Hydrogeological Study Report

2095 Dilworth Road

Kars, Ontario

Prepared for:

Dilworth Development Inc.
92 Bentley Avenue
Ottawa, ON
K3E 6T9

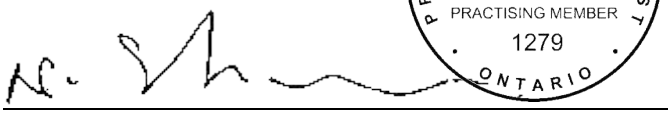
February 2025

Englobe Ref No: 02101208.000

Prepared by:

Kevin Bailey, M.A.Sc., P.Eng.
Environmental Engineer and Team Lead

Reviewed and Approved by:



Sonny Sundaram, Ph.D., P.Geo.
Senior Technical Director – Environment

Property and Confidentiality

“This report can only be used for the purposes stated therein. Any use of the report must take into consideration the object and scope of the mandate by virtue of which the report was prepared, as well as the limitations and conditions specified therein and the state of scientific knowledge at the time the report was prepared. Englobe provides no warranty and makes no representations other than those expressly contained in the report.

This document is the work product of Englobe Any reproduction, distribution or adaptation, partial or total, is strictly forbidden without the prior written authorization of Englobe and its Client. For greater certainty, the use of any and all extracts from the report is strictly forbidden without the written authorization of Englobe and its Client, given that the report must be read and considered in its entirety.

No information contained in this report can be used by any third party without the prior written authorization of Englobe and its Client. Englobe disclaims any responsibility or liability for any unauthorized reproduction, distribution, adaptation or use of the report.

If tests have been carried out, the results of these tests are valid only for the sample described in this report.

Englobe’s subcontractors who have carried out on-site or laboratory work are duly assessed according to the purchase procedure of our quality system. For further information, please contact your project manager.”

Table of Contents

TABLES

APPENDICES

LIST OF ACRONYMS

AWWA	American Water Works Association
bgs	Below ground surface
CFU	Colony Forming Units
D 5-4	Ontario Ministry of the Environment and Energy Technical Guideline for Individual On-Site Sewage Systems: Water Quality Impact Risk Assessment
D 5-5	Ontario Ministry of the Environment and Energy Procedure D 5-5 Technical Guideline for Private Wells: Water Supply Assessment.
EG	Englobe
HP	Horsepower
I.D.	Inner diameter
km	Kilometres
L	Litres
Lpm	Litres per minute
m	Metre
m^2	Square metre
m^3	Cubic metre
min	Minute
mg/L	Milligram per litre, equivalent to one part per million
MECP	Ontario Ministry of the Environment, Conservation, and Parks
MNRF	Ontario Ministry of Natural Resources and Forestry
NTU	Nephelometric Turbidity Unit
SC	Specific Capacity
OBC	Ontario Building Code
ON	Ontario
ODWQS	Ontario Drinking Water Quality Standards
PHC	Petroleum hydrocarbon
TCU	True Colour Units
TDS	Total Dissolved Solids
TSS	Total Suspended Solids
µg/L	Microgram per litre, equivalent to one part per billion
US EPA	The United States Environmental Protection Agency
VOC	Volatile organic compound

1 Introduction

Englobe Corp. (Englobe) was retained by Dilworth Development Inc., (the Client) located at 92 Bentley Avenue, Ottawa, Ontario, to conduct a hydrogeological study at the property located at 2095 Dilworth Road in Kars, Ontario (the "Site"). The Site location is presented in Figure 1 (Appendix A).

The subject Site is located immediately east of the northbound lanes of Highway 416 and northeast of the intersection of Highway 416 and Dilworth Road, Lot 35, Concession 3 (Ottawa Front), Rideau-Goulbourn West, City of Ottawa. The Site reportedly occupies a total area of approximately 87 acres (35 hectares). At the time of this study, the Site was mostly undeveloped, with vacant land, except for the following structures located in the proximity of the property entrance at Dilworth Road.

- One-storey commercial snowmobile storage and service garage (approximately 625 square metres (m^2) of building footprint);
- Two-storey residential dwelling (approximately 1602 m^2 of building footprint) serviced by an existing onsite sewage system and *a water supply well*;
- One-storey residential trailer home (approximately 85 m^2 of building footprint); and,
- Two small storage sheds (approximately 30 m^2 of total building footprint).

The Site, detailed in Figure 2, Appendix A, is surrounded by the following:

- North: Vacant wooded area, followed by residential dwellings;
- East: Residential dwellings, followed by Third Line Road;
- South: Dilworth Road, followed by a vacant wooded area and residential dwellings; and
- West: Veterans Memorial Highway (HWY 416), followed by a vacant wooded area and agricultural fields.

Since the issuance of the hydrogeological study report dated May 2024, the Client has decided to subdivide the Site into two separate parcels of land (Part 1 and 2), the severed portion of the land (Part 2) is located at the southeastern area of the Site, refer to the Appendix A-2 for a copy of the plan entitled "*Plan of Survey of Part of Lot 35, Concession 3, Geographic Township of North Gower, City of Ottawa*", prepared by Annis, O'Sullivan, Vollebekk Ltd.

The subject hydrogeological study report applies to Part 1 of the Site. A follow-up meeting occurred with the City of Ottawa (the City) on October 7, 2024, and the City noted that chloride and sodium concentrations in groundwater exceeded the maximum concentration considered reasonably treatable (MCCRT) and every effort should be made to find acceptable sources of groundwater in Part 1 of the Site. Following the meeting

with the City, the Client proceeded to find a suitable source of groundwater supply within Part 1 of the Site by installing a new test well (refer to Figure 2, Appendix A for the well location). Groundwater sampling results from the new test well indicated elevated levels of sodium and chloride. Hence, it is understood that the proposed zoning amendment for the lands within Part 1 of the Site is intended for the less sensitive uses (i.e., RC, rural commercial with exclusions to exclude sensitive uses) where the number of employees would be low and it does not rely on the potable water supply. The City email dated October 10, 2024, included a list of proposed uses such as an artist studio, automobile rental establishment, automobile service station, car wash, detached dwelling, parking lot, heavy equipment servicing, warehouse, farmers market, etc.

It should be noted that the subject hydrogeological study is a pre-site control plan application hydrogeological study and intended for zoning by-law amendment application to less sensitive uses. Further targeted investigation will likely be required at the site control plan application stage with plans showing the actual intended use of Part 1 of the Site. This hydrogeological study report is subject to the limitations in Section 9 of this report.

1.1 Scope of Work

The 2021 scope of work involved the following activities.

- Collection, review, and analysis of the Site and surrounding area background information.
- Obtain a round of groundwater levels from the monitoring wells completed as part of the geotechnical investigation and Phase II Environmental Site Assessment (ESA) completed by Englobe for the Site;
- Review of groundwater sampling results from the monitoring wells completed as part of geotechnical investigation and Phase II ESA.
- Complete an 8-hour constant rate pumping test at the existing large-diameter potable well and monitor groundwater drawdown/recovery within the existing large-diameter well and two (2) nearest shallow monitoring wells regularly both manually and electronically. After the completion of the pumping test, monitor water level recovery in the wells until 95% recovery occurs or for 24 hours, whichever is less.
- Collect two (2) groundwater samples from the existing potable well. The groundwater samples were to be collected at the 4-hour and 8-hour intervals during the pumping test. Submit groundwater samples to a Canadian Association for Laboratory Accreditation Inc. (CALA) certified analytical laboratory for analysis of inorganics, general chemistry, volatile organic compounds (VOCs), petroleum hydrocarbons (PHCs), pesticides/herbicides, nutrients, metals, free chlorine, total chlorine, and microbiological parameters.

- Prepare a detailed hydrogeological study report summarizing the results of field investigation and data analysis.

The 2024 and 2025 scope of work involved the following activities.

- Review/evaluate available background information and data to assess if a suitable source of the groundwater supply can be found within the Site.
- Installation of a test water well by the Client to assess if a suitable source of the groundwater supply can be found within Part 1 of the Site.
- Collection of groundwater samples for the analysis of selected general chemistry and inorganics parameters from the new test water well and the existing water supply well PW21-01.
- Consult with the City on the comments dated November 19, 2024 (Englobe consulted with the City on January 13, 2025).
- Prepare an updated hydrogeological study report addressing the comments dated November 19, 2024.

2 Study Methodology

Methodologies or procedures applied to carry out the key hydrogeological study tasks are described in this Section. In addition to the methodology and procedures included in this document, procedures from the following documents were incorporated into the study:

- Ministry of the Environment (MOE) Procedure D-5-4. Technical Guideline for Individual On-Site Sewage Systems: Water Quality Impact Risk Assessment (August 1996).
- MOE Procedure D-5-5. Technical Guideline for Private Wells: Water Supply Assessment (August 1996).

Englobe recognizes the receipt of the City of Ottawa guidance document titled “Hydrogeological and Terrain Analysis Guidelines” on April 29, 2021. This guidance document was issued after the initiation of this study, however, this guidance document in general references MOE procedures D-5-4 and D-5-5.

2.1 Background Information Review

Englobe reviewed readily available maps, reports, and records providing information pertinent to the geological and hydrogeological setting of the Site and surrounding areas. The list of available reports and documents for the Site is as follows:

- Draft Phase I Environmental Site Assessment (April 2021), Prepared by Englobe
- Draft Phase II Environmental Site Assessment (April 2021), Prepared by Englobe
- Preliminary Geotechnical Investigation Report (April 2021), Prepared by Englobe
- Pre-Application Consultation Meeting Notes (September 2019), Prepared by the City of Ottawa
- Pre- Consultation Meeting Notes (September 2023), Prepared by the City of Ottawa
  Hydrogeological Study Report – Adequacy Review Comments (November 2024) – 2095 Dilworth Road, Prepared by the City of Ottawa

The hydrogeological study requires background information on the Site and the surrounding area's physical and hydrogeological setting. The background information on the Site and the surrounding area's physical setting would describe the physical system (i.e., surface topography, drainage, geology, and stratigraphy) in terms of parameters that do not change with time. The background information on the Site and surrounding area hydrogeological setting would describe the occurrence, distribution, and flow of groundwater in the porous, unconsolidated materials and fractured bedrock. The background information review phase of this hydrogeological study involved an extensive review of the readily available literature and data to develop a

conceptual understanding of the important aspects of the physical and hydrogeological system within the Site and surrounding area. Literature and data sources used to develop the conceptual understanding of the Site and surrounding area are referenced or cited throughout this report.

Following is a summary of key findings relevant to the subject study from the review of background information (i.e., studies, notes, and letters) completed by Englobe:

- The Phase I Environmental Site Assessment (ESA) report (Englobe, 2021) identified fill materials of unknown environmental quality and the existing commercial garage as the areas of potential environmental concern.
- The Phase II ESA completed by Englobe in 2021 included the installation of 10 boreholes and these boreholes, and two boreholes were completed as monitoring wells (MW21-01 and MW21-06) in the overburden materials. The results of the Phase II ESA relevant to the subject study can be summarized as follows:
  - Two soil samples BH21-11 SS1 (0.0-0.6 m) and BH21-11 SS2 (0.6-1.2 m), exceeded the applicable Ontario Ministry of the Environment, Conservation, and Parks (MECP) Table 1 standards for PHC F4 and PHC F4 (gravimetric). Soil sample BH21-11 SS1 (0.0-0.6 m) also exceeded Table 1 standards for PHC F3.
  - The groundwater sample collected from MW21-01 (including the duplicate sample) exceeded the applicable MECP Table 1 standards for ethylbenzene.
  - The groundwater sample collected from MW21-06 exceeded the applicable MECP Table 1 standards for chloroform.
  - It was recommended that PHC-impacted soils be excavated and disposed of off-site (at an MECP-licensed waste disposal facility) during the construction of the proposed development on Site. Further confirmatory soil sampling is required during excavation activities during construction to ensure that all PHC-impacted soils are removed from the area of the garage on Site.
  - Regarding the observed MECP Table 1 exceedances in the Site groundwater, it was recommended that a second groundwater sampling event be completed at the MW21-01 and MW21-06 well locations. This sampling event is recommended to confirm whether the exceedances can be considered isolated anomalies or to verify the presence of ethylbenzene at the MW21-01 location and chloroform at the MW21-06 location.
- A geotechnical investigation was carried out in conjunction with the Phase II ESA. The results of the geotechnical investigation relevant to the subject study can be summarized as follows:

- Native silty clay was identified below the sand/silt material in boreholes MW21-01, BH21-02, BH21-05, BH21-07 and below the topsoil in borehole BH20-08. The native silty clays on this Site have low shear strength and are subject to consolidation if loaded beyond their pre-consolidation pressure. No significant (i.e., greater than 0.5 m) global grade raises should be allowed for this Site.
- The glacial till at the Site ranged from clayey sandy silt, clayey silty sand, silty sand, gravelly silty sand, silty sand, and gravel to silty sandy gravel. Sporadic blow counts and spoon refusals were encountered in the till material; therefore, cobbles and boulders are present throughout the glacial till deposit. A boulder was cored within the glacial till from 3.8 to 4.0 m in borehole MW21-06.
- Groundwater levels are generally expected to be less than 2.0 m below the ground surface (mbgs), therefore excavations are likely to extend below the groundwater table. Significant dewatering efforts should be expected.

- The pre-application consultation meeting notes (September 2023) prepared by the City of Ottawa contained the following relevant comments and/or observations:
  - Property is currently zoned Rural Countryside Zone (RU), and Environmental Protection (EP3).
  - Subject to floodplain throughout the property; no development or site alterations are permitted within the floodplain.
  - The watercourses identified on-site trigger a 30 m setback requirement; this limits the development envelope on the property.
  - An Environmental Impact Study will need to include an Ontario Wetland Evaluation for the wetlands to confirm the extent of significant wetland habitat on the property and it will need to be approved by the Ontario Ministry of Natural Resources and Forestry (MNRF).
  - A Groundwater Impact Study will be required for design flows (septage) exceeding 10,000 Litres/day (L/day).
  - The majority of the property is located within the floodplain. The designer shall ensure that all proposed development is located outside of the floodplain including wells, septic systems, buildings, pervious areas, etc. In addition, the development of earthworks within the 30-metre setback of a watercourse and wetland is not permitted.
  - The development shall be located above the floodplain elevation of 82.29 m.
  - The hydrogeology analysis should provide an eight-hour pumping test per MECP requirements.
  - The terrain analysis shall demonstrate the suitability of the soils to adequately support a septic system at this location and the capacity of dilution.

- The City letter regarding the hydrogeological study report dated May 2024 primarily contained comments related to the water quality results associated with the existing water well within Part 1 of the Site. An updated signed and stamped report (this report) addressing the City's comments was issued.

2.2 Borehole Investigation (February 2021)

A borehole drilling program was completed to support the hydrogeological study and geotechnical investigation from February 16 and 19, 2021. The purpose of the borehole drilling program is to gain a better understanding of terrain units present within the area of future development. The borehole drilling program consisted of the advancement of 10 boreholes across the Site. They were labelled as boreholes MW21-01 through BH21-10.

The boreholes were drilled to depths ranging from approximately 4.2 to 7.2 mbgs, with BH21-05 cored into the limestone bedrock.

A geotechnical drilling subcontractor, CCC Geotechnical and Environmental Drilling Limited (CCC) was retained to perform the drilling. All boreholes were drilled using a track-mounted drill rig. The boreholes were advanced through the overburden using hollow-stem augers and casings and into the bedrock using wireline diamond coring methods. Monitoring wells were installed with screens sealed into the overburden in MW20-01 and MW20-06.

Standard Penetration Tests (SPTs) were undertaken in each borehole at 0.76 m intervals with soil samples retrieved using a split spoon sampler. The compaction of cohesionless soils was assessed using recorded SPT N-values. In-situ field vane tests and a Pocket Penetrometer (PP) were performed at selected depth intervals to estimate the undrained shear strength of cohesive soils. Rock was cored in BH21-05 with HQ-sized wireline coring equipment to confirm the presence and quality of bedrock.

The subsurface conditions encountered in the boreholes were described by Englobe field staff based on the samples that were recovered. Selected soil samples were sent to Englobe's Ottawa geotechnical laboratory and a third-party geotechnical laboratory for further testing.

The elevation of the boreholes was interpolated from a survey drawing entitled, "*Original Ground Field Topo, 2095 Dilworth Road*" prepared by Tomlinson Limited and should be taken as approximate only.

The borehole locations are shown in Figure 2 (Appendix A).

2.3 Monitoring Well Installation (February 2021)

Two monitoring wells were installed by CCC in the boreholes advanced from February 16 to 19, 2021, using a track-mounted drill rig. The monitoring wells were constructed of a 50-millimetre (mm) diameter polyvinyl chloride (PVC) pipe and a #10 slotted PVC well screen. A sand pack consisting of clean silica sand was placed within the annulus space surrounding the screened section of the wells, and a bentonite hole plug was used from the top of the sand layer to within 0.3 m of the surface to minimize the potential for cross-contamination between aquifers. A locking J-Plug cap was placed at the top of each well pipe, and a protective steel monument casing was installed and cemented at the surface to protect the well. New disposable nitrile gloves were donned before the handling of the well materials for each monitoring well. The monitoring wells were installed and registered per O. Reg. 903 – Wells, made under the Ontario Water Resources Act.

The following table provides monitoring well construction details.

Table 2-1: Monitoring Well Construction Details

Well ID	Surface Elevation (masl)	Well Depth (mbgs / masl)	Screen Interval (mbgs / masl)	Approximate Depth to the Bedrock Interface (mbgs)	Screened Stratigraphic Unit
MW21-01	87.90	81.80 / 6.1	3.1 - 6.1 / 84.8 - 81.8	Not intercepted	Sandy clayey silt to silty sand (Till)
MW21-06	87.60	81.5 / 6.1	3.1 – 4.6 / 84.5 – 83.0		Silty sand (Till)

Notes:
mbgs - metres below ground surface and ground surface elevations were measured from the top of the casing after the completion of wells.
masl – metres above mean sea level.

Following monitoring well installation activities, the wells were equipped with dedicated Waterra™ tubing and inertial lift foot valves for well development purposes. On February 26, 2021, the monitoring wells were purged of a minimum of six casing volumes of water, or until dry, to remove any groundwater impacted by drilling activities and to reduce the amount of sediment within the wells.

The monitoring well and boreholes completed as part of the geotechnical investigation and Phase II ESA are shown in Figure 2 (Appendix A).

2.4 Aquifer Testing and Groundwater Sampling Program (March 2021) – Existing Water Supply Well PW21-01

To assess the quantity and quality of groundwater available from the aquifer intercepting in the existing water supply well PW21-01, the existing water supply well was subjected to a constant rate pumping test for eight (8) hours on May 31, 2021. The constant rate pumping test was conducted using the existing one-horsepower electrical pump within the well by Stanton Drilling of Pakenham, Ontario.

The pumping test was initiated with a static water level and was performed at a fixed pumping rate. During the pumping test, water well measurements were made regularly to manually and electronically monitor the drawdown of the water level in the test well in response to pumping at a constant rate. Immediately following the pumping test, water level recovery was monitored in the test and observation wells until approximately 95% recovery.

In addition to monitoring groundwater level changes over time, barometric pressure was monitored using a Solinst™ baro-logger. Groundwater pumped during the test was discharged to a down-gradient location to ensure that artificial recharge did not occur. The constant rate pumping test results are provided in Appendix D. The following table provides pumping test program details.

Table 2-2: Pumping Test Program Details - Existing Water Supply Well

Pumping Well	Well Depth (mbgs)	Water Found Depths (mbgs)	Pump Depth (mbgs)	Pumping Rate (L/min)	Pumping Duration (min)	Static Water Level* (m toc)**	Observation Wells
PW21-01	65.5	65	9.1	76	480	2.16	MW21-01, MW21-06

Notes:
*static groundwater level measured on May 31, 2021.
**metres above the top of the well casing.

The pumping rate of 76 L/min used in the pumping test program is the maximum rated capacity of the pre-existing submersible pump installed in the existing water well (note that the existing well was installed in 1978) and the pumping rate is not based on the estimated water usage under the future development scenarios. It should be noted that the proposed zoning amendment for the lands within Part 1 of the Site would be to less sensitive uses (RC, rural commercial with exclusions to exclude sensitive uses) where the number of employees would be low and it does not rely on the potable water supply. The City email dated October 10, 2024, included a list of proposed uses such as an artist studio, automobile rental establishment, automobile service station, car wash, detached dwelling, parking lot, heavy equipment servicing, warehouse, farmers market, etc. The average daily demand associated with these restricted uses could not be determined at this stage given that the exact proposed use of Part 1 of the Site and associated design parameters are unknown. We recommend that the Site servicing requirements within the context of the pumping test program be determined per "*Ottawa Design Guidelines – Water Distribution*" when the exact proposed use is determined by the future owner.

A total of two (2) groundwater samples were collected at 4-hour and 8-hour marks from the end of the pipe from each test well during the eight-hour aquifer testing program. The groundwater samples were submitted to Bureau Veritas (BV) laboratories in Mississauga, Ontario, for analysis of inorganic, general chemistry, nutrients, metal, pesticides, herbicides, and microbiological parameters by approved methodologies. BV laboratories are accredited by the Standards Council of Canada according to protocols provided by the

Canadian Association of Environmental Analytical Laboratories (CAEAL) and employ in-house quality assurance and quality control programs to govern sample analysis including the analysis of method blanks, spiked blanks, and the analysis of duplicates (10%) for each sample batch. Free residual chlorine concentrations in groundwater were monitored in the field using the Hanna™ Model HI93414 during the pumping phase of the testing program.

The laboratory certificate of analyses and field monitoring results associated with this groundwater sampling program are included in Appendix E of this report.

2.5 Groundwater Sampling Program (March 2021) – Observation Wells

On March 15, 2021 groundwater was purged using low flow techniques using a submersible stainless-steel Monsoon™ pump complete with flow controller (target flow rate approximately 150 mL/min), through a flow-through cell fitted with a Horiba™ U52 multi-parameter water quality meter.

Englobe monitored the water quality parameters using the Horiba™ U52 multi-parameter water quality meter, including pH, conductivity, dissolved oxygen (DO), temperature, turbidity and oxygen redox potential (ORP) and recorded each reading every 3 to 5 minutes during purging before sampling.

Groundwater samples were collected after three consecutive readings of field groundwater parameters were within 10% of each other. Once field parameters stabilized, the flow-through cell was removed, and the groundwater sample was collected directly into laboratory-supplied sample containers. Samples collected for the analysis of metals were field filtered using 0.45-micron inline disposable field filters. Clean, new, powder-free nitrile gloves were worn by Englobe field staff during the sampling process and discarded between samples to prevent cross-contamination.

Table 2-3: Observation Well Sampling Program Details

Well ID	Analyzed Parameters
MW21-01	PHC F1 – F4, VOCs, metals and inorganics, general chemistry, and anions
MW21-06	PHC F1 – F4, VOCs, metals and inorganics, general chemistry, and anions

The laboratory certificate of analyses and field monitoring results associated with this groundwater sampling program are included in Appendix F of this report.

2.6 Installation of a Test Well and Groundwater Sampling Program (October 2024) – New Test Well

To address the following comments noted in the City's letter dated November 19, 2024, "*every effort will be made to find a source of groundwater meeting the MCCRT parameters, which should include the discussion of other potential source/aquifer*", several options for further groundwater exploration within the Site was considered. The existing water well (PW21-01) installed in 1978 obtains groundwater from a depth of about 65 m at the limestone and sandstone interface. Groundwater sampling results from 2021 and 2024 indicated that deeper groundwater at the Site is characterized by sodium and chloride levels exceeding the MCCRT. In October 2024, the Client retained Splash Well Drilling of Prescott, Ontario to find a source of groundwater supply in the shallower horizons of the limestone bedrock. A new test well was installed to approximately 12 m with a water-found depth of approximately 10 m. Appendix B-2 contains the MECP well record for this new water well. Groundwater sampling was completed on October 30, 2024, to assess the groundwater quality for the selected general chemistry, inorganics, and metal parameters. Groundwater samples were submitted to Eurofins laboratories of Ottawa. Eurofins is accredited by CALA. Appendix E-2 contains the sampling results. Section 5.2 of this report discusses the sampling results.

2.7 Groundwater Sampling Program (2024 and 2025) – Existing Water Supply Well PW21-01

On September 17, 2024, a groundwater sample was obtained to confirm if the previously detected exceedances of sodium and chloride were persistent and the groundwater sample was submitted for laboratory analysis of sodium and chloride to Bureau Veritas, Ottawa, Ontario. Bureau Veritas is accredited by CALA.

In the meeting with the City on January 13, 2025, it was agreed that groundwater samples would be collected from the deeper water supply well PW21-01 for the parameters (field and laboratory parameters) referenced in the City's comments letter dated November 2024.

On January 20, 2025, a raw groundwater sample was obtained for the field testing of parameters such as colour, pH, temperature, conductivity, turbidity, and chlorine residual. The field parameter test results are detailed in section 5.3 of this report. Field parameters such as temperature, electrical conductivity, and turbidity were obtained by using the Horiba™ U-52 multi-parameter probe. Field measurements of colour and chlorine residual were obtained using the Hach™ DR 900 colorimeter. The pH measurements were obtained using the Hanna™ H1991300 portable water quality meter and Horiba™ U-52 multi-parameter probe. The lowest pH value from the data was used to estimate the Langelier Saturation Index (LSI) and Ryznar Stability Index (RSI) values. The calibration certificates for the field instruments (Horiba™ U-52 and Hanna™

H1991300) are provided in Appendix E-3. The Hach™ DR 900 colorimeter was field-calibrated using the manufacturer-supplied zero-cell.

In the November 2024 comments letter, the City required the field determination of H2S using the Methylene Blue method. However, the local distributor for the Hach™ Calorimeter notified Englobe that the chemical regents for the analysis H2S are back ordered and the wait time was not suitable for project timelines. To minimize analyte loss and obtain similar results, Englobe collected the sample and preserved it immediately in the field using Zinc Acetate and Sodium Hydroxide to pH>9, kept at a temperature <10 degrees Celsius, and then analyzed within 24 hours by a CALA accredited laboratory (i.e., Bureau Veritas, Ottawa, Ontario) following method SM 24 4500 S2-A D Fm. This provides a more accurate value while still meeting the City's requirement of using the Methylene Blue method. This method is commonly used in assessing the water quality at municipal drinking water wells to meet the requirement of the MECP drinking water license. The parameters tested at the laboratory (i.e., Bureau Veritas, Ottawa, Ontario) included alkalinity and calcium. Section 5.3 of this report discusses the sampling results.

3 Physical Setting

3.1 Site Physiography and Drainage

Based on the available physiographic mapping information, the Site is located primarily within the Till plains. This physiographic region is characterized by drumlins and gently undulating to moderately sloping topography (Chapman and Putnam, 1984). Based on the available topographic information, the area of the Site with the existing structures at the property entrance is about 90 to 91 m above mean sea level (masl) and topographic elevations appear to slope downwards going north-northeast of the existing structures. The area around the existing unnamed creek located to the north-northeast of the existing structures is relatively flat suggesting poor drainage. The unnamed creek in the north-northeast area of the existing structures is characterized by the presence of northern and north-western branches. These two (2) branches coalesce into a single stream about 100 m northeast of the property entrance and the coalesced stream is referenced by Rideau Valley Conservation as “Cranberry Creek”. It appears that the part of Cranberry Creek discharges into the Rideau River based on the topographic elevation differences between the Rideau River (85 masl) and the subject property (89 masl to 92 masl).

The area to the west of the existing structures is relatively flat with topographic elevations at about 89 masl and topographic elevations increasing to 92 masl in the proximity of Highway 416. Another ditch or an unnamed creek originates from the north-western portion of the property bordering the wooded area. The Rideau Valley Conservation identifies the watercourses present within the property as either first or second-order streams based on the Ontario Hydro Network classification.

A review of the available information from MNRF and Rideau Valley Conservation indicates the presence of wetlands bordering the unnamed creeks within the property. The areas bordering the watercourses within the property are identified as located within the regulated areas of a flood plan by Rideau Valley Conservation.

3.2 Site Surficial and Bedrock Geology

According to the Ontario Geological Survey surficial geology map (OGS, 2010), which provides geological information on a regional scale indicates the surficial geology of the Site surrounding is comprised of till materials or coarse-textured glaciomarine deposits overlying the Paleozoic terrain with varying proportions of silt and clay.

The overburden materials encountered within the Site during the borehole investigation consisted of the following and a copy of the borehole logs is provided in Appendix B:

- Topsoil /Organic Soil: A surficial layer of topsoil was identified at boreholes BH21-08 and BH21-09. The thickness of the topsoil was approximately 200 mm and consisted of silty clay and silt in BH21-08 and BH21-09 respectively. A layer of organic soil was identified at the ground surface at boreholes BH21-05, MW21-06, BH21-07, and BH21-10. The thickness of the organic soil ranged from approximately 900 mm to 1,700 mm and consisted of silty clay to silty sand, dark brown to brown,
- Fill: Fill associated with the house construction was identified in borehole MW21- 01. The thickness of the FILL layer encountered within the borehole MW21-01 was approximately 1.1 m and consisted of sand and gravel, brownish grey, underlain by silty sand and some gravel.
- Sand and Silt: Native sand/silt material was identified below the fill in borehole MW21-01, at the surface in boreholes BH21-02 to BH21-04, and below the topsoil/organic soil in BH21-05, BH21-07, and BH21-09. The sand/silt material extended to depths ranging from 1.7 to 2.3 mbgs, corresponding to elevations ranging from 84.5 to 85.6 masl.
- Silty Clay: Native silty clay was identified below the sand/silt material in boreholes MW21-01, BH21-02, BH21-05, BH21-07, and below the topsoil in borehole BH20-08. The native silty clay in boreholes BH21-02, BH21-07, and BH21-08 was first encountered in a weathered/desiccated crustal state at depths ranging from 0.2 to 1.7 mbgs and extending to depths ranging from 1.7 to 2.4 mbgs. The corresponding thickness of the crustal layer ranged from 0.7 to 1.5 m. Below the crust, the silty clay was encountered in an un-weathered condition. The weathered silty clay was brown, and the unweathered material was grey in colour. The silty clay deposits in MW21-01, BH21-02, BH21- 07 extended to depths ranging from 3.5 to 5.1 mbgs, corresponding to elevation ranging from 82.5 to 83.4 masl and a total thickness ranging from 2.3 to 3.3 m. Only a weathered silty clay layer was encountered in boreholes MW21-01 and BH21-05 extending to depths ranging from 3.0 to 3.2 mbgs, corresponding to elevations ranging from 84.2 to 84.5 m.
- Glacial Till: Glacial till was encountered below the topsoil in boreholes MW21-06 and BH21-10, below the sand/silt in boreholes BH21-03, BH21-04, BH21-05, and BH21-09, and below the silty clay in boreholes MW21-01, BH21-02, BH21-07, BH21-08. Boreholes MW21-01, BH21-02, BH21-03, BH21-04 and MW21-06 were terminated in the till at a depth of 6.1 mbgs, corresponding to elevations ranging from 81.1 to 81.8 masl. Boreholes BH21-07, BH21-08, BH21-09, and BH21- 10 were also terminated in the till on auger refusal on an inferred boulder at depths ranging from 4.2 to 5.9 mbgs, corresponding to elevations ranging from 81.0 to 83.1 masl.

According to the Ontario Geological Survey surficial geology map (OGS, 2010), the Site overburden materials are underlain by the Oxford Formation dolostone and/ or limestone. The Oxford Formation of the

Paleozoic age is characterized by dolostone and limestone with localized minor shales and thin sandstone beds (Armstrong, D.K., and J.E.P. Dodge, 2007). A review of the MECP water well records within the Site and immediate area indicates that the depth to the bedrock interface varies approximately from a minimum of about 4.8 m to a maximum of about 27 m depending on the location. A copy of the water well records reviewed as part of this study is included in Appendix G.

A review of the water well records identified within the property indicates that the average depth to the bedrock interface is about 12 m within the Site and depth to the bedrock interface varies from a minimum of 7.3 m at PW21-01 (MECP Well ID# 1516779) located near the existing structures within the property to a maximum of 25.3 m at MECP Well ID# 1526608 located within the southwestern portion of the property near the Highway 416.

3.3 Terrain Units

Given the limited scope of the field investigation, it is not feasible to delineate the bounds of terrain units within the Site without collecting additional information. However, based on the preceding discussion on the surficial geology of the Site, borehole investigation results, grain size analysis, and general interpretations of the physiographic features of the Site, it is possible to identify the major terrain units comprising the Site within the context of planned future septic sewage disposal systems. It should be noted that the location of the future septic field and associated metrics such as the maximum daily sewage disposal rates and the class of the septic system (Class 4 or 5) are not yet determined. It is recommended that the soil percolation tests per the Ontario Building Code be conducted upon the identification of septic bed and system location in addition to boreholes. The area selected for siting the planned septic system should not be located within the 100-year flood event extents specified by the Rideau Valley Conservation Agency and meet the setback distances prescribed in the Ontario Building Code.

Based on the information collected from the borehole investigation, in the north-western portion of the proposed development area, a layer of silty sand (Till) was found underlying the organics at MW21-06. The grain size analysis of a soil sample collected from the silty sand layer is comprised of 54 % sand and 28 % silt & clay. The thickness of this organics layer was also intercepted in BH21-05 located in the south, BH21-07 located near the north-eastern portion of the site, and BH21-10 located near the southern property boundary (Refer to Figure 3, Appendix A). A layer of till was intercepted in all of the boreholes and Till was found overlying the Paleozoic limestone bedrock at BH21-05.

A layer of silty clay or clay was intercepted in MW21-01, BH21-02, BH21-05, BH21-07, and BH21-08 typically overlying the glacial Till and underlying the topsoil or silty sand. The silty clay or clay was not intercepted as the surficial layer in the areas where borehole instigation was conducted. Depending on the depth of the clay or silty clay layer in the subsurface, septic effluent could mound and result in incomplete treatment if

the presence of clay or silty clay materials is not considered in the septic design. Soil samples collected from the silty clay or clay layer intercepted in BH21-02 and BH21-05 indicated that this soil material is characterized by a liquid limit of about 20% to 52%. The soil samples from BH21-05 were interpreted as sandy silty clay (CL) with low to medium plasticity. The soil materials of low to medium plasticity (i.e., CL) are identified as having a percolation time of over 50 minutes per centimetre (mins/cm) and hydraulic conductivity of 10^{-6} cm/sec (centimetre per second). or less by the Ontario Building Code (OBC, 2012). The soil samples from BH21-02 were interpreted as silty clay (CL or CH) with low to high plasticity. The soil materials of low to high plasticity are identified as having a percolation time of over 50 mins/cm and hydraulic conductivity of 10^{-7} cm/sec. or less by the Ontario Building Code (OBC, 2012). The results of sieve analysis and Atterberg limit tests are provided in Appendix C of this report.

3.4 Site Hydrogeology

Information on the Site hydrogeology and groundwater availability was inferred by reviewing the MECP water well records for the properties located immediately north, northwest, south, and southwest of the Site. The shallow monitoring wells (MW21-01, MW21-06) completed as part of this study indicated the presence of a Till aquifer overlying the bedrock. A review of the MECP water well records for the Site and surrounding area suggested that there were two unsuccessful attempts (MECP well records# 1514870 and 1512294) in the past to obtain adequate groundwater supply from the till and bedrock interface.

The MECP well records for the Site and nearby properties (refer to Table 3-1) indicated that groundwater is obtained primarily from the Oxford Formation dolostone and/ or limestone or sandstone with recommended pumping rates are highly variable with the maximum recommended pumping rate at 200 L/min (Litres per minute). Well terminating depths of the reviewed water well records are a function of the water found depths and driller recorded water found depths varied from 18.3 mbgs to 65.5 mbgs with the average water found depth of 33. 4 mbgs. A summary of the information extracted from the MECP water well records is presented in Table 3-1.

Table 3-1: Summary of MECP Well Record Information for the Site and Surrounding Area

Well ID #	Well Depth (mbgs)	Water Found Depth (mbgs)	Pump Depth (mbgs)	Pumping Rate (L/min)	Pumping Duration (min)	Water Level at the End of Pumping (m)	Inferred Depth to Bedrock (m)
1516779 (PW21-01)	65.5	65	9.1	91	60	9.1	7.3
1514870	7.6	7.5	6.1	113	60	6.0	7.6
1514695	35.3	34	27.4	11	60	18.2	27
1534319	45.7	42.3	7.62	190	60	8.2	11.5
1526608	31.4	29.5	24.4	57	60	9.1	25.3

Well ID #	Well Depth (mbgs)	Water Found Depth (mbgs)	Pump Depth (mbgs)	Pumping Rate (L/min)	Pumping Duration (min)	Water Level at the End of Pumping (m)	Inferred Depth to Bedrock (m)
1518449	25.6	24.4	7.62	190	60	7.62	19.2
1533871	25	21.3	21.3	37.9	60	7.6	14.2
7048482	55.2	45	51.2	23	60	32	8.2
1514876	41.1	39.6	30.5	2	60	30	6.4
1513560	24.4	22.2	15.24	57	60	11	13.7
1511642	24.7	24.6	18.3	26	60	12.1	8
1513806	22.3	16.8, 22.2	13.7	30	60	12.2	7.6
1516795	18.3	13.7, 16.7	7.6	56	60	7.6	4.8
1516200	45.7	44	30.5	11	60	30.5	9.1
1518097	18.3	15	15	38	60	9.1	5.1
1513307	22.3	16.8, 22.2	13.7	19	60	12	7.6
1512294	11	9.1	9	23	60	7.6	6
BH21-05*	Not Applicable						5.8

Notes:
*Monitoring well installed as part of the study.

Well yield is the rate of water withdrawal that a well can supply over a period of time. Alternatively, well yield is the maximum pumping rate that can be achieved without increasing the drawdown in the well. The theoretical estimates of well yield can be obtained from the one-hour pumping test data presented in the MECP well records and Table 3-1 to assess the water supply potential of the bedrock aquifer underlying the Site and surrounding area.

To determine theoretical well yield from the water well records, specific capacities of these can be determined from the 60-minute constant-rate pumping test data. The specific capacity of a well is normally estimated as follows:

$SC = Q/S$

Where SC = Specific Capacity (m^3/day/m)

Q = discharge or pumping rate (m^3/day)

s = drawdown (m)

The theoretical well yield or maximum pumping rate can be estimated by multiplying the specific capacity by the maximum available drawdown. It is necessary to apply a 30% safety factor, utilizing only 70% of the available drawdown, when estimating the maximum pumping rate for each well record. The following table presents the estimates of specific capacity and maximum pumping rates or theoretical well yield for the bedrock aquifer underlying the Site and surrounding area. A review of water level data in the records

1526608, 1533871, and 1518097 appeared to be incorrect and these well records were not considered in the specific capacity estimates.

Table 3-2: Estimates of Specific Capacity based on MECP Well Record Information for the Site and Surrounding Area

Well ID #	Well Depth (mbgs)	Static Water Level (mbgs)	Pumping Rate (L/min)	Pumping Rate (m^3/day)	Water Level at the End of Pumping (m)	Approx. Estimated Drawdown (m)	Approx. Estimated Specific Capacity (m^3/day/m)
1516779 (PW21-01)	65.5	1.82	91	131	9.1	7.28	18
1514870	7.6	1.83	113	162.72	6.0	4.17	39.02
1514695	35.3	4.5	11	15.84	18.2	13.7	1.16
1534319	45.7	0.64	190	273.6	8.2	7.56	36.19
1518449	25.6	2.4	190	273.6	7.62	5.22	52.41
7048482	55.2	1.86	23	33.12	32	30.14	1.10
1514876	41.1	1.5	2	2.88	30	28.5	0.10
1513560	24.4	2.4	57	82.08	11	8.6	9.54
1511642	24.7	1.8	26	37.44	12.1	10.3	3.63
1513806	22.3	3.0	30	43.2	12.2	9.2	4.70
1516795	18.3	2.4	56	80.64	7.6	5.2	15.51
1516200	45.7	3.0	11	15.84	30.5	27.5	0.58
1513307	22.3	3.0	19	27.36	12	9	3.04

The estimated specific capacity values varied from 0.58 to 52.41 m^3/day/m with an average value of 14 m^3/day/m. The maximum pumping rate of a well can be theoretically estimated using the initial specific capacity in Table 3-2. The approximate values of the maximum pumping rate are calculated as the specific capacity times the maximum available drawdown. The maximum available drawdown is estimated based on the pump depth information in Table 3-1 and a metre of the water column will be maintained above the submersible pump. Table 3-3 presents the estimates of maximum pumping rates based on the approximate driller recorded information in the water well records and conservatively accounting for the available head above the pump depth minus one metre of space above the pump top to avoid dry running of the pump.

Table 3-3: Estimates of Maximum Pumping Rate based on MECP Well Record Information for the Site and Surrounding Area

Well ID #	Well Depth (mbgs)	Static Water Level (mbgs)	Pumping Rate (m^3/day)	Water Level at the End of Pumping (m)	Approx. Estimated Drawdown (m)	Available Head (m)	Approx. Estimated Specific Capacity (m^3/day/m)	Approx. Estimated Max. Pumping Rate (m^3/day)
1516779 (PW21-01)	65.5	1.82	131	9.1	7.28	6.28	18	113
1514870	7.6	1.83	162.72	6.0	4.17	3.27	39.02	128
1514695	35.3	4.5	15.84	18.2	13.7	21.9	1.16	25
1534319	45.7	0.64	273.6	8.2	7.56	5.98	36.19	216
1518449	25.6	2.4	273.6	7.62	5.22	4.22	52.41	221
7048482	55.2	1.86	33.12	32	30.14	48.34	1.10	53
1514876	41.1	1.5	2.88	30	28.5	28	0.10	2.8
1513560	24.4	2.4	82.08	11	8.6	11.84	9.54	113
1511642	24.7	1.8	37.44	12.1	10.3	15.5	3.63	56
1513806	22.3	3.0	43.2	12.2	9.2	9.7	4.70	46
1516795	18.3	2.4	80.64	7.6	5.2	4.2	15.51	65
1516200	45.7	3.0	15.84	30.5	27.5	26.5	0.58	15
1513307	22.3	3.0	27.36	12	9	9.7	3.04	29

The estimated maximum pumping rates varied from 3 to 221 m^3/day with an average value of 83 m^3/day. Applying the method of Razack and Huntley (1991), where transmissivity value can be estimated using the data presented in Table 3-3 and following empirical relationship. The approximate transmissivity estimates are presented in Table 3-4.

$$T = 15.3\ (Q/S)0.67$$

Estimated approximate transmissivity values ranged from 3 m^2/day to 217 m^2/day suggesting aquifer heterogeneity in addition to the influence of factors such as bedrock fracture connectivity and intensity, presence or absence of interconnected water-bearing fracture zones, and well depth.

Table 3-4: Estimates of Transmissivity based on MECP Well Record Information for the Site and Surrounding Area

Well ID #	Approx. Estimated Specific Capacity (m^3/day/m)	Approx. Estimated Max. Pumping Rate (m^3/day)	Approx. Estimated Transmissivity (m^2/day)
1516779 (PW21-01)	18	113	106
1514870	39.02	128	178
1514695	1.16	25	17

Well ID #	Approx. Estimated Specific Capacity (m^3/day/m)	Approx. Estimated Max. Pumping Rate (m^3/day)	Approx. Estimated Transmissivity (m^2/day)
1534319	36.19	216	169
1518449	52.41	221	217
7048482	1.10	53	16
1514876	0.10	3	3
1513560	9.54	113	69
1511642	3.63	56	36
1513806	4.70	46	43
1516795	15.51	65	96
1516200	0.58	15	11
1513307	3.04	29	32

These estimates are not substitutes for the field test results, these estimates are a useful approximation for understanding the water supply potential of the Site and surrounding areas. A copy of the MECP water well records located within the Site and nearby properties are included in Appendix G.

4 Aquifer Testing Program

4.1 Constant Rate Pumping Test in the Existing Water Supply Well PW21-01

The eight-hour constant rate pumping test was carried out in PW21-01. The following table summarizes the details of the pumping test program results.

Table 4-1: Pumping Test Program Results

Pumping Well	Test Date	Pumping Rate (L/min)	Pumping Duration (min)	Static Water Level (m toc*)	Available Drawdown (m)	Maximum Drawdown (m)	Percent Drawdown (%)	% Recovery in 120 mins
PW21-01	May 31, 2021	76	480	2.16	60.4	2.21	4	>95

Notes:
*metres above the top of the well casing. The well steel casing stick-up has a height of 0.67 m.

The well PW21-01 was pumped at a rate of 76 L/min (109,440 L/day) based on the results of background hydrogeological data review completed as part of this study and results of this background hydrogeological review is presented in Section 3 of this report. Groundwater drawdown and recovery measurements were recorded manually and electronically in the existing water supply well PW21-01 and monitoring wells MW21-01 and MW21-06.

After 120 minutes of pumping, the well PW21-01 appeared to be approaching a pseudo-steady-state condition with minor changes in the drawdown. During the final eighth hour of pumping, no changes in groundwater level were noted, indicating a steady-state condition. A drawdown of 2.21 m was measured after eight hours of pumping at a constant rate of 76 L/min. The observed drawdown equals approximately 4 percent of the total available drawdown of 60.4 m. It should be noted that the observed drawdown during the 8-hour pumping test conducted on May 31, 2021, and the initial one-hour yield test conducted at the time of well installation (Sept. 15, 1978) noted in Section 3 of this report are not comparable, it is possible that the variances in the drawdown could be associated with non-equilibrated conditions that might have existed at the time of well installation and higher pumping rates (20 imperial gallons per minute or 91 L/min) employed during the one-hour yield test.

The well PW21-01 recovered to 94.9% percent of the static groundwater level within 30 minutes after the end of the pumping phase. 120 minutes after the end of pumping, the groundwater level in the well PW21-01 recovered approximately 95.8% (2.16 mtoc of static water level vs. 2.25 mtoc after 120 minutes). A groundwater level of 2.17 mtoc was observed after 23 hours indicating >99% recovery.

Groundwater levels in shallow overburden observation wells MW21-01 and MW21-06 were monitored continuously during the constant rate pumping test and no perceptible groundwater level changes were noted at MW21-06 completed in silty sand Till, which is located approximately 525 m southwest of PW21-01, however, observed groundwater levels at MW21-01 varied insignificantly throughout the test. A maximum drawdown of 0.18 m was observed at MW21-01 located approximately 35 m from PW21-01 after 480 minutes of pumping. Groundwater levels in MW21-01 recovered >95% within 60 mins of the cessation of pumping at MW21-01. A 100% recovery was noted in MW21-01 on June 1, 2021.

4.2 Estimates of Transmissivity Values and Test Well Yields

The objective of the constant rate pumping test carried out as part of the hydrogeological study is to estimate the aquifer properties such as the transmissivity of the limestone/dolostone aquifer intercepted in PW21-01. The estimate of transmissivity value can be used to identify groundwater supply potential at PW21-01.

The following table presents the estimates of aquifer transmissivity based on the pumping test data.

The results of the aquifer test analysis are provided in Appendix D.

Table 4-2: Estimates of Aquifer Transmissivity

Well ID	Stratigraphic Unit	Transmissivity (m^2/day)[1]	Groundwater Supply Potential[2]
PW21-01	Paleozoic limestone/dolostone bedrock	55.5	Local water supply

Notes:
1. Aquifer test analysis was carried out using the Aqtesolv Version 4.5.
2. per Kransy, J., 2002. Quantitative Hard Rock Hydrogeology in a Regional Scale, NGU Bulletin 439, 2002 -Page 7

Estimates of the specific capacity of PW21-01 can be estimated by dividing the pumping rate (109.4 m^3/day) by drawdown (i.e., 2.21 m). Maximum pumping rate can be estimated based on the available head (approximately 6.61 m) above the pump depth of 9.1 m in the existing water well PW21-01 while accounting for the static water level of 1.49 mbgs and one m of space above the pump top to avoid dry running of the pump. The estimated max. the pumping rate of 327 m^3/day is calculated based on the specific capacity times the maximum available head or drawdown. However, the estimated max. pumping rate does not account for seasonality, reductions in the specific capacity of a well that occur over time due to the mineral encrustations or biofouling or deterioration in the well condition and further, estimated theoretical maximum pumping rate may not be sustainable.

The method of Cooper and Jacob (1946) can be used to estimate the maximum theoretical sustainable yield:

$$Q_{max} = \frac{E \cdot s_{max} \cdot T}{0.183 \log (2.25\, Tt / r^2 S)}$$

Where:

Qmax = the maximum allowable (sustainable) discharge expressed in m^3/day

Smax = the maximum allowable drawdown of 4.61 m was applied (Smax = maximum seasonal water level decline of 2 m based on the review provincial groundwater monitoring network groundwater level data for the Rideau Valley Conservation – available head of 6.61)

t = time between two rainy seasons (about 180 days in Ottawa or late October to mid-April)

r = well radius, the effective well radius of 0.0762 m was applied

T = transmissivity in m^2/day

S = the storativity of the aquifer

E = the well efficiency as a fraction of 1, calculated as theoretical drawdown divided by actual drawdown. A well-efficiency value of 0.75 was applied.

The estimated maximum sustainable well yield of 118 m^3/day was obtained based on the method of Cooper and Jacob.

Table 4-3: Estimates of Specific Capacity, Maximum Pumping Rate, and Sustainable Well Yield

Well ID	Stratigraphic Unit	Approx. Estimated Specific Capacity (m^3/day/m)	Estimated Max. Pumping Rate (m^3/day)	Estimated Theoretical Sustainable Well Yield (m^3/day)
PW21-01	Paleozoic limestone/dolostone bedrock	49.5	327	118

It is understood that the proposed zoning amendment for the lands within Part 1 of the Site would be to less sensitive uses (RC, rural commercial with exclusions to exclude sensitive uses) where the number of employees would be low and it does not rely on the potable water supply. The potential less-sensitive uses include such as an artist studio, automobile rental establishment, automobile service station, car wash, detached dwelling, parking lot, heavy equipment servicing, warehouse, farmers market, etc., however, the exact potential less-sensitive uses are unknown at this time and it is recommended that the maximum day demand of any potential future less-sensitive use be determined through a servicing report at the time of site plan control application in conjunction with the data presented in this section of the report.

4.3 New Test Well

In October 2024, the Client retained Splash Well Drilling of Prescott, Ontario to find a source of groundwater supply in the shallower horizons of the limestone bedrock. A new test well was installed to approximately 12 m with a water-found depth of approximately 10 m. Appendix B-2 contains the MECP well record for this new water well. Groundwater sampling was completed on October 30, 2024, to assess the groundwater quality for the selected general chemistry, inorganics, and metal parameters. No pumping tests were conducted to estimate the well yields due to the poor water quality and MCCRT exceedances of sodium and chloride.

5 Groundwater Quality

5.1 Groundwater Sampling Results (May 2021) – Existing Water Supply Well PW21-01

The groundwater quality of the water samples from the existing water supply well PW21-01 located on the Site was analytically determined by collecting samples during the eight-hour aquifer testing program conducted on May 31, 2021. Groundwater samples were also collected from the monitoring wells MW21-01 and MW21-06.

A total of two (2) groundwater samples (PW21-01 - 4 HRs and PW21-01- 8 HRs) were collected at 4-hour and 8-hour marks during the eight-hour aquifer testing program at the existing water supply well PW21-01. Groundwater sampling results were compared to the standards and objectives specified in the Ontario Drinking Water Quality Standards (ODWQS) (MECP, 2006) and the maximum treatability limits included in the MECP Procedure D-5-5. Free residual chlorine in groundwater samples was tested in the field using the Hanna™ Model HI93414 during the pumping phase of the testing program. Groundwater samples submitted to the analytical laboratory were also tested for free residual chlorine in addition to total chlorine. Laboratory certificates of analysis and summary tables comparing reported concentrations to the applicable standards, objectives, and treatability limits are included in Appendix E-1 of this report.

Except for sodium and chloride, the reported concentrations of other parameters met the ODWQS in groundwater samples from PW21-01. The parameter exceedances of sodium and chloride in groundwater samples from PW21-01 are associated with the aesthetic objectives of ODWQS.

The following is a summary of key observations relevant to the groundwater quality:

- **Alkalinity (Total):** Alkalinity in the range of 30 mg/L to 100 mg/L is acceptable for the operational efficiency of most water treatment systems. However, alkalinity (as $CaCO_3$) was detected in groundwater samples at a concentration of 250-360 mg/L, which is below the operational guideline value of 500 mg/L.
- **Chloride:** Higher than normal levels of chloride (>250 mg/L) in water would likely cause corrosion and shorten the life of plumbing and piping associated with the treatment systems (AWWA, 2010). Chloride concentration in groundwater samples varied from 480-490 mg/L. The reported concentration of chloride in groundwater exceeded the objective level and treatability limit or the maximum concentration considered reasonably treatable (MCCRT) of 250 mg/L. It is understood that the City does not consider treatment for certain types of industrial and commercial developments, however, the proposed zoning amendment for Part 1 of the Site would be to less sensitive uses (RC,

rural commercial with exclusions to exclude sensitive uses) where the number of employees would be low and it does not rely on the potable water supply. Further, the proposed zoning amendment to a less sensitive use would set the limits such that there would not be any significant effect on the use of groundwater on the neighbouring properties and it is professional opinion that permitting the chloride exceedance would not adversely impact the groundwater resources on the Site and neighbouring properties. It is also recommended that salt management plans be implemented as part of future development depending on the type of less sensitive use (for example, parking lot The most common water treatment systems for reducing the chloride content of drinking water are reverse osmosis, anion exchange, or distillation treatment systems). For additional recommendations concerning the treatment of chloride and other issues such as the corrosivity of water on the lifespan of plumbing fixtures in groundwater, please refer to section 5.4.

- **Hardness (as $CaCo_3$):** Hardness in groundwater samples varied from 370 mg/L (PW21-01 - 4 HRs) to 390 mg/L (PW21-01 - 8 HRs). Reported concentrations of hardness exceeded the operational guideline value range of 80 to 100 mg/L. The degree of hardness of water may be classified in terms of its calcium carbonate concentration as follows: soft, 0 to <60 mg/L; medium-hard, 60 to <120 mg/L; hard, 120 to < 180 mg/L; and very hard, 180 mg/L and above (AWWA, 2010). For additional recommendations concerning the treatment of hardness, please refer to section 5.4.
- **Iron:** Iron in groundwater samples detected was at a concentration of 0.11 mg/L (PW21-01 - 4 HRs and PW21-01- 8 HRs), and detected concentrations were below the aesthetic objective of 0.3 mg/L and the treatability limit of 5 to 10 mg/L.
- **Manganese:** Manganese in groundwater samples were detected at concentrations varying from 0.012 mg/L (PW21-01 - 4 HRs) to 0.014 mg/L (PW21-01- 8 HRs). Reported concentrations of manganese in groundwater samples from PW21-01 were above the aesthetic objective of 0.05 mg/L but below the treatability limit of 1 mg/L. Manganese at concentrations higher than 0.05 mg/L may cause staining of the treatment system piping and vessels (AWWA, 2010). For additional recommendations concerning the treatment of manganese, please refer to section 5.4.
- **Microbiological Parameters (E. Coli, Fecal and Total Coliforms):** No microbiological exceedances were reported for the groundwater samples collected on May 31, 2021.
- **Nitrate and Nitrite (as N):** The presence of nitrate and nitrite in groundwater samples at concentrations lower than the laboratory reportable detection limit (i.e., <0.10 for Nitrate and <0.010 Nitrite) is not a treatment or operational issue. The maximum acceptable concentration of nitrates in drinking water is 10 mg/L as nitrogen. Nitrates are present in water (particularly groundwater) because of the decay of plant or animal material, the use of agricultural fertilizers, domestic sewage or treated wastewater contamination, or geological formations containing soluble nitrogen compounds.

- **pH:** The pH of water influences the rate of the chemical reaction and the degree to which many chemical reactions occur (AWWA, 2010). For example, the treatment efficiency of chlorine disinfection decreases in waters with pH levels above 8.5. Reported values of pH in groundwater samples were within the acceptable ODWQS range and varied from 7.96 (PW21-01 - 4 HRs) to 7.86 (PW21-01- 8 HRs).
- **Sodium:** Sodium was detected at concentrations varying from 300 mg/L (PW21-01 - 4 HRs) to 320 mg/L (PW21-01 - 8 HRs) and above the sodium notification limits, MCCRT, and aesthetic objectives. Under the Safe Drinking Water Act, the Ontario Drinking Water Systems Regulation (170/03 as amended) requires that a report be made to the local Medical Officer(s) of Health if a sodium result exceeds 20 mg/L in a sample of drinking water. It is understood that the City does not consider treatment for certain types of industrial and commercial developments, however, the proposed zoning amendment for Part 1 of the Site would be to less sensitive uses (RC, rural commercial with exclusions to exclude sensitive uses) where the number of employees would be low and it does not rely on the potable water supply. Further, the proposed zoning amendment to a less sensitive use would set the limits such that there would not be any significant effect on the use of groundwater on the neighbouring properties and it is professional opinion that permitting the sodium exceedance would not adversely impact the groundwater resources on the Site and neighbouring properties. It is also recommended that salt management plans be implemented as part of future development depending on the type of less sensitive use (for example, parking lot). Sodium in the groundwater supply can be reduced by employing water treatment systems such as reverse osmosis and ion exchange. For additional recommendations concerning the treatment of sodium in groundwater, please refer to section 5.4.
- **Sulphide (as H2S):** Sulphide (as H2S) was detected at concentrations lower than the laboratory method detection limit of <0.020 mg/L.
- **Tannins and Lignins:** Tannins and Lignins were at concentrations lower than the laboratory reportable detection limit of <0.2 mg/L in groundwater samples from PW21-01.
- **Total Suspended Solids:** Total Suspended Solids (TSS) were detected at concentrations varying from 3 mg/L (PW21-01 - 4 HRs) to 2 mg/L (PW21-01 - 8 HRs) below the aesthetic objective of 500 mg/L.
- **Turbidity:** Reported values of turbidity in groundwater samples varied from 1.0 NTU (PW21-01 - 4 HRs) to 0.7 NTU (PW21-01 - 8 HRs) and were lower than the aesthetic objective of turbidity (> 5 NTU).
- **Pesticides & Herbicides:** Both samples were tested negative for common pesticides and herbicides.

- **Volatile Organic Compounds:** Both samples tested negative for the analyzed volatile organic compounds.

Groundwater samples were also collected from the observation wells MW21-01 and MW21-06, no detectable concentrations of nitrate or nitrite as nitrogen were reported in the samples collected on March 15, 2021 (for more details, refer to Appendix F). A discussion of groundwater sampling results associated with these monitoring wells is provided in the accompanying Phase II Environmental Site Assessment Report.

5.2 Groundwater Sampling Results (October 2024) – New Test Well Installed in 2024

In October 2024, the Client installed a test water well and following the installation of the test groundwater exploration well, groundwater sampling was completed on October 30, 2024, to assess the groundwater quality for the selected general chemistry, inorganics, microbiological and metal parameters. The results of October 30, 2024, indicated that no detectable concentrations of microbiological parameters and the reported concentrations of chloride, hardness (as $CaCo_3$), iron, manganese, and sodium exceeded the aesthetic objectives. The reported concentrations of chloride and sodium exceeded the treatability limits or MCCRT.

Appendix E-2 provides the certificates of analysis associated with the October and November 2024 sampling events.

5.3 Groundwater Sampling Results (September 2024 and January 2025) – Existing Water Supply Well PW21-01

In September 2024, Englobe collected a groundwater sample from the existing water supply well PW21-01 for the analysis of chloride and chloride. The reported concentrations of chloride and sodium exceeded the treatability limits or MCCRT. Section 5.4 provides the treatability recommendations for sodium and chloride. Appendix E-3 provides the certificates of analysis associated with the September 2024 sampling event.

In response to the City comments dated November 19, 2024, and comments 4 and 7, Englobe collected groundwater samples on January 20, 2025, for the laboratory analysis of total dissolved solids and field testing of colour, pH, temperature, conductivity, turbidity, hydrogen sulphide (using the Methylene Blue method) and chlorine residual. The field testing results are summarized in Table 5-1. The reported value for colour exceeds the aesthetic objective of 5 TCU (True Colour Units) and the reported value of pH is within operational guideline values of 6.5 and 8.5. The reported value of turbidity exceeds the aesthetic objective of 5 NTU (Nephelometric Turbidity Unit).

Table 5-1: Field Testing Results

Well ID	Temperature (°C)[1]	pH[3]	Colour (TCU)[2]	Turbidity (NTU)[1]	Electrical Conductivity (mS/cm)[1]	Chlorine Residual mg/L[2]
PW21-01	7.69	7.05	17	106	2.50	0.0

Notes:

1. Field measurement from Horiba™ U-52 multi-parameter probe
2. Field measurements from the Hach™ DR 900 colorimeter
3. Field measurement from Hanna™ H1991300 portable water quality meter

In the November 2024 comments letter, the City required the field determination of H2S using the Methylene Blue method. However, the local distributor for the Hach Calorimeter notified Englobe that the chemical regents for the analysis H2S are back ordered and the wait time was not suitable for the timelines. To minimize analyte loss and obtain similar results, Englobe collected the sample and preserved it immediately in the field using Zinc Acetate and Sodium Hydroxide to pH>9, kept at a temperature <10 degrees Celsius, and then analyzed within 24 hours by a CALA accredited laboratory following method SM 24 4500 S2-A D Fm. This provides a more accurate value while still meeting the City's requirement of using the Methylene Blue method. This method is commonly used in assessing the water quality at municipal drinking water wells to meet the requirement of the MECP drinking water license.

The laboratory analytical results for the H2S indicated non-detectable concentration. The laboratory analytical results for the TDS exceeded the aesthetic objective of 500 mg/L at a concentration of 1180 mg/L.

The parameters tested at the laboratory included alkalinity and calcium. Based on the field parameters and laboratory analytical values of temperature, pH, alkalinity, TDS, and calcium, the Langelier Saturation Index (LSI) and Ryznar Stability Index (RSI) were estimated. The estimated LSI values were negative indicating that water is mildly corrosive, whereas the estimated RSI was greater than 6.5 indicating that the water is probably corrosive.

Removing high concentrations of dissolved salts such as sodium and chloride through an appropriate treatment system coupled with corrosion-resistant plumbing such as plastic jacketed copper tubing, crosslinked polyethylene (PEX) high-temperature flexible polymer tubing, and polyvinyl chloride tubing (PVC) could minimize the corrosion in the plumbing and treatment systems.

Section 5.4 provides the treatability recommendations. Appendix E-4 provides the certificates of analysis associated with the January 2025 sampling event and LSI and RSI estimates.

5.4 Groundwater Treatment Recommendations

As discussed in sections 5.1 and 5.3, water quality results for the raw water samples collected from the existing water supply well PW21-01 indicated exceedances of colour, chloride, hardness, manganese, sodium, TDS, and turbidity.

The most effective way to treat the parameter exceedances such as colour, hardness, and turbidity is to use the sand filter (alternatively a system comprised of 1-micron and 5-micron sediment cartridge filters) and activated carbon column to improve the colour of the water and remove particulate matter causing the elevated turbidity values, then followed by water softener treatment for reducing the level of hardness to the operational guideline value range of 80 to 100 mg/L. The cartridge-style sediment filters can be used to remove the small amounts of manganese detected in the water samples from PW21-01.

The next important step in the treatment process typically involves the treatment of the softened water using systems such as a nanofiltration/reverse osmosis unit to reduce the levels of sodium and chloride. The softened water typically passes through a pre-filter and a high-pressure pump before entering the nanofiltration/reverse osmosis unit. The nanofiltration/reverse osmosis unit reduces the concentrations of sodium, chloride, and TDS in water. The reduction in the TDS also presents the opportunity for reducing manganese in a post-treatment step using an oxidizing filter if required. Additional design considerations regarding the post-treatment include the addition of ultra-violet (UV) disinfection or controlled addition of potable quality caustic (sodium hydroxide) for increasing the pH and minimizing the downstream corrosion of piping and fixtures.

As discussed previously, the removal of high concentrations of dissolved salts such as sodium and chloride coupled with the use of corrosion-resistant plumbing such as plastic jacketed copper tubing, crosslinked polyethylene (PEX) high-temperature flexible polymer tubing, and polyvinyl chloride tubing (PVC) could minimize the corrosion in the plumbing, treatment systems as well as improve the lifespan of the plumbing fixtures and the septic system.

The preceding recommendations should not be construed as the design recommendations for the water treatment, a water treatment specialist should be consulted once the exact less-sensitive use of the Part 1 of the Site and the maximum water demand is determined by the future owner.

5.5 Rationale for Permitting the Exceedances

1. **Every effort was made to find a suitable source of groundwater that meets the MCCRT parameters:** To address the City's comments noted in the November 19, 2024 letter, "*every effort will be made to find a source of groundwater meeting the MCCRT parameters, which should include the discussion of other potential source/aquifer*", following efforts in the groundwater

exploration of the Site was completed to find other potential sources of groundwater supply in the overburden, overburden and bedrock interface, and shallow bedrock. The deeper bedrock aquifer at the Site was already explored with the existing water well (PW21-01) which was installed in 1978 and obtains groundwater from a depth of about 65 m at the limestone and sandstone interface.

As a first step, the potential for a good source of groundwater supply within the overburden materials at the Site was assessed by reviewing the available background information. The surficial geology of the site is comprised of a thin veneer of silty sand till overlying the Paleozoic bedrock in the southwestern part of the Site and reminder of the Site is comprised of glaciomarine deposits according to the Ontario Geological Survey's surficial geology of Southern Ontario map (OGS, 2010). The sand and gravel or esker deposits with sufficient thickness and lateral extents could host aquifers capable of yielding groundwater for potable purposes, however, the glaciomarine deposits and silty sand till overlying the bedrock did not contain highly permeable materials of sufficient thicknesses or lateral extent. This is further evident in the water well records (i.e., the MECP well records the Site and nearby properties) examined as part of the background review indicated that groundwater is obtained primarily from the Oxford Formation dolostone and/ or limestone or sandstone (refer to Table 3-1 for well details and Appendix G for the well records). Groundwater sampling results from the monitoring wells (i.e., MW21-01 and MW21-06) installed in the overburden within the Site indicated elevated levels of total dissolved solids in concentrations ranging from 328 mg/L to 754 mg/L (refer to Table F-1 in Appendix F), thus, no further assessment of the overburden was conducted for purposes of identifying a potential source of groundwater supply for the Site.

In the second step, a review of the MECP water well records for the Site and surrounding area suggested that there were two unsuccessful attempts (MECP well records# 1514870 and 1512294, (refer to Table 3-1 and Appendix G) in the past to obtain adequate groundwater supply from the till and bedrock interface indicating the absence of an interface aquifer.

In the third and final step, the Client retained Splash Well Drilling of Prescott, Ontario in October 2024 to find a source of groundwater supply in the shallower horizons of the limestone bedrock. A new test well was installed to approximately 12 m with a water-found depth of approximately 10 m. Appendix B-2 contains the MECP well record for this new water well. Groundwater sampling completed on October 30, 2024, indicated that the concentrations of chloride and sodium exceeded the treatability limits or MCCRT and confirmed that the shallow bedrock aquifer is not a suitable source of groundwater supply. Appendix E-2 contains the laboratory certificates of analysis.

2. **Permitting the MCCRT exceedances and the zoning by-law amendment to less-sensitive uses:** The existing water well (PW21-01) installed in 1978 (MECP Well ID: 1516779) obtains groundwater from a depth of about 65 m at the limestone and sandstone interface. The water

well record (refer to the last water well record in Appendix G) identifies water quality at the time of well installation in 1978 as “fresh”. The existing water well (PW21-01) obtained groundwater primarily from the Oxford Formation, which is part of the Nepean-March-Oxford hydrostratigraphic unit. The MECP publication titled, “*Hydrogeology of the Southern Ontario*”, notes, “*the quality of groundwater within the Neapean-March-Oxford hydrostratigraphic Unit is available for 17,390 wells. The majority of these wells yield fresh water. A few of these wells, however, yield sulphurous water (193 wells) or salty water (33 wells)*”, which confirms that encountering salty water in the wells drilled in the Nepean-March-Oxford hydrostratigraphic unit is rare. From a hydrogeological point of view, pre-Cambrian hydrogeological units typically host high-salinity brines in deep crystalline and granitic bedrock environments and the Nepean-March-Oxford hydrostratigraphic unit does not host naturally occurring high-salinity brines. Further, the groundwater sampled from the overburden monitoring wells (MW21-01 and MW21-06) at the Site did not indicate the presence of sodium and chloride exceeding their respective aesthetic guideline values. The source of sodium and chloride in the shallow and deeper bedrock aquifers at the Site is unknown and likely associated with the winter salt application in the aquifer recharge areas and development of road networks and associated winter salt application within the vicinity of the Site over the last four decades.

It is understood that the City does consider treatment for industrial/commercial developments for aesthetic exceedances such as sodium and chloride exceedances. It is understood that the proposed zoning amendment for the lands within Part 1 of the Site is intended for the less sensitive uses (i.e., RC, rural commercial with exclusions to exclude sensitive uses) where the number of employees would be low and it does not rely on the potable water supply, therefore, the proposed zoning by-law amendment with permitting of the MCCRT exceedances (exceedances above the treatability limits) with an appropriately designed treatment system per recommendations in section 5.4 of this report for the Part 1 of the Site is not expected to result in the degradation of groundwater quality or quantity.

6 Evaluation of Subsurface Sewage

A septic system services the existing residential dwelling. A new on-site septic system is anticipated to be constructed to service future less-sensitive uses (RC, rural commercial with exclusions to exclude sensitive uses) of Part 1 of the Site where the number of employees would be low and the use does not rely on the potable water supply. The location of the planned septic system is unknown and depends on the type of future less-sensitive uses (e.g., artist studio, automobile rental establishment, automobile service station, car wash, detached dwelling, parking lot, heavy equipment servicing, warehouse, farmers market) selected as part of the site plan control application by the future owner.

The following evaluation is intended to support the zoning by-law amendment proposal and further site-specific evaluation of subsurface sewage would be required depending on the type and site plan of less-sensitive uses selected by the future owner.

The MECP Procedure D-5-4 also provides an approach for evaluating the potential impact of on-site sewage systems on the underlying water supply aquifer. The MECP D-5-4 procedure also considers the concept of system isolation, which is the potential for hydraulic isolation of the water supply aquifer from the surficial aquifers or soil materials receiving septic effluent. As discussed in Section 3 of this report, there is evidence of the presence of silty clay or clay of sufficient plasticity to retard the septic effluent. The results of sieve analysis and Atterberg limit tests are provided in Appendix C of this report. However, these fine-textured materials are not contagious in the areas investigated as part of the study, thus, an estimation of nitrate attenuation was performed per the MECP Procedure D-5-4 by applying the following assumptions and groundwater sampling results:

- It is estimated that the shallow groundwater direction is towards Cranberry Creek located northeast of the property and it is assumed that the future septic system would be located in an area outside of the 100-year flood extent and allowing for sufficient setback distances between the 100-year flood event extent defined by Rideau Valley Conservation.
- No detectable concentrations of nitrates were noted in groundwater samples from PW21-01, MW21-01, and MW21-06.
- The potential groundwater recharge as infiltration volume for the Site and surrounding area is provided in “Figure 5.2-1 titled Potential Groundwater Recharge of the Conceptual Understanding of the Water Budget” prepared by the Mississippi-Rideau Source Protection Region (March 2007), which is about 350 mm/year. It is anticipated that the areas containing wetlands and floodplain areas are likely to retard infiltration most of the year, planned impervious surface areas, and promote mostly surface water runoff. Therefore, it is conservatively assumed that the land area available for

infiltration would be limited to about 175,000 m^2, which is equivalent to half of the total area of 35 hectares. Further, it is assumed that the amount of potential infiltration that eventually contributes to the Site's shallow groundwater regime would be smaller than 350 mm/ year, a value of 175 mm/year is used in the estimation of nitrate dilution. The estimated infiltration volume is approximately 30,625 m^3/year.

- The maximum daily sewage discharge is assumed to be 9,000 L/day.
- The nitrate input as estimated as 1.31 x 10^8 mg/year (9,000 L/year x 40 mg/L x 365 days)
- The downgradient nitrate concentrations can be estimated by dividing the nitrate input by infiltration volume.

Based on the preceding assumptions, the estimated theoretical nitrate concentration is 4.3 mg/L complies with the requirements of Procedure D-5-4 concerning nitrate impacts.

It is Englobe's professional opinion that the potential for notable adverse impacts (i.e., nitrate as N in concentrations in excess of 10 mg/L) to the onsite water supply aquifer is low and the requirements of the MECP D 5-4 Procedure are met. Further, it is recommended that the percolation tests in the area of the future septic system per the Ontario Building Code be performed to develop the septic system design specifics. We note that there are new sewage system technologies available that could reduce the overall footprint of the septic system. Also, note that the partially or fully raised septic bed will mandate an increase in the minimum separation distance to the existing water supply well by twice the height of the raised system. The septic system designer should also reference the accompanying geotechnical investigation report regarding the limitations on the grade raises.

7 Evaluation of Potential Well Interference

Well interference is defined as the change in the groundwater level (drawdown) that occurs in one well as a result of groundwater extraction from another neighbouring well. Simply stated, the area of influence associated with groundwater extraction at the pumping well overlaps another adjacent well. If more wells are developed in the same area, then the potential for mutual well interference increases. In general, well interference results in a reduction of available drawdown in the affected well.

The theoretical drawdown at a radial distance from a pumping well can be evaluated by using the aquifer hydraulic properties presented in Section 4 of this report with the following Cooper-Jacob (1946) equation, written as:

$$s = \frac{0.183\ Q}{T} \cdot \text{Log} \frac{2.25Tt}{r^2S}$$

s = theoretical drawdown at a given distance (m)

Q = pumping rate (m^3/day)

T = estimated transmissivity for the existing water well from this study (m^2/day)

t = elapsed time since the start of pumping (days)

r = radial distance from pumping well (m)

S = estimated storativity estimate from the study (dimensionless)

It is understood that the proposed zoning by-law amendment for the lands within Part 1 of the Site would be to less sensitive uses (RC, rural commercial with exclusions to exclude sensitive uses) where the number of employees would be low and it does not rely on the potable water supply. The exact nature of the proposed uses is not known at this stage and the exact less-sensitive use of Part 1 of the Site would be determined by the future owner. Per the City email dated October 10, 2024, proposed less sensitive uses include such as an artist studio, automobile rental establishment, automobile service station, car wash, detached dwelling, parking lot, heavy equipment servicing, warehouse, farmers market, etc.

To estimate the cumulative drawdown using the Cooper-Jacob (1946) equation, it is assumed that the existing water well PW21-01 is the approximate centre of the future less sensitive use of Part 1 of the Site, then calculated the amount of drawdown at four of the existing well record locations located at a radial distance outside of the Site. The total drawdown is estimated by summing all drawdowns together. The same approach can be used to identify potential interference issues with neighbouring properties.

It is also assumed that PW21-01 would be pumping at a rate of about 5 m^3 during each morning and afternoon/evening peak hours for 20 years. It is possible that the actual peak demand could occur in the morning and afternoon/evening hours as two separate one-hour peak demand periods, permitting the recovery of groundwater between the two one-hour peak demand periods. The neighbouring wells were identified from the MECP well records and located across Dilworth Road at various distances identified in Table 7-1.

The results of this evaluation indicate that the cumulative peak two-hour theoretical drawdown at the test well PW21-01 is approximately 0.8 m, which includes the interference from the existing water supply well and offsite existing wells on the neighbouring properties.

Table 7-1 provides a summary of the theoretical drawdown that would occur at wells located at assumed distances from the PW21-01.

Table 7-1: Estimates of Predicted Drawdown – 2 Hour Peak Demand

Radial Distance from the Pumping Well (m)	Number of Wells Located at Specified Radial Distance		Predicted Drawdown Caused by a Single Well (m)	Drawdown Caused by All Wells at Specified Radial Distance (m)
	Onsite*	Offsite		
Well Record # 1516779 PW21-01	1	0	0.36	0.36
Well Record # 1514870 – 200 m	0	1	0.12	0.12
Well Record # 1514695 - 225 m	0	1	0.12	0.12
Well Record # 7048482 – 350 m	0	1	0.11	0.11
Well Record # 1514876 - 400 m	0	1	0.10	0.10
Total Number of Wells =	5		Total Cumulative Drawdown =	0.81

Notes:
*Existing water well PW21-01 is the only active well and six other water well records identified for the subject property are reportedly not active and the current condition of these historical wells is unknown.

Given the available head of 3.27 mbgs (well record# 1514870) to 48.24 mbgs (well record # 7048482), predicted drawdowns are considered acceptable.

It should be noted that the well interference estimation approach does not consider the hydrologic input from the recharge or boundary conditions, both of which would minimize the potential impacts of well interference. Further, the actual maximum day demand for the proposed less sensitive uses such as an artist studio, automobile rental establishment, automobile service station, car wash, detached dwelling, parking lot, heavy equipment servicing, warehouse, farmers market, etc., is yet to be determined and the subject report is intended for the zoning by-law amendment application. It is recommended that the

evaluation of potential well interference be updated at the time of the site control application submission by the future owner depending on the type of future less-sensitive use.

8 Summary of Findings and Recommendations

Based on the preceding discussion and findings, Englobe offers the following conclusions, recommendations, and provides responses to the City's comments dated November 19, 2025.

8.1 General

- All future owners should be provided with a copy of this report.
- All future owners should be advised to follow the MECP guidance on water wells at the website: https://www.ontario.ca/document/water-supply-wells-requirements-and-best-practices
- It should be noted that the subject hydrogeological study is a pre-site control plan application hydrogeological study and intended for zoning by-law amendment application to less sensitive uses. The proposed zoning amendment for the lands within Part 1 of the Site is intended for the less sensitive uses (i.e., RC, rural commercial with exclusions to exclude sensitive uses) where the number of employees would be low and it does not rely on the potable water supply. The City email dated October 10, 2024, included a list of proposed less sensitive uses such as an artist studio, automobile rental establishment, automobile service station, car wash, detached dwelling, parking lot, heavy equipment servicing, warehouse, farmers market, etc. The exact proposed less sensitive use would be determined by the future owner.

8.2 Water Quantity

A constant rate pumping test was conducted at the existing water supply well PW21-01. The existing water supply well PW21-01 was pumped at a rate of 76 L/min (109,440 L/day). Groundwater drawdown and recovery measurements were recorded manually and electronically in the existing water supply well PW21-01 and shallow overburden wells MW21-01 and MW21-06.

The pumping rate of 76 L/min used in the pumping test program is the maximum rated capacity of the pre-existing submersible pump installed in the existing water well (note that the existing well was installed in 1978) and the pumping rate is not based on the estimated water usage under the future use scenarios. The average daily demand associated with these less sensitive uses could not be determined at this stage given that the exact proposed use of Part 1 of the Site and associated design parameters are unknown. We recommend that the Site servicing requirements within the context of the pumping test program be determined per "*Ottawa Design Guidelines – Water Distribution*" when the exact proposed use is determined by the future owner.

The well PW21-01 recovered to 94.9% percent of the static groundwater level within 30 minutes after the end of the pumping phase. 120 minutes after the end of pumping, the groundwater level in the well PW21-01 recovered approximately 95.8% (2.16 mtoc of static water level vs. 2.25 mtoc after 120 minutes). A groundwater level of 2.17 mtoc was observed after 23 hours indicating >99% recovery.

Groundwater levels in shallow overburden observation wells MW21-01 and MW21-06 were monitored continuously during the constant rate pumping test and no perceptible groundwater level changes were noted at MW21-06 completed in silty sand Till, which is located approximately 525 m southwest of PW21-01, however, observed groundwater levels at MW21-01 varied insignificantly throughout the test. A maximum drawdown of 0.18 m was observed at MW21-01 located approximately 35 m of PW21-01 after 480 mins of pumping. Groundwater levels in MW21-01 recovered >95% within 60 mins of the cessation of pumping at MW21-01. A 100% recovery was noted in MW21-01 on June 1, 2021.

Based on the aquifer transmissivity and storativity values estimated from 8-hour constant rate pumping tests, the maximum sustainable yield of 118 m^3/day for the existing water supply well PW21-01 was estimated. As stated, the proposed zoning amendment for the lands within Part 1 of the Site would be to less sensitive uses (RC, rural commercial with exclusions to exclude sensitive uses) where the number of employees would be low and it does not rely on the potable water supply. The exact less-sensitive use of Part 1 of the Site is unknown at this time and it is recommended that the maximum day demand of any potential future less-sensitive use be determined through a servicing report at the time of site plan control application in conjunction with the data presented in this section of the report.

8.3 Water Quality – Existing Water Supply Well PW21-01

Water quality results for the raw water samples (groundwater samples collected in March 2021, September 2024, and January 2025 events) collected from the existing water supply well PW21-01 indicated exceedances of colour, chloride, hardness, manganese, sodium, TDS, and turbidity. The reported concentrations of sodium and chloride exceeded the treatability limits or MCCRT. No detectable concentrations of nitrates were noted in groundwater samples from PW21-01 and the monitoring wells MW21-01, and MW21-06.

In response to the City comments dated November 19, 2024, and comments 4 and 7 (refer to Appendix H for a copy of the City's letter), Englobe collected groundwater samples on January 20, 2025, for the laboratory analysis of total dissolved solids and field testing of colour, pH, temperature, conductivity, turbidity, hydrogen sulphide (using the Methylene Blue method) and chlorine residual. The reported value for colour exceeds the aesthetic objective of 5 TCU and the reported value of pH is within operational guideline values of 6.5 and 8.5. The reported value of turbidity exceeds the aesthetic objective of 5 NTU.

In the November 2024 comments letter, the City required the field determination of H2S using the Methylene Blue method. However, the local distributor for the Hach Calorimeter notified Englobe that the chemical regents for the analysis H2S are back ordered and the wait time was not suitable for the project timelines. To minimize analyte loss and obtain similar results, Englobe collected the sample and preserved it immediately in the field using Zinc Acetate and Sodium Hydroxide to pH>9, kept at a temperature <10 degrees Celsius, and then analyzed within 24 hours by a CALA accredited laboratory following method SM 24 4500 S2-A D Fm. This provides a more accurate value while still meeting the City's requirement of using the Methylene Blue method. This method is commonly used in assessing the water quality at municipal drinking water wells to meet the requirement of the MECP drinking water license. The laboratory analytical results for the H2S indicated non-detectable concentration. The laboratory analytical results for the TDS exceeded the aesthetic objective of 500 mg/L at a concentration of 1180 mg/L.

The parameters tested at the laboratory in the January 2025 event included alkalinity and calcium. Based on the field parameters and laboratory analytical values of temperature, pH, alkalinity, TDS, and calcium, the Langelier Saturation Index (LSI) and Ryznar Stability Index (RSI) were estimated. The estimated LSI values were negative indicating that water is mildly corrosive, whereas the estimated RSI was greater than 6.5 indicating that the water is probably corrosive. Refer to section 8.3 for water treatment recommendations.

8.4 Water Treatment Recommendations

As discussed in section 8.2, water quality results for the raw water samples collected from the existing water supply well PW21-01 indicated exceedances of colour, chloride, hardness, manganese, sodium, TDS, and turbidity.

The most effective way to treat the parameter exceedances such as colour, hardness, and turbidity is to use the sand filter (alternatively a system comprised of 1-micron and 5-micron sediment cartridge filters) and activated carbon column to improve the colour of the water and remove particulate matter causing the elevated turbidity values, then followed by water softener treatment for reducing the level of hardness to the operational guideline value range of 80 to 100 mg/L. The cartridge-style sediment filters can be used to remove the small amounts of manganese detected in the water samples from PW21-01. It should be noted that a water softener using sodium-based brine could result in elevated levels of sodium in the water supply, therefore, the use of sodium-based brine or water softener that could elevate the sodium levels in water is not recommended.

The next important step in the treatment process typically involves the treatment of the softened water using systems such as a nanofiltration/reverse osmosis unit to reduce the levels of sodium and chloride. The softened water typically passes through a pre-filter and a high-pressure pump before entering the

nanofiltration/reverse osmosis unit. The nanofiltration/reverse osmosis unit reduces the concentrations of sodium, chloride, and TDS in water. The reduction in the TDS also presents the opportunity for reducing manganese in a post-treatment step using an oxidizing filter if required. Additional design considerations regarding the post-treatment include the addition of ultra-violet (UV) disinfection or controlled addition of potable quality caustic (sodium hydroxide) for increasing the pH and limiting the downstream corrosion of piping and fixtures.

The removal of high concentrations of dissolved salts such as sodium and chloride coupled with the use of corrosion-resistant plumbing such as plastic jacketed copper tubing, crosslinked polyethylene (PEX) high-temperature flexible polymer tubing, and polyvinyl chloride tubing (PVC) could minimize the corrosion in the plumbing, treatment systems as well as improve the lifespan of the plumbing fixtures and the septic system.

The preceding recommendations should not be construed as the design recommendations for the water treatment, a water treatment specialist should be consulted once the exact less-sensitive use of the Part 1 of the Site and the maximum water demand is determined by the future owner.

8.5 Efforts made to find a Source of Groundwater that meets MCCRT Parameters

To address the City's comment no. 5.b in the November 19, 2024 letter (refer to Appendix H for a copy of the City's letter), following efforts in the groundwater exploration of the Site were completed to find other potential sources of groundwater supply in the overburden, overburden and bedrock interface, and shallow bedrock. The deeper bedrock aquifer at the Site was already explored with the existing water well (PW21-01) which was installed in 1978 and obtains groundwater from a depth of about 65 m at the limestone and sandstone interface.

As a first step, the potential for a good source of groundwater supply within the overburden materials at the Site was assessed by reviewing the available background information. The surficial geology of the site is comprised of a thin veneer of silty sand till overlying the Paleozoic bedrock in the southwestern part of the Site and reminder of the Site is comprised of glaciomarine deposits according to the Ontario Geological Survey's surficial geology of Southern Ontario map (OGS, 2010). The sand and gravel or esker deposits with sufficient thickness and lateral extents could host aquifers capable of yielding groundwater for potable purposes, however, the glaciomarine deposits and silty sand till overlying the bedrock did not contain highly permeable materials of sufficient thicknesses or lateral extent. This is further evident in the water well records (i.e., the MECP well records the Site and nearby properties) examined as part of the background review indicated that groundwater is obtained primarily from the Oxford Formation dolostone and/ or limestone or sandstone (refer to Table 3-1 for well details and Appendix G for the well records). Groundwater sampling results from the monitoring wells (i.e., MW21-01 and MW21-06) installed in the overburden within the Site

indicated elevated levels of total dissolved solids in concentrations ranging from 328 mg/L to 754 mg/L (refer to Table F-1 in Appendix F), thus, no further assessment of the overburden was conducted for purposes of identifying a potential source of groundwater supply for the Site.

In the second step, a review of the MECP water well records for the Site and surrounding area suggested that there were two unsuccessful attempts (MECP well records# 1514870 and 1512294, (refer to Table 3-1 and Appendix G) in the past to obtain adequate groundwater supply from the till and bedrock interface indicating the absence of an interface aquifer.

In the third and final step, the Client retained Splash Well Drilling of Prescott, Ontario in October 2024 to find a source of groundwater supply in the shallower horizons of the limestone bedrock. A new test well was installed to approximately 12 m with a water-found depth of approximately 10 m. Appendix B-2 contains the MECP well record for this new water well. Groundwater sampling completed on October 30, 2024, indicated that the concentrations of chloride and sodium exceeded the treatability limits or MCCRT and confirmed that the shallow bedrock aquifer is not a suitable source of groundwater supply. Appendix E-2 contains the laboratory certificates of analysis.

8.6 Permitting the MCCRT Exceedances with Water Treatment

It is understood that the City does consider treatment for industrial/commercial developments for aesthetic exceedances such as sodium and chloride exceedances. It is understood that the proposed zoning amendment for the lands within Part 1 of the Site is intended for the less sensitive uses (i.e., RC, rural commercial with exclusions to exclude sensitive uses) where the number of employees would be low and it does not rely on the potable water supply, therefore, the proposed zoning by-law amendment with permitting of the MCCRT exceedances (exceedances above the treatability limits) with an appropriately designed treatment system per recommendations in section 8.3 of this report for the Part 1 of the Site is not expected to result in the degradation of groundwater quality or quantity.

8.7 Evaluation of Subsurface Sewage

A septic system services the existing residential dwelling. A new on-site septic system is anticipated to be constructed to service future less-sensitive uses (RC, rural commercial with exclusions to exclude sensitive uses) of Part 1 of the Site where the number of employees would be low and the use does not rely on the potable water supply. The location of the planned septic system is unknown and depends on the type of future less-sensitive uses (e.g., artist studio, automobile rental establishment, automobile service station, car wash, detached dwelling, parking lot, heavy equipment servicing, warehouse, farmers market) selected as part of the site plan control application by the future owner.

Based on the estimated theoretical nitrate concentration of 4.3 mg/L obtained from the nitrate dilution assessment and groundwater sampling results, the proposed development complies with the requirements of Procedure D-5-4 concerning nitrate impacts.

It is Englobe's professional opinion that the potential for notable adverse impacts (i.e., nitrate as N in concentrations in excess of 10 mg/L) to the onsite water supply aquifer is low and the requirements of the MECP D-5-4 Procedure are met. Further, it is recommended that the percolation tests in the area of planned septic systems per the Ontario Building Code be performed to develop the septic system design specifics. We note that there are new sewage system technologies available that could reduce the overall footprint of the septic system. Also, note that the partially or fully raised septic bed will mandate an increase in the minimum separation distance to the existing water supply well by twice the height of the raised system. The septic system designer should also reference the accompanying geotechnical investigation report regarding the limitations on the grade raises.

A site plan should be developed and provided to the local municipality and conservation agency to ensure that the appropriate separation distances with the 100-year flood event extent, between the water supply well and septic system. The planned septic system should be sited at a location where the topographic elevation is higher than the 100-year flood event extent specified by Rideau Valley Conservation. The siting of septic system design should also consider the presence or absence of the less permeable layers in the subsurface such as silty clay or clay and potential mounding of effluent above the clay layer.

8.8 Evaluation of Well Interference

Based on the field investigation results, the method of Cooper-Jacob (1946) was applied to determine the drawdown at radial distances by assuming that PW21-01 is the centre of future less sensitive use. It is understood that no new water supply wells are being proposed for the Site and interference to the nearest off-site wells was determined. The results of this evaluation indicated that the cumulative peak two-hour theoretical drawdown at the existing water supply well PW21-01 is approximately 0.81 m, which includes the interference from the existing water supply well and offsite existing wells on the neighbouring properties. The results of well interference evaluation are considered acceptable given the available head of 3.27 mbgs (well record# 1514870) to 48.24 mbgs (well record # 7048482) in the nearest offsite wells.

Further, the actual maximum day demand for the proposed less sensitive uses such as an artist studio, automobile rental establishment, automobile service station, car wash, detached dwelling, parking lot, heavy equipment servicing, warehouse, farmers market, etc., is yet to be determined and the subject report is intended for the zoning by-law amendment application. It is recommended that the evaluation of potential well interference be updated at the time of the site control application submission by the future owner depending on the type of future less-sensitive use.

9 Limitations

The information, conclusions, recommendations, and opinion regarding groundwater supply and treatment given herein are specifically for this project, Dilworth Developments Inc., and for the scope of work described herein. It may not be sufficient for other uses. Englobe does not accept responsibility for the use by third parties.

The data, conclusions, and recommendations which are presented in this report, and the quality thereof, are based on a scope of work authorized by Dilworth Developments Inc. Note, however, that no scope of work, no matter how exhaustive, can identify all hydrogeological conditions below ground. For example, conditions encountered in test wells may differ from those encountered in the water wells in the future, and observed or measured conditions may change with time. This report, therefore, cannot warranty that all conditions on or off the Site are represented by those identified at specific locations.

Any recommendations, conclusions, and opinions regarding groundwater quality, quantity, and treatment provided that are based on conditions or assumptions reported herein will inherently include any uncertainty associated with those conditions or assumptions. In fact, many aspects involving professional judgment such as groundwater quality, quantity, and treatment contain a degree of uncertainty which cannot be eliminated. This uncertainty should be managed by periodic review and refinement as additional information becomes available.

Note also that standards, guidelines, and practices related to groundwater quality, quantity, and treatment supporting this document may change with time. Those which were applied at the time of this assignment may be obsolete or unacceptable at a later date.

The scope of work may not be sufficient to determine all of the factors that may affect the construction methods and costs. Contractors bidding on this project or undertaking construction should, therefore, make their own interpretation of the factual information presented and draw their own conclusions as to how the conditions may affect their work.

Any results from an analytical laboratory by other consultants reported herein have been carried out by others and Englobe cannot warranty their accuracy.

References

American Water Works Association (AWWA). 2004. A guide for design and installation of steel pipes.

Armstrong, D.K. and J.E.P Dodge, 2007. Paleozoic Geology of Southern Ontario – Project Summary and Technical Document, Ontario Geological Survey.

Birsoy, Y.K. and W.K. Summers, 1980. Determination of aquifer parameters from step tests and intermittent pumping, Ground Water, vol. 18, no. 2, pp. 137-146.

Chapman, L.J., and Putnam, D.F., 1984. The physiography of southern Ontario, Volume 2, Ontario Geological Survey, Sudbury, Ontario.

Cooper, H.H. and C.E. Jacob, 1946. A generalized graphical method for evaluating formation constants and summarizing well field history, Am. Geophys. Union Trans., vol. 27, pp. 526-534.

Driscoll F.G., 1986. Groundwater and Wells. Johnson Division St. Paul, Minnesota, 1089p.

Ontario Ministry of the Environment and Climate Change. 2006. Ontario Drinking Water Quality Standards.

Ontario Ministry of the Environment (MOE). 2001. Water Wells & Groundwater Supplies in Ontario.

Ontario Ministry of the Environment and Energy (MOEE). 1996. Procedure D 5-5 Technical Guideline for Private Wells: Water Supply Assessment.

Ontario Geological Survey (OGS), 2011. Bedrock Geology of Ontario 1:250,000 (OGS MRD-126-Rev 2011).

OGS, 2010. Surficial Geology of Southern Ontario 1: 50,000 (OGS MRD-128-Rev 2010).

OGS, 2007. Paleozoic Geology of Southern Ontario 1:50,000 (OGS MRD-219, 2007).

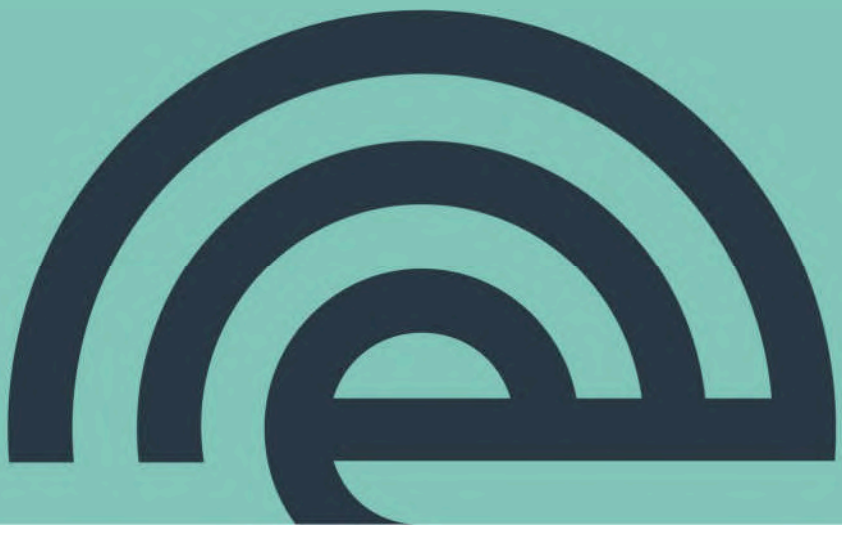
OGS, 2007b. Physiography of Southern Ontario 1:50,000 (OGS MRD-228, 2007).

Razack, M. and David Huntley. 1991. Assessing Transmissivity from Specific Capacity in a Large and Heterogeneous Alluvial Aquifer. Groundwater, Volume 26 and Issue 6. Pages 856-861.

Singer, S.N., Cheng, C.K., and Scafe, M.G., 1997. The hydrogeology of southern Ontario, Ministry of the Environment, Toronto, Ontario.

Appendix A

Figures and Plans

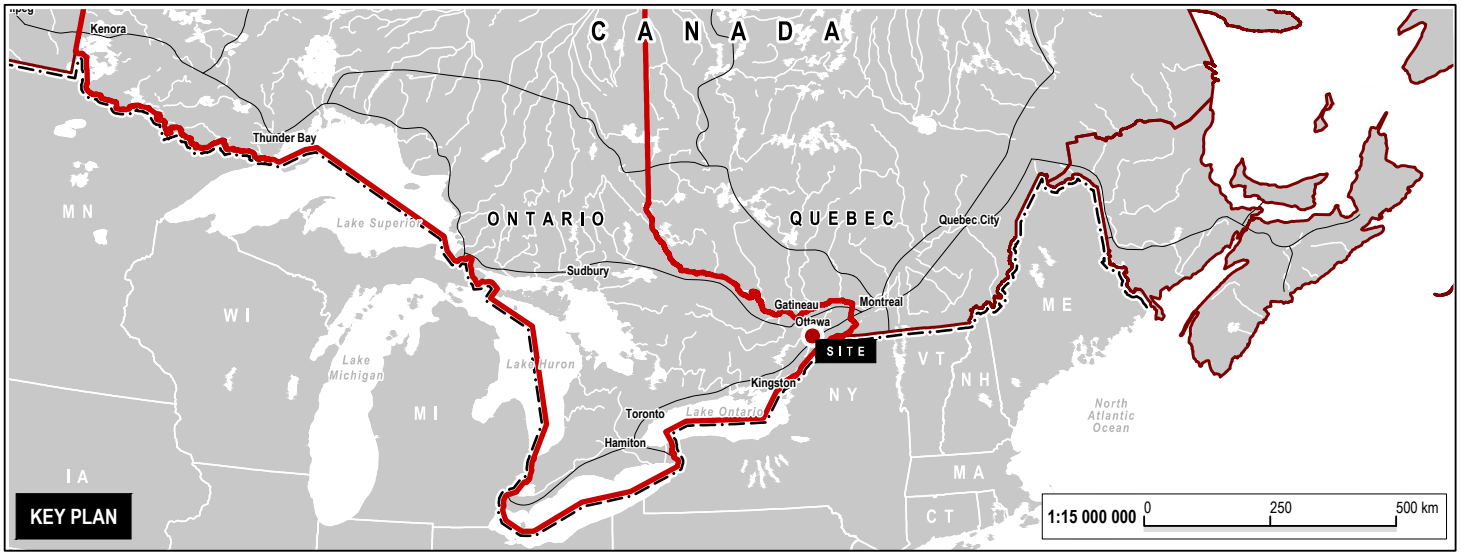


ENGLOBE

Appendix A-1

Figures

ENGLOBE



Note

1. This drawing shall be read in conjunction with the associated technical report.

Revision	Date	Issue	Approval
A	07/19/2021	Final	SR

Client: Dilworth Development Inc.	Site: 2095 Dilworth Road, Kars, ON		
ENGLOBE	Report Title: Hydrogeological Study Report	Designed By: S.R.	Date: July 2021
		Drawn By: K.M.	Project No.: 02101208.000
	Drawing Title: Site Location Map	Approved By: S.S.	Figure No.: 1
		Scale: As shown	

Folder: C:\DST\02101208.000 2095 Dilworth\Hydrogeological Study\DWGs
Monday, July 19, 2021 @ 09:37 by Kris Morin
Drawing: 1 site location map.dwg

Note

1. This drawing shall be read in conjunction with the associated technical report.

Legend

- Approximate location of borehole
- Approximate location of monitoring well
- New test well installed in 2024
- Existing water well

1:2 500

0 20 40 60 80 100 m

0 1:1 5 cm

Scale accurate when printed at 100% using paper size ANSI full bleed B (11.0 x 17.0 Inches)

Revision	Date	Issue	Approval
A	07/19/2021	Final	SR

Client: **Dilworth Development Inc.**

Site: **2095 Dilworth Road, Kars, ON**

Report Title: **Hydrogeological Study Report**

Drawing Title: **Borehole Location Plan**

Designed By: S.R.	Scale: As shown
Drawn By: K.M.	Date: January 2025
Approved By: S.S.	Project No.: 02101208.000

Figure No.: **2**

Drawing: 2 locations.dwg Folder: C:\DST\02101208.000_2095 Dilworth\Hydrogeological Study\DWGs Monday, July 19, 2021 @ 09:49 by Kris Morin

Appendix A-2

Plan of Survey

ENGLOBE

PART	LOT	CONCESSION	PIN
SCHEDULE			
1	PART OF 35	3	ALL OF 03915-0052
2			
3			

PLAN 4R-36265

Received and deposited

July 22nd, 2024

Samantha Rill

Representative for the Land Registrar for the Land Titles Division of Ottawa-carleton (No.4)

PLAN OF SURVEY OF

PART OF LOT 35
CONCESSION 3
Geographic Township of North Gower
CITY OF OTTAWA

Surveyed by Annis, O'Sullivan, Vollebekk Ltd.

Scale 1 : 1500

60 45 30 15 0 30 60 Metres

The intended plot size of the plan is 914 mm in width by 457 mm in height when plotted at a scale of 1:1500.

Metric

DISTANCES AND COORDINATES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048.

Surveyor's Certificate

I CERTIFY THAT :

1. This survey and plan are correct and in accordance with the Surveys Act, the Surveyors Act and the Land Titles Act and the regulations made under them.
2. The survey was completed on the 17th day of July, 2024.

July 18, 2024
Date

Jamie Leslie
Ontario Land Surveyor

This plan of survey relates to AOLS Plan Submission Form Number V-75512

Notes & Legend

—□—	Denotes	Survey Monument Planted
—■—	"	Survey Monument Found
SIB	"	Standard Iron Bar
SSIB	"	Short Standard Iron Bar
IB	"	Iron Bar
IBØ	"	Round Iron Bar
CC	"	Cut Cross
HCM	"	Horizontal Control Monument
(WIT)	"	Witness
(AOG)	"	Annis, O'Sullivan, Vollebekk Ltd.
Meas.	"	Measured
(P1)	"	Expropriation Plan CT130460 (P-6074-7)
(P2)	"	Plan 5R-6904
(P3)	"	Plan 5R-1873
(P4)	"	Plan 4R-11511
OHW	"	Overhead Wires
○ UP	"	Utility Pole
∘ AN	"	Anchor
BF	"	Board Fence
P&W	"	Post and Wire Fence
□ TB-C	"	Cable Terminal Box
○ WP	"	Wooden Post
C/L	"	Centreline
Acc.	"	Accepted

All Survey Monuments Planted are SSIB Unless Otherwise Noted.

Distances shown on this plan are ground distances and can be converted to grid distances by multiplying by the combined scale factor of 0.999941.

Bearings are grid, derived from Can-Net 2016 Real Time Network GPS observations on points A and B, shown hereon, having a bearing of N29°10'30"W and are referred to the Central Meridian of MTM Zone 9 NAD-83 (CSRS) (2010).

For bearing comparisons, a rotation of 0°39'35" counter-clockwise was applied to bearings on P1, P2 & P3.

Coordinates are derived from Can-Net 2016 Real Time Network GPS observations and are referred to the Central Meridian of MTM Zone 9 NAD-83 (CSRS) (2010).

Coordinate values are to urban accuracy in accordance with O. Reg. 216/10.

. Point A	Northing	4995551.28	Easting	371340.12
. Point B	Northing	4995749.78	Easting	372323.99

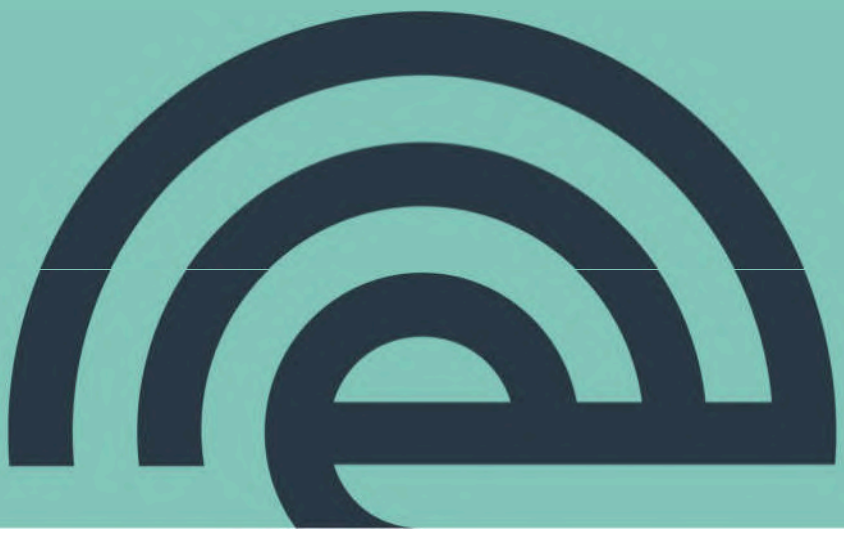
Caution: Coordinates cannot, in themselves, be used to re-establish corners or boundaries shown on this plan.

ANNIS, O'SULLIVAN, VOLLEBEKK LTD.
14 Concourse Gate, Suite 500
Nepean, Ont. K2E 7S6
Phone: (613) 727-0850 / Fax: (613) 727-1079
Email: Nepean@aovltd.com
Ontario Land Surveyors

Job No. 21515-21 W.Griesseeir PrtLt35Con3 NGower R F | DG/pj

Appendix B

Borehole Logs



ENGLOBE

Appendix B-1

Borehole and Monitoring Well Logs

ENGLOBE

LIST OF SYMBOLS AND DEFINITIONS FOR GEOTECHNICAL SAMPLING AND COMMON LITHOLOGIES

The following is a reference sheet for commonly used symbols and definitions within this report and in any figures or appendices, including borehole logs and test results. Symbols and definitions conform to the standard proposed by the International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE) wherever possible. Discrepancies may exist when comparing to third-party results using the Unified Soil Classification System (USCS).

PART A – SOILS

Standard Penetration Test (SPT) 'N'

The number of blows required to drive a 50-mm (2 in) split barrel sampler 300 mm (12 in). The standard hammer has a mass of 63.5 kg (140 lbs) and is dropped vertically from a height of 760 mm (30 in). Additional information can be found in ASTM D1586-11 and in §4.5.2 of the CFEM 4th Ed.

For penetration less than 300 mm, 'N' is recorded with the penetration that was achieved.

Non-Cohesive Soils

The relative density of non-cohesive soils relates empirically to SPT 'N' as follows:

Relative Density	'N'
Very Loose	0 – 4
Loose	4 – 10
Compact	10 – 30
Dense	30 – 50
Very Dense	> 50

Cohesive Soils

The consistency and undrained shear strength of cohesive soils relates empirically to SPT 'N' as follows:

Consistency	Undrained Shear Strength (kPa)	'N'
Very Soft	< 12	0 – 2
Soft	12 – 25	2 – 4
Firm	25 – 50	4 – 8
Stiff	50 – 100	8 – 15
Very Stiff	100 – 200	15 – 30
Hard	> 200	> 30

PART B – ROCK

The following parameters are used to describe core recovery and to infer the quality of a rockmass.

Total Core Recovery, TCR (%)

The total length of solid drill core recovered, regardless of the quality or length of the pieces, taken as a percentage of the length of the core run.

Solid Core Recovery, SCR (%)

The total length of solid, full-diameter drill core recovered, taken as a percentage of the length of the core run.

Rock Quality Designation, RQD (%)

The sum of the lengths of solid drill core greater than 100 mm long, taken as a percentage of the length of the core run. RQD is commonly used to infer the quality of the rockmass, as follows:

Rockmass Quality	RQD (%)
Very Poor	< 25
Poor	25 – 50
Fair	50 – 75
Good	75 – 90
Excellent	> 90

Weathering

The terminology used to describe the degree of weathering for recovered rock core is defined as follows, as suggested by the *Geological Society of London*:

Completely weathered: All rock material is decomposed and/or disintegrated to soil. The original mass structure is largely intact.

Highly weathered: More than half the rock material is decomposed and/or disintegrated to soil. Fresh or discolored rock is present either as a discontinuous framework or as core stone.

Moderately weathered: Less than half the rock material is decomposed and/or disintegrates to soil. Fresh or discolored rock is present ether as a continuous framework or as core stone.

Slightly weathered: Discoloration indicates weathering of rock material and discontinuity of surfaces. All the rock material may be discolored by weathering and may be somewhat weaker than its fresh condition.

Fresh: No visible signs of weathering.

PART C – SAMPLING SYMBOLS

Symbol	Description
SS	Split spoon sample
TW	Thin-walled (Shelby Tube) sample
PH	Sampler advanced by hydraulic pressure
WH	Sampler advanced by static weight
SC	Soil core

PART D – IN-SITU AND LAB TESTING

SOIL NAMING CONVENTIONS

Particle sizes are described as follows:

Particle Size Descriptor		Size (mm)
Boulder		> 300
Cobble		75 – 300
Gravel	Coarse	19 – 75
	Fine	4.75 – 19
Sand	Coarse	2.0 – 4.75
	Medium	0.425 – 2.0
	Fine	0.075 – 0425
Silt		0.002 – 0.075
Clay		< 0.002

The principle constituent of a soil is written in uppercase. The minor constituents of a soil are written according to the following convention:

Descriptive Term	Proportion of Soil (%)
Trace	1 – 10
Some	10 – 20
(ey) or (y)	20 – 35
And	35 – 50

Eg.: A soil comprising 65% Silt, 21% Sand and 14% Clay would be described as a: Sandy SILT, Some Clay

LOG OF BOREHOLE MW21-01

DST REF. No.: **02101208**
CLIENT: **Walter Greisseier**
PROJECT: **Proposed Commercial Subdivision and Private Servicing**
LOCATION: **2095 Dilworth Road, Kars, ON**
SURFACE ELEV.: **87.90 metres**

Drilling Data
METHOD: **Hollow Stem Augers**
DIAMETER: **203 mm**
DATE: **February 16, 2021**
COORDINATES: m N, m E

DEPTH (m)	ELEV. (m)	Water Data	% MOISTURE (W_p W W_l)	Symbol	MATERIAL DESCRIPTION	SAMPLE #	SAMPLE TYPE	'N' VALUE	VANE (kPa) ✖ / SPT (N) □ Blows/0.3m / DCPT ◆	REMARKS & GRAINSIZE DISTRIBUTION (%) GR SA SI CL
0.0	87				**FILL -** sand and gravel, brownish grey, frozen	SS1		50/152mm		
1.0					**FILL -** silty sand some gravel, grey, frozen	SS2		62		
					SILT AND SAND - loose, black, moist					
2.0	86				Becomes grey below 1.8 m	SS3		7		0 56 (44)
					CLAY - firm, light brown, moist - Contains signs of oxidation	SS4		3		
3.0	85				**SANDY CLAYEY SILT (TILL) -** compact, brown, moist to wet	SS5		19		
4.0	84				Becomes gravelly below 3.8 m	SS6		14		
5.0	83				**SILTY SAND (TILL) -** some gravel, loose, brown, wet	SS7		7		29 49 (24)
					Becomes coarse and compact below 5.3 m	SS8		11		
6.0	82				Spoon refual at 5.8 m on inferred cobbles or boulders; Advanced auger to 6.1m					
					End of borehole at 6.1 m in TILL.					
7.0	81				Water level in monitoring well measured to be at 1.5 mbgs (~Elev. 86.4 masl) on March 15, 2021.					
8.0	80									
9.0	79									
	78									

BOREHOLE (STANDARD) 02100377 2095 DILWORTH ROAD.GPJ DST_MIN.GDT 4/12/21

DST consulting engineers
DST Consulting Engineers Ltd.
Email: thunderbay@dstgroup.com
Web: www.dstgroup.com

SAMPLE TYPE LEGEND

- Auger Sample
- Split Spoon Sample
- Bulk Sample
- Rock Core
- Hiller Peat Sampler
- 70mm Thick Wall Tube
- Bentonite
- Sand

ENCLOSURE 9

LOG OF BOREHOLE BH21-02

DST REF. No.: **02101208**
CLIENT: **Walter Greisseier**
PROJECT: **Proposed Commercial Subdivision and Private Servicing**
LOCATION: **2095 Dilworth Road, Kars, ON**
SURFACE ELEV.: **87.60 metres**

Drilling Data
METHOD: **Hollow Stem Augers**
DIAMETER: **203 mm**
DATE: **February 16, 2021**
COORDINATES: m N, m E

DEPTH (m)	ELEV. (m)	Water Data	% MOISTURE (W_p W W_l) 20 40 60 80	Symbol	MATERIAL DESCRIPTION	SAMPLE #	SAMPLE TYPE	'N' VALUE	VANE (kPa) ✖ 20 40 60 80; SPT (N) □ Blows/0.3m; DCPT ◆ 20 40 60 80	REMARKS & GRAINSIZE DISTRIBUTION (%) GR SA SI CL
0	87				**SILTY SAND-** compact, brown, moist	SS1		18		
1.0						SS2		10		
	86				**SILTY CLAY -** stiff, brown, moist					
2.0						SS3		2		
	85				Becomes grey and firm below 2.4 m	SS4		0		
3.0						SS5		0		
	84									
4.0						FV1			✖	Su = 63 kPa; S = 6 @ 4.1m
	83					FV2			✖	Su = 39 kPa; S = 6 @ 4.4m
5.0						SS6		18		
	82				**SILTY SAND AND GRAVEL (TILL) -** trace clay, compact, grey, wet					
6.0						SS7		14		32 41 26 1
	81				End of borehole at approximately 6.1 m in TILL Water level measure to be at approximatley 1.1 mbgs (~Elev. 86.5 masl) in open borheole.					
7.0										
	80									
8.0										
	79									
9.0										
	78									

BOREHOLE (STANDARD) 02100377 2095 DILWORTH ROAD.GPJ DST_MIN.GDT 4/12/21

DST consulting engineers
DST Consulting Engineers Ltd.
Email: thunderbay@dstgroup.com
Web: www.dstgroup.com

SAMPLE TYPE LEGEND

- Auger Sample
- Split Spoon Sample
- Bulk Sample
- Rock Core
- Hiller Peat Sampler
- 70mm Thick Wall Tube
- Bentonite
- Sand

ENCLOSURE 1

LOG OF BOREHOLE BH21-03

DST REF. No.: **02101208**
CLIENT: **Walter Greisseier**
PROJECT: **Proposed Commercial Subdivision and Private Servicing**
LOCATION: **2095 Dilworth Road, Kars, ON**
SURFACE ELEV.: **87.20 metres**

Drilling Data
METHOD: **Hollow Stem Augers**
DIAMETER: **203 mm**
DATE: **February 16, 2021**
COORDINATES: m N, m E

DEPTH (m)	ELEV. (m)	Water Data	% MOISTURE (W_p W W_l) 20 40 60 80	Symbol	MATERIAL DESCRIPTION	SAMPLE #	SAMPLE TYPE	'N' VALUE	VANE (kPa) ✖ 20 40 60 80; SPT (N) □ Blows/0.3m DCPT ◆ 20 40 60 80	REMARKS & GRAINSIZE DISTRIBUTION (%) GR SA SI CL
0.0	87				**SILTY SAND-** loose, brown, damp	SS1		5		
1.0	86				**SILT-** some sand some clay, very loose, brown, damp	SS2		3		
2.0	85				Contains trace shells and becomes brownish grey below 1.7 m	SS3		2		1 10 76 13
3.0	84				**GRAVELLY SILTY SAND (TILL) -** very dense to compact, brown, wet Presences of cobbles and/or boulders to be expected based on sporadic blow counts Becomes grey below 3.2m	SS4 SS5		55 28		33 40 (27)
4.0	83				**SILTY SAND (TILL) -** some gravel, compact to very dense, grey, wet Presences of cobbles and/or boulders to be expected based on sporadic blow counts Becoming coarse sand below 4.7 m	SS6 SS7		14 60		
5.0	82									
6.0	81				**CLAYEY SILTY SAND (TILL) -** some gravel, compact, grey, wet	SS8		28		
7.0	80				End of borehole at approximately 6.1 m in TILL Water level measure to be at approximatley 1.8 mbgs (~Elev. 85. 4 masl) in open borehole.					
8.0	79									
9.0	78									

BOREHOLE (STANDARD) 02100377 2095 DILWORTH ROAD.GPJ DST_MIN.GDT 4/12/21

DST consulting engineers
DST Consulting Engineers Ltd.
Email: thunderbay@dstgroup.com
Web: www.dstgroup.com

SAMPLE TYPE LEGEND

- Auger Sample
- Split Spoon Sample
- Bulk Sample
- Rock Core
- Hiller Peat Sampler
- 70mm Thick Wall Tube
- Bentonite
- Sand

ENCLOSURE 2

LOG OF BOREHOLE BH21-04

DST REF. No.: **02101208**
CLIENT: **Walter Greisseier**
PROJECT: **Proposed Commercial Subdivision and Private Servicing**
LOCATION: **2095 Dilworth Road, Kars, ON**
SURFACE ELEV.: **87.20 metres**

Drilling Data
METHOD: **Hollow Stem Augers**
DIAMETER: **203 mm**
DATE: **February 17, 2021**
COORDINATES: m N, m E

DEPTH (m)	ELEV. (m)	Water Data	% MOISTURE W_p W W_l (20 40 60 80)	Symbol	MATERIAL DESCRIPTION	SAMPLE #	SAMPLE TYPE	'N' VALUE	VANE (kPa) ✖ 20 40 60 80; SPT (N) □ Blows/0.3m; DCPT ◆ 20 40 60 80	REMARKS & GRAINSIZE DISTRIBUTION (%) GR SA SI CL
0.0	87				**SILT -** loose, brown, damp	SS1		7		
1.0	86				Becomes clayey silt below 0.9 m	SS2		1		
2.0	85				**GRAVELLY SILTY SAND (TILL) -** trace clay, compact, brown, wet Presences of cobbles and/or boulders to be expected based on sporadic blow counts	SS3		30		
					Becomes grey below 2.4 m	SS4		19		
3.0	84					SS5		25		34 39 26 1
4.0	83				Becomes very dense below 4.0 m	SS6		59		
5.0	82					SS7		>99	>>	
					Spoon refusal at 4.7 m on inferred cobble or bouldler	SS8		98/305mm		
6.0	81				Spoon refusal at 5.8 m on inferred cobble or bouldler; Advanced auger to 6.1m End of borehole at approximately 6.1 m in TILL					
7.0	80				Water level measure to be at approximatley 1.3 mbgs (~Elev. 85.9 masl) in open borehole.					
8.0	79									
9.0	78									

BOREHOLE (STANDARD) 02100377 2095 DILWORTH ROAD.GPJ DST_MIN.GDT 4/12/21

DST consulting engineers
DST Consulting Engineers Ltd.
Email: thunderbay@dstgroup.com
Web: www.dstgroup.com

SAMPLE TYPE LEGEND

- Auger Sample
- Split Spoon Sample
- Bulk Sample
- Rock Core
- Hiller Peat Sampler
- 70mm Thick Wall Tube
- Bentonite
- Sand

ENCLOSURE 3

LOG OF BOREHOLE BH21-05

DST REF. No.: **02101208**
CLIENT: **Walter Greisseier**
PROJECT: **Proposed Commercial Subdivision and Private Servicing**
LOCATION: **2095 Dilworth Road, Kars, ON**
SURFACE ELEV.: **87.70 metres**

Drilling Data
METHOD: **Casings**
DIAMETER: **203 mm**
DATE: **February 19, 2021**
COORDINATES: m N, m E

DEPTH (m)	ELEV. (m)	Water Data	% MOISTURE (W_p W W_l)	Symbol	MATERIAL DESCRIPTION	SAMPLE #	SAMPLE TYPE	'N' VALUE	VANE (kPa) ✖ / SPT (N) □ Blows/0.3m / DCPT ◆	REMARKS & GRAINSIZE DISTRIBUTION (%) GR SA SI CL
0.0	87				**ORANGICS -** silty sand, compact, dark brown to brown, damp	SS1		11		
1.0					**SANDY SILT-** some clay trace gravel, loose to very loose, brown, moist	SS2		3		
	86									
2.0					**SANDY SILTY CLAY-** stiff to firm, dark brown, moist	SS3		4		4 29 56 11
	85					SS4		1		
3.0					**SILTY GRAVELLY SAND (TILL) -** dense, grey, moist to wet Presences of cobbles and/or boulders to be expected based on sporadic blow counts	SS5		48		
4.0	84					SS6		50		
	83				Becoming wet below 4.7 m	SS7		49		
5.0					Spoon refusal on inferred cobble or boulder at 5.2 m	SS8		>99		
6.0	82				Very poor quality, grey, LIMESTONE BEDROCK	RC9				
	81									
7.0					End of Borehole at approximately 7.2 m in Limestone Bedrock Water level measure to be at approximatley 1.3 mbgs (~Elev. 86.4 masl) in open borehole.					
	80									
8.0										
	79									
9.0										
	78									

BOREHOLE (STANDARD) 02100377 2095 DILWORTH ROAD.GPJ DST_MIN.GDT 4/12/21

DST consulting engineers
DST Consulting Engineers Ltd.
Email: thunderbay@dstgroup.com
Web: www.dstgroup.com

SAMPLE TYPE LEGEND

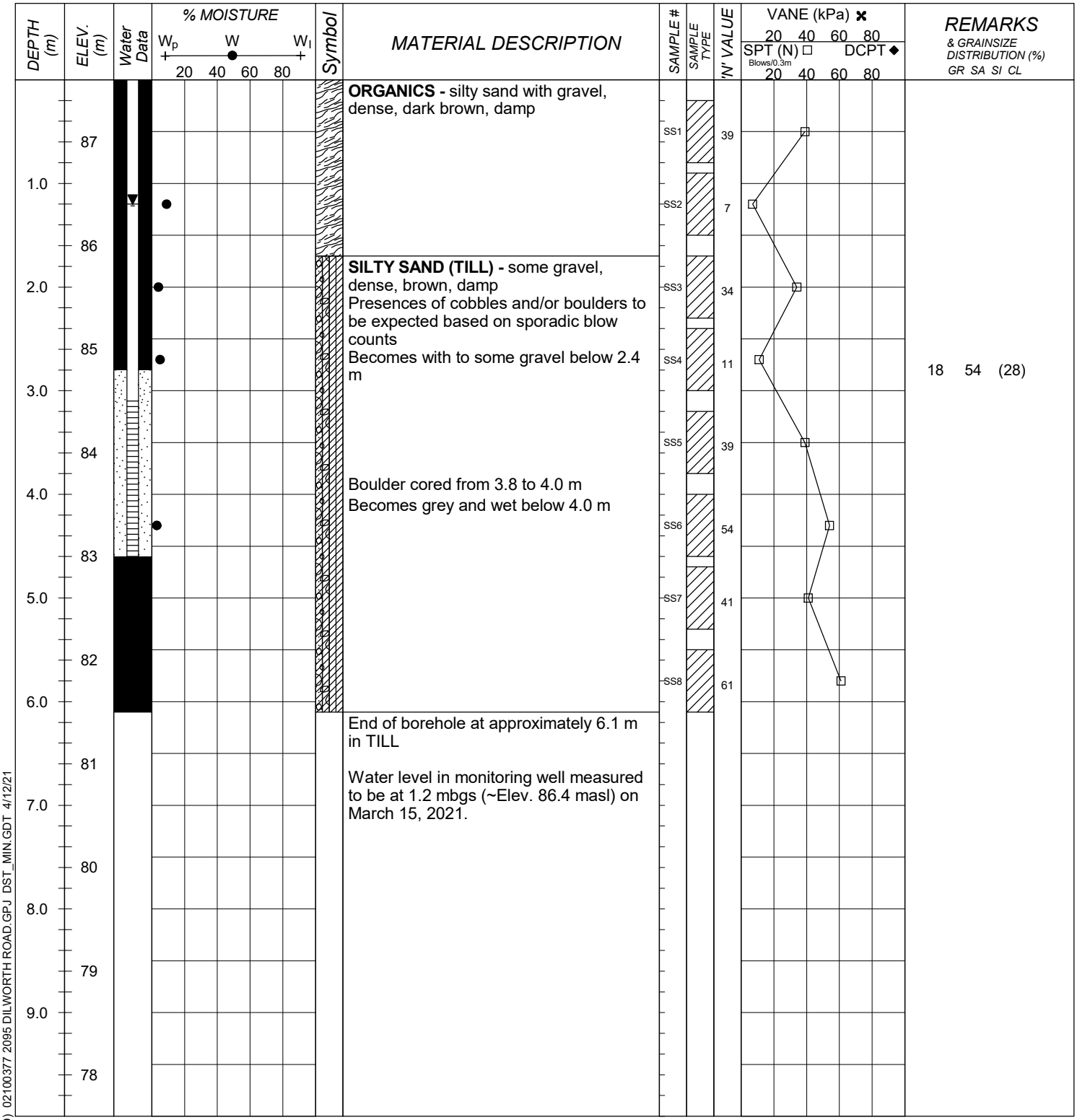
- Auger Sample
- Split Spoon Sample
- Bulk Sample
- Rock Core
- Hiller Peat Sampler
- 70mm Thick Wall Tube
- Bentonite
- Sand

ENCLOSURE 4

LOG OF BOREHOLE MW21-06

DST REF. No.: **02101208**
CLIENT: **Walter Greisseier**
PROJECT: **Proposed Commercial Subdivision and Private Servicing**
LOCATION: **2095 Dilworth Road, Kars, ON**
SURFACE ELEV.: **87.60 metres**

Drilling Data
METHOD: **Hollow Stem Augers**
DIAMETER: **203 mm**
DATE: **February 17, 2021**
COORDINATES: m N, m E



BOREHOLE (STANDARD) 02100377 2095 DILWORTH ROAD.GPJ DST_MIN.GDT 4/12/21

DST consulting engineers

DST Consulting Engineers Ltd.
Email: thunderbay@dstgroup.com
Web: www.dstgroup.com

SAMPLE TYPE LEGEND

- Auger Sample
- Split Spoon Sample
- Bulk Sample
- Rock Core
- Hiller Peat Sampler
- 70mm Thick Wall Tube
- Bentonite
- Sand

ENCLOSURE 10

LOG OF BOREHOLE BH21-07

DST REF. No.: **02101208**
CLIENT: **Walter Greisseier**
PROJECT: **Proposed Commercial Subdivision and Private Servicing**
LOCATION: **2095 Dilworth Road, Kars, ON**
SURFACE ELEV.: **86.90 metres**

Drilling Data
METHOD: **Hollow Stem Augers**
DIAMETER: **203 mm**
DATE: **February 18, 2021**
COORDINATES: m N, m E

DEPTH (m)	ELEV. (m)	Water Data	% MOISTURE (W_p W W_l) 20 40 60 80	Symbol	MATERIAL DESCRIPTION	SAMPLE #	SAMPLE TYPE	'N' VALUE	VANE (kPa) ✖ 20 40 60 80; SPT (N) □ Blows/0.3m; DCPT ◆ 20 40 60 80	REMARKS & GRAINSIZE DISTRIBUTION (%) GR SA SI CL
0.0	86				**ORGANICS -** silty clay, firm, dark brown, moist	SS1		4		
1.0					**SILTY SAND-** loose, brown, moist	SS2		8		
2.0	85				**SILTY CLAY-** stiff, brownish grey, moist	SS3		4		PP = 98 kPa
					Becomes firm and grey below 2.4 m	SS4		2		PP = 49 kPa
3.0	84					FV1		-	✖	Su = 42 kPa, S = 11 @ 3.2m
						FV2			✖	Su = 42 kPa, S = 11 @ 3.5m
4.0	83				**SILTY SAND (TILL)-** trace gravel, compact to loose, grey, wet Presences of cobbles and/or boulders to be expected based on sporadic blow counts	SS5		16		
5.0	82				Becomes loose below 4.7 m	SS6		6		
					CLAYEY SANDY SILT (TILL)- trace gravel, compact, grey, wet	SS7		24		
6.0	81				End of Borehole at approximately 5.9 m on auger refusal on inferred boulder. Water level measure to be at approximatley 1.1 m (~Elev. 85.8 masl) in open borehole.					
7.0	80									
8.0	79									
9.0	78									
	77									

BOREHOLE (STANDARD) 02100377 2095 DILWORTH ROAD.GPJ DST_MIN.GDT 4/12/21

DST consulting engineers
DST Consulting Engineers Ltd.
Email: thunderbay@dstgroup.com
Web: www.dstgroup.com

SAMPLE TYPE LEGEND

- Auger Sample
- Split Spoon Sample
- Bulk Sample
- Rock Core
- Hiller Peat Sampler
- 70mm Thick Wall Tube
- Bentonite
- Sand

ENCLOSURE 5

LOG OF BOREHOLE BH21-08

DST REF. No.: **02101208**
CLIENT: **Walter Greisseier**
PROJECT: **Proposed Commercial Subdivision and Private Servicing**
LOCATION: **2095 Dilworth Road, Kars, ON**
SURFACE ELEV.: **87.10 metres**

Drilling Data
METHOD: **Hollow Stem Augers**
DIAMETER: **203 mm**
DATE: **February 18, 2021**
COORDINATES: m N, m E

DEPTH (m)	ELEV. (m)	Water Data	% MOISTURE (W_p W W_l) 20 40 60 80	Symbol	MATERIAL DESCRIPTION	SAMPLE #	SAMPLE TYPE	'N' VALUE	VANE (kPa) ✖ 20 40 60 80; SPT (N) □ Blows/0.3m; DCPT ◆ 20 40 60 80	REMARKS & GRAINSIZE DISTRIBUTION (%) GR SA SI CL
0.0	87				**200 mm TOPSOIL -** silty clay, very stiff, brown					
					SILTY CLAY - stiff, brown, wet	SS1		3		
1.0	86					SS2		4		
					Becomes grey and firm below 1.7 m	SS3		2		PP = 37 kPa
2.0	85					SS4		0		
3.0	84					TW1				Shelby tube refusal at 3.4 m
					GRAVELLY SILTY SAND (TILL)- trace clay, compact, grey, wet	SS5		17		
4.0	83									
					SAND AND GRAVEL (TILL)- dense, grey, wet	SS6		31		
5.0	82									
					Becomes coarse sand below 5.5 m	SS7		50/51mm		
6.0	81				End of Borehole at approximately 5.7 m on auger refusal on inferred boulder.					
					Water level measure to be at approximatley 0.8 mbgs (~Elev. 86.3 masl) in open borehole.					
7.0	80									
8.0	79									
9.0	78									

BOREHOLE (STANDARD) 02100377 2095 DILWORTH ROAD.GPJ DST_MIN.GDT 4/12/21

DST consulting engineers
DST Consulting Engineers Ltd.
Email: thunderbay@dstgroup.com
Web: www.dstgroup.com

SAMPLE TYPE LEGEND

- Auger Sample
- Split Spoon Sample
- Bulk Sample
- Rock Core
- Hiller Peat Sampler
- 70mm Thick Wall Tube
- Bentonite
- Sand

ENCLOSURE 6

LOG OF BOREHOLE BH21-09

DST REF. No.: **02101208**
CLIENT: **Walter Greisseier**
PROJECT: **Proposed Commercial Subdivision and Private Servicing**
LOCATION: **2095 Dilworth Road, Kars, ON**
SURFACE ELEV.: **87.30 metres**

Drilling Data
METHOD: **Hollow Stem Augers**
DIAMETER: **203 mm**
DATE: **February 18, 2021**
COORDINATES: m N, m E

DEPTH (m)	ELEV. (m)	Water Data	% MOISTURE (W_p W W_l) 20 40 60 80	Symbol	MATERIAL DESCRIPTION	SAMPLE #	SAMPLE TYPE	'N' VALUE	VANE (kPa) ✖ 20 40 60 80; SPT (N) □ Blows/0.3m DCPT ◆ 20 40 60 80	REMARKS & GRAINSIZE DISTRIBUTION (%) GR SA SI CL
0.0	87				**200 mm TOPSOIL -** silt, loose, brown, damp - Contains organic material	SS1		6		
1.0	86				**SILTY SAND -** loose, brown, damp to moist Becomes clayey below 0.9 m	SS2		2		
2.0	85				**SILTY SANDY GRAVEL (TILL)-** trace clay, compact, brown, wet	SS3		11		
						SS4		12		36 32 31 1
3.0	84				**SAND AND GRAVEL (TILL)-** dense, brown, wet Presences of cobbles and/or boulders to be expected based on sporadic blow counts	SS5		41		
4.0	83					SS6		50/0mm		
5.0	82				End of Borehole at approximately 4.2 m on auger refusal on inferred boulder. Water level measure to be at approximatley 1.0 mbgs (~Elev. 86.3 masl) in open borehole.					
6.0	81									
7.0	80									
8.0	79									
9.0	78									

BOREHOLE (STANDARD) 02100377 2095 DILWORTH ROAD.GPJ DST_MIN.GDT 4/12/21

DST consulting engineers
DST Consulting Engineers Ltd.
Email: thunderbay@dstgroup.com
Web: www.dstgroup.com

SAMPLE TYPE LEGEND

- Auger Sample
- Split Spoon Sample
- Bulk Sample
- Rock Core
- Hiller Peat Sampler
- 70mm Thick Wall Tube
- Bentonite
- Sand

ENCLOSURE 7

LOG OF BOREHOLE BH21-10

DST REF. No.: **02101208**
CLIENT: **Walter Greisseier**
PROJECT: **Proposed Commercial Subdivision and Private Servicing**
LOCATION: **2095 Dilworth Road, Kars, ON**
SURFACE ELEV.: **87.40 metres**

Drilling Data
METHOD: **Hollow Stem Augers**
DIAMETER: **203 mm**
DATE: **February 17, 2021**
COORDINATES: m N, m E

DEPTH (m)	ELEV. (m)	Water Data	% MOISTURE (W_p W W_l) 20 40 60 80	Symbol	MATERIAL DESCRIPTION	SAMPLE #	SAMPLE TYPE	'N' VALUE	VANE (kPa) ✖ 20 40 60 80; SPT (N) □ Blows/0.3m; DCPT ◆ 20 40 60 80	REMARKS & GRAINSIZE DISTRIBUTION (%) GR SA SI CL
0.0	87				**ORGANICS -** silty clay, brown, damp	SS1		8		
1.0	86				**GRAVELLY SILTY SAND (TILL)-** trace clay, dense to compact, brown, moist Presences of cobbles and/or boulders to be expected based on sporadic blow counts Becomes grey and wet below 1.7 m	SS2		42		
2.0	85					SS3		22		31 36 31 2
3.0	84					SS4		34		
4.0	83				**SANDY GRAVELLY SILT (TILL)-** compact to very dense, grey, wet Presences of cobbles and/or boulders to be expected based on sporadic blow counts	SS5		31		
5.0	82					SS6		21		
6.0	81				End of Borehole at approximately 5.3 m on auger refusal on inferred boulder. Water level measure to be at approximatley 1.4 mbgs (~Elev. 86.0 masl) in open borehole.	SS7		54		
7.0	80									
8.0	79									
9.0	78									

DST consulting engineers
DST Consulting Engineers Ltd.
Email: thunderbay@dstgroup.com
Web: www.dstgroup.com

SAMPLE TYPE LEGEND

- Auger Sample
- Split Spoon Sample
- Bulk Sample
- Rock Core
- Hiller Peat Sampler
- 70mm Thick Wall Tube
- Bentonite
- Sand

ENCLOSURE 8

Appendix B-2

Water Well Record - Newly Installed Well

ENGLOBE

Ontario | Ministry of the Environment, Conservation and Parks

Well Tag No. (Place Sticker and/or Print Below) Tag#:A414971

Well Record

Regulation 903 Ontario Water Resources Act

Page ______ of ______

Measurements recorded in: ☐ Metric ☒ Imperial

Well Owner's Information

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

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
92 Bentley Av	Ottawa	ON	K2E6T9	6132234900

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
Dilworth Road	City of Ottawa	35	3

County/District/Municipality	City/Town/Village	Province	Postal Code
Ottawa Carleton	Ottawa	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83	18	449134	4993849		

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
Grey	Stones (Fill)		Loose	0	1'6"
Brown	Sand		Soft	1'6"	5'
Grey	Clay		Packed	5'	20'
Grey	Limestone		Layered	20'	40'

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
25'	0	Neat Cement Pressure Grouted	20.31

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): 30'

Pumping rate (l/min / GPM): 20gpm

Duration of pumping: 1 hrs + ____ min

Final water level end of pumping (m/ft): 13.7

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

Recommended pump depth (m/ft): 30'

Recommended pump rate (l/min/GPM): 20gpm

Well production (l/min/GPM):

Disinfected? ☒ Yes ☐ No 178ppm

Draw Down Time (min)	Water Level (m/ft)	Recovery Time (min)	Water Level (m/ft)
Static Level	7.3		13.7
1	10	1	11.55
2	10.05	2	9.95
3	10.05	3	7.3
4	11.1	4	
5	11.2	5	
10	11.7	10	
15	12.7	15	
20	13.1	20	
25	13.35	25	
30	13.5	30	
40	13.6	40	
50	13.65	50	
60	13.7	60	

Method of Construction

☐ Cable Tool ☐ Diamond
☒ Rotary (~~Conventional~~ Mud) ☐ 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	To
6¼"	Steel	.188	+ 2'	25'
6 1/16"	Open Hole		25'	40'

Status of Well

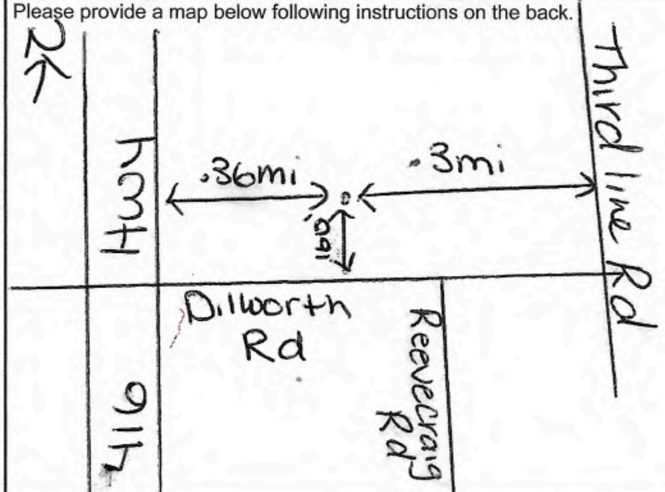
☒ Water Supply
☐ Replacement Well
☐ Test Hole
☐ Recharge Well
☐ Dewatering Well
☐ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, specify
☐ Other, specify

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	To

Map of Well Location

Please provide a map below following instructions on the back.



Comments:

Water Details

Water found at Depth	Kind of Water
32' (m/ft) ☐ Gas	☐ Fresh ☒ Untested ☐ Other, specify
(m/ft) ☐ Gas	☐ Fresh ☐ Untested ☐ Other, specify
(m/ft) ☐ Gas	☐ Fresh ☐ Untested ☐ Other, specify

Hole Diameter

Depth (m/ft) From	To	Diameter (cm/in)
0	25'	9 7/8"
25'	40'	6 1/16

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
1425486 Ontario Ltd. o/a Splash Well Drilling	4877

Business Address (Street Number/Name)	Municipality
P.O Box 1083	Prescott

Province	Postal Code	Business E-mail Address
ON	K0E1T0	

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
6139254885	Ferguson, Johnathon

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
4042	[signature]	20241130

Well owner's information package delivered: ☐ Yes ☐ No

Date Package Delivered: Y Y Y Y M M D D

Date Work Completed: 20241028

Ministry Use Only

Audit No. Z428823

Received

Ministry's Copy

CERTIFICATE OF WELL COMPLIANCE

1425481 Ontario Ltd o/a Splash Well Drilling
Johnathon Ferguson DO HEREBY CERTIFY that I am licensed to drill wells in the Province of Ontario, and that I have supervised the drilling of a well on the property of Dilworth Developments (Name of Landowner), located at Dilworth Road. (Legal Description, Lot/Plan No.) in the City of Ottawa (Geographical Township of).

Lot 35 Conc. 3 Plan* S/L*

CERTIFY FURTHER that, I am aware of the well drilling requirements, the guidelines, recommendations and regulations of the Ministry of the Environment governing well installations in the Province of Ontario, and the standards specified in any subdivision agreement and hydrogeological report applicable to this site and City Standards.

AND DO HEREBY CERTIFY THAT the said well has been drilled, cased, grouted (cement or bentonite) as applicable and constructed in strict conformity with the standards required.

Signed this 2 day of December, 2024.

Well Driller/Company

The Engineer on behalf of the landowner set out above Certifies that he/she has inspected the well and it was constructed in accordance with the specifications in O.Reg.903, this report ~~and the Hydrogeological Report~~ with regards to casing length and grouting requirements.

SIGNED this 02 day of December, 2024

D.G. Morey, P.Eng. on behalf of Morey Associates Ltd.
Engineer

*Morey Associates Ltd. accepts no responsibility for the groundwater quality, groundwater quantity, and well depth of the subject drilled well at this site.

Appendix C

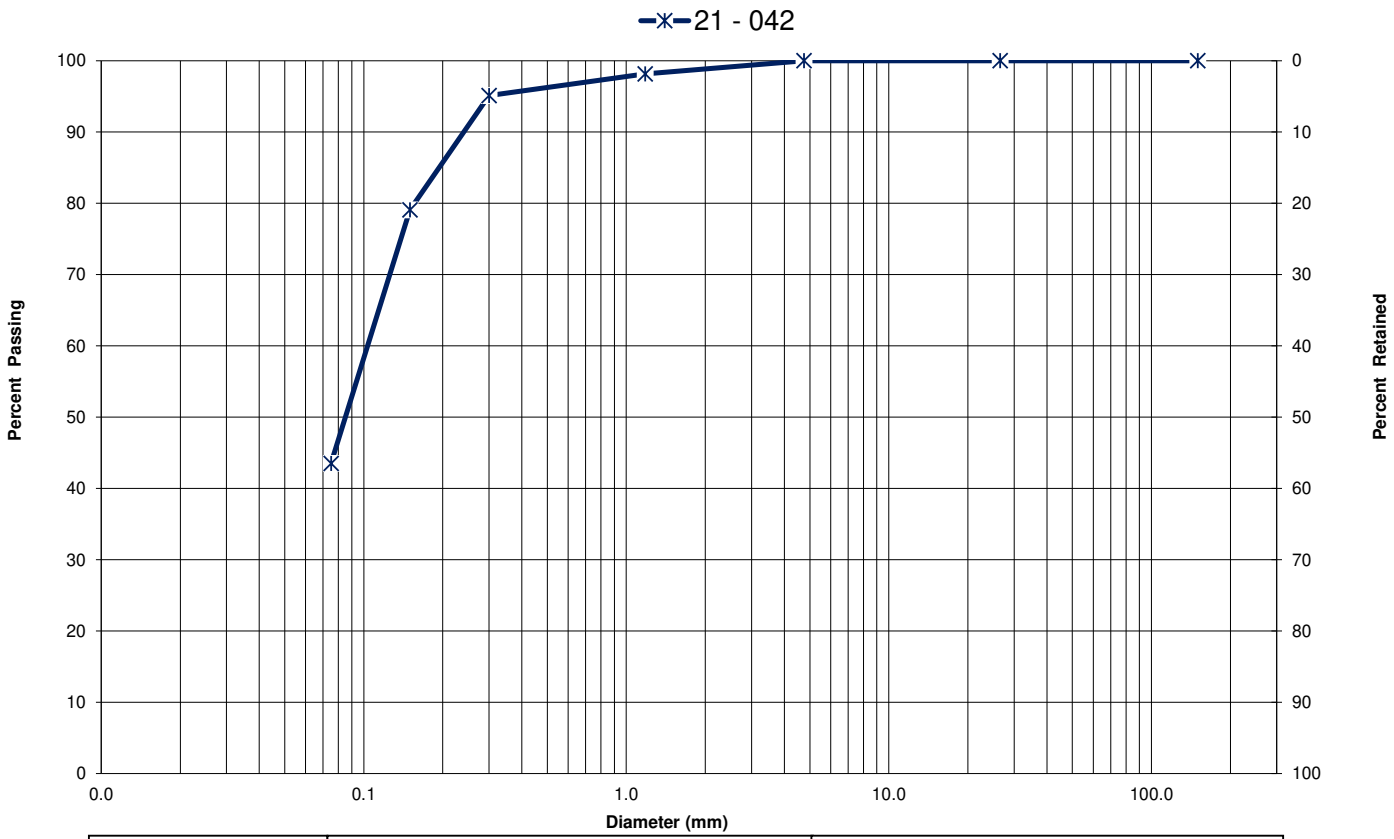
Grain Size Analysis

ENGLOBE

DST, a Division of Englobe
203-2150 Thurston Drive
Ottawa, ON
K1G 5T9
Tel.: 613 748 1415
Fax: 613 748 1356
www.dstgroup.com
ottawa@dstgroup.com

GRAIN SIZE ANALYSIS

DST Ref. No.:	2101208.000	**Date Sampled:**	16-Feb-21
Project:	Proposed Commercial Subdivision	**Sampled By:**	Cameron Fischl (DST)
Client:	2095 Dilworth Road	**Material Source:**	MW21-01, SS3A
Project Location:	Dilworth Development Inc.	**Sampling Location:**	1.5m-2.1m
Sample #:	21-042	**Material Description:**	SILT AND SAND



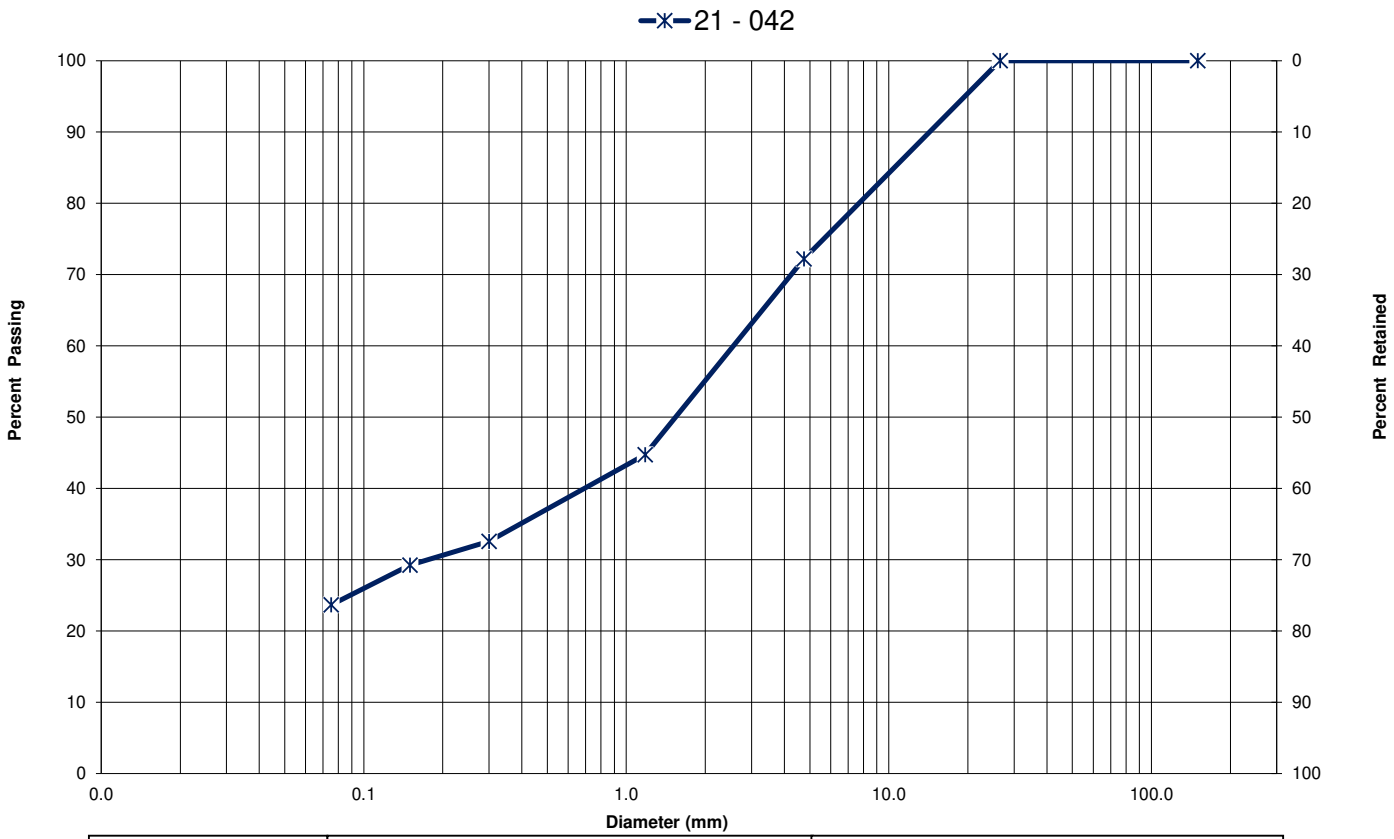
Clay & Silt	Sand			Gravel	
	Fine	Medium	Coarse	Fine	Coarse
Particle-Size Limits as per USCS (ASTM D-2487)					

SUMMARY			
Soil Description	**Gravel (%)**	**Sand (%)**	**Clay and Silt (%)**
SILT AND SAND	0	56	44

DST, a Division of Englobe
203-2150 Thurston Drive
Ottawa, ON
K1G 5T9
Tel.: 613 748 1415
Fax: 613 748 1356
www.dstgroup.com
ottawa@dstgroup.com

GRAIN SIZE ANALYSIS

DST Ref. No.:	2101208.000	**Date Sampled:**	16-Feb-21
Project:	Proposed Commercial Subdivisions	**Sampled By:**	Cameron Fischl (DST)
Client:	Dilworth Development Inc.	**Material Source:**	MW21-01, SS7
Project Location:	2095 Dilworth Road	**Sampling Location:**	4.6m-5.2m
Sample #:	21-042	**Material Description:**	SILTY SAND, some gravel (TILL)



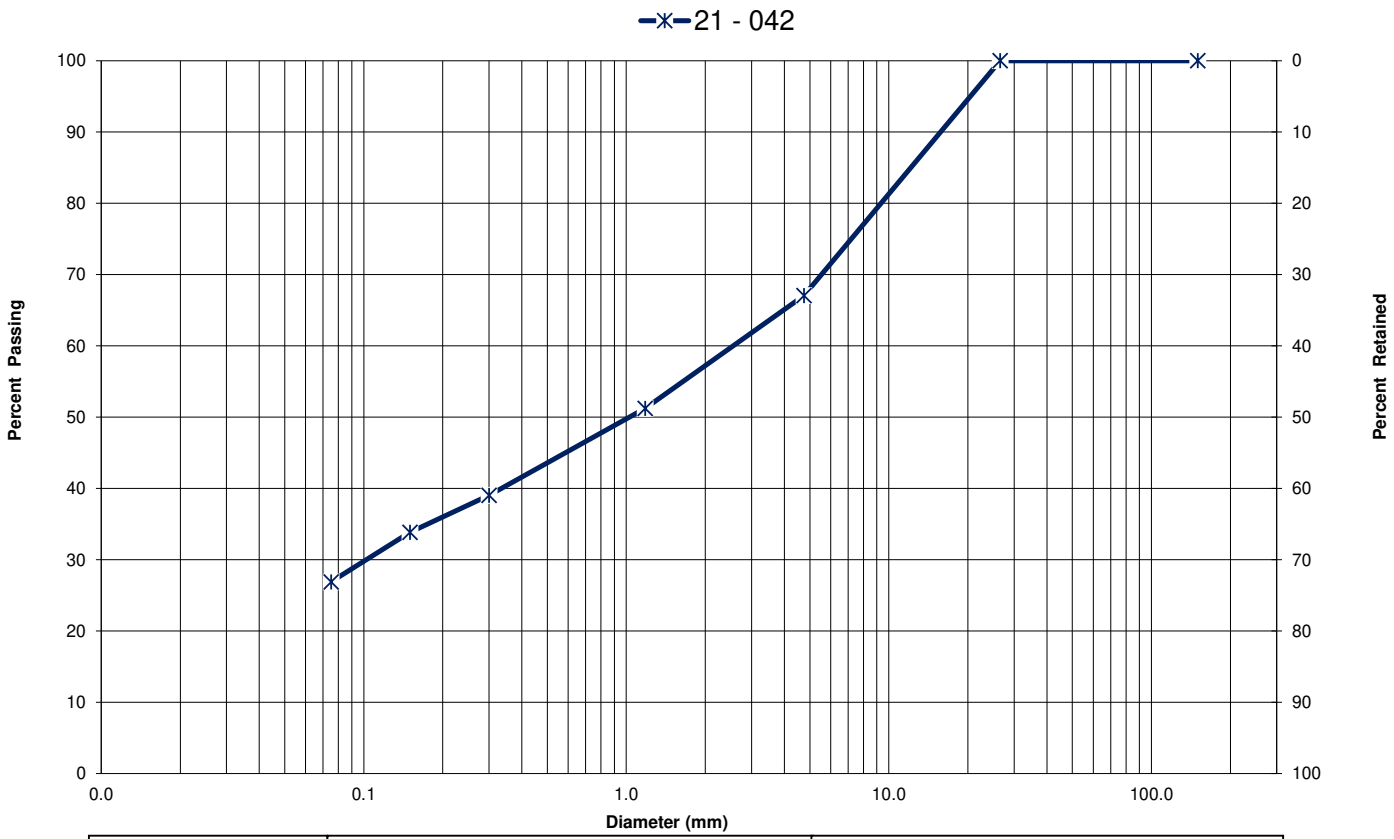
Clay & Silt	Sand			Gravel	
	Fine	Medium	Coarse	Fine	Coarse
Particle-Size Limits as per USCS (ASTM D-2487)					

SUMMARY			
Soil Description	**Gravel (%)**	**Sand (%)**	**Clay and Silt (%)**
SILTY SAND, some gravel (TILL)	28	49	24

DST, a Division of Englobe
203-2150 Thurston Drive
Ottawa, ON
K1G 5T9
Tel.: 613 748 1415
Fax: 613 748 1356
www.dstgroup.com
ottawa@dstgroup.com

GRAIN SIZE ANALYSIS

DST Ref. No.:	2101208.000	**Date Sampled:**	16-Feb-21
Project:	Proposed Commercial Subdivision	**Sampled By:**	Cameron Fischl (DST)
Client:	Dilworth Development Inc.	**Material Source:**	MW21-03, SS5
Project Location:	2095 Dilworth Road	**Sampling Location:**	3.2m-3.8m
Sample #:	21-042	**Material Description:**	GRAVELLY SILTY SAND (TILL)



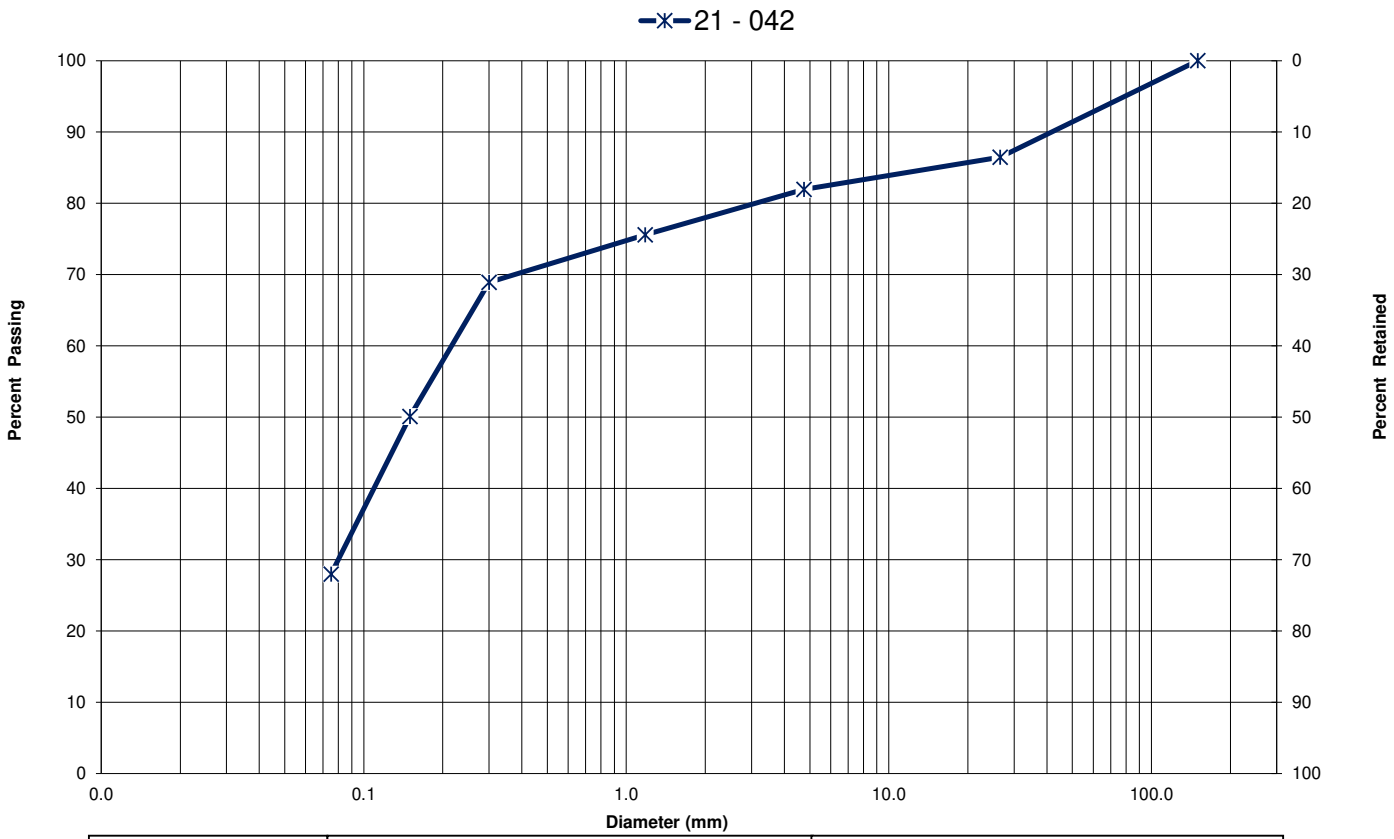
Clay & Silt	Sand			Gravel	
	Fine	Medium	Coarse	Fine	Coarse
Particle-Size Limits as per USCS (ASTM D-2487)					

SUMMARY			
Soil Description	**Gravel (%)**	**Sand (%)**	**Clay and Silt (%)**
GRAVELLY SILTY SAND (TILL)	33	40	27

DST, a Division of Englobe
203-2150 Thurston Drive
Ottawa, ON
K1G 5T9
Tel.: 613 748 1415
Fax: 613 748 1356
www.dstgroup.com
ottawa@dstgroup.com

GRAIN SIZE ANALYSIS

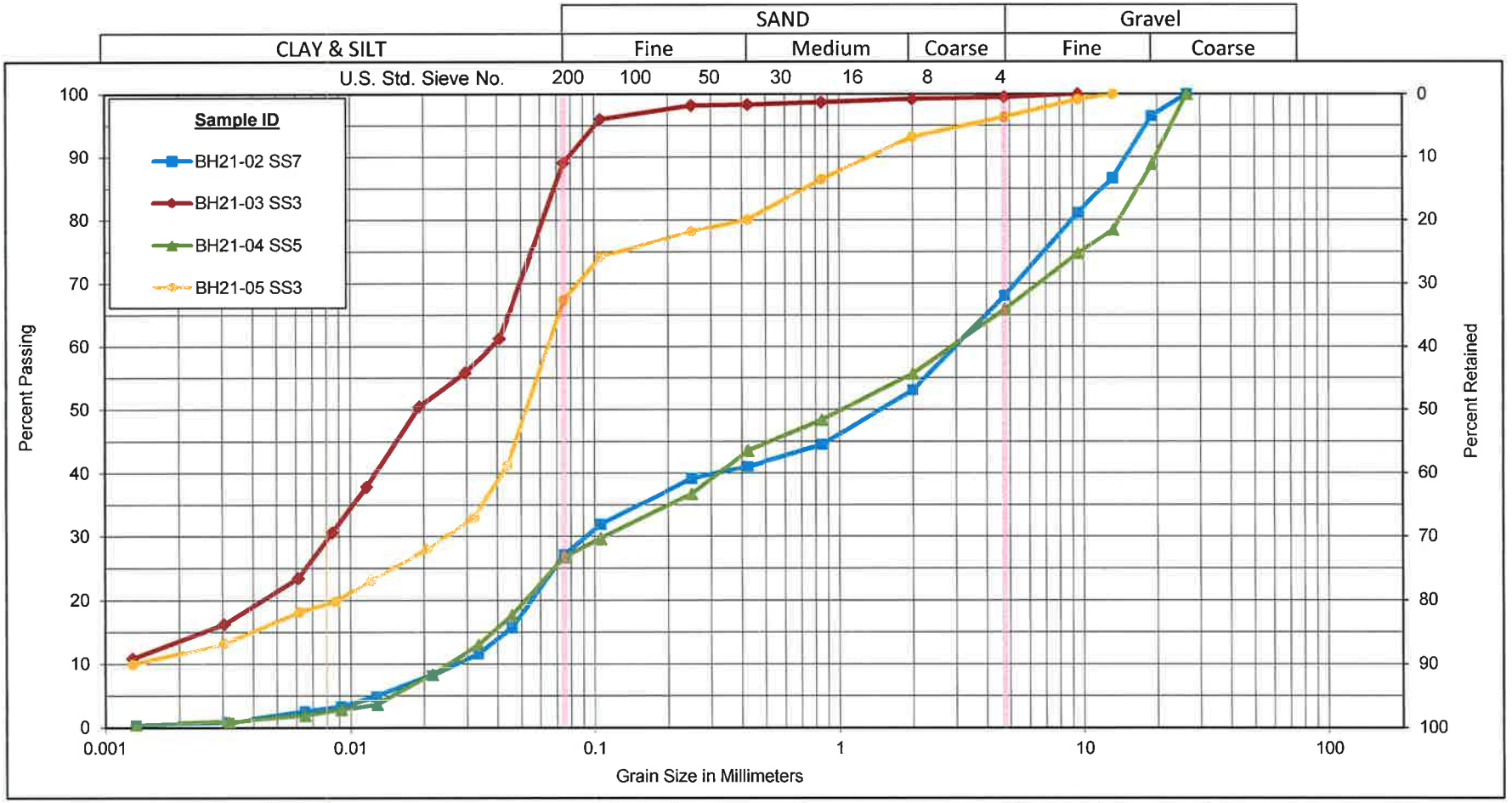
DST Ref. No.:	2101208.000	**Date Sampled:**	17-Feb-21
Project:	Proposed Commercial Subdivision	**Sampled By:**	Cameron Fischl (DST)
Client:	Dilworth Development Inc.	**Material Source:**	MW21-06, SS4
Project Location:	2095 Dilworth Road	**Sampling Location:**	2.4m-3.0m
Sample #:	21-042	**Material Description:**	SILTY SAND some gravel (TILL)



Clay & Silt	Sand			Gravel	
	Fine	Medium	Coarse	Fine	Coarse
Particle-Size Limits as per USCS (ASTM D-2487)					

SUMMARY			
Soil Description	**Gravel (%)**	**Sand (%)**	**Clay and Silt (%)**
SILTY SAND some gravel (TILL)	18	54	28

Unified Soil Classification System



Sample ID	Depth	% Gravel	% Sand	% Silt	% Clay
BH21-02 SS7	5.5-6.1 m	31.9	41.0	26.1	1.0
BH21-03 SS3	1.7-2.3 m	0.5	10.4	76.1	13.0
BH21-04 SS5	3.2-3.8 m	34.1	39.2	25.7	1.0
BH21-05 SS3	1.7-2.3 m	3.7	29.0	56.3	11.0

Stantec

GRAIN SIZE DISTRIBUTION

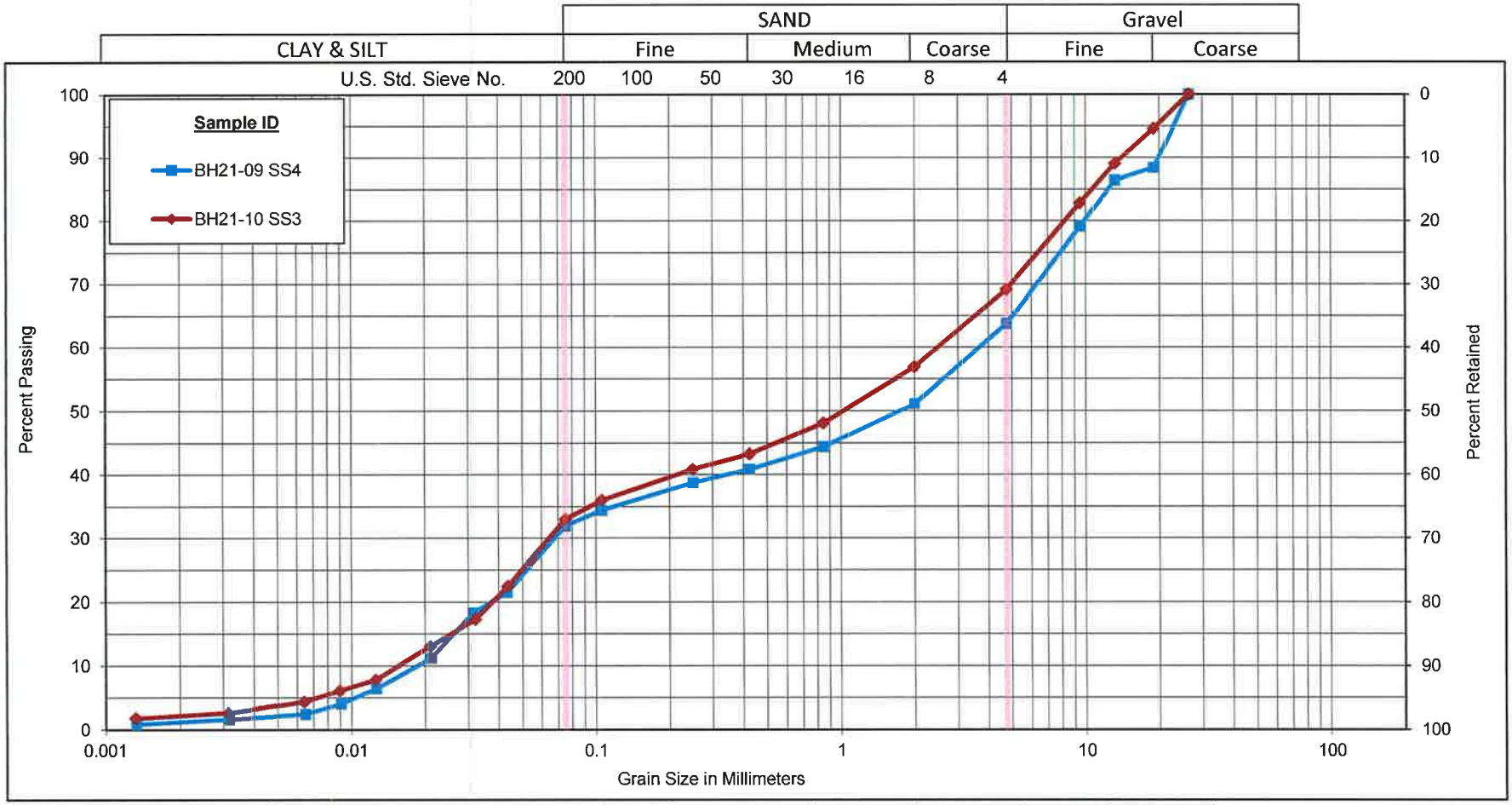
DST Consulting Engineers Inc. File # 2101208

2095 Dilworth Road

Figure No.

Project No. 122411080

Unified Soil Classification System



Sample ID	Depth	% Gravel	% Sand	% Silt	% Clay
BH21-09 SS4	2.5-3.1 m	36.2	31.9	30.9	1.0
BH21-10 SS3	1.7-2.3 m	31.0	36.0	31.0	2.0

Stantec

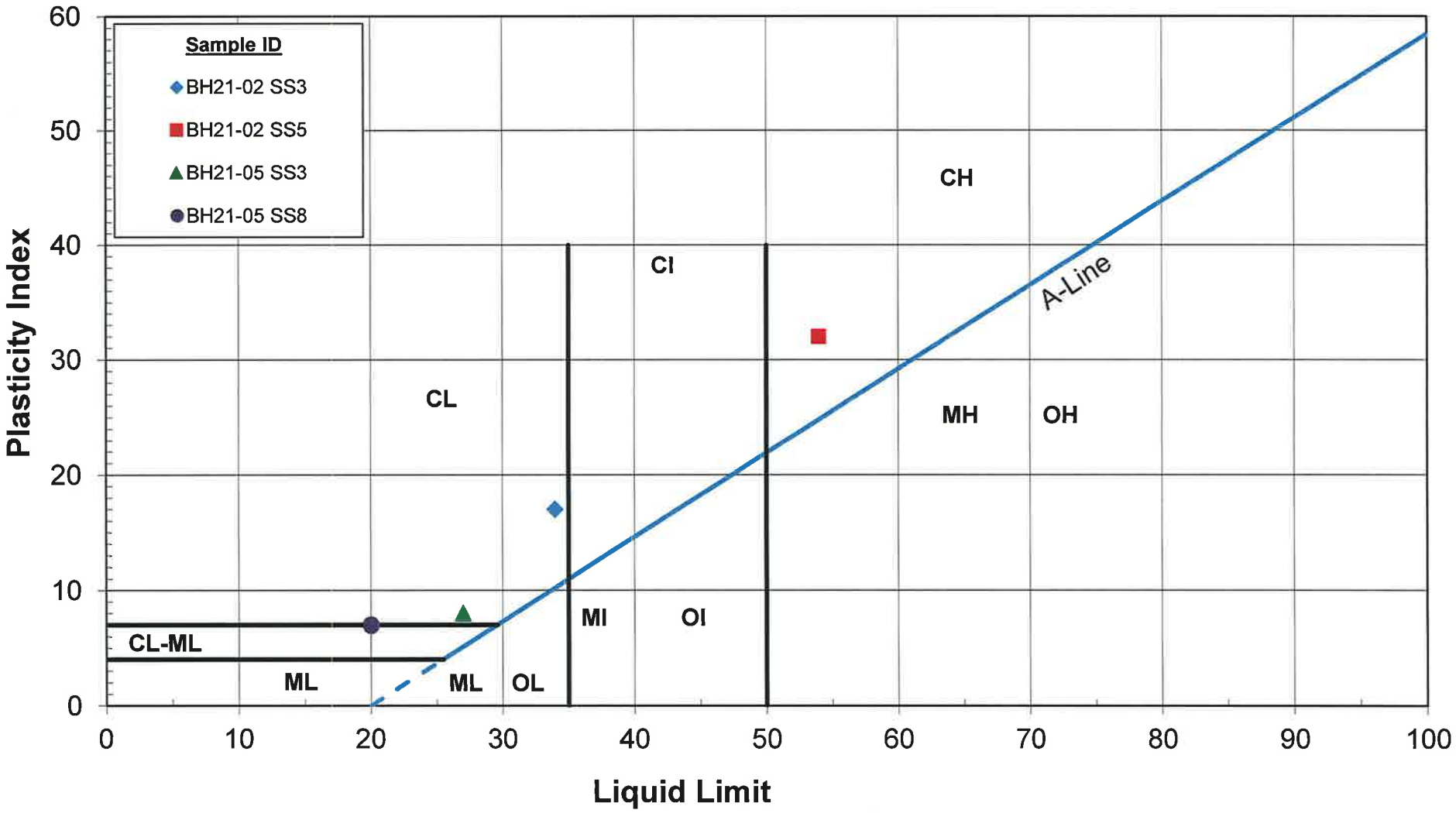
GRAIN SIZE DISTRIBUTION

DST Consulting Engineers Inc. File # 2101208

2095 Dilworth Road

Figure No.

Project No. 122411080



Stantec

DST Consulting Engineers Inc. File # 2101208

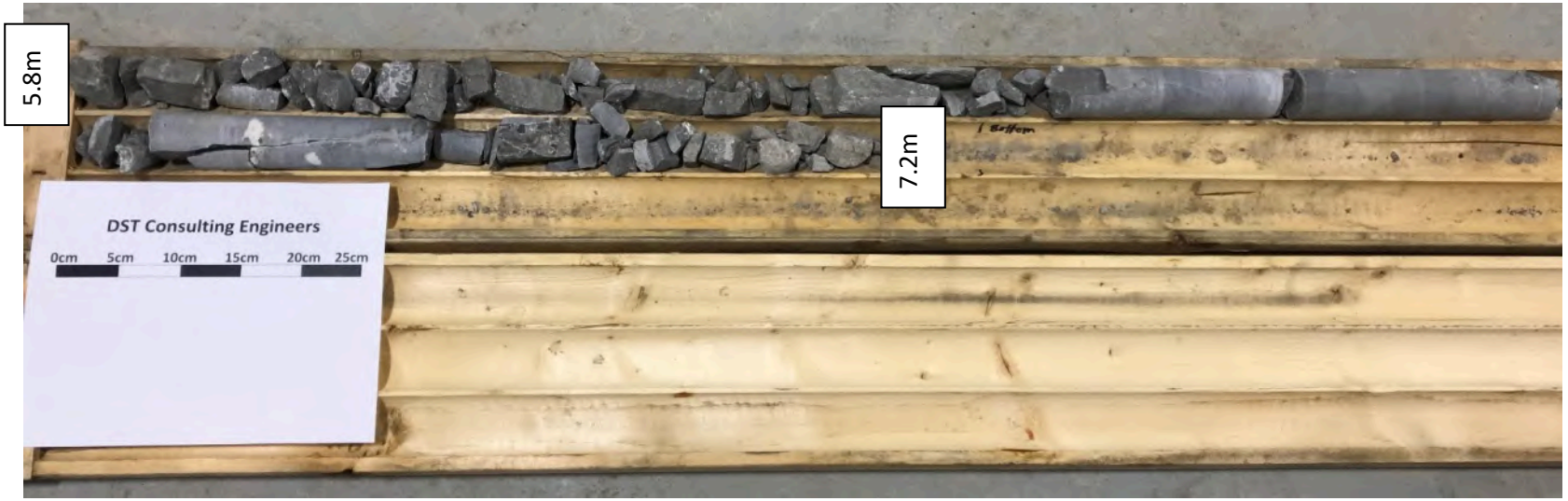
2095 Dilworth Road.

PLASTICITY CHART

Figure No.

Project No. 122411080

DST consulting engineers a division of Englobe	Rockcore Photograph 2095 Dilworth Road, Kars, ON	Project No.: 0210208.000

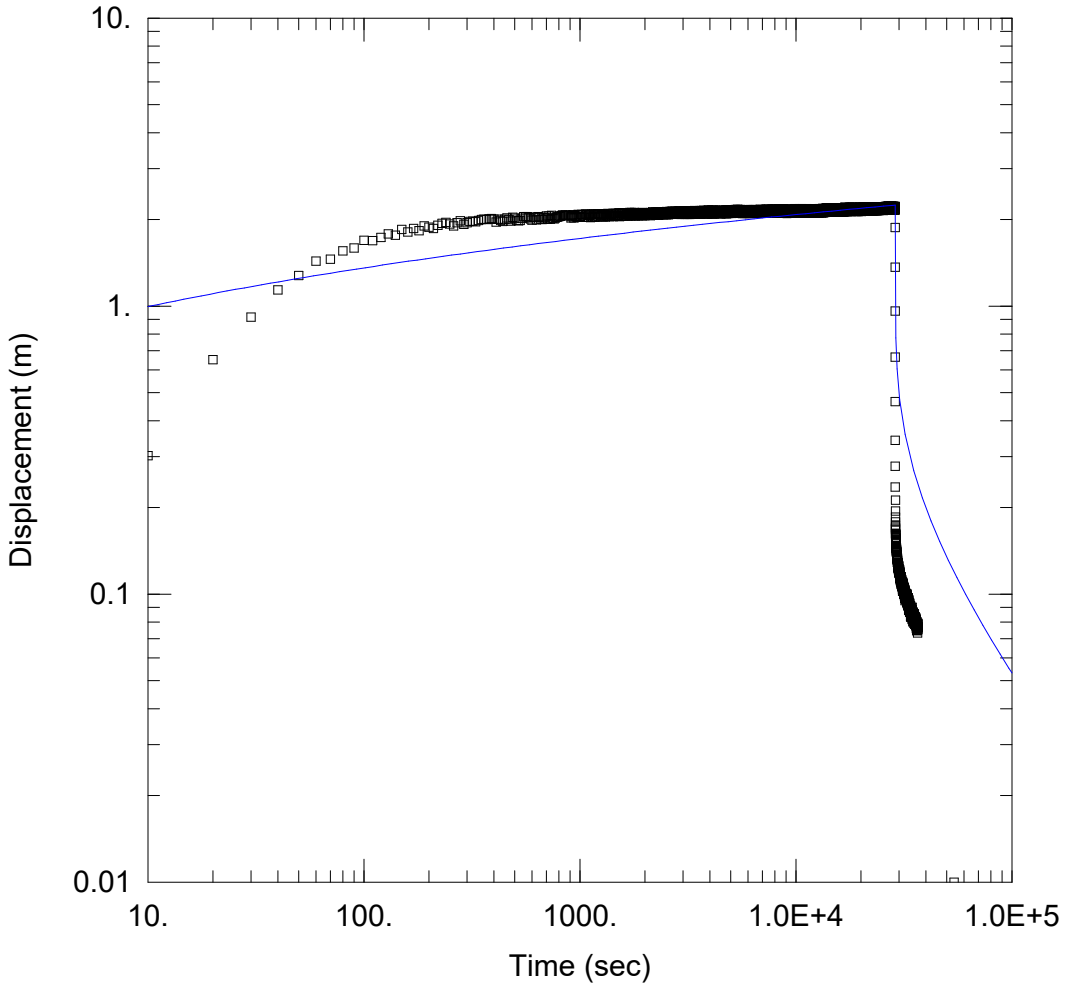


Rock Core Photo No.: 1	Borehole: BH 21-05	Depth: 5.8 to 7.2 m

Appendix D

Aquifer Test Analysis

ENGLOBE



WELL TEST ANALYSIS

Data Set: C:\...\PW21-01.aqt
Date: 07/16/21 Time: 08:49:37

PROJECT INFORMATION

Company: DST, A Division of Englobe
Client: Dilworth Development Inc.
Project: 02101208.000
Location: 2095 Dilworth Road, Kars, ON
Test Well: PW21-01
Test Date: May 31, 2021

WELL DATA

Pumping Wells

Well Name	X (m)	Y (m)
PW21-01	0	0

Observation Wells

Well Name	X (m)	Y (m)
PW21-01	0	0
MW21-01	17.3	0

SOLUTION

Aquifer Model: Confined
Solution Method: Theis

T = 0.000642 m^2/sec
S = 0.004293
Kz/Kr = 1.
b = 58.2 m

Data Set: C:\Users\kbailey\OneDrive - DST Consulting Engineers\Desktop Files\HydroG\02101208.000 Dilworth\PW
Date: 07/16/21
Time: 08:50:50

PROJECT INFORMATION

Company: DST, A Division of Englobe
Client: Dilworth Development Inc.
Project: 02101208.000
Location: 2095 Dilworth Road, Kars, ON
Test Date: May 31, 2021
Test Well: PW21-01

AQUIFER DATA

Saturated Thickness: 58.2 m
Anisotropy Ratio (Kz/Kr): 1.

PUMPING WELL DATA

No. of pumping wells: 1

Pumping Well No. 1: PW21-01

X Location: 0. m
Y Location: 0. m

Casing Radius: 0.0762 m
Well Radius: 0.0762 m

Fully Penetrating Well

No. of pumping periods: 2

Pumping Period Data

Time (sec)	Rate (cu. m/sec)	Time (sec)	Rate (cu. m/sec)
0.	0.001263	2.88E+4	0.

OBSERVATION WELL DATA

No. of observation wells: 2

Observation Well No. 1: PW21-01

X Location: 0. m
Y Location: 0. m

Radial distance from PW21-01: 0. m

Fully Penetrating Well

No. of Observations: 3673

Observation Data

Time (sec)	Displacement (m)	Time (sec)	Displacement (m)
10.	0.3023	1.838E+4	2.136
20.	0.6517	1.839E+4	2.146
30.	0.9158	1.84E+4	2.158
40.	1.137	1.841E+4	2.158
50.	1.278	1.842E+4	2.14
60.	1.433	1.843E+4	2.14
70.	1.455	1.844E+4	2.141
80.	1.553	1.845E+4	2.158
90.	1.592	1.846E+4	2.183

Time (sec)	Displacement (m)	Time (sec)	Displacement (m)
100.	1.691	1.847E+4	2.182
110.	1.686	1.848E+4	2.155
120.	1.731	1.849E+4	2.138
130.	1.782	1.85E+4	2.144
140.	1.764	1.851E+4	2.142
150.	1.846	1.852E+4	2.15
160.	1.81	1.853E+4	2.152
170.	1.858	1.854E+4	2.159
180.	1.829	1.855E+4	2.202
190.	1.899	1.856E+4	2.164
200.	1.879	1.857E+4	2.146
210.	1.859	1.858E+4	2.182
220.	1.906	1.859E+4	2.186
230.	1.939	1.86E+4	2.191
240.	1.953	1.861E+4	2.19
250.	1.925	1.862E+4	2.187
260.	1.899	1.863E+4	2.18
270.	1.946	1.864E+4	2.166
280.	1.977	1.865E+4	2.165
290.	1.925	1.866E+4	2.189
300.	1.948	1.867E+4	2.192
310.	1.968	1.868E+4	2.165
320.	1.974	1.869E+4	2.139
330.	1.964	1.87E+4	2.195
340.	1.983	1.871E+4	2.167
350.	1.999	1.872E+4	2.15
360.	2.002	1.873E+4	2.2
370.	1.999	1.874E+4	2.168
380.	2.008	1.875E+4	2.183
390.	2.012	1.876E+4	2.195
400.	2.003	1.877E+4	2.161
410.	1.956	1.878E+4	2.137
420.	2.004	1.879E+4	2.166
430.	1.984	1.88E+4	2.183
440.	1.97	1.881E+4	2.2
450.	2.003	1.882E+4	2.192
460.	2.024	1.883E+4	2.153
470.	1.999	1.884E+4	2.136
480.	1.973	1.885E+4	2.144
490.	2.035	1.886E+4	2.164
500.	2.02	1.887E+4	2.193
510.	1.99	1.888E+4	2.136
520.	1.98	1.889E+4	2.194
530.	1.981	1.89E+4	2.141
540.	2.02	1.891E+4	2.19
550.	2.042	1.892E+4	2.16
560.	2.043	1.893E+4	2.148
570.	2.046	1.894E+4	2.178
580.	2.03	1.895E+4	2.163
590.	2.01	1.896E+4	2.137
600.	1.988	1.897E+4	2.166
610.	2.037	1.898E+4	2.194
620.	2.036	1.899E+4	2.139
630.	1.992	1.9E+4	2.196
640.	2.043	1.901E+4	2.159
650.	2.036	1.902E+4	2.132
660.	2.004	1.903E+4	2.143
670.	1.996	1.904E+4	2.179
680.	2.023	1.905E+4	2.198
690.	2.03	1.906E+4	2.173
700.	2.057	1.907E+4	2.159
710.	2.003	1.908E+4	2.162
720.	2.054	1.909E+4	2.145

Time (sec)	Displacement (m)	Time (sec)	Displacement (m)
730.	2.001	1.91E+4	2.135
740.	2.064	1.911E+4	2.164
750.	2.016	1.912E+4	2.196
760.	2.009	1.913E+4	2.169
770.	2.022	1.914E+4	2.137
780.	2.033	1.915E+4	2.156
790.	2.039	1.916E+4	2.164
800.	2.042	1.917E+4	2.141
810.	2.052	1.918E+4	2.162
820.	2.06	1.919E+4	2.191
830.	2.07	1.92E+4	2.197
840.	2.067	1.921E+4	2.172
850.	2.064	1.922E+4	2.156
860.	2.07	1.923E+4	2.171
870.	2.067	1.924E+4	2.151
880.	2.059	1.925E+4	2.19
890.	2.068	1.926E+4	2.14
900.	2.06	1.927E+4	2.195
910.	2.021	1.928E+4	2.132
920.	2.047	1.929E+4	2.193
930.	2.078	1.93E+4	2.138
940.	2.024	1.931E+4	2.196
950.	2.061	1.932E+4	2.159
960.	2.05	1.933E+4	2.134
970.	2.036	1.934E+4	2.135
980.	2.083	1.935E+4	2.186
990.	2.076	1.936E+4	2.171
1000.	2.031	1.937E+4	2.142
1010.	2.051	1.938E+4	2.137
1020.	2.082	1.939E+4	2.161
1030.	2.074	1.94E+4	2.196
1040.	2.036	1.941E+4	2.176
1050.	2.033	1.942E+4	2.187
1060.	2.086	1.943E+4	2.192
1070.	2.071	1.944E+4	2.197
1080.	2.089	1.945E+4	2.192
1090.	2.036	1.946E+4	2.174
1100.	2.076	1.947E+4	2.174
1110.	2.065	1.948E+4	2.165
1120.	2.029	1.949E+4	2.155
1130.	2.089	1.95E+4	2.135
1140.	2.053	1.951E+4	2.14
1150.	2.04	1.952E+4	2.138
1160.	2.085	1.953E+4	2.132
1170.	2.035	1.954E+4	2.149
1180.	2.089	1.955E+4	2.192
1190.	2.037	1.956E+4	2.149
1200.	2.087	1.957E+4	2.193
1210.	2.086	1.958E+4	2.16
1220.	2.087	1.959E+4	2.155
1230.	2.083	1.96E+4	2.184
1240.	2.046	1.961E+4	2.17
1250.	2.07	1.962E+4	2.156
1260.	2.061	1.963E+4	2.133
1270.	2.084	1.964E+4	2.151
1280.	2.037	1.965E+4	2.169
1290.	2.077	1.966E+4	2.194
1300.	2.079	1.967E+4	2.141
1310.	2.038	1.968E+4	2.145
1320.	2.09	1.969E+4	2.139
1330.	2.063	1.97E+4	2.137
1340.	2.048	1.971E+4	2.145
1350.	2.095	1.972E+4	2.141

Time (sec)	Displacement (m)	Time (sec)	Displacement (m)
1360.	2.072	1.973E+4	2.142
1370.	2.043	1.974E+4	2.171
1380.	2.05	1.975E+4	2.206
1390.	2.091	1.976E+4	2.161
1400.	2.083	1.977E+4	2.141
1410.	2.057	1.978E+4	2.183
1420.	2.095	1.979E+4	2.192
1430.	2.045	1.98E+4	2.162
1440.	2.098	1.981E+4	2.175
1450.	2.06	1.982E+4	2.192
1460.	2.069	1.983E+4	2.197
1470.	2.095	1.984E+4	2.199
1480.	2.049	1.985E+4	2.193
1490.	2.096	1.986E+4	2.166
1500.	2.059	1.987E+4	2.14
1510.	2.058	1.988E+4	2.143
1520.	2.107	1.989E+4	2.185
1530.	2.047	1.99E+4	2.184
1540.	2.098	1.991E+4	2.141
1550.	2.048	1.992E+4	2.155
1560.	2.097	1.993E+4	2.187
1570.	2.109	1.994E+4	2.199
1580.	2.098	1.995E+4	2.198
1590.	2.087	1.996E+4	2.17
1600.	2.057	1.997E+4	2.138
1610.	2.102	1.998E+4	2.175
1620.	2.091	1.999E+4	2.198
1630.	2.053	2.0E+4	2.176
1640.	2.092	2.001E+4	2.168
1650.	2.079	2.002E+4	2.17
1660.	2.098	2.003E+4	2.171
1670.	2.053	2.004E+4	2.168
1680.	2.098	2.005E+4	2.178
1690.	2.07	2.006E+4	2.186
1700.	2.112	2.007E+4	2.198
1710.	2.064	2.008E+4	2.196
1720.	2.059	2.009E+4	2.186
1730.	2.113	2.01E+4	2.156
1740.	2.062	2.011E+4	2.198
1750.	2.103	2.012E+4	2.142
1760.	2.096	2.013E+4	2.16
1770.	2.059	2.014E+4	2.194
1780.	2.082	2.015E+4	2.135
1790.	2.114	2.016E+4	2.188
1800.	2.1	2.017E+4	2.177
1810.	2.057	2.018E+4	2.132
1820.	2.104	2.019E+4	2.186
1830.	2.095	2.02E+4	2.153
1840.	2.074	2.021E+4	2.202
1850.	2.094	2.022E+4	2.18
1860.	2.099	2.023E+4	2.156
1870.	2.06	2.024E+4	2.14
1880.	2.109	2.025E+4	2.159
1890.	2.09	2.026E+4	2.192
1900.	2.074	2.027E+4	2.146
1910.	2.083	2.028E+4	2.167
1920.	2.103	2.029E+4	2.191
1930.	2.059	2.03E+4	2.161
1940.	2.114	2.031E+4	2.151
1950.	2.06	2.032E+4	2.188
1960.	2.109	2.033E+4	2.198
1970.	2.077	2.034E+4	2.169
1980.	2.094	2.035E+4	2.161

Time (sec)	Displacement (m)	Time (sec)	Displacement (m)
1990.	2.091	2.036E+4	2.149
2000.	2.061	2.037E+4	2.189
2010.	2.11	2.038E+4	2.146
2020.	2.085	2.039E+4	2.196
2030.	2.08	2.04E+4	2.133
2040.	2.103	2.041E+4	2.194
2050.	2.08	2.042E+4	2.165
2060.	2.105	2.043E+4	2.142
2070.	2.097	2.044E+4	2.201
2080.	2.073	2.045E+4	2.146
2090.	2.08	2.046E+4	2.16
2100.	2.088	2.047E+4	2.188
2110.	2.086	2.048E+4	2.194
2120.	2.062	2.049E+4	2.186
2130.	2.113	2.05E+4	2.158
2140.	2.105	2.051E+4	2.165
2150.	2.081	2.052E+4	2.192
2160.	2.09	2.053E+4	2.199
2170.	2.126	2.054E+4	2.187
2180.	2.116	2.055E+4	2.186
2190.	2.102	2.056E+4	2.136
2200.	2.084	2.057E+4	2.192
2210.	2.074	2.058E+4	2.2
2220.	2.11	2.059E+4	2.202
2230.	2.113	2.06E+4	2.18
2240.	2.07	2.061E+4	2.141
2250.	2.121	2.062E+4	2.138
2260.	2.096	2.063E+4	2.156
2270.	2.079	2.064E+4	2.203
2280.	2.121	2.065E+4	2.182
2290.	2.072	2.066E+4	2.148
2300.	2.126	2.067E+4	2.138
2310.	2.072	2.068E+4	2.166
2320.	2.127	2.069E+4	2.203
2330.	2.071	2.07E+4	2.148
2340.	2.106	2.071E+4	2.169
2350.	2.085	2.072E+4	2.2
2360.	2.103	2.073E+4	2.186
2370.	2.1	2.074E+4	2.161
2380.	2.088	2.075E+4	2.139
2390.	2.106	2.076E+4	2.178
2400.	2.086	2.077E+4	2.145
2410.	2.11	2.078E+4	2.2
2420.	2.092	2.079E+4	2.143
2430.	2.079	2.08E+4	2.195
2440.	2.101	2.081E+4	2.142
2450.	2.127	2.082E+4	2.193
2460.	2.08	2.083E+4	2.177
2470.	2.125	2.084E+4	2.143
2480.	2.105	2.085E+4	2.144
2490.	2.083	2.086E+4	2.185
2500.	2.117	2.087E+4	2.162
2510.	2.077	2.088E+4	2.182
2520.	2.129	2.089E+4	2.178
2530.	2.081	2.09E+4	2.158
2540.	2.095	2.091E+4	2.177
2550.	2.119	2.092E+4	2.145
2560.	2.081	2.093E+4	2.172
2570.	2.076	2.094E+4	2.185
2580.	2.098	2.095E+4	2.159
2590.	2.101	2.096E+4	2.135
2600.	2.129	2.097E+4	2.138
2610.	2.127	2.098E+4	2.16

Time (sec)	Displacement (m)	Time (sec)	Displacement (m)
2620.	2.081	2.099E+4	2.203
2630.	2.119	2.1E+4	2.14
2640.	2.129	2.101E+4	2.187
2650.	2.089	2.102E+4	2.171
2660.	2.094	2.103E+4	2.15
2670.	2.132	2.104E+4	2.201
2680.	2.137	2.105E+4	2.139
2690.	2.125	2.106E+4	2.199
2700.	2.118	2.107E+4	2.145
2710.	2.122	2.108E+4	2.177
2720.	2.086	2.109E+4	2.195
2730.	2.114	2.11E+4	2.171
2740.	2.096	2.111E+4	2.159
2750.	2.09	2.112E+4	2.177
2760.	2.134	2.113E+4	2.188
2770.	2.129	2.114E+4	2.136
2780.	2.123	2.115E+4	2.19
2790.	2.098	2.116E+4	2.158
2800.	2.094	2.117E+4	2.152
2810.	2.106	2.118E+4	2.183
2820.	2.111	2.119E+4	2.199
2830.	2.112	2.12E+4	2.198
2840.	2.094	2.121E+4	2.186
2850.	2.134	2.122E+4	2.14
2860.	2.112	2.123E+4	2.195
2870.	2.118	2.124E+4	2.138
2880.	2.138	2.125E+4	2.203
2890.	2.093	2.126E+4	2.152
2900.	2.08	2.127E+4	2.178
2910.	2.108	2.128E+4	2.178
2920.	2.133	2.129E+4	2.139
2930.	2.136	2.13E+4	2.145
2940.	2.119	2.131E+4	2.176
2950.	2.082	2.132E+4	2.197
2960.	2.084	2.133E+4	2.135
2970.	2.101	2.134E+4	2.189
2980.	2.121	2.135E+4	2.185
2990.	2.089	2.136E+4	2.149
3000.	2.092	2.137E+4	2.196
3010.	2.122	2.138E+4	2.157
3020.	2.135	2.139E+4	2.188
3030.	2.137	2.14E+4	2.171
3040.	2.136	2.141E+4	2.144
3050.	2.115	2.142E+4	2.184
3060.	2.08	2.143E+4	2.206
3070.	2.115	2.144E+4	2.188
3080.	2.135	2.145E+4	2.144
3090.	2.133	2.146E+4	2.154
3100.	2.118	2.147E+4	2.192
3110.	2.092	2.148E+4	2.188
3120.	2.087	2.149E+4	2.152
3130.	2.127	2.15E+4	2.143
3140.	2.124	2.151E+4	2.153
3150.	2.083	2.152E+4	2.177
3160.	2.132	2.153E+4	2.163
3170.	2.088	2.154E+4	2.143
3180.	2.084	2.155E+4	2.168
3190.	2.103	2.156E+4	2.198
3200.	2.088	2.157E+4	2.147
3210.	2.143	2.158E+4	2.14
3220.	2.083	2.159E+4	2.162
3230.	2.132	2.16E+4	2.142
3240.	2.129	2.161E+4	2.153

Time (sec)	Displacement (m)	Time (sec)	Displacement (m)
3250.	2.081	2.162E+4	2.148
3260.	2.141	2.163E+4	2.144
3270.	2.113	2.164E+4	2.165
3280.	2.085	2.165E+4	2.175
3290.	2.134	2.166E+4	2.197
3300.	2.131	2.167E+4	2.188
3310.	2.087	2.168E+4	2.144
3320.	2.142	2.169E+4	2.195
3330.	2.13	2.17E+4	2.14
3340.	2.09	2.171E+4	2.186
3350.	2.138	2.172E+4	2.201
3360.	2.109	2.173E+4	2.207
3370.	2.103	2.174E+4	2.194
3380.	2.148	2.175E+4	2.148
3390.	2.095	2.176E+4	2.159
3400.	2.14	2.177E+4	2.173
3410.	2.09	2.178E+4	2.204
3420.	2.134	2.179E+4	2.143
3430.	2.142	2.18E+4	2.199
3440.	2.093	2.181E+4	2.15
3450.	2.133	2.182E+4	2.163
3460.	2.119	2.183E+4	2.199
3470.	2.125	2.184E+4	2.203
3480.	2.101	2.185E+4	2.167
3490.	2.141	2.186E+4	2.14
3500.	2.101	2.187E+4	2.186
3510.	2.091	2.188E+4	2.194
3520.	2.142	2.189E+4	2.2
3530.	2.092	2.19E+4	2.195
3540.	2.139	2.191E+4	2.165
3550.	2.123	2.192E+4	2.143
3560.	2.1	2.193E+4	2.146
3570.	2.139	2.194E+4	2.148
3580.	2.095	2.195E+4	2.186
3590.	2.144	2.196E+4	2.188
3600.	2.09	2.197E+4	2.146
3610.	2.131	2.198E+4	2.197
3620.	2.129	2.199E+4	2.148
3630.	2.088	2.2E+4	2.199
3640.	2.136	2.201E+4	2.148
3650.	2.146	2.202E+4	2.207
3660.	2.115	2.203E+4	2.197
3670.	2.115	2.204E+4	2.187
3680.	2.124	2.205E+4	2.156
3690.	2.128	2.206E+4	2.14
3700.	2.123	2.207E+4	2.162
3710.	2.104	2.208E+4	2.161
3720.	2.118	2.209E+4	2.152
3730.	2.132	2.21E+4	2.161
3740.	2.137	2.211E+4	2.18
3750.	2.153	2.212E+4	2.199
3760.	2.129	2.213E+4	2.149
3770.	2.105	2.214E+4	2.179
3780.	2.086	2.215E+4	2.203
3790.	2.118	2.216E+4	2.149
3800.	2.142	2.217E+4	2.145
3810.	2.103	2.218E+4	2.145
3820.	2.09	2.219E+4	2.147
3830.	2.098	2.22E+4	2.145
3840.	2.119	2.221E+4	2.152
3850.	2.143	2.222E+4	2.16
3860.	2.146	2.223E+4	2.203
3870.	2.101	2.224E+4	2.174

Time (sec)	Displacement (m)	Time (sec)	Displacement (m)
3880.	2.124	2.225E+4	2.149
3890.	2.126	2.226E+4	2.204
3900.	2.094	2.227E+4	2.154
3910.	2.093	2.228E+4	2.17
3920.	2.112	2.229E+4	2.202
3930.	2.157	2.23E+4	2.167
3940.	2.098	2.231E+4	2.155
3950.	2.127	2.232E+4	2.154
3960.	2.117	2.233E+4	2.147
3970.	2.134	2.234E+4	2.156
3980.	2.107	2.235E+4	2.19
3990.	2.146	2.236E+4	2.2
4000.	2.097	2.237E+4	2.151
4010.	2.14	2.238E+4	2.169
4020.	2.116	2.239E+4	2.201
4030.	2.128	2.24E+4	2.141
4040.	2.109	2.241E+4	2.178
4050.	2.142	2.242E+4	2.199
4060.	2.092	2.243E+4	2.157
4070.	2.15	2.244E+4	2.157
4080.	2.094	2.245E+4	2.199
4090.	2.121	2.246E+4	2.16
4100.	2.151	2.247E+4	2.174
4110.	2.094	2.248E+4	2.191
4120.	2.151	2.249E+4	2.151
4130.	2.099	2.25E+4	2.142
4140.	2.101	2.251E+4	2.167
4150.	2.118	2.252E+4	2.151
4160.	2.152	2.253E+4	2.147
4170.	2.142	2.254E+4	2.188
4180.	2.094	2.255E+4	2.171
4190.	2.093	2.256E+4	2.16
4200.	2.097	2.257E+4	2.205
4210.	2.143	2.258E+4	2.18
4220.	2.152	2.259E+4	2.158
4230.	2.142	2.26E+4	2.146
4240.	2.133	2.261E+4	2.154
4250.	2.109	2.262E+4	2.156
4260.	2.099	2.263E+4	2.145
4270.	2.1	2.264E+4	2.161
4280.	2.142	2.265E+4	2.149
4290.	2.134	2.266E+4	2.172
4300.	2.116	2.267E+4	2.203
4310.	2.102	2.268E+4	2.146
4320.	2.098	2.269E+4	2.176
4330.	2.12	2.27E+4	2.209
4340.	2.124	2.271E+4	2.194
4350.	2.111	2.272E+4	2.147
4360.	2.121	2.273E+4	2.187
4370.	2.127	2.274E+4	2.209
4380.	2.127	2.275E+4	2.16
4390.	2.116	2.276E+4	2.169
4400.	2.121	2.277E+4	2.21
4410.	2.116	2.278E+4	2.207
4420.	2.123	2.279E+4	2.204
4430.	2.112	2.28E+4	2.204
4440.	2.129	2.281E+4	2.15
4450.	2.108	2.282E+4	2.201
4460.	2.123	2.283E+4	2.16
4470.	2.149	2.284E+4	2.165
4480.	2.109	2.285E+4	2.201
4490.	2.094	2.286E+4	2.209
4500.	2.095	2.287E+4	2.204

Time (sec)	Displacement (m)	Time (sec)	Displacement (m)
4510.	2.118	2.288E+4	2.196
4520.	2.146	2.289E+4	2.18
4530.	2.108	2.29E+4	2.162
4540.	2.15	2.291E+4	2.182
4550.	2.103	2.292E+4	2.203
4560.	2.128	2.293E+4	2.141
4570.	2.098	2.294E+4	2.2
4580.	2.14	2.295E+4	2.148
4590.	2.14	2.296E+4	2.184
4600.	2.14	2.297E+4	2.201
4610.	2.135	2.298E+4	2.164
4620.	2.15	2.299E+4	2.154
4630.	2.142	2.3E+4	2.177
4640.	2.108	2.301E+4	2.191
4650.	2.1	2.302E+4	2.206
4660.	2.121	2.303E+4	2.159
4670.	2.14	2.304E+4	2.177
4680.	2.14	2.305E+4	2.203
4690.	2.131	2.306E+4	2.193
4700.	2.1	2.307E+4	2.18
4710.	2.109	2.308E+4	2.179
4720.	2.141	2.309E+4	2.156
4730.	2.096	2.31E+4	2.157
4740.	2.157	2.311E+4	2.186
4750.	2.107	2.312E+4	2.201
4760.	2.092	2.313E+4	2.176
4770.	2.099	2.314E+4	2.146
4780.	2.102	2.315E+4	2.171
4790.	2.103	2.316E+4	2.199
4800.	2.107	2.317E+4	2.207
4810.	2.151	2.318E+4	2.203
4820.	2.095	2.319E+4	2.197
4830.	2.153	2.32E+4	2.158
4840.	2.115	2.321E+4	2.153
4850.	2.137	2.322E+4	2.149
4860.	2.099	2.323E+4	2.177
4870.	2.15	2.324E+4	2.202
4880.	2.125	2.325E+4	2.205
4890.	2.11	2.326E+4	2.191
4900.	2.157	2.327E+4	2.148
4910.	2.099	2.328E+4	2.193
4920.	2.128	2.329E+4	2.201
4930.	2.149	2.33E+4	2.179
4940.	2.104	2.331E+4	2.208
4950.	2.144	2.332E+4	2.185
4960.	2.115	2.333E+4	2.154
4970.	2.104	2.334E+4	2.159
4980.	2.132	2.335E+4	2.17
4990.	2.132	2.336E+4	2.183
5000.	2.124	2.337E+4	2.204
5010.	2.137	2.338E+4	2.148
5020.	2.156	2.339E+4	2.197
5030.	2.11	2.34E+4	2.181
5040.	2.117	2.341E+4	2.183
5050.	2.149	2.342E+4	2.175
5060.	2.126	2.343E+4	2.205
5070.	2.095	2.344E+4	2.161
5080.	2.134	2.345E+4	2.151
5090.	2.119	2.346E+4	2.208
5100.	2.119	2.347E+4	2.171
5110.	2.153	2.348E+4	2.196
5120.	2.152	2.349E+4	2.15
5130.	2.149	2.35E+4	2.209

Time (sec)	Displacement (m)	Time (sec)	Displacement (m)
5140.	2.15	2.351E+4	2.147
5150.	2.127	2.352E+4	2.21
5160.	2.109	2.353E+4	2.172
5170.	2.139	2.354E+4	2.149
5180.	2.112	2.355E+4	2.19
5190.	2.14	2.356E+4	2.16
5200.	2.16	2.357E+4	2.216
5210.	2.156	2.358E+4	2.197
5220.	2.156	2.359E+4	2.173
5230.	2.153	2.36E+4	2.156
5240.	2.155	2.361E+4	2.149
5250.	2.153	2.362E+4	2.193
5260.	2.161	2.363E+4	2.206
5270.	2.161	2.364E+4	2.216
5280.	2.161	2.365E+4	2.177
5290.	2.159	2.366E+4	2.151
5300.	2.157	2.367E+4	2.21
5310.	2.112	2.368E+4	2.199
5320.	2.152	2.369E+4	2.155
5330.	2.108	2.37E+4	2.167
5340.	2.151	2.371E+4	2.204
5350.	2.124	2.372E+4	2.148
5360.	2.124	2.373E+4	2.209
5370.	2.123	2.374E+4	2.169
5380.	2.167	2.375E+4	2.147
5390.	2.104	2.376E+4	2.168
5400.	2.15	2.377E+4	2.185
5410.	2.102	2.378E+4	2.185
5420.	2.142	2.379E+4	2.199
5430.	2.148	2.38E+4	2.203
5440.	2.101	2.381E+4	2.196
5450.	2.161	2.382E+4	2.197
5460.	2.142	2.383E+4	2.197
5470.	2.124	2.384E+4	2.146
5480.	2.138	2.385E+4	2.206
5490.	2.155	2.386E+4	2.172
5500.	2.132	2.387E+4	2.15
5510.	2.105	2.388E+4	2.168
5520.	2.113	2.389E+4	2.196
5530.	2.149	2.39E+4	2.201
5540.	2.162	2.391E+4	2.198
5550.	2.164	2.392E+4	2.199
5560.	2.161	2.393E+4	2.175
5570.	2.156	2.394E+4	2.16
5580.	2.147	2.395E+4	2.188
5590.	2.141	2.396E+4	2.178
5600.	2.125	2.397E+4	2.15
5610.	2.103	2.398E+4	2.179
5620.	2.098	2.399E+4	2.204
5630.	2.105	2.4E+4	2.201
5640.	2.102	2.401E+4	2.209
5650.	2.099	2.402E+4	2.206
5660.	2.097	2.403E+4	2.193
5670.	2.137	2.404E+4	2.157
5680.	2.129	2.405E+4	2.191
5690.	2.106	2.406E+4	2.171
5700.	2.155	2.407E+4	2.208
5710.	2.116	2.408E+4	2.149
5720.	2.108	2.409E+4	2.207
5730.	2.105	2.41E+4	2.147
5740.	2.122	2.411E+4	2.208
5750.	2.152	2.412E+4	2.15
5760.	2.155	2.413E+4	2.192

Time (sec)	Displacement (m)	Time (sec)	Displacement (m)
5770.	2.134	2.414E+4	2.155
5780.	2.12	2.415E+4	2.21
5790.	2.098	2.416E+4	2.166
5800.	2.111	2.417E+4	2.185
5810.	2.138	2.418E+4	2.151
5820.	2.143	2.419E+4	2.149
5830.	2.153	2.42E+4	2.152
5840.	2.15	2.421E+4	2.169
5850.	2.149	2.422E+4	2.186
5860.	2.148	2.423E+4	2.195
5870.	2.15	2.424E+4	2.196
5880.	2.144	2.425E+4	2.176
5890.	2.142	2.426E+4	2.151
5900.	2.131	2.427E+4	2.204
5910.	2.134	2.428E+4	2.187
5920.	2.157	2.429E+4	2.171
5930.	2.117	2.43E+4	2.184
5940.	2.103	2.431E+4	2.146
5950.	2.095	2.432E+4	2.172
5960.	2.147	2.433E+4	2.214
5970.	2.132	2.434E+4	2.163
5980.	2.101	2.435E+4	2.187
5990.	2.111	2.436E+4	2.154
6000.	2.141	2.437E+4	2.209
6010.	2.158	2.438E+4	2.152
6020.	2.16	2.439E+4	2.204
6030.	2.157	2.44E+4	2.15
6040.	2.154	2.441E+4	2.183
6050.	2.124	2.442E+4	2.192
6060.	2.103	2.443E+4	2.151
6070.	2.096	2.444E+4	2.197
6080.	2.099	2.445E+4	2.187
6090.	2.114	2.446E+4	2.168
6100.	2.145	2.447E+4	2.193
6110.	2.139	2.448E+4	2.151
6120.	2.1	2.449E+4	2.176
6130.	2.164	2.45E+4	2.201
6140.	2.105	2.451E+4	2.183
6150.	2.152	2.452E+4	2.161
6160.	2.12	2.453E+4	2.151
6170.	2.102	2.454E+4	2.156
6180.	2.134	2.455E+4	2.16
6190.	2.148	2.456E+4	2.191
6200.	2.132	2.457E+4	2.215
6210.	2.097	2.458E+4	2.157
6220.	2.157	2.459E+4	2.181
6230.	2.104	2.46E+4	2.197
6240.	2.152	2.461E+4	2.184
6250.	2.152	2.462E+4	2.201
6260.	2.15	2.463E+4	2.175
6270.	2.148	2.464E+4	2.203
6280.	2.148	2.465E+4	2.158
6290.	2.118	2.466E+4	2.167
6300.	2.112	2.467E+4	2.206
6310.	2.164	2.468E+4	2.15
6320.	2.112	2.469E+4	2.209
6330.	2.108	2.47E+4	2.202
6340.	2.146	2.471E+4	2.2
6350.	2.139	2.472E+4	2.19
6360.	2.103	2.473E+4	2.176
6370.	2.107	2.474E+4	2.158
6380.	2.123	2.475E+4	2.19
6390.	2.16	2.476E+4	2.204

Time (sec)	Displacement (m)	Time (sec)	Displacement (m)
6400.	2.146	2.477E+4	2.194
6410.	2.105	2.478E+4	2.199
6420.	2.103	2.479E+4	2.186
6430.	2.124	2.48E+4	2.16
6440.	2.15	2.481E+4	2.21
6450.	2.159	2.482E+4	2.189
6460.	2.16	2.483E+4	2.174
6470.	2.121	2.484E+4	2.19
6480.	2.143	2.485E+4	2.211
6490.	2.105	2.486E+4	2.184
6500.	2.15	2.487E+4	2.188
6510.	2.145	2.488E+4	2.18
6520.	2.126	2.489E+4	2.194
6530.	2.139	2.49E+4	2.212
6540.	2.146	2.491E+4	2.213
6550.	2.098	2.492E+4	2.204
6560.	2.155	2.493E+4	2.182
6570.	2.115	2.494E+4	2.149
6580.	2.138	2.495E+4	2.158
6590.	2.156	2.496E+4	2.177
6600.	2.107	2.497E+4	2.198
6610.	2.113	2.498E+4	2.201
6620.	2.154	2.499E+4	2.156
6630.	2.155	2.5E+4	2.187
6640.	2.116	2.501E+4	2.21
6650.	2.107	2.502E+4	2.207
6660.	2.135	2.503E+4	2.201
6670.	2.155	2.504E+4	2.205
6680.	2.161	2.505E+4	2.186
6690.	2.131	2.506E+4	2.154
6700.	2.098	2.507E+4	2.181
6710.	2.134	2.508E+4	2.208
6720.	2.154	2.509E+4	2.174
6730.	2.11	2.51E+4	2.166
6740.	2.158	2.511E+4	2.186
6750.	2.108	2.512E+4	2.187
6760.	2.115	2.513E+4	2.18
6770.	2.121	2.514E+4	2.187
6780.	2.104	2.515E+4	2.187
6790.	2.109	2.516E+4	2.17
6800.	2.11	2.517E+4	2.202
6810.	2.111	2.518E+4	2.173
6820.	2.104	2.519E+4	2.167
6830.	2.108	2.52E+4	2.213
6840.	2.167	2.521E+4	2.21
6850.	2.13	2.522E+4	2.19
6860.	2.104	2.523E+4	2.158
6870.	2.117	2.524E+4	2.153
6880.	2.147	2.525E+4	2.168
6890.	2.162	2.526E+4	2.193
6900.	2.144	2.527E+4	2.2
6910.	2.126	2.528E+4	2.155
6920.	2.102	2.529E+4	2.208
6930.	2.105	2.53E+4	2.186
6940.	2.134	2.531E+4	2.197
6950.	2.125	2.532E+4	2.185
6960.	2.127	2.533E+4	2.151
6970.	2.14	2.534E+4	2.154
6980.	2.142	2.535E+4	2.16
6990.	2.107	2.536E+4	2.151
7000.	2.164	2.537E+4	2.154
7010.	2.106	2.538E+4	2.159
7020.	2.136	2.539E+4	2.205

Time (sec)	Displacement (m)	Time (sec)	Displacement (m)
7030.	2.159	2.54E+4	2.178
7040.	2.156	2.541E+4	2.149
7050.	2.141	2.542E+4	2.151
7060.	2.141	2.543E+4	2.151
7070.	2.141	2.544E+4	2.199
7080.	2.127	2.545E+4	2.18
7090.	2.107	2.546E+4	2.17
7100.	2.107	2.547E+4	2.2
7110.	2.118	2.548E+4	2.167
7120.	2.147	2.549E+4	2.18
7130.	2.164	2.55E+4	2.179
7140.	2.154	2.551E+4	2.168
7150.	2.128	2.552E+4	2.195
7160.	2.108	2.553E+4	2.157
7170.	2.103	2.554E+4	2.16
7180.	2.118	2.555E+4	2.189
7190.	2.161	2.556E+4	2.203
7200.	2.137	2.557E+4	2.2
7210.	2.105	2.558E+4	2.205
7220.	2.125	2.559E+4	2.201
7230.	2.116	2.56E+4	2.201
7240.	2.11	2.561E+4	2.2
7250.	2.116	2.562E+4	2.158
7260.	2.118	2.563E+4	2.207
7270.	2.109	2.564E+4	2.166
7280.	2.166	2.565E+4	2.173
7290.	2.102	2.566E+4	2.207
7300.	2.14	2.567E+4	2.208
7310.	2.166	2.568E+4	2.173
7320.	2.147	2.569E+4	2.156
7330.	2.115	2.57E+4	2.158
7340.	2.115	2.571E+4	2.163
7350.	2.164	2.572E+4	2.179
7360.	2.108	2.573E+4	2.185
7370.	2.162	2.574E+4	2.167
7380.	2.116	2.575E+4	2.154
7390.	2.16	2.576E+4	2.151
7400.	2.116	2.577E+4	2.154
7410.	2.155	2.578E+4	2.155
7420.	2.107	2.579E+4	2.158
7430.	2.155	2.58E+4	2.15
7440.	2.158	2.581E+4	2.156
7450.	2.111	2.582E+4	2.162
7460.	2.167	2.583E+4	2.18
7470.	2.128	2.584E+4	2.206
7480.	2.131	2.585E+4	2.184
7490.	2.155	2.586E+4	2.158
7500.	2.107	2.587E+4	2.211
7510.	2.163	2.588E+4	2.16
7520.	2.111	2.589E+4	2.158
7530.	2.154	2.59E+4	2.177
7540.	2.158	2.591E+4	2.166
7550.	2.106	2.592E+4	2.17
7560.	2.162	2.593E+4	2.196
7570.	2.119	2.594E+4	2.216
7580.	2.125	2.595E+4	2.171
7590.	2.149	2.596E+4	2.154
7600.	2.143	2.597E+4	2.156
7610.	2.126	2.598E+4	2.158
7620.	2.112	2.599E+4	2.209
7630.	2.109	2.6E+4	2.192
7640.	2.114	2.601E+4	2.159
7650.	2.112	2.602E+4	2.203

Time (sec)	Displacement (m)	Time (sec)	Displacement (m)
7660.	2.106	2.603E+4	2.214
7670.	2.105	2.604E+4	2.205
7680.	2.111	2.605E+4	2.179
7690.	2.134	2.606E+4	2.16
7700.	2.159	2.607E+4	2.168
7710.	2.157	2.608E+4	2.213
7720.	2.161	2.609E+4	2.194
7730.	2.167	2.61E+4	2.151
7740.	2.15	2.611E+4	2.164
7750.	2.125	2.612E+4	2.181
7760.	2.105	2.613E+4	2.211
7770.	2.121	2.614E+4	2.154
7780.	2.162	2.615E+4	2.165
7790.	2.111	2.616E+4	2.175
7800.	2.147	2.617E+4	2.159
7810.	2.168	2.618E+4	2.164
7820.	2.145	2.619E+4	2.198
7830.	2.104	2.62E+4	2.192
7840.	2.123	2.621E+4	2.159
7850.	2.158	2.622E+4	2.16
7860.	2.163	2.623E+4	2.212
7870.	2.143	2.624E+4	2.184
7880.	2.13	2.625E+4	2.171
7890.	2.113	2.626E+4	2.162
7900.	2.106	2.627E+4	2.155
7910.	2.111	2.628E+4	2.154
7920.	2.131	2.629E+4	2.187
7930.	2.148	2.63E+4	2.194
7940.	2.126	2.631E+4	2.166
7950.	2.17	2.632E+4	2.218
7960.	2.109	2.633E+4	2.176
7970.	2.149	2.634E+4	2.158
7980.	2.161	2.635E+4	2.155
7990.	2.15	2.636E+4	2.156
8000.	2.148	2.637E+4	2.182
8010.	2.117	2.638E+4	2.176
8020.	2.119	2.639E+4	2.156
8030.	2.174	2.64E+4	2.167
8040.	2.115	2.641E+4	2.169
8050.	2.157	2.642E+4	2.152
8060.	2.164	2.643E+4	2.164
8070.	2.156	2.644E+4	2.186
8080.	2.16	2.645E+4	2.151
8090.	2.166	2.646E+4	2.217
8100.	2.155	2.647E+4	2.159
8110.	2.11	2.648E+4	2.186
8120.	2.12	2.649E+4	2.199
8130.	2.135	2.65E+4	2.157
8140.	2.113	2.651E+4	2.211
8150.	2.156	2.652E+4	2.165
8160.	2.116	2.653E+4	2.186
8170.	2.161	2.654E+4	2.196
8180.	2.146	2.655E+4	2.176
8190.	2.118	2.656E+4	2.155
8200.	2.108	2.657E+4	2.195
8210.	2.122	2.658E+4	2.207
8220.	2.141	2.659E+4	2.154
8230.	2.133	2.66E+4	2.177
8240.	2.123	2.661E+4	2.192
8250.	2.113	2.662E+4	2.179
8260.	2.11	2.663E+4	2.173
8270.	2.111	2.664E+4	2.187
8280.	2.117	2.665E+4	2.209

Time (sec)	Displacement (m)	Time (sec)	Displacement (m)
8290.	2.13	2.666E+4	2.156
8300.	2.146	2.667E+4	2.178
8310.	2.148	2.668E+4	2.155
8320.	2.123	2.669E+4	2.161
8330.	2.157	2.67E+4	2.188
8340.	2.113	2.671E+4	2.178
8350.	2.152	2.672E+4	2.16
8360.	2.173	2.673E+4	2.171
8370.	2.176	2.674E+4	2.209
8380.	2.174	2.675E+4	2.217
8390.	2.168	2.676E+4	2.21
8400.	2.166	2.677E+4	2.217
8410.	2.108	2.678E+4	2.217
8420.	2.163	2.679E+4	2.216
8430.	2.116	2.68E+4	2.216
8440.	2.16	2.681E+4	2.197
8450.	2.134	2.682E+4	2.155
8460.	2.129	2.683E+4	2.21
8470.	2.164	2.684E+4	2.158
8480.	2.105	2.685E+4	2.166
8490.	2.162	2.686E+4	2.176
8500.	2.153	2.687E+4	2.164
8510.	2.109	2.688E+4	2.152
8520.	2.162	2.689E+4	2.16
8530.	2.141	2.69E+4	2.191
8540.	2.127	2.691E+4	2.175
8550.	2.114	2.692E+4	2.205
8560.	2.147	2.693E+4	2.156
8570.	2.164	2.694E+4	2.219
8580.	2.172	2.695E+4	2.158
8590.	2.172	2.696E+4	2.207
8600.	2.173	2.697E+4	2.155
8610.	2.154	2.698E+4	2.204
8620.	2.138	2.699E+4	2.164
8630.	2.141	2.7E+4	2.193
8640.	2.161	2.701E+4	2.152
8650.	2.171	2.702E+4	2.175
8660.	2.137	2.703E+4	2.202
8670.	2.148	2.704E+4	2.166
8680.	2.145	2.705E+4	2.215
8690.	2.123	2.706E+4	2.155
8700.	2.168	2.707E+4	2.183
8710.	2.121	2.708E+4	2.196
8720.	2.109	2.709E+4	2.186
8730.	2.164	2.71E+4	2.174
8740.	2.109	2.711E+4	2.186
8750.	2.15	2.712E+4	2.219
8760.	2.137	2.713E+4	2.215
8770.	2.144	2.714E+4	2.17
8780.	2.143	2.715E+4	2.154
8790.	2.114	2.716E+4	2.169
8800.	2.167	2.717E+4	2.203
8810.	2.166	2.718E+4	2.206
8820.	2.137	2.719E+4	2.174
8830.	2.108	2.72E+4	2.155
8840.	2.164	2.721E+4	2.15
8850.	2.108	2.722E+4	2.172
8860.	2.162	2.723E+4	2.213
8870.	2.139	2.724E+4	2.181
8880.	2.107	2.725E+4	2.156
8890.	2.147	2.726E+4	2.209
8900.	2.157	2.727E+4	2.215
8910.	2.116	2.728E+4	2.202

Time (sec)	Displacement (m)	Time (sec)	Displacement (m)
8920.	2.114	2.729E+4	2.205
8930.	2.158	2.73E+4	2.206
8940.	2.136	2.731E+4	2.209
8950.	2.126	2.732E+4	2.208
8960.	2.167	2.733E+4	2.219
8970.	2.106	2.734E+4	2.19
8980.	2.172	2.735E+4	2.158
8990.	2.113	2.736E+4	2.205
9000.	2.154	2.737E+4	2.186
9010.	2.111	2.738E+4	2.154
9020.	2.103	2.739E+4	2.151
9030.	2.134	2.74E+4	2.165
9040.	2.154	2.741E+4	2.163
9050.	2.117	2.742E+4	2.155
9060.	2.156	2.743E+4	2.154
9070.	2.119	2.744E+4	2.161
9080.	2.104	2.745E+4	2.192
9090.	2.1	2.746E+4	2.211
9100.	2.097	2.747E+4	2.155
9110.	2.101	2.748E+4	2.204
9120.	2.098	2.749E+4	2.208
9130.	2.1	2.75E+4	2.197
9140.	2.146	2.751E+4	2.16
9150.	2.155	2.752E+4	2.183
9160.	2.105	2.753E+4	2.181
9170.	2.135	2.754E+4	2.159
9180.	2.144	2.755E+4	2.175
9190.	2.122	2.756E+4	2.205
9200.	2.116	2.757E+4	2.219
9210.	2.144	2.758E+4	2.197
9220.	2.147	2.759E+4	2.182
9230.	2.148	2.76E+4	2.198
9240.	2.107	2.761E+4	2.215
9250.	2.153	2.762E+4	2.198
9260.	2.154	2.763E+4	2.176
9270.	2.128	2.764E+4	2.156
9280.	2.133	2.765E+4	2.181
9290.	2.158	2.766E+4	2.212
9300.	2.161	2.767E+4	2.223
9310.	2.155	2.768E+4	2.213
9320.	2.106	2.769E+4	2.18
9330.	2.168	2.77E+4	2.158
9340.	2.126	2.771E+4	2.209
9350.	2.145	2.772E+4	2.209
9360.	2.16	2.773E+4	2.18
9370.	2.141	2.774E+4	2.168
9380.	2.143	2.775E+4	2.175
9390.	2.158	2.776E+4	2.212
9400.	2.16	2.777E+4	2.166
9410.	2.132	2.778E+4	2.219
9420.	2.115	2.779E+4	2.192
9430.	2.11	2.78E+4	2.175
9440.	2.108	2.781E+4	2.197
9450.	2.156	2.782E+4	2.219
9460.	2.146	2.783E+4	2.19
9470.	2.113	2.784E+4	2.171
9480.	2.165	2.785E+4	2.172
9490.	2.11	2.786E+4	2.217
9500.	2.164	2.787E+4	2.173
9510.	2.155	2.788E+4	2.159
9520.	2.117	2.789E+4	2.168
9530.	2.16	2.79E+4	2.161
9540.	2.156	2.791E+4	2.215

Time (sec)	Displacement (m)	Time (sec)	Displacement (m)
9550.	2.138	2.792E+4	2.157
9560.	2.148	2.793E+4	2.2
9570.	2.159	2.794E+4	2.21
9580.	2.16	2.795E+4	2.179
9590.	2.134	2.796E+4	2.161
9600.	2.107	2.797E+4	2.164
9610.	2.159	2.798E+4	2.215
9620.	2.138	2.799E+4	2.162
9630.	2.12	2.8E+4	2.188
9640.	2.165	2.801E+4	2.179
9650.	2.134	2.802E+4	2.161
9660.	2.104	2.803E+4	2.205
9670.	2.155	2.804E+4	2.209
9680.	2.158	2.805E+4	2.161
9690.	2.119	2.806E+4	2.202
9700.	2.113	2.807E+4	2.207
9710.	2.112	2.808E+4	2.157
9720.	2.11	2.809E+4	2.189
9730.	2.115	2.81E+4	2.217
9740.	2.124	2.811E+4	2.182
9750.	2.145	2.812E+4	2.151
9760.	2.152	2.813E+4	2.161
9770.	2.135	2.814E+4	2.154
9780.	2.114	2.815E+4	2.163
9790.	2.116	2.816E+4	2.186
9800.	2.115	2.817E+4	2.213
9810.	2.123	2.818E+4	2.212
9820.	2.131	2.819E+4	2.182
9830.	2.145	2.82E+4	2.193
9840.	2.155	2.821E+4	2.217
9850.	2.132	2.822E+4	2.2
9860.	2.114	2.823E+4	2.177
9870.	2.172	2.824E+4	2.197
9880.	2.11	2.825E+4	2.211
9890.	2.178	2.826E+4	2.211
9900.	2.127	2.827E+4	2.16
9910.	2.109	2.828E+4	2.174
9920.	2.134	2.829E+4	2.209
9930.	2.136	2.83E+4	2.197
9940.	2.14	2.831E+4	2.17
9950.	2.122	2.832E+4	2.186
9960.	2.112	2.833E+4	2.218
9970.	2.161	2.834E+4	2.163
9980.	2.153	2.835E+4	2.189
9990.	2.106	2.836E+4	2.201
10000.	2.12	2.837E+4	2.213
1.001E+4	2.145	2.838E+4	2.196
1.002E+4	2.156	2.839E+4	2.196
1.003E+4	2.134	2.84E+4	2.21
1.004E+4	2.11	2.841E+4	2.21
1.005E+4	2.106	2.842E+4	2.161
1.006E+4	2.118	2.843E+4	2.171
1.007E+4	2.111	2.844E+4	2.198
1.008E+4	2.115	2.845E+4	2.206
1.009E+4	2.136	2.846E+4	2.207
1.01E+4	2.141	2.847E+4	2.187
1.011E+4	2.111	2.848E+4	2.201
1.012E+4	2.166	2.849E+4	2.207
1.013E+4	2.134	2.85E+4	2.202
1.014E+4	2.138	2.851E+4	2.172
1.015E+4	2.17	2.852E+4	2.157
1.016E+4	2.168	2.853E+4	2.158
1.017E+4	2.143	2.854E+4	2.166

Time (sec)	Displacement (m)	Time (sec)	Displacement (m)
1.018E+4	2.108	2.855E+4	2.218
1.019E+4	2.109	2.856E+4	2.177
1.02E+4	2.106	2.857E+4	2.152
1.021E+4	2.12	2.858E+4	2.193
1.022E+4	2.168	2.859E+4	2.205
1.023E+4	2.141	2.86E+4	2.186
1.024E+4	2.124	2.861E+4	2.16
1.025E+4	2.152	2.862E+4	2.165
1.026E+4	2.109	2.863E+4	2.201
1.027E+4	2.131	2.864E+4	2.211
1.028E+4	2.148	2.865E+4	2.154
1.029E+4	2.163	2.866E+4	2.196
1.03E+4	2.173	2.867E+4	2.207
1.031E+4	2.176	2.868E+4	2.185
1.032E+4	2.177	2.869E+4	2.192
1.033E+4	2.157	2.87E+4	2.204
1.034E+4	2.135	2.871E+4	2.202
1.035E+4	2.147	2.872E+4	2.154
1.036E+4	2.173	2.873E+4	2.215
1.037E+4	2.119	2.874E+4	2.164
1.038E+4	2.171	2.875E+4	2.204
1.039E+4	2.122	2.876E+4	2.173
1.04E+4	2.12	2.877E+4	2.167
1.041E+4	2.148	2.878E+4	2.188
1.042E+4	2.172	2.879E+4	2.202
1.043E+4	2.174	2.88E+4	2.217
1.044E+4	2.151	2.881E+4	1.874
1.045E+4	2.134	2.882E+4	1.363
1.046E+4	2.131	2.883E+4	0.9622
1.047E+4	2.14	2.884E+4	0.665
1.048E+4	2.147	2.885E+4	0.4654
1.049E+4	2.148	2.886E+4	0.3416
1.05E+4	2.154	2.887E+4	0.2782
1.051E+4	2.166	2.888E+4	0.2354
1.052E+4	2.167	2.889E+4	0.2119
1.053E+4	2.152	2.89E+4	0.1944
1.054E+4	2.13	2.891E+4	0.1851
1.055E+4	2.119	2.892E+4	0.1782
1.056E+4	2.127	2.893E+4	0.1735
1.057E+4	2.141	2.894E+4	0.1708
1.058E+4	2.174	2.895E+4	0.1692
1.059E+4	2.11	2.896E+4	0.1672
1.06E+4	2.161	2.897E+4	0.1602
1.061E+4	2.169	2.898E+4	0.1625
1.062E+4	2.157	2.899E+4	0.1615
1.063E+4	2.142	2.9E+4	0.1608
1.064E+4	2.114	2.901E+4	0.1569
1.065E+4	2.112	2.902E+4	0.1595
1.066E+4	2.111	2.903E+4	0.1547
1.067E+4	2.115	2.904E+4	0.1548
1.068E+4	2.128	2.905E+4	0.1535
1.069E+4	2.168	2.906E+4	0.153
1.07E+4	2.178	2.907E+4	0.1562
1.071E+4	2.168	2.908E+4	0.1529
1.072E+4	2.114	2.909E+4	0.1521
1.073E+4	2.152	2.91E+4	0.1509
1.074E+4	2.175	2.911E+4	0.1466
1.075E+4	2.171	2.912E+4	0.1509
1.076E+4	2.148	2.913E+4	0.1459
1.077E+4	2.147	2.914E+4	0.1475
1.078E+4	2.114	2.915E+4	0.1468
1.079E+4	2.16	2.916E+4	0.1446
1.08E+4	2.146	2.917E+4	0.1439

Time (sec)	Displacement (m)	Time (sec)	Displacement (m)
1.081E+4	2.145	2.918E+4	0.1461
1.082E+4	2.111	2.919E+4	0.1433
1.083E+4	2.162	2.92E+4	0.1425
1.084E+4	2.114	2.921E+4	0.145
1.085E+4	2.13	2.922E+4	0.1415
1.086E+4	2.161	2.923E+4	0.1435
1.087E+4	2.167	2.924E+4	0.1407
1.088E+4	2.126	2.925E+4	0.1416
1.089E+4	2.114	2.926E+4	0.1398
1.09E+4	2.165	2.927E+4	0.1397
1.091E+4	2.106	2.928E+4	0.1404
1.092E+4	2.137	2.929E+4	0.1392
1.093E+4	2.16	2.93E+4	0.1367
1.094E+4	2.165	2.931E+4	0.1407
1.095E+4	2.168	2.932E+4	0.1356
1.096E+4	2.17	2.933E+4	0.1365
1.097E+4	2.153	2.934E+4	0.137
1.098E+4	2.149	2.935E+4	0.1364
1.099E+4	2.167	2.936E+4	0.1359
1.1E+4	2.161	2.937E+4	0.1371
1.101E+4	2.115	2.938E+4	0.1363
1.102E+4	2.123	2.939E+4	0.1356
1.103E+4	2.169	2.94E+4	0.1362
1.104E+4	2.141	2.941E+4	0.1355
1.105E+4	2.108	2.942E+4	0.1358
1.106E+4	2.14	2.943E+4	0.1343
1.107E+4	2.169	2.944E+4	0.133
1.108E+4	2.17	2.945E+4	0.1334
1.109E+4	2.168	2.946E+4	0.1359
1.11E+4	2.157	2.947E+4	0.1322
1.111E+4	2.143	2.948E+4	0.133
1.112E+4	2.172	2.949E+4	0.1312
1.113E+4	2.124	2.95E+4	0.1333
1.114E+4	2.116	2.951E+4	0.1309
1.115E+4	2.161	2.952E+4	0.1326
1.116E+4	2.127	2.953E+4	0.1316
1.117E+4	2.112	2.954E+4	0.1342
1.118E+4	2.159	2.955E+4	0.1288
1.119E+4	2.161	2.956E+4	0.1291
1.12E+4	2.121	2.957E+4	0.1315
1.121E+4	2.123	2.958E+4	0.1311
1.122E+4	2.16	2.959E+4	0.1263
1.123E+4	2.116	2.96E+4	0.1278
1.124E+4	2.141	2.961E+4	0.1279
1.125E+4	2.16	2.962E+4	0.1275
1.126E+4	2.105	2.963E+4	0.128
1.127E+4	2.178	2.964E+4	0.1289
1.128E+4	2.105	2.965E+4	0.126
1.129E+4	2.17	2.966E+4	0.1269
1.13E+4	2.109	2.967E+4	0.1259
1.131E+4	2.169	2.968E+4	0.124
1.132E+4	2.119	2.969E+4	0.1286
1.133E+4	2.119	2.97E+4	0.1246
1.134E+4	2.17	2.971E+4	0.1239
1.135E+4	2.113	2.972E+4	0.1254
1.136E+4	2.165	2.973E+4	0.1255
1.137E+4	2.107	2.974E+4	0.1257
1.138E+4	2.164	2.975E+4	0.1254
1.139E+4	2.171	2.976E+4	0.1272
1.14E+4	2.167	2.977E+4	0.1252
1.141E+4	2.159	2.978E+4	0.1231
1.142E+4	2.133	2.979E+4	0.1241
1.143E+4	2.141	2.98E+4	0.1221

Time (sec)	Displacement (m)	Time (sec)	Displacement (m)
1.144E+4	2.148	2.981E+4	0.1235
1.145E+4	2.163	2.982E+4	0.1257
1.146E+4	2.109	2.983E+4	0.1243
1.147E+4	2.119	2.984E+4	0.1214
1.148E+4	2.148	2.985E+4	0.1232
1.149E+4	2.157	2.986E+4	0.1252
1.15E+4	2.16	2.987E+4	0.1233
1.151E+4	2.159	2.988E+4	0.1247
1.152E+4	2.142	2.989E+4	0.123
1.153E+4	2.116	2.99E+4	0.1215
1.154E+4	2.109	2.991E+4	0.1216
1.155E+4	2.164	2.992E+4	0.1189
1.156E+4	2.109	2.993E+4	0.1243
1.157E+4	2.145	2.994E+4	0.1217
1.158E+4	2.122	2.995E+4	0.1221
1.159E+4	2.166	2.996E+4	0.1256
1.16E+4	2.121	2.997E+4	0.1213
1.161E+4	2.109	2.998E+4	0.1202
1.162E+4	2.134	2.999E+4	0.1207
1.163E+4	2.15	3.0E+4	0.1217
1.164E+4	2.137	3.001E+4	0.1221
1.165E+4	2.126	3.002E+4	0.1208
1.166E+4	2.156	3.003E+4	0.1213
1.167E+4	2.151	3.004E+4	0.1212
1.168E+4	2.103	3.005E+4	0.1193
1.169E+4	2.15	3.006E+4	0.1193
1.17E+4	2.142	3.007E+4	0.1199
1.171E+4	2.103	3.008E+4	0.1199
1.172E+4	2.111	3.009E+4	0.1191
1.173E+4	2.108	3.01E+4	0.12
1.174E+4	2.112	3.011E+4	0.118
1.175E+4	2.152	3.012E+4	0.1186
1.176E+4	2.169	3.013E+4	0.1175
1.177E+4	2.164	3.014E+4	0.1187
1.178E+4	2.153	3.015E+4	0.1208
1.179E+4	2.103	3.016E+4	0.1188
1.18E+4	2.156	3.017E+4	0.1204
1.181E+4	2.135	3.018E+4	0.1183
1.182E+4	2.105	3.019E+4	0.1182
1.183E+4	2.111	3.02E+4	0.1201
1.184E+4	2.111	3.021E+4	0.1184
1.185E+4	2.164	3.022E+4	0.1174
1.186E+4	2.124	3.023E+4	0.1178
1.187E+4	2.102	3.024E+4	0.1214
1.188E+4	2.119	3.025E+4	0.1181
1.189E+4	2.167	3.026E+4	0.1178
1.19E+4	2.15	3.027E+4	0.1186
1.191E+4	2.119	3.028E+4	0.1199
1.192E+4	2.107	3.029E+4	0.1169
1.193E+4	2.12	3.03E+4	0.1133
1.194E+4	2.164	3.031E+4	0.1138
1.195E+4	2.145	3.032E+4	0.1145
1.196E+4	2.118	3.033E+4	0.1153
1.197E+4	2.167	3.034E+4	0.1158
1.198E+4	2.118	3.035E+4	0.1149
1.199E+4	2.115	3.036E+4	0.1145
1.2E+4	2.156	3.037E+4	0.115
1.201E+4	2.165	3.038E+4	0.1137
1.202E+4	2.107	3.039E+4	0.1182
1.203E+4	2.109	3.04E+4	0.1132
1.204E+4	2.148	3.041E+4	0.1159
1.205E+4	2.164	3.042E+4	0.1163
1.206E+4	2.15	3.043E+4	0.118

Time (sec)	Displacement (m)	Time (sec)	Displacement (m)
1.207E+4	2.125	3.044E+4	0.1157
1.208E+4	2.112	3.045E+4	0.1147
1.209E+4	2.123	3.046E+4	0.1124
1.21E+4	2.125	3.047E+4	0.1156
1.211E+4	2.103	3.048E+4	0.1175
1.212E+4	2.162	3.049E+4	0.1146
1.213E+4	2.133	3.05E+4	0.1112
1.214E+4	2.135	3.051E+4	0.1142
1.215E+4	2.129	3.052E+4	0.1133
1.216E+4	2.134	3.053E+4	0.1146
1.217E+4	2.134	3.054E+4	0.113
1.218E+4	2.129	3.055E+4	0.1133
1.219E+4	2.164	3.056E+4	0.1124
1.22E+4	2.157	3.057E+4	0.1105
1.221E+4	2.153	3.058E+4	0.1127
1.222E+4	2.164	3.059E+4	0.1133
1.223E+4	2.16	3.06E+4	0.1108
1.224E+4	2.144	3.061E+4	0.1134
1.225E+4	2.112	3.062E+4	0.1084
1.226E+4	2.112	3.063E+4	0.1099
1.227E+4	2.126	3.064E+4	0.1111
1.228E+4	2.151	3.065E+4	0.112
1.229E+4	2.148	3.066E+4	0.1136
1.23E+4	2.134	3.067E+4	0.1121
1.231E+4	2.104	3.068E+4	0.1111
1.232E+4	2.124	3.069E+4	0.1132
1.233E+4	2.126	3.07E+4	0.1133
1.234E+4	2.104	3.071E+4	0.1114
1.235E+4	2.139	3.072E+4	0.1117
1.236E+4	2.143	3.073E+4	0.1108
1.237E+4	2.103	3.074E+4	0.1101
1.238E+4	2.165	3.075E+4	0.1149
1.239E+4	2.17	3.076E+4	0.1127
1.24E+4	2.16	3.077E+4	0.112
1.241E+4	2.118	3.078E+4	0.1114
1.242E+4	2.109	3.079E+4	0.1108
1.243E+4	2.105	3.08E+4	0.1104
1.244E+4	2.109	3.081E+4	0.1096
1.245E+4	2.103	3.082E+4	0.1107
1.246E+4	2.106	3.083E+4	0.112
1.247E+4	2.154	3.084E+4	0.1107
1.248E+4	2.124	3.085E+4	0.1075
1.249E+4	2.126	3.086E+4	0.1111
1.25E+4	2.145	3.087E+4	0.1101
1.251E+4	2.129	3.088E+4	0.1123
1.252E+4	2.147	3.089E+4	0.1088
1.253E+4	2.114	3.09E+4	0.111
1.254E+4	2.16	3.091E+4	0.1092
1.255E+4	2.112	3.092E+4	0.1068
1.256E+4	2.16	3.093E+4	0.1089
1.257E+4	2.111	3.094E+4	0.1098
1.258E+4	2.171	3.095E+4	0.1079
1.259E+4	2.112	3.096E+4	0.1067
1.26E+4	2.138	3.097E+4	0.1084
1.261E+4	2.126	3.098E+4	0.1077
1.262E+4	2.17	3.099E+4	0.1085
1.263E+4	2.125	3.1E+4	0.1094
1.264E+4	2.138	3.101E+4	0.1089
1.265E+4	2.173	3.102E+4	0.1081
1.266E+4	2.115	3.103E+4	0.1078
1.267E+4	2.14	3.104E+4	0.1077
1.268E+4	2.168	3.105E+4	0.11
1.269E+4	2.169	3.106E+4	0.109

Time (sec)	Displacement (m)	Time (sec)	Displacement (m)
1.27E+4	2.151	3.107E+4	0.1082
1.271E+4	2.144	3.108E+4	0.1061
1.272E+4	2.159	3.109E+4	0.1096
1.273E+4	2.154	3.11E+4	0.1074
1.274E+4	2.111	3.111E+4	0.1064
1.275E+4	2.135	3.112E+4	0.1072
1.276E+4	2.177	3.113E+4	0.1078
1.277E+4	2.177	3.114E+4	0.1054
1.278E+4	2.16	3.115E+4	0.1077
1.279E+4	2.127	3.116E+4	0.1037
1.28E+4	2.115	3.117E+4	0.107
1.281E+4	2.157	3.118E+4	0.1058
1.282E+4	2.17	3.119E+4	0.107
1.283E+4	2.169	3.12E+4	0.1084
1.284E+4	2.146	3.121E+4	0.108
1.285E+4	2.11	3.122E+4	0.1082
1.286E+4	2.114	3.123E+4	0.1022
1.287E+4	2.154	3.124E+4	0.1038
1.288E+4	2.164	3.125E+4	0.106
1.289E+4	2.144	3.126E+4	0.1063
1.29E+4	2.154	3.127E+4	0.1029
1.291E+4	2.15	3.128E+4	0.1033
1.292E+4	2.157	3.129E+4	0.1098
1.293E+4	2.115	3.13E+4	0.1087
1.294E+4	2.15	3.131E+4	0.1051
1.295E+4	2.147	3.132E+4	0.1048
1.296E+4	2.136	3.133E+4	0.1077
1.297E+4	2.137	3.134E+4	0.107
1.298E+4	2.151	3.135E+4	0.1056
1.299E+4	2.159	3.136E+4	0.107
1.3E+4	2.133	3.137E+4	0.1059
1.301E+4	2.147	3.138E+4	0.1068
1.302E+4	2.136	3.139E+4	0.1056
1.303E+4	2.179	3.14E+4	0.1055
1.304E+4	2.169	3.141E+4	0.1039
1.305E+4	2.133	3.142E+4	0.1088
1.306E+4	2.118	3.143E+4	0.1059
1.307E+4	2.116	3.144E+4	0.1035
1.308E+4	2.158	3.145E+4	0.1027
1.309E+4	2.165	3.146E+4	0.1048
1.31E+4	2.124	3.147E+4	0.1067
1.311E+4	2.135	3.148E+4	0.1034
1.312E+4	2.172	3.149E+4	0.1042
1.313E+4	2.121	3.15E+4	0.1052
1.314E+4	2.136	3.151E+4	0.1026
1.315E+4	2.175	3.152E+4	0.104
1.316E+4	2.136	3.153E+4	0.1024
1.317E+4	2.109	3.154E+4	0.1039
1.318E+4	2.116	3.155E+4	0.1023
1.319E+4	2.107	3.156E+4	0.1039
1.32E+4	2.155	3.157E+4	0.1014
1.321E+4	2.182	3.158E+4	0.1052
1.322E+4	2.164	3.159E+4	0.1057
1.323E+4	2.129	3.16E+4	0.1
1.324E+4	2.123	3.161E+4	0.1032
1.325E+4	2.142	3.162E+4	0.1037
1.326E+4	2.172	3.163E+4	0.1017
1.327E+4	2.118	3.164E+4	0.1036
1.328E+4	2.174	3.165E+4	0.1038
1.329E+4	2.13	3.166E+4	0.1057
1.33E+4	2.173	3.167E+4	0.1036
1.331E+4	2.122	3.168E+4	0.0997
1.332E+4	2.163	3.169E+4	0.1019

Time (sec)	Displacement (m)	Time (sec)	Displacement (m)
1.333E+4	2.185	3.17E+4	0.1036
1.334E+4	2.173	3.171E+4	0.1027
1.335E+4	2.167	3.172E+4	0.1003
1.336E+4	2.169	3.173E+4	0.1024
1.337E+4	2.144	3.174E+4	0.1042
1.338E+4	2.115	3.175E+4	0.1052
1.339E+4	2.126	3.176E+4	0.1025
1.34E+4	2.178	3.177E+4	0.1019
1.341E+4	2.112	3.178E+4	0.1024
1.342E+4	2.175	3.179E+4	0.1017
1.343E+4	2.115	3.18E+4	0.1007
1.344E+4	2.164	3.181E+4	0.0983
1.345E+4	2.152	3.182E+4	0.1042
1.346E+4	2.114	3.183E+4	0.1025
1.347E+4	2.171	3.184E+4	0.0994
1.348E+4	2.146	3.185E+4	0.1028
1.349E+4	2.117	3.186E+4	0.1001
1.35E+4	2.114	3.187E+4	0.1015
1.351E+4	2.117	3.188E+4	0.1003
1.352E+4	2.115	3.189E+4	0.1022
1.353E+4	2.119	3.19E+4	0.1025
1.354E+4	2.124	3.191E+4	0.1001
1.355E+4	2.139	3.192E+4	0.0988
1.356E+4	2.157	3.193E+4	0.0998
1.357E+4	2.173	3.194E+4	0.0991
1.358E+4	2.148	3.195E+4	0.1002
1.359E+4	2.12	3.196E+4	0.1003
1.36E+4	2.181	3.197E+4	0.0965
1.361E+4	2.121	3.198E+4	0.1022
1.362E+4	2.135	3.199E+4	0.0982
1.363E+4	2.13	3.2E+4	0.1012
1.364E+4	2.119	3.201E+4	0.0993
1.365E+4	2.128	3.202E+4	0.0986
1.366E+4	2.118	3.203E+4	0.0949
1.367E+4	2.172	3.204E+4	0.1003
1.368E+4	2.115	3.205E+4	0.0997
1.369E+4	2.181	3.206E+4	0.0995
1.37E+4	2.137	3.207E+4	0.1033
1.371E+4	2.171	3.208E+4	0.1014
1.372E+4	2.119	3.209E+4	0.0982
1.373E+4	2.185	3.21E+4	0.0991
1.374E+4	2.119	3.211E+4	0.0969
1.375E+4	2.151	3.212E+4	0.1015
1.376E+4	2.16	3.213E+4	0.0992
1.377E+4	2.144	3.214E+4	0.0998
1.378E+4	2.128	3.215E+4	0.0959
1.379E+4	2.179	3.216E+4	0.0996
1.38E+4	2.122	3.217E+4	0.0976
1.381E+4	2.181	3.218E+4	0.0971
1.382E+4	2.122	3.219E+4	0.0983
1.383E+4	2.163	3.22E+4	0.099
1.384E+4	2.162	3.221E+4	0.0985
1.385E+4	2.118	3.222E+4	0.0971
1.386E+4	2.167	3.223E+4	0.0976
1.387E+4	2.189	3.224E+4	0.0986
1.388E+4	2.144	3.225E+4	0.0994
1.389E+4	2.134	3.226E+4	0.0977
1.39E+4	2.182	3.227E+4	0.0995
1.391E+4	2.121	3.228E+4	0.0993
1.392E+4	2.165	3.229E+4	0.0991
1.393E+4	2.184	3.23E+4	0.0984
1.394E+4	2.184	3.231E+4	0.0976
1.395E+4	2.161	3.232E+4	0.1007

Time (sec)	Displacement (m)	Time (sec)	Displacement (m)
1.396E+4	2.13	3.233E+4	0.0975
1.397E+4	2.121	3.234E+4	0.0972
1.398E+4	2.142	3.235E+4	0.0991
1.399E+4	2.192	3.236E+4	0.099
1.4E+4	2.167	3.237E+4	0.0994
1.401E+4	2.132	3.238E+4	0.0972
1.402E+4	2.123	3.239E+4	0.0958
1.403E+4	2.154	3.24E+4	0.0967
1.404E+4	2.185	3.241E+4	0.0973
1.405E+4	2.14	3.242E+4	0.0999
1.406E+4	2.121	3.243E+4	0.0982
1.407E+4	2.126	3.244E+4	0.0993
1.408E+4	2.14	3.245E+4	0.099
1.409E+4	2.165	3.246E+4	0.0968
1.41E+4	2.187	3.247E+4	0.0967
1.411E+4	2.19	3.248E+4	0.0975
1.412E+4	2.187	3.249E+4	0.0998
1.413E+4	2.16	3.25E+4	0.098
1.414E+4	2.134	3.251E+4	0.0991
1.415E+4	2.124	3.252E+4	0.0974
1.416E+4	2.127	3.253E+4	0.0975
1.417E+4	2.129	3.254E+4	0.0969
1.418E+4	2.129	3.255E+4	0.098
1.419E+4	2.131	3.256E+4	0.0994
1.42E+4	2.131	3.257E+4	0.0959
1.421E+4	2.14	3.258E+4	0.0982
1.422E+4	2.159	3.259E+4	0.0987
1.423E+4	2.19	3.26E+4	0.0995
1.424E+4	2.187	3.261E+4	0.0999
1.425E+4	2.183	3.262E+4	0.098
1.426E+4	2.171	3.263E+4	0.0985
1.427E+4	2.194	3.264E+4	0.1004
1.428E+4	2.189	3.265E+4	0.0986
1.429E+4	2.146	3.266E+4	0.0993
1.43E+4	2.132	3.267E+4	0.0984
1.431E+4	2.137	3.268E+4	0.0976
1.432E+4	2.138	3.269E+4	0.0977
1.433E+4	2.132	3.27E+4	0.0965
1.434E+4	2.134	3.271E+4	0.0955
1.435E+4	2.133	3.272E+4	0.0973
1.436E+4	2.134	3.273E+4	0.0956
1.437E+4	2.184	3.274E+4	0.0966
1.438E+4	2.176	3.275E+4	0.0936
1.439E+4	2.138	3.276E+4	0.0934
1.44E+4	2.123	3.277E+4	0.096
1.441E+4	2.125	3.278E+4	0.0931
1.442E+4	2.138	3.279E+4	0.0938
1.443E+4	2.155	3.28E+4	0.0958
1.444E+4	2.166	3.281E+4	0.095
1.445E+4	2.176	3.282E+4	0.0938
1.446E+4	2.185	3.283E+4	0.094
1.447E+4	2.185	3.284E+4	0.0924
1.448E+4	2.174	3.285E+4	0.0943
1.449E+4	2.174	3.286E+4	0.0961
1.45E+4	2.175	3.287E+4	0.0935
1.451E+4	2.182	3.288E+4	0.093
1.452E+4	2.168	3.289E+4	0.0965
1.453E+4	2.16	3.29E+4	0.0959
1.454E+4	2.144	3.291E+4	0.0948
1.455E+4	2.123	3.292E+4	0.097
1.456E+4	2.13	3.293E+4	0.0942
1.457E+4	2.152	3.294E+4	0.0941
1.458E+4	2.188	3.295E+4	0.0946

Time (sec)	Displacement (m)	Time (sec)	Displacement (m)
1.459E+4	2.189	3.296E+4	0.0911
1.46E+4	2.19	3.297E+4	0.0948
1.461E+4	2.186	3.298E+4	0.0965
1.462E+4	2.158	3.299E+4	0.0932
1.463E+4	2.124	3.3E+4	0.0949
1.464E+4	2.177	3.301E+4	0.0954
1.465E+4	2.126	3.302E+4	0.0914
1.466E+4	2.181	3.303E+4	0.0934
1.467E+4	2.133	3.304E+4	0.0969
1.468E+4	2.135	3.305E+4	0.0961
1.469E+4	2.188	3.306E+4	0.0947
1.47E+4	2.129	3.307E+4	0.0938
1.471E+4	2.181	3.308E+4	0.0927
1.472E+4	2.131	3.309E+4	0.0946
1.473E+4	2.191	3.31E+4	0.0932
1.474E+4	2.153	3.311E+4	0.0944
1.475E+4	2.15	3.312E+4	0.0927
1.476E+4	2.14	3.313E+4	0.0972
1.477E+4	2.177	3.314E+4	0.0921
1.478E+4	2.129	3.315E+4	0.0957
1.479E+4	2.173	3.316E+4	0.0928
1.48E+4	2.166	3.317E+4	0.0927
1.481E+4	2.139	3.318E+4	0.0922
1.482E+4	2.176	3.319E+4	0.0911
1.483E+4	2.181	3.32E+4	0.0934
1.484E+4	2.124	3.321E+4	0.0923
1.485E+4	2.149	3.322E+4	0.0931
1.486E+4	2.193	3.323E+4	0.0951
1.487E+4	2.156	3.324E+4	0.0937
1.488E+4	2.146	3.325E+4	0.0947
1.489E+4	2.185	3.326E+4	0.094
1.49E+4	2.138	3.327E+4	0.0937
1.491E+4	2.142	3.328E+4	0.0953
1.492E+4	2.188	3.329E+4	0.0956
1.493E+4	2.182	3.33E+4	0.0891
1.494E+4	2.151	3.331E+4	0.0929
1.495E+4	2.123	3.332E+4	0.0878
1.496E+4	2.123	3.333E+4	0.09
1.497E+4	2.144	3.334E+4	0.0916
1.498E+4	2.17	3.335E+4	0.0897
1.499E+4	2.189	3.336E+4	0.0903
1.5E+4	2.181	3.337E+4	0.0915
1.501E+4	2.176	3.338E+4	0.0878
1.502E+4	2.173	3.339E+4	0.0899
1.503E+4	2.171	3.34E+4	0.0908
1.504E+4	2.154	3.341E+4	0.0922
1.505E+4	2.139	3.342E+4	0.0918
1.506E+4	2.128	3.343E+4	0.0929
1.507E+4	2.141	3.344E+4	0.0893
1.508E+4	2.19	3.345E+4	0.0911
1.509E+4	2.169	3.346E+4	0.0893
1.51E+4	2.123	3.347E+4	0.0922
1.511E+4	2.134	3.348E+4	0.091
1.512E+4	2.167	3.349E+4	0.0909
1.513E+4	2.181	3.35E+4	0.0914
1.514E+4	2.178	3.351E+4	0.0922
1.515E+4	2.162	3.352E+4	0.0924
1.516E+4	2.132	3.353E+4	0.0893
1.517E+4	2.127	3.354E+4	0.0909
1.518E+4	2.134	3.355E+4	0.092
1.519E+4	2.165	3.356E+4	0.0898
1.52E+4	2.183	3.357E+4	0.0915
1.521E+4	2.161	3.358E+4	0.0931

Time (sec)	Displacement (m)	Time (sec)	Displacement (m)
1.522E+4	2.153	3.359E+4	0.0889
1.523E+4	2.154	3.36E+4	0.0898
1.524E+4	2.149	3.361E+4	0.088
1.525E+4	2.133	3.362E+4	0.0927
1.526E+4	2.142	3.363E+4	0.0888
1.527E+4	2.181	3.364E+4	0.0904
1.528E+4	2.163	3.365E+4	0.0865
1.529E+4	2.163	3.366E+4	0.0868
1.53E+4	2.134	3.367E+4	0.0881
1.531E+4	2.193	3.368E+4	0.0926
1.532E+4	2.14	3.369E+4	0.0906
1.533E+4	2.166	3.37E+4	0.0913
1.534E+4	2.156	3.371E+4	0.0894
1.535E+4	2.153	3.372E+4	0.0907
1.536E+4	2.16	3.373E+4	0.0874
1.537E+4	2.128	3.374E+4	0.0892
1.538E+4	2.133	3.375E+4	0.0896
1.539E+4	2.139	3.376E+4	0.0875
1.54E+4	2.128	3.377E+4	0.0901
1.541E+4	2.124	3.378E+4	0.0896
1.542E+4	2.147	3.379E+4	0.0879
1.543E+4	2.185	3.38E+4	0.0886
1.544E+4	2.127	3.381E+4	0.0866
1.545E+4	2.188	3.382E+4	0.0897
1.546E+4	2.153	3.383E+4	0.0883
1.547E+4	2.17	3.384E+4	0.0897
1.548E+4	2.124	3.385E+4	0.0885
1.549E+4	2.122	3.386E+4	0.0896
1.55E+4	2.148	3.387E+4	0.0882
1.551E+4	2.17	3.388E+4	0.0874
1.552E+4	2.191	3.389E+4	0.089
1.553E+4	2.163	3.39E+4	0.0865
1.554E+4	2.129	3.391E+4	0.0873
1.555E+4	2.154	3.392E+4	0.091
1.556E+4	2.186	3.393E+4	0.0877
1.557E+4	2.125	3.394E+4	0.0875
1.558E+4	2.183	3.395E+4	0.088
1.559E+4	2.155	3.396E+4	0.0886
1.56E+4	2.13	3.397E+4	0.0878
1.561E+4	2.188	3.398E+4	0.0878
1.562E+4	2.17	3.399E+4	0.0875
1.563E+4	2.122	3.4E+4	0.0832
1.564E+4	2.184	3.401E+4	0.0859
1.565E+4	2.177	3.402E+4	0.0865
1.566E+4	2.139	3.403E+4	0.0863
1.567E+4	2.128	3.404E+4	0.0847
1.568E+4	2.123	3.405E+4	0.0867
1.569E+4	2.131	3.406E+4	0.0896
1.57E+4	2.135	3.407E+4	0.0865
1.571E+4	2.153	3.408E+4	0.0879
1.572E+4	2.162	3.409E+4	0.0863
1.573E+4	2.139	3.41E+4	0.0868
1.574E+4	2.136	3.411E+4	0.0848
1.575E+4	2.136	3.412E+4	0.0875
1.576E+4	2.156	3.413E+4	0.0838
1.577E+4	2.178	3.414E+4	0.0848
1.578E+4	2.19	3.415E+4	0.0831
1.579E+4	2.132	3.416E+4	0.0887
1.58E+4	2.158	3.417E+4	0.0866
1.581E+4	2.195	3.418E+4	0.086
1.582E+4	2.154	3.419E+4	0.0852
1.583E+4	2.129	3.42E+4	0.0864
1.584E+4	2.178	3.421E+4	0.0858

Time (sec)	Displacement (m)	Time (sec)	Displacement (m)
1.585E+4	2.137	3.422E+4	0.0863
1.586E+4	2.18	3.423E+4	0.0893
1.587E+4	2.173	3.424E+4	0.0899
1.588E+4	2.13	3.425E+4	0.0858
1.589E+4	2.175	3.426E+4	0.0863
1.59E+4	2.187	3.427E+4	0.0876
1.591E+4	2.189	3.428E+4	0.0877
1.592E+4	2.151	3.429E+4	0.0846
1.593E+4	2.136	3.43E+4	0.0872
1.594E+4	2.178	3.431E+4	0.0857
1.595E+4	2.168	3.432E+4	0.0855
1.596E+4	2.173	3.433E+4	0.0861
1.597E+4	2.127	3.434E+4	0.0884
1.598E+4	2.17	3.435E+4	0.0852
1.599E+4	2.184	3.436E+4	0.0855
1.6E+4	2.132	3.437E+4	0.0871
1.601E+4	2.154	3.438E+4	0.0858
1.602E+4	2.179	3.439E+4	0.0852
1.603E+4	2.128	3.44E+4	0.0857
1.604E+4	2.197	3.441E+4	0.084
1.605E+4	2.131	3.442E+4	0.0871
1.606E+4	2.19	3.443E+4	0.0849
1.607E+4	2.126	3.444E+4	0.0847
1.608E+4	2.184	3.445E+4	0.087
1.609E+4	2.193	3.446E+4	0.0858
1.61E+4	2.195	3.447E+4	0.0879
1.611E+4	2.162	3.448E+4	0.084
1.612E+4	2.129	3.449E+4	0.0828
1.613E+4	2.144	3.45E+4	0.0864
1.614E+4	2.191	3.451E+4	0.0884
1.615E+4	2.164	3.452E+4	0.0876
1.616E+4	2.175	3.453E+4	0.0899
1.617E+4	2.186	3.454E+4	0.0846
1.618E+4	2.164	3.455E+4	0.0874
1.619E+4	2.134	3.456E+4	0.0856
1.62E+4	2.156	3.457E+4	0.0817
1.621E+4	2.193	3.458E+4	0.0845
1.622E+4	2.127	3.459E+4	0.0868
1.623E+4	2.172	3.46E+4	0.085
1.624E+4	2.178	3.461E+4	0.0855
1.625E+4	2.128	3.462E+4	0.0835
1.626E+4	2.14	3.463E+4	0.0827
1.627E+4	2.172	3.464E+4	0.0842
1.628E+4	2.194	3.465E+4	0.0868
1.629E+4	2.163	3.466E+4	0.0843
1.63E+4	2.127	3.467E+4	0.0843
1.631E+4	2.147	3.468E+4	0.0837
1.632E+4	2.192	3.469E+4	0.0857
1.633E+4	2.129	3.47E+4	0.0861
1.634E+4	2.194	3.471E+4	0.0848
1.635E+4	2.144	3.472E+4	0.0858
1.636E+4	2.132	3.473E+4	0.0823
1.637E+4	2.166	3.474E+4	0.0822
1.638E+4	2.181	3.475E+4	0.0847
1.639E+4	2.129	3.476E+4	0.0801
1.64E+4	2.195	3.477E+4	0.0868
1.641E+4	2.133	3.478E+4	0.0846
1.642E+4	2.181	3.479E+4	0.082
1.643E+4	2.161	3.48E+4	0.0816
1.644E+4	2.131	3.481E+4	0.0844
1.645E+4	2.137	3.482E+4	0.0856
1.646E+4	2.158	3.483E+4	0.0852
1.647E+4	2.181	3.484E+4	0.0844

Time (sec)	Displacement (m)	Time (sec)	Displacement (m)
1.648E+4	2.18	3.485E+4	0.0859
1.649E+4	2.148	3.486E+4	0.086
1.65E+4	2.127	3.487E+4	0.0857
1.651E+4	2.172	3.488E+4	0.0863
1.652E+4	2.165	3.489E+4	0.0853
1.653E+4	2.129	3.49E+4	0.0851
1.654E+4	2.184	3.491E+4	0.0851
1.655E+4	2.148	3.492E+4	0.0859
1.656E+4	2.14	3.493E+4	0.0821
1.657E+4	2.192	3.494E+4	0.0857
1.658E+4	2.161	3.495E+4	0.0819
1.659E+4	2.143	3.496E+4	0.0855
1.66E+4	2.126	3.497E+4	0.0837
1.661E+4	2.133	3.498E+4	0.0835
1.662E+4	2.173	3.499E+4	0.0829
1.663E+4	2.187	3.5E+4	0.0832
1.664E+4	2.144	3.501E+4	0.0833
1.665E+4	2.165	3.502E+4	0.083
1.666E+4	2.194	3.503E+4	0.083
1.667E+4	2.185	3.504E+4	0.0852
1.668E+4	2.192	3.505E+4	0.0844
1.669E+4	2.182	3.506E+4	0.0829
1.67E+4	2.18	3.507E+4	0.0834
1.671E+4	2.192	3.508E+4	0.0834
1.672E+4	2.145	3.509E+4	0.0839
1.673E+4	2.13	3.51E+4	0.0842
1.674E+4	2.158	3.511E+4	0.083
1.675E+4	2.143	3.512E+4	0.0804
1.676E+4	2.132	3.513E+4	0.0811
1.677E+4	2.127	3.514E+4	0.0814
1.678E+4	2.132	3.515E+4	0.0825
1.679E+4	2.159	3.516E+4	0.0828
1.68E+4	2.181	3.517E+4	0.0833
1.681E+4	2.17	3.518E+4	0.0839
1.682E+4	2.142	3.519E+4	0.0821
1.683E+4	2.184	3.52E+4	0.0837
1.684E+4	2.134	3.521E+4	0.0827
1.685E+4	2.199	3.522E+4	0.0837
1.686E+4	2.134	3.523E+4	0.0806
1.687E+4	2.195	3.524E+4	0.0826
1.688E+4	2.132	3.525E+4	0.0818
1.689E+4	2.158	3.526E+4	0.0833
1.69E+4	2.2	3.527E+4	0.0848
1.691E+4	2.151	3.528E+4	0.0829
1.692E+4	2.153	3.529E+4	0.0817
1.693E+4	2.181	3.53E+4	0.0807
1.694E+4	2.132	3.531E+4	0.0825
1.695E+4	2.187	3.532E+4	0.0806
1.696E+4	2.199	3.533E+4	0.0792
1.697E+4	2.195	3.534E+4	0.0794
1.698E+4	2.187	3.535E+4	0.0813
1.699E+4	2.195	3.536E+4	0.0835
1.7E+4	2.151	3.537E+4	0.0828
1.701E+4	2.19	3.538E+4	0.0808
1.702E+4	2.166	3.539E+4	0.0798
1.703E+4	2.147	3.54E+4	0.0813
1.704E+4	2.181	3.541E+4	0.0854
1.705E+4	2.15	3.542E+4	0.0825
1.706E+4	2.151	3.543E+4	0.0805
1.707E+4	2.186	3.544E+4	0.0829
1.708E+4	2.191	3.545E+4	0.0815
1.709E+4	2.178	3.546E+4	0.0828
1.71E+4	2.164	3.547E+4	0.0822

Time (sec)	Displacement (m)	Time (sec)	Displacement (m)
1.711E+4	2.159	3.548E+4	0.0823
1.712E+4	2.158	3.549E+4	0.0832
1.713E+4	2.158	3.55E+4	0.0789
1.714E+4	2.161	3.551E+4	0.0798
1.715E+4	2.171	3.552E+4	0.0811
1.716E+4	2.171	3.553E+4	0.0804
1.717E+4	2.139	3.554E+4	0.081
1.718E+4	2.132	3.555E+4	0.0827
1.719E+4	2.147	3.556E+4	0.0803
1.72E+4	2.181	3.557E+4	0.0792
1.721E+4	2.188	3.558E+4	0.0806
1.722E+4	2.194	3.559E+4	0.0801
1.723E+4	2.192	3.56E+4	0.0818
1.724E+4	2.19	3.561E+4	0.08
1.725E+4	2.177	3.562E+4	0.0811
1.726E+4	2.176	3.563E+4	0.081
1.727E+4	2.196	3.564E+4	0.0812
1.728E+4	2.143	3.565E+4	0.0792
1.729E+4	2.167	3.566E+4	0.0806
1.73E+4	2.179	3.567E+4	0.08
1.731E+4	2.153	3.568E+4	0.0786
1.732E+4	2.196	3.569E+4	0.0796
1.733E+4	2.175	3.57E+4	0.0802
1.734E+4	2.148	3.571E+4	0.0832
1.735E+4	2.128	3.572E+4	0.0802
1.736E+4	2.151	3.573E+4	0.0789
1.737E+4	2.196	3.574E+4	0.0799
1.738E+4	2.198	3.575E+4	0.0788
1.739E+4	2.192	3.576E+4	0.0783
1.74E+4	2.193	3.577E+4	0.0789
1.741E+4	2.15	3.578E+4	0.0804
1.742E+4	2.129	3.579E+4	0.082
1.743E+4	2.138	3.58E+4	0.083
1.744E+4	2.134	3.581E+4	0.0786
1.745E+4	2.191	3.582E+4	0.0817
1.746E+4	2.169	3.583E+4	0.082
1.747E+4	2.132	3.584E+4	0.0802
1.748E+4	2.191	3.585E+4	0.0818
1.749E+4	2.188	3.586E+4	0.0806
1.75E+4	2.163	3.587E+4	0.0789
1.751E+4	2.14	3.588E+4	0.0828
1.752E+4	2.143	3.589E+4	0.0786
1.753E+4	2.153	3.59E+4	0.0823
1.754E+4	2.185	3.591E+4	0.0803
1.755E+4	2.192	3.592E+4	0.0801
1.756E+4	2.194	3.593E+4	0.0807
1.757E+4	2.191	3.594E+4	0.0801
1.758E+4	2.168	3.595E+4	0.0799
1.759E+4	2.145	3.596E+4	0.0787
1.76E+4	2.135	3.597E+4	0.0784
1.761E+4	2.139	3.598E+4	0.0792
1.762E+4	2.166	3.599E+4	0.0791
1.763E+4	2.201	3.6E+4	0.0813
1.764E+4	2.146	3.601E+4	0.0782
1.765E+4	2.157	3.602E+4	0.079
1.766E+4	2.178	3.603E+4	0.081
1.767E+4	2.193	3.604E+4	0.0787
1.768E+4	2.185	3.605E+4	0.0815
1.769E+4	2.146	3.606E+4	0.0798
1.77E+4	2.134	3.607E+4	0.0781
1.771E+4	2.166	3.608E+4	0.0797
1.772E+4	2.192	3.609E+4	0.0772
1.773E+4	2.201	3.61E+4	0.0777

Time (sec)	Displacement (m)	Time (sec)	Displacement (m)
1.774E+4	2.194	3.611E+4	0.0761
1.775E+4	2.182	3.612E+4	0.0778
1.776E+4	2.137	3.613E+4	0.0778
1.777E+4	2.136	3.614E+4	0.0779
1.778E+4	2.158	3.615E+4	0.0788
1.779E+4	2.182	3.616E+4	0.0805
1.78E+4	2.189	3.617E+4	0.0801
1.781E+4	2.193	3.618E+4	0.0792
1.782E+4	2.174	3.619E+4	0.0765
1.783E+4	2.135	3.62E+4	0.0783
1.784E+4	2.131	3.621E+4	0.0803
1.785E+4	2.147	3.622E+4	0.0752
1.786E+4	2.191	3.623E+4	0.0798
1.787E+4	2.175	3.624E+4	0.079
1.788E+4	2.135	3.625E+4	0.0783
1.789E+4	2.179	3.626E+4	0.0764
1.79E+4	2.179	3.627E+4	0.0772
1.791E+4	2.144	3.628E+4	0.0783
1.792E+4	2.189	3.629E+4	0.0781
1.793E+4	2.136	3.63E+4	0.0747
1.794E+4	2.202	3.631E+4	0.0769
1.795E+4	2.176	3.632E+4	0.0784
1.796E+4	2.147	3.633E+4	0.0749
1.797E+4	2.187	3.634E+4	0.0784
1.798E+4	2.142	3.635E+4	0.0787
1.799E+4	2.2	3.636E+4	0.0783
1.8E+4	2.162	3.637E+4	0.0771
1.801E+4	2.146	3.638E+4	0.079
1.802E+4	2.142	3.639E+4	0.0759
1.803E+4	2.137	3.64E+4	0.0781
1.804E+4	2.139	3.641E+4	0.0769
1.805E+4	2.14	3.642E+4	0.0799
1.806E+4	2.148	3.643E+4	0.0774
1.807E+4	2.14	3.644E+4	0.0761
1.808E+4	2.156	3.645E+4	0.0775
1.809E+4	2.19	3.646E+4	0.0748
1.81E+4	2.164	3.647E+4	0.0782
1.811E+4	2.132	3.648E+4	0.0769
1.812E+4	2.135	3.649E+4	0.0767
1.813E+4	2.169	3.65E+4	0.0769
1.814E+4	2.178	3.651E+4	0.0759
1.815E+4	2.137	3.652E+4	0.0775
1.816E+4	2.159	3.653E+4	0.0758
1.817E+4	2.201	3.654E+4	0.0765
1.818E+4	2.197	3.655E+4	0.0779
1.819E+4	2.184	3.656E+4	0.0769
1.82E+4	2.191	3.657E+4	0.0732
1.821E+4	2.195	3.658E+4	0.0765
1.822E+4	2.188	3.659E+4	0.0767
1.823E+4	2.182	3.66E+4	0.0767
1.824E+4	2.183	3.661E+4	0.076
1.825E+4	2.176	3.662E+4	0.0778
1.826E+4	2.2	3.663E+4	0.077
1.827E+4	2.142	3.664E+4	0.0765
1.828E+4	2.196	3.665E+4	0.0785
1.829E+4	2.135	3.666E+4	0.0773
1.83E+4	2.18	3.667E+4	0.0767
1.831E+4	2.154	3.668E+4	0.075
1.832E+4	2.183	3.669E+4	0.0792
1.833E+4	2.154	3.67E+4	0.077
1.834E+4	2.199	3.671E+4	0.0785
1.835E+4	2.159	3.672E+4	0.0756
1.836E+4	2.138	5.4E+4	0.01

Time (sec)	Displacement (m)	Time (sec)	Displacement (m)
1.837E+4	2.138		

Observation Well No. 2: MW21-01

X Location: 17.3 m
Y Location: 0. m

Radial distance from PW21-01: 17.3 m

Fully Penetrating Well

No. of Observations: 305

Observation Data

Time (sec)	Displacement (m)	Time (sec)	Displacement (m)
120.	0.0295	1.848E+4	0.1735
240.	0.0531	1.86E+4	0.1714
360.	0.0686	1.872E+4	0.1716
480.	0.0797	1.884E+4	0.1738
600.	0.0884	1.896E+4	0.1697
720.	0.0966	1.908E+4	0.1701
840.	0.103	1.92E+4	0.1707
960.	0.1088	1.932E+4	0.1698
1080.	0.1126	1.944E+4	0.171
1200.	0.1155	1.956E+4	0.1712
1320.	0.1191	1.968E+4	0.172
1440.	0.1213	1.98E+4	0.1708
1560.	0.1253	1.992E+4	0.1713
1680.	0.1273	2.004E+4	0.1717
1800.	0.1293	2.016E+4	0.1712
1920.	0.1303	2.028E+4	0.1716
2040.	0.134	2.04E+4	0.1701
2160.	0.135	2.052E+4	0.171
2280.	0.1361	2.064E+4	0.1722
2400.	0.1375	2.076E+4	0.1711
2520.	0.1396	2.088E+4	0.1705
2640.	0.1411	2.1E+4	0.1714
2760.	0.1421	2.112E+4	0.1725
2880.	0.1408	2.124E+4	0.1722
3000.	0.1393	2.136E+4	0.174
3120.	0.1401	2.148E+4	0.1729
3240.	0.1414	2.16E+4	0.1715
3360.	0.1427	2.172E+4	0.1713
3480.	0.1441	2.184E+4	0.1722
3600.	0.1439	2.196E+4	0.1722
3720.	0.1448	2.208E+4	0.1716
3840.	0.1459	2.22E+4	0.1711
3960.	0.1466	2.232E+4	0.1731
4080.	0.1483	2.244E+4	0.1734
4200.	0.1462	2.256E+4	0.1736
4320.	0.148	2.268E+4	0.1741
4440.	0.149	2.28E+4	0.1728
4560.	0.1495	2.292E+4	0.1738
4680.	0.1493	2.304E+4	0.1744
4800.	0.1513	2.316E+4	0.1717
4920.	0.1517	2.328E+4	0.1729
5040.	0.1521	2.34E+4	0.1739
5160.	0.1541	2.352E+4	0.1744
5280.	0.1552	2.364E+4	0.1745
5400.	0.155	2.376E+4	0.1739
5520.	0.1562	2.388E+4	0.173
5640.	0.1556	2.4E+4	0.1727
5760.	0.1575	2.412E+4	0.1745

Time (sec)	Displacement (m)	Time (sec)	Displacement (m)
5880.	0.1577	2.424E+4	0.1761
6000.	0.1565	2.436E+4	0.1735
6120.	0.1577	2.448E+4	0.1744
6240.	0.1591	2.46E+4	0.1728
6360.	0.1581	2.472E+4	0.1735
6480.	0.1593	2.484E+4	0.1737
6600.	0.1594	2.496E+4	0.1743
6720.	0.1594	2.508E+4	0.1742
6840.	0.1599	2.52E+4	0.1735
6960.	0.1594	2.532E+4	0.1734
7080.	0.1608	2.544E+4	0.1742
7200.	0.1604	2.556E+4	0.1766
7320.	0.1614	2.568E+4	0.1757
7440.	0.1625	2.58E+4	0.176
7560.	0.161	2.592E+4	0.1763
7680.	0.1613	2.604E+4	0.1769
7800.	0.1616	2.616E+4	0.1759
7920.	0.163	2.628E+4	0.1762
8040.	0.1642	2.64E+4	0.1752
8160.	0.162	2.652E+4	0.1759
8280.	0.1634	2.664E+4	0.1756
8400.	0.1593	2.676E+4	0.1763
8520.	0.161	2.688E+4	0.1769
8640.	0.1627	2.7E+4	0.1753
8760.	0.1571	2.712E+4	0.1765
8880.	0.1608	2.724E+4	0.1767
9000.	0.1572	2.736E+4	0.1758
9120.	0.1571	2.748E+4	0.1765
9240.	0.1589	2.76E+4	0.1757
9360.	0.1579	2.772E+4	0.1775
9480.	0.1596	2.784E+4	0.1769
9600.	0.1564	2.796E+4	0.1781
9720.	0.1579	2.808E+4	0.1775
9840.	0.1586	2.82E+4	0.1777
9960.	0.1562	2.832E+4	0.1784
1.008E+4	0.1572	2.844E+4	0.1783
1.02E+4	0.1572	2.856E+4	0.1788
1.032E+4	0.1605	2.868E+4	0.1777
1.044E+4	0.1624	2.88E+4	0.1794
1.056E+4	0.1544	2.892E+4	0.154
1.068E+4	0.1568	2.904E+4	0.1258
1.08E+4	0.149	2.916E+4	0.1139
1.092E+4	0.1497	2.928E+4	0.0886
1.104E+4	0.1511	2.94E+4	0.0816
1.116E+4	0.1484	2.952E+4	0.0751
1.128E+4	0.1504	2.964E+4	0.0825
1.14E+4	0.1465	2.976E+4	0.0788
1.152E+4	0.1478	2.988E+4	0.075
1.164E+4	0.149	3.0E+4	0.0714
1.176E+4	0.1479	3.012E+4	0.0691
1.188E+4	0.149	3.024E+4	0.0663
1.2E+4	0.1483	3.036E+4	0.0632
1.212E+4	0.1478	3.048E+4	0.0607
1.224E+4	0.1481	3.06E+4	0.0585
1.236E+4	0.1487	3.072E+4	0.0575
1.248E+4	0.1498	3.084E+4	0.0566
1.26E+4	0.1501	3.096E+4	0.054
1.272E+4	0.1492	3.108E+4	0.0529
1.284E+4	0.1489	3.12E+4	0.0522
1.296E+4	0.1534	3.132E+4	0.0504
1.308E+4	0.1541	3.144E+4	0.0482
1.32E+4	0.1574	3.156E+4	0.0486
1.332E+4	0.1575	3.168E+4	0.0472

Time (sec)	Displacement (m)	Time (sec)	Displacement (m)
1.344E+4	0.1567	3.18E+4	0.046
1.356E+4	0.1587	3.192E+4	0.0449
1.368E+4	0.1588	3.204E+4	0.0437
1.38E+4	0.1641	3.216E+4	0.0434
1.392E+4	0.1639	3.228E+4	0.0422
1.404E+4	0.1637	3.24E+4	0.0426
1.416E+4	0.1679	3.252E+4	0.0416
1.428E+4	0.17	3.264E+4	0.0409
1.44E+4	0.1655	3.276E+4	0.0376
1.452E+4	0.1658	3.288E+4	0.038
1.464E+4	0.1663	3.3E+4	0.0367
1.476E+4	0.1658	3.312E+4	0.0364
1.488E+4	0.168	3.324E+4	0.037
1.5E+4	0.1656	3.336E+4	0.0349
1.512E+4	0.1655	3.348E+4	0.0346
1.524E+4	0.1661	3.36E+4	0.0332
1.536E+4	0.1671	3.372E+4	0.0324
1.548E+4	0.167	3.384E+4	0.0318
1.56E+4	0.1681	3.396E+4	0.0324
1.572E+4	0.1679	3.408E+4	0.0308
1.584E+4	0.1696	3.42E+4	0.0317
1.596E+4	0.1686	3.432E+4	0.0319
1.608E+4	0.1688	3.444E+4	0.0305
1.62E+4	0.1693	3.456E+4	0.0306
1.632E+4	0.171	3.468E+4	0.0304
1.644E+4	0.171	3.48E+4	0.0312
1.656E+4	0.1712	3.492E+4	0.0294
1.668E+4	0.1709	3.504E+4	0.0295
1.68E+4	0.1713	3.516E+4	0.0291
1.692E+4	0.173	3.528E+4	0.0284
1.704E+4	0.1734	3.54E+4	0.0294
1.716E+4	0.1725	3.552E+4	0.0278
1.728E+4	0.1731	3.564E+4	0.0276
1.74E+4	0.1718	3.576E+4	0.0282
1.752E+4	0.1732	3.588E+4	0.0268
1.764E+4	0.1746	3.6E+4	0.0277
1.776E+4	0.171	3.612E+4	0.0272
1.788E+4	0.1715	3.624E+4	0.027
1.8E+4	0.1706	3.636E+4	0.0269
1.812E+4	0.1708	3.648E+4	0.0255
1.824E+4	0.171	3.66E+4	0.0265
1.836E+4	0.1722		

SOLUTION

Pumping Test
Aquifer Model: Confined
Solution Method: Theis

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
T	0.000642	m^2/sec
S	0.004293	
Kz/Kr	1.	
b	58.2	m

K = T/b = 1.103E-5 m/sec (0.001103 cm/sec)
Ss = S/b = 7.376E-5 1/m

Table D-1: PW21-01 - Pumping and Recovery Data - Manual Readings for the Pumping Well
Date: May 31, 2021 to June 1, 2021

Time	Elapsed Time min	WL (mtoc)	Flow Rate usgpm	Flow Rate L/min	Comments:	
8:30					Well Depth (mtoc) - 65.5	
9:00		2.16			Well Stickup (m) - 0.67	
9:30	0.00	2.15			Static WL (mbgs)	1.49
9:31	1.00	3.92	20	75.8	PUMP ON	
9:32	2.00	4.03	20	75.8		
9:33	3.00	4.07	20	75.8		
9:34	4.00	4.10	20	75.8		
9:35	5.00	4.12	20	75.8		
9:36	6.00	4.14	20	75.8		
9:37	7.00	4.15	20	75.8		
9:38	8.00	4.16	20	75.8		
9:39	9.00	4.17	20	75.8		
9:40	10.00	4.17	20	75.8		
9:42	12.00	4.19	20	75.8		
9:45	15.00	4.21	20	75.8		
9:50	20.00	4.22	20	75.8		
9:55	25.00	4.24	20	75.8		
10:00	30.00	4.25	20	75.8		
10:05	35.00	4.25	20	75.8		
10:10	40.00	4.26	20	75.8		
10:20	50.00	4.27	20	75.8		
10:30	60.00	4.28	20	75.8		
10:45	75.00	4.29	20	75.8		
11:00	90.00	4.30	20	75.8		
11:15	105.00	4.30	20	75.8		
11:30	120.00	4.31	20	75.8		
11:45	135.00	4.32	20	75.8		
12:00	150.00	4.32	20	75.8		
12:30	180.00	4.33	20	75.8		
13:00	210.00	4.33	20	75.8		
13:30	240.00	4.34	20	75.8		
14:30	300.00	4.35	20	75.8		
15:30	360.00	4.35	20	75.8		
16:30	420.00	4.36	20	75.8		
17:30	480.00	4.36	20	75.8	PUMP OFF	
17:30	0.00	4.36			RECOVERY TEST START	
17:31	1.00	2.35				
17:32	2.00	2.32				
17:33	3.00	2.31				
17:34	4.00	2.31				
17:35	5.00	2.30				
17:36	6.00	2.30				
17:37	7.00	2.30				
17:38	8.00	2.29				
17:39	9.00	2.29				
17:40	10.00	2.29				
17:42	12.00	2.28				
17:45	15.00	2.28				
17:50	20.00	2.27				
17:55	25.00	2.27				
18:00	30.00	2.27				
18:05	35.00	2.27				
18:10	40.00	2.26				
18:20	50.00	2.26				
18:30	60.00	2.25				
8:30	900.00	2.17			Next Day (June 1, 2021)	

END OF RECOVERY TEST
Logger stopped+Downloaded+Saved+Removed
Well head bagged and taped - Driller notified that all logger equipment was removed

Table D-2: PW21-01 Pumping Test - Observation Well Data (May 31, 2021 to June 1, 2021)

Observation Well: MW21-01
Well Depth (mtoc) - 5.32
Well Stickup (m) -'0.11

Levelogger Serial# 0032096460
Levelogger Depth = 5.13 m
Future start at 8:30 on 2 min readings

Time	WL (mtoc)	Comment
9:00	1.52	Static WL
8:30		Logger Start
9:30	1.52	Pump on at PW21-01
9:45	1.63	
9:50	1.64	
9:55	1.64	
10:00	1.65	
10:05	1.65	
10:10	1.66	
10:20	1.66	
10:30	1.66	
10:45	1.67	
11:00	1.67	
11:15	1.67	
11:30	1.68	
11:45	1.68	
12:00	1.68	
12:30	1.69	
13:00	1.69	
13:30	1.69	
14:30	1.70	
15:30	1.70	
16:30	1.70	
17:30	1.70	Pump off at PW21-01
17:32	1.69	
17:35	1.63	
17:40	1.63	
17:55	1.61	
18:00	1.60	
18:05	1.58	
18:10	1.57	
18:20	1.56	
18:30	1.55	
8:30	1.52	Next Day
		Logger Stopped+Download+Save+Removed
		Well Secured

Observation Well: MW21-06
Well Depth (mtoc) - 5.59
Well Stickup (m) - 0.92

Levelogger Serial# 0052066710
Levelogger Depth = 5.29 m
Future start at 8:30 on 2 min readings

Time	WL (mtoc	Comment
9:00	2.97	Static WL
8:30		Logger Start
9:30	2.97	Pump on at PW21-01
8:30	2.96	Next Day
Logger Stopped+Download+Save+Removed		
Well Secured		

Appendix E

Groundwater Quality – Existing Water Well PW21-01 and Newly Install Well

ENGLOBE

Appendix E-1

Groundwater Quality Results – Existing Water Well PW21-01

ENGLOBE

Table E-1 Water Quality Analysis Results
2095 Dilworth Road, Kars, Ontario
DST File No.: 02101208.000

Table E-1 Groundwater Sampling Results

Parameter	Units	RDL	Criteria			PW21-01			
Sample ID			Ontario Drinking Water Quality Standards[1]	Type of Objective	Treatability Limits[2]	*PW21-01, 4 HRS*	*PW21-01, 8 HRS*	*PW21-01, 0.5 HRS*	*PW21-01, 1 HRS*
Sample Date & Time						*5/31/2021 1:30:00 PM*	*5/31/2021 5:30:00 PM*	*9/16/2024 10:00:00 AM*	*1/20/2025 10:30:00 AM*
Microbological Parameters									
E. Coli	CFU/100 mL	NA	0	MAC	--	0	0	NM	NM
Fecal Coliform	CFU/100 mL	NA	--	--	--	0	0	NM	NM
Total Coliforms	CFU/100 mL	NA	0	MAC	--	0	0	NM	NM
Background	CFU/100 mL	NA	--	--	--	0	0	NM	NM
Heterotrophic Plate Count	CFU/mL	NA	--	--	--	0	1	NM	NM
General Inoganics									
Alkalinity, total	mg/L	1.0	30 - 500	OG	--	260	250	NM	260
Ammonia as N	mg/L	0.050	--	--	--	0.35	0.36	NM	NM
Colour	TCU	2	5	AO	7	<2	<2	NM	NM
Conductivity	uS/cm	1.0	--	--	--	2.18	2.09	NM	NM
Dissolved Organic Carbon	mg/L	0.50	5	AO	10	0.83	0.88	NM	NM
Hardness	mg/L	1.0	80 - 100	OG	--	370	390	NM	NM
Ion Balance	% difference	NA	--	--	--	0.410	3.01	NM	NM
pH	pH Units	NA	6.5 - 8.5	OG	--	7.96	7.86	NM	NM
Phenols	mg/L	0.0010	--	--	--	<0.0010	<0.0010	NM	NM
Tannins & Lignins	mg/L	0.2	--	--	--	<0.2	<0.2	NM	NM
Total Suspended Solids	mg/L	1.0	500	AO	--	3	2	NM	NM
Total Dissolved Solids	mg/L	10.0	500	AO	-	NM	NM	NM	1180
Total Kjeldahl Nitrogen	mg/L	0.10	--	--	--	0.42	0.55	NM	NM
Turbidity	NTU	0.1	5	AO	5	1.0	0.7	NM	NM
Free Chlorine Residual (Lab)	mg/L	0.1	NA	NA	--	<0.1	<0.1	NM	NM
Free Chlorine Residual (Field)	mg/L	0.1	NA	NA	--	Not Detected	Not Detected	NM	NM
Total Chlorine	mg/L	0.1	NA	NA	--	<0.1	<0.1	NM	NM
Total Sulphide	mg/L	0.0018	--	--	--	NM	NM	NM	260
Anions									
Chloride	mg/L	1.0	250	AO	250	490	480	480	NM
Fluoride	mg/L	0.10	1.5	MAC	--	0.70	0.78	NM	NM
Nitrate as N	mg/L	0.10	10	MAC	--	<0.10	<0.10	NM	NM
Nitrite as N	mg/L	0.010	1	MAC	--	<0.010	<0.010	NM	NM
Orthophosphate (P)	mg/L	0.010	--		--	<0.010	<0.010	NM	NM
Sulphide as H_2S	mg/L	0.002	0.05	AO	--	<0.020	<0.020	NM	<0.0020
Sulphate	mg/L	1.0	500	AO	500	89	100	NM	NM
Metals									
Calcium	mg/L	0.2	--	--	--	71	75	NM	69
Iron	mg/L	0.1	0.30	AO	5 to 10	0.11	0.11	NM	NM
Magnesium	mg/L	0.05	--	--	--	46	49	NM	NM
Manganese	mg/L	0.002	0.05	AO	1.0	0.012	0.014	NM	NM
Mercury	mg/L	0.0001	0.001	MAC	--	<0.0001	< 0.0001	NM	NM
Potassium	mg/L	0.2	--	--	--	14	15	NM	NM
Sodium	mg/L	0.1	200	AO	200	300	320	290	NM
Pesticides & Herbicides									
2,4,5-T	ug/L	1.0	--	--	--	<0.50	<0.50	NM	NM
2,4,5-TP (Silvex)	ug/L	1.0	NA	--	--	<0.50	<0.50	NM	NM
2,4-Dichlorophenoxyacetic acid (2-4-D)	ug/L	1.0	100	MAC	--	<0.50	<0.50	NM	NM
2,4-D (BEE)	ug/L	2.0	NA	--	--	<0.50	<0.50	NM	NM
2,4-DB	ug/L	1.0	NA	--	--	<0.50	<0.50	NM	NM
2,4-DP	ug/L	1.0	NA	--	--	<0.50	<0.50	NM	NM
Dicamba	ug/L	1.0	120	MAC	--	<0.50	<0.50	NM	NM
MCPA	ug/L	2.0	100	MAC	--	<0.50	<0.50	NM	NM
MCPP	ug/L	2.0	NA	--	--	<0.50	<0.50	NM	NM
Picloram	ug/L	5.0	190	MAC	--	<0.50	<0.50	NM	NM

Notes:

1 - Ontario Regulation 169/03: Ontario Drinking Water Quality Standards, including the Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines (Rev. June 2006).

2 - Maximum Concentration Considered Reasonably Treatable according to Procedure D-5-5 Private Wells: Water Supply Assessment

RDL - Reportable Detection Limit

NA - Not Applicable

MAC - Maximum Allowable Concentration

OG - Operational Guideline

AO - Aesthetic Objective

-- No standard value

Concentration exceeds the Ontario Drinking Water Quality Standards

NM - Not Measured

Your Project #: 02101208.000
Your C.O.C. #: 829546-01-01

Attention: Sonny Sundaram

DST Consulting Engineers Inc
Ottawa - Standing Offer
2150 Thurston Dr
Unit 203
Ottawa, ON
CANADA K1G 5T9

Report Date: 2021/06/10
Report #: R6669735
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1E7322
Received: 2021/05/31, 15:30

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity (1)	1	N/A	2021/06/02	CAM SOP-00448	SM 23 2320 B m
1,3-Dichloropropene Sum (1)	1	N/A	2021/06/03		EPA 8260C m
Free Residual Chlorine (1)	1	2021/06/01	2021/06/01	CAM SOP 00425	SM 23 4500-CL G m
Total Chlorine (1)	1	2021/06/01	2021/06/01	CAM SOP 00425	SM 23 4500-CL G m
Chloride by Automated Colourimetry (1)	1	N/A	2021/06/03	CAM SOP-00463	SM 23 4500-Cl E m
Colour (1)	1	N/A	2021/06/03	CAM SOP-00412	SM 23 2120C m
Conductivity (1)	1	N/A	2021/06/04	CAM SOP-00414	SM 23 2510 m
Dissolved Organic Carbon (DOC) (1, 2)	1	N/A	2021/06/04	CAM SOP-00446	SM 23 5310 B m
Fluoride (1)	1	2021/06/01	2021/06/02	CAM SOP-00449	SM 23 4500-F C m
Hardness (calculated as CaCO3) (1)	1	N/A	2021/06/04	CAM SOP 00102/00408/00447	SM 2340 B
Dissolved Mercury in Water by CVAA (1)	1	2021/06/04	2021/06/04	CAM SOP-00453	EPA 7470A m
Dissolved Metals by ICPMS (1)	1	N/A	2021/06/03	CAM SOP-00447	EPA 6020B m
Ion Balance (% Difference) (1)	1	N/A	2021/06/04		
Total Coliforms/ E. coli, CFU/100mL (1)	1	N/A	2021/06/01	CAM SOP-00551	MOE E3407
Fecal coliform, (CFU/100mL) (1)	1	N/A	2021/06/01	CAM SOP-00552	SM 9222D
Heterotrophic plate count, (CFU/mL) (1)	1	N/A	2021/06/01	CAM SOP-00512	SM 9215B
Total Ammonia-N (1)	1	N/A	2021/06/04	CAM SOP-00441	USGS I-2522-90 m
Nitrate (NO3) and Nitrite (NO2) in Water (1, 3)	1	N/A	2021/06/03	CAM SOP-00440	SM 23 4500-NO3I/NO2B
Phenoxy Acid Herbicides (1)	1	2021/06/07	2021/06/08	CAM SOP-00330	EPA 8270 m
pH (1)	1	2021/06/01	2021/06/02	CAM SOP-00413	SM 4500H+ B m
Phenols (4AAP) (1)	1	N/A	2021/06/03	CAM SOP-00444	OMOE E3179 m
Orthophosphate (1)	1	N/A	2021/06/02	CAM SOP-00461	EPA 365.1 m
Sulphate by Automated Colourimetry (1)	1	N/A	2021/06/03	CAM SOP-00464	EPA 375.4 m
Sulphide (1)	1	N/A	2021/06/01	CAM SOP-00455	SM 23 4500-S G m
Tannins & Lignins (1)	1	N/A	2021/06/02	CAM SOP-00410	SM 23 5550 B m
Total Kjeldahl Nitrogen in Water (1)	1	2021/06/02	2021/06/03	CAM SOP-00938	OMOE E3516 m
Low Level Total Suspended Solids (1)	1	2021/06/03	2021/06/04	CAM SOP-00428	SM 23 2540D m
Turbidity (1)	1	N/A	2021/06/01	CAM SOP-00417	SM 23 2130 B m
Volatile Organic Compounds in Water (1)	1	N/A	2021/06/03	CAM SOP-00228	EPA 8260C m

Your Project #: 02101208.000
Your C.O.C. #: 829546-01-01

Attention: Sonny Sundaram

DST Consulting Engineers Inc
Ottawa - Standing Offer
2150 Thurston Dr
Unit 203
Ottawa, ON
CANADA K1G 5T9

Report Date: 2021/06/10
Report #: R6669735
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1E7322
Received: 2021/05/31, 15:30

Remarks:

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

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

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

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

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

Encryption Key

Bureau Veritas
10 Jun 2021 10:02:46

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Katherine Szozda, Project Manager
Email: Katherine.Szozda@bureauveritas.com
Phone# (613)274-0573 Ext:7063633

==========

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

RESULTS OF ANALYSES OF WATER

BV Labs ID		PSA277			PSA277		
Sampling Date		2021/05/31 13:30			2021/05/31 13:30		
COC Number		829546-01-01			829546-01-01		
	UNITS	PW21-01, 4 HRS	RDL	QC Batch	PW21-01, 4 HRS Lab-Dup	RDL	QC Batch
Calculated Parameters							
Hardness (CaCO3)	mg/L	370	1.0	7381624			
Ion Balance (% Difference)	%	0.410	N/A	7381625			
Inorganics							
Total Ammonia-N	mg/L	0.35	0.050	7385604			
Free Chlorine	mg/L	<0.1	0.1	7382236	<0.1	0.1	7382236
Total Chlorine	mg/L	<0.1	0.1	7382241	<0.1	0.1	7382241
Colour	TCU	<2	2	7386482			
Conductivity	mS/cm	2.18	0.001	7388222			
Fluoride (F-)	mg/L	0.70	0.10	7383110			
Total Kjeldahl Nitrogen (TKN)	mg/L	0.42	0.10	7385549	0.41	0.10	7385549
Dissolved Organic Carbon	mg/L	0.83	0.40	7387686			
Orthophosphate (P)	mg/L	<0.010	0.010	7383377			
pH	pH	7.96		7383156			
Phenols-4AAP	mg/L	<0.0010	0.0010	7385046			
Total Suspended Solids	mg/L	3	1	7384783	2	1	7384783
Dissolved Sulphate (SO4)	mg/L	89	1.0	7383371			
Sulphide	mg/L	<0.020	0.020	7381234			
Tannins & Lignins	mg/L	<0.2	0.2	7383936	<0.2	0.2	7383936
Turbidity	NTU	1.0	0.1	7383045			
Alkalinity (Total as CaCO3)	mg/L	260	1.0	7383151			
Dissolved Chloride (Cl-)	mg/L	490	6.0	7383362			
Nitrite (N)	mg/L	<0.010	0.010	7383228			
Nitrate (N)	mg/L	<0.10	0.10	7383228			
Nitrate + Nitrite (N)	mg/L	<0.10	0.10	7383228			

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

Bureau Veritas Laboratories 100 – 36 Antares Dr. Nepean, ON, K2E 7W5 Phone: 613-274-0573 Website: www.bvlabs.com

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

BV Labs ID		PSA277			PSA277		
Sampling Date		2021/05/31 13:30			2021/05/31 13:30		
COC Number		829546-01-01			829546-01-01		
	UNITS	PW21-01, 4 HRS	RDL	QC Batch	PW21-01, 4 HRS Lab-Dup	RDL	QC Batch
Metals							
Dissolved Mercury (Hg)	ug/L	<0.10	0.10	7389302	<0.10	0.10	7389302
Dissolved Aluminum (Al)	ug/L	13	4.9	7387332			
Dissolved Antimony (Sb)	ug/L	<0.50	0.50	7387332			
Dissolved Arsenic (As)	ug/L	<1.0	1.0	7387332			
Dissolved Barium (Ba)	ug/L	32	2.0	7387332			
Dissolved Beryllium (Be)	ug/L	<0.40	0.40	7387332			
Dissolved Bismuth (Bi)	ug/L	<1.0	1.0	7387332			
Dissolved Boron (B)	ug/L	530	10	7387332			
Dissolved Cadmium (Cd)	ug/L	<0.090	0.090	7387332			
Dissolved Calcium (Ca)	ug/L	71000	200	7387332			
Dissolved Chromium (Cr)	ug/L	<5.0	5.0	7387332			
Dissolved Cobalt (Co)	ug/L	<0.50	0.50	7387332			
Dissolved Copper (Cu)	ug/L	<0.90	0.90	7387332			
Dissolved Iron (Fe)	ug/L	110	100	7387332			
Dissolved Lead (Pb)	ug/L	<0.50	0.50	7387332			
Dissolved Magnesium (Mg)	ug/L	46000	50	7387332			
Dissolved Manganese (Mn)	ug/L	12	2.0	7387332			
Dissolved Molybdenum (Mo)	ug/L	1.8	0.50	7387332			
Dissolved Nickel (Ni)	ug/L	<1.0	1.0	7387332			
Dissolved Potassium (K)	ug/L	14000	200	7387332			
Dissolved Selenium (Se)	ug/L	<2.0	2.0	7387332			
Dissolved Silver (Ag)	ug/L	<0.090	0.090	7387332			
Dissolved Sodium (Na)	ug/L	300000	100	7387332			
Dissolved Strontium (Sr)	ug/L	3800	1.0	7387332			
Dissolved Thallium (Tl)	ug/L	<0.050	0.050	7387332			
Dissolved Uranium (U)	ug/L	0.22	0.10	7387332			
Dissolved Vanadium (V)	ug/L	<0.50	0.50	7387332			
Dissolved Zinc (Zn)	ug/L	<5.0	5.0	7387332			

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

PHENOXY ACID HERBICIDES BY GC-MS (WATER)

BV Labs ID		PSA277		
Sampling Date		2021/05/31 13:30		
COC Number		829546-01-01		
	UNITS	PW21-01, 4 HRS	RDL	QC Batch
Pesticides & Herbicides				
2,4,5-T	ug/L	<0.50	0.50	7392455
2,4,5-TP (Silvex)	ug/L	<0.50	0.50	7392455
2,4-D	ug/L	<0.50	0.50	7392455
2,4-D (BEE)	ug/L	<0.50	0.50	7392455
2,4-DB	ug/L	<0.50	0.50	7392455
2,4-DP (Dichlorprop)	ug/L	<0.50	0.50	7392455
Dicamba	ug/L	<0.50	0.50	7392455
MCPA	ug/L	<0.50	0.50	7392455
MCPP	ug/L	<0.50	0.50	7392455
Picloram	ug/L	<0.50	0.50	7392455
Surrogate Recovery (%)				
2,4-Dichlorophenyl Acetic Acid	%	84		7392455
2,5-Dibromobenzoic Acid	%	81		7392455
4,4-Dibromobiphenyl	%	82		7392455

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Bureau Veritas Laboratories 100 – 36 Antares Dr. Nepean, ON, K2E 7W5 Phone: 613-274-0573 Website: www.bvlabs.com

MICROBIOLOGY (WATER)

BV Labs ID		PSA277	
Sampling Date		2021/05/31 13:30	
COC Number		829546-01-01	
	UNITS	PW21-01, 4 HRS	QC Batch
Microbiological			
Fecal coliform	CFU/100mL	0	7382457
Heterotrophic plate count	CFU/mL	0	7382200
Background	CFU/100mL	0	7382193
Total Coliforms	CFU/100mL	0	7382193
Escherichia coli	CFU/100mL	0	7382193
QC Batch = Quality Control Batch			

O.REG 153 VOCS BY HS (WATER)

BV Labs ID		PSA277		
Sampling Date		2021/05/31 13:30		
COC Number		829546-01-01		
	UNITS	PW21-01, 4 HRS	RDL	QC Batch
Calculated Parameters				
1,3-Dichloropropene (cis+trans)	ug/L	<0.50	0.50	7381526
Volatile Organics				
Acetone (2-Propanone)	ug/L	<10	10	7381484
Benzene	ug/L	<0.20	0.20	7381484
Bromodichloromethane	ug/L	<0.50	0.50	7381484
Bromoform	ug/L	<1.0	1.0	7381484
Bromomethane	ug/L	<0.50	0.50	7381484
Carbon Tetrachloride	ug/L	<0.19	0.19	7381484
Chlorobenzene	ug/L	<0.20	0.20	7381484
Chloroform	ug/L	<0.20	0.20	7381484
Dibromochloromethane	ug/L	<0.50	0.50	7381484
1,2-Dichlorobenzene	ug/L	<0.40	0.40	7381484
1,3-Dichlorobenzene	ug/L	<0.40	0.40	7381484
1,4-Dichlorobenzene	ug/L	<0.40	0.40	7381484
Dichlorodifluoromethane (FREON 12)	ug/L	<1.0	1.0	7381484
1,1-Dichloroethane	ug/L	<0.20	0.20	7381484
1,2-Dichloroethane	ug/L	<0.49	0.49	7381484
1,1-Dichloroethylene	ug/L	<0.20	0.20	7381484
cis-1,2-Dichloroethylene	ug/L	<0.50	0.50	7381484
trans-1,2-Dichloroethylene	ug/L	<0.50	0.50	7381484
1,2-Dichloropropane	ug/L	<0.20	0.20	7381484
cis-1,3-Dichloropropene	ug/L	<0.30	0.30	7381484
trans-1,3-Dichloropropene	ug/L	<0.40	0.40	7381484
Ethylbenzene	ug/L	<0.20	0.20	7381484
Ethylene Dibromide	ug/L	<0.19	0.19	7381484
Hexane	ug/L	<1.0	1.0	7381484
Methylene Chloride(Dichloromethane)	ug/L	<2.0	2.0	7381484
Methyl Ethyl Ketone (2-Butanone)	ug/L	<10	10	7381484
Methyl Isobutyl Ketone	ug/L	<5.0	5.0	7381484
Methyl t-butyl ether (MTBE)	ug/L	<0.50	0.50	7381484
Styrene	ug/L	<0.40	0.40	7381484
1,1,1,2-Tetrachloroethane	ug/L	<0.50	0.50	7381484
1,1,2,2-Tetrachloroethane	ug/L	<0.40	0.40	7381484
Tetrachloroethylene	ug/L	<0.20	0.20	7381484

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Bureau Veritas Laboratories 100 – 36 Antares Dr. Nepean, ON, K2E 7W5 Phone: 613-274-0573 Website: www.bvlabs.com

O.REG 153 VOCS BY HS (WATER)

BV Labs ID		PSA277		
Sampling Date		2021/05/31 13:30		
COC Number		829546-01-01		
	UNITS	PW21-01, 4 HRS	RDL	QC Batch
Toluene	ug/L	<0.20	0.20	7381484
1,1,1-Trichloroethane	ug/L	<0.20	0.20	7381484
1,1,2-Trichloroethane	ug/L	<0.40	0.40	7381484
Trichloroethylene	ug/L	<0.20	0.20	7381484
Trichlorofluoromethane (FREON 11)	ug/L	<0.50	0.50	7381484
Vinyl Chloride	ug/L	<0.20	0.20	7381484
p+m-Xylene	ug/L	<0.20	0.20	7381484
o-Xylene	ug/L	<0.20	0.20	7381484
Total Xylenes	ug/L	<0.20	0.20	7381484
Surrogate Recovery (%)				
4-Bromofluorobenzene	%	97		7381484
D4-1,2-Dichloroethane	%	108		7381484
D8-Toluene	%	94		7381484

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Bureau Veritas Laboratories 100 – 36 Antares Dr. Nepean, ON, K2E 7W5 Phone: 613-274-0573 Website: www.bvlabs.com

TEST SUMMARY

BV Labs ID: PSA277
Sample ID: PW21-01, 4 HRS
Matrix: Water

Collected: 2021/05/31
Shipped:
Received: 2021/05/31

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	7383151	N/A	2021/06/02	Neil Dassanayake
1,3-Dichloropropene Sum	CALC	7381526	N/A	2021/06/03	Automated Statchk
Free Residual Chlorine	SPEC	7382236	2021/06/01	2021/06/01	Khushbu Vijay kumar Patel
Total Chlorine	SPEC	7382241	2021/06/01	2021/06/01	Khushbu Vijay kumar Patel
Chloride by Automated Colourimetry	KONE	7383362	N/A	2021/06/03	Avneet Kour Sudan
Colour	SPEC	7386482	N/A	2021/06/03	Viorica Rotaru
Conductivity	AT	7388222	N/A	2021/06/04	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	7387686	N/A	2021/06/04	Nimarta Singh
Fluoride	ISE	7383110	2021/06/01	2021/06/02	Neil Dassanayake
Hardness (calculated as CaCO3)		7381624	N/A	2021/06/04	Automated Statchk
Dissolved Mercury in Water by CVAA	CV/AA	7389302	2021/06/04	2021/06/04	Gagandeep Rai
Dissolved Metals by ICPMS	ICP/MS	7387332	N/A	2021/06/03	Azita Fazaeli
Ion Balance (% Difference)	CALC	7381625	N/A	2021/06/04	Automated Statchk
Total Coliforms/ E. coli, CFU/100mL	PL	7382193	N/A	2021/06/01	Sirimathie Aluthwala
Fecal coliform, (CFU/100mL)	PL	7382457	N/A	2021/06/01	Sirimathie Aluthwala
Heterotrophic plate count, (CFU/mL)	PL	7382200	N/A	2021/06/01	Ranju Chaudhari
Total Ammonia-N	LACH/NH4	7385604	N/A	2021/06/04	Amanpreet Sappal
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	7383228	N/A	2021/06/03	Chandra Nandlal
Phenoxy Acid Herbicides	GC/MS	7392455	2021/06/07	2021/06/08	May Yin Mak
pH	AT	7383156	2021/06/01	2021/06/02	Neil Dassanayake
Phenols (4AAP)	TECH/PHEN	7385046	N/A	2021/06/03	Deonarine Ramnarine
Orthophosphate	KONE	7383377	N/A	2021/06/02	Avneet Kour Sudan
Sulphate by Automated Colourimetry	KONE	7383371	N/A	2021/06/03	Avneet Kour Sudan
Sulphide	ISE/S	7381234	N/A	2021/06/01	Neil Dassanayake
Tannins & Lignins	SPEC	7383936	N/A	2021/06/02	Viorica Rotaru
Total Kjeldahl Nitrogen in Water	SKAL	7385549	2021/06/02	2021/06/03	Rajni Tyagi
Low Level Total Suspended Solids	BAL	7384783	2021/06/03	2021/06/04	Shivani Desai
Turbidity	AT	7383045	N/A	2021/06/01	Khushbu Vijay kumar Patel
Volatile Organic Compounds in Water	GC/MS	7381484	N/A	2021/06/03	Ancheol Jeong

BV Labs ID: PSA277 Dup
Sample ID: PW21-01, 4 HRS
Matrix: Water

Collected: 2021/05/31
Shipped:
Received: 2021/05/31

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Free Residual Chlorine	SPEC	7382236	2021/06/01	2021/06/01	Khushbu Vijay kumar Patel
Total Chlorine	SPEC	7382241	2021/06/01	2021/06/01	Khushbu Vijay kumar Patel
Dissolved Mercury in Water by CVAA	CV/AA	7389302	2021/06/04	2021/06/04	Gagandeep Rai
Tannins & Lignins	SPEC	7383936	N/A	2021/06/02	Viorica Rotaru
Total Kjeldahl Nitrogen in Water	SKAL	7385549	2021/06/02	2021/06/03	Rajni Tyagi
Low Level Total Suspended Solids	BAL	7384783	2021/06/03	2021/06/04	Shivani Desai

GENERAL COMMENTS

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

Package 1	11.0°C

Results relate only to the items tested.

Bureau Veritas Laboratories 100 – 36 Antares Dr. Nepean, ON, K2E 7W5 Phone: 613-274-0573 Website: www.bvlabs.com

QUALITY ASSURANCE REPORT

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
7381484	4-Bromofluorobenzene	2021/06/02	100	70 - 130	101	70 - 130	98	%				
7381484	D4-1,2-Dichloroethane	2021/06/02	103	70 - 130	101	70 - 130	109	%				
7381484	D8-Toluene	2021/06/02	102	70 - 130	104	70 - 130	95	%				
7392455	2,4-Dichlorophenyl Acetic Acid	2021/06/08			86	10 - 130	93	%				
7392455	2,5-Dibromobenzoic Acid	2021/06/08			85	10 - 130	89	%				
7392455	4,4-Dibromobiphenyl	2021/06/08			84	10 - 130	88	%				
7381234	Sulphide	2021/06/01	95	80 - 120	99	80 - 120	<0.020	mg/L	NC	20		
7381484	1,1,1,2-Tetrachloroethane	2021/06/03	99	70 - 130	99	70 - 130	<0.50	ug/L	NC	30		
7381484	1,1,1-Trichloroethane	2021/06/03	98	70 - 130	98	70 - 130	<0.20	ug/L	NC	30		
7381484	1,1,2,2-Tetrachloroethane	2021/06/03	101	70 - 130	100	70 - 130	<0.40	ug/L	NC	30		
7381484	1,1,2-Trichloroethane	2021/06/03	104	70 - 130	103	70 - 130	<0.40	ug/L	NC	30		
7381484	1,1-Dichloroethane	2021/06/03	95	70 - 130	94	70 - 130	<0.20	ug/L	NC	30		
7381484	1,1-Dichloroethylene	2021/06/03	92	70 - 130	92	70 - 130	<0.20	ug/L	NC	30		
7381484	1,2-Dichlorobenzene	2021/06/03	94	70 - 130	92	70 - 130	<0.40	ug/L	NC	30		
7381484	1,2-Dichloroethane	2021/06/03	96	70 - 130	95	70 - 130	<0.49	ug/L	NC	30		
7381484	1,2-Dichloropropane	2021/06/03	103	70 - 130	102	70 - 130	<0.20	ug/L	NC	30		
7381484	1,3-Dichlorobenzene	2021/06/03	90	70 - 130	89	70 - 130	<0.40	ug/L	NC	30		
7381484	1,4-Dichlorobenzene	2021/06/03	105	70 - 130	103	70 - 130	<0.40	ug/L	NC	30		
7381484	Acetone (2-Propanone)	2021/06/03	111	60 - 140	110	60 - 140	<10	ug/L	NC	30		
7381484	Benzene	2021/06/03	89	70 - 130	89	70 - 130	<0.20	ug/L	NC	30		
7381484	Bromodichloromethane	2021/06/03	102	70 - 130	100	70 - 130	<0.50	ug/L	NC	30		
7381484	Bromoform	2021/06/03	101	70 - 130	100	70 - 130	<1.0	ug/L	NC	30		
7381484	Bromomethane	2021/06/03	87	60 - 140	85	60 - 140	<0.50	ug/L	NC	30		
7381484	Carbon Tetrachloride	2021/06/03	96	70 - 130	97	70 - 130	<0.19	ug/L	NC	30		
7381484	Chlorobenzene	2021/06/03	94	70 - 130	94	70 - 130	<0.20	ug/L	NC	30		
7381484	Chloroform	2021/06/03	98	70 - 130	97	70 - 130	<0.20	ug/L	NC	30		
7381484	cis-1,2-Dichloroethylene	2021/06/03	102	70 - 130	99	70 - 130	<0.50	ug/L	NC	30		
7381484	cis-1,3-Dichloropropene	2021/06/03	94	70 - 130	93	70 - 130	<0.30	ug/L	NC	30		
7381484	Dibromochloromethane	2021/06/03	96	70 - 130	96	70 - 130	<0.50	ug/L	NC	30		
7381484	Dichlorodifluoromethane (FREON 12)	2021/06/03	71	60 - 140	73	60 - 140	<1.0	ug/L	NC	30		
7381484	Ethylbenzene	2021/06/03	89	70 - 130	89	70 - 130	<0.20	ug/L	NC	30		
7381484	Ethylene Dibromide	2021/06/03	96	70 - 130	96	70 - 130	<0.19	ug/L	NC	30		

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
7381484	Hexane	2021/06/03	94	70 - 130	95	70 - 130	<1.0	ug/L	NC	30		
7381484	Methyl Ethyl Ketone (2-Butanone)	2021/06/03	113	60 - 140	114	60 - 140	<10	ug/L	NC	30		
7381484	Methyl Isobutyl Ketone	2021/06/03	113	70 - 130	114	70 - 130	<5.0	ug/L	NC	30		
7381484	Methyl t-butyl ether (MTBE)	2021/06/03	90	70 - 130	90	70 - 130	<0.50	ug/L	NC	30		
7381484	Methylene Chloride(Dichloromethane)	2021/06/03	97	70 - 130	93	70 - 130	<2.0	ug/L	NC	30		
7381484	o-Xylene	2021/06/03	87	70 - 130	91	70 - 130	<0.20	ug/L	NC	30		
7381484	p+m-Xylene	2021/06/03	91	70 - 130	92	70 - 130	<0.20	ug/L	NC	30		
7381484	Styrene	2021/06/03	100	70 - 130	101	70 - 130	<0.40	ug/L	NC	30		
7381484	Tetrachloroethylene	2021/06/03	86	70 - 130	88	70 - 130	<0.20	ug/L	NC	30		
7381484	Toluene	2021/06/03	90	70 - 130	89	70 - 130	<0.20	ug/L	NC	30		
7381484	Total Xylenes	2021/06/03					<0.20	ug/L	NC	30		
7381484	trans-1,2-Dichloroethylene	2021/06/03	95	70 - 130	95	70 - 130	<0.50	ug/L	NC	30		
7381484	trans-1,3-Dichloropropene	2021/06/03	101	70 - 130	99	70 - 130	<0.40	ug/L	NC	30		
7381484	Trichloroethylene	2021/06/03	98	70 - 130	97	70 - 130	<0.20	ug/L	2.5	30		
7381484	Trichlorofluoromethane (FREON 11)	2021/06/03	86	70 - 130	87	70 - 130	<0.50	ug/L	NC	30		
7381484	Vinyl Chloride	2021/06/03	82	70 - 130	82	70 - 130	<0.20	ug/L	NC	30		
7382236	Free Chlorine	2021/06/01	67 (1)	85 - 115	103	85 - 115	<0.1	mg/L	NC	25		
7382241	Total Chlorine	2021/06/01	102	85 - 115	104	85 - 115	<0.1	mg/L	NC	25		
7383045	Turbidity	2021/06/01			97	85 - 115	<0.1	NTU	2.0	20		
7383110	Fluoride (F-)	2021/06/02	98	80 - 120	93	80 - 120	<0.10	mg/L	1.9	20		
7383151	Alkalinity (Total as CaCO3)	2021/06/02			95	85 - 115	<1.0	mg/L	0.21	20		
7383156	pH	2021/06/02			102	98 - 103			0.37	N/A		
7383228	Nitrate (N)	2021/06/03	NC	80 - 120	100	80 - 120	<0.10	mg/L	0.030	20		
7383228	Nitrite (N)	2021/06/03	105	80 - 120	107	80 - 120	<0.010	mg/L	NC	20		
7383362	Dissolved Chloride (Cl-)	2021/06/03	104	80 - 120	102	80 - 120	<1.0	mg/L	NC	20		
7383371	Dissolved Sulphate (SO4)	2021/06/03	116	75 - 125	106	80 - 120	<1.0	mg/L	NC	20		
7383377	Orthophosphate (P)	2021/06/02	87	75 - 125	101	80 - 120	<0.010	mg/L	NC	25		
7383936	Tannins & Lignins	2021/06/02	96	80 - 120	99	80 - 120	<0.2	mg/L	NC	20		
7384783	Total Suspended Solids	2021/06/04					<1	mg/L	NC	25	96	85 - 115
7385046	Phenols-4AAP	2021/06/03	102	80 - 120	103	80 - 120	<0.0010	mg/L	NC	20		
7385549	Total Kjeldahl Nitrogen (TKN)	2021/06/03	100	80 - 120	100	80 - 120	<0.10	mg/L	0.48	20	99	80 - 120
7385604	Total Ammonia-N	2021/06/04	96	75 - 125	99	80 - 120	<0.050	mg/L	NC	20		

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
7386482	Colour	2021/06/03			98	80 - 120	<2	TCU	8.2	25		
7387332	Dissolved Aluminum (Al)	2021/06/03	102	80 - 120	100	80 - 120	<4.9	ug/L				
7387332	Dissolved Antimony (Sb)	2021/06/03	102	80 - 120	100	80 - 120	<0.50	ug/L				
7387332	Dissolved Arsenic (As)	2021/06/03	101	80 - 120	99	80 - 120	<1.0	ug/L	NC	20		
7387332	Dissolved Barium (Ba)	2021/06/03	99	80 - 120	96	80 - 120	<2.0	ug/L	13	20		
7387332	Dissolved Beryllium (Be)	2021/06/03	101	80 - 120	98	80 - 120	<0.40	ug/L				
7387332	Dissolved Bismuth (Bi)	2021/06/03	98	80 - 120	96	80 - 120	<1.0	ug/L				
7387332	Dissolved Boron (B)	2021/06/03	99	80 - 120	96	80 - 120	<10	ug/L	NC	20		
7387332	Dissolved Cadmium (Cd)	2021/06/03	100	80 - 120	97	80 - 120	<0.090	ug/L	NC	20		
7387332	Dissolved Calcium (Ca)	2021/06/03	NC	80 - 120	102	80 - 120	<200	ug/L	2.1	20		
7387332	Dissolved Chromium (Cr)	2021/06/03	101	80 - 120	97	80 - 120	<5.0	ug/L	NC	20		
7387332	Dissolved Cobalt (Co)	2021/06/03	98	80 - 120	97	80 - 120	<0.50	ug/L				
7387332	Dissolved Copper (Cu)	2021/06/03	99	80 - 120	97	80 - 120	<0.90	ug/L	5.3	20		
7387332	Dissolved Iron (Fe)	2021/06/03	99	80 - 120	96	80 - 120	<100	ug/L	NC	20		
7387332	Dissolved Lead (Pb)	2021/06/03	96	80 - 120	95	80 - 120	<0.50	ug/L	NC	20		
7387332	Dissolved Magnesium (Mg)	2021/06/03	101	80 - 120	97	80 - 120	<50	ug/L	1.0	20		
7387332	Dissolved Manganese (Mn)	2021/06/03	100	80 - 120	96	80 - 120	<2.0	ug/L	NC	20		
7387332	Dissolved Molybdenum (Mo)	2021/06/03	103	80 - 120	99	80 - 120	<0.50	ug/L				
7387332	Dissolved Nickel (Ni)	2021/06/03	97	80 - 120	97	80 - 120	<1.0	ug/L				
7387332	Dissolved Potassium (K)	2021/06/03	102	80 - 120	98	80 - 120	<200	ug/L	5.7	20		
7387332	Dissolved Selenium (Se)	2021/06/03	104	80 - 120	102	80 - 120	<2.0	ug/L				
7387332	Dissolved Silver (Ag)	2021/06/03	99	80 - 120	98	80 - 120	<0.090	ug/L				
7387332	Dissolved Sodium (Na)	2021/06/03	102	80 - 120	98	80 - 120	<100	ug/L	0.10	20		
7387332	Dissolved Strontium (Sr)	2021/06/03	99	80 - 120	97	80 - 120	<1.0	ug/L				
7387332	Dissolved Thallium (Tl)	2021/06/03	96	80 - 120	93	80 - 120	<0.050	ug/L				
7387332	Dissolved Uranium (U)	2021/06/03	104	80 - 120	102	80 - 120	<0.10	ug/L				
7387332	Dissolved Vanadium (V)	2021/06/03	103	80 - 120	98	80 - 120	<0.50	ug/L				
7387332	Dissolved Zinc (Zn)	2021/06/03	99	80 - 120	97	80 - 120	<5.0	ug/L	NC	20		
7387686	Dissolved Organic Carbon	2021/06/03	93	80 - 120	96	80 - 120	<0.40	mg/L	1.2	20		
7388222	Conductivity	2021/06/04			101	85 - 115	<0.001	mS/cm	0	25		
7389302	Dissolved Mercury (Hg)	2021/06/04	87	75 - 125	96	80 - 120	<0.10	ug/L	NC	20		
7392455	2,4,5-T	2021/06/08			87	10 - 130	<0.50	ug/L	1.5	40		

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
7392455	2,4,5-TP (Silvex)	2021/06/08			84	10 - 130	<0.50	ug/L	1.6	40		
7392455	2,4-D (BEE)	2021/06/08			98	10 - 130	<0.50	ug/L	2.7	40		
7392455	2,4-D	2021/06/08			78	10 - 130	<0.50	ug/L	1.3	40		
7392455	2,4-DB	2021/06/08			85	10 - 130	<0.50	ug/L	0.39	40		
7392455	2,4-DP (Dichlorprop)	2021/06/08			82	10 - 130	<0.50	ug/L	0.061	40		
7392455	Dicamba	2021/06/08			81	10 - 130	<0.50	ug/L	2.1	40		
7392455	MCPA	2021/06/08			87	10 - 130	<0.50	ug/L	0.47	40		
7392455	MCPP	2021/06/08			94	10 - 130	<0.50	ug/L	1.1	40		
7392455	Picloram	2021/06/08			68	10 - 130	<0.50	ug/L	3.0	40		

N/A = Not Applicable

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

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

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

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

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

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

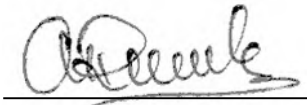
NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

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

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

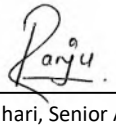
VALIDATION SIGNATURE PAGE

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

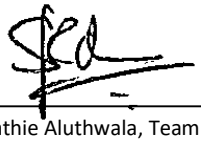


Anastassia Hamanov, Scientific Specialist

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



Ranju Chaudhari, Senior Analyst



Sirimathie Aluthwala, Team Lead

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

Bureau Veritas Laboratories 100 – 36 Antares Dr. Nepean, ON, K2E 7W5 Phone: 613-274-0573 Website: www.bvlabs.com

31-May-21 15:30
Katherine Szozda
C1E7322

KTN ENV-692

Page 1 of 1

CHAIN OF CUSTODY RECORD

Eurofins Environment Testing
2395 Speakman Drive, Mississauga, Ontario Canada L5K 1B3 Tel: (905) 817-5700 Toll-free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Company Name: #3824 DST Consulting Engineers Inc	**REPORT TO:** Company Name: DST Group	**PROJECT INFORMATION:** Quotation #: B82715	**Laboratory Use Only:** BV Labs Job #:
Attention: Accounts Payable	Attention: Sonny Sundaram	P.O. #:	Bottle Order #: 829546
Address: 2150 Thurston Dr Unit 203	Address:	Project: 02101208.000	COC #: C#829546-01-01
Ottawa ON K1G 5T9		Project Name:	Project Manager: Katherine Szozda
Tel: (613) 748-1415 **Fax:** (613) 748-1356	Tel: Fax:	Site #:	
Email: ap@dstgroup.com	Email: ssundaram@dstgroup.com	Sampled By: CF	

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BV LABS DRINKING WATER CHAIN OF CUSTODY

Regulation 153 (2011): [X] Table 1 [ ] Res/Park [ ] Medium/Fine; [ ] Table 2 [ ] Ind/Comm [ ] Coarse; [ ] Table 3 [ ] Agri/Other [ ] For RSC; [ ] Table ____

Other Regulations: [ ] CCME [ ] Sanitary Sewer Bylaw; [ ] Reg 558 [ ] Storm Sewer Bylaw; [ ] MISA Municipality ____; [ ] PWQO [ ] Reg 406 Table ____; [ ] Other ____

Special Instructions:

Include Criteria on Certificate of Analysis (Y/N)? ____

Turnaround Time (TAT) Required: Please provide advance notice for rush projects

Regular (Standard) TAT: [X] *(will be applied if Rush TAT is not specified)*
Standard TAT = 5-7 Working days for most tests.
Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

Job Specific Rush TAT (if applies to entire submission)
Date Required: ____ Time Required: ____ [ ]
Rush Confirmation Number: ____ *(call lab for #)*

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered (please circle): Metals / Hg / Cr VI	Microbiological Parameters	General Inorganics	Anions	Metals	O.Reg 153 VOCs by HS (Water)	Phenoxy Acid Herbicides	# of Bottles	Comments
1		PW21-01, 4 hrs	2021/05/31	1330	GW	X	X	X	X	X	X	X		See Sonny email
2														
3														
4														
5														
6														
7														
8														
9														ON Jug
10														

RECEIVED IN OTTAWA

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted
Cam Fischl / Cam Fischl	21/05/31	1345	Ian Jung	2021/05/31	15:30	
			Vi TRINH	2021/06/01	08:40	

Laboratory Use Only

Time Sensitive	Temperature (°C) on Recei	Custody Seal	Yes	No
	10, 11, 12	Present	X	
		Intact	X	

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

White: BV Labs Yellow: Client

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

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

** SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT WWW.BVLABS.COM/RESOURCES/CHAIN-OF-CUSTODY-FORMS.

0/5/11

Your Project #: 2101208.000
Your C.O.C. #: 157147

Attention: Sonny Sundaram

DST Consulting Engineers Inc
Ottawa - Standing Offer
2150 Thurston Dr
Unit 203
Ottawa, ON
CANADA K1G 5T9

Report Date: 2021/06/10
Report #: R6669729
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1E8916
Received: 2021/06/01, 08:35

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity (1)	1	N/A	2021/06/04	CAM SOP-00448	SM 23 2320 B m
1,3-Dichloropropene Sum (1)	1	N/A	2021/06/06		EPA 8260C m
Free Residual Chlorine (1)	1	2021/06/02	2021/06/02	CAM SOP 00425	SM 23 4500-CL G m
Total Chlorine (1)	1	2021/06/02	2021/06/02	CAM SOP 00425	SM 23 4500-CL G m
Chloride by Automated Colourimetry (1)	1	N/A	2021/06/04	CAM SOP-00463	SM 23 4500-Cl E m
Colour (1)	1	N/A	2021/06/07	CAM SOP-00412	SM 23 2120C m
Conductivity (1)	1	N/A	2021/06/04	CAM SOP-00414	SM 23 2510 m
Dissolved Organic Carbon (DOC) (1, 2)	1	N/A	2021/06/07	CAM SOP-00446	SM 23 5310 B m
Fluoride (1)	1	2021/06/03	2021/06/04	CAM SOP-00449	SM 23 4500-F C m
Hardness (calculated as CaCO3) (1)	1	N/A	2021/06/08	CAM SOP 00102/00408/00447	SM 2340 B
Dissolved Mercury in Water by CVAA (1)	1	2021/06/04	2021/06/04	CAM SOP-00453	EPA 7470A m
Dissolved Metals by ICPMS (1)	1	N/A	2021/06/07	CAM SOP-00447	EPA 6020B m
Ion Balance (% Difference) (1)	1	N/A	2021/06/08		
Total Coliforms/ E. coli, CFU/100mL (1)	1	N/A	2021/06/02	CAM SOP-00551	MOE E3407
Fecal coliform, (CFU/100mL) (1)	1	N/A	2021/06/02	CAM SOP-00552	SM 9222D
Fecal streptococcus,(CFU/100mL) (1)	1	N/A	2021/06/02	CAM SOP-00511	MOELSB E3371;SM9230C
Heterotrophic plate count, (CFU/mL) (1)	1	N/A	2021/06/02	CAM SOP-00512	SM 9215B
Total Ammonia-N (1)	1	N/A	2021/06/04	CAM SOP-00441	USGS I-2522-90 m
Nitrate (NO3) and Nitrite (NO2) in Water (1, 3)	1	N/A	2021/06/04	CAM SOP-00440	SM 23 4500-NO3I/NO2B
Phenoxy Acid Herbicides (1)	1	2021/06/07	2021/06/08	CAM SOP-00330	EPA 8270 m
pH (1)	1	2021/06/03	2021/06/04	CAM SOP-00413	SM 4500H+ B m
Phenols (4AAP) (1)	1	N/A	2021/06/04	CAM SOP-00444	OMOE E3179 m
Orthophosphate (1)	1	N/A	2021/06/04	CAM SOP-00461	EPA 365.1 m
Sulphate by Automated Colourimetry (1)	1	N/A	2021/06/04	CAM SOP-00464	EPA 375.4 m
Sulphide (1)	1	N/A	2021/06/03	CAM SOP-00455	SM 23 4500-S G m
Tannins & Lignins (1)	1	N/A	2021/06/04	CAM SOP-00410	SM 23 5550 B m
Total Kjeldahl Nitrogen in Water (1)	1	2021/06/03	2021/06/03	CAM SOP-00938	OMOE E3516 m
Low Level Total Suspended Solids (1)	1	2021/06/04	2021/06/07	CAM SOP-00428	SM 23 2540D m
Turbidity (1)	1	N/A	2021/06/03	CAM SOP-00417	SM 23 2130 B m

Your Project #: 2101208.000
Your C.O.C. #: 157147

Attention: Sonny Sundaram

DST Consulting Engineers Inc
Ottawa - Standing Offer
2150 Thurston Dr
Unit 203
Ottawa, ON
CANADA K1G 5T9

Report Date: 2021/06/10
Report #: R6669729
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1E8916
Received: 2021/06/01, 08:35

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Volatile Organic Compounds in Water (1)	1	N/A	2021/06/05	CAM SOP-00228	EPA 8260C m

Remarks:

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

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

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

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

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

Your Project #: 2101208.000
Your C.O.C. #: 157147

Attention: Sonny Sundaram

DST Consulting Engineers Inc
Ottawa - Standing Offer
2150 Thurston Dr
Unit 203
Ottawa, ON
CANADA K1G 5T9

Report Date: 2021/06/10
Report #: R6669729
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1E8916
Received: 2021/06/01, 08:35

Encryption Key

Bureau Veritas
10 Jun 2021 09:59:10

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Katherine Szozda, Project Manager
Email: Katherine.Szozda@bureauveritas.com
Phone# (613)274-0573 Ext:7063633
==========
This report has been generated and distributed using a secure automated process.
BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

RESULTS OF ANALYSES OF WATER

BV Labs ID		PSJ330			PSJ330		
Sampling Date		2021/05/31 17:30			2021/05/31 17:30		
COC Number		157147			157147		
	UNITS	PW21-01, 8 HRS	RDL	QC Batch	PW21-01, 8 HRS Lab-Dup	RDL	QC Batch
Calculated Parameters							
Hardness (CaCO3)	mg/L	390	1.0	7384244			
Ion Balance (% Difference)	%	3.01	N/A	7384245			
Inorganics							
Total Ammonia-N	mg/L	0.36	0.050	7387699	0.36	0.050	7387699
Free Chlorine	mg/L	<0.1	0.1	7384891	<0.1	0.1	7384891
Total Chlorine	mg/L	<0.1	0.1	7384892	<0.1	0.1	7384892
Colour	TCU	<2	2	7391883	<2	2	7391883
Conductivity	mS/cm	2.09	0.001	7388222	2.09	0.001	7388222
Fluoride (F-)	mg/L	0.78	0.10	7388203	0.76	0.10	7388203
Total Kjeldahl Nitrogen (TKN)	mg/L	0.55	0.10	7387234			
Dissolved Organic Carbon	mg/L	0.88	0.40	7391432			
Orthophosphate (P)	mg/L	<0.010	0.010	7387407			
pH	pH	7.86		7388220	7.90		7388220
Phenols-4AAP	mg/L	<0.0010	0.0010	7389030	<0.0010	0.0010	7389030
Total Suspended Solids	mg/L	2	1	7388682			
Dissolved Sulphate (SO4)	mg/L	100	1.0	7387415			
Sulphide	mg/L	<0.020	0.020	7387461			
Tannins & Lignins	mg/L	<0.2	0.2	7388950			
Turbidity	NTU	0.7	0.1	7387079			
Alkalinity (Total as CaCO3)	mg/L	250	1.0	7389207	250	1.0	7389207
Dissolved Chloride (Cl-)	mg/L	480	7.0	7387411			
Nitrite (N)	mg/L	<0.010	0.010	7387354			
Nitrate (N)	mg/L	<0.10	0.10	7387354			
Nitrate + Nitrite (N)	mg/L	<0.10	0.10	7387354			

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

Bureau Veritas Laboratories 100 – 36 Antares Dr. Nepean, ON, K2E 7W5 Phone: 613-274-0573 Website: www.bvlabs.com

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

BV Labs ID		PSJ330		
Sampling Date		2021/05/31 17:30		
COC Number		157147		
	UNITS	PW21-01, 8 HRS	RDL	QC Batch
Metals				
Dissolved Mercury (Hg)	ug/L	<0.10	0.10	7389302
Dissolved Aluminum (Al)	ug/L	5.2	4.9	7388319
Dissolved Antimony (Sb)	ug/L	<0.50	0.50	7388319
Dissolved Arsenic (As)	ug/L	<1.0	1.0	7388319
Dissolved Barium (Ba)	ug/L	36	2.0	7388319
Dissolved Beryllium (Be)	ug/L	<0.40	0.40	7388319
Dissolved Bismuth (Bi)	ug/L	<1.0	1.0	7388319
Dissolved Boron (B)	ug/L	580	10	7388319
Dissolved Cadmium (Cd)	ug/L	<0.090	0.090	7388319
Dissolved Calcium (Ca)	ug/L	75000	200	7388319
Dissolved Chromium (Cr)	ug/L	<5.0	5.0	7388319
Dissolved Cobalt (Co)	ug/L	<0.50	0.50	7388319
Dissolved Copper (Cu)	ug/L	<0.90	0.90	7388319
Dissolved Iron (Fe)	ug/L	110	100	7388319
Dissolved Lead (Pb)	ug/L	<0.50	0.50	7388319
Dissolved Magnesium (Mg)	ug/L	49000	50	7388319
Dissolved Manganese (Mn)	ug/L	14	2.0	7388319
Dissolved Molybdenum (Mo)	ug/L	1.2	0.50	7388319
Dissolved Nickel (Ni)	ug/L	<1.0	1.0	7388319
Dissolved Potassium (K)	ug/L	15000	200	7388319
Dissolved Selenium (Se)	ug/L	<2.0	2.0	7388319
Dissolved Silver (Ag)	ug/L	<0.090	0.090	7388319
Dissolved Sodium (Na)	ug/L	320000	100	7388319
Dissolved Strontium (Sr)	ug/L	3800	1.0	7388319
Dissolved Thallium (Tl)	ug/L	<0.050	0.050	7388319
Dissolved Uranium (U)	ug/L	0.23	0.10	7388319
Dissolved Vanadium (V)	ug/L	<0.50	0.50	7388319
Dissolved Zinc (Zn)	ug/L	<5.0	5.0	7388319

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

PHENOXY ACID HERBICIDES BY GC-MS (WATER)

BV Labs ID		PSJ330		
Sampling Date		2021/05/31 17:30		
COC Number		157147		
	UNITS	PW21-01, 8 HRS	RDL	QC Batch
Pesticides & Herbicides				
2,4,5-T	ug/L	<0.50	0.50	7392455
2,4,5-TP (Silvex)	ug/L	<0.50	0.50	7392455
2,4-D	ug/L	<0.50	0.50	7392455
2,4-D (BEE)	ug/L	<0.50	0.50	7392455
2,4-DB	ug/L	<0.50	0.50	7392455
2,4-DP (Dichlorprop)	ug/L	<0.50	0.50	7392455
Dicamba	ug/L	<0.50	0.50	7392455
MCPA	ug/L	<0.50	0.50	7392455
MCPP	ug/L	<0.50	0.50	7392455
Picloram	ug/L	<0.50	0.50	7392455
Surrogate Recovery (%)				
2,4-Dichlorophenyl Acetic Acid	%	88		7392455
2,5-Dibromobenzoic Acid	%	85		7392455
4,4-Dibromobiphenyl	%	86		7392455

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Bureau Veritas Laboratories 100 – 36 Antares Dr. Nepean, ON, K2E 7W5 Phone: 613-274-0573 Website: www.bvlabs.com

MICROBIOLOGY (WATER)

BV Labs ID		PSJ330	
Sampling Date		2021/05/31 17:30	
COC Number		157147	
	UNITS	PW21-01, 8 HRS	QC Batch
Microbiological			
Fecal coliform	CFU/100mL	0	7385192
Fecal streptococcus	CFU/100mL	0	7385193
Heterotrophic plate count	CFU/mL	1	7385191
Background	CFU/100mL	0	7385190
Total Coliforms	CFU/100mL	0	7385190
Escherichia coli	CFU/100mL	0	7385190
QC Batch = Quality Control Batch			

Bureau Veritas Laboratories 100 – 36 Antares Dr. Nepean, ON, K2E 7W5 Phone: 613-274-0573 Website: www.bvlabs.com

O.REG 153 VOCS BY HS (WATER)

BV Labs ID		PSJ330		
Sampling Date		2021/05/31 17:30		
COC Number		157147		
	UNITS	PW21-01, 8 HRS	RDL	QC Batch
Calculated Parameters				
1,3-Dichloropropene (cis+trans)	ug/L	<0.50	0.50	7384080
Volatile Organics				
Acetone (2-Propanone)	ug/L	<10	10	7386766
Benzene	ug/L	<0.20	0.20	7386766
Bromodichloromethane	ug/L	<0.50	0.50	7386766
Bromoform	ug/L	<1.0	1.0	7386766
Bromomethane	ug/L	<0.50	0.50	7386766
Carbon Tetrachloride	ug/L	<0.19	0.19	7386766
Chlorobenzene	ug/L	<0.20	0.20	7386766
Chloroform	ug/L	<0.20	0.20	7386766
Dibromochloromethane	ug/L	<0.50	0.50	7386766
1,2-Dichlorobenzene	ug/L	<0.40	0.40	7386766
1,3-Dichlorobenzene	ug/L	<0.40	0.40	7386766
1,4-Dichlorobenzene	ug/L	<0.40	0.40	7386766
Dichlorodifluoromethane (FREON 12)	ug/L	<1.0	1.0	7386766
1,1-Dichloroethane	ug/L	<0.20	0.20	7386766
1,2-Dichloroethane	ug/L	<0.49	0.49	7386766
1,1-Dichloroethylene	ug/L	<0.20	0.20	7386766
cis-1,2-Dichloroethylene	ug/L	<0.50	0.50	7386766
trans-1,2-Dichloroethylene	ug/L	<0.50	0.50	7386766
1,2-Dichloropropane	ug/L	<0.20	0.20	7386766
cis-1,3-Dichloropropene	ug/L	<0.30	0.30	7386766
trans-1,3-Dichloropropene	ug/L	<0.40	0.40	7386766
Ethylbenzene	ug/L	<0.20	0.20	7386766
Ethylene Dibromide	ug/L	<0.19	0.19	7386766
Hexane	ug/L	<1.0	1.0	7386766
Methylene Chloride(Dichloromethane)	ug/L	<2.0	2.0	7386766
Methyl Ethyl Ketone (2-Butanone)	ug/L	<10	10	7386766
Methyl Isobutyl Ketone	ug/L	<5.0	5.0	7386766
Methyl t-butyl ether (MTBE)	ug/L	<0.50	0.50	7386766
Styrene	ug/L	<0.40	0.40	7386766
1,1,1,2-Tetrachloroethane	ug/L	<0.50	0.50	7386766
1,1,2,2-Tetrachloroethane	ug/L	<0.40	0.40	7386766
Tetrachloroethylene	ug/L	<0.20	0.20	7386766

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Bureau Veritas Laboratories 100 – 36 Antares Dr. Nepean, ON, K2E 7W5 Phone: 613-274-0573 Website: www.bvlabs.com

O.REG 153 VOCS BY HS (WATER)

BV Labs ID		PSJ330		
Sampling Date		2021/05/31 17:30		
COC Number		157147		
	UNITS	PW21-01, 8 HRS	RDL	QC Batch
Toluene	ug/L	<0.20	0.20	7386766
1,1,1-Trichloroethane	ug/L	<0.20	0.20	7386766
1,1,2-Trichloroethane	ug/L	<0.40	0.40	7386766
Trichloroethylene	ug/L	<0.20	0.20	7386766
Trichlorofluoromethane (FREON 11)	ug/L	<0.50	0.50	7386766
Vinyl Chloride	ug/L	<0.20	0.20	7386766
p+m-Xylene	ug/L	<0.20	0.20	7386766
o-Xylene	ug/L	<0.20	0.20	7386766
Total Xylenes	ug/L	<0.20	0.20	7386766
Surrogate Recovery (%)				
4-Bromofluorobenzene	%	88		7386766
D4-1,2-Dichloroethane	%	102		7386766
D8-Toluene	%	91		7386766

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Bureau Veritas Laboratories 100 – 36 Antares Dr. Nepean, ON, K2E 7W5 Phone: 613-274-0573 Website: www.bvlabs.com

TEST SUMMARY

BV Labs ID: PSJ330
Sample ID: PW21-01, 8 HRS
Matrix: Water

Collected: 2021/05/31
Shipped:
Received: 2021/06/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	7389207	N/A	2021/06/04	Surinder Rai
1,3-Dichloropropene Sum	CALC	7384080	N/A	2021/06/06	Automated Statchk
Free Residual Chlorine	SPEC	7384891	2021/06/02	2021/06/02	Khushbu Vijay kumar Patel
Total Chlorine	SPEC	7384892	2021/06/02	2021/06/02	Khushbu Vijay kumar Patel
Chloride by Automated Colourimetry	KONE	7387411	N/A	2021/06/04	Alina Dobreanu
Colour	SPEC	7391883	N/A	2021/06/07	Viorica Rotaru
Conductivity	AT	7388222	N/A	2021/06/04	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	7391432	N/A	2021/06/07	Nimarta Singh
Fluoride	ISE	7388203	2021/06/03	2021/06/04	Surinder Rai
Hardness (calculated as CaCO3)		7384244	N/A	2021/06/08	Automated Statchk
Dissolved Mercury in Water by CVAA	CV/AA	7389302	2021/06/04	2021/06/04	Gagandeep Rai
Dissolved Metals by ICPMS	ICP/MS	7388319	N/A	2021/06/07	Nan Raykha
Ion Balance (% Difference)	CALC	7384245	N/A	2021/06/08	Automated Statchk
Total Coliforms/ E. coli, CFU/100mL	PL	7385190	N/A	2021/06/02	Ranju Chaudhari
Fecal coliform, (CFU/100mL)	PL	7385192	N/A	2021/06/02	Ranju Chaudhari
Fecal streptococcus,(CFU/100mL)	PL	7385193	N/A	2021/06/02	Tasbir Singh
Heterotrophic plate count, (CFU/mL)	PL	7385191	N/A	2021/06/02	Tasbir Singh
Total Ammonia-N	LACH/NH4	7387699	N/A	2021/06/04	Amanpreet Sappal
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	7387354	N/A	2021/06/04	Chandra Nandlal
Phenoxy Acid Herbicides	GC/MS	7392455	2021/06/07	2021/06/08	May Yin Mak
pH	AT	7388220	2021/06/03	2021/06/04	Surinder Rai
Phenols (4AAP)	TECH/PHEN	7389030	N/A	2021/06/04	Deonarine Ramnarine
Orthophosphate	KONE	7387407	N/A	2021/06/04	Avneet Kour Sudan
Sulphate by Automated Colourimetry	KONE	7387415	N/A	2021/06/04	Alina Dobreanu
Sulphide	ISE/S	7387461	N/A	2021/06/03	Neil Dassanayake
Tannins & Lignins	SPEC	7388950	N/A	2021/06/04	Viorica Rotaru
Total Kjeldahl Nitrogen in Water	SKAL	7387234	2021/06/03	2021/06/03	Massarat Jan
Low Level Total Suspended Solids	BAL	7388682	2021/06/04	2021/06/07	Shaneil Hall
Turbidity	AT	7387079	N/A	2021/06/03	Khushbu Vijay kumar Patel
Volatile Organic Compounds in Water	GC/MS	7386766	N/A	2021/06/05	Rebecca McClean

BV Labs ID: PSJ330 Dup
Sample ID: PW21-01, 8 HRS
Matrix: Water

Collected: 2021/05/31
Shipped:
Received: 2021/06/01

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	7389207	N/A	2021/06/04	Surinder Rai
Free Residual Chlorine	SPEC	7384891	2021/06/02	2021/06/02	Khushbu Vijay kumar Patel
Total Chlorine	SPEC	7384892	2021/06/02	2021/06/02	Khushbu Vijay kumar Patel
Colour	SPEC	7391883	N/A	2021/06/07	Viorica Rotaru
Conductivity	AT	7388222	N/A	2021/06/04	Surinder Rai
Fluoride	ISE	7388203	2021/06/03	2021/06/04	Surinder Rai
Total Ammonia-N	LACH/NH4	7387699	N/A	2021/06/04	Amanpreet Sappal
pH	AT	7388220	2021/06/03	2021/06/04	Surinder Rai
Phenols (4AAP)	TECH/PHEN	7389030	N/A	2021/06/04	Deonarine Ramnarine

GENERAL COMMENTS

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

Package 1	1.7°C

Results relate only to the items tested.

Bureau Veritas Laboratories 100 – 36 Antares Dr. Nepean, ON, K2E 7W5 Phone: 613-274-0573 Website: www.bvlabs.com

QUALITY ASSURANCE REPORT

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
7386766	4-Bromofluorobenzene	2021/06/05	101	70 - 130	101	70 - 130	95	%				
7386766	D4-1,2-Dichloroethane	2021/06/05	95	70 - 130	89	70 - 130	98	%				
7386766	D8-Toluene	2021/06/05	106	70 - 130	107	70 - 130	92	%				
7392455	2,4-Dichlorophenyl Acetic Acid	2021/06/08			86	10 - 130	93	%				
7392455	2,5-Dibromobenzoic Acid	2021/06/08			85	10 - 130	89	%				
7392455	4,4-Dibromobiphenyl	2021/06/08			84	10 - 130	88	%				
7384891	Free Chlorine	2021/06/02	31 (1)	85 - 115	97	85 - 115	<0.1	mg/L	NC	25		
7384892	Total Chlorine	2021/06/02	99	85 - 115	104	85 - 115	<0.1	mg/L	NC	25		
7386766	1,1,1,2-Tetrachloroethane	2021/06/05	100	70 - 130	101	70 - 130	<0.50	ug/L	NC	30		
7386766	1,1,1-Trichloroethane	2021/06/05	95	70 - 130	96	70 - 130	<0.20	ug/L	0.53	30		
7386766	1,1,2,2-Tetrachloroethane	2021/06/05	100	70 - 130	95	70 - 130	<0.40	ug/L	NC	30		
7386766	1,1,2-Trichloroethane	2021/06/05	93	70 - 130	90	70 - 130	<0.40	ug/L	NC	30		
7386766	1,1-Dichloroethane	2021/06/05	93	70 - 130	93	70 - 130	<0.20	ug/L	3.2	30		
7386766	1,1-Dichloroethylene	2021/06/05	91	70 - 130	93	70 - 130	<0.20	ug/L	0.64	30		
7386766	1,2-Dichlorobenzene	2021/06/05	97	70 - 130	99	70 - 130	<0.40	ug/L	NC	30		
7386766	1,2-Dichloroethane	2021/06/05	89	70 - 130	85	70 - 130	<0.49	ug/L	NC	30		
7386766	1,2-Dichloropropane	2021/06/05	98	70 - 130	97	70 - 130	<0.20	ug/L	NC	30		
7386766	1,3-Dichlorobenzene	2021/06/05	93	70 - 130	98	70 - 130	<0.40	ug/L	NC	30		
7386766	1,4-Dichlorobenzene	2021/06/05	107	70 - 130	113	70 - 130	<0.40	ug/L	NC	30		
7386766	Acetone (2-Propanone)	2021/06/05	105	60 - 140	89	60 - 140	<10	ug/L	NC	30		
7386766	Benzene	2021/06/05	95	70 - 130	94	70 - 130	<0.20	ug/L	NC	30		
7386766	Bromodichloromethane	2021/06/05	99	70 - 130	96	70 - 130	<0.50	ug/L	NC	30		
7386766	Bromoform	2021/06/05	106	70 - 130	101	70 - 130	<1.0	ug/L	NC	30		
7386766	Bromomethane	2021/06/05	95	60 - 140	92	60 - 140	<0.50	ug/L	NC	30		
7386766	Carbon Tetrachloride	2021/06/05	93	70 - 130	94	70 - 130	<0.19	ug/L	NC	30		
7386766	Chlorobenzene	2021/06/05	98	70 - 130	100	70 - 130	<0.20	ug/L	2.4	30		
7386766	Chloroform	2021/06/05	95	70 - 130	94	70 - 130	<0.20	ug/L	NC	30		
7386766	cis-1,2-Dichloroethylene	2021/06/05	100	70 - 130	99	70 - 130	<0.50	ug/L	NC	30		
7386766	cis-1,3-Dichloropropene	2021/06/05	87	70 - 130	83	70 - 130	<0.30	ug/L	NC	30		
7386766	Dibromochloromethane	2021/06/05	100	70 - 130	98	70 - 130	<0.50	ug/L	NC	30		
7386766	Dichlorodifluoromethane (FREON 12)	2021/06/05	92	60 - 140	94	60 - 140	<1.0	ug/L	NC	30		
7386766	Ethylbenzene	2021/06/05	87	70 - 130	92	70 - 130	<0.20	ug/L	NC	30		

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
7386766	Ethylene Dibromide	2021/06/05	100	70 - 130	96	70 - 130	<0.19	ug/L	NC	30		
7386766	Hexane	2021/06/05	102	70 - 130	105	70 - 130	<1.0	ug/L	NC	30		
7386766	Methyl Ethyl Ketone (2-Butanone)	2021/06/05	113	60 - 140	98	60 - 140	<10	ug/L	NC	30		
7386766	Methyl Isobutyl Ketone	2021/06/05	104	70 - 130	96	70 - 130	<5.0	ug/L	NC	30		
7386766	Methyl t-butyl ether (MTBE)	2021/06/05	90	70 - 130	90	70 - 130	<0.50	ug/L	NC	30		
7386766	Methylene Chloride(Dichloromethane)	2021/06/05	115	70 - 130	110	70 - 130	<2.0	ug/L	NC	30		
7386766	o-Xylene	2021/06/05	89	70 - 130	98	70 - 130	<0.20	ug/L	NC	30		
7386766	p+m-Xylene	2021/06/05	94	70 - 130	101	70 - 130	<0.20	ug/L	NC	30		
7386766	Styrene	2021/06/05	107	70 - 130	113	70 - 130	<0.40	ug/L	NC	30		
7386766	Tetrachloroethylene	2021/06/05	90	70 - 130	94	70 - 130	<0.20	ug/L	NC	30		
7386766	Toluene	2021/06/05	97	70 - 130	99	70 - 130	<0.20	ug/L	NC	30		
7386766	Total Xylenes	2021/06/05					<0.20	ug/L	NC	30		
7386766	trans-1,2-Dichloroethylene	2021/06/05	96	70 - 130	97	70 - 130	<0.50	ug/L	NC	30		
7386766	trans-1,3-Dichloropropene	2021/06/05	93	70 - 130	88	70 - 130	<0.40	ug/L	NC	30		
7386766	Trichloroethylene	2021/06/05	100	70 - 130	102	70 - 130	<0.20	ug/L	NC	30		
7386766	Trichlorofluoromethane (FREON 11)	2021/06/05	90	70 - 130	92	70 - 130	<0.50	ug/L	NC	30		
7386766	Vinyl Chloride	2021/06/05	99	70 - 130	100	70 - 130	<0.20	ug/L	NC	30		
7387079	Turbidity	2021/06/03			96	85 - 115	<0.1	NTU	1.3	20		
7387234	Total Kjeldahl Nitrogen (TKN)	2021/06/03	NC	80 - 120	97	80 - 120	<0.10	mg/L	1.1	20	99	80 - 120
7387354	Nitrate (N)	2021/06/04	101	80 - 120	104	80 - 120	<0.10	mg/L	17	20		
7387354	Nitrite (N)	2021/06/04	104	80 - 120	106	80 - 120	<0.010	mg/L	7.6	20		
7387407	Orthophosphate (P)	2021/06/04	104	75 - 125	101	80 - 120	<0.010	mg/L	NC	25		
7387411	Dissolved Chloride (Cl-)	2021/06/04	NC	80 - 120	102	80 - 120	<1.0	mg/L	1.2	20		
7387415	Dissolved Sulphate (SO4)	2021/06/04	NC	75 - 125	107	80 - 120	<1.0	mg/L	0.36	20		
7387461	Sulphide	2021/06/03	98	80 - 120	95	80 - 120	<0.020	mg/L	NC	20		
7387699	Total Ammonia-N	2021/06/04	95	75 - 125	97	80 - 120	<0.050	mg/L	0.45	20		
7388203	Fluoride (F-)	2021/06/04	104	80 - 120	100	80 - 120	<0.10	mg/L	1.9	20		
7388220	pH	2021/06/04			102	98 - 103			0.48	N/A		
7388222	Conductivity	2021/06/04			101	85 - 115	<0.001	mS/cm	0	25		
7388319	Dissolved Aluminum (Al)	2021/06/07	104	80 - 120	115	80 - 120	<4.9	ug/L				
7388319	Dissolved Antimony (Sb)	2021/06/07	105	80 - 120	96	80 - 120	<0.50	ug/L	NC	20		
7388319	Dissolved Arsenic (As)	2021/06/07	106	80 - 120	100	80 - 120	<1.0	ug/L	NC	20		

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
7388319	Dissolved Barium (Ba)	2021/06/07	107	80 - 120	102	80 - 120	<2.0	ug/L	0.69	20		
7388319	Dissolved Beryllium (Be)	2021/06/07	111	80 - 120	104	80 - 120	<0.40	ug/L	NC	20		
7388319	Dissolved Bismuth (Bi)	2021/06/07	103	80 - 120	99	80 - 120	<1.0	ug/L				
7388319	Dissolved Boron (B)	2021/06/07	109	80 - 120	101	80 - 120	<10	ug/L	2.5	20		
7388319	Dissolved Cadmium (Cd)	2021/06/07	102	80 - 120	95	80 - 120	<0.090	ug/L	NC	20		
7388319	Dissolved Calcium (Ca)	2021/06/07	NC	80 - 120	99	80 - 120	<200	ug/L				
7388319	Dissolved Chromium (Cr)	2021/06/07	105	80 - 120	102	80 - 120	<5.0	ug/L	NC	20		
7388319	Dissolved Cobalt (Co)	2021/06/07	104	80 - 120	100	80 - 120	<0.50	ug/L	7.5	20		
7388319	Dissolved Copper (Cu)	2021/06/07	105	80 - 120	101	80 - 120	<0.90	ug/L	NC	20		
7388319	Dissolved Iron (Fe)	2021/06/07	104	80 - 120	99	80 - 120	<100	ug/L				
7388319	Dissolved Lead (Pb)	2021/06/07	103	80 - 120	98	80 - 120	<0.50	ug/L	NC	20		
7388319	Dissolved Magnesium (Mg)	2021/06/07	NC	80 - 120	99	80 - 120	<50	ug/L				
7388319	Dissolved Manganese (Mn)	2021/06/07	103	80 - 120	99	80 - 120	<2.0	ug/L				
7388319	Dissolved Molybdenum (Mo)	2021/06/07	108	80 - 120	99	80 - 120	<0.50	ug/L	9.1	20		
7388319	Dissolved Nickel (Ni)	2021/06/07	101	80 - 120	97	80 - 120	<1.0	ug/L	7.5	20		
7388319	Dissolved Potassium (K)	2021/06/07	109	80 - 120	104	80 - 120	<200	ug/L				
7388319	Dissolved Selenium (Se)	2021/06/07	106	80 - 120	99	80 - 120	<2.0	ug/L	NC	20		
7388319	Dissolved Silver (Ag)	2021/06/07	102	80 - 120	96	80 - 120	<0.090	ug/L	NC	20		
7388319	Dissolved Sodium (Na)	2021/06/07	103	80 - 120	98	80 - 120	<100	ug/L	1.7	20		
7388319	Dissolved Strontium (Sr)	2021/06/07	102	80 - 120	97	80 - 120	<1.0	ug/L				
7388319	Dissolved Thallium (Tl)	2021/06/07	103	80 - 120	99	80 - 120	<0.050	ug/L	NC	20		
7388319	Dissolved Uranium (U)	2021/06/07	101	80 - 120	95	80 - 120	<0.10	ug/L	2.1	20		
7388319	Dissolved Vanadium (V)	2021/06/07	106	80 - 120	99	80 - 120	<0.50	ug/L	NC	20		
7388319	Dissolved Zinc (Zn)	2021/06/07	102	80 - 120	97	80 - 120	<5.0	ug/L	NC	20		
7388682	Total Suspended Solids	2021/06/07					<1	mg/L	NC	25	101	85 - 115
7388950	Tannins & Lignins	2021/06/04	99	80 - 120	102	80 - 120	<0.2	mg/L	NC	20		
7389030	Phenols-4AAP	2021/06/04	106	80 - 120	103	80 - 120	<0.0010	mg/L	NC	20		
7389207	Alkalinity (Total as CaCO3)	2021/06/04			94	85 - 115	<1.0	mg/L	0.072	20		
7389302	Dissolved Mercury (Hg)	2021/06/04	87	75 - 125	96	80 - 120	<0.10	ug/L	NC	20		
7391432	Dissolved Organic Carbon	2021/06/07	94	80 - 120	98	80 - 120	<0.40	mg/L	0.60	20		
7391883	Colour	2021/06/07			98	80 - 120	<2	TCU	NC	25		
7392455	2,4,5-T	2021/06/08			87	10 - 130	<0.50	ug/L	1.5	40		

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
7392455	2,4,5-TP (Silvex)	2021/06/08			84	10 - 130	<0.50	ug/L	1.6	40		
7392455	2,4-D (BEE)	2021/06/08			98	10 - 130	<0.50	ug/L	2.7	40		
7392455	2,4-D	2021/06/08			78	10 - 130	<0.50	ug/L	1.3	40		
7392455	2,4-DB	2021/06/08			85	10 - 130	<0.50	ug/L	0.39	40		
7392455	2,4-DP (Dichlorprop)	2021/06/08			82	10 - 130	<0.50	ug/L	0.061	40		
7392455	Dicamba	2021/06/08			81	10 - 130	<0.50	ug/L	2.1	40		
7392455	MCPA	2021/06/08			87	10 - 130	<0.50	ug/L	0.47	40		
7392455	MCPP	2021/06/08			94	10 - 130	<0.50	ug/L	1.1	40		
7392455	Picloram	2021/06/08			68	10 - 130	<0.50	ug/L	3.0	40		

N/A = Not Applicable

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

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

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

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

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

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

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

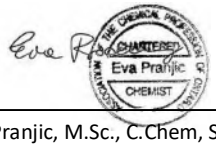
NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

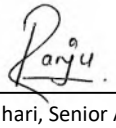
VALIDATION SIGNATURE PAGE

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

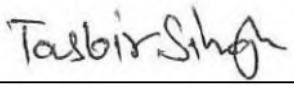
Brad Newman, B.Sc., C.Chem., Scientific Service Specialist



Ewa Pranjic, M.Sc., C.Chem, Scientific Specialist



Ranju Chaudhari, Senior Analyst



Tasbir Singh, Analyst 2

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

Bureau Veritas Laboratories 100 – 36 Antares Dr. Nepean, ON, K2E 7W5 Phone: 613-274-0573 Website: www.bvlabs.com

MICRO

BUREAU VERITAS

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

CHAIN OF CUSTODY RECORD 157147 Page 1 of 1

Invoice Information	Report Information (if differs from invoice)	Project Information (where applicable)	Turnaround Time (TAT) Required
Company Name: DST Group	Company Name: DST Group	Quotation #: B82715	[X] Regular TAT (5-7 days) Most analyses
Contact Name: Accounts Payable ~~Sonny Sundaram~~	Contact Name: Sonny Sundaram	P.O. #/ AFE#:	PLEASE PROVIDE ADVANCE NOTICE FOR RUSH PROJECTS
Address: 2150 Thurston Dr Ottawa, ON	Address: 2150 Thurston Ottawa, ON	Project #: 2101208.00	Rush TAT (Surcharges will be applied) [ ] 1 Day [ ] 2 Days [ ] 3-4 Days
Phone: Fax:	Phone: Fax:	Site Location:	
Email: ap@dstgroup.com	Email: ssundaram@dstgroup.com	Site #:	Date Required:
		Site Location Province: ON	Rush Confirmation #:
		Sampled By: CE	

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

Regulation 153
[X] Table 1 [ ] Res/Park [ ] Med/ Fine
[ ] Table 2 [ ] Ind/Comm [ ] Coarse
[ ] Table 3 [ ] Agri/ Other
[ ] Table ____
FOR RSC (PLEASE CIRCLE) Y / N

Other Regulations
[ ] CCME [ ] Sanitary Sewer Bylaw
[ ] MISA [ ] Storm Sewer Bylaw
[ ] PWQO Region ____
[ ] Other (Specify) ____
[ ] REG 558 (MIN. 3 DAY TAT REQUIRED)
[ ] REG 406 Table ____

Include Criteria on Certificate of Analysis: Y / N

Analysis Requested

LABORATORY USE ONLY
CUSTODY SEAL Y / N: Present / Intact
COOLER TEMPERATURES: 1, 2, 2
COOLING MEDIA PRESENT: Y / N

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

	SAMPLE IDENTIFICATION	DATE SAMPLED (YYYY/MM/DD)	TIME SAMPLED (HH:MM)	MATRIX	# OF CONTAINERS SUBMITTED	FIELD FILTERED (CIRCLE) (Metals / Hg / CrVI)	BTEX/ PHC F1	PHCs F2 - F4	VOCs	REG 153 METALS & INORGANICS	REG 153 ICPMS METALS	REG 153 METALS (Hg, Cr VI, ICP-MS Metals, HWS - B)	Plenary Acid Herbicides		General Inorganics	Microbiological Parameters	Anions				HOLD- DO NOT ANALYZE	COMMENTS
1	PW21-01, 8 hrs	2021/05/31	1730	GW			X	X	X	X		X	X		X	X	X					See Sonny S. Email
2																						
3																						
4																						
5																						
6																						
7																						ON In
8																						
9																						
10																						

RECEIVED IN OTTAWA

RELINQUISHED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)	RECEIVED BY: (Signature/Print)	DATE: (YYYY/MM/DD)	TIME: (HH:MM)
Cam Fisch / Cam Fisch	2021/05/31	1930	Ian Jang	2021/06/01	8:31
			J. Jang	2021/06/02	08:00

01-Jun-21 08:35
Katherine Szozda
C1E8916
KTN ENV-1333

-1/0/1°C

Unless otherwise agreed to in writing, work submitted on this Chain of Custody is subject to Bureau Veritas Laboratories' standard Terms and Conditions. Signing of this Chain of Custody document is acknowledgment and accep and-conditions

COC-1004 (06/19)

White: BV Labs - Yellow: Client

Your Project #: 02101208.000
Your C.O.C. #: C#1012481-01-01

Attention: Sonny Sundaram

Englobe Corp.
Ottawa - Standing Offer
2713 Lancaster Road
Unit 101
Ottawa, ON
CANADA K1B 5R6

Report Date: 2024/09/17
Report #: R8323883
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C4S9677
Received: 2024/09/16, 12:40

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Chloride by Automated Colourimetry (1)	1	N/A	2024/09/17	CAM SOP-00463	SM 24 4500-Cl E m
Metals Analysis by ICPMS (as received) (1, 2)	1	N/A	2024/09/17	CAM SOP-00447	EPA 6020B m

Remarks:

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

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

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

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

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by Bureau Veritas Mississauga, 6740 Campobello Rd , Mississauga, ON, L5N 2L8
(2) Metals analysis was performed on the sample 'as received'.

Your Project #: 02101208.000
Your C.O.C. #: C#1012481-01-01

Attention: Sonny Sundaram

Englobe Corp.
Ottawa - Standing Offer
2713 Lancaster Road
Unit 101
Ottawa, ON
CANADA K1B 5R6

Report Date: 2024/09/17
Report #: R8323883
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C4S9677
Received: 2024/09/16, 12:40

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:
Katherine Szozda, Project Manager
Email: Katherine.Szozda@bureauveritas.com
Phone# (613)274-0573 Ext:7063633
==========

This report has been generated and distributed using a secure automated process.
Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

Bureau Veritas Job #: C4S9677
Report Date: 2024/09/17

Englobe Corp.
Client Project #: 02101208.000
Sampler Initials: TL

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		ADAG87		
Sampling Date		2024/09/13 10:00		
COC Number		C#1012481-01-01		
	UNITS	**DWW-01**	**RDL**	**QC Batch**
Inorganics				
Dissolved Chloride (Cl-)	mg/L	480	5.0	9639496

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Bureau Veritas ID		ADAG87		
Sampling Date		2024/09/13 10:00		
COC Number		C#1012481-01-01		
	UNITS	**DWW-01**	**RDL**	**QC Batch**
Metals				
Sodium (Na)	ug/L	290000	100	9642540

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Bureau Veritas Job #: C4S9677
Report Date: 2024/09/17

Englobe Corp.
Client Project #: 02101208.000
Sampler Initials: TL

TEST SUMMARY

Bureau Veritas ID: ADAG87
Sample ID: DWW-01
Matrix: Water

Collected: 2024/09/13
Shipped:
Received: 2024/09/16

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Chloride by Automated Colourimetry	SKAL	9639496	N/A	2024/09/17	Massarat Jan
Metals Analysis by ICPMS (as received)	ICP/MS	9642540	N/A	2024/09/17	Azita Fazaeli

Bureau Veritas 100 – 36 Antares Dr. Nepean, ON, K2E 7W5 Phone: 613-274-0573 Website: www.bvna.com

GENERAL COMMENTS

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

Package 1	18.3°C

Results relate only to the items tested.

Bureau Veritas 100 – 36 Antares Dr. Nepean, ON, K2E 7W5 Phone: 613-274-0573 Website: www.bvna.com

QUALITY ASSURANCE REPORT

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9639496	Dissolved Chloride (Cl-)	2024/09/17	NC	80 - 120	96	80 - 120	<1.0	mg/L	2.7	20
9642540	Sodium (Na)	2024/09/17	94	80 - 120	98	80 - 120	<100	ug/L		

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

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

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

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

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

VALIDATION SIGNATURE PAGE

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

Louise Harding, Scientific Specialist

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

Bureau Veritas 100 – 36 Antares Dr. Nepean, ON, K2E 7W5 Phone: 613-274-0573 Website: www.bvna.com

Your Project #: P2101208.001
Your C.O.C. #: C#1031355-01-01

Attention: Shanti Ratmono

Englobe Corp.
Ottawa - Standing Offer
2713 Lancaster Road
Unit 101
Ottawa, ON
CANADA K1B 5R6

Report Date: 2025/01/22
Report #: R8474782
Version: 3 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C506367
Received: 2025/01/20, 12:45

Sample Matrix: Ground Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity (1)	1	N/A	2025/01/21	CAM SOP-00448	SM 24 2320 B m
Total Metals Analysis by ICP (1)	1	2025/01/21	2025/01/21	CAM SOP-00408	EPA 6010D m
Sulphide (as H2S) (2)	1	N/A	2025/01/22	AB WI-00065	Auto Calc
Total Sulphide (2)	1	2025/01/22	2025/01/22	AB SOP-00080	SM 24 4500 S2-A D Fm
Total Dissolved Solids (1)	1	2025/01/21	2025/01/22	CAM SOP-00428	SM 24 2540C m

Remarks:

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

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

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

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

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by Bureau Veritas Mississauga, 6740 Campobello Rd , Mississauga, ON, L5N 2L8
(2) This test was performed by Bureau Veritas Calgary (19th), 4000 19th Street NE , Calgary, AB, T2E 6P8

Your Project #: P2101208.001
Your C.O.C. #: C#1031355-01-01

Attention: Shanti Ratmono

Englobe Corp.
Ottawa - Standing Offer
2713 Lancaster Road
Unit 101
Ottawa, ON
CANADA K1B 5R6

Report Date: 2025/01/22
Report #: R8474782
Version: 3 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C506367
Received: 2025/01/20, 12:45

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:
Katherine Szozda, Project Manager
Email: Katherine.Szozda@bureauveritas.com
Phone# (613)274-0573 Ext:7063633

==========

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

Bureau Veritas Job #: C506367
Report Date: 2025/01/22

Englobe Corp.
Client Project #: P2101208.001
Sampler Initials: IL

RESULTS OF ANALYSES OF GROUND WATER

Bureau Veritas ID		ANIY16			ANIY16		
Sampling Date		2025/01/20 10:30			2025/01/20 10:30		
COC Number		C#1031355-01-01			C#1031355-01-01		
	UNITS	PW21-01	RDL	QC Batch	PW21-01 Lab-Dup	RDL	QC Batch
Calculated Parameters							
Sulphide (as H2S)	mg/L	<0.0020	0.0020	9863412			
Inorganics							
Total Dissolved Solids	mg/L	1180	10	9862132	1180	10	9862132
Total Sulphide	mg/L	<0.0018 (1)	0.0018	9863413			
Alkalinity (Total as CaCO3)	mg/L	260	1.0	9862194	260	1.0	9862194

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Lab-Dup = Laboratory Initiated Duplicate
(1) Sample pH <9, preservation incomplete. Due to volatility of analyte, a low bias in the results is likely.

ELEMENTS BY ATOMIC SPECTROSCOPY (GROUND WATER)

Bureau Veritas ID		ANIY16	ANIY16		
Sampling Date		2025/01/20 10:30	2025/01/20 10:30		
COC Number		C#1031355-01-01	C#1031355-01-01		
	UNITS	**PW21-01**	**PW21-01 Lab-Dup**	**RDL**	**QC Batch**
Metals					
Total Calcium (Ca)	mg/L	69	71	0.05	9862120

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

Bureau Veritas 100 – 36 Antares Dr. Nepean, ON, K2E 7W5 Phone: 613-274-0573 Website: www.bvna.com

Bureau Veritas Job #: C506367
Report Date: 2025/01/22

Englobe Corp.
Client Project #: P2101208.001
Sampler Initials: IL

TEST SUMMARY

Bureau Veritas ID: ANIY16
Sample ID: PW21-01
Matrix: Ground Water

Collected: 2025/01/20
Shipped:
Received: 2025/01/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9862194	N/A	2025/01/21	Nachiketa Gohil
Total Metals Analysis by ICP	ICP	9862120	2025/01/21	2025/01/21	Japneet Gill
Sulphide (as H2S)	CALC	9863412	N/A	2025/01/22	Automated Statchk
Total Sulphide	SPEC	9863413	2025/01/22	2025/01/22	Ly Vu
Total Dissolved Solids	BAL	9862132	2025/01/21	2025/01/22	Razieh Tabesh

Bureau Veritas ID: ANIY16 Dup
Sample ID: PW21-01
Matrix: Ground Water

Collected: 2025/01/20
Shipped:
Received: 2025/01/20

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	9862194	N/A	2025/01/21	Nachiketa Gohil
Total Metals Analysis by ICP	ICP	9862120	2025/01/21	2025/01/21	Japneet Gill
Total Dissolved Solids	BAL	9862132	2025/01/21	2025/01/22	Razieh Tabesh

Bureau Veritas 100 – 36 Antares Dr. Nepean, ON, K2E 7W5 Phone: 613-274-0573 Website: www.bvna.com

GENERAL COMMENTS

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

Package 1	3.0°C

Results relate only to the items tested.

Bureau Veritas 100 – 36 Antares Dr. Nepean, ON, K2E 7W5 Phone: 613-274-0573 Website: www.bvna.com

QUALITY ASSURANCE REPORT

			Matrix Spike		SPIKED BLANK		Method Blank		RPD	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits
9862120	Total Calcium (Ca)	2025/01/21	NC	80 - 120	99	80 - 120	<0.05	mg/L	2.4	20
9862132	Total Dissolved Solids	2025/01/22			92	80 - 120	<10	mg/L	0.42	20
9862194	Alkalinity (Total as CaCO3)	2025/01/21			98	85 - 115	<1.0	mg/L	0.49	20
9863413	Total Sulphide	2025/01/22	39 (1)	80 - 120	103	80 - 120	<0.0018	mg/L		

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

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

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

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

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

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

VALIDATION SIGNATURE PAGE

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

Cristina Carriere, Senior Scientific Specialist

Louise Harding, Scientific Specialist

Suwan (Sze Yeung) Fock, B.Sc., Scientific Specialist

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

Bureau Veritas 100 – 36 Antares Dr. Nepean, ON, K2E 7W5 Phone: 613-274-0573 Website: www.bvna.com

Appendix E-2

Groundwater Quality Results – Newly Install Well

ENGLOBE

eurofins | Environment Testing
146 Colonnade Rd, Unit 8, Ottawa, ON K2E 7Y1 (613) 727-5692

OFFICIAL CERTIFICATE OF ANALYSIS : 4139391

WORK REQUEST : 100324057

Report Date : 2024-10-31

Splash Well Drilling
Box 1083
Prescott, ON
K0E 1T0
Attention : Todd Ferguson

Reception Date : 2024-10-30
Project : Dilworth Rd
Sampler : NA
PO Number : Not applicable
Temperature : 4 °C

Analysis	Quantity	External Method
E.Coli and Total Coliforms (DC Plate)	1	Modified from MECP E3407

Criteria :
A : Ontario Regulation 169/03 (Non-Regulated Drinking Water)

Sample status upon receipt :
8156040
Compliant

Notes :
- All analysis is completed at Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) unless otherwise stated.
- Eurofins Environment Testing Canada Inc. is accredited by CALA, Canadian Association for Laboratory Accreditation to ISO/IEC 17025 for tests which appear on the scope of accreditation. The scope is available at https://directory.cala.ca/
- Please note: Field data, where presented on the report, has been provided by the client and is presented for informational purposes only. Guideline or regulatory limits listed on this report are provided for ease of use (informational purposes) only. Eurofins recommends consulting the official guideline or regulation as required. Unless otherwise stated, measurement uncertainty is not taken into account when determining guideline or regulatory exceedances.

Legend :
RL : Reporting limit
QC : Reference material (QC)
N/A : Not applicable
1 : Results in annex
* : Analysis conducted by external subcontracting
^ : Analysis not accredited

eurofins | Environment Testing
146 Colonnade Rd, Unit 8, Ottawa, ON K2E 7Y1 (613) 727-5692

OFFICIAL CERTIFICATE OF ANALYSIS - RESULTS

Client : Splash Well Drilling
Project : Dilworth Rd

Reception Date: 2024-10-30

					Eurofins Sample No :	**8156040**				
					Matrix :	Drinking water				
					Sampling Date :	2024-10-30				
					Client Sample Identification :	Water Well 1 Dilworth Rd				
Microbiology	**RL**	**Unit**	**Criteria**							
			A	**B**	**C**					
E.Coli and Total Coliforms (DC Plate)										
Escherichia coli (DC)	0	CFU/100mL	0			0				
Total Coliforms (DC)	0	CFU/100mL	0			0				

Approved by : _____
Emma-Dawn Ferguson, M.Sc.
Environmental Chemist

eurofins | Environment Testing
146 Colonnade Rd, Unit 8, Ottawa, ON K2E 7Y1 (613) 727-5692

OFFICIAL CERTIFICATE OF ANALYSIS - QUALITY CONTROL

Client : Splash Well Drilling
Project : Dilworth Rd

Reception Date: 2024-10-30

Parameter	Unit	RL	Blank	QC		Matrix Spike		Duplicate	
				Recovery %	Range %	Recovery %	Range %	RPD %	Range %
E.Coli and Total Coliforms (DC Plate)									
Method : Total Coliforms and E.Coli by MF (Water, DC plate). Internal method: OTT-M-BAC-WI45296.									
Escherichia coli (DC)	CFU/100mL	0	0					-	0-30
Total Coliforms (DC)	CFU/100mL	0	0					-	0-30
Associated Samples : 8156040								Prep Date: 2024-10-30 Analysis Date: 2024-10-31	

Where RPD % is reported as "-" the calculation is not available because one or both of the duplicates is within 5 times the RL.

eurofins 119296

DRINKING WATER CHAIN-OF-CUSTODY

146 Colonnade Road, Unit #8, Ottawa, ON, K2E 7Y1 - Phone: 613-727-5692, Fax: 613-727-5222

Eurofins Workorder #: _____

CLIENT INFORMATION

Company: Splash Well Drilling
Contact: Todd Ferguson
Address: P.O. Box 1083 Prescott ON.
Telephone: 613-925-4585 Fax:
Email #1: splashwelldr.llng1987@yahoo.ca #2:
Project: Dilworth Rd
PO #: Quote #:

WATERWORKS INFORMATION

Waterworks Name:
Waterworks #:
Contact:
Address:
Telephone: Fax:
Cell Phone:
Email #1: #2:

100324057

Printed On : 2024-10-30 14:56:46

REGULATION/GUIDELINE REQUIRED

☐ O. Reg 170 ☐ O. Reg 170 15.1, Lead ☐ ODWSOG ☒ Private Well ☐ None
☐ O. Reg 319 ☐ O. Reg 243 ☐ GCDWQ ☐ Other:

☐ Has an LSN form been submitted to MECP or MOHLTC (if applicable)? Public Health Unit:

TURN-AROUND TIME (Business Days)

☐ 1 Day* (100%) ☑ 2 Day** (50%) ☐ 3-5 Days (25%) ☐ 5-7 Days (Standard)

Please contact the laboratory in advance to determine rush availability. Surcharges may apply to rush service. Note that some tests (i.e. O. Reg. 170 Schedule 24 pesticides may take up to 3 weeks to analyze). Please see notes (on reverse) about TAT policies.

The optimal temperature conditions during transport must be less than 10°C. Sample(s) cannot be frozen. Note that for drinking water samples, all exceedances will be reported where (and how) the application legislation requires.
The COC must be complete upon submission of the samples, there will be a $25 surcharge if required information is missing (required fields are shaded in grey).

Sample ID	Date/Time Collected	Sample Type Code (see below)	Resample? Y = Yes N = No	MECP/MOHLTC Reportable? Y = Yes N = No	# of Containers	SPL Code/Watertrax	Sample Location (i.e. Kitchen, POE)	Sample Analysis Required: General Characteristics	Sample Analysis Required: TCLEC	Sample Analysis Required:	Sample Analysis Required:	Sample Analysis Required:	Sample Analysis Required:	Sample Analysis Required:	Field Measurements: pH	Field Measurements: Total Chlorine	Field Measurements: Free Chlorine	Field Measurements: Turbidity	Sample RN# (Lab Use Only)
Water well 1 Dilworth Rd	Oct 30 10:15	PW	N	N	2			✓	✓										R56040

RUSH
S-8194 ULINE: 800-295-5510

Sample Type Codes for Drinking Water: RW = Raw Water, TW = Treated Water at Point of Entry to distribution, TW-NT = Untreated Water at Point of Entry to distribution; DW = Distribution, RP = Residential Plumbing, NRP = Non-Residential Plumbing, S = Standing, F = Flushed, PW = Private Well

	PRINT	SIGN	DATE/TIME	TEMP (°C)
Sampled By:				
Relinquished By:				
Received By:	S.Stu	SJ	Oct 30/24 11:30	3.9°C

COMMENTS: all additional info added as per client -SS Oct 30/24.

AFCOCDW.9

eurofins | Environment Testing
146 Colonnade Rd, Unit 8, Ottawa, ON K2E 7Y1 (613) 727-5692

OFFICIAL CERTIFICATE OF ANALYSIS : 4140489

WORK REQUEST : 100324056

Report Date : 2024-11-01

Splash Well Drilling
Box 1083
Prescott, ON
K0E 1T0
Attention : Todd Ferguson

Reception Date : 2024-10-30
Project : Dilworth Rd
Sampler : NA
PO Number : Not applicable
Temperature : 4 °C

Analysis	Quantity	External Method
Alkalinity (Water, Automated)	1	Modified from SM 2320 B
Chloride (Water, IC)	1	Modified from SM 4110 B and C
Conductivity (Water, Automated)	1	Modified from SM 2510 B
Fluoride (Water, Auto/ISE)	1	Modified from SM 4500-F A and 4500-F C
Hardness (Water, Calculation Only)	1	SM 2340 B
Ion Balance (Water, Calculation)	1	Modified from SM1030 E
Metals Scan (Water, ICP/MS)	1	Modified from EPA 200.8
Metals Scan (Water, ICP/OES)	1	Modified from SM 3120 B
Nitrate (Water, IC)	1	Modified from SM 4110 B and C
pH (25°C) (Water, Automated)	1	Modified from SM 4500-H+ B
Sulphate (Water, IC)	1	Modified from SM 4110 B and C

Criteria :
A : Ontario Regulation 169/03 (Non-Regulated Drinking Water)

Sample status upon receipt :
8156038
Compliant

Certificate Comments :
8156038
Anions MRL increased due to matrix interference.

Notes :
- All analysis is completed at Eurofins Environment Testing Canada Inc. (Ottawa, Ontario) unless otherwise stated.
- Eurofins Environment Testing Canada Inc. is accredited by CALA, Canadian Association for Laboratory Accreditation to ISO/IEC 17025 for tests which appear on the scope of accreditation. The scope is available at https://directory.cala.ca/
- Please note: Field data, where presented on the report, has been provided by the client and is presented for informational purposes only. Guideline or regulatory limits listed on this report are provided for ease of use (informational purposes) only. Eurofins recommends consulting the official guideline or regulation as required. Unless otherwise stated, measurement uncertainty is not taken into account when determining guideline or regulatory exceedances.

Legend :
RL : Reporting limit
QC : Reference material (QC)
N/A : Not applicable
1 : Results in annex
* : Analysis conducted by external subcontracting
^ : Analysis not accredited

eurofins | Environment Testing
146 Colonnade Rd, Unit 8, Ottawa, ON K2E 7Y1 (613) 727-5692

OFFICIAL CERTIFICATE OF ANALYSIS - EXCEEDENCE SUMMARY

Client : Splash Well Drilling
Project : Dilworth Rd

Reception Date : 2024-10-30

Eurofins Sample No	Client Sample Identification	Analyte	Result	Units	Exceeded Criteria		
					A	B	C
Chloride (Water, IC)							
8156038	Water Well 1 Dilworth Rd	Chloride	743	mg/L	250		
Hardness (Water, Calculation Only)							
8156038	Water Well 1 Dilworth Rd	Hardness as CaCO3 (Calculation)	638	mg/L	80-100		
Metals Scan (Water, ICP/MS)							
8156038	Water Well 1 Dilworth Rd	Iron	0.79	mg/L	0.3		
8156038	Water Well 1 Dilworth Rd	Manganese	0.09	mg/L	0.05		
Metals Scan (Water, ICP/OES)							
8156038	Water Well 1 Dilworth Rd	Sodium	446	mg/L	200		

eurofins | Environment Testing
146 Colonnade Rd, Unit 8, Ottawa, ON K2E 7Y1 (613) 727-5692

OFFICIAL CERTIFICATE OF ANALYSIS - RESULTS

Client : Splash Well Drilling
Project : Dilworth Rd

Reception Date: 2024-10-30

					Eurofins Sample No :	**8156038**				
					Matrix :	Drinking water				
					Sampling Date :	2024-10-30				
					Client Sample Identification :	Water Well 1 Dilworth Rd				
Anions	**RL**	**Unit**	**Criteria A**	**B**	**C**					
Chloride	0.5	mg/L	250			743				
Nitrate (as Nitrogen)	0.1	mg/L	10.0			<1.0				
Sulphate	1	mg/L	500			74				

			Eurofins Sample No :	**8156038**						
			Matrix :	Drinking water						
			Sampling Date :	2024-10-30						
			Client Sample Identification :	Water Well 1 Dilworth Rd						
Calculations	**RL**	**Unit**								
Ion Balance (Calculation)^	0.1		1.09							

					Eurofins Sample No :	**8156038**				
					Matrix :	Drinking water				
					Sampling Date :	2024-10-30				
					Client Sample Identification :	Water Well 1 Dilworth Rd				
General Chemistry	**RL**	**Unit**	**Criteria A**	**B**	**C**					
Alkalinity (as CaCO3)	5	mg/L	500			361				
Conductivity @ 25°C	5	µS/cm				3000				
Fluoride	0.1	mg/L	1.5			0.34				
Hardness as CaCO3 (Calculation)	1	mg/L	80-100			638				
pH @ 25°C	1		6.5-8.5			7.40				

					Eurofins Sample No :	**8156038**				
					Matrix :	Drinking water				
					Sampling Date :	2024-10-30				
					Client Sample Identification :	Water Well 1 Dilworth Rd				
Metals	**RL**	**Unit**	**Criteria A**	**B**	**C**					
Metals Scan (Water, ICP/MS)										
Iron	0.03	mg/L	0.3			0.79				
Manganese	0.01	mg/L	0.05			0.09				
Metals Scan (Water, ICP/OES)										
Calcium	1	mg/L				147				
Magnesium	1	mg/L				66				
Potassium	1	mg/L				10				
Sodium	1	mg/L	200			446				

eurofins | Environment Testing
146 Colonnade Rd, Unit 8, Ottawa, ON K2E 7Y1 (613) 727-5692

Approved by :

Patrick Jacques,
Ottawa, Environmental Chemist,

OFFICIAL CERTIFICATE OF ANALYSIS - QUALITY CONTROL

Client : Splash Well Drilling
Project : Dilworth Rd

Reception Date: 2024-10-30

Parameter	Unit	RL	Blank	QC		Matrix Spike		Duplicate	
				Recovery %	Range %	Recovery %	Range %	RPD %	Range %
Alkalinity (Water, Automated)									
Method : Alkalinity (water, titration to pH 4.5, automated). Internal method: OTT-I-AT-WI45398.									
Alkalinity (as CaCO3)	mg/L	5	<5	97	95-105			1	0-20
Associated Samples : 8156038								Prep Date: 2024-10-31 Analysis Date: 2024-11-01	
Chloride (Water, IC)									
Method : Anions (Water, Ion Chromatography). Internal method: OTT-I-IC-WI45985.									
Chloride	mg/L	0.5	<0.5	96	80-120	99	80-120	12	0-20
Associated Samples : 8156038								Prep Date: 2024-10-31 Analysis Date: 2024-11-01	
Conductivity (Water, Automated)									
Method : Conductivity (Water, Autotitrator). Internal Method: OTT-I-AT-WI45398.									
Conductivity @ 25°C	uS/cm	5	<5	98	98-102			0	0-20
Associated Samples : 8156038								Prep Date: 2024-10-31 Analysis Date: 2024-11-01	
Fluoride (Water, Auto/ISE)									
Method : Fluoride by autotitrator, ion selective electrode. Internal method: OTT-I-AT-WI45398.									
Fluoride	mg/L	0.1	<0.10	97	90-110			-	0-20
Associated Samples : 8156038								Prep Date: 2024-10-31 Analysis Date: 2024-11-01	
Metals Scan (Water, ICP/MS)									
Method : Metals (Water, ICP/MS). Internal method: AMMTFQE1.									
Iron	mg/L	0.03	<0.03	100	80-120	105	70-130	-	0-20
Manganese	mg/L	0.01	<0.01	100	80-120	100	70-130	-	0-20
Associated Samples : 8156038								Prep Date: 2024-10-31 Analysis Date: 2024-10-30	
Metals Scan (Water, ICP/OES)									
Method : Metals (Water, ICP/OES). Internal method: OTT-I-MET-WI48491.									
Calcium	mg/L	1	<1	99	86-115	102	70-130	4	0-20
Magnesium	mg/L	1	<1	93	91-109	99	70-130	-	0-20
Potassium	mg/L	1	<1	109	87-113	116	70-130	-	0-20
Sodium	mg/L	1	<1	108	85-115	108	70-130	0	0-20
Associated Samples : 8156038								Prep Date: 2024-10-31 Analysis Date: 2024-10-30	
Nitrate (Water, IC)									
Method : Anions (Water, Ion Chromatography). Internal method: OTT-I-IC-WI45985.									
Nitrate (as Nitrogen)	mg/L	0.1	<0.1	100	80-120	96	80-120	-	0-20
Associated Samples : 8156038								Prep Date: 2024-10-31 Analysis Date: 2024-11-01	
pH (25°C) (Water, Automated)									
Method : pH (Water, Automated Meter). Internal method: OTT-I-AT-WI45398.									
pH @ 25°C		1	6.05	100	97-103			1	0-20
Associated Samples : 8156038								Prep Date: 2024-10-31 Analysis Date: 2024-11-01	

eurofins | Environment Testing
146 Colonnade Rd, Unit 8, Ottawa, ON K2E 7Y1 (613) 727-5692

OFFICIAL CERTIFICATE OF ANALYSIS - QUALITY CONTROL

Client : Splash Well Drilling
Project : Dilworth Rd

Reception Date: 2024-10-30

Parameter	Unit	RL	Blank	QC		Matrix Spike		Duplicate	
				Recovery %	Range %	Recovery %	Range %	RPD %	Range %
Sulphate (Water, IC)									
Method : Anions (Water, Ion Chromatography). Internal method: OTT-I-IC-WI45985.									
Sulphate	mg/L	1	<1	95	90-110	96	80-120	9	0-20
Associated Samples : 8156038								Prep Date: 2024-10-31 Analysis Date: 2024-11-01	

Where RPD % is reported as "-" the calculation is not available because one or both of the duplicates is within 5 times the RL.

eurofins 119296

DRINKING WATER CHAIN-OF-CUSTODY

146 Colonnade Road, Unit #8, Ottawa, ON, K2E 7Y1 - Phone: 613-727-5692, Fax: 613-727-5222

Eurofins Workorder #: 100324056

Printed On : 2024-10-30 14:55:41

CLIENT INFORMATION

Company: Splash Well Drilling
Contact: Todd Ferguson
Address: P.O. Box 1083 Prescott ON.
Telephone: 613-925-4885 Fax:
Email #1: splashwelldrilling1987@yahoo.ca #2:
Project: Dilworth Rd
PO #: Quote #:

WATERWORKS INFO

Waterworks Name:
Waterworks #:
Contact:
Address:
Telephone: Fax:
Cell Phone:
Email #1: #2:

REGULATION/GUIDELINE REQUIRED

☐ O. Reg 170 ☐ O. Reg 170 15.1, Lead ☐ ODWSOG ☒ Private Well ☐ None
☐ O. Reg 319 ☐ O. Reg 243 ☐ GCDWQ ☐ Other:
☐ Has an LSN form been submitted to MECP or MOHLTC (if applicable)? Public Health Unit:

TURN-AROUND TIME (Business Days)

☐ 1 Day* (100%) ☑ 2 Day** (50%) ☐ 3-5 Days (25%) ☐ 5-7 Days (Standard)

Please contact the laboratory in advance to determine rush availability. Surcharges may apply to rush service. Note that some tests (i.e. O. Reg. 170 Schedule 24 pesticides may take up to 3 weeks to analyze). Please see notes (on reverse) about TAT policies.

The optimal temperature conditions during transport must be less than 10°C. Sample(s) cannot be frozen. Note that for drinking water samples, all exceedances will be reported where (and how) the application legislation requires.
The COC must be complete upon submission of the samples, there will be a $25 surcharge if required information is missing (required fields are shaded in grey).

Sample ID	Date/Time Collected	Sample Type Code (see below)	Resample? Y = Yes N = No	MECP/MOHLTC Reportable? Y = Yes N = No	# of Containers	SPL Code/Watertrax	Sample Location (i.e. Kitchen, POE)	General Characteristics	TCLEC					pH	Total Chlorine	Free Chlorine	Turbidity	Sample RN# (Lab Use Only)
Water well 1 Dilworth Rd	2024-10-30 10:15	PW	N	N	2			✓	✓									8156038

RUSH

S-8194, ULINE, 800-295-5510

Sample Type Codes for Drinking Water: **RW** = Raw Water, **TW** = Treated Water at Point of Entry to distribution, **TW-NT** = Untreated Water at Point of Entry to distribution, **DW** = Distribution, **RP** = Residential Plumbing, **NRP** = Non-Residential Plumbing, **S** = Standing, **F** = Flushed, **PW** = Private Well

	PRINT	SIGN	DATE/TIME	TEMP (°C)
Sampled By:				
Relinquished By:				
Received By:	S. Stu		Oct 30/24 11:30	3.9°C

COMMENTS: all additional info added as per client -BS Oct 30/24.

AFCOCDW.9

Appendix E-3

Field Equipment Calibration Certificates

ENGLOBE

CERTIFICATE OF CALIBRATION

The HORIBA Instrument listed below has been inspected and calibrated following the Manufacturer's specifications and methods.

Instrument Model: **HORIBA U-52** *Serial Number:* **PKMJA9VM/L0MASY2G** *Calibration Date:* **August 8, 2024**

2-POINT pH	CONDUCTIVITY	TURBIDITY	DISSOLVED OXYGEN	OXIDIZATION-REDUCTION POTENTIAL	TEMPERATURE
4.00 pH, 7.00 pH	4.49mS/cm ZERO CHECKED	0 & 100 NTU	8.58 mg/L @ 23.0 DegC SODIUM SULFITE ZERO	240mV	Fisher Scientific s/n 230606647
AutoCal 4.00 pH Solution LOT # 3GE0924	AutoCal Solution LOT # 3GH0985	AutoCal Solution LOT# 3GH0985	Oakton Zero Solution LOT # 796055	Hanna ORP LOT # 8976	
Expiry Date: August 1, 2024	Expiry Date: August 1, 2024	Expiry Date: August 1, 2024		Expiry Date: May 1, 2028	
pH 7.00 LOT # 4GB0027	@25 DegC LOT # 3GH0985	Turb. 100 NTU LOT # A3312			
Expiry Date: February 1, 2026		Expiry Date: November 1, 2025			

The calibration standard used is considered to be a certified standard and is traceable to the National Institute of Standards and Technology (NIST). Certificate of Analysis is available upon request.

The instrument indicated above is now certified to be operating within the Manufacturer's specifications. This does not eliminate the requirement for regular maintenance and pre-use sensor response checks in order to ensure continued complete and accurate operating condition.

Certified By: Vincent Marin

MAXIM Environmental and Safety Inc.

sales@maximenvironmental.com
www.maximenvironmental.com

9 - 170 Ambassador Dr., Mississauga, ON L5T 2H9
(905)670-1304 | Toll Free (888)285-2324

9 - 148 Colonnade Rd., Ottawa, ON K2E 7R4
(613)224-4747 | Toll Free (888)285-2324

CERTIFICATE OF CALIBRATION

The Hanna Instrument listed below has been inspected and calibrated following the Manufacturer's specifications and methods.

Instrument Model: **Hanna HI991300** *Serial Number:* **7916BP** *Calibration Date:* **17-Jan-25**

2-POINT pH	*Conductivity*
4.01 pH, 7.00 pH	1413uS/cm
4.01 pH LOT # 4GE1065	LOT # 4GB0058
Expiry Date: May 1, 2026	Expiry Date: February 1, 2025
7.00 pH LOT # 4GF0046	@25 DegC
Expiry Date: June 1, 2026	

The calibration standard used is considered to be a certified standard and is traceable to the National Institute of Standards and Technology (NIST). Certificate of Analysis is available upon request.

The instrument indicated above is now certified to be operating within the Manufacturer's specifications. This does not eliminate the requirement for regular maintenance and pre-use sensor response checks in order to ensure continued complete and accurate operating condition.

Certified By: Vincent Marin

Maxim **Environmental and Safety Inc.**

sales@maximenvironmental.com
www.maximenvironmental.com

Head Office:

Ottawa Office:

Appendix E-4

LSI and RSI Estimates - Existing Water Supply Well PW21-01

ENGLOBE

Blue Tabs = Outputs	Yellow Tabs = Inputs

TDS	1180	mg/L
Temp	7.9	^{o}C
Ca^{+2}	172	mg/L as $CaCO_3$
Ca^{+2}	69	mg/L
Alk	260	mg/L as $CaCO_3$
pH	7.1	

Calcium Concentration Converter		
Ca^{+2}	69	mg/L
Ca^{+2}	**172**	mg/L as $CaCO_3$

SOURCE: Faust and Aly, 1998 (p459)

pHs = A + B -log[Ca^{2+}] - log[TALK]	7.46
LSI	**-0.41**
A = 2.24961-0.017853*T+0.00008238*T^2-0.00000041*T^3	2.11
B = 9.7+((2.5*(m)^0.5)/(1.0+5.3*(m)^0.5+5.5*m)), = 10 for TDS >500	10.00
m = 0.000025*TDS (ionic strength)	0.0295

SOURCE: http://events.nace.org/library/corrosion/NaturalWaters/Langelier.asp

LSI = pH - pHs

LSI	**-0.63**
pHs = (9.3 + A + B) - (C + D)	7.68
A = (Log_{10} [TDS] - 1) / 10	0.21
B = -13.12 x Log_{10} (^{o}C + 273) + 34.55	2.43
C = Log10 [Ca^{2+} as $CaCO_3$] - 0.4	1.84
D = Log_{10} [alkalinity as $CaCO_3$]	2.41

RSI = 2(pHs) - pH

RSI	**8.31**

RSI < 6.5 the scale tendency increases as the index decreases

RSI > 7.0 undersatureated

Appendix F

Groundwater Quality - Observation Wells

eNGLOBe

Table F-1 Water Quality Analysis Results
2095 Dilworth Road, Kars, Ontario
DST File No.: 02101208.000

Table F-1 Groundwater Sampling Results

Parameter	Units	RDL	Criteria			Monitoring Well	
Sample ID			Ontario Drinking Water Quality Standards[1]	Type of Objective	Treatability Limits[2]	*MW21-01*	*MW21-06*
Sample Date & Time						2021-03-15	2021-03-15
General Inoganics							
Alkalinity, total	mg/L	1.0	30 - 500	OG	--	454	396
Total Ammonia as N	mg/L	0.050	--	--	--	2.96	0.03
Colour	TCU	2	5	AO	7	NS	NS
Conductivity	uS/cm	1.0	--	--	--	1,250	660
Dissolved Organic Carbon	mg/L	0.50	5	AO	10	10.3	15.2
Hardness	mg/L	1.0	80 - 100	OG	--	475	387
Ion Balance	% difference	NA	--	--	--	NS	NS
pH	pH Units	NA	6.5 - 8.5	OG	--	7.60	8.10
Phenols	mg/L	0.0010	--	--	--	<0.001	<0.001
Tannins & Lignins	mg/L	0.2	--	--	--	5.50	0.70
Total Dissolved Solids	mg/L	1.0	500	AO	--	754	328
Total Kjeldahl Nitrogen	mg/L	0.10	--	--	--	4.1	0.3
Turbidity	NTU	0.1	5	AO	5	6,850	1,400
Anions							
Chloride	mg/L	1.0	250	AO	250	36	30
Fluoride	mg/L	0.10	1.5	MAC	--	<0.1	<0.1
Nitrate as N	mg/L	0.10	10	MAC	--	<0.1	<0.1
Nitrite as N	mg/L	0.010	1	MAC	--	<0.05	<0.05
Orthophosphate (P)	mg/L	0.010	--		--	<0.2	<0.2
Sulphide as H_2S	mg/L	0.020	0.05	AO	--	NS	NS
Sulphate	mg/L	1.0	500	AO	500	174	8
Metals							
Calcium	mg/L	0.2	--	--	--	116	59
Iron	mg/L	0.1	0.30	AO	5 to 10	0.898	<0.1
Magnesium	mg/L	0.05	--	--	--	44.9	34
Manganese	mg/L	0.002	0.05	AO	1.0	4.24	0.07
Mercury	mg/L	0.0001	0.001	MAC	--	NS	NS
Potassium	mg/L	0.2	--	--	--	21.5	0.514
Sodium	mg/L	0.1	200	AO	200	63	17
For the results of VOCs, PHCs, and Pesticides, please refer to the certificates of analysis							

Notes:

1 - Ontario Regulation 169/03: Ontario Drinking Water Quality Standards, including the Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines (Rev. June 2006).

2 - Maximum Concentration Considered Reasonably Treatable according to Procedure D-5-5 Private Wells: Water Supply Assessment

RDL - Reportable Detection Limit

NA - Not Applicable

NS - Not Sampled

MAC - Maximum Allowable Concentration

OG - Operational Guideline

AO - Aesthetic Objective

-- No standard value

Concentration exceeds the Ontario Drinking Water Quality Standards

PARACEL LABORATORIES LTD.
TRUSTED. RESPONSIVE. RELIABLE.

300 - 2319 St. Laurent Blvd
Ottawa, ON, K1G 4J8
1-800-749-1947
www.paracellabs.com

Certificate of Analysis

DST Consulting Engineers Inc. (Ottawa)

203-2150 Thurston Dr.
Ottawa, ON K1G 5T9
Attn: Salim Eid

Client PO:
Project: 2101208.00
Custody: 129465

Report Date: 22-Mar-2021
Order Date: 16-Mar-2021

Order #: 2112199

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
2112199-01	MW21-1
2112199-02	MW21-1-1
2112199-03	MW21-6

Approved By: Mark Foto

Mark Foto, M.Sc.
Lab Supervisor

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Alkalinity, total to pH 4.5	EPA 310.1 - Titration to pH 4.5	17-Mar-21	17-Mar-21
Ammonia, as N	EPA 351.2 - Auto Colour	18-Mar-21	18-Mar-21
Anions	EPA 300.1 - IC	16-Mar-21	16-Mar-21
Colour, apparent	SM2120 - Spectrophotometric	16-Mar-21	16-Mar-21
Conductivity	EPA 9050A- probe @25 °C	17-Mar-21	17-Mar-21
Dissolved Organic Carbon	MOE E3247B - Combustion IR, filtration	18-Mar-21	18-Mar-21
Hardness	Hardness as CaCO3	17-Mar-21	17-Mar-21
Ion Balance	Calculated	22-Mar-21	22-Mar-21
Metals, ICP-MS	EPA 200.8 - ICP-MS	17-Mar-21	17-Mar-21
pH	EPA 150.1 - pH probe @25 °C	17-Mar-21	17-Mar-21
PHC F1	CWS Tier 1 - P&T GC-FID	16-Mar-21	17-Mar-21
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	18-Mar-21	18-Mar-21
Phenolics	EPA 420.2 - Auto Colour, 4AAP	16-Mar-21	16-Mar-21
REG 153: Pesticides, OC	EPA 8081B - GC-ECD	17-Mar-21	17-Mar-21
REG 153: VOCs by P&T GC/MS	EPA 624 - P&T GC-MS	16-Mar-21	17-Mar-21
Hardness	Hardness as CaCO3	17-Mar-21	17-Mar-21
Sulphide	SM 4500SE - Colourimetric	18-Mar-21	18-Mar-21
Tannin/Lignin	SM 5550B - Colourimetric	17-Mar-21	17-Mar-21
Total Dissolved Solids	SM 2540C - gravimetric, filtration	16-Mar-21	17-Mar-21
Total Kjeldahl Nitrogen	EPA 351.2 - Auto Colour, digestion	17-Mar-21	17-Mar-21
Turbidity	SM 2130B - Turbidity meter	16-Mar-21	16-Mar-21

Certificate of Analysis

Report Date: 22-Mar-2021

Client: DST Consulting Engineers Inc. (Ottawa)

Order Date: 16-Mar-2021

Client PO:

Project Description: 2101208.00

	Client ID:	MW21-1	MW21-1-1	MW21-6	-
	Sample Date:	15-Mar-21 09:00	15-Mar-21 09:00	15-Mar-21 09:00	-
	Sample ID:	2112199-01	2112199-02	2112199-03	-
	MDL/Units	Water	Water	Water	-
Calculated Parameters					
Ion balance	0.1 %	-3.6	-	-3.3	-
General Inorganics					
Alkalinity, total	5 mg/L	454	-	296	-
Hardness	mg/L	475	-	287	-
Ammonia as N	0.01 mg/L	2.96	-	0.03	-
Dissolved Organic Carbon	0.5 mg/L	10.3	-	15.2	-
Colour, apparent	2 ACU	24600	-	4750	-
Conductivity	5 uS/cm	1250	-	660	-
Hardness	0.824 mg/L	475	-	287	-
pH	0.1 pH Units	7.6	-	8.1	-
Phenolics	0.001 mg/L	<0.001	-	<0.001	-
Total Dissolved Solids	10 mg/L	754	-	328	-
Sulphide	0.02 mg/L	<0.02	-	<0.02	-
Tannin & Lignin	0.1 mg/L	5.5	-	0.7	-
Total Kjeldahl Nitrogen	0.1 mg/L	4.1	-	0.3	-
Turbidity	0.1 NTU	6850	-	1400	-
Anions					
Chloride	1 mg/L	36	-	30	-
Fluoride	0.1 mg/L	<0.1	-	<0.1	-
Nitrate as N	0.1 mg/L	<0.1	-	<0.1	-
Nitrite as N	0.05 mg/L	<0.05	-	<0.05	-
Phosphate as P	0.2 mg/L	<0.2	-	<0.2	-
Sulphate	1 mg/L	174	-	8	-
Metals					
Calcium	100 ug/L	116000	-	58500	-
Iron	100 ug/L	898	-	<100	-
Magnesium	200 ug/L	44900	-	34400	-
Manganese	5 ug/L	4240	-	70	-
Potassium	100 ug/L	21500	-	514	-
Sodium	200 ug/L	63000	-	17000	-
Volatiles					
Acetone	5.0 ug/L	<5.0	<5.0	<5.0	-
Benzene	0.5 ug/L	<0.5	<0.5	<0.5	-
Bromodichloromethane	0.5 ug/L	<0.5	<0.5	1.0	-
Bromoform	0.5 ug/L	<0.5	<0.5	<0.5	-

Certificate of Analysis

Report Date: 22-Mar-2021

Client: DST Consulting Engineers Inc. (Ottawa)

Order Date: 16-Mar-2021

Client PO:

Project Description: 2101208.00

	Client ID:	MW21-1	MW21-1-1	MW21-6	-
	Sample Date:	15-Mar-21 09:00	15-Mar-21 09:00	15-Mar-21 09:00	-
	Sample ID:	2112199-01	2112199-02	2112199-03	-
	MDL/Units	Water	Water	Water	-
Bromomethane	0.5 ug/L	<0.5	<0.5	<0.5	-
Carbon Tetrachloride	0.2 ug/L	<0.2	<0.2	<0.2	-
Chlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	-
Chloroform	0.5 ug/L	<0.5	<0.5	8.3	-
Dibromochloromethane	0.5 ug/L	<0.5	<0.5	<0.5	-
Dichlorodifluoromethane	1.0 ug/L	<1.0	<1.0	<1.0	-
1,2-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,3-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,4-Dichlorobenzene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1-Dichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
1,2-Dichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	-
cis-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	-
trans-1,2-Dichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,2-Dichloropropane	0.5 ug/L	<0.5	<0.5	<0.5	-
cis-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	<0.5	-
trans-1,3-Dichloropropylene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,3-Dichloropropene, total	0.5 ug/L	<0.5	<0.5	<0.5	-
Ethylbenzene	0.5 ug/L	0.6	0.8	<0.5	-
Ethylene dibromide (dibromoethane, 1,2-)	0.2 ug/L	<0.2	<0.2	<0.2	-
Hexane	1.0 ug/L	<1.0	<1.0	<1.0	-
Methyl Ethyl Ketone (2-Butanone)	5.0 ug/L	<5.0	<5.0	<5.0	-
Methyl Isobutyl Ketone	5.0 ug/L	<5.0	<5.0	<5.0	-
Methyl tert-butyl ether	2.0 ug/L	<2.0	<2.0	<2.0	-
Methylene Chloride	5.0 ug/L	<5.0	<5.0	<5.0	-
Styrene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1,1,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1,2,2-Tetrachloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
Tetrachloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	-
Toluene	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1,1-Trichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
1,1,2-Trichloroethane	0.5 ug/L	<0.5	<0.5	<0.5	-
Trichloroethylene	0.5 ug/L	<0.5	<0.5	<0.5	-
Trichlorofluoromethane	1.0 ug/L	<1.0	<1.0	<1.0	-
Vinyl chloride	0.5 ug/L	<0.5	<0.5	<0.5	-

Certificate of Analysis

Report Date: 22-Mar-2021

Client: DST Consulting Engineers Inc. (Ottawa)

Order Date: 16-Mar-2021

Client PO:

Project Description: 2101208.00

	Client ID:	MW21-1	MW21-1-1	MW21-6	-
	Sample Date:	15-Mar-21 09:00	15-Mar-21 09:00	15-Mar-21 09:00	-
	Sample ID:	2112199-01	2112199-02	2112199-03	-
	MDL/Units	Water	Water	Water	-
m,p-Xylenes	0.5 ug/L	2.4	3.2	<0.5	-
o-Xylene	0.5 ug/L	0.9	1.3	<0.5	-
Xylenes, total	0.5 ug/L	3.3	4.6	<0.5	-
4-Bromofluorobenzene	Surrogate	108%	87.8%	94.4%	-
Dibromofluoromethane	Surrogate	90.7%	104%	102%	-
Toluene-d8	Surrogate	114%	110%	89.4%	-
Hydrocarbons					
F1 PHCs (C6-C10)	25 ug/L	<25	<25	<25	-
F2 PHCs (C10-C16)	100 ug/L	<100	<100	<100	-
F3 PHCs (C16-C34)	100 ug/L	<100	109	<100	-
F4 PHCs (C34-C50)	100 ug/L	<100	<100	<100	-
Pesticides, OC					
Aldrin	0.01 ug/L	<0.01	-	<0.01	-
alpha-Chlordane	0.01 ug/L	<0.01	-	<0.01	-
gamma-Chlordane	0.01 ug/L	<0.01	-	<0.01	-
Chlordane	0.01 ug/L	<0.01	-	<0.01	-
o,p'-DDD	0.01 ug/L	<0.01	-	<0.01	-
p,p'-DDD	0.01 ug/L	<0.01	-	<0.01	-
DDD	0.01 ug/L	<0.01	-	<0.01	-
o,p'-DDE	0.01 ug/L	<0.01	-	<0.01	-
p,p'-DDE	0.01 ug/L	<0.01	-	<0.01	-
DDE	0.01 ug/L	<0.01	-	<0.01	-
o,p'-DDT	0.01 ug/L	<0.01	-	<0.01	-
p,p'-DDT	0.01 ug/L	<0.01	-	<0.01	-
DDT	0.01 ug/L	<0.01	-	<0.01	-
Dieldrin	0.01 ug/L	<0.01	-	<0.01	-
Endosulfan I	0.01 ug/L	<0.01	-	<0.01	-
Endosulfan II	0.01 ug/L	<0.01	-	<0.01	-
Endosulfan I/II	0.01 ug/L	<0.01	-	<0.01	-
Endrin	0.01 ug/L	<0.01	-	<0.01	-
Heptachlor	0.01 ug/L	<0.01	-	<0.01	-
Heptachlor epoxide	0.01 ug/L	<0.01	-	<0.01	-
Hexachlorobenzene	0.01 ug/L	<0.01	-	<0.01	-
Hexachlorobutadiene	0.01 ug/L	<0.01	-	<0.01	-
Hexachlorocyclohexane, gamma	0.01 ug/L	<0.01	-	<0.01	-
Hexachloroethane	0.01 ug/L	<0.01	-	<0.01	-

Certificate of Analysis

Report Date: 22-Mar-2021

Client: DST Consulting Engineers Inc. (Ottawa)

Order Date: 16-Mar-2021

Client PO:

Project Description: 2101208.00

	Client ID:	MW21-1	MW21-1-1	MW21-6	-
	Sample Date:	15-Mar-21 09:00	15-Mar-21 09:00	15-Mar-21 09:00	-
	Sample ID:	2112199-01	2112199-02	2112199-03	-
	MDL/Units	Water	Water	Water	-
Methoxychlor	0.01 ug/L	<0.01	-	<0.01	-
Decachlorobiphenyl	Surrogate	119%	-	111%	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	ND	1	mg/L						
Fluoride	ND	0.1	mg/L						
Nitrate as N	ND	0.1	mg/L						
Nitrite as N	ND	0.05	mg/L						
Phosphate as P	ND	0.2	mg/L						
Sulphate	ND	1	mg/L						
General Inorganics									
Alkalinity, total	ND	5	mg/L						
Ammonia as N	ND	0.01	mg/L						
Dissolved Organic Carbon	ND	0.5	mg/L						
Colour, apparent	ND	2	ACU						
Conductivity	ND	5	uS/cm						
Phenolics	ND	0.001	mg/L						
Total Dissolved Solids	ND	10	mg/L						
Sulphide	ND	0.02	mg/L						
Tannin & Lignin	ND	0.1	mg/L						
Total Kjeldahl Nitrogen	ND	0.1	mg/L						
Turbidity	ND	0.1	NTU						
Hydrocarbons									
F1 PHCs (C6-C10)	ND	25	ug/L						
F2 PHCs (C10-C16)	ND	100	ug/L						
F3 PHCs (C16-C34)	ND	100	ug/L						
F4 PHCs (C34-C50)	ND	100	ug/L						
Metals									
Calcium	ND	100	ug/L						
Iron	ND	100	ug/L						
Magnesium	ND	200	ug/L						
Manganese	ND	5	ug/L						
Potassium	ND	100	ug/L						
Sodium	ND	200	ug/L						
Pesticides, OC									
Aldrin	ND	0.01	ug/L						
alpha-Chlordane	ND	0.01	ug/L						
gamma-Chlordane	ND	0.01	ug/L						
Chlordane	ND	0.01	ug/L						
o,p'-DDD	ND	0.01	ug/L						
p,p'-DDD	ND	0.01	ug/L						
DDD	ND	0.01	ug/L						
o,p'-DDE	ND	0.01	ug/L						
p,p'-DDE	ND	0.01	ug/L						
DDE	ND	0.01	ug/L						
o,p'-DDT	ND	0.01	ug/L						
p,p'-DDT	ND	0.01	ug/L						
DDT	ND	0.01	ug/L						
Dieldrin	ND	0.01	ug/L						
Endosulfan I	ND	0.01	ug/L						
Endosulfan II	ND	0.01	ug/L						
Endosulfan I/II	ND	0.01	ug/L						
Endrin	ND	0.01	ug/L						
Heptachlor	ND	0.01	ug/L						
Heptachlor epoxide	ND	0.01	ug/L						
Hexachlorobenzene	ND	0.01	ug/L						
Hexachlorobutadiene	ND	0.01	ug/L						
Hexachlorocyclohexane, gamma	ND	0.01	ug/L						
Hexachloroethane	ND	0.01	ug/L						
Methoxychlor	ND	0.01	ug/L						
Surrogate: Decachlorobiphenyl	*0.618*		*ug/L*		*124*	*50-140*			

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Volatiles									
Acetone	ND	5.0	ug/L						
Benzene	ND	0.5	ug/L						
Bromodichloromethane	ND	0.5	ug/L						
Bromoform	ND	0.5	ug/L						
Bromomethane	ND	0.5	ug/L						
Carbon Tetrachloride	ND	0.2	ug/L						
Chlorobenzene	ND	0.5	ug/L						
Chloroform	ND	0.5	ug/L						
Dibromochloromethane	ND	0.5	ug/L						
Dichlorodifluoromethane	ND	1.0	ug/L						
1,2-Dichlorobenzene	ND	0.5	ug/L						
1,3-Dichlorobenzene	ND	0.5	ug/L						
1,4-Dichlorobenzene	ND	0.5	ug/L						
1,1-Dichloroethane	ND	0.5	ug/L						
1,2-Dichloroethane	ND	0.5	ug/L						
1,1-Dichloroethylene	ND	0.5	ug/L						
cis-1,2-Dichloroethylene	ND	0.5	ug/L						
trans-1,2-Dichloroethylene	ND	0.5	ug/L						
1,2-Dichloropropane	ND	0.5	ug/L						
cis-1,3-Dichloropropylene	ND	0.5	ug/L						
trans-1,3-Dichloropropylene	ND	0.5	ug/L						
1,3-Dichloropropene, total	ND	0.5	ug/L						
Ethylbenzene	ND	0.5	ug/L						
Ethylene dibromide (dibromoethane, 1,2	ND	0.2	ug/L						
Hexane	ND	1.0	ug/L						
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L						
Methyl Isobutyl Ketone	ND	5.0	ug/L						
Methyl tert-butyl ether	ND	2.0	ug/L						
Methylene Chloride	ND	5.0	ug/L						
Styrene	ND	0.5	ug/L						
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L						
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L						
Tetrachloroethylene	ND	0.5	ug/L						
Toluene	ND	0.5	ug/L						
1,1,1-Trichloroethane	ND	0.5	ug/L						
1,1,2-Trichloroethane	ND	0.5	ug/L						
Trichloroethylene	ND	0.5	ug/L						
Trichlorofluoromethane	ND	1.0	ug/L						
Vinyl chloride	ND	0.5	ug/L						
m,p-Xylenes	ND	0.5	ug/L						
o-Xylene	ND	0.5	ug/L						
Xylenes, total	ND	0.5	ug/L						
Surrogate: 4-Bromofluorobenzene	*89.3*		*ug/L*		*112*	*50-140*			
Surrogate: Dibromofluoromethane	*79.8*		*ug/L*		*99.8*	*50-140*			
Surrogate: Toluene-d8	*92.2*		*ug/L*		*115*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	204	1	mg/L	198			2.8	10	
Fluoride	0.60	0.1	mg/L	0.61			2.9	10	
Nitrate as N	ND	0.1	mg/L	ND			NC	10	
Nitrite as N	ND	0.05	mg/L	ND			NC	10	
Phosphate as P	ND	0.2	mg/L	ND			NC	10	
Sulphate	38.6	1	mg/L	38.3			0.7	10	
General Inorganics									
Alkalinity, total	1050	25	mg/L	1050			0.6	14	
Ammonia as N	0.036	0.01	mg/L	0.025			NC	18	
Dissolved Organic Carbon	3.6	0.5	mg/L	3.7			2.7	37	
Colour, apparent	4900	50	ACU	4750			3.1	12	
Conductivity	2080	5	uS/cm	2060			0.8	5	
pH	7.4	0.1	pH Units	7.4			0.5	3.3	
Phenolics	0.002	0.001	mg/L	0.002			1.1	10	
Total Dissolved Solids	244	10	mg/L	258			5.6	10	
Sulphide	ND	0.02	mg/L	ND			NC	10	
Tannin & Lignin	0.6	0.1	mg/L	0.7			9.8	11	
Turbidity	1400	0.4	NTU	1400			0.0	10	
Hydrocarbons									
F1 PHCs (C6-C10)	69	25	ug/L	71			2.9	30	
Metals									
Calcium	ND	100	ug/L	ND			NC	20	
Iron	ND	100	ug/L	ND			NC	20	
Magnesium	ND	200	ug/L	ND			NC	20	
Manganese	ND	5	ug/L	ND			NC	20	
Potassium	ND	100	ug/L	ND			NC	20	
Sodium	ND	200	ug/L	221			NC	20	
Volatiles									
Acetone	ND	5.0	ug/L	ND			NC	30	
Benzene	ND	0.5	ug/L	ND			NC	30	
Bromodichloromethane	ND	0.5	ug/L	ND			NC	30	
Bromoform	ND	0.5	ug/L	ND			NC	30	
Bromomethane	ND	0.5	ug/L	ND			NC	30	
Carbon Tetrachloride	ND	0.2	ug/L	ND			NC	30	
Chlorobenzene	ND	0.5	ug/L	ND			NC	30	
Chloroform	ND	0.5	ug/L	ND			NC	30	
Dibromochloromethane	ND	0.5	ug/L	ND			NC	30	
Dichlorodifluoromethane	ND	1.0	ug/L	ND			NC	30	
1,2-Dichlorobenzene	ND	0.5	ug/L	ND			NC	30	
1,3-Dichlorobenzene	ND	0.5	ug/L	ND			NC	30	
1,4-Dichlorobenzene	ND	0.5	ug/L	ND			NC	30	
1,1-Dichloroethane	ND	0.5	ug/L	ND			NC	30	
1,2-Dichloroethane	ND	0.5	ug/L	ND			NC	30	
1,1-Dichloroethylene	ND	0.5	ug/L	ND			NC	30	
cis-1,2-Dichloroethylene	ND	0.5	ug/L	ND			NC	30	
trans-1,2-Dichloroethylene	ND	0.5	ug/L	ND			NC	30	
1,2-Dichloropropane	ND	0.5	ug/L	ND			NC	30	
cis-1,3-Dichloropropylene	ND	0.5	ug/L	ND			NC	30	
trans-1,3-Dichloropropylene	ND	0.5	ug/L	ND			NC	30	
Ethylbenzene	0.55	0.5	ug/L	0.68			21.1	30	
Ethylene dibromide (dibromoethane, 1,2	ND	0.2	ug/L	ND			NC	30	
Hexane	ND	1.0	ug/L	ND			NC	30	
Methyl Ethyl Ketone (2-Butanone)	ND	5.0	ug/L	ND			NC	30	
Methyl Isobutyl Ketone	ND	5.0	ug/L	ND			NC	30	
Methyl tert-butyl ether	ND	2.0	ug/L	ND			NC	30	
Methylene Chloride	ND	5.0	ug/L	ND			NC	30	

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Styrene	ND	0.5	ug/L	ND			NC	30	
1,1,1,2-Tetrachloroethane	ND	0.5	ug/L	ND			NC	30	
1,1,2,2-Tetrachloroethane	ND	0.5	ug/L	ND			NC	30	
Tetrachloroethylene	ND	0.5	ug/L	ND			NC	30	
Toluene	ND	0.5	ug/L	ND			NC	30	
1,1,1-Trichloroethane	ND	0.5	ug/L	ND			NC	30	
1,1,2-Trichloroethane	ND	0.5	ug/L	ND			NC	30	
Trichloroethylene	ND	0.5	ug/L	ND			NC	30	
Trichlorofluoromethane	ND	1.0	ug/L	ND			NC	30	
Vinyl chloride	ND	0.5	ug/L	ND			NC	30	
m,p-Xylenes	ND	0.5	ug/L	ND			NC	30	
o-Xylene	ND	0.5	ug/L	ND			NC	30	
Surrogate: 4-Bromofluorobenzene	*79.7*		*ug/L*		*99.6*	*50-140*			
Surrogate: Dibromofluoromethane	*81.8*		*ug/L*		*102*	*50-140*			
Surrogate: Toluene-d8	*90.9*		*ug/L*		*114*	*50-140*			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	208	1	mg/L	198	94.8	77-123			
Fluoride	1.50	0.1	mg/L	0.61	88.7	79-121			
Nitrate as N	1.06	0.1	mg/L	ND	106	79-120			
Nitrite as N	0.944	0.05	mg/L	ND	94.4	84-117			
Phosphate as P	5.28	0.2	mg/L	ND	106	59-141			
Sulphate	47.8	1	mg/L	38.3	95.5	74-126			
General Inorganics									
Ammonia as N	0.284	0.01	mg/L	0.025	104	81-124			
Dissolved Organic Carbon	9.9	0.5	mg/L	3.7	61.4	60-133			
Phenolics	0.026	0.001	mg/L	0.002	96.6	69-132			
Total Dissolved Solids	100	10	mg/L	ND	100	75-125			
Sulphide	0.52	0.02	mg/L	ND	103	79-115			
Tannin & Lignin	1.6	0.1	mg/L	0.7	96.2	71-113			
Total Kjeldahl Nitrogen	4.07	0.1	mg/L	2.15	95.9	81-126			
Hydrocarbons									
F1 PHCs (C6-C10)	1990	25	ug/L	ND	99.7	68-117			
F2 PHCs (C10-C16)	1580	100	ug/L	ND	98.6	60-140			
F3 PHCs (C16-C34)	3570	100	ug/L	ND	91.2	60-140			
F4 PHCs (C34-C50)	2220	100	ug/L	ND	89.5	60-140			
Metals									
Calcium	12600	100	ug/L	ND	125	80-120			QM-07
Iron	2340	100	ug/L	ND	93.5	80-120			
Magnesium	11500	200	ug/L	ND	115	80-120			
Manganese	50.8	5	ug/L	ND	101	80-120			
Potassium	12100	100	ug/L	ND	121	80-120			QM-07
Sodium	11400	200	ug/L	221	112	80-120			
Pesticides, OC									
Aldrin	0.58	0.01	ug/L	ND	116	50-140			
alpha-Chlordane	0.58	0.01	ug/L	ND	115	50-140			
gamma-Chlordane	0.56	0.01	ug/L	ND	113	50-140			
o,p'-DDD	0.70	0.01	ug/L	ND	140	50-140			
p,p'-DDD	0.61	0.01	ug/L	ND	123	50-140			
o,p'-DDE	0.68	0.01	ug/L	ND	135	50-140			
p,p'-DDE	0.62	0.01	ug/L	ND	123	50-140			
o,p'-DDT	0.68	0.01	ug/L	ND	135	50-140			
p,p'-DDT	0.62	0.01	ug/L	ND	125	50-140			
Dieldrin	0.60	0.01	ug/L	ND	120	50-140			
Endosulfan I	0.60	0.01	ug/L	ND	120	50-140			
Endosulfan II	0.57	0.01	ug/L	ND	115	50-140			
Endrin	0.18	0.01	ug/L	ND	35.0	50-140			QS-02
Heptachlor	0.58	0.01	ug/L	ND	116	50-140			
Heptachlor epoxide	0.55	0.01	ug/L	ND	110	50-140			
Hexachlorobenzene	0.40	0.01	ug/L	ND	80.4	50-140			
Hexachlorobutadiene	0.54	0.01	ug/L	ND	108	50-140			
Hexachlorocyclohexane, gamma	0.55	0.01	ug/L	ND	110	50-140			
Hexachloroethane	0.36	0.01	ug/L	ND	71.0	50-140			
Methoxychlor	0.55	0.01	ug/L	ND	110	50-140			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Surrogate: Decachlorobiphenyl	*0.643*		*ug/L*		*129*	*50-140*			
Volatiles									
Acetone	94.6	5.0	ug/L	ND	94.6	50-140			
Benzene	37.6	0.5	ug/L	ND	94.0	60-130			
Bromodichloromethane	36.6	0.5	ug/L	ND	91.5	60-130			
Bromoform	37.5	0.5	ug/L	ND	93.7	60-130			
Bromomethane	44.0	0.5	ug/L	ND	110	50-140			
Carbon Tetrachloride	39.6	0.2	ug/L	ND	99.1	60-130			
Chlorobenzene	44.4	0.5	ug/L	ND	111	60-130			
Chloroform	38.2	0.5	ug/L	ND	95.4	60-130			
Dibromochloromethane	41.9	0.5	ug/L	ND	105	60-130			
Dichlorodifluoromethane	43.8	1.0	ug/L	ND	110	50-140			
1,2-Dichlorobenzene	33.5	0.5	ug/L	ND	83.8	60-130			
1,3-Dichlorobenzene	31.6	0.5	ug/L	ND	79.0	60-130			
1,4-Dichlorobenzene	36.7	0.5	ug/L	ND	91.8	60-130			
1,1-Dichloroethane	37.9	0.5	ug/L	ND	94.7	60-130			
1,2-Dichloroethane	36.6	0.5	ug/L	ND	91.4	60-130			
1,1-Dichloroethylene	37.9	0.5	ug/L	ND	94.6	60-130			
cis-1,2-Dichloroethylene	35.5	0.5	ug/L	ND	88.8	60-130			
trans-1,2-Dichloroethylene	37.7	0.5	ug/L	ND	94.3	60-130			
1,2-Dichloropropane	37.1	0.5	ug/L	ND	92.7	60-130			
cis-1,3-Dichloropropylene	36.1	0.5	ug/L	ND	90.2	60-130			
trans-1,3-Dichloropropylene	39.5	0.5	ug/L	ND	98.8	60-130			
Ethylbenzene	37.4	0.5	ug/L	ND	93.5	60-130			
Ethylene dibromide (dibromoethane, 1,2-	41.3	0.2	ug/L	ND	103	60-130			
Hexane	35.6	1.0	ug/L	ND	89.0	60-130			
Methyl Ethyl Ketone (2-Butanone)	89.2	5.0	ug/L	ND	89.2	50-140			
Methyl Isobutyl Ketone	78.0	5.0	ug/L	ND	78.0	50-140			
Methyl tert-butyl ether	82.7	2.0	ug/L	ND	82.7	50-140			
Methylene Chloride	38.0	5.0	ug/L	ND	94.9	60-130			
Styrene	35.7	0.5	ug/L	ND	89.2	60-130			
1,1,1,2-Tetrachloroethane	45.1	0.5	ug/L	ND	113	60-130			
1,1,2,2-Tetrachloroethane	41.6	0.5	ug/L	ND	104	60-130			
Tetrachloroethylene	44.5	0.5	ug/L	ND	111	60-130			
Toluene	41.6	0.5	ug/L	ND	104	60-130			
1,1,1-Trichloroethane	38.6	0.5	ug/L	ND	96.6	60-130			
1,1,2-Trichloroethane	36.8	0.5	ug/L	ND	91.9	60-130			
Trichloroethylene	39.8	0.5	ug/L	ND	99.5	60-130			
Trichlorofluoromethane	39.7	1.0	ug/L	ND	99.2	60-130			
Vinyl chloride	39.0	0.5	ug/L	ND	97.6	50-140			
m,p-Xylenes	74.1	0.5	ug/L	ND	92.6	60-130			
o-Xylene	36.7	0.5	ug/L	ND	91.8	60-130			
Surrogate: 4-Bromofluorobenzene	*73.8*		*ug/L*		*92.3*	*50-140*			
Surrogate: Dibromofluoromethane	*78.5*		*ug/L*		*98.1*	*50-140*			
Surrogate: Toluene-d8	*79.3*		*ug/L*		*99.1*	*50-140*			

Qualifier Notes:

Login Qualifiers :

Sample - Received with >5% sediment, instructed to decant and analyze without sediment

Applies to samples: MW21-1, MW21-1-1

QC Qualifiers :

QM-07 : The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on other acceptable QC.

QS-02 : Spike level outside of control limits. Analysis batch accepted based on other QC included in the batch.

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable
ND: Not Detected
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.
NC: Not Calculated

CCME PHC additional information:

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.
- When reported, data for F4G has been processed using a silica gel cleanup.

PARACEL LABORATORIES LTD.

Paracel ID: 2112199

Paracel Order Number (Lab Use Only)	Chain Of Custody (Lab Use Only)
2112199	№ 129465

Client Name: DST Group	Project Ref: 2101208.00	Page 1 of 1
Contact Name: Salim Eid	Quote #:	
Address: 2150 Thurston Drive Ottawa, ON	PO #:	Turnaround Time: ☐ 1 day ☐ 3 day ☐ 2 day ☒ Regular
Telephone: 613-402-0393	E-mail: seid@dstgroup.com cfischl@dstgroup.com	Date Required:

Regulation 153/04	Other Regulation
☒ Table 1 ☐ Res/Park ☐ Med/Fine	☐ REG 558 ☐ PWQO
☐ Table 2 ☐ Ind/Comm ☐ Coarse	☐ CCME ☐ MISA
☐ Table 3 ☐ Agri/Other	☐ SU - Sani ☐ SU - Storm
☐ Table	Mun:
For RSC: ☐ Yes ☐ No	☐ Other:

Matrix Type: S (Soil/Sed.) GW (Ground Water) SW (Surface Water) SS (Storm/Sanitary Sewer) P (Paint) A (Air) O (Other)

	Sample ID/Location Name	Matrix	Air Volume	# of Containers	Sample Taken: Date	Sample Taken: Time	PHCs F1-F4+BTEX	VOCs	PAHs	Metals	Hg	CrVI	B (HWS)	Inorganics	General Chemistry	Nutrients	Pesticides/ Herbicides		
1	MW21-1	S	15	~~4~~	2020/03/15		X	X		X				X	X	X	X		
2	MW21-1-1	S		3	↓		X	X											
3	MW21-6	S	15	~~4~~	↓		X	X		X				X	X	X	X		
4																			
5																			
6																			
7																			
8																			
9																			
10																			

Comments: Please see attached communication for exact analysis.

Method of Delivery: Drop Box

Relinquished By (Sign):	Received By Driver/Depot:	Received at Lab: Suneeporn Dokmai	Verified By:
Relinquished By (Print): Cam Fischl	Date/Time:	Date/Time: Mar 16, 2021 11:52	Date/Time: March 16, 2021 12:34
Date/Time: 2021/03/16 10:30	Temperature: °C	Temperature: 2.4 °C	pH Verified: ☑ By:

Do you require the bacteria portion of the Subdivision package?

Scott Clark
Account Manager

PARACEL LABORATORIES LTD. | TRUSTED. RESPONSIVE. RELIABLE.

2319 St.Laurent Blvd., Suite 300
Ottawa, Ontario, K1G 4J8
p: (613) 731-9577
c: (343) 961-1438
t: 1-800-749-1947
sclark@paracellabs.com
www.paracellabs.com

COVID 19 Update

Paracel continues to take strong measures to ensure the health, safety and well-being of our employees and clients. While our reception areas may be closed, we are open for contactless sample drop off and bottle order pickups. Our service group remains available by phone and email to assist you.

Take care and stay healthy.

From: Sonny Sundaram [mailto:ssundaram@dstgroup.com]
Sent: Thursday, March 11, 2021 3:01 PM
To: Scott Clark <sclark@paracellabs.com>
Cc: Salim Eid <seid@dstgroup.com>; Cameron Fischl <cfischl@dstgroup.com>; Shanti Ratmono <sratmono@dstgroup.com>
Subject: FW: Bottle Order -Dilworth Road - water samples

Hi Scott,

Refer to the list of parameters below for the general inorganics, anions, nutrients pesticides and herbicides (these parameters will be compared to the Ontario Drinking Water Quality Standards in addition to metals). For PHCs and VOCs, these parameters will be compared to O.Reg. 153/04. There is no need for mercury or chromium VI

For metals, can we just sample the metals included in the subdivision package? Not the entire group of metals, please let us know, thanks

General Inorganics	***Anions***
Alkalinity, total	Chloride
Ammonia as N	Fluoride
Colour	Nitrate as N
Conductivity	Nitrite as N
Dissolved Organic Carbon	Orthophosphate (P)
Hardness	Sulphide as H_2S

Ion Balance	Sulphate
pH	
Phenols	
Tannins & Lignins	
Total Dissolved Solids	
Total Kjeldahl Nitrogen	
Turbidity	

Paracel ID: 2112199

Calculated Parameters
Aldrin + Dieldrin
Chlordane (Total)
DDT+ Metabolites
Heptachlor + Heptachlor epoxide
o,p-DDD + p,p-DDD
o,p-DDE + p,p-DDE
o,p-DDT + p,p-DDT
Total Endosulfan
Total PCB
Pesticides & Herbicides
Lindane
Heptachlor
Aldrin
Heptachlor epoxide
Oxychlordane
g-Chlordane
a-Chlordane
Dieldrin
o,p-DDE
p,p-DDE
o,p-DDD
p,p-DDD
o,p-DDT
p,p-DDT
Methoxychlor
Aroclor 1016
Aroclor 1221
Aroclor 1232
Aroclor 1242
Aroclor 1248
Aroclor 1254
Aroclor 1260

Appendix G

MECP Water Well Records

ENGLOBE

MINISTRY OF THE ENVIRONMENT
The Ontario Water Resources Act

WATER WELL RECORD

Ontario

31G4E

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 1516795 MUNICIP. 15004 CON. CON 03

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT
Carleton	North Gower	Con 3,	034

[redacted] RR#1, Kars Ont. DATE COMPLETED DAY 12 MO. 10 YR. 78

[redacted] 94300 RC 5 ELEVATION 0299 RC 5 BASIN CODE 26

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	TO
grey	clay hardpan	stones		0	16
grey	limestone			16	60

31 0016205 1412 0060215

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
0045	1 ☒ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
0055	1 ☒ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	TO
06	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	.188	0	0022
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.) DIAMETER INCHES LENGTH FEET
MATERIAL AND TYPE DEPTH TO TOP OF SCREEN FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT LEAD PACKER, ETC.)

71 PUMPING TEST

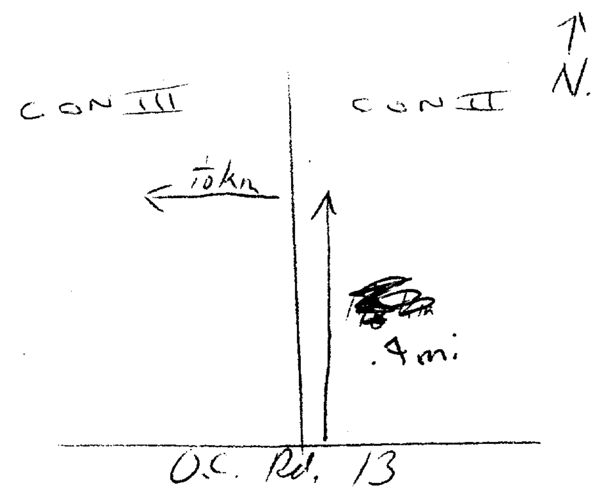
PUMPING TEST METHOD 1 ☒ PUMP 2 ☐ BAILER
PUMPING RATE 0015 GPM
DURATION OF PUMPING 01 HOURS 00 MINS
WATER LEVELS DURING 1 ☒ PUMPING 2 ☐ RECOVERY

STATIC LEVEL	WATER LEVEL END OF PUMPING	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
008 FEET	025 FEET	025 FEET	025 FEET	025 FEET	025 FEET

IF FLOWING, GIVE RATE GPM
PUMP INTAKE SET AT FEET
WATER AT END OF TEST 1 ☐ CLEAR 2 ☒ CLOUDY
RECOMMENDED PUMP TYPE ☒ SHALLOW ☐ DEEP
RECOMMENDED PUMP SETTING 025 FEET
RECOMMENDED PUMPING RATE 0010 GPM
GPM./FT. SPECIFIC CAPACITY

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS

FINAL STATUS OF WELL 1
1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED

WATER USE 12
1 ☒ DOMESTIC 2 ☒ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED

METHOD OF DRILLING 5
1 ☐ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☒ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: Henry Mains Well Drilling LICENCE NUMBER 3644
ADDRESS: Box 326, Richmond Ont.
NAME OF DRILLER OR BORER: Henry Mains LICENCE NUMBER
SIGNATURE OF CONTRACTOR: SUBMISSION DATE DAY 14 MO. 10 YR. 78

OFFICE USE ONLY

DATA SOURCE 1 CONTRACTOR 3644 DATE RECEIVED 271178
DATE OF INSPECTION 21/6/79 INSPECTOR
REMARKS:
P
WI

MINISTRY OF THE ENVIRONMENT COPY

FORM 7 MOE 07-091

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 1518449 MUNICIP 15004 CON 03

COUNTY OR DISTRICT: Carleton
TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: Rideau
CON., BLOCK, TRACT, SURVEY, ETC.: Con 3
LOT: 35
DATE COMPLETED: DAY 25 MO 5 YR 83

[redacted]

ELEVATION RC BASIN CODE

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
grey	sand			0	12
grey	hardpan	stones		12	63
grey	limestone			63	84

31
32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
80	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
6	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	.188	0	65
6	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE		65	84
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET

MATERIAL AND TYPE | DEPTH TO TOP OF SCREEN FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT LEAD PACKER, ETC.)

71 PUMPING TEST

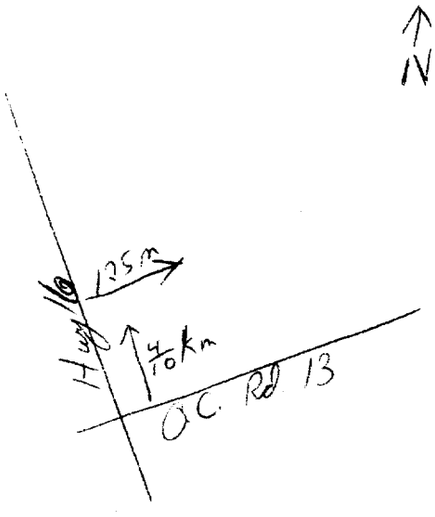
PUMPING TEST METHOD: 1 ☒ PUMP 2 ☐ BAILER
PUMPING RATE: 50 GPM
DURATION OF PUMPING: 1 HOURS 0 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☐ PUMPING 2 ☐ RECOVERY			
		15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
8 FEET	25 FEET	25 FEET	25 FEET	25 FEET	25 FEET

IF FLOWING, GIVE RATE: GPM
PUMP INTAKE SET AT: FEET
WATER AT END OF TEST: 1 ☐ CLEAR 2 ☒ CLOUDY
RECOMMENDED PUMP TYPE: ☒ SHALLOW ☐ DEEP
RECOMMENDED PUMP SETTING: 25 FEET
RECOMMENDED PUMPING RATE: 10 GPM

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS

FINAL STATUS OF WELL

1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED POOR QUALITY 7 ☐ UNFINISHED

WATER USE

1 ☒ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED

METHOD OF DRILLING

1 ☐ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☒ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: Henry Mans Well Drilling
LICENCE NUMBER: 3644
ADDRESS: Box 326, Richmond Ont.
NAME OF DRILLER OR BORER: Henry Mans
LICENCE NUMBER:
SIGNATURE OF CONTRACTOR:
SUBMISSION DATE: DAY 28 MO 5 YR 83

OFFICE USE ONLY

DATA SOURCE
CONTRACTOR 3644
DATE RECEIVED 03 08 83
DATE OF INSPECTION
INSPECTOR
REMARKS
WDE
CSS, ES

MINISTRY OF THE ENVIRONMENT COPY

FORM NO. 0506—4—77 FORM 7

Ministry of the Environment
Ontario

The Ontario Water Resources Act

WATER WELL RECORD

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 — 1526608 — MUNICIP. 1,5004 — CON. CON 03

COUNTY OR DISTRICT: Carleton
TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: Rideau (North Gower)
CON., BLOCK, TRACT, SURVEY, ETC: Con 3
LOT: 34
[redacted] R#4, Kemptville K0G 1J0
DATE COMPLETED: DAY 14 MO 10 YR 92
RC. ELEVATION RC. BASIN CODE

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
grey	hardpan	stones		0	83
grey	limestone			83	103

31
32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
97	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERALS 6 ☐ GAS

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
6 1/4	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC	188	0	86
6	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC		86	103
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE 5 ☐ PLASTIC			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET
MATERIAL AND TYPE	DEPTH TO TOP OF SCREEN FEET	

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT LEAD PACKER, ETC.)
10-13	14-17	cement grouted
18-21	22-25	
26-29	30-33	

71 PUMPING TEST

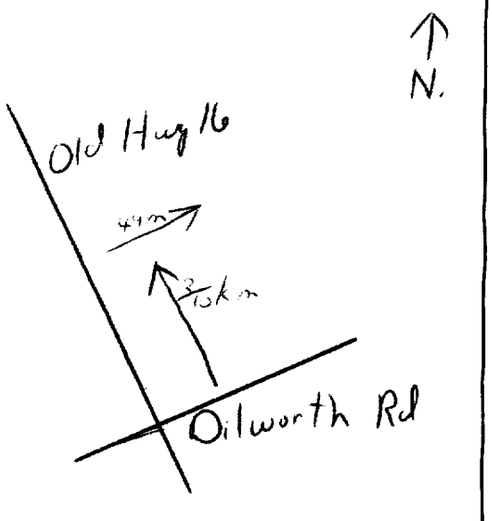
PUMPING TEST METHOD: 1 ☒ PUMP 2 ☐ BAILER
PUMPING RATE: 15 GPM
DURATION OF PUMPING: 1 HOURS 0 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☐ PUMPING 2 ☒ RECOVERY			
		15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
30 FEET	80 FEET	32 FEET	30 FEET	30 FEET	30 FEET

IF FLOWING, GIVE RATE: GPM
PUMP INTAKE SET AT: FEET
WATER AT END OF TEST: 1 ☐ CLEAR 2 ☒ CLOUDY
RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP
RECOMMENDED PUMP SETTING: 80 FEET
RECOMMENDED PUMPING RATE: 15 GPM

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS: 111937

FINAL STATUS OF WELL

1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED ☐ DEWATERING

WATER USE

1 ☒ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED

METHOD OF CONSTRUCTION

1 ☐ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☒ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING ☐ DIGGING ☐ OTHER

CONTRACTOR

NAME OF WELL CONTRACTOR: W. Mains Well Drilling
WELL CONTRACTOR'S LICENCE NUMBER: 3644
ADDRESS: Box 326, Richmond Ont.
NAME OF WELL TECHNICIAN:
WELL TECHNICIAN'S LICENCE NUMBER: T-0064
SIGNATURE OF TECHNICIAN/CONTRACTOR:
SUBMISSION DATE: DAY ____ MO ____ YR ____

OFFICE USE ONLY

DATA SOURCE
CONTRACTOR: 3644
DATE RECEIVED: OCT 26 1992
DATE OF INSPECTION:
INSPECTOR:
REMARKS:
cas/fs

MINISTRY OF THE ENVIRONMENT COPY

FORM NO. 0506 (11/86) FORM 9

Ontario **Ministry of Environment and Energy**

The Ontario Water Resources Act
WATER WELL RECORD

Print only in spaces provided.
Mark correct box with a checkmark, where applicable.

11 **1533871**

Municipality 15004 Con. CON 03

County or District	Township/Borough/City/Town/Village	Con block tract survey, etc.	Lot
Ottawa Carleton	Osgood (North Gower)	Plan 4M-773	34

Owner's surname: Haus + Jo Const Limited — First Name:

Address of Well Location: 21 Railwood Dr. North Gower ROA 2TO ONT

Date completed: 25/07/03 (day/month/year)

(1) 21 — Zone — Easting — Northing — RC — Elevation — RC — Basin Code — ii — iii — iv

LOG OF OVERBURDEN AND BEDROCK MATERIALS (see instructions)

General colour	Most common material	Other materials	General description	Depth - feet From	Depth - feet To
Brown	Till	Boulder	Packed	0	14
Grey	Till	Gravel Boulders	Loose	14	46
Grey	limestone Rock		Layered	46	82

31

32

41 WATER RECORD

Water found at - feet	Kind of water
70	1 ☑ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas
	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas
	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas
	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas
	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas

51 CASING & OPEN HOLE RECORD

Inside diam inches	Material	Wall thickness inches	Depth - feet From	Depth - feet To
8 3/4"	1 ☐ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☑ Open hole 5 ☐ Plastic		0	51
6 1/4"	1 ☑ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic	1.88	+2	51
6"	1 ☐ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☑ Open hole 5 ☐ Plastic		51	82

SCREEN

Sizes of opening (Slot No.)	Diameter inches	Length feet

Material and type: — Depth at top of screen feet:

61 PLUGGING & SEALING RECORD

☑ Annular space ☐ Abandonment

Depth set at - feet From	Depth set at - feet To	Material and type (Cement grout, bentonite, etc.)
0	51	Cement grout

71 PUMPING TEST

Pumping test method: 1 ☐ Pump 2 ☑ Bailer — Pumping rate: 25 GPM — Duration of pumping: 1 Hours 0 Mins

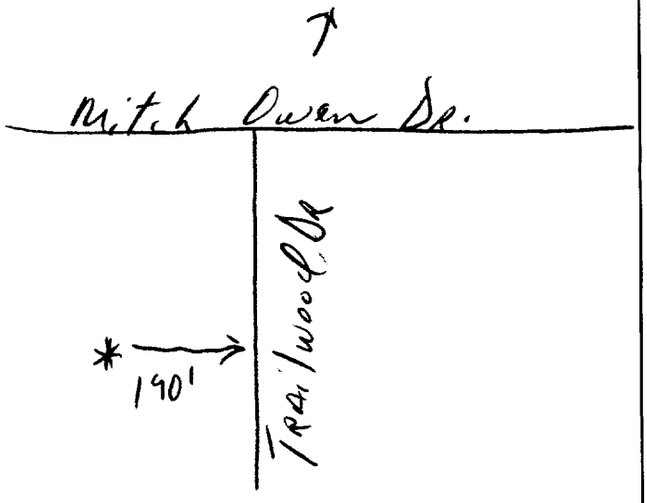
Static level	Water level end of pumping	Water levels during: 1 ☐ Pumping 2 ☑ Recovery			
		15 minutes	30 minutes	45 minutes	60 minutes
25 feet	82 feet	25 feet	23 feet	25 feet	25 feet

If flowing give rate: GPM — Pump intake set at: 82 feet — Water at end of test: ☐ Clear ☑ Cloudy

Recommended pump type: ☐ Shallow ☑ Deep — Recommended pump setting: 70 feet — Recommended pump rate: 10 GPM

LOCATION OF WELL

In diagram below show distances of well from road and lot line.
Indicate north by arrow.



257336

FINAL STATUS OF WELL

1 ☑ Water supply 2 ☐ Observation well 3 ☐ Test hole 4 ☐ Recharge well 5 ☐ Abandoned, insufficient supply 6 ☐ Abandoned, poor quality 7 ☐ Abandoned (Other) 8 ☐ Dewatering 9 ☐ Unfinished 10 ☐ Replacement well

WATER USE

1 ☑ Domestic 2 ☐ Stock 3 ☐ Irrigation 4 ☐ Industrial 5 ☐ Commercial 6 ☐ Municipal 7 ☐ Public supply 8 ☐ Cooling & air conditioning 9 ☐ Not use 10 ☐ Other

METHOD OF CONSTRUCTION

1 ☐ Cable tool 2 ☐ Rotary (conventional) 3 ☐ Rotary (reverse) 4 ☑ Rotary (air) 5 ☐ Air percussion 6 ☐ Boring 7 ☐ Diamond 8 ☐ Jetting 9 ☐ Driving 10 ☐ Digging 11 ☐ Other

Name of Well Contractor	Well Contractor's Licence No.
Gilles Bourgeois Well Dri	1414
Address: St-Albert Ont.	
Name of Well Technician: Jacques Raymond	Well Technician's Licence No.: T-0264
Signature of Technician/Contractor:	Submission date: 25/07/03 (day/mo/yr)

MINISTRY USE ONLY

Data source	Contractor	Date received
	1414	JUL 31 2003
Date of inspection	Inspector	
Remarks		

CSS.ES3

2 - MINISTRY OF ENVIRONMENT AND ENERGY COPY

0506 (06/02) Front Form 9

Ontario — Ministry of Environment and Energy

The Ontario Water Resources Act
WATER WELL RECORD

Print only in spaces provided.
Mark correct box with a checkmark, where applicable.

11 — 1534319

Municipality 1504 — Con. Con 03

County or District	Township/Borough/City/Town/Village	Con	block	tract	survey, etc.	Lot
[redacted]	Rideau - North Gower	3				34/35

Address of Well Location: 174 Old Pakenham Rd. Fitzroy Harbour, Ontario K0A 1X0

Date completed: 23 day 10 month 03 year

21 — UTM: Zone — Easting — Northing — RC — Elevation — RC — Basin Code

LOG OF OVERBURDEN AND BEDROCK MATERIALS (see instructions)

General colour	Most common material	Other materials	General description	Depth - feet From	Depth - feet To
Brown	Sandy Clay			0	8
Gray	Clay			8	22
Gray	Sand, Gravel	Boulders	Packed	22	38
Gray	Limestone		Hard	28	150

31

32

41 WATER RECORD

Water found at - feet	Kind of water
139	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 5 ☐ Gas — NOT TESTED
	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas
	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas
	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas
	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas

51 CASING & OPEN HOLE RECORD

Inside diam inches	Material	Wall thickness inches	Depth - feet From	Depth - feet To
6 1/4	1 ☒ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic	.188	+ 2	42.5
5 7/8	1 ☐ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☒ Open hole 5 ☐ Plastic		42.5	150
	1 ☐ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic			

SCREEN

Sizes of opening (Slot No.)	Diameter inches	Length feet

Material and type | Depth at top of screen feet

61 PLUGGING & SEALING RECORD

☒ Annular space ☐ Abandonment

Depth set at - feet From	Depth set at - feet To	Material and type (Cement grout, bentonite, etc.)
42.5	0	Grouted-Bentonite(5)

71 PUMPING TEST

Pumping test method: 1 ☒ Pump 2 ☐ Bailer

Pumping rate: 50 GPM

Duration of pumping: 1 Hours ..... Mins

Static level	Water level end of pumping	Water levels during: 1 ☒ Pumping 2 ☐ Recovery — 15 minutes	30 minutes	45 minutes	60 minutes
2'1" feet	27 feet	145 feet	75 feet	60 feet	27 feet

If flowing give rate: GPM

Pump intake set at: feet

Water at end of test: ☐ Clear ☒ Cloudy

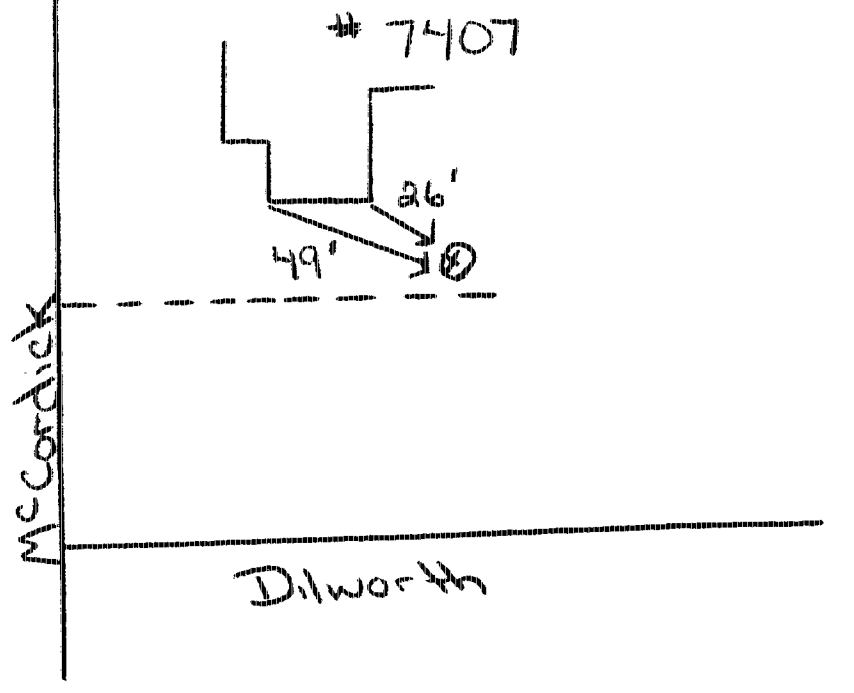
Recommended pump type: ☐ Shallow ☒ Deep

Recommended pump setting: 25 feet

Recommended pump rate: 5 GPM

LOCATION OF WELL

In diagram below show distances of well from road and lot line.
Indicate north by arrow.



267035

FINAL STATUS OF WELL

1 ☒ Water supply 2 ☐ Observation well 3 ☐ Test hole 4 ☐ Recharge well 5 ☐ Abandoned, insufficient supply 6 ☐ Abandoned, poor quality 7 ☐ Abandoned (Other) 8 ☐ Dewatering 9 ☐ Unfinished 10 ☐ Replacement well

WATER USE

1 ☒ Domestic 2 ☐ Stock 3 ☐ Irrigation 4 ☐ Industrial 5 ☐ Commercial 6 ☐ Municipal 7 ☐ Public supply 8 ☐ Cooling & air conditioning 9 ☐ Not use 10 ☐ Other .....

METHOD OF CONSTRUCTION

1 ☐ Cable tool 2 ☐ Rotary (conventional) 3 ☐ Rotary (reverse) 4 ☒ Rotary (air) MUD 5 ☒ Air percussion 6 ☐ Boring 7 ☐ Diamond 8 ☐ Jetting 9 ☐ Driving 10 ☐ Digging 11 ☐ Other .....

Name of Well Contractor	Well Contractor's Licence No.
Capital Water Supply Ltd.	1558
Address: P.O. Box 490 Stittsville, Ontario K2S 1A6	
Name of Well Technician: S. Miller	Well Technician's Licence No.: T0097
Signature of Technician/Contractor	Submission date: day 27 mo 10 yr 03

MINISTRY USE ONLY

Data source	Contractor	Date received
	1558	NOV 13 2003
Date of inspection	Inspector	
Remarks		

2 - MINISTRY OF ENVIRONMENT AND ENERGY COPY

0506 (06/02) Front Form 9

Ontario Ministry of the Environment

Well Tag No. (Plate number below) A049954 A049954

Well Record

Regulation 903 Ontario Water Resources Act

page ___ of ___

Instructions for Completing Form

- For use in the **Province of Ontario** only. This document is a permanent **legal** document. Please retain for future reference.
- All Sections **must** be completed in full to avoid delays in processing. Further instructions and explanations are available on the back of this form.
- Questions regarding completing this application can be directed to the Water Well Help Desk (Toll Free) at 1-888-396-9355.
- **All metre measurements shall be reported to 1/10th of a metre.**
- Please print clearly in blue or black ink only.

Ministry Use Only

[redacted]

Address of Well Location (County/District/Municipality): Ottawa

Township: Rideau

Lot: 36 Concession: 3 pt 1 Plan 4R-16444

RR#/Street Number/Name: 7421 Rev Craig Road

City/Town/Village: Kemptville

Site/Compartment/Block/Tract etc.:

GPS Reading: NAD 83 Zone 18 Easting 449463 Northing 4993792

Unit Make/Model: Garmin

Mode of Operation: ☐ Undifferentiated ☒ Averaged ☐ Differentiated, specify

Log of Overburden and Bedrock Materials (see instructions)

General Colour	Most common material	Other Materials	General Description	Depth From	Depth To (Metres)
Brown	Sandy Clay	Stones	Packed	0	2.74
Grey	Clay	Stones	Packed	2.74	8.23
Grey/Black	Limestone	Dolomite	Hard Layered	8.23	55.17

Hole Diameter

Depth From	Depth To (Metres)	Diameter (Centimetres)
0	9.45	25.08
9.45	55.17	15.55

Water Record

Water found at Metres / Kind of Water

Metres	Fresh	Salty	Sulphur	Gas	Minerals	Other
45 m	☐	☐	☐	☐	☐	☐ 9.1 l/pm
49.68 m	☐	☐	☐	☐	☐	☐ 9.1 l/pm
___ m	☐	☐	☐	☐	☐	☐

After test of well yield, water was: ☒ Clear and sediment free ☐ Other, specify

Chlorinated ☒ Yes ☐ No

Construction Record

Inside diam centimetres	Material	Wall thickness centimetres	Depth From	Depth To (Metres)
Casing				
15.88	☒ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	.48	0	9.45
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
Screen				
Outside diam	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	Slot No.		
No Casing or Screen				
	☒ Open hole		9.45	55.17

Test of Well Yield

Pumping test method: Submersible

Pump intake set at - (metres): 51.82

Pumping rate - (litres/min): 22.75

Duration of pumping: 1 hrs + 0 min

Final water level end of pumping: 31.57 metres

Recommended pump type: ☐ Shallow ☒ Deep

Recommended pump depth: 51.82 metres

Recommended pump rate: 22.75 (litres/min)

If flowing give rate - (litres/min):

If pumping discontinued, give reason.

Draw Down Time min	Draw Down Water Level Metres	Recovery Time min	Recovery Water Level Metres
Static Level	1.86		31.57
1	3.51	1	30.52
2	4.44	2	30.21
3	5.54	3	29.78
4	6.23	4	29.48
5	7.12	5	29.21
10	11.38	10	26.42
15	15.40½	15	25.35
20	19.86	20	23.35
25	21.19	25	21.42
30	22.88	30	19.71
40	26.08	40	16.66
50	29.18	50	13.57
60	31.57	60	11.87

Plugging and Sealing Record

☒ Annular space ☐ Abandonment

Depth set at - Metres From	To	Material and type (bentonite slurry, neat cement slurry) etc.	Volume Placed (cubic metres)
9.45	6.10	Cement Pressure Grouted	.16
6.10	0	Bentonite Pressure Grouted	.49

Method of Construction

☐ Cable Tool ☒ Rotary (air) ☐ Diamond ☐ Digging
☐ Rotary (conventional) ☒ Air percussion ☐ Jetting ☐ Other
☐ Rotary (reverse) ☐ Boring ☐ Driving

Water Use

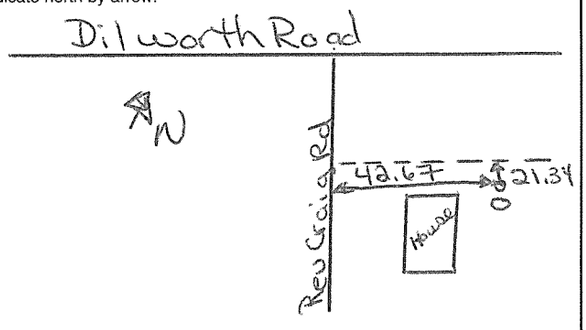
☒ Domestic ☐ Industrial ☐ Public Supply ☐ Other
☐ Stock ☐ Commercial ☐ Not used
☐ Irrigation ☐ Municipal ☐ Cooling & air conditioning

Final Status of Well

☒ Water Supply ☐ Recharge well ☐ Unfinished ☐ Abandoned, (Other)
☐ Observation well ☐ Abandoned, insufficient supply ☐ Dewatering
☐ Test Hole ☐ Abandoned, poor quality ☐ Replacement well

Location of Well

In diagram below show distances of well from road, lot line, and building. Indicate north by arrow.



Audit No. Z 72515

Date Well Completed: YYYY 2007 MM 06 DD 20

Was the well owner's information package delivered? ☒ Yes ☐ No

Date Delivered: YYYY 2007 MM 06 DD 29

Well Contractor/Technician Information

Name of Well Contractor: Splash Well Drilling

Well Contractor's Licence No.: 4877

Business Address (street name, number, city etc.): P.O. Box 1083, Prescott

Name of Well Technician (last name, first name): Ferguson, Todd

Well Technician's Licence No.: T478

Signature of Technician/Contractor: X Todd

Date Submitted: YYYY 2007 MM 07 DD 03

Ministry Use Only

Data Source

Contractor: 4877

Date Received: AUG 23 2007 YYYY MM DD

Date of Inspection: YYYY MM DD

Remarks

Well Record Number

0506E (08/2006)

Ministry's Copy

Cette formule est disponible en français

The Ontario Water Resources Commission Act

WATER WELL RECORD

3194E

Water management in Ontario

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 | 1511642 | MUNICIP. 15004 | CON. CON | 02

COUNTY OR DISTRICT: Carl
TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: North Gower
CON., BLOCK, TRACT, SURVEY, ETC.: 2
LOT: 035
OWNER (SURNAME FIRST): [redacted]
ADDRESS: Mountain Ont
DATE COMPLETED: DAY 02 MO. 12 YR. 71
UTM: 194030 | RC. 4 | ELEVATION 0295 | RC. 5 | BASIN CODE 25

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH – FEET FROM	DEPTH – FEET TO
brown	sand	boulders	hard	0	11
grey	"	"	hard	11	16
"	hardpan	boulders	"	16	26
"	limestone		hard	26	81

31: 0011 | 09 | 13 | 0016 | 09 | 13 | 0026 | 14 | 13 | 0081 | 15
32:

41 WATER RECORD

WATER FOUND AT – FEET	KIND OF WATER
0080	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH – FEET FROM	DEPTH – FEET TO
58	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ ~~OPEN HOLE~~	188	0	~~0033~~ 33
05			33	~~81~~
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE			0081
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET

MATERIAL AND TYPE | DEPTH TO TOP OF SCREEN FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT – FEET FROM	DEPTH SET AT – FEET TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

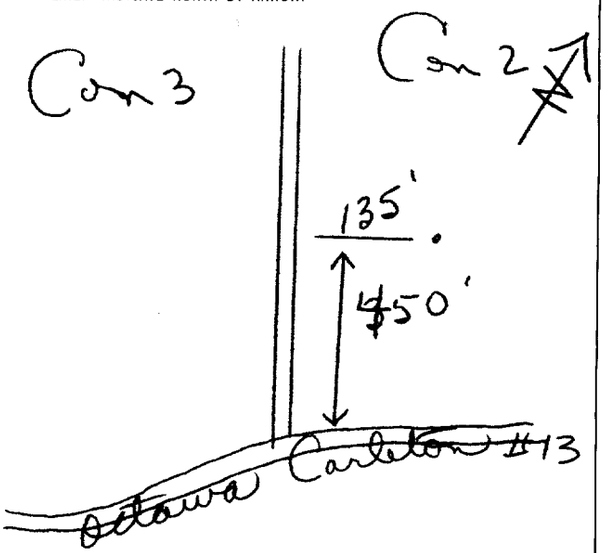
PUMPING TEST METHOD: 1 ☐ PUMP 2 ☒ BAILER
PUMPING RATE: 0007 GPM.
DURATION OF PUMPING: 01 HOURS 00 MINS.
1 ☒ PUMPING 2 ☐ RECOVERY

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
006 FEET	040 FEET	030 FEET	040 FEET	040 FEET	040 FEET

IF FLOWING, GIVE RATE: GPM.
PUMP INTAKE SET AT: FEET
WATER AT END OF TEST: 1 ☒ CLEAR 2 ☐ CLOUDY
RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP
RECOMMENDED PUMP SETTING: 060 FEET
RECOMMENDED PUMPING RATE: 0005 GPM.
000.2 GPM./FT. SPECIFIC CAPACITY

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS:

FINAL STATUS OF WELL
1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED

WATER USE 01
1 ☒ DOMESTIC 2 ☒ STOCK 3 ☒ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED

METHOD OF DRILLING
1 ☒ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☐ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: Capital Water Supply | LICENCE NUMBER: 558
ADDRESS: Box 490 Stittsville Ont
NAME OF DRILLER OR BORER: J. Moore | LICENCE NUMBER:
SIGNATURE OF CONTRACTOR: Walter Kavanagh | SUBMISSION DATE DAY MO. YR.

OFFICE USE ONLY

DATA SOURCE 1 | CONTRACTOR 1558 | DATE RECEIVED 130172
DATE OF INSPECTION | INSPECTOR K
REMARKS: PK WI

OWRC COPY

The Ontario Water Resources Commission Act

WATER WELL RECORD

31G/4E

Water management in Ontario

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 — 1512294

MUNICIP. 15004 — CON. CON 03

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT
CARLETON	N GOWER — N GOWER	3	035

OWNER (SURNAME FIRST) [redacted] R#1 KARS

DATE COMPLETED: DAY 03 MO 08 YR 72

... 993960 | RC. 4 | ELEVATION 0290 | RC. 5 | BASIN CODE 26

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH – FEET FROM	TO
			CLAY LOAM	0	20
			GREY SANDSTONE	20	36

31 | 0020 05 06 28 | 0036 21 8

32

41 WATER RECORD

WATER FOUND AT – FEET	KIND OF WATER
0030	1 ☒ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH – FEET FROM	TO
06	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	.188	0	0025
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET

MATERIAL AND TYPE | DEPTH TO TOP OF SCREEN FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT – FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☒ PUMP 2 ☐ BAILER

PUMPING RATE: 0006 GPM.

DURATION OF PUMPING: 01 HOURS 00 MINS.

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING ☒ PUMPING ☐ RECOVERY: 15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
004 FEET	025 FEET	004 FEET	— FEET	FEET	FEET

IF FLOWING, GIVE RATE: GPM.

PUMP INTAKE SET AT: FEET

WATER AT END OF TEST: 1 ☒ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE: ☒ SHALLOW ☐ DEEP

RECOMMENDED PUMP SETTING: 032 FEET

RECOMMENDED PUMPING RATE: 0006 GPM.

0003 GPM./FT. SPECIFIC CAPACITY

FINAL STATUS OF WELL

1 ☒ WATER SUPPLY
2 ☐ OBSERVATION WELL
3 ☐ TEST HOLE
4 ☐ RECHARGE WELL
5 ☐ ABANDONED, INSUFFICIENT SUPPLY
6 ☐ ABANDONED, POOR QUALITY
7 ☐ UNFINISHED

WATER USE 01

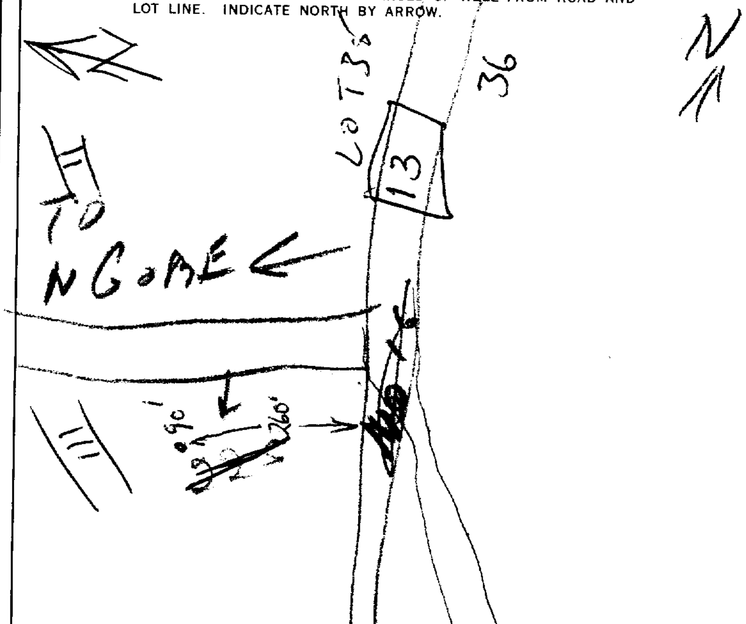
1 ☒ DOMESTIC
2 ☐ STOCK
3 ☐ IRRIGATION
4 ☐ INDUSTRIAL
☐ OTHER
5 ☐ COMMERCIAL
6 ☐ MUNICIPAL
7 ☐ PUBLIC SUPPLY
8 ☐ COOLING OR AIR CONDITIONING
9 ☐ NOT USED

METHOD OF DRILLING

1 ☐ CABLE TOOL
2 ☐ ROTARY (CONVENTIONAL)
3 ☐ ROTARY (REVERSE)
4 ☒ ROTARY (AIR)
5 ☐ AIR PERCUSSION
6 ☐ BORING
7 ☐ DIAMOND
8 ☐ JETTING
9 ☐ DRIVING

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS:

CONTRACTOR

NAME OF WELL CONTRACTOR: THOMPSON BROS — LICENCE NUMBER: 4904

ADDRESS: LANARK RR#3

NAME OF DRILLER OR BORER: C THOMPSON — LICENCE NUMBER:

SIGNATURE OF CONTRACTOR — SUBMISSION DATE: DAY 03 MO 08 YR 72

OFFICE USE ONLY

DATA SOURCE 1 | CONTRACTOR 4904 | DATE RECEIVED 310173

DATE OF INSPECTION | INSPECTOR

REMARKS: P WI

OWRC COPY

MINISTRY OF THE ENVIRONMENT

The Ontario Water Resources Act

WATER WELL RECORD

ONTARIO

Kemptville 3|6|4

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 | 1513307 | MUNICIP. 15004 | CON. CON 03

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT
Carleton	North Gower	Con 3,	035

[redacted] Kars Ont.

DATE COMPLETED: DAY 27 MO. 06 YR. 73

[redacted] 93903 | RC. 4 | ELEVATION 0295 | RC. 5 | BASIN CODE 26

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
brown	sand		loose	0	15
"	clay		packed	15	20
dark	gravel		"	20	25
"	limestone		medium	25	73

31 | 0015628 | 0020605 | 0025 11 | 0073 15

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
0055	1 ☒ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
0073	1 ☒ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
06 (~~6¼~~)	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	.188	0	0026 (~~26~~)
06	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE			0073
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.) | DIAMETER INCHES | LENGTH FEET

MATERIAL AND TYPE | DEPTH TO TOP OF SCREEN FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☒ PUMP 2 ☐ BAILER | PUMPING RATE 0008 GPM. | DURATION OF PUMPING 01 HOURS 00 MINS.

STATIC LEVEL	WATER LEVEL END OF PUMPING	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
010 FEET	040 FEET	040 FEET	040 FEET	040 FEET	040 FEET

WATER LEVELS DURING: 1 ☒ PUMPING 2 ☐ RECOVERY

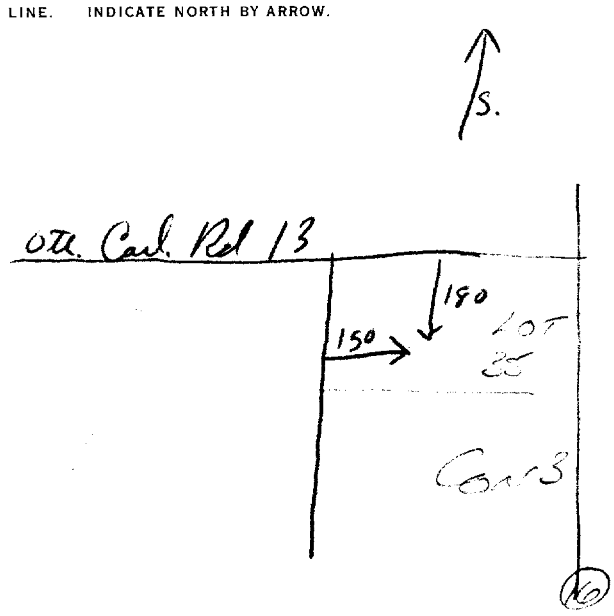
IF FLOWING, GIVE RATE GPM. | PUMP INTAKE SET AT FEET | WATER AT END OF TEST: 1 ☐ CLEAR 2 ☒ CLOUDY

RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP | RECOMMENDED PUMP SETTING 045 FEET | RECOMMENDED PUMPING RATE 0005 GPM.

000.3 GPM./FT. SPECIFIC CAPACITY

LOCATION OF WELL 4993

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS:

FINAL STATUS OF WELL: 1
1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED

WATER USE: 01
1 ☒ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED

METHOD OF DRILLING: 5
1 ☐ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☒ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: Henry Mains Well Drilling | LICENCE NUMBER: 3644.

ADDRESS: Box 326, Richmond Ont.

NAME OF DRILLER OR BORER: Lennie Dryms | LICENCE NUMBER

SIGNATURE OF CONTRACTOR: Henry Mains | SUBMISSION DATE: DAY 29 MO. 6 YR. 73

OFFICE USE ONLY

DATA SOURCE 1 | CONTRACTOR 3644 | DATE RECEIVED 130873 (~~130873~~)

DATE OF INSPECTION | INSPECTOR

REMARKS:

P | WI

MINISTRY OF THE ENVIRONMENT COPY

FORM 7 07-091

MINISTRY OF THE ENVIRONMENT
The Ontario Water Resources Act

WATER WELL RECORD

Ontario

213 3/G/4

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 | 1513560 | MUNICIP. 15001 | CON. CON 02

COUNTY OR DISTRICT: [redacted]

TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: North Gower

CON., BLOCK, TRACT, SURVEY, ETC.: 2

LOT: Part of 05-36

[redacted] # 1 Kars, Ont.

DATE COMPLETED: DAY 14 MO 09 YR 73

UTM: 9 3 9 6 1 | RC: 4 | ELEVATION: 0290 | RC: 5 | BASIN CODE: 26

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
brown	sand		packed	0	10
brown	clay		"	10	20
blue	clay		"	20	45
grey	gravel		"	45	70
black	limestone		medium	70	80

31: 0018608 | 0020605 | 0045305 | 0070211 | 0080815

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
0073	1 ☒ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
0078	1 ☒ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
~~6~~ 06 ~~5 7/8~~	1 ☒ STEEL; 2 ☐ GALVANIZED; 3 ☐ CONCRETE; 4 ☒ OPEN HOLE	188	0	0070
			~~78~~	~~88~~
06	1 ☐ STEEL; 2 ☐ GALVANIZED; 3 ☐ CONCRETE; 4 ☒ OPEN HOLE			0080
	1 ☐ STEEL; 2 ☐ GALVANIZED; 3 ☐ CONCRETE; 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET
MATERIAL AND TYPE	DEPTH TO TOP OF SCREEN FEET	

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☒ PUMP 2 ☐ BAILER

PUMPING RATE: 0015 GPM

DURATION OF PUMPING: 01 HOURS 00 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☒ PUMPING 2 ☐ RECOVERY	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
008 FEET	035 FEET		035 FEET	035 FEET	035 FEET	035 FEET

IF FLOWING, GIVE RATE: GPM

PUMP INTAKE SET AT: FEET

WATER AT END OF TEST: 1 ☒ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP

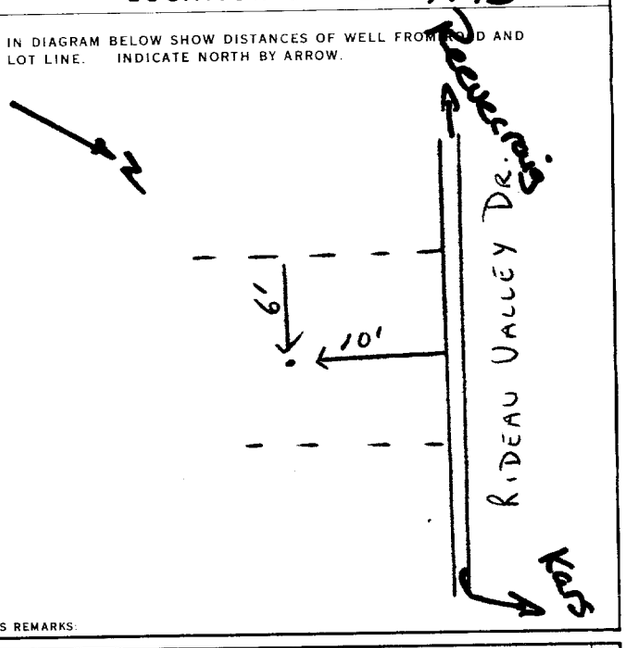
RECOMMENDED PUMP SETTING: 050 FEET

RECOMMENDED PUMPING RATE: 0005 GPM

50-53: 000.6

LOCATION OF WELL 4993

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS:

FINAL STATUS OF WELL 54: 1

1 ☒ WATER SUPPLY; 2 ☐ OBSERVATION WELL; 3 ☐ TEST HOLE; 4 ☐ RECHARGE WELL; 5 ☐ ABANDONED, INSUFFICIENT SUPPLY; 6 ☐ ABANDONED, POOR QUALITY; 7 ☐ UNFINISHED

WATER USE 55-56: 01

1 ☒ DOMESTIC; 2 ☐ STOCK; 3 ☐ IRRIGATION; 4 ☐ INDUSTRIAL; ☐ OTHER; 5 ☐ COMMERCIAL; 6 ☐ MUNICIPAL; 7 ☐ PUBLIC SUPPLY; 8 ☐ COOLING OR AIR CONDITIONING; 9 ☐ NOT USED

METHOD OF DRILLING 57: 5

1 ☐ CABLE TOOL; 2 ☐ ROTARY (CONVENTIONAL); 3 ☐ ROTARY (REVERSE); 4 ☐ ROTARY (AIR); 5 ☒ AIR PERCUSSION; 6 ☐ BORING; 7 ☐ DIAMOND; 8 ☐ JETTING; 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: Capital Water Supply Ltd. | LICENCE NUMBER: 1558

ADDRESS: Box 490 Stittsville

NAME OF DRILLER OR BORER: Lenny Drynan | LICENCE NUMBER:

SIGNATURE OF CONTRACTOR: Walter Kownack | SUBMISSION DATE: DAY 18 MO. 9 YR. 73

OFFICE USE ONLY

DATA SOURCE 58: 1 | CONTRACTOR 59-62: 1558 | DATE RECEIVED 63-68: 20 11 73

DATE OF INSPECTION | INSPECTOR

REMARKS:

CSS.SB

FORM 7 07-091

MINISTRY OF THE ENVIRONMENT COPY

MINISTRY OF THE ENVIRONMENT

The Ontario Water Resources Act

WATER WELL RECORD

ONTARIO

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

1513806

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT
Carleton	North Gower	Con 3,	035

OWNER (SURNAME FIRST) [redacted]

ADDRESS Kars Ont.

DATE COMPLETED DAY 27 MO. 6 YR. 73

1 4993961 4 295 5 26

B5 - P111

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
brown	sand		loose	0	15
"	clay		packed	15	20
dark.	gravel		"	20	25
"	limestone		medium	25	73
		CORED.			

WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
55	☑ FRESH ☐ SULPHUR ☐ SALTY ☐ MINERAL
73	☑ FRESH ☐ SULPHUR ☐ SALTY ☐ MINERAL
	☐ FRESH ☐ SULPHUR ☐ SALTY ☐ MINERAL
	☐ FRESH ☐ SULPHUR ☐ SALTY ☐ MINERAL
	☐ FRESH ☐ SULPHUR ☐ SALTY ☐ MINERAL

CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
6 1/4	☑ STEEL ☐ GALVANIZED ☐ CONCRETE ☐ OPEN HOLE	.188	0	26
	☐ STEEL ☐ GALVANIZED ☐ CONCRETE ☐ OPEN HOLE			
	☐ STEEL ☐ GALVANIZED ☐ CONCRETE ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET

MATERIAL AND TYPE | DEPTH TO TOP OF SCREEN FEET

PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

PUMPING TEST

PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
☑ PUMP ☐ BAILER	8 GPM.	1 HOURS 0 MINS.

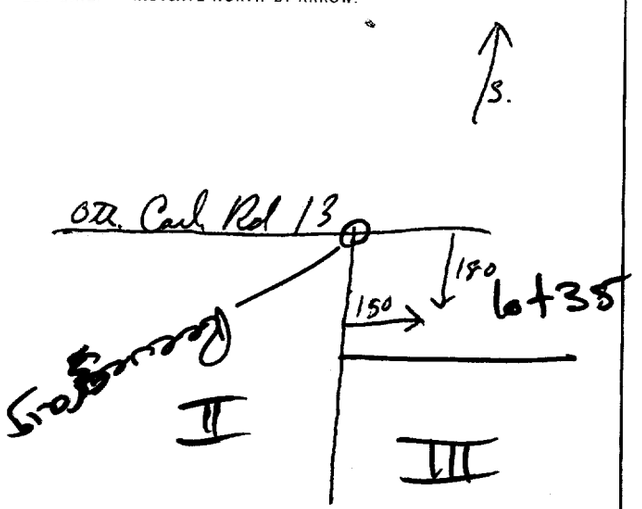
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING ☑ PUMPING ☐ RECOVERY	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
10 FEET	40 FEET		40 FEET	40 FEET	40 FEET	40 FEET

IF FLOWING, GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST
GPM	FEET	☐ CLEAR ☑ CLOUDY

RECOMMENDED PUMP TYPE	RECOMMENDED PUMP SETTING	RECOMMENDED PUMPING RATE
☐ SHALLOW ☑ DEEP	45 FEET	5 GPM.

LOCATION OF WELL 4993

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS:

FINAL STATUS OF WELL

☑ WATER SUPPLY ☐ ABANDONED, INSUFFICIENT SUPPLY
☐ OBSERVATION WELL ☐ ABANDONED, POOR QUALITY
☐ TEST HOLE ☐ UNFINISHED
☐ RECHARGE WELL

WATER USE

☑ DOMESTIC ☐ COMMERCIAL
☐ STOCK ☐ MUNICIPAL
☐ IRRIGATION ☐ PUBLIC SUPPLY
☐ INDUSTRIAL ☐ COOLING OR AIR CONDITIONING
☐ OTHER ☐ NOT USED

METHOD OF DRILLING

☐ CABLE TOOL ☐ BORING
☐ ROTARY (CONVENTIONAL) ☐ DIAMOND
☐ ROTARY (REVERSE) ☐ JETTING
☐ ROTARY (AIR) ☐ DRIVING
☑ AIR PERCUSSION

CONTRACTOR

NAME OF WELL CONTRACTOR Henry Mains Well Drilling | LICENCE NUMBER 3644.

ADDRESS Box 326, Richmond Ont.

NAME OF DRILLER OR BORER Lennie Payne | LICENCE NUMBER

SIGNATURE OF CONTRACTOR Henry Mains | SUBMISSION DATE DAY 29 MO. 6 YR. 73

OFFICE USE ONLY

1 10274

K

CONTRACTOR'S COPY

M.E.S.

FORM 7 07-091

Ontario

The Ontario Water Resources Act

WATER WELL RECORD

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11514695

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT
Carleton	Rideau	3	19

[redacted] R. # 4 Kemptville, Ontario

DATE COMPLETED: DAY 20 MO 5 YR 75

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
grey	clay	fill	packed	0	12
blue	clay		loose	12	35
grey	gravel	sand & boulders	packed	35	75
grey	hardpan	sand	packed	75	90
black	limestone		porous	90	116

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
112	1 ☐ FRESH 3 ☒ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR; 2 ☐ SALTY 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
6¼	1 ☒ STEEL; 2 ☐ GALVANIZED; 3 ☐ CONCRETE; 4 ☐ OPEN HOLE	188	0	90
5 1/16	1 ☒ STEEL; 2 ☐ GALVANIZED; 3 ☐ CONCRETE; 4 ☒ OPEN HOLE		72	94
5	1 ☐ STEEL; 2 ☐ GALVANIZED; 3 ☐ CONCRETE; 4 ☐ OPEN HOLE		94	116

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET

MATERIAL AND TYPE | DEPTH TO TOP OF SCREEN FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☐ PUMP 2 ☒ BAILER

PUMPING RATE: 3 GPM

DURATION OF PUMPING: 1 HOURS ____ MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☒ PUMPING 2 ☐ RECOVERY	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
15 FEET	60 FEET		60 FEET	60 FEET	60 FEET	60 FEET

IF FLOWING, GIVE RATE: ____ GPM

PUMP INTAKE SET AT: ____ FEET

WATER AT END OF TEST: 1 ☐ CLEAR 2 ☒ CLOUDY

RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP

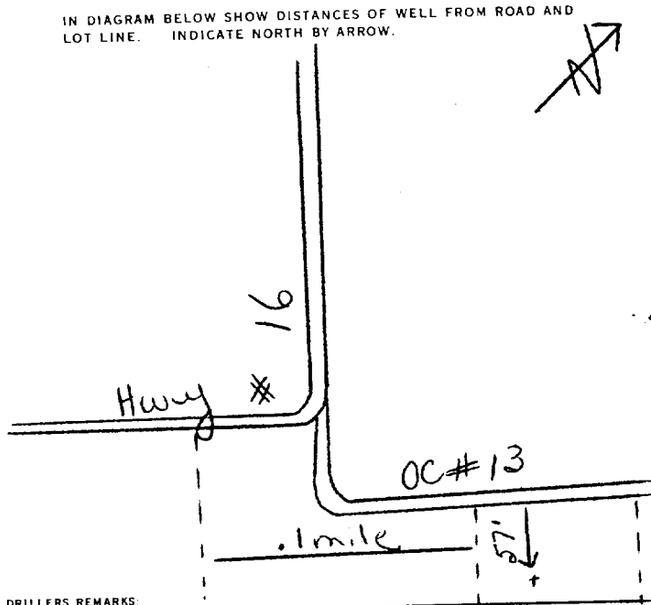
RECOMMENDED PUMP SETTING: 90 FEET

RECOMMENDED PUMPING RATE: 2½ GPM

____ GPM./FT. SPECIFIC CAPACITY

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS:

FINAL STATUS OF WELL

1 ☒ WATER SUPPLY; 2 ☐ OBSERVATION WELL; 3 ☐ TEST HOLE; 4 ☐ RECHARGE WELL; 5 ☐ ABANDONED, INSUFFICIENT SUPPLY; 6 ☐ ABANDONED, POOR QUALITY; 7 ☐ UNFINISHED

WATER USE

1 ☒ DOMESTIC; 2 ☐ STOCK; 3 ☐ IRRIGATION; 4 ☐ INDUSTRIAL; ☐ OTHER; 5 ☐ COMMERCIAL; 6 ☐ MUNICIPAL; 7 ☐ PUBLIC SUPPLY; 8 ☐ COOLING OR AIR CONDITIONING; 9 ☐ NOT USED

METHOD OF DRILLING

1 ☒ CABLE TOOL; 2 ☐ ROTARY (CONVENTIONAL); 3 ☐ ROTARY (REVERSE); 4 ☐ ROTARY (AIR); 5 ☐ AIR PERCUSSION; 6 ☐ BORING; 7 ☐ DIAMOND; 8 ☐ JETTING; 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: Capital Water Supply Ltd. — LICENCE NUMBER: 1558

ADDRESS: Box 490 Stittsville, Ontario

NAME OF DRILLER OR BORER: E. Maurice — LICENCE NUMBER:

SIGNATURE OF CONTRACTOR: [signature] — SUBMISSION DATE: DAY 20 MO 5 YR 75

OFFICE USE ONLY

DATA SOURCE | CONTRACTOR | DATE RECEIVED: 05 06 75

DATE OF INSPECTION | INSPECTOR

REMARKS

P

WI

FORM 7 MOE 07

MINISTRY OF THE ENVIRONMENT COPY

MINISTRY OF THE ENVIRONMENT
The Ontario Water Resources Act

WATER WELL RECORD

Ontario

31G/4

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

(11) 11514695 | MUNICIP. 15004 | CON. CON | 03

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT
[redacted]	[redacted] North Gower	3	35

[redacted]. # 4 Kemptville, Ontario

DATE COMPLETED: DAY 20 MO. 05 YR. 75

[redacted]93503 | RC. 4 | ELEVATION 0295 | RC. 5 | BASIN CODE 26

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
grey	clay	fill	packed	0	12
blue	clay		loose	12	35
grey	gravel	sand & boulders	packed	35	75
grey	hardpan	sand	packed	75	90
black	limestone		porous	90	116

(31) 0012205011 | 0035305 | 0075211281 3 | 0090214 28 | 01168 15

32

(41) WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
0112	1 ☐ FRESH 3 ☒ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL

(51) CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
~~6¼~~ 06	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	188	0	0090
~~5 1/16~~ 05	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ ~~OPEN HOLE~~		72	0094
~~5~~ 05	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE		~~94~~	~~116~~ 0116

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET

MATERIAL AND TYPE	DEPTH TO TOP OF SCREEN FEET

(61) PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

(71) PUMPING TEST

PUMPING TEST METHOD: 1 ☐ PUMP 2 ☒ BAILER

PUMPING RATE: 0003 GPM.

DURATION OF PUMPING: 01 HOURS 00 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
015 FEET	060 FEET	060 FEET	060 FEET	060 FEET	060 FEET

WATER LEVELS DURING: 1 ☒ PUMPING 2 ☐ RECOVERY

IF FLOWING GIVE RATE: GPM.

PUMP INTAKE SET AT: FEET

WATER AT END OF TEST: 1 ☐ CLEAR 2 ☒ CLOUDY

RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP

RECOMMENDED PUMP SETTING: 090 FEET

RECOMMENDED PUMPING RATE: 0003~~2~~ GPM.

000.1 GPM./FT. SPECIFIC CAPACITY

FINAL STATUS OF WELL: 1

1 ☒ WATER SUPPLY
2 ☐ OBSERVATION WELL
3 ☐ TEST HOLE
4 ☐ RECHARGE WELL
5 ☐ ABANDONED, INSUFFICIENT SUPPLY
6 ☐ ABANDONED, POOR QUALITY
7 ☐ UNFINISHED

WATER USE: 01

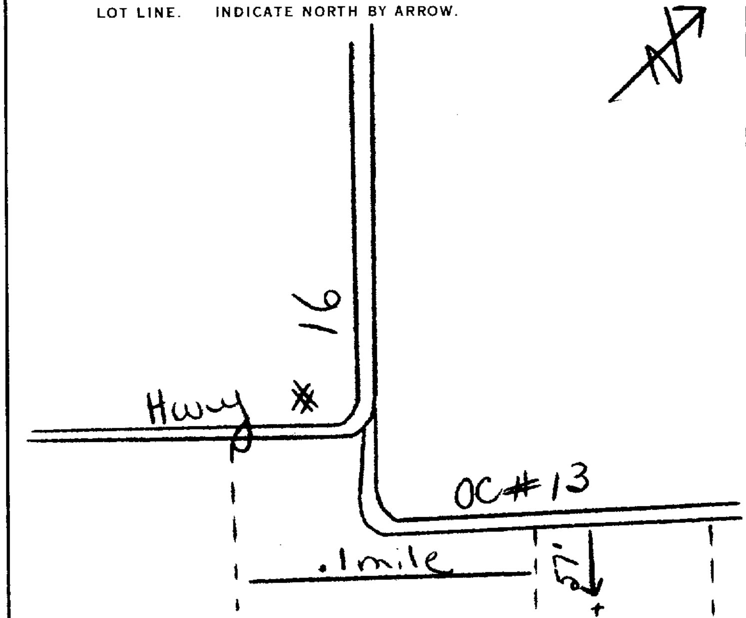
1 ☒ DOMESTIC
2 ☐ STOCK
3 ☐ IRRIGATION
4 ☐ INDUSTRIAL
☐ OTHER
5 ☐ COMMERCIAL
6 ☐ MUNICIPAL
7 ☐ PUBLIC SUPPLY
8 ☐ COOLING OR AIR CONDITIONING
9 ☐ NOT USED

METHOD OF DRILLING: 1

1 ☒ CABLE TOOL
2 ☐ ROTARY (CONVENTIONAL)
3 ☐ ROTARY (REVERSE)
4 ☐ ROTARY (AIR)
5 ☐ AIR PERCUSSION
6 ☐ BORING
7 ☐ DIAMOND
8 ☐ JETTING
9 ☐ DRIVING

LOCATION OF WELL 4993

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS:

CONTRACTOR

NAME OF WELL CONTRACTOR: Capital Water Supply Ltd. | LICENCE NUMBER: 1558

ADDRESS: Box 490 Stittsville, Ontario

NAME OF DRILLER OR BORER: E. Maurice | LICENCE NUMBER:

SIGNATURE OF CONTRACTOR: Walter Kavanagh | SUBMISSION DATE: DAY 20 MO. 5 YR. 75

OFFICE USE ONLY

DATA SOURCE: 1 | CONTRACTOR: 1558 | DATE RECEIVED: 05 06 75

DATE OF INSPECTION: | INSPECTOR:

REMARKS: CSS.S8

P ✓

WI

MINISTRY OF THE ENVIRONMENT COPY

FORM 7 MOE 07-

MINISTRY OF THE ENVIRONMENT

The Ontario Water Resources Act

WATER WELL RECORD

3/6/4

Ontario

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 | 1514870 | MUNICIP. 15004 | CON. COR | 03

COUNTY OR DISTRICT: Carleton | TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE: North Gower Richmond Ont. | CON., BLOCK, TRACT, SURVEY, ETC.: Con 3 | LOT: 036

DATE COMPLETED: DAY 09 MO. 06 YR. 75

[redacted]

NG: 93624 | RC: 4 | ELEVATION: 0295 | RC: 5 | BASIN CODE: 26

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
grey	clay	stones		0	21
~~hardpan~~ grey	gravel			21	25

31: 0021205 12 | 0025211

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
0025	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
06	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	.188	0	0025 25
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET

MATERIAL AND TYPE | DEPTH TO TOP OF SCREEN FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☒ PUMP 2 ☐ BAILER | PUMPING RATE: 0030 GPM | DURATION OF PUMPING: 01 HOURS 00 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☒ PUMPING 2 ☐ RECOVERY	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
006 FEET	020 FEET		020 FEET	020 FEET	020 FEET	020 FEET

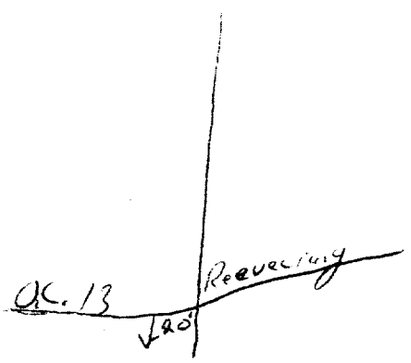
IF FLOWING, GIVE RATE: GPM | PUMP INTAKE SET AT: FEET | WATER AT END OF TEST: 1 ☐ CLEAR 2 ☒ CLOUDY

RECOMMENDED PUMP TYPE: ☒ SHALLOW ☐ DEEP | RECOMMENDED PUMP SETTING: 020 FEET | RECOMMENDED PUMPING RATE: 0005 GPM

0021 GPM./FT. SPECIFIC CAPACITY

LOCATION OF WELL 4993

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS:

FINAL STATUS OF WELL 54: 1

1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED

WATER USE 55-56: 01

1 ☒ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED

METHOD OF DRILLING 57: 5

1 ☐ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☒ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: Henry Mans Well Drilling | LICENCE NUMBER: 3644

ADDRESS: Rr. 32 Richmond Ont

NAME OF DRILLER OR BORER: Henry Mans | LICENCE NUMBER:

SIGNATURE OF CONTRACTOR: | SUBMISSION DATE: DAY 14 MO. 6 YR. 75

OFFICE USE ONLY

DATA SOURCE 58: 1 | CONTRACTOR 59-62: 3644 | DATE RECEIVED 63-68: 220875 | 80

DATE OF INSPECTION | INSPECTOR: K.m

REMARKS: | P ✓ | WI

MINISTRY OF THE ENVIRONMENT COPY

FORM 7 MOE 07-091

Ontario

MINISTRY OF THE ENVIRONMENT
The Ontario Water Resources Act

WATER WELL RECORD

316/4

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 | 1514876 | MUNICIP. 15004 | CON. CON 03

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT
Carleton	North Gower	Con 3	036

[redacted] RR#1, Kars

DATE COMPLETED: DAY 09 MO. 06 YR. 75

[redacted] 93717 | RC. 4 | ELEVATION 0295 | RC. 5 | BASIN CODE 26

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
grey	sand			0	6
grey	clay	stones		6	21
grey	limestone			21	135

31 | 0006728 | 0021 2 05 12 | 0135 2 15
32 |

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
0130	1 ☑ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
06	1 ☑ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	23	0	0023
06	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE			0135
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET

MATERIAL AND TYPE	DEPTH TO TOP OF SCREEN FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☑ PUMP 2 ☐ BAILER | PUMPING RATE 0002 GPM | DURATION OF PUMPING 01 HOURS 00 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
005 FEET	100 FEET	100 FEET	100 FEET	100 FEET	100 FEET

WATER LEVELS DURING: 1 ☒ PUMPING 2 ☐ RECOVERY

IF FLOWING, GIVE RATE: GPM | PUMP INTAKE SET AT: FEET | WATER AT END OF TEST: 1 ☐ CLEAR 2 ☑ CLOUDY

RECOMMENDED PUMP TYPE: ☐ SHALLOW ☑ DEEP | RECOMMENDED PUMP SETTING 100 FEET | RECOMMENDED PUMPING RATE 0002 GPM

000.0 GPM./FT. SPECIFIC CAPACITY

FINAL STATUS OF WELL: 1

1 ☑ WATER SUPPLY
2 ☐ OBSERVATION WELL
3 ☐ TEST HOLE
4 ☐ RECHARGE WELL
5 ☐ ABANDONED, INSUFFICIENT SUPPLY
6 ☐ ABANDONED, POOR QUALITY
7 ☐ UNFINISHED

WATER USE: 01

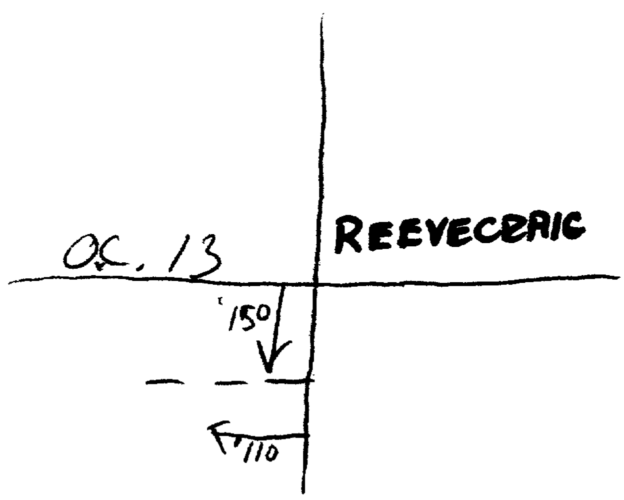
1 ☑ DOMESTIC
2 ☐ STOCK
3 ☐ IRRIGATION
4 ☐ INDUSTRIAL
☐ OTHER
5 ☐ COMMERCIAL
6 ☐ MUNICIPAL
7 ☐ PUBLIC SUPPLY
8 ☐ COOLING OR AIR CONDITIONING
9 ☐ NOT USED

METHOD OF DRILLING: 5

1 ☐ CABLE TOOL
2 ☐ ROTARY (CONVENTIONAL)
3 ☐ ROTARY (REVERSE)
4 ☐ ROTARY (AIR)
5 ☑ AIR PERCUSSION
6 ☐ BORING
7 ☐ DIAMOND
8 ☐ JETTING
9 ☐ DRIVING

LOCATION OF WELL 4993

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS:

CONTRACTOR

NAME OF WELL CONTRACTOR: Gerry Maris Well Drilling | LICENCE NUMBER:
ADDRESS: Box 326, Richmond Ont.
NAME OF DRILLER OR BORER: Gerry Maris | LICENCE NUMBER:
SIGNATURE OF CONTRACTOR: | SUBMISSION DATE DAY ___ MO. ___ YR. ___

OFFICE USE ONLY

DATA SOURCE 1 | CONTRACTOR 3644 | DATE RECEIVED 220875
DATE OF INSPECTION | INSPECTOR K.M.
REMARKS: | P ✓ | WI

MINISTRY OF THE ENVIRONMENT COPY

FORM 7 MOE 07-091

MINISTRY OF THE ENVIRONMENT
The Ontario Water Resources Act

WATER WELL RECORD

Ontario

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 | 1516200 | MUNICIP. 15004 | CON. CON 03

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT
Carleton	North Gower	Con 3.	034

[redacted] RR#1, Kars Ont. — DATE COMPLETED DAY 22 MO 08 YR 77

[redacted] 9,4370 5 0295 5 26

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	TO
grey	clay	boulders		0	30
grey	limestone			30	150

31 0030205 13 0150215
32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
0145	1 ☒ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	TO
06	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	.188	0	0032 / 32
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET

MATERIAL AND TYPE — DEPTH TO TOP OF SCREEN FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
1 ☒ PUMP 2 ☐ BAILER	0003 GPM	01 HOURS 00 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
010 FEET	100 FEET	100 FEET	100 FEET	100 FEET	100 FEET

WATER LEVELS DURING: 1 ☒ PUMPING 2 ☐ RECOVERY

IF FLOWING, GIVE RATE: GPM — PUMP INTAKE SET AT: FEET — WATER AT END OF TEST: 1 ☐ CLEAR 2 ☒ CLOUDY

RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP — RECOMMENDED PUMP SETTING: 100 FEET — RECOMMENDED PUMPING RATE: 0003 GPM

50-53 ____ GPM./FT. SPECIFIC CAPACITY

FINAL STATUS OF WELL: 1

1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED

WATER USE: 01

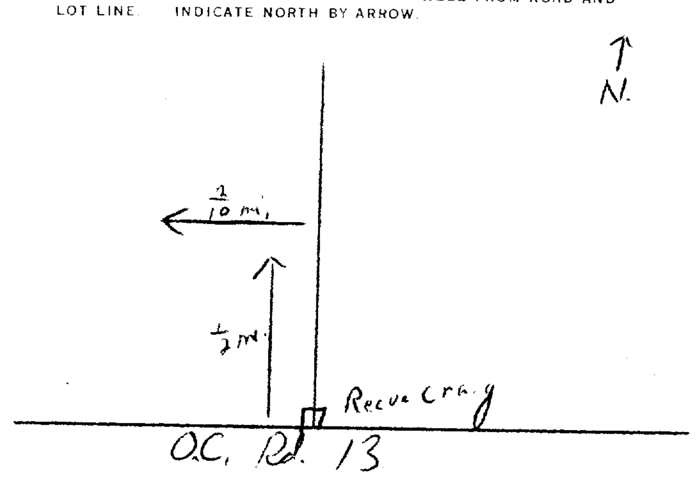
1 ☒ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED

METHOD OF DRILLING: 5

1 ☐ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☒ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS:

CONTRACTOR

NAME OF WELL CONTRACTOR: Henry Mains Well Drilling — LICENCE NUMBER: 3644
ADDRESS: Box 326, Richmond Ont.
NAME OF DRILLER OR BORER: Henry Mains — LICENCE NUMBER:
SIGNATURE OF CONTRACTOR: [signature] — SUBMISSION DATE DAY 29 MO. 8 YR. 77

OFFICE USE ONLY

DATA SOURCE: 1 — CONTRACTOR: 3644 — DATE RECEIVED: 290977
DATE OF INSPECTION: JUNE 6/78 — INSPECTOR: Km DN
REMARKS: WHITE FARM HOUSE — P ✓ — WI

MINISTRY OF THE ENVIRONMENT COPY

FORM 7 MOE 07-091

MINISTRY OF THE ENVIRONMENT

The Ontario Water Resources Act

WATER WELL RECORD

Ontario

31G4E

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 1516779 MUNICIP. 15004 CON. CON 03

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT
Carleton	Rideau North Gower	Con 3,	035

[redacted] Box 52, Kars Ontario — DATE COMPLETED DAY 15 MO 09 YR 78

[redacted] 93700 RC 5 ELEVATION 0290 RC 5 BASIN CODE 26

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	TO
grey	sand	gravel		0	24
grey	limestone			24	190
white	sandstone			190	215

31 0024228111 0190215 0215118

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
0215	1 ☒ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	TO
06	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	.188	0	0026
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.) — DIAMETER INCHES — LENGTH FEET

MATERIAL AND TYPE — DEPTH TO TOP OF SCREEN FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☒ PUMP 2 ☐ BAILER — PUMPING RATE 0020 GPM — DURATION OF PUMPING 01 HOURS 00 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
006 FEET	030 FEET	030 FEET	030 FEET	030 FEET	030 FEET

WATER LEVELS DURING: 1 ☒ PUMPING 2 ☐ RECOVERY

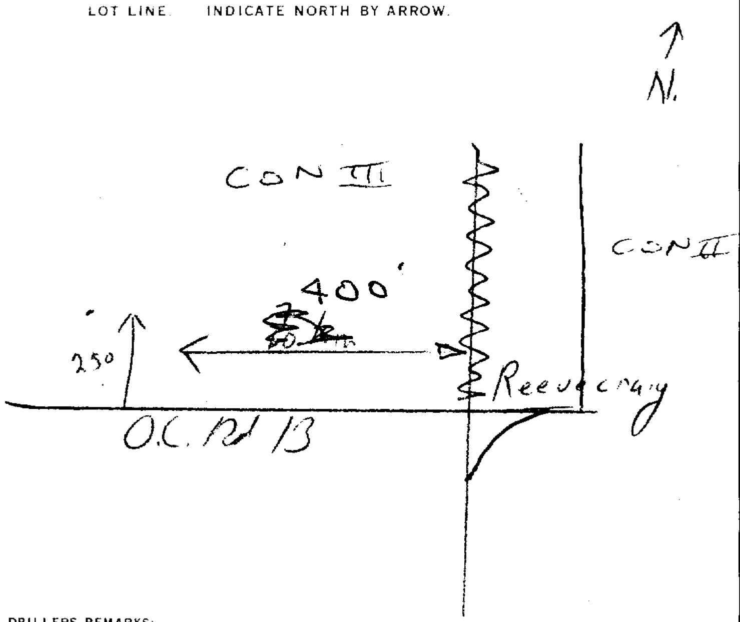
IF FLOWING, GIVE RATE ___ GPM — PUMP INTAKE SET AT ___ FEET — WATER AT END OF TEST: 1 ☐ CLEAR 2 ☒ CLOUDY

RECOMMENDED PUMP TYPE: ☒ SHALLOW ☐ DEEP — RECOMMENDED PUMP SETTING 030 FEET — RECOMMENDED PUMPING RATE 0005 GPM

___ GPM./FT. SPECIFIC CAPACITY

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS:

FINAL STATUS OF WELL 1: 1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED

WATER USE 01: 1 ☒ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED

METHOD OF DRILLING 5: 1 ☐ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☒ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: Henry Mains Well Drilling — LICENCE NUMBER 3644

ADDRESS: Box 326, Richmond Ont

NAME OF DRILLER OR BORER: Henry Mains — LICENCE NUMBER

SIGNATURE OF CONTRACTOR — SUBMISSION DATE DAY 18 MO. 9 YR. 78

OFFICE USE ONLY

DATA SOURCE 1 — CONTRACTOR 3644 — DATE RECEIVED 271178

DATE OF INSPECTION 21/6/79 — INSPECTOR Km. / J.P.P.

REMARKS: — P — WI

MINISTRY OF THE ENVIRONMENT COPY

FORM 7 MOE 07-091

Appendix H

City of Ottawa Letter Nov. 19 2024

ENGLOBE

File Number: **D02-02-24-0029**

November 19, 2024

Novatech c/o Robert Tran
240 Michael Cowpland Drive Suite 200, Ottawa, ON K2M 1P6

Dear Robert Tran:

Subject: Zoning By-law Amendment Proposal
Hydrogeological Study Report – Adequacy Review Comments
2095 Dilworth Road

Pursuant to subsection 34 (10.4) of the *Planning Act*, this letter is to advise that the above-noted Zoning By-law Amendment application submission, received by the City of Ottawa on **July 19, 2024**, and for which you submitted revised documents on October 22, 2024, has been reviewed and remains “incomplete” for the purposes of the *Planning Act*, regulations to the *Planning Act*, and the City’s submission requirements. The following summarizes where the submission is deficient, based on review of the Hydrogeological Study Report.

Deemed Incomplete Comments:

1. The report must include the professional's seal in addition to the signature on second page.

2. In Section 2, the report notes that the City's Hydrogeological and Terrain Analysis Guidelines were not strictly followed. As this is a new application, the current standards shall be followed and the report, where required, must be updated.

3. In Section 2.4, please provide and rationalize the selected pumping rate. It appears that the rate was determined by dividing the estimated water usage of 9,000 L/day by the 120-minute peaking factor. State how the determined rate compares to the permitted uses available in the zoning or as calculated by the City's Water Design Guidelines. The guidelines for commercial development note an average daily demand of 28,000 L/gross ha/day, with the maximum daily demand being calculated as 1.5x average daily demand.

4. In the last sentence of Section 2, the reporting notes that field measurements for water quality would be provided in Appendix F, but only the free chlorine measurements could be found. Please clarify the location in the report. Parameters that must be tested in the field include colour, pH, temperature, conductivity, turbidity, hydrogen sulphide (using the Methylene Blue method) and chlorine residual, and should be carried out following current methods. Manufacturers, model numbers and calibration records for the field equipment should be presented in the report.

5. In Section 5, the results of the water quality testing for chloride are above the maximum concentration considered reasonably treatable (MCCRT) of 250 mg/L provided in MECP D-5-5 - Private Wells: Water Supply Assessment, as amended. D-5-5 notes that chloride is not considered reasonably treatable above the limit.

    a. The City does consider treatment, for industrial/commercial developments, for aesthetic exceedances above the MCCRT, however the issue and rationale for permitting the exceedance should be discussed in the reporting.

    b. It is expected that every effort will be made to find a source of groundwater meeting the MCCRT parameters, which should include discussion of other potential source/aquifers.

    c. The concentrations of chloride between 480-490 mg/L are at the limit of what O. Reg. 903 - Wells deems a mineralized well (chloride in excess of 500 mg/L). If the water supply is mineralized, then approval from the MECP is typically required to not abandon the well, as required in Section 21, O. Reg. 903. The reporting should consider the other issues associated with mineralized water including corrosivity of the water and shortened lifespan of plumbing fixtures and the septic system. Specialized plumbing and fixtures may be beneficial to reduce long-term issues.

6. In Section 5, the results of the water quality testing for sodium are above the maximum concentration considered reasonably treatable (MCCRT) of 200 mg/L provided in MECP D-5-5. This is associated with taste issues. The City does consider treatment, for industrial/commercial developments, for aesthetic exceedances above the MCCRT; however, the issue and rationale for permitting the exceedance should be discussed in the reporting. It is expected that every effort will be made to find a source of groundwater meeting the MCCRT parameters, which should include discussion of other potential source/aquifers.

7. Table E-1 provides a parameter of "Total Suspended Solids" which is a different parameter than Total Dissolved Solids (TDS) for which the AO of 500 mg/L is provided. The parameter that shall be measured is TDS, which is comprised of the dissolved minerals and salts in the water. The TDS, based on concentrations of calcium, magnesium, potassium, sodium, etc.) is likely quite high and may be exceeding the aesthetic objective. If the TDS is above 500 mg/L, Langelier Saturation index (LSI) & Ryznar Stability index (RSI) calculations should be provided to establish that taste or corrosion/scaling issues are not present or that mitigation measures are recommended to address the concern.

8. In Section 6 of the report, MECP's D-5-4 s. 5.6.3 Predictive Assessment - Industrial/Commercial Development should be incorporated into the reporting. This set of calculations provides a maximum allowable flow and/or maximum number of users which guides what development would be appropriate for the

site. It may provide that some of the permitted uses available in the proposed zoning would not be suitable. Given the correspondence between Travis Smith (City) and Andrew Naoum (Englobe) about the potential for the water quality to limit permitted uses, staff require more detailed and specific information about the proposed uses. **Staff recommend scheduling a meeting to discuss the above prior to a subsequent submission.**

This application will not be considered until the required information and materials set out in the numbered list above are received. Please submit all required material to the undersigned.

Other comments to be addressed in the submission based on preliminary review:

9. Section 2.4, below Table 2-2, refers to a "six-hour aquifer testing program" and samples being sent to a laboratory in Mississauga. Please clarify.

10. In Section 5, please provide a treatment method for removal of manganese, if desired by future owner, based on the result exceeding the aesthetic objective of ODWQS.

11. Section 7 - Evaluation of Potential Well Interference is noted; however, a commercial subdivision is not being considered in the current application. Testing regarding potential impacts would require a detailed and comprehensive analysis as detailed in the City's Hydrogeological and Terrain Analysis Guidelines. For example, site assessments for subdivisions would require a minimum of 5 test wells for sites between 25 and 40 hectares. Pre-consultation would be required for any proposed subdivision development and is considered beyond the scope of the current review.

12. In Section 8, the recommendations regarding the noted exceedances and treatment methods should be clearly provided.

If you have any questions concerning the above comments, please contact Travis Smith by telephone at 613-580-2424, extension 16544, or by e-mail at travis.smith@ottawa.ca.