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Project name:
Centre Wellington Well Replacement Project

Project ref:
60664299

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Date:
May 19, 2023

Technical Memorandum

Subject: Municipal Supply Wells F2 & F5 Replacement Program - Results of Well Installation and Testing

Executive Summary

AECOM Canada Ltd. (AECOM) was retained by the Township of Centre Wellington (the 'Township') to provide professional consulting services relating to the design, construction and hydrogeological (aquifer) testing of replacement municipal (test and production) wells at the F2 (449 St. Andrew St. East) and F5 (900 Scotland St.) well sites, in the Town of Fergus, Ontario.

Drilling, construction and testing of each new well source was completed by Aardvark Drilling Inc. (Aardvark), under contract with the Township. AECOM's hydrogeology staff acted as the Township's representative on-site during both the well construction and testing phases. Test wells F2-T and F5-T were constructed at the Township's existing F2 and F5 well sites to assess hydrogeological conditions within the bedrock below the terminal depths of the original F2 and F5 wells; including an assessment of groundwater quality and quantity. Following the completion of successful testing at both test wells, they were overdrilled to full-scale production diameter (nominal 12" or 305 mm; identified as F2-R and F5-R), and additional groundwater quality and quantity testing was completed by the Township at each location.

In conjunction with the work described above, multi-level monitoring well nest MW7-21 also was constructed by Aardvark within the Township right-of-way near the corner of Cameron St. and St. Andrew St. East, approximately 380 m southwest of the F2 well site. The purpose of this multi-level monitoring well is to allow for the measurement of groundwater levels within each of the shallow, intermediate, and deep bedrock aquifers during subsequent testing of F2-T and F2-R.

Multi-level monitoring well MW8-21 also was installed by Aardvark at the existing F1 well site (281 Queen St. East) following completion of the Township's wellfield capacity testing program in the fall of 2022. The purpose of this multi-level monitoring well is to provide for the long-term assessment of groundwater quality at the F1 well site.

It is recommended that MW7-21 and MW8-21 be integrated into the Township monitoring network for monitoring of groundwater levels and quality. The suite of water quality analytes should include VOCs, as this is known to be present within the local bedrock aquifer (although not detected during the well replacement program).

Based on the results of well capacity testing at F2-R, it is recommended that this well be operated at a maximum rate of 20 L/s, and that the pumping groundwater level be maintained in the range of 350 to 355 mASL. This approach maintains the

groundwater level above the primary water-bearing feature identified in the borehole at approximately 341.8 mASL. Testing of F2-R did not interfere with the ongoing use of any local private wells. Monitoring at MW7-21D, located approximately 380 m southwest of the F2 well site, indicates that deep bedrock wells within 500 m could experience appreciable drawdown in response to long-term pumping at F2-R. The Township may consider obtaining an access agreement with the owner of Well 36 (a private well located at 590 St. Andrew St. East), or an equivalent nearby well, for the purpose of establishing a groundwater level monitoring point in that area. In the absence of a willing participant, the Township could consider establishing a monitoring well on Township-owned property to supplement the existing monitoring network. Testing of the F2-R discharge water indicated a high-quality groundwater source with sodium (30.6 mg/L) in excess of the 20 mg/L limit for individuals on sodium reduced diets (although below its 200 mg/L Aesthetic Objective), and TDS (850 mg/L) in excess its Aesthetic Objective value of 500 mg/L, primarily due to elevated hardness (637 mg/L, as compared to the Operational Guideline range of 80 to 100 mg/L). These results are common for groundwater sources in the local aquifer system. It is anticipated that a groundwater supply source can be developed on this site requiring typical treatment measures (i.e., standard disinfection).

Based on results of the testing completed for the well replacement program and the subsequent wellfield capacity assessment, it is recommended that F5-R be operated at a maximum rate of 20 L/s, and that the pumping groundwater level be maintained above the base of casing at approximately 365 mASL. Testing of F5-R did not interfere with the ongoing use of any private wells. Monitoring at MW3-11A/B, located approximately 370 m northeast of the F5-R well site, indicates that the intermediate and deep components of the bedrock aquifer could experience moderate drawdown (<5 m) in response to long-term pumping on site. This is greater than the drawdown observed at the closest monitored private well at 935 Scotland St., where <1 m of drawdown occurred; however the position of the pump intake within this well is unknown. It is recommended that the Township collect additional information regarding this well, if the resident is willing to participate and provide such information. MW3-11 should continue to be monitored during future operation of the F5-R well to evaluate drawdown within the local aquifer in response to its operation.

Testing of the F5-R discharge water indicated a high-quality groundwater source with hardness (307 mg/L) exceeding its ODWQS Operational guideline range of 80 to 100 mg/L, total aluminum (0.148 mg/L) exceeding its Aesthetic Objective of 0.1 mg/L, and total coliforms (1 MPN/100 mL) exceeding its Maximum Acceptable Concentration (health-related) of 0 MPN/100 mL. The trace total coliform detection of 1 MPN/100 mL is an indication of potential ingress of shallow water into the well intake; however, no E.coli detections occurred within F5-T or F5-R, suggesting that this result is spurious. Turbidity measurements collected on site and by the laboratory (ALS) confirm that the well produces high turbidity, primarily on start-up. AECOM has conducted a separate treatability study, focusing on treatment for the observed turbidity, which is provided under separate cover (AECOM, 2022). It is understood that the treatment system would address required disinfection, turbidity, and total aluminum concentrations.

1.0 Introduction

The Township of Centre Wellington (the ‘Township’) retained AECOM Canada Ltd. (AECOM) to provide professional consulting services relating to the design, construction and hydrogeological (aquifer) testing of replacement municipal (test and production) wells at the F2 (449 St. Andrew St. East) and F5 (900 Scotland St.) well sites, in the Town of Fergus, Ontario (the ‘Project’). The F2 and F5 well site locations are shown in **Figure 1**.

The scope of the replacement well construction and aquifer testing program is provided in the Township’s Request for Quotation #38-21 and was developed based on available information regarding the Township’s existing municipal well system and geologic setting, AECOM’s experience on other municipal well construction and aquifer testing programs, pre-consultation discussion with Ontario Ministry of the Environment, Conservation and Parks (MECP) regional technical support staff, and recommendations presented within Section 8 of the Township’s approved Water Supply Master Plan (WSMP), as prepared by AECOM (July 2019). The scope of work for the project includes:

- Review of background information
- Site supervision during well construction and testing
- Input into design of a multilevel monitoring well (MW8-21)
- Data analysis and reporting:

- Hydrographs for the monitored wells
- Calculation of aquifer hydraulic parameters
- Zone of influence (ZOI) mapping
- Borehole logs for all drilled wells
- Summary of completed well construction and pumping tests
- Analysis of water quality data (does not include GUDI assessment)
- Impact assessment, including hydrograph review and ZOI mapping

- Project management

Replacement of the existing F2 and F5 municipal supply wells was recommended in the Township's approved WSMP to increase the capacity of groundwater pumped at each site, as the F2 well site had been non-operational since the early nineties due to its status as a Groundwater Under the Direct Influence of Surface Water (GUDI) source and the F5 well operated below its Permit to Take Water (PTTW) maximum daily rate and volume. The F5 well experienced declining performance over time, with naturally elevated turbidity (silt production) which limited its maximum pumping rate.

This technical memorandum has been prepared to present the key results of drilling, well construction, monitoring and testing during the replacement of Municipal Supply Wells F2 and F5.

2.0 Drilling and Well Installation

Drilling and well installation was completed by Aardvark Drilling Inc. ("ADI") under Township Tender No. 01-21. AECOM hydrogeology staff acted as the Township's representative on site during well construction and testing. Test wells F2-T and F5-T were installed at the F2 and F5 well sites to assess hydrogeological conditions within the bedrock below the terminal depths of the original F2 and F5 wells; including an assessment of groundwater quality and quantity. Following the completion of successful testing at both test wells, they were overdrilled to full-scale production size (nominal 12" or 305 mm), and additional water quality and quantity testing was completed at each location.

Multi-level monitoring well MW7-21 was installed within the Township right-of-way near the corner of Cameron St. and St. Andrew St. East, approximately 380 m southwest of the F2 well site, for the purpose of monitoring groundwater levels within the shallow, intermediate, and deep bedrock aquifers during subsequent testing of F2-T and F2-R. Multi-level monitoring well MW8-21 was installed at the F1 well site at 281 Queen St. East following the Township of Centre Wellington wellfield capacity testing program conducted in fall 2022. The purpose of this multi-level monitoring well is to provide for the long-term assessment of water quality conditions at the F1 well site. The location of wells constructed for the Project are shown in **Figure 1**.

2.1 F2 Well Site

2.1.1 F2-T Well

Test well F2-T was drilled and installed by ADI between July 29th and September 7th, 2021. The borehole was advanced through the overburden using a CME 75 drilling rig equipped with hollow stem augers to top of bedrock at a depth of approximately 2.39 m below ground surface (mBGS). A temporary, 277 mmØ (10-7/8") steel casing equipped with casing shoe was then installed within the borehole from ground surface to a short distance within the upper bedrock at 2.46 mBGS. The borehole was subsequently advanced into bedrock via 153 mmØ (6") SQ coring to a depth of 70.41 mBGS, at which point the core hole was widened via air hammer to accommodate the 169mmØ (6-5/8") steel casing equipped with a casing shoe. Upon sealing the 169 mmØ (6-5/8") casing at 70.41 mBGS, SQ rock coring was continued below the casing to the base of the well at 116.26 mBGS. The well was completed with an above ground casing stick-up of 0.60 m and capped with a locking, vermin-proof lid. Well installation details are provided in **Table 1** and a borehole log is provided in **Appendix A**.

Table 1: F2-T Installation Details

Detail	From (mBGS)	To (mBGS)
10-7/8" Steel Casing	-0.40[a]	2.46
6-5/8" Steel Casing	-0.60[a]	70.41
6" (SQ) Open Core hole	70.41	116.26
Coated Bentonite Pellets between 10-7/8" and 6-5/8" Steel Casings	0.00	2.46
Bentonite Grout between Borehole Wall and 6-5/8" Steel Casing	2.46	66.90
Coated Bentonite Pellets between Borehole Wall and 6-5/8" Steel Casing	66.90	70.41

Notes: a – Negative values indicate height above ground surface.

Following completion of the well construction stage, F2-T was developed to remove fine particles generated during the drilling process and establish a good hydraulic connection with the surrounding geological (bedrock) formation. Well development (air surging) was completed on September 9th, 2021 and concluded with a minimum turbidity reading of <1 NTU. A groundwater quality sample was collected during the development process to assess its quality relative to the Fergus Sewer Use By-Law No. 2849 (**Appendix B**). Following review of the groundwater quality testing results, discharge to the local storm sewer was permitted by the Township.

During geophysical logging conducted by Lotowater Technical Services (LTS), a 0.14 m gap at the location of a threaded joint in the 169 mmØ (6-5/8") steel casing was identified at a depth of approximately 7.54 mBGS. Grout placed between the well casing and borehole wall during sealing of F2-T likely entered the well through this gap prior to development. As a result, the integrity of the grout seal was expected to be compromised between 7.54 mBGS and ground surface. Given the relatively shallow depth of the gap in the casing, it likely contributed minimal impact during the pump testing and groundwater quality sampling due to the position of the static groundwater level consistently being below the depth of the casing gap. The LTS geophysical log is provided in **Appendix C**.

2.1.2 F2-R Well

Production well F2-R was drilled and installed by ADI between July 5th and August 15th, 2022. The drilling process involved removing the existing casing in test well F2-T, widening the well annulus, and installing / sealing the production well casing. Casing removal, well drilling and casing installation were completed using a Foremost DR24 drilling rig. Following removal of the F2-T casing, casing advancement / air hammering was utilized to install a temporary 508 mmØ (20") steel casing from ground surface to a depth of 3.05 mBGS. Following placement of the temporary casing, ADI widened the borehole to 458 mmØ (18") from 3.05 to 44.04 mBGS to allow for installation of the permanent 305 mmØ (12") steel casing. Following placement of the casing, the borehole was advanced at 305 mmØ (12") from 44.04 to 116.26 mBGS using an air hammer. Information regarding the water-bearing fracture zones identified within the F2-R well is provided in **Section 2.1.3**.

Following the completion of borehole drilling, the annular space between the 305 mmØ (12") casing and borehole wall was sealed by placing bentonite pellets followed by bentonite grout within the well annulus. The temporary 508 mmØ (20") steel casing was removed during placement of the well seal. The well was completed with an above ground casing stick-up of 0.73 m and capped with a locking, vermin-proof lid. Well installation details are provided in **Table 2** and borehole logs are provided in **Appendix A**.

Table 2: F2-R Installation Details

Detail	From (mBGS)	To (mBGS)
12" Steel Casing	-0.73[a]	44.04
12" Open Core hole	44.04	116.26
Coated Bentonite Pellets between 12" Steel Casing and borehole wall	43.43	44.04
Bentonite Grout between 12" Steel Casing and borehole wall	0.60	43.43
Coated Bentonite Pellets between 12" Steel Casing and borehole wall	0.00	0.60

Notes: a – Negative values indicate height above ground surface.

Following installation, F2-R was developed via air lifting and pumping to remove fine particles generated during the drilling process and establish a good hydraulic connection with the surrounding geological (bedrock) formation. Well development (air surging) was completed between August 15th and 18th, 2022 and concluded with a minimum turbidity reading of <10 NTU. After turbidity measurements stabilized at approximately 10 NTU, it was deemed by ADI that the development technique of air surging was too aggressive to further reduce the turbidity, and that pumping the well during the step testing and 24-hour pump test was the recommended approach to complete well development. The design standard of <1 NTU turbidity was subsequently achieved via stop-start pump development. Development water was not discharged to the storm sewer until field readings confirmed that TSS was below 15 mg/L. The F2-R MECP Well Record is included in **Appendix A**.

2.1.3 F2 Well Site Geophysics

Geophysical testing was completed by LTS at F2, F2-T and F5-R during the course of the Project, and included flow-profiling, gamma, caliper, temperature, conductivity, optical/acoustic televiewer, and downhole camera. Testing results are provided in **Appendix C**.

LTS identified a majority of groundwater inflow to the F2-R well at approximately 44.80 mBGS, or 358.3 to 322.3 mASL (30% of the total flow; 10% of this at 60.5 mBGS or 341.8 mASL), 80-100 mBGS or 322.3 to 302.3 mASL (30% of the total flow), and 104 mBGS or 298.3 mASL (40% of the total flow).

2.2 F5 Well Site

2.2.1 F5-T Well

Test well F5-T was drilled and installed by ADI between October 6th and November 10th, 2021. The borehole was advanced through the overburden using a Foremost DR24 drilling rig with steel casing advancement at a nominal 277 mmØ (10-7/8"), equipped with casing shoe, to a depth of 21.95 mBGS. The borehole was subsequently advanced using air hammer to a target depth of 35.38 mBGS, at which time a 169 mmØ (6-5/8") steel casing with casing shoe was set within the borehole and sealed. ADI experienced significant difficulty sealing the 169 mmØ (6-5/8") steel casing due to the presence of highly fractured shallow bedrock that displaced grout placed by tremie in the well annulus; however, the base of the casing was

effectively sealed using coated bentonite pellets. The borehole was then advanced below the casing using a CME 75 drilling rig and SQ rock coring, to a depth of 56.13 mBGS. Sand ingress during rock coring necessitated deepening of the 169 mmØ (6-5/8") casing from the original target depth of 35.38 mBGS to a depth of 53.04 mBGS in an attempt to seal off sand-producing fractures. The casing was advanced via air hammer in the SQ core hole. Further sand-producing fractures encountered below 53.04 mBGS necessitated sealing of the 153 mmØ (6") SQ casing at 56.13 mBGS. Below this point, the borehole was advanced using 127 mmØ (5") PQ rock coring to a final depth of 143.54 mBGS. The well was completed with an above ground casing stick-up of 0.46 m and capped with a locking, vermin-proof lid. Well installation details are provided in **Table 3** and a borehole log is provided in **Appendix A**.

Table 3: F5-T Installation Details

Detail	From (mBGS)	To (mBGS)
10-7/8" Steel Casing	-0.36[a]	21.95
6-5/8" Steel Casing	-0.41[a]	53.04
6" (SQ) Steel Casing	-0.46[a]	56.13
5" (PQ) Open Core hole	56.13	143.54
Bentonite Grout	N/A[b]	
Coated Bentonite Pellets between Borehole Wall/ 6-5/8" Steel Casing and 6" (SQ) Steel Casing	50.04	56.13

Notes: *a – Negative values indicate height above ground surface.*

b – Grout seal not placed due to encountered transmissive fractures.

Following installation, F5-T was developed via air lifting to remove fine particles generated during the drilling process and establish a good hydraulic connection with the surrounding geological (bedrock) formation. Well development (air surging) was completed on November 15th and 16th, 2021, and concluded with a turbidity reading of approximately 300 NTU. Due to the high turbidity encountered during well development, it was determined to be impractical to continue development beyond two (2) days of effort, and that additional development would be conducted during subsequent testing stages. A groundwater quality sample was collected during the development process to assess the water quality for discharge purposes (**Appendix B**). Based on the water quality results, discharge to a woodlot (Township-owned land) located adjacent to and behind the site was permitted by the Township.

2.2.2 F5-R Well

Production well F5-R was drilled and constructed by ADI between February 22nd and April 8th, 2022. The drilling process involved removing the F5-T well casing, widening the borehole, and installing and sealing the production well casing. Casing removal was performed with a CME 75 drilling rig. Subsequent drilling and casing installation was completed using a Foremost DR24 drilling rig. Upon pulling the F5-T casing, gas was observed entering the borehole at a depth of approximately 0.5 mBGS. The local gas utility owner (Enbridge) performed a site inspection and confirmed that no gas utility had been struck and stated that the woodlot/wetland adjacent to the F5 well site was a potential source of the natural gas entering the borehole. Flowable concrete (u-fill) was placed in the hole from approximately 1.5 mBGS to ground surface to mitigate the gas ingress and allow drilling to continue uninhibited. Casing advancement / air hammering was then performed to install a temporary 508 mmØ (20") steel casing from ground surface to a depth of 20.12 mBGS. Following placement of the temporary casing, ADI widened the annulus to 458 mmØ (18") from 20.12 to 55.47 mBGS to allow for installation of the permanent casing. Due to the occurrence of sand/gravel ingress into the borehole during the widening process, a double-

walled steel casing was installed to reduce the risk of seal failure at the base of the casing. This step included placement of a 407 mmØ (16") steel casing from ground surface to 55.46 mBGS, followed by an inner 305 mmØ (12") steel casing to 55.78 mBGS. Native material present within the 407 mmØ (16") casing was cleared via air hammer prior to placement of the 305 mmØ (12") steel casing. With the 305 mmØ (12") and 407 mmØ (16") casings in place, the borehole was widened to 305 mmØ (12") from 55.78 to 144.93 mBGS using an air hammer. Information regarding water-bearing fracture zones identified within the F5-R well is provided in **Section 2.2.3**.

Following the completion of borehole drilling, the annulus between the 305 mmØ (12") and 407 mmØ (16") casings was sealed with coated bentonite pellets followed by bentonite grout. The annular space between the 407 mmØ (16") steel casing and borehole wall contained native infill (sand and gravel) to a depth of 20.12 mBGS. During the process of removing the 508 mmØ (20") casing, bentonite chips were placed above the sand and gravel infill to 18.29 mBGS. Due to the highly fractured/cavernous nature of the shallow bedrock, ADI had difficulty placing seal above the bentonite at 18.29 mBGS. A 5.18 m thick layer of pea gravel was placed above the bentonite (to 13.11 mBGS) as a foundation for the upper seal. Bentonite pellets and grout were then placed, respectively, above the pea gravel to ground surface, while completing removal of the 508 mmØ (20") steel casing. The well was completed with an above-ground casing stick-up of 0.70 m and capped with a locking, vermin-proof lid. Well installation details are provided in **Table 4** and a borehole log is provided in **Appendix A**.

Table 4: F5-R Installation Details

Detail	From (mBGS)	To (mBGS)
16" Steel Casing	-0.10[a]	55.46
12" Steel Casing	-0.70[a]	55.78
12" Open Core hole	55.78	144.93
Coated Bentonite Pellets between 12" and 16" Steel Casings	55.17	55.78
Grout between 12" and 16" Steel Casings	0.60	55.17
Coated Bentonite Pellets between 12" and 16" Steel Casings	0.00	0.60
Cave-in/gravel ingress between 16" Steel Casing and Borehole Wall	20.12	55.46
Coated Bentonite Pellets between 16" Steel Casing and Borehole Wall	18.29	20.12
Pea Gravel between 16" Steel Casing and Borehole Wall	13.11	18.29
Bentonite Pellets between 16" Steel Casing and Borehole Wall	12.50	13.11
Bentonite Grout between 16" Steel Casing and borehole wall	0.60	12.50

Detail	From (mBGS)	To (mBGS)
Bentonite Pellets between 16" Steel Casing and Borehole Wall	0.00	0.60

Notes: a – Negative values indicate height above ground surface.

Following the completion of well construction, F5-R was developed via air lifting and pumping to remove fine particles generated during the drilling process and establish a good hydraulic connection with the surrounding geological (bedrock) formation, such that representative groundwater levels and well capacity details during subsequent testing could be obtained. Development of F5-R was extremely difficult, with the well exhibiting high turbidity readings after several weeks of air surging/pumping. During development, turbidity readings of <5 NTU were attained; however, F5-R continued to produce high turbidity during the start of pumping activities / after extended shutdown periods (generally in the range of 10 to 70 NTU, as measured by the Township). The turbidity results are further discussed in **Section 4.2.2**. The F5-R MECP Well Record is included in **Appendix A**.

2.2.3 F5 Well Site Geophysics

Geophysical testing was completed by LTS at F5, F5-T and F5-R over the duration of the Project, and included flow-profiling, gamma, caliper, temperature, conductivity, optical/acoustic televiewer, and downhole camera. Testing results are provided in **Appendix C**.

LTS identified a majority of the inflow to the F5-R well at approximately 75.8, 80.3, and 83.7 mBGS (345.1, 288.1, and 281.4 mASL, respectively), with minor in/outflow at 141 mBGS (224.8 mASL).

2.3 MW7-21 Well Nest

2.3.1 MW7-21D

Monitoring well MW7-21D was drilled and installed between September 15th and October 1st, 2021. This well, along with MW7-21S/I form the multi-level monitoring well nest located at the corner of Cameron St. and St. Andrew St. East, within the Community of Fergus (**Figure 1**). The MW7-21D borehole was advanced through the overburden using a CME 75 drilling rig equipped with hollow stem augers to the top of bedrock at 1.30 mBGS. The borehole was then advanced into bedrock via 127 mmØ (5") PQ rock coring to a depth of 115.98 mBGS. The well was completed using a flush mounted steel cap. Well installation details are provided in **Table** 5 and a borehole log is provided in **Appendix A**.

Table 5:MW7-21D Installation Details

Detail	From (mBGS)	To (mBGS)
50 mm schedule 80 PVC Riser	0.08	104.67
50 mm schedule 80 PVC Screen (Size 10 Slot)	104.67	107.72
Bentonite Pellets	0.00	0.30
Bentonite Grout	0.30	99.97
Coated Bentonite Pellets	99.97	100.58
Silica Sand	100.58	108.33
Coated Bentonite Pellets	108.33	115.98

Following the completion of drilling and prior to well installation, MW7-21D was developed to remove fine particles generated during the drilling process and establish a good hydraulic connection with the surrounding geological (bedrock) formation such that representative groundwater levels and well response information during subsequent testing could be obtained. Well development (air surging) was completed on September 24th, 2021, and concluded with turbidity reading of approximately 1.5 NTU.

2.3.2 MW7-21S/I

Monitoring well MW7-21S/I (two wells installed in a single borehole) was drilled and installed adjacent to MW7-21D between October 4th and October 14th, 2021. The borehole was advanced through the overburden using a CME 75 drilling rig equipped with hollow stem augers to the top of bedrock at 1.30 mBGS. The borehole was then advanced into bedrock via air hammer to a total depth of 86.41 mBGS. The well was completed using a flush mounted steel cap. The well comprises two (2) separate well installations within the single borehole, denoted as S (shallow) and I (intermediate), respectively. Well installation details are provided in **Table 6** and a borehole log is provided in **Appendix A**.

Table 6: MW7-21S/I Installation Details

Detail	From (mBGS)	To (mBGS)
Shallow Well: 38 mm schedule 40 PVC Riser	0.12	21.44
Shallow Well: 38 mm schedule 40 PVC Screen (Size 10 Slot)	21.44	24.49
Intermediate Well: 38 mm schedule 40 PVC Riser	0.08	83.16
Intermediate Well: 38 mm schedule 40 PVC Screen (Size 10 Slot)	83.16	86.21
Bentonite Pellets	0.00	0.30
Bentonite Grout	0.30	19.51
Coated Bentonite Pellets	19.51	20.78
Silica Sand	20.78	25.25
Coated Bentonite Pellets	25.25	82.40
Silica Sand	82.40	86.41

Following completion of drilling and prior to well installation, MW7-21S/I was developed to remove fine particles generated during the drilling process and establish a good hydraulic connection with the surrounding geological (bedrock) formation, such that representative groundwater levels and well response information during subsequent testing could be obtained. Well development (air surging) was completed on October 7th, 2021, and concluded when visually clear water was being produced from the borehole.

2.3.3 MW7-21D Geophysics

Geophysical testing was completed by LTS at MW7-21D and included flow-profiling, gamma, caliper, conductivity, temperature, optical/acoustic televiewer, and downhole camera. Testing results are provided in **Appendix C**. Of note were multiple, significant voids identified at depths of approximately 294.05 and 292.05 mASL.

2.4 MW8-21

MW8-21 was originally identified as the "MW4 Replacement Well" in Township of Centre Wellington RFT#01-2,1 but was subsequently renamed by the Township. MW8-21 comprises a multi-level monitoring system with five (5) ports installed within a single borehole using a Solinst® Waterloo Multilevel Groundwater Monitoring System. Each port includes a 153 mmØ (6") length screened interval, with a built-in vibrating wire piezometer (VWP) and double valve pump. The borehole for the multi-level monitoring well was drilled between November 30th and December 9th, 2021, and followed by well installation between December 13th and 23rd, 2022. A packer was installed within the borehole during the interim period to prevent downward groundwater flow within the borehole.

The MW8-21 borehole was advanced through the overburden using a CME 75 drilling rig equipped with hollow stem augers to the top of bedrock at 0.61 mBGS. The borehole was then advanced into bedrock via 127mmØ (5") PQ rock coring to a depth of 78.99 mBGS. Well installation details are provided in **Table 7** and a borehole log is provided in **Appendix A**[1].

Of note, the filter pack for Port 2 was installed with pea stone rather than sand to inhibit potential migration of backfill material, due to its location within the main water bearing fracture supplying the F1 well. The well was completed using a custom steel locking casing with an above ground casing stick-up of 1.35m.

Table 7: MW8-21 Installation Details

Detail	From (mBGS)	To (mBGS)
50 mm PVC Riser	-1.35	13.84
Port 5 Stainless Steel Screen	13.84	14.00
50 mm PVC Riser	14.00	27.10
Port 4 Stainless Steel Screen	27.10	27.25
50 mm PVC Riser	27.25	35.18
Port 3 Stainless Steel Screen	35.18	35.33
50 mm PVC Riser	35.33	53.62
Port 2 Stainless Steel Screen	53.62	53.77
50 mm PVC Riser	53.77	68.40
Port 1 Stainless Steel Screen	68.40	68.55
50 mm PVC Riser	68.55	78.92
Multilevel Base Plug	78.92	78.97
Coated Bentonite Pellets	0.00	13.11
Silica Sand	13.11	14.99

[1] *Well coordinates and elevation provided in the borehole log are based on Google Earth as the well has not yet been surveyed.*

Detail	From (mBGS)	To (mBGS)
Coated Bentonite Pellets	14.99	26.37
Silica Sand	26.37	27.91
Coated Bentonite Pellets	27.91	33.40
Silica Sand	33.40	36.27
Coated Bentonite Pellets	36.27	52.04
Pea Stone	52.04	54.74
Coated Bentonite Pellets	54.74	67.72
Silica Sand	67.72	69.34
Coated Bentonite Pellets	69.34	79.10
Silica Sand	79.10	79.27

Following the completion of drilling and prior to well installation, MW8-21 was developed to remove fine particles generated during the drilling process and establish a good hydraulic connection with the surrounding geological (bedrock) formation, such that representative groundwater levels and well response information during subsequent testing could be obtained. Well development (air surging) was completed on December 13th, 2021. Well development was concluded when visually clear water was being produced from the borehole.

2.4.1 MW8-21 Geophysics

Geophysical testing was completed by LTS at MW8-21 and included flow-profiling, gamma, caliper, resistivity, optical televiewer, and downhole camera. Testing results are provided in **Appendix C**. This information was utilized to select the multi-level port locations listed in **Table 7**, and shown on the borehole log in **Appendix A**.

3.0 Aquifer Capacity Testing

Over the course of the Well Replacement Project, pumping tests were conducted by LTS at the F2, F2-T, F2-R, F5-T and F5-R wells to determine drawdown characteristics, estimate well yield, and determine potential private well interference related to the replacement wells.

Unfiltered groundwater samples were collected by AECOM upon completion of pumping tests at F2-T, F2-R, F5-T and F5-R to document the quality of groundwater within the target bedrock aquifers at the replacement well sites. Groundwater samples were also collected from the F2 well during the course of pump testing to assess the quality of groundwater produced by the intermediate water-bearing formation, isolated by the use of a packer. Additionally, groundwater quality samples were collected from private residences that participated in the private well monitoring program. A summary of the sampling events completed by AECOM during the F2, and F5 Well Replacement Program is included in the following sections.

A full summary of the analytical testing results provided by CALA-accredited environmental analytical laboratories ALS Laboratories (ALS) and AGAT Laboratories (AGAT) is included within the laboratory Certificates of Analysis in **Appendix B**. Concentrations reported within the laboratory Certificates of Analysis, and subsequently on the exceedance summary tables within this report, reflect non-filtered samples, as required by the Town of Fergus's Sewer Use By-Law criteria and the Ontario Drinking Water Quality Standards (ODWQS). The unfiltered results are representative of raw groundwater quality prior to any treatment processes.

Water level monitoring completed during each test is also summarized in the following sections and displayed on the hydrographs included in **Appendix D**.

3.1 F2 Well Site

3.1.1 Private Well Monitoring

In accordance with the Permit Take Water (PTTW) issued by the Ministry of Environment, Conservation and Parks (MECP) for the well replacement Project pump tests (# P-300-1118618843), AECOM completed a private well monitoring program within a 500 m radius of the F2-T/F2-R wells. A door-to-door survey was completed to obtain background information on existing local aquifer use, and to assess potential locations for the monitoring of groundwater levels and quality both prior to and during replacement well drilling and aquifer testing at the F2-T/F2-R wells (documented in AECOM, 2021). Groundwater quality monitoring included sampling for a general potability package (including general chemistry, physical and bacteriological tests) as well as for a suite of volatile organic compounds (VOCs). Groundwater level monitoring included continuous data collection via in-situ pressure/temperature transducers (with on-board dataloggers), supplemented by manual measurements using an electronic water level tape during datalogger installation and retrieval events.

A summary of the private well monitoring program participants and their agreement to participate in the water level and water quality components of the program is provided in **Table 8**. A copy of the letters sent to residents with the water quality sampling results is provided in **Appendix E**.

Table 8: F2 Well Site – Private Well Monitoring Program Participants Summary

Address	Centre Wellington Private Well ID	Agreed to Participate in Water Level Monitoring (Y/N)	Agreed to Participate in Water Quality Monitoring (Y/N)
515 Orangeville Rd.	N/A	N – shared private well, not located on property	Y
535 Orangeville Rd[a]	Well 37	Y	Y
565 Orangeville Rd.	Well 38	Y	Y
590 St. Andrew St. East	Well 36	Y	Y
640 St. Andrew St. East	Well 33	Y	Y
140 Tom St.	N/A	N – well is not accessible for monitoring	Y

Notes: a – Well owner agreed to participate in monitoring program following F2-T Pump Test #2; monitoring was not completed during the F2-T Step Test, Pump Test #1 and Pump Test #2.

3.1.2 F2-T Well Capacity Testing

A step test was completed at F2-T on October 26th, 2021, to identify an appropriate pumping rate for the planned 24-hour pumping test. The step-test included four (4) one-hour steps at increasing rates of 3, 6, 9, and 11 L/s (**Appendix C**).

The initial 24-hour test was started on October 27th, 2021, at a rate of 10 L/s. An additional short duration (one-hour) pump test was performed on October 29th, 2021, at a slightly increased pump rate (12 L/s) to evaluate the maximum capacity of the well.

A summary of the pump tests performed at F2-T is provided in **Table 9**.

Table 9: F2-T Pump Test Summary

Pump Test	Start Date and Time (YYYY-MM-DD hr:min)	End Date and Time (YYYY-MM-DD hr:min)	Pumping Rate (L/s)
F2-T Step Test	2021-10-26 09:47	2021-10-26 15:30	Four (4) steps at 3, 6, 9 and 11
F2-T Pump Test #1	2021-10-27 10:35	2021-10-28 10:35	10
F2-T Pump Test #2	2021-10-29 08:58	2021-10-29 09:58	12

Groundwater Quality

A summary of groundwater quality sampling completed at F2-T, including laboratory results is provided in **Table 10**. A suite of parameters within ODWQS Schedules 1, 2 and 3 were analyzed for the samples collected from F2-T on October 28th and 29th, 2021 (**Appendix B**). No exceedances of the ODWQS parameter limits were reported in the sample results. Although below its ODWQS Aesthetic Objective of 200 mg/L, the reported concentration of sodium exceeded 20 mg/L (value of 23.6 mg/L), and thus should be reported to the local Medical Officer of Health so that this information may be communicated to local physicians for their use with patients on sodium restricted diets.

Table 10: F2-T – Pump Test Water Quality Sampling Summary

Pump Test	Sampling Date (YYYY-MM-DD)	Parameters Tested	Laboratory Work Order #	ODWQS Exceedances – Aesthetic Objective/ Operational Guideline	ODWQS Exceedances – Maximum Acceptable Concentration
F2-T Pump Test #1	2021-10-28	Bromate, Chloramines, Radionuclides	AGAT: 21T822326	N/A	N/A
		Anions and Nutrients, Cyanides, Bacteriological Tests, Total Metals, PAHs, HAAs, Semi-Volatile Organics, Herbicides, Pesticides	ALS: L2656807	Sodium[a]	N/A
F2-T Pump Test #2	2021-10-29	Mercury, VOCs, THMs, PCBs, Organochlorine Pesticides		N/A	N/A

Notes: a – The aesthetic objective for sodium in drinking water is 200 mg/L. The local Medical Officer of Health should be notified when the sodium concentration exceeds 20 mg/L so that this information may be communicated to local physicians for their use with patients on sodium restricted diets.

Groundwater Level Monitoring

F2-T and Monitoring Well Results

During the F2-T pump tests, groundwater level monitoring was completed at F2-T and MW7-21S/I/D by LTS. Groundwater level monitoring hydrographs for F2-T, each monitored private well, and MW7-21S/I/D are provided in **Appendix D**.

The results indicate that the lower portion of the aquifer (open portion of the well extending from 70.4 to 116.3 mBGS) is capable of sustaining a pumping rate of approximately 10 L/s (**Figure D-1**). This rate was deemed by the Township to be insufficient for a production well at this location, and therefore additional testing was completed on the original F2 well to evaluate the productivity of the upper component of the local aquifer (**Section 3.1.3**).

The hydrograph for the MW7-21S/I/D nest (**Figure D-2**) shows a response to the pumping of F2-T within the intermediate (I) and deep (D) wells. Maximum drawdown in the deep well was approximately 9.6 m during Pump Test #1 at 10 L/s. The observed drawdown in the intermediate well (completed within the Goat Island Formation) was approximately 4.1 m; however, a component of this drawdown is caused by the cyclical pumping of the F1 well, located approximately 160 m to the southeast (across the Grand River). The shallow well (completed within the Guelph Formation) did not respond to pumping at F2-T. It is noted that the MW7-21D groundwater level consistently remained above the level in MW7-21S, reflecting the presence of an upward hydraulic gradient, locally.

Private Well Results

Groundwater level monitoring was completed at private wells located at 565 Orangeville Rd., 590 St. Andrew St. East and 640 St. Andrew St. East for the duration of the pumping tests at F2-T (**Figure D-3**). Although included in the groundwater level monitoring program outlined in **Table 8**, 535 Orangeville Rd. did not request to participate until after the F2-T testing was completed. The private well located at 590 St. Andrew St. East indicated approximately 1.0 m of drawdown during the F2-T pump test #1 (10 L/s); however, this well was operating during the test, causing a portion of observed drawdown. The other two private wells monitored during the F2-T pumping tests (640 St. Andrew St. East and 565 Orangeville Rd.) did not show any groundwater level response.

3.1.3 F2 Well Assessment

Subsequent to F2-T testing, the original F2 well was assessed to evaluate the shallow component of the bedrock aquifer and to inform the final design of the F2 replacement well. A packer was placed within the original F2 well at a depth of 44 mBGS to isolate the upper and lower sections of the well. The lower section of the well was pumped during the subsequent pump tests and results were analyzed to determine the productivity and groundwater quality of the intermediate bedrock and to evaluate the potential presence of a hydraulic connection between the upper and lower aquifer segments. A summary of the pump tests is provided in **Table 11**.

Table 11: F2 Well Pump Test Summary

Pump Test	Start Date and Time (YYYY-MM-DD hr:min)	End Date and Time (YYYY-MM-DD hr:min)	Pumping Rate (L/s)
F2 Pump Test #1	2021-11-17 09:00	2021-11-17 09:58	6.3
F2 Pump Test #2	2021-11-17 11:35	2021-11-17 15:35	6.3
F2 Pump Test #3	2021-11-22 11:35	2021-11-22 17:35	6.3

Groundwater Quality

A summary of groundwater quality sampling completed during F2 Tests #1 and #3 is provided in **Table 12**. No groundwater samples were collected during Test #2.

Table 12: Well F2 – Pump Test Water Quality Sampling Summary

Pump Test	Sampling Date (YYYY-MM-DD)	Parameters Tested	Laboratory Work Order #	ODWQS Exceedances – Aesthetic Objective/ Operational Guideline	ODWQS Exceedances – Maximum Acceptable Concentration
F2 Pump Test #1	2021-11-17	TSS, Turbidity, E.Coli and Total Coliforms	ALS: L2663747	N/A	N/A
F2 Pump Test #3	2021-11-22	VOCs, TSS, Turbidity, E.Coli and Total Coliforms	ALS: L2665028	N/A	Total Coliforms[a]

Notes: a – The total coliform detection of 1 MPN/100 mL may not be indicative of site conditions.

Groundwater Level Monitoring

F2 and Monitoring Well Results

During the F2 well assessment, groundwater level monitoring was completed by LTS in the pumping well both above and below the packer placed at 44 mBGS. A groundwater level monitoring hydrograph for F2 (above and below the packer) is provided in **Appendix D (Figure D-4)**. Results show minimal drawdown above the packer during pumping (<1 m), indicating that there is minor interconnectivity between the upper and intermediate bedrock aquifers. The test rate was limited to 6.3 L/s due to the restricted borehole size (packer installation); however, the observed drawdown of approximately 7.5 m (pumping water level at approximately 17 mBGS) indicated that the intermediate zone of the bedrock aquifer could provide additional capacity to the final replacement well. Therefore, a decision was made to install the base of the F2-R casing to a depth of 44 mBGS.

The hydrograph for the MW7-21S/I/D nest (**Figure D-5**) shows a very minor response to the pumping of F2 within the deep well (<0.5 m). No response was observed in the shallow well and data are not available for the intermediate well due to over pressurization of the installed transducer.

Private Well Results

Groundwater level monitoring was completed at private wells located at 535 and 565 Orangeville Rd., 590 St. Andrew St. East and 640 St. Andrew St. East for the duration of the pump tests at F2 (**Figure D-3**). Similar to the F2-T testing, the private well located at 590 St. Andrew Street East responded to the F2 test, with approximately 0.6 m of drawdown observed. This well was operating during the testing, causing a portion of observed drawdown. The other private wells monitored during the F2 pump tests did not show an appreciable response.

Well Abandonment

Prior to construction of the F2-R well, the original F2 well was abandoned by ADI in accordance with O.Reg. 903, as amended (**Appendix A**).

3.1.4 F2-R Well Capacity Testing

A step test was completed at F2-R on August 31st, 2022, to identify an appropriate pumping rate for the planned 24-hour pump test. The step-test included three (3) one-hour steps at increasing rates of 7, 14, and 20 L/s.

Following the step test, the well was chlorinated and then purged on September 1st, 2022 (**Appendix C**) in advance of a 24-hour test that was completed at a rate of 20 L/s.

A summary of the step-test and long-term pump test performed at F2-R is provided in **Table 13**.

Table 13: F2-R Pump Tests

Pump Test ID	Start Date and Time (YYYY-MM-DD hr:min)	End Date and Time (YYYY-MM-DD hr:min)	Pumping Rate (L/s)
F2-R Step Test	2022-08-31 12:45	2022-08-31 15:45	Three (3) steps at 7, 14 and 20
F2-R Pump Test	2022-09-01 09:00	2022-09-02 10:07	20

Groundwater Quality

A summary of groundwater quality sampling completed at F2-R, including laboratory testing results is provided in **Table 14**. A suite of parameters within ODWQS Schedules 1, 2 and 3 were analyzed for the groundwater samples collected from F2-R on September 2nd, 2022 (**Appendix B**). Similar to the F2-T results, although below its ODWQS Aesthetic Objective of 200 mg/L, the reported concentration of sodium exceeded 20 mg/L (value of 30.6 mg/L), and thus should be reported to the local Medical Officer of Health so that this information may be communicated to local physicians for their use with patients on sodium restricted diets. In addition, TDS in the sampled groundwater (850 mg/L) also was reported to exceed the Aesthetic Objective of 500 mg/L, and hardness (637 mg/L) was reported to exceed the Operational Guideline range of 80 to 100 mg/L.

Table 14: F2-R – Pump Test Water Quality Sampling Summary

Pump Test	Sampling Date (YYYY-MM-DD)	Parameters Tested	Laboratory Work Order #	ODWQS Exceedances – Aesthetic Objective/ Operational Guideline	ODWQS Exceedances – Maximum Acceptable Concentration
F2-R Pump Test	2022-09-02	Physical Tests, Anions and Nutrients, Cyanides, Organic/ Inorganic Carbon, Total Sulfides, Total Metals, Aggregate Organics (NTA), Dissolved Gases (Methane), VOCs, THMs, PAHs, Disinfectant By-products, HAAs, Semi-volatile Organics, Chlorinated Phenolics, PCBs, Pesticides, Herbicides, Organic Parameters (microcystin)	ALS: WT2212954	Sodium[a], TDS; Hardness (as $CaCO_3$)	N/A
		Bromate, Chloramines	AGAT: 22T940792	N/A	N/A

Notes: a – The aesthetic objective for sodium in drinking water is 200 mg/L. The local Medical Officer of Health should be notified when the sodium concentration exceeds 20 mg/L so that this information may be communicated to local physicians for their use with patients on sodium restricted diets.

Groundwater Level Monitoring

F2-R and Monitoring Well Results

During the F2-R testing, groundwater level monitoring was completed at F2-R and MW7-21S/I/D by LTS. Groundwater level monitoring hydrographs for F2-R, each monitored private well, and MW7-21S/I/D are provided in **Appendix D**. Drawdown

within F2-R stabilized at about 355 mASL late in the 24-hour test, a total drawdown of approximately 34.4 m and a specific capacity of 0.58 L/s/m (**Figure D-6**). The drawdown curve was relatively smooth with one fairly sharp increase at 6:50PM on September 1st, in response to a pumping rate adjustment. The groundwater level did draw down below the base of the well casing; however, there was no observable impact to the drawdown curve in response.

The hydrograph for the MW7-21S/I/D nest (**Figure D-7**) shows a response to the pumping of F2-R within the intermediate and deep wells. The maximum drawdown in the deep well was approximately 13.3 m during pumping of F2-R at 20 L/s, compared to an approximate drawdown of 9.6 m during pumping of F2-T 10 L/s. The observed drawdown in the intermediate well was approximately 4 m; however, a component of this drawdown was caused by the cyclical pumping of the F1 well, as was observed during the F2-T test.

The hydrograph for MW7-21S displays several metres of variability before and after the F2-R test that may be related to pumping of the F1 well, with the absence of a drawdown trend that can be attributed to the F2-R testing.

Private Well Results

Groundwater level monitoring was completed at the private wells identified in **Table 8** for the duration of the pump test at F2-R. Each of the four (4) private wells show some magnitude of drawdown due to the pump test conducted at F5-R (**Figure D-8**). Private wells at 565 Orangeville Rd., 535 Orangeville Rd. and 640 St. Andrew St. East show very minor to minor drawdown (<1.0 m) at the conclusion of the F2-R pumping test, indicating a slight connection with the fracture zones intercepted by F2-R. The private well located at 590 St. Andrew St. East showed moderate drawdown (approximately 2.6 m) in response to pumping at F5-R.

The maximum observed drawdown at the conclusion of the 24-hour F2-R pump test is shown on **Figure 2**, indicating the zone of influence pattern caused by pumping F2-R. The variability apparent in this pattern is explained by the nature of fractured bedrock hydrogeology, such that the connection with any one observation and/or private well depends on the construction details of the pumping well and the well being monitored, radial distance, and interconnectivity of the fracture network.

Transmissivity Estimate

Aquifer transmissivity was estimated for F2-R using the 24-hour drawdown pumping test data provided by LTS for both the pumping well (F2-R) and municipal monitoring well MW7-21D. The bulk transmissivity surrounding the water supply well was determined to be approximately 90 m^2/day at the pumping well and 144 m^2/day at the monitoring well (**Appendix F**).

3.2 F5 Well Site

3.2.1 Private Well Monitoring

In accordance with PTTW # P-300-1118618843, as issued by MECP for the F5 replacement well pump tests, AECOM completed a private well monitoring program within a 500 m radius of F5-T/F5-R. A door-to-door survey was completed to obtain background information on existing local aquifer use, and to assess potential locations for the monitoring of groundwater levels and quality both prior to and during replacement well drilling and aquifer testing at F5-T/F5-R (AECOM, 2021). Groundwater quality monitoring included sampling for a general potability package (including general chemistry, physical and bacteriological tests) and VOCs. Groundwater level monitoring included continuous measurements via in-situ pressure/temperature transducers (with on-board datalogger), supplemented by manual groundwater level measurements using an electronic water level tape during datalogger installation and retrieval events.

Table 15 provides a summary of the private well at 935 Scotland St. and their agreement to participate in the groundwater level and water quality components of the program. A copy of the letter sent to this resident with the water quality sampling results is provided in **Appendix E**.

Table 15: F5 Well Site – Private Well Monitoring Program Participant Summary

Address	Centre Wellington Private Well ID	Agreed to Participate in Water Level Monitoring (Y/N)	Agreed to Participate in Water Quality Monitoring (Y/N)
935 Scotland St.	Well 28	Y	Y

3.2.2 F5-T Well Capacity Testing

A summary of the 24-hour pumping test performed at F5-T is provided in **Table 16**. A step test was not completed prior to the long-term pumping test since the pumping rate was limited by the borehole diameter (PQ), rather than aquifer performance. This was due to the reduced casing diameter of F5-T necessitated by the issue of sand ingress to the borehole during drilling, as noted previously.

Table 16: F5-T Pump Test Summary

Pump Test ID	Start Date and Time (YYYY-MM-DD hr:min)	End Date and Time (YYYY-MM-DD hr:min)	Pumping Rate (L/s)
F5-T Pump Test #1	2021-11-30 10:45	2021-12-01 12:00	6.6

Groundwater Quality

A summary of groundwater quality sampling completed at F5-T during the F5-T pumping test, including laboratory testing results is provided in **Table 17**. A suite of parameters within ODWQS Schedules 1, 2 and 3 were analyzed for the samples collected from F5-T on December 1st, 2021. No parameter exceedances were reported.

Table 17: F5-T – Pump Test Water Quality Sampling Summary

Pump Test	Sampling Date (YYYY-MM-DD)	Parameters Tested	Laboratory Work Order #	ODWQS Exceedances – Aesthetic Objective/ Operational Guideline	ODWQS Exceedances – Maximum Acceptable Concentration
F5-T Pump Test	2021-12-01	Anions & Nutrients, Cyanides, Bacteriological Tests, Total Metals, Mercury, VOCs, PAHs, THMs, Semi-Volatile Organics, PCBs, Organochlorine Pesticides, Herbicides, Pesticides, Organic Parameters	ALS: L2668348	N/A	N/A
		Bromate, Chloramines, Radionuclides	AGAT: 21T838364	N/A	N/A

Groundwater Level Monitoring

F5-T and Monitoring Well Results

During the F5-T pumping test, groundwater level monitoring was completed at F5-T and F5 by LTS. Groundwater level monitoring hydrographs for F5, F5-T, the monitored private well and MW3-11A/B/C is provided in **Appendix D**.

The results indicate that the F5-T well was capable of sustaining the test pumping rate of approximately 6.6 L/s. Maximum drawdown in the test well was approximately 4.8 m, being equivalent to pumping water level of 399.1 mASL (**Figure D-9**). As a reference point, the base of the F5-T casing was located at 363.9 mASL. A muted response was observed in the F5 well, with maximum drawdown of approximately 2.4 m. The inverse response occurred during subsequent pumping events where F5 was operating, and the groundwater level response was monitored in F5-T (**Figure D-9**). This response indicated a direct connection between the two wells on site via bedrock fractures occurring below 364 mASL (56 mBGS). Both wells recover quickly after pumping ceases.

Township multi-level monitoring well MW3-11A/B/C is located approximately 370 m northeast of the F5 well site (**Figure 1**) and is screened at three (3) discrete intervals identified as A, B, and C, targeting the Goat Island Formation bedrock, Guelph Formation bedrock, and overburden, respectively. The hydrograph for this monitoring well (**Figure D-9**) shows that, during the F5-T pumping test, MW3-11A and MW3-11B exhibit identical responses, with sharp, immediate drawdown (<1 m) occurring at the start of pumping, and immediate recovery following pump shut-off. Drawdown in response to pumping of F5 is steeper, indicating that shallow fractures open with the F5 well are more directly connected to MW3. The overburden monitoring well, MW3-11C, displays a significantly higher groundwater level (reflecting a downward hydraulic gradient) and did not register a drawdown response to pumping at the F5 well site.

Private Well Results

Groundwater level monitoring was completed at the 935 Scotland St. private well for the duration of the pumping test at F5-T (**Figure D-9**). This private well showed minimal drawdown (<0.2 m) during pumping of F5-T, indicating that a hydraulic connection exists between the F5 site wells, but that the private well likely primarily draws water from shallower fractures within the aquifer.

3.2.3 F5-R Well Capacity Testing

A step test was completed at F5-R to identify an appropriate pumping rate for the long-term pumping test. A summary of the step test and long-term pumping test performed at F5-R is provided in **Table 18**. Following review of the step test results, a pumping rate of 30 L/s was selected for the long-term test. Subsequent to completion of the long-term test, additional development was completed at F5-R to address ongoing high turbidity levels in the well discharge water. An element of the development work included the installation of a packer within the F5 well to assess the relative contribution of the upper and lower aquifer zones to the turbidity issue. Following installation of the packer, an additional step test was completed at F5-R at rates of 10, 20, and 25 L/s. With the upper zone isolated in the F5 well, the pump in F5-R broke suction while pumping at 25 L/s (**Appendix C**). This indicates that, prior to full well development and without a deeper pump setting, 20 L/s was likely the maximum sustainable rate at F5-R, with a packer installed in the F5 well, or if this well were to be decommissioned.

Table 18: F5-R Pump Test

Pump Test ID	Start Date and Time (YYYY-MM-DD hr:min)	End Date and Time (YYYY-MM-DD hr:min)	Pumping Rate (L/s)
F5-R Step Test #1	2022-04-26 12:25	2022-04-26 15:21	Three (3) steps at 10, 20, and 30
F5-R Pump Test	2022-04-27 10:30	2022-04-28 10:50	30
F5-R Step Test #1	2022-05-16 10:38	2022-05-16 13:38	Three (3) steps at 10, 20, and 25 (pump broke suction at 25 L/s)

Monitoring of the private well at 935 Scotland St. continued during pump testing of F5-R and included continuous groundwater level monitoring via in-situ pressure/temperature transducer (with on-board datalogger), supplemented with manual groundwater level measurements using an electronic water level tape during data logger installation and retrieval events.

Groundwater Quality

A summary of groundwater quality sampling completed at F5-R, including laboratory testing results is provided in **Table 19**. A suite of parameters within ODWQS Schedules 1, 2 and 3 were analyzed for in the groundwater samples collected from F5-R on April 28th, 2022. Exceedances of the ODWQS Operational Guideline for hardness (80 to 100 mg/L) and total aluminum (0.1 mg/L), in addition to the Maximum Acceptable Concentration (health-related) for total coliforms were reported. It is noted that, although turbidity was below the ODWQS Aesthetic Objective of 5 mg/L, this parameter was elevated during subsequent testing of F5-R resulting in the Township conducting a related treatability study (**Section 4.2.2**).

Table 19: F5-R – Pump Test Water Quality Sampling Summary

Pump Test	Sampling Date (YYYY-MM-DD)	Parameters Tested	Laboratory Work Order #	ODWQS Exceedances – Aesthetic Objective/ Operational Guideline	ODWQS Exceedances – Maximum Acceptable Concentration
F5-R Pump Test	2022-04-28	Physical Tests, Anions and Nutrients, Cyanides, Organic/ Inorganic Carbon, Bacteriological Tests, Total Metals, VOCs, HAAs, Semi-Volatile Organics, Herbicides, Pesticides, Organic Parameters	ALS: L2702028	Hardness (as $CaCO_3$), Total Aluminum	Total Coliforms[a]

Notes: a – The total coliform detection of 1 MPN/100 mL may not be indicative of site conditions.

Groundwater Level Monitoring

F5-R and Monitoring Well Results

During the F5-R pumping test, groundwater level monitoring was completed at F5-R and F5 by LTS. Additionally, Township multi-level monitoring well MW3-11A/B/C was monitored for the duration of the test. Groundwater level monitoring hydrographs for F5-R, the monitored private well and MW3-11A/B/C are provided in **Appendix D**. As displayed on the F5-R pumping test hydrograph (**Figure D-10**), the well drew down from a static level of approximately 405 mASL to approximately 375 mASL over the course of the 24-hour test (total drawdown of 30 m and specific capacity of 0.99 L/s/m). The pumping groundwater level in the late time of the test was about 10 m above the base of the F5-R well casing. As discussed above, the yield of this well is affected by the cross-connection with the F5 well, such that a lower sustainable rate is likely achievable with a packer installed in the F5 well and/or if the F5 well were to be decommissioned. Subsequent to the 24-hour test at 30 L/s, extensive development pumping was completed at a rate of 20 L/s without drawing the groundwater level down to the well pump intake. Additionally, the Township has successfully completed 72-hour testing of F5-R at 20 L/s for the Wellfield Capacity Testing program without issue. This testing will be documented under separate cover.

Cross-connection with the F5 well is demonstrated on **Figure D-10**, which shows an immediate response in F5 to the testing. Total drawdown in F5 is approximately 15 m. Both wells recover very quickly after pumping ceases.

Monitoring wells MW3-11A and MW3-11B show identical responses to pumping at F5-R, with sharp, immediate drawdown displayed at the start of pumping, and immediate recovery following pump shut-off (**Figure D-11**). Maximum drawdown observed in monitoring wells MW3-11A and MW3-11B was approximately 3.0 m. The overburden monitoring well, MW3-11C, registered a slight response (0.3 m drawdown) during the F5-R pumping test (**Figure D-11**).

Private Well Results

Groundwater level monitoring was completed at 935 Scotland St. for the duration of the F5-R testing. This private well showed minimal drawdown (0.6 m) at the conclusion of the 24-hour pump test for F5-R, indicating connection with the fracture zones intercepted by F5-R and this private well, but no interruption to normal well use (**Figure D-11**). Private wells at 535 and 565 Orangeville Rd. did not show a response to the pumping test conducted at F5-R (**Figure D-11**).

The maximum observed drawdown at the conclusion of the 24-hour F5-R pumping test is shown on **Figure 3**, indicating the zone of influence pattern caused by pumping F5-R. The variability apparent in this pattern is explained by the nature of fractured bedrock hydrogeology, such that the connection with any one observation or private well depends on the construction details of the pumping well and monitored well, radial distance, and interconnectivity of the fracture network.

Transmissivity Estimate

Transmissivity was estimated for F5-R using the 24-hour drawdown pumping test data provided by LTS for both the pumping well (F5-R) and nearby municipal monitoring wells MW3-11A and MW3-11B. The bulk transmissivity surrounding the water supply well was determined to be approximately 237 m^2/day at the pumping well and 250 m^2/day at the monitoring wells (**Appendix F**).

4.0 Discussion and Recommendations

4.1 F2-R Well

4.1.1 Well Capacity

The F2-R well was pumped at 20 L/s for approximately 24-hours during the testing completed for this Project. During the test, the groundwater level in the well was drawn down 34.4 m to a final pumping water level of approximately 355 mASL. This is below the F2-R well casing at 358.3 mASL; however, the stabilized drawdown was not affected by the groundwater level being within the open portion of the well. It is recommended that this well be operated at a maximum rate of 20 L/s and that the pumping groundwater level be maintained in the range of 350 to 355 mASL. This approach maintains the groundwater level above the water-bearing feature identified during well drilling/installation at approximately 341.8 mASL.

4.1.2 Well Water Quality

Testing of the well discharge water indicated a high-quality groundwater source with sodium (30.6 mg/L) in excess of the 20 mg/L limit for individuals on sodium reduced diets (although below its 200 mg/L Aesthetic Objective), and TDS (850 mg/L) in excess its Aesthetic Objective value of 500 mg/L, primarily due to elevated hardness (637 mg/L compared to the ODWQS Operational Guideline range of 80 to 100 mg/L). These results are common for groundwater sources in the local aquifer system. It is anticipated that a groundwater supply source can be developed on this site requiring typical treatment measures (i.e., standard disinfection).

MW7-21 should be integrated into the Township monitoring network for monitoring of groundwater levels and quality. The suite of water quality analytes should include VOCs, as this is known to be present within the local bedrock aquifer (although not detected during the well replacement program).

4.1.3 Pumping Impacts

Testing of F2-R did not interfere with the ongoing use of any local private wells. Monitoring at MW7-21D, located approximately 380 m southwest of the F2 well site, indicates that deep bedrock wells within 500 m could experience appreciable drawdown in response to long-term pumping at F2-R. The Township may consider obtaining an access agreement with the owner of Well 36 (590 St. Andrew St. East), or an equivalent nearby well, for the purpose of establishing a groundwater level monitoring point. It is understood that a cluster of private wells exist in this neighbourhood and further to the north and east. The ongoing collection of data in this area will provide an understanding of how operation of F2-R, along with F4 and F5-R, may affect local groundwater levels. In the absence of a willing participant, the Township could establish a monitoring well on Township-owned property to supplement the existing monitoring network.

4.2 F5-R Well

4.2.1 Well Capacity

The F5-R well was pumped at 30 L/s for approximately 24-hours during the testing completed for this Project. During the test, the groundwater level in the well was drawn down 30.3 m to a final pumping water level of approximately 375 mASL. Following installation of a packer in the F5 well, the specific capacity of F5-R was reduced, and subsequent pumping was conducted at 20 L/s. Based on results of the testing completed for the well replacement program and the subsequent wellfield capacity assessment, it is recommended that this well be operated at a maximum rate of 20 L/s, and that the pumping groundwater level be maintained above the base of casing at approximately 365 mASL.

4.2.2 Well Water Quality

Testing of the well discharge water indicated a high-quality groundwater source with hardness (307 mg/L) exceeding its ODWQS Operational guideline range of 80 to 100 mg/L, total aluminum (0.148 mg/L) exceeding its Aesthetic Objective of 0.1 mg/L, and total coliforms (1 MPN/100 mL) exceeding its Maximum Acceptable Concentration (health-related) of 0 MPN/100 mL. The trace total coliform detection of 1 MPN/100 mL is an indication of potential ingress of shallow water into the well intake; however, no E.coli detections occurred within F5-T or F5-R, suggesting that this result is spurious. This well was subsequently disinfected and is not anticipated to exhibit further coliform detections.

Turbidity measurements collected on site and by the laboratory (ALS) confirm that the well produces high turbidity, primarily on start-up. AECOM has conducted a separate treatability study, focusing on the treatment for the observed turbidity, which is provided under separate cover (AECOM, 2022). It is understood that the treatment system would address required disinfection, turbidity, and total aluminum concentrations.

4.2.3 Pumping Impacts

Testing of F5-R did not interfere with the ongoing use of any private wells. Monitoring at MW3-11A/B, located approximately 370 m northeast of the F5-R well site, indicates that the intermediate and deep components of the bedrock aquifer could experience moderate drawdown (<5 m) in response to long-term pumping on site. This is greater than the drawdown observed at the closest monitored private well at 935 Scotland St., where <1 m of drawdown occurred. This well is approximately 400 m southeast of the F5-R well site. This private well is used frequently to supply a geothermal cooling/heating system on the property; however, the position of the pump intake within the well is unknown. It is recommended that the Township collect additional information regarding this well, if the resident is willing to participate and provide such information. MW3-11 should continue to be monitored during future operation of the F5-R well to evaluate drawdown within the local aquifer in response to its operation. This well provides a conservative representation of potential impacts as the drawdown in the monitoring well is anticipated to exceed that which occurs at 935 Scotland St. It is noted that additional private wells likely exist to the southeast of the site. For example, a well survey response was received from 920 Scotland St., however the resident declined to participate in the monitoring program.

5.0 Closing

This technical memorandum provides a summary of the work completed under the F2 and F5 well replacement program, including an assessment of the collected data. Please do not hesitate to contact AECOM to discuss the contents of this document.

6.0 References

AECOM, 2021. Municipal Supply Wells F2 & F5 Replacement Program. OWRA, Section 34, Permit to Take Water (Category 3) Application for Aquifer Testing. Dated February 2021.

AECOM, 2022. Fergus Well F5R Water Treatment Feasibility Study – Alternatives Evaluation. Township of Centre Wellington. Dated December 2022.

Statement of Qualifications and Limitations

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

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

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

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

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

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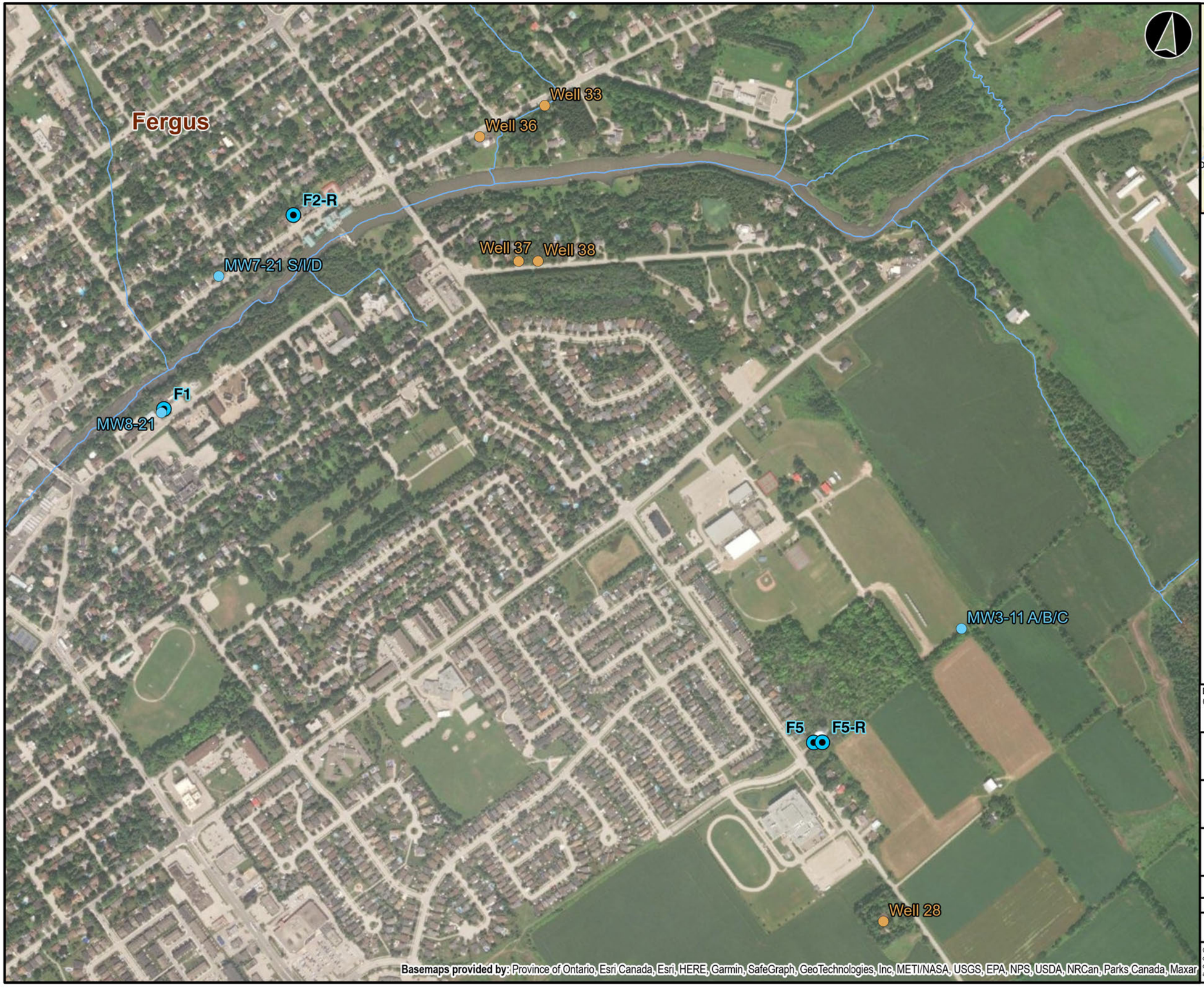
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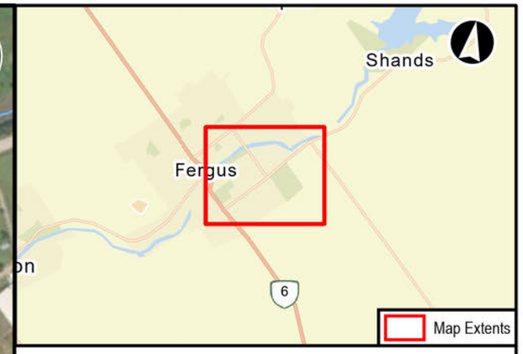
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Figures





Legend

- Municipal Multi-Level Monitoring Well
- Private Well
- Municipal Production Well
- Watercourse

Data Sources:
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Municipal Well F2 and F5 Replacement Program

Well Location Map

0 50 100 200 300 400 500 M

NAD 1983 UTM Zone 17N

Feb, 2023	1:7,500	
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Figure 1		AECOM

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Project Location: \\na.aecomnet.com\LFS\AMER\Hamilton-CAHAM1\DOSIG\IS\Projects\60664299-CentreWellington\Data\60664299-CentreWellington\60664299-CentreWellington.aprx Layout: Figure 1 - Well Location Map
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Fergus

Well 33
(0.1 m)

Well 36
(2.7 m)

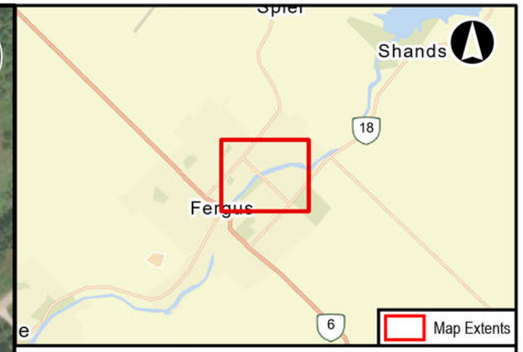
F2-R (34.4 m)

Well 37
(0.0 m)

Well 38
(0.0 m)

MW7-21S (1.0 m)
MW7-21I (2.7 m)
MW7-21D (13.4 m)

Basemaps provided by: Province of Ontario, Esri Canada, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, USDA, NRCan, Parks Canada, Maxar



Legend

- Municipal Multi-Level Monitoring Well
- Private Well
- Municipal Production Well
- Watercourse
- (XX m) Drawdown at the conclusion of 24-hour pumping test

Data Sources:
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Municipal Well F2 and F5 Replacement Program

F2-R Pumping Test Zone of Influence

0 50 100 200 300 M

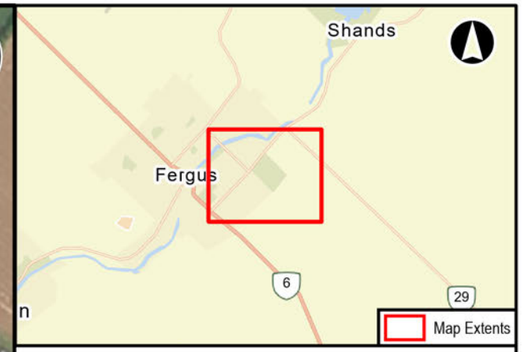
NAD 1983 UTM Zone 17N

Feb, 2023	1:5,000	
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Figure 2		AECOM

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Legend

- Municipal Multi-Level Monitoring Well
- Private Well
- Municipal Production Well
- Watercourse
- (XX m) Drawdown at the conclusion of 24-hour pumping test

Data Sources:
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Municipal Well F2 and F5 Replacement Program

F5-R Pumping Test Zone of Influence

0 50 100 200 300 400 500 M

NAD 1983 UTM Zone 17N

Feb, 2023	1:7,000	
P:60664299	Rev:00	
Figure 3		AECOM

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Project Location: \\na.aecomnet.com\LFS\AMER\Hamilton-CA\HAM1\DCS\GIS\Projects\60664299-CentreWellington\Data\60664299-CentreWellington\60664299-CentreWellington.aprx Layout: Figure 3 - F5-R Pumping Test Zone of Influence
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AECOM

Appendix A

Project Borehole Logs & MECP Water Well Records

AECOM

Project Borehole Logs

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 449 St. Andrew St. E, Fergus
COORDINATES: N 4839939.4; E 550597.2
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: F2-T

START DATE: July 29, 2021
END DATE: Sept. 7, 2021
DRILLING METHOD: 152 mm O.D. SQ Rock Core
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN / FLUSH	RECOVERY TOTAL CORE %	RECOVERY SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA DIP w.r.t. CORE AXIS	DISCONTINUITY DATA TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		GROUND SURFACE		402.30												
0		**FILL:** sand and gravel, brown, moist		0.00												10-7/8" steel casing from -0.40 to 2.46 m; 6-5/8" steel casing from -0.60 to 70.41 m; Bentonite pellets from 0.00 to 2.46 m
1																
2				399.91												
2		Light creamy grey to light brownish grey, fine grained, crystalline, faintly porous, slightly to highly weathered, slightly to moderately pitted, vuggy, occasional stylolites, gastropods and crinoids, medium to thickly bedded **DOLOSTONE (GUELPH FORMATION, 2.39 to 68.94 m)**		2.39												Base of 10-7/8" steel casing at 2.46 m
3					1	0.1										
3				399.00												
3				3.30												
4		Calcite mineralization observed in vugs			2	0.2										
4				397.42												
5				4.88												
6	Diamond Core Drilling 152 mm O.D. SQ Rock Core				3	0.1										Grout from 2.46 to 66.90 m
6				395.87												
6				6.43												
7					4	0.1										
7		Pitting and crystallization in vugs		394.55												
7				7.75												
8					5	0.1										
9		Fossiliferous (bivalves)														
9				392.90												
9				9.40												
10					6	0.1										
10		*CONTINUED NEXT PAGE*														

DEPTH SCALE
1 : 50

Centre Wellington

AECOM

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RK_LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 449 St. Andrew St. E, Fergus
COORDINATES: N 4839939.4; E 550597.2
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

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START DATE: July 29, 2021
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DRILLING METHOD: 152 mm O.D. SQ Rock Core
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN / FLUSH	RECOVERY TOTAL CORE %	RECOVERY SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA DIP w.r.t. CORE AXIS	DISCONTINUITY DATA TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		CONTINUED FROM PREVIOUS PAGE														
10	Diamond Core Drilling 152 mm O.D. SQ Rock Core	Light creamy grey to light brownish grey, fine grained, crystalline, faintly porous, slightly to highly weathered, slightly to moderately pitted, vuggy, occasional stylolites, gastropods and crinoids, medium to thickly bedded **DOLOSTONE (GUELPH FORMATION, 2.39 to 68.94 m)**		391.43	6	0.1										
11		130 mm void at 10.67 m		10.87	7	0.1										
12				389.85												
13		Large vugs (diameter between 10 and 30 mm)		12.45	8	0.1										▽ September 13, 2021
14				388.43												
15		Potential water-bearing zone from 15.33 to 15.44 m. Fracture is oxidized and water loss was observed by drilling contractor.		13.87	9	0.1	Low Water Return									Grout from 2.46 to 66.90 m
16				386.86												
17		Rock density increasing inferred by drill bit resistance		15.44	10	0.1										
18				385.33												
19				16.97	11	0.1										
20		*CONTINUED NEXT PAGE*		383.73												
				18.57	12	0.1										

RK_LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

DEPTH SCALE
1 : 50

LOGGED: PM
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PROJECT: F2 and F5 Well Replacement Project
LOCATION: 449 St. Andrew St. E, Fergus
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VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR, % RETURN / FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		CONTINUED FROM PREVIOUS PAGE														
20	Diamond Core Drilling 152 mm O.D. SQ Rock Core	Light creamy grey to light brownish grey, fine grained, crystalline, faintly porous, slightly to highly weathered, slightly to moderately pitted, vuggy, occasional stylolites, gastropods and crinoids, medium to thickly bedded **DOLOSTONE (GUELPH FORMATION, 2.39 to 68.94 m)**		380.48 20.64												
21					13	0.1										
				380.71 21.59												
22					14	0.1										
23				379.14 23.16												
		Drilling contractor noted decrease in water circulation return beginning at 23.17 m.			15	0.1										
24				377.66 24.64												
25					16	0.1										Grout from 2.46 to 66.90 m
26				376.09 26.21												
27					17	0.1										
				374.56 27.74												
28					18	0.1	Minimal Water Return									
		Potential water-bearing zone at 28.32 m. Fracture is open to approximately 15 mm and water loss was observed by drilling contractor.														
29				373.09 29.21												
					19	0.1										
30		*CONTINUED NEXT PAGE*														

DEPTH SCALE
1 : 50

Centre Wellington

AECOM

LOGGED: PM
CHECKED: MA

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 449 St. Andrew St. E, Fergus
COORDINATES: N 4839939.4; E 550597.2
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CONTRACTOR: Aardvark Drilling

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DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN / FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		CONTINUED FROM PREVIOUS PAGE														
30	Diamond Core Drilling 152 mm O.D. SQ Rock Core	Light creamy grey to light brownish grey, fine grained, crystalline, faintly porous, slightly to highly weathered, slightly to moderately pitted, vuggy, occasional stylolites, gastropods and crinoids, medium to thickly bedded **DOLOSTONE (GUELPH FORMATION, 2.39 to 68.94 m)**			19	0.1										
				371.52												
31				30.78	20	0.1										
32				369.99												
				32.31												
		Potential water-bearing zone at 32.54 m. Fracture is highly mineralized and open to approximately 20 mm.														
33					21	0.1										
				368.52												
34				33.78	22	0.2										
				366.99												
35				35.31												Grout from 2.46 to 66.90 m
		Potential water-bearing zone at 35.13 m. Fracture is oxidized and open to approximately 15 mm.														
36					23	0.1										
				365.42												
37				36.88												
		Potential water-bearing zone at 37.27 m. Fracture is oxidized and open to approximately 5 mm.			24	0.1										
38				363.90												
		Drilling contractor noted significant water circulation loss and poor water circulation return at 38.41 m.		38.40												
39					25	0.1	Minimal Water Return									
				362.42												
40				39.88	26	0.1										
		CONTINUED NEXT PAGE														

DEPTH SCALE
1 : 50

LOGGED: PM
CHECKED: MA

RK_LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

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DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN / FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		CONTINUED FROM PREVIOUS PAGE														
40	Diamond Core Drilling 152 mm O.D. SQ Rock Core	Light creamy grey to light brownish grey, fine grained, crystalline, faintly porous, slightly to highly weathered, slightly to moderately pitted, vuggy, occasional stylolites, gastropods and crinoids, medium to thickly bedded **DOLOSTONE (GUELPH FORMATION, 2.39 to 68.94 m)**														
41				360.85	26	0.1										
42				41.45	27	0.2										
43				359.35												
44				42.95	28	0.1										
45		Potential water-bearing zone at 45.19 m. Fracture is oxidized and open to approximately 15 mm.		357.80												Grout from 2.46 to 66.90 m
46				44.50	29	0.1										
		Drilling contractor noted no to little water circulation return beginning at 46.05 m.		356.25												
47				46.05	30	0.1	Minimal Water Return									
		Potential water-bearing zone within oxidized fractures proximal to pitting and vugs between 47.37 and 47.45 m.		354.75												
48		Potential water-bearing zone within oxidized fractures between 47.78 and 48.18 m. Sand infilling within fractures.		47.55	31	0.1										
49				353.23												
				49.07	32	0.1										
50		*CONTINUED NEXT PAGE*														

DEPTH SCALE
1 : 50

LOGGED: PM
CHECKED: MA

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 449 St. Andrew St. E, Fergus
COORDINATES: N 4839939.4; E 550597.2
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: F2-T

START DATE: July 29, 2021
END DATE: Sept. 7, 2021
DRILLING METHOD: 152 mm O.D. SQ Rock Core
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR, % RETURN / FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		CONTINUED FROM PREVIOUS PAGE														
50	Diamond Core Drilling 152 mm O.D. SQ Rock Core	Light creamy grey to light brownish grey, fine grained, crystalline, faintly porous, slightly to highly weathered, slightly to moderately pitted, vuggy, occasional stylolites, gastropods and crinoids, medium to thickly bedded **DOLOSTONE (GUELPH FORMATION, 2.39 to 68.94 m)**		351.68	32	0.1										
51				50.62	33	0.1										
52				350.18												
53		Potential water-bearing zone within large fracture at 53.26 m. Fracture is oxidized and has sand and gravel infilling.		52.12	34	0.1	No Water Return									
54				348.63												
55				53.67	35	0.1										Grout from 2.46 to 66.90 m
56				347.13												
57				55.17	36	0.1	No Water Return									
58				345.61												
59				56.69	37	0.1										
60		*CONTINUED NEXT PAGE*		344.11												
				58.19	38	0.2										
				342.56												
				59.74	39	0.2										

RK_LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

DEPTH SCALE
1 : 50

LOGGED: PM
CHECKED: MA

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 449 St. Andrew St. E, Fergus
COORDINATES: N 4839939.4; E 550597.2
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: F2-T

START DATE: July 29, 2021
END DATE: Sept. 7, 2021
DRILLING METHOD: 152 mm O.D. SQ Rock Core
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN / FLUSH	RECOVERY TOTAL CORE %	RECOVERY SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA DIP w.r.t. CORE AXIS	DISCONTINUITY DATA TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		CONTINUED FROM PREVIOUS PAGE														
60	Diamond Core Drilling 152 mm O.D. SQ Rock Core	Light creamy grey to light brownish grey, fine grained, crystalline, faintly porous, slightly to highly weathered, slightly to moderately pitted, vuggy, occasional stylolites, gastropods and crinoids, medium to thickly bedded **DOLOSTONE (GUELPH FORMATION, 2.39 to 68.94 m)**														
					39	0.2										
61				341.04												
				61.26												
62					40	0.2										
				339.49												
63				62.81												
					41	0.1										Grout from 2.46 to 66.90 m
64				337.96												
				64.34												
65					42	0.1										
				336.46												
66				65.84												
					43	0.2										
67				334.91												
				67.39												
68					44	0.2										Coated bentonite pellets from 66.90 to 70.41 m
				333.36												
69		Light greyish brown to medium greyish brown, fine grained, crystalline, faintly porous, stylolitic, occasional crinoids and gastropods, thinly bedded, cross bedding throughout; transition from overlying Guelph Formation is gradational **DOLOSTONE (GOAT ISLAND FORMATION, 68.94 to 89.41 m)**		68.94												
					45	0.2										
70		*CONTINUED NEXT PAGE*														

DEPTH SCALE
1 : 50

LOGGED: PM
CHECKED: MA

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 449 St. Andrew St. E, Fergus
COORDINATES: N 4839939.4; E 550597.2
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: F2-T

START DATE: July 29, 2021
END DATE: Sept. 7, 2021
DRILLING METHOD: 152 mm O.D. SQ Rock Core
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR & % RETURN / FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
70		CONTINUED FROM PREVIOUS PAGE														
		Light greyish brown to medium greyish brown, fine grained, crystalline, faintly porous, stylolitic, occasional crinoids and gastropods, thinly bedded, cross bedding throughout; transition from overlying Guelph Formation is gradational **DOLOSTONE (GOAT ISLAND FORMATION, 68.94 to 89.41 m)**		331.89	45	0.2										Base of 6-5/8" steel casing at 70.41 m
				70.41												
71		Potential water-bearing zone within fracture at 70.23 m. Fracture is oxidized and has sand and gravel infilling.			46	0.2										
72				330.24												
				72.06												
73					47	0.1										
		Potential water-bearing zone at large fracture (60 mm) at 73.15 m. Fracture has significant calcite mineralization.		328.74												
				73.56												
74					48	0.1										
				327.22												
75				75.08												6" open corehole from 70.41 to 116.26 m
					49	0.1										
76																
				325.69												
				76.61												
77					50	0.1										
				324.17												
78				78.13												
					51	0.2										
79		Potential water-bearing zone within large fracture (25 mm) at 79.40 m. Fracture has significant calcite mineralization and is proximal to pitting and vugs.		322.67												
				79.63												
80		*CONTINUED NEXT PAGE*			52	0.2										

Diamond Core Drilling
152 mm O.D. SQ Rock Core

DEPTH SCALE
1 : 50

LOGGED: PM
CHECKED: MA

RK_LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 449 St. Andrew St. E, Fergus
COORDINATES: N 4839939.4; E 550597.2
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: F2-T

START DATE: July 29, 2021
END DATE: Sept. 7, 2021
DRILLING METHOD: 152 mm O.D. SQ Rock Core
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN / FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
80		CONTINUED FROM PREVIOUS PAGE														
	Diamond Core Drilling 152 mm O.D. SQ Rock Core	Light greyish brown to medium greyish brown, fine grained, crystalline, faintly porous, stylolitic, occasional crinoids and gastropods, thinly bedded, cross bedding throughout; transition from overlying Guelph Formation is gradational **DOLOSTONE (GOAT ISLAND FORMATION, 68.94 to 89.41 m)**		321.15	52	0.2										
81				81.15												
		Potential water-bearing zone within large fracture (30 mm) at 81.58 m. Fracture has significant calcite mineralization and is proximal to pitting and vugs.			53	0.1										
82				319.57												
				82.73												
83																
					54	0.1										
84				318.05												
				84.25												
85					55	0.2										6" open corehole, from 70.41 to 116.26 m
				316.52												
86		Potential water-bearing zone within large fracture/vug (100 mm) at 85.20 m.		85.78												
					56	0.1										
87				315.13												
				87.17												
88					57	0.1										
				313.50												
89				88.80												
				312.89	58	0.1										
				89.41												
90		*CONTINUED NEXT PAGE*														

DEPTH SCALE
1 : 50

Centre Wellington

AECOM

LOGGED: PM
CHECKED: MA

RK LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 449 St. Andrew St. E, Fergus
COORDINATES: N 4839939.4; E 550597.2
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: F2-T

START DATE: July 29, 2021
END DATE: Sept. 7, 2021
DRILLING METHOD: 152 mm O.D. SQ Rock Core
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN / FLUSH	RECOVERY TOTAL CORE %	RECOVERY SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA DIP w.r.t. CORE AXIS	DISCONTINUITY DATA TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		CONTINUED FROM PREVIOUS PAGE														
90	Diamond Core Drilling 152 mm O.D. SQ Rock Core	Very light grey to dark blue-grey, fine grained, crystalline, faintly porous, moderately pitted, stylolitic, crinoids throughout, occasional gastropods, thickly to massively bedded **DOLOSTONE (GASPORT FORMATION, 89.41 to 112.27 m)**		311.98 / 90.32	58	0.1										
91				310.48 / 91.82	59	0.1										
92																
93				308.88 / 93.42	60	0.1										
94																
95				307.35 / 94.95	61	0.1										6" open corehole, from 70.41 to 116.26 m
96																
97				305.86 / 96.44	62	0.2										
98				304.33 / 97.97	63	0.1										
99																
100		*CONTINUED NEXT PAGE*		302.81 / 99.49	64	0.1										
					65	0.1										

DEPTH SCALE
1 : 50

LOGGED: PM
CHECKED: MA

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 449 St. Andrew St. E, Fergus
COORDINATES: N 4839939.4; E 550597.2
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: F2-T

START DATE: July 29, 2021
END DATE: Sept. 7, 2021
DRILLING METHOD: 152 mm O.D. SQ Rock Core
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN / FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
100		CONTINUED FROM PREVIOUS PAGE														
	Diamond Core Drilling 152 mm O.D. SQ Rock Core	Very light grey to dark blue-grey, fine grained, crystalline, faintly porous, moderately pitted, stylolitic, crinoids throughout, occasional gastropods, thickly to massively bedded **DOLOSTONE (GASPORT FORMATION, 89.41 to 112.27 m)**		301.28	65	0.1										
101				101.02												
					66	0.1										
102				299.76												
				102.54												
103					67	0.1										
				298.26												
104				104.04												
					68	0.1										6" open corehole, from 70.41 to 116.26 m
105				296.74												
				105.56												
106					69	0.2										
				295.19												
107				107.11												
					70	0.1										
108				293.66												
				108.64												
109					71	0.1										
110		*CONTINUED NEXT PAGE*														

DEPTH SCALE
1 : 50

Centre Wellington

AECOM

LOGGED: PM
CHECKED: MA

RK_LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 449 St. Andrew St. E, Fergus
COORDINATES: N 4839939.4; E 550597.2
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: F2-T

START DATE: July 29, 2021
END DATE: Sept. 7, 2021
DRILLING METHOD: 152 mm O.D. SQ Rock Core
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN / FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
110		CONTINUED FROM PREVIOUS PAGE														
	Diamond Core Drilling 152 mm O.D. SQ Rock Core	Very light grey to dark blue-grey, fine grained, crystalline, faintly porous, moderately pitted, stylolitic, crinoids throughout, occasional gastropods, thickly to massively bedded **DOLOSTONE (GASPORT FORMATION, 89.41 to 112.27 m)**		292.14	71	0.1										
				110.16												
111					72	0.1										
				290.64												
				111.66												
112				290.03												
		Light to medium grey (mottled appearance), fine to medium grained, crystalline, non-porous, medium to thickly bedded **DOLOSTONE (IRONDEQUOIT, ROCKWAY & MERRITTON FORMATION, 112.27 to 116.26 m)**		112.27	73	0.1										
113				289.09												6" open corehole from 70.41 to 116.26 m
				113.21												
114					74	0.1										
				287.57												
				114.73												
115					75	0.1										
116				286.04												
		END OF BOREHOLE		116.26												
117		Notes: 1. Interpretation assistance by AECOM is required for projects excluding the above mentioned project. 2. No abnormal odour or staining was observed unless otherwise indicated. 3. Corehole diameter: 10-7/8" from 0.00 to 2.46 mBGS 8" from 2.46 mBGS to 70.41 mBGS 6" from 70.41 mBGS to 116.26 mBGS 4. Well installation details include: 10-7/8" Steel Casing: -0.40 to 2.46 mBGS 6-5/8" Steel Casing: -0.60 to 70.41 mBGS 6" Open Corehole: 70.41 to 116.26 mBGS 5. Static water level of 12.53 mbgs was observed on September 13, 2021.														
118																
119																
120																

DEPTH SCALE
1 : 50

Centre Wellington

AECOM

LOGGED: PM
CHECKED: MA

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 449 St. Andrew St. E, Fergus
COORDINATES: N 4839939.4; E 550597.2
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: F2-R

START DATE: July 5, 2022
END DATE: August 15, 2022
DRILLING METHOD: 18" O.D.
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN / FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		GROUND SURFACE		402.30												
0	Air Hammer 18" O.D.	**FILL:** sand and gravel, brown, moist		0.00												Bentonite pellets from 0.00 to 0.60 m
1																12" steel casing from -0.73 to 44.04 m
2				399.91												
3		Light creamy grey to light brownish grey, fine grained, crystalline, faintly porous, slightly to highly weathered, slightly to moderately pitted, vuggy, occasional stylolites, gastropods and crinoids, medium to thickly bedded **DOLOSTONE (GUELPH FORMATION, 2.39 to 68.94 m)**		2.39												
4		Calcite mineralization observed in vugs														
5																Grout from 0.60 to 43.43 m
6																
7		Pitting and crystallization in vugs														
8																
9		Fossiliferous (bivalves)														
10		*CONTINUED NEXT PAGE*														

DEPTH SCALE
1 : 50

LOGGED: PM
CHECKED: MA

RK_LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 449 St. Andrew St. E, Fergus
COORDINATES: N 4839939.4; E 550597.2
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: F2-R

START DATE: July 5, 2022
END DATE: August 15, 2022
DRILLING METHOD: 18" O.D.
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN / FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		CONTINUED FROM PREVIOUS PAGE														
10	Air Hammer 18" O.D.	Light creamy grey to light brownish grey, fine grained, crystalline, faintly porous, slightly to highly weathered, slightly to moderately pitted, vuggy, occasional stylolites, gastropods and crinoids, medium to thickly bedded **DOLOSTONE (GUELPH FORMATION, 2.39 to 68.94 m)**														
11		130 mm void at 10.67 m														
12																
13		Large vugs (diameter between 10 and 30 mm)														▽ September 1, 2022
14																
15																Grout from 0.60 to 43.43 m
16		Potential water-bearing zone from 15.33 to 15.44 m. Fracture is oxidized and water loss was observed by drilling contractor														
17																
18		Rock density increasing inferred by drill bit resistance														
19																
20		*CONTINUED NEXT PAGE*														

DEPTH SCALE
1 : 50

Centre Wellington

AECOM

LOGGED: PM
CHECKED: MA

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 449 St. Andrew St. E, Fergus
COORDINATES: N 4839939.4; E 550597.2
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: F2-R

START DATE: July 5, 2022
END DATE: August 15, 2022
DRILLING METHOD: 18" O.D.
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR, % RETURN / FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		CONTINUED FROM PREVIOUS PAGE														
20		Light creamy grey to light brownish grey, fine grained, crystalline, faintly porous, slightly to highly weathered, slightly to moderately pitted, vuggy, occasional stylolites, gastropods and crinoids, medium to thickly bedded **DOLOSTONE (GUELPH FORMATION, 2.39 to 68.94 m)**														
21																
22																
23		Drilling contractor noted decrease in water circulation return beginning at 23.17 m														
24																
25	Air Hammer 18" O.D.															Grout from 0.60 to 43.43 m
26																
27																
28		Potential water-bearing zone at 28.32 m. Fracture is open to approximately 15 mm and water loss was observed by drilling contractor														
29																
30		*CONTINUED NEXT PAGE*														

DEPTH SCALE
1 : 50

LOGGED: PM
CHECKED: MA

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 449 St. Andrew St. E, Fergus
COORDINATES: N 4839939.4; E 550597.2
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: F2-R

START DATE: July 5, 2022
END DATE: August 15, 2022
DRILLING METHOD: 18" O.D.
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR & % RETURN / FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		CONTINUED FROM PREVIOUS PAGE														
30		Light creamy grey to light brownish grey, fine grained, crystalline, faintly porous, slightly to highly weathered, slightly to moderately pitted, vuggy, occasional stylolites, gastropods and crinoids, medium to thickly bedded **DOLOSTONE (GUELPH FORMATION, 2.39 to 68.94 m)**														
31																
32																
		Potential water-bearing zone at 32.54 m. Fracture is highly mineralized and open to approximately 20 mm														
33																
34																
35	Air Hammer 18" O.D.															Grout from 0.60 to 43.43 m
		Potential water-bearing zone at 35.13 m. Fracture is oxidized and open to approximately 15 mm														
36																
37																
		Potential water-bearing zone at 37.27 m. Fracture is oxidized and open to approximately 5 mm.														
38																
		Drilling contractor noted significant water circulation loss and poor water circulation return at 38.41 m														
39																
40		*CONTINUED NEXT PAGE*														

DEPTH SCALE
1 : 50

Centre Wellington

AECOM

LOGGED: PM
CHECKED: MA

RK_LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 449 St. Andrew St. E, Fergus
COORDINATES: N 4839939.4; E 550597.2
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: F2-R

START DATE: July 5, 2022
END DATE: August 15, 2022
DRILLING METHOD: 18" O.D.
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN / FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		CONTINUED FROM PREVIOUS PAGE														
40	Air Hammer 18" O.D.	Light creamy grey to light brownish grey, fine grained, crystalline, faintly porous, slightly to highly weathered, slightly to moderately pitted, vuggy, occasional stylolites, gastropods and crinoids, medium to thickly bedded **DOLOSTONE (GUELPH FORMATION, 2.39 to 68.94 m)**														Grout from 0.60 to 43.43 m
41																
42																
43																Coated bentonite pellets from 43.43 to 44.04 m
44																Base of 12" steel casing at 44.04 m
45		Potential water-bearing zone at 45.19 m. Fracture is oxidized and open to approximately 15 mm.														
46		Drilling contractor noted no to little water circulation return beginning at 46.05 m.														
47	Air Hammer 12" O.D.															12" open corehole from 44.04 to 116.26 m
48		Potential water-bearing zone within oxidized fractures proximal to pitting and vugs between 47.37 and 47.45 m. Potential water-bearing zone within oxidized fractures between 47.78 and 48.18 m. Sand infilling within fractures.														
49																
50		*CONTINUED NEXT PAGE*														

DEPTH SCALE
1 : 50

Centre Wellington

AECOM

LOGGED: PM
CHECKED: MA

RK LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 449 St. Andrew St. E, Fergus
COORDINATES: N 4839939.4; E 550597.2
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: F2-R

START DATE: July 5, 2022
END DATE: August 15, 2022
DRILLING METHOD: 18" O.D.
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	FLUSH / COLOUR % RETURN	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		CONTINUED FROM PREVIOUS PAGE														
50		Light creamy grey to light brownish grey, fine grained, crystalline, faintly porous, slightly to highly weathered, slightly to moderately pitted, vuggy, occasional stylolites, gastropods and crinoids, medium to thickly bedded **DOLOSTONE (GUELPH FORMATION, 2.39 to 68.94 m)**														
51																
52																
53		Potential water-bearing zone within large fracture at 53.26 m. Fracture is oxidized and has sand and gravel infilling.														
54																
55	Air Hammer 12" O.D.															12" open corehole from 44.04 to 116.26 m
56																
57																
58																
59																
60		*CONTINUED NEXT PAGE*														

RK_LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

DEPTH SCALE
1 : 50

LOGGED: PM
CHECKED: MA

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 449 St. Andrew St. E, Fergus
COORDINATES: N 4839939.4; E 550597.2
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: F2-R

START DATE: July 5, 2022
END DATE: August 15, 2022
DRILLING METHOD: 18" O.D.
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN / FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		CONTINUED FROM PREVIOUS PAGE														
60	Air Hammer 12" O.D.	Light creamy grey to light brownish grey, fine grained, crystalline, faintly porous, slightly to highly weathered, slightly to moderately pitted, vuggy, occasional stylolites, gastropods and crinoids, medium to thickly bedded **DOLOSTONE (GUELPH FORMATION, 2.39 to 68.94 m)**														
61																
62																
63																
64																
65																12" open corehole from 44.04 to 116.26 m
66																
67																
68																
69		Light greyish brown to medium greyish brown, fine grained, crystalline, faintly porous, stylolitic, occasional crinoids and gastropods, thinly bedded, cross bedding throughout; transition from overlying Guelph Formation is gradational **DOLOSTONE (GOAT ISLAND FORMATION, 68.94 to 89.41 m)**		333.36 / 68.94												
70		*CONTINUED NEXT PAGE*														

DEPTH SCALE
1 : 50

Centre Wellington

AECOM

LOGGED: PM
CHECKED: MA

RK LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 449 St. Andrew St. E, Fergus
COORDINATES: N 4839939.4; E 550597.2
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: F2-R

START DATE: July 5, 2022
END DATE: August 15, 2022
DRILLING METHOD: 18" O.D.
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR & % RETURN / FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		CONTINUED FROM PREVIOUS PAGE														
70	Air Hammer 12" O.D.	Light greyish brown to medium greyish brown, fine grained, crystalline, faintly porous, stylolitic, occasional crinoids and gastropods, thinly bedded, cross bedding throughout; transition from overlying Guelph Formation is gradational **DOLOSTONE (GOAT ISLAND FORMATION, 68.94 to 89.41 m)**														
71		Potential water-bearing zone within fracture at 70.23 m. Fracture is oxidized and has sand and gravel infilling.														
72																
73		Potential water-bearing zone at large fracture (60 mm) at 73.15 m. Fracture has significant calcite mineralization.														
74																
75																12" open corehole from 44.04 to 116.26 m
76																
77																
78																
79		Potential water-bearing zone within large fracture (25 mm) at 79.40 m. Fracture has significant calcite mineralization and is proximal to pitting and vugs.														
80		*CONTINUED NEXT PAGE*														

DEPTH SCALE
1 : 50

Centre Wellington

AECOM

LOGGED: PM
CHECKED: MA

RK LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 449 St. Andrew St. E, Fergus
COORDINATES: N 4839939.4; E 550597.2
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: F2-R

START DATE: July 5, 2022
END DATE: August 15, 2022
DRILLING METHOD: 18" O.D.
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN / FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		CONTINUED FROM PREVIOUS PAGE														
80	Air Hammer 12" O.D.	Light greyish brown to medium greyish brown, fine grained, crystalline, faintly porous, stylolitic, occasional crinoids and gastropods, thinly bedded, cross bedding throughout; transition from overlying Guelph Formation is gradational **DOLOSTONE (GOAT ISLAND FORMATION, 68.94 to 89.41 m)**														
81		Potential water-bearing zone within large fracture (30 mm) at 81.58 m. Fracture has significant calcite mineralization and is proximal to pitting and vugs.														
82																
83																
84																
85																12" open corehole from 44.04 to 116.26 m
86		Potential water-bearing zone within large fracture/vug (100 mm) at 85.20 m.														
87																
88																
89				312.89 / 89.41												
90		*CONTINUED NEXT PAGE*														

DEPTH SCALE
1 : 50

Centre Wellington

AECOM

LOGGED: PM
CHECKED: MA

RK LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 449 St. Andrew St. E, Fergus
COORDINATES: N 4839939.4; E 550597.2
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: F2-R

START DATE: July 5, 2022
END DATE: August 15, 2022
DRILLING METHOD: 18" O.D.
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN / FLUSH	RECOVERY: TOTAL CORE % (80 60 40 20)	RECOVERY: SOLID CORE % (80 60 40 20)	R.Q.D. % (80 60 40 20)	FRACT. INDEX PER 0.3 (5 10 15 20)	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS (0 30 60 90)	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec (10^{-6} 10^{-5} 10^{-4} 10^{-3})	DIAMETRAL POINT LOAD INDEX (MPa) (2 4 6)	WELL INSTALLATION AND WATER LEVELS
90	Air Hammer 12" O.D.	CONTINUED FROM PREVIOUS PAGE Very light grey to dark blue-grey, fine grained, crystalline, faintly porous, moderately pitted, stylolitic, crinoids throughout, occasional gastropods, thickly to massively bedded **DOLOSTONE (GASPORT FORMATION, 89.41 to 112.27 m)**														12" open corehole from 44.04 to 116.26 m
91																
92																
93																
94																
95																
96																
97																
98																
99																
100		*CONTINUED NEXT PAGE*														

DEPTH SCALE
1 : 50

Centre Wellington

AECOM

LOGGED: PM
CHECKED: MA

RK_LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 449 St. Andrew St. E, Fergus
COORDINATES: N 4839939.4; E 550597.2
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: F2-R

START DATE: July 5, 2022
END DATE: August 15, 2022
DRILLING METHOD: 18" O.D.
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN / FLUSH	RECOVERY: TOTAL CORE % (80 60 40 20)	RECOVERY: SOLID CORE % (80 60 40 20)	R.Q.D. % (80 60 40 20)	FRACT. INDEX PER 0.3 (5 10 15 20)	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS (0 30 60 90)	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec (10^{-6} 10^{-5} 10^{-4} 10^{-3})	DIAMETRAL POINT LOAD INDEX (MPa) (2 4 6)	WELL INSTALLATION AND WATER LEVELS
100		CONTINUED FROM PREVIOUS PAGE														
	Air Hammer 12" O.D.	Very light grey to dark blue-grey, fine grained, crystalline, faintly porous, moderately pitted, stylolitic, crinoids throughout, occasional gastropods, thickly to massively bedded **DOLOSTONE (GASPORT FORMATION, 89.41 to 112.27 m)**														12" open corehole from 44.04 to 116.26 m
101																
102																
103																
104																
105																
106																
107																
108																
109																
110		*CONTINUED NEXT PAGE*														

DEPTH SCALE
1 : 50

Centre Wellington

AECOM

LOGGED: PM
CHECKED: MA

RK LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 449 St. Andrew St. E, Fergus
COORDINATES: N 4839939.4; E 550597.2
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: F2-R

START DATE: July 5, 2022
END DATE: August 15, 2022
DRILLING METHOD: 18" O.D.
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN / FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		CONTINUED FROM PREVIOUS PAGE														
110	Air Hammer 12" O.D.	Very light grey to dark blue-grey, fine grained, crystalline, faintly porous, moderately pitted, stylolitic, crinoids throughout, occasional gastropods, thickly to massively bedded **DOLOSTONE (GASPORT FORMATION, 89.41 to 112.27 m)**														
111																
112				290.03												
		Light to medium grey (mottled appearance), fine to medium grained, crystalline, non-porous, medium to thickly bedded **DOLOSTONE (IRONDEQUOIT, ROCKWAY & MERRITTON FORMATION, 112.27 to 116.26 m)**		112.27												
113																12" open corehole from 44.04 to 116.26 m
114																
115																
116				286.04												
		END OF BOREHOLE		116.26												
117		Notes: 1. Interpretation assistance by AECOM is required for projects excluding the above mentioned project. 2. No abnormal odour or staining was observed unless otherwise indicated. 3. Corehole diameter: 20" from 0.00 to 3.05 mBGS 18" from 3.05 mBGS to 44.04 mBGS 12" from 44.04 mBGS to 116.26 mBGS 4. Well installation details include: 12" Steel Casing: -0.73 to 44.04 mBGS 12" Open Corehole: 44.04 to 116.26 mBGS 5. Static water level of 12.70 mbgs was observed on September 1, 2022.														
118																
119																
120																

RK_LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

DEPTH SCALE
1 : 50

LOGGED: PM
CHECKED: MA

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 900 Scotland St., Fergus
COORDINATES: N 4839071.7; E 551838.9
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: F5-T

START DATE: Oct. 6, 2021
END DATE: Nov. 10, 2021
DRILLING METHOD: 270 mm O.D. Casing Advancement
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	FLUSH / COLOUR % RETURN	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		GROUND SURFACE		420.87												
0	Dual Rotary Casing Advancement 270 mm O.D. Casing Advancement	Coring began at 35.38 m. Top of bedrock inferred by driller at 19.8 m.		0.00												10-7/8" steel casing from -0.36 to 21.95 m 6-5/8" steel casing from -0.41 to 53.04 m 6" steel casing from -0.46 to 56.13 m
1																
2																
3																
4																
5																
6																
7																
8																
9																
10		*CONTINUED NEXT PAGE*														

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

RECOVERY: 80 60 40 20 | 80 60 40 20
R.Q.D.: 80 60 40 20
FRACT. INDEX PER 0.3: 5 10 15 20
DISCONTINUITY DATA: DIP w.r.t. CORE AXIS: 0 30 60 90
HYDRAULIC CONDUCTIVITY K, cm/sec: 10^{-6} 10^{-5} 10^{-4} 10^{-3}
DIAMETRAL POINT LOAD INDEX (MPa): 2 4 6

DEPTH SCALE
1 : 50

Centre Wellington

AECOM

LOGGED: PM
CHECKED: MA

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 900 Scotland St., Fergus
COORDINATES: N 4839071.7; E 551838.9
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: F5-T

START DATE: Oct. 6, 2021
END DATE: Nov. 10, 2021
DRILLING METHOD: 270 mm O.D. Casing Advancement
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN / FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		CONTINUED FROM PREVIOUS PAGE														
10	Dual Rotary Casing Advancement 270 mm O.D. Casing Advancement	Coring began at 35.38 m. Top of bedrock inferred by driller at 19.8 m.						80 60 40 20	80 60 40 20	80 60 40 20	5 10 15 20	0 30 60 90		10^{-6} 10^{-5} 10^{-4} 10^{-3}	2 4 6	
11																
12																
13																
14																
15																
16																▽ November 30, 2021
17																
18																
19																
20		*CONTINUED NEXT PAGE*														

DEPTH SCALE
1 : 50

Centre Wellington

AECOM

LOGGED: PM
CHECKED: MA

RK LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 900 Scotland St., Fergus
COORDINATES: N 4839071.7; E 551838.9
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: F5-T

START DATE: Oct. 6, 2021
END DATE: Nov. 10, 2021
DRILLING METHOD: 270 mm O.D. Casing Advancement
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN / FLUSH	RECOVERY: TOTAL CORE % (80 60 40 20)	RECOVERY: SOLID CORE % (80 60 40 20)	R.Q.D. % (80 60 40 20)	FRACT. INDEX PER 0.3 (5 10 15 20)	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS (0 30 60 90)	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec (10^{-6} 10^{-5} 10^{-4} 10^{-3})	DIAMETRAL POINT LOAD INDEX (MPa) (2 4 6)	WELL INSTALLATION AND WATER LEVELS
		CONTINUED FROM PREVIOUS PAGE														
20	Dual Rotary Casing Advancement 270 mm O.D. Casing Advancement	Coring began at 35.38 m. Top of bedrock inferred by driller at 19.8 m.														Base of 10-7/8" steel casing at 21.95 m
21																
22																
23																
24																
25																
26	Diamond Core Drilling 152 mm O.D. SQ Rock Core															
27																
28																
29																
30		*CONTINUED NEXT PAGE*														

DEPTH SCALE
1 : 50

Centre Wellington

AECOM

LOGGED: PM
CHECKED: MA

RK_LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 900 Scotland St., Fergus
COORDINATES: N 4839071.7; E 551838.9
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: F5-T

START DATE: Oct. 6, 2021
END DATE: Nov. 10, 2021
DRILLING METHOD: 270 mm O.D. Casing Advancement
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN / FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		CONTINUED FROM PREVIOUS PAGE														
30	Diamond Core Drilling 152 mm O.D. SQ Rock Core	Coring began at 35.38 m. Top of bedrock inferred by driller at 19.8 m.														
31																
32																
33																
34																
35				385.49												
36		Light creamy grey to light brownish grey, fine grained, crystalline, faintly porous, slightly to highly weathered, slightly to moderately pitted, vuggy, occasional stylolites, gastropods and crinoids, medium to thickly bedded **DOLOSTONE (GUELPH FORMATION, 35.38 to 60.48 m)**		35.38	1	0.1										
		Potential water-bearing zone at 35.51 m. Fracture is oxidized and open to approximately 20 mm. Drilling contractor lost water circulation during Run 1		384.19												
37				36.68	2	0.2										
		Potential water-bearing zone at 37.49 m. Vertical fracture (290 mm length) is highly oxidized														
38				382.59												
				38.28												
39		Increase in gastropods			3	0.2										
				381.06												
				39.80	4	0.1										
40		*CONTINUED NEXT PAGE*														

DEPTH SCALE
1 : 50

Centre Wellington

AECOM

LOGGED: PM
CHECKED: MA

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 900 Scotland St., Fergus
COORDINATES: N 4839071.7; E 551838.9
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: F5-T

START DATE: Oct. 6, 2021
END DATE: Nov. 10, 2021
DRILLING METHOD: 270 mm O.D. Casing Advancement
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN / FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		CONTINUED FROM PREVIOUS PAGE														
40	Diamond Core Drilling 152 mm O.D. SQ Rock Core	Light creamy grey to light brownish grey, fine grained, crystalline, faintly porous, slightly to highly weathered, slightly to moderately pitted, vuggy, occasional stylolites, gastropods and crinoids, medium to thickly bedded **DOLOSTONE (GUELPH FORMATION, 35.38 to 60.48 m)**														
41		Fracture at 40.61 m is highly oxidized and coated with fine sand		379.51	4	0.1										
42				41.35 377.96	5	0.1										
43		Increase in vugs		42.90												
44				376.42	6	0.1										
45				44.45												
46				374.89	7	0.1										
47				45.97												
48				373.39	8	0.1										
49				47.47												
50		Fracture at 49.44 m is highly oxidized and coated with fine sand		371.84 49.02	9	0.1										
		CONTINUED NEXT PAGE			10	0.1										

DEPTH SCALE
1 : 50

LOGGED: PM
CHECKED: MA

RK_LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 900 Scotland St., Fergus
COORDINATES: N 4839071.7; E 551838.9
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: F5-T

START DATE: Oct. 6, 2021
END DATE: Nov. 10, 2021
DRILLING METHOD: 270 mm O.D. Casing Advancement
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN / FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
50		CONTINUED FROM PREVIOUS PAGE														
	Diamond Core Drilling 152 mm O.D. SQ Rock Core	Light creamy grey to light brownish grey, fine grained, crystalline, faintly porous, slightly to highly weathered, slightly to moderately pitted, vuggy, occasional stylolites, gastropods and crinoids, medium to thickly bedded **DOLOSTONE (GUELPH FORMATION, 35.38 to 60.48 m)**		370.37	10	0.1									
51				50.50	11	0.1										
52				368.77												
				52.10	12	0.1										
53				367.32												Base of 6-5/8" steel casing at 53.04 m. Coated bentonite pellets from 50.04 to 56.13 m (between 6-5/8" and 6" casings)
				53.54	13	0.1										
54				365.77												
55				55.09	14											
56		Potential water-bearing zone between 55.6 and 56.11 m. Fractures in this zone are highly oxidized		364.25												Base of 6" steel casing at 56.13 m
	Diamond Core Drilling 123 mm O.D. PQ Rock Core			56.62	15	0.2										
57																
58				362.70												6" open corehole from 56.13 to 143.54 m
				58.17	16	0.2										
59				361.18												
				59.69	17	0.2										
60		*CONTINUED NEXT PAGE*														

RK_LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

DEPTH SCALE
1 : 50

LOGGED: PM
CHECKED: MA

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 900 Scotland St., Fergus
COORDINATES: N 4839071.7; E 551838.9
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: F5-T

START DATE: Oct. 6, 2021
END DATE: Nov. 10, 2021
DRILLING METHOD: 270 mm O.D. Casing Advancement
CONTRACTOR: Aardvark Drilling
INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN / FLUSH	RECOVERY TOTAL CORE %	RECOVERY SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA DIP w.r.t. CORE AXIS	DISCONTINUITY DATA TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
60		CONTINUED FROM PREVIOUS PAGE														
		Light greyish brown to medium greyish brown, fine grained, crystalline, faintly porous, stylolitic, occasional crinoids and gastropods, thinly bedded, cross bedding throughout; transition from overlying Guelph Formation is gradational **DOLOSTONE (GOAT ISLAND FORMATION, 60.48 to 96.90 m)**		360.39 60.48	17	0.2									
61				359.65 61.21												
62					18	0.1										
				358.13 62.74												
63					19	0.2										
64				356.58 64.29												
65	Diamond Core Drilling 123 mm O.D. PQ Rock Core				20	0.1										6" open corehole from 56.13 to 143.54 m
				355.10 65.76												
66					21	0.2										
67				353.53 67.34												
68		Vugs have high degree of crystallization (calcite)			22	0.1										
				352.06 68.81												
69					23	0.2										
70		*CONTINUED NEXT PAGE*														

DEPTH SCALE
1 : 50

LOGGED: PM
CHECKED: MA

RK LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 900 Scotland St., Fergus
COORDINATES: N 4839071.7; E 551838.9
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: F5-T

START DATE: Oct. 6, 2021
END DATE: Nov. 10, 2021
DRILLING METHOD: 270 mm O.D. Casing Advancement
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN / FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		CONTINUED FROM PREVIOUS PAGE														
70	Diamond Core Drilling 123 mm O.D. PQ Rock Core	Light greyish brown to medium greyish brown, fine grained, crystalline, faintly porous, stylolitic, occasional crinoids and gastropods, thinly bedded, cross bedding throughout; transition from overlying Guelph Formation is gradational **DOLOSTONE (GOAT ISLAND FORMATION, 60.48 to 96.90 m)**		350.53 70.33	23	0.2										
71					24	0.2										
72				349.01 71.86	25	0.2										
73																
74		Potential water-bearing zone at 74.22 m. Fracture is highly crystallized and oxidized, and proximal to large vugs		347.46 73.41	26	0.2										
75		Crinoid bed from 74.93 to 75.11 m Potential water-bearing zone between 75.11 and 75.64 m. Fractures within this zone are highly crystallized and oxidized, and proximal to large vugs		345.94 74.93	27	0.2										6" open corehole from 56.13 to 143.54 m
76				344.44												
77		Potential water-bearing zone between 76.43 and 77.98 m. Fractures within this zone are highly crystallized and oxidized, and proximal to large vugs		76.43	28	0.2										
78				342.89 77.98	29	0.2										
79		Potential water-bearing zone at 79.10 m. Large void (250 mm) is oxidized and coated in coarse sand Potential water-bearing zone at 79.76 m. Large void (230 mm) is oxidized		341.36 79.50	30	0.2										
80		*CONTINUED NEXT PAGE*														

DEPTH SCALE
1 : 50

LOGGED: PM
CHECKED: MA

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 900 Scotland St., Fergus
COORDINATES: N 4839071.7; E 551838.9
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: F5-T

START DATE: Oct. 6, 2021
END DATE: Nov. 10, 2021
DRILLING METHOD: 270 mm O.D. Casing Advancement
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN / FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		CONTINUED FROM PREVIOUS PAGE														
80	Diamond Core Drilling 123 mm O.D. PQ Rock Core	Light greyish brown to medium greyish brown, fine grained, crystalline, faintly porous, stylolitic, occasional crinoids and gastropods, thinly bedded, cross bedding throughout; transition from overlying Guelph Formation is gradational **DOLOSTONE (GOAT ISLAND FORMATION, 60.48 to 96.90 m)**														
81		Potential water-bearing zone at 80.39 m. Large void (710 mm) is oxidized		339.84 81.03	30	0.2										
82				338.32 82.55	31	0.3										
83		Potential water-bearing zone at 83.62 m. Large void (300 mm) is oxidized		336.79 84.07	32	0.3										
84					33	0.3										6" open corehole from 56.13 to 143.54 m
85		Potential water-bearing zone at 85.29 m. Large void (300 mm) is oxidized		335.27 85.60	34	0.3										
86																
87				333.74 87.12	35	0.3										
88				332.22 88.65												
89					36	0.3										
90		*CONTINUED NEXT PAGE*														

DEPTH SCALE
1 : 50

Centre Wellington

AECOM

LOGGED: PM
CHECKED: MA

RK LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 900 Scotland St., Fergus
COORDINATES: N 4839071.7; E 551838.9
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: F5-T

START DATE: Oct. 6, 2021
END DATE: Nov. 10, 2021
DRILLING METHOD: 270 mm O.D. Casing Advancement
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN / FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		CONTINUED FROM PREVIOUS PAGE														
90	Diamond Core Drilling 123 mm O.D. PQ Rock Core	Light greyish brown to medium greyish brown, fine grained, crystalline, faintly porous, stylolitic, occasional crinoids and gastropods, thinly bedded, cross bedding throughout; transition from overlying Guelph Formation is gradational **DOLOSTONE (GOAT ISLAND FORMATION, 60.48 to 96.90 m)**		330.70 90.17	36	0.3										
91		Potential water-bearing zone at 91.21 m. Large void (130 mm) is oxidized		329.17	37	0.2										
92				91.69	38	0.2										
93				327.67 93.19												
94					39	0.3										
95				326.12 94.74												6" open corehole from 56.13 to 143.54 m
96					40	0.3										
97		Very light grey to dark blue-grey, fine grained, crystalline, faintly porous, moderately pitted, stylolitic, crinoids throughout, occasional gastropods, thickly to massively bedded **DOLOSTONE (GASPORT FORMATION, 96.90 to 138.30 m)**		324.57 96.29 323.97 96.90	41	0.3										
98				323.05 97.82	42	0.3										
99				321.53 99.34	43	0.3										
100		*CONTINUED NEXT PAGE*														

DEPTH SCALE
1 : 50

Centre Wellington

AECOM

LOGGED: PM
CHECKED: MA

RK_LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 900 Scotland St., Fergus
COORDINATES: N 4839071.7; E 551838.9
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: F5-T

START DATE: Oct. 6, 2021
END DATE: Nov. 10, 2021
DRILLING METHOD: 270 mm O.D. Casing Advancement
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN / FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		CONTINUED FROM PREVIOUS PAGE														
100	Diamond Core Drilling 123 mm O.D. PQ Rock Core	Very light grey to dark blue-grey, fine grained, crystalline, faintly porous, moderately pitted, stylolitic, crinoids throughout, occasional gastropods, thickly to massively bedded **DOLOSTONE (GASPORT FORMATION, 96.90 to 138.30 m)**		320.00	43	0.3										6" open corehole from 56.13 to 143.54 m
101				100.86	44	0.2										
102				318.50												
103				102.36	45	0.3										
104				316.93												
105				103.94	46	0.2										
106				315.46												
107				105.41	47	0.2										
108				313.91												
109				106.96	48	0.2										
110		*CONTINUED NEXT PAGE*		312.33												
				108.53	49	0.2										

DEPTH SCALE
1 : 50

LOGGED: PM
CHECKED: MA

RK LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 900 Scotland St., Fergus
COORDINATES: N 4839071.7; E 551838.9
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: F5-T

START DATE: Oct. 6, 2021
END DATE: Nov. 10, 2021
DRILLING METHOD: 270 mm O.D. Casing Advancement
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN / FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		CONTINUED FROM PREVIOUS PAGE														
110	Diamond Core Drilling 123 mm O.D. PQ Rock Core	Very light grey to dark blue-grey, fine grained, crystalline, faintly porous, moderately pitted, stylolitic, crinoids throughout, occasional gastropods, thickly to massively bedded **DOLOSTONE (GASPORT FORMATION, 96.90 to 138.30 m)**		310.81 110.06												
111				309.28 111.58	50	0.2										
112					51	0.2										
113				307.81 113.06												
114					52	0.2										
115				306.26 114.60	53	0.2										6" open corehole from 56.13 to 143.54 m
116				304.74 116.13												
117					54	0.2										
118				303.24 117.63												
119					55	0.2										
120		*CONTINUED NEXT PAGE*		301.71 119.15	56	0.2										

DEPTH SCALE
1 : 50

Centre Wellington

AECOM

LOGGED: PM
CHECKED: MA

RK LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 900 Scotland St., Fergus
COORDINATES: N 4839071.7; E 551838.9
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: F5-T

START DATE: Oct. 6, 2021
END DATE: Nov. 10, 2021
DRILLING METHOD: 270 mm O.D. Casing Advancement
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN	FLUSH	RECOVERY TOTAL CORE %	RECOVERY SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA DIP w.r.t. CORE AXIS	DISCONTINUITY DATA TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		CONTINUED FROM PREVIOUS PAGE															
120	Diamond Core Drilling 123 mm O.D. PQ Rock Core	Very light grey to dark blue-grey, fine grained, crystalline, faintly porous, moderately pitted, stylolitic, crinoids throughout, occasional gastropods, thickly to massively bedded **DOLOSTONE (GASPORT FORMATION, 96.90 to 138.30 m)**		300.16	56	0.2											
121				120.70	57	0.2											
122				298.64													
123				122.22	58	0.2											
124				297.12													
125				123.75	59	0.2											6" open corehole from 56.13 to 143.54 m
126				295.62													
127				125.25	60	0.2											
128				294.07													
129				126.80	61	0.1											
130		*CONTINUED NEXT PAGE*		292.52													
				128.35	62	0.1											
				291.02													
				129.84	63	0.1											

DEPTH SCALE
1 : 50

Centre Wellington

AECOM

LOGGED: PM
CHECKED: MA

RK LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 900 Scotland St., Fergus
COORDINATES: N 4839071.7; E 551838.9
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: F5-T

START DATE: Oct. 6, 2021
END DATE: Nov. 10, 2021
DRILLING METHOD: 270 mm O.D. Casing Advancement
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN / FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		CONTINUED FROM PREVIOUS PAGE														
130	Diamond Core Drilling 123 mm O.D. PQ Rock Core	Very light grey to dark blue-grey, fine grained, crystalline, faintly porous, moderately pitted, stylolitic, crinoids throughout, occasional gastropods, thickly to massively bedded **DOLOSTONE (GASPORT FORMATION, 96.90 to 138.30 m)**														
131				289.50 131.37	63	0.1										
132					64	0.1										
133				287.97 132.89												
134					65	0.1										
135				286.45 134.42	66	0.1										6" open corehole from 56.13 to 143.54 m
136				284.92 135.94	67	0.2										
137				283.37 137.49												
138		Light to medium grey (mottled appearance), fine to medium grained, crystalline, non-porous, medium to thickly bedded **DOLOSTONE (IRONDEQUOIT, ROCKWAY & MERRITTON FORMATION, 138.30 to 141.81 m)**		282.57 138.30	68	0.1										
139				281.88 138.99	69	0.2										
140		*CONTINUED NEXT PAGE*														

DEPTH SCALE
1 : 50

LOGGED: PM
CHECKED: MA

RK LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 900 Scotland St., Fergus
COORDINATES: N 4839071.7; E 551838.9
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: F5-T

START DATE: Oct. 6, 2021
END DATE: Nov. 10, 2021
DRILLING METHOD: 270 mm O.D. Casing Advancement
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN / FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		CONTINUED FROM PREVIOUS PAGE														
140	Diamond Core Drilling 123 mm O.D. PQ Rock Core	Light to medium grey (mottled appearance), fine to medium grained, crystalline, non-porous, medium to thickly bedded **DOLOSTONE (IRONDEQUOIT, ROCKWAY & MERRITTON FORMATION, 138.30 to 141.81 m)**		280.35	69	0.2										
141				140.51	70	0.1										
142		Dark green, fine grained, non-porous, thinly bedded **SHALE (CABOT HEAD FORMATION, 141.81 to 143.54 m)**		279.06 141.81 278.83 142.04	71	0.1										6" open corehole from 56.13 to 143.54 m
143				277.33												
		END OF BOREHOLE		**143.54**												
144		Notes: 1. Interpretation assistance by AECOM is required for projects excluding the above mentioned project. 2. No abnormal odour or staining was observed unless otherwise indicated. 3. Corehole diameter: 10-7/8" from 0.00 to 21.95 mBGS 8" from 21.95 mBGS to 53.04 mBGS 6" from 53.04 mBGS to 56.13 mBGS 5" from 56.13 to 143.54 mBGS 4. Well installation details include: 6-5/8" Steel Casing: -0.41 to 53.04 mBGS 10-7/8" Steel Casing: -0.36 to 21.95 mBGS 6" Steel Casing: -0.46 to 56.13 mBGS 5" Open Corehole: 56.13 to 143.54 mBGS 5. Static water level of 16.05 mbgs was observed on November 20, 2021.														
145																
146																
147																
148																
149																
150																

DEPTH SCALE
1 : 50

Centre Wellington

AECOM

LOGGED: PM
CHECKED: MA

RK LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 900 Scotland St., Fergus
COORDINATES: N 4839071.7; E 551838.9
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: F5-R

START DATE: February 22, 2022
END DATE: April 8, 2022
DRILLING METHOD: 18" O.D.
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR, % RETURN / FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		GROUND SURFACE		420.87												
0	Air Hammer 18" O.D.	Coring during F5-T drilling began at 35.38 m. Top of bedrock inferred by driller at 19.8 m.		0.00												See notes for sealing details between 16" steel casing and outer corehole. Coated bentonite pellets from 0.00 to 0.60 m (between 12" and 16" casings) 12" steel casing from -0.70 to 55.78 m 16" steel casing from -0.10 to 55.46 m Grout from 0.60 to 55.17 m (between 12" and 16" casings)
1																
2																
3																
4																
5																
6																
7																
8																
9																
10		*CONTINUED NEXT PAGE*														

RK_LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

DEPTH SCALE
1 : 50

LOGGED: PM
CHECKED: MA

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 900 Scotland St., Fergus
COORDINATES: N 4839071.7; E 551838.9
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: F5-R

START DATE: February 22, 2022
END DATE: April 8, 2022
DRILLING METHOD: 18" O.D.
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR & % RETURN / FLUSH	RECOVERY: TOTAL CORE % (80 60 40 20)	RECOVERY: SOLID CORE % (80 60 40 20)	R.Q.D. % (80 60 40 20)	FRACT. INDEX PER 0.3 (5 10 15 20)	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS (0 30 60 90)	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec (10^{-6} 10^{-5} 10^{-4} 10^{-3})	DIAMETRAL POINT LOAD INDEX (MPa) (2 4 6)	WELL INSTALLATION AND WATER LEVELS
10	Air Hammer 18" O.D.	CONTINUED FROM PREVIOUS PAGE Coring during F5-T drilling began at 35.38 m. Top of bedrock inferred by driller at 19.8 m.														Grout from 0.60 to 55.17 m (between 12" and 16" casings) April 27, 2022
11																
12																
13																
14																
15																
16																
17																
18																
19																
20		*CONTINUED NEXT PAGE*														

RK_LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

DEPTH SCALE
1 : 50

Centre Wellington

AECOM

LOGGED: PM
CHECKED: MA

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 900 Scotland St., Fergus
COORDINATES: N 4839071.7; E 551838.9
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: F5-R

START DATE: February 22, 2022
END DATE: April 8, 2022
DRILLING METHOD: 18" O.D.
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR & % RETURN / FLUSH	RECOVERY: TOTAL CORE % (80 60 40 20)	RECOVERY: SOLID CORE % (80 60 40 20)	R.Q.D. % (80 60 40 20)	FRACT. INDEX PER 0.3 (5 10 15 20)	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS (0 30 60 90)	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec (10^{-6} 10^{-5} 10^{-4} 10^{-3})	DIAMETRAL POINT LOAD INDEX (MPa) (2 4 6)	WELL INSTALLATION AND WATER LEVELS
20		CONTINUED FROM PREVIOUS PAGE														
		Coring during F5-T drilling began at 35.38 m. Top of bedrock inferred by driller at 19.8 m.														
21																
22																
23																
24																
25	Air Hammer 18" O.D.															Grout from 0.60 to 55.17 m (between 12" and 16" casings)
26																
27																
28																
29																
30		*CONTINUED NEXT PAGE*														

RK_LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

DEPTH SCALE
1 : 50

Centre Wellington

AECOM

LOGGED: PM
CHECKED: MA

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 900 Scotland St., Fergus
COORDINATES: N 4839071.7; E 551838.9
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: F5-R

START DATE: February 22, 2022
END DATE: April 8, 2022
DRILLING METHOD: 18" O.D.
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR, % RETURN / FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		CONTINUED FROM PREVIOUS PAGE						80 60 40 20	80 60 40 20	80 60 40 20	5 10 15 20	0 30 60 90		10^{-6} 10^{-5} 10^{-4} 10^{-3}	2 4 6	
30		Coring during F5-T drilling began at 35.38 m. Top of bedrock inferred by driller at 19.8 m.														
31																
32																
33																
34																
35	Air Hammer 18" O.D.			385.49 35.38												Grout from 0.60 to 55.17 m (between 12" and 16" casings)
36		Light creamy grey to light brownish grey, fine grained, crystalline, faintly porous, slightly to highly weathered, slightly to moderately pitted, vuggy, occasional stylolites, gastropods and crinoids, medium to thickly bedded **DOLOSTONE (GUELPH FORMATION, 35.38 to 60.48 m)**														
37		Potential water-bearing zone at 35.51 m. Fracture is oxidized and open to approximately 20 mm. Drilling contractor lost water circulation during Run 1														
38		Potential water-bearing zone at 37.49 m. Vertical fracture (290 mm length) is highly oxidized														
39		Increase in gastropods														
40		*CONTINUED NEXT PAGE*														

DEPTH SCALE
1 : 50

Centre Wellington

AECOM

LOGGED: PM
CHECKED: MA

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 900 Scotland St., Fergus
COORDINATES: N 4839071.7; E 551838.9
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: F5-R

START DATE: February 22, 2022
END DATE: April 8, 2022
DRILLING METHOD: 18" O.D.
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN / FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		CONTINUED FROM PREVIOUS PAGE														
40		Light creamy grey to light brownish grey, fine grained, crystalline, faintly porous, slightly to highly weathered, slightly to moderately pitted, vuggy, occasional stylolites, gastropods and crinoids, medium to thickly bedded **DOLOSTONE (GUELPH FORMATION, 35.38 to 60.48 m)**														
41		Fracture at 40.61 m is highly oxidized and coated with fine sand														
42																
43		Increase in vugs														
44																
45	Air Hammer 18" O.D.															Grout from 0.60 to 55.17 m (between 12" and 16" casings)
46																
47																
48																
49																
50		Fracture at 49.44 m is highly oxidized and coated with fine sand														
		CONTINUED NEXT PAGE														

DEPTH SCALE
1 : 50

Centre Wellington

AECOM

LOGGED: PM
CHECKED: MA

RK_LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 900 Scotland St., Fergus
COORDINATES: N 4839071.7; E 551838.9
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: F5-R

START DATE: February 22, 2022
END DATE: April 8, 2022
DRILLING METHOD: 18" O.D.
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR & % RETURN / FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		CONTINUED FROM PREVIOUS PAGE														
50	Air Hammer 18" O.D.	Light creamy grey to light brownish grey, fine grained, crystalline, faintly porous, slightly to highly weathered, slightly to moderately pitted, vuggy, occasional stylolites, gastropods and crinoids, medium to thickly bedded **DOLOSTONE (GUELPH FORMATION, 35.38 to 60.48 m)**														
51																
52																
53																Grout from 0.60 to 55.17 m (between 12" and 16" casings)
54																
55																
56	Air Hammer 12" O.D.	Potential water-bearing zone between 55.6 and 56.11 m. Fractures in this zone are highly oxidized														Base of 16" steel casing at 55.46 m Coated bentonite pellets from 55.17 to 55.78 m (between 12" and 16" casings) Base of 12" steel casing at 55.78 m
57																
58																12" open corehole from 55.78 to 144.93 m
59																
60		*CONTINUED NEXT PAGE*														

DEPTH SCALE
1 : 50

Centre Wellington

AECOM

LOGGED: PM
CHECKED: MA

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 900 Scotland St., Fergus
COORDINATES: N 4839071.7; E 551838.9
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: F5-R

START DATE: February 22, 2022
END DATE: April 8, 2022
DRILLING METHOD: 18" O.D.
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	FLUSH / COLOUR % RETURN	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		CONTINUED FROM PREVIOUS PAGE														
60				360.39												
		Light greyish brown to medium greyish brown, fine grained, crystalline, faintly porous, stylolitic, occasional crinoids and gastropods, thinly bedded, cross bedding throughout; transition from overlying Guelph Formation is gradational **DOLOSTONE (GOAT ISLAND FORMATION, 60.48 to 96.90 m)**		60.48												
61																
62																
63																
64																
65	Air Hammer 12" O.D.															12" open corehole from 55.78 to 144.93 m
66																
67																
68		Vugs have high degree of crystallization (calcite)														
69																
70		*CONTINUED NEXT PAGE*														

DEPTH SCALE
1 : 50

Centre Wellington

AECOM

LOGGED: PM
CHECKED: MA

RK LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 900 Scotland St., Fergus
COORDINATES: N 4839071.7; E 551838.9
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: F5-R

START DATE: February 22, 2022
END DATE: April 8, 2022
DRILLING METHOD: 18" O.D.
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR & % RETURN / FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		CONTINUED FROM PREVIOUS PAGE														
70	Air Hammer 12" O.D.	Light greyish brown to medium greyish brown, fine grained, crystalline, faintly porous, stylolitic, occasional crinoids and gastropods, thinly bedded, cross bedding throughout; transition from overlying Guelph Formation is gradational **DOLOSTONE (GOAT ISLAND FORMATION, 60.48 to 96.90 m)**														
71																
72																
73																
74		Potential water-bearing zone at 74.22 m. Fracture is highly crystallized and oxidized, and proximal to large vugs														
75		Crinoid bed from 74.93 to 75.11 m Potential water-bearing zone between 75.11 and 75.64 m. Fractures within this zone are highly crystallized and oxidized, and proximal to large vugs														12" open corehole from 55.78 to 144.93 m
76																
77		Potential water-bearing zone between 76.43 and 77.98 m. Fractures within this zone are highly crystallized and oxidized, and proximal to large vugs														
78																
79		Potential water-bearing zone at 79.10 m. Large void (250 mm) is oxidized and coated in coarse sand Potential water-bearing zone at 79.76 m. Large void (230 mm) is oxidized														
80		*CONTINUED NEXT PAGE*														

DEPTH SCALE
1 : 50

Centre Wellington

AECOM

LOGGED: PM
CHECKED: MA

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 900 Scotland St., Fergus
COORDINATES: N 4839071.7; E 551838.9
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: F5-R

START DATE: February 22, 2022
END DATE: April 8, 2022
DRILLING METHOD: 18" O.D.
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN / FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		CONTINUED FROM PREVIOUS PAGE														
80		Light greyish brown to medium greyish brown, fine grained, crystalline, faintly porous, stylolitic, occasional crinoids and gastropods, thinly bedded, cross bedding throughout; transition from overlying Guelph Formation is gradational **DOLOSTONE (GOAT ISLAND FORMATION, 60.48 to 96.90 m)**														
81		Potential water-bearing zone at 80.39 m. Large void (710 mm) is oxidized														
82																
83																
84		Potential water-bearing zone at 83.62 m. Large void (300 mm) is oxidized														
85	Air Hammer 12" O.D.															12" open corehole from 55.78 to 144.93 m
86		Potential water-bearing zone at 85.29 m. Large void (300 mm) is oxidized														
87																
88																
89																
90		*CONTINUED NEXT PAGE*														

DEPTH SCALE
1 : 50

Centre Wellington

AECOM

LOGGED: PM
CHECKED: MA

RK_LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 900 Scotland St., Fergus
COORDINATES: N 4839071.7; E 551838.9
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: F5-R

START DATE: February 22, 2022
END DATE: April 8, 2022
DRILLING METHOD: 18" O.D.
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN / FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		CONTINUED FROM PREVIOUS PAGE														
90	Air Hammer 12" O.D.	Light greyish brown to medium greyish brown, fine grained, crystalline, faintly porous, stylolitic, occasional crinoids and gastropods, thinly bedded, cross bedding throughout; transition from overlying Guelph Formation is gradational **DOLOSTONE (GOAT ISLAND FORMATION, 60.48 to 96.90 m)**														
91		Potential water-bearing zone at 91.21 m. Large void (130 mm) is oxidized														
92																
93																
94																
95																12" open corehole from 55.78 to 144.93 m
96																
				323.97												
97		Very light grey to dark blue-grey, fine grained, crystalline, faintly porous, moderately pitted, stylolitic, crinoids throughout, occasional gastropods, thickly to massively bedded **DOLOSTONE (GASPORT FORMATION, 96.90 to 138.30 m)**		96.90												
98																
99																
100		*CONTINUED NEXT PAGE*														

RK_LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

DEPTH SCALE
1 : 50

LOGGED: PM
CHECKED: MA

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 900 Scotland St., Fergus
COORDINATES: N 4839071.7; E 551838.9
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: F5-R

START DATE: February 22, 2022
END DATE: April 8, 2022
DRILLING METHOD: 18" O.D.
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN / FLUSH	RECOVERY: TOTAL CORE % (80 60 40 20)	RECOVERY: SOLID CORE % (80 60 40 20)	R.Q.D. % (80 60 40 20)	FRACT. INDEX PER 0.3 (5 10 15 20)	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS (0 30 60 90)	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec (10^{-6} 10^{-5} 10^{-4} 10^{-3})	DIAMETRAL POINT LOAD INDEX (MPa) (2 4 6)	WELL INSTALLATION AND WATER LEVELS
100		CONTINUED FROM PREVIOUS PAGE														
	Air Hammer 12" O.D.	Very light grey to dark blue-grey, fine grained, crystalline, faintly porous, moderately pitted, stylolitic, crinoids throughout, occasional gastropods, thickly to massively bedded **DOLOSTONE (GASPORT FORMATION, 96.90 to 138.30 m)**														12" open corehole from 55.78 to 144.93 m
101																
102																
103																
104																
105																
106																
107																
108																
109																
110		*CONTINUED NEXT PAGE*														

DEPTH SCALE
1 : 50

Centre Wellington

AECOM

LOGGED: PM
CHECKED: MA

RK LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 900 Scotland St., Fergus
COORDINATES: N 4839071.7; E 551838.9
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: F5-R

START DATE: February 22, 2022
END DATE: April 8, 2022
DRILLING METHOD: 18" O.D.
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN / FLUSH	RECOVERY: TOTAL CORE % (80 60 40 20)	RECOVERY: SOLID CORE % (80 60 40 20)	R.Q.D. % (80 60 40 20)	FRACT. INDEX PER 0.3 (5 10 15 20)	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS (0 30 60 90)	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec (10^{-6} 10^{-5} 10^{-4} 10^{-3})	DIAMETRAL POINT LOAD INDEX (MPa) (2 4 6)	WELL INSTALLATION AND WATER LEVELS
110		CONTINUED FROM PREVIOUS PAGE														
		Very light grey to dark blue-grey, fine grained, crystalline, faintly porous, moderately pitted, stylolitic, crinoids throughout, occasional gastropods, thickly to massively bedded **DOLOSTONE (GASPORT FORMATION, 96.90 to 138.30 m)**														
111																
112																
113																
114																
115	Air Hammer 12" O.D.															12" open corehole from 55.78 to 144.93 m
116																
117																
118																
119																
120		*CONTINUED NEXT PAGE*														

DEPTH SCALE
1 : 50

Centre Wellington

AECOM

LOGGED: PM
CHECKED: MA

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 900 Scotland St., Fergus
COORDINATES: N 4839071.7; E 551838.9
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: F5-R

START DATE: February 22, 2022
END DATE: April 8, 2022
DRILLING METHOD: 18" O.D.
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN / FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		CONTINUED FROM PREVIOUS PAGE						80 60 40 20	80 60 40 20	80 60 40 20	5 10 15 20	0 30 60 90		10^{-6} 10^{-5} 10^{-4} 10^{-3}	2 4 6	
120		Very light grey to dark blue-grey, fine grained, crystalline, faintly porous, moderately pitted, stylolitic, crinoids throughout, occasional gastropods, thickly to massively bedded **DOLOSTONE (GASPORT FORMATION, 96.90 to 138.30 m)**														
121																
122																
123																
124																
125	Air Hammer 12" O.D.															12" open corehole from 55.78 to 144.93 m
126																
127																
128																
129																
130		*CONTINUED NEXT PAGE*														

RK_LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

DEPTH SCALE
1 : 50

Centre Wellington

AECOM

LOGGED: PM
CHECKED: MA

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 900 Scotland St., Fergus
COORDINATES: N 4839071.7; E 551838.9
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: F5-R

START DATE: February 22, 2022
END DATE: April 8, 2022
DRILLING METHOD: 18" O.D.
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR & % RETURN / FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		CONTINUED FROM PREVIOUS PAGE														
130	Air Hammer 12" O.D.	Very light grey to dark blue-grey, fine grained, crystalline, faintly porous, moderately pitted, stylolitic, crinoids throughout, occasional gastropods, thickly to massively bedded **DOLOSTONE (GASPORT FORMATION, 96.90 to 138.30 m)**														
131																
132																
133																
134																
135																12" open corehole from 55.78 to 144.93 m
136																
137																
138				282.57												
		Light to medium grey (mottled appearance), fine to medium grained, crystalline, non-porous, medium to thickly bedded **DOLOSTONE (IRONDEQUOIT, ROCKWAY & MERRITTON FORMATION, 138.30 to 141.81 m)**		138.30												
139																
140		*CONTINUED NEXT PAGE*														

DEPTH SCALE
1 : 50

Centre Wellington

AECOM

LOGGED: PM
CHECKED: MA

RK LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 900 Scotland St., Fergus
COORDINATES: N 4839071.7; E 551838.9
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: F5-R

START DATE: February 22, 2022
END DATE: April 8, 2022
DRILLING METHOD: 18" O.D.
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR & % RETURN / FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		CONTINUED FROM PREVIOUS PAGE														
140	Air Hammer 12" O.D.	Light to medium grey (mottled appearance), fine to medium grained, crystalline, non-porous, medium to thickly bedded **DOLOSTONE (IRONDEQUOIT, ROCKWAY & MERRITTON FORMATION, 138.30 to 141.81 m)**														
141				279.06												
142		Dark green, fine grained, non-porous, thinly bedded **SHALE (CABOT HEAD FORMATION, 141.81 to 144.93 m)**		141.81												12" open corehole from 55.78 to 144.93 m
143																
144																
145		**END OF BOREHOLE**		275.94 144.93												
146		Notes: 1. Interpretation assistance by AECOM is required for projects excluding the above mentioned project. 2. No abnormal odour or staining was observed unless otherwise indicated. 3. Corehole diameter: 20" from 0.00 to 20.12 mBGS 18" from 20.12 mBGS to 55.47 mBGS 12" from 55.47 mBGS to 144.93 mBGS 4. Well installation details include: 12" Steel Casing: -0.70 to 55.78 mBGS 16" Steel Casing: -0.10 to 55.46 mBGS 12" Open Corehole: 55.78 to 144.93 mBGS 5. Sealing details between corehole and 16" steel casing: Bentonite pellets: 0.00 to 0.60 mBGS Bentonite grout: 0.60 to 12.50 mBGS Bentonite pellets: 12.50 to 13.11 mBGS Pea gravel: 13.11 to 18.29 mBGS Coated bentonite pellets: 18.29 to 20.12 mBGS Cave-in/gravel ingress: 20.12 to 55.46 mBGS 6. Static water level of 15.77 mbgs was observed on April 27, 2022.														
147																
148																
149																
150																

HYDRAULIC CONDUCTIVITY K, cm/sec: 10^{-6} 10^{-5} 10^{-4} 10^{-3}
DIAMETRAL POINT LOAD INDEX (MPa): 2 4 6

DEPTH SCALE
1 : 50

Centre Wellington

AECOM

LOGGED: PM
CHECKED: MA

PROJECT: F2 and F5 Well Replacement Project
LOCATION: Corner of Cameron St. & St. Andrew St. E, Fergus
COORDINATES: N 4839659.4; E 550347.6
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: MW7-21D

START DATE: Sept. 15, 2021
END DATE: Oct. 1, 2021
DRILLING METHOD: 123 mm O.D. PQ Rock Core
CONTRACTOR: Aardvark Drilling
INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR & % RETURN / FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		GROUND SURFACE		399.25												
0		**TOPSOIL**		0.00												Bentonite pellets from 0.00 to 0.30 m; 50 mm schedule 80 PVC Riser from 0.08 to 104.67 m
				398.84												
		FILL: silty sand, brown, moist		0.41												
1				397.95												
	Diamond Core Drilling; 123 mm O.D. PQ Rock Core	Light creamy grey to light brownish grey, fine grained, crystalline, faintly porous, slightly to highly weathered, slightly to moderately pitted, vuggy, occasional stylolites, gastropods and crinoids, medium to thickly bedded **DOLOSTONE (GUELPH FORMATION, 1.30 to 70.41 m)**		1.30	1	0.2										
2				396.56												
				2.69	2	0.2										
3				394.83												
				4.42	3	0.2										Grout from 0.30 to 99.97 m
4				393.33												
				5.92	4	0.1										
5				391.86												
				7.39	5	0.2										
6				390.16												
				9.09	6	0.2										
7																
8																
9																
10		*CONTINUED NEXT PAGE*														▽ October 18,

RK_LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

DEPTH SCALE
1 : 50

LOGGED: PM
CHECKED: MA

PROJECT: F2 and F5 Well Replacement Project
LOCATION: Corner of Cameron St. & St. Andrew St. E, Fergus
COORDINATES: N 4839659.4; E 550347.6
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: MW7-21D

START DATE: Sept. 15, 2021
END DATE: Oct. 1, 2021
DRILLING METHOD: 123 mm O.D. PQ Rock Core
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN / FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
10		CONTINUED FROM PREVIOUS PAGE														
	Diamond Core Drilling 123 mm O.D. PQ Rock Core	Light creamy grey to light brownish grey, fine grained, crystalline, faintly porous, slightly to highly weathered, slightly to moderately pitted, vuggy, occasional stylolites, gastropods and crinoids, medium to thickly bedded **DOLOSTONE (GUELPH FORMATION, 1.30 to 70.41 m)**		388.48	6	0.2									2021
11		Increase in vugs at 10.8 m		10.77	7	0.2										
12				386.96												
13				12.29	8	0.2										
14				385.44												
15				13.82	9	0.2										Grout from 0.30 to 99.97 m
16				383.91												
17				15.34	10	0.2										
18				382.36												
19				16.89	11	0.2										
20		*CONTINUED NEXT PAGE*		380.86												
				18.39	12	0.2										
				379.34	13	0.2										

DEPTH SCALE
1 : 50

Centre Wellington

AECOM

LOGGED: PM
CHECKED: MA

RK LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

PROJECT: F2 and F5 Well Replacement Project
LOCATION: Corner of Cameron St. & St. Andrew St. E, Fergus
COORDINATES: N 4839659.4; E 550347.6
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: MW7-21D

START DATE: Sept. 15, 2021
END DATE: Oct. 1, 2021
DRILLING METHOD: 123 mm O.D. PQ Rock Core
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN / FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		CONTINUED FROM PREVIOUS PAGE														
20		Increase in stylolites at 19.9 m Light creamy grey to light brownish grey, fine grained, crystalline, faintly porous, slightly to highly weathered, slightly to moderately pitted, vuggy, occasional stylolites, gastropods and crinoids, medium to thickly bedded **DOLOSTONE (GUELPH FORMATION, 1.30 to 70.41 m)**		19.91												
					13	0.2										
21				377.82												
				21.44												
22		Potential water-bearing zone at 22.0 m. Highly vuggy rubble zone for 0.46 m; drop in drilling pressure was observed by drilling contractor			14	0.2										
				376.29												
23				22.96												
					15	0.2										
24				374.77												
				24.49												
25	Diamond Core Drilling 123 mm O.D. PQ Rock Core				16	0.2										Grout from 0.30 to 99.97 m
26				373.24												
				26.01												
					17	0.2										
27				371.72												
				27.53												
28					18	0.2										
				370.20												
29		Increase in fossils at 29.1 m		29.06												
					19	0.2										
30		*CONTINUED NEXT PAGE*														

DEPTH SCALE
1 : 50

Centre Wellington

AECOM

LOGGED: PM
CHECKED: MA

RK LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

PROJECT: F2 and F5 Well Replacement Project
LOCATION: Corner of Cameron St. & St. Andrew St. E, Fergus
COORDINATES: N 4839659.4; E 550347.6
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: MW7-21D

START DATE: Sept. 15, 2021
END DATE: Oct. 1, 2021
DRILLING METHOD: 123 mm O.D. PQ Rock Core
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN / FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		CONTINUED FROM PREVIOUS PAGE														
30	Diamond Core Drilling 123 mm O.D. PQ Rock Core	Light creamy grey to light brownish grey, fine grained, crystalline, faintly porous, slightly to highly weathered, slightly to moderately pitted, vuggy, occasional stylolites, gastropods and crinoids, medium to thickly bedded **DOLOSTONE (GUELPH FORMATION, 1.30 to 70.41 m)**		368.65 30.61	19	0.2										
31																
32				367.12 32.13	20	0.2										
33					21	0.2										
34				365.57 33.68	22	0.2										
35				364.05 35.20												Grout from 0.30 to 99.97 m
36		Potential water-bearing zone at 36.0 m. Drilling contractor noted a large drop in drilling pressure			23	0.2										
37				362.52 36.73	24	0.2										
38				361.03 38.23												
39					25	0.2										
40		*CONTINUED NEXT PAGE*		359.50 39.75	26	0.2										

RK_LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

DEPTH SCALE
1 : 50

Centre Wellington

AECOM

LOGGED: PM
CHECKED: MA

PROJECT: F2 and F5 Well Replacement Project
LOCATION: Corner of Cameron St. & St. Andrew St. E, Fergus
COORDINATES: N 4839659.4; E 550347.6
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: MW7-21D

START DATE: Sept. 15, 2021
END DATE: Oct. 1, 2021
DRILLING METHOD: 123 mm O.D. PQ Rock Core
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN / FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		CONTINUED FROM PREVIOUS PAGE														
40	Diamond Core Drilling 123 mm O.D. PQ Rock Core	Light creamy grey to light brownish grey, fine grained, crystalline, faintly porous, slightly to highly weathered, slightly to moderately pitted, vuggy, occasional stylolites, gastropods and crinoids, medium to thickly bedded **DOLOSTONE (GUELPH FORMATION, 1.30 to 70.41 m)**														
		Calcite mineralization observed in vugs														
				357.98	26	0.2										
41				41.28												
					27	0.2										
42				356.45												
				42.80												
43					28	0.2										
				354.93												
44				44.32												
					29	0.2										Grout from 0.30 to 99.97 m
45				353.41												
				45.85												
46					30	0.2										
				351.88												
47				47.37												
					31	0.2										
48				350.36												
				48.90												
49					32	0.2										
50		*CONTINUED NEXT PAGE*														

DEPTH SCALE
1 : 50

LOGGED: PM
CHECKED: MA

PROJECT: F2 and F5 Well Replacement Project
LOCATION: Corner of Cameron St. & St. Andrew St. E, Fergus
COORDINATES: N 4839659.4; E 550347.6
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: MW7-21D

START DATE: Sept. 15, 2021
END DATE: Oct. 1, 2021
DRILLING METHOD: 123 mm O.D. PQ Rock Core
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN	FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		CONTINUED FROM PREVIOUS PAGE															
50	Diamond Core Drilling 123 mm O.D. PQ Rock Core	Light creamy grey to light brownish grey, fine grained, crystalline, faintly porous, slightly to highly weathered, slightly to moderately pitted, vuggy, occasional stylolites, gastropods and crinoids, medium to thickly bedded **DOLOSTONE (GUELPH FORMATION, 1.30 to 70.41 m)**		348.83	32	0.2											
51				50.42	33	0.2											
52				347.31	34	0.2											
53				51.94													
54				345.79	35	0.2											
55				53.47													Grout from 0.30 to 99.97 m
56				344.26	36	0.1											
57				54.99	37	0.2											
58				342.76													
59				56.49	38	0.2											
60		*CONTINUED NEXT PAGE*		341.24	39	0.2											
				58.01													
				339.69													
				59.56													

DEPTH SCALE
1 : 50

Centre Wellington

AECOM

LOGGED: PM
CHECKED: MA

RK LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

PROJECT: F2 and F5 Well Replacement Project
LOCATION: Corner of Cameron St. & St. Andrew St. E, Fergus

RECORD OF DRILLHOLE: MW7-21D

SHEET 7 OF 12

COORDINATES: N 4839659.4; E 550347.6
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

START DATE: Sept. 15, 2021
END DATE: Oct. 1, 2021
DRILLING METHOD: 123 mm O.D. PQ Rock Core
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN	FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		CONTINUED FROM PREVIOUS PAGE															
60	Diamond Core Drilling 123 mm O.D. PQ Rock Core	Light creamy grey to light brownish grey, fine grained, crystalline, faintly porous, slightly to highly weathered, slightly to moderately pitted, vuggy, occasional stylolites, gastropods and crinoids, medium to thickly bedded **DOLOSTONE (GUELPH FORMATION, 1.30 to 70.41 m)**							80 60 40 20	80 60 40 20	80 60 40 20	5 10 15 20	0 30 60 90		10^{-6} 10^{-5} 10^{-4} 10^{-3}	2 4 6	
				338.14													
61				61.11	39	0.2											
					40	0.2											
62				336.62													
				62.64													
63					41	0.2											
64				335.09													
				64.16													
65					42	0.2											Grout from 0.30 to 99.97 m
				333.57													
66				65.68													
					43	0.2											
67				332.04													
				67.21													
68					44	0.2											
				330.52													
69				68.73													
					45	0.2											
70		*CONTINUED NEXT PAGE*															

RK_LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

DEPTH SCALE
1 : 50

Centre Wellington

AECOM

LOGGED: PM
CHECKED: MA

PROJECT: F2 and F5 Well Replacement Project
LOCATION: Corner of Cameron St. & St. Andrew St. E, Fergus
COORDINATES: N 4839659.4; E 550347.6
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: MW7-21D

START DATE: Sept. 15, 2021
END DATE: Oct. 1, 2021
DRILLING METHOD: 123 mm O.D. PQ Rock Core
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN / FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		CONTINUED FROM PREVIOUS PAGE														
70				329.00	45	0.2										
				328.84												
		Light greyish brown to medium greyish brown, fine grained, crystalline, faintly porous, stylolitic, occasional crinoids and gastropods, thinly bedded, cross bedding throughout; transition from overlying Guelph Formation is gradational **DOLOSTONE (GOAT ISLAND FORMATION, 70.41 to 92.68 m)**		70.41												
71		Increasing vugs beginning at 70.89 m			46	0.2										
				327.47												
72				71.78												
					47	0.2										
73				325.95												
		Driller noted poor return starting at 73.3 m until end of hole		73.30												
74					48	0.2										
				324.48												
75	Diamond Core Drilling 123 mm O.D. PQ Rock Core			74.78												Grout from 0.30 to 99.97 m
					49	0.2										
76		Decreasing vugs beginning at 75.87 m		322.90												
				76.35												
77					50	0.2										
				321.38												
78				77.88												
					51	0.2										
79				319.88												
				79.38												
					52	0.2										
80		*CONTINUED NEXT PAGE*														

RK_LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

DEPTH SCALE
1 : 50

LOGGED: PM
CHECKED: MA

PROJECT: F2 and F5 Well Replacement Project
LOCATION: Corner of Cameron St. & St. Andrew St. E, Fergus
COORDINATES: N 4839659.4; E 550347.6
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: MW7-21D

START DATE: Sept. 15, 2021
END DATE: Oct. 1, 2021
DRILLING METHOD: 123 mm O.D. PQ Rock Core
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN	FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		CONTINUED FROM PREVIOUS PAGE															
80	Diamond Core Drilling 123 mm O.D. PQ Rock Core	Light greyish brown to medium greyish brown, fine grained, crystalline, faintly porous, stylolitic, occasional crinoids and gastropods, thinly bedded, cross bedding throughout; transition from overlying Guelph Formation is gradational **DOLOSTONE (GOAT ISLAND FORMATION, 70.41 to 92.68 m)**			52	0.2											
		Highly vuggy from 80.11 to 80.72 m		318.33 80.92													
81					53	0.2											
82				316.80 82.45													
83					54	0.2											
		Potential water-bearing zone within void (50 mm) at 83.69 m. Void has significant mineralization and is proximal to pitting and vugs.		315.28 83.97													
84		Highly vuggy from 84.35 to 84.48 m			55	0.2											
85				313.76 85.50													Grout from 0.30 to 99.97 m
86					56	0.2											
87				312.26 87.00													
88					57	0.2											
				310.71 88.54													
89					58	0.2											
90		*CONTINUED NEXT PAGE*															

RK_LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

DEPTH SCALE
1 : 50

Centre Wellington

AECOM

LOGGED: PM
CHECKED: MA

PROJECT: F2 and F5 Well Replacement Project
LOCATION: Corner of Cameron St. & St. Andrew St. E, Fergus
COORDINATES: N 4839659.4; E 550347.6
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: MW7-21D

START DATE: Sept. 15, 2021
END DATE: Oct. 1, 2021
DRILLING METHOD: 123 mm O.D. PQ Rock Core
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN / FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
90		CONTINUED FROM PREVIOUS PAGE														
		Light greyish brown to medium greyish brown, fine grained, crystalline, faintly porous, stylolitic, occasional crinoids and gastropods, thinly bedded, cross bedding throughout; transition from overlying Guelph Formation is gradational **DOLOSTONE (GOAT ISLAND FORMATION, 70.41 to 92.68 m)**		390.18 90.07												
91					59	0.2										
				307.66 91.59												
92					60	0.2										
				306.57 92.68												
		Very light grey to dark blue-grey, fine grained, crystalline, faintly porous, moderately pitted, stylolitic, crinoids throughout, occasional gastropods, thickly to massively bedded **DOLOSTONE (GASPORT FORMATION, 92.68 to 115.98 m)**		306.14 93.12												
93					61	0.2										
				304.61 94.64												
94																
																Grout from 0.30 to 99.97 m
95					62	0.1										
		Increase in crinoids at 95.5 m														
96				303.09 96.16												
					63	0.1										
97																
				301.54 97.71												
98					64	0.1										
99				300.07 99.19												
					65	0.2										
100		*CONTINUED NEXT PAGE*														

Diamond Core Drilling
123 mm O.D. PQ Rock Core

DEPTH SCALE
1 : 50

Centre Wellington

AECOM

LOGGED: PM
CHECKED: MA

RK_LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

PROJECT: F2 and F5 Well Replacement Project
LOCATION: Corner of Cameron St. & St. Andrew St. E, Fergus
COORDINATES: N 4839659.4; E 550347.6
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: MW7-21D

START DATE: Sept. 15, 2021
END DATE: Oct. 1, 2021
DRILLING METHOD: 123 mm O.D. PQ Rock Core
CONTRACTOR: Aardvark Drilling
INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN / FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		CONTINUED FROM PREVIOUS PAGE														
100	Diamond Core Drilling 123 mm O.D. PQ Rock Core	Very light grey to dark blue-grey, fine grained, crystalline, faintly porous, moderately pitted, stylolitic, crinoids throughout, occasional gastropods, thickly to massively bedded **DOLOSTONE (GASPORT FORMATION, 92.68 to 115.98 m)**														Coated bentonite pellets from 99.97 to 100.58 m
				298.52	65	0.2										
101				100.74												
					66	0.2										
102				296.99												
				102.26												Sand from 100.58 to 108.33 m
103					67	0.2										
				295.47												
104				103.78												
					68	0.2										
105				294.00												
				105.26												
		Potential water-bearing zone within void (80 mm) at 105.56 m. Void is proximal to pitting and vugs.														
106					69	0.2										50 mm schedule 80 PVC Screen (Size 10 Slot) from 104.67 to 107.72 m
				292.45												
107				106.81												
		Calcite deposits present from 107.25 to 107.39 m and from 107.61 to 107.66 m														
					70	0.2										
108				290.92												
				108.33												
109					71	0.2										Coated bentonite pellets from 108.33 to 115.98 m
				289.37												
110				109.88	72	0.2										
		CONTINUED NEXT PAGE														

DEPTH SCALE
1 : 50

Centre Wellington

AECOM

LOGGED: PM
CHECKED: MA

RK_LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

PROJECT: F2 and F5 Well Replacement Project
LOCATION: Corner of Cameron St. & St. Andrew St. E, Fergus
COORDINATES: N 4839659.4; E 550347.6
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: MW7-21D

START DATE: Sept. 15, 2021
END DATE: Oct. 1, 2021
DRILLING METHOD: 123 mm O.D. PQ Rock Core
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN / FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		CONTINUED FROM PREVIOUS PAGE														
110	Diamond Core Drilling 123 mm O.D. PQ Rock Core	Very light grey to dark blue-grey, fine grained, crystalline, faintly porous, moderately pitted, stylolitic, crinoids throughout, occasional gastropods, thickly to massively bedded **DOLOSTONE (GASPORT FORMATION, 92.68 to 115.98 m)**														
111				287.82	72	0.2										
112				111.43 286.30	73	0.2										
113				112.95												Coated bentonite pellets from 108.33 to 115.98 m
114				284.78	74	0.2										
115				114.48	75	0.2										
116		**END OF BOREHOLE** Notes: 1. Interpretation assistance by AECOM is required for projects excluding the above mentioned project. 2. No abnormal odour or staining was observed unless otherwise indicated. 3. Corehole diameter: 123 mm from 0.00 to 115.98 mBGS 4. Well installation details include: 50 mm schedule 80 PVC Riser: 0.08 to 104.67 mBGS 50 mm schedule 80 PVC Screen (Size 10 Slot): 104.67 to 107.72 mBGS 5. Static water level of 9.86 mbgs was observed on October 18, 2021.		283.27 115.98												
117																
118																
119																
120																

DEPTH SCALE
1 : 50

Centre Wellington

AECOM

LOGGED: PM
CHECKED: MA

RK LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

PROJECT: F2 and F5 Well Replacement Project
LOCATION: Corner of Cameron St. & St. Andrew St. E, Fergus

RECORD OF DRILLHOLE: MW7-21S/I

COORDINATES: N 4839661.3; E 550345.0
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

START DATE: Oct. 4, 2021
END DATE: Oct. 14, 2021
DRILLING METHOD:
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN / FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		GROUND SURFACE		399.28												
0		**TOPSOIL**		0.00												Bentonite pellets from 0.00 to 0.30 m; Shallow Well: 38 mm schedule 40 PVC Riser from 0.12 to 21.44 m; Intermediate Well: 38 mm schedule 40 PVC Riser from 0.08 to 83.16 m
				398.87												
		FILL: silty sand, brown, moist		0.41												
1				397.98												
		Light creamy grey to light brownish grey, fine grained, crystalline, faintly porous, slightly to highly weathered, slightly to moderately pitted, vuggy, occasional stylolites, gastropods and crinoids, medium to thickly bedded **DOLOSTONE (GUELPH FORMATION, 1.30 to 70.41 m)**		1.30											
2																
3																
4																
5	Pneumatic Hammer 254 mm O.D. Air Hammer															Grout from 0.30 to 19.51 m
6																
7																
8																
9																
10		*CONTINUED NEXT PAGE*														

RK_LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

DEPTH SCALE
1 : 50

Centre Wellington

AECOM

LOGGED: PM
CHECKED: MA

PROJECT: F2 and F5 Well Replacement Project
LOCATION: Corner of Cameron St. & St. Andrew St. E, Fergus
COORDINATES: N 4839661.3; E 550345.0
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: MW7-21S/I

START DATE: Oct. 4, 2021
END DATE: Oct. 14, 2021
DRILLING METHOD:
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN / FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		CONTINUED FROM PREVIOUS PAGE														
10	Pneumatic Hammer 254 mm O.D. Air Hammer	Light creamy grey to light brownish grey, fine grained, crystalline, faintly porous, slightly to highly weathered, slightly to moderately pitted, vuggy, occasional stylolites, gastropods and crinoids, medium to thickly bedded **DOLOSTONE (GUELPH FORMATION, 1.30 to 70.41 m)**														
11		Increase in vugs at 10.8 m														
12																
13																
14																
15																Grout from 0.30 to 19.51 m
16																
17																
18																
19																
20		*CONTINUED NEXT PAGE*														Coated bentonite pellets from 19.51 to 20.78 m

RK_LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

DEPTH SCALE
1 : 50

Centre Wellington

AECOM

LOGGED: PM
CHECKED: MA

PROJECT: F2 and F5 Well Replacement Project
LOCATION: Corner of Cameron St. & St. Andrew St. E, Fergus
COORDINATES: N 4839661.3; E 550345.0
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: MW7-21S/I

START DATE: Oct. 4, 2021
END DATE: Oct. 14, 2021
DRILLING METHOD:
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN / FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
20	Pneumatic Hammer 254 mm O.D. Air Hammer	CONTINUED FROM PREVIOUS PAGE														
		Increase in stylolites at 19.9 m Light creamy grey to light brownish grey, fine grained, crystalline, faintly porous, slightly to highly weathered, slightly to moderately pitted, vuggy, occasional stylolites, gastropods and crinoids, medium to thickly bedded **DOLOSTONE (GUELPH FORMATION, 1.30 to 70.41 m)**														Coated bentonite pellets from 19.51 to 20.78 m
21																Sand from 20.78 to 25.25.44 m
22		Potential water-bearing zone at 22.0 m. Highly vuggy rubble zone for 0.46 m; drop in drilling pressure was observed by drilling contractor														
23																Shallow Well: 38 mm schedule 40 PVC Screen (Size 10 Slot) from 21.44 to 24.49 m
24																
25																▽ October 18, 2021 (Shallow Well) ▽ October 18, 2021 (Intermediate Well)
26																
27																
28																Coated bentonite pellets from 25.25 to 82.4 m
29		Increase in fossils at 29.1 m														
30		*CONTINUED NEXT PAGE*														

DEPTH SCALE
1 : 50

LOGGED: PM
CHECKED: MA

RK LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

PROJECT: F2 and F5 Well Replacement Project
LOCATION: Corner of Cameron St. & St. Andrew St. E, Fergus
COORDINATES: N 4839661.3; E 550345.0
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: MW7-21S/I

START DATE: Oct. 4, 2021
END DATE: Oct. 14, 2021
DRILLING METHOD:
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN / FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		CONTINUED FROM PREVIOUS PAGE														
30	Pneumatic Hammer 254 mm O.D. Air Hammer	Light creamy grey to light brownish grey, fine grained, crystalline, faintly porous, slightly to highly weathered, slightly to moderately pitted, vuggy, occasional stylolites, gastropods and crinoids, medium to thickly bedded **DOLOSTONE (GUELPH FORMATION, 1.30 to 70.41 m)**														
31																
32																
33																
34																
35																Coated bentonite pellets from 25.25 to 82.4 m
36		Potential water-bearing zone at 36.0 m. Drilling contractor noted a large drop in drilling pressure														
37																
38																
39																
40		*CONTINUED NEXT PAGE*														

DEPTH SCALE
1 : 50

Centre Wellington

AECOM

LOGGED: PM
CHECKED: MA

PROJECT: F2 and F5 Well Replacement Project
LOCATION: Corner of Cameron St. & St. Andrew St. E, Fergus
COORDINATES: N 4839661.3; E 550345.0
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: MW7-21S/I

START DATE: Oct. 4, 2021
END DATE: Oct. 14, 2021
DRILLING METHOD:
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN / FLUSH	RECOVERY: TOTAL CORE % (80 60 40 20)	RECOVERY: SOLID CORE % (80 60 40 20)	R.Q.D. % (80 60 40 20)	FRACT. INDEX PER 0.3 (5 10 15 20)	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS (0 30 60 90)	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec (10^{-6} 10^{-5} 10^{-4} 10^{-3})	DIAMETRAL POINT LOAD INDEX (MPa) (2 4 6)	WELL INSTALLATION AND WATER LEVELS
40	Pneumatic Hammer 254 mm O.D. Air Hammer	CONTINUED FROM PREVIOUS PAGE Light creamy grey to light brownish grey, fine grained, crystalline, faintly porous, slightly to highly weathered, slightly to moderately pitted, vuggy, occasional stylolites, gastropods and crinoids, medium to thickly bedded **DOLOSTONE (GUELPH FORMATION, 1.30 to 70.41 m)** Calcite mineralization observed in vugs														Coated bentonite pellets from 25.25 to 82.4 m
41																
42																
43																
44																
45																
46																
47																
48																
49																
50		*CONTINUED NEXT PAGE*														

DEPTH SCALE
1 : 50

LOGGED: PM
CHECKED: MA

RK_LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

PROJECT: F2 and F5 Well Replacement Project
LOCATION: Corner of Cameron St. & St. Andrew St. E, Fergus
COORDINATES: N 4839661.3; E 550345.0
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: MW7-21S/I

START DATE: Oct. 4, 2021
END DATE: Oct. 14, 2021
DRILLING METHOD:
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN / FLUSH	RECOVERY: TOTAL CORE % (80 60 40 20)	RECOVERY: SOLID CORE % (80 60 40 20)	R.Q.D. % (80 60 40 20)	FRACT. INDEX PER 0.3 (5 10 15 20)	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS (0 30 60 90)	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec (10^{-6} 10^{-5} 10^{-4} 10^{-3})	DIAMETRAL POINT LOAD INDEX (MPa) (2 4 6)	WELL INSTALLATION AND WATER LEVELS
50	Pneumatic Hammer 254 mm O.D. Air Hammer	CONTINUED FROM PREVIOUS PAGE Light creamy grey to light brownish grey, fine grained, crystalline, faintly porous, slightly to highly weathered, slightly to moderately pitted, vuggy, occasional stylolites, gastropods and crinoids, medium to thickly bedded **DOLOSTONE (GUELPH FORMATION, 1.30 to 70.41 m)**														Coated bentonite pellets from 25.25 to 82.4 m
51																
52																
53																
54																
55																
56																
57																
58																
59																
60		*CONTINUED NEXT PAGE*														

DEPTH SCALE
1 : 50

Centre Wellington

AECOM

LOGGED: PM
CHECKED: MA

RK LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

PROJECT: F2 and F5 Well Replacement Project
LOCATION: Corner of Cameron St. & St. Andrew St. E, Fergus
COORDINATES: N 4839661.3; E 550345.0
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: MW7-21S/I

START DATE: Oct. 4, 2021
END DATE: Oct. 14, 2021
DRILLING METHOD:
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN / FLUSH	RECOVERY: TOTAL CORE % (80 60 40 20)	RECOVERY: SOLID CORE % (80 60 40 20)	R.Q.D. % (80 60 40 20)	FRACT. INDEX PER 0.3 (5 10 15 20)	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS (0 30 60 90)	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec (10^{-6} 10^{-5} 10^{-4} 10^{-3})	DIAMETRAL POINT LOAD INDEX (MPa) (2 4 6)	WELL INSTALLATION AND WATER LEVELS
60	Pneumatic Hammer 254 mm O.D. Air Hammer	CONTINUED FROM PREVIOUS PAGE Light creamy grey to light brownish grey, fine grained, crystalline, faintly porous, slightly to highly weathered, slightly to moderately pitted, vuggy, occasional stylolites, gastropods and crinoids, medium to thickly bedded **DOLOSTONE (GUELPH FORMATION, 1.30 to 70.41 m)**														Coated bentonite pellets from 25.25 to 82.4 m
61																
62																
63																
64																
65																
66																
67																
68																
69																
70		*CONTINUED NEXT PAGE*														

DEPTH SCALE
1 : 50

Centre Wellington

AECOM

LOGGED: PM
CHECKED: MA

RK LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

PROJECT: F2 and F5 Well Replacement Project
LOCATION: Corner of Cameron St. & St. Andrew St. E, Fergus
COORDINATES: N 4839661.3; E 550345.0
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: MW7-21S/I

START DATE: Oct. 4, 2021
END DATE: Oct. 14, 2021
DRILLING METHOD:
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	FLUSH	COLOUR % RETURN	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		CONTINUED FROM PREVIOUS PAGE															
70				328.87													
		Light greyish brown to medium greyish brown, fine grained, crystalline, faintly porous, stylolitic, occasional crinoids and gastropods, thinly bedded, cross bedding throughout; transition from overlying Guelph Formation is gradational **DOLOSTONE (GOAT ISLAND FORMATION, 70.41 to 92.68 m)**		70.41													
71		Increasing vugs beginning at 70.89 m															
72																	
73																	
		Driller noted poor return starting at 73.3 m until end of hole															
74																	
75	Pneumatic Hammer 254 mm O.D. Air Hammer																Coated bentonite pellets from 25.25 to 82.4 m
76		Decreasing vugs beginning at 75.87 m															
77																	
78																	
79																	
80		*CONTINUED NEXT PAGE*															

DEPTH SCALE
1 : 50

Centre Wellington

AECOM

LOGGED: PM
CHECKED: MA

RK LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

PROJECT: F2 and F5 Well Replacement Project
LOCATION: Corner of Cameron St. & St. Andrew St. E, Fergus
COORDINATES: N 4839661.3; E 550345.0
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: MW7-21S/I

START DATE: Oct. 4, 2021
END DATE: Oct. 14, 2021
DRILLING METHOD:
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR & % RETURN / FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
80		CONTINUED FROM PREVIOUS PAGE														
80	Pneumatic Hammer 254 mm O.D. Air Hammer	Light greyish brown to medium greyish brown, fine grained, crystalline, faintly porous, stylolitic, occasional crinoids and gastropods, thinly bedded, cross bedding throughout; transition from overlying Guelph Formation is gradational **DOLOSTONE (GOAT ISLAND FORMATION, 70.41 to 92.68 m)**														
81		Highly vuggy from 80.11 to 80.72 m														Coated bentonite pellets from 25.25 to 82.4 m
82																
83																Sand from 82.4 to 86.41 m
84		Potential water-bearing zone within void (50 mm) at 83.69 m. Void has significant mineralization and is proximal to pitting and vugs.														
84		Highly vuggy from 84.35 to 84.48 m														Intermediate Well: 38 mm schedule 40 PVC Screen (Size 10 Slot) from 83.16 to 86.21 m
85																
86				312.87												
		END OF BOREHOLE		86.41												
87		Notes: 1. Interpretation assistance by AECOM is required for projects excluding the above mentioned project. 2. No abnormal odour or staining was observed unless otherwise indicated. 3. Corehole diameter: 254 mm from 0.00 to 115.98 mBGS 4. Well installation details include: 38 mm schedule 40 PVC Riser: 0.12 to 21.44 mBGS (Shallow Well) 38 mm schedule 40 PVC Screen (Size 10 Slot): 21.44 to 24.49 mBGS (Shallow Well) 38 mm schedule 40 PVC Riser: 0.08 to 83.16 mBGS (Intermediate Well) 38 mm schedule 40 PVC Screen (Size 10 Slot): 83.16 to 86.21 mBGS (Intermediate Well) 5. Static water levels of 24.32 and 24.92 mBGS were measured respectively in the shallow and intermediate wells on October 18, 2021.														
88																
89																
90																

RK_LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

DEPTH SCALE
1 : 50

Centre Wellington

AECOM

LOGGED: PM
CHECKED: MA

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 295 Queen St. E., Fergus
COORDINATES: N 4839661.3; E 550345.0
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: MW8-21

START DATE: Nov. 30, 2021
END DATE: Dec. 23, 2023
DRILLING METHOD:
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN / FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		GROUND SURFACE		399.28												
0		**FILL:** sandy silt, trace clay, trace gravel, brown, moist		0.00 / 398.67												
1	Diamond Core Drilling 123 mm O.D. PQ Rock Core	Light creamy grey to light brownish grey, fine grained, crystalline, faintly porous, slightly to highly weathered, slightly to moderately pitted, vuggy, occasional stylolites, gastropods and crinoids, medium to thickly bedded **DOLOSTONE (GUELPH FORMATION, 0.61 to 66.80 m)**		0.61 / 397.96	1	0.2										
2				1.32 / 396.39	2	0.3										
3				2.90 / 394.91	3	0.2										
4				4.37 / 393.36	4	0.2										Bentonite pellets from 0.00 to 13.11 m
6				5.92 / 391.84	5	0.2										
7				7.44 / 390.26	6	0.1										
9				9.02	7	0.2										
10		*CONTINUED NEXT PAGE*														

RK_LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

DEPTH SCALE
1 : 50

Centre Wellington

AECOM

LOGGED: PM
CHECKED: MA

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 295 Queen St. E., Fergus
COORDINATES: N 4839661.3; E 550345.0
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: MW8-21

START DATE: Nov. 30, 2021
END DATE: Dec. 23, 2023
DRILLING METHOD:
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN / FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		CONTINUED FROM PREVIOUS PAGE														
10	Diamond Core Drilling 123 mm O.D. PQ Rock Core	Light creamy grey to light brownish grey, fine grained, crystalline, faintly porous, slightly to highly weathered, slightly to moderately pitted, vuggy, occasional stylolites, gastropods and crinoids, medium to thickly bedded **DOLOSTONE (GUELPH FORMATION, 0.61 to 66.80 m)**		388.79	7	0.2										
				10.49												
11		Oxidation staining in vertical fracture at 10.8 m Increase in vugs at 11.1 m			8	0.2										
12				387.24 12.04												
13					9	0.2										
				385.74 13.54												
14		Cross bedding at 14.35, 14.83 and 15.04 m			10	0.2										
15				384.22 15.06												
16					11	0.1										
				382.69 16.59												
17					12	0.2										
18				381.12 18.16												
19					13	0.2										
				379.60 19.69												
20					14	0.1										
		CONTINUED NEXT PAGE														

Bentonite pellets from 0.00 to 13.11 m
Sand from 13.11 to 14.99 m
Port 5: stainless steel screen from 13.84 to 14.00 m
Bentonite pellets from 14.99 to 26.37 m

DEPTH SCALE
1 : 50

Centre Wellington

AECOM

LOGGED: PM
CHECKED: MA

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 295 Queen St. E., Fergus
COORDINATES: N 4839661.3; E 550345.0
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: MW8-21

START DATE: Nov. 30, 2021
END DATE: Dec. 23, 2023
DRILLING METHOD:
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	FLUSH COLOUR % RETURN	RECOVERY TOTAL CORE %	RECOVERY SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA DIP w.r.t. CORE AXIS	DISCONTINUITY DATA TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		CONTINUED FROM PREVIOUS PAGE														
20	Diamond Core Drilling 123 mm O.D. PQ Rock Core	Light creamy grey to light brownish grey, fine grained, crystalline, faintly porous, slightly to highly weathered, slightly to moderately pitted, vuggy, occasional stylolites, gastropods and crinoids, medium to thickly bedded **DOLOSTONE (GUELPH FORMATION, 0.61 to 66.80 m)**														
21				378.10	14	0.1										
22				21.18	15	0.2										
23				376.57												Bentonite pellets from 14.99 to 26.37 m
24				22.71	16	0.2										
25				375.05												
26		Large vugs (diameter between 50 and 70 mm)		24.23	17	0.2										
27				373.53												Sand from 26.37 to 27.91 m Port 4: stainless steel screen from 27.10 to 27.25 m
28				25.76	18	0.2										
29				372.00												
30		*CONTINUED NEXT PAGE*		27.28	19	0.1										Bentonite pellets from 27.91 to 33.40 m
				370.55												
				28.73	20	0.1										

DEPTH SCALE
1 : 50

LOGGED: PM
CHECKED: MA

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 295 Queen St. E., Fergus
COORDINATES: N 4839661.3; E 550345.0
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: MW8-21

START DATE: Nov. 30, 2021
END DATE: Dec. 23, 2023
DRILLING METHOD:
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN	FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		CONTINUED FROM PREVIOUS PAGE															
30	Diamond Core Drilling 123 mm O.D. PQ Rock Core	Light creamy grey to light brownish grey, fine grained, crystalline, faintly porous, slightly to highly weathered, slightly to moderately pitted, vuggy, occasional stylolites, gastropods and crinoids, medium to thickly bedded **DOLOSTONE (GUELPH FORMATION, 0.61 to 66.80 m)**		368.93	20	0.1											
				30.35													
31					21	0.2											
				367.43													
32				31.85													
					22	0.2											
33				365.93													
				33.35													
34					23	0.2											
				364.38													
35		Drilling contractor lost circulation at approximately 34.90 m 100 mm void at 35.15 m		34.90													
					24	0.2											
36				362.88													
				36.40													
37					25	0.1											
				361.33													
38				37.95													
					26	0.2											
39				359.58													
				39.70													
40					27	0.1											
		CONTINUED NEXT PAGE															

WELL INSTALLATION AND WATER LEVELS:
- Bentonite pellets from 27.91 to 33.40 m
- Sand from 33.40 to 36.27 m
- Port 3: stainless steel screen from 35.18 to 35.33 m
- Bentonite pellets from 36.27 to 52.04 m

DEPTH SCALE
1 : 50

LOGGED: PM
CHECKED: MA

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 295 Queen St. E., Fergus
COORDINATES: N 4839661.3; E 550345.0
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: MW8-21

START DATE: Nov. 30, 2021
END DATE: Dec. 23, 2023
DRILLING METHOD:
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN	FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		CONTINUED FROM PREVIOUS PAGE															
40	Diamond Core Drilling 123 mm O.D. PQ Rock Core	Light creamy grey to light brownish grey, fine grained, crystalline, faintly porous, slightly to highly weathered, slightly to moderately pitted, vuggy, occasional stylolites, gastropods and crinoids, medium to thickly bedded **DOLOSTONE (GUELPH FORMATION, 0.61 to 66.80 m)**															
				358.36													
41				40.92	27	0.1											
					28	0.2											
42				356.79													
				42.49													
43					29	0.2											
				355.31													
44				43.97													
					30	0.2											
45																	Bentonite pellets from 36.27 to 52.04 m
				353.74													
46				45.54	31	0.1											
				352.34													
47				46.94													
					32	0.2											
48				350.79													
				48.49													
49					33	0.2											
50				349.27													
		CONTINUED NEXT PAGE															

RK_LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

DEPTH SCALE
1 : 50

Centre Wellington

AECOM

LOGGED: PM
CHECKED: MA

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 295 Queen St. E., Fergus
COORDINATES: N 4839661.3; E 550345.0
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: MW8-21

START DATE: Nov. 30, 2021
END DATE: Dec. 23, 2023
DRILLING METHOD:
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN / FLUSH	RECOVERY TOTAL CORE %	RECOVERY SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA DIP w.r.t. CORE AXIS	DISCONTINUITY DATA TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		CONTINUED FROM PREVIOUS PAGE														
50	Diamond Core Drilling 123 mm O.D. PQ Rock Core	Light creamy grey to light brownish grey, fine grained, crystalline, faintly porous, slightly to highly weathered, slightly to moderately pitted, vuggy, occasional stylolites, gastropods and crinoids, medium to thickly bedded **DOLOSTONE (GUELPH FORMATION, 0.61 to 66.80 m)**		50.01												
					34	0.1										
51				347.82												Bentonite pellets from 36.27 to 52.04 m
				51.46												
52					35	0.2										
				346.25												
53				53.04												Pea stone from 52.04 to 54.74 m
		410 mm void at 53.59 m			36	0.2										Port 2: stainless steel screen from 53.62 to 53.77 m
54				344.57												
				54.71												
55					37	0.2										
56				343.02												
				56.26												
57					38	0.2										Bentonite pellets from 54.74 to 67.72 m
				341.50												
58				57.79												
					39	0.1										
59				340.00												
				59.28												
60					40	0.2										
		CONTINUED NEXT PAGE														

RK_LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

DEPTH SCALE
1 : 50

LOGGED: PM
CHECKED: MA

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 295 Queen St. E., Fergus
COORDINATES: N 4839661.3; E 550345.0
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: MW8-21

START DATE: Nov. 30, 2021
END DATE: Dec. 23, 2023
DRILLING METHOD:
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR & % RETURN	FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
		CONTINUED FROM PREVIOUS PAGE															
60	Diamond Core Drilling 123 mm O.D. PQ Rock Core	Light creamy grey to light brownish grey, fine grained, crystalline, faintly porous, slightly to highly weathered, slightly to moderately pitted, vuggy, occasional stylolites, gastropods and crinoids, medium to thickly bedded **DOLOSTONE (GUELPH FORMATION, 0.61 to 66.80 m)**		60.76	40	0.2											
61				337.13	41	0.1											
62				62.15													
63				335.70	42	0.2											
64				63.58	43	0.1											Bentonite pellets from 54.74 to 67.72 m
				335.27													
				64.01	44	0.2											
65		Increase in vugs (diameter greater than 50 mm)		333.77													
66				65.51	45	0.2											
				332.48													
		Light greyish brown to medium greyish brown, fine grained, crystalline, faintly porous, stylolitic, occasional crinoids and gastropods, thinly bedded, cross bedding throughout; transition from overlying Guelph Formation is gradational **DOLOSTONE (GOAT ISLAND FORMATION, 66.80 to 78.99 m)**		66.80													
67				332.25													
				67.03	46	0.2											
68				330.85													Sand from 67.72 to 69.34 m Port 1: stainless steel screen from 68.40 to 68.55 m
				68.43													
69					47	0.1											
				329.41													Bentonite pellets from 69.34 to 79.10 m
70				69.88	48	0.2											
		CONTINUED NEXT PAGE															

DEPTH SCALE
1 : 50

LOGGED: PM
CHECKED: MA

RK_LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 295 Queen St. E., Fergus
COORDINATES: N 4839661.3; E 550345.0
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: MW8-21

START DATE: Nov. 30, 2021
END DATE: Dec. 23, 2023
DRILLING METHOD:
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN	FLUSH	RECOVERY: TOTAL CORE %	RECOVERY: SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.3	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec	DIAMETRAL POINT LOAD INDEX (MPa)	WELL INSTALLATION AND WATER LEVELS
70		CONTINUED FROM PREVIOUS PAGE															
	Diamond Core Drilling, 123 mm O.D. PQ Rock Core	Light greyish brown to medium greyish brown, fine grained, crystalline, faintly porous, stylolitic, occasional crinoids and gastropods, thinly bedded, cross bedding throughout; transition from overlying Guelph Formation is gradational **DOLOSTONE (GOAT ISLAND FORMATION, 66.80 to 78.99 m)**			48	0.2										
71				327.81 71.48													
					49	0.2											
72				326.28 73.00													
					50	0.1											
73				324.83 74.45													
					51	0.2											
74				323.31 75.97													
					52	0.2											
75				321.68 77.60													
					53	0.2											
76				320.29 78.99													
		END OF BOREHOLE															
77		Notes: 1. Interpretation assistance by AECOM is required for projects excluding the above mentioned project. 2. No abnormal odour or staining was observed unless otherwise indicated. 3. Corehole diameter:															
78																	
79																	
80		*CONTINUED NEXT PAGE*															

Bentonite pellets from 69.34 to 79.10 m

Sand from 79.10 to 79.27 m

DEPTH SCALE
1 : 50

Centre Wellington

AECOM

LOGGED: PM
CHECKED: MA

RK LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

PROJECT: F2 and F5 Well Replacement Project
LOCATION: 295 Queen St. E., Fergus
COORDINATES: N 4839661.3; E 550345.0
DATUM: Geodetic NAD83
AECOM PROJECT #: 60664299
CLIENT: Township of Centre Wellington

RECORD OF DRILLHOLE: MW8-21

START DATE: Nov. 30, 2021
END DATE: Dec. 23, 2023
DRILLING METHOD:
CONTRACTOR: Aardvark Drilling

INCLINATION: -90° AZIMUTH: —

FR/FX-FRACTURE F-FAULT SM-SMOOTH FL-FLEXURED BC-BROKEN CORE
CL-CLEAVAGE J-JOINT R-ROUGH UE-UNEVEN MB-MECH. BREAK
SH-SHEAR P-POLISHED ST-STEPPED W-WAVY B-BEDDING
VN-VEIN S-SLICKENSIDED PL-PLANAR C-CURVED

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. / DEPTH (m)	RUN No.	PENETRATION RATE (m/min)	COLOUR % RETURN / FLUSH	RECOVERY: TOTAL CORE % (80 60 40 20)	RECOVERY: SOLID CORE % (80 60 40 20)	R.Q.D. % (80 60 40 20)	FRACT. INDEX PER 0.3 (5 10 15 20)	DISCONTINUITY DATA: DIP w.r.t. CORE AXIS (0 30 60 90)	DISCONTINUITY DATA: TYPE AND SURFACE DESCRIPTION	HYDRAULIC CONDUCTIVITY K, cm/sec (10^{-6} 10^{-5} 10^{-4} 10^{-3})	DIAMETRAL POINT LOAD INDEX (MPa) (2 4 6)	WELL INSTALLATION AND WATER LEVELS
		CONTINUED FROM PREVIOUS PAGE														
80		123 mm from 0.00 to 78.99 mBGS 4. Well installation details for the 5-port Solinst Waterloo Multilevel Groundwater System include: 50 mm stainless steel port 1: 68.40 to 68.55 mBGS 50 mm stainless steel port 2: 53.62 to 53.77 mBGS 50 mm stainless steel port 3: 35.18 to 35.33 mBGS 50 mm stainless steel port 4: 27.10 to 27.25 mBGS 50 mm stainless steel port 5: 13.84 to 14.00 mBGS 5. Water was cascading downwards in the open borehole (prior to well installation) on December 13, 2022 at a depth of approximately 6.84 mBGS.														
81																
82																
83																
84																
85																
86																
87																
88																
89																
90																

DEPTH SCALE
1 : 50

Centre Wellington

AECOM

LOGGED: PM
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RK LOG 60664299 - CW WELL REPLACEMENT 2023-01-13.GPJ GAL-MISS.GDT 5/17/23

AECOM

MECP Water Well Records

Well Record - Regulation 903

Ontario Water Resources Act

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Check the declaration statement to confirm that the person constructing the well agrees with the following statement: “I hereby confirm that I am the person who constructed the well and I hereby confirm that the information on the form is correct and accurate”.

Validate

Click the validate button. If there is no missing information, you will be asked to enter the well tag again to make sure the well tag is entered correctly (only enter the numeric portion of the tag number). The audit number will then be changed from “**incomplete**” to an assigned audit number. The signature field will then be available. Click on “signature” to enter the well technician’s electronic signature. For instructions on how to create an electronic signature, please visit the Adobe Digital IDs website using the following link: https://helpx.adobe.com/acrobat/using/digital-ids.html

Notice of Collection of Personal Information

Personal information contained on this form is collected pursuant to sections 35-50 and 75(2) of the *Ontario Water Resources Act* and section 16.3 of the Wells Regulation. This information will be used for the purpose of maintaining a public record of wells in Ontario. This form and the information contained on the form will be stored in the Ministry's well record database and made publicly available. Questions about this collection should be directed to the Water Well Customer Service Representative at the Wells Help Desk, 125 Resources Road, Toronto Ontario M9P 3V6, at 1-888-396-9355 or wellshelpdesk@ontario.ca.

Fields marked with an asterisk (*) are mandatory.

Well Tag Number *
A 324183

Type *

☑ Construction ☐ Abandonment

Measurement recorded in: *

☐ Metric ☑ Imperial

1. Well Owner's Information

Last Name and First Name, or Organization is mandatory. *

Last Name	First Name

Organization	Email Address
Township of Centre Wellington	

Current Address

Unit Number	Street Number *	Street Name *	City/Town/Village
	1	MacDonald Square	Elora

Country	Province	Postal Code	Telephone Number
Canada	Ontario	N0B 1S0	519-846-9691

2. Well Location

Address of Well Location

Unit Number	Street Number *	Street Name *	Township
	449	St. Andrew Street East	Nichol

Lot	Concession	County/District/Municipality
		Wellington

City/Town	Province	Postal Code
Fergus	Ontario	

UTM Coordinates	Zone *	Easting *	Northing *		Municipal Plan and Sublot Number
NAD 83	17	550587	4839948	Test UTM in Map	

Other
F2R

3. Overburden and Bedrock Material *

Well Depth * 380 (ft)

General Colour	Most Common Material	Other Materials	General Description	Depth From	Depth To

				(ft)	(ft)
	Fill			0	3
	Gravel	Sand		3	4
	Limestone			4	380

4. Annular Space *

Depth From (ft)	Depth To (ft)	Type of Sealant Used (Material and Type)	Volume Placed (cubic feet)
0	144.8	Cement	151.56
144.8	380	Open Hole	

5. Method of Construction *

- [ ] Cable Tool
- [ ] Rotary (Conventional)
- [ ] Rotary (Reverse)
- [ ] Boring
- [ ] Air percussion
- [ ] Diamond
- [ ] Jetting
- [ ] Driving
- [ ] Digging
- [ ] Rotary (Air)
- [ ] Augering
- [ ] Direct Push
- [x] Other (specify) DR

6. Well Use *

- [ ] Public
- [ ] Industrial
- [ ] Cooling & Air Conditioning
- [ ] Domestic
- [ ] Commercial
- [ ] Not Used
- [ ] Livestock
- [x] Municipal
- [ ] Monitoring
- [ ] Irrigation
- [ ] Test Hole
- [ ] Dewatering
- [ ] Other (specify)

7. Status of Well *

- [x] Water Supply
- [x] 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)

8. Construction Record - Casing * (use negative number(s) to indicate depth above ground surface)

Inside Diameter (in)	Open Hole **or** Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness	Depth From (ft)	Depth To (ft)
12.75	Steel	0.375	-3	144.8
12	Open Hole		144.8	380

9. Construction Record - Screen

Outside Diameter (in)	Material (Plastic, Galvanized, Steel)	Slot Number	Depth From (ft)	Depth To (ft)

10. Water Details

Water found at Depth 120 (ft) ☐ Gas Kind of water ☐ Fresh ☑ Untested ☐ Other

11. Hole Diameter

Depth From (ft)	Depth To (ft)	Diameter (in)
0	144.8	19
144.8	380	12

12. Results of Well Yield Testing

☐ Pumping Discontinued

Explain _____

If flowing give rate

☐ Flowing _____ (GPM)

Draw down

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

Recovery

Time (min)	1	2	3	4	5	10	15	20	25	30	40	50	60
Water Level (ft)													

After test of well yield, water was

☑ Clear and sand free ☐ Other (specify)

Pump intake set at (ft)	Pumping rate (GPM)	Duration of pumping	Final water level end of pumping (ft)	Disinfected? *
	317.01	8 hrs + min	157	☑ Yes ☐ No

Recommended pump depth (ft)	Recommended pump rate (GPM)	Well production (GPM)

13. Map of Well Location *

Map 1. Please Click the map area below to import an image file to use as the map. ☐ Make map area bigger



14. Information

Well owner's information package delivered	Date Package Delivered (yyyy/mm/dd)	Date Work Completed (yyyy/mm/dd) *
☐ Yes ☐ No	2022/08/22	2022/09/01

Comments
Please See pump test info on Excel spread sheet labelled "Aquifer Test - F2-R(313-010)"

15. Well Contractor and Well Technician Information

Business Name of Well Contractor *	Well Contractor's License Number *
Aardvark Drilling Inc.	7675

Business Address

Unit Number	Street Number	Street Name *
C	25	Lewis Road

City/Town/Village *	Province	Postal Code *
Guelph	ON	N1H 1E9

Business Telephone Number	Business Email Address
519-826-9340	info@aardvarkdrillinginc.com

Last Name of Well Technician *	First Name of Well Technician *	Well Technician's License Number *
Smith	Kyle	3591

16. Declaration *

☑ I hereby confirm that I am the person who constructed the well and I hereby confirm that the information on the form is correct and accurate.

Last Name	First Name	Email Address
England	Matthew	mengland@aardvarkdrillinginc.com

Signature	Date Submitted (yyyy/mm/dd)
	2022/11/23

17. Ministry Use Only

Audit Number
MQEH DU8G

Well Record - Regulation 903

Ontario Water Resources Act

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Validate

Click the validate button. If there is no missing information, you will be asked to enter the well tag again to make sure the well tag is entered correctly (only enter the numeric portion of the tag number). The audit number will then be changed from “**incomplete**” to an assigned audit number. The signature field will then be available. Click on “signature” to enter the well technician’s electronic signature. For instructions on how to create an electronic signature, please visit the Adobe Digital IDs website using the following link: https://helpx.adobe.com/acrobat/using/digital-ids.html

Notice of Collection of Personal Information

Personal information contained on this form is collected pursuant to sections 35-50 and 75(2) of the *Ontario Water Resources Act* and section 16.3 of the Wells Regulation. This information will be used for the purpose of maintaining a public record of wells in Ontario. This form and the information contained on the form will be stored in the Ministry's well record database and made publicly available. Questions about this collection should be directed to the Water Well Customer Service Representative at the Wells Help Desk, 125 Resources Road, Toronto Ontario M9P 3V6, at 1-888-396-9355 or wellshelpdesk@ontario.ca.

Fields marked with an asterisk (*) are mandatory.

Well Tag Number *
A 324195

Type *

☑ Construction ☐ Abandonment

Measurement recorded in: *

☐ Metric ☑ Imperial

1. Well Owner's Information

Last Name and First Name, or Organization is mandatory. *

Last Name	First Name

Organization	Email Address
Township of Centre Wellington	

Current Address

Unit Number	Street Number *	Street Name *	City/Town/Village
	1	MacDonald Square	Elora

Country	Province	Postal Code	Telephone Number
Canada	Ontario	N0B 1S0	519-846-9691

2. Well Location

Address of Well Location

Unit Number	Street Number *	Street Name *	Township
	900	Scotland Street	

Lot	Concession	County/District/Municipality
		Wellington

City/Town	Province	Postal Code
Center Wellington	Ontario	

UTM Coordinates	Zone *	Easting *	Northing *		Municipal Plan and Sublot Number
NAD 83	17	551835	4839072	Test UTM in Map	

Other
F5R

3. Overburden and Bedrock Material *

Well Depth * 475.5 (ft)

General Colour	Most Common Material	Other Materials	General Description	Depth From	Depth To

				(ft)	(ft)
	Overburden			0	65
Brown	Limestone			65	475.5

4. Annular Space *

Depth From (ft)	Depth To (ft)	Type of Sealant Used (Material and Type)	Volume Placed (cubic feet)
0	183	Cement/Bentonite	11.25
183	475.5	Open Hole	229.92

5. Method of Construction *

☐ Cable Tool ☐ Rotary (Conventional) ☐ Rotary (Reverse) ☐ Boring ☐ Air percussion ☐ Diamond
☐ Jetting ☐ Driving ☐ Digging ☐ Rotary (Air) ☐ Augering ☐ Direct Push
☑ Other (specify) DR

6. Well Use *

☐ Public ☐ Industrial ☐ Cooling & Air Conditioning
☐ Domestic ☐ Commercial ☐ Not Used
☐ Livestock ☑ Municipal ☐ Monitoring
☐ Irrigation ☐ Test Hole ☐ Dewatering
☐ Other (specify)

7. 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)

8. Construction Record - Casing * (use negative number(s) to indicate depth above ground surface)

Inside Diameter (in)	Open Hole **or** Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness	Depth From (ft)	Depth To (ft)
12	Steel	0.375	-2.33	183
16	Steel	0.375	-0.58	182
12	Open Hole		183	475.5

9. Construction Record - Screen

Outside Diameter (in)	Material (Plastic, Galvanized, Steel)	Slot Number	Depth From (ft)	Depth To (ft)

10. Water Details

Water found at Depth (ft) ☐ Gas Kind of water ☐ Fresh ☐ Untested ☐ Other

11. Hole Diameter

Depth From (ft)	Depth To (ft)	Diameter (in)
0	182	20
182	183	16
183	475.5	12

12. Results of Well Yield Testing

☐ Pumping Discontinued

Explain

If flowing give rate

☐ Flowing (GPM)

Draw down

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

Recovery

Time (min)	1	2	3	4	5	10	15	20	25	30	40	50	60
Water Level (ft)													

After test of well yield, water was

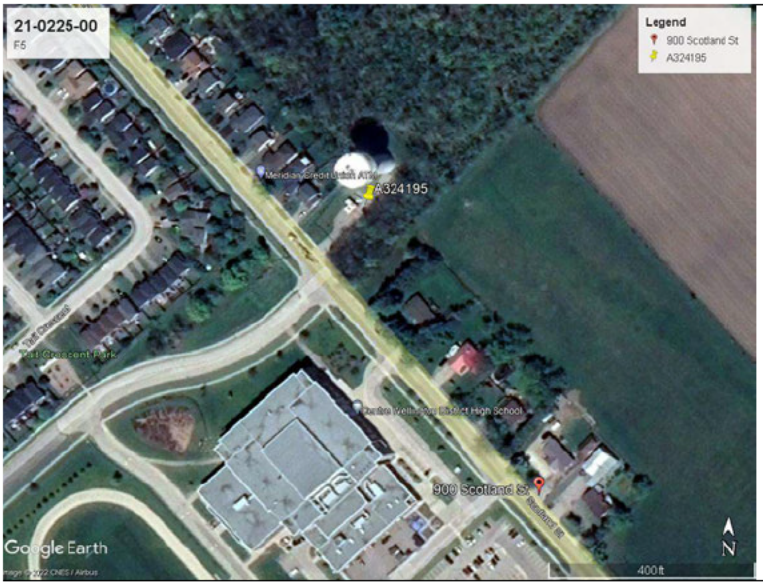
☑ Clear and sand free ☐ Other (specify)

Pump intake set at (ft)	Pumping rate	Duration of pumping	Final water level end of pumping	Disinfected? *
	104.61 (GPM)	27 hrs + min	57.05 (ft)	☑ Yes ☐ No

Recommended pump depth (ft)	Recommended pump rate (GPM)	Well production (GPM)

13. Map of Well Location *

Map 1. Please Click the map area below to import an image file to use as the map. ☐ Make map area bigger



14. Information

Well owner's information package delivered	Date Package Delivered (yyyy/mm/dd)	Date Work Completed (yyyy/mm/dd) *
☐ Yes ☐ No	2021/12/01	2022/06/28

Comments
Please see Excel spread sheet for the pump test imformation

15. Well Contractor and Well Technician Information

Business Name of Well Contractor *	Well Contractor's License Number *
Aardvark Drilling Inc.	7675

Business Address

Unit Number	Street Number	Street Name *
C	25	Lewis Road

City/Town/Village *	Province	Postal Code *
Guelph	ON	N1H 1E9

Business Telephone Number	Business Email Address
519-826-9340	info@aardvarkdrillinginc.com

Last Name of Well Technician *	First Name of Well Technician *	Well Technician's License Number *
Smith	Kyle	3591

16. Declaration *

☑ I hereby confirm that I am the person who constructed the well and I hereby confirm that the information on the form is correct and accurate.

Last Name	First Name	Email Address
England	Matthew	mengland@aardvarkdrillinginc.com

Signature	Date Submitted (yyyy/mm/dd)
	2022/10/05

17. Ministry Use Only

Audit Number
47RO TSTE

Well Record - Regulation 903

Ontario Water Resources Act

General Instructions and Explanations for completing a Well Record

A completed electronic Well Record Form must be delivered to the well purchaser and the owner of the land on which the well is situated within 14 days after the date on which the well's structural stage is complete. The electronic Well Record must also be forwarded within 30 days after the date on which the well's structural stage is complete to the ministry through email to the following email address: WellRecordSubmission@ontario.ca

False and Misleading Information

Subsection 98(2) of the *Ontario Water Resources Act*, R.S.O. 1990 c. O. 40, states that:

“No person shall orally, in writing or electronically, give or submit false or misleading information in any statement, document or data, to any provincial officer, the Minister, the Ministry or the Agency, any employee in or agent of the Ministry or the Agency, or any person involved in carrying out a program of the Ministry or the Agency in respect of any matter related to this Act or the regulations.”

Further, subsection 98(3) of the Act states that:

“No person shall include false or misleading information in any document or data required to be created, stored or submitted under this Act.”

Measurements

All measurements must be recorded in the specified unit, metric or imperial by checking off the applicable box on the top of the form. You must use the checked unit consistently throughout the well record. Measurements must be reported to 1/10th of a metre if the unit is a metre. All measurements of depth must be referenced to ground surface.

Well Owner’s Information

A “well owner” means the owner of land upon which a well is situated and includes a tenant or lessee of the land and a well purchaser. If the “well owner” is an individual, record the owner’s last name and first name or if the “well owner” is a business, government or other organization, record the name in the “organization” area.

Well Location

Street Number/Name and City/town/Village must be provided, if available.

Geographic Township, Concession and Lot must be reported if the well is located in an area where such information exists.

UTM Coordinates must be recorded each time a Well Record is completed. Click the button [Test UTM in Map] to use the UTM Coordinates to plot the location to Google map. This allows verification of the UTM Coordinates. This will also automatically populate the County/District.

Municipal Plan and Sublet Number may be provided, if available.

Overburden and Bedrock Materials

For each formation encountered during construction, choose words from the lists that best describe the formation on the basis of general colour, most common material, other materials, and general description of the formation.

General Colours are White, Yellow, Grey, Brown, Blue, Red, Green and Black.

Examples of Materials are: Fill, Silt, Top Soil, Coarse Sand, Slate, Muck, Gravel, Limestone, Dolomite, Quartzite, Peat, Stones, Fine Sand, Shale, Granite, Clay, Boulders, Medium Sand, Sandstone, and Greenstone.

Some definitions are as follows:

- Clay: Composed of very fine particles. Forms dense hard lumps or clods when dry and a very elastic putty-like mass when wet. It can be rolled between fingers to form a long, flexible ribbon.
- Silt: Grain size, midway between sand and clay. It may form clods which, when broken, feel soft and floury. When moist, it will form a cast that can be handled freely without breaking. Rolled between thumb and finger, it will not "ribbon" but will give a broken appearance.

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- Sand: Grains are loose and granular and may be seen and felt readily. Squeezed in the hand when dry, it falls apart when the pressure is released. Squeezed when moist, it will form a cast that will crumble when touched. Should be listed as fine sand, medium sand or coarse sand.
- Gravel: Rock fragments greater than 0.3 cm in diameter.

Examples of General Descriptions are Loose, Cemented, Previously Dug or Bored, Porous, Layered, Previously Drilled, Dense, Soft, Wood Fragments, Packed, Hard.

Abandonment

To report abandonment of a well, check off the applicable box in Type on the top of the form. Details of abandonment must be recorded in the Abandonment and Sealing Section. Additional comments may be entered in the comments box under the Information section.

Annular Space

Record all material placed in the annular space around the single casing or around the permanent outer casing. If the well is a telescoped well [i.e., a well with an outer casing and inner casing(s)] or if the well is a multi-level nested test hole, report the depth from, depth to, material and volume placed for the annular space between two different sized casings or between the inner casing(s) and the side of the well in the “Comments” area of this electronic well record form.

Method of Construction

If the equipment used to construct the well is not on the list, check “Other (specify)” and record the type of equipment, check each equipment that applies.

Well Use

If the well’s use is not provided on the list, check “Other (specify)” and record the use of the well. If the well has multiple uses, check each use that applies.

Status of Well

If the well’s status is not provided on the list, check “Other (specify)” and record the use of the well. If the well has multiple statuses, check each use that applies.

Construction Record – Casing and Open Hole

Use negative values to report the top of casing above ground surface. For example, if the top of the casing is 0.4 metres above the ground surface and the bottom of the casing 6.0 metres below the ground surface, record the casing “Depth From” as -0.4.

If the top of casing is located below the ground surface (e.g., if a test hole is constructed and the top of casing is located below the ground surface in a flush mounted well vault), report the top of the casing from below ground surface. For example, if the top of the casing is 0.1 metres below the ground surface and the bottom of the casing is 6 metres below the ground surface, record the casing “Depth From” as 0.1.

Note: If a drive shoe is used, the shoe is considered casing and it must be reported if the shoe has a different inside diameter thickness.

If a portion of the well was created an open hole, record the location of the open hole on a separate row, including the diameter and the depth (top and bottom of open hole) from the ground surface.

Construction Record – Well Screen

A “well screen” means perforated pipe or tubing, unsealed concrete tiles or other material installed in a well to filter out particulate matter and form the water intake zone. Therefore, the length of a well screen includes any slotted or perforated area and unsealed area of pipe or tiles.

Water Details

- if groundwater was located, record the depth from the ground surface to the location of the groundwater resource, and
- record if the groundwater quality is “Untested,” “Fresh” (i.e., not salty), or “Other (specify).” If “Other (specify)” is recorded, use the “Other (specify)” dropdown list toselect the type of groundwater (e.g., salty, blackish water, yellowish water, mineralized, etc.).

Check off “Gas” if natural gas was encountered during well construction.

Note: Natural gas encounters need to be immediately reported to the ministry at 1-800-268-6060, well purchaser and the owner of the land.

Results of Well Yield Testing

Check off “Pumping Discontinued” if pumping was discontinued before 1 hour of continuous pumping. Explain the reason why pumping was discontinued or in some cases not performed (e.g., the well went dry, impossible to install pump in small diameter well, static water level from test hole or dewatering well was obtained and is reported instead of completing a yield test etc.).

Note: Equipment breakdown is not an acceptable reason for checking off “Pumping Discontinued” on the well record form. If groundwater in the well is flowing out of the well, provide the rate of flow, and check off “Flowing Well” (i.e., static water level above the ground surface).

In the “Results of Well Yield Testing” section of the well record form, record:

- the depth to the intake of the pump,
- the rate of pumping and duration of pumping period during the yield test,
- the final water level when pumping stops,
- water level measurements made during pumping (drawdown) and recovery. All water level measurements must be referenced from below the ground surface for each time interval specified in the drawdown and recovery boxes.

If the water level measurements remain the same over a period of time, continue to measure and report the same water level measurement for the remaining pumping or recovery time intervals.

If pumping continuously for at least 1 hour, but the design of the well does not allow for water level measurements (e.g., driven point well), the person constructing the well is not required to report drawdown or recovery water level measurements.

Map of Well Location

In the “Map of Well Location” section of the well record form, click the map area to attach a map of the well location. The map must show sufficient information to locate the well, including:

- a mark on the map showing the well,
- a scale on the map, and
- where available, the name of the structure, street or surface water body nearest to the well.

Note: More than one map can be added to the well record form by clicking on “Add Map (+)” to add an additional map.

Information

Record any additional information (e.g., observations, tests, additional licensed well technicians who worked on the well, additional annular space details for a telescoped well or a multi-level nested test hole, reasons for not providing a well owner information package) in the comments area.

Declaration

Check the declaration statement to confirm that the person constructing the well agrees with the following statement: “I hereby confirm that I am the person who constructed the well and I hereby confirm that the information on the form is correct and accurate”.

Validate

Click the validate button. If there is no missing information, you will be asked to enter the well tag again to make sure the well tag is entered correctly (only enter the numeric portion of the tag number). The audit number will then be changed from “**incomplete**” to an assigned audit number. The signature field will then be available. Click on “signature” to enter the well technician’s electronic signature. For instructions on how to create an electronic signature, please visit the Adobe Digital IDs website using the following link: https://helpx.adobe.com/acrobat/using/digital-ids.html

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Fields marked with an asterisk (*) are mandatory.

Well Tag Number *
A 323424

Type *

☑ Construction ☐ Abandonment

Measurement recorded in: *

☐ Metric ☑ Imperial

1. Well Owner's Information

Last Name and First Name, or Organization is mandatory. *

Last Name	First Name

Organization	Email Address
Township of Centre Wellington	

Current Address

Unit Number	Street Number *	Street Name *	City/Town/Village
	1	MacDonald Square	Elora

Country	Province	Postal Code	Telephone Number
Canada	Ontario	N0B 1S0	519-846-9691

2. Well Location

Address of Well Location

Unit Number	Street Number *	Street Name *	Township
	0	St Andrew St & Cameron St	Nichol

Lot	Concession	County/District/Municipality
		Wellington

City/Town	Province	Postal Code
Fergus	Ontario	

UTM Coordinates	Zone *	Easting *	Northing *		Municipal Plan and Sublot Number
NAD 83	17	550345	4839658	Test UTM in Map	

Other

3. Overburden and Bedrock Material *

Well Depth * 283.6 (ft)

General Colour	Most Common Material	Other Materials	General Description	Depth From	Depth To

				(ft)	(ft)
	Fill			0	3
	Gravel	Sand		3	4
	Limestone			4	283.6

4. Annular Space *

Depth From (ft)	Depth To (ft)	Type of Sealant Used (Material and Type)	Volume Placed (cubic feet)
0	64	Grout, Cement	9.82
64	68.2	Pellet Chips	0.74
68.2	82.1	Sand	2.44
82.1	270	Pellet Chips	33
270	283.6	Sand	2.40

5. Method of Construction *

☐ Cable Tool ☐ Rotary (Conventional) ☐ Rotary (Reverse) ☐ Boring ☑ Air percussion ☐ Diamond
☐ Jetting ☐ Driving ☐ Digging ☐ Rotary (Air) ☐ Augering ☐ Direct Push
☐ Other (specify) _____

6. Well Use *

☐ Public ☐ Industrial ☐ Cooling & Air Conditioning
☐ Domestic ☑ Commercial ☐ Not Used
☐ Livestock ☐ Municipal ☐ Monitoring
☐ Irrigation ☐ Test Hole ☐ Dewatering
☐ Other (specify) _____

7. 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) _____

8. Construction Record - Casing * (use negative number(s) to indicate depth above ground surface)

Inside Diameter (in)	Open Hole **or** Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness	Depth From (ft)	Depth To (ft)
1.25	Plastic	0.28	0	70.4
1.25	Plastic	0.28	0	272.1

9. Construction Record - Screen

Outside Diameter (in)	Material (Plastic, Galvanized, Steel)	Slot Number	Depth From (ft)	Depth To (ft)
1.5	Plastic	10	70.4	80.4
1.5	Plastic	10	272.1	282.1

10. Water Details

Water found at Depth 30 (ft) ☐ Gas Kind of water ☐ Fresh ☑ Untested ☐ Other

11. Hole Diameter

Depth From (ft)	Depth To (ft)	Diameter (in)
0	4	10
4	283.6	5.87

12. Results of Well Yield Testing

☐ Pumping Discontinued

Explain

If flowing give rate

☐ Flowing (GPM)

Draw down

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

Recovery

Time (min)	1	2	3	4	5	10	15	20	25	30	40	50	60
Water Level (ft)													

After test of well yield, water was

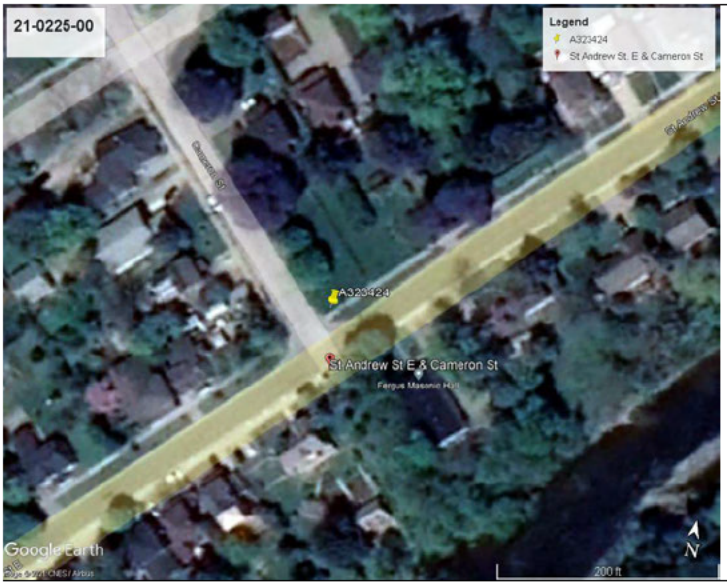
☐ Clear and sand free ☐ Other (specify)

Pump intake set at (ft)	Pumping rate (GPM)	Duration of pumping hrs + min	Final water level end of pumping (ft)	Disinfected? *
				☐ Yes ☑ No

Recommended pump depth (ft)	Recommended pump rate (GPM)	Well production (GPM)

13. Map of Well Location *

Map 1. Please Click the map area below to import an image file to use as the map. ☐ Make map area bigger



14. Information

Well owner's information package delivered	Date Package Delivered (yyyy/mm/dd)	Date Work Completed (yyyy/mm/dd) *
☐ Yes ☐ No		2021/10/14

Comments

15. Well Contractor and Well Technician Information

Business Name of Well Contractor *	Well Contractor's License Number *
Aardvark Drilling Inc.	7675

Business Address

Unit Number	Street Number	Street Name *
C	25	Lewis Road

City/Town/Village *	Province	Postal Code *
Guelph	ON	N1H 1E9

Business Telephone Number	Business Email Address
519-826-9340	info@aardvarkdrillinginc.com

Last Name of Well Technician *	First Name of Well Technician *	Well Technician's License Number *
Richards	Adrian	2554

16. Declaration *

☑ I hereby confirm that I am the person who constructed the well and I hereby confirm that the information on the form is correct and accurate.

Last Name	First Name	Email Address
England	Matthew	mengland@aardvarkdrillinginc.com

Signature	Date Submitted (yyyy/mm/dd)
	2021/11/26

17. Ministry Use Only

Audit Number

2AVF SN8L

Well Record - Regulation 903

Ontario Water Resources Act

General Instructions and Explanations for completing a Well Record

A completed electronic Well Record Form must be delivered to the well purchaser and the owner of the land on which the well is situated within 14 days after the date on which the well's structural stage is complete. The electronic Well Record must also be forwarded within 30 days after the date on which the well's structural stage is complete to the ministry through email to the following email address: WellRecordSubmission@ontario.ca

False and Misleading Information

Subsection 98(2) of the *Ontario Water Resources Act*, R.S.O. 1990 c. O. 40, states that:

“No person shall orally, in writing or electronically, give or submit false or misleading information in any statement, document or data, to any provincial officer, the Minister, the Ministry or the Agency, any employee in or agent of the Ministry or the Agency, or any person involved in carrying out a program of the Ministry or the Agency in respect of any matter related to this Act or the regulations.”

Further, subsection 98(3) of the Act states that:

“No person shall include false or misleading information in any document or data required to be created, stored or submitted under this Act.”

Measurements

All measurements must be recorded in the specified unit, metric or imperial by checking off the applicable box on the top of the form. You must use the checked unit consistently throughout the well record. Measurements must be reported to 1/10th of a metre if the unit is a metre. All measurements of depth must be referenced to ground surface.

Well Owner’s Information

A “well owner” means the owner of land upon which a well is situated and includes a tenant or lessee of the land and a well purchaser. If the “well owner” is an individual, record the owner’s last name and first name or if the “well owner” is a business, government or other organization, record the name in the “organization” area.

Well Location

Street Number/Name and City/town/Village must be provided, if available.

Geographic Township, Concession and Lot must be reported if the well is located in an area where such information exists.

UTM Coordinates must be recorded each time a Well Record is completed. Click the button [Test UTM in Map] to use the UTM Coordinates to plot the location to Google map. This allows verification of the UTM Coordinates. This will also automatically populate the County/District.

Municipal Plan and Sublet Number may be provided, if available.

Overburden and Bedrock Materials

For each formation encountered during construction, choose words from the lists that best describe the formation on the basis of general colour, most common material, other materials, and general description of the formation.

General Colours are White, Yellow, Grey, Brown, Blue, Red, Green and Black.

Examples of Materials are: Fill, Silt, Top Soil, Coarse Sand, Slate, Muck, Gravel, Limestone, Dolomite, Quartzite, Peat, Stones, Fine Sand, Shale, Granite, Clay, Boulders, Medium Sand, Sandstone, and Greenstone.

Some definitions are as follows:

- Clay: Composed of very fine particles. Forms dense hard lumps or clods when dry and a very elastic putty-like mass when wet. It can be rolled between fingers to form a long, flexible ribbon.
- Silt: Grain size, midway between sand and clay. It may form clods which, when broken, feel soft and floury. When moist, it will form a cast that can be handled freely without breaking. Rolled between thumb and finger, it will not "ribbon" but will give a broken appearance.

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- Sand: Grains are loose and granular and may be seen and felt readily. Squeezed in the hand when dry, it falls apart when the pressure is released. Squeezed when moist, it will form a cast that will crumble when touched. Should be listed as fine sand, medium sand or coarse sand.
- Gravel: Rock fragments greater than 0.3 cm in diameter.

Examples of General Descriptions are Loose, Cemented, Previously Dug or Bored, Porous, Layered, Previously Drilled, Dense, Soft, Wood Fragments, Packed, Hard.

Abandonment

To report abandonment of a well, check off the applicable box in Type on the top of the form. Details of abandonment must be recorded in the Abandonment and Sealing Section. Additional comments may be entered in the comments box under the Information section.

Annular Space

Record all material placed in the annular space around the single casing or around the permanent outer casing. If the well is a telescoped well [i.e., a well with an outer casing and inner casing(s)] or if the well is a multi-level nested test hole, report the depth from, depth to, material and volume placed for the annular space between two different sized casings or between the inner casing(s) and the side of the well in the “Comments” area of this electronic well record form.

Method of Construction

If the equipment used to construct the well is not on the list, check “Other (specify)” and record the type of equipment, check each equipment that applies.

Well Use

If the well’s use is not provided on the list, check “Other (specify)” and record the use of the well. If the well has multiple uses, check each use that applies.

Status of Well

If the well’s status is not provided on the list, check “Other (specify)” and record the use of the well. If the well has multiple statuses, check each use that applies.

Construction Record – Casing and Open Hole

Use negative values to report the top of casing above ground surface. For example, if the top of the casing is 0.4 metres above the ground surface and the bottom of the casing 6.0 metres below the ground surface, record the casing “Depth From” as -0.4.

If the top of casing is located below the ground surface (e.g., if a test hole is constructed and the top of casing is located below the ground surface in a flush mounted well vault), report the top of the casing from below ground surface. For example, if the top of the casing is 0.1 metres below the ground surface and the bottom of the casing is 6 metres below the ground surface, record the casing “Depth From” as 0.1.

Note: If a drive shoe is used, the shoe is considered casing and it must be reported if the shoe has a different inside diameter thickness.

If a portion of the well was created an open hole, record the location of the open hole on a separate row, including the diameter and the depth (top and bottom of open hole) from the ground surface.

Construction Record – Well Screen

A “well screen” means perforated pipe or tubing, unsealed concrete tiles or other material installed in a well to filter out particulate matter and form the water intake zone. Therefore, the length of a well screen includes any slotted or perforated area and unsealed area of pipe or tiles.

Water Details

- if groundwater was located, record the depth from the ground surface to the location of the groundwater resource, and
- record if the groundwater quality is “Untested,” “Fresh” (i.e., not salty), or “Other (specify).” If “Other (specify)” is recorded, use the “Other (specify)” dropdown list toselect the type of groundwater (e.g., salty, blackish water, yellowish water, mineralized, etc.).

Check off “Gas” if natural gas was encountered during well construction.

Note: Natural gas encounters need to be immediately reported to the ministry at 1-800-268-6060, well purchaser and the owner of the land.

Results of Well Yield Testing

Check off “Pumping Discontinued” if pumping was discontinued before 1 hour of continuous pumping. Explain the reason why pumping was discontinued or in some cases not performed (e.g., the well went dry, impossible to install pump in small diameter well, static water level from test hole or dewatering well was obtained and is reported instead of completing a yield test etc.).

Note: Equipment breakdown is not an acceptable reason for checking off “Pumping Discontinued” on the well record form. If groundwater in the well is flowing out of the well, provide the rate of flow, and check off “Flowing Well” (i.e., static water level above the ground surface).

In the “Results of Well Yield Testing” section of the well record form, record:

- the depth to the intake of the pump,
- the rate of pumping and duration of pumping period during the yield test,
- the final water level when pumping stops,
- water level measurements made during pumping (drawdown) and recovery. All water level measurements must be referenced from below the ground surface for each time interval specified in the drawdown and recovery boxes.

If the water level measurements remain the same over a period of time, continue to measure and report the same water level measurement for the remaining pumping or recovery time intervals.

If pumping continuously for at least 1 hour, but the design of the well does not allow for water level measurements (e.g., driven point well), the person constructing the well is not required to report drawdown or recovery water level measurements.

Map of Well Location

In the “Map of Well Location” section of the well record form, click the map area to attach a map of the well location. The map must show sufficient information to locate the well, including:

- a mark on the map showing the well,
- a scale on the map, and
- where available, the name of the structure, street or surface water body nearest to the well.

Note: More than one map can be added to the well record form by clicking on “Add Map (+)” to add an additional map.

Information

Record any additional information (e.g., observations, tests, additional licensed well technicians who worked on the well, additional annular space details for a telescoped well or a multi-level nested test hole, reasons for not providing a well owner information package) in the comments area.

Declaration

Check the declaration statement to confirm that the person constructing the well agrees with the following statement: “I hereby confirm that I am the person who constructed the well and I hereby confirm that the information on the form is correct and accurate”.

Validate

Click the validate button. If there is no missing information, you will be asked to enter the well tag again to make sure the well tag is entered correctly (only enter the numeric portion of the tag number). The audit number will then be changed from “**incomplete**” to an assigned audit number. The signature field will then be available. Click on “signature” to enter the well technician’s electronic signature. For instructions on how to create an electronic signature, please visit the Adobe Digital IDs website using the following link: https://helpx.adobe.com/acrobat/using/digital-ids.html

Notice of Collection of Personal Information

Personal information contained on this form is collected pursuant to sections 35-50 and 75(2) of the *Ontario Water Resources Act* and section 16.3 of the Wells Regulation. This information will be used for the purpose of maintaining a public record of wells in Ontario. This form and the information contained on the form will be stored in the Ministry's well record database and made publicly available. Questions about this collection should be directed to the Water Well Customer Service Representative at the Wells Help Desk, 125 Resources Road, Toronto Ontario M9P 3V6, at 1-888-396-9355 or wellshelpdesk@ontario.ca.

Fields marked with an asterisk (*) are mandatory.

Well Tag Number *
A 323425

Type *

☑ Construction ☐ Abandonment

Measurement recorded in: *

☐ Metric ☑ Imperial

1. Well Owner's Information

Last Name and First Name, or Organization is mandatory. *

Last Name	First Name

Organization	Email Address
Township of Centre Wellington	

Current Address

Unit Number	Street Number *	Street Name *	City/Town/Village
	1	MacDonald Square	Elora

Country	Province	Postal Code	Telephone Number
Canada	Ontario	N0B 1S0	519-846-9691

2. Well Location

Address of Well Location

Unit Number	Street Number *	Street Name *	Township
	0	St Andrew St & Cameron St	Nichol

Lot	Concession	County/District/Municipality
		Wellington

City/Town	Province	Postal Code
Fergus	Ontario	

UTM Coordinates	Zone *	Easting *	Northing *		Municipal Plan and Sublot Number
NAD 83	17	550349	4839658	Test UTM in Map	

Other

3. Overburden and Bedrock Material *

Well Depth * 380.6 (ft)

General Colour	Most Common Material	Other Materials	General Description	Depth From	Depth To

				(ft)	(ft)
	Fill			0	3
	Gravel	Sand		3	4
	Limestone			4	380.6

4. Annular Space *

Depth From (ft)	Depth To (ft)	Type of Sealant Used (Material and Type)	Volume Placed (cubic feet)
0	328	Grout, Cement	41.45
328	330	Pellet Chips	0.26
330	355	Sand	3.19
355	380	Pellet Chips	3.19

5. Method of Construction *

☐ Cable Tool ☐ Rotary (Conventional) ☐ Rotary (Reverse) ☐ Boring ☐ Air percussion ☑ Diamond
☐ Jetting ☐ Driving ☐ Digging ☐ Rotary (Air) ☐ Augering ☐ Direct Push
☐ Other (specify) _____

6. Well Use *

☐ Public ☐ Industrial ☐ Cooling & Air Conditioning
☐ Domestic ☑ Commercial ☐ Not Used
☐ Livestock ☐ Municipal ☐ Monitoring
☐ Irrigation ☐ Test Hole ☐ Dewatering
☐ Other (specify) _____

7. 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) _____

8. Construction Record - Casing * (use negative number(s) to indicate depth above ground surface)

Inside Diameter (in)	Open Hole **or** Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness	Depth From (ft)	Depth To (ft)
2	Plastic	80	0	353

9. Construction Record - Screen

Outside Diameter (in)	Material (Plastic, Galvanized, Steel)	Slot Number	Depth From (ft)	Depth To (ft)
2	Plastic	80	341	353

10. Water Details

Water found at Depth 30 (ft) ☐ Gas Kind of water ☐ Fresh ☑ Untested ☐ Other

11. Hole Diameter

Depth From (ft)	Depth To (ft)	Diameter (in)
0	4	6
4	380.6	5

12. Results of Well Yield Testing

☐ Pumping Discontinued

Explain _____

If flowing give rate

☐ Flowing _____ (GPM)

Draw down

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

Recovery

Time (min)	1	2	3	4	5	10	15	20	25	30	40	50	60
Water Level (ft)													

After test of well yield, water was

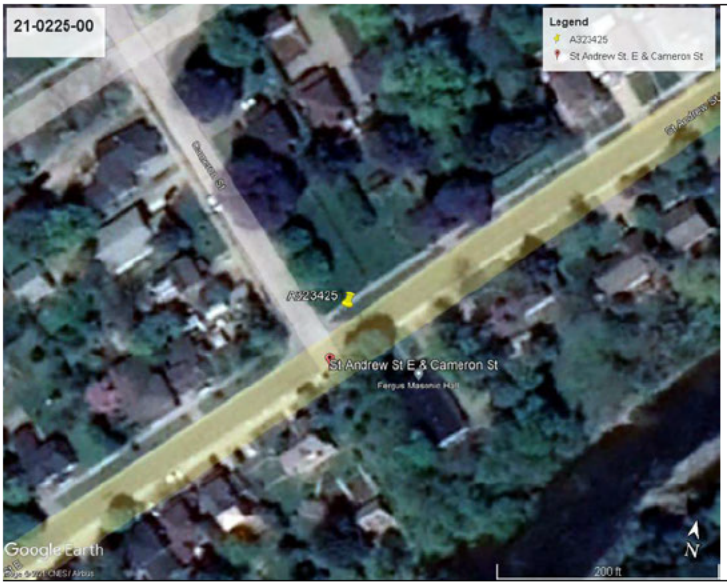
☐ Clear and sand free ☐ Other (specify)

Pump intake set at (ft)	Pumping rate (GPM)	Duration of pumping hrs + min	Final water level end of pumping (ft)	Disinfected? *
				☐ Yes ☑ No

Recommended pump depth (ft)	Recommended pump rate (GPM)	Well production (GPM)

13. Map of Well Location *

Map 1. Please Click the map area below to import an image file to use as the map. ☐ Make map area bigger



14. Information

Well owner's information package delivered	Date Package Delivered (yyyy/mm/dd)	Date Work Completed (yyyy/mm/dd) *
☐ Yes ☐ No		2021/10/14

Comments

15. Well Contractor and Well Technician Information

Business Name of Well Contractor *	Well Contractor's License Number *
Aardvark Drilling Inc.	7675

Business Address

Unit Number	Street Number	Street Name *
C	25	Lewis Road

City/Town/Village *	Province	Postal Code *
Guelph	ON	N1H 1E9

Business Telephone Number	Business Email Address
519-826-9340	info@aardvarkdrillinginc.com

Last Name of Well Technician *	First Name of Well Technician *	Well Technician's License Number *
Richards	Adrian	2554

16. Declaration *

☑ I hereby confirm that I am the person who constructed the well and I hereby confirm that the information on the form is correct and accurate.

Last Name	First Name	Email Address
England	Matthew	mengland@aardvarkdrillinginc.com

Signature	Date Submitted (yyyy/mm/dd)
	2021/11/26

17. Ministry Use Only

Audit Number

IQVW SCOU

Well Record - Regulation 903

Ontario Water Resources Act

General Instructions and Explanations for completing a Well Record

A completed electronic Well Record Form must be delivered to the well purchaser and the owner of the land on which the well is situated within 14 days after the date on which the well's structural stage is complete. The electronic Well Record must also be forwarded within 30 days after the date on which the well's structural stage is complete to the ministry through email to the following email address: WellRecordSubmission@ontario.ca

False and Misleading Information

Subsection 98(2) of the *Ontario Water Resources Act*, R.S.O. 1990 c. O. 40, states that:

“No person shall orally, in writing or electronically, give or submit false or misleading information in any statement, document or data, to any provincial officer, the Minister, the Ministry or the Agency, any employee in or agent of the Ministry or the Agency, or any person involved in carrying out a program of the Ministry or the Agency in respect of any matter related to this Act or the regulations.”

Further, subsection 98(3) of the Act states that:

“No person shall include false or misleading information in any document or data required to be created, stored or submitted under this Act.”

Measurements

All measurements must be recorded in the specified unit, metric or imperial by checking off the applicable box on the top of the form. You must use the checked unit consistently throughout the well record. Measurements must be reported to 1/10th of a metre if the unit is a metre. All measurements of depth must be referenced to ground surface.

Well Owner’s Information

A “well owner” means the owner of land upon which a well is situated and includes a tenant or lessee of the land and a well purchaser. If the “well owner” is an individual, record the owner’s last name and first name or if the “well owner” is a business, government or other organization, record the name in the “organization” area.

Well Location

Street Number/Name and City/town/Village must be provided, if available.

Geographic Township, Concession and Lot must be reported if the well is located in an area where such information exists.

UTM Coordinates must be recorded each time a Well Record is completed. Click the button [Test UTM in Map] to use the UTM Coordinates to plot the location to Google map. This allows verification of the UTM Coordinates. This will also automatically populate the County/District.

Municipal Plan and Sublet Number may be provided, if available.

Overburden and Bedrock Materials

For each formation encountered during construction, choose words from the lists that best describe the formation on the basis of general colour, most common material, other materials, and general description of the formation.

General Colours are White, Yellow, Grey, Brown, Blue, Red, Green and Black.

Examples of Materials are: Fill, Silt, Top Soil, Coarse Sand, Slate, Muck, Gravel, Limestone, Dolomite, Quartzite, Peat, Stones, Fine Sand, Shale, Granite, Clay, Boulders, Medium Sand, Sandstone, and Greenstone.

Some definitions are as follows:

- Clay: Composed of very fine particles. Forms dense hard lumps or clods when dry and a very elastic putty-like mass when wet. It can be rolled between fingers to form a long, flexible ribbon.
- Silt: Grain size, midway between sand and clay. It may form clods which, when broken, feel soft and floury. When moist, it will form a cast that can be handled freely without breaking. Rolled between thumb and finger, it will not "ribbon" but will give a broken appearance.

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- Sand: Grains are loose and granular and may be seen and felt readily. Squeezed in the hand when dry, it falls apart when the pressure is released. Squeezed when moist, it will form a cast that will crumble when touched. Should be listed as fine sand, medium sand or coarse sand.
- Gravel: Rock fragments greater than 0.3 cm in diameter.

Examples of General Descriptions are Loose, Cemented, Previously Dug or Bored, Porous, Layered, Previously Drilled, Dense, Soft, Wood Fragments, Packed, Hard.

Abandonment

To report abandonment of a well, check off the applicable box in Type on the top of the form. Details of abandonment must be recorded in the Abandonment and Sealing Section. Additional comments may be entered in the comments box under the Information section.

Annular Space

Record all material placed in the annular space around the single casing or around the permanent outer casing. If the well is a telescoped well [i.e., a well with an outer casing and inner casing(s)] or if the well is a multi-level nested test hole, report the depth from, depth to, material and volume placed for the annular space between two different sized casings or between the inner casing(s) and the side of the well in the “Comments” area of this electronic well record form.

Method of Construction

If the equipment used to construct the well is not on the list, check “Other (specify)” and record the type of equipment, check each equipment that applies.

Well Use

If the well’s use is not provided on the list, check “Other (specify)” and record the use of the well. If the well has multiple uses, check each use that applies.

Status of Well

If the well’s status is not provided on the list, check “Other (specify)” and record the use of the well. If the well has multiple statuses, check each use that applies.

Construction Record – Casing and Open Hole

Use negative values to report the top of casing above ground surface. For example, if the top of the casing is 0.4 metres above the ground surface and the bottom of the casing 6.0 metres below the ground surface, record the casing “Depth From” as -0.4.

If the top of casing is located below the ground surface (e.g., if a test hole is constructed and the top of casing is located below the ground surface in a flush mounted well vault), report the top of the casing from below ground surface. For example, if the top of the casing is 0.1 metres below the ground surface and the bottom of the casing is 6 metres below the ground surface, record the casing “Depth From” as 0.1.

Note: If a drive shoe is used, the shoe is considered casing and it must be reported if the shoe has a different inside diameter thickness.

If a portion of the well was created an open hole, record the location of the open hole on a separate row, including the diameter and the depth (top and bottom of open hole) from the ground surface.

Construction Record – Well Screen

A “well screen” means perforated pipe or tubing, unsealed concrete tiles or other material installed in a well to filter out particulate matter and form the water intake zone. Therefore, the length of a well screen includes any slotted or perforated area and unsealed area of pipe or tiles.

Water Details

- if groundwater was located, record the depth from the ground surface to the location of the groundwater resource, and
- record if the groundwater quality is “Untested,” “Fresh” (i.e., not salty), or “Other (specify).” If “Other (specify)” is recorded, use the “Other (specify)” dropdown list toselect the type of groundwater (e.g., salty, blackish water, yellowish water, mineralized, etc.).

Check off “Gas” if natural gas was encountered during well construction.

Note: Natural gas encounters need to be immediately reported to the ministry at 1-800-268-6060, well purchaser and the owner of the land.

Results of Well Yield Testing

Check off “Pumping Discontinued” if pumping was discontinued before 1 hour of continuous pumping. Explain the reason why pumping was discontinued or in some cases not performed (e.g., the well went dry, impossible to install pump in small diameter well, static water level from test hole or dewatering well was obtained and is reported instead of completing a yield test etc.).

Note: Equipment breakdown is not an acceptable reason for checking off “Pumping Discontinued” on the well record form. If groundwater in the well is flowing out of the well, provide the rate of flow, and check off “Flowing Well” (i.e., static water level above the ground surface).

In the “Results of Well Yield Testing” section of the well record form, record:

- the depth to the intake of the pump,
- the rate of pumping and duration of pumping period during the yield test,
- the final water level when pumping stops,
- water level measurements made during pumping (drawdown) and recovery. All water level measurements must be referenced from below the ground surface for each time interval specified in the drawdown and recovery boxes.

If the water level measurements remain the same over a period of time, continue to measure and report the same water level measurement for the remaining pumping or recovery time intervals.

If pumping continuously for at least 1 hour, but the design of the well does not allow for water level measurements (e.g., driven point well), the person constructing the well is not required to report drawdown or recovery water level measurements.

Map of Well Location

In the “Map of Well Location” section of the well record form, click the map area to attach a map of the well location. The map must show sufficient information to locate the well, including:

- a mark on the map showing the well,
- a scale on the map, and
- where available, the name of the structure, street or surface water body nearest to the well.

Note: More than one map can be added to the well record form by clicking on “Add Map (+)” to add an additional map.

Information

Record any additional information (e.g., observations, tests, additional licensed well technicians who worked on the well, additional annular space details for a telescoped well or a multi-level nested test hole, reasons for not providing a well owner information package) in the comments area.

Declaration

Check the declaration statement to confirm that the person constructing the well agrees with the following statement: “I hereby confirm that I am the person who constructed the well and I hereby confirm that the information on the form is correct and accurate”.

Validate

Click the validate button. If there is no missing information, you will be asked to enter the well tag again to make sure the well tag is entered correctly (only enter the numeric portion of the tag number). The audit number will then be changed from “**incomplete**” to an assigned audit number. The signature field will then be available. Click on “signature” to enter the well technician’s electronic signature. For instructions on how to create an electronic signature, please visit the Adobe Digital IDs website using the following link: https://helpx.adobe.com/acrobat/using/digital-ids.html

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Fields marked with an asterisk (*) are mandatory.

Well Tag Number *
A 352935

Type *

☑ Construction ☐ Abandonment

Measurement recorded in: *

☐ Metric ☑ Imperial

1. Well Owner's Information

Last Name and First Name, or Organization is mandatory. *

Last Name	First Name

Organization	Email Address
Township of Centre Wellington	

Current Address

Unit Number	Street Number *	Street Name *	City/Town/Village
	1	MacDonald Square	Elora

Country	Province	Postal Code	Telephone Number
Canada	Ontario	N0B1S0	519-846-9691

2. Well Location

Address of Well Location

Unit Number	Street Number *	Street Name *	Township
	295	Queen Street E	Nichol

Lot	Concession	County/District/Municipality
		Wellington

City/Town	Province	Postal Code
Fergus	Ontario	N1M 3N4

UTM Coordinates	Zone *	Easting *	Northing *		Municipal Plan and Sublot Number
NAD 83	17	550391	4836513	Test UTM in Map	

Other

3. Overburden and Bedrock Material *

Well Depth * 260 (ft)

General Colour	Most Common Material	Other Materials	General Description	Depth From	Depth To

				(ft)	(ft)
Brown	Fill	Clay	Dirty	0	5
White	Dolostone			5	260

4. Annular Space *

Depth From (ft)	Depth To (ft)	Type of Sealant Used (Material and Type)	Volume Placed (cubic feet)
0	43	Pellet Plug	5.16
43	49	Sand (Port 5)	0.72
49	87	Pellet Plug	4.56
87	92	Sand (Port 4)	0.6
92	109	Pellet Plug	2.04
109	119	Sand (Port 3)	1.2
119	171	Pellet Plug	6.24
171	180	Pea Stone (Port 2)	20
180	222	Pellet Plug	5.04
222	227.5	Sand (Port 1)	0.66

5. Method of Construction *

- [ ] Cable Tool
- [ ] Rotary (Conventional)
- [ ] Rotary (Reverse)
- [ ] Boring
- [ ] Air percussion
- [x] Diamond
- [ ] Jetting
- [ ] Driving
- [ ] Digging
- [ ] Rotary (Air)
- [ ] Augering
- [ ] Direct Push
- [x] Other (specify) PQ Cored

6. Well Use *

- [ ] Public
- [ ] Industrial
- [ ] Cooling & Air Conditioning
- [ ] Domestic
- [ ] Commercial
- [ ] Not Used
- [ ] Livestock
- [ ] Municipal
- [x] Monitoring
- [ ] Irrigation
- [ ] Test Hole
- [ ] Dewatering
- [ ] Other (specify)

7. Status of Well *

- [ ] Water Supply
- [ ] Replacement Well
- [ ] Test Hole
- [ ] Recharge Well
- [ ] Dewatering Well
- [x] Observation and/or Monitoring Hole
- [ ] Alteration (Construction)
- [ ] Abandoned, Insufficient Supply
- [ ] Abandoned, Poor Water Quality
- [ ] Abandoned, other (specify)
- [x] Other (specify) This is a multilevel Waterloo Well System

8. Construction Record - Casing * (use negative number(s) to indicate depth above ground surface)

Inside Diameter (in)	Open Hole **or** Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness	Depth From (ft)	Depth To (ft)
2	Plastic	0.25	-3	260

9. Construction Record - Screen

Outside Diameter (in)	Material (Plastic, Galvanized, Steel)	Slot Number	Depth From (ft)	Depth To (ft)
2	Plastic		45	45.5
2	Plastic		89	89.5
2	Plastic		115.5	116
2	Plastic		176	176.5
2	Plastic		225	225.5

10. Water Details

Water found at Depth (ft) ☐ Gas Kind of water ☐ Fresh ☑ Untested ☐ Other

11. Hole Diameter

Depth From (ft)	Depth To (ft)	Diameter (in)
0	260	5

12. Results of Well Yield Testing

☐ Pumping Discontinued

Explain _____

If flowing give rate

☐ Flowing _____ (GPM)

Draw down

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

Recovery

Time (min)	1	2	3	4	5	10	15	20	25	30	40	50	60
Water Level (ft)													

After test of well yield, water was

☐ Clear and sand free ☐ Other (specify)

Pump intake set at (ft)	Pumping rate (GPM)	Duration of pumping hrs + min	Final water level end of pumping (ft)	Disinfected? *
				☐ Yes ☑ No

Recommended pump depth (ft)	Recommended pump rate (GPM)	Well production (GPM)

13. Map of Well Location *

Map 1. Please Click the map area below to import an image file to use as the map. ☐ Make map area bigger



14. Information

Well owner's information package delivered	Date Package Delivered (yyyy/mm/dd)	Date Work Completed (yyyy/mm/dd) *
☐ Yes ☐ No		2022/12/22

Comments
Annular Space Continued:
Depth From: 227.5'
Depth To: 260'
Type of Sealant: Pellet Plug
Pellet Plug Volume Placed (cubic ft): 3.9

15. Well Contractor and Well Technician Information

Business Name of Well Contractor *	Well Contractor's License Number *
Aardvark Drilling Inc.	7675

Business Address

Unit Number	Street Number	Street Name *
C	25	Lewis Road

City/Town/Village *	Province	Postal Code *
Guelph	ON	N1H 1E9

Business Telephone Number	Business Email Address
519-826-9340	info@aardvarkdrillinginc.com

Last Name of Well Technician *	First Name of Well Technician *	Well Technician's License Number *
Hovey	Aaron	4256

16. Declaration *

☑ I hereby confirm that I am the person who constructed the well and I hereby confirm that the information on the form is correct and accurate.

Last Name	First Name	Email Address
England	Matthew	mengland@aardvarkdrillinginc.com

Signature	Date Submitted (yyyy/mm/dd)
	2023/01/18

17. Ministry Use Only

Audit Number

I5LQ XNHJ

Well Record - Regulation 903

Ontario Water Resources Act

General Instructions and Explanations for completing a Well Record

A completed electronic Well Record Form must be delivered to the well purchaser and the owner of the land on which the well is situated within 14 days after the date on which the well's structural stage is complete. The electronic Well Record must also be forwarded within 30 days after the date on which the well's structural stage is complete to the ministry through email to the following email address: WellRecordSubmission@ontario.ca

False and Misleading Information

Subsection 98(2) of the *Ontario Water Resources Act*, R.S.O. 1990 c. O. 40, states that:

“No person shall orally, in writing or electronically, give or submit false or misleading information in any statement, document or data, to any provincial officer, the Minister, the Ministry or the Agency, any employee in or agent of the Ministry or the Agency, or any person involved in carrying out a program of the Ministry or the Agency in respect of any matter related to this Act or the regulations.”

Further, subsection 98(3) of the Act states that:

“No person shall include false or misleading information in any document or data required to be created, stored or submitted under this Act.”

Measurements

All measurements must be recorded in the specified unit, metric or imperial by checking off the applicable box on the top of the form. You must use the checked unit consistently throughout the well record. Measurements must be reported to 1/10th of a metre if the unit is a metre. All measurements of depth must be referenced to ground surface.

Well Owner’s Information

A “well owner” means the owner of land upon which a well is situated and includes a tenant or lessee of the land and a well purchaser. If the “well owner” is an individual, record the owner’s last name and first name or if the “well owner” is a business, government or other organization, record the name in the “organization” area.

Well Location

Street Number/Name and City/town/Village must be provided, if available.

Geographic Township, Concession and Lot must be reported if the well is located in an area where such information exists.

UTM Coordinates must be recorded each time a Well Record is completed. Click the button [Test UTM in Map] to use the UTM Coordinates to plot the location to Google map. This allows verification of the UTM Coordinates. This will also automatically populate the County/District.

Municipal Plan and Sublet Number may be provided, if available.

Overburden and Bedrock Materials

For each formation encountered during construction, choose words from the lists that best describe the formation on the basis of general colour, most common material, other materials, and general description of the formation.

General Colours are White, Yellow, Grey, Brown, Blue, Red, Green and Black.

Examples of Materials are: Fill, Silt, Top Soil, Coarse Sand, Slate, Muck, Gravel, Limestone, Dolomite, Quartzite, Peat, Stones, Fine Sand, Shale, Granite, Clay, Boulders, Medium Sand, Sandstone, and Greenstone.

Some definitions are as follows:

- Clay: Composed of very fine particles. Forms dense hard lumps or clods when dry and a very elastic putty-like mass when wet. It can be rolled between fingers to form a long, flexible ribbon.
- Silt: Grain size, midway between sand and clay. It may form clods which, when broken, feel soft and floury. When moist, it will form a cast that can be handled freely without breaking. Rolled between thumb and finger, it will not "ribbon" but will give a broken appearance.

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- Sand: Grains are loose and granular and may be seen and felt readily. Squeezed in the hand when dry, it falls apart when the pressure is released. Squeezed when moist, it will form a cast that will crumble when touched. Should be listed as fine sand, medium sand or coarse sand.
- Gravel: Rock fragments greater than 0.3 cm in diameter.

Examples of General Descriptions are Loose, Cemented, Previously Dug or Bored, Porous, Layered, Previously Drilled, Dense, Soft, Wood Fragments, Packed, Hard.

Abandonment

To report abandonment of a well, check off the applicable box in Type on the top of the form. Details of abandonment must be recorded in the Abandonment and Sealing Section. Additional comments may be entered in the comments box under the Information section.

Annular Space

Record all material placed in the annular space around the single casing or around the permanent outer casing. If the well is a telescoped well [i.e., a well with an outer casing and inner casing(s)] or if the well is a multi-level nested test hole, report the depth from, depth to, material and volume placed for the annular space between two different sized casings or between the inner casing(s) and the side of the well in the “Comments” area of this electronic well record form.

Method of Construction

If the equipment used to construct the well is not on the list, check “Other (specify)” and record the type of equipment, check each equipment that applies.

Well Use

If the well’s use is not provided on the list, check “Other (specify)” and record the use of the well. If the well has multiple uses, check each use that applies.

Status of Well

If the well’s status is not provided on the list, check “Other (specify)” and record the use of the well. If the well has multiple statuses, check each use that applies.

Construction Record – Casing and Open Hole

Use negative values to report the top of casing above ground surface. For example, if the top of the casing is 0.4 metres above the ground surface and the bottom of the casing 6.0 metres below the ground surface, record the casing “Depth From” as -0.4.

If the top of casing is located below the ground surface (e.g., if a test hole is constructed and the top of casing is located below the ground surface in a flush mounted well vault), report the top of the casing from below ground surface. For example, if the top of the casing is 0.1 metres below the ground surface and the bottom of the casing is 6 metres below the ground surface, record the casing “Depth From” as 0.1.

Note: If a drive shoe is used, the shoe is considered casing and it must be reported if the shoe has a different inside diameter thickness.

If a portion of the well was created an open hole, record the location of the open hole on a separate row, including the diameter and the depth (top and bottom of open hole) from the ground surface.

Construction Record – Well Screen

A “well screen” means perforated pipe or tubing, unsealed concrete tiles or other material installed in a well to filter out particulate matter and form the water intake zone. Therefore, the length of a well screen includes any slotted or perforated area and unsealed area of pipe or tiles.

Water Details

- if groundwater was located, record the depth from the ground surface to the location of the groundwater resource, and
- record if the groundwater quality is “Untested,” “Fresh” (i.e., not salty), or “Other (specify).” If “Other (specify)” is recorded, use the “Other (specify)” dropdown list toselect the type of groundwater (e.g., salty, blackish water, yellowish water, mineralized, etc.).

Check off “Gas” if natural gas was encountered during well construction.

Note: Natural gas encounters need to be immediately reported to the ministry at 1-800-268-6060, well purchaser and the owner of the land.

Results of Well Yield Testing

Check off “Pumping Discontinued” if pumping was discontinued before 1 hour of continuous pumping. Explain the reason why pumping was discontinued or in some cases not performed (e.g., the well went dry, impossible to install pump in small diameter well, static water level from test hole or dewatering well was obtained and is reported instead of completing a yield test etc.).

Note: Equipment breakdown is not an acceptable reason for checking off “Pumping Discontinued” on the well record form. If groundwater in the well is flowing out of the well, provide the rate of flow, and check off “Flowing Well” (i.e., static water level above the ground surface).

In the “Results of Well Yield Testing” section of the well record form, record:

- the depth to the intake of the pump,
- the rate of pumping and duration of pumping period during the yield test,
- the final water level when pumping stops,
- water level measurements made during pumping (drawdown) and recovery. All water level measurements must be referenced from below the ground surface for each time interval specified in the drawdown and recovery boxes.

If the water level measurements remain the same over a period of time, continue to measure and report the same water level measurement for the remaining pumping or recovery time intervals.

If pumping continuously for at least 1 hour, but the design of the well does not allow for water level measurements (e.g., driven point well), the person constructing the well is not required to report drawdown or recovery water level measurements.

Map of Well Location

In the “Map of Well Location” section of the well record form, click the map area to attach a map of the well location. The map must show sufficient information to locate the well, including:

- a mark on the map showing the well,
- a scale on the map, and
- where available, the name of the structure, street or surface water body nearest to the well.

Note: More than one map can be added to the well record form by clicking on “Add Map (+)” to add an additional map.

Information

Record any additional information (e.g., observations, tests, additional licensed well technicians who worked on the well, additional annular space details for a telescoped well or a multi-level nested test hole, reasons for not providing a well owner information package) in the comments area.

Declaration

Check the declaration statement to confirm that the person constructing the well agrees with the following statement: “I hereby confirm that I am the person who constructed the well and I hereby confirm that the information on the form is correct and accurate”.

Validate

Click the validate button. If there is no missing information, you will be asked to enter the well tag again to make sure the well tag is entered correctly (only enter the numeric portion of the tag number). The audit number will then be changed from “**incomplete**” to an assigned audit number. The signature field will then be available. Click on “signature” to enter the well technician’s electronic signature. For instructions on how to create an electronic signature, please visit the Adobe Digital IDs website using the following link: https://helpx.adobe.com/acrobat/using/digital-ids.html

Notice of Collection of Personal Information

Personal information contained on this form is collected pursuant to sections 35-50 and 75(2) of the *Ontario Water Resources Act* and section 16.3 of the Wells Regulation. This information will be used for the purpose of maintaining a public record of wells in Ontario. This form and the information contained on the form will be stored in the Ministry's well record database and made publicly available. Questions about this collection should be directed to the Water Well Customer Service Representative at the Wells Help Desk, 125 Resources Road, Toronto Ontario M9P 3V6, at 1-888-396-9355 or wellshelpdesk@ontario.ca.

Fields marked with an asterisk (*) are mandatory.

Well Tag Number *
No Tag on Well

Type *

☐ Construction ☑ Abandonment

Measurement recorded in: *

☐ Metric ☑ Imperial

1. Well Owner's Information

Last Name and First Name, or Organization is mandatory. *

Last Name	First Name

Organization	Email Address
Township of Centre Wellington	

Current Address

Unit Number	Street Number *	Street Name *	City/Town/Village
	1	MacDonald Square	Elora

Country	Province	Postal Code	Telephone Number
Canada	Ontario	N0B 1S0	519-846-9691

2. Well Location

Address of Well Location

Unit Number	Street Number *	Street Name *	Township
	445	St Andrew St & Gartshore St	Nichol

Lot	Concession	County/District/Municipality
		Wellington

City/Town	Province	Postal Code
Fergus	Ontario	

UTM Coordinates	Zone *	Easting *	Northing *		Municipal Plan and Sublot Number
NAD 83	17	550587	4839948	Test UTM in Map	

Other

3. Abandonment and Sealing

Well Depth 251 (ft)

Provide information of well (e.g. construction date, original contractor). **Do not** enter private information
Original construction date July 10, 1946. Original contractor International Water Supply Ltd.

Original Owner
Original owner PVC Fergus

General Description	Depth From (ft)	Depth To (ft)
Pulled pipe and filled with holeplug	0	251

4. Annular Space

Depth From (ft)	Depth To (ft)	Type of Sealant Used (Material and Type)	Volume Placed (cubic feet)
0	251	Holeplug	197.13

5. Method of Construction

☐ Cable Tool ☐ Rotary (Conventional) ☐ Rotary (Reverse) ☐ Boring ☐ Air percussion ☐ Diamond
☐ Jetting ☐ Driving ☐ Digging ☐ Rotary (Air) ☐ Augering ☐ Direct Push
☑ Other (specify) unknown

6. Well Use

☐ Public ☐ Industrial ☐ Cooling & Air Conditioning
☐ Domestic ☐ Commercial ☐ Not Used
☐ Livestock ☑ Municipal ☐ Monitoring
☐ Irrigation ☐ Test Hole ☐ Dewatering
☐ Other (specify)

7. 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) no longer in use
☐ Other (specify)

8. Construction Record - Casing (use negative number(s) to indicate depth above ground surface)

Inside Diameter (in)	Open Hole **or** Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness	Depth From (ft)	Depth To (ft)

9. Construction Record - Screen

Outside Diameter (in)	Material (Plastic, Galvanized, Steel)	Slot Number	Depth From (ft)	Depth To (ft)

10. Water Details

Water found at Depth (ft) ☐ Gas Kind of water ☐ Fresh ☐ Untested ☐ Other

11. Hole Diameter

Depth From (ft)	Depth To (ft)	Diameter (in)
0	251	12

12. Results of Well Yield Testing

☐ Pumping Discontinued

Explain _____

If flowing give rate

☐ Flowing _____ (GPM)

Draw down

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

Recovery

Time (min)	1	2	3	4	5	10	15	20	25	30	40	50	60
Water Level (ft)													

After test of well yield, water was

☐ Clear and sand free ☐ Other (specify)

Pump intake set at (ft)	Pumping rate (GPM)	Duration of pumping hrs + min	Final water level end of pumping (ft)	Disinfected?
				☐ Yes ☑ No

Recommended pump depth (ft)	Recommended pump rate (GPM)	Well production (GPM)

13. Map of Well Location *

Map 1. Please Click the map area below to import an image file to use as the map. ☐ Make map area bigger



14. Information

Well owner's information package delivered	Date Package Delivered (yyyy/mm/dd)	Date Work Completed (yyyy/mm/dd) *
☐ Yes ☐ No		2021/10/14

Comments

15. Well Contractor and Well Technician Information

Business Name of Well Contractor *	Well Contractor's License Number *
Aardvark Drilling Inc.	7675

Business Address

Unit Number	Street Number	Street Name *
C	25	Lewis Road

City/Town/Village *	Province	Postal Code *
Guelph	ON	N1H 1E9

Business Telephone Number	Business Email Address
519-826-9340	info@aardvarkdrillinginc.com

Last Name of Well Technician *	First Name of Well Technician *	Well Technician's License Number *
Smith	Kyle	3591

16. Declaration *

☑ I hereby confirm that I am the person who constructed the well and I hereby confirm that the information on the form is correct and accurate.

Last Name	First Name	Email Address
England	Matthew	mengland@aardvarkdrillinginc.com

Signature	Date Submitted (yyyy/mm/dd)
	2022/01/19

17. Ministry Use Only

Audit Number

SZCU D6PJ

AECOM

MECP Water Well Records

Well Record - Regulation 903

Ontario Water Resources Act

General Instructions and Explanations for completing a Well Record

A completed electronic Well Record Form must be delivered to the well purchaser and the owner of the land on which the well is situated within 14 days after the date on which the well's structural stage is complete. The electronic Well Record must also be forwarded within 30 days after the date on which the well's structural stage is complete to the ministry through email to the following email address: WellRecordSubmission@ontario.ca

False and Misleading Information

Subsection 98(2) of the *Ontario Water Resources Act*, R.S.O. 1990 c. O. 40, states that:

“No person shall orally, in writing or electronically, give or submit false or misleading information in any statement, document or data, to any provincial officer, the Minister, the Ministry or the Agency, any employee in or agent of the Ministry or the Agency, or any person involved in carrying out a program of the Ministry or the Agency in respect of any matter related to this Act or the regulations.”

Further, subsection 98(3) of the Act states that:

“No person shall include false or misleading information in any document or data required to be created, stored or submitted under this Act.”

Measurements

All measurements must be recorded in the specified unit, metric or imperial by checking off the applicable box on the top of the form. You must use the checked unit consistently throughout the well record. Measurements must be reported to 1/10th of a metre if the unit is a metre. All measurements of depth must be referenced to ground surface.

Well Owner’s Information

A “well owner” means the owner of land upon which a well is situated and includes a tenant or lessee of the land and a well purchaser. If the “well owner” is an individual, record the owner’s last name and first name or if the “well owner” is a business, government or other organization, record the name in the “organization” area.

Well Location

Street Number/Name and City/town/Village must be provided, if available.

Geographic Township, Concession and Lot must be reported if the well is located in an area where such information exists.

UTM Coordinates must be recorded each time a Well Record is completed. Click the button [Test UTM in Map] to use the UTM Coordinates to plot the location to Google map. This allows verification of the UTM Coordinates. This will also automatically populate the County/District.

Municipal Plan and Sublet Number may be provided, if available.

Overburden and Bedrock Materials

For each formation encountered during construction, choose words from the lists that best describe the formation on the basis of general colour, most common material, other materials, and general description of the formation.

General Colours are White, Yellow, Grey, Brown, Blue, Red, Green and Black.

Examples of Materials are: Fill, Silt, Top Soil, Coarse Sand, Slate, Muck, Gravel, Limestone, Dolomite, Quartzite, Peat, Stones, Fine Sand, Shale, Granite, Clay, Boulders, Medium Sand, Sandstone, and Greenstone.

Some definitions are as follows:

- Clay: Composed of very fine particles. Forms dense hard lumps or clods when dry and a very elastic putty-like mass when wet. It can be rolled between fingers to form a long, flexible ribbon.
- Silt: Grain size, midway between sand and clay. It may form clods which, when broken, feel soft and floury. When moist, it will form a cast that can be handled freely without breaking. Rolled between thumb and finger, it will not "ribbon" but will give a broken appearance.

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- Sand: Grains are loose and granular and may be seen and felt readily. Squeezed in the hand when dry, it falls apart when the pressure is released. Squeezed when moist, it will form a cast that will crumble when touched. Should be listed as fine sand, medium sand or coarse sand.
- Gravel: Rock fragments greater than 0.3 cm in diameter.

Examples of General Descriptions are Loose, Cemented, Previously Dug or Bored, Porous, Layered, Previously Drilled, Dense, Soft, Wood Fragments, Packed, Hard.

Abandonment

To report abandonment of a well, check off the applicable box in Type on the top of the form. Details of abandonment must be recorded in the Abandonment and Sealing Section. Additional comments may be entered in the comments box under the Information section.

Annular Space

Record all material placed in the annular space around the single casing or around the permanent outer casing. If the well is a telescoped well [i.e., a well with an outer casing and inner casing(s)] or if the well is a multi-level nested test hole, report the depth from, depth to, material and volume placed for the annular space between two different sized casings or between the inner casing(s) and the side of the well in the “Comments” area of this electronic well record form.

Method of Construction

If the equipment used to construct the well is not on the list, check “Other (specify)” and record the type of equipment, check each equipment that applies.

Well Use

If the well’s use is not provided on the list, check “Other (specify)” and record the use of the well. If the well has multiple uses, check each use that applies.

Status of Well

If the well’s status is not provided on the list, check “Other (specify)” and record the use of the well. If the well has multiple statuses, check each use that applies.

Construction Record – Casing and Open Hole

Use negative values to report the top of casing above ground surface. For example, if the top of the casing is 0.4 metres above the ground surface and the bottom of the casing 6.0 metres below the ground surface, record the casing “Depth From” as -0.4.

If the top of casing is located below the ground surface (e.g., if a test hole is constructed and the top of casing is located below the ground surface in a flush mounted well vault), report the top of the casing from below ground surface. For example, if the top of the casing is 0.1 metres below the ground surface and the bottom of the casing is 6 metres below the ground surface, record the casing “Depth From” as 0.1.

Note: If a drive shoe is used, the shoe is considered casing and it must be reported if the shoe has a different inside diameter thickness.

If a portion of the well was created an open hole, record the location of the open hole on a separate row, including the diameter and the depth (top and bottom of open hole) from the ground surface.

Construction Record – Well Screen

A “well screen” means perforated pipe or tubing, unsealed concrete tiles or other material installed in a well to filter out particulate matter and form the water intake zone. Therefore, the length of a well screen includes any slotted or perforated area and unsealed area of pipe or tiles.

Water Details

- if groundwater was located, record the depth from the ground surface to the location of the groundwater resource, and
- record if the groundwater quality is “Untested,” “Fresh” (i.e., not salty), or “Other (specify).” If “Other (specify)” is recorded, use the “Other (specify)” dropdown list toselect the type of groundwater (e.g., salty, blackish water, yellowish water, mineralized, etc.).

Check off “Gas” if natural gas was encountered during well construction.

Note: Natural gas encounters need to be immediately reported to the ministry at 1-800-268-6060, well purchaser and the owner of the land.

Results of Well Yield Testing

Check off “Pumping Discontinued” if pumping was discontinued before 1 hour of continuous pumping. Explain the reason why pumping was discontinued or in some cases not performed (e.g., the well went dry, impossible to install pump in small diameter well, static water level from test hole or dewatering well was obtained and is reported instead of completing a yield test etc.).

Note: Equipment breakdown is not an acceptable reason for checking off “Pumping Discontinued” on the well record form. If groundwater in the well is flowing out of the well, provide the rate of flow, and check off “Flowing Well” (i.e., static water level above the ground surface).

In the “Results of Well Yield Testing” section of the well record form, record:

- the depth to the intake of the pump,
- the rate of pumping and duration of pumping period during the yield test,
- the final water level when pumping stops,
- water level measurements made during pumping (drawdown) and recovery. All water level measurements must be referenced from below the ground surface for each time interval specified in the drawdown and recovery boxes.

If the water level measurements remain the same over a period of time, continue to measure and report the same water level measurement for the remaining pumping or recovery time intervals.

If pumping continuously for at least 1 hour, but the design of the well does not allow for water level measurements (e.g., driven point well), the person constructing the well is not required to report drawdown or recovery water level measurements.

Map of Well Location

In the “Map of Well Location” section of the well record form, click the map area to attach a map of the well location. The map must show sufficient information to locate the well, including:

- a mark on the map showing the well,
- a scale on the map, and
- where available, the name of the structure, street or surface water body nearest to the well.

Note: More than one map can be added to the well record form by clicking on “Add Map (+)” to add an additional map.

Information

Record any additional information (e.g., observations, tests, additional licensed well technicians who worked on the well, additional annular space details for a telescoped well or a multi-level nested test hole, reasons for not providing a well owner information package) in the comments area.

Declaration

Check the declaration statement to confirm that the person constructing the well agrees with the following statement: “I hereby confirm that I am the person who constructed the well and I hereby confirm that the information on the form is correct and accurate”.

Validate

Click the validate button. If there is no missing information, you will be asked to enter the well tag again to make sure the well tag is entered correctly (only enter the numeric portion of the tag number). The audit number will then be changed from “**incomplete**” to an assigned audit number. The signature field will then be available. Click on “signature” to enter the well technician’s electronic signature. For instructions on how to create an electronic signature, please visit the Adobe Digital IDs website using the following link: https://helpx.adobe.com/acrobat/using/digital-ids.html

Notice of Collection of Personal Information

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Fields marked with an asterisk (*) are mandatory.

Well Tag Number *
A 324183

Type *

☑ Construction ☐ Abandonment

Measurement recorded in: *

☐ Metric ☑ Imperial

1. Well Owner's Information

Last Name and First Name, or Organization is mandatory. *

Last Name	First Name

Organization	Email Address
Township of Centre Wellington	

Current Address

Unit Number	Street Number *	Street Name *	City/Town/Village
	1	MacDonald Square	Elora

Country	Province	Postal Code	Telephone Number
Canada	Ontario	N0B 1S0	519-846-9691

2. Well Location

Address of Well Location

Unit Number	Street Number *	Street Name *	Township
	449	St. Andrew Street East	Nichol

Lot	Concession	County/District/Municipality
		Wellington

City/Town	Province	Postal Code
Fergus	Ontario	

UTM Coordinates	Zone *	Easting *	Northing *		Municipal Plan and Sublot Number
NAD 83	17	550587	4839948	Test UTM in Map	

Other
F2R

3. Overburden and Bedrock Material *

Well Depth * 380 (ft)

General Colour	Most Common Material	Other Materials	General Description	Depth From	Depth To

				(ft)	(ft)
	Fill			0	3
	Gravel	Sand		3	4
	Limestone			4	380

4. Annular Space *

Depth From (ft)	Depth To (ft)	Type of Sealant Used (Material and Type)	Volume Placed (cubic feet)
0	144.8	Cement	151.56
144.8	380	Open Hole	

5. Method of Construction *

- [ ] Cable Tool
- [ ] Rotary (Conventional)
- [ ] Rotary (Reverse)
- [ ] Boring
- [ ] Air percussion
- [ ] Diamond
- [ ] Jetting
- [ ] Driving
- [ ] Digging
- [ ] Rotary (Air)
- [ ] Augering
- [ ] Direct Push
- [x] Other (specify) DR

6. Well Use *

- [ ] Public
- [ ] Industrial
- [ ] Cooling & Air Conditioning
- [ ] Domestic
- [ ] Commercial
- [ ] Not Used
- [ ] Livestock
- [x] Municipal
- [ ] Monitoring
- [ ] Irrigation
- [ ] Test Hole
- [ ] Dewatering
- [ ] Other (specify)

7. Status of Well *

- [x] Water Supply
- [x] 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)

8. Construction Record - Casing * (use negative number(s) to indicate depth above ground surface)

Inside Diameter (in)	Open Hole **or** Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness	Depth From (ft)	Depth To (ft)
12.75	Steel	0.375	-3	144.8
12	Open Hole		144.8	380

9. Construction Record - Screen

Outside Diameter (in)	Material (Plastic, Galvanized, Steel)	Slot Number	Depth From (ft)	Depth To (ft)

10. Water Details

Water found at Depth 120 (ft) ☐ Gas Kind of water ☐ Fresh ☑ Untested ☐ Other

11. Hole Diameter

Depth From (ft)	Depth To (ft)	Diameter (in)
0	144.8	19
144.8	380	12

12. Results of Well Yield Testing

☐ Pumping Discontinued

Explain _____

If flowing give rate

☐ Flowing _____ (GPM)

Draw down

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

Recovery

Time (min)	1	2	3	4	5	10	15	20	25	30	40	50	60
Water Level (ft)													

After test of well yield, water was

☑ Clear and sand free ☐ Other (specify)

Pump intake set at (ft)	Pumping rate (GPM)	Duration of pumping	Final water level end of pumping (ft)	Disinfected? *
	317.01	8 hrs + min	157	☑ Yes ☐ No

Recommended pump depth (ft)	Recommended pump rate (GPM)	Well production (GPM)

13. Map of Well Location *

Map 1. Please Click the map area below to import an image file to use as the map. ☐ Make map area bigger



14. Information

Well owner's information package delivered	Date Package Delivered (yyyy/mm/dd)	Date Work Completed (yyyy/mm/dd) *
☐ Yes ☐ No	2022/08/22	2022/09/01

Comments
Please See pump test info on Excel spread sheet labelled "Aquifer Test - F2-R(313-010)"

15. Well Contractor and Well Technician Information

Business Name of Well Contractor *	Well Contractor's License Number *
Aardvark Drilling Inc.	7675

Business Address

Unit Number	Street Number	Street Name *
C	25	Lewis Road

City/Town/Village *	Province	Postal Code *
Guelph	ON	N1H 1E9

Business Telephone Number	Business Email Address
519-826-9340	info@aardvarkdrillinginc.com

Last Name of Well Technician *	First Name of Well Technician *	Well Technician's License Number *
Smith	Kyle	3591

16. Declaration *

☑ I hereby confirm that I am the person who constructed the well and I hereby confirm that the information on the form is correct and accurate.

Last Name	First Name	Email Address
England	Matthew	mengland@aardvarkdrillinginc.com

Signature	Date Submitted (yyyy/mm/dd)
	2022/11/23

17. Ministry Use Only

Audit Number
MQEH DU8G

Well Record - Regulation 903

Ontario Water Resources Act

General Instructions and Explanations for completing a Well Record

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Well Location

Street Number/Name and City/town/Village must be provided, if available.

Geographic Township, Concession and Lot must be reported if the well is located in an area where such information exists.

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General Colours are White, Yellow, Grey, Brown, Blue, Red, Green and Black.

Examples of Materials are: Fill, Silt, Top Soil, Coarse Sand, Slate, Muck, Gravel, Limestone, Dolomite, Quartzite, Peat, Stones, Fine Sand, Shale, Granite, Clay, Boulders, Medium Sand, Sandstone, and Greenstone.

Some definitions are as follows:

- Clay: Composed of very fine particles. Forms dense hard lumps or clods when dry and a very elastic putty-like mass when wet. It can be rolled between fingers to form a long, flexible ribbon.
- Silt: Grain size, midway between sand and clay. It may form clods which, when broken, feel soft and floury. When moist, it will form a cast that can be handled freely without breaking. Rolled between thumb and finger, it will not "ribbon" but will give a broken appearance.

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- Sand: Grains are loose and granular and may be seen and felt readily. Squeezed in the hand when dry, it falls apart when the pressure is released. Squeezed when moist, it will form a cast that will crumble when touched. Should be listed as fine sand, medium sand or coarse sand.
- Gravel: Rock fragments greater than 0.3 cm in diameter.

Examples of General Descriptions are Loose, Cemented, Previously Dug or Bored, Porous, Layered, Previously Drilled, Dense, Soft, Wood Fragments, Packed, Hard.

Abandonment

To report abandonment of a well, check off the applicable box in Type on the top of the form. Details of abandonment must be recorded in the Abandonment and Sealing Section. Additional comments may be entered in the comments box under the Information section.

Annular Space

Record all material placed in the annular space around the single casing or around the permanent outer casing. If the well is a telescoped well [i.e., a well with an outer casing and inner casing(s)] or if the well is a multi-level nested test hole, report the depth from, depth to, material and volume placed for the annular space between two different sized casings or between the inner casing(s) and the side of the well in the “Comments” area of this electronic well record form.

Method of Construction

If the equipment used to construct the well is not on the list, check “Other (specify)” and record the type of equipment, check each equipment that applies.

Well Use

If the well’s use is not provided on the list, check “Other (specify)” and record the use of the well. If the well has multiple uses, check each use that applies.

Status of Well

If the well’s status is not provided on the list, check “Other (specify)” and record the use of the well. If the well has multiple statuses, check each use that applies.

Construction Record – Casing and Open Hole

Use negative values to report the top of casing above ground surface. For example, if the top of the casing is 0.4 metres above the ground surface and the bottom of the casing 6.0 metres below the ground surface, record the casing “Depth From” as -0.4.

If the top of casing is located below the ground surface (e.g., if a test hole is constructed and the top of casing is located below the ground surface in a flush mounted well vault), report the top of the casing from below ground surface. For example, if the top of the casing is 0.1 metres below the ground surface and the bottom of the casing is 6 metres below the ground surface, record the casing “Depth From” as 0.1.

Note: If a drive shoe is used, the shoe is considered casing and it must be reported if the shoe has a different inside diameter thickness.

If a portion of the well was created an open hole, record the location of the open hole on a separate row, including the diameter and the depth (top and bottom of open hole) from the ground surface.

Construction Record – Well Screen

A “well screen” means perforated pipe or tubing, unsealed concrete tiles or other material installed in a well to filter out particulate matter and form the water intake zone. Therefore, the length of a well screen includes any slotted or perforated area and unsealed area of pipe or tiles.

Water Details

- if groundwater was located, record the depth from the ground surface to the location of the groundwater resource, and
- record if the groundwater quality is “Untested,” “Fresh” (i.e., not salty), or “Other (specify).” If “Other (specify)” is recorded, use the “Other (specify)” dropdown list toselect the type of groundwater (e.g., salty, blackish water, yellowish water, mineralized, etc.).

Check off “Gas” if natural gas was encountered during well construction.

Note: Natural gas encounters need to be immediately reported to the ministry at 1-800-268-6060, well purchaser and the owner of the land.

Results of Well Yield Testing

Check off “Pumping Discontinued” if pumping was discontinued before 1 hour of continuous pumping. Explain the reason why pumping was discontinued or in some cases not performed (e.g., the well went dry, impossible to install pump in small diameter well, static water level from test hole or dewatering well was obtained and is reported instead of completing a yield test etc.).

Note: Equipment breakdown is not an acceptable reason for checking off “Pumping Discontinued” on the well record form. If groundwater in the well is flowing out of the well, provide the rate of flow, and check off “Flowing Well” (i.e., static water level above the ground surface).

In the “Results of Well Yield Testing” section of the well record form, record:

- the depth to the intake of the pump,
- the rate of pumping and duration of pumping period during the yield test,
- the final water level when pumping stops,
- water level measurements made during pumping (drawdown) and recovery. All water level measurements must be referenced from below the ground surface for each time interval specified in the drawdown and recovery boxes.

If the water level measurements remain the same over a period of time, continue to measure and report the same water level measurement for the remaining pumping or recovery time intervals.

If pumping continuously for at least 1 hour, but the design of the well does not allow for water level measurements (e.g., driven point well), the person constructing the well is not required to report drawdown or recovery water level measurements.

Map of Well Location

In the “Map of Well Location” section of the well record form, click the map area to attach a map of the well location. The map must show sufficient information to locate the well, including:

- a mark on the map showing the well,
- a scale on the map, and
- where available, the name of the structure, street or surface water body nearest to the well.

Note: More than one map can be added to the well record form by clicking on “Add Map (+)” to add an additional map.

Information

Record any additional information (e.g., observations, tests, additional licensed well technicians who worked on the well, additional annular space details for a telescoped well or a multi-level nested test hole, reasons for not providing a well owner information package) in the comments area.

Declaration

Check the declaration statement to confirm that the person constructing the well agrees with the following statement: “I hereby confirm that I am the person who constructed the well and I hereby confirm that the information on the form is correct and accurate”.

Validate

Click the validate button. If there is no missing information, you will be asked to enter the well tag again to make sure the well tag is entered correctly (only enter the numeric portion of the tag number). The audit number will then be changed from “**incomplete**” to an assigned audit number. The signature field will then be available. Click on “signature” to enter the well technician’s electronic signature. For instructions on how to create an electronic signature, please visit the Adobe Digital IDs website using the following link: https://helpx.adobe.com/acrobat/using/digital-ids.html

Notice of Collection of Personal Information

Personal information contained on this form is collected pursuant to sections 35-50 and 75(2) of the *Ontario Water Resources Act* and section 16.3 of the Wells Regulation. This information will be used for the purpose of maintaining a public record of wells in Ontario. This form and the information contained on the form will be stored in the Ministry's well record database and made publicly available. Questions about this collection should be directed to the Water Well Customer Service Representative at the Wells Help Desk, 125 Resources Road, Toronto Ontario M9P 3V6, at 1-888-396-9355 or wellshelpdesk@ontario.ca.

Fields marked with an asterisk (*) are mandatory.

Well Tag Number *
A 324195

Type *

☑ Construction ☐ Abandonment

Measurement recorded in: *

☐ Metric ☑ Imperial

1. Well Owner's Information

Last Name and First Name, or Organization is mandatory. *

Last Name	First Name

Organization	Email Address
Township of Centre Wellington	

Current Address

Unit Number	Street Number *	Street Name *	City/Town/Village
	1	MacDonald Square	Elora

Country	Province	Postal Code	Telephone Number
Canada	Ontario	N0B 1S0	519-846-9691

2. Well Location

Address of Well Location

Unit Number	Street Number *	Street Name *	Township
	900	Scotland Street	

Lot	Concession	County/District/Municipality
		Wellington

City/Town	Province	Postal Code
Center Wellington	Ontario	

UTM Coordinates	Zone *	Easting *	Northing *		Municipal Plan and Sublot Number
NAD 83	17	551835	4839072	Test UTM in Map	

Other
F5R

3. Overburden and Bedrock Material *

Well Depth * 475.5 (ft)

General Colour	Most Common Material	Other Materials	General Description	Depth From	Depth To

				(ft)	(ft)
	Overburden			0	65
Brown	Limestone			65	475.5

4. Annular Space *

Depth From (ft)	Depth To (ft)	Type of Sealant Used (Material and Type)	Volume Placed (cubic feet)
0	183	Cement/Bentonite	11.25
183	475.5	Open Hole	229.92

5. Method of Construction *

☐ Cable Tool ☐ Rotary (Conventional) ☐ Rotary (Reverse) ☐ Boring ☐ Air percussion ☐ Diamond
☐ Jetting ☐ Driving ☐ Digging ☐ Rotary (Air) ☐ Augering ☐ Direct Push
☑ Other (specify) DR

6. Well Use *

☐ Public ☐ Industrial ☐ Cooling & Air Conditioning
☐ Domestic ☐ Commercial ☐ Not Used
☐ Livestock ☑ Municipal ☐ Monitoring
☐ Irrigation ☐ Test Hole ☐ Dewatering
☐ Other (specify)

7. 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)

8. Construction Record - Casing * (use negative number(s) to indicate depth above ground surface)

Inside Diameter (in)	Open Hole **or** Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness	Depth From (ft)	Depth To (ft)
12	Steel	0.375	-2.33	183
16	Steel	0.375	-0.58	182
12	Open Hole		183	475.5

9. Construction Record - Screen

Outside Diameter (in)	Material (Plastic, Galvanized, Steel)	Slot Number	Depth From (ft)	Depth To (ft)

10. Water Details

Water found at Depth (ft) ☐ Gas Kind of water ☐ Fresh ☐ Untested ☐ Other

11. Hole Diameter

Depth From (ft)	Depth To (ft)	Diameter (in)
0	182	20
182	183	16
183	475.5	12

12. Results of Well Yield Testing

☐ Pumping Discontinued

Explain

If flowing give rate

☐ Flowing (GPM)

Draw down

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

Recovery

Time (min)	1	2	3	4	5	10	15	20	25	30	40	50	60
Water Level (ft)													

After test of well yield, water was

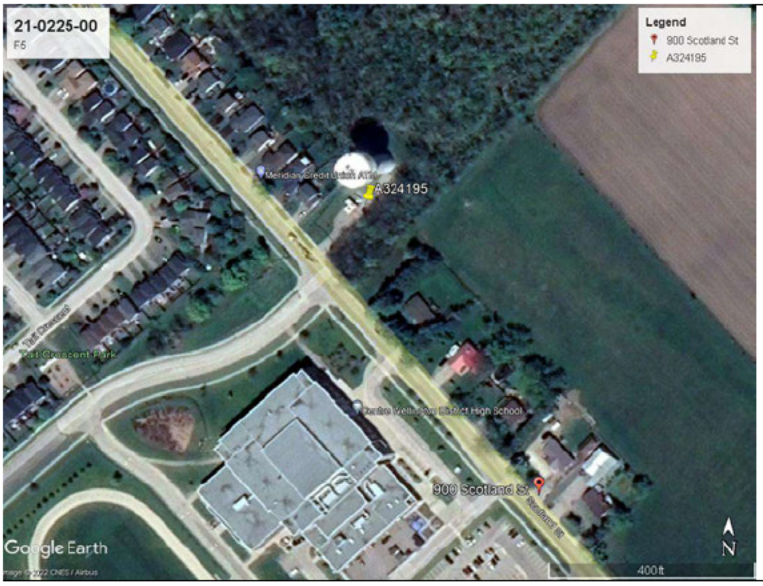
☑ Clear and sand free ☐ Other (specify)

Pump intake set at (ft)	Pumping rate	Duration of pumping	Final water level end of pumping	Disinfected? *
	104.61 (GPM)	27 hrs + min	57.05 (ft)	☑ Yes ☐ No

Recommended pump depth (ft)	Recommended pump rate (GPM)	Well production (GPM)

13. Map of Well Location *

Map 1. Please Click the map area below to import an image file to use as the map. ☐ Make map area bigger



14. Information

Well owner's information package delivered	Date Package Delivered (yyyy/mm/dd)	Date Work Completed (yyyy/mm/dd) *
☐ Yes ☐ No	2021/12/01	2022/06/28

Comments
Please see Excel spread sheet for the pump test imformation

15. Well Contractor and Well Technician Information

Business Name of Well Contractor *	Well Contractor's License Number *
Aardvark Drilling Inc.	7675

Business Address

Unit Number	Street Number	Street Name *
C	25	Lewis Road

City/Town/Village *	Province	Postal Code *
Guelph	ON	N1H 1E9

Business Telephone Number	Business Email Address
519-826-9340	info@aardvarkdrillinginc.com

Last Name of Well Technician *	First Name of Well Technician *	Well Technician's License Number *
Smith	Kyle	3591

16. Declaration *

☑ I hereby confirm that I am the person who constructed the well and I hereby confirm that the information on the form is correct and accurate.

Last Name	First Name	Email Address
England	Matthew	mengland@aardvarkdrillinginc.com

Signature	Date Submitted (yyyy/mm/dd)
	2022/10/05

17. Ministry Use Only

Audit Number
47RO TSTE

Well Record - Regulation 903

Ontario Water Resources Act

General Instructions and Explanations for completing a Well Record

A completed electronic Well Record Form must be delivered to the well purchaser and the owner of the land on which the well is situated within 14 days after the date on which the well's structural stage is complete. The electronic Well Record must also be forwarded within 30 days after the date on which the well's structural stage is complete to the ministry through email to the following email address: WellRecordSubmission@ontario.ca

False and Misleading Information

Subsection 98(2) of the *Ontario Water Resources Act*, R.S.O. 1990 c. O. 40, states that:

“No person shall orally, in writing or electronically, give or submit false or misleading information in any statement, document or data, to any provincial officer, the Minister, the Ministry or the Agency, any employee in or agent of the Ministry or the Agency, or any person involved in carrying out a program of the Ministry or the Agency in respect of any matter related to this Act or the regulations.”

Further, subsection 98(3) of the Act states that:

“No person shall include false or misleading information in any document or data required to be created, stored or submitted under this Act.”

Measurements

All measurements must be recorded in the specified unit, metric or imperial by checking off the applicable box on the top of the form. You must use the checked unit consistently throughout the well record. Measurements must be reported to 1/10th of a metre if the unit is a metre. All measurements of depth must be referenced to ground surface.

Well Owner’s Information

A “well owner” means the owner of land upon which a well is situated and includes a tenant or lessee of the land and a well purchaser. If the “well owner” is an individual, record the owner’s last name and first name or if the “well owner” is a business, government or other organization, record the name in the “organization” area.

Well Location

Street Number/Name and City/town/Village must be provided, if available.

Geographic Township, Concession and Lot must be reported if the well is located in an area where such information exists.

UTM Coordinates must be recorded each time a Well Record is completed. Click the button [Test UTM in Map] to use the UTM Coordinates to plot the location to Google map. This allows verification of the UTM Coordinates. This will also automatically populate the County/District.

Municipal Plan and Sublet Number may be provided, if available.

Overburden and Bedrock Materials

For each formation encountered during construction, choose words from the lists that best describe the formation on the basis of general colour, most common material, other materials, and general description of the formation.

General Colours are White, Yellow, Grey, Brown, Blue, Red, Green and Black.

Examples of Materials are: Fill, Silt, Top Soil, Coarse Sand, Slate, Muck, Gravel, Limestone, Dolomite, Quartzite, Peat, Stones, Fine Sand, Shale, Granite, Clay, Boulders, Medium Sand, Sandstone, and Greenstone.

Some definitions are as follows:

- Clay: Composed of very fine particles. Forms dense hard lumps or clods when dry and a very elastic putty-like mass when wet. It can be rolled between fingers to form a long, flexible ribbon.
- Silt: Grain size, midway between sand and clay. It may form clods which, when broken, feel soft and floury. When moist, it will form a cast that can be handled freely without breaking. Rolled between thumb and finger, it will not "ribbon" but will give a broken appearance.

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- Sand: Grains are loose and granular and may be seen and felt readily. Squeezed in the hand when dry, it falls apart when the pressure is released. Squeezed when moist, it will form a cast that will crumble when touched. Should be listed as fine sand, medium sand or coarse sand.
- Gravel: Rock fragments greater than 0.3 cm in diameter.

Examples of General Descriptions are Loose, Cemented, Previously Dug or Bored, Porous, Layered, Previously Drilled, Dense, Soft, Wood Fragments, Packed, Hard.

Abandonment

To report abandonment of a well, check off the applicable box in Type on the top of the form. Details of abandonment must be recorded in the Abandonment and Sealing Section. Additional comments may be entered in the comments box under the Information section.

Annular Space

Record all material placed in the annular space around the single casing or around the permanent outer casing. If the well is a telescoped well [i.e., a well with an outer casing and inner casing(s)] or if the well is a multi-level nested test hole, report the depth from, depth to, material and volume placed for the annular space between two different sized casings or between the inner casing(s) and the side of the well in the “Comments” area of this electronic well record form.

Method of Construction

If the equipment used to construct the well is not on the list, check “Other (specify)” and record the type of equipment, check each equipment that applies.

Well Use

If the well’s use is not provided on the list, check “Other (specify)” and record the use of the well. If the well has multiple uses, check each use that applies.

Status of Well

If the well’s status is not provided on the list, check “Other (specify)” and record the use of the well. If the well has multiple statuses, check each use that applies.

Construction Record – Casing and Open Hole

Use negative values to report the top of casing above ground surface. For example, if the top of the casing is 0.4 metres above the ground surface and the bottom of the casing 6.0 metres below the ground surface, record the casing “Depth From” as -0.4.

If the top of casing is located below the ground surface (e.g., if a test hole is constructed and the top of casing is located below the ground surface in a flush mounted well vault), report the top of the casing from below ground surface. For example, if the top of the casing is 0.1 metres below the ground surface and the bottom of the casing is 6 metres below the ground surface, record the casing “Depth From” as 0.1.

Note: If a drive shoe is used, the shoe is considered casing and it must be reported if the shoe has a different inside diameter thickness.

If a portion of the well was created an open hole, record the location of the open hole on a separate row, including the diameter and the depth (top and bottom of open hole) from the ground surface.

Construction Record – Well Screen

A “well screen” means perforated pipe or tubing, unsealed concrete tiles or other material installed in a well to filter out particulate matter and form the water intake zone. Therefore, the length of a well screen includes any slotted or perforated area and unsealed area of pipe or tiles.

Water Details

- if groundwater was located, record the depth from the ground surface to the location of the groundwater resource, and
- record if the groundwater quality is “Untested,” “Fresh” (i.e., not salty), or “Other (specify).” If “Other (specify)” is recorded, use the “Other (specify)” dropdown list toselect the type of groundwater (e.g., salty, blackish water, yellowish water, mineralized, etc.).

Check off “Gas” if natural gas was encountered during well construction.

Note: Natural gas encounters need to be immediately reported to the ministry at 1-800-268-6060, well purchaser and the owner of the land.

Results of Well Yield Testing

Check off “Pumping Discontinued” if pumping was discontinued before 1 hour of continuous pumping. Explain the reason why pumping was discontinued or in some cases not performed (e.g., the well went dry, impossible to install pump in small diameter well, static water level from test hole or dewatering well was obtained and is reported instead of completing a yield test etc.).

Note: Equipment breakdown is not an acceptable reason for checking off “Pumping Discontinued” on the well record form. If groundwater in the well is flowing out of the well, provide the rate of flow, and check off “Flowing Well” (i.e., static water level above the ground surface).

In the “Results of Well Yield Testing” section of the well record form, record:

- the depth to the intake of the pump,
- the rate of pumping and duration of pumping period during the yield test,
- the final water level when pumping stops,
- water level measurements made during pumping (drawdown) and recovery. All water level measurements must be referenced from below the ground surface for each time interval specified in the drawdown and recovery boxes.

If the water level measurements remain the same over a period of time, continue to measure and report the same water level measurement for the remaining pumping or recovery time intervals.

If pumping continuously for at least 1 hour, but the design of the well does not allow for water level measurements (e.g., driven point well), the person constructing the well is not required to report drawdown or recovery water level measurements.

Map of Well Location

In the “Map of Well Location” section of the well record form, click the map area to attach a map of the well location. The map must show sufficient information to locate the well, including:

- a mark on the map showing the well,
- a scale on the map, and
- where available, the name of the structure, street or surface water body nearest to the well.

Note: More than one map can be added to the well record form by clicking on “Add Map (+)” to add an additional map.

Information

Record any additional information (e.g., observations, tests, additional licensed well technicians who worked on the well, additional annular space details for a telescoped well or a multi-level nested test hole, reasons for not providing a well owner information package) in the comments area.

Declaration

Check the declaration statement to confirm that the person constructing the well agrees with the following statement: “I hereby confirm that I am the person who constructed the well and I hereby confirm that the information on the form is correct and accurate”.

Validate

Click the validate button. If there is no missing information, you will be asked to enter the well tag again to make sure the well tag is entered correctly (only enter the numeric portion of the tag number). The audit number will then be changed from “**incomplete**” to an assigned audit number. The signature field will then be available. Click on “signature” to enter the well technician’s electronic signature. For instructions on how to create an electronic signature, please visit the Adobe Digital IDs website using the following link: https://helpx.adobe.com/acrobat/using/digital-ids.html

Notice of Collection of Personal Information

Personal information contained on this form is collected pursuant to sections 35-50 and 75(2) of the *Ontario Water Resources Act* and section 16.3 of the Wells Regulation. This information will be used for the purpose of maintaining a public record of wells in Ontario. This form and the information contained on the form will be stored in the Ministry's well record database and made publicly available. Questions about this collection should be directed to the Water Well Customer Service Representative at the Wells Help Desk, 125 Resources Road, Toronto Ontario M9P 3V6, at 1-888-396-9355 or wellshelpdesk@ontario.ca.

Fields marked with an asterisk (*) are mandatory.

Well Tag Number *
A 323424

Type *

☑ Construction ☐ Abandonment

Measurement recorded in: *

☐ Metric ☑ Imperial

1. Well Owner's Information

Last Name and First Name, or Organization is mandatory. *

Last Name	First Name

Organization	Email Address
Township of Centre Wellington	

Current Address

Unit Number	Street Number *	Street Name *	City/Town/Village
	1	MacDonald Square	Elora

Country	Province	Postal Code	Telephone Number
Canada	Ontario	N0B 1S0	519-846-9691

2. Well Location

Address of Well Location

Unit Number	Street Number *	Street Name *	Township
	0	St Andrew St & Cameron St	Nichol

Lot	Concession	County/District/Municipality
		Wellington

City/Town	Province	Postal Code
Fergus	Ontario	

UTM Coordinates	Zone *	Easting *	Northing *		Municipal Plan and Sublot Number
NAD 83	17	550345	4839658	Test UTM in Map	

Other

3. Overburden and Bedrock Material *

Well Depth * 283.6 (ft)

General Colour	Most Common Material	Other Materials	General Description	Depth From	Depth To

				(ft)	(ft)
	Fill			0	3
	Gravel	Sand		3	4
	Limestone			4	283.6

4. Annular Space *

Depth From (ft)	Depth To (ft)	Type of Sealant Used (Material and Type)	Volume Placed (cubic feet)
0	64	Grout, Cement	9.82
64	68.2	Pellet Chips	0.74
68.2	82.1	Sand	2.44
82.1	270	Pellet Chips	33
270	283.6	Sand	2.40

5. Method of Construction *

☐ Cable Tool ☐ Rotary (Conventional) ☐ Rotary (Reverse) ☐ Boring ☑ Air percussion ☐ Diamond
☐ Jetting ☐ Driving ☐ Digging ☐ Rotary (Air) ☐ Augering ☐ Direct Push
☐ Other (specify) _____

6. Well Use *

☐ Public ☐ Industrial ☐ Cooling & Air Conditioning
☐ Domestic ☑ Commercial ☐ Not Used
☐ Livestock ☐ Municipal ☐ Monitoring
☐ Irrigation ☐ Test Hole ☐ Dewatering
☐ Other (specify) _____

7. 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) _____

8. Construction Record - Casing * (use negative number(s) to indicate depth above ground surface)

Inside Diameter (in)	Open Hole **or** Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness	Depth From (ft)	Depth To (ft)
1.25	Plastic	0.28	0	70.4
1.25	Plastic	0.28	0	272.1

9. Construction Record - Screen

Outside Diameter (in)	Material (Plastic, Galvanized, Steel)	Slot Number	Depth From (ft)	Depth To (ft)
1.5	Plastic	10	70.4	80.4
1.5	Plastic	10	272.1	282.1

10. Water Details

Water found at Depth 30 (ft) ☐ Gas Kind of water ☐ Fresh ☑ Untested ☐ Other

11. Hole Diameter

Depth From (ft)	Depth To (ft)	Diameter (in)
0	4	10
4	283.6	5.87

12. Results of Well Yield Testing

☐ Pumping Discontinued

Explain

If flowing give rate

☐ Flowing (GPM)

Draw down

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

Recovery

Time (min)	1	2	3	4	5	10	15	20	25	30	40	50	60
Water Level (ft)													

After test of well yield, water was

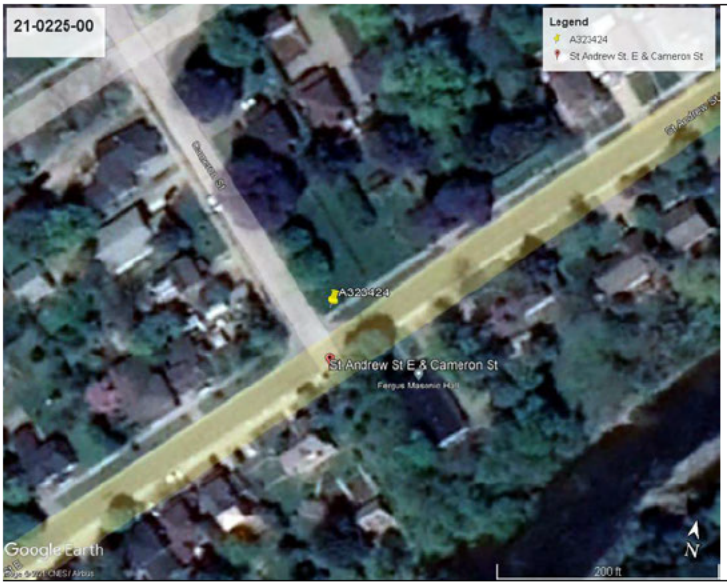
☐ Clear and sand free ☐ Other (specify)

Pump intake set at (ft)	Pumping rate (GPM)	Duration of pumping hrs + min	Final water level end of pumping (ft)	Disinfected? *
				☐ Yes ☑ No

Recommended pump depth (ft)	Recommended pump rate (GPM)	Well production (GPM)

13. Map of Well Location *

Map 1. Please Click the map area below to import an image file to use as the map. ☐ Make map area bigger



14. Information

Well owner's information package delivered	Date Package Delivered (yyyy/mm/dd)	Date Work Completed (yyyy/mm/dd) *
☐ Yes ☐ No		2021/10/14

Comments

15. Well Contractor and Well Technician Information

Business Name of Well Contractor *	Well Contractor's License Number *
Aardvark Drilling Inc.	7675

Business Address

Unit Number	Street Number	Street Name *
C	25	Lewis Road

City/Town/Village *	Province	Postal Code *
Guelph	ON	N1H 1E9

Business Telephone Number	Business Email Address
519-826-9340	info@aardvarkdrillinginc.com

Last Name of Well Technician *	First Name of Well Technician *	Well Technician's License Number *
Richards	Adrian	2554

16. Declaration *

☑ I hereby confirm that I am the person who constructed the well and I hereby confirm that the information on the form is correct and accurate.

Last Name	First Name	Email Address
England	Matthew	mengland@aardvarkdrillinginc.com

Signature	Date Submitted (yyyy/mm/dd)
	2021/11/26

17. Ministry Use Only

Audit Number

2AVF SN8L

Well Record - Regulation 903

Ontario Water Resources Act

General Instructions and Explanations for completing a Well Record

A completed electronic Well Record Form must be delivered to the well purchaser and the owner of the land on which the well is situated within 14 days after the date on which the well's structural stage is complete. The electronic Well Record must also be forwarded within 30 days after the date on which the well's structural stage is complete to the ministry through email to the following email address: WellRecordSubmission@ontario.ca

False and Misleading Information

Subsection 98(2) of the *Ontario Water Resources Act*, R.S.O. 1990 c. O. 40, states that:

“No person shall orally, in writing or electronically, give or submit false or misleading information in any statement, document or data, to any provincial officer, the Minister, the Ministry or the Agency, any employee in or agent of the Ministry or the Agency, or any person involved in carrying out a program of the Ministry or the Agency in respect of any matter related to this Act or the regulations.”

Further, subsection 98(3) of the Act states that:

“No person shall include false or misleading information in any document or data required to be created, stored or submitted under this Act.”

Measurements

All measurements must be recorded in the specified unit, metric or imperial by checking off the applicable box on the top of the form. You must use the checked unit consistently throughout the well record. Measurements must be reported to 1/10th of a metre if the unit is a metre. All measurements of depth must be referenced to ground surface.

Well Owner’s Information

A “well owner” means the owner of land upon which a well is situated and includes a tenant or lessee of the land and a well purchaser. If the “well owner” is an individual, record the owner’s last name and first name or if the “well owner” is a business, government or other organization, record the name in the “organization” area.

Well Location

Street Number/Name and City/town/Village must be provided, if available.

Geographic Township, Concession and Lot must be reported if the well is located in an area where such information exists.

UTM Coordinates must be recorded each time a Well Record is completed. Click the button [Test UTM in Map] to use the UTM Coordinates to plot the location to Google map. This allows verification of the UTM Coordinates. This will also automatically populate the County/District.

Municipal Plan and Sublet Number may be provided, if available.

Overburden and Bedrock Materials

For each formation encountered during construction, choose words from the lists that best describe the formation on the basis of general colour, most common material, other materials, and general description of the formation.

General Colours are White, Yellow, Grey, Brown, Blue, Red, Green and Black.

Examples of Materials are: Fill, Silt, Top Soil, Coarse Sand, Slate, Muck, Gravel, Limestone, Dolomite, Quartzite, Peat, Stones, Fine Sand, Shale, Granite, Clay, Boulders, Medium Sand, Sandstone, and Greenstone.

Some definitions are as follows:

- Clay: Composed of very fine particles. Forms dense hard lumps or clods when dry and a very elastic putty-like mass when wet. It can be rolled between fingers to form a long, flexible ribbon.
- Silt: Grain size, midway between sand and clay. It may form clods which, when broken, feel soft and floury. When moist, it will form a cast that can be handled freely without breaking. Rolled between thumb and finger, it will not "ribbon" but will give a broken appearance.

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- Sand: Grains are loose and granular and may be seen and felt readily. Squeezed in the hand when dry, it falls apart when the pressure is released. Squeezed when moist, it will form a cast that will crumble when touched. Should be listed as fine sand, medium sand or coarse sand.
- Gravel: Rock fragments greater than 0.3 cm in diameter.

Examples of General Descriptions are Loose, Cemented, Previously Dug or Bored, Porous, Layered, Previously Drilled, Dense, Soft, Wood Fragments, Packed, Hard.

Abandonment

To report abandonment of a well, check off the applicable box in Type on the top of the form. Details of abandonment must be recorded in the Abandonment and Sealing Section. Additional comments may be entered in the comments box under the Information section.

Annular Space

Record all material placed in the annular space around the single casing or around the permanent outer casing. If the well is a telescoped well [i.e., a well with an outer casing and inner casing(s)] or if the well is a multi-level nested test hole, report the depth from, depth to, material and volume placed for the annular space between two different sized casings or between the inner casing(s) and the side of the well in the “Comments” area of this electronic well record form.

Method of Construction

If the equipment used to construct the well is not on the list, check “Other (specify)” and record the type of equipment, check each equipment that applies.

Well Use

If the well’s use is not provided on the list, check “Other (specify)” and record the use of the well. If the well has multiple uses, check each use that applies.

Status of Well

If the well’s status is not provided on the list, check “Other (specify)” and record the use of the well. If the well has multiple statuses, check each use that applies.

Construction Record – Casing and Open Hole

Use negative values to report the top of casing above ground surface. For example, if the top of the casing is 0.4 metres above the ground surface and the bottom of the casing 6.0 metres below the ground surface, record the casing “Depth From” as -0.4.

If the top of casing is located below the ground surface (e.g., if a test hole is constructed and the top of casing is located below the ground surface in a flush mounted well vault), report the top of the casing from below ground surface. For example, if the top of the casing is 0.1 metres below the ground surface and the bottom of the casing is 6 metres below the ground surface, record the casing “Depth From” as 0.1.

Note: If a drive shoe is used, the shoe is considered casing and it must be reported if the shoe has a different inside diameter thickness.

If a portion of the well was created an open hole, record the location of the open hole on a separate row, including the diameter and the depth (top and bottom of open hole) from the ground surface.

Construction Record – Well Screen

A “well screen” means perforated pipe or tubing, unsealed concrete tiles or other material installed in a well to filter out particulate matter and form the water intake zone. Therefore, the length of a well screen includes any slotted or perforated area and unsealed area of pipe or tiles.

Water Details

- if groundwater was located, record the depth from the ground surface to the location of the groundwater resource, and
- record if the groundwater quality is “Untested,” “Fresh” (i.e., not salty), or “Other (specify).” If “Other (specify)” is recorded, use the “Other (specify)” dropdown list toselect the type of groundwater (e.g., salty, blackish water, yellowish water, mineralized, etc.).

Check off “Gas” if natural gas was encountered during well construction.

Note: Natural gas encounters need to be immediately reported to the ministry at 1-800-268-6060, well purchaser and the owner of the land.

Results of Well Yield Testing

Check off “Pumping Discontinued” if pumping was discontinued before 1 hour of continuous pumping. Explain the reason why pumping was discontinued or in some cases not performed (e.g., the well went dry, impossible to install pump in small diameter well, static water level from test hole or dewatering well was obtained and is reported instead of completing a yield test etc.).

Note: Equipment breakdown is not an acceptable reason for checking off “Pumping Discontinued” on the well record form. If groundwater in the well is flowing out of the well, provide the rate of flow, and check off “Flowing Well” (i.e., static water level above the ground surface).

In the “Results of Well Yield Testing” section of the well record form, record:

- the depth to the intake of the pump,
- the rate of pumping and duration of pumping period during the yield test,
- the final water level when pumping stops,
- water level measurements made during pumping (drawdown) and recovery. All water level measurements must be referenced from below the ground surface for each time interval specified in the drawdown and recovery boxes.

If the water level measurements remain the same over a period of time, continue to measure and report the same water level measurement for the remaining pumping or recovery time intervals.

If pumping continuously for at least 1 hour, but the design of the well does not allow for water level measurements (e.g., driven point well), the person constructing the well is not required to report drawdown or recovery water level measurements.

Map of Well Location

In the “Map of Well Location” section of the well record form, click the map area to attach a map of the well location. The map must show sufficient information to locate the well, including:

- a mark on the map showing the well,
- a scale on the map, and
- where available, the name of the structure, street or surface water body nearest to the well.

Note: More than one map can be added to the well record form by clicking on “Add Map (+)” to add an additional map.

Information

Record any additional information (e.g., observations, tests, additional licensed well technicians who worked on the well, additional annular space details for a telescoped well or a multi-level nested test hole, reasons for not providing a well owner information package) in the comments area.

Declaration

Check the declaration statement to confirm that the person constructing the well agrees with the following statement: “I hereby confirm that I am the person who constructed the well and I hereby confirm that the information on the form is correct and accurate”.

Validate

Click the validate button. If there is no missing information, you will be asked to enter the well tag again to make sure the well tag is entered correctly (only enter the numeric portion of the tag number). The audit number will then be changed from “**incomplete**” to an assigned audit number. The signature field will then be available. Click on “signature” to enter the well technician’s electronic signature. For instructions on how to create an electronic signature, please visit the Adobe Digital IDs website using the following link: https://helpx.adobe.com/acrobat/using/digital-ids.html

Notice of Collection of Personal Information

Personal information contained on this form is collected pursuant to sections 35-50 and 75(2) of the *Ontario Water Resources Act* and section 16.3 of the Wells Regulation. This information will be used for the purpose of maintaining a public record of wells in Ontario. This form and the information contained on the form will be stored in the Ministry's well record database and made publicly available. Questions about this collection should be directed to the Water Well Customer Service Representative at the Wells Help Desk, 125 Resources Road, Toronto Ontario M9P 3V6, at 1-888-396-9355 or wellshelpdesk@ontario.ca.

Fields marked with an asterisk (*) are mandatory.

Well Tag Number *
A 323425

Type *

☑ Construction ☐ Abandonment

Measurement recorded in: *

☐ Metric ☑ Imperial

1. Well Owner's Information

Last Name and First Name, or Organization is mandatory. *

Last Name	First Name

Organization	Email Address
Township of Centre Wellington	

Current Address

Unit Number	Street Number *	Street Name *	City/Town/Village
	1	MacDonald Square	Elora

Country	Province	Postal Code	Telephone Number
Canada	Ontario	N0B 1S0	519-846-9691

2. Well Location

Address of Well Location

Unit Number	Street Number *	Street Name *	Township
	0	St Andrew St & Cameron St	Nichol

Lot	Concession	County/District/Municipality
		Wellington

City/Town	Province	Postal Code
Fergus	Ontario	

UTM Coordinates	Zone *	Easting *	Northing *		Municipal Plan and Sublot Number
NAD 83	17	550349	4839658	Test UTM in Map	

Other

3. Overburden and Bedrock Material *

Well Depth * 380.6 (ft)

General Colour	Most Common Material	Other Materials	General Description	Depth From	Depth To

				(ft)	(ft)
	Fill			0	3
	Gravel	Sand		3	4
	Limestone			4	380.6

4. Annular Space *

Depth From (ft)	Depth To (ft)	Type of Sealant Used (Material and Type)	Volume Placed (cubic feet)
0	328	Grout, Cement	41.45
328	330	Pellet Chips	0.26
330	355	Sand	3.19
355	380	Pellet Chips	3.19

5. Method of Construction *

☐ Cable Tool ☐ Rotary (Conventional) ☐ Rotary (Reverse) ☐ Boring ☐ Air percussion ☑ Diamond
☐ Jetting ☐ Driving ☐ Digging ☐ Rotary (Air) ☐ Augering ☐ Direct Push
☐ Other (specify) _____

6. Well Use *

☐ Public ☐ Industrial ☐ Cooling & Air Conditioning
☐ Domestic ☑ Commercial ☐ Not Used
☐ Livestock ☐ Municipal ☐ Monitoring
☐ Irrigation ☐ Test Hole ☐ Dewatering
☐ Other (specify) _____

7. 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) _____

8. Construction Record - Casing * (use negative number(s) to indicate depth above ground surface)

Inside Diameter (in)	Open Hole **or** Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness	Depth From (ft)	Depth To (ft)
2	Plastic	80	0	353

9. Construction Record - Screen

Outside Diameter (in)	Material (Plastic, Galvanized, Steel)	Slot Number	Depth From (ft)	Depth To (ft)
2	Plastic	80	341	353

10. Water Details

Water found at Depth 30 (ft) ☐ Gas Kind of water ☐ Fresh ☑ Untested ☐ Other

11. Hole Diameter

Depth From (ft)	Depth To (ft)	Diameter (in)
0	4	6
4	380.6	5

12. Results of Well Yield Testing

☐ Pumping Discontinued

Explain _____

If flowing give rate

☐ Flowing _____ (GPM)

Draw down

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

Recovery

Time (min)	1	2	3	4	5	10	15	20	25	30	40	50	60
Water Level (ft)													

After test of well yield, water was

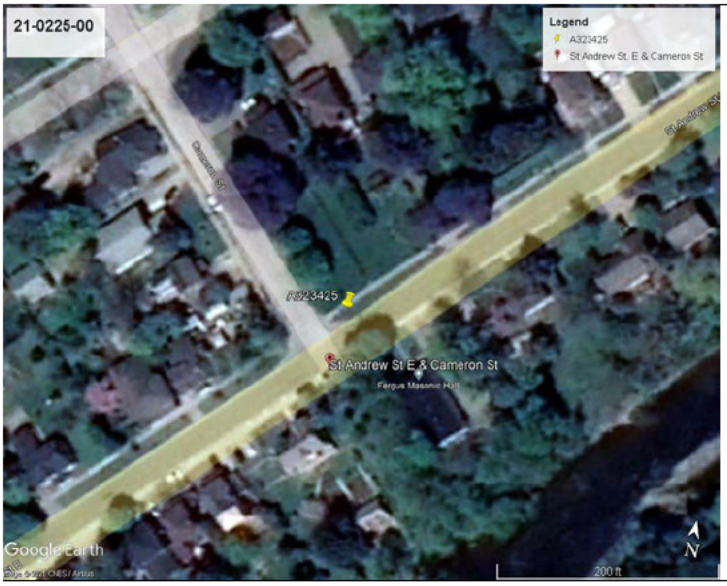
☐ Clear and sand free ☐ Other (specify)

Pump intake set at (ft)	Pumping rate (GPM)	Duration of pumping hrs + min	Final water level end of pumping (ft)	Disinfected? *
				☐ Yes ☑ No

Recommended pump depth (ft)	Recommended pump rate (GPM)	Well production (GPM)

13. Map of Well Location *

Map 1. Please Click the map area below to import an image file to use as the map. ☐ Make map area bigger



14. Information

Well owner's information package delivered	Date Package Delivered (yyyy/mm/dd)	Date Work Completed (yyyy/mm/dd) *
☐ Yes ☐ No		2021/10/14

Comments

15. Well Contractor and Well Technician Information

Business Name of Well Contractor *	Well Contractor's License Number *
Aardvark Drilling Inc.	7675

Business Address

Unit Number	Street Number	Street Name *
C	25	Lewis Road

City/Town/Village *	Province	Postal Code *
Guelph	ON	N1H 1E9

Business Telephone Number	Business Email Address
519-826-9340	info@aardvarkdrillinginc.com

Last Name of Well Technician *	First Name of Well Technician *	Well Technician's License Number *
Richards	Adrian	2554

16. Declaration *

☑ I hereby confirm that I am the person who constructed the well and I hereby confirm that the information on the form is correct and accurate.

Last Name	First Name	Email Address
England	Matthew	mengland@aardvarkdrillinginc.com

Signature	Date Submitted (yyyy/mm/dd)
	2021/11/26

17. Ministry Use Only

Audit Number

IQVW SCOU

Well Record - Regulation 903

Ontario Water Resources Act

General Instructions and Explanations for completing a Well Record

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- Sand: Grains are loose and granular and may be seen and felt readily. Squeezed in the hand when dry, it falls apart when the pressure is released. Squeezed when moist, it will form a cast that will crumble when touched. Should be listed as fine sand, medium sand or coarse sand.
- Gravel: Rock fragments greater than 0.3 cm in diameter.

Examples of General Descriptions are Loose, Cemented, Previously Dug or Bored, Porous, Layered, Previously Drilled, Dense, Soft, Wood Fragments, Packed, Hard.

Abandonment

To report abandonment of a well, check off the applicable box in Type on the top of the form. Details of abandonment must be recorded in the Abandonment and Sealing Section. Additional comments may be entered in the comments box under the Information section.

Annular Space

Record all material placed in the annular space around the single casing or around the permanent outer casing. If the well is a telescoped well [i.e., a well with an outer casing and inner casing(s)] or if the well is a multi-level nested test hole, report the depth from, depth to, material and volume placed for the annular space between two different sized casings or between the inner casing(s) and the side of the well in the “Comments” area of this electronic well record form.

Method of Construction

If the equipment used to construct the well is not on the list, check “Other (specify)” and record the type of equipment, check each equipment that applies.

Well Use

If the well’s use is not provided on the list, check “Other (specify)” and record the use of the well. If the well has multiple uses, check each use that applies.

Status of Well

If the well’s status is not provided on the list, check “Other (specify)” and record the use of the well. If the well has multiple statuses, check each use that applies.

Construction Record – Casing and Open Hole

Use negative values to report the top of casing above ground surface. For example, if the top of the casing is 0.4 metres above the ground surface and the bottom of the casing 6.0 metres below the ground surface, record the casing “Depth From” as -0.4.

If the top of casing is located below the ground surface (e.g., if a test hole is constructed and the top of casing is located below the ground surface in a flush mounted well vault), report the top of the casing from below ground surface. For example, if the top of the casing is 0.1 metres below the ground surface and the bottom of the casing is 6 metres below the ground surface, record the casing “Depth From” as 0.1.

Note: If a drive shoe is used, the shoe is considered casing and it must be reported if the shoe has a different inside diameter thickness.

If a portion of the well was created an open hole, record the location of the open hole on a separate row, including the diameter and the depth (top and bottom of open hole) from the ground surface.

Construction Record – Well Screen

A “well screen” means perforated pipe or tubing, unsealed concrete tiles or other material installed in a well to filter out particulate matter and form the water intake zone. Therefore, the length of a well screen includes any slotted or perforated area and unsealed area of pipe or tiles.

Water Details

- if groundwater was located, record the depth from the ground surface to the location of the groundwater resource, and
- record if the groundwater quality is “Untested,” “Fresh” (i.e., not salty), or “Other (specify).” If “Other (specify)” is recorded, use the “Other (specify)” dropdown list toselect the type of groundwater (e.g., salty, blackish water, yellowish water, mineralized, etc.).

Check off “Gas” if natural gas was encountered during well construction.

Note: Natural gas encounters need to be immediately reported to the ministry at 1-800-268-6060, well purchaser and the owner of the land.

Results of Well Yield Testing

Check off “Pumping Discontinued” if pumping was discontinued before 1 hour of continuous pumping. Explain the reason why pumping was discontinued or in some cases not performed (e.g., the well went dry, impossible to install pump in small diameter well, static water level from test hole or dewatering well was obtained and is reported instead of completing a yield test etc.).

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If the water level measurements remain the same over a period of time, continue to measure and report the same water level measurement for the remaining pumping or recovery time intervals.

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Map of Well Location

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- a scale on the map, and
- where available, the name of the structure, street or surface water body nearest to the well.

Note: More than one map can be added to the well record form by clicking on “Add Map (+)” to add an additional map.

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Declaration

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Fields marked with an asterisk (*) are mandatory.

Well Tag Number *
A 352935

Type *

☑ Construction ☐ Abandonment

Measurement recorded in: *

☐ Metric ☑ Imperial

1. Well Owner's Information

Last Name and First Name, or Organization is mandatory. *

Last Name	First Name

Organization	Email Address
Township of Centre Wellington	

Current Address

Unit Number	Street Number *	Street Name *	City/Town/Village
	1	MacDonald Square	Elora

Country	Province	Postal Code	Telephone Number
Canada	Ontario	N0B1S0	519-846-9691

2. Well Location

Address of Well Location

Unit Number	Street Number *	Street Name *	Township
	295	Queen Street E	Nichol

Lot	Concession	County/District/Municipality
		Wellington

City/Town	Province	Postal Code
Fergus	Ontario	N1M 3N4

UTM Coordinates	Zone *	Easting *	Northing *		Municipal Plan and Sublot Number
NAD 83	17	550391	4836513	Test UTM in Map	

Other

3. Overburden and Bedrock Material *

Well Depth * 260 (ft)

General Colour	Most Common Material	Other Materials	General Description	Depth From	Depth To

				(ft)	(ft)
Brown	Fill	Clay	Dirty	0	5
White	Dolostone			5	260

4. Annular Space *

Depth From (ft)	Depth To (ft)	Type of Sealant Used (Material and Type)	Volume Placed (cubic feet)
0	43	Pellet Plug	5.16
43	49	Sand (Port 5)	0.72
49	87	Pellet Plug	4.56
87	92	Sand (Port 4)	0.6
92	109	Pellet Plug	2.04
109	119	Sand (Port 3)	1.2
119	171	Pellet Plug	6.24
171	180	Pea Stone (Port 2)	20
180	222	Pellet Plug	5.04
222	227.5	Sand (Port 1)	0.66

5. Method of Construction *

- [ ] Cable Tool
- [ ] Rotary (Conventional)
- [ ] Rotary (Reverse)
- [ ] Boring
- [ ] Air percussion
- [x] Diamond
- [ ] Jetting
- [ ] Driving
- [ ] Digging
- [ ] Rotary (Air)
- [ ] Augering
- [ ] Direct Push
- [x] Other (specify) PQ Cored

6. Well Use *

- [ ] Public
- [ ] Industrial
- [ ] Cooling & Air Conditioning
- [ ] Domestic
- [ ] Commercial
- [ ] Not Used
- [ ] Livestock
- [ ] Municipal
- [x] Monitoring
- [ ] Irrigation
- [ ] Test Hole
- [ ] Dewatering
- [ ] Other (specify)

7. Status of Well *

- [ ] Water Supply
- [ ] Replacement Well
- [ ] Test Hole
- [ ] Recharge Well
- [ ] Dewatering Well
- [x] Observation and/or Monitoring Hole
- [ ] Alteration (Construction)
- [ ] Abandoned, Insufficient Supply
- [ ] Abandoned, Poor Water Quality
- [ ] Abandoned, other (specify)
- [x] Other (specify) This is a multilevel Waterloo Well System

8. Construction Record - Casing * (use negative number(s) to indicate depth above ground surface)

Inside Diameter (in)	Open Hole **or** Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness	Depth From (ft)	Depth To (ft)
2	Plastic	0.25	-3	260

9. Construction Record - Screen

Outside Diameter (in)	Material (Plastic, Galvanized, Steel)	Slot Number	Depth From (ft)	Depth To (ft)
2	Plastic		45	45.5
2	Plastic		89	89.5
2	Plastic		115.5	116
2	Plastic		176	176.5
2	Plastic		225	225.5

10. Water Details

Water found at Depth (ft) ☐ Gas Kind of water ☐ Fresh ☑ Untested ☐ Other

11. Hole Diameter

Depth From (ft)	Depth To (ft)	Diameter (in)
0	260	5

12. Results of Well Yield Testing

☐ Pumping Discontinued

Explain _____

If flowing give rate

☐ Flowing _____ (GPM)

Draw down

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

Recovery

Time (min)	1	2	3	4	5	10	15	20	25	30	40	50	60
Water Level (ft)													

After test of well yield, water was

☐ Clear and sand free ☐ Other (specify)

Pump intake set at (ft)	Pumping rate (GPM)	Duration of pumping hrs + min	Final water level end of pumping (ft)	Disinfected? *
				☐ Yes ☑ No

Recommended pump depth (ft)	Recommended pump rate (GPM)	Well production (GPM)

13. Map of Well Location *

Map 1. Please Click the map area below to import an image file to use as the map. ☐ Make map area bigger



14. Information

Well owner's information package delivered	Date Package Delivered (yyyy/mm/dd)	Date Work Completed (yyyy/mm/dd) *
☐ Yes ☐ No		2022/12/22

Comments
Annular Space Continued:
Depth From: 227.5'
Depth To: 260'
Type of Sealant: Pellet Plug
Pellet Plug Volume Placed (cubic ft): 3.9

15. Well Contractor and Well Technician Information

Business Name of Well Contractor *	Well Contractor's License Number *
Aardvark Drilling Inc.	7675

Business Address

Unit Number	Street Number	Street Name *
C	25	Lewis Road

City/Town/Village *	Province	Postal Code *
Guelph	ON	N1H 1E9

Business Telephone Number	Business Email Address
519-826-9340	info@aardvarkdrillinginc.com

Last Name of Well Technician *	First Name of Well Technician *	Well Technician's License Number *
Hovey	Aaron	4256

16. Declaration *

☑ I hereby confirm that I am the person who constructed the well and I hereby confirm that the information on the form is correct and accurate.

Last Name	First Name	Email Address
England	Matthew	mengland@aardvarkdrillinginc.com

Signature	Date Submitted (yyyy/mm/dd)
	2023/01/18

17. Ministry Use Only

Audit Number

I5LQ XNHJ

Well Record - Regulation 903

Ontario Water Resources Act

General Instructions and Explanations for completing a Well Record

A completed electronic Well Record Form must be delivered to the well purchaser and the owner of the land on which the well is situated within 14 days after the date on which the well's structural stage is complete. The electronic Well Record must also be forwarded within 30 days after the date on which the well's structural stage is complete to the ministry through email to the following email address: WellRecordSubmission@ontario.ca

False and Misleading Information

Subsection 98(2) of the *Ontario Water Resources Act*, R.S.O. 1990 c. O. 40, states that:

“No person shall orally, in writing or electronically, give or submit false or misleading information in any statement, document or data, to any provincial officer, the Minister, the Ministry or the Agency, any employee in or agent of the Ministry or the Agency, or any person involved in carrying out a program of the Ministry or the Agency in respect of any matter related to this Act or the regulations.”

Further, subsection 98(3) of the Act states that:

“No person shall include false or misleading information in any document or data required to be created, stored or submitted under this Act.”

Measurements

All measurements must be recorded in the specified unit, metric or imperial by checking off the applicable box on the top of the form. You must use the checked unit consistently throughout the well record. Measurements must be reported to 1/10th of a metre if the unit is a metre. All measurements of depth must be referenced to ground surface.

Well Owner’s Information

A “well owner” means the owner of land upon which a well is situated and includes a tenant or lessee of the land and a well purchaser. If the “well owner” is an individual, record the owner’s last name and first name or if the “well owner” is a business, government or other organization, record the name in the “organization” area.

Well Location

Street Number/Name and City/town/Village must be provided, if available.

Geographic Township, Concession and Lot must be reported if the well is located in an area where such information exists.

UTM Coordinates must be recorded each time a Well Record is completed. Click the button [Test UTM in Map] to use the UTM Coordinates to plot the location to Google map. This allows verification of the UTM Coordinates. This will also automatically populate the County/District.

Municipal Plan and Sublet Number may be provided, if available.

Overburden and Bedrock Materials

For each formation encountered during construction, choose words from the lists that best describe the formation on the basis of general colour, most common material, other materials, and general description of the formation.

General Colours are White, Yellow, Grey, Brown, Blue, Red, Green and Black.

Examples of Materials are: Fill, Silt, Top Soil, Coarse Sand, Slate, Muck, Gravel, Limestone, Dolomite, Quartzite, Peat, Stones, Fine Sand, Shale, Granite, Clay, Boulders, Medium Sand, Sandstone, and Greenstone.

Some definitions are as follows:

- Clay: Composed of very fine particles. Forms dense hard lumps or clods when dry and a very elastic putty-like mass when wet. It can be rolled between fingers to form a long, flexible ribbon.
- Silt: Grain size, midway between sand and clay. It may form clods which, when broken, feel soft and floury. When moist, it will form a cast that can be handled freely without breaking. Rolled between thumb and finger, it will not "ribbon" but will give a broken appearance.

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- Sand: Grains are loose and granular and may be seen and felt readily. Squeezed in the hand when dry, it falls apart when the pressure is released. Squeezed when moist, it will form a cast that will crumble when touched. Should be listed as fine sand, medium sand or coarse sand.
- Gravel: Rock fragments greater than 0.3 cm in diameter.

Examples of General Descriptions are Loose, Cemented, Previously Dug or Bored, Porous, Layered, Previously Drilled, Dense, Soft, Wood Fragments, Packed, Hard.

Abandonment

To report abandonment of a well, check off the applicable box in Type on the top of the form. Details of abandonment must be recorded in the Abandonment and Sealing Section. Additional comments may be entered in the comments box under the Information section.

Annular Space

Record all material placed in the annular space around the single casing or around the permanent outer casing. If the well is a telescoped well [i.e., a well with an outer casing and inner casing(s)] or if the well is a multi-level nested test hole, report the depth from, depth to, material and volume placed for the annular space between two different sized casings or between the inner casing(s) and the side of the well in the “Comments” area of this electronic well record form.

Method of Construction

If the equipment used to construct the well is not on the list, check “Other (specify)” and record the type of equipment, check each equipment that applies.

Well Use

If the well’s use is not provided on the list, check “Other (specify)” and record the use of the well. If the well has multiple uses, check each use that applies.

Status of Well

If the well’s status is not provided on the list, check “Other (specify)” and record the use of the well. If the well has multiple statuses, check each use that applies.

Construction Record – Casing and Open Hole

Use negative values to report the top of casing above ground surface. For example, if the top of the casing is 0.4 metres above the ground surface and the bottom of the casing 6.0 metres below the ground surface, record the casing “Depth From” as -0.4.

If the top of casing is located below the ground surface (e.g., if a test hole is constructed and the top of casing is located below the ground surface in a flush mounted well vault), report the top of the casing from below ground surface. For example, if the top of the casing is 0.1 metres below the ground surface and the bottom of the casing is 6 metres below the ground surface, record the casing “Depth From” as 0.1.

Note: If a drive shoe is used, the shoe is considered casing and it must be reported if the shoe has a different inside diameter thickness.

If a portion of the well was created an open hole, record the location of the open hole on a separate row, including the diameter and the depth (top and bottom of open hole) from the ground surface.

Construction Record – Well Screen

A “well screen” means perforated pipe or tubing, unsealed concrete tiles or other material installed in a well to filter out particulate matter and form the water intake zone. Therefore, the length of a well screen includes any slotted or perforated area and unsealed area of pipe or tiles.

Water Details

- if groundwater was located, record the depth from the ground surface to the location of the groundwater resource, and
- record if the groundwater quality is “Untested,” “Fresh” (i.e., not salty), or “Other (specify).” If “Other (specify)” is recorded, use the “Other (specify)” dropdown list toselect the type of groundwater (e.g., salty, blackish water, yellowish water, mineralized, etc.).

Check off “Gas” if natural gas was encountered during well construction.

Note: Natural gas encounters need to be immediately reported to the ministry at 1-800-268-6060, well purchaser and the owner of the land.

Results of Well Yield Testing

Check off “Pumping Discontinued” if pumping was discontinued before 1 hour of continuous pumping. Explain the reason why pumping was discontinued or in some cases not performed (e.g., the well went dry, impossible to install pump in small diameter well, static water level from test hole or dewatering well was obtained and is reported instead of completing a yield test etc.).

Note: Equipment breakdown is not an acceptable reason for checking off “Pumping Discontinued” on the well record form. If groundwater in the well is flowing out of the well, provide the rate of flow, and check off “Flowing Well” (i.e., static water level above the ground surface).

In the “Results of Well Yield Testing” section of the well record form, record:

- the depth to the intake of the pump,
- the rate of pumping and duration of pumping period during the yield test,
- the final water level when pumping stops,
- water level measurements made during pumping (drawdown) and recovery. All water level measurements must be referenced from below the ground surface for each time interval specified in the drawdown and recovery boxes.

If the water level measurements remain the same over a period of time, continue to measure and report the same water level measurement for the remaining pumping or recovery time intervals.

If pumping continuously for at least 1 hour, but the design of the well does not allow for water level measurements (e.g., driven point well), the person constructing the well is not required to report drawdown or recovery water level measurements.

Map of Well Location

In the “Map of Well Location” section of the well record form, click the map area to attach a map of the well location. The map must show sufficient information to locate the well, including:

- a mark on the map showing the well,
- a scale on the map, and
- where available, the name of the structure, street or surface water body nearest to the well.

Note: More than one map can be added to the well record form by clicking on “Add Map (+)” to add an additional map.

Information

Record any additional information (e.g., observations, tests, additional licensed well technicians who worked on the well, additional annular space details for a telescoped well or a multi-level nested test hole, reasons for not providing a well owner information package) in the comments area.

Declaration

Check the declaration statement to confirm that the person constructing the well agrees with the following statement: “I hereby confirm that I am the person who constructed the well and I hereby confirm that the information on the form is correct and accurate”.

Validate

Click the validate button. If there is no missing information, you will be asked to enter the well tag again to make sure the well tag is entered correctly (only enter the numeric portion of the tag number). The audit number will then be changed from “**incomplete**” to an assigned audit number. The signature field will then be available. Click on “signature” to enter the well technician’s electronic signature. For instructions on how to create an electronic signature, please visit the Adobe Digital IDs website using the following link: https://helpx.adobe.com/acrobat/using/digital-ids.html

Notice of Collection of Personal Information

Personal information contained on this form is collected pursuant to sections 35-50 and 75(2) of the *Ontario Water Resources Act* and section 16.3 of the Wells Regulation. This information will be used for the purpose of maintaining a public record of wells in Ontario. This form and the information contained on the form will be stored in the Ministry's well record database and made publicly available. Questions about this collection should be directed to the Water Well Customer Service Representative at the Wells Help Desk, 125 Resources Road, Toronto Ontario M9P 3V6, at 1-888-396-9355 or wellshelpdesk@ontario.ca.

Fields marked with an asterisk (*) are mandatory.

Well Tag Number *
No Tag on Well

Type *

☐ Construction ☑ Abandonment

Measurement recorded in: *

☐ Metric ☑ Imperial

1. Well Owner's Information

Last Name and First Name, or Organization is mandatory. *

Last Name	First Name

Organization	Email Address
Township of Centre Wellington	

Current Address

Unit Number	Street Number *	Street Name *	City/Town/Village
	1	MacDonald Square	Elora

Country	Province	Postal Code	Telephone Number
Canada	Ontario	N0B 1S0	519-846-9691

2. Well Location

Address of Well Location

Unit Number	Street Number *	Street Name *	Township
	445	St Andrew St & Gartshore St	Nichol

Lot	Concession	County/District/Municipality
		Wellington

City/Town	Province	Postal Code
Fergus	Ontario	

UTM Coordinates	Zone *	Easting *	Northing *		Municipal Plan and Sublot Number
NAD 83	17	550587	4839948	Test UTM in Map	

Other

3. Abandonment and Sealing

Well Depth 251 (ft)

Provide information of well (e.g. construction date, original contractor). **Do not** enter private information
Original construction date July 10, 1946. Original contractor International Water Supply Ltd.

Original Owner
Original owner PVC Fergus

General Description	Depth From (ft)	Depth To (ft)
Pulled pipe and filled with holeplug	0	251

4. Annular Space

Depth From (ft)	Depth To (ft)	Type of Sealant Used (Material and Type)	Volume Placed (cubic feet)
0	251	Holeplug	197.13

5. Method of Construction

☐ Cable Tool ☐ Rotary (Conventional) ☐ Rotary (Reverse) ☐ Boring ☐ Air percussion ☐ Diamond
☐ Jetting ☐ Driving ☐ Digging ☐ Rotary (Air) ☐ Augering ☐ Direct Push
☑ Other (specify) unknown

6. Well Use

☐ Public ☐ Industrial ☐ Cooling & Air Conditioning
☐ Domestic ☐ Commercial ☐ Not Used
☐ Livestock ☑ Municipal ☐ Monitoring
☐ Irrigation ☐ Test Hole ☐ Dewatering
☐ Other (specify)

7. 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) no longer in use
☐ Other (specify)

8. Construction Record - Casing (use negative number(s) to indicate depth above ground surface)

Inside Diameter (in)	Open Hole **or** Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness	Depth From (ft)	Depth To (ft)

9. Construction Record - Screen

Outside Diameter (in)	Material (Plastic, Galvanized, Steel)	Slot Number	Depth From (ft)	Depth To (ft)

10. Water Details

Water found at Depth (ft) ☐ Gas Kind of water ☐ Fresh ☐ Untested ☐ Other

11. Hole Diameter

Depth From (ft)	Depth To (ft)	Diameter (in)
0	251	12

12. Results of Well Yield Testing

☐ Pumping Discontinued

Explain _____

If flowing give rate

☐ Flowing _____ (GPM)

Draw down

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

Recovery

Time (min)	1	2	3	4	5	10	15	20	25	30	40	50	60
Water Level (ft)													

After test of well yield, water was

☐ Clear and sand free ☐ Other (specify)

Pump intake set at (ft)	Pumping rate (GPM)	Duration of pumping hrs + min	Final water level end of pumping (ft)	Disinfected?
				☐ Yes ☑ No

Recommended pump depth (ft)	Recommended pump rate (GPM)	Well production (GPM)

13. Map of Well Location *

Map 1. Please Click the map area below to import an image file to use as the map. ☐ Make map area bigger



14. Information

Well owner's information package delivered	Date Package Delivered (yyyy/mm/dd)	Date Work Completed (yyyy/mm/dd) *
☐ Yes ☐ No		2021/10/14

Comments

15. Well Contractor and Well Technician Information

Business Name of Well Contractor *	Well Contractor's License Number *
Aardvark Drilling Inc.	7675

Business Address

Unit Number	Street Number	Street Name *
C	25	Lewis Road

City/Town/Village *	Province	Postal Code *
Guelph	ON	N1H 1E9

Business Telephone Number	Business Email Address
519-826-9340	info@aardvarkdrillinginc.com

Last Name of Well Technician *	First Name of Well Technician *	Well Technician's License Number *
Smith	Kyle	3591

16. Declaration *

☑ I hereby confirm that I am the person who constructed the well and I hereby confirm that the information on the form is correct and accurate.

Last Name	First Name	Email Address
England	Matthew	mengland@aardvarkdrillinginc.com

Signature	Date Submitted (yyyy/mm/dd)
	2022/01/19

17. Ministry Use Only

Audit Number

SZCU D6PJ

AECOM

Appendix B

Laboratory Certificates of Analysis

AECOM

F2-T Well Certificate of Analysis

AGAT Laboratories

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

CLIENT NAME: AECOM CANADA LTD
50 SPORTSWORLD CROSSING RD UNIT 290
KITCHENER, ON N2P0A4
(519) 650-5313
ATTENTION TO: Matthew Alexander
PROJECT: 60664299
AGAT WORK ORDER: 21W799802
WATER ANALYSIS REVIEWED BY: Yris Verastegui, Report Reviewer
DATE REPORTED: Sep 16, 2021
PAGES (INCLUDING COVER): 9
VERSION*: 1

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

Notes

Disclaimer:

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

Member of: Association of Professional Engineers and Geoscientists of Alberta (APEGA)
Western Enviro-Agricultural Laboratory Association (WEALA)
Environmental Services Association of Alberta (ESAA)

AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation. Measurement Uncertainty is not taken into consideration when stating conformity with a specified requirement.

AGAT Laboratories

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MISSISSAUGA, ONTARIO
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FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 21W799802

PROJECT: 60664299

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Matthew Alexander

SAMPLING SITE:

SAMPLED BY:PM

(Water) TSS

DATE RECEIVED: 2021-09-10

DATE REPORTED: 2021-09-16

			SAMPLE DESCRIPTION:	**F2-T Development**
			SAMPLE TYPE:	**Water**
			DATE SAMPLED:	**2021-09-09 16:30**
Parameter	**Unit**	**G / S**	**RDL**	**2955573**
Total Suspended Solids	mg/L		10	<10

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

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: Iris Verástegui

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

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

Certificate of Analysis

AGAT WORK ORDER: 21W799802

PROJECT: 60664299

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Matthew Alexander

SAMPLING SITE:

SAMPLED BY:PM

Water Quality Assessment (mg/L)

DATE RECEIVED: 2021-09-10

DATE REPORTED: 2021-09-16

		SAMPLE DESCRIPTION:		F2-T Development
		SAMPLE TYPE:		Water
		DATE SAMPLED:		2021-09-09 16:30
Parameter	**Unit**	**G / S**	**RDL**	**2955573**
Electrical Conductivity	µS/cm		2	1540
pH	pH Units		NA	7.86
Saturation pH (Calculated)				6.60
Langelier Index (Calculated)				1.26
Hardness (as CaCO3) (Calculated)	mg/L		0.5	939
Total Dissolved Solids	mg/L		10	1190
Alkalinity (as CaCO3)	mg/L		5	212
Bicarbonate (as CaCO3)	mg/L		5	212
Carbonate (as CaCO3)	mg/L		5	<5
Hydroxide (as CaCO3)	mg/L		5	<5
Fluoride	mg/L		0.05	<0.05
Chloride	mg/L		0.24	34.1
Nitrate as N	mg/L		0.07	<0.07
Nitrite as N	mg/L		0.05	0.62
Bromide	mg/L		0.06	<0.06
Sulphate	mg/L		0.19	686
Ortho Phosphate as P	mg/L		0.13	<0.13
Ammonia as N	mg/L		0.02	0.17
Total Phosphorus	mg/L		0.02	0.03
Total Organic Carbon	mg/L		0.5	1.0
True Colour	TCU		5	<5
Turbidity	NTU		0.5	3.0
Total Calcium	mg/L		0.16	279
Total Magnesium	mg/L		0.17	58.8
Total Potassium	mg/L		0.58	2.05
Total Sodium	mg/L		0.22	24.3
Total Aluminum	mg/L		0.010	<0.010
Total Antimony	mg/L		0.003	<0.003

Certified By: Iris Verástegui

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 21W799802

PROJECT: 60664299

CLIENT NAME: AECOM CANADA LTD

ATTENTION TO: Matthew Alexander

SAMPLING SITE:

SAMPLED BY:PM

Water Quality Assessment (mg/L)

DATE RECEIVED: 2021-09-10

DATE REPORTED: 2021-09-16

			SAMPLE DESCRIPTION:	F2-T Development
			SAMPLE TYPE:	Water
			DATE SAMPLED:	2021-09-09 16:30
Parameter	**Unit**	**G / S**	**RDL**	**2955573**
Total Arsenic	mg/L		0.003	<0.003
Total Barium	mg/L		0.002	0.012
Total Beryllium	mg/L		0.001	<0.001
Total Boron	mg/L		0.010	0.067
Total Cadmium	mg/L		0.001	<0.001
Total Chromium	mg/L		0.003	<0.003
Total Cobalt	mg/L		0.001	<0.001
Total Copper	mg/L		0.003	<0.003
Total Iron	mg/L		0.010	0.393
Total Lead	mg/L		0.001	<0.001
Total Manganese	mg/L		0.002	0.009
Total Mercury	mg/L		0.0001	<0.0001
Total Molybdenum	mg/L		0.002	0.002
Total Nickel	mg/L		0.003	<0.003
Total Selenium	mg/L		0.002	<0.002
Total Silver	mg/L		0.002	<0.002
Total Strontium	mg/L		0.05	7.28
Total Thallium	mg/L		0.006	<0.006
Total Tin	mg/L		0.002	<0.002
Total Titanium	mg/L		0.002	<0.002
Total Tungsten	mg/L		0.010	<0.010
Total Uranium	mg/L		0.002	<0.002
Total Vanadium	mg/L		0.002	<0.002
Total Zinc	mg/L		0.005	<0.005
Total Zirconium	mg/L		0.004	<0.004

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

2955573 Dilution required, RDL has been increased accordingly.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By: Iris Verástegui

Results relate only to the items tested. Results apply to samples as received.

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

Quality Assurance

CLIENT NAME: AECOM CANADA LTD

AGAT WORK ORDER: 21W799802

PROJECT: 60664299

ATTENTION TO: Matthew Alexander

SAMPLING SITE:

SAMPLED BY:PM

Water Analysis

RPT Date: Sep 16, 2021			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Water Quality Assessment (mg/L)															
Electrical Conductivity	2955483		1470	1470	0.0%	< 2	99%	90%	110%						
pH	2955483		7.65	7.81	2.1%	NA	104%	90%	110%						
Total Dissolved Solids	2949140		368	382	3.7%	< 10	96%	80%	120%						
Alkalinity (as CaCO3)	2955483		393	438	10.8%	< 5	86%	80%	120%						
Bicarbonate (as CaCO3)	2955483		393	438	10.8%	< 5	NA								
Carbonate (as CaCO3)	2955483		<5	<5	NA	< 5	NA								
Hydroxide (as CaCO3)	2955483		<5	<5	NA	< 5	NA								
Fluoride	2955573	2955573	<0.05	<0.05	NA	< 0.05	103%	70%	130%	105%	80%	120%	110%	70%	130%
Chloride	2955573	2955573	34.1	34.0	0.3%	< 0.10	94%	70%	130%	102%	80%	120%	103%	70%	130%
Nitrate as N	2955573	2955573	<0.07	<0.07	NA	< 0.05	98%	70%	130%	103%	80%	120%	102%	70%	130%
Nitrite as N	2955573	2955573	0.62	0.66	6.3%	< 0.05	93%	70%	130%	97%	80%	120%	103%	70%	130%
Bromide	2955573	2955573	<0.06	<0.06	NA	< 0.05	103%	70%	130%	102%	80%	120%	102%	70%	130%
Sulphate	2955573	2955573	686	686	0.0%	< 0.10	98%	70%	130%	100%	80%	120%	NA	70%	130%
Ortho Phosphate as P	2955573	2955573	<0.13	<0.13	NA	< 0.10	98%	70%	130%	94%	80%	120%	91%	70%	130%
Ammonia as N	2956321		0.48	0.47	2.1%	< 0.02	120%	70%	130%	108%	80%	120%	110%	70%	130%
Total Phosphorus	2970883		0.03	0.03	NA	< 0.02	102%	70%	130%	101%	80%	120%	101%	70%	130%
Total Organic Carbon	2956321		2.3	2.2	NA	< 0.5	104%	90%	110%	105%	90%	110%	102%	80%	120%
True Colour	2963128		<5	<5	NA	< 5	102%	90%	110%						
Turbidity	2955573	2955573	3.0	3.1	3.3%	< 0.5	98%	80%	120%						
Total Calcium	2955573	2955573	279	254	9.4%	< 0.10	95%	70%	130%	96%	80%	120%	104%	70%	130%
Total Magnesium	2955573	2955573	58.8	54.6	7.4%	< 0.10	98%	70%	130%	98%	80%	120%	108%	70%	130%
Total Potassium	2955573	2955573	2.05	2.07	NA	< 0.50	97%	70%	130%	98%	80%	120%	110%	70%	130%
Total Sodium	2955573	2955573	24.3	22.7	6.8%	< 0.10	94%	70%	130%	94%	80%	120%	108%	70%	130%
Total Aluminum	2955573	2955573	<0.010	<0.010	NA	< 0.010	96%	70%	130%	99%	80%	120%	102%	70%	130%
Total Antimony	2955573	2955573	<0.003	<0.003	NA	< 0.003	97%	70%	130%	94%	80%	120%	104%	70%	130%
Total Arsenic	2955573	2955573	<0.003	<0.003	NA	< 0.003	94%	70%	130%	103%	80%	120%	106%	70%	130%
Total Barium	2955573	2955573	0.012	0.011	8.7%	< 0.002	92%	70%	130%	95%	80%	120%	97%	70%	130%
Total Beryllium	2955573	2955573	<0.001	<0.001	NA	< 0.001	96%	70%	130%	99%	80%	120%	103%	70%	130%
Total Boron	2955573	2955573	0.067	0.064	4.6%	< 0.010	96%	70%	130%	97%	80%	120%	102%	70%	130%
Total Cadmium	2955573	2955573	<0.001	<0.001	NA	< 0.001	96%	70%	130%	96%	80%	120%	101%	70%	130%
Total Chromium	2955573	2955573	<0.003	<0.003	NA	< 0.003	104%	70%	130%	97%	80%	120%	99%	70%	130%
Total Cobalt	2955573	2955573	<0.001	<0.001	NA	< 0.001	104%	70%	130%	100%	80%	120%	100%	70%	130%
Total Copper	2955573	2955573	<0.003	<0.003	NA	< 0.003	101%	70%	130%	100%	80%	120%	99%	70%	130%
Total Iron	2955573	2955573	0.393	0.376	4.4%	< 0.010	104%	70%	130%	102%	80%	120%	99%	70%	130%
Total Lead	2955573	2955573	<0.001	<0.001	NA	< 0.001	98%	70%	130%	92%	80%	120%	95%	70%	130%
Total Manganese	2955573	2955573	0.009	0.008	NA	< 0.002	104%	70%	130%	98%	80%	120%	99%	70%	130%
Total Mercury	2956321		<0.0001	<0.0001	NA	< 0.0001	103%	70%	130%	101%	80%	120%	102%	70%	130%
Total Molybdenum	2955573	2955573	0.002	0.002	NA	< 0.002	108%	70%	130%	103%	80%	120%	103%	70%	130%
Total Nickel	2955573	2955573	<0.003	<0.003	NA	< 0.003	105%	70%	130%	98%	80%	120%	100%	70%	130%

AGAT Laboratories is accredited to ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA) and/or Standards Council of Canada (SCC) for specific tests listed on the scope of accreditation. AGAT Laboratories (Mississauga) is also accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA) for specific drinking water tests. Accreditations are location and parameter specific. A complete listing of parameters for each location is available from www.cala.ca and/or www.scc.ca. The tests in this report may not necessarily be included in the scope of accreditation. RPDs calculated using raw data. The RPD may not be reflective of duplicate values shown, due to rounding of final results.

Results relate only to the items tested. Results apply to samples as received.

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

Quality Assurance

CLIENT NAME: AECOM CANADA LTD
AGAT WORK ORDER: 21W799802
PROJECT: 60664299
ATTENTION TO: Matthew Alexander
SAMPLING SITE:
SAMPLED BY:PM

Water Analysis (Continued)

RPT Date: Sep 16, 2021			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Total Selenium	2955573	2955573	<0.002	<0.002	NA	< 0.002	100%	70%	130%	107%	80%	120%	106%	70%	130%
Total Silver	2955573	2955573	<0.002	<0.002	NA	< 0.002	99%	70%	130%	96%	80%	120%	99%	70%	130%
Total Strontium	2955573	2955573	7.28	7.91	8.3%	< 0.005	104%	70%	130%	97%	80%	120%	108%	70%	130%
Total Thallium	2955573	2955573	<0.006	<0.006	NA	< 0.006	98%	70%	130%	111%	80%	120%	117%	70%	130%
Total Tin	2955573	2955573	<0.002	<0.002	NA	< 0.002	95%	70%	130%	95%	80%	120%	104%	70%	130%
Total Titanium	2955573	2955573	<0.002	<0.002	NA	< 0.002	105%	70%	130%	100%	80%	120%	109%	70%	130%
Total Tungsten	2955573	2955573	<0.010	<0.010	NA	< 0.010	85%	70%	130%	87%	80%	120%	90%	70%	130%
Total Uranium	2955573	2955573	<0.002	<0.002	NA	< 0.002	100%	70%	130%	99%	80%	120%	103%	70%	130%
Total Vanadium	2955573	2955573	<0.002	<0.002	NA	< 0.002	106%	70%	130%	100%	80%	120%	101%	70%	130%
Total Zinc	2955573	2955573	<0.005	<0.005	NA	< 0.005	101%	70%	130%	98%	80%	120%	100%	70%	130%
Total Zirconium	2955573	2955573	<0.004	<0.004	NA	< 0.004	101%	70%	130%	98%	80%	120%	97%	70%	130%
(Water) TSS															
Total Suspended Solids	2953715		<10	<10	NA	< 10	98%	80%	120%						

Comments: NA signifies Not Applicable.
If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.

Certified By: Iris Verástegui

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Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
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http://www.agatlabs.com

Method Summary

CLIENT NAME: AECOM CANADA LTD

AGAT WORK ORDER: 21W799802

PROJECT: 60664299

ATTENTION TO: Matthew Alexander

SAMPLING SITE:

SAMPLED BY:PM

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Total Suspended Solids	INOR-93-6028	modified from EPA 1684,ON MOECC E3139,SM 2540C,D	BALANCE
Electrical Conductivity	INOR-93-6000	modified from SM 2510 B	PC TITRATE
pH	INOR-93-6000	modified from SM 4500-H+ B	PC TITRATE
Saturation pH (Calculated)		SM 2320 B	CALCULATION
Langelier Index (Calculated)		SM 2330B	CALCULATION
Hardness (as CaCO3) (Calculated)	MET-93-6105	modified from EPA SW-846 6010C & 200.7 & SM 2340 B	CALCULATION
Total Dissolved Solids	INOR-93-6028	modified from EPA 1684,ON MOECC E3139,SM 2540C,D	BALANCE
Alkalinity (as CaCO3)	INOR-93-6000	Modified from SM 2320 B	PC TITRATE
Bicarbonate (as CaCO3)	INOR-93-6000	modified from SM 2320 B	PC TITRATE
Carbonate (as CaCO3)	INOR-93-6000	modified from SM 2320 B	PC TITRATE
Hydroxide (as CaCO3)	INOR-93-6000	modified from SM 2320 B	PC TITRATE
Fluoride	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Chloride	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Nitrate as N	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Bromide	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Ortho Phosphate as P	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Ammonia as N	INOR-93-6059	modified from SM 4500-NH3 H	LACHAT FIA
Total Phosphorus	INOR-93-6057	modified from LACHAT 10-115-01-3A	LACHAT FIA
Total Organic Carbon	INOR-93-6049	modified from SM 5310 B	SHIMADZU CARBON ANALYZER
True Colour	INOR-93-6074	modified from SM 2120 B	LACHAT FIA
Turbidity	INOR-93-6044	modified from SM 2130 B	NEPHELOMETER
Total Calcium	MET-93-6105	modified from EPA 6010D	ICP/OES
Total Magnesium	MET-93-6105	modified from EPA 6010D	ICP/OES
Total Potassium	MET-93-6105	modified from EPA 6010D	ICP/OES
Total Sodium	MET-93-6105	modified from EPA 6010D	ICP/OES
Total Aluminum	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Antimony	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Arsenic	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Barium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Beryllium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Boron	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Cadmium	MET -93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Chromium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Cobalt	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Copper	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Iron	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS

Results relate only to the items tested. Results apply to samples as received.

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CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Method Summary

CLIENT NAME: AECOM CANADA LTD

AGAT WORK ORDER: 21W799802

PROJECT: 60664299

ATTENTION TO: Matthew Alexander

SAMPLING SITE:

SAMPLED BY:PM

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

Results relate only to the items tested. Results apply to samples as received.

AGAT Laboratories

Short Holding Time Turbidity

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

Chain of Custody Record

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

Report Information:

Company: AECOM
Contact: Matthew Alexander
Address: 50 Sportsworld Crossing Road, Suite 290
Kitchener, ON N2P 0A4
Phone: Fax:
Reports to be sent to:
1. Email: matthew.alexander@aecom.com
2. Email: peter.f.moffat@aecom.com

Project Information:

Project: 60664299
Site Location:
Sampled By: PM
AGAT ID #: PO:
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

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

Regulatory Requirements:

(Please check all applicable boxes)

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

☐ Excess Soils R406
Table (Indicate One)
☐ Regulation 558
☐ CCME

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

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

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

Sample Matrix Legend

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

Laboratory Use Only

Work Order #: 21W799802
Cooler Quantity: 1 small
Arrival Temperatures: 7.5 | 8.1 | 8.9 | 8.0 | 7.6 | 6.8
Custody Seal Intact: ☐ Yes ☐ No ☐ N/A
Notes: Ice Packs

Turnaround Time (TAT) Required:

Regular TAT (Most Analysis) ☒ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

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

OR Date Required (Rush Surcharges May Apply):

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

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

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI, DOC (Y/N)	O. Reg 153: Metals & Inorganics	O. Reg 153: Metals - ☐ CrVI, ☐ Hg, ☐ HWSB	O. Reg 153: BTEX, F1-F4 PHCs, Analyze F4G if required ☐ Yes ☐ No	O. Reg 153: PAHs	O. Reg 153: Total PCBs ☐ Aroclor	O. Reg 153: VOC	O. Reg 558: Landfill Disposal Characterization TCLP: ☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐ PCBs	O. Reg 406: Excess Soils SPLP Rainwater Leach ☐ Metals ☐ VOCs ☐ SVOCs	O. Reg 406: Excess Soils Characterization Package pH, ICPMS Metals, BTEX, F1-F4	Salt - EC/SAR	WQA, TSS, Turb	Potentially Hazardous or High Concentration (Y/N)
F2-T Development	2021/09/09	16:30 AM/PM	8	GW	All results to be non-filtered	N											✓	
		AM/PM																
		AM/PM																
		AM/PM																
		AM/PM																
		AM/PM																
		AM/PM																
		AM/PM																
		AM/PM																
		AM/PM																
		AM/PM																

Samples Relinquished By (Print Name and Sign): Peter Moffat	Date 2021/09/10	Time 09:58	Samples Received By (Print Name and Sign): A McAdam G McAdam	Date 21/9/10	Time 9:58am
Samples Relinquished By (Print Name and Sign): Brendan G	Date Sept10/21	Time 215pm	Samples Received By (Print Name and Sign): Brendan G	Date Sept10/21	Time 1240
Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time

Page 1 of 1

Nº: T 124155

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2021-13808

Nov 08, 2021

AGAT Labs
5835 Coopers Ave
Mississauga, ON L4Z 1Y2
Attn: Eva Janzen

Date Samples Received: Oct-29-2021 Client P.O.:

All results have been reviewed and approved by a Qualified Person in accordance with the Saskatchewan Environmental Code, Corrective Action Plan Chapter, for the purposes of certifying a laboratory analysis

Results from Lab Section 3 approved by Tamosiunis, Cindy

---

* Test methods and data are validated by the laboratory's Quality Assurance Program.

* Routine methods follow recognized procedures from sources such as
    * Standard Methods for the Examination of Water and Wastewater APHA AWWA WEF
    * Environment Canada
    * US EPA
    * CANMET

* The results reported relate only to the test samples as provided by the client.

* Samples will be kept for 30 days after the final report is sent. Please contact the lab if you have any special requirements.

* Additional information is available upon request.

* Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

This is a final report.

SASKATCHEWAN RESEARCH COUNCIL

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SRC Group # 2021-13808

Nov 08, 2021

AGAT Labs

5835 Coopers Ave
Mississauga, ON L4Z 1Y2
Attn: Eva Janzen

Date Samples Received: Oct-29-2021 Client P.O.:

51820 10/28/2021 21T822326 3141673 *WATER*

Analyte	Units	51820
Lab Section 3		
Chloramines	mg/L	<0.01

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 14.8 °C upon receipt.

SASKATCHEWAN RESEARCH COUNCIL

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SRC Group # 2021-13808

Nov 08, 2021

AGAT Labs

Analyte Methods

Name	Units	Method
Chloramines	mg/L	CHM-340

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
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www.src.sk.ca/analytical

Nov 08, 2021

This report was generated for samples included in SRC Group # 2021-13808

Quality Control Report

Eva Janzen
AGAT Labs
5835 Coopers Ave
Mississauga, ON L4Z 1Y2

Reference Materials and Standards:

A reference material of known concentration is used whenever possible as either a control sample or control standard and analyzed with each batch of samples. These "QC" results are used to assess the performance of the method and must be within clearly defined limits; otherwise corrective action is required.

QC Analysis	Units	Target Value	Obtained Value
Free chlorine	mg/L	25.0	28.5
Total residual chlorine	mg/L	1.1	1.1

Duplicates:

Duplicates are used to assess problems with precision and help ensure that samples within a given batch were processed appropriately. The difference between duplicates must be within strict limits, otherwise corrective action is required. Please note, the duplicate(s) in this report are duplicates analyzed within a given batch of test samples and may not be from this specific group of samples.

Duplicate Analysis	Units	Sample ID	First Result	Second Result
Chloramines	mg/L	51820	<0.01	<0.01

All quality control results were within the specified limits and considered acceptable.

Approved by Section Supervisor

Your Project #: 21T822326
Your C.O.C. #: N/A

Attention: Eva Janzen

AGAT Laboratories
5835 Coopers Ave
Mississauga, ON
CANADA L4Z 1Y2

Report Date: 2022/01/21
Report #: R6971612
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1V9565
Received: 2021/11/01, 12:45

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
DW Parameters by Alpha Spec.	1	N/A	2021/12/20	BQL SOP-00006	Alpha Spectrometry
Long-lived Gamma Emitters	1	N/A	2021/11/01	BQL SOP-00007	Gamma Spectrometry
Short-lived Gamma Emitters	1	N/A	2021/11/01		Gamma Spectroscopy
Iodine-125 & Iodine-129 in Water	1	N/A	2021/12/17		Gamma Spectroscopy
Drinking Water Parameters by LSC	1	N/A	2021/12/12		LSC
Lead 210	1	N/A	2021/12/06	BQL SOP-00008	GFPC
Polonium-210 by Alpha Spectrometry	1	N/A	2021/11/28	BQL SOP-00006	Alpha Spectrometry
Radium-228 & Thorium-234 in Water	1	N/A	2021/12/15		Gamma Spectroscopy
Radium Isotopes by Alpha Spectrometry (1)	1	N/A	2021/12/17	BQL SOP-00006 BQL SOP-00017 BQL SOP-00032	Alpha Spectrometry
Strontium-90 by Proportional Counting	1	N/A	2021/11/11	BQL SOP-00008	GFPC
Tritium & Carbon-14 by Liq. Sc. Counting	1	N/A	2021/12/16	BQL SOP-00009	LSC
Uranium Isotopes by Alpha Spectrometry	1	N/A	2021/11/22	BQL SOP-00006	Alpha Spectrometry

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.

Your Project #: 21T822326
Your C.O.C. #: N/A

Attention: Eva Janzen

AGAT Laboratories
5835 Coopers Ave
Mississauga, ON
CANADA L4Z 1Y2

Report Date: 2022/01/21
Report #: R6971612
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1V9565
Received: 2021/11/01, 12:45

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Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
(1) Radium-226 results have not been corrected for blanks.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Mayank Nigam, Project Manager
Email: Mayank.Nigam@bureauveritas.com
Phone# (905) 826-3080
==========
This report has been generated and distributed using a secure automated process.
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RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		RCH757		
Sampling Date				
COC Number		N/A		
	UNITS	3141673	RDL	QC Batch
Americium-241	Bq/L	<0.01	0.01	7754425
Bismuth-210	Bq/L	<20	20	7761710
Calcium-45	Bq/L	<20	20	7761710
Cesium-131	Bq/L	<20	20	7761710
Iron-55	Bq/L	<20	20	7761710
Phosphorus-32	Bq/L	<20	20	7761710
Plutonium-238	Bq/L	<0.01	0.01	7754425
Plutonium-239	Bq/L	<0.01	0.01	7754425
Plutonium-240	Bq/L	<0.01	0.01	7754425
Plutonium-241	Bq/L	<5	5	7761710
Polonium-210	Bq/L	<0.010	0.010	7748155
Strontium-89	Bq/L	<20	20	7761710
Sulphur-35	Bq/L	<20	20	7761710
Technetium-99	Bq/L	<20	20	7761710
Thorium-228	Bq/L	<0.01	0.01	7754425
Thorium-230	Bq/L	<0.01	0.01	7754425
Thorium-232	Bq/L	<0.01	0.01	7754425
Uranium-234	Bq/L	<0.010	0.010	7705868
Uranium-235	Bq/L	<0.010	0.010	7705868
Uranium-238	Bq/L	<0.010	0.010	7705868
Yttrium-90	Bq/L	<20	20	7761710
Yttrium-91	Bq/L	<20	20	7761710
Bromine-82	Bq/L	<2	2	7673201
Carbon-14	Bq/L	<20	20	7761708
Cesium-137	Bq/L	<2	2	7673201
Gallium-67	Bq/L	<10	10	7673201
Iodine-125	Bq/L	<1	1	7747947
Iodine-129	Bq/L	<1	1	7747947
Lead-210	Bq/L	<0.10	0.10	7748319
Mercury-197	Bq/L	<5	5	7673201
Molybdenum-99	Bq/L	<3	3	7673201
Radium-224	Bq/L	<0.010	0.010	7753111
Radium-226	Bq/L	<0.010	0.010	7753111
Radium-228	Bq/L	<0.1	0.1	7760725
Rhodium-105	Bq/L	<10	10	7673201
Rubidium-81	Bq/L	<3	3	7673201
Strontium-90	Bq/L	<0.10	0.10	7677288

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		RCH757		
Sampling Date				
COC Number		N/A		
	UNITS	3141673	RDL	QC Batch
Technetium-99m	Bq/L	<2	2	7673201
Tellurium-131m	Bq/L	<3	3	7673201
Thallium-201	Bq/L	<10	10	7673201
Thorium-234	Bq/L	<7	7	7760725
Tritium	Bq/L	<100	100	7761708
Antimony-122	Bq/L	<1	1	7673211
Antimony-124	Bq/L	<1	1	7673211
Antimony-125	Bq/L	<2	2	7673211
Barium-140	Bq/L	<3	3	7673211
Beryllium-7	Bq/L	<6	6	7673211
Calcium-47	Bq/L	<2	2	7673211
Cerium-141	Bq/L	<1	1	7673211
Cerium-144	Bq/L	<3	3	7673211
Cesium-134	Bq/L	<1	1	7673211
Cesium-136	Bq/L	<1	1	7673211
Chromium-51	Bq/L	<5	5	7673211
Cobalt-57	Bq/L	<1	1	7673211
Cobalt-58	Bq/L	<1	1	7673211
Cobalt-60	Bq/L	<1	1	7673211
Gold-198	Bq/L	<1	1	7673211
Indium-111	Bq/L	<1	1	7673211
Iodine-131	Bq/L	<1	1	7673211
Iron-59	Bq/L	<2	2	7673211
Manganese-54	Bq/L	<1	1	7673211
Mercury-203	Bq/L	<1	1	7673211
Neptunium-239	Bq/L	<3	3	7673211
Niobium-95	Bq/L	<1	1	7673211
Rubidium-86	Bq/L	<10	10	7673211
Ruthenium-103	Bq/L	<1	1	7673211
Ruthenium-106	Bq/L	<8	8	7673211
Selenium-75	Bq/L	<1	1	7673211
Silver-108m	Bq/L	<1	1	7673211
Silver-110m	Bq/L	<1	1	7673211
Silver-111	Bq/L	<8	8	7673211
Sodium-22	Bq/L	<1	1	7673211
Strontium-85	Bq/L	<10	10	7673211
Tellurium-129m	Bq/L	<9	9	7673211

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		RCH757		
Sampling Date				
COC Number		N/A		
	UNITS	**3141673**	**RDL**	**QC Batch**
Tellurium-132	Bq/L	<1	1	7673211
Ytterbium-169	Bq/L	<1	1	7673211
Zinc-65	Bq/L	<2	2	7673211
Zirconium-95	Bq/L	<2	2	7673211

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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GENERAL COMMENTS

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
7673201	DS2	QC Standard	Cesium-137	2021/11/04		96	%	N/A
7673201	DS2	Method Blank	Bromine-82	2021/11/04	<2		Bq/L	
			Cesium-137	2021/11/04	<2		Bq/L	
			Gallium-67	2021/11/04	<10		Bq/L	
			Mercury-197	2021/11/04	<5		Bq/L	
			Molybdenum-99	2021/11/04	<3		Bq/L	
			Rhodium-105	2021/11/04	<10		Bq/L	
			Rubidium-81	2021/11/04	<3		Bq/L	
			Technetium-99m	2021/11/04	<2		Bq/L	
			Tellurium-131m	2021/11/04	<3		Bq/L	
			Thallium-201	2021/11/04	<10		Bq/L	
7673211	DS2	QC Standard	Cesium-134	2021/11/04		91	%	N/A
			Cobalt-60	2021/11/04		105	%	N/A
			Iodine-131	2021/11/04		96	%	N/A
7673211	DS2	Method Blank	Antimony-122	2021/11/04	<1		Bq/L	
			Antimony-124	2021/11/04	<1		Bq/L	
			Antimony-125	2021/11/04	<2		Bq/L	
			Barium-140	2021/11/04	<3		Bq/L	
			Beryllium-7	2021/11/04	<6		Bq/L	
			Calcium-47	2021/11/04	<2		Bq/L	
			Cerium-141	2021/11/04	<1		Bq/L	
			Cerium-144	2021/11/04	<3		Bq/L	
			Cesium-134	2021/11/04	<1		Bq/L	
			Cesium-136	2021/11/04	<1		Bq/L	
			Chromium-51	2021/11/04	<5		Bq/L	
			Cobalt-57	2021/11/04	<1		Bq/L	
			Cobalt-58	2021/11/04	<1		Bq/L	
			Cobalt-60	2021/11/04	<1		Bq/L	
			Gold-198	2021/11/04	<1		Bq/L	
			Indium-111	2021/11/04	<1		Bq/L	
			Iodine-131	2021/11/04	<1		Bq/L	
			Iron-59	2021/11/04	<2		Bq/L	
			Manganese-54	2021/11/04	<1		Bq/L	
			Mercury-203	2021/11/04	<1		Bq/L	
			Neptunium-239	2021/11/04	<3		Bq/L	
			Niobium-95	2021/11/04	<1		Bq/L	
			Rubidium-86	2021/11/04	<10		Bq/L	
			Ruthenium-103	2021/11/04	<1		Bq/L	
			Ruthenium-106	2021/11/04	<8		Bq/L	
			Selenium-75	2021/11/04	<1		Bq/L	
			Silver-108m	2021/11/04	<1		Bq/L	
			Silver-110m	2021/11/04	<1		Bq/L	
			Silver-111	2021/11/04	<8		Bq/L	
			Sodium-22	2021/11/04	<1		Bq/L	
			Strontium-85	2021/11/04	<10		Bq/L	
			Tellurium-129m	2021/11/04	<9		Bq/L	
			Tellurium-132	2021/11/04	<1		Bq/L	
			Ytterbium-169	2021/11/04	<1		Bq/L	
			Zinc-65	2021/11/04	<2		Bq/L	
			Zirconium-95	2021/11/04	<2		Bq/L	
7673211	DS2	RPD [RCH757-01]	Antimony-122	2021/11/02	NC		%	N/A
			Antimony-124	2021/11/02	NC		%	N/A
			Antimony-125	2021/11/02	NC		%	N/A
			Barium-140	2021/11/02	NC		%	N/A
			Beryllium-7	2021/11/02	NC		%	N/A

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Calcium-47	2021/11/02	NC		%	N/A
			Cerium-141	2021/11/02	NC		%	N/A
			Cerium-144	2021/11/02	NC		%	N/A
			Cesium-134	2021/11/02	NC		%	N/A
			Cesium-136	2021/11/02	NC		%	N/A
			Chromium-51	2021/11/02	NC		%	N/A
			Cobalt-57	2021/11/02	NC		%	N/A
			Cobalt-58	2021/11/02	NC		%	N/A
			Cobalt-60	2021/11/02	NC		%	N/A
			Gold-198	2021/11/02	NC		%	N/A
			Indium-111	2021/11/02	NC		%	N/A
			Iodine-131	2021/11/02	NC		%	N/A
			Iron-59	2021/11/02	NC		%	N/A
			Manganese-54	2021/11/02	NC		%	N/A
			Mercury-203	2021/11/02	NC		%	N/A
			Neptunium-239	2021/11/02	NC		%	N/A
			Niobium-95	2021/11/02	NC		%	N/A
			Rubidium-86	2021/11/02	NC		%	N/A
			Ruthenium-103	2021/11/02	NC		%	N/A
			Ruthenium-106	2021/11/02	NC		%	N/A
			Selenium-75	2021/11/02	NC		%	N/A
			Silver-108m	2021/11/02	NC		%	N/A
			Silver-110m	2021/11/02	NC		%	N/A
			Silver-111	2021/11/02	NC		%	N/A
			Sodium-22	2021/11/02	NC		%	N/A
			Strontium-85	2021/11/02	NC		%	N/A
			Tellurium-129m	2021/11/02	NC		%	N/A
			Tellurium-132	2021/11/02	NC		%	N/A
			Ytterbium-169	2021/11/02	NC		%	N/A
			Zinc-65	2021/11/02	NC		%	N/A
			Zirconium-95	2021/11/02	NC		%	N/A
7677288	FK1	Spiked Blank	Strontium-90	2021/11/11		104	%	75 - 125
7677288	FK1	Method Blank	Strontium-90	2021/11/11	<0.10		Bq/L	
7677288	FK1	RPD	Strontium-90	2021/11/11	NC		%	N/A
7705868	FK1	Spiked Blank	Uranium-234	2021/11/21		99	%	N/A
			Uranium-235	2021/11/21		108	%	N/A
			Uranium-238	2021/11/21		102	%	N/A
7705868	FK1	Method Blank	Uranium-234	2021/11/21	<0.010		Bq/L	
			Uranium-235	2021/11/21	<0.010		Bq/L	
			Uranium-238	2021/11/21	<0.010		Bq/L	
7705868	FK1	RPD	Uranium-234	2021/11/21	NC		%	N/A
			Uranium-238	2021/11/21	NC		%	N/A
7747947	FK1	QC Standard	Iodine-129	2012/06/21		97	%	N/A
7747947	FK1	Method Blank	Iodine-125	2021/12/16	<1		Bq/L	
			Iodine-129	2021/12/16	<1		Bq/L	
7747947	FK1	RPD [RCH757-01]	Iodine-125	2021/12/20	NC		%	N/A
			Iodine-129	2021/12/20	NC		%	N/A
7748155	FK1	Spiked Blank	Polonium-210	2021/11/28		97	%	74 - 126
7748155	FK1	Method Blank	Polonium-210	2021/11/28	<0.010		Bq/L	
7748155	FK1	RPD	Polonium-210	2021/11/28	NC		%	N/A
7748319	FK1	Spiked Blank	Lead-210	2021/12/06		103	%	80 - 120
7748319	FK1	Method Blank	Lead-210	2021/12/06	<0.10		Bq/L	
7748319	FK1	RPD	Lead-210	2021/12/06	NC		%	N/A
7753111	FK1	QC Standard	Radium-224	2021/12/17		97	%	85 - 115
			Radium-226	2021/12/17		90	%	85 - 115

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
7753111	FK1	Spiked Blank	Radium-226	2021/12/17		97	%	85 - 115
7753111	FK1	Method Blank	Radium-224	2021/12/17	<0.010		Bq/L	
			Radium-226	2021/12/17	<0.010		Bq/L	
7753111	FK1	RPD	Radium-224	2021/12/17	NC		%	N/A
			Radium-226	2021/12/17	NC		%	N/A
7754425	JK2	Spiked Blank	Thorium-228	2021/12/20		93	%	63 - 137
			Thorium-230	2021/12/20		105	%	63 - 137
			Thorium-232	2021/12/20		100	%	63 - 137
7754425	JK2	Method Blank	Americium-241	2021/12/20	<0.01		Bq/L	
			Plutonium-238	2021/12/20	<0.01		Bq/L	
			Plutonium-239	2021/12/20	<0.01		Bq/L	
			Plutonium-240	2021/12/20	<0.01		Bq/L	
			Thorium-228	2021/12/20	<0.01		Bq/L	
			Thorium-230	2021/12/20	<0.01		Bq/L	
			Thorium-232	2021/12/20	<0.01		Bq/L	
7754425	JK2	RPD [RCH757-01]	Americium-241	2021/12/20	NC		%	N/A
			Plutonium-238	2021/12/20	NC		%	N/A
			Plutonium-239	2021/12/20	NC		%	N/A
			Plutonium-240	2021/12/20	NC		%	N/A
			Thorium-228	2021/12/20	NC		%	N/A
			Thorium-230	2021/12/20	NC		%	N/A
			Thorium-232	2021/12/20	NC		%	N/A
7760725	DS2	QC Standard	Radium-228	2021/12/15		102	%	N/A
			Thorium-234	2021/12/15		95	%	N/A
7760725	DS2	Method Blank	Radium-228	2021/12/14	<0.1		Bq/L	
			Thorium-234	2021/12/14	<7		Bq/L	
7761708	DS2	Spiked Blank	Carbon-14	2021/12/16		98	%	80 - 120
			Tritium	2021/12/16		101	%	N/A
7761708	DS2	Method Blank	Carbon-14	2021/12/16	<20		Bq/L	
			Tritium	2021/12/16	<100		Bq/L	
7761708	DS2	RPD [RCH757-01]	Carbon-14	2021/12/16	NC		%	N/A
			Tritium	2021/12/16	NC		%	N/A
7761710	DS2	Method Blank	Bismuth-210	2021/12/12	<20		Bq/L	
			Calcium-45	2021/12/12	<20		Bq/L	
			Cesium-131	2021/12/12	<20		Bq/L	
			Iron-55	2021/12/12	<20		Bq/L	
			Phosphorus-32	2021/12/12	<20		Bq/L	
			Plutonium-241	2021/12/12	<5		Bq/L	
			Strontium-89	2021/12/12	<20		Bq/L	
			Sulphur-35	2021/12/12	<20		Bq/L	
			Technetium-99	2021/12/12	<20		Bq/L	
			Yttrium-90	2021/12/12	<20		Bq/L	
			Yttrium-91	2021/12/12	<20		Bq/L	
7761710	DS2	RPD [RCH757-01]	Bismuth-210	2021/12/12	NC		%	N/A
			Calcium-45	2021/12/12	NC		%	N/A
			Cesium-131	2021/12/12	NC		%	N/A
			Iron-55	2021/12/12	NC		%	N/A
			Phosphorus-32	2021/12/12	NC		%	N/A
			Plutonium-241	2021/12/12	NC		%	N/A
			Strontium-89	2021/12/12	NC		%	N/A
			Sulphur-35	2021/12/12	NC		%	N/A
			Technetium-99	2021/12/12	NC		%	N/A
			Yttrium-90	2021/12/12	NC		%	N/A

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Yttrium-91	2021/12/12	NC		%	N/A

N/A = Not Applicable

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

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

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

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

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

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VALIDATION SIGNATURE PAGE

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



Robert Allen, Scientific Specialist

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

Bureau Veritas Laboratories 6790 Kitimat Rd, Unit 4, Mississauga, ON L5N 5L9 Phone: (905) 826-3080 Fax: (905) 826-4151 Toll Free: 1 877-726-3080 www.bvlabs.com

SGS

Request for Laboratory Services and CHAIN OF CUSTODY (specific SDWA/HPPA - 1st Party)

SGS Environmental Services - Lakefield: 185 Concession St., Lakefield, ON K0L 2H0 Phone: 705-652-2000 Toll Free: 877-747-7658 Fax: 705-652-6365 Web: www.ca.sgs.com

Laboratory Information Section

Received Date (mm/dd/yyyy):	LAB LIMS #: OCT14635NK
Received Time (After Hours Only): OCT 29 2021	Temperature Upon Receipt (°C): 12

Billing & Reporting Information

Invoice/ Receipt to:	Company:	Accounts Payable			Quote #:
	Attention:	AGAT Laboratories - Mississauga			Attached Parameter List: ☐ YES ☐ NO
	Address:	5835 Coopers Avenue, Mississauga, ON, L4Z1Y2			
	Email:	gough@agatlabs.com			**Turnaround Time**
Report to: {3}	Attention:	Eva Janzen, Nathan Berkely	PO #:		Is *Rush Turnaround Time Required? ☐ YES ☑ NO
	Email:	janzen@agatlabs.com. berkeley@agatlabs.com	Job #:	21T822326	Specify:
	Phone:	905-712-5096	Fax:		* Rush TA Requests Require Lab Approval

Drinking Water System Information (Exceedance Reporting Information)

System Name:		**Waterworks/DWS #:**	**Client Lab #:**
Physical Address:		**Contact Phone Number:**	
Contact Name:		**Contact Fax Number:**	
MOH Unit (Ministry of Health):		**Day Care Licence # or SFIS #:**	

Please check the regulation that applies to your water samples: O.Reg. 170/03 ☐ | O.Reg 318/08 O.Reg 319/08 ☐ | O.Reg 243/07 ☐ | Certificate of Approval Requirement ☐ | Samples NOT Regulated ☑

As per the Ontario Safe Drinking Water Act and Health Protection and Promotion Act, the water facility information and the sample information sections **must be filled out prior to processing samples**. Sample Source Codes * indicate whether samples are Reportable or Not Reportable. The laboratory will report all exceedances to the SDWA/HPPA as per sample the applicable regulation and source codes.

Sample Information

Bottle #	Sample Source Code*	Sample Location Name	Check if Re-Sample From an Adverse Report	Date Sampled (mm/dd/yy)	Time Sampled	# of Bottles	Field Total Residual Chlorine	Field Free Residual Chlorine	Analysis Requested (please enter the analysis required below and check off which analysis applies to each sample)				
									Bromate				
1	NR	3141673		Oct 28/21	8:00am	1			x				
2													
3													
4													
5													
6													
7		*Non Reportable Drinking Water											
8													
9													
10													
11						For NP/NPE work please report in mg/L							
12													

Sampled By {1}:	(Name)	(Signature)	Date: ___ ___ /___ ___ /___ ___ (mm/dd/yy)
Relinquished by {2}:	Neal Gorospe	Neal Gorospe	Date: 10 /28 /21 (mm/dd/yy)

*** Sample Source Codes**

DW-Distribution Water: Water in the DWS that is in the distribution system. These samples are reportable under applicable Ontario drinking water regulations
TW-Treated Water: Water in the DWS at the point of entry to the distribution system. These samples are reportable under applicable Ontario drinking water regulations
RW-Raw Water: Water source for a DWS that has a treatment system. These samples are not for consumption and not reportable under applicable Ontario drinking water regulations
RWFC-Raw Water For Consumption: Water source for a DWS that **does not** have a treatment system. These samples **are for consumption** and are reportable under applicable Ontario drinking water regulations
TAP-Tap Water: Water taken for the purposes of lead testing under O.Reg. 243/07
NR-Not Reportable: Water samples that are not reportable under applicable Ontario drinking water regulations

Note: {1} Submission of samples to SGS is acknowledgement that you have been provided direction on sample collection/handling and transportation of samples. {2} Submission of samples to SGS is considered authorization for completion of work. Signatures may appear on this form or be retained on file in the contract, or in an alternative format (e.g. shipping documents). {3} Results may be sent by email to an unlimited number of addresses for no additional cost. Fax is available upon request.

This document is issued by the Company under its General Conditions of Service accessible at http://www.sgs.com/terms_and_conditions.htm. (Printed copies are available upon request.) Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

Revision #: 3.1
Date of Issue: 06 Sep. 2011

PP 333203788877

1000 GK

SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

05-November-2021

AGAT Laboratories - Mississauga
Attn : Eva Janzen / Nathan Berkeley

5835 Coopers Avenue
Mississauga, ON
L4Z 1Y2, Canada

Phone: 905-712-5096
Fax:

Date Rec. : 29 October 2021
LR Report: **CA14635-OCT21**
Reference: PO#: 183300 - AGAT Job # 21T822326

Copy: #1

CERTIFICATE OF ANALYSIS
Final Report

Sample ID	Sample Date & Time	Temperature Upon Receipt °C	Bromate mg/L
1: Analysis Start Date		---	29-Oct-21
2: Analysis Start Time		---	14:53
3: Analysis Completed Date		---	04-Nov-21
4: Analysis Completed Time		---	06:54
5: QC - Blank		---	< 0.005
6: QC - STD % Recovery		---	97%
7: QC - DUP % RPD		---	ND
8: RL		---	0.005
9: NR 3141673	28-Oct-21 08:00	12.0	< 0.005

RL - SGS Reporting Limit
NR - Not regulated / reportable under applicable Provincial drinking water regulations as per client.
ND - Not Detected

Kimberley Didsbury
Project Specialist,
Environment, Health & Safety

OnLine LIMS

0002702326

Data reported represents the sample submitted to SGS. Reproduction of this analytical report in full or in part is prohibited without prior written approval. Please refer to SGS General Conditions of Services located at https://www.sgs.ca/en/terms-and-conditions (Printed copies are available upon request.)
Test method information available upon request. "Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples. SGS Canada Inc. Environment-Health & Safety statement of conformity decision rule does not consider uncertainty when analytical results are compared to a specified standard or regulation.

TOWNSHIP OF CENTRE WELLINGTON
ATTN: Matthew Alexander c/o Centre Wellington
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4

Date Received: 28-OCT-21
Report Date: 30-NOV-21
Version: INTERNAL

Client Phone: 226-821-4906

Certificate of Analysis

Lab Work Order #: L2656807

Project P.O. #: NOT SUBMITTED
Job Reference: 60664299
C of C Numbers:
Legal Site Desc:

DRAFT

Candice Hunter
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2
L2656807-1 F2-T-PT							
Sampled By: CLIENT on 28-OCT-21 @ 08:00							
Matrix: WATER							
Anions and Nutrients							
Chlorate	<0.010		0.010	mg/L	02-NOV-21	1.0	
Chlorite	<0.010		0.010	mg/L	02-NOV-21	1.0	
Fluoride (F)	0.95	DLDS	0.50	mg/L	01-NOV-21	1.5	
Nitrate (as N)	<0.10	DLDS	0.10	mg/L	01-NOV-21	10	
Nitrite (as N)	<0.050	DLDS	0.050	mg/L	01-NOV-21	1	
Cyanides							
Cyanide, Total	<0.0020		0.0020	mg/L	29-OCT-21		
Bacteriological Tests							
Escherichia Coli	0		0	MPN/100mL	29-OCT-21	0	
Total Coliforms	0		0	MPN/100mL	29-OCT-21	0	
Total Metals							
Antimony (Sb)	<0.60		0.60	ug/L	02-NOV-21	6	
Arsenic (As)	<1.0		1.0	ug/L	02-NOV-21	10.0	
Barium (Ba)	15		10	ug/L	02-NOV-21	1000	
Boron (B)	59		50	ug/L	02-NOV-21	5000	
Cadmium (Cd)	<0.10		0.10	ug/L	02-NOV-21	5	
Chromium (Cr)	<1.0		1.0	ug/L	02-NOV-21	50	
Lead (Pb)	<1.0		1.0	ug/L	02-NOV-21	10	
Selenium (Se)	<5.0		5.0	ug/L	02-NOV-21	50	
Sodium (Na)	23.6		0.50	mg/L	02-NOV-21	*20	200
Uranium (U)	<5.0		5.0	ug/L	02-NOV-21	20	
Polycyclic Aromatic Hydrocarbons							
Benzo(a)pyrene	<0.0050		0.0050	ug/L	02-NOV-21	0.01	
Surrogate: Chrysene d12	95.9		50-150	%	02-NOV-21		
Haloacetic Acids							
Dibromoacetic Acid	<1.0		1.0	ug/L	03-NOV-21		
Dichloroacetic Acid	<1.0		1.0	ug/L	03-NOV-21		
Total Haloacetic Acids 5	<2.2		2.2	ug/L	03-NOV-21	80	
Bromoacetic Acid	<1.0		1.0	ug/L	03-NOV-21		
Chloroacetic acid	<1.0		1.0	ug/L	03-NOV-21		
Trichloroacetic Acid	<1.0		1.0	ug/L	03-NOV-21		
Semi-Volatile Organics							
N-Nitrosodimethylamine	<0.00090		0.00090	ug/L	03-NOV-21	0.009	
Surrogate: N-Nitrosodimethylamine-d6	62.0		50-150	%	03-NOV-21		
Herbicides							
AMPA	<0.50		0.50	ug/L	02-NOV-21		
Bromoxynil	<0.20		0.20	ug/L	29-OCT-21	5	
2,4-D	<0.20		0.20	ug/L	29-OCT-21	100	
Dicamba	<0.20		0.20	ug/L	29-OCT-21	120	
Dinoseb	<0.20		0.20	ug/L	29-OCT-21	10	
Glyphosate	<5.0		5.0	ug/L	02-NOV-21	280	
MCPA	<0.20		0.20	ug/L	29-OCT-21	100	
Picloram	<0.20		0.20	ug/L	29-OCT-21	190	
2,4,5-TP	<0.20		0.20	ug/L	29-OCT-21		

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Drinking Water Regulation (ODWQS) JAN.1,2020 = [Suite] - ON-DW-STANDARD+GUIDELINES

#1: Schedule 1 (Microbiological) and 2 (Chemical) Standards (JAN,2020) **#2: Ontario DW Aesthetic and Operational Guidelines (June, 2006)**

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2		
L2656807-1 F2-T-PT Sampled By: CLIENT on 28-OCT-21 @ 08:00 Matrix: WATER									
Herbicides									
Surrogate: 2,4-Dichlorophenylacetic Acid	90.0		50-130	%	29-OCT-21				
Pesticides									
Alachlor	<0.10		0.10	ug/L	08-NOV-21	5			
Atrazine	<0.10		0.10	ug/L	08-NOV-21				
Atrazine & Metabolites	<0.20		0.20	ug/L	08-NOV-21	5			
Azinphos-methyl	<0.10		0.10	ug/L	08-NOV-21	20			
Carbaryl	<0.20		0.20	ug/L	08-NOV-21	90			
Carbofuran	<0.20		0.20	ug/L	08-NOV-21	90			
Chlorpyriphos	<0.10		0.10	ug/L	08-NOV-21	90			
Diazinon	<0.10		0.10	ug/L	08-NOV-21	20			
2,4-Dichlorophenol	<0.30		0.30	ug/L	04-NOV-21	900	0.3		
Dimethoate	<0.10		0.10	ug/L	08-NOV-21	20			
Diquat	<1.0		1.0	ug/L	01-NOV-21	70			
Diuron	<1.0		1.0	ug/L	02-NOV-21	150			
Atrazine-desethyl	<0.10		0.10	ug/L	08-NOV-21				
Malathion	<0.10		0.10	ug/L	08-NOV-21	190			
Diclofop-methyl	<0.20		0.20	ug/L	08-NOV-21	9			
Metolachlor	<0.10		0.10	ug/L	08-NOV-21	50			
Metribuzin	<0.10		0.10	ug/L	08-NOV-21	80			
Paraquat	<1.0		1.0	ug/L	01-NOV-21	10			
Pentachlorophenol	<0.50		0.50	ug/L	04-NOV-21	60	30		
Phorate	<0.10		0.10	ug/L	08-NOV-21	2			
Prometryne	<0.10		0.10	ug/L	08-NOV-21	1			
Simazine	<0.10		0.10	ug/L	08-NOV-21	10			
Terbufos	<0.20		0.20	ug/L	08-NOV-21	1			
2,3,4,6-Tetrachlorophenol	<0.50		0.50	ug/L	04-NOV-21	100	1		
Triallate	<0.10		0.10	ug/L	08-NOV-21	230			
2,4,6-Trichlorophenol	<0.50		0.50	ug/L	04-NOV-21	5	2		
Trifluralin	<0.10		0.10	ug/L	08-NOV-21	45			
Surrogate: 2-Fluorobiphenyl	85.1		40-130	%	08-NOV-21				
Surrogate: 2,4,6-Tribromophenol	101.1		40-150	%	04-NOV-21				
L2656807-2 F2-T-PT (RESAMPLE) Sampled By: CLIENT on 29-OCT-21 @ 08:00 Matrix: WATER						#1	#2		
Extractable Metals									
Mercury	<0.10		0.10	ug/L	02-NOV-21	1			
Volatile Organic Compounds									
Benzene	<0.50		0.50	ug/L	02-NOV-21	1			
Carbon tetrachloride	<0.20		0.20	ug/L	02-NOV-21	2			
Monochlorobenzene	<0.50		0.50	ug/L	02-NOV-21	80	30		
1,2-Dichlorobenzene	<0.50		0.50	ug/L	02-NOV-21	200	3		
1,4-Dichlorobenzene	<0.50		0.50	ug/L	02-NOV-21	5	1		
1,2-Dichloroethane	<0.50		0.50	ug/L	02-NOV-21	5			
1,1-dichloroethylene (vinylidene chlorid	<0.50		0.50	ug/L	02-NOV-21	14			

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Drinking Water Regulation (ODWQS) JAN.1,2020 = [Suite] - ON-DW-STANDARD+GUIDELINES

#1: Schedule 1 (Microbiological) and 2 (Chemical) Standards (JAN,2020) **#2: Ontario DW Aesthetic and Operational Guidelines (June, 2006)**

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2
L2656807-2 F2-T-PT (RESAMPLE)							
Sampled By: CLIENT on 29-OCT-21 @ 08:00							
Matrix: WATER							
Volatile Organic Compounds							
Dichloromethane	<5.0		5.0	ug/L	02-NOV-21	50	
Ethylbenzene	<0.50		0.50	ug/L	02-NOV-21	140	2.4
Tetrachloroethylene (perchloroethylene)	<0.50		0.50	ug/L	02-NOV-21	10	
Toluene	<0.50		0.50	ug/L	02-NOV-21	60	24
Trichloroethylene	<0.50		0.50	ug/L	02-NOV-21	5	
Vinyl chloride	<0.20		0.20	ug/L	02-NOV-21	1	
o-xylene	<0.50		0.50	ug/L	02-NOV-21		
m/p-xylene	<1.0		1.0	ug/L	02-NOV-21		
Xylenes (Total)	<1.5		1.5	ug/L	02-NOV-21	90	300
Surrogate: 4-Bromofluorobenzene	89.8		70-130	%	02-NOV-21		
Surrogate: 1,4-Difluorobenzene	97.9		50-150	%	02-NOV-21		
Surrogate: 1,4-Difluorobenzene	97.9		70-130	%	02-NOV-21		
Trihalomethanes							
Bromodichloromethane	<2.0		2.0	ug/L	02-NOV-21		
Bromoform	<2.0		2.0	ug/L	02-NOV-21		
Dibromochloromethane	<2.0		2.0	ug/L	02-NOV-21		
Chloroform	<2.0		2.0	ug/L	02-NOV-21		
Total THMs	<4.0		4.0	ug/L	02-NOV-21	100	
Polychlorinated Biphenyls							
Aroclor 1242	<0.020		0.020	ug/L	02-NOV-21		
Aroclor 1254	<0.020		0.020	ug/L	02-NOV-21		
Aroclor 1260	<0.020		0.020	ug/L	02-NOV-21		
Surrogate: Decachlorobiphenyl	91.0		50-150	%	02-NOV-21		
Total PCBs	<0.035		0.035	ug/L	02-NOV-21	3	
Surrogate: Tetrachloro-m-xylene	94.8		50-150	%	02-NOV-21		
Organochlorine Pesticides							
Aldrin	<0.0080		0.0080	ug/L	02-NOV-21		
alpha-BHC	<0.0080		0.0080	ug/L	02-NOV-21		
gamma-hexachlorocyclohexane	<0.0080		0.0080	ug/L	02-NOV-21		
a-chlordane	<0.0080		0.0080	ug/L	02-NOV-21		
g-chlordane	<0.0080		0.0080	ug/L	02-NOV-21		
pp-DDD	<0.004		0.004	ug/L	02-NOV-21		
o,p-DDE	<0.0040		0.0040	ug/L	02-NOV-21		
pp-DDE	<0.004		0.004	ug/L	02-NOV-21		
op-DDT	<0.0040		0.0040	ug/L	02-NOV-21		
pp-DDT	<0.0040		0.0040	ug/L	02-NOV-21		
Endosulfan I	<0.0070		0.0070	ug/L	02-NOV-21		
Endosulfan II	<0.0070		0.0070	ug/L	02-NOV-21		
Endosulfan Sulfate	<0.0070		0.0070	ug/L	02-NOV-21		
Endrin	<0.010		0.010	ug/L	02-NOV-21		
Heptachlor	<0.0080		0.0080	ug/L	02-NOV-21		
Heptachlor Epoxide	<0.0080		0.0080	ug/L	02-NOV-21		
Hexachlorobenzene	<0.0080		0.0080	ug/L	02-NOV-21		
Methoxychlor	<0.0080		0.0080	ug/L	02-NOV-21	900	
Mirex	<0.0080		0.0080	ug/L	02-NOV-21		

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Drinking Water Regulation (ODWQS) JAN.1,2020 = [Suite] - ON-DW-STANDARD+GUIDELINES

#1: Schedule 1 (Microbiological) and 2 (Chemical) Standards (JAN,2020) **#2: Ontario DW Aesthetic and Operational Guidelines (June, 2006)**

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	Guideline Limits #2		
L2656807-2 F2-T-PT (RESAMPLE)									
Sampled By: CLIENT on 29-OCT-21 @ 08:00									
Matrix: WATER									
Organochlorine Pesticides									
Oxychlordane	<0.0080		0.0080	ug/L	02-NOV-21				
Surrogate: Decachlorobiphenyl	107.2		50-150	%	02-NOV-21				
Surrogate: Tetrachloro-m-xylene	102.9		50-150	%	02-NOV-21				

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Drinking Water Regulation (ODWQS) JAN.1,2020 = [Suite] - ON-DW-STANDARD+GUIDELINES

#1: Schedule 1 (Microbiological) and 2 (Chemical) Standards (JAN,2020) **#2: Ontario DW Aesthetic and Operational Guidelines (June, 2006)**

Reference Information

Sample Parameter Qualifier key listed:

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference***
ACIDS-ONT-DW-WT	Water	O.Reg 170/03 Acids	SW846 8270
Pesticides are extracted from an aqueous sample using separate aliquots of solvent, extracts are concentrated down to a certain volume and analyzed on the GC/MSD.			
BAP-ONT-DW-WT	Water	Benzo(a)pyrene in Drinking Water	SW 846 8270
CHLORATE-IC-DW-WT	Water	Chlorate by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
CHLORITE-IC-DW-WT	Water	Chlorite by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
CN-TOT-ONT-DW-WT	Water	Cyanide, Total	ISO 14403-2
Total cyanide is determined by the combination of UV digestion and distillation. Cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex. When using this method, high levels of thiocyanate in samples can cause false positives at ~1-2% of the thiocyanate concentration. For samples with detectable cyanide analyzed by this method, ALS recommends analysis for thiocyanate to check for this potential interference. Ontario Drinking Water samples are not filtered during analysis.			
DIQUAT-ONT-DW-WT	Water	Diquat in Water by LC/MS-MS	E3503
An aliquot of the sample is taken and internal standard is added. The sample is analyzed by LC/MS/MS.			
DIURON-ONT-DW-WT	Water	Diuron in Drinking Water	E3501
An aliquot of water sample is diluted 1:1 using acetonitrile and analyzed using LC/MS/MS			
EC-SCREEN-WT	Water	Conductivity Screen (Internal Use Only)	APHA 2510
Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.			
F-DW-IC-WT	Water	Fluoride in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
GLYPHOSATE-ONT-DW-WT	Water	Glyphosate in Drinking Water	MOE E3500
This analysis is carried out using procedures adapted from ON MOE E3500 "Glyphosate". Glyphosate is determined by direct injection by LC-MS/MS on a sample that bas been derivatized.			
HAA-DW-LCMS-WT	Water	Haloacetic Acids - Ontario DW List	MOECC E3478
An aliquot of sample is fortified with formic acid and analyzed by direct inject via Electro Spray Ionization MS/MS detection using Triple Quadrupole MS/MS detector.			
HAA5-SUM-DW-CALC-WT	Water		CALCULATION
Total Haloacetic Acids 5 (HAA5) represents the sum of monobromoacetic acid, monochloroacetic acid, dibromoacetic acid, dichloroacetic acid and trichloroacetic acid. For the purpose of calculation, results less than the detection limit (DL) are treated as zero.			
HG-T-ONT-DW-WT	Water	Mercury (Hg)	EPA 1631E (mod)
MET-ONT-DW-WT	Water	Drinking Water Metals	EPA 6020A
MISC-ONT-DW-WT	Water	O.Reg 170/03 Miscellaneous Pesticides	SW846 8270
Pesticides are extracted from an aqueous sample using separate aliquots of solvent, extracts are concentrated down to a certain volume and analyzed on the GC/MSD.			
NDMA-ONTDW-WT	Water	NDMA to meet Ont Reg 170/03	QWI-ORG/WP239
An aliquot of sample is solid phase extracted followed by liquid chromatography tandem mass spectrometry instead of direct injection.			

Reference Information

NO2-DW-IC-WT	Water	Nitrite in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-DW-IC-WT	Water	Nitrate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

OCP-ROUTINE-DW-WT	Water	Pesticides, Organochlorine in Water	SW846 8270

Samples are extracted using a solvent mixture and the resulting extracts are analyzed on GC/MSD

PAHERB-ONT-DW-WT	Water	O.Reg 170/03 PA Herbicides	MOE E3552

Water samples are analyzed by direct injection without sample preparation using liquid chromatography tandem mass spectrometry (LC-MS/MS).

PARAQUAT-ONT-DW-WT	Water	Paraquat in Water by LC/MS-MS	E3503

An aliquot of the sample is taken and internal standard is added. The sample is analyzed by LC/MS/MS.

PCB-ONT-DW-WT	Water	O.Reg 170/03 PCBs	EPA 8270

PCBs are extracted from an aqueous sample at neutral pH with aliquots of dichloromethane using a modified separatory funnel technique. The extracts are analyzed by GC/MSD.

TC,EC-QT51-DW-WT	Water	Total Coliform and E. Coli	APHA 9223B

This analysis is carried out using procedures adapted from APHA Method 9223 "Enzyme Substrate Coliform Test". E. coli and Total Coliform are determined simultaneously. The sample is mixed with a mixture of hydrolyzable substrates and then sealed in a multi-well packet. The packet is incubated for 18 or 24 hours and then the number of wells exhibiting a positive response are counted. The final result is obtained by comparing the positive responses to a probability table.

THM-ONT-DW-WT	Water	Trihalomethanes	SW846 8260

Liquid samples are analyzed by headspace GC/MSD.

THM-SUM-DW-CALC-WT	Water	Total Trihalomethanes (THMs)	CALCULATION

Total Trihalomethanes (THMs) represents the sum of bromodichloromethane, bromoform, chlorodibromomethane and chloroform. For the purpose of calculation, results less than the detection limit (DL) are treated as zero.

TURB-MET-WT	Water	Turbidity on preserved metals sample	APHA 2130 B

Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.

VOC-ONT-DW-WT	Water	Volatile Organics (O.Reg 170/03)	SW846 8260

Liquid samples are analyzed by headspace GC/MSD.

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

Chain of Custody numbers:

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

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

Reference Information

GLOSSARY OF REPORT TERMS

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

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

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guideline limits are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.

Quality Control Report

Workorder: L2656807 Report Date: 30-NOV-21

Client: TOWNSHIP OF CENTRE WELLINGTON
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4
Contact: Matthew Alexander c/o Centre Wellington

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACIDS-ONT-DW-WT	**Water**							
Batch R5635233								
WG3650243-2 LCS								
2,4-Dichlorophenol			95.9		%		50-140	03-NOV-21
2,4,6-Trichlorophenol			97.2		%		50-140	03-NOV-21
2,3,4,6-Tetrachlorophenol			92.5		%		50-140	03-NOV-21
Pentachlorophenol			119.5		%		60-130	03-NOV-21
WG3650243-1 MB								
2,4-Dichlorophenol			<0.30		ug/L		0.3	03-NOV-21
2,4,6-Trichlorophenol			<0.50		ug/L		0.5	03-NOV-21
2,3,4,6-Tetrachlorophenol			<0.50		ug/L		0.5	03-NOV-21
Pentachlorophenol			<0.50		ug/L		0.5	03-NOV-21
Surrogate: 2,4,6-Tribromophenol			92.1		%		40-150	03-NOV-21
BAP-ONT-DW-WT	**Water**							
Batch R5634292								
WG3649560-2 LCS								
Benzo(a)pyrene			78.2		%		60-130	02-NOV-21
WG3649560-1 MB								
Benzo(a)pyrene			<0.0050		ug/L		0.005	02-NOV-21
Surrogate: Chrysene d12			99.8		%		50-150	02-NOV-21
CHLORATE-IC-DW-WT	**Water**							
Batch R5634938								
WG3650575-3 DUP		**WG3650575-5**						
Chlorate		<0.010	<0.010	RPD-NA	mg/L	N/A	20	02-NOV-21
WG3650575-2 LCS								
Chlorate			99.1		%		85-115	02-NOV-21
WG3650575-1 MB								
Chlorate			<0.010		mg/L		0.01	02-NOV-21
WG3650575-4 MS		**WG3650575-5**						
Chlorate			95.0		%		75-125	02-NOV-21
CHLORITE-IC-DW-WT	**Water**							
Batch R5634938								
WG3650575-3 DUP		**WG3650575-5**						
Chlorite		<0.010	<0.010	RPD-NA	mg/L	N/A	20	02-NOV-21
WG3650575-2 LCS								
Chlorite			102.3		%		85-115	02-NOV-21
WG3650575-1 MB								
Chlorite			<0.010		mg/L		0.01	02-NOV-21
WG3650575-4 MS		**WG3650575-5**						

Quality Control Report

Client: TOWNSHIP OF CENTRE WELLINGTON
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4
Contact: Matthew Alexander c/o Centre Wellington

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CHLORITE-IC-DW-WT	**Water**							
Batch R5634938								
WG3650575-4 MS		**WG3650575-5**						
Chlorite			90.7		%		75-125	02-NOV-21
CN-TOT-ONT-DW-WT	**Water**							
Batch R5633500								
WG3648574-19 DUP		**WG3648574-18**						
Cyanide, Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	29-OCT-21
WG3648574-17 LCS								
Cyanide, Total			97.7		%		80-120	29-OCT-21
WG3648574-16 MB								
Cyanide, Total			<0.0020		mg/L		0.002	29-OCT-21
WG3648574-20 MS		**WG3648574-18**						
Cyanide, Total			102.7		%		70-130	29-OCT-21
DIQUAT-ONT-DW-WT	**Water**							
Batch R5633999								
WG3649847-3 DUP		**WG3649847-5**						
Diquat		<1.0	<1.0	RPD-NA	ug/L	N/A	30	01-NOV-21
WG3649847-2 LCS								
Diquat			114.2		%		70-130	01-NOV-21
WG3649847-1 MB								
Diquat			<1.0		ug/L		1	01-NOV-21
WG3649847-4 MS		**WG3649847-5**						
Diquat			91.1		%		70-130	01-NOV-21
DIURON-ONT-DW-WT	**Water**							
Batch R5634139								
WG3650015-3 DUP		**WG3650015-5**						
Diuron		<1.0	<1.0	RPD-NA	ug/L	N/A	30	02-NOV-21
WG3650015-2 LCS								
Diuron			105.4		%		70-130	02-NOV-21
WG3650015-1 MB								
Diuron			<1.0		ug/L		1	02-NOV-21
WG3650015-4 MS		**WG3650015-5**						
Diuron			101.5		%		70-130	02-NOV-21
F-DW-IC-WT	**Water**							

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Quality Control Report

Client: TOWNSHIP OF CENTRE WELLINGTON
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4
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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F-DW-IC-WT	**Water**							
Batch R5634301								
WG3649968-9 DUP		**WG3649968-8**						
Fluoride (F)		<0.10	<0.10	RPD-NA	mg/L	N/A	20	01-NOV-21
WG3649968-7 LCS								
Fluoride (F)			102.5		%		90-110	01-NOV-21
WG3649968-6 MB								
Fluoride (F)			<0.10		mg/L		0.1	01-NOV-21
WG3649968-10 MS		**WG3649968-8**						
Fluoride (F)			99.0		%		75-125	01-NOV-21
GLYPHOSATE-ONT-DW-WT	**Water**							
Batch R5634650								
WG3649751-3 DUP		**L2656451-2**						
Glyphosate		<5.0	<5.0	RPD-NA	ug/L	N/A	30	02-NOV-21
AMPA		<0.50	<0.50	RPD-NA	ug/L	N/A	40	02-NOV-21
WG3649751-2 LCS								
Glyphosate			96.4		%		70-130	02-NOV-21
AMPA			97.6		%		70-130	02-NOV-21
WG3649751-1 MB								
Glyphosate			<5.0		ug/L		5	02-NOV-21
AMPA			<0.50		ug/L		0.5	02-NOV-21
WG3649751-4 MS		**L2656451-2**						
Glyphosate			97.0		%		70-130	02-NOV-21
AMPA			88.3		%		70-130	02-NOV-21
HAA-DW-LCMS-WT	**Water**							
Batch R5634844								
WG3650532-2 LCS								
Bromoacetic Acid			73.5		%		70-130	02-NOV-21
Chloroacetic acid			89.8		%		70-130	02-NOV-21
Dibromoacetic Acid			75.0		%		70-130	02-NOV-21
Dichloroacetic Acid			86.9		%		70-130	02-NOV-21
Trichloroacetic Acid			86.9		%		70-130	02-NOV-21
WG3650532-1 MB								
Bromoacetic Acid			<1.0		ug/L		1	02-NOV-21
Chloroacetic acid			<1.0		ug/L		1	02-NOV-21
Dibromoacetic Acid			<1.0		ug/L		1	02-NOV-21
Dichloroacetic Acid			<1.0		ug/L		1	02-NOV-21
Trichloroacetic Acid			<1.0		ug/L		1	02-NOV-21

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Quality Control Report

Client: TOWNSHIP OF CENTRE WELLINGTON
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4
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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HAA-DW-LCMS-WT	**Water**							
Batch R5634844								
WG3650532-3 MS		**L2655472-2**						
Bromoacetic Acid			70.6		%		70-130	02-NOV-21
Chloroacetic acid			N/A	MS-B	%		-	02-NOV-21
Dibromoacetic Acid			86.1		%		70-130	02-NOV-21
Dichloroacetic Acid			N/A	MS-B	%		-	02-NOV-21
Trichloroacetic Acid			N/A	MS-B	%		-	02-NOV-21
WG3650532-4 MSD		**WG3650532-3**						
Bromoacetic Acid		70.6	76.9		%	8.5	50	02-NOV-21
Dibromoacetic Acid		86.1	89.3		%	3.7	50	02-NOV-21
HG-T-ONT-DW-WT	**Water**							
Batch R5634372								
WG3649856-4 DUP		**WG3649856-3**						
Mercury		<0.10	<0.10	RPD-NA	ug/L	N/A	20	02-NOV-21
WG3649856-2 LCS								
Mercury			104.0		%		80-120	02-NOV-21
WG3649856-1 MB								
Mercury			<0.10		ug/L		0.1	02-NOV-21
WG3649856-6 MS		**WG3649856-5**						
Mercury			101.0		%		70-130	02-NOV-21
MET-ONT-DW-WT	**Water**							
Batch R5634831								
WG3650707-4 DUP		**WG3650707-3**						
Antimony (Sb)		<0.60	<0.60	RPD-NA	ug/L	N/A	25	02-NOV-21
Arsenic (As)		<1.0	<1.0	RPD-NA	ug/L	N/A	25	02-NOV-21
Barium (Ba)		32	32		ug/L	0.9	25	02-NOV-21
Boron (B)		<50	<50	RPD-NA	ug/L	N/A	25	02-NOV-21
Cadmium (Cd)		<0.10	<0.10	RPD-NA	ug/L	N/A	25	02-NOV-21
Chromium (Cr)		<1.0	<1.0	RPD-NA	ug/L	N/A	25	02-NOV-21
Lead (Pb)		73.9	74.8		ug/L	1.2	25	02-NOV-21
Selenium (Se)		<1.0	<1.0	RPD-NA	ug/L	N/A	25	02-NOV-21
Sodium (Na)		12.0	12.2		mg/L	1.9	25	02-NOV-21
Uranium (U)		<2.0	<2.0	RPD-NA	ug/L	N/A	25	02-NOV-21
WG3650707-2 LCS								
Antimony (Sb)			101.1		%		70-130	02-NOV-21
Arsenic (As)			102.0		%		70-130	02-NOV-21

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Quality Control Report

Client: TOWNSHIP OF CENTRE WELLINGTON
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4
Contact: Matthew Alexander c/o Centre Wellington

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-ONT-DW-WT	**Water**							
Batch R5634831								
WG3650707-2 LCS								
Barium (Ba)			103.3		%		70-130	02-NOV-21
Boron (B)			90.9		%		70-130	02-NOV-21
Cadmium (Cd)			108.3		%		70-130	02-NOV-21
Chromium (Cr)			100.6		%		70-130	02-NOV-21
Lead (Pb)			97.7		%		70-130	02-NOV-21
Selenium (Se)			102.9		%		70-130	02-NOV-21
Sodium (Na)			104.8		%		70-130	02-NOV-21
Uranium (U)			95.7		%		70-130	02-NOV-21
WG3650707-1 MB								
Antimony (Sb)			<0.60		ug/L		0.6	02-NOV-21
Arsenic (As)			<1.0		ug/L		1	02-NOV-21
Barium (Ba)			<10		ug/L		10	02-NOV-21
Boron (B)			<50		ug/L		50	02-NOV-21
Cadmium (Cd)			<0.10		ug/L		0.1	02-NOV-21
Chromium (Cr)			<1.0		ug/L		1	02-NOV-21
Lead (Pb)			<1.0		ug/L		1	02-NOV-21
Selenium (Se)			<1.0		ug/L		1	02-NOV-21
Sodium (Na)			<0.50		mg/L		0.5	02-NOV-21
Uranium (U)			<2.0		ug/L		2	02-NOV-21
WG3650707-5 MS		**WG3650707-3**						
Antimony (Sb)			100.7		%		70-130	02-NOV-21
Arsenic (As)			103.8		%		70-130	02-NOV-21
Barium (Ba)			N/A	MS-B	%		-	02-NOV-21
Boron (B)			92.4		%		70-130	02-NOV-21
Cadmium (Cd)			104.7		%		70-130	02-NOV-21
Chromium (Cr)			101.0		%		70-130	02-NOV-21
Lead (Pb)			N/A	MS-B	%		-	02-NOV-21
Selenium (Se)			107.5		%		70-130	02-NOV-21
Sodium (Na)			N/A	MS-B	%		-	02-NOV-21
Uranium (U)			96.7		%		70-130	02-NOV-21
MISC-ONT-DW-WT	**Water**							

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Quality Control Report

Client: TOWNSHIP OF CENTRE WELLINGTON
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4
Contact: Matthew Alexander c/o Centre Wellington

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MISC-ONT-DW-WT	**Water**							
Batch R5637728								
WG3652227-2 LCS								
Alachlor			112.2		%		60-130	08-NOV-21
Atrazine			107.3		%		60-130	08-NOV-21
Atrazine-desethyl			57.1		%		50-130	08-NOV-21
Azinphos-methyl			127.6		%		60-140	08-NOV-21
Carbaryl			129.7		%		50-140	08-NOV-21
Carbofuran			113.4		%		60-140	08-NOV-21
Chlorpyriphos			89.0		%		60-130	08-NOV-21
Diazinon			89.3		%		60-130	08-NOV-21
Diclofop-methyl			77.7		%		60-140	08-NOV-21
Dimethoate			95.9		%		60-130	08-NOV-21
Malathion			111.5		%		60-130	08-NOV-21
Metribuzin			109.0		%		60-130	08-NOV-21
Metolachlor			118.7		%		60-130	08-NOV-21
Phorate			99.8		%		30-140	08-NOV-21
Prometryne			101.0		%		60-130	08-NOV-21
Simazine			107.6		%		60-130	08-NOV-21
Terbufos			92.3		%		60-130	08-NOV-21
Triallate			88.3		%		60-130	08-NOV-21
Trifluralin			88.3		%		60-130	08-NOV-21
WG3652227-1 MB								
Alachlor			<0.10		ug/L		0.1	08-NOV-21
Atrazine			<0.10		ug/L		0.1	08-NOV-21
Atrazine-desethyl			<0.10		ug/L		0.1	08-NOV-21
Azinphos-methyl			<0.10		ug/L		0.1	08-NOV-21
Carbaryl			<0.20		ug/L		0.2	08-NOV-21
Carbofuran			<0.20		ug/L		0.2	08-NOV-21
Chlorpyriphos			<0.10		ug/L		0.1	08-NOV-21
Diazinon			<0.10		ug/L		0.1	08-NOV-21
Diclofop-methyl			<0.20		ug/L		0.2	08-NOV-21
Dimethoate			<0.10		ug/L		0.1	08-NOV-21
Malathion			<0.10		ug/L		0.1	08-NOV-21
Metribuzin			<0.10		ug/L		0.1	08-NOV-21
Metolachlor			<0.10		ug/L		0.1	08-NOV-21
Phorate			<0.10		ug/L		0.1	08-NOV-21

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Quality Control Report

Client: TOWNSHIP OF CENTRE WELLINGTON
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4
Contact: Matthew Alexander c/o Centre Wellington

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MISC-ONT-DW-WT	**Water**							
Batch R5637728								
WG3652227-1 MB								
Prometryne			<0.10		ug/L		0.1	08-NOV-21
Simazine			<0.10		ug/L		0.1	08-NOV-21
Terbufos			<0.20		ug/L		0.2	08-NOV-21
Triallate			<0.10		ug/L		0.1	08-NOV-21
Trifluralin			<0.10		ug/L		0.1	08-NOV-21
Surrogate: 2-Fluorobiphenyl			87.1		%		40-130	08-NOV-21
NDMA-ONTDW-WT	**Water**							
Batch R5635633								
WG3650285-3 DUP		**L2656807-1**						
N-Nitrosodimethylamine		<0.00090	<0.00090	RPD-NA	ug/L	N/A	30	03-NOV-21
WG3650285-2 LCS								
N-Nitrosodimethylamine			72.9		%		50-150	03-NOV-21
WG3650285-1 MB								
N-Nitrosodimethylamine			<0.00090		ug/L		0.0009	03-NOV-21
Surrogate: N-Nitrosodimethylamine-d6			69.9		%		50-150	03-NOV-21
NO2-DW-IC-WT	**Water**							
Batch R5634301								
WG3649968-9 DUP		**WG3649968-8**						
Nitrite (as N)		<0.010	<0.010	RPD-NA	mg/L	N/A	20	01-NOV-21
WG3649968-7 LCS								
Nitrite (as N)			97.9		%		90-110	01-NOV-21
WG3649968-6 MB								
Nitrite (as N)			<0.010		mg/L		0.01	01-NOV-21
WG3649968-10 MS		**WG3649968-8**						
Nitrite (as N)			103.3		%		75-125	01-NOV-21
NO3-DW-IC-WT	**Water**							
Batch R5634301								
WG3649968-9 DUP		**WG3649968-8**						
Nitrate (as N)		1.28	1.28		mg/L	0.1	20	01-NOV-21
WG3649968-7 LCS								
Nitrate (as N)			97.8		%		90-110	01-NOV-21
WG3649968-6 MB								
Nitrate (as N)			<0.020		mg/L		0.02	01-NOV-21
WG3649968-10 MS		**WG3649968-8**						
Nitrate (as N)			103.2		%		75-125	01-NOV-21
	Water							

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Quality Control Report

Client: TOWNSHIP OF CENTRE WELLINGTON
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4
Contact: Matthew Alexander c/o Centre Wellington

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
OCP-ROUTINE-DW-WT	**Water**							
Batch	**R5634570**							
WG3649551-2	**LCS**							
Aldrin			128.6		%		50-150	02-NOV-21
gamma-hexachlorocyclohexane			118.9		%		50-150	02-NOV-21
a-chlordane			136.4		%		50-150	02-NOV-21
g-chlordane			137.2		%		50-150	02-NOV-21
alpha-BHC			124.1		%		50-150	02-NOV-21
o,p-DDE			121.7		%		50-150	02-NOV-21
op-DDT			69.6		%		50-150	02-NOV-21
pp-DDD			137.7		%		50-150	02-NOV-21
pp-DDE			131.9		%		50-150	02-NOV-21
pp-DDT			53.0		%		50-150	02-NOV-21
Endosulfan I			138.3		%		50-150	02-NOV-21
Endosulfan II			133.4		%		50-150	02-NOV-21
Endosulfan Sulfate			126.4		%		50-150	02-NOV-21
Endrin			54.9		%		50-150	02-NOV-21
Heptachlor			81.1		%		50-150	02-NOV-21
Heptachlor Epoxide			131.4		%		50-150	02-NOV-21
Hexachlorobenzene			118.8		%		50-150	02-NOV-21
Methoxychlor			61.4		%		50-150	02-NOV-21
Mirex			145.2		%		50-150	02-NOV-21
Oxychlordane			117.3		%		50-150	02-NOV-21
WG3649551-1	**MB**							
Aldrin			<0.0080		ug/L		0.008	02-NOV-21
gamma-hexachlorocyclohexane			<0.0080		ug/L		0.008	02-NOV-21
a-chlordane			<0.0080		ug/L		0.008	02-NOV-21
g-chlordane			<0.0080		ug/L		0.008	02-NOV-21
alpha-BHC			<0.0080		ug/L		0.008	02-NOV-21
o,p-DDE			<0.0040		ug/L		0.004	02-NOV-21
op-DDT			<0.0040		ug/L		0.004	02-NOV-21
pp-DDD			<0.004		ug/L		0.004	02-NOV-21
pp-DDE			<0.004		ug/L		0.004	02-NOV-21
pp-DDT			<0.0040		ug/L		0.004	02-NOV-21
Endosulfan I			<0.0070		ug/L		0.007	02-NOV-21
Endosulfan II			<0.0070		ug/L		0.007	02-NOV-21
Endosulfan Sulfate			<0.0070		ug/L		0.007	02-NOV-21

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Quality Control Report

Client: TOWNSHIP OF CENTRE WELLINGTON
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4
Contact: Matthew Alexander c/o Centre Wellington

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
OCP-ROUTINE-DW-WT	**Water**							
Batch R5634570								
WG3649551-1 MB								
Endrin			<0.010		ug/L		0.01	02-NOV-21
Heptachlor			<0.0080		ug/L		0.008	02-NOV-21
Heptachlor Epoxide			<0.0080		ug/L		0.008	02-NOV-21
Hexachlorobenzene			<0.0080		ug/L		0.008	02-NOV-21
Methoxychlor			<0.0080		ug/L		0.008	02-NOV-21
Mirex			<0.0080		ug/L		0.008	02-NOV-21
Oxychlordane			<0.0080		ug/L		0.008	02-NOV-21
Surrogate: Decachlorobiphenyl			108.1		%		50-150	02-NOV-21
Surrogate: Tetrachloro-m-xylene			99.5		%		50-150	02-NOV-21
PAHERB-ONT-DW-WT	**Water**							
Batch R5632959								
WG3647919-13 DUP		**WG3647919-15**						
Dicamba		<0.20	<0.20	RPD-NA	ug/L	N/A	30	29-OCT-21
Bromoxynil		<0.20	<0.20	RPD-NA	ug/L	N/A	30	29-OCT-21
2,4-D		<0.20	<0.20	RPD-NA	ug/L	N/A	30	29-OCT-21
2,4,5-TP		<0.20	<0.20	RPD-NA	ug/L	N/A	50	29-OCT-21
Dinoseb		<0.20	<0.20	RPD-NA	ug/L	N/A	50	29-OCT-21
Picloram		<0.20	<0.20	RPD-NA	ug/L	N/A	30	29-OCT-21
MCPA		<0.20	<0.20	RPD-NA	ug/L	N/A	30	29-OCT-21
WG3647919-12 LCS								
Dicamba			127.0		%		65-130	29-OCT-21
Dicamba			118.2		%		65-130	30-OCT-21
Bromoxynil			112.0		%		65-130	29-OCT-21
Bromoxynil			88.9		%		65-130	30-OCT-21
2,4-D			134.5	LCS-H	%		65-130	29-OCT-21
2,4-D			114.9		%		65-130	30-OCT-21
2,4,5-TP			159.1	LCS-H	%		50-150	29-OCT-21
2,4,5-TP			116.5		%		50-150	30-OCT-21
Dinoseb			104.7		%		50-150	29-OCT-21
Dinoseb			92.7		%		50-150	30-OCT-21
Picloram			128.0		%		50-150	29-OCT-21
Picloram			95.6		%		50-150	30-OCT-21
MCPA			101.9		%		65-130	29-OCT-21
MCPA			103.2		%		65-130	30-OCT-21

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Quality Control Report

Client: TOWNSHIP OF CENTRE WELLINGTON
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4

Contact: Matthew Alexander c/o Centre Wellington

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAHERB-ONT-DW-WT	**Water**							
Batch R5632959								
WG3647919-11 MB								
Dicamba			<0.20		ug/L		0.2	29-OCT-21
Bromoxynil			<0.20		ug/L		0.2	29-OCT-21
2,4-D			<0.20		ug/L		0.2	29-OCT-21
2,4,5-TP			<0.20		ug/L		0.2	29-OCT-21
Dinoseb			<0.20		ug/L		0.2	29-OCT-21
Picloram			<0.20		ug/L		0.2	29-OCT-21
MCPA			<0.20		ug/L		0.2	29-OCT-21
Surrogate: 2,4-Dichlorophenylacetic Acid			95.5		%		50-130	29-OCT-21
WG3647919-14 MS		**WG3647919-15**						
Dicamba			112.5		%		50-150	29-OCT-21
Bromoxynil			90.5		%		50-150	29-OCT-21
2,4-D			98.9		%		50-150	29-OCT-21
2,4,5-TP			129.3		%		50-150	29-OCT-21
Dinoseb			105.8		%		50-150	29-OCT-21
Picloram			108.7		%		50-150	29-OCT-21
MCPA			110.3		%		50-150	29-OCT-21
PARAQUAT-ONT-DW-WT	**Water**							
Batch R5633999								
WG3649847-3 DUP		**WG3649847-5**						
Paraquat		<1.0	<1.0	RPD-NA	ug/L	N/A	30	01-NOV-21
WG3649847-2 LCS								
Paraquat			113.4		%		70-130	01-NOV-21
WG3649847-1 MB								
Paraquat			<1.0		ug/L		1	01-NOV-21
WG3649847-4 MS		**WG3649847-5**						
Paraquat			97.1		%		70-130	01-NOV-21
PCB-ONT-DW-WT	**Water**							
Batch R5634507								
WG3649551-2 LCS								
Aroclor 1242			108.3		%		60-140	02-NOV-21
Aroclor 1254			99.0		%		60-140	02-NOV-21
Aroclor 1260			103.7		%		60-140	02-NOV-21
WG3649551-1 MB								
Aroclor 1242			<0.020		ug/L		0.02	02-NOV-21
Aroclor 1254			<0.020		ug/L		0.02	02-NOV-21

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Quality Control Report

Client: TOWNSHIP OF CENTRE WELLINGTON
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4
Contact: Matthew Alexander c/o Centre Wellington

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PCB-ONT-DW-WT	**Water**							
Batch R5634507								
WG3649551-1 MB								
Aroclor 1260			<0.020		ug/L		0.02	02-NOV-21
Surrogate: Decachlorobiphenyl			107.8		%		50-150	02-NOV-21
Surrogate: Tetrachloro-m-xylene			91.0		%		50-150	02-NOV-21
TC,EC-QT51-DW-WT	**Water**							
Batch R5633162								
WG3648459-3 DUP		**L2656573-2**						
Total Coliforms		0	0		MPN/100mL	0.0	65	29-OCT-21
Escherichia Coli		0	0		MPN/100mL	0.0	65	29-OCT-21
WG3648459-1 MB								
Total Coliforms			0		MPN/100mL		1	29-OCT-21
Escherichia Coli			0		MPN/100mL		1	29-OCT-21
THM-ONT-DW-WT	**Water**							
Batch R5634248								
WG3650010-4 DUP		**WG3650010-3**						
Chloroform		<2.0	<2.0	RPD-NA	ug/L	N/A	30	02-NOV-21
Bromodichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	02-NOV-21
Dibromochloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	02-NOV-21
Bromoform		<2.0	<2.0	RPD-NA	ug/L	N/A	30	02-NOV-21
WG3650010-1 LCS								
Chloroform			108.6		%		70-130	02-NOV-21
Bromodichloromethane			111.3		%		70-130	02-NOV-21
Dibromochloromethane			100.2		%		70-130	02-NOV-21
Bromoform			97.5		%		70-130	02-NOV-21
WG3650010-2 MB								
Chloroform			<2.0		ug/L		2	02-NOV-21
Bromodichloromethane			<2.0		ug/L		2	02-NOV-21
Dibromochloromethane			<2.0		ug/L		2	02-NOV-21
Bromoform			<2.0		ug/L		2	02-NOV-21
Surrogate: 1,4-Difluorobenzene			98.2		%		50-150	02-NOV-21
WG3650010-5 MS		**WG3650010-3**						
Chloroform			106.7		%		70-130	02-NOV-21
Bromodichloromethane			107.1		%		70-130	02-NOV-21
Dibromochloromethane			92.3		%		70-130	02-NOV-21
Bromoform			85.8		%		70-130	02-NOV-21

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Quality Control Report

Client: TOWNSHIP OF CENTRE WELLINGTON
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4
Contact: Matthew Alexander c/o Centre Wellington

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-ONT-DW-WT	**Water**							
Batch R5634248								
WG3650010-4 DUP		**WG3650010-3**						
1,1-dichloroethylene (vinylidene chlorid		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-NOV-21
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-NOV-21
1,2-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-NOV-21
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-NOV-21
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-NOV-21
Carbon tetrachloride		<0.20	<0.20	RPD-NA	ug/L	N/A	30	02-NOV-21
Dichloromethane		<5.0	<5.0	RPD-NA	ug/L	N/A	30	02-NOV-21
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-NOV-21
Monochlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-NOV-21
Tetrachloroethylene (perchloroethylene)		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-NOV-21
Toluene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-NOV-21
Trichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-NOV-21
m/p-xylene		<1.0	<1.0	RPD-NA	ug/L	N/A	30	02-NOV-21
o-xylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	02-NOV-21
Vinyl chloride		<0.20	<0.20	RPD-NA	ug/L	N/A	30	02-NOV-21
WG3650010-1 LCS								
1,1-dichloroethylene (vinylidene chlorid			109.7		%		70-130	02-NOV-21
1,2-Dichlorobenzene			98.8		%		70-130	02-NOV-21
1,2-Dichloroethane			109.4		%		70-130	02-NOV-21
1,4-Dichlorobenzene			101.4		%		70-130	02-NOV-21
Benzene			106.3		%		70-130	02-NOV-21
Carbon tetrachloride			104.2		%		70-130	02-NOV-21
Dichloromethane			115.0		%		70-130	02-NOV-21
Ethylbenzene			100.4		%		70-130	02-NOV-21
Monochlorobenzene			102.5		%		70-130	02-NOV-21
Tetrachloroethylene (perchloroethylene)			97.9		%		70-130	02-NOV-21
Toluene			103.6		%		70-130	02-NOV-21
Trichloroethylene			100.2		%		70-130	02-NOV-21
m/p-xylene			107.7		%		70-130	02-NOV-21
o-xylene			99.6		%		70-130	02-NOV-21
Vinyl chloride			100.1		%		60-140	02-NOV-21
WG3650010-2 MB								
1,1-dichloroethylene (vinylidene chlorid			<0.50		ug/L		0.5	02-NOV-21
							0.5	

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Quality Control Report

Client: TOWNSHIP OF CENTRE WELLINGTON
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4
Contact: Matthew Alexander c/o Centre Wellington

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-ONT-DW-WT	**Water**							
Batch R5634248								
WG3650010-2 MB								
1,2-Dichlorobenzene			<0.50		ug/L		0.5	02-NOV-21
1,2-Dichloroethane			<0.50		ug/L		0.5	02-NOV-21
1,4-Dichlorobenzene			<0.50		ug/L		0.5	02-NOV-21
Surrogate: 1,4-Difluorobenzene			98.2		%		70-130	02-NOV-21
Benzene			<0.50		ug/L		0.5	02-NOV-21
Carbon tetrachloride			<0.20		ug/L		0.2	02-NOV-21
Dichloromethane			<5.0		ug/L		5	02-NOV-21
Ethylbenzene			<0.50		ug/L		0.5	02-NOV-21
Monochlorobenzene			<0.50		ug/L		0.5	02-NOV-21
Tetrachloroethylene (perchloroethylene)			<0.50		ug/L		0.5	02-NOV-21
Toluene			<0.50		ug/L		0.5	02-NOV-21
Trichloroethylene			<0.50		ug/L		0.5	02-NOV-21
m/p-xylene			<1.0		ug/L		1	02-NOV-21
o-xylene			<0.50		ug/L		0.5	02-NOV-21
Vinyl chloride			<0.20		ug/L		0.2	02-NOV-21
Surrogate: 4-Bromofluorobenzene			91.5		%		70-130	02-NOV-21
WG3650010-5 MS		**WG3650010-3**						
1,1-dichloroethylene (vinylidene chlorid			108.3		%		70-130	02-NOV-21
1,2-Dichlorobenzene			96.6		%		70-130	02-NOV-21
1,2-Dichloroethane			99.3		%		70-130	02-NOV-21
1,4-Dichlorobenzene			99.3		%		70-130	02-NOV-21
Benzene			102.9		%		70-130	02-NOV-21
Carbon tetrachloride			105.6		%		70-130	02-NOV-21
Dichloromethane			108.6		%		70-130	02-NOV-21
Ethylbenzene			97.0		%		70-130	02-NOV-21
Monochlorobenzene			100.8		%		70-130	02-NOV-21
Tetrachloroethylene (perchloroethylene)			96.5		%		70-130	02-NOV-21
Toluene			97.8		%		50-150	02-NOV-21
Trichloroethylene			98.1		%		70-130	02-NOV-21
m/p-xylene			107.7		%		70-130	02-NOV-21
o-xylene			95.5		%		50-150	02-NOV-21
Vinyl chloride			94.1		%		70-130	02-NOV-21

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Quality Control Report

Workorder: L2656807 Report Date: 30-NOV-21

Client: TOWNSHIP OF CENTRE WELLINGTON
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4
Contact: Matthew Alexander c/o Centre Wellington

Legend:

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

Sample Parameter Qualifier Definitions:

Qualifier	Description
LCS-H	Lab Control Sample recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

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Hold Time Exceedances:

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

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

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

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

AECOM

F2-R Well Certificate of Analysis

TOWNSHIP OF CENTRE WELLINGTON
ATTN: Matthew Alexander c/o Centre Wellington
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4

Date Received: 02-SEP-22
Report Date: 03-OCT-22 10:52 (MT)
Version: FINAL

Client Phone: 226-821-4906

Certificate of Analysis

Lab Work Order #: L2731392

Project P.O. #: NOT SUBMITTED
Job Reference:
C of C Numbers: 20-1007481
Legal Site Desc:

Candice Hunter
Account Manager

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Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits			
L2731392-1	F2-R									
Sampled By:	CLIENT on 02-SEP-22 @ 09:35									
Matrix:	WATER									
Dioxins and Furans										
	2,3,7,8-TCDD	<0.43	[U]	0.43	pg/L	15-SEP-22				
	1,2,3,7,8-PeCDD	<0.32	[U]	0.32	pg/L	15-SEP-22				
	1,2,3,4,7,8-HxCDD	<0.27	[U]	0.27	pg/L	15-SEP-22				
	1,2,3,6,7,8-HxCDD	<0.25	[U]	0.25	pg/L	15-SEP-22				
	1,2,3,7,8,9-HxCDD	<0.25	[U]	0.25	pg/L	15-SEP-22				
	1,2,3,4,6,7,8-HpCDD	<0.50	M,U	0.50	pg/L	15-SEP-22				
	OCDD	1.9	M,J,B	1.1	pg/L	15-SEP-22				
	Total-TCDD	<0.43	[U]	0.43	pg/L	15-SEP-22				
	Total TCDD # Homologues	0			No Unit	15-SEP-22				
	Total-PeCDD	<0.32	[U]	0.32	pg/L	15-SEP-22				
	Total PeCDD # Homologues	0			No Unit	15-SEP-22				
	Total-HxCDD	<0.27	[U]	0.27	pg/L	15-SEP-22				
	Total HxCDD # Homologues	0			No Unit	15-SEP-22				
	Total-HpCDD	<0.50	[U]	0.50	pg/L	15-SEP-22				
	Total HpCDD # Homologues	0			No Unit	15-SEP-22				
	2,3,7,8-TCDF	<0.32	[U]	0.32	pg/L	15-SEP-22				
	1,2,3,7,8-PeCDF	<0.23	[U]	0.23	pg/L	15-SEP-22				
	2,3,4,7,8-PeCDF	<0.20	[U]	0.20	pg/L	15-SEP-22				
	1,2,3,4,7,8-HxCDF	<0.24	[U]	0.24	pg/L	15-SEP-22				
	1,2,3,6,7,8-HxCDF	<0.23	[U]	0.23	pg/L	15-SEP-22				
	1,2,3,7,8,9-HxCDF	<0.36	[U]	0.36	pg/L	15-SEP-22				
	2,3,4,6,7,8-HxCDF	<0.25	[U]	0.25	pg/L	15-SEP-22				
	1,2,3,4,6,7,8-HpCDF	<0.23	[U]	0.23	pg/L	15-SEP-22				
	1,2,3,4,7,8,9-HpCDF	<0.36	[U]	0.36	pg/L	15-SEP-22				
	OCDF	<0.65	[U]	0.65	pg/L	15-SEP-22				
	Total-TCDF	<0.32	[U]	0.32	pg/L	15-SEP-22				
	Total TCDF # Homologues	0			No Unit	15-SEP-22				
	Total-PeCDF	<0.23	[U]	0.23	pg/L	15-SEP-22				
	Total PeCDF # Homologues	0			No Unit	15-SEP-22				
	Total-HxCDF	<0.36	[U]	0.36	pg/L	15-SEP-22				
	Total HxCDF # Homologues	0			No Unit	15-SEP-22				
	Total-HpCDF	<0.36	[U]	0.36	pg/L	15-SEP-22				
	Total HpCDF # Homologues	0			No Unit	15-SEP-22				
	Surrogate: 13C12-2,3,7,8-TCDD	70.0		20-175	%	15-SEP-22				
	Surrogate: 13C12-1,2,3,7,8-PeCDD	77.0		21-227	%	15-SEP-22				
	Surrogate: 13C12-1,2,3,4,7,8-HxCDD	77.0		21-193	%	15-SEP-22				
	Surrogate: 13C12-1,2,3,6,7,8-HxCDD	90.0		25-163	%	15-SEP-22				
	Surrogate: 13C12-1,2,3,4,6,7,8-HpCDD	80.0		23-166	%	15-SEP-22				
	Surrogate: 13C12-OCDD	75.0		13-138	%	15-SEP-22				
	Surrogate: 13C12-2,3,7,8-TCDF	70.0		22-152	%	15-SEP-22				
	Surrogate: 13C12-1,2,3,7,8-PeCDF	72.0		24-185	%	15-SEP-22				
	Surrogate: 13C12-2,3,4,7,8-PeCDF	72.0		21-178	%	15-SEP-22				
	Surrogate: 13C12-1,2,3,4,7,8-HxCDF	78.0		26-152	%	15-SEP-22				
	Surrogate: 13C12-1,2,3,6,7,8-HxCDF	92.0		21-159	%	15-SEP-22				
	Surrogate: 13C12-2,3,4,6,7,8-HxCDF	80.0		17-205	%	15-SEP-22				
	Surrogate: 13C12-1,2,3,7,8,9-HxCDF	79.0		28-136	%	15-SEP-22				
	Surrogate: 13C12-1,2,3,4,6,7,8-HpCDF	96.0		21-158	%	15-SEP-22				
	Surrogate: 13C12-1,2,3,4,7,8,9-HpCDF	84.0		20-186	%	15-SEP-22				

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

= [Suite] - ON-DW-STANDARD+GUIDELINES

#1: Schedule 1 (Microbiological) and 2 (Chemical) Standards (JAN,2020) **#2: Ontario DW Aesthetic and Operational Guidelines (June, 2006)**

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits			
L2731392-1	F2-R									
Sampled By:	CLIENT on 02-SEP-22 @ 09:35									
Matrix:	WATER									
Dioxins and Furans										
	Surrogate: 37Cl4-2,3,7,8-TCDD (Cleanup)	69.0		31-191	%	15-SEP-22				
Toxic Equivalency										
	Lower Bound PCDD/F TEQ (WHO 2005)	0.000558			pg/L	15-SEP-22				
	Mid Point PCDD/F TEQ (WHO 2005)	0.523			pg/L	15-SEP-22				
	Upper Bound PCDD/F TEQ (WHO 2005)	1.05			pg/L	15-SEP-22				

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

= [Suite] - ON-DW-STANDARD+GUIDELINES

#1: Schedule 1 (Microbiological) and 2 (Chemical) Standards (JAN,2020) **#2: Ontario DW Aesthetic and Operational Guidelines (June, 2006)**

Reference Information

Sample Parameter Qualifier key listed:

Qualifier	Description
[U]	The analyte was not detected above the EDL.
M,U	A peak has been manually integrated, and the analyte was not detected above the EDL.
M,J,B	A peak has been manually integrated. Target analyte was detected below the calibrated range but above the EDL. Compound was detected in the method blank at >10% of the sample concentration.

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference***
DX-1613B-HRMS-BU	Water	Dioxins and Furans HR 1613B	USEPA 1613B

Samples are filtered if required. Solids are extracted by Soxhlet using toluene. The liquid portion is extracted by liquid/liquid extraction using dichloromethane. The extracts are prepared using column chromatography, reduced in volume and analyzed by isotope-dilution GC/HRMS

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

Chain of Custody numbers:

20-1007481

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

Laboratory Definition Code	Laboratory Location	Laboratory Definition Code	Laboratory Location
BU	ALS ENVIRONMENTAL - BURLINGTON, ONTARIO, CANADA		

GLOSSARY OF REPORT TERMS

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

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

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guideline limits are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.

Quality Control Report

Workorder: L2731392 Report Date: 03-OCT-22

Client: TOWNSHIP OF CENTRE WELLINGTON
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4
Contact: Matthew Alexander c/o Centre Wellington

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
DX-1613B-HRMS-BU	**Water**							
Batch R5859036								
WG3761666-2 LCS								
2,3,7,8-TCDD			86.0		%		67-158	14-SEP-22
1,2,3,7,8-PeCDD			106.0		%		70-142	14-SEP-22
1,2,3,4,7,8-HxCDD			98.0		%		70-164	14-SEP-22
1,2,3,6,7,8-HxCDD			89.0		%		76-134	14-SEP-22
1,2,3,7,8,9-HxCDD			93.0		%		64-162	14-SEP-22
1,2,3,4,6,7,8-HpCDD			102.0		%		70-140	14-SEP-22
OCDD			97.0		%		78-144	14-SEP-22
2,3,7,8-TCDF			98.0		%		75-158	14-SEP-22
1,2,3,7,8-PeCDF			107.0		%		80-134	14-SEP-22
2,3,4,7,8-PeCDF			102.0		%		68-160	14-SEP-22
1,2,3,4,7,8-HxCDF			98.0		%		72-134	14-SEP-22
1,2,3,6,7,8-HxCDF			95.0		%		84-130	14-SEP-22
2,3,4,6,7,8-HxCDF			100.0		%		70-156	14-SEP-22
1,2,3,7,8,9-HxCDF			102.0		%		78-130	14-SEP-22
1,2,3,4,6,7,8-HpCDF			102.0		%		82-122	14-SEP-22
1,2,3,4,7,8,9-HpCDF			106.0		%		78-138	14-SEP-22
OCDF			108.0		%		63-170	14-SEP-22

Quality Control Report

Workorder: L2731392 Report Date: 03-OCT-22

Client: TOWNSHIP OF CENTRE WELLINGTON
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4
Contact: Matthew Alexander c/o Centre Wellington

Legend:

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

Hold Time Exceedances:

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

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

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

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

Chain of Custody (COC) / Analytical Request Form

COC Number: 20 - 1007481

Canada Toll Free: 1 800 668 9878

Page 1 of 1

www.alsglobal.com

L2731392-COFC

Report To	Contact and company name below will appear on the final report
Company:	AECOM
Contact:	Matthew Alexander
Phone:	
	Company address below will appear on the final report
Street:	50 Sportsworld Crossing
City/Province:	Kitchener ON
Postal Code:	N2P 0A4
Invoice To	Same as Report To ☐ YES ☑ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	Township of Centre Wellington
Contact:	Adam Gilmore

Project Information

ALS Account # / Quote #:	Q87626 + Q89943
Job #:	
PO / AFE:	L2731392
LSD:	
ALS Lab Work Order # (ALS use only):	WT2212951

Reports / Recipients

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)

Merge QC/QCI Reports with COA ☐ YES ☐ NO ☐ N/A

☑ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☐ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: matthew.alexander@aecom.com

Email 2: AGilmore@centrewellington.ca

Email 3:

Invoice Recipients

Select Invoice Distribution: ☐ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax:

Email 2:

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	
ALS Contact:	Sampler:

Turnaround

☑ Routine [R] if received by

☐ 4 day [P4] if received by 3

☐ 3 day [P3] if received by

☐ 2 day [P2] if received by

☐ 1 day [E] if received by 3pm

☐ Same day [E2] if received by 10am M-S - 200% rush surcharge. Additional fees may apply to rush requests on weekends, statutory holidays and non-routine tests

Date and Time Required for all E&P TATs:

For all tests with rush TATs requested, please contact your AM to confirm availability.

Analysis Request

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

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Q87626 + Q89943	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	FZ-R	02-09-22	09:35	GW	32	✓			

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human consumption/ use? ☐ YES ☑ NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

ODWQS

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☑ ICE ☐ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments Identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
				11.9	11.0		

SHIPMENT RELEASE (client use)

Released by:	Date:	Time:
Peter McIntosh	Sept 2, 2022	11:15

INITIAL SHIPMENT RECEPTION (ALS use only)

Received by:	Date:	Time:

FINAL SHIPMENT RECEPTION (ALS use only)

Received by:	Date:	Time:
AP	2 Sep 22	11:45

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

AUG 2020 FRONT

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

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

CERTIFICATE OF ANALYSIS (GUIDELINE EVALUATION)

Work Order	: **WT2212954**	Page	: 1 of 19
Client	: **Township of Centre Wellington**	Laboratory	: Waterloo - Environmental
Contact	: Matthew Alexander	Account Manager	: Candice Hunter
Address	: 1 MacDonald Square Elora ON Canada N0B 1S0	Address	: 60 Northland Road, Unit 1 Waterloo, Ontario Canada N2V 2B8
Telephone	: ----	Telephone	: +1 519 886 6910
Project	: ----	Date Samples Received	: 02-Sep-2022 11:45
PO	: ----	Date Analysis Commenced	: 02-Sep-2022
C-O-C number	: 20-1007481	Issue Date	: 16-Sep-2022 11:04
Sampler	: ----		
Site	: ----		
Quote number	: Special Non - Regulated Water		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Guideline Comparison

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Adam Boettger	Team Leader - LCMS	LCMS, Waterloo, Ontario
David Tremblett	Team Leader - Volatiles	Air Quality, Waterloo, Ontario
Greg Pokocky	Supervisor - Inorganic	Inorganics, Waterloo, Ontario
Greg Pokocky	Supervisor - Inorganic	Metals, Waterloo, Ontario
Jennifer Siemiernik		Metals, Waterloo, Ontario
Jeremy Gingras	Team Leader - Semi-Volatile Instrumentation	Organics, Waterloo, Ontario
Jihun Jeon	Laboratory Analyst	LCMS, Waterloo, Ontario
Jocelyn Kennedy	Department Manager - Semi-Volatile Organics	Organics, Waterloo, Ontario
Michelle Michalchuk	Analyst	Organics, Winnipeg, Manitoba
Phouvana Chounramany	Analyst	Air Quality, Waterloo, Ontario
Ruby Sujeepan		Microbiology, Waterloo, Ontario
Sarah Birch	Team Leader - Volatiles	Organics, Waterloo, Ontario

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.
Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guidelines are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.

Key : LOR: Limit of Reporting (detection limit).

Unit	*Description*
µg/L	micrograms per litre
CU	colour units (1 CU = 1 mg/L Pt)
mg/L	milligrams per litre
MPN/100mL	most probable number per 100 mL
NTU	nephelometric turbidity units
pH units	pH units
ppmv	parts per million (volume/volume)

>: greater than.
<: less than.
Red shading is applied where the result is greater than the Guideline Upper Limit or the result is lower than the Guideline Lower Limit.
For drinking water samples, Red shading is applied where the result for E.coli, fecal or total coliforms is greater than or equal to the Guideline Upper Limit.

Workorder Comments

<1 or Not Detected with LOR of 1 equals Zero (0).

Qualifiers

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).

Analytical Results Evaluation

Matrix: **Water**

Analyte	CAS Number	Unit	Client sample ID: F2-R	----	----	----	----	----	----
			Sampling date/time: 02-Sep-2022 09:35	----	----	----	----	----	----
			Sub-Matrix: Water	----	----	----	----	----	----
			WT2212954-001	--------	--------	--------	--------	--------	--------
Physical Tests									
colour, true	----	CU	<2.0	----	----	----	----	----	----
hardness (as CaCO3), from total Ca/Mg	----	mg/L	637	----	----	----	----	----	----
pH	----	pH units	8.24	----	----	----	----	----	----
solids, total dissolved [TDS]	----	mg/L	850 DLDS	----	----	----	----	----	----
turbidity	----	NTU	<1.00	----	----	----	----	----	----
alkalinity, total (as CaCO3)	----	mg/L	238	----	----	----	----	----	----
Anions and Nutrients									
chloride	16887-00-6	mg/L	51.7 DLDS	----	----	----	----	----	----
fluoride	16984-48-8	mg/L	0.742 DLDS	----	----	----	----	----	----
nitrate (as N)	14797-55-8	mg/L	<0.100 DLDS	----	----	----	----	----	----
nitrite (as N)	14797-65-0	mg/L	<0.050 DLDS	----	----	----	----	----	----
nitrogen, total organic	----	mg/L	<0.123	----	----	----	----	----	----
sulfate (as SO4)	14808-79-8	mg/L	361 DLDS	----	----	----	----	----	----
ammonia, total (as N)	7664-41-7	mg/L	0.114	----	----	----	----	----	----
Kjeldahl nitrogen, total [TKN]	----	mg/L	0.120	----	----	----	----	----	----
Cyanides									
cyanide, strong acid dissociable (total)	----	mg/L	<0.0050	----	----	----	----	----	----
Organic / Inorganic Carbon									
carbon, dissolved organic [DOC]	----	mg/L	0.93	----	----	----	----	----	----
Total Sulfides									
sulfide, total (as S)	18496-25-8	mg/L	<0.018	----	----	----	----	----	----
Microbiological Tests									
coliforms, total	----	MPN/100mL	Not Detected	----	----	----	----	----	----
coliforms, Escherichia coli [E. coli]	----	MPN/100mL	Not Detected	----	----	----	----	----	----
Total Metals									
aluminum, total	7429-90-5	mg/L	0.0067	----	----	----	----	----	----

Analytical Results Evaluation

Matrix: **Water**

Analyte	CAS Number	Unit	Client sample ID	F2-R	----	----	----	----	----	----
			Sampling date/time	02-Sep-2022 09:35	----	----	----	----	----	----
			Sub-Matrix	Water	----	----	----	----	----	----
				WT2212954-001	--------	--------	--------	--------	--------	--------
Total Metals										
antimony, total	7440-36-0	µg/L		<0.60	----	----	----	----	----	----
antimony, total	7440-36-0	mg/L		0.00020	----	----	----	----	----	----
arsenic, total	7440-38-2	µg/L		<1.0	----	----	----	----	----	----
arsenic, total	7440-38-2	mg/L		0.00074	----	----	----	----	----	----
barium, total	7440-39-3	µg/L		40	----	----	----	----	----	----
barium, total	7440-39-3	mg/L		0.0372	----	----	----	----	----	----
beryllium, total	7440-41-7	mg/L		<0.000020	----	----	----	----	----	----
bismuth, total	7440-69-9	mg/L		<0.000050	----	----	----	----	----	----
boron, total	7440-42-8	µg/L		<50	----	----	----	----	----	----
boron, total	7440-42-8	mg/L		0.044	----	----	----	----	----	----
cadmium, total	7440-43-9	µg/L		<0.10	----	----	----	----	----	----
cadmium, total	7440-43-9	mg/L		<0.0000050	----	----	----	----	----	----
calcium, total	7440-70-2	mg/L		184	----	----	----	----	----	----
cesium, total	7440-46-2	mg/L		0.000012	----	----	----	----	----	----
chromium, total	7440-47-3	µg/L		<1.0	----	----	----	----	----	----
chromium, total	7440-47-3	mg/L		<0.00050	----	----	----	----	----	----
cobalt, total	7440-48-4	mg/L		<0.00010	----	----	----	----	----	----
copper, total	7440-50-8	mg/L		<0.00050	----	----	----	----	----	----
iron, total	7439-89-6	mg/L		0.089	----	----	----	----	----	----
lead, total	7439-92-1	mg/L		0.000104	----	----	----	----	----	----
lithium, total	7439-93-2	mg/L		0.0065	----	----	----	----	----	----
magnesium, total	7439-95-4	mg/L		43.2	----	----	----	----	----	----
manganese, total	7439-96-5	mg/L		0.00517	----	----	----	----	----	----
mercury, total	7439-97-6	µg/L		<0.100	----	----	----	----	----	----
molybdenum, total	7439-98-7	mg/L		0.00135	----	----	----	----	----	----
nickel, total	7440-02-0	mg/L		0.00099	----	----	----	----	----	----
phosphorus, total	7723-14-0	mg/L		<0.050	----	----	----	----	----	----
potassium, total	7440-09-7	mg/L		1.82	----	----	----	----	----	----
rubidium, total	7440-17-7	mg/L		0.00107	----	----	----	----	----	----
selenium, total	7782-49-2	µg/L		<1.0	----	----	----	----	----	----

Analytical Results Evaluation

Matrix: **Water**

Analyte	CAS Number	Unit	Client sample ID: F2-R	----	----	----	----	----	----
			Sampling date/time: 02-Sep-2022 09:35	----	----	----	----	----	----
			Sub-Matrix: Water	----	----	----	----	----	----
			WT2212954-001	--------	--------	--------	--------	--------	--------
Total Metals									
selenium, total	7782-49-2	mg/L	<0.000050	----	----	----	----	----	----
silicon, total	7440-21-3	mg/L	4.91	----	----	----	----	----	----
silver, total	7440-22-4	mg/L	<0.000010	----	----	----	----	----	----
sodium, total	7440-23-5	mg/L	30.6	----	----	----	----	----	----
strontium, total	7440-24-6	mg/L	5.44 DLHC	----	----	----	----	----	----
sulfur, total	7704-34-9	mg/L	131	----	----	----	----	----	----
tellurium, total	13494-80-9	mg/L	0.00047	----	----	----	----	----	----
thallium, total	7440-28-0	mg/L	0.000021	----	----	----	----	----	----
thorium, total	7440-29-1	mg/L	<0.00010	----	----	----	----	----	----
tin, total	7440-31-5	mg/L	<0.00010	----	----	----	----	----	----
titanium, total	7440-32-6	mg/L	<0.00030	----	----	----	----	----	----
tungsten, total	7440-33-7	mg/L	<0.00010	----	----	----	----	----	----
uranium, total	7440-61-1	µg/L	<2.0	----	----	----	----	----	----
uranium, total	7440-61-1	mg/L	0.000247	----	----	----	----	----	----
vanadium, total	7440-62-2	mg/L	<0.00050	----	----	----	----	----	----
zinc, total	7440-66-6	mg/L	0.0129	----	----	----	----	----	----
zirconium, total	7440-67-7	mg/L	<0.00020	----	----	----	----	----	----
Aggregate Organics									
nitrilotriacetic acid [NTA]	139-13-9	mg/L	<0.20	----	----	----	----	----	----
Dissolved Gases									
methane	74-82-8	µg/L	1.7	----	----	----	----	----	----
methane	74-82-8	ppmv	7.1	----	----	----	----	----	----
Volatile Organic Compounds									
Acetone	67-64-1	µg/L	<20	----	----	----	----	----	----
benzene	71-43-2	µg/L	<0.50	----	----	----	----	----	----
bromodichloromethane	75-27-4	µg/L	<0.50	----	----	----	----	----	----
bromoform	75-25-2	µg/L	<0.50	----	----	----	----	----	----
bromomethane	74-83-9	µg/L	<0.50	----	----	----	----	----	----
carbon tetrachloride	56-23-5	µg/L	<0.20	----	----	----	----	----	----

Analytical Results Evaluation

Matrix: **Water**

Analyte	CAS Number	Unit	Client sample ID	----	----	----	----	----	----
			F2-R	**----**	**----**	**----**	**----**	**----**	**----**
		Sampling date/time	02-Sep-2022 09:35	----	----	----	----	----	----
		Sub-Matrix	Water	----	----	----	----	----	----
			WT2212954-001	--------	--------	--------	--------	--------	--------
Volatile Organic Compounds									
chlorobenzene	108-90-7	µg/L	<0.50	----	----	----	----	----	----
chloroform	67-66-3	µg/L	<0.50	----	----	----	----	----	----
dibromochloromethane	124-48-1	µg/L	<0.50	----	----	----	----	----	----
dibromoethane, 1,2-	106-93-4	µg/L	<0.20	----	----	----	----	----	----
dichlorobenzene, 1,2-	95-50-1	µg/L	<0.50	----	----	----	----	----	----
dichlorobenzene, 1,3-	541-73-1	µg/L	<0.50	----	----	----	----	----	----
dichlorobenzene, 1,4-	106-46-7	µg/L	<0.50	----	----	----	----	----	----
dichlorodifluoromethane	75-71-8	µg/L	<0.50	----	----	----	----	----	----
dichloroethane, 1,1-	75-34-3	µg/L	<0.50	----	----	----	----	----	----
dichloroethane, 1,2-	107-06-2	µg/L	<0.50	----	----	----	----	----	----
dichloroethylene, 1,1-	75-35-4	µg/L	<0.50	----	----	----	----	----	----
dichloroethylene, cis-1,2-	156-59-2	µg/L	<0.50	----	----	----	----	----	----
dichloroethylene, trans-1,2-	156-60-5	µg/L	<0.50	----	----	----	----	----	----
dichloromethane	75-09-2	µg/L	<1.0	----	----	----	----	----	----
dichloropropane, 1,2-	78-87-5	µg/L	<0.50	----	----	----	----	----	----
dichloropropylene, cis+trans-1,3-	542-75-6	µg/L	<0.50	----	----	----	----	----	----
dichloropropylene, cis-1,3-	10061-01-5	µg/L	<0.30	----	----	----	----	----	----
dichloropropylene, trans-1,3-	10061-02-6	µg/L	<0.30	----	----	----	----	----	----
ethylbenzene	100-41-4	µg/L	<0.50	----	----	----	----	----	----
hexane, n-	110-54-3	µg/L	<0.50	----	----	----	----	----	----
methyl ethyl ketone [MEK]	78-93-3	µg/L	<20	----	----	----	----	----	----
methyl isobutyl ketone [MIBK]	108-10-1	µg/L	<20	----	----	----	----	----	----
methyl-tert-butyl ether [MTBE]	1634-04-4	µg/L	<0.50	----	----	----	----	----	----
styrene	100-42-5	µg/L	<0.50	----	----	----	----	----	----
tetrachloroethane, 1,1,1,2-	630-20-6	µg/L	<0.50	----	----	----	----	----	----
tetrachloroethane, 1,1,2,2-	79-34-5	µg/L	<0.50	----	----	----	----	----	----
tetrachloroethylene	127-18-4	µg/L	<0.50	----	----	----	----	----	----
toluene	108-88-3	µg/L	<0.50	----	----	----	----	----	----
trichloroethane, 1,1,1-	71-55-6	µg/L	<0.50	----	----	----	----	----	----
trichloroethane, 1,1,2-	79-00-5	µg/L	<0.50	----	----	----	----	----	----

Analytical Results Evaluation

Matrix: **Water**

Analyte	CAS Number	Unit	Client sample ID: F2-R	----	----	----	----	----	----
			Sampling date/time: 02-Sep-2022 09:35	----	----	----	----	----	----
			Sub-Matrix: Water	----	----	----	----	----	----
			WT2212954-001	--------	--------	--------	--------	--------	--------
Volatile Organic Compounds									
trichloroethylene	79-01-6	µg/L	<0.50	----	----	----	----	----	----
trichlorofluoromethane	75-69-4	µg/L	<0.50	----	----	----	----	----	----
vinyl chloride	75-01-4	µg/L	<0.50	----	----	----	----	----	----
xylene, m+p-	179601-23-1	µg/L	<0.40	----	----	----	----	----	----
xylene, o-	95-47-6	µg/L	<0.30	----	----	----	----	----	----
xylenes, total	1330-20-7	µg/L	<0.50	----	----	----	----	----	----
BTEX, total	----	µg/L	<1.0	----	----	----	----	----	----
Volatile Organic Compounds [THMs]									
bromodichloromethane	75-27-4	µg/L	<1.0	----	----	----	----	----	----
bromoform	75-25-2	µg/L	<1.0	----	----	----	----	----	----
chloroform	67-66-3	µg/L	<1.0	----	----	----	----	----	----
dibromochloromethane	124-48-1	µg/L	<1.0	----	----	----	----	----	----
trihalomethanes [THMs], total	----	µg/L	<2.0	----	----	----	----	----	----
Volatile Organic Compounds [THMs] Surrogates									
bromofluorobenzene, 4-	460-00-4	%	89.7	----	----	----	----	----	----
difluorobenzene, 1,4-	540-36-3	%	104	----	----	----	----	----	----
Volatile Organic Compounds Surrogates									
bromofluorobenzene, 4-	460-00-4	%	89.7	----	----	----	----	----	----
difluorobenzene, 1,4-	540-36-3	%	104	----	----	----	----	----	----
Polycyclic Aromatic Hydrocarbons									
benzo(a)pyrene	50-32-8	µg/L	<0.0050	----	----	----	----	----	----
Polycyclic Aromatic Hydrocarbons Surrogates									
chrysene-d12	1719-03-5	%	109	----	----	----	----	----	----
naphthalene-d8	1146-65-2	%	91.6	----	----	----	----	----	----
phenanthrene-d10	1517-22-2	%	104	----	----	----	----	----	----
Disinfectant By-Products									
chlorate	14866-68-3	mg/L	<0.010	----	----	----	----	----	----
chlorite	14998-27-7	mg/L	<0.010	----	----	----	----	----	----

Analytical Results Evaluation

Matrix: **Water**

Analyte	CAS Number	Unit	Client sample ID: F2-R	----	----	----	----	----	----
			Sampling date/time: 02-Sep-2022 09:35	----	----	----	----	----	----
			Sub-Matrix: Water	----	----	----	----	----	----
			WT2212954-001	--------	--------	--------	--------	--------	--------
Haloacetic Acids									
dibromoacetic acid	631-64-1	µg/L	<1.00	----	----	----	----	----	----
dichloroacetic acid	79-43-6	µg/L	<1.00	----	----	----	----	----	----
monobromoacetic acid	79-08-3	µg/L	<1.00	----	----	----	----	----	----
monochloroacetic acid	79-11-8	µg/L	<1.00	----	----	----	----	----	----
trichloroacetic acid	76-03-9	µg/L	<1.00	----	----	----	----	----	----
haloacetic acids, total [HAA5]	----	µg/L	<5.00	----	----	----	----	----	----
Semi-Volatile Organics									
nitrosodimethylamine, n- [NDMA]	62-75-9	µg/L	<0.00090	----	----	----	----	----	----
Chlorinated Phenolics									
dichlorophenol, 2,4-	120-83-2	µg/L	<0.30	----	----	----	----	----	----
pentachlorophenol [PCP]	87-86-5	µg/L	<0.50	----	----	----	----	----	----
tetrachlorophenol, 2,3,4,6-	58-90-2	µg/L	<0.50	----	----	----	----	----	----
trichlorophenol, 2,4,6-	88-06-2	µg/L	<0.50	----	----	----	----	----	----
Phenolics Surrogates									
tribromophenol, 2,4,6-	118-79-6	%	94.8	----	----	----	----	----	----
Polychlorinated Biphenyls									
Aroclor 1016	12674-11-2	µg/L	<0.020	----	----	----	----	----	----
Aroclor 1221	11104-28-2	µg/L	<0.020	----	----	----	----	----	----
Aroclor 1232	11141-16-5	µg/L	<0.020	----	----	----	----	----	----
Aroclor 1242	53469-21-9	µg/L	<0.020	----	----	----	----	----	----
Aroclor 1248	12672-29-6	µg/L	<0.020	----	----	----	----	----	----
Aroclor 1254	11097-69-1	µg/L	<0.020	----	----	----	----	----	----
Aroclor 1260	11096-82-5	µg/L	<0.020	----	----	----	----	----	----
Aroclor 1262	37324-23-5	µg/L	<0.020	----	----	----	----	----	----
Aroclor 1268	11100-14-4	µg/L	<0.020	----	----	----	----	----	----
polychlorinated biphenyls [PCBs], total	----	µg/L	<0.060	----	----	----	----	----	----
Polychlorinated Biphenyls Surrogates									
decachlorobiphenyl	2051-24-3	%	87.8	----	----	----	----	----	----

Analytical Results Evaluation

Matrix: **Water**

Analyte	CAS Number	Unit	Client sample ID: F2-R	----	----	----	----	----	----
			Sampling date/time: 02-Sep-2022 09:35	----	----	----	----	----	----
			Sub-Matrix: Water	----	----	----	----	----	----
			WT2212954-001	--------	--------	--------	--------	--------	--------
Polychlorinated Biphenyls Surrogates									
tetrachloro-m-xylene	877-09-8	%	93.4	----	----	----	----	----	----
Carbamate Pesticides									
diuron	330-54-1	µg/L	<1.0	----	----	----	----	----	----
Organochlorine Pesticides									
chlordane, cis- (alpha)	5103-71-9	µg/L	<0.0080	----	----	----	----	----	----
chlordane, trans- (gamma)	5103-74-2	µg/L	<0.0080	----	----	----	----	----	----
DDD, 4,4'-	72-54-8	µg/L	<0.0040	----	----	----	----	----	----
DDE, 4,4'-	72-55-9	µg/L	<0.0040	----	----	----	----	----	----
DDT, 2,4'-	789-02-6	µg/L	<0.0040	----	----	----	----	----	----
DDT, 4,4'-	50-29-3	µg/L	<0.0040	----	----	----	----	----	----
oxychlordane	27304-13-8	µg/L	<0.0080	----	----	----	----	----	----
Organochlorine Pesticides Surrogates									
decachlorobiphenyl	2051-24-3	%	98.4	----	----	----	----	----	----
tetrachloro-m-xylene	877-09-8	%	111	----	----	----	----	----	----
Herbicides									
acetic acid, 2-methyl-4-chlorophenoxy- [MCPA]	94-74-6	µg/L	<0.050	----	----	----	----	----	----
AMPA	74341-63-2	µg/L	<0.50	----	----	----	----	----	----
bromoxynil	1689-84-5	µg/L	<0.050	----	----	----	----	----	----
dicamba	1918-00-9	µg/L	<0.10	----	----	----	----	----	----
dichlorophenoxyacetic acid, 2,4- [2,4-D]	94-75-7	µg/L	<0.050	----	----	----	----	----	----
dinoseb	88-85-7	µg/L	<0.050	----	----	----	----	----	----
diquat (ion)	2764-72-9	µg/L	<1.0	----	----	----	----	----	----
glyphosate	1071-83-6	µg/L	<0.20	----	----	----	----	----	----
paraquat (as dichloride)	1910-42-5	µg/L	<1.0	----	----	----	----	----	----
picloram	1918-02-1	µg/L	<0.10	----	----	----	----	----	----
trichlorophenoxypropionic acid, 2,4,5- [2,4,5-TP]	93-72-1	µg/L	<0.050	----	----	----	----	----	----
Herbicides Surrogates									
dichlorophenylacetic acid, 2,4-	19719-28-9	%	75.2	----	----	----	----	----	----

Analytical Results Evaluation

Matrix: **Water**

Analyte	CAS Number	Unit	Client sample ID: F2-R	----	----	----	----	----	----
			Sampling date/time: 02-Sep-2022 09:35	----	----	----	----	----	----
			Sub-Matrix: Water	----	----	----	----	----	----
			WT2212954-001	--------	--------	--------	--------	--------	--------
Pesticides									
alachlor	15972-60-8	µg/L	<0.10	----	----	----	----	----	----
atrazine	1912-24-9	µg/L	<0.10	----	----	----	----	----	----
atrazine + n-dealkylated metabolites	----	µg/L	<0.20	----	----	----	----	----	----
atrazine-desethyl	6190-65-4	µg/L	<0.10	----	----	----	----	----	----
azinphos-methyl	86-50-0	µg/L	<0.10	----	----	----	----	----	----
carbaryl	63-25-2	µg/L	<0.20	----	----	----	----	----	----
carbofuran	1563-66-2	µg/L	<0.20	----	----	----	----	----	----
chlorpyrifos	2921-88-2	µg/L	<0.10	----	----	----	----	----	----
diazinon	333-41-5	µg/L	<0.10	----	----	----	----	----	----
diclofop-methyl	51338-27-3	µg/L	<0.10	----	----	----	----	----	----
dimethoate	60-51-5	µg/L	<0.10	----	----	----	----	----	----
malathion	121-75-5	µg/L	<0.10	----	----	----	----	----	----
metolachlor	51218-45-2	µg/L	<0.10	----	----	----	----	----	----
metribuzin	21087-64-9	µg/L	<0.10	----	----	----	----	----	----
phorate	298-02-2	µg/L	<0.50 DLM	----	----	----	----	----	----
prometryn	7287-19-6	µg/L	<0.10	----	----	----	----	----	----
simazine	122-34-9	µg/L	<0.10	----	----	----	----	----	----
terbufos	13071-79-9	µg/L	<0.50 DLM	----	----	----	----	----	----
triallate	2303-17-5	µg/L	<0.10	----	----	----	----	----	----
trifluralin	1582-09-8	µg/L	<0.10	----	----	----	----	----	----
Pesticides Surrogates									
fluorobiphenyl, 2-	321-60-8	%	77.3	----	----	----	----	----	----
terphenyl-d14, p-	1718-51-0	%	90.7	----	----	----	----	----	----
Nitrosamines Surrogates									
nitrosodimethylamine-d6, n-	17829-05-9	%	95.9	----	----	----	----	----	----
Organic Parameters									
microcystin	101043-37-2	µg/L	<0.20	----	----	----	----	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.

Summary of Guideline Breaches by Sample

SampleID/Client ID	Matrix	Analyte	Analyte Summary	Guideline	Category	Result	Limit
F2-R	Water	solids, total dissolved [TDS]	Based on taste; TDS above 500 mg/L results in excessive scaling in water pipes, water heaters, boilers and appliances; TDS is composed of calcium, magnesium, sodium, potassium, carbonate, bicarbonate, chloride, sulphate and nitrate.	ONDWS	AO/OG	850 mg/L	500 mg/L
	Water	sodium, total	Based on taste; where a sodium-based water softener is used, a separate unsoftened supply for cooking and drinking purposes is recommended.	ONDWS	MAC	30.6 mg/L	20 mg/L

Summary of Guideline Limits

Analyte	CAS Number	Unit	ONDWS AO/OG	ONDWS MAC
Physical Tests				
alkalinity, total (as CaCO3)	----	mg/L	**30 - 500 mg/L**	
colour, true	----	CU		
hardness (as CaCO3), from total Ca/Mg	----	mg/L		
pH	----	pH units	**6.5 - 8.5 pH units**	
solids, total dissolved [TDS]	----	mg/L	**500 mg/L**	
turbidity	----	NTU	**5 NTU**	
Anions and Nutrients				
ammonia, total (as N)	7664-41-7	mg/L		
chloride	16887-00-6	mg/L	**250 mg/L**	
fluoride	16984-48-8	mg/L		**1.5 mg/L**
Kjeldahl nitrogen, total [TKN]	----	mg/L		
nitrate (as N)	14797-55-8	mg/L		**10 mg/L**
nitrite (as N)	14797-65-0	mg/L		**1 mg/L**
nitrogen, total organic	----	mg/L		
sulfate (as SO4)	14808-79-8	mg/L		
Cyanides				
cyanide, strong acid dissociable (total)	----	mg/L		**0.2 mg/L**
Organic / Inorganic Carbon				
carbon, dissolved organic [DOC]	----	mg/L	**5 mg/L**	
Total Sulfides				
sulfide, total (as S)	18496-25-8	mg/L	**0.05 mg/L**	
Microbiological Tests				
coliforms, Escherichia coli [E. coli]	----	MPN/100mL		**1 MPN/100mL**
coliforms, total	----	MPN/100mL		**1 MPN/100mL**
Total Metals				
aluminum, total	7429-90-5	mg/L	**0.1 mg/L**	
antimony, total	7440-36-0	µg/L		**0.006 mg/L**
antimony, total	7440-36-0	mg/L		**0.006 mg/L**
arsenic, total	7440-38-2	µg/L		**0.01 mg/L**
arsenic, total	7440-38-2	mg/L		**0.01 mg/L**
barium, total	7440-39-3	µg/L		**1 mg/L**
barium, total	7440-39-3	mg/L		**1 mg/L**
beryllium, total	7440-41-7	mg/L		
bismuth, total	7440-69-9	mg/L		
boron, total	7440-42-8	µg/L		**5 mg/L**
boron, total	7440-42-8	mg/L		**5 mg/L**

Analyte	CAS Number	Unit	ONDWS AO/OG	ONDWS MAC					
Total Metals - Continued									
cadmium, total	7440-43-9	µg/L		0.005 mg/L					
cadmium, total	7440-43-9	mg/L		0.005 mg/L					
calcium, total	7440-70-2	mg/L							
cesium, total	7440-46-2	mg/L							
chromium, total	7440-47-3	µg/L		0.05 mg/L					
chromium, total	7440-47-3	mg/L		0.05 mg/L					
cobalt, total	7440-48-4	mg/L							
copper, total	7440-50-8	mg/L	1 mg/L						
iron, total	7439-89-6	mg/L	0.3 mg/L						
lead, total	7439-92-1	mg/L		0.01 mg/L					
lithium, total	7439-93-2	mg/L							
magnesium, total	7439-95-4	mg/L							
manganese, total	7439-96-5	mg/L	0.05 mg/L						
mercury, total	7439-97-6	µg/L		1 µg/L					
molybdenum, total	7439-98-7	mg/L							
nickel, total	7440-02-0	mg/L							
phosphorus, total	7723-14-0	mg/L							
potassium, total	7440-09-7	mg/L							
rubidium, total	7440-17-7	mg/L							
selenium, total	7782-49-2	µg/L		0.05 mg/L					
selenium, total	7782-49-2	mg/L		0.05 mg/L					
silicon, total	7440-21-3	mg/L							
silver, total	7440-22-4	mg/L							
sodium, total	7440-23-5	mg/L	200 mg/L	20 mg/L					
strontium, total	7440-24-6	mg/L							
sulfur, total	7704-34-9	mg/L							
tellurium, total	13494-80-9	mg/L							
thallium, total	7440-28-0	mg/L							
thorium, total	7440-29-1	mg/L							
tin, total	7440-31-5	mg/L							
titanium, total	7440-32-6	mg/L							
tungsten, total	7440-33-7	mg/L							
uranium, total	7440-61-1	µg/L		0.02 mg/L					
uranium, total	7440-61-1	mg/L		0.02 mg/L					
vanadium, total	7440-62-2	mg/L							
zinc, total	7440-66-6	mg/L	5 mg/L						
zirconium, total	7440-67-7	mg/L							
Aggregate Organics									
nitrilotriacetic acid [NTA]	139-13-9	mg/L		0.4 mg/L					

Analyte	CAS Number	Unit	ONDWS AO/OG	ONDWS MAC					
Dissolved Gases									
methane	74-82-8	µg/L							
methane	74-82-8	ppmv							
Volatile Organic Compounds									
Acetone	67-64-1	µg/L							
benzene	71-43-2	µg/L		**1 µg/L**					
bromodichloromethane	75-27-4	µg/L							
bromoform	75-25-2	µg/L							
bromomethane	74-83-9	µg/L							
BTEX, total	----	µg/L							
carbon tetrachloride	56-23-5	µg/L		**2 µg/L**					
chlorobenzene	108-90-7	µg/L	**30 µg/L**	**80 µg/L**					
chloroform	67-66-3	µg/L							
dibromochloromethane	124-48-1	µg/L							
dibromoethane, 1,2-	106-93-4	µg/L							
dichlorobenzene, 1,2-	95-50-1	µg/L	**3 µg/L**	**200 µg/L**					
dichlorobenzene, 1,3-	541-73-1	µg/L							
dichlorobenzene, 1,4-	106-46-7	µg/L	**1 µg/L**	**5 µg/L**					
dichlorodifluoromethane	75-71-8	µg/L							
dichloroethane, 1,1-	75-34-3	µg/L							
dichloroethane, 1,2-	107-06-2	µg/L		**5 µg/L**					
dichloroethylene, 1,1-	75-35-4	µg/L		**14 µg/L**					
dichloroethylene, cis-1,2-	156-59-2	µg/L							
dichloroethylene, trans-1,2-	156-60-5	µg/L							
dichloromethane	75-09-2	µg/L		**50 µg/L**					
dichloropropane, 1,2-	78-87-5	µg/L							
dichloropropylene, cis+trans-1,3-	542-75-6	µg/L							
dichloropropylene, cis-1,3-	10061-01-5	µg/L							
dichloropropylene, trans-1,3-	10061-02-6	µg/L							
ethylbenzene	100-41-4	µg/L	**2.4 µg/L**	**140 µg/L**					
hexane, n-	110-54-3	µg/L							
methyl ethyl ketone [MEK]	78-93-3	µg/L							
methyl isobutyl ketone [MIBK]	108-10-1	µg/L							
methyl-tert-butyl ether [MTBE]	1634-04-4	µg/L		**15 µg/L**					
styrene	100-42-5	µg/L							
tetrachloroethane, 1,1,1,2-	630-20-6	µg/L							
tetrachloroethane, 1,1,2,2-	79-34-5	µg/L							
tetrachloroethylene	127-18-4	µg/L		**10 µg/L**					
toluene	108-88-3	µg/L	**24 µg/L**	**60 µg/L**					
trichloroethane, 1,1,1-	71-55-6	µg/L							

Analyte	CAS Number	Unit	ONDWS AO/OG	ONDWS MAC					
Volatile Organic Compounds - Continued									
trichloroethane, 1,1,2-	79-00-5	µg/L							
trichloroethylene	79-01-6	µg/L		**5 µg/L**					
trichlorofluoromethane	75-69-4	µg/L							
vinyl chloride	75-01-4	µg/L		**1 µg/L**					
xylene, m+p-	179601-23-1	µg/L							
xylene, o-	95-47-6	µg/L							
xylenes, total	1330-20-7	µg/L	**300 µg/L**	**90 µg/L**					
bromodichloromethane	75-27-4	µg/L							
bromoform	75-25-2	µg/L							
chloroform	67-66-3	µg/L							
dibromochloromethane	124-48-1	µg/L							
trihalomethanes [THMs], total	----	µg/L		**100 µg/L**					
Polycyclic Aromatic Hydrocarbons									
benzo(a)pyrene	50-32-8	µg/L		**0.01 µg/L**					
DIsinfectant By-Products									
chlorate	14866-68-3	mg/L		**1 mg/L**					
chlorite	14998-27-7	mg/L		**1 mg/L**					
Haloacetic Acids									
dibromoacetic acid	631-64-1	µg/L							
dichloroacetic acid	79-43-6	µg/L							
haloacetic acids, total [HAA5]	----	µg/L		**80 µg/L**					
monobromoacetic acid	79-08-3	µg/L							
monochloroacetic acid	79-11-8	µg/L							
trichloroacetic acid	76-03-9	µg/L							
Semi-Volatile Organics									
nitrosodimethylamine, n- [NDMA]	62-75-9	µg/L		**0.009 µg/L**					
Chlorinated Phenolics									
dichlorophenol, 2,4-	120-83-2	µg/L	**0.3 µg/L**	**900 µg/L**					
pentachlorophenol [PCP]	87-86-5	µg/L	**30 µg/L**	**60 µg/L**					
tetrachlorophenol, 2,3,4,6-	58-90-2	µg/L	**1 µg/L**	**100 µg/L**					
trichlorophenol, 2,4,6-	88-06-2	µg/L	**2 µg/L**	**5 µg/L**					
Polychlorinated Biphenyls									
Aroclor 1016	12674-11-2	µg/L							
Aroclor 1221	11104-28-2	µg/L							
Aroclor 1232	11141-16-5	µg/L							
Aroclor 1242	53469-21-9	µg/L							
Aroclor 1248	12672-29-6	µg/L							
Aroclor 1254	11097-69-1	µg/L							
Aroclor 1260	11096-82-5	µg/L							

Analyte	CAS Number	Unit	ONDWS AO/OG	ONDWS MAC					
Polychlorinated Biphenyls - Continued									
Aroclor 1262	37324-23-5	µg/L							
Aroclor 1268	11100-14-4	µg/L							
polychlorinated biphenyls [PCBs], total	----	µg/L		**3 µg/L**					
Carbamate Pesticides									
diuron	330-54-1	µg/L		**150 µg/L**					
chlordane, cis- (alpha)	5103-71-9	µg/L							
chlordane, trans- (gamma)	5103-74-2	µg/L							
DDD, 4,4'-	72-54-8	µg/L							
DDE, 4,4'-	72-55-9	µg/L							
DDT, 2,4'-	789-02-6	µg/L							
DDT, 4,4'-	50-29-3	µg/L							
oxychlordane	27304-13-8	µg/L							
Herbicides									
acetic acid, 2-methyl-4-chlorophenoxy- [MCPA]	94-74-6	µg/L		**100 µg/L**					
AMPA	74341-63-2	µg/L							
bromoxynil	1689-84-5	µg/L		**5 µg/L**					
dicamba	1918-00-9	µg/L		**120 µg/L**					
dichlorophenoxyacetic acid, 2,4- [2,4-D]	94-75-7	µg/L		**100 µg/L**					
dinoseb	88-85-7	µg/L		**10 µg/L**					
diquat (ion)	2764-72-9	µg/L							
glyphosate	1071-83-6	µg/L		**280 µg/L**					
paraquat (as dichloride)	1910-42-5	µg/L		**10 µg/L**					
picloram	1918-02-1	µg/L		**190 µg/L**					
trichlorophenoxypropionic acid, 2,4,5- [2,4,5-TP]	93-72-1	µg/L							
Pesticides									
alachlor	15972-60-8	µg/L		**5 µg/L**					
atrazine + n-dealkylated metabolites	----	µg/L		**5 µg/L**					
atrazine	1912-24-9	µg/L							
atrazine-desethyl	6190-65-4	µg/L							
azinphos-methyl	86-50-0	µg/L		**20 µg/L**					
carbaryl	63-25-2	µg/L		**90 µg/L**					
carbofuran	1563-66-2	µg/L		**90 µg/L**					
chlorpyrifos	2921-88-2	µg/L		**90 µg/L**					
diazinon	333-41-5	µg/L		**20 µg/L**					
diclofop-methyl	51338-27-3	µg/L		**9 µg/L**					
dimethoate	60-51-5	µg/L		**20 µg/L**					
malathion	121-75-5	µg/L		**190 µg/L**					
metolachlor	51218-45-2	µg/L		**50 µg/L**					
metribuzin	21087-64-9	µg/L		**80 µg/L**					

Analyte	CAS Number	Unit	ONDWS AO/OG	ONDWS MAC					
Pesticides - Continued									
phorate	298-02-2	µg/L		**2 µg/L**					
prometryn	7287-19-6	µg/L		**1 µg/L**					
simazine	122-34-9	µg/L		**10 µg/L**					
terbufos	13071-79-9	µg/L		**1 µg/L**					
triallate	2303-17-5	µg/L		**230 µg/L**					
trifluralin	1582-09-8	µg/L		**45 µg/L**					
Organic Parameters									
microcystin	101043-37-2	µg/L		**1.5 µg/L**					

Please refer to the General Comments section for an explanation of any qualifiers detected.

Key:

ONDWS	Ontario Drinking Water Regulation (JAN, 2020)
AO/OG	Aesthetic Objective/Operational Guideline
MAC	Schedule 1 (Microbiological) and 2 (Chemical) Standards (JAN,2018)

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **WT2212954**	Page	: 1 of 19
Client	: **Township of Centre Wellington**	Laboratory	: Waterloo - Environmental
Contact	: Matthew Alexander	Account Manager	: Candice Hunter
Address	: 1 MacDonald Square Elora ON Canada N0B 1S0	Address	: 60 Northland Road, Unit 1 Waterloo, Ontario Canada N2V 2B8
Telephone	: ----	Telephone	: +1 519 886 6910
Project	: ----	Date Samples Received	: 02-Sep-2022 11:45
PO	: ----	Issue Date	: 16-Sep-2022 11:04
C-O-C number	: 20-1007481		
Sampler	: ----		
Site	: ----		
Quote number	: Special Non - Regulated Water		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Duplicate outliers occur.
- Method Blank value outliers occur - please see following pages for full details.
- Laboratory Control Sample (LCS) outliers occur - please see following pages for full details.
- Matrix Spike outliers occur - please see following pages for full details.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Water**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Method Blank (MB) Values								
Total Metals	QC-633334-001	----	magnesium, total	7439-95-4	E420	0.0114 mg/L B	0.005 mg/L	Blank result exceeds permitted value
Volatile Organic Compounds	QC-MRG2-637812001	----	dichloromethane	75-09-2	E611D	1.1 µg/L B	1 µg/L	Blank result exceeds permitted value

Result Qualifiers

Qualifier	Description
B	*Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.*

Laboratory Control Sample (LCS) Recoveries								
Pesticides	QC-633345-002	----	alachlor	15972-60-8	E660E-H	155 % LCS-H	60.0-130%	Recovery greater than upper control limit
Pesticides	QC-633345-002	----	atrazine	1912-24-9	E660E-H	147 % LCS-H	60.0-130%	Recovery greater than upper control limit
Pesticides	QC-633345-002	----	azinphos-methyl	86-50-0	E660E-H	196 % LCS-H	60.0-140%	Recovery greater than upper control limit
Pesticides	QC-633345-002	----	carbaryl	63-25-2	E660E-H	145 % LCS-H	50.0-140%	Recovery greater than upper control limit
Pesticides	QC-633345-002	----	carbofuran	1563-66-2	E660E-H	145 % LCS-H	60.0-140%	Recovery greater than upper control limit
Pesticides	QC-633345-002	----	chlorpyrifos	2921-88-2	E660E-H	156 % LCS-H	60.0-130%	Recovery greater than upper control limit
Pesticides	QC-633345-002	----	diclofop-methyl	51338-27-3	E660E-H	156 % LCS-H	60.0-140%	Recovery greater than upper control limit
Pesticides	QC-633345-002	----	dimethoate	60-51-5	E660E-H	152 % LCS-H	60.0-130%	Recovery greater than upper control limit
Pesticides	QC-633345-002	----	malathion	121-75-5	E660E-H	191 % LCS-H	60.0-130%	Recovery greater than upper control limit
Pesticides	QC-633345-002	----	metolachlor	51218-45-2	E660E-H	181 % LCS-H	60.0-130%	Recovery greater than upper control limit
Pesticides	QC-633345-002	----	metribuzin	21087-64-9	E660E-H	154 % LCS-H	60.0-130%	Recovery greater than upper control limit
Pesticides	QC-633345-002	----	phorate	298-02-2	E660E-H	13.5 % LCS-L	60.0-140%	Recovery less than lower control limit
Pesticides	QC-633345-002	----	prometryn	7287-19-6	E660E-H	156 % LCS-H	60.0-130%	Recovery greater than upper control limit

Matrix: **Water**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Laboratory Control Sample (LCS) Recoveries - Continued								
Pesticides	QC-633345-002	----	simazine	122-34-9	E660E-H	135 % LCS-H	60.0-130%	Recovery greater than upper control limit
Pesticides	QC-633345-002	----	terbufos	13071-79-9	E660E-H	11.5 % LCS-L	60.0-130%	Recovery less than lower control limit
Pesticides	QC-633345-002	----	trifluralin	1582-09-8	E660E-H	146 % LCS-H	60.0-130%	Recovery greater than upper control limit

Result Qualifiers

Qualifier	Description
LCS-H	*Lab Control Sample recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.*
LCS-L	*Lab Control Sample recovery was below ALS DQO. Reference Material and/or Matrix Spike results were acceptable. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.*

Matrix Spike (MS) Recoveries								
Total Metals	Anonymous	Anonymous	selenium, total	7782-49-2	E432	138 % MES	70.0-130%	Recovery greater than upper data quality objective
Volatile Organic Compounds	WT2212954-001	F2-R	bromomethane	74-83-9	E611D	19.6 % K	60.0-140%	Recovery less than lower data quality objective
Volatile Organic Compounds	WT2212954-001	F2-R	dichloropropylene, cis-1,3-	10061-01-5	E611D	38.3 % K	60.0-140%	Recovery less than lower data quality objective

Result Qualifiers

Qualifier	Description
K	*Matrix Spike recovery outside ALS DQO due to sample matrix effects.*
MES	*Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).*

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Aggregate Organics : Nitrilotriacetic Acid (NTA) in Water										
HDPE [ON MECP]										
F2-R	E394	02-Sep-2022	----	----	----		05-Sep-2022	30 days	3 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid)										
F2-R	E298	02-Sep-2022	09-Sep-2022	----	----		12-Sep-2022	28 days	11 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE [ON MECP]										
F2-R	E235.Cl	02-Sep-2022	08-Sep-2022	----	----		08-Sep-2022	28 days	6 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE [ON MECP]										
F2-R	E235.F	02-Sep-2022	08-Sep-2022	----	----		08-Sep-2022	28 days	6 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE [ON MECP]										
F2-R	E235.NO3	02-Sep-2022	08-Sep-2022	----	----		08-Sep-2022	7 days	6 days	✓
Anions and Nutrients : Nitrite in Water by IC										
HDPE [ON MECP]										
F2-R	E235.NO2	02-Sep-2022	08-Sep-2022	----	----		08-Sep-2022	7 days	6 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE [ON MECP]										
F2-R	E235.SO4	02-Sep-2022	08-Sep-2022	----	----		08-Sep-2022	28 days	6 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) F2-R	E318	02-Sep-2022	12-Sep-2022	----	----		13-Sep-2022	28 days	11 days	✓
Carbamate Pesticides : Aldicarb and Diuron in Water by LC-MS/MS										
Amber glass/Teflon lined cap - LCMS F2-R	E712B	02-Sep-2022	09-Sep-2022	20 days	7 days	✓	12-Sep-2022	7 days	3 days	✓
Chlorinated Phenolics : Phenolics (Ontario Chlorophenols List) by GC-MS										
Amber glass/Teflon lined cap F2-R	E651D	02-Sep-2022	06-Sep-2022	7 days	4 days	✓	07-Sep-2022	40 days	1 days	✓
Cyanides : Total Cyanide										
UV-inhibited HDPE - total (sodium hydroxide) F2-R	E333	02-Sep-2022	06-Sep-2022	----	----		06-Sep-2022	14 days	4 days	✓
Disinfectant By-Products : Chlorate (CLO3) in Waters by Ion Chromatography										
HDPE (teflon free) F2-R	E409.CLO3	02-Sep-2022	07-Sep-2022	28 days	5 days	✓	07-Sep-2022	23 days	0 days	✓
Disinfectant By-Products : Chlorite (CLO2) in Waters by Ion Chromatography										
HDPE (teflon free) F2-R	E409.CLO2	02-Sep-2022	07-Sep-2022	14 days	5 days	✓	07-Sep-2022	9 days	0 days	✓
Dissolved Gases : Methane, Ethane, & Ethene by Headspace GC-FID										
Glass vial (sodium bisulfate) F2-R	E614B	02-Sep-2022	----	----	----		07-Sep-2022	14 days	5 days	✓
Haloacetic Acids : Haloacetic Acids in Water by LC-MS/MS										
Glass vial (ammonium chloride+copper sulfate) F2-R	E750	02-Sep-2022	09-Sep-2022	14 days	7 days	✓	11-Sep-2022	14 days	2 days	✓
Herbicides : Diquat and Paraquat in Water by LC-MS-MS										
Amber glass/Teflon lined cap - LCMS F2-R	E723A	02-Sep-2022	08-Sep-2022	7 days	6 days	✓	08-Sep-2022	21 days	0 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Herbicides : Glyphosate and AMPA in Water										
Amber glass/Teflon lined cap - LCMS										
F2-R	E716A	02-Sep-2022	07-Sep-2022	14 days	5 days	✓	07-Sep-2022	40 days	0 days	✓
Herbicides : Phenoxy Acid Herbicides in Water by LC-MS-MS										
Amber glass/Teflon lined cap - LCMS										
F2-R	E706A	02-Sep-2022	06-Sep-2022	----	----		07-Sep-2022	14 days	5 days	✓
Microbiological Tests : Total Coliforms and E. coli (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) [ON MECP]										
F2-R	E010	02-Sep-2022	----	----	----		03-Sep-2022	48 hrs	26 hrs	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid)										
F2-R	E358-L	02-Sep-2022	07-Sep-2022	----	----		14-Sep-2022	28 days	12 days	✓
Organic Parameters : Microcystin by ELISA (Extraction by Sonication)										
Amber glass/Teflon lined cap										
F2-R	E576	02-Sep-2022	----	----	----		09-Sep-2022	14 days	7 days	✓
Organochlorine Pesticides : OCP Analysis by GC-MS-MS										
Amber glass/Teflon lined cap										
F2-R	E660F	02-Sep-2022	06-Sep-2022	7 days	4 days	✓	07-Sep-2022	40 days	1 days	✓
Pesticides : Miscellaneous Pesticides by GC-MS										
Amber glass/Teflon lined cap										
F2-R	E660E-H	02-Sep-2022	05-Sep-2022	14 days	4 days	✓	06-Sep-2022	40 days	1 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE [ON MECP]										
F2-R	E290	02-Sep-2022	08-Sep-2022	----	----		09-Sep-2022	14 days	7 days	✓
Physical Tests : Colour (True) by Spectrometer (2 CU)										
HDPE [ON MECP]										
F2-R	E329-L	02-Sep-2022	03-Sep-2022	----	----		06-Sep-2022	48 hrs	128 hrs	× EHT

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : pH by Meter										
HDPE [ON MECP] F2-R	E108	02-Sep-2022	08-Sep-2022	----	----		09-Sep-2022	14 days	7 days	✓
Physical Tests : TDS by Gravimetry										
HDPE [ON MECP] F2-R	E162	02-Sep-2022	----	----	----		06-Sep-2022	7 days	4 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE [ON MECP] F2-R	E121	02-Sep-2022	----	----	----		02-Sep-2022	3 days	0 days	✓
Polychlorinated Biphenyls : PCB Aroclors by GC-MS										
Amber glass/Teflon lined cap F2-R	E687	02-Sep-2022	06-Sep-2022	14 days	4 days	✓	07-Sep-2022	40 days	1 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS										
Amber glass/Teflon lined cap F2-R	E641A	02-Sep-2022	08-Sep-2022	7 days	6 days	✓	12-Sep-2022	40 days	3 days	✓
Semi-Volatile Organics : N-Nitrosodimethylamine (NDMA) by LC-MS-MS (Trace Level)										
Amber glass/Teflon lined cap - LCMS F2-R	E725-T	02-Sep-2022	06-Sep-2022	28 days	4 days	✓	09-Sep-2022	28 days	3 days	✓
Total Metals : Drinking Water Metals [Ontario]										
HDPE total (nitric acid) F2-R	E432	02-Sep-2022	06-Sep-2022	----	----		06-Sep-2022	60 days	4 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) F2-R	E508	02-Sep-2022	06-Sep-2022	----	----		06-Sep-2022	28 days	4 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) F2-R	E420	02-Sep-2022	06-Sep-2022	----	----		06-Sep-2022	180 days	5 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Total Sulfides : Total Sulfide by Colourimetry (Manual)										
HDPE total (zinc acetate+sodium hydroxide)										
F2-R	E396	02-Sep-2022	----	----	----		09-Sep-2022	7 days	7 days	✓
Volatile Organic Compounds : VOCs (ON List) by Headspace GC-MS										
Glass vial (sodium bisulfate)										
F2-R	E611D	02-Sep-2022	08-Sep-2022	----	----		08-Sep-2022	14 days	6 days	✓
Volatile Organic Compounds [THMs] : THMs by Headspace GC-MS										
Glass vial (sodium bisulfate)										
F2-R	E611B	02-Sep-2022	08-Sep-2022	----	----		08-Sep-2022	14 days	6 days	✓

Legend & Qualifier Definitions

EHT: Exceeded ALS recommended hold time prior to analysis.

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Aldicarb and Diuron in Water by LC-MS/MS	E712B	638961	1	1	100.0	5.0	✓
Alkalinity Species by Titration	E290	637654	1	16	6.2	5.0	✓
Ammonia by Fluorescence	E298	639864	1	15	6.6	5.0	✓
Chlorate (CLO3) in Waters by Ion Chromatography	E409.CLO3	635446	1	5	20.0	5.0	✓
Chloride in Water by IC	E235.Cl	637486	1	12	8.3	5.0	✓
Chlorite (CLO2) in Waters by Ion Chromatography	E409.CLO2	635447	1	4	25.0	5.0	✓
Colour (True) by Spectrometer (2 CU)	E329-L	632380	1	1	100.0	5.0	✓
Diquat and Paraquat in Water by LC-MS-MS	E723A	637025	1	1	100.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	635753	1	9	11.1	5.0	✓
Drinking Water Metals [Ontario]	E432	634512	1	3	33.3	5.0	✓
Fluoride in Water by IC	E235.F	637487	1	5	20.0	5.0	✓
Glyphosate and AMPA in Water	E716A	633946	1	2	50.0	5.0	✓
Haloacetic Acids in Water by LC-MS/MS	E750	638905	1	14	7.1	4.7	✓
Methane, Ethane, & Ethene by Headspace GC-FID	E614B	635471	1	11	9.0	4.5	✓
Microcystin by ELISA (Extraction by Sonication)	E576	639186	1	11	9.0	5.0	✓
Nitrate in Water by IC	E235.NO3	637489	1	13	7.6	5.0	✓
Nitrilotriacetic Acid (NTA) in Water	E394	633331	1	3	33.3	5.0	✓
Nitrite in Water by IC	E235.NO2	637490	1	6	16.6	5.0	✓
N-Nitrosodimethylamine (NDMA) by LC-MS-MS (Trace Level)	E725-T	638901	1	4	25.0	5.0	✓
pH by Meter	E108	637652	1	18	5.5	5.0	✓
Phenoxy Acid Herbicides in Water by LC-MS-MS	E706A	634443	1	16	6.2	5.0	✓
Sulfate in Water by IC	E235.SO4	637488	1	4	25.0	5.0	✓
TDS by Gravimetry	E162	634117	1	20	5.0	5.0	✓
THMs by Headspace GC-MS	E611B	637813	1	1	100.0	5.0	✓
Total Coliforms and E. coli (Enzyme Substrate)	E010	632124	1	11	9.0	5.0	✓
Total Cyanide	E333	634176	1	10	10.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	639862	1	18	5.5	5.0	✓
Total Mercury in Water by CVAAS	E508	634028	1	8	12.5	5.0	✓
Total Metals in Water by CRC ICPMS	E420	633334	1	20	5.0	5.0	✓
Total Sulfide by Colourimetry (Manual)	E396	639357	1	1	100.0	5.0	✓
Turbidity by Nephelometry	E121	631650	1	2	50.0	5.0	✓
VOCs (ON List) by Headspace GC-MS	E611D	637812	1	1	100.0	5.0	✓
Laboratory Control Samples (LCS)							
Aldicarb and Diuron in Water by LC-MS/MS	E712B	638961	1	1	100.0	5.0	✓
Alkalinity Species by Titration	E290	637654	1	16	6.2	5.0	✓
Ammonia by Fluorescence	E298	639864	1	15	6.6	5.0	✓
Chlorate (CLO3) in Waters by Ion Chromatography	E409.CLO3	635446	1	5	20.0	5.0	✓

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Control Samples (LCS) - Continued							
Chloride in Water by IC	E235.Cl	637486	1	12	8.3	5.0	✓
Chlorite (CLO2) in Waters by Ion Chromatography	E409.CLO2	635447	1	4	25.0	5.0	✓
Colour (True) by Spectrometer (2 CU)	E329-L	632380	1	1	100.0	5.0	✓
Diquat and Paraquat in Water by LC-MS-MS	E723A	637025	1	1	100.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	635753	1	9	11.1	5.0	✓
Drinking Water Metals [Ontario]	E432	634512	1	3	33.3	5.0	✓
Fluoride in Water by IC	E235.F	637487	1	5	20.0	5.0	✓
Glyphosate and AMPA in Water	E716A	633946	1	2	50.0	5.0	✓
Haloacetic Acids in Water by LC-MS/MS	E750	638905	1	14	7.1	4.7	✓
Microcystin by ELISA (Extraction by Sonication)	E576	639186	1	11	9.0	5.0	✓
Miscellaneous Pesticides by GC-MS	E660E-H	633345	1	3	33.3	5.0	✓
Nitrate in Water by IC	E235.NO3	637489	1	13	7.6	5.0	✓
Nitrilotriacetic Acid (NTA) in Water	E394	633331	1	3	33.3	5.0	✓
Nitrite in Water by IC	E235.NO2	637490	1	6	16.6	5.0	✓
N-Nitrosodimethylamine (NDMA) by LC-MS-MS (Trace Level)	E725-T	638901	1	4	25.0	5.0	✓
OCP Analysis by GC-MS-MS	E660F	633430	1	7	14.2	5.0	✓
PAHs by Hexane LVI GC-MS	E641A	638508	1	1	100.0	5.0	✓
PCB Aroclors by GC-MS	E687	633429	1	9	11.1	4.7	✓
pH by Meter	E108	637652	1	18	5.5	5.0	✓
Phenolics (Ontario Chlorophenols List) by GC-MS	E651D	633416	1	3	33.3	5.0	✓
Phenoxy Acid Herbicides in Water by LC-MS-MS	E706A	634443	1	16	6.2	5.0	✓
Sulfate in Water by IC	E235.SO4	637488	1	4	25.0	5.0	✓
TDS by Gravimetry	E162	634117	1	20	5.0	5.0	✓
THMs by Headspace GC-MS	E611B	637813	1	1	100.0	5.0	✓
Total Cyanide	E333	634176	1	10	10.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	639862	1	18	5.5	5.0	✓
Total Mercury in Water by CVAAS	E508	634028	1	8	12.5	5.0	✓
Total Metals in Water by CRC ICPMS	E420	633334	2	20	10.0	5.0	✓
Total Sulfide by Colourimetry (Manual)	E396	639357	1	1	100.0	5.0	✓
Turbidity by Nephelometry	E121	631650	1	2	50.0	5.0	✓
VOCs (ON List) by Headspace GC-MS	E611D	637812	1	1	100.0	5.0	✓
Method Blanks (MB)							
Aldicarb and Diuron in Water by LC-MS/MS	E712B	638961	1	1	100.0	5.0	✓
Alkalinity Species by Titration	E290	637654	1	16	6.2	5.0	✓
Ammonia by Fluorescence	E298	639864	1	15	6.6	5.0	✓
Chlorate (CLO3) in Waters by Ion Chromatography	E409.CLO3	635446	1	5	20.0	5.0	✓
Chloride in Water by IC	E235.Cl	637486	1	12	8.3	5.0	✓
Chlorite (CLO2) in Waters by Ion Chromatography	E409.CLO2	635447	1	4	25.0	5.0	✓
Colour (True) by Spectrometer (2 CU)	E329-L	632380	1	1	100.0	5.0	✓
Diquat and Paraquat in Water by LC-MS-MS	E723A	637025	1	1	100.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	635753	1	9	11.1	5.0	✓

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Method Blanks (MB) - Continued							
Drinking Water Metals [Ontario]	E432	634512	1	3	33.3	5.0	✓
Fluoride in Water by IC	E235.F	637487	1	5	20.0	5.0	✓
Glyphosate and AMPA in Water	E716A	633946	1	2	50.0	5.0	✓
Haloacetic Acids in Water by LC-MS/MS	E750	638905	1	14	7.1	4.7	✓
Methane, Ethane, & Ethene by Headspace GC-FID	E614B	635471	1	11	9.0	4.5	✓
Microcystin by ELISA (Extraction by Sonication)	E576	639186	1	11	9.0	5.0	✓
Miscellaneous Pesticides by GC-MS	E660E-H	633345	1	3	33.3	5.0	✓
Nitrate in Water by IC	E235.NO3	637489	1	13	7.6	5.0	✓
Nitrilotriacetic Acid (NTA) in Water	E394	633331	1	3	33.3	5.0	✓
Nitrite in Water by IC	E235.NO2	637490	1	6	16.6	5.0	✓
N-Nitrosodimethylamine (NDMA) by LC-MS-MS (Trace Level)	E725-T	638901	1	4	25.0	5.0	✓
OCP Analysis by GC-MS-MS	E660F	633430	1	7	14.2	5.0	✓
PAHs by Hexane LVI GC-MS	E641A	638508	1	1	100.0	5.0	✓
PCB Aroclors by GC-MS	E687	633429	1	9	11.1	4.7	✓
Phenolics (Ontario Chlorophenols List) by GC-MS	E651D	633416	1	3	33.3	5.0	✓
Phenoxy Acid Herbicides in Water by LC-MS-MS	E706A	634443	1	16	6.2	5.0	✓
Sulfate in Water by IC	E235.SO4	637488	1	4	25.0	5.0	✓
TDS by Gravimetry	E162	634117	1	20	5.0	5.0	✓
THMs by Headspace GC-MS	E611B	637813	1	1	100.0	5.0	✓
Total Coliforms and E. coli (Enzyme Substrate)	E010	632124	1	11	9.0	5.0	✓
Total Cyanide	E333	634176	1	10	10.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	639862	1	18	5.5	5.0	✓
Total Mercury in Water by CVAAS	E508	634028	1	8	12.5	5.0	✓
Total Metals in Water by CRC ICPMS	E420	633334	1	20	5.0	5.0	✓
Total Sulfide by Colourimetry (Manual)	E396	639357	1	1	100.0	5.0	✓
Turbidity by Nephelometry	E121	631650	1	2	50.0	5.0	✓
VOCs (ON List) by Headspace GC-MS	E611D	637812	1	1	100.0	5.0	✓
Matrix Spikes (MS)							
Aldicarb and Diuron in Water by LC-MS/MS	E712B	638961	1	1	100.0	5.0	✓
Ammonia by Fluorescence	E298	639864	1	15	6.6	5.0	✓
Chlorate (CLO3) in Waters by Ion Chromatography	E409.CLO3	635446	1	5	20.0	5.0	✓
Chloride in Water by IC	E235.Cl	637486	1	12	8.3	5.0	✓
Chlorite (CLO2) in Waters by Ion Chromatography	E409.CLO2	635447	1	4	25.0	5.0	✓
Diquat and Paraquat in Water by LC-MS-MS	E723A	637025	1	1	100.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	635753	1	9	11.1	5.0	✓
Drinking Water Metals [Ontario]	E432	634512	1	3	33.3	5.0	✓
Fluoride in Water by IC	E235.F	637487	1	5	20.0	5.0	✓
Glyphosate and AMPA in Water	E716A	633946	1	2	50.0	5.0	✓
Haloacetic Acids in Water by LC-MS/MS	E750	638905	1	14	7.1	4.7	✓
Microcystin by ELISA (Extraction by Sonication)	E576	639186	1	11	9.0	5.0	✓
Nitrate in Water by IC	E235.NO3	637489	1	13	7.6	5.0	✓

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Matrix Spikes (MS) - Continued							
Nitrilotriacetic Acid (NTA) in Water	E394	633331	1	3	33.3	5.0	✓
Nitrite in Water by IC	E235.NO2	637490	1	6	16.6	5.0	✓
N-Nitrosodimethylamine (NDMA) by LC-MS-MS (Trace Level)	E725-T	638901	1	4	25.0	5.0	✓
Phenoxy Acid Herbicides in Water by LC-MS-MS	E706A	634443	1	16	6.2	5.0	✓
Sulfate in Water by IC	E235.SO4	637488	1	4	25.0	5.0	✓
THMs by Headspace GC-MS	E611B	637813	1	1	100.0	5.0	✓
Total Cyanide	E333	634176	1	10	10.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	639862	1	18	5.5	5.0	✓
Total Mercury in Water by CVAAS	E508	634028	1	8	12.5	5.0	✓
Total Metals in Water by CRC ICPMS	E420	633334	1	20	5.0	5.0	✓
Total Sulfide by Colourimetry (Manual)	E396	639357	1	1	100.0	5.0	✓
VOCs (ON List) by Headspace GC-MS	E611D	637812	1	1	100.0	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Coliforms and E. coli (Enzyme Substrate)	E010 Waterloo - Environmental	Water	APHA 9223 (mod)	The enzyme substrate test simultaneously detects Total Coliforms and E. coli in a 100 mL sample after incubation at 35.0 ±0.5°C for either 18 or 24 hours (dependent on reagent used).
pH by Meter	E108 Waterloo - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Turbidity by Nephelometry	E121 Waterloo - Environmental	Water	APHA 2130 B (mod)	Turbidity is measured by the nephelometric method, by measuring the intensity of light scatter under defined conditions.
TDS by Gravimetry	E162 Waterloo - Environmental	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl Waterloo - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Waterloo - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC	E235.NO2 Waterloo - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC	E235.NO3 Waterloo - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Waterloo - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Waterloo - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Ammonia by Fluorescence	E298 Waterloo - Environmental	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318 Waterloo - Environmental	Water	Method Fialab 100, 2018	TKN in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021).
Colour (True) by Spectrometer (2 CU)	E329-L Waterloo - Environmental	Water	APHA 2120 C (mod)	Colour (True Colour) is determined by filtering a sample through a 0.45 micron membrane filter followed by analysis of the filtrate using the platinum-cobalt colourimetric method. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment.
Total Cyanide	E333 Waterloo - Environmental	Water	ISO 14403 (mod)	Total or Strong Acid Dissociable (SAD) Cyanide is determined by Continuous Flow Analyzer (CFA) with in-line UV digestion followed by colourmetric analysis. Method Limitation: High levels of thiocyanate (SCN) may cause positive interference (up to 0.5% of SCN concentration).
Dissolved Organic Carbon by Combustion (Low Level)	E358-L Waterloo - Environmental	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Nitrilotriacetic Acid (NTA) in Water	E394 Waterloo - Environmental	Water	EPA 430.1 (mod)	NTA refers to the tri-sodium salt of nitrilotriacetic acid, N(CH2COONa)3. Zinc forms a blue-coloured complex with 2 carboxy-2-hydroxy-5-sulfoformazylbenzene (Zincon) in a solution buffered to pH 9.2. When NTA is added to the sample, the Zinc-Zincon complex is broken which reduces the absorbance in proportion to the amount of NTA present. Samples are filtered with a 0.45 um membrane before analysis.
Total Sulfide by Colourimetry (Manual)	E396 Waterloo - Environmental	Water	APHA 4500-S2 D (mod)	Total Sulfide is determined by spectrophotometer using the methlyene blue colourimetric method. Results expressed "as H2S" if reported represent the maximum possible H2S concentration based on the total sulfide concentration in the sample. The H2S calculation converts Total Sulphide as (S2-) and reports it as Total Sulphide as (H2S).
Chlorite (CLO2) in Waters by Ion Chromatography	E409.CLO2 Waterloo - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity detection.
Chlorate (CLO3) in Waters by Ion Chromatography	E409.CLO3 Waterloo - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity detection.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Metals in Water by CRC ICPMS	E420 Waterloo - Environmental	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Drinking Water Metals [Ontario]	E432 Waterloo - Environmental	Water	APHA 3030E/EPA 6020A	Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).
Total Mercury in Water by CVAAS	E508 Waterloo - Environmental	Water	EPA 1631E (mod)	Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS
Microcystin by ELISA (Extraction by Sonication)	E576 Winnipeg - Environmental	Water	ENVIROLOGIX QUANTIPLATE KIT CAT. EP022	Total Microcystins (intraceller and extraceller) in aqueous matrices is determined by the Enzyme-Linked ImmunoSorbent Assay (ELISA) method. Extraction is by sonication
THMs by Headspace GC-MS	E611B Waterloo - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
VOCs (ON List) by Headspace GC-MS	E611D Waterloo - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
Methane, Ethane, & Ethene by Headspace GC-FID	E614B Waterloo - Environmental	Water	EPA REGION 1, NATATTEN.WPD, REV. 1	Volatile hydrocarbons are analyzed by static headspace GC/FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing the analyte(s) to partition between the aqueous phase and the headspace in accordance with Henry's law.
PAHs by Hexane LVI GC-MS	E641A Waterloo - Environmental	Water	EPA 8270E (mod)	Polycyclic Aromatic Hydrocarbons (PAHs) are analyzed by large volume injection (LVI) GC-MS.
Phenolics (Ontario Chlorophenols List) by GC-MS	E651D Waterloo - Environmental	Water	EPA 8270E (mod)	Phenolics are analyzed by GC-MS.
Miscellaneous Pesticides by GC-MS	E660E-H Waterloo - Environmental	Water	EPA 8270E (mod)	Pesticides are analyzed by GC-MS.
OCP Analysis by GC-MS-MS	E660F Waterloo - Environmental	Water	EPA 8270E (mod)	Pesticides are analyzed by GC-MS-MS

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
PCB Aroclors by GC-MS	E687 Waterloo - Environmental	Water	EPA 8270E (mod)	PCB Aroclors are analyzed by GC-MS
Phenoxy Acid Herbicides in Water by LC-MS-MS	E706A Waterloo - Environmental	Water	MOE E3552	Water samples are subjected to 0.2 µM RC filtration and analyzed by direct injection using liquid chromatography tandem mass spectrometry (LC-MS/MS).
Aldicarb and Diuron in Water by LC-MS/MS	E712B Waterloo - Environmental	Water	E3501	An aliquot of water sample is diluted 1:1 using acetonitrile and analyzed using LC/MS/MS
Glyphosate and AMPA in Water	E716A Waterloo - Environmental	Water	E3505	An aliquot of 4.0 ± 0.1 mL of a water sample is spiked with an Internal Standard, Glyphosate-13C2,15N, and derivatized to FMOC-Glyphosate and FMOC-AMPA, then analyzed by LC-MS/MS.
Diquat and Paraquat in Water by LC-MS-MS	E723A Waterloo - Environmental	Water	EPA 549.2	If the sample is not clear filter a portion of the sample using a RC filter. An aliquot of the sample is taken and internal standard is added. The sample is analyzed by LC/MS/MS.
N-Nitrosodimethylamine (NDMA) by LC-MS-MS (Trace Level)	E725-T Waterloo - Environmental	Water	EPA/600/r-05/054. Method 521	Nitrosamines analytes are analyzed via LC/MS/MS in Positive APCI mode.
Haloacetic Acids in Water by LC-MS/MS	E750 Waterloo - Environmental	Water	MOE E3478	An aliquot of sample is fortified with formic acid and internal standards and analyzed via direct injection by LCMSMS
Hardness (Calculated) from Total Ca/Mg	EC100A Waterloo - Environmental	Water	APHA 2340B	"Hardness (as CaCO3), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in $CaCO_3$ equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.
Total Organic Nitrogen (Calculation)	EC363 Waterloo - Environmental	Water	APHA 4500-NORG (TKN)/NH3-NITROGEN (NH3)	Total Organic Nitrogen is a calculated parameter. Total Organic Nitrogen = Total Kjeldahl Nitrogen - Ammonia.
Methane, Ethane, & Ethene by Headspace GC-FID	EC614B Waterloo - Environmental	Water	Unit Conversion	Convert ppmV to ug/L

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
	Waterloo - Environmental			
Digestion for TKN in water	EP318 Waterloo - Environmental	Water	APHA 4500-Norg D (mod)	Samples are digested at high temperature using Sulfuric Acid with Copper catalyst, which converts organic nitrogen sources to Ammonia, which is then quantified by the analytical method as TKN. This method is unsuitable for samples containing high levels of nitrate. If nitrate exceeds TKN concentration by ten times or more, results may be biased low.
Preparation for Dissolved Organic Carbon for Combustion	EP358 Waterloo - Environmental	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
VOCs Preparation for Headspace Analysis	EP581 Waterloo - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601 Waterloo - Environmental	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.
Phenolics Extraction	EP651 Waterloo - Environmental	Water	EPA 3511 (mod)	Phenolics are extracted from acidic aqueous sample using DCM liquid-liquid extraction.
Pesticides, PCB, and Neutral Extractable Chlorinated Hydrocarbons Extraction	EP660 Waterloo - Environmental	Water	EPA 3511 (mod)	Samples are extracted from aqueous sample using an organic solvent liquid-liquid extraction.
Pesticides & Toxaphene Extraction by DCM	EP660D Waterloo - Environmental	Water	EPA 1699 (mod)	Samples are extracted from aqueous sample using DCM liquid-liquid extraction.
Preparation of Phenoxy Acid Herbicides in Water by LC-MS-MS	EP706 Waterloo - Environmental	Water	MOE E3552	Water samples are subjected to 0.2 µM RC filtration (drinking water samples are not filtered) and analyzed by direct injection using liquid chromatography tandem mass spectrometry (LC-MS/MS).
Preparation of Aldicarb and Diuron in Water by LC-MS/MS	EP712B Waterloo - Environmental	Water	E3501	An aliquot of water sample is diluted 1:1 using acetonitrile and analyzed using LC/MS/MS
Preparation of Glyphosate and AMPA in Water	EP716 Waterloo - Environmental	Water	MOE E3500	Preparation of Glyphosate and AMPA in Water

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation of Diquat and Paraquat in Water	EP723 Waterloo - Environmental	Water	EPA 549.2	If the sample is not clear filter a portion of the sample using a RC filter. An aliquot of the sample is taken and internal standard is added. The sample is analyzed by LC/MS/MS.
Nitrosamines SPE Extraction	EP725 Waterloo - Environmental	Water	EPA/600/r-05/054. Method 521	Nitrosamines analytes are extracted from water samples using SPE (solid phase extraction). The analytes are eluted and evaporated for solvent exchange and then analyzed via LC/MS/MS in Positive APCI mode.
Preparation of Haloacetic acid in Water for LCMSMS	EP750 Waterloo - Environmental	Water	E3478	An aliquot of samples is fortified with formic acid and internal standard to be analyzed by direct injection LCMSMS

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **WT2212954**	Page	: 1 of 26
Client	: Township of Centre Wellington	Laboratory	: Waterloo - Environmental
Contact	: Matthew Alexander	Account Manager	: Candice Hunter
Address	: 1 MacDonald Square Elora ON Canada N0B 1S0	Address	: 60 Northland Road, Unit 1 Waterloo, Ontario Canada N2V 2B8
Telephone	: ----	Telephone	: +1 519 886 6910
Project	: ----	Date Samples Received	: 02-Sep-2022 11:45
PO	: ----	Date Analysis Commenced	: 02-Sep-2022
C-O-C number	: 20-1007481	Issue Date	: 16-Sep-2022 11:04
Sampler	: ----		
Site	: ----		
Quote number	: Special Non - Regulated Water		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Adam Boettger	Team Leader - LCMS	Waterloo LCMS, Waterloo, Ontario
David Tremblett	Team Leader - Volatiles	Waterloo Air Quality, Waterloo, Ontario
Greg Pokocky	Supervisor - Inorganic	Waterloo Inorganics, Waterloo, Ontario
Greg Pokocky	Supervisor - Inorganic	Waterloo Metals, Waterloo, Ontario
Jennifer Siemiernik		Waterloo Metals, Waterloo, Ontario
Jeremy Gingras	Team Leader - Semi-Volatile Instrumentation	Waterloo Organics, Waterloo, Ontario
Jihun Jeon	Laboratory Analyst	Waterloo LCMS, Waterloo, Ontario
Jocelyn Kennedy	Department Manager - Semi-Volatile Organics	Waterloo Organics, Waterloo, Ontario
Michelle Michalchuk	Analyst	Winnipeg Organics, Winnipeg, Manitoba
Phouvana Chounramany	Analyst	Waterloo Air Quality, Waterloo, Ontario
Ruby Sujeepan		Waterloo Microbiology, Waterloo, Ontario
Sarah Birch	Team Leader - Volatiles	Waterloo Organics, Waterloo, Ontario

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
= Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 631650)											
WT2212573-001	Anonymous	turbidity	----	E121	1.00	NTU	<1.00	<1.00	0	Diff <2x LOR	----
Physical Tests (QC Lot: 632380)											
WT2212954-001	F2-R	colour, true	----	E329-L	2.0	CU	<2.0	<2.0	0	Diff <2x LOR	----
Physical Tests (QC Lot: 634117)											
WT2212859-003	Anonymous	solids, total dissolved [TDS]	----	E162	20	mg/L	327	304	7.45%	20%	----
Physical Tests (QC Lot: 637652)											
WT2212938-001	Anonymous	pH	----	E108	0.10	pH units	8.08	8.10	0.247%	4%	----
Physical Tests (QC Lot: 637654)											
WT2212938-001	Anonymous	alkalinity, total (as CaCO3)	----	E290	2.0	mg/L	85.0	79.5	6.73%	20%	----
Anions and Nutrients (QC Lot: 637486)											
WT2213026-001	Anonymous	chloride	16887-00-6	E235.Cl	2.50	mg/L	149	151	1.30%	20%	----
Anions and Nutrients (QC Lot: 637487)											
WT2213026-001	Anonymous	fluoride	16984-48-8	E235.F	0.100	mg/L	0.340	0.347	0.007	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 637488)											
WT2213026-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	1.50	mg/L	397	403	1.56%	20%	----
Anions and Nutrients (QC Lot: 637489)											
WT2213026-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3	0.100	mg/L	0.185	0.187	0.003	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 637490)											
WT2213026-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 639862)											
WT2212926-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	0.500	mg/L	7.70	8.10	5.06%	20%	----
Anions and Nutrients (QC Lot: 639864)											
WT2212951-001	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0505	0.0504	0.198%	20%	----
Cyanides (QC Lot: 634176)											
SK2204799-001	Anonymous	cyanide, strong acid dissociable (total)	----	E333	0.0100	mg/L	<0.0100	<0.0100	0	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 635753)											
TY2201174-008	Anonymous	carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
Total Sulfides (QC Lot: 639357)											
WT2212954-001	F2-R	sulfide, total (as S)	18496-25-8	E396	0.018	mg/L	<0.018	<0.018	0	Diff <2x LOR	----
Microbiological Tests (QC Lot: 632124)											
WT2212944-002	Anonymous	coliforms, Escherichia coli [E. coli]	----	E010	1	MPN/100mL	<1	<1	0	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Microbiological Tests (QC Lot: 632124) - continued											
WT2212944-002	Anonymous	coliforms, total	----	E010	1	MPN/100mL	<1	<1	0	Diff <2x LOR	----
Total Metals (QC Lot: 633334)											
WT2212936-001	Anonymous	aluminum, total	7429-90-5	E420	0.0030	mg/L	0.233	0.233	0.0652%	20%	----
		antimony, total	7440-36-0	E420	0.00010	mg/L	0.00022	0.00023	0.000008	Diff <2x LOR	----
		arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00394	0.00394	0.0634%	20%	----
		barium, total	7440-39-3	E420	0.00010	mg/L	0.00772	0.00746	3.43%	20%	----
		beryllium, total	7440-41-7	E420	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		bismuth, total	7440-69-9	E420	0.000050	mg/L	0.000068	0.000065	0.000003	Diff <2x LOR	----
		boron, total	7440-42-8	E420	0.010	mg/L	0.039	0.037	0.001	Diff <2x LOR	----
		cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.000153	0.000161	5.10%	20%	----
		calcium, total	7440-70-2	E420	0.050	mg/L	45.6	43.2	5.33%	20%	----
		cesium, total	7440-46-2	E420	0.000010	mg/L	0.000028	0.000028	0.0000004	Diff <2x LOR	----
		chromium, total	7440-47-3	E420	0.00050	mg/L	0.00097	0.00089	0.00007	Diff <2x LOR	----
		cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00431	0.00432	0.236%	20%	----
		copper, total	7440-50-8	E420	0.00050	mg/L	0.0909	0.0904	0.538%	20%	----
		iron, total	7439-89-6	E420	0.010	mg/L	2.30	2.29	0.166%	20%	----
		lead, total	7439-92-1	E420	0.000050	mg/L	1.79 µg/L	0.00181	1.35%	20%	----
		lithium, total	7439-93-2	E420	0.0010	mg/L	0.0014	0.0011	0.0003	Diff <2x LOR	----
		magnesium, total	7439-95-4	E420	0.0050	mg/L	8.69	8.64	0.603%	20%	----
		manganese, total	7439-96-5	E420	0.00010	mg/L	0.200	0.200	0.0186%	20%	----
		molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000432	0.000441	0.000010	Diff <2x LOR	----
		nickel, total	7440-02-0	E420	0.00050	mg/L	0.00693	0.00697	0.578%	20%	----
		phosphorus, total	7723-14-0	E420	0.050	mg/L	2.07	2.01	2.57%	20%	----
		potassium, total	7440-09-7	E420	0.050	mg/L	9.24	9.34	1.06%	20%	----
		rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00679	0.00706	3.87%	20%	----
		selenium, total	7782-49-2	E420	0.000050	mg/L	0.000140	0.000138	0.000002	Diff <2x LOR	----
		silicon, total	7440-21-3	E420	0.10	mg/L	1.17	1.16	1.15%	20%	----
		silver, total	7440-22-4	E420	0.000010	mg/L	0.000018	0.000018	0.0000005	Diff <2x LOR	----
		sodium, total	7440-23-5	E420	0.050	mg/L	48.1	48.3	0.323%	20%	----
		strontium, total	7440-24-6	E420	0.00020	mg/L	0.0864	0.0876	1.35%	20%	----
		sulfur, total	7704-34-9	E420	0.50	mg/L	5.44	5.30	2.57%	20%	----
		tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		tin, total	7440-31-5	E420	0.00010	mg/L	0.00224	0.00223	0.448%	20%	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Total Metals (QC Lot: 633334) - continued											
WT2212936-001	Anonymous	titanium, total	7440-32-6	E420	0.00240	mg/L	<0.00240	<0.00240	0	Diff <2x LOR	----
		tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		uranium, total	7440-61-1	E420	0.000010	mg/L	0.000209	0.000214	2.65%	20%	----
		vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		zinc, total	7440-66-6	E420	0.0030	mg/L	0.0589	0.0589	0.0593%	20%	----
		zirconium, total	7440-67-7	E420	0.00020	mg/L	0.00086	0.00093	0.00008	Diff <2x LOR	----
Total Metals (QC Lot: 634028)											
WT2212782-006	Anonymous	mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Total Metals (QC Lot: 634512)											
WT2212529-002	Anonymous	antimony, total	7440-36-0	E432	0.00060	mg/L	<0.60 µg/L	<0.00060	0	Diff <2x LOR	----
		arsenic, total	7440-38-2	E432	0.0010	mg/L	<1.0 µg/L	<0.0010	0	Diff <2x LOR	----
		barium, total	7440-39-3	E432	0.010	mg/L	<10 µg/L	<0.010	0	Diff <2x LOR	----
		boron, total	7440-42-8	E432	0.05	mg/L	<50 µg/L	<0.05	0	Diff <2x LOR	----
		cadmium, total	7440-43-9	E432	0.00010	mg/L	<0.10 µg/L	<0.00010	0	Diff <2x LOR	----
		chromium, total	7440-47-3	E432	0.0010	mg/L	<1.0 µg/L	<0.0010	0	Diff <2x LOR	----
		selenium, total	7782-49-2	E432	0.0010	mg/L	<1.0 µg/L	<0.0010	0	Diff <2x LOR	----
		uranium, total	7440-61-1	E432	0.0020	mg/L	<2.0 µg/L	<0.0020	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 633331)											
CG2211713-001	Anonymous	nitrilotriacetic acid [NTA]	139-13-9	E394	0.20	mg/L	<0.20	<0.20	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 639186)											
CG2212007-001	Anonymous	microcystin	101043-37-2	E576	0.20	µg/L	<0.20	<0.20	0	Diff <2x LOR	----
Dissolved Gases (QC Lot: 635471)											
VA22C0739-002	Anonymous	methane	74-82-8	E614B	4.0	ppmv	17500	20600	16.1%	30%	----
Volatile Organic Compounds (QC Lot: 637812)											
WT2212954-001	F2-R	Acetone	67-64-1	E611D	20	µg/L	<20	<20	0	Diff <2x LOR	----
		benzene	71-43-2	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		bromodichloromethane	75-27-4	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		bromoform	75-25-2	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		bromomethane	74-83-9	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		carbon tetrachloride	56-23-5	E611D	0.20	µg/L	<0.20	<0.20	0	Diff <2x LOR	----
		chlorobenzene	108-90-7	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		chloroform	67-66-3	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dibromochloromethane	124-48-1	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dibromoethane, 1,2-	106-93-4	E611D	0.20	µg/L	<0.20	<0.20	0	Diff <2x LOR	----
		dichlorobenzene, 1,2-	95-50-1	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----

Sub-Matrix: **Water**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Laboratory Duplicate (DUP) Report						
					LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Volatile Organic Compounds (QC Lot: 637812) - continued											
WT2212954-001	F2-R	dichlorobenzene, 1,3-	541-73-1	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichlorobenzene, 1,4-	106-46-7	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichlorodifluoromethane	75-71-8	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloroethane, 1,1-	75-34-3	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloroethane, 1,2-	107-06-2	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloroethylene, 1,1-	75-35-4	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloroethylene, cis-1,2-	156-59-2	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloroethylene, trans-1,2-	156-60-5	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloromethane	75-09-2	E611D	1.0	µg/L	<1.0	<1.0	0	Diff <2x LOR	----
		dichloropropane, 1,2-	78-87-5	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloropropylene, cis-1,3-	10061-01-5	E611D	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	----
		dichloropropylene, trans-1,3-	10061-02-6	E611D	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		hexane, n-	110-54-3	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		methyl ethyl ketone [MEK]	78-93-3	E611D	20	µg/L	<20	<20	0	Diff <2x LOR	----
		methyl isobutyl ketone [MIBK]	108-10-1	E611D	20	µg/L	<20	<20	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		styrene	100-42-5	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		tetrachloroethane, 1,1,1,2-	630-20-6	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		tetrachloroethane, 1,1,2,2-	79-34-5	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		tetrachloroethylene	127-18-4	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		toluene	108-88-3	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		trichloroethane, 1,1,1-	71-55-6	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		trichloroethane, 1,1,2-	79-00-5	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		trichloroethylene	79-01-6	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		trichlorofluoromethane	75-69-4	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		vinyl chloride	75-01-4	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611D	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611D	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	----
Volatile Organic Compounds [THMs] (QC Lot: 637813)											
WT2212954-001	F2-R	bromodichloromethane	75-27-4	E611B	1.0	µg/L	<1.0	<1.0	0	Diff <2x LOR	----
		bromoform	75-25-2	E611B	1.0	µg/L	<1.0	<1.0	0	Diff <2x LOR	----
		chloroform	67-66-3	E611B	1.0	µg/L	<1.0	<1.0	0	Diff <2x LOR	----
		dibromochloromethane	124-48-1	E611B	1.0	µg/L	<1.0	<1.0	0	Diff <2x LOR	----
DIsinfectant By-Products (QC Lot: 635446)											

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
DIsinfectant By-Products (QC Lot: 635446) - continued											
EO2207084-001	Anonymous	chlorate	14866-68-3	E409.CLO3	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
DIsinfectant By-Products (QC Lot: 635447)											
EO2207084-001	Anonymous	chlorite	14998-27-7	E409.CLO2	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
Haloacetic Acids (QC Lot: 638905)											
CG2211691-001	Anonymous	dibromoacetic acid	631-64-1	E750	1.00	µg/L	<1.00	<1.00	0	Diff <2x LOR	----
		dichloroacetic acid	79-43-6	E750	1.00	µg/L	12.7	12.3	3.20%	30%	----
		monobromoacetic acid	79-08-3	E750	1.00	µg/L	<1.00	<1.00	0	Diff <2x LOR	----
		monochloroacetic acid	79-11-8	E750	1.00	µg/L	1.46	1.73	0.27	Diff <2x LOR	----
		trichloroacetic acid	76-03-9	E750	1.00	µg/L	9.49	9.29	2.19%	30%	----
Carbamate Pesticides (QC Lot: 638961)											
WT2212954-001	F2-R	diuron	330-54-1	E712B	1.0	µg/L	<1.0	<1.0	0	Diff <2x LOR	----
Herbicides (QC Lot: 633946)											
CG2211713-001	Anonymous	AMPA	74341-63-2	E716A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		glyphosate	1071-83-6	E716A	0.20	µg/L	<0.20	<0.20	0	Diff <2x LOR	----
Herbicides (QC Lot: 634443)											
CG2211713-001	Anonymous	acetic acid, 2-methyl-4-chlorophenoxy- [MCPA]	94-74-6	E706A	0.050	µg/L	<0.050	<0.050	0	Diff <2x LOR	----
		bromoxynil	1689-84-5	E706A	0.050	µg/L	<0.050	<0.050	0	Diff <2x LOR	----
		dicamba	1918-00-9	E706A	0.10	µg/L	<0.10	<0.10	0	Diff <2x LOR	----
		dichlorophenoxyacetic acid, 2,4- [2,4-D]	94-75-7	E706A	0.050	µg/L	<0.050	<0.050	0	Diff <2x LOR	----
		dinoseb	88-85-7	E706A	0.050	µg/L	<0.050	<0.050	0	Diff <2x LOR	----
		picloram	1918-02-1	E706A	0.10	µg/L	<0.10	<0.10	0	Diff <2x LOR	----
		trichlorophenoxypropionic acid, 2,4,5- [2,4,5-TP]	93-72-1	E706A	0.050	µg/L	<0.050	<0.050	0	Diff <2x LOR	----
Herbicides (QC Lot: 637025)											
WT2212954-001	F2-R	diquat (ion)	2764-72-9	E723A	1.0	µg/L	<1.0	<1.0	0	Diff <2x LOR	----
		paraquat (as dichloride)	1910-42-5	E723A	1.0	µg/L	<1.0	<1.0	0	Diff <2x LOR	----
Nitrosamines (QC Lot: 638901)											
WT2213464-001	Anonymous	nitrosodimethylamine, n- [NDMA]	62-75-9	E725-T	0.00090	µg/L	<0.00090	<0.00090	0	Diff <2x LOR	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 631650)						
turbidity	----	E121	0.1	NTU	<0.10	B
Physical Tests (QCLot: 632380)						
colour, true	----	E329-L	2	CU	<2.0	----
Physical Tests (QCLot: 634117)						
solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Physical Tests (QCLot: 637654)						
alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Anions and Nutrients (QCLot: 637486)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 637487)						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 637488)						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 637489)						
nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 637490)						
nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	<0.010	----
Anions and Nutrients (QCLot: 639862)						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 639864)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Cyanides (QCLot: 634176)						
cyanide, strong acid dissociable (total)	----	E333	0.002	mg/L	<0.0020	----
Organic / Inorganic Carbon (QCLot: 635753)						
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
Total Sulfides (QCLot: 639357)						
sulfide, total (as S)	18496-25-8	E396	0.018	mg/L	<0.018	----
Microbiological Tests (QCLot: 632124)						
coliforms, Escherichia coli [E. coli]	----	E010	1	MPN/100mL	<1	----
coliforms, total	----	E010	1	MPN/100mL	<1	----
Total Metals (QCLot: 633334)						
aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	----
antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 633334) - continued						
arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	----
barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	----
bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	----
boron, total	7440-42-8	E420	0.01	mg/L	<0.010	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	----
calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	----
cesium, total	7440-46-2	E420	0.00001	mg/L	<0.000010	----
chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	----
copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	----
iron, total	7439-89-6	E420	0.01	mg/L	<0.010	----
lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	----
lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	----
magnesium, total	7439-95-4	E420	0.005	mg/L	# 0.0114	B
manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	----
molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	----
nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	----
phosphorus, total	7723-14-0	E420	0.05	mg/L	<0.050	----
potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	----
rubidium, total	7440-17-7	E420	0.0002	mg/L	<0.00020	----
selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	----
silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	----
silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	----
sodium, total	7440-23-5	E420	0.05	mg/L	<0.050	----
strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----
sulfur, total	7704-34-9	E420	0.5	mg/L	<0.50	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	<0.00020	----
thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
thorium, total	7440-29-1	E420	0.0001	mg/L	<0.00010	----
tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	<0.00010	----
uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 633334) - continued						
zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	----
Total Metals (QCLot: 634028)						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
Total Metals (QCLot: 634512)						
antimony, total	7440-36-0	E432	0.0006	mg/L	<0.00060	----
arsenic, total	7440-38-2	E432	0.001	mg/L	<0.0010	----
barium, total	7440-39-3	E432	0.01	mg/L	<0.010	----
boron, total	7440-42-8	E432	0.05	mg/L	<0.05	----
cadmium, total	7440-43-9	E432	0.0001	mg/L	<0.00010	----
chromium, total	7440-47-3	E432	0.001	mg/L	<0.0010	----
selenium, total	7782-49-2	E432	0.001	mg/L	<0.0010	----
uranium, total	7440-61-1	E432	0.002	mg/L	<0.0020	----
Aggregate Organics (QCLot: 633331)						
nitrilotriacetic acid [NTA]	139-13-9	E394	0.2	mg/L	<0.20	----
Aggregate Organics (QCLot: 639186)						
microcystin	101043-37-2	E576	0.2	µg/L	<0.20	----
Dissolved Gases (QCLot: 635471)						
methane	74-82-8	E614B	4	ppmv	<4.0	----
Volatile Organic Compounds (QCLot: 637812)						
Acetone	67-64-1	E611D	20	µg/L	<20	----
benzene	71-43-2	E611D	0.5	µg/L	<0.50	----
bromodichloromethane	75-27-4	E611D	0.5	µg/L	<0.50	----
bromoform	75-25-2	E611D	0.5	µg/L	<0.50	----
bromomethane	74-83-9	E611D	0.5	µg/L	<0.50	----
carbon tetrachloride	56-23-5	E611D	0.2	µg/L	<0.20	----
chlorobenzene	108-90-7	E611D	0.5	µg/L	<0.50	----
chloroform	67-66-3	E611D	0.5	µg/L	<0.50	----
dibromochloromethane	124-48-1	E611D	0.5	µg/L	<0.50	----
dibromoethane, 1,2-	106-93-4	E611D	0.2	µg/L	<0.20	----
dichlorobenzene, 1,2-	95-50-1	E611D	0.5	µg/L	<0.50	----
dichlorobenzene, 1,3-	541-73-1	E611D	0.5	µg/L	<0.50	----
dichlorobenzene, 1,4-	106-46-7	E611D	0.5	µg/L	<0.50	----
dichlorodifluoromethane	75-71-8	E611D	0.5	µg/L	<0.50	----
dichloroethane, 1,1-	75-34-3	E611D	0.5	µg/L	<0.50	----
dichloroethane, 1,2-	107-06-2	E611D	0.5	µg/L	<0.50	----
dichloroethylene, 1,1-	75-35-4	E611D	0.5	µg/L	<0.50	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Volatile Organic Compounds (QCLot: 637812) - continued						
dichloroethylene, cis-1,2-	156-59-2	E611D	0.5	µg/L	<0.50	----
dichloroethylene, trans-1,2-	156-60-5	E611D	0.5	µg/L	<0.50	----
dichloromethane	75-09-2	E611D	1	µg/L	# 1.1	B
dichloropropane, 1,2-	78-87-5	E611D	0.5	µg/L	<0.50	----
dichloropropylene, cis-1,3-	10061-01-5	E611D	0.3	µg/L	<0.30	----
dichloropropylene, trans-1,3-	10061-02-6	E611D	0.3	µg/L	<0.30	----
ethylbenzene	100-41-4	E611D	0.5	µg/L	<0.50	----
hexane, n-	110-54-3	E611D	0.5	µg/L	<0.50	----
methyl ethyl ketone [MEK]	78-93-3	E611D	20	µg/L	<20	----
methyl isobutyl ketone [MIBK]	108-10-1	E611D	20	µg/L	<20	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611D	0.5	µg/L	<0.50	----
styrene	100-42-5	E611D	0.5	µg/L	<0.50	----
tetrachloroethane, 1,1,1,2-	630-20-6	E611D	0.5	µg/L	<0.50	----
tetrachloroethane, 1,1,2,2-	79-34-5	E611D	0.5	µg/L	<0.50	----
tetrachloroethylene	127-18-4	E611D	0.5	µg/L	<0.50	----
toluene	108-88-3	E611D	0.5	µg/L	<0.50	----
trichloroethane, 1,1,1-	71-55-6	E611D	0.5	µg/L	<0.50	----
trichloroethane, 1,1,2-	79-00-5	E611D	0.5	µg/L	<0.50	----
trichloroethylene	79-01-6	E611D	0.5	µg/L	<0.50	----
trichlorofluoromethane	75-69-4	E611D	0.5	µg/L	<0.50	----
vinyl chloride	75-01-4	E611D	0.5	µg/L	<0.50	----
xylene, m+p-	179601-23-1	E611D	0.4	µg/L	<0.40	----
xylene, o-	95-47-6	E611D	0.3	µg/L	<0.30	----
Volatile Organic Compounds [THMs] (QCLot: 637813)						
bromodichloromethane	75-27-4	E611B	1	µg/L	<1.0	----
bromoform	75-25-2	E611B	1	µg/L	<1.0	----
chloroform	67-66-3	E611B	1	µg/L	<1.0	----
dibromochloromethane	124-48-1	E611B	1	µg/L	<1.0	----
Polycyclic Aromatic Hydrocarbons (QCLot: 638508)						
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	<0.0050	----
DIsinfectant By-Products (QCLot: 635446)						
chlorate	14866-68-3	E409.CLO3	0.01	mg/L	<0.010	----
DIsinfectant By-Products (QCLot: 635447)						
chlorite	14998-27-7	E409.CLO2	0.01	mg/L	<0.010	----
Haloacetic Acids (QCLot: 638905)						
dibromoacetic acid	631-64-1	E750	1	µg/L	<1.00	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Haloacetic Acids (QCLot: 638905) - continued						
dichloroacetic acid	79-43-6	E750	1	µg/L	<1.00	----
monobromoacetic acid	79-08-3	E750	0.2	µg/L	<0.20	----
monochloroacetic acid	79-11-8	E750	0.5	µg/L	<0.50	----
trichloroacetic acid	76-03-9	E750	1	µg/L	<1.00	----
Chlorinated Phenolics (QCLot: 633416)						
dichlorophenol, 2,4-	120-83-2	E651D	0.3	µg/L	<0.30	----
pentachlorophenol [PCP]	87-86-5	E651D	0.5	µg/L	<0.50	----
tetrachlorophenol, 2,3,4,6-	58-90-2	E651D	0.5	µg/L	<0.50	----
trichlorophenol, 2,4,6-	88-06-2	E651D	0.5	µg/L	<0.50	----
Polychlorinated Biphenyls (QCLot: 633429)						
Aroclor 1016	12674-11-2	E687	0.02	µg/L	<0.020	----
Aroclor 1221	11104-28-2	E687	0.02	µg/L	<0.020	----
Aroclor 1232	11141-16-5	E687	0.02	µg/L	<0.020	----
Aroclor 1242	53469-21-9	E687	0.02	µg/L	<0.020	----
Aroclor 1248	12672-29-6	E687	0.02	µg/L	<0.020	----
Aroclor 1254	11097-69-1	E687	0.02	µg/L	<0.020	----
Aroclor 1260	11096-82-5	E687	0.02	µg/L	<0.020	----
Aroclor 1262	37324-23-5	E687	0.02	µg/L	<0.020	----
Aroclor 1268	11100-14-4	E687	0.02	µg/L	<0.020	----
Carbamate Pesticides (QCLot: 638961)						
diuron	330-54-1	E712B	1	µg/L	<1.0	----
Organochlorine Pesticides (QCLot: 633430)						
chlordane, cis- (alpha)	5103-71-9	E660F	0.008	µg/L	<0.0080	----
chlordane, trans- (gamma)	5103-74-2	E660F	0.008	µg/L	<0.0080	----
DDD, 4,4'-	72-54-8	E660F	0.004	µg/L	<0.0040	----
DDE, 4,4'-	72-55-9	E660F	0.004	µg/L	<0.0040	----
DDT, 2,4'-	789-02-6	E660F	0.004	µg/L	<0.0040	----
DDT, 4,4'-	50-29-3	E660F	0.004	µg/L	<0.0040	----
oxychlordane	27304-13-8	E660F	0.008	µg/L	<0.0080	----
Herbicides (QCLot: 633946)						
AMPA	74341-63-2	E716A	0.5	µg/L	<0.50	----
glyphosate	1071-83-6	E716A	0.2	µg/L	<0.20	----
Herbicides (QCLot: 634443)						
acetic acid, 2-methyl-4-chlorophenoxy- [MCPA]	94-74-6	E706A	0.05	µg/L	<0.050	----
bromoxynil	1689-84-5	E706A	0.05	µg/L	<0.050	----
dicamba	1918-00-9	E706A	0.1	µg/L	<0.10	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Herbicides (QCLot: 634443) - continued						
dichlorophenoxyacetic acid, 2,4- [2,4-D]	94-75-7	E706A	0.05	µg/L	<0.050	----
dinoseb	88-85-7	E706A	0.05	µg/L	<0.050	----
picloram	1918-02-1	E706A	0.1	µg/L	<0.10	----
trichlorophenoxypropionic acid, 2,4,5- [2,4,5-TP]	93-72-1	E706A	0.05	µg/L	<0.050	----
Herbicides (QCLot: 637025)						
diquat (ion)	2764-72-9	E723A	1	µg/L	<1.0	----
paraquat (as dichloride)	1910-42-5	E723A	1	µg/L	<1.0	----
Pesticides (QCLot: 633345)						
alachlor	15972-60-8	E660E-H	0.1	µg/L	<0.10	----
atrazine	1912-24-9	E660E-H	0.1	µg/L	<0.10	----
atrazine-desethyl	6190-65-4	E660E-H	0.1	µg/L	<0.10	----
azinphos-methyl	86-50-0	E660E-H	0.1	µg/L	<0.10	----
carbaryl	63-25-2	E660E-H	0.2	µg/L	<0.20	----
carbofuran	1563-66-2	E660E-H	0.2	µg/L	<0.20	----
chlorpyrifos	2921-88-2	E660E-H	0.1	µg/L	<0.10	----
diazinon	333-41-5	E660E-H	0.1	µg/L	<0.10	----
diclofop-methyl	51338-27-3	E660E-H	0.1	µg/L	<0.10	----
dimethoate	60-51-5	E660E-H	0.1	µg/L	<0.10	----
malathion	121-75-5	E660E-H	0.1	µg/L	<0.10	----
metolachlor	51218-45-2	E660E-H	0.1	µg/L	<0.10	----
metribuzin	21087-64-9	E660E-H	0.1	µg/L	<0.10	----
phorate	298-02-2	E660E-H	0.1	µg/L	<0.10	----
prometryn	7287-19-6	E660E-H	0.1	µg/L	<0.10	----
simazine	122-34-9	E660E-H	0.1	µg/L	<0.10	----
terbufos	13071-79-9	E660E-H	0.1	µg/L	<0.10	----
triallate	2303-17-5	E660E-H	0.1	µg/L	<0.10	----
trifluralin	1582-09-8	E660E-H	0.1	µg/L	<0.10	----
Nitrosamines (QCLot: 638901)						
nitrosodimethylamine, n- [NDMA]	62-75-9	E725-T	0.0009	µg/L	<0.00090	----

Qualifiers

Qualifier	Description
B	*Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.*

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 631650)									
turbidity	----	E121	0.1	NTU	200 NTU	99.4	85.0	115	----
Physical Tests (QCLot: 632380)									
colour, true	----	E329-L	2	CU	25 CU	105	85.0	115	----
Physical Tests (QCLot: 634117)									
solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	100	85.0	115	----
Physical Tests (QCLot: 637652)									
pH	----	E108	----	pH units	7 pH units	101	98.0	102	----
Physical Tests (QCLot: 637654)									
alkalinity, total (as CaCO3)	----	E290	1	mg/L	150 mg/L	100	85.0	115	----
Anions and Nutrients (QCLot: 637486)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 637487)									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 637488)									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 637489)									
nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	2.5 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 637490)									
nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	0.5 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 639862)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	97.8	75.0	125	----
Anions and Nutrients (QCLot: 639864)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	95.6	85.0	115	----
Cyanides (QCLot: 634176)									
cyanide, strong acid dissociable (total)	----	E333	0.002	mg/L	0.25 mg/L	88.8	80.0	120	----
Organic / Inorganic Carbon (QCLot: 635753)									
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	107	80.0	120	----
Total Sulfides (QCLot: 639357)									
sulfide, total (as S)	18496-25-8	E396	0.018	mg/L	0.1244 mg/L	97.3	75.0	125	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 633334)									
aluminum, total	7429-90-5	E420	0.003	mg/L	0.1 mg/L	107	80.0	120	----
antimony, total	7440-36-0	E420	0.0001	mg/L	0.05 mg/L	104	80.0	120	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	0.05 mg/L	107	80.0	120	----
barium, total	7440-39-3	E420	0.0001	mg/L	0.0125 mg/L	106	80.0	120	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	0.005 mg/L	108	80.0	120	----
bismuth, total	7440-69-9	E420	0.00005	mg/L	0.05 mg/L	104	80.0	120	----
boron, total	7440-42-8	E420	0.01	mg/L	0.05 mg/L	106	80.0	120	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	0.005 mg/L	107	80.0	120	----
calcium, total	7440-70-2	E420	0.05	mg/L	2.5 mg/L	106	80.0	120	----
cesium, total	7440-46-2	E420	0.00001	mg/L	0.0025 mg/L	108	80.0	120	----
chromium, total	7440-47-3	E420	0.0005	mg/L	0.0125 mg/L	105	80.0	120	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	0.0125 mg/L	103	80.0	120	----
copper, total	7440-50-8	E420	0.0005	mg/L	0.0125 mg/L	103	80.0	120	----
iron, total	7439-89-6	E420	0.01	mg/L	0.05 mg/L	107	80.0	120	----
lead, total	7439-92-1	E420	0.00005	mg/L	0.025 mg/L	108	80.0	120	----
lithium, total	7439-93-2	E420	0.001	mg/L	0.0125 mg/L	111	80.0	120	----
magnesium, total	7439-95-4	E420	0.005	mg/L	2.5 mg/L	118	80.0	120	----
manganese, total	7439-96-5	E420	0.0001	mg/L	0.0125 mg/L	107	80.0	120	----
molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.0125 mg/L	98.2	80.0	120	----
nickel, total	7440-02-0	E420	0.0005	mg/L	0.025 mg/L	105	80.0	120	----
phosphorus, total	7723-14-0	E420	0.05	mg/L	0.5 mg/L	105	80.0	120	----
potassium, total	7440-09-7	E420	0.05	mg/L	2.5 mg/L	100	80.0	120	----
rubidium, total	7440-17-7	E420	0.0002	mg/L	0.005 mg/L	106	80.0	120	----
selenium, total	7782-49-2	E420	0.00005	mg/L	0.05 mg/L	110	80.0	120	----
silicon, total	7440-21-3	E420	0.1	mg/L	0.5 mg/L	108	80.0	120	----
silver, total	7440-22-4	E420	0.00001	mg/L	0.005 mg/L	99.4	80.0	120	----
sodium, total	7440-23-5	E420	0.05	mg/L	2.5 mg/L	107	80.0	120	----
strontium, total	7440-24-6	E420	0.0002	mg/L	0.0125 mg/L	102	80.0	120	----
sulfur, total	7704-34-9	E420	0.5	mg/L	2.5 mg/L	102	80.0	120	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	0.005 mg/L	104	80.0	120	----
thallium, total	7440-28-0	E420	0.00001	mg/L	0.05 mg/L	104	80.0	120	----
thorium, total	7440-29-1	E420	0.0001	mg/L	0.005 mg/L	102	80.0	120	----
tin, total	7440-31-5	E420	0.0001	mg/L	0.025 mg/L	104	80.0	120	----
titanium, total	7440-32-6	E420	0.0003	mg/L	0.0125 mg/L	100	80.0	120	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	0.005 mg/L	102	80.0	120	----
uranium, total	7440-61-1	E420	0.00001	mg/L	0.00025 mg/L	109	80.0	120	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	0.025 mg/L	105	80.0	120	----
zinc, total	7440-66-6	E420	0.003	mg/L	0.025 mg/L	106	80.0	120	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 633334) - continued									
zirconium, total	7440-67-7	E420	0.0002	mg/L	0.005 mg/L	102	80.0	120	----
Total Metals (QCLot: 634028)									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	100	80.0	120	----
Total Metals (QCLot: 634512)									
antimony, total	7440-36-0	E432	0.0006	mg/L	0.05 mg/L	102	80.0	120	----
arsenic, total	7440-38-2	E432	0.001	mg/L	0.05 mg/L	105	80.0	120	----
barium, total	7440-39-3	E432	0.01	mg/L	0.0125 mg/L	104	80.0	120	----
boron, total	7440-42-8	E432	0.05	mg/L	0.05 mg/L	92.3	80.0	120	----
cadmium, total	7440-43-9	E432	0.0001	mg/L	0.005 mg/L	102	80.0	120	----
chromium, total	7440-47-3	E432	0.001	mg/L	0.0125 mg/L	99.3	80.0	120	----
selenium, total	7782-49-2	E432	0.001	mg/L	0.05 mg/L	103	80.0	120	----
uranium, total	7440-61-1	E432	0.002	mg/L	0.00025 mg/L	107	80.0	120	----
Total Metals (QCLot: 635062)									
aluminum, total	7429-90-5	E420	----	mg/L	0.1 mg/L	105	80.0	120	----
antimony, total	7440-36-0	E420	----	mg/L	0.05 mg/L	107	80.0	120	----
arsenic, total	7440-38-2	E420	----	mg/L	0.05 mg/L	104	80.0	120	----
barium, total	7440-39-3	E420	----	mg/L	0.0125 mg/L	101	80.0	120	----
beryllium, total	7440-41-7	E420	----	mg/L	0.005 mg/L	103	80.0	120	----
bismuth, total	7440-69-9	E420	----	mg/L	0.05 mg/L	100	80.0	120	----
boron, total	7440-42-8	E420	----	mg/L	0.05 mg/L	103	80.0	120	----
cadmium, total	7440-43-9	E420	----	mg/L	0.005 mg/L	103	80.0	120	----
calcium, total	7440-70-2	E420	----	mg/L	2.5 mg/L	103	80.0	120	----
cesium, total	7440-46-2	E420	----	mg/L	0.0025 mg/L	106	80.0	120	----
chromium, total	7440-47-3	E420	----	mg/L	0.0125 mg/L	103	80.0	120	----
cobalt, total	7440-48-4	E420	----	mg/L	0.0125 mg/L	101	80.0	120	----
copper, total	7440-50-8	E420	----	mg/L	0.0125 mg/L	99.9	80.0	120	----
iron, total	7439-89-6	E420	----	mg/L	0.05 mg/L	103	80.0	120	----
lead, total	7439-92-1	E420	----	mg/L	0.025 mg/L	104	80.0	120	----
lithium, total	7439-93-2	E420	----	mg/L	0.0125 mg/L	98.8	80.0	120	----
magnesium, total	7439-95-4	E420	----	mg/L	2.5 mg/L	110	80.0	120	----
manganese, total	7439-96-5	E420	----	mg/L	0.0125 mg/L	103	80.0	120	----
molybdenum, total	7439-98-7	E420	----	mg/L	0.0125 mg/L	103	80.0	120	----
nickel, total	7440-02-0	E420	----	mg/L	0.025 mg/L	101	80.0	120	----
phosphorus, total	7723-14-0	E420	----	mg/L	0.5 mg/L	115	80.0	120	----
potassium, total	7440-09-7	E420	----	mg/L	2.5 mg/L	100	80.0	120	----
rubidium, total	7440-17-7	E420	----	mg/L	0.005 mg/L	107	80.0	120	----
selenium, total	7782-49-2	E420	----	mg/L	0.05 mg/L	106	80.0	120	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 635062) - continued									
silicon, total	7440-21-3	E420	----	mg/L	0.5 mg/L	106	80.0	120	----
silver, total	7440-22-4	E420	----	mg/L	0.005 mg/L	96.5	80.0	120	----
sodium, total	7440-23-5	E420	----	mg/L	2.5 mg/L	102	80.0	120	----
strontium, total	7440-24-6	E420	----	mg/L	0.0125 mg/L	107	80.0	120	----
sulfur, total	7704-34-9	E420	----	mg/L	2.5 mg/L	108	80.0	120	----
tellurium, total	13494-80-9	E420	----	mg/L	0.005 mg/L	105	80.0	120	----
thallium, total	7440-28-0	E420	----	mg/L	0.05 mg/L	102	80.0	120	----
thorium, total	7440-29-1	E420	----	mg/L	0.005 mg/L	102	80.0	120	----
tin, total	7440-31-5	E420	----	mg/L	0.025 mg/L	103	80.0	120	----
titanium, total	7440-32-6	E420	----	mg/L	0.0125 mg/L	103	80.0	120	----
tungsten, total	7440-33-7	E420	----	mg/L	0.005 mg/L	102	80.0	120	----
uranium, total	7440-61-1	E420	----	mg/L	0.00025 mg/L	107	80.0	120	----
vanadium, total	7440-62-2	E420	----	mg/L	0.025 mg/L	102	80.0	120	----
zinc, total	7440-66-6	E420	----	mg/L	0.025 mg/L	103	80.0	120	----
zirconium, total	7440-67-7	E420	----	mg/L	0.005 mg/L	98.1	80.0	120	----
Aggregate Organics (QCLot: 633331)									
nitrilotriacetic acid [NTA]	139-13-9	E394	0.2	mg/L	1 mg/L	93.7	75.0	125	----
Aggregate Organics (QCLot: 639186)									
microcystin	101043-37-2	E576	0.2	µg/L	0.5 µg/L	102	70.0	130	----
Volatile Organic Compounds (QCLot: 637812)									
Acetone	67-64-1	E611D	20	µg/L	100 µg/L	125	70.0	130	----
benzene	71-43-2	E611D	0.5	µg/L	100 µg/L	112	70.0	130	----
bromodichloromethane	75-27-4	E611D	0.5	µg/L	100 µg/L	121	70.0	130	----
bromoform	75-25-2	E611D	0.5	µg/L	100 µg/L	117	70.0	130	----
bromomethane	74-83-9	E611D	0.5	µg/L	100 µg/L	121	60.0	140	----
carbon tetrachloride	56-23-5	E611D	0.2	µg/L	100 µg/L	109	70.0	130	----
chlorobenzene	108-90-7	E611D	0.5	µg/L	100 µg/L	105	70.0	130	----
chloroform	67-66-3	E611D	0.5	µg/L	100 µg/L	112	70.0	130	----
dibromochloromethane	124-48-1	E611D	0.5	µg/L	100 µg/L	106	70.0	130	----
dibromoethane, 1,2-	106-93-4	E611D	0.2	µg/L	100 µg/L	112	70.0	130	----
dichlorobenzene, 1,2-	95-50-1	E611D	0.5	µg/L	100 µg/L	106	70.0	130	----
dichlorobenzene, 1,3-	541-73-1	E611D	0.5	µg/L	100 µg/L	102	70.0	130	----
dichlorobenzene, 1,4-	106-46-7	E611D	0.5	µg/L	100 µg/L	103	70.0	130	----
dichlorodifluoromethane	75-71-8	E611D	0.5	µg/L	100 µg/L	104	60.0	140	----
dichloroethane, 1,1-	75-34-3	E611D	0.5	µg/L	100 µg/L	109	70.0	130	----
dichloroethane, 1,2-	107-06-2	E611D	0.5	µg/L	100 µg/L	116	70.0	130	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Volatile Organic Compounds (QCLot: 637812) - continued									
dichloroethylene, 1,1-	75-35-4	E611D	0.5	µg/L	100 µg/L	101	70.0	130	----
dichloroethylene, cis-1,2-	156-59-2	E611D	0.5	µg/L	100 µg/L	122	70.0	130	----
dichloroethylene, trans-1,2-	156-60-5	E611D	0.5	µg/L	100 µg/L	105	70.0	130	----
dichloromethane	75-09-2	E611D	1	µg/L	100 µg/L	118	70.0	130	----
dichloropropane, 1,2-	78-87-5	E611D	0.5	µg/L	100 µg/L	114	70.0	130	----
dichloropropylene, cis-1,3-	10061-01-5	E611D	0.3	µg/L	100 µg/L	128	70.0	130	----
dichloropropylene, trans-1,3-	10061-02-6	E611D	0.3	µg/L	100 µg/L	117	70.0	130	----
ethylbenzene	100-41-4	E611D	0.5	µg/L	100 µg/L	96.1	70.0	130	----
hexane, n-	110-54-3	E611D	0.5	µg/L	100 µg/L	101	70.0	130	----
methyl ethyl ketone [MEK]	78-93-3	E611D	20	µg/L	100 µg/L	125	70.0	130	----
methyl isobutyl ketone [MIBK]	108-10-1	E611D	20	µg/L	100 µg/L	111	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611D	0.5	µg/L	100 µg/L	102	70.0	130	----
styrene	100-42-5	E611D	0.5	µg/L	100 µg/L	101	70.0	130	----
tetrachloroethane, 1,1,1,2-	630-20-6	E611D	0.5	µg/L	100 µg/L	108	70.0	130	----
tetrachloroethane, 1,1,2,2-	79-34-5	E611D	0.5	µg/L	100 µg/L	122	70.0	130	----
tetrachloroethylene	127-18-4	E611D	0.5	µg/L	100 µg/L	104	70.0	130	----
toluene	108-88-3	E611D	0.5	µg/L	100 µg/L	99.5	70.0	130	----
trichloroethane, 1,1,1-	71-55-6	E611D	0.5	µg/L	100 µg/L	110	70.0	130	----
trichloroethane, 1,1,2-	79-00-5	E611D	0.5	µg/L	100 µg/L	107	70.0	130	----
trichloroethylene	79-01-6	E611D	0.5	µg/L	100 µg/L	113	70.0	130	----
trichlorofluoromethane	75-69-4	E611D	0.5	µg/L	100 µg/L	107	60.0	140	----
vinyl chloride	75-01-4	E611D	0.5	µg/L	100 µg/L	94.8	60.0	140	----
xylene, m+p-	179601-23-1	E611D	0.4	µg/L	200 µg/L	99.3	70.0	130	----
xylene, o-	95-47-6	E611D	0.3	µg/L	100 µg/L	96.7	70.0	130	----
Volatile Organic Compounds [THMs] (QCLot: 637813)									
bromodichloromethane	75-27-4	E611B	1	µg/L	100 µg/L	121	70.0	130	----
bromoform	75-25-2	E611B	1	µg/L	100 µg/L	117	70.0	130	----
chloroform	67-66-3	E611B	1	µg/L	100 µg/L	112	70.0	130	----
dibromochloromethane	124-48-1	E611B	1	µg/L	100 µg/L	106	70.0	130	----
Polycyclic Aromatic Hydrocarbons (QCLot: 638508)									
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	0.5263 µg/L	110	50.0	140	----
DIsinfectant By-Products (QCLot: 635446)									
chlorate	14866-68-3	E409.CLO3	0.01	mg/L	1 mg/L	103	85.0	115	----
DIsinfectant By-Products (QCLot: 635447)									
chlorite	14998-27-7	E409.CLO2	0.01	mg/L	1 mg/L	102	85.0	115	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report: Spike Concentration	Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Haloacetic Acids (QCLot: 638905)									
dibromoacetic acid	631-64-1	E750	1	µg/L	5 µg/L	119	70.0	130	----
dichloroacetic acid	79-43-6	E750	1	µg/L	5 µg/L	124	70.0	130	----
monobromoacetic acid	79-08-3	E750	0.2	µg/L	1 µg/L	83.7	70.0	130	----
monochloroacetic acid	79-11-8	E750	0.5	µg/L	2.5 µg/L	106	70.0	130	----
trichloroacetic acid	76-03-9	E750	1	µg/L	5 µg/L	111	70.0	130	----
Chlorinated Phenolics (QCLot: 633416)									
dichlorophenol, 2,4-	120-83-2	E651D	0.3	µg/L	4.8 µg/L	103	50.0	140	----
pentachlorophenol [PCP]	87-86-5	E651D	0.5	µg/L	4.8 µg/L	140	50.0	140	----
tetrachlorophenol, 2,3,4,6-	58-90-2	E651D	0.5	µg/L	4.8 µg/L	100	50.0	140	----
trichlorophenol, 2,4,6-	88-06-2	E651D	0.5	µg/L	4.8 µg/L	104	50.0	140	----
Polychlorinated Biphenyls (QCLot: 633429)									
Aroclor 1016	12674-11-2	E687	0.02	µg/L	0.2 µg/L	118	60.0	140	----
Aroclor 1221	11104-28-2	E687	0.02	µg/L	0.2 µg/L	118	60.0	140	----
Aroclor 1232	11141-16-5	E687	0.02	µg/L	0.2 µg/L	118	60.0	140	----
Aroclor 1242	53469-21-9	E687	0.02	µg/L	0.2 µg/L	118	60.0	140	----
Aroclor 1248	12672-29-6	E687	0.02	µg/L	0.2 µg/L	91.3	60.0	140	----
Aroclor 1254	11097-69-1	E687	0.02	µg/L	0.2 µg/L	118	60.0	140	----
Aroclor 1260	11096-82-5	E687	0.02	µg/L	0.2 µg/L	108	60.0	140	----
Aroclor 1262	37324-23-5	E687	0.02	µg/L	0.2 µg/L	108	60.0	140	----
Aroclor 1268	11100-14-4	E687	0.02	µg/L	0.2 µg/L	108	60.0	140	----
Carbamate Pesticides (QCLot: 638961)									
diuron	330-54-1	E712B	1	µg/L	10 µg/L	106	80.0	120	----
Organochlorine Pesticides (QCLot: 633430)									
chlordane, cis- (alpha)	5103-71-9	E660F	0.008	µg/L	0.2 µg/L	105	50.0	150	----
chlordane, trans- (gamma)	5103-74-2	E660F	0.008	µg/L	0.2 µg/L	123	50.0	150	----
DDD, 4,4'-	72-54-8	E660F	0.004	µg/L	0.2 µg/L	96.4	50.0	150	----
DDE, 4,4'-	72-55-9	E660F	0.004	µg/L	0.2 µg/L	107	50.0	150	----
DDT, 2,4'-	789-02-6	E660F	0.004	µg/L	0.2 µg/L	116	50.0	150	----
DDT, 4,4'-	50-29-3	E660F	0.004	µg/L	0.2 µg/L	114	50.0	150	----
oxychlordane	27304-13-8	E660F	0.008	µg/L	0.2 µg/L	89.6	50.0	150	----
Herbicides (QCLot: 633946)									
AMPA	74341-63-2	E716A	0.5	µg/L	5 µg/L	94.0	70.0	130	----
glyphosate	1071-83-6	E716A	0.2	µg/L	5 µg/L	100	70.0	130	----
Herbicides (QCLot: 634443)									

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report: Spike Concentration	Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High	Qualifier
Herbicides (QCLot: 634443) - continued									
acetic acid, 2-methyl-4-chlorophenoxy- [MCPA]	94-74-6	E706A	0.05	µg/L	1 µg/L	76.1	65.0	130	----
bromoxynil	1689-84-5	E706A	0.05	µg/L	1 µg/L	112	65.0	130	----
dicamba	1918-00-9	E706A	0.1	µg/L	2 µg/L	81.5	50.0	150	----
dichlorophenoxyacetic acid, 2,4- [2,4-D]	94-75-7	E706A	0.05	µg/L	1 µg/L	76.0	65.0	130	----
dinoseb	88-85-7	E706A	0.05	µg/L	1 µg/L	88.7	65.0	130	----
picloram	1918-02-1	E706A	0.1	µg/L	2 µg/L	94.5	50.0	150	----
trichlorophenoxypropionic acid, 2,4,5- [2,4,5-TP]	93-72-1	E706A	0.05	µg/L	1 µg/L	105	65.0	130	----
Herbicides (QCLot: 637025)									
diquat (ion)	2764-72-9	E723A	1	µg/L	25 µg/L	105	70.0	130	----
paraquat (as dichloride)	1910-42-5	E723A	1	µg/L	25 µg/L	83.8	70.0	130	----
Pesticides (QCLot: 633345)									
alachlor	15972-60-8	E660E-H	0.1	µg/L	0.2 µg/L	# 155	60.0	130	LCS-H
atrazine	1912-24-9	E660E-H	0.1	µg/L	0.2 µg/L	# 147	60.0	130	LCS-H
atrazine-desethyl	6190-65-4	E660E-H	0.1	µg/L	0.2 µg/L	88.8	50.0	130	----
azinphos-methyl	86-50-0	E660E-H	0.1	µg/L	0.2 µg/L	# 196	60.0	140	LCS-H
carbaryl	63-25-2	E660E-H	0.2	µg/L	0.2 µg/L	# 145	50.0	140	LCS-H
carbofuran	1563-66-2	E660E-H	0.2	µg/L	0.2 µg/L	# 145	60.0	140	LCS-H
chlorpyrifos	2921-88-2	E660E-H	0.1	µg/L	0.2 µg/L	# 156	60.0	130	LCS-H
diazinon	333-41-5	E660E-H	0.1	µg/L	0.2 µg/L	111	60.0	130	----
diclofop-methyl	51338-27-3	E660E-H	0.1	µg/L	0.2 µg/L	# 156	60.0	140	LCS-H
dimethoate	60-51-5	E660E-H	0.1	µg/L	0.2 µg/L	# 152	60.0	130	LCS-H
malathion	121-75-5	E660E-H	0.1	µg/L	0.2 µg/L	# 191	60.0	130	LCS-H
metolachlor	51218-45-2	E660E-H	0.1	µg/L	0.2 µg/L	# 181	60.0	130	LCS-H
metribuzin	21087-64-9	E660E-H	0.1	µg/L	0.2 µg/L	# 154	60.0	130	LCS-H
phorate	298-02-2	E660E-H	0.1	µg/L	0.2 µg/L	# 13.5	60.0	140	LCS-L
prometryn	7287-19-6	E660E-H	0.1	µg/L	0.2 µg/L	# 156	60.0	130	LCS-H
simazine	122-34-9	E660E-H	0.1	µg/L	0.2 µg/L	# 135	60.0	130	LCS-H
terbufos	13071-79-9	E660E-H	0.1	µg/L	0.2 µg/L	# 11.5	60.0	130	LCS-L
triallate	2303-17-5	E660E-H	0.1	µg/L	0.2 µg/L	126	60.0	130	----
trifluralin	1582-09-8	E660E-H	0.1	µg/L	0.2 µg/L	# 146	60.0	130	LCS-H
Nitrosamines (QCLot: 638901)									
nitrosodimethylamine, n- [NDMA]	62-75-9	E725-T	0.0009	µg/L	0.005 µg/L	105	50.0	150	----

Qualifiers

Qualifier	Description
LCS-H	Lab Control Sample recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.
LCS-L	Lab Control Sample recovery was below ALS DQO. Reference Material and/or Matrix Spike results were acceptable. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 637486)										
WT2213026-001	Anonymous	chloride	16887-00-6	E235.Cl	478 mg/L	500 mg/L	95.6	75.0	125	----
Anions and Nutrients (QCLot: 637487)										
WT2213026-001	Anonymous	fluoride	16984-48-8	E235.F	4.93 mg/L	5 mg/L	98.6	75.0	125	----
Anions and Nutrients (QCLot: 637488)										
WT2213026-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	462 mg/L	500 mg/L	92.4	75.0	125	----
Anions and Nutrients (QCLot: 637489)										
WT2213026-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3	11.7 mg/L	12.5 mg/L	94.0	75.0	125	----
Anions and Nutrients (QCLot: 637490)										
WT2213026-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2	2.39 mg/L	2.5 mg/L	95.6	75.0	125	----
Anions and Nutrients (QCLot: 639862)										
WT2212926-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	25.4 mg/L	2.5 mg/L	102	70.0	130	----
Anions and Nutrients (QCLot: 639864)										
WT2212951-001	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0970 mg/L	0.1 mg/L	97.0	75.0	125	----
Cyanides (QCLot: 634176)										
SK2204799-001	Anonymous	cyanide, strong acid dissociable (total)	----	E333	0.224 mg/L	0.25 mg/L	89.7	75.0	125	----
Organic / Inorganic Carbon (QCLot: 635753)										
TY2201174-008	Anonymous	carbon, dissolved organic [DOC]	----	E358-L	5.93 mg/L	5 mg/L	118	70.0	130	----
Total Sulfides (QCLot: 639357)										
WT2212954-001	F2-R	sulfide, total (as S)	18496-25-8	E396	0.102 mg/L	0.1244 mg/L	82.0	65.0	135	----
Total Metals (QCLot: 633334)										
WT2212936-002	Anonymous	aluminum, total	7429-90-5	E420	0.0990 mg/L	0.1 mg/L	99.0	70.0	130	----
		antimony, total	7440-36-0	E420	0.0531 mg/L	0.05 mg/L	106	70.0	130	----
		arsenic, total	7440-38-2	E420	0.0515 mg/L	0.05 mg/L	103	70.0	130	----
		barium, total	7440-39-3	E420	ND mg/L	0.0125 mg/L	ND	70.0	130	----
		beryllium, total	7440-41-7	E420	0.00510 mg/L	0.005 mg/L	102	70.0	130	----
		bismuth, total	7440-69-9	E420	0.0475 mg/L	0.05 mg/L	95.1	70.0	130	----
		boron, total	7440-42-8	E420	ND mg/L	0.05 mg/L	ND	70.0	130	----
		cadmium, total	7440-43-9	E420	0.00512 mg/L	0.005 mg/L	102	70.0	130	----
		calcium, total	7440-70-2	E420	ND mg/L	2.5 mg/L	ND	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 633334) - continued										
WT2212936-002	Anonymous	cesium, total	7440-46-2	E420	0.00264 mg/L	0.0025 mg/L	106	70.0	130	----
		chromium, total	7440-47-3	E420	0.0128 mg/L	0.0125 mg/L	102	70.0	130	----
		cobalt, total	7440-48-4	E420	ND mg/L	0.0125 mg/L	ND	70.0	130	----
		copper, total	7440-50-8	E420	0.0120 mg/L	0.0125 mg/L	96.0	70.0	130	----
		iron, total	7439-89-6	E420	ND mg/L	0.05 mg/L	ND	70.0	130	----
		lead, total	7439-92-1	E420	0.0249 mg/L	0.025 mg/L	99.6	70.0	130	----
		lithium, total	7439-93-2	E420	0.0132 mg/L	0.0125 mg/L	105	70.0	130	----
		magnesium, total	7439-95-4	E420	ND mg/L	2.5 mg/L	ND	70.0	130	----
		manganese, total	7439-96-5	E420	ND mg/L	0.0125 mg/L	ND	70.0	130	----
		molybdenum, total	7439-98-7	E420	0.0124 mg/L	0.0125 mg/L	99.1	70.0	130	----
		nickel, total	7440-02-0	E420	ND mg/L	0.025 mg/L	ND	70.0	130	----
		phosphorus, total	7723-14-0	E420	0.497 mg/L	0.5 mg/L	99.4	70.0	130	----
		potassium, total	7440-09-7	E420	ND mg/L	2.5 mg/L	ND	70.0	130	----
		rubidium, total	7440-17-7	E420	0.00515 mg/L	0.005 mg/L	103	70.0	130	----
		selenium, total	7782-49-2	E420	0.0520 mg/L	0.05 mg/L	104	70.0	130	----
		silicon, total	7440-21-3	E420	ND mg/L	0.5 mg/L	ND	70.0	130	----
		silver, total	7440-22-4	E420	0.00470 mg/L	0.005 mg/L	93.9	70.0	130	----
		sodium, total	7440-23-5	E420	ND mg/L	2.5 mg/L	ND	70.0	130	----
		strontium, total	7440-24-6	E420	ND mg/L	0.0125 mg/L	ND	70.0	130	----
		sulfur, total	7704-34-9	E420	ND mg/L	2.5 mg/L	ND	70.0	130	----
		tellurium, total	13494-80-9	E420	0.00478 mg/L	0.005 mg/L	95.6	70.0	130	----
		thallium, total	7440-28-0	E420	0.0486 mg/L	0.05 mg/L	97.2	70.0	130	----
		thorium, total	7440-29-1	E420	0.00459 mg/L	0.005 mg/L	91.8	70.0	130	----
		tin, total	7440-31-5	E420	0.0249 mg/L	0.025 mg/L	99.5	70.0	130	----
		titanium, total	7440-32-6	E420	0.0124 mg/L	0.0125 mg/L	99.6	70.0	130	----
		tungsten, total	7440-33-7	E420	0.00504 mg/L	0.005 mg/L	101	70.0	130	----
		uranium, total	7440-61-1	E420	ND mg/L	0.00025 mg/L	ND	70.0	130	----
		vanadium, total	7440-62-2	E420	0.0263 mg/L	0.025 mg/L	105	70.0	130	----
		zinc, total	7440-66-6	E420	0.0231 mg/L	0.025 mg/L	92.3	70.0	130	----
		zirconium, total	7440-67-7	E420	0.00476 mg/L	0.005 mg/L	95.1	70.0	130	----
Total Metals (QCLot: 634028)										
WT2212938-001	Anonymous	mercury, total	7439-97-6	E508	0.0000830 mg/L	0.0001 mg/L	83.0	70.0	130	----
Total Metals (QCLot: 634512)										
WT2212529-003	Anonymous	antimony, total	7440-36-0	E432	0.0567 mg/L	0.05 mg/L	113	70.0	130	----
		arsenic, total	7440-38-2	E432	0.0644 mg/L	0.05 mg/L	129	70.0	130	----
		barium, total	7440-39-3	E432	ND mg/L	0.0125 mg/L	ND	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 634512) - continued										
WT2212529-003	Anonymous	boron, total	7440-42-8	E432	0.05 mg/L	0.05 mg/L	98.1	70.0	130	----
		cadmium, total	7440-43-9	E432	0.00583 mg/L	0.005 mg/L	117	70.0	130	----
		chromium, total	7440-47-3	E432	0.0135 mg/L	0.0125 mg/L	108	70.0	130	----
		selenium, total	7782-49-2	E432	0.0692 mg/L	0.05 mg/L	138	70.0	130	MES
		uranium, total	7440-61-1	E432	0.0003 mg/L	0.00025 mg/L	111	70.0	130	----
Aggregate Organics (QCLot: 633331)										
CG2211713-001	Anonymous	nitrilotriacetic acid [NTA]	139-13-9	E394	0.82 mg/L	1 mg/L	82.2	50.0	150	----
Aggregate Organics (QCLot: 639186)										
CG2212007-001	Anonymous	microcystin	101043-37-2	E576	0.51 µg/L	1 µg/L	50.8	50.0	150	----
Volatile Organic Compounds (QCLot: 637812)										
WT2212954-001	F2-R	Acetone	67-64-1	E611D	100 µg/L	100 µg/L	99.5	60.0	140	----
		benzene	71-43-2	E611D	113 µg/L	100 µg/L	113	60.0	140	----
		bromodichloromethane	75-27-4	E611D	119 µg/L	100 µg/L	119	60.0	140	----
		bromoform	75-25-2	E611D	106 µg/L	100 µg/L	106	60.0	140	----
		bromomethane	74-83-9	E611D	19.6 µg/L	100 µg/L	19.6	60.0	140	K
		carbon tetrachloride	56-23-5	E611D	115 µg/L	100 µg/L	115	60.0	140	----
		chlorobenzene	108-90-7	E611D	106 µg/L	100 µg/L	106	60.0	140	----
		chloroform	67-66-3	E611D	113 µg/L	100 µg/L	113	60.0	140	----
		dibromochloromethane	124-48-1	E611D	102 µg/L	100 µg/L	102	60.0	140	----
		dibromoethane, 1,2-	106-93-4	E611D	99.1 µg/L	100 µg/L	99.1	60.0	140	----
		dichlorobenzene, 1,2-	95-50-1	E611D	107 µg/L	100 µg/L	107	60.0	140	----
		dichlorobenzene, 1,3-	541-73-1	E611D	106 µg/L	100 µg/L	106	60.0	140	----
		dichlorobenzene, 1,4-	106-46-7	E611D	106 µg/L	100 µg/L	106	60.0	140	----
		dichlorodifluoromethane	75-71-8	E611D	100 µg/L	100 µg/L	100	60.0	140	----
		dichloroethane, 1,1-	75-34-3	E611D	111 µg/L	100 µg/L	111	60.0	140	----
		dichloroethane, 1,2-	107-06-2	E611D	108 µg/L	100 µg/L	108	60.0	140	----
		dichloroethylene, 1,1-	75-35-4	E611D	105 µg/L	100 µg/L	105	60.0	140	----
		dichloroethylene, cis-1,2-	156-59-2	E611D	113 µg/L	100 µg/L	113	60.0	140	----
		dichloroethylene, trans-1,2-	156-60-5	E611D	109 µg/L	100 µg/L	109	60.0	140	----
		dichloromethane	75-09-2	E611D	112 µg/L	100 µg/L	112	60.0	140	----
		dichloropropane, 1,2-	78-87-5	E611D	111 µg/L	100 µg/L	111	60.0	140	----
		dichloropropylene, cis-1,3-	10061-01-5	E611D	38.3 µg/L	100 µg/L	38.3	60.0	140	K
		dichloropropylene, trans-1,3-	10061-02-6	E611D	64.2 µg/L	100 µg/L	64.2	60.0	140	----
		ethylbenzene	100-41-4	E611D	101 µg/L	100 µg/L	101	60.0	140	----
		hexane, n-	110-54-3	E611D	106 µg/L	100 µg/L	106	60.0	140	----
		methyl ethyl ketone [MEK]	78-93-3	E611D	100 µg/L	100 µg/L	99.8	60.0	140	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Volatile Organic Compounds (QCLot: 637812) - continued										
WT2212954-001	F2-R	methyl isobutyl ketone [MIBK]	108-10-1	E611D	92 µg/L	100 µg/L	92.3	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611D	104 µg/L	100 µg/L	104	60.0	140	----
		styrene	100-42-5	E611D	95.6 µg/L	100 µg/L	95.6	60.0	140	----
		tetrachloroethane, 1,1,1,2-	630-20-6	E611D	109 µg/L	100 µg/L	109	60.0	140	----
		tetrachloroethane, 1,1,2,2-	79-34-5	E611D	106 µg/L	100 µg/L	106	60.0	140	----
		tetrachloroethylene	127-18-4	E611D	111 µg/L	100 µg/L	111	60.0	140	----
		toluene	108-88-3	E611D	104 µg/L	100 µg/L	104	60.0	140	----
		trichloroethane, 1,1,1-	71-55-6	E611D	115 µg/L	100 µg/L	115	60.0	140	----
		trichloroethane, 1,1,2-	79-00-5	E611D	100 µg/L	100 µg/L	100	60.0	140	----
		trichloroethylene	79-01-6	E611D	118 µg/L	100 µg/L	118	60.0	140	----
		trichlorofluoromethane	75-69-4	E611D	112 µg/L	100 µg/L	112	60.0	140	----
		vinyl chloride	75-01-4	E611D	95.6 µg/L	100 µg/L	95.6	60.0	140	----
		xylene, m+p-	179601-23-1	E611D	209 µg/L	200 µg/L	104	60.0	140	----
		xylene, o-	95-47-6	E611D	100 µg/L	100 µg/L	100	60.0	140	----
Volatile Organic Compounds [THMs] (QCLot: 637813)										
WT2212954-001	F2-R	bromodichloromethane	75-27-4	E611B	119 µg/L	100 µg/L	119	60.0	140	----
		bromoform	75-25-2	E611B	106 µg/L	100 µg/L	106	60.0	140	----
		chloroform	67-66-3	E611B	113 µg/L	100 µg/L	113	60.0	140	----
		dibromochloromethane	124-48-1	E611B	102 µg/L	100 µg/L	102	60.0	140	----
DIsinfectant By-Products (QCLot: 635446)										
EO2207084-001	Anonymous	chlorate	14866-68-3	E409.CLO3	0.966 mg/L	1 mg/L	96.6	75.0	125	----
DIsinfectant By-Products (QCLot: 635447)										
EO2207084-001	Anonymous	chlorite	14998-27-7	E409.CLO2	0.974 mg/L	1 mg/L	97.4	75.0	125	----
Haloacetic Acids (QCLot: 638905)										
CG2211691-001	Anonymous	dibromoacetic acid	631-64-1	E750	5.91 µg/L	5 µg/L	118	50.0	150	----
		dichloroacetic acid	79-43-6	E750	ND µg/L	5 µg/L	ND	50.0	150	----
		monobromoacetic acid	79-08-3	E750	0.75 µg/L	1 µg/L	75.4	50.0	150	----
		monochloroacetic acid	79-11-8	E750	2.78 µg/L	2.5 µg/L	111	50.0	150	----
		trichloroacetic acid	76-03-9	E750	ND µg/L	5 µg/L	ND	50.0	150	----
Carbamate Pesticides (QCLot: 638961)										
WT2212954-001	F2-R	diuron	330-54-1	E712B	9.8 µg/L	10 µg/L	97.9	70.0	130	----
Herbicides (QCLot: 633946)										
CG2211713-001	Anonymous	AMPA	74341-63-2	E716A	4.90 µg/L	5 µg/L	98.0	70.0	130	----
		glyphosate	1071-83-6	E716A	4.98 µg/L	5 µg/L	99.7	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Herbicides (QCLot: 634443)										
CG2211713-001	Anonymous	acetic acid, 2-methyl-4-chlorophenoxy- [MCPA]	94-74-6	E706A	1.14 µg/L	1 µg/L	114	50.0	130	----
		bromoxynil	1689-84-5	E706A	0.664 µg/L	1 µg/L	66.4	50.0	130	----
		dicamba	1918-00-9	E706A	1.65 µg/L	2 µg/L	82.3	50.0	150	----
		dichlorophenoxyacetic acid, 2,4- [2,4-D]	94-75-7	E706A	0.901 µg/L	1 µg/L	90.1	50.0	130	----
		dinoseb	88-85-7	E706A	0.704 µg/L	1 µg/L	70.4	50.0	130	----
		picloram	1918-02-1	E706A	1.75 µg/L	2 µg/L	87.7	50.0	150	----
		trichlorophenoxypropionic acid, 2,4,5- [2,4,5-TP]	93-72-1	E706A	0.939 µg/L	1 µg/L	93.9	50.0	130	----
Herbicides (QCLot: 637025)										
WT2212954-001	F2-R	diquat (ion)	2764-72-9	E723A	25.2 µg/L	25 µg/L	101	70.0	130	----
		paraquat (as dichloride)	1910-42-5	E723A	20.7 µg/L	25 µg/L	83.0	70.0	130	----
Nitrosamines (QCLot: 638901)										
WT2213464-002	Anonymous	nitrosodimethylamine, n- [NDMA]	62-75-9	E725-T	0.00437 µg/L	0.005 µg/L	81.2	50.0	150	----

Qualifiers

Qualifier	Description
K	*Matrix Spike recovery outside ALS DQO due to sample matrix effects.*
MES	*Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).*

Chain of Custody (COC) / Analytical Request Form

COC Number: 20

Page

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

Environmental Division Waterloo

Work Order Reference WT2212954

Telephone : +1 519 886 6910

Report To	Contact and company name below will appear on the final report
Company:	AECOM
Contact:	Matthew Alexander
Phone:	
	Company address below will appear on the final report
Street:	50 Sportsworld Crossing
City/Province:	Kitchener ON
Postal Code:	N2P 0A4
Invoice To	Same as Report To ☐ YES ☑ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	Township of Centre Wellington
Contact:	Adam Gilmore
Project Information	
ALS Account # / Quote #:	Q87626 + Q89943
Job #:	
PO / AFE:	
LSD:	

Reports / Recipients

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)

Merge QC/QCI Reports with COA ☐ YES ☐ NO ☐ N/A

☑ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☐ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: matthew.alexander@aecom.com

Email 2: AGilmore@centrewellington.ca

Email 3:

Invoice Recipients

Select Invoice Distribution: ☐ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax:

Email 2:

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Contact: | Sampler:

ALS Lab Work Order # (ALS use only): WT2212954

Turnaround Time (TAT) Requested

☑ Routine [R] if received by 3pm M-F - no surcharges apply

☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum

☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum

☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum

☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum

☐ Same day [E2] if received by 10am M-S - 200% rush surcharge. Additional fees may apply to rush requests on weekends, statutory holidays and non-routine tests.

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm am/pm

For all tests with rush TATs requested, please contact your AM to confirm availability.

Analysis Request

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

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Q87626 + Q89943	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	F2-R	02-09-22	09:35	GW	32	✓			

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human consumption/ use? ☐ YES ☑ NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

ODWQS

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☑ ICE ☐ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
				11.9	11.0		

SHIPMENT RELEASE (client use)

Released by: | Date: Sept 2, 2022 | Time: 11:15

INITIAL SHIPMENT RECEPTION (ALS use only)

Received by: | Date: | Time:

FINAL SHIPMENT RECEPTION (ALS use only)

Received by: AP | Date: 2 Sep. 22 | Time: 11:45

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

AUG 2020 FRONT

< PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

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

ples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

CERTIFICATE OF ANALYSIS (GUIDELINE EVALUATION)

Work Order	: **WT2212954**	Page	: 1 of 18
Amendment	: **1**		
Client	: **Township of Centre Wellington**	Laboratory	: Waterloo - Environmental
Contact	: Matthew Alexander	Account Manager	: Candice Hunter
Address	: 1 MacDonald Square Elora ON Canada N0B 1S0	Address	: 60 Northland Road, Unit 1 Waterloo, Ontario Canada N2V 2B8
Telephone	: ----	Telephone	: +1 519 886 6910
Project	: ----	Date Samples Received	: 02-Sep-2022 11:45
PO	: ----	Date Analysis Commenced	: 02-Sep-2022
C-O-C number	: 20-1007481	Issue Date	: 04-Oct-2022 14:46
Sampler	: ----		
Site	: ----		
Quote number	: Special Non - Regulated Water		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Guideline Comparison

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Adam Boettger	Team Leader - LCMS	LCMS, Waterloo, Ontario
Andrea Armstrong	Department Manager - Air Quality and Volatiles	Air Quality, Waterloo, Ontario
Greg Pokocky	Supervisor - Inorganic	Inorganics, Waterloo, Ontario
Greg Pokocky	Supervisor - Inorganic	Metals, Waterloo, Ontario
Jennifer Siemiernik		Metals, Waterloo, Ontario
Jeremy Gingras	Team Leader - Semi-Volatile Instrumentation	Organics, Waterloo, Ontario
Jihun Jeon	Laboratory Analyst	LCMS, Waterloo, Ontario
Jocelyn Kennedy	Department Manager - Semi-Volatile Organics	Organics, Waterloo, Ontario
Michelle Michalchuk	Analyst	Organics, Winnipeg, Manitoba
Ruby Sujeepan		Microbiology, Waterloo, Ontario
Sarah Birch	Team Leader - Volatiles	Organics, Waterloo, Ontario

Summary of Guideline Breaches by Sample

SampleID/Client ID	Matrix	Analyte	Analyte Summary	Guideline	Category	Result	Limit
F2-R	Water	solids, total dissolved [TDS]	Based on taste; TDS above 500 mg/L results in excessive scaling in water pipes, water heaters, boilers and appliances; TDS is composed of calcium, magnesium, sodium, potassium, carbonate, bicarbonate, chloride, sulphate and nitrate.	ONDWS	AO/OG	850 mg/L	500 mg/L
	Water	sodium, total	Based on taste; where a sodium-based water softener is used, a separate unsoftened supply for cooking and drinking purposes is recommended.	ONDWS	MAC	30.6 mg/L	20 mg/L

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.
Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guidelines are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.

Key : LOR: Limit of Reporting (detection limit).

Unit	*Description*
µg/L	micrograms per litre
CU	colour units (1 CU = 1 mg/L Pt)
mg/L	milligrams per litre
MPN/100mL	most probable number per 100 mL
NTU	nephelometric turbidity units
pH units	pH units
ppmv	parts per million (volume/volume)

>: greater than.
<: less than.
Red shading is applied where the result is greater than the Guideline Upper Limit or the result is lower than the Guideline Lower Limit.
For drinking water samples, Red shading is applied where the result for E.coli, fecal or total coliforms is greater than or equal to the Guideline Upper Limit.

Workorder Comments

RRR: Results biased low due to sample preparation error.
<1 or Not Detected with LOR of 1 equals Zero (0).

Qualifiers

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
RRR	Refer to report comments for issues regarding this analysis.

Analytical Results Evaluation

Matrix: **Water**

Analyte	CAS Number	Unit	Client sample ID: F2-R	----	----	----	----	----	----
			Sampling date/time: 02-Sep-2022 09:35	----	----	----	----	----	----
			Sub-Matrix: Water	----	----	----	----	----	----
			WT2212954-001	--------	--------	--------	--------	--------	--------
Physical Tests									
colour, true	----	CU	<2.0	----	----	----	----	----	----
hardness (as CaCO3), from total Ca/Mg	----	mg/L	637	----	----	----	----	----	----
pH	----	pH units	8.24	----	----	----	----	----	----
solids, total dissolved [TDS]	----	mg/L	850 DLDS	----	----	----	----	----	----
turbidity	----	NTU	<1.00	----	----	----	----	----	----
alkalinity, total (as CaCO3)	----	mg/L	238	----	----	----	----	----	----
Anions and Nutrients									
chloride	16887-00-6	mg/L	51.7 DLDS	----	----	----	----	----	----
fluoride	16984-48-8	mg/L	0.742 DLDS	----	----	----	----	----	----
nitrate (as N)	14797-55-8	mg/L	<0.100 DLDS	----	----	----	----	----	----
nitrite (as N)	14797-65-0	mg/L	<0.050 DLDS	----	----	----	----	----	----
nitrogen, total organic	----	mg/L	<0.123	----	----	----	----	----	----
sulfate (as SO4)	14808-79-8	mg/L	361 DLDS	----	----	----	----	----	----
ammonia, total (as N)	7664-41-7	mg/L	0.114	----	----	----	----	----	----
Kjeldahl nitrogen, total [TKN]	----	mg/L	0.120	----	----	----	----	----	----
Cyanides									
cyanide, strong acid dissociable (total)	----	mg/L	<0.0050	----	----	----	----	----	----
Organic / Inorganic Carbon									
carbon, dissolved organic [DOC]	----	mg/L	0.93	----	----	----	----	----	----
Total Sulfides									
sulfide, total (as S)	18496-25-8	mg/L	<0.018	----	----	----	----	----	----
Microbiological Tests									
coliforms, total	----	MPN/100mL	Not Detected	----	----	----	----	----	----
coliforms, Escherichia coli [E. coli]	----	MPN/100mL	Not Detected	----	----	----	----	----	----
Total Metals									
aluminum, total	7429-90-5	mg/L	0.0067	----	----	----	----	----	----

Analytical Results Evaluation

Matrix: **Water**

Analyte	CAS Number	Unit	Client sample ID						
			F2-R	**----**	**----**	**----**	**----**	**----**	**----**
			Sampling date/time	02-Sep-2022 09:35	----	----	----	----	----	----
			Sub-Matrix	Water	----	----	----	----	----	----
			WT2212954-001	--------	--------	--------	--------	--------	--------
Total Metals									
antimony, total	7440-36-0	µg/L	<0.60	----	----	----	----	----	----
antimony, total	7440-36-0	mg/L	0.00020	----	----	----	----	----	----
arsenic, total	7440-38-2	µg/L	<1.0	----	----	----	----	----	----
arsenic, total	7440-38-2	mg/L	0.00074	----	----	----	----	----	----
barium, total	7440-39-3	µg/L	40	----	----	----	----	----	----
barium, total	7440-39-3	mg/L	0.0372	----	----	----	----	----	----
beryllium, total	7440-41-7	mg/L	<0.000020	----	----	----	----	----	----
bismuth, total	7440-69-9	mg/L	<0.000050	----	----	----	----	----	----
boron, total	7440-42-8	µg/L	<50	----	----	----	----	----	----
boron, total	7440-42-8	mg/L	0.044	----	----	----	----	----	----
cadmium, total	7440-43-9	µg/L	<0.10	----	----	----	----	----	----
cadmium, total	7440-43-9	mg/L	<0.0000050	----	----	----	----	----	----
calcium, total	7440-70-2	mg/L	184	----	----	----	----	----	----
cesium, total	7440-46-2	mg/L	0.000012	----	----	----	----	----	----
chromium, total	7440-47-3	µg/L	<1.0	----	----	----	----	----	----
chromium, total	7440-47-3	mg/L	<0.00050	----	----	----	----	----	----
cobalt, total	7440-48-4	mg/L	<0.00010	----	----	----	----	----	----
copper, total	7440-50-8	mg/L	<0.00050	----	----	----	----	----	----
iron, total	7439-89-6	mg/L	0.089	----	----	----	----	----	----
lead, total	7439-92-1	mg/L	0.000104	----	----	----	----	----	----
lithium, total	7439-93-2	mg/L	0.0065	----	----	----	----	----	----
magnesium, total	7439-95-4	mg/L	43.2	----	----	----	----	----	----
manganese, total	7439-96-5	mg/L	0.00517	----	----	----	----	----	----
mercury, total	7439-97-6	µg/L	<0.100	----	----	----	----	----	----
molybdenum, total	7439-98-7	mg/L	0.00135	----	----	----	----	----	----
nickel, total	7440-02-0	mg/L	0.00099	----	----	----	----	----	----
phosphorus, total	7723-14-0	mg/L	<0.050	----	----	----	----	----	----
potassium, total	7440-09-7	mg/L	1.82	----	----	----	----	----	----
rubidium, total	7440-17-7	mg/L	0.00107	----	----	----	----	----	----
selenium, total	7782-49-2	µg/L	<1.0	----	----	----	----	----	----

Analytical Results Evaluation

Matrix: **Water**

Analyte	CAS Number	Unit	Client sample ID: F2-R	----	----	----	----	----	----
			Sampling date/time: 02-Sep-2022 09:35	----	----	----	----	----	----
			Sub-Matrix: Water	----	----	----	----	----	----
			WT2212954-001	--------	--------	--------	--------	--------	--------
Total Metals									
selenium, total	7782-49-2	mg/L	<0.000050	----	----	----	----	----	----
silicon, total	7440-21-3	mg/L	4.91	----	----	----	----	----	----
silver, total	7440-22-4	mg/L	<0.000010	----	----	----	----	----	----
sodium, total	7440-23-5	mg/L	30.6	----	----	----	----	----	----
strontium, total	7440-24-6	mg/L	5.44 DLHC	----	----	----	----	----	----
sulfur, total	7704-34-9	mg/L	131	----	----	----	----	----	----
tellurium, total	13494-80-9	mg/L	0.00047	----	----	----	----	----	----
thallium, total	7440-28-0	mg/L	0.000021	----	----	----	----	----	----
thorium, total	7440-29-1	mg/L	<0.00010	----	----	----	----	----	----
tin, total	7440-31-5	mg/L	<0.00010	----	----	----	----	----	----
titanium, total	7440-32-6	mg/L	<0.00030	----	----	----	----	----	----
tungsten, total	7440-33-7	mg/L	<0.00010	----	----	----	----	----	----
uranium, total	7440-61-1	µg/L	<2.0	----	----	----	----	----	----
uranium, total	7440-61-1	mg/L	0.000247	----	----	----	----	----	----
vanadium, total	7440-62-2	mg/L	<0.00050	----	----	----	----	----	----
zinc, total	7440-66-6	mg/L	0.0129	----	----	----	----	----	----
zirconium, total	7440-67-7	mg/L	<0.00020	----	----	----	----	----	----
Aggregate Organics									
nitrilotriacetic acid [NTA]	139-13-9	mg/L	<0.20	----	----	----	----	----	----
Dissolved Gases									
methane	74-82-8	µg/L	1.7	----	----	----	----	----	----
methane	74-82-8	ppmv	7.1 RRR	----	----	----	----	----	----
Volatile Organic Compounds									
Acetone	67-64-1	µg/L	<20	----	----	----	----	----	----
benzene	71-43-2	µg/L	<0.50	----	----	----	----	----	----
bromodichloromethane	75-27-4	µg/L	<0.50	----	----	----	----	----	----
bromoform	75-25-2	µg/L	<0.50	----	----	----	----	----	----
bromomethane	74-83-9	µg/L	<0.50	----	----	----	----	----	----
carbon tetrachloride	56-23-5	µg/L	<0.20	----	----	----	----	----	----

Analytical Results Evaluation

Matrix: **Water**

Analyte	CAS Number	Unit	Client sample ID	F2-R	----	----	----	----	----	----
			Sampling date/time	02-Sep-2022 09:35	----	----	----	----	----	----
			Sub-Matrix	Water	----	----	----	----	----	----
				WT2212954-001	--------	--------	--------	--------	--------	--------
Volatile Organic Compounds										
chlorobenzene	108-90-7	µg/L		<0.50	----	----	----	----	----	----
chloroform	67-66-3	µg/L		<0.50	----	----	----	----	----	----
dibromochloromethane	124-48-1	µg/L		<0.50	----	----	----	----	----	----
dibromoethane, 1,2-	106-93-4	µg/L		<0.20	----	----	----	----	----	----
dichlorobenzene, 1,2-	95-50-1	µg/L		<0.50	----	----	----	----	----	----
dichlorobenzene, 1,3-	541-73-1	µg/L		<0.50	----	----	----	----	----	----
dichlorobenzene, 1,4-	106-46-7	µg/L		<0.50	----	----	----	----	----	----
dichlorodifluoromethane	75-71-8	µg/L		<0.50	----	----	----	----	----	----
dichloroethane, 1,1-	75-34-3	µg/L		<0.50	----	----	----	----	----	----
dichloroethane, 1,2-	107-06-2	µg/L		<0.50	----	----	----	----	----	----
dichloroethylene, 1,1-	75-35-4	µg/L		<0.50	----	----	----	----	----	----
dichloroethylene, cis-1,2-	156-59-2	µg/L		<0.50	----	----	----	----	----	----
dichloroethylene, trans-1,2-	156-60-5	µg/L		<0.50	----	----	----	----	----	----
dichloromethane	75-09-2	µg/L		<1.0	----	----	----	----	----	----
dichloropropane, 1,2-	78-87-5	µg/L		<0.50	----	----	----	----	----	----
dichloropropylene, cis+trans-1,3-	542-75-6	µg/L		<0.50	----	----	----	----	----	----
dichloropropylene, cis-1,3-	10061-01-5	µg/L		<0.30	----	----	----	----	----	----
dichloropropylene, trans-1,3-	10061-02-6	µg/L		<0.30	----	----	----	----	----	----
ethylbenzene	100-41-4	µg/L		<0.50	----	----	----	----	----	----
hexane, n-	110-54-3	µg/L		<0.50	----	----	----	----	----	----
methyl ethyl ketone [MEK]	78-93-3	µg/L		<20	----	----	----	----	----	----
methyl isobutyl ketone [MIBK]	108-10-1	µg/L		<20	----	----	----	----	----	----
methyl-tert-butyl ether [MTBE]	1634-04-4	µg/L		<0.50	----	----	----	----	----	----
styrene	100-42-5	µg/L		<0.50	----	----	----	----	----	----
tetrachloroethane, 1,1,1,2-	630-20-6	µg/L		<0.50	----	----	----	----	----	----
tetrachloroethane, 1,1,2,2-	79-34-5	µg/L		<0.50	----	----	----	----	----	----
tetrachloroethylene	127-18-4	µg/L		<0.50	----	----	----	----	----	----
toluene	108-88-3	µg/L		<0.50	----	----	----	----	----	----
trichloroethane, 1,1,1-	71-55-6	µg/L		<0.50	----	----	----	----	----	----
trichloroethane, 1,1,2-	79-00-5	µg/L		<0.50	----	----	----	----	----	----

Analytical Results Evaluation

Matrix: **Water**

Analyte	CAS Number	Unit	Client sample ID: F2-R	----	----	----	----	----	----
			Sampling date/time: 02-Sep-2022 09:35	----	----	----	----	----	----
			Sub-Matrix: Water	----	----	----	----	----	----
			WT2212954-001	--------	--------	--------	--------	--------	--------
Volatile Organic Compounds									
trichloroethylene	79-01-6	µg/L	<0.50	----	----	----	----	----	----
trichlorofluoromethane	75-69-4	µg/L	<0.50	----	----	----	----	----	----
vinyl chloride	75-01-4	µg/L	<0.50	----	----	----	----	----	----
xylene, m+p-	179601-23-1	µg/L	<0.40	----	----	----	----	----	----
xylene, o-	95-47-6	µg/L	<0.30	----	----	----	----	----	----
xylenes, total	1330-20-7	µg/L	<0.50	----	----	----	----	----	----
BTEX, total	----	µg/L	<1.0	----	----	----	----	----	----
Volatile Organic Compounds [THMs]									
bromodichloromethane	75-27-4	µg/L	<1.0	----	----	----	----	----	----
bromoform	75-25-2	µg/L	<1.0	----	----	----	----	----	----
chloroform	67-66-3	µg/L	<1.0	----	----	----	----	----	----
dibromochloromethane	124-48-1	µg/L	<1.0	----	----	----	----	----	----
trihalomethanes [THMs], total	----	µg/L	<2.0	----	----	----	----	----	----
Volatile Organic Compounds [THMs] Surrogates									
bromofluorobenzene, 4-	460-00-4	%	89.7	----	----	----	----	----	----
difluorobenzene, 1,4-	540-36-3	%	104	----	----	----	----	----	----
Volatile Organic Compounds Surrogates									
bromofluorobenzene, 4-	460-00-4	%	89.7	----	----	----	----	----	----
difluorobenzene, 1,4-	540-36-3	%	104	----	----	----	----	----	----
Polycyclic Aromatic Hydrocarbons									
benzo(a)pyrene	50-32-8	µg/L	<0.0050	----	----	----	----	----	----
Polycyclic Aromatic Hydrocarbons Surrogates									
chrysene-d12	1719-03-5	%	109	----	----	----	----	----	----
naphthalene-d8	1146-65-2	%	91.6	----	----	----	----	----	----
phenanthrene-d10	1517-22-2	%	104	----	----	----	----	----	----
Disinfectant By-Products									
chlorate	14866-68-3	mg/L	<0.010	----	----	----	----	----	----
chlorite	14998-27-7	mg/L	<0.010	----	----	----	----	----	----

Analytical Results Evaluation

Matrix: **Water**

Analyte	CAS Number	Unit	Client sample ID: F2-R	----	----	----	----	----	----
			Sampling date/time: 02-Sep-2022 09:35	----	----	----	----	----	----
			Sub-Matrix: Water	----	----	----	----	----	----
			WT2212954-001	--------	--------	--------	--------	--------	--------
Haloacetic Acids									
dibromoacetic acid	631-64-1	µg/L	<1.00	----	----	----	----	----	----
dichloroacetic acid	79-43-6	µg/L	<1.00	----	----	----	----	----	----
monobromoacetic acid	79-08-3	µg/L	<1.00	----	----	----	----	----	----
monochloroacetic acid	79-11-8	µg/L	<1.00	----	----	----	----	----	----
trichloroacetic acid	76-03-9	µg/L	<1.00	----	----	----	----	----	----
haloacetic acids, total [HAA5]	----	µg/L	<5.00	----	----	----	----	----	----
Semi-Volatile Organics									
nitrosodimethylamine, n- [NDMA]	62-75-9	µg/L	<0.00090	----	----	----	----	----	----
Chlorinated Phenolics									
dichlorophenol, 2,4-	120-83-2	µg/L	<0.30	----	----	----	----	----	----
pentachlorophenol [PCP]	87-86-5	µg/L	<0.50	----	----	----	----	----	----
tetrachlorophenol, 2,3,4,6-	58-90-2	µg/L	<0.50	----	----	----	----	----	----
trichlorophenol, 2,4,6-	88-06-2	µg/L	<0.50	----	----	----	----	----	----
Phenolics Surrogates									
tribromophenol, 2,4,6-	118-79-6	%	94.8	----	----	----	----	----	----
Polychlorinated Biphenyls									
Aroclor 1016	12674-11-2	µg/L	<0.020	----	----	----	----	----	----
Aroclor 1221	11104-28-2	µg/L	<0.020	----	----	----	----	----	----
Aroclor 1232	11141-16-5	µg/L	<0.020	----	----	----	----	----	----
Aroclor 1242	53469-21-9	µg/L	<0.020	----	----	----	----	----	----
Aroclor 1248	12672-29-6	µg/L	<0.020	----	----	----	----	----	----
Aroclor 1254	11097-69-1	µg/L	<0.020	----	----	----	----	----	----
Aroclor 1260	11096-82-5	µg/L	<0.020	----	----	----	----	----	----
Aroclor 1262	37324-23-5	µg/L	<0.020	----	----	----	----	----	----
Aroclor 1268	11100-14-4	µg/L	<0.020	----	----	----	----	----	----
polychlorinated biphenyls [PCBs], total	----	µg/L	<0.060	----	----	----	----	----	----
Polychlorinated Biphenyls Surrogates									
decachlorobiphenyl	2051-24-3	%	87.8	----	----	----	----	----	----

Analytical Results Evaluation

Matrix: **Water**

Analyte	CAS Number	Unit	Client sample ID: F2-R	----	----	----	----	----	----
			Sampling date/time: 02-Sep-2022 09:35	----	----	----	----	----	----
			Sub-Matrix: Water	----	----	----	----	----	----
			WT2212954-001	--------	--------	--------	--------	--------	--------
Polychlorinated Biphenyls Surrogates									
tetrachloro-m-xylene	877-09-8	%	93.4	----	----	----	----	----	----
Carbamate Pesticides									
diuron	330-54-1	µg/L	<1.0	----	----	----	----	----	----
Organochlorine Pesticides									
chlordane, cis- (alpha)	5103-71-9	µg/L	<0.0080	----	----	----	----	----	----
chlordane, trans- (gamma)	5103-74-2	µg/L	<0.0080	----	----	----	----	----	----
DDD, 4,4'-	72-54-8	µg/L	<0.0040	----	----	----	----	----	----
DDE, 4,4'-	72-55-9	µg/L	<0.0040	----	----	----	----	----	----
DDT, 2,4'-	789-02-6	µg/L	<0.0040	----	----	----	----	----	----
DDT, 4,4'-	50-29-3	µg/L	<0.0040	----	----	----	----	----	----
oxychlordane	27304-13-8	µg/L	<0.0080	----	----	----	----	----	----
Organochlorine Pesticides Surrogates									
decachlorobiphenyl	2051-24-3	%	98.4	----	----	----	----	----	----
tetrachloro-m-xylene	877-09-8	%	111	----	----	----	----	----	----
Herbicides									
acetic acid, 2-methyl-4-chlorophenoxy- [MCPA]	94-74-6	µg/L	<0.050	----	----	----	----	----	----
AMPA	74341-63-2	µg/L	<0.50	----	----	----	----	----	----
bromoxynil	1689-84-5	µg/L	<0.050	----	----	----	----	----	----
dicamba	1918-00-9	µg/L	<0.10	----	----	----	----	----	----
dichlorophenoxyacetic acid, 2,4- [2,4-D]	94-75-7	µg/L	<0.050	----	----	----	----	----	----
dinoseb	88-85-7	µg/L	<0.050	----	----	----	----	----	----
diquat (ion)	2764-72-9	µg/L	<1.0	----	----	----	----	----	----
glyphosate	1071-83-6	µg/L	<0.20	----	----	----	----	----	----
paraquat (as dichloride)	1910-42-5	µg/L	<1.0	----	----	----	----	----	----
picloram	1918-02-1	µg/L	<0.10	----	----	----	----	----	----
trichlorophenoxypropionic acid, 2,4,5- [2,4,5-TP]	93-72-1	µg/L	<0.050	----	----	----	----	----	----
Herbicides Surrogates									
dichlorophenylacetic acid, 2,4-	19719-28-9	%	75.2	----	----	----	----	----	----

Analytical Results Evaluation

Matrix: **Water**

Analyte	CAS Number	Unit	Client sample ID: F2-R	----	----	----	----	----	----
			Sampling date/time: 02-Sep-2022 09:35	----	----	----	----	----	----
			Sub-Matrix: Water	----	----	----	----	----	----
			WT2212954-001	--------	--------	--------	--------	--------	--------
Pesticides									
alachlor	15972-60-8	µg/L	<0.10	----	----	----	----	----	----
atrazine	1912-24-9	µg/L	<0.10	----	----	----	----	----	----
atrazine + n-dealkylated metabolites	----	µg/L	<0.20	----	----	----	----	----	----
atrazine-desethyl	6190-65-4	µg/L	<0.10	----	----	----	----	----	----
azinphos-methyl	86-50-0	µg/L	<0.10	----	----	----	----	----	----
carbaryl	63-25-2	µg/L	<0.20	----	----	----	----	----	----
carbofuran	1563-66-2	µg/L	<0.20	----	----	----	----	----	----
chlorpyrifos	2921-88-2	µg/L	<0.10	----	----	----	----	----	----
diazinon	333-41-5	µg/L	<0.10	----	----	----	----	----	----
diclofop-methyl	51338-27-3	µg/L	<0.10	----	----	----	----	----	----
dimethoate	60-51-5	µg/L	<0.10	----	----	----	----	----	----
malathion	121-75-5	µg/L	<0.10	----	----	----	----	----	----
metolachlor	51218-45-2	µg/L	<0.10	----	----	----	----	----	----
metribuzin	21087-64-9	µg/L	<0.10	----	----	----	----	----	----
phorate	298-02-2	µg/L	<0.50 DLM	----	----	----	----	----	----
prometryn	7287-19-6	µg/L	<0.10	----	----	----	----	----	----
simazine	122-34-9	µg/L	<0.10	----	----	----	----	----	----
terbufos	13071-79-9	µg/L	<0.50 DLM	----	----	----	----	----	----
triallate	2303-17-5	µg/L	<0.10	----	----	----	----	----	----
trifluralin	1582-09-8	µg/L	<0.10	----	----	----	----	----	----
Pesticides Surrogates									
fluorobiphenyl, 2-	321-60-8	%	77.3	----	----	----	----	----	----
terphenyl-d14, p-	1718-51-0	%	90.7	----	----	----	----	----	----
Nitrosamines Surrogates									
nitrosodimethylamine-d6, n-	17829-05-9	%	95.9	----	----	----	----	----	----
Organic Parameters									
microcystin	101043-37-2	µg/L	<0.20	----	----	----	----	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.

Summary of Guideline Limits

Analyte	CAS Number	Unit	ONDWS AO/OG	ONDWS MAC
Physical Tests				
alkalinity, total (as CaCO3)	----	mg/L	**30 - 500 mg/L**	
colour, true	----	CU		
hardness (as CaCO3), from total Ca/Mg	----	mg/L		
pH	----	pH units	**6.5 - 8.5 pH units**	
solids, total dissolved [TDS]	----	mg/L	**500 mg/L**	
turbidity	----	NTU	**5 NTU**	
Anions and Nutrients				
ammonia, total (as N)	7664-41-7	mg/L		
chloride	16887-00-6	mg/L	**250 mg/L**	
fluoride	16984-48-8	mg/L		**1.5 mg/L**
Kjeldahl nitrogen, total [TKN]	----	mg/L		
nitrate (as N)	14797-55-8	mg/L		**10 mg/L**
nitrite (as N)	14797-65-0	mg/L		**1 mg/L**
nitrogen, total organic	----	mg/L		
sulfate (as SO4)	14808-79-8	mg/L		
Cyanides				
cyanide, strong acid dissociable (total)	----	mg/L		**0.2 mg/L**
Organic / Inorganic Carbon				
carbon, dissolved organic [DOC]	----	mg/L	**5 mg/L**	
Total Sulfides				
sulfide, total (as S)	18496-25-8	mg/L	**0.05 mg/L**	
Microbiological Tests				
coliforms, Escherichia coli [E. coli]	----	MPN/100mL		**1 MPN/100mL**
coliforms, total	----	MPN/100mL		**1 MPN/100mL**
Total Metals				
aluminum, total	7429-90-5	mg/L	**0.1 mg/L**	
antimony, total	7440-36-0	µg/L		**0.006 mg/L**
antimony, total	7440-36-0	mg/L		**0.006 mg/L**
arsenic, total	7440-38-2	µg/L		**0.01 mg/L**
arsenic, total	7440-38-2	mg/L		**0.01 mg/L**
barium, total	7440-39-3	µg/L		**1 mg/L**
barium, total	7440-39-3	mg/L		**1 mg/L**
beryllium, total	7440-41-7	mg/L		
bismuth, total	7440-69-9	mg/L		
boron, total	7440-42-8	µg/L		**5 mg/L**
boron, total	7440-42-8	mg/L		**5 mg/L**

Analyte	CAS Number	Unit	ONDWS AO/OG	ONDWS MAC					
Total Metals - Continued									
cadmium, total	7440-43-9	µg/L		0.005 mg/L					
cadmium, total	7440-43-9	mg/L		0.005 mg/L					
calcium, total	7440-70-2	mg/L							
cesium, total	7440-46-2	mg/L							
chromium, total	7440-47-3	µg/L		0.05 mg/L					
chromium, total	7440-47-3	mg/L		0.05 mg/L					
cobalt, total	7440-48-4	mg/L							
copper, total	7440-50-8	mg/L	1 mg/L						
iron, total	7439-89-6	mg/L	0.3 mg/L						
lead, total	7439-92-1	mg/L		0.01 mg/L					
lithium, total	7439-93-2	mg/L							
magnesium, total	7439-95-4	mg/L							
manganese, total	7439-96-5	mg/L	0.05 mg/L						
mercury, total	7439-97-6	µg/L		1 µg/L					
molybdenum, total	7439-98-7	mg/L							
nickel, total	7440-02-0	mg/L							
phosphorus, total	7723-14-0	mg/L							
potassium, total	7440-09-7	mg/L							
rubidium, total	7440-17-7	mg/L							
selenium, total	7782-49-2	µg/L		0.05 mg/L					
selenium, total	7782-49-2	mg/L		0.05 mg/L					
silicon, total	7440-21-3	mg/L							
silver, total	7440-22-4	mg/L							
sodium, total	7440-23-5	mg/L	200 mg/L	20 mg/L					
strontium, total	7440-24-6	mg/L							
sulfur, total	7704-34-9	mg/L							
tellurium, total	13494-80-9	mg/L							
thallium, total	7440-28-0	mg/L							
thorium, total	7440-29-1	mg/L							
tin, total	7440-31-5	mg/L							
titanium, total	7440-32-6	mg/L							
tungsten, total	7440-33-7	mg/L							
uranium, total	7440-61-1	µg/L		0.02 mg/L					
uranium, total	7440-61-1	mg/L		0.02 mg/L					
vanadium, total	7440-62-2	mg/L							
zinc, total	7440-66-6	mg/L	5 mg/L						
zirconium, total	7440-67-7	mg/L							
Aggregate Organics									
nitrilotriacetic acid [NTA]	139-13-9	mg/L		0.4 mg/L					

Analyte	CAS Number	Unit	ONDWS AO/OG	ONDWS MAC					
Dissolved Gases									
methane	74-82-8	µg/L							
methane	74-82-8	ppmv							
Volatile Organic Compounds									
Acetone	67-64-1	µg/L							
benzene	71-43-2	µg/L		**1 µg/L**					
bromodichloromethane	75-27-4	µg/L							
bromoform	75-25-2	µg/L							
bromomethane	74-83-9	µg/L							
BTEX, total	----	µg/L							
carbon tetrachloride	56-23-5	µg/L		**2 µg/L**					
chlorobenzene	108-90-7	µg/L	**30 µg/L**	**80 µg/L**					
chloroform	67-66-3	µg/L							
dibromochloromethane	124-48-1	µg/L							
dibromoethane, 1,2-	106-93-4	µg/L							
dichlorobenzene, 1,2-	95-50-1	µg/L	**3 µg/L**	**200 µg/L**					
dichlorobenzene, 1,3-	541-73-1	µg/L							
dichlorobenzene, 1,4-	106-46-7	µg/L	**1 µg/L**	**5 µg/L**					
dichlorodifluoromethane	75-71-8	µg/L							
dichloroethane, 1,1-	75-34-3	µg/L							
dichloroethane, 1,2-	107-06-2	µg/L		**5 µg/L**					
dichloroethylene, 1,1-	75-35-4	µg/L		**14 µg/L**					
dichloroethylene, cis-1,2-	156-59-2	µg/L							
dichloroethylene, trans-1,2-	156-60-5	µg/L							
dichloromethane	75-09-2	µg/L		**50 µg/L**					
dichloropropane, 1,2-	78-87-5	µg/L							
dichloropropylene, cis+trans-1,3-	542-75-6	µg/L							
dichloropropylene, cis-1,3-	10061-01-5	µg/L							
dichloropropylene, trans-1,3-	10061-02-6	µg/L							
ethylbenzene	100-41-4	µg/L	**2.4 µg/L**	**140 µg/L**					
hexane, n-	110-54-3	µg/L							
methyl ethyl ketone [MEK]	78-93-3	µg/L							
methyl isobutyl ketone [MIBK]	108-10-1	µg/L							
methyl-tert-butyl ether [MTBE]	1634-04-4	µg/L		**15 µg/L**					
styrene	100-42-5	µg/L							
tetrachloroethane, 1,1,1,2-	630-20-6	µg/L							
tetrachloroethane, 1,1,2,2-	79-34-5	µg/L							
tetrachloroethylene	127-18-4	µg/L		**10 µg/L**					
toluene	108-88-3	µg/L	**24 µg/L**	**60 µg/L**					
trichloroethane, 1,1,1-	71-55-6	µg/L							

Analyte	CAS Number	Unit	ONDWS AO/OG	ONDWS MAC					
Volatile Organic Compounds - Continued									
trichloroethane, 1,1,2-	79-00-5	µg/L							
trichloroethylene	79-01-6	µg/L		**5 µg/L**					
trichlorofluoromethane	75-69-4	µg/L							
vinyl chloride	75-01-4	µg/L		**1 µg/L**					
xylene, m+p-	179601-23-1	µg/L							
xylene, o-	95-47-6	µg/L							
xylenes, total	1330-20-7	µg/L	**300 µg/L**	**90 µg/L**					
bromodichloromethane	75-27-4	µg/L							
bromoform	75-25-2	µg/L							
chloroform	67-66-3	µg/L							
dibromochloromethane	124-48-1	µg/L							
trihalomethanes [THMs], total	----	µg/L		**100 µg/L**					
Polycyclic Aromatic Hydrocarbons									
benzo(a)pyrene	50-32-8	µg/L		**0.01 µg/L**					
DIsinfectant By-Products									
chlorate	14866-68-3	mg/L		**1 mg/L**					
chlorite	14998-27-7	mg/L		**1 mg/L**					
Haloacetic Acids									
dibromoacetic acid	631-64-1	µg/L							
dichloroacetic acid	79-43-6	µg/L							
haloacetic acids, total [HAA5]	----	µg/L		**80 µg/L**					
monobromoacetic acid	79-08-3	µg/L							
monochloroacetic acid	79-11-8	µg/L							
trichloroacetic acid	76-03-9	µg/L							
Semi-Volatile Organics									
nitrosodimethylamine, n- [NDMA]	62-75-9	µg/L		**0.009 µg/L**					
Chlorinated Phenolics									
dichlorophenol, 2,4-	120-83-2	µg/L	**0.3 µg/L**	**900 µg/L**					
pentachlorophenol [PCP]	87-86-5	µg/L	**30 µg/L**	**60 µg/L**					
tetrachlorophenol, 2,3,4,6-	58-90-2	µg/L	**1 µg/L**	**100 µg/L**					
trichlorophenol, 2,4,6-	88-06-2	µg/L	**2 µg/L**	**5 µg/L**					
Polychlorinated Biphenyls									
Aroclor 1016	12674-11-2	µg/L							
Aroclor 1221	11104-28-2	µg/L							
Aroclor 1232	11141-16-5	µg/L							
Aroclor 1242	53469-21-9	µg/L							
Aroclor 1248	12672-29-6	µg/L							
Aroclor 1254	11097-69-1	µg/L							
Aroclor 1260	11096-82-5	µg/L							

Analyte	CAS Number	Unit	ONDWS AO/OG	ONDWS MAC					
Polychlorinated Biphenyls - Continued									
Aroclor 1262	37324-23-5	µg/L							
Aroclor 1268	11100-14-4	µg/L							
polychlorinated biphenyls [PCBs], total	----	µg/L		**3 µg/L**					
Carbamate Pesticides									
diuron	330-54-1	µg/L		**150 µg/L**					
chlordane, cis- (alpha)	5103-71-9	µg/L							
chlordane, trans- (gamma)	5103-74-2	µg/L							
DDD, 4,4'-	72-54-8	µg/L							
DDE, 4,4'-	72-55-9	µg/L							
DDT, 2,4'-	789-02-6	µg/L							
DDT, 4,4'-	50-29-3	µg/L							
oxychlordane	27304-13-8	µg/L							
Herbicides									
acetic acid, 2-methyl-4-chlorophenoxy- [MCPA]	94-74-6	µg/L		**100 µg/L**					
AMPA	74341-63-2	µg/L							
bromoxynil	1689-84-5	µg/L		**5 µg/L**					
dicamba	1918-00-9	µg/L		**120 µg/L**					
dichlorophenoxyacetic acid, 2,4- [2,4-D]	94-75-7	µg/L		**100 µg/L**					
dinoseb	88-85-7	µg/L		**10 µg/L**					
diquat (ion)	2764-72-9	µg/L							
glyphosate	1071-83-6	µg/L		**280 µg/L**					
paraquat (as dichloride)	1910-42-5	µg/L		**10 µg/L**					
picloram	1918-02-1	µg/L		**190 µg/L**					
trichlorophenoxypropionic acid, 2,4,5- [2,4,5-TP]	93-72-1	µg/L							
Pesticides									
alachlor	15972-60-8	µg/L		**5 µg/L**					
atrazine + n-dealkylated metabolites	----	µg/L		**5 µg/L**					
atrazine	1912-24-9	µg/L							
atrazine-desethyl	6190-65-4	µg/L							
azinphos-methyl	86-50-0	µg/L		**20 µg/L**					
carbaryl	63-25-2	µg/L		**90 µg/L**					
carbofuran	1563-66-2	µg/L		**90 µg/L**					
chlorpyrifos	2921-88-2	µg/L		**90 µg/L**					
diazinon	333-41-5	µg/L		**20 µg/L**					
diclofop-methyl	51338-27-3	µg/L		**9 µg/L**					
dimethoate	60-51-5	µg/L		**20 µg/L**					
malathion	121-75-5	µg/L		**190 µg/L**					
metolachlor	51218-45-2	µg/L		**50 µg/L**					
metribuzin	21087-64-9	µg/L		**80 µg/L**					

Analyte	CAS Number	Unit	ONDWS AO/OG	ONDWS MAC					
Pesticides - Continued									
phorate	298-02-2	µg/L		**2 µg/L**					
prometryn	7287-19-6	µg/L		**1 µg/L**					
simazine	122-34-9	µg/L		**10 µg/L**					
terbufos	13071-79-9	µg/L		**1 µg/L**					
triallate	2303-17-5	µg/L		**230 µg/L**					
trifluralin	1582-09-8	µg/L		**45 µg/L**					
Organic Parameters									
microcystin	101043-37-2	µg/L		**1.5 µg/L**					

Please refer to the General Comments section for an explanation of any qualifiers detected.

Key:

ONDWS	Ontario Drinking Water Regulation (JAN, 2020)
AO/OG	Aesthetic Objective/Operational Guideline
MAC	Schedule 1 (Microbiological) and 2 (Chemical) Standards (JAN,2020)

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **WT2212954**	Page	: 1 of 19
Amendment	: 1		
Client	: **Township of Centre Wellington**	Laboratory	: Waterloo - Environmental
Contact	: Matthew Alexander	Account Manager	: Candice Hunter
Address	: 1 MacDonald Square Elora ON Canada N0B 1S0	Address	: 60 Northland Road, Unit 1 Waterloo, Ontario Canada N2V 2B8
Telephone	: ----	Telephone	: +1 519 886 6910
Project	: ----	Date Samples Received	: 02-Sep-2022 11:45
PO	: ----	Issue Date	: 04-Oct-2022 14:46
C-O-C number	: 20-1007481		
Sampler	: ----		
Site	: ----		
Quote number	: Special Non - Regulated Water		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Duplicate outliers occur.
- Method Blank value outliers occur - please see following pages for full details.
- Laboratory Control Sample (LCS) outliers occur - please see following pages for full details.
- Matrix Spike outliers occur - please see following pages for full details.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Water**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Method Blank (MB) Values								
Total Metals	QC-633334-001	----	magnesium, total	7439-95-4	E420	0.0114 mg/L B	0.005 mg/L	Blank result exceeds permitted value
Volatile Organic Compounds	QC-MRG2-637812001	----	dichloromethane	75-09-2	E611D	1.1 µg/L B	1 µg/L	Blank result exceeds permitted value

Result Qualifiers

Qualifier	Description
B	*Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.*

Laboratory Control Sample (LCS) Recoveries								
Pesticides	QC-633345-002	----	alachlor	15972-60-8	E660E-H	155 % LCS-H	60.0-130%	Recovery greater than upper control limit
Pesticides	QC-633345-002	----	atrazine	1912-24-9	E660E-H	147 % LCS-H	60.0-130%	Recovery greater than upper control limit
Pesticides	QC-633345-002	----	azinphos-methyl	86-50-0	E660E-H	196 % LCS-H	60.0-140%	Recovery greater than upper control limit
Pesticides	QC-633345-002	----	carbaryl	63-25-2	E660E-H	145 % LCS-H	50.0-140%	Recovery greater than upper control limit
Pesticides	QC-633345-002	----	carbofuran	1563-66-2	E660E-H	145 % LCS-H	60.0-140%	Recovery greater than upper control limit
Pesticides	QC-633345-002	----	chlorpyrifos	2921-88-2	E660E-H	156 % LCS-H	60.0-130%	Recovery greater than upper control limit
Pesticides	QC-633345-002	----	diclofop-methyl	51338-27-3	E660E-H	156 % LCS-H	60.0-140%	Recovery greater than upper control limit
Pesticides	QC-633345-002	----	dimethoate	60-51-5	E660E-H	152 % LCS-H	60.0-130%	Recovery greater than upper control limit
Pesticides	QC-633345-002	----	malathion	121-75-5	E660E-H	191 % LCS-H	60.0-130%	Recovery greater than upper control limit
Pesticides	QC-633345-002	----	metolachlor	51218-45-2	E660E-H	181 % LCS-H	60.0-130%	Recovery greater than upper control limit
Pesticides	QC-633345-002	----	metribuzin	21087-64-9	E660E-H	154 % LCS-H	60.0-130%	Recovery greater than upper control limit
Pesticides	QC-633345-002	----	phorate	298-02-2	E660E-H	13.5 % LCS-L	60.0-140%	Recovery less than lower control limit
Pesticides	QC-633345-002	----	prometryn	7287-19-6	E660E-H	156 % LCS-H	60.0-130%	Recovery greater than upper control limit

Matrix: **Water**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Laboratory Control Sample (LCS) Recoveries - Continued								
Pesticides	QC-633345-002	----	simazine	122-34-9	E660E-H	135 % LCS-H	60.0-130%	Recovery greater than upper control limit
Pesticides	QC-633345-002	----	terbufos	13071-79-9	E660E-H	11.5 % LCS-L	60.0-130%	Recovery less than lower control limit
Pesticides	QC-633345-002	----	trifluralin	1582-09-8	E660E-H	146 % LCS-H	60.0-130%	Recovery greater than upper control limit

Result Qualifiers

Qualifier	Description
LCS-H	*Lab Control Sample recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.*
LCS-L	*Lab Control Sample recovery was below ALS DQO. Reference Material and/or Matrix Spike results were acceptable. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.*

Matrix Spike (MS) Recoveries								
Total Metals	Anonymous	Anonymous	selenium, total	7782-49-2	E432	138 % MES	70.0-130%	Recovery greater than upper data quality objective
Volatile Organic Compounds	WT2212954-001	F2-R	bromomethane	74-83-9	E611D	19.6 % K	60.0-140%	Recovery less than lower data quality objective
Volatile Organic Compounds	WT2212954-001	F2-R	dichloropropylene, cis-1,3-	10061-01-5	E611D	38.3 % K	60.0-140%	Recovery less than lower data quality objective

Result Qualifiers

Qualifier	Description
K	*Matrix Spike recovery outside ALS DQO due to sample matrix effects.*
MES	*Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).*

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Aggregate Organics : Nitrilotriacetic Acid (NTA) in Water										
HDPE [ON MECP] F2-R	E394	02-Sep-2022	----	----	----		05-Sep-2022	30 days	3 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) F2-R	E298	02-Sep-2022	09-Sep-2022	----	----		12-Sep-2022	28 days	11 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE [ON MECP] F2-R	E235.Cl	02-Sep-2022	08-Sep-2022	----	----		08-Sep-2022	28 days	6 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE [ON MECP] F2-R	E235.F	02-Sep-2022	08-Sep-2022	----	----		08-Sep-2022	28 days	6 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE [ON MECP] F2-R	E235.NO3	02-Sep-2022	08-Sep-2022	----	----		08-Sep-2022	7 days	6 days	✓
Anions and Nutrients : Nitrite in Water by IC										
HDPE [ON MECP] F2-R	E235.NO2	02-Sep-2022	08-Sep-2022	----	----		08-Sep-2022	7 days	6 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE [ON MECP] F2-R	E235.SO4	02-Sep-2022	08-Sep-2022	----	----		08-Sep-2022	28 days	6 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Total Kjeldahl Nitrogen by Fluorescence (Low Level)										
Amber glass total (sulfuric acid) F2-R	E318	02-Sep-2022	12-Sep-2022	----	----		13-Sep-2022	28 days	11 days	✓
Carbamate Pesticides : Aldicarb and Diuron in Water by LC-MS/MS										
Amber glass/Teflon lined cap - LCMS F2-R	E712B	02-Sep-2022	09-Sep-2022	20 days	7 days	✓	12-Sep-2022	7 days	3 days	✓
Chlorinated Phenolics : Phenolics (Ontario Chlorophenols List) by GC-MS										
Amber glass/Teflon lined cap F2-R	E651D	02-Sep-2022	06-Sep-2022	7 days	4 days	✓	07-Sep-2022	40 days	1 days	✓
Cyanides : Total Cyanide										
UV-inhibited HDPE - total (sodium hydroxide) F2-R	E333	02-Sep-2022	06-Sep-2022	----	----		06-Sep-2022	14 days	4 days	✓
Disinfectant By-Products : Chlorate (CLO3) in Waters by Ion Chromatography										
HDPE (teflon free) F2-R	E409.CLO3	02-Sep-2022	07-Sep-2022	28 days	5 days	✓	07-Sep-2022	23 days	0 days	✓
Disinfectant By-Products : Chlorite (CLO2) in Waters by Ion Chromatography										
HDPE (teflon free) F2-R	E409.CLO2	02-Sep-2022	07-Sep-2022	14 days	5 days	✓	07-Sep-2022	9 days	0 days	✓
Dissolved Gases : Methane, Ethane, & Ethene by Headspace GC-FID										
Glass vial (sodium bisulfate) F2-R	E614B	02-Sep-2022	----	----	----		07-Sep-2022	14 days	5 days	✓
Haloacetic Acids : Haloacetic Acids in Water by LC-MS/MS										
Glass vial (ammonium chloride+copper sulfate) F2-R	E750	02-Sep-2022	09-Sep-2022	14 days	7 days	✓	11-Sep-2022	14 days	2 days	✓
Herbicides : Diquat and Paraquat in Water by LC-MS-MS										
Amber glass/Teflon lined cap - LCMS F2-R	E723A	02-Sep-2022	08-Sep-2022	7 days	6 days	✓	08-Sep-2022	21 days	0 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Herbicides : Glyphosate and AMPA in Water										
Amber glass/Teflon lined cap - LCMS										
F2-R	E716A	02-Sep-2022	07-Sep-2022	14 days	5 days	✓	07-Sep-2022	40 days	0 days	✓
Herbicides : Phenoxy Acid Herbicides in Water by LC-MS-MS										
Amber glass/Teflon lined cap - LCMS										
F2-R	E706A	02-Sep-2022	06-Sep-2022	----	----		07-Sep-2022	14 days	5 days	✓
Microbiological Tests : Total Coliforms and E. coli (Enzyme Substrate)										
Sterile HDPE (Sodium thiosulphate) [ON MECP]										
F2-R	E010	02-Sep-2022	----	----	----		03-Sep-2022	48 hrs	26 hrs	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid)										
F2-R	E358-L	02-Sep-2022	07-Sep-2022	----	----		14-Sep-2022	28 days	12 days	✓
Organic Parameters : Microcystin by ELISA (Extraction by Sonication)										
Amber glass/Teflon lined cap										
F2-R	E576	02-Sep-2022	----	----	----		09-Sep-2022	14 days	7 days	✓
Organochlorine Pesticides : OCP Analysis by GC-MS-MS										
Amber glass/Teflon lined cap										
F2-R	E660F	02-Sep-2022	06-Sep-2022	7 days	4 days	✓	07-Sep-2022	40 days	1 days	✓
Pesticides : Miscellaneous Pesticides by GC-MS										
Amber glass/Teflon lined cap										
F2-R	E660E-H	02-Sep-2022	05-Sep-2022	14 days	4 days	✓	06-Sep-2022	40 days	1 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE [ON MECP]										
F2-R	E290	02-Sep-2022	08-Sep-2022	----	----		09-Sep-2022	14 days	7 days	✓
Physical Tests : Colour (True) by Spectrometer (2 CU)										
HDPE [ON MECP]										
F2-R	E329-L	02-Sep-2022	03-Sep-2022	----	----		06-Sep-2022	48 hrs	128 hrs	× EHT

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : pH by Meter										
HDPE [ON MECP] F2-R	E108	02-Sep-2022	08-Sep-2022	----	----		09-Sep-2022	14 days	7 days	✓
Physical Tests : TDS by Gravimetry										
HDPE [ON MECP] F2-R	E162	02-Sep-2022	----	----	----		06-Sep-2022	7 days	4 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE [ON MECP] F2-R	E121	02-Sep-2022	----	----	----		02-Sep-2022	3 days	0 days	✓
Polychlorinated Biphenyls : PCB Aroclors by GC-MS										
Amber glass/Teflon lined cap F2-R	E687	02-Sep-2022	06-Sep-2022	14 days	4 days	✓	07-Sep-2022	40 days	1 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hexane LVI GC-MS										
Amber glass/Teflon lined cap F2-R	E641A	02-Sep-2022	08-Sep-2022	7 days	6 days	✓	12-Sep-2022	40 days	3 days	✓
Semi-Volatile Organics : N-Nitrosodimethylamine (NDMA) by LC-MS-MS (Trace Level)										
Amber glass/Teflon lined cap - LCMS F2-R	E725-T	02-Sep-2022	06-Sep-2022	28 days	4 days	✓	09-Sep-2022	28 days	3 days	✓
Total Metals : Drinking Water Metals [Ontario]										
HDPE total (nitric acid) F2-R	E432	02-Sep-2022	06-Sep-2022	----	----		06-Sep-2022	60 days	4 days	✓
Total Metals : Total Mercury in Water by CVAAS										
Glass vial total (hydrochloric acid) F2-R	E508	02-Sep-2022	06-Sep-2022	----	----		06-Sep-2022	28 days	4 days	✓
Total Metals : Total metals in Water by CRC ICPMS										
HDPE total (nitric acid) F2-R	E420	02-Sep-2022	06-Sep-2022	----	----		06-Sep-2022	180 days	5 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Total Sulfides : Total Sulfide by Colourimetry (Manual)										
HDPE total (zinc acetate+sodium hydroxide)										
F2-R	E396	02-Sep-2022	----	----	----		09-Sep-2022	7 days	7 days	✓
Volatile Organic Compounds : VOCs (Eastern Canada List) by Headspace GC-MS										
Glass vial (sodium bisulfate)										
F2-R	E611D	02-Sep-2022	08-Sep-2022	----	----		08-Sep-2022	14 days	6 days	✓
Volatile Organic Compounds [THMs] : THMs by Headspace GC-MS										
Glass vial (sodium bisulfate)										
F2-R	E611B	02-Sep-2022	08-Sep-2022	----	----		08-Sep-2022	14 days	6 days	✓

Legend & Qualifier Definitions

EHT: Exceeded ALS recommended hold time prior to analysis.

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Aldicarb and Diuron in Water by LC-MS/MS	E712B	638961	1	1	100.0	5.0	✓
Alkalinity Species by Titration	E290	637654	1	16	6.2	5.0	✓
Ammonia by Fluorescence	E298	639864	1	15	6.6	5.0	✓
Chlorate (CLO3) in Waters by Ion Chromatography	E409.CLO3	635446	1	5	20.0	5.0	✓
Chloride in Water by IC	E235.Cl	637486	1	12	8.3	5.0	✓
Chlorite (CLO2) in Waters by Ion Chromatography	E409.CLO2	635447	1	4	25.0	5.0	✓
Colour (True) by Spectrometer (2 CU)	E329-L	632380	1	1	100.0	5.0	✓
Diquat and Paraquat in Water by LC-MS-MS	E723A	637025	1	1	100.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	635753	1	9	11.1	5.0	✓
Drinking Water Metals [Ontario]	E432	634512	1	3	33.3	5.0	✓
Fluoride in Water by IC	E235.F	637487	1	5	20.0	5.0	✓
Glyphosate and AMPA in Water	E716A	633946	1	2	50.0	5.0	✓
Haloacetic Acids in Water by LC-MS/MS	E750	638905	1	14	7.1	4.7	✓
Methane, Ethane, & Ethene by Headspace GC-FID	E614B	635471	1	11	9.0	4.5	✓
Microcystin by ELISA (Extraction by Sonication)	E576	639186	1	11	9.0	5.0	✓
Nitrate in Water by IC	E235.NO3	637489	1	13	7.6	5.0	✓
Nitrilotriacetic Acid (NTA) in Water	E394	633331	1	3	33.3	5.0	✓
Nitrite in Water by IC	E235.NO2	637490	1	6	16.6	5.0	✓
N-Nitrosodimethylamine (NDMA) by LC-MS-MS (Trace Level)	E725-T	638901	1	4	25.0	5.0	✓
pH by Meter	E108	637652	1	18	5.5	5.0	✓
Phenoxy Acid Herbicides in Water by LC-MS-MS	E706A	634443	1	16	6.2	5.0	✓
Sulfate in Water by IC	E235.SO4	637488	1	4	25.0	5.0	✓
TDS by Gravimetry	E162	634117	1	20	5.0	5.0	✓
THMs by Headspace GC-MS	E611B	637813	1	1	100.0	5.0	✓
Total Coliforms and E. coli (Enzyme Substrate)	E010	632124	1	11	9.0	5.0	✓
Total Cyanide	E333	634176	1	10	10.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	639862	1	18	5.5	5.0	✓
Total Mercury in Water by CVAAS	E508	634028	1	8	12.5	5.0	✓
Total metals in Water by CRC ICPMS	E420	633334	1	20	5.0	5.0	✓
Total Sulfide by Colourimetry (Manual)	E396	639357	1	1	100.0	5.0	✓
Turbidity by Nephelometry	E121	631650	1	2	50.0	5.0	✓
VOCs (Eastern Canada List) by Headspace GC-MS	E611D	637812	1	1	100.0	5.0	✓
Laboratory Control Samples (LCS)							
Aldicarb and Diuron in Water by LC-MS/MS	E712B	638961	1	1	100.0	5.0	✓
Alkalinity Species by Titration	E290	637654	1	16	6.2	5.0	✓
Ammonia by Fluorescence	E298	639864	1	15	6.6	5.0	✓
Chlorate (CLO3) in Waters by Ion Chromatography	E409.CLO3	635446	1	5	20.0	5.0	✓

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Control Samples (LCS) - Continued							
Chloride in Water by IC	E235.Cl	637486	1	12	8.3	5.0	✓
Chlorite (CLO2) in Waters by Ion Chromatography	E409.CLO2	635447	1	4	25.0	5.0	✓
Colour (True) by Spectrometer (2 CU)	E329-L	632380	1	1	100.0	5.0	✓
Diquat and Paraquat in Water by LC-MS-MS	E723A	637025	1	1	100.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	635753	1	9	11.1	5.0	✓
Drinking Water Metals [Ontario]	E432	634512	1	3	33.3	5.0	✓
Fluoride in Water by IC	E235.F	637487	1	5	20.0	5.0	✓
Glyphosate and AMPA in Water	E716A	633946	1	2	50.0	5.0	✓
Haloacetic Acids in Water by LC-MS/MS	E750	638905	1	14	7.1	4.7	✓
Microcystin by ELISA (Extraction by Sonication)	E576	639186	1	11	9.0	5.0	✓
Miscellaneous Pesticides by GC-MS	E660E-H	633345	1	3	33.3	5.0	✓
Nitrate in Water by IC	E235.NO3	637489	1	13	7.6	5.0	✓
Nitrilotriacetic Acid (NTA) in Water	E394	633331	1	3	33.3	5.0	✓
Nitrite in Water by IC	E235.NO2	637490	1	6	16.6	5.0	✓
N-Nitrosodimethylamine (NDMA) by LC-MS-MS (Trace Level)	E725-T	638901	1	4	25.0	5.0	✓
OCP Analysis by GC-MS-MS	E660F	633430	1	7	14.2	5.0	✓
PAHs by Hexane LVI GC-MS	E641A	638508	1	1	100.0	5.0	✓
PCB Aroclors by GC-MS	E687	633429	1	9	11.1	4.7	✓
pH by Meter	E108	637652	1	18	5.5	5.0	✓
Phenolics (Ontario Chlorophenols List) by GC-MS	E651D	633416	1	3	33.3	5.0	✓
Phenoxy Acid Herbicides in Water by LC-MS-MS	E706A	634443	1	16	6.2	5.0	✓
Sulfate in Water by IC	E235.SO4	637488	1	4	25.0	5.0	✓
TDS by Gravimetry	E162	634117	1	20	5.0	5.0	✓
THMs by Headspace GC-MS	E611B	637813	1	1	100.0	5.0	✓
Total Cyanide	E333	634176	1	10	10.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	639862	1	18	5.5	5.0	✓
Total Mercury in Water by CVAAS	E508	634028	1	8	12.5	5.0	✓
Total metals in Water by CRC ICPMS	E420	633334	2	20	10.0	5.0	✓
Total Sulfide by Colourimetry (Manual)	E396	639357	1	1	100.0	5.0	✓
Turbidity by Nephelometry	E121	631650	1	2	50.0	5.0	✓
VOCs (Eastern Canada List) by Headspace GC-MS	E611D	637812	1	1	100.0	5.0	✓
Method Blanks (MB)							
Aldicarb and Diuron in Water by LC-MS/MS	E712B	638961	1	1	100.0	5.0	✓
Alkalinity Species by Titration	E290	637654	1	16	6.2	5.0	✓
Ammonia by Fluorescence	E298	639864	1	15	6.6	5.0	✓
Chlorate (CLO3) in Waters by Ion Chromatography	E409.CLO3	635446	1	5	20.0	5.0	✓
Chloride in Water by IC	E235.Cl	637486	1	12	8.3	5.0	✓
Chlorite (CLO2) in Waters by Ion Chromatography	E409.CLO2	635447	1	4	25.0	5.0	✓
Colour (True) by Spectrometer (2 CU)	E329-L	632380	1	1	100.0	5.0	✓
Diquat and Paraquat in Water by LC-MS-MS	E723A	637025	1	1	100.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	635753	1	9	11.1	5.0	✓

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Method Blanks (MB) - Continued							
Drinking Water Metals [Ontario]	E432	634512	1	3	33.3	5.0	✓
Fluoride in Water by IC	E235.F	637487	1	5	20.0	5.0	✓
Glyphosate and AMPA in Water	E716A	633946	1	2	50.0	5.0	✓
Haloacetic Acids in Water by LC-MS/MS	E750	638905	1	14	7.1	4.7	✓
Methane, Ethane, & Ethene by Headspace GC-FID	E614B	635471	1	11	9.0	4.5	✓
Microcystin by ELISA (Extraction by Sonication)	E576	639186	1	11	9.0	5.0	✓
Miscellaneous Pesticides by GC-MS	E660E-H	633345	1	3	33.3	5.0	✓
Nitrate in Water by IC	E235.NO3	637489	1	13	7.6	5.0	✓
Nitrilotriacetic Acid (NTA) in Water	E394	633331	1	3	33.3	5.0	✓
Nitrite in Water by IC	E235.NO2	637490	1	6	16.6	5.0	✓
N-Nitrosodimethylamine (NDMA) by LC-MS-MS (Trace Level)	E725-T	638901	1	4	25.0	5.0	✓
OCP Analysis by GC-MS-MS	E660F	633430	1	7	14.2	5.0	✓
PAHs by Hexane LVI GC-MS	E641A	638508	1	1	100.0	5.0	✓
PCB Aroclors by GC-MS	E687	633429	1	9	11.1	4.7	✓
Phenolics (Ontario Chlorophenols List) by GC-MS	E651D	633416	1	3	33.3	5.0	✓
Phenoxy Acid Herbicides in Water by LC-MS-MS	E706A	634443	1	16	6.2	5.0	✓
Sulfate in Water by IC	E235.SO4	637488	1	4	25.0	5.0	✓
TDS by Gravimetry	E162	634117	1	20	5.0	5.0	✓
THMs by Headspace GC-MS	E611B	637813	1	1	100.0	5.0	✓
Total Coliforms and E. coli (Enzyme Substrate)	E010	632124	1	11	9.0	5.0	✓
Total Cyanide	E333	634176	1	10	10.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	639862	1	18	5.5	5.0	✓
Total Mercury in Water by CVAAS	E508	634028	1	8	12.5	5.0	✓
Total metals in Water by CRC ICPMS	E420	633334	1	20	5.0	5.0	✓
Total Sulfide by Colourimetry (Manual)	E396	639357	1	1	100.0	5.0	✓
Turbidity by Nephelometry	E121	631650	1	2	50.0	5.0	✓
VOCs (Eastern Canada List) by Headspace GC-MS	E611D	637812	1	1	100.0	5.0	✓
Matrix Spikes (MS)							
Aldicarb and Diuron in Water by LC-MS/MS	E712B	638961	1	1	100.0	5.0	✓
Ammonia by Fluorescence	E298	639864	1	15	6.6	5.0	✓
Chlorate (CLO3) in Waters by Ion Chromatography	E409.CLO3	635446	1	5	20.0	5.0	✓
Chloride in Water by IC	E235.Cl	637486	1	12	8.3	5.0	✓
Chlorite (CLO2) in Waters by Ion Chromatography	E409.CLO2	635447	1	4	25.0	5.0	✓
Diquat and Paraquat in Water by LC-MS-MS	E723A	637025	1	1	100.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	635753	1	9	11.1	5.0	✓
Drinking Water Metals [Ontario]	E432	634512	1	3	33.3	5.0	✓
Fluoride in Water by IC	E235.F	637487	1	5	20.0	5.0	✓
Glyphosate and AMPA in Water	E716A	633946	1	2	50.0	5.0	✓
Haloacetic Acids in Water by LC-MS/MS	E750	638905	1	14	7.1	4.7	✓
Microcystin by ELISA (Extraction by Sonication)	E576	639186	1	11	9.0	5.0	✓
Nitrate in Water by IC	E235.NO3	637489	1	13	7.6	5.0	✓

Matrix: **Water**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Matrix Spikes (MS) - Continued							
Nitrilotriacetic Acid (NTA) in Water	E394	633331	1	3	33.3	5.0	✓
Nitrite in Water by IC	E235.NO2	637490	1	6	16.6	5.0	✓
N-Nitrosodimethylamine (NDMA) by LC-MS-MS (Trace Level)	E725-T	638901	1	4	25.0	5.0	✓
Phenoxy Acid Herbicides in Water by LC-MS-MS	E706A	634443	1	16	6.2	5.0	✓
Sulfate in Water by IC	E235.SO4	637488	1	4	25.0	5.0	✓
THMs by Headspace GC-MS	E611B	637813	1	1	100.0	5.0	✓
Total Cyanide	E333	634176	1	10	10.0	5.0	✓
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318	639862	1	18	5.5	5.0	✓
Total Mercury in Water by CVAAS	E508	634028	1	8	12.5	5.0	✓
Total metals in Water by CRC ICPMS	E420	633334	1	20	5.0	5.0	✓
Total Sulfide by Colourimetry (Manual)	E396	639357	1	1	100.0	5.0	✓
VOCs (Eastern Canada List) by Headspace GC-MS	E611D	637812	1	1	100.0	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Coliforms and E. coli (Enzyme Substrate)	E010 Waterloo - Environmental	Water	APHA 9223 (mod)	The enzyme substrate test simultaneously detects Total Coliforms and E. coli in a 100 mL sample after incubation at 35.0 ±0.5°C for either 18 or 24 hours (dependent on reagent used).
pH by Meter	E108 Waterloo - Environmental	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Turbidity by Nephelometry	E121 Waterloo - Environmental	Water	APHA 2130 B (mod)	Turbidity is measured by the nephelometric method, by measuring the intensity of light scatter under defined conditions.
TDS by Gravimetry	E162 Waterloo - Environmental	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Chloride in Water by IC	E235.Cl Waterloo - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F Waterloo - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC	E235.NO2 Waterloo - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC	E235.NO3 Waterloo - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 Waterloo - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 Waterloo - Environmental	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Ammonia by Fluorescence	E298 Waterloo - Environmental	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Total Kjeldahl Nitrogen by Fluorescence (Low Level)	E318 Waterloo - Environmental	Water	Method Fialab 100, 2018	TKN in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021).
Colour (True) by Spectrometer (2 CU)	E329-L Waterloo - Environmental	Water	APHA 2120 C (mod)	Colour (True Colour) is determined by filtering a sample through a 0.45 micron membrane filter followed by analysis of the filtrate using the platinum-cobalt colourimetric method. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment.
Total Cyanide	E333 Waterloo - Environmental	Water	ISO 14403 (mod)	Total or Strong Acid Dissociable (SAD) Cyanide is determined by Continuous Flow Analyzer (CFA) with in-line UV digestion followed by colourmetric analysis. Method Limitation: High levels of thiocyanate (SCN) may cause positive interference (up to 0.5% of SCN concentration).
Dissolved Organic Carbon by Combustion (Low Level)	E358-L Waterloo - Environmental	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
Nitrilotriacetic Acid (NTA) in Water	E394 Waterloo - Environmental	Water	EPA 430.1 (mod)	NTA refers to the tri-sodium salt of nitrilotriacetic acid, N(CH2COONa)3. Zinc forms a blue-coloured complex with 2 carboxy-2-hydroxy-5-sulfoformazylbenzene (Zincon) in a solution buffered to pH 9.2. When NTA is added to the sample, the Zinc-Zincon complex is broken which reduces the absorbance in proportion to the amount of NTA present. Samples are filtered with a 0.45 um membrane before analysis.
Total Sulfide by Colourimetry (Manual)	E396 Waterloo - Environmental	Water	APHA 4500-S2 D (mod)	Total Sulfide is determined by spectrophotometer using the methlyene blue colourimetric method. Results expressed "as H2S" if reported represent the maximum possible H2S concentration based on the total sulfide concentration in the sample. The H2S calculation converts Total Sulphide as (S2-) and reports it as Total Sulphide as (H2S).
Chlorite (CLO2) in Waters by Ion Chromatography	E409.CLO2 Waterloo - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity detection.
Chlorate (CLO3) in Waters by Ion Chromatography	E409.CLO3 Waterloo - Environmental	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity detection.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total metals in Water by CRC ICPMS	E420 Waterloo - Environmental	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Drinking Water Metals [Ontario]	E432 Waterloo - Environmental	Water	APHA 3030E/EPA 6020A	Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).
Total Mercury in Water by CVAAS	E508 Waterloo - Environmental	Water	EPA 1631E (mod)	Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS
Microcystin by ELISA (Extraction by Sonication)	E576 Winnipeg - Environmental	Water	ENVIROLOGIX QUANTIPLATE KIT CAT. EP022	Total Microcystins (intraceller and extraceller) in aqueous matrices is determined by the Enzyme-Linked ImmunoSorbent Assay (ELISA) method. Extraction is by sonication
THMs by Headspace GC-MS	E611B Waterloo - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
VOCs (Eastern Canada List) by Headspace GC-MS	E611D Waterloo - Environmental	Water	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
Methane, Ethane, & Ethene by Headspace GC-FID	E614B Waterloo - Environmental	Water	EPA REGION 1, NATATTEN.WPD, REV. 1	Volatile hydrocarbons are analyzed by static headspace GC/FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing the analyte(s) to partition between the aqueous phase and the headspace in accordance with Henry's law.
PAHs by Hexane LVI GC-MS	E641A Waterloo - Environmental	Water	EPA 8270E (mod)	Polycyclic Aromatic Hydrocarbons (PAHs) are analyzed by large volume injection (LVI) GC-MS.
Phenolics (Ontario Chlorophenols List) by GC-MS	E651D Waterloo - Environmental	Water	EPA 8270E (mod)	Phenolics are analyzed by GC-MS.
Miscellaneous Pesticides by GC-MS	E660E-H Waterloo - Environmental	Water	EPA 8270E (mod)	Pesticides are analyzed by GC-MS.
OCP Analysis by GC-MS-MS	E660F Waterloo - Environmental	Water	EPA 8270E (mod)	Pesticides are analyzed by GC-MS-MS

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
PCB Aroclors by GC-MS	E687 Waterloo - Environmental	Water	EPA 8270E (mod)	PCB Aroclors are analyzed by GC-MS
Phenoxy Acid Herbicides in Water by LC-MS-MS	E706A Waterloo - Environmental	Water	MOE E3552	Water samples are subjected to 0.2 µM RC filtration and analyzed by direct injection using liquid chromatography tandem mass spectrometry (LC-MS/MS).
Aldicarb and Diuron in Water by LC-MS/MS	E712B Waterloo - Environmental	Water	E3501	An aliquot of water sample is diluted 1:1 using acetonitrile and analyzed using LC/MS/MS
Glyphosate and AMPA in Water	E716A Waterloo - Environmental	Water	E3505	An aliquot of 4.0 ± 0.1 mL of a water sample is spiked with an Internal Standard, Glyphosate-13C2,15N, and derivatized to FMOC-Glyphosate and FMOC-AMPA, then analyzed by LC-MS/MS.
Diquat and Paraquat in Water by LC-MS-MS	E723A Waterloo - Environmental	Water	EPA 549.2	If the sample is not clear filter a portion of the sample using a RC filter. An aliquot of the sample is taken and internal standard is added. The sample is analyzed by LC/MS/MS.
N-Nitrosodimethylamine (NDMA) by LC-MS-MS (Trace Level)	E725-T Waterloo - Environmental	Water	EPA/600/r-05/054. Method 521	Nitrosamines analytes are analyzed via LC/MS/MS in Positive APCI mode.
Haloacetic Acids in Water by LC-MS/MS	E750 Waterloo - Environmental	Water	MOE E3478	An aliquot of sample is fortified with formic acid and internal standards and analyzed via direct injection by LCMSMS
Hardness (Calculated) from Total Ca/Mg	EC100A Waterloo - Environmental	Water	APHA 2340B	"Hardness (as CaCO3), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.
Total Organic Nitrogen (Calculation)	EC363 Waterloo - Environmental	Water	APHA 4500-NORG (TKN)/NH3-NITROGEN (NH3)	Total Organic Nitrogen is a calculated parameter. Total Organic Nitrogen = Total Kjeldahl Nitrogen - Ammonia.
Methane, Ethane, & Ethene by Headspace GC-FID	EC614B Waterloo - Environmental	Water	Unit Conversion	Convert ppmV to ug/L

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
	Waterloo - Environmental			
Digestion for TKN in water	EP318 Waterloo - Environmental	Water	APHA 4500-Norg D (mod)	Samples are digested at high temperature using Sulfuric Acid with Copper catalyst, which converts organic nitrogen sources to Ammonia, which is then quantified by the analytical method as TKN. This method is unsuitable for samples containing high levels of nitrate. If nitrate exceeds TKN concentration by ten times or more, results may be biased low.
Preparation for Dissolved Organic Carbon for Combustion	EP358 Waterloo - Environmental	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon
VOCs Preparation for Headspace Analysis	EP581 Waterloo - Environmental	Water	EPA 5021A (mod)	Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler. An aliquot of the headspace is then injected into the GC/MS-FID system.
PHCs and PAHs Hexane Extraction	EP601 Waterloo - Environmental	Water	EPA 3511 (mod)	Petroleum Hydrocarbons (PHCs) and Polycyclic Aromatic Hydrocarbons (PAHs) are extracted using a hexane liquid-liquid extraction.
Phenolics Extraction	EP651 Waterloo - Environmental	Water	EPA 3511 (mod)	Phenolics are extracted from acidic aqueous sample using DCM liquid-liquid extraction.
Pesticides, PCB, and Neutral Extractable Chlorinated Hydrocarbons Extraction	EP660 Waterloo - Environmental	Water	EPA 3511 (mod)	Samples are extracted from aqueous sample using an organic solvent liquid-liquid extraction.
Pesticides & Toxaphene Extraction by DCM	EP660D Waterloo - Environmental	Water	EPA 1699 (mod)	Samples are extracted from aqueous sample using DCM liquid-liquid extraction.
Preparation of Phenoxy Acid Herbicides in Water by LC-MS-MS	EP706 Waterloo - Environmental	Water	MOE E3552	Water samples are subjected to 0.2 µM RC filtration (drinking water samples are not filtered) and analyzed by direct injection using liquid chromatography tandem mass spectrometry (LC-MS/MS).
Preparation of Aldicarb and Diuron in Water by LC-MS/MS	EP712B Waterloo - Environmental	Water	E3501	An aliquot of water sample is diluted 1:1 using acetonitrile and analyzed using LC/MS/MS
Preparation of Glyphosate and AMPA in Water	EP716 Waterloo - Environmental	Water	MOE E3500	Preparation of Glyphosate and AMPA in Water

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation of Diquat and Paraquat in Water	EP723 Waterloo - Environmental	Water	EPA 549.2	If the sample is not clear filter a portion of the sample using a RC filter. An aliquot of the sample is taken and internal standard is added. The sample is analyzed by LC/MS/MS.
Nitrosamines SPE Extraction	EP725 Waterloo - Environmental	Water	EPA/600/r-05/054. Method 521	Nitrosamines analytes are extracted from water samples using SPE (solid phase extraction). The analytes are eluted and evaporated for solvent exchange and then analyzed via LC/MS/MS in Positive APCI mode.
Preparation of Haloacetic acid in Water for LCMSMS	EP750 Waterloo - Environmental	Water	E3478	An aliquot of samples is fortified with formic acid and internal standard to be analyzed by direct injection LCMSMS

QUALITY CONTROL REPORT

Work Order	: **WT2212954**	Page	: 1 of 26
Amendment	: **1**		
Client	: Township of Centre Wellington	Laboratory	: Waterloo - Environmental
Contact	: Matthew Alexander	Account Manager	: Candice Hunter
Address	: 1 MacDonald Square Elora ON Canada N0B 1S0	Address	: 60 Northland Road, Unit 1 Waterloo, Ontario Canada N2V 2B8
Telephone	: ----	Telephone	: +1 519 886 6910
Project	: ----	Date Samples Received	: 02-Sep-2022 11:45
PO	: ----	Date Analysis Commenced	: 02-Sep-2022
C-O-C number	: 20-1007481	Issue Date	: 04-Oct-2022 14:46
Sampler	: ----		
Site	: ----		
Quote number	: Special Non - Regulated Water		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Adam Boettger	Team Leader - LCMS	Waterloo LCMS, Waterloo, Ontario
Andrea Armstrong	Department Manager - Air Quality and Volatiles	Waterloo Air Quality, Waterloo, Ontario
Greg Pokocky	Supervisor - Inorganic	Waterloo Inorganics, Waterloo, Ontario
Greg Pokocky	Supervisor - Inorganic	Waterloo Metals, Waterloo, Ontario
Jennifer Siemiernik		Waterloo Metals, Waterloo, Ontario
Jeremy Gingras	Team Leader - Semi-Volatile Instrumentation	Waterloo Organics, Waterloo, Ontario
Jihun Jeon	Laboratory Analyst	Waterloo LCMS, Waterloo, Ontario
Jocelyn Kennedy	Department Manager - Semi-Volatile Organics	Waterloo Organics, Waterloo, Ontario
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Ruby Sujeepan		Waterloo Microbiology, Waterloo, Ontario
Sarah Birch	Team Leader - Volatiles	Waterloo Organics, Waterloo, Ontario

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
= Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 631650)											
WT2212573-001	Anonymous	turbidity	----	E121	1.00	NTU	<1.00	<1.00	0	Diff <2x LOR	----
Physical Tests (QC Lot: 632380)											
WT2212954-001	F2-R	colour, true	----	E329-L	2.0	CU	<2.0	<2.0	0	Diff <2x LOR	----
Physical Tests (QC Lot: 634117)											
WT2212859-003	Anonymous	solids, total dissolved [TDS]	----	E162	20	mg/L	327	304	7.45%	20%	----
Physical Tests (QC Lot: 637652)											
WT2212938-001	Anonymous	pH	----	E108	0.10	pH units	8.08	8.10	0.247%	4%	----
Physical Tests (QC Lot: 637654)											
WT2212938-001	Anonymous	alkalinity, total (as CaCO3)	----	E290	2.0	mg/L	85.0	79.5	6.73%	20%	----
Anions and Nutrients (QC Lot: 637486)											
WT2213026-001	Anonymous	chloride	16887-00-6	E235.Cl	2.50	mg/L	149	151	1.30%	20%	----
Anions and Nutrients (QC Lot: 637487)											
WT2213026-001	Anonymous	fluoride	16984-48-8	E235.F	0.100	mg/L	0.340	0.347	0.007	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 637488)											
WT2213026-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	1.50	mg/L	397	403	1.56%	20%	----
Anions and Nutrients (QC Lot: 637489)											
WT2213026-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3	0.100	mg/L	0.185	0.187	0.003	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 637490)											
WT2213026-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 639862)											
WT2212926-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	0.500	mg/L	7.70	8.10	5.06%	20%	----
Anions and Nutrients (QC Lot: 639864)											
WT2212951-001	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.0505	0.0504	0.198%	20%	----
Cyanides (QC Lot: 634176)											
SK2204799-001	Anonymous	cyanide, strong acid dissociable (total)	----	E333	0.0100	mg/L	<0.0100	<0.0100	0	Diff <2x LOR	----
Organic / Inorganic Carbon (QC Lot: 635753)											
TY2201174-008	Anonymous	carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
Total Sulfides (QC Lot: 639357)											
WT2212954-001	F2-R	sulfide, total (as S)	18496-25-8	E396	0.018	mg/L	<0.018	<0.018	0	Diff <2x LOR	----
Microbiological Tests (QC Lot: 632124)											
WT2212944-002	Anonymous	coliforms, Escherichia coli [E. coli]	----	E010	1	MPN/100mL	<1	<1	0	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Microbiological Tests (QC Lot: 632124) - continued											
WT2212944-002	Anonymous	coliforms, total	----	E010	1	MPN/100mL	<1	<1	0	Diff <2x LOR	----
Total Metals (QC Lot: 633334)											
WT2212936-001	Anonymous	aluminum, total	7429-90-5	E420	0.0030	mg/L	0.233	0.233	0.0652%	20%	----
		antimony, total	7440-36-0	E420	0.00010	mg/L	0.00022	0.00023	0.000008	Diff <2x LOR	----
		arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00394	0.00394	0.0634%	20%	----
		barium, total	7440-39-3	E420	0.00010	mg/L	0.00772	0.00746	3.43%	20%	----
		beryllium, total	7440-41-7	E420	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		bismuth, total	7440-69-9	E420	0.000050	mg/L	0.000068	0.000065	0.000003	Diff <2x LOR	----
		boron, total	7440-42-8	E420	0.010	mg/L	0.039	0.037	0.001	Diff <2x LOR	----
		cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.000153	0.000161	5.10%	20%	----
		calcium, total	7440-70-2	E420	0.050	mg/L	45.6	43.2	5.33%	20%	----
		cesium, total	7440-46-2	E420	0.000010	mg/L	0.000028	0.000028	0.0000004	Diff <2x LOR	----
		chromium, total	7440-47-3	E420	0.00050	mg/L	0.00097	0.00089	0.00007	Diff <2x LOR	----
		cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00431	0.00432	0.236%	20%	----
		copper, total	7440-50-8	E420	0.00050	mg/L	0.0909	0.0904	0.538%	20%	----
		iron, total	7439-89-6	E420	0.010	mg/L	2.30	2.29	0.166%	20%	----
		lead, total	7439-92-1	E420	0.000050	mg/L	1.79 µg/L	0.00181	1.35%	20%	----
		lithium, total	7439-93-2	E420	0.0010	mg/L	0.0014	0.0011	0.0003	Diff <2x LOR	----
		magnesium, total	7439-95-4	E420	0.0050	mg/L	8.69	8.64	0.603%	20%	----
		manganese, total	7439-96-5	E420	0.00010	mg/L	0.200	0.200	0.0186%	20%	----
		molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.000432	0.000441	0.000010	Diff <2x LOR	----
		nickel, total	7440-02-0	E420	0.00050	mg/L	0.00693	0.00697	0.578%	20%	----
		phosphorus, total	7723-14-0	E420	0.050	mg/L	2.07	2.01	2.57%	20%	----
		potassium, total	7440-09-7	E420	0.050	mg/L	9.24	9.34	1.06%	20%	----
		rubidium, total	7440-17-7	E420	0.00020	mg/L	0.00679	0.00706	3.87%	20%	----
		selenium, total	7782-49-2	E420	0.000050	mg/L	0.000140	0.000138	0.000002	Diff <2x LOR	----
		silicon, total	7440-21-3	E420	0.10	mg/L	1.17	1.16	1.15%	20%	----
		silver, total	7440-22-4	E420	0.000010	mg/L	0.000018	0.000018	0.0000005	Diff <2x LOR	----
		sodium, total	7440-23-5	E420	0.050	mg/L	48.1	48.3	0.323%	20%	----
		strontium, total	7440-24-6	E420	0.00020	mg/L	0.0864	0.0876	1.35%	20%	----
		sulfur, total	7704-34-9	E420	0.50	mg/L	5.44	5.30	2.57%	20%	----
		tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		tin, total	7440-31-5	E420	0.00010	mg/L	0.00224	0.00223	0.448%	20%	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Total Metals (QC Lot: 633334) - continued											
WT2212936-001	Anonymous	titanium, total	7440-32-6	E420	0.00240	mg/L	<0.00240	<0.00240	0	Diff <2x LOR	----
		tungsten, total	7440-33-7	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		uranium, total	7440-61-1	E420	0.000010	mg/L	0.000209	0.000214	2.65%	20%	----
		vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		zinc, total	7440-66-6	E420	0.0030	mg/L	0.0589	0.0589	0.0593%	20%	----
		zirconium, total	7440-67-7	E420	0.00020	mg/L	0.00086	0.00093	0.00008	Diff <2x LOR	----
Total Metals (QC Lot: 634028)											
WT2212782-006	Anonymous	mercury, total	7439-97-6	E508	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
Total Metals (QC Lot: 634512)											
WT2212529-002	Anonymous	antimony, total	7440-36-0	E432	0.00060	mg/L	<0.60 µg/L	<0.00060	0	Diff <2x LOR	----
		arsenic, total	7440-38-2	E432	0.0010	mg/L	<1.0 µg/L	<0.0010	0	Diff <2x LOR	----
		barium, total	7440-39-3	E432	0.010	mg/L	<10 µg/L	<0.010	0	Diff <2x LOR	----
		boron, total	7440-42-8	E432	0.05	mg/L	<50 µg/L	<0.05	0	Diff <2x LOR	----
		cadmium, total	7440-43-9	E432	0.00010	mg/L	<0.10 µg/L	<0.00010	0	Diff <2x LOR	----
		chromium, total	7440-47-3	E432	0.0010	mg/L	<1.0 µg/L	<0.0010	0	Diff <2x LOR	----
		selenium, total	7782-49-2	E432	0.0010	mg/L	<1.0 µg/L	<0.0010	0	Diff <2x LOR	----
		uranium, total	7440-61-1	E432	0.0020	mg/L	<2.0 µg/L	<0.0020	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 633331)											
CG2211713-001	Anonymous	nitrilotriacetic acid [NTA]	139-13-9	E394	0.20	mg/L	<0.20	<0.20	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 639186)											
CG2212007-001	Anonymous	microcystin	101043-37-2	E576	0.20	µg/L	<0.20	<0.20	0	Diff <2x LOR	----
Dissolved Gases (QC Lot: 635471)											
VA22C0739-002	Anonymous	methane	74-82-8	E614B	4.0	ppmv	17500	20600	16.1%	30%	----
Volatile Organic Compounds (QC Lot: 637812)											
WT2212954-001	F2-R	Acetone	67-64-1	E611D	20	µg/L	<20	<20	0	Diff <2x LOR	----
		benzene	71-43-2	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		bromodichloromethane	75-27-4	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		bromoform	75-25-2	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		bromomethane	74-83-9	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		carbon tetrachloride	56-23-5	E611D	0.20	µg/L	<0.20	<0.20	0	Diff <2x LOR	----
		chlorobenzene	108-90-7	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		chloroform	67-66-3	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dibromochloromethane	124-48-1	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dibromoethane, 1,2-	106-93-4	E611D	0.20	µg/L	<0.20	<0.20	0	Diff <2x LOR	----
		dichlorobenzene, 1,2-	95-50-1	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Volatile Organic Compounds (QC Lot: 637812) - continued											
WT2212954-001	F2-R	dichlorobenzene, 1,3-	541-73-1	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichlorobenzene, 1,4-	106-46-7	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichlorodifluoromethane	75-71-8	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloroethane, 1,1-	75-34-3	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloroethane, 1,2-	107-06-2	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloroethylene, 1,1-	75-35-4	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloroethylene, cis-1,2-	156-59-2	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloroethylene, trans-1,2-	156-60-5	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloromethane	75-09-2	E611D	1.0	µg/L	<1.0	<1.0	0	Diff <2x LOR	----
		dichloropropane, 1,2-	78-87-5	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		dichloropropylene, cis-1,3-	10061-01-5	E611D	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	----
		dichloropropylene, trans-1,3-	10061-02-6	E611D	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	----
		ethylbenzene	100-41-4	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		hexane, n-	110-54-3	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		methyl ethyl ketone [MEK]	78-93-3	E611D	20	µg/L	<20	<20	0	Diff <2x LOR	----
		methyl isobutyl ketone [MIBK]	108-10-1	E611D	20	µg/L	<20	<20	0	Diff <2x LOR	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		styrene	100-42-5	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		tetrachloroethane, 1,1,1,2-	630-20-6	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		tetrachloroethane, 1,1,2,2-	79-34-5	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		tetrachloroethylene	127-18-4	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		toluene	108-88-3	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		trichloroethane, 1,1,1-	71-55-6	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		trichloroethane, 1,1,2-	79-00-5	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		trichloroethylene	79-01-6	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		trichlorofluoromethane	75-69-4	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		vinyl chloride	75-01-4	E611D	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		xylene, m+p-	179601-23-1	E611D	0.40	µg/L	<0.40	<0.40	0	Diff <2x LOR	----
		xylene, o-	95-47-6	E611D	0.30	µg/L	<0.30	<0.30	0	Diff <2x LOR	----
Volatile Organic Compounds [THMs] (QC Lot: 637813)											
WT2212954-001	F2-R	bromodichloromethane	75-27-4	E611B	1.0	µg/L	<1.0	<1.0	0	Diff <2x LOR	----
		bromoform	75-25-2	E611B	1.0	µg/L	<1.0	<1.0	0	Diff <2x LOR	----
		chloroform	67-66-3	E611B	1.0	µg/L	<1.0	<1.0	0	Diff <2x LOR	----
		dibromochloromethane	124-48-1	E611B	1.0	µg/L	<1.0	<1.0	0	Diff <2x LOR	----
DIsinfectant By-Products (QC Lot: 635446)											

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
DIsinfectant By-Products (QC Lot: 635446) - continued											
EO2207084-001	Anonymous	chlorate	14866-68-3	E409.CLO3	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
DIsinfectant By-Products (QC Lot: 635447)											
EO2207084-001	Anonymous	chlorite	14998-27-7	E409.CLO2	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
Haloacetic Acids (QC Lot: 638905)											
CG2211691-001	Anonymous	dibromoacetic acid	631-64-1	E750	1.00	µg/L	<1.00	<1.00	0	Diff <2x LOR	----
		dichloroacetic acid	79-43-6	E750	1.00	µg/L	12.7	12.3	3.20%	30%	----
		monobromoacetic acid	79-08-3	E750	1.00	µg/L	<1.00	<1.00	0	Diff <2x LOR	----
		monochloroacetic acid	79-11-8	E750	1.00	µg/L	1.46	1.73	0.27	Diff <2x LOR	----
		trichloroacetic acid	76-03-9	E750	1.00	µg/L	9.49	9.29	2.19%	30%	----
Carbamate Pesticides (QC Lot: 638961)											
WT2212954-001	F2-R	diuron	330-54-1	E712B	1.0	µg/L	<1.0	<1.0	0	Diff <2x LOR	----
Herbicides (QC Lot: 633946)											
CG2211713-001	Anonymous	AMPA	74341-63-2	E716A	0.50	µg/L	<0.50	<0.50	0	Diff <2x LOR	----
		glyphosate	1071-83-6	E716A	0.20	µg/L	<0.20	<0.20	0	Diff <2x LOR	----
Herbicides (QC Lot: 634443)											
CG2211713-001	Anonymous	acetic acid, 2-methyl-4-chlorophenoxy- [MCPA]	94-74-6	E706A	0.050	µg/L	<0.050	<0.050	0	Diff <2x LOR	----
		bromoxynil	1689-84-5	E706A	0.050	µg/L	<0.050	<0.050	0	Diff <2x LOR	----
		dicamba	1918-00-9	E706A	0.10	µg/L	<0.10	<0.10	0	Diff <2x LOR	----
		dichlorophenoxyacetic acid, 2,4- [2,4-D]	94-75-7	E706A	0.050	µg/L	<0.050	<0.050	0	Diff <2x LOR	----
		dinoseb	88-85-7	E706A	0.050	µg/L	<0.050	<0.050	0	Diff <2x LOR	----
		picloram	1918-02-1	E706A	0.10	µg/L	<0.10	<0.10	0	Diff <2x LOR	----
		trichlorophenoxypropionic acid, 2,4,5- [2,4,5-TP]	93-72-1	E706A	0.050	µg/L	<0.050	<0.050	0	Diff <2x LOR	----
Herbicides (QC Lot: 637025)											
WT2212954-001	F2-R	diquat (ion)	2764-72-9	E723A	1.0	µg/L	<1.0	<1.0	0	Diff <2x LOR	----
		paraquat (as dichloride)	1910-42-5	E723A	1.0	µg/L	<1.0	<1.0	0	Diff <2x LOR	----
Nitrosamines (QC Lot: 638901)											
WT2213464-001	Anonymous	nitrosodimethylamine, n- [NDMA]	62-75-9	E725-T	0.00090	µg/L	<0.00090	<0.00090	0	Diff <2x LOR	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 631650)						
turbidity	----	E121	0.1	NTU	<0.10	B
Physical Tests (QCLot: 632380)						
colour, true	----	E329-L	2	CU	<2.0	----
Physical Tests (QCLot: 634117)						
solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Physical Tests (QCLot: 637654)						
alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Anions and Nutrients (QCLot: 637486)						
chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 637487)						
fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 637488)						
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 637489)						
nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 637490)						
nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	<0.010	----
Anions and Nutrients (QCLot: 639862)						
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 639864)						
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Cyanides (QCLot: 634176)						
cyanide, strong acid dissociable (total)	----	E333	0.002	mg/L	<0.0020	----
Organic / Inorganic Carbon (QCLot: 635753)						
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
Total Sulfides (QCLot: 639357)						
sulfide, total (as S)	18496-25-8	E396	0.018	mg/L	<0.018	----
Microbiological Tests (QCLot: 632124)						
coliforms, Escherichia coli [E. coli]	----	E010	1	MPN/100mL	<1	----
coliforms, total	----	E010	1	MPN/100mL	<1	----
Total Metals (QCLot: 633334)						
aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	----
antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 633334) - continued						
arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	----
barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	----
bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	----
boron, total	7440-42-8	E420	0.01	mg/L	<0.010	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	----
calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	----
cesium, total	7440-46-2	E420	0.00001	mg/L	<0.000010	----
chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	----
copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	----
iron, total	7439-89-6	E420	0.01	mg/L	<0.010	----
lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	----
lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	----
magnesium, total	7439-95-4	E420	0.005	mg/L	# 0.0114	B
manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	----
molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	----
nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	----
phosphorus, total	7723-14-0	E420	0.05	mg/L	<0.050	----
potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	----
rubidium, total	7440-17-7	E420	0.0002	mg/L	<0.00020	----
selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	----
silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	----
silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	----
sodium, total	7440-23-5	E420	0.05	mg/L	<0.050	----
strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----
sulfur, total	7704-34-9	E420	0.5	mg/L	<0.50	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	<0.00020	----
thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
thorium, total	7440-29-1	E420	0.0001	mg/L	<0.00010	----
tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	<0.00010	----
uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 633334) - continued						
zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	----
Total Metals (QCLot: 634028)						
mercury, total	7439-97-6	E508	0.000005	mg/L	<0.0000050	----
Total Metals (QCLot: 634512)						
antimony, total	7440-36-0	E432	0.0006	mg/L	<0.00060	----
arsenic, total	7440-38-2	E432	0.001	mg/L	<0.0010	----
barium, total	7440-39-3	E432	0.01	mg/L	<0.010	----
boron, total	7440-42-8	E432	0.05	mg/L	<0.05	----
cadmium, total	7440-43-9	E432	0.0001	mg/L	<0.00010	----
chromium, total	7440-47-3	E432	0.001	mg/L	<0.0010	----
selenium, total	7782-49-2	E432	0.001	mg/L	<0.0010	----
uranium, total	7440-61-1	E432	0.002	mg/L	<0.0020	----
Aggregate Organics (QCLot: 633331)						
nitrilotriacetic acid [NTA]	139-13-9	E394	0.2	mg/L	<0.20	----
Aggregate Organics (QCLot: 639186)						
microcystin	101043-37-2	E576	0.2	µg/L	<0.20	----
Dissolved Gases (QCLot: 635471)						
methane	74-82-8	E614B	4	ppmv	<4.0	----
Volatile Organic Compounds (QCLot: 637812)						
Acetone	67-64-1	E611D	20	µg/L	<20	----
benzene	71-43-2	E611D	0.5	µg/L	<0.50	----
bromodichloromethane	75-27-4	E611D	0.5	µg/L	<0.50	----
bromoform	75-25-2	E611D	0.5	µg/L	<0.50	----
bromomethane	74-83-9	E611D	0.5	µg/L	<0.50	----
carbon tetrachloride	56-23-5	E611D	0.2	µg/L	<0.20	----
chlorobenzene	108-90-7	E611D	0.5	µg/L	<0.50	----
chloroform	67-66-3	E611D	0.5	µg/L	<0.50	----
dibromochloromethane	124-48-1	E611D	0.5	µg/L	<0.50	----
dibromoethane, 1,2-	106-93-4	E611D	0.2	µg/L	<0.20	----
dichlorobenzene, 1,2-	95-50-1	E611D	0.5	µg/L	<0.50	----
dichlorobenzene, 1,3-	541-73-1	E611D	0.5	µg/L	<0.50	----
dichlorobenzene, 1,4-	106-46-7	E611D	0.5	µg/L	<0.50	----
dichlorodifluoromethane	75-71-8	E611D	0.5	µg/L	<0.50	----
dichloroethane, 1,1-	75-34-3	E611D	0.5	µg/L	<0.50	----
dichloroethane, 1,2-	107-06-2	E611D	0.5	µg/L	<0.50	----
dichloroethylene, 1,1-	75-35-4	E611D	0.5	µg/L	<0.50	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Volatile Organic Compounds (QCLot: 637812) - continued						
dichloroethylene, cis-1,2-	156-59-2	E611D	0.5	µg/L	<0.50	----
dichloroethylene, trans-1,2-	156-60-5	E611D	0.5	µg/L	<0.50	----
dichloromethane	75-09-2	E611D	1	µg/L	# 1.1	B
dichloropropane, 1,2-	78-87-5	E611D	0.5	µg/L	<0.50	----
dichloropropylene, cis-1,3-	10061-01-5	E611D	0.3	µg/L	<0.30	----
dichloropropylene, trans-1,3-	10061-02-6	E611D	0.3	µg/L	<0.30	----
ethylbenzene	100-41-4	E611D	0.5	µg/L	<0.50	----
hexane, n-	110-54-3	E611D	0.5	µg/L	<0.50	----
methyl ethyl ketone [MEK]	78-93-3	E611D	20	µg/L	<20	----
methyl isobutyl ketone [MIBK]	108-10-1	E611D	20	µg/L	<20	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611D	0.5	µg/L	<0.50	----
styrene	100-42-5	E611D	0.5	µg/L	<0.50	----
tetrachloroethane, 1,1,1,2-	630-20-6	E611D	0.5	µg/L	<0.50	----
tetrachloroethane, 1,1,2,2-	79-34-5	E611D	0.5	µg/L	<0.50	----
tetrachloroethylene	127-18-4	E611D	0.5	µg/L	<0.50	----
toluene	108-88-3	E611D	0.5	µg/L	<0.50	----
trichloroethane, 1,1,1-	71-55-6	E611D	0.5	µg/L	<0.50	----
trichloroethane, 1,1,2-	79-00-5	E611D	0.5	µg/L	<0.50	----
trichloroethylene	79-01-6	E611D	0.5	µg/L	<0.50	----
trichlorofluoromethane	75-69-4	E611D	0.5	µg/L	<0.50	----
vinyl chloride	75-01-4	E611D	0.5	µg/L	<0.50	----
xylene, m+p-	179601-23-1	E611D	0.4	µg/L	<0.40	----
xylene, o-	95-47-6	E611D	0.3	µg/L	<0.30	----
Volatile Organic Compounds [THMs] (QCLot: 637813)						
bromodichloromethane	75-27-4	E611B	1	µg/L	<1.0	----
bromoform	75-25-2	E611B	1	µg/L	<1.0	----
chloroform	67-66-3	E611B	1	µg/L	<1.0	----
dibromochloromethane	124-48-1	E611B	1	µg/L	<1.0	----
Polycyclic Aromatic Hydrocarbons (QCLot: 638508)						
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	<0.0050	----
Disinfectant By-Products (QCLot: 635446)						
chlorate	14866-68-3	E409.CLO3	0.01	mg/L	<0.010	----
Disinfectant By-Products (QCLot: 635447)						
chlorite	14998-27-7	E409.CLO2	0.01	mg/L	<0.010	----
Haloacetic Acids (QCLot: 638905)						
dibromoacetic acid	631-64-1	E750	1	µg/L	<1.00	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Haloacetic Acids (QCLot: 638905) - continued						
dichloroacetic acid	79-43-6	E750	1	µg/L	<1.00	----
monobromoacetic acid	79-08-3	E750	0.2	µg/L	<0.20	----
monochloroacetic acid	79-11-8	E750	0.5	µg/L	<0.50	----
trichloroacetic acid	76-03-9	E750	1	µg/L	<1.00	----
Chlorinated Phenolics (QCLot: 633416)						
dichlorophenol, 2,4-	120-83-2	E651D	0.3	µg/L	<0.30	----
pentachlorophenol [PCP]	87-86-5	E651D	0.5	µg/L	<0.50	----
tetrachlorophenol, 2,3,4,6-	58-90-2	E651D	0.5	µg/L	<0.50	----
trichlorophenol, 2,4,6-	88-06-2	E651D	0.5	µg/L	<0.50	----
Polychlorinated Biphenyls (QCLot: 633429)						
Aroclor 1016	12674-11-2	E687	0.02	µg/L	<0.020	----
Aroclor 1221	11104-28-2	E687	0.02	µg/L	<0.020	----
Aroclor 1232	11141-16-5	E687	0.02	µg/L	<0.020	----
Aroclor 1242	53469-21-9	E687	0.02	µg/L	<0.020	----
Aroclor 1248	12672-29-6	E687	0.02	µg/L	<0.020	----
Aroclor 1254	11097-69-1	E687	0.02	µg/L	<0.020	----
Aroclor 1260	11096-82-5	E687	0.02	µg/L	<0.020	----
Aroclor 1262	37324-23-5	E687	0.02	µg/L	<0.020	----
Aroclor 1268	11100-14-4	E687	0.02	µg/L	<0.020	----
Carbamate Pesticides (QCLot: 638961)						
diuron	330-54-1	E712B	1	µg/L	<1.0	----
Organochlorine Pesticides (QCLot: 633430)						
chlordane, cis- (alpha)	5103-71-9	E660F	0.008	µg/L	<0.0080	----
chlordane, trans- (gamma)	5103-74-2	E660F	0.008	µg/L	<0.0080	----
DDD, 4,4'-	72-54-8	E660F	0.004	µg/L	<0.0040	----
DDE, 4,4'-	72-55-9	E660F	0.004	µg/L	<0.0040	----
DDT, 2,4'-	789-02-6	E660F	0.004	µg/L	<0.0040	----
DDT, 4,4'-	50-29-3	E660F	0.004	µg/L	<0.0040	----
oxychlordane	27304-13-8	E660F	0.008	µg/L	<0.0080	----
Herbicides (QCLot: 633946)						
AMPA	74341-63-2	E716A	0.5	µg/L	<0.50	----
glyphosate	1071-83-6	E716A	0.2	µg/L	<0.20	----
Herbicides (QCLot: 634443)						
acetic acid, 2-methyl-4-chlorophenoxy- [MCPA]	94-74-6	E706A	0.05	µg/L	<0.050	----
bromoxynil	1689-84-5	E706A	0.05	µg/L	<0.050	----
dicamba	1918-00-9	E706A	0.1	µg/L	<0.10	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Herbicides (QCLot: 634443) - continued						
dichlorophenoxyacetic acid, 2,4- [2,4-D]	94-75-7	E706A	0.05	µg/L	<0.050	----
dinoseb	88-85-7	E706A	0.05	µg/L	<0.050	----
picloram	1918-02-1	E706A	0.1	µg/L	<0.10	----
trichlorophenoxypropionic acid, 2,4,5- [2,4,5-TP]	93-72-1	E706A	0.05	µg/L	<0.050	----
Herbicides (QCLot: 637025)						
diquat (ion)	2764-72-9	E723A	1	µg/L	<1.0	----
paraquat (as dichloride)	1910-42-5	E723A	1	µg/L	<1.0	----
Pesticides (QCLot: 633345)						
alachlor	15972-60-8	E660E-H	0.1	µg/L	<0.10	----
atrazine	1912-24-9	E660E-H	0.1	µg/L	<0.10	----
atrazine-desethyl	6190-65-4	E660E-H	0.1	µg/L	<0.10	----
azinphos-methyl	86-50-0	E660E-H	0.1	µg/L	<0.10	----
carbaryl	63-25-2	E660E-H	0.2	µg/L	<0.20	----
carbofuran	1563-66-2	E660E-H	0.2	µg/L	<0.20	----
chlorpyrifos	2921-88-2	E660E-H	0.1	µg/L	<0.10	----
diazinon	333-41-5	E660E-H	0.1	µg/L	<0.10	----
diclofop-methyl	51338-27-3	E660E-H	0.1	µg/L	<0.10	----
dimethoate	60-51-5	E660E-H	0.1	µg/L	<0.10	----
malathion	121-75-5	E660E-H	0.1	µg/L	<0.10	----
metolachlor	51218-45-2	E660E-H	0.1	µg/L	<0.10	----
metribuzin	21087-64-9	E660E-H	0.1	µg/L	<0.10	----
phorate	298-02-2	E660E-H	0.1	µg/L	<0.10	----
prometryn	7287-19-6	E660E-H	0.1	µg/L	<0.10	----
simazine	122-34-9	E660E-H	0.1	µg/L	<0.10	----
terbufos	13071-79-9	E660E-H	0.1	µg/L	<0.10	----
triallate	2303-17-5	E660E-H	0.1	µg/L	<0.10	----
trifluralin	1582-09-8	E660E-H	0.1	µg/L	<0.10	----
Nitrosamines (QCLot: 638901)						
nitrosodimethylamine, n- [NDMA]	62-75-9	E725-T	0.0009	µg/L	<0.00090	----

Qualifiers

Qualifier	Description
B	*Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.*

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 631650)									
turbidity	----	E121	0.1	NTU	200 NTU	99.4	85.0	115	----
Physical Tests (QCLot: 632380)									
colour, true	----	E329-L	2	CU	25 CU	105	85.0	115	----
Physical Tests (QCLot: 634117)									
solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	100	85.0	115	----
Physical Tests (QCLot: 637652)									
pH	----	E108	----	pH units	7 pH units	101	98.0	102	----
Physical Tests (QCLot: 637654)									
alkalinity, total (as CaCO3)	----	E290	1	mg/L	150 mg/L	100	85.0	115	----
Anions and Nutrients (QCLot: 637486)									
chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 637487)									
fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 637488)									
sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 637489)									
nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	2.5 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 637490)									
nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	0.5 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 639862)									
Kjeldahl nitrogen, total [TKN]	----	E318	0.05	mg/L	4 mg/L	97.8	75.0	125	----
Anions and Nutrients (QCLot: 639864)									
ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	95.6	85.0	115	----
Cyanides (QCLot: 634176)									
cyanide, strong acid dissociable (total)	----	E333	0.002	mg/L	0.25 mg/L	88.8	80.0	120	----
Organic / Inorganic Carbon (QCLot: 635753)									
carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	107	80.0	120	----
Total Sulfides (QCLot: 639357)									
sulfide, total (as S)	18496-25-8	E396	0.018	mg/L	0.1244 mg/L	97.3	75.0	125	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 633334)									
aluminum, total	7429-90-5	E420	0.003	mg/L	0.1 mg/L	107	80.0	120	----
antimony, total	7440-36-0	E420	0.0001	mg/L	0.05 mg/L	104	80.0	120	----
arsenic, total	7440-38-2	E420	0.0001	mg/L	0.05 mg/L	107	80.0	120	----
barium, total	7440-39-3	E420	0.0001	mg/L	0.0125 mg/L	106	80.0	120	----
beryllium, total	7440-41-7	E420	0.00002	mg/L	0.005 mg/L	108	80.0	120	----
bismuth, total	7440-69-9	E420	0.00005	mg/L	0.05 mg/L	104	80.0	120	----
boron, total	7440-42-8	E420	0.01	mg/L	0.05 mg/L	106	80.0	120	----
cadmium, total	7440-43-9	E420	0.000005	mg/L	0.005 mg/L	107	80.0	120	----
calcium, total	7440-70-2	E420	0.05	mg/L	2.5 mg/L	106	80.0	120	----
cesium, total	7440-46-2	E420	0.00001	mg/L	0.0025 mg/L	108	80.0	120	----
chromium, total	7440-47-3	E420	0.0005	mg/L	0.0125 mg/L	105	80.0	120	----
cobalt, total	7440-48-4	E420	0.0001	mg/L	0.0125 mg/L	103	80.0	120	----
copper, total	7440-50-8	E420	0.0005	mg/L	0.0125 mg/L	103	80.0	120	----
iron, total	7439-89-6	E420	0.01	mg/L	0.05 mg/L	107	80.0	120	----
lead, total	7439-92-1	E420	0.00005	mg/L	0.025 mg/L	108	80.0	120	----
lithium, total	7439-93-2	E420	0.001	mg/L	0.0125 mg/L	111	80.0	120	----
magnesium, total	7439-95-4	E420	0.005	mg/L	2.5 mg/L	118	80.0	120	----
manganese, total	7439-96-5	E420	0.0001	mg/L	0.0125 mg/L	107	80.0	120	----
molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.0125 mg/L	98.2	80.0	120	----
nickel, total	7440-02-0	E420	0.0005	mg/L	0.025 mg/L	105	80.0	120	----
phosphorus, total	7723-14-0	E420	0.05	mg/L	0.5 mg/L	105	80.0	120	----
potassium, total	7440-09-7	E420	0.05	mg/L	2.5 mg/L	100	80.0	120	----
rubidium, total	7440-17-7	E420	0.0002	mg/L	0.005 mg/L	106	80.0	120	----
selenium, total	7782-49-2	E420	0.00005	mg/L	0.05 mg/L	110	80.0	120	----
silicon, total	7440-21-3	E420	0.1	mg/L	0.5 mg/L	108	80.0	120	----
silver, total	7440-22-4	E420	0.00001	mg/L	0.005 mg/L	99.4	80.0	120	----
sodium, total	7440-23-5	E420	0.05	mg/L	2.5 mg/L	107	80.0	120	----
strontium, total	7440-24-6	E420	0.0002	mg/L	0.0125 mg/L	102	80.0	120	----
sulfur, total	7704-34-9	E420	0.5	mg/L	2.5 mg/L	102	80.0	120	----
tellurium, total	13494-80-9	E420	0.0002	mg/L	0.005 mg/L	104	80.0	120	----
thallium, total	7440-28-0	E420	0.00001	mg/L	0.05 mg/L	104	80.0	120	----
thorium, total	7440-29-1	E420	0.0001	mg/L	0.005 mg/L	102	80.0	120	----
tin, total	7440-31-5	E420	0.0001	mg/L	0.025 mg/L	104	80.0	120	----
titanium, total	7440-32-6	E420	0.0003	mg/L	0.0125 mg/L	100	80.0	120	----
tungsten, total	7440-33-7	E420	0.0001	mg/L	0.005 mg/L	102	80.0	120	----
uranium, total	7440-61-1	E420	0.00001	mg/L	0.00025 mg/L	109	80.0	120	----
vanadium, total	7440-62-2	E420	0.0005	mg/L	0.025 mg/L	105	80.0	120	----
zinc, total	7440-66-6	E420	0.003	mg/L	0.025 mg/L	106	80.0	120	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 633334) - continued									
zirconium, total	7440-67-7	E420	0.0002	mg/L	0.005 mg/L	102	80.0	120	----
Total Metals (QCLot: 634028)									
mercury, total	7439-97-6	E508	0.000005	mg/L	0.0001 mg/L	100	80.0	120	----
Total Metals (QCLot: 634512)									
antimony, total	7440-36-0	E432	0.0006	mg/L	0.05 mg/L	102	80.0	120	----
arsenic, total	7440-38-2	E432	0.001	mg/L	0.05 mg/L	105	80.0	120	----
barium, total	7440-39-3	E432	0.01	mg/L	0.0125 mg/L	104	80.0	120	----
boron, total	7440-42-8	E432	0.05	mg/L	0.05 mg/L	92.3	80.0	120	----
cadmium, total	7440-43-9	E432	0.0001	mg/L	0.005 mg/L	102	80.0	120	----
chromium, total	7440-47-3	E432	0.001	mg/L	0.0125 mg/L	99.3	80.0	120	----
selenium, total	7782-49-2	E432	0.001	mg/L	0.05 mg/L	103	80.0	120	----
uranium, total	7440-61-1	E432	0.002	mg/L	0.00025 mg/L	107	80.0	120	----
Total Metals (QCLot: 635062)									
aluminum, total	7429-90-5	E420	----	mg/L	0.1 mg/L	105	80.0	120	----
antimony, total	7440-36-0	E420	----	mg/L	0.05 mg/L	107	80.0	120	----
arsenic, total	7440-38-2	E420	----	mg/L	0.05 mg/L	104	80.0	120	----
barium, total	7440-39-3	E420	----	mg/L	0.0125 mg/L	101	80.0	120	----
beryllium, total	7440-41-7	E420	----	mg/L	0.005 mg/L	103	80.0	120	----
bismuth, total	7440-69-9	E420	----	mg/L	0.05 mg/L	100	80.0	120	----
boron, total	7440-42-8	E420	----	mg/L	0.05 mg/L	103	80.0	120	----
cadmium, total	7440-43-9	E420	----	mg/L	0.005 mg/L	103	80.0	120	----
calcium, total	7440-70-2	E420	----	mg/L	2.5 mg/L	103	80.0	120	----
cesium, total	7440-46-2	E420	----	mg/L	0.0025 mg/L	106	80.0	120	----
chromium, total	7440-47-3	E420	----	mg/L	0.0125 mg/L	103	80.0	120	----
cobalt, total	7440-48-4	E420	----	mg/L	0.0125 mg/L	101	80.0	120	----
copper, total	7440-50-8	E420	----	mg/L	0.0125 mg/L	99.9	80.0	120	----
iron, total	7439-89-6	E420	----	mg/L	0.05 mg/L	103	80.0	120	----
lead, total	7439-92-1	E420	----	mg/L	0.025 mg/L	104	80.0	120	----
lithium, total	7439-93-2	E420	----	mg/L	0.0125 mg/L	98.8	80.0	120	----
magnesium, total	7439-95-4	E420	----	mg/L	2.5 mg/L	110	80.0	120	----
manganese, total	7439-96-5	E420	----	mg/L	0.0125 mg/L	103	80.0	120	----
molybdenum, total	7439-98-7	E420	----	mg/L	0.0125 mg/L	103	80.0	120	----
nickel, total	7440-02-0	E420	----	mg/L	0.025 mg/L	101	80.0	120	----
phosphorus, total	7723-14-0	E420	----	mg/L	0.5 mg/L	115	80.0	120	----
potassium, total	7440-09-7	E420	----	mg/L	2.5 mg/L	100	80.0	120	----
rubidium, total	7440-17-7	E420	----	mg/L	0.005 mg/L	107	80.0	120	----
selenium, total	7782-49-2	E420	----	mg/L	0.05 mg/L	106	80.0	120	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 635062) - continued									
silicon, total	7440-21-3	E420	----	mg/L	0.5 mg/L	106	80.0	120	----
silver, total	7440-22-4	E420	----	mg/L	0.005 mg/L	96.5	80.0	120	----
sodium, total	7440-23-5	E420	----	mg/L	2.5 mg/L	102	80.0	120	----
strontium, total	7440-24-6	E420	----	mg/L	0.0125 mg/L	107	80.0	120	----
sulfur, total	7704-34-9	E420	----	mg/L	2.5 mg/L	108	80.0	120	----
tellurium, total	13494-80-9	E420	----	mg/L	0.005 mg/L	105	80.0	120	----
thallium, total	7440-28-0	E420	----	mg/L	0.05 mg/L	102	80.0	120	----
thorium, total	7440-29-1	E420	----	mg/L	0.005 mg/L	102	80.0	120	----
tin, total	7440-31-5	E420	----	mg/L	0.025 mg/L	103	80.0	120	----
titanium, total	7440-32-6	E420	----	mg/L	0.0125 mg/L	103	80.0	120	----
tungsten, total	7440-33-7	E420	----	mg/L	0.005 mg/L	102	80.0	120	----
uranium, total	7440-61-1	E420	----	mg/L	0.00025 mg/L	107	80.0	120	----
vanadium, total	7440-62-2	E420	----	mg/L	0.025 mg/L	102	80.0	120	----
zinc, total	7440-66-6	E420	----	mg/L	0.025 mg/L	103	80.0	120	----
zirconium, total	7440-67-7	E420	----	mg/L	0.005 mg/L	98.1	80.0	120	----
Aggregate Organics (QCLot: 633331)									
nitrilotriacetic acid [NTA]	139-13-9	E394	0.2	mg/L	1 mg/L	93.7	75.0	125	----
Aggregate Organics (QCLot: 639186)									
microcystin	101043-37-2	E576	0.2	µg/L	0.5 µg/L	102	70.0	130	----
Volatile Organic Compounds (QCLot: 637812)									
Acetone	67-64-1	E611D	20	µg/L	100 µg/L	125	70.0	130	----
benzene	71-43-2	E611D	0.5	µg/L	100 µg/L	112	70.0	130	----
bromodichloromethane	75-27-4	E611D	0.5	µg/L	100 µg/L	121	70.0	130	----
bromoform	75-25-2	E611D	0.5	µg/L	100 µg/L	117	70.0	130	----
bromomethane	74-83-9	E611D	0.5	µg/L	100 µg/L	121	60.0	140	----
carbon tetrachloride	56-23-5	E611D	0.2	µg/L	100 µg/L	109	70.0	130	----
chlorobenzene	108-90-7	E611D	0.5	µg/L	100 µg/L	105	70.0	130	----
chloroform	67-66-3	E611D	0.5	µg/L	100 µg/L	112	70.0	130	----
dibromochloromethane	124-48-1	E611D	0.5	µg/L	100 µg/L	106	70.0	130	----
dibromoethane, 1,2-	106-93-4	E611D	0.2	µg/L	100 µg/L	112	70.0	130	----
dichlorobenzene, 1,2-	95-50-1	E611D	0.5	µg/L	100 µg/L	106	70.0	130	----
dichlorobenzene, 1,3-	541-73-1	E611D	0.5	µg/L	100 µg/L	102	70.0	130	----
dichlorobenzene, 1,4-	106-46-7	E611D	0.5	µg/L	100 µg/L	103	70.0	130	----
dichlorodifluoromethane	75-71-8	E611D	0.5	µg/L	100 µg/L	104	60.0	140	----
dichloroethane, 1,1-	75-34-3	E611D	0.5	µg/L	100 µg/L	109	70.0	130	----
dichloroethane, 1,2-	107-06-2	E611D	0.5	µg/L	100 µg/L	116	70.0	130	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
					Concentration	LCS	Low	High	Qualifier
Volatile Organic Compounds (QCLot: 637812) - continued									
dichloroethylene, 1,1-	75-35-4	E611D	0.5	µg/L	100 µg/L	101	70.0	130	----
dichloroethylene, cis-1,2-	156-59-2	E611D	0.5	µg/L	100 µg/L	122	70.0	130	----
dichloroethylene, trans-1,2-	156-60-5	E611D	0.5	µg/L	100 µg/L	105	70.0	130	----
dichloromethane	75-09-2	E611D	1	µg/L	100 µg/L	118	70.0	130	----
dichloropropane, 1,2-	78-87-5	E611D	0.5	µg/L	100 µg/L	114	70.0	130	----
dichloropropylene, cis-1,3-	10061-01-5	E611D	0.3	µg/L	100 µg/L	128	70.0	130	----
dichloropropylene, trans-1,3-	10061-02-6	E611D	0.3	µg/L	100 µg/L	117	70.0	130	----
ethylbenzene	100-41-4	E611D	0.5	µg/L	100 µg/L	96.1	70.0	130	----
hexane, n-	110-54-3	E611D	0.5	µg/L	100 µg/L	101	70.0	130	----
methyl ethyl ketone [MEK]	78-93-3	E611D	20	µg/L	100 µg/L	125	70.0	130	----
methyl isobutyl ketone [MIBK]	108-10-1	E611D	20	µg/L	100 µg/L	111	70.0	130	----
methyl-tert-butyl ether [MTBE]	1634-04-4	E611D	0.5	µg/L	100 µg/L	102	70.0	130	----
styrene	100-42-5	E611D	0.5	µg/L	100 µg/L	101	70.0	130	----
tetrachloroethane, 1,1,1,2-	630-20-6	E611D	0.5	µg/L	100 µg/L	108	70.0	130	----
tetrachloroethane, 1,1,2,2-	79-34-5	E611D	0.5	µg/L	100 µg/L	122	70.0	130	----
tetrachloroethylene	127-18-4	E611D	0.5	µg/L	100 µg/L	104	70.0	130	----
toluene	108-88-3	E611D	0.5	µg/L	100 µg/L	99.5	70.0	130	----
trichloroethane, 1,1,1-	71-55-6	E611D	0.5	µg/L	100 µg/L	110	70.0	130	----
trichloroethane, 1,1,2-	79-00-5	E611D	0.5	µg/L	100 µg/L	107	70.0	130	----
trichloroethylene	79-01-6	E611D	0.5	µg/L	100 µg/L	113	70.0	130	----
trichlorofluoromethane	75-69-4	E611D	0.5	µg/L	100 µg/L	107	60.0	140	----
vinyl chloride	75-01-4	E611D	0.5	µg/L	100 µg/L	94.8	60.0	140	----
xylene, m+p-	179601-23-1	E611D	0.4	µg/L	200 µg/L	99.3	70.0	130	----
xylene, o-	95-47-6	E611D	0.3	µg/L	100 µg/L	96.7	70.0	130	----
Volatile Organic Compounds [THMs] (QCLot: 637813)									
bromodichloromethane	75-27-4	E611B	1	µg/L	100 µg/L	121	70.0	130	----
bromoform	75-25-2	E611B	1	µg/L	100 µg/L	117	70.0	130	----
chloroform	67-66-3	E611B	1	µg/L	100 µg/L	112	70.0	130	----
dibromochloromethane	124-48-1	E611B	1	µg/L	100 µg/L	106	70.0	130	----
Polycyclic Aromatic Hydrocarbons (QCLot: 638508)									
benzo(a)pyrene	50-32-8	E641A	0.005	µg/L	0.5263 µg/L	110	50.0	140	----
DIsinfectant By-Products (QCLot: 635446)									
chlorate	14866-68-3	E409.CLO3	0.01	mg/L	1 mg/L	103	85.0	115	----
DIsinfectant By-Products (QCLot: 635447)									
chlorite	14998-27-7	E409.CLO2	0.01	mg/L	1 mg/L	102	85.0	115	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Haloacetic Acids (QCLot: 638905)									
dibromoacetic acid	631-64-1	E750	1	µg/L	5 µg/L	119	70.0	130	----
dichloroacetic acid	79-43-6	E750	1	µg/L	5 µg/L	124	70.0	130	----
monobromoacetic acid	79-08-3	E750	0.2	µg/L	1 µg/L	83.7	70.0	130	----
monochloroacetic acid	79-11-8	E750	0.5	µg/L	2.5 µg/L	106	70.0	130	----
trichloroacetic acid	76-03-9	E750	1	µg/L	5 µg/L	111	70.0	130	----
Chlorinated Phenolics (QCLot: 633416)									
dichlorophenol, 2,4-	120-83-2	E651D	0.3	µg/L	4.8 µg/L	103	50.0	140	----
pentachlorophenol [PCP]	87-86-5	E651D	0.5	µg/L	4.8 µg/L	140	50.0	140	----
tetrachlorophenol, 2,3,4,6-	58-90-2	E651D	0.5	µg/L	4.8 µg/L	100	50.0	140	----
trichlorophenol, 2,4,6-	88-06-2	E651D	0.5	µg/L	4.8 µg/L	104	50.0	140	----
Polychlorinated Biphenyls (QCLot: 633429)									
Aroclor 1016	12674-11-2	E687	0.02	µg/L	0.2 µg/L	118	60.0	140	----
Aroclor 1221	11104-28-2	E687	0.02	µg/L	0.2 µg/L	118	60.0	140	----
Aroclor 1232	11141-16-5	E687	0.02	µg/L	0.2 µg/L	118	60.0	140	----
Aroclor 1242	53469-21-9	E687	0.02	µg/L	0.2 µg/L	118	60.0	140	----
Aroclor 1248	12672-29-6	E687	0.02	µg/L	0.2 µg/L	91.3	60.0	140	----
Aroclor 1254	11097-69-1	E687	0.02	µg/L	0.2 µg/L	118	60.0	140	----
Aroclor 1260	11096-82-5	E687	0.02	µg/L	0.2 µg/L	108	60.0	140	----
Aroclor 1262	37324-23-5	E687	0.02	µg/L	0.2 µg/L	108	60.0	140	----
Aroclor 1268	11100-14-4	E687	0.02	µg/L	0.2 µg/L	108	60.0	140	----
Carbamate Pesticides (QCLot: 638961)									
diuron	330-54-1	E712B	1	µg/L	10 µg/L	106	80.0	120	----
Organochlorine Pesticides (QCLot: 633430)									
chlordane, cis- (alpha)	5103-71-9	E660F	0.008	µg/L	0.2 µg/L	105	50.0	150	----
chlordane, trans- (gamma)	5103-74-2	E660F	0.008	µg/L	0.2 µg/L	123	50.0	150	----
DDD, 4,4'-	72-54-8	E660F	0.004	µg/L	0.2 µg/L	96.4	50.0	150	----
DDE, 4,4'-	72-55-9	E660F	0.004	µg/L	0.2 µg/L	107	50.0	150	----
DDT, 2,4'-	789-02-6	E660F	0.004	µg/L	0.2 µg/L	116	50.0	150	----
DDT, 4,4'-	50-29-3	E660F	0.004	µg/L	0.2 µg/L	114	50.0	150	----
oxychlordane	27304-13-8	E660F	0.008	µg/L	0.2 µg/L	89.6	50.0	150	----
Herbicides (QCLot: 633946)									
AMPA	74341-63-2	E716A	0.5	µg/L	5 µg/L	94.0	70.0	130	----
glyphosate	1071-83-6	E716A	0.2	µg/L	5 µg/L	100	70.0	130	----
Herbicides (QCLot: 634443)									

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Herbicides (QCLot: 634443) - continued									
acetic acid, 2-methyl-4-chlorophenoxy- [MCPA]	94-74-6	E706A	0.05	µg/L	1 µg/L	76.1	65.0	130	----
bromoxynil	1689-84-5	E706A	0.05	µg/L	1 µg/L	112	65.0	130	----
dicamba	1918-00-9	E706A	0.1	µg/L	2 µg/L	81.5	50.0	150	----
dichlorophenoxyacetic acid, 2,4- [2,4-D]	94-75-7	E706A	0.05	µg/L	1 µg/L	76.0	65.0	130	----
dinoseb	88-85-7	E706A	0.05	µg/L	1 µg/L	88.7	65.0	130	----
picloram	1918-02-1	E706A	0.1	µg/L	2 µg/L	94.5	50.0	150	----
trichlorophenoxypropionic acid, 2,4,5- [2,4,5-TP]	93-72-1	E706A	0.05	µg/L	1 µg/L	105	65.0	130	----
Herbicides (QCLot: 637025)									
diquat (ion)	2764-72-9	E723A	1	µg/L	25 µg/L	105	70.0	130	----
paraquat (as dichloride)	1910-42-5	E723A	1	µg/L	25 µg/L	83.8	70.0	130	----
Pesticides (QCLot: 633345)									
alachlor	15972-60-8	E660E-H	0.1	µg/L	0.2 µg/L	# 155	60.0	130	LCS-H
atrazine	1912-24-9	E660E-H	0.1	µg/L	0.2 µg/L	# 147	60.0	130	LCS-H
atrazine-desethyl	6190-65-4	E660E-H	0.1	µg/L	0.2 µg/L	88.8	50.0	130	----
azinphos-methyl	86-50-0	E660E-H	0.1	µg/L	0.2 µg/L	# 196	60.0	140	LCS-H
carbaryl	63-25-2	E660E-H	0.2	µg/L	0.2 µg/L	# 145	50.0	140	LCS-H
carbofuran	1563-66-2	E660E-H	0.2	µg/L	0.2 µg/L	# 145	60.0	140	LCS-H
chlorpyrifos	2921-88-2	E660E-H	0.1	µg/L	0.2 µg/L	# 156	60.0	130	LCS-H
diazinon	333-41-5	E660E-H	0.1	µg/L	0.2 µg/L	111	60.0	130	----
diclofop-methyl	51338-27-3	E660E-H	0.1	µg/L	0.2 µg/L	# 156	60.0	140	LCS-H
dimethoate	60-51-5	E660E-H	0.1	µg/L	0.2 µg/L	# 152	60.0	130	LCS-H
malathion	121-75-5	E660E-H	0.1	µg/L	0.2 µg/L	# 191	60.0	130	LCS-H
metolachlor	51218-45-2	E660E-H	0.1	µg/L	0.2 µg/L	# 181	60.0	130	LCS-H
metribuzin	21087-64-9	E660E-H	0.1	µg/L	0.2 µg/L	# 154	60.0	130	LCS-H
phorate	298-02-2	E660E-H	0.1	µg/L	0.2 µg/L	# 13.5	60.0	140	LCS-L
prometryn	7287-19-6	E660E-H	0.1	µg/L	0.2 µg/L	# 156	60.0	130	LCS-H
simazine	122-34-9	E660E-H	0.1	µg/L	0.2 µg/L	# 135	60.0	130	LCS-H
terbufos	13071-79-9	E660E-H	0.1	µg/L	0.2 µg/L	# 11.5	60.0	130	LCS-L
triallate	2303-17-5	E660E-H	0.1	µg/L	0.2 µg/L	126	60.0	130	----
trifluralin	1582-09-8	E660E-H	0.1	µg/L	0.2 µg/L	# 146	60.0	130	LCS-H
Nitrosamines (QCLot: 638901)									
nitrosodimethylamine, n- [NDMA]	62-75-9	E725-T	0.0009	µg/L	0.005 µg/L	105	50.0	150	----

Qualifiers

Qualifier	Description
LCS-H	Lab Control Sample recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.
LCS-L	Lab Control Sample recovery was below ALS DQO. Reference Material and/or Matrix Spike results were acceptable. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 637486)										
WT2213026-001	Anonymous	chloride	16887-00-6	E235.Cl	478 mg/L	500 mg/L	95.6	75.0	125	----
Anions and Nutrients (QCLot: 637487)										
WT2213026-001	Anonymous	fluoride	16984-48-8	E235.F	4.93 mg/L	5 mg/L	98.6	75.0	125	----
Anions and Nutrients (QCLot: 637488)										
WT2213026-001	Anonymous	sulfate (as SO4)	14808-79-8	E235.SO4	462 mg/L	500 mg/L	92.4	75.0	125	----
Anions and Nutrients (QCLot: 637489)										
WT2213026-001	Anonymous	nitrate (as N)	14797-55-8	E235.NO3	11.7 mg/L	12.5 mg/L	94.0	75.0	125	----
Anions and Nutrients (QCLot: 637490)										
WT2213026-001	Anonymous	nitrite (as N)	14797-65-0	E235.NO2	2.39 mg/L	2.5 mg/L	95.6	75.0	125	----
Anions and Nutrients (QCLot: 639862)										
WT2212926-001	Anonymous	Kjeldahl nitrogen, total [TKN]	----	E318	25.4 mg/L	2.5 mg/L	102	70.0	130	----
Anions and Nutrients (QCLot: 639864)										
WT2212951-001	Anonymous	ammonia, total (as N)	7664-41-7	E298	0.0970 mg/L	0.1 mg/L	97.0	75.0	125	----
Cyanides (QCLot: 634176)										
SK2204799-001	Anonymous	cyanide, strong acid dissociable (total)	----	E333	0.224 mg/L	0.25 mg/L	89.7	75.0	125	----
Organic / Inorganic Carbon (QCLot: 635753)										
TY2201174-008	Anonymous	carbon, dissolved organic [DOC]	----	E358-L	5.93 mg/L	5 mg/L	118	70.0	130	----
Total Sulfides (QCLot: 639357)										
WT2212954-001	F2-R	sulfide, total (as S)	18496-25-8	E396	0.102 mg/L	0.1244 mg/L	82.0	65.0	135	----
Total Metals (QCLot: 633334)										
WT2212936-002	Anonymous	aluminum, total	7429-90-5	E420	0.0990 mg/L	0.1 mg/L	99.0	70.0	130	----
		antimony, total	7440-36-0	E420	0.0531 mg/L	0.05 mg/L	106	70.0	130	----
		arsenic, total	7440-38-2	E420	0.0515 mg/L	0.05 mg/L	103	70.0	130	----
		barium, total	7440-39-3	E420	ND mg/L	0.0125 mg/L	ND	70.0	130	----
		beryllium, total	7440-41-7	E420	0.00510 mg/L	0.005 mg/L	102	70.0	130	----
		bismuth, total	7440-69-9	E420	0.0475 mg/L	0.05 mg/L	95.1	70.0	130	----
		boron, total	7440-42-8	E420	ND mg/L	0.05 mg/L	ND	70.0	130	----
		cadmium, total	7440-43-9	E420	0.00512 mg/L	0.005 mg/L	102	70.0	130	----
		calcium, total	7440-70-2	E420	ND mg/L	2.5 mg/L	ND	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 633334) - continued										
WT2212936-002	Anonymous	cesium, total	7440-46-2	E420	0.00264 mg/L	0.0025 mg/L	106	70.0	130	----
		chromium, total	7440-47-3	E420	0.0128 mg/L	0.0125 mg/L	102	70.0	130	----
		cobalt, total	7440-48-4	E420	ND mg/L	0.0125 mg/L	ND	70.0	130	----
		copper, total	7440-50-8	E420	0.0120 mg/L	0.0125 mg/L	96.0	70.0	130	----
		iron, total	7439-89-6	E420	ND mg/L	0.05 mg/L	ND	70.0	130	----
		lead, total	7439-92-1	E420	0.0249 mg/L	0.025 mg/L	99.6	70.0	130	----
		lithium, total	7439-93-2	E420	0.0132 mg/L	0.0125 mg/L	105	70.0	130	----
		magnesium, total	7439-95-4	E420	ND mg/L	2.5 mg/L	ND	70.0	130	----
		manganese, total	7439-96-5	E420	ND mg/L	0.0125 mg/L	ND	70.0	130	----
		molybdenum, total	7439-98-7	E420	0.0124 mg/L	0.0125 mg/L	99.1	70.0	130	----
		nickel, total	7440-02-0	E420	ND mg/L	0.025 mg/L	ND	70.0	130	----
		phosphorus, total	7723-14-0	E420	0.497 mg/L	0.5 mg/L	99.4	70.0	130	----
		potassium, total	7440-09-7	E420	ND mg/L	2.5 mg/L	ND	70.0	130	----
		rubidium, total	7440-17-7	E420	0.00515 mg/L	0.005 mg/L	103	70.0	130	----
		selenium, total	7782-49-2	E420	0.0520 mg/L	0.05 mg/L	104	70.0	130	----
		silicon, total	7440-21-3	E420	ND mg/L	0.5 mg/L	ND	70.0	130	----
		silver, total	7440-22-4	E420	0.00470 mg/L	0.005 mg/L	93.9	70.0	130	----
		sodium, total	7440-23-5	E420	ND mg/L	2.5 mg/L	ND	70.0	130	----
		strontium, total	7440-24-6	E420	ND mg/L	0.0125 mg/L	ND	70.0	130	----
		sulfur, total	7704-34-9	E420	ND mg/L	2.5 mg/L	ND	70.0	130	----
		tellurium, total	13494-80-9	E420	0.00478 mg/L	0.005 mg/L	95.6	70.0	130	----
		thallium, total	7440-28-0	E420	0.0486 mg/L	0.05 mg/L	97.2	70.0	130	----
		thorium, total	7440-29-1	E420	0.00459 mg/L	0.005 mg/L	91.8	70.0	130	----
		tin, total	7440-31-5	E420	0.0249 mg/L	0.025 mg/L	99.5	70.0	130	----
		titanium, total	7440-32-6	E420	0.0124 mg/L	0.0125 mg/L	99.6	70.0	130	----
		tungsten, total	7440-33-7	E420	0.00504 mg/L	0.005 mg/L	101	70.0	130	----
		uranium, total	7440-61-1	E420	ND mg/L	0.00025 mg/L	ND	70.0	130	----
		vanadium, total	7440-62-2	E420	0.0263 mg/L	0.025 mg/L	105	70.0	130	----
		zinc, total	7440-66-6	E420	0.0231 mg/L	0.025 mg/L	92.3	70.0	130	----
		zirconium, total	7440-67-7	E420	0.00476 mg/L	0.005 mg/L	95.1	70.0	130	----
Total Metals (QCLot: 634028)										
WT2212938-001	Anonymous	mercury, total	7439-97-6	E508	0.0000830 mg/L	0.0001 mg/L	83.0	70.0	130	----
Total Metals (QCLot: 634512)										
WT2212529-003	Anonymous	antimony, total	7440-36-0	E432	0.0567 mg/L	0.05 mg/L	113	70.0	130	----
		arsenic, total	7440-38-2	E432	0.0644 mg/L	0.05 mg/L	129	70.0	130	----
		barium, total	7440-39-3	E432	ND mg/L	0.0125 mg/L	ND	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 634512) - continued										
WT2212529-003	Anonymous	boron, total	7440-42-8	E432	0.05 mg/L	0.05 mg/L	98.1	70.0	130	----
		cadmium, total	7440-43-9	E432	0.00583 mg/L	0.005 mg/L	117	70.0	130	----
		chromium, total	7440-47-3	E432	0.0135 mg/L	0.0125 mg/L	108	70.0	130	----
		selenium, total	7782-49-2	E432	0.0692 mg/L	0.05 mg/L	138	70.0	130	MES
		uranium, total	7440-61-1	E432	0.0003 mg/L	0.00025 mg/L	111	70.0	130	----
Aggregate Organics (QCLot: 633331)										
CG2211713-001	Anonymous	nitrilotriacetic acid [NTA]	139-13-9	E394	0.82 mg/L	1 mg/L	82.2	50.0	150	----
Aggregate Organics (QCLot: 639186)										
CG2212007-001	Anonymous	microcystin	101043-37-2	E576	0.51 µg/L	1 µg/L	50.8	50.0	150	----
Volatile Organic Compounds (QCLot: 637812)										
WT2212954-001	F2-R	Acetone	67-64-1	E611D	100 µg/L	100 µg/L	99.5	60.0	140	----
		benzene	71-43-2	E611D	113 µg/L	100 µg/L	113	60.0	140	----
		bromodichloromethane	75-27-4	E611D	119 µg/L	100 µg/L	119	60.0	140	----
		bromoform	75-25-2	E611D	106 µg/L	100 µg/L	106	60.0	140	----
		bromomethane	74-83-9	E611D	19.6 µg/L	100 µg/L	19.6	60.0	140	K
		carbon tetrachloride	56-23-5	E611D	115 µg/L	100 µg/L	115	60.0	140	----
		chlorobenzene	108-90-7	E611D	106 µg/L	100 µg/L	106	60.0	140	----
		chloroform	67-66-3	E611D	113 µg/L	100 µg/L	113	60.0	140	----
		dibromochloromethane	124-48-1	E611D	102 µg/L	100 µg/L	102	60.0	140	----
		dibromoethane, 1,2-	106-93-4	E611D	99.1 µg/L	100 µg/L	99.1	60.0	140	----
		dichlorobenzene, 1,2-	95-50-1	E611D	107 µg/L	100 µg/L	107	60.0	140	----
		dichlorobenzene, 1,3-	541-73-1	E611D	106 µg/L	100 µg/L	106	60.0	140	----
		dichlorobenzene, 1,4-	106-46-7	E611D	106 µg/L	100 µg/L	106	60.0	140	----
		dichlorodifluoromethane	75-71-8	E611D	100 µg/L	100 µg/L	100	60.0	140	----
		dichloroethane, 1,1-	75-34-3	E611D	111 µg/L	100 µg/L	111	60.0	140	----
		dichloroethane, 1,2-	107-06-2	E611D	108 µg/L	100 µg/L	108	60.0	140	----
		dichloroethylene, 1,1-	75-35-4	E611D	105 µg/L	100 µg/L	105	60.0	140	----
		dichloroethylene, cis-1,2-	156-59-2	E611D	113 µg/L	100 µg/L	113	60.0	140	----
		dichloroethylene, trans-1,2-	156-60-5	E611D	109 µg/L	100 µg/L	109	60.0	140	----
		dichloromethane	75-09-2	E611D	112 µg/L	100 µg/L	112	60.0	140	----
		dichloropropane, 1,2-	78-87-5	E611D	111 µg/L	100 µg/L	111	60.0	140	----
		dichloropropylene, cis-1,3-	10061-01-5	E611D	38.3 µg/L	100 µg/L	38.3	60.0	140	K
		dichloropropylene, trans-1,3-	10061-02-6	E611D	64.2 µg/L	100 µg/L	64.2	60.0	140	----
		ethylbenzene	100-41-4	E611D	101 µg/L	100 µg/L	101	60.0	140	----
		hexane, n-	110-54-3	E611D	106 µg/L	100 µg/L	106	60.0	140	----
		methyl ethyl ketone [MEK]	78-93-3	E611D	100 µg/L	100 µg/L	99.8	60.0	140	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Volatile Organic Compounds (QCLot: 637812) - continued										
WT2212954-001	F2-R	methyl isobutyl ketone [MIBK]	108-10-1	E611D	92 µg/L	100 µg/L	92.3	60.0	140	----
		methyl-tert-butyl ether [MTBE]	1634-04-4	E611D	104 µg/L	100 µg/L	104	60.0	140	----
		styrene	100-42-5	E611D	95.6 µg/L	100 µg/L	95.6	60.0	140	----
		tetrachloroethane, 1,1,1,2-	630-20-6	E611D	109 µg/L	100 µg/L	109	60.0	140	----
		tetrachloroethane, 1,1,2,2-	79-34-5	E611D	106 µg/L	100 µg/L	106	60.0	140	----
		tetrachloroethylene	127-18-4	E611D	111 µg/L	100 µg/L	111	60.0	140	----
		toluene	108-88-3	E611D	104 µg/L	100 µg/L	104	60.0	140	----
		trichloroethane, 1,1,1-	71-55-6	E611D	115 µg/L	100 µg/L	115	60.0	140	----
		trichloroethane, 1,1,2-	79-00-5	E611D	100 µg/L	100 µg/L	100	60.0	140	----
		trichloroethylene	79-01-6	E611D	118 µg/L	100 µg/L	118	60.0	140	----
		trichlorofluoromethane	75-69-4	E611D	112 µg/L	100 µg/L	112	60.0	140	----
		vinyl chloride	75-01-4	E611D	95.6 µg/L	100 µg/L	95.6	60.0	140	----
		xylene, m+p-	179601-23-1	E611D	209 µg/L	200 µg/L	104	60.0	140	----
		xylene, o-	95-47-6	E611D	100 µg/L	100 µg/L	100	60.0	140	----
Volatile Organic Compounds [THMs] (QCLot: 637813)										
WT2212954-001	F2-R	bromodichloromethane	75-27-4	E611B	119 µg/L	100 µg/L	119	60.0	140	----
		bromoform	75-25-2	E611B	106 µg/L	100 µg/L	106	60.0	140	----
		chloroform	67-66-3	E611B	113 µg/L	100 µg/L	113	60.0	140	----
		dibromochloromethane	124-48-1	E611B	102 µg/L	100 µg/L	102	60.0	140	----
DIsinfectant By-Products (QCLot: 635446)										
EO2207084-001	Anonymous	chlorate	14866-68-3	E409.CLO3	0.966 mg/L	1 mg/L	96.6	75.0	125	----
DIsinfectant By-Products (QCLot: 635447)										
EO2207084-001	Anonymous	chlorite	14998-27-7	E409.CLO2	0.974 mg/L	1 mg/L	97.4	75.0	125	----
Haloacetic Acids (QCLot: 638905)										
CG2211691-001	Anonymous	dibromoacetic acid	631-64-1	E750	5.91 µg/L	5 µg/L	118	50.0	150	----
		dichloroacetic acid	79-43-6	E750	ND µg/L	5 µg/L	ND	50.0	150	----
		monobromoacetic acid	79-08-3	E750	0.75 µg/L	1 µg/L	75.4	50.0	150	----
		monochloroacetic acid	79-11-8	E750	2.78 µg/L	2.5 µg/L	111	50.0	150	----
		trichloroacetic acid	76-03-9	E750	ND µg/L	5 µg/L	ND	50.0	150	----
Carbamate Pesticides (QCLot: 638961)										
WT2212954-001	F2-R	diuron	330-54-1	E712B	9.8 µg/L	10 µg/L	97.9	70.0	130	----
Herbicides (QCLot: 633946)										
CG2211713-001	Anonymous	AMPA	74341-63-2	E716A	4.90 µg/L	5 µg/L	98.0	70.0	130	----
		glyphosate	1071-83-6	E716A	4.98 µg/L	5 µg/L	99.7	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Herbicides (QCLot: 634443)										
CG2211713-001	Anonymous	acetic acid, 2-methyl-4-chlorophenoxy- [MCPA]	94-74-6	E706A	1.14 µg/L	1 µg/L	114	50.0	130	----
		bromoxynil	1689-84-5	E706A	0.664 µg/L	1 µg/L	66.4	50.0	130	----
		dicamba	1918-00-9	E706A	1.65 µg/L	2 µg/L	82.3	50.0	150	----
		dichlorophenoxyacetic acid, 2,4- [2,4-D]	94-75-7	E706A	0.901 µg/L	1 µg/L	90.1	50.0	130	----
		dinoseb	88-85-7	E706A	0.704 µg/L	1 µg/L	70.4	50.0	130	----
		picloram	1918-02-1	E706A	1.75 µg/L	2 µg/L	87.7	50.0	150	----
		trichlorophenoxypropionic acid, 2,4,5- [2,4,5-TP]	93-72-1	E706A	0.939 µg/L	1 µg/L	93.9	50.0	130	----
Herbicides (QCLot: 637025)										
WT2212954-001	F2-R	diquat (ion)	2764-72-9	E723A	25.2 µg/L	25 µg/L	101	70.0	130	----
		paraquat (as dichloride)	1910-42-5	E723A	20.7 µg/L	25 µg/L	83.0	70.0	130	----
Nitrosamines (QCLot: 638901)										
WT2213464-002	Anonymous	nitrosodimethylamine, n- [NDMA]	62-75-9	E725-T	0.00437 µg/L	0.005 µg/L	81.2	50.0	150	----

Qualifiers

Qualifier	Description
K	*Matrix Spike recovery outside ALS DQO due to sample matrix effects.*
MES	*Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).*

Chain of Custody (COC) / Analytical Request Form

COC Number: 20

Page

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

Environmental Division Waterloo

Work Order Reference WT2212954

Telephone : +1 519 886 6910

Report To	Contact and company name below will appear on the final report
Company:	AECOM
Contact:	Matthew Alexander
Phone:	
	Company address below will appear on the final report
Street:	50 Sportsworld Crossing
City/Province:	Kitchener ON
Postal Code:	N2P 0A4
Invoice To	Same as Report To ☐ YES ☑ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	Township of Centre Wellington
Contact:	Adam Gilmore
Project Information	
ALS Account # / Quote #:	Q87626 + Q89943
Job #:	
PO / AFE:	
LSD:	

Reports / Recipients

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)

Merge QC/QCI Reports with COA ☐ YES ☐ NO ☐ N/A

☑ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☐ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: matthew.alexander@aecom.com

Email 2: AGilmore@centrewellington.ca

Email 3:

Invoice Recipients

Select Invoice Distribution: ☐ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax:

Email 2:

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Contact: | Sampler:

ALS Lab Work Order # (ALS use only): WT2212954

Turnaround Time (TAT) Requested

☑ Routine [R] if received by 3pm M-F - no surcharges apply

☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum

☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum

☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum

☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum

☐ Same day [E2] if received by 10am M-S - 200% rush surcharge. Additional fees may apply to rush requests on weekends, statutory holidays and non-routine tests.

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm am/pm

For all tests with rush TATs requested, please contact your AM to confirm availability.

Analysis Request

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

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Q87626 + Q89943	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	F2-R	02-09-22	09:35	GW	32	✓			

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human consumption/ use? ☐ YES ☑ NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

ODWQS

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☑ ICE ☐ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
				11.9	11.0		

SHIPMENT RELEASE (client use)

Released by: | Date: Sept 2, 2022 | Time: 11:15

INITIAL SHIPMENT RECEPTION (ALS use only)

Received by: | Date: | Time:

FINAL SHIPMENT RECEPTION (ALS use only)

Received by: AP | Date: 2 Sep. 22 | Time: 11:45

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

AUG 2020 FRONT

< PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

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

ples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

AGAT Laboratories

5835 Coopers Avenue
Mississauga, ON
L4Z 1Y2

P: 905.712.5100 • F: 905.712.5122 • TF: 1.800.856.6261

Drinking Water Chain of Custody Record

Laboratory Use Only

Arrival Condition: ☐ Good ☐ Poor (complete notes)
Arrival Temperature: 6.4 | 8.9 | 9.3
AGAT Job Number: 22T940792
Notes: Free Ice

Client Information

Company: AECOM
Contact: Matthew Alexander
Address: 50 Sportsworld Crossing Rd
Suite 290, Kitchener ON N2P 0A4
Phone: 226-821-4906 Fax:
PO #:
Client Project #: Centre Wellington; 60664299
AGAT Quotation #:

Report Information

1. Name: Matthew Alexander
Email: matthew.alexander@aecom.com
2. Name: Adam Gilmore
Email: AGilmore@centrewellington.ca

Report Format

☐ Single Sample per page
☐ Multiple Samples per page

Facility Type (Check all that are applicable)

☐ Large OR ☐ Small
☐ Residential OR ☐ Non-Residential
☐ Municipal OR ☐ Non-Municipal

+ Water Type

(Specify in column below)
Raw (R), Treated (TR), Distribution (D), Tap (TP) Private Well (P)

Turnaround Time Required (TAT) *

Regular TAT	7 to 14 business days	☐	Sch 23/24 only
	5 to 7 business days	☑	
Rush TAT (please provide prior notification)	3 to 4 business days	☐	**Rush surcharges apply**
	2 business days	☐	
	1 business days	☐	

Date Required (Rush surcharges may apply):

Requirements (Check one)

☐ O. Regulation 170 ☐ Not Applicable
☐ O. Regulation 243 ☐ Federal
☐ O. Regulation 318/319 ☑ Other O.Reg 169/03

IS THIS WATER BEING CONSUMED BY HUMANS? ☐ Yes ☑ No
DO THE RESULTS REQUIRE REPORTING TO THE MECP OR LOCAL PUBLIC HEALTH UNIT? ☐ Yes ☑ No
FOR RAW WATER (E.G. UNTREATED), IS THE SAMPLE COLLECTED FROM A POINT OF HUMAN CONSUMPTION? ☐ Yes ☑ No

CLIENT IS RESPONSIBLE TO COMPLETE AND SUBMIT LAB SERVICE NOTIFICATION (LSN) FORM TO THE MOECC/PHU. FAILURE TO DO SO MAY DELAY REPORTING.
"NOTIFICATION INFORMATION" MUST BE COMPLETE BELOW UPON SUBMISSION OF SAMPLES. LABORATORY ANALYSIS WILL NOT COMMENCE UNTIL ALL INFORMATION HAS BEEN PROVIDED.

SAMPLE IDENTIFICATION/LOCATION	DATE SAMPLED	TIME SAMPLED	WATER TYPE *	# OF CONTAINERS	CHLORINE RESIDUAL (incl. Units)	STANDING	FLUSHED	COMMENTS/STANDING TIME (IN MINUTES)	Inorganics (Sch. 23)	Organics (Sch. 24)	Lead	Fluoride	Sodium	Turbidity	Nitrate, Nitrite	Trihalomethanes / HAAs	E.coli, Total Coliforms	Water Quality Assessment Package	Bromate + chlorumino
F2-R	2022/09/02	9:35 AM PM	GW(R)	4			✓												✓
		AM PM																	
		AM PM																	
		AM PM																	
		AM PM																	
		AM PM																	
		AM PM																	

Samples Taken By (Print Name and Sign):

* TAT is exclusive of weekends and statutory holidays. Prior arrangements must be made with the laboratory in order to submit Microbiology samples on Fridays

NOTIFICATION INFORMATION - (required to report adverse results as per the *Safe Drinking Water Act*) - **Laboratory analysis will not commence until all information is received.**

INFORMATION FOR ADVERSE REPORTING			MEDICAL OFFICER OF HEALTH (MOH)	
Waterworks Name:	Phone:	Fax:	Region:	
MOECC# (ie: Waterworks #):	After Hours Phone:		PHU Contact:	
Contact:	Address/Location (if different from client above)		Phone:	Fax:
Email:			Email:	

Samples Relinquished By (Print Name and Sign): Peter Musial	Date/Time 12:52 2022/09/02	Samples Received By (Print Name and Sign): Anthony Dasilva	Date/Time
Samples Relinquished By (Print Name and Sign):	Date/Time	Samples Received By (Print Name and Sign):	Date/Time
Samples Relinquished By (Print Name and Sign):	Date/Time	Samples Received By (Print Name and Sign):	Date/Time

Pink Copy - Client
Yellow/Golden Copy - AGAT
White Copy AGAT

Page 1 of 1

N°: DW 07063

Document #: DW 78 1512 011

Last Revised: March 16, 2021

SASKATCHEWAN RESEARCH COUNCIL
Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2
T: 306-933-6932 F: 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca
www.src.sk.ca/analytical

Sep 13, 2022

This report was generated for samples included in SRC Group # 2022-10697

Quality Control Report

Eva Janzen
AGAT Labs
5835 Coopers Ave
Mississauga, ON L4Z 1Y2

Reference Materials and Standards:

A reference material of known concentration is used whenever possible as either a control sample or control standard and analyzed with each batch of samples. These "QC" results are used to assess the performance of the method and must be within clearly defined limits; otherwise corrective action is required.

QC Analysis	Units	Target Value	Obtained Value
Free chlorine	mg/L	27.6	26.1
Total residual chlorine	mg/L	1.86	1.87

Duplicates:

Duplicates are used to assess problems with precision and help ensure that samples within a given batch were processed appropriately. The difference between duplicates must be within strict limits, otherwise corrective action is required. Please note, the duplicate(s) in this report are duplicates analyzed within a given batch of test samples and may not be from this specific group of samples.

Duplicate Analysis	Units	Sample ID	First Result	Second Result
Chloramines	mg/L	34582	<0.01	<0.01

All quality control results were within the specified limits and considered acceptable.

Approved by Section Supervisor

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2022-10697

Sep 13, 2022

AGAT Labs
5835 Coopers Ave
Mississauga, ON L4Z 1Y2
Attn: Eva Janzen

Date Samples Received: Sep-07-2022 Client P.O.: 197466

All results have been reviewed and approved by a Qualified Person in accordance with the Saskatchewan Environmental Code, Corrective Action Plan Chapter, for the purposes of certifying a laboratory analysis

Results from Lab Section 3 approved by Tamosiunis, Cindy

---

* Test methods and data are validated by the laboratory's Quality Assurance Program.

* Routine methods follow recognized procedures from sources such as
    * Standard Methods for the Examination of Water and Wastewater APHA AWWA WEF
    * Environment Canada
    * US EPA
    * CANMET

* The results reported relate only to the test samples as provided by the client. Results apply to the sample as received, unless otherwise indicated.

* Data marked as "by Client" has been provided by the client and may affect the validity of results.

* Samples will be kept for 30 days after the final report is sent. Please contact the lab if you have any special requirements.

* Additional information is available upon request.

* Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

This is a final report.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

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SRC Group # 2022-10697

Sep 13, 2022

AGAT Labs

5835 Coopers Ave
Mississauga, ON L4Z 1Y2
Attn: Eva Janzen

Date Samples Received: Sep-07-2022 Client P.O.: 197466

34582 09/02/2022 22T940792 4270526 *WATER*

Analyte	Units	34582
Lab Section 3		
Chloramines	mg/L	<0.01

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

Time between sampling and receipt in lab exceeds the recommended 24 hours for Chloramines.

The temperature of the cooler was 17 °C upon receipt.

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2022-10697

Sep 13, 2022

AGAT Labs

Analyte Methods

Name	Units	Method
Chloramines	mg/L	CHM-340

SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

20-September-2022

AGAT Laboratories - Mississauga
Attn : Eva Janzen, Neil Ramnaraign

5835 Coopers Avenue
Mississauga, ON
L4Z 1Y2, Canada

Phone: 905-712-5096
Fax:

Date Rec. : 07 September 2022
LR Report: **CA12164-SEP22**
Reference: PO#: 197468 - AGAT Job #: 22T940792

Copy: #1

CERTIFICATE OF ANALYSIS
Final Report

Sample ID	Sample Date & Time	Temperature Upon Receipt °C	Bromate mg/L
1: Analysis Start Date		---	15-Sep-22
2: Analysis Start Time		---	10:52
3: Analysis Completed Date		---	20-Sep-22
4: Analysis Completed Time		---	09:19
5: QC - Blank		---	< 0.005
6: QC - STD % Recovery		---	87%
7: QC - DUP % RPD		---	ND
8: RL		---	0.005
9: NR 4270526	02-Sep-22 09:35	13.0	0.005 <MDL

RL - SGS Reporting Limit
ND - Not Detected

Method Descriptions

Parameter	Description	SGS Method Code	Reference Method Code
Bromate	Bromate by Ion Chromatography	ME-CA-[ENV]IC-LAK-AN-006	EPA317

Kimberley Didsbury
Project Specialist,
Environment, Health & Safety

OnLine LIMS

0003054948

Results relate only to the sample tested. Data reported represents the sample submitted to SGS. Reproduction of this analytical report in full or in part is prohibited without prior written approval. Please refer to SGS General Conditions of Services located at https://www.sgs.ca/en/terms-and-conditions (Printed copies are available upon request.)
Test method information available upon request. "Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples.
SGS Canada Inc. Environment-Health & Safety statement of conformity decision rule does not consider uncertainty when analytical results are compared to a specified standard or regulation.

AECOM

F2 Well Certificate of Analysis

TOWNSHIP OF CENTRE WELLINGTON
ATTN: Matthew Alexander c/o Centre Wellington
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4

Date Received: 17-NOV-21
Report Date: 24-NOV-21 10:54 (MT)
Version: FINAL

Client Phone: 226-821-4906

Certificate of Analysis

Lab Work Order #: L2663747

Project P.O. #: NOT SUBMITTED
Job Reference:
C of C Numbers: 20-953714
Legal Site Desc:

Candice Hunter
Account Manager

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ANALYTICAL GUIDELINE REPORT

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	Guideline Limits #2		
L2663747-1 F2 PUMPING TEST Sampled By: CLIENT on 17-NOV-21 @ 15:35 Matrix: WATER									
Physical Tests									
Total Suspended Solids	7.4		3.0	mg/L	22-NOV-21				
Turbidity	2.60		0.10	NTU	18-NOV-21		5		
Bacteriological Tests									
Escherichia Coli	0		0	MPN/100mL	18-NOV-21	0			
Total Coliforms	0		0	MPN/100mL	18-NOV-21	0			

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Drinking Water Regulation (ODWQS) JAN.1,2020 = [Suite] - ON-DW-STANDARD+GUIDELINES

#1: Schedule 1 (Microbiological) and 2 (Chemical) Standards (JAN,2020) **#2: Ontario DW Aesthetic and Operational Guidelines (June, 2006)**

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference***
SOLIDS-TSS-ONT-DW-WT	Water	Suspended solids	APHA 2540 D-Gravimetric
		A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104–1°C for a minimum of four hours or until a constant weight is achieved.	
TC,EC-QT51-DW-WT	Water	Total Coliform and E. Coli	APHA 9223B
		This analysis is carried out using procedures adapted from APHA Method 9223 "Enzyme Substrate Coliform Test". E. coli and Total Coliform are determined simultaneously. The sample is mixed with a mixture of hydrolyzable substrates and then sealed in a multi-well packet. The packet is incubated for 18 or 24 hours and then the number of wells exhibiting a positive response are counted. The final result is obtained by comparing the positive responses to a probability table.	
TURBIDITY-ONT-DW-WT	Water	Turbidity	APHA 2130 B
		Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.	

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

Chain of Custody numbers:

20-953714

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

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

GLOSSARY OF REPORT TERMS

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

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

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guideline limits are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.

Quality Control Report

Workorder: L2663747 Report Date: 24-NOV-21

Client: TOWNSHIP OF CENTRE WELLINGTON
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4
Contact: Matthew Alexander c/o Centre Wellington

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SOLIDS-TSS-ONT-DW-WT	**Water**							
Batch R5656397								
WG3661544-6 DUP		**WG3661544-7**						
Total Suspended Solids		13000	13200		mg/L	1.8	25	22-NOV-21
WG3661544-5 LCS								
Total Suspended Solids			98.3		%		70-130	22-NOV-21
WG3661544-4 MB								
Total Suspended Solids			<3.0		mg/L		3	22-NOV-21
TC,EC-QT51-DW-WT	**Water**							
Batch R5654443								
WG3660667-2 DUP		**L2663695-1**						
Total Coliforms		0	0		MPN/100mL	0.0	65	18-NOV-21
Escherichia Coli		0	0		MPN/100mL	0.0	65	18-NOV-21
WG3660667-1 MB								
Total Coliforms			0		MPN/100mL		1	18-NOV-21
Escherichia Coli			0		MPN/100mL		1	18-NOV-21
TURBIDITY-ONT-DW-WT	**Water**							
Batch R5654796								
WG3660714-3 DUP		**L2663774-2**						
Turbidity		<0.10	<0.10	RPD-NA	NTU	N/A	15	18-NOV-21
WG3660714-2 LCS								
Turbidity			94.0		%		85-115	18-NOV-21
WG3660714-1 MB								
Turbidity			<0.10		NTU		0.1	18-NOV-21

Quality Control Report

Workorder: L2663747 Report Date: 24-NOV-21

Client: TOWNSHIP OF CENTRE WELLINGTON
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4
Contact: Matthew Alexander c/o Centre Wellington

Legend:

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

Sample Parameter Qualifier Definitions:

Qualifier	Description
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

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

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

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

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

ALS www.alsglobal.com

L2663747-COFC

COC Number: 20 - 953714

Page 1 of 1

Report To	Contact and company name below will appear on the final report
Company:	AECOM
Contact:	Matthew Alexander
Phone:	226-821-4906
	Company address below will appear on the final report
Street:	50 Sportsworld Crossing
City/Province:	Kitchener ON
Postal Code:	N2P 0A4
Invoice To	Same as Report To ☐ YES ☑ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	Township of Centre Wellington
Contact:	Adam Gilmore

Project Information	
ALS Account # / Quote #:	BR337095 (13806 Acct)
Job #:	
PO / AFE:	
LSD:	
ALS Lab Work Order # (ALS use only):	L2663747

Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Merge QC/QCI Reports with COA	☑ YES ☐ NO ☐ N/A
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☐ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	matthew.alexander@aecom.com
Email 2	AGilmore@centrewellington.ca
Email 3	

Invoice Recipients	
Select Invoice Distribution:	☐ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	
Email 2	

Oil and Gas Required Fields (client use)	
AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	
ALS Contact:	Sampler:

Turnaround Time (TAT) Requested

- ☑ Routine [R] if received by 3pm M-F - no surcharges apply
- ☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum
- ☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum
- ☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum
- ☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum
- ☐ Same day [E2] if received by 10am M-S - 200% rush surcharge. Additional fees may apply to rush requests on weekends, statutory holidays and non-routine tests.

Date and Time Required for all E&P TATs:

For all tests with rush TATs requested, please contact your AM to confirm availability.

AFFIX ALS BARCODE LABEL HERE (ALS use only)

Analysis Request

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

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	TSS, turb.	bact. (E.coli/Coli)	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	F2 Pumping Test	17-11-21	15:35	GW	3	✓	✓			

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☐ NO

Are samples for human consumption/ use? ☐ YES ☐ NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☑ ICE ☐ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
				9.1			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (ALS use only)			FINAL SHIPMENT RECEPTION (ALS use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
	2021/11/17	17:10					17-NOV-21	17:35

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

AUC 0020 FRONT

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

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

TOWNSHIP OF CENTRE WELLINGTON
ATTN: Matthew Alexander c/o Centre Wellington
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4

Date Received: 22-NOV-21
Report Date: 30-NOV-21 09:28 (MT)
Version: FINAL

Client Phone: 226-821-4906

Certificate of Analysis

Lab Work Order #: L2665028

Project P.O. #: NOT SUBMITTED
Job Reference:
C of C Numbers:
Legal Site Desc:

Candice Hunter
Account Manager

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ANALYTICAL GUIDELINE REPORT

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	Guideline Limits #2
L2665028-1 535 ORANGEVILLE RD Sampled By: CLIENT on 22-NOV-21 @ 10:40 Matrix: WATER							
Physical Tests							
Colour, Apparent	7.6		2.0	CU	23-NOV-21		*5
Conductivity	1720		3.0	umhos/cm	24-NOV-21		
pH	8.35		0.10	pH units	24-NOV-21		6.5-8.5
Total Dissolved Solids	1030	DLDS	20	mg/L	27-NOV-21		*500
Turbidity	1.04		0.10	NTU	23-NOV-21		5
Anions and Nutrients							
Alkalinity, Bicarbonate (as CaCO3)	398		1.0	mg/L	24-NOV-21		
Alkalinity, Carbonate (as CaCO3)	11.8		1.0	mg/L	24-NOV-21		
Alkalinity, Hydroxide (as CaCO3)	<1.0		1.0	mg/L	24-NOV-21		
Alkalinity, Total (as CaCO3)	410		1.0	mg/L	24-NOV-21		30-500
Ammonia, Total (as N)	0.090		0.010	mg/L	23-NOV-21		
Bromide (Br)	<0.50	DLDS	0.50	mg/L	24-NOV-21		
Chloride (Cl)	320	DLDS	2.5	mg/L	24-NOV-21		*250
Computed Conductivity	1550			uS/cm	29-NOV-21		
Conductivity % Difference	-10			%	29-NOV-21		
Fluoride (F)	<0.50	DLDS	0.50	mg/L	24-NOV-21	1.5	
Hardness (as CaCO3)	468			mg/L	29-NOV-21		*80-100
Ion Balance	102			%	29-NOV-21		
Langelier Index	2			No Unit	29-NOV-21		
Nitrate (as N)	14.2	DLDS	0.10	mg/L	24-NOV-21	*10	
Nitrite (as N)	<0.050	DLDS	0.050	mg/L	24-NOV-21	1	
Saturation pH	6.79			pH	29-NOV-21		
Orthophosphate-Dissolved (as P)	0.157	DLHC	0.030	mg/L	23-NOV-21		
TDS (Calculated)	1010			mg/L	29-NOV-21		
Sulfate (SO4)	18.8	DLDS	1.5	mg/L	24-NOV-21		500
Anion Sum	17.3			me/L	29-NOV-21		
Cation Sum	17.6			me/L	29-NOV-21		
Cation - Anion Balance	1			%	29-NOV-21		
Inorganic Parameters							
Silica	7500		2100	mg/L	22-NOV-21		
Bacteriological Tests							
E. Coli	0		0	CFU/100mL	23-NOV-21	0	
Total Coliform Background	23		0	CFU/100mL	23-NOV-21		
Total Coliforms	96		0	CFU/100mL	23-NOV-21	*0	
Metals							
Sodium Adsorption Ratio	3.74		0.10	SAR	26-NOV-21		
Total Metals							
Aluminum (Al)	17		10	ug/L	26-NOV-21		100
Antimony (Sb)	<0.60		0.60	ug/L	26-NOV-21	6	
Arsenic (As)	<1.0		1.0	ug/L	26-NOV-21	10.0	
Barium (Ba)	50		10	ug/L	26-NOV-21	1000	
Beryllium (Be)	<0.50		0.50	ug/L	26-NOV-21		
Bismuth (Bi)	<1.0		1.0	ug/L	26-NOV-21		
Boron (B)	83		50	ug/L	26-NOV-21	5000	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Drinking Water Regulation (ODWQS) JAN.1,2020 = [Suite] - ON-DW-STANDARD+GUIDELINES

#1: Schedule 1 (Microbiological) and 2 (Chemical) Standards (JAN,2020) **#2: Ontario DW Aesthetic and Operational Guidelines (June, 2006)**

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	Guideline Limits #2
L2665028-1 535 ORANGEVILLE RD							
Sampled By: CLIENT on 22-NOV-21 @ 10:40							
Matrix: WATER							
Total Metals							
Cadmium (Cd)	0.13		0.10	ug/L	26-NOV-21	5	
Calcium (Ca)	137		0.50	mg/L	26-NOV-21		
Cesium (Cs)	<0.10		0.10	ug/L	26-NOV-21		
Chromium (Cr)	<1.0		1.0	ug/L	26-NOV-21	50	
Cobalt (Co)	<0.50		0.50	ug/L	26-NOV-21		
Copper (Cu)	60.5		1.0	ug/L	26-NOV-21		1000
Iron (Fe)	<50		50	ug/L	26-NOV-21		300
Lead (Pb)	2.7		1.0	ug/L	26-NOV-21	10	
Lithium (Li)	<100		100	ug/L	26-NOV-21		
Magnesium (Mg)	30.3		0.50	mg/L	26-NOV-21		
Manganese (Mn)	6.6		1.0	ug/L	26-NOV-21		50
Molybdenum (Mo)	<0.50		0.50	ug/L	26-NOV-21		
Nickel (Ni)	5.6		1.0	ug/L	26-NOV-21		
Phosphorus (P)	0.184		0.050	mg/L	26-NOV-21		
Potassium (K)	6.2		1.0	mg/L	26-NOV-21		
Rubidium (Rb)	<2.0		2.0	ug/L	26-NOV-21		
Selenium (Se)	<1.0		1.0	ug/L	26-NOV-21	50	
Silicon (Si)	3500		1000	ug/L	26-NOV-21		
Silver (Ag)	<0.050		0.050	ug/L	26-NOV-21		
Sodium (Na)	186	DLHC	5.0	mg/L	26-NOV-21	*20	200
Strontium (Sr)	249		1.0	ug/L	26-NOV-21		
Sulfur (S)	6900		500	ug/L	26-NOV-21		
Tellurium (Te)	<2.0		2.0	ug/L	26-NOV-21		
Thallium (Tl)	<0.060		0.060	ug/L	26-NOV-21		
Thorium (Th)	<1.0		1.0	ug/L	26-NOV-21		
Tin (Sn)	<1.0		1.0	ug/L	26-NOV-21		
Titanium (Ti)	<2.0		2.0	ug/L	26-NOV-21		
Tungsten (W)	<6.0		6.0	ug/L	26-NOV-21		
Uranium (U)	<2.0		2.0	ug/L	26-NOV-21	20	
Vanadium (V)	<0.50		0.50	ug/L	26-NOV-21		
Zinc (Zn)	9.7		3.0	ug/L	26-NOV-21		5000
Zirconium (Zr)	<0.80		0.80	ug/L	26-NOV-21		
Volatile Organic Compounds							
Benzene	<0.50		0.50	ug/L	23-NOV-21	1	
Carbon tetrachloride	<0.20		0.20	ug/L	23-NOV-21	2	
Monochlorobenzene	<0.50		0.50	ug/L	23-NOV-21	80	30
1,2-Dichlorobenzene	<0.50		0.50	ug/L	23-NOV-21	200	3
1,4-Dichlorobenzene	<0.50		0.50	ug/L	23-NOV-21	5	1
1,2-Dichloroethane	<0.50		0.50	ug/L	23-NOV-21	5	
1,1-dichloroethylene (vinylidene chlorid	<0.50		0.50	ug/L	23-NOV-21	14	
Dichloromethane	<5.0		5.0	ug/L	23-NOV-21	50	
Ethylbenzene	<0.50		0.50	ug/L	23-NOV-21	140	2.4
Tetrachloroethylene (perchloroethylene)	<0.50		0.50	ug/L	23-NOV-21	10	
Toluene	<0.50		0.50	ug/L	23-NOV-21	60	24
Trichloroethylene	<0.50		0.50	ug/L	23-NOV-21	5	
Vinyl chloride	<0.20		0.20	ug/L	23-NOV-21	1	
o-xylene	<0.50		0.50	ug/L	23-NOV-21		

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Drinking Water Regulation (ODWQS) JAN.1,2020 = [Suite] - ON-DW-STANDARD+GUIDELINES

#1: Schedule 1 (Microbiological) and 2 (Chemical) Standards (JAN,2020) **#2: Ontario DW Aesthetic and Operational Guidelines (June, 2006)**

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	Guideline Limits #2		
L2665028-1 535 ORANGEVILLE RD Sampled By: CLIENT on 22-NOV-21 @ 10:40 Matrix: WATER									
Volatile Organic Compounds									
m/p-xylene	<1.0		1.0	ug/L	23-NOV-21				
Xylenes (Total)	<1.5		1.5	ug/L	23-NOV-21	90	300		
Surrogate: 4-Bromofluorobenzene	94.1		70-130	%	23-NOV-21				
Surrogate: 1,4-Difluorobenzene	101.0		70-130	%	23-NOV-21				
L2665028-2 F2 PT Sampled By: CLIENT on 22-NOV-21 @ 16:00 Matrix: WATER						#1	#2		
Physical Tests									
Total Suspended Solids	3.7		3.0	mg/L	27-NOV-21				
Turbidity	3.09		0.10	NTU	24-NOV-21		5		
Bacteriological Tests									
Escherichia Coli	0		0	MPN/100mL	23-NOV-21	0			
Total Coliforms	1		0	MPN/100mL	23-NOV-21	*0			
Volatile Organic Compounds									
Benzene	<0.50		0.50	ug/L	23-NOV-21	1			
Carbon tetrachloride	<0.20		0.20	ug/L	23-NOV-21	2			
Monochlorobenzene	<0.50		0.50	ug/L	23-NOV-21	80	30		
1,2-Dichlorobenzene	<0.50		0.50	ug/L	23-NOV-21	200	3		
1,4-Dichlorobenzene	<0.50		0.50	ug/L	23-NOV-21	5	1		
1,2-Dichloroethane	<0.50		0.50	ug/L	23-NOV-21	5			
1,1-dichloroethylene (vinylidene chlorid	<0.50		0.50	ug/L	23-NOV-21	14			
Dichloromethane	<5.0		5.0	ug/L	23-NOV-21	50			
Ethylbenzene	<0.50		0.50	ug/L	23-NOV-21	140	2.4		
Tetrachloroethylene (perchloroethylene)	<0.50		0.50	ug/L	23-NOV-21	10			
Toluene	<0.50		0.50	ug/L	23-NOV-21	60	24		
Trichloroethylene	<0.50		0.50	ug/L	23-NOV-21	5			
Vinyl chloride	<0.20		0.20	ug/L	23-NOV-21	1			
o-xylene	<0.50		0.50	ug/L	23-NOV-21				
m/p-xylene	<1.0		1.0	ug/L	23-NOV-21				
Xylenes (Total)	<1.5		1.5	ug/L	23-NOV-21	90	300		
Surrogate: 4-Bromofluorobenzene	94.3		70-130	%	23-NOV-21				
Surrogate: 1,4-Difluorobenzene	101.0		70-130	%	23-NOV-21				

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Drinking Water Regulation (ODWQS) JAN.1,2020 = [Suite] - ON-DW-STANDARD+GUIDELINES

#1: Schedule 1 (Microbiological) and 2 (Chemical) Standards (JAN,2020) **#2: Ontario DW Aesthetic and Operational Guidelines (June, 2006)**

Reference Information

Sample Parameter Qualifier key listed:

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference***
ALK-SPEC-PCT-WT	Water	Automated Speciated Alkalinity	APHA 2320B

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

BR-IC-N-ONT-DW-WT	Water	Bromide in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CL-IC-N-ONT-DW-WT	Water	Chloride by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

COLOUR-APP-DW-WT	Water	Colour	APHA 2120

Apparent Colour is measured spectrophotometrically by comparison to platinum-cobalt standards using the single wavelength method after sample decanting. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment. Concurrent measurement of sample pH is recommended.

EC-MF-DW-WT	Water	E. coli	SM 9222D

A 100 mL volume of sample is filtered through a membrane, the membrane is placed on mFC-BCIG agar and incubated at 44.5 –0 .2 °C for 24 – 2 h. Method ID: WT-TM-1200

EC-ONT-DW-WT	Water	Conductivity	APHA 2510 B

Water samples can be measured directly by immersing the conductivity cell into the sample.

EC-SCREEN-WT	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

ETL-SAR-CALC-WT	Water	Sodium Adsorption Ratio	Calculation
ETL-SILICA-CALC-WT	Water	Calculate from SI-TOT-WT	EPA 200.8
F-DW-IC-WT	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

IONBALANCE-OP03-WT	Water	Detailed Ion Balance Calculation	APHA 1030E, 2330B, 2510A
MET-ONT-DW-WT	Water	Drinking Water Metals	EPA 6020A
NH3-F-ONT-DW-WT	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-DW-IC-WT	Water	Nitrite in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-DW-IC-WT	Water	Nitrate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

PH-ONT-DW-WT	Water	pH	APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011). Holdtime for samples under this regulation is 28 days

PO4-DO-COL-DW-WT	Water	Diss. Orthophosphate in Water by Colour	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

SO4-IC-N-ONT-DW-WT	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Reference Information

SOLIDS-TDS-ONT-DW-WT	Water	Total Dissolved Solids	APHA 2540C

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

SOLIDS-TSS-ONT-DW-WT	Water	Suspended solids	APHA 2540 D-Gravimetric

A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104–1°C for a minimum of four hours or until a constant weight is achieved.

TC,EC-QT51-DW-WT	Water	Total Coliform and E. Coli	APHA 9223B

This analysis is carried out using procedures adapted from APHA Method 9223 "Enzyme Substrate Coliform Test". E. coli and Total Coliform are determined simultaneously. The sample is mixed with a mixture of hydrolyzable substrates and then sealed in a multi-well packet. The packet is incubated for 18 or 24 hours and then the number of wells exhibiting a positive response are counted. The final result is obtained by comparing the positive responses to a probability table.

TC-MF-DW-WT	Water	Total Coliforms	SM 9222B

A 100mL volume of sample is filtered through a membrane, the membrane is placed on mENDO LES agar and incubated at 35–0.5°C for 24–2h. Method ID: WT-TM-1200

TCB-MF-DW-WT	Water	Total Coliform Background	SM 9222B

A 100mL volume of sample is filtered through a membrane, the membrane is placed on mENDO LES agar and incubated at 35–0.5°C for 24–2h. Method ID: WT-TM-1200.

TURB-MET-WT	Water	Turbidity on preserved metals sample	APHA 2130 B

Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.

TURBIDITY-ONT-DW-WT	Water	Turbidity	APHA 2130 B

Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.

VOC-ONT-DW-WT	Water	Volatile Organics (O.Reg 170/03)	SW846 8260

Liquid samples are analyzed by headspace GC/MSD.

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

Chain of Custody numbers:

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

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

GLOSSARY OF REPORT TERMS

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

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

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guideline limits are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.

Quality Control Report

Workorder: L2665028 Report Date: 30-NOV-21

Client: TOWNSHIP OF CENTRE WELLINGTON
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4

Contact: Matthew Alexander c/o Centre Wellington

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ALK-SPEC-PCT-WT	**Water**							
Batch R5657086								
WG3664329-4 DUP		**WG3664329-3**						
Alkalinity, Total (as CaCO3)		176	179		mg/L	1.7	20	24-NOV-21
Alkalinity, Bicarbonate (as CaCO3)		176	179		mg/L	1.7	20	24-NOV-21
Alkalinity, Carbonate (as CaCO3)		<1.0	<1.0	RPD-NA	mg/L	N/A	20	24-NOV-21
Alkalinity, Hydroxide (as CaCO3)		<1.0	<1.0	RPD-NA	mg/L	N/A	20	24-NOV-21
WG3664329-1 MB								
Alkalinity, Total (as CaCO3)			<2.0		mg/L		2	24-NOV-21
Alkalinity, Bicarbonate (as CaCO3)			<2.0		mg/L		4	24-NOV-21
Alkalinity, Carbonate (as CaCO3)			<2.0		mg/L		2	24-NOV-21
Alkalinity, Hydroxide (as CaCO3)			<2.0		mg/L		2	24-NOV-21
BR-IC-N-ONT-DW-WT	**Water**							
Batch R5657011								
WG3664404-9 DUP		**WG3664404-8**						
Bromide (Br)		<0.10	<0.10	RPD-NA	mg/L	N/A	25	24-NOV-21
WG3664404-7 LCS								
Bromide (Br)			98.6		%		70-130	24-NOV-21
WG3664404-6 MB								
Bromide (Br)			<0.10		mg/L		0.1	24-NOV-21
WG3664404-10 MS		**WG3664404-8**						
Bromide (Br)			94.6		%		70-130	24-NOV-21
CL-IC-N-ONT-DW-WT	**Water**							
Batch R5657011								
WG3664404-9 DUP		**WG3664404-8**						
Chloride (Cl)		7.83	7.83		mg/L	0.0	25	24-NOV-21
WG3664404-7 LCS								
Chloride (Cl)			102.2		%		70-130	24-NOV-21
WG3664404-6 MB								
Chloride (Cl)			<0.50		mg/L		0.5	24-NOV-21
WG3664404-10 MS		**WG3664404-8**						
Chloride (Cl)			102.3		%		70-130	24-NOV-21
COLOUR-APP-DW-WT	**Water**							
Batch R5656146								
WG3663775-3 DUP		**L2665028-1**						
Colour, Apparent		7.6	7.6		CU	0.8	25	23-NOV-21
WG3663775-2 LCS								
Colour, Apparent			104.2		%		70-130	23-NOV-21
WG3663775-1 MB								

Quality Control Report

Client: TOWNSHIP OF CENTRE WELLINGTON
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4
Contact: Matthew Alexander c/o Centre Wellington

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
COLOUR-APP-DW-WT	**Water**							
Batch R5656146								
WG3663775-1 MB								
Colour, Apparent			<2.0		CU		2	23-NOV-21
EC-MF-DW-WT	**Water**							
Batch R5656455								
WG3663232-1 MB								
E. Coli			0		CFU/100mL		1	23-NOV-21
EC-ONT-DW-WT	**Water**							
Batch R5657086								
WG3664329-4 DUP		**WG3664329-3**						
Conductivity		599	601		umhos/cm	0.3	25	24-NOV-21
WG3664329-2 LCS								
Conductivity			97.9		%		70-130	24-NOV-21
WG3664329-1 MB								
Conductivity			<6.0		umhos/cm		6	24-NOV-21
F-DW-IC-WT	**Water**							
Batch R5657011								
WG3664404-9 DUP		**WG3664404-8**						
Fluoride (F)		<0.10	<0.10	RPD-NA	mg/L	N/A	20	24-NOV-21
WG3664404-7 LCS								
Fluoride (F)			102.5		%		90-110	24-NOV-21
WG3664404-6 MB								
Fluoride (F)			<0.10		mg/L		0.1	24-NOV-21
WG3664404-10 MS		**WG3664404-8**						
Fluoride (F)			99.2		%		75-125	24-NOV-21
MET-ONT-DW-WT	**Water**							
Batch R5657787								
WG3665048-4 DUP		**WG3665048-3**						
Aluminum (Al)		25	27		ug/L	6.5	25	26-NOV-21
Antimony (Sb)		<0.60	<0.60	RPD-NA	ug/L	N/A	25	26-NOV-21
Arsenic (As)		<1.0	<1.0	RPD-NA	ug/L	N/A	25	26-NOV-21
Barium (Ba)		23	24		ug/L	2.2	25	26-NOV-21
Beryllium (Be)		<0.50	<0.50	RPD-NA	ug/L	N/A	25	26-NOV-21
Bismuth (Bi)		<1.0	<1.0	RPD-NA	ug/L	N/A	25	26-NOV-21
Boron (B)		<50	<50	RPD-NA	ug/L	N/A	25	26-NOV-21

Quality Control Report

Client: TOWNSHIP OF CENTRE WELLINGTON
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4
Contact: Matthew Alexander c/o Centre Wellington

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-ONT-DW-WT	**Water**							
Batch R5657787								
WG3665048-4 DUP		**WG3665048-3**						
Cadmium (Cd)		<0.10	<0.10	RPD-NA	ug/L	N/A	25	26-NOV-21
Calcium (Ca)		34.5	33.1		mg/L	4.2	25	26-NOV-21
Cesium (Cs)		<0.10	<0.10	RPD-NA	ug/L	N/A	25	26-NOV-21
Chromium (Cr)		<1.0	<1.0	RPD-NA	ug/L	N/A	25	26-NOV-21
Cobalt (Co)		<0.50	<0.50	RPD-NA	ug/L	N/A	25	26-NOV-21
Copper (Cu)		63.7	64.5		ug/L	1.2	25	26-NOV-21
Iron (Fe)		<50	<50	RPD-NA	ug/L	N/A	25	26-NOV-21
Lead (Pb)		<1.0	<1.0	RPD-NA	ug/L	N/A	25	26-NOV-21
Lithium (Li)		<100	<100	RPD-NA	ug/L	N/A	25	26-NOV-21
Magnesium (Mg)		9.58	9.68		mg/L	1.0	25	26-NOV-21
Manganese (Mn)		<1.0	<1.0	RPD-NA	ug/L	N/A	25	26-NOV-21
Molybdenum (Mo)		1.20	1.18		ug/L	1.8	25	26-NOV-21
Nickel (Ni)		<1.0	<1.0	RPD-NA	ug/L	N/A	25	26-NOV-21
Phosphorus (P)		<0.050	<0.050	RPD-NA	mg/L	N/A	25	26-NOV-21
Potassium (K)		1.6	1.6		mg/L	0.9	25	26-NOV-21
Rubidium (Rb)		<2.0	<2.0	RPD-NA	ug/L	N/A	25	26-NOV-21
Selenium (Se)		<1.0	<1.0	RPD-NA	ug/L	N/A	25	26-NOV-21
Silicon (Si)		<1000	<1000	RPD-NA	ug/L	N/A	25	26-NOV-21
Silver (Ag)		<0.050	<0.050	RPD-NA	ug/L	N/A	25	26-NOV-21
Sodium (Na)		15.8	15.7		mg/L	0.3	25	26-NOV-21
Strontium (Sr)		189	187		ug/L	1.1	25	26-NOV-21
Sulfur (S)		9120	9210		ug/L	1.0	25	26-NOV-21
Tellurium (Te)		<2.0	<2.0	RPD-NA	ug/L	N/A	25	26-NOV-21
Thallium (Tl)		<0.060	<0.060	RPD-NA	ug/L	N/A	25	26-NOV-21
Thorium (Th)		<1.0	<1.0	RPD-NA	ug/L	N/A	25	26-NOV-21
Tin (Sn)		<1.0	<1.0	RPD-NA	ug/L	N/A	25	26-NOV-21
Titanium (Ti)		<2.0	<2.0	RPD-NA	ug/L	N/A	25	26-NOV-21
Tungsten (W)		<6.0	<6.0	RPD-NA	ug/L	N/A	25	26-NOV-21
Uranium (U)		<2.0	<2.0	RPD-NA	ug/L	N/A	25	26-NOV-21
Vanadium (V)		<0.50	<0.50	RPD-NA	ug/L	N/A	25	26-NOV-21
Zinc (Zn)		13.8	13.4		ug/L	3.3	25	26-NOV-21
Zirconium (Zr)		<0.80	<0.80	RPD-NA	ug/L	N/A	25	26-NOV-21
WG3665048-2 LCS								

Quality Control Report

Client: TOWNSHIP OF CENTRE WELLINGTON
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4
Contact: Matthew Alexander c/o Centre Wellington

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-ONT-DW-WT	**Water**							
Batch R5657787								
WG3665048-2 LCS								
Aluminum (Al)			104.3		%		70-130	26-NOV-21
Antimony (Sb)			104.8		%		70-130	26-NOV-21
Arsenic (As)			103.6		%		70-130	26-NOV-21
Barium (Ba)			98.3		%		70-130	26-NOV-21
Beryllium (Be)			101.2		%		70-130	26-NOV-21
Bismuth (Bi)			103.2		%		70-130	26-NOV-21
Boron (B)			96.5		%		70-130	26-NOV-21
Cadmium (Cd)			102.7		%		70-130	26-NOV-21
Calcium (Ca)			100.1		%		70-130	26-NOV-21
Cesium (Cs)			104.2		%		70-130	26-NOV-21
Chromium (Cr)			99.6		%		70-130	26-NOV-21
Cobalt (Co)			102.6		%		70-130	26-NOV-21
Copper (Cu)			101.3		%		70-130	26-NOV-21
Iron (Fe)			101.1		%		70-130	26-NOV-21
Lead (Pb)			102.7		%		70-130	26-NOV-21
Lithium (Li)			95.8		%		70-130	26-NOV-21
Magnesium (Mg)			103.5		%		70-130	26-NOV-21
Manganese (Mn)			100.9		%		70-130	26-NOV-21
Molybdenum (Mo)			103.5		%		70-130	26-NOV-21
Nickel (Ni)			101.1		%		70-130	26-NOV-21
Phosphorus (P)			108.7		%		70-130	26-NOV-21
Potassium (K)			99.6		%		70-130	26-NOV-21
Rubidium (Rb)			104.2		%		70-130	26-NOV-21
Selenium (Se)			101.9		%		70-130	26-NOV-21
Silicon (Si)			102.9		%		70-130	26-NOV-21
Silver (Ag)			102.5		%		70-130	26-NOV-21
Sodium (Na)			100.7		%		70-130	26-NOV-21
Strontium (Sr)			103.6		%		70-130	26-NOV-21
Sulfur (S)			97.1		%		70-130	26-NOV-21
Tellurium (Te)			103.7		%		70-130	26-NOV-21
Thallium (Tl)			103.6		%		70-130	26-NOV-21
Thorium (Th)			102.7		%		70-130	26-NOV-21
Tin (Sn)			102.5		%		70-130	26-NOV-21

Quality Control Report

Client: TOWNSHIP OF CENTRE WELLINGTON
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4
Contact: Matthew Alexander c/o Centre Wellington

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-ONT-DW-WT	**Water**							
Batch R5657787								
WG3665048-2 LCS								
Titanium (Ti)			101.2		%		70-130	26-NOV-21
Tungsten (W)			99.1		%		70-130	26-NOV-21
Uranium (U)			103.4		%		70-130	26-NOV-21
Vanadium (V)			102.7		%		70-130	26-NOV-21
Zinc (Zn)			100.9		%		70-130	26-NOV-21
Zirconium (Zr)			99.8		%		70-130	26-NOV-21
WG3665048-1 MB								
Aluminum (Al)			<10		ug/L		10	26-NOV-21
Antimony (Sb)			<0.60		ug/L		0.6	26-NOV-21
Arsenic (As)			<1.0		ug/L		1	26-NOV-21
Barium (Ba)			<10		ug/L		10	26-NOV-21
Beryllium (Be)			<0.50		ug/L		0.5	26-NOV-21
Bismuth (Bi)			<1.0		ug/L		1	26-NOV-21
Boron (B)			<50		ug/L		50	26-NOV-21
Cadmium (Cd)			<0.10		ug/L		0.1	26-NOV-21
Calcium (Ca)			<0.50		mg/L		0.5	26-NOV-21
Cesium (Cs)			<0.10		ug/L		0.1	26-NOV-21
Chromium (Cr)			<1.0		ug/L		1	26-NOV-21
Cobalt (Co)			<0.50		ug/L		0.5	26-NOV-21
Copper (Cu)			<1.0		ug/L		1	26-NOV-21
Iron (Fe)			<50		ug/L		50	26-NOV-21
Lead (Pb)			<1.0		ug/L		1	26-NOV-21
Lithium (Li)			<100		ug/L		100	26-NOV-21
Magnesium (Mg)			<0.50		mg/L		0.5	26-NOV-21
Manganese (Mn)			<1.0		ug/L		1	26-NOV-21
Molybdenum (Mo)			<0.50		ug/L		0.5	26-NOV-21
Nickel (Ni)			<1.0		ug/L		1	26-NOV-21
Phosphorus (P)			<0.050		mg/L		0.05	26-NOV-21
Potassium (K)			<1.0		mg/L		1	26-NOV-21
Rubidium (Rb)			<2.0		ug/L		2	26-NOV-21
Selenium (Se)			<1.0		ug/L		1	26-NOV-21
Silicon (Si)			<1000		ug/L		1000	26-NOV-21
Silver (Ag)			<0.050		ug/L		0.05	26-NOV-21
Sodium (Na)			<0.50		mg/L		0.5	26-NOV-21

Quality Control Report

Client: TOWNSHIP OF CENTRE WELLINGTON
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4
Contact: Matthew Alexander c/o Centre Wellington

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-ONT-DW-WT	**Water**							
Batch R5657787								
WG3665048-1 MB								
Strontium (Sr)			<1.0		ug/L		1	26-NOV-21
Sulfur (S)			<500		ug/L		500	26-NOV-21
Tellurium (Te)			<2.0		ug/L		2	26-NOV-21
Thallium (Tl)			<0.060		ug/L		0.06	26-NOV-21
Thorium (Th)			<1.0		ug/L		1	26-NOV-21
Tin (Sn)			<1.0		ug/L		1	26-NOV-21
Titanium (Ti)			<2.0		ug/L		2	26-NOV-21
Tungsten (W)			<6.0		ug/L		6	26-NOV-21
Uranium (U)			<2.0		ug/L		2	26-NOV-21
Vanadium (V)			<0.50		ug/L		0.5	26-NOV-21
Zinc (Zn)			<3.0		ug/L		3	26-NOV-21
Zirconium (Zr)			<0.80		ug/L		0.8	26-NOV-21
WG3665048-5 MS		**WG3665048-3**						
Aluminum (Al)			99.6		%		70-130	26-NOV-21
Antimony (Sb)			107.7		%		70-130	26-NOV-21
Arsenic (As)			105.8		%		70-130	26-NOV-21
Barium (Ba)			N/A	MS-B	%		-	26-NOV-21
Beryllium (Be)			101.7		%		70-130	26-NOV-21
Bismuth (Bi)			99.0		%		70-130	26-NOV-21
Boron (B)			89.5		%		70-130	26-NOV-21
Cadmium (Cd)			102.1		%		70-130	26-NOV-21
Calcium (Ca)			N/A	MS-B	%		-	26-NOV-21
Cesium (Cs)			105.4		%		70-130	26-NOV-21
Chromium (Cr)			99.1		%		70-130	26-NOV-21
Cobalt (Co)			99.4		%		70-130	26-NOV-21
Copper (Cu)			N/A	MS-B	%		-	26-NOV-21
Iron (Fe)			98.0		%		70-130	26-NOV-21
Lead (Pb)			100.2		%		70-130	26-NOV-21
Lithium (Li)			93.2		%		70-130	26-NOV-21
Magnesium (Mg)			N/A	MS-B	%		-	26-NOV-21
Manganese (Mn)			98.4		%		70-130	26-NOV-21
Molybdenum (Mo)			105.8		%		70-130	26-NOV-21
Nickel (Ni)			96.8		%		70-130	26-NOV-21
Phosphorus (P)			114.8		%		70-130	26-NOV-21

Quality Control Report

Client: TOWNSHIP OF CENTRE WELLINGTON
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4
Contact: Matthew Alexander c/o Centre Wellington

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-ONT-DW-WT	**Water**							
Batch R5657787								
WG3665048-5 MS		**WG3665048-3**						
Potassium (K)			100.4		%		70-130	26-NOV-21
Rubidium (Rb)			100.2		%		70-130	26-NOV-21
Selenium (Se)			111.4		%		70-130	26-NOV-21
Silicon (Si)			N/A	MS-B	%		-	26-NOV-21
Silver (Ag)			102.6		%		70-130	26-NOV-21
Sodium (Na)			N/A	MS-B	%		-	26-NOV-21
Strontium (Sr)			N/A	MS-B	%		-	26-NOV-21
Sulfur (S)			N/A	MS-B	%		-	26-NOV-21
Tellurium (Te)			107.2		%		70-130	26-NOV-21
Thallium (Tl)			102.7		%		70-130	26-NOV-21
Thorium (Th)			99.7		%		70-130	26-NOV-21
Tin (Sn)			100.7		%		70-130	26-NOV-21
Titanium (Ti)			99.2		%		70-130	26-NOV-21
Tungsten (W)			98.5		%		70-130	26-NOV-21
Uranium (U)			N/A	MS-B	%		-	26-NOV-21
Vanadium (V)			103.2		%		70-130	26-NOV-21
Zinc (Zn)			96.6		%		70-130	26-NOV-21
Zirconium (Zr)			102.0		%		70-130	26-NOV-21
NH3-F-ONT-DW-WT	**Water**							
Batch R5656343								
WG3663516-3 DUP		**WG3663516-5**						
Ammonia, Total (as N)		0.092	0.091		mg/L	0.4	20	23-NOV-21
WG3663516-2 LCS								
Ammonia, Total (as N)			108.3		%		85-115	23-NOV-21
WG3663516-1 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	23-NOV-21
WG3663516-4 MS		**WG3663516-5**						
Ammonia, Total (as N)			105.6		%		75-125	24-NOV-21
NO2-DW-IC-WT	**Water**							
Batch R5657011								
WG3664404-9 DUP		**WG3664404-8**						
Nitrite (as N)		<0.010	<0.010	RPD-NA	mg/L	N/A	20	24-NOV-21
WG3664404-7 LCS								
Nitrite (as N)			102.3		%		90-110	24-NOV-21
WG3664404-6 MB								

Quality Control Report

Client: TOWNSHIP OF CENTRE WELLINGTON
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4
Contact: Matthew Alexander c/o Centre Wellington

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO2-DW-IC-WT	**Water**							
Batch R5657011								
WG3664404-6 MB								
Nitrite (as N)			<0.010		mg/L		0.01	24-NOV-21
WG3664404-10 MS		**WG3664404-8**						
Nitrite (as N)			102.6		%		75-125	24-NOV-21
NO3-DW-IC-WT	**Water**							
Batch R5657011								
WG3664404-9 DUP		**WG3664404-8**						
Nitrate (as N)		2.86	2.86		mg/L	0.2	20	24-NOV-21
WG3664404-7 LCS								
Nitrate (as N)			101.3		%		90-110	24-NOV-21
WG3664404-6 MB								
Nitrate (as N)			<0.020		mg/L		0.02	24-NOV-21
WG3664404-10 MS		**WG3664404-8**						
Nitrate (as N)			N/A	MS-B	%		-	24-NOV-21
PH-ONT-DW-WT	**Water**							
Batch R5657086								
WG3664329-4 DUP		**WG3664329-3**						
pH		7.66	7.70	J	pH units	0.04	0.2	24-NOV-21
WG3664329-2 LCS								
pH			7.00		pH units		6.9-7.1	24-NOV-21
PO4-DO-COL-DW-WT	**Water**							
Batch R5655808								
WG3663374-3 DUP		**WG3663374-5**						
Orthophosphate-Dissolved (as P)		0.0051	0.0053		mg/L	3.4	20	23-NOV-21
WG3663374-2 LCS								
Orthophosphate-Dissolved (as P)			103.0		%		80-120	23-NOV-21
WG3663374-1 MB								
Orthophosphate-Dissolved (as P)			<0.0030		mg/L		0.003	23-NOV-21
WG3663374-4 MS		**WG3663374-5**						
Orthophosphate-Dissolved (as P)			96.1		%		70-130	23-NOV-21
SO4-IC-N-ONT-DW-WT	**Water**							
Batch R5657011								
WG3664404-9 DUP		**WG3664404-8**						
Sulfate (SO4)		7.38	7.38		mg/L	0.0	20	24-NOV-21
WG3664404-7 LCS								
Sulfate (SO4)			103.7		%		90-110	24-NOV-21
WG3664404-6 MB								

Quality Control Report

Client: TOWNSHIP OF CENTRE WELLINGTON
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4
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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SO4-IC-N-ONT-DW-WT	**Water**							
Batch R5657011								
WG3664404-6 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	24-NOV-21
WG3664404-10 MS		**WG3664404-8**						
Sulfate (SO4)			102.7		%		75-125	24-NOV-21
SOLIDS-TDS-ONT-DW-WT	**Water**							
Batch R5658856								
WG3666204-3 DUP		**L2666401-2**						
Total Dissolved Solids		341	338		mg/L	0.9	25	27-NOV-21
WG3666204-2 LCS								
Total Dissolved Solids			100.6		%		70-130	27-NOV-21
WG3666204-1 MB								
Total Dissolved Solids			<10		mg/L		10	27-NOV-21
SOLIDS-TSS-ONT-DW-WT	**Water**							
Batch R5658376								
WG3665109-3 DUP		**L2665028-2**						
Total Suspended Solids		3.7	3.4		mg/L	7.7	25	27-NOV-21
WG3665109-2 LCS								
Total Suspended Solids			105.0		%		70-130	27-NOV-21
WG3665109-1 MB								
Total Suspended Solids			<3.0		mg/L		3	27-NOV-21
TC,EC-QT51-DW-WT	**Water**							
Batch R5656490								
WG3663325-3 DUP		**L2665017-1**						
Total Coliforms		1	1		MPN/100mL	0.0	65	23-NOV-21
Escherichia Coli		0	0		MPN/100mL	0.0	65	23-NOV-21
WG3663325-4 DUP		**L2664869-2**						
Total Coliforms		0	0		MPN/100mL	0.0	65	23-NOV-21
Escherichia Coli		0	0		MPN/100mL	0.0	65	23-NOV-21
WG3663325-1 MB								
Total Coliforms			0		MPN/100mL		1	23-NOV-21
Escherichia Coli			0		MPN/100mL		1	23-NOV-21
WG3663325-2 MB								
Total Coliforms			0		MPN/100mL		1	23-NOV-21
Escherichia Coli			0		MPN/100mL		1	23-NOV-21
TC-MF-DW-WT	**Water**							

Quality Control Report

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50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4
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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TC-MF-DW-WT	**Water**							
Batch R5656459								
WG3663241-1 MB								
Total Coliforms			0		CFU/100mL		1	23-NOV-21
TCB-MF-DW-WT	**Water**							
Batch R5656459								
WG3663241-1 MB								
Total Coliform Background			0		CFU/100mL		1	23-NOV-21
TURBIDITY-ONT-DW-WT	**Water**							
Batch R5655930								
WG3663278-2 LCS								
Turbidity			94.5		%		85-115	23-NOV-21
WG3663278-1 MB								
Turbidity			<0.10		NTU		0.1	23-NOV-21
Batch R5657937								
WG3664038-2 LCS								
Turbidity			94.5		%		85-115	24-NOV-21
WG3664038-1 MB								
Turbidity			<0.10		NTU		0.1	24-NOV-21
VOC-ONT-DW-WT	**Water**							
Batch R5655712								
WG3662873-4 DUP		**WG3662873-3**						
1,1-dichloroethylene (vinylidene chlorid		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-NOV-21
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-NOV-21
1,2-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-NOV-21
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-NOV-21
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-NOV-21
Carbon tetrachloride		<0.20	<0.20	RPD-NA	ug/L	N/A	30	23-NOV-21
Dichloromethane		<5.0	<5.0	RPD-NA	ug/L	N/A	30	23-NOV-21
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-NOV-21
Monochlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-NOV-21
Tetrachloroethylene (perchloroethylene)		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-NOV-21
Toluene		0.86	0.80		ug/L	7.2	30	23-NOV-21
Trichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	23-NOV-21
m/p-xylene		1.6	1.5		ug/L	7.9	30	23-NOV-21
o-xylene		0.51	<0.50	RPD-NA	ug/L	N/A	30	23-NOV-21

Quality Control Report

Client: TOWNSHIP OF CENTRE WELLINGTON
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4
Contact: Matthew Alexander c/o Centre Wellington

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-ONT-DW-WT	**Water**							
Batch R5655712								
WG3662873-4 DUP		**WG3662873-3**						
Vinyl chloride		<0.20	<0.20	RPD-NA	ug/L	N/A	30	23-NOV-21
WG3662873-1 LCS								
1,1-dichloroethylene (vinylidene chlorid			95.3		%		70-130	23-NOV-21
1,2-Dichlorobenzene			93.5		%		70-130	23-NOV-21
1,2-Dichloroethane			85.6		%		70-130	23-NOV-21
1,4-Dichlorobenzene			95.8		%		70-130	23-NOV-21
Benzene			89.1		%		70-130	23-NOV-21
Carbon tetrachloride			95.0		%		70-130	23-NOV-21
Dichloromethane			87.4		%		70-130	23-NOV-21
Ethylbenzene			95.9		%		70-130	23-NOV-21
Monochlorobenzene			91.2		%		70-130	23-NOV-21
Tetrachloroethylene (perchloroethylene)			97.2		%		70-130	23-NOV-21
Toluene			93.3		%		70-130	23-NOV-21
Trichloroethylene			93.5		%		70-130	23-NOV-21
m/p-xylene			96.6		%		70-130	23-NOV-21
o-xylene			94.1		%		70-130	23-NOV-21
Vinyl chloride			86.7		%		60-140	23-NOV-21
WG3662873-2 MB								
1,1-dichloroethylene (vinylidene chlorid			<0.50		ug/L		0.5	23-NOV-21
1,2-Dichlorobenzene			<0.50		ug/L		0.5	23-NOV-21
1,2-Dichloroethane			<0.50		ug/L		0.5	23-NOV-21
1,4-Dichlorobenzene			<0.50		ug/L		0.5	23-NOV-21
Surrogate: 1,4-Difluorobenzene			100.7		%		70-130	23-NOV-21
Benzene			<0.50		ug/L		0.5	23-NOV-21
Carbon tetrachloride			<0.20		ug/L		0.2	23-NOV-21
Dichloromethane			<5.0		ug/L		5	23-NOV-21
Ethylbenzene			<0.50		ug/L		0.5	23-NOV-21
Monochlorobenzene			<0.50		ug/L		0.5	23-NOV-21
Tetrachloroethylene (perchloroethylene)			<0.50		ug/L		0.5	23-NOV-21
Toluene			<0.50		ug/L		0.5	23-NOV-21
Trichloroethylene			<0.50		ug/L		0.5	23-NOV-21
m/p-xylene			<1.0		ug/L		1	23-NOV-21
o-xylene			<0.50		ug/L		0.5	23-NOV-21
Vinyl chloride			<0.20		ug/L		0.2	23-NOV-21

Quality Control Report

Client: TOWNSHIP OF CENTRE WELLINGTON
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4
Contact: Matthew Alexander c/o Centre Wellington

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-ONT-DW-WT	**Water**							
Batch R5655712								
WG3662873-2 MB								
Surrogate: 4-Bromofluorobenzene			96.8		%		70-130	23-NOV-21
WG3662873-5 MS		**WG3662873-3**						
1,1-dichloroethylene (vinylidene chlorid			97.0		%		70-130	23-NOV-21
1,2-Dichlorobenzene			95.6		%		70-130	23-NOV-21
1,2-Dichloroethane			90.9		%		70-130	23-NOV-21
1,4-Dichlorobenzene			96.5		%		70-130	23-NOV-21
Benzene			92.7		%		70-130	23-NOV-21
Carbon tetrachloride			97.5		%		70-130	23-NOV-21
Dichloromethane			89.9		%		70-130	23-NOV-21
Ethylbenzene			98.0		%		70-130	23-NOV-21
Monochlorobenzene			94.0		%		70-130	23-NOV-21
Tetrachloroethylene (perchloroethylene)			97.7		%		70-130	23-NOV-21
Toluene			95.5		%		50-150	23-NOV-21
Trichloroethylene			96.0		%		70-130	23-NOV-21
m/p-xylene			98.5		%		70-130	23-NOV-21
o-xylene			96.8		%		50-150	23-NOV-21
Vinyl chloride			91.0		%		70-130	23-NOV-21

Quality Control Report

Workorder: L2665028 Report Date: 30-NOV-21

Client: TOWNSHIP OF CENTRE WELLINGTON
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4
Contact: Matthew Alexander c/o Centre Wellington

Legend:

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

Sample Parameter Qualifier Definitions:

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

Hold Time Exceedances:

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

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

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

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

ALS www.alsglobal.com

L2665028-COFC

rm

COC Number: 20 - 896718

Page 1 of 1

Report To	Contact and company name below will appear on the final report
Company:	AECOM
Contact:	Matthew Alexander
Phone:	226-821-4906
	Company address below will appear on the final report
Street:	50 Sportsworld Crossing
City/Province:	Kitchener ON
Postal Code:	N2P 0A4
Invoice To	Same as Report To ☐ YES ☒ NO
	Copy of Invoice with Report ☐ YES ☒ NO
Company:	Township of Centre Wellington
Contact:	Adam Gilmore

Project Information

ALS Account # / Quote #:	BR333359
Job #:	
PO / AFE:	
LSD:	

ALS Lab Work Order # (ALS use only): L2665028

Reports / Recipients

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)

Merge QC/QCI Reports with COA ☑ YES ☐ NO ☐ N/A

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☐ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: AGilmore@centrewellington.ca

Email 2: matthew.alexander@aecom.com

Email 3: peter.f.moffat@aecom.com

Invoice Recipients

Select Invoice Distribution: ☒ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: AGilmore@centrewellington.ca

Email 2:

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	
ALS Contact:	Sampler:

Turnaround Time (TAT) Requested

☑ Routine [R] if received by 3pm M-F - no surcharges apply

☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum

☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum

☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum

☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum

☐ Same day [E2] if received by 10am M-S - 200% rush surcharge. Additional fees may apply to rush requests on weekends, statutory holidays and non-routine tests

Date and Time Required for all E&P TATs:

For all tests with rush TATs requested, please contact your AM to confirm availability.

AFFIX ALS BARCODE LABEL HERE (ALS use only)

Analysis Request

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

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Potability, Phy, VOCs	TSS, Turb, VOC, E.coli	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	535 Orangeville Rd	22-11-21	10:40	GW	8	✓				
	F2 PT	22-11-21	16:00	GW	6		✓			

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☒ NO

Are samples for human consumption/ use? ☒ YES ☐ NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

ODWQS

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☒ ICE ☐ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
				9.1			

SHIPMENT RELEASE (client use)

Released by:	Date:	Time:
Peter M. Moffat	2021/11/22	16:45

INITIAL SHIPMENT RECEPTION (ALS use only)

Received by:	Date:	Time:

FINAL SHIPMENT RECEPTION (ALS use only)

Received by:	Date	Time
MR	11/22/21	16:30

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

AUG 2021 FRONT

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

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

AECOM

F5-T Well Certificate of Analysis

TOWNSHIP OF CENTRE WELLINGTON
ATTN: Matthew Alexander c/o Centre Wellington
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4

Date Received: 19-NOV-21
Report Date: 25-NOV-21 13:31 (MT)
Version: FINAL

Client Phone: 226-821-4906

Certificate of Analysis

Lab Work Order #: L2664502

Project P.O. #: NOT SUBMITTED
Job Reference: 60664299
C of C Numbers:
Legal Site Desc:

Candice Hunter
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	Guideline Limits #2
L2664502-1 FS-T							
Sampled By: CLIENT on 19-NOV-21 @ 12:05							
Matrix: WATER							
Physical Tests							
pH	8.38		0.10	pH units	20-NOV-21		6.5-8.5
Total Suspended Solids	<3.0		3.0	mg/L	25-NOV-21		
Bacteriological Tests							
E. Coli	0		0	CFU/100mL	20-NOV-21	0	
Fecal Coliforms	0		0	CFU/100mL	20-NOV-21	0	
Total Metals							
Aluminum (Al)-Total	0.0064		0.0050	mg/L	22-NOV-21		0.1
Antimony (Sb)-Total	<0.00010		0.00010	mg/L	22-NOV-21	0.006	
Arsenic (As)-Total	0.00089		0.00010	mg/L	22-NOV-21	0.0100	
Barium (Ba)-Total	0.0654		0.00010	mg/L	22-NOV-21	1	
Beryllium (Be)-Total	<0.00010		0.00010	mg/L	22-NOV-21		
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L	22-NOV-21		
Boron (B)-Total	0.028		0.010	mg/L	22-NOV-21	5	
Cadmium (Cd)-Total	0.0000058		0.0000050	mg/L	22-NOV-21	0.005	
Calcium (Ca)-Total	69.5		0.050	mg/L	22-NOV-21		
Cesium (Cs)-Total	<0.000010		0.000010	mg/L	22-NOV-21		
Chromium (Cr)-Total	<0.00050		0.00050	mg/L	22-NOV-21	0.05	
Cobalt (Co)-Total	0.00011		0.00010	mg/L	22-NOV-21		
Copper (Cu)-Total	<0.00050		0.00050	mg/L	22-NOV-21		1
Iron (Fe)-Total	0.341		0.010	mg/L	23-NOV-21		*0.3
Lead (Pb)-Total	0.000249		0.000050	mg/L	22-NOV-21	0.01	
Lithium (Li)-Total	0.0044		0.0010	mg/L	22-NOV-21		
Magnesium (Mg)-Total	33.4		0.0050	mg/L	22-NOV-21		
Manganese (Mn)-Total	0.0225		0.00050	mg/L	22-NOV-21		0.05
Molybdenum (Mo)-Total	0.00589		0.000050	mg/L	22-NOV-21		
Nickel (Ni)-Total	0.00054		0.00050	mg/L	22-NOV-21		
Phosphorus (P)-Total	<0.050		0.050	mg/L	22-NOV-21		
Potassium (K)-Total	1.55		0.050	mg/L	22-NOV-21		
Rubidium (Rb)-Total	0.00104		0.00020	mg/L	22-NOV-21		
Selenium (Se)-Total	0.000101		0.000050	mg/L	22-NOV-21	0.05	
Silicon (Si)-Total	5.18		0.10	mg/L	22-NOV-21		
Silver (Ag)-Total	<0.000050		0.000050	mg/L	22-NOV-21		
Sodium (Na)-Total	24.4		0.050	mg/L	22-NOV-21	*20	200
Strontium (Sr)-Total	0.877		0.0010	mg/L	22-NOV-21		
Sulfur (S)-Total	38.6		0.50	mg/L	22-NOV-21		
Tellurium (Te)-Total	<0.00020		0.00020	mg/L	22-NOV-21		
Thallium (Tl)-Total	0.000045		0.000010	mg/L	22-NOV-21		
Thorium (Th)-Total	<0.00010		0.00010	mg/L	22-NOV-21		
Tin (Sn)-Total	<0.00010		0.00010	mg/L	22-NOV-21		
Titanium (Ti)-Total	<0.00030		0.00030	mg/L	22-NOV-21		
Tungsten (W)-Total	0.00142		0.00010	mg/L	22-NOV-21		
Uranium (U)-Total	0.000793		0.000010	mg/L	22-NOV-21	0.02	
Vanadium (V)-Total	<0.00050		0.00050	mg/L	22-NOV-21		
Zinc (Zn)-Total	0.0080		0.0030	mg/L	22-NOV-21		5

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Drinking Water Regulation (ODWQS) JAN.1,2020 = [Suite] - ON-DW-STANDARD+GUIDELINES

#1: Schedule 1 (Microbiological) and 2 (Chemical) Standards (JAN,2020) **#2: Ontario DW Aesthetic and Operational Guidelines (June, 2006)**

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits			
							#1	#2		
L2664502-1	FS-T									
Sampled By:	CLIENT on 19-NOV-21 @ 12:05									
Matrix:	WATER									
Total Metals										
	Zirconium (Zr)-Total	<0.00020		0.00020	mg/L	22-NOV-21				

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Drinking Water Regulation (ODWQS) JAN.1,2020 = [Suite] - ON-DW-STANDARD+GUIDELINES

#1: Schedule 1 (Microbiological) and 2 (Chemical) Standards (JAN,2020) **#2: Ontario DW Aesthetic and Operational Guidelines (June, 2006)**

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference***
EC-MF-WT	Water	E. coli	SM 9222D
A 100 mL volume of sample is filtered through a membrane, the membrane is placed on mFC-BCIG agar and incubated at 44.5 –0 .2 °C for 24 – 2 h. Method ID: WT-TM-1200			
EC-SCREEN-WT	Water	Conductivity Screen (Internal Use Only)	APHA 2510
Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.			
FC-MF-WT	Water	Fecal Coliforms	SM 9222D
A 100mL volume of sample is filtered through a membrane, the membrane is placed on mFC agar and incubated at 24–2h@44.5–0.2°C. Method ID: WT-TM-1200			
MET-T-CCMS-WT	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)
Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method. Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).			
PH-WT	Water	pH	APHA 4500 H-Electrode
Water samples are analyzed directly by a calibrated pH meter. Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011). Holdtime for samples under this regulation is 28 days			
SOLIDS-TSS-WT	Water	Suspended solids	APHA 2540 D-Gravimetric
A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104–1°C for a minimum of four hours or until a constant weight is achieved.			

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

Chain of Custody numbers:

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

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

GLOSSARY OF REPORT TERMS

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

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

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guideline limits are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.

Quality Control Report

Workorder: L2664502 Report Date: 25-NOV-21

Client: TOWNSHIP OF CENTRE WELLINGTON
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4
Contact: Matthew Alexander c/o Centre Wellington

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
EC-MF-WT	**Water**							
Batch R5654910								
WG3662085-1 MB								
E. Coli			0		CFU/100mL		1	20-NOV-21
FC-MF-WT	**Water**							
Batch R5654912								
WG3662087-1 MB								
Fecal Coliforms			0		CFU/100mL		1	20-NOV-21
MET-T-CCMS-WT	**Water**							
Batch R5655361								
WG3662500-4 DUP		**WG3662500-3**						
Aluminum (Al)-Total		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	22-NOV-21
Antimony (Sb)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	22-NOV-21
Arsenic (As)-Total		0.00023	0.00023		mg/L	3.4	20	22-NOV-21
Barium (Ba)-Total		0.0449	0.0436		mg/L	2.9	20	22-NOV-21
Beryllium (Be)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	22-NOV-21
Bismuth (Bi)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	22-NOV-21
Boron (B)-Total		0.024	0.025		mg/L	2.7	20	22-NOV-21
Cadmium (Cd)-Total		<0.0000050	<0.000005(	RPD-NA	mg/L	N/A	20	22-NOV-21
Calcium (Ca)-Total		59.0	58.4		mg/L	0.9	20	22-NOV-21
Chromium (Cr)-Total		0.00143	0.00134		mg/L	6.4	20	22-NOV-21
Cesium (Cs)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	22-NOV-21
Cobalt (Co)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	22-NOV-21
Copper (Cu)-Total		0.00206	0.00202		mg/L	1.9	20	22-NOV-21
Iron (Fe)-Total		0.141	0.145		mg/L	2.8	20	22-NOV-21
Lead (Pb)-Total		0.000346	0.000354		mg/L	2.5	20	22-NOV-21
Lithium (Li)-Total		0.0028	0.0029		mg/L	3.0	20	22-NOV-21
Magnesium (Mg)-Total		14.5	14.8		mg/L	1.7	20	22-NOV-21
Manganese (Mn)-Total		0.00437	0.00438		mg/L	0.2	20	22-NOV-21
Molybdenum (Mo)-Total		0.000529	0.000526		mg/L	0.6	20	22-NOV-21
Nickel (Ni)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	22-NOV-21
Phosphorus (P)-Total		<0.050	<0.050	RPD-NA	mg/L	N/A	20	22-NOV-21
Potassium (K)-Total		1.52	1.50		mg/L	1.5	20	22-NOV-21
Rubidium (Rb)-Total		0.00032	0.00032		mg/L	1.9	20	22-NOV-21
Selenium (Se)-Total		0.000201	0.000194		mg/L	3.5	20	22-NOV-21

Quality Control Report

Client: TOWNSHIP OF CENTRE WELLINGTON
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4
Contact: Matthew Alexander c/o Centre Wellington

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R5655361								
WG3662500-4 DUP		**WG3662500-3**						
Silicon (Si)-Total		5.69	5.45		mg/L	4.3	20	22-NOV-21
Silver (Ag)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	22-NOV-21
Sodium (Na)-Total		15.7	15.1		mg/L	3.9	20	22-NOV-21
Strontium (Sr)-Total		0.239	0.235		mg/L	1.8	20	22-NOV-21
Sulfur (S)-Total		3.87	3.88		mg/L	0.1	20	22-NOV-21
Thallium (Tl)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	22-NOV-21
Tellurium (Te)-Total		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	22-NOV-21
Thorium (Th)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	22-NOV-21
Tin (Sn)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	22-NOV-21
Titanium (Ti)-Total		<0.00030	<0.00030	RPD-NA	mg/L	N/A	20	22-NOV-21
Tungsten (W)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	22-NOV-21
Uranium (U)-Total		0.00125	0.00126		mg/L	0.6	20	22-NOV-21
Vanadium (V)-Total		0.00234	0.00228		mg/L	2.6	20	22-NOV-21
Zinc (Zn)-Total		0.0076	0.0076		mg/L	0.9	20	22-NOV-21
Zirconium (Zr)-Total		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	22-NOV-21
WG3662500-2 LCS								
Aluminum (Al)-Total			100.2		%		80-120	22-NOV-21
Antimony (Sb)-Total			103.3		%		80-120	22-NOV-21
Arsenic (As)-Total			101.3		%		80-120	22-NOV-21
Barium (Ba)-Total			98.7		%		80-120	22-NOV-21
Beryllium (Be)-Total			102.9		%		80-120	22-NOV-21
Bismuth (Bi)-Total			103.6		%		80-120	22-NOV-21
Boron (B)-Total			98.6		%		80-120	22-NOV-21
Cadmium (Cd)-Total			101.4		%		80-120	22-NOV-21
Calcium (Ca)-Total			100.0		%		80-120	22-NOV-21
Chromium (Cr)-Total			98.1		%		80-120	22-NOV-21
Cesium (Cs)-Total			99.99		%		80-120	22-NOV-21
Cobalt (Co)-Total			99.9		%		80-120	22-NOV-21
Copper (Cu)-Total			100.6		%		80-120	22-NOV-21
Iron (Fe)-Total			97.7		%		80-120	22-NOV-21
Lead (Pb)-Total			101.6		%		80-120	22-NOV-21
Lithium (Li)-Total			103.5		%		80-120	22-NOV-21
Magnesium (Mg)-Total			105.3		%		80-120	22-NOV-21

Quality Control Report

Client: TOWNSHIP OF CENTRE WELLINGTON
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4
Contact: Matthew Alexander c/o Centre Wellington

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R5655361								
WG3662500-2 LCS								
Manganese (Mn)-Total			98.0		%		80-120	22-NOV-21
Molybdenum (Mo)-Total			102.8		%		80-120	22-NOV-21
Nickel (Ni)-Total			99.6		%		80-120	22-NOV-21
Phosphorus (P)-Total			102.6		%		70-130	22-NOV-21
Potassium (K)-Total			98.3		%		80-120	22-NOV-21
Rubidium (Rb)-Total			101.7		%		80-120	22-NOV-21
Selenium (Se)-Total			99.95		%		80-120	22-NOV-21
Silicon (Si)-Total			96.9		%		60-140	22-NOV-21
Silver (Ag)-Total			101.5		%		80-120	22-NOV-21
Sodium (Na)-Total			100.1		%		80-120	22-NOV-21
Strontium (Sr)-Total			98.9		%		80-120	22-NOV-21
Sulfur (S)-Total			103.5		%		80-120	22-NOV-21
Thallium (Tl)-Total			102.0		%		80-120	22-NOV-21
Tellurium (Te)-Total			96.4		%		80-120	22-NOV-21
Thorium (Th)-Total			101.8		%		80-120	22-NOV-21
Tin (Sn)-Total			97.7		%		80-120	22-NOV-21
Titanium (Ti)-Total			96.7		%		80-120	22-NOV-21
Tungsten (W)-Total			97.2		%		80-120	22-NOV-21
Uranium (U)-Total			100.5		%		80-120	22-NOV-21
Vanadium (V)-Total			100.9		%		80-120	22-NOV-21
Zinc (Zn)-Total			96.2		%		80-120	22-NOV-21
Zirconium (Zr)-Total			99.7		%		80-120	22-NOV-21
WG3662500-1 MB								
Aluminum (Al)-Total			<0.0050		mg/L		0.005	22-NOV-21
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	22-NOV-21
Arsenic (As)-Total			<0.00010		mg/L		0.0001	22-NOV-21
Barium (Ba)-Total			<0.00010		mg/L		0.0001	22-NOV-21
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	22-NOV-21
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	22-NOV-21
Boron (B)-Total			<0.010		mg/L		0.01	22-NOV-21
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	22-NOV-21
Calcium (Ca)-Total			<0.050		mg/L		0.05	22-NOV-21
Chromium (Cr)-Total			<0.00050		mg/L		0.0005	22-NOV-21
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	22-NOV-21

Quality Control Report

Client: TOWNSHIP OF CENTRE WELLINGTON
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4
Contact: Matthew Alexander c/o Centre Wellington

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R5655361								
WG3662500-1 MB								
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	22-NOV-21
Copper (Cu)-Total			<0.00050		mg/L		0.0005	22-NOV-21
Iron (Fe)-Total			<0.010		mg/L		0.01	23-NOV-21
Lead (Pb)-Total			<0.000050		mg/L		0.00005	22-NOV-21
Lithium (Li)-Total			<0.0010		mg/L		0.001	22-NOV-21
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	22-NOV-21
Manganese (Mn)-Total			<0.00050		mg/L		0.0005	22-NOV-21
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	22-NOV-21
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	22-NOV-21
Phosphorus (P)-Total			<0.050		mg/L		0.05	22-NOV-21
Potassium (K)-Total			<0.050		mg/L		0.05	22-NOV-21
Rubidium (Rb)-Total			<0.00020		mg/L		0.0002	22-NOV-21
Selenium (Se)-Total			<0.000050		mg/L		0.00005	22-NOV-21
Silicon (Si)-Total			<0.10		mg/L		0.1	22-NOV-21
Silver (Ag)-Total			<0.000050		mg/L		0.00005	22-NOV-21
Sodium (Na)-Total			<0.050		mg/L		0.05	22-NOV-21
Strontium (Sr)-Total			<0.0010		mg/L		0.001	22-NOV-21
Sulfur (S)-Total			<0.50		mg/L		0.5	22-NOV-21
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	22-NOV-21
Tellurium (Te)-Total			<0.00020		mg/L		0.0002	22-NOV-21
Thorium (Th)-Total			<0.00010		mg/L		0.0001	22-NOV-21
Tin (Sn)-Total			<0.00010		mg/L		0.0001	22-NOV-21
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	22-NOV-21
Tungsten (W)-Total			<0.00010		mg/L		0.0001	22-NOV-21
Uranium (U)-Total			<0.000010		mg/L		0.00001	22-NOV-21
Vanadium (V)-Total			<0.00050		mg/L		0.0005	22-NOV-21
Zinc (Zn)-Total			<0.0030		mg/L		0.003	22-NOV-21
Zirconium (Zr)-Total			<0.00020		mg/L		0.0002	22-NOV-21
WG3662500-5 MS		**WG3662500-3**						
Aluminum (Al)-Total			100.7		%		70-130	22-NOV-21
Antimony (Sb)-Total			104.5		%		70-130	22-NOV-21
Arsenic (As)-Total			102.5		%		70-130	22-NOV-21
Barium (Ba)-Total			N/A	MS-B	%		-	22-NOV-21
Beryllium (Be)-Total			101.7		%		70-130	22-NOV-21

Quality Control Report

Client: TOWNSHIP OF CENTRE WELLINGTON
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4
Contact: Matthew Alexander c/o Centre Wellington

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R5655361								
WG3662500-5 MS		**WG3662500-3**						
Bismuth (Bi)-Total			101.7		%		70-130	22-NOV-21
Boron (B)-Total			96.2		%		70-130	22-NOV-21
Cadmium (Cd)-Total			100.9		%		70-130	22-NOV-21
Calcium (Ca)-Total			N/A	MS-B	%		-	22-NOV-21
Chromium (Cr)-Total			99.7		%		70-130	22-NOV-21
Cesium (Cs)-Total			101.0		%		70-130	22-NOV-21
Cobalt (Co)-Total			100.2		%		70-130	22-NOV-21
Copper (Cu)-Total			100.2		%		70-130	22-NOV-21
Iron (Fe)-Total			N/A	MS-B	%		-	22-NOV-21
Lead (Pb)-Total			99.7		%		70-130	22-NOV-21
Lithium (Li)-Total			101.7		%		70-130	22-NOV-21
Magnesium (Mg)-Total			N/A	MS-B	%		-	22-NOV-21
Manganese (Mn)-Total			100.0		%		70-130	22-NOV-21
Molybdenum (Mo)-Total			104.4		%		70-130	22-NOV-21
Nickel (Ni)-Total			100.2		%		70-130	22-NOV-21
Phosphorus (P)-Total			107.3		%		70-130	22-NOV-21
Potassium (K)-Total			98.2		%		70-130	22-NOV-21
Rubidium (Rb)-Total			103.3		%		70-130	22-NOV-21
Selenium (Se)-Total			100.7		%		70-130	22-NOV-21
Silicon (Si)-Total			N/A	MS-B	%		-	22-NOV-21
Silver (Ag)-Total			97.9		%		70-130	22-NOV-21
Sodium (Na)-Total			N/A	MS-B	%		-	22-NOV-21
Strontium (Sr)-Total			N/A	MS-B	%		-	22-NOV-21
Sulfur (S)-Total			N/A	MS-B	%		-	22-NOV-21
Thallium (Tl)-Total			100.8		%		70-130	22-NOV-21
Tellurium (Te)-Total			96.1		%		70-130	22-NOV-21
Thorium (Th)-Total			102.2		%		70-130	22-NOV-21
Tin (Sn)-Total			98.0		%		70-130	22-NOV-21
Titanium (Ti)-Total			99.4		%		70-130	22-NOV-21
Tungsten (W)-Total			98.2		%		70-130	22-NOV-21
Uranium (U)-Total			N/A	MS-B	%		-	22-NOV-21
Vanadium (V)-Total			102.9		%		70-130	22-NOV-21
Zinc (Zn)-Total			96.5		%		70-130	22-NOV-21

Quality Control Report

Client: TOWNSHIP OF CENTRE WELLINGTON
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4
Contact: Matthew Alexander c/o Centre Wellington

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R5655361								
WG3662500-5 MS		**WG3662500-3**						
Zirconium (Zr)-Total			98.7		%		70-130	22-NOV-21
PH-WT	**Water**							
Batch R5656563								
WG3662022-4 DUP		**WG3662022-3**						
pH		8.24	8.24	J	pH units	0.00	0.2	20-NOV-21
WG3662022-2 LCS								
pH			7.03		pH units		6.9-7.1	20-NOV-21
SOLIDS-TSS-WT	**Water**							
Batch R5657105								
WG3664122-6 DUP		**WG3664122-7**						
Total Suspended Solids		10400	10400		mg/L	0.0	20	25-NOV-21
WG3664122-5 LCS								
Total Suspended Solids			101.3		%		85-115	25-NOV-21
WG3664122-4 MB								
Total Suspended Solids			<3.0		mg/L		3	25-NOV-21

Quality Control Report

Workorder: L2664502 Report Date: 25-NOV-21

Client: TOWNSHIP OF CENTRE WELLINGTON
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4
Contact: Matthew Alexander c/o Centre Wellington

Legend:

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

Sample Parameter Qualifier Definitions:

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

Hold Time Exceedances:

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

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

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

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

Chain of C·

L2664502-COFC

COC Number: 20 - 947661

Page 1 of 1

www.alsglobal.com

Report To	Contact and company name below will appear on the final report	Select Report Format: ☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)	Turnaround Time (TAT) Requested
Company:	AECOM CANADA LTD	Merge QC/QCI Reports with COA ☑ YES ☐ NO ☐ N/A	☑ Routine [R] if received by 3pm M-F - no surcharges apply
Contact:	MATTHEW ALEXANDER	☐ Compare Results to Criteria on Report - provide details below if box checked	☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum
Phone:	226 821-4906	Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum
	Company address below will appear on the final report		☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum
Street:	50 Sportsworld Crossing Rd, SUITE 240	Email 1 ~~or Fax~~ MATTHEW.ALEXANDER@AECOM.COM	☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum
City/Province:	KITCHENER, ON	Email 2	☐ Same day [E2] if received by 10am M-S - 200% rush surcharge. Additional fees may apply to rush requests on weekends, statutory holidays and non-routine tests
Postal Code:	N2P 0A4	Email 3	

AFFIX ALS BARCODE LABEL HERE (ALS use only)

Date and Time Required for all E&P TATs:

For all tests with rush TATs requested, please contact your AM to confirm availability.

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

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:		AFE/Cost Center:	PO#
Job #:	60664299	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (ALS use only):	L2664502	ALS Contact:	Sampler:

Analysis Request

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

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Physical Tests (pH, TSS)	Ecol, Fecal Coliforms	Total Metals	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	F5-T	19/11/21	12:05pm	GW	5	✓	✓	✓			

Drinking Water (DW) Samples[1] (client use)	Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)
Are samples taken from a Regulated DW System? ☐ YES ☑ NO	
Are samples for human consumption/ use? ☐ YES ☑ NO	

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☑ ICE ☐ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
4.3				~1.9			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (ALS use only)			FINAL SHIPMENT RECEPTION (ALS use only)		
Released by: Satya Mulkapuchi	Date: 2021/11/19	Time: 14:40	Received by: HK	Date: 11/19/21	Time: 14:36	Received by:	Date: 11/19/21	Time: 1725

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

AUG 2020 FRONT

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

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

TOWNSHIP OF CENTRE WELLINGTON
ATTN: Matthew Alexander c/o Centre Wellington
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4

Date Received: 01-DEC-21
Report Date: 23-DEC-21 14:42 (MT)
Version: FINAL

Client Phone: 226-821-4906

Certificate of Analysis

Lab Work Order #: L2668348

Project P.O. #: NOT SUBMITTED
Job Reference: 60669299
C of C Numbers: 20-945121
Legal Site Desc:

Candice Hunter
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2
L2668348-1 FS-T							
Sampled By: CLIENT on 01-DEC-21 @ 12:00							
Matrix: WATER							
Anions and Nutrients							
Chlorate	<0.010		0.010	mg/L	07-DEC-21	1.0	
Chlorite	<0.010		0.010	mg/L	07-DEC-21	1.0	
Fluoride (F)	0.13		0.10	mg/L	02-DEC-21	1.5	
Nitrate (as N)	0.238		0.020	mg/L	02-DEC-21	10	
Nitrite (as N)	<0.010		0.010	mg/L	02-DEC-21	1	
Cyanides							
Cyanide, Total	<0.0020		0.0020	mg/L	02-DEC-21		
Bacteriological Tests							
Escherichia Coli	0		0	MPN/100mL	02-DEC-21	0	
Total Coliforms	0		0	MPN/100mL	02-DEC-21	0	
Total Metals							
Antimony (Sb)	<0.60		0.60	ug/L	07-DEC-21	6	
Arsenic (As)	1.3		1.0	ug/L	07-DEC-21	10.0	
Barium (Ba)	53		10	ug/L	07-DEC-21	1000	
Boron (B)	<50		50	ug/L	07-DEC-21	5000	
Cadmium (Cd)	<0.10		0.10	ug/L	07-DEC-21	5	
Chromium (Cr)	<1.0		1.0	ug/L	07-DEC-21	50	
Lead (Pb)	<1.0		1.0	ug/L	07-DEC-21	10	
Selenium (Se)	<5.0		5.0	ug/L	07-DEC-21	50	
Sodium (Na)	15.5		0.50	mg/L	07-DEC-21	20	200
Uranium (U)	<5.0		5.0	ug/L	07-DEC-21	20	
Extractable Metals							
Mercury	<0.10		0.10	ug/L	02-DEC-21	1	
Volatile Organic Compounds							
Benzene	<0.50		0.50	ug/L	09-DEC-21	1	
Carbon tetrachloride	<0.20		0.20	ug/L	09-DEC-21	2	
Monochlorobenzene	<0.50		0.50	ug/L	09-DEC-21	80	30
1,2-Dichlorobenzene	<0.50		0.50	ug/L	09-DEC-21	200	3
1,4-Dichlorobenzene	<0.50		0.50	ug/L	09-DEC-21	5	1
1,2-Dichloroethane	<0.50		0.50	ug/L	09-DEC-21	5	
1,1-dichloroethylene (vinylidene chlorid	<0.50		0.50	ug/L	09-DEC-21	14	
Dichloromethane	<5.0		5.0	ug/L	09-DEC-21	50	
Ethylbenzene	<0.50		0.50	ug/L	09-DEC-21	140	2.4
Tetrachloroethylene (perchloroethylene)	<0.50		0.50	ug/L	09-DEC-21	10	
Toluene	<0.50		0.50	ug/L	09-DEC-21	60	24
Trichloroethylene	<0.50		0.50	ug/L	09-DEC-21	5	
Vinyl chloride	<0.20		0.20	ug/L	09-DEC-21	1	
o-xylene	<0.50		0.50	ug/L	09-DEC-21		
m/p-xylene	<1.0		1.0	ug/L	09-DEC-21		
Xylenes (Total)	<1.5		1.5	ug/L	09-DEC-21	90	300
Surrogate: 4-Bromofluorobenzene	92.3		70-130	%	09-DEC-21		
Surrogate: 1,4-Difluorobenzene	98.3		50-150	%	09-DEC-21		
Surrogate: 1,4-Difluorobenzene	98.3		70-130	%	09-DEC-21		

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Drinking Water Regulation (ODWQS) JAN.1,2020 = [Suite] - ON-DW-STANDARD+GUIDELINES

#1: Schedule 1 (Microbiological) and 2 (Chemical) Standards (JAN,2020) **#2: Ontario DW Aesthetic and Operational Guidelines (June, 2006)**

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2		
L2668348-1 FS-T									
Sampled By: CLIENT on 01-DEC-21 @ 12:00									
Matrix: WATER									
Volatile Organic Compounds									
Polycyclic Aromatic Hydrocarbons									
Benzo(a)pyrene	<0.0050		0.0050	ug/L	03-DEC-21	0.01			
Surrogate: Chrysene d12	66.4		50-150	%	03-DEC-21				
Trihalomethanes									
Bromodichloromethane	<2.0		2.0	ug/L	09-DEC-21				
Bromoform	<2.0		2.0	ug/L	09-DEC-21				
Dibromochloromethane	<2.0		2.0	ug/L	09-DEC-21				
Chloroform	<2.0		2.0	ug/L	09-DEC-21				
Total THMs	<4.0		4.0	ug/L	09-DEC-21	100			
Semi-Volatile Organics									
N-Nitrosodimethylamine	<0.00090		0.00090	ug/L	07-DEC-21	0.009			
Surrogate: N-Nitrosodimethylamine-d6	56.2		50-150	%	07-DEC-21				
Polychlorinated Biphenyls									
Aroclor 1242	<0.020		0.020	ug/L	23-DEC-21				
Aroclor 1254	<0.020		0.020	ug/L	23-DEC-21				
Aroclor 1260	<0.020		0.020	ug/L	23-DEC-21				
Surrogate: Decachlorobiphenyl	120.5		50-150	%	23-DEC-21				
Total PCBs	<0.035		0.035	ug/L	23-DEC-21	3			
Surrogate: Tetrachloro-m-xylene	73.8		50-150	%	23-DEC-21				
Organochlorine Pesticides									
a-chlordane	<0.0080		0.0080	ug/L	03-DEC-21				
g-chlordane	<0.0080		0.0080	ug/L	03-DEC-21				
pp-DDD	<0.004		0.004	ug/L	03-DEC-21				
pp-DDE	<0.004		0.004	ug/L	03-DEC-21				
op-DDT	<0.0040		0.0040	ug/L	03-DEC-21				
pp-DDT	<0.0040		0.0040	ug/L	03-DEC-21				
Oxychlordane	<0.0080		0.0080	ug/L	03-DEC-21				
Surrogate: Decachlorobiphenyl	143.5		50-150	%	03-DEC-21				
Herbicides									
AMPA	<0.50		0.50	ug/L	08-DEC-21				
Bromoxynil	<0.20		0.20	ug/L	08-DEC-21	5			
2,4-D	<0.20		0.20	ug/L	08-DEC-21	100			
Dicamba	<0.20		0.20	ug/L	08-DEC-21	120			
Dinoseb	<0.20		0.20	ug/L	08-DEC-21	10			
Glyphosate	<5.0		5.0	ug/L	08-DEC-21	280			
MCPA	<0.20		0.20	ug/L	08-DEC-21	100			
Picloram	<0.20		0.20	ug/L	08-DEC-21	190			
2,4,5-TP	<0.20		0.20	ug/L	08-DEC-21				
Surrogate: 2,4-Dichlorophenylacetic Acid	79.6		50-130	%	08-DEC-21				
Pesticides									
Alachlor	<0.10		0.10	ug/L	07-DEC-21	5			
Atrazine	<0.10		0.10	ug/L	07-DEC-21				
Atrazine & Metabolites	<0.20		0.20	ug/L	07-DEC-21	5			
Azinphos-methyl	<0.10		0.10	ug/L	07-DEC-21	20			
Carbaryl	<0.20		0.20	ug/L	07-DEC-21	90			

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Drinking Water Regulation (ODWQS) JAN.1,2020 = [Suite] - ON-DW-STANDARD+GUIDELINES

#1: Schedule 1 (Microbiological) and 2 (Chemical) Standards (JAN,2020) **#2: Ontario DW Aesthetic and Operational Guidelines (June, 2006)**

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2		
L2668348-1	FS-T									
Sampled By:	CLIENT on 01-DEC-21 @ 12:00									
Matrix:	WATER									
Pesticides										
	Carbofuran	<0.20		0.20	ug/L	07-DEC-21	90			
	Chlorpyriphos	<0.10		0.10	ug/L	07-DEC-21	90			
	Diazinon	<0.10		0.10	ug/L	07-DEC-21	20			
	2,4-Dichlorophenol	<0.30		0.30	ug/L	10-DEC-21	900	0.3		
	Dimethoate	<0.10		0.10	ug/L	07-DEC-21	20			
	Diquat	<1.0		1.0	ug/L	13-DEC-21	70			
	Diuron	<1.0		1.0	ug/L	13-DEC-21	150			
	Atrazine-desethyl	<0.10		0.10	ug/L	07-DEC-21				
	Malathion	<0.10		0.10	ug/L	07-DEC-21	190			
	Diclofop-methyl	<0.20		0.20	ug/L	07-DEC-21	9			
	Metolachlor	<0.10		0.10	ug/L	07-DEC-21	50			
	Metribuzin	<0.10		0.10	ug/L	07-DEC-21	80			
	Paraquat	<1.0		1.0	ug/L	13-DEC-21	10			
	Pentachlorophenol	<0.50		0.50	ug/L	10-DEC-21	60	30		
	Phorate	<0.10		0.10	ug/L	07-DEC-21	2			
	Prometryne	<0.10		0.10	ug/L	07-DEC-21	1			
	Simazine	<0.10		0.10	ug/L	07-DEC-21	10			
	Terbufos	<0.20		0.20	ug/L	07-DEC-21	1			
	2,3,4,6-Tetrachlorophenol	<0.50		0.50	ug/L	10-DEC-21	100	1		
	Triallate	<0.10		0.10	ug/L	07-DEC-21	230			
	2,4,6-Trichlorophenol	<0.50		0.50	ug/L	10-DEC-21	5	2		
	Trifluralin	<0.10		0.10	ug/L	07-DEC-21	45			
	Surrogate: 2-Fluorobiphenyl	80.3		40-130	%	07-DEC-21				
	Surrogate: 2,4,6-Tribromophenol	115.2		40-150	%	10-DEC-21				
Organic Parameters										
	Microcystin	<0.20		0.20	ug/L	07-DEC-21	1.5			
	Nitrilotriacetic Acid (NTA)	<0.20		0.20	mg/L	08-DEC-21	0.4			

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Drinking Water Regulation (ODWQS) JAN.1,2020 = [Suite] - ON-DW-STANDARD+GUIDELINES

#1: Schedule 1 (Microbiological) and 2 (Chemical) Standards (JAN,2020) **#2: Ontario DW Aesthetic and Operational Guidelines (June, 2006)**

Reference Information

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference***
ACIDS-ONT-DW-WT	Water	O.Reg 170/03 Acids	SW846 8270
Pesticides are extracted from an aqueous sample using separate aliquots of solvent, extracts are concentrated down to a certain volume and analyzed on the GC/MSD.			
BAP-ONT-DW-WT	Water	Benzo(a)pyrene in Drinking Water	SW 846 8270
CHLORATE-IC-DW-WT	Water	Chlorate by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
CHLORITE-IC-DW-WT	Water	Chlorite by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
CN-TOT-ONT-DW-WT	Water	Cyanide, Total	ISO 14403-2
Total cyanide is determined by the combination of UV digestion and distillation. Cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.			
When using this method, high levels of thiocyanate in samples can cause false positives at ~1-2% of the thiocyanate concentration. For samples with detectable cyanide analyzed by this method, ALS recommends analysis for thiocyanate to check for this potential interference.			
Ontario Drinking Water samples are not filtered during analysis.			
DIQUAT-ONT-DW-WT	Water	Diquat in Water by LC/MS-MS	E3503
An aliquot of the sample is taken and internal standard is added. The sample is analyzed by LC/MS/MS.			
DIURON-ONT-DW-WT	Water	Diuron in Drinking Water	E3501
An aliquot of water sample is diluted 1:1 using acetonitrile and analyzed using LC/MS/MS			
EC-SCREEN-WT	Water	Conductivity Screen (Internal Use Only)	APHA 2510
Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.			
F-DW-IC-WT	Water	Fluoride in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
GLYPHOSATE-ONT-DW-WT	Water	Glyphosate in Drinking Water	MOE E3500
This analysis is carried out using procedures adapted from ON MOE E3500 "Glyphosate". Glyphosate is determined by direct injection by LC-MS/MS on a sample that bas been derivatized.			
HG-T-ONT-DW-WT	Water	Mercury (Hg)	EPA 1631E (mod)
MET-ONT-DW-WT	Water	Drinking Water Metals	EPA 6020A
MICROCYSTIN-WP	Water	Microcystin	ENVIROLOGIX QUANTIPLATE KIT CAT. EP022HS
Total Microcystins (intraceller and extraceller) in aqueous matrices is determined by the Enzyme-Linked ImmunoSorbent Assay (ELISA) method.			
MISC-ONT-DW-WT	Water	O.Reg 170/03 Miscellaneous Pesticides	SW846 8270
Pesticides are extracted from an aqueous sample using separate aliquots of solvent, extracts are concentrated down to a certain volume and analyzed on the GC/MSD.			
NDMA-ONTDW-WT	Water	NDMA to meet Ont Reg 170/03	QWI-ORG/WP239
An aliquot of sample is solid phase extracted followed by liquid chromatography tandem mass spectrometry instead of direct injection.			
NO2-DW-IC-WT	Water	Nitrite in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
NO3-DW-IC-WT	Water	Nitrate in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
NTA-WT	Water	Nitrilotriacetic Acid (NTA)	EPA 430.1
NTA refers to the tri-sodium salt of nitrilotriacetic acid, N(CH2COONa)3. Zinc forms a blue-coloured complex with 2 carboxy-2-hydroxy-5-sulfoformazylbenzene (Zincon) in a solution buffered to pH 9.2. When NTA is added to the sample, the Zinc-Zincon complex is broken which reduces the absorbance in proportion to the amount of NTA present. Samples are filtered with a 0.45 um membrane before analysis.			
OCP-ROUTINE-DW-WT	Water	Pesticides, Organochlorine in Water	SW846 8270
Samples are extracted using a solvent mixture and the resulting extracts are analyzed on GC/MSD			

Reference Information

PAHERB-ONT-DW-WT	Water	O.Reg 170/03 PA Herbicides	MOE E3552

Water samples are analyzed by direct injection without sample preparation using liquid chromatography tandem mass spectrometry (LC-MS/MS).

PARAQUAT-ONT-DW-WT	Water	Paraquat in Water by LC/MS-MS	E3503

An aliquot of the sample is taken and internal standard is added. The sample is analyzed by LC/MS/MS.

PCB-ONT-DW-WT	Water	O.Reg 170/03 PCBs	EPA 8270

PCBs are extracted from an aqueous sample at neutral pH with aliquots of dichloromethane using a modified separatory funnel technique. The extracts are analyzed by GC/MSD.

TC,EC-QT51-DW-WT	Water	Total Coliform and E. Coli	APHA 9223B

This analysis is carried out using procedures adapted from APHA Method 9223 "Enzyme Substrate Coliform Test". E. coli and Total Coliform are determined simultaneously. The sample is mixed with a mixture of hydrolyzable substrates and then sealed in a multi-well packet. The packet is incubated for 18 or 24 hours and then the number of wells exhibiting a positive response are counted. The final result is obtained by comparing the positive responses to a probability table.

THM-ONT-DW-WT	Water	Trihalomethanes	SW846 8260

Liquid samples are analyzed by headspace GC/MSD.

THM-SUM-DW-CALC-WT	Water	Total Trihalomethanes (THMs)	CALCULATION

Total Trihalomethanes (THMs) represents the sum of bromodichloromethane, bromoform, chlorodibromomethane and chloroform. For the purpose of calculation, results less than the detection limit (DL) are treated as zero.

TURB-MET-WT	Water	Turbidity on preserved metals sample	APHA 2130 B

Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.

VOC-ONT-DW-WT	Water	Volatile Organics (O.Reg 170/03)	SW846 8260

Liquid samples are analyzed by headspace GC/MSD.

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

Chain of Custody numbers:

20-945121

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

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

Reference Information

GLOSSARY OF REPORT TERMS

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

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

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guideline limits are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.

Quality Control Report

Workorder: L2668348 Report Date: 23-DEC-21

Client: TOWNSHIP OF CENTRE WELLINGTON
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4
Contact: Matthew Alexander c/o Centre Wellington

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACIDS-ONT-DW-WT	**Water**							
Batch R5672481								
WG3671245-2 LCS								
2,4-Dichlorophenol			84.1		%		50-140	09-DEC-21
2,4,6-Trichlorophenol			87.8		%		50-140	09-DEC-21
2,3,4,6-Tetrachlorophenol			92.4		%		50-140	09-DEC-21
Pentachlorophenol			118.9		%		60-130	09-DEC-21
WG3671245-1 MB								
2,4-Dichlorophenol			<0.30		ug/L		0.3	09-DEC-21
2,4,6-Trichlorophenol			<0.50		ug/L		0.5	09-DEC-21
2,3,4,6-Tetrachlorophenol			<0.50		ug/L		0.5	09-DEC-21
Pentachlorophenol			<0.50		ug/L		0.5	09-DEC-21
Surrogate: 2,4,6-Tribromophenol			95.8		%		40-150	09-DEC-21
BAP-ONT-DW-WT	**Water**							
Batch R5663248								
WG3669114-2 LCS								
Benzo(a)pyrene			80.9		%		60-130	03-DEC-21
WG3669114-1 MB								
Benzo(a)pyrene			<0.0050		ug/L		0.005	03-DEC-21
Surrogate: Chrysene d12			97.5		%		50-150	03-DEC-21
CHLORATE-IC-DW-WT	**Water**							
Batch R5671178								
WG3671404-3 DUP		**WG3671404-5**						
Chlorate		<0.010	<0.010	RPD-NA	mg/L	N/A	20	07-DEC-21
WG3671404-2 LCS								
Chlorate			100.3		%		85-115	07-DEC-21
WG3671404-1 MB								
Chlorate			<0.010		mg/L		0.01	07-DEC-21
WG3671404-4 MS		**WG3671404-5**						
Chlorate			99.8		%		75-125	07-DEC-21
CHLORITE-IC-DW-WT	**Water**							
Batch R5671178								
WG3671404-3 DUP		**WG3671404-5**						
Chlorite		<0.010	<0.010	RPD-NA	mg/L	N/A	20	07-DEC-21
WG3671404-2 LCS								
Chlorite			101.3		%		85-115	07-DEC-21
WG3671404-1 MB								
Chlorite			<0.010		mg/L		0.01	07-DEC-21
WG3671404-4 MS		**WG3671404-5**						

Quality Control Report

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50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4
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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CHLORITE-IC-DW-WT	**Water**							
Batch R5671178								
WG3671404-4 MS		**WG3671404-5**						
Chlorite			98.8		%		75-125	07-DEC-21
CN-TOT-ONT-DW-WT	**Water**							
Batch R5663116								
WG3668780-3 DUP		**WG3668780-5**						
Cyanide, Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	02-DEC-21
WG3668780-2 LCS								
Cyanide, Total			97.4		%		80-120	02-DEC-21
WG3668780-1 MB								
Cyanide, Total			<0.0020		mg/L		0.002	02-DEC-21
WG3668780-4 MS		**WG3668780-5**						
Cyanide, Total			96.8		%		70-130	02-DEC-21
DIQUAT-ONT-DW-WT	**Water**							
Batch R5673652								
WG3672276-3 DUP		**WG3672276-5**						
Diquat		<1.0	<1.0	RPD-NA	ug/L	N/A	30	09-DEC-21
WG3672276-2 LCS								
Diquat			109.9		%		70-130	09-DEC-21
WG3672276-1 MB								
Diquat			<1.0		ug/L		1	09-DEC-21
WG3672276-4 MS		**WG3672276-6**						
Diquat			108.3		%		70-130	09-DEC-21
DIURON-ONT-DW-WT	**Water**							
Batch R5673639								
WG3671922-3 DUP		**WG3671922-5**						
Diuron		<1.0	<1.0	RPD-NA	ug/L	N/A	30	09-DEC-21
WG3671922-2 LCS								
Diuron			109.6		%		70-130	09-DEC-21
WG3671922-1 MB								
Diuron			<1.0		ug/L		1	09-DEC-21
WG3671922-4 MS		**WG3671922-5**						
Diuron			108.5		%		70-130	09-DEC-21
F-DW-IC-WT	**Water**							

Quality Control Report

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50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F-DW-IC-WT	**Water**							
Batch R5663265								
WG3669087-14 DUP		**WG3669087-13**						
Fluoride (F)		<0.10	<0.10	RPD-NA	mg/L	N/A	20	02-DEC-21
WG3669087-12 LCS								
Fluoride (F)			101.6		%		90-110	02-DEC-21
WG3669087-11 MB								
Fluoride (F)			<0.10		mg/L		0.1	02-DEC-21
WG3669087-15 MS		**WG3669087-13**						
Fluoride (F)			102.9		%		75-125	02-DEC-21
GLYPHOSATE-ONT-DW-WT	**Water**							
Batch R5672549								
WG3671193-3 DUP		**L2666133-1**						
Glyphosate		<5.0	<5.0	RPD-NA	ug/L	N/A	30	08-DEC-21
AMPA		<0.50	<0.50	RPD-NA	ug/L	N/A	40	08-DEC-21
WG3671193-2 LCS								
Glyphosate			113.9		%		70-130	08-DEC-21
AMPA			100.6		%		70-130	08-DEC-21
WG3671193-1 MB								
Glyphosate			<5.0		ug/L		5	08-DEC-21
AMPA			<0.50		ug/L		0.5	08-DEC-21
WG3671193-4 MS		**L2666133-1**						
Glyphosate			99.1		%		70-130	08-DEC-21
AMPA			95.8		%		70-130	08-DEC-21
HG-T-ONT-DW-WT	**Water**							
Batch R5662140								
WG3668893-3 DUP		**WG3668893-5**						
Mercury		<0.10	<0.10	RPD-NA	ug/L	N/A	20	02-DEC-21
WG3668893-2 LCS								
Mercury			95.8		%		80-120	02-DEC-21
WG3668893-1 MB								
Mercury			<0.10		ug/L		0.1	02-DEC-21
WG3668893-4 MS		**WG3668893-6**						
Mercury			99.1		%		70-130	02-DEC-21
MET-ONT-DW-WT	**Water**							
Batch R5669643								
WG3671334-4 DUP		**WG3671334-3**						
Antimony (Sb)		<0.60	<0.60	RPD-NA	ug/L	N/A	25	07-DEC-21
Arsenic (As)		1.3	1.3		ug/L	0.3	25	07-DEC-21

Quality Control Report

Client: TOWNSHIP OF CENTRE WELLINGTON
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4
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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-ONT-DW-WT	**Water**							
Batch R5669643								
WG3671334-4 DUP		**WG3671334-3**						
Barium (Ba)		53	53		ug/L	0.4	25	07-DEC-21
Boron (B)		<50	<50	RPD-NA	ug/L	N/A	25	07-DEC-21
Cadmium (Cd)		<0.10	<0.10	RPD-NA	ug/L	N/A	25	07-DEC-21
Chromium (Cr)		<1.0	<1.0	RPD-NA	ug/L	N/A	25	07-DEC-21
Lead (Pb)		<1.0	<1.0	RPD-NA	ug/L	N/A	25	07-DEC-21
Selenium (Se)		<1.0	<1.0	RPD-NA	ug/L	N/A	25	07-DEC-21
Sodium (Na)		15.5	14.7		mg/L	5.1	25	07-DEC-21
Uranium (U)		<2.0	<2.0	RPD-NA	ug/L	N/A	25	07-DEC-21
WG3671334-2 LCS								
Antimony (Sb)			102.2		%		70-130	07-DEC-21
Arsenic (As)			101.7		%		70-130	07-DEC-21
Barium (Ba)			99.1		%		70-130	07-DEC-21
Boron (B)			97.7		%		70-130	07-DEC-21
Cadmium (Cd)			101.4		%		70-130	07-DEC-21
Chromium (Cr)			100.8		%		70-130	07-DEC-21
Lead (Pb)			103.7		%		70-130	07-DEC-21
Selenium (Se)			101.8		%		70-130	07-DEC-21
Sodium (Na)			102.6		%		70-130	07-DEC-21
Uranium (U)			105.6		%		70-130	07-DEC-21
WG3671334-1 MB								
Antimony (Sb)			<0.60		ug/L		0.6	07-DEC-21
Arsenic (As)			<1.0		ug/L		1	07-DEC-21
Barium (Ba)			<10		ug/L		10	07-DEC-21
Boron (B)			<50		ug/L		50	07-DEC-21
Cadmium (Cd)			<0.10		ug/L		0.1	07-DEC-21
Chromium (Cr)			<1.0		ug/L		1	07-DEC-21
Lead (Pb)			<1.0		ug/L		1	07-DEC-21
Selenium (Se)			<1.0		ug/L		1	07-DEC-21
Sodium (Na)			<0.50		mg/L		0.5	07-DEC-21
Uranium (U)			<2.0		ug/L		2	07-DEC-21
WG3671334-5 MS		**WG3671334-3**						
Antimony (Sb)			101.7		%		70-130	07-DEC-21
Arsenic (As)			105.3		%		70-130	07-DEC-21
Barium (Ba)			N/A	MS-B	%		-	07-DEC-21

Quality Control Report

Client: TOWNSHIP OF CENTRE WELLINGTON
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Kitchener ON N2P 0A4
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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-ONT-DW-WT	**Water**							
Batch R5669643								
WG3671334-5 MS		**WG3671334-3**						
Boron (B)			92.9		%		70-130	07-DEC-21
Cadmium (Cd)			101.3		%		70-130	07-DEC-21
Chromium (Cr)			96.9		%		70-130	07-DEC-21
Lead (Pb)			98.5		%		70-130	07-DEC-21
Selenium (Se)			113.5		%		70-130	07-DEC-21
Sodium (Na)			N/A	MS-B	%		-	07-DEC-21
Uranium (U)			N/A	MS-B	%		-	07-DEC-21
MICROCYSTIN-WP	**Water**							
Batch R5668198								
WG3670520-4 DUP		**L2668348-1**						
Microcystin		<0.20	<0.20	RPD-NA	ug/L	N/A	30	07-DEC-21
WG3670520-2 LCS								
Microcystin			96.3		%		70-130	07-DEC-21
WG3670520-1 MB								
Microcystin			<0.20		ug/L		0.2	07-DEC-21
WG3670520-3 MS		**L2668348-1**						
Microcystin			111.4		%		50-150	07-DEC-21
MISC-ONT-DW-WT	**Water**							
Batch R5668418								
WG3670344-2 LCS								
Alachlor			121.4		%		60-130	07-DEC-21
Atrazine			122.2		%		60-130	07-DEC-21
Atrazine-desethyl			72.5		%		50-130	07-DEC-21
Azinphos-methyl			162.3	LCS-H	%		60-140	07-DEC-21
Carbaryl			170.4	LCS-H	%		50-140	07-DEC-21
Carbofuran			143.7	LCS-H	%		60-140	07-DEC-21
Chlorpyriphos			114.3		%		60-130	07-DEC-21
Diazinon			113.1		%		60-130	07-DEC-21
Diclofop-methyl			110.5		%		60-140	07-DEC-21
Dimethoate			118.2		%		60-130	07-DEC-21
Malathion			130.9	LCS-H	%		60-130	07-DEC-21
Metribuzin			132.6	LCS-H	%		60-130	07-DEC-21
Metolachlor			129.0		%		60-130	07-DEC-21
Phorate			117.8		%		30-140	07-DEC-21

Quality Control Report

Client: TOWNSHIP OF CENTRE WELLINGTON
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4
Contact: Matthew Alexander c/o Centre Wellington

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MISC-ONT-DW-WT	**Water**							
Batch R5668418								
WG3670344-2 LCS								
Prometryne			126.4		%		60-130	07-DEC-21
Simazine			126.0		%		60-130	07-DEC-21
Terbufos			114.1		%		60-130	07-DEC-21
Triallate			106.4		%		60-130	07-DEC-21
Trifluralin			100.4		%		60-130	07-DEC-21
WG3670344-1 MB								
Alachlor			<0.10		ug/L		0.1	07-DEC-21
Atrazine			<0.10		ug/L		0.1	07-DEC-21
Atrazine-desethyl			<0.10		ug/L		0.1	07-DEC-21
Azinphos-methyl			<0.10		ug/L		0.1	07-DEC-21
Carbaryl			<0.20		ug/L		0.2	07-DEC-21
Carbofuran			<0.20		ug/L		0.2	07-DEC-21
Chlorpyriphos			<0.10		ug/L		0.1	07-DEC-21
Diazinon			<0.10		ug/L		0.1	07-DEC-21
Diclofop-methyl			<0.20		ug/L		0.2	07-DEC-21
Dimethoate			<0.10		ug/L		0.1	07-DEC-21
Malathion			<0.10		ug/L		0.1	07-DEC-21
Metribuzin			<0.10		ug/L		0.1	07-DEC-21
Metolachlor			<0.10		ug/L		0.1	07-DEC-21
Phorate			<0.10		ug/L		0.1	07-DEC-21
Prometryne			<0.10		ug/L		0.1	07-DEC-21
Simazine			<0.10		ug/L		0.1	07-DEC-21
Terbufos			<0.20		ug/L		0.2	07-DEC-21
Triallate			<0.10		ug/L		0.1	07-DEC-21
Trifluralin			<0.10		ug/L		0.1	07-DEC-21
Surrogate: 2-Fluorobiphenyl			72.4		%		40-130	07-DEC-21
NDMA-ONTDW-WT	**Water**							
Batch R5668102								
WG3669352-7 DUP		**WG3669352-9**						
N-Nitrosodimethylamine		<0.00090	<0.00090	RPD-NA	ug/L	N/A	30	06-DEC-21
WG3669352-2 LCS								
N-Nitrosodimethylamine			114.5		%		50-150	06-DEC-21
WG3669352-1 MB								
N-Nitrosodimethylamine			0.00150	RRQC	ug/L		0.0009	06-DEC-21

Quality Control Report

Client: TOWNSHIP OF CENTRE WELLINGTON
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4
Contact: Matthew Alexander c/o Centre Wellington

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NDMA-ONTDW-WT	**Water**							
Batch R5668102								
WG3669352-1 MB								
Surrogate: N-Nitrosodimethylamine-d6			68.2		%		50-150	06-DEC-21
COMMENTS: RRQC - all samples non-detect, MB hit qualified								
WG3669352-8 MS		**WG3669352-10**						
N-Nitrosodimethylamine			68.5		%		50-150	07-DEC-21
NO2-DW-IC-WT	**Water**							
Batch R5663265								
WG3669087-14 DUP		**WG3669087-13**						
Nitrite (as N)		<0.010	<0.010	RPD-NA	mg/L	N/A	20	02-DEC-21
WG3669087-12 LCS								
Nitrite (as N)			99.6		%		90-110	02-DEC-21
WG3669087-11 MB								
Nitrite (as N)			<0.010		mg/L		0.01	02-DEC-21
WG3669087-15 MS		**WG3669087-13**						
Nitrite (as N)			102.0		%		75-125	02-DEC-21
NO3-DW-IC-WT	**Water**							
Batch R5663265								
WG3669087-14 DUP		**WG3669087-13**						
Nitrate (as N)		0.173	0.174		mg/L	0.4	20	02-DEC-21
WG3669087-12 LCS								
Nitrate (as N)			99.9		%		90-110	02-DEC-21
WG3669087-11 MB								
Nitrate (as N)			<0.020		mg/L		0.02	02-DEC-21
WG3669087-15 MS		**WG3669087-13**						
Nitrate (as N)			102.0		%		75-125	02-DEC-21
NTA-WT	**Water**							
Batch R5671086								
WG3671831-3 DUP		**L2668348-1**						
Nitrilotriacetic Acid (NTA)		<0.20	<0.20	RPD-NA	mg/L	N/A	25	08-DEC-21
WG3671831-2 LCS								
Nitrilotriacetic Acid (NTA)			99.8		%		75-125	08-DEC-21
WG3671831-1 MB								
Nitrilotriacetic Acid (NTA)			<0.20		mg/L		0.2	08-DEC-21
WG3671831-4 MS		**L2668348-1**						
Nitrilotriacetic Acid (NTA)			86.7		%		50-150	08-DEC-21
OCP-ROUTINE-DW-WT	**Water**							

Quality Control Report

Client: TOWNSHIP OF CENTRE WELLINGTON
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4
Contact: Matthew Alexander c/o Centre Wellington

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
OCP-ROUTINE-DW-WT	**Water**							
Batch R5663790								
WG3668582-2 LCS								
a-chlordane			116.7		%		50-150	03-DEC-21
g-chlordane			122.4		%		50-150	03-DEC-21
op-DDT			130.5		%		50-150	03-DEC-21
pp-DDD			93.1		%		50-150	03-DEC-21
pp-DDE			115.7		%		50-150	03-DEC-21
pp-DDT			128.9		%		50-150	03-DEC-21
Oxychlordane			123.4		%		50-150	03-DEC-21
WG3668582-1 MB								
a-chlordane			<0.0080		ug/L		0.008	03-DEC-21
g-chlordane			<0.0080		ug/L		0.008	03-DEC-21
op-DDT			<0.0040		ug/L		0.004	03-DEC-21
pp-DDD			<0.004		ug/L		0.004	03-DEC-21
pp-DDE			<0.004		ug/L		0.004	03-DEC-21
pp-DDT			<0.0040		ug/L		0.004	03-DEC-21
Oxychlordane			<0.0080		ug/L		0.008	03-DEC-21
Surrogate: Decachlorobiphenyl			149.0		%		50-150	03-DEC-21
PAHERB-ONT-DW-WT	**Water**							
Batch R5667241								
WG3670496-3 DUP		**WG3670496-5**						
Dicamba		<0.20	<0.20	RPD-NA	ug/L	N/A	30	06-DEC-21
Bromoxynil		<0.20	<0.20	RPD-NA	ug/L	N/A	30	06-DEC-21
2,4-D		<0.20	<0.20	RPD-NA	ug/L	N/A	30	06-DEC-21
2,4,5-TP		<0.20	<0.20	RPD-NA	ug/L	N/A	50	06-DEC-21
Dinoseb		<0.20	<0.20	RPD-NA	ug/L	N/A	50	06-DEC-21
Picloram		<0.20	<0.20	RPD-NA	ug/L	N/A	30	06-DEC-21
MCPA		<0.20	<0.20	RPD-NA	ug/L	N/A	30	06-DEC-21
WG3670496-2 LCS								
Dicamba			95.3		%		65-130	06-DEC-21
Bromoxynil			121.8		%		65-130	06-DEC-21
2,4-D			96.1		%		65-130	06-DEC-21
2,4,5-TP			100.4		%		50-150	06-DEC-21
Dinoseb			91.2		%		50-150	06-DEC-21
Picloram			110.0		%		50-150	06-DEC-21
MCPA			104.1		%		65-130	06-DEC-21

Quality Control Report

Client: TOWNSHIP OF CENTRE WELLINGTON
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4
Contact: Matthew Alexander c/o Centre Wellington

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAHERB-ONT-DW-WT	**Water**							
Batch R5667241								
WG3670496-1 MB								
Dicamba			<0.20		ug/L		0.2	06-DEC-21
Bromoxynil			<0.20		ug/L		0.2	06-DEC-21
2,4-D			<0.20		ug/L		0.2	06-DEC-21
2,4,5-TP			<0.20		ug/L		0.2	06-DEC-21
Dinoseb			<0.20		ug/L		0.2	06-DEC-21
Picloram			<0.20		ug/L		0.2	06-DEC-21
MCPA			<0.20		ug/L		0.2	06-DEC-21
Surrogate: 2,4-Dichlorophenylacetic Acid			97.5		%		50-130	06-DEC-21
WG3670496-4 MS		**WG3670496-5**						
Dicamba			94.5		%		50-150	06-DEC-21
Bromoxynil			112.3		%		50-150	06-DEC-21
2,4-D			81.5		%		50-150	06-DEC-21
2,4,5-TP			106.4		%		50-150	06-DEC-21
Dinoseb			89.0		%		50-150	06-DEC-21
Picloram			108.8		%		50-150	06-DEC-21
MCPA			98.3		%		50-150	06-DEC-21
PARAQUAT-ONT-DW-WT	**Water**							
Batch R5673652								
WG3672276-3 DUP		**WG3672276-5**						
Paraquat		<1.0	<1.0	RPD-NA	ug/L	N/A	30	09-DEC-21
WG3672276-2 LCS								
Paraquat			107.3		%		70-130	09-DEC-21
WG3672276-1 MB								
Paraquat			<1.0		ug/L		1	09-DEC-21
WG3672276-4 MS		**WG3672276-6**						
Paraquat			82.0		%		70-130	09-DEC-21
PCB-ONT-DW-WT	**Water**							
Batch R5682879								
WG3668582-2 LCS								
Aroclor 1242			112.6		%		60-140	23-DEC-21
Aroclor 1254			107.2		%		60-140	23-DEC-21
Aroclor 1260			106.3		%		60-140	23-DEC-21
WG3668582-1 MB								
Aroclor 1242			<0.020		ug/L		0.02	23-DEC-21
Aroclor 1254			<0.020		ug/L		0.02	23-DEC-21

Quality Control Report

Client: TOWNSHIP OF CENTRE WELLINGTON
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4
Contact: Matthew Alexander c/o Centre Wellington

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PCB-ONT-DW-WT	**Water**							
Batch R5682879								
WG3668582-1 MB								
Aroclor 1260			<0.020		ug/L		0.02	23-DEC-21
Surrogate: Decachlorobiphenyl			126.8		%		50-150	23-DEC-21
Surrogate: Tetrachloro-m-xylene			89.3		%		50-150	23-DEC-21
TC,EC-QT51-DW-WT	**Water**							
Batch R5663256								
WG3668782-2 DUP		**L2668393-4**						
Total Coliforms		0	0		MPN/100mL	0.0	65	02-DEC-21
Escherichia Coli		0	0		MPN/100mL	0.0	65	02-DEC-21
WG3668782-1 MB								
Total Coliforms			0		MPN/100mL		1	02-DEC-21
Escherichia Coli			0		MPN/100mL		1	02-DEC-21
THM-ONT-DW-WT	**Water**							
Batch R5671794								
WG3671587-4 DUP		**WG3671587-3**						
Chloroform		5.4	5.3		ug/L	1.3	30	09-DEC-21
Bromodichloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	09-DEC-21
Dibromochloromethane		<2.0	<2.0	RPD-NA	ug/L	N/A	30	09-DEC-21
Bromoform		<2.0	<2.0	RPD-NA	ug/L	N/A	30	09-DEC-21
WG3671587-1 LCS								
Chloroform			107.6		%		70-130	09-DEC-21
Bromodichloromethane			112.8		%		70-130	09-DEC-21
Dibromochloromethane			101.5		%		70-130	09-DEC-21
Bromoform			94.5		%		70-130	09-DEC-21
WG3671587-2 MB								
Chloroform			<2.0		ug/L		2	09-DEC-21
Bromodichloromethane			<2.0		ug/L		2	09-DEC-21
Dibromochloromethane			<2.0		ug/L		2	09-DEC-21
Bromoform			<2.0		ug/L		2	09-DEC-21
Surrogate: 1,4-Difluorobenzene			98.7		%		50-150	09-DEC-21
WG3671587-5 MS		**WG3671587-3**						
Chloroform			102.9		%		70-130	09-DEC-21
Bromodichloromethane			107.4		%		70-130	09-DEC-21
Dibromochloromethane			93.8		%		70-130	09-DEC-21
Bromoform			85.6		%		70-130	09-DEC-21

Quality Control Report

Client: TOWNSHIP OF CENTRE WELLINGTON
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4
Contact: Matthew Alexander c/o Centre Wellington

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-ONT-DW-WT	**Water**							
Batch R5671794								
WG3671587-4 DUP		**WG3671587-3**						
1,1-dichloroethylene (vinylidene chlorid		<0.50	<0.50	RPD-NA	ug/L	N/A	30	09-DEC-21
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	09-DEC-21
1,2-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	09-DEC-21
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	09-DEC-21
Benzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	09-DEC-21
Carbon tetrachloride		<0.20	<0.20	RPD-NA	ug/L	N/A	30	09-DEC-21
Dichloromethane		<5.0	<5.0	RPD-NA	ug/L	N/A	30	09-DEC-21
Ethylbenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	09-DEC-21
Monochlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	09-DEC-21
Tetrachloroethylene (perchloroethylene)		<0.50	<0.50	RPD-NA	ug/L	N/A	30	09-DEC-21
Toluene		2.93	2.95		ug/L	0.7	30	09-DEC-21
Trichloroethylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	09-DEC-21
m/p-xylene		<1.0	<1.0	RPD-NA	ug/L	N/A	30	09-DEC-21
o-xylene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	09-DEC-21
Vinyl chloride		<0.20	<0.20	RPD-NA	ug/L	N/A	30	09-DEC-21
WG3671587-1 LCS								
1,1-dichloroethylene (vinylidene chlorid			113.4		%		70-130	09-DEC-21
1,2-Dichlorobenzene			105.6		%		70-130	09-DEC-21
1,2-Dichloroethane			105.4		%		70-130	09-DEC-21
1,4-Dichlorobenzene			104.8		%		70-130	09-DEC-21
Benzene			104.9		%		70-130	09-DEC-21
Carbon tetrachloride			103.1		%		70-130	09-DEC-21
Dichloromethane			106.6		%		70-130	09-DEC-21
Ethylbenzene			106.4		%		70-130	09-DEC-21
Monochlorobenzene			104.6		%		70-130	09-DEC-21
Tetrachloroethylene (perchloroethylene)			96.1		%		70-130	09-DEC-21
Toluene			99.1		%		70-130	09-DEC-21
Trichloroethylene			101.8		%		70-130	09-DEC-21
m/p-xylene			107.5		%		70-130	09-DEC-21
o-xylene			105.1		%		70-130	09-DEC-21
Vinyl chloride			100.1		%		60-140	09-DEC-21
WG3671587-2 MB								
1,1-dichloroethylene (vinylidene chlorid			<0.50		ug/L		0.5	09-DEC-21
							0.5	

Quality Control Report

Client: TOWNSHIP OF CENTRE WELLINGTON
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4
Contact: Matthew Alexander c/o Centre Wellington

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-ONT-DW-WT	**Water**							
Batch R5671794								
WG3671587-2 MB								
1,2-Dichlorobenzene			<0.50		ug/L		0.5	09-DEC-21
1,2-Dichloroethane			<0.50		ug/L		0.5	09-DEC-21
1,4-Dichlorobenzene			<0.50		ug/L		0.5	09-DEC-21
Surrogate: 1,4-Difluorobenzene			98.7		%		70-130	09-DEC-21
Benzene			<0.50		ug/L		0.5	09-DEC-21
Carbon tetrachloride			<0.20		ug/L		0.2	09-DEC-21
Dichloromethane			<5.0		ug/L		5	09-DEC-21
Ethylbenzene			<0.50		ug/L		0.5	09-DEC-21
Monochlorobenzene			<0.50		ug/L		0.5	09-DEC-21
Tetrachloroethylene (perchloroethylene)			<0.50		ug/L		0.5	09-DEC-21
Toluene			<0.50		ug/L		0.5	09-DEC-21
Trichloroethylene			<0.50		ug/L		0.5	09-DEC-21
m/p-xylene			<1.0		ug/L		1	09-DEC-21
o-xylene			<0.50		ug/L		0.5	09-DEC-21
Vinyl chloride			<0.20		ug/L		0.2	09-DEC-21
Surrogate: 4-Bromofluorobenzene			91.9		%		70-130	09-DEC-21
WG3671587-5 MS		**WG3671587-3**						
1,1-dichloroethylene (vinylidene chlorid			107.8		%		70-130	09-DEC-21
1,2-Dichlorobenzene			99.7		%		70-130	09-DEC-21
1,2-Dichloroethane			99.4		%		70-130	09-DEC-21
1,4-Dichlorobenzene			100.5		%		70-130	09-DEC-21
Benzene			99.8		%		70-130	09-DEC-21
Carbon tetrachloride			100.3		%		70-130	09-DEC-21
Dichloromethane			100.6		%		70-130	09-DEC-21
Ethylbenzene			101.2		%		70-130	09-DEC-21
Monochlorobenzene			99.4		%		70-130	09-DEC-21
Tetrachloroethylene (perchloroethylene)			93.0		%		70-130	09-DEC-21
Toluene			95.0		%		50-150	09-DEC-21
Trichloroethylene			97.1		%		70-130	09-DEC-21
m/p-xylene			102.6		%		70-130	09-DEC-21
o-xylene			99.7		%		50-150	09-DEC-21
Vinyl chloride			92.4		%		70-130	09-DEC-21

Quality Control Report

Workorder: L2668348 Report Date: 23-DEC-21

Client: TOWNSHIP OF CENTRE WELLINGTON
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4
Contact: Matthew Alexander c/o Centre Wellington

Legend:

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

Sample Parameter Qualifier Definitions:

Qualifier	Description
LCS-H	Lab Control Sample recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.
RRQC	Refer to report remarks for information regarding this QC result.

Hold Time Exceedances:

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

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

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

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

Chain of Custo

Ca L2668348-COFC

COC Number: 20 - 945121

Page of

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Report To	Contact and company name below will appear on the final report	Reports / Recipients	Turnaround Time (TAT) Requested
Company:	[illegible] Canada Ltd / Cho-wellington	Select Report Format: ☒ PDF ☒ EXCEL ☐ EDD (DIGITAL)	☒ Routine [R] if received by 3pm M-F - no surcharges apply
Contact:	Matthew Alexander	Merge QC/QCI Reports with COA ☒ YES ☐ NO ☐ N/A	☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum
Phone:	226 - 521 - 4906	☒ Compare Results to Criteria on Report - provide details below if box checked	☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum
	Company address below will appear on the final report	Select Distribution: ☒ EMAIL ☐ MAIL ☐ FAX	☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum
Street:	50 Spot Street (Unit 2)	Email 1 or Fax [illegible]	☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum
City/Province:	Kitchener, ON	Email 2	☐ Same day [E2] if received by 10am M-S - 200% rush surcharge. Additional fees may apply to rush requests on weekends, statutory holidays and non-routine tests
Postal Code:	N2E 2P4	Email 3	AFFIX ALS BARCODE LABEL HERE (ALS use only)
Invoice To	Same as Report To ☐ YES ☒ NO	Invoice Recipients	Date and Time Required for all E&P TATs:
	Copy of Invoice with Report ☐ YES ☒ NO	Select Invoice Distribution: ☒ EMAIL ☐ MAIL ☐ FAX	For all tests with rush TATs requested, please contact your AM to confirm availability.
Company:	City of Wellington (13306)	Email 1 or Fax [illegible]	
Contact:	Adam Lehmann	Email 2	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	[illegible]	AFE/Cost Center:	PO#
Job #:	[illegible]	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (ALS use only):	L2668348	ALS Contact:	Sampler:

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	[illegible]	12/01/2021	11:00	GW	29	[illegible]			

Analysis Request

Drinking Water (DW) Samples[1] (client use)	Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)
Are samples taken from a Regulated DW System? ☐ YES ☒ NO	BR 333803 - Schedule 18 O. Reg 169 Parameters
Are samples for human consumption/ use? ☐ YES ☒ NO	

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☐ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
				5.4	1.1		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (ALS use only)			FINAL SHIPMENT RECEPTION (ALS use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by: AP	Date: 1-Dec 21	Time: 14:40

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

AUG 2021 FRONT

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

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

SASKATCHEWAN RESEARCH COUNCIL

Environmental Analytical Laboratories
143-111 Research Drive, Saskatoon, SK Canada S7N 3R2

T: 306-933-6932 **F:** 306-933-7922
Toll-free: 1-800-240-8808
E: analytical@src.sk.ca

www.src.sk.ca/analytical

SRC Group # 2021-15209

Dec 14, 2021

AGAT Labs
5835 Coopers Ave
Mississauga, ON L4Z 1Y2
Attn: Eva Janzen

Date Samples Received: Dec-03-2021 Client P.O.: 185010

All results have been reviewed and approved by a Qualified Person in accordance with the Saskatchewan Environmental Code, Corrective Action Plan Chapter, for the purposes of certifying a laboratory analysis

Results from Lab Section 3 approved by Moser, Pat

---

* Test methods and data are validated by the laboratory's Quality Assurance Program.

* Routine methods follow recognized procedures from sources such as
    * Standard Methods for the Examination of Water and Wastewater APHA AWWA WEF
    * Environment Canada
    * US EPA
    * CANMET

* The results reported relate only to the test samples as provided by the client.

* Samples will be kept for 30 days after the final report is sent. Please contact the lab if you have any special requirements.

* Additional information is available upon request.

* Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

This is a final report.

SASKATCHEWAN RESEARCH COUNCIL

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SRC Group # 2021-15209

Dec 14, 2021

AGAT Labs

5835 Coopers Ave
Mississauga, ON L4Z 1Y2
Attn: Eva Janzen

Date Samples Received: Dec-03-2021 Client P.O.: 185010

56561 12/01/2021 21T838364 3282837 *WATER*

Analyte	Units	56561
Lab Section 3		
Chloramines	mg/L	<0.01

Symbol of "<" means "less than". This indicates that it was not detected at level stated above.

The temperature of the cooler was 11.3 °C upon receipt.

SASKATCHEWAN RESEARCH COUNCIL

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SRC Group # 2021-15209

Dec 14, 2021

AGAT Labs

Analyte Methods

Name	Units	Method
Chloramines	mg/L	CHM-340

SASKATCHEWAN RESEARCH COUNCIL
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Dec 14, 2021

This report was generated for samples included in SRC Group # 2021-15209

Quality Control Report

Eva Janzen
AGAT Labs
5835 Coopers Ave
Mississauga, ON L4Z 1Y2

Reference Materials and Standards:

A reference material of known concentration is used whenever possible as either a control sample or control standard and analyzed with each batch of samples. These "QC" results are used to assess the performance of the method and must be within clearly defined limits; otherwise corrective action is required.

QC Analysis	Units	Target Value	Obtained Value
Free chlorine	mg/L	25.0	29.5
Total residual chlorine	mg/L	1.13	1.02

Duplicates:

Duplicates are used to assess problems with precision and help ensure that samples within a given batch were processed appropriately. The difference between duplicates must be within strict limits, otherwise corrective action is required. Please note, the duplicate(s) in this report are duplicates analyzed within a given batch of test samples and may not be from this specific group of samples.

Duplicate Analysis	Units	Sample ID	First Result	Second Result
Chloramines	mg/L	56561	<0.01	<0.01

All quality control results were within the specified limits and considered acceptable.

Approved by Section Supervisor

Your P.O. #: 185144
Your Project #: 21T838364

Attention: Eva Janzen

AGAT Laboratories
5835 Coopers Ave
Mississauga, ON
CANADA L4Z 1Y2

Report Date: 2022/01/21
Report #: R6971709
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1Y7286
Received: 2021/12/07, 14:05

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
DW Parameters by Alpha Spec.	1	N/A	2021/12/20	BQL SOP-00006	Alpha Spectrometry
Long-lived Gamma Emitters	1	N/A	2021/12/07	BQL SOP-00007	Gamma Spectrometry
Short-lived Gamma Emitters	1	N/A	2021/12/07		Gamma Spectroscopy
Iodine-125 & Iodine-129 in Water	1	N/A	2021/12/21		Gamma Spectroscopy
Drinking Water Parameters by LSC	1	N/A	2021/12/13		LSC
Lead 210	1	N/A	2021/12/22	BQL SOP-00008	GFPC
Polonium-210 by Alpha Spectrometry	1	N/A	2021/12/16	BQL SOP-00006	Alpha Spectrometry
Radium-228 & Thorium-234 in Water	1	N/A	2021/12/16		Gamma Spectroscopy
Radium Isotopes by Alpha Spectrometry (1)	1	N/A	2021/12/17	BQL SOP-00006 BQL SOP-00017 BQL SOP-00032	Alpha Spectrometry
Strontium-90 by Proportional Counting	1	N/A	2021/12/18	BQL SOP-00008	GFPC
Tritium & Carbon-14 by Liq. Sc. Counting	1	N/A	2021/12/16	BQL SOP-00009	LSC
Uranium Isotopes by Alpha Spectrometry	1	N/A	2021/12/20	BQL SOP-00006	Alpha Spectrometry

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.

Your P.O. #: 185144
Your Project #: 21T838364

Attention: Eva Janzen

AGAT Laboratories
5835 Coopers Ave
Mississauga, ON
CANADA L4Z 1Y2

Report Date: 2022/01/21
Report #: R6971709
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1Y7286
Received: 2021/12/07, 14:05

This Certificate shall not be reproduced except in full, without the written approval of the laboratory.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
(1) Radium-226 results have not been corrected for blanks.

Encryption Key

AUTHORIZED REPORT
RAPPORT AUTORISÉ

Bureau Veritas
21 Jan 2022 15:34:29

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Mayank Nigam, Project Manager
Email: Mayank.Nigam@bureauveritas.com
Phone# (905) 826-3080
==========
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

Bureau Veritas ID		RIE671		
Sampling Date		2021/12/01 12:00		
	UNITS	3282837	RDL	QC Batch
Americium-241	Bq/L	<0.01	0.01	7754425
Bismuth-210	Bq/L	<20	20	7761710
Calcium-45	Bq/L	<20	20	7761710
Cesium-131	Bq/L	<20	20	7761710
Iron-55	Bq/L	<20	20	7761710
Phosphorus-32	Bq/L	<20	20	7761710
Plutonium-238	Bq/L	<0.01	0.01	7754425
Plutonium-239	Bq/L	<0.01	0.01	7754425
Plutonium-240	Bq/L	<0.01	0.01	7754425
Plutonium-241	Bq/L	<5	5	7761710
Polonium-210	Bq/L	<0.010	0.010	7753020
Strontium-89	Bq/L	<20	20	7761710
Sulphur-35	Bq/L	<20	20	7761710
Technetium-99	Bq/L	<20	20	7761710
Thorium-228	Bq/L	<0.01	0.01	7754425
Thorium-230	Bq/L	<0.01	0.01	7754425
Thorium-232	Bq/L	<0.01	0.01	7754425
Uranium-234	Bq/L	<0.010	0.010	7754444
Uranium-235	Bq/L	<0.010	0.010	7754444
Uranium-238	Bq/L	<0.010	0.010	7754444
Yttrium-90	Bq/L	<20	20	7761710
Yttrium-91	Bq/L	<20	20	7761710
Bromine-82	Bq/L	<2	2	7760842
Carbon-14	Bq/L	<20	20	7761708
Cesium-137	Bq/L	<2	2	7760842
Gallium-67	Bq/L	<10	10	7760842
Iodine-125	Bq/L	<1	1	7747947
Iodine-129	Bq/L	<1	1	7747947
Lead-210	Bq/L	<0.10	0.10	7750963
Mercury-197	Bq/L	<5	5	7760842
Molybdenum-99	Bq/L	<3	3	7760842
Radium-224	Bq/L	<0.010	0.010	7753111
Radium-226	Bq/L	<0.010	0.010	7753111
Radium-228	Bq/L	<0.1	0.1	7760725
Rhodium-105	Bq/L	<10	10	7760842
Rubidium-81	Bq/L	<3	3	7760842
Strontium-90	Bq/L	<0.10	0.10	7754053

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Bureau Veritas Laboratories 6790 Kitimat Rd, Unit 4, Mississauga, ON L5N 5L9 Phone: (905) 826-3080 Fax: (905) 826-4151 Toll Free: 1 877-726-3080 www.bvlabs.com

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		RIE671		
Sampling Date		2021/12/01 12:00		
	UNITS	3282837	RDL	QC Batch
Technetium-99m	Bq/L	<2	2	7760842
Tellurium-131m	Bq/L	<3	3	7760842
Thallium-201	Bq/L	<10	10	7760842
Thorium-234	Bq/L	<7	7	7760725
Tritium	Bq/L	<100	100	7761708
Antimony-122	Bq/L	<1	1	7760841
Antimony-124	Bq/L	<1	1	7760841
Antimony-125	Bq/L	<2	2	7760841
Barium-140	Bq/L	<3	3	7760841
Beryllium-7	Bq/L	<6	6	7760841
Calcium-47	Bq/L	<2	2	7760841
Cerium-141	Bq/L	<1	1	7760841
Cerium-144	Bq/L	<3	3	7760841
Cesium-134	Bq/L	<1	1	7760841
Cesium-136	Bq/L	<1	1	7760841
Chromium-51	Bq/L	<5	5	7760841
Cobalt-57	Bq/L	<1	1	7760841
Cobalt-58	Bq/L	<1	1	7760841
Cobalt-60	Bq/L	<1	1	7760841
Gold-198	Bq/L	<1	1	7760841
Indium-111	Bq/L	<1	1	7760841
Iodine-131	Bq/L	<1	1	7760841
Iron-59	Bq/L	<2	2	7760841
Manganese-54	Bq/L	<1	1	7760841
Mercury-203	Bq/L	<1	1	7760841
Neptunium-239	Bq/L	<3	3	7760841
Niobium-95	Bq/L	<1	1	7760841
Rubidium-86	Bq/L	<10	10	7760841
Ruthenium-103	Bq/L	<1	1	7760841
Ruthenium-106	Bq/L	<8	8	7760841
Selenium-75	Bq/L	<1	1	7760841
Silver-108m	Bq/L	<1	1	7760841
Silver-110m	Bq/L	<1	1	7760841
Silver-111	Bq/L	<8	8	7760841
Sodium-22	Bq/L	<1	1	7760841
Strontium-85	Bq/L	<10	10	7760841
Tellurium-129m	Bq/L	<9	9	7760841

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		RIE671		
Sampling Date		2021/12/01 12:00		
	UNITS	3282837	RDL	QC Batch
Tellurium-132	Bq/L	<1	1	7760841
Ytterbium-169	Bq/L	<1	1	7760841
Zinc-65	Bq/L	<2	2	7760841
Zirconium-95	Bq/L	<2	2	7760841

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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GENERAL COMMENTS

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
7747947	FK1	QC Standard	Iodine-129	2012/06/21		97	%	N/A
7747947	FK1	Method Blank	Iodine-125	2021/12/16	<1		Bq/L	
			Iodine-129	2021/12/16	<1		Bq/L	
7747947	FK1	RPD	Iodine-125	2021/12/20	NC		%	N/A
			Iodine-129	2021/12/20	NC		%	N/A
7750963	FK1	Spiked Blank	Lead-210	2021/12/22		102	%	80 - 120
7750963	FK1	Method Blank	Lead-210	2021/12/22	<0.10		Bq/L	
7750963	FK1	RPD	Lead-210	2021/12/22	NC		%	N/A
7753020	FK1	Spiked Blank	Polonium-210	2021/12/16		90	%	74 - 126
7753020	FK1	Method Blank	Polonium-210	2021/12/16	<0.010		Bq/L	
7753020	FK1	RPD	Polonium-210	2021/12/16	NC		%	N/A
7753111	FK1	QC Standard	Radium-224	2021/12/17		97	%	85 - 115
			Radium-226	2021/12/17		90	%	85 - 115
7753111	FK1	Spiked Blank	Radium-226	2021/12/17		97	%	85 - 115
7753111	FK1	Method Blank	Radium-224	2021/12/17	<0.010		Bq/L	
			Radium-226	2021/12/17	<0.010		Bq/L	
7753111	FK1	RPD [RIE671-01]	Radium-224	2021/12/17	NC		%	N/A
			Radium-226	2021/12/17	NC		%	N/A
7754053	JK2	Spiked Blank	Strontium-90	2021/12/18		95	%	75 - 125
7754053	JK2	Method Blank	Strontium-90	2021/12/18	<0.10		Bq/L	
7754053	JK2	RPD	Strontium-90	2021/12/18	NC		%	N/A
7754425	JK2	Spiked Blank	Thorium-228	2021/12/20		93	%	63 - 137
			Thorium-230	2021/12/20		105	%	63 - 137
			Thorium-232	2021/12/20		100	%	63 - 137
7754425	JK2	Method Blank	Americium-241	2021/12/20	<0.01		Bq/L	
			Plutonium-238	2021/12/20	<0.01		Bq/L	
			Plutonium-239	2021/12/20	<0.01		Bq/L	
			Plutonium-240	2021/12/20	<0.01		Bq/L	
			Thorium-228	2021/12/20	<0.01		Bq/L	
			Thorium-230	2021/12/20	<0.01		Bq/L	
			Thorium-232	2021/12/20	<0.01		Bq/L	
7754425	JK2	RPD	Americium-241	2021/12/20	NC		%	N/A
			Plutonium-238	2021/12/20	NC		%	N/A
			Plutonium-239	2021/12/20	NC		%	N/A
			Plutonium-240	2021/12/20	NC		%	N/A
			Thorium-228	2021/12/20	NC		%	N/A
			Thorium-230	2021/12/20	NC		%	N/A
			Thorium-232	2021/12/20	NC		%	N/A
7754444	JK2	Spiked Blank	Uranium-234	2021/12/20		100	%	N/A
			Uranium-235	2021/12/20		101	%	N/A
			Uranium-238	2021/12/20		103	%	N/A
7754444	JK2	Method Blank	Uranium-234	2021/12/20	<0.010		Bq/L	
			Uranium-235	2021/12/20	<0.010		Bq/L	
			Uranium-238	2021/12/20	<0.010		Bq/L	
7754444	JK2	RPD	Uranium-234	2021/12/20	NC		%	N/A
			Uranium-235	2021/12/20	NC		%	N/A
			Uranium-238	2021/12/20	NC		%	N/A
7760725	DS2	QC Standard	Radium-228	2021/12/15		102	%	N/A
			Thorium-234	2021/12/15		95	%	N/A
7760725	DS2	Method Blank	Radium-228	2021/12/14	<0.1		Bq/L	
			Thorium-234	2021/12/14	<7		Bq/L	
7760841	DS2	QC Standard	Cesium-134	2021/12/09		95	%	N/A
			Cobalt-60	2021/12/09		102	%	N/A
			Iodine-131	2021/12/09		98	%	N/A

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
7760841	DS2	Method Blank	Antimony-122	2021/12/12	<1		Bq/L	
			Antimony-124	2021/12/12	<1		Bq/L	
			Antimony-125	2021/12/12	<2		Bq/L	
			Barium-140	2021/12/12	<3		Bq/L	
			Beryllium-7	2021/12/12	<6		Bq/L	
			Calcium-47	2021/12/12	<2		Bq/L	
			Cerium-141	2021/12/12	<1		Bq/L	
			Cerium-144	2021/12/12	<3		Bq/L	
			Cesium-134	2021/12/12	<1		Bq/L	
			Cesium-136	2021/12/12	<1		Bq/L	
			Chromium-51	2021/12/12	<5		Bq/L	
			Cobalt-57	2021/12/12	<1		Bq/L	
			Cobalt-58	2021/12/12	<1		Bq/L	
			Cobalt-60	2021/12/12	<1		Bq/L	
			Gold-198	2021/12/12	<1		Bq/L	
			Indium-111	2021/12/12	<1		Bq/L	
			Iodine-131	2021/12/12	<1		Bq/L	
			Iron-59	2021/12/12	<2		Bq/L	
			Manganese-54	2021/12/12	<1		Bq/L	
			Mercury-203	2021/12/12	<1		Bq/L	
			Neptunium-239	2021/12/12	<3		Bq/L	
			Niobium-95	2021/12/12	<1		Bq/L	
			Rubidium-86	2021/12/12	<10		Bq/L	
			Ruthenium-103	2021/12/12	<1		Bq/L	
			Ruthenium-106	2021/12/12	<8		Bq/L	
			Selenium-75	2021/12/12	<1		Bq/L	
			Silver-108m	2021/12/12	<1		Bq/L	
			Silver-110m	2021/12/12	<1		Bq/L	
			Silver-111	2021/12/12	<8		Bq/L	
			Sodium-22	2021/12/12	<1		Bq/L	
			Strontium-85	2021/12/12	<10		Bq/L	
			Tellurium-129m	2021/12/12	<9		Bq/L	
			Tellurium-132	2021/12/12	<1		Bq/L	
			Ytterbium-169	2021/12/12	<1		Bq/L	
			Zinc-65	2021/12/12	<2		Bq/L	
			Zirconium-95	2021/12/12	<2		Bq/L	
7760841	DS2	RPD [RIE671-01]	Antimony-122	2021/12/08	NC		%	N/A
			Antimony-124	2021/12/08	NC		%	N/A
			Antimony-125	2021/12/08	NC		%	N/A
			Barium-140	2021/12/08	NC		%	N/A
			Beryllium-7	2021/12/08	NC		%	N/A
			Calcium-47	2021/12/08	NC		%	N/A
			Cerium-141	2021/12/08	NC		%	N/A
			Cerium-144	2021/12/08	NC		%	N/A
			Cesium-134	2021/12/08	NC		%	N/A
			Cesium-136	2021/12/08	NC		%	N/A
			Chromium-51	2021/12/08	NC		%	N/A
			Cobalt-57	2021/12/08	NC		%	N/A
			Cobalt-58	2021/12/08	NC		%	N/A
			Cobalt-60	2021/12/08	NC		%	N/A
			Gold-198	2021/12/08	NC		%	N/A
			Indium-111	2021/12/08	NC		%	N/A
			Iodine-131	2021/12/08	NC		%	N/A
			Iron-59	2021/12/08	NC		%	N/A

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Manganese-54	2021/12/08	NC		%	N/A
			Mercury-203	2021/12/08	NC		%	N/A
			Neptunium-239	2021/12/08	NC		%	N/A
			Niobium-95	2021/12/08	NC		%	N/A
			Rubidium-86	2021/12/08	NC		%	N/A
			Ruthenium-103	2021/12/08	NC		%	N/A
			Ruthenium-106	2021/12/08	NC		%	N/A
			Selenium-75	2021/12/08	NC		%	N/A
			Silver-108m	2021/12/08	NC		%	N/A
			Silver-110m	2021/12/08	NC		%	N/A
			Silver-111	2021/12/08	NC		%	N/A
			Sodium-22	2021/12/08	NC		%	N/A
			Strontium-85	2021/12/08	NC		%	N/A
			Tellurium-129m	2021/12/08	NC		%	N/A
			Tellurium-132	2021/12/08	NC		%	N/A
			Ytterbium-169	2021/12/08	NC		%	N/A
			Zinc-65	2021/12/08	NC		%	N/A
			Zirconium-95	2021/12/08	NC		%	N/A
7760842	DS2	QC Standard	Cesium-137	2021/12/09		95	%	N/A
7760842	DS2	Method Blank	Bromine-82	2021/12/12	<2		Bq/L	
			Cesium-137	2021/12/12	<2		Bq/L	
			Gallium-67	2021/12/12	<10		Bq/L	
			Mercury-197	2021/12/12	<5		Bq/L	
			Molybdenum-99	2021/12/12	<3		Bq/L	
			Rhodium-105	2021/12/12	<10		Bq/L	
			Rubidium-81	2021/12/12	<3		Bq/L	
			Technetium-99m	2021/12/12	<2		Bq/L	
			Tellurium-131m	2021/12/12	<3		Bq/L	
			Thallium-201	2021/12/12	<10		Bq/L	
7761708	DS2	Spiked Blank	Carbon-14	2021/12/16		98	%	80 - 120
			Tritium	2021/12/16		101	%	N/A
7761708	DS2	Method Blank	Carbon-14	2021/12/16	<20		Bq/L	
			Tritium	2021/12/16	<100		Bq/L	
7761708	DS2	RPD	Carbon-14	2021/12/16	NC		%	N/A
			Tritium	2021/12/16	NC		%	N/A
7761710	DS2	Method Blank	Bismuth-210	2021/12/12	<20		Bq/L	
			Calcium-45	2021/12/12	<20		Bq/L	
			Cesium-131	2021/12/12	<20		Bq/L	
			Iron-55	2021/12/12	<20		Bq/L	
			Phosphorus-32	2021/12/12	<20		Bq/L	
			Plutonium-241	2021/12/12	<5		Bq/L	
			Strontium-89	2021/12/12	<20		Bq/L	
			Sulphur-35	2021/12/12	<20		Bq/L	
			Technetium-99	2021/12/12	<20		Bq/L	
			Yttrium-90	2021/12/12	<20		Bq/L	
			Yttrium-91	2021/12/12	<20		Bq/L	
7761710	DS2	RPD	Bismuth-210	2021/12/12	NC		%	N/A
			Calcium-45	2021/12/12	NC		%	N/A
			Cesium-131	2021/12/12	NC		%	N/A
			Iron-55	2021/12/12	NC		%	N/A
			Phosphorus-32	2021/12/12	NC		%	N/A
			Plutonium-241	2021/12/12	NC		%	N/A
			Strontium-89	2021/12/12	NC		%	N/A
			Sulphur-35	2021/12/12	NC		%	N/A

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Technetium-99	2021/12/12	NC		%	N/A
			Yttrium-90	2021/12/12	NC		%	N/A
			Yttrium-91	2021/12/12	NC		%	N/A

N/A = Not Applicable

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

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

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

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

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

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Bureau Veritas Job #: C1Y7286
Report Date: 2022/01/21

AGAT Laboratories
Client Project #: 21T838364
Your P.O. #: 185144

VALIDATION SIGNATURE PAGE

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



Robert Allen, Scientific Specialist

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

Bureau Veritas Laboratories 6790 Kitimat Rd, Unit 4, Mississauga, ON L5N 5L9 Phone: (905) 826-3080 Fax: (905) 826-4151 Toll Free: 1 877-726-3080 www.bvlabs.com

SGS

Request for Laboratory Services and CHAIN OF CUSTODY (specific SDWA/HPPA - 1st Party)

SGS Environmental Services - Lakefield: 185 Concession St., Lakefield, ON K0L 2H0 Phone: 705-652-2000 Toll Free: 877-747-7658 Fax: 705-652-6365 Web: www.ca.sgs.com

Laboratory Information Section

Received Date (mm/dd/yyyy): DEC 03 2021 — LAB LIMS #: dec 176880

Received Time (After Hours Only): __ : __ — Temperature Upon Receipt (°C): 8

Billing & Reporting Information

Invoice/ Receipt to:	Company:	Accounts Payable			Quote #:
	Attention:	AGAT Laboratories - Mississauga			Attached Parameter List: ☐ YES ☐ NO
	Address:	5835 Coopers Avenue, Mississauga, ON, L4Z1Y2			
	Email:	gough@agatlabs.com			**Turnaround Time**
Report to: {3}	Attention:	Eva Janzen, Nathan Berkely	PO #:	185009	Is *Rush Turnaround Time Required? ☐ YES ☑ NO
	Email:	janzen@agatlabs.com. berkeley@agatlabs.com	Job #:	21T838364	Specify:
	Phone:	905-712-5100 Ext. 5096	Fax:		* Rush TA Requests Require Lab Approval

Drinking Water System Information (Exceedance Reporting Information)

System Name:		**Waterworks/DWS #:**	**Client Lab #:**
Physical Address:		**Contact Phone Number:**	
Contact Name:		**Contact Fax Number:**	
MOH Unit (Ministry of Health):		**Day Care Licence # or SFIS #:**	

Please check the regulation that applies to your water samples: O.Reg. 170/03 ☐ — O.Reg 318/08 O.Reg 319/08 ☐ — O.Reg 243/07 ☐ — Certificate of Approval Requirement ☐ — Samples NOT Regulated ☑

As per the Ontario Safe Drinking Water Act and Health Protection and Promotion Act, the water facility information and the sample information sections **must be filled out prior to processing samples**. Sample Source Codes * indicate whether samples are Reportable or Not Reportable. The laboratory will report all exceedances to the SDWA/HPPA as per sample the applicable regulation and source codes.

Sample Information

Bottle #	Sample Source Code*	Sample Location Name	Check if Re-Sample From an Adverse Report	Date Sampled (mm/dd/yy)	Time Sampled	# of Bottles	Field Total Residual Chlorine	Field Free Residual Chlorine	Analysis Requested (please enter the analysis required below and check off which analysis applies to each sample) — Bromate				
1	NR	3282837		Dec 01/21	12:00PM	1			x				
2													
3													
4													
5													
6													
7		*Non Reportable Drinking Water											
8													
9		bottle is not											
10		labelled w/ it											
11		sample is preserved.					For NP/NPE work please report in mg/L						
12		new											

Sampled By {1}: (Name) — (Signature) — Date: __ __ / __ __ / __ __ (mm/dd/yy)

Relinquished by {2}: Neal Gorospe — Neal Gorospe — Date: 12 /02 /21 (mm/dd/yy)

* Sample Source Codes

DW-Distribution Water: Water in the DWS that is in the distribution system. These samples are reportable under applicable Ontario drinking water regulations
TW-Treated Water: Water in the DWS at the point of entry to the distribution system. These samples are reportable under applicable Ontario drinking water regulations
RW-Raw Water: Water source for a DWS that has a treatment system. These samples are not for consumption and not reportable under applicable Ontario drinking water regulations
RWFC-Raw Water For Consumption: Water source for a DWS that **does not** have a treatment system. These samples **are for consumption** and are reportable under applicable Ontario drinking water regulations
TAP-Tap Water: Water taken for the purposes of lead testing under O.Reg. 243/07
NR-Not Reportable: Water samples that are not reportable under applicable Ontario drinking water regulations

Note: {1} Submission of samples to SGS is acknowledgement that you have been provided direction on sample collection/handling and transportation of samples. {2} Submission of samples to SGS is considered authorization for completion of work. Signatures may appear on this form or be retained on file in the contract, or in an alternative format (e.g. shipping documents). {3} Results may be sent by email to an unlimited number of addresses for no additional cost. Fax is available upon request.

This document is issued by the Company under its General Conditions of Service accessible at http://www.sgs.com/terms_and_conditions.htm. (Printed copies are available upon request.) Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

Revision # 3.1
Date of Issue: 06 Sep 2011

PP # 333268896650
10:00 KC

SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

09-December-2021

AGAT Laboratories - Mississauga
Attn : Eva Janzen / Nathan Berkeley

5835 Coopers Avenue
Mississauga, ON
L4Z 1Y2, Canada

Phone: 905-712-5096
Fax:

Date Rec. : 03 December 2021
LR Report: **CA17680-DEC21**
Reference: PO#: 185009 - AGAT Job #: 21T838364

Copy: #1

CERTIFICATE OF ANALYSIS
Final Report

Sample ID	Sample Date & Time	Temperature Upon Receipt °C	Bromate mg/L
1: Analysis Start Date		---	06-Dec-21
2: Analysis Start Time		---	14:04
3: Analysis Completed Date		---	08-Dec-21
4: Analysis Completed Time		---	14:59
5: QC - Blank		---	< 0.005
6: QC - STD % Recovery		---	100%
7: QC - DUP % RPD		---	ND
8: RL		---	0.005
9: NR 3282837	01-Dec-21 12:00	8.0	< 0.005

RL - SGS Reporting Limit
NR - Not regulated / reportable under applicable Provincial drinking water regulations as per client.
ND - Not Detected

Kimberley Didsbury
Project Specialist,
Environment, Health & Safety

OnLine LIMS

0002738056

Data reported represents the sample submitted to SGS. Reproduction of this analytical report in full or in part is prohibited without prior written approval. Please refer to SGS General Conditions of Services located at https://www.sgs.ca/en/terms-and-conditions (Printed copies are available upon request.)
Test method information available upon request. "Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples. SGS Canada Inc. Environment-Health & Safety statement of conformity decision rule does not consider uncertainty when analytical results are compared to a specified standard or regulation.

AECOM

F5-R Well Certificate of Analysis

TOWNSHIP OF CENTRE WELLINGTON
ATTN: Matthew Alexander c/o Centre Wellington
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4

Date Received: 28-APR-22
Report Date: 15-JUN-22 09:02 (MT)
Version: FINAL

Client Phone: 226-821-4906

Certificate of Analysis

Lab Work Order #: L2702028

Project P.O. #: NOT SUBMITTED
Job Reference:
C of C Numbers: 20-946007
Legal Site Desc:

Candice Hunter
Account Manager

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Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	Guideline Limits #2
L2702028-1 FS-R							
Sampled By: CLIENT on 28-APR-22 @ 10:25							
Matrix: WATER							
Physical Tests							
Hardness (as CaCO3)	307	HTC	2.4	mg/L	12-MAY-22		*80-100
pH	8.13		0.10	pH units	04-MAY-22		6.5-8.5
Total Dissolved Solids	346	DLDS	20	mg/L	09-MAY-22		500
Turbidity	3.30		0.10	NTU	29-APR-22		5
Anions and Nutrients							
Alkalinity, Total (as CaCO3)	217		10	mg/L	04-MAY-22		30-500
Ammonia, Total (as N)	0.049		0.010	mg/L	16-MAY-22		
Chlorate	<0.010		0.010	mg/L	13-MAY-22	1.0	
Chloride (Cl)	15.1		0.50	mg/L	05-MAY-22		250
Chlorite	<0.010		0.010	mg/L	13-MAY-22	1.0	
Fluoride (F)	0.13		0.10	mg/L	05-MAY-22	1.5	
Nitrate (as N)	0.272		0.020	mg/L	05-MAY-22	10	
Nitrite (as N)	<0.010		0.010	mg/L	05-MAY-22	1	
Total Kjeldahl Nitrogen	<0.15		0.15	mg/L	17-MAY-22		
Total Organic Nitrogen	<0.15		0.15	mg/L	28-APR-22		
Orthophosphate-Dissolved (as P)	0.0042		0.0030	mg/L	29-APR-22		
Sulfate (SO4)	85.7		0.30	mg/L	05-MAY-22		500
Sulphide (as S)	0.022		0.018	mg/L	02-MAY-22		0.05
Cyanides							
Cyanide, Total	<0.0020		0.0020	mg/L	05-MAY-22		
Organic / Inorganic Carbon							
Dissolved Carbon Filtration Location	LAB			No Unit	29-APR-22		
Dissolved Organic Carbon	<0.50		0.50	mg/L	29-APR-22		5
Bacteriological Tests							
Escherichia Coli	0		0	MPN/100mL	29-APR-22	0	
Heterotrophic Plate Count	204		0	CFU/mL	29-APR-22		
Total Coliforms	1		0	MPN/100mL	29-APR-22	*0	
Total Metals							
Aluminum (Al)-Total	148		10	ug/L	03-MAY-22		*100
Antimony (Sb)-Total	<0.60		0.60	ug/L	03-MAY-22	6	
Arsenic (As)-Total	1.4		1.0	ug/L	03-MAY-22	10.0	
Barium (Ba)-Total	57		10	ug/L	03-MAY-22	1000	
Boron (B)-Total	<50		50	ug/L	03-MAY-22	5000	
Cadmium (Cd)-Total	<0.10		0.10	ug/L	03-MAY-22	5	
Calcium (Ca)-Total	75.4		0.50	mg/L	03-MAY-22		
Chromium (Cr)-Total	<1.0		1.0	ug/L	03-MAY-22	50	
Copper (Cu)-Total	<1.0		1.0	ug/L	03-MAY-22		1000
Iron (Fe)-Total	180		50	ug/L	03-MAY-22		300
Lead (Pb)-Total	<1.0		1.0	ug/L	03-MAY-22	10	
Magnesium (Mg)-Total	28.8		0.50	mg/L	03-MAY-22		
Manganese (Mn)-Total	21.0		1.0	ug/L	03-MAY-22		50
Selenium (Se)-Total	<5.0		5.0	ug/L	03-MAY-22	50	
Sodium (Na)-Total	11.8		0.50	mg/L	03-MAY-22	20	200
Uranium (U)-Total	<5.0		5.0	ug/L	03-MAY-22	20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Drinking Water Regulation (ODWQS) JAN.1,2020 = [Suite] - ON-DW-STANDARD+GUIDELINES

#1: Schedule 1 (Microbiological) and 2 (Chemical) Standards (JAN,2020) **#2: Ontario DW Aesthetic and Operational Guidelines (June, 2006)**

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	Guideline Limits #2
L2702028-1 FS-R							
Sampled By: CLIENT on 28-APR-22 @ 10:25							
Matrix: WATER							
Total Metals							
Zinc (Zn)-Total	7.2		3.0	ug/L	03-MAY-22		5000
Volatile Organic Compounds							
Benzene	<0.50		0.50	ug/L	06-MAY-22	1	
Carbon tetrachloride	<0.20		0.20	ug/L	06-MAY-22	2	
Monochlorobenzene	<0.50		0.50	ug/L	06-MAY-22	80	30
1,2-Dichlorobenzene	<0.50		0.50	ug/L	06-MAY-22	200	3
1,4-Dichlorobenzene	<0.50		0.50	ug/L	06-MAY-22	5	1
1,2-Dichloroethane	<0.50		0.50	ug/L	06-MAY-22	5	
1,1-dichloroethylene (vinylidene chlorid	<0.50		0.50	ug/L	06-MAY-22	14	
Dichloromethane	<5.0		5.0	ug/L	06-MAY-22	50	
Ethylbenzene	<0.50		0.50	ug/L	06-MAY-22	140	2.4
Tetrachloroethylene (perchloroethylene)	<0.50		0.50	ug/L	06-MAY-22	10	
Toluene	<0.50		0.50	ug/L	06-MAY-22	60	24
Trichloroethylene	<0.50		0.50	ug/L	06-MAY-22	5	
Vinyl chloride	<0.20		0.20	ug/L	06-MAY-22	1	
o-xylene	<0.50		0.50	ug/L	06-MAY-22		
m/p-xylene	<1.0		1.0	ug/L	06-MAY-22		
Xylenes (Total)	<1.5		1.5	ug/L	06-MAY-22	90	300
Surrogate: 4-Bromofluorobenzene	80.1		70-130	%	06-MAY-22		
Surrogate: 1,4-Difluorobenzene	95.9		70-130	%	06-MAY-22		
Haloacetic Acids							
Dibromoacetic Acid	<1.0		1.0	ug/L	03-MAY-22		
Dichloroacetic Acid	<1.0		1.0	ug/L	03-MAY-22		
Total Haloacetic Acids 5	<2.2		2.2	ug/L	03-MAY-22	80	
Bromoacetic Acid	<1.0		1.0	ug/L	03-MAY-22		
Chloroacetic acid	<1.0		1.0	ug/L	03-MAY-22		
Trichloroacetic Acid	<1.0		1.0	ug/L	03-MAY-22		
Semi-Volatile Organics							
N-Nitrosodimethylamine	<0.00090		0.00090	ug/L	08-MAY-22	0.009	
Surrogate: N-Nitrosodimethylamine-d6	101.0		50-150	%	08-MAY-22		
Herbicides							
AMPA	<0.50		0.50	ug/L	06-MAY-22		
Bromoxynil	<0.20		0.20	ug/L	04-MAY-22	5	
2,4-D	<0.20		0.20	ug/L	04-MAY-22	100	
Dicamba	<0.20		0.20	ug/L	04-MAY-22	120	
Dinoseb	<0.20		0.20	ug/L	04-MAY-22	10	
Glyphosate	<5.0		5.0	ug/L	06-MAY-22	280	
MCPA	<0.20		0.20	ug/L	04-MAY-22	100	
Picloram	<0.20		0.20	ug/L	04-MAY-22	190	
2,4,5-TP	<0.20		0.20	ug/L	04-MAY-22		
Surrogate: 2,4-Dichlorophenylacetic Acid	106.0		50-130	%	04-MAY-22		
Pesticides							
Alachlor	<0.10		0.10	ug/L	02-MAY-22	5	
Atrazine	<0.10		0.10	ug/L	02-MAY-22		
Atrazine & Metabolites	<0.20		0.20	ug/L	02-MAY-22	5	
Azinphos-methyl	<0.10		0.10	ug/L	02-MAY-22	20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Drinking Water Regulation (ODWQS) JAN.1,2020 = [Suite] - ON-DW-STANDARD+GUIDELINES

#1: Schedule 1 (Microbiological) and 2 (Chemical) Standards (JAN,2020) **#2: Ontario DW Aesthetic and Operational Guidelines (June, 2006)**

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2		
L2702028-1 FS-R									
Sampled By: CLIENT on 28-APR-22 @ 10:25									
Matrix: WATER									
Pesticides									
Carbaryl	<0.20		0.20	ug/L	02-MAY-22	90			
Carbofuran	<0.20		0.20	ug/L	02-MAY-22	90			
Chlorpyriphos	<0.10		0.10	ug/L	02-MAY-22	90			
Diazinon	<0.10		0.10	ug/L	02-MAY-22	20			
2,4-Dichlorophenol	<0.30		0.30	ug/L	04-MAY-22	900	0.3		
Dimethoate	<0.10		0.10	ug/L	02-MAY-22	20			
Diquat	<1.0		1.0	ug/L	06-MAY-22	70			
Diuron	<1.0		1.0	ug/L	03-MAY-22	150			
Atrazine-desethyl	<0.10		0.10	ug/L	02-MAY-22				
Malathion	<0.10		0.10	ug/L	02-MAY-22	190			
Diclofop-methyl	<0.20		0.20	ug/L	02-MAY-22	9			
Metolachlor	<0.10		0.10	ug/L	02-MAY-22	50			
Metribuzin	<0.10		0.10	ug/L	02-MAY-22	80			
Paraquat	<1.0		1.0	ug/L	06-MAY-22	10			
Pentachlorophenol	<0.50		0.50	ug/L	04-MAY-22	60	30		
Phorate	<0.10		0.10	ug/L	02-MAY-22	2			
Prometryne	<0.10		0.10	ug/L	02-MAY-22	1			
Simazine	<0.10		0.10	ug/L	02-MAY-22	10			
Terbufos	<0.20		0.20	ug/L	02-MAY-22	1			
2,3,4,6-Tetrachlorophenol	<0.50		0.50	ug/L	04-MAY-22	100	1		
Triallate	<0.10		0.10	ug/L	02-MAY-22	230			
2,4,6-Trichlorophenol	<0.50		0.50	ug/L	04-MAY-22	5	2		
Trifluralin	<0.10		0.10	ug/L	02-MAY-22	45			
Surrogate: 2-Fluorobiphenyl	73.4		40-130	%	02-MAY-22				
Surrogate: 2,4,6-Tribromophenol	100.2		40-150	%	04-MAY-22				
Organic Parameters									
Ethane, Dissolved	<5.0		5.0	ug/L	03-MAY-22				
Ethene, Dissolved	<5.0		5.0	ug/L	03-MAY-22				
Methane, Dissolved	<5.0		5.0	ug/L	03-MAY-22		2000		

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Drinking Water Regulation (ODWQS) JAN.1,2020 = [Suite] - ON-DW-STANDARD+GUIDELINES

#1: Schedule 1 (Microbiological) and 2 (Chemical) Standards (JAN,2020) **#2: Ontario DW Aesthetic and Operational Guidelines (June, 2006)**

Reference Information

Sample Parameter Qualifier key listed:

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
HTC	Hardness was calculated from Total Ca and/or Mg concentrations and may be biased high (dissolved Ca/Mg results unavailable).

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference***
ACIDS-ONT-DW-WT	Water	O.Reg 170/03 Acids	SW846 8270
Pesticides are extracted from an aqueous sample using separate aliquots of solvent, extracts are concentrated down to a certain volume and analyzed on the GC/MSD.			
ALK-ONT-DW-WT	Water	Alkalinity, Total (as CaCO3)	EPA 310.2
CHLORATE-IC-DW-WT	Water	Chlorate by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
CHLORITE-IC-DW-WT	Water	Chlorite by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
CL-IC-N-ONT-DW-WT	Water	Chloride by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
CN-TOT-ONT-DW-WT	Water	Cyanide, Total	ISO 14403-2
Total cyanide is determined by the combination of UV digestion and distillation. Cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.			
When using this method, high levels of thiocyanate in samples can cause false positives at ~1-2% of the thiocyanate concentration. For samples with detectable cyanide analyzed by this method, ALS recommends analysis for thiocyanate to check for this potential interference.			
Ontario Drinking Water samples are not filtered during analysis.			
DIQUAT-DW-LCMS-WT	Water	Diquat in Water by LC/MS-MS	E3503
An aliquot of the sample is taken and internal standard is added. The sample is analyzed by LC/MS/MS.			
DIURON-DW-LCMS-WT	Water	Diuron in Drinking Water	E3501
An aliquot of water sample is diluted 1:1 using acetonitrile and analyzed using LC/MS/MS			
DOC-ONT-DW-WT	Water	Dissolved Organic Carbon	APHA 5310B
Sample is filtered through a 0.45um filter, then injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic carbon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.			
EC-SCREEN-WT	Water	Conductivity Screen (Internal Use Only)	APHA 2510
Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.			
F-DW-IC-WT	Water	Fluoride in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
GLYPHOSATE-ONT-DW-WT	Water	Glyphosate in Drinking Water	MOE E3500
This analysis is carried out using procedures adapted from ON MOE E3500 "Glyphosate". Glyphosate is determined by direct injection by LC-MS/MS on a sample that bas been derivatized.			
HAA-DW-LCMS-WT	Water	Haloacetic Acids - Ontario DW List	MOECC E3478
An aliquot of sample is fortified with formic acid and analyzed by direct inject via Electro Spray Ionization MS/MS detection using Triple Quadrupole MS/MS detector.			
HAA5-SUM-DW-CALC-WT	Water		CALCULATION
Total Haloacetic Acids 5 (HAA5) represents the sum of monobromoacetic acid, monochloroacetic acid, dibromoacetic acid, dichloroacetic acid and trichloroacetic acid. For the purpose of calculation, results less than the detection limit (DL) are treated as zero.			

Reference Information

HARDNESS-CALC-WT	Water	Hardness	APHA 2340 B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HPC-DW-MF-WT	Water	Heterotrophic Plate Count	SM 9215D

A 1mL volume of sample is filtered through a membrane, the membrane is placed on mHPC agar and incubated for 48–2h@35–0.5°C. Method ID: WT-TM-1200

MET-ONT-DW-DIG-WT	Water	Metals in Water by ICPMS	EPA 200.8

This analysis involves preliminary sample treatment by hotblock acid digestion (APHA 3030E). Instrumental analysis is by inductively coupled plasma - mass spectrometry (EPA Method 6020A).

METHANE,C2-DIS-DW-WT	Water	Methane, Ethane and Ethene	EPA REGION 1, NATATTEN.WPD REV. 1

Water samples are collected in headspace vials containing sodium bisulfate preservative. A volume of water is withdrawn from the un-capped vial. After shaking & equilibration, the vial headspace is analyzed for target gases by GC/FID. The concentration of the gas in water is proportional to the partial pressure of the gas above the liquid & is calculated using Henry's Law.

MISC-ONT-DW-WT	Water	O.Reg 170/03 Miscellaneous Pesticides	SW846 8270

Pesticides are extracted from an aqueous sample using separate aliquots of solvent, extracts are concentrated down to a certain volume and analyzed on the GC/MSD.

N-T-ORG-DW-CALC-WT	Water	Total Organic Nitrogen (Calculation)	APHA 4500-NORG (TKN)/NH3-NITROGEN (NH3)

Total Organic Nitrogen is a calculated parameter. Total Organic Nitrogen = Total Kjeldahl Nitrogen - Ammonia.

NDMA-ONTDW-WT	Water	NDMA to meet Ont Reg 170/03	QWI-ORG/WP239

An aliquot of sample is solid phase extracted followed by liquid chromatography tandem mass spectrometry instead of direct injection.

NH3-F-ONT-DW-WT	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO2-DW-IC-WT	Water	Nitrite in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-DW-IC-WT	Water	Nitrate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

PAHERB-ONT-DW-WT	Water	O.Reg 170/03 PA Herbicides	MOE E3552

Water samples are analyzed by direct injection without sample preparation using liquid chromatography tandem mass spectrometry (LC-MS/MS).

PARAQUAT-ONT-DW-WT	Water	Paraquat in Water by LC/MS-MS	E3503

An aliquot of the sample is taken and internal standard is added. The sample is analyzed by LC/MS/MS.

PH-ONT-DW-WT	Water	pH	APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011). Holdtime for samples under this regulation is 28 days

PO4-DO-COL-DW-WT	Water	Diss. Orthophosphate in Water by Colour	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

SO4-IC-N-ONT-DW-WT	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-ONT-DW-WT	Water	Total Dissolved Solids	APHA 2540C

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

SULPHIDE-ONT-DW-WT	Water	Sulphide (as S)	APHA 4500S2D

This analysis is carried out using procedures adapted from APHA Method 4500-S2-D "Methylene Blue Method". Sulphide is determined colourmetrically.

Reference Information

TC,EC-QT51-DW-WT	Water	Total Coliform and E. Coli	APHA 9223B

This analysis is carried out using procedures adapted from APHA Method 9223 "Enzyme Substrate Coliform Test". E. coli and Total Coliform are determined simultaneously. The sample is mixed with a mixture of hydrolyzable substrates and then sealed in a multi-well packet. The packet is incubated for 18 or 24 hours and then the number of wells exhibiting a positive response are counted. The final result is obtained by comparing the positive responses to a probability table.

TKN-ONT-DW-WT	Water	Total Kjeldahl Nitrogen	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

TURB-MET-WT	Water	Turbidity on preserved metals sample	APHA 2130 B

Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.

TURBIDITY-ONT-DW-WT	Water	Turbidity	APHA 2130 B

Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.

VOC-ONT-DW-WT	Water	Volatile Organics (O.Reg 170/03)	SW846 8260

Liquid samples are analyzed by headspace GC/MSD.

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

Chain of Custody numbers:

20-946007

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

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

GLOSSARY OF REPORT TERMS

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

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

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guideline limits are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.

Quality Control Report

Workorder: L2702028 Report Date: 15-JUN-22

Client: TOWNSHIP OF CENTRE WELLINGTON
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4

Contact: Matthew Alexander c/o Centre Wellington

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACIDS-ONT-DW-WT	**Water**							
Batch R5771012								
WG3722194-2 LCS								
2,4-Dichlorophenol			97.3		%		50-140	04-MAY-22
2,4,6-Trichlorophenol			109.5		%		50-140	04-MAY-22
2,3,4,6-Tetrachlorophenol			119.1		%		50-140	04-MAY-22
Pentachlorophenol			144.0	LCS-H	%		60-130	04-MAY-22
WG3722194-1 MB								
2,4-Dichlorophenol			<0.30		ug/L		0.3	04-MAY-22
2,4,6-Trichlorophenol			<0.50		ug/L		0.5	04-MAY-22
2,3,4,6-Tetrachlorophenol			<0.50		ug/L		0.5	04-MAY-22
Pentachlorophenol			<0.50		ug/L		0.5	04-MAY-22
Surrogate: 2,4,6-Tribromophenol			80.3		%		40-150	04-MAY-22
ALK-ONT-DW-WT	**Water**							
Batch R5771577								
WG3723597-4 DUP		**WG3723597-3**						
Alkalinity, Total (as CaCO3)		297	298		mg/L	0.4	20	04-MAY-22
WG3723597-2 LCS								
Alkalinity, Total (as CaCO3)			100.9		%		85-115	04-MAY-22
WG3723597-1 MB								
Alkalinity, Total (as CaCO3)			<10		mg/L		10	04-MAY-22
CHLORATE-IC-DW-WT	**Water**							
Batch R5779858								
WG3727087-3 DUP		**WG3727087-5**						
Chlorate		<0.010	<0.010	RPD-NA	mg/L	N/A	20	13-MAY-22
WG3727087-2 LCS								
Chlorate			98.7		%		85-115	13-MAY-22
WG3727087-1 MB								
Chlorate			<0.010		mg/L		0.01	13-MAY-22
WG3727087-4 MS		**WG3727087-5**						
Chlorate			99.5		%		75-125	13-MAY-22
CHLORITE-IC-DW-WT	**Water**							
Batch R5779858								
WG3727087-3 DUP		**WG3727087-5**						
Chlorite		<0.010	<0.010	RPD-NA	mg/L	N/A	20	13-MAY-22
WG3727087-2 LCS								
Chlorite			99.6		%		85-115	13-MAY-22
WG3727087-1 MB								
Chlorite			<0.010				0.01	

Quality Control Report

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Kitchener ON N2P 0A4
Contact: Matthew Alexander c/o Centre Wellington

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CHLORITE-IC-DW-WT	**Water**							
Batch R5779858								
WG3727087-1 MB								
Chlorite			<0.010		mg/L		0.01	13-MAY-22
WG3727087-4 MS		**WG3727087-5**						
Chlorite			96.7		%		75-125	13-MAY-22
CL-IC-N-ONT-DW-WT	**Water**							
Batch R5772848								
WG3724115-4 DUP		**WG3724115-3**						
Chloride (Cl)		5.04	5.07		mg/L	0.7	25	05-MAY-22
WG3724115-2 LCS								
Chloride (Cl)			102.1		%		70-130	05-MAY-22
WG3724115-1 MB								
Chloride (Cl)			<0.50		mg/L		0.5	05-MAY-22
WG3724115-5 MS		**WG3724115-3**						
Chloride (Cl)			103.5		%		70-130	05-MAY-22
CN-TOT-ONT-DW-WT	**Water**							
Batch R5773048								
WG3724063-3 DUP		**WG3724063-5**						
Cyanide, Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	05-MAY-22
WG3724063-2 LCS								
Cyanide, Total			103.4		%		80-120	05-MAY-22
WG3724063-1 MB								
Cyanide, Total			<0.0020		mg/L		0.002	05-MAY-22
WG3724063-4 MS		**WG3724063-5**						
Cyanide, Total			100.1		%		70-130	05-MAY-22
DIQUAT-DW-LCMS-WT	**Water**							
Batch R5774650								
WG3722409-7 DUP		**WG3722409-9**						
Diquat		<1.0	<1.0	RPD-NA	ug/L	N/A	30	06-MAY-22
WG3722409-6 LCS								
Diquat			96.7		%		70-130	06-MAY-22
WG3722409-5 MB								
Diquat			<1.0		ug/L		1	06-MAY-22
WG3722409-8 MS		**WG3722409-9**						
Diquat			97.1		%		70-130	06-MAY-22
DIURON-DW-LCMS-WT	**Water**							

Quality Control Report

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
DIURON-DW-LCMS-WT	**Water**							
Batch R5771020								
WG3722590-3 DUP		**L2700819-1**						
Diuron		<1.0	<1.0	RPD-NA	ug/L	N/A	30	03-MAY-22
WG3722590-2 LCS								
Diuron			97.7		%		50-140	03-MAY-22
WG3722590-1 MB								
Diuron			<1.0		ug/L		1	03-MAY-22
WG3722590-4 MS		**L2700819-1**						
Diuron			91.7		%		50-150	03-MAY-22
DOC-ONT-DW-WT	**Water**							
Batch R5769761								
WG3721744-3 DUP		**WG3721744-5**						
Dissolved Organic Carbon		9.01	8.73		mg/L	3.2	20	29-APR-22
WG3721744-2 LCS								
Dissolved Organic Carbon			97.7		%		80-120	29-APR-22
WG3721744-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	29-APR-22
WG3721744-4 MS		**WG3721744-5**						
Dissolved Organic Carbon			N/A	MS-B	%		-	29-APR-22
F-DW-IC-WT	**Water**							
Batch R5772848								
WG3724115-4 DUP		**WG3724115-3**						
Fluoride (F)		0.20	0.20		mg/L	0.4	20	05-MAY-22
WG3724115-2 LCS								
Fluoride (F)			100.1		%		90-110	05-MAY-22
WG3724115-1 MB								
Fluoride (F)			<0.10		mg/L		0.1	05-MAY-22
WG3724115-5 MS		**WG3724115-3**						
Fluoride (F)			103.7		%		75-125	05-MAY-22
GLYPHOSATE-ONT-DW-WT	**Water**							
Batch R5774621								
WG3720886-3 DUP		**L2700819-1**						
Glyphosate		<5.0	<5.0	RPD-NA	ug/L	N/A	30	06-MAY-22
AMPA		<0.50	<0.50	RPD-NA	ug/L	N/A	40	06-MAY-22
WG3720886-2 LCS								
Glyphosate			80.8		%		70-130	06-MAY-22
AMPA			88.3		%		70-130	06-MAY-22
WG3720886-1 MB								

Quality Control Report

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
GLYPHOSATE-ONT-DW-WT	**Water**							
Batch R5774621								
WG3720886-1 MB								
Glyphosate			<5.0		ug/L		5	06-MAY-22
AMPA			<0.50		ug/L		0.5	06-MAY-22
WG3720886-4 MS		**L2700819-1**						
Glyphosate			96.1		%		70-130	06-MAY-22
AMPA			93.6		%		70-130	06-MAY-22
HAA-DW-LCMS-WT	**Water**							
Batch R5770756								
WG3722546-2 LCS								
Bromoacetic Acid			97.8		%		70-130	03-MAY-22
Chloroacetic acid			109.2		%		70-130	03-MAY-22
Dibromoacetic Acid			115.9		%		70-130	03-MAY-22
Dichloroacetic Acid			116.9		%		70-130	03-MAY-22
Trichloroacetic Acid			113.5		%		70-130	03-MAY-22
WG3722546-1 MB								
Bromoacetic Acid			<1.0		ug/L		1	03-MAY-22
Chloroacetic acid			<1.0		ug/L		1	03-MAY-22
Dibromoacetic Acid			<1.0		ug/L		1	03-MAY-22
Dichloroacetic Acid			<1.0		ug/L		1	03-MAY-22
Trichloroacetic Acid			<1.0		ug/L		1	03-MAY-22
WG3722546-3 MS		**L2701941-1**						
Bromoacetic Acid			91.9		%		70-130	03-MAY-22
Chloroacetic acid			106.1		%		70-130	03-MAY-22
Dibromoacetic Acid			111.2		%		70-130	03-MAY-22
Dichloroacetic Acid			N/A	MS-B	%		-	03-MAY-22
Trichloroacetic Acid			N/A	MS-B	%		-	03-MAY-22
WG3722546-4 MSD		**WG3722546-3**						
Bromoacetic Acid		91.9	90.4		%	1.7	50	03-MAY-22
Chloroacetic acid		106.1	103.8		%	2.2	50	03-MAY-22
Dibromoacetic Acid		111.2	121.7		%	9.1	50	03-MAY-22
HPC-DW-MF-WT	**Water**							
Batch R5770164								
WG3721946-1 MB								
Heterotrophic Plate Count			0		CFU/mL		1	29-APR-22
WG3721946-2 MB								
Heterotrophic Plate Count			0		CFU/mL		1	29-APR-22

Quality Control Report

Client: TOWNSHIP OF CENTRE WELLINGTON
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Kitchener ON N2P 0A4
Contact: Matthew Alexander c/o Centre Wellington

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-ONT-DW-DIG-WT	**Water**							
Batch R5770728								
WG3722304-4 DUP		**WG3722304-3**						
Aluminum (Al)-Total		<10	<10	RPD-NA	ug/L	N/A	25	03-MAY-22
Antimony (Sb)-Total		<0.60	<0.60	RPD-NA	ug/L	N/A	25	03-MAY-22
Arsenic (As)-Total		<1.0	<1.0	RPD-NA	ug/L	N/A	25	03-MAY-22
Barium (Ba)-Total		173	172		ug/L	0.5	25	03-MAY-22
Boron (B)-Total		53	52		ug/L	1.5	25	03-MAY-22
Cadmium (Cd)-Total		<0.10	<0.10	RPD-NA	ug/L	N/A	25	03-MAY-22
Calcium (Ca)-Total		102	98.0		mg/L	3.6	25	03-MAY-22
Chromium (Cr)-Total		<1.0	<1.0	RPD-NA	ug/L	N/A	25	03-MAY-22
Copper (Cu)-Total		1.6	1.5		ug/L	5.9	25	03-MAY-22
Iron (Fe)-Total		109	105		ug/L	3.8	25	03-MAY-22
Lead (Pb)-Total		<1.0	<1.0	RPD-NA	ug/L	N/A	25	03-MAY-22
Magnesium (Mg)-Total		33.1	32.5		mg/L	2.0	25	03-MAY-22
Manganese (Mn)-Total		9.7	9.6		ug/L	1.2	25	03-MAY-22
Selenium (Se)-Total		<1.0	<1.0	RPD-NA	ug/L	N/A	25	03-MAY-22
Sodium (Na)-Total		28.9	29.1		mg/L	0.7	25	03-MAY-22
Uranium (U)-Total		2.2	2.2		ug/L	0.2	25	03-MAY-22
Zinc (Zn)-Total		<3.0	<3.0	RPD-NA	ug/L	N/A	25	03-MAY-22
WG3722304-2 LCS								
Aluminum (Al)-Total			98.1		%		70-130	03-MAY-22
Antimony (Sb)-Total			101.3		%		70-130	03-MAY-22
Arsenic (As)-Total			97.6		%		70-130	03-MAY-22
Barium (Ba)-Total			97.5		%		70-130	03-MAY-22
Boron (B)-Total			86.2		%		70-130	03-MAY-22
Cadmium (Cd)-Total			98.2		%		70-130	03-MAY-22
Calcium (Ca)-Total			96.4		%		70-130	03-MAY-22
Chromium (Cr)-Total			97.6		%		70-130	03-MAY-22
Copper (Cu)-Total			96.0		%		70-130	03-MAY-22
Iron (Fe)-Total			97.5		%		70-130	03-MAY-22
Lead (Pb)-Total			103.0		%		70-130	03-MAY-22
Magnesium (Mg)-Total			103.6		%		70-130	03-MAY-22
Manganese (Mn)-Total			96.8		%		70-130	03-MAY-22
Selenium (Se)-Total			97.7		%		70-130	03-MAY-22
Sodium (Na)-Total			98.1		%		70-130	03-MAY-22

Quality Control Report

Client: TOWNSHIP OF CENTRE WELLINGTON
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4
Contact: Matthew Alexander c/o Centre Wellington

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-ONT-DW-DIG-WT	**Water**							
Batch R5770728								
WG3722304-2 LCS								
Uranium (U)-Total			103.9		%		70-130	03-MAY-22
Zinc (Zn)-Total			96.8		%		70-130	03-MAY-22
WG3722304-1 MB								
Aluminum (Al)-Total			<10		ug/L		10	03-MAY-22
Antimony (Sb)-Total			<0.60		ug/L		0.6	03-MAY-22
Arsenic (As)-Total			<1.0		ug/L		1	03-MAY-22
Barium (Ba)-Total			<10		ug/L		10	03-MAY-22
Boron (B)-Total			<50		ug/L		50	03-MAY-22
Cadmium (Cd)-Total			<0.10		ug/L		0.1	03-MAY-22
Calcium (Ca)-Total			<0.50		mg/L		0.5	03-MAY-22
Chromium (Cr)-Total			<1.0		ug/L		1	03-MAY-22
Copper (Cu)-Total			<1.0		ug/L		1	03-MAY-22
Iron (Fe)-Total			<50		ug/L		50	03-MAY-22
Lead (Pb)-Total			<1.0		ug/L		1	03-MAY-22
Magnesium (Mg)-Total			<0.50		mg/L		0.5	03-MAY-22
Manganese (Mn)-Total			<1.0		ug/L		1	03-MAY-22
Selenium (Se)-Total			<1.0		ug/L		1	03-MAY-22
Sodium (Na)-Total			<0.50		mg/L		0.5	03-MAY-22
Uranium (U)-Total			<2.0		ug/L		2	03-MAY-22
Zinc (Zn)-Total			<3.0		ug/L		3	03-MAY-22
WG3722304-5 MS		**WG3722304-6**						
Aluminum (Al)-Total			N/A	MS-B	%		-	03-MAY-22
Antimony (Sb)-Total			103.4		%		70-130	03-MAY-22
Arsenic (As)-Total			99.0		%		70-130	03-MAY-22
Barium (Ba)-Total			N/A	MS-B	%		-	03-MAY-22
Boron (B)-Total			101.4		%		70-130	03-MAY-22
Cadmium (Cd)-Total			93.9		%		70-130	03-MAY-22
Calcium (Ca)-Total			N/A	MS-B	%		-	03-MAY-22
Chromium (Cr)-Total			98.0		%		70-130	03-MAY-22
Copper (Cu)-Total			93.4		%		70-130	03-MAY-22
Iron (Fe)-Total			N/A	MS-B	%		-	03-MAY-22
Lead (Pb)-Total			96.9		%		70-130	03-MAY-22
Magnesium (Mg)-Total			N/A	MS-B	%		-	03-MAY-22
Manganese (Mn)-Total			N/A	MS-B	%		-	03-MAY-22

Quality Control Report

Client: TOWNSHIP OF CENTRE WELLINGTON
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4
Contact: Matthew Alexander c/o Centre Wellington

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-ONT-DW-DIG-WT	**Water**							
Batch R5770728								
WG3722304-5 MS		**WG3722304-6**						
Selenium (Se)-Total			101.2		%		70-130	03-MAY-22
Sodium (Na)-Total			N/A	MS-B	%		-	03-MAY-22
Uranium (U)-Total			N/A	MS-B	%		-	03-MAY-22
Zinc (Zn)-Total			91.9		%		70-130	03-MAY-22
METHANE,C2-DIS-DW-WT	**Water**							
Batch R5770974								
WG3722807-4 DUP		**WG3722807-3**						
Methane, Dissolved		10200	12000		ug/L	16	50	03-MAY-22
Ethane, Dissolved		13.0	14.4		ug/L	9.8	50	03-MAY-22
Ethene, Dissolved		5.5	6.6		ug/L	18	50	03-MAY-22
WG3722807-1 MB								
Methane, Dissolved			<5.0		ug/L		5	03-MAY-22
Ethane, Dissolved			<5.0		ug/L		5	03-MAY-22
Ethene, Dissolved			<5.0		ug/L		5	03-MAY-22
MISC-ONT-DW-WT	**Water**							
Batch R5770281								
WG3721708-2 LCS								
Alachlor			115.1		%		60-130	02-MAY-22
Atrazine			114.1		%		60-130	02-MAY-22
Atrazine-desethyl			73.8		%		50-130	02-MAY-22
Azinphos-methyl			131.2		%		60-140	02-MAY-22
Carbaryl			149.5	LCS-H	%		50-140	02-MAY-22
Carbofuran			138.4		%		60-140	02-MAY-22
Chlorpyriphos			103.8		%		60-130	02-MAY-22
Diazinon			87.8		%		60-130	02-MAY-22
Diclofop-methyl			136.2		%		60-140	02-MAY-22
Dimethoate			116.6		%		60-130	02-MAY-22
Malathion			121.0		%		60-130	02-MAY-22
Metribuzin			110.8		%		60-130	02-MAY-22
Metolachlor			116.2		%		60-130	02-MAY-22
Phorate			99.7		%		30-140	02-MAY-22
Prometryne			107.8		%		60-130	02-MAY-22
Simazine			108.6		%		60-130	02-MAY-22
Terbufos			83.9		%		60-130	02-MAY-22

Quality Control Report

Client: TOWNSHIP OF CENTRE WELLINGTON
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4
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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MISC-ONT-DW-WT	**Water**							
Batch R5770281								
WG3721708-2 LCS								
Triallate			104.1		%		60-130	02-MAY-22
Trifluralin			97.2		%		60-130	02-MAY-22
WG3721708-1 MB								
Alachlor			<0.10		ug/L		0.1	02-MAY-22
Atrazine			<0.10		ug/L		0.1	02-MAY-22
Atrazine-desethyl			<0.10		ug/L		0.1	02-MAY-22
Azinphos-methyl			<0.10		ug/L		0.1	02-MAY-22
Carbaryl			<0.20		ug/L		0.2	02-MAY-22
Carbofuran			<0.20		ug/L		0.2	02-MAY-22
Chlorpyriphos			<0.10		ug/L		0.1	02-MAY-22
Diazinon			<0.10		ug/L		0.1	02-MAY-22
Diclofop-methyl			<0.20		ug/L		0.2	02-MAY-22
Dimethoate			<0.10		ug/L		0.1	02-MAY-22
Malathion			<0.10		ug/L		0.1	02-MAY-22
Metribuzin			<0.10		ug/L		0.1	02-MAY-22
Metolachlor			<0.10		ug/L		0.1	02-MAY-22
Phorate			<0.10		ug/L		0.1	02-MAY-22
Prometryne			<0.10		ug/L		0.1	02-MAY-22
Simazine			<0.10		ug/L		0.1	02-MAY-22
Terbufos			<0.20		ug/L		0.2	02-MAY-22
Triallate			<0.10		ug/L		0.1	02-MAY-22
Trifluralin			<0.10		ug/L		0.1	02-MAY-22
Surrogate: 2-Fluorobiphenyl			66.7		%		40-130	02-MAY-22
NDMA-ONTDW-WT	**Water**							
Batch R5774632								
WG3721940-3 DUP		**L2702193-1**						
N-Nitrosodimethylamine		<0.00090	<0.00090	RPD-NA	ug/L	N/A	30	08-MAY-22
WG3721940-2 LCS								
N-Nitrosodimethylamine			114.0		%		50-150	07-MAY-22
WG3721940-1 MB								
N-Nitrosodimethylamine			0.00113	MB-LOR	ug/L		0.0009	07-MAY-22
Surrogate: N-Nitrosodimethylamine-d6			99.0		%		50-150	07-MAY-22
WG3721940-4 MS		**WG3721940-5**						
N-Nitrosodimethylamine			111.3		%		50-150	08-MAY-22

Quality Control Report

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NH3-F-ONT-DW-WT	**Water**							
Batch R5782148								
WG3727728-3 DUP		**WG3727728-5**						
Ammonia, Total (as N)		<0.010	<0.010	RPD-NA	mg/L	N/A	20	16-MAY-22
WG3727728-2 LCS								
Ammonia, Total (as N)			109.1		%		85-115	16-MAY-22
WG3727728-1 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	16-MAY-22
WG3727728-4 MS		**WG3727728-5**						
Ammonia, Total (as N)			101.5		%		75-125	16-MAY-22
NO2-DW-IC-WT	**Water**							
Batch R5772848								
WG3724115-4 DUP		**WG3724115-3**						
Nitrite (as N)		<0.010	<0.010	RPD-NA	mg/L	N/A	20	05-MAY-22
WG3724115-2 LCS								
Nitrite (as N)			101.2		%		90-110	05-MAY-22
WG3724115-1 MB								
Nitrite (as N)			<0.010		mg/L		0.01	05-MAY-22
WG3724115-5 MS		**WG3724115-3**						
Nitrite (as N)			103.5		%		75-125	05-MAY-22
NO3-DW-IC-WT	**Water**							
Batch R5772848								
WG3724115-4 DUP		**WG3724115-3**						
Nitrate (as N)		<0.020	<0.020	RPD-NA	mg/L	N/A	20	05-MAY-22
WG3724115-2 LCS								
Nitrate (as N)			100.3		%		90-110	05-MAY-22
WG3724115-1 MB								
Nitrate (as N)			<0.020		mg/L		0.02	05-MAY-22
WG3724115-5 MS		**WG3724115-3**						
Nitrate (as N)			100.6		%		75-125	05-MAY-22
PAHERB-ONT-DW-WT	**Water**							
Batch R5771118								
WG3722989-3 DUP		**WG3722989-5**						
Dicamba		<0.20	<0.20	RPD-NA	ug/L	N/A	30	04-MAY-22
Bromoxynil		<0.20	<0.20	RPD-NA	ug/L	N/A	30	04-MAY-22
2,4-D		<0.20	<0.20	RPD-NA	ug/L	N/A	30	04-MAY-22
2,4,5-TP		<0.20	<0.20	RPD-NA	ug/L	N/A	50	04-MAY-22
Dinoseb		<0.20	<0.20	RPD-NA	ug/L	N/A	50	04-MAY-22
Picloram		<0.20	<0.20	RPD-NA	ug/L	N/A	30	04-MAY-22

Quality Control Report

Client: TOWNSHIP OF CENTRE WELLINGTON
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4
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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PAHERB-ONT-DW-WT	**Water**							
Batch R5771118								
WG3722989-3 DUP		**WG3722989-5**						
MCPA		<0.20	<0.20	RPD-NA	ug/L	N/A	30	04-MAY-22
WG3722989-2 LCS								
Dicamba			109.8		%		65-130	04-MAY-22
Bromoxynil			129.4		%		65-130	04-MAY-22
2,4-D			89.1		%		65-130	04-MAY-22
2,4,5-TP			118.3		%		50-150	04-MAY-22
Dinoseb			94.3		%		50-150	04-MAY-22
Picloram			105.6		%		50-150	04-MAY-22
MCPA			103.1		%		65-130	04-MAY-22
WG3722989-1 MB								
Dicamba			<0.20		ug/L		0.2	04-MAY-22
Bromoxynil			<0.20		ug/L		0.2	04-MAY-22
2,4-D			<0.20		ug/L		0.2	04-MAY-22
2,4,5-TP			<0.20		ug/L		0.2	04-MAY-22
Dinoseb			<0.20		ug/L		0.2	04-MAY-22
Picloram			<0.20		ug/L		0.2	04-MAY-22
MCPA			<0.20		ug/L		0.2	04-MAY-22
Surrogate: 2,4-Dichlorophenylacetic Acid			91.0		%		50-130	04-MAY-22
WG3722989-4 MS		**WG3722989-5**						
Dicamba			119.2		%		50-150	04-MAY-22
Bromoxynil			124.1		%		50-150	04-MAY-22
2,4-D			108.4		%		50-150	04-MAY-22
2,4,5-TP			106.5		%		50-150	04-MAY-22
Dinoseb			107.3		%		50-150	04-MAY-22
Picloram			102.6		%		50-150	04-MAY-22
MCPA			112.2		%		50-150	04-MAY-22
PARAQUAT-ONT-DW-WT	**Water**							
Batch R5774650								
WG3722409-7 DUP		**WG3722409-9**						
Paraquat		<1.0	<1.0	RPD-NA	ug/L	N/A	30	06-MAY-22
WG3722409-6 LCS								
Paraquat			76.8		%		70-130	06-MAY-22
WG3722409-5 MB								
Paraquat			<1.0		ug/L		1	06-MAY-22
WG3722409-8 MS		**WG3722409-9**						

Quality Control Report

Client: TOWNSHIP OF CENTRE WELLINGTON
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PARAQUAT-ONT-DW-WT	**Water**							
Batch R5774650								
WG3722409-8 MS		**WG3722409-9**						
Paraquat			92.4		%		70-130	06-MAY-22
PH-ONT-DW-WT	**Water**							
Batch R5771577								
WG3723597-4 DUP		**WG3723597-3**						
pH		7.90	7.92	J	pH units	0.02	0.2	04-MAY-22
WG3723597-2 LCS								
pH			6.96		pH units		6.9-7.1	04-MAY-22
PO4-DO-COL-DW-WT	**Water**							
Batch R5769784								
WG3721857-3 DUP		**WG3721857-5**						
Orthophosphate-Dissolved (as P)		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	29-APR-22
WG3721857-2 LCS								
Orthophosphate-Dissolved (as P)			108.2		%		80-120	29-APR-22
WG3721857-1 MB								
Orthophosphate-Dissolved (as P)			<0.0030		mg/L		0.003	29-APR-22
WG3721857-4 MS		**WG3721857-5**						
Orthophosphate-Dissolved (as P)			97.3		%		70-130	29-APR-22
SO4-IC-N-ONT-DW-WT	**Water**							
Batch R5772848								
WG3724115-4 DUP		**WG3724115-3**						
Sulfate (SO4)		<0.30	<0.30	RPD-NA	mg/L	N/A	20	05-MAY-22
WG3724115-2 LCS								
Sulfate (SO4)			102.4		%		90-110	05-MAY-22
WG3724115-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	05-MAY-22
WG3724115-5 MS		**WG3724115-3**						
Sulfate (SO4)			104.7		%		75-125	05-MAY-22
SOLIDS-TDS-ONT-DW-WT	**Water**							
Batch R5776119								
WG3725025-3 DUP		**L2703904-4**						
Total Dissolved Solids		334	331		mg/L	0.9	25	09-MAY-22
WG3725025-2 LCS								
Total Dissolved Solids			102.5		%		70-130	09-MAY-22
WG3725025-1 MB								
Total Dissolved Solids			<10		mg/L		10	09-MAY-22

Quality Control Report

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SULPHIDE-ONT-DW-WT	**Water**							
Batch R5770462								
WG3722545-3 DUP		**WG3722545-5**						
Sulphide (as S)		0.95	1.06		mg/L	11	20	02-MAY-22
WG3722545-2 LCS								
Sulphide (as S)			87.9		%		75-125	02-MAY-22
WG3722545-1 MB								
Sulphide (as S)			<0.018		mg/L		0.018	02-MAY-22
WG3722545-4 MS		**WG3722545-5**						
Sulphide (as S)			N/A	MS-B	%		-	02-MAY-22
TC,EC-QT51-DW-WT	**Water**							
Batch R5770080								
WG3722065-2 DUP		**L2702098-2**						
Total Coliforms		0	0		MPN/100mL	0.0	65	29-APR-22
Escherichia Coli		0	0		MPN/100mL	0.0	65	29-APR-22
WG3722065-1 MB								
Total Coliforms			0		MPN/100mL		1	29-APR-22
Escherichia Coli			0		MPN/100mL		1	29-APR-22
TKN-ONT-DW-WT	**Water**							
Batch R5784167								
WG3727736-3 DUP		**WG3727736-5**						
Total Kjeldahl Nitrogen		0.80	0.73		mg/L	9.2	20	17-MAY-22
WG3727736-2 LCS								
Total Kjeldahl Nitrogen			101.3		%		75-125	17-MAY-22
WG3727736-1 MB								
Total Kjeldahl Nitrogen			<0.15		mg/L		0.15	17-MAY-22
WG3727736-4 MS		**WG3727736-5**						
Total Kjeldahl Nitrogen			99.2		%		70-130	17-MAY-22
TURBIDITY-ONT-DW-WT	**Water**							
Batch R5770712								
WG3721943-2 LCS								
Turbidity			95.0		%		85-115	29-APR-22
WG3721943-1 MB								
Turbidity			<0.10		NTU		0.1	29-APR-22
VOC-ONT-DW-WT	**Water**							
Batch R5772679								
WG3724017-4 DUP		**WG3724017-3**						
1,1-dichloroethylene (vinylidene chlorid		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-MAY-22
1,2-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-MAY-22

Quality Control Report

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-ONT-DW-WT	**Water**							
Batch R5772679								
WG3724017-4 DUP		**WG3724017-3**						
1,2-Dichloroethane		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-MAY-22
1,4-Dichlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-MAY-22
Benzene		1.17	1.12		ug/L	4.4	30	06-MAY-22
Carbon tetrachloride		<0.20	<0.20	RPD-NA	ug/L	N/A	30	06-MAY-22
Dichloromethane		<5.0	<5.0	RPD-NA	ug/L	N/A	30	06-MAY-22
Ethylbenzene		23.8	21.3		ug/L	11	30	06-MAY-22
Monochlorobenzene		<0.50	<0.50	RPD-NA	ug/L	N/A	30	06-MAY-22
Tetrachloroethylene (perchloroethylene)		17.8	15.8		ug/L	12	30	06-MAY-22
Toluene		N/A	<0.50	RPD-NA	ug/L	N/A	30	06-MAY-22
Trichloroethylene		4.30	3.82		ug/L	12	30	06-MAY-22
m/p-xylene		12.4	11.1		ug/L	11	30	06-MAY-22
o-xylene		10.7	9.58		ug/L	11	30	06-MAY-22
Vinyl chloride		1.56	1.39		ug/L	12	30	06-MAY-22
WG3724017-1 LCS								
1,1-dichloroethylene (vinylidene chlorid			116.6		%		70-130	06-MAY-22
1,2-Dichlorobenzene			102.8		%		70-130	06-MAY-22
1,2-Dichloroethane			117.2		%		70-130	06-MAY-22
1,4-Dichlorobenzene			102.8		%		70-130	06-MAY-22
Benzene			111.9		%		70-130	06-MAY-22
Carbon tetrachloride			111.8		%		70-130	06-MAY-22
Dichloromethane			112.8		%		70-130	06-MAY-22
Ethylbenzene			92.2		%		70-130	06-MAY-22
Monochlorobenzene			104.9		%		70-130	06-MAY-22
Tetrachloroethylene (perchloroethylene)			90.6		%		70-130	06-MAY-22
Toluene			98.1		%		70-130	06-MAY-22
Trichloroethylene			108.9		%		70-130	06-MAY-22
m/p-xylene			103.5		%		70-130	06-MAY-22
o-xylene			97.0		%		70-130	06-MAY-22
Vinyl chloride			108.8		%		60-140	06-MAY-22
WG3724017-2 MB								
1,1-dichloroethylene (vinylidene chlorid			<0.50		ug/L		0.5	06-MAY-22
1,2-Dichlorobenzene			<0.50		ug/L		0.5	06-MAY-22
1,2-Dichloroethane			<0.50		ug/L		0.5	06-MAY-22
							0.5	

Quality Control Report

Client: TOWNSHIP OF CENTRE WELLINGTON
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4
Contact: Matthew Alexander c/o Centre Wellington

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
VOC-ONT-DW-WT	**Water**							
Batch R5772679								
WG3724017-2 MB								
1,4-Dichlorobenzene			<0.50		ug/L		0.5	06-MAY-22
Surrogate: 1,4-Difluorobenzene			97.2		%		70-130	06-MAY-22
Benzene			<0.50		ug/L		0.5	06-MAY-22
Carbon tetrachloride			<0.20		ug/L		0.2	06-MAY-22
Dichloromethane			<5.0		ug/L		5	06-MAY-22
Ethylbenzene			<0.50		ug/L		0.5	06-MAY-22
Monochlorobenzene			<0.50		ug/L		0.5	06-MAY-22
Tetrachloroethylene (perchloroethylene)			<0.50		ug/L		0.5	06-MAY-22
Toluene			<0.50		ug/L		0.5	06-MAY-22
Trichloroethylene			<0.50		ug/L		0.5	06-MAY-22
m/p-xylene			<1.0		ug/L		1	06-MAY-22
o-xylene			<0.50		ug/L		0.5	06-MAY-22
Vinyl chloride			<0.20		ug/L		0.2	06-MAY-22
Surrogate: 4-Bromofluorobenzene			80.6		%		70-130	06-MAY-22
WG3724017-5 MS		**WG3724017-3**						
1,1-dichloroethylene (vinylidene chlorid			110.4		%		70-130	06-MAY-22
1,2-Dichlorobenzene			99.4		%		70-130	06-MAY-22
1,2-Dichloroethane			122.4		%		70-130	06-MAY-22
1,4-Dichlorobenzene			104.2		%		70-130	06-MAY-22
Benzene			109.4		%		70-130	06-MAY-22
Carbon tetrachloride			106.0		%		70-130	06-MAY-22
Dichloromethane			113.7		%		70-130	06-MAY-22
Ethylbenzene			87.6		%		70-130	06-MAY-22
Monochlorobenzene			101.4		%		70-130	06-MAY-22
Tetrachloroethylene (perchloroethylene)			79.7		%		70-130	06-MAY-22
Toluene			93.1		%		50-150	06-MAY-22
Trichloroethylene			102.7		%		70-130	06-MAY-22
m/p-xylene			97.3		%		70-130	06-MAY-22
o-xylene			92.4		%		50-150	06-MAY-22
Vinyl chloride			101.4		%		70-130	06-MAY-22

Quality Control Report

Workorder: L2702028 Report Date: 15-JUN-22

Client: TOWNSHIP OF CENTRE WELLINGTON
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4
Contact: Matthew Alexander c/o Centre Wellington

Legend:

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

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
LCS-H	Lab Control Sample recovery was above ALS DQO. Non-detected sample results are considered reliable. Other results, if reported, have been qualified.
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

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

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

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

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

Your P.O. #: L2702028
Your C.O.C. #: n/a

Attention: Candice Hunter

ALS Laboratory Group
Environmental Div.
60 Northland Dr.
Unit #1
Waterloo, ON
Canada N2V 2B8

Report Date: 2022/06/02
Report #: R7149142
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BUREAU VERITAS JOB #: C2B7960
Received: 2022/05/03, 12:30

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Dioxins/Furans in Water (1613B) (1)	1	2022/05/13	2022/05/17	BRL SOP-00410	EPA 1613B 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.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Confirmatory runs for 2,3,7,8-TCDF are performed only if the primary result is greater than the RDL.

Your P.O. #: L2702028
Your C.O.C. #: n/a

Attention: Candice Hunter

ALS Laboratory Group
Environmental Div.
60 Northland Dr.
Unit #1
Waterloo, ON
Canada N2V 2B8

Report Date: 2022/06/02
Report #: R7149142
Version: 2 - Revision

CERTIFICATE OF ANALYSIS – REVISED REPORT

BUREAU VERITAS JOB #: C2B7960
Received: 2022/05/03, 12:30

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Archana Gothoskar, B.Sc., Project Manager
Email: archana.gothoskar@bureauveritas.com
Phone# (905) 817-5700
==========
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 Signature Page.

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

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

DIOXINS AND FURANS BY HRMS (WATER)

Bureau Veritas ID		SNC549						
Sampling Date		2022/04/28 10:25						
COC Number		n/a			TOXIC EQUIVALENCY		# of	
	UNITS	L2702028-1 FS-R	EDL	RDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
2,3,7,8-Tetra CDD *	pg/L	<1.66	1.66	10.5	1.00	1.66		7993737
1,2,3,7,8-Penta CDD *	pg/L	<1.54	1.54	52.6	1.00	1.54		7993737
1,2,3,4,7,8-Hexa CDD *	pg/L	<1.62	1.62	52.6	0.100	0.162		7993737
1,2,3,6,7,8-Hexa CDD *	pg/L	<1.59	1.59	52.6	0.100	0.159		7993737
1,2,3,7,8,9-Hexa CDD *	pg/L	2.79	1.63	52.6	0.100	0.279		7993737
1,2,3,4,6,7,8-Hepta CDD *	pg/L	2.69	1.56	52.6	0.0100	0.0269		7993737
Octa CDD *	pg/L	<3.51 (1)	3.51	105	0.000300	0.00105		7993737
Total Tetra CDD *	pg/L	3.29	1.66	10.5			1	7993737
Total Penta CDD *	pg/L	<4.20 (1)	4.20	52.6			0	7993737
Total Hexa CDD *	pg/L	13.4	1.68	52.6			3	7993737
Total Hepta CDD *	pg/L	9.71	1.56	52.6			2	7993737
2,3,7,8-Tetra CDF **	pg/L	<1.15	1.15	10.5	0.100	0.115		7993737
1,2,3,7,8-Penta CDF **	pg/L	<1.53	1.53	52.6	0.0300	0.0459		7993737
2,3,4,7,8-Penta CDF **	pg/L	<1.36	1.36	52.6	0.300	0.408		7993737
1,2,3,4,7,8-Hexa CDF **	pg/L	<1.39	1.39	52.6	0.100	0.139		7993737
1,2,3,6,7,8-Hexa CDF **	pg/L	<1.50	1.50	52.6	0.100	0.150		7993737
2,3,4,6,7,8-Hexa CDF **	pg/L	<1.28	1.28	52.6	0.100	0.128		7993737
1,2,3,7,8,9-Hexa CDF **	pg/L	<1.45	1.45	52.6	0.100	0.145		7993737
1,2,3,4,6,7,8-Hepta CDF **	pg/L	<1.33	1.33	52.6	0.0100	0.0133		7993737
1,2,3,4,7,8,9-Hepta CDF **	pg/L	<1.33	1.33	52.6	0.0100	0.0133		7993737
Octa CDF **	pg/L	2.73	1.58	105	0.000300	0.000819		7993737
Total Tetra CDF **	pg/L	<1.15	1.15	10.5			0	7993737
Total Penta CDF **	pg/L	<1.44	1.44	52.6			0	7993737
Total Hexa CDF **	pg/L	<1.40	1.40	52.6			0	7993737
Total Hepta CDF **	pg/L	1.65	1.33	52.6			1	7993737
TOTAL TOXIC EQUIVALENCY	pg/L					4.99		

EDL = Estimated Detection Limit

RDL = Reportable Detection Limit

TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.

WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds

QC Batch = Quality Control Batch

* CDD = Chloro Dibenzo-p-Dioxin

** CDF = Chloro Dibenzo-p-Furan

(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

DIOXINS AND FURANS BY HRMS (WATER)

Bureau Veritas ID		SNC549						
Sampling Date		2022/04/28 10:25						
COC Number		n/a			TOXIC EQUIVALENCY		# of	
	UNITS	L2702028-1 FS-R	EDL	RDL	TEF (2005 WHO)	TEQ(DL)	Isomers	QC Batch
Surrogate Recovery (%)								
37CL4 2378 Tetra CDD *	%	94						7993737
C13-1234678 HeptaCDD *	%	88						7993737
C13-1234678 HeptaCDF **	%	89						7993737
C13-123478 HexaCDD *	%	93						7993737
C13-123478 HexaCDF **	%	93						7993737
C13-1234789 HeptaCDF **	%	89						7993737
C13-123678 HexaCDD *	%	89						7993737
C13-123678 HexaCDF **	%	88						7993737
C13-12378 PentaCDD *	%	97						7993737
C13-12378 PentaCDF **	%	88						7993737
C13-123789 HexaCDF **	%	87						7993737
C13-234678 HexaCDF **	%	101						7993737
C13-23478 PentaCDF **	%	94						7993737
C13-2378 TetraCDD *	%	72						7993737
C13-2378 TetraCDF **	%	84						7993737
C13-OCDD *	%	88						7993737

EDL = Estimated Detection Limit
RDL = Reportable Detection Limit
TEF = Toxic Equivalency Factor, TEQ = Toxic Equivalency Quotient,
The Total Toxic Equivalency (TEQ) value reported is the sum of Toxic Equivalent Quotients for the congeners tested.
WHO(2005): The 2005 World Health Organization, Human and Mammalian Toxic Equivalency Factors for Dioxins and Dioxin-like Compounds
QC Batch = Quality Control Batch
* CDD = Chloro Dibenzo-p-Dioxin
** CDF = Chloro Dibenzo-p-Furan

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

GENERAL COMMENTS

DIOXINS AND FURANS BY HRMS (WATER)

Dioxins/Furans in Water (1613B): Worksheet Blank contains some traces levels of total tetra CDD that is above the RDL. However, all samples in the worksheet (7993737) have lower TCDD concentration in total compared to levels found in blank. Data is reportable.

Results relate only to the items tested.

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Bureau Veritas Job #: C2B7960
Report Date: 2022/06/02

ALS Laboratory Group
Your P.O. #: L2702028
Sampler Initials: PM

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
7993737	RAK	Spiked Blank	37CL4 2378 Tetra CDD	2022/05/17		100	%	35 - 197
			C13-1234678 HeptaCDD	2022/05/17		94	%	23 - 140
			C13-1234678 HeptaCDF	2022/05/17		106	%	28 - 143
			C13-123478 HexaCDD	2022/05/17		95	%	32 - 141
			C13-123478 HexaCDF	2022/05/17		100	%	26 - 152
			C13-1234789 HeptaCDF	2022/05/17		91	%	28 - 138
			C13-123678 HexaCDD	2022/05/17		100	%	28 - 130
			C13-123678 HexaCDF	2022/05/17		102	%	26 - 123
			C13-12378 PentaCDD	2022/05/17		94	%	25 - 181
			C13-12378 PentaCDF	2022/05/17		99	%	24 - 185
			C13-123789 HexaCDF	2022/05/17		99	%	29 - 147
			C13-234678 HexaCDF	2022/05/17		109	%	28 - 136
			C13-23478 PentaCDF	2022/05/17		93	%	21 - 178
			C13-2378 TetraCDD	2022/05/17		80	%	25 - 164
			C13-2378 TetraCDF	2022/05/17		95	%	24 - 169
			C13-OCDD	2022/05/17		79	%	17 - 157
			2,3,7,8-Tetra CDD	2022/05/17		103	%	67 - 158
			1,2,3,7,8-Penta CDD	2022/05/17		99	%	25 - 181
			1,2,3,4,7,8-Hexa CDD	2022/05/17		97	%	70 - 164
			1,2,3,6,7,8-Hexa CDD	2022/05/17		101	%	76 - 134
			1,2,3,7,8,9-Hexa CDD	2022/05/17		106	%	64 - 162
			1,2,3,4,6,7,8-Hepta CDD	2022/05/17		105	%	70 - 140
			Octa CDD	2022/05/17		99	%	78 - 144
			2,3,7,8-Tetra CDF	2022/05/17		108	%	75 - 158
			1,2,3,7,8-Penta CDF	2022/05/17		102	%	80 - 134
			2,3,4,7,8-Penta CDF	2022/05/17		100	%	68 - 160
			1,2,3,4,7,8-Hexa CDF	2022/05/17		104	%	72 - 134
			1,2,3,6,7,8-Hexa CDF	2022/05/17		107	%	84 - 130
			2,3,4,6,7,8-Hexa CDF	2022/05/17		96	%	70 - 156
			1,2,3,7,8,9-Hexa CDF	2022/05/17		104	%	78 - 130
			1,2,3,4,6,7,8-Hepta CDF	2022/05/17		101	%	82 - 122
			1,2,3,4,7,8,9-Hepta CDF	2022/05/17		98	%	78 - 138
			Octa CDF	2022/05/17		102	%	63 - 170
7993737	RAK	RPD	2,3,7,8-Tetra CDD	2022/05/17	17		%	25
			1,2,3,7,8-Penta CDD	2022/05/17	14		%	25
			1,2,3,4,7,8-Hexa CDD	2022/05/17	19		%	25
			1,2,3,6,7,8-Hexa CDD	2022/05/17	20		%	25
			1,2,3,7,8,9-Hexa CDD	2022/05/17	22		%	25
			1,2,3,4,6,7,8-Hepta CDD	2022/05/17	25		%	25
			Octa CDD	2022/05/17	0		%	25
			2,3,7,8-Tetra CDF	2022/05/17	22		%	25
			1,2,3,7,8-Penta CDF	2022/05/17	16		%	25
			2,3,4,7,8-Penta CDF	2022/05/17	17		%	25
			1,2,3,4,7,8-Hexa CDF	2022/05/17	18		%	25
			1,2,3,6,7,8-Hexa CDF	2022/05/17	22		%	25
			2,3,4,6,7,8-Hexa CDF	2022/05/17	25		%	25
			1,2,3,7,8,9-Hexa CDF	2022/05/17	20		%	25
			1,2,3,4,6,7,8-Hepta CDF	2022/05/17	13		%	25
			1,2,3,4,7,8,9-Hepta CDF	2022/05/17	9.6		%	25
			Octa CDF	2022/05/17	2.0		%	25
7993737	RAK	Method Blank	37CL4 2378 Tetra CDD	2022/05/18		95	%	35 - 197
			C13-1234678 HeptaCDD	2022/05/18		102	%	23 - 140

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			C13-1234678 HeptaCDF	2022/05/18		106	%	28 - 143
			C13-123478 HexaCDD	2022/05/18		105	%	32 - 141
			C13-123478 HexaCDF	2022/05/18		103	%	26 - 152
			C13-1234789 HeptaCDF	2022/05/18		103	%	28 - 138
			C13-123678 HexaCDD	2022/05/18		100	%	28 - 130
			C13-123678 HexaCDF	2022/05/18		99	%	26 - 123
			C13-12378 PentaCDD	2022/05/18		106	%	25 - 181
			C13-12378 PentaCDF	2022/05/18		103	%	24 - 185
			C13-123789 HexaCDF	2022/05/18		102	%	29 - 147
			C13-234678 HexaCDF	2022/05/18		117	%	28 - 136
			C13-23478 PentaCDF	2022/05/18		107	%	21 - 178
			C13-2378 TetraCDD	2022/05/18		80	%	25 - 164
			C13-2378 TetraCDF	2022/05/18		89	%	24 - 169
			C13-OCDD	2022/05/18		107	%	17 - 157
			2,3,7,8-Tetra CDD	2022/05/18	<1.61, EDL=1.61		pg/L	
			1,2,3,7,8-Penta CDD	2022/05/18	<1.53, EDL=1.53		pg/L	
			1,2,3,4,7,8-Hexa CDD	2022/05/18	<1.41, EDL=1.41		pg/L	
			1,2,3,6,7,8-Hexa CDD	2022/05/18	<1.38, EDL=1.38		pg/L	
			1,2,3,7,8,9-Hexa CDD	2022/05/18	<2.51, EDL=2.51 (1)		pg/L	
			1,2,3,4,6,7,8-Hepta CDD	2022/05/18	<1.64, EDL=1.64		pg/L	
			Octa CDD	2022/05/18	<1.31, EDL=1.31		pg/L	
			Total Tetra CDD	2022/05/18	37.1, EDL=1.61		pg/L	
			Total Penta CDD	2022/05/18	41.2, EDL=1.53		pg/L	
			Total Hexa CDD	2022/05/18	19.0, EDL=1.46		pg/L	
			Total Hepta CDD	2022/05/18	<1.16, EDL=1.16		pg/L	
			2,3,7,8-Tetra CDF	2022/05/18	<1.52, EDL=1.52		pg/L	
			1,2,3,7,8-Penta CDF	2022/05/18	<1.14, EDL=1.14		pg/L	
			2,3,4,7,8-Penta CDF	2022/05/18	<1.02, EDL=1.02		pg/L	
			1,2,3,4,7,8-Hexa CDF	2022/05/18	<0.996, EDL=0.996		pg/L	
			1,2,3,6,7,8-Hexa CDF	2022/05/18	<1.07, EDL=1.07		pg/L	
			2,3,4,6,7,8-Hexa CDF	2022/05/18	<0.913, EDL=0.913		pg/L	
			1,2,3,7,8,9-Hexa CDF	2022/05/18	<1.03, EDL=1.03		pg/L	
			1,2,3,4,6,7,8-Hepta CDF	2022/05/18	<1.46, EDL=1.46		pg/L	

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			1,2,3,4,7,8,9-Hepta CDF	2022/05/18	<1.46, EDL=1.46		pg/L	
			Octa CDF	2022/05/18	<1.04, EDL=1.04		pg/L	
			Total Tetra CDF	2022/05/18	<1.52, EDL=1.52		pg/L	
			Total Penta CDF	2022/05/18	<1.08, EDL=1.08		pg/L	
			Total Hexa CDF	2022/05/18	<1.00, EDL=1.00		pg/L	
			Total Hepta CDF	2022/05/18	<1.46, EDL=1.46		pg/L	

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

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.

(1) EMPC / NDR - Peak detected does not meet ratio criteria and has resulted in an elevated detection limit.

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

VALIDATION SIGNATURE PAGE

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

Angel Guerrero, Supervisor, Ultra Trace Analysis, HRMS

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 Signature Page.

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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Chain of Custody (COC) / Analyt

www.alsglobal.com

Canada Toll Free: 1 800 (

L2702028-COFC

ber: 20 - 946007

Page 1 of 1

Report To	Contact and company name below will appear on the final report
Company:	AECOM
Contact:	Matthew Alexander
Phone:	226-821-4906
	Company address below will appear on the final report
Street:	50 Sportsworld Crossing
City/Province:	Kitchener ON
Postal Code:	N2P 0A4
Invoice To	Same as Report To ☐ YES ☑ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	Township of Centre Wellington
Contact:	Adam Gilmore

Project Information

ALS Account # / Quote #:	BR350348 / Q89128
Job #:	
PO / AFE:	
LSD:	
ALS Lab Work Order # (ALS use only):	L2702028

Reports / Recipients

Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Merge QC/QCI Reports with COA	☑ YES ☐ NO ☐ N/A
	☑ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution:	☐ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	matthew.alexander@aecom.com
Email 2	AGilmore@centrewellington.ca
Email 3	

Invoice Recipients

Select Invoice Distribution:	☐ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	
Email 2	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	
ALS Contact:	Sampler:

ed

- ☑ Routine [R] if received by 3pm M-F - no surcharges apply
- ☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum
- ☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum
- ☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum
- ☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum
- ☐ Same day [E2] if received by 10am M-S - 200% rush surcharge. Additional fees may apply to rush requests on weekends, statutory holidays and non-routine tests

AFFIX ALS BARCODE LABEL HERE (ALS use only)

Date and Time Required for all E&P TATs: [illegible]

For all tests with rush TATs requested, please contact your AM to confirm availability.

Analysis Request

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

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Q89128	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	FS-R	28-04-22	10:25	GW	34	✓			

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human consumption/ use? ☐ YES ☑ NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

ODWQS

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☑ ICE ☐ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
				6.8			

SHIPMENT RELEASE (client use)

Released by:	Date:	Time:
Peter Mohr	April 29, 2022	12:00

INITIAL SHIPMENT RECEPTION (ALS use only)

Received by:	Date:	Time:

FINAL SHIPMENT RECEPTION (ALS use only)

Received by:	Date:	Time:
TS	4/28/22	12:15pm

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

AUG 2020 FRONT

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

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

Appendix C

Lotowater Technical Services Test Results

AECOM

F2-T Well Results

Lotowater TECHNICAL SERVICES INC.

Client: Township of Centre Wellington

LOCATION	*445 St Andrews St E, Fergus, ON*	**BOREHOLE**	**F2-T**
DEPTH REF.	*Ground level*	**PROJECT #**	*313-010*
WATER LEVEL	*15.53 m at time of logging*	**LOG DATE**	*2021-09-13&14*
DRILL METHOD	*n/a*	**LOGGED BY**	*R. Hettinga*

Depth 1m:575m

Natural Gamma Down 0 Cps 50

Natural Gamma Up 0 Cps 50

16" Norma Resistivity 0 Ohm.m 5000

64" Normal Resistivity 0 Ohm.m 5000

Caliper - max from ABI 100 mm 250

Caliper - ave from ABI 100 mm 250

Caliper-u1 100 mm 250

Caliper-u2 100 mm 250

Flow Profile 0 (m/s) 0.2

Temperature Static 8 'C 11

Cond25C 0 uS/cm 2000

Temp Pumping 9 'C 10

Cond25C Pumping 0 uS/cm 2500

Geological Contacts

After Brunton & Brintnell, 2011

OBI Image-NMcorr 0° 90° 180° 270° 0°

OBI Tilt 0 deg 2

OBI Azimuth 0 deg 360

ABI MagnField 0 uT 100

Engineering Log 150 mm 150 Comment

Plain casing -0.60-70.82 165.1mm

Plain casing -0.40-70.82 270mm

Grout 0.00-70.82

drill 0.00-70.82 diameter:270mm

Water borehole fluid 12.53-70.82

Water borehole fluid 12.53-116.00

drill 70.82-116.40 diameter:152.4mm

ABI Amplitude NMcorr 0 1000 0° 90° 180° 270° 0°

ABI Travel Time Proc 1450 0.1us 1650 0° 90° 180° 270° 0°

ABI Eastward Deviation -0.2 [m] 0.2

ABI Northward Deviation -0.2 [m] 0.2

ABI Closure Distance 0 [m] 0.4

Allowed Closure 0 [m] 0.4

Figure:

Lotowater TECHNICAL SERVICES INC.

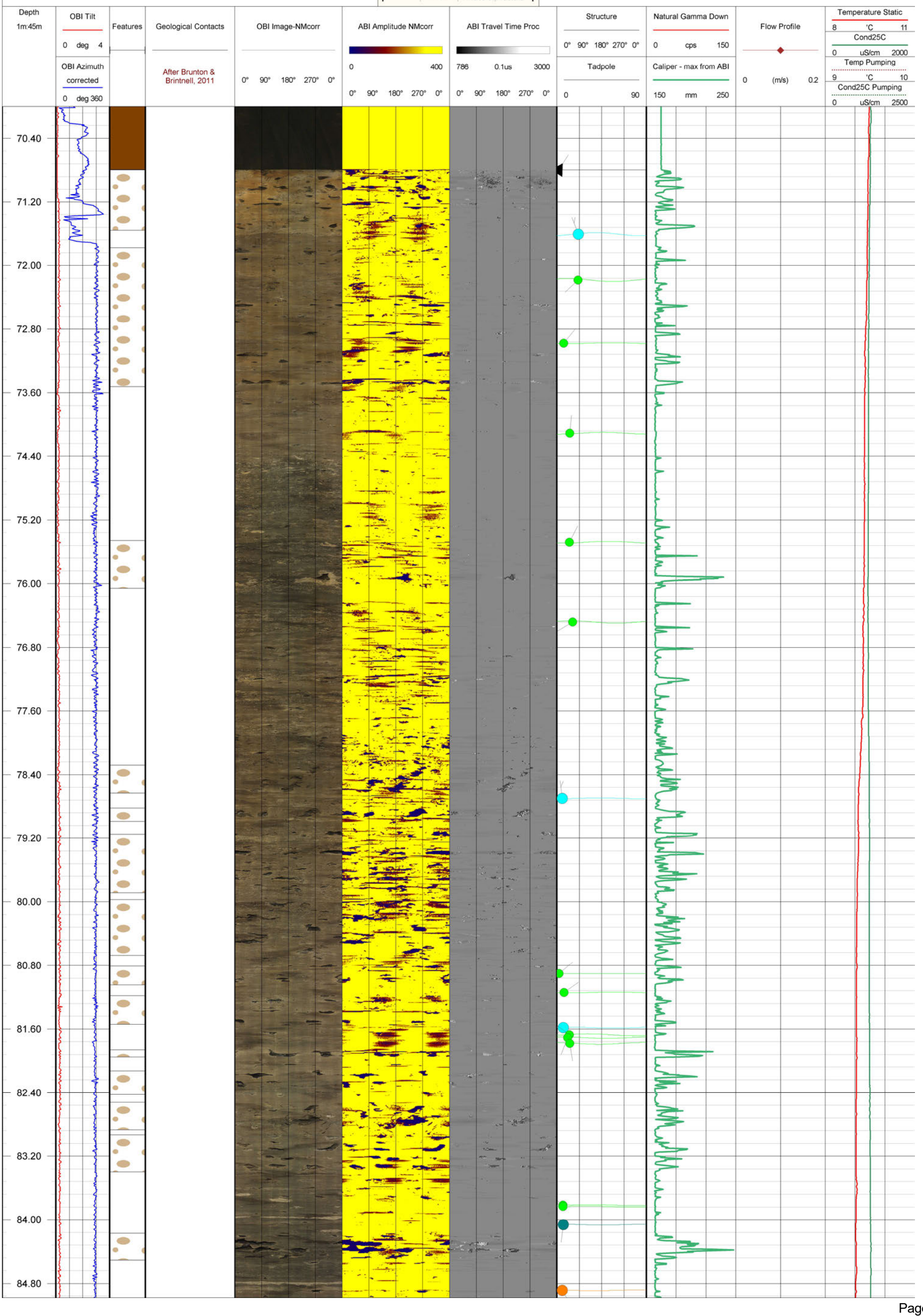
CLIENT
Township of Centre Wellington

LOCATION	*445 St Andrews St E, Fergus, ON*	**BOREHOLE**	**F2-T**
DEPTH REF.	*Ground level*	**PROJECT #**	*313-010*
WATER LEVEL	*15.53 at time of logging*	**LOG DATE**	*2021-09-13&14*
DRILL METHOD	*n/a*	**LOGGED BY**	*R. Hettinga*

Structure: 2 - Minor Open Joint/Fracture; 3 - Partly Open Joint/Fracture; 4 - Filled Fracture/Joint; 5 - Bedding/Banding/Foliation; 6 - Closed Joint/Fracture; 7 - Contact; 8 - Bottom of Casing

Structure / Tadpole: 0 90 180 270 0 | 0 Tadpole 90 | Dip (0-90) | Dip direction(0-360) | Trace of Fracture

Features: Casing; Soft Layers; Vuggy Zone



Depth
1m:45m

OBI Tilt
0 deg 4
OBI Azimuth corrected
0 deg 360

Features

Geological Contacts
After Brunton & Brintnell, 2011

OBI Image-NMcorr
0° 90° 180° 270° 0°

ABI Amplitude NMcorr
0 400
0° 90° 180° 270° 0°

ABI Travel Time Proc
786 0.1us 3000
0° 90° 180° 270° 0°

Structure
0° 90° 180° 270° 0°
Tadpole
0 90

Natural Gamma Down
0 cps 150
Caliper - max from ABI
150 mm 250

Flow Profile
0 (m/s) 0.2

Temperature Static
8 'C 11
Cond25C
0 uS/cm 2000
Temp Pumping
9 'C 10
Cond25C Pumping
0 uS/cm 2500

85.60
86.40
87.20
88.00
88.80
89.60
90.40
91.20
92.00
92.80
93.60
94.40
95.20
96.00
96.80
97.60
98.40
99.20
100.00
100.80
101.60
102.40

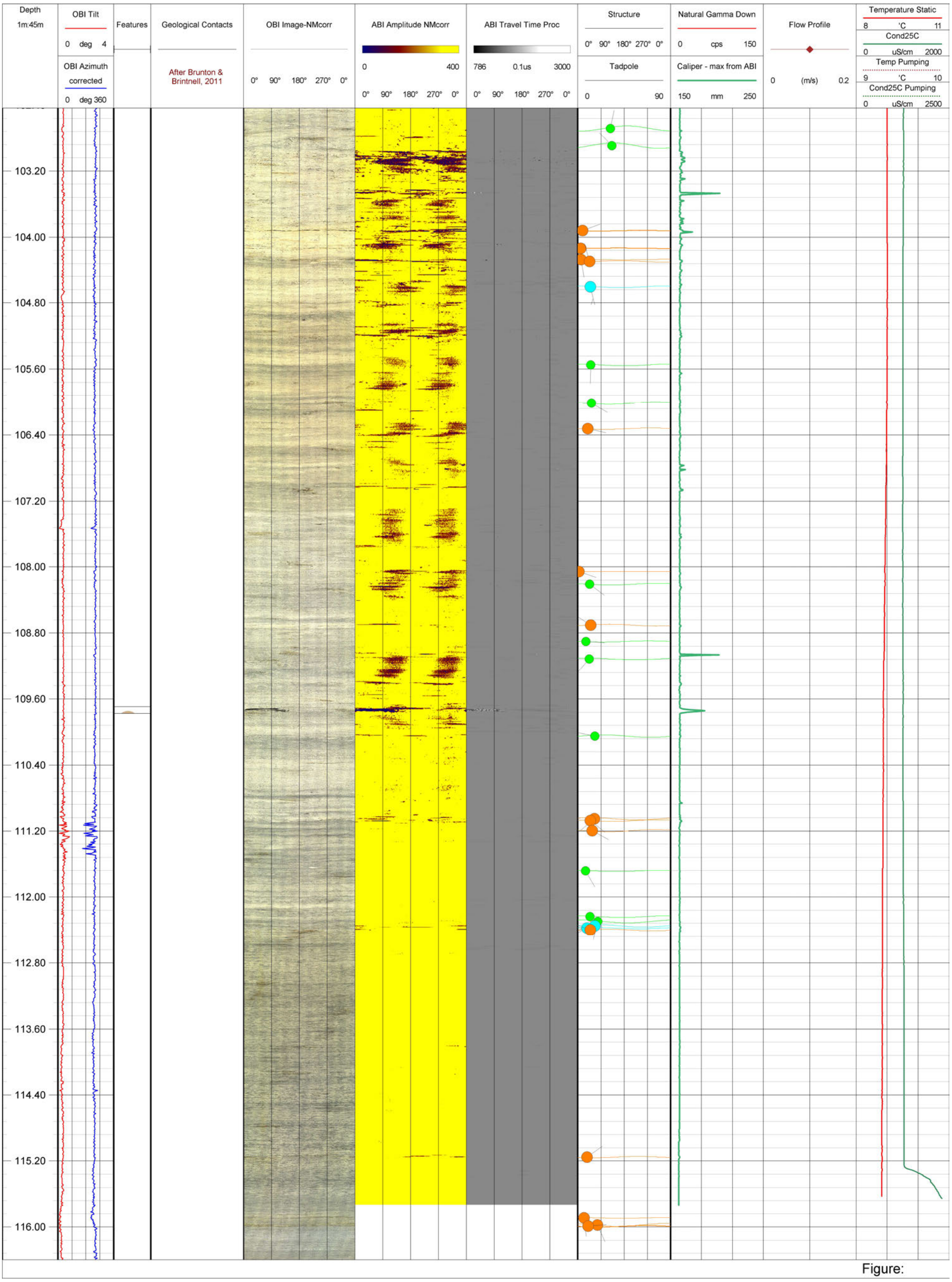

Depth
1m:45m
OBI Tilt
0 deg 4
OBI Azimuth
corrected
0 deg 360
Features
Geological Contacts
After Brunton & Brintnell, 2011
OBI Image-NMcorr
0° 90° 180° 270° 0°
ABI Amplitude NMcorr
0 400
0° 90° 180° 270° 0°
ABI Travel Time Proc
786 0.1us 3000
0° 90° 180° 270° 0°
Structure
0° 90° 180° 270° 0°
Tadpole
0 90
Natural Gamma Down
0 cps 150
Caliper - max from ABI
150 mm 250
Flow Profile
0 (m/s) 0.2
Temperature Static
8 'C 11
Cond25C
0 uS/cm 2000
Temp Pumping
9 'C 10
Cond25C Pumping
0 uS/cm 2500
103.20
104.00
104.80
105.60
106.40
107.20
108.00
108.80
109.60
110.40
111.20
112.00
112.80
113.60
114.40
115.20
116.00

Figure:

Lotowater TECHNICAL SERVICES INC.

Plumbness and Alignment Log

CLIENT
Twp of Centre Wellington

LOCATION	*445 St Andrew St E, Fergus, ON*	**BOREHOLE**	**F2-T**
DEPTH REF.	*Ground Surface*	**PROJECT #**	*313-010*
WATER LEVEL	*12.53 m bgl*	**LOG DATE**	*2021-09-14*
DRILL METHOD	*n/a*	**LOGGED BY**	*R. Hettinga*

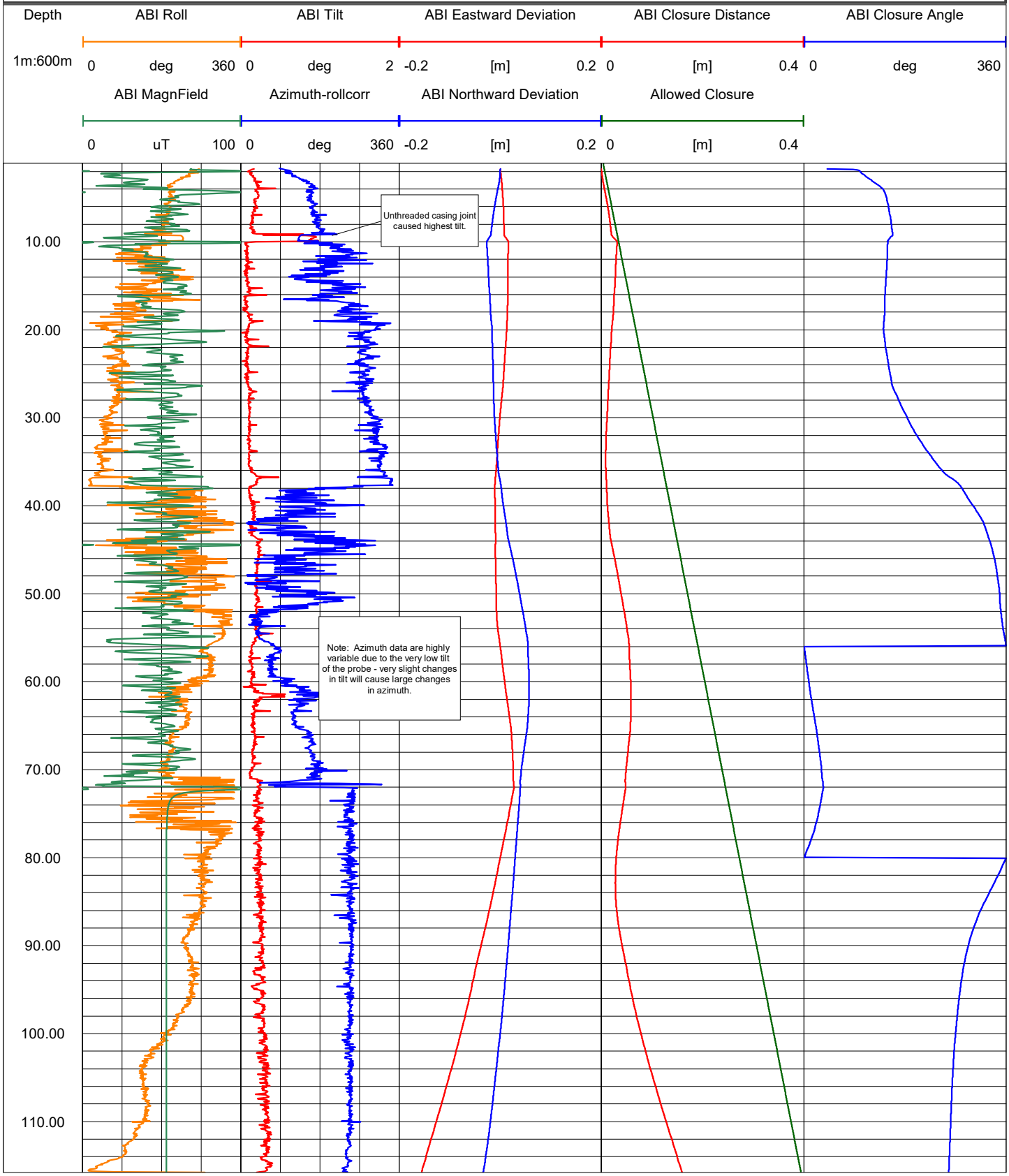


TABLE 2

Township of Centre Wellington
Well F2-T
Static Investigation Video Summary
2021/09/13

Elapsed Time (h:min)	Depth (ft below MP)	Depth (m below MP)	Comments
0:00	0.79	0.24	At ground level (top of casing is 0.60 m above ground level)
0:00	7.12	2.17	Casing joint
0:01	16.96	5.17	Casing joint
0:03	26.71	8.14	Casing joint (broken)
0:05	37.14	11.32	Casing joint
0:06	39.37	12.00	Static water level (turbid)
0:07	46.85	14.28	Casing joint
0:26	203.35	61.98	Casing joint
0:28	212.60	64.80	Casing joint
0:29	222.38	67.78	Casing joint
0:30	230.97	70.40	Bottom of casing
0:31	232.15	70.76	Vuggy
0:31	234.02	71.33	Horizontal flow visible
0:32	238.78	72.78	Vuggy w/grout
0:33	239.90	73.12	Fracture w/grout
0:34	247.97	75.58	Large vug
0:34	250.00	76.20	Horizontal flow visible
0:35	252.07	76.83	Horizontal flow visible, vuggy
0:36	254.79	77.66	Vuggy
0:36	256.00	78.03	Horizontal flow visible, vuggy
0:37	259.35	79.05	Fracture zone
0:38	264.67	80.67	Vuggy
0:38	267.62	81.57	Partial fractures
0:39	270.44	82.43	Partial fractures
0:39	273.43	83.34	Horizontal flow visible, vuggy
0:40	274.97	83.81	Horizontal flow visible, fracture zone
0:41	279.07	85.06	Vuggy
0:41	283.01	86.26	Large vug
0:42	284.42	86.69	Partial fractures
0:42	290.72	88.61	Partial fractures
0:45	310.73	94.71	Horizontal ring feature
0:47	321.13	97.88	Horizontal ring feature
0:47	324.08	98.78	Partial fracture
0:48	328.18	100.03	Partial fracture
0:48	332.45	101.33	Vuggy
0:49	337.37	102.83	Vuggy
0:50	340.22	103.70	Partial fracture
0:52	359.32	109.52	Partial fracture
0:56	381.82	116.38	Bottom of well
0:58	380.22	115.89	Minor partial fracture

TABLE 2

Township of Centre Wellington
Well F2-T
Static Investigation Video Summary
2021/09/13

Elapsed Time (h:min)	Depth (ft below MP)	Depth (m below MP)	Comments
0:59	377.82	115.16	Minor partial fracture
1:03	364.37	111.06	Minor partial fracture
1:06	356.59	108.69	Minor partial fracture
1:10	341.93	104.22	Minor partial fracture
1:11	340.78	103.87	Major fracture, minor flow visible
1:14	332.25	101.27	Vuggy
1:15	330.28	100.67	Large vugs
1:16	327.99	99.97	Crinoid bed
1:17	326.87	99.63	Fracture w/high dip
1:19	324.77	98.99	Major fracture, minor flow visible
1:21	321.75	98.07	Partially filled fracture
1:22	321.26	97.92	Minor partial fracture
1:24	313.55	95.57	Vuggy
1:25	311.35	94.90	Fracture w/grout
1:27	304.59	92.84	Minor partial fracture
1:31	292.06	89.02	Large vugs
1:34	288.02	87.79	Partially filled fracture
1:34	287.66	87.68	Large vug
1:35	285.04	86.88	Large vug, minor flow visible
1:37	283.69	86.47	Large vugs
1:38	280.41	85.47	Vuggy
1:39	279.53	85.20	Partial fracture/vugs
1:41	278.15	84.78	Fracture
1:43	276.44	84.26	Major fracture, minor flow visible
1:44	274.25	83.59	Large vug
1:46	271.10	82.63	Large partial fracture, minor flow visible
1:48	268.41	81.81	Large vugs
1:49	266.60	81.26	Partial fracture
1:50	264.01	80.47	Partial fracture, minor flow visible
1:52	263.12	80.20	Large vug, major flow visible
1:53	261.38	79.67	Vuggy
1:53	261.06	79.57	Major fracture, minor flow visible
1:55	260.96	79.54	Large partial fracture, major flow visible
1:56	258.37	78.75	Large vug
1:56	257.22	78.40	Large vugs/breakouts
1:58	252.95	77.10	Large vugs/breakouts
2:00	246.49	75.13	Vuggy
2:02	240.52	73.31	NEW DISK
-	-	-	- -
0:00	240.52	73.31	Continue up run
0:00	240.58	73.33	Vuggy, major flow visible
0:01	238.06	72.56	Vuggy

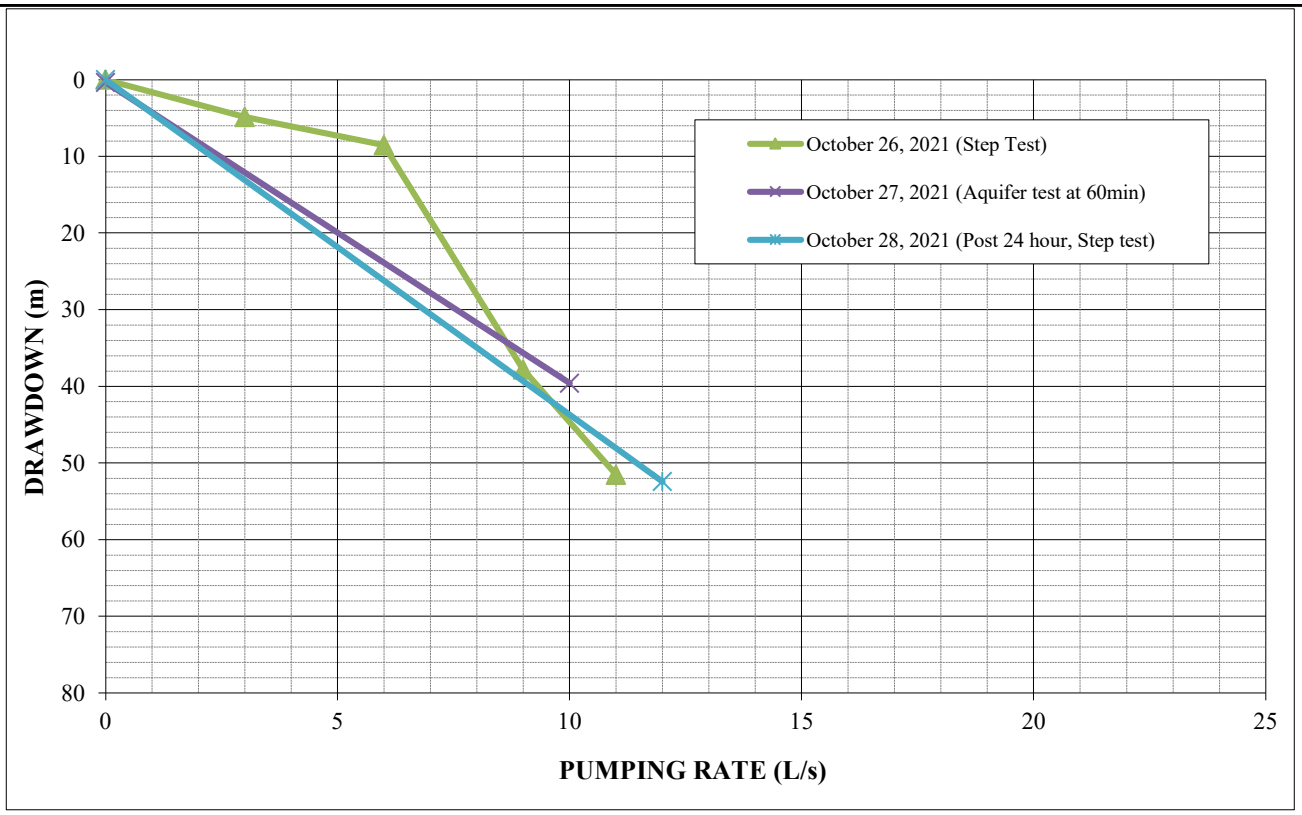
TABLE 2

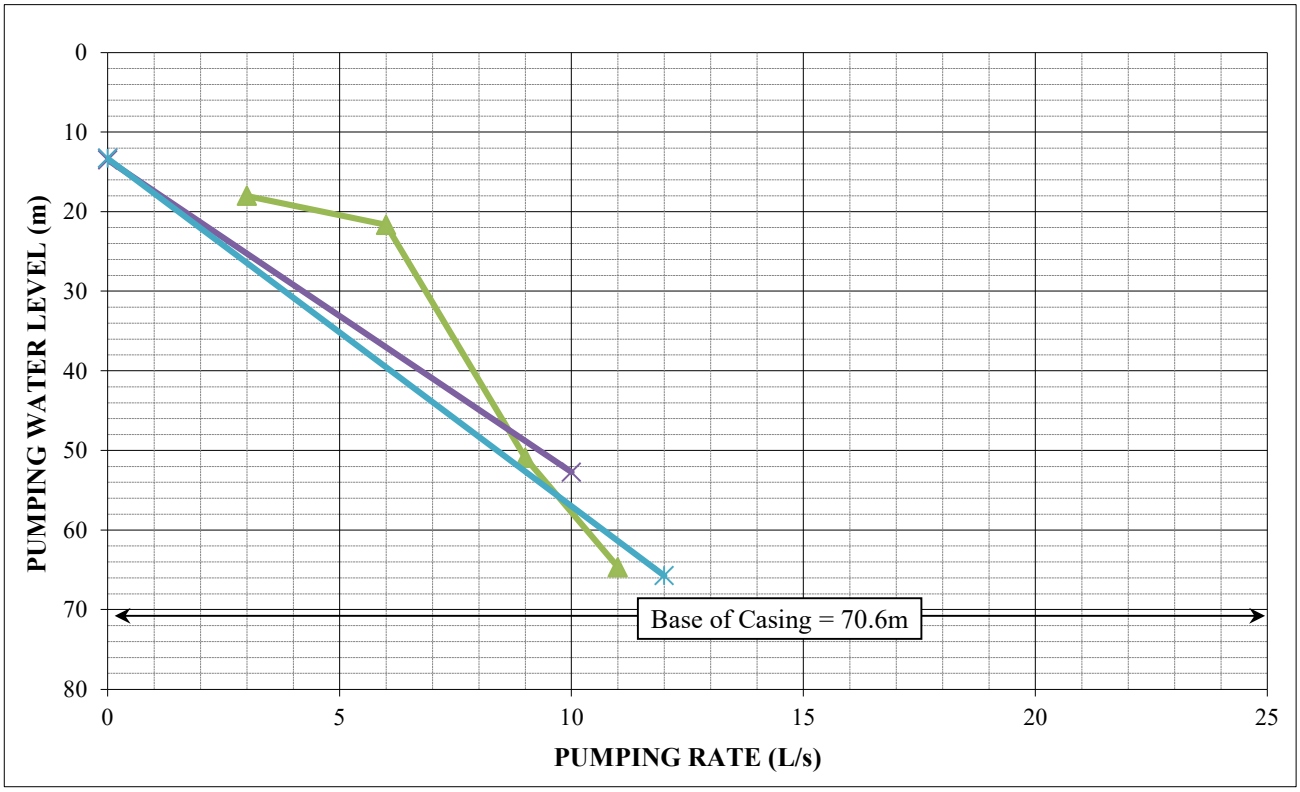
Township of Centre Wellington
Well F2-T
Static Investigation Video Summary
2021/09/13

Elapsed Time (h:min)	Depth (ft below MP)	Depth (m below MP)	Comments
0:03	235.14	71.67	Vuggy
0:04	233.17	71.07	Large vug
0:04	232.87	70.98	Large vug
0:05	231.76	70.64	Bottom of casing (reduction opens upward)
0:08	223.16	68.02	Casing joint
0:10	213.39	65.04	Casing joint
0:12	203.61	62.06	Casing joint
0:14	193.80	59.07	Casing joint
0:16	183.99	56.08	Casing joint
0:18	174.70	53.25	Casing joint
0:22	164.86	50.25	Casing joint
0:24	155.02	47.25	Casing joint
0:26	145.21	44.26	Casing joint
0:28	135.37	41.26	Casing joint
0:31	125.56	38.27	Casing joint
0:32	116.21	35.42	Casing joint
0:33	106.40	32.43	Casing joint
0:35	96.59	29.44	Casing joint
0:36	86.78	26.45	Casing joint
0:38	76.94	23.45	Casing joint
0:40	67.16	20.47	Casing joint
0:41	57.84	17.63	Casing joint
0:43	48.00	14.63	Casing joint
0:45	39.99	12.19	Static water level
0:45	38.19	11.64	Casing joint
0:47	28.15	8.58	Unthreaded casing joint
0:48	27.76	8.46	Bottom of unthreaded casing joint
0:50	17.98	5.48	Casing joint
0:51	8.17	2.49	Casing joint
0:53	1.31	0.40	Below ground level

Video survey conducted by Rayne Hettinga

Note: Measuring point (MP) is ground level. Top of casing is 0.60 m above





Notes:

All water levels are referenced from top of casing

Top of casing = 0.60 m above floor surface

Flow meter = 3" Banjo Flow Meter

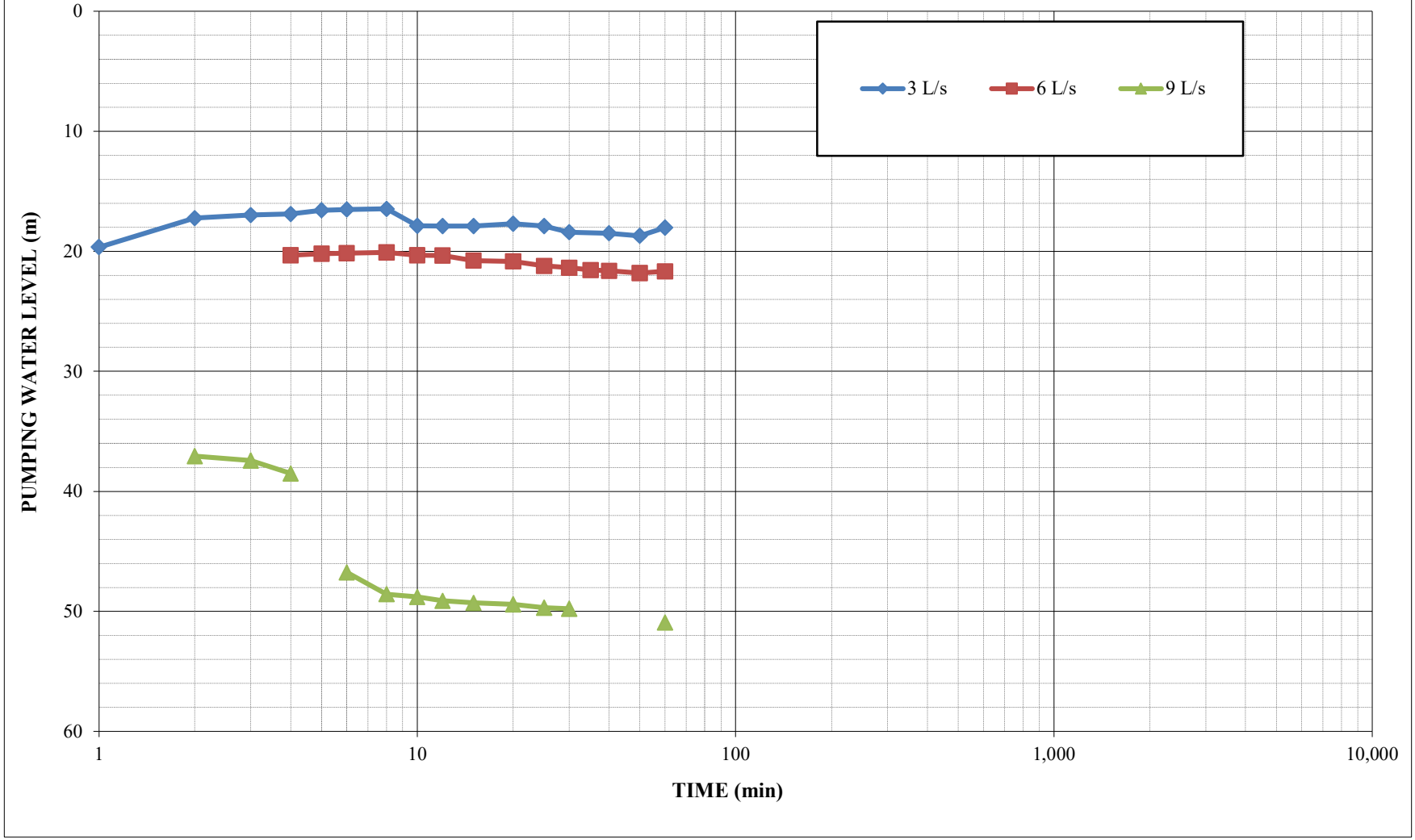
Township of Centre Wellington

Fergus F2-T

Comparison of Variable Rate Tests

Lotowater Technical Services Inc. **Figure 1**

Reference: 313-010 10/25/2021



Notes:

Step Test October 26, 2021

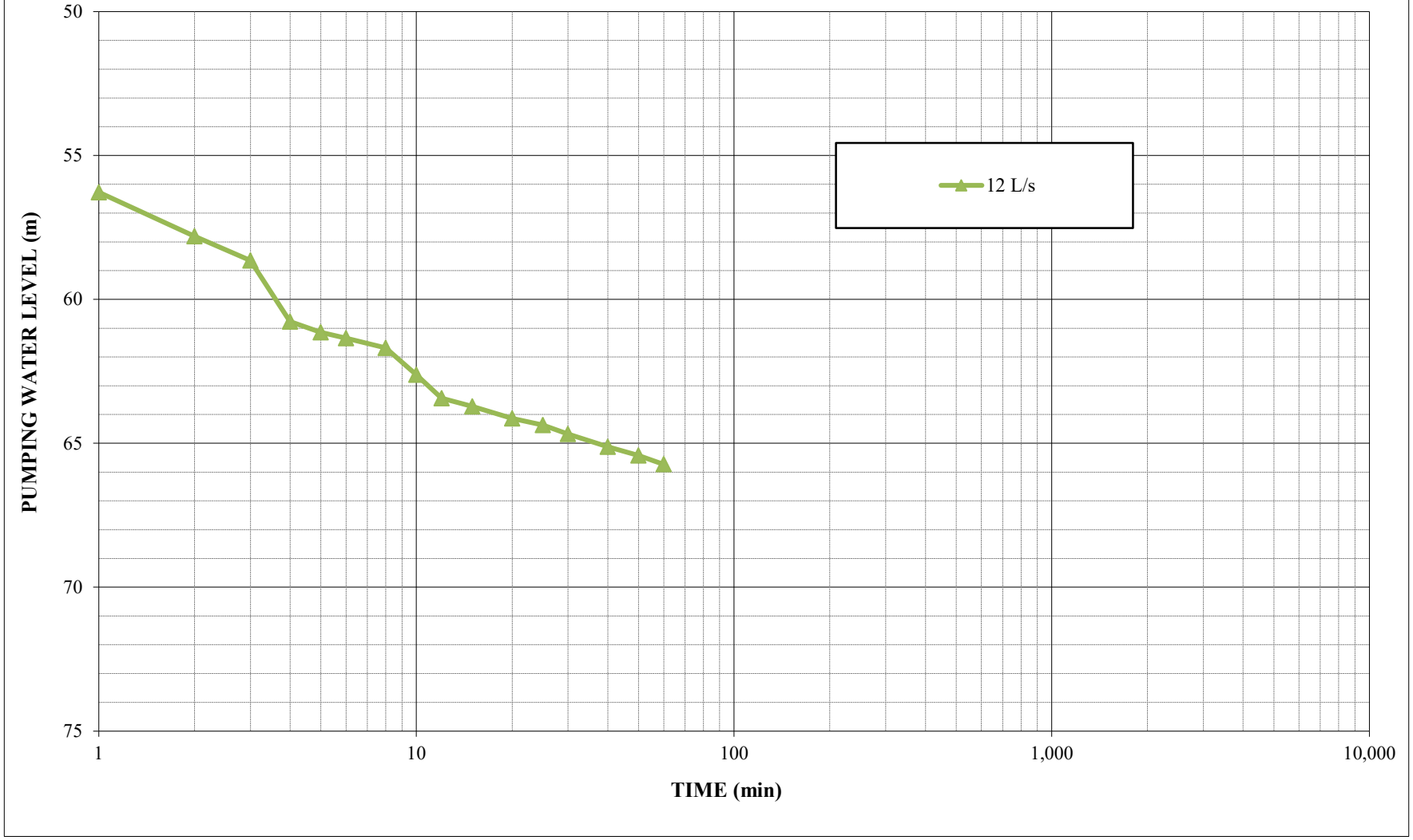
Township of Centre Wellington

Fergus Well F2-T

Comparison of Variable Rate Tests

Lotowater Technical Services Inc. **Figure 1**

Reference: 313-010 10/26/2021



Notes:

Step Test October 28, 2021

Township of Centre Wellington

Fergus Well F2-T

Comparison of Variable Rate Tests

Lotowater Technical Services Inc. **Figure 1**

Reference: 313-010 10/29/2021

TABLE 1

VARIABLE RATE PERFORMANCE TEST

Lotowater TECHNICAL SERVICES INC.

Well Name:	Fergus Test Well F2-T	**Project Number:**	313-010
Client:	Township Centre of Wellington	**Date:**	10/26/2021
Technician Name:	Art Krzysko	**Pump:**	Grundfos 300S-7aa (30hp)
Water Level Device:	LTS water level meter	**Pump Inlet:**	71.0 m
Water Level Reference:	Top of casing (0.60m ags)	**Flow Measuring Device:**	3" Banjo
Test Note:	Test to waste		

Time *hr:min*	**Elapsed Time** *min*	**Level** *mbBP*	**Drawdown** *m*	**Flow** *L/s*	**Note**
9:47	0	13.13	0.00	3.0	Start Step 1
9:48	1	19.65	6.52	3.0	
9:49	2	17.23	4.10	3.0	
9:50	3	16.97	3.84	3.0	
9:51	4	16.89	3.76	3.0	
9:52	5	16.58	3.45	3.0	
9:53	6	16.51	3.38	3.0	
9:55	8	16.46	3.33	3.0	
9:57	10	17.87	4.74	3.0	
9:59	12	17.89	4.76	3.0	
10:02	15	17.90	4.77	3.0	
10:07	20	17.71	4.58	3.0	
10:12	25	17.89	4.76	3.0	
10:17	30	18.41	5.28	3.0	170 psi
10:27	40	18.49	5.36	3.0	
10:37	50	18.70	5.57	3.0	
10:47	60	18.02	4.89	3.0	
10:47	0			6.0	Start Step 2
10:48	1			6.0	adusting flow
10:49	2			6.0	
10:50	3			6.0	
10:51	4	20.32	7.19	6.0	flow set
10:52	5	20.19	7.06	6.0	
10:53	6	20.16	7.03	6.0	140 psi
10:55	8	20.09	6.96	6.0	
10:57	10	20.32	7.19	6.0	
10:59	12	20.35	7.22	6.0	
11:02	15	20.78	7.65	6.0	
11:07	20	20.83	7.70	6.0	
11:12	25	21.21	8.08	6.0	
11:17	30	21.36	8.23	6.0	
11:22	35	21.55	8.42	6.0	
11:27	40	21.62	8.49	6.0	
11:37	50	21.82	8.69	6.0	
11:47	60	21.67	8.54	6.0	

TABLE 1

VARIABLE RATE PERFORMANCE TEST

Lotowater TECHNICAL SERVICES INC.

Well Name:	Fergus Test Well F2-T	**Project Number:**	313-010
Client:	Township Centre of Wellington	**Date:**	10/26/2021
Technician Name:	Art Krzysko	**Pump:**	Grundfos 300S-7aa (30hp)
Water Level Device:	LTS water level meter	**Pump Inlet:**	71.0 m
Water Level Reference:	Top of casing (0.60m ags)	**Flow Measuring Device:**	3" Banjo
Test Note:	Test to waste		

Time *hr:min*	**Elapsed Time** *min*	**Level** *mbBP*	**Drawdown** *m*	**Flow** *L/s*	**Note**
10:47	0	21.67		9.0	Start Step 3
10:48	1			9.0	Adjusting flow
10:49	2	37.06		9.0	
10:50	3	37.43		9.0	
10:51	4	38.51	25.38	9.0	Flow set
10:52	5			9.0	
10:53	6	46.75	33.62	9.0	104 psi
10:55	8	48.56	35.43	9.0	
10:57	10	48.79	35.66	9.0	
10:59	12	49.12	35.99	9.0	
11:02	15	49.28	36.15	9.0	
11:07	20	49.42	36.29	9.0	
11:12	25	49.69	36.56	9.0	
11:17	30	49.77	36.64	9.0	
11:22	35			9.0	
11:27	40			9.0	
11:37	50			9.0	
11:47	60	50.92	37.79	9.0	

TABLE 1

VARIABLE RATE PERFORMANCE TEST

Lotowater TECHNICAL SERVICES INC.

Well Name:	Fergus Test Well F2-T	**Project Number:**	313-010
Client:	Township Centre of Wellington	**Date:**	10/26/2021
Technician Name:	Art Krzysko	**Pump:**	Grundfos 300S-7aa (30hp)
Water Level Device:	LTS water level meter	**Pump Inlet:**	71.0 m
Water Level Reference:	Top of casing (0.60m ags)	**Flow Measuring Device:**	3" Banjo
Test Note:	ReTest to check flow meter and levels		

Time *hr:min*	**Elapsed Time** *min*	**Level** *mbBP*	**Drawdown** *m*	**Flow** *L/s*	**Note**
12:47	0	15.84		9.0	Re run 9 L/s test
	1			9.0	
	2	46.16		9.0	
	3	47.19		9.0	
	4			9.0	
	5	47.47		9.0	
	6	47.66		9.0	
	8	47.89		9.0	
	10	48.15		9.0	55 sec to fill 160gallon bin
	12	48.31		9.0	
	15	48.70		9.0	
	20	49.08		9.0	
	25	49.32		9.0	
	30	49.40		9.0	
	40	49.65		9.0	
	50	49.86		9.0	
	60	50.07		9.0	
	68	60.44		11.0	Increase flow to 11 L/s
	69	60.10		11.0	
	70	62.67		11.0	
	71	64.28		11.0	
	72	64.66		11.0	

TABLE 1

VARIABLE RATE PERFORMANCE TEST

Lotowater TECHNICAL SERVICES INC.

Well Name:	Fergus Test Well F2-T	**Project Number:**	313-010
Client:	Township Centre of Wellington	**Date:**	10/29/2021
Technician Name:	Art Krzysko	**Pump:**	Grundfos 300S-7aa (30hp)
Water Level Device:	LTS water level meter	**Pump Inlet:**	71.0 m
Water Level Reference:	Top of casing (0.60m ags)	**Flow Measuring Device:**	3" Banjo
Test Note:	Retest after 24 test at 12 L/s rate		

Time *hr:min*	Elapsed Time *min*	Level *mbBP*	Drawdown *m*	Flow *L/s*	Note
8:58	0	13.31	0.00	12.0	
	1	56.28	42.97	12.0	
	2	57.81	44.50	12.0	
	3	58.65	45.34	12.0	
	4	60.77	47.46	12.0	
	5	61.15	47.84	12.0	
	6	61.35	48.04	12.0	
	8	61.69	48.38	12.0	
	10	62.62	49.31	12.0	63 psi
	12	63.44	50.13	12.0	
	15	63.72	50.41	12.0	
	20	64.14	50.83	12.0	
	25	64.37	51.06	12.0	
	30	64.68	51.37	12.0	
	40	65.12	51.81	12.0	
	50	65.43	52.12	12.0	
	60	65.73	52.42	12.0	

APPENDIX A

Well Chlorination Record

Well Name:	F2T	
Client:	Wellinton Township	
Project #:	313-010	
Disinfected By:		
LTS Chlorination Worksheet Used:	Yes	
Treatment Volume:	2,022	**Litres**
Desired Concentration:	100	**ppm**
Volume of Mixing Water:	n/a	**Litres**
Qty of Sterilene Needed (granular 55%):	367.57	**grams**
	5.39	**Capfuls**
Type and Quantity of Chlorine Used:	Sterilene 400 g	
Date and Time Chlorine Added:		
Chlorine Addition Method:	Added granular directly to well recirc at aprox 3 L/s	
Chlorine Residual Measured at Surface:		
Chlorine Residual Measurement Method:		
Date & Time Chlorine Purged:		
Pre-Purge Chlorine Residual Measured at Surface:		
Chlorine Residual Measurement Method:	Test strip	
Purged By:	400L poly bin with 75mm conection	
Purged To:	Storm	
Quantity and Type of Dechlorinating Agent Used:	0.50 kg sodium thiosulphate	
Minutes of Pumping until Zero Free Chlorine Residual:		
Final Turbidity Measurement (NTU):		
Notes on Disinfection:		

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AECOM

F2-R Well Results

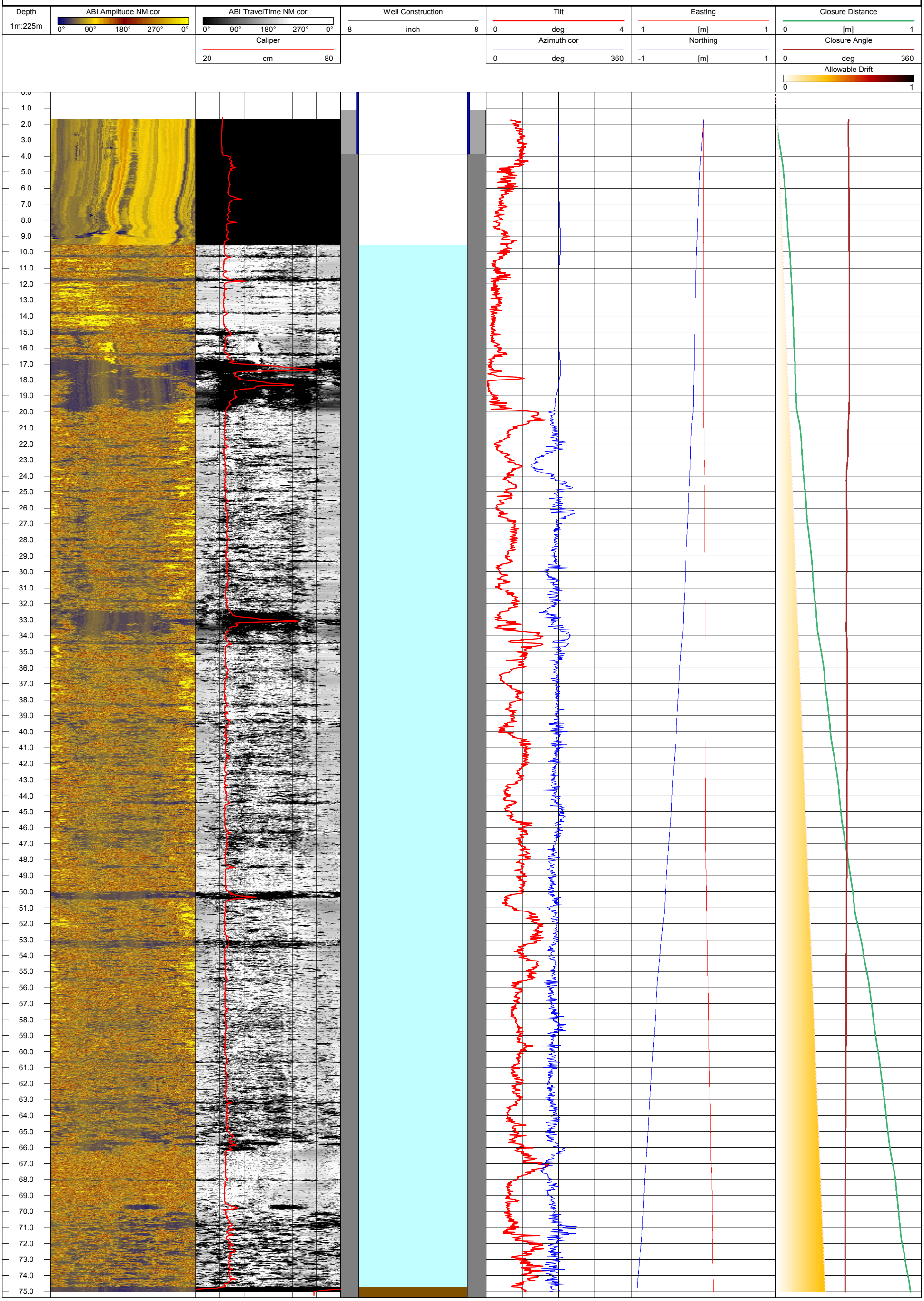
Lotowater TECHNICAL SERVICES INC.

GEOPHYSICAL RECORD OF BOREHOLE: Well F2 Plumbness & Alignment

Project Number: 313-010

Date: July 23, 2021

Client: Twp. of Centre Wellington

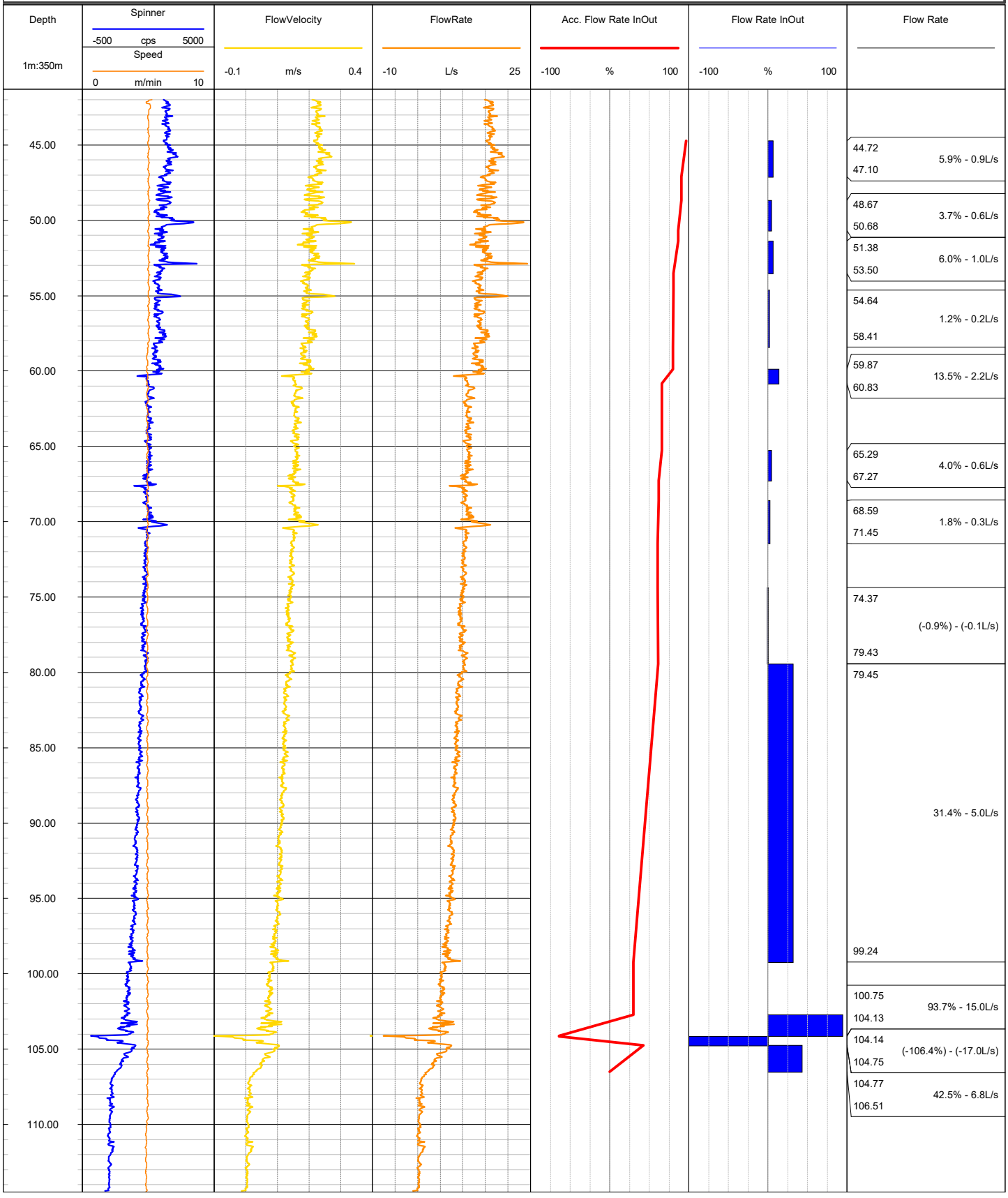


Lotowater
TECHNICAL SERVICES INC.

Pumping Flow Profile (16 L/s)

CLIENT
Township of Centre Wellington

LOCATION	*St Andrew St E, Fergus ON*	**BOREHOLE**	**F2-R**
DEPTH REF.	*Top of casing (0.73 magl)*	**PROJECT #**	*313-010*
WATER LEVEL	*12.07 mbToC static*	**LOG DATE**	*2022-12-14*
DRILL METHOD	*n/a*	**LOGGED BY**	*RH*



Lotowater
TECHNICAL SERVICES INC.

3-arm Caliper Logs

CLIENT
Township of Centre Wellington

LOCATION	*St Andrew St E, Fergus ON*	**BOREHOLE**	**F2-R**
DEPTH REF.	*Top of casing (0.73 m agl)*	**PROJECT #**	*313-010*
WATER LEVEL	*12.02 m bToC*	**LOG DATE**	*2022-12-14*
DRILL METHOD	*n/a*	**LOGGED BY**	*RH*

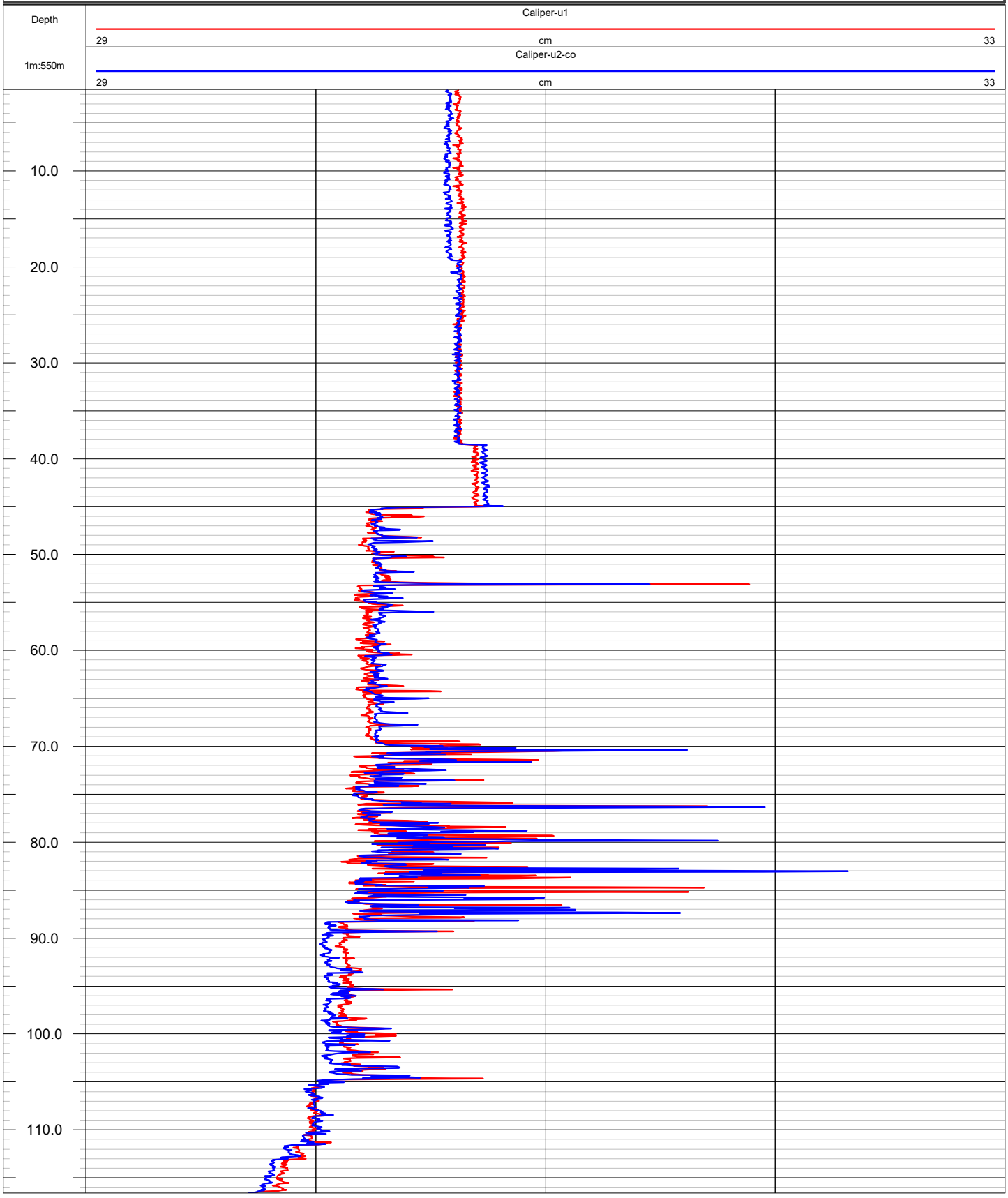


TABLE X

Township of Centre Wellington

Well F2-R
Static Investigation Video Summary
2022/12/21

Elapsed Time (h:min)	Depth (ft below MP)	Depth (m below MP)	Comments
0:00	2.76	0.84	Below top of casing
0:01	20.54	6.26	Casing joint
0:02	39.57	12.06	Static water level
0:02	40.03	12.20	Casing joint
0:04	62.47	19.04	Casing joint
0:06	83.69	25.51	Casing joint
0:07	104.82	31.95	Casing joint
0:09	126.08	38.43	Casing joint
0:10	147.31	44.90	Bottom of casing
0:12	164.86	50.25	Partial fracture
0:12	174.01	53.04	Fracture
0:13	181.43	55.30	Partial fracture
0:14	190.78	58.15	Rock staining change
0:14	198.23	60.42	Partial fracture
0:15	214.76	65.46	Vuggy
0:16	219.88	67.02	Vug
0:16	222.44	67.80	Rock staining change
0:16	228.08	69.52	Vuggy
0:17	231.36	70.52	Large vugs
0:17	233.59	71.20	Vuggy zone
0:17	239.50	73.00	Vuggy/partial fractures
0:18	250.82	76.45	Large vug/partial fracture
0:19	262.46	80.00	Vuggy/partial fractures
0:20	272.80	83.15	Vuggy/partial fractures
0:21	278.87	85.00	Large vugs
0:21	285.86	87.13	Large vug
0:24	313.68	95.61	Fracture, rock staining change
0:25	327.16	99.72	Fracture
0:26	340.42	103.76	Rough rock
0:28	344.22	104.92	Fracture
0:28	347.08	105.79	Darker rock
0:29	356.92	108.79	Filled fracture
0:29	358.95	109.41	Filled fracture
0:30	366.83	111.81	Filled fracture
0:32	384.97	117.34	Bottom of well, tape
0:35	368.04	112.18	Partial/filled fracture
0:36	360.23	109.80	Partial/filled fracture
0:39	345.63	105.35	Partial fracture, flow visible, taking water
0:40	345.14	105.20	Partial fracture zone
0:41	340.68	103.84	Lighter rock, vuggy
0:42	334.12	101.84	Large vug
0:43	332.44	101.33	Large vug
0:43	328.44	100.11	Partial fracture

TABLE X

Township of Centre Wellington

Well F2-R
Static Investigation Video Summary
2022/12/21

Elapsed Time (h:min)	Depth (ft below MP)	Depth (m below MP)	Comments
0:45	325.36	99.17	Partial fracture
0:46	324.80	99.00	Partial fracture
0:48	314.89	95.98	Partial/filled fracture
0:51	294.85	89.87	Large vug, biofouling
0:53	289.07	88.11	Vuggy
0:53	286.18	87.23	Amethyst geodes?
0:55	280.80	85.59	Large vug, biofouling
0:56	275.69	84.03	Large vug, biofouling
0:57	273.95	83.50	Many large vugs
0:57	271.68	82.81	Large vug, biofouling, amethyst?
0:59	266.34	81.18	Large vugs
1:00	262.73	80.08	More dolomitic stone
1:04	243.86	74.33	Large vug
1:06	232.28	70.80	Large vugs
1:08	230.41	70.23	Large vuggy zone
1:09	223.88	68.24	Partial fracture
1:11	214.63	65.42	Large vug
1:13	199.60	60.84	Partial fracture
1:17	182.74	55.70	Partial fracture
1:18	175.39	53.46	Major fracture zone
1:20	166.27	50.68	Partial fracture zone, laterL flow visible
1:23	152.23	46.40	Partial fracture zone, lateral flow visible
1:24	148.62	45.30	Bottom of casing
1:27	127.33	38.81	Casing joint
1:30	106.23	32.38	Casing joint
1:33	85.04	25.92	Casing joint
1:35	63.91	19.48	Casing joint
1:38	42.75	13.03	Casing joint
1:39	40.88	12.46	Static water level
1:41	21.55	6.57	Casing joint
1:44	2.85	0.87	Below top of casing

Video survey conducted by Rayne Hettinga

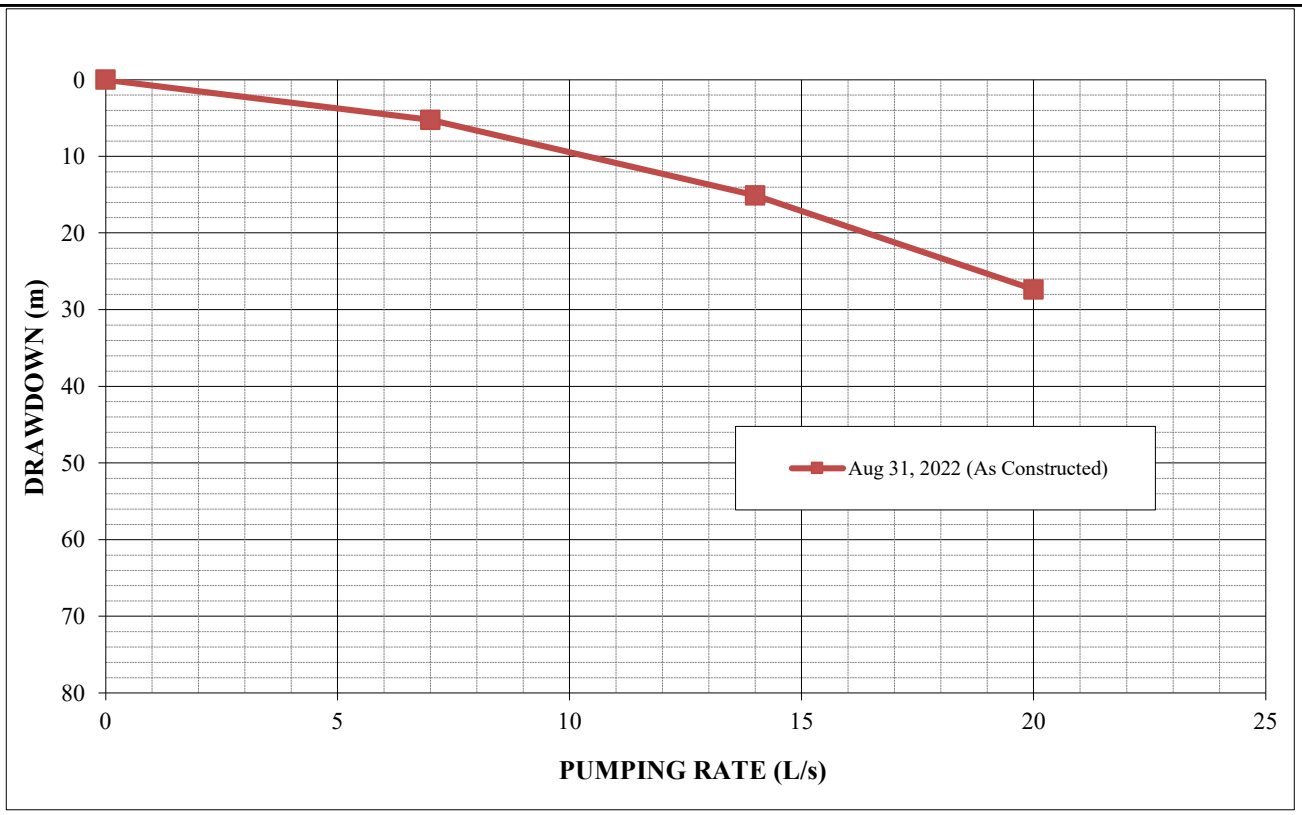
Note: Measuring point (MP) is top of casing which is 0.73 m above ground level

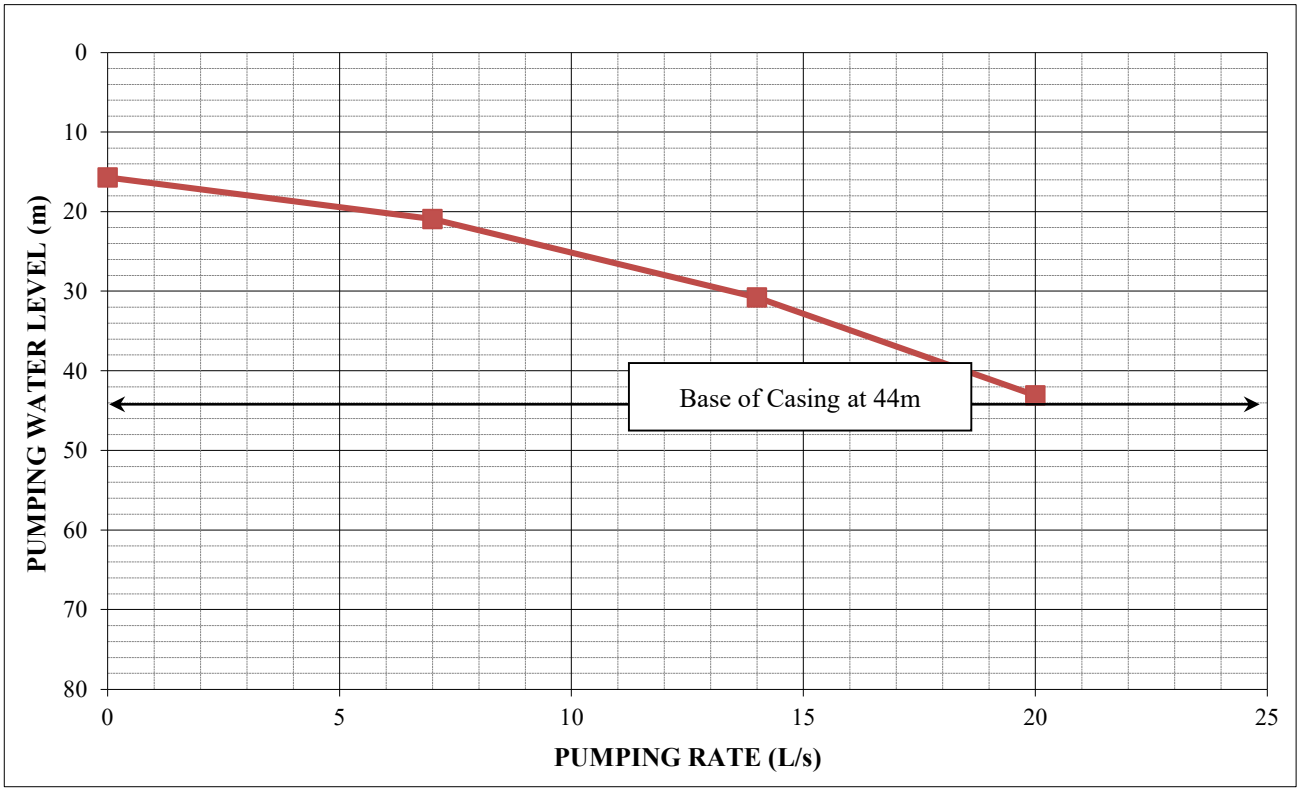
Well Chlorination Record

Well Name:	Well F2-R	
Client:	Township of Centre Wellington	
Project #:	313-010	
Disinfected By:	Arthur Krzysko	
LTS Chlorination Worksheet Used:	Yes	
Treatment Volume:	3,016	**Litres**
Desired Concentration:	150	**ppm**
Volume of Mixing Water:	n/a	**Litres**
Qty of Sterilene Needed (granular 55%):	822.53	**grams**
Type and Quantity of Chlorine Used:	850 grams Sterilene	
Date and Time Chlorine Added:	2022-08-31 15:30	
Chlorine Addition Method:	circulate with test pump	
Chlorine Residual Measured at Surface:	150ppm	
Chlorine Residual Measurement Method:	test strip	
Date & Time Chlorine Purged:	2022-09-01 10:00	
Pre-Purge Chlorine Residual Measured at Surface:	50ppm	
Chlorine Residual Measurement Method:	test strip	
Purged By:	Arthur Krzysko	
Purged To:	Storm drain	
Quantity and Type of Dechlorinating Agent Used:	850grams sodium metabisulpahte	
Minutes of Pumping until Zero Free Chlorine Residual:	2min	
Final Turbidity Measurement (NTU):		
Notes on Disinfection:		

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Notes:

All water levels are referenced from top of casing
Top of casing = 0.58m above ground surace
Flow meter = 4" Mcrometer Propeller Flow Meter
Pump Inlet 71.6m

Township of Centre Wellington

Fergus F2-R

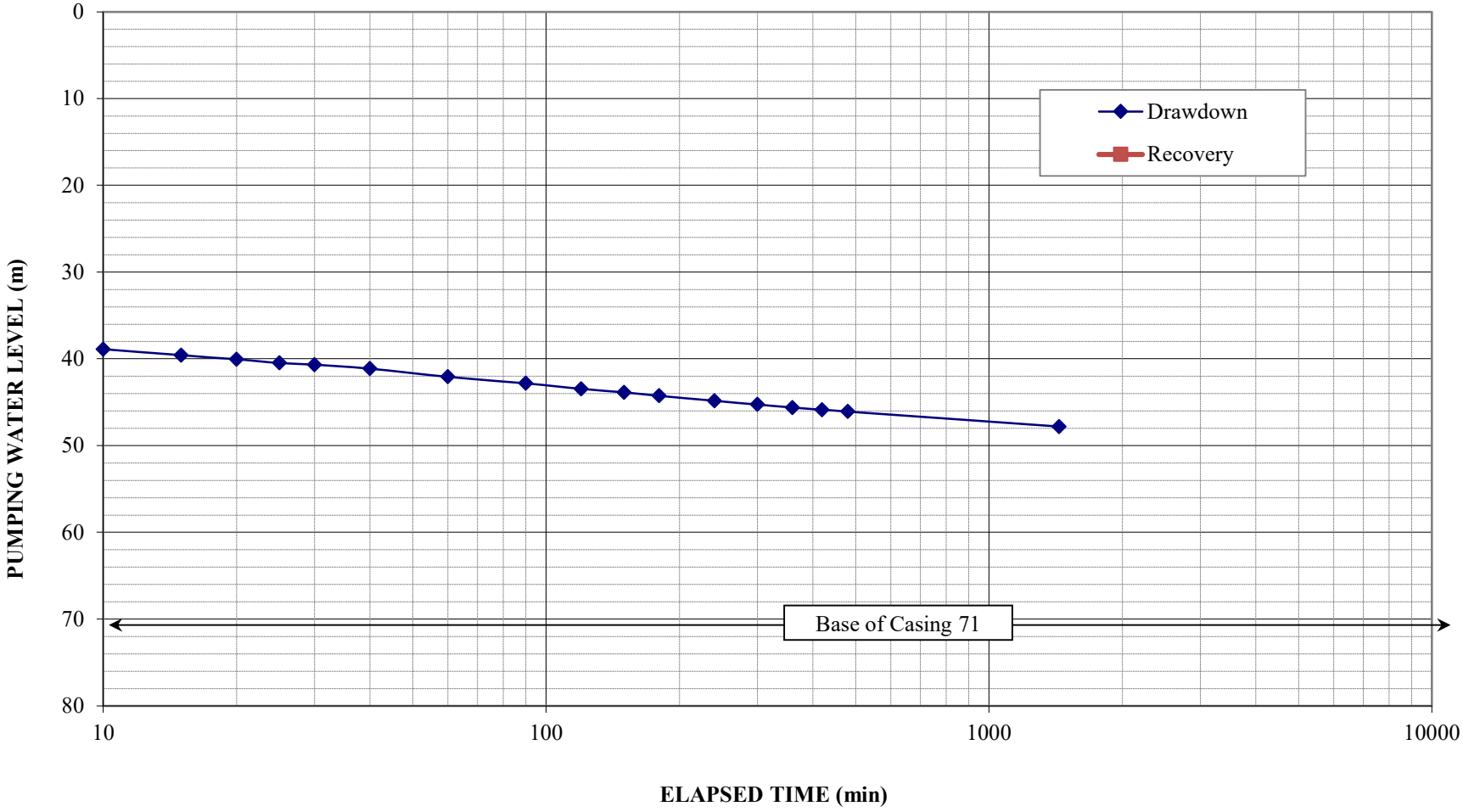
Comparison of Variable Rate Tests

Lotowater Technical Services Inc. **Figure 1**

Reference: 313-010 8/31/2022

Fergus F2-R
Q = 20.0 L/s
Test Start on September 1, 2022; 9:00
SWL = 13.28m

Pump at 71m



AECOM

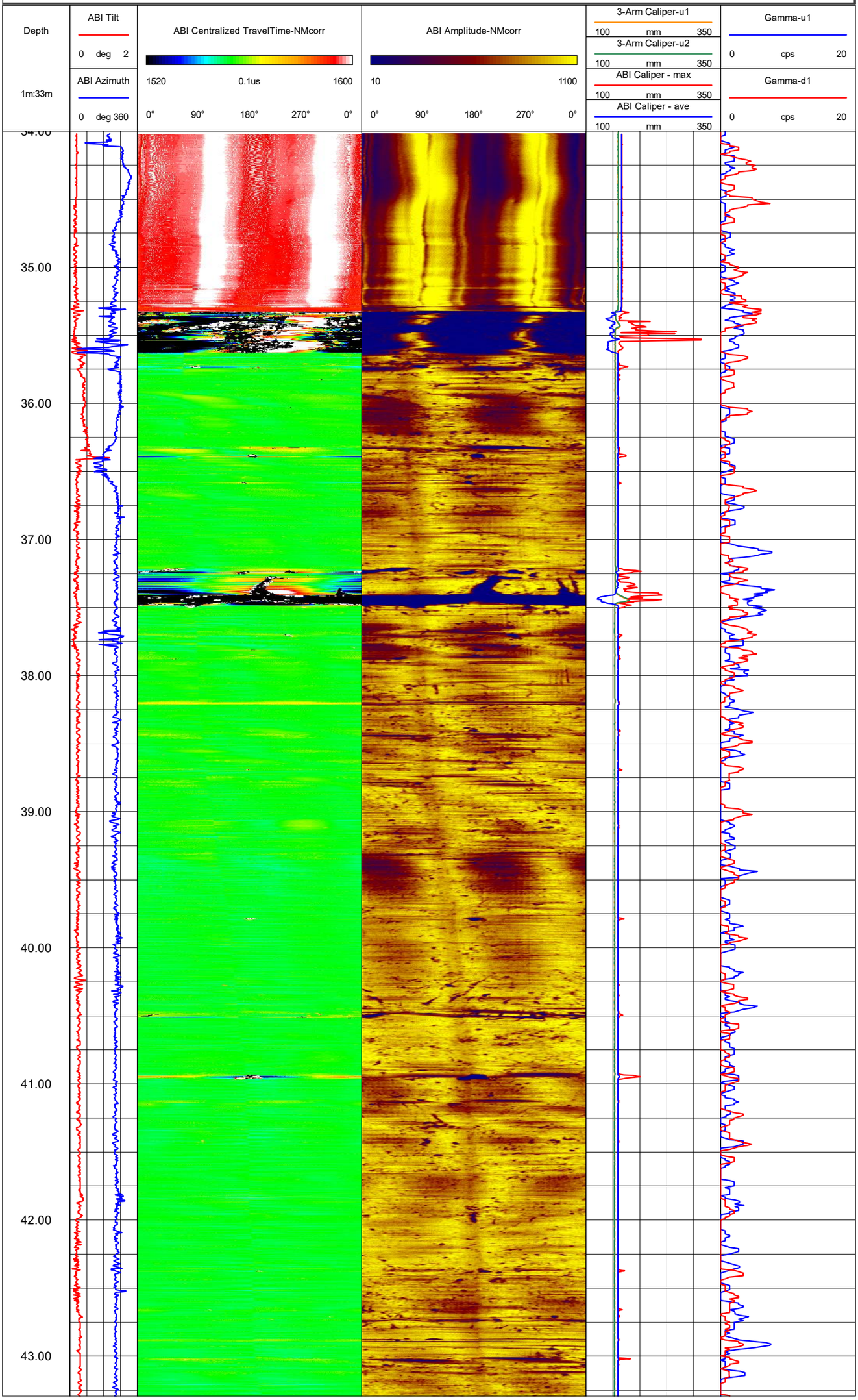
F5-T Well Results

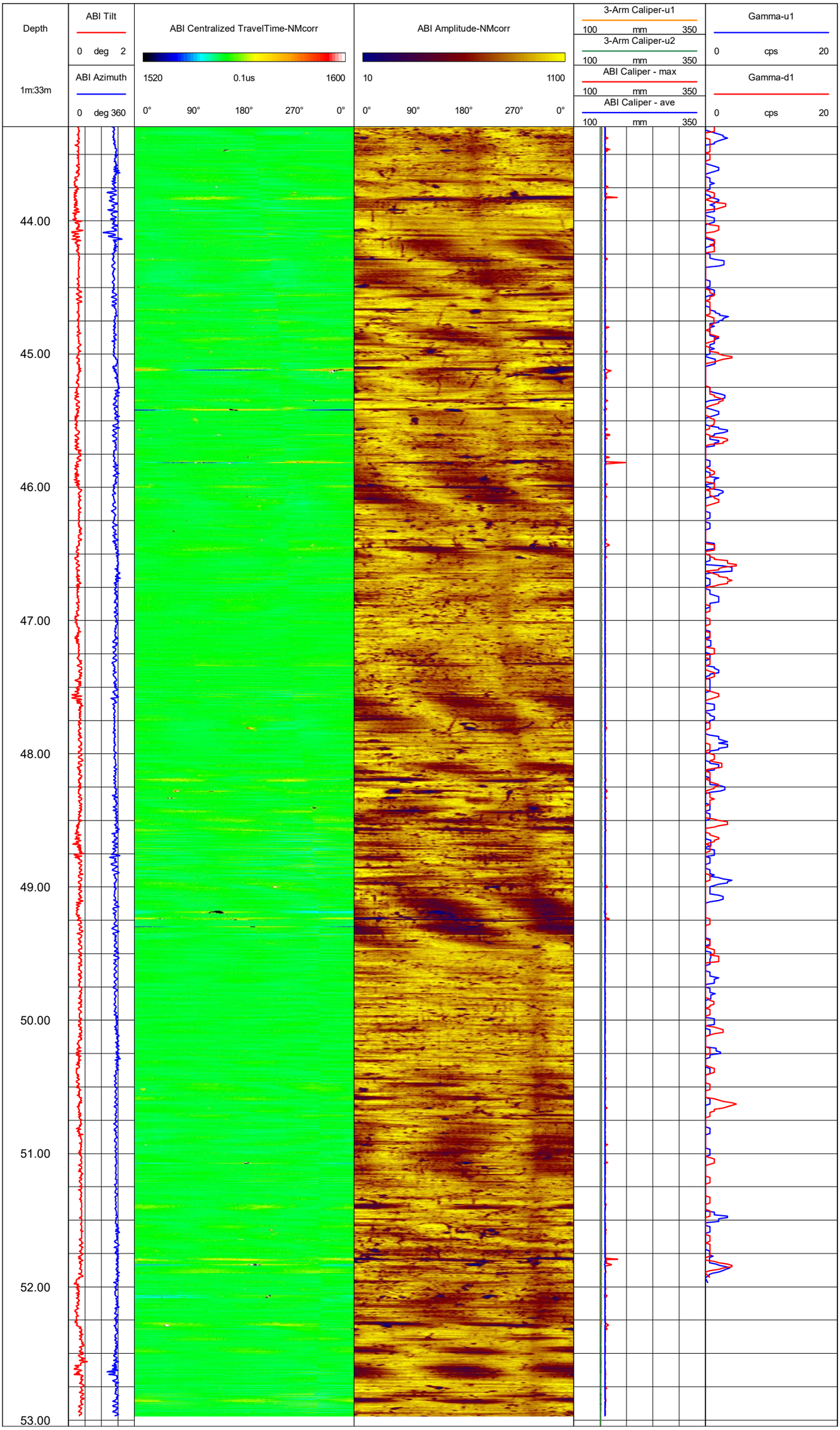
Lotowater
TECHNICAL SERVICES INC.

Preliminary Geophysics Logs

CLIENT
Township of Centre Wellington

LOCATION	*878 Scotland St, Fergus, ON*	**BOREHOLE**	**F5-T**
DEPTH REF.	*Ground Surface*	**PROJECT #**	*313-010*
WATER LEVEL	*17.47 m bgl at time of logging*	**LOG DATE**	*2021-10-20*
DRILL METHOD	*n/a*	**LOGGED BY**	*R. Hettinga*




Depth
1m:33m
ABI Tilt
0 deg 2
ABI Azimuth
0 deg 360
ABI Centralized TravelTime-NMcorr
1520 0.1us 1600
0° 90° 180° 270° 0°
ABI Amplitude-NMcorr
10 1100
0° 90° 180° 270° 0°
3-Arm Caliper-u1
100 mm 350
3-Arm Caliper-u2
100 mm 350
ABI Caliper - max
100 mm 350
ABI Caliper - ave
100 mm 350
Gamma-u1
0 cps 20
Gamma-d1
0 cps 20
44.00
45.00
46.00
47.00
48.00
49.00
50.00
51.00
52.00
53.00

Lotowater TECHNICAL SERVICES INC.

Client: Centre Wellington

LOCATION	*Centre Wellington*
DEPTH REF.	*"0" at Ground Surface*
WATER LEVEL	*16.2 m-bgl*
DRILL METHOD	*Mud Rotary*

BOREHOLE	**F5-T Deep**
PROJECT #	*313-010*
LOG DATE	*2021-11-24 & 12-07*
LOGGED BY	*RH*

Figure

Summary Logs for Well Construction

Depth 1m:150m

Natural Gamma-d1 0 Cps 150 | Natural Gamma-u1 0 Cps 150

3-Arm Caliper 10 cm 20 | Flow Velocity -1 (m/s) 1

Temperature (static) 0 'C 10 | Temp Pumping 0 'C 10

Cond@25C Static 0 uS/cm 2000 | Cond@25C Pumping 0 uS/cm 2000

Single Point Resistance 0 Ohm 7500 | 16" Normal Resistivity 0 Ohm.m 7500 | 64" Normal Resistivity 0 Ohm.m 7500

Image NM cor 0° 90° 180° 270° 0°

OBI MagnField 40 uT 70 | Engineering Log 150 mm 150 Comment

OBI Tilt 0 deg 4 | OBI Azimuth adj 0 deg 360

ABI Amplitude 0 1000 0° 90° 180° 270° 0°

Centralized ABI T-Time 1200 0.1us 1500 0° 90° 180° 270° 0°

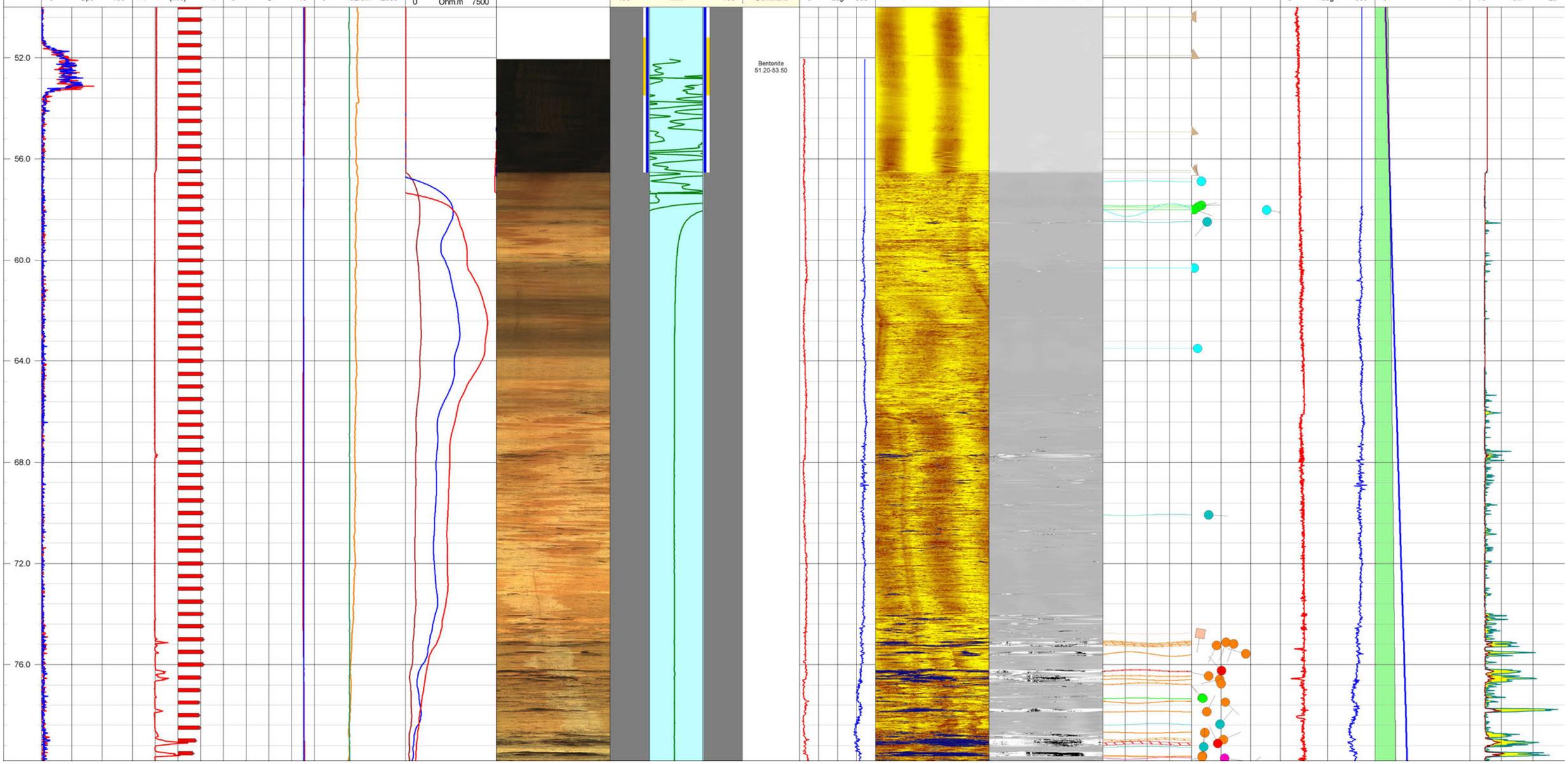
Structure 0° 90° 180° 270° 0°

Tadpoles 0 90

ABI Tilt 0 deg 2 | ABI Az - rep'd with OBI Az 0 deg 300

Closure Distance 0 [m] 1 | Allowable Drift 0 1

Caliper - max 10 cm 25 | Caliper - ave 10 cm 25



Depth
1m:150m

Natural Gamma-d1 0 Cps 150
Natural Gamma-u1 0 Cps 150

3-Arm Caliper 10 cm 20
Flow Velocity -1 (m/s) 1

Temperature (static) 0 'C 10
Temp Pumping 0 'C 10

Cond@25C Static 0 uS/cm 2000
Cond@25C Pumping 0 uS/cm 2000

Single Point Resistance 0 Ohm 7500
16" Normal Resistivity 0 Ohm.m 7500
64" Normal Resistivity 0 Ohm.m 7500

Image NM cor 0° 90° 180° 270° 0°

OBI MagnField 40 uT 70
Engineering Log 150 mm 150 Comment

OBI Tilt 0 deg 4
OBI Azimuth adj 0 deg 360

ABI Amplitude 0 1000 0° 90° 180° 270° 0°

Centralized ABI T-Time 1200 0.1us 1500 0° 90° 180° 270° 0°

Structure 0° 90° 180° 270° 0°

Tadpoles 0 90

ABI Tilt 0 deg 2
ABI Az - rep'd with OBI Az 0 deg 360

Closure Distance 0 [m] 1
Allowable Drift 0 1

Caliper - max 10 cm 25
Caliper - ave 10 cm 25

80.0
84.0
88.0
92.0
96.0
100.0
104.0
108.0
112.0

Water borehole
fluid
56.55-143.20

drill
56.55-143.20
diameter:124.4mm

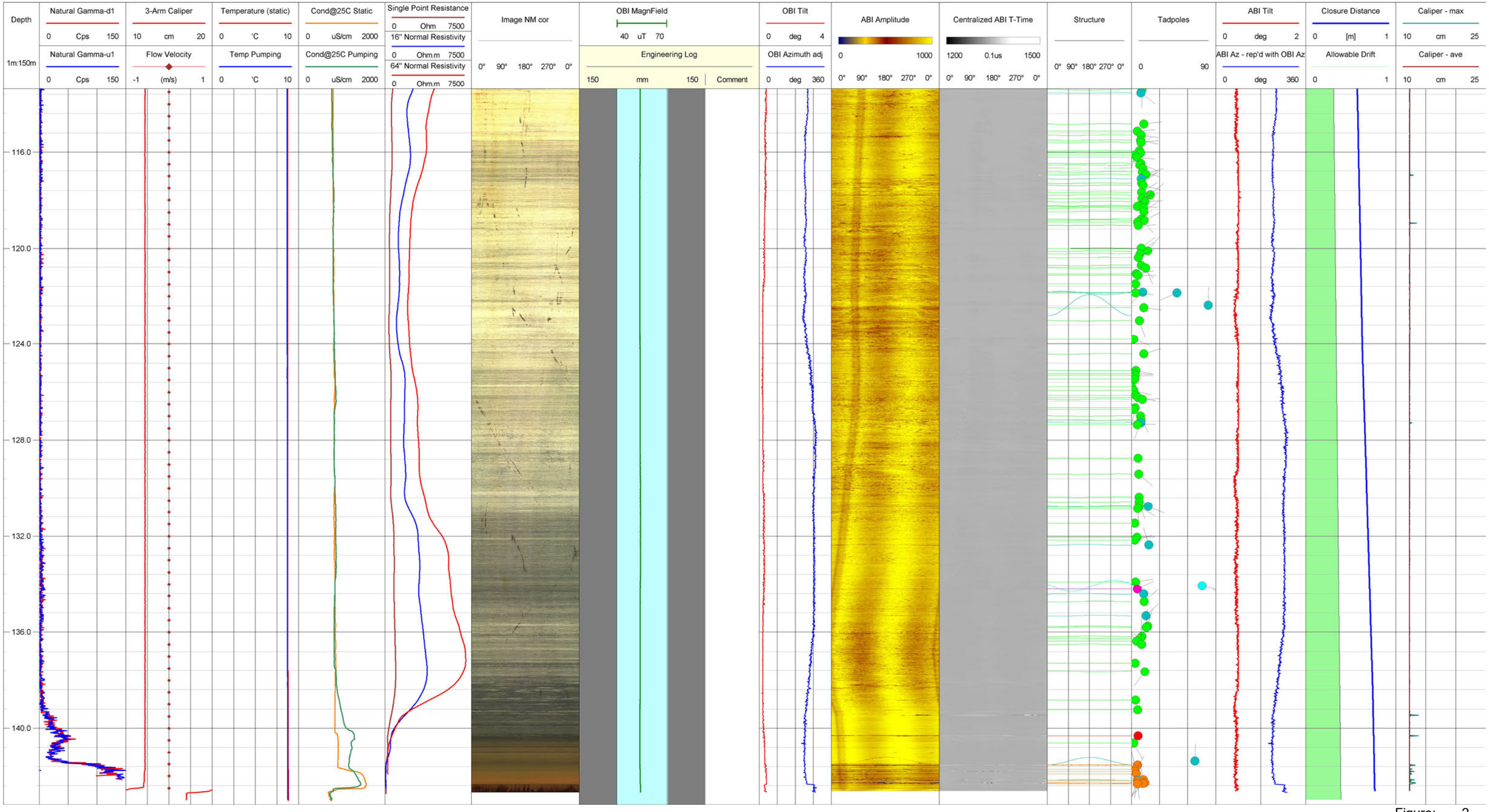

Depth
1m:150m
Natural Gamma-d1
0 Cps 150
Natural Gamma-u1
0 Cps 150
3-Arm Caliper
10 cm 20
Flow Velocity
-1 (m/s) 1
Temperature (static)
0 'C 10
Temp Pumping
0 'C 10
Cond@25C Static
0 uS/cm 2000
Cond@25C Pumping
0 uS/cm 2000
Single Point Resistance
0 Ohm 7500
16" Normal Resistivity
0 Ohm.m 7500
64" Normal Resistivity
0 Ohm.m 7500
Image NM cor
0° 90° 180° 270° 0°
OBI MagnField
40 uT 70
Engineering Log
150 mm 150 Comment
OBI Tilt
0 deg 4
OBI Azimuth adj
0 deg 360
ABI Amplitude
0 1000
0° 90° 180° 270° 0°
Centralized ABI T-Time
1200 0.1us 1500
0° 90° 180° 270° 0°
Structure
0° 90° 180° 270° 0°
Tadpoles
0 90
ABI Tilt
0 deg 2
ABI Az - rep'd with OBI Az
0 deg 360
Closure Distance
0 [m] 1
Allowable Drift
0 1
Caliper - max
10 cm 25
Caliper - ave
10 cm 25
116.0
120.0
124.0
128.0
132.0
136.0
140.0

Figure: 2

Lotowater TECHNICAL SERVICES INC.

Comparison Log

CLIENT
Township of Centre Wellington

LOCATION	*878 Scotland St, Fergus, ON*	**BOREHOLE**	**F5 & F5-T**
DEPTH REF.	*Ground Surface (F5 shifted)*	**PROJECT #**	*313-010*
WATER LEVEL	*varied*	**LOG DATE**	*2021-11-24*
DRILL METHOD	*n/a*	**LOGGED BY**	*RH & JD*

Depth 1m:200m

F5-T Natural Gamma 0 cps 40
F5 Natural Gamma 0 cps 40

F5-T 3-Arm Caliper 12 cm 16
F5 3-Arm Caliper 25 cm 75

F5 Video Images

F5 Video Summary

- Below top of casing
- Water level, Turbid
- Flow in at base of casing, Turbid
- Fracture
- Large fracture/cavern

F5-T Image NM cor 0° 90° 180° 270° 0°

F5-T Flow Velocity 0 (m/s) 1
F5 Flow Velocity 0 (m/s) 1

5.00
10.00
15.00
20.00
25.00
30.00
35.00
40.00
45.00
50.00
55.00

Depth
1m:200m

F5-T Natural Gamma
0 cps 40
F5 Natural Gamma
0 cps 40

F5-T 3-Arm Caliper
12 cm 16
F5 3-Arm Caliper
25 cm 75

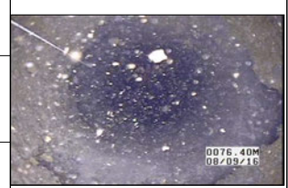
F5 Video Images

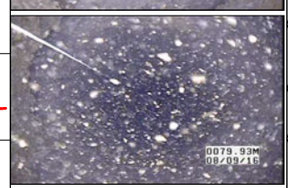
F5 Video Summary

F5-T Image NM cor
0° 90° 180° 270° 0°

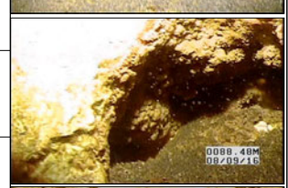
F5-T Flow Velocity
0 (m/s) 1
F5 Flow Velocity
0 (m/s) 1

60.00
65.00
70.00
75.00
80.00
85.00
90.00
95.00
100.00
105.00
110.00
115.00
120.00





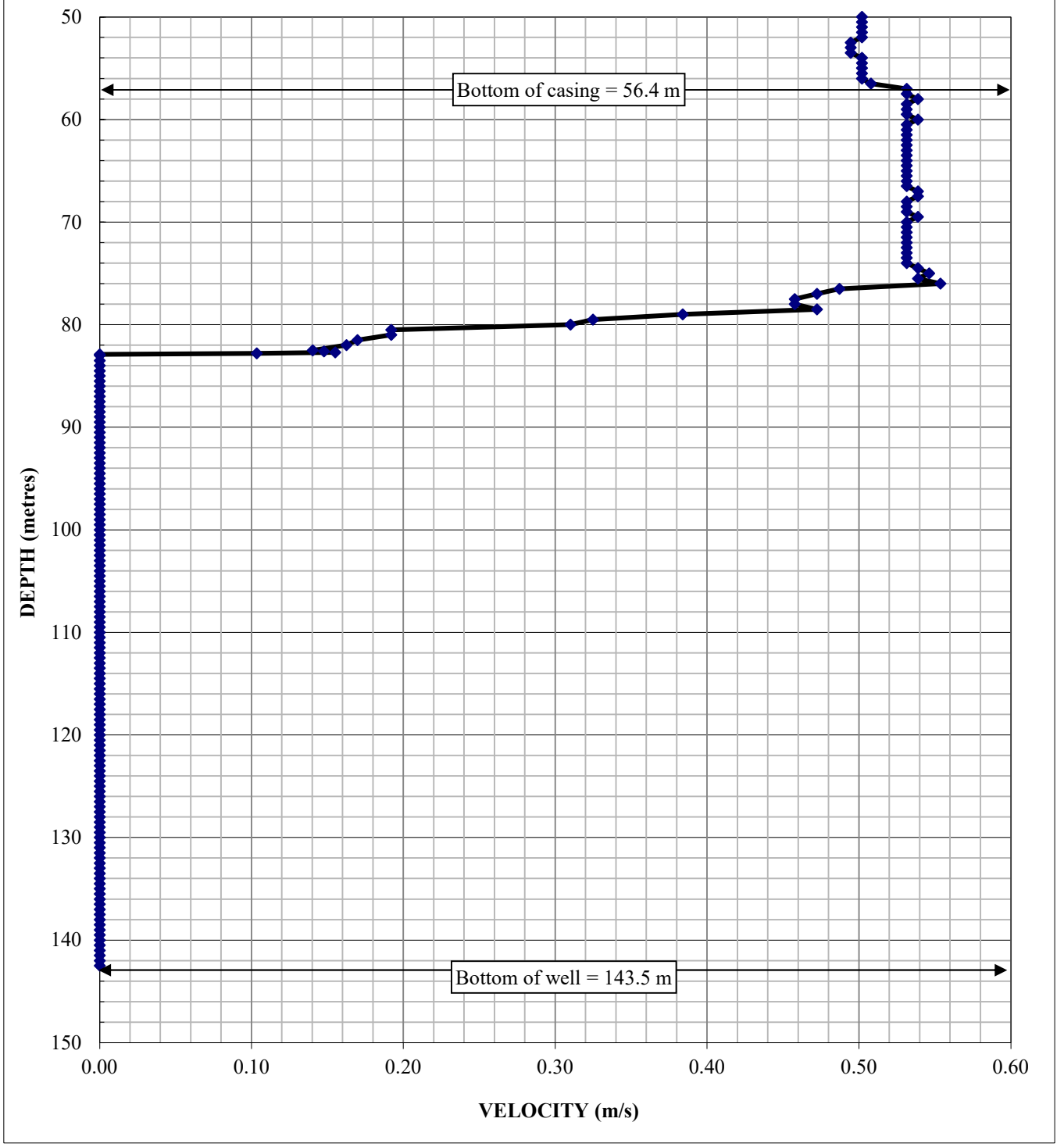








Fracture
Fracture
Fracture with flow in
Fracture with flow in
Flow in
Water turbid with very little flow below
Near bottom of well



Notes:
Measurement point: Ground level
Test Date: November 24, 2021
Test Flow: 6.06 L/s

Township of Centre Wellington

Fergus Well F5-T

Flow Distribution Profile

Lotowater Technical Services Inc. **Figure X**
Reference: 313-010 2021-11-24

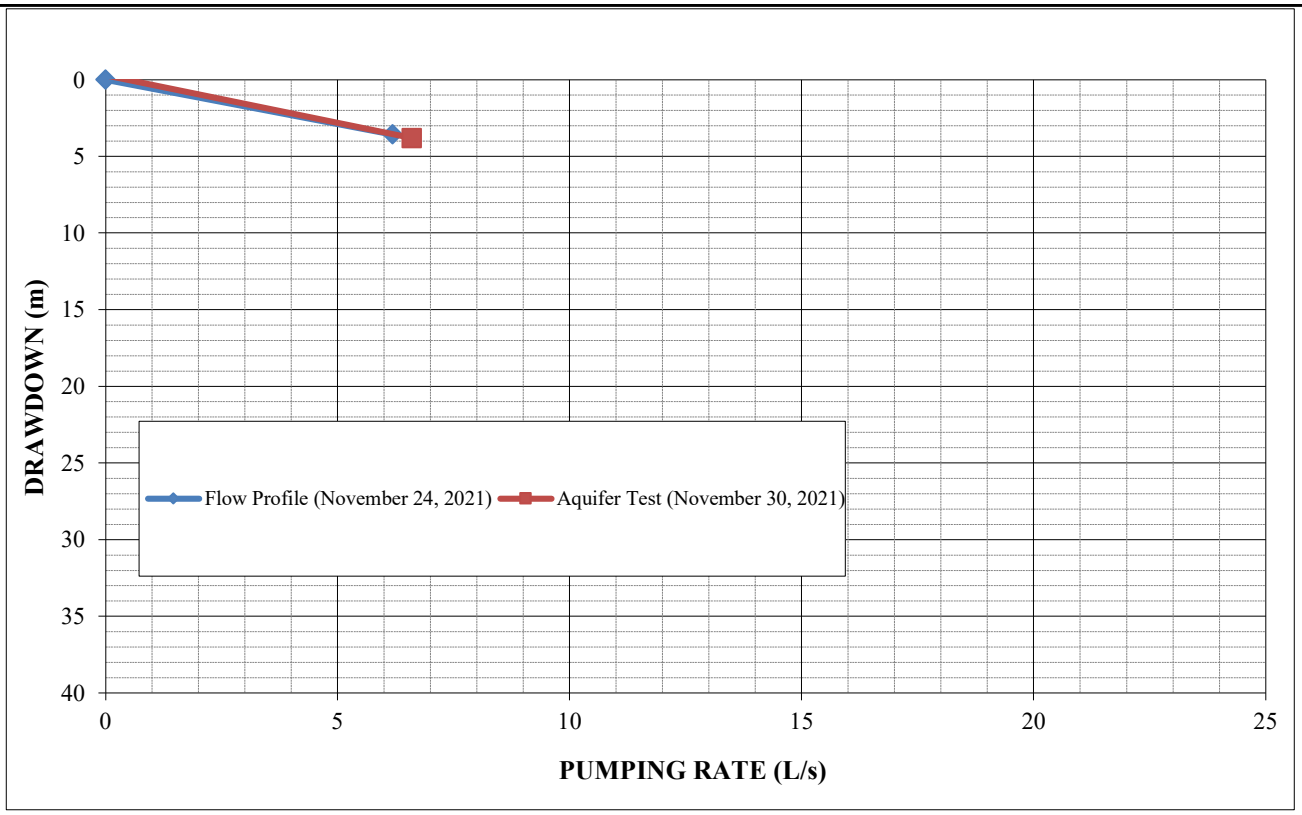
TABLE 2

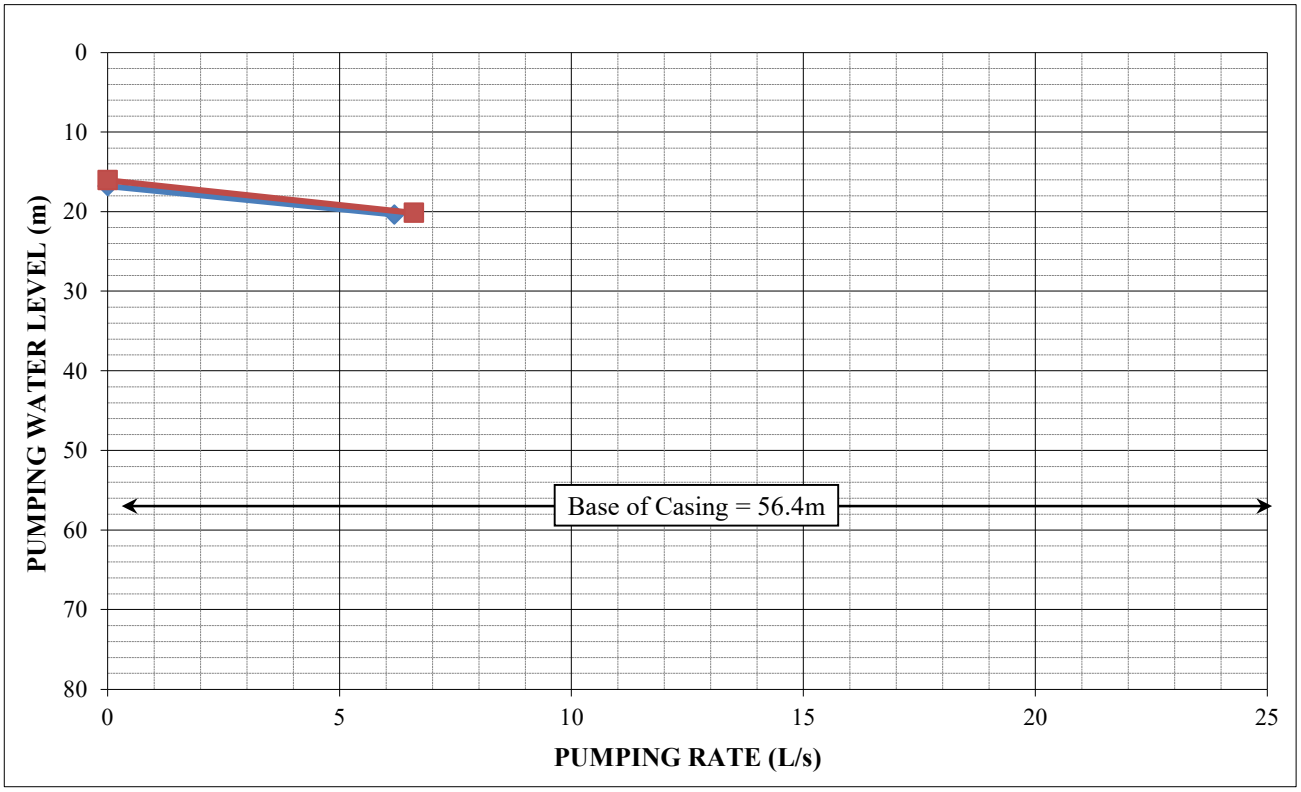
Township of Centre Wellington

Fergus Well F5-T
Investigation Video Summary
2021/10/20

Elapsed Time (h:min)	Depth (ft below MP)	Depth (m below MP)	Comments
0:00	2.76	0.84	Below ground level (0.38 m top of casing reference depth)
0:01	15.22	4.64	Casing joint
0:02	35.37	10.78	Casing joint
0:04	55.45	16.90	Casing joint
0:04	57.32	17.47	Static water level (turbid)
0:09	116.47	35.50	Bottom of casing
0:13	123.46	37.63	Major fracture w/ vertical fracture
0:18	161.78	49.31	Minor fracture, turbidity increases below
0:21	174.90	53.31	Bottom of well (drilling mud fill)
0:22	171.72	52.34	Vugs
0:24	162.40	49.50	Partially open fracture
0:26	157.78	48.09	Closed fracture
0:29	149.77	45.65	Large vug
0:29	149.61	45.60	Partially open fracture
0:32	142.95	43.57	Vuggy
0:33	140.98	42.97	Partially open fracture
0:34	139.86	42.63	Closed fracture
0:36	133.53	40.70	Major, partially open fracture w/ vertical fractures
0:41	123.52	37.65	Major fracture (drilling mud/grout)
0:45	118.93	36.25	Closed fracture
0:46	117.85	35.92	Closed fracture
0:48	117.13	35.70	Partially open fracture
0:48	116.93	35.64	Major fracture, filled with drilling mud/grout
0:50	116.54	35.52	Bottom of casing, possible fracture below
0:51	115.55	35.22	10SQ pump set to clear image, pause
1:05	116.57	35.53	Grout/mud source, bottom of casing
1:07	116.96	35.65	Major fracture, grout/mud source
1:10	162.47	49.52	Sand source, turbid below
1:13	174.84	53.29	Bottom of well
n/a	1.97	0.60	Below top of casing (+0.22 m off reference depth)

Note: Measuring point (MP) is ground level. Top of temporary casing is 0.46 m above ground level





Notes:

All water levels are referenced from top of casing

Top of casing = 0.46 m above ground sufrace

Flow meter = 2" Banjo Flow Meter

Township of Centre Wellington

Fergus F5-T

Comparison of Variable Rate Tests

Lotowater Technical Services Inc. **Figure 1**

Reference: 313-010 12/1/2021

TABLE 1

VARIABLE RATE PERFORMANCE TEST

Lotowater TECHNICAL SERVICES INC.

Well Name:	Fergus F5-T	**Project Number:**	313-010
Client:	Township of Centre Wellington	**Date:**	11/24/2021
Technician Name:	Alex O'Hearn	**Pump:**	LTS test pump
Water Level Device:	LTS water level meter	**Pump Inlet:**	45 m
Water Level Reference:	Top of casing	**Flow Measuring Device:**	2" LTS flow meter
Test Note:			

Time *hr:min*	Elapsed Time *min*	Level *mbBP*	Drawdown *m*	Flow *L/s*	Note
0:00	0	16.79	0.00	6.18	Test
0:01	1	19.03	2.24	6.18	
0:02	2	19.49	2.70	6.18	
0:03	3	19.62	2.83	6.18	
0:04	4	19.77	2.98	6.18	
0:05	5	19.82	3.03	6.18	
0:06	6	19.91	3.12	6.18	
0:08	8	20.00	3.21	6.18	
0:10	10	20.08	3.29	6.18	
0:12	12	20.14	3.35	6.18	
0:15	15	20.18	3.39	6.18	
0:20	20	20.28	3.49	6.18	
0:25	25	20.33	3.54	6.18	
0:30	30	20.36	3.57	6.18	

TABLE 1

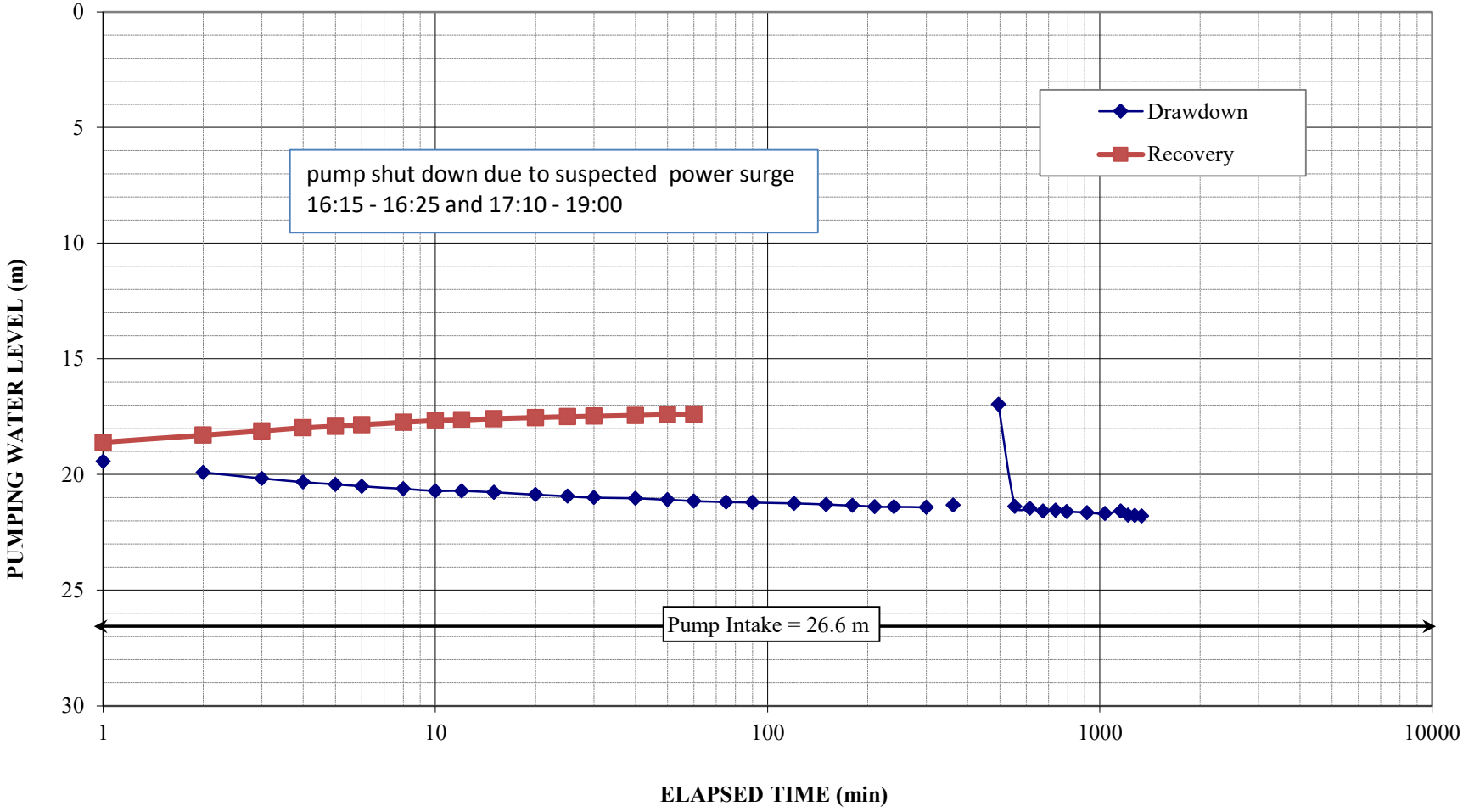
VARIABLE RATE PERFORMANCE TEST

Lotowater TECHNICAL SERVICES INC.

Well Name:	Fergus F5-T	**Project Number:**	313-010
Client:	Township of Centre Wellington	**Date:**	11/24/2021
Technician Name:	Alex O'Hearn	**Pump:**	LTS test pump
Water Level Device:	LTS water level meter	**Pump Inlet:**	26.6 m
Water Level Reference:	Top of casing	**Flow Measuring Device:**	2" LTS flow meter
Test Note:			

Time *hr:min*	Elapsed Time *min*	Level *mbBP*	Drawdown *m*	Flow *L/s*	Note
0:00	0	16.51	0.00	6.60	Test
0:01	1	19.04	2.53	6.60	
0:02	2	19.51	3.00	6.60	
0:03	3	19.77	3.26	6.60	
0:04	4	19.93	3.42	6.60	
0:05	5	20.03	3.52	6.60	
0:06	6	20.11	3.60	6.60	
0:08	8	20.22	3.71	6.60	
0:10	10	20.31	3.80	6.60	
0:12	12	20.31	3.80	6.60	
0:15	15	20.37	3.86	6.60	
0:20	20	20.47	3.96	6.60	
0:25	25	20.54	4.03	6.60	
0:30	30	20.60	4.09	6.60	
0:40	40	20.63	4.12	6.60	
0:50	50	20.69	4.18	6.60	
1:00	60	20.75	4.24	6.60	

Fergus F5-T
Q = 6.6 L/s
Test Start on November 30, 2021; 10:45
SWL = 16.91mbmp



Well Chlorination Record

Well Name:	Well F5-T	
Client:	Township of Centre Wellington	
Project #:	313-010	
Disinfected By:	Justin Bickle	
LTS Chlorination Worksheet Used:	Yes	
Treatment Volume:	2,253	**Litres**
Desired Concentration:	150	**ppm**
Volume of Mixing Water:	n/a	**Litres**
Qty of Sterilene Needed (granular 55%):	614.48	**grams**
Type and Quantity of Chlorine Used:	650 grams Sterilene	
Date and Time Chlorine Added:	2021-11-29 14:00	
Chlorine Addition Method:	inject from surface and circulate with test pump	
Chlorine Residual Measured at Surface:	150ppm	
Chlorine Residual Measurement Method:	test strip	
Date & Time Chlorine Purged:	2021-11-30 10:45	
Pre-Purge Chlorine Residual Measured at Surface:	50ppm	
Chlorine Residual Measurement Method:	test strip	
Purged By:	Justin Bickle	
Purged To:	storm ditch	
Quantity and Type of Dechlorinating Agent Used:	600grams sodium metabisulpahte	
Minutes of Pumping until Zero Free Chlorine Residual:	2min	
Final Turbidity Measurement (NTU):		
Notes on Disinfection:		

Lotowater
TECHNICAL SERVICES INC.

92 SCOTT AVENUE T (519) 442-2086
PARIS, ON N3L 3R1 F (519) 442-7242
www.lotowater.com

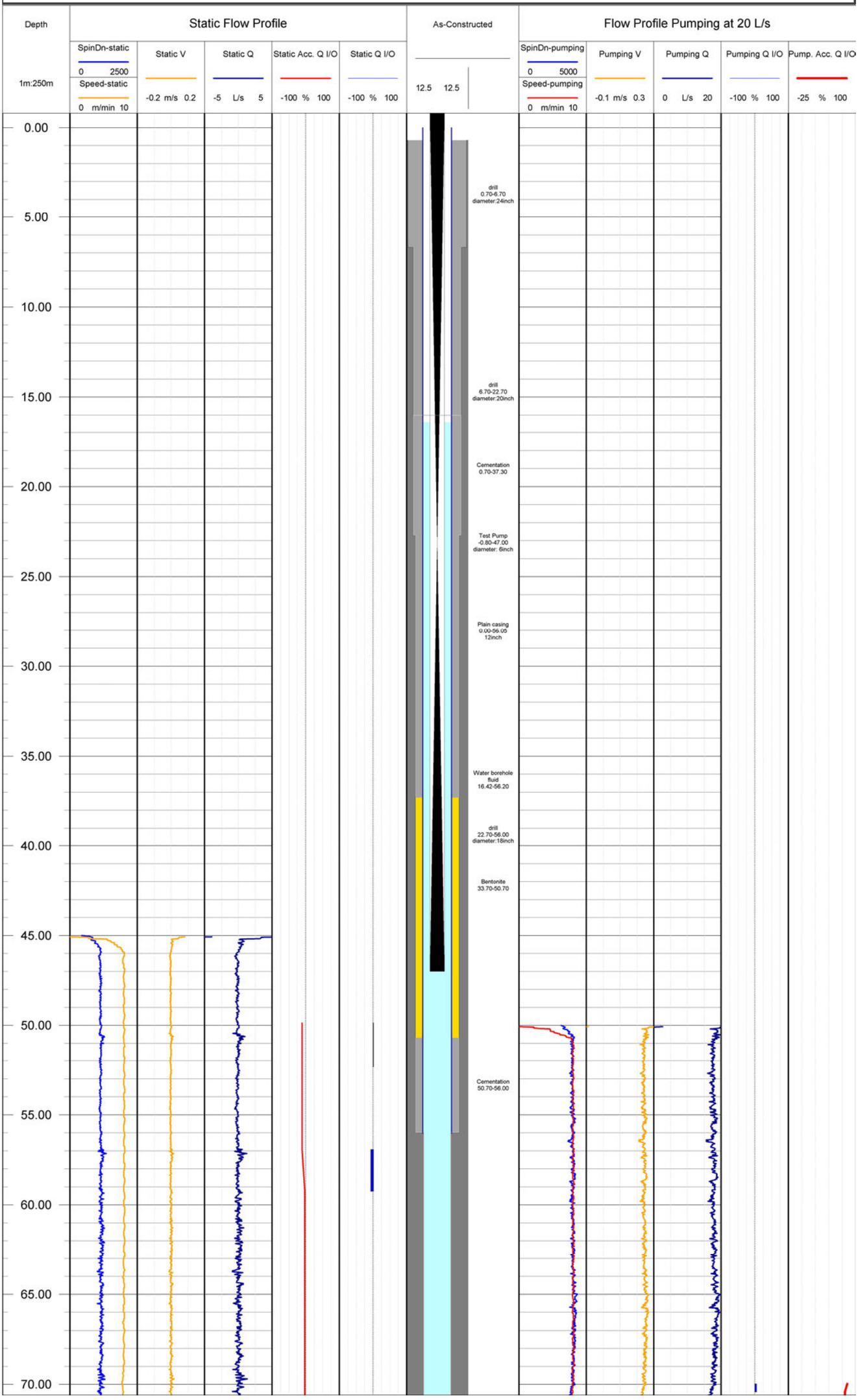
AECOM

F5-R Well Results

Lotowater
TECHNICAL SERVICES INC.

LOCATION	*878 Scotland St, Fergus ON*	**BOREHOLE**	**F5-R**
DEPTH REF.	*Top of casing (0.70 m agl)*	**PROJECT #**	*313-010*
WATER LEVEL	*16.42 m at time of logging*	**LOG DATE**	*2022-05-25*
DRILL METHOD	*n/a*	**LOGGED BY**	*RH*

CLIENT
Township of Centre Wellington



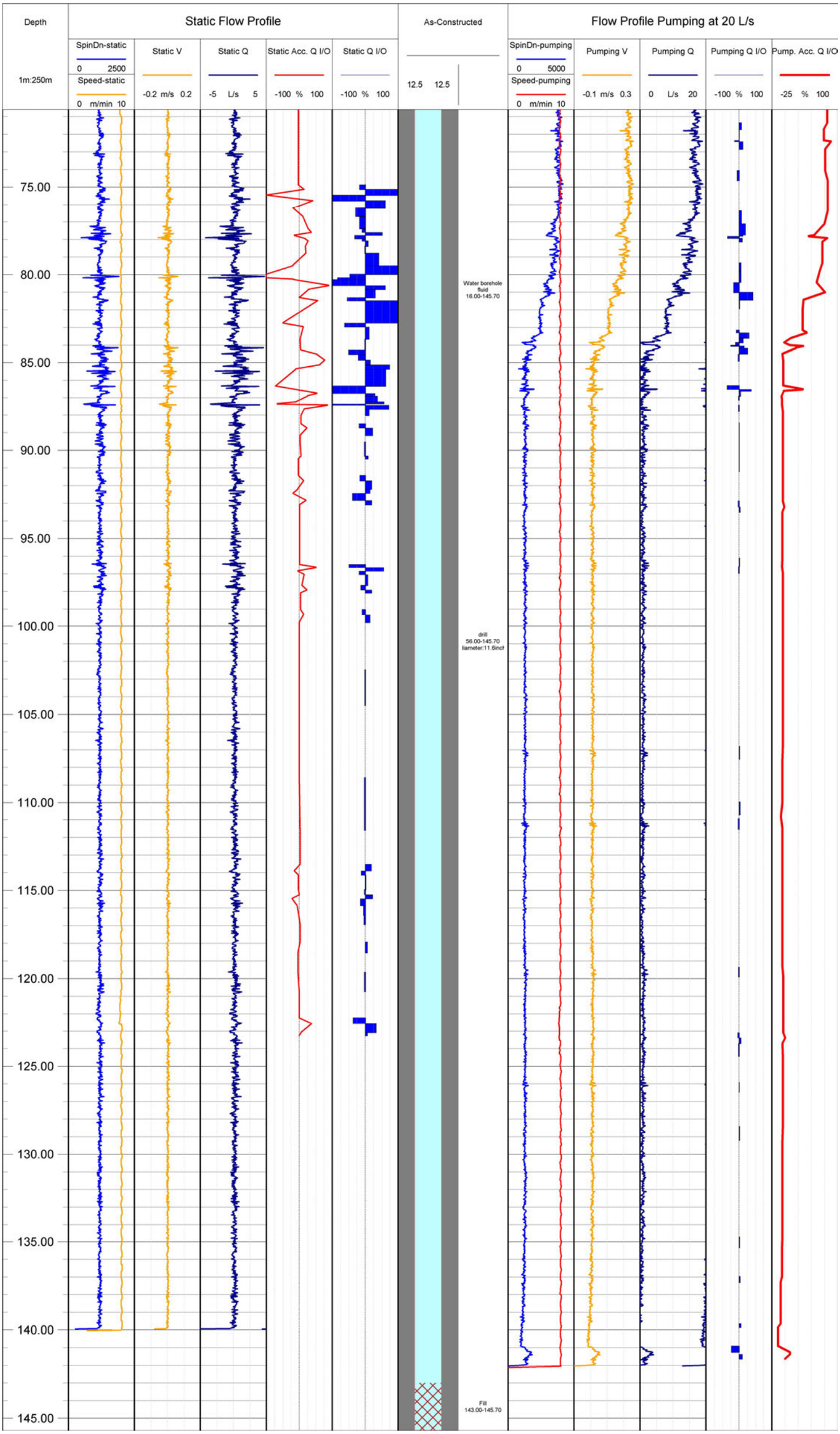

Depth
1m:250m
Static Flow Profile
SpinDn-static
0 2500
Speed-static
0 m/min 10
Static V
-0.2 m/s 0.2
Static Q
-5 L/s 5
Static Acc. Q I/O
-100 % 100
Static Q I/O
-100 % 100
As-Constructed
12.5 12.5
Flow Profile Pumping at 20 L/s
SpinDn-pumping
0 5000
Speed-pumping
0 m/min 10
Pumping V
-0.1 m/s 0.3
Pumping Q
0 L/s 20
Pumping Q I/O
-100 % 100
Pump. Acc. Q I/O
-25 % 100
75.00
80.00
85.00
90.00
95.00
100.00
105.00
110.00
115.00
120.00
125.00
130.00
135.00
140.00
145.00
Water borehole fluid 16.00-145.70
drill 56.00-145.70 liameter:11.6inch
Fill 143.00-145.70

TABLE X

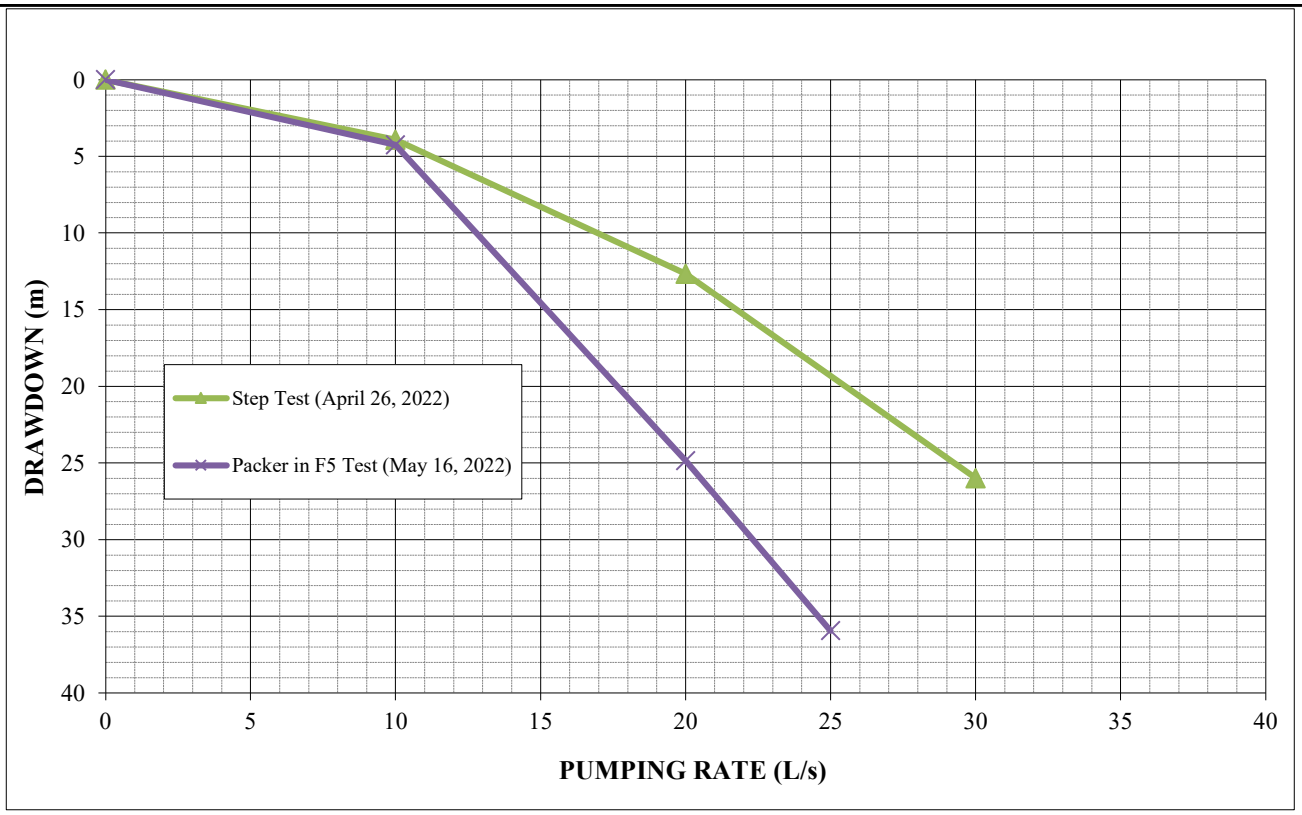
Township of Centre Wellington

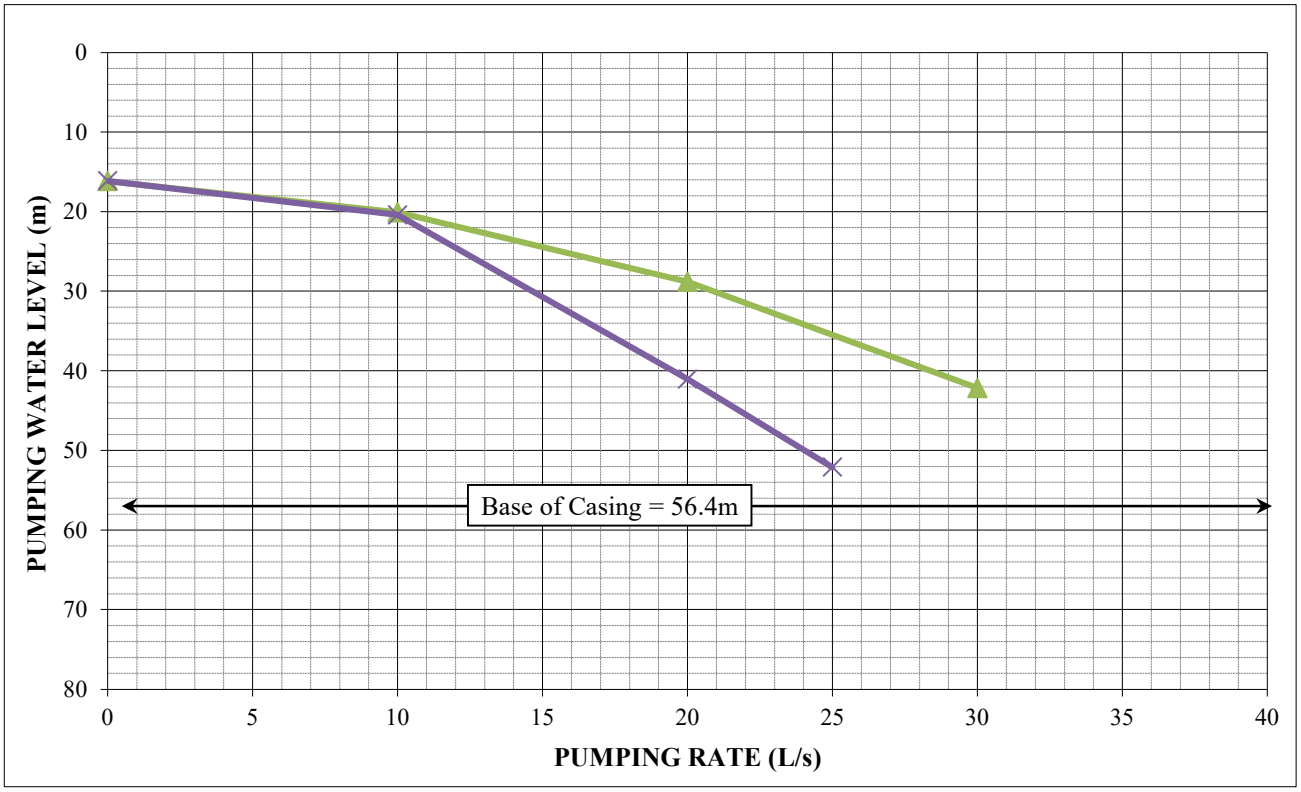
Fergus Well F5-R
Pumping/Static Investigation Video Summary
2022/05/25

Elapsed Time (h:min)	Depth (ft below MP)	Depth (m below MP)	Comments
0:00	2.76	0.84	Below top of casing
0:00	16.08	4.90	Casing joint
0:01	37.34	11.38	Casing joint
0:02	53.87	16.42	Static water level (turbid)
0:08	186.52	56.85	Bottom of casing
0:08	183.73	56.00	Pause above bottom of casing, set pump
0:10	183.73	56.00	Pumping at 20 L/s
0:29	277.03	84.44	Fracture, source of turbidity
0:30	285.43	87.00	Fracture
0:31	288.71	88.00	Minimal flow visible
0:34	319.88	97.50	Fracture
0:38	356.17	108.56	Slight flow visible
0:39	359.32	109.52	Vertical fracture/breakout
0:48	459.74	140.13	Pause to lower Flow tool
0:48	459.71	140.12	Downward flow visible
0:49	467.49	142.49	Above flow tool on bottom of well
0:52	451.51	137.62	Crinoid bed
1:02	375.75	114.53	Pump failure, pause
1:02	375.75	114.53	Resume run, not pumping
1:07	321.00	97.84	Partial fracture zone
1:07	317.13	96.66	Vuggy
1:08	302.56	92.22	Large vug
1:09	299.87	91.40	Vuggy
1:11	284.45	86.70	Large fracture
1:11	283.20	86.32	Void/fracture zone
1:12	279.66	85.24	Void/fracture zone
1:13	277.46	84.57	Facture with silt, turbidity increases above
1:16	267.52	81.54	Pumping at 20 L/s
1:19	250.00	76.20	Large vug/fracture
1:19	248.26	75.67	Turbidity clears slightly
1:22	232.61	70.90	Vuggy
1:27	186.19	56.75	Bottom of casing, source of bubbles, possibly very fine particles
1:30	180.45	55.00	In casing, end video

Video survey conducted by Rayne Hettinga

Note: Measuring point (MP) is top of casing which is 0.70 m above ground surface





Notes:

All water levels are referenced from top of casing

Top of casing = 0.46 m above ground sufrace

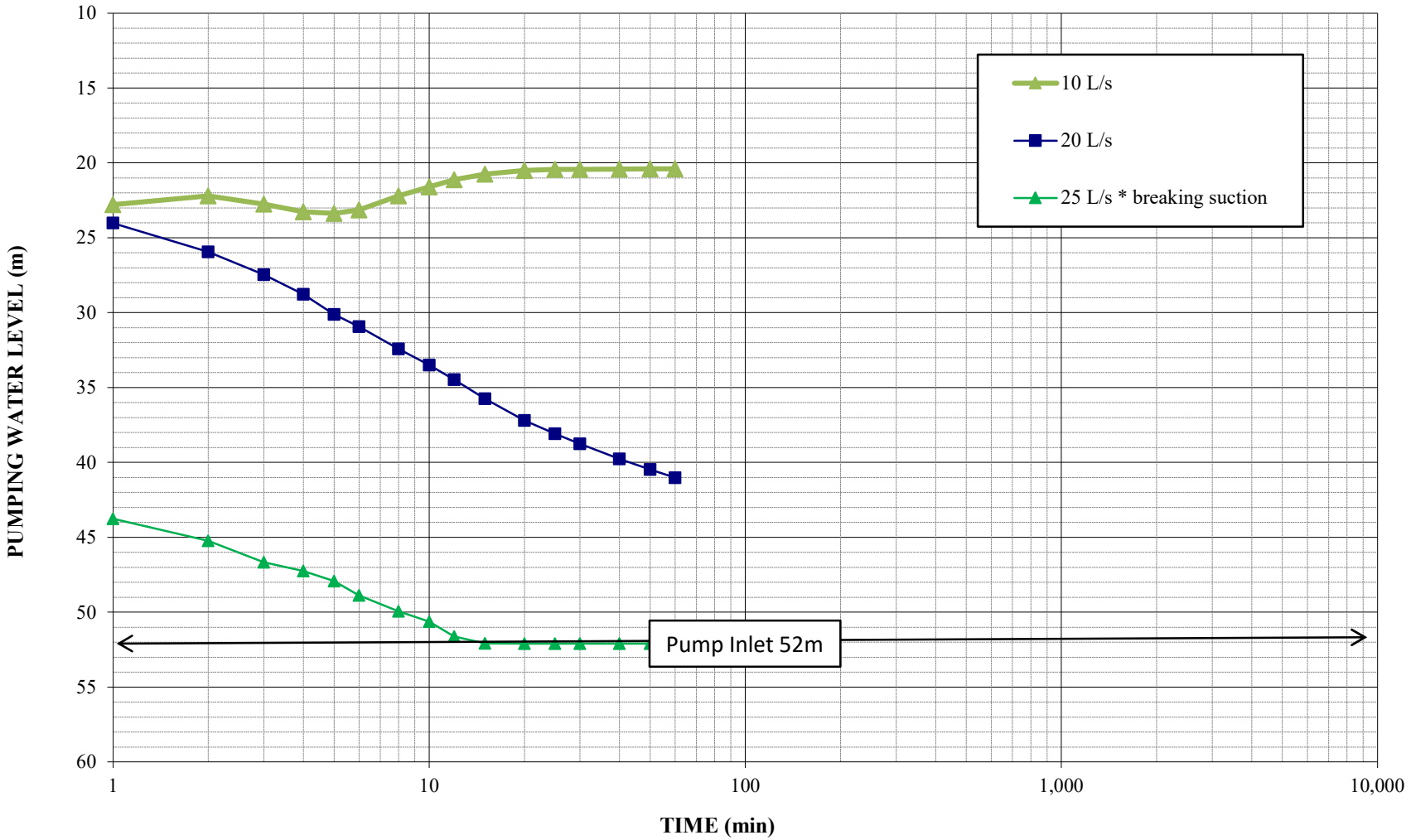
Township of Centre Wellington

Fergus F5-R

Comparison of Variable Rate Tests

Lotowater Technical Services Inc. **Figure 1**

Reference: 313-010 5/16/2022



Notes:

Test Date : May 16, 2022

All water levels are referenced from top of casing

Top of casing = 0.46 m above ground sufrace

Pump inlet at 52m

Township of Centre Wellington

Fergus F5-R

Comparison of Variable Rate Tests

Lotowater Technical Services Inc. **Figure 1**

Reference: 313-010 5/16/2022

TABLE 1

VARIABLE RATE PERFORMANCE TEST

Lotowater TECHNICAL SERVICES INC.

Well Name:	Fergus F5-R	**Project Number:**	313-010
Client:	Township of Centre Wellington	**Date:**	4/14/2022
Technician Name:	Justin Bickel	**Pump:**	Unitra SP500-5b (40hp)
Water Level Device:	LTS water level meter	**Pump Inlet:**	52m
Water Level Reference:	Top of casing	**Flow Measuring Device:**	6" McCrometer
Test Note:			

Time *hr:min*	Elapsed Time *min*	Level *mbBP*	Drawdown *m*	Flow *L/s*	Note
0:00	0	16.05	0.00	20.0	Step 1
	1	21.46	5.41		
	2	22.11	6.06		Turbid for about 5min then clear
	3	22.88	6.83		
	4	23.37	7.32		115psi
	5	23.79	7.74		
	6	24.22	8.17		
	8	24.85	8.80		
	10	25.36	9.31		
	12	25.70	9.65		
	15	26.13	10.08		
	20	26.71	10.66		
	25	27.16	11.11		
	30	27.47	11.42		
	1	30.17	14.12	30.0	Step 2
	2	31.33	15.28		
	3	32.19	16.14		
	4	32.90	16.85		72 psi
	5	33.49	17.44		
	6	33.99	17.94		
	8	34.85	18.80		
	10	35.53	19.48		
	12	36.09	20.04		
	15	36.80	20.75		
	20	37.80	21.75		
	25	38.50	22.45		
	30	38.99	22.94		

TABLE 1

VARIABLE RATE PERFORMANCE TEST

Lotowater TECHNICAL SERVICES INC.

Well Name:	Fergus F5-R	**Project Number:**	313-010
Client:	Township of Centre Wellington	**Date:**	4/26/2022
Technician Name:	Rodney Secor	**Pump:**	385S400-5 (destaged) - 40hp
Water Level Device:	LTS water level meter	**Pump Inlet:**	52m
Water Level Reference:	Top of casing 0.46m ags	**Flow Measuring Device:**	6" McCrometer
Test Note:			

Time *hr:min*	Elapsed Time *min*	Level *mbBP*	Drawdown *m*	Flow *L/s*	Note
12:19	0	16.16	0.00	10.0	Step 1
	1			10.0	
	2			10.0	
	3	20.05	3.89	10.0	
	4	19.80	3.64	10.0	>100 psi
	5	19.71	3.55	10.0	
	6	19.68	3.52	10.0	
	8	19.66	3.50	10.0	
	10	19.65	3.49	10.0	
	12	19.67	3.51	10.0	
	15	19.73	3.57	10.0	
	20	19.80	3.64	10.0	
	25	19.87	3.71	10.0	
	30	19.92	3.76	10.0	
	40	19.99	3.83	10.0	
	50	20.05	3.89	10.0	
	60	20.09	3.93	10.0	
	1	22.86	6.70	20.0	Step 2
	2	23.76	7.60	20.0	
	3	24.40	8.24	20.0	
	4	24.84	8.68	20.0	
	5	25.24	9.08	20.0	105 psi
	6	25.54	9.38	20.0	
	8	26.05	9.89	20.0	
	10	26.43	10.27	20.0	
	12	26.71	10.55	20.0	
	15	27.12	10.96	20.0	100 psi
	20	27.59	11.43	20.0	
	25	27.89	11.73	20.0	
	30	28.10	11.94	20.0	
	40	28.46	12.30	20.0	98 psi
	50	28.66	12.50	20.0	
	60	28.82	12.66	20.0	
	1	31.02	14.86	30.0	Step 3
	2	32.42	16.26	30.0	
	3	33.59	17.43	30.0	
	4	34.44	18.28	30.0	
	5	35.09	18.93	30.0	22 psi
	6	35.64	19.48	30.0	
	8	36.60	20.44	30.0	
	10	37.25	21.09	30.0	18 psi
	12	37.86	21.70	30.0	
	15	38.51	22.35	30.0	
	20	39.39	23.23	30.0	
	25	39.96	23.80	30.0	
	30	40.45	24.29	30.0	
	40	41.20	25.04	30.0	17 psi
	50	41.71	25.55	30.0	
	60	42.15	25.99	30.0	2733301 m^3

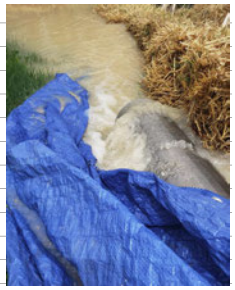
TABLE 1

VARIABLE RATE PERFORMANCE TEST

Lotowater TECHNICAL SERVICES INC.

Well Name:	Fergus F5-R	**Project Number:**	313-010
Client:	Township of Centre Wellington	**Date:**	5/16/2022
Technician Name:	Steve V	**Pump:**	385S400-5 (destaged) - 40hp
Water Level Device:	LTS water level meter	**Pump Inlet:**	52m
Water Level Reference:	Top of casing 0.46m ags	**Flow Measuring Device:**	6" McCrometer
Test Note:	Test with Packer in F5 at 52m and 135psi		

Time *hr:min*	Elapsed Time *min*	Level *mbBP*	Drawdown *m*	Flow *L/s*	Note
10:38	0	16.12	0.00	10.0	Step 1 F5 level 16.10m
	1	22.80	6.68		
	2	22.21	6.09		ramp flow down
	3	22.75	6.63		
	4	23.27	7.15		
	5	23.37	7.25		
	6	23.15	7.03		
	8	22.20	6.08	10.0	Flow set
	10	21.60	5.48	10.0	
	12	21.13	5.01	10.0	
	15	20.75	4.63	10.0	
	20	20.50	4.38	10.0	
	25	20.44	4.32	10.0	
	30	20.43	4.31	10.0	
	40	20.42	4.30	10.0	F5 level at 20.17m
	50	20.40	4.28	10.0	
	60	20.41	4.29	10.0	
	1	24.02	7.90	20.0	Step 2
	2	25.95	9.83	20.0	
	3	27.46	11.34	20.0	
	4	28.77	12.65	20.0	
	5	30.12	14.00	20.0	
	6	30.94	14.82	20.0	
	8	32.42	16.30	20.0	
	10	33.50	17.38	20.0	
	12	34.48	18.36	20.0	
	15	35.75	19.63	20.0	
	20	37.20	21.08	20.0	
	25	38.09	21.97	20.0	
	30	38.75	22.63	20.0	
	40	39.76	23.64	20.0	12.7 NTU
	50	40.48	24.36	20.0	
	60	41.02	24.90	20.0	
	1	43.76	27.64	25.0	Step 3
	2	45.23	29.11	25.0	
	3	46.67	30.55	25.0	Pump valve wide open
	4	47.25	31.13	25.0	
	5	47.92	31.80	25.0	
	6	48.88	32.76	25.0	
	8	49.94	33.82	25.0	
	10	50.64	34.52	25.0	
	12	51.62	35.50	25.0	
	15	52.09	35.97	25.0	
	20	52.10	35.98	25.0	pump breaking suction
	25	52.10	35.98	25.0	water turbid
	30	52.10	35.98	25.0	
	40	52.10	35.98	25.0	
	50	52.10	35.98	25.0	
	60	52.10	35.98	25.0	F5 level 51.55m



Aquifer Test (Pumping Well)

Lotowater TECHNICAL SERVICES INC.

Project Number: 313-010

Location: Fergus

Measuring Point: Top of nipple, 5 cm above top of casing

Pump Type: 385S400-5 (40hp)

Stick-up: 0.51 m above ground surface

Pump Inlet: 52 m

SWL: 16.28 m

Technician: Nathan Schmitt

Pumping Rate: 30 L/s

Transducer Serial #:

Flow Measurement: LTS 6" flow meter

Discharge Location: Approx 45 m NE of well head

Test Note: Top of casing 0.46 m above ground surface

WELL NAME: **Fergus F5-R**

Date	Time	Elapsed Time	Water Level	Drawdown	Flow Rate	Totalizer	Comments
yyyy/mm/dd	*hr:min*	*min*	*mbMP*	*m*	*L/s*	*m3*	
4/27/2022	10:30	0	16.28		30	273,300	Start of Test
	10:31	1	24.34	8.06			
	10:32	2	26.04	9.76			
	10:33	3	27.90	11.62			
	10:34	4	29.28	13.00			
	10:35	5	30.55	14.27			20psi
	10:36	6	31.43	15.15			
	10:38	8	32.81	16.53			
	10:40	10	33.89	17.61			
	10:42	12	34.71	18.43			
	10:45	15	35.63	19.35			
	10:50	20	37.15	20.87			
	10:55	25	38.26	21.98			10psi
	11:00	30	39.00	22.72			
	11:10	40	40.06	23.78			
	11:20	50	40.75	24.47			
	11:30	60	41.27	24.99			
	11:45	75	42.25	25.97			
	12:00	90	42.74	26.46			
	12:30	120	43.29	27.01			
	13:00	150	43.69	27.41			

Aquifer Test (Pumping Well)

Lotowater TECHNICAL SERVICES INC.

WELL NAME: Fergus F5-R

Date	Time	Elapsed Time	Water Level	Drawdown	Flow Rate	Totalizer	Comments
yyyy/mm/dd	*hr:min*	*min*	*mbMP*	*m*	*L/s*	*m3*	
	13:30	180	44.00	27.72			
	14:00	210	44.23	27.95			0psi
	14:30	240	44.82	28.54			
	15:30	300	44.39	28.11	30.0	273,803	28.70 m
	15:34	304					Pump off, blown fuse
	15:54	324	28.70		30.0		Pump on
	16:30	360	42.56	26.28	30.0		
	18:30	480	45.25	28.97		274,071	28-30 L/s
	20:30	600	45.58	29.30		274,274	30 L/s
	22:30	720	45.75	29.47		274,464	30 L/s
4/28/2022	00:30	840	45.98	29.70			30 L/s
	02:30	960	46.09	29.81		275,059	30 L/s
	04:30	1080	46.14	29.86			
	06:30	1200	46.29	30.01	30.00	275,279	30 L/s
	08:30	1320	46.38	30.10	29.50	275,480	Pump wide open
	10:30	1440	46.41	30.13	29.50	275,683	
4/28/2022	10:50	0	46.43	30.15		275,716	Recovery
		1	39.98				
		2	36.73				
		3	34.3				
		4	32.29				
		5	30.57				
		6	29.19				
		8	27.00				
		10	25.41				
		12	24.21				
		15	22.89				
		20	21.56				
		25	20.78				

Aquifer Test (Pumping Well)

Lotowater TECHNICAL SERVICES INC.

WELL NAME: **Fergus F5-R**

Date	Time	Elapsed Time	Water Level	Drawdown	Flow Rate	Totalizer	Comments
yyyy/mm/dd	*hr:min*	*min*	*mbMP*	*m*	*L/s*	*m3*	
	11:20	30	20.23				
		40	19.53				
		50	19.18				
	11:50	60	18.93				

Aquifer Test (Observation Well)

Lotowater TECHNICAL SERVICES INC.

Project Number:

Location:

Measuring Point:

Stick-up:

SWL:

Pumping Well:

Distance to PW:

Technician:

Transducer Serial #:

WELL NAME: F5

Date	Time	Elapsed Time	Water Level	Drawdown	Comments
yyyy/mm/dd	*hr:min*	*min*	*mbMP*	*m*	
4/28/2022	8:52		30.95		

Aquifer Test (Observation Well)

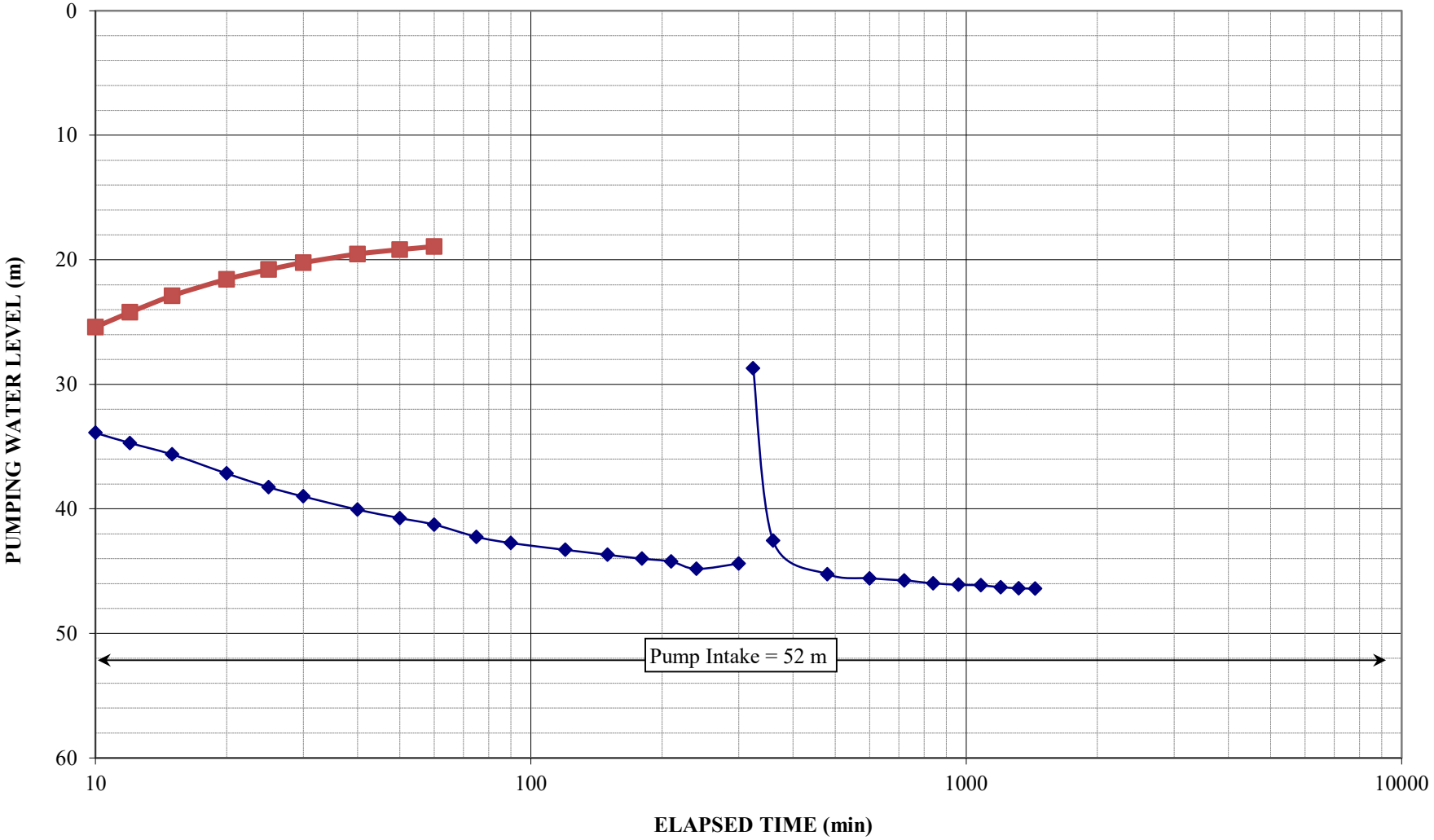
Transducer Serial #:

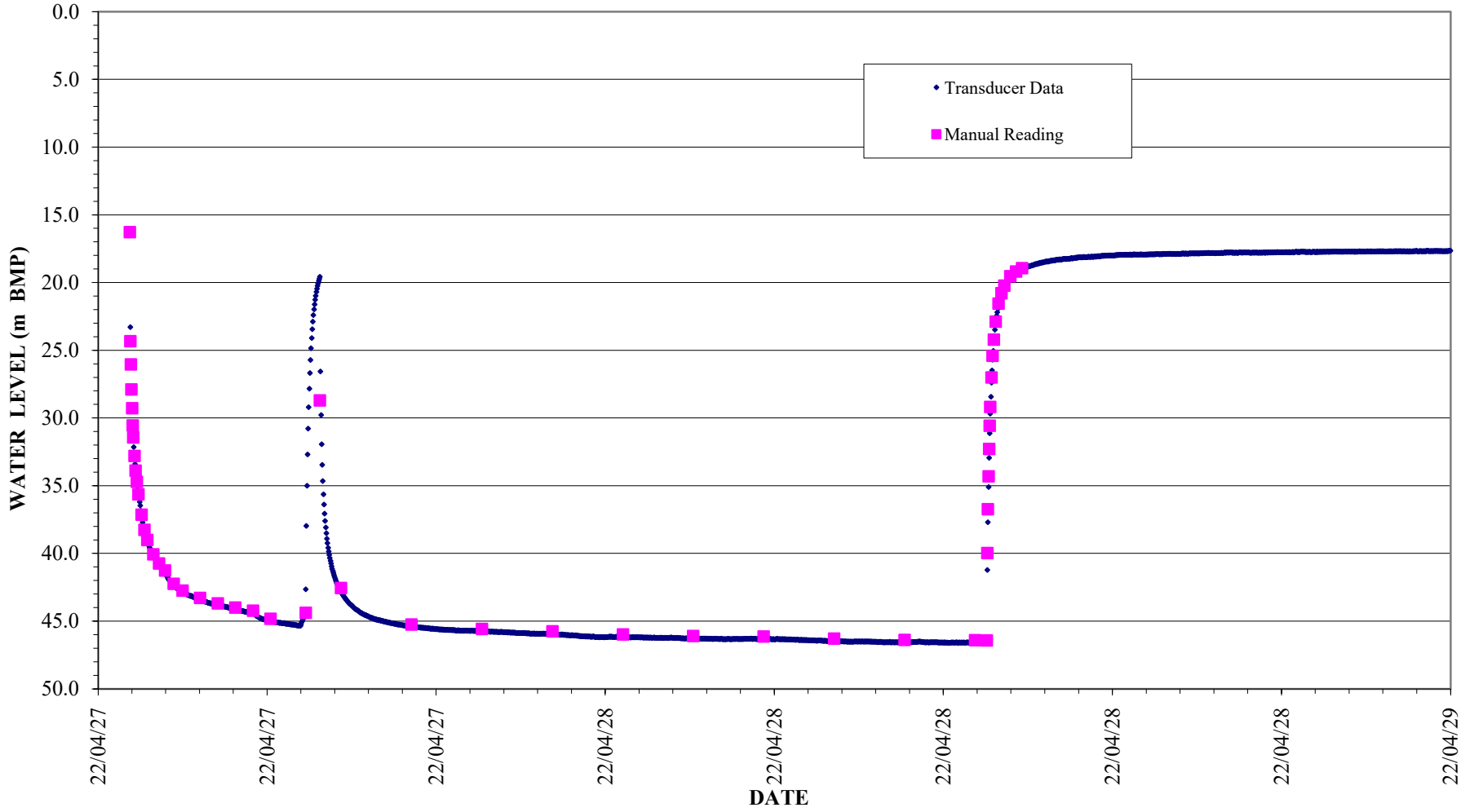
Lotowater TECHNICAL SERVICES INC.

WELL NAME: **F5**

Date	Time	Elapsed Time	Water Level	Drawdown	Comments
yyyy/mm/dd	*hr:min*	*min*	*mbMP*	*m*	
4/28/2022	8:52		30.95		

Fergus F5-R
Q = 30L/s
Start: April 27, 2022 10:30AM





Notes:

Measuring Point: Top of PVC flush joint

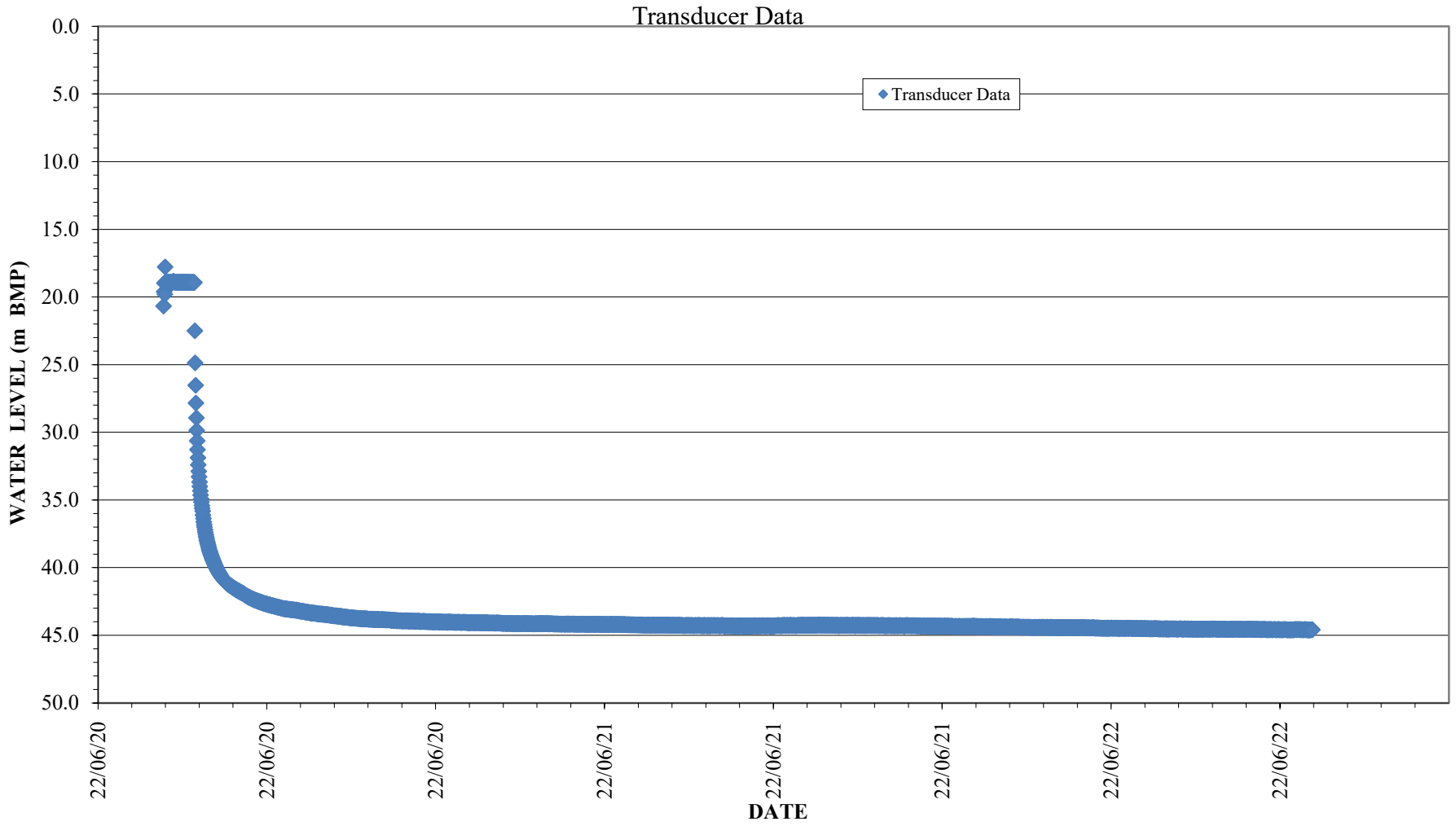
Stickup: 0.51 m AGL

Townshp of Centre Wellington

Well 5-R Hydrograph

Lotowater Technical Services Inc. **Figure A1**

Reference: 313-010 5/18/2022



Notes:

Measuring Point: Top of PVC flush joint

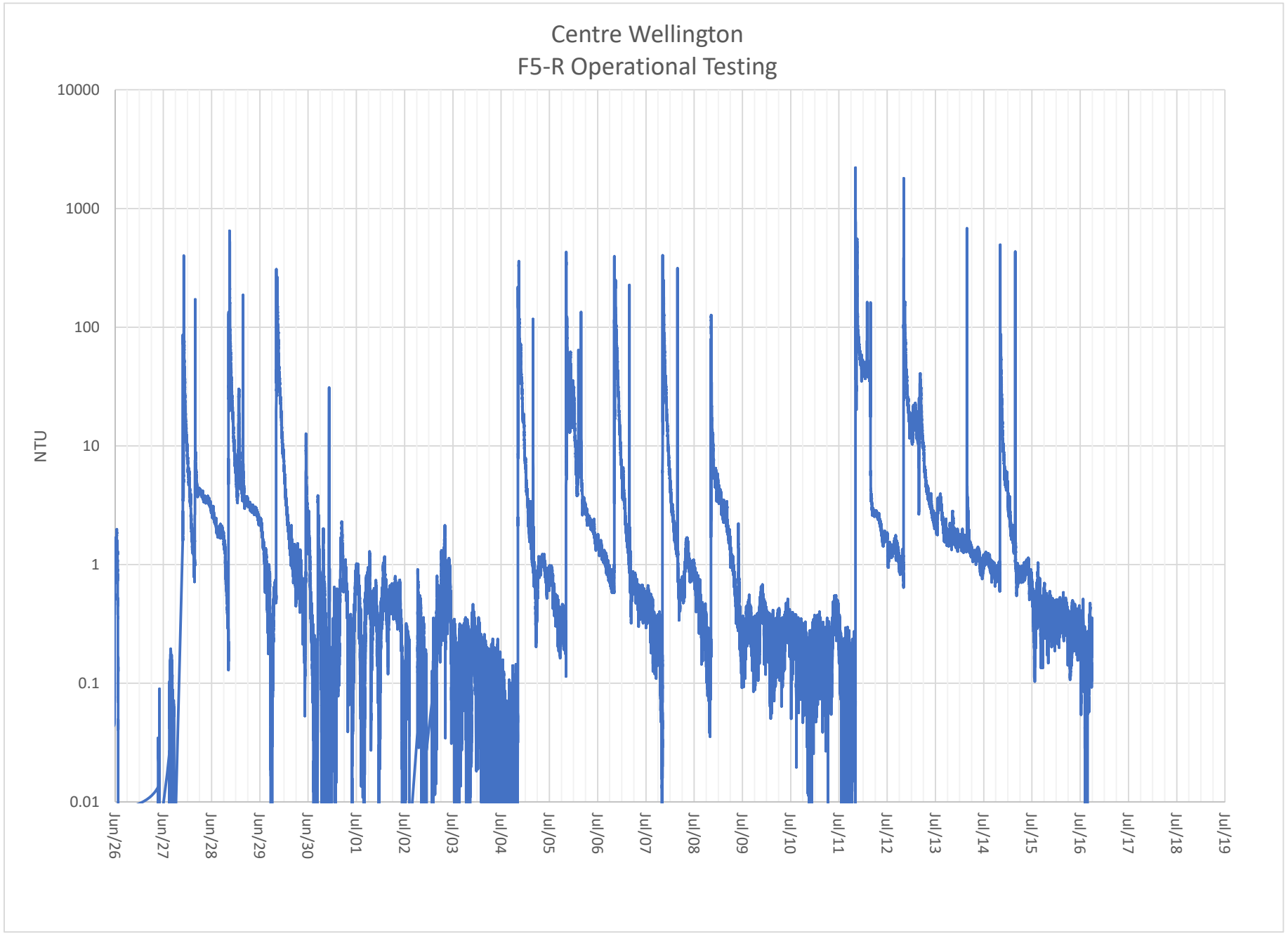
Stickup: 0.51 m AGL

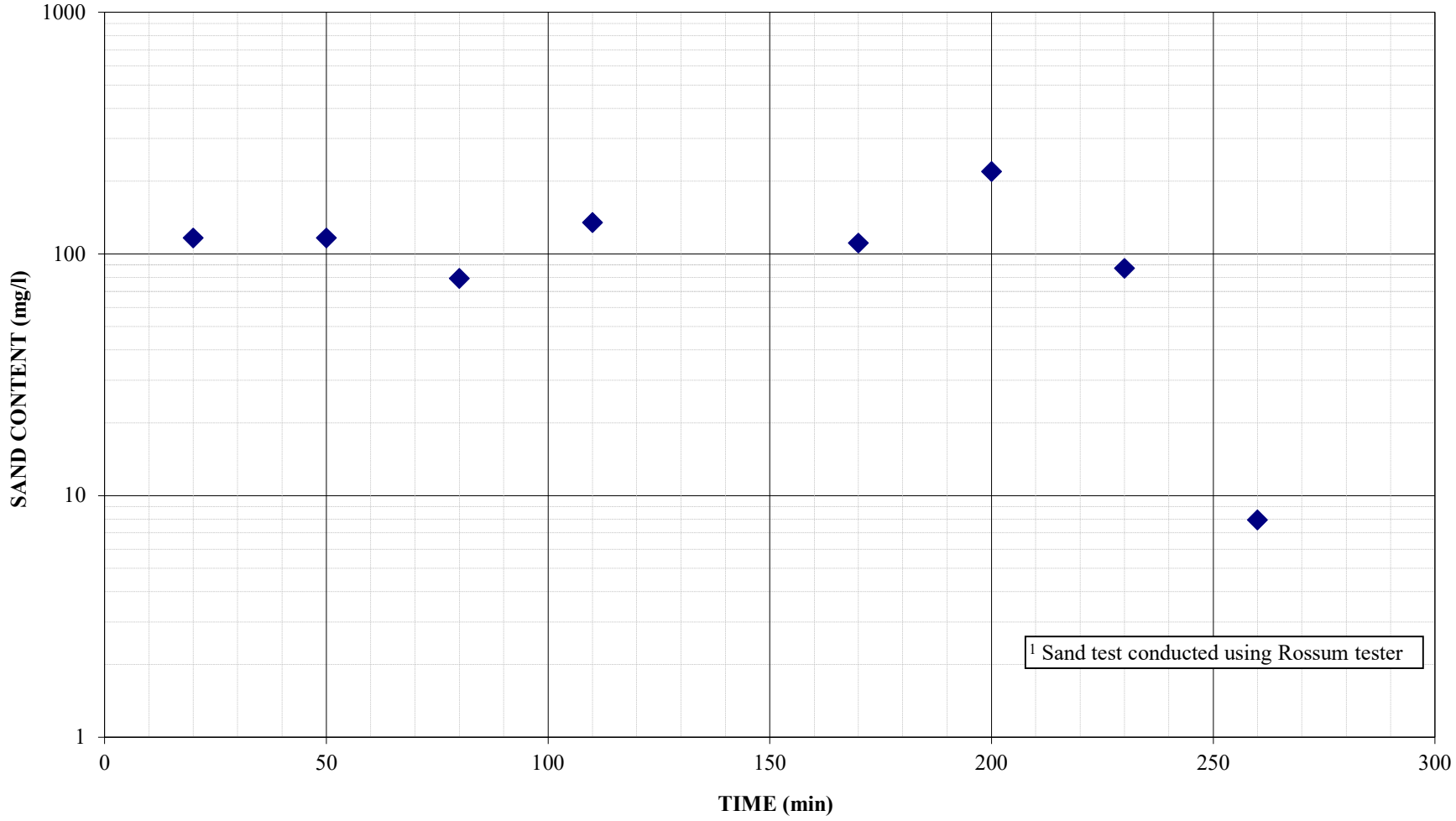
Townshp of Centre Wellington

Well 5-R Hydrograph

Lotowater Technical Services Inc. **Figure A2**

Reference: 313-010 6/23/2022


Centre Wellington
F5-R Operational Testing
NTU
10000
1000
100
10
1
0.1
0.01
Jun/26
Jun/27
Jun/28
Jun/29
Jun/30
Jul/01
Jul/02
Jul/03
Jul/04
Jul/05
Jul/06
Jul/07
Jul/08
Jul/09
Jul/10
Jul/11
Jul/12
Jul/13
Jul/14
Jul/15
Jul/16
Jul/17
Jul/18
Jul/19



Notes:

#
Test to waste
concentration in ppm over 20min test period at 25-15 L/s

Centre Wellington

Sand Testing Results

Sand Test Results

Lotowater Technical Services Inc. **Figure X**

Reference: 313-010 5/18/2021

Well Chlorination Record

Well Name:	Well F5-R	
Client:	Township of Centre Wellington	
Project #:	313-010	
Disinfected By:	Justin Bickle	
LTS Chlorination Worksheet Used:	Yes	
Treatment Volume:	9,118	**Litres**
Desired Concentration:	100	**ppm**
Volume of Mixing Water:	n/a	**Litres**
Qty of Sterilene Needed (granular 55%):	1657.90	**grams**
Type and Quantity of Chlorine Used:	1750 grams Sterilene	
Date and Time Chlorine Added:	2022-08-08 10:45	
Chlorine Addition Method:	inject from surface	
Chlorine Residual Measured at Surface:		
Chlorine Residual Measurement Method:		
Date & Time Chlorine Purged:		
Pre-Purge Chlorine Residual Measured at Surface:		
Chlorine Residual Measurement Method:		
Purged By:		
Purged To:		
Quantity and Type of Dechlorinating Agent Used:		
Minutes of Pumping until Zero Free Chlorine Residual:		
Final Turbidity Measurement (NTU):		
Notes on Disinfection:		

Lotowater TECHNICAL SERVICES INC.

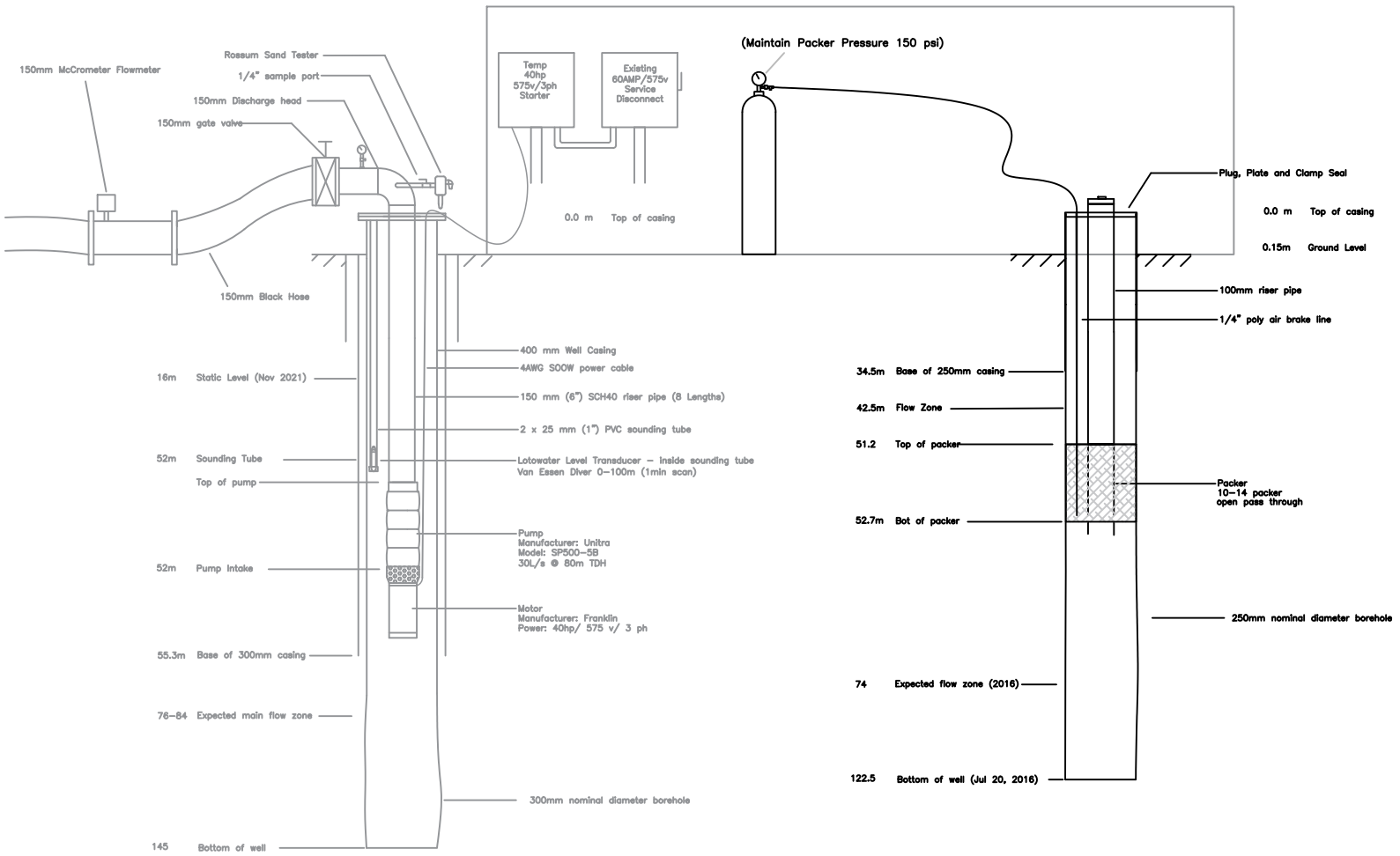
92 SCOTT AVENUE T (519) 442-2086
PARIS, ON N3L 3R1 F (519) 442-7242
www.lotowater.com

AECOM

F5 Well Results

F5–R

F5



LEGEND

Lotowater TECHNICAL SERVICES INC.

CLIENT
Township of Centre Wellington

TITLE
F5 Packer Install
Proposed

PROJECT No. 313–010					FIGURE 1
DESIGN			REVISION No. May 9, 2022	SCALE NTS	
DRAWN	BP	Nov 26, 2021	SCALE (m)		
CHECKED					

TABLE X

Township of Centre Wellington

Fergus Well F5
Static/Well F5-R Pumping Video Summary
2022/08/05

Elapsed Time (h:min)	Depth (ft below MP)	Depth (m below MP)	Comments
0:00	2.76	0.84	Below top of casing
0:03	48.13	14.67	Casing joint
0:04	51.08	15.57	Packer marks
0:04	56.82	17.32	Static water level (tubid)
0:08	111.48	33.98	Turbidity decreases
0:10	115.48	35.20	Bottom of casing
0:10	124.67	38.00	Major partial fracture/breakout
0:12	139.53	42.53	Large major fracture
0:14	171.78	52.36	Change of rock, darker
0:16	194.26	59.21	Vuggy
0:17	205.08	62.51	Large vertical fracture
0:18	219.06	66.77	Beakout/vuggy
0:19	233.17	71.07	Vuggy
0:20	248.52	75.75	Breakouts/vuggy
0:21	257.71	78.55	Major fracture zone, large vugs
0:22	267.39	81.50	Turbidity increases
0:22	272.31	83.00	Large vug
0:23	278.87	85.00	Turbidity increases
0:23	286.84	87.43	Large vugs
0:24	296.58	90.40	Large vugs/partial fracture
0:25	304.88	92.93	Large partial fracture
0:26	317.38	96.74	Turbidity slightly decreases
0:27	326.01	99.37	Very large partial fracture/karst feature
0:29	354.33	108.00	Tubidity increases
0:30	355.70	108.42	Above fill on bottom of well
0:33	342.52	104.40	Vuggy
0:35	327.42	99.80	Very large partial fracture/karst feature
0:38	318.96	97.22	Large vugs
0:43	305.08	92.99	Partial fracture/karst feature
0:44	304.29	92.75	Large vug/karst feature
0:45	303.51	92.51	Large vug/karst feature
0:47	297.90	90.80	Large vug/karst feature
0:48	296.65	90.42	Large vug/karst feature
0:49	292.88	89.27	Breakouts/vuggy
0:50	288.45	87.92	Breakouts/vuggy
0:51	284.18	86.62	Breakouts/vuggy
0:54	272.47	83.05	Breakouts/vuggy
0:55	266.43	81.21	Breakouts/vuggy
0:57	259.81	79.19	Breakout/karst feature (grout?)
1:01	245.21	74.74	Vugs
1:03	241.17	73.51	Vertical fracture (grout fill?)
1:04	239.10	72.88	Key seat
1:08	219.81	67.00	Vuggy

TABLE X

Township of Centre Wellington

Fergus Well F5
Static/Well F5-R Pumping Video Summary
2022/08/05

Elapsed Time (h:min)	Depth (ft below MP)	Depth (m below MP)	Comments
1:10	209.81	63.95	Vertical fracture
1:15	171.16	52.17	Darker rock
1:16	173.52	52.89	Blue precipitate?
1:19	161.48	49.22	Vuggy
1:23	141.27	43.06	Major karst feature/void
1:27	125.62	38.29	Partial fracture
1:30	115.98	35.35	Bottom of casing, blisters
1:31	114.20	34.81	Above base of casing, prep for pumping video
-	-	-	-
0:00	114.20	34.81	Begin pumping at 20 L/s
0:12	156.63	47.74	Pause to clear, not clearing, increase flow to 30 L/s
0:19	241.20	73.52	Turbid
0:21	259.81	79.19	Turbid
0:24	288.71	88.00	Turbidity lessening
0:36	354.88	108.17	Camera in fill on bottom
0:38	341.20	104.00	NEW DISK
0:00	341.20	104.00	Continue up-run
0:03	327.92	99.95	Flow of fine particles from large void
0:14	297.50	90.68	Particle source, large turbidity increase
0:18	269.03	82.00	Slight decrease in turbidity
0:41	143.83	43.84	Flow out
0:45	140.55	42.84	High turbidity
0:46	136.65	41.65	Bubble/particle source
0:50	125.00	38.10	Flow zone
0:52	119.45	36.41	High flow, moving camera, high turbidity, bubbles
0:55	112.33	34.24	In casing, still turbid
0:57	94.09	28.68	F5-R pumping 30 L/s water level
1:02	34.28	10.45	Heavy delamination
1:06	2.23	0.68	Below top of casing

Video survey conducted by Rayne Hettinga

Note: Measuring point (MP) is top of casing which is 0.43 m above floor level

MW7 Well Results

Lotowater
TECHNICAL SERVICES INC.

CLIENT
?

LOCATION	*Centre Wellington*	**BOREHOLE**	**MW7**	**Figure ?**
DEPTH REF.	*"0" at ToC - 0.43 m agl*	**PROJECT #**	*313-010*	**Preliminary**
WATER LEVEL	*11.21 m - btoc*	**LOG DATE**	*2021/09/27&28*	**Geophysical**
DRILL METHOD	*?*	**LOGGED BY**	*R. Hettinga*	**Logs**

Depth 1m:100m

OBI Tilt 0 deg 2

OBI Azimuth adj 0 deg 360

Natural Gamma 0 cps 100

R16 0 5000

R64 0 5000

Image 0° 90° 180° 270° 0°

Amplitude1 0° 90° 180° 270° 0°

Centralized TravelTime1 0° 90° 180° 270° 0°

ABI Caliper - max 10 cm 30

Caliper 10 cm 30

OBI MagnField 50 uT 60

Well Completion 85 mm 85 Comment

Plain casing
-0.43-1.81
132mm

drill
0.00-1.81
diameter:152.4mm

Temperature 5 'C 15

Cond25C 0 uS/cm 3000

Velocity Static -0.3 (m/s) 0.3

Velocity Pumping -0.3 (m/s) 0.3

0.0
2.0
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
20.0
22.0
24.0
26.0
28.0
30.0
32.0
34.0

Depth
1m:100m

OBI Tilt
0 deg 2

OBI Azimuth adj
0 deg360

Natural Gamma
0 cps 100

R16
0 5000

R64
0 5000

Image
0° 90° 180° 270° 0°

Amplitude1
0° 90° 180° 270° 0°

Centralized TravelTime1
0° 90° 180° 270° 0°

ABI Caliper - max
10 cm 30

Caliper
10 cm 30

OBI MagnField
50 uT 60

Well Completion
85 mm 85 Comment

Temperature
5 'C 15

Cond25C
0 uS/cm 3000

Velocity Static
-0.3 (m/s) 0.3

Velocity Pumping
-0.3 (m/s) 0.3

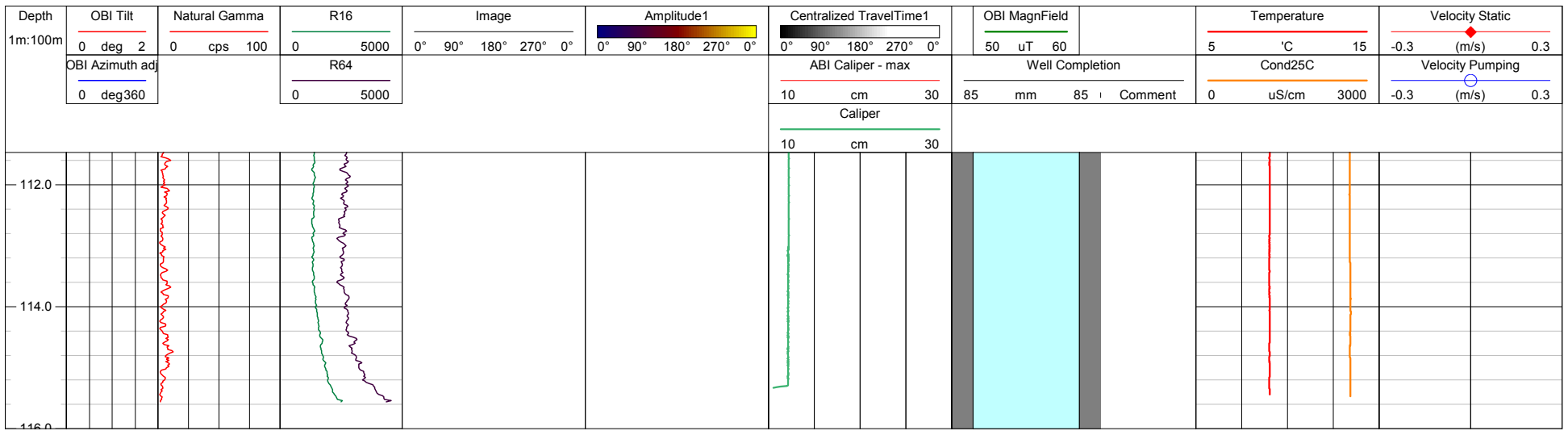
36.0
38.0
40.0
42.0
44.0
46.0
48.0
50.0
52.0
54.0
56.0
58.0
60.0
62.0
64.0
66.0
68.0
70.0
72.0

drill
1.81-116.00
diameter:122mm

Water borehole
fluid
11.21-116.00

Depth	OBI Tilt	Natural Gamma	R16	Image	Amplitude1	Centralized TravelTime1	OBI MagnField		Temperature	Velocity Static
1m:100m	0 deg 2	0 cps 100	0 5000	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°	0° 90° 180° 270° 0°	50 uT 60		5 'C 15	-0.3 (m/s) 0.3
	OBI Azimuth adj		R64			ABI Caliper - max	Well Completion		Cond25C	Velocity Pumping
	0 deg360		0 5000			10 cm 30	85 mm 85	Comment	0 uS/cm 3000	-0.3 (m/s) 0.3
						Caliper				
						10 cm 30				

74.0
76.0
78.0
80.0
82.0
84.0
86.0
88.0
90.0
92.0
94.0
96.0
98.0
100.0
102.0
104.0
106.0
108.0
110.0


Depth
1m:100m
OBI Tilt
0 deg 2
Natural Gamma
0 cps 100
R16
0 5000
Image
0° 90° 180° 270° 0°
Amplitude1
0° 90° 180° 270° 0°
Centralized TravelTime1
0° 90° 180° 270° 0°
OBI MagnField
50 uT 60
Temperature
5 'C 15
Velocity Static
-0.3 (m/s) 0.3
OBI Azimuth adj
0 deg360
R64
0 5000
ABI Caliper - max
10 cm 30
Caliper
10 cm 30
Well Completion
85 mm 85 Comment
Cond25C
0 uS/cm 3000
Velocity Pumping
-0.3 (m/s) 0.3
112.0
114.0
116.0

MW8 Well Results

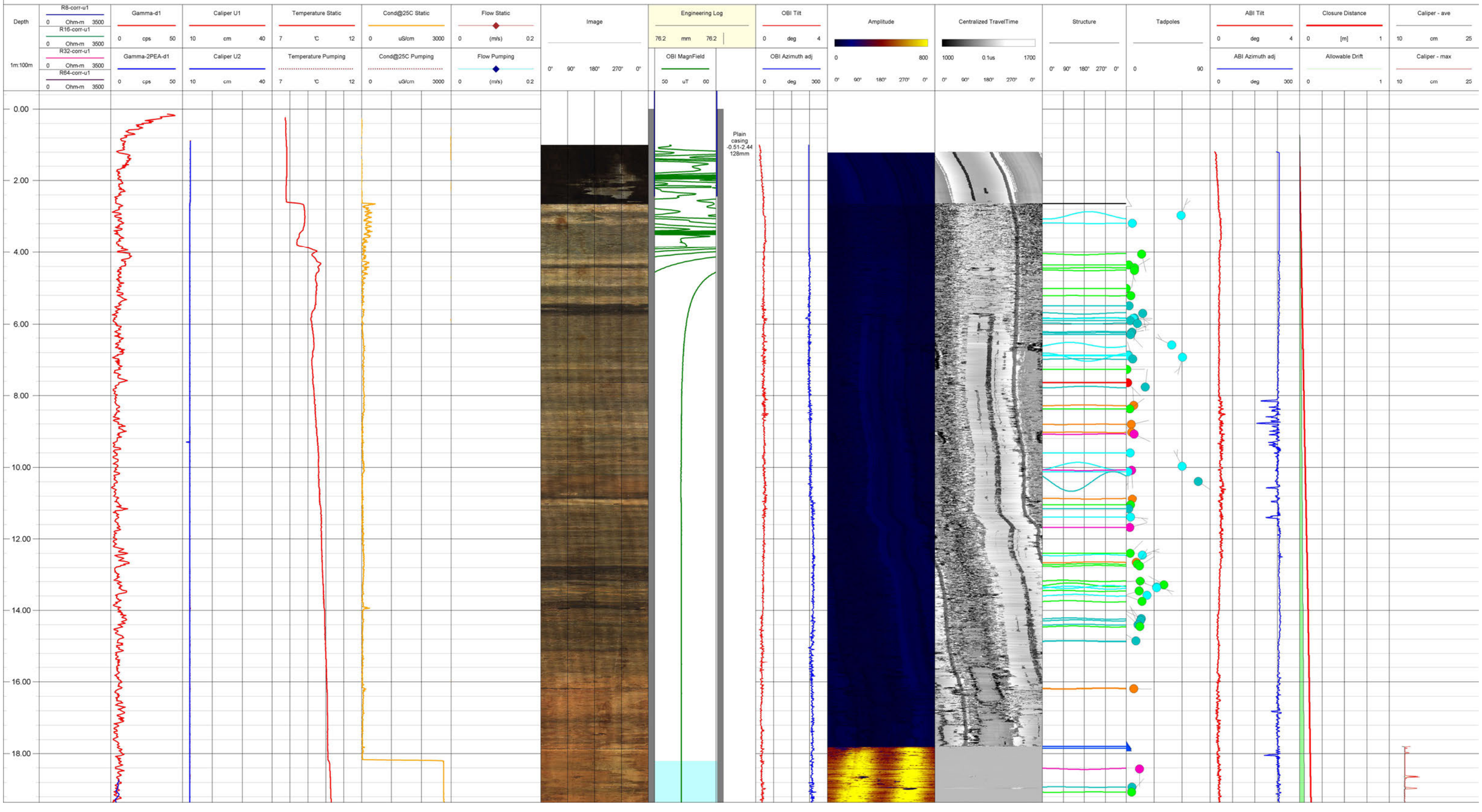
Lotowater TECHNICAL SERVICES INC.

Client: Centre Wellington

LOCATION	*Centre Wellington*	**BOREHOLE**	**MW8**
DEPTH REF.	*"0" at Ground Surface*	**PROJECT #**	*313-010*
WATER LEVEL	*17.80 m (cascading from 2.66 m)*	**LOG DATE**	*2021-12-14, 15, 16, 17*
DRILL METHOD	*PQ Core*	**LOGGED BY**	*RH*

Figure

Summary Logs for Borehole Condition



Depth
1m:100m

R8-corr-u1 0 Ohm-m 3500
R16-corr-u1 0 Ohm-m 3500
R32-corr-u1 0 Ohm-m 3500
R64-corr-u1 0 Ohm-m 3600

Gamma-d1 0 cps 50
Gamma-2PEA-d1 0 cps 50

Caliper U1 10 cm 40
Caliper U2 10 cm 40

Temperature Static 7 °C 12
Temperature Pumping 7 °C 12

Cond@25C Static 0 uS/cm 3000
Cond@25C Pumping 0 uS/cm 3000

Flow Static 0 (m/s) 0.2
Flow Pumping 0 (m/s) 0.2

Image 0° 90° 180° 270° 0°

Engineering Log 76.2 mm 76.2
OBI MagnField 50 uT 60

OBI Tilt 0 deg 4
OBI Azimuth adj 0 deg 360

Amplitude 0 800 0° 90° 180° 270° 0°

Centralized TravelTime 1000 0.1us 1700 0° 90° 180° 270° 0°

Structure 0° 90° 180° 270° 0°

Tadpoles 0 90

ABI Tilt 0 deg 4
ABI Azimuth adj 0 deg 360

Closure Distance 0 [m] 1
Allowable Drift 0 1

Caliper - ave 10 cm 25
Caliper - max 10 cm 25

20.00
22.00
24.00
26.00
28.00
30.00
32.00
34.00
36.00
38.00
40.00

drill
).00-79.0(
meter:128

Depth
1m:100m

R8-corr-u1 0 Ohm-m 3500
R16-corr-u1 0 Ohm-m 3500
R32-corr-u1 0 Ohm-m 3500
R64-corr-u1 0 Ohm-m 3600

Gamma-d1 0 cps 50
Gamma-2PEA-d1 0 cps 50

Caliper U1 10 cm 40
Caliper U2 10 cm 40

Temperature Static 7 °C 12
Temperature Pumping 7 °C 12

Cond@25C Static 0 uS/cm 3000
Cond@25C Pumping 0 uS/cm 3000

Flow Static 0 (m/s) 0.2
Flow Pumping 0 (m/s) 0.2

Image 0° 90° 180° 270° 0°

Engineering Log 76.2 mm 76.2
OBI MagnField 50 uT 60

Water borehole fluid 8.21-79.0

OBI Tilt 0 deg 4
OBI Azimuth adj 0 deg 360

Amplitude 0 800 0° 90° 180° 270° 0°

Centralized TravelTime 1000 0.1us 1700 0° 90° 180° 270° 0°

Structure 0° 90° 180° 270° 0°

Tadpoles 0 90

ABI Tilt 0 deg 4
ABI Azimuth adj 0 deg 360

Closure Distance 0 [m] 1
Allowable Drift 0 1

Caliper - ave 10 cm 25
Caliper - max 10 cm 25

42.00
44.00
46.00
48.00
50.00
52.00
54.00
56.00
58.00
60.00
62.00
64.00

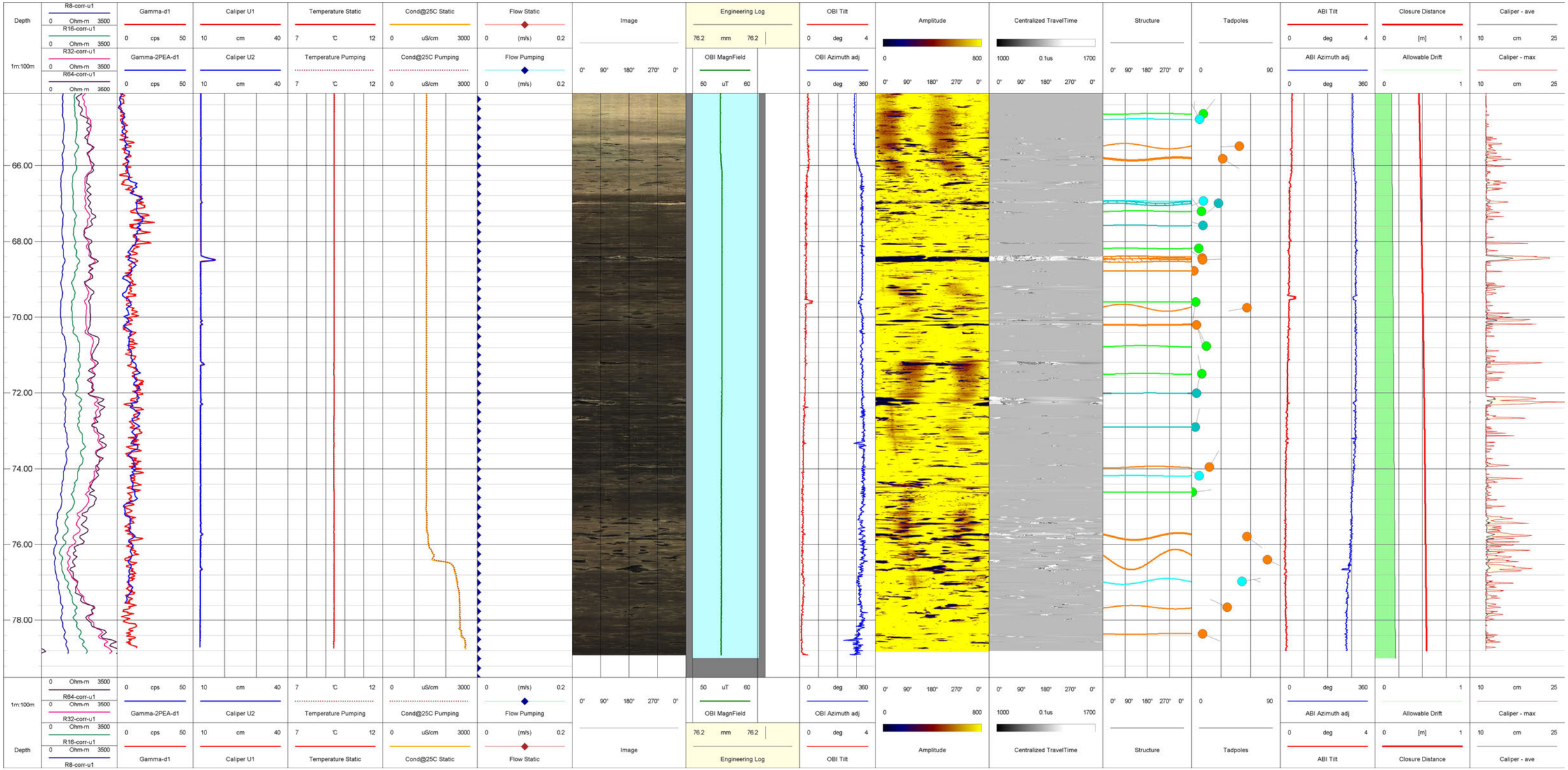
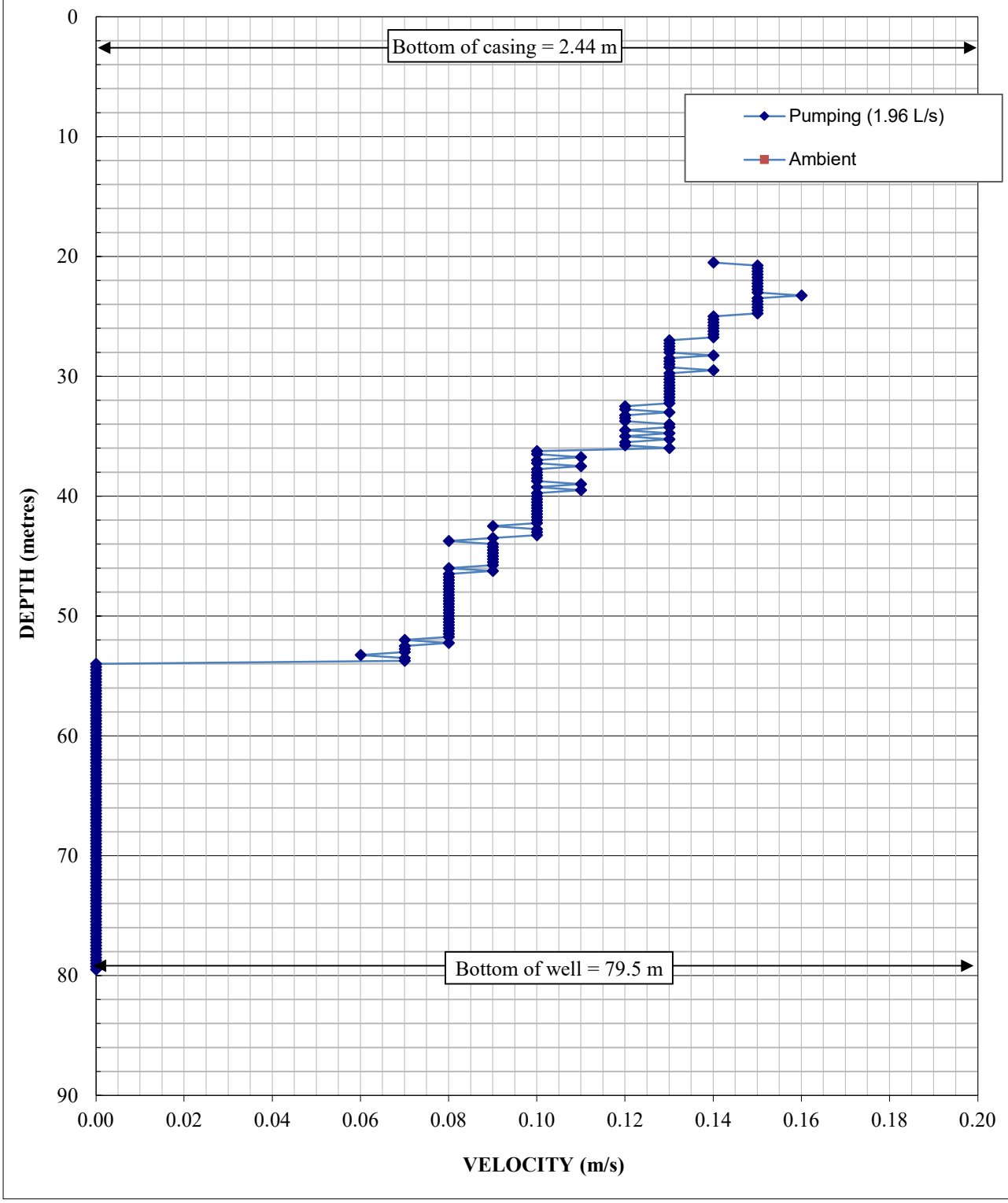

Depth
1m:100m
R8-corr-u1
R16-corr-u1
R32-corr-u1
R64-corr-u1
0 Ohm-m 3500
Gamma-d1
Gamma-2PEA-d1
0 cps 50
Caliper U1
Caliper U2
10 cm 40
Temperature Static
Temperature Pumping
7 °C 12
Cond@25C Static
Cond@25C Pumping
0 uS/cm 3000
Flow Static
Flow Pumping
0 (m/s) 0.2
Image
0° 90° 180° 270° 0°
Engineering Log
76.2 mm 76.2
OBI MagnField
50 uT 60
OBI Tilt
OBI Azimuth adj
0 deg 360
Amplitude
0 800
Centralized TravelTime
1000 0.1us 1700
Structure
Tadpoles
0 90
ABI Tilt
ABI Azimuth adj
0 deg 4
Closure Distance
Allowable Drift
0 [m] 1
Caliper - ave
Caliper - max
10 cm 25
66.00
68.00
70.00
72.00
74.00
76.00
78.00

Figure: ?



Notes:
Top of casing 0.53m above ground surface
Test Date: December 17, 2021
Note cascade heard entering well likely from base of casing

Twp of Centre Wellington

Borehole MW8

Flow Distribution Profile

Lotowater Technical Services Inc. **Figure X**
Reference: 313-010 2021-12-17

TABLE 2

Township of Centre Wellington

Well MW8
Static/Pumping Video Summary
2022/02/10

Elapsed Time (h:min)	Depth (ft below MP)	Depth (m below MP)	Comments
0:00	1.12	0.34	Below ground level (soap on lens)
0:01	7.64	2.33	Bottom of casing, water cascading
0:02	11.94	3.64	Streams of cascading water
0:02	14.90	4.54	Streams of cascading water
0:03	24.11	7.35	Fracture, possible cascading water source
0:05	35.73	10.89	Fracture, possible cascading water source
0:07	45.37	13.83	Vug, possible cascading water source
0:08	52.33	15.95	Fracture, possible cascading water source
0:09	56.53	17.23	Vug, possible cascading water source
0:10	67.42	20.55	Fracture, possible cascading water source
0:11	74.15	22.60	Fracture, possible cascading water source
0:12	83.30	25.39	Static water level
0:13	86.02	26.22	Flow visible, bubble source below
0:14	89.67	27.33	Fracture, flow visible
0:17	95.14	29.00	Pause to set 10SQ pump
0:18	102.59	31.27	Major fracture, water producing
0:19	111.88	34.10	Fractured/vuggy
0:20	115.94	35.34	Major fracture, possible downward flow
0:22	121.39	37.00	Minor fracture
0:23	127.49	38.86	Minor fracture
0:24	135.14	41.19	Minor fracture
0:24	139.83	42.62	Minor fracture
0:26	150.07	45.74	Fracture, flow visible
0:28	160.50	48.92	Large vug, water producing, particle source
0:30	175.00	53.34	Top of very large fracture/void, water producing
0:32	177.33	54.05	Bottom of fracture/void
0:33	179.17	54.61	Very little flow visible
0:27	214.73	65.45	Vuggy (drilling mud?)
0:38	224.41	68.40	Major fracture, very little flow
0:40	236.94	72.22	Vuggy zone
0:42	248.69	75.80	Vuggy zone
0:42	251.18	76.56	Large vug (dissolution waves/line?)
0:45	259.61	79.13	On bottom of well, fallen cobbles
0:47	258.14	78.68	Large vug
0:48	254.59	77.60	Vuggy zonne
0:50	249.54	76.06	Large vugs
0:55	237.83	72.49	Large vug/karst features
0:58	230.94	70.39	Vug/breakout
0:59	229.99	70.10	Vuggy zone
1:01	225.16	68.63	Large fracture/karst feature, precipitate
1:03	221.19	67.42	Large breakout/karst feature

TABLE 2

Township of Centre Wellington

Well MW8
Static/Pumping Video Summary
2022/02/10

Elapsed Time (h:min)	Depth (ft below MP)	Depth (m below MP)	Comments
1:05	216.60	66.02	Large vug
1:06	212.27	64.70	Lighter, more crystalline rock than below
1:10	199.28	60.74	Reefal limestone
1:18	177.56	54.12	Bottom of very large fracture/void
1:19	176.57	53.82	Water producing
1:20	175.59	53.52	Top of very large fracture/void, water producing
1:28	151.15	46.07	Vuggy, slightly wate producing
1:29	150.72	45.94	Major fracture, water producing
1:33	142.95	43.57	Vug, particle source
1:34	140.85	42.93	Large vug, water producing, particle source
1:36	135.83	41.40	Minor fracture
1:38	128.18	39.07	Minor fracture
1:40	122.11	37.22	Fracture, water producing, particle source
1:41	119.46	36.41	Vuggy
1:43	116.83	35.61	Major fracture, water producing
1:44	110.56	33.70	Fracture/vuggy zone
1:45	103.61	31.58	Major fracture, water producing
1:48	95.14	29.00	Pause to pull 10SQ pump
1:50	89.90	27.40	Major fracture, water producing (fabric?)
1:52	86.12	26.25	Minor fracture, water producing
1:53	85.86	26.17	Very large vug
1:54	84.55	25.77	Water level, cascading from above
1:57	74.80	22.80	Fracture, possible cascading water source
2:00	68.04	20.74	Fracture, possible cascading water source
-	-	-	NEW DVD DISK
0:00	68.04	20.74	Continue up run
0:03	60.33	18.39	Minor fracture, possible cascading water source
0:04	55.91	17.04	Minor fracture, possible cascading water source
0:07	53.02	16.16	Fracture, possible cascading water source
0:09	48.56	14.80	Fracture, possible cascading water source
0:10	46.72	14.24	Fracture, possible cascading water source
0:11	45.70	13.93	Vug/breakout, possible cascading water source
0:15	36.42	11.10	Fracture, possible cascading water source
0:17	32.84	10.01	Minor fracture, possible cascading water source
0:18	32.02	9.76	Vuggy
0:19	29.36	8.95	Minor fracture, possible cascading water source
0:21	24.80	7.56	Fracture, possible cascading water source
0:25	15.39	4.69	Streams of cascading water
0:28	12.24	3.73	Streams of cascading water
0:28	12.53	3.82	Streams of cascading water

TABLE 2

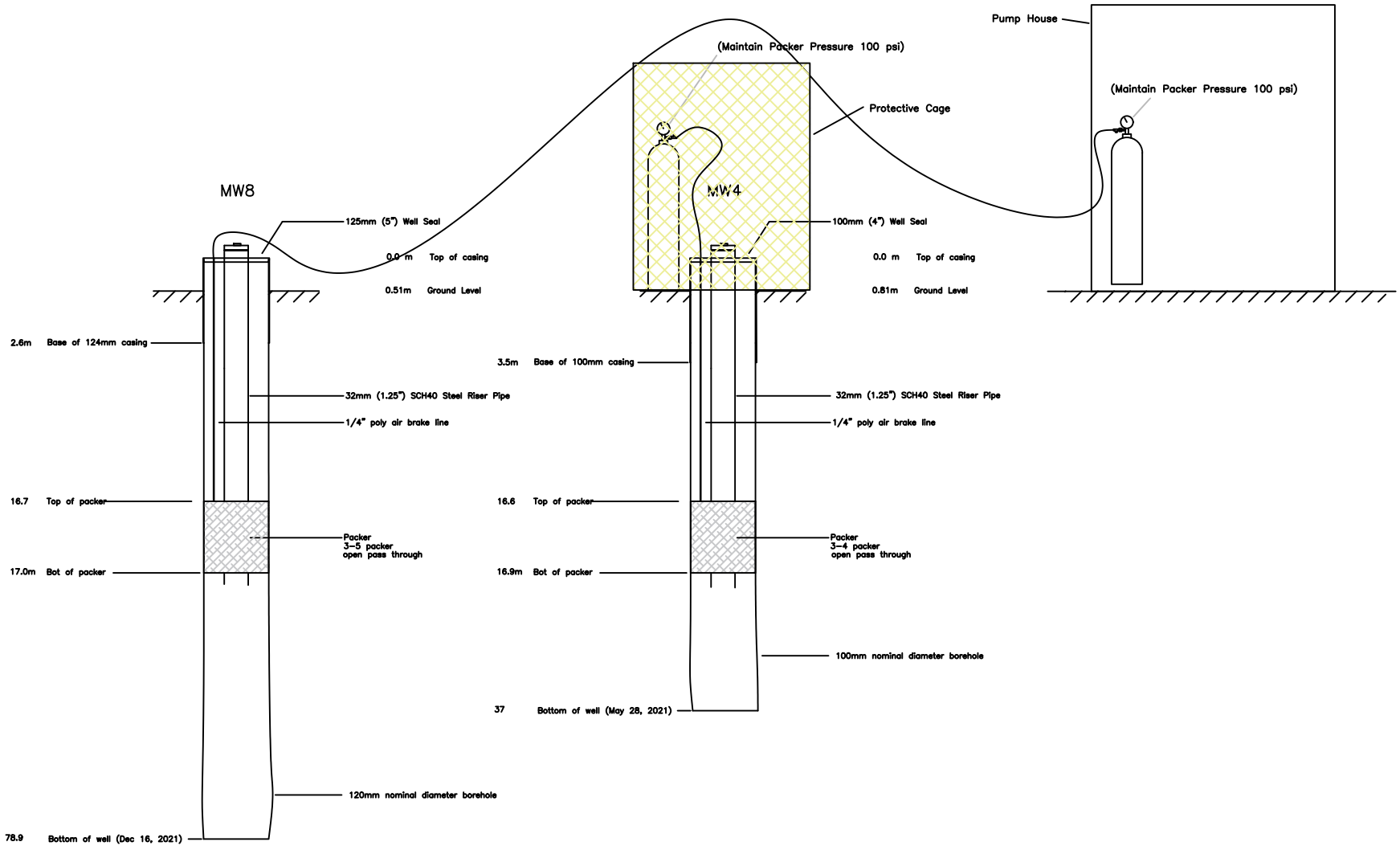
Township of Centre Wellington

Well MW8
Static/Pumping Video Summary
2022/02/10

Elapsed Time (h:min)	Depth (ft below MP)	Depth (m below MP)	Comments
0:30	8.37	2.55	Bottom of casing, water cascading
0:31	0.66	0.20	Below ground level

Video survey conducted by Rayne Hettinga

Note: Measuring point (MP) is ground level. Top of casing is currently 0.51 m above ground level



LEGEND

Lotowater TECHNICAL SERVICES INC.

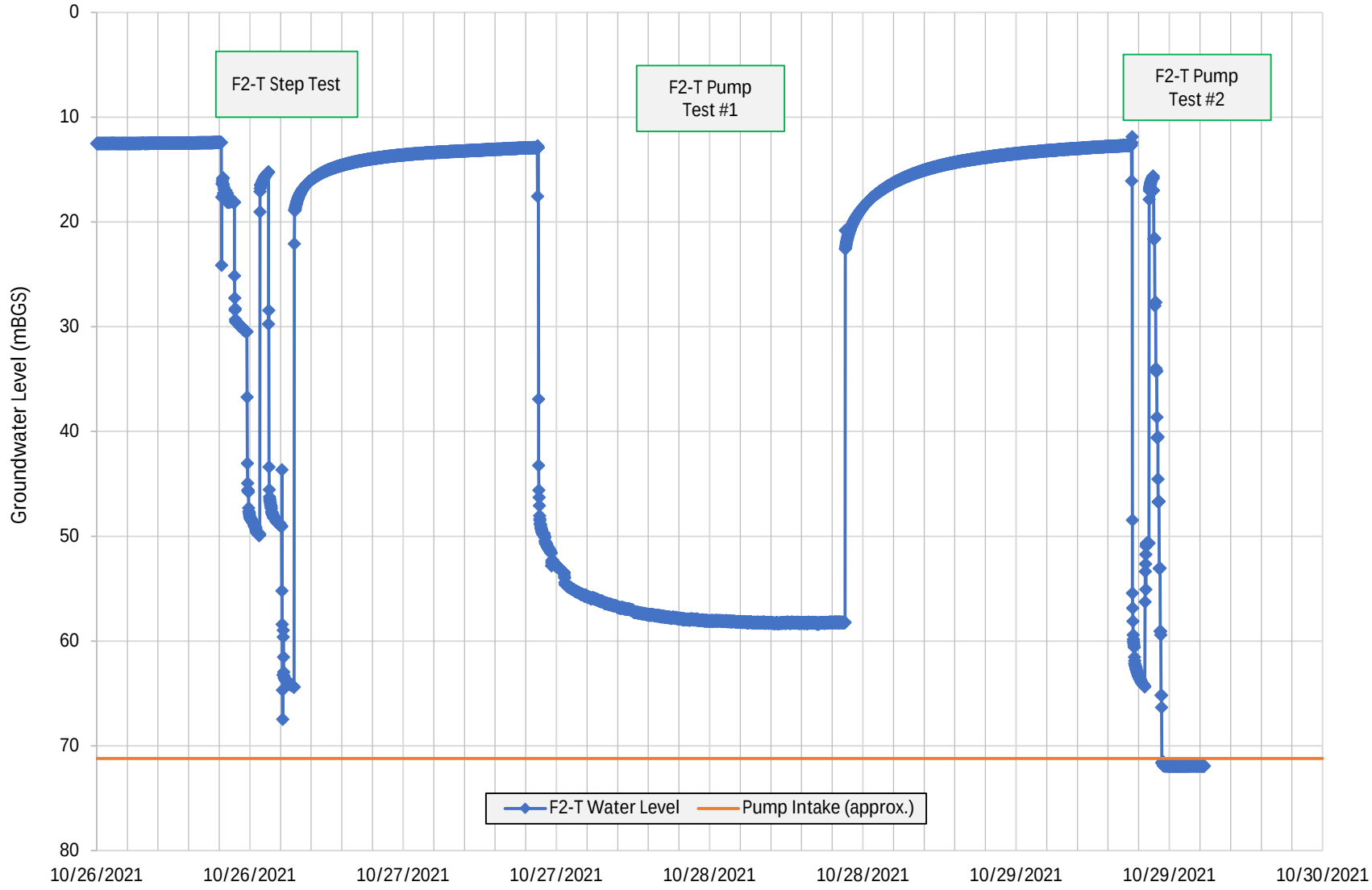
CLIENT
Township of Centre Wellington

TITLE
MW8 and MW4 Packer Install
(As Constructed)

PROJECT No. 313-010					FIGURE 1
DESIGN			REVISION No. Dec 23, 2021	SCALE NTS	
DRAWN	BP	Dec 20, 2021	SCALE (m)		
CHECKED					

Appendix D

Hydrographs

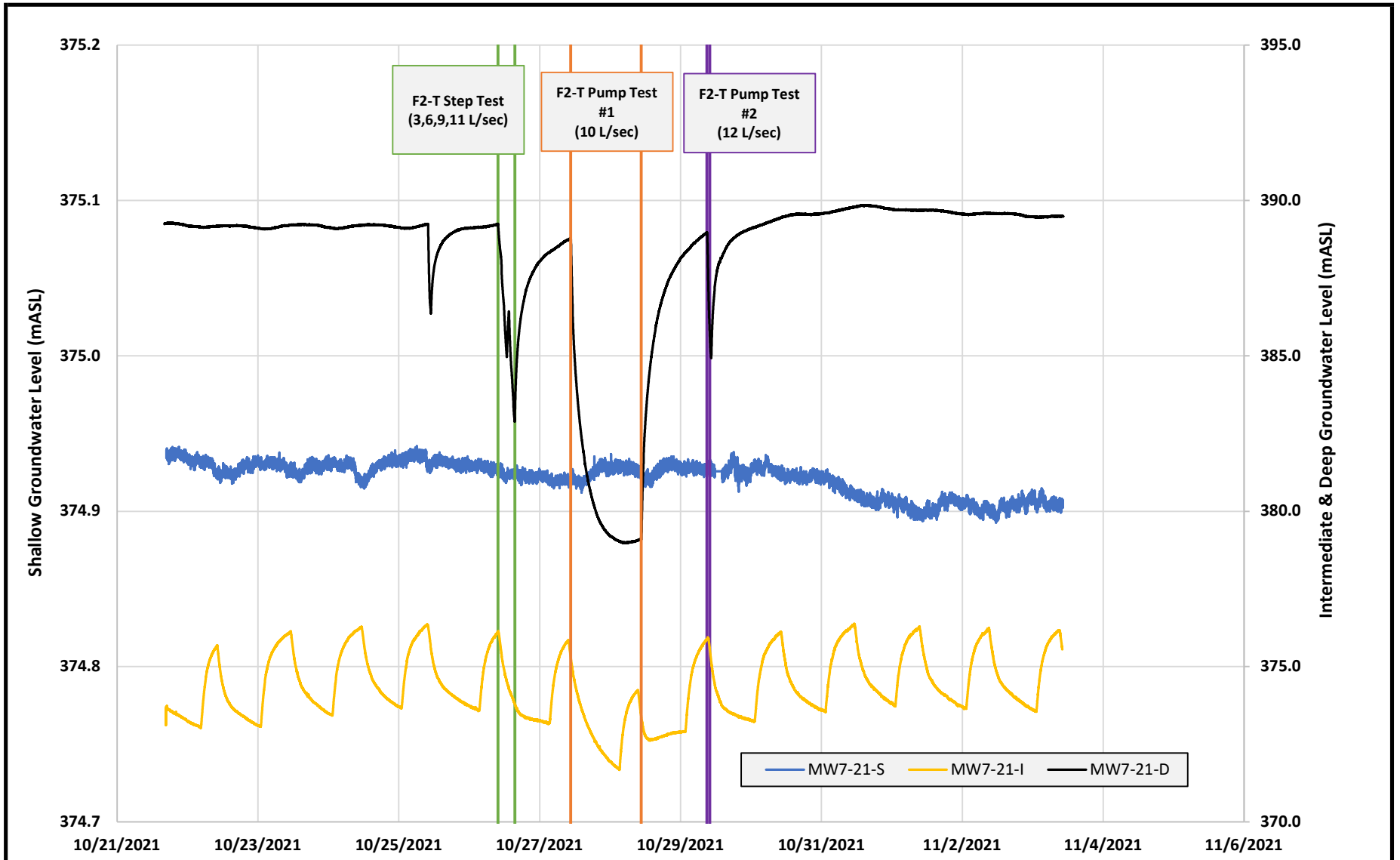


AECOM

F2-T Pumping Test Hydrograph

February 2023

Figure D-1

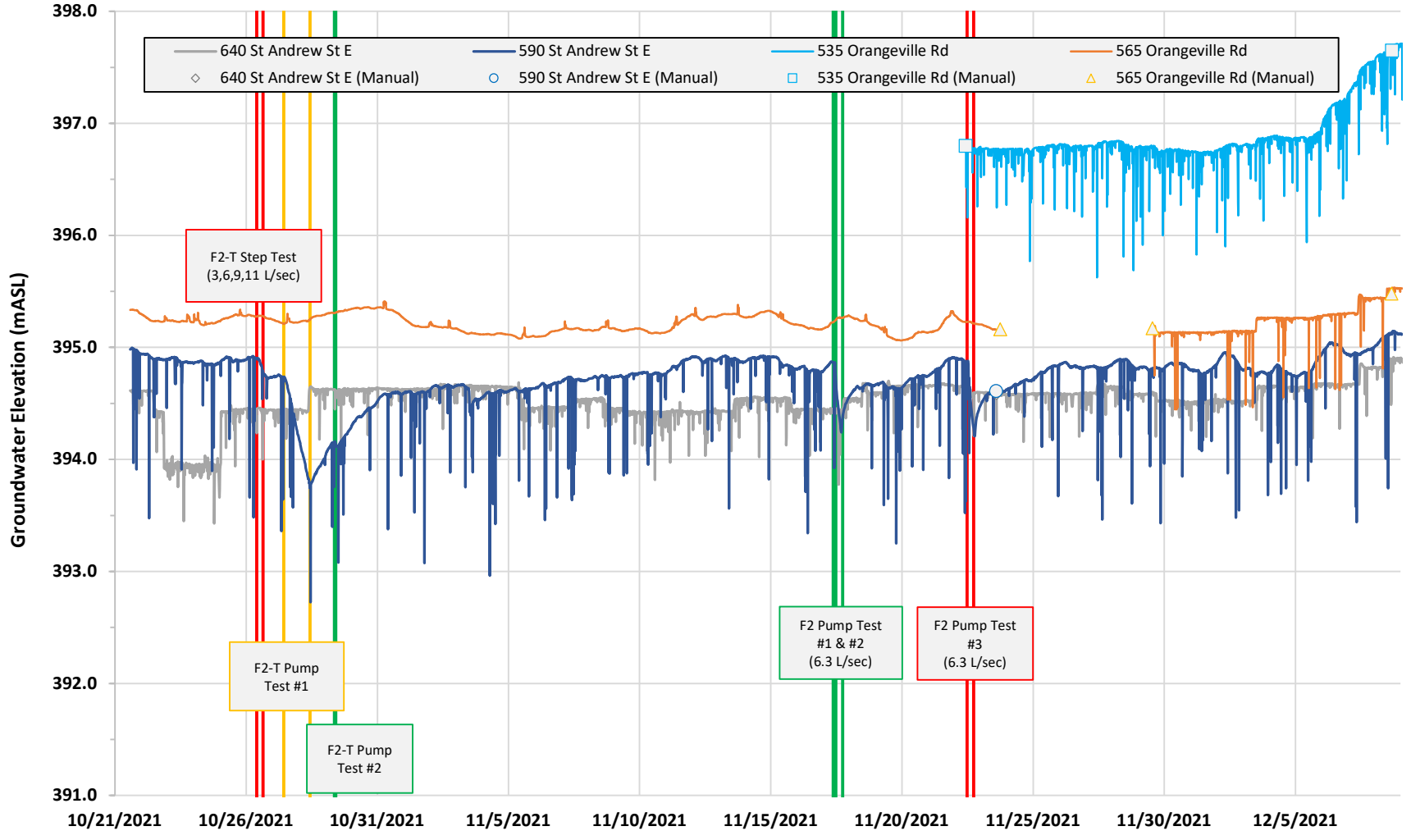


AECOM

F2-T Pump Test - MW7-21 Hydrograph

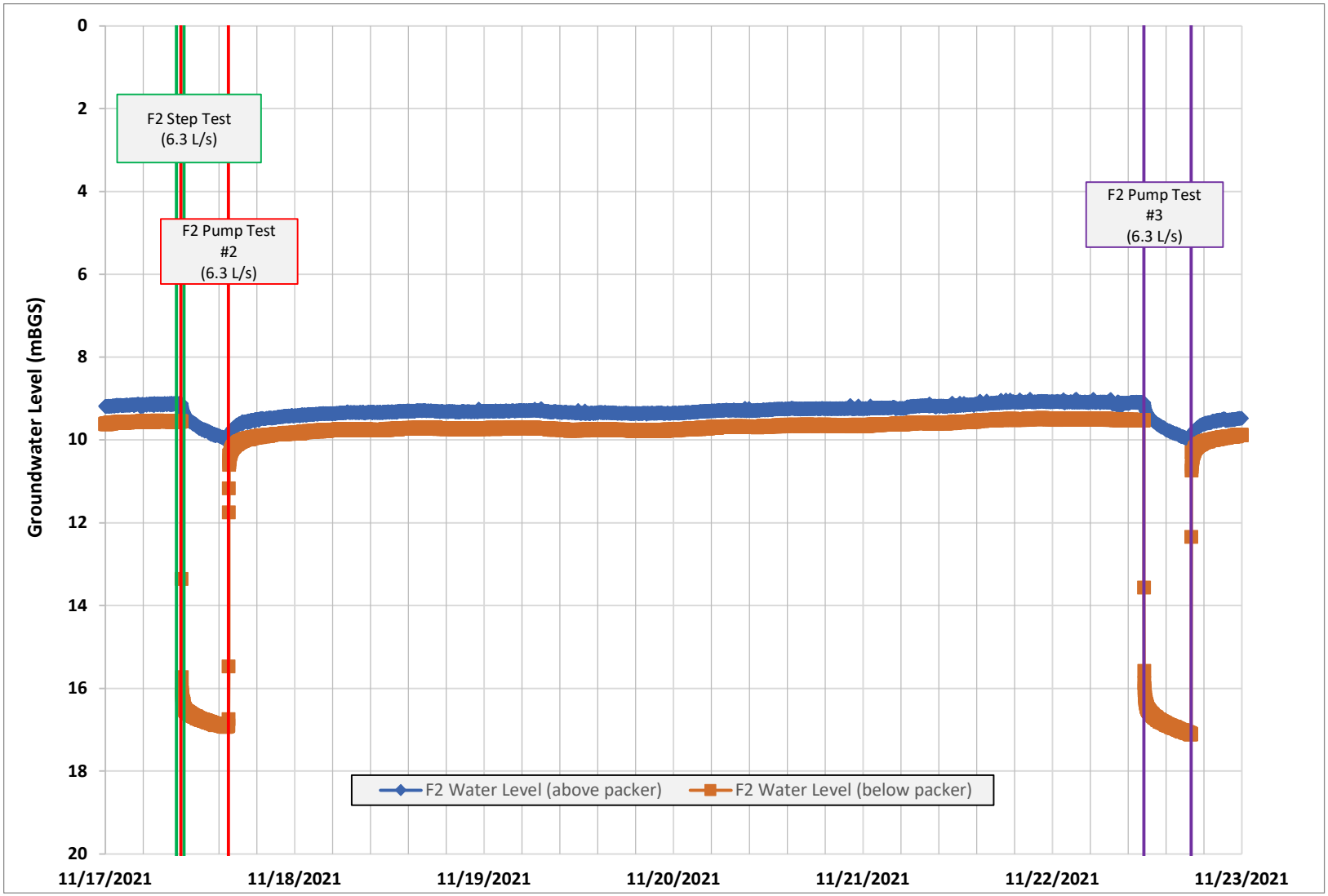
February 2023

Figure D-2



Note: well elevation is estimated from Google Earth

AECOM	**F2-T and F2 Pumping Test - Private Wells Hydrograph**	**February 2023**
		Figure D-3



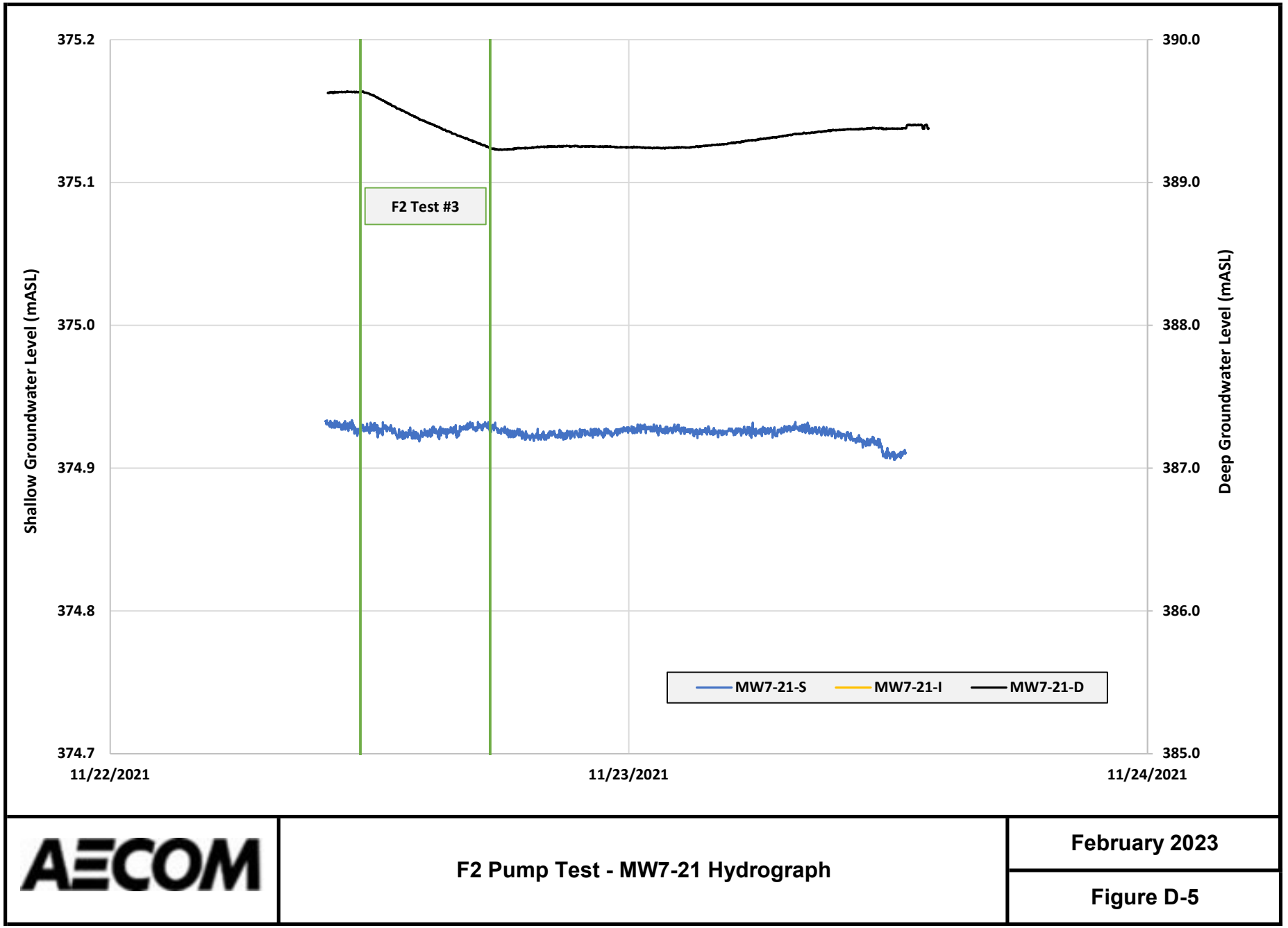
Note: packer set at 44 mBGS

AECOM

F2 Pumping Test Hydrograph

February 2023

Figure D-4

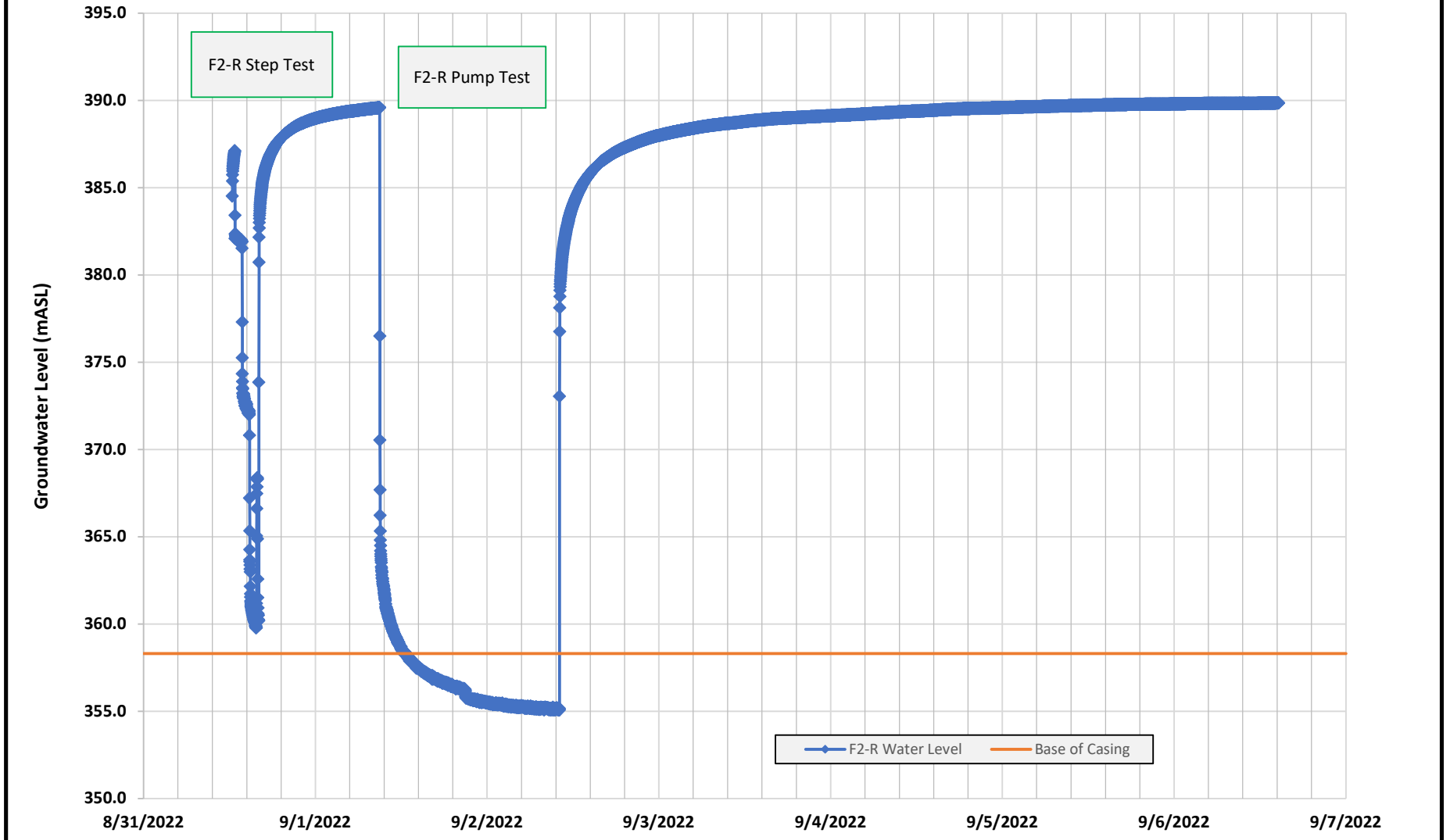


AECOM

F2 Pump Test - MW7-21 Hydrograph

February 2023

Figure D-5

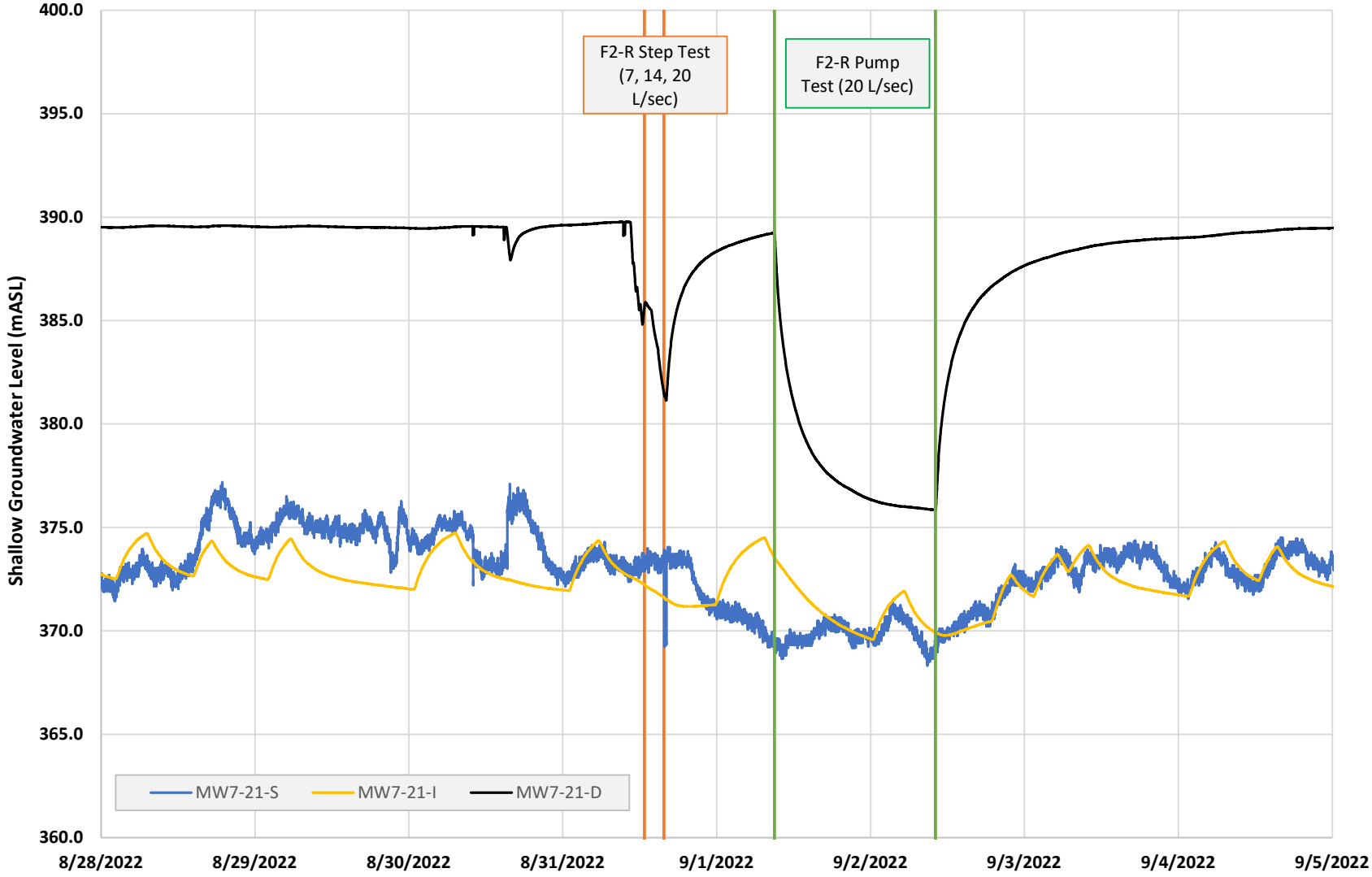


AECOM

F2-R Pumping Test Hydrograph

February 2023

Figure D-6

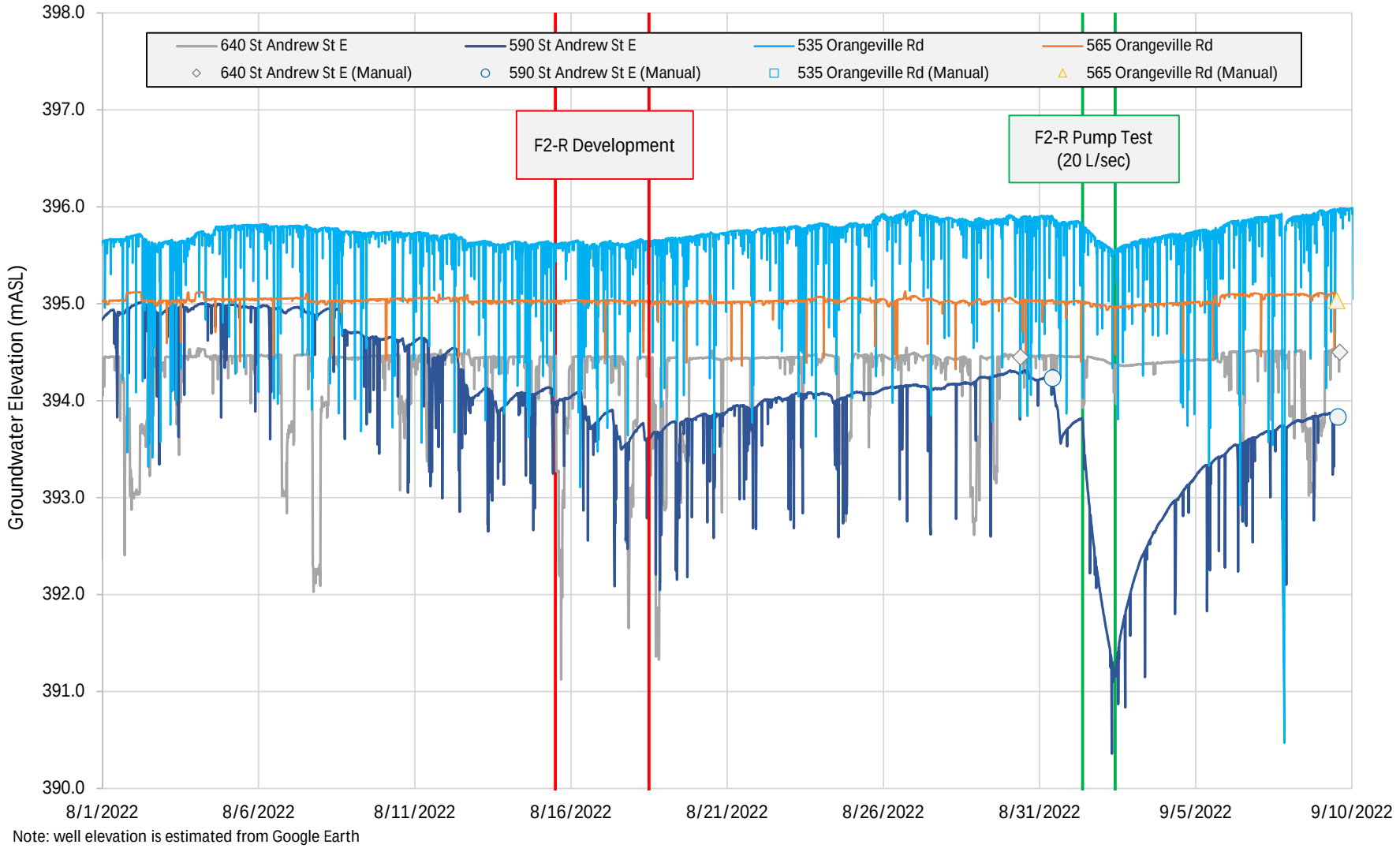


AECOM

F2-R Pump Test - MW7-21 Hydrograph

February 2023

Figure D-7



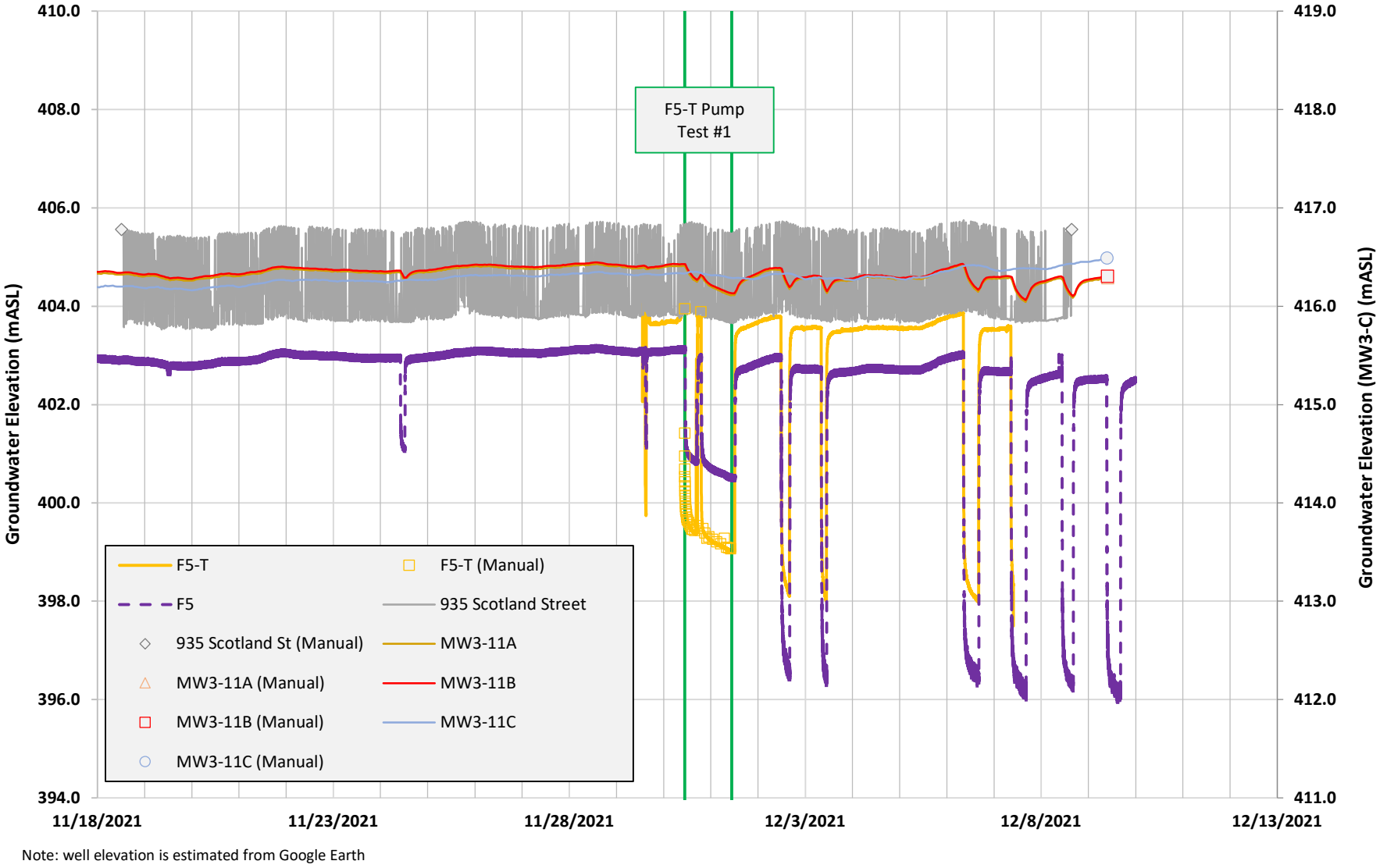
Note: well elevation is estimated from Google Earth

AECOM

F2-R Pumping Test - Private Wells Hydrograph

February 2023

Figure D-8



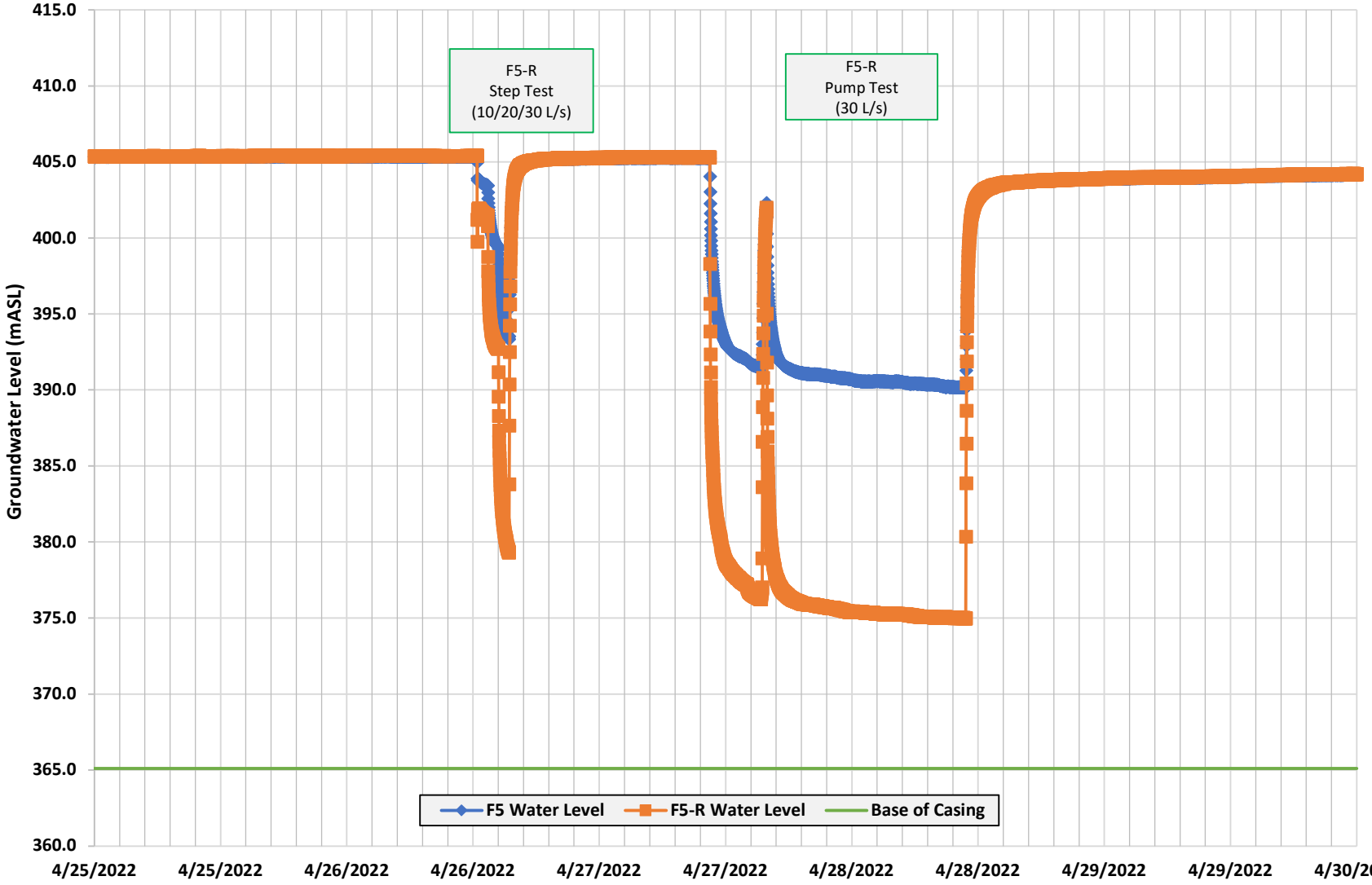
Note: well elevation is estimated from Google Earth

AECOM

F5-T Pumping Test Hydrograph

February 2023

Figure D-9

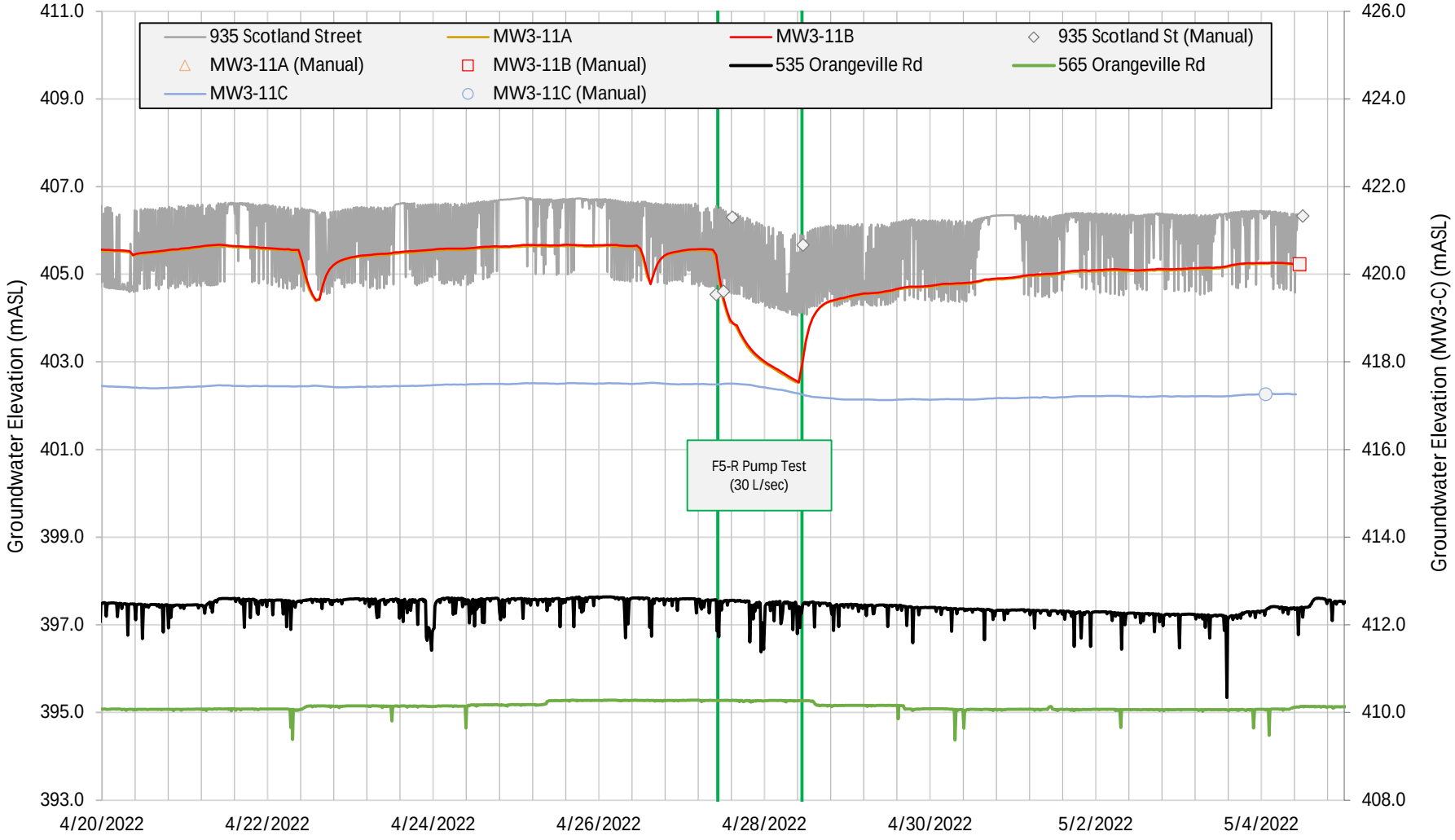


AECOM

F5-R Pumping Test Hydrograph

February 2023

Figure D-10



Note: well elevation is estimated from Google Earth

AECOM

F5-R Pumping Test Hydrograph

February 2023

Figure D-11

Appendix E

Private Well Sampling Results

AECOM Canada Ltd.
50 Sportsworld Crossing Road, Suite 290 519.650.5313 tel
Kitchener, ON, Canada N2P 0A4 519.650.3424 fax
www.aecom.com

November 22nd, 2021

[redacted]
Fergus, ON
N1M 1T9

Project No: 60664299

Regarding: Pre-Pumping Test Water Quality Testing Results
Municipal Supply Well F2 Replacement Program

Dear [redacted],

AECOM Canada Ltd. (AECOM) would like to thank you for your participation in the Pumping Test Monitoring Program offered to local residents as part of the Municipal Supply Well F2 Replacement Program. Based on receipt of permission from yourself, a sample of raw (untreated) groundwater from your private well was collected for laboratory analysis by AECOM staff on October 14th, 2021. Please find attached a copy of the water quality testing results for your review and record.

Laboratory testing results for the sample obtained indicate that concentrations of certain parameters, as shown in the table below, are in excess of the *Ontario Drinking Water Standards, Objectives and Guidelines* (Ontario Ministry of the Environment, 2006). It should be noted, however, that these results are based on a single sample analysis and that additional testing is recommended.

The Ministry guidelines include the following three types of standards:

- Maximum Acceptable Concentration (MAC): Established for parameters known or suspected of having adverse health effects, when present above a specified concentration.
- Aesthetic Objective (AO): Established for parameters that may impair the taste, odour or colour of water, or which may interfere with good water quality control practices.
- Operational Guideline (OG): Established for parameters that, if not controlled, may negatively effect the efficient and effective treatment, disinfection and distribution of the water.

PARAMETER	CONCENTRATION IN YOUR WATER	STANDARD VALUE / RANGE	STANDARD TYPE	HEALTH RELATED (Y / N)
Total Dissolved Solids	517 mg/L	500 mg/L	AO	N
Sodium	55.6 mg/L	200 (20) mg/L	AO	N
Hardness (as $CaCO_3$)	379 mg/L	80 to 100 mg/L	OG	N

NOTE: AO – Aesthetic Objective; OG – Operational Guideline.

The presence of sodium in your raw (untreated) drinking water, although reported to be below the ODWQS Aesthetic Objective of 200 mg/L, was found to be in excess of 20 mg/L, and thus should be considered as a source for any consumers who may be on a sodium-restricted diet.

For your information, the *Well Aware Booklet – A Guide To Caring For Your Well* created by Green Communities Canada is available on the Walkerton Clean Water Centre (WCWC) website at:

https://wcwc.ca/well-aware-and-well-wise-program-resources-for-homeowners/

If you have any further questions, please contact:

AECOM Canada Ltd. C/O Matthew Alexander, M.Sc., P.Geo.
Manager, Hydrogeology
Telephone: 226-821-4906
Email: matthew.alexander@aecom.com

Sincerely,
AECOM Canada Ltd.



Matthew Alexander, M.Sc., P.Geo.
Manager, Hydrogeology
DCS Americas, Canada Region (Ontario)
Environment

Encl.

cc: Jason Murchison – AECOM;
Adam Gilmore – Township of Centre Wellington

TOWNSHIP OF CENTRE WELLINGTON
ATTN: Matthew Alexander c/o Centre Wellington
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4

Date Received: 14-OCT-21
Report Date: 26-OCT-21 14:13 (MT)
Version: FINAL

Client Phone: 226-821-4906

Certificate of Analysis

Lab Work Order #: L2651210

Project P.O. #: NOT SUBMITTED
Job Reference: BK333359
C of C Numbers: 20-896345
Legal Site Desc:

Candice Hunter
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits			
[redacted]										
L2651210-2	140 TOM ST.									
Sampled By:	CLIENT on 14-OCT-21 @ 10:30									
Matrix:	WATER						#1	#2		
Physical Tests										
	Colour, Apparent	2.6		2.0	CU	15-OCT-21		5		
	Conductivity	950		3.0	umhos/cm	16-OCT-21				
	pH	7.51		0.10	pH units	16-OCT-21		6.5-8.5		
	Total Dissolved Solids	517	DLDS	20	mg/L	17-OCT-21		*500		
	Turbidity	<0.10		0.10	NTU	15-OCT-21		5		
Anions and Nutrients										
	Alkalinity, Bicarbonate (as CaCO3)	311		1.0	mg/L	16-OCT-21				
	Alkalinity, Carbonate (as CaCO3)	<1.0		1.0	mg/L	16-OCT-21				
	Alkalinity, Hydroxide (as CaCO3)	<1.0		1.0	mg/L	16-OCT-21				
	Alkalinity, Total (as CaCO3)	311		1.0	mg/L	16-OCT-21		30-500		
	Ammonia, Total (as N)	<0.010		0.010	mg/L	18-OCT-21				
	Bromide (Br)	<0.10		0.10	mg/L	18-OCT-21				
	Chloride (Cl)	99.4		0.50	mg/L	18-OCT-21		250		
	Computed Conductivity	843			uS/cm	19-OCT-21				
	Conductivity % Difference	-12			%	19-OCT-21				
	Fluoride (F)	0.12		0.10	mg/L	18-OCT-21	1.5			
	Hardness (as CaCO3)	379			mg/L	19-OCT-21		*80-100		
	Ion Balance	116			%	19-OCT-21				
	Langelier Index	1			No Unit	19-OCT-21				
	Nitrate (as N)	2.33		0.020	mg/L	18-OCT-21	10			
	Nitrite (as N)	<0.010		0.010	mg/L	18-OCT-21	1			
	Saturation pH	6.96			pH	19-OCT-21				
	Orthophosphate-Dissolved (as P)	0.0035		0.0030	mg/L	18-OCT-21				
	TDS (Calculated)	517			mg/L	19-OCT-21				
	Sulfate (SO4)	28.7		0.30	mg/L	18-OCT-21		500		
	Anion Sum	8.68			me/L	19-OCT-21				
	Cation Sum	10.0			me/L	19-OCT-21				
	Cation - Anion Balance	7			%	19-OCT-21				
Inorganic Parameters										
	Silica	10700		2100	mg/L	14-OCT-21				
Bacteriological Tests										
	E. Coli	0		0	CFU/100mL	15-OCT-21	0			
	Total Coliform Background	0		0	CFU/100mL	15-OCT-21				
	Total Coliforms	0		0	CFU/100mL	15-OCT-21	0			
Metals										

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Drinking Water Regulation (ODWQS) JAN.1,2020 = [Suite] - ON-DW-STANDARD+GUIDELINES

#1: Schedule 1 (Microbiological) and 2 (Chemical) Standards (JAN,2020) **#2: Ontario DW Aesthetic and Operational Guidelines (June, 2006)**

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	Guideline Limits #2
L2651210-2	140 TOM ST.							
Sampled By:	CLIENT on 14-OCT-21 @ 10:30							
Matrix:	WATER							
Metals								
	Sodium Adsorption Ratio	1.24		0.10	SAR	18-OCT-21		
Total Metals								
	Aluminum (Al)	<10		10	ug/L	18-OCT-21		100
	Antimony (Sb)	<0.60		0.60	ug/L	18-OCT-21	6	
	Arsenic (As)	<1.0		1.0	ug/L	18-OCT-21	10.0	
	Barium (Ba)	51		10	ug/L	18-OCT-21	1000	
	Beryllium (Be)	<0.50		0.50	ug/L	18-OCT-21		
	Bismuth (Bi)	<1.0		1.0	ug/L	18-OCT-21		
	Boron (B)	<50		50	ug/L	18-OCT-21	5000	
	Cadmium (Cd)	0.12		0.10	ug/L	18-OCT-21	5	
	Calcium (Ca)	107		0.50	mg/L	18-OCT-21		
	Cesium (Cs)	<0.10		0.10	ug/L	18-OCT-21		
	Chromium (Cr)	<1.0		1.0	ug/L	18-OCT-21	50	
	Cobalt (Co)	<0.50		0.50	ug/L	18-OCT-21		
	Copper (Cu)	61.8		1.0	ug/L	18-OCT-21		1000
	Iron (Fe)	<50		50	ug/L	18-OCT-21		300
	Lead (Pb)	2.4		1.0	ug/L	18-OCT-21	10	
	Lithium (Li)	<100		100	ug/L	18-OCT-21		
	Magnesium (Mg)	27.2		0.50	mg/L	18-OCT-21		
	Manganese (Mn)	<1.0		1.0	ug/L	18-OCT-21		50
	Molybdenum (Mo)	<0.50		0.50	ug/L	18-OCT-21		
	Nickel (Ni)	1.5		1.0	ug/L	18-OCT-21		
	Phosphorus (P)	<0.050		0.050	mg/L	18-OCT-21		
	Potassium (K)	2.1		1.0	mg/L	18-OCT-21		
	Rubidium (Rb)	<2.0		2.0	ug/L	18-OCT-21		
	Selenium (Se)	<1.0		1.0	ug/L	18-OCT-21	50	
	Silicon (Si)	5000		1000	ug/L	18-OCT-21		
	Silver (Ag)	<0.050		0.050	ug/L	18-OCT-21		
	Sodium (Na)	55.6		0.50	mg/L	18-OCT-21	*20	200
	Strontium (Sr)	531		1.0	ug/L	18-OCT-21		
	Sulfur (S)	10700		500	ug/L	18-OCT-21		
	Tellurium (Te)	<2.0		2.0	ug/L	18-OCT-21		
	Thallium (Tl)	<0.060		0.060	ug/L	18-OCT-21		
	Thorium (Th)	<1.0		1.0	ug/L	18-OCT-21		
	Tin (Sn)	<1.0		1.0	ug/L	18-OCT-21		
	Titanium (Ti)	<2.0		2.0	ug/L	18-OCT-21		
	Tungsten (W)	<6.0		6.0	ug/L	18-OCT-21		
	Uranium (U)	<2.0		2.0	ug/L	18-OCT-21	20	
	Vanadium (V)	<0.50		0.50	ug/L	18-OCT-21		
	Zinc (Zn)	126		3.0	ug/L	18-OCT-21		5000
	Zirconium (Zr)	<0.80		0.80	ug/L	18-OCT-21		
Volatile Organic Compounds								
	Benzene	<0.50		0.50	ug/L	19-OCT-21	1	
	Carbon tetrachloride	<0.20		0.20	ug/L	19-OCT-21	2	
	Monochlorobenzene	<0.50		0.50	ug/L	19-OCT-21	80	30
	1,2-Dichlorobenzene	<0.50		0.50	ug/L	19-OCT-21	200	3
	1,4-Dichlorobenzene	<0.50		0.50	ug/L	19-OCT-21	5	1

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Drinking Water Regulation (ODWQS) JAN.1,2020 = [Suite] - ON-DW-STANDARD+GUIDELINES

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Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	Guideline Limits #2
L2651210-2 140 TOM ST.							
Sampled By: CLIENT on 14-OCT-21 @ 10:30							
Matrix: WATER							
Volatile Organic Compounds							
1,2-Dichloroethane	<0.50		0.50	ug/L	19-OCT-21	5	
1,1-dichloroethylene (vinylidene chlorid	<0.50		0.50	ug/L	19-OCT-21	14	
Dichloromethane	<5.0		5.0	ug/L	19-OCT-21	50	
Ethylbenzene	<0.50		0.50	ug/L	19-OCT-21	140	2.4
Tetrachloroethylene (perchloroethylene)	<0.50		0.50	ug/L	19-OCT-21	10	
Toluene	<0.50		0.50	ug/L	19-OCT-21	60	24
Trichloroethylene	<0.50		0.50	ug/L	19-OCT-21	5	
Vinyl chloride	<0.20		0.20	ug/L	19-OCT-21	1	
o-xylene	<0.50		0.50	ug/L	19-OCT-21		
m/p-xylene	<1.0		1.0	ug/L	19-OCT-21		
Xylenes (Total)	<1.5		1.5	ug/L	19-OCT-21	90	300
Surrogate: 4-Bromofluorobenzene	98.0		70-130	%	19-OCT-21		
Surrogate: 1,4-Difluorobenzene	100.5		70-130	%	19-OCT-21		
[redacted]							

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Drinking Water Regulation (ODWQS) JAN.1,2020 = [Suite] - ON-DW-STANDARD+GUIDELINES

#1: Schedule 1 (Microbiological) and 2 (Chemical) Standards (JAN,2020) **#2: Ontario DW Aesthetic and Operational Guidelines (June, 2006)**

AECOM Canada Ltd.
50 Sportsworld Crossing Road, Suite 290 519.650.5313 tel
Kitchener, ON, Canada N2P 0A4 519.650.3424 fax
www.aecom.com

November 22nd, 2021

[redacted]
Fergus, ON
N1M 1T9

Project No: 60664299

Regarding: Pre-Pumping Test Water Quality Testing Results
Municipal Supply Well F2 Replacement Program

Dear [redacted],

AECOM Canada Ltd. (AECOM) would like to thank you for your participation in the Pumping Test Monitoring Program offered to local residents as part of the Municipal Supply Well F2 Replacement Program. Based on receipt of permission from yourself, a sample of raw (untreated) groundwater from your private well was collected for laboratory analysis by AECOM staff on October 14th, 2021. Please find attached a copy of the water quality testing results for your review and record.

Laboratory testing results for the sample obtained indicate that concentrations of certain parameters, as shown in the table below, are in excess of the *Ontario Drinking Water Standards, Objectives and Guidelines* (Ontario Ministry of the Environment, 2006). It should be noted, however, that these results are based on a single sample analysis and that additional testing is recommended.

The Ministry guidelines include the following three types of standards:

- Maximum Acceptable Concentration (MAC): Established for parameters known or suspected of having adverse health effects, when present above a specified concentration.
- Aesthetic Objective (AO): Established for parameters that may impair the taste, odour or colour of water, or which may interfere with good water quality control practices.
- Operational Guideline (OG): Established for parameters that, if not controlled, may negatively effect the efficient and effective treatment, disinfection and distribution of the water.

PARAMETER	CONCENTRATION IN YOUR WATER	STANDARD VALUE / RANGE	STANDARD TYPE	HEALTH RELATED (Y / N)
Nitrate (as N)	14.3 mg/L	10 mg/L	MAC	Y
Total Dissolved Solids	840 mg/L	500 mg/L	AO	N
Sodium	139 mg/L	200 (20) mg/L	AO	N
Hardness (as $CaCO_3$)	461 mg/L	80 to 100 mg/L	OG	N

NOTE: MAC – Maximum Acceptable Concentration; AO – Aesthetic Objective; OG – Operational Guideline.

As discussed in person with yourself on October 27th, 2021, following receipt of the water quality testing results, the presence of nitrate in your drinking water may represent an immediate health concern. It is recommended that you discuss this exceedance with your Local Public Health Unit:

Wellington-Dufferin-Guelph Public Health
160 Chancellors Way
Guelph, ON N1G 0E1
Website: www.wdgpublichealth.ca / Telephone: 1-800-265-7293

The presence of sodium in your raw (untreated) drinking water, although reported to be below the ODWQS Aesthetic Objective of 200 mg/L, was found to be in excess of 20 mg/L, and thus should be considered as a source for any consumers who may be on a sodium-restricted diet.

For your information, the *Well Aware Booklet – A Guide To Caring For Your Well* created by Green Communities Canada is available on the Walkerton Clean Water Centre (WCWC) website at:

https://wcwc.ca/well-aware-and-well-wise-program-resources-for-homeowners/

If you have any further questions, please contact:

AECOM Canada Ltd. C/O Matthew Alexander, M.Sc., P.Geo.
Manager, Hydrogeology
Telephone: 226-821-4906
Email: matthew.alexander@aecom.com

Sincerely,
AECOM Canada Ltd.



Matthew Alexander, M.Sc., P.Geo.
Manager, Hydrogeology
DCS Americas, Canada Region (Ontario)
Environment

Encl.

cc: Jason Murchison – AECOM;
Adam Gilmore – Township of Centre Wellington

TOWNSHIP OF CENTRE WELLINGTON
ATTN: Matthew Alexander c/o Centre Wellington
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4

Date Received: 14-OCT-21
Report Date: 26-OCT-21 14:13 (MT)
Version: FINAL

Client Phone: 226-821-4906

Certificate of Analysis

Lab Work Order #: L2651210

Project P.O. #: NOT SUBMITTED
Job Reference: BK333359
C of C Numbers: 20-896345
Legal Site Desc:

Candice Hunter
Account Manager

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Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	Guideline Limits #2
L2651210-4 515 ORANGEVILLE RD.							
Sampled By: CLIENT on 14-OCT-21 @ 11:40							
Matrix: WATER							
Anions and Nutrients							
Nitrate (as N)	14.3	DLDS	0.10	mg/L	18-OCT-21	*10	
Nitrite (as N)	<0.050	DLDS	0.050	mg/L	18-OCT-21	1	
Saturation pH	6.87			pH	19-OCT-21		
Orthophosphate-Dissolved (as P)	0.075	DLHC	0.012	mg/L	18-OCT-21		
TDS (Calculated)	854			mg/L	19-OCT-21		
Sulfate (SO4)	41.3	DLDS	1.5	mg/L	18-OCT-21		500
Anion Sum	14.2			me/L	19-OCT-21		
Cation Sum	15.4			me/L	19-OCT-21		
Cation - Anion Balance	4			%	19-OCT-21		
Inorganic Parameters							
Silica	7900		2100	mg/L	14-OCT-21		
Bacteriological Tests							
E. Coli	0		0	CFU/100mL	15-OCT-21	0	
Total Coliform Background	0		0	CFU/100mL	15-OCT-21		
Total Coliforms	0		0	CFU/100mL	15-OCT-21	0	
Metals							
Sodium Adsorption Ratio	2.83		0.10	SAR	18-OCT-21		
Total Metals							
Aluminum (Al)	<10		10	ug/L	18-OCT-21		100
Antimony (Sb)	<0.60		0.60	ug/L	18-OCT-21	6	
Arsenic (As)	<1.0		1.0	ug/L	18-OCT-21	10.0	
Barium (Ba)	42		10	ug/L	18-OCT-21	1000	
Beryllium (Be)	<0.50		0.50	ug/L	18-OCT-21		
Bismuth (Bi)	<1.0		1.0	ug/L	18-OCT-21		
Boron (B)	91		50	ug/L	18-OCT-21	5000	
Cadmium (Cd)	<0.10		0.10	ug/L	18-OCT-21	5	
Calcium (Ca)	131		0.50	mg/L	18-OCT-21		
Cesium (Cs)	<0.10		0.10	ug/L	18-OCT-21		
Chromium (Cr)	<1.0		1.0	ug/L	18-OCT-21	50	
Cobalt (Co)	<0.50		0.50	ug/L	18-OCT-21		
Copper (Cu)	278		1.0	ug/L	18-OCT-21		1000
Iron (Fe)	<50		50	ug/L	18-OCT-21		300
Lead (Pb)	1.2		1.0	ug/L	18-OCT-21	10	
Lithium (Li)	<100		100	ug/L	18-OCT-21		
Magnesium (Mg)	32.3		0.50	mg/L	18-OCT-21		
Manganese (Mn)	1.8		1.0	ug/L	18-OCT-21		50
Molybdenum (Mo)	<0.50		0.50	ug/L	18-OCT-21		
Nickel (Ni)	2.5		1.0	ug/L	18-OCT-21		
Phosphorus (P)	0.105		0.050	mg/L	18-OCT-21		
Potassium (K)	5.3		1.0	mg/L	18-OCT-21		
Rubidium (Rb)	<2.0		2.0	ug/L	18-OCT-21		
Selenium (Se)	<1.0		1.0	ug/L	18-OCT-21	50	
Silicon (Si)	3700		1000	ug/L	18-OCT-21		
Silver (Ag)	<0.050		0.050	ug/L	18-OCT-21		

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Ontario Drinking Water Regulation (ODWQS) JAN.1,2020 = [Suite] - ON-DW-STANDARD+GUIDELINES

#1: Schedule 1 (Microbiological) and 2 (Chemical) Standards (JAN,2020) **#2: Ontario DW Aesthetic and Operational Guidelines (June, 2006)**

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	Guideline Limits #2
L2651210-4 515 ORANGEVILLE RD.							
Sampled By: CLIENT on 14-OCT-21 @ 11:40							
Matrix: WATER							
Total Metals							
Sodium (Na)	139	DLHC	5.0	mg/L	18-OCT-21	*20	200
Strontium (Sr)	517		1.0	ug/L	18-OCT-21		
Sulfur (S)	15400		500	ug/L	18-OCT-21		
Tellurium (Te)	<2.0		2.0	ug/L	18-OCT-21		
Thallium (Tl)	<0.060		0.060	ug/L	18-OCT-21		
Thorium (Th)	<1.0		1.0	ug/L	18-OCT-21		
Tin (Sn)	<1.0		1.0	ug/L	18-OCT-21		
Titanium (Ti)	<2.0		2.0	ug/L	18-OCT-21		
Tungsten (W)	<6.0		6.0	ug/L	18-OCT-21		
Uranium (U)	<2.0		2.0	ug/L	18-OCT-21	20	
Vanadium (V)	<0.50		0.50	ug/L	18-OCT-21		
Zinc (Zn)	62.7		3.0	ug/L	18-OCT-21		5000
Zirconium (Zr)	<0.80		0.80	ug/L	18-OCT-21		
Volatile Organic Compounds							
Benzene	<0.50		0.50	ug/L	19-OCT-21	1	
Carbon tetrachloride	<0.20		0.20	ug/L	19-OCT-21	2	
Monochlorobenzene	<0.50		0.50	ug/L	19-OCT-21	80	30
1,2-Dichlorobenzene	<0.50		0.50	ug/L	19-OCT-21	200	3
1,4-Dichlorobenzene	<0.50		0.50	ug/L	19-OCT-21	5	1
1,2-Dichloroethane	<0.50		0.50	ug/L	19-OCT-21	5	
1,1-dichloroethylene (vinylidene chlorid	<0.50		0.50	ug/L	19-OCT-21	14	
Dichloromethane	<5.0		5.0	ug/L	19-OCT-21	50	
Ethylbenzene	<0.50		0.50	ug/L	19-OCT-21	140	2.4
Tetrachloroethylene (perchloroethylene)	<0.50		0.50	ug/L	19-OCT-21	10	
Toluene	<0.50		0.50	ug/L	19-OCT-21	60	24
Trichloroethylene	<0.50		0.50	ug/L	19-OCT-21	5	
Vinyl chloride	<0.20		0.20	ug/L	19-OCT-21	1	
o-xylene	<0.50		0.50	ug/L	19-OCT-21		
m/p-xylene	<1.0		1.0	ug/L	19-OCT-21		
Xylenes (Total)	<1.5		1.5	ug/L	19-OCT-21	90	300
Surrogate: 4-Bromofluorobenzene	102.7		70-130	%	19-OCT-21		
Surrogate: 1,4-Difluorobenzene	101.6		70-130	%	19-OCT-21		

[redacted]

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Ontario Drinking Water Regulation (ODWQS) JAN.1,2020 = [Suite] - ON-DW-STANDARD+GUIDELINES

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AECOM Canada Ltd.
50 Sportsworld Crossing Road, Suite 290 519.650.5313 tel
Kitchener, ON, Canada N2P 0A4 519.650.3424 fax
www.aecom.com

November 22nd, 2021

[redacted]
Fergus, ON
N1M 1T9

Project No: 60664299

Regarding: Pre-Pumping Test Water Quality Testing Results
Municipal Supply Well F2 Replacement Program

Dear [redacted]

AECOM Canada Ltd. (AECOM) would like to thank you for your participation in the Pumping Test Monitoring Program offered to local residents as part of the Municipal Supply Well F2 Replacement Program. Based on receipt of permission from yourself, a sample of raw (untreated) groundwater from your private well was collected for laboratory analysis by AECOM staff on October 14th, 2021. Please find attached a copy of the water quality testing results for your review and record.

Laboratory testing results for the sample obtained indicate that concentrations of certain parameters, as shown in the table below, are in excess of the *Ontario Drinking Water Standards, Objectives and Guidelines* (Ontario Ministry of the Environment, 2006). It should be noted, however, that these results are based on a single sample analysis and that additional testing is recommended.

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- Operational Guideline (OG): Established for parameters that, if not controlled, may negatively effect the efficient and effective treatment, disinfection and distribution of the water.

PARAMETER	CONCENTRATION IN YOUR WATER	STANDARD VALUE / RANGE	STANDARD TYPE	HEALTH RELATED (Y / N)
Colour, apparent	5.1 CU	5 CU	AO	N
Turbidity	8.39 NTU	5 NTU	AO	N
Iron	0.884 mg/L	0.3 mg/L	AO	N
Sodium	42.9 mg/L	200 (20) mg/L	AO	N
Hardness (as $CaCO_3$)	351 mg/L	80 to 100 mg/L	OG	N

NOTE: AO – Aesthetic Objective; OG – Operational Guideline.

The presence of sodium in your raw (untreated) drinking water, although reported to be below the ODWQS Aesthetic Objective of 200 mg/L, was found to be in excess of 20 mg/L, and thus should be considered as a source for any consumers who may be on a sodium-restricted diet.

For your information, the *Well Aware Booklet – A Guide To Caring For Your Well* created by Green Communities Canada is available on the Walkerton Clean Water Centre (WCWC) website at:

https://wcwc.ca/well-aware-and-well-wise-program-resources-for-homeowners/

If you have any further questions, please contact:

AECOM Canada Ltd. C/O Matthew Alexander, M.Sc., P.Geo.
Manager, Hydrogeology
Telephone: 226-821-4906
Email: matthew.alexander@aecom.com

Sincerely,
AECOM Canada Ltd.



Matthew Alexander, M.Sc., P.Geo.
Manager, Hydrogeology
DCS Americas, Canada Region (Ontario)
Environment

Encl.

cc: Jason Murchison – AECOM;
Adam Gilmore – Township of Centre Wellington

TOWNSHIP OF CENTRE WELLINGTON
ATTN: Matthew Alexander c/o Centre Wellington
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4

Date Received: 14-OCT-21
Report Date: 26-OCT-21 14:13 (MT)
Version: FINAL

Client Phone: 226-821-4906

Certificate of Analysis

Lab Work Order #: L2651210

Project P.O. #: NOT SUBMITTED
Job Reference: BK333359
C of C Numbers: 20-896345
Legal Site Desc:

Candice Hunter
Account Manager

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Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	Guideline Limits #2
L2651210-1	590 ST. ANDREW ST. E.							
Sampled By:	CLIENT on 14-OCT-21 @ 09:40							
Matrix:	WATER							
Physical Tests								
	Colour, Apparent	5.1		2.0	CU	15-OCT-21		*5
	Conductivity	838		3.0	umhos/cm	16-OCT-21		
	pH	7.60		0.10	pH units	16-OCT-21		6.5-8.5
	Total Dissolved Solids	460	DLDS	20	mg/L	17-OCT-21		500
	Turbidity	8.39		0.10	NTU	15-OCT-21		*5
Anions and Nutrients								
	Alkalinity, Bicarbonate (as CaCO3)	297		1.0	mg/L	16-OCT-21		
	Alkalinity, Carbonate (as CaCO3)	<1.0		1.0	mg/L	16-OCT-21		
	Alkalinity, Hydroxide (as CaCO3)	<1.0		1.0	mg/L	16-OCT-21		
	Alkalinity, Total (as CaCO3)	297		1.0	mg/L	16-OCT-21		30-500
	Ammonia, Total (as N)	0.176		0.010	mg/L	18-OCT-21		
	Bromide (Br)	<0.10		0.10	mg/L	18-OCT-21		
	Chloride (Cl)	74.3		0.50	mg/L	18-OCT-21		250
	Computed Conductivity	747			uS/cm	19-OCT-21		
	Conductivity % Difference	-11			%	19-OCT-21		
	Fluoride (F)	0.49		0.10	mg/L	18-OCT-21	1.5	
	Hardness (as CaCO3)	351			mg/L	19-OCT-21		*80-100
	Ion Balance	116			%	19-OCT-21		
	Langelier Index	1			No Unit	19-OCT-21		
	Nitrate (as N)	<0.020		0.020	mg/L	18-OCT-21	10	
	Nitrite (as N)	<0.010		0.010	mg/L	18-OCT-21	1	
	Saturation pH	7.03			pH	19-OCT-21		
	Orthophosphate-Dissolved (as P)	<0.0030		0.0030	mg/L	18-OCT-21		
	TDS (Calculated)	452			mg/L	19-OCT-21		
	Sulfate (SO4)	32.4		0.30	mg/L	18-OCT-21		500
	Anion Sum	7.69			me/L	19-OCT-21		
	Cation Sum	8.94			me/L	19-OCT-21		
	Cation - Anion Balance	8			%	19-OCT-21		
Inorganic Parameters								
	Silica	12700		2100	mg/L	14-OCT-21		
Bacteriological Tests								
	E. Coli	0		0	CFU/100mL	15-OCT-21	0	
	Total Coliform Background	0		0	CFU/100mL	15-OCT-21		
	Total Coliforms	0		0	CFU/100mL	15-OCT-21	0	
Metals								
	Sodium Adsorption Ratio	1.00		0.10	SAR	18-OCT-21		
Total Metals								
	Aluminum (Al)	<10		10	ug/L	18-OCT-21		100
	Antimony (Sb)	<0.60		0.60	ug/L	18-OCT-21	6	
	Arsenic (As)	1.5		1.0	ug/L	18-OCT-21	10.0	
	Barium (Ba)	73		10	ug/L	18-OCT-21	1000	
	Beryllium (Be)	<0.50		0.50	ug/L	18-OCT-21		
	Bismuth (Bi)	<1.0		1.0	ug/L	18-OCT-21		
	Boron (B)	<50		50	ug/L	18-OCT-21	5000	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
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Ontario Drinking Water Regulation (ODWQS) JAN.1,2020 = [Suite] - ON-DW-STANDARD+GUIDELINES

#1: Schedule 1 (Microbiological) and 2 (Chemical) Standards (JAN,2020) **#2: Ontario DW Aesthetic and Operational Guidelines (June, 2006)**

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	Guideline Limits #2
L2651210-1 590 ST. ANDREW ST. E.							
Sampled By: CLIENT on 14-OCT-21 @ 09:40							
Matrix: WATER							
Total Metals							
Cadmium (Cd)	<0.10		0.10	ug/L	18-OCT-21	5	
Calcium (Ca)	92.3		0.50	mg/L	18-OCT-21		
Cesium (Cs)	<0.10		0.10	ug/L	18-OCT-21		
Chromium (Cr)	<1.0		1.0	ug/L	18-OCT-21	50	
Cobalt (Co)	<0.50		0.50	ug/L	18-OCT-21		
Copper (Cu)	1.9		1.0	ug/L	18-OCT-21		1000
Iron (Fe)	884		50	ug/L	18-OCT-21		*300
Lead (Pb)	10.0		1.0	ug/L	18-OCT-21	10	
Lithium (Li)	<100		100	ug/L	18-OCT-21		
Magnesium (Mg)	29.2		0.50	mg/L	18-OCT-21		
Manganese (Mn)	17.2		1.0	ug/L	18-OCT-21		50
Molybdenum (Mo)	1.24		0.50	ug/L	18-OCT-21		
Nickel (Ni)	1.4		1.0	ug/L	18-OCT-21		
Phosphorus (P)	<0.050		0.050	mg/L	18-OCT-21		
Potassium (K)	2.1		1.0	mg/L	18-OCT-21		
Rubidium (Rb)	<2.0		2.0	ug/L	18-OCT-21		
Selenium (Se)	<1.0		1.0	ug/L	18-OCT-21	50	
Silicon (Si)	5900		1000	ug/L	18-OCT-21		
Silver (Ag)	<0.050		0.050	ug/L	18-OCT-21		
Sodium (Na)	42.9		0.50	mg/L	18-OCT-21	*20	200
Strontium (Sr)	2070	DLHC	10	ug/L	18-OCT-21		
Sulfur (S)	12200		500	ug/L	18-OCT-21		
Tellurium (Te)	<2.0		2.0	ug/L	18-OCT-21		
Thallium (Tl)	<0.060		0.060	ug/L	18-OCT-21		
Thorium (Th)	<1.0		1.0	ug/L	18-OCT-21		
Tin (Sn)	<1.0		1.0	ug/L	18-OCT-21		
Titanium (Ti)	<2.0		2.0	ug/L	18-OCT-21		
Tungsten (W)	<6.0		6.0	ug/L	18-OCT-21		
Uranium (U)	<2.0		2.0	ug/L	18-OCT-21	20	
Vanadium (V)	<0.50		0.50	ug/L	18-OCT-21		
Zinc (Zn)	71.0		3.0	ug/L	18-OCT-21		5000
Zirconium (Zr)	<0.80		0.80	ug/L	18-OCT-21		
Volatile Organic Compounds							
Benzene	<0.50		0.50	ug/L	19-OCT-21	1	
Carbon tetrachloride	<0.20		0.20	ug/L	19-OCT-21	2	
Monochlorobenzene	<0.50		0.50	ug/L	19-OCT-21	80	30
1,2-Dichlorobenzene	<0.50		0.50	ug/L	19-OCT-21	200	3
1,4-Dichlorobenzene	<0.50		0.50	ug/L	19-OCT-21	5	1
1,2-Dichloroethane	<0.50		0.50	ug/L	19-OCT-21	5	
1,1-dichloroethylene (vinylidene chlorid	<0.50		0.50	ug/L	19-OCT-21	14	
Dichloromethane	<5.0		5.0	ug/L	19-OCT-21	50	
Ethylbenzene	<0.50		0.50	ug/L	19-OCT-21	140	2.4
Tetrachloroethylene (perchloroethylene)	<0.50		0.50	ug/L	19-OCT-21	10	
Toluene	<0.50		0.50	ug/L	19-OCT-21	60	24
Trichloroethylene	<0.50		0.50	ug/L	19-OCT-21	5	
Vinyl chloride	<0.20		0.20	ug/L	19-OCT-21	1	
o-xylene	<0.50		0.50	ug/L	19-OCT-21		

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Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	Guideline Limits #2		
L2651210-1	590 ST. ANDREW ST. E.									
Sampled By:	CLIENT on 14-OCT-21 @ 09:40									
Matrix:	WATER									
Volatile Organic Compounds										
	m/p-xylene	<1.0		1.0	ug/L	19-OCT-21				
	Xylenes (Total)	<1.5		1.5	ug/L	19-OCT-21	90	300		
	Surrogate: 4-Bromofluorobenzene	101.3		70-130	%	19-OCT-21				
	Surrogate: 1,4-Difluorobenzene	100.7		70-130	%	19-OCT-21				

[redacted]

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AECOM Canada Ltd.
50 Sportsworld Crossing Road, Suite 290 519.650.5313 tel
Kitchener, ON, Canada N2P 0A4 519.650.3424 fax
www.aecom.com

November 22nd, 2021

[redacted]
Fergus, ON
N1M 1T9

Project No: 60664299

Regarding: Pre-Pumping Test Water Quality Testing Results
Municipal Supply Well F2 Replacement Program

Dear [redacted]

AECOM Canada Ltd. (AECOM) would like to thank you for your participation in the Pumping Test Monitoring Program offered to local residents as part of the Municipal Supply Well F2 Replacement Program. Based on receipt of permission from yourself, a sample of raw (untreated) groundwater from your private well was collected for laboratory analysis by AECOM staff on October 14th, 2021. Please find attached a copy of the water quality testing results for your review and record.

Laboratory testing results for the sample obtained indicate that concentrations of certain parameters, as shown in the table below, are in excess of the *Ontario Drinking Water Standards, Objectives and Guidelines* (Ontario Ministry of the Environment, 2006). It should be noted, however, that these results are based on a single sample analysis and that additional testing is recommended.

The Ministry guidelines include the following three types of standards:

- Maximum Acceptable Concentration (MAC): Established for parameters known or suspected of having adverse health effects, when present above a specified concentration.
- Aesthetic Objective (AO): Established for parameters that may impair the taste, odour or colour of water, or which may interfere with good water quality control practices.
- Operational Guideline (OG): Established for parameters that, if not controlled, may negatively effect the efficient and effective treatment, disinfection and distribution of the water.

PARAMETER	CONCENTRATION IN YOUR WATER	STANDARD VALUE / RANGE	STANDARD TYPE	HEALTH RELATED (Y / N)
Colour, apparent	5.1 CU	5 CU	AO	N
Total Dissolved Solids	563 mg/L	500 mg/L	AO	N
Manganese	0.111 mg/L	0.05 mg/L	AO	N
Sodium	77.7 mg/L	200 (20) mg/L	AO	N
Hardness (as $CaCO_3$)	385 mg/L	80 to 100 mg/L	OG	N

NOTE: AO – Aesthetic Objective; OG – Operational Guideline.

The presence of sodium in your raw (untreated) drinking water, although reported to be below the ODWQS Aesthetic Objective of 200 mg/L, was found to be in excess of 20 mg/L, and thus should be considered as a source for any consumers who may be on a sodium-restricted diet.

For your information, the *Well Aware Booklet – A Guide To Caring For Your Well* created by Green Communities Canada is available on the Walkerton Clean Water Centre (WCWC) website at:

https://wcwc.ca/well-aware-and-well-wise-program-resources-for-homeowners/

If you have any further questions, please contact:

AECOM Canada Ltd. C/O Matthew Alexander, M.Sc., P.Geo.
Manager, Hydrogeology
Telephone: 226-821-4906
Email: matthew.alexander@aecom.com

Sincerely,
AECOM Canada Ltd.



Matthew Alexander, M.Sc., P.Geo.
Manager, Hydrogeology
DCS Americas, Canada Region (Ontario)
Environment

Encl.

cc: Jason Murchison – AECOM;
Adam Gilmore – Township of Centre Wellington

TOWNSHIP OF CENTRE WELLINGTON
ATTN: Matthew Alexander c/o Centre Wellington
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4

Date Received: 14-OCT-21
Report Date: 26-OCT-21 14:13 (MT)
Version: FINAL

Client Phone: 226-821-4906

Certificate of Analysis

Lab Work Order #: L2651210

Project P.O. #: NOT SUBMITTED
Job Reference: BK333359
C of C Numbers: 20-896345
Legal Site Desc:

Candice Hunter
Account Manager

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Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits			
[redacted]										
L2651210-5	640 ST. ANDREW ST. E.									
Sampled By:	CLIENT on 14-OCT-21 @ 13:15									
Matrix:	WATER						#1	#2		
Physical Tests										
	Colour, Apparent	5.1		2.0	CU	15-OCT-21		*5		
	Conductivity	1060		3.0	umhos/cm	16-OCT-21				
	pH	7.47		0.10	pH units	16-OCT-21		6.5-8.5		
	Total Dissolved Solids	563	DLDS	20	mg/L	17-OCT-21		*500		
	Turbidity	0.14		0.10	NTU	15-OCT-21		5		
Anions and Nutrients										
	Alkalinity, Bicarbonate (as CaCO3)	333		1.0	mg/L	16-OCT-21				
	Alkalinity, Carbonate (as CaCO3)	<1.0		1.0	mg/L	16-OCT-21				
	Alkalinity, Hydroxide (as CaCO3)	<1.0		1.0	mg/L	16-OCT-21				

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Drinking Water Regulation (ODWQS) JAN.1,2020 = [Suite] - ON-DW-STANDARD+GUIDELINES

#1: Schedule 1 (Microbiological) and 2 (Chemical) Standards (JAN,2020) **#2: Ontario DW Aesthetic and Operational Guidelines (June, 2006)**

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	Guideline Limits #2
L2651210-5 640 ST. ANDREW ST. E.							
Sampled By: CLIENT on 14-OCT-21 @ 13:15							
Matrix: WATER							
Anions and Nutrients							
Alkalinity, Total (as CaCO3)	333		1.0	mg/L	16-OCT-21		30-500
Ammonia, Total (as N)	0.451		0.010	mg/L	18-OCT-21		
Bromide (Br)	<0.10		0.10	mg/L	18-OCT-21		
Chloride (Cl)	134		0.50	mg/L	18-OCT-21		250
Computed Conductivity	932			uS/cm	19-OCT-21		
Conductivity % Difference	-13			%	19-OCT-21		
Fluoride (F)	<0.10		0.10	mg/L	18-OCT-21	1.5	
Hardness (as CaCO3)	385			mg/L	19-OCT-21		*80-100
Ion Balance	116			%	19-OCT-21		
Langelier Index	1			No Unit	19-OCT-21		
Nitrate (as N)	1.55		0.020	mg/L	18-OCT-21	10	
Nitrite (as N)	<0.010		0.010	mg/L	18-OCT-21	1	
Saturation pH	6.93			pH	19-OCT-21		
Orthophosphate-Dissolved (as P)	0.0372		0.0030	mg/L	18-OCT-21		
TDS (Calculated)	571			mg/L	19-OCT-21		
Sulfate (SO4)	14.4		0.30	mg/L	18-OCT-21		500
Anion Sum	9.65			me/L	19-OCT-21		
Cation Sum	11.2			me/L	19-OCT-21		
Cation - Anion Balance	7			%	19-OCT-21		
Inorganic Parameters							
Silica	11500		2100	mg/L	14-OCT-21		
Bacteriological Tests							
E. Coli	0		0	CFU/100mL	15-OCT-21	0	
Total Coliform Background	0		0	CFU/100mL	15-OCT-21		
Total Coliforms	0		0	CFU/100mL	15-OCT-21	0	
Metals							
Sodium Adsorption Ratio	1.72		0.10	SAR	18-OCT-21		
Total Metals							
Aluminum (Al)	<10		10	ug/L	18-OCT-21		100
Antimony (Sb)	<0.60		0.60	ug/L	18-OCT-21	6	
Arsenic (As)	<1.0		1.0	ug/L	18-OCT-21	10.0	
Barium (Ba)	51		10	ug/L	18-OCT-21	1000	
Beryllium (Be)	<0.50		0.50	ug/L	18-OCT-21		
Bismuth (Bi)	<1.0		1.0	ug/L	18-OCT-21		
Boron (B)	<50		50	ug/L	18-OCT-21	5000	
Cadmium (Cd)	0.15		0.10	ug/L	18-OCT-21	5	
Calcium (Ca)	107		0.50	mg/L	18-OCT-21		
Cesium (Cs)	<0.10		0.10	ug/L	18-OCT-21		
Chromium (Cr)	<1.0		1.0	ug/L	18-OCT-21	50	
Cobalt (Co)	<0.50		0.50	ug/L	18-OCT-21		
Copper (Cu)	15.9		1.0	ug/L	18-OCT-21		1000
Iron (Fe)	<50		50	ug/L	18-OCT-21		300
Lead (Pb)	<1.0		1.0	ug/L	18-OCT-21	10	
Lithium (Li)	<100		100	ug/L	18-OCT-21		

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Drinking Water Regulation (ODWQS) JAN.1,2020 = [Suite] - ON-DW-STANDARD+GUIDELINES

#1: Schedule 1 (Microbiological) and 2 (Chemical) Standards (JAN,2020) **#2: Ontario DW Aesthetic and Operational Guidelines (June, 2006)**

Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2
L2651210-5	640 ST. ANDREW ST. E.							
Sampled By:	CLIENT on 14-OCT-21 @ 13:15							
Matrix:	WATER							
Total Metals								
	Magnesium (Mg)	28.4		0.50	mg/L	18-OCT-21		
	Manganese (Mn)	111		1.0	ug/L	18-OCT-21		*50
	Molybdenum (Mo)	<0.50		0.50	ug/L	18-OCT-21		
	Nickel (Ni)	3.0		1.0	ug/L	18-OCT-21		
	Phosphorus (P)	0.051		0.050	mg/L	18-OCT-21		
	Potassium (K)	3.3		1.0	mg/L	18-OCT-21		
	Rubidium (Rb)	<2.0		2.0	ug/L	18-OCT-21		
	Selenium (Se)	<1.0		1.0	ug/L	18-OCT-21	50	
	Silicon (Si)	5400		1000	ug/L	18-OCT-21		
	Silver (Ag)	<0.050		0.050	ug/L	18-OCT-21		
	Sodium (Na)	77.7		0.50	mg/L	18-OCT-21	*20	200
	Strontium (Sr)	387		1.0	ug/L	18-OCT-21		
	Sulfur (S)	5580		500	ug/L	18-OCT-21		
	Tellurium (Te)	<2.0		2.0	ug/L	18-OCT-21		
	Thallium (Tl)	<0.060		0.060	ug/L	18-OCT-21		
	Thorium (Th)	<1.0		1.0	ug/L	18-OCT-21		
	Tin (Sn)	<1.0		1.0	ug/L	18-OCT-21		
	Titanium (Ti)	<2.0		2.0	ug/L	18-OCT-21		
	Tungsten (W)	<6.0		6.0	ug/L	18-OCT-21		
	Uranium (U)	<2.0		2.0	ug/L	18-OCT-21	20	
	Vanadium (V)	<0.50		0.50	ug/L	18-OCT-21		
	Zinc (Zn)	36.5		3.0	ug/L	18-OCT-21		5000
	Zirconium (Zr)	<0.80		0.80	ug/L	18-OCT-21		
Volatile Organic Compounds								
	Benzene	<0.50		0.50	ug/L	19-OCT-21	1	
	Carbon tetrachloride	<0.20		0.20	ug/L	19-OCT-21	2	
	Monochlorobenzene	<0.50		0.50	ug/L	19-OCT-21	80	30
	1,2-Dichlorobenzene	<0.50		0.50	ug/L	19-OCT-21	200	3
	1,4-Dichlorobenzene	<0.50		0.50	ug/L	19-OCT-21	5	1
	1,2-Dichloroethane	<0.50		0.50	ug/L	19-OCT-21	5	
	1,1-dichloroethylene (vinylidene chlorid	<0.50		0.50	ug/L	19-OCT-21	14	
	Dichloromethane	<5.0		5.0	ug/L	19-OCT-21	50	
	Ethylbenzene	<0.50		0.50	ug/L	19-OCT-21	140	2.4
	Tetrachloroethylene (perchloroethylene)	<0.50		0.50	ug/L	19-OCT-21	10	
	Toluene	<0.50		0.50	ug/L	19-OCT-21	60	24
	Trichloroethylene	<0.50		0.50	ug/L	19-OCT-21	5	
	Vinyl chloride	<0.20		0.20	ug/L	19-OCT-21	1	
	o-xylene	<0.50		0.50	ug/L	19-OCT-21		
	m/p-xylene	<1.0		1.0	ug/L	19-OCT-21		
	Xylenes (Total)	<1.5		1.5	ug/L	19-OCT-21	90	300
	Surrogate: 4-Bromofluorobenzene	99.5		70-130	%	19-OCT-21		
	Surrogate: 1,4-Difluorobenzene	100.4		70-130	%	19-OCT-21		

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
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Ontario Drinking Water Regulation (ODWQS) JAN.1,2020 = [Suite] - ON-DW-STANDARD+GUIDELINES

#1: Schedule 1 (Microbiological) and 2 (Chemical) Standards (JAN,2020) **#2: Ontario DW Aesthetic and Operational Guidelines (June, 2006)**

AECOM Imagine it. Delivered.

AECOM Canada Ltd.
50 Sportsworld Crossing Road, Suite 290 519.650.5313 tel
Kitchener, ON, Canada N2P 0A4 519.650.3424 fax
www.aecom.com

December 16th, 2021

[redacted]
Fergus, ON
N1M 1T9

Project No: 60664299

Regarding: Pre-Pumping Test Water Quality Testing Results
Municipal Supply Well F2 Replacement Program

Dear [redacted]

AECOM Canada Ltd. (AECOM) would like to thank you for your participation in the Pumping Test Monitoring Program offered to local residents as part of the Municipal Supply Well F2 Replacement Program. Based on receipt of permission from yourself, a sample of raw (untreated) groundwater from your private well was collected for laboratory analysis by AECOM staff on November 22nd, 2021. Please find attached a copy of the water quality testing results for your review and records.

Laboratory testing results for the sample obtained indicate that concentrations of certain parameters, as shown in the table below, are in excess of the *Ontario Drinking Water Standards, Objectives and Guidelines* (Ontario Ministry of the Environment, 2006). It should be noted, however, that these results are based on a single sample analysis and that additional testing is recommended.

The Ministry guidelines include the following three types of standards:

- Maximum Acceptable Concentration (MAC): Established for parameters known or suspected of having adverse health effects, when present above a specified concentration.
- Aesthetic Objective (AO): Established for parameters that may impair the taste, odour or colour of water, or which may interfere with good water quality control practices.
- Operational Guideline (OG): Established for parameters that, if not controlled, may negatively effect the efficient and effective treatment, disinfection and distribution of the water.

PARAMETER	CONCENTRATION IN YOUR WATER	STANDARD VALUE / RANGE	STANDARD TYPE	HEALTH RELATED (Y / N)
Colour (Apparent)	7.6 CU	5 CU	AO	N
Total Dissolved Solids	1030 mg/L	500 mg/L	AO	N
Chloride	320 mg/L	250 mg/L	AO	N
Hardness (as $CaCO_3$)	468 mg/L	80 to 100 mg/L	OG	N
Nitrate (as N)	14.2 mg/L	10 mg/L	MAC	Y
Total Coliforms	96 CFU/100 mL	0 CFU/100 mL	MAC	Y
Sodium	186 mg/L	200 (20) mg/L	MAC	Y

NOTE: AO – Aesthetic Objective; OG – Operational Guideline.

As discussed in person with Ms. Dunk on December 7th, 2021, following receipt of the water quality testing results, the presence of nitrate, total coliforms and sodium in your drinking water may represent an immediate health concern. It is recommended that you discuss this exceedance with your Local Public Health Unit:

Wellington-Dufferin-Guelph Public Health
160 Chancellors Way
Guelph, ON N1G 0E1
Website: www.wdgpublichealth.ca
Telephone: 1-800-265-7293

The presence of nitrate in your raw (untreated) drinking water was found to be in excess of 10 mg/L and thus should be considered as a potential health risk to infants younger than 6 months of age.

The presence of total coliforms in your raw (untreated) drinking water can be an indication of bacterial contamination.

The presence of sodium in your raw (untreated) drinking water, although reported to be below the ODWQS Aesthetic Objective of 200 mg/L, was found to be in excess of 20 mg/L, and thus should be considered as a source for any consumers who may be on a sodium-restricted diet.

For your information, the *Well Aware Booklet – A Guide To Caring For Your Well* created by Green Communities Canada is available on the Walkerton Clean Water Centre (WCWC) website at:

https://wcwc.ca/well-aware-and-well-wise-program-resources-for-homeowners/

If you have any further questions, please contact:

AECOM Canada Ltd. c/o Matthew Alexander, M.Sc., P.Geo.
Manager, Hydrogeology
Telephone: 226-821-4906
Email: matthew.alexander@aecom.com

Sincerely,
AECOM Canada Ltd.



Matthew Alexander, M.Sc., P.Geo.
Manager, Hydrogeology
DCS Americas, Canada Region (Ontario)
Environment

Encl.

cc: Jason Murchison – AECOM;
Adam Gilmore – Township of Centre Wellington

TOWNSHIP OF CENTRE WELLINGTON
ATTN: Matthew Alexander c/o Centre Wellington
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4

Date Received: 22-NOV-21
Report Date: 30-NOV-21 09:28 (MT)
Version: FINAL

Client Phone: 226-821-4906

Certificate of Analysis

Lab Work Order #: L2665028

Project P.O. #: NOT SUBMITTED
Job Reference:
C of C Numbers:
Legal Site Desc:

Candice Hunter
Account Manager

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ANALYTICAL GUIDELINE REPORT

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	Guideline Limits #2
L2665028-1 535 ORANGEVILLE RD Sampled By: CLIENT on 22-NOV-21 @ 10:40 Matrix: WATER							
Physical Tests							
Colour, Apparent	7.6		2.0	CU	23-NOV-21		*5
Conductivity	1720		3.0	umhos/cm	24-NOV-21		
pH	8.35		0.10	pH units	24-NOV-21		6.5-8.5
Total Dissolved Solids	1030	DLDS	20	mg/L	27-NOV-21		*500
Turbidity	1.04		0.10	NTU	23-NOV-21		5
Anions and Nutrients							
Alkalinity, Bicarbonate (as CaCO3)	398		1.0	mg/L	24-NOV-21		
Alkalinity, Carbonate (as CaCO3)	11.8		1.0	mg/L	24-NOV-21		
Alkalinity, Hydroxide (as CaCO3)	<1.0		1.0	mg/L	24-NOV-21		
Alkalinity, Total (as CaCO3)	410		1.0	mg/L	24-NOV-21		30-500
Ammonia, Total (as N)	0.090		0.010	mg/L	23-NOV-21		
Bromide (Br)	<0.50	DLDS	0.50	mg/L	24-NOV-21		
Chloride (Cl)	320	DLDS	2.5	mg/L	24-NOV-21		*250
Computed Conductivity	1550			uS/cm	29-NOV-21		
Conductivity % Difference	-10			%	29-NOV-21		
Fluoride (F)	<0.50	DLDS	0.50	mg/L	24-NOV-21	1.5	
Hardness (as CaCO3)	468			mg/L	29-NOV-21		*80-100
Ion Balance	102			%	29-NOV-21		
Langelier Index	2			No Unit	29-NOV-21		
Nitrate (as N)	14.2	DLDS	0.10	mg/L	24-NOV-21	*10	
Nitrite (as N)	<0.050	DLDS	0.050	mg/L	24-NOV-21	1	
Saturation pH	6.79			pH	29-NOV-21		
Orthophosphate-Dissolved (as P)	0.157	DLHC	0.030	mg/L	23-NOV-21		
TDS (Calculated)	1010			mg/L	29-NOV-21		
Sulfate (SO4)	18.8	DLDS	1.5	mg/L	24-NOV-21		500
Anion Sum	17.3			me/L	29-NOV-21		
Cation Sum	17.6			me/L	29-NOV-21		
Cation - Anion Balance	1			%	29-NOV-21		
Inorganic Parameters							
Silica	7500		2100	mg/L	22-NOV-21		
Bacteriological Tests							
E. Coli	0		0	CFU/100mL	23-NOV-21	0	
Total Coliform Background	23		0	CFU/100mL	23-NOV-21		
Total Coliforms	96		0	CFU/100mL	23-NOV-21	*0	
Metals							
Sodium Adsorption Ratio	3.74		0.10	SAR	26-NOV-21		
Total Metals							
Aluminum (Al)	17		10	ug/L	26-NOV-21		100
Antimony (Sb)	<0.60		0.60	ug/L	26-NOV-21	6	
Arsenic (As)	<1.0		1.0	ug/L	26-NOV-21	10.0	
Barium (Ba)	50		10	ug/L	26-NOV-21	1000	
Beryllium (Be)	<0.50		0.50	ug/L	26-NOV-21		
Bismuth (Bi)	<1.0		1.0	ug/L	26-NOV-21		
Boron (B)	83		50	ug/L	26-NOV-21	5000	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Drinking Water Regulation (ODWQS) JAN.1,2020 = [Suite] - ON-DW-STANDARD+GUIDELINES

#1: Schedule 1 (Microbiological) and 2 (Chemical) Standards (JAN,2020) **#2: Ontario DW Aesthetic and Operational Guidelines (June, 2006)**

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	Guideline Limits #2
L2665028-1 535 ORANGEVILLE RD							
Sampled By: CLIENT on 22-NOV-21 @ 10:40							
Matrix: WATER							
Total Metals							
Cadmium (Cd)	0.13		0.10	ug/L	26-NOV-21	5	
Calcium (Ca)	137		0.50	mg/L	26-NOV-21		
Cesium (Cs)	<0.10		0.10	ug/L	26-NOV-21		
Chromium (Cr)	<1.0		1.0	ug/L	26-NOV-21	50	
Cobalt (Co)	<0.50		0.50	ug/L	26-NOV-21		
Copper (Cu)	60.5		1.0	ug/L	26-NOV-21		1000
Iron (Fe)	<50		50	ug/L	26-NOV-21		300
Lead (Pb)	2.7		1.0	ug/L	26-NOV-21	10	
Lithium (Li)	<100		100	ug/L	26-NOV-21		
Magnesium (Mg)	30.3		0.50	mg/L	26-NOV-21		
Manganese (Mn)	6.6		1.0	ug/L	26-NOV-21		50
Molybdenum (Mo)	<0.50		0.50	ug/L	26-NOV-21		
Nickel (Ni)	5.6		1.0	ug/L	26-NOV-21		
Phosphorus (P)	0.184		0.050	mg/L	26-NOV-21		
Potassium (K)	6.2		1.0	mg/L	26-NOV-21		
Rubidium (Rb)	<2.0		2.0	ug/L	26-NOV-21		
Selenium (Se)	<1.0		1.0	ug/L	26-NOV-21	50	
Silicon (Si)	3500		1000	ug/L	26-NOV-21		
Silver (Ag)	<0.050		0.050	ug/L	26-NOV-21		
Sodium (Na)	186	DLHC	5.0	mg/L	26-NOV-21	*20	200
Strontium (Sr)	249		1.0	ug/L	26-NOV-21		
Sulfur (S)	6900		500	ug/L	26-NOV-21		
Tellurium (Te)	<2.0		2.0	ug/L	26-NOV-21		
Thallium (Tl)	<0.060		0.060	ug/L	26-NOV-21		
Thorium (Th)	<1.0		1.0	ug/L	26-NOV-21		
Tin (Sn)	<1.0		1.0	ug/L	26-NOV-21		
Titanium (Ti)	<2.0		2.0	ug/L	26-NOV-21		
Tungsten (W)	<6.0		6.0	ug/L	26-NOV-21		
Uranium (U)	<2.0		2.0	ug/L	26-NOV-21	20	
Vanadium (V)	<0.50		0.50	ug/L	26-NOV-21		
Zinc (Zn)	9.7		3.0	ug/L	26-NOV-21		5000
Zirconium (Zr)	<0.80		0.80	ug/L	26-NOV-21		
Volatile Organic Compounds							
Benzene	<0.50		0.50	ug/L	23-NOV-21	1	
Carbon tetrachloride	<0.20		0.20	ug/L	23-NOV-21	2	
Monochlorobenzene	<0.50		0.50	ug/L	23-NOV-21	80	30
1,2-Dichlorobenzene	<0.50		0.50	ug/L	23-NOV-21	200	3
1,4-Dichlorobenzene	<0.50		0.50	ug/L	23-NOV-21	5	1
1,2-Dichloroethane	<0.50		0.50	ug/L	23-NOV-21	5	
1,1-dichloroethylene (vinylidene chlorid	<0.50		0.50	ug/L	23-NOV-21	14	
Dichloromethane	<5.0		5.0	ug/L	23-NOV-21	50	
Ethylbenzene	<0.50		0.50	ug/L	23-NOV-21	140	2.4
Tetrachloroethylene (perchloroethylene)	<0.50		0.50	ug/L	23-NOV-21	10	
Toluene	<0.50		0.50	ug/L	23-NOV-21	60	24
Trichloroethylene	<0.50		0.50	ug/L	23-NOV-21	5	
Vinyl chloride	<0.20		0.20	ug/L	23-NOV-21	1	
o-xylene	<0.50		0.50	ug/L	23-NOV-21		

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Drinking Water Regulation (ODWQS) JAN.1,2020 = [Suite] - ON-DW-STANDARD+GUIDELINES

#1: Schedule 1 (Microbiological) and 2 (Chemical) Standards (JAN,2020) **#2: Ontario DW Aesthetic and Operational Guidelines (June, 2006)**

ANALYTICAL GUIDELINE REPORT

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	Guideline Limits #2		
L2665028-1 535 ORANGEVILLE RD Sampled By: CLIENT on 22-NOV-21 @ 10:40 Matrix: WATER									
Volatile Organic Compounds									
m/p-xylene	<1.0		1.0	ug/L	23-NOV-21				
Xylenes (Total)	<1.5		1.5	ug/L	23-NOV-21	90	300		
Surrogate: 4-Bromofluorobenzene	94.1		70-130	%	23-NOV-21				
Surrogate: 1,4-Difluorobenzene	101.0		70-130	%	23-NOV-21				

[redacted]

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Drinking Water Regulation (ODWQS) JAN.1,2020 = [Suite] - ON-DW-STANDARD+GUIDELINES

#1: Schedule 1 (Microbiological) and 2 (Chemical) Standards (JAN,2020) **#2: Ontario DW Aesthetic and Operational Guidelines (June, 2006)**

AECOM Canada Ltd.
50 Sportsworld Crossing Road, Suite 290 519.650.5313 tel
Kitchener, ON, Canada N2P 0A4 519.650.3424 fax
www.aecom.com

November 22nd, 2021

[redacted]
Fergus, ON
N1M 1T9

Project No: 60664299

Regarding: Pre-Pumping Test Water Quality Testing Results
Municipal Supply Well F2 Replacement Program

Dear [redacted],

AECOM Canada Ltd. (AECOM) would like to thank you for your participation in the Pumping Test Monitoring Program offered to local residents as part of the Municipal Supply Well F2 Replacement Program. Based on receipt of permission from yourself, a sample of raw (untreated) groundwater from your private well was collected for laboratory analysis by AECOM staff on October 14th, 2021. Please find attached a copy of the water quality testing results for your review and record.

Laboratory testing results for the sample obtained indicate that concentrations of certain parameters, as shown in the table below, are in excess of the *Ontario Drinking Water Standards, Objectives and Guidelines* (Ontario Ministry of the Environment, 2006). It should be noted, however, that these results are based on a single sample analysis and that additional testing is recommended.

The Ministry guidelines include the following three types of standards:

- Maximum Acceptable Concentration (MAC): Established for parameters known or suspected of having adverse health effects, when present above a specified concentration.
- Aesthetic Objective (AO): Established for parameters that may impair the taste, odour or colour of water, or which may interfere with good water quality control practices.
- Operational Guideline (OG): Established for parameters that, if not controlled, may negatively effect the efficient and effective treatment, disinfection and distribution of the water.

PARAMETER	CONCENTRATION IN YOUR WATER	STANDARD VALUE / RANGE	STANDARD TYPE	HEALTH RELATED (Y / N)
Total Dissolved Solids	757 mg/L	500 mg/L	AO	N
Sodium	111 mg/L	200 (20) mg/L	AO	N
Hardness (as $CaCO_3$)	487 mg/L	80 to 100 mg/L	OG	N

NOTE: AO – Aesthetic Objective; OG – Operational Guideline.

The presence of sodium in your raw (untreated) drinking water, although reported to be below the ODWQS Aesthetic Objective of 200 mg/L, was found to be in excess of 20 mg/L, and thus should be considered as a source for any consumers who may be on a sodium-restricted diet.

For your information, the *Well Aware Booklet – A Guide To Caring For Your Well* created by Green Communities Canada is available on the Walkerton Clean Water Centre (WCWC) website at:

https://wcwc.ca/well-aware-and-well-wise-program-resources-for-homeowners/

If you have any further questions, please contact:

AECOM Canada Ltd. C/O Matthew Alexander, M.Sc., P.Geo.
Manager, Hydrogeology
Telephone: 226-821-4906
Email: matthew.alexander@aecom.com

Sincerely,
AECOM Canada Ltd.



Matthew Alexander, M.Sc., P.Geo.
Manager, Hydrogeology
DCS Americas, Canada Region (Ontario)
Environment

Encl.

cc: Jason Murchison – AECOM;
Adam Gilmore – Township of Centre Wellington

TOWNSHIP OF CENTRE WELLINGTON
ATTN: Matthew Alexander c/o Centre Wellington
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4

Date Received: 14-OCT-21
Report Date: 26-OCT-21 14:13 (MT)
Version: FINAL

Client Phone: 226-821-4906

Certificate of Analysis

Lab Work Order #: L2651210

Project P.O. #: NOT SUBMITTED
Job Reference: BK333359
C of C Numbers: 20-896345
Legal Site Desc:

Candice Hunter
Account Manager

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Sample Details Grouping	Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits			
[redacted]										
L2651210-3	565 ORANGEVILLE RD.									
Sampled By:	CLIENT on 14-OCT-21 @ 11:20									
Matrix:	WATER						#1	#2		
Physical Tests										
	Colour, Apparent	4.7		2.0	CU	15-OCT-21		5		
	Conductivity	1400		3.0	umhos/cm	16-OCT-21				
	pH	7.34		0.10	pH units	16-OCT-21		6.5-8.5		
	Total Dissolved Solids	757	DLDS	20	mg/L	17-OCT-21		*500		
	Turbidity	<0.10		0.10	NTU	15-OCT-21		5		
Anions and Nutrients										
	Alkalinity, Bicarbonate (as CaCO3)	382		1.0	mg/L	16-OCT-21				
	Alkalinity, Carbonate (as CaCO3)	<1.0		1.0	mg/L	16-OCT-21				
	Alkalinity, Hydroxide (as CaCO3)	<1.0		1.0	mg/L	16-OCT-21				
	Alkalinity, Total (as CaCO3)	382		1.0	mg/L	16-OCT-21		30-500		
	Ammonia, Total (as N)	<0.010		0.010	mg/L	18-OCT-21				
	Bromide (Br)	<0.50	DLDS	0.50	mg/L	18-OCT-21				
	Chloride (Cl)	195	DLDS	2.5	mg/L	18-OCT-21		250		
	Computed Conductivity	1210			uS/cm	19-OCT-21				
	Conductivity % Difference	-14			%	19-OCT-21				
	Fluoride (F)	<0.50	DLDS	0.50	mg/L	18-OCT-21	1.5			
	Hardness (as CaCO3)	487			mg/L	19-OCT-21		*80-100		
	Ion Balance	115			%	19-OCT-21				
	Langelier Index	1			No Unit	19-OCT-21				
	Nitrate (as N)	6.49	DLDS	0.10	mg/L	18-OCT-21	10			
	Nitrite (as N)	<0.050	DLDS	0.050	mg/L	18-OCT-21	1			
	Saturation pH	6.80			pH	19-OCT-21				
	Orthophosphate-Dissolved (as P)	0.0114		0.0030	mg/L	18-OCT-21				
	TDS (Calculated)	760			mg/L	19-OCT-21				
	Sulfate (SO4)	21.3	DLDS	1.5	mg/L	18-OCT-21		500		
	Anion Sum	12.7			me/L	19-OCT-21				
	Cation Sum	14.6			me/L	19-OCT-21				
	Cation - Anion Balance	7			%	19-OCT-21				

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Drinking Water Regulation (ODWQS) JAN.1,2020 = [Suite] - ON-DW-STANDARD+GUIDELINES

#1: Schedule 1 (Microbiological) and 2 (Chemical) Standards (JAN,2020) **#2: Ontario DW Aesthetic and Operational Guidelines (June, 2006)**

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	Guideline Limits #2
L2651210-3 565 ORANGEVILLE RD.							
Sampled By: CLIENT on 14-OCT-21 @ 11:20							
Matrix: WATER							
Inorganic Parameters							
Silica	10100		2100	mg/L	14-OCT-21		
Bacteriological Tests							
E. Coli	0		0	CFU/100mL	15-OCT-21	0	
Total Coliform Background	0		0	CFU/100mL	15-OCT-21		
Total Coliforms	0		0	CFU/100mL	15-OCT-21	0	
Metals							
Sodium Adsorption Ratio	2.20		0.10	SAR	18-OCT-21		
Total Metals							
Aluminum (Al)	<10		10	ug/L	18-OCT-21		100
Antimony (Sb)	<0.60		0.60	ug/L	18-OCT-21	6	
Arsenic (As)	<1.0		1.0	ug/L	18-OCT-21	10.0	
Barium (Ba)	75		10	ug/L	18-OCT-21	1000	
Beryllium (Be)	<0.50		0.50	ug/L	18-OCT-21		
Bismuth (Bi)	<1.0		1.0	ug/L	18-OCT-21		
Boron (B)	<50		50	ug/L	18-OCT-21	5000	
Cadmium (Cd)	0.15		0.10	ug/L	18-OCT-21	5	
Calcium (Ca)	135		0.50	mg/L	18-OCT-21		
Cesium (Cs)	<0.10		0.10	ug/L	18-OCT-21		
Chromium (Cr)	<1.0		1.0	ug/L	18-OCT-21	50	
Cobalt (Co)	<0.50		0.50	ug/L	18-OCT-21		
Copper (Cu)	57.7		1.0	ug/L	18-OCT-21		1000
Iron (Fe)	<50		50	ug/L	18-OCT-21		300
Lead (Pb)	1.3		1.0	ug/L	18-OCT-21	10	
Lithium (Li)	<100		100	ug/L	18-OCT-21		
Magnesium (Mg)	36.6		0.50	mg/L	18-OCT-21		
Manganese (Mn)	6.2		1.0	ug/L	18-OCT-21		50
Molybdenum (Mo)	<0.50		0.50	ug/L	18-OCT-21		
Nickel (Ni)	2.6		1.0	ug/L	18-OCT-21		
Phosphorus (P)	<0.050		0.050	mg/L	18-OCT-21		
Potassium (K)	3.1		1.0	mg/L	18-OCT-21		
Rubidium (Rb)	<2.0		2.0	ug/L	18-OCT-21		
Selenium (Se)	<1.0		1.0	ug/L	18-OCT-21	50	
Silicon (Si)	4700		1000	ug/L	18-OCT-21		
Silver (Ag)	<0.050		0.050	ug/L	18-OCT-21		
Sodium (Na)	111	DLHC	5.0	mg/L	18-OCT-21	*20	200
Strontium (Sr)	364		1.0	ug/L	18-OCT-21		
Sulfur (S)	8700		500	ug/L	18-OCT-21		
Tellurium (Te)	<2.0		2.0	ug/L	18-OCT-21		
Thallium (Tl)	<0.060		0.060	ug/L	18-OCT-21		
Thorium (Th)	<1.0		1.0	ug/L	18-OCT-21		
Tin (Sn)	<1.0		1.0	ug/L	18-OCT-21		
Titanium (Ti)	<2.0		2.0	ug/L	18-OCT-21		
Tungsten (W)	<6.0		6.0	ug/L	18-OCT-21		
Uranium (U)	<2.0		2.0	ug/L	18-OCT-21	20	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Drinking Water Regulation (ODWQS) JAN.1,2020 = [Suite] - ON-DW-STANDARD+GUIDELINES

#1: Schedule 1 (Microbiological) and 2 (Chemical) Standards (JAN,2020) **#2: Ontario DW Aesthetic and Operational Guidelines (June, 2006)**

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	#2		
L2651210-3 565 ORANGEVILLE RD.									
Sampled By: CLIENT on 14-OCT-21 @ 11:20									
Matrix: WATER									
Total Metals									
Vanadium (V)	<0.50		0.50	ug/L	18-OCT-21				
Zinc (Zn)	44.7		3.0	ug/L	18-OCT-21		5000		
Zirconium (Zr)	<0.80		0.80	ug/L	18-OCT-21				
Volatile Organic Compounds									
Benzene	<0.50		0.50	ug/L	19-OCT-21	1			
Carbon tetrachloride	<0.20		0.20	ug/L	19-OCT-21	2			
Monochlorobenzene	<0.50		0.50	ug/L	19-OCT-21	80	30		
1,2-Dichlorobenzene	<0.50		0.50	ug/L	19-OCT-21	200	3		
1,4-Dichlorobenzene	<0.50		0.50	ug/L	19-OCT-21	5	1		
1,2-Dichloroethane	<0.50		0.50	ug/L	19-OCT-21	5			
1,1-dichloroethylene (vinylidene chlorid	<0.50		0.50	ug/L	19-OCT-21	14			
Dichloromethane	<5.0		5.0	ug/L	19-OCT-21	50			
Ethylbenzene	<0.50		0.50	ug/L	19-OCT-21	140	2.4		
Tetrachloroethylene (perchloroethylene)	<0.50		0.50	ug/L	19-OCT-21	10			
Toluene	<0.50		0.50	ug/L	19-OCT-21	60	24		
Trichloroethylene	<0.50		0.50	ug/L	19-OCT-21	5			
Vinyl chloride	<0.20		0.20	ug/L	19-OCT-21	1			
o-xylene	<0.50		0.50	ug/L	19-OCT-21				
m/p-xylene	<1.0		1.0	ug/L	19-OCT-21				
Xylenes (Total)	<1.5		1.5	ug/L	19-OCT-21	90	300		
Surrogate: 4-Bromofluorobenzene	98.6		70-130	%	19-OCT-21				
Surrogate: 1,4-Difluorobenzene	100.7		70-130	%	19-OCT-21				

[redacted]

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Drinking Water Regulation (ODWQS) JAN.1,2020 = [Suite] - ON-DW-STANDARD+GUIDELINES

#1: Schedule 1 (Microbiological) and 2 (Chemical) Standards (JAN,2020) **#2: Ontario DW Aesthetic and Operational Guidelines (June, 2006)**

AECOM Canada Ltd.
50 Sportsworld Crossing Road, Suite 290 519.650.5313 tel
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www.aecom.com

December 16th, 2021

[redacted]
Fergus, ON
N1M 3R9

Project No: 60664299

Regarding: Pre-Pumping Test Water Quality Testing Results
Municipal Supply Well F5 Replacement Program

Dear [redacted]

AECOM Canada Ltd. (AECOM) would like to thank you for your participation in the Pumping Test Monitoring Program offered to local residents as part of the Municipal Supply Well F5 Replacement Program. Based on receipt of permission from yourself, a sample of raw (untreated) groundwater from your private well was collected for laboratory analysis by AECOM staff on November 18th, 2021. Please find attached a copy of the water quality testing results for your review and record.

Laboratory testing results for the sample obtained indicate that concentrations of certain parameters, as shown in the table below, are in excess of the *Ontario Drinking Water Standards, Objectives and Guidelines* (Ontario Ministry of the Environment, 2006). It should be noted, however, that these results are based on a single sample analysis and that additional testing is recommended.

The Ministry guidelines include the following three types of standards:

- Maximum Acceptable Concentration (MAC): Established for parameters known or suspected of having adverse health effects, when present above a specified concentration. This standard is not applicable to your results.
- Aesthetic Objective (AO): Established for parameters that may impair the taste, odour or colour of water, or which may interfere with good water quality control practices.
- Operational Guideline (OG): Established for parameters that, if not controlled, may negatively effect the efficient and effective treatment, disinfection and distribution of the water.

PARAMETER	CONCENTRATION IN YOUR WATER	STANDARD VALUE / RANGE	STANDARD TYPE	HEALTH RELATED (Y / N)
Manganese	0.0904 mg/L	0.05 mg/L	AO	N
Hardness (as $CaCO_3$)	203 mg/L	80 to 100 mg/L	OG	N

NOTE: AO – Aesthetic Objective; OG – Operational Guideline.

For your information, the *Well Aware Booklet – A Guide To Caring For Your Well* created by Green Communities Canada is available on the Walkerton Clean Water Centre (WCWC) website at:

https://wcwc.ca/well-aware-and-well-wise-program-resources-for-homeowners/

If you have any further questions, please contact:

AECOM Canada Ltd. C/O Matthew Alexander, M.Sc., P.Geo.
Manager, Hydrogeology
Telephone: 226-821-4906
Email: matthew.alexander@aecom.com

Sincerely,
AECOM Canada Ltd.



Matthew Alexander, M.Sc., P.Geo.
Manager, Hydrogeology
DCS Americas, Canada Region (Ontario)
Environment

Encl.

cc: Jason Murchison – AECOM;
Adam Gilmore – Township of Centre Wellington

TOWNSHIP OF CENTRE WELLINGTON
ATTN: Matthew Alexander c/o Centre Wellington
50 Sportsworld Crossing Rd
Kitchener ON N2P 0A4

Date Received: 18-NOV-21
Report Date: 25-NOV-21 13:33 (MT)
Version: FINAL

Client Phone: 226-821-4906

Certificate of Analysis

Lab Work Order #: L2664092

Project P.O. #: NOT SUBMITTED
Job Reference:
C of C Numbers:
Legal Site Desc:

Comments: ADDITIONAL 19-NOV-21 09:38

Candice Hunter
Account Manager

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Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	Guideline Limits #2
L2664092-1 935 SCOTLAND STREET							
Sampled By: CLIENT on 18-NOV-21 @ 13:30							
Matrix: WATER							
Physical Tests							
Colour, Apparent	<2.0		2.0	CU	19-NOV-21		5
Conductivity	429		3.0	umhos/cm	22-NOV-21		
pH	8.21		0.10	pH units	23-NOV-21		6.5-8.5
Total Dissolved Solids	237	DLDS	20	mg/L	23-NOV-21		500
Turbidity	0.56		0.10	NTU	20-NOV-21		5
Anions and Nutrients							
Alkalinity, Bicarbonate (as CaCO3)	220		1.0	mg/L	22-NOV-21		
Alkalinity, Carbonate (as CaCO3)	<1.0		1.0	mg/L	22-NOV-21		
Alkalinity, Hydroxide (as CaCO3)	<1.0		1.0	mg/L	22-NOV-21		
Alkalinity, Total (as CaCO3)	220		1.0	mg/L	22-NOV-21		30-500
Ammonia, Total (as N)	0.104		0.010	mg/L	23-NOV-21		
Bromide (Br)	<0.10		0.10	mg/L	22-NOV-21		
Chloride (Cl)	6.26		0.50	mg/L	22-NOV-21		250
Computed Conductivity	391			uS/cm	24-NOV-21		
Conductivity % Difference	-9			%	24-NOV-21		
Fluoride (F)	0.21		0.10	mg/L	22-NOV-21	1.5	
Hardness (as CaCO3)	203			mg/L	24-NOV-21		*80-100
Ion Balance	103			%	24-NOV-21		
Langelier Index	1			No Unit	24-NOV-21		
Nitrate (as N)	0.392		0.020	mg/L	22-NOV-21	10	
Nitrite (as N)	<0.010		0.010	mg/L	22-NOV-21	1	
Saturation pH	7.52			pH	24-NOV-21		
Orthophosphate-Dissolved (as P)	0.0144		0.0030	mg/L	22-NOV-21		
TDS (Calculated)	233			mg/L	24-NOV-21		
Sulfate (SO4)	21.2		0.30	mg/L	22-NOV-21		500
Anion Sum	4.32			me/L	24-NOV-21		
Cation Sum	4.44			me/L	24-NOV-21		
Cation - Anion Balance	1			%	24-NOV-21		
Inorganic Parameters							
Silica	9800		2100	mg/L	19-NOV-21		
Bacteriological Tests							
E. Coli	0		0	CFU/100mL	19-NOV-21	0	
Total Coliform Background	0		0	CFU/100mL	19-NOV-21		
Total Coliforms	0		0	CFU/100mL	19-NOV-21	0	
Metals							
Sodium Adsorption Ratio	0.25		0.10	SAR	24-NOV-21		
Total Metals							
Aluminum (Al)	<10		10	ug/L	23-NOV-21		100
Antimony (Sb)	<0.60		0.60	ug/L	23-NOV-21	6	
Arsenic (As)	<1.0		1.0	ug/L	23-NOV-21	10.0	
Barium (Ba)	18		10	ug/L	23-NOV-21	1000	
Beryllium (Be)	<0.50		0.50	ug/L	23-NOV-21		
Bismuth (Bi)	<1.0		1.0	ug/L	23-NOV-21		
Boron (B)	<50		50	ug/L	23-NOV-21	5000	

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Drinking Water Regulation (ODWQS) JAN.1,2020 = [Suite] - ON-DW-STANDARD+GUIDELINES

#1: Schedule 1 (Microbiological) and 2 (Chemical) Standards (JAN,2020) **#2: Ontario DW Aesthetic and Operational Guidelines (June, 2006)**

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	Guideline Limits #2
L2664092-1 935 SCOTLAND STREET Sampled By: CLIENT on 18-NOV-21 @ 13:30 Matrix: WATER							
Total Metals							
Cadmium (Cd)	<0.10		0.10	ug/L	23-NOV-21	5	
Calcium (Ca)	35.7		0.50	mg/L	23-NOV-21		
Cesium (Cs)	<0.10		0.10	ug/L	23-NOV-21		
Chromium (Cr)	<1.0		1.0	ug/L	23-NOV-21	50	
Cobalt (Co)	<0.50		0.50	ug/L	23-NOV-21		
Copper (Cu)	7.5		1.0	ug/L	23-NOV-21		1000
Iron (Fe)	93		50	ug/L	23-NOV-21		300
Lead (Pb)	<1.0		1.0	ug/L	23-NOV-21	10	
Lithium (Li)	<100		100	ug/L	23-NOV-21		
Magnesium (Mg)	27.7		0.50	mg/L	23-NOV-21		
Manganese (Mn)	90.4		1.0	ug/L	23-NOV-21		*50
Molybdenum (Mo)	1.46		0.50	ug/L	23-NOV-21		
Nickel (Ni)	<1.0		1.0	ug/L	23-NOV-21		
Phosphorus (P)	<0.050		0.050	mg/L	23-NOV-21		
Potassium (K)	<1.0		1.0	mg/L	23-NOV-21		
Rubidium (Rb)	<2.0		2.0	ug/L	23-NOV-21		
Selenium (Se)	<1.0		1.0	ug/L	23-NOV-21	50	
Silicon (Si)	4600		1000	ug/L	23-NOV-21		
Silver (Ag)	<0.050		0.050	ug/L	23-NOV-21		
Sodium (Na)	8.34		0.50	mg/L	23-NOV-21	20	200
Strontium (Sr)	466		1.0	ug/L	23-NOV-21		
Sulfur (S)	6890		500	ug/L	23-NOV-21		
Tellurium (Te)	<2.0		2.0	ug/L	23-NOV-21		
Thallium (Tl)	<0.060		0.060	ug/L	23-NOV-21		
Thorium (Th)	<1.0		1.0	ug/L	23-NOV-21		
Tin (Sn)	<1.0		1.0	ug/L	23-NOV-21		
Titanium (Ti)	<2.0		2.0	ug/L	23-NOV-21		
Tungsten (W)	<6.0		6.0	ug/L	23-NOV-21		
Uranium (U)	<2.0		2.0	ug/L	23-NOV-21	20	
Vanadium (V)	<0.50		0.50	ug/L	23-NOV-21		
Zinc (Zn)	5.8		3.0	ug/L	23-NOV-21		5000
Zirconium (Zr)	<0.80		0.80	ug/L	23-NOV-21		
Volatile Organic Compounds							
Benzene	<0.50		0.50	ug/L	23-NOV-21	1	
Carbon tetrachloride	<0.20		0.20	ug/L	23-NOV-21	2	
Monochlorobenzene	<0.50		0.50	ug/L	23-NOV-21	80	30
1,2-Dichlorobenzene	<0.50		0.50	ug/L	23-NOV-21	200	3
1,4-Dichlorobenzene	<0.50		0.50	ug/L	23-NOV-21	5	1
1,2-Dichloroethane	<0.50		0.50	ug/L	23-NOV-21	5	
1,1-dichloroethylene (vinylidene chlorid	<0.50		0.50	ug/L	23-NOV-21	14	
Dichloromethane	<5.0		5.0	ug/L	23-NOV-21	50	
Ethylbenzene	<0.50		0.50	ug/L	23-NOV-21	140	2.4
Tetrachloroethylene (perchloroethylene)	<0.50		0.50	ug/L	23-NOV-21	10	
Toluene	<0.50		0.50	ug/L	23-NOV-21	60	24
Trichloroethylene	<0.50		0.50	ug/L	23-NOV-21	5	
Vinyl chloride	<0.20		0.20	ug/L	23-NOV-21	1	
o-xylene	<0.50		0.50	ug/L	23-NOV-21		

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Drinking Water Regulation (ODWQS) JAN.1,2020 = [Suite] - ON-DW-STANDARD+GUIDELINES

#1: Schedule 1 (Microbiological) and 2 (Chemical) Standards (JAN,2020) **#2: Ontario DW Aesthetic and Operational Guidelines (June, 2006)**

ANALYTICAL GUIDELINE REPORT

Sample Details Grouping / Analyte	Result	Qualifier	D.L.	Units	Analyzed	Guideline Limits #1	Guideline Limits #2		
L2664092-1 935 SCOTLAND STREET Sampled By: CLIENT on 18-NOV-21 @ 13:30 Matrix: WATER									
Volatile Organic Compounds									
m/p-xylene	<1.0		1.0	ug/L	23-NOV-21				
Xylenes (Total)	<1.5		1.5	ug/L	23-NOV-21	90	300		
Surrogate: 4-Bromofluorobenzene	91.1		70-130	%	23-NOV-21				
Surrogate: 1,4-Difluorobenzene	101.1		70-130	%	23-NOV-21				

** Detection Limit for result exceeds Guideline Limit. Assessment against Guideline Limit cannot be made.
* Analytical result for this parameter exceeds Guideline Limit listed on this report. Guideline Limits applied:

Ontario Drinking Water Regulation (ODWQS) JAN.1,2020 = [Suite] - ON-DW-STANDARD+GUIDELINES

#1: Schedule 1 (Microbiological) and 2 (Chemical) Standards (JAN,2020) **#2: Ontario DW Aesthetic and Operational Guidelines (June, 2006)**

Reference Information

Sample Parameter Qualifier key listed:

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.

Methods Listed (if applicable):

ALS Test Code	Matrix	Test Description	Method Reference***
ALK-SPEC-PCT-WT	Water	Automated Speciated Alkalinity	APHA 2320B
		This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.	
BR-IC-N-ONT-DW-WT	Water	Bromide in Water by IC	EPA 300.1 (mod)
		Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.	
CL-IC-N-ONT-DW-WT	Water	Chloride by IC	EPA 300.1 (mod)
		Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.	
COLOUR-APP-DW-WT	Water	Colour	APHA 2120
		Apparent Colour is measured spectrophotometrically by comparison to platinum-cobalt standards using the single wavelength method after sample decanting. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment. Concurrent measurement of sample pH is recommended.	
EC-MF-DW-WT	Water	E. coli	SM 9222D
		A 100 mL volume of sample is filtered through a membrane, the membrane is placed on mFC-BCIG agar and incubated at 44.5 –0 .2 °C for 24 – 2 h. Method ID: WT-TM-1200	
EC-ONT-DW-WT	Water	Conductivity	APHA 2510 B
		Water samples can be measured directly by immersing the conductivity cell into the sample.	
EC-SCREEN-WT	Water	Conductivity Screen (Internal Use Only)	APHA 2510
		Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.	
ETL-SAR-CALC-WT	Water	Sodium Adsorption Ratio	Calculation
ETL-SILICA-CALC-WT	Water	Calculate from SI-TOT-WT	EPA 200.8
F-DW-IC-WT	Water	Fluoride in Water by IC	EPA 300.1 (mod)
		Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.	
IONBALANCE-OP03-WT	Water	Detailed Ion Balance Calculation	APHA 1030E, 2330B, 2510A
MET-ONT-DW-WT	Water	Drinking Water Metals	EPA 6020A
NH3-F-ONT-DW-WT	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC
		This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.	
NO2-DW-IC-WT	Water	Nitrite in Water by IC	EPA 300.1 (mod)
		Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.	
NO3-DW-IC-WT	Water	Nitrate in Water by IC	EPA 300.1 (mod)
		Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.	
PH-ONT-DW-WT	Water	pH	APHA 4500 H-Electrode
		Water samples are analyzed directly by a calibrated pH meter.	
		Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011). Holdtime for samples under this regulation is 28 days	
PO4-DO-COL-DW-WT	Water	Diss. Orthophosphate in Water by Colour	APHA 4500-P PHOSPHORUS
		This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.	
SO4-IC-N-ONT-DW-WT	Water	Sulfate in Water by IC	EPA 300.1 (mod)
		Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.	
SOLIDS-TDS-ONT-DW-WT	Water	Total Dissolved Solids	APHA 2540C
		This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.	

Reference Information

TC-MF-DW-WT	Water	Total Coliforms	SM 9222B

A 100mL volume of sample is filtered through a membrane, the membrane is placed on mENDO LES agar and incubated at 35–0.5°C for 24–2h.
Method ID: WT-TM-1200

TCB-MF-DW-WT	Water	Total Coliform Background	SM 9222B

A 100mL volume of sample is filtered through a membrane, the membrane is placed on mENDO LES agar and incubated at 35–0.5°C for 24–2h.
Method ID: WT-TM-1200.

TURB-MET-WT	Water	Turbidity on preserved metals sample	APHA 2130 B

Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.

TURBIDITY-ONT-DW-WT	Water	Turbidity	APHA 2130 B

Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.

VOC-ONT-DW-WT	Water	Volatile Organics (O.Reg 170/03)	SW846 8260

Liquid samples are analyzed by headspace GC/MSD.

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

Chain of Custody numbers:

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

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

GLOSSARY OF REPORT TERMS

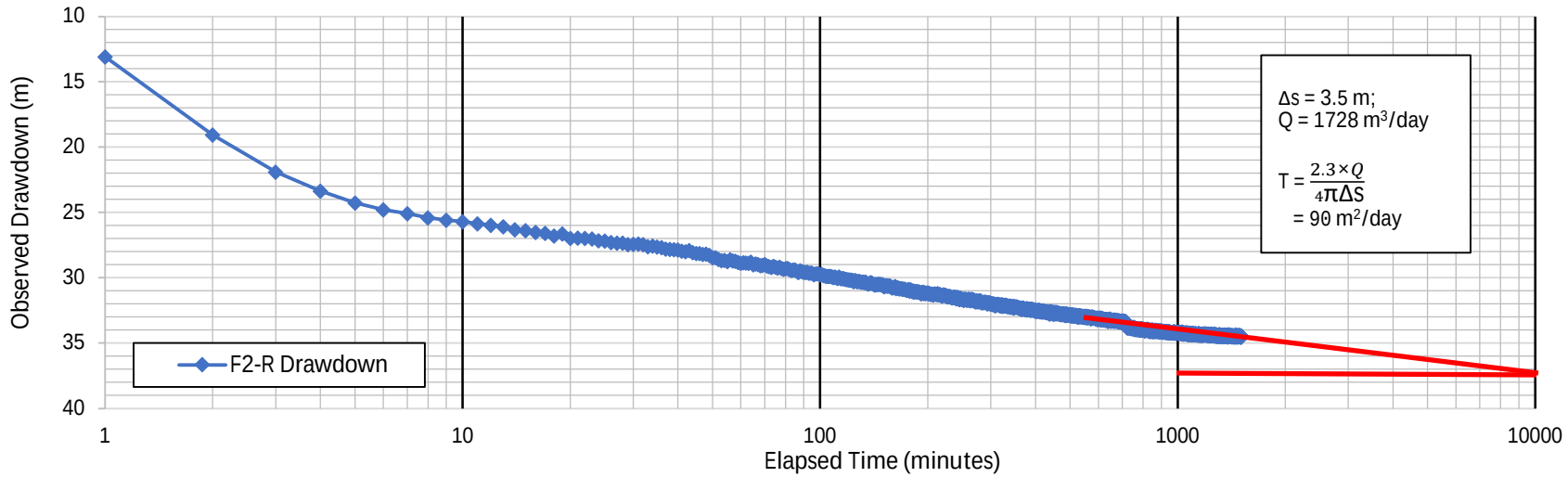
Surrogates are compounds that are similar in behaviour to target analyte(s), but that do not normally occur in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery. In reports that display the D.L. column, laboratory objectives for surrogates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

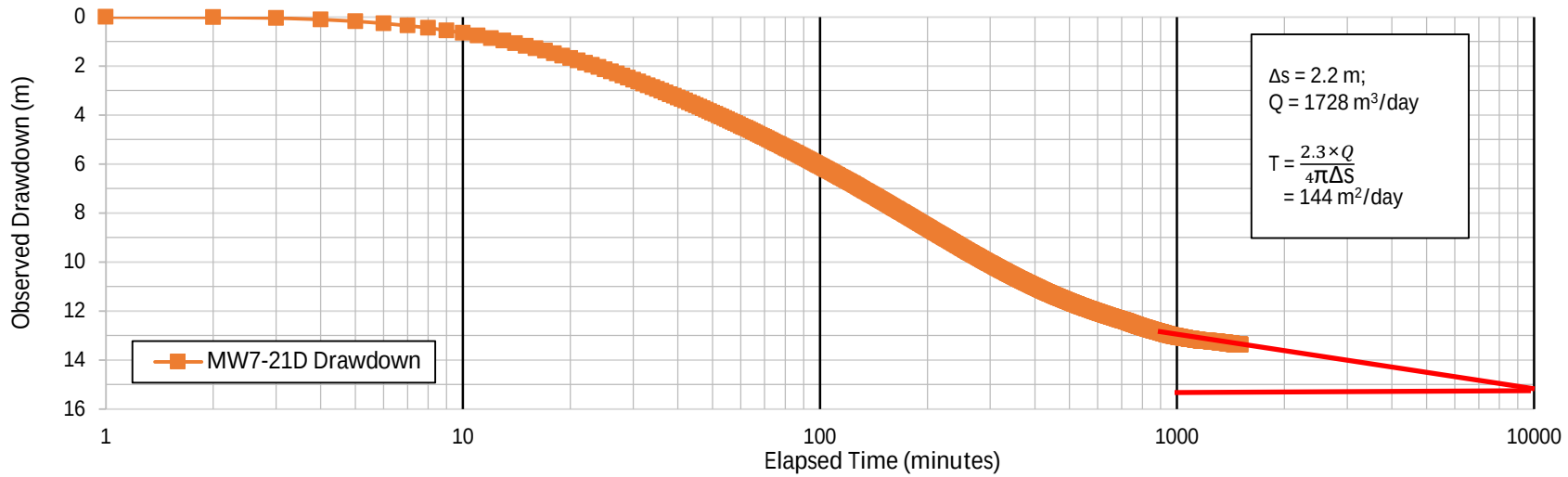
Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guideline limits are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.

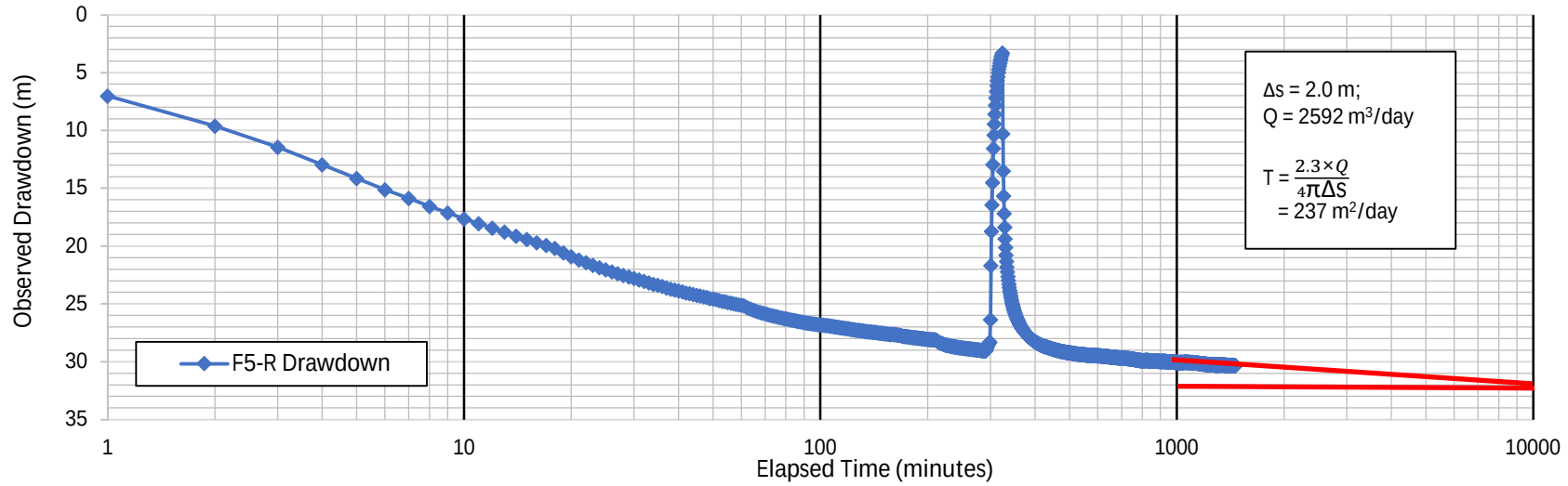
Appendix F

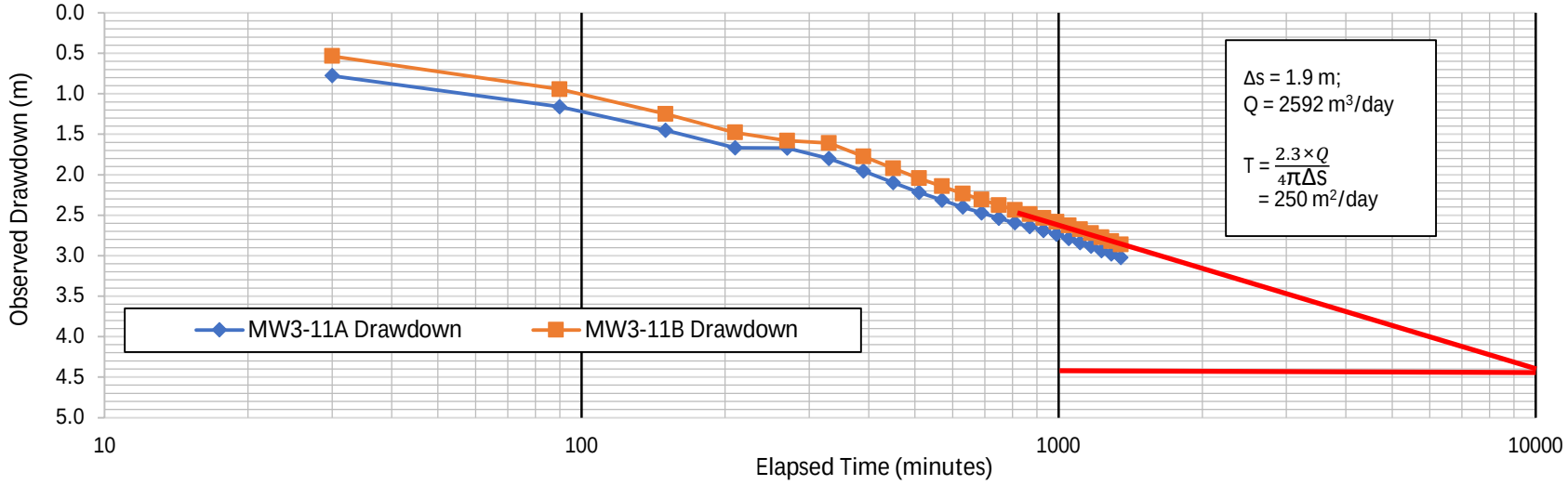
Transmissivity Estimates





AECOM	**Well Drawdown Vs. Time - F2-R Pumping Test**	**February 2023**
		Figure F-1





AECOM	**Well Drawdown Vs. Time - F5-R Pumping Test**	**February 2023**
		Figure F-2