EVENDALE DEVELOPMENTS LTD.

HYDROGEOLOGICAL ASSESSMENT AND WATER BALANCE STUDY

BLOCK 8 - PART OF LOT 31, CONCESSION 7, UXBRIDGE

DECEMBER 09, 2020

wsp

HYDROGEOLOGICAL ASSESSMENT AND WATER BALANCE STUDY

BLOCK 8 - PART OF LOT 31, CONCESSION 7, UXBRIDGE

EVENDALE DEVELOPMENTS LTD.

PROJECT NO.: 181-00471-02
DATE: DECEMBER 09, 2020

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December 09, 2020

EVENDALE DEVELOPMENTS LTD.
2 Farr Avenue
Sharon, Ontario
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Attention: Mr. David Sud

Dear David:

Subject: Hydrogeological Assessment and Water Balance Study
Block 8, Part of Lot 31, Concession 7, Uxbridge

WSP Canada Inc. (WSP) is pleased to submit the attached report to document the Hydrogeological Assessment and Water Balance Study prepared for a proposed residential development on Block 8 within Part of Lot 31, Concession 7, Uxbridge, Ontario (Site).

The report provides an assessment of the existing hydrogeological conditions beneath the Site as well as water budgets for existing and future conditions to illustrate the likely changes in water balance that would be expected due to the proposed development. The report includes a preliminary assessment of anticipated dewatering requirements for the proposed residential condominium based on observed conditions.

We trust that this information is sufficient for your current needs. If you have any questions or require further information, please contact us.

Yours truly,

Lloyd Lemon, P.Geo., M.Sc.
Senior Project Geoscientist

VLB/LALdlw

WSP ref.: 181-00471-02
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EXECUTIVE SUMMARY

WSP Canada Inc. (WSP) was retained by Evendale Developments Ltd. to prepare a Hydrogeological Assessment and Water Balance Study for the proposed residential development on Block 8 of Part of Lot 31, Concession 7, in the Township of Uxbridge (Site). The development plans for Block 8 include the streets, six (6) detached residential homes, and a six (6)-storey residential condominium building including one (1) level underground parking garage.

The proposed development area lies within the Peterborough Drumlin Field physiographic region as defined by Chapman and Putnam (1984). The Peterborough Drumlin Field is typically characterized by deposits of highly calcareous till, but the local area surrounding the Site is mapped as clay plains.

The on-site runoff generally drains to the northwest via overland flow, towards the proposed Lowe Blvd extension and is captured in the drainage ditch along Donland Lane.

Based on previous geotechnical investigations conducted at the Site the proposed development area is underlain by a shallow layer of topsoil which is followed by a heterogenous mixture layer of fill or probable fill ranging in texture from gravel, sand, silt and clay to a thickness of 2.3 to 3.1 m. The Fill overlies a layer of clayey silt to silty clay on the east side of the property and overlies layers of silty sand on the west side of the Site. This pattern is consistent with the surficial geology mapping presented on a regional scale and with stratigraphy information presented in water well records obtained through the MECP. The information presented in the Sola borehole logs from review of physical samples does not confirm that the clayey silt to silty clay formation will typically overlie the silty sand formation but this is implied from regional stratigraphic understanding.

Seasonal high groundwater levels were observed in April 2020 in BH2 (268.61 masl) and BH5 (267.81 masl), and in January 2018 in MW1 (268.10 masl) and in MW2 (268.05 masl). The measured seasonally high groundwater levels correspond to depths of 1.59 mbgs at BH2, 1.49 mbgs at BH5, 0.13 mbgs at MW1 and 1.12 mbgs at MW2. The lowest groundwater levels were observed in October 2020 at BH2 (267.71 masl), in August 2020 at BH5 (267.76 masl), in July 2018 at MW1 (267.09 masl) and at MW2 (267.41 masl). Typically, groundwater levels are observed to be the highest between February and May and also in the late fall, while groundwater levels tend to be lowest between July and October. The observed groundwater levels generally follow the typical groundwater level trends.

The hydraulic conductivity estimates obtained from the on-site monitoring wells for the single well hydraulic response tests were 9.84×10^{-8} m/sec, 6.20×10^{-6} m/sec and 4.01×10^{-7} m/sec for BH2, BH5 and MW1, respectively. These results are consistent with the observed soil descriptions of the clayey silty at BH2, fill (sand) at BH5 and silty sand at MW1 in which the monitoring wells are screened. The hydraulic conductivity estimate obtained from the off-site monitoring wells for the single well hydraulic response tests was 4.90×10^{-7} for MW2. This result is consistent with the observed soil descriptions of the silty sand at MW2 in which the monitoring wells are screened.

Two (2) groundwater samples were collected from the existing monitoring wells on February 14th, 2017. The concentrations of the parameters tested were less than the values of the MECP Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition for All Types of Property Use (Coarse Textured Soil) .

The Climate-Based Water Budget indicates that average annual precipitation over the past 30 years is 886.2 mm/year. The available moisture surplus at the Site ranges between 321.8 mm/yr to 336.8 mm/year depending on the type of soil and vegetation cover. The moisture surplus will reflect the infiltration and runoff based on the soil properties, slopes, and vegetation within individual catchments.

Under existing conditions, there is one (1) on-site catchment. Runoff generated on-site drains to the northwest via overland flow and is captured in the drainage ditch along Donland Lane. Runoff subsequently flows south along Donland Lane and exits the Site through the southern property boundary.

The Pre-Development Water Budget reflects infiltration for the Site of approximately 2,216 m^3/yr and runoff from the Site of approximately 3,256 m^3/yr.

The Post-Development Water Budget reflects changes in land use to include increased areas of impervious surfaces (i.e. roads, buildings etc.) and re-grading. The proposed development area has been subdivided into four (4) on-site catchments. The majority of the runoff generated under post development conditions will be directed off-site to the Barton SWM Pond located approximately 500 m to the north of the Site via storm sewers.

The Post-Development Water Budget predicts a total on-site infiltration of 818 m^3/yr. Overall, this is a decrease of 63% relative to the Pre-Development case, and represents an infiltration deficit of 1,399 m^3/yr.

The Post-Development Water Budget predicts a net runoff of 7,837 m^3/yr over the Site area. This is an increase of 141% or 4,581 m^3/yr relative to the Pre-Development case. The runoff generated from the impervious surfaces in the post-development scenario has entirely been captured by the onsite catch basin and is redirected from the south property boundary to the Barton SWM Pond.

The estimated pumping rate that may be experienced to maintain dry conditions during construction is up to 176,600 L/day. WSP recommends that the dewatering activity be registered on the EASR prior to construction. Additional groundwater quality testing is recommended to confirm suitability for discharge to nearby Region of Durham storm sewers.

The majority of the proposed footing elevations are below the seasonally high water table. Estimates of the dewatering rates to maintain dry foundations are up to 85,500 L/day, including a 2X factor of safety. Water proofing of the basement/underground parking is recommended to reduce the potential that water is being removed and to thereby comply with Policy DEMD-1.

The Site lies within WHPA-Q1 and WHPA-Q2 for the Uxbridge Water Supply system with assigned stress levels of moderate. Source Protection Plan (SPP) policies for WHPA-Q1 apply to areas where activities that take water without returning it to the same source may be a threat. SPP policies for WHPA-Q2 apply to areas where activities that reduce recharge might be a threat. Based on the estimated volumes of water that may require removal during construction and long-term drainage of the residential condominium, the Site will need to comply further with policies for WHPA-Q1. As per the South Georgian Bay Lake Simcoe Protection Region, Approved Source Protection Plan, policy number DEMD-1 will apply to the water taking activities during dewatering for construction and long-term drainage. Policies associated with WHPA – Q2 may apply to offset identified infiltration deficit relative to pre-development conditions.

The proposed development area is mapped within a Highly Vulnerable Aquifer (HVA) area with a vulnerability score of 6. The Site will be municipally serviced for sewage which will eliminate potential contamination of groundwater by nitrates and phosphorous. De-icing agents applied on impervious surfaces such as driveways and roadways will be collected by the on-site storm sewer system and released to the Barton SWM Pond. This will help to minimize the amount of de-icing agents that infiltrate into the groundwater. Best management practices will likely require that the use of salt for winter road de-icing be minimized.

The proposed development is located within a Significant Groundwater Recharge Area with a vulnerability score of 6.

The Site lies within Intake Protection Zone 3 (IPZ-3) for Lake Simcoe. The majority of the runoff directed to Lake Simcoe leaves the Site to north after detention in the Barton stormwater management pond and is not likely to contain contaminants of concern. The potential for release of contaminants to surface water that will reach Lake Simcoe from the Site is minimal given the proposed residential land use. Winter road de-icing agents could potentially cause runoff contamination as the residence will include driveway and roadway areas. Mixing with clean runoff will reduce the concentration of these chemicals to an acceptable level prior to reaching Lake Simcoe and therefore the proposed activity does not present a water quality threat to the municipal surface water sources protected by the Source Protection Plan.

SIGNATURES

PREPARED BY

Valyn Bernard, P.Eng.
Project Engineer

REVIEWED BY

Lloyd Lemon, P.Geo., M.Sc.
Senior Project Geoscientist

PROFESSIONAL GEOSCIENTIST
LLOYD A. LEMON
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ONTARIO

WSP CANADA INC ("WSP") prepared this report solely for the use of the intended recipient. EVENDALE DEVELOPMENTS LTD., in accordance with the professional services agreement between the parties. In the event a contract has not been executed, the parties agree that the WSP General Terms for Consultant shall govern their business relationship which was provided to you prior to the preparation of this report.

The report is intended to be used in its entirety. No excerpts may be taken to be representative of the findings in the assessment.

The conclusions presented in this report are based on work performed by trained, professional and technical staff, in accordance with their reasonable interpretation of current and accepted engineering and scientific practices at the time the work was performed.

The content and opinions contained in the present report are based on the observations and/or information available to WSP at the time of preparation, using investigation techniques and engineering analysis methods consistent with those ordinarily exercised by WSP and other engineering/scientific practitioners working under similar conditions, and subject to the same time, financial and physical constraints applicable to this project.

WSP disclaims any obligation to update this report if, after the date of this report, any conditions appear to differ significantly from those presented in this report; however, WSP reserves the right to amend or supplement this report based on additional information, documentation or evidence.

WSP makes no other representations whatsoever concerning the legal significance of its findings.

The intended recipient is solely responsible for the disclosure of any information contained in this report. If a third party makes use of, relies on, or makes decisions in accordance with this report, said third party is solely responsible for such use, reliance or decisions. WSP does not accept responsibility for damages, if any, suffered by any third party as a result of decisions made or actions taken by said third party based on this report.

WSP has provided services to the intended recipient in accordance with the professional services agreement between the parties and in a manner consistent with that degree of care, skill and diligence normally provided by members of the same profession performing the same or comparable services in respect of projects of a similar nature in similar

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In preparing this report, WSP has relied in good faith on information provided by others, as noted in the report. WSP has reasonably assumed that the information provided is correct and WSP is not responsible for the accuracy or completeness of such information.

Benchmark and elevations used in this report are primarily to establish relative elevation differences between the specific testing and/or sampling locations and should not be used for other purposes, such as grading, excavating, construction, planning, development, etc.

Design recommendations given in this report are applicable only to the project and areas as described in the text and then only if constructed in accordance with the details stated in this report. The comments made in this report on potential construction issues and possible methods are intended only for the guidance of the designer. The number of testing and/or sampling locations may not be sufficient to determine all the factors that may affect construction methods and costs. We accept no responsibility for any decisions made or actions taken as a result of this report unless we are specifically advised of and participate in such action, in which case our responsibility will be as agreed to at that time.

Overall conditions can only be extrapolated to an undefined limited area around these testing and sampling locations. The conditions that WSP interprets to exist between testing and sampling points may differ from those that actually exist. The accuracy of any extrapolation and interpretation beyond the sampling locations will depend on natural conditions, the history of Site development and changes through construction and other activities. In addition, analysis has been carried out for the identified chemical and physical parameters only, and it should not be inferred that other chemical species or physical conditions are not present. WSP cannot warrant against undiscovered environmental liabilities or adverse impacts off-Site.

The original of this digital file will be kept by WSP for a period of not less than 10 years. As the digital file transmitted to the intended recipient is no longer under the control of WSP, its integrity cannot be assured. As such, WSP does not guarantee any modifications made to this digital file subsequent to its transmission to the intended recipient.

This limitations statement is considered an integral part of this report.

TABLE OF CONTENTS

TABLES

FIGURES

APPENDICES

1 INTRODUCTION

WSP Canada Inc. (WSP) was retained by Evendale Developments Ltd. to prepare a Hydrogeological Assessment and Water Balance Study for a proposed residential development on Block 8 of Part of Lot 31, Concession 7 in the Town of Uxbridge, herein referred to as the Site. The location of the Site is shown on **Figure 1**.

The Site (development Block 8) is approximately 0.5 ha in size and is located northeast of the intersection of Brock Street East and Donland Lane in the Town of Uxbridge, Ontario. The existing conditions at the Site are shown in **Figure 2**. The Site is currently occupied by agricultural fields in the northern half of the Site and a gravel parking lot in the southern half of the Site. The development plans provided by Masongsong Associates Engineering Limited are included in **Appendix A** and encompasses six detached residential homes and a six (6)-storey residential condominium building including one (1) level underground parking garage.

Previous reports made available for review for preparing the Hydrogeological Assessment and Water Balance Study included:

- Geotechnical Investigation Report, Sola Engineering Inc (Sola), April 2020.
- Hydrogeological Assessment and Water Balance Study, Block 6 – Part of Lot 31, Concession 7, Uxbridge, July 30, 2020.
- Hydrogeological Assessment and Water Balance Study, Part of Lot 31, Concession 7, Uxbridge, March 28, 2018.

The geotechnical characterization of the Site provided by Sola has been used to assist in identifying appropriate infiltration factors for soil types. The monitoring wells installed by Sola have been used to characterize local groundwater conditions.

This report documents the work performed to provide an understanding of the hydrogeological conditions at the Site, to prepare a water balance, to identify dewatering requirements (if applicable), and provide preliminary estimates of dewatering based on the proposed building conditions.

1.1 OBJECTIVES AND SCOPE

The need for a water balance assessment and infiltration study was identified to help support the development application process and quantify changes to site infiltration between the pre- and post-development conditions for the development plan.

The Hydrogeological Assessment and Water Balance Study has been designed to:

- Review historical information and integrate findings.
- Identify the inventory of groundwater users within 500 m of the property.
- Confirm groundwater flow directions and patterns.
- Confirm and identify potential watershed divides, if any, which control groundwater flow.
- Characterize the water quality of the shallow groundwater.
- Characterize the relationships between on-site groundwater flow systems and adjacent surface water bodies.
- Create an annual water budget for the existing conditions at the property for use as a baseline.
- Determine a future annual water budget for the proposed development scenario.
- Identify significant changes to the water balance or to the form and function of the groundwater or surface water systems that might result from future plans and provide recommendations for mitigative measures to address these changes.
- Identify potential impacts of dewatering for construction and long-term drainage of foundation drains.
- Prepare a project report.

1.2 ANALYSIS AND DOCUMENTATION

The following published information and mapping was reviewed and considered in our analysis of the Site:

- Hydrogeological Assessments - Conservation Authority Guidelines to Support Development Applications, April 2013.
- Assessment Report, South Georgian Bay Lake Simcoe Source Protection Region, Part 1 (Lake Simcoe, May 2015 update). Approved Lakes Simcoe and Couchiching Source Protection Plan.
- Lake Simcoe Protection Plan, Water Budget Offsetting Policy for LSPP 4.8-DP and 6.40 DP.
- Ministry of Environment, Conservation and Parks Water Well Information System (MECP WWIS);
- Other sources of information as listed in **Section 8.0**.

2 REGIONAL SETTING

2.1 PHYSIOGRAPHY

The regional physiography for the Site area is shown on **Figure 3**. The proposed development area lies within the Peterborough Drumlin Field physiographic region as defined by Chapman and Putnam (1984). The Peterborough Drumlin Field consists of highly calcareous till but there are local differences. The area in and surrounding the Site consists of clay plains.

Regional topography is illustrated on **Figure 4**. The topography is variable and hummocky and controls local drainage. Topography at the Site ranges from elevation 268.6 m at the north-west property boundary to 271.17 at the south-east property boundary. Topography to the east and south of the site increases gently toward the watershed divides between the Lake Simcoe watershed and the Kawartha-Haliburton Watershed and the Humber-Don River Watershed, respectively.

2.2 DRAINAGE

The Site is located approximately 3 km east of the divide between the Lake Simcoe Watershed and the Kawartha-Haliburton Watershed, and approximately 9.5 km north of the drainage divide between the Lake Simcoe Watershed and the Don-Humber River Watershed. The watershed boundaries are illustrated on **Figure 4**.

The on-site runoff generally drains to the northwest via overland flow, towards the proposed Lowe Blvd extension and is captured in the drainage ditch along Donland Lane.

2.3 REGIONAL GEOLOGY

The near surface soils are the top unit in a layered sequence of glacial and interglacial sediments that comprise the stratigraphic profile overlying bedrock beneath the Lake Simcoe region. The distribution of surficial soil types near the site are shown on **Figure 5**. The deposits and stratigraphy are described in a series of papers and posters for the regional area prepared by the Geological Survey of Canada under the direction of Dr. David Sharpe.

The stratigraphic profile beneath Oak Ridges Moraine area typically includes the following layers, from youngest to oldest:

1. Recent deposits.
2. Oak Ridges Moraine (ORM) Sediments
3. Newmarket Till.

4 Thorncliffe Formation.
5 Sunnybrook Drift.
6 Scarborough Formation.
7 Don Formation.
8 York Till.
9 Bedrock.

The ORM sediments are a complex package of granular sediments deposited in the meltwater at the later stages of the last glacial period. These deposits generally become finer, and typically become thinner and eventually pinch out away from the original outlets of meltwater. These sediments may be present as a thin layer based on the proximity of the Site to the Oak Ridges Moraine as per regional geological mapping. Certain areas with the ORM sediments may be overlain by a thin layer of Halton Till.

The Newmarket Till represents a regionally extensive stratum that is associated with the most recent period of glaciation. This till is typically dense to very hard and sandy to silty in texture with relatively low gravel content.

The stratigraphic layers between the Newmarket Till and the underlying bedrock are commonly grouped as the Lower Sediments. The Lower Sediments are considered to have been formed by similar cycles of earlier glacial advances and retreats and associated meltwater events that resulted in the deposition of the Newmarket Till and Oak Ridges Moraine sediments. Five (5) stratigraphic layers that constitute the Lower Sediments are described below, although not all are interpreted to occur below the study area.

- The Thorncliffe Formation is a complex of stratified glaciofluvial and glaciolacustrine deposits. The texture of the Thorncliffe Formation is highly variable and is best described as fine-grained, with interbedded coarse-grained material capable of yielding notable amounts of water.
- The Sunnybrook Drift is a fine-grained material deposited in glacial and proglacial lacustrine depositional environments (diamicton). The advance of the ice sheet blocked the main drainage from the regional basin, which caused water levels to rise and form a deep lacustrine environment with deposits including varved clays.
- The Scarborough Formation is a coarsening upward sequence of sediment that ranges from clay/silt rythmites (fine-grained) to channelized cross-bedded sands (coarse-grained). The coarser fractions of this delta are a potential source of groundwater.
- The Don Formation is only rarely preserved within southern Ontario and consists of alternating beds of fossiliferous sand and mud.
- The York Till was deposited immediately overlying the bedrock by the preceding Illinoian glaciation. This till occurs only sporadically within the study area and is believed to be preserved in lows upon the bedrock surface. The till is dark grey with a sandy silt matrix and includes clusters of the underlying shale.

The bedrock in the study area is mapped as shale/limestone/dolostone/siltstone of the Blue Mountain Formation (Armstrong and Dodge, 2007) as illustrated on **Figure 6**. The depth to bedrock is estimated to be between 80 to 85 metres below ground surface, based on bedrock topography mapping and topographic mapping of the ground surface (Gao et al., 2006). A map of overburden thickness is provided on **Figure 7**. The thickness of overburden is typically greatest along the crest of the Oak Ridges Moraine or in areas where there are topographic lows in the underlying bedrock surface.

2.4 REGIONAL HYDROGEOLOGY

The movement of groundwater through the subsurface is controlled by the hydraulic gradients and the relative distribution of coarse and fine-grained sediments. In general, water will move laterally through coarse-grained sediments (sands and gravels) and vertically through fine-grained sediments (silts and clays). As such, the geologic units are typically grouped into hydrostratigraphic units that reflect the capacity of the geologic units to transmit water. Hydrostratigraphic units are considered to be either aquifers (with good capacity to transmit water) or aquitards (which typically impede transmission of water). Ultimately the distribution and interconnection of aquifers and aquitards are responsible for observed groundwater movement.

Earthfx Inc. (2006) grouped the regional stratigraphic profile into a seven layer hydrostratigraphic profile as follows:

1 Recent Deposits
2 Oak Ridges Aquifer Complex (ORAC).
3 Newmarket Aquitard.
4 Thorncliffe Aquifer Complex.
5 Sunnybrook Aquitard.
6 Scarborough Aquifer Complex.
7 Bedrock.

The Oak Ridges Aquifer Complex is a regional aquifer system in Ontario that corresponds to the area where the Oak Ridges Sediments are deposited. The aquifer is a significant source of groundwater for domestic, commercial, industrial, institutional, agricultural, and municipal water supplies. The ORAC provides baseflow to the headwaters of creeks and rivers where the Halton Aquitard is absent. The shallow water table will typically be observed within this layer. The ORAC is present at the Site.

The Newmarket Aquitard consists of the Newmarket Till and low permeability deposits that are known to infill the erosional channels. The Newmarket Aquitard is considered to be a leaky confining layer that provides protection from contamination to aquifers within the underlying hydrostratigraphic units. The Newmarket Aquitard may be present at ground surface beneath the southern part of the Site.

The Thorncliffe Aquifer Complex consists of fine to coarse-grained sediments of the Thorncliffe Formation. Local sand and gravel deposits within the Thorncliffe Aquifer Complex provide high yield wells. Groundwater in this layer is typically under pressure and in areas to the south of Aurora, the groundwater is under artesian pressure which can result in flowing wells.

The Sunnybrook Aquitard separates the Thorncliffe and Scarborough Aquifer Complexes. This aquitard demonstrates low permeability, provides some resistance to vertical groundwater movement, and protects the underlying aquifer from potential contaminant movement.

The Scarborough Aquifer Complex consists of fine to coarse-grained sediments associated with the Scarborough Formation. In general, these sediments tend to be coarse-grained and thicker where they fill topographic lows and valleys in the underlying bedrock surface. Groundwater within the Scarborough Aquifer Complex is typically under pressure, but only local artesian conditions occur. Locally, the Scarborough Aquifer Complex produces high well yields suitable for municipal or commercial wells. Due to its depth and presence of shallower aquifers, the Scarborough Aquifer Complex is not exploited extensively for private water supplies.

2.4.1 REGIONAL GROUNDWATER MOVEMENT

In general terms, precipitation infiltrates vertically into the surficial clay and sand/gravel soil units. Groundwater will primarily move downward to the water table within the upper aquifer or aquitard unit. Groundwater will then tend to flow up or down through the aquitard units and laterally within the aquifers. Groundwater flow patterns can be influenced by established watercourses where there is potential for groundwater discharge to supply baseflow into the watercourses. The rate of groundwater discharge is controlled by the relative permeability of the recent deposits at the base of the streams. Discharge as baseflow is typically low through fine-grained base soils and higher where the streams have eroded down into coarser aquifers.

The horizontal groundwater movement through the subsurface aquifers tends to reflect the ground surface topography and the presence of stream channels.

3 WORK PERFORMED

The work program for the Hydrogeological Assessment and Water Balance Study included the following activities:

1. Coordinating field work.
2. Undertaking field reconnaissance to inventory site conditions. Site features were located using a calibrated, hand held Global Positioning System (GPS) device with sub-metre accuracy;
3. Measuring groundwater elevations at the monitoring wells;
4. Conducting in-situ hydraulic response tests on the two (2) on-site monitoring wells to characterize the hydraulic conductivity in the fill and native soil layers.
5. Conducting six (6) monthly site visits (October, November, January, March, April, May) to collect groundwater levels from the on-site monitoring wells. The first monitoring event was conducted in conjunction with the in-situ hydraulic response testing. Pressure transducers were installed in both monitoring wells to supplement the manual water level measurements.
6. Analyzing field data from the field investigation, Sola Geotechnical Investigation and the Hydrogeological Assessment and Water Balance Study prepared by WSP for the entire development:
7. Preparing an annual climatic water budget and Site-specific water balance for Pre- and Post-Development conditions;
8. Documenting applicable policy areas and provide opinions on the effect of these policies on the proposed Development; and
9. Identifying dewatering requirements (if applicable), and providing preliminary estimates of dewatering volumes based on the proposed building conditions;
10. Providing conclusions and recommendations.

3.1 BACKGROUND REVIEW OF GEOLOGICAL CONDITIONS

The geologic conditions beneath the proposed development were reviewed using published map sources, records from work on adjacent properties, and the WWIS database as maintained by the MECP.

Water well records within a 500-metre radius of the Site were reviewed to obtain information on existing wells and to provide information on the geology of the area. A summary of the well record search is provided in Table B-1, **Appendix B** and water well record locations are plotted on **Figure 8**.

3.2 PREVIOUS GEOTECHNICAL INVESTIGATIONS

Sola was retained by Evendale Developments Limited to carry out geotechnical investigations for the proposed residential condominium building located in the southern half of the Block 8 development. The investigations consisted of drilling six (6) boreholes to a maximum depth of 10.67 m, with monitoring wells installed in two (2) of the boreholes. The locations of the borehole and monitoring well locations are shown on **Figure 2** and a copy of the borehole logs are included in **Appendix B.**

3.3 SITE RECONAISSANCE AND GROUNDWATER ELEVATION MEASUREMENTS

WSP staff visited the Site on August 19 and October 21, 2020 and five monthly site visits (November, January, March, April and May, 2021) are planned to measure static groundwater elevations at the two (2) existing monitoring well onsite (BH2 and BH5). The purpose of the groundwater level monitoring program is to characterize seasonal changes to groundwater elevations and determine the high seasonal water level.

A pressure transducer/datalogger and a corresponding Barologger was installed at BH2 and BH5 on October 21, 2020 to automatically record groundwater levels on a regular basis. The groundwater monitoring program will continue after this submission, with regular manual measurements and continued recording of groundwater elevation change using a datalogger for up until May 2021. WSP shall prepare a technical memorandum to summarize the groundwater elevation data obtained at the end of this monitoring period.

3.4 SINGLE-WELL HYDRAULIC RESPONSE TEST

Single well hydraulic response tests were performed to estimate the hydraulic conductivity of the aquifer materials adjacent to the well screens in BH2 and BH5.

For this program, the single well hydraulic response test consisted of monitoring the recovery of the water level after a short pumping/bailing interval. The recovery data obtained from these response tests was adequate to estimate the *in situ* hydraulic conductivity of the saturated intervals adjacent to the monitoring well screen.

The hydraulic conductivity was estimated from the data using the methods of Hvorslev (1957).

The hydraulic response tests for the on-site wells were performed on October 21, 2020. The results of the Single Well Response Test Analysis are summarized in **Table 2**. Detailed results are provided in **Appendix C**.

Additional single well response tests were completed by WSP on January 25, 2018 at MW1 and MW2, located at the neighbouring development block 6 east of the Site. The hydraulic conductivities estimated from the data obtained in January 2018 were analyzed as part of the hydrogeological assessment, and are discussed in detail in **Section 4.5.**

3.5 WATER QUALITY

Representative samples of groundwater were collected on February 14, 2017 from MW1 and MW2, located at the neighbouring development block 6 east of the Site. A duplicate sample was taken at MW2 for QA/QC purposes. Samples were collected via the dedicated Waterra™ inertial pump placed in the monitoring well. Field measurements of temperature, electrical conductivity, and pH were recorded at the time of sample collection. The water samples were collected in sample bottles prepared by and provided by ALS Environmental Laboratories (ALS) located in Waterloo, Ontario.

The water quality samples were submitted to determine concentrations of:

- General water quality parameters (major cations, major anions, pH)
- Dissolved Metals
- Dissolved Organic Carbon
- Nutrients.

The Certificates of Analysis provided by ALS are provided in **Appendix D**.

The water quality results were reviewed with respect to Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition for All Types of Property Use (Coarse Textured Soil), hereinto referred to as the "MECP Table 2 SCS", as outlined in the Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act (April 15, 2011). This table was selected as it provides a conservative assessment of potential water quality concerns in groundwater as the area surrounding the Site is serviced by municipal water supplies.

3.6 WATER BUDGET ANALYSIS

A Water Budget provides an accounting of the water inputs and water outputs within a defined area. In this case, the area of the proposed development is used to estimate the water budgets in the existing condition (Pre-Development) and in the future condition (Post-Development).

The basic assumption of a water budget analysis is that there is a balance between water inputs and outputs, unless there is a clear understanding that water is being removed from storage within the system. The water budget is typically represented in a simple form as:

Water In = Water Out

P + EI = ET + IR + RO + EO

Where:

P	=	Precipitation
EI	=	External Inputs (including run-on, irrigation, and vertical/lateral transfers)
ET	=	Evapotranspiration
IR	=	Infiltration Recharge
RO	=	Runoff
EO	=	External Outputs (including water taking, and vertical/lateral transfers)

In more complex scenarios, lateral inputs through groundwater and surface water, movement between subsurface aquifer layers, and removal from storage can also be considered.

The objectives of the Water Budget Analysis are to:

a) quantify the water budget equation for the existing conditions;

b) quantify the water budget equation for proposed future conditions; and

c) illustrate that there is either no significant change (i.e. a water balance) between the existing or future conditions, or that mitigation methods can be employed to minimize the estimated change.

The Water Budget Analysis was completed in three main steps:

Step 1) Analysis of Climatic Data;

Step 2) Pre-Development Water Budget; and

Step 3) Post-Development Water Budget (including mitigation).

The water budget analysis has been completed using methods outlined in "Hydrogeological Technical Information Requirements for Land Development Applications" (MOEE, 1995).

3.6.1 ANALYSIS OF CLIMATE DATA

Climate data available from on-line resources maintained by the Meteorological Service of Canada (Environmental Canada) were obtained and analyzed to determine the appropriate values for annual average precipitation and evapotranspiration. The surplus left over after subtraction of the evapotranspiration from the average precipitation is considered to represent the quantity of water available for infiltration and runoff under existing conditions.

Climate data was obtained for the Udora Climate Station for the period from 1981 until 2010. These data are provided in Table E-1 (**Appendix E**). Mean monthly temperatures were calculated by averaging mean monthly minimum and maximum temperatures. Temperature data were derived from the 30 year (1981-2010) climate data summaries.

The Thornthwaite-Mather method was used to estimate potential and actual evapotranspiration on a monthly basis. The Thornthwaite-Mather method is based on an empirical relationship between potential evapotranspiration and

mean air temperature. The method also takes into account the water holding capacity for the soil to compute the actual evapotranspiration and the resulting moisture surplus that is available for infiltration and runoff.

The water holding capacity of the soil depends on two different factors – the soil type and structure, and the type of vegetation growing on the surface. Different types of soil hold different amounts of moisture storage capacity, while different species of vegetation will send roots into the soil to different depths and therefore retain varying amounts of moisture. The water holding capacity for each soil type/vegetation type combination found on the Site was determined from the Environmental Design Criteria of the Storm Water Management Planning and Design Manual published by the MECP in 2003.

The monthly estimates were used to calculate an annual average for precipitation, potential evapotranspiration, actual evapotranspiration, and available moisture surplus for each combination of soil and vegetation type found on-site. The moisture surplus represents the quantity of water available for infiltration and runoff on an annual average basis. Tables that document the details of the Thornthwaite-Mather analysis for the combinations of soil type and land use are provided in **Appendix E**.

3.6.2 PRE-DEVELOPMENT WATER BUDGET

The Pre-Development Water Budget was estimated using the approach recommended in Table 2 of the "Hydrogeological Technical Information Requirements for Land Development Applications" (MOEE, 1995). The steps taken to estimate the Pre-Development Water Budget included:

1. Identify sensitive features and to observe existing topography, soil types, and other controls on infiltration and runoff.
2. Delineating drainage catchments and sub-catchments based on observed drainage outlets and physical characteristics as described below.
3. Estimating the quantities of infiltration and runoff for each of the sub-catchment areas and preparing summary estimates for catchments related to identified drainage outlets and for the proposed development area.

The drainage catchments and sub-catchments were defined by considering the following factors:

- Existing elevations;
- Existing property boundaries;
- Post-development features and property boundaries;
- Natural topographical features;
- Slope ratio; and
- Land cover, and
- Land use.

The sub-catchments defined for the Pre-Development Water Budget also considered the proposed development areas and future drainage considerations for the proposed development. This was incorporated into the analysis to be able to demonstrate changes in drainage to the identified outlets and infiltration beneath the development area. The defined sub-catchments for the Pre-Development Water Budget are shown on **Figure 9** and in Table F-1 (**Appendix F**).

The Infiltration Factor for each Pre-Development sub-catchment was estimated by adding the sub-factors for topography, soil type, and land cover as recommended in the MECP methodology. A geographic information system (GIS) was used to evaluate the topography, soil type and land use for each of the Pre-Development, Current Condition, and Post-Development scenarios and to generate a set of sub-catchments that can be used in analysis of each scenario. Section 5 provides a characterization of the Site in terms of the topography, soil type, and land use as input into the water budget analysis. The calculated infiltration factor for each catchment was reviewed and updated manually, as a confirmation that they reflect actual conditions. Assumptions applied to the Pre-Development water budget scenario are described in Section 5.2.

The volume of Pre-Development Infiltration was estimated as the product of [sub-catchment area] x [moisture surplus] x [Infiltration factor]. The Pre-Development Runoff was estimated by subtracting the volume of infiltration

from the total volume of moisture surplus for each sub-catchment. A detailed table to document the calculations of the Pre-development Water Budget is provided in **Appendix F**.

3.6.3 POST-DEVELOPMENT WATER BUDGET

The Post-Development Water Budget was estimated using a similar approach as outlined for the Pre-Development case. The proposed development plan and future drainage plan were used to establish new drainage sub-catchments that relate to the outlets identified in the Pre-Development case. Within each drainage sub-catchment, the area of pervious soils and impervious development (roads, driveways, amenities, and roofs) were estimated based on the Site and grading plans as provided by Cole Engineering.

For the pervious areas, the quantity of infiltration was calculated using the [pervious area] x [precipitation surplus] x [Infiltration Factor]. The Infiltration Factors were reviewed to correspond to the Post-Development conditions. The runoff for the pervious areas was estimated by subtracting the volume of infiltration from the total volume of precipitation surplus for the pervious area in each sub-catchment.

The volume of runoff from the impervious surfaces was estimated using the area of impervious surfaces and the volume of precipitation. A factor of 10% was considered to represent some evaporation in the course of runoff. This value is consistent with assumptions made on adjacent lands.

The proposed residential development is to be serviced by municipal water and sewage system. The Post-Development Water Budget reflects this.

Details of the Post-Development Water Budget calculations are provided in **Appendix G**.

4 OBSERVATIONS

The information obtained during previous site studies was reviewed and analyzed to characterize the soil profile and the groundwater system at the Site.

4.1 SOIL PROFILE

According to previous geotechnical investigations conducted at the Site by Sola (April, 2020), the proposed development area is underlain by a shallow layer of topsoil which is followed by a layer heterogenous mixture of fill or probable fill ranging in texture from gravel, sand, silt and clay to a thickness of 2.3 to 3.1 m. The Fill overlies a layer of clayey silt to silty clay on the east side of the property and overlies layers of silty sand on the west side of the Site. This pattern is consistent with the surficial geology mapping presented on a regional scale in **Figure 5** and with stratigraphy information presented in water well records obtained through the MECP. The information presented in the Sola borehole logs from review of physical samples does not confirm that the clayey silt to silty clay formation will typically overlie the silty sand formation but this is implied from regional stratigraphic understanding.

4.2 GROUNDWATER ELEVATIONS

As noted in the Sola geotechnical report (2020), the groundwater elevations at the two (2) on-site monitoring well (BH2 and BH5) were measured in April 2020. Additional groundwater elevations were measured by WSP at the on-site monitoring wells installed by Sola in August and October 2020. As part of the groundwater elevation monitoring program for the entire property, the groundwater elevations at one on-site monitoring well (MW1) and one off-site monitoring well (MW2) were measured in January, February and April 2018 and were measured again on a monthly basis for a period of one (1) year. Additional groundwater elevations were measured from monitoring well MW1 in May 2020, and from monitoring well MW2 in May, August and October 2020. MW1 was not available after May 2020. The groundwater elevation measurements are summarized in **Table 1.**

The measured groundwater depths and elevations at the on-site monitoring wells indicate that groundwater levels were observed to vary between 1.59 and 2.49 mbgs at BH2 and 1.49 and 1.55 mbgs at BH5 between April and October 2020. The observed groundwater level ranges correspond to groundwater elevation ranges of 267.71 to 268.61 m above sea level (masl) for monitoring well BH2 and 267.76 masl to 267.81 masl for monitoring well BH5.

The groundwater elevations in the monitoring well at BH5 reflect the water levels within the fill formation on the west side of the Site. The groundwater elevations at BH2 reflect the water levels within the clayey silt to silty clay on the central and east side of the proposed site of the condo structure.

The measured groundwater depths and elevations at MW1 and MW2 indicate that groundwater levels were observed to vary between 0.34 and 1.14 mbgs at MW1 and 1.12 and 1.76 mbgs at MW2 throughout 2018 and the beginning of 2019. The observed groundwater level ranges correspond to groundwater elevation ranges of 267.09 to 267.89 m above sea level (masl) for monitoring well MW1 and 267.41 masl to 268.05 masl for monitoring well MW2.

Seasonal high groundwater levels were observed in April 2020 in BH2 (268.61 masl) and BH5 (267.81 masl), and in January 2018 in MW1 (268.10 masl) and in MW2 (268.05 masl). The measured seasonally high groundwater levels correspond to depths of 1.59 mbgs at BH2, 1.49 mbgs at BH5, 0.13 mbgs at MW1 and 1.12 mbgs at MW2. The lowest groundwater levels were observed in October 2020 at BH2 (267.71 masl), in August 2020 at BH5 (267.76 masl), in July 2018 at MW1 (267.09 masl) and at MW2 (267.41 masl). Typically, groundwater levels are observed to be the highest between February and May and also in the late fall, while groundwater levels tend to be lowest between July and October. The observed groundwater levels generally follow the typical groundwater level trends.

The seasonally high groundwater elevations measured to date from available monitors and the interpreted groundwater flow direction are presented on **Figure 9.** The apparent groundwater flow direction is inferred to be in the northerly direction. This inferred groundwater direction is generally consistent with topography at the Site and regional groundwater flow patterns, which indicates a gradual slope from south to north.

4.3 WATER USE

The Site is not currently serviced as it is a vacant lot. The proposed development will be municipally serviced for water and sewage.

4.3.1 MECP WATER WELL SEARCH

A list of MECP water well records is provided in **Appendix B**. **Figure 8** illustrates the locations of wells located within 500 m of the Site as per the MECP WWIS. The well record database includes seventy-seven (77) water well records within a 500-metre radius of the Site. Of the well records, ten (10) are water supply wells for domestic, irrigation and livestock purposes, twenty-two (22) are test holes, seventeen (17) are abandoned for other purposes, twelve (12) are monitoring wells, fourteen (14) are unknown, one (1) is a dewatering well, one (1) is for other purposes.

Of the ten (10) water supply wells, four (4) draw water from sand lenses at a depth less than 20 m and six (6) draw water from sand lenses at depths ranging between 20 and 40 m. It is our understanding that this area is municipally serviced for water and that most of the domestic water supply wells have been removed from active use as this area has been developed.

It is possible that the MECP WWIS database includes other wells that are incorrectly located and there may be some wells for which well records are not on file at the MECP.

4.4 SINGLE-WELL HYDRAULIC RESPONSE TESTS

A single well hydraulic response test was performed to estimate the hydraulic conductivity of the aquifer materials adjacent to the well screens in BH2, BH5, MW1 and MW2.

For this program, the single well hydraulic response test consisted of monitoring the recovery of the water level after a short pumping/bailing interval. The recovery data obtained from these response tests was adequate to estimate the *in situ* hydraulic conductivity of the saturated intervals adjacent to the monitoring well screen.

The hydraulic conductivity was estimated from the data using the methods of Hvorslev (1957).

The hydraulic response tests for MW1 and MW2 were performed on February 1, 2018, and tests for BH2 and BH5 were performed on October 21 and 22, 2020. The results of the Single Well Response Test Analysis are summarized in **Table 2**. Detailed results are provided in **Appendix C**.

The hydraulic conductivity estimates obtained from the on-site monitoring wells for the single well hydraulic response tests were 9.84×10^{-8} m/sec, 6.20×10^{-6} m/sec and 4.01×10^{-7} m/sec for BH2, BH5 and MW1, respectively. These results are consistent with the observed soil descriptions of the clayey silty at BH2, fill (sand) at BH5 and silty sand at MW1 in which the monitoring wells are screened.

The hydraulic conductivity estimate obtained from the off-site monitoring wells for the single well hydraulic response tests was 4.90×10^{-7} m/sec for MW2. This result is consistent with the observed soil descriptions of the silty sand at MW2 in which the monitoring wells are screened.

4.5 WATER QUALITY TESTING

The results of water quality testing at the one on-site (MW1) and one off-site (MW2) monitoring wells are summarized in **Table 3**. The water quality analysis reports as provided by ALS are presented in **Appendix D**.

The concentrations of the parameters tested are less than the MECP Table 2 SCS values. Additional groundwater quality testing will be required to determine potential discharge options during construction dewatering activities.

5 WATER BUDGET ANALYSIS

The Water Budget Analysis is presented in the following sections. Section 5.1 describes the analysis of historical climate data to estimate annual average precipitation and potential evapotranspiration. Section 5.2 describes the Pre-Development Water Budget. Section 5.3 Describes the Post-Development Water Budget including evaluation of the benefits of identified mitigation opportunities.

5.1 CLIMATE-BASED WATER BUDGET

The climate-based water budget calculations are included in Tables E-1 to E-3 (**Appendix E**) and are summarized in **Table 4**. The average annual precipitation for the thirty year normal data between 1981 and 2010 is about 886.2 mm/m^2/year (mm/year). The annual potential evapotranspiration is calculated in Table E-1 at 575.9 mm/year. This equates to a potential water surplus of 394.8 mm/year and a soil moisture deficit of 84.5 mm/year. Thus the net annual water surplus based on potential evapotranspiration is 310.3 mm/year.

The calculations were expanded to include the water holding capacity of the soil as presented in Tables E-2 to E-3. This will produce a total moisture surplus based on the calculated actual evapotranspiration. Two (2) combinations of soil type and vegetation type were identified on the Site property for the Pre-Development and Post-Development scenarios. The majority of the surficial soil at the site is considered to be clay loam. The land use classifications and the corresponding water holding capacities are:

— Clay Loam, Residential Lawn (100 mm/year); and

— Clay Loam, Uncultivated (250 mm/year).

Consideration of these factors produces a range of net annual moisture surplus between 321.8 and 336.8 mm/year as summarized in **Table 4**. The soils with higher water holding capacity effectively increase the water removed as evapotranspiration.

The calculated moisture surplus occurs during the winter, spring and fall months, and a water deficit occurs during the summer months. Much of the water surplus in the winter accumulates as snow. Snowmelt during the spring results in the runoff or infiltration of precipitation that is effectively equivalent to the winter and spring water surplus.

5.2 PRE-DEVELOPMENT WATER BUDGET

The Pre-Development Water Budget was developed based on topographic information provided by Ontario Base Mapping and the Pre-Development Drainage Plan provided by Cole Engineering (Overall Development Plan).

5.2.1 PRE-DEVELOPMENT CATCHMENTS

A water balance for the larger development block was prepared by WSP in 2018. The calculations for this study considered the original study area. This analysis focusses on development Block 8, which is within the larger development block.

Figure 9 illustrates the delineation of drainage catchments and sub-catchments for the pre-development condition at the Site. The Site is comprised of one internal (on-site) catchment. The catchment area has been further subdivided. The drainage sub-catchments are based on similar slopes, soils, and vegetation/land use. The drainage sub-catchments also include consideration of post-development drainage boundaries so that changes to drainage areas can be evaluated for the post-development conditions. The outlets for drainage of the identified Pre-Development catchment is as follows:

On-Site Catchments:

— **Pre-Development On-Site Catchment A:** Drains to the northwest via overland flow and is captured in the drainage ditches along both sides of Donland Lane. Runoff subsequently flows south along Donland Lane and exits the Site through the southern property boundary.

Table F-1 (**Appendix F**) provides a summary of the data attributes used to estimate the infiltration factor for each pre-development catchment and sub-catchment. The infiltration factor determined the proportion of the annual water surplus that would infiltrate or runoff within each sub-catchment.

5.2.2 PRE-DEVELOPMENT ANALYSIS

Properties associated with area, slope, soil type, and land cover were analyzed and assigned to each Pre-Development sub-catchment. The values assigned to each Pre-Development sub-catchment are provided in Table F-1 (**Appendix F**). These values were used to estimate an Infiltration Factor. The Infiltration Factors were reviewed to confirm that they are appropriate and adjusted if necessary. Existing paved areas were assumed to be impervious and to generate runoff equivalent to the precipitation volume minus a 10% evaporative loss.

Table F-1 includes the overall analysis of infiltration and runoff for the Site. Table F-1 also documents the calculation of volumes associated with input and output parameters for the Pre-Development conditions. These volumes are also expressed in terms of the number of mm of water within each sub-catchment area.

A summary of the Pre-Development water budget calculations is provided in **Table 5**. These values will be used to assess the changes that proposed development will create relative to the pre-development conditions.

5.2.3 PRE-DEVELOPMENT INFILTRATION

The estimated total infiltration for the Site is 2,216 m^3/yr or an equivalent of 162 mm/year (mm/m^2/yr). The calculated infiltration represents approximately 18.2% of the annual precipitation (886.2 mm/yr) and 40.5% of the calculated annual water surplus (399.2 mm/yr).

5.2.4 PRE-DEVELOPMENT RUNOFF

The total runoff for the Site is 3,256 m^3/yr or an equivalent of 238 mm/year. The calculated runoff represents approximately 26.8% of the annual precipitation (886.2 mm/yr) and 59.5% of the estimated annual water surplus (399.2 mm/yr).

5.3 WATER BUDGET– POST-DEVELOPMENT CONDITIONS

The Post-Development Water Budget was based on the proposed site plan for development Block 8 as shown on **Figure 10**. The Post-Development scenario introduces six detached residential homes and a six (6)-storey residential condominium building including one (1) level underground parking garage and new roadways.

5.3.1 POST-DEVELOPMENT CATCHMENTS

Under post-development conditions, the Site has been subdivided into four (4) on-site catchments. Catchment and sub-catchment delineations in Pre-Development conditions were maintained for the Post-Development analysis.

Under Post-Development conditions, runoff from within the Site drains off-site via the on-site storm sewer system and overland flow. The outlets for each sub-catchment are summarized below:

On-Site Catchments:

- **Post-Development On-Site Catchment PA:** Drains off-site to the Barton SWM Pond (north of Site) via rear lot catch basins (RLCBs) and the on-site storm sewer system.
- **Post-Development On-Site Catchment PB:** Drains off-site to the Barton SWM Pond via the on-site storm sewer system.
- **Post-Development On-Site Catchment PC**: Drains off-site to the Barton SWM Pond via the on-site storm sewer system.
- **Post-Development On-Site Catchment PD**: Drains off-site to the Barton SWM Pond via the on-site storm sewer system.

Runoff from the developed areas in on-site catchment areas will be affected by the creation of buildings and driveway areas.

For the purpose of this analysis, Catchment PA is shown to generate runoff from rooftops and driveways that is inferred to be directed to the rear lot catchbasins. It is possible that some of this runoff from impervious surfaces may reach the ultimate outlet after being transferred via Catchment PB. This detail is not considered to change the finding of this analysis in terms of amount of runoff generated.

5.3.2 POST-DEVELOPMENT ANALYSIS

Properties associated with area, slope, soil type, and land cover were analyzed and assigned to each Post-Development sub-catchment. The values assigned to each Post-Development sub-catchment are provided in Table G-1 (**Appendix G**). These values were used to estimate an Infiltration Factor. The Infiltration Factors were reviewed to confirm that they are appropriate and adjusted if necessary.

Table G-1 includes the overall analysis of the total Study Area's infiltration and runoff. Table G-1 also documents the calculation of volumes associated with input and output parameters for the Post-Development condition. These volumes are also expressed in terms of the number of mm of water within each sub-catchment area. The volumes are summed by catchment and for the total property area.

Assumptions incorporated into the water budget for the Post-Development scenario included:

1) Impervious surfaces (roads, driveways and buildings) are assumed to have a 10% evaporative loss.

2) Runoff is assumed to be conveyed directly to the outlets and not infiltrated.

A summary of the Post-Development water budget calculations is provided in **Table 5**.

5.3.3 POST-DEVELOPMENT INFILTRATION

In the post-development condition, the Site will contain approximately 8,801 m^2 (64%) of impervious surfaces (44% roads, driveways and amenities and 20% building roofs). This would result in a net infiltration of 818 m^3/year or 60 mm/yr. The net infiltration would reflect approximately 7% of the precipitation (886.2 mm/yr).

5.3.4 POST-DEVELOPMENT RUNOFF

The introduction of impervious surfaces will increase the total runoff from the developed area. The total runoff generated by the proposed development area is 7,837 m^3/yr or 572 mm/year. The total calculated Post-Development runoff represents approximately 65% of the annual precipitation (886.2 mm/yr).

5.3.5 COMPARISON WITH PRE-DEVELOPMENT

Table 5 provides a comparison of the water budget estimates for the Pre-Development and Post-Development cases. The total on-site infiltration is decreased by approximately 63% or 1,399 m^3/yr. The introduction of additional impervious surfaces increases total runoff by 141% or 4,581 m^3/yr. Review of Table G-1 (**Appendix G**) shows that approximately 40% of the post-development runoff comes from the road network (Catchment PB) and 41.5% comes from the area of the proposed condo building and associated parking area (Catchment PC). The runoff generated from the impervious surfaces in the post-development scenario has entirely been captured by the network of onsite catch basins and is redirected from the south property boundary to the Barton SWM Pond.

Part B of **Table 5** shows that approximately 2,239 m^3/yr of runoff could be available from building rooftops for redirection to enhance infiltration within Block 8. Only 62% of this runoff would be required to off-set the infiltration deficit. Previous work on other parts of the development have identified challenges in demonstrating that enhanced infiltration can be achieved to fully off-set the deficit. This opportunity could potentially be investigated further, but experience with the low permeability of the native soils, high water table, and conditions associated with the proposed construction of underground parking suggest that there may only be potential to achieve a minor benefit associated with disconnection of roof leaders in the rear lots of the residential block. This benefit can be calculated on request.

LSRCA provides a program for developers to pay a fee to support initiatives to off-set infiltration within the LSRCA area in lieu of the effort and costs to design and implement measures to enhance infiltration.

5.4 WATER QUALITY

The water budget analysis must also consider potential changes to water quality that could be experienced in relation to the proposed development. The following sections describe the typical contaminants associated with the current and future land uses.

5.4.1 EXISTING CONDITIONS

The Site is currently vacant. As such, there are no activities present that could potentially impact groundwater quality at this time.

5.4.2 FUTURE CONDITIONS

The proposed Post-Development condition includes new driveway, parking lot, and roadway areas. These areas may be a future source of contamination to groundwater infiltration or surface water runoff by winter road de-icing agents. The most effective method of reducing potential impacts from salt or other winter road de-icing agents is to minimize the mass/volume of material applied through the use of Best Management Practices (BMPs). Any pervious areas used for winter snow storage may also become potential sources of contamination from winter road de-icing agents. BMPs recommend storing snow on impervious surfaces.

The driveway, parking lot, and roadway areas may also be a potential sources of petroleum hydrocarbons. These are typically contained in vehicles. The release of these substances will typically be the result of accidents. These potential releases could result in impairment of water quality by infiltrating into the groundwater. The risk of an accident occurring at the Site is low considering the only traffic will be the residents who occupy the building.

In pervious areas, soil-enrichment agents (i.e. fertilizers) and/or herbicides may also be a source of contamination. Application of these products should be minimized in order to reduce potential contamination.

6 DEWATERING ASSESSMENT

The potential requirements for dewatering in association with construction of the proposed residences and for long-term drainage from foundation drains is assessed below. The potential requirements for permitting associated with dewatering activities are as follows:

- Takings of less than 50,000 L/day at any one time do not require a permit;
- Takings of greater than 50,000 L/day but less than 400,000 L/day at any one time requires registration with the Environmental Activity and Sector Registry (EASR); or
- Takings of greater than 400,000 L/day at any one time for the project will require a Category 3 Permit to Take Water (PTTW).

WSP has prepared a preliminary assessment of the dewatering requirements and the associated impacts associated with construction and long-term drainage.

6.1 DEWATERING EQUATIONS AND ASSUMPTIONS

Given the subsurface conditions encountered in the study area, equations are used to account for excavations under unconfined groundwater conditions. For the purposes of these calculations, long narrow trench equations are assumed to be more appropriate to estimate flows for the foundation excavation, since the length to width ratio of the excavation is greater than 1.5.

LONG NARROW TRENCH EQUATION – UNCONFINED CONDITIONS

Dewatering volumes were estimated using the following equation from Powers (1992) for drainage trench of finite length with a length to width ratio of greater than 1.5 for an unconfined system:

$$Q = \frac{xK(H^2 - h^2)}{In\frac{R_o}{r_s}} + 2\left[\frac{xK(H^2 - h^2)}{2L}\right]$$

where Q is discharge (m^3/s), x is the trench sidewall length (m), K is hydraulic conductivity (m/s), H is initial water level (m), h is the required drawdown (m), R_0 is the equivalent radius of influence (m), and r_s is the equivalent well radius (m). For more details, please refer to Powers (1992). Using the equation for a long, narrow system provides a more conservative estimate for dewatering rates when compared with using the equation for a drainage trench from a line source.

DARCY'S LAW

Dewatering volumes for the calculation of seepage across the base of the excavation was estimated using the empirical Darcy's Law equation as described in Powers (1992):

$$Q = K_V A i$$

where Q is discharge (m^3/s), K_V is vertical hydraulic conductivity (m/s), A is cross-sectional area (m^2), and i is the hydraulic gradient.

EQUIVALENT RADIUS OF INFLUENCE (R_O)

The equivalent radius of influence R_0 is assumed to be equivalent to the zone of influence (ZOI). R_0 was estimated using the empirical Sichart equation as described in Powers (1992):

$$R_0 = 3000(H - h)\sqrt{K}$$

where R_0 is the equivalent radius of influence or ZOI (meters), H is the initial water level (meters), h is the required drawdown (meters), and K is hydraulic conductivity (meters/second).

6.2 ASSUMPTIONS

A number of assumptions were incorporated based on the site-specific data collected in site investigations and information about the proposed development. The assumptions related to construction dewatering are as follows:

- No measures are to be put in place to restrict flows into the excavations (e.g., sheet piling, caissons) to provide more conservative (overestimate) dewatering rates;
- The aquifer is uniform, continuous and of infinite extent;
- The proposed elevations of the building footing (October 2020) was provided to WSP by Keith Loffler Design Inc and McAlpine Architect Inc and are interpreted to range between 266.55 and 268.05 masl as presented in **Appendix D.** The condominium building basement footprint has been subdivided to represent three areas of footing elevations as presented in **Figure 12**. The footings for the main building are to be at 268.05 and the lower footings will be associated with the western part of the underground parking.
- The dimensions of each area used to estimate potential dewatering requirements are outlined below:
  - Area A – Proposed footing elevation of 266.55 masl – 53 x 18 m
  - Area B – Proposed footing elevation 267.05 masl – 9 x 18 m
  - Area C1 – Proposed footing elevation 268.05 masl – 62 x 22 m
  - Area C2 – Proposed footing elevation 268.05 masl – 22 x 19 m (for dewatering estimates, this section of the building basement is assumed to be rectangular in shape)
  - Area C3 – Proposed footing elevation 268.05 masl – 19 x 18 m
- Based on a review of the shallow soils observed during the Sola drilling, the majority of excavations for the building foundations are anticipated to be completed within the shallow layer soils described as fill. Conservative dewatering rates for excavation and long-term drainage were estimated using the estimated hydraulic conductivity for the shallow fill material, consisting of sand and some silt (6.20×10^{-6} m/sec);
- For the purposes of estimating flux across the base of the excavation, vertical hydraulic conductivity was used in the calculation using the Darcy equation. The vertical hydraulic conductivity is assumed to be an order of magnitude lower than the horizontal hydraulic conductivity (6.20×10^{-7} m/sec for the conservative dewatering rate);
- The vertical hydraulic gradient was assumed to be 0.1 m/m;
- Dewatering during construction is assumed to lower the water table by 1 m below the base of the footing;

- Assumed seasonal high groundwater elevations for the Site is based on elevations measured in April 2020. Based on the groundwater contours presented in **Figure 12,** the following average groundwater elevations within the subdivided building foundation areas were used in the dewatering estimates:
  - Area A – 268.25 masl
  - Area B – 269 masl
  - Area C1 – 268.25 masl
  - Area C2 – 269.25 masl
  - Area C3 – 269.25 masl

  Groundwater levels are typically at their highest level during the spring months (March -May) as the spring melt causes higher elevations than those experienced throughout the rest of the year. As such, WSP has used the measured groundwater levels on April 1, 2020 for the dewatering assessment.
- The required dewatering for the condominium was determined by comparing the average assumed seasonal high groundwater elevation to the proposed footing elevations for the building, and presented in **Figure 12.**

Figure 13 has been prepared to illustrate the relative elevations of the proposed base of footings and the seasonal high water table in cross-section. The groundwater elevations observed during August 2020 are also shown on **Figure 13** to illustrate that groundwater elevations may not always be above the proposed footing elevations.

The primary factors that will control the rate of seepage into the excavation or foundations are the hydraulic conductivity and the depth that the water table will be lowered.

WSP notes that the available information on the groundwater elevations may reflect the presence of groundwater within the fill layer that is infiltrating down to the underlying strata. The hydraulic conductivity of this stratum is observed to be higher than the native soils beneath the proposed condominium. Information is not available to confirm that the groundwater will replenish the fill layer upon initiation of pumping. The calculations provided reflect a worst-case scenario where there is unlimited water available to enter the excavation. These estimates are likely to overestimate the actual rate of dewatering that will be experienced.

This assessment does not represent an engineering design of a dewatering operation, but a preliminary hydrogeological analysis for assessment of dewatering volumes. The actual design of the dewatering operation will be the responsibility of the contractor.

6.3 CONSTRUCTION DEWATERING CALCULATIONS

The calculations of the estimated volumes of water that could enter the excavations for the condominium is shown in **Table 6**. These calculations show the conservative dewatering rate that may be observed. Dewatering calculations are provided in **Appendix I**.

The total volume that would potentially need to be dewatered to maintain the entire area open to construct foundations at the same time is estimated to be up to 176,600 L/day, with an applied safety factor of 2. The zone of hydraulic influence from the excavation would be up to 38 m. Given the nature of the site, it is likely that hydraulic influence would extend off-site. Review of the conservatism in the estimates, and the effects of seasonality on potential impacts, it is prudent to register the proposed dewatering activity for the construction of foundations on the EASR and to manage activities such that daily dewatering volumes are maintained below 400,000 L/day.

The dewatering estimates provided herein address dewatering associated with construction of the building foundations and is intended to be conservative to reflect the maximum volume that could be experienced. These calculations only reflect potential dewatering requirements for construction of the building foundations. Additional dewatering may also be required to construct underground utilities. Ideally, work can be coordinated on the Site so that the combined daily flows from all dewatering can be managed to be less than 400,000 L/day such that a PTTW is not required.

WSP notes that the water table is observed in the soil unit described as fill or probable fill. The hydraulic conductivity of this layer is typically greater than the underlying native soils. As the fill layer is likely of limited lateral extent, there is potential that there may not be continuous influx of water into the excavation after it is opened and water is removed from storage.

6.4 LONG-TERM DRAINAGE

Much of the proposed foundation for the underground parking garage is anticipated to be continually below the seasonally high water table. A portion of the northeast corner of the proposed condominium building may not be continually submerged. As such, the construction design will either need to incorporate waterproofing measures or will require drainage systems to maintain dry foundations. It is possible that there may be reduced or no flow in dry seasons, particularly beneath the main building, but less likely beneath the northwestern portion of the parking garage.

The calculations of the estimated volume of water that could enter the foundation drains for the building block are shown in **Table 6**. These calculations show a conservative (maximum) seepage rate. Dewatering calculations for the long-term drainage scenario are provided in **Appendix I**.

The total volume that would potentially need to be drained to maintain dry conditions for the foundations would be up to 85,500 L/day with an applied safety factor of 2. The zone of hydraulic influence under this circumstance would be up to 30 m. It is likely that hydraulic influence would extend off-site.

Based on the volumes that are estimated for long-term drainage to maintain dry foundations, WSP recommends that the design of the condominium consider the use of a water proof basement that will not require continuous dewatering. As discussed below, continuous dewatering may not comply with Policy DEMD-1.

6.5 DEWATERING SUMMARY

The calculations of potential volumes of water that may require removal during construction or during long term use of the proposed structure are summarized in **Table 6**. The estimated pumping rate that may be experienced to maintain dry conditions during construction is up to 176,600 L/day. WSP recommends that the dewatering activity be registered on the EASR prior to construction. Additional groundwater quality testing is recommended to confirm suitability for discharge to nearby Region of Durham storm sewers.

Review of the water level data suggests that the majority of the foundation will be below the seasonally high water table. Water proofing of the basement/underground parking is recommended to reduce the potential that water is being removed and to thereby comply with Policy DEMD-1 (see below). The results of the ongoing groundwater monitoring program are recommended to be reviewed to confirm the relative positions of proposed foundation drains and the water table throughout the year.

The potential capacity of the Region of Durham storm sewers to receive these flows has not been evaluated as part of this preliminary evaluation. The estimated rate of pumping to maintain dry foundations will likely exceed 50,000 L/day, and therefore the construction activity will need to be registered on the EASR. An agreement with the Region of Durham will be required for discharge to be directed to the storm or sanitary sewers.

7 POLICY AREAS

The following sections discuss specific policy areas that pertain to groundwater resources and measures taken within the proposed development plan to conform to these policies.

7.1 WELLHEAD PROTECTION AREAS

The Durham Region Official Plan (DROP) delineates Wellhead Protection Areas (WHPA) for protection of the groundwater supplies that are used to provide the primary source of potable drinking water. The wellhead protection policies of the DROP conform to the requirements of the Oak Ridges Moraine Conservation Plan and are included in the Official Plan for the Township of Uxbridge. Section 1.9.6 of the Official Plan for the Township of Uxbridge states:

Wellhead Protection Areas are designated on Schedule "L" to this Plan. They include lands that contribute water to municipal wells (capture zone). Land use restrictions shall be applied within Wellhead Protection Areas based on "time-of-travel" for groundwater to reach the municipal well and the relative threat posed by certain land use/activities in proximity to such wellheads. Land uses which pose a risk to the quality and quantity of groundwater in the wellhead protection areas are prohibited or restricted in accordance with Schedule 'E' – Tables 'E5' and 'E6' in the Durham Regional Official Plan and the policies of Section 2.3.25 to 2.3.28 inclusive of the Durham Regional Official Plan.

In addition to the DROP, a Provincial initiative on Drinking Water Source Protection under *The Clean Water Act,* 2006 has been underway since 2006 to develop Drinking Water Source Protection Plans. *The Clean Water Act* provides regulations that define requirements for a "Risk Management Plan" that is not necessarily consistent with the DROP policies. A Risk Management Plan will only be required in areas where the Provincial Regulations under *The Clean Water Act*, 2006 apply. The WHPA and vulnerability scores from the Assessment Report for the Lakes Simcoe and Couchiching Source Protection Area are provided as **Figure 12**.

The Site does not lie within WHPA-A to D for the Town of Uxbridge wells as mapped under *The Clean Water Act*.

The Site does lie within the WHPA-Q1 and WHPA-Q2 areas that are mapped to identify the overall recharge areas for municipal wells and have assigned stress levels of moderate. Source Protection Plan (SPP) policies for WHPA-Q1 apply to areas where activities that take water without returning it to the same source may be a threat. SPP policies for WHPA-Q2 apply to areas where activities that reduce recharge might be a threat. As per the South Georgian Bay Lake Simcoe Protection Region, Approved Source Protection Plan, policy number DEMD-1 will apply to the water taking activities during dewatering for construction and long-term drainage.

Based on the estimated volumes of water that may require removal during construction and long-term drainage of the residential condominium, these activities will need to comply with policies for WHPA-Q1.

The proposed land use is residential and is not anticipated to present a threat to groundwater resources as per DROP Section 2.3.26.

7.2 HIGHLY VULNERABLE AQUIFERS

The Source Protection Plan for the Lakes Simcoe and Couchiching Source Protection Area, as developed to comply with *The Clean Water Act, 2006*, contains policies that apply to Highly Vulnerable Aquifers. **Figure 13** presents the mapping of Highly Vulnerable Aquifers (HVA) from the Assessment Report for the Lakes Simcoe and Couchiching Source Protection Area. HVA are considered to be susceptible to contamination of groundwater from activities on the surface or shallow subsurface. The proposed development area is mapped within an HVA area with a vulnerability score of 6.

The proposed development will be municipally serviced for sewage which will eliminate potential contamination of groundwater by nitrates and phosphorous. De-icing agents applied on impervious surfaces such as driveways and roadways will be collected by the on-site storm sewer system and released to the Barton SWM Pond. This will help

to minimize the amount of de-icing agents that infiltrate into the groundwater. Best management practices will likely require that the use of salt for winter road de-icing be minimized.

7.3 SIGNIFICANT GROUNDWATER RECHARGE AREAS

Policies 6.36 DP through 6.40 DP of the Lake Simcoe Protection Plan address significant Groundwater Recharge Areas (SGRA) and ecologically significant Groundwater Recharge Areas (ESGRA).

The Assessment Report for the Lakes Simcoe and Couchiching Source Protection Area contains mapping of Significant Groundwater Recharge Areas (SGRA). SGRA are regional areas that receive more than the average estimated recharge for a watershed area.

A very small portion of the Site is located within a SGRA with high vulnerability, as shown in **Figure 14**.

7.4 INTAKE PROTECTION ZONES

Intake Protection Zones (IPZ) refer to areas on the water and land surrounding a municipal surface water intake. The Site lies within an IPZ-3 with a score of 4.5 as shown on **Figure 15**. IPZ-3 includes areas that can be delineated if modelling demonstrates that spills from a specific activity that is located outside IPZ-1 and IPZ-2 may be transported to an intake and result in a deterioration of the water quality at an intake. In this case, there is potential for contaminants at the Site to be transported northward to Lake Simcoe and eventually to the water supply intakes around the Lake.

The majority of the runoff directed to Lake Simcoe leaves the Site to north after detention in the Barton stormwater management pond and is not likely to contain contaminants of concern. The potential for release of contaminants to surface water that will reach Lake Simcoe from the Site is minimal given the proposed residential land use. Winter road de-icing agents could potentially cause runoff contamination as the residence will include driveway and roadway areas. Mixing with clean runoff will reduce the concentration of these chemicals to an acceptable level prior to reaching Lake Simcoe and therefore the proposed activity does not present a water quality threat to the municipal surface water sources protected by the Source Protection Plan.

In addition, a vulnerability score between 8 and 10 is required to be considered a significant threat. The IPZ-3 has a vulnerability score of 4.5 and therefore activities associated with the development are not considered to be a significant threat.

8 CONCLUSIONS

1. WSP Canada Inc. (WSP) was retained by Evendale Developments Ltd. to prepare a Hydrogeological Assessment and Water Balance Study for the proposed residential development on Block 8 of Part of Lot 31, Concession 7, in the Township of Uxbridge (Site). The development plans for Block 8 include the streets, six (6) detached residential homes, and a six (6)-storey residential condominium building including one (1) level underground parking garage.
2. The proposed development area lies within the Peterborough Drumlin Field physiographic region as defined by Chapman and Putnam (1984). The Peterborough Drumlin Field is typically characterized by deposits of highly calcareous till, but the local area surrounding the Site is mapped as clay plains.
3. The on-site runoff generally drains to the northwest via overland flow, towards the proposed Lowe Blvd extension and is captured in the drainage ditch along Donland Lane.
4. Based on previous geotechnical investigations conducted at the Site the proposed development area is underlain by a shallow layer of topsoil which is followed by a layer heterogenous mixture of fill or probable fill ranging in texture from gravel, sand, silt and clay to a thickness of 2.3 to 3.1 m. The Fill overlies a layer of clayey silt to silty clay on the east side of the property and overlies layers of silty sand on the west side of the Site. This pattern is consistent with the surficial geology mapping presented on a regional scale and with stratigraphy information presented in water well records obtained through the MECP. The information presented in the Sola

borehole logs from review of physical samples does not confirm that the clayey silt to silty clay formation will typically overlie the silty sand formation but this is implied from regional stratigraphic understanding.

5 Seasonal high groundwater levels were observed in April 2020 in BH2 (268.61 masl) and BH5 (267.81 masl), and in January 2018 in MW1 (268.10 masl) and in MW2 (268.05 masl). The measured seasonally high groundwater levels correspond to depths of 1.59 mbgs at BH2, 1.49 mbgs at BH5, 0.13 mbgs at MW1 and 1.12 mbgs at MW2. Typically, groundwater levels are observed to be the highest between February and May and also in the late fall, while groundwater levels tend to be lowest between July and October. The observed groundwater levels generally follow the typical groundwater level trends.

6 The hydraulic conductivity estimates obtained from the on-site monitoring wells for the single well hydraulic response tests were 9.84×10^{-8} m/sec, 6.20×10^{-6} m/sec and 4.01×10^{-7} m/sec for BH2, BH5 and MW1, respectively. These results are consistent with the observed soil descriptions of the clayey silty at BH2, fill (sand) at BH5 and silty sand at MW1 in which the monitoring wells are screened. The hydraulic conductivity estimate obtained from the off-site monitoring well for the single well hydraulic response tests was 4.90×10^{-7} for MW2. This result is consistent with the observed soil descriptions of the silty sand at MW2 in which the monitoring wells are screened.

7 Two (2) groundwater samples were collected from the existing monitoring wells on February 14th, 2017. The concentrations of the parameters tested were less than the values of the MECP Table 2: Full Depth Generic Site Condition Standards in a Potable Ground Water Condition for All Types of Property Use (Coarse Textured Soil).

8 The Climate-Based Water Budget indicates that average annual precipitation over the past 30 years is 886.2 mm/year. The available moisture surplus at the Site ranges between 321.8 mm/yr to 336.8 mm/year depending on the type of soil and vegetation cover. The moisture surplus will reflect the infiltration and runoff based on the soil properties, slopes, and vegetation within individual catchments.

9 Under existing conditions, there is one (1) on-site catchment. Runoff generated on-site outlets to the northwest via overland flow and is captured in the drainage ditch along Donland Lane. Runoff subsequently flows south along Donland Lane and exits the Site through the southern property boundary.

10 The Pre-Development Water Budget reflects infiltration for the Site of approximately 2,216 m^3/yr and runoff from the Site of approximately 3,256 m^3/yr.

11 The Post-Development Water Budget reflects changes in land use to include increased areas of impervious surfaces (i.e. roads, buildings etc.) and re-grading. The proposed development area has been subdivided into four (4) on-site catchments. The majority of the runoff generated under post development conditions will be directed off-site to the Barton SWM Pond located approximately 500 m to the north of the Site via storm sewers.

12 The Post-Development Water Budget predicts a total on-site infiltration of 818 m^3/yr. Overall, this is a decrease of 63% relative to the Pre-Development case, and represents an infiltration deficit of 1,399 m^3/yr.

13 The Post-Development Water Budget predicts a net runoff of 7,837 m^3/yr over the Site area. This is an increase of 141% or 4,581 m^3/yr relative to the Pre-Development case. The runoff generated from the impervious surfaces in the post-development scenario has entirely been captured by the onsite catch basin and is redirected from the south property boundary to the Barton SWM Pond.

14 The estimated pumping rate that may be experienced to maintain dry conditions during construction is up to 176,600 L/day. WSP recommends that the dewatering activity be registered on the EASR prior to construction. Additional groundwater quality testing is recommended to confirm suitability for discharge to nearby Region of Durham storm sewers.

15 The majority of the proposed footing elevations are below the seasonally high water table. Estimates of the dewatering rates to maintain dry foundations are up to 85,500 L/day, including a 2X factor of safety. Water proofing of the basement/underground parking is recommended to reduce the potential that water is being removed and to thereby comply with Policy DEMD-1.

16 The Site lies within WHPA-Q1 and WHPA-Q2 for the Uxbridge Water Supply system with assigned stress levels of moderate. Source Protection Plan (SPP) policies for WHPA-Q1 apply to areas where activities that take water without returning it to the same source may be a threat. SPP policies for WHPA-Q2 apply to areas where activities that reduce recharge might be a threat. Based on the estimated volumes of water that may require removal during construction and long-term drainage of the residential condominium, the Site will need to comply further with policies for WHPA-Q1. As per the South Georgian Bay Lake Simcoe Protection Region, Approved Source Protection Plan, policy number DEMD-1 will apply to the water taking activities during

dewatering for construction and long-term drainage. Policies associated with WHPA – Q2 may apply to offset identified infiltration deficit relative to pre-development conditions.

17 The proposed development area is mapped within a Highly Vulnerable Aquifer (HVA) area with a vulnerability score of 6. The Site will be municipally serviced for sewage which will eliminate potential contamination of groundwater by nitrates and phosphorous. De-icing agents applied on impervious surfaces such as driveways and roadways will be collected by the on-site storm sewer system and released to the Barton SWM Pond. This will help to minimize the amount of de-icing agents that infiltrate into the groundwater. Best management practices will likely require that the use of salt for winter road de-icing be minimized.

18 The proposed development is located within a Significant Groundwater Recharge Area with a vulnerability score of 6.

19 The Site lies within Intake Protection Zone 3 (IPZ-3) for Lake Simcoe. The majority of the runoff directed to Lake Simcoe leaves the Site to north after detention in the Barton stormwater management pond and is not likely to contain contaminants of concern. The potential for release of contaminants to surface water that will reach Lake Simcoe from the Site is minimal given the proposed residential land use. Winter road de-icing agents could potentially cause runoff contamination as the residence will include driveway and roadway areas. Mixing with clean runoff will reduce the concentration of these chemicals to an acceptable level prior to reaching Lake Simcoe and therefore the proposed activity does not present a water quality threat to the municipal surface water sources protected by the Source Protection Plan.

This concludes the Hydrogeological Assessment and Water Balance Study. We trust that this report satisfies your requirements. If you have any questions or concerns regarding this report, do not hesitate to contact our office.

9 REFERENCES

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TABLES

TABLE 1
OBSERVED GROUNDWATER LEVELS
PART OF LOT 31, CONCESSION 7, BLOCK 8
UXBRIDGE, ON

On-Site Monitoring Wells

Monitor Designation	Top of Pipe Elevation	Ground Elevation	PVC Casing Stick-up	Measurement Date	Depth to Water		Water Elevation
			m		m bmp	m bgl	m asl
BH2	271.04	270.20	0.84	1-Apr-20	2.43	1.59	268.61
				19-Aug-20	3.29	2.45	267.76
				21-Oct-20	3.33	2.49	267.71
BH5	270.46	269.3	1.16	1-Apr-20	2.65	1.49	267.81
				19-Aug-20	2.71	1.55	267.76
				21-Oct-20	2.66	1.50	267.80
MW1	268.80	268.23	0.57	25-Jan-18	0.7*	0.13	268.10
				1-Feb-18	1.65	1.08	267.15
				14-Feb-18	1.09	0.52	267.71
				12-Apr-18	0.97	0.40	267.83
				17-May-18	1.01	0.44	267.79
				21-Jun-18	1.16	0.59	267.64
				23-Jul-18	1.71	1.14	267.09
				9-Aug-18	0.91	0.34	267.89
				12-Sep-18	1.09	0.52	267.72
				24-Oct-18	1.08	0.51	267.72
				21-Nov-18	0.95	0.38	267.85
				18-Dec-18	0.96	0.39	267.84
				29-Jan-19	1.07	0.50	267.73
				15-Feb-19	1.05*	0.48	267.75
				12-May-20	1.28	0.71	267.52
Off-Site Monitoring Wells							
MW2	269.85	269.17	0.68	25-Jan-18	1.80	1.12	268.05
				1-Feb-18	2.01	1.33	267.84
				14-Feb-18	2.14	1.46	267.71
				12-Apr-18	2.02	1.34	267.83
				17-May-18	1.98	1.30	267.87
				21-Jun-18	2.29	1.61	267.56
				23-Jul-18	2.44	1.76	267.41
				9-Aug-18	1.96	1.28	267.89
				12-Sep-18	2.14	1.46	267.71
				24-Oct-18	2.24	1.56	267.62
				21-Nov-18	2.17	1.49	267.68
				18-Dec-18	2.13	1.45	267.72
				29-Jan-19	1.96	1.28	267.89
				15-Feb-19	2.08	1.40	267.77
				12-May-20	2.24	1.56	267.62
				19-Aug-20	2.39	1.71	267.46
				21-Oct-20	2.30	1.62	267.55

Notes:

1) "m" indicates metres.
2) "m bmp" indicates metres below measurement point, which is the top of pipe (referred to as T.O.P.)
3) "m bgl" indicates metres below ground level.
4) "*" Water levels in MW1 on January 25, 2018 and February 5,2019 were frozen. Water level is expected to be lower.

Table 2 Summary of Hydraulic Conductivity Test Values

Monitoring Well	Test Date	Test Type	Static Water Depth (BTOP)	Estimated Hydraulic Conductivity		
			m	m/sec	cm/sec	m/day
On-Site Monitors						
BH2	21-Oct-20	Rising Head	3.33	9.84E-08	9.8E-06	8.50E-03
BH5	22-Oct-20	Rising Head	2.67	6.20E-06	6.2E-04	5.36E-01
MW1	1-Feb-18	Rising Head	1.02	4.01E-07	4.0E-05	3.46E-02
Average/Geometric Mean			**2.34**	**6.25E-07**	**6.3E-05**	**5.40E-02**
Maximum			**3.33**	**6.20E-06**	**6.2E-04**	**5.36E-01**
Minimum			**1.02**	**9.84E-08**	**9.8E-06**	**8.50E-03**
Off-Site Monitors						
MW2	1-Feb-18	Rising Head	1.94	4.90E-07	4.9E-05	4.23E-02
Average/Geometric Mean			**1.94**	**4.90E-07**	**4.9E-05**	**4.23E-02**
Maximum			**1.94**	**4.90E-07**	**4.9E-05**	**4.23E-02**
Minimum			**1.94**	**4.90E-07**	**4.9E-05**	**4.23E-02**
All Monitors						
Average/Geometric Mean			**2.24**	**5.88E-07**	**5.9E-05**	**0.1**
Maximum			**3.33**	**6.20E-06**	**6.2E-04**	**0.5**
Minimum			**1.02**	**9.84E-08**	**9.8E-06**	**0.0**

TABLE 3
GROUNDWATER CHEMISTRY
HYDROGEOLOGICAL STUDY AND WATER BALANCE ASSESSMENT
PART OF LOT 31, CONCESSION 7
UXBRIDGE, ON

Parameters	UNIT	Table 2 SCS [1]	MW1	MW2	DUP
Sample Date			14-Feb-18	14-Feb-18	14-Feb-18
Calculated Parameters					
Anion Sum	me/L	-	28.40	4.0	4.22
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	-	275	192	197
Calculated TDS	mg/L	-	1640	238	244
Carb. Alkalinity (calc. as CaCO3)	mg/L	-	<10	<10	<10
Cation Sum	me/L	-	27.80	4.6	4.61
Hardness (CaCO3)	mg/L	-	566	209	209
Ion Balance (% Difference)	%	-	97.80	114.00	109.00
Langelier Index	N/A	-	0.80	0.600	0.600
Saturation pH	N/A	-	6.87	7.29	7.28
Inorganics					
Total Ammonia-N	mg/L	-	0.20	0.276	0.32
Conductivity	umho/cm	-	2680	457	452
Dissolved Organic Carbon	mg/L	-	3.4	2.2	4.2
Orthophosphate (P)	mg/L	-	0.004	<0.0030	<0.0030
pH	pH	-	7.64	7.94	7.87
Dissolved Sulphate (SO4)	mg/L	-	98	18	15
Alkalinity (Total as CaCO3)	mg/L	-	275	192	197
Dissolved Chloride (Cl)	mg/L	790	770	17	23
Nitrite (N)	mg/L	-	0.224	<0.010	<0.010
Nitrate (N)	mg/L	-	2.08	<0.020	<0.020
Nitrate + Nitrite (N)	mg/L	-			
Metals					
Dissolved Aluminum (Al)	mg/L	-	<0.050	<0.0050	<0.0050
Dissolved Antimony (Sb)	mg/L	0.006	<0.0010	0.00016	0.00015
Dissolved Arsenic (As)	mg/L	0.025	<0.0010	0.00127	0.0013
Dissolved Barium (Ba)	mg/L	1	0.34	0.118	0.116
Dissolved Beryllium (Be)	mg/L	0.004	<0.0010	<0.00010	<0.00010
Dissolved Boron (B)	mg/L	5	<0.10	<0.010	<0.010
Dissolved Cadmium (Cd)	mg/L	0.0027	<0.000050	<0.000010	<0.000010
Dissolved Calcium (Ca)	mg/L	-	193	69	68
Dissolved Chromium (Cr)	mg/L	0.05	<0.0050	<0.00050	<0.00050
Dissolved Cobalt (Co)	mg/L	0.0038	<0.0010	0.00012	0.00013
Dissolved Copper (Cu)	mg/L	0.087	<0.0020	<0.00020	<0.00020
Dissolved Iron (Fe)	mg/L	-	<0.10	0.062	0.07
Dissolved Lead (Pb)	mg/L	0.01	<0.00050	<0.000050	<0.000050
Dissolved Magnesium (Mg)	mg/L	-	21	9	9
Dissolved Manganese (Mn)	mg/L	-	0.11	0.1000	0.104
Dissolved Molybdenum (Mo)	mg/L	0.07	<0.00050	0.000392	0.000389
Dissolved Nickel (Ni)	mg/L	0.1	<0.0050	<0.00050	<0.00050
Dissolved Phosphorus (P)	mg/L	-	<0.50	<0.050	<0.050
Dissolved Potassium (K)	mg/L	-	5.1	1.3	1.3
Dissolved Selenium (Se)	mg/L	0.01	<0.00050	<0.000050	0.000054
Dissolved Silicon (Si)	mg/L	-	6.2	11.6	11.2
Dissolved Silver (Ag)	mg/L	0.0015	<0.00050	<0.000050	<0.000050
Dissolved Sodium (Na)	mg/L	-	376	8	8.6
Dissolved Strontium (Sr)	mg/L	-	0.76	0.18	0.19
Dissolved Thallium (Tl)	mg/L	0.002	<0.00010	<0.000010	<0.000010
Dissolved Titanium (Ti)	mg/L	-	<0.0030	<0.00030	<0.00030
Dissolved Uranium (U)	mg/L	0.02	0.0017	0.00009	0.0001
Dissolved Vanadium (V)	mg/L	0.0062	<0.0050	0.00070	0.0007
Dissolved Zinc (Zn)	mg/L	1.1	<0.010	<0.0010	<0.0010

NOTES

1) Table 2 SCS = Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act (April 2011).

Sewer Use By-Law No. 55-2013

2) Yellow shading indicates parameter reportable detection limit exceeds Table 2 SCS.

TABLE 4
CLIMATIC WATER BUDGET SUMMARY TABLE
HYDROGEOLOGICAL ASSESSMENT AND WATER BALANCE STUDY - BLOCK 8
PART OF LOT 31, CONCESSION 7
UXBRIDGE, ONTARIO

Year of Climate Data Used	Total Adjusted Potential Evapotranspiration	Total Water Surplus	Total Precipitation	Soil Type	Land Use	Water Holding Capacity	Total Actual Evapotranspiration	Total Moisture Surplus used for Water Balance
	mm/yr	mm/yr	mm/yr			mm/yr	mm/yr	mm/yr
CLIMATE NORMAL 1981-2010	575.9	310.3	886.2	Clay Loam	Residential Lawn	100	549.4	336.8
					Uncultivated	250	564.4	321.8

NOTES:
1) Water Holding Capacity obtained from Environmental Design Criteria of the SWM Planning and Design Manual published by the MOE in 2003.

TABLE 5 WATER BALANCE SUMMARY
HYDROGEOLOGICAL ASSESSMENT AND WATER BALANCE STUDY - BLOCK 8
PART OF LOT 31, CONCESSION 7
UXBRIDGE, ONTARIO

A. WATER BALANCE DEVELOPMENT BLOCK 8

Characteristics		Pre-development		Post-development (No Recharge mitigation)		Change	
		Volume (m^3/yr)	mm/yr	Volume (m^3/yr)	mm/yr	Volume (m^3/yr)	%
Input	Precipitation	12,148	886	12,148	886	0	0%
	Runon	0	0	0	0	0	0%
	Total In	**12,148**	**886**	**12,148**	**886**	**0**	**0.00%**
Output	Infiltration via Pervious Areas	2,216	162	818	60	-1,399	-63%
	Total Infiltration	2,216	162	818	60	-1,399	-63%
	Run-off (Net)	3,256	238	7,837	572	4,581	141%
	Evapotranspiration	6,676	487	3,494	255	-3,182	-48%
	Total Out	**12,148**	**886**	**12,148**	**886**	**0**	**0.00%**

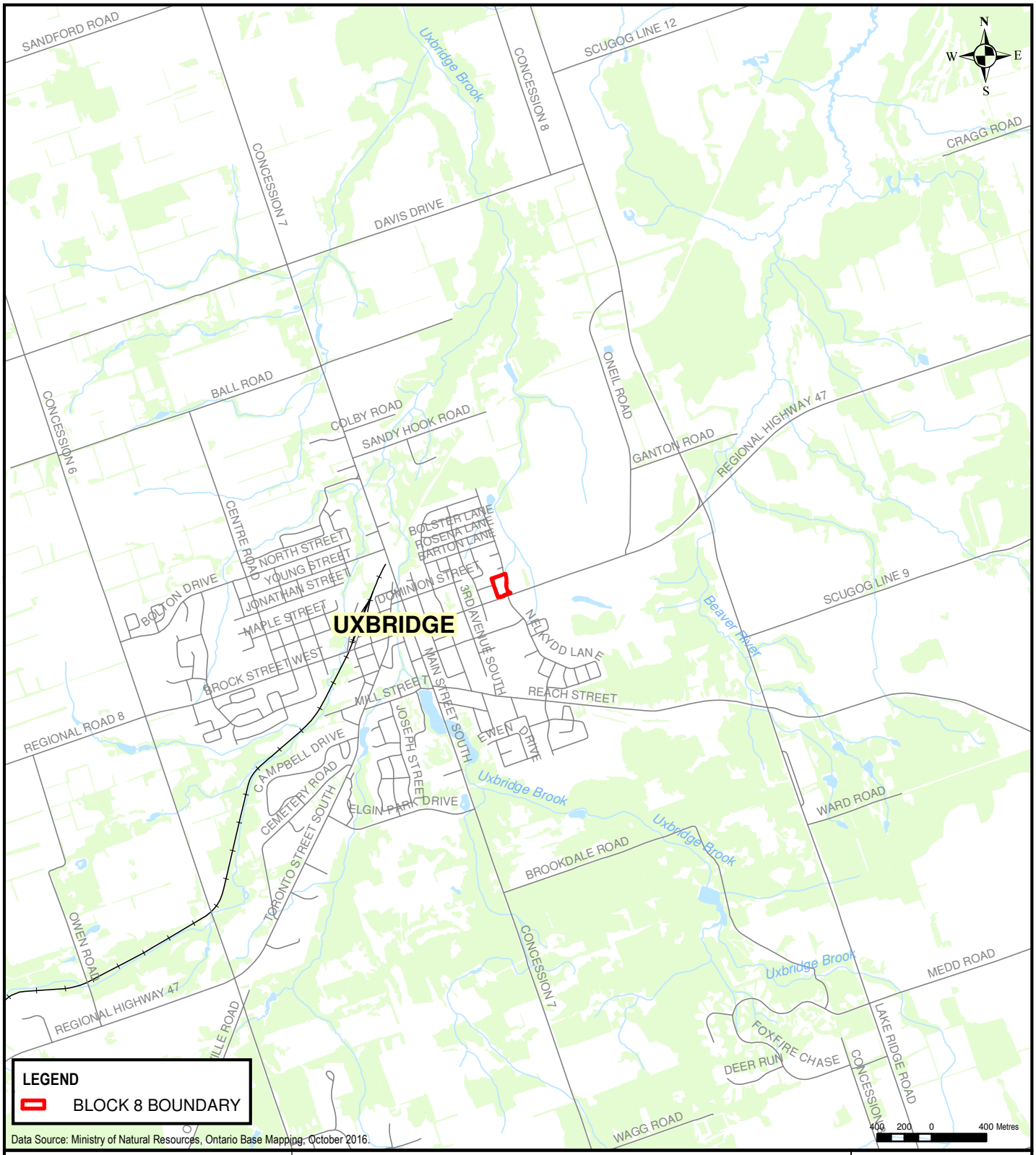
B. Breakdown of Post-Development Run-Off by Land Use - Development Block 8

Land Use	Description	Post-Development		Runoff
		Area	Volume	
		m^2	m^3	m^3
Buildings	**Includes residential homes and commercial buildings**	2,808	2,239	2,239
Paved Areas	**Includes roads, sidewalks and driveways**	5,993	4,780	4,780
Impervious Areas		8,801	7,019	7,019
Pervious Areas	**Inclues residential lawns, uncultivated areas and woodland**	4,908	818	818
Pervious Areas		4,908	818	818
Total Run-Off		13,708	7,837	7,837

TABLE 6
DEWATERING ESTIMATES SUMMARY - RESIDENTIAL CONDOMINIUM BUILDING
HYDROGEOLOGICAL ASSESSMENT AND WATER BALANCE STUDY - BLOCK 8
PART OF LOT 31, CONCESSION 7,
UXBRIDGE, ON

Building	Length (m)	Width (m)	a/b	Assumed Basement Elevation (m asl)	Assumed High Groundwater Elevation (m asl)	Difference	Construction Maximum Drawdown (m)	Long-term Maximum Drawdown (m)	Ground Seepage Alone Conservative Rate			Long-Term Conservative Rate		
									Calculated Value	Safety Factor of 2	Maximum ZOI (m)	Calculated Value	Safety Factor of 2	Maximum ZOI (m)
Footing Elevation Area A	53	18	2.9444	266.55	268.25	-1.7	2.70	1.70	32,077	64,153	38	19,443	38,885	30
Footing Elevation Area B	18	9	2	267.05	269	-1.95	2.95	1.95	17,048	34,096	29	10,015	20,030	22
Footing Elevation Area C1	62	22	2.8182	268.05	268.25	-0.2	1.20	0.20	17,289	34,578	30	8,398	16,796	22
Footing Elevation Area C2	22	19	1.1579	268.05	269.25	-1.2	2.20	0.15	11,435	22,871	28	2,648	5,295	13
Footing Elevation Area C3	19	18	1.0556	268.05	269.25	-1.2	2.20	0.15	10,443	20,887	27	2,203	4,406	12
								Total L/day (Rounded)	**88,300**	**176,600**		**42,800**	**85,500**	

FIGURES



Data Source: Ministry of Natural Resources, Ontario Base Mapping, October 2016.

126 DON HILLOCK DRIVE, UNIT 2
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PROJECT:
HYDROGEOLOGICAL ASSESSMENT AND
WATER BALANCE STUDY - BLOCK 8
PART OF LOT 31, CONCESSION 7, UXBRIDGE, ONTARIO

TITLE:
SITE LOCATION MAP

CLIENT:
EVENDALE DEVELOPMENTS LTD

SCALE:	1:40,000
DRAWN BY:	TP
CHECKED BY:	LL
PROJECT NO:	181-00471-01
DATE:	DECEMBER 2020
FIGURE NO:	1
REV.:	-

Document Path: D:\aProjects\181-00471-00\MXD\2020\Block 8\181-00471-01 Figure 1 Location Map.mxd

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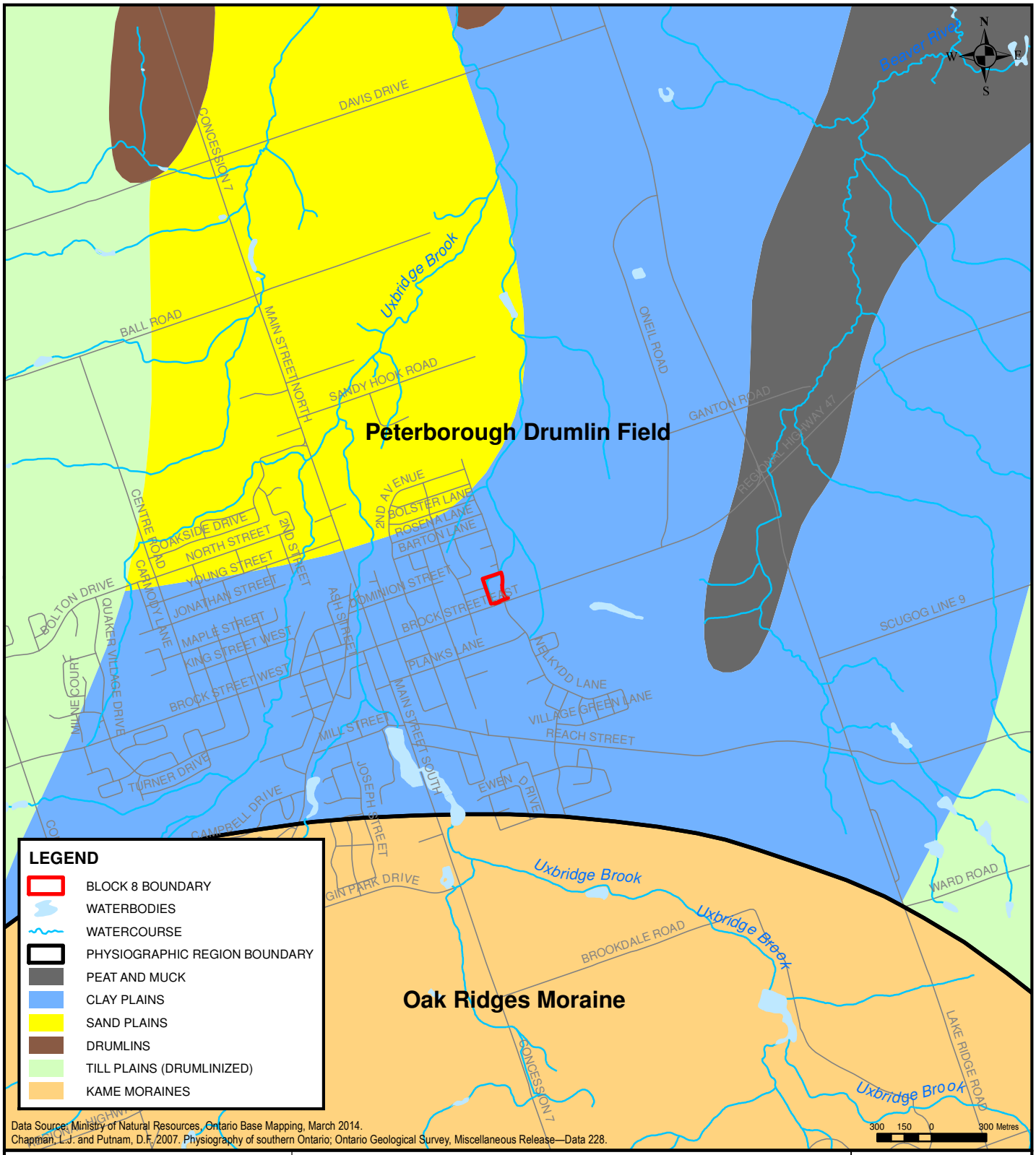
PROJECT: HYDROGEOLOGICAL ASSESSMENT AND WATER BALANCE STUDY - BLOCK 8 PART OF LOT 31, CONCESSION 7, UXBRIDGE, ONTARIO	SCALE: 1:4,000
	DRAWN BY: TP / CHECKED BY: -
TITLE: EXISTING CONDITIONS	PROJECT NO: 181-00471-01
	DATE: DECEMBER 2020
CLIENT: EVENDALE DEVELOPMENTS LTD	FIGURE NO: 2 / REV.: -

Document Path: D:\aProjects\181-00471-00\MXD\2020\Block 8\181-00471-01 Figure 2 Existing Conditions.mxd



Data Source: Ministry of Natural Resources, Ontario Base Mapping, March 2014.
Chapman, L.J. and Putnam, D.F. 2007. Physiography of southern Ontario; Ontario Geological Survey, Miscellaneous Release—Data 228.

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PROJECT:
HYDROGEOLOGICAL ASSESSMENT AND
WATER BALANCE STUDY - BLOCK 8
PART OF LOT 31, CONCESSION 7, UXBRIDGE, ONTARIO

TITLE:
REGIONAL PHYSIOGRAPHY

CLIENT:
EVENDALE DEVELOPMENTS LTD

SCALE:	1:30,000
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CHECKED BY:	LL
PROJECT NO:	181-00471-01
DATE:	DECEMBER 2020
FIGURE NO:	3
REV.:	-

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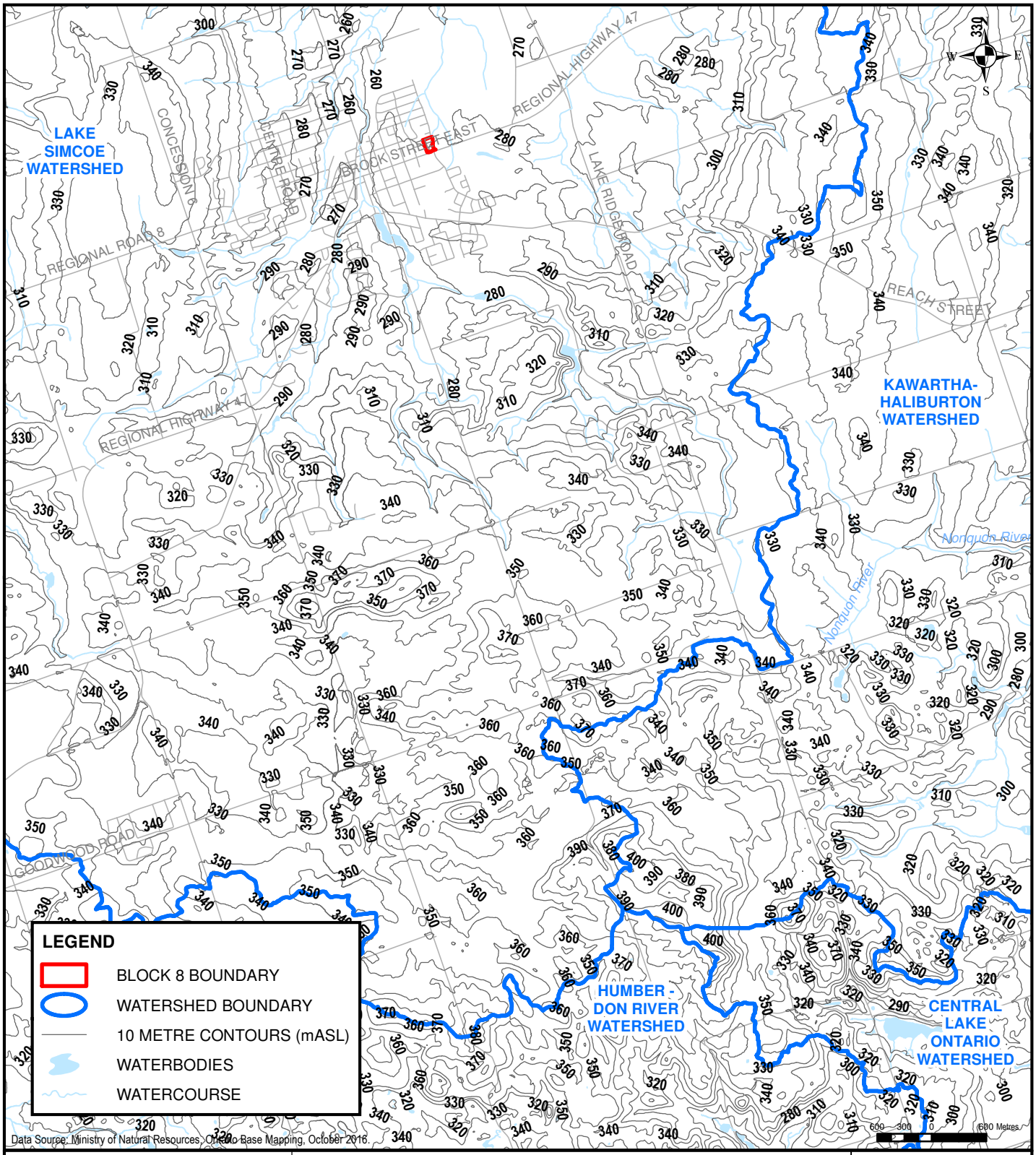

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PROJECT:
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PART OF LOT 31, CONCESSION 7, UXBRIDGE, ONTARIO

TITLE:
REGIONAL TOPOGRAPHY AND DRAINAGE

CLIENT:
EVENDALE DEVELOPMENTS LTD

SCALE:	1:60,000
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CHECKED BY:	LL
PROJECT NO:	181-00471-01
DATE:	DECEMBER 2020
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REV.:	-

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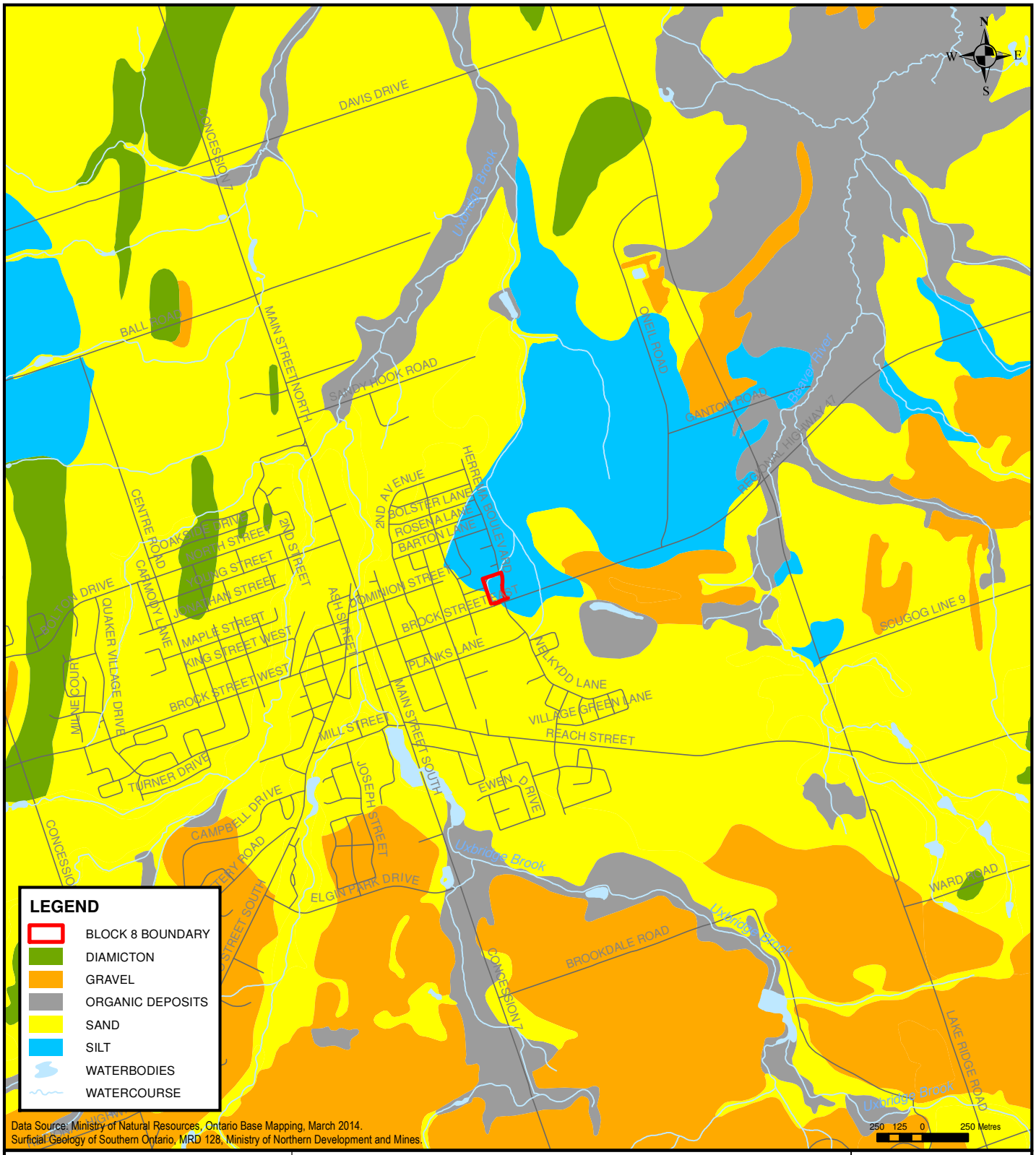

Data Source: Ministry of Natural Resources, Ontario Base Mapping, March 2014.
Surficial Geology of Southern Ontario, MRD 128, Ministry of Northern Development and Mines.

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PROJECT:
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PART OF LOT 31, CONCESSION 7, UXBRIDGE, ONTARIO

TITLE:
SURFICIAL GEOLOGY

CLIENT:
EVENDALE DEVELOPMENTS LTD

SCALE:	1:30,000
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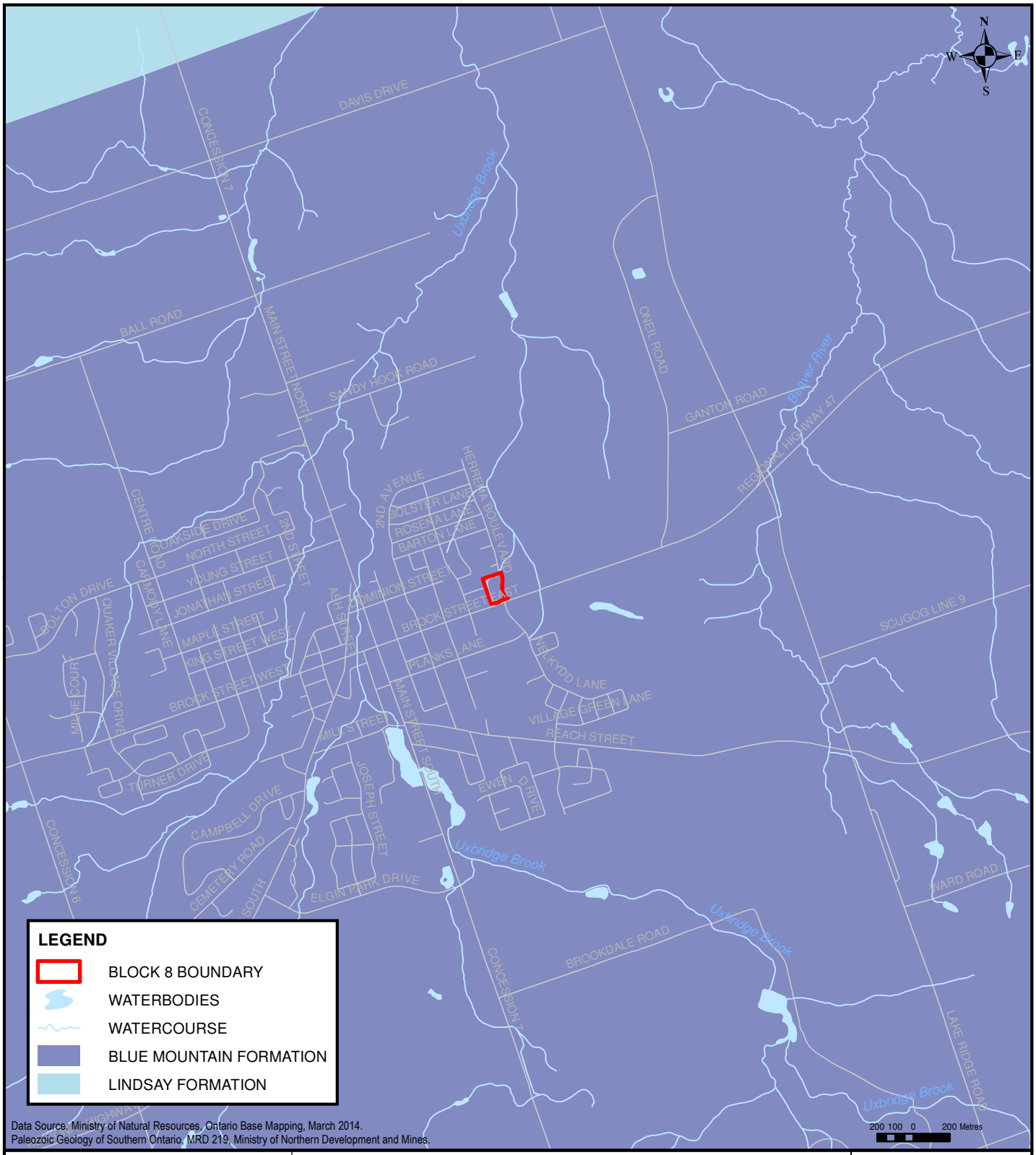
CHECKED BY:	LL
PROJECT NO:	181-00471-01
DATE:	DECEMBER 2020
FIGURE NO:	5
REV.:	-

Document Path: D:\aProjects\181-00471-00\MXD\2020\Block 8\181-00471-01 Figure 5 Surficial Geology.mxd



LEGEND

- BLOCK 8 BOUNDARY
- WATERBODIES
- WATERCOURSE
- BLUE MOUNTAIN FORMATION
- LINDSAY FORMATION

Data Source: Ministry of Natural Resources, Ontario Base Mapping, March 2014.
Paleozoic Geology of Southern Ontario, MRD 219, Ministry of Northern Development and Mines.

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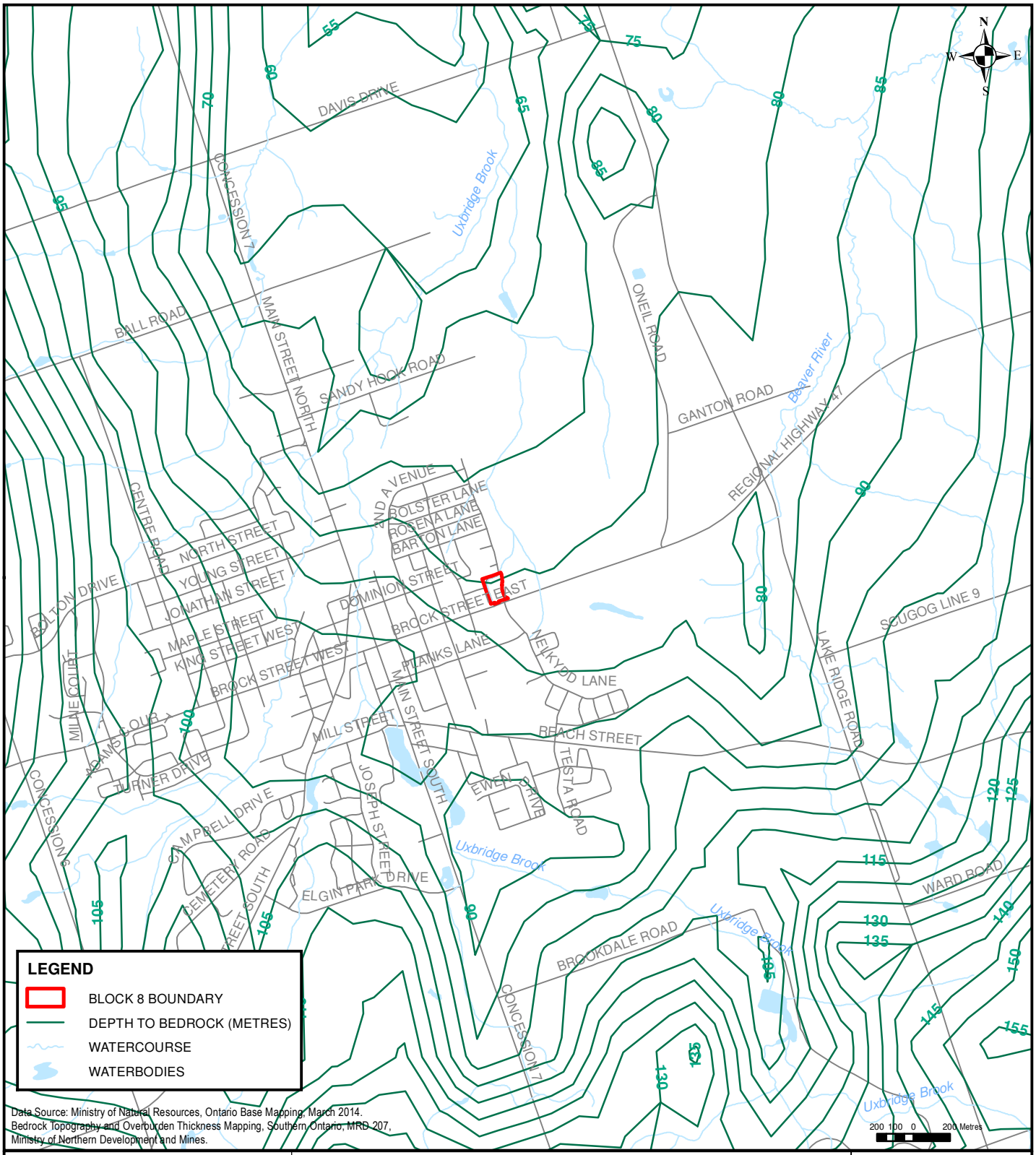
PROJECT:
HYDROGEOLOGICAL ASSESSMENT AND
WATER BALANCE STUDY - BLOCK 8
PART OF LOT 31, CONCESSION 7, UXBRIDGE, ONTARIO

TITLE:
BEDROCK GEOLOGY

CLIENT:
EVENDALE DEVELOPMENTS LTD

SCALE:	1:30,000
DRAWN BY:	TP
CHECKED BY:	LL
PROJECT NO:	181-00471-01
DATE:	DECEMBER 2020
FIGURE NO:	6
REV.:	-

Document Path: D:\aProjects\181-00471-00\MXD\2020\Block 8\181-00471-01 Figure 6 Bedrock Geology.mxd



LEGEND

- BLOCK 8 BOUNDARY
- DEPTH TO BEDROCK (METRES)
- WATERCOURSE
- WATERBODIES

Data Source: Ministry of Natural Resources, Ontario Base Mapping, March 2014.
Bedrock Topography and Overburden Thickness Mapping, Southern Ontario, MRD 207, Ministry of Northern Development and Mines.

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PROJECT:
HYDROGEOLOGICAL ASSESSMENT AND
WATER BALANCE STUDY - BLOCK 8
PART OF LOT 31, CONCESSION 7, UXBRIDGE, ONTARIO

TITLE:
OVERBURDEN THICKNESS

CLIENT:
EVENDALE DEVELOPMENTS LTD

SCALE:	1:30,000
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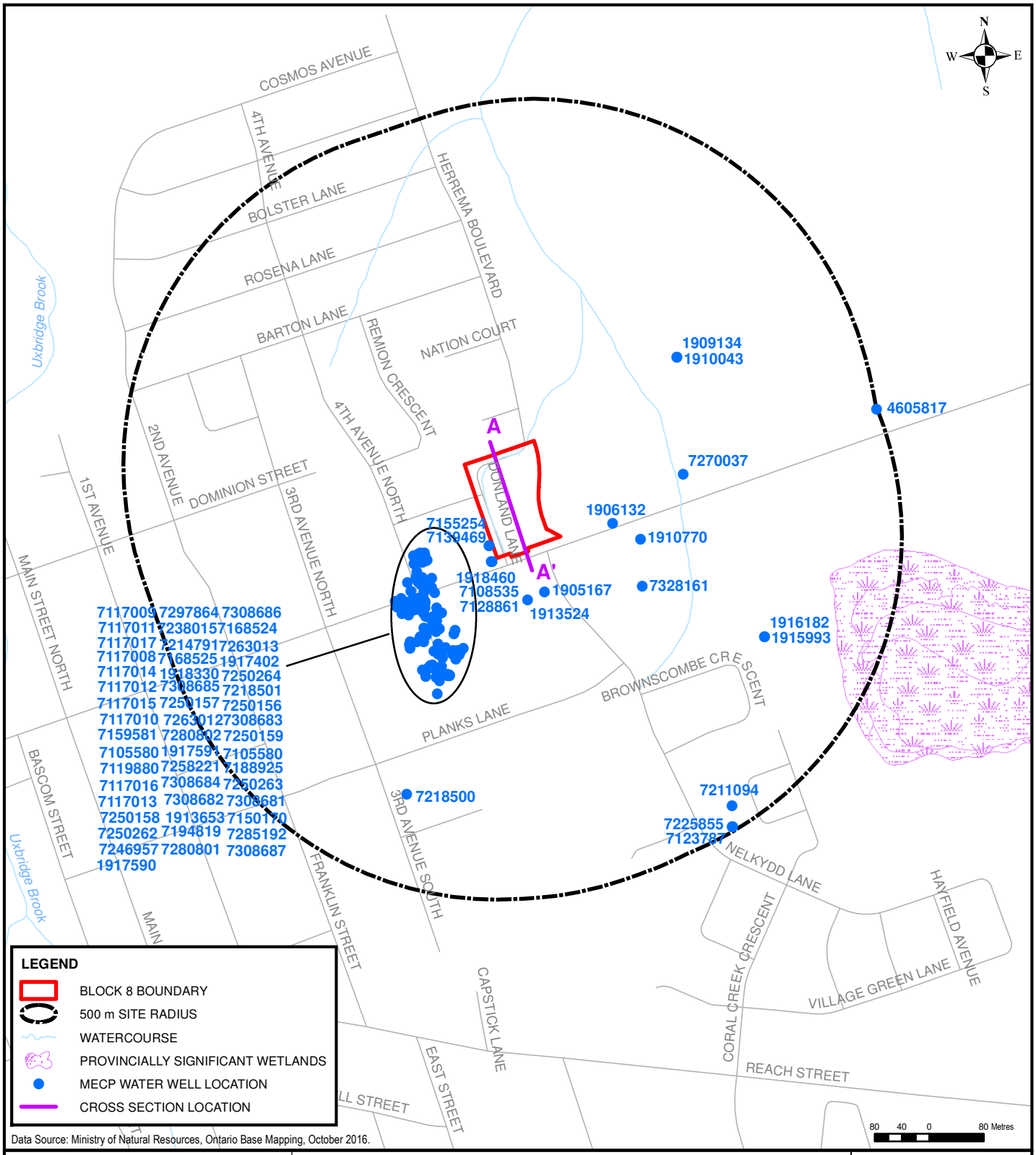
CHECKED BY:	LL
PROJECT NO:	181-00471-01
DATE:	DECEMBER 2020
FIGURE NO:	7
REV.:	-

Document Path: D:\aProjects\181-00471-00\MXD\2020\Block 8\181-00471-01 Figure 7 Overburden Thickness.mxd



LEGEND

- BLOCK 8 BOUNDARY
- 500 m SITE RADIUS
- WATERCOURSE
- PROVINCIALLY SIGNIFICANT WETLANDS
- MECP WATER WELL LOCATION
- CROSS SECTION LOCATION

Data Source: Ministry of Natural Resources, Ontario Base Mapping, October 2016.

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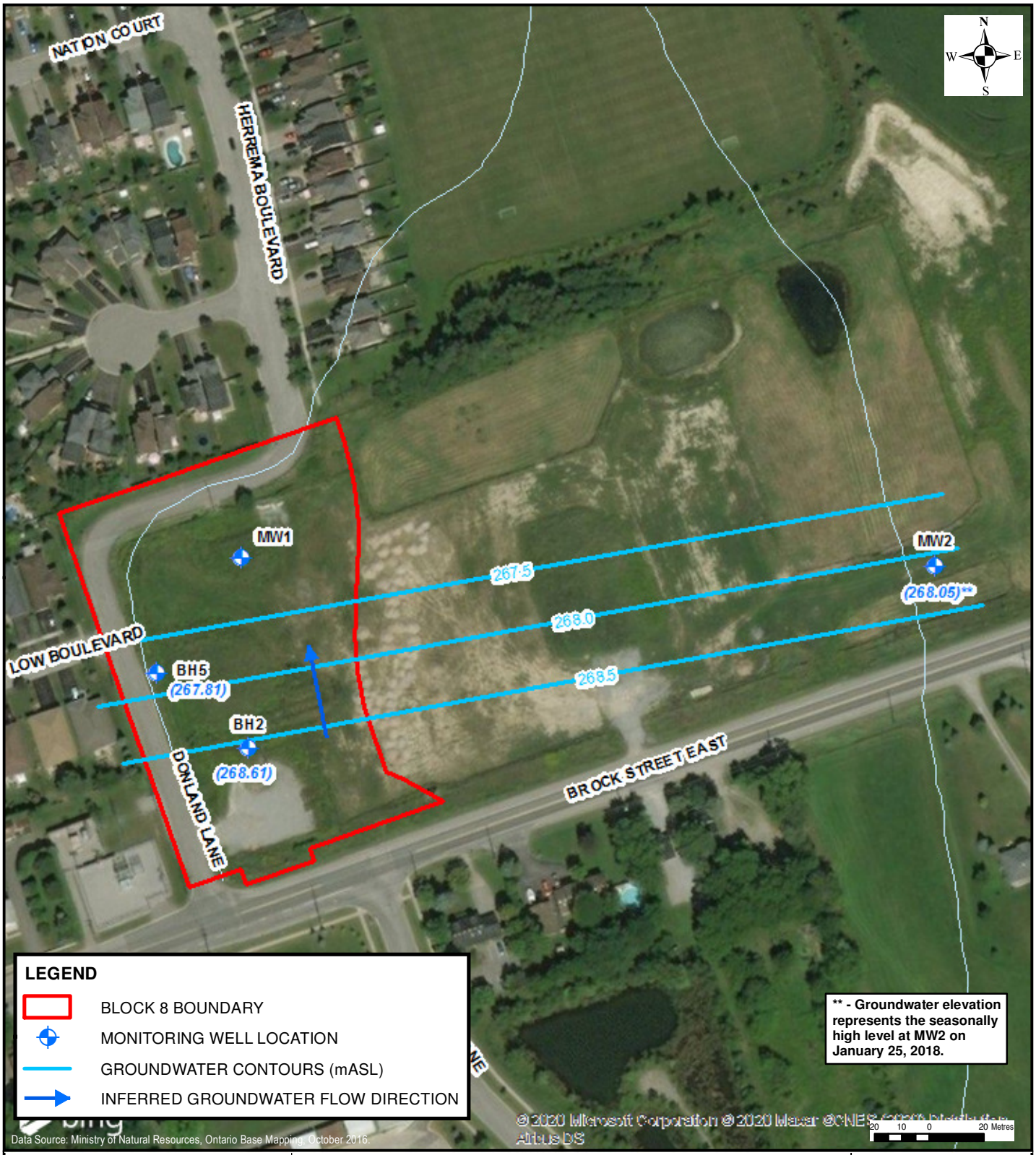
PROJECT:
HYDROGEOLOGICAL ASSESSMENT AND
WATER BALANCE STUDY - BLOCK 8
PART OF LOT 31, CONCESSION 7, UXBRIDGE, ONTARIO

TITLE:
MECP WATER WELLS

CLIENT:
EVENDALE DEVELOPMENTS LTD

SCALE:	1:8,000
DRAWN BY:	TP
CHECKED BY:	LL
PROJECT NO:	181-00471-01
DATE:	DECEMBER 2020
FIGURE NO:	8
REV.:	-

Document Path: D:\aProjects\181-00471-00\MXD\2020\Block 8\181-00471-01 Figure 8 MECP Wells.mxd



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PROJECT: HYDROGEOLOGICAL ASSESSMENT AND WATER BALANCE STUDY - BLOCK 8 PART OF LOT 31, CONCESSION 7, UXBRIDGE, ONTARIO	SCALE: 1:2,000
	DRAWN BY: TP / CHECKED BY: -
TITLE: GROUNDWATER ELEVATIONS - APRIL 2020	PROJECT NO: 181-00471-01
	DATE: DECEMBER 2020
CLIENT: EVENDALE DEVELOPMENTS LTD	FIGURE NO: 9 / REV.: -

Document Path: D:\aProjects\181-00471-00\MXD\2020\Block 8\181-00471-01 Figure 9 GW Elevations.mxd

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LEGEND

- PRE DEVELOPMENT CATCHMENT AREAS
- ROAD
- UNCULTIVATED
- PRE DEVELOPMENT FLOW DIRECTION

N W E S

8 4 0 8 Metres

CLIENT:

EVENDALE DEVELOPMENTS LTD

PROJECT:

HYDROGEOLOGICAL ASSESSMENT AND
WATER BALANCE STUDY - BLOCK 8
PART OF LOT 31, CONCESSION 7
UXBRIDGE, ONTARIO

PROJECT NO:	DATE:
181-00471-01	DECEMBER 2020

DESIGNED BY: -

DRAWN BY: T.P.

CHECKED BY: LL

FIGURE NO:	SCALE:
10	1:800

TITLE:

PRE DEVELOPMENT SITE CATCHMENT AREAS
BLOCK 8

DISCIPLINE: ENVIRONMENT

ISSUE:	REV.:
-	-

Document Path: D:\aProjects\181-00471-00\MXD\2020\Block 8\181-00471-01 Figure 10 Block 8 Pre Development.mxd

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LEGEND

- POST DEVELOPMENT CATCHMENT AREAS
- BUILDING
- CONCRETE
- DRIVEWAY
- LAWN
- ROAD
- SIDEWALK
- POST DEVELOPMENT FLOW DIRECTION

N W E S

8 4 0 8 Metres

CLIENT:
EVENDALE DEVELOPMENTS LTD

PROJECT:
HYDROGEOLOGICAL ASSESSMENT AND WATER BALANCE STUDY - BLOCK 8
PART OF LOT 31, CONCESSION 7
UXBRIDGE, ONTARIO

PROJECT NO:	DATE:
181-00471-01	DECEMBER 2020

DESIGNED BY: -

DRAWN BY: T.P.

CHECKED BY: LL

FIGURE NO:	SCALE:
11	1:800

TITLE:
POST DEVELOPMENT SITE CATCHMENT AREAS
BLOCK 8

DISCIPLINE:
ENVIRONMENT

ISSUE:	REV.:
-	-

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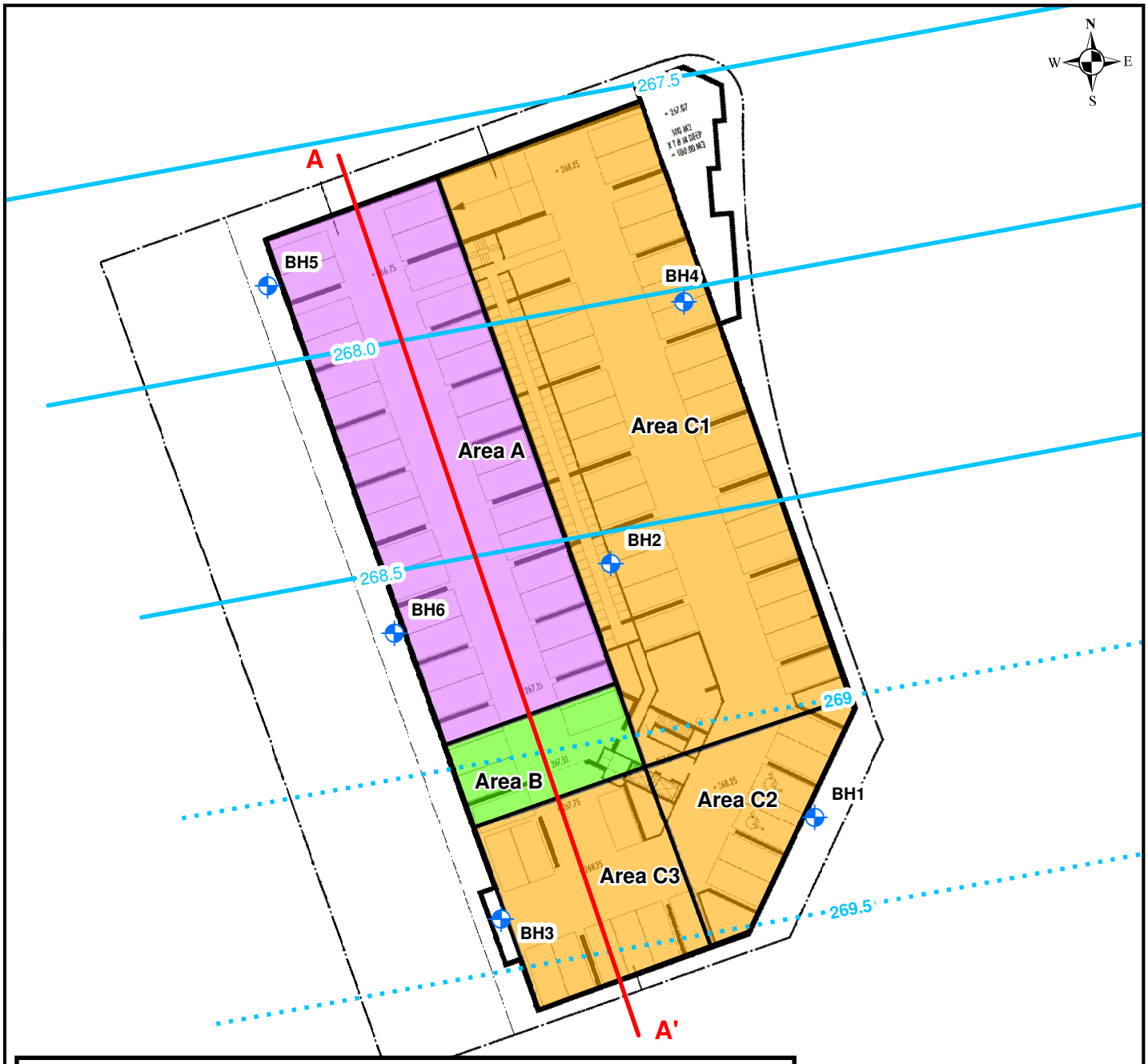

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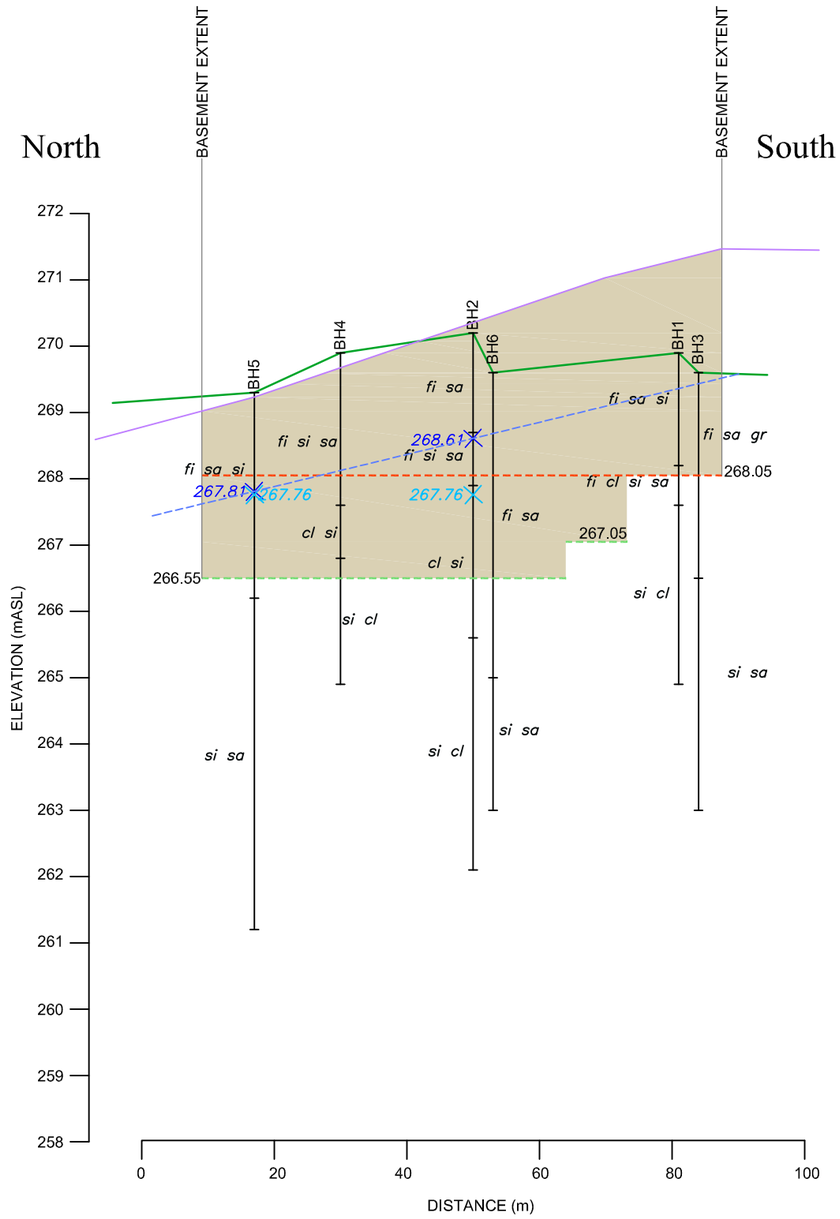
PROJECT:
HYDROGEOLOGICAL ASSESSMENT AND
WATER BALANCE STUDY - BLOCK 8
PART OF LOT 31, CONCESSION 7, UXBRIDGE, ONTARIO

TITLE:
PROPOSED BASEMENT LEVEL FOOTING ELEVATIONS

CLIENT:
EVENDALE DEVELOPMENTS LTD

SCALE:	1:600
DRAWN BY:	TP
CHECKED BY:	-
PROJECT NO:	181-00471-01
DATE:	DECEMBER 2020
FIGURE NO:	12
REV.:	-

Document Path: D:\aProjects\181-00471-00\MXD\2020\Block 8\181-00471-01 Figure 12 Basement Level Footings.mxd



LEGEND

BH1 — WELL ID

PROPOSED GROUND SURFACE

EXISTING GROUND SURFACE

SEASONALLY HIGH GROUNDWATER ELEVATIONS (APRIL, 2020)

SEASONALLY LOW GROUNDWATER ELEVATIONS (AUGUST, 2020)

INTERPRETED WATER TABLE ELEVATION

CHANGE IN STRATIGRAPHY

END OF BORING (mBGL)

SUBSURFACE BUILDING FOOTPRINT

BASEMENT TOP OF FOOTING ELEVATION ALONG EAST AND SOUTH SIDE OF STRUCTURE

BASEMENT TOP OF FOOTING ELEVATION ALONG WEST SIDE OF STRUCTURE

SOIL DESCRIPTION:

fi - FILL
si - SILT
sa - SAND
cl - CLAY
gr - GRAVEL

NOTE:
THE ACTUAL SOIL STRATIFICATION HAS BEEN VERIFIED FROM DATA OBTAINED AT THE WELL LOCATIONS ONLY. THE INFERRED CONTACTS SHOWN ARE BASED ON GEOLOGICAL EVIDENCE AND THESE MAY VARY FROM THOSE SHOWN BETWEEN BORINGS. WELL DATA IS PROJECTED ONTO THE SECTION WHICH ALSO MAY CREATE SOME IRREGULARITIES IN CONTACT DEPTHS.

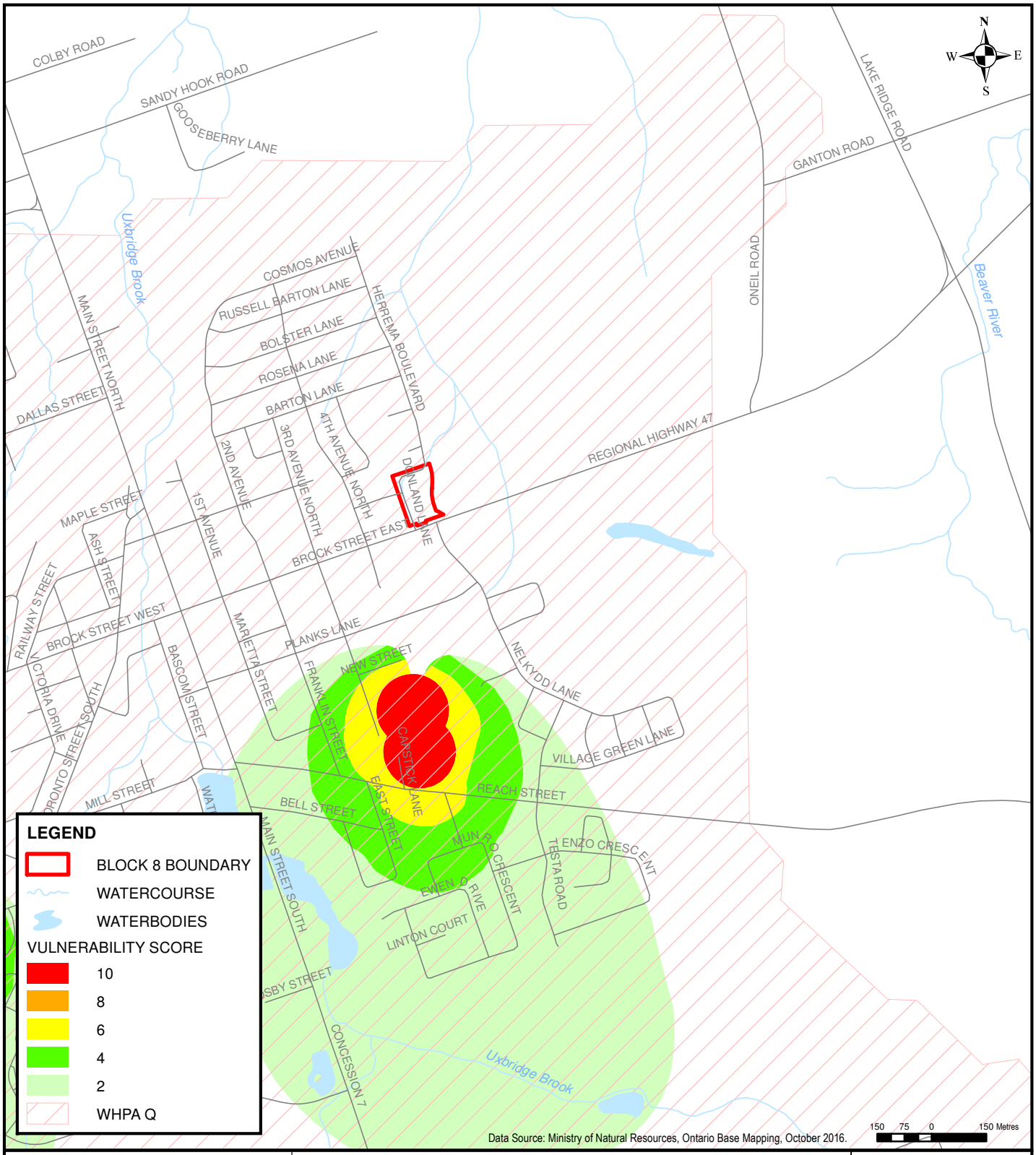
CROSS SECTION A-A'

HYDROGEOLOGICAL ASSESSMENT AND
WATER BALANCE STUDY - BLOCK 8
PART OF LOT 31, CONCESSION 7,
UXBRIDGE, ONTARIO

DATE: DECEMBER 2020	SCALES: AS SHOWN
PROJECT: 181-00471-01	FILE NO.: 181-00471-01 F13 CR

wsp

FIGURE 13



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PROJECT:
HYDROGEOLOGICAL ASSESSMENT AND
WATER BALANCE STUDY - BLOCK 8
PART OF LOT 31, CONCESSION 7, UXBRIDGE, ONTARIO

TITLE:
WELLHEAD PROTECTION AREAS

CLIENT:
EVENDALE DEVELOPMENTS LTD

SCALE: 1:15,000

DRAWN BY: TP

CHECKED BY: LL

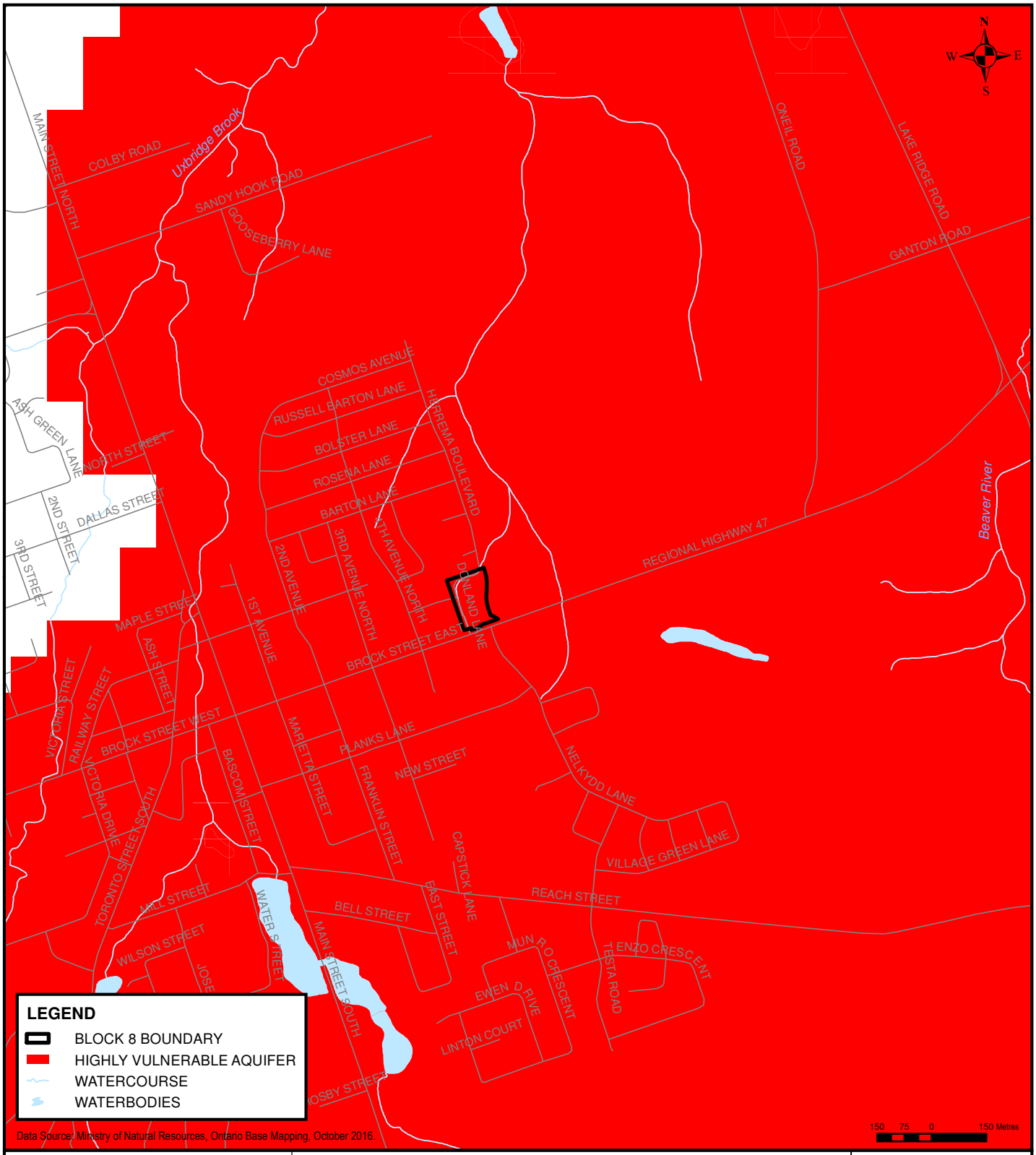
PROJECT NO: 181-00471-01

DATE: DECEMBER 2020

FIGURE NO: 14

REV.: -

Document Path: D:\aProjects\181-00471-00\MXD\2020\Block 8\181-00471-01 Figure 14 WHPA.mxd



Data Source: Ministry of Natural Resources, Ontario Base Mapping, October 2016.

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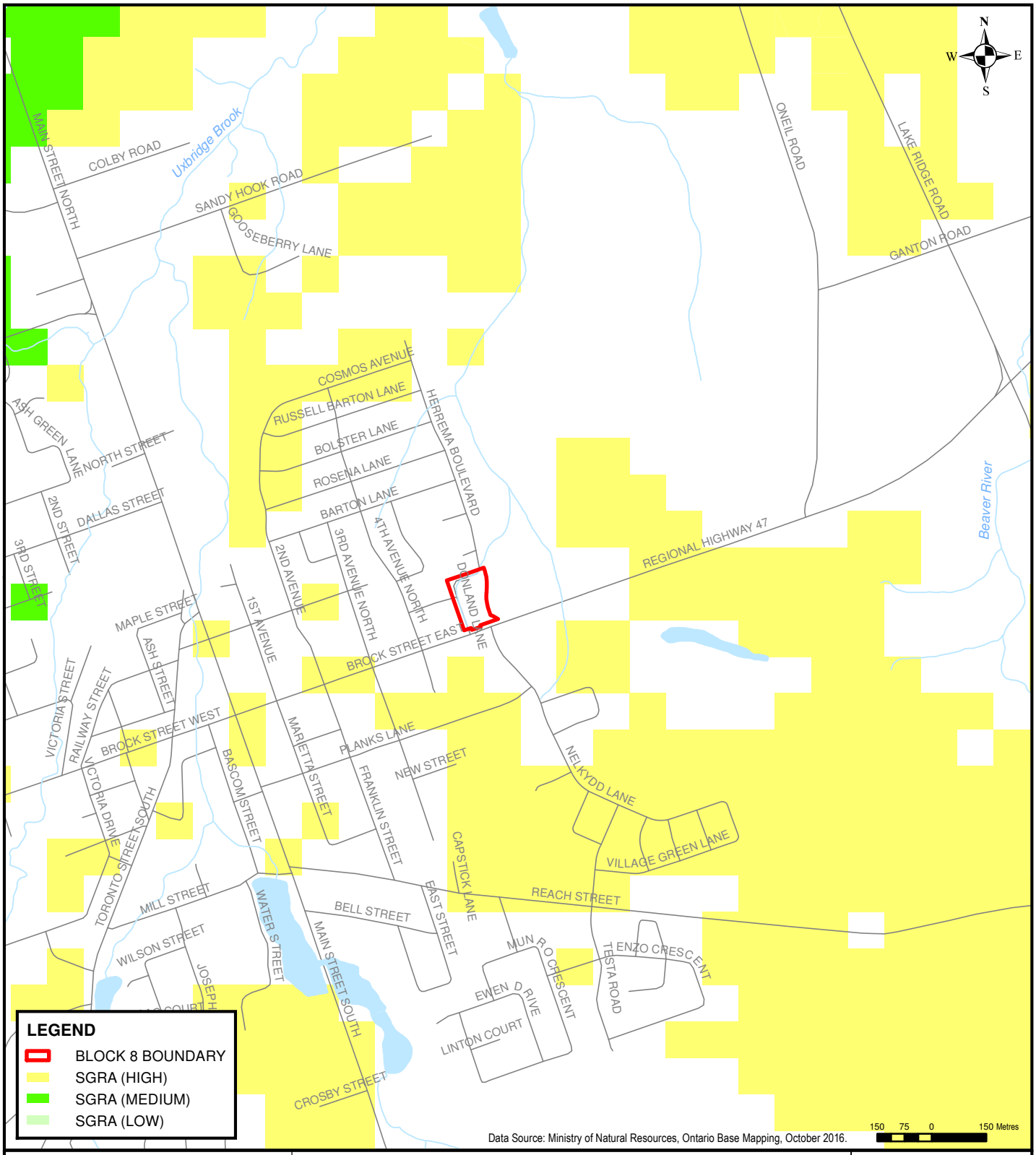
PROJECT:
HYDROGEOLOGICAL ASSESSMENT AND
WATER BALANCE STUDY - BLOCK 8
PART OF LOT 31, CONCESSION 7, UXBRIDGE, ONTARIO

TITLE:
HIGHLY VULNERABLE AQUIFERS

CLIENT:
EVENDALE DEVELOPMENTS LTD

SCALE:	1:15,000
DRAWN BY:	TP
CHECKED BY:	LL
PROJECT NO:	181-00471-01
DATE:	DECEMBER 2020
FIGURE NO:	15
REV.:	-

Document Path: D:\aProjects\181-00471-00\MXD\2020\Block 8\181-00471-01 Figure 15 HVA.mxd



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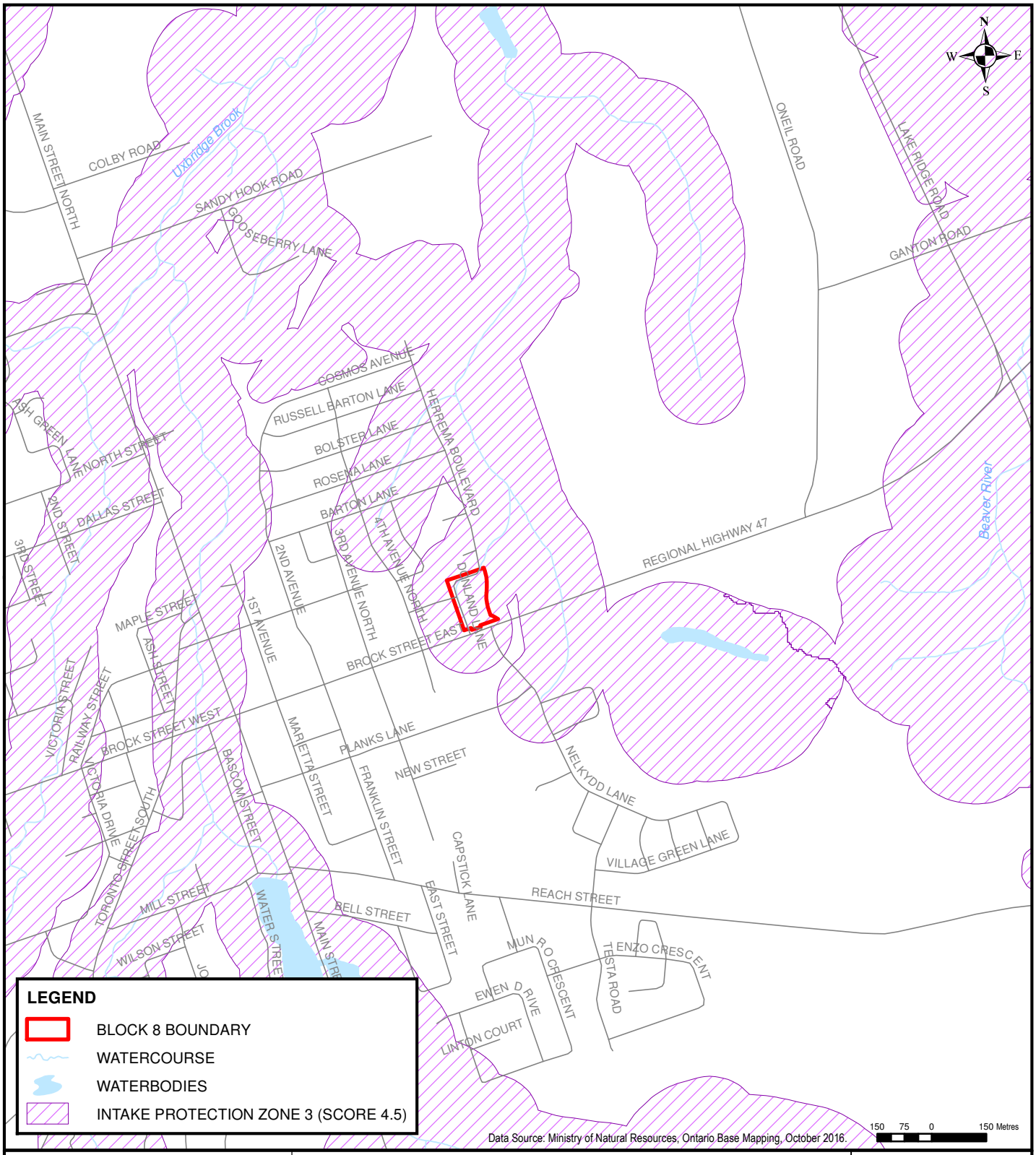
PROJECT:
HYDROGEOLOGICAL ASSESSMENT AND
WATER BALANCE STUDY - BLOCK 8
PART OF LOT 31, CONCESSION 7, UXBRIDGE, ONTARIO

TITLE:
SIGNIFICANT GROUNDWATER RECHARGE AREAS

CLIENT:
EVENDALE DEVELOPMENTS LTD

SCALE:	1:15,000
DRAWN BY:	TP
CHECKED BY:	LL
PROJECT NO:	181-00471-01
DATE:	DECEMBER 2020
FIGURE NO:	16
REV.:	-

Document Path: D:\aProjects\181-00471-00\MXD\2020\Block 8\181-00471-01 Figure 16 SGRA.mxd



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PROJECT:
HYDROGEOLOGICAL ASSESSMENT AND
WATER BALANCE STUDY - BLOCK 8
PART OF LOT 31, CONCESSION 7, UXBRIDGE, ONTARIO

TITLE:
INTAKE PROTECTION ZONES

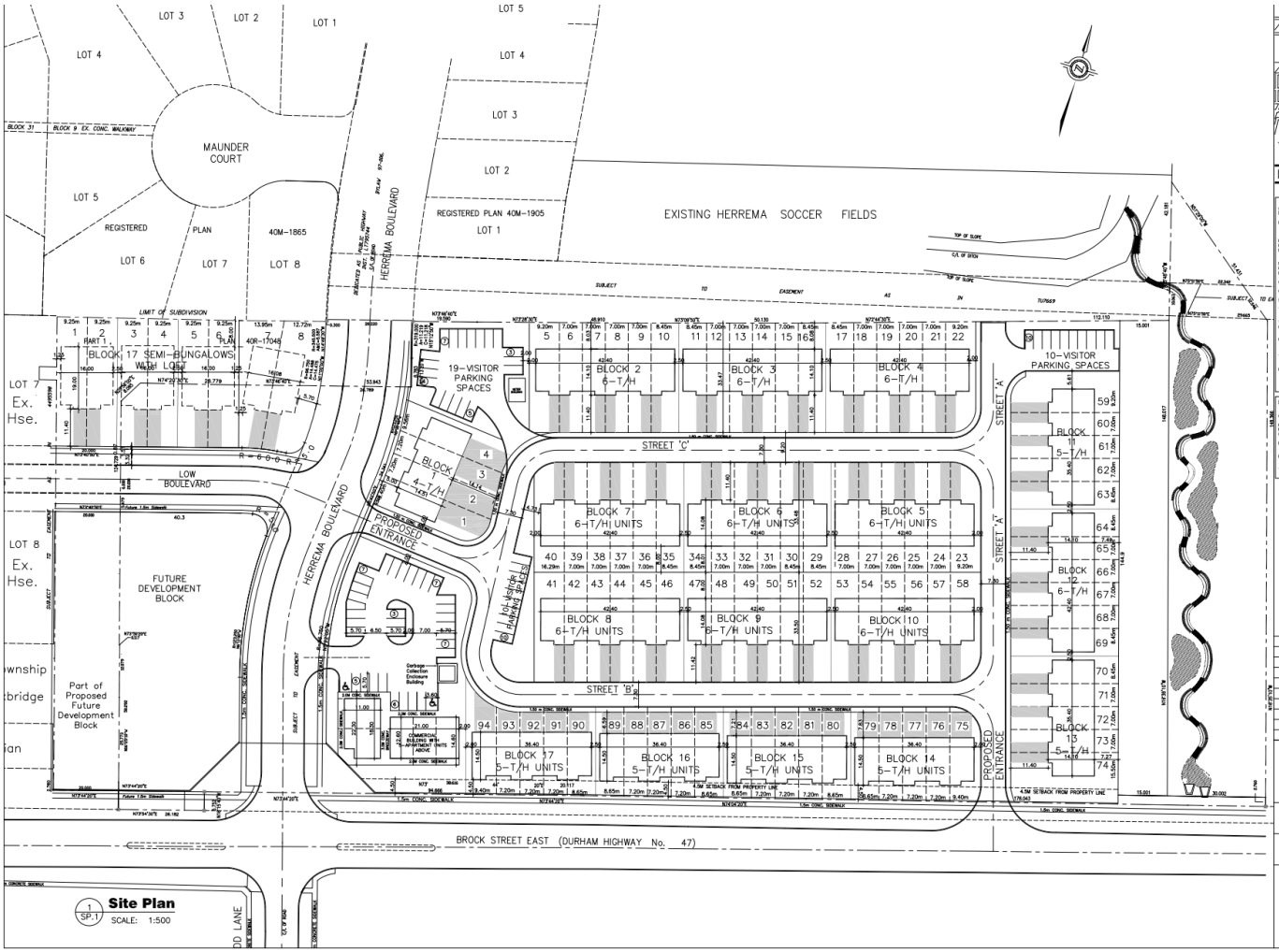
CLIENT:
EVENDALE DEVELOPMENTS LTD

SCALE:	1:15,000
DRAWN BY:	TP
CHECKED BY:	LL
PROJECT NO:	181-00471-01
DATE:	DECEMBER 2020
FIGURE NO:	17
REV.:	-

Document Path: D:\aProjects\181-00471-00\MXD\2020\Block 8\181-00471-01 Figure 17 IPZ.mxd

APPENDIX

A PROPOSED SITE PLANS



1 SP.1 **Site Plan** SCALE: 1:500

Key Plan N.T.S.

AREA SUMMARY:
CONDOMINIUM TOWNHOUSE BLOCK:

LOT AREA	= 49,714.57 m²	=	12.28 ACRES (100.0 %)
EASEMENT A	= 1,361.39 m²	=	0.336 AC.
EASEMENT B	= 813.44 m²	=	0.202 AC.
EASEMENT C	= 511.40 m²	=	0.126 AC.
LOW AVENUE	= 1,420.50 m²	=	0.351 AC.
HERREMA AVE	= 3,851.77 m²	=	0.955 AC.
HERREMA AVE (ENTRY BLVD)	= 983.80 m²	=	0.170 AC.
COMMERCIAL BLOCK	= 2,831.82 m²	=	0.702 AC.
CONDOMINIUM BLOCK	= 4,753.30 m²	=	1.175 AC.
SEMI - BUNGALOW LOT AREA	= 3,122.80 m²	=	0.772 AC.
TOTAL AREA	= 19,280.52 m²	=	4.764 AC.

TOTAL RES. CONDOMINIUM TOWNHOUSE USABLE AREA: (49,714.57 m² - 19,280.10 m²= 30,434.47 m² = 7.52 AC.

UNIT DISTRIBUTION: 24 = 7.0M WIDE TOWN HOUSE UNITS; 70 = 7.5M WIDE TOWN HOUSE UNITS

TOTAL UNITS = 94 UNITS

DENSITY: = 94 UNITS / 7.69 ACRES OR 94 UNITS / 3.11 Ha. 94/3.11 = 30.22 units / Hectares

COMMERCIAL BLOCK SUMMARY:

COMMERCIAL BLOCK / WITH 5- RESIDENTIAL UNITS ABOVE

LOT AREA	= 2,831.81 m²	=	0.71 ACRES
BUILDING AREA			
COMMERCIAL GROUND FLOOR AREA	= 466.45 m²		
PARKING PROVIDED 780 m² / 5.0 SMS/100 m²	=		39 PARKING SPACES
RESIDENTIAL PARKING SPACES PROVIDED (1.5 SPACES/UNIT)=			8 PARKING SPACES
TOTAL PARKING SPACES PROVIDE	=		34 PARKING SPACES

DATE REVISIONS

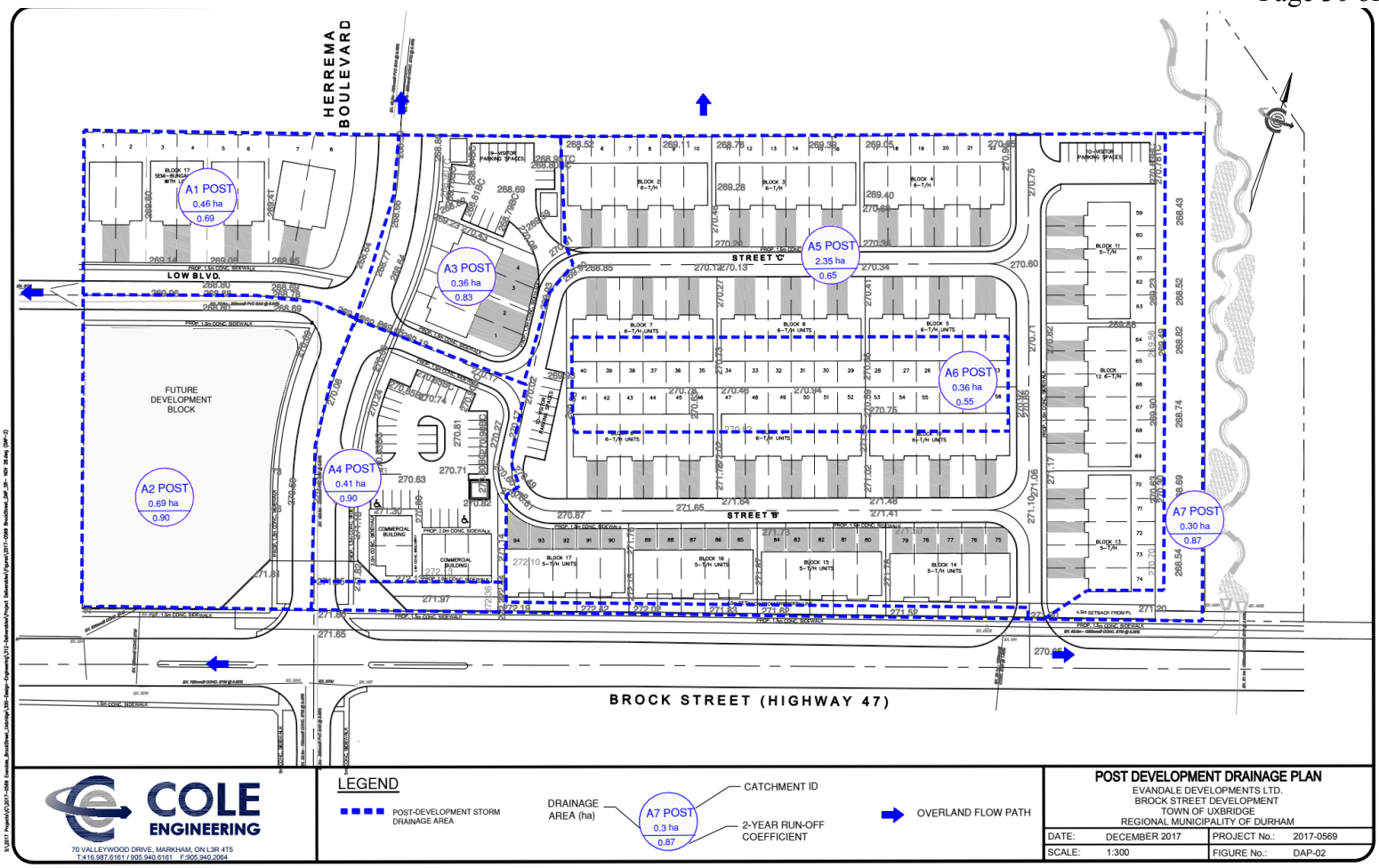
icr
207 Edgeley Boulevard, Ste. 16 Concord, On. L4K 4B5
Tel.(905) 738-8500, Fax(905) 738-2227

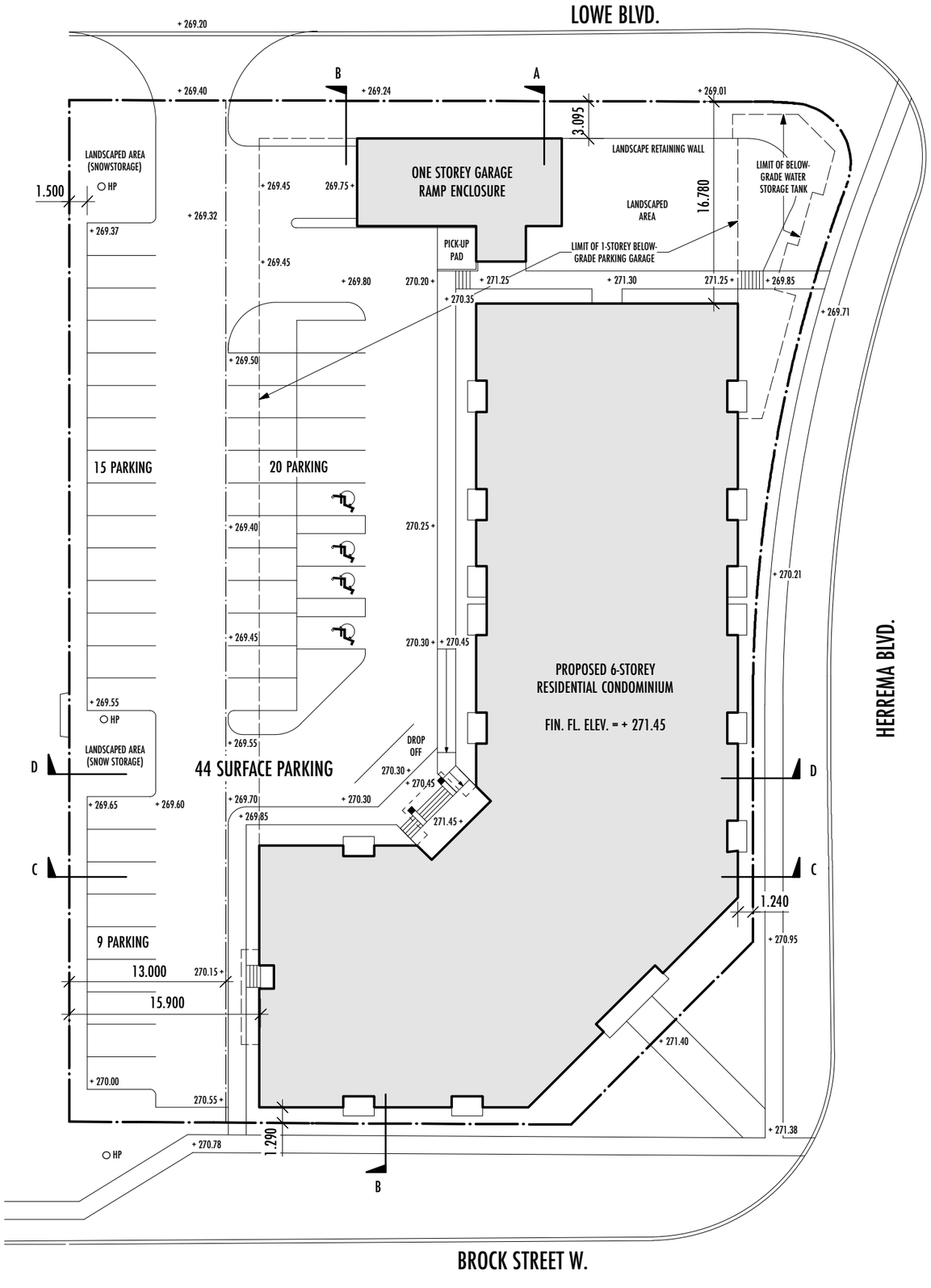
Evendale Developments Ltd.
BROCK STREET DEVELOPMENT
UXBRIDGE, ONTARIO

Proposed Brock Street Development

DATE	AUG. 2017
SCALE	1:500
DRAWN BY	B.M.
JOB NO	217-000

A.1


HERREMA BOULEVARD
LOW BLVD.
STREET 'C'
STREET 'B'
BROCK STREET (HIGHWAY 47)
FUTURE DEVELOPMENT BLOCK
A1 POST 0.46 ha 0.69
A2 POST 0.69 ha 0.90
A3 POST 0.36 ha 0.83
A4 POST 0.41 ha 0.90
A5 POST 2.35 ha 0.65
A6 POST 0.36 ha 0.55
A7 POST 0.30 ha 0.87
COMMERCIAL BUILDING
10+VISITOR PARKING SPACES
LEGEND
POST-DEVELOPMENT STORM DRAINAGE AREA
DRAINAGE AREA (ha)
CATCHMENT ID
2-YEAR RUN-OFF COEFFICIENT
OVERLAND FLOW PATH
COLE ENGINEERING
70 VALLEYWOOD DRIVE, MARKHAM, ON L3R 4T5
T 416.987.6161 / 905.940.6161 F 905.940.2064
POST DEVELOPMENT DRAINAGE PLAN
EVANDALE DEVELOPMENTS LTD.
BROCK STREET DEVELOPMENT
TOWN OF UXBRIDGE
REGIONAL MUNICIPALITY OF DURHAM
DATE: DECEMBER 2017
PROJECT No.: 2017-0569
SCALE: 1:300
FIGURE No.: DAP-02



KEITH LOFFLER MCALPINE ARCHITECTS
10 ST. MARY STREET
SUITE #402
TORONTO, ONTARIO
M4Y 1P9

ONTARIO ASSOCIATION OF ARCHITECTS
JOHN WILLIAM McALPINE
LICENCE
4397

SITE AREA:	4,870.34 M2
COVERAGE:	1,858.93 M2
% COVERAGE:	38.17
G.F.A:	9,738.86 M2
F.S.I:	2.0
RES. UNITS:	86
NET SALEABLE:	1,410.37 X 5 + 932.89 M2 = 7,984.47 M2

6 STOREYS
15 UNITS PER FLOOR
(15 X 5 = 75 + 11 = 86 UNITS)

PARKING:

SURFACE:	44 SPACES
BELOW GRADE:	86 SPACES
TOTAL PARKING:	130 SPACES

klma
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KEITH LOFFLER DESIGN INC
MCALPINE ARCHITECT INC

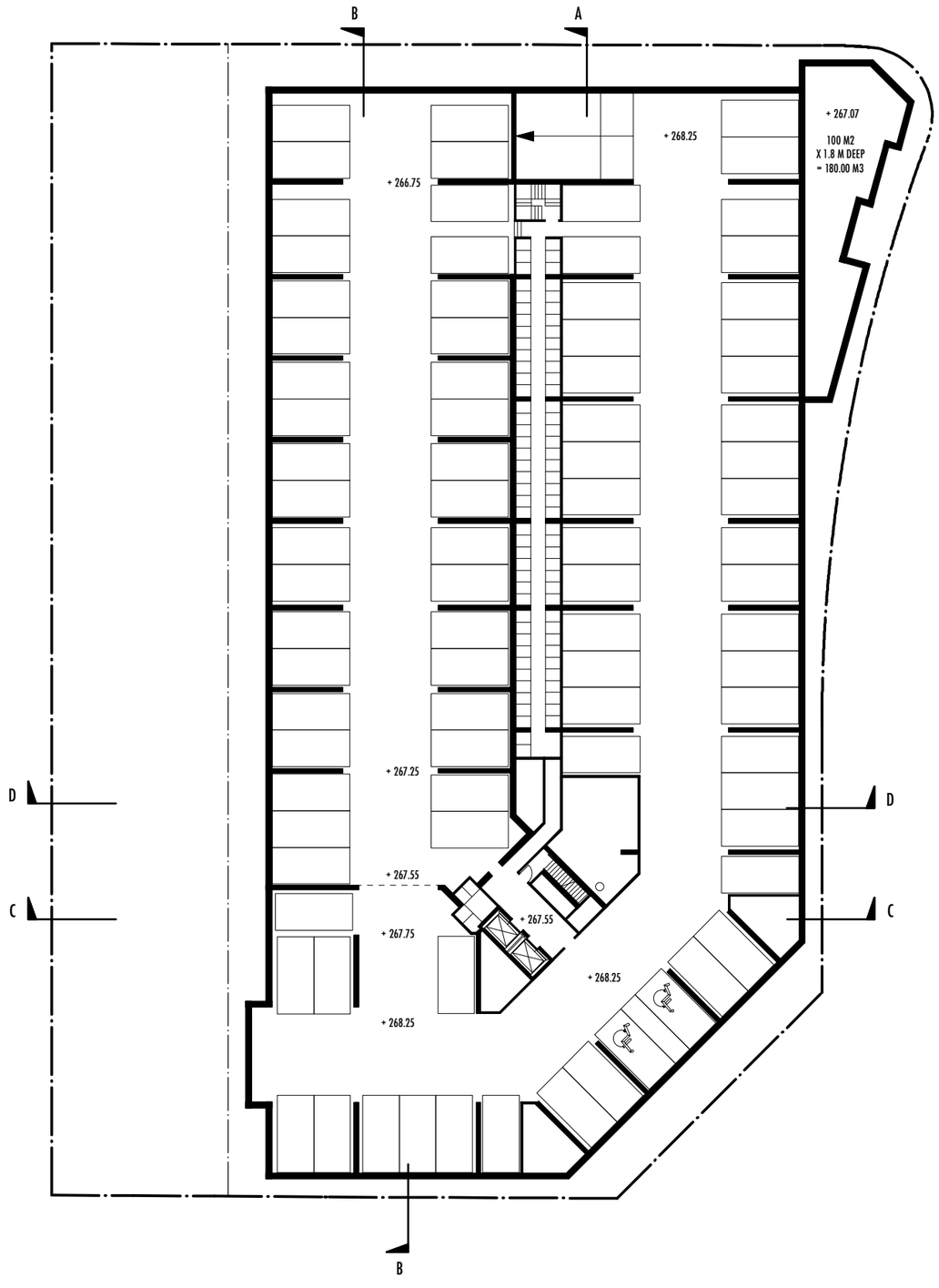
PROPOSED RESIDENTIAL DEVELOPMENT
BROCK STREET EAST
UXBRIDGE, ONTARIO
LEDGEMARK HOMES

SITE PLAN

A1

SCALE: 1 : 400

OCTOBER 14, 2020



BASEMENT

BASEMENT LEVEL = 86 CARS

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MCALPINE ARCHITECT INC

PROPOSED RESIDENTIAL DEVELOPMENT
BROCK STREET EAST
UXBRIDGE, ONTARIO
LEDGEMARK HOMES

BASEMENT PLAN

A2

SCALE: 1 : 400

OCTOBER 14, 2020

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PROPOSED RESIDENTIAL DEVELOPMENT

BROCK STREET EAST
UXBRIDGE, ONTARIO

LEDGEMARK HOMES

GROUND PLAN

A3

SCALE: 1 : 400

OCTOBER 14, 2020

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PROPOSED RESIDENTIAL DEVELOPMENT

BROCK STREET EAST
UXBRIDGE, ONTARIO

LEDGEMARK HOMES

2ND TO 6TH PLAN

A4

SCALE: 1 : 400

OCTOBER 14, 2020

SOUTH ELEVATION (BROCK STREET WEST)

EAST ELEVATION (HERREMA BOULEVARD)

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M4Y 1P9

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MCALPINE ARCHITECT INC

PROPOSED RESIDENTIAL DEVELOPMENT

BROCK STREET EAST
UXBRIDGE, ONTARIO

LEDGEMARK HOMES

SOUTH ELEVATION
EAST ELEVATION

A5

SCALE: 1 : 250

OCTOBER 14, 2020

NORTH ELEVATION

WEST ELEVATION

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KEITH LOFFLER DESIGN INC
MCALPINE ARCHITECT INC

PROPOSED RESIDENTIAL DEVELOPMENT

BROCK STREET EAST
UXBRIDGE, ONTARIO

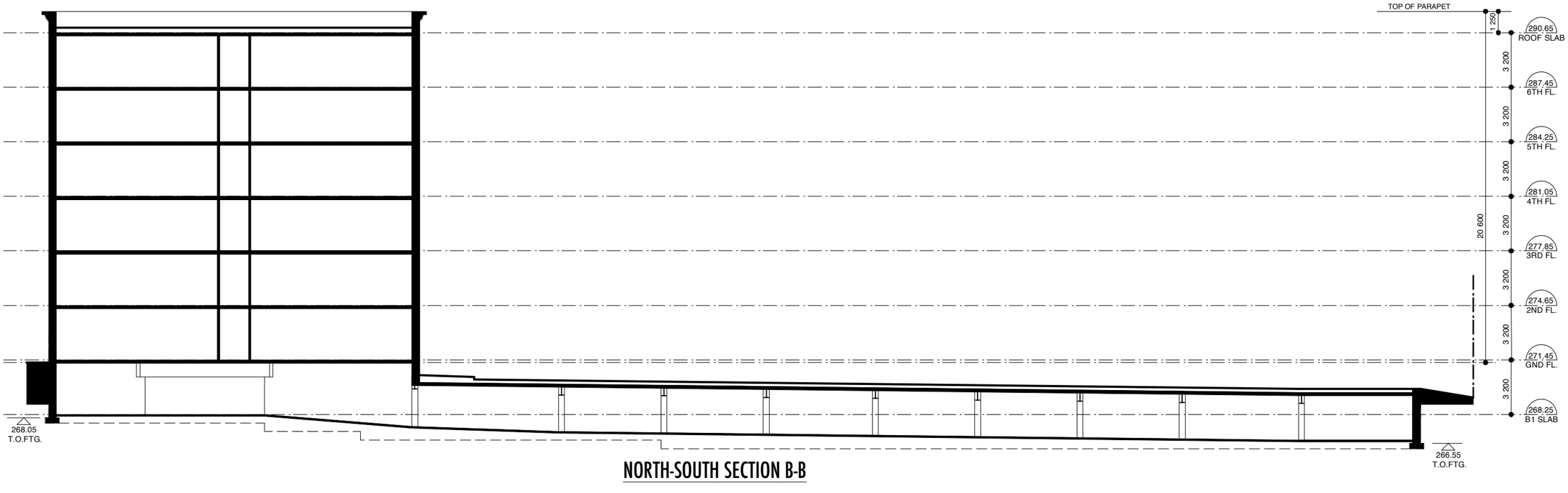
LEDGEMARK HOMES

NORTH ELEVATION
WEST ELEVATION

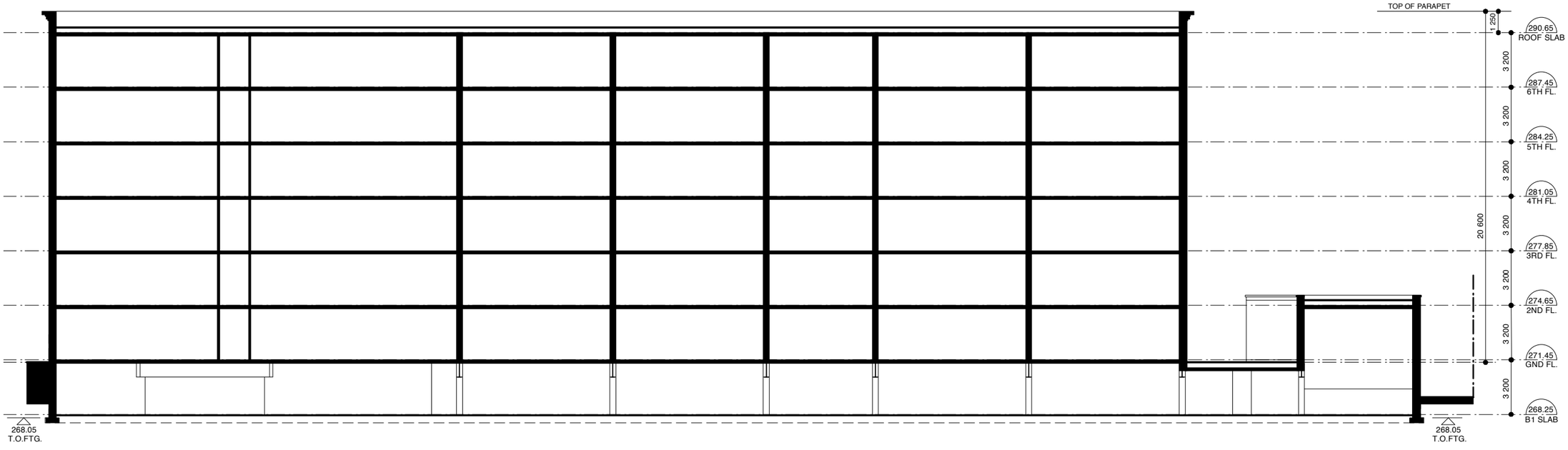
A6

SCALE: 1 : 250

OCTOBER 14, 2020



NORTH-SOUTH SECTION B-B



NORTH-SOUTH SECTION A-A

KEITH LOFFLER MCALPINE ARCHITECTS
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MCALPINE ARCHITECT INC

PROPOSED RESIDENTIAL DEVELOPMENT

BROCK STREET EAST
UXBRIDGE, ONTARIO

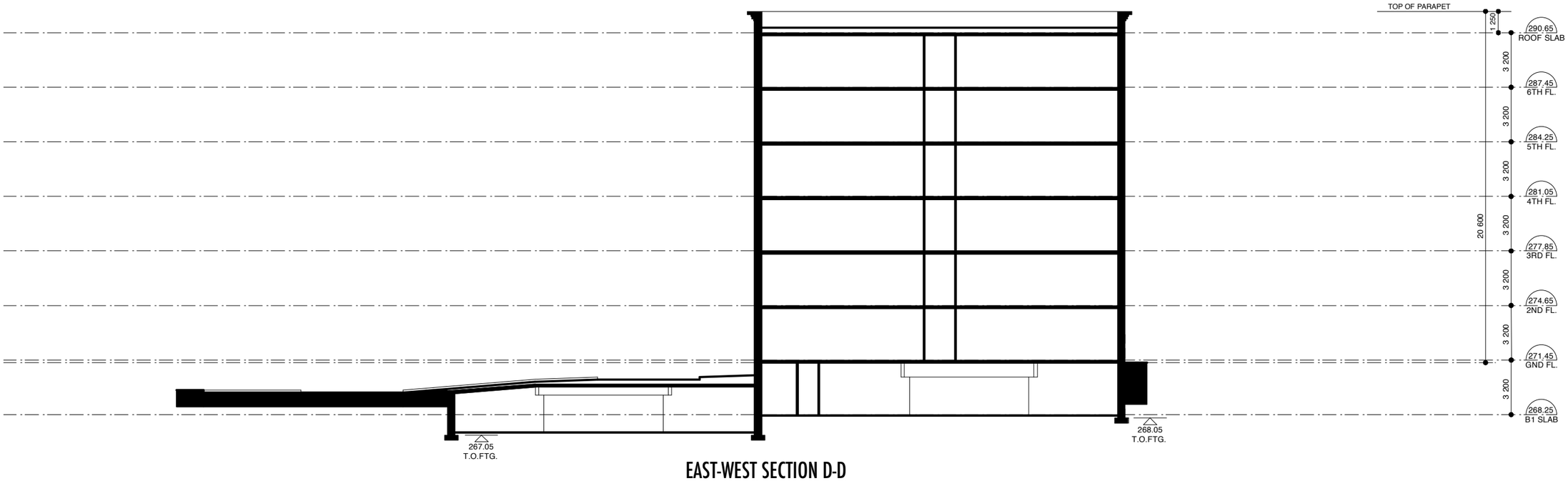
LEDGEMARK HOMES

SECTION A-A
SECTION B-B

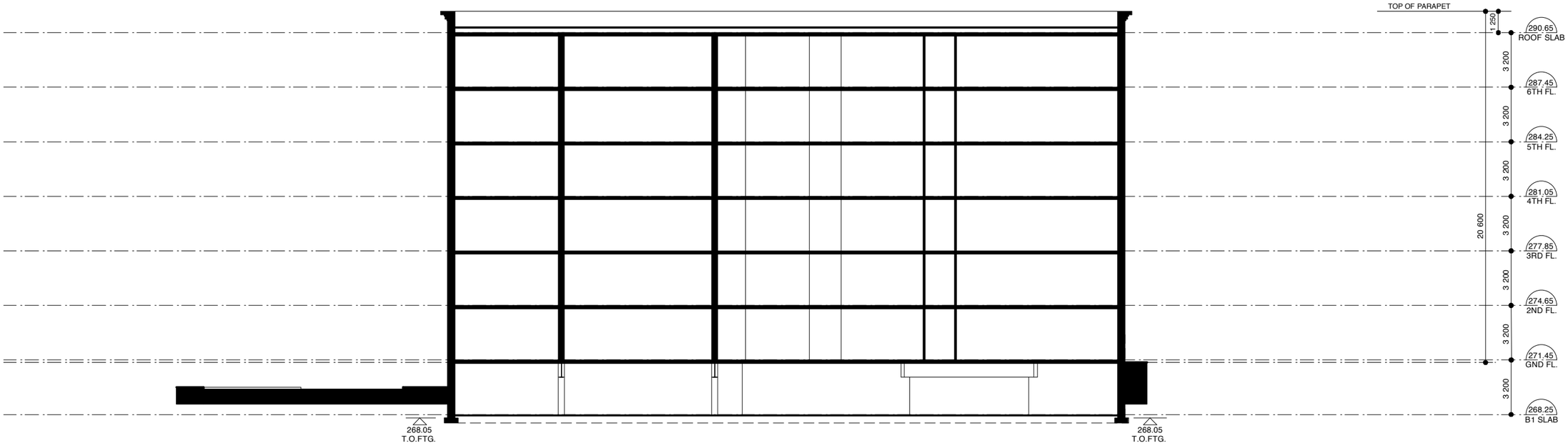
A7

SCALE: 1 : 250

OCTOBER 14, 2020



EAST-WEST SECTION D-D



EAST-WEST SECTION C-C

KEITH LOFFLER MCALPINE ARCHITECTS
10 ST. MARY STREET
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TORONTO, ONTARIO
M4Y 1P9

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MCALPINE ARCHITECT INC

PROPOSED RESIDENTIAL DEVELOPMENT

BROCK STREET EAST
UXBRIDGE, ONTARIO

LEDGEMARK HOMES

SECTION C-C
SECTION D-D

A8

SCALE: 1 : 250

OCTOBER 14, 2020

APPENDIX

B

MECP WATER WELL RECORDS AND GEOTECHNICAL BOREHOLE LOGS

TABLE B-1
MECP WATER WELL RECORDS
HYDROGEOLOGICAL ASSESSMENT AND WATER BALANCE STUDY
BLOCK 6 - PART OF LOT 31, CONCESSION 7, UXBRIDGE

Well ID	X	Y	Elevation (m)	Well Depth (m)	Construction Method	Water Level (m)	Water Yield	Units of Measurement	Water Use	Water Status	Formation Depth (m)	Material Colour	Material 1	Material 2	Material 3
											0.6		TOPSOIL		
1905167	651114.9	4885923	272.593658	4.87680006	Boring	3.048000097		GPM	Domestic	Water Supply	3.0	BROWN	CLAY	STONEY	
											4.9		COARSE SAND		
											0.6	BLACK	TOPSOIL		
1906132	651214.9	4886023	271.525054	31.69919968	Cable Tool	25.90800095	20	GPM	Domestic	Water Supply	5.2	BROWN	CLAY	SOFT	
											25.9	BLUE	CLAY	SOFT	
											29.0	BROWN	SAND	SILT	DIRTY
											31.7	BROWN	COARSE SAND		
											16.5	BROWN	GRAVEL	CLAY	BOULDERS
1909134	651308.9	4886267	269.258789	22.86000061	Rotary (Convent.)	22.86000061	8	GPM	Domestic	Water Supply	20.4	GREY	CLAY	BOULDERS	HARD
											22.9	GREY	SAND	CLEAN	
											3.0	BROWN	CLAY	DENSE	
1910043	651308.9	4886267	269.258789	11.27760029	Rotary (Air)	11.27760029	6	GPM	Domestic	Water Supply	4.6	BROWN	SAND	FINE SAND	
											11.3	GREY	SAND	FINE SAND	
											3.7	BROWN	CLAY	SOFT	
1910770	651255.9	4886000	271.236328	24.38400078	Rotary (Air)	24.38400078	12	GPM	Domestic	Water Supply	5.2	GREY	CLAY	SOFT	
											17.4	BLUE	SILT	SOFT	
											21.3	BROWN	SAND	MEDIUM SAND	
											24.4	BROWN	SAND	MEDIUM SAND	CLEAN
											4.6	BROWN	SAND	PACKED	
1913524	651090	4885911	272.539215	23.46960068	Rotary (Air)	23.46960068	40	GPM	Domestic	Water Supply	12.2	GREY	CLAY	SOFT	
											17.1	GREY	SILT	SOFT	
											23.5	BROWN	SAND	GRAVEL	COARSE-GRAINED
											1.2	BLACK	TOPSOIL		
											2.7	GREY	SAND	SILTY	CLAY
											5.8	GREY	SAND	SILTY	GRAVEL
											7.6	GREY	CLAY	SILTY	GRAVEL
											16.8	GREY	SAND	SILTY	GRAVEL
1916320	651172	4886647	265.803833	41.45280075	Rotary (Air)	14.93519974	272	GPM		Dewatering	18.9	GREY	SAND	SILT	WATER-BEARING
											22.6	GREY	SAND	SILTY	GRAVEL
											29.9	GREY	COARSE SAND	COARSE GRAVEL	WATER-BEARING
											30.5	GREY	SAND	GRAVEL	WATER-BEARING
											31.1	GREY	SAND	GRAVEL	
											40.8	BROWN	SAND	GRAVEL	WATER-BEARING
											41.5	GREY	CLAY	SILT	DENSE
											9.1		PREVIOUSLY DUG		
											15.8		CLAY	MEDIUM SAND	
4603034	651497.9	4885651	274.356475	28.34640121	Cable Tool	28.34640121	9	GPM	Irrigation	Water Supply	18.6	RED	FINE SAND		
											25.0	BLUE	MEDIUM SAND		
											28.3	BLACK	MEDIUM SAND		
											1.2		CLAY		
											5.5		SAND		
4605817	651601.9	4886190	272.364318	10.66800022	Boring	6.705600262	0	GPM	Livestock	Water Supply	6.4		SANDSTONE		
											9.4		QUICKSAND		
											10.7		COARSE SAND		
											3.7		CLAY		
4605818	651675.9	4886287	270.361145	10.66800022	Boring	7.924799919		GPM	Livestock	Water Supply	6.7		SAND		
											9.1		SANDSTONE		
											10.7		SAND	GRAVEL	
4605920	651580.9	4886286	270.920379	27.43200111	Rotary (Convent.)	27.43200111	9	GPM	Livestock	Water Supply	7.6	BROWN	SAND	CLAY	
											27.4	BROWN	SAND		
7105580	650938	4885870	275.0	4.2	Auger	2.4			Not Used	Other Status	4.2	BROWN	MEDIUM SAND		
1913652	650932	4885903	274.26773							Test Hole	4.572000027	BROWN	SAND	SILT	LOOSE
1913653	650928	4885912	274.034484							Test Hole	5.486400127	BROWN	SAND	SILT	LOOSE
1915993	651437.2	4885858	273.423126							Abandoned-Other					
1916182	651437.2	4885858	273.423126							Abandoned-Other					
1916322	651172	4886647	265.803833							Abandoned-Other					
1916324	651172	4886647	265.803833							Abandoned-Other					
1916325	651172	4886647	265.803833							Abandoned-Other					
											1.22	BROWN	SAND		
1917402	650928	4885912	274.034484							Observation Wells	4.28	BROWN	SAND	WATER-BEARING	
											0.15	BROWN	GRAVEL		
1917590	650959	4885832	275.415618							Observation Wells	4.5	BROWN	SAND		
											3	BROWN	SAND	DRY	
1917591	650957	4885900	274.293457							Observation Wells	4.5	BROWN	SAND		
											2.4	BROWN	MEDIUM SAND	GRAVEL	
1918330	650940	4885900	274.353515							Observation Wells	3.6	BROWN	MEDIUM SAND	GRAVEL	
											0.1				
											0.3		GRAVEL	SANDY	FILL
1918460	651037	4885968	270.425231						Not Used	Test Hole	2	BROWN	SAND	SILT	
											2.3	BROWN	SILT	SAND	
											6	BROWN	SAND	SILT	
7108535	651038	4885968	270.408782							Abandoned-Other					
											1.2	BROWN	SAND		MEDIUM-GRAINED
7117008	650934	4885934	273.390747						Test Hole	Test Hole	3	BROWN	SAND	SILT	
											5.1	BROWN	SAND	SILT	COARSE-GRAINED
											1.2	BROWN	SAND		MEDIUM-GRAINED
7117009	650898	4885903	274.189971							Test Hole	1.8	BROWN	SAND	SILT	MEDIUM-GRAINED
											4.5	BROWN	SAND	SILT	WATER-BEARING
											0.6	BROWN	SAND		COARSE-GRAINED
7117010	650940	4885909	274.099853						Test Hole	Test Hole	1.8	BROWN	SAND	SILT	MEDIUM-GRAINED
											4.5	BROWN	SAND	SILT	WATER-BEARING
											0.6	BROWN	SAND	GRAVEL	COARSE-GRAINED
7117011	650933	4885896	274.444671						Test Hole	Test Hole	1.8	BROWN	SAND	SILT	FINE-GRAINED
											4.2	BROWN	SAND	SILT	WATER-BEARING
											4.6	GREY	SILT	SAND	WATER-BEARING
											1.8	BROWN	SAND		FINE-GRAINED
7117012	650904	4885899	274.299011						Test Hole	Test Hole	3	BROWN	SAND	SILT	
											4.5	BROWN	SAND	SILT	MEDIUM-GRAINED
											1.5	BROWN	SAND	MEDIUM GRAVEL	
											2.8	BROWN	SAND	SILT	
											3.6	BROWN	SAND	CLAY	SILT
7117013	650951	4885871	275.050262						Test Hole	Test Hole	4.8	BROWN	SAND	SILT	CLAY
											5.1	BROWN	SILT	CLAY	WATER-BEARING
											5.9	BROWN	CLAY	SILT	WATER-BEARING
											1.8	BROWN	SAND		FINE-GRAINED
7117014	650917	4885846	275.190399						Test Hole	Test Hole	3	BROWN	SAND	SILTY	WATER-BEARING
											4.5	BROWN	SAND		WATER-BEARING
											0.3	BROWN	TOPSOIL		
7117015	650984	4885867	274.794677						Test Hole	Test Hole	3.8	BROWN	SAND		WATER-BEARING
											1.5	BROWN	SAND		MEDIUM-GRAINED
7117016	650991	4885836	275.18045						Test Hole	Test Hole	5.3	BROWN	SAND	SILT	CLAY
											5.9	GREY	CLAY		WATER-BEARING
											1.2	BROWN	SAND	MEDIUM-GRAINED	
7117017	650958	4885774	275.578857						Test Hole	Test Hole	3.6	BROWN	SAND	SILT	MEDIUM-GRAINED
											5.4	BROWN	SAND	SILT	WATER-BEARING
											3.8	BROWN	SAND		SOFT
7119880	650950	4885814	275.5						Test Hole	Test Hole	4.4	BROWN	CLAY		SOFT
											5.2	BROWN	SAND		SOFT
7123787	651582	4885689	273.245361						Monitoring and Test	Test Hole	10	BROWN	SAND	SILT	WATER-BEARING
											15	GREY	SAND	SILT	WATER-BEARING
7128861	651038	4885968	270.408782							Abandoned-Other					
7139469	651034	4885991	270.067626						Not Used	Test Hole	0.9	GREY	STONES	GRAVEL	
											3.05	BROWN	SAND	SILT	SILTY

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BLOCK 6 - PART OF LOT 31, CONCESSION 7, UXBRIDGE

Well ID	X	Y	Elevation (m)	Well Depth (m)	Construction Method	Water Level (m)	Water Yield	Units of Measurement	Water Use	Water Status	Formation Depth (m)	Material Colour	Material 1	Material 2	Material 3
7150170	650938	4885903	274.272674							Abandoned-Other					
7155254	651034	4885991													
7159581	650920	4885896							Test Hole	Test Hole	3	BROWN	FILL	SAND	LOOSE
											7	BROWN	FILL	SAND	GRAVEL
											15	BROWN	FILL	SAND	WATER-BEARING
7168524	650916	4885889								Abandoned-Other					
7168525	650982	4885862								Abandoned-Other					
7188925	650996	4885841													
7194819	650937	4885855							Test Hole	Test Hole	3.657599926	BROWN	FILL		LOOSE
											4.572000027	BROWN	MEDIUM SAND		WATER-BEARING
7211094	651390	4885610								Abandoned-Other					
7214791	650918	4885850								Abandoned Monitoring and Test Hole					
7218500	650913	4885627							Test Hole	Test Hole	0.304800004	BROWN	TOPSOIL	HARD	DENSE
											3.96239996	YELLOW	SAND	SILT	
											4.572000027	YELLOW	SAND	CLAY	WATER-BEARING
7218501	650918	4885841							Test Hole	Test Hole	0.304800004	BROWN	TOPSOIL	HARD	DENSE
											3.96239996	YELLOW	SAND	SILT	
											4.572000027	YELLOW	SAND	CLAY	WATER-BEARING
7225855	651390	4885579							Not Used	Abandoned-Other					
7235444	650587	4886059								Abandoned-Other					
7238015	650948	4885815													
7246957	650949	4885812							Test Hole	Test Hole	2.43840003	BROWN	SAND		
											4.572000027	BROWN	SAND		WATER-BEARING
7250156	650927	4885943							Test Hole	Observation Wells	1	BROWN	TOPSOIL	LOOSE	
											5	BROWN	FILL	LOOSE	
											17.5	GREY	SILT	CLAY	SOFT
7250157	650930	4885938							Test Hole	Observation Wells	1	BROWN	TOPSOIL	LOOSE	
											5	BROWN	FILL	LOOSE	
											17.5	GREY	SILT	CLAY	SOFT
7250158	650928	4885953							Test Hole	Observation Wells	1	BROWN	TOPSOIL	SOFT	
											5	BROWN	SAND	SILT	SOFT
											15	GREY	SILT	CLAY	SOFT
7250159	650936	4885944							Test Hole	Observation Wells	1	BROWN	TOPSOIL	SOFT	
											5	BROWN	SAND	SILT	SOFT
											15	GREY	SILT	CLAY	SOFT
7250262	650933	4885968							Test Hole	Observation Wells	0.152400002	BROWN	TOPSOIL	LOOSE	
											0.304800004	BROWN	SAND	SILT	LOOSE
											2.743200064	BROWN	SILT	CLAY	LOOSE
											4.572000027	GREY	SILT	CLAY	LOOSE
7250263	650933	4885971							Test Hole	Observation Wells	0.152400002	BROWN	TOPSOIL	LOOSE	
											0.304800004	BROWN	SAND	SILT	LOOSE
											2.743200064	BROWN	SILT	CLAY	LOOSE
											4.572000027	GREY	SILT	CLAY	LOOSE
7250264	650940	4885976							Test Hole	Observation Wells	0.152400002	BROWN	TOPSOIL	LOOSE	
											0.304800004	BROWN	SAND	SILT	LOOSE
											2.743200064	BROWN	SILT	CLAY	LOOSE
											4.572000027	GREY	SILT	CLAY	LOOSE
7258221	650941	4885799							Monitoring	Observation Wells	0.300000012	BROWN	TOPSOIL		TOPSOIL
											2.440000057	BROWN	SAND		SOFT
											4.570000172	BROWN	SAND		WATER-BEARING
7263012	650940	4885926													
7263013	650938	4885923													
7270037	651318	4886095	269.234924	7.619999886	Rotary (Convent.)				Monitoring		1.5	BROWN	TOPSOIL		
											4.6	BROWN	SAND	TOPSOIL	
											7.6	GREY	CLAY		SILTY
7280801	650936	4885809	275.492126	3.048000097	Boring				Monitoring		0.3	BROWN	TOPSOIL		
											2.7	GREY	SAND		SOFT
											3.0	BROWN	FINE SAND	CLAY	
7280802	650945	4885812	275.49942	3.048000097	Boring				Monitoring		0.3	BROWN	TOPSOIL		
											2.7	GREY	SAND		
											3.0	BROWN	FINE SAND	CLAY	SOFT
7285192	650948	4885815	275.5							Abandoned-Other					
7297864	650961	4885869	275.1												
7308681	650936	4885967													
7308682	650943	4885970													
7308683	650939	4885980													
7308684	650941	4885969													
7308685	650940	4885936													
7308686	650952	4885814													
7308687	650951	4885816		4.572000027	Other Method						1.2	BROWN	SAND	SAND	
											2.7	BROWN	SAND	GRAVEL	
											4.6	BROWN	SAND		
7328161	651258	4885932													

Ontario — Ministry of the Environment and Climate Change

Measurements recorded in: ☐ Metric ☐ Imperial

Well Tag No. *(Place Sticker and/or Print Below)*
Tag#: A202261

Well Record
Regulation 903 Ontario Water Resources Act

Page _____ of _____

Well Owner's Information

First Name	Last Name / Organization	E-mail Address	☐ Well Constructed by Well Owner
Exp			

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
1595 Clark Blvd	Brampton	On	L6T4V1	9057939800

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
Donland Ln & Brock St E			

County/District/Municipality	City/Town/Village	Province	Postal Code
	Uxbridge	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	17	651318	4886095		

Overburden and Bedrock Materials/Abandonment Sealing Record *(see instructions on the back of this form)*

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
brown	top soil			0	5
light Brown	Sand	soil		5	15
grey	Silty clay			15	25
Well #2					
	6510 Cell				
	4886095				

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0	13	holeplug	

Method of Construction

☐ Cable Tool ☐ Diamond
☑ Rotary (Conventional) ☐ Jetting
☐ Rotary (Reverse) ☐ Driving
☐ Boring ☐ Digging
☐ Air percussion
☐ Other, *specify* _____

Well Use

☐ Public ☐ Commercial ☐ Not used
☐ Domestic ☐ Municipal ☐ Dewatering
☐ Livestock ☐ Test Hole ☑ Monitoring
☐ Irrigation ☐ Cooling & Air Conditioning
☐ Industrial
☐ Other, *specify* _____

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
1"	PVC		0	15

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To
1"	PVC	10	15	25

Status of Well

☐ Water Supply
☐ Replacement Well
☐ Test Hole
☐ Recharge Well
☐ Dewatering Well
☐ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, *specify*
☐ Other, *specify*

Water Details

Water found at Depth (m/ft)	Kind of Water	Hole Diameter Depth From	Depth To	Diameter (cm/in)
☐ Gas	☐ Fresh ☐ Untested ☐ Other, *specify*	0	25	6"
☐ Gas	☐ Fresh ☐ Untested ☐ Other, *specify*			
☐ Gas	☐ Fresh ☐ Untested ☐ Other, *specify*			

Results of Well Yield Testing

After test of well yield, water was:
☐ Clear and sand free
☐ Other, *specify* _____

If pumping discontinued, give reason:

Pump intake set at *(m/ft)*

Pumping rate *(l/min / GPM)*

Duration of pumping _____ hrs + _____ min

Final water level end of pumping *(m/ft)*

If flowing give rate *(l/min / GPM)*

Recommended pump depth *(m/ft)*

Recommended pump rate *(l/min / GPM)*

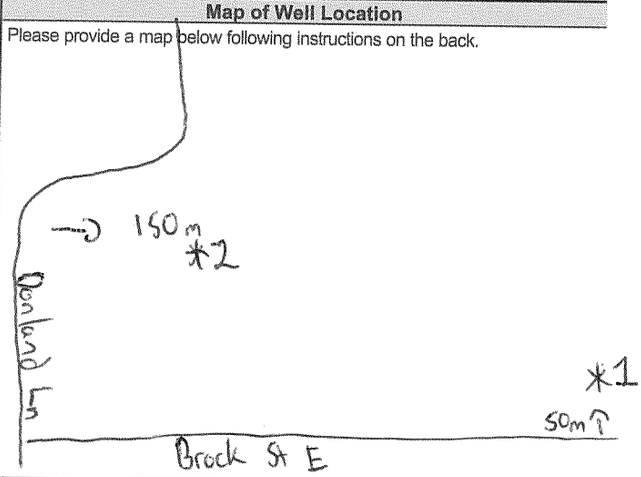
Well production *(l/min / GPM)*

Disinfected? ☐ Yes ☐ No

Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level			
1		1	
2		2	
3		3	
4		4	
5		5	
10		10	
15		15	
20		20	
25		25	
30		30	
40		40	
50		50	
60		60	

Map of Well Location

Please provide a map below following instructions on the back.



Comments:

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Terex Drilling Solutions	7501

Business Address (Street Number/Name)	Municipality
491 Bowes Rd	Vaughan

Province	Postal Code	Business E-mail Address
Ont	L4K1J5	terexdrillingsolutions@gmail.com

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
4167503636	MacEachern, Jon

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
3681		2016082 2

Well owner's information package delivered	Date Package Delivered	Date Work Completed
☐ Yes ☐ No		2016822

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SOLA ENGINEERING

ENCLOSURE No. 2

RECORD OF BOREHOLE No. BH1 1 OF 3 METRIC

PROJECT NUMBER 10451A LOCATION Brock Street East, Uxbridge, ON ORIGINATED BY JA

DIST HWY BOREHOLE TYPE Solid Stem Auger COMPILED BY JA

DATUM Geodetic DATE 2020.03.05 - 2020.03.05 LATITUDE LONGITUDE CHECKED BY

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH kPa: ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L WATER CONTENT (%) 20 40 60	UNIT WEIGHT γ kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
269.9	Gravel										
0.0 / 269.8	CRUSHED LIMESTONE- 125 mm thick		1A	SS							
0.1 / 269.7	FILL- sand and gravel, brown, moist		1B	SS							
0.2	FILL - sand, some silt, trace stones, light brown, moist		1C	SS	16						
269.1											
0.8	- organic odour, very moist		2	SS	19	▽	269				
268.4											
1.5 / 268.3	FILL - sandy silt, organic odour, brownish grey, very moist										
1.7	PROBABLE FILL - clayey silt, trace sand, grey, moist		3	SS	16		268				
267.6											
2.3	SILTY CLAY - trace gravel, trace sand, grey, very stiff, moist		4	SS	17		267				
266.9											
3.1	- trace sand, firm		5	SS	7		266				

Continued Next Page

$+^3, \times^3$: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

SOLA ENGINEERING

ENCLOSURE No. 2

RECORD OF BOREHOLE No. BH1 2 OF 3 METRIC

PROJECT NUMBER 10451A LOCATION Brock Street East, Uxbridge, ON ORIGINATED BY JA

DIST HWY BOREHOLE TYPE Solid Stem Auger COMPILED BY JA

DATUM Geodetic DATE 2020.03.05 - 2020.03.05 LATITUDE LONGITUDE CHECKED BY

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH kPa ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L WATER CONTENT (%) 20 40 60	UNIT WEIGHT γ kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES						
265.3	- trace sand, firm *(continued)*										
4.6	- stiff to very stiff		6	SS	15		265		○		
264.9											
5.0	End of Standard Penetration Test (SPT) at 5.03 m Below Ground Surface; Dynamic Cone Penetration Test (DCPT) Starts at 5.18 m;						264				
							263				
							262				

Continued Next Page

+ ^{3}, × ^{3}: Numbers refer to Sensitivity ○ $^{3\%}$ STRAIN AT FAILURE

SOLA ENGINEERING

ENCLOSURE No. 2

RECORD OF BOREHOLE No. BH1 3 OF 3 METRIC

PROJECT NUMBER 10451A LOCATION Brock Street East, Uxbridge, ON ORIGINATED BY JA

DIST HWY BOREHOLE TYPE Solid Stem Auger COMPILED BY JA

DATUM Geodetic DATE 2020.03.05 - 2020.03.05 LATITUDE LONGITUDE CHECKED BY

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH kPa	PLASTIC LIMIT / NATURAL MOISTURE CONTENT / LIQUID LIMIT / WATER CONTENT (%)	UNIT WEIGHT	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100 ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB VANE 20 40 60 80 100	w_P w w_L 20 40 60	γ kN/m³	GR SA SI CL
							261				
	DCPT Ends at 9.45 m; End of Borehole at 9.45 m Below Ground Surface. Borehole Caved at 1.22 m Upon Completion of Drilling. Groundwater Measured at 1.17m Upon Completion of Drilling.										

$+^3, \times^3$: Numbers refer to Sensitivity $\circ^{3\%}$ STRAIN AT FAILURE

SOLA ENGINEERING

ENCLOSURE No. 3

RECORD OF BOREHOLE No. BH2

1 OF 3

METRIC

PROJECT NUMBER 10451A | LOCATION Brock Street East, Uxbridge, ON | ORIGINATED BY JA

DIST _____ | HWY _____ | BOREHOLE TYPE Solid Stem Auger | COMPILED BY JA

DATUM Geodetic | DATE 2020.03.05 - 2020.03.05 | LATITUDE _____ | LONGITUDE _____ | CHECKED BY _____

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: "N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH kPa (○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB VANE) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) (20 40 60)	UNIT WEIGHT γ kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
270.2	Topsoil										
0.0 / 270.1	TOPSOIL- 125 mm thick		1A	SS							
0.1	FILL- sand, some silt, trace rootlets, trace organic, brown, moist		1B	SS	4		270		○		
269.4											
0.8	- trace clay, trace organic, very moist		2	SS	11		269		○		
268.7											
1.5	FILL- silty sand, trace organic, brown, wet		3	SS	12	▽	268		○		
267.9											
2.3	CLAYEY SILT - trace sand, grey, very stiff, wet		4	SS	17				○		
			5	SS	16		267		○		

Continued Next Page

+ 3, × 3: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

SOLA ENGINEERING

ENCLOSURE No. 3

RECORD OF BOREHOLE No. BH2 2 OF 3 METRIC

PROJECT NUMBER 10451A LOCATION Brock Street East, Uxbridge, ON ORIGINATED BY JA

DIST HWY BOREHOLE TYPE Solid Stem Auger COMPILED BY JA

DATUM Geodetic DATE 2020.03.05 - 2020.03.05 LATITUDE LONGITUDE CHECKED BY

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: "N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH kPa (○ UNCONFINED, ● QUICK TRIAXIAL, + FIELD VANE, × LAB VANE)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%)	UNIT WEIGHT γ kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
265.6	CLAYEY SILT - trace sand, grey, very stiff, wet *(continued)*						266				
4.6	SILTY CLAY- stiff, very moist		6	SS	12		265		○		
264.1											
6.1	- stiff, moist		7	SS	10		264		○		
			8	SS	11		263		○		

Continued Next Page

$+^3, \times^3$: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

SOLA ENGINEERING

ENCLOSURE No. 3

RECORD OF BOREHOLE No. BH2 3 OF 3 METRIC

PROJECT NUMBER 10451A LOCATION Brock Street East, Uxbridge, ON ORIGINATED BY JA

DIST HWY BOREHOLE TYPE Solid Stem Auger COMPILED BY JA

DATUM Geodetic DATE 2020.03.05 - 2020.03.05 LATITUDE LONGITUDE CHECKED BY

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: "N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH kPa (○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB VANE) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) (20 40 60)	UNIT WEIGHT γ kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
262.1	- stiff, moist *(continued)*										
8.1	End of Borehole at 8.08 m Below Ground Surface. Borehole Caved at 6.1 m Upon Completion of Drilling. Groundwater Measured at 2.13 m Upon Completion of Drilling.										

$+^3, \times^3$: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

SOLA ENGINEERING

ENCLOSURE No. 4

RECORD OF BOREHOLE No. BH3

1 OF 2

METRIC

PROJECT NUMBER 10451A | LOCATION Brock Street East, Uxbridge, ON | ORIGINATED BY JA

DIST | HWY | BOREHOLE TYPE Solid Stem Auger | COMPILED BY JA

DATUM Geodetic | DATE 2020.03.05 - 2020.03.05 | LATITUDE | LONGITUDE | CHECKED BY

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: "N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH kPa (○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB VANE) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) (20 40 60)	UNIT WEIGHT γ kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
269.6	Topsoil										
269.6 / 0.0	TOPSOIL- 50 mm thick		1A	SS							
0.1 / 269.5	FILL- sand and gravel, trace clay, grey, moist		1B	SS							
0.2	- brown		1C	SS	15		269				
268.9											
0.8	FILL- sand, trace gravel, trace silt, brown, very moist		2	SS	11						
268.1						▽	268				
1.5	- wet		3	SS	21						
267.3											
2.3	- very moist		4	SS	40		267				
266.6											
3.1	SILTY SAND - brown, dense, very moist		5	SS	36		266				

Continued Next Page

+3, ×3: Numbers refer to Sensitivity

○3% STRAIN AT FAILURE

SOLA ENGINEERING

ENCLOSURE No. 4

RECORD OF BOREHOLE No. BH3 2 OF 2 METRIC

PROJECT NUMBER 10451A LOCATION Brock Street East, Uxbridge, ON ORIGINATED BY JA

DIST HWY BOREHOLE TYPE Solid Stem Auger COMPILED BY JA

DATUM Geodetic DATE 2020.03.05 - 2020.03.05 LATITUDE LONGITUDE CHECKED BY

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH kPa (○ UNCONFINED, ● QUICK TRIAXIAL, + FIELD VANE, × LAB VANE) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) (20 40 60)	UNIT WEIGHT γ kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES						
265.1 4.6	SILTY SAND - brown, dense, very moist *(continued)*										
	- dense to very dense		6	SS	30		265		○		
							264				
263.5 6.1	- compact		7	SS	16				○		
263.1 6.6	End of Borehole at 6.55 m Below Ground Surface. Borehole Caved at 3.05 m Upon Completion of Drilling. Groundwater Measured at 1.52 m Upon Completion of Drilling.										

+ ^{3}, × ^{3}: Numbers refer to Sensitivity ○ $^{3\%}$ STRAIN AT FAILURE

SOLA ENGINEERING

ENCLOSURE No. 5

RECORD OF BOREHOLE No. BH4 1 OF 3 METRIC

PROJECT NUMBER 10451A LOCATION Brock Street East, Uxbridge, ON ORIGINATED BY JA

DIST HWY BOREHOLE TYPE Solid Stem Auger COMPILED BY JA

DATUM Geodetic DATE 2020.03.05 - 2020.03.05 LATITUDE LONGITUDE CHECKED BY

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH kPa (○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB VANE)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L / WATER CONTENT (%)	UNIT WEIGHT γ kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
269.9	Topsoil										
269.8	TOPSOIL- 50 mm thick		1A	SS							
0.1	FILL- silty sand, trace gravel, trace clay, trace rootlets, brown, moist		1B	SS	8						
269.1											
0.8	FILL- sandy silt, mottled, light brown, moist		2	SS	24		269				
268.4						▽					
1.5	FILL- silty sand, brown, very wet		3	SS	17		268				
267.6											
2.3	CLAYEY SILT- some sand, grey, very stiff, wet		4	SS	26		267				
266.8											
3.1	SILTY CLAY- grey, firm to stiff, very moist		5	SS	8		266				

Continued Next Page

+³, ×³: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

SOLA ENGINEERING

ENCLOSURE No. 5

RECORD OF BOREHOLE No. BH4 2 OF 3 METRIC

PROJECT NUMBER 10451A LOCATION Brock Street East, Uxbridge, ON ORIGINATED BY JA

DIST HWY BOREHOLE TYPE Solid Stem Auger COMPILED BY JA

DATUM Geodetic DATE 2020.03.05 - 2020.03.05 LATITUDE LONGITUDE CHECKED BY

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT / SHEAR STRENGTH kPa	PLASTIC LIMIT / NATURAL MOISTURE CONTENT / LIQUID LIMIT	UNIT WEIGHT	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	w_P w w_L	γ kN/m³	GR SA SI CL
265.3	SILTY CLAY- grey, firm to stiff, very moist *(continued)*							○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE	WATER CONTENT (%) 20 40 60		
4.6	- trace sand, firm to stiff		6	SS	8		265		○		
264.8											
5.0	End of Standard Penetration Test (SPT) at 5.03 m Below Ground Surface Vane Shear Test at 5.11 m Below Ground Surface Dynamic Cone Penetration Test (DCPT) Starts at 5.18 m;						264				
							263				
							262				

Continued Next Page

+ 3, × 3: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

SOLA ENGINEERING

ENCLOSURE No. 5

RECORD OF BOREHOLE No. BH4 3 OF 3 METRIC

PROJECT NUMBER 10451A LOCATION Brock Street East, Uxbridge, ON ORIGINATED BY JA

DIST HWY BOREHOLE TYPE Solid Stem Auger COMPILED BY JA

DATUM Geodetic DATE 2020.03.05 - 2020.03.05 LATITUDE LONGITUDE CHECKED BY

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH kPa ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L WATER CONTENT (%) 20 40 60	UNIT WEIGHT γ kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES						
							261				
							260				
	DCPT Ends at 10.67 m; End of Borehole at 10.67 m Below Ground Surface. Borehole Caved at 2.44 m Upon Completion of Drilling. Groundwater Measured at 1.52 m Upon Completion of Drilling.										

$+^3, \times^3$: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

SOLA ENGINEERING

ENCLOSURE No. 6

RECORD OF BOREHOLE No. BH5

1 OF 3

METRIC

PROJECT NUMBER 10451A | LOCATION Brock Street East, Uxbridge, ON | ORIGINATED BY JA

DIST _____ | HWY _____ | BOREHOLE TYPE Solid Stem Auger | COMPILED BY JA

DATUM Geodetic | DATE 2020.03.05 - 2020.03.05 | LATITUDE _____ | LONGITUDE _____ | CHECKED BY _____

ELEV / DEPTH	DESCRIPTION	STRAT PLOT	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: "N" VALUES	GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH kPa: ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB VANE (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) (20 40 60)	UNIT WEIGHT γ kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
269.3	Topsoil										
0.0 / 269.2	TOPSOIL- 125 mm thick		1A	SS							
0.1	FILL- sandy silt, trace stone, trace organic, trace rootlets, dark brown, moist		1B	SS	7		269				
268.5											
0.8	FILL- silty sand, trace rootlets, grey, very moist		2A		17				○		
268.2											
1.1	FILL- sand, some silt, organic odour, light brown, very moist		2B						○		
267.8							268				
1.5	- brown, wet		3	SS	16				○		
267.0											
2.3	FILL- sand, some silt, brown, wet		4	SS	20		267		○		
266.3											
3.1	SILTY SAND- grey, compact, wet		5	SS	28		266		○		

Continued Next Page

+ 3, × 3: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

SOLA ENGINEERING

ENCLOSURE No. 6

RECORD OF BOREHOLE No. BH5 2 OF 3 METRIC

PROJECT NUMBER 10451A LOCATION Brock Street East, Uxbridge, ON ORIGINATED BY JA

DIST ____ HWY ____ BOREHOLE TYPE Solid Stem Auger COMPILED BY JA

DATUM Geodetic DATE 2020.03.05 - 2020.03.05 LATITUDE ____ LONGITUDE ____ CHECKED BY ____

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT; SHEAR STRENGTH kPa (○ UNCONFINED, ● QUICK TRIAXIAL, + FIELD VANE, × LAB VANE)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L; WATER CONTENT (%)	UNIT WEIGHT γ kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%)
ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			20 40 60 80 100	20 40 60		GR SA SI CL
	SILTY SAND- grey, compact, wet *(continued)*						265				
264.7											
4.6	- dense		6	SS	46		264		○		
							263				
							262				
261.7											
7.6	- very dense		7	SS	68				○		

Continued Next Page

+ 3, × 3: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

SOLA ENGINEERING

ENCLOSURE No. 6

RECORD OF BOREHOLE No. BH5 3 OF 3 METRIC

PROJECT NUMBER 10451A LOCATION Brock Street East, Uxbridge, ON ORIGINATED BY JA

DIST HWY BOREHOLE TYPE Solid Stem Auger COMPILED BY JA

DATUM Geodetic DATE 2020.03.05 - 2020.03.05 LATITUDE LONGITUDE CHECKED BY

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH kPa ○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L WATER CONTENT (%) 20 40 60	UNIT WEIGHT γ kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES						
261.2	- very dense *(continued)*										
8.1	End of Borehole at 8.08 m Below Ground Surface. Borehole Caved at 1.83 m Upon Completion of Drilling. Groundwater Measured at 1.22 m Upon Completion of Drilling.										

$+^3, \times^3$: Numbers refer to Sensitivity $\circ^{3\%}$ STRAIN AT FAILURE

SOLA ENGINEERING

ENCLOSURE No. 7

RECORD OF BOREHOLE No. BH6 1 OF 2 METRIC

PROJECT NUMBER 10451A LOCATION Brock Street East, Uxbridge, ON ORIGINATED BY JA

DIST HWY BOREHOLE TYPE Solid Stem Auger COMPILED BY JA

DATUM Geodetic DATE 2020.03.05 - 2020.03.05 LATITUDE LONGITUDE CHECKED BY

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT 20 40 60 80 100 / SHEAR STRENGTH kPa ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE × LAB VANE 20 40 60 80 100	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L WATER CONTENT (%) 20 40 60	UNIT WEIGHT γ kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES						
269.6 Topsoil											
0.0 / 269.5	TOPSOIL- 150 mm thick		1A	SS							
0.2 / 268.8	FILL- sand, trace silt, brown, moist		1B	SS	7		269				
0.8 / 268.1	FILL- sand, trace to some silt, trace organic, very moist		2	SS	25	▽					
1.5	- wet		3	SS	22		268				
			4	SS	24		267				
			5	SS	30		266				

Continued Next Page

$+^3, \times^3$: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

SOLA ENGINEERING

ENCLOSURE No. 7

RECORD OF BOREHOLE No. BH6 2 OF 2 METRIC

PROJECT NUMBER 10451A LOCATION Brock Street East, Uxbridge, ON ORIGINATED BY JA

DIST HWY BOREHOLE TYPE Solid Stem Auger COMPILED BY JA

DATUM Geodetic DATE 2020.03.05 - 2020.03.05 LATITUDE LONGITUDE CHECKED BY

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH kPa (○ UNCONFINED, ● QUICK TRIAXIAL, + FIELD VANE, × LAB VANE) (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L — WATER CONTENT (%) (20 40 60)	UNIT WEIGHT γ kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
ELEV / DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES						
265.0	- wet *(continued)*										
4.6	SILTY SAND- brown, dense, wet		6	SS	39		265		○		
							264				
263.5											
6.1	- very dense		7	SS	52						
263.1											
6.6	End of Borehole at 6.55 m Below Ground Surface. Borehole Caved at 0.92 m Upon Completion of Drilling. Groundwater Measured at 0.92 m Upon Completion of Drilling.										

$+^3, \times^3$: Numbers refer to Sensitivity ○ 3% STRAIN AT FAILURE

APPENDIX

C IN-SITU HYDRAULIC CONDUCTIVITY TESTING

Slug Test - Water Level Data

Project: Brock Street East - Evandale

Number: 171-00471-00

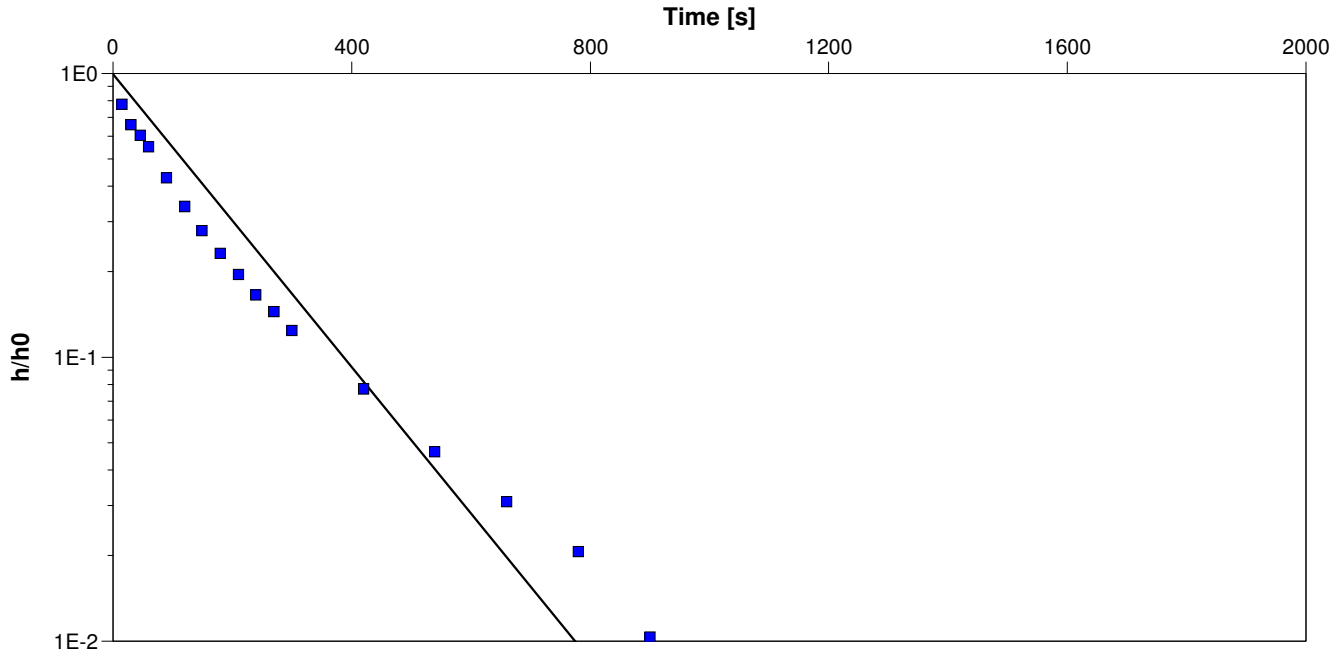
Client:

Location: Uxbridge	Slug Test: MW2 - Test 1 Manual	Test Well: MW2
Test Conducted by:	Test Date: 2/1/2018	
Water level at t=0 [m]: 0.00	Static Water Level [m]: 1.94	Water level change at t=0 [m]: -1.94

	Time [s]	Water Level [m]	WL Change [m]
1	15	0.43	-1.51
2	30	0.66	-1.28
3	45	0.77	-1.17
4	60	0.87	-1.07
5	90	1.11	-0.83
6	120	1.28	-0.66
7	150	1.40	-0.54
8	180	1.49	-0.45
9	210	1.56	-0.38
10	240	1.62	-0.32
11	270	1.66	-0.28
12	300	1.70	-0.24
13	420	1.79	-0.15
14	540	1.85	-0.09
15	660	1.88	-0.06
16	780	1.90	-0.04
17	900	1.92	-0.02
18	1020	1.94	0.00

Slug Test Analysis Report	
Project: Brock Street East - Evandale	
Number: 171-00471-00	
Client:	

Location: Uxbridge	Slug Test: MW2 - Test 1 Manual	Test Well: MW2
Test Conducted by:		Test Date: 2/1/2018
Analysis Performed by:	New analysis 1	Analysis Date: 2/10/2018
Aquifer Thickness:		



Calculation using Hvorslev

Observation Well	Hydraulic Conductivity [m/s]	
MW2	4.90×10^{-7}	

Slug Test - Analyses Report

Project: Brock Street East - Evandale

Number: 171-00471-00

Client:

Location: Uxbridge	Slug Test: MW2 - Test 1 Manual	Test Well: MW2
Test Conducted by:		Test Date: 2/1/2018
Aquifer Thickness: NAN m		

	Analysis Name	Analysis Performed by	Analysis Date	Method name	Well	T [m²/s]	S
1	New analysis 1		2/10/2018	Hvorslev	MW2		4.90×10^{-7}

Slug Test - Water Level Data

Project: Brock Street East - Evandale

Number: 171-00471-00

Client:

Location: Uxbridge	Slug Test: MW1 - Test 2	Test Well: MW1
Test Conducted by:	Test Date: 2/10/2018	
Water level at t=0 [m]: 0.00	Static Water Level [m]: 1.02	Water level change at t=0 [m]: -1.02

	Time [s]	Water Level [m]	WL Change [m]
1	1	1.00	-0.02
2	2	0.0827	-0.9373
3	3	0.1032	-0.9168
4	4	0.1261	-0.8939
5	5	0.1455	-0.8745
6	6	0.1617	-0.8583
7	7	0.1787	-0.8413
8	8	0.195	-0.825
9	9	0.2102	-0.8098
10	10	0.2298	-0.7902
11	11	0.245	-0.775
12	12	0.2493	-0.7707
13	13	0.2705	-0.7495
14	14	0.2928	-0.7272
15	15	0.311	-0.709
16	16	0.3219	-0.6981
17	17	0.3214	-0.6986
18	18	0.3368	-0.6832
19	19	0.3414	-0.6786
20	20	0.3478	-0.6722
21	21	0.331	-0.689
22	22	0.3361	-0.6839
23	23	0.346	-0.674
24	24	0.3548	-0.6652
25	25	0.363	-0.657
26	26	0.3716	-0.6484
27	27	0.3791	-0.6409
28	28	0.4281	-0.5919
29	29	0.4434	-0.5766
30	30	0.4367	-0.5833
31	31	0.4368	-0.5832
32	32	0.4447	-0.5753
33	33	0.4488	-0.5712
34	34	0.453	-0.567
35	35	0.4602	-0.5598
36	36	0.4647	-0.5553
37	37	0.4349	-0.5851
38	38	0.4445	-0.5755
39	39	0.4516	-0.5684
40	40	0.4586	-0.5614
41	41	0.465	-0.555
42	42	0.4729	-0.5471
43	43	0.5285	-0.4915
44	44	0.5302	-0.4898
45	45	0.5347	-0.4853
46	46	0.5389	-0.4811
47	47	0.5417	-0.4783
48	48	0.5293	-0.4907

Project: Brock Street East - Evandale

Number: 171-00471-00

Client:

	Time [s]	Water Level [m]	WL Change [m]
49	49	0.535	-0.485
50	50	0.5383	-0.4817
51	51	0.5433	-0.4767
52	52	0.5422	-0.4778
53	53	0.5489	-0.4711
54	54	0.5538	-0.4662
55	55	0.5568	-0.4632
56	56	0.5641	-0.4559
57	57	0.5677	-0.4523
58	58	0.5728	-0.4472
59	59	0.5753	-0.4447
60	60	0.5806	-0.4394
61	61	0.5826	-0.4374
62	62	0.5882	-0.4318
63	63	0.5912	-0.4288
64	64	0.5941	-0.4259
65	65	0.5832	-0.4368
66	66	0.581	-0.439
67	67	0.5859	-0.4341
68	68	0.591	-0.429
69	69	0.5979	-0.4221
70	70	0.6024	-0.4176
71	71	0.6078	-0.4122
72	72	0.6125	-0.4075
73	73	0.6159	-0.4041
74	74	0.6206	-0.3994
75	75	0.6252	-0.3948
76	76	0.6541	-0.3659
77	77	0.6453	-0.3747
78	78	0.6555	-0.3645
79	79	0.6597	-0.3603
80	80	0.6621	-0.3579
81	81	0.6648	-0.3552
82	82	0.667	-0.353
83	83	0.6696	-0.3504
84	84	0.6717	-0.3483
85	85	0.6746	-0.3454
86	86	0.6696	-0.3504
87	87	0.6637	-0.3563
88	88	0.6654	-0.3546
89	89	0.6716	-0.3484
90	90	0.6739	-0.3461
91	91	0.6773	-0.3427
92	92	0.6783	-0.3417
93	93	0.6813	-0.3387
94	94	0.6835	-0.3365
95	95	0.6853	-0.3347
96	96	0.6724	-0.3476
97	97	0.6643	-0.3557
98	98	0.6686	-0.3514
99	99	0.6717	-0.3483
100	100	0.6746	-0.3454
101	101	0.6782	-0.3418

Project: Brock Street East - Evandale

Number: 171-00471-00

Client:

	Time [s]	Water Level [m]	WL Change [m]
102	102	0.6814	-0.3386
103	103	0.6839	-0.3361
104	104	0.7205	-0.2995
105	105	0.7218	-0.2982
106	106	0.7175	-0.3025
107	107	0.7202	-0.2998
108	108	0.7213	-0.2987
109	109	0.7227	-0.2973
110	110	0.7242	-0.2958
111	111	0.7262	-0.2938
112	112	0.7276	-0.2924
113	113	0.7293	-0.2907
114	114	0.73	-0.29
115	115	0.7308	-0.2892
116	116	0.7314	-0.2886
117	117	0.7166	-0.3034
118	118	0.7235	-0.2965
119	119	0.7244	-0.2956
120	120	0.7268	-0.2932
121	121	0.7283	-0.2917
122	122	0.7299	-0.2901
123	123	0.73	-0.29
124	124	0.7314	-0.2886
125	125	0.7315	-0.2885
126	126	0.7346	-0.2854
127	127	0.6956	-0.3244
128	128	0.7011	-0.3189
129	129	0.7035	-0.3165
130	130	0.7066	-0.3134
131	131	0.7086	-0.3114
132	132	0.7097	-0.3103
133	133	0.7117	-0.3083
134	134	0.7158	-0.3042
135	135	0.7701	-0.2499
136	136	0.7671	-0.2529
137	137	0.7604	-0.2596
138	138	0.7634	-0.2566
139	139	0.7645	-0.2555
140	140	0.7651	-0.2549
141	141	0.7658	-0.2542
142	142	0.7668	-0.2532
143	143	0.7681	-0.2519
144	144	0.7683	-0.2517
145	145	0.7697	-0.2503
146	146	0.7719	-0.2481
147	147	0.7709	-0.2491
148	148	0.7598	-0.2602
149	149	0.7621	-0.2579
150	150	0.764	-0.256
151	151	0.7647	-0.2553
152	152	0.7643	-0.2557
153	153	0.7644	-0.2556
154	154	0.7664	-0.2536

Project: Brock Street East - Evandale

Number: 171-00471-00

Client:

	Time [s]	Water Level [m]	WL Change [m]
155	155	0.7656	-0.2544
156	156	0.7707	-0.2493
157	157	0.7778	-0.2422
158	158	0.7325	-0.2875
159	159	0.7336	-0.2864
160	160	0.7347	-0.2853
161	161	0.7372	-0.2828
162	162	0.7383	-0.2817
163	163	0.7397	-0.2803
164	164	0.7411	-0.2789
165	165	0.7422	-0.2778
166	166	0.743	-0.277
167	167	0.7455	-0.2745
168	168	0.7866	-0.2334
169	169	0.7873	-0.2327
170	170	0.7872	-0.2328
171	171	0.7888	-0.2312
172	172	0.7897	-0.2303
173	173	0.7903	-0.2297
174	174	0.7916	-0.2284
175	175	0.7924	-0.2276
176	176	0.7937	-0.2263
177	177	0.7941	-0.2259
178	178	0.78	-0.24
179	179	0.7839	-0.2361
180	180	0.7949	-0.2251
181	181	0.7941	-0.2259
182	182	0.794	-0.226
183	183	0.796	-0.224
184	184	0.7978	-0.2222
185	185	0.7977	-0.2223
186	186	0.8002	-0.2198
187	187	0.7617	-0.2583
188	188	0.7626	-0.2574
189	189	0.7637	-0.2563
190	190	0.7652	-0.2548
191	191	0.7664	-0.2536
192	192	0.7678	-0.2522
193	193	0.7699	-0.2501
194	194	0.7707	-0.2493
195	195	0.7725	-0.2475
196	196	0.7733	-0.2467
197	197	0.7749	-0.2451
198	198	0.8109	-0.2091
199	199	0.8312	-0.1888
200	200	0.8314	-0.1886
201	201	0.8309	-0.1891
202	202	0.8318	-0.1882
203	203	0.8318	-0.1882
204	204	0.8325	-0.1875
205	205	0.8343	-0.1857
206	206	0.8345	-0.1855
207	207	0.832	-0.188

Project: Brock Street East - Evandale

Number: 171-00471-00

Client:

	Time [s]	Water Level [m]	WL Change [m]
208	208	0.833	-0.187
209	209	0.8345	-0.1855
210	210	0.8349	-0.1851
211	211	0.8179	-0.2021
212	212	0.8204	-0.1996
213	213	0.8217	-0.1983
214	214	0.8212	-0.1988
215	215	0.8214	-0.1986
216	216	0.8316	-0.1884
217	217	0.7888	-0.2312
218	218	0.7938	-0.2262
219	219	0.7954	-0.2246
220	220	0.7968	-0.2232
221	221	0.7979	-0.2221
222	222	0.799	-0.221
223	223	0.8003	-0.2197
224	224	0.8024	-0.2176
225	225	0.8026	-0.2174
226	226	0.8047	-0.2153
227	227	0.8063	-0.2137
228	228	0.8296	-0.1904
229	229	0.8553	-0.1647
230	230	0.8545	-0.1655
231	231	0.8546	-0.1654
232	232	0.8508	-0.1692
233	233	0.8456	-0.1744
234	234	0.8553	-0.1647
235	235	0.8565	-0.1635
236	236	0.8558	-0.1642
237	237	0.8564	-0.1636
238	238	0.8376	-0.1824
239	239	0.8397	-0.1803
240	240	0.8446	-0.1754
241	241	0.8427	-0.1773
242	242	0.8429	-0.1771
243	243	0.8427	-0.1773
244	244	0.8449	-0.1751
245	245	0.8448	-0.1752
246	246	0.8452	-0.1748
247	247	0.846	-0.174
248	248	0.85	-0.17
249	249	0.8598	-0.1602
250	250	0.8642	-0.1558
251	251	0.8659	-0.1541
252	252	0.8657	-0.1543
253	253	0.8657	-0.1543
254	254	0.8658	-0.1542
255	255	0.8659	-0.1541
256	256	0.8668	-0.1532
257	257	0.8665	-0.1535
258	258	0.8672	-0.1528
259	259	0.8679	-0.1521
260	260	0.8691	-0.1509

Project: Brock Street East - Evandale

Number: 171-00471-00

Client:

	Time [s]	Water Level [m]	WL Change [m]
261	261	0.8694	-0.1506
262	262	0.8704	-0.1496
263	263	0.8706	-0.1494
264	264	0.8717	-0.1483
265	265	0.8721	-0.1479
266	266	0.8729	-0.1471
267	267	0.8732	-0.1468
268	268	0.8741	-0.1459
269	269	0.8745	-0.1455
270	270	0.875	-0.145
271	271	0.8754	-0.1446
272	272	0.8761	-0.1439
273	273	0.8767	-0.1433
274	274	0.8771	-0.1429
275	275	0.8769	-0.1431
276	276	0.8591	-0.1609
277	277	0.8607	-0.1593
278	278	0.8631	-0.1569
279	279	0.865	-0.155
280	280	0.872	-0.148
281	281	0.877	-0.143
282	282	0.8816	-0.1384
283	283	0.8822	-0.1378
284	284	0.8824	-0.1376
285	285	0.8831	-0.1369
286	286	0.8838	-0.1362
287	287	0.8838	-0.1362
288	288	0.8844	-0.1356
289	289	0.8846	-0.1354
290	290	0.8857	-0.1343
291	291	0.8866	-0.1334
292	292	0.8861	-0.1339
293	293	0.8876	-0.1324
294	294	0.8883	-0.1317
295	295	0.889	-0.131
296	296	0.8897	-0.1303
297	297	0.8897	-0.1303
298	298	0.888	-0.132
299	299	0.8759	-0.1441
300	300	0.8761	-0.1439
301	301	0.8739	-0.1461
302	302	0.8759	-0.1441
303	303	0.8768	-0.1432
304	304	0.8773	-0.1427
305	305	0.8779	-0.1421
306	306	0.8782	-0.1418
307	307	0.879	-0.141
308	308	0.8801	-0.1399
309	309	0.8905	-0.1295
310	310	0.8952	-0.1248
311	311	0.8988	-0.1212
312	312	0.8988	-0.1212
313	313	0.8987	-0.1213

Project: Brock Street East - Evandale

Number: 171-00471-00

Client:

	Time [s]	Water Level [m]	WL Change [m]
314	314	0.8989	-0.1211
315	315	0.8991	-0.1209
316	316	0.8997	-0.1203
317	317	0.9003	-0.1197
318	318	0.9009	-0.1191
319	319	0.901	-0.119
320	320	0.9016	-0.1184
321	321	0.902	-0.118
322	322	0.9012	-0.1188
323	323	0.903	-0.117
324	324	0.903	-0.117
325	325	0.9038	-0.1162
326	326	0.9044	-0.1156
327	327	0.9048	-0.1152
328	328	0.9051	-0.1149
329	329	0.9059	-0.1141
330	330	0.9062	-0.1138
331	331	0.9057	-0.1143
332	332	0.9068	-0.1132
333	333	0.9077	-0.1123
334	334	0.9074	-0.1126
335	335	0.9083	-0.1117
336	336	0.9086	-0.1114
337	337	0.9089	-0.1111
338	338	0.9087	-0.1113
339	339	0.9087	-0.1113
340	340	0.9098	-0.1102
341	341	0.9104	-0.1096
342	342	0.911	-0.109
343	343	0.9119	-0.1081
344	344	0.913	-0.107
345	345	0.9135	-0.1065
346	346	0.9138	-0.1062
347	347	0.9133	-0.1067
348	348	0.9146	-0.1054
349	349	0.9149	-0.1051
350	350	0.9152	-0.1048
351	351	0.9164	-0.1036
352	352	0.9159	-0.1041
353	353	0.9175	-0.1025
354	354	0.917	-0.103
355	355	0.9176	-0.1024
356	356	0.9185	-0.1015
357	357	0.9188	-0.1012
358	358	0.9191	-0.1009
359	359	0.9198	-0.1002
360	360	0.9203	-0.0997
361	361	0.9208	-0.0992
362	362	0.9213	-0.0987
363	363	0.9217	-0.0983
364	364	0.9223	-0.0977
365	365	0.9222	-0.0978
366	366	0.9231	-0.0969

Project: Brock Street East - Evandale

Number: 171-00471-00

Client:

	Time [s]	Water Level [m]	WL Change [m]
367	367	0.9236	-0.0964
368	368	0.9245	-0.0955
369	369	0.9249	-0.0951
370	370	0.9249	-0.0951
371	371	0.9254	-0.0946
372	372	0.9262	-0.0938
373	373	0.9263	-0.0937
374	374	0.9269	-0.0931
375	375	0.9276	-0.0924
376	376	0.9275	-0.0925
377	377	0.9283	-0.0917
378	378	0.9285	-0.0915
379	379	0.9288	-0.0912
380	380	0.9293	-0.0907
381	381	0.9296	-0.0904
382	382	0.9305	-0.0895
383	383	0.9307	-0.0893
384	384	0.931	-0.089
385	385	0.931	-0.089
386	386	0.9316	-0.0884
387	387	0.9321	-0.0879
388	388	0.9323	-0.0877
389	389	0.9324	-0.0876
390	390	0.9332	-0.0868
391	391	0.9334	-0.0866
392	392	0.9343	-0.0857
393	393	0.9343	-0.0857
394	394	0.935	-0.085
395	395	0.9349	-0.0851
396	396	0.9356	-0.0844
397	397	0.9362	-0.0838
398	398	0.9361	-0.0839
399	399	0.9367	-0.0833
400	400	0.9371	-0.0829
401	401	0.9376	-0.0824
402	402	0.9374	-0.0826
403	403	0.9382	-0.0818
404	404	0.9383	-0.0817
405	405	0.9385	-0.0815
406	406	0.9393	-0.0807
407	407	0.9395	-0.0805
408	408	0.9397	-0.0803
409	409	0.9403	-0.0797
410	410	0.9404	-0.0796
411	411	0.9409	-0.0791
412	412	0.9416	-0.0784
413	413	0.9418	-0.0782
414	414	0.9422	-0.0778
415	415	0.9301	-0.0899
416	416	0.9246	-0.0954
417	417	0.9287	-0.0913
418	418	0.9286	-0.0914
419	419	0.9264	-0.0936

Project: Brock Street East - Evandale

Number: 171-00471-00

Client:

	Time [s]	Water Level [m]	WL Change [m]
420	420	0.9277	-0.0923
421	421	0.9288	-0.0912
422	422	0.9293	-0.0907
423	423	0.9297	-0.0903
424	424	0.9296	-0.0904
425	425	0.9309	-0.0891
426	426	0.9294	-0.0906
427	427	0.9412	-0.0788
428	428	0.9467	-0.0733
429	429	0.9463	-0.0737
430	430	0.946	-0.074
431	431	0.947	-0.073
432	432	0.9469	-0.0731
433	433	0.9473	-0.0727
434	434	0.9478	-0.0722
435	435	0.9481	-0.0719
436	436	0.9485	-0.0715
437	437	0.9488	-0.0712
438	438	0.9495	-0.0705
439	439	0.9493	-0.0707
440	440	0.9499	-0.0701
441	441	0.9501	-0.0699
442	442	0.9504	-0.0696
443	443	0.9509	-0.0691
444	444	0.9513	-0.0687
445	445	0.9515	-0.0685
446	446	0.9515	-0.0685
447	447	0.9519	-0.0681
448	448	0.9512	-0.0688
449	449	0.9519	-0.0681
450	450	0.952	-0.068
451	451	0.9526	-0.0674
452	452	0.9531	-0.0669
453	453	0.953	-0.067
454	454	0.953	-0.067
455	455	0.9532	-0.0668
456	456	0.9539	-0.0661
457	457	0.9536	-0.0664
458	458	0.9543	-0.0657
459	459	0.9538	-0.0662
460	460	0.9543	-0.0657
461	461	0.9546	-0.0654
462	462	0.9548	-0.0652
463	463	0.955	-0.065
464	464	0.9555	-0.0645
465	465	0.9553	-0.0647
466	466	0.9558	-0.0642
467	467	0.9555	-0.0645
468	468	0.9559	-0.0641
469	469	0.9555	-0.0645
470	470	0.9557	-0.0643
471	471	0.9564	-0.0636
472	472	0.9565	-0.0635

Project: Brock Street East - Evandale

Number: 171-00471-00

Client:

	Time [s]	Water Level [m]	WL Change [m]
473	473	0.9568	-0.0632
474	474	0.9565	-0.0635
475	475	0.9573	-0.0627
476	476	0.9579	-0.0621
477	477	0.9579	-0.0621
478	478	0.957	-0.063
479	479	0.958	-0.062
480	480	0.9583	-0.0617
481	481	0.9579	-0.0621
482	482	0.958	-0.062
483	483	0.9584	-0.0616
484	484	0.9583	-0.0617
485	485	0.959	-0.061
486	486	0.959	-0.061
487	487	0.9589	-0.0611
488	488	0.9593	-0.0607
489	489	0.9591	-0.0609
490	490	0.9591	-0.0609
491	491	0.9591	-0.0609
492	492	0.9589	-0.0611
493	493	0.9593	-0.0607
494	494	0.9592	-0.0608
495	495	0.9592	-0.0608
496	496	0.9592	-0.0608
497	497	0.9597	-0.0603
498	498	0.9607	-0.0593
499	499	0.9606	-0.0594
500	500	0.9607	-0.0593
501	501	0.9603	-0.0597
502	502	0.9601	-0.0599
503	503	0.9604	-0.0596
504	504	0.9602	-0.0598
505	505	0.9594	-0.0606
506	506	0.959	-0.061
507	507	0.9594	-0.0606
508	508	0.9588	-0.0612
509	509	0.9581	-0.0619
510	510	0.9579	-0.0621
511	511	0.9601	-0.0599
512	512	0.9596	-0.0604
513	513	0.9587	-0.0613
514	514	0.9556	-0.0644
515	515	0.9555	-0.0645
516	516	0.9609	-0.0591
517	517	0.9587	-0.0613
518	518	0.9599	-0.0601
519	519	0.961	-0.059
520	520	0.9619	-0.0581
521	521	0.9603	-0.0597
522	522	0.9593	-0.0607
523	523	0.9598	-0.0602
524	524	0.9592	-0.0608
525	525	0.9594	-0.0606

Project: Brock Street East - Evandale

Number: 171-00471-00

Client:

	Time [s]	Water Level [m]	WL Change [m]
526	526	0.9596	-0.0604
527	527	0.9617	-0.0583
528	528	0.9605	-0.0595
529	529	0.9569	-0.0631
530	530	0.9619	-0.0581
531	531	0.9619	-0.0581
532	532	0.9618	-0.0582
533	533	0.9621	-0.0579
534	534	0.9632	-0.0568
535	535	0.9624	-0.0576
536	536	0.9619	-0.0581
537	537	0.9595	-0.0605
538	538	0.9199	-0.1001
539	539	0.9544	-0.0656
540	540	0.949	-0.071
541	541	0.9447	-0.0753
542	542	0.9471	-0.0729
543	543	0.9467	-0.0733
544	544	0.9477	-0.0723
545	545	0.9458	-0.0742
546	546	0.9503	-0.0697
547	547	0.9458	-0.0742
548	548	0.9135	-0.1065
549	549	0.9668	-0.0532
550	550	0.9655	-0.0545
551	551	0.9671	-0.0529
552	552	0.9659	-0.0541
553	553	0.9649	-0.0551
554	554	0.9658	-0.0542
555	555	0.9655	-0.0545
556	556	0.9647	-0.0553
557	557	0.9659	-0.0541
558	558	0.9664	-0.0536
559	559	0.9651	-0.0549
560	560	0.966	-0.054
561	561	0.9627	-0.0573
562	562	0.9655	-0.0545
563	563	0.9664	-0.0536
564	564	0.9657	-0.0543
565	565	0.9656	-0.0544
566	566	0.9651	-0.0549
567	567	0.9666	-0.0534
568	568	0.9666	-0.0534
569	569	0.9659	-0.0541
570	570	0.9664	-0.0536
571	571	0.9662	-0.0538
572	572	0.9667	-0.0533
573	573	0.9665	-0.0535
574	574	0.9664	-0.0536
575	575	0.9668	-0.0532
576	576	0.9664	-0.0536
577	577	0.9665	-0.0535
578	578	0.9677	-0.0523

Project: Brock Street East - Evandale

Number: 171-00471-00

Client:

	Time [s]	Water Level [m]	WL Change [m]
579	579	0.9675	-0.0525
580	580	0.9678	-0.0522
581	581	0.968	-0.052
582	582	0.9692	-0.0508
583	583	0.9686	-0.0514
584	584	0.9675	-0.0525
585	585	0.9667	-0.0533
586	586	0.9672	-0.0528
587	587	0.9682	-0.0518
588	588	0.9678	-0.0522
589	589	0.9687	-0.0513
590	590	0.9685	-0.0515
591	591	0.9695	-0.0505
592	592	0.9687	-0.0513
593	593	0.969	-0.051
594	594	0.9692	-0.0508
595	595	0.9707	-0.0493
596	596	0.9687	-0.0513
597	597	0.9692	-0.0508
598	598	0.9689	-0.0511
599	599	0.969	-0.051
600	600	0.9698	-0.0502
601	601	0.9695	-0.0505
602	602	0.9695	-0.0505
603	603	0.9701	-0.0499
604	604	0.9692	-0.0508
605	605	0.97	-0.05
606	606	0.9698	-0.0502
607	607	0.9698	-0.0502
608	608	0.9699	-0.0501
609	609	0.9697	-0.0503
610	610	0.9694	-0.0506
611	611	0.9698	-0.0502
612	612	0.9704	-0.0496
613	613	0.9699	-0.0501
614	614	0.9688	-0.0512
615	615	0.9695	-0.0505
616	616	0.9694	-0.0506
617	617	0.9688	-0.0512
618	618	0.9685	-0.0515
619	619	0.9686	-0.0514
620	620	0.9677	-0.0523
621	621	0.9679	-0.0521
622	622	0.9673	-0.0527
623	623	0.9668	-0.0532
624	624	0.966	-0.054
625	625	0.9645	-0.0555
626	626	0.9627	-0.0573
627	627	0.9624	-0.0576
628	628	0.962	-0.058
629	629	0.962	-0.058
630	630	0.9615	-0.0585
631	631	0.9609	-0.0591

Project: Brock Street East - Evandale

Number: 171-00471-00

Client:

	Time [s]	Water Level [m]	WL Change [m]
632	632	0.9621	-0.0579
633	633	0.9604	-0.0596
634	634	0.9605	-0.0595
635	635	0.9596	-0.0604
636	636	0.9599	-0.0601
637	637	0.9608	-0.0592
638	638	0.9606	-0.0594
639	639	0.9612	-0.0588
640	640	0.9596	-0.0604
641	641	0.9605	-0.0595
642	642	0.96	-0.06
643	643	0.9596	-0.0604
644	644	0.9596	-0.0604
645	645	0.9594	-0.0606
646	646	0.9595	-0.0605
647	647	0.9591	-0.0609
648	648	0.9593	-0.0607
649	649	0.9588	-0.0612
650	650	0.9585	-0.0615
651	651	0.9599	-0.0601
652	652	0.9587	-0.0613
653	653	0.9586	-0.0614
654	654	0.9587	-0.0613
655	655	0.9589	-0.0611
656	656	0.9597	-0.0603
657	657	0.9598	-0.0602
658	658	0.9599	-0.0601
659	659	0.9594	-0.0606
660	660	0.9591	-0.0609
661	661	0.9593	-0.0607
662	662	0.9594	-0.0606
663	663	0.951	-0.069
664	664	0.9434	-0.0766
665	665	0.9411	-0.0789
666	666	0.9423	-0.0777
667	667	0.9442	-0.0758
668	668	0.9435	-0.0765
669	669	0.9448	-0.0752
670	670	0.945	-0.075
671	671	0.9448	-0.0752
672	672	0.946	-0.074
673	673	0.945	-0.075
674	674	0.9467	-0.0733
675	675	0.9476	-0.0724
676	676	0.9482	-0.0718
677	677	0.95	-0.07
678	678	0.949	-0.071
679	679	0.95	-0.07
680	680	0.9555	-0.0645
681	681	0.9572	-0.0628
682	682	0.9682	-0.0518
683	683	0.9674	-0.0526
684	684	0.9676	-0.0524

Project: Brock Street East - Evandale

Number: 171-00471-00

Client:

	Time [s]	Water Level [m]	WL Change [m]
685	685	0.9661	-0.0539
686	686	0.9668	-0.0532
687	687	0.9656	-0.0544
688	688	0.9658	-0.0542
689	689	0.9671	-0.0529
690	690	0.9664	-0.0536
691	691	0.9666	-0.0534
692	692	0.9663	-0.0537
693	693	0.967	-0.053
694	694	0.9663	-0.0537
695	695	0.9659	-0.0541
696	696	0.967	-0.053
697	697	0.9652	-0.0548
698	698	0.9652	-0.0548
699	699	0.9655	-0.0545
700	700	0.9657	-0.0543
701	701	0.9662	-0.0538
702	702	0.9664	-0.0536
703	703	0.9666	-0.0534
704	704	0.9655	-0.0545
705	705	0.9643	-0.0557
706	706	0.9648	-0.0552
707	707	0.9638	-0.0562
708	708	0.9638	-0.0562
709	709	0.9632	-0.0568
710	710	0.9642	-0.0558
711	711	0.9637	-0.0563
712	712	0.9641	-0.0559
713	713	0.9642	-0.0558
714	714	0.9639	-0.0561
715	715	0.9646	-0.0554
716	716	0.9653	-0.0547
717	717	0.9641	-0.0559
718	718	0.9637	-0.0563
719	719	0.9639	-0.0561
720	720	0.9644	-0.0556
721	721	0.9635	-0.0565
722	722	0.9646	-0.0554
723	723	0.965	-0.055
724	724	0.9634	-0.0566
725	725	0.9635	-0.0565
726	726	0.9631	-0.0569
727	727	0.9651	-0.0549
728	728	0.9644	-0.0556
729	729	0.9644	-0.0556
730	730	0.9641	-0.0559
731	731	0.9649	-0.0551
732	732	0.9647	-0.0553
733	733	0.9633	-0.0567
734	734	0.9631	-0.0569
735	735	0.9633	-0.0567
736	736	0.9639	-0.0561
737	737	0.965	-0.055

Project: Brock Street East - Evandale

Number: 171-00471-00

Client:

	Time [s]	Water Level [m]	WL Change [m]
738	738	0.9648	-0.0552
739	739	0.9647	-0.0553
740	740	0.9643	-0.0557
741	741	0.9656	-0.0544
742	742	0.965	-0.055
743	743	0.966	-0.054
744	744	0.9667	-0.0533
745	745	0.9666	-0.0534
746	746	0.9666	-0.0534
747	747	0.9642	-0.0558
748	748	0.966	-0.054
749	749	0.9651	-0.0549
750	750	0.968	-0.052
751	751	0.967	-0.053
752	752	0.9681	-0.0519
753	753	0.9673	-0.0527
754	754	0.9669	-0.0531
755	755	0.9674	-0.0526
756	756	0.9671	-0.0529
757	757	0.9681	-0.0519
758	758	0.967	-0.053
759	759	0.967	-0.053
760	760	0.9672	-0.0528
761	761	0.9692	-0.0508
762	762	0.9682	-0.0518
763	763	0.969	-0.051
764	764	0.9699	-0.0501
765	765	0.9731	-0.0469
766	766	0.9712	-0.0488
767	767	0.9694	-0.0506
768	768	0.9687	-0.0513
769	769	0.9682	-0.0518
770	770	0.9659	-0.0541
771	771	0.9666	-0.0534
772	772	0.9698	-0.0502
773	773	0.9701	-0.0499
774	774	0.9699	-0.0501
775	775	0.9697	-0.0503
776	776	0.9685	-0.0515
777	777	0.9672	-0.0528
778	778	0.967	-0.053
779	779	0.9709	-0.0491
780	780	0.9702	-0.0498
781	781	0.9714	-0.0486
782	782	0.971	-0.049
783	783	0.9553	-0.0647
784	784	0.9513	-0.0687
785	785	0.9538	-0.0662
786	786	0.9554	-0.0646
787	787	0.9539	-0.0661
788	788	0.9549	-0.0651
789	789	0.954	-0.066
790	790	0.9528	-0.0672

Project: Brock Street East - Evandale

Number: 171-00471-00

Client:

	Time [s]	Water Level [m]	WL Change [m]
791	791	0.9564	-0.0636
792	792	0.9635	-0.0565
793	793	0.9672	-0.0528
794	794	0.9734	-0.0466
795	795	0.9728	-0.0472
796	796	0.9733	-0.0467
797	797	0.9735	-0.0465
798	798	0.9739	-0.0461
799	799	0.9739	-0.0461
800	800	0.9743	-0.0457
801	801	0.9743	-0.0457
802	802	0.9737	-0.0463
803	803	0.9737	-0.0463
804	804	0.9746	-0.0454
805	805	0.9747	-0.0453
806	806	0.9746	-0.0454
807	807	0.9743	-0.0457
808	808	0.9746	-0.0454
809	809	0.9744	-0.0456
810	810	0.9724	-0.0476
811	811	0.9752	-0.0448
812	812	0.9752	-0.0448
813	813	0.9748	-0.0452
814	814	0.9749	-0.0451
815	815	0.9757	-0.0443
816	816	0.9759	-0.0441
817	817	0.9762	-0.0438
818	818	0.9759	-0.0441
819	819	0.9757	-0.0443
820	820	0.9764	-0.0436
821	821	0.977	-0.043
822	822	0.9777	-0.0423
823	823	0.977	-0.043
824	824	0.9761	-0.0439
825	825	0.9766	-0.0434
826	826	0.9762	-0.0438
827	827	0.9761	-0.0439
828	828	0.976	-0.044
829	829	0.9756	-0.0444
830	830	0.9761	-0.0439
831	831	0.9754	-0.0446
832	832	0.9766	-0.0434
833	833	0.978	-0.042
834	834	0.979	-0.041
835	835	0.9789	-0.0411
836	836	0.9783	-0.0417
837	837	0.9789	-0.0411
838	838	0.9784	-0.0416
839	839	0.9792	-0.0408
840	840	0.978	-0.042
841	841	0.9775	-0.0425
842	842	0.9783	-0.0417
843	843	0.9786	-0.0414

Project: Brock Street East - Evandale

Number: 171-00471-00

Client:

	Time [s]	Water Level [m]	WL Change [m]
844	844	0.9784	-0.0416
845	845	0.9787	-0.0413
846	846	0.9787	-0.0413
847	847	0.9782	-0.0418
848	848	0.979	-0.041
849	849	0.9792	-0.0408
850	850	0.9787	-0.0413
851	851	0.9792	-0.0408
852	852	0.9798	-0.0402
853	853	0.9798	-0.0402
854	854	0.98	-0.04
855	855	0.9802	-0.0398
856	856	0.981	-0.039
857	857	0.9814	-0.0386
858	858	0.9814	-0.0386
859	859	0.9814	-0.0386
860	860	0.9809	-0.0391
861	861	0.9811	-0.0389
862	862	0.9807	-0.0393
863	863	0.9808	-0.0392
864	864	0.9811	-0.0389
865	865	0.9815	-0.0385
866	866	0.9831	-0.0369
867	867	0.9832	-0.0368
868	868	0.9829	-0.0371
869	869	0.9829	-0.0371
870	870	0.9831	-0.0369
871	871	0.9832	-0.0368
872	872	0.983	-0.037
873	873	0.9833	-0.0367
874	874	0.9839	-0.0361
875	875	0.983	-0.037
876	876	0.9828	-0.0372
877	877	0.9817	-0.0383
878	878	0.9824	-0.0376
879	879	0.9838	-0.0362
880	880	0.9841	-0.0359
881	881	0.9837	-0.0363
882	882	0.9839	-0.0361
883	883	0.9833	-0.0367
884	884	0.9826	-0.0374
885	885	0.9833	-0.0367
886	886	0.9839	-0.0361
887	887	0.9832	-0.0368
888	888	0.9824	-0.0376
889	889	0.9832	-0.0368
890	890	0.9841	-0.0359
891	891	0.9846	-0.0354
892	892	0.9855	-0.0345
893	893	0.9855	-0.0345
894	894	0.9866	-0.0334
895	895	0.9883	-0.0317
896	896	0.9874	-0.0326

Project: Brock Street East - Evandale

Number: 171-00471-00

Client:

	Time [s]	Water Level [m]	WL Change [m]
897	897	0.988	-0.032
898	898	0.9882	-0.0318
899	899	0.9874	-0.0326
900	900	0.9875	-0.0325
901	901	0.9875	-0.0325
902	902	0.9869	-0.0331
903	903	0.9866	-0.0334
904	904	0.9765	-0.0435
905	905	0.9715	-0.0485
906	906	0.97	-0.05
907	907	0.9694	-0.0506
908	908	0.9703	-0.0497
909	909	0.9715	-0.0485
910	910	0.9709	-0.0491
911	911	0.9836	-0.0364
912	912	0.9858	-0.0342
913	913	0.9886	-0.0314
914	914	0.9889	-0.0311
915	915	0.9891	-0.0309
916	916	0.9898	-0.0302
917	917	0.9898	-0.0302
918	918	0.9897	-0.0303
919	919	0.9893	-0.0307
920	920	0.9887	-0.0313
921	921	0.9895	-0.0305
922	922	0.9876	-0.0324
923	923	0.9887	-0.0313
924	924	0.9874	-0.0326
925	925	0.986	-0.034
926	926	0.9882	-0.0318
927	927	0.9873	-0.0327
928	928	0.9892	-0.0308
929	929	0.9889	-0.0311
930	930	0.9903	-0.0297
931	931	0.991	-0.029
932	932	0.9917	-0.0283
933	933	0.9921	-0.0279
934	934	0.9929	-0.0271
935	935	0.9933	-0.0267
936	936	0.992	-0.028
937	937	0.9917	-0.0283
938	938	0.9908	-0.0292
939	939	0.991	-0.029
940	940	0.9919	-0.0281
941	941	0.9917	-0.0283
942	942	0.9912	-0.0288
943	943	0.9914	-0.0286
944	944	0.9913	-0.0287
945	945	0.9918	-0.0282
946	946	0.9928	-0.0272
947	947	0.9933	-0.0267
948	948	0.9934	-0.0266
949	949	0.9917	-0.0283

Project: Brock Street East - Evandale

Number: 171-00471-00

Client:

	Time [s]	Water Level [m]	WL Change [m]
950	950	0.9907	-0.0293
951	951	0.9894	-0.0306
952	952	0.9926	-0.0274
953	953	0.9915	-0.0285
954	954	0.9926	-0.0274
955	955	0.994	-0.026
956	956	0.9931	-0.0269
957	957	0.9946	-0.0254
958	958	0.9934	-0.0266
959	959	0.9935	-0.0265
960	960	0.993	-0.027
961	961	0.9958	-0.0242
962	962	0.9946	-0.0254
963	963	0.9954	-0.0246
964	964	0.9962	-0.0238
965	965	0.9951	-0.0249
966	966	0.9935	-0.0265
967	967	0.9924	-0.0276
968	968	0.9922	-0.0278
969	969	0.9933	-0.0267
970	970	0.9941	-0.0259
971	971	0.9944	-0.0256
972	972	0.9936	-0.0264
973	973	0.9937	-0.0263
974	974	0.9939	-0.0261
975	975	0.9943	-0.0257
976	976	0.9952	-0.0248
977	977	0.9946	-0.0254
978	978	0.9946	-0.0254
979	979	0.9951	-0.0249
980	980	0.9952	-0.0248
981	981	0.9957	-0.0243
982	982	0.9956	-0.0244
983	983	0.9953	-0.0247
984	984	0.9958	-0.0242
985	985	0.9962	-0.0238
986	986	0.9959	-0.0241
987	987	0.9951	-0.0249
988	988	0.9955	-0.0245
989	989	0.9966	-0.0234
990	990	0.996	-0.024
991	991	0.9965	-0.0235
992	992	0.9964	-0.0236
993	993	0.9969	-0.0231
994	994	0.9963	-0.0237
995	995	0.9963	-0.0237
996	996	0.9961	-0.0239
997	997	0.9968	-0.0232
998	998	0.997	-0.023
999	999	0.9971	-0.0229
1000	1000	0.9963	-0.0237
1001	1001	0.9962	-0.0238
1002	1002	0.9965	-0.0235

Project: Brock Street East - Evandale

Number: 171-00471-00

Client:

	Time [s]	Water Level [m]	WL Change [m]
1003	1003	0.9962	-0.0238
1004	1004	0.9968	-0.0232
1005	1005	0.9971	-0.0229
1006	1006	0.9976	-0.0224
1007	1007	0.9977	-0.0223
1008	1008	0.9971	-0.0229
1009	1009	0.9977	-0.0223
1010	1010	0.9971	-0.0229
1011	1011	0.9982	-0.0218
1012	1012	0.9976	-0.0224
1013	1013	0.9978	-0.0222
1014	1014	0.9981	-0.0219
1015	1015	0.9982	-0.0218
1016	1016	0.9989	-0.0211
1017	1017	0.9989	-0.0211
1018	1018	0.998	-0.022
1019	1019	0.9978	-0.0222
1020	1020	0.9981	-0.0219
1021	1021	0.9985	-0.0215
1022	1022	0.9993	-0.0207
1023	1023	0.9986	-0.0214
1024	1024	0.9979	-0.0221
1025	1025	0.9976	-0.0224
1026	1026	0.9996	-0.0204
1027	1027	0.9999	-0.0201
1028	1028	0.9995	-0.0205
1029	1029	0.9998	-0.0202
1030	1030	1.00	-0.02
1031	1031	0.9996	-0.0204
1032	1032	0.9997	-0.0203
1033	1033	1.0005	-0.0195
1034	1034	1.0008	-0.0192
1035	1035	0.9999	-0.0201
1036	1036	0.9998	-0.0202
1037	1037	1.0009	-0.0191
1038	1038	1.0015	-0.0185
1039	1039	1.0013	-0.0187
1040	1040	1.0008	-0.0192
1041	1041	1.0006	-0.0194
1042	1042	1.0004	-0.0196
1043	1043	1.0005	-0.0195
1044	1044	1.0003	-0.0197
1045	1045	1.0001	-0.0199
1046	1046	1.0009	-0.0191
1047	1047	1.0032	-0.0168
1048	1048	1.0018	-0.0182
1049	1049	1.0023	-0.0177
1050	1050	1.0013	-0.0187
1051	1051	1.0016	-0.0184
1052	1052	1.0009	-0.0191
1053	1053	1.0014	-0.0186
1054	1054	1.0015	-0.0185
1055	1055	1.0015	-0.0185

Project: Brock Street East - Evandale

Number: 171-00471-00

Client:

	Time [s]	Water Level [m]	WL Change [m]
1056	1056	1.0013	-0.0187
1057	1057	1.002	-0.018
1058	1058	1.001	-0.019
1059	1059	1.0015	-0.0185
1060	1060	1.0009	-0.0191
1061	1061	1.0017	-0.0183
1062	1062	1.002	-0.018
1063	1063	1.0027	-0.0173
1064	1064	1.003	-0.017
1065	1065	1.0014	-0.0186
1066	1066	1.0019	-0.0181
1067	1067	1.0019	-0.0181
1068	1068	1.0021	-0.0179
1069	1069	1.0016	-0.0184
1070	1070	1.0028	-0.0172
1071	1071	1.0031	-0.0169
1072	1072	1.0029	-0.0171
1073	1073	1.0027	-0.0173
1074	1074	1.0039	-0.0161
1075	1075	1.0038	-0.0162
1076	1076	1.0023	-0.0177
1077	1077	1.002	-0.018
1078	1078	1.002	-0.018
1079	1079	1.0036	-0.0164
1080	1080	1.004	-0.016
1081	1081	1.0046	-0.0154
1082	1082	1.0036	-0.0164
1083	1083	1.0034	-0.0166
1084	1084	1.0039	-0.0161
1085	1085	1.0032	-0.0168
1086	1086	1.0033	-0.0167
1087	1087	1.0036	-0.0164
1088	1088	1.0044	-0.0156
1089	1089	1.0038	-0.0162
1090	1090	1.0046	-0.0154
1091	1091	1.0049	-0.0151
1092	1092	1.0037	-0.0163
1093	1093	1.004	-0.016
1094	1094	1.005	-0.015
1095	1095	1.0043	-0.0157
1096	1096	1.0048	-0.0152
1097	1097	1.0035	-0.0165
1098	1098	1.0046	-0.0154
1099	1099	1.0041	-0.0159
1100	1100	1.0046	-0.0154
1101	1101	1.0057	-0.0143
1102	1102	1.0051	-0.0149
1103	1103	1.0049	-0.0151
1104	1104	1.0048	-0.0152
1105	1105	1.005	-0.015
1106	1106	1.0056	-0.0144
1107	1107	1.0062	-0.0138
1108	1108	1.0061	-0.0139

Project: Brock Street East - Evandale

Number: 171-00471-00

Client:

	Time [s]	Water Level [m]	WL Change [m]
1109	1109	1.0062	-0.0138
1110	1110	1.0051	-0.0149
1111	1111	1.0055	-0.0145
1112	1112	1.006	-0.014
1113	1113	1.0073	-0.0127
1114	1114	1.007	-0.013
1115	1115	1.0059	-0.0141
1116	1116	1.0066	-0.0134
1117	1117	1.007	-0.013
1118	1118	1.0071	-0.0129
1119	1119	1.0069	-0.0131
1120	1120	1.0069	-0.0131
1121	1121	1.0064	-0.0136
1122	1122	1.0061	-0.0139
1123	1123	1.0067	-0.0133
1124	1124	1.007	-0.013
1125	1125	1.0069	-0.0131
1126	1126	1.0067	-0.0133
1127	1127	1.0062	-0.0138
1128	1128	1.0078	-0.0122
1129	1129	1.0071	-0.0129
1130	1130	1.0073	-0.0127
1131	1131	1.0073	-0.0127
1132	1132	1.0077	-0.0123
1133	1133	1.0074	-0.0126
1134	1134	1.0077	-0.0123
1135	1135	1.0086	-0.0114
1136	1136	1.0084	-0.0116
1137	1137	1.0078	-0.0122
1138	1138	1.0078	-0.0122
1139	1139	1.0084	-0.0116
1140	1140	1.0092	-0.0108
1141	1141	1.0076	-0.0124
1142	1142	1.0077	-0.0123
1143	1143	1.0083	-0.0117
1144	1144	1.0075	-0.0125
1145	1145	1.0073	-0.0127
1146	1146	1.008	-0.012
1147	1147	1.0074	-0.0126
1148	1148	1.0079	-0.0121
1149	1149	1.0079	-0.0121
1150	1150	1.0087	-0.0113
1151	1151	1.0091	-0.0109
1152	1152	1.0104	-0.0096
1153	1153	1.0091	-0.0109
1154	1154	1.0087	-0.0113
1155	1155	1.0075	-0.0125
1156	1156	1.0088	-0.0112
1157	1157	1.0101	-0.0099
1158	1158	1.0078	-0.0122
1159	1159	1.0087	-0.0113
1160	1160	1.0086	-0.0114
1161	1161	1.0082	-0.0118

Project: Brock Street East - Evandale

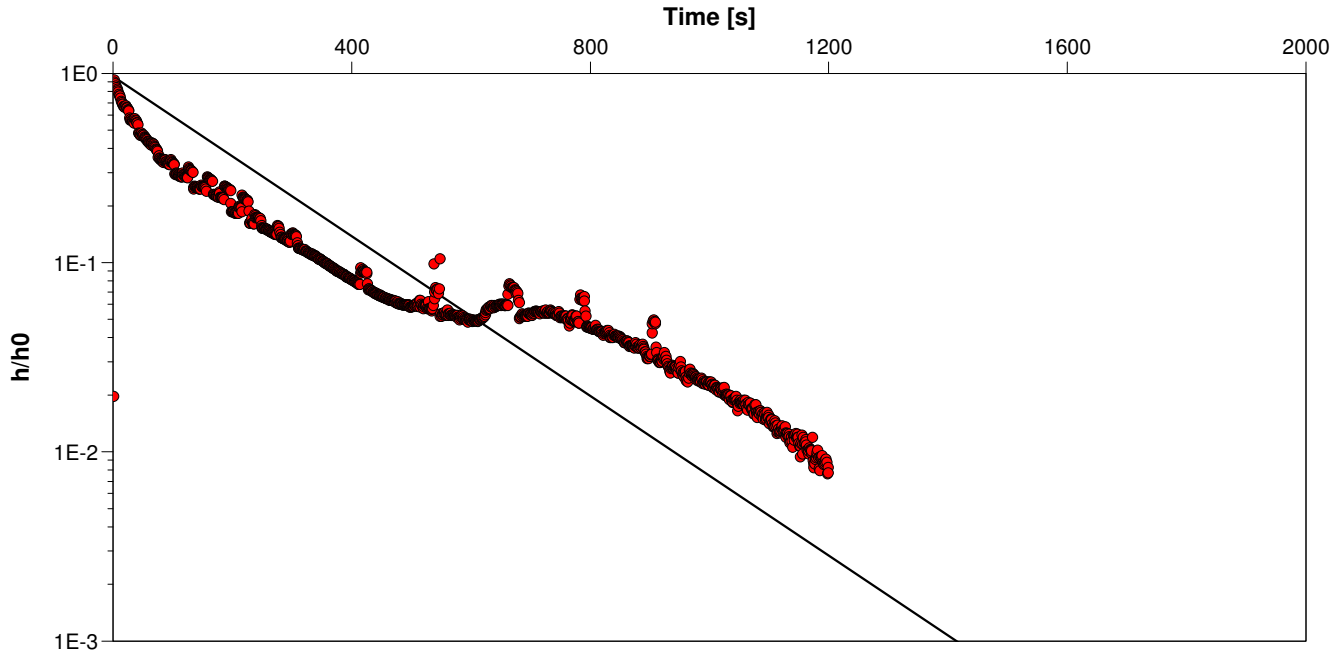
Number: 171-00471-00

Client:

	Time [s]	Water Level [m]	WL Change [m]
1162	1162	1.0085	-0.0115
1163	1163	1.0089	-0.0111
1164	1164	1.0096	-0.0104
1165	1165	1.0096	-0.0104
1166	1166	1.0101	-0.0099
1167	1167	1.0097	-0.0103
1168	1168	1.0093	-0.0107
1169	1169	1.0095	-0.0105
1170	1170	1.0096	-0.0104
1171	1171	1.01	-0.01
1172	1172	1.0097	-0.0103
1173	1173	1.0079	-0.0121
1174	1174	1.0109	-0.0091
1175	1175	1.0112	-0.0088
1176	1176	1.0116	-0.0084
1177	1177	1.0112	-0.0088
1178	1178	1.0107	-0.0093
1179	1179	1.0105	-0.0095
1180	1180	1.0102	-0.0098
1181	1181	1.0099	-0.0101
1182	1182	1.0096	-0.0104
1183	1183	1.0105	-0.0095
1184	1184	1.0117	-0.0083
1185	1185	1.0119	-0.0081
1186	1186	1.0104	-0.0096
1187	1187	1.0105	-0.0095
1188	1188	1.0104	-0.0096
1189	1189	1.0103	-0.0097
1190	1190	1.0111	-0.0089
1191	1191	1.0111	-0.0089
1192	1192	1.0113	-0.0087
1193	1193	1.0112	-0.0088
1194	1194	1.0108	-0.0092
1195	1195	1.011	-0.009
1196	1196	1.0107	-0.0093
1197	1197	1.011	-0.009
1198	1198	1.0122	-0.0078
1199	1199	1.0116	-0.0084
1200	1200	1.0121	-0.0079

	Slug Test Analysis Report
	Project: Brock Street East - Evandale
	Number: 171-00471-00
	Client:

Location: Uxbridge	Slug Test: MW1 - Test 2	Test Well: MW1
Test Conducted by:		Test Date: 2/10/2018
Analysis Performed by:	New analysis 1	Analysis Date: 2/10/2018
Aquifer Thickness:		



Calculation using Hvorslev

Observation Well	Hydraulic Conductivity [m/s]	
MW1	4.01×10^{-7}	

	Slug Test - Analyses Report
	Project: Brock Street East - Evandale
	Number: 171-00471-00
	Client:

Location: Uxbridge	Slug Test: MW1 - Test 2	Test Well: MW1
Test Conducted by:		Test Date: 2/10/2018
Aquifer Thickness: NAN m		

	Analysis Name	Analysis Performed by	Analysis Date	Method name	Well	T [m²/s]	S
1	New analysis 1		2/10/2018	Hvorslev	MW1		4.01×10^{-7}

HYDRAULIC CONDUCTIVITY DETERMINATION
SINGLE WELL RESPONSE TESTS

Project Name:	Evendale - Block 8	**Project Number:**	181-00471-00
Test Date:	21-Oct-20	**Well Number:**	**BH2**
Field Personnel:	T. Watters	**Analysis By:**	V.Bernard

Well Diameter (2r):	0.08636	m	**Screen (Sand Pack) Length (L):**	3.66	m
Borehole Diameter (2R):	0.1524	m	**Static Water Depth (H):**	3.327	m

HYDRAULIC CONDUCTIVITY:

$K = [(r^2)*\ln(L/R)]/(2*L*To)$

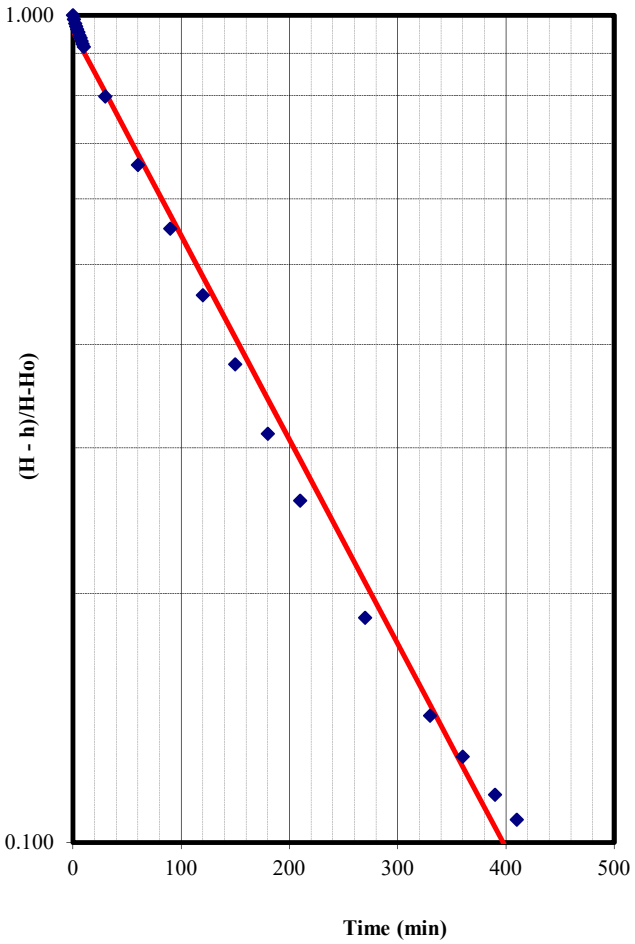
K = **9.8E-08** **m/sec** **9.8E-06** **cm/sec** **8.5E-03** **m/day**

RISING HEAD

TIME LAG (To): 167.1 min

Time (min)	Measured Water Depth (m)	H-h (m)	(H-h)/ (H-Ho)
0	6.835	-3.508	1.000
1	6.795	-3.468	0.989
2	6.755	-3.428	0.977
3	6.727	-3.4	0.969
4	6.699	-3.372	0.961
5	6.673	-3.346	0.954
6	6.644	-3.317	0.946
7	6.619	-3.292	0.938
8	6.591	-3.264	0.930
9	6.565	-3.238	0.923
10	6.539	-3.212	0.916
30	6.125	-2.798	0.798
60	5.64	-2.313	0.659
90	5.2639	-1.9369	0.552
120	4.9364	-1.6094	0.459
150	4.6541	-1.3271	0.378
180	4.4209	-1.0939	0.312
210	4.2352	-0.9082	0.259
270	3.9825	-0.6555	0.187
330	3.8261	-0.4991	0.142
360	3.7722	-0.4452	0.127
390	3.7276	-0.4006	0.114
410	3.7007	-0.3737	0.107

NORMALIZED RECOVERY CURVE



HYDRAULIC CONDUCTIVITY DETERMINATION
SINGLE WELL RESPONSE TESTS

Project Name:	Evendale - Block 8	**Project Number:**	181-00471-00
Test Date:	22-Oct-20	**Well Number:**	**BH5**
Field Personnel:	T. Watters	**Analysis By:**	V.Bernard

6.2E-06

Well Diameter (2r):	0.08636	m	**Screen (Sand Pack) Length (L):**	1.52	m
Borehole Diameter (2R):	0.1524	m	**Static Water Depth (H):**	2.665	m

HYDRAULIC CONDUCTIVITY: $K = [(r^2)*\ln(L/R)]/(2*L*To)$

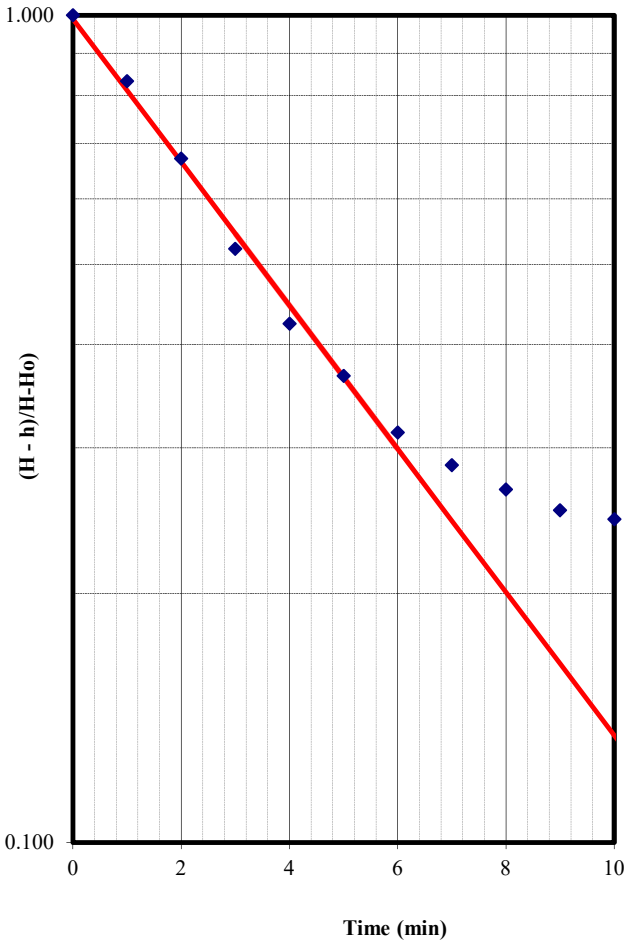
K = **6.2E-06** **m/sec** **6.2E-04** **cm/sec** **5.4E-01** **m/day**

RISING HEAD

TIME LAG (To): 4.9 min

Time (min)	Measured Water Depth (m)	H-h (m)	(H-h)/ (H-Ho)
0	3.47	-0.805	1.000
1	3.335	-0.67	0.832
2	3.205	-0.54	0.671
3	3.085	-0.42	0.522
4	3.006	-0.341	0.424
5	2.96	-0.295	0.366
6	2.917	-0.252	0.313
7	2.895	-0.23	0.286
8	2.88	-0.215	0.267
9	2.868	-0.203	0.252
10	2.863	-0.198	0.246
20	2.85	-0.185	0.230
30	2.845	-0.18	0.224
60	2.8383	-0.1733	0.215
120	2.8355	-0.1705	0.212
240	2.8362	-0.1712	0.213
360	2.835	-0.17	0.211
480	2.8291	-0.1641	0.204
600	2.8279	-0.1629	0.202
720	2.8292	-0.1642	0.204
840	2.8306	-0.1656	0.206
840	2.8306	-0.1656	0.206
960	2.8279	-0.1629	0.202
1080	2.8295	-0.1645	0.204
1200	2.8299	-0.1649	0.205
1320	2.8302	-0.1652	0.205
1440	2.8303	-0.1653	0.205
1600	2.8356	-0.1706	0.212

NORMALIZED RECOVERY CURVE



APPENDIX

D WATER QUALITY TESTING

WSP Canada Inc. (Aurora)
ATTN: JAKE WHITTAMORE
126 Hillock Drive
Unit 2
Aurora ON L4G 0G9

Date Received: 15-FEB-18
Report Date: 23-FEB-18 09:52 (MT)
Version: FINAL

Client Phone: 905-750-3080

Certificate of Analysis

Lab Work Order #: L2057407

Project P.O. #: NOT SUBMITTED
Job Reference: 181-00471-00
C of C Numbers: 17-618284
Legal Site Desc:

Mary-Lynn Pike
Client Services Supervisor

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2057407-1 MW1 Sampled By: JFA on 14-FEB-18 @ 10:30 Matrix: WATER							
Physical Tests							
Colour, Apparent	20.7		2.0	CU		16-FEB-18	R3966764
Conductivity	2680		3.0	umhos/cm		16-FEB-18	R3966444
pH	7.64		0.10	pH units		16-FEB-18	R3966444
Total Dissolved Solids	1580	DLDS	20	mg/L		20-FEB-18	R3966889
Turbidity	>4000		0.10	NTU		16-FEB-18	R3962769
Anions and Nutrients							
Alkalinity, Bicarbonate (as CaCO3)	275		10	mg/L		21-FEB-18	R3966994
Alkalinity, Carbonate (as CaCO3)	<10		10	mg/L		21-FEB-18	R3966994
Alkalinity, Hydroxide (as CaCO3)	<10		10	mg/L		21-FEB-18	R3966994
Alkalinity, Total (as CaCO3)	275		10	mg/L		21-FEB-18	R3966994
Ammonia, Total (as N)	0.202		0.020	mg/L		16-FEB-18	R3962989
Bromide (Br)	0.88	DLDS	0.50	mg/L		20-FEB-18	R3967011
Chloride (Cl)	770	DLDS	2.5	mg/L		20-FEB-18	R3967011
Computed Conductivity	2510			uS/cm		21-FEB-18	
Conductivity % Difference	-6.8			%		21-FEB-18	
Fluoride (F)	<0.10	DLDS	0.10	mg/L		20-FEB-18	R3967011
Hardness (as CaCO3)	566			mg/L		21-FEB-18	
Ion Balance	97.8			%		21-FEB-18	
Langelier Index	0.8					21-FEB-18	
Nitrate and Nitrite as N	2.304		0.11	mg/L		21-FEB-18	
Nitrate (as N)	2.08	DLDS	0.10	mg/L		20-FEB-18	R3967011
Nitrite (as N)	0.224	DLDS	0.050	mg/L		20-FEB-18	R3967011
Saturation pH	6.87			pH		21-FEB-18	
Orthophosphate-Dissolved (as P)	0.0039		0.0030	mg/L		16-FEB-18	R3966396
TDS (Calculated)	1640			mg/L		21-FEB-18	
Sulfate (SO4)	97.7	DLDS	1.5	mg/L		20-FEB-18	R3967011
Anion Sum	28.4			me/L		21-FEB-18	
Cation Sum	27.8			me/L		21-FEB-18	
Cation - Anion Balance	-1.1			%		21-FEB-18	
Organic / Inorganic Carbon							
Dissolved Organic Carbon	3.4		1.0	mg/L		20-FEB-18	R3967300
Inorganic Parameters							
Silica	13.3		1.1	mg/L		16-FEB-18	
Dissolved Metals							
Dissolved Metals Filtration Location	FIELD					16-FEB-18	R3962995
Aluminum (Al)-Dissolved	<0.050	DLHC	0.050	mg/L	16-FEB-18	16-FEB-18	R3963327
Antimony (Sb)-Dissolved	<0.0010	DLHC	0.0010	mg/L	16-FEB-18	16-FEB-18	R3963327
Arsenic (As)-Dissolved	<0.0010	DLHC	0.0010	mg/L	16-FEB-18	16-FEB-18	R3963327
Barium (Ba)-Dissolved	0.336	DLHC	0.0010	mg/L	16-FEB-18	16-FEB-18	R3963327
Beryllium (Be)-Dissolved	<0.0010	DLHC	0.0010	mg/L	16-FEB-18	16-FEB-18	R3963327
Bismuth (Bi)-Dissolved	<0.00050	DLHC	0.00050	mg/L	16-FEB-18	16-FEB-18	R3963327
Boron (B)-Dissolved	<0.10	DLHC	0.10	mg/L	16-FEB-18	16-FEB-18	R3963327

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2057407-1 MW1 Sampled By: JFA on 14-FEB-18 @ 10:30 Matrix: WATER							
Dissolved Metals							
Cadmium (Cd)-Dissolved	<0.000050	DLHC	0.000050	mg/L	16-FEB-18	16-FEB-18	R3963327
Calcium (Ca)-Dissolved	193	DLHC	0.50	mg/L	16-FEB-18	16-FEB-18	R3963327
Chromium (Cr)-Dissolved	<0.0050	DLHC	0.0050	mg/L	16-FEB-18	16-FEB-18	R3963327
Cobalt (Co)-Dissolved	<0.0010	DLHC	0.0010	mg/L	16-FEB-18	16-FEB-18	R3963327
Copper (Cu)-Dissolved	<0.0020	DLHC	0.0020	mg/L	16-FEB-18	16-FEB-18	R3963327
Iron (Fe)-Dissolved	<0.10	DLHC	0.10	mg/L	16-FEB-18	16-FEB-18	R3963327
Lead (Pb)-Dissolved	<0.00050	DLHC	0.00050	mg/L	16-FEB-18	16-FEB-18	R3963327
Magnesium (Mg)-Dissolved	20.5	DLHC	0.50	mg/L	16-FEB-18	16-FEB-18	R3963327
Manganese (Mn)-Dissolved	0.108	DLHC	0.0050	mg/L	16-FEB-18	16-FEB-18	R3963327
Molybdenum (Mo)-Dissolved	<0.00050	DLHC	0.00050	mg/L	16-FEB-18	16-FEB-18	R3963327
Nickel (Ni)-Dissolved	<0.0050	DLHC	0.0050	mg/L	16-FEB-18	16-FEB-18	R3963327
Phosphorus (P)-Dissolved	<0.50	DLHC	0.50	mg/L	16-FEB-18	16-FEB-18	R3963327
Potassium (K)-Dissolved	5.09	DLHC	0.50	mg/L	16-FEB-18	16-FEB-18	R3963327
Selenium (Se)-Dissolved	<0.00050	DLHC	0.00050	mg/L	16-FEB-18	16-FEB-18	R3963327
Silicon (Si)-Dissolved	6.21	DLHC	0.50	mg/L	16-FEB-18	16-FEB-18	R3963327
Silver (Ag)-Dissolved	<0.00050	DLHC	0.00050	mg/L	16-FEB-18	16-FEB-18	R3963327
Sodium (Na)-Dissolved	376	DLHC	5.0	mg/L	16-FEB-18	16-FEB-18	R3963327
Strontium (Sr)-Dissolved	0.757	DLHC	0.010	mg/L	16-FEB-18	16-FEB-18	R3963327
Sulfur (S)-Dissolved	15.4	DLHC	5.0	mg/L	16-FEB-18	16-FEB-18	R3963327
Thallium (Tl)-Dissolved	<0.00010	DLHC	0.00010	mg/L	16-FEB-18	16-FEB-18	R3963327
Tin (Sn)-Dissolved	<0.0010	DLHC	0.0010	mg/L	16-FEB-18	16-FEB-18	R3963327
Titanium (Ti)-Dissolved	<0.0030	DLHC	0.0030	mg/L	16-FEB-18	16-FEB-18	R3963327
Tungsten (W)-Dissolved	<0.0010	DLHC	0.0010	mg/L	16-FEB-18	16-FEB-18	R3963327
Uranium (U)-Dissolved	0.00169	DLHC	0.00010	mg/L	16-FEB-18	16-FEB-18	R3963327
Vanadium (V)-Dissolved	<0.0050	DLHC	0.0050	mg/L	16-FEB-18	16-FEB-18	R3963327
Zinc (Zn)-Dissolved	<0.010	DLHC	0.010	mg/L	16-FEB-18	16-FEB-18	R3963327
Zirconium (Zr)-Dissolved	<0.0030	DLHC	0.0030	mg/L	16-FEB-18	16-FEB-18	R3963327
L2057407-2 MW2 Sampled By: JFA on 14-FEB-18 @ 11:50 Matrix: WATER							
Physical Tests							
Colour, Apparent	32.2		2.0	CU		16-FEB-18	R3966764
Conductivity	457		3.0	umhos/cm		16-FEB-18	R3966444
pH	7.94		0.10	pH units		16-FEB-18	R3966444
Total Dissolved Solids	382	DLDS	20	mg/L		20-FEB-18	R3966889
Turbidity	>4000		0.10	NTU		16-FEB-18	R3962769
Anions and Nutrients							
Alkalinity, Bicarbonate (as CaCO3)	192		10	mg/L		21-FEB-18	R3966994
Alkalinity, Carbonate (as CaCO3)	<10		10	mg/L		21-FEB-18	R3966994
Alkalinity, Hydroxide (as CaCO3)	<10		10	mg/L		21-FEB-18	R3966994
Alkalinity, Total (as CaCO3)	192		10	mg/L		21-FEB-18	R3966994
Ammonia, Total (as N)	0.276		0.020	mg/L		16-FEB-18	R3962989

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2057407-2 MW2 Sampled By: JFA on 14-FEB-18 @ 11:50 Matrix: WATER							
Anions and Nutrients							
Bromide (Br)	<0.10		0.10	mg/L		20-FEB-18	R3967011
Chloride (Cl)	16.8		0.50	mg/L		20-FEB-18	R3967011
Computed Conductivity	401			uS/cm		21-FEB-18	
Conductivity % Difference	-13.1			%		21-FEB-18	
Fluoride (F)	0.086		0.020	mg/L		20-FEB-18	R3967011
Hardness (as CaCO3)	209			mg/L		21-FEB-18	
Ion Balance	114			%		21-FEB-18	
Langelier Index	0.6					21-FEB-18	
Nitrate and Nitrite as N	<0.022		0.022	mg/L		21-FEB-18	
Nitrate (as N)	<0.020		0.020	mg/L		20-FEB-18	R3967011
Nitrite (as N)	<0.010		0.010	mg/L		20-FEB-18	R3967011
Saturation pH	7.29			pH		21-FEB-18	
Orthophosphate-Dissolved (as P)	<0.0030		0.0030	mg/L		16-FEB-18	R3966396
TDS (Calculated)	238			mg/L		21-FEB-18	
Sulfate (SO4)	17.6		0.30	mg/L		20-FEB-18	R3967011
Anion Sum	4.03			me/L		21-FEB-18	
Cation Sum	4.60			me/L		21-FEB-18	
Cation - Anion Balance	6.6			%		21-FEB-18	
Organic / Inorganic Carbon							
Dissolved Organic Carbon	2.2		1.0	mg/L		20-FEB-18	R3967300
Inorganic Parameters							
Silica	24.9		0.11	mg/L		16-FEB-18	
Dissolved Metals							
Dissolved Metals Filtration Location	FIELD					16-FEB-18	R3962995
Aluminum (Al)-Dissolved	<0.0050		0.0050	mg/L	16-FEB-18	16-FEB-18	R3963327
Antimony (Sb)-Dissolved	0.00016		0.00010	mg/L	16-FEB-18	16-FEB-18	R3963327
Arsenic (As)-Dissolved	0.00127		0.00010	mg/L	16-FEB-18	16-FEB-18	R3963327
Barium (Ba)-Dissolved	0.118		0.00010	mg/L	16-FEB-18	16-FEB-18	R3963327
Beryllium (Be)-Dissolved	<0.00010		0.00010	mg/L	16-FEB-18	16-FEB-18	R3963327
Bismuth (Bi)-Dissolved	<0.000050		0.000050	mg/L	16-FEB-18	16-FEB-18	R3963327
Boron (B)-Dissolved	<0.010		0.010	mg/L	16-FEB-18	16-FEB-18	R3963327
Cadmium (Cd)-Dissolved	<0.000010		0.000010	mg/L	16-FEB-18	16-FEB-18	R3963327
Calcium (Ca)-Dissolved	68.7		0.050	mg/L	16-FEB-18	16-FEB-18	R3963327
Chromium (Cr)-Dissolved	<0.00050		0.00050	mg/L	16-FEB-18	16-FEB-18	R3963327
Cobalt (Co)-Dissolved	0.00012		0.00010	mg/L	16-FEB-18	16-FEB-18	R3963327
Copper (Cu)-Dissolved	<0.00020		0.00020	mg/L	16-FEB-18	16-FEB-18	R3963327
Iron (Fe)-Dissolved	0.062		0.010	mg/L	16-FEB-18	16-FEB-18	R3963327
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L	16-FEB-18	16-FEB-18	R3963327
Magnesium (Mg)-Dissolved	9.15		0.050	mg/L	16-FEB-18	16-FEB-18	R3963327
Manganese (Mn)-Dissolved	0.100		0.00050	mg/L	16-FEB-18	16-FEB-18	R3963327
Molybdenum (Mo)-Dissolved	0.000392		0.000050	mg/L	16-FEB-18	16-FEB-18	R3963327
Nickel (Ni)-Dissolved	<0.00050		0.00050	mg/L	16-FEB-18	16-FEB-18	R3963327

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2057407-2 MW2 Sampled By: JFA on 14-FEB-18 @ 11:50 Matrix: WATER							
Dissolved Metals							
Phosphorus (P)-Dissolved	<0.050		0.050	mg/L	16-FEB-18	16-FEB-18	R3963327
Potassium (K)-Dissolved	1.30		0.050	mg/L	16-FEB-18	16-FEB-18	R3963327
Selenium (Se)-Dissolved	<0.000050		0.000050	mg/L	16-FEB-18	16-FEB-18	R3963327
Silicon (Si)-Dissolved	11.6		0.050	mg/L	16-FEB-18	16-FEB-18	R3963327
Silver (Ag)-Dissolved	<0.000050		0.000050	mg/L	16-FEB-18	16-FEB-18	R3963327
Sodium (Na)-Dissolved	8.45		0.50	mg/L	16-FEB-18	16-FEB-18	R3963327
Strontium (Sr)-Dissolved	0.182		0.0010	mg/L	16-FEB-18	16-FEB-18	R3963327
Sulfur (S)-Dissolved	6.4		5.0	mg/L	16-FEB-18	16-FEB-18	R3963327
Thallium (Tl)-Dissolved	<0.000010		0.000010	mg/L	16-FEB-18	16-FEB-18	R3963327
Tin (Sn)-Dissolved	0.00011		0.00010	mg/L	16-FEB-18	16-FEB-18	R3963327
Titanium (Ti)-Dissolved	<0.00030		0.00030	mg/L	16-FEB-18	16-FEB-18	R3963327
Tungsten (W)-Dissolved	<0.00010		0.00010	mg/L	16-FEB-18	16-FEB-18	R3963327
Uranium (U)-Dissolved	0.000091		0.000010	mg/L	16-FEB-18	16-FEB-18	R3963327
Vanadium (V)-Dissolved	0.00070		0.00050	mg/L	16-FEB-18	16-FEB-18	R3963327
Zinc (Zn)-Dissolved	<0.0010		0.0010	mg/L	16-FEB-18	16-FEB-18	R3963327
Zirconium (Zr)-Dissolved	<0.00030		0.00030	mg/L	16-FEB-18	16-FEB-18	R3963327
L2057407-3 GW DUPLICATE Sampled By: JFA on 14-FEB-18 @ 10:30 Matrix: WATER							
Physical Tests							
Colour, Apparent	20.3		2.0	CU		16-FEB-18	R3966764
Conductivity	452		3.0	umhos/cm		16-FEB-18	R3966444
pH	7.87		0.10	pH units		16-FEB-18	R3966444
Total Dissolved Solids	340	DLDS	20	mg/L		20-FEB-18	R3966889
Turbidity	>4000		0.10	NTU		16-FEB-18	R3962769
Anions and Nutrients							
Alkalinity, Bicarbonate (as CaCO3)	197		10	mg/L		21-FEB-18	R3966994
Alkalinity, Carbonate (as CaCO3)	<10		10	mg/L		21-FEB-18	R3966994
Alkalinity, Hydroxide (as CaCO3)	<10		10	mg/L		21-FEB-18	R3966994
Alkalinity, Total (as CaCO3)	197		10	mg/L		21-FEB-18	R3966994
Ammonia, Total (as N)	0.319		0.020	mg/L		16-FEB-18	R3962989
Bromide (Br)	<0.10		0.10	mg/L		20-FEB-18	R3967011
Chloride (Cl)	22.9		0.50	mg/L		20-FEB-18	R3967011
Computed Conductivity	411			uS/cm		21-FEB-18	
Conductivity % Difference	-9.5			%		21-FEB-18	
Fluoride (F)	0.088		0.020	mg/L		20-FEB-18	R3967011
Hardness (as CaCO3)	209			mg/L		21-FEB-18	
Ion Balance	109			%		21-FEB-18	
Langelier Index	0.6					21-FEB-18	
Nitrate and Nitrite as N	<0.022		0.022	mg/L		21-FEB-18	
Nitrate (as N)	<0.020		0.020	mg/L		20-FEB-18	R3967011
Nitrite (as N)	<0.010		0.010	mg/L		20-FEB-18	R3967011

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2057407-3 GW DUPLICATE Sampled By: JFA on 14-FEB-18 @ 10:30 Matrix: WATER							
Anions and Nutrients							
Saturation pH	7.28			pH		21-FEB-18	
Orthophosphate-Dissolved (as P)	<0.0030		0.0030	mg/L		16-FEB-18	R3966396
TDS (Calculated)	244			mg/L		21-FEB-18	
Sulfate (SO4)	15.1		0.30	mg/L		20-FEB-18	R3967011
Anion Sum	4.22			me/L		21-FEB-18	
Cation Sum	4.61			me/L		21-FEB-18	
Cation - Anion Balance	4.5			%		21-FEB-18	
Organic / Inorganic Carbon							
Dissolved Organic Carbon	4.2		1.0	mg/L		20-FEB-18	R3967300
Inorganic Parameters							
Silica	23.9		0.11	mg/L		16-FEB-18	
Dissolved Metals							
Dissolved Metals Filtration Location	FIELD					16-FEB-18	R3962995
Aluminum (Al)-Dissolved	<0.0050		0.0050	mg/L	16-FEB-18	16-FEB-18	R3963327
Antimony (Sb)-Dissolved	0.00015		0.00010	mg/L	16-FEB-18	16-FEB-18	R3963327
Arsenic (As)-Dissolved	0.00132		0.00010	mg/L	16-FEB-18	16-FEB-18	R3963327
Barium (Ba)-Dissolved	0.116		0.00010	mg/L	16-FEB-18	16-FEB-18	R3963327
Beryllium (Be)-Dissolved	<0.00010		0.00010	mg/L	16-FEB-18	16-FEB-18	R3963327
Bismuth (Bi)-Dissolved	<0.000050		0.000050	mg/L	16-FEB-18	16-FEB-18	R3963327
Boron (B)-Dissolved	<0.010		0.010	mg/L	16-FEB-18	16-FEB-18	R3963327
Cadmium (Cd)-Dissolved	<0.000010		0.000010	mg/L	16-FEB-18	16-FEB-18	R3963327
Calcium (Ca)-Dissolved	68.2		0.050	mg/L	16-FEB-18	16-FEB-18	R3963327
Chromium (Cr)-Dissolved	<0.00050		0.00050	mg/L	16-FEB-18	16-FEB-18	R3963327
Cobalt (Co)-Dissolved	0.00013		0.00010	mg/L	16-FEB-18	16-FEB-18	R3963327
Copper (Cu)-Dissolved	<0.00020		0.00020	mg/L	16-FEB-18	16-FEB-18	R3963327
Iron (Fe)-Dissolved	0.070		0.010	mg/L	16-FEB-18	16-FEB-18	R3963327
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L	16-FEB-18	16-FEB-18	R3963327
Magnesium (Mg)-Dissolved	9.47		0.050	mg/L	16-FEB-18	16-FEB-18	R3963327
Manganese (Mn)-Dissolved	0.104		0.00050	mg/L	16-FEB-18	16-FEB-18	R3963327
Molybdenum (Mo)-Dissolved	0.000389		0.000050	mg/L	16-FEB-18	16-FEB-18	R3963327
Nickel (Ni)-Dissolved	<0.00050		0.00050	mg/L	16-FEB-18	16-FEB-18	R3963327
Phosphorus (P)-Dissolved	<0.050		0.050	mg/L	16-FEB-18	16-FEB-18	R3963327
Potassium (K)-Dissolved	1.31		0.050	mg/L	16-FEB-18	16-FEB-18	R3963327
Selenium (Se)-Dissolved	0.000054		0.000050	mg/L	16-FEB-18	16-FEB-18	R3963327
Silicon (Si)-Dissolved	11.2		0.050	mg/L	16-FEB-18	16-FEB-18	R3963327
Silver (Ag)-Dissolved	<0.000050		0.000050	mg/L	16-FEB-18	16-FEB-18	R3963327
Sodium (Na)-Dissolved	8.56		0.50	mg/L	16-FEB-18	16-FEB-18	R3963327
Strontium (Sr)-Dissolved	0.186		0.0010	mg/L	16-FEB-18	16-FEB-18	R3963327
Sulfur (S)-Dissolved	6.3		5.0	mg/L	16-FEB-18	16-FEB-18	R3963327
Thallium (Tl)-Dissolved	<0.000010		0.000010	mg/L	16-FEB-18	16-FEB-18	R3963327
Tin (Sn)-Dissolved	0.00011		0.00010	mg/L	16-FEB-18	16-FEB-18	R3963327
Titanium (Ti)-Dissolved	<0.00030		0.00030	mg/L	16-FEB-18	16-FEB-18	R3963327

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2057407-3 GW DUPLICATE Sampled By: JFA on 14-FEB-18 @ 10:30 Matrix: WATER							
Dissolved Metals							
Tungsten (W)-Dissolved	<0.00010		0.00010	mg/L	16-FEB-18	16-FEB-18	R3963327
Uranium (U)-Dissolved	0.000087		0.000010	mg/L	16-FEB-18	16-FEB-18	R3963327
Vanadium (V)-Dissolved	0.00070		0.00050	mg/L	16-FEB-18	16-FEB-18	R3963327
Zinc (Zn)-Dissolved	<0.0010		0.0010	mg/L	16-FEB-18	16-FEB-18	R3963327
Zirconium (Zr)-Dissolved	<0.00030		0.00030	mg/L	16-FEB-18	16-FEB-18	R3963327

* Refer to Referenced Information for Qualifiers (if any) and Methodology.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2057407-1, -2, -3
Matrix Spike	Boron (B)-Dissolved	MS-B	L2057407-1, -2, -3
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2057407-1, -2, -3
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2057407-1, -2, -3
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L2057407-1, -2, -3
Matrix Spike	Molybdenum (Mo)-Dissolved	MS-B	L2057407-1, -2, -3
Matrix Spike	Potassium (K)-Dissolved	MS-B	L2057407-1, -2, -3
Matrix Spike	Silicon (Si)-Dissolved	MS-B	L2057407-1, -2, -3
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2057407-1, -2, -3
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2057407-1, -2, -3
Matrix Spike	Sulfur (S)-Dissolved	MS-B	L2057407-1, -2, -3
Matrix Spike	Uranium (U)-Dissolved	MS-B	L2057407-1, -2, -3

Sample Parameter Qualifier key listed:

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-AUTO-WT	Water	Automated Speciated Alkalinity	EPA 310.2
This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.			
ALK-SPECIATED-WT	Water	pH Measurement for Spec. Alk	APHA 4500 H-Electrode
Water samples are analyzed directly by a calibrated pH meter.			
BR-IC-N-WT	Water	Bromide in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
C-DIS-ORG-WT	Water	Dissolved Organic Carbon	APHA 5310B
Sample is filtered through a 0.45um filter, then injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic carbon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.			
CL-IC-N-WT	Water	Chloride by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).			
COLOUR-APPARENT-WT	Water	Colour	APHA 2120
Apparent Colour is measured spectrophotometrically by comparison to platinum-cobalt standards using the single wavelength method after sample decanting. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment. Concurrent measurement of sample pH is recommended.			
EC-WT	Water	Conductivity	APHA 2510 B
Water samples can be measured directly by immersing the conductivity cell into the sample.			
ETL-N2N3-WT	Water	Calculate from NO2 + NO3	APHA 4110 B
ETL-SILICA-CALC-WT	Water	Calculate from SI-TOT-WT	EPA 200.8
F-IC-N-WT	Water	Fluoride in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
IONBALANCE-OP03-WT	Water	Detailed Ion Balance Calculation	APHA 1030E, 2330B, 2510A
MET-D-CCMS-WT	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)
Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.			
Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.			

Reference Information

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

NH3-WT Water Ammonia, Total as N EPA 350.1
Sample is measured colorimetrically. When sample is turbid a distillation step is required, sample is distilled into a solution of boric acid and measured colorimetrically.

NO2-IC-WT Water Nitrite in Water by IC EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-IC-WT Water Nitrate in Water by IC EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

PO4-DO-COL-WT Water Diss. Orthophosphate in Water by Colour APHA 4500-P PHOSPHORUS
This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

SO4-IC-N-WT Water Sulfate in Water by IC EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-WT Water Total Dissolved Solids APHA 2540C
This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

TURBIDITY-WT Water Turbidity APHA 2130 B
Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA

Chain of Custody Numbers:

17-618284

GLOSSARY OF REPORT TERMS
Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates are listed there.
mg/kg - milligrams per kilogram based on dry weight of sample
mg/kg wwt - milligrams per kilogram based on wet weight of sample
mg/kg lwt - milligrams per kilogram based on lipid weight of sample
mg/L - unit of concentration based on volume, parts per million.
< - Less than.
D.L. - The reporting limit.
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Workorder: L2057407 Report Date: 23-FEB-18

Client: WSP Canada Inc. (Aurora)
126 Hillock Drive Unit 2
Aurora ON L4G 0G9

Contact: JAKE WHITTAMORE

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ALK-AUTO-WT	**Water**							
Batch R3966994								
WG2719604-3 CRM		**WT-ALK-CRM**						
Alkalinity, Total (as CaCO3)			104.9		%		80-120	21-FEB-18
WG2719604-4 DUP		**L2057363-2**						
Alkalinity, Total (as CaCO3)		137	138		mg/L	0.7	20	21-FEB-18
WG2719604-2 LCS								
Alkalinity, Total (as CaCO3)			97.7		%		85-115	21-FEB-18
WG2719604-1 MB								
Alkalinity, Total (as CaCO3)			<10		mg/L		10	21-FEB-18
ALK-SPECIATED-WT	**Water**							
Batch R3966444								
WG2717494-12 DUP		**WG2717494-11**						
pH		7.86	7.86	J	pH units	0.00	0.2	16-FEB-18
WG2717494-10 LCS								
pH			6.99		pH units		6.9-7.1	16-FEB-18
BR-IC-N-WT	**Water**							
Batch R3967011								
WG2718847-4 DUP		**L2057075-2**						
Bromide (Br)		0.29	0.28		mg/L	1.1	20	20-FEB-18
WG2718847-8 DUP		**L2057428-2**						
Bromide (Br)		<0.10	<0.10	RPD-NA	mg/L	N/A	20	20-FEB-18
WG2718847-2 LCS								
Bromide (Br)			99.1		%		85-115	20-FEB-18
WG2718847-7 LCS								
Bromide (Br)			96.8		%		85-115	20-FEB-18
WG2718847-1 MB								
Bromide (Br)			<0.10		mg/L		0.1	20-FEB-18
WG2718847-6 MB								
Bromide (Br)			<0.10		mg/L		0.1	20-FEB-18
WG2718847-5 MS		**L2057075-2**						
Bromide (Br)			106.2		%		75-125	20-FEB-18
WG2718847-9 MS		**L2057428-2**						
Bromide (Br)			89.4		%		75-125	20-FEB-18
C-DIS-ORG-WT	**Water**							
Batch R3967300								
WG2719466-3 DUP		**L2057075-1**						
Dissolved Organic Carbon		2.0	2.6	J	mg/L	0.7	2	20-FEB-18
WG2719466-2 LCS								

Quality Control Report

Client: WSP Canada Inc. (Aurora)
126 Hillock Drive Unit 2
Aurora ON L4G 0G9
Contact: JAKE WHITTAMORE

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
C-DIS-ORG-WT	**Water**							
Batch R3967300								
WG2719466-2 LCS								
Dissolved Organic Carbon			104.4		%		80-120	20-FEB-18
WG2719466-1 MB								
Dissolved Organic Carbon			<1.0		mg/L		1	20-FEB-18
WG2719466-4 MS		**L2057075-1**						
Dissolved Organic Carbon			97.9		%		70-130	20-FEB-18
CL-IC-N-WT	**Water**							
Batch R3967011								
WG2718847-4 DUP		**L2057075-2**						
Chloride (Cl)		40.7	40.4		mg/L	0.6	20	20-FEB-18
WG2718847-8 DUP		**L2057428-2**						
Chloride (Cl)		57.1	57.1		mg/L	0.1	20	20-FEB-18
WG2718847-2 LCS								
Chloride (Cl)			100.5		%		90-110	20-FEB-18
WG2718847-7 LCS								
Chloride (Cl)			101.1		%		90-110	20-FEB-18
WG2718847-1 MB								
Chloride (Cl)			<0.50		mg/L		0.5	20-FEB-18
WG2718847-6 MB								
Chloride (Cl)			<0.50		mg/L		0.5	20-FEB-18
WG2718847-5 MS		**L2057075-2**						
Chloride (Cl)			99.7		%		75-125	20-FEB-18
WG2718847-9 MS		**L2057428-2**						
Chloride (Cl)			101.0		%		75-125	20-FEB-18
COLOUR-APPARENT-WT	**Water**							
Batch R3966764								
WG2717514-3 DUP		**L2057397-1**						
Colour, Apparent		<2.0	2.1	RPD-NA	CU	N/A	20	16-FEB-18
WG2717514-2 LCS								
Colour, Apparent			98.7		%		85-115	16-FEB-18
WG2717514-1 MB								
Colour, Apparent			<2.0		CU		2	16-FEB-18
EC-WT	**Water**							
Batch R3966444								
WG2717494-12 DUP		**WG2717494-11**						
Conductivity		1100	1100		umhos/cm	0.3	10	16-FEB-18
WG2717494-10 LCS								

Quality Control Report

Client: WSP Canada Inc. (Aurora)
126 Hillock Drive Unit 2
Aurora ON L4G 0G9
Contact: JAKE WHITTAMORE

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
EC-WT	**Water**							
Batch R3966444								
WG2717494-10 LCS								
Conductivity			98.7		%		90-110	16-FEB-18
WG2717494-9 MB								
Conductivity			<3.0		umhos/cm		3	16-FEB-18
F-IC-N-WT	**Water**							
Batch R3967011								
WG2718847-4 DUP		**L2057075-2**						
Fluoride (F)		0.265	0.266		mg/L	0.6	20	20-FEB-18
WG2718847-8 DUP		**L2057428-2**						
Fluoride (F)		0.058	0.058		mg/L	0.5	20	20-FEB-18
WG2718847-2 LCS								
Fluoride (F)			100.5		%		90-110	20-FEB-18
WG2718847-7 LCS								
Fluoride (F)			106.8		%		90-110	20-FEB-18
WG2718847-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	20-FEB-18
WG2718847-6 MB								
Fluoride (F)			<0.020		mg/L		0.02	20-FEB-18
WG2718847-5 MS		**L2057075-2**						
Fluoride (F)			102.1		%		75-125	20-FEB-18
WG2718847-9 MS		**L2057428-2**						
Fluoride (F)			105.8		%		75-125	20-FEB-18
MET-D-CCMS-WT	**Water**							
Batch R3963327								
WG2717994-4 DUP		**WG2717994-3**						
Aluminum (Al)-Dissolved		<0.050	<0.050	RPD-NA	mg/L	N/A	20	16-FEB-18
Antimony (Sb)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	16-FEB-18
Arsenic (As)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	16-FEB-18
Barium (Ba)-Dissolved		0.455	0.410		mg/L	10	20	16-FEB-18
Beryllium (Be)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	16-FEB-18
Bismuth (Bi)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	16-FEB-18
Boron (B)-Dissolved		<0.10	<0.10	RPD-NA	mg/L	N/A	20	16-FEB-18
Cadmium (Cd)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	16-FEB-18
Calcium (Ca)-Dissolved		611	529		mg/L	14	20	16-FEB-18
Chromium (Cr)-Dissolved		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	16-FEB-18
Cobalt (Co)-Dissolved		0.0014	0.0012		mg/L	9.8	20	16-FEB-18

Quality Control Report

Client: WSP Canada Inc. (Aurora)
126 Hillock Drive Unit 2
Aurora ON L4G 0G9
Contact: JAKE WHITTAMORE

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R3963327								
WG2717994-4 DUP		**WG2717994-3**						
Copper (Cu)-Dissolved		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	16-FEB-18
Iron (Fe)-Dissolved		0.36	0.33		mg/L	10	20	16-FEB-18
Lead (Pb)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	16-FEB-18
Magnesium (Mg)-Dissolved		80.6	73.2		mg/L	9.6	20	16-FEB-18
Manganese (Mn)-Dissolved		5.14	4.67		mg/L	9.5	20	16-FEB-18
Molybdenum (Mo)-Dissolved		0.00067	0.00066		mg/L	1.4	20	16-FEB-18
Nickel (Ni)-Dissolved		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	16-FEB-18
Phosphorus (P)-Dissolved		<0.50	<0.50	RPD-NA	mg/L	N/A	20	16-FEB-18
Potassium (K)-Dissolved		4.81	4.32		mg/L	11	20	16-FEB-18
Selenium (Se)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	16-FEB-18
Silicon (Si)-Dissolved		7.50	6.73		mg/L	11	20	16-FEB-18
Silver (Ag)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	16-FEB-18
Sodium (Na)-Dissolved		606	548		mg/L	10	20	16-FEB-18
Strontium (Sr)-Dissolved		1.39	1.28		mg/L	8.4	20	16-FEB-18
Sulfur (S)-Dissolved		44.5	38.1		mg/L	16	20	16-FEB-18
Thallium (Tl)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	16-FEB-18
Tin (Sn)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	16-FEB-18
Titanium (Ti)-Dissolved		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	16-FEB-18
Tungsten (W)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	16-FEB-18
Uranium (U)-Dissolved		0.00311	0.00298		mg/L	4.2	20	16-FEB-18
Vanadium (V)-Dissolved		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	16-FEB-18
Zinc (Zn)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	16-FEB-18
Zirconium (Zr)-Dissolved		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	16-FEB-18
WG2717994-2 LCS								
Aluminum (Al)-Dissolved			103.5		%		80-120	16-FEB-18
Antimony (Sb)-Dissolved			89.7		%		80-120	16-FEB-18
Arsenic (As)-Dissolved			100.3		%		80-120	16-FEB-18
Barium (Ba)-Dissolved			99.2		%		80-120	16-FEB-18
Beryllium (Be)-Dissolved			98.4		%		80-120	16-FEB-18
Bismuth (Bi)-Dissolved			94.4		%		80-120	16-FEB-18
Boron (B)-Dissolved			96.2		%		80-120	16-FEB-18
Cadmium (Cd)-Dissolved			97.8		%		80-120	16-FEB-18
Calcium (Ca)-Dissolved			100.9		%		80-120	16-FEB-18

Quality Control Report

Client: WSP Canada Inc. (Aurora)
126 Hillock Drive Unit 2
Aurora ON L4G 0G9
Contact: JAKE WHITTAMORE

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R3963327								
WG2717994-2 LCS								
Chromium (Cr)-Dissolved			101.6		%		80-120	16-FEB-18
Cobalt (Co)-Dissolved			99.6		%		80-120	16-FEB-18
Copper (Cu)-Dissolved			99.5		%		80-120	16-FEB-18
Iron (Fe)-Dissolved			93.1		%		80-120	16-FEB-18
Lead (Pb)-Dissolved			96.7		%		80-120	16-FEB-18
Magnesium (Mg)-Dissolved			102.6		%		80-120	16-FEB-18
Manganese (Mn)-Dissolved			109.2		%		80-120	16-FEB-18
Molybdenum (Mo)-Dissolved			100.1		%		80-120	16-FEB-18
Nickel (Ni)-Dissolved			99.5		%		80-120	16-FEB-18
Phosphorus (P)-Dissolved			105.6		%		80-120	16-FEB-18
Potassium (K)-Dissolved			104.8		%		80-120	16-FEB-18
Selenium (Se)-Dissolved			96.0		%		80-120	16-FEB-18
Silicon (Si)-Dissolved			101.0		%		60-140	16-FEB-18
Silver (Ag)-Dissolved			96.2		%		80-120	16-FEB-18
Sodium (Na)-Dissolved			98.7		%		80-120	16-FEB-18
Strontium (Sr)-Dissolved			104.0		%		80-120	16-FEB-18
Sulfur (S)-Dissolved			96.1		%		80-120	16-FEB-18
Thallium (Tl)-Dissolved			100.3		%		80-120	16-FEB-18
Tin (Sn)-Dissolved			95.3		%		80-120	16-FEB-18
Titanium (Ti)-Dissolved			99.0		%		80-120	16-FEB-18
Tungsten (W)-Dissolved			98.2		%		80-120	16-FEB-18
Uranium (U)-Dissolved			97.2		%		80-120	16-FEB-18
Vanadium (V)-Dissolved			101.8		%		80-120	16-FEB-18
Zinc (Zn)-Dissolved			95.5		%		80-120	16-FEB-18
Zirconium (Zr)-Dissolved			97.3		%		80-120	16-FEB-18
WG2717994-1 MB								
Aluminum (Al)-Dissolved			<0.0050		mg/L		0.005	16-FEB-18
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	16-FEB-18
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	16-FEB-18
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	16-FEB-18
Beryllium (Be)-Dissolved			<0.00010		mg/L		0.0001	16-FEB-18
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	16-FEB-18
Boron (B)-Dissolved			<0.010		mg/L		0.01	16-FEB-18
Cadmium (Cd)-Dissolved			<0.000005(		mg/L		0.000005	16-FEB-18

Quality Control Report

Client: WSP Canada Inc. (Aurora)
126 Hillock Drive Unit 2
Aurora ON L4G 0G9
Contact: JAKE WHITTAMORE

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R3963327								
WG2717994-1 MB								
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	16-FEB-18
Chromium (Cr)-Dissolved			<0.00050		mg/L		0.0005	16-FEB-18
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	16-FEB-18
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	16-FEB-18
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	16-FEB-18
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	16-FEB-18
Magnesium (Mg)-Dissolved			<0.050		mg/L		0.05	16-FEB-18
Manganese (Mn)-Dissolved			<0.00050		mg/L		0.0005	16-FEB-18
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	16-FEB-18
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	16-FEB-18
Phosphorus (P)-Dissolved			<0.050		mg/L		0.05	16-FEB-18
Potassium (K)-Dissolved			<0.050		mg/L		0.05	16-FEB-18
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	16-FEB-18
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	16-FEB-18
Silver (Ag)-Dissolved			<0.000050		mg/L		0.00005	16-FEB-18
Sodium (Na)-Dissolved			<0.50		mg/L		0.5	16-FEB-18
Strontium (Sr)-Dissolved			<0.0010		mg/L		0.001	16-FEB-18
Sulfur (S)-Dissolved			<0.50		mg/L		0.5	16-FEB-18
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	16-FEB-18
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	16-FEB-18
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	16-FEB-18
Tungsten (W)-Dissolved			<0.00010		mg/L		0.0001	16-FEB-18
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	16-FEB-18
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	16-FEB-18
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	16-FEB-18
Zirconium (Zr)-Dissolved			<0.00030		mg/L		0.0003	16-FEB-18
WG2717994-5 MS		**WG2717994-6**						
Aluminum (Al)-Dissolved			94.3		%		70-130	16-FEB-18
Antimony (Sb)-Dissolved			89.0		%		70-130	16-FEB-18
Arsenic (As)-Dissolved			94.3		%		70-130	16-FEB-18
Barium (Ba)-Dissolved			N/A	MS-B	%		-	16-FEB-18
Beryllium (Be)-Dissolved			92.8		%		70-130	16-FEB-18
Bismuth (Bi)-Dissolved			84.7		%		70-130	16-FEB-18
Boron (B)-Dissolved			N/A	MS-B	%		-	16-FEB-18

Quality Control Report

Client: WSP Canada Inc. (Aurora)
126 Hillock Drive Unit 2
Aurora ON L4G 0G9
Contact: JAKE WHITTAMORE

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R3963327								
WG2717994-5 MS		**WG2717994-6**						
Cadmium (Cd)-Dissolved			92.3		%		70-130	16-FEB-18
Calcium (Ca)-Dissolved			N/A	MS-B	%		-	16-FEB-18
Chromium (Cr)-Dissolved			94.5		%		70-130	16-FEB-18
Cobalt (Co)-Dissolved			79.9		%		70-130	16-FEB-18
Copper (Cu)-Dissolved			84.5		%		70-130	16-FEB-18
Lead (Pb)-Dissolved			84.9		%		70-130	16-FEB-18
Magnesium (Mg)-Dissolved			N/A	MS-B	%		-	16-FEB-18
Manganese (Mn)-Dissolved			N/A	MS-B	%		-	16-FEB-18
Molybdenum (Mo)-Dissolved			N/A	MS-B	%		-	16-FEB-18
Nickel (Ni)-Dissolved			80.7		%		70-130	16-FEB-18
Phosphorus (P)-Dissolved			98.1		%		70-130	16-FEB-18
Potassium (K)-Dissolved			N/A	MS-B	%		-	16-FEB-18
Selenium (Se)-Dissolved			89.9		%		70-130	16-FEB-18
Silicon (Si)-Dissolved			N/A	MS-B	%		-	16-FEB-18
Silver (Ag)-Dissolved			88.8		%		70-130	16-FEB-18
Sodium (Na)-Dissolved			N/A	MS-B	%		-	16-FEB-18
Strontium (Sr)-Dissolved			N/A	MS-B	%		-	16-FEB-18
Sulfur (S)-Dissolved			N/A	MS-B	%		-	16-FEB-18
Thallium (Tl)-Dissolved			88.1		%		70-130	16-FEB-18
Tin (Sn)-Dissolved			91.1		%		70-130	16-FEB-18
Titanium (Ti)-Dissolved			94.1		%		70-130	16-FEB-18
Tungsten (W)-Dissolved			85.9		%		70-130	16-FEB-18
Uranium (U)-Dissolved			N/A	MS-B	%		-	16-FEB-18
Vanadium (V)-Dissolved			94.5		%		70-130	16-FEB-18
Zirconium (Zr)-Dissolved			92.2		%		70-130	16-FEB-18
NH3-WT	**Water**							
Batch R3962989								
WG2717985-7 DUP		**L2057397-1**						
Ammonia, Total (as N)		0.248	0.254		mg/L	2.3	20	16-FEB-18
WG2717985-6 LCS								
Ammonia, Total (as N)			102.7		%		85-115	16-FEB-18
WG2717985-5 MB								
Ammonia, Total (as N)			<0.020		mg/L		0.02	16-FEB-18
WG2717985-8 MS		**L2057397-1**						

Quality Control Report

Client: WSP Canada Inc. (Aurora)
126 Hillock Drive Unit 2
Aurora ON L4G 0G9
Contact: JAKE WHITTAMORE

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NH3-WT	**Water**							
Batch R3962989								
WG2717985-8 MS		**L2057397-1**						
Ammonia, Total (as N)			104.8		%		75-125	16-FEB-18
NO2-IC-WT	**Water**							
Batch R3967011								
WG2718847-4 DUP		**L2057075-2**						
Nitrite (as N)		0.014	0.014		mg/L	2.1	25	20-FEB-18
WG2718847-8 DUP		**L2057428-2**						
Nitrite (as N)		<0.010	<0.010	RPD-NA	mg/L	N/A	25	20-FEB-18
WG2718847-2 LCS								
Nitrite (as N)			99.6		%		70-130	20-FEB-18
WG2718847-7 LCS								
Nitrite (as N)			100.1		%		70-130	20-FEB-18
WG2718847-1 MB								
Nitrite (as N)			<0.010		mg/L		0.01	20-FEB-18
WG2718847-6 MB								
Nitrite (as N)			<0.010		mg/L		0.01	20-FEB-18
WG2718847-5 MS		**L2057075-2**						
Nitrite (as N)			94.8		%		70-130	20-FEB-18
WG2718847-9 MS		**L2057428-2**						
Nitrite (as N)			95.1		%		70-130	20-FEB-18
NO3-IC-WT	**Water**							
Batch R3967011								
WG2718847-4 DUP		**L2057075-2**						
Nitrate (as N)		0.023	0.021		mg/L	7.5	25	20-FEB-18
WG2718847-8 DUP		**L2057428-2**						
Nitrate (as N)		1.01	1.02		mg/L	0.1	25	20-FEB-18
WG2718847-2 LCS								
Nitrate (as N)			100.6		%		70-130	20-FEB-18
WG2718847-7 LCS								
Nitrate (as N)			100.9		%		70-130	20-FEB-18
WG2718847-1 MB								
Nitrate (as N)			<0.020		mg/L		0.02	20-FEB-18
WG2718847-6 MB								
Nitrate (as N)			<0.020		mg/L		0.02	20-FEB-18
WG2718847-5 MS		**L2057075-2**						
Nitrate (as N)			99.1		%		70-130	20-FEB-18
WG2718847-9 MS		**L2057428-2**						

Quality Control Report

Client: WSP Canada Inc. (Aurora)
126 Hillock Drive Unit 2
Aurora ON L4G 0G9
Contact: JAKE WHITTAMORE

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO3-IC-WT	**Water**							
Batch R3967011								
WG2718847-9 MS		**L2057428-2**						
Nitrate (as N)			103.0		%		70-130	20-FEB-18
PO4-DO-COL-WT	**Water**							
Batch R3966396								
WG2717671-7 DUP		**L2057363-2**						
Orthophosphate-Dissolved (as P)		<0.0030	<0.0030	RPD-NA	mg/L	N/A	30	16-FEB-18
WG2717671-6 LCS								
Orthophosphate-Dissolved (as P)			104.4		%		70-130	16-FEB-18
WG2717671-5 MB								
Orthophosphate-Dissolved (as P)			<0.0030		mg/L		0.003	16-FEB-18
WG2717671-8 MS		**L2057363-2**						
Orthophosphate-Dissolved (as P)			75.4		%		70-130	16-FEB-18
SO4-IC-N-WT	**Water**							
Batch R3967011								
WG2718847-4 DUP		**L2057075-2**						
Sulfate (SO4)		46.9	46.4		mg/L	1.1	20	20-FEB-18
WG2718847-8 DUP		**L2057428-2**						
Sulfate (SO4)		24.0	24.0		mg/L	0.2	20	20-FEB-18
WG2718847-2 LCS								
Sulfate (SO4)			101.1		%		90-110	20-FEB-18
WG2718847-7 LCS								
Sulfate (SO4)			101.5		%		90-110	20-FEB-18
WG2718847-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	20-FEB-18
WG2718847-6 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	20-FEB-18
WG2718847-5 MS		**L2057075-2**						
Sulfate (SO4)			101.1		%		75-125	20-FEB-18
WG2718847-9 MS		**L2057428-2**						
Sulfate (SO4)			103.4		%		75-125	20-FEB-18
SOLIDS-TDS-WT	**Water**							
Batch R3966889								
WG2718917-3 DUP		**L2056943-1**						
Total Dissolved Solids		920	919		mg/L	0.1	20	20-FEB-18
WG2718917-2 LCS								
Total Dissolved Solids			96.9		%		85-115	20-FEB-18
WG2718917-1 MB								

Quality Control Report

Client: WSP Canada Inc. (Aurora)
126 Hillock Drive Unit 2
Aurora ON L4G 0G9
Contact: JAKE WHITTAMORE

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SOLIDS-TDS-WT	**Water**							
Batch R3966889								
WG2718917-1 MB								
Total Dissolved Solids			<10		mg/L		10	20-FEB-18
TURBIDITY-WT	**Water**							
Batch R3962769								
WG2717608-3 DUP		**L2056566-1**						
Turbidity		16.3	16.0		NTU	1.9	15	16-FEB-18
WG2717608-2 LCS								
Turbidity			104.0		%		85-115	16-FEB-18
WG2717608-1 MB								
Turbidity			<0.10		NTU		0.1	16-FEB-18

Quality Control Report

Workorder: L2057407 Report Date: 23-FEB-18

Client: WSP Canada Inc. (Aurora)
126 Hillock Drive Unit 2
Aurora ON L4G 0G9
Contact: JAKE WHITTAMORE

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2057407-COFC

COC Number: 17 - 618284

Page 1 of 1

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)
Company:	WSP	Select Report Format: ☐ PDF ☒ EXCEL ☐ EDD (DIGITAL)	Regular [R] ☒ Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	Jake Whittamore	Quality Control (QC) Report with Report ☐ YES ☐ NO	PRIORITY (Business Days): 4 day [P4-20%] ☐ / 3 day [P3-25%] ☐ / 2 day [P2-50%] ☐
Phone:	1-289-984-0429	☐ Compare Results to Criteria on Report - provide details below if box checked	EMERGENCY: 1 Business day [E-100%] ☐ / Same Day, Weekend or Statutory holiday [E2-200% (Laboratory opening fees may apply)] ☐
	Company address below will appear on the final report	Select Distribution: ☒ EMAIL ☐ MAIL ☐ FAX	
Street:	126 Don Hillock Dr. #2	Email 1 or Fax: jake-whittamore@wsp.com	Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
City/Province:	Aurora ON	Email 2	For tests that can not be performed according to the service level selected, you will be contacted.
Postal Code:	L4G 0G9	Email 3	

Invoice To		Invoice Distribution	
	Same as Report To ☒ YES ☐ NO	Select Invoice Distribution: ☒ EMAIL ☐ MAIL ☐ FAX	
	Copy of Invoice with Report ☒ YES ☐ NO		
Company:		Email 1 or Fax: "	
Contact:		Email 2	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	26113	AFE/Cost Center:	PO#:
Job #:	181-00471-00	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	

ALS Lab Work Order # (lab use only): L2057407 SM

ALS Contact: Mary-Lynn Pike Sampler: JFA

Analysis Request — Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	F/P: Dissolved metals	F: DOC	Gen. chem. 3	P: NH3	SAMPLES ON HOLD	Sample is hazardous (please provide further details)	NUMBER OF CONTAINERS
	MW1	14-02-18	10:30	GW	X	X	X	X			4
	MW2	"	11:50	↓	X	X	X	X			4
	GW Duplicate	"		↓	X	X	X	X			4

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☒ NO	
Are samples for human consumption/ use? ☐ YES ☒ NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
				3.9			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: John Albus	Date: Feb. 14/18	Time: 14:00	Received by:	Date:	Time:	Received by:	Date: 15-2-18	Time: 17:00

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

JULY 2017 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

APPENDIX

E CLIMATE BASED WATER BUDGET

TABLE E-1
CLIMATIC WATER BUDGET: CLIMATE NORMAL 1981-2010 (UDORA CLIMATE STATION)
HYDROGEOLOGICAL ASSESSMENT AND WATER BALANCE STUDY - BLOCK 8
PART OF LOT 31, CONCESSION 7
UXBRIDGE, ONTARIO

	Thornthwaite (1948)							
Month	**Mean Temperature (°C)**	**Heat Index**	**Potential Evapo-transpiration (mm)**	**Daylight Correction Value**	**Adjusted Potential Evapo-transpiration (mm)**	**Total Precipitation (mm)**	**Surplus (mm)**	**Deficit (mm)**
January	-7.0	0.0	0.0	0.7839	0.00	64.9	64.9	0.0
February	-6.6	0.0	0.0	0.8786	0.00	45.9	45.9	0.0
March	-1.3	0.0	0.0	0.9871	0.00	53.1	53.1	0.0
April	5.7	1.2	26.6	1.1200	29.76	67.9	38.1	0.0
May	12.2	3.9	59.4	1.2194	72.46	82.1	9.6	0.0
June	18.0	7.0	89.7	1.2800	114.78	106.6	0.0	8.2
July	19.9	8.1	99.7	1.2484	124.48	86.4	0.0	38.1
August	19.3	7.7	96.5	1.1613	112.10	73.9	0.0	38.2
September	15.1	5.3	74.5	1.0400	77.44	87.3	9.9	0.0
October	8.6	2.3	41.1	0.9194	37.74	74.9	37.2	0.0
November	2.0	0.2	8.8	0.8100	7.11	83.2	76.1	0.0
December	-4.0	0.0	0.0	0.7355	0.00	60.0	60.0	0.0
TOTALS		**35.7**			**575.9**	**886.2**	**394.8**	**84.5**

TOTAL WATER SURPLUS **310.3** **mm**

NOTES:

1) Water budget adjusted for latitude and daylight.

2) (°C) - Represents calculated mean of daily temperatures for the month.

3) Precipitation and Temperature data from the Georgetown WWTP Climate Station located at latitude 43°38'24.018" N, longitude 79°52'45.018" W, elevation 221.0 m.

4) Total Water Surplus (Thornthwaite, 1948) is calculated as total precipitation minus adjusted potential evapotranspiration.

5) Total Moisture Surplus (Thornthwaite and Mather, 1957) is calculated as total precipitation minus actual evapotranspiration.

TABLE E-2
CLIMATIC WATER BUDGET: CLIMATE NORMAL 1981-2010 (UDORA CLIMATE STATION)
CLAY LOAM, URBAN LAWN (100 mm HOLDING CAPACITY)
HYDROGEOLOGICAL ASSESSMENT AND WATER BALANCE STUDY - BLOCK 8
PART OF LOT 31, CONCESSION 7
UXBRIDGE, ONTARIO

	Thornthwaite (1948)									Thornthwaite and Mather (1957)					
Month	Mean Temperature (°C)	Heat Index	Potential Evapo-transpiration (mm)	Daylight Correction Value	Adjusted Potential Evapo-transpiration (mm)	Total Precipitation (mm)	Surplus (mm)	Deficit (mm)	TP - PET (mm)	Accumulated Potential Water Loss (mm)	Soil Moisture (mm)	Change in Soil Moisture (mm) (delta S)	Actual Evapo-transpiration (mm)	Moisture Deficit (mm)	Unadjusted Moisture Surplus (mm)
January	-7.0	0.0	0.0	0.7839	0.00	64.9	64.9	0.0	64.9	0.0	100.0	0.0	0.0	0.0	64.9
February	-6.6	0.0	0.0	0.8786	0.00	45.9	45.9	0.0	45.9	0.0	100.0	0.0	0.0	0.0	45.9
March	-1.3	0.0	0.0	0.9871	0.00	53.1	53.1	0.0	53.1	0.0	100.0	0.0	0.0	0.0	53.1
April	5.7	1.2	26.6	1.1200	29.76	67.9	38.1	0.0	38.1	0.0	100.0	0.0	29.8	0.0	38.1
May	12.2	3.9	59.4	1.2194	72.46	82.1	9.6	0.0	9.6	0.0	100.0	0.0	72.5	0.0	9.6
June	18.0	7.0	89.7	1.2800	114.78	106.6	0.0	8.2	-8.2	-8.2	92.0	-8.0	114.6	0.2	0.0
July	19.9	8.1	99.7	1.2484	124.48	86.4	0.0	38.1	-38.1	-46.3	62.0	-30.0	116.4	8.1	0.0
August	19.3	7.7	96.5	1.1613	112.10	73.9	0.0	38.2	-38.2	-84.5	42.0	-20.0	93.9	18.2	0.0
September	15.1	5.3	74.5	1.0400	77.44	87.3	9.9	0.0	9.9	0.0	51.9	9.9	77.4	0.0	0.0
October	8.6	2.3	41.1	0.9194	37.74	74.9	37.2	0.0	37.2	0.0	89.0	37.2	37.7	0.0	0.0
November	2.0	0.2	8.8	0.8100	7.11	83.2	76.1	0.0	76.1	0.0	100.0	11.0	7.1	0.0	65.1
December	-4.0	0.0	0.0	0.7355	0.00	60.0	60.0	0.0	60.0	0.0	100.0	0.0	0.0	0.0	60.0
TOTALS		**35.7**			**575.9**	**886.2**	**394.8**	**84.5**	**310.3**	**-84.5**	**1036.9**	**0.0**	**549.4**	**26.5**	**336.8**

TOTAL WATER SURPLUS **310.3** **mm**

TOTAL MOISTURE SURPLUS **336.8** **mm**

NOTES:

1) Water budget adjusted for latitude and daylight.

2) (°C) - Represents calculated mean of daily temperatures for the month.

3) Precipitation and Temperature data from the Georgetown WWTP Climate Station located at latitude 43°38'24.018" N, longitude 79°52'45.018" W, elevation 221.0 m.

4) Total Water Surplus (Thornthwaite, 1948) is calculated as total precipitation minus adjusted potential evapotranspiration.

5) Total Moisture Surplus (Thornthwaite and Mather, 1957) is calculated as total precipitation minus actual evapotranspiration.

TABLE E-3
CLIMATIC WATER BUDGET: CLIMATE NORMAL 1981-2010 (UDORA CLIMATE STATION)
CLAY LOAM, UNCULTIVATED (250 mm HOLDING CAPACITY)
HYDROGEOLOGICAL ASSESSMENT AND WATER BALANCE STUDY - BLOCK 8
PART OF LOT 31, CONCESSION 7
UXBRIDGE, ONTARIO

	Thornthwaite (1948)									Thornthwaite and Mather (1957)					
Month	**Mean Temperature (°C)**	**Heat Index**	**Potential Evapo-transpiration (mm)**	**Daylight Correction Value**	**Adjusted Potential Evapo-transpiration (mm)**	**Total Precipitation (mm)**	**Surplus (mm)**	**Deficit (mm)**	**TP - PET (mm)**	**Accumulated Potential Water Loss (mm)**	**Soil Moisture (mm)**	**Change in Soil Moisture (mm) (delta S)**	**Actual Evapo-transpiration (mm)**	**Moisture Deficit (mm)**	**Unadjusted Moisture Surplus (mm)**
January	-7.0	0.0	0.0	0.7839	0.00	64.9	64.9	0.0	64.9	0.0	250.0	0.0	0.0	0.0	64.9
February	-6.6	0.0	0.0	0.8786	0.00	45.9	45.9	0.0	45.9	0.0	250.0	0.0	0.0	0.0	45.9
March	-1.3	0.0	0.0	0.9871	0.00	53.1	53.1	0.0	53.1	0.0	250.0	0.0	0.0	0.0	53.1
April	5.7	1.2	26.6	1.1200	29.76	67.9	38.1	0.0	38.1	0.0	250.0	0.0	29.8	0.0	38.1
May	12.2	3.9	59.4	1.2194	72.46	82.1	9.6	0.0	9.6	0.0	250.0	0.0	72.5	0.0	9.6
June	18.0	7.0	89.7	1.2800	114.78	106.6	0.0	8.2	-8.2	-8.2	242.0	-8.0	114.6	0.2	0.0
July	19.9	8.1	99.7	1.2484	124.48	86.4	0.0	38.1	-38.1	-46.3	208.0	-34.0	120.4	4.1	0.0
August	19.3	7.7	96.5	1.1613	112.10	73.9	0.0	38.2	-38.2	-84.5	177.0	-31.0	104.9	7.2	0.0
September	15.1	5.3	74.5	1.0400	77.44	87.3	9.9	0.0	9.9	0.0	186.9	9.9	77.4	0.0	0.0
October	8.6	2.3	41.1	0.9194	37.74	74.9	37.2	0.0	37.2	0.0	224.0	37.2	37.7	0.0	0.0
November	2.0	0.2	8.8	0.8100	7.11	83.2	76.1	0.0	76.1	0.0	250.0	26.0	7.1	0.0	50.1
December	-4.0	0.0	0.0	0.7355	0.00	60.0	60.0	0.0	60.0	0.0	250.0	0.0	0.0	0.0	60.0
TOTALS		**35.7**			**575.9**	**886.2**	**394.8**	**84.5**	**310.3**	**-84.5**	**2787.9**	**0.0**	**564.4**	**11.5**	**321.8**

TOTAL WATER SURPLUS **310.3** **mm**

TOTAL MOISTURE SURPLUS **321.8** **mm**

NOTES:

1) Water budget adjusted for latitude and daylight.

2) (°C) - Represents calculated mean of daily temperatures for the month.

3) Precipitation and Temperature data from the Georgetown WWTP Climate Station located at latitude 43°38'24.018" N, longitude 79°52'45.018" W, elevation 221.0 m.

4) Total Water Surplus (Thornthwaite, 1948) is calculated as total precipitation minus adjusted potential evapotranspiration.

5) Total Moisture Surplus (Thornthwaite and Mather, 1957) is calculated as total precipitation minus actual evapotranspiration.

APPENDIX

F

WATER BUDGET CALCULATIONS – PRE-DEVELOPMENT

TABLE F-1 PRE-DEVELOPMENT WATER BUDGET (BY CATCHMENT)
HYDROGEOLOGICAL ASSESSMENT AND WATER BALANCE STUDY - BLOCK 8
PART OF LOT 31, CONCESSION 7
UXBRIDGE, ONTARIO

Subcatchment Designation	Development Block	Outlet	Area	MOE TABLE 2 Components					MOE Infiltration Factor	Adjusted MOE Infiltration Factor	Precipitation	Precipitation Total	Precipitation Surplus	Evapotranspiration	Runon		Net Surplus		Infiltration		Runoff*		Total Infiltration + Runoff
			(m^2)	Cover		Soil		Topography			(mm/a)	(m^3/a)	(mm/a)	(m^3/a)	(mm/a)	(m^3/a)	(mm/a)	(m^3/a)	(mm/a)	(m^3/a)	(mm/a)	(m^3/a)	(m^3/a)
Cat A -203	8	South property boundary	649.5	Road	0	Clay Loam	0.2	0.25	0.45	0	886.2	575.6	797.6	57.6	0	0	797.6	518.0	0.0	0.0	797.6	518.0	518.0
Cat A -204	8	South property boundary	11.4	Road	0	Clay Loam	0.2	0.25	0.45	0	886.2	10.1	797.6	1.0	0	0	797.6	9.1	0.0	0.0	797.6	9.1	9.1
Cat A -205	8	South property boundary	153.6	Road	0	Clay Loam	0.2	0.25	0.45	0	886.2	136.1	797.6	13.6	0	0	797.6	122.5	0.0	0.0	797.6	122.5	122.5
Cat A -206	8	South property boundary	12.7	Road	0	Clay Loam	0.2	0.25	0.45	0	886.2	11.2	797.6	1.1	0	0	797.6	10.1	0.0	0.0	797.6	10.1	10.1
Cat A -207	8	South property boundary	134.7	Road	0	Clay Loam	0.2	0.25	0.45	0	886.2	119.4	797.6	11.9	0	0	797.6	107.4	0.0	0.0	797.6	107.4	107.4
Cat A -208	8	South property boundary	32.5	Road	0	Clay Loam	0.2	0.25	0.45	0	886.2	28.8	797.6	2.9	0	0	797.6	25.9	0.0	0.0	797.6	25.9	25.9
Cat A -209	8	South property boundary	39.9	Road	0	Clay Loam	0.2	0.25	0.45	0	886.2	35.3	797.6	3.5	0	0	797.6	31.8	0.0	0.0	797.6	31.8	31.8
Cat A -210	8	South property boundary	32.7	Road	0	Clay Loam	0.2	0.25	0.45	0	886.2	29.0	797.6	2.9	0	0	797.6	26.1	0.0	0.0	797.6	26.1	26.1
Cat A -211	8	South property boundary	37.2	Road	0	Clay Loam	0.2	0.25	0.45	0	886.2	32.9	797.6	3.3	0	0	797.6	29.6	0.0	0.0	797.6	29.6	29.6
Cat A -212	8	South property boundary	38.4	Road	0	Clay Loam	0.2	0.25	0.45	0	886.2	34.0	797.6	3.4	0	0	797.6	30.6	0.0	0.0	797.6	30.6	30.6
Cat A -213	8	South property boundary	23.9	Road	0	Clay Loam	0.2	0.25	0.45	0	886.2	21.1	797.6	2.1	0	0	797.6	19.0	0.0	0.0	797.6	19.0	19.0
Cat A -214	8	South property boundary	88.5	Road	0	Clay Loam	0.2	0.25	0.45	0	886.2	78.4	797.6	7.8	0	0	797.6	70.6	0.0	0.0	797.6	70.6	70.6
Cat A -215	8	South property boundary	7.3	Road	0	Clay Loam	0.2	0.25	0.45	0	886.2	6.5	797.6	0.7	0	0	797.6	5.9	0.0	0.0	797.6	5.9	5.9
Cat A -216	8	South property boundary	26.0	Road	0	Clay Loam	0.2	0.25	0.45	0	886.2	23.0	797.6	2.3	0	0	797.6	20.7	0.0	0.0	797.6	20.7	20.7
Cat A -217	8	South property boundary	639.4	Road	0	Clay Loam	0.2	0.25	0.45	0	886.2	566.6	797.6	56.7	0	0	797.6	510.0	0.0	0.0	797.6	510.0	510.0
Cat A -218	8	South property boundary	246.6	Road	0	Clay Loam	0.2	0.25	0.45	0	886.2	218.5	797.6	21.9	0	0	797.6	196.7	0.0	0.0	797.6	196.7	196.7
Cat A -219	8	South property boundary	28.0	Road	0	Clay Loam	0.2	0.25	0.45	0	886.2	24.8	797.6	2.5	0	0	797.6	22.4	0.0	0.0	797.6	22.4	22.4
Cat A -220	8	South property boundary	28.1	Road	0	Clay Loam	0.2	0.25	0.45	0	886.2	24.9	797.6	2.5	0	0	797.6	22.4	0.0	0.0	797.6	22.4	22.4
Cat A -231	8	South property boundary	494.7	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	438.4	321.8	279.2	0	0	321.8	159.2	193.1	95.5	128.7	63.7	159.2
Cat A -232	8	South property boundary	1.6	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	1.4	321.8	0.9	0	0	321.8	0.5	193.1	0.3	128.7	0.2	0.5
Cat A -233	8	South property boundary	0.9	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	0.8	321.8	0.5	0	0	321.8	0.3	193.1	0.2	128.7	0.1	0.3
Cat A -235	8	South property boundary	605.7	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	536.8	321.8	341.9	0	0	321.8	194.9	193.1	117.0	128.7	78.0	194.9
Cat A -236	8	South property boundary	29.2	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	25.8	321.8	16.5	0	0	321.8	9.4	193.1	5.6	128.7	3.8	9.4
Cat A -237	8	South property boundary	21.3	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	18.9	321.8	12.0	0	0	321.8	6.8	193.1	4.1	128.7	2.7	6.8
Cat A -238	8	South property boundary	34.2	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	30.3	321.8	19.3	0	0	321.8	11.0	193.1	6.6	128.7	4.4	11.0
Cat A -239	8	South property boundary	34.5	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	30.5	321.8	19.5	0	0	321.8	11.1	193.1	6.7	128.7	4.4	11.1
Cat A -240	8	South property boundary	33.5	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	29.7	321.8	18.9	0	0	321.8	10.8	193.1	6.5	128.7	4.3	10.8
Cat A -241	8	South property boundary	35.7	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	31.6	321.8	20.1	0	0	321.8	11.5	193.1	6.9	128.7	4.6	11.5
Cat A -242	8	South property boundary	1.2	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	1.0	321.8	0.7	0	0	321.8	0.4	193.1	0.2	128.7	0.2	0.4
Cat A -243	8	South property boundary	1.2	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	1.0	321.8	0.7	0	0	321.8	0.4	193.1	0.2	128.7	0.1	0.4
Cat A -244	8	South property boundary	2713.4	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	2404.6	321.8	1531.5	0	0	321.8	873.2	193.1	523.9	128.7	349.3	873.2
Cat A -245	8	South property boundary	85.8	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	76.0	321.8	48.4	0	0	321.8	27.6	193.1	16.6	128.7	11.0	27.6
Cat A -246	8	South property boundary	52.3	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	46.4	321.8	29.5	0	0	321.8	16.8	193.1	10.1	128.7	6.7	16.8
Cat A -247	8	South property boundary	60.5	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	53.6	321.8	34.1	0	0	321.8	19.5	193.1	11.7	128.7	7.8	19.5
Cat A -248	8	South property boundary	20.2	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	17.9	321.8	11.4	0	0	321.8	6.5	193.1	3.9	128.7	2.6	6.5
Cat A -249	8	South property boundary	2.8	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	2.5	321.8	1.6	0	0	321.8	0.9	193.1	0.5	128.7	0.4	0.9
Cat A -250	8	South property boundary	14.7	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	13.0	321.8	8.3	0	0	321.8	4.7	193.1	2.8	128.7	1.9	4.7
Cat A -251	8	South property boundary	3.9	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	3.4	321.8	2.2	0	0	321.8	1.3	193.1	0.8	128.7	0.5	1.3
Cat A -252	8	South property boundary	14.6	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	12.9	321.8	8.2	0	0	321.8	4.7	193.1	2.8	128.7	1.9	4.7
Cat A -253	8	South property boundary	3.8	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	3.3	321.8	2.1	0	0	321.8	1.2	193.1	0.7	128.7	0.5	1.2
Cat A -254	8	South property boundary	138.4	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	122.6	321.8	78.1	0	0	321.8	44.5	193.1	26.7	128.7	17.8	44.5
Cat A -352	8	South property boundary	139.4	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	123.6	321.8	78.7	0	0	321.8	44.9	193.1	26.9	128.7	17.9	44.9
Cat A -353	8	South property boundary	1682.0	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	1490.6	321.8	949.3	0	0	321.8	541.3	193.1	324.8	128.7	216.5	541.3
Cat A -354	8	South property boundary	50.6	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	44.9	321.8	28.6	0	0	321.8	16.3	193.1	9.8	128.7	6.5	16.3
Cat A -355	8	South property boundary	43.0	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	38.1	321.8	24.3	0	0	321.8	13.8	193.1	8.3	128.7	5.5	13.8
Cat A -356	8	South property boundary	56.9	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	50.5	321.8	32.1	0	0	321.8	18.3	193.1	11.0	128.7	7.3	18.3
Cat A -357	8	South property boundary	109.3	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	96.9	321.8	61.7	0	0	321.8	35.2	193.1	21.1	128.7	14.1	35.2
Cat A -362	8	South property boundary	39.3	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	34.8	321.8	22.2	0	0	321.8	12.6	193.1	7.6	128.7	5.1	12.6
Cat A -363	8	South property boundary	29.6	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	26.2	321.8	16.7	0	0	321.8	9.5	193.1	5.7	128.7	3.8	9.5
Cat A -364	8	South property boundary	133.3	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	118.2	321.8	75.2	0	0	321.8	42.9	193.1	25.7	128.7	17.2	42.9
Cat A -365	8	South property boundary	126.0	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	111.7	321.8	71.1	0	0	321.8	40.5	193.1	24.3	128.7	16.2	40.5
Cat A -366	8	South property boundary	130.1	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	115.3	321.8	73.4	0	0	321.8	41.9	193.1	25.1	128.7	16.7	41.9
Cat A -367	8	South property boundary	125.7	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	111.4	321.8	70.9	0	0	321.8	40.4	193.1	24.3	128.7	16.2	40.4
Cat A -368	8	South property boundary	124.4	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	110.3	321.8	70.2	0	0	321.8	40.0	193.1	24.0	128.7	16.0	40.0
Cat A -369	8	South property boundary	68.9	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	61.1	321.8	38.9	0	0	321.8	22.2	193.1	13.3	128.7	8.9	22.2
Cat A -370	8	South property boundary	45.3	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	40.2	321.8	25.6	0	0	321.8	14.6	193.1	8.8	128.7	5.8	14.6
Cat A -371	8	South property boundary	68.9	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	61.0	321.8	38.9	0	0	321.8	22.2	193.1	13.3	128.7	8.9	22.2
Cat A -372	8	South property boundary	70.6	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	62.5	321.8	39.8	0	0	321.8	22.7	193.1	13.6	128.7	9.1	22.7
Cat A -373	8	South property boundary	66.9	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	59.3	321.8	37.8	0	0	321.8	21.5	193.1	12.9	128.7	8.6	21.5
Cat A -374	8	South property boundary	69.2	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	61.3	321.8	39.1	0	0	321.8	22.3	193.1	13.4	128.7	8.9	22.3
Cat A -375	8	South property boundary	215.1	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	190.6	321.8	121.4	0	0	321.8	69.2	193.1	41.5	128.7	27.7	69.2
Cat A -376	8	South property boundary	222.3	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	197.0	321.8	125.5	0	0	321.8	71.6	193.1	42.9	128.7	28.6	71.6
Cat A -377	8	South property boundary	1.8	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	1.6	321.8	1.0	0	0	321.8	0.6	193.1	0.4	128.7	0.2	0.6
Cat A -378	8	South property boundary	14.4	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	12.7	321.8	8.1	0	0	321.8	4.6	193.1	2.8	128.7	1.8	4.6
Cat A -379	8	South property boundary	9.5	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	8.4	321.8	5.4	0	0	321.8	3.1	193.1	1.8	128.7	1.2	3.1
Cat A -380	8	South property boundary	5.6	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	5.0	321.8	3.2	0	0	321.8	1.8	193.1	1.1	128.7	0.7	1.8
Cat A -381	8	South property boundary	31.1	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	27.6	321.8	17.6	0	0	321.8	10.0	193.1	6.0	128.7	4.0	10.0
Cat A -382	8	South property boundary	2.5	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	2.2	321.8	1.4	0	0	321.8	0.8	193.1	0.5	128.7	0.3	0.8
Cat A -383	8	South property boundary	8.4	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	7.4	321.8	4.7	0	0	321.8	2.7	193.1	1.6	128.7	1.1	2.7
Cat A -384	8	South property boundary	8.8	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	7.8	321.8	5.0	0	0	321.8	2.8	193.1	1.7	128.7	1.1	2.8
Cat A -385	8	South property boundary	31.6	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	28.0	321.8	17.9	0	0	321.8	10.2	193.1	6.1	128.7	4.1	10.2
Cat A -386	8	South property boundary	301.1	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	266.9	321.8	170.0	0	0	321.8	96.9	193.1	58.1	128.7	38.8	96.9
Cat A -387	8	South property boundary	2.2	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	1.9	321.8	1.2	0	0	321.8	0.7	193.1	0.4	128.7	0.3	0.7
Cat A -388	8	South property boundary	365.8	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	324.2	321.8	206.5	0	0	321.8	117.7	193.1	70.6	128.7	47.1	117.7
Cat A -389	8	South property boundary	8.2	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	7.3	321.8	4.6	0	0	321.8	2.6	193.1	1.6	128.7	1.1	2.6
Cat A -390	8	South property boundary	36.7	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	32.5	321.8	20.7	0	0	321.8	11.8	193.1	7.1	128.7	4.7	11.8
Cat A -391	8	South property boundary	132.1	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	117.0	321.8	74.5	0	0	321.8	42.5	193.1	25.5	128.7	17.0	42.5
Cat A -430	8	South property boundary	1163.3	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	1030.9	321.8	656.5	0	0	321.8	374.3	193.1	224.6	128.7	149.7	374.3
Cat A -431	8	South property boundary	221.8	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	196.6	321.8	125.2	0	0	321.8	71.4	193.1	42.8	128.7	28.6	71.4
Cat A -432	8	South property boundary	90.0	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	79.7	321.8	50.8	0	0	321.8	29.0	193.1	17.4	128.7	11.6	29.0
Cat A -433	8	South property boundary	185.3	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	164.2	321.8	104.6	0	0	321.8	59.6	193.1	35.8	128.7	23.9	59.6
Cat A -434	8	South property boundary	12.1	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	10.7	321.8	6.8	0	0	321.8	3.9	193.1	2.3	128.7	1.6	3.9
Cat A -435	8	South property boundary	86.8	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	77.0	321.8	49.0	0	0	321.8	27.9	193.1	16.8	128.7	11.2	27.9
Cat A -436	7	South property boundary	105.6	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	93.6	321.8	59.6	0	0	321.8	34.0	193.1	20.4	128.7	13.6	34.0
Cat A -442	8	South property boundary	146.1	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	129.5	321.8	82.5	0	0	321.8	47.0	193.1	28.2	128.7	18.8	47.0
Cat A -446	8	South property boundary	4.3	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	3.8	321.8	2.4	0	0	321.8	1.4	193.1	0.8	128.7	0.6	1.4
Cat A -447	8	South property boundary	131.6	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	116.6	321.8	74.3	0	0	321.8	42.4	193.1	25.4	128.7	16.9	42.4
Cat A -448	8	South property boundary	4.0	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	3.6	321.8	2.3	0	0	321.8	1.3	193.1	0.8	128.7	0.5	1.3
Cat A -449	8	South property boundary	428.5	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	379.7	321.8	241.8	0	0	321.8	137.9	193.1	82.7	128.7	55.2	137.9
Cat A -450	8	South property boundary	23.5	Uncultivated	0.15	Clay Loam	0.2	0.25	0.6	0.6	886.2	20.8	321.8	13.2	0	0	321.8	7.6	193.1	4.5	128.7	3.0	7.6
Pre-Development Catchment A Total (Block 8)		**South property boundary**	**13,708**								**886.2**	**12,148**	**399.2**	**6,676**	**0**	**0**	**399.2**	**5,472**	**162**	**2,216**	**238**	**3,256**	**5,472**
Total Development Block 8			**13,708**								**886.2**	**12,148**	**399.2**	**6,676**	**0**	**0**	**399.2**	**5,472**	**162**	**2,216**	**238**	**3,256**	**5,472**

APPENDIX

G WATER BUDGET CALCULATIONS – POST DEVELOPMENT

TABLE G-1 POST-DEVELOPMENT WATER BUDGET (BY CATCHMENT)
HYDROGEOLOGICAL ASSESSMENT AND WATER BALANCE STUDY - BLOCK 8
PART OF LOT 31, CONCESSION 7
UXBRIDGE, ONTARIO

ANNUAL PRECIPITATION	EVAPORATION AND EVAPOTRANSPIRATION FACTORS			
	Impervious Areas		Waterbody	
mm	%	mm	%	mm
886	10%	89	73%	646

On-Site Subcatchment Designation	Outlet	Development Block	Total Area (m²)	Impervious: Total Impervious % of Total Area	Total Impervious (m²)	Assumed Buildings % of Impervious Area	Assumed Buildings (m²)	Assumed Road/ Parking/ Amenities % of Impervious Area	Assumed Road/ Parking/ Amenities (m²)	Other Impervious (m²)	Pervious: Total Pervious % of Total Area	Total Pervious (m²)	MOE TABLE 2 Components: Cover		Soil		Topography	MOE Infiltration Factor	Adjusted MOE Infiltration Factor
Cat PA - 203	Barton SWM Pond via On-Site	8	649.5	0%	0.0	0%	0.0	0%	0.0	0.0	100%	649	Lawn	0.05	Clay Loam	0.2	0.25	0.5	0.5
Cat PA - 207	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	134.7	100%	134.7	100%	134.7	0%	0.0	0.0	0%	0	Building	0	Clay Loam	0.2	0.25	0.45	0
Cat PA - 208	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	32.5	100%	32.5	100%	32.5	0%	0.0	0.0	0%	0	Building	0	Clay Loam	0.2	0.25	0.45	0
Cat PA - 209	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	39.9	100%	39.9	100%	39.9	0%	0.0	0.0	0%	0	Building	0	Clay Loam	0.2	0.25	0.45	0
Cat PA - 210	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	32.7	100%	32.7	100%	32.7	0%	0.0	0.0	0%	0	Building	0	Clay Loam	0.2	0.25	0.45	0
Cat PA - 211	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	37.2	100%	37.2	100%	37.2	0%	0.0	0.0	0%	0	Building	0	Clay Loam	0.2	0.25	0.45	0
Cat PA - 212	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	38.4	100%	38.4	100%	38.4	0%	0.0	0.0	0%	0	Building	0	Clay Loam	0.2	0.25	0.45	0
Cat PA - 213	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	23.9	100%	23.9	0%	0.0	100%	23.9	0.0	0%	0	Driveway	0	Clay Loam	0.2	0.25	0.45	0
Cat PA - 231	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	494.7	0%	0.0	0%	0.0	0%	0.0	0.0	100%	495	Lawn	0.05	Clay Loam	0.2	0.25	0.5	0.5
Cat PA - 232	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	1.6	100%	1.6	100%	1.6	0%	0.0	0.0	0%	0	Building	0	Clay Loam	0.2	0.25	0.45	0
Cat PA - 235	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	605.7	0%	0.0	0%	0.0	0%	0.0	0.0	100%	606	Lawn	0.05	Clay Loam	0.2	0.25	0.5	0.5
Cat PA - 363	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	29.6	100%	29.6	100%	29.6	0%	0.0	0.0	0%	0	Building	0	Clay Loam	0.2	0.25	0.45	0
Cat PA - 364	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	133.3	100%	133.3	100%	133.3	0%	0.0	0.0	0%	0	Building	0	Clay Loam	0.2	0.25	0.45	0
Cat PA - 365	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	126.0	100%	126.0	100%	126.0	0%	0.0	0.0	0%	0	Building	0	Clay Loam	0.2	0.25	0.45	0
Cat PA - 366	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	130.1	100%	130.1	100%	130.1	0%	0.0	0.0	0%	0	Building	0	Clay Loam	0.2	0.25	0.45	0
Cat PA - 367	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	125.7	100%	125.7	100%	125.7	0%	0.0	0.0	0%	0	Building	0	Clay Loam	0.2	0.25	0.45	0
Cat PA - 368	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	124.4	100%	124.4	100%	124.4	0%	0.0	0.0	0%	0	Building	0	Clay Loam	0.2	0.25	0.45	0
Cat PA - 369	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	68.9	100%	68.9	0%	0.0	100%	68.9	0.0	0%	0	Driveway	0	Clay Loam	0.2	0.25	0.45	0
Cat PA - 370	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	45.3	100%	45.3	0%	0.0	100%	45.3	0.0	0%	0	Driveway	0	Clay Loam	0.2	0.25	0.45	0
Cat PA - 371	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	68.9	100%	68.9	0%	0.0	100%	68.9	0.0	0%	0	Driveway	0	Clay Loam	0.2	0.25	0.45	0
Cat PA - 372	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	70.6	100%	70.6	0%	0.0	100%	70.6	0.0	0%	0	Driveway	0	Clay Loam	0.2	0.25	0.45	0
Cat PA - 373	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	66.9	100%	66.9	0%	0.0	100%	66.9	0.0	0%	0	Driveway	0	Clay Loam	0.2	0.25	0.45	0
Cat PA - 374	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	69.2	100%	69.2	0%	0.0	100%	69.2	0.0	0%	0	Driveway	0	Clay Loam	0.2	0.25	0.45	0
Post-Development Catchment PA Total	**Barton SWM Pond via On-Site Storm Sewers via RLCB**		**3,150**	**44%**	**1,400**	**31%**	**986**	**13%**	**414**	**0**	**56%**	**1,750**							
Cat PB - 204	Barton SWM Pond via On-Site	8	11.4	100%	11.4	0%	0.0	100%	11.4	0.0	0%	0	Driveway	0	Clay Loam	0.2	0.25	0.45	0
Cat PB - 205	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	153.6	100%	153.6	0%	0.0	100%	153.6	0.0	0%	0	Road	0	Clay Loam	0.2	0.25	0.45	0
Cat PB - 206	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	12.7	100%	12.7	0%	0.0	100%	12.7	0.0	0%	0	Sidewalk	0	Clay Loam	0.2	0.25	0.45	0
Cat PB - 214	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	88.5	0%	0.0	0%	0.0	0%	0.0	0.0	100%	89	Lawn	0.05	Clay Loam	0.2	0.25	0.5	0.5
Cat PB - 215	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	7.3	0%	0.0	0%	0.0	0%	0.0	0.0	100%	7	Lawn	0.05	Clay Loam	0.2	0.25	0.5	0.5
Cat PB - 216	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	26.0	0%	0.0	0%	0.0	0%	0.0	0.0	100%	26	Lawn	0.05	Clay Loam	0.2	0.25	0.5	0.5
Cat PB - 219	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	28.0	0%	0.0	0%	0.0	0%	0.0	0.0	100%	28	Lawn	0.05	Clay Loam	0.2	0.25	0.5	0.5
Cat PB - 220	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	28.1	100%	28.1	0%	0.0	100%	28.1	0.0	0%	0	Road	0	Clay Loam	0.2	0.25	0.45	0
Cat PB - 233	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	0.9	0%	0.0	0%	0.0	0%	0.0	0.0	100%	1	Lawn	0.05	Clay Loam	0.2	0.25	0.5	0.5
Cat PB - 236	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	29.2	100%	29.2	0%	0.0	100%	29.2	0.0	0%	0	Driveway	0	Clay Loam	0.2	0.25	0.45	0
Cat PB - 237	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	21.3	100%	21.3	0%	0.0	100%	21.3	0.0	0%	0	Driveway	0	Clay Loam	0.2	0.25	0.45	0
Cat PB - 238	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	34.2	100%	34.2	0%	0.0	100%	34.2	0.0	0%	0	Driveway	0	Clay Loam	0.2	0.25	0.45	0
Cat PB - 239	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	34.5	100%	34.5	0%	0.0	100%	34.5	0.0	0%	0	Driveway	0	Clay Loam	0.2	0.25	0.45	0
Cat PB - 240	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	33.5	100%	33.5	0%	0.0	100%	33.5	0.0	0%	0	Driveway	0	Clay Loam	0.2	0.25	0.45	0
Cat PB - 241	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	35.7	100%	35.7	0%	0.0	100%	35.7	0.0	0%	0	Driveway	0	Clay Loam	0.2	0.25	0.45	0
Cat PB - 242	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	1.2	80%	0.9	0%	0.0	100%	0.9	0.0	20%	0	Concrete	0	Clay Loam	0.2	0.25	0.45	0
Cat PB - 243	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	1.2	80%	0.9	0%	0.0	100%	0.9	0.0	20%	0	Concrete	0	Clay Loam	0.2	0.25	0.45	0
Cat PB - 244	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	2713.4	100%	2713.4	0%	0.0	100%	2713.4	0.0	0%	0	Road	0	Clay Loam	0.2	0.25	0.45	0
Cat PB - 245	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	85.8	100%	85.8	0%	0.0	100%	85.8	0.0	0%	0	Sidewalk	0	Clay Loam	0.2	0.25	0.45	0
Cat PB - 246	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	52.3	100%	52.3	0%	0.0	100%	52.3	0.0	0%	0	Sidewalk	0	Clay Loam	0.2	0.25	0.45	0
Cat PB - 247	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	60.5	100%	60.5	0%	0.0	100%	60.5	0.0	0%	0	Sidewalk	0	Clay Loam	0.2	0.25	0.45	0
Cat PB - 248	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	20.2	100%	20.2	0%	0.0	100%	20.2	0.0	0%	0	Sidewalk	0	Clay Loam	0.2	0.25	0.45	0
Cat PB - 249	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	2.8	100%	2.8	0%	0.0	100%	2.8	0.0	0%	0	Sidewalk	0	Clay Loam	0.2	0.25	0.45	0
Cat PB - 250	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	14.7	100%	14.7	0%	0.0	100%	14.7	0.0	0%	0	Sidewalk	0	Clay Loam	0.2	0.25	0.45	0
Cat PB - 251	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	3.9	100%	3.9	0%	0.0	100%	3.9	0.0	0%	0	Sidewalk	0	Clay Loam	0.2	0.25	0.45	0
Cat PB - 252	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	14.6	100%	14.6	0%	0.0	100%	14.6	0.0	0%	0	Sidewalk	0	Clay Loam	0.2	0.25	0.45	0
Cat PB - 253	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	3.8	100%	3.8	0%	0.0	100%	3.8	0.0	0%	0	Sidewalk	0	Clay Loam	0.2	0.25	0.45	0
Cat PB - 254	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	138.4	100%	138.4	0%	0.0	100%	138.4	0.0	0%	0	Sidewalk	0	Clay Loam	0.2	0.25	0.45	0
Cat PB - 375	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	215.1	0%	0.0	0%	0.0	0%	0.0	0.0	100%	215	Lawn	0.05	Clay Loam	0.2	0.25	0.5	0.5
Cat PB - 376	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	222.3	0%	0.0	0%	0.0	0%	0.0	0.0	100%	222	Lawn	0.05	Clay Loam	0.2	0.25	0.5	0.5
Cat PB - 377	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	1.8	0%	0.0	0%	0.0	0%	0.0	0.0	100%	2	Lawn	0.05	Clay Loam	0.2	0.25	0.5	0.5
Cat PB - 378	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	14.4	0%	0.0	0%	0.0	0%	0.0	0.0	100%	14	Lawn	0.05	Clay Loam	0.2	0.25	0.5	0.5
Cat PB - 379	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	9.5	0%	0.0	0%	0.0	0%	0.0	0.0	100%	9	Lawn	0.05	Clay Loam	0.2	0.25	0.5	0.5
Cat PB - 380	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	5.6	0%	0.0	0%	0.0	0%	0.0	0.0	100%	6	Lawn	0.05	Clay Loam	0.2	0.25	0.5	0.5
Cat PB - 381	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	31.1	0%	0.0	0%	0.0	0%	0.0	0.0	100%	31	Lawn	0.05	Clay Loam	0.2	0.25	0.5	0.5
Cat PB - 382	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	2.5	0%	0.0	0%	0.0	0%	0.0	0.0	100%	3	Lawn	0.05	Clay Loam	0.2	0.25	0.5	0.5
Cat PB - 383	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	8.4	0%	0.0	0%	0.0	0%	0.0	0.0	100%	8	Lawn	0.05	Clay Loam	0.2	0.25	0.5	0.5
Cat PB - 384	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	8.8	0%	0.0	0%	0.0	0%	0.0	0.0	100%	9	Lawn	0.05	Clay Loam	0.2	0.25	0.5	0.5
Cat PB - 385	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	31.6	0%	0.0	0%	0.0	0%	0.0	0.0	100%	32	Lawn	0.05	Clay Loam	0.2	0.25	0.5	0.5
Cat PB - 386	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	301.1	0%	0.0	0%	0.0	0%	0.0	0.0	100%	301	Lawn	0.05	Clay Loam	0.2	0.25	0.5	0.5
Cat PB - 387	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	2.2	0%	0.0	0%	0.0	0%	0.0	0.0	100%	2	Lawn	0.05	Clay Loam	0.2	0.25	0.5	0.5
Cat PB - 388	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	365.8	0%	0.0	0%	0.0	0%	0.0	0.0	100%	366	Lawn	0.05	Clay Loam	0.2	0.25	0.5	0.5
Cat PB - 389	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	8.2	0%	0.0	0%	0.0	0%	0.0	0.0	100%	8	Lawn	0.05	Clay Loam	0.2	0.25	0.5	0.5
Cat PB - 390	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	36.7	0%	0.0	0%	0.0	0%	0.0	0.0	100%	37	Lawn	0.05	Clay Loam	0.2	0.25	0.5	0.5
Cat PB - 391	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	132.1	0%	0.0	0%	0.0	0%	0.0	0.0	100%	132	Lawn	0.05	Clay Loam	0.2	0.25	0.5	0.5
Cat PB - 442	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	146.1	0%	0.0	0%	0.0	0%	0.0	0.0	100%	146	Lawn	0.05	Clay Loam	0.2	0.25	0.5	0.5
Cat PB - 446	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	4.3	0%	0.0	0%	0.0	0%	0.0	0.0	100%	4	Lawn	0.05	Clay Loam	0.2	0.25	0.5	0.5
Cat PB - 447	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	131.6	0%	0.0	0%	0.0	0%	0.0	0.0	100%	132	Lawn	0.05	Clay Loam	0.2	0.25	0.5	0.5
Cat PB - 450	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	23.5	100%	23.5	0%	0.0	100%	23.5	0.0	0%	0	Road	0	Clay Loam	0.2	0.25	0.45	0
Post-Development Catchment PBTotal	**Off-site north via overland flow** Storm Sewers via RLCB		**5,360**	**66%**	**3,530**	**0%**	**0**	**66%**	**3,530**	**0**	**34%**	**1,831**							
Cat PC - 217	Barton SWM Pond via On-Site	8	639.4	100%	639.4	0%	0.0	100%	639.4	0.0	0%	0	Road	0	Clay Loam	0.2	0.25	0.45	0
Cat PC - 218	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	246.6	0%	0.0	0%	0.0	0%	0.0	0.0	100%	247	Lawn	0.05	Clay Loam	0.2	0.25	0.5	0.5
Cat PC - 352	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	139.4	100%	139.4	100%	139.4	0%	0.0	0.0	0%	0	Building	0	Clay Loam	0.2	0.25	0.45	0
Cat PC - 353	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	1682.0	100%	1682.0	100%	1682.0	0%	0.0	0.0	0%	0	Building	0	Clay Loam	0.2	0.25	0.45	0
Cat PC - 354	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	50.6	80%	40.5	0%	0.0	100%	40.5	0.0	20%	10	Concrete	0	Clay Loam	0.2	0.25	0.45	0
Cat PC - 355	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	43.0	80%	34.4	0%	0.0	100%	34.4	0.0	20%	9	Concrete	0	Clay Loam	0.2	0.25	0.45	0
Cat PC - 356	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	56.9	80%	45.5	0%	0.0	100%	45.5	0.0	20%	11	Concrete	0	Clay Loam	0.2	0.25	0.45	0
Cat PC - 357	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	109.3	80%	87.5	0%	0.0	100%	87.5	0.0	20%	22	Concrete	0	Clay Loam	0.2	0.25	0.45	0
Cat PC - 430	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	1163.3	100%	1163.3	0%	0.0	100%	1163.3	0.0	0%	0	Road	0	Clay Loam	0.2	0.25	0.45	0
Cat PC - 431	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	221.8	0%	0.0	0%	0.0	0%	0.0	0.0	100%	222	Lawn	0.05	Clay Loam	0.2	0.25	0.5	0.5
Cat PC - 432	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	90.0	0%	0.0	0%	0.0	0%	0.0	0.0	100%	90	Lawn	0.05	Clay Loam	0.2	0.25	0.5	0.5
Cat PC - 433	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	185.3	0%	0.0	0%	0.0	0%	0.0	0.0	100%	185	Lawn	0.05	Clay Loam	0.2	0.25	0.5	0.5
Cat PC - 448	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	4.0	0%	0.0	0%	0.0	0%	0.0	0.0	100%	4	Lawn	0.05	Clay Loam	0.2	0.25	0.5	0.5
Cat PC - 449	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	428.5	0%	0.0	0%	0.0	0%	0.0	0.0	100%	428	Lawn	0.05	Clay Loam	0.2	0.25	0.5	0.5
Post-Development Catchment PCTotal	**On-Site Storm Sewers via Overland Flow** Storm Sewers via RLCB Barton SWM Pond via On-Site		**5,060**	**76%**	**3,832**	**36%**	**1,821**	**40%**	**2,011**	**0**	**24%**	**1,228**							
Cat PD - 362	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	39.3	100%	39.3	0%	0.0	100%	39.3	0.0	0%	0	Sidewalk	0	Clay Loam	0.2	0.25	0.45	0
Cat PD - 434	Barton SWM Pond via On-Site Storm Sewers via RLCB	8	12.1	0%	0.0	0%	0.0	0%	0.0	0.0	100%	12	Lawn	0.05	Clay Loam	0.2	0.25	0.5	0.5
Cat PD - 435	Storm Sewers via RLCB	8	86.8	0%	0.0	0%	0.0	0%	0.0	0.0	100%	87	Lawn	0.05	Clay Loam	0.2	0.25	0.5	0.5
Post-Development Catchment PD Total	**Off-site south via overland flow**		**138**	**28%**	**39**	**0%**	**0**	**28%**	**39**	**0**	**72%**	**99**							
Total Development Block 8			**13,708**	**64%**	**8,801**	**20%**	**2,808**	**44%**	**5,993**	**0**	**36%**	**4,908**							

On-Site Subcatchment Designation	Inputs – Precipitation: Annual Average (mm/yr)	Annual Average (m³/yr)	Surplus (Pervious) (mm/yr)	Surplus (Pervious) (m³/yr)	Surplus (Impervious) (m³/yr)	Total Inputs (m³/yr)	Outputs – Evapotranspiration: Pervious (m³/yr)	Impervious (m³/yr)	Total Evapotranspiration (m³/yr)	Infiltration: Pervious Areas (m³/yr)	Infiltration Trenches (mm/yr)	Infiltration Trenches (m³/yr)	Total Infiltration (mm/yr)	Total Infiltration (m³/yr)	Runoff: Pervious (m³/yr)	Landscaped Area Redirecte (m3/yr)	Building (m³/yr)	Road/ Driveway/ Amenities (m³/yr)	Other Impervious (m³/yr)	Rooftop Redirection to Infiltration (m3/yr)	Total Impervious (mm/yr)	Total Impervious (m³/yr)	Net Runoff (mm/yr)	Net Runoff (m³/yr)	Total Outputs (mm/yr)	Total Outputs (m³/yr)
Cat PA - 203	886	576	337	219	0	576	357	0	357	109	0	0	168	109	109	0	0	0	0	0	0	0	168	109	886	576
Cat PA - 207	886	119	0	0	107	119	0	12	12	0	0	0	0	0	0	0	107	0	0	0	798	107	798	107	886	119
Cat PA - 208	886	29	0	0	26	29	0	3	3	0	0	0	0	0	0	0	26	0	0	0	798	26	798	26	886	29
Cat PA - 209	886	35	0	0	32	35	0	4	4	0	0	0	0	0	0	0	32	0	0	0	798	32	798	32	886	35
Cat PA - 210	886	29	0	0	26	29	0	3	3	0	0	0	0	0	0	0	26	0	0	0	798	26	798	26	886	29
Cat PA - 211	886	33	0	0	30	33	0	3	3	0	0	0	0	0	0	0	30	0	0	0	798	30	798	30	886	33
Cat PA - 212	886	34	0	0	31	34	0	3	3	0	0	0	0	0	0	0	31	0	0	0	798	31	798	31	886	34
Cat PA - 213	886	21	0	0	19	21	0	2	2	0	0	0	0	0	0	0	0	19	0	0	798	19	798	19	886	21
Cat PA - 231	886	438	337	167	0	438	272	0	272	83	0	0	168	83	83	0	0	0	0	0	0	0	168	83	886	438
Cat PA - 232	886	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0	0	798	1	798	1	886	1
Cat PA - 235	886	537	337	204	0	537	333	0	333	102	0	0	168	102	102	0	0	0	0	0	0	0	168	102	886	537
Cat PA - 363	886	26	0	0	24	26	0	3	3	0	0	0	0	0	0	0	24	0	0	0	798	24	798	24	886	26
Cat PA - 364	886	118	0	0	106	118	0	12	12	0	0	0	0	0	0	0	106	0	0	0	798	106	798	106	886	118
Cat PA - 365	886	112	0	0	100	112	0	11	11	0	0	0	0	0	0	0	100	0	0	0	798	100	798	100	886	112
Cat PA - 366	886	115	0	0	104	115	0	12	12	0	0	0	0	0	0	0	104	0	0	0	798	104	798	104	886	115
Cat PA - 367	886	111	0	0	100	111	0	11	11	0	0	0	0	0	0	0	100	0	0	0	798	100	798	100	886	111
Cat PA - 368	886	110	0	0	99	110	0	11	11	0	0	0	0	0	0	0	99	0	0	0	798	99	798	99	886	110
Cat PA - 369	886	61	0	0	55	61	0	6	6	0	0	0	0	0	0	0	0	55	0	0	798	55	798	55	886	61
Cat PA - 370	886	40	0	0	36	40	0	4	4	0	0	0	0	0	0	0	0	36	0	0	798	36	798	36	886	40
Cat PA - 371	886	61	0	0	55	61	0	6	6	0	0	0	0	0	0	0	0	55	0	0	798	55	798	55	886	61
Cat PA - 372	886	63	0	0	56	63	0	6	6	0	0	0	0	0	0	0	0	56	0	0	798	56	798	56	886	63
Cat PA - 373	886	59	0	0	53	59	0	6	6	0	0	0	0	0	0	0	0	53	0	0	798	53	798	53	886	59
Cat PA - 374	886	61	0	0	55	61	0	6	6	0	0	0	0	0	0	0	0	55	0	0	798	55	798	55	886	61
Post-Development Catchment PA Total	**886**	**2,791**			**1,116**	**2,791**	**961**	**124**	**1,085**	**295**	**0**	**0**	**168**	**295**	**295**	**0**	**786**	**330**	**0**		**354**	**1,116**	**448**	**1,411**	**886**	**2,791**
Cat PB - 204	886	10	0	0	9	10	0	1	1	0	0	0	0	0	0	0	0	9	0	0	798	9	798	9	886	10
Cat PB - 205	886	136	0	0	122	136	0	14	14	0	0	0	0	0	0	0	0	122	0	0	798	122	798	122	886	136
Cat PB - 206	886	11	0	0	10	11	0	1	1	0	0	0	0	0	0	0	0	10	0	0	798	10	798	10	886	11
Cat PB - 214	886	78	337	30	0	78	49	0	49	15	0	0	168	15	15	0	0	0	0	0	0	0	168	15	886	78
Cat PB - 215	886	7	337	2	0	7	4	0	4	1	0	0	168	1	1	0	0	0	0	0	0	0	168	1	886	7
Cat PB - 216	886	23	337	9	0	23	14	0	14	4	0	0	168	4	4	0	0	0	0	0	0	0	168	4	886	23
Cat PB - 219	886	25	337	9	0	25	15	0	15	5	0	0	168	5	5	0	0	0	0	0	0	0	168	5	886	25
Cat PB - 220	886	25	0	0	22	25	0	2	2	0	0	0	0	0	0	0	0	22	0	0	798	22	798	22	886	25
Cat PB - 233	886	1	337	0	0	1	0	0	0	0	0	0	168	0	0	0	0	0	0	0	0	0	168	0	886	1
Cat PB - 236	886	26	0	0	23	26	0	3	3	0	0	0	0	0	0	0	0	23	0	0	798	23	798	23	886	26
Cat PB - 237	886	19	0	0	17	19	0	2	2	0	0	0	0	0	0	0	0	17	0	0	798	17	798	17	886	19
Cat PB - 238	886	30	0	0	27	30	0	3	3	0	0	0	0	0	0	0	0	27	0	0	798	27	798	27	886	30
Cat PB - 239	886	31	0	0	27	31	0	3	3	0	0	0	0	0	0	0	0	27	0	0	798	27	798	27	886	31
Cat PB - 240	886	30	0	0	27	30	0	3	3	0	0	0	0	0	0	0	0	27	0	0	798	27	798	27	886	30
Cat PB - 241	886	32	0	0	28	32	0	3	3	0	0	0	0	0	0	0	0	28	0	0	798	28	798	28	886	32
Cat PB - 242	886	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	638	1	638	1	886	1
Cat PB - 243	886	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	638	1	638	1	886	1
Cat PB - 244	886	2,405	0	0	2,164	2,405	0	240	240	0	0	0	0	0	0	0	0	2,164	0	0	798	2,164	798	2,164	886	2,405
Cat PB - 245	886	76	0	0	68	76	0	8	8	0	0	0	0	0	0	0	0	68	0	0	798	68	798	68	886	76
Cat PB - 246	886	46	0	0	42	46	0	5	5	0	0	0	0	0	0	0	0	42	0	0	798	42	798	42	886	46
Cat PB - 247	886	54	0	0	48	54	0	5	5	0	0	0	0	0	0	0	0	48	0	0	798	48	798	48	886	54
Cat PB - 248	886	18	0	0	16	18	0	2	2	0	0	0	0	0	0	0	0	16	0	0	798	16	798	16	886	18
Cat PB - 249	886	2	0	0	2	2	0	0	0	0	0	0	0	0	0	0	0	2	0	0	798	2	798	2	886	2
Cat PB - 250	886	13	0	0	12	13	0	1	1	0	0	0	0	0	0	0	0	12	0	0	798	12	798	12	886	13
Cat PB - 251	886	3	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	3	0	0	798	3	798	3	886	3
Cat PB - 252	886	13	0	0	12	13	0	1	1	0	0	0	0	0	0	0	0	12	0	0	798	12	798	12	886	13
Cat PB - 253	886	3	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	3	0	0	798	3	798	3	886	3
Cat PB - 254	886	123	0	0	110	123	0	12	12	0	0	0	0	0	0	0	0	110	0	0	798	110	798	110	886	123
Cat PB - 375	886	191	337	72	0	191	118	0	118	36	0	0	168	36	36	0	0	0	0	0	0	0	168	36	886	191
Cat PB - 376	886	197	337	75	0	197	122	0	122	37	0	0	168	37	37	0	0	0	0	0	0	0	168	37	886	197
Cat PB - 377	886	2	337	1	0	2	1	0	1	0	0	0	168	0	0	0	0	0	0	0	0	0	168	0	886	2
Cat PB - 378	886	13	337	5	0	13	8	0	8	2	0	0	168	2	2	0	0	0	0	0	0	0	168	2	886	13
Cat PB - 379	886	8	337	3	0	8	5	0	5	2	0	0	168	2	2	0	0	0	0	0	0	0	168	2	886	8
Cat PB - 380	886	5	337	2	0	5	3	0	3	1	0	0	168	1	1	0	0	0	0	0	0	0	168	1	886	5
Cat PB - 381	886	28	337	10	0	28	17	0	17	5	0	0	168	5	5	0	0	0	0	0	0	0	168	5	886	28
Cat PB - 382	886	2	337	1	0	2	1	0	1	0	0	0	168	0	0	0	0	0	0	0	0	0	168	0	886	2
Cat PB - 383	886	7	337	3	0	7	5	0	5	1	0	0	168	1	1	0	0	0	0	0	0	0	168	1	886	7
Cat PB - 384	886	8	337	3	0	8	5	0	5	1	0	0	168	1	1	0	0	0	0	0	0	0	168	1	886	8
Cat PB - 385	886	28	337	11	0	28	17	0	17	5	0	0	168	5	5	0	0	0	0	0	0	0	168	5	886	28
Cat PB - 386	886	267	337	101	0	267	165	0	165	51	0	0	168	51	51	0	0	0	0	0	0	0	168	51	886	267
Cat PB - 387	886	2	337	1	0	2	1	0	1	0	0	0	168	0	0	0	0	0	0	0	0	0	168	0	886	2
Cat PB - 388	886	324	337	123	0	324	201	0	201	62	0	0	168	62	62	0	0	0	0	0	0	0	168	62	886	324
Cat PB - 389	886	7	337	3	0	7	5	0	5	1	0	0	168	1	1	0	0	0	0	0	0	0	168	1	886	7
Cat PB - 390	886	33	337	12	0	33	20	0	20	6	0	0	168	6	6	0	0	0	0	0	0	0	168	6	886	33
Cat PB - 391	886	117	337	44	0	117	73	0	73	22	0	0	168	22	22	0	0	0	0	0	0	0	168	22	886	117
Cat PB - 442	886	129	337	49	0	129	80	0	80	25	0	0	168	25	25	0	0	0	0	0	0	0	168	25	886	129
Cat PB - 446	886	4	337	1	0	4	2	0	2	1	0	0	168	1	1	0	0	0	0	0	0	0	168	1	886	4
Cat PB - 447	886	117	337	44	0	117	72	0	72	22	0	0	168	22	22	0	0	0	0	0	0	0	168	22	886	117
Cat PB - 450	886	21	0	0	19	21	0	2	2	0	0	0	0	0	0	0	0	19	0	0	798	19	798	19	886	21
Post-Development Catchment PBTotal	**886**	**4,750**			**2,815**	**4,750**	**1,006**	**313**	**1,319**	**308**	**0**	**0**	**168**	**308**	**308**	**0**	**0**	**2,815**	**0**		**525**	**2,815**	**583**	**3,123**	**886**	**4,750**
Cat PC - 217	886	567	0	0	510	567	0	57	57	0	0	0	0	0	0	0	0	510	0	0	798	510	798	510	886	567
Cat PC - 218	886	219	337	83	0	219	135	0	135	42	0	0	168	42	42	0	0	0	0	0	0	0	168	42	886	219
Cat PC - 352	886	124	0	0	111	124	0	12	12	0	0	0	0	0	0	0	111	0	0	0	798	111	798	111	886	124
Cat PC - 353	886	1,491	0	0	1,342	1,491	0	149	149	0	0	0	0	0	0	0	1,342	0	0	0	798	1,342	798	1,342	886	1,491
Cat PC - 354	886	45	0	0	32	45	9	4	13	0	0	0	0	0	0	0	0	32	0	0	638	32	638	32	886	45
Cat PC - 355	886	38	0	0	27	38	8	3	11	0	0	0	0	0	0	0	0	27	0	0	638	27	638	27	886	38
Cat PC - 356	886	50	0	0	36	50	10	4	14	0	0	0	0	0	0	0	0	36	0	0	638	36	638	36	886	50
Cat PC - 357	886	97	0	0	70	97	19	8	27	0	0	0	0	0	0	0	0	70	0	0	638	70	638	70	886	97
Cat PC - 430	886	1,031	0	0	928	1,031	0	103	103	0	0	0	0	0	0	0	0	928	0	0	798	928	798	928	886	1,031
Cat PC - 431	886	197	337	75	0	197	122	0	122	37	0	0	168	37	37	0	0	0	0	0	0	0	168	37	886	197
Cat PC - 432	886	80	337	30	0	80	49	0	49	15	0	0	168	15	15	0	0	0	0	0	0	0	168	15	886	80
Cat PC - 433	886	164	337	62	0	164	102	0	102	31	0	0	168	31	31	0	0	0	0	0	0	0	168	31	886	164
Cat PC - 448	886	4	337	1	0	4	2	0	2	1	0	0	168	1	1	0	0	0	0	0	0	0	168	1	886	4
Cat PC - 449	886	380	337	144	0	380	235	0	235	72	0	0	168	72	72	0	0	0	0	0	0	0	168	72	886	380
Post-Development Catchment PCTotal	**886**	**4,484**	**78**	**396**	**3,056**	**4,484**	**692**	**340**	**1,032**	**198**	**0**	**0**	**161**	**198**	**198**	**0**	**1,453**	**1,604**	**0**		**604**	**3,056**	**643**	**3,254**	**886**	**4,484**
Cat PD - 362	886	35	0	0	31	35	0	3	3	0	0	0	0	0	0	0	0	31	0	0	798	31	798	31	886	35
Cat PD - 434	886	11	337	4	0	11	7	0	7	2	0	0	168	2	2	0	0	0	0	0	0	0	168	2	886	11
Cat PD - 435	886	77	337	29	0	77	48	0	48	15	0	0	168	15	15	0	0	0	0	0	0	0	168	15	886	77
Post-Development Catchment PD Total	**886**	**122**	**241**	**33**	**31**	**122**	**54**	**3**	**58**	**17**	**0**	**0**	**168**	**17**	**17**	**0**	**0**	**31**	**0**		**227**	**31**	**347**	**48**	**886**	**122**
Total Development Block 8	**886**	**12,148**	**119**	**1,635**	**7,019**	**12,148**	**2,714**	**780**	**3,494**	**818**	**0**	**0**	**167**	**818**	**818**	**0**	**2,239**	**4,780**	**0**	**0**	**512**	**7,019**	**572**	**7,837**	**886**	**12,148**

APPENDIX

H DEWATERING CALCULATIONS

Construction Dewatering Worksheet - Unconfined Conditions

from Powers, 1992

Site: Condominium Building - BLOCK 8 - PART OF LOT 31, CONCESSION 7, UXBRIDGE - Conservative with Maximum Potential Drawdown During Construction - Area A

Input Parameters

Initial Elevation of Water Table (m)	H	2.70	m
Final Elevation of Water Table (m)	h	0	m
Hydraulic Conductivity (m/s)	K	6.20E-06	m/s
Hydraulic Conductivity (m/d)	K	5.36E-01	m/d
Aquifer Thickness (m)	B	4.51	
Linear Trench Size (m)	a	53	m
Linear Trench Size (m)	b	18	m
Length of Dewatering - Trench Length (m)	X	53	m
Width of Dewatering (m)	L	19	m

L = Ro / 2 (eq. 6.15, p. 105)

ZOI - Radius of Influence (m)

Ro = 3 (H - h) x sqrt (K) (eq. 6.14, p. 104)

Well radius + ZOI	Ro + Rs	38	m
Radius outside well	Ro	20	m

Equivalent Radius of Well (m)

Rs = sqrt ((a x b)/ pi) (eq. 6.10, p. 102)

Rs	17	m

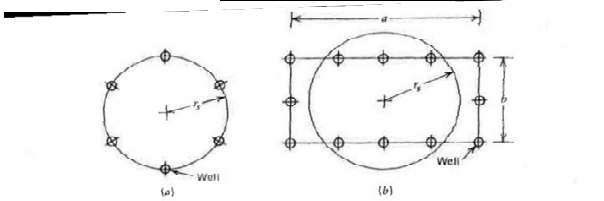


Figure 6.7 Approximation of equivalent radius r_s. (a) Circular systems. (b) Rectangular systems.

Flow Calculations - Q

Radial Flow to a Shaft (a/b < 1.5)

Shaft Calculation (m3/day)

Q = (pi x K x (H^2 - h^2)) / ln (Ro / Rs) (Eq. 6.3, p. 99)

Q	16	m3/day
Q	15,956	L/day

Long Narrow System - Trench (a/b > 1.5)

Trench Calculation (m3/day)

Q = (pi x K x (H^2 - h^2)) / ln (Ro / Rs) + 2 x (X x K x (H^2 - h^2)) / 2 x L

Q	26.97	m3/day
Q	26,966	L/day

Drainage Trench from a Line Source (m3/day)

Q = 2 x X x K x (H^2 - h^2) / 2 x L (eq. 6.9, p. 102)

Q	11	m3/day
Q	11,011	L/day

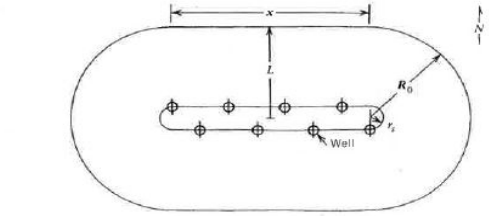
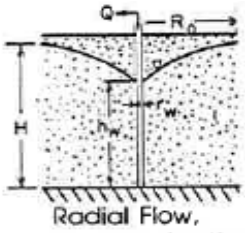
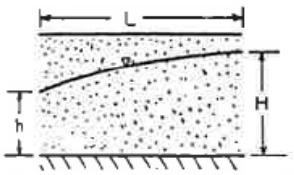


Figure 6.8 Approximate analysis of long narrow systems.



Radial Flow, Water Table Aquifer



Water Table Flow From a Line Source to a Drainage Trench

Construction Dewatering Worksheet - Unconfined Conditions

from Powers, 1992

Site: Condominium Building - BLOCK 8 - PART OF LOT 31, CONCESSION 7, UXBRIDGE - Conservative with Maximum Potential Longterm Drawdown - Area A

Input Parameters

Initial Elevation of Water Table (m)	H	1.70	m
Final Elevation of Water Table (m)	h	0	m
Hydraulic Conductivity (m/s)	K	6.20E-06	m/s
Hydraulic Conductivity (m/d)	K	5.36E-01	m/d
Aquifer Thickness (m)	B	4.51	
Linear Trench Size (m)	a	53	m
Linear Trench Size (m)	b	18	m
Length of Dewatering - Trench Length (m)	X	53	m
Width of Dewatering (m)	L	15	m

L = Ro / 2 (eq. 6.15, p. 105)

ZOI - Radius of Influence (m)

Ro = 3 (H - h) x sqrt (K) (eq. 6.14, p. 104)

Well radius + ZOI	Ro + Rs	30	m
Radius outside well	Ro	13	m

Equivalent Radius of Well (m)

Rs = sqrt ((a x b)/ pi) (eq. 6.10, p. 102)

Rs	17	m

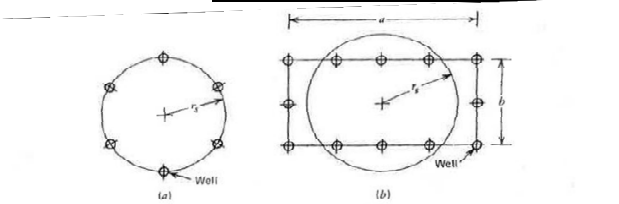


Figure 6.7 Approximation of equivalent radius r_s. (a) Circular systems. (b) Rectangular systems.

Flow Calculations - Q

Radial Flow to a Shaft (a/b < 1.5)

Shaft Calculation (m3/day)

Q = (pi x K x (H^2 - h^2)) / ln (Ro / Rs) (Eq. 6.3, p. 99)

Q	9	m3/day
Q	8,885	L/day

Long Narrow System - Trench (a/b > 1.5)

Trench Calculation (m3/day)

Q = (pi x K x (H^2 - h^2)) / ln (Ro / Rs) + 2 x (X x K x (H^2 - h^2)) / 2 x L

Q	14.33	m3/day
Q	14,332	L/day

Drainage Trench from a Line Source (m3/day)

Q = 2 x X x K x (H^2 - h^2) / 2 x L (eq. 6.9, p. 102)

Q	5	m3/day
Q	5,447	L/day

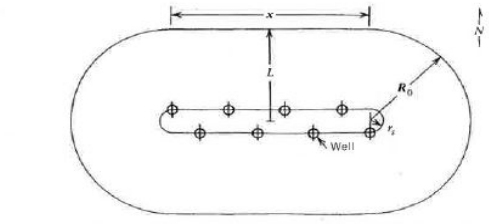
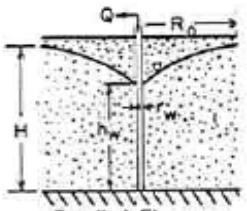
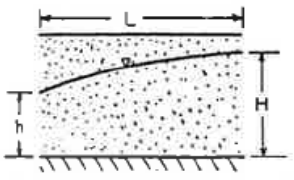


Figure 6.8 Approximate analysis of long narrow systems.



Radial Flow, Water Table Aquifer



Water Table Flow From a Line Source to a Drainage Trench

Ground Seepage Dewatering Worksheet - Unconfined Conditions

from Powers, 1992

Condominium - BLOCK 8 - PART OF LOT 31, CONCESSION 7, UXBRIDGE - Conservative with Maximum Potential Drawdown - Area A

Site

Input Parameters		**High K**	
Vertical Hydraulic Conductivity (m/s)	K	6.20E-07	m/s
Vertical Hydraulic Conductivity (m/d)	K	5.36E-02	m/day
Hydraulic gradient (m/m)	i	0.1	m/m
Cross Sectional Area(m^2)	A	954	m^2

Seepage Flow Calculations - Q			
Q = K x i x A (Eq. 3.10, p. 30)	Q	5	m3/day
	Q	5,110	L/day

Construction Dewatering Worksheet - Unconfined Conditions

from Powers, 1992

Site: Condominium Building - BLOCK 8 - PART OF LOT 31, CONCESSION 7, UXBRIDGE Conservative with Maximum Potential Drawdown During Construction - Area B

Input Parameters

Initial Elevation of Water Table (m)	H	2.95	m
Final Elevation of Water Table (m)	h	0	m
Hydraulic Conductivity (m/s)	K	6.20E-06	m/s
Hydraulic Conductivity (m/d)	K	5.36E-01	m/d
Aquifer Thickness (m)	B	4.51	
Linear Trench Size (m)	a	18	m
Linear Trench Size (m)	b	9	m
Length of Dewatering - Trench Length (m)	X	18	m
Width of Dewatering (m)	L	15	m

L = Ro / 2 (eq. 6.15, p. 105)

ZOI - Radius of Influence (m)

Ro = 3 (H - h) x sqrt (K) (eq. 6.14, p. 104)

Well radius + ZOI	Ro + Rs	29	m
Radius outside well	Ro	22	m

Equivalent Radius of Well (m)

Rs = sqrt ((a x b)/ pi) (eq. 6.10, p. 102)

Rs	7	m

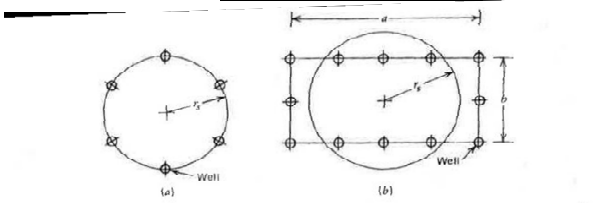


Figure 6.7 Approximation of equivalent radius r_s. (a) Circular systems. (b) Rectangular systems.

Flow Calculations - Q

Radial Flow to a Shaft (a/b < 1.5)

Shaft Calculation (m3/day)

Q = (pi x K x (H^2 - h^2)) / ln (Ro / Rs) (Eq. 6.3, p. 99)

Q	10	m3/day
Q	10,436	L/day

Long Narrow System - Trench (a/b > 1.5)

Trench Calculation (m3/day)

Q = (pi x K x (H^2 - h^2)) / ln (Ro / Rs) + 2 x (X x K x (H^2 - h^2)) / 2 x L

Q	16.18	m3/day
Q	16,180	L/day

Drainage Trench from a Line Source (m3/day)

Q = 2 x X x K x (H^2 - h^2) / 2 x L (eq. 6.9, p. 102)

Q	6	m3/day
Q	5,744	L/day

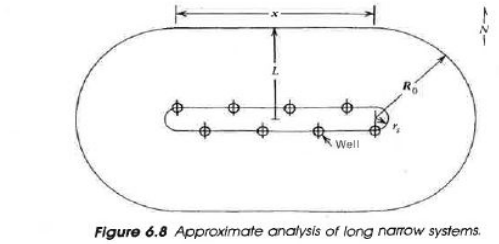
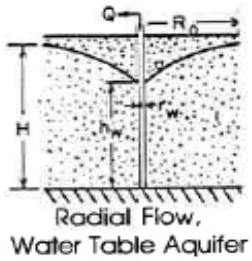
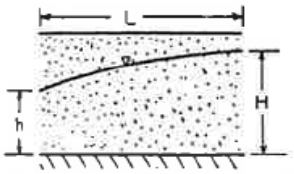


Figure 6.8 Approximate analysis of long narrow systems.



Radial Flow, Water Table Aquifer



Water Table Flow From a Line Source to a Drainage Trench

Construction Dewatering Worksheet - Unconfined Conditions

from Powers, 1992

Site: Condominium Building - BLOCK 8 - PART OF LOT 31, CONCESSION 7, UXBRIDGE - Conservative with Maximum Potential Longterm Drawdown - Area B

Input Parameters

Initial Elevation of Water Table (m)	H	1.95	m
Final Elevation of Water Table (m)	h	0	m
Hydraulic Conductivity (m/s)	K	6.20E-06	m/s
Hydraulic Conductivity (m/d)	K	5.36E-01	m/d
Aquifer Thickness (m)	B	4.51	
Linear Trench Size (m)	a	18	m
Linear Trench Size (m)	b	9	m
Length of Dewatering - Trench Length (m)	X	18	m
Width of Dewatering (m)	L	11	m

L = Ro / 2 (eq. 6.15, p. 105)

ZOI - Radius of Influence (m)

Ro = 3 (H - h) x sqrt (K) (eq. 6.14, p. 104)

Well radius + ZOI	Ro + Rs	22	m
Radius outside well	Ro	15	m

Equivalent Radius of Well (m)

Rs = sqrt ((a x b)/ pi) (eq. 6.10, p. 102)

Rs	7	m

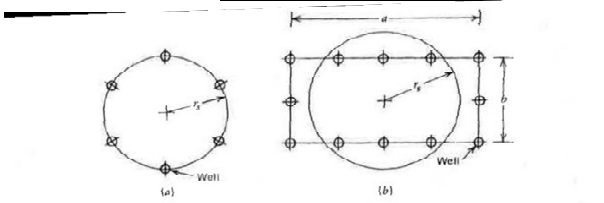


Figure 6.7 Approximation of equivalent radius r_s. (a) Circular systems. (b) Rectangular systems.

Flow Calculations - Q

Radial Flow to a Shaft (a/b < 1.5)

Shaft Calculation (m3/day)

Q = (pi x K x (H^2 - h^2)) / ln (Ro / Rs) (Eq. 6.3, p. 99)

Q	6	m3/day
Q	5,775	L/day

Long Narrow System - Trench (a/b > 1.5)

Trench Calculation (m3/day)

Q = (pi x K x (H^2 - h^2)) / ln (Ro / Rs) + 2 x (X x K x (H^2 - h^2)) / 2 x L

Q	9.15	m3/day
Q	9,147	L/day

Drainage Trench from a Line Source (m3/day)

Q = 2 x X x K x (H^2 - h^2) / 2 x L (eq. 6.9, p. 102)

Q	3	m3/day
Q	3,372	L/day

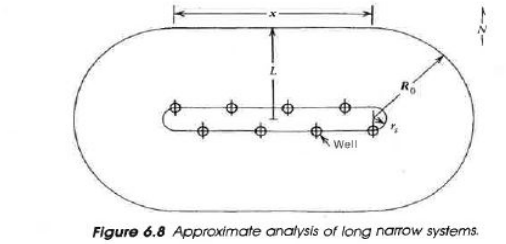
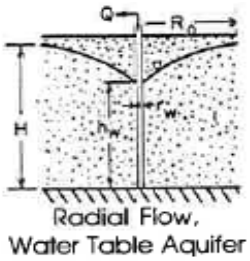
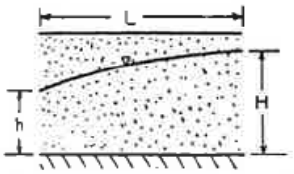


Figure 6.8 Approximate analysis of long narrow systems.



Radial Flow, Water Table Aquifer



Water Table Flow From a Line Source to a Drainage Trench

Ground Seepage Dewatering Worksheet - Unconfined Conditions

from Powers, 1992

Condominium - BLOCK 8 - PART OF LOT 31, CONCESSION 7, UXBRIDGE - Conservative with Maximum Potential Drawdown - Area B

Site

Input Parameters		**High K**	
Vertical Hydraulic Conductivity (m/s)	K	6.20E-07	m/s
Vertical Hydraulic Conductivity (m/d)	K	5.36E-02	m/day
Hydraulic gradient (m/m)	i	0.1	m/m
Cross Sectional Area(m^2)	A	162	m^2

Seepage Flow Calculations - Q			
Q = K x i x A (Eq. 3.10, p. 30)	Q	1	m3/day
	Q	868	L/day

Construction Dewatering Worksheet - Unconfined Conditions

from Powers, 1992

Site: Condominium Building - BLOCK 8 - PART OF LOT 31, CONCESSION 7, UXBRIDGE - Conservative with Maximum Potential Drawdown During Construction - Area C1

Input Parameters

Initial Elevation of Water Table (m)	H	1.20	m
Final Elevation of Water Table (m)	h	0	m
Hydraulic Conductivity (m/s)	K	6.20E-06	m/s
Hydraulic Conductivity (m/d)	K	5.36E-01	m/d
Aquifer Thickness (m)	B	4.51	
Linear Trench Size (m)	a	62	m
Linear Trench Size (m)	b	22	m
Length of Dewatering - Trench Length (m)	X	62	m
Width of Dewatering (m)	L	15	m

L = Ro / 2 (eq. 6.15, p. 105)

ZOI - Radius of Influence (m)

Ro = 3 (H - h) x sqrt (K) (eq. 6.14, p. 104)

Well radius + ZOI	Ro + Rs	30	m
Radius outside well	Ro	9	m

Equivalent Radius of Well (m)

Rs = sqrt ((a x b)/ pi) (eq. 6.10, p. 102)

Rs	21	m

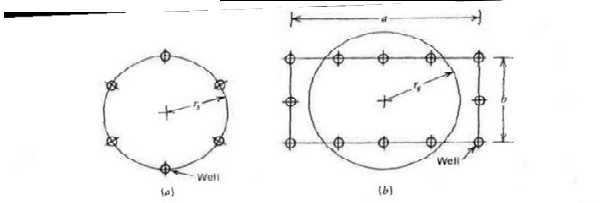


Figure 6.7 Approximation of equivalent radius r_s. (a) Circular systems. (b) Rectangular systems.

Flow Calculations - Q

Radial Flow to a Shaft (a/b < 1.5)

Shaft Calculation (m3/day)

Q = (pi x K x (H^2 - h^2)) / ln (Ro / Rs) (Eq. 6.3, p. 99)

Q	7	m3/day
Q	6,773	L/day

Long Narrow System - Trench (a/b > 1.5)

Trench Calculation (m3/day)

Q = (pi x K x (H^2 - h^2)) / ln (Ro / Rs) + 2 x (X x K x (H^2 - h^2)) / 2 x L

Q	9.98	m3/day
Q	9,982	L/day

Drainage Trench from a Line Source (m3/day)

Q = 2 x X x K x (H^2 - h^2) / 2 x L (eq. 6.9, p. 102)

Q	3	m3/day
Q	3,210	L/day

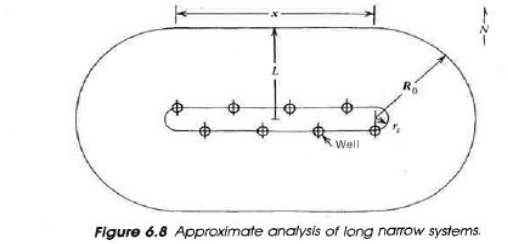
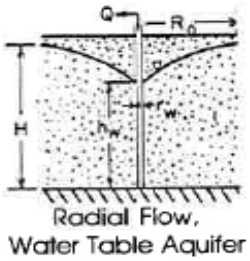
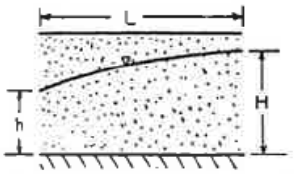


Figure 6.8 Approximate analysis of long narrow systems.



Radial Flow, Water Table Aquifer



Water Table Flow From a Line Source to a Drainage Trench

Construction Dewatering Worksheet - Unconfined Conditions

from Powers, 1992

Site: Condominium Building - BLOCK 8 - PART OF LOT 31, CONCESSION 7, UXBRIDGE - Conservative with Maximum Potential Longterm Drawdown - Area C1

Input Parameters

Initial Elevation of Water Table (m)	H	0.20	m
Final Elevation of Water Table (m)	h	0	m
Hydraulic Conductivity (m/s)	K	6.20E-06	m/s
Hydraulic Conductivity (m/d)	K	5.36E-01	m/d
Aquifer Thickness (m)	B	4.51	
Linear Trench Size (m)	a	62	m
Linear Trench Size (m)	b	22	m
Length of Dewatering - Trench Length (m)	X	62	m
Width of Dewatering (m)	L	11	m

L = Ro / 2 (eq. 6.15, p. 105)

ZOI - Radius of Influence (m)

Ro = 3 (H - h) x sqrt (K) (eq. 6.14, p. 104)

Well radius + ZOI	Ro + Rs	22	m
Radius outside well	Ro	1	m

Equivalent Radius of Well (m)

Rs = sqrt ((a x b)/ pi) (eq. 6.10, p. 102)

Rs	21	m

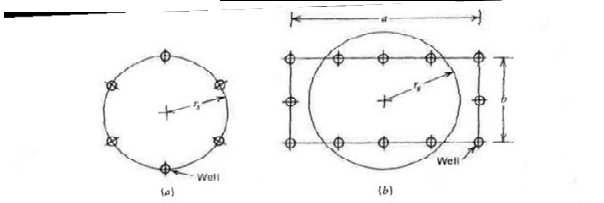


Figure 6.7 Approximation of equivalent radius r_s. (a) Circular systems. (b) Rectangular systems.

Flow Calculations - Q

Radial Flow to a Shaft (a/b < 1.5)

Shaft Calculation (m3/day)

Q = (pi x K x (H^2 - h^2)) / ln (Ro / Rs) (Eq. 6.3, p. 99)

Q	1	m3/day
Q	972	L/day

Long Narrow System - Trench (a/b > 1.5)

Trench Calculation (m3/day)

Q = (pi x K x (H^2 - h^2)) / ln (Ro / Rs) + 2 x (X x K x (H^2 - h^2)) / 2 x L

Q	1.09	m3/day
Q	1,091	L/day

Drainage Trench from a Line Source (m3/day)

Q = 2 x X x K x (H^2 - h^2) / 2 x L (eq. 6.9, p. 102)

Q	0	m3/day
Q	119	L/day

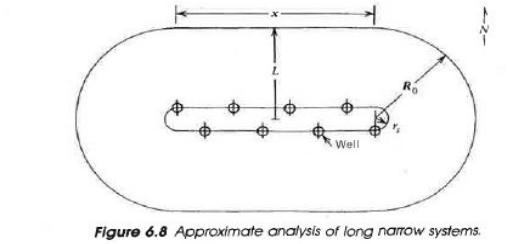
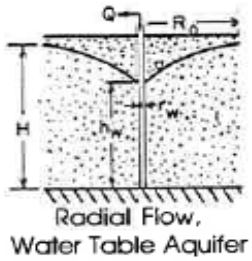
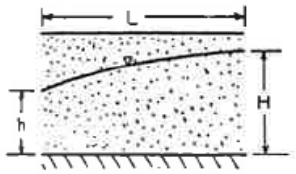


Figure 6.8 Approximate analysis of long narrow systems.



Radial Flow, Water Table Aquifer



Water Table Flow From a Line Source to a Drainage Trench

Ground Seepage Dewatering Worksheet - Unconfined Conditions

from Powers, 1992

Condominium - BLOCK 8 - PART OF LOT 31, CONCESSION 7, UXBRIDGE -Conservative with Maximum Potential Drawdown - Area C1

Site

Input Parameters		**High K**	
Vertical Hydraulic Conductivity (m/s)	K	6.20E-07	m/s
Vertical Hydraulic Conductivity (m/d)	K	5.36E-02	m/day
Hydraulic gradient (m/m)	i	0.1	m/m
Cross Sectional Area(m^2)	A	1364	m^2

Seepage Flow Calculations - Q			
Q = K x i x A (Eq. 3.10, p. 30)	Q	7	m3/day
	Q	7,307	L/day

Construction Dewatering Worksheet - Unconfined Conditions

from Powers, 1992

Site: Condominium Building - BLOCK 8 - PART OF LOT 31, CONCESSION 7, UXBRIDGE - Conservative with Maximum Potential Drawdown During Construction - Area C2

Input Parameters

Initial Elevation of Water Table (m)	H	2.20	m
Final Elevation of Water Table (m)	h	0	m
Hydraulic Conductivity (m/s)	K	6.20E-06	m/s
Hydraulic Conductivity (m/d)	K	5.36E-01	m/d
Aquifer Thickness (m)	B	4.51	
Linear Trench Size (m)	a	22	m
Linear Trench Size (m)	b	19	m
Length of Dewatering - Trench Length (m)	X	22	m
Width of Dewatering (m)	L	14	m

L = Ro / 2 (eq. 6.15, p. 105)

ZOI - Radius of Influence (m)

Ro = 3 (H - h) x sqrt (K) (eq. 6.14, p. 104)

Well radius + ZOI	Ro + Rs	28	m
Radius outside well	Ro	16	m

Equivalent Radius of Well (m)

Rs = sqrt ((a x b)/ pi) (eq. 6.10, p. 102)

Rs	12	m

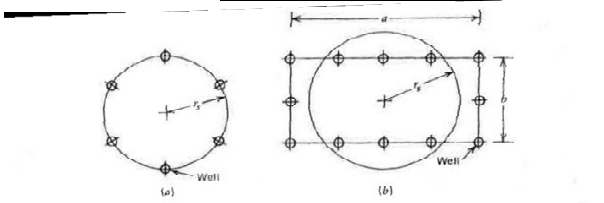


Figure 6.7 Approximation of equivalent radius r_s. (a) Circular systems. (b) Rectangular systems.

Flow Calculations - Q

Radial Flow to a Shaft (a/b < 1.5)

Shaft Calculation (m3/day)

Q = (pi x K x (H^2 - h^2)) / ln (Ro / Rs) (Eq. 6.3, p. 99)

Q	9	m3/day
Q	9,196	L/day

Long Narrow System - Trench (a/b > 1.5)

Trench Calculation (m3/day)

Q = (pi x K x (H^2 - h^2)) / ln (Ro / Rs) + 2 x (X x K x (H^2 - h^2)) / 2 x L

Q	13.27	m3/day
Q	13,275	L/day

Drainage Trench from a Line Source (m3/day)

Q = 2 x X x K x (H^2 - h^2) / 2 x L (eq. 6.9, p. 102)

Q	4	m3/day
Q	4,079	L/day

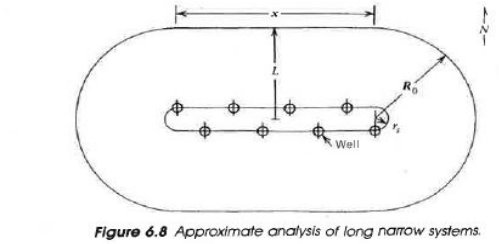
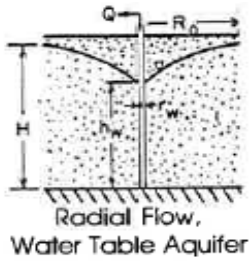
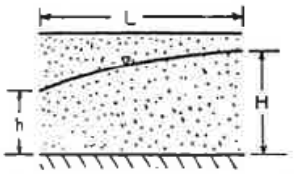


Figure 6.8 Approximate analysis of long narrow systems.



Radial Flow, Water Table Aquifer



Water Table Flow From a Line Source to a Drainage Trench

Construction Dewatering Worksheet - Unconfined Conditions

from Powers, 1992

Site: Condominium Building - BLOCK 8 - PART OF LOT 31, CONCESSION 7, UXBRIDGE - Conservative with Maximum Potential Longterm Drawdown - Area C2

Input Parameters

Initial Elevation of Water Table (m)	H	0.15	m
Final Elevation of Water Table (m)	h	0	m
Hydraulic Conductivity (m/s)	K	6.20E-06	m/s
Hydraulic Conductivity (m/d)	K	5.36E-01	m/d
Aquifer Thickness (m)	B	4.51	
Linear Trench Size (m)	a	22	m
Linear Trench Size (m)	b	19	m
Length of Dewatering - Trench Length (m)	X	22	m
Width of Dewatering (m)	L	6	m

L = Ro / 2 (eq. 6.15, p. 105)

ZOI - Radius of Influence (m)

Ro = 3 (H - h) x sqrt (K) (eq. 6.14, p. 104)

Well radius + ZOI	Ro + Rs	13	m
Radius outside well	Ro	1	m

Equivalent Radius of Well (m)

Rs = sqrt ((a x b)/ pi) (eq. 6.10, p. 102)

Rs	12	m

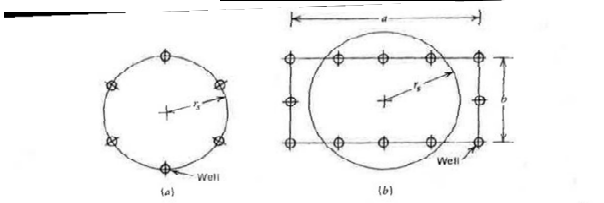


Figure 6.7 Approximation of equivalent radius r_s. (a) Circular systems. (b) Rectangular systems.

Flow Calculations - Q

Radial Flow to a Shaft (a/b < 1.5)

Shaft Calculation (m3/day)

Q = (pi x K x (H^2 - h^2)) / ln (Ro / Rs) (Eq. 6.3, p. 99)

Q	0	m3/day
Q	408	L/day

Long Narrow System - Trench (a/b > 1.5)

Trench Calculation (m3/day)

Q = (pi x K x (H^2 - h^2)) / ln (Ro / Rs) + 2 x (X x K x (H^2 - h^2)) / 2 x L

Q	0.45	m3/day
Q	450	L/day

Drainage Trench from a Line Source (m3/day)

Q = 2 x X x K x (H^2 - h^2) / 2 x L (eq. 6.9, p. 102)

Q	0	m3/day
Q	42	L/day

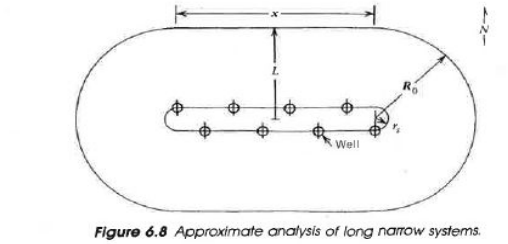
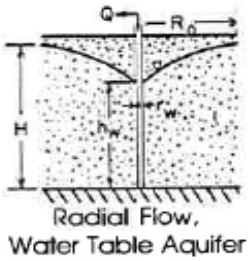
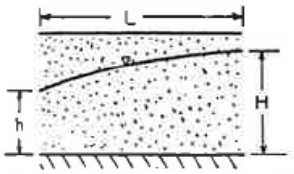


Figure 6.8 Approximate analysis of long narrow systems.



Radial Flow, Water Table Aquifer



Water Table Flow From a Line Source to a Drainage Trench

Ground Seepage Dewatering Worksheet - Unconfined Conditions

from Powers, 1992

Condominium - BLOCK 8 - PART OF LOT 31, CONCESSION 7, UXBRIDGE - Conservative with Maximum Potential Drawdown - Area C2

Site

Input Parameters		**High K**	
Vertical Hydraulic Conductivity (m/s)	K	6.20E-07	m/s
Vertical Hydraulic Conductivity (m/d)	K	5.36E-02	m/day
Hydraulic gradient (m/m)	i	0.1	m/m
Cross Sectional Area(m^2)	A	418	m^2

Seepage Flow Calculations - Q			
Q = K x i x A (Eq. 3.10, p. 30)	Q	2	m3/day
	Q	2,239	L/day

Construction Dewatering Worksheet - Unconfined Conditions

from Powers, 1992

Site: Condominium Building - BLOCK 8 - PART OF LOT 31, CONCESSION 7, UXBRIDGE - Conservative with Maximum Potential Drawdown During Construction - Area C3

Input Parameters

Initial Elevation of Water Table (m)	H	2.20	m
Final Elevation of Water Table (m)	h	0	m
Hydraulic Conductivity (m/s)	K	6.20E-06	m/s
Hydraulic Conductivity (m/d)	K	5.36E-01	m/d
Aquifer Thickness (m)	B	4.51	
Linear Trench Size (m)	a	19	m
Linear Trench Size (m)	b	18	m
Length of Dewatering - Trench Length (m)	X	19	m
Width of Dewatering (m)	L	13	m

L = Ro / 2 (eq. 6.15, p. 105)

ZOI - Radius of Influence (m)

Ro = 3 (H - h) x sqrt (K) (eq. 6.14, p. 104)

Well radius + ZOI	Ro + Rs	27	m
Radius outside well	Ro	16	m

Equivalent Radius of Well (m)

Rs = sqrt ((a x b)/ pi) (eq. 6.10, p. 102)

Rs	10	m

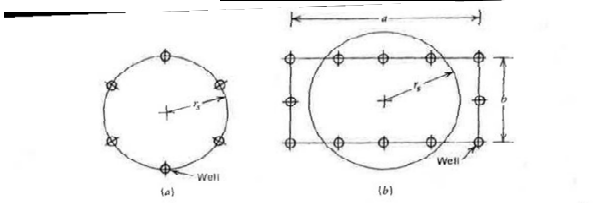


Figure 6.7 Approximation of equivalent radius r_s. (a) Circular systems. (b) Rectangular systems.

Flow Calculations - Q

Radial Flow to a Shaft (a/b < 1.5)

Shaft Calculation (m3/day)

Q = (pi x K x (H^2 - h^2)) / ln (Ro / Rs) (Eq. 6.3, p. 99)

Q	9	m3/day
Q	8,611	L/day

Long Narrow System - Trench (a/b > 1.5)

Trench Calculation (m3/day)

Q = (pi x K x (H^2 - h^2)) / ln (Ro / Rs) + 2 x (X x K x (H^2 - h^2)) / 2 x L

Q	12.28	m3/day
Q	12,278	L/day

Drainage Trench from a Line Source (m3/day)

Q = 2 x X x K x (H^2 - h^2) / 2 x L (eq. 6.9, p. 102)

Q	4	m3/day
Q	3,667	L/day

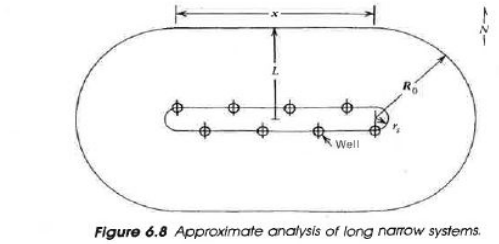
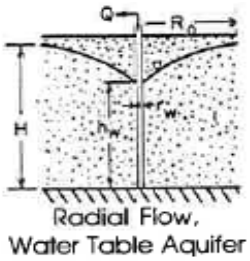
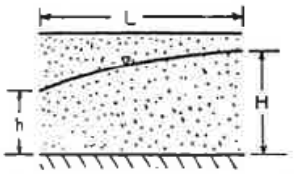


Figure 6.8 Approximate analysis of long narrow systems.



Radial Flow, Water Table Aquifer



Water Table Flow From a Line Source to a Drainage Trench

Construction Dewatering Worksheet - Unconfined Conditions

from Powers, 1992

Site: Condominium Building - BLOCK 8 - PART OF LOT 31, CONCESSION 7, UXBRIDGE - Conservative with Maximum Potential Longterm Drawdown - Area C3

Input Parameters

Initial Elevation of Water Table (m)	H	0.15	m
Final Elevation of Water Table (m)	h	0	m
Hydraulic Conductivity (m/s)	K	6.20E-06	m/s
Hydraulic Conductivity (m/d)	K	5.36E-01	m/d
Aquifer Thickness (m)	B	4.51	
Linear Trench Size (m)	a	19	m
Linear Trench Size (m)	b	18	m
Length of Dewatering - Trench Length (m)	X	19	m
Width of Dewatering (m)	L	6	m

L = Ro / 2 (eq. 6.15, p. 105)

ZOI - Radius of Influence (m)

Ro = 3 (H - h) x sqrt (K) (eq. 6.14, p. 104)

Well radius + ZOI	Ro + Rs	12	m
Radius outside well	Ro	1	m

Equivalent Radius of Well (m)

Rs = sqrt ((a x b)/ pi) (eq. 6.10, p. 102)

Rs	10	m

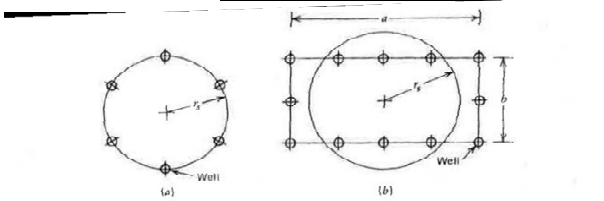


Figure 6.7 Approximation of equivalent radius r_s. (a) Circular systems. (b) Rectangular systems.

Flow Calculations - Q

Radial Flow to a Shaft (a/b < 1.5)

Shaft Calculation (m3/day)

Q = (pi x K x (H^2 - h^2)) / ln (Ro / Rs) (Eq. 6.3, p. 99)

Q	0	m3/day
Q	371	L/day

Long Narrow System - Trench (a/b > 1.5)

Trench Calculation (m3/day)

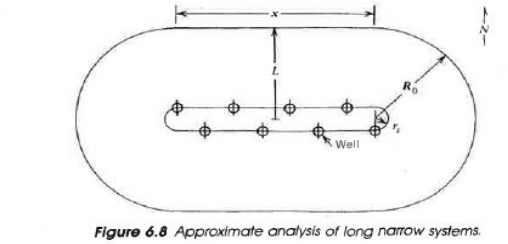
Q = (pi x K x (H^2 - h^2)) / ln (Ro / Rs) + 2 x (X x K x (H^2 - h^2)) / 2 x L

Q	0.41	m3/day
Q	411	L/day

Drainage Trench from a Line Source (m3/day)

Q = 2 x X x K x (H^2 - h^2) / 2 x L (eq. 6.9, p. 102)

Q	0	m3/day
Q	40	L/day



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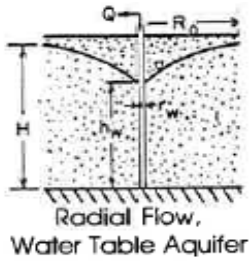
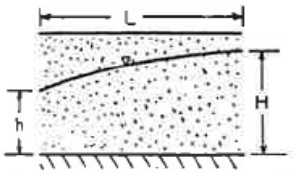


Radial Flow, Water Table Aquifer



Water Table Flow From a Line Source to a Drainage Trench

Ground Seepage Dewatering Worksheet - Unconfined Conditions

from Powers, 1992

Condominium - BLOCK 8 - PART OF LOT 31, CONCESSION 7, UXBRIDGE - Conservative with Maximum Potential Drawdown - Area C3

Site

Input Parameters		**High K**	
Vertical Hydraulic Conductivity (m/s)	K	6.20E-07	m/s
Vertical Hydraulic Conductivity (m/d)	K	5.36E-02	m/day
Hydraulic gradient (m/m)	i	0.1	m/m
Cross Sectional Area(m^2)	A	342	m^2

Seepage Flow Calculations - Q			
Q = K x i x A (Eq. 3.10, p. 30)	Q	2	m3/day
	Q	1,832	L/day