American Society for Testing and Materials
BGS	below ground surface
Client	Ron Stroh
EASR	Environmental Activity and Sector Registry
GRCA	Grand River Conservation Authority
GUDI	Groundwater under the direct influence of surface water
HDPE	High density polyethylene
HVA	Highly Vulnerable Area
IPZ	Intake Protection Zone
LERSPC	Lake Erie Region Source Protection Committee
m	meters
m^3	cubic meters
m/s	meters per second
m^3/year	cubic meters per year
MECP	Ministry of the Environment, Conservation and Parks
MOH	Medical Officer of Health
ODWQS	Ontario Drinking Water Quality Standards
OG	Operational Guideline

OGS	Ontario Geological Survey
PVC	Polyvinyl chloride
PTTW	Permit to Take Water
SGRA	Significant Groundwater Recharge Area
SPP	Source Protection Plan
Stantec	Stantec Consulting Ltd.
Subject Lands	Plan 1148, Part Lot 80, Registered Plan 58R-3548, Part 1, Township of Wellesley, Regional Municipality of Waterloo
WHPA	Well Head Protection Area

1.0 INTRODUCTION

Strohvest Ontario Inc. (Applicant) retained Stantec Consulting Ltd. (Stantec) to complete a hydrogeological assessment of a land parcel located to the north of Gerber Road within the Village of Wellesley. The Lands Owned by the Applicant (Applicant Lands) cover an area of 16.4 hectares (ha) in size; however, the portion of these lands currently being proposed for development at this time (Stage 1) cover an area of 10.2 ha and are legally described as Plan 1148, Part Lot 80, Registered Plan 58R-3548, Part 1, Township of Wellesley, Regional Municipality of Waterloo (Subject Lands) (Figure 1). The Subject Lands are bounded to the south by Gerber Road, to the west and north by active agricultural lands, and to the east by existing low-rise residential development. The Site will be developed with full municipal servicing.

This hydrogeological assessment has been prepared to support Zoning By-law Amendment and Draft Plan of Subdivision applications, with proposed development for the Subject Lands to be residential development consisting of 66 single detached lots, 17 semi-detached lots, and 12 multi-family blocks for a total of 166 units (Appendix A). A stormwater management block is currently planned for the south end of the Subject Lands fronting Gerber Road.

The hydrogeological work performed for the Subject Lands follows the *Conservation Authority Guidelines for Development Applications - Hydrogeological Assessment Submissions* (2013), as well as drawing upon Stantec's experience with the completing of hydrogeological assessments in support of land development projects throughout the Regional Municipality of Waterloo. Specifically, the objectives of the hydrogeological assessment are to:

1. Characterize the geological and hydrogeological conditions at the Subject Lands, including identifying hydrostratigraphic / aquifer units, seasonal position of the groundwater table, groundwater flow regimes, groundwater recharge and/or discharge zones / features, and the hydraulic conductivity of the subsurface deposits.

2. Identify local groundwater uses near the Subject Lands (i.e., municipal and private water well uses) and evaluate the potential for quantity and/or quality interference to these existing groundwater uses because of the proposed site development.

3. Assess whether proposed buildings and associated servicing infrastructure on the Subject Lands will intercept the groundwater table, evaluative the potential need for temporary construction dewatering and/or installation of a permanent drainage system (for long-term dewatering), and identify what mitigation measures could be employed at the site to minimize any potential disturbances to the groundwater flow system and, subsequently, groundwater availability to local water supply wells and surface water features.

4. Conduct a pre- and post-development water budget assessment to evaluate potential changes on local groundwater recharge.

5. Evaluate whether proposed land use activities conform to Source Water Protection requirements as stipulated in the Clean Water Act, S.O. 2006, Chapter 22.

The report is arranged into seven sections, including this introduction (Section 1.0). Section 2.0 presents the physical setting of the Applicant Lands at a regional scale, with Section 3.0 outlining the methods utilized to evaluate existing hydrogeological conditions within these lands. Section 4.0 presents the results of the hydrogeological field investigation and Section 5.0 provides an assessment of potential hydrogeological constraints associated with the proposed Site development and recommended mitigation measures to address these constraints. Report conclusions and references are listed in Sections 6.0 and 7.0, respectively.

Appendix A provides a copy of the Draft Plan of Subdivision, with all figures and tables referenced in this report being presented in Appendices B and C, respectively. Appendices D to I include Regional Groundwater Mapping, Source Water Protection Plan Mapping, Region of Waterloo Source Water Protection Land Use Categories, Borehole Logs, Hydraulic Conductivity Analytical Solutions, and Laboratory Certificates of Analysis, respectively.

2.0 PHYSICAL SETTING

2.1 PHYSIOGRAPHY, SURFACE WATER FEATURES, AND TOPOGRAPHY

The Applicant Lands are situated within the physiographic region referred by Chapman and Putnam (1984) as the Stratford Till Plain, with these lands sitting upon undrumlinized till plains composed predominantly of silty clay. Spillways lie immediately to the south of the Site (Figure 2).

The Applicant Lands are located within the Bamberg Creek-Nith River subwatershed. As shown in Figure 2, the closest surface water features to the Applicant Lands include Wellesley Pond and Firella Creek, which lie approximately 250 m to the northeast of the site, and a tributary positioned approximately 180 m to the southwest of the site. These previously mentioned watercourses flow into the Nith River, which generally flows southward and eventually discharges to the Grand River near Paris. Two wetlands exist to the northwest of the Applicant Lands: Firella Creek Swamp (660 m from site) and the Wellesley West Wetland Complex (830 m from site).

In the region containing the Applicant Lands, a topographic high point of 368 m AMSL exists near the T-intersection of Queens Bush Road and Hutchison Road, with the lands sloping to the east, south and west towards Wellesley Pond, Firella Creek, the Nith River, and the tributaries associated with these watercourses from this point (Figure 3). Within the Applicant Lands (Figure 1), a surface water drainage divide is shown to run in a southwest to northeast direction in the northern portion of the property. The lands slope from an elevation of 363.5 m AMSL at the divide to 360.2 m AMSL near MW03-21, with this area of the property draining overland to the north towards Queens Bush Road. To the south of the divide, the lands slope from an elevation of 363.5 m AMSL to 353 m AMSL along Gerber Road, with most of the Applicant Lands (including the full area of the Subject Lands) draining overland to the south to an existing culvert that crosses the road and ultimately discharges to the Nith River. Some external flows also enter the Applicant Lands through the existing agricultural fields located to the west of the property.

2.2 REGIONAL GEOLOGY AND HYDROGEOLOGY

The Applicant Lands are located immediately to the north of the Waterloo Hills (Figure 2), also commonly known as the Waterloo Moraine, a kame moraine formed between ice lobes extending from the Lake Ontario-Erie, Huron, and Georgian bay areas (Karrow 1993). Numerous advances and retreats of the ice lobes during the Wisconsinan glaciation resulted in a complex deposit of ice-contact and glacial outwash sands and gravels separated by silt- and clay-rich tills. The conceptual hydrogeologic model for the Waterloo Moraine comprises four main aquifers and aquitards after Terraqua Investigations Ltd. (1995), which was broken down further into 19 hydrostratigraphic units after Bajc and Shirota (2007). The model generally does not include more recent deposits shown on surficial geology mapping such as modern alluvial deposits (Figure 4, unit 19), which are found in wetlands and creek / river valleys.

The hydrostratigraphic units expected to be encountered in the subsurface where the Applicant Lands occur are described below. The units are described from ground surface downward, with Bajc and Shirota (2007) unit names shown in parentheses.

Outwash Deposits (AFA2): Referred to as the Grand River glaciofluvial deposits and equivalent aquifers that consist of well bedded sands and gravels restricted to the valleys of the Conestogo, Grand, and Nith rivers (Figure 4, Unit 7).

Aquitard 1 (ATB1): Surficial and spatially discontinuous glacial till units found predominantly along the flanks of the Waterloo Moraine. Along the western flank of the moraine Aquitard 1 corresponds to the Mornington Till (silty clay till; Figure 4, Unit 5d), Stratford Till (sandy silt till; Figure 4, Unit 5b), and Tavistock Till (clayey silt till); whereas along the eastern flank of the Moraine this unit corresponds to the Upper Maryhill (clay till) and Port Stanley Tills (sandy to silty till) (Bajc and Shirota, 2007). Aquitard 1 is characterized by low permeability and forms a relatively impermeable barrier that effectively limits the downward movement of groundwater to the deeper aquifer systems. Perched aquifer conditions are often present within this unit

Aquifer 1 (AFB1/ATB2/AFB2): This hydrostratigraphic unit represents the main water supply aquifer in the core areas of the Waterloo Moraine. Depending on the depositional environment, the composition of Aquifer 1 varies from a layered silt and fine sand to coarse sand and gravel. Throughout the core areas of the moraine, Aquifer 1 corresponds to a thick, laterally extensive sand and/or gravel aquifer overlying Aquitard 2 and is often exposed at surface. In some areas, Aquifer 1 is interpreted to be bisected by the Middle Maryhill Till (ATB2), which effectively separates Aquifer 1 into two units: AFB1 and AFB2. Where Aquifer 1 is overlain by Aquitard 1, the aquifer behaves as a confined to semi-confined aquifer system. Where Aquitard 1 is absent and the sediments of Aquifer 1 are exposed at ground surface, these deposits represent an important source of groundwater recharge to this aquifer system.

Aquitard 2 (ATB3): Aquitard 2 corresponds to the Lower Maryhill Till, an overconsolidated, stony, clayey silt till, that represents one of the primary regional hydrostratigraphic units (Bajc and Shirota, 2007). Along the flanks of the Waterloo Moraine, the Lower Maryhill Till is often found to be discontinuous.

Aquifer 2/3 (AFB3/AFD1): Associated with reworked layers of gravel, sand and silt associated with the Catfish Creek Till (Aquifer 2) and Pre-Catfish Creek sand and gravel (Aquifer 3), with these aquifers being separated by the Catfish Creek Till (stony, silty to sandy till) (Aquitard 3, ATC1/ATC2). These units are discontinuous through the Waterloo Moraine. The municipal production wells of the Wellesley Wellfield (i.e., WY1, WY5 and WY6; Figure 5) are partially screened within these aquifer units (LERSPC, 2021a).

Bedrock: Bedrock in this region is comprised of limestone, dolostone, and sandstone corresponding to the Bois Blanc Formation (Armstrong and Dodge 2007). According to available MECP water well records, bedrock is encountered between 295 m AMSL and 307 m AMSL. Municipal production wells in Wellesley are screened partially within this unit (LERSPC, 2021a).

The regional study completed by the Grand River Conservation Authority (2001) indicates that groundwater flow through the overburden deposits of the unconfined aquifer (i.e., using static water levels in wells constructed less than 25 m deep) is generally from northwest to southeast and moves towards the Nith River, which is identified as a potential groundwater discharge feature (Figure ST-7, Appendix D).

Mapping created using the Grand River Information Network (GRIN) (GRCA, 2021) indicates that annual groundwater recharge rates across the Applicant Lands range between 100 to 200 mm/year, for an average of 139 mm/year (Figure D-1, Appendix D), in those areas where silty to sand till is mapped as occurring at ground surface (Figure 4). However, in the southern portion of the Applicant Lands where silty to clayey till is exposed at ground surface (Figure 4), annual recharge rates are identified as being lower with values ranging from 50 to 100 mm/year, for an average of 52 mm/year (Figure D-1, Appendix D).

2.3 SOURCE WATER PROTECTION

2.3.1 Ontario Clean Water Act

As established under the Ontario *Clean Water Act*, 2006, S.O., 2006, c. 22, source protection areas and associated land use restrictions exist for all municipal drinking water sources located throughout the Lake Erie Source Protection Area.

The Ontario Ministry of the Environment (now the MECP) introduced the *Clean Water Act* as a means of ensuring the protection of drinking water sources within the Province. The *Clean Water Act* requires that a detailed Assessment Report be prepared for each municipal drinking water system, with this Assessment Report incorporating numerous components as outlined in the document “Technical Rules: Assessment Report, *Clean Water Act* (2006), November 16, 2009”. This legislation provides a basic framework for communities to follow in developing an approach to protecting their municipal water supplies, with the key components of this approach being as follows:

- Identification and assessment of risks to the quality and quantity of municipal drinking water sources and determine which risks are significant and require immediate action, which risks need monitoring to ensure they do not become significant, or which pose low to negligible risk. This information is presented in a detailed Assessment Report, with the content of this report consisting of (i) the defining of Well Head Protection Areas (WHPA) for groundwater drinking water sources and Intake Protection Zones (IPZ) for surface water drinking water sources, (ii) completion of a vulnerability assessment for each WHPA and IPZ, and (iii) identification of drinking water issues and threats.
- Preparation of a Source Protection Plan (SPP) that addresses identified drinking water threats, particularly significant threats.
- Carry out the SPP through existing land use planning and regulatory requirements.
- Perform ongoing monitoring and reporting to measure the effectiveness of the actions taken to protect drinking water sources and ensure that they are protected in the future.

Within the Lake Erie Source Protection Area and specifically the Grand River Source Protection Area, the MECP has designated the following types of vulnerable areas that apply to drinking water sources:

Wellhead Protection Area (WHPA): an area delineated on the ground surface that represents the capture zone for the underlying aquifer in which a given municipal well draws its water. The zone represents the total amount of time it would take for groundwater to flow through the aquifer system and reach the intake of a given municipal well. The zones are defined as follows:

- WHPA-A: 100 m radius around the municipal well.
- WHPA-B: Horizontal time-of-travel to the municipal well is two years or less.
- WHPA-C: Horizontal time-of-travel to the municipal well is equal to or less than five years and greater than two years.
- WHPA-D: Horizontal time-of-travel to the municipal well is equal to or less than 25 years and greater than five years.
- WHPA-E: Area where groundwater is under the direct influence of surface water (GUDI), where horizontal time-of-travel of this groundwater from the surface water body to the municipal well is two hours or less.

The water supply for the Village of Wellesley is obtained from production wells of the Wellesley Wellfield, which are located approximately 250 m to the east of the Applicant Lands (Figure 5). These wells draw their groundwater supply from Aquifer 2 (AFB3) and Aquifer 3 (AFD1), and potentially from the Bedrock Aquifer (Paragon Engineering Limited 1991; LERSPC, 2021a; MECP, 2021a). Based on a review of the online MECP Source Water Protection Information Atlas (2021b) and as shown in Figure 5, most of the Applicant Lands are located within the WHPA-B of the Wellesley Wellfield, with the northern and southern extents of these lands occurring within WHPA-C and WHPA-D of the same wellfield. The vulnerability scoring for WHPA-B to WHPA-D that intercepts the Applicant Lands is 6 (Map A1, Appendix E).

Intake Protection Zone (IPZ): An IPZ is a zone established around a drinking / surface water intake within which a spill or leak may get to the intake too quickly for the operators of the municipal water treatment plant to shut the intake down until the pollutant passes by. These zones also include land adjacent to streams and storm sewers where surface water runoff can quickly reach the intake. Based on a review of the online MECP Source Water Protection Information Atlas (2021b) and as shown in Figure 5, the proposed Applicant Lands do not intercept any surface water system IPZs.

Significant Groundwater Recharge Area (SGRA): Groundwater recharge represents the proportion of precipitation and/or surface water run-off that infiltrates to the subsurface and reaches the groundwater table. Recharge areas are classified as “significant” when they supply more water to an aquifer used as a drinking water source than the surrounding area. The volume of water that infiltrates to the subsurface is largely influenced by site topography, the physical properties of the soil, and land cover characteristics. The LERSPC (2021a) defines a significant groundwater recharge area (SGRA) to be an area where the annual recharge rate is greater than the average plus 15% or more across the source protection region.

As per the Assessment Report (LERSPC, 2021a), lands within the Grand River Source Protection Area (i.e., the Grand River Watershed) are deemed to be SGRA when the annual recharge rate is greater than 176 mm/year. Based on a review of the online MECP Source Water Protection Information Atlas (2021b) and as shown in Figure 5, the Applicant Lands are not designated as SGRA.

Highly Vulnerable Aquifer (HVA): Defined as subsurface, geologic formations that are sources of drinking water, which could be easily affected by the release of pollutants on the ground surface. The HVA is identified using variables that include depth to the aquifer, physical properties of the overlying soil and/or rock, and the aquifer composition. In general, an HVA will consist of granular aquifer materials (i.e., sands and gravels) that are exposed near the ground surface and where a relatively shallow water table is present. Based on a review of the online MECP Source Water Protection Information Atlas (2021b) and as shown in Figure 5, the Applicant Lands do not occur within an area designated as HVA.

Water Quantity Vulnerable Area: Water quantity vulnerable areas are determined through a tiered process of water budget analyses as set out in the Technical Rules under O. Reg. 287/07. WHPA-Q is defined as an area where an activity can occur and pose a threat to drinking water quantities. Any activity that takes water without returning it to the same source or an activity which reduces recharge may be a threat in WHPA-Q. Based on a review of the online MECP Source Water Protection Information Atlas (2021b) (Figure E-1, Appendix E), the Applicant Lands do not occur within an area designated as WHPA-Q.

2.3.2 Region of Waterloo Official Plan

In the Region of Waterloo, sensitivity rankings were developed for the municipal well fields, with these rankings being based on modeled time-of-travel capture zones and the vulnerability of the groundwater to contamination at each individual well head. A Sensitive Area 1 designation represented an area surrounding the well head that has the highest potential for groundwater contamination, whereas a Sensitivity Area 8 designation represents the lowest. As per the Region of Waterloo Official Plan (ROP) (2015), Wellhead Protection Sensitivity Areas (WPSA) are categorized under eight categories (WPSA 1 to WPSA 8). This range of classifications allows for varying degrees of management relative to the vulnerability of the underlying groundwater to contamination, the importance of the subject well to the capacity of the municipal drinking-water supply system, and the length of time groundwater within the WPSA will take to reach the municipal well.

As shown in Figure 6, the Applicant Lands are located within what appears to be the WPSA of the Wellesley Wellfield. The specific WPSA include:

WPSA-4: Where covering the Applicant Lands, this WPSA indicates that groundwater takes less than two years to flow to the intake of a given municipal production well. As per the ROP (2015) Schedule B, Category ‘A’ (Very High Risk) land uses are not permitted in this zone, whereas Category ‘B’ (High Risk), ‘C’ (Moderate Risk) and ‘D’ (i.e., underground parking garages, individual wastewater treatment systems, pipelines, sewers, stormwater management ponds (or other ponds), and plans of subdivision or vacant land condominiums) land uses may be

permitted subject to further study in accordance with Policy 8.A.4[1]. A copy of Schedule B from the ROP (2015) that lists the various land uses associated with each Category is provided in Appendix F.

WPSA-5: Where covering the Applicant Lands, this WPSA indicates that groundwater takes between two to 10 years to flow to the intake of a given municipal production well. Category 'A' land uses are not permitted in this zone, nor are Category 'B' and 'C' land uses located outside of the Built-Up Area (note that the Applicant Lands do not fall within this area). However, Category 'B' and 'C' land uses already permitted by existing Area Municipal official plans may be permitted subject to further study in accordance with Policy 8.A.4. Category 'D' land uses and plans of subdivision or vacant land condominiums may also be permitted subject to further study in accordance with Policy 8.A.4.

[1] Policy 8.A.4 states that studies submitted in support of a development application must be completed in accordance with the Regional Implementation Guideline for Source Water Protection Studies to the satisfaction of the Region. Studies submitted by the owner/applicant will demonstrate that the proposed use will not negatively impact the quantity and/or quality of drinking-water resources in Source Protection Areas for the development application to receive approval.

3.0 METHODOLOGY

Section 3.0 provides the methodology used to obtain the data required to complete the hydrogeological investigation. The key components of the investigation included:

- borehole drilling
- installation and development of monitoring wells
- monitoring of groundwater levels
- performing hydraulic response (hydraulic conductivity) testing
- collection of groundwater samples from onsite monitoring wells and offsite private wells for quality testing

The methodology for these tasks is described in Sections 3.1 to 3.5 below.

3.1 BOREHOLE DRILLING

From May 5 to 6, 2021, boreholes were advanced at eight locations across the Applicant Lands (Figure 1) using a CME track-mounted drilling rig equipped with hollow-stem augers operated by a licensed drilling subcontractor (Geo-Environmental Drilling Inc.). The depth of the boreholes extended to 5.2 m to 6.7 m below ground surface (BGS), with six of the eight boreholes being equipped with a single monitoring well (i.e., MW01-21 to MW06-21). Soil sampling occurred using a 0.6 m long stainless-steel split spoon sampler at 0.75 m (2.5 feet) intervals for the first 3.6 m (12 feet) of drilling depth, followed by sample collection occurring at approximately every 1.5 m (5 feet) to the termination depth of the borehole. Stantec personnel directed the drilling, soil sampling operations, and logging of the borehole stratigraphy. The borehole logs contain descriptions (where relevant and possible) of soil type, texture, colour, structure, consistency, plasticity, moisture content, and other visual and olfactory observations as per the procedures outlined in American Society for Testing and Materials (ASTM 2009) specification D2488-09a. Overall, the boreholes were strategically positioned throughout the Applicant Lands to confirm shallow soil conditions, seasonal groundwater depths, and the direction of horizontal groundwater flow. Further details on the borehole drilling and monitoring well installations are provided in the Geotechnical Investigation Report (Stantec, 2021a). Copies of the borehole logs are provided in Appendix G.

3.2 MONITORING WELL INSTALLATION AND DEVELOPMENT

Stantec observed the installation of monitoring wells in six of the eight boreholes advanced within the Applicant Lands (i.e., MW01-21 to MW06-21), with the wells being installed to allow for the measurement of groundwater levels / elevations, completion of in-situ hydraulic conductivity testing, and the collection of groundwater samples for quality analysis. The drilling contractor installed the monitoring wells adhering to the construction requirements as outlined under Ontario Regulation 903 (O. Reg. 903) (MECP, 1990). Installation details for each of the monitoring wells are summarized in Table 1. Each monitoring well is

constructed of 50 mm inside diameter, Schedule 40 polyvinyl chloride (PVC) pipe, having a No. 10 slot screen (0.01-inch slot) measuring 3.0 m in length. Backfilling of the screened interval consisted of silica sand to a height of approximately 0.3 m above the top of screen, followed by granular bentonite to ground surface prevent a hydraulic connection from occurring between the screened formation and overlying soils. The completion of each monitoring well involved encasing the pipe stick-up within a lockable steel casing. Stantec Geomatics surveyed the ground surface and top-of-pipe elevations at each monitoring well location to a geodetic benchmark using Global Positioning System (GPS) having a spatial accuracy of ± 0.03 m and ± 0.02 m in the vertical and horizontal plane, respectively.

Following installation, Stantec personnel developed each monitoring well to remove drilling fluids, solids, or other particulates that may have been introduced during drilling. Stantec personnel purged each monitoring well using dedicated 16 mm inside diameter high density polyethylene (HDPE) tubing connected to a D-25 Waterra™ foot valve. Stantec personnel purged at least three standing column volumes from each monitoring well to clear out the drilling residues and any fine-grained sediments to establish a proper hydraulic connection with the native saturated material.

3.3 GROUNDWATER LEVEL MONITORING

Stantec personnel manually measured water levels in the monitoring wells in June and August 2021 using a battery operated Heron™ water level meter. Equipped with an electrode connected to a graduated polyethylene tape, Stantec personnel used the meter to measure the depth to water by slowly lowering the electrode into the well until the buzzer sounded. Stantec personnel recorded the water level measurements in meters to the nearest 0.01 m. A summary of the manual water level measurements measured at the monitoring wells by Stantec personnel throughout the investigation is provided in Table 2.

The continuous recording of groundwater level fluctuations occurred in each onsite monitoring well from June to August 2021 using a Solinst® Levelogger 5® (Levelogger). Suspended into the water column at each monitoring well, the Levelogger was programmed to record water levels at 60-minute intervals. Leveloggers are not vented to the atmosphere and, therefore, record total pressure (where total pressure is the sum of the atmospheric pressure and the height of water column). To obtain an accurate measurement of the groundwater level at each well, the water level data obtained from the Leveloggers are corrected for atmospheric pressure using data obtained from a Solinst® Barologger 5® (Barologger), which was suspended in the air column within one of the onsite monitoring wells (i.e., MW01-21). Hydrographs showing groundwater level fluctuations in the monitoring wells over time are presented in Figures 7 to 9.

3.4 HYDRAULIC RESPONSE TESTING

To estimate the horizontal hydraulic conductivity of the deposits beneath the Applicant Lands, Stantec performed in-situ hydraulic response testing on MW01-21 to MW05-21 on May 31, 2021. The testing performed for this investigation consisted of creating an instantaneous change in the monitoring well water level by removing a known volume of water from the well (i.e., rising head / bail test), followed by recording the time taken for the resulting water level to return to static conditions using a combination manual and continuous (i.e., Levelogger) measurements. The testing results were analyzed using the Bouwer and Rice (1976) / Bouwer (1989) solution provided in the software package AQTESOLV™ Pro Version 4.5 (Duffield, 2014) to calculate the horizontal hydraulic conductivity of the aquifer sediments within the immediate vicinity of the screened interval of each monitoring well. Table 1 provides a summary of the calculated horizontal hydraulic conductivities, with the analytical solutions for the data being presented in Appendix H.

Stantec also used the in-situ hydraulic response testing results obtained from the monitoring wells to provide preliminary estimates of infiltration rates for the overburden soils (i.e., at depths between 2.8 m and 6.2 m BGS). Since hydraulic conductivity in the horizontal direction is generally an order (potentially two orders for clay-based deposits) of magnitude higher than hydraulic conductivity in the vertical direction (Todd 1980; Freeze and Cherry 1979), the vertical hydraulic conductivities for overburden deposits surrounding the well screens were assumed to be one order of magnitude lower than in-situ measured horizontal hydraulic conductivities. The Credit Valley Conservation-Toronto and Region Conservation (CVC-TRCA) (2010) method for converting vertical hydraulic conductivity to an infiltration rate was then applied to these data, with the results being presented in Table 3.

3.5 GROUNDWATER SAMPLING AND QUALITY TESTING

3.5.1 Onsite Monitoring Wells

On May 27, 2021, Stantec personnel collected groundwater samples from monitoring wells MW01-21, MW03-21, and MW05-21 for analysis and comparison against the Ontario Drinking Water Quality Standards (ODWQS) (MECP, 2018). One field duplicate sample was collected at MW05-21 for quality control purposes.

Groundwater collected from the three previously mentioned monitoring wells involved using the same dedicated tubing to develop the monitoring wells (Section 3.2). Prior to collecting the sample, Stantec personnel measured in-situ field parameters of pH, temperature, and specific conductivity using a Hanna HI 98129 waterproof pH/conductivity/TDS tester. The meter was calibrated prior to use according to the manufacturer's specification with the appropriate clabration standards. Sampled groundwater was poured directly from the HDPE tubing into lab supplied sample bottles. All groundwater samples were packed into coolers with ice, which was added to maintain sample temperatures below 10°C during transit to the analytical laboratory. Samples were delivered to an accredited laboratory (i.e., Bureau Veritas Laboratories) for the analysis of general inorganic chemistry, nutrients, and metals. Samples collected for

metals were filtered in the field using dedicated disposable 0.45 µm in-line filters and, subsequently, reported concentrations represent dissolved metals.

Chain of custody forms were completed and included with the samples at the time of the laboratory submission. The quality results for groundwater sampled from the onsite monitroing wells are summarized in Table 4. A copy of the laboratory Certificate of Analysis is presented in Appendix I.

3.5.2 Offsite Private Wells

The Village of Wellesley primarily receives their drinking water from the municipal system (i.e., Wellesley Wellfield); however, there are residential properties on the surrounding edges of the Village that obtain their potable water supply from private wells. Stantec personnel delivered letters to homes surrounding the Applicant Lands that were identified as potentially having a private well, inviting the residents to participate in a voluntary, pre-construction well water quality monitoring program. The letter detailed that the monitoring program would consist of the completion of a well survey questionnaire, collection of a water quality sample, and an inspection of the well head, with the well water quality results being provided to the resident. Four letters were delivered to properties near the Applicant Lands, with two homeowners responding to the letter expressing their interest in participating in the pre-construction monitoring program. The locations of the properties participating in the program (i.e., RW01 and RW02) are shown on Figure 1.

- Water samples were either collected from an outdoor tap attached to the house or garage, or from a kitchen faucet. Prior to collecting the water sample, the aerator, if present and easily accessible on the tap spout, was removed. Stantec personnel disinfected the tap spout with a dilute (10%) sterilene solution and allowed the water to run for a minimum of 10 minutes. While the water was running, Stantec personnel recorded quality parameters such as temperature, pH, specific conductivity, and turbidity using a Hanna pen® and the Hach 2100Q® turbidity meter. Once these parameter values stabilized, Stantec personnel proceeded to collect the water sample.

Water samples were collected directly into labelled, laboratory supplied containers (as per MECP, 2009), and placed in coolers on ice for storage for transport and submission to Bureau Veritas Laboratories for analysis. Water samples collected from the private wells were analyzed for microbiological parameters (i.e., total coliform and *E.coli*), general inorganic chemistry, nutrients, and metals. The samples were not filtered in the field and, subsequently, metals results represent total concentrations (versus dissolved).

Chain of custody forms were completed and included with the samples at the time of the laboratory submission. The results of the groundwater quality testing are summarized in Table 5. A copy of the laboratory Certificate of Analysis is presented in Appendix I.

4.0 LOCAL GEOLOGY AND HYDROGEOLOGY

4.1 GEOLOGY AND HYDROSTRATIGRAPHY

Figure 4 presents the surficial geology within and surrounding the Applicant Lands as mapped by the OGS (2010). Deposits of stone-poor, sandy silt to silty sand till, which is interpreted to represent the Stratford Till, covers most of the Applicant Lands with these deposits also covering the northern portion of the Subject Lands (Figure 4, Unit 5b). The remainder of the Subject Lands are covered with glaciolacustrine-derived deposits of silty clay till, which is interpreted to represent the Mornington Till (Figure 4, Unit 5d). Surrounding the Applicant Lands are glaciofluvial deposits of sand and gravel (AFA2), modern deposits of alluvium associated within the corridors of the Nith River and its associated tributaries, and ice-contact stratified deposits of gravel, sand, and silt that are potentially associated with Aquifer 1 (AFB1). Overall, the onsite drilling results completed as a part of this investigation support the OGS interpreted distribution of surficial soils that cover the Applicant Lands.

Figure 4 shows the locations of Cross Sections A-A' (Figure 10) and B-B' (Figure 11), which were constructed using the results of the onsite drilling investigation. A summary of these drilling results is shown on the borehole logs provided in Appendix G. The investigation results indicate that a 0.3 to 1.5 m thick mixture of fill and topsoil (sandy silt to silty sand) covers the Applicant Lands, with the fill being encountered mostly along the eastern and southern limits of these lands (e.g., MW01-21, MW04-21, MW06-21, and MW07-21). In general, these surficial deposits overlie a combination of sandy silt, silt, silty clay, and clay tills (i.e., Aquitard 1; ATB1), which form a horizontally and vertically contiguous unit that extends up to the termination depth of the boreholes (i.e., 4.7 m BGS to 6.7 m BGS; approximately 350 m AMSL). Local MECP water well records (Appendix G) suggest that the Aquitard 1 unit extends to a depth of up to 50 m BGS near the Applicant Lands. Layers and seams of sand, silt, and sand and gravel are also present in the glacial till at variable depths, with notable pockets of these deposits being encountered at MW03-21 and MW05-21 (Figure 11).

4.2 HYDROGEOLOGY

4.2.1 Groundwater Levels

Figures 7 to 9 and Table 2 present the continuous and manual water levels recorded within the monitoring wells between June and August 2021. Groundwater levels across the Applicant Lands ranged from 0.5 m BGS (at MW03-21) to 2.9 m BGS (at MW02-21) over the monitoring period, equating to elevations ranging from 353.2 m to 361.3 m AMSL. Stantec notes that the observed groundwater levels/ elevations presented in this report represent a period outside of typical high groundwater conditions and that higher water table positioning is likely to occur throughout the Applicant Lands from the late fall to early spring.

As shown in Figure 7, the groundwater table demonstrated a similar pattern in fluctuations across the Applicant Lands. Traditionally, high groundwater elevations in southern Ontario occur in the spring, with groundwater elevations typically beginning their steady rise in the late fall. This groundwater table rise is attributed to a reduction in soil moisture losses to evapotranspiration that occurs over the late fall to spring together with a melting snowpack that occurs during the spring, which in turn provides a greater volume of water available to infiltrate and recharge the groundwater system. In contrast, during the summer months the groundwater table is at its lowest elevation due to more water being drawn from the subsurface to meet an increased evapotranspiration demand. In 2021, the region experienced a drier than normal winter and spring where total precipitation was 117 mm lower than the corresponding the 30-year normal as recorded at the Kitchener-Waterloo Climate Station. In June, rainfall exceeded the 30-year normal for this month by 54 mm (136 mm vs. 82 mm, with 93 mm of this precipitation falling between June 25 and 29) and, as such, the groundwater table experienced a notable rise between June 25 and 29, 2021, with groundwater levels increasing by 0.5 to 0.9 m at the monitoring wells over this period.

In general, the groundwater table within Aquitard 1 (ATB1) demonstrates a restricted response to precipitation events as evidenced by the absent to minor spikes observed in groundwater levels within the onsite monitoring wells (screened within this unit) following such events (Figures 8 and 9). Although infiltration to the subsurface is occurring, the volume of this infiltration appears to be restricted by the fine-grained deposits of the glacial tills. This restricted response is not surprising, given that the deposits of Aquitard 1 (ATB1) are characterized by a geometric mean hydraulic conductivity of 8.0×10^{-8} m/s (Table 1; Appendix H). The groundwater table is observed to respond more quickly to larger precipitation events at MW01-21 and MW03-21 (Figure 7), given that higher permeability deposits of sandy silt to silty sand (not glacial till) occur at ground surface at these locations (Figures 10 and 11). Overall, these results are in general agreement with regional GRCA (2021) mapping, which indicates average annual groundwater recharge rates across the Applicant Lands where Aquitard 1 (ATB1) occurs at ground surface ranges from 52 mm to 139 mm, with the lower values of groundwater recharge potential occurring within the Subject Lands (Figure D-1, Appendix D).

4.2.2 Groundwater Flow

Figure 12 presents groundwater elevation contours and the interpreted direction of horizontal flow through the groundwater system beneath the Applicant Lands using water level measurements collected from the onsite monitoring wells in June 2021. In general, groundwater contours generally mimic the prevailing topography of the Applicant Lands, with an interpreted localized groundwater divide occurring somewhere in the northern portion of these lands and potentially being in line with the surface water flow divide that separates Catchments 100 and 101. Within the Subject Lands, groundwater flows in a southern direction towards Gerber Road, with this interpretation being in general agreement with regional groundwater flow patterns (Figure ST-7, Appendix D).

Available horizontal hydraulic conductivity estimates calculated from onsite hydraulic response testing completed at the monitoring wells completed within the shallow overburden deposits of the Subject Lands (i.e., MW01-21 to MW04-21) ranged from 7.3 x 10^{-6} m/s to 5.8 x 10^{-9} m/s (Table 1; Appendix H), for an estimated bulk (i.e., geometric mean) horizontal hydraulic conductivity of 7.8 x 10^{-8} m/s (Table 1).

The velocity at which groundwater horizontally flows through the subsurface is calculated through the application of Darcy's law, where:

$$v = \frac{K \nabla}{\theta}$$

where: v = velocity (m/s)
K = hydraulic conductivity (m/s)
∇ = hydraulic gradient (m/m)
θ = effective porosity (unitless)

As discussed in Section 4.1, the Subject Lands are covered by the deposits of Aquitard 1 (ATB1; sandy silt, silt, silty clay, and clay tills) that vertically extend to a confirmed depth of up to 6.7 m BGS (approximately 350 m AMSL) but potentially up to a depth of 50 m BGS based on local MECP water well records, with the groundwater table being positioned within this unit. Assuming an effective soil porosity of 0.20 for glacial till (Fetter, 1994), a calculated average horizontal hydraulic gradient of 0.02 m/m, and geometric mean hydraulic conductivity of 7.8 x 10^{-8} m/s (Table 1), the estimated velocity of groundwater flowing in a southward direction through Aquitard 1 (ATB1) beneath the Subject Lands is calculated to be approximately 0.26 m/year (i.e., one meter every 3.9 years).

4.2.3 Infiltration Potential

Estimated infiltration rates for the overburden deposits are provided in Table 3. Infiltration rates were calculated based on an established relationship between vertical hydraulic conductivity and infiltration rate presented in CVC-TRCA (2010), with vertical hydraulic conductivities being estimated based on in-situ hydraulic response testing completed at MW01-21 to MW05-21 (Section 3.4).

Vertical hydraulic conductivities for overburden deposits screened at depths between 2.8 m to 6.1 m beneath the Applicant Lands and tested via in-situ hydraulic response testing completed at the previously mentioned monitoring wells is assumed to be one order of magnitude lower than in-situ measured horizontal hydraulic conductivities at these locations (Todd, 1980; Freeze and Cherry, 1979). For the deposits of Aquitard 1 (ATB1), vertical hydraulic conductivities are estimated to range from 7.3 x 10^{-7} m/s to 5.4 x 10^{-10} m/s, equating to infiltration rates ranging from 6 mm/hour to 42 mm/hour (Table 3).

4.2.4 Groundwater Quality

Onsite Monitoring Wells

Groundwater samples were collected from MW01-21, MW03-21, and MW05-21 on May 27, 2021, for the analysis of general inorganic chemistry, nutrients, and metals. The samples were compared to Ontario Drinking Water Quality Standards (ODWQS) for health and non-health related parameters (MECP, 2018). Groundwater sampled from across the Applicant Lands is identified as calcium-bicarbonate type water (Figure 13), which is typical of fresh shallow groundwater in southern Ontario. Overall, no analyzed parameters in the groundwater samples had concentrations detected above applicable ODWQS health related objectives (i.e., maximum acceptable concentrations) (Table 4), although some parameters did exceed their corresponding Aesthetic Objective (AO), Operational Guideline (OG), and/or Medical Officer of Health Reporting Limit (MOH) concentrations as outlined below.

- Hardness exceeded the ODWQS OG (80 to 100 mg/L) at all sampling locations with concentrations of 350 mg/L (MW05-21), 370 mg/L (MW01-21), and 450 mg/L (MW03-21). Overall, the presence of elevated hardness is typical of groundwater in southern Ontario and not considered to be a concern.
- Turbidity exceeded the ODWQS AO (5 mg/L) at all sampling locations with concentrations of 1,800 mg/L (MW01-21), 2,100 to 3,500 mg/L (MW05-21), and 4,700 mg/L (MW03-21). This parameter is often elevated in groundwater samples collected from monitoring wells due to the presence of sediment in the samples from the sampling process.
- Manganese slightly exceeded the ODWQS AO (0.05 mg/L) at MW01-21 (0.052 mg/L) and MW03-21 (0.065 mg/L). Overall, the presence of elevated manganese is typical of groundwater in southern Ontario and not considered to be a concern.
- Sodium exceeded the ODWQS MOH reporting limit (20 mg/L) with a concentration of 33 mg/L at MW01-21. If the groundwater is utilized as a potable drinking-water source, the local Medical Officer of Health should be notified when the sodium concentration exceeds 20 mg/L so that this information may be communicated to local physicians for their use with patients on sodium restricted diets.

Offsite Private Wells

Groundwater quality results for those samples collected from the offsite private wells (i.e., RW01 and RW02; Figure 1) indicate that the groundwater is calcium-sulfate type water (Figure 13), suggesting that these wells draw their water supply from a deeper confined aquifer system (e.g., Aquifer 2/3 and/or the Bedrock Aquifer – refer to Section 2.2). Overall, no analyzed parameters in the groundwater samples had concentrations detected above applicable ODWQS health related objectives (i.e., maximum acceptable concentrations) (Table 5), although some parameters did exceed their corresponding Aesthetic Objective (AO) and Operational Guideline (OG) concentrations as outlined below:

- Hardness exceeded the ODWQS OG (80 to 100 mg/L) with concentrations of 420 mg/L (RW01) and 580 mg/L (RW02). The presence of elevated hardness is typical of groundwater in southern Ontario and not considered to be a concern.

- Iron exceeded the ODWQS AO (0.3 mg/L) with concentrations of 0.4 mg/L (RW01) and 5.9 mg/L (RW02). Manganese was also detected in the well water sample collected from RW02 at a concentration of 0.08 mg/L, exceeding the corresponding ODWQS AO of 0.05 mg/L. Elevated concentrations of iron and manganese in well water are often indicative of groundwater that is drawn from an aquifer that is characterized by anaerobic (i.e., reducing) conditions, which is often characteristic of a confined aquifer system.

- Total dissolved solids (TDS) exceeded the ODWQS AO with concentrations of 530 mg/L (RW01) and 780 mg/L (RW02). The presence of elevated TDS is typical of groundwater drawn from confined bedrock aquifer systems in Ontario and not considered to be a concern.

- Turbidity exceeded the ODWQS OG (5 mg/L) with a concentration of 49 mg/L at RW02.

5.0 IMPACT ASSESSMENT AND MITIGATION MEASURES

5.1 WATER BALANCE AND INFILTRATION

Proposed development for the Applicant Lands will consist of future residential development and with this development will come the introduction of impervious surfaces (e.g., rooftops, concrete/asphalt roadways, parking lots, and walkways) and, subsequently, a corresponding reduction in the volume of water infiltrating to the subsurface.

As documented in Stantec's (2021b) *Stormwater Management Report*, results of the water balance analyses indicates that the total volume of infiltration occurring across the Applicant Lands under the pre-development condition is approximately 23,360 m^3/year, with this volume declining to 9,800 m^3/year under an unmitigated post-development condition (i.e., infiltration deficit of 13,560 m^3/year). To address this situation, the primary post-development infiltration augmentation measure proposed for the Applicant Lands will be to capture rooftop runoff and return this clean stormwater to the subsurface via a series of soakaway pits designed to infiltrate and retain a 25 mm storm event, where possible.

Overall, the utilization of the post-development low impact development (LID) infiltration augmentation option throughout the Applicant Lands will be evaluated further during the detailed design stages of the development. However, post-development water balance calculations indicate pre-development infiltration volumes can be maintained, if not enhanced, based on the volume of precipitation that can be captured by proposed residential rooftops (i.e., 22,890 m^3/year). Assuming that this total volume of stormwater can be returned to the subsurface using onsite soakaway pits, a resulting infiltration surplus of 9,330 m^3 will be realized at the Applicant Lands.

A key constraint to the implementation of post-development infiltration augmentation measures is the positioning of a seasonally high groundwater table. As per CVC-TRCA (2010), the recommended vertical separation between the base of a given infiltration augmentation option and the high groundwater table is at least one meter; however, distances of less than one meter of separation in soils having higher infiltration potential may still be effective. Based on groundwater monitoring data presented in this report (i.e., from June to August 2021), groundwater levels are shown to fluctuate between 0.5 m BGS to 2.9 m BGS throughout the Applicant Lands (Figures 8 and 9) with the subsurface deposits having estimated infiltration rates ranging from 6 mm/hour to 42 mm/hour (Table 3). Stantec notes that the observed groundwater levels / elevations presented in this report represent a period outside of typical high groundwater conditions and that higher water table positioning may occur throughout the Applicant Lands during the late fall to early spring. Overall, the implementation of post-development infiltration augmentation measures across certain areas of the Applicant Lands may be challenging based on the high groundwater level and low soil permeability conditions mentioned above.

5.2 GROUNDWATER DEWATERING

With the construction of below ground structures (e.g., basements) and servicing infrastructure (e.g., sewer and watermain, SWM pond facilities) comes the potential of intercepting the groundwater table and, consequently, the need for short-term construction dewatering and/or the installation of permanent drainage systems (in the absence of waterproofing). Where required, dewatering will result in the lowering of the groundwater table to the base of a given excavation and/or underground structure. The effects of local dewatering in general cannot be mitigated, since dewatering deliberately seeks to create an effect (i.e., lowering of groundwater levels).

For dewatering occurring in the moderate to low permeability deposits associated with ATB1, the dewatering zone of influence (ZOI) (i.e., horizontal extent of groundwater level declines / drawdown caused by dewatering activities at a point source) is expected to remain within relatively short distances around excavations and/or subsurface structures, given that these deposits are characterized by horizontal hydraulic conductivities ranging from 7.3×10^{-6} m/s to 5.4×10^{-9} m/s (geometric mean of 8.0×10^{-8} m/s) (Table 1; Appendix H). At these hydraulic conductivities, low volumes of groundwater are expected to discharge into temporary construction excavations, with conventional pumping from filtered sumps being capable of removing these anticipated volumes from a given excavation area.

Under O. Reg. 64/16 and O. Reg. 63/16A, if construction dewatering volumes are projected to exceed 50,000 L/day, registration of an MECP Environmental Activity and Sector Registry (EASR) or Permit to Take Water (PTTW) will be required for dewatering to occur. A PTTW is required when groundwater volumes for construction dewatering are expected to exceed 400,000 L/day or when groundwater collected and discharged from a permanent drainage system exceeds 50,000 L/day. An EASR is required when construction dewatering volumes are projected to range from 50,000 L to 400,000 L/day.

Stantec notes that recent amendments made to EASR requirements by the MECP (as of July 1, 2021) for construction dewatering include the following:

The ability to register multiple dewatering pits for a single project under the same EASR.

- Allowing construction dewatering of up to 400,000 L/day for each dewatering pit as long as the dewatering area of influence do not overlap.
- Stormwater will no longer be counted in the 400,000 L/day water taking limit, however, registrants will at a minimum be required to keep a record of precipitation events, or if determined by a Qualified Person, detailed monitoring/documentation.
- EASRs will apply to linear projects including transit and pipelines.
- Registrants will be required to notify the local municipalities and conservation authorities if the water taking is intended to continue for more than 365 days.

Dewatering assessments are recommended for completion during detailed design to specifically determine anticipated dewatering volumes and associated water taking permitting requirements.

When dewatering volumes are projected to be greater than 50,000 L/day, the following mitigation measures are likely to be required for either an EASR or PTTW application:

- **Groundwater Discharge Management** – Establishment of an appropriate dewatering system that will dissipate the energy and reduce the sediment content of discharging water for the purpose of limiting potential erosion effects if groundwater is to be discharged to a receiving surface water feature. Common measures include the use of sediment control basins, erosion pads, geotextile filter bags, and the positioning of straw bale/filter cloth barriers downgradient of the discharge point. The quality of the groundwater discharge must also meet Provincial Water Quality Objectives (PWQO) (MECP, 1994). If groundwater is to be discharged to the regional sewer system for disposal, the quality of this water must not exceed parameter concentrations as listed under Regional Municipality of Waterloo Sewer Use By-Law No. 1-90.

- **Private Well Monitoring** – The monitoring of private wells expected to be located within the dewatering ZOI (as estimated from the dewatering assessment) for drawdown interference, which could potentially affect the operation of private wells with regards to water quantities. The providing of affected well owners with temporary potable water supplies or reducing dewatering rates and/or duration would be required if notable interference effects are observed.

  A review of the MECP water well records for wells located within 500 m of the Applicant Lands indicates that there are 37 wells identified as being utilized for water supply (i.e., domestic, commercial, livestock, or municipal). One well is located within 20 m of the Applicant Lands (i.e., MECP Well 7318145; Figure 4), with the remaining 36 wells being positioned between 170 m to 500 m away from these lands (Appendix G). The average constructed depth of these private wells is 53 m BGS, indicating that groundwater drawn into these wells originates from the deeper confined Aquifer 2/3 (AFB3/AFD1) and/or the Bedrock Aquifer. As such, construction dewatering activities potentially occurring at the Applicant Lands are highly unlikely to interfere with the yields of these local private wells, given that the shallow overburden where these activities will occur is hydraulically separated from these previously mentioned deeper aquifer systems by the low permeability silt to clay-based glacial tills of Aquitard 1 (ATB1).

5.3 SOURCE WATER PROTECTION

A drinking-water threat is an activity or condition that adversely affects or has the potential to adversely affect the quality or quantity of any water that is or may be used as a source of drinking water. The following activities are prescribed by the province of Ontario under O. Reg. 287/07 to be drinking water threats (i.e., Significant Drinking Water Threat Policy Categories):

1. The establishment, operation, or maintenance of a waste disposal site within the meaning of Part V of the *Environmental Protection Act.*

    a) Untreated sewage
    b) Waste disposal
    c) Mine tailings

2. The establishment, operation, or maintenance of a system that collects, stores, transmits, treats, or disposes of sewage.

    a) Stormwater management
    b) Wastewater treatment plants/sewer systems
    c) On-site sewage systems
    d) Industrial effluent

3. The application of agricultural source material to land.

4. The storage of agricultural source material.

5. The management of agricultural source material.

6. The application of non-agricultural source material to land.

7. The handling and storage of non-agricultural source material.

8. The application of commercial fertilizer to land.

9. The handling and storage of commercial fertilizer.

10. The application of pesticide to land.

11. The handling and storage of pesticide.

12. The application of road salt.

13. The handling and storage of road salt.

14. The storage of snow.

15. The handling and storage of fuel.

16. The handling and storage of a dense non-aqueous phase liquid (DNAPL).

17. The handling and storage of an organic solvent.

18. The management of runoff that contains chemicals used in the de-icing of aircraft.

19. An activity that takes water from an aquifer or a surface water body without returning the water taken to the same aquifer or surface water body.

20. An activity that reduces the recharge of an aquifer.

21. The use of land as livestock grazing or pasturing land, an outdoor confinement area or a farm-animal yard.

22. The establishment and operation of a liquid hydrocarbon pipeline as per O. Reg. 385/08, s. 3.

As shown in Figure 5, the Applicant Lands are largely intercepted by the WHPA-B, and to a lesser extent WHPA-C and WHPA-D, of the Wellesley Wellfield (Wells WY1, WY5, and WY6). The vulnerability score assigned to these WHPA is 6 (Map A1, Appendix E), indicating that the threat of an activity or condition occurring at ground surface within this area and subsequently adversely affecting the quality and/or quantity of the aquifer system in which these municipal production wells draw their groundwater supply is medium to low.

As per the SPP (LERSPC, 2021b) Map A1 (Appendix E), the Applicant Lands are only subject to the protection policies specified under Significant Drinking Water Threat Policy Category 16 (DNAPLs). Since the planned use for the Applicant Lands will not involve the onsite handling and storage of DNAPLs, the SPP policy under Category 16 does not apply.

Policies in the SPP that address significant threat activities that pose a risk to the quantity of source water available for municipal well use (i.e., Significant Drinking Water Threat Policies 19 and 20) only apply to WHPA-Q. As mentioned previously, no WHPA-Q intercepts the Applicant Lands (Figure E-1, Appendix E).

5.4 SERVICING ALIGNMENTS AND GROUNDWATER FLOW

Proposed development for the Applicant Lands will include the installation of servicing (i.e., storm / sanitary sewers and watermains), with preliminary designs indicating that this servicing will be installed at depths ranging from 1.5 to 3.0 m BGS. Given that preliminary monitoring results indicate that the groundwater table ranges from 0.5 to 2.9 m BGS across the Applicant Lands (Section 4.2.1), these servicing installations are likely to intercept the groundwater table. In areas where site servicing extends below the groundwater table, Stantec recommends that anti-seepage (cut-off) collars be installed to prevent the preferential movement of groundwater along the servicing alignments. The use of anti-seepage collars will likely be required given that the subsurface of the Applicant Lands is characterized by low permeability deposits where groundwater movement is more restricted (e.g., silt to clay-based soils). An assessment for the need, total number, and exact placements of anti-seepage collars along the servicing alignments can be explored in more detail during the detailed design phase of the project.

5.5 SPILL CONTAINMENT AND RESPONSE

The potential exists for spills during any construction activity, with the most probable type of spill occurring being attributable to the refuelling of major construction equipment that cannot readily leave the Applicant Lands (e.g., earth movers). The potential impacts of a spill could be the contamination of soils, groundwater and/or surface water. By implementing proper protocols for the handling of fuels and lubricants during construction, the risk of a spill occurring will be greatly reduced. The procedures to be implemented to prevent onsite spills are as follows:

- All trucks or other road vehicles would be refuelled and maintained offsite, where practicable.
- Refuelling and lubrication of other construction equipment would not be allowed within 30 m of a drainage system or dewatering excavation.

- Regular inspections of hydraulic and fuel systems on machinery, with leaks being repaired immediately upon detection or the equipment being removed from Site.
- Spill kits containing absorbent materials would be kept on hand; and
- Implement best management practices and develop an emergency spill response plan.

Given that anticipated construction activities at the Applicant Lands are not expected to involve the storage or use of bulk chemicals or fuels, a potential spill that may occur would be localized and involve a small volume of material. If there were to be an accidental release of a deleterious substance, the low to moderate permeability of the soils that cover the Applicant Lands will prevent the rapid infiltration and movement of these substances through the subsurface, allowing response personnel sufficient time to contain and clean-up such a release before it causes potential harm to the quality of the groundwater system. Overall, standard containment facilities and emergency response materials are to be maintained onsite as required, with refuelling, equipment maintenance, and other potentially contaminating activities being confined to designated areas. As appropriate, spills are to be reported immediately to the MECP Spills Action Centre.

6.0 CONCLUSIONS

The following conclusions are provided based on the completed hydrogeological assessment:

1. Stratigraphic conditions beneath the Applicant Lands consist of a 0.3 m to 1.5 m thick mixture of topsoil and pockets of fill and topsoil (sandy silt to silty sand) that is predominantly underlain by a combination of sandy silt, silt, silty clay, and clay glacial till (i.e., Aquitard 1; ATB1), which form a horizontally and vertically contiguous unit that extends up to the termination depth of the boreholes (i.e., 4.7 m BGS to 6.7 m BGS; approximately 350 m AMSL). Local MECP water well records suggest that the Aquitard 1 unit extends to a depth of up to 50 m BGS near the Applicant Lands. Layers and seams of sand, silt, and sand and gravel are also present in the glacial till at variable depths.

2. Groundwater elevations across the Site ranged from 0.5 m BGS (at MW03-21) to 2.9 m BGS (at MW02-21) over the monitoring period (i.e., June to August 2021), equating to elevations ranging from 353.2 m to 361.3 m AMSL.

3. In general, groundwater contours generally mimic the prevailing topography of the Applicant Lands, with an interpreted localized groundwater divide occurring somewhere in the northern portion of these lands and potentially being in line with the surface water flow divide that separates Catchments 100 and 101. Within the Subject Lands, groundwater flows in a southern direction towards Gerber Road, with this interpretation being in general agreement with regional groundwater flow patterns.

4. The horizontal movement of groundwater through Aquitard 1 (ATB1) is calculated to be in the range of 0.26 m/year (i.e., one meter every 3.9 years) beneath the Subject Lands, due to the low hydraulic conductivity associated with these deposits (i.e., 10^{-6} to 10^{-9} m/s, for a geometric average of 10^{-8} m/s).

5. Estimated vertical hydraulic conductivities for the deposits of Aquitard 1 (ATB1) range from 7.3×10^{-7} m/s to 5.4×10^{-10} m/s, equating to infiltration rates ranging from 6 mm/hour to 42 mm/hour.

6. Groundwater sampled from the onsite monitoring wells (screened in the upper deposits of Aquitard 1) is identified as calcium-bicarbonate type water, which is typical of fresh shallow groundwater in southern Ontario. Groundwater sampled from the offsite private wells is identified as calcium-sulfate type water, suggesting that these wells draw their water supply from a deeper confined aquifer system (e.g., Aquifer 2/3 and/or the Bedrock Aquifer). Overall, no analyzed parameters in the groundwater samples collected from the onsite and offsite wells had concentrations detected above applicable ODWQS health related objectives.

7. As documented the *Stormwater Management Report* (Stantec, 2021b), proposed development of the Applicant Lands is expected to result in an infiltration deficit of approximately 13,560 m^3/yr. However, post-development water balance calculations indicate pre-development infiltration volumes can be maintained, if not enhanced, based on the volume of precipitation that can be captured by proposed residential rooftops (i.e., 22,890 m^3/year). Assuming that this total volume of stormwater can be returned to the subsurface using onsite soakaway pits, a resulting infiltration surplus of 9,330 m^3 will be realized at the Applicant Lands. Overall, the implementation of post-development infiltration augmentation measures across certain areas of the Applicant Lands may be challenging based on the high groundwater level and low soil permeability conditions.

8. The Applicant Lands are intercepted by WHPA-B to WHPA-D of the Wellesley Wellfield, which are assigned with a vulnerability score of 6. As per the Source Protection Plan (SPP) (LERSPC, 2021b) Map A1 (Appendix E), the Applicant Lands are only subject to the protection policies specified under Significant Drinking Water Threat Policy Category 16 (DNAPLs). Since the planned use for the Applicant Lands will not involve the onsite handling and storage of DNAPLs, the SPP policy under Category 16 does not apply.

9. Construction dewatering will likely be required at the Applicant Lands due to an elevated groundwater table; however, for dewatering occurring in low permeability deposits such as Aquitard 1 (ATB1), the dewatering zone of influence (ZOI) (i.e., horizontal extent of groundwater level declines / drawdown caused by dewatering activities at a point source) is expected to be low and isolated to a small distance around excavations and/or subsurface structures, given that these deposits across these lands are characterized by hydraulic conductivities ranging from 10^{-6} m/s to 10^{-9} m/s. Dewatering assessments are recommended for completion during detailed design to specifically determine anticipated dewatering volumes and associated water taking permitting requirements for the proposed future development.

10. A review of the MECP water well records for wells located within 500 m of the Applicant Lands indicates that there are 37 wells identified as being utilized for water supply (i.e., domestic, commercial, livestock, or municipal). One well is located within 20 m of the Applicant Lands, with the remaining 36 wells being positioned between 170 m to 500 m away from these lands. The average constructed depth of these private wells is 53 m BGS, indicating that groundwater drawn into these wells originates from the deeper confined Aquifer 2/3 (AFB3/AFD1) and/or the Bedrock Aquifer. As such, construction dewatering activities potentially occurring at the Applicant Lands are highly unlikely to interfere with the yields of these local private wells, given that the shallow overburden where these activities will occur is hydraulically separated from these previously mentioned deeper aquifer systems by the low permeability silt to clay-based glacial tills of Aquitard 1 (ATB1).

11. In areas where site servicing extends below the groundwater table, Stantec recommends that anti-seepage (cut-off) collars be installed to prevent the preferential movement of groundwater along the servicing alignments. The use of anti-seepage collars will likely be required given that most of the subsurface throughout the Site is characterized by deposits where groundwater movement is more restricted (e.g., silt to clay-based soils). An assessment for the need, total number, and exact placements of anti-seepage collars along the servicing alignments can be explored in more detail during the detailed design phase of the project.

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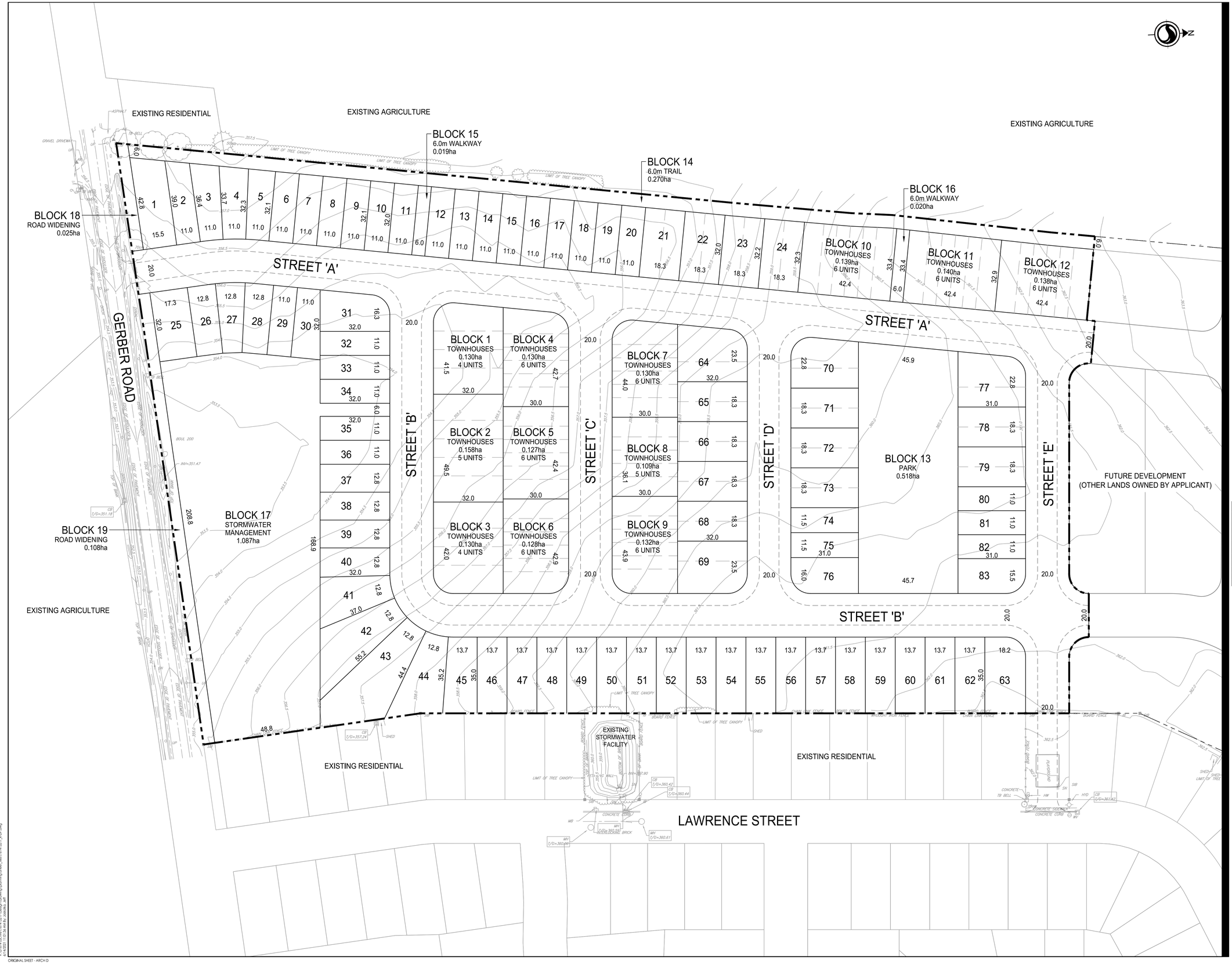
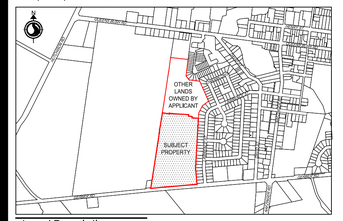
APPENDIX A:
Development Plans



Stantec

Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo ON N2L 0A4
Tel: (519) 579-4410
www.stantec.com

Key Map NTS.



Legal Description

Plan 1148, Part Lot 80,
Registered Plan 58R-3548, Part 1,
Township of Wellesley,
Regional Municipality of Waterloo

Information Required

Under Section 51(17) of the Planning Act,
R.S.O 1990 c.P 13 as Amended
a) - As Shown
b) - As Shown
c) - As Shown
d) - As Listed Below
e) - As Shown
f) - As Shown
g) - As Shown
h) - Municipal Water
i) - As Shown
j) - Municipal Sanitary and Storm Sewers
k) - None

Surveyor's Certificate

I hereby certify the boundaries of the subject lands and their relationship to the adjoining lands have been accurately and correctly shown.

Signed _____
O.L.S Name
Company Name

Date _____

Owner's Certificate

I hereby authorize Stantec Consulting Ltd. to submit this Draft Plan of Subdivision on my behalf.

Signed _____
Owner Name
Company Name

Date _____

Land Use Schedule

Lots/Blocks	Land Use	Area (ha)	# of Units
Lots 1-20, 25-63, 74-76, 80-83	Single Detached	2.915	66
Lots 21-24, 64-73, 77-79	Semi Detached	1.047	34
Blocks 1-12	Townhouse	1.596	66
Block 13	Park	0.518	
Block 14	6.0m Trail	0.270	
Blocks 15-16	6.0m Walkway	0.039	
Block 17	Stormwater Management	1.087	
Blocks 18-19	Road Widening	0.133	
Roads		2.582	
TOTAL		10.187	166 Units

Issued for Client Review	JJ	GR	2021.06.14
Revision	By	Appd	YYYY.MM.DD
File Name: 161413217_R-DP	JJ	JJ	GR	2021.04.21
	Dwn.	Dsgn.	Chkd.	YYYY.MM.DD

Permit-Seal

APPROVED: _____ DATE: _____

I hereby certify that the plan was prepared under the supervision of a registered professional planner, within the meaning of the Ontario Professional Planners Institute Act, 1994.

Client/Project
STROHVEST ONTARIO INC.

WELLESLEY PROPERTY
GERBER ROAD

TOWNSHIP OF WELLESLEY, ON

Title
CONCEPTUAL
DRAFT PLAN OF SUBDIVISION

Project No. 161413217
Scale 1:750 (0, 7.5, 22.5, 37.5m)
Revision 0
Sheet 1 of 1
Drawing No. DP-1

V:\161\414\active\161413217\design\drawing\planning\sheet_files\161413217_R-DP.dwg
6/14/2021 11:01:36 AM By: jasbolts, jeff

ORIGINAL SHEET - ARCH D

APPENDIX B:
Figures

Stantec

Legend

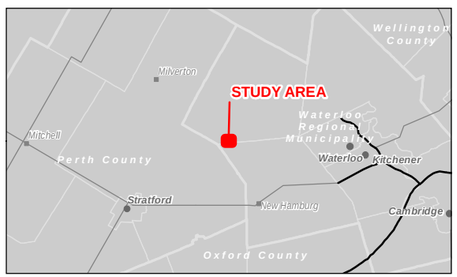
- Subject Lands
- Boundary of Lands Owned by the Applicant (Strohvest Ontario Inc.)
- Monitoring Well (Stantec, 2021)
- Borehole (Stantec, 2021)
- Private Well Sampling Location
- Topographic Contour (m AMSL)
- Stormwater Catchment (Existing Conditions)

0 100 200 m

1:4,000 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2021.
3. Orthoimagery © First Base Solutions, 2021. Imagery Date, 2020.



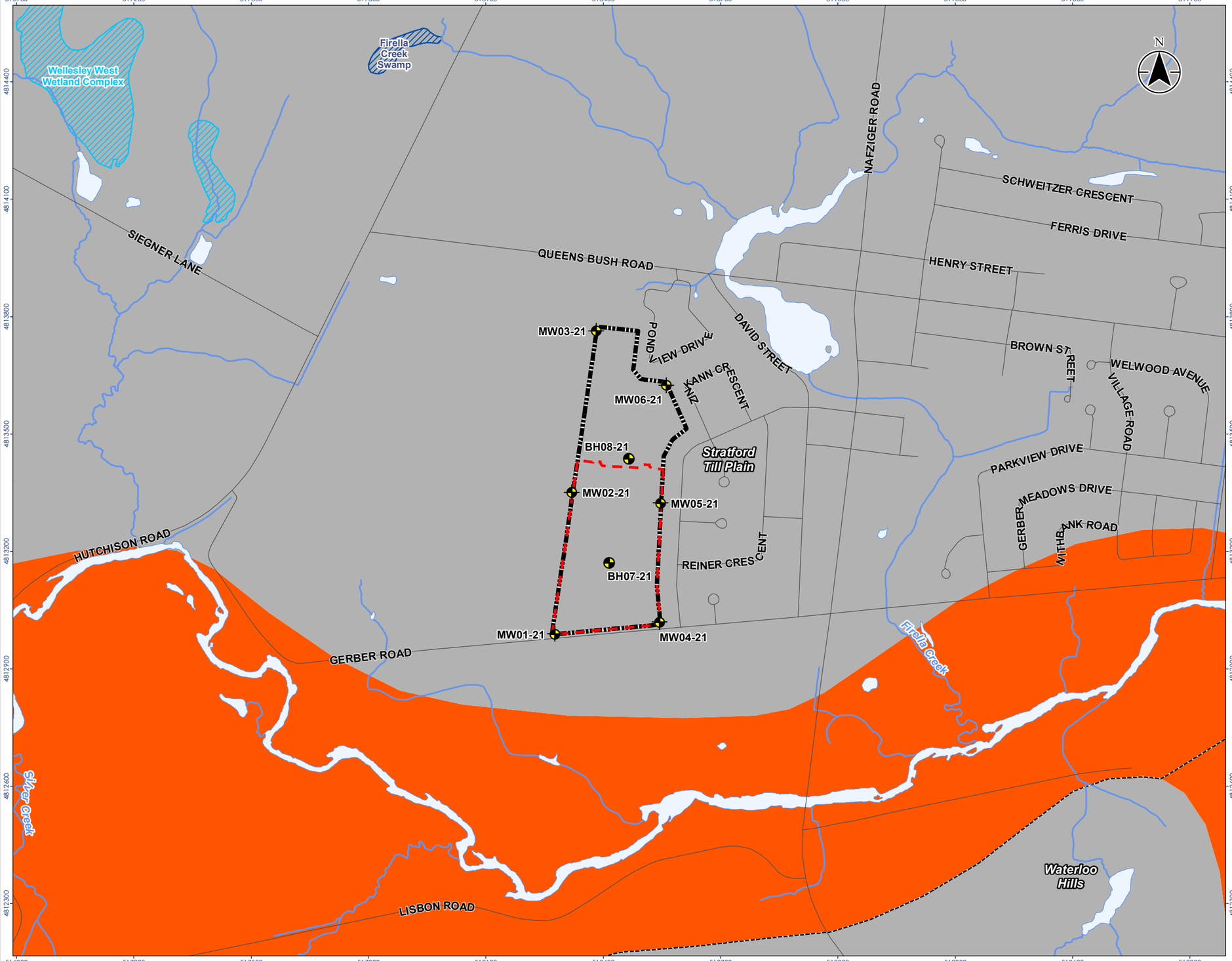
Project Location
Township of Wellesley

161413217 REVA
Prepared by CMC on 2021-09-21
Technical Review by BCC on 2021-02-03

Client/Project
STROHVEST ONTARIO INC.
STROH LANDS, WELLESLEY, ONTARIO
HYDROGEOLOGICAL ASSESSMENT

Figure No.
1

Title
Location Plan



Stantec

Legend

- Subject Lands
- Boundary of Lands Owned by the Applicant (Strohvest Ontario Inc.)
- Monitoring Well (Stantec, 2021)
- Borehole (Stantec, 2021)
- Road
- Watercourse - Permanent
- Waterbody
- Wetland - Evaluated (Provincial)
- Wetland - Evaluated (Other)
- Physiographic Region Boundary

Physiography

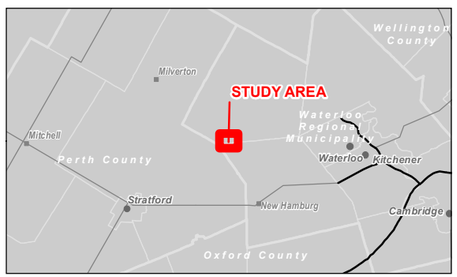
- 5: Till Plains (Undrumlinized)
- 3: Spillways

0 250 500 m

1:10,000 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2021.
3. Chapman, L.J. and Putnam, D.F. 2007. Physiography of southern Ontario; Ontario Geological Survey, Miscellaneous Release—Data 228.



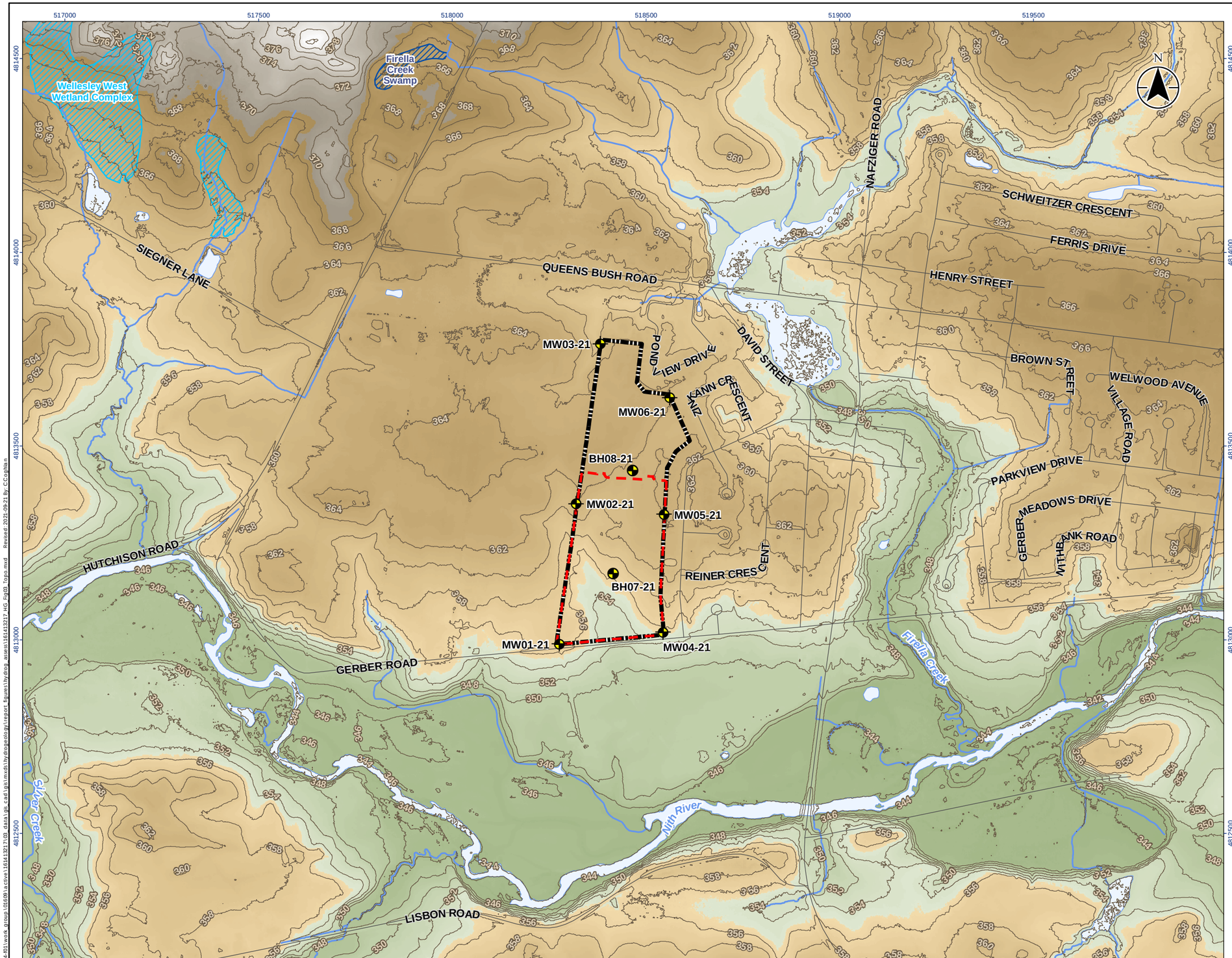
Project Location
Township of Wellesley

161413217 REVA
Prepared by CMC on 2021-09-21
Technical Review by BCC on 2021-02-03

Client/Project
STROHVEST ONTARIO INC.
STROH LANDS, WELLESLEY, ONTARIO
HYDROGEOLOGICAL ASSESSMENT

Figure No.
2

Title
Physiography



Stantec

Legend

- Subject Lands
- Boundary of Lands Owned by the Applicant (Strohvest Ontario Inc.)
- Monitoring Well (Stantec, 2021)
- Borehole (Stantec, 2021)
- Road
- Watercourse - Permanent
- Waterbody
- Wetland - Evaluated (Provincial)
- Wetland - Evaluated (Other)

Ground Surface Elevation (m

High : 382.25

Low : 341.56

0 250 500 m

1:10,000 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
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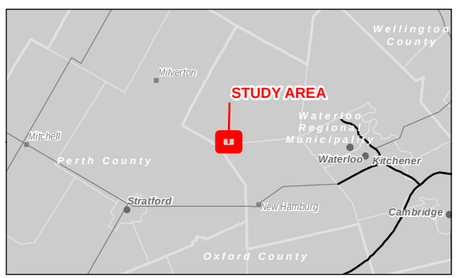
3. Topography derived from the Southwestern Ontario Orthophotography Project (SWOOP) 2015 Digital Elevation Model (DEM) © Queen's Printer for Ontario, 2021.



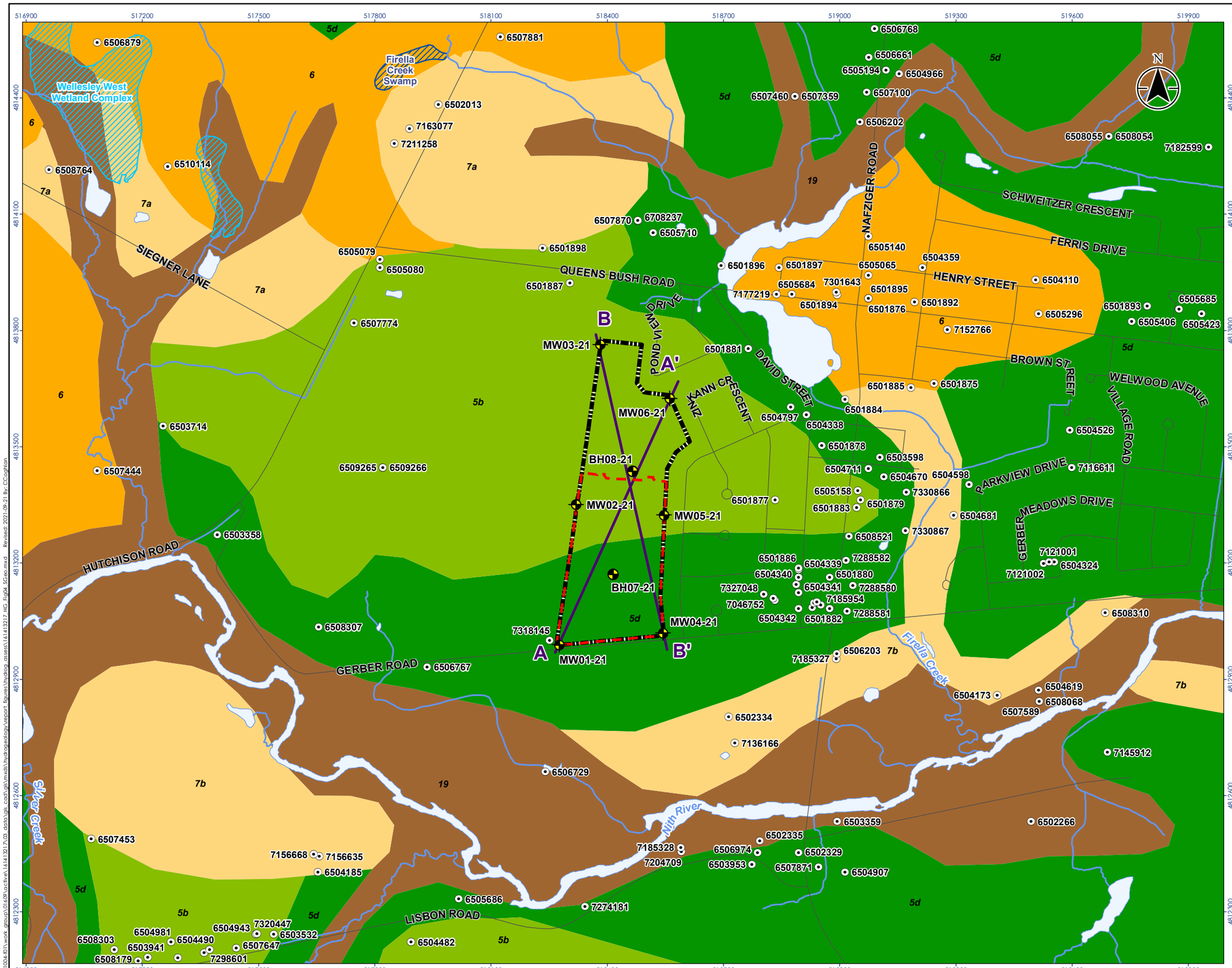
Project Location
Township of Wellesley

161413217 REVA
Prepared by CMC on 2021-09-21
Technical Review by BCC on 2021-02-03

Client/Project
STROHVEST ONTARIO INC.
STROH LANDS, WELLESLEY, ONTARIO
HYDROGEOLOGICAL ASSESSMENT

Figure No.
3

Title
Topography



Stantec

Legend

- Subject Lands
- Boundary of Lands Owned by the Applicant (Strohvest Ontario Inc.)
- Monitoring Well (Stantec, 2021)
- Borehole (Stantec, 2021)
- MECP Water Well Record
- Cross-Section Location
- Road
- Watercourse - Permanent
- Waterbody
- Wetland - Evaluated (Provincial)
- Wetland - Evaluated (Other)

Surficial Geology

- 19: Modern alluvial deposits
- 7a: Glaciofluvial deposits (Sandy deposits)
- 7b: Glaciofluvial deposits (Gravelly deposits)
- 6: Ice-contact stratified deposits
- 5b: Stone-poor, carbonate-derived silty to sandy till (Stratford Till)
- 5d: Glaciolacustrine-derived silty to clayey till (Mornington Till)

0 250 500 m

1:10,000 (At original document size of 11x17)

Notes

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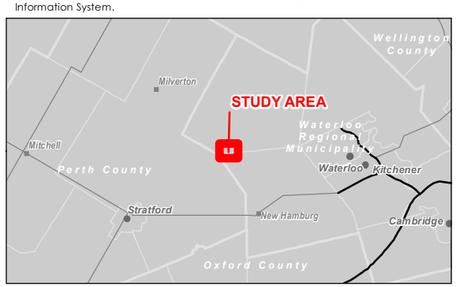
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2021.
3. Ontario Geological Survey 2010. Surficial geology of Southern Ontario; Ontario Geological Survey, Miscellaneous Release--Data 128-REV ISBN 978-1-4435-2483-4.
4. MECP Water Well locations based on published UTMs provided in the Water Well Information System.



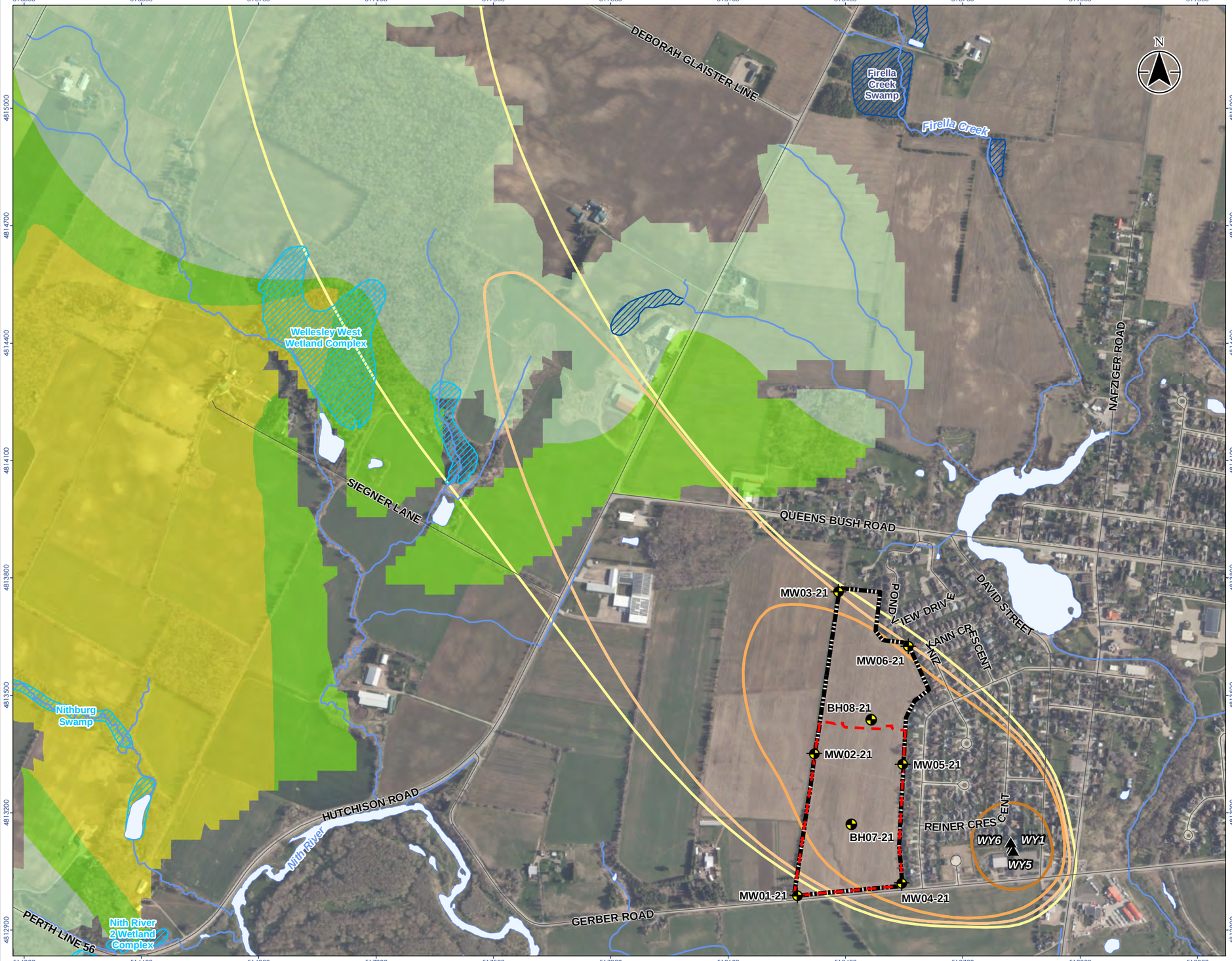
Project Location
Township of Wellesley

161413217 REVA
Prepared by CMC on 2021-09-21
Technical Review by BCC on 2021-02-03

Client/Project
STROHVEST ONTARIO INC.
STROH LANDS, WELLESLEY, ONTARIO
HYDROGEOLOGICAL ASSESSMENT

Figure No.
4

Title
Surficial Geology



Stantec

Legend

- Subject Lands
- Boundary of Lands Owned by the Applicant (Strohvest Ontario Inc.)
- Monitoring Well (Stantec, 2021)
- Borehole (Stantec, 2021)
- Municipal Production Well
- Road
- Watercourse - Permanent
- Waterbody
- Wetland - Evaluated (Provincial)
- Wetland - Evaluated (Other)

Wellhead Protection Areas

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

SGRA Vulnerability

- 2
- 4
- 6

0 250 500 m

1:10,000 (At original document size of 11x17)

Notes

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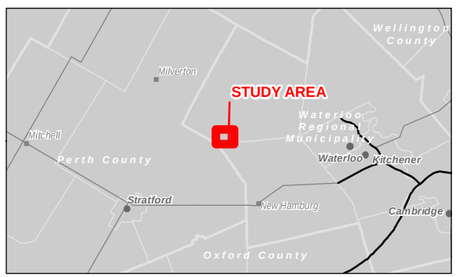


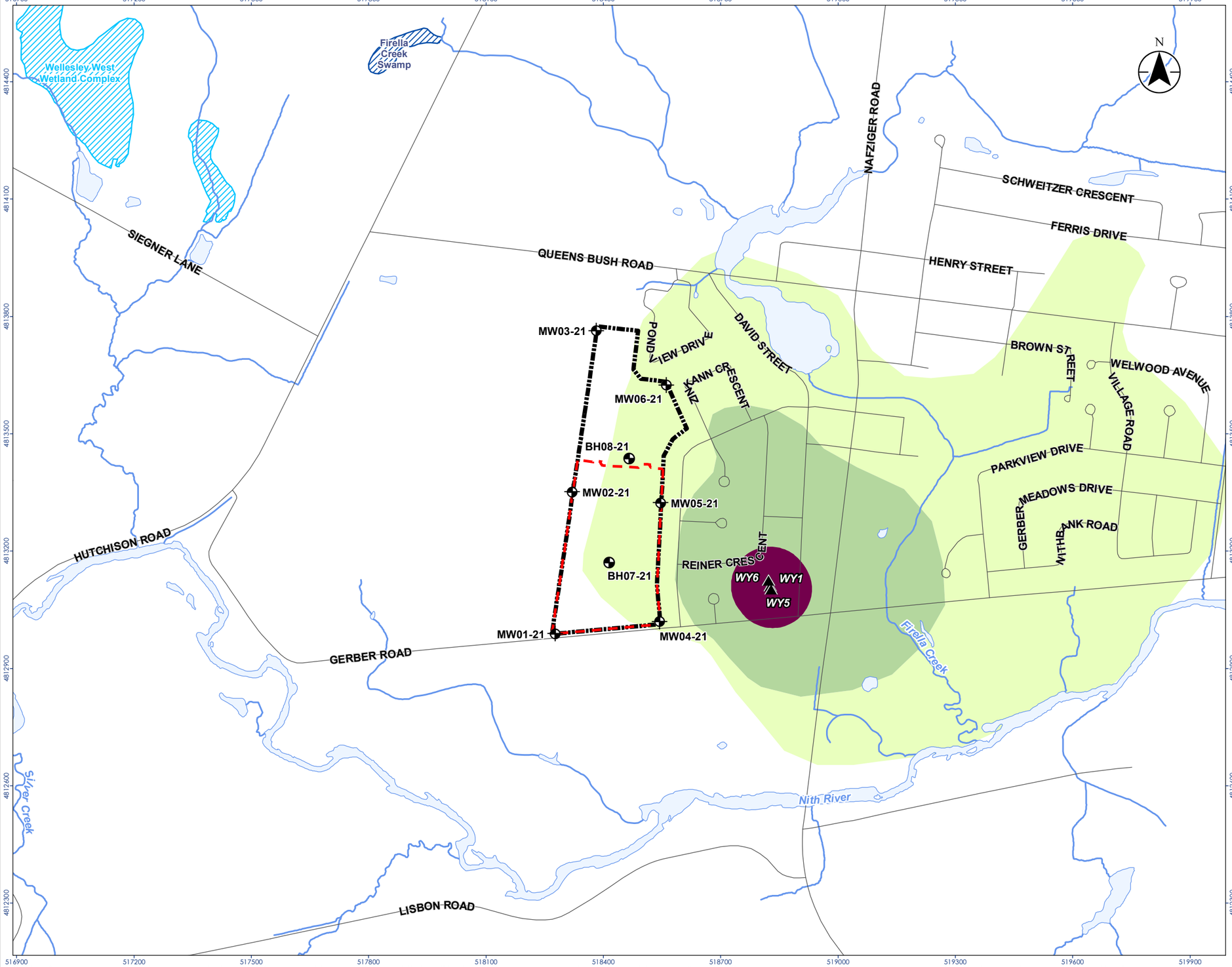
Project Location
Township of Wellesley

161413217 REVA
Prepared by CMC on 2021-09-21
Technical Review by BCC on 2021-02-03

Client/Project
STROHVEST ONTARIO INC.
STROH LANDS, WELLESLEY, ONTARIO
HYDROGEOLOGICAL ASSESSMENT

Figure No.
5

Title
Source Water Protection



Legend

- Subject Lands
- Boundary of Lands Owned by the Applicant (Strohvest Ontario Inc.)
- Monitoring Well (Stantec, 2021)
- Borehole (Stantec, 2021)
- Municipal Production Well
- Road
- Watercourse - Permanent
- Waterbody
- Wetland - Evaluated (Provincial)
- Wetland - Evaluated (Other)

Wellhead Protection

- WPSA-1
- WPSA-4
- WPSA-5

0 250 500 m

1:10,000 (At original document size of 11x17)

Notes

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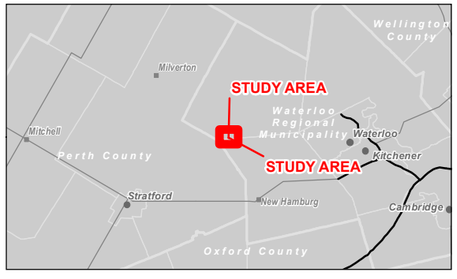


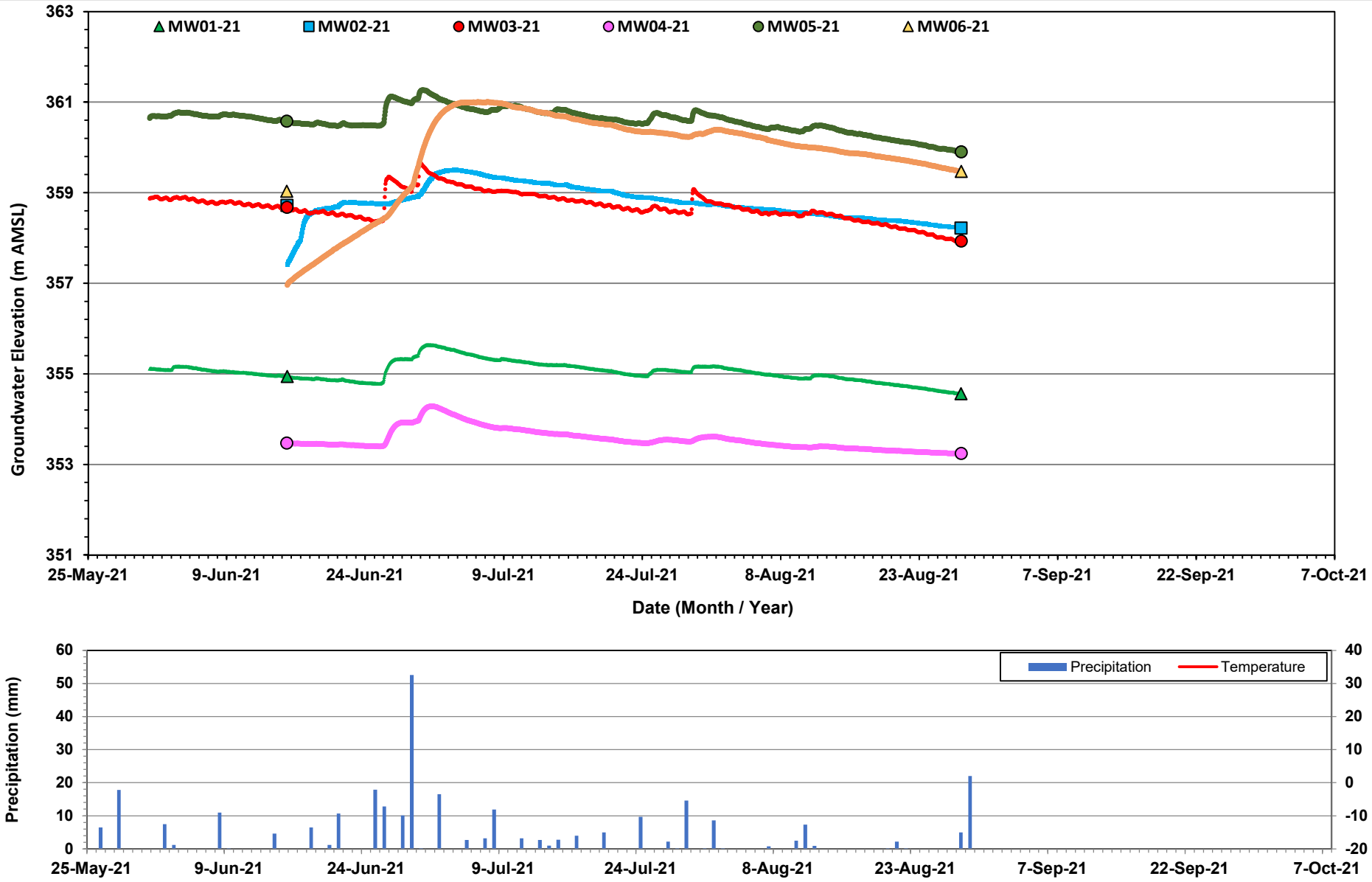
Project Location
Township of Wellesley

161413217 REVA
Prepared by CMC on 2021-09-21
Technical Review by BCC on 2021-02-03

Client/Project
STROHVEST ONTARIO INC.
STROH LANDS, WELLESLEY, ONTARIO
HYDROGEOLOGICAL ASSESSMENT

Figure No.
6

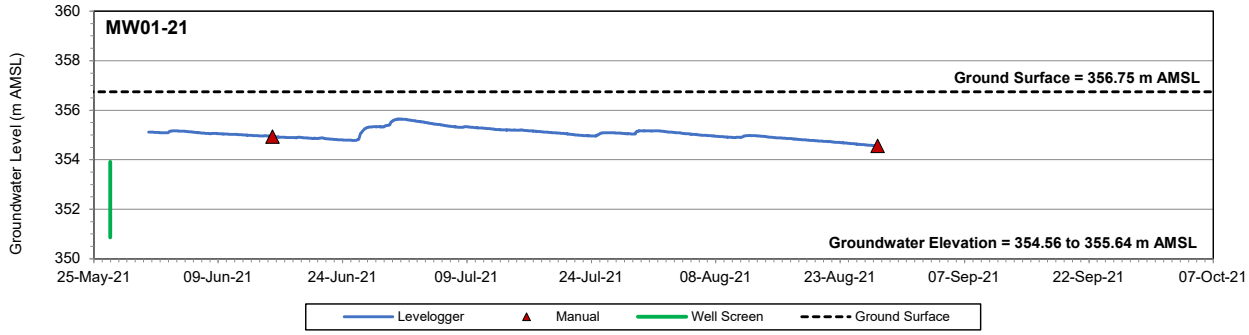
Title
Regional Wellhead Protection Sensitivity Areas

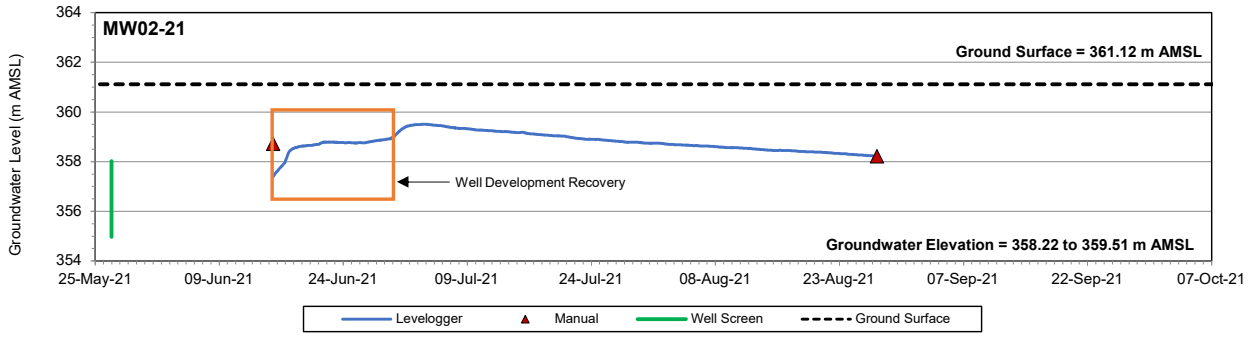


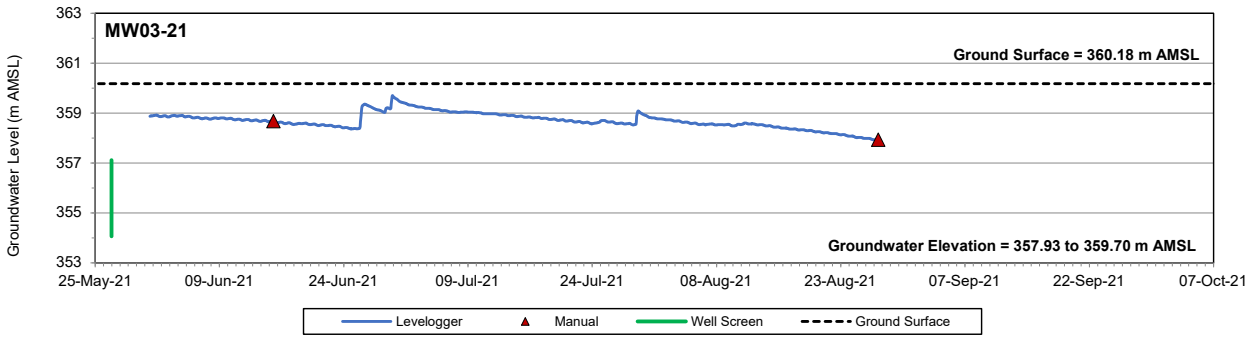
Precipitation and temperature data obtained from Environment Canada for the Kitchener/Waterloo Climate Station (Station ID 6144239), accessed September 2021

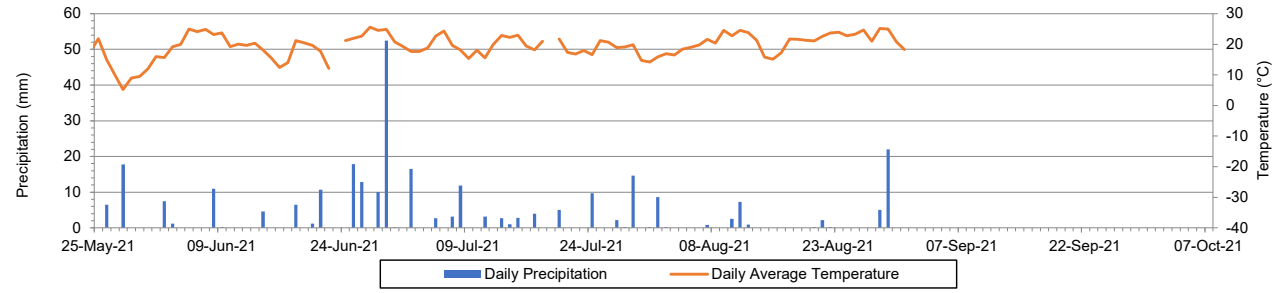
Stantec

Project:	Stroh Lands, Wellesley, Ontario Hydrogeological Assessment
Figure:	**7**
Title:	**HYDROGRAPHS - MONITORING WELLS**









Notes:

1) Precipitation and temperature data obtained from Environment Canada for the Kitchener/Waterloo Climate Station (Station ID 6144239), accessed September 2021.

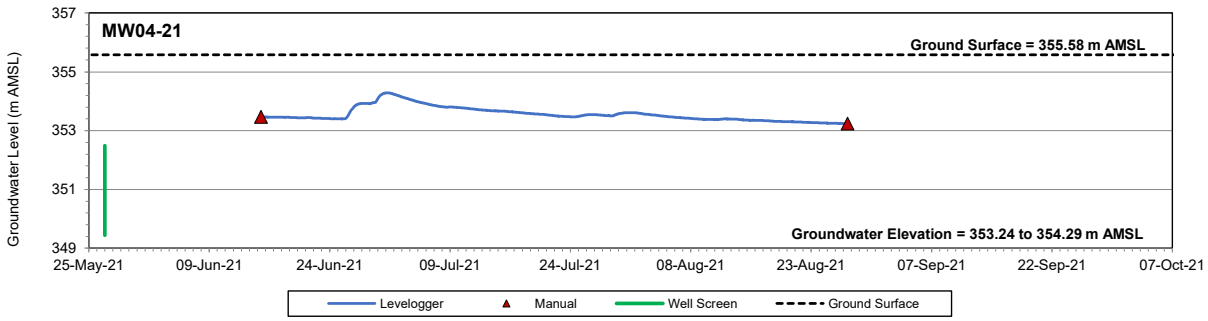
2) Data enclosed in orange boxes not included in groundwater elevation ranges.

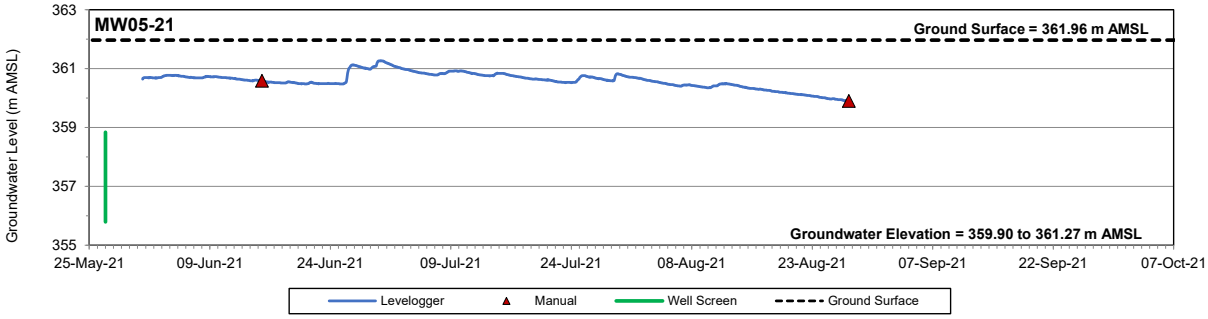
Stantec

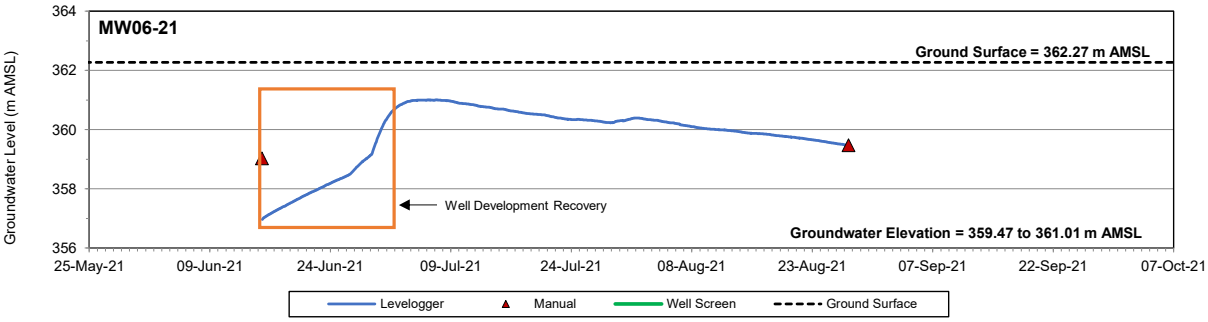
Client/Project
Strohvest Ontario Inc.
Hydrogeological Assessment
Stroh Lands, Wellesley, Ontario

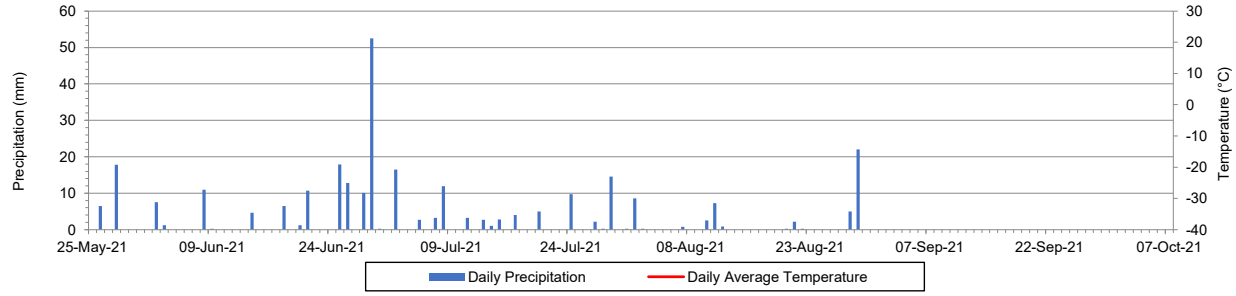
Figure No.
8

Title **HYDROGRAPHS**
MW01-21, MW02-21, and MW03-21









Notes:

1) Precipitation and temperature data obtained from Environment Canada for the Kitchener/Waterloo Climate Station (Station ID 6144239), accessed September 2021.

2) Data enclosed in orange boxes not included in groundwater elevation ranges.

Stantec

Client/Project
Strohvest Ontario Inc.
Hydrogeological Assessment
Stroh Lands, Wellesley, Ontario

Figure No.
9

Title **HYDROGRAPHS**
MW04-21, MW05-21, and MW06-21

A
SOUTHWEST

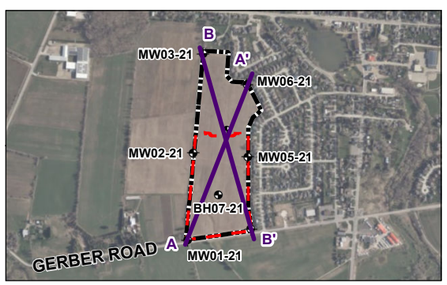
A'
NORTHEAST

Elevation (mAMSL)

Subject Lands

MW01-21(OS - 3 m)
BH07-21(OS - 54 m)
MW02-21(OS - 108 m)
MW05-21(OS - 110 m)
BH08-21(OS - 11 m)
MW06-21(OS - 2 m)

SANDY SILT TOPSOIL FILL
SILTY SAND FILL
SANDY SILT TOPSOIL
SILTY SAND
SILTY CLAY TILL
SANDY SILT TOPSOIL FILL
SANDY SILT FILL
SANDY SILT
CLAYEY SILT TILL
CLAY TILL
SANDY SILT TOPSOIL FILL
SANDY SILT FILL
SILTY SAND FILL
CLAYEY SILT TILL
CLAY TILL
SANDY SILT TOPSOIL
SANDY SILT TILL
CLAY WITH SAND TILL
SILTY SAND
CLAY TILL
SILTY SAND
SANDY SILT TOPSOIL
CLAYEY SILT TILL
SILT TILL
SILTY SAND
CLAYEY SILT TILL
CLAY TILL
SANDY SILT TOPSOIL FILL
SANDY SILT FILL
SANDY SILT
CLAYEY SILT TILL
CLAY TILL



MW1-15 (OS m)
Sand

Well ID (Offset)
Stratigraphy
Water Level (June 15, 2021)
Well Screen

Fill / Topsoil
Silty Sand / Sandy Silt / Silt
ATB1 - Mornington Till (Silty Clay Till) and/or Stratford Till (Sandy Silt Till) - Aquitard 1

Surficial Geology
5d: Glaciolacustrine-derived silty to clayey till (Mornington Till)
5b: Stone-poor, carbonate-derived silty to sandy till (Stratford Till)

10x Vertical Exaggeration
0 40 80 metres

1:2,500 (At original document size of 11x17)

Notes
1. Groundwater elevations shown measured by Stantec personnel on June 15, 2021.

Stantec

Project Location
Township of Wellesley

161413217 REVA
Prepared by pmoser on 2021-09-22
Technical Review by GW on 2021-09-22

Client/Project
STROHVEST ONTARIO INC.
STROH LANDS, WELLESLEY, ONTARIO
HYDROGEOLOGICAL ASSESSMENT

Figure No.
10

Title
Cross-Section A-A'

B
NORTHWEST

B'
SOUTHEAST

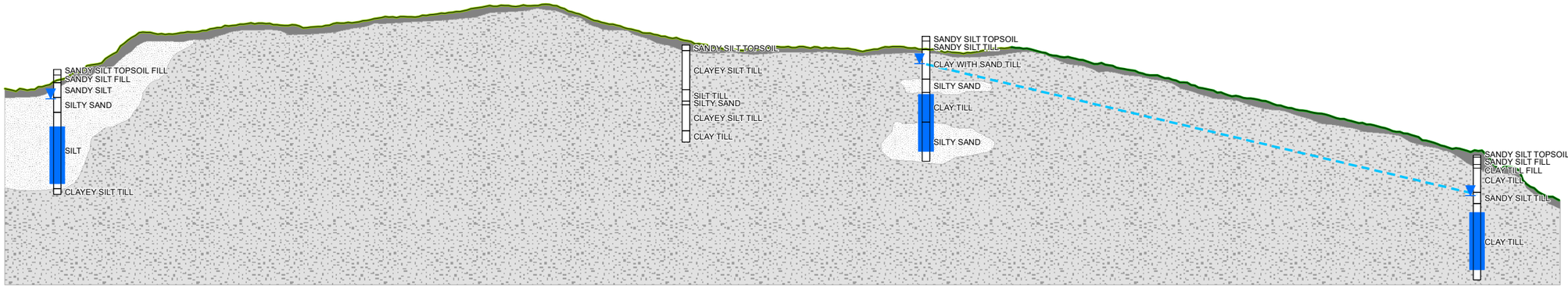
Subject Lands

MW03-21(OS - 6 m)

BH08-21(OS - 15 m)

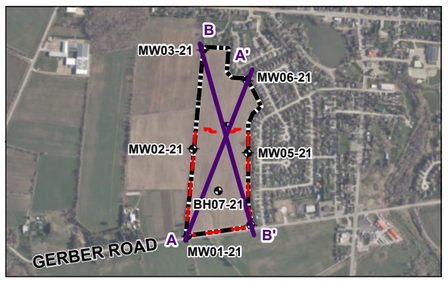
MW05-21(OS - 69 m)

MW04-21(OS - 1 m)



Elevation (mAMSL)

382 380 378 376 374 372 370 368 366 364 362 360 358 356 354 352 350 348 346 344 342 340



MW1-15 (OS m)

Sand

Well ID (Offset)

Stratigraphy

Water Level
(June 15, 2021)

Well Screen

Fill / Topsoil

Silty Sand / Sandy Silt / Silt

ATB1 - Mornington Till (Silty Clay Till) and/or
Stratford Till (Sandy Silt Till) - Aquitard 1

Interpreted Water Table

Surficial Geology

5d: Glaciolacustrine-derived silty to clayey till
(Mornington Till)

5b: Stone-poor, carbonate-derived silty to sandy till
(Stratford Till)

10x Vertical Exaggeration

0 40 80 metres

1:2,500 (At original document size of 11x17)

Notes

1. Groundwater elevations shown measured by Stantec personnel on June 15, 2021.

Stantec

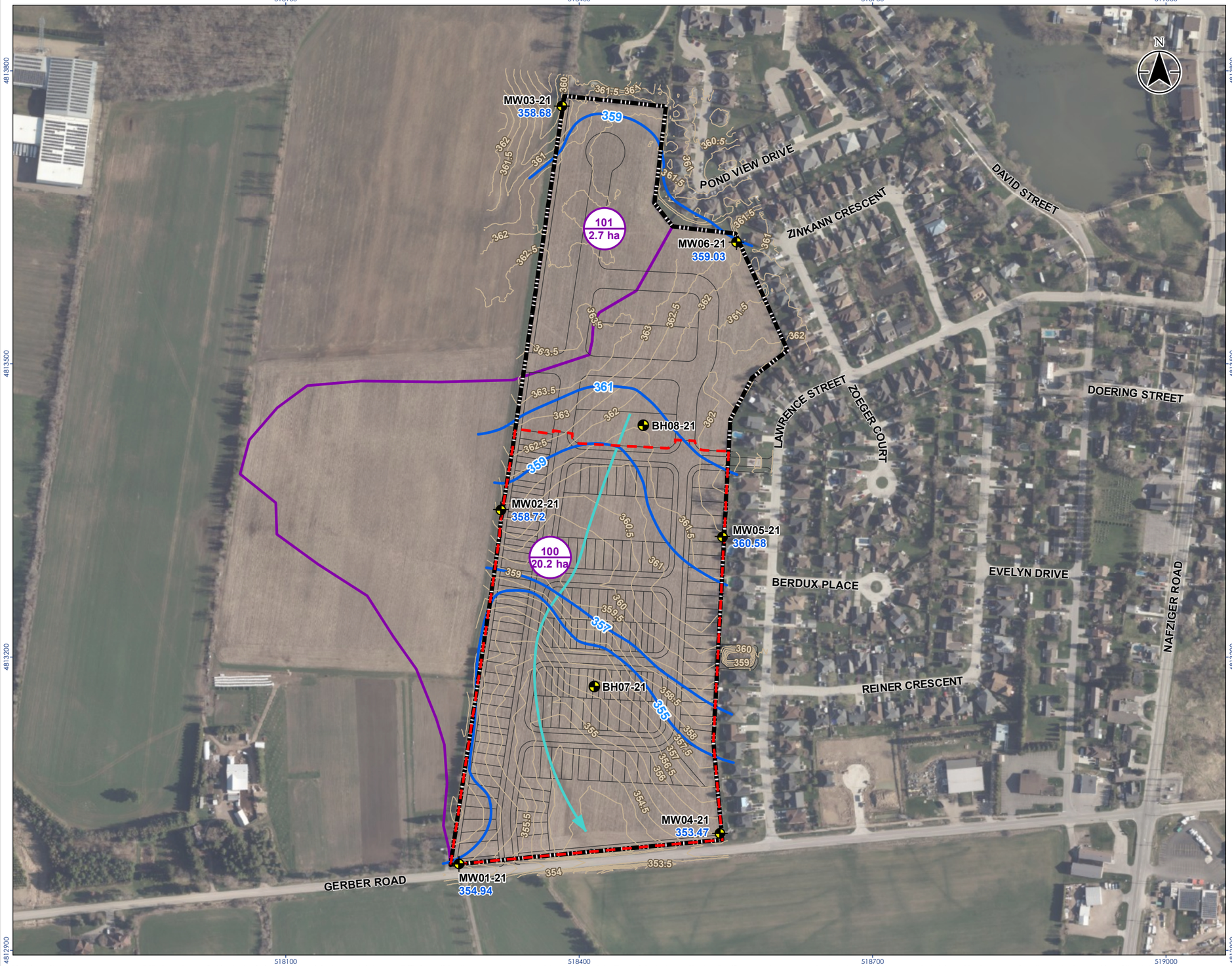
Project Location
Township of Wellesley

161413217 REVA
Prepared by pmoser on 2021-09-22
Technical Review by GW on 2021-09-22

Client/Project
STROHVEST ONTARIO INC.
STROH LANDS, WELLESLEY, ONTARIO
HYDROGEOLOGICAL ASSESSMENT

Figure No.
11

Title
Cross-Section B-B'



Stantec

Legend

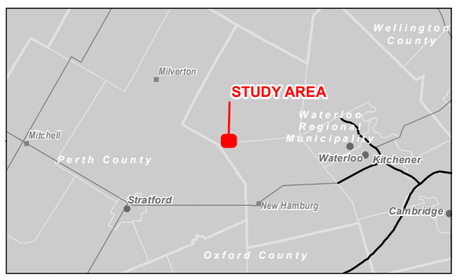
- Subject Lands
- Boundary of Lands Owned by the Applicant (Strohvest Ontario Inc.)
- Monitoring Well (Stantec, 2021)
- Borehole (Stantec, 2021)
- Proposed Development Plan
- 358.54 Groundwater Elevation - June 15, 2021
- Groundwater Contour (m AMSL)
- Interpreted Direction of Groundwater Flow
- Topographic Contour (m AMSL)
- Stormwater Catchment (Existing Conditions)

0 100 200 m

1:4,000 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2021.
3. Orthoimagery © First Base Solutions, 2021. Imagery Date, 2020.



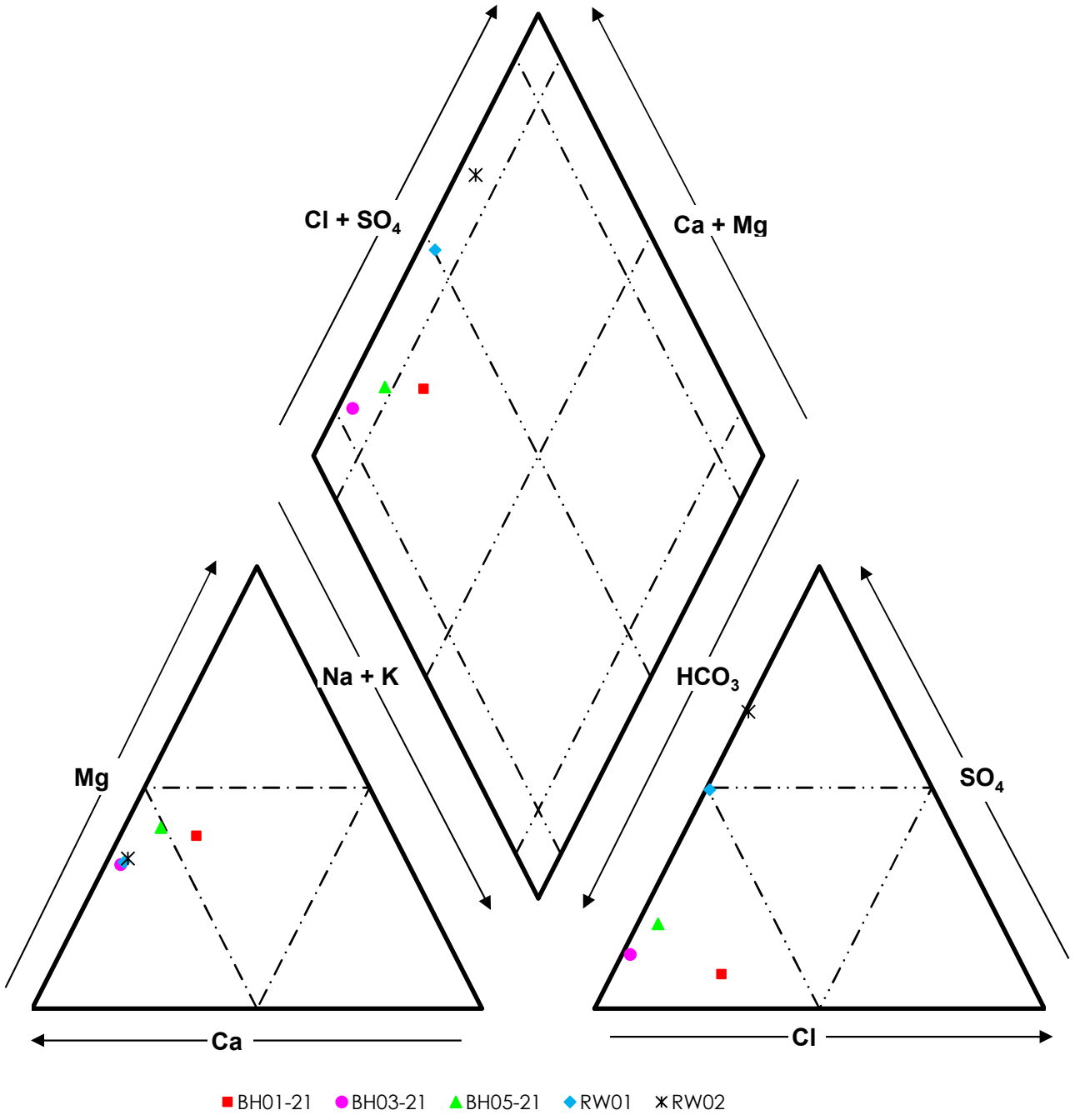
Project Location
Township of Wellesley

161413217 REVA
Prepared by CMC on 2021-09-21
Technical Review by BCC on 2021-02-03

Client/Project
STROHVEST ONTARIO INC.
STROH LANDS, WELLESLEY, ONTARIO
HYDROGEOLOGICAL ASSESSMENT

Figure No.
12

Title
Groundwater Flow



Stantec	STROH LANDS, WELLESLEY, ONTARIO HYDROGEOLOGICAL ASSESSMENT			
	PIPER DIAGRAM			
	DATE: September 2021	SCALE:	PROJECT No. 161413217	FIGURE No. 13

APPENDIX C:
Tables

TABLE 1
MONITORING WELL CONSTRUCTION DETAILS

Well ID	UTM Coordinates		Elevations		Well Stick-up (m)	Well Depth (m BTOC)	Well Depth (m BGS)	Well Base Elevation (m AMSL)	Screened Interval				Screened Material Description [a] (% of screened interval)	Probable Hydrostratigraphic Unit	Hydraulic Conductivity [b] (m/s)
	Northing	Easting	Top of Casing (m AMSL)	Ground Surface (m AMSL)					Top Elevation (m BGS)	Top Elevation (m AMSL)	Bottom Elevation (m BGS)	Bottom Elevation (m AMSL)			
MONITORING WELLS															
MW01-21	4812989	518277	357.59	356.75	0.84	6.73	5.89	350.86	2.84	353.91	5.89	350.86	Clay (100%)	ATB1	7.3E-06
MW02-21	4813350	518320	362.03	361.12	0.90	7.06	6.16	354.97	3.11	358.02	6.16	354.97	Clayey Silt (50%), Clay (50%)	ATB1	5.8E-09
MW03-21	4813763	518382	361.02	360.18	0.84	6.97	6.13	354.05	3.08	357.10	6.13	354.05	Silt (100%)	ATB1	1.6E-07
MW04-21	4813019	518544	356.37	355.58	0.79	6.93	6.14	349.44	3.09	352.49	6.14	349.44	Clay (100%)	ATB1	5.4E-09
MW05-21	4813323	518547	362.79	361.96	0.83	7.00	6.17	355.79	3.12	358.84	6.17	355.79	Clay (50%), Silty Sand (50%)	ATB1	9.1E-08
MW06-21	4813624	518561	363.09	362.27	0.82	6.91	6.09	356.18	3.04	359.23	6.09	356.18	Clay (100%)	ATB1	-
													GEOMEAN (Applicant Lands) =		**8.0E-08**
													GEOMEAN (Subject Lands) =		**7.8E-08**

Notes:

(a) Refer to **Appendix G** for borehole and well construction logs
(b) Refer to **Appendix H** for hydraulic conductivity analytical solutions

m AMSL = meters above mean sea level
m BGS = meters below ground surface
m BTOC = meters below top of well casing
- = data not available

TABLE 2
GROUNDWATER LEVEL DATA - MONITORING WELLS

Well ID	Date	Time	Well Depth			Screen Length	Top of Casing Elevation	Ground Surface Elevation	Pipe Stick-up	Groundwater Level		
			(m BTOC)	(m BGS)	(m AMSL)	(m)	(m AMSL)	(m AMSL)	(m)	(m BGS) [1]	(m BTOC)	(m AMSL)
MW01-21	15-Jun-21 27-Aug-21	12:43 PM 12:01 PM	6.73	5.89	350.86	3.05	357.59	356.75	0.84	1.81 2.19	2.65 3.03	354.94 354.56
MW02-21	15-Jun-21 27-Aug-21	12:25 PM 12:20 PM	7.06	6.16	354.97	3.05	362.03	361.12	0.90	2.40 2.91	3.31 3.81	358.72 358.22
MW03-21	15-Jun-21 27-Aug-21	12:18 PM 12:30 PM	6.97	6.13	354.05	3.05	361.02	360.18	0.84	1.50 2.25	2.34 3.09	358.68 357.93
MW04-21	15-Jun-21 27-Aug-21	11:19 AM 12:55 PM	6.93	6.14	349.44	3.05	356.37	355.58	0.79	2.11 2.34	2.90 3.13	353.47 353.24
MW05-21	15-Jun-21 27-Aug-21	11:38 AM 12:47 PM	7.00	6.17	355.79	3.05	362.79	361.96	0.83	1.38 2.06	2.21 2.89	360.58 359.90
MW06-21	15-Jun-21 27-Aug-21	11:44 AM 12:39 PM	6.91	6.09	356.18	3.05	363.09	362.27	0.82	3.24 2.80	4.06 3.62	359.03 359.47

Notes:

(1) A negative value indicates that the water level measured within the pipe is located above ground surface

m BGS = meters below ground surface
m BTOC = meters below top of casing
DRY = no groundwater or surface water was observed in the piezometer or watercourse, respectively
- = measurement not available

TABLE 3
INFILTRATION ESTIMATES

Testing Location ID	Horizontal Hydraulic Conductivity (m/s)	Vertical Hydraulic Conductivity[2] (cm/s)	Vertical Hydraulic Conductivity[2] (m/s)	Infiltration Rate[1] (mm/hr)	Pit Depth (m BGS)	Screened Interval (m BGS)	Soil Substrate Tested (% of screened interval)
In-situ Hydraulic Response Testing							
MW01-21	7.3E-06	7.3E-05	7.3E-07	42	-	2.8 - 5.8	Clay (100%)
MW02-21	5.8E-09	5.8E-08	5.8E-10	6	-	3.1 - 6.1	Clayey Silt (50%), Clay (50%)
MW03-21	1.6E-07	1.6E-06	1.6E-08	16	-	3.1 - 6.1	Silt (100%)
MW04-21	5.4E-09	5.4E-08	5.4E-10	6	-	3.1 - 6.1	Clay (100%)
MW05-21	9.1E-08	9.1E-07	9.1E-09	13	-	3.1 - 6.1	Clay (50%), Silty Sand (50%)
		GEOMEAN =	**8.0E-09**	**13**			

Notes:

(1) Infiltration rate calculated based on established relationship between vertical hydraulic conductivity and infiltration rate presented in *Credit Valley Conservation and Toronto and Region Conservation (2010) Low Impact Stormwater Management Planning and Design Guideline - Version 1.0.*

(2) Vertical hydraulic conductivities assumed to be one order of magnitude lower than in-situ measured horizontal hydraulic conductivities.

TABLE 4
GROUNDWATER QUALITY RESULTS
ONSITE MONITORING WELLS

Sample Location			BH01-21	BH03-21		BH05-21	
Sample Date			27-May-21	27-May-21	27-May-21	27-May-21	27-May-21
Sample ID			BH01-21	BH03-21	BH05-21	QC-01	BH05-21 Lab-Dup
Sampling Company			STANTEC	STANTEC	STANTEC	STANTEC	STANTEC
Laboratory			BV	BV	BV	BV	BV
Laboratory Work Order			C1E5622	C1E5622	C1E5622	C1E5622	C1E5622
Laboratory Sample ID			PRQ479	PRQ480	PRQ481	PRQ482	PRQ481
Sample Type	Units	ODWS				Field Duplicate	Lab Replicate
General Chemistry							
Alkalinity, Carbonate (as CaCO3)	mg/L	n/v	2.8	3.1	2.5	3.2	-
Alkalinity, Total (as CaCO3)	mg/L	30-500[E]	300	380	290	280	-
Anion Sum	me/L	n/v	8.85	8.86	7.54	7.42	-
Bicarbonate(as CaCO3, Calculated)	mg/L	n/v	300	380	280	280	-
Cation Sum	me/L	n/v	8.86	9.26	7.66	7.65	-
Chloride	mg/L	250[C]	76	5.7	12	11	12
Electrical Conductivity, Lab	µmhos/cm	n/v	820	780	680	670	-
Hardness (as CaCO3)	mg/L	80-100[E]	**370[E]**	**450[E]**	**350[E]**	**350[E]**	-
Ion Balance	%	n/v	0.0500	2.22	0.840	1.56	-
Langelier Index (at 20 C)	none	n/v	0.919	1.13	0.868	0.972	-
Langelier Index (at 4 C)	none	n/v	0.671	0.878	0.619	0.724	-
Nitrate (as N)	mg/L	10.0_d[B]	<0.10	<0.10	0.12	<0.10	0.12
Nitrate + Nitrite (as N)	mg/L	10.0_d[B]	<0.10	<0.10	0.12	0.11	0.12
Nitrite (as N)	mg/L	1.0_d[B]	<0.010	<0.010	<0.010	0.015	<0.010
pH, lab	S.U.	6.5-8.5[E]	8.01	7.94	7.96	8.08	-
Saturation pH (at 20 C)	none	n/v	7.09	6.81	7.10	7.10	-
Saturation pH (at 4 C)	none	n/v	7.34	7.06	7.35	7.35	-
Sulfate	mg/L	500_h[C]	33	52	70	68	70
Total Dissolved Solids (Calculated)	mg/L	500[C]	460	470	400	400	-
Total Suspended Solids	mg/L	n/v	1,700	55,000	85,000	59,000	-
Turbidity, Lab	NTU	5_i[C] $_j$[E]	**1,800[C]**	**4,700[C]**	**2,100[C]**	**3,500[C]**	-
Nutrients							
Ammonia (as N)	mg/L	n/v	0.062	0.071	0.097	0.093	-
Dissolved Organic Carbon (DOC)	mg/L	5[C]	0.88	0.90	0.99	1.0	-
Orthophosphate (as P)	mg/L	n/v	<0.010	<0.010	<0.010	<0.010	<0.010
Metals							
Aluminum	mg/L	0.1[E]	<0.0049	0.010	0.021	0.0053	-
Antimony	mg/L	0.006[B]	<0.00050	<0.00050	<0.00050	<0.00050	-
Arsenic	mg/L	0.01[B]	0.0014	0.0012	0.0029	0.0027	-
Barium	mg/L	1[B]	0.13	0.14	0.13	0.13	-
Beryllium	mg/L	n/v	<0.00040	<0.00040	<0.00040	<0.00040	-
Boron	mg/L	5[B]	0.063	0.016	0.029	0.029	-
Cadmium	mg/L	0.005[B]	<0.000090	<0.000090	<0.000090	<0.000090	-
Calcium	mg/L	n/v	78	120	78	77	-
Chromium	mg/L	0.05[B]	<0.0050	<0.0050	<0.0050	<0.0050	-
Cobalt	mg/L	n/v	<0.00050	0.00074	<0.00050	<0.00050	-
Copper	mg/L	1[C]	<0.00090	<0.00090	<0.00090	<0.00090	-
Iron	mg/L	0.3[C]	<0.10	<0.10	<0.10	<0.10	-
Lead	mg/L	0.01[B]	<0.00050	<0.00050	<0.00050	<0.00050	-
Magnesium	mg/L	n/v	42	37	38	38	-
Manganese	mg/L	0.05[C]	**0.052[C]**	**0.065[C]**	0.046	0.043	-
Molybdenum	mg/L	n/v	0.0042	0.0012	0.0034	0.0036	-
Nickel	mg/L	n/v	<0.0010	<0.0010	<0.0010	<0.0010	-
Phosphorus	mg/L	n/v	<0.10	<0.10	<0.10	<0.10	-
Potassium	mg/L	n/v	2.4	1.7	2.0	2.0	-
Selenium	mg/L	0.05[B]	<0.0020	<0.0020	<0.0020	<0.0020	-
Silicon	mg/L	n/v	7.3	8.0	8.7	8.5	-
Silver	mg/L	n/v	<0.000090	<0.000090	<0.000090	<0.000090	-
Sodium	mg/L	200_g[C] 20_g[D]	**33[D]**	5.7	13	14	-
Strontium	mg/L	n/v	1.0	0.36	0.52	0.53	-
Thallium	mg/L	n/v	<0.000050	<0.000050	<0.000050	<0.000050	-
Titanium	mg/L	n/v	<0.0050	<0.0050	<0.0050	<0.0050	-
Uranium	mg/L	0.02[B]	0.0017	0.0011	0.0027	0.0028	-
Vanadium	mg/L	n/v	<0.00050	0.00053	<0.00050	<0.00050	-
Zinc	mg/L	5[C]	<0.0050	<0.0050	<0.0050	<0.0050	-

Notes:

ODWS	Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines (MOE, 2006), in support of O.Reg 169/03 (January 1, 2018)
A	Schedule 1 - Microbiological Standards (expressed as a maximum)
B	Schedule 2 - Chemical Standards (expressed as a maximum acceptable concentration)
C	ODWS Table 4 - Chemical/Physical Objectives and Guidelines, Aesthetic Objectives
D	ODWS Table 4 - Medical Officer of Health Reporting Limit
E	ODWS Table 4 - Chemical/Physical Objectives and Guidelines, Operational Guidelines
6.5[A]	Concentration exceeds the indicated standard.
15.2	Measured concentration did not exceed the indicated standard.
<0.50	Laboratory reporting limit was greater than the applicable standard.
<0.03	Analyte was not detected at a concentration greater than the laboratory reporting limit.
n/v	No standard/guideline value.
-	Parameter not analyzed / not available.
d	Where both nitrate and nitrite are present, the total of the two should not exceed 10 mg/L (as nitrogen).
g	The aesthetic objective for sodium in drinking water is 200 mg/L. The local Medical Officer of Health should be notified when the sodium concentration exceeds 20 mg/L so that this information may be communicated to local physicians for their use with patients on sodium restricted diets.
h	When sulfate levels exceed 500 mg/L, water may have a laxative effect on some people.
i	Applicable for all waters at the point of consumption.
j	The operational guidelines for filtration processes are provided as performance criteria in the Procedure for Disinfection of Drinking Water in Ontario.

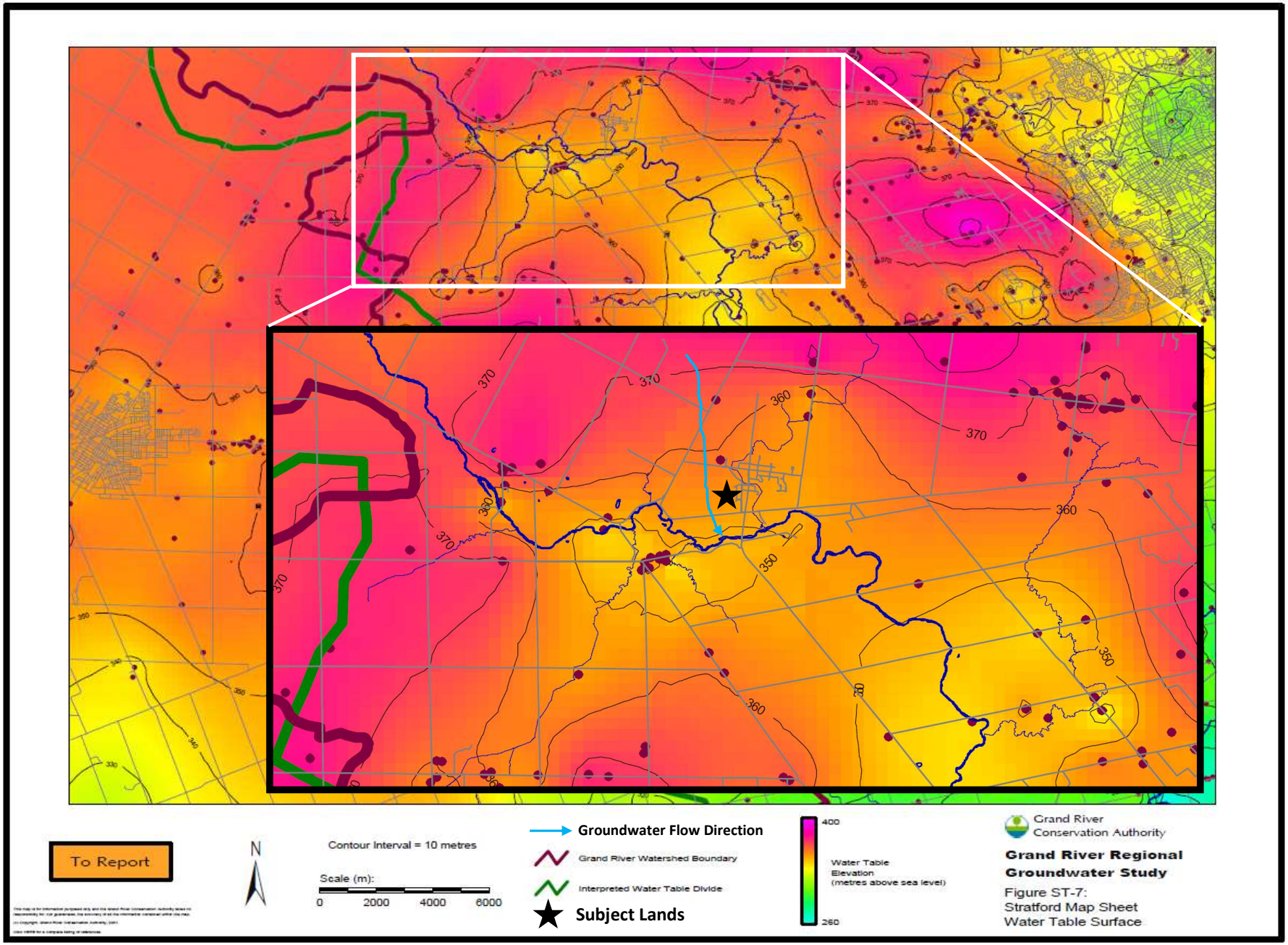
TABLE 5
GROUNDWATER QUALITY RESULTS
OFFSITE PRIVATE WELLS

Sample Location			RW01	RW02	
Sample Date			15-Jun-21	6-Aug-21	6-Aug-21
Sample ID			RW01	RW02	RW02 Lab-Dup
Sampling Company			STANTEC	STANTEC	STANTEC
Laboratory			BV	BV	BV
Laboratory Work Order			C1G5523	C1M2547	C1M2547
Laboratory Sample ID			PVV199	QHU792	QHU792
Sample Type	Units	ODWS			Lab Replicate
General Chemistry					
Alkalinity, Carbonate (as CaCO3)	mg/L	n/v	2.1	3.3	-
Alkalinity, Total (as CaCO3)	mg/L	30-500[E]	230	210	-
Anion Sum	me/L	n/v	9.36	13.0	-
Bicarbonate(as CaCO3, Calculated)	mg/L	n/v	230	200	-
Cation Sum	me/L	n/v	8.68	12.3	-
Chloride	mg/L	250[C]	2.7	2.9	-
Electrical Conductivity, Lab	µmhos/cm	n/v	840	1,200	-
Hardness (as CaCO3)	mg/L	80-100[E]	**420[E]**	**580[E]**	-
Ion Balance	%	n/v	3.76	2.50	-
Langelier Index (at 20 C)	none	n/v	0.919	1.21	-
Langelier Index (at 4 C)	none	n/v	0.671	0.958	-
Nitrate (as N)	mg/L	10.0_d[B]	<0.10	<0.10	<0.10
Nitrate + Nitrite (as N)	mg/L	10.0_d[B]	-	-	-
Nitrite (as N)	mg/L	1.0_d[B]	<0.010	<0.010	<0.010
pH, lab	S.U.	6.5-8.5[E]	7.99	8.23	-
Saturation pH (at 20 C)	none	n/v	7.07	7.03	-
Saturation pH (at 4 C)	none	n/v	7.32	7.28	-
Sulfate	mg/L	500_h[C]	220	420	-
Total Dissolved Solids (Calculated)	mg/L	500[C]	**530[C]**	**780[C]**	-
Total Suspended Solids	mg/L	n/v	<10	15	-
Turbidity, Lab	NTU	5_i[C] $_j$[E]	1.5	**49[C]**	**48[C]**
Microbiological					
E. Coli/Fecal Coliform	cfu/100mL	0[A]	0	0	-
Total Coliform Background	cfu/100mL	n/v	0	-	-
Total Coliforms	cfu/100mL	0[A]	0	0	-
Nutrients					
Ammonia (as N)	mg/L	n/v	0.33	0.065	-
Dissolved Organic Carbon (DOC)	mg/L	5[C]	0.60	0.64	-
Orthophosphate (as P)	mg/L	n/v	<0.010	<0.010	-
Metals					
Aluminum	mg/L	0.1[E]	<0.0049	<0.0049	-
Antimony	mg/L	0.006[B]	<0.00050	<0.00050	-
Arsenic	mg/L	0.01[B]	<0.0010	0.0010	-
Barium	mg/L	1[B]	0.064	0.024	-
Beryllium	mg/L	n/v	<0.00040	<0.00040	-
Boron	mg/L	5[B]	0.024	0.047	-
Cadmium	mg/L	0.005[B]	<0.000090	<0.000090	-
Calcium	mg/L	n/v	110	150	-
Chromium	mg/L	0.05[B]	<0.0050	<0.0050	-
Cobalt	mg/L	n/v	<0.00050	<0.00050	-
Copper	mg/L	1[C]	0.0029	<0.00090	-
Iron	mg/L	0.3[C]	**0.43[C]**	**5.9[C]**	-
Lead	mg/L	0.01[B]	<0.00050	<0.00050	-
Lithium	mg/L	n/v	0.0053	0.0087	-
Magnesium	mg/L	n/v	35	50	-
Manganese	mg/L	0.05[C]	0.013	**0.080[C]**	-
Molybdenum	mg/L	n/v	0.0013	0.0016	-
Nickel	mg/L	n/v	<0.0010	<0.0010	-
Phosphorus	mg/L	n/v	<0.10	<0.10	-
Potassium	mg/L	n/v	1.1	1.4	-
Selenium	mg/L	0.05[B]	<0.0020	<0.0020	-
Silicon	mg/L	n/v	6.8	4.7	-
Silver	mg/L	n/v	<0.000090	<0.000090	-
Sodium	mg/L	200_g[C] 20_g[D]	6.9	11	-
Strontium	mg/L	n/v	35	38	-
Thallium	mg/L	n/v	<0.000050	<0.000050	-
Titanium	mg/L	n/v	<0.0050	<0.0050	-
Uranium	mg/L	0.02[B]	0.00090	0.00016	-
Vanadium	mg/L	n/v	<0.00050	<0.00050	-
Zinc	mg/L	5[C]	0.021	<0.0050	-

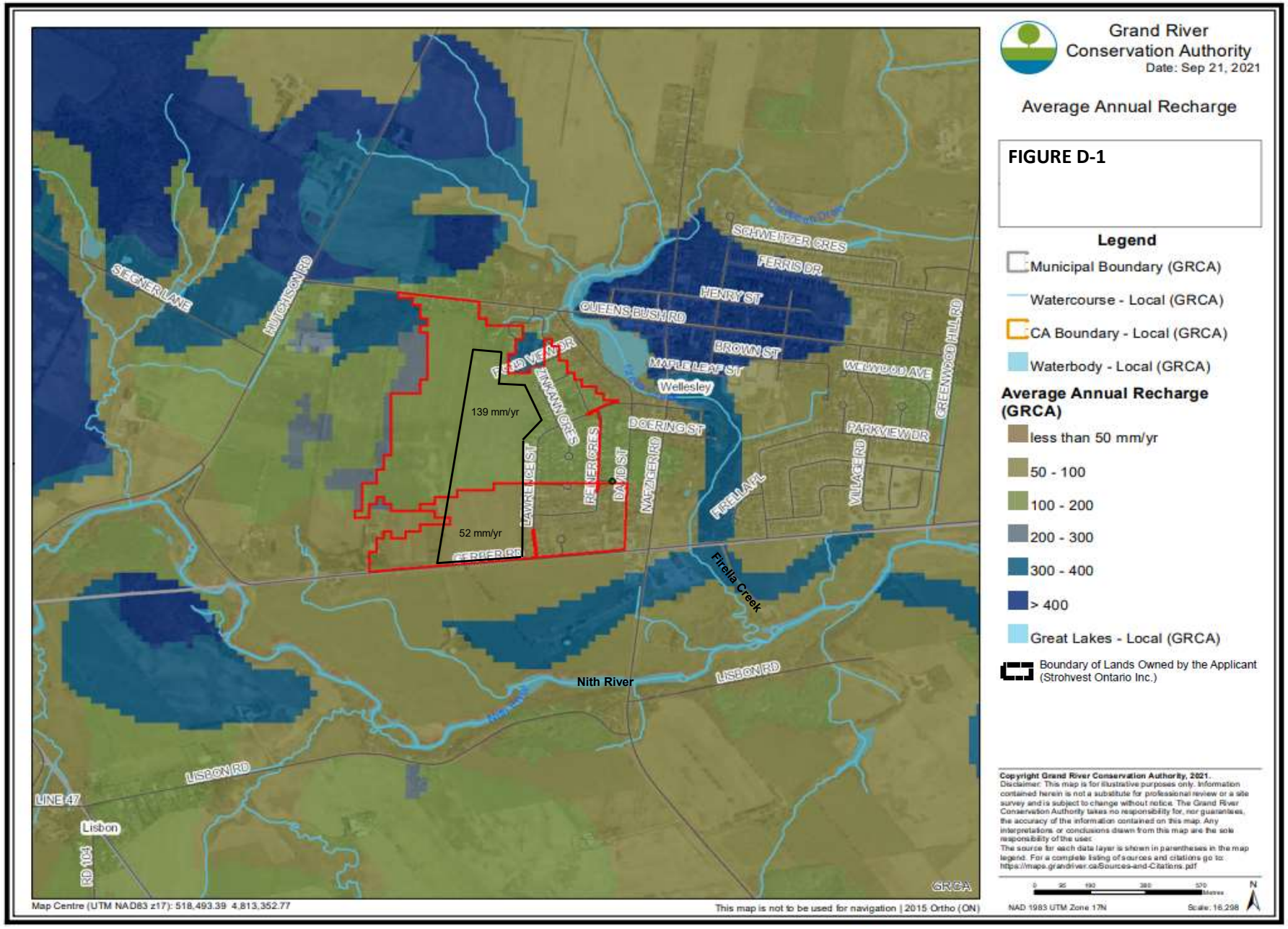
Notes:

ODWS	Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines (MOE, 2006), in support of O.Reg 169/03 (January 1, 2018)
A	Schedule 1 - Microbiological Standards (expressed as a maximum)
B	Schedule 2 - Chemical Standards (expressed as a maximum acceptable concentration)
C	ODWS Table 4 - Chemical/Physical Objectives and Guidelines, Aesthetic Objectives
D	ODWS Table 4 - Medical Officer of Health Reporting Limit
E	ODWS Table 4 - Chemical/Physical Objectives and Guidelines, Operational Guidelines
6.5[A]	Concentration exceeds the indicated standard.
15.2	Measured concentration did not exceed the indicated standard.
<0.50	Laboratory reporting limit was greater than the applicable standard.
<0.03	Analyte was not detected at a concentration greater than the laboratory reporting limit.
n/v	No standard/guideline value.
-	Parameter not analyzed / not available.
d	Where both nitrate and nitrite are present, the total of the two should not exceed 10 mg/L (as nitrogen).
CD g	The aesthetic objective for sodium in drinking water is 200 mg/L. The local Medical Officer of Health should be notified when the sodium concentration exceeds 20 mg/L so that this information may be communicated to local physicians for their use with patients on sodium restricted diets.
h	When sulfate levels exceed 500 mg/L, water may have a laxative effect on some people.
i	Applicable for all waters at the point of consumption.
j	The operational guidelines for filtration processes are provided as performance criteria in the Procedure for Disinfection of Drinking Water in Ontario.

APPENDIX D:
Regional Groundwater Mapping



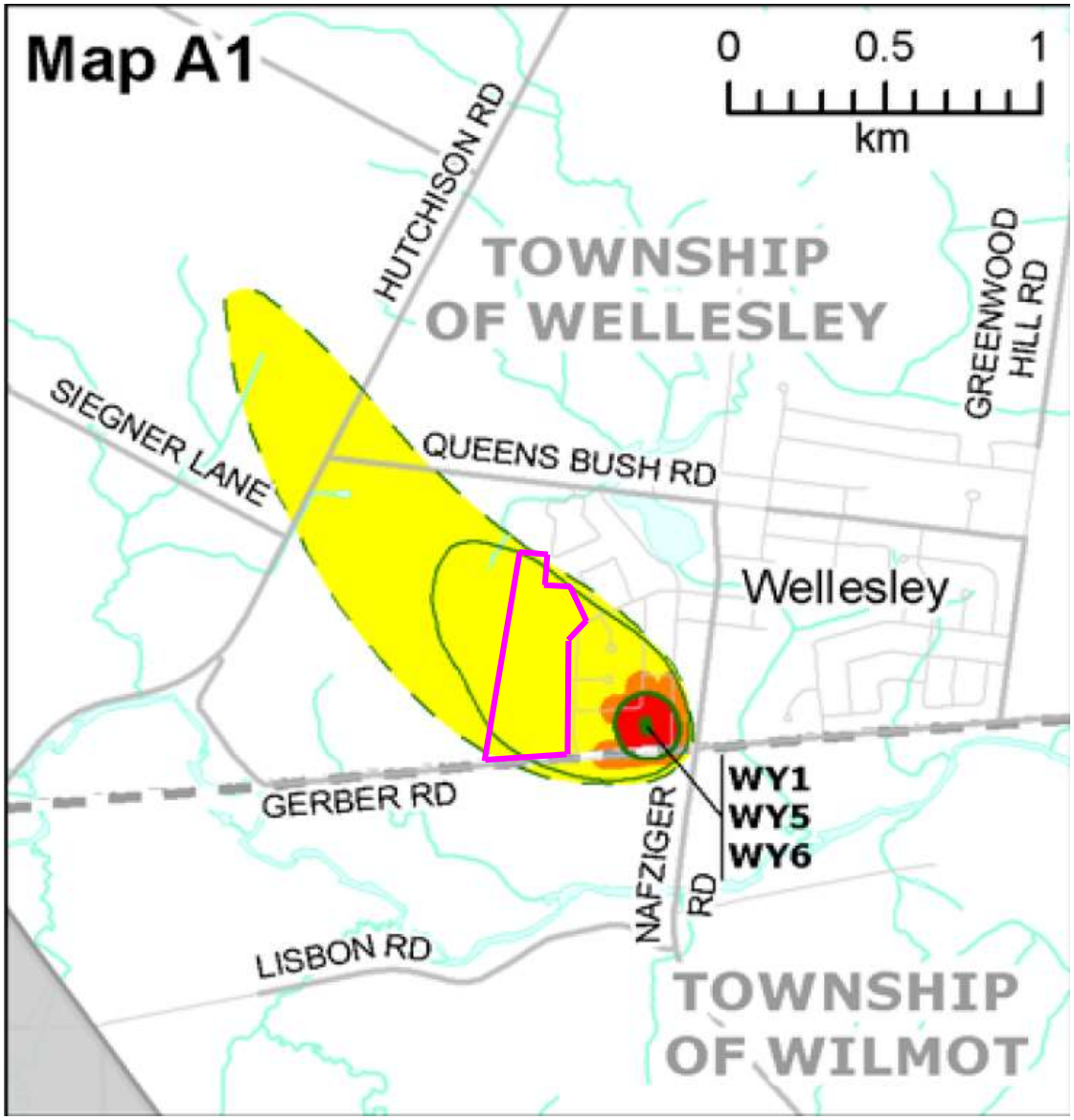
Source: Grand River Conservation Authority. 2001. Grand River Regional Groundwater Study, Technical Report. June 2001.



Source: Grand River Information Network (GRIN). 2021. https://data.grandriver.ca/applications.html.

APPENDIX E:
Source Water Protection Plan Mapping

10.6 Schedule B: Region of Waterloo Groundwater Systems: Map A



DRINKING WATER SOURCE PROTECTION
ACT FOR CLEAN WATER

Significant Drinking Water Threat Policy Applicability

	Significant Drinking Water Threat Policy Categories	Vulnerability Scores on Map: 10	8	2,4,6
1.	Waste Disposal			
2.	Sewage Systems			
3, 4.	Agricultural Source Material			
6, 7.	Non-Agricultural Source Material*			
8, 9.	Commercial Fertilizer*			
10, 11.	Pesticide			
12, 13.	Road Salt*			
14.	Storage of Snow			
15.	Fuel			
16.	DNAPLs			
17.	Organic Solvents			
18.	Aircraft De-icing			
21.	Livestock Area			
22.	Oil Pipelines			

Note: This table provides a summary of the activities listed in the Clean Water Act (2006) that apply as Prescribed Drinking Water Threats (PDWT) within Non-GUDI Wellhead Protection Zones on this map. For details refer to the Drinking Water Threats Tables from the Ministry of the Environment and Climate Change, and the text of this Source Protection Plan.
*Application of Commercial Fertilizer, Non-Agricultural Source Material, and Road Salt may not be a significant drinking water threat in some areas due to the %managed land, livestock density, and/or % impervious surface calculations for these areas. See the text of this plan for further details.

- Well
- Main Road
- Minor River
- Lake / Main River
- Lower Tier Boundary
- Region of Waterloo Boundary

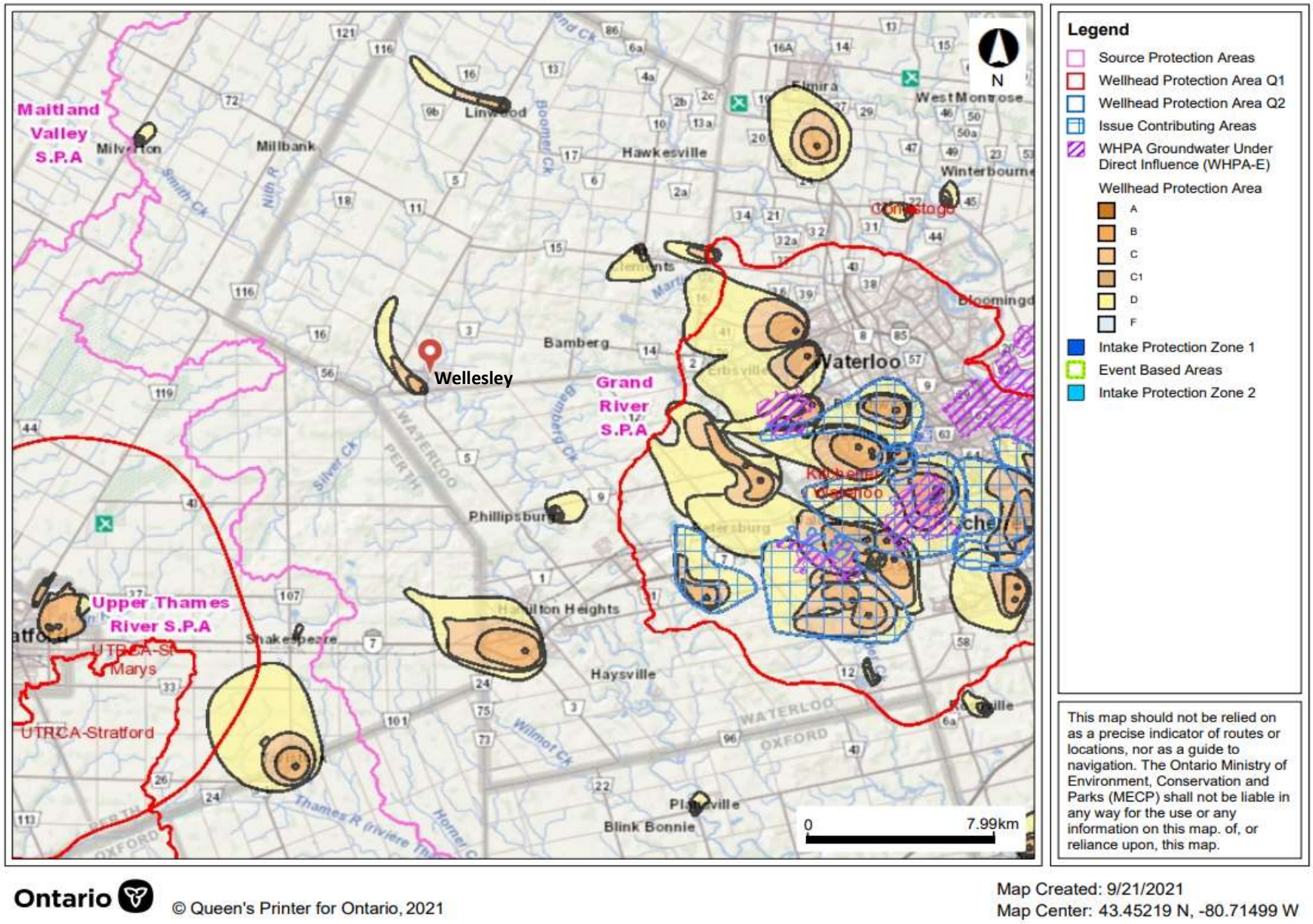
Wellhead Protection Zones:
- WHPA-A
- WHPA-B
- WHPA-C

Grand River Conservation Authority

1. Updated July 24, 2019
2. Larger scale mapping of some map layers, including roads and vulnerability scores, is available at www.sourcewater.ca.
3. This map is for illustrative purposes only. Information contained hereon is not a substitute for professional review or a site survey and is subject to change without notice. The Grand River Conservation Authority takes no responsibility for, nor guarantees, the accuracy of the information contained on this map. Any interpretations or conclusions drawn from this map are the sole responsibility of the user.

Source: (LERSPC) Lake Erie Region Source Protection Committee. 2021b. Grand River Source Protection Area, Draft Updated Source Protection Plan. June 17, 2021.

FIGURE E-1: Water Quantity Vulnerable Areas



Ontario © Queen's Printer for Ontario, 2021

Map Created: 9/21/2021
Map Center: 43.45219 N, -80.71499 W

Source: Ministry of the Environment, Conservation and Parks. 2021b. Source Water Protection Information Atlas. Accessed September 2021. https://www.gisapplication.lrc.gov.on.ca/SourceWaterProtection/Index.html?viewer=SourceWaterProtection.SWPViewer&locale=en-US

APPENDIX F:
Region of Waterloo Source Water Protection Land Use Categories

Schedule B: Source Water Protection Land Use Categories

Category 'A'

- Waste treatment and disposal facilities, including lagoons, landfills, communal/municipal sewage treatment facilities and including large sewage vaults at sewage pumping stations, but not including facilities regulated under the Nutrient Management Act.
- Salvage yards, including automobile wrecking yards or premises
- Bulk storage of hazardous chemicals and hazardous substances (as listed in O.Reg. 347 under the Environmental Protection Act), including bulk storage of oil, gasoline or petroleum products, and including transportation terminals for these substances/chemicals (including truck/trailer/container parking, washing or cleaning depots)

Category 'B'

- Bulk storage of road salt and snow disposal sites
- Primary metal manufacturing, including iron and steel mills and ferro-alloy manufacturing; steel product manufacturing from purchased steel; alumina and aluminum production and processing; non-ferrous metal production and processing; and foundries
- Manufacturing of fabricated metal products, including manufacturing of unfinished metal products and metal finishing operations
- Manufacturing and assembly of transportation equipment, including motor vehicles and parts, aerospace products and parts, rail cars, ships and boats
- Manufacturing of machinery, including agricultural, commercial, industrial, and other machinery
- Chemical manufacturing including chemicals; resins; fertilizers, pesticides and other agricultural chemicals; pharmaceutical and medicines; paint, coating and adhesives; inks and other chemicals but excluding soap and cleaning compound manufacturing. Including manufacturing, packaging, repackaging, and bottling. Excludes uses involving bulk storage of hazardous materials which are included under Category 'A'
- Manufacturing of petroleum and coal products, including manufacturing of asphalt materials. Excludes uses involving bulk storage of hazardous materials which are included under Category 'A'
- Manufacturing of electronic components such as semiconductors, printed circuit boards, and cathode ray tubes
- Manufacturing of electrical equipment, appliances and components
- Commercial or industrial dry cleaning of textiles and textile products, excluding depots not performing on-site dry cleaning
- Manufacturing of leather and allied products including footwear
- Wood and wood product preservation and treatment
- Gasoline stations and other retail establishments with gasoline sales
- Wholesale/distributing of cleaning products, pesticides, herbicides, fungicides and chemicals

Category 'C'

- Manufacturing of rubber products
- Manufacturing of soap, cleaning compounds and toilet preparations
- Textile and fabric finishing and fabric coating
- Manufacturing of plastic products
- Manufacturing of wood products including wood furniture, and excluding wood preservation
- Manufacturing of glass and glass products
- Manufacturing of paper and paper products including newsprint and boxes
- Printing and related support activities, excluding business support services such as photocopy services
- Repair and Maintenance of automobiles and automotive machinery, electronic equipment, industrial and commercial machinery, and personal and household goods repair
- Golf courses
- Airports, train and public transit terminals, except terminals with no fuel storage or transfer of shipped goods or materials
- Medical, health and other laboratories (other than clinics generally associated with commercial plazas)
- Miscellaneous manufacturing not included elsewhere, including jewellery, silverware, medical equipment and signs
- Recycling, recovery, or remanufacturing of materials including the collection, processing, manufacturing, or reuse of post-consumer or post-industrial materials, not including recycling or disposal of hazardous materials, and not including salvage yards or facilities with outdoor operations which are Category 'A' uses

Category 'D'

- Underground parking garages
- *Geothermal wells*
- *Mineral aggregate operations* including *wayside pits and quarries*

Schedule C: Other information and materials that may be required to process an application

Digital Plans

- Subdivision/Condominium Plan(s)

Cultural

- *Archaeological Assessment*
- *Cultural Heritage Impact Assessment*

Environmental

- Aggregate/Mineral Resource Analysis
- Local Air Quality Study

- Salt Impact Assessment
- Salt Management Plans
- Cut & Fill Analysis
- *Environmental Impact Statement*
- Comprehensive *Environmental Impact Statement*
- Natural Habitat Inventory
- Environmental Management Plan
- Tree Conservation and Planting Plans
- *Provincial and Federal Requirements* for *Fish Habitat*
- Slope Stability Study and Report
- Floodline Delineation Study/Hydraulics Study
- Hydrologic and Hydrogeologic Studies
- Source Water Protection Studies
- Best Management Practices for development within the Regional Recharge Area
- Best Management Practices (for golf courses)
- Environmental Site Assessment and/or Record of Site Condition
- *Cumulative Impact* Assessment
- Site Plan, Spill Protection Measures and other Best Management Practices for *Mineral Aggregate Operations*
- Final Rehabilitation Plan (for *mineral aggregate operations*)

Construction, Servicing and Infrastructure

- Preliminary Grading Plan
- Preliminary Stormwater Management Report/Plan and/or update to an existing Stormwater Management Plan
- Soils/Geotechnical Study
- Construction Methods and Spills Protection Measures
- Servicing Options Report
- Development Phasing Plan
- Water and Wastewater Servicing Plans and associated studies
- Hydrogeologic Studies for Privately Serviced Developments
- Impact on Existing Infrastructure Study

Land Use Compatibility

- Air Quality Assessment
- Dust Impact Analysis
- Land Use Compatibility Study
- Landfill Impact Study
- Agricultural Impact Assessment
- *Minimum Distance Separation*
- Noise Study
- Odour Impact Assessment
- Vibration Study
- Written Provincial approval (pursuant to the Environmental Protection Act for development within former waste management facilities)

- *Provincial and Federal Requirements* for *Alternative and/or Renewable Energy Systems* and *Fish Habitat*
- Approval from the Grand River Conservation Authority

Planning

- Affordable Housing Report/Rental Conversion Assessment
- Detailed Property Assessment of Affordable Rental Housing
- Farm Viability Study
- Planning Report
- Land Use Study for Retail/Commercial Land Uses in Support of the Planned Community Structure or Retail/Commercial Impact Analysis
- Retail Commercial Market Impact Study
- Urban Design Report/Brief

Transportation

- Transportation Impact Study
- Transportation System Impact Study
- Parking Analysis
- *Pedestrian* Route and Sidewalk Analysis
- Roundabout Feasibility Analysis
- Traffic Calming Options Report
- Transit Assessment
- Transportation Demand Management Options Report
- Provincial Requirements and Permits under the Public Transportation Act and Highway Improvements Act
- Environmental Assessment and Other Appropriate Studies for development adjacent to Proposed Regional and Provincial Corridors

APPENDIX G:
Borehole Logs

Stantec

BOREHOLE RECORD

N: 4 812 989 E: 518 277

BH/MW01-21

CLIENT Strohvest Ontario Inc. PROJECT No. 161413217

LOCATION Stroh Properties, Wellesley DATUM

DATES: BORING May 6, 2021 WATER LEVEL June 15, 2021 TPC ELEVATION

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	DEPTH (ft)	TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)
0	356.7	**Edge of Plowed Field**	0				
	356.6	Dark brown to black, sandy silt topsoil FILL - moist	1	SS	1	610/610	7
	356.4	Brown, silty sand FILL	2				
1		Dark brown to black, sandy silt TOPSOIL - moist	3	SS	2	100/610	10
	355.2		4				
	355.1	Compact, brown, silty SAND (SM) - wet - slightly dilatant	5				
2			6	SS	3	610/610	15
		Hard to very stiff, brown, silty CLAY (CL) TILL - trace sand and gravel - DTPL to APL	7				
			8	SS	4	610/610	19
3		- grey below 3.1 m BGS	9				
			10				
			11	SS	5	610/610	11
4			12				
			13				
			14				
			15				
			16	SS	6	460/610	19
5		- coarse grained sand and gravel seam/layer, saturated	17				
			18				
			19				
6			20				
			21	SS	7	510/610	12
	350.0		22				
7		Borehole terminated at 6.7 m BGS. 50 mm diameter PVC well installed with 3.1 m screen across 3.1 - 6.1 m BGS. Sand from 6.1 m up to 2.7 m, and bentonite from 2.7 m to 0.3 m BGS. Concrete and above ground casing. MECP Well Tag # A313918	23				
			24				
			25				
8			26				
			27				

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

10 20 30 40 50 60 70 80 90 100

REMARKS & GRAIN SIZE DISTRIBUTION (%)

GR SA SI CL

2 8 55 35

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

N: 4 813 350 E: 518 320

BH/MW02-21

CLIENT Strohvest Ontario Inc. PROJECT No. 161413217

LOCATION Stroh Properties, Wellesley DATUM

DATES: BORING May 5, 2021 WATER LEVEL June 15, 2021 TPC ELEVATION

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)
0	**361.1**	**Grassed**			0				
	360.8	Dark brown, sandy silt topsoil FILL - wet			1	SS	1	610/610	5
		Brown, sandy silt FILL - trace gravel			2				
1	360.2	- wet			3	SS	2	610/610	5
	359.9	Brown, silty sand FILL - some gravel - saturated			4				
		Very stiff to hard, brown, clayey SILT (CL-ML) TILL - some to trace gravel - APL to DTPL			5				
2					6	SS	3	610/610	13
					7				
					8	SS	4	610/610	14
3					9				
					10				
					11	SS	5	610/610	14
		- grey below 3.5 m BGS			12				
4					13				
	356.6				14				
		Very stiff to stiff, grey, CLAY (CL) TILL - trace gravel - occasional cobbles and boulders - APL			15				
					16	SS	6	610/610	16
5					17				
					18				
					19				
6					20				
					21	SS	7	610/610	11
	354.4	- wet gravelly pocket			22				
		Borehole terminated at 6.7 m BGS. 50 mm diameter PVC well installed with 3.1 m screen across 3.1 - 6.1 m BGS. Sand from 6.1 m up to 2.7 m, and bentonite from 2.7 m to 0.3 m BGS. Concrete and above ground casing. MECP Well Tag # A313723			23				
7					24				
					25				
					26				
8					27				

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

N: 4 813 763 E: 518 382

BH/MW03-21

CLIENT Strohvest Ontario Inc. PROJECT No. 161413217

LOCATION Stroh Properties, Wellesley DATUM

DATES: BORING May 5, 2021 WATER LEVEL June 15, 2021 TPC ELEVATION

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	DEPTH (ft)	TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)
0	360.2	**Grassed**	0				
	359.9	Dark brown, sandy silt topsoil FILL - some clay, trace gravel - wet	1	SS	1	610/610	7
	359.4	Brown, sandy silt FILL - some clay, trace gravel - wet	2 3	SS	2	610/610	9
1	358.7	Loose, mottled brown, sandy SILT (ML) - trace to some clay - wet	4 5 6	SS	3	610/610	16
	357.9	Compact, brown, silty SAND (SM) - wet - very stiff, brown, sandy silt, some clay layers, APL	7 8	SS	4	510/610	18
2		Compact, brown to grey, SILT (ML) - trace sand and clay - wet - slightly dilatant - grey below 3.4 m BGS - very stiff, grey, clayey silt layer, APL	9 10 11	SS	5	610/610	16
3			12 13				
4			14 15 16	SS	6	560/610	24
5		- slightly dilatant seam	17 18 19				
6	353.8		20 21	SS	7	610/610	21
	353.5	Very stiff, grey, clayey SILT (CL-ML) TILL - DTPL	22				
7		Borehole terminated at 6.7 m BGS. 50 mm diameter PVC well installed with 3.1 m screen across 3.1 - 6.1 m BGS. Sand from 6.1 m up to 2.7 m, and bentonite from 2.7 m to 0.3 m BGS. Concrete and above ground casing. MECP Well Tag # A069634	23 24 25				
8			26 27				

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m

STANDARD PENETRATION TEST, BLOWS/0.3m

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

0 2 91 7

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

N: 4 813 019 E: 518 544

BH/MW04-21

CLIENT Strohvest Ontario Inc. PROJECT No. 161413217

LOCATION Stroh Properties, Wellesley DATUM

DATES: BORING May 6, 2021 WATER LEVEL June 15, 2021 TPC ELEVATION

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION
0	355.6	**Grassed**
		Dark brown, sandy silt topsoil FILL - moist
	355.0	Dark brown, sandy silt FILL
	354.8	- moist
1		Brown, clay till FILL - trace gravel - DTPL
		Hard, brown, CLAY (CL) TILL - trace sand and gravel - occasional silt seams
2	353.6	- APL to DTPL
	353.0	Compact, brown, sandy SILT (ML) TILL - trace to some clay - some gravel - wet - 100 mm thick silty sand and gravel seam, saturated
3		Hard to very stiff, brown, CLAY (CL) TILL - trace gravel - DTPL to APL - some silt seams - grey below 3.1 m BGS
4		
5		
6		- WTPL
	348.9	
7		Borehole terminated at 6.7 m BGS. 50 mm diameter PVC well installed with 3.1 m screen across 3.1 - 6.1 m BGS. Sand from 6.1 m up to 2.7 m, and bentonite from 2.7 m to 0.3 m BGS. Concrete and above ground casing.MECP Well Tag # A074962
8		

STRATA PLOT

WATER LEVEL

DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)
0				
1	SS	1	460/610	4
2				
3	SS	2	560/610	15
4				
5				
6	SS	3	560/610	9
7				
8	SS	4	460/610	12
9				
10				
11	SS	5	610/610	12
12				
13				
14				
15				
16	SS	6	610/610	15
17				
18				
19				
20				
21	SS	7	410/610	10
22				
23				
24				
25				
26				
27				

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

N: 4 813 323 E: 518 547

BH/MW05-21

CLIENT Strohvest Ontario Inc. PROJECT No. 161413217

LOCATION Stroh Properties, Wellesley DATUM

DATES: BORING May 6, 2021 WATER LEVEL June 15, 2021 TPC ELEVATION

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	DEPTH (ft)	TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)
0	362.0	**Grassed**	0				
	361.7	Loose, dark brown, sandy silt TOPSOIL - moist	1	SS	1	510/610	8
	361.2	Loose, brown, sandy SILT (ML) TILL - some gravel - trace clay - moist	2				
1			3	SS	2	510/610	15
			4				
		Very stiff to hard, motlled brown, CLAY with Sand (CL) TILL - silty	5				
2			6	SS	3	610/610	23
	359.7	- trace gravel - DTPL to APL - frequent silt seams - occasional silty sand layers	7				
			8	SS	4	610/610	44
3	358.9	Dense, light brown, silty SAND (SM) - moist - occasional clayey pockets	9				
			10				
			11	SS	5	560/610	44
		Hard, grey-brown, CLAY (CL) TILL - DTPL	12				
4			13				
	357.4	- silt seams - silty sand layers	14				
			15				
		Very dense, grey, silty SAND (SM) - moist to wet - slightly dilatant - occasional clayey pockets	16	SS	6	610/610	73
5			17				
			18				
			19				
6			20				
	355.3		21	SS	7	610/610	53
			22				
7		Borehole terminated at 6.7 m BGS. 50 mm diameter PVC well installed with 3.1 m screen across 3.1 - 6.1 m BGS. Sand from 6.1 m up to 2.7 m, and bentonite from 2.7 m to 0.3 m BGS. Concrete and above ground casing. MECP Well Tag # A245818	23				
			24				
			25				
8			26				
			27				

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m

STANDARD PENETRATION TEST, BLOWS/0.3m

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

5 20 51 24

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

N: 4 813 624 E: 518 561

BH/MW06-21

CLIENT Strohvest Ontario Inc. PROJECT No. 161413217

LOCATION Stroh Properties, Wellesley DATUM

DATES: BORING May 5, 2021 WATER LEVEL June 15, 2021 TPC ELEVATION

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WATER LEVEL	DEPTH (ft)	SAMPLES TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)
0	**362.3**	**Grassed**			0				
		Dark brown, sandy silt topsoil FILL - moist			1	SS	1	560/610	8
	361.8				2				
	361.5	Brown, sandy silt FILL - some clay - wet			3	SS	2	610/610	10
1	361.0	Compact, mottled brown, sandy SILT (ML) - some gravel - wet			4				
	360.3				5				
		Very stiff, mottled brown, clayey SILT (CL-ML) TILL - occasional cobbles - DTPL - silty sand layer, wet			6	SS	3	610/610	13
2					7				
					8	SS	4	610/610	15
					9				
		Hard to very stiff, brown, CLAY (CL) TILL - trace sand and gravel - APL - occasional sand seams -grey below 3.4 m BGS		▽	10				
3					11	SS	5	610/610	12
					12				
					13				
4					14				
					15				
		- occasional silt seam - occasional cobbles			16	SS	6	610/610	15
5					17				
					18				
					19				
6					20				
		- stiff			21	SS	7	510/610	9
	355.6				22				
7		Borehole terminated at 6.7 m BGS. 50 mm diameter PVC well installed with 3.1 m screen across 3.1 - 6.1 m BGS. Sand from 6.1 m up to 2.7 m, and bentonite from 2.7 m to 0.3 m BGS. Concrete and above ground casing.MECP Well Tag # A313952			23				
					24				
					25				
8					26				
					27				

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

Stantec

BOREHOLE RECORD

N: 4 813 170 E: 518 415

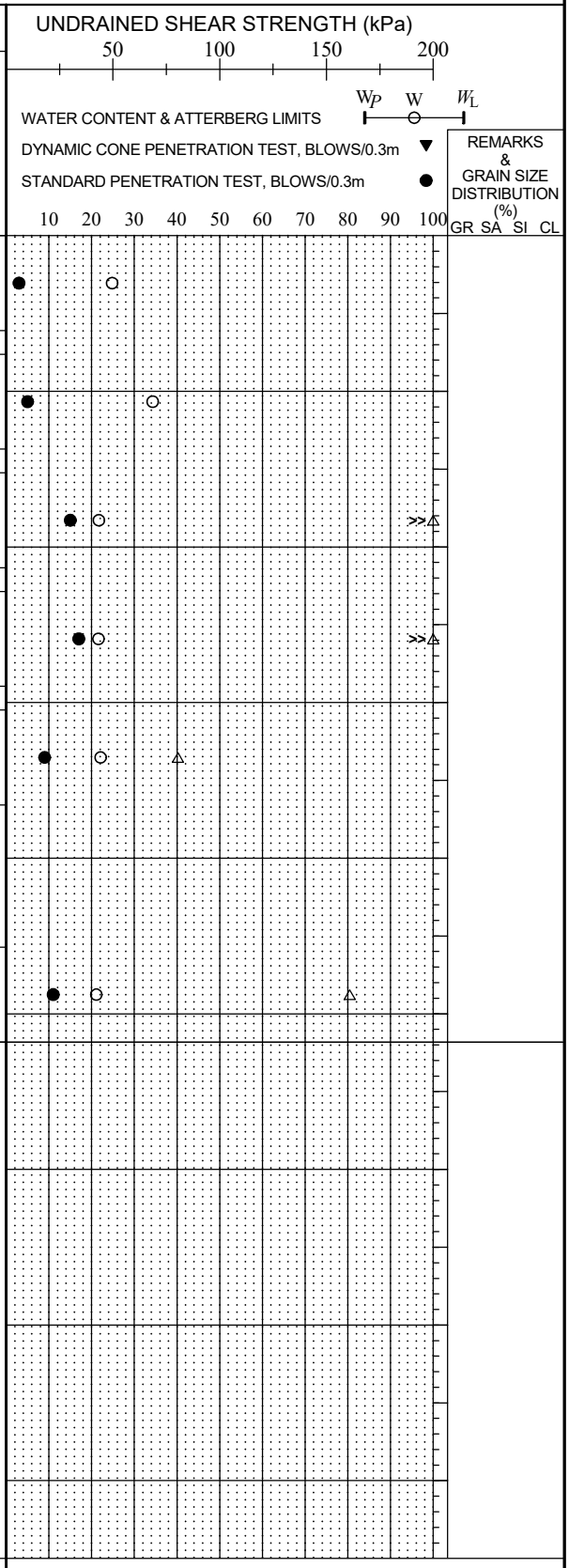
BH07-21

CLIENT Strohvest Ontario Inc. PROJECT No. 161413217

LOCATION Stroh Properties, Wellesley DATUM

DATES: BORING May 5, 2021 WATER LEVEL TPC ELEVATION

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	DEPTH (ft)	TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)
0	356.1	**Plowed Field**	0				
	355.8	Dark brown, sandy silt topsoil FILL - wet	1	SS	1	410/610	3
		Brown, sandy silt FILL - trace gravel - some topsoil inclusions	2				
1	355.2		3	SS	2	510/610	5
	354.9	- wet	4				
	354.6	Loose, brown, sandy SILT (ML) - trace clay and gravel - wet - occasional silty sand seams	5				
2			6	SS	3	610/610	15
		Very stiff, mottled brown, clayey SILT (CL-ML) TILL - APL	7				
			8	SS	4	610/610	17
		Hard to stiff, brown, CLAY (CL) TILL - some gravel - DTPL to APL	9				
3			10				
			11	SS	5	610/610	9
			12				
4			13				
			14				
		- occcasional silt seams, wet	15				
			16	SS	6	610/610	11
5	350.9		17				
		Borehole terminated at 5.2 m BGS. Borehole open and dry. Backfilled with bentonite and cuttings to surface.	18				
6			19				
			20				
			21				
			22				
7			23				
			24				
			25				
			26				
8			27				



Stantec

BOREHOLE RECORD

N: 4 813 437 E: 518 466

BH08-21

CLIENT Strohvest Ontario Inc. PROJECT No. 161413217

LOCATION Stroh Properties, Wellesley DATUM

DATES: BORING May 5, 2021 WATER LEVEL TPC ELEVATION

DEPTH (m)	ELEVATION (m)	STRATA DESCRIPTION	DEPTH (ft)	TYPE	NUMBER	RECOVERY (mm) TCR(%) / SCR(%)	N-VALUE OR RQD(%)
0	361.5	**Plowed Field**	0				
	361.2	Loose, dark brown, sandy silt TOPSOIL - trace clay - wet	1	SS	1	610/610	8
1		Very stiff, mottled brown, clayey SILT (CL-ML) TILL - some sand - trace gravel - rootlets to 1.4 m BGS - APL	3 4	SS	2	460/610	9
2			5 6	SS	3	610/610	12
	359.1		7				
		Compact, brown, SILT (ML) TILL - trace to some clay - trace sand and gravel	8 9	SS	4	610/610	23
3	358.4	- moist	10				
	358.3	- frequently laminated with silt seams	11	SS	5	610/610	29
		Compact, grey, silty SAND (SM) - moist	12				
4		Hard, grey, clayey SILT (CL-ML) TILL	13 14				
	356.9	- DTPL - silty fine sand layers, moist	15				
5		Very stiff, grey, CLAY (CL) TILL	16	SS	6	610/610	12
	356.3	- trace gravel - occasional silt seams - APL	17				
		Borehole terminated at 5.2 m BGS. Borehole open and dry. Backfilled with bentonite and cuttings to surface.	18 19				
6			20 21				
			22				
7			23 24				
			25				
8			26 27				

SAMPLES

UNDRAINED SHEAR STRENGTH (kPa)

50 100 150 200

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

DYNAMIC CONE PENETRATION TEST, BLOWS/0.3m ▼

STANDARD PENETRATION TEST, BLOWS/0.3m ●

REMARKS & GRAIN SIZE DISTRIBUTION (%)

10 20 30 40 50 60 70 80 90 100

GR SA SI CL

□ Field Vane Test, kPa

■ Remoulded Vane Test, kPa

△ Pocket Penetrometer Test, kPa

MECP Water Well Records - Construction Details

Well ID	Distance from Site (m)	Easting	Northing	Depth to Bedrock (m BGS)	Well Depth (m BGS)	Ground Surface (m AMSL)	Well Base Elevation (m AMSL)	Well Use		Date Constructed
								Type	Use	
7185953	401	518941	4813100		4.00	358.30	354.30		Test Hole	05-Jun-12
7185955	388	518929	4813085		4.60	357.86	353.26		Test Hole	05-Jun-12
7257398	394	518934	4813097			358.26		Alteration		19-Jan-16
7177219	372	518837	4813894		6.10	353.87	347.77	Observation	Monitoring	08-Jul-11
7288580	495	519034	4813143		7.62	354.30	346.68	Observation	Monitoring	05-May-17
7288581	477	519019	4813076		10.67	353.69	343.02	Observation	Monitoring	05-May-17
7288582	474	519017	4813207		9.14	358.29	349.14	Observation	Monitoring	05-May-17
6504339	353	518894	4813183	59.44	59.74	360.92	301.18	Test Hole	Not Used	07-Aug-75
6504340	354	518894	4813163	59.13	59.74	360.39	300.65	Test Hole	Not Used	12-Aug-75
6504341	356	518894	4813123	48.77	49.07	359.16	310.08	Test Hole	Not Used	14-Aug-75
7185954	410	518951	4813092		4.60	357.94	353.34	Test Hole	Test Hole	05-Jun-12
6501877	267	518834	4813363	65.53	70.71	362.95	292.24	Water Supply	Domestic	10-Oct-49
6501878	341	518954	4813503	60.05	78.03	356.64	278.61	Water Supply	Domestic	14-Jun-54
6501879	466	519054	4813363	63.40	70.10	359.13	289.03	Water Supply	Domestic	01-Nov-54
6501880	434	518974	4813163		30.48	359.36	328.88	Water Supply	Domestic	09-Feb-55
6501881	237	518764	4813753	60.35	69.49	357.57	288.07	Water Supply	Domestic	18-Aug-55
6501882	432	518974	4813083	49.99	54.25	357.34	303.09	Water Supply	Domestic	18-Jan-57
6501883	463	519044	4813343	48.46	56.39	359.17	302.78	Water Supply	Domestic	29-May-59
6501884	416	519014	4813623		43.89	349.84	305.95	Water Supply	Domestic	30-Jan-67
6501886	352	518894	4813188		46.63	361.05	314.41	Water Supply	Domestic	24-Feb-67
6501887	169	518304	4813923	60.35	70.41	361.15	290.74	Water Supply	Domestic	21-May-57
6501896	290	518694	4813968		28.04	351.69	323.65	Water Supply	Domestic	12-Aug-57
6501897	407	518844	4813963		30.48	354.63	324.15	Water Supply	Industrial	18-May-52
6501898	283	518234	4814013		57.30	363.50	306.20	Water Supply	Domestic	06-Oct-67
6502334	269	518714	4812803	43.89	59.13	351.23	292.10	Water Supply	Livestock	05-May-54
6503598	493	519104	4813473		43.28	355.41	312.13	Water Supply	Domestic	08-May-72
6503993	349	518888	4813145		45.11	359.80	314.69	Water Supply	Domestic	20-Aug-73
6504338	309	518914	4813583	55.78	59.13	354.00	294.86	Water Supply	Livestock	12-Sep-75
6504342	353	518894	4813083		48.46	357.62	309.16	Water Supply	Municipal	05-Sep-74
6504711	466	519074	4813443		45.72	357.44	311.72	Water Supply	Domestic	23-Aug-77
6504797	276	518874	4813603		44.50	355.67	311.17	Water Supply	Domestic	01-Jun-78
6505158	452	519047	4813387	62.48	65.84	359.78	293.94	Water Supply	Domestic	10-Oct-80
6505684	409	518877	4813894		67.67	354.68	287.01	Water Supply	Public	31-May-85
6505710	291	518519	4814053		11.58	363.44	351.86	Water Supply	Domestic	31-Oct-85
6506203	449	518993	4812967		44.50	352.61	308.11	Water Supply	Domestic	03-Nov-87
6506729	327	518240	4812662		49.38	346.31	296.93	Water Supply	Domestic	02-Aug-89
6506767	337	517936	4812932	44.20	48.16	357.43	309.27	Water Supply	Domestic	12-Jan-89
6507285	290	518829	4813110	49.38	52.43	358.19	305.76	Water Supply	Municipal	10-Apr-92
6507870	318	518479	4814084	60.35	62.18	363.94	301.76	Water Supply	Domestic	30-Aug-84
6508521	479	519025	4813269		65.84	359.01	293.17	Water Supply	Domestic	27-Aug-99
6708237	317	518480	4814083		62.18	363.95	301.77	Water Supply	Domestic	30-Aug-84
7046752	266	518804	4813120		52.43	358.46	306.03	Water Supply	Domestic	29-Jun-07
7136166	333	518730	4812736		58.83	350.67	291.84	Water Supply	Domestic	04-Jun-09
7185327	449	518991	4812953		47.85	351.97	304.12	Water Supply	Commerical	20-Jun-12
7211359	294	518833	4813104			358.00		Water Supply	Municipal	16-Oct-13
7217068	294	518833	4813104			358.00		Water Supply	Municipal	16-Oct-13
7318145	19	518251	4813001		67.67			Water Supply		27-Aug-18
7327048	266	518804	4813120		52.43			Water Supply	Municipal	29-Jun-07

MECP Water Well Records - Lithology

Well ID	Easting	Northing	Ground Surface Elevation	Geologic Unit Depth		Geologic Unit Elevation		Geologic Description		
				Top	Bottom	Top	Bottom			
			(m AMSL)	(m BGS)	(m BGS)	(m AMSL)	(m AMSL)	Primary	Secondary	Tertiary
6501877	518834	4813363	362.95	0.00	7.62	362.95	355.33	DUG		
6501877	518834	4813363	362.95	7.62	38.40	355.33	324.55	CLAY		
6501877	518834	4813363	362.95	38.40	65.53	324.55	297.42	MEDIUM SAND		
6501877	518834	4813363	362.95	65.53	70.71	297.42	292.24	SHALE		
6501878	518954	4813503	356.64	0.00	8.23	356.64	348.41	CLAY	MEDIUM SAND	
6501878	518954	4813503	356.64	8.23	60.05	348.41	296.59	MEDIUM SAND		
6501878	518954	4813503	356.64	60.05	78.03	296.59	278.61	ROCK		
6501879	519054	4813363	359.13	0.00	0.91	359.13	358.22	CLAY		
6501879	519054	4813363	359.13	0.91	1.52	358.22	357.61	MEDIUM SAND		
6501879	519054	4813363	359.13	1.52	30.48	357.61	328.65	CLAY		
6501879	519054	4813363	359.13	30.48	49.07	328.65	310.06	MEDIUM SAND		
6501879	519054	4813363	359.13	49.07	60.35	310.06	298.78	MEDIUM SAND	GRAVEL	
6501879	519054	4813363	359.13	60.35	63.40	298.78	295.73	MEDIUM SAND		
6501879	519054	4813363	359.13	63.40	70.10	295.73	289.03	LIMESTONE		
6501880	518974	4813163	359.36	0.00	17.68	359.36	341.68	CLAY		
6501880	518974	4813163	359.36	17.68	27.74	341.68	331.63	HARDPAN		
6501880	518974	4813163	359.36	27.74	29.57	331.63	329.80	GRAVEL	HARDPAN	
6501880	518974	4813163	359.36	29.57	30.48	329.80	328.88	GRAVEL	COARSE SAND	
6501881	518764	4813753	357.57	0.00	7.01	357.57	350.56	DUG		
6501881	518764	4813753	357.57	7.01	18.29	350.56	339.28	CLAY		
6501881	518764	4813753	357.57	18.29	21.34	339.28	336.23	MEDIUM SAND	CLAY	
6501881	518764	4813753	357.57	21.34	42.67	336.23	314.89	HARDPAN		
6501881	518764	4813753	357.57	42.67	60.35	314.89	297.22	GRAVEL		
6501881	518764	4813753	357.57	60.35	68.88	297.22	288.68	LIMESTONE		
6501881	518764	4813753	357.57	68.88	69.49	288.68	288.07	LIMESTONE		
6501882	518974	4813083	357.34	0.00	9.14	357.34	348.20	CLAY		
6501882	518974	4813083	357.34	9.14	38.40	348.20	318.94	HARDPAN	BOULDERS	
6501882	518974	4813083	357.34	38.40	39.01	318.94	318.33	QUICKSAND		
6501882	518974	4813083	357.34	39.01	49.99	318.33	307.35	HARDPAN		
6501882	518974	4813083	357.34	49.99	54.25	307.35	303.09	LIMESTONE		
6501883	519044	4813343	359.17	0.00	0.61	359.17	358.56	FILL		
6501883	519044	4813343	359.17	0.61	3.96	358.56	355.21	CLAY		

MECP Water Well Records - Lithology

Well ID	Easting	Northing	Ground Surface Elevation	Geologic Unit Depth		Geologic Unit Elevation		Geologic Description		
				Top	Bottom	Top	Bottom			
			(m AMSL)	(m BGS)	(m BGS)	(m AMSL)	(m AMSL)	Primary	Secondary	Tertiary
6501883	519044	4813343	359.17	3.96	26.52	355.21	332.65	CLAY		
6501883	519044	4813343	359.17	26.52	27.13	332.65	332.04	FINE SAND		
6501883	519044	4813343	359.17	27.13	32.92	332.04	326.25	CLAY	MEDIUM SAND	
6501883	519044	4813343	359.17	32.92	37.80	326.25	321.37	HARDPAN	GRAVEL	
6501883	519044	4813343	359.17	37.80	46.63	321.37	312.53	CLAY	MEDIUM SAND	
6501883	519044	4813343	359.17	46.63	48.46	312.53	310.70	HARDPAN	GRAVEL	
6501883	519044	4813343	359.17	48.46	54.25	310.70	304.91	SHALE		
6501883	519044	4813343	359.17	54.25	56.39	304.91	302.78	ROCK		
6501884	519014	4813623	349.84	0.00	0.91	349.84	348.93	FILL		
6501884	519014	4813623	349.84	0.91	36.58	348.93	313.27	CLAY		
6501884	519014	4813623	349.84	36.58	42.67	313.27	307.17	CLAY	STONES	
6501884	519014	4813623	349.84	42.67	43.59	307.17	306.26	MEDIUM SAND		
6501884	519014	4813623	349.84	43.59	43.89	306.26	305.95	GRAVEL		
6501886	518894	4813188	361.05	0.00	0.61	361.05	360.44	TOPSOIL		
6501886	518894	4813188	361.05	0.61	36.58	360.44	324.47	CLAY	MEDIUM SAND	
6501886	518894	4813188	361.05	36.58	44.20	324.47	316.85	FINE SAND		
6501886	518894	4813188	361.05	44.20	46.63	316.85	314.41	MEDIUM SAND		
6501887	518304	4813923	361.15	0.00	0.91	361.15	360.23	FILL		
6501887	518304	4813923	361.15	0.91	14.33	360.23	346.82	MEDIUM SAND	CLAY	
6501887	518304	4813923	361.15	14.33	30.78	346.82	330.36	HARDPAN		
6501887	518304	4813923	361.15	30.78	34.75	330.36	326.40	GRAVEL		
6501887	518304	4813923	361.15	34.75	49.99	326.40	311.16	HARDPAN		
6501887	518304	4813923	361.15	49.99	54.25	311.16	306.89	QUICKSAND		
6501887	518304	4813923	361.15	54.25	60.35	306.89	300.80	GRAVEL	MEDIUM SAND	
6501887	518304	4813923	361.15	60.35	61.57	300.80	299.58	SHALE		
6501887	518304	4813923	361.15	61.57	70.41	299.58	290.74	LIMESTONE		
6501896	518694	4813968	351.69	0.00	0.61	351.69	351.08	TOPSOIL		
6501896	518694	4813968	351.69	0.61	8.53	351.08	343.15	CLAY		
6501896	518694	4813968	351.69	8.53	27.43	343.15	324.26	HARDPAN		
6501896	518694	4813968	351.69	27.43	28.04	324.26	323.65	GRAVEL		
6501897	518844	4813963	354.63	0.00	6.10	354.63	348.53	CLAY		
6501897	518844	4813963	354.63	6.10	15.24	348.53	339.39	MEDIUM SAND	CLAY	

MECP Water Well Records - Lithology

Well ID	Easting	Northing	Ground Surface Elevation	Geologic Unit Depth		Geologic Unit Elevation		Geologic Description		
				Top	Bottom	Top	Bottom			
			(m AMSL)	(m BGS)	(m BGS)	(m AMSL)	(m AMSL)	Primary	Secondary	Tertiary
6501897	518844	4813963	354.63	15.24	27.43	339.39	327.20	HARDPAN		
6501897	518844	4813963	354.63	27.43	30.48	327.20	324.15	GRAVEL		
6501898	518234	4814013	363.50	0.00	0.61	363.50	362.89	TOPSOIL		
6501898	518234	4814013	363.50	0.61	15.54	362.89	347.96	CLAY		
6501898	518234	4814013	363.50	15.54	26.21	347.96	337.29	HARDPAN		
6501898	518234	4814013	363.50	26.21	28.35	337.29	335.16	MEDIUM SAND		
6501898	518234	4814013	363.50	28.35	51.82	335.16	311.69	CLAY		
6501898	518234	4814013	363.50	51.82	54.56	311.69	308.94	HARDPAN		
6501898	518234	4814013	363.50	54.56	57.30	308.94	306.20	MEDIUM SAND		
6502334	518714	4812803	351.23	0.00	2.13	351.23	349.10	GRAVEL		
6502334	518714	4812803	351.23	2.13	4.27	349.10	346.96	MEDIUM SAND		
6502334	518714	4812803	351.23	4.27	11.58	346.96	339.65	CLAY		
6502334	518714	4812803	351.23	11.58	32.00	339.65	319.23	CLAY	MEDIUM SAND	
6502334	518714	4812803	351.23	32.00	39.62	319.23	311.61	MEDIUM SAND		
6502334	518714	4812803	351.23	39.62	43.89	311.61	307.34	CLAY	MEDIUM SAND	
6502334	518714	4812803	351.23	43.89	52.43	307.34	298.80	SHALE		
6502334	518714	4812803	351.23	52.43	59.13	298.80	292.10	LIMESTONE		
6503598	519104	4813473	355.41	0.00	1.52	355.41	353.89	DUG		
6503598	519104	4813473	355.41	1.52	3.66	353.89	351.75	CLAY		
6503598	519104	4813473	355.41	3.66	19.81	351.75	335.60	CLAY		
6503598	519104	4813473	355.41	19.81	21.03	335.60	334.38	BOULDERS		
6503598	519104	4813473	355.41	21.03	33.22	334.38	322.19	CLAY	SILT	
6503598	519104	4813473	355.41	33.22	39.32	322.19	316.09	CLAY	SAND	STONES
6503598	519104	4813473	355.41	39.32	41.15	316.09	314.26	CLAY		
6503598	519104	4813473	355.41	41.15	43.28	314.26	312.13	SAND		
6503993	518888	4813145	359.80	0.00	3.66	359.80	356.15	CLAY		
6503993	518888	4813145	359.80	3.66	17.37	356.15	342.43	CLAY		
6503993	518888	4813145	359.80	17.37	26.52	342.43	333.29	CLAY		
6503993	518888	4813145	359.80	26.52	40.23	333.29	319.57	CLAY		
6503993	518888	4813145	359.80	40.23	43.28	319.57	316.52	CLAY		
6503993	518888	4813145	359.80	43.28	45.11	316.52	314.69	GRAVEL	SAND	
6504338	518914	4813583	354.00	0.00	0.91	354.00	353.08	CLAY		

MECP Water Well Records - Lithology

Well ID	Easting	Northing	Ground Surface Elevation	Geologic Unit Depth		Geologic Unit Elevation		Geologic Description		
				Top	Bottom	Top	Bottom			
			(m AMSL)	(m BGS)	(m BGS)	(m AMSL)	(m AMSL)	Primary	Secondary	Tertiary
6504338	518914	4813583	354.00	0.91	3.66	353.08	350.34	CLAY		
6504338	518914	4813583	354.00	3.66	10.06	350.34	343.94	CLAY	FRAGMENTS	
6504338	518914	4813583	354.00	10.06	23.47	343.94	330.53	CLAY		
6504338	518914	4813583	354.00	23.47	29.26	330.53	324.73	SAND	SILT	
6504338	518914	4813583	354.00	29.26	33.53	324.73	320.47	CLAY		
6504338	518914	4813583	354.00	33.53	34.75	320.47	319.25	CLAY		
6504338	518914	4813583	354.00	34.75	55.78	319.25	298.22	CLAY	SAND	
6504338	518914	4813583	354.00	55.78	58.83	298.22	295.17	CLAY	STONES	SHALE
6504338	518914	4813583	354.00	58.83	59.13	295.17	294.86	SAND	GRAVEL	
6504339	518894	4813183	360.92	0.00	3.66	360.92	357.26	CLAY		
6504339	518894	4813183	360.92	3.66	35.36	357.26	325.56	CLAY	STICKY	
6504339	518894	4813183	360.92	35.36	48.16	325.56	312.76	CLAY	SILT	
6504339	518894	4813183	360.92	48.16	53.64	312.76	307.27	CLAY		
6504339	518894	4813183	360.92	53.64	57.91	307.27	303.01	CLAY		
6504339	518894	4813183	360.92	57.91	58.83	303.01	302.09	CLAY		
6504339	518894	4813183	360.92	58.83	59.44	302.09	301.48	CLAY		
6504339	518894	4813183	360.92	59.44	59.74	301.48	301.18	LIMESTONE		
6504340	518894	4813163	360.39	0.00	3.35	360.39	357.04	CLAY		
6504340	518894	4813163	360.39	3.35	33.83	357.04	326.56	CLAY	STICKY	
6504340	518894	4813163	360.39	33.83	37.49	326.56	322.90	CLAY	SILTY	
6504340	518894	4813163	360.39	37.49	42.98	322.90	317.41	CLAY	SAND	SILTY
6504340	518894	4813163	360.39	42.98	47.24	317.41	313.14	SAND	SILT	
6504340	518894	4813163	360.39	47.24	57.91	313.14	302.48	CLAY	SANDY	
6504340	518894	4813163	360.39	57.91	58.52	302.48	301.87	SAND		
6504340	518894	4813163	360.39	58.52	59.13	301.87	301.26	CLAY		
6504340	518894	4813163	360.39	59.13	59.74	301.26	300.65	SHALE		
6504340	518894	4813163	360.39	59.74	59.74	300.65	300.65	LIMESTONE		
6504341	518894	4813123	359.16	0.00	3.35	359.16	355.80	CLAY		
6504341	518894	4813123	359.16	3.35	32.61	355.80	326.54	CLAY		
6504341	518894	4813123	359.16	32.61	36.88	326.54	322.28	CLAY	SILT	
6504341	518894	4813123	359.16	36.88	43.89	322.28	315.27	CLAY		
6504341	518894	4813123	359.16	43.89	48.77	315.27	310.39	GRAVEL		

MECP Water Well Records - Lithology

Well ID	Easting	Northing	Ground Surface Elevation	Geologic Unit Depth		Geologic Unit Elevation		Geologic Description		
				Top	Bottom	Top	Bottom			
			(m AMSL)	(m BGS)	(m BGS)	(m AMSL)	(m AMSL)	Primary	Secondary	Tertiary
6504341	518894	4813123	359.16	48.77	49.07	310.39	310.08	LIMESTONE	FRACTURED	
6504342	518894	4813083	357.62	0.00	3.35	357.62	354.27	CLAY		
6504342	518894	4813083	357.62	3.35	32.61	354.27	325.01	CLAY		
6504342	518894	4813083	357.62	32.61	36.88	325.01	320.74	CLAY	SILT	
6504342	518894	4813083	357.62	36.88	43.89	320.74	313.73	CLAY		
6504342	518894	4813083	357.62	43.89	48.46	313.73	309.16	GRAVEL		
6504711	519074	4813443	357.44	0.00	1.83	357.44	355.61	GRAVEL	FILL	LOOSE
6504711	519074	4813443	357.44	1.83	9.75	355.61	347.68	CLAY	STONES	HARD
6504711	519074	4813443	357.44	9.75	39.01	347.68	318.42	CLAY	HARD	
6504711	519074	4813443	357.44	39.01	44.50	318.42	312.93	SAND	CLAY	LOOSE
6504711	519074	4813443	357.44	44.50	45.72	312.93	311.72	FINE GRAVEL	LOOSE	
6504797	518874	4813603	355.67	0.00	0.30	355.67	355.36	TOPSOIL		
6504797	518874	4813603	355.67	0.30	2.74	355.36	352.92	CLAY		
6504797	518874	4813603	355.67	2.74	25.91	352.92	329.76	CLAY		
6504797	518874	4813603	355.67	25.91	26.21	329.76	329.45	GRAVEL		
6504797	518874	4813603	355.67	26.21	39.32	329.45	316.35	CLAY		
6504797	518874	4813603	355.67	39.32	44.50	316.35	311.17	SAND	CLAY	
6505158	519047	4813387	359.78	0.00	8.53	359.78	351.24	CLAY	GRAVEL	LOOSE
6505158	519047	4813387	359.78	8.53	30.48	351.24	329.30	CLAY	HARD	
6505158	519047	4813387	359.78	30.48	45.11	329.30	314.67	CLAY	SAND	LOOSE
6505158	519047	4813387	359.78	45.11	47.85	314.67	311.93	SAND	SILT	LOOSE
6505158	519047	4813387	359.78	47.85	62.48	311.93	297.30	CLAY	STONES	SAND
6505158	519047	4813387	359.78	62.48	64.31	297.30	295.47	SHALE	HARD	
6505158	519047	4813387	359.78	64.31	65.84	295.47	293.94	LIMESTONE	HARD	
6505684	518877	4813894	354.68	0.00	5.79	354.68	348.88	CLAY		SANDY
6505684	518877	4813894	354.68	5.79	10.36	348.88	344.31	CLAY	STONES	HARD
6505684	518877	4813894	354.68	10.36	13.11	344.31	341.57	SAND	GRAVEL	SOFT
6505684	518877	4813894	354.68	13.11	33.22	341.57	321.45	CLAY	SAND	SOFT
6505684	518877	4813894	354.68	33.22	41.15	321.45	313.53	SAND	CLAY	
6505684	518877	4813894	354.68	41.15	51.21	313.53	303.47	HARDPAN	STONES	HARD
6505684	518877	4813894	354.68	51.21	62.79	303.47	291.89	SAND	CLAY	
6505684	518877	4813894	354.68	62.79	64.31	291.89	290.36	SAND	GRAVEL	SOFT

MECP Water Well Records - Lithology

Well ID	Easting	Northing	Ground Surface Elevation	Geologic Unit Depth		Geologic Unit Elevation		Geologic Description		
				Top	Bottom	Top	Bottom			
			(m AMSL)	(m BGS)	(m BGS)	(m AMSL)	(m AMSL)	Primary	Secondary	Tertiary
6505684	518877	4813894	354.68	64.31	67.67	290.36	287.01	GRAVEL	BOULDERS	SOFT
6505710	518519	4814053	363.44	0.00	2.44	363.44	361.00	CLAY		
6505710	518519	4814053	363.44	2.44	3.66	361.00	359.78	SAND		
6505710	518519	4814053	363.44	3.66	6.10	359.78	357.34	CLAY		
6505710	518519	4814053	363.44	6.10	6.40	357.34	357.04	CLAY	SAND	LAYERED
6505710	518519	4814053	363.44	6.40	10.97	357.04	352.47	CLAY		
6505710	518519	4814053	363.44	10.97	11.58	352.47	351.86	CLAY		HARD
6506203	518993	4812967	352.61	0.00	6.40	352.61	346.21	CLAY		SOFT
6506203	518993	4812967	352.61	6.40	35.36	346.21	317.25	STONES	BOULDERS	HARD
6506203	518993	4812967	352.61	35.36	43.59	317.25	309.02	STONES	BOULDERS	SAND
6506203	518993	4812967	352.61	43.59	44.50	309.02	308.11	GRAVEL		LOOSE
6506729	518240	4812662	346.31	0.00	0.61	346.31	345.70	TOPSOIL	SOFT	
6506729	518240	4812662	346.31	0.61	7.01	345.70	339.30	CLAY	HARD	STICKY
6506729	518240	4812662	346.31	7.01	26.21	339.30	320.10	CLAY	STONES	SOFT
6506729	518240	4812662	346.31	26.21	29.57	320.10	316.74	SILT	SAND	LOOSE
6506729	518240	4812662	346.31	29.57	29.57	316.74	316.74	CLAY	SOFT	
6506729	518240	4812662	346.31	29.57	33.22	316.74	313.09	CLAY	SOFT	
6506729	518240	4812662	346.31	33.22	36.27	313.09	310.04	SILT	CLAY	LOOSE
6506729	518240	4812662	346.31	36.27	41.15	310.04	305.16	SAND	SILT	LOOSE
6506729	518240	4812662	346.31	41.15	46.02	305.16	300.28	SAND	LOOSE	
6506729	518240	4812662	346.31	46.02	47.85	300.28	298.46	SAND	LOOSE	
6506729	518240	4812662	346.31	47.85	49.38	298.46	296.93	SAND	CLAY	STONES
6506767	517936	4812932	357.43	0.00	5.49	357.43	351.94	CLAY		
6506767	517936	4812932	357.43	5.49	12.19	351.94	345.23	CLAY	STONES	
6506767	517936	4812932	357.43	12.19	35.05	345.23	322.37	CLAY		SANDY
6506767	517936	4812932	357.43	35.05	37.19	322.37	320.24	FINE SAND		
6506767	517936	4812932	357.43	37.19	44.20	320.24	313.23	HARDPAN		
6506767	517936	4812932	357.43	44.20	48.16	313.23	309.27	LIMESTONE		
6507285	518829	4813110	358.19	0.00	0.61	358.19	357.58	FILL	CLAY	
6507285	518829	4813110	358.19	0.61	2.74	357.58	355.44	CLAY		
6507285	518829	4813110	358.19	2.74	17.98	355.44	340.20	CLAY		
6507285	518829	4813110	358.19	17.98	32.00	340.20	326.18	CLAY	FINE SAND	GRAVEL

MECP Water Well Records - Lithology

Well ID	Easting	Northing	Ground Surface Elevation	Geologic Unit Depth		Geologic Unit Elevation		Geologic Description		
				Top	Bottom	Top	Bottom			
			(m AMSL)	(m BGS)	(m BGS)	(m AMSL)	(m AMSL)	Primary	Secondary	Tertiary
6507285	518829	4813110	358.19	32.00	40.54	326.18	317.65	CLAY	GRAVEL	STONES
6507285	518829	4813110	358.19	40.54	43.28	317.65	314.90	CLAY	STONES	
6507285	518829	4813110	358.19	43.28	49.38	314.90	308.81	GRAVEL	SILT	LAYERED
6507285	518829	4813110	358.19	49.38	50.90	308.81	307.28	LIMESTONE		
6507285	518829	4813110	358.19	50.90	51.51	307.28	306.67	LIMESTONE	SHALE	LAYERED
6507285	518829	4813110	358.19	51.51	52.43	306.67	305.76	LIMESTONE		
6507870	518479	4814084	363.94	0.00	0.61	363.94	363.33	CLAY		
6507870	518479	4814084	363.94	0.61	4.57	363.33	359.37	SAND		
6507870	518479	4814084	363.94	4.57	21.34	359.37	342.60	CLAY		SANDY
6507870	518479	4814084	363.94	21.34	32.00	342.60	331.93	CLAY		
6507870	518479	4814084	363.94	32.00	35.05	331.93	328.89	GRAVEL		DIRTY
6507870	518479	4814084	363.94	35.05	59.44	328.89	304.50	TILL	GRAVEL	SANDY
6507870	518479	4814084	363.94	59.44	60.35	304.50	303.59	CLAY	GRAVEL	
6507870	518479	4814084	363.94	60.35	62.18	303.59	301.76	SHALE		
6708237	518480	4814083	363.95	0.00	0.61	363.95	363.34	TOPSOIL	CLAY	
6708237	518480	4814083	363.95	0.61	4.57	363.34	359.37	SAND		
6708237	518480	4814083	363.95	4.57	21.34	359.37	342.61	SAND	CLAY	
6708237	518480	4814083	363.95	21.34	32.00	342.61	331.94	CLAY		
6708237	518480	4814083	363.95	32.00	35.05	331.94	328.89	GRAVEL		
6708237	518480	4814083	363.95	35.05	59.44	328.89	304.51	SAND	TILL	GRAVEL
6708237	518480	4814083	363.95	59.44	62.18	304.51	301.77	CLAY	GRAVEL	LAYERED
6508521	519025	4813269	359.01	0.00	5.49	359.01	353.52	CLAY	STONES	
6508521	519025	4813269	359.01	5.49	23.77	353.52	335.23	CLAY		
6508521	519025	4813269	359.01	23.77	26.21	335.23	332.79	GRAVEL		
6508521	519025	4813269	359.01	26.21	60.05	332.79	298.96	HARDPAN		
6508521	519025	4813269	359.01	60.05	61.87	298.96	297.13	SAND	STONES	
6508521	519025	4813269	359.01	61.87	64.01	297.13	295.00	GRAVEL	SAND	
6508521	519025	4813269	359.01	64.01	65.84	295.00	293.17	HARDPAN		
7046752	518804	4813120	358.46	0.00	3.66	358.46	354.80	GRAVEL	FILL	
7046752	518804	4813120	358.46	3.66	25.91	354.80	332.55	CLAY		
7046752	518804	4813120	358.46	25.91	45.42	332.55	313.04	CLAY	STONES	SILTY
7046752	518804	4813120	358.46	45.42	47.85	313.04	310.60	GRAVEL	SAND	

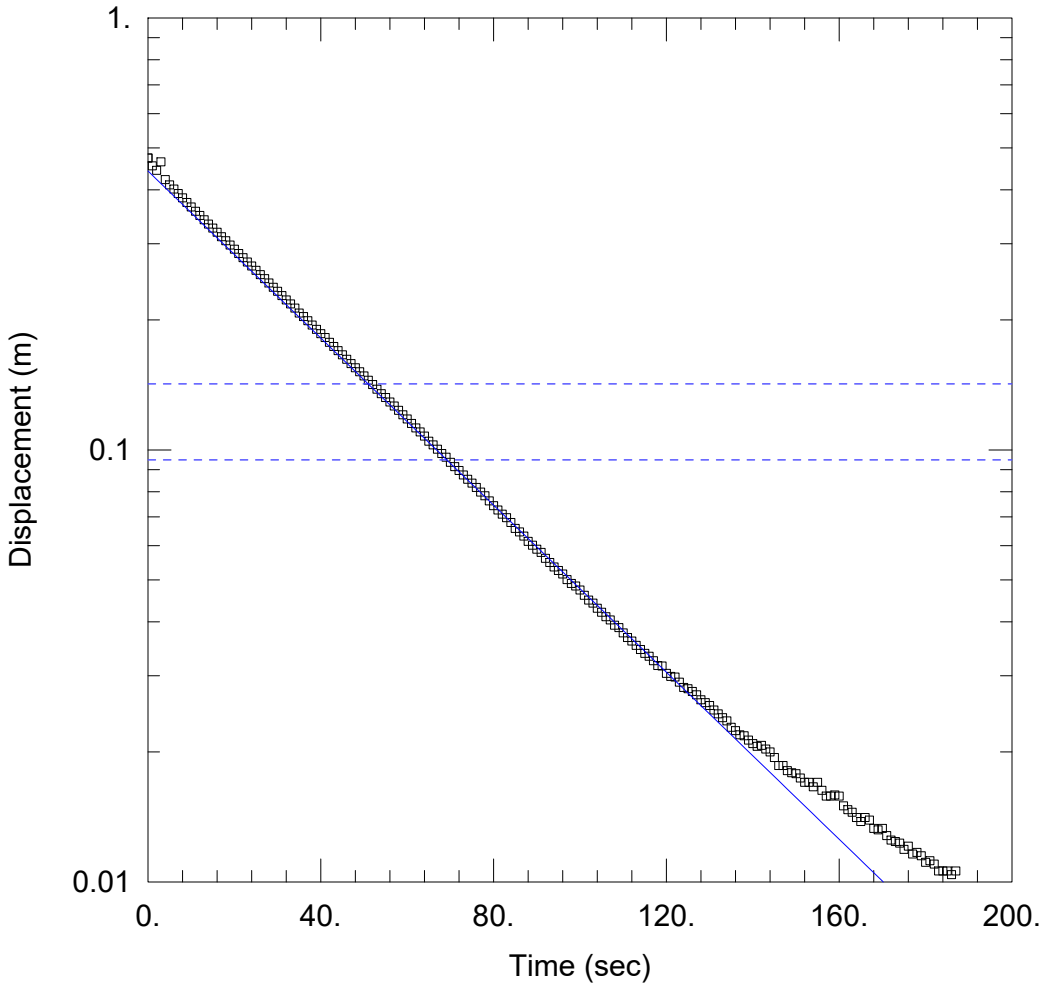
MECP Water Well Records - Lithology

Well ID	Easting	Northing	Ground Surface Elevation	Geologic Unit Depth		Geologic Unit Elevation		Geologic Description		
				Top	Bottom	Top	Bottom			
			(m AMSL)	(m BGS)	(m BGS)	(m AMSL)	(m AMSL)	Primary	Secondary	Tertiary
7046752	518804	4813120	358.46	47.85	50.90	310.60	307.55	MEDIUM SAND		
7046752	518804	4813120	358.46	50.90	52.43	307.55	306.03	LIMESTONE		
7136166	518730	4812736	350.67	0.00	58.83	350.67	291.84			
7177219	518837	4813894	353.87	0.00	2.13	353.87	351.74	GRAVEL	SAND	FILL
7177219	518837	4813894	353.87	2.13	6.10	351.74	347.77	CLAY	TILL	
7185327	518991	4812953	351.97	0.00	7.92	351.97	344.05	CLAY		
7185327	518991	4812953	351.97	7.92	9.75	344.05	342.22	CLAY	STONES	
7185327	518991	4812953	351.97	9.75	11.58	342.22	340.39	SILT	SAND	
7185327	518991	4812953	351.97	11.58	44.81	340.39	307.17	CLAY	STONES	
7185327	518991	4812953	351.97	44.81	47.85	307.17	304.12	LIMESTONE		
7185953	518941	4813100	358.30	0.00	0.30	358.30	358.00	TOPSOIL		
7185953	518941	4813100	358.30	0.30	1.20	358.00	357.10	SAND	FINE GRAVEL	BEARING
7185953	518941	4813100	358.30	1.20	2.40	357.10	355.90	CLAY	SILT	
7185953	518941	4813100	358.30	2.40	4.00	355.90	354.30	CLAY		DENSE
7185954	518951	4813092	357.94	0.00	0.30	357.94	357.64	TOPSOIL		
7185954	518951	4813092	357.94	0.30	2.40	357.64	355.54	CLAY	SILT	
7185954	518951	4813092	357.94	2.40	3.30	355.54	354.64	SILT	CLAY	BEARING
7185954	518951	4813092	357.94	3.30	4.60	354.64	353.34	SILT	CLAY	DENSE
7185955	518929	4813085	357.86	0.00	0.30	357.86	357.56	TOPSOIL		
7185955	518929	4813085	357.86	0.30	1.80	357.56	356.06	CLAY	SILT	
7185955	518929	4813085	357.86	1.80	3.30	356.06	354.56	SILT	CLAY	BEARING
7185955	518929	4813085	357.86	3.30	4.60	354.56	353.26	SILT	CLAY	DENSE
7288580	519034	4813143	354.30	0.00	1.52	354.30	352.78	CLAY	SILT	FILL
7288580	519034	4813143	354.30	1.52	3.05	352.78	351.26	CLAY		HARD
7288580	519034	4813143	354.30	3.05	6.10	351.26	348.21	CLAY		SOFT
7288580	519034	4813143	354.30	6.10	6.71	348.21	347.60	SAND	GRAVEL	LOOSE
7288580	519034	4813143	354.30	6.71	7.62	347.60	346.68	CLAY		SOFT
7288581	519019	4813076	353.69	0.00	0.30	353.69	353.38	TOPSOIL		SOFT
7288581	519019	4813076	353.69	0.30	6.10	353.38	347.59	CLAY		HARD
7288581	519019	4813076	353.69	6.10	9.14	347.59	344.54	CLAY		SOFT
7288581	519019	4813076	353.69	9.14	10.67	344.54	343.02	SILT	CLAY	HARD
7288582	519017	4813207	358.29	0.00	0.61	358.29	357.68	TOPSOIL		SOFT

MECP Water Well Records - Lithology

Well ID	Easting	Northing	Ground Surface Elevation	Geologic Unit Depth		Geologic Unit Elevation		Geologic Description		
				Top	Bottom	Top	Bottom			
			(m AMSL)	(m BGS)	(m BGS)	(m AMSL)	(m AMSL)	Primary	Secondary	Tertiary
7288582	519017	4813207	358.29	0.61	1.52	357.68	356.76	CLAY	SILT	FILL
7288582	519017	4813207	358.29	1.52	2.44	356.76	355.85	CLAY	SILT	FILL
7288582	519017	4813207	358.29	2.44	4.57	355.85	353.71	CLAY	SILT	HARD
7288582	519017	4813207	358.29	4.57	9.14	353.71	349.14	CLAY		SOFT
7318145	518251	4813001		0.00	5.49			SAND	SILT	CLAY
7318145	518251	4813001		5.49	12.19			CLAY		HARD
7318145	518251	4813001		12.19	44.20			CLAY	STONES	SOFT
7318145	518251	4813001		44.20	51.21			CLAY		HARD
7318145	518251	4813001		51.21	55.78			LIMESTONE		
7318145	518251	4813001		55.78	57.91			LIMESTONE		
7318145	518251	4813001		57.91	67.67			LIMESTONE	SHALE	LAYERED
7327048	518804	4813120		0.00	3.66			GRAVEL	FILL	
7327048	518804	4813120		3.66	25.91			CLAY		
7327048	518804	4813120		25.91	45.42			CLAY	STONES	SILTY
7327048	518804	4813120		45.42	47.85			GRAVEL	STONES	SAND
7327048	518804	4813120		47.85	50.90			MEDIUM SAND		
7327048	518804	4813120		50.90	52.43			LIMESTONE		

APPENDIX H:
Hydraulic Conductivity Testing Solutions



MW01-21 - TEST 2

Data Set: \...\mw01-21_2_ah_JK.aqt
Date: 07/05/21 Time: 09:41:05

PROJECT INFORMATION

Company: Stantec Consulting, Ltd
Project: 161413217
Location: Wellesley, ON
Test Well: MW01-21
Test Date: 31-May-21

AQUIFER DATA

Saturated Thickness: 5.095 m Anisotropy Ratio (Kz/Kr): 0.2

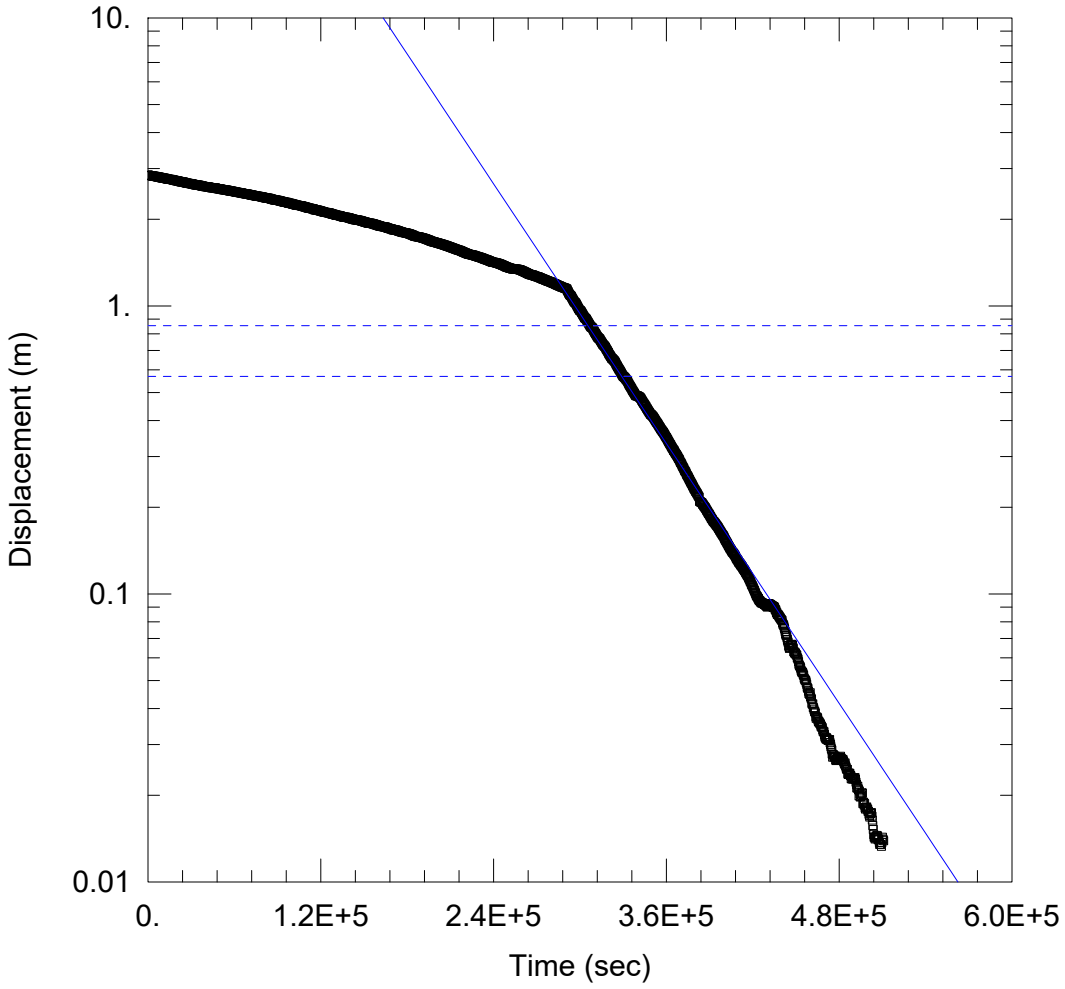
WELL DATA (MW01-21)

Initial Displacement: 0.4739 m Static Water Column Height: 4.285 m
Total Well Penetration Depth: 4.285 m Screen Length: 3.05 m
Casing Radius: 0.0254 m Well Radius: 0.105 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 7.3E-6 m/sec y0 = 0.4422 m



MW02-21

Data Set: \...\mw02-21_1_ah_JK.aqt
Date: 07/05/21 Time: 11:12:41

PROJECT INFORMATION

Company: Stantec Consulting, Ltd
Project: 161413217
Location: Wellesley, ON
Test Well: MW02-21
Test Date: 31-May-21

AQUIFER DATA

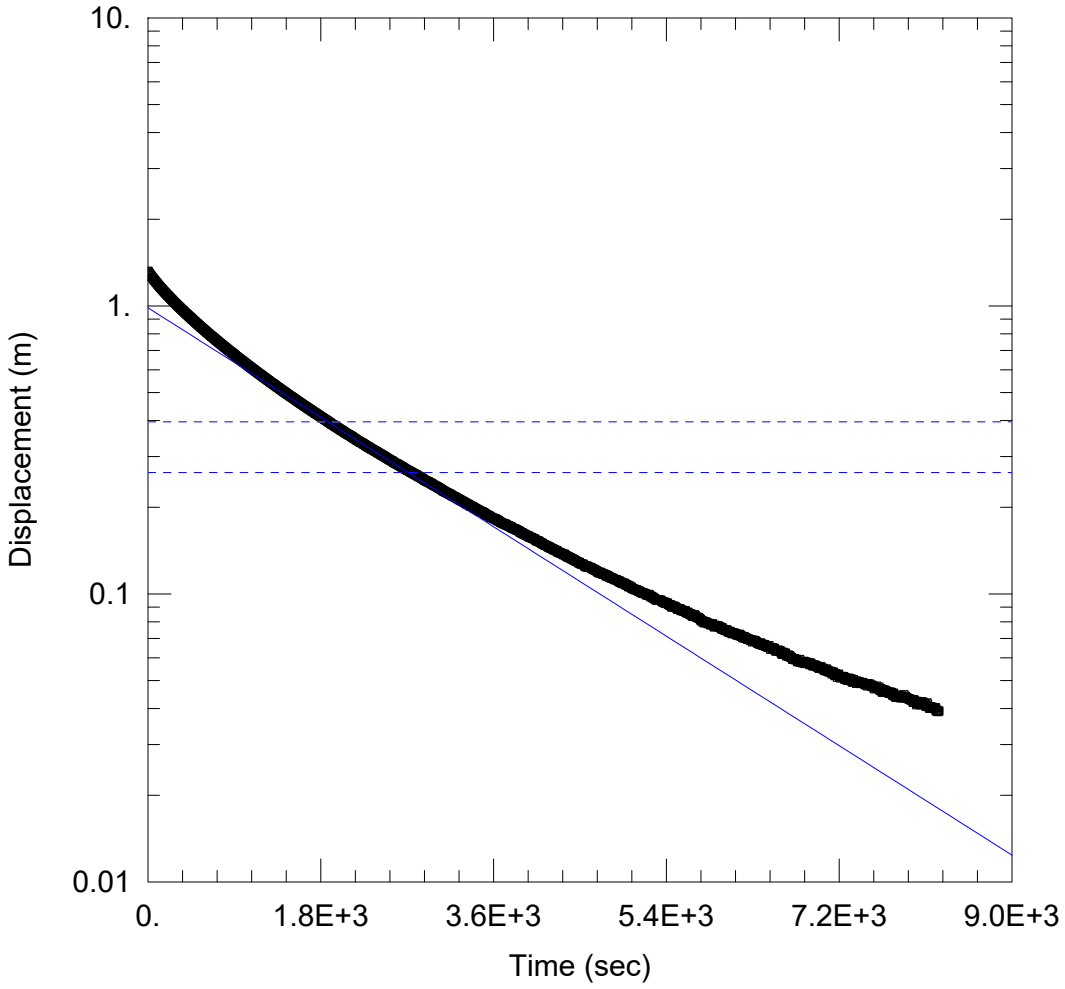
Saturated Thickness: 5.11 m Anisotropy Ratio (Kz/Kr): 0.2

WELL DATA (MW02-21)

Initial Displacement: 2.847 m Static Water Column Height: 4.57 m
Total Well Penetration Depth: 4.57 m Screen Length: 3.05 m
Casing Radius: 0.0254 m Well Radius: 0.105 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
K = 5.8E-9 m/sec y0 = 169. m



MW03-21 - TEST 1

Data Set: \...\mw03-21_1_ah_JK.aqt
Date: 07/05/21 Time: 11:24:09

PROJECT INFORMATION

Company: Stantec Consulting, Ltd
Project: 161413217
Location: Wellesley, ON
Test Well: MW03-21
Test Date: 31-May-21

AQUIFER DATA

Saturated Thickness: 4.87 m Anisotropy Ratio (Kz/Kr): 0.2

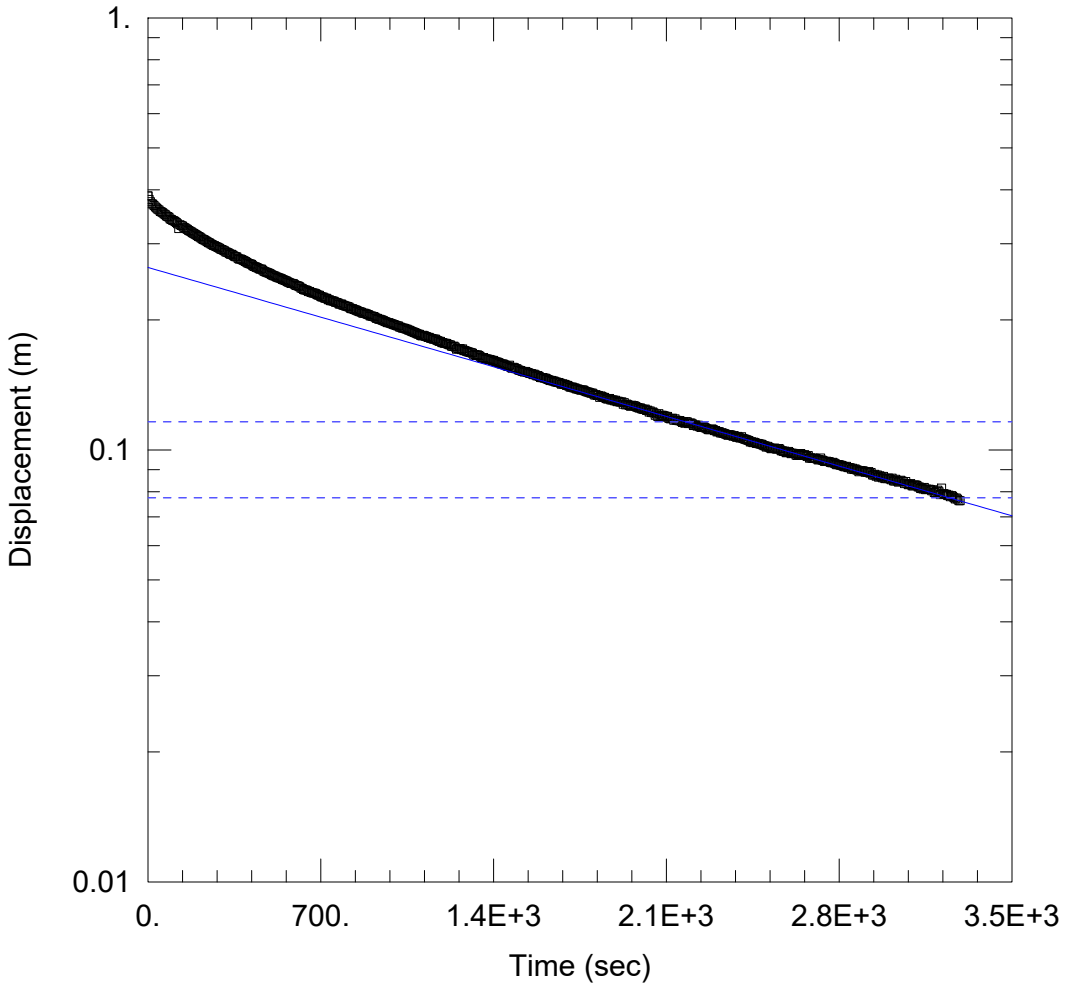
WELL DATA (MW03-21)

Initial Displacement: 1.319 m
Total Well Penetration Depth: 4.87 m
Casing Radius: 0.0254 m
Static Water Column Height: 4.87 m
Screen Length: 3.05 m
Well Radius: 0.105 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 1.8E-7 m/sec
y0 = 0.9849 m



MW03-21 - TEST 2

Data Set: \...\mw03-21_2_ah_JK.aqt
Date: 07/05/21 Time: 11:25:43

PROJECT INFORMATION

Company: Stantec Consulting, Ltd
Project: 161413217
Location: Wellesley, ON
Test Well: MW03-21
Test Date: 31-May-21

AQUIFER DATA

Saturated Thickness: 4.87 m Anisotropy Ratio (Kz/Kr): 0.2

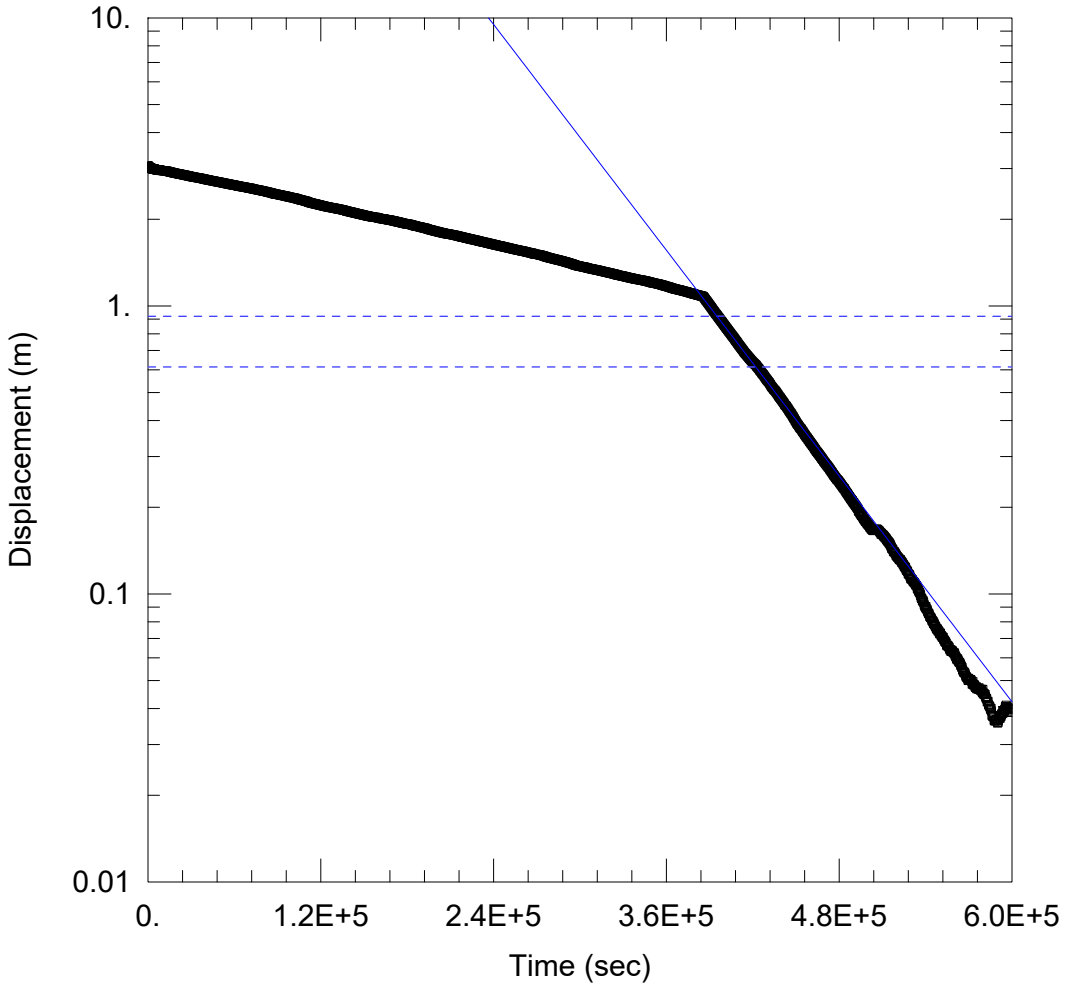
WELL DATA (MW03-21)

Initial Displacement: 0.3872 m
Total Well Penetration Depth: 4.87 m
Casing Radius: 0.0254 m
Static Water Column Height: 4.87 m
Screen Length: 3.05 m
Well Radius: 0.105 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 1.4E-7 m/sec y0 = 0.2644 m



MW04-21

Data Set: \\Cd1004-f01\01609\active\161413217\03_data\field\logger_data\k-tests\mw04-21_ah_JK.aqt
Date: 07/05/21 Time: 11:32:19

PROJECT INFORMATION

Company: Stantec Consulting, Ltd
Project: 161413217
Location: Wellesley, ON
Test Well: MW04-21
Test Date: 31-May-21

AQUIFER DATA

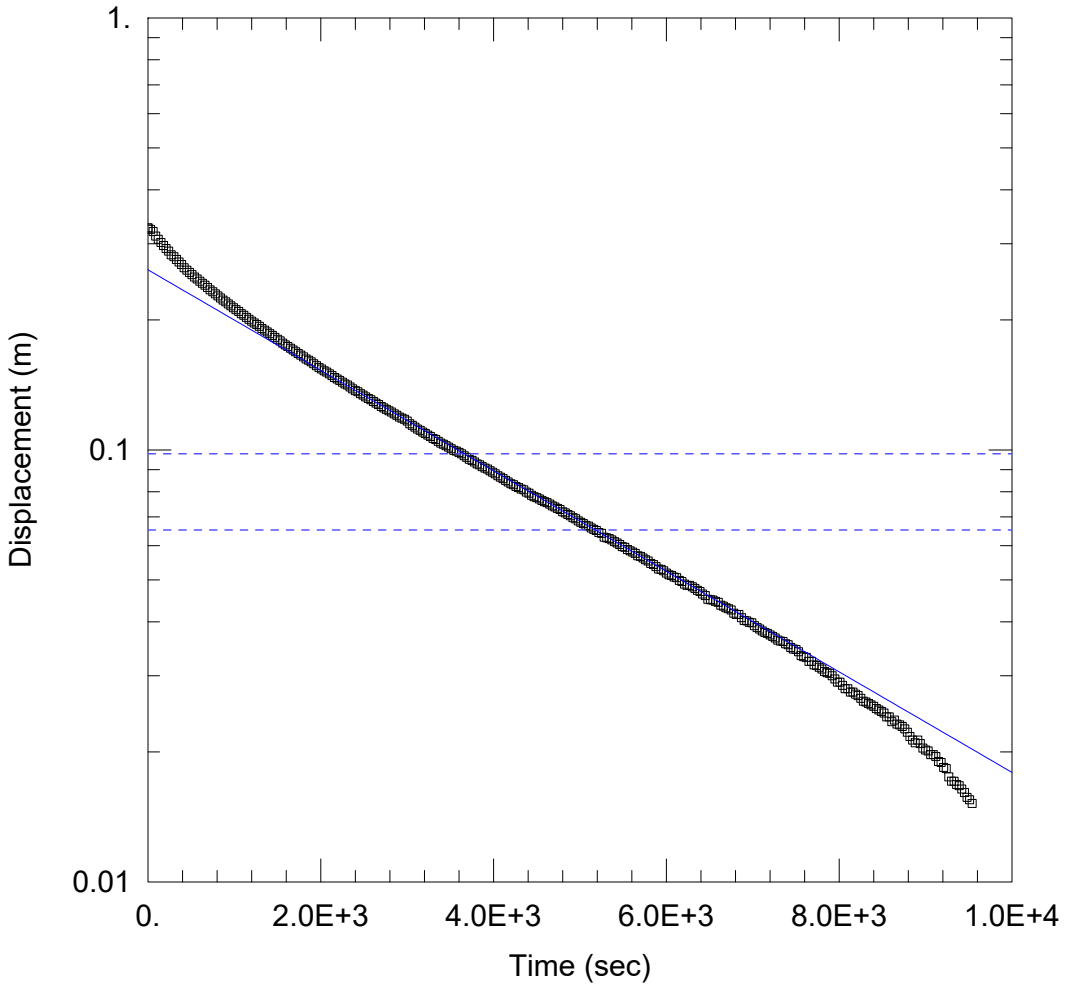
Saturated Thickness: 4.11 m Anisotropy Ratio (Kz/Kr): 0.2

WELL DATA (MW04-21)

Initial Displacement: 3.067 m
Total Well Penetration Depth: 4.11 m
Casing Radius: 0.0254 m
Static Water Column Height: 4.11 m
Screen Length: 3.05 m
Well Radius: 0.105 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 5.4E-9 m/sec
y0 = 351.1 m



MW05-21 - TEST 2

Data Set: \...\mw05-21_2_ah_JK.aqt
Date: 07/05/21 Time: 11:37:03

PROJECT INFORMATION

Company: Stantec Consulting, Ltd
Project: 161413217
Location: Wellesley, ON
Test Well: MW05-21
Test Date: 31-May-21

AQUIFER DATA

Saturated Thickness: 5.4 m Anisotropy Ratio (Kz/Kr): 0.2

WELL DATA (MW05-21)

Initial Displacement: 0.3264 m
Total Well Penetration Depth: 4.9 m
Casing Radius: 0.0254 m
Static Water Column Height: 4.9 m
Screen Length: 3.05 m
Well Radius: 0.105 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 9.1E-8 m/sec
y0 = 0.2612 m

APPENDIX I:
Laboratory Certificates of Analysis

Your Project #: 161413217.777
Site Location: WELLESLEY
Your C.O.C. #: 158433

Attention: Grant Whitehead

Stantec Consulting Ltd
300 Hagey Blvd
Suite 100
Waterloo, ON
CANADA N2L 0A4

Report Date: 2021/06/04
Report #: R6661365
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1E5622
Received: 2021/05/28, 10:25

Sample Matrix: Water
Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity	4	N/A	2021/06/01	CAM SOP-00448	SM 23 2320 B m
Carbonate, Bicarbonate and Hydroxide	4	N/A	2021/06/02	CAM SOP-00102	APHA 4500-CO2 D
Chloride by Automated Colourimetry	2	N/A	2021/06/02	CAM SOP-00463	SM 23 4500-Cl E m
Chloride by Automated Colourimetry	2	N/A	2021/06/03	CAM SOP-00463	SM 23 4500-Cl E m
Conductivity	4	N/A	2021/06/01	CAM SOP-00414	SM 23 2510 m
Dissolved Organic Carbon (DOC) (1)	3	N/A	2021/05/31	CAM SOP-00446	SM 23 5310 B m
Dissolved Organic Carbon (DOC) (1)	1	N/A	2021/06/01	CAM SOP-00446	SM 23 5310 B m
Hardness (calculated as CaCO3)	4	N/A	2021/06/03	CAM SOP 00102/00408/00447	SM 2340 B
Dissolved Metals by ICPMS	4	N/A	2021/06/02	CAM SOP-00447	EPA 6020B m
Ion Balance (% Difference)	4	N/A	2021/06/03		
Anion and Cation Sum	4	N/A	2021/06/03		
Total Ammonia-N	4	N/A	2021/06/03	CAM SOP-00441	USGS I-2522-90 m
Nitrate (NO3) and Nitrite (NO2) in Water (2)	4	N/A	2021/06/01	CAM SOP-00440	SM 23 4500-NO3I/NO2B
pH	4	2021/05/31	2021/06/01	CAM SOP-00413	SM 4500H+ B m
Orthophosphate	2	N/A	2021/06/02	CAM SOP-00461	EPA 365.1 m
Orthophosphate	2	N/A	2021/06/03	CAM SOP-00461	EPA 365.1 m
Sat. pH and Langelier Index (@ 20C)	4	N/A	2021/06/03		Auto Calc
Sat. pH and Langelier Index (@ 4C)	4	N/A	2021/06/03		Auto Calc
Sulphate by Automated Colourimetry	2	N/A	2021/06/02	CAM SOP-00464	EPA 375.4 m
Sulphate by Automated Colourimetry	2	N/A	2021/06/03	CAM SOP-00464	EPA 375.4 m
Total Dissolved Solids (TDS calc)	4	N/A	2021/06/03		Auto Calc
Total Suspended Solids	4	2021/06/01	2021/06/02	CAM SOP-00428	SM 23 2540D m
Turbidity	4	N/A	2021/05/31	CAM SOP-00417	SM 23 2130 B m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in

Your Project #: 161413217.777
Site Location: WELLESLEY
Your C.O.C. #: 158433

Attention: Grant Whitehead

Stantec Consulting Ltd
300 Hagey Blvd
Suite 100
Waterloo, ON
CANADA N2L 0A4

Report Date: 2021/06/04
Report #: R6661365
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1E5622
Received: 2021/05/28, 10:25

writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Dissolved Organic Carbon (DOC) present in the sample should be considered as non-purgeable DOC.
(2) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.

Encryption Key

Ronklin Gracian
Project Manager
04 Jun 2021 15:18:43

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Ronklin Gracian, Project Manager
Email: Ronklin.Gracian@bureauveritas.com
Phone# (905)817-5752
==========
BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

BV Labs Job #: C1E5622
Report Date: 2021/06/04

Stantec Consulting Ltd
Client Project #: 161413217.777
Site Location: WELLESLEY
Sampler Initials: AH

RCAP - COMPREHENSIVE (WATER)

BV Labs ID		PRQ479	PRQ480		PRQ481		
Sampling Date		2021/05/27 14:30	2021/05/27 16:15		2021/05/27 15:00		
COC Number		158433	158433		158433		
	UNITS	BH01-21	BH03-21	QC Batch	BH05-21	RDL	QC Batch
Calculated Parameters							
Anion Sum	me/L	8.85	8.86	7378596	7.54	N/A	7378596
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	300	380	7378589	280	1.0	7378589
Calculated TDS	mg/L	460	470	7378601	400	1.0	7378601
Carb. Alkalinity (calc. as CaCO3)	mg/L	2.8	3.1	7378589	2.5	1.0	7378589
Cation Sum	me/L	8.86	9.26	7378596	7.66	N/A	7378596
Hardness (CaCO3)	mg/L	370	450	7378593	350	1.0	7378593
Ion Balance (% Difference)	%	0.0500	2.22	7378595	0.840	N/A	7378595
Langelier Index (@ 20C)	N/A	0.919	1.13	7378599	0.868		7378599
Langelier Index (@ 4C)	N/A	0.671	0.878	7378600	0.619		7378600
Saturation pH (@ 20C)	N/A	7.09	6.81	7378599	7.10		7378599
Saturation pH (@ 4C)	N/A	7.34	7.06	7378600	7.35		7378600
Inorganics							
Total Ammonia-N	mg/L	0.062	0.071	7382520	0.097	0.050	7382520
Conductivity	umho/cm	820	780	7380237	680	1.0	7380953
Dissolved Organic Carbon	mg/L	0.88	0.90	7380569	0.99	0.40	7379930
Orthophosphate (P)	mg/L	<0.010	<0.010	7380186	<0.010	0.010	7380176
pH	pH	8.01	7.94	7380241	7.96		7380962
Dissolved Sulphate (SO4)	mg/L	33	52	7380196	70	1.0	7380185
Alkalinity (Total as CaCO3)	mg/L	300	380	7380240	290	1.0	7380946
Dissolved Chloride (Cl-)	mg/L	76	5.7	7380194	12	1.0	7380181
Nitrite (N)	mg/L	<0.010	<0.010	7380282	<0.010	0.010	7380287
Nitrate (N)	mg/L	<0.10	<0.10	7380282	0.12	0.10	7380287
Nitrate + Nitrite (N)	mg/L	<0.10	<0.10	7380282	0.12	0.10	7380287
Metals							
Dissolved Aluminum (Al)	mg/L	<0.0049	0.010	7379961	0.021	0.0049	7379961
Dissolved Antimony (Sb)	mg/L	<0.00050	<0.00050	7379961	<0.00050	0.00050	7379961
Dissolved Arsenic (As)	mg/L	0.0014	0.0012	7379961	0.0029	0.0010	7379961
Dissolved Barium (Ba)	mg/L	0.13	0.14	7379961	0.13	0.0020	7379961
Dissolved Beryllium (Be)	mg/L	<0.00040	<0.00040	7379961	<0.00040	0.00040	7379961
Dissolved Boron (B)	mg/L	0.063	0.016	7379961	0.029	0.010	7379961

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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BV Labs Job #: C1E5622
Report Date: 2021/06/04

Stantec Consulting Ltd
Client Project #: 161413217.777
Site Location: WELLESLEY
Sampler Initials: AH

RCAP - COMPREHENSIVE (WATER)

BV Labs ID		PRQ479	PRQ480		PRQ481		
Sampling Date		2021/05/27 14:30	2021/05/27 16:15		2021/05/27 15:00		
COC Number		158433	158433		158433		
	UNITS	BH01-21	BH03-21	QC Batch	BH05-21	RDL	QC Batch
Dissolved Cadmium (Cd)	mg/L	<0.000090	<0.000090	7379961	<0.000090	0.000090	7379961
Dissolved Calcium (Ca)	mg/L	78	120	7379961	78	0.20	7379961
Dissolved Chromium (Cr)	mg/L	<0.0050	<0.0050	7379961	<0.0050	0.0050	7379961
Dissolved Cobalt (Co)	mg/L	<0.00050	0.00074	7379961	<0.00050	0.00050	7379961
Dissolved Copper (Cu)	mg/L	<0.00090	<0.00090	7379961	<0.00090	0.00090	7379961
Dissolved Iron (Fe)	mg/L	<0.10	<0.10	7379961	<0.10	0.10	7379961
Dissolved Lead (Pb)	mg/L	<0.00050	<0.00050	7379961	<0.00050	0.00050	7379961
Dissolved Magnesium (Mg)	mg/L	42	37	7379961	38	0.050	7379961
Dissolved Manganese (Mn)	mg/L	0.052	0.065	7379961	0.046	0.0020	7379961
Dissolved Molybdenum (Mo)	mg/L	0.0042	0.0012	7379961	0.0034	0.00050	7379961
Dissolved Nickel (Ni)	mg/L	<0.0010	<0.0010	7379961	<0.0010	0.0010	7379961
Dissolved Phosphorus (P)	mg/L	<0.10	<0.10	7379961	<0.10	0.10	7379961
Dissolved Potassium (K)	mg/L	2.4	1.7	7379961	2.0	0.20	7379961
Dissolved Selenium (Se)	mg/L	<0.0020	<0.0020	7379961	<0.0020	0.0020	7379961
Dissolved Silicon (Si)	mg/L	7.3	8.0	7379961	8.7	0.050	7379961
Dissolved Silver (Ag)	mg/L	<0.000090	<0.000090	7379961	<0.000090	0.000090	7379961
Dissolved Sodium (Na)	mg/L	33	5.7	7379961	13	0.10	7379961
Dissolved Strontium (Sr)	mg/L	1.0	0.36	7379961	0.52	0.0010	7379961
Dissolved Thallium (Tl)	mg/L	<0.000050	<0.000050	7379961	<0.000050	0.000050	7379961
Dissolved Titanium (Ti)	mg/L	<0.0050	<0.0050	7379961	<0.0050	0.0050	7379961
Dissolved Uranium (U)	mg/L	0.0017	0.0011	7379961	0.0027	0.00010	7379961
Dissolved Vanadium (V)	mg/L	<0.00050	0.00053	7379961	<0.00050	0.00050	7379961
Dissolved Zinc (Zn)	mg/L	<0.0050	<0.0050	7379961	<0.0050	0.0050	7379961

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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RCAP - COMPREHENSIVE (WATER)

BV Labs ID		PRQ481			PRQ482		
Sampling Date		2021/05/27 15:00			2021/05/27 15:05		
COC Number		158433			158433		
	UNITS	BH05-21 Lab-Dup	RDL	QC Batch	QC-01	RDL	QC Batch
Calculated Parameters							
Anion Sum	me/L				7.42	N/A	7378596
Bicarb. Alkalinity (calc. as CaCO3)	mg/L				280	1.0	7378589
Calculated TDS	mg/L				400	1.0	7378601
Carb. Alkalinity (calc. as CaCO3)	mg/L				3.2	1.0	7378589
Cation Sum	me/L				7.65	N/A	7378596
Hardness (CaCO3)	mg/L				350	1.0	7378593
Ion Balance (% Difference)	%				1.56	N/A	7378595
Langelier Index (@ 20C)	N/A				0.972		7378599
Langelier Index (@ 4C)	N/A				0.724		7378600
Saturation pH (@ 20C)	N/A				7.10		7378599
Saturation pH (@ 4C)	N/A				7.35		7378600
Inorganics							
Total Ammonia-N	mg/L				0.093	0.050	7382520
Conductivity	umho/cm				670	1.0	7380237
Dissolved Organic Carbon	mg/L				1.0	0.40	7380569
Orthophosphate (P)	mg/L	<0.010	0.010	7380176	<0.010	0.010	7380176
pH	pH				8.08		7380241
Dissolved Sulphate (SO4)	mg/L	70	1.0	7380185	68	1.0	7380185
Alkalinity (Total as CaCO3)	mg/L				280	1.0	7380240
Dissolved Chloride (Cl-)	mg/L	12	1.0	7380181	11	1.0	7380181
Nitrite (N)	mg/L	<0.010	0.010	7380287	0.015	0.010	7380282
Nitrate (N)	mg/L	0.12	0.10	7380287	<0.10	0.10	7380282
Nitrate + Nitrite (N)	mg/L	0.12	0.10	7380287	0.11	0.10	7380282
Metals							
Dissolved Aluminum (Al)	mg/L				0.0053	0.0049	7379961
Dissolved Antimony (Sb)	mg/L				<0.00050	0.00050	7379961
Dissolved Arsenic (As)	mg/L				0.0027	0.0010	7379961
Dissolved Barium (Ba)	mg/L				0.13	0.0020	7379961
Dissolved Beryllium (Be)	mg/L				<0.00040	0.00040	7379961

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

BV Labs Job #: C1E5622
Report Date: 2021/06/04

Stantec Consulting Ltd
Client Project #: 161413217.777
Site Location: WELLESLEY
Sampler Initials: AH

RCAP - COMPREHENSIVE (WATER)

BV Labs ID		PRQ481			PRQ482		
Sampling Date		2021/05/27 15:00			2021/05/27 15:05		
COC Number		158433			158433		
	UNITS	BH05-21 Lab-Dup	RDL	QC Batch	QC-01	RDL	QC Batch
Dissolved Boron (B)	mg/L				0.029	0.010	7379961
Dissolved Cadmium (Cd)	mg/L				<0.000090	0.000090	7379961
Dissolved Calcium (Ca)	mg/L				77	0.20	7379961
Dissolved Chromium (Cr)	mg/L				<0.0050	0.0050	7379961
Dissolved Cobalt (Co)	mg/L				<0.00050	0.00050	7379961
Dissolved Copper (Cu)	mg/L				<0.00090	0.00090	7379961
Dissolved Iron (Fe)	mg/L				<0.10	0.10	7379961
Dissolved Lead (Pb)	mg/L				<0.00050	0.00050	7379961
Dissolved Magnesium (Mg)	mg/L				38	0.050	7379961
Dissolved Manganese (Mn)	mg/L				0.043	0.0020	7379961
Dissolved Molybdenum (Mo)	mg/L				0.0036	0.00050	7379961
Dissolved Nickel (Ni)	mg/L				<0.0010	0.0010	7379961
Dissolved Phosphorus (P)	mg/L				<0.10	0.10	7379961
Dissolved Potassium (K)	mg/L				2.0	0.20	7379961
Dissolved Selenium (Se)	mg/L				<0.0020	0.0020	7379961
Dissolved Silicon (Si)	mg/L				8.5	0.050	7379961
Dissolved Silver (Ag)	mg/L				<0.000090	0.000090	7379961
Dissolved Sodium (Na)	mg/L				14	0.10	7379961
Dissolved Strontium (Sr)	mg/L				0.53	0.0010	7379961
Dissolved Thallium (Tl)	mg/L				<0.000050	0.000050	7379961
Dissolved Titanium (Ti)	mg/L				<0.0050	0.0050	7379961
Dissolved Uranium (U)	mg/L				0.0028	0.00010	7379961
Dissolved Vanadium (V)	mg/L				<0.00050	0.00050	7379961
Dissolved Zinc (Zn)	mg/L				<0.0050	0.0050	7379961

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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BV Labs Job #: C1E5622
Report Date: 2021/06/04

Stantec Consulting Ltd
Client Project #: 161413217.777
Site Location: WELLESLEY
Sampler Initials: AH

RESULTS OF ANALYSES OF WATER

BV Labs ID		PRQ479		PRQ480	PRQ481	PRQ482		
Sampling Date		2021/05/27 14:30		2021/05/27 16:15	2021/05/27 15:00	2021/05/27 15:05		
COC Number		158433		158433	158433	158433		
	UNITS	BH01-21	RDL	BH03-21	BH05-21	QC-01	RDL	QC Batch
Inorganics								
Total Suspended Solids	mg/L	1700	20	55000	85000	59000	100	7379053
Turbidity	NTU	1800	0.5	4700	2100	3500	0.5	7379924

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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BV Labs Job #: C1E5622
Report Date: 2021/06/04

Stantec Consulting Ltd
Client Project #: 161413217.777
Site Location: WELLESLEY
Sampler Initials: AH

TEST SUMMARY

BV Labs ID: PRQ479
Sample ID: BH01-21
Matrix: Water

Collected: 2021/05/27
Shipped:
Received: 2021/05/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	7380240	N/A	2021/06/01	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	7378589	N/A	2021/06/02	Automated Statchk
Chloride by Automated Colourimetry	KONE	7380194	N/A	2021/06/02	Avneet Kour Sudan
Conductivity	AT	7380237	N/A	2021/06/01	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	7380569	N/A	2021/05/31	Nimarta Singh
Hardness (calculated as CaCO3)		7378593	N/A	2021/06/03	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	7379961	N/A	2021/06/02	Azita Fazaeli
Ion Balance (% Difference)	CALC	7378595	N/A	2021/06/03	Automated Statchk
Anion and Cation Sum	CALC	7378596	N/A	2021/06/03	Automated Statchk
Total Ammonia-N	LACH/NH4	7382520	N/A	2021/06/03	Amanpreet Sappal
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	7380282	N/A	2021/06/01	Chandra Nandlal
pH	AT	7380241	2021/05/31	2021/06/01	Surinder Rai
Orthophosphate	KONE	7380186	N/A	2021/06/02	Avneet Kour Sudan
Sat. pH and Langelier Index (@ 20C)	CALC	7378599	N/A	2021/06/03	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	7378600	N/A	2021/06/03	Automated Statchk
Sulphate by Automated Colourimetry	KONE	7380196	N/A	2021/06/02	Avneet Kour Sudan
Total Dissolved Solids (TDS calc)	CALC	7378601	N/A	2021/06/03	Automated Statchk
Total Suspended Solids	BAL	7379053	2021/06/01	2021/06/02	Sandeep Kaur
Turbidity	AT	7379924	N/A	2021/05/31	Neil Dassanayake

BV Labs ID: PRQ480
Sample ID: BH03-21
Matrix: Water

Collected: 2021/05/27
Shipped:
Received: 2021/05/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	7380240	N/A	2021/06/01	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	7378589	N/A	2021/06/02	Automated Statchk
Chloride by Automated Colourimetry	KONE	7380194	N/A	2021/06/02	Avneet Kour Sudan
Conductivity	AT	7380237	N/A	2021/06/01	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	7380569	N/A	2021/05/31	Nimarta Singh
Hardness (calculated as CaCO3)		7378593	N/A	2021/06/03	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	7379961	N/A	2021/06/02	Azita Fazaeli
Ion Balance (% Difference)	CALC	7378595	N/A	2021/06/03	Automated Statchk
Anion and Cation Sum	CALC	7378596	N/A	2021/06/03	Automated Statchk
Total Ammonia-N	LACH/NH4	7382520	N/A	2021/06/03	Amanpreet Sappal
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	7380282	N/A	2021/06/01	Chandra Nandlal
pH	AT	7380241	2021/05/31	2021/06/01	Surinder Rai
Orthophosphate	KONE	7380186	N/A	2021/06/02	Avneet Kour Sudan
Sat. pH and Langelier Index (@ 20C)	CALC	7378599	N/A	2021/06/03	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	7378600	N/A	2021/06/03	Automated Statchk
Sulphate by Automated Colourimetry	KONE	7380196	N/A	2021/06/02	Avneet Kour Sudan
Total Dissolved Solids (TDS calc)	CALC	7378601	N/A	2021/06/03	Automated Statchk
Total Suspended Solids	BAL	7379053	2021/06/01	2021/06/02	Sandeep Kaur
Turbidity	AT	7379924	N/A	2021/05/31	Neil Dassanayake

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BV Labs Job #: C1E5622
Report Date: 2021/06/04

Stantec Consulting Ltd
Client Project #: 161413217.777
Site Location: WELLESLEY
Sampler Initials: AH

TEST SUMMARY

BV Labs ID: PRQ481
Sample ID: BH05-21
Matrix: Water

Collected: 2021/05/27
Shipped:
Received: 2021/05/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	7380946	N/A	2021/06/01	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	7378589	N/A	2021/06/02	Automated Statchk
Chloride by Automated Colourimetry	KONE	7380181	N/A	2021/06/03	Avneet Kour Sudan
Conductivity	AT	7380953	N/A	2021/06/01	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	7379930	N/A	2021/06/01	Nimarta Singh
Hardness (calculated as CaCO3)		7378593	N/A	2021/06/03	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	7379961	N/A	2021/06/02	Azita Fazaeli
Ion Balance (% Difference)	CALC	7378595	N/A	2021/06/03	Automated Statchk
Anion and Cation Sum	CALC	7378596	N/A	2021/06/03	Automated Statchk
Total Ammonia-N	LACH/NH4	7382520	N/A	2021/06/03	Amanpreet Sappal
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	7380287	N/A	2021/06/01	Chandra Nandlal
pH	AT	7380962	2021/05/31	2021/06/01	Surinder Rai
Orthophosphate	KONE	7380176	N/A	2021/06/03	Avneet Kour Sudan
Sat. pH and Langelier Index (@ 20C)	CALC	7378599	N/A	2021/06/03	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	7378600	N/A	2021/06/03	Automated Statchk
Sulphate by Automated Colourimetry	KONE	7380185	N/A	2021/06/03	Avneet Kour Sudan
Total Dissolved Solids (TDS calc)	CALC	7378601	N/A	2021/06/03	Automated Statchk
Total Suspended Solids	BAL	7379053	2021/06/01	2021/06/02	Sandeep Kaur
Turbidity	AT	7379924	N/A	2021/05/31	Neil Dassanayake

BV Labs ID: PRQ481 Dup
Sample ID: BH05-21
Matrix: Water

Collected: 2021/05/27
Shipped:
Received: 2021/05/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chloride by Automated Colourimetry	KONE	7380181	N/A	2021/06/03	Avneet Kour Sudan
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	7380287	N/A	2021/06/01	Chandra Nandlal
Orthophosphate	KONE	7380176	N/A	2021/06/03	Avneet Kour Sudan
Sulphate by Automated Colourimetry	KONE	7380185	N/A	2021/06/03	Avneet Kour Sudan

BV Labs ID: PRQ482
Sample ID: QC-01
Matrix: Water

Collected: 2021/05/27
Shipped:
Received: 2021/05/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	7380240	N/A	2021/06/01	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	7378589	N/A	2021/06/02	Automated Statchk
Chloride by Automated Colourimetry	KONE	7380181	N/A	2021/06/03	Avneet Kour Sudan
Conductivity	AT	7380237	N/A	2021/06/01	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	7380569	N/A	2021/05/31	Nimarta Singh
Hardness (calculated as CaCO3)		7378593	N/A	2021/06/03	Automated Statchk
Dissolved Metals by ICPMS	ICP/MS	7379961	N/A	2021/06/02	Azita Fazaeli
Ion Balance (% Difference)	CALC	7378595	N/A	2021/06/03	Automated Statchk
Anion and Cation Sum	CALC	7378596	N/A	2021/06/03	Automated Statchk

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BV Labs Job #: C1E5622
Report Date: 2021/06/04

Stantec Consulting Ltd
Client Project #: 161413217.777
Site Location: WELLESLEY
Sampler Initials: AH

TEST SUMMARY

BV Labs ID: PRQ482
Sample ID: QC-01
Matrix: Water

Collected: 2021/05/27
Shipped:
Received: 2021/05/28

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Ammonia-N	LACH/NH4	7382520	N/A	2021/06/03	Amanpreet Sappal
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	7380282	N/A	2021/06/01	Chandra Nandlal
pH	AT	7380241	2021/05/31	2021/06/01	Surinder Rai
Orthophosphate	KONE	7380176	N/A	2021/06/03	Avneet Kour Sudan
Sat. pH and Langelier Index (@ 20C)	CALC	7378599	N/A	2021/06/03	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	7378600	N/A	2021/06/03	Automated Statchk
Sulphate by Automated Colourimetry	KONE	7380185	N/A	2021/06/03	Avneet Kour Sudan
Total Dissolved Solids (TDS calc)	CALC	7378601	N/A	2021/06/03	Automated Statchk
Total Suspended Solids	BAL	7379053	2021/06/01	2021/06/02	Sandeep Kaur
Turbidity	AT	7379924	N/A	2021/05/31	Neil Dassanayake

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GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	0.7°C

Results relate only to the items tested.

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BV Labs Job #: C1E5622
Report Date: 2021/06/04

QUALITY ASSURANCE REPORT

Stantec Consulting Ltd
Client Project #: 161413217.777
Site Location: WELLESLEY
Sampler Initials: AH

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
7379053	Total Suspended Solids	2021/06/02					<10	mg/L	13	25	99	85 - 115
7379924	Turbidity	2021/05/31			96	85 - 115	<0.1	NTU	5.5	20		
7379930	Dissolved Organic Carbon	2021/05/31	92	80 - 120	95	80 - 120	<0.40	mg/L	3.5	20		
7379961	Dissolved Aluminum (Al)	2021/06/02	104	80 - 120	104	80 - 120	<0.0049	mg/L	11	20		
7379961	Dissolved Antimony (Sb)	2021/06/02	107	80 - 120	102	80 - 120	<0.00050	mg/L				
7379961	Dissolved Arsenic (As)	2021/06/02	103	80 - 120	99	80 - 120	<0.0010	mg/L				
7379961	Dissolved Barium (Ba)	2021/06/02	103	80 - 120	101	80 - 120	<0.0020	mg/L				
7379961	Dissolved Beryllium (Be)	2021/06/02	103	80 - 120	99	80 - 120	<0.00040	mg/L				
7379961	Dissolved Boron (B)	2021/06/02	NC	80 - 120	98	80 - 120	<0.010	mg/L				
7379961	Dissolved Cadmium (Cd)	2021/06/02	102	80 - 120	100	80 - 120	<0.000090	mg/L				
7379961	Dissolved Calcium (Ca)	2021/06/02	NC	80 - 120	99	80 - 120	<0.20	mg/L				
7379961	Dissolved Chromium (Cr)	2021/06/02	104	80 - 120	100	80 - 120	<0.0050	mg/L				
7379961	Dissolved Cobalt (Co)	2021/06/02	101	80 - 120	99	80 - 120	<0.00050	mg/L				
7379961	Dissolved Copper (Cu)	2021/06/02	104	80 - 120	100	80 - 120	<0.00090	mg/L				
7379961	Dissolved Iron (Fe)	2021/06/02	98	80 - 120	96	80 - 120	<0.10	mg/L	NC	20		
7379961	Dissolved Lead (Pb)	2021/06/02	98	80 - 120	96	80 - 120	<0.00050	mg/L				
7379961	Dissolved Magnesium (Mg)	2021/06/02	NC	80 - 120	100	80 - 120	<0.050	mg/L				
7379961	Dissolved Manganese (Mn)	2021/06/02	101	80 - 120	99	80 - 120	<0.0020	mg/L				
7379961	Dissolved Molybdenum (Mo)	2021/06/02	108	80 - 120	102	80 - 120	<0.00050	mg/L				
7379961	Dissolved Nickel (Ni)	2021/06/02	100	80 - 120	100	80 - 120	<0.0010	mg/L				
7379961	Dissolved Phosphorus (P)	2021/06/02	111	80 - 120	110	80 - 120	<0.10	mg/L				
7379961	Dissolved Potassium (K)	2021/06/02	102	80 - 120	99	80 - 120	<0.20	mg/L				
7379961	Dissolved Selenium (Se)	2021/06/02	101	80 - 120	99	80 - 120	<0.0020	mg/L				
7379961	Dissolved Silicon (Si)	2021/06/02	102	80 - 120	99	80 - 120	<0.050	mg/L				
7379961	Dissolved Silver (Ag)	2021/06/02	91	80 - 120	100	80 - 120	<0.000090	mg/L				
7379961	Dissolved Sodium (Na)	2021/06/02	NC	80 - 120	101	80 - 120	<0.10	mg/L				
7379961	Dissolved Strontium (Sr)	2021/06/02	NC	80 - 120	99	80 - 120	<0.0010	mg/L				
7379961	Dissolved Thallium (Tl)	2021/06/02	98	80 - 120	95	80 - 120	<0.000050	mg/L				
7379961	Dissolved Titanium (Ti)	2021/06/02	100	80 - 120	93	80 - 120	<0.0050	mg/L				
7379961	Dissolved Uranium (U)	2021/06/02	105	80 - 120	103	80 - 120	<0.00010	mg/L				
7379961	Dissolved Vanadium (V)	2021/06/02	105	80 - 120	101	80 - 120	<0.00050	mg/L	7.8	20		

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
7379961	Dissolved Zinc (Zn)	2021/06/02	99	80 - 120	99	80 - 120	<0.0050	mg/L	4.6	20		
7380176	Orthophosphate (P)	2021/06/03	114	75 - 125	101	80 - 120	<0.010	mg/L	NC	25		
7380181	Dissolved Chloride (Cl-)	2021/06/03	101	80 - 120	105	80 - 120	<1.0	mg/L	0.41	20		
7380185	Dissolved Sulphate (SO4)	2021/06/03	NC	75 - 125	104	80 - 120	<1.0	mg/L	0.023	20		
7380186	Orthophosphate (P)	2021/06/02	108	75 - 125	101	80 - 120	<0.010	mg/L	NC	25		
7380194	Dissolved Chloride (Cl-)	2021/06/02	NC	80 - 120	100	80 - 120	<1.0	mg/L	1.7	20		
7380196	Dissolved Sulphate (SO4)	2021/06/02	NC	75 - 125	105	80 - 120	<1.0	mg/L	1.4	20		
7380237	Conductivity	2021/06/01			100	85 - 115	<1.0	umho/cm	0.39	25		
7380240	Alkalinity (Total as CaCO3)	2021/06/01			95	85 - 115	<1.0	mg/L	0.39	20		
7380241	pH	2021/06/01			102	98 - 103			0.45	N/A		
7380282	Nitrate (N)	2021/06/01	96	80 - 120	96	80 - 120	<0.10	mg/L	NC	20		
7380282	Nitrite (N)	2021/06/01	104	80 - 120	105	80 - 120	<0.010	mg/L	NC	20		
7380287	Nitrate (N)	2021/06/01	93	80 - 120	91	80 - 120	<0.10	mg/L	3.3	20		
7380287	Nitrite (N)	2021/06/01	107	80 - 120	105	80 - 120	<0.010	mg/L	NC	20		
7380569	Dissolved Organic Carbon	2021/05/31	93	80 - 120	96	80 - 120	<0.40	mg/L	0.41	20		
7380946	Alkalinity (Total as CaCO3)	2021/06/01			96	85 - 115	<1.0	mg/L	3.4	20		
7380953	Conductivity	2021/06/01			101	85 - 115	<1.0	umho/cm	0.33	25		
7380962	pH	2021/06/01			102	98 - 103			1.2	N/A		
7382520	Total Ammonia-N	2021/06/03	NC	75 - 125	98	80 - 120	<0.050	mg/L	0.11	20		

N/A = Not Applicable

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

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

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

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

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

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

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

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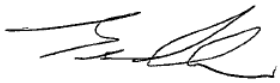
Stantec Consulting Ltd
Client Project #: 161413217.777
Site Location: WELLESLEY
Sampler Initials: AH

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:



Brad Newman, B.Sc., C.Chem., Scientific Service Specialist

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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BUREAU VERITAS

6740 Campobello Road, Mississauga, Ontario L5N 2L8
Phone: 905-817-5700 Fax: 905-817-5779 Toll Free: 800-563-6266
CAM FCD-01191/6

CHAIN OF CUSTODY RECORD 158433

Page 1 of 1

Invoice Information	Report Information (if differs from invoice)	Project Information (where applicable)	Turnaround Time (TAT) Required
Company Name: #9197 Stantec Consulting	Company Name:	Quotation #: C01624	☒ Regular TAT (5-7 days) Most analyses
Contact Name: Accounts Payable	Contact Name: Grant Whitehead	P.O. #/ AFE#:	PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS
Address: 100-300 Hagey Boulevard Waterloo ON N2L 0A4	Address:	Project #: 161413217.777	Rush TAT (Surcharges will be applied)
Phone: 5195794410 Fax: 5195796933	Phone: 5195857400 Fax: edd@stantec.com	Site Location: Wellesley	☐ 1 Day ☐ 2 Days ☐ 3-4 Days
Email: SAPinvoices@stantec.com	Email: grant.whitehead@stantec.com	Site #:	Date Required:
MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BUREAU VERITAS LABORATORIES' DRINKING WATER CHAIN OF CUSTODY		Site Location Province: ON	Rush Confirmation #:
		Sampled By: A. Healey	

Regulation 153	Other Regulations
☐ Table 1 ☐ Res/Park ☐ Med/ Fine	☐ CCME ☐ Sanitary Sewer Bylaw
☐ Table 2 ☐ Ind/Comm ☐ Coarse	☐ MISA ☐ Storm Sewer Bylaw
☐ Table 3 ☐ Agri/ Other	☐ PWQO Region
☐ Table ____	☒ Other (Specify) ODWS
FOR RSC (PLEASE CIRCLE) Y / N	☐ REG 558 (MIN. 3 DAY TAT REQUIRED)
	☐ REG 406 Table ____

Include Criteria on Certificate of Analysis: Y / N

SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS

Analysis Requested

LABORATORY USE ONLY

CUSTODY SEAL Y / N

COOLER TEMPERATURES: Present / Intact: 1/1 | 10°C

COOLING MEDIA PRESENT: (Y) / N Ice

	SAMPLE IDENTIFICATION	DATE SAMPLED (YYYY/MM/DD)	TIME SAMPLED (HH:MM)	MATRIX	# OF CONTAINERS SUBMITTED	FIELD FILTERED (CIRCLE) (Metals / Hg / CrVI)	BTEX/ PHC F1	PHCs F2 - F4	VOCs	REG 153 METALS & INORGANICS	REG 153 ICPMS METALS	REG 153 METALS (Hg; Cr VI, ICPMS Metals, HWS - B)	RCAP-Comp	Total Suspended Solids	Turbidity					HOLD- DO NOT ANALYZE
1	BH01-21	~~27~~ 2021/05/27	14:30	WG	5	Y							X	X	X						
2	BH03-21	2021/05/27	16:15	WG	5	Y							X	X	X						
3	BH05-21	2021/05/27	15:00	WG	5	Y							X	X	X						
4	QC-01	2021/05/27	15:05	WG	5	Y							X	X	X						
5																					
6																					
7																					
8																					
9																					
10																					

COMMENTS: IMMEDIATE TEST

REC'D IN WATERLOO

28-May-21 10:25
Ronklin Gracian
C1E5622
URE ENV-1327

RELINQUISHED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)
A Healey / Allison Healey	2021/05/28	10:25	TAMSIN DAVISON	2021/05/28	10:25
			Rosey / Rosey Kilcline	2021/05/28	13:08

BVH 373134 1/0/1

COC-1004 (06/19)

White: BV Labs - Yellow: Client

Your Project #: 161413217.777
Your C.O.C. #: 829092-01-01

Attention: Grant Whitehead

Stantec Consulting Ltd
300 Hagey Blvd
Suite 100
Waterloo, ON
CANADA N2L 0A4

Report Date: 2021/06/23
Report #: R6689237
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1G5523
Received: 2021/06/16, 08:31

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity	1	N/A	2021/06/18	CAM SOP-00448	SM 23 2320 B m
Carbonate, Bicarbonate and Hydroxide	1	N/A	2021/06/21	CAM SOP-00102	APHA 4500-CO2 D
Chloride by Automated Colourimetry	1	N/A	2021/06/18	CAM SOP-00463	SM 23 4500-Cl E m
Conductivity	1	N/A	2021/06/18	CAM SOP-00414	SM 23 2510 m
Dissolved Organic Carbon (DOC) (1)	1	N/A	2021/06/19	CAM SOP-00446	SM 23 5310 B m
Hardness (calculated as CaCO3)	1	N/A	2021/06/18	CAM SOP 00102/00408/00447	SM 2340 B
Metals Analysis by ICPMS (as received) (2)	1	N/A	2021/06/18	CAM SOP-00447	EPA 6020B m
Ion Balance (% Difference)	1	N/A	2021/06/21		
Anion and Cation Sum	1	N/A	2021/06/21		
Total Coliforms/ E. coli, CFU/100mL	1	N/A	2021/06/16	CAM SOP-00551	MOE E3407
Total Ammonia-N	1	N/A	2021/06/21	CAM SOP-00441	USGS I-2522-90 m
Nitrate (NO3) and Nitrite (NO2) in Water (3)	1	N/A	2021/06/22	CAM SOP-00440	SM 23 4500-NO3I/NO2B
pH	1	2021/06/18	2021/06/18	CAM SOP-00413	SM 4500H+ B m
Orthophosphate	1	N/A	2021/06/18	CAM SOP-00461	EPA 365.1 m
Sat. pH and Langelier Index (@ 20C)	1	N/A	2021/06/21		Auto Calc
Sat. pH and Langelier Index (@ 4C)	1	N/A	2021/06/21		Auto Calc
Sulphate by Automated Colourimetry	1	N/A	2021/06/18	CAM SOP-00464	EPA 375.4 m
Total Dissolved Solids (TDS calc)	1	N/A	2021/06/21		Auto Calc
Total Suspended Solids	1	2021/06/19	2021/06/21	CAM SOP-00428	SM 23 2540D m
Turbidity	1	N/A	2021/06/17	CAM SOP-00417	SM 23 2130 B m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Your Project #: 161413217.777
Your C.O.C. #: 829092-01-01

Attention: Grant Whitehead

Stantec Consulting Ltd
300 Hagey Blvd
Suite 100
Waterloo, ON
CANADA N2L 0A4

Report Date: 2021/06/23
Report #: R6689237
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1G5523
Received: 2021/06/16, 08:31

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Dissolved Organic Carbon (DOC) present in the sample should be considered as non-purgeable DOC.
(2) Metals analysis was performed on the sample 'as received'.
(3) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.

Encryption Key

Bureau Veritas
23 Jun 2021 16:34:21

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Ronklin Gracian, Project Manager
Email: Ronklin.Gracian@bureauveritas.com
Phone# (905)817-5752
==========
This report has been generated and distributed using a secure automated process.
BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

RCAP - COMPREHENSIVE (DRINKING WATER)

BV Labs ID		PVV199		
Sampling Date		2021/06/15 15:27		
COC Number		829092-01-01		
	UNITS	RW01	RDL	QC Batch
Calculated Parameters				
Anion Sum	me/L	9.36	N/A	7412409
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	230	1.0	7411294
Calculated TDS	mg/L	530	1.0	7412416
Carb. Alkalinity (calc. as CaCO3)	mg/L	2.1	1.0	7411294
Cation Sum	me/L	8.68	N/A	7412409
Hardness (CaCO3)	mg/L	420	1.0	7411169
Ion Balance (% Difference)	%	3.76	N/A	7411296
Langelier Index (@ 20C)	N/A	0.919		7412412
Langelier Index (@ 4C)	N/A	0.671		7412414
Saturation pH (@ 20C)	N/A	7.07		7412412
Saturation pH (@ 4C)	N/A	7.32		7412414
Inorganics				
Total Ammonia-N	mg/L	0.33	0.050	7416599
Conductivity	umho/cm	840	1.0	7416565
Dissolved Organic Carbon	mg/L	0.60	0.40	7417389
Orthophosphate (P)	mg/L	<0.010	0.010	7414881
pH	pH	7.99		7416562
Dissolved Sulphate (SO4)	mg/L	220	1.0	7414879
Alkalinity (Total as CaCO3)	mg/L	230	1.0	7416560
Dissolved Chloride (Cl-)	mg/L	2.7	1.0	7414878
Nitrite (N)	mg/L	<0.010	0.010	7417724
Nitrate (N)	mg/L	<0.10	0.10	7417724
Metals				
Aluminum (Al)	mg/L	<0.0049	0.0049	7415349
Antimony (Sb)	mg/L	<0.00050	0.00050	7415349
Arsenic (As)	mg/L	<0.0010	0.0010	7415349
Barium (Ba)	mg/L	0.064	0.0020	7415349
Beryllium (Be)	mg/L	<0.00040	0.00040	7415349
Boron (B)	mg/L	0.024	0.010	7415349
Cadmium (Cd)	mg/L	<0.000090	0.000090	7415349
Calcium (Ca)	mg/L	110	1.0	7415349

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

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Stantec Consulting Ltd
Client Project #: 161413217.777
Sampler Initials: AH

RCAP - COMPREHENSIVE (DRINKING WATER)

BV Labs ID		PVV199		
Sampling Date		2021/06/15 15:27		
COC Number		829092-01-01		
	UNITS	RW01	RDL	QC Batch
Chromium (Cr)	mg/L	<0.0050	0.0050	7415349
Cobalt (Co)	mg/L	<0.00050	0.00050	7415349
Copper (Cu)	mg/L	0.0029	0.00090	7415349
Iron (Fe)	mg/L	0.43	0.10	7415349
Lead (Pb)	mg/L	<0.00050	0.00050	7415349
Lithium (Li)	mg/L	0.0053	0.0050	7415349
Magnesium (Mg)	mg/L	35	0.050	7415349
Manganese (Mn)	mg/L	0.013	0.0020	7415349
Molybdenum (Mo)	mg/L	0.0013	0.00050	7415349
Nickel (Ni)	mg/L	<0.0010	0.0010	7415349
Phosphorus (P)	mg/L	<0.10	0.10	7415349
Potassium (K)	mg/L	1.1	0.20	7415349
Selenium (Se)	mg/L	<0.0020	0.0020	7415349
Silicon (Si)	mg/L	6.8	0.050	7415349
Silver (Ag)	mg/L	<0.000090	0.000090	7415349
Sodium (Na)	mg/L	6.9	0.10	7415349
Strontium (Sr)	mg/L	35	0.0010	7415349
Thallium (Tl)	mg/L	<0.000050	0.000050	7415349
Titanium (Ti)	mg/L	<0.0050	0.0050	7415349
Uranium (U)	mg/L	0.00090	0.00010	7415349
Vanadium (V)	mg/L	<0.00050	0.00050	7415349
Zinc (Zn)	mg/L	0.021	0.0050	7415349

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

BV Labs Job #: C1G5523
Report Date: 2021/06/23

Stantec Consulting Ltd
Client Project #: 161413217.777
Sampler Initials: AH

RESULTS OF ANALYSES OF WATER

BV Labs ID		PVV199		
Sampling Date		2021/06/15 15:27		
COC Number		829092-01-01		
	UNITS	RW01	RDL	QC Batch
Inorganics				
Total Suspended Solids	mg/L	<10	10	7416785
Turbidity	NTU	1.5	0.1	7413299

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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MICROBIOLOGY (WATER)

BV Labs ID		PVV199	
Sampling Date		2021/06/15 15:27	
COC Number		829092-01-01	
	UNITS	RW01	QC Batch
Microbiological			
Background	CFU/100mL	0	7412803
Total Coliforms	CFU/100mL	0	7412803
Escherichia coli	CFU/100mL	0	7412803
QC Batch = Quality Control Batch			

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BV Labs Job #: C1G5523
Report Date: 2021/06/23

Stantec Consulting Ltd
Client Project #: 161413217.777
Sampler Initials: AH

TEST SUMMARY

BV Labs ID: PVV199
Sample ID: RW01
Matrix: Water

Collected: 2021/06/15
Shipped:
Received: 2021/06/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	7416560	N/A	2021/06/18	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	7411294	N/A	2021/06/21	Automated Statchk
Chloride by Automated Colourimetry	KONE	7414878	N/A	2021/06/18	Alina Dobreanu
Conductivity	AT	7416565	N/A	2021/06/18	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	7417389	N/A	2021/06/19	Nimarta Singh
Hardness (calculated as CaCO3)		7411169	N/A	2021/06/18	Automated Statchk
Metals Analysis by ICPMS (as received)	ICP/MS	7415349	N/A	2021/06/18	Arefa Dabhad
Ion Balance (% Difference)	CALC	7411296	N/A	2021/06/21	Automated Statchk
Anion and Cation Sum	CALC	7412409	N/A	2021/06/21	Automated Statchk
Total Coliforms/ E. coli, CFU/100mL	PL	7412803	N/A	2021/06/16	Ranju Chaudhari
Total Ammonia-N	LACH/NH4	7416599	N/A	2021/06/21	Amanpreet Sappal
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	7417724	N/A	2021/06/22	Chandra Nandlal
pH	AT	7416562	2021/06/18	2021/06/18	Surinder Rai
Orthophosphate	KONE	7414881	N/A	2021/06/18	Avneet Kour Sudan
Sat. pH and Langelier Index (@ 20C)	CALC	7412412	N/A	2021/06/21	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	7412414	N/A	2021/06/21	Automated Statchk
Sulphate by Automated Colourimetry	KONE	7414879	N/A	2021/06/18	Avneet Kour Sudan
Total Dissolved Solids (TDS calc)	CALC	7412416	N/A	2021/06/21	Automated Statchk
Total Suspended Solids	BAL	7416785	2021/06/19	2021/06/21	Sandeep Kaur
Turbidity	AT	7413299	N/A	2021/06/17	Khushbu Vijay kumar Patel

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GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	0.3°C

Results relate only to the items tested.

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BV Labs Job #: C1G5523
Report Date: 2021/06/23

QUALITY ASSURANCE REPORT

Stantec Consulting Ltd
Client Project #: 161413217.777
Sampler Initials: AH

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
7413299	Turbidity	2021/06/17			94	85 - 115	<0.1	NTU				
7414878	Dissolved Chloride (Cl-)	2021/06/18	NC	80 - 120	104	80 - 120	<1.0	mg/L	7.5	20		
7414879	Dissolved Sulphate (SO4)	2021/06/18	83	75 - 125	103	80 - 120	<1.0	mg/L	1.0	20		
7414881	Orthophosphate (P)	2021/06/18	108	75 - 125	101	80 - 120	<0.010	mg/L	NC	25		
7415349	Aluminum (Al)	2021/06/18	104	80 - 120	103	80 - 120	<0.0049	mg/L	NC	20		
7415349	Antimony (Sb)	2021/06/18	108	80 - 120	100	80 - 120	<0.00050	mg/L	NC	20		
7415349	Arsenic (As)	2021/06/18	104	80 - 120	101	80 - 120	<0.0010	mg/L	NC	20		
7415349	Barium (Ba)	2021/06/18	99	80 - 120	99	80 - 120	<0.0020	mg/L	0.17	20		
7415349	Beryllium (Be)	2021/06/18	111	80 - 120	103	80 - 120	<0.00040	mg/L	NC	20		
7415349	Boron (B)	2021/06/18	105	80 - 120	96	80 - 120	<0.010	mg/L	0.67	20		
7415349	Cadmium (Cd)	2021/06/18	104	80 - 120	99	80 - 120	<0.000090	mg/L	NC	20		
7415349	Calcium (Ca)	2021/06/18	NC	80 - 120	101	80 - 120	<0.20	mg/L	4.0	20		
7415349	Chromium (Cr)	2021/06/18	100	80 - 120	97	80 - 120	<0.0050	mg/L	NC	20		
7415349	Cobalt (Co)	2021/06/18	100	80 - 120	97	80 - 120	<0.00050	mg/L	2.2	20		
7415349	Copper (Cu)	2021/06/18	100	80 - 120	96	80 - 120	<0.00090	mg/L	NC	20		
7415349	Iron (Fe)	2021/06/18	102	80 - 120	99	80 - 120	<0.10	mg/L	1.4	20		
7415349	Lead (Pb)	2021/06/18	102	80 - 120	100	80 - 120	<0.00050	mg/L	NC	20		
7415349	Lithium (Li)	2021/06/18	107	80 - 120	102	80 - 120	<0.0050	mg/L	2.7	20		
7415349	Magnesium (Mg)	2021/06/18	NC	80 - 120	101	80 - 120	<0.050	mg/L	3.1	20		
7415349	Manganese (Mn)	2021/06/18	100	80 - 120	98	80 - 120	<0.0020	mg/L	4.3	20		
7415349	Molybdenum (Mo)	2021/06/18	110	80 - 120	101	80 - 120	<0.00050	mg/L	4.1	20		
7415349	Nickel (Ni)	2021/06/18	100	80 - 120	98	80 - 120	<0.0010	mg/L	0.52	20		
7415349	Phosphorus (P)	2021/06/18	105	80 - 120	104	80 - 120	<0.10	mg/L	NC	20		
7415349	Potassium (K)	2021/06/18	109	80 - 120	103	80 - 120	<0.20	mg/L	2.7	20		
7415349	Selenium (Se)	2021/06/18	105	80 - 120	104	80 - 120	<0.0020	mg/L	NC	20		
7415349	Silicon (Si)	2021/06/18	104	80 - 120	102	80 - 120	<0.050	mg/L	3.7	20		
7415349	Silver (Ag)	2021/06/18	100	80 - 120	99	80 - 120	<0.000090	mg/L	NC	20		
7415349	Sodium (Na)	2021/06/18	NC	80 - 120	101	80 - 120	<0.10	mg/L	1.9	20		
7415349	Strontium (Sr)	2021/06/18	NC	80 - 120	96	80 - 120	<0.0010	mg/L	5.3	20		
7415349	Thallium (Tl)	2021/06/18	105	80 - 120	99	80 - 120	<0.000050	mg/L	NC	20		
7415349	Titanium (Ti)	2021/06/18	101	80 - 120	98	80 - 120	<0.0050	mg/L	NC	20		

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
7415349	Uranium (U)	2021/06/18	106	80 - 120	101	80 - 120	<0.00010	mg/L	4.3	20		
7415349	Vanadium (V)	2021/06/18	104	80 - 120	98	80 - 120	<0.00050	mg/L	NC	20		
7415349	Zinc (Zn)	2021/06/18	101	80 - 120	98	80 - 120	<0.0050	mg/L	1.1	20		
7416560	Alkalinity (Total as CaCO3)	2021/06/18			98	85 - 115	<1.0	mg/L	1.8	20		
7416562	pH	2021/06/18			102	98 - 103			0.26	N/A		
7416565	Conductivity	2021/06/18			100	85 - 115	<1.0	umho/cm	0.32	25		
7416599	Total Ammonia-N	2021/06/21	97	75 - 125	98	80 - 120	<0.050	mg/L	0.36	20		
7416785	Total Suspended Solids	2021/06/21					<10	mg/L	NC	25	97	85 - 115
7417389	Dissolved Organic Carbon	2021/06/18	94	80 - 120	99	80 - 120	<0.40	mg/L	3.0	20		
7417724	Nitrate (N)	2021/06/22	106	80 - 120	105	80 - 120	<0.10	mg/L	0.25	20		
7417724	Nitrite (N)	2021/06/22	107	80 - 120	106	80 - 120	<0.010	mg/L	NC	20		

N/A = Not Applicable

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

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

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

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

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

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

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

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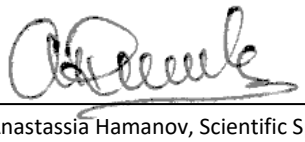
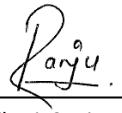
VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:



Anastassia Hamanov, Scientific Specialist



Ranju Chaudhari, Senior Analyst

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MICRO

ONTARIO DRINKING WATER CHAIN OF CUSTODY RECORD

6660 & 6740 Campobello Rd, Mississauga, Ontario Canada L5N 2L8 www.bvlabs.com
Tel:(905) 817-5700 Toll-free:800-563-6266 Fax:905-817-5779

Bottle Order #: 829092 COC #: C#829092-01-01

Please indicate which regulation applies to the samples being submitted:
☐ 170 ☐ 318/319 ☐ 243 ☐ 170Pb
☒ Not regulated (however water is for human consumption)

CAM FCD-01101/2 Page of

INVOICE TO:

Company Name: #9197 Stantec Consulting Ltd
Attention: Accounts Payable
Address: 300 Hagey Blvd Suite 100 Waterloo ON N2L 0A4
Tel: (519) 579-4410 Project: 161413217.777
Fax: (519) 579-6733 P.O. #:
Email: SAPinvoices@Stantec.com

REPORT TO:

Same as Invoice To ☐
Company Name:
Attention: Grant Whitehead
Address:
Tel: (519) 585-7400 Fax: (519) 579-4239
Email: grant.whitehead@stantec.com, edd@stantec.com

***DRINKING WATER TYPE LEGEND: [R=Raw Water] [T=Treated/POE] [D=Distribution] [P=Plumbing] [S=Standing] [F=Flushed]**

	Sample Identification/Location	Date Sampled	Time Sampled	*WATER TYPE (R,T,D,P,S,F)	MOE/MOH Adverse Notifcation Required? Yes	No	Field Chlorine Free	Total	Field Turbidity	Field pH	Watertrax SPL#	Resample Y/N?	# of Bottles	RCAp - Comprehensive (Drinking	Total Suspended Solids	Turbidity	Total Coliforms/ E. coli, CFU/100mL
1	RW01	15Jun21	15:27	R		x			0.48	7.26			6	X	X	X	X
2						x											
3						x											
4						x											
5						x											
6						x											
7						x											
8																	
9																	
10																	

16-Jun-21 08:31
Ronklin Gracian
C1G5523
DSG ENV 925

MICRO

REC'D IN WATERLOO

Analysis Requested

IT IS MANDATORY THAT ALL NOTIFICATION INFORMATION BELOW BE COMPLETED PRIOR TO ANALYSIS FOR REGULATED DRINKING WATER SUBMISSIONS.

TAT (TURNAROUND TIME):

RUSH TAT MUST HAVE PRIOR APPROVAL
☒ Regular (5-15 Working Days)
☐ RUSH (Specify Below)
Date Due:
RUSH #

ADVERSE NOTIFICATION INFORMATION

Waterworks Name: .
Waterworks Number: .
Address:
Contact:
Tel: Fax:
Cell:
Email:

Medical Officer of Health/Public Health Unit
Name/Region:
Contact:
Address:
Tel:
Fax:
After Hours:

LABORATORY USE ONLY

Received By (Print): JASPREET KAUR
Received By (Sign):
Date: 2021/06/16 Time: 08:31
Comments: Open Ice
Receiving Temp: 1°/0°/0°

Sampled By (Print): A. Healey Sampled By (Sign):
*Relinquished By (Print): A Healey *Relinquished By (Sign):
Date: 15Jun21 Time: 16:50
Time: Cooling Media Present Y/N? ☐
Metals Preservation Check Y/N? ☒

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BV LABS' STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVLABS.COM/TERMS-AND-CONDITIONS.

WB# 205545
AANISHA VAHORA 2,2,1 2021/06/16 16:00

Your Project #: 161413217.777
Site Location: WELLESLEY
Your C.O.C. #: 15552

Attention: Grant Whitehead

Stantec Consulting Ltd
300 Hagey Blvd
Suite 100
Waterloo, ON
CANADA N2L 0A4

Report Date: 2021/08/12
Report #: R6762261
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1M2547
Received: 2021/08/06, 14:25

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity	1	N/A	2021/08/10	CAM SOP-00448	SM 23 2320 B m
Carbonate, Bicarbonate and Hydroxide	1	N/A	2021/08/10	CAM SOP-00102	APHA 4500-CO2 D
Chloride by Automated Colourimetry	1	N/A	2021/08/10	CAM SOP-00463	SM 23 4500-Cl E m
Conductivity	1	N/A	2021/08/10	CAM SOP-00414	SM 23 2510 m
Dissolved Organic Carbon (DOC) (1)	1	N/A	2021/08/10	CAM SOP-00446	SM 23 5310 B m
Hardness (calculated as CaCO3)	1	N/A	2021/08/12	CAM SOP 00102/00408/00447	SM 2340 B
Metals Analysis by ICPMS (as received) (2)	1	N/A	2021/08/11	CAM SOP-00447	EPA 6020B m
Ion Balance (% Difference)	1	N/A	2021/08/12		
Anion and Cation Sum	1	N/A	2021/08/12		
Total Coliforms/ E. coli, CFU/100mL	1	N/A	2021/08/06	CAM SOP-00551	MOE E3407
Total Ammonia-N	1	N/A	2021/08/10	CAM SOP-00441	USGS I-2522-90 m
Nitrate (NO3) and Nitrite (NO2) in Water (3)	1	N/A	2021/08/09	CAM SOP-00440	SM 23 4500-NO3I/NO2B
pH	1	2021/08/07	2021/08/10	CAM SOP-00413	SM 4500H+ B m
Orthophosphate	1	N/A	2021/08/09	CAM SOP-00461	EPA 365.1 m
Sat. pH and Langelier Index (@ 20C)	1	N/A	2021/08/12		Auto Calc
Sat. pH and Langelier Index (@ 4C)	1	N/A	2021/08/12		Auto Calc
Sulphate by Automated Colourimetry	1	N/A	2021/08/09	CAM SOP-00464	EPA 375.4 m
Total Dissolved Solids (TDS calc)	1	N/A	2021/08/12		Auto Calc
Total Suspended Solids	1	2021/08/10	2021/08/11	CAM SOP-00428	SM 23 2540D m
Turbidity	1	N/A	2021/08/09	CAM SOP-00417	SM 23 2130 B m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Your Project #: 161413217.777
Site Location: WELLESLEY
Your C.O.C. #: 15552

Attention: Grant Whitehead

Stantec Consulting Ltd
300 Hagey Blvd
Suite 100
Waterloo, ON
CANADA N2L 0A4

Report Date: 2021/08/12
Report #: R6762261
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1M2547
Received: 2021/08/06, 14:25

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Dissolved Organic Carbon (DOC) present in the sample should be considered as non-purgeable DOC.
(2) Metals analysis was performed on the sample 'as received'.
(3) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.

Encryption Key

AUTHORIZED REPORT
RAPPORT AUTORISÉ

Bureau Veritas
12 Aug 2021 17:28:03

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Ronklin Gracian, Project Manager
Email: Ronklin.Gracian@bureauveritas.com
Phone# (905)817-5752
==========
This report has been generated and distributed using a secure automated process.
BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

BV Labs Job #: C1M2547
Report Date: 2021/08/12

Stantec Consulting Ltd
Client Project #: 161413217.777
Site Location: WELLESLEY
Sampler Initials: AV

RCAP - COMPREHENSIVE (DRINKING WATER)

BV Labs ID		QHU792			QHU792		
Sampling Date		2021/08/06 10:40			2021/08/06 10:40		
COC Number		15552			15552		
	UNITS	RW02	RDL	QC Batch	RW02 Lab-Dup	RDL	QC Batch
Calculated Parameters							
Anion Sum	me/L	13.0	N/A	7504994			
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	200	1.0	7504991			
Calculated TDS	mg/L	780	1.0	7504997			
Carb. Alkalinity (calc. as CaCO3)	mg/L	3.3	1.0	7504991			
Cation Sum	me/L	12.3	N/A	7504994			
Hardness (CaCO3)	mg/L	580	1.0	7506368			
Ion Balance (% Difference)	%	2.50	N/A	7504993			
Langelier Index (@ 20C)	N/A	1.21		7504995			
Langelier Index (@ 4C)	N/A	0.958		7504996			
Saturation pH (@ 20C)	N/A	7.03		7504995			
Saturation pH (@ 4C)	N/A	7.28		7504996			
Inorganics							
Total Ammonia-N	mg/L	0.065	0.050	7510353			
Conductivity	umho/cm	1200	1.0	7507152			
Dissolved Organic Carbon	mg/L	0.64	0.40	7510708			
Orthophosphate (P)	mg/L	<0.010	0.010	7507377			
pH	pH	8.23		7507154			
Dissolved Sulphate (SO4)	mg/L	420	2.0	7507376			
Alkalinity (Total as CaCO3)	mg/L	210	1.0	7507135			
Dissolved Chloride (Cl-)	mg/L	2.9	1.0	7507375			
Nitrite (N)	mg/L	<0.010	0.010	7507369	<0.010	0.010	7507369
Nitrate (N)	mg/L	<0.10	0.10	7507369	<0.10	0.10	7507369
Metals							
Aluminum (Al)	mg/L	<0.0049	0.0049	7508999			
Antimony (Sb)	mg/L	<0.00050	0.00050	7508999			
Arsenic (As)	mg/L	0.0010	0.0010	7508999			
Barium (Ba)	mg/L	0.024	0.0020	7508999			
Beryllium (Be)	mg/L	<0.00040	0.00040	7508999			
Boron (B)	mg/L	0.047	0.010	7508999			

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

BV Labs Job #: C1M2547
Report Date: 2021/08/12

Stantec Consulting Ltd
Client Project #: 161413217.777
Site Location: WELLESLEY
Sampler Initials: AV

RCAP - COMPREHENSIVE (DRINKING WATER)

BV Labs ID		QHU792			QHU792		
Sampling Date		2021/08/06 10:40			2021/08/06 10:40		
COC Number		15552			15552		
	UNITS	RW02	RDL	QC Batch	RW02 Lab-Dup	RDL	QC Batch
Cadmium (Cd)	mg/L	<0.000090	0.000090	7508999			
Calcium (Ca)	mg/L	150	1.0	7508999			
Chromium (Cr)	mg/L	<0.0050	0.0050	7508999			
Cobalt (Co)	mg/L	<0.00050	0.00050	7508999			
Copper (Cu)	mg/L	<0.00090	0.00090	7508999			
Iron (Fe)	mg/L	5.9	0.10	7508999			
Lead (Pb)	mg/L	<0.00050	0.00050	7508999			
Lithium (Li)	mg/L	0.0087	0.0050	7508999			
Magnesium (Mg)	mg/L	50	0.050	7508999			
Manganese (Mn)	mg/L	0.080	0.0020	7508999			
Molybdenum (Mo)	mg/L	0.0016	0.00050	7508999			
Nickel (Ni)	mg/L	<0.0010	0.0010	7508999			
Phosphorus (P)	mg/L	<0.10	0.10	7508999			
Potassium (K)	mg/L	1.4	0.20	7508999			
Selenium (Se)	mg/L	<0.0020	0.0020	7508999			
Silicon (Si)	mg/L	4.7	0.050	7508999			
Silver (Ag)	mg/L	<0.000090	0.000090	7508999			
Sodium (Na)	mg/L	11	0.10	7508999			
Strontium (Sr)	mg/L	38	0.0010	7508999			
Thallium (Tl)	mg/L	<0.000050	0.000050	7508999			
Titanium (Ti)	mg/L	<0.0050	0.0050	7508999			
Uranium (U)	mg/L	0.00016	0.00010	7508999			
Vanadium (V)	mg/L	<0.00050	0.00050	7508999			
Zinc (Zn)	mg/L	<0.0050	0.0050	7508999			

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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BV Labs Job #: C1M2547
Report Date: 2021/08/12

Stantec Consulting Ltd
Client Project #: 161413217.777
Site Location: WELLESLEY
Sampler Initials: AV

RESULTS OF ANALYSES OF WATER

BV Labs ID		QHU792			QHU792		
Sampling Date		2021/08/06 10:40			2021/08/06 10:40		
COC Number		15552			15552		
	UNITS	RW02	RDL	QC Batch	RW02 Lab-Dup	RDL	QC Batch
Inorganics							
Total Suspended Solids	mg/L	15	10	7509445			
Turbidity	NTU	49	0.1	7507047	48	0.1	7507047

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate

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BV Labs Job #: C1M2547
Report Date: 2021/08/12

Stantec Consulting Ltd
Client Project #: 161413217.777
Site Location: WELLESLEY
Sampler Initials: AV

MICROBIOLOGY (WATER)

BV Labs ID		QHU792	
Sampling Date		2021/08/06 10:40	
COC Number		15552	
	UNITS	**RW02**	**QC Batch**
Microbiological			
Total Coliforms	CFU/100mL	0	7506507
Escherichia coli	CFU/100mL	0	7506507
QC Batch = Quality Control Batch			

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

BV Labs Job #: C1M2547
Report Date: 2021/08/12

Stantec Consulting Ltd
Client Project #: 161413217.777
Site Location: WELLESLEY
Sampler Initials: AV

TEST SUMMARY

BV Labs ID: QHU792
Sample ID: RW02
Matrix: Water

Collected: 2021/08/06
Shipped:
Received: 2021/08/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	7507135	N/A	2021/08/10	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	7504991	N/A	2021/08/10	Automated Statchk
Chloride by Automated Colourimetry	KONE	7507375	N/A	2021/08/10	Alina Dobreanu
Conductivity	AT	7507152	N/A	2021/08/10	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	7510708	N/A	2021/08/10	Julianna Castiglione
Hardness (calculated as CaCO3)		7506368	N/A	2021/08/12	Automated Statchk
Metals Analysis by ICPMS (as received)	ICP/MS	7508999	N/A	2021/08/11	Nan Raykha
Ion Balance (% Difference)	CALC	7504993	N/A	2021/08/12	Automated Statchk
Anion and Cation Sum	CALC	7504994	N/A	2021/08/12	Automated Statchk
Total Coliforms/ E. coli, CFU/100mL	PL	7506507	N/A	2021/08/06	Soham Patel
Total Ammonia-N	LACH/NH4	7510353	N/A	2021/08/10	Amanpreet Sappal
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	7507369	N/A	2021/08/09	Chandra Nandlal
pH	AT	7507154	2021/08/07	2021/08/10	Surinder Rai
Orthophosphate	KONE	7507377	N/A	2021/08/09	Avneet Kour Sudan
Sat. pH and Langelier Index (@ 20C)	CALC	7504995	N/A	2021/08/12	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	7504996	N/A	2021/08/12	Automated Statchk
Sulphate by Automated Colourimetry	KONE	7507376	N/A	2021/08/09	Avneet Kour Sudan
Total Dissolved Solids (TDS calc)	CALC	7504997	N/A	2021/08/12	Automated Statchk
Total Suspended Solids	BAL	7509445	2021/08/10	2021/08/11	Shaneil Hall
Turbidity	AT	7507047	N/A	2021/08/09	Neil Dassanayake

BV Labs ID: QHU792 Dup
Sample ID: RW02
Matrix: Water

Collected: 2021/08/06
Shipped:
Received: 2021/08/06

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	7507369	N/A	2021/08/09	Chandra Nandlal
Turbidity	AT	7507047	N/A	2021/08/09	Neil Dassanayake

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

BV Labs Job #: C1M2547
Report Date: 2021/08/12

Stantec Consulting Ltd
Client Project #: 161413217.777
Site Location: WELLESLEY
Sampler Initials: AV

GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	5.0°C

Results relate only to the items tested.

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

BV Labs Job #: C1M2547
Report Date: 2021/08/12

QUALITY ASSURANCE REPORT

Stantec Consulting Ltd
Client Project #: 161413217.777
Site Location: WELLESLEY
Sampler Initials: AV

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
7507047	Turbidity	2021/08/09			94	85 - 115	<0.1	NTU	2.7	20		
7507135	Alkalinity (Total as CaCO3)	2021/08/10			96	85 - 115	<1.0	mg/L	0.82	20		
7507152	Conductivity	2021/08/10			103	85 - 115	<1.0	umho/cm	0.68	25		
7507154	pH	2021/08/10			102	98 - 103			0.47	N/A		
7507369	Nitrate (N)	2021/08/09	98	80 - 120	100	80 - 120	<0.10	mg/L	NC	20		
7507369	Nitrite (N)	2021/08/09	107	80 - 120	109	80 - 120	<0.010	mg/L	NC	20		
7507375	Dissolved Chloride (Cl-)	2021/08/10	NC	80 - 120	105	80 - 120	<1.0	mg/L	2.2	20		
7507376	Dissolved Sulphate (SO4)	2021/08/09	NC	75 - 125	102	80 - 120	<1.0	mg/L	1.5	20		
7507377	Orthophosphate (P)	2021/08/09	124	75 - 125	101	80 - 120	<0.010	mg/L	2.3	25		
7508999	Aluminum (Al)	2021/08/11	92	80 - 120	93	80 - 120	<0.0049	mg/L				
7508999	Antimony (Sb)	2021/08/11	105	80 - 120	106	80 - 120	<0.00050	mg/L				
7508999	Arsenic (As)	2021/08/11	104	80 - 120	104	80 - 120	<0.0010	mg/L				
7508999	Barium (Ba)	2021/08/11	99	80 - 120	101	80 - 120	<0.0020	mg/L				
7508999	Beryllium (Be)	2021/08/11	98	80 - 120	99	80 - 120	<0.00040	mg/L				
7508999	Boron (B)	2021/08/11	96	80 - 120	94	80 - 120	<0.010	mg/L				
7508999	Cadmium (Cd)	2021/08/11	101	80 - 120	102	80 - 120	<0.000090	mg/L				
7508999	Calcium (Ca)	2021/08/11	NC	80 - 120	92	80 - 120	<0.20	mg/L	5.2	20		
7508999	Chromium (Cr)	2021/08/11	100	80 - 120	99	80 - 120	<0.0050	mg/L				
7508999	Cobalt (Co)	2021/08/11	98	80 - 120	99	80 - 120	<0.00050	mg/L				
7508999	Copper (Cu)	2021/08/11	97	80 - 120	98	80 - 120	<0.00090	mg/L				
7508999	Iron (Fe)	2021/08/11	99	80 - 120	100	80 - 120	<0.10	mg/L	NC	20		
7508999	Lead (Pb)	2021/08/11	100	80 - 120	102	80 - 120	<0.00050	mg/L				
7508999	Lithium (Li)	2021/08/11	106	80 - 120	104	80 - 120	<0.0050	mg/L				
7508999	Magnesium (Mg)	2021/08/11	NC	80 - 120	103	80 - 120	<0.050	mg/L	1.1	20		
7508999	Manganese (Mn)	2021/08/11	97	80 - 120	98	80 - 120	<0.0020	mg/L	2.4	20		
7508999	Molybdenum (Mo)	2021/08/11	106	80 - 120	103	80 - 120	<0.00050	mg/L				
7508999	Nickel (Ni)	2021/08/11	97	80 - 120	99	80 - 120	<0.0010	mg/L				
7508999	Phosphorus (P)	2021/08/11	93	80 - 120	107	80 - 120	<0.10	mg/L				
7508999	Potassium (K)	2021/08/11	95	80 - 120	96	80 - 120	<0.20	mg/L				
7508999	Selenium (Se)	2021/08/11	102	80 - 120	97	80 - 120	<0.0020	mg/L				

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
7508999	Silicon (Si)	2021/08/11	92	80 - 120	90	80 - 120	<0.050	mg/L				
7508999	Silver (Ag)	2021/08/11	101	80 - 120	101	80 - 120	<0.000090	mg/L				
7508999	Sodium (Na)	2021/08/11	97	80 - 120	102	80 - 120	<0.10	mg/L				
7508999	Strontium (Sr)	2021/08/11	NC	80 - 120	100	80 - 120	<0.0010	mg/L				
7508999	Thallium (Tl)	2021/08/11	103	80 - 120	102	80 - 120	<0.000050	mg/L				
7508999	Titanium (Ti)	2021/08/11	91	80 - 120	92	80 - 120	<0.0050	mg/L				
7508999	Uranium (U)	2021/08/11	105	80 - 120	103	80 - 120	<0.00010	mg/L				
7508999	Vanadium (V)	2021/08/11	101	80 - 120	100	80 - 120	<0.00050	mg/L				
7508999	Zinc (Zn)	2021/08/11	98	80 - 120	101	80 - 120	<0.0050	mg/L				
7509445	Total Suspended Solids	2021/08/11					<10	mg/L	NC	25	96	85 - 115
7510353	Total Ammonia-N	2021/08/10	106	75 - 125	101	80 - 120	<0.050	mg/L	2.8	20		
7510708	Dissolved Organic Carbon	2021/08/10	95	80 - 120	99	80 - 120	<0.40	mg/L	0.42	20		

N/A = Not Applicable

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

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

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

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

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

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

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

BV Labs Job #: C1M2547
Report Date: 2021/08/12

Stantec Consulting Ltd
Client Project #: 161413217.777
Site Location: WELLESLEY
Sampler Initials: AV

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Brad Newman, B.Sc., C.Chem., Scientific Service Specialist

Soham Patel, Analyst 2

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports.
For Service Group specific validation please refer to the Validation Signature Page.

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MICRO

BUREAU VERITAS

6740 Campobello Road, Mississauga, Ontario L5N 2L8
Phone: 905-817-5700 Fax: 905-817-5779 Toll Free: 800-563-6266
CAM FCD-01191/6

CHAIN OF CUSTODY RECORD 155552 Page 1 of 1

Invoice Information

Company Name: #9197 STANTEC CONSULTING LTD
Contact Name: ACCOUNTS PAYABLE
Address: 300 HAGEY BLVD SUITE 100 WATERLOO ON N2L 0A4
Phone: 519-579-4410 Fax: 519-579-6733
Email: SAPINVOICES@STANTEC.COM

Report Information (if differs from invoice)

Company Name:
Contact Name: GRANT WHITEHEAD
Address: edd@stantec.com
Phone: 519-585-7400 Fax:
Email: grant.whitehead@stantec.com

Project Information (where applicable)

Quotation #: C01624
P.O. #/ AFE#:
Project #: 161413217-777
Site Location: Wellesley
Site #:
Site Location Province: ON
Sampled By: A. VANDENHOFF

Turnaround Time (TAT) Required

☑ Regular TAT (5-7 days) Most analyses

PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS

Rush TAT (Surcharges will be applied)
☐ 1 Day ☐ 2 Days ☐ 3-4 Days

Date Required:
Rush Confirmation #:

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BUREAU VERITAS LABORATORIES' DRINKING WATER CHAIN OF CUSTODY

Regulation 153

☐ Table 1 ☐ Res/Park ☐ Med/ Fine
☐ Table 2 ☐ Ind/Comm ☐ Coarse
☐ Table 3 ☐ Agri/ Other
☐ Table ____
FOR RSC (PLEASE CIRCLE) Y / N

Other Regulations

☐ CCME ☐ Sanitary Sewer Bylaw
☐ MISA ☐ Storm Sewer Bylaw
☐ PWQO Region ____
☑ Other (Specify) ODWS
☐ REG 558 (MIN. 3 DAY TAT REQUIRED)
☐ REG 406 Table ____

Include Criteria on Certificate of Analysis: Y / N

SAMPLES MUST BE KEPT COOL (< 10 °C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS

Analysis Requested

	SAMPLE IDENTIFICATION	DATE SAMPLED (YYYY/MM/DD)	TIME SAMPLED (HH:MM)	MATRIX	# OF CONTAINERS SUBMITTED	FIELD FILTERED (CIRCLE) Metals / Hg / CrVI	BTEX/ PHC F1	PHCs F2 - F4	VOCs	REG 153 METALS & INORGANICS	REG 153 ICPMS METALS	REG 153 METALS (Hg, Cr VI, ICPMS Metals, HWS - B)	RCAs - Complete suite (Drinking Water)	Total Coli-/E. Coli, CFU/100mL	Total Suspended Solids	Turbidity			HOLD - DO NOT ANALYZE
1	RW02	2021/08/06	1040	GW	6	N*							✓	✓	✓	✓			
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			

06-Aug-21 14:25
Ronklin Gracian
C1M2547
ATM ENV 637

LABORATORY USE ONLY

CUSTODY SEAL Y / N

Present	Intact	COOLER TEMPERATURES
		6/4/5
N	N	0/2/4

COOLING MEDIA PRESENT: Y / N

COMMENTS

*metals as rec'd

REC'D IN WATERLOO

On Ice

RELINQUISHED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)
AARON VANDENHOFF	2021/08/06	14:24	Jaspreet Kaur	2021/08/06	14:25
			DIPIKA SINGH	2021/08/06	17:44

BV JOB #

COC-1004 (06/19)

WB#421136

White: BV Labs - Yellow: Client