GROUNDWATER SUPPLY ASSESSMENT

PROPOSED RESIDENTIAL DEVELOPMENT

ARKELL, ONTARIO
(TOWNSHIP OF PUSLINCH)

Prepared for:

Stovel and Associates Inc.
Timberworx Custom Homes Inc.

March 2023

Prepared by:

ARL Groundwater Resources Ltd.

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1.0 INTRODUCTION

ARL Groundwater Resources Ltd. was retained by Timberworx Inc. and Stovel & Associates Inc. to undertake to undertake a groundwater supply assessment for a proposed multi-lot residential development in and adjacent to the Hamlet of Arkell located in the Township of Puslinch. The development property is understood to be within Part Lots 7, 8 & 9, Concession 10, Township of Puslinch, County of Wellington (**FIGURE 1**).

The proposed residential development is to be serviced by individual private wells and wastewater disposal systems. In general, the groundwater supply assessment presented in this report addresses the requirements of the guideline D-5-5 (Private Wells: Water Supply Assessment), published by the Ontario Ministry of the Environment, Conservation and Parks (MECP). The most recent revision to Guideline D-5-5 is understood to have been made in August 1996, and the MECP has continued to publish the guideline in its current form up until at least December 2018.

2.0 BACKGROUND INFORMATION ON THE SITE HYDROGEOLOGY

The property was previously considered for development in about 2005-2006. At that time R.J. Burnside & Associates Limited (RJB 2006) completed a hydrogeological review and predictive nitrate assessment for a proposed 38 single family residential lot development at the site. The land size for the development was reported to be 21.68 ha.

Some of the information presented in the following discussion is based in part on the results of the RBJ (2006) report.

2.1 QUATERNARY (SURFICIAL) GEOLOGY

Quaternary geological mapping by P.F. Karrow in the 1960s (Map 2153, Geological Report 61, Ontario Department of Mines, 1968) indicates that the surficial sediments on the property are described as outwash gravel. Wentworth Till occurs to the east and north of the property where it occurs as a surface expression of the Paris Moraine. Karrow (1968) describes the Wentworth Till as predominantly a sand till (typically 49% sand, 33% silt, 18% clay). RBJ (2006) reports that the Port Stanley Till (sandy silt till) is present in the general area, but this is not evident from the mapping by Karrow. Kame and esker deposits (consisting of sand and gravel) are mapped directly beneath the centre of the Hamlet of Arkell and to the north of the Hamlet where Arkell Road rises in elevation towards an intersection with the Paris Moraine.

RBJ (2006; Figure 5, Cross-Section A-A') indicates that overburden sediment thickness beneath the proposed development property is approximately 15 - 20 m. Sediment types are shown to consist of sand, gravel and stones to silty sand, clay, and stones. In general,

the overburden materials appear to be mostly coarse-grained materials.

2.2 BEDROCK GEOLOGY

Geological mapping of the Toronto to Windsor corridor by Sanford (Geological Survey of Canada, 1969) includes the study area. The mapping indicates that the Hamlet of Arkell and the proposed development property are underlain by the Eramosa Member of the Guelph Fm. The Eramosa Member is shown as occurring as a relatively narrow band in the area and is described as a dark brown to black bituminous dolomite and shale that intertongues with the basal Guelph Formation. The Eramosa Member is bordered to the west/southwest by the main Guelph Fm. unit, described by Sanford as a cream to brown, fine to medium crystalline dolomite containing numerous bioherm reefs. The Guelph Fm. sub-crop is shown to extend over a wide area to the west of Arkell, including the cities of Guelph, Cambridge, and a large part of Kitchener. The Eramosa Member is bordered on the east/northeast side by the Amabel Group, described as a grey and blue-grey medium crystalline dolomite containing numerous bioherm reefs. Stratigraphically, the Guelph Fm. overlies the Eramosa Member, which overlies the Amabel Group. The regional dip of the formations is to the southwest towards the Michigan Basin.

The bedrock nomenclature associated with the Guelph-Eramosa-Amabel stratigraphic sequence was revised by Brunton in about 2006. The corresponding revised stratigraphic sequence in descending order (Brunton 2006) is as follows: Guelph Fm., Eramosa Fm., Goat Island Fm., Gasport Fm., and Irondequoit Fm. In general, the former un-subdivided Amabel Fm. has now been subdivided into 3 separate formations (Goat Island, Gasport, Irondequoit).

2.3 BOREHOLE INFORMATION

R.J. Burnside and Associates Limited (RBJ 2006) provide the results of 10 boreholes drilled into the overburden sediments at the site using hollow stem auger drilling equipment. Two of the boreholes (BH1, BH10) were equipped as single monitoring wells for measuring groundwater levels in the overburden sediments. The borehole locations are shown in **FIGURE 2**. Based on the borehole logs as presented in the RBJ (2006) report, a summary of the borehole results is provided in **TABLE 1**.

TABLE 1
SUMMARY OF BOREHOLE LOG INFORMATION
(from RJB 2006)

Borehole Number	Total Depth	Sediment Description	Sediment Description	Bedrock Encountered
BH1 (MW1)	9.5 m (31.2 ft.)	Mostly sand & gravel to 7.7 m (25.2 ft.)	Silt, some clay, sand & gravel (7.7 - 9.5 m)	Yes
BH2	6.6 m (21.7 ft.)	Mostly sand & gravel to 6.6 m		No
BH3	6.6 m (21.7 ft.)	Mostly sand & gravel to 6.6 m		No
BH4	6.3 m (20.7 ft.)	Mostly sand & gravel to 6.3 m		No
BH5	6.6 m (21.7 ft.)	Mostly sand & gravel to 6.6 m		No
BH6	3.3 m (10.8 ft.)	Mostly sand & gravel to 3.3 m		No
BH7	7.3 m (24 ft.)	Mostly sand & gravel to 7.3 m		Uncertain
BH8	5.2 m (17.1 ft.)	Mostly sand & gravel to 5.2 m		No
BH9	6.2 m (20.3 ft.)	Mostly sand & gravel to 6.2 m		No
BH10 (MW2)	12.6 m (41.3 ft.)	Mostly sand & gravel to 6.9 m	Gravel-silt till to 10.1 m, interbedded sand, silt, till (10.1 - 12.6 m)	No

RBJ (2006) reported one round of water levels measurements recorded in the two monitoring wells approximately 2 weeks after the borehole drilling and well installation program (January 26, 2006). The water level measurements indicated that there was approximately 2 m of standing water in the two wells.

The borehole logs indicate that sand and gravel are the predominant sediment types present at the site to depths of at least 6 - 8 m (20 - 26 ft.).

2.4 WATER WELL RECORD INFORMATION

Existing water well record locations in the vicinity of Arkell were obtained from the MECP water well record database and are shown in **FIGURE 2**. The locations in **FIGURE 2** are based on a combination of the well coordinates provided in the MECP database and a site inspection to confirm apparent well locations. The water well records provide useful information with respect to the hydrogeological conditions at the site. Summary information from the water well records is provided in **TABLE 2**.

TABLE 2
Existing Water Well Record Information (Arkell)

Water Well Record	Date	Depth to Bedrock (ft.)	Brown Limestone or Rock Thickness (ft.)	Dark Brown Limestone or Rock Thickness (ft.)	Grey Limestone or Rock Thickness (ft.)	Brown Limestone or Rock Thickness (ft.)	Total Well Depth (ft.)
7046276	Jun. 25, 2007	49	36	75	80	-	240
6715979	Oct. 3, 2006	50	40	70	60	20	240
6715668	Jan. 10, 2006	49	41	65	75	10	240
6715483	Aug. 31, 2005	50	50	-	-	-	100
7100299	Dec. 31, 2007	54	24	97	25	-	200
7046277	Jun. 21, 2007	51	24	95	50	-	220
6712507	May 1, 1998	39	66	60	36	-	201
6706077	Jun. 24, 1976	33	37	25	-	-	95
6712521	Apr. 14, 1998	29	81	10	-	-	120
6702775	Mar. 20, 1965	46	54	25	-	-	125
6702773	July 4, 1964	55	75	10	-	-	140
6710001	Sept. 11, 1989	39	41	-	-	-	80

The water well record information indicates that the overburden thickness at the site ranges from approximately 9 - 17 m (30 - 55 ft.). The sediments are described as clay, sand and gravel, and boulders. Most of the existing water well records describe clay and stones in the upper part of the overburden sequence and clay and sand-gravel in the lower part of the overburden sequence. When interpreting the water well record information, it is important to note that most of the wells were targeting the bedrock aquifer system. Accurate sampling and descriptions of the overburden sediments was not a priority during drilling of the wells.

The existing water well record descriptions indicate that the following stratigraphic sequence appears to occur at the site; the upper 7 - 25 m (24 - 81 ft.) of bedrock (including the bedrock subcrop) is part of the Guelph Fm. (brown dolostone). The Eramosa Fm. occurs below the Guelph Fm., and is described by Brunton (OGS 2011) as a dark brown to black dolostone unit; the darker colour is due to a higher shale/organic content in the rock compared to the dolostone of the overlying Guelph Fm. The existing water well records indicate that thickness of the Eramosa Fm. is approximately 18 - 39 m (60 - 100 ft.) at the site.

At least 15 - 24 m (50 - 80 ft.) of grey rock occurs below the Eramosa Fm. The grey rock is interpreted as the Goat Island/Gasport Fm. (formerly referred to as unsubdivided Amabel Fm.). For the purposes of this report, the lower grey rock unit will be referred to as the Gasport Fm.

The Guelph Fm. is interpreted as the upper bedrock aquifer at the site. The Gasport Fm. are interpreted as a lower bedrock aquifer at the site. The Guelph Fm. is interpreted to be an unconfined to semi-confined aquifer as there is limited evidence of a confining layer in the overburden sediments at the site. Recharge to the Guelph Fm. is inferred as being relatively high due to the absence or limited occurrence of low hydraulic conductivity materials (such as silt and clay till) in the overlying overburden sediments. The Gasport

Fm. is interpreted as a semi-confined to confined aquifer; in this case the overlying Eramosa Fm. has a high shale content that imparts some aquitard characteristics to the unit and impedes leakage across the Eramosa Fm. from the overlying Guelph Fm.

The earlier bedrock geological mapping by Sanford (1969) showing the Eramosa Fm. as the bedrock subcrop in Arkell appears to be out-of-date. Based on the water well record information and the 2022 test well information (described in the following section), the Guelph Fm. is interpreted as forming the bedrock subcrop at the site.

3.0 TEST WELL INVESTIGATION

2.1 GENERAL

It is understood that the proposed development could eventually consist of up to about 50 individual single family residential lots on the 22-ha property. However, the initial stage of development may consist of something less than 50 lots on only a portion of the property. Based on this consideration, a program of 3 test wells was undertaken at the site in November 2022.The test well locations are shown in **FIGURE 3**.

2.2 TEST WELL PROGRAM

A test well program was designed so that the 3 test wells would be constructed in the lower aquifer (Gasport Fm.) at the site. The well design was selected to provide additional protection from surface sources of contamination.

The well design included drilling and installation of 150 mm (6 inch) nominal steel outer casing through the overburden sediments and into the top of the bedrock. The annular space surrounding the outer well casing was sealed with a bentonite slurry. Drilling of the bedrock commenced inside of the outer casing and continued to the base of the Eramosa Fm. A nominal 130 mm (5 inch) inner steel casing equipped with packers was installed to the base of Eramosa Fm. The packers are intended to serve as an annular seal around the inner casing. Drilling of a nominal 127 mm (5 inch) open hole continued inside of the inner steel casing, eventually terminating in the Gasport Fm. Final well depths are as follows.

TW1/2022: 72.5 m (238 ft.)
TW2/2022: 73.5 m (241 ft.)
TW3/2022: 79.6 m (261 ft.).

All work was performed by a licensed water well contractor. Water well records for the three test wells are included as **APPENDIX A**.

2.3 TEST WELL PUMPING TEST RESULTS

Constant rate pumping tests were performed by the water well contractor at each of the three test wells. Pumping rates were the same for all 3 tests (45.5 L/min; 10 Igal./min) and the pumping tests lasted for 6 hours. Flow rate for each test was recorded with a calibrated flow meter. The test pumping rates exceed the peak demand attributed to a four-person household (4 x 3.75 L/min = 15 L/min or 1,800 L/day) as specified in MECP guideline D-5-5.

Manual water level measurements were recorded during each pumping test. Manual water level recovery measurements were also recorded for 40 - 90 minutes following shutdown of the pump in each of the 3 test wells.

The dates of each pumping test were as follows:

TW1/2022 - November 21, 2022
TW2/2022 - November 23, 2022
TW3/2022 - November 25, 2022.

The results of the pumping test at TW1/2022 with elapsed time at an arithmetic scale are shown in **FIGURE 4**. The graph shows that water levels decline at a consistent rate of drawdown from about 1 minute until pump shutdown at an elapsed time of 6 hours (360 minutes). Water levels recover sharply for the first minute following pump shutdown, mirroring the initial drawdown observed during the first minute of the test. Water levels then recover at about the same rate in reverse as the drawdown trend.

The results of the pumping test at TW2/2022 with elapsed time at an arithmetic scale are shown in **FIGURE 5**. The graph shows that water levels decline at a relatively steep rate for the first 10 minutes of pumping before levelling off and approaching steady- state for about the next 215 minutes (3.5 hours into the pumping test). At that point water levels drop sharply by approximately 11 m, followed by a steady drawdown trend for the next 2 hours, at which time the pump is shut-off. After pump shutdown, water levels follow a steady recovery to within 4 m of the pre-test level after 40 minutes. The sudden decline in water level observed at 3.5 hours into the pumping test is interpreted as a probable boundary condition affecting one or more of the fractures/producing zones in the well.

The results of the pumping test at TW3/2022 with elapsed time at an arithmetic scale are shown in **FIGURE 6**. Water levels at TW3/2022 decline at a relatively steep rate for the first 15 minutes of pumping before levelling off for the next 60 minutes, and then following a recovery trend for the remainder of the pumping portion of the test. Recovery to the pre-test level essentially occurs within 75 minutes of pump shutdown. The apparent recovery in water levels measured during the pumping portion of the test may reflect ongoing development of some of the fractures/producing zones during the pumping test.

The results from the 3 pumping tests indicate that the test wells can easily meet the water quantity requirements of a single-family residence. Additional wells at the site can be expected to yield similar performance with respect to water quantity.

Additional graphs showing pumping water level and drawdown versus a log time scale for the three pumping tests are included in **APPENDIX B**.

2.4 WATER QUALITY TEST RESULTS

Water samples were collected from the three test wells during the pumping tests for water quality analysis. The water samples were collected at the following intervals during each test:

TW1 - samples collected after an elapsed time of approximately two hours.
TW2 - samples collected at approximately 1.5, 2.5, 4 hours.
TW3 - samples collected at approximately 3 and 6 hours.
TW3 - repeat set of samples collected at 3 hours during a second test.

The water samples were submitted to a commercial analytical laboratory (ALS Environmental - Waterloo, Ontario) for testing of parameters related to drinking water quality. The lab reports are included as an **APPENDIX C**.

Results from TW1

The water samples collected from TW1 were analyzed by the lab for a comprehensive list of parameters, including:

- Hardness, Total Dissolved Solids (TDS)
- Anions (including chloride, fluoride, nitrate, nitrite, sulphate, sulphide)
- Cyanide
- Bacteria (E. coli, total coliforms)
- Metals (including antimony, arsenic, barium, boron, cadmium, chromium, selenium, uranium)
- Volatile Organic Compounds (VOC)
- Benzo(a)pyrene (a polycyclic aromatic hydrocarbon)
- Semi-volatile organics (including Aldrin + Dieldrin and NDMA)
- Organochlorine Pesticides
- Herbicides and Pesticides.

The list included many of the parameters with an Ontario Microbiological or Chemical Drinking Water Standard (both Standards are human health-based). Review of the lab report indicates all parameters tested that have a Microbiological or Chemical Standard

were measured at levels below the Standard.

Sulphide was reported at a concentration of 0.182 mg/L. This concentration exceeds the aesthetic-based Ontario Drinking Water Objective of 0.05 mg/L. The Ministry notes that aesthetic criteria do not affect the safety of a water supply but may cause objectionable effects or render water unsuitable for domestic use. In this case, the elevated sulphide may result in some unpleasant odour in the water but should not otherwise prevent the water from being used for domestic supply.

Hardness was reported at a concentration of 365 mg/L (as $CaCO_3$), which exceeds the Ontario Drinking Water Operational Guideline of 80 - 100 mg/L (as $CaCO_3$). The Ministry notes that operational guidelines are established for parameters that, if not controlled, may negatively affect efficient and effective treatment, disinfection, and distribution of the water. Elevated hardness is a common occurrence in both municipal and private well supplies in Ontario. For private well systems the solution is often a home-based water softener.

Results from TW2

The water samples collected from TW2 were analyzed by the lab for a reduced number of parameters compared with TW1. Two sets of samples collected from TW2 were tested for nitrate and nitrite, E. coli and total coliforms, and a list of approximately 40 parameters that are part of a total metals scan.

Nitrate and nitrite were below the laboratory detection limit in both samples. E. coli and total coliforms were not detected in either sample.

In the metals scan, lead was reported at a concentration of 0.0219 mg/L in the first sample and 0.00668 mg/L in the second sample. The Ontario Drinking Water Chemical Standard for lead is 0.01 mg/L. Iron was reported at a concentration of 1.11 mg/L in the first sample and 0.355 mg/L in the second sample. The aesthetic Ontario Drinking Water Objective for iron is 0.3 mg/L. Manganese was reported at concentrations of 0.0399 mg/L in the first sample and 0.0148 mg/L in the second sample. The aesthetic Ontario Drinking Water Objective for manganese is 0.05 mg/L. Iron and manganese concentrations above the aesthetic drinking water objectives are common occurrences in both municipal and private well supplies.

Results from TW3

The lab analyses performed on all three sets of samples collected at TW3 included nitrate, nitrite, E. coli, total coliforms, and a metals scan of approximately 40 parameters.

The two samples from the first day of testing had reported nitrate concentrations of 4.7 and 5.3 mg/L (N). The Ontario Drinking Water Chemical Standard for nitrate is 10 mg/L (N). E. coli and total coliforms were not detected. Arsenic was reported at concentrations of 0.0203 and 0.0502 mg/L. The Ontario Drinking Water Chemical Standard for arsenic is 0.01 mg/L. Lead was reported at concentrations of 0.123 mg/L and 0.332 mg/L. As noted previously, the Ontario Drinking Water Chemical Standard for lead is 0.01 mg/L. It was noted at the time of sampling that there was some turbidity in the pump discharge water.

The one set of samples collected on the second day of testing had a reported nitrate concentration of 5 mg/L (N). E. coli and total coliforms were not detected. Lead was reported at 0.0052 mg/L, now below the Ontario Drinking Water Standard of 0.01 mg/L. Arsenic was reported as below the detection limit (<0.001mg/L). Iron was reported at 0.671 mg/L and manganese was reported at 0.0145 mg/L. It was noted that the clarity of the water had improved at the time of sampling compared with what was observed on the first day of sampling.

Based on these results, it is possible that turbidity in the well water at the time of sample collection on the first day may have affected the measured lead and arsenic levels in that sample.

3.0 WATER SUPPLY REQUIREMENTS AND AQUIFER YIELD

The results from the 3 test wells indicate that on average individual wells can easily meet the needs of single-family homes at the site. However, it is important to consider the total number of homes in relation to the expected aquifer yield at the site.

The proposed residential development presently under consideration includes up to 50 single-family residential units. Using the MECP peak flow rate requirement of 15 L/min over a 2-hour period, a daily flow requirement per home can be estimated at 1,800 L/day. At maximum build out (50 homes), maximum water demand can be estimated at 90,000 L/day (62.5 L/min; 1 L/s). Adding a 50% safety factor to the maximum water demand brings the total up to 135,000 L/day (94 L/min; 1.5 L/s).

The pumping rates used for each of the 3 test well pumping tests were identical at 65,520 L/day (45.5 L/min; 0.76 L/s), which is approximately 70% of the estimated maximum demand for all 50 lots, and 49% of the estimated maximum demand with a 50% safety factor added. Review of the pumping test data in more detail is warranted to evaluate

whether additional well yield is available above that of the pumping rate used for the well tests. Graphs to facilitate this review are available in **APPENDIX B**.

The pumping test at TW1indicates that the well specific capacity after 6 hours of pumping at 45.5 L/min was approximately 8.6 L/min/m of drawdown. Projecting the drawdown trend out to a hypothetical time of 1 day of continuous pumping indicates that the well specific capacity would have been approximately 6.1 L/min/m of drawdown. The available drawdown to the base of the inner casing at TW1 is approximately 19 m, so the specific capacity information indicates that the one-day yield of TW1 alone (19 m x 6.1 L/min/m x 50% additional S.F. = 58 L/min or 83,450 L/day) can meet about 90% of the expected maximum demand for a 50-lot subdivision.

The pumping test at TW2 indicates that the well water level dropped below the inner well casing approximately 240 minutes into the pumping test, yet the well was still able to sustain the test flow rate for the remainder of the 6-hour test. The projected pumping water level at 1 day would have been approximately 52.1 m, which is about 20 m above the bottom of the test well. However, the test data indicates that the one-day yield of TW2 should not exceed the pumping test rate of 45.5 L/min (65,520 L/day).

The pumping test at TW3 indicates that the well water level declined by 13 m over the first 45 minutes and then recovered for the remainder of the test. As noted previously, the observed recovery during the pumping test may be related to ongoing development of the fractures as the well was being pumped. It could also possibly have reflected interference from another nearby private well in Arkell. The drawdown after 6 hours of pumping had recovered to 8.2 m, and the well water level had essentially reached full recovery to the pre-test condition 75 minutes after the pump shutdown. The specific capacity of TW3 prior to pump shutdown was approximately 5.6 L/min/m of drawdown and the pumping level was measured at 24.1 m. The base of the inner well casing is at a depth of approximately 48 m indicating that an additional drawdown of approximately 24 m was available at the end of the pumping test. Using only 50% of the apparent remaining available drawdown indicates that well capacity is over 110 L/min (158,400 L/day). The results indicate that the well capacity of TW3 can meet the maximum demand for a 50-lot subdivision.

4.0 SUMMARY AND CONCLUSIONS

A review of background information including existing water well record information indicates that a multi-aquifer system exists in the vicinity of the Hamlet of Arkell, including the proposed development property. The multi-aquifer system consists of the following geological units, in descending order:

Guelph Fm. - Upper Aquifer
Eramosa Fm. - Intermediate Aquitard/Aquifer
Gasport Fm. - Lower Aquifer.

It is evident from the water well record information that both the Guelph Fm. and Gasport Fm. aquifers have met the water quantity needs of residences and businesses in the Arkell area for many years.

Three test wells (TW1/2022 - TW3/2022) were constructed and tested as part of a groundwater supply assessment for the proposed development property. The wells were constructed in the lower aquifer (Gasport Fm.) to evaluate whether the lower aquifer alone could meet the water supply requirements of up to 50 new residential lots on the property. The upper aquifer (Guelph Fm.) was not considered in the test well program.

The results from 3 test wells indicate that the Gasport Fm. aquifer (lower aquifer) can meet the water quantity requirements of new individual lots on the proposed development property. Further, interpretation of the test well performance indicates that the aquifer can support the water quantity requirements associated with 50 new residential lots at the site.

Overall, the water quality test results indicate that groundwater produced from the 3 test wells is potable, as most of the parameters tested with an Ontario Drinking Water Standards Maximum Acceptable Concentration (MAC) were within the MAC. The marginally elevated arsenic concentrations reported at TW3, and the marginally elevated lead concentrations reported at TW2 and TW3 may be related to particulate in the water at the time of sampling. Additional well development, sampling and lab testing could be considered to further assess the levels of arsenic and lead in the well water.

Construction of new supply wells associated with a multi-lot residential development on the property has the potential for interference to occur among individual wells as the development is built out. This interference could come in the form of (a) turbidity interference resulting from the process of well drilling and development and (b) water level interference when the wells are operating. The turbidity interference is a temporary problem that should dissipate after the well drilling and development operations are complete. Notification of adjacent well owners and monitoring when each new well is constructed will help to mitigate potential turbidity interference. Measures to minimize the effects of water level interference include optimizing the pump settings to maximize

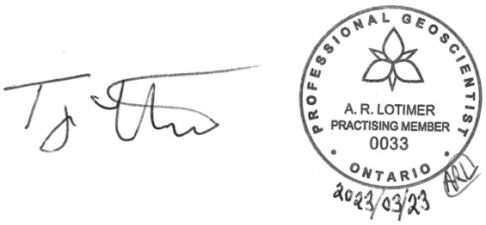
drawdown in each of the individual wells. Consideration could also be given to implementing an outdoor water use bylaw or similar instrument to manage water use during the warm weather months of the year when water demand is higher.

5.0 RECOMMENDATION

Consideration should be given to implementing a well water level monitoring program for new supply wells serving the proposed residential development. The program would require that each well be equipped with an access tube designed to facilitate measuring water levels.

Prepared by:

ARL GROUNDWATER RESOURCES LTD.



A.R. (Tony) Lotimer, M.Sc., P.Geo.
Principal Hydrogeologist

FIGURE 4: Arkell Test Well TW1
Pumping Water Level vs. Elapsed Time

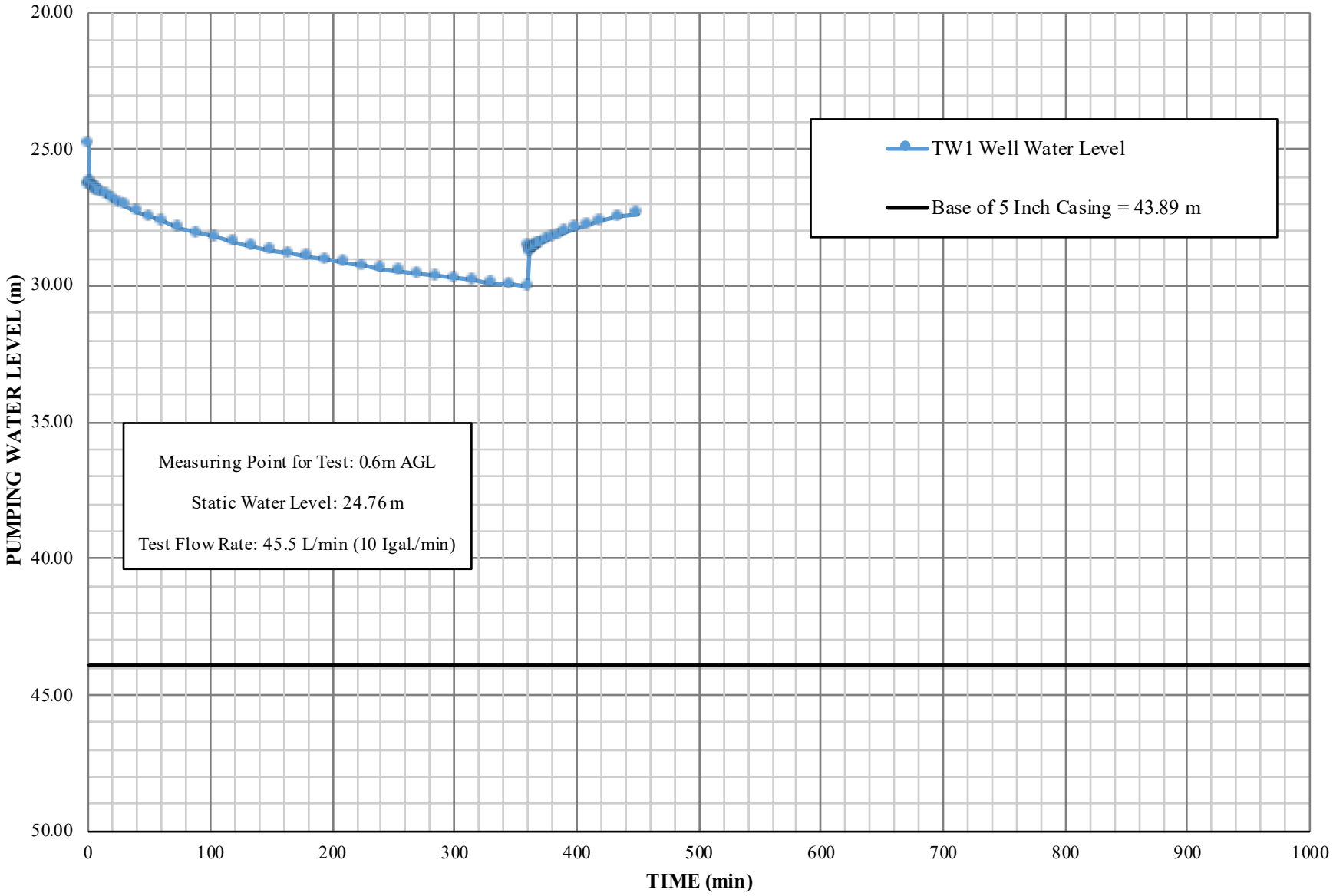


FIGURE 5: Arkell Test Well TW2
Pumping Water Level vs. Elapsed Time

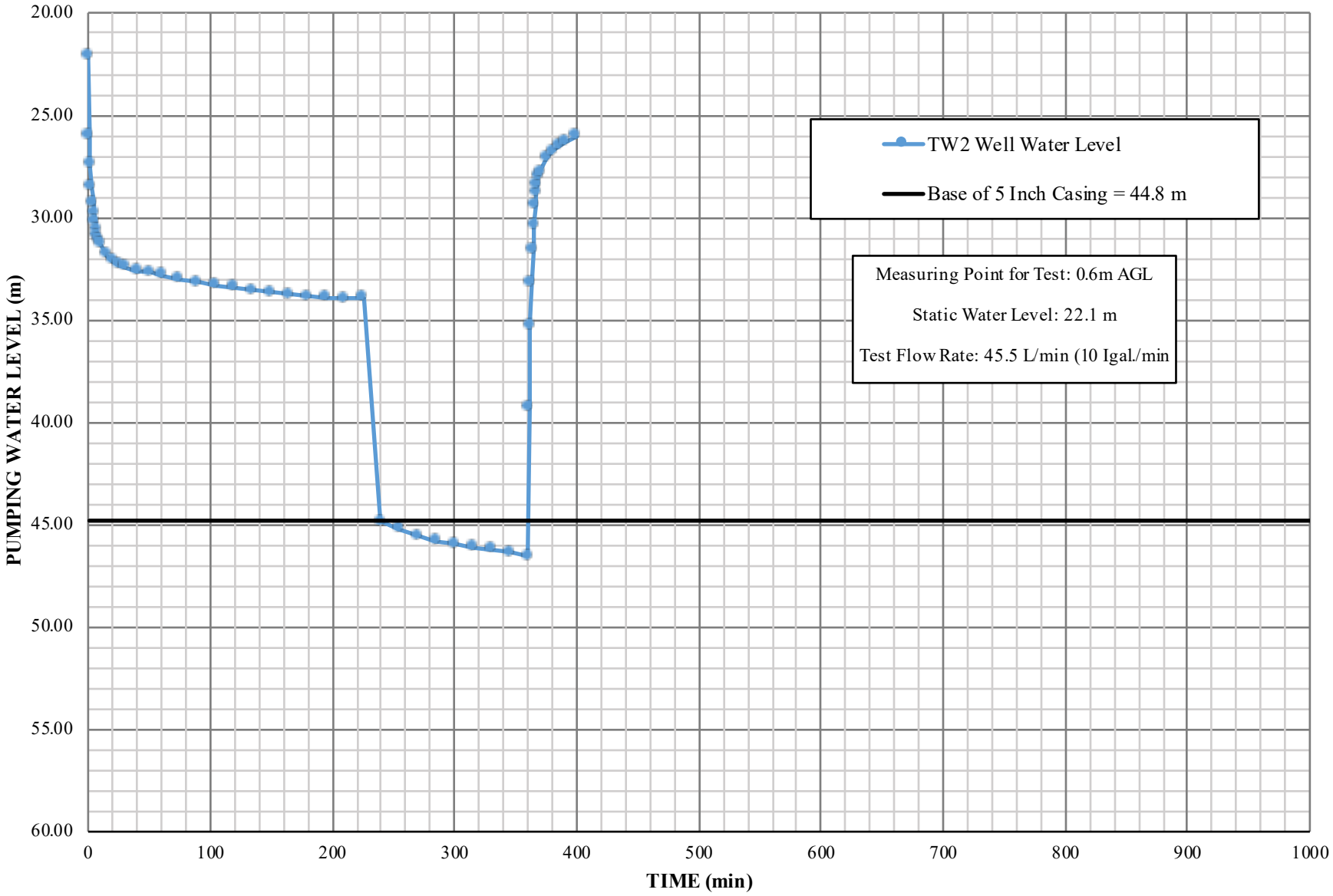
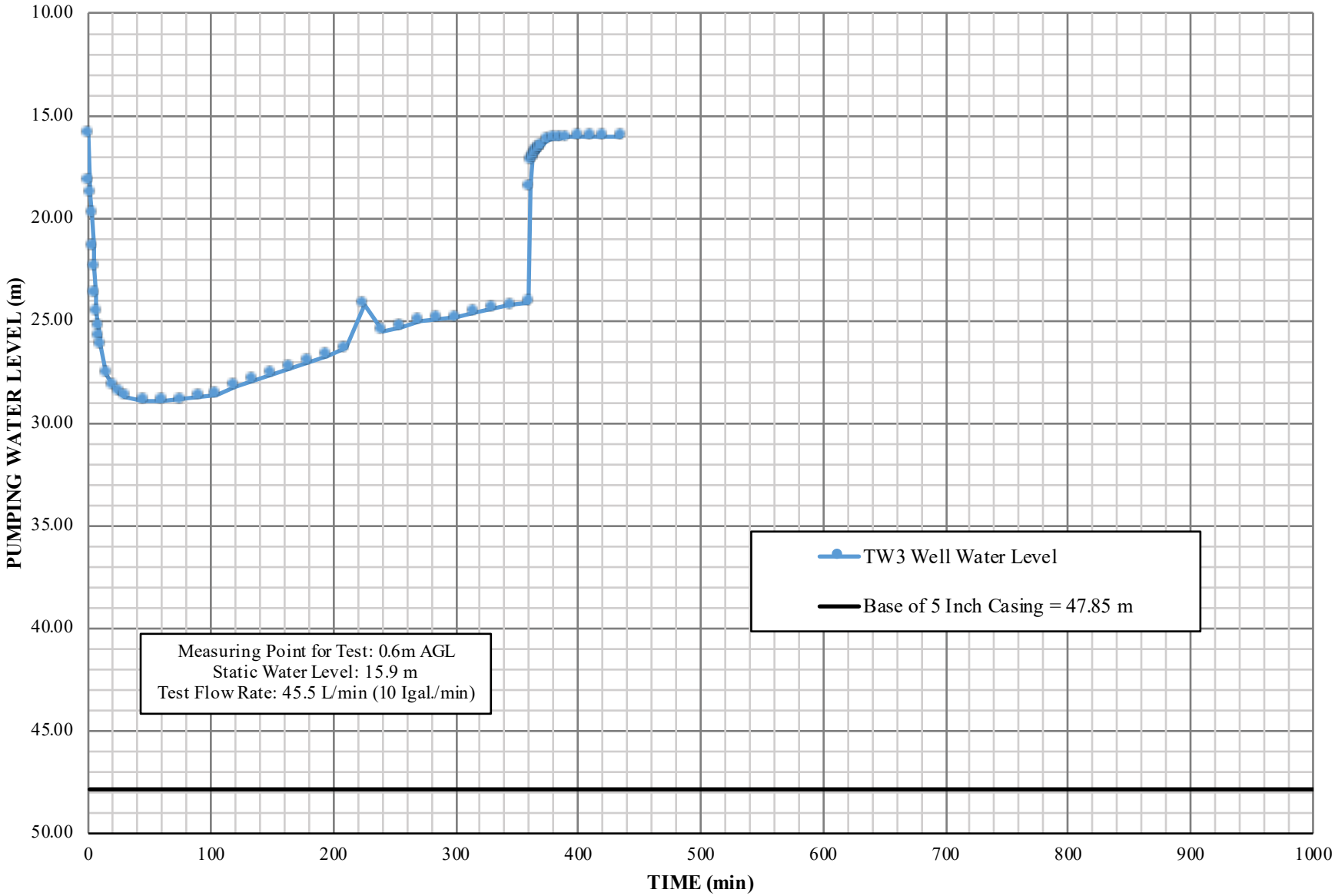


FIGURE 6: Arkell Test Well TW3
Pumping Water Level vs. Elapsed Time



APPENDIX A

WATER WELL RECORDS

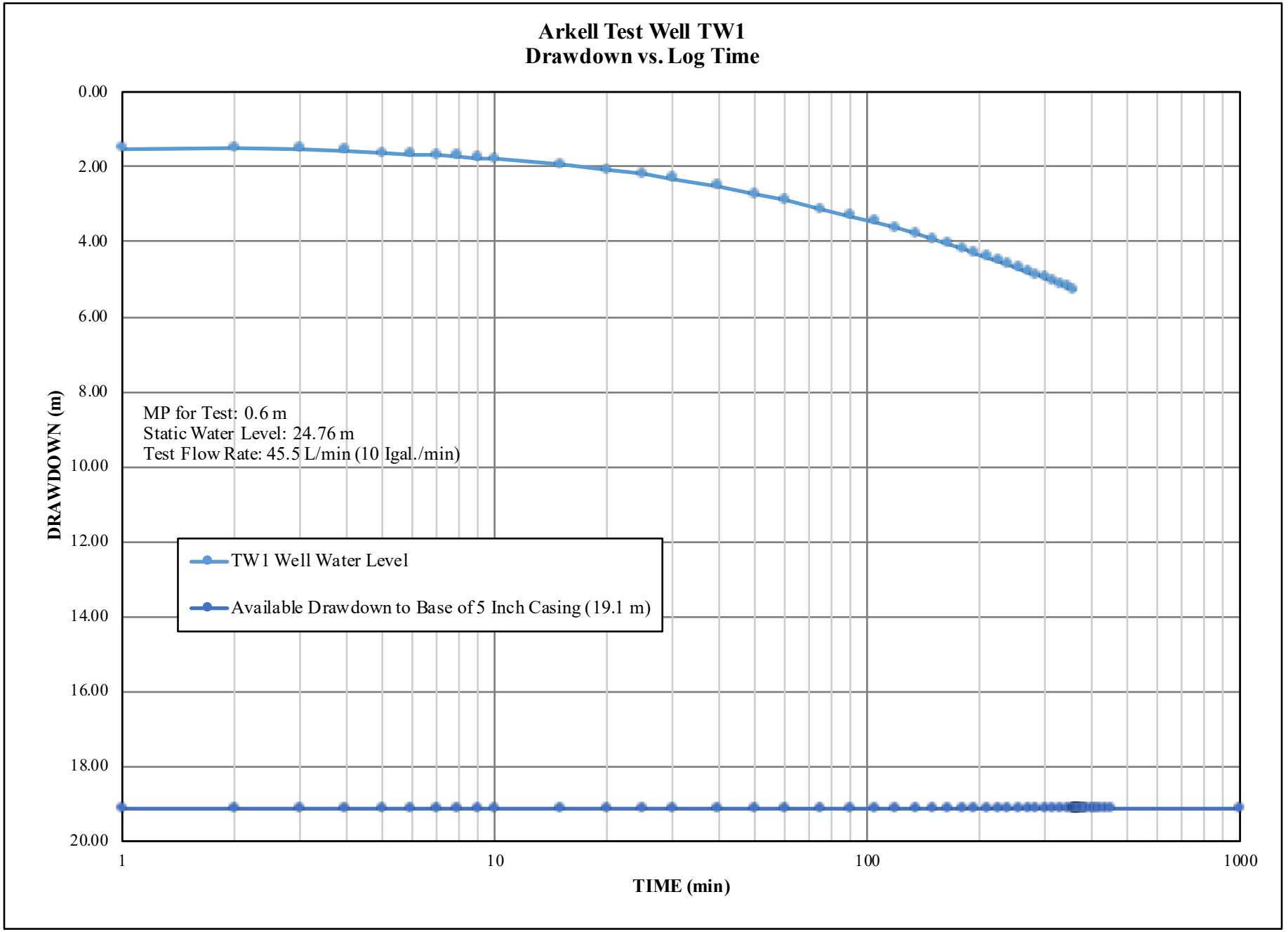
FOR THE TEST WELLS (2022)

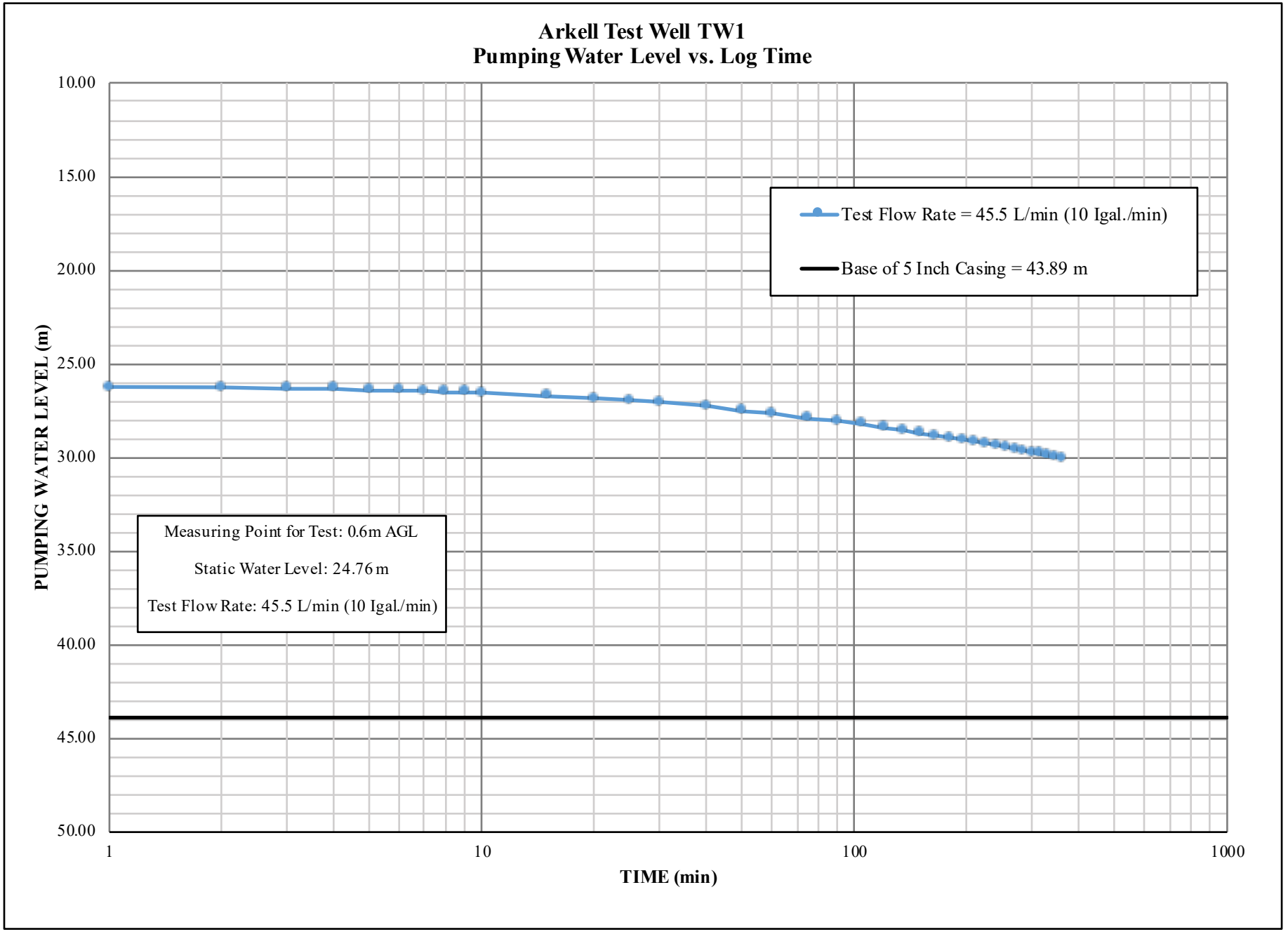
APPENDIX B

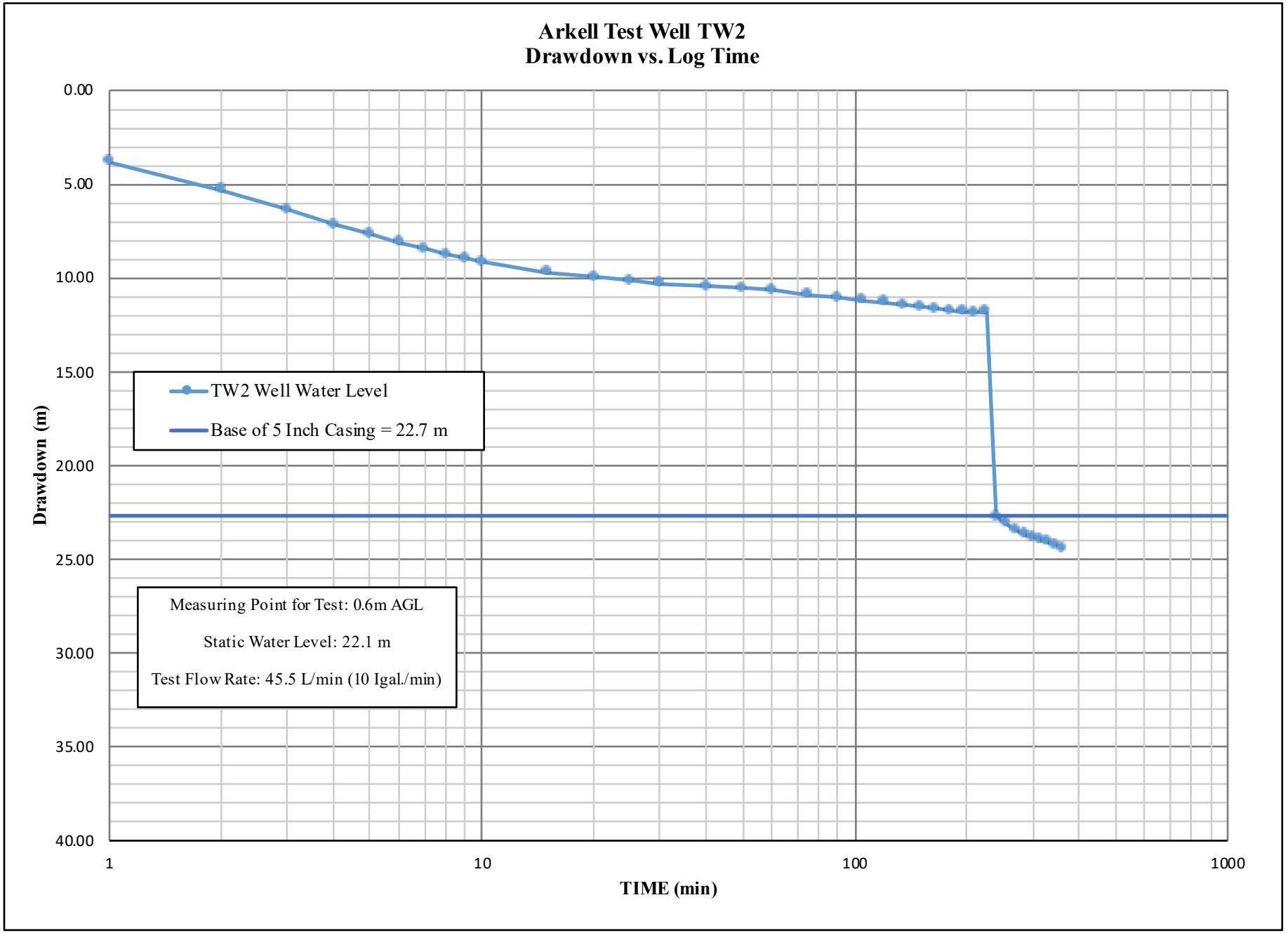
ADDITIONAL GRAPHS FROM THE PUMPING TESTS

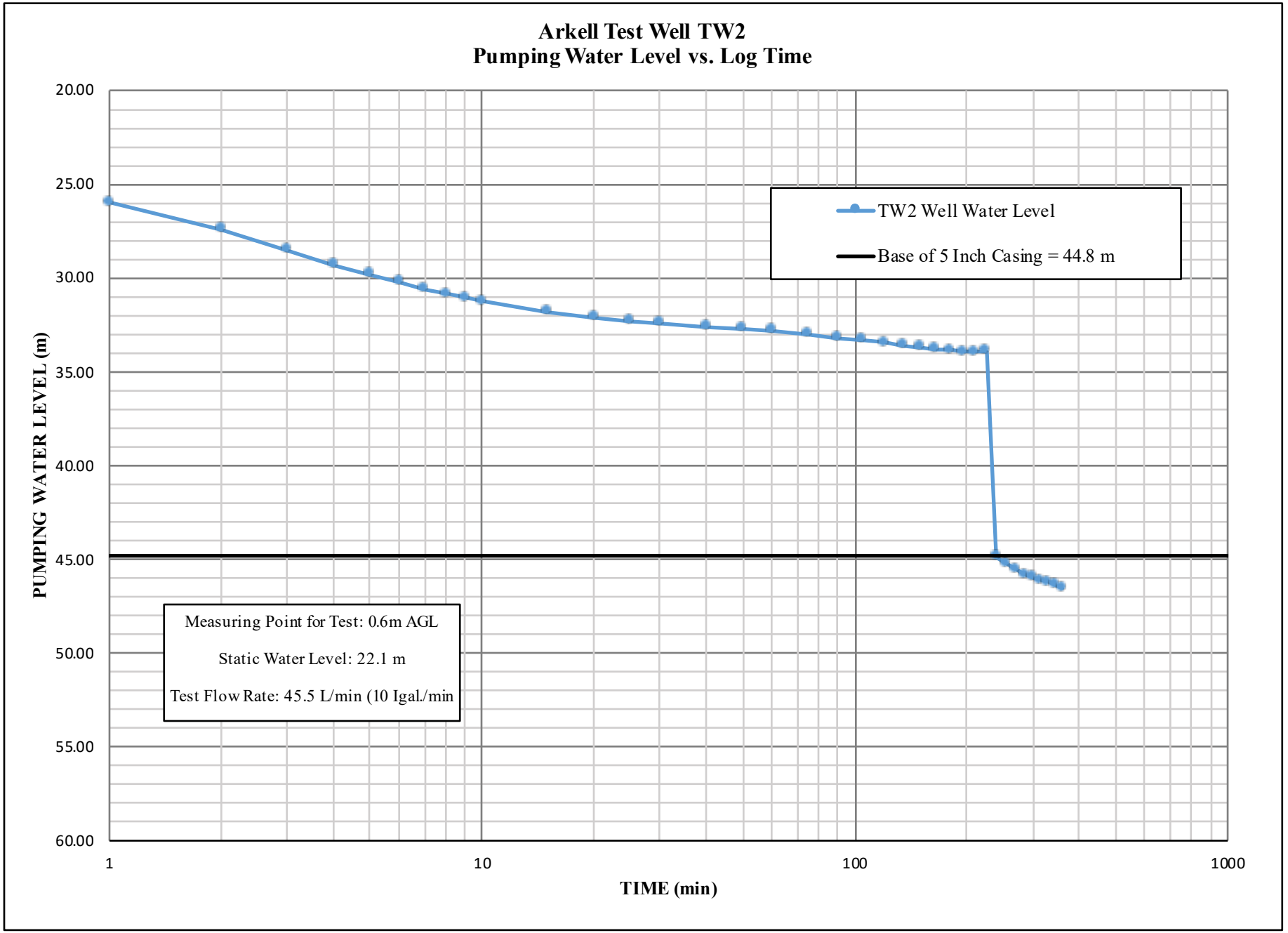
AT THE TEST WELLS

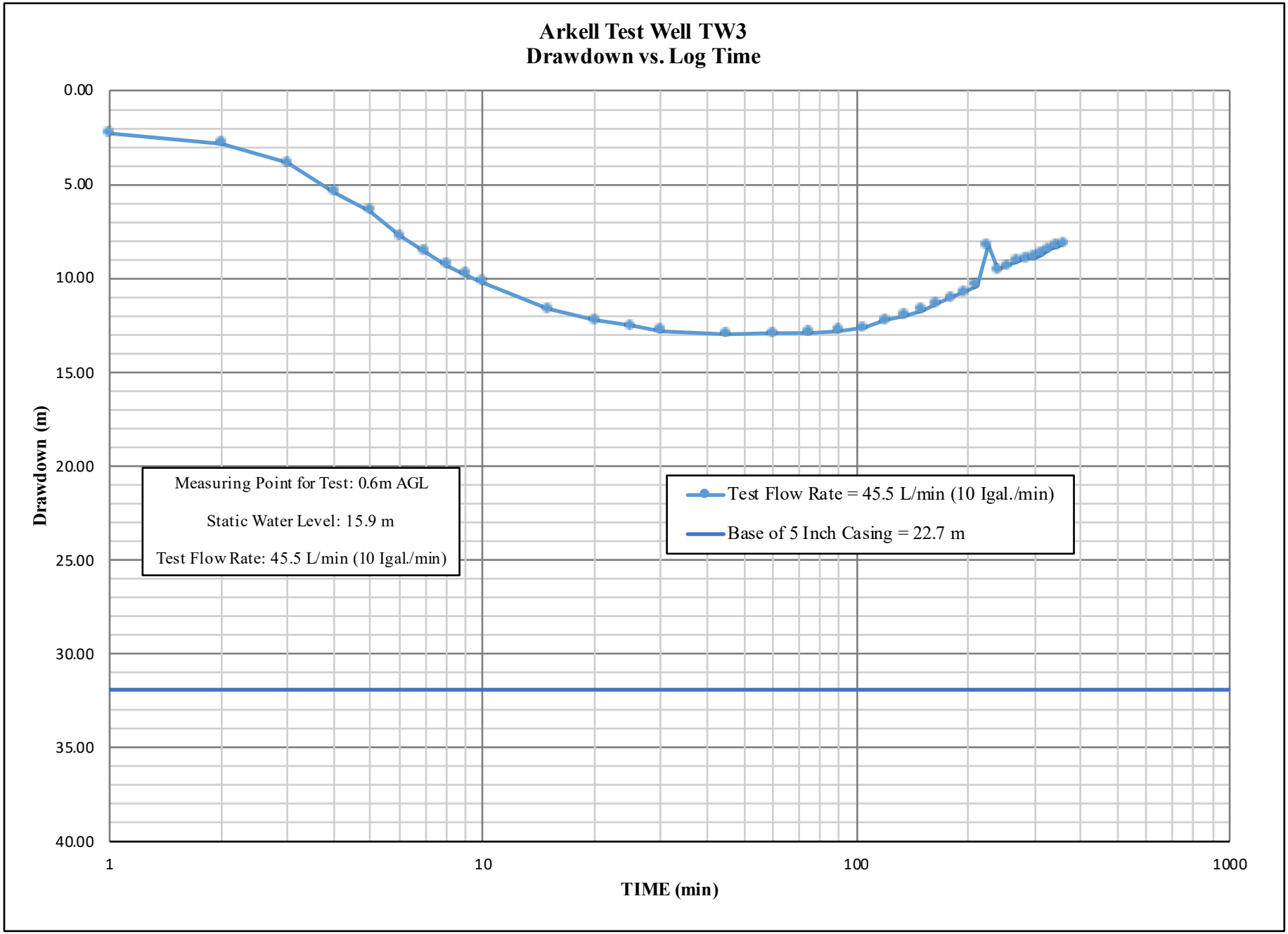
(NOVEMBER 2022)

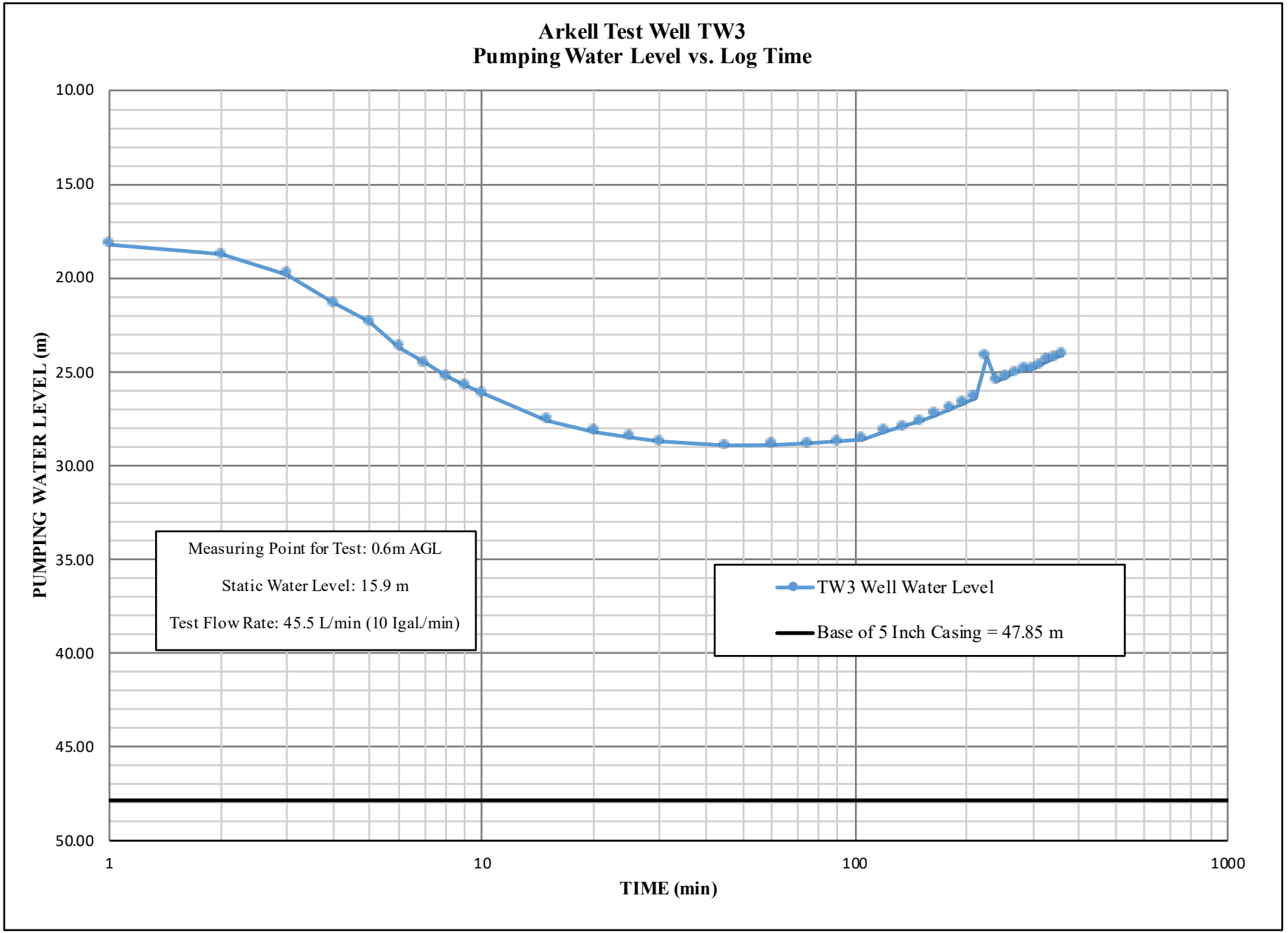

Arkell Test Well TW1
Drawdown vs. Log Time
DRAWDOWN (m)
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
18.00
20.00
MP for Test: 0.6 m
Static Water Level: 24.76 m
Test Flow Rate: 45.5 L/min (10 Igal./min)
TW1 Well Water Level
Available Drawdown to Base of 5 Inch Casing (19.1 m)
1
10
100
1000
TIME (min)


Arkell Test Well TW1
Pumping Water Level vs. Log Time
PUMPING WATER LEVEL (m)
10.00
15.00
20.00
25.00
30.00
35.00
40.00
45.00
50.00
1
10
100
1000
TIME (min)
Test Flow Rate = 45.5 L/min (10 Igal./min)
Base of 5 Inch Casing = 43.89 m
Measuring Point for Test: 0.6m AGL
Static Water Level: 24.76 m
Test Flow Rate: 45.5 L/min (10 Igal./min)


Arkell Test Well TW2
Drawdown vs. Log Time
0.00
5.00
10.00
15.00
20.00
25.00
30.00
35.00
40.00
Drawdown (m)
1
10
100
1000
TIME (min)
TW2 Well Water Level
Base of 5 Inch Casing = 22.7 m
Measuring Point for Test: 0.6m AGL
Static Water Level: 22.1 m
Test Flow Rate: 45.5 L/min (10 Igal./min)


Arkell Test Well TW2
Pumping Water Level vs. Log Time
PUMPING WATER LEVEL (m)
20.00
25.00
30.00
35.00
40.00
45.00
50.00
55.00
60.00
1
10
100
1000
TIME (min)
TW2 Well Water Level
Base of 5 Inch Casing = 44.8 m
Measuring Point for Test: 0.6m AGL
Static Water Level: 22.1 m
Test Flow Rate: 45.5 L/min (10 Igal./min


Arkell Test Well TW3
Drawdown vs. Log Time
0.00
5.00
10.00
15.00
20.00
25.00
30.00
35.00
40.00
Drawdown (m)
1
10
100
1000
TIME (min)
Measuring Point for Test: 0.6m AGL
Static Water Level: 15.9 m
Test Flow Rate: 45.5 L/min (10 Igal./min)
Test Flow Rate = 45.5 L/min (10 Igal./min)
Base of 5 Inch Casing = 22.7 m


Arkell Test Well TW3
Pumping Water Level vs. Log Time
PUMPING WATER LEVEL (m)
10.00
15.00
20.00
25.00
30.00
35.00
40.00
45.00
50.00
1
10
100
1000
TIME (min)
Measuring Point for Test: 0.6m AGL
Static Water Level: 15.9 m
Test Flow Rate: 45.5 L/min (10 Igal./min)
TW3 Well Water Level
Base of 5 Inch Casing = 47.85 m

APPENDIX C

LAB REPORTS ON WATER QUALITY TESTING AT THE TEST WELLS (2022)

Results Summary L2741043

Job Reference	ARKELL PROPERTY
Report To	Scott Stovel , CASH CLIENTS - WATERLOO
Date Received	21-Nov-2022 15:00
Report Date	9-Dec-2022 8:11
Report Version	1

Guideline: [Suite] - ON-DW-STANDARD+GUIDELINES - Ontario Drinking Water Regulation (ODWQS) JAN.1,2020

Category: Ontario DW Aesthetic and Operational Guidelines (June, 2006)

Parameter	Guideline Limit	Lowest Detection Limit	Units	Min	Client Sample ID (Min)	Max	Client Sample ID (Max)
Physical Tests (Water)							
Color, True		2.0	T.C.U.	3.6	TW 1	3.6	TW 1
Hardness (as CaCO3)	80 -> 100	2.4	mg/L	365	TW 1	365	TW 1
pH	6.5 -> 8.5	0.10	pH units	8.23	TW 1	8.23	TW 1
Total Dissolved Solids	500 (U)	20	mg/L	446	TW 1	446	TW 1
Anions and Nutrients (Water)							
Alkalinity, Total (as CaCO3)	30 -> 500	10	mg/L	226	TW 1	226	TW 1
Ammonia, Total (as N)		0.010	mg/L	0.174	TW 1	0.174	TW 1
Chloride (Cl)	250 (U)	0.50	mg/L	31	TW 1	31	TW 1
Fluoride (F)		0.10	mg/L	0.89	TW 1	0.89	TW 1
Nitrate (as N)		0.020	mg/L	<0.020	TW 1	<0.020	TW 1
Nitrite (as N)		0.010	mg/L	<0.010	TW 1	<0.010	TW 1
Total Kjeldahl Nitrogen		0.050	mg/L	0.252	TW 1	0.252	TW 1
Total Organic Nitrogen		0.050	mg/L	0.078	TW 1	0.078	TW 1
Phosphorus, Total		0.0030	mg/L	0.0066	TW 1	0.0066	TW 1
Sulfate (SO4)	500 (U)	0.30	mg/L	107	TW 1	107	TW 1
Sulphide (as S)	0.05 (U)	0.018	mg/L	0.182	TW 1	0.182	TW 1
Cyanides (Water)							
Cyanide, Free		2.0	ug/L	<2.0	TW 1	<2.0	TW 1
Organic / Inorganic Carbon (Water)							
Dissolved Carbon Filtration Location			-				
Dissolved Organic Carbon	5 (U)	0.50	mg/L	<0.50	TW 1	<0.50	TW 1
Bacteriological Tests (Water)							
Escherichia Coli			MPN/100mL	0	TW 1	0	TW 1
Heterotrophic Plate Count			CFU/mL	58	TW 1	58	TW 1
Total Coliforms			MPN/100mL	0	TW 1	0	TW 1
Total Metals (Water)							

Results Summary L2741043

Job Reference ARKELL PROPERTY
Report To Scott Stovel , CASH CLIENTS - WATERLOO
Date Received 21-Nov-2022 15:00
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Report Version 1

Guideline: [Suite] - ON-DW-STANDARD+GUIDELINES - Ontario Drinking Water Regulation (ODWQS) JAN.1,2020
Category: Ontario DW Aesthetic and Operational Guidelines (June, 2006)

Parameter	Guideline Limit	Lowest Detection Limit	Units	Min	Client Sample ID (Min)	Max	Client Sample ID (Max)
Antimony (Sb)		0.60	ug/L	5.5	TW 1	5.5	TW 1
Arsenic (As)		1.0	ug/L	6.1	TW 1	6.1	TW 1
Barium (Ba)		10	ug/L	32	TW 1	32	TW 1
Boron (B)		50	ug/L	<50	TW 1	<50	TW 1
Cadmium (Cd)		0.10	ug/L	<0.10	TW 1	<0.10	TW 1
Calcium (Ca)		0.50	mg/L	88.9	TW 1	88.9	TW 1
Chromium (Cr)		1.0	ug/L	1	TW 1	1	TW 1
Magnesium (Mg)		0.50	mg/L	34.7	TW 1	34.7	TW 1
Selenium (Se)		5.0	ug/L	<5.0	TW 1	<5.0	TW 1
Uranium (U)		5.0	ug/L	<5.0	TW 1	<5.0	TW 1
Volatile Organic Compounds (Water)							
Benzene		0.50	ug/L	<0.50	TW 1	<0.50	TW 1
Carbon tetrachloride		0.20	ug/L	<0.20	TW 1	<0.20	TW 1
Monochlorobenzene	30 (U)	0.50	ug/L	<0.50	TW 1	<0.50	TW 1
1,2-Dichlorobenzene	3 (U)	0.50	ug/L	<0.50	TW 1	<0.50	TW 1
1,4-Dichlorobenzene	1 (U)	0.50	ug/L	<0.50	TW 1	<0.50	TW 1
1,2-Dichloroethane		0.50	ug/L	<0.50	TW 1	<0.50	TW 1
1,1-dichloroethylene (vinylidene chlorid		0.50	ug/L	<0.50	TW 1	<0.50	TW 1
Dichloromethane		5.0	ug/L	<5.0	TW 1	<5.0	TW 1
Ethylbenzene	2.4 (U)	0.50	ug/L	<0.50	TW 1	<0.50	TW 1
Tetrachloroethylene (perchloroethylene)		0.50	ug/L	<0.50	TW 1	<0.50	TW 1
Toluene	24 (U)	0.50	ug/L	<0.50	TW 1	<0.50	TW 1
Trichloroethylene		0.50	ug/L	<0.50	TW 1	<0.50	TW 1
Vinyl chloride		0.20	ug/L	<0.20	TW 1	<0.20	TW 1
o-xylene		0.50	ug/L	<0.50	TW 1	<0.50	TW 1
m/p-xylene		1.0	ug/L	<1.0	TW 1	<1.0	TW 1
Xylenes (Total)	300 (U)	1.5	ug/L	<1.5	TW 1	<1.5	TW 1
4-Bromofluorobenzene			%	89.7	TW 1	89.7	TW 1
1,4-Difluorobenzene			%	97.9	TW 1	97.9	TW 1
Polycyclic Aromatic Hydrocarbons (Water)							
Benzo(a)pyrene		0.0050	ug/L	<0.0050	TW 1	<0.0050	TW 1

Results Summary L2741043

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Date Received 21-Nov-2022 15:00
Report Date 9-Dec-2022 8:11
Report Version 1
Guideline: [Suite] - ON-DW-STANDARD+GUIDELINES - Ontario Drinking Water Regulation (ODWQS) JAN.1,2020
Category: Ontario DW Aesthetic and Operational Guidelines (June, 2006)

Parameter	Guideline Limit	Lowest Detection Limit	Units	Min	Client Sample ID (Min)	Max	Client Sample ID (Max)
Chrysene d12			%	84.3	TW 1	84.3	TW 1
Semi-Volatile Organics (Water)							
Aldrin + Dieldrin		0.14	ug/L	<0.14	TW 1	<0.14	TW 1
N-Nitrosodimethylamine		0.00090	ug/L	<0.00090	TW 1	<0.00090	TW 1
N-Nitrosodimethylamine-d6			%	105	TW 1	105	TW 1
Organochlorine Pesticides (Water)							
a-chlordane		0.10	ug/L	<0.10	TW 1	<0.10	TW 1
g-chlordane		0.10	ug/L	<0.10	TW 1	<0.10	TW 1
pp-DDD		0.10	ug/L	<0.10	TW 1	<0.10	TW 1
pp-DDE		0.10	ug/L	<0.10	TW 1	<0.10	TW 1
op-DDT		0.10	ug/L	<0.10	TW 1	<0.10	TW 1
pp-DDT		0.10	ug/L	<0.10	TW 1	<0.10	TW 1
Oxychlordane		0.10	ug/L	<0.10	TW 1	<0.10	TW 1
Decachlorobiphenyl			%	116.8	TW 1	116.8	TW 1
Tetrachloro-m-xylene			%	117.1	TW 1	117.1	TW 1
Herbicides (Water)							
AMPA		0.50	ug/L	<0.50	TW 1	<0.50	TW 1
Bromoxynil		0.20	ug/L	<0.20	TW 1	<0.20	TW 1
2,4-D		0.20	ug/L	<0.20	TW 1	<0.20	TW 1
Dicamba		0.20	ug/L	<0.20	TW 1	<0.20	TW 1
Dinoseb		0.20	ug/L	<0.20	TW 1	<0.20	TW 1
Glyphosate		5.0	ug/L	<5.0	TW 1	<5.0	TW 1
MCPA		0.20	ug/L	<0.20	TW 1	<0.20	TW 1
Picloram		0.20	ug/L	<0.20	TW 1	<0.20	TW 1
2,4,5-TP		0.20	ug/L	<0.20	TW 1	<0.20	TW 1
2,4-Dichlorophenylacetic Acid			%	112	TW 1	112	TW 1
Carbamate Pesticides (Water)							
Aldicarb		0.90	ug/L	<0.90	TW 1	<0.90	TW 1

Results Summary L2741043

Job Reference ARKELL PROPERTY
Report To Scott Stovel , CASH CLIENTS - WATERLOO
Date Received 21-Nov-2022 15:00
Report Date 9-Dec-2022 8:11
Report Version 1

Guideline: [Suite] - ON-DW-STANDARD+GUIDELINES - Ontario Drinking Water Regulation (ODWQS) JAN.1,2020
Category: Ontario DW Aesthetic and Operational Guidelines (June, 2006)

Parameter	Guideline Limit	Lowest Detection Limit	Units	Min	Client Sample ID (Min)	Max	Client Sample ID (Max)
Pesticides (Water)							
Alachlor		0.10	ug/L	<0.10	TW 1	<0.10	TW 1
Atrazine		0.10	ug/L	<0.10	TW 1	<0.10	TW 1
Atrazine & Metabolites		0.20	ug/L	<0.20	TW 1	<0.20	TW 1
Azinphos-methyl		0.10	ug/L	<0.10	TW 1	<0.10	TW 1
Carbaryl		0.20	ug/L	<0.20	TW 1	<0.20	TW 1
Carbofuran		0.20	ug/L	<0.20	TW 1	<0.20	TW 1
Chlorpyriphos		0.10	ug/L	<0.10	TW 1	<0.10	TW 1
Diazinon		0.10	ug/L	<0.10	TW 1	<0.10	TW 1
2,4-Dichlorophenol	0.3 (U)	0.30	ug/L	<0.30	TW 1	<0.30	TW 1
Dimethoate		0.10	ug/L	<0.10	TW 1	<0.10	TW 1
Diquat		1.0	ug/L	<1.0	TW 1	<1.0	TW 1
Diuron		1.0	ug/L	<1.0	TW 1	<1.0	TW 1
Atrazine-desethyl		0.10	ug/L	<0.10	TW 1	<0.10	TW 1
Malathion		0.10	ug/L	<0.10	TW 1	<0.10	TW 1
Diclofop-methyl		0.20	ug/L	<0.20	TW 1	<0.20	TW 1
Metolachlor		0.10	ug/L	<0.10	TW 1	<0.10	TW 1
Metribuzin		0.10	ug/L	<0.10	TW 1	<0.10	TW 1
Paraquat		1.0	ug/L	<1.0	TW 1	<1.0	TW 1
Pentachlorophenol	30 (U)	0.50	ug/L	<0.50	TW 1	<0.50	TW 1
Phorate		0.10	ug/L	<0.10	TW 1	<0.10	TW 1
Prometryne		0.10	ug/L	<0.10	TW 1	<0.10	TW 1
Simazine		0.10	ug/L	<0.10	TW 1	<0.10	TW 1
Terbufos		0.20	ug/L	<0.20	TW 1	<0.20	TW 1
2,3,4,6-Tetrachlorophenol	1 (U)	0.50	ug/L	<0.50	TW 1	<0.50	TW 1
Triallate		0.10	ug/L	<0.10	TW 1	<0.10	TW 1
2,4,6-Trichlorophenol	2 (U)	0.50	ug/L	<0.50	TW 1	<0.50	TW 1
Trifluralin		0.10	ug/L	<0.10	TW 1	<0.10	TW 1
2-Fluorobiphenyl			%	87.7	TW 1	87.7	TW 1
2,4,6-Tribromophenol			%	83.6	TW 1	83.6	TW 1

Qualifier Legend
HTC

Results Summary L2741043

Job Reference	ARKELL PROPERTY
Report To	Scott Stovel , CASH CLIENTS - WATERLOO
Date Received	21-Nov-2022 15:00
Report Date	9-Dec-2022 8:11
Report Version	1

Guideline: [Suite] - ON-DW-STANDARD+GUIDELINES - Ontario Drinking Water Regulation (ODWQS) JAN.1,2020

Category: Ontario DW Aesthetic and Operational Guidelines (June, 2006)

Parameter	Guideline Limit	Lowest Detection Limit	Units	Min	Client Sample ID (Min)	Max	Client Sample ID (Max)
DLDS							
SRU							

Exceeds Guideline Limit

Detection Limit Exceeds Guideline

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.

Results Summary L2741043

Job Reference	ARKELL PROPERTY
Report To	Scott Stovel , CASH CLIENTS - WATERLOO
Date Received	21-Nov-2022 15:00
Report Date	9-Dec-2022 8:11
Report Version	1

Guideline: [Suite] - ON-DW-STANDARD+GUIDELINES - Ontario Drinking Water Regulation (ODWQS) JAN.1,2020

Category: Schedule 1 (Microbiological) and 2 (Chemical) Standards (JAN,2020)

Parameter	Guideline Limit	Lowest Detection Limit	Units	Min	Client Sample ID (Min)	Max	Client Sample ID (Max)
Physical Tests (Water)							
Color, True		2.0	T.C.U.	3.6	TW 1	3.6	TW 1
Hardness (as CaCO3)		2.4	mg/L	365	TW 1	365	TW 1
pH		0.10	pH units	8.23	TW 1	8.23	TW 1
Total Dissolved Solids		20	mg/L	446	TW 1	446	TW 1
Anions and Nutrients (Water)							
Alkalinity, Total (as CaCO3)		10	mg/L	226	TW 1	226	TW 1
Ammonia, Total (as N)		0.010	mg/L	0.174	TW 1	0.174	TW 1
Chloride (Cl)		0.50	mg/L	31	TW 1	31	TW 1
Fluoride (F)	1.5 (U)	0.10	mg/L	0.89	TW 1	0.89	TW 1
Nitrate (as N)	10 (U)	0.020	mg/L	<0.020	TW 1	<0.020	TW 1
Nitrite (as N)	1 (U)	0.010	mg/L	<0.010	TW 1	<0.010	TW 1
Total Kjeldahl Nitrogen		0.050	mg/L	0.252	TW 1	0.252	TW 1
Total Organic Nitrogen		0.050	mg/L	0.078	TW 1	0.078	TW 1
Phosphorus, Total		0.0030	mg/L	0.0066	TW 1	0.0066	TW 1
Sulfate (SO4)		0.30	mg/L	107	TW 1	107	TW 1
Sulphide (as S)		0.018	mg/L	0.182	TW 1	0.182	TW 1
Cyanides (Water)							
Cyanide, Free	200 (U)	2.0	ug/L	<2.0	TW 1	<2.0	TW 1
Organic / Inorganic Carbon (Water)							
Dissolved Carbon Filtration Location			-				
Dissolved Organic Carbon		0.50	mg/L	<0.50	TW 1	<0.50	TW 1
Bacteriological Tests (Water)							
Escherichia Coli	0 (U)		MPN/100mL	0	TW 1	0	TW 1
Heterotrophic Plate Count			CFU/mL	58	TW 1	58	TW 1
Total Coliforms	0 (U)		MPN/100mL	0	TW 1	0	TW 1
Total Metals (Water)							

Results Summary L2741043

Job Reference	ARKELL PROPERTY
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Guideline: [Suite] - ON-DW-STANDARD+GUIDELINES - Ontario Drinking Water Regulation (ODWQS) JAN.1,2020

Category: Schedule 1 (Microbiological) and 2 (Chemical) Standards (JAN,2020)

Parameter	Guideline Limit	Lowest Detection Limit	Units	Min	Client Sample ID (Min)	Max	Client Sample ID (Max)
Antimony (Sb)	6 (U)	0.60	ug/L	5.5	TW 1	5.5	TW 1
Arsenic (As)	10 (U)	1.0	ug/L	6.1	TW 1	6.1	TW 1
Barium (Ba)	1000 (U)	10	ug/L	32	TW 1	32	TW 1
Boron (B)	5000 (U)	50	ug/L	<50	TW 1	<50	TW 1
Cadmium (Cd)	5 (U)	0.10	ug/L	<0.10	TW 1	<0.10	TW 1
Calcium (Ca)		0.50	mg/L	88.9	TW 1	88.9	TW 1
Chromium (Cr)	50 (U)	1.0	ug/L	1	TW 1	1	TW 1
Magnesium (Mg)		0.50	mg/L	34.7	TW 1	34.7	TW 1
Selenium (Se)	50 (U)	5.0	ug/L	<5.0	TW 1	<5.0	TW 1
Uranium (U)	20 (U)	5.0	ug/L	<5.0	TW 1	<5.0	TW 1
Volatile Organic Compounds (Water)							
Benzene	1 (U)	0.50	ug/L	<0.50	TW 1	<0.50	TW 1
Carbon tetrachloride	2 (U)	0.20	ug/L	<0.20	TW 1	<0.20	TW 1
Monochlorobenzene	80 (U)	0.50	ug/L	<0.50	TW 1	<0.50	TW 1
1,2-Dichlorobenzene	200 (U)	0.50	ug/L	<0.50	TW 1	<0.50	TW 1
1,4-Dichlorobenzene	5 (U)	0.50	ug/L	<0.50	TW 1	<0.50	TW 1
1,2-Dichloroethane	5 (U)	0.50	ug/L	<0.50	TW 1	<0.50	TW 1
1,1-dichloroethylene (vinylidene chlorid	14 (U)	0.50	ug/L	<0.50	TW 1	<0.50	TW 1
Dichloromethane	50 (U)	5.0	ug/L	<5.0	TW 1	<5.0	TW 1
Ethylbenzene	140 (U)	0.50	ug/L	<0.50	TW 1	<0.50	TW 1
Tetrachloroethylene (perchloroethylene)	10 (U)	0.50	ug/L	<0.50	TW 1	<0.50	TW 1
Toluene	60 (U)	0.50	ug/L	<0.50	TW 1	<0.50	TW 1
Trichloroethylene	5 (U)	0.50	ug/L	<0.50	TW 1	<0.50	TW 1
Vinyl chloride	1 (U)	0.20	ug/L	<0.20	TW 1	<0.20	TW 1
o-xylene		0.50	ug/L	<0.50	TW 1	<0.50	TW 1
m/p-xylene		1.0	ug/L	<1.0	TW 1	<1.0	TW 1
Xylenes (Total)	90 (U)	1.5	ug/L	<1.5	TW 1	<1.5	TW 1
4-Bromofluorobenzene			%	89.7	TW 1	89.7	TW 1
1,4-Difluorobenzene			%	97.9	TW 1	97.9	TW 1
Polycyclic Aromatic Hydrocarbons (Water)							
Benzo(a)pyrene	0.01 (U)	0.0050	ug/L	<0.0050	TW 1	<0.0050	TW 1

Results Summary L2741043

Job Reference ARKELL PROPERTY
Report To Scott Stovel , CASH CLIENTS - WATERLOO
Date Received 21-Nov-2022 15:00
Report Date 9-Dec-2022 8:11
Report Version 1
Guideline: [Suite] - ON-DW-STANDARD+GUIDELINES - Ontario Drinking Water Regulation (ODWQS) JAN.1,2020
Category: Schedule 1 (Microbiological) and 2 (Chemical) Standards (JAN,2020)

Parameter	Guideline Limit	Lowest Detection Limit	Units	Min	Client Sample ID (Min)	Max	Client Sample ID (Max)
Chrysene d12			%	84.3	TW 1	84.3	TW 1
Semi-Volatile Organics (Water)							
Aldrin + Dieldrin	0.7 (U)	0.14	ug/L	<0.14	TW 1	<0.14	TW 1
N-Nitrosodimethylamine	0.009 (U)	0.00090	ug/L	<0.00090	TW 1	<0.00090	TW 1
N-Nitrosodimethylamine-d6			%	105	TW 1	105	TW 1
Organochlorine Pesticides (Water)							
a-chlordane		0.10	ug/L	<0.10	TW 1	<0.10	TW 1
g-chlordane		0.10	ug/L	<0.10	TW 1	<0.10	TW 1
pp-DDD		0.10	ug/L	<0.10	TW 1	<0.10	TW 1
pp-DDE		0.10	ug/L	<0.10	TW 1	<0.10	TW 1
op-DDT		0.10	ug/L	<0.10	TW 1	<0.10	TW 1
pp-DDT		0.10	ug/L	<0.10	TW 1	<0.10	TW 1
Oxychlordane		0.10	ug/L	<0.10	TW 1	<0.10	TW 1
Decachlorobiphenyl			%	116.8	TW 1	116.8	TW 1
Tetrachloro-m-xylene			%	117.1	TW 1	117.1	TW 1
Herbicides (Water)							
AMPA		0.50	ug/L	<0.50	TW 1	<0.50	TW 1
Bromoxynil	5 (U)	0.20	ug/L	<0.20	TW 1	<0.20	TW 1
2,4-D	100 (U)	0.20	ug/L	<0.20	TW 1	<0.20	TW 1
Dicamba	120 (U)	0.20	ug/L	<0.20	TW 1	<0.20	TW 1
Dinoseb	10 (U)	0.20	ug/L	<0.20	TW 1	<0.20	TW 1
Glyphosate	280 (U)	5.0	ug/L	<5.0	TW 1	<5.0	TW 1
MCPA	100 (U)	0.20	ug/L	<0.20	TW 1	<0.20	TW 1
Picloram	190 (U)	0.20	ug/L	<0.20	TW 1	<0.20	TW 1
2,4,5-TP		0.20	ug/L	<0.20	TW 1	<0.20	TW 1
2,4-Dichlorophenylacetic Acid			%	112	TW 1	112	TW 1
Carbamate Pesticides (Water)							
Aldicarb	9 (U)	0.90	ug/L	<0.90	TW 1	<0.90	TW 1

Results Summary L2741043

Job Reference ARKELL PROPERTY
Report To Scott Stovel , CASH CLIENTS - WATERLOO
Date Received 21-Nov-2022 15:00
Report Date 9-Dec-2022 8:11
Report Version 1

Guideline: [Suite] - ON-DW-STANDARD+GUIDELINES - Ontario Drinking Water Regulation (ODWQS) JAN.1,2020
Category: Schedule 1 (Microbiological) and 2 (Chemical) Standards (JAN,2020)

Parameter	Guideline Limit	Lowest Detection Limit	Units	Min	Client Sample ID (Min)	Max	Client Sample ID (Max)
Pesticides (Water)							
Alachlor	5 (U)	0.10	ug/L	<0.10	TW 1	<0.10	TW 1
Atrazine		0.10	ug/L	<0.10	TW 1	<0.10	TW 1
Atrazine & Metabolites	5 (U)	0.20	ug/L	<0.20	TW 1	<0.20	TW 1
Azinphos-methyl	20 (U)	0.10	ug/L	<0.10	TW 1	<0.10	TW 1
Carbaryl	90 (U)	0.20	ug/L	<0.20	TW 1	<0.20	TW 1
Carbofuran	90 (U)	0.20	ug/L	<0.20	TW 1	<0.20	TW 1
Chlorpyriphos	90 (U)	0.10	ug/L	<0.10	TW 1	<0.10	TW 1
Diazinon	20 (U)	0.10	ug/L	<0.10	TW 1	<0.10	TW 1
2,4-Dichlorophenol	900 (U)	0.30	ug/L	<0.30	TW 1	<0.30	TW 1
Dimethoate	20 (U)	0.10	ug/L	<0.10	TW 1	<0.10	TW 1
Diquat	70 (U)	1.0	ug/L	<1.0	TW 1	<1.0	TW 1
Diuron	150 (U)	1.0	ug/L	<1.0	TW 1	<1.0	TW 1
Atrazine-desethyl		0.10	ug/L	<0.10	TW 1	<0.10	TW 1
Malathion	190 (U)	0.10	ug/L	<0.10	TW 1	<0.10	TW 1
Diclofop-methyl	9 (U)	0.20	ug/L	<0.20	TW 1	<0.20	TW 1
Metolachlor	50 (U)	0.10	ug/L	<0.10	TW 1	<0.10	TW 1
Metribuzin	80 (U)	0.10	ug/L	<0.10	TW 1	<0.10	TW 1
Paraquat	10 (U)	1.0	ug/L	<1.0	TW 1	<1.0	TW 1
Pentachlorophenol	60 (U)	0.50	ug/L	<0.50	TW 1	<0.50	TW 1
Phorate	2 (U)	0.10	ug/L	<0.10	TW 1	<0.10	TW 1
Prometryne	1 (U)	0.10	ug/L	<0.10	TW 1	<0.10	TW 1
Simazine	10 (U)	0.10	ug/L	<0.10	TW 1	<0.10	TW 1
Terbufos	1 (U)	0.20	ug/L	<0.20	TW 1	<0.20	TW 1
2,3,4,6-Tetrachlorophenol	100 (U)	0.50	ug/L	<0.50	TW 1	<0.50	TW 1
Triallate	230 (U)	0.10	ug/L	<0.10	TW 1	<0.10	TW 1
2,4,6-Trichlorophenol	5 (U)	0.50	ug/L	<0.50	TW 1	<0.50	TW 1
Trifluralin	45 (U)	0.10	ug/L	<0.10	TW 1	<0.10	TW 1
2-Fluorobiphenyl			%	87.7	TW 1	87.7	TW 1
2,4,6-Tribromophenol			%	83.6	TW 1	83.6	TW 1

Qualifier Legend
HTC

Results Summary L2741043

Job Reference	ARKELL PROPERTY
Report To	Scott Stovel , CASH CLIENTS - WATERLOO
Date Received	21-Nov-2022 15:00
Report Date	9-Dec-2022 8:11
Report Version	1

Guideline: [Suite] - ON-DW-STANDARD+GUIDELINES - Ontario Drinking Water Regulation (ODWQS) JAN.1,2020

Category: Schedule 1 (Microbiological) and 2 (Chemical) Standards (JAN,2020)

Parameter	Guideline Limit	Lowest Detection Limit	Units	Min	Client Sample ID (Min)	Max	Client Sample ID (Max)
DLDS							
SRU							

Exceeds Guideline Limit

Detection Limit Exceeds Guideline

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.

Results Summary WT2222903

Date Received 23-Nov-2022 17:25
Report Date 30-Nov-2022 11:28
Report Version 1
Guideline: [Suite] - ON-DW-STANDARD+GUIDELINES - Ontario Drinking Water Regulation (ODWQS) JAN.1,2020
Category: Ontario DW Aesthetic and Operational Guidelines (June, 2006)

Parameter	Guideline Limit	Lowest Detection Limit	Units	Min	Client Sample ID (Min)	Max	Client Sample ID (Max)
Physical Tests (Water)							
Color, True			T.C.U.				
Hardness (as CaCO3)	80 -> 100		mg/L				
pH	6.5 -> 8.5		pH units				
Total Dissolved Solids	500 (U)		mg/L				
Anions and Nutrients (Water)							
Alkalinity, Total (as CaCO3)	30 -> 500		mg/L				
Ammonia, Total (as N)			mg/L				
Chloride (Cl)	250 (U)		mg/L				
Fluoride (F)			mg/L				
Nitrate (as N)		0.020	mg/L	<0.020	TW 2	<0.020	TW 2
Nitrite (as N)		0.010	mg/L	<0.010	TW 2	<0.010	TW 2
Total Kjeldahl Nitrogen		0.050	mg/L				
Total Organic Nitrogen		0.050	mg/L				
Phosphorus, Total		0.0500	mg/L	<0.050	TW 2	<0.050	TW 2
Sulfate (SO4)	500 (U)		mg/L				
Sulphide (as S)	0.05 (U)		mg/L				
Cyanides (Water)							
Cyanide, Free			ug/L				
Organic / Inorganic Carbon (Water)							
Dissolved Carbon Filtration Location			-				
Dissolved Organic Carbon	5 (U)		mg/L				
Bacteriological Tests (Water)							
Escherichia Coli		1	MPN/100mL	<1	TW 2	<1	TW 2
Heterotrophic Plate Count		1	CFU/mL	13	TW 2	31	TW 2
Total Coliforms		1	MPN/100mL	<1	TW 2	<1	TW 2
Total Metals (Water)							

Antimony (Sb)		0.10	ug/L	0.3	TW 2	0.67	TW 2
Arsenic (As)		0.10	ug/L	0.95	TW 2	1.87	TW 2
Barium (Ba)		0.10	ug/L	37	TW 2	41.1	TW 2
Boron (B)		10	ug/L	46	TW 2	47	TW 2
Cadmium (Cd)		0.005	ug/L	0.0203	TW 2	0.0621	TW 2
Calcium (Ca)		0.05	mg/L	73.6	TW 2	80.7	TW 2
Chromium (Cr)		0.5	ug/L	1.69	TW 2	1.91	TW 2
Magnesium (Mg)		0.005	mg/L	31.1	TW 2	32.8	TW 2
Selenium (Se)		0.05	ug/L	<0.05	TW 2	<0.05	TW 2
Uranium (U)		0.01	ug/L	0.028	TW 2	0.074	TW 2

Volatile Organic Compounds (Water)

Benzene			ug/L				
Carbon tetrachloride			ug/L				
Monochlorobenzene	30 (U)		ug/L				
1,2-Dichlorobenzene	3 (U)		ug/L				
1,4-Dichlorobenzene	1 (U)		ug/L				
1,2-Dichloroethane			ug/L				
1,1-dichloroethylene (vinylidene chlorid			ug/L				
Dichloromethane			ug/L				
Ethylbenzene	2.4 (U)		ug/L				
Tetrachloroethylene (perchloroethylene)			ug/L				
Toluene	24 (U)		ug/L				
Trichloroethylene			ug/L				
Vinyl chloride			ug/L				
o-xylene			ug/L				
m/p-xylene			ug/L				
Xylenes (Total)	300 (U)		ug/L				
4-Bromofluorobenzene			%				
1,4-Difluorobenzene			%				

Polycyclic Aromatic Hydrocarbons (Water)

Benzo(a)pyrene			ug/L				
Chrysene d12			%				

Semi-Volatile Organics (Water)

Aldrin + Dieldrin			ug/L				
N-Nitrosodimethylamine			ug/L				
N-Nitrosodimethylamine-d6			%				

Organochlorine Pesticides (Water)

a-chlordane			ug/L				
g-chlordane			ug/L				
pp-DDD			ug/L				
pp-DDE			ug/L				
op-DDT			ug/L				

pp-DDT		ug/L
Oxychlordane		ug/L
Decachlorobiphenyl		%
Tetrachloro-m-xylene		%

Herbicides (Water)

AMPA		ug/L
Bromoxynil		ug/L
2,4-D		ug/L
Dicamba		ug/L
Dinoseb		ug/L
Glyphosate		ug/L
MCPA		ug/L
Picloram		ug/L
2,4,5-TP		ug/L
2,4-Dichlorophenylacetic Acid		%

Carbamate Pesticides (Water)

Aldicarb		ug/L

Pesticides (Water)

Alachlor		ug/L
Atrazine		ug/L
Atrazine & Metabolites		ug/L
Azinphos-methyl		ug/L
Carbaryl		ug/L
Carbofuran		ug/L
Chlorpyriphos		ug/L
Diazinon		ug/L
2,4-Dichlorophenol	0.3 (U)	ug/L
Dimethoate		ug/L
Diquat		ug/L
Diuron		ug/L
Atrazine-desethyl		ug/L
Malathion		ug/L
Diclofop-methyl		ug/L
Metolachlor		ug/L
Metribuzin		ug/L
Paraquat		ug/L
Pentachlorophenol	30 (U)	ug/L
Phorate		ug/L
Prometryne		ug/L
Simazine		ug/L
Terbufos		ug/L
2,3,4,6-Tetrachlorophenol	1 (U)	ug/L
Triallate		ug/L

2,4,6-Trichlorophenol	2 (U)	ug/L
Trifluralin		ug/L
2-Fluorobiphenyl		%
2,4,6-Tribromophenol		%

Qualifier Legend
HTC
DLDS
SRU

Exceeds Guideline Limit

Detection Limit Exceeds Guideline

Results Summary WT2222903

Date Received 23-Nov-2022 17:25
Report Date 30-Nov-2022 11:28
Report Version 1
Guideline: [Suite] - ON-DW-STANDARD+GUIDELINES - Ontario Drinking Water Regulation (ODWQS) JAN.1,2020
Category: Schedule 1 (Microbiological) and 2 (Chemical) Standards (JAN,2020)

Parameter	Guideline Limit	Lowest Detection Limit	Units	Min	Client Sample ID (Min)	Max	Client Sample ID (Max)
Physical Tests (Water)							
Color, True			T.C.U.				
Hardness (as CaCO3)			mg/L				
pH			pH units				
Total Dissolved Solids			mg/L				
Anions and Nutrients (Water)							
Alkalinity, Total (as CaCO3)			mg/L				
Ammonia, Total (as N)			mg/L				
Chloride (Cl)			mg/L				
Fluoride (F)	1.5 (U)		mg/L				
Nitrate (as N)	10 (U)	0.020	mg/L	<0.020	TW 2	<0.020	TW 2
Nitrite (as N)	1 (U)	0.010	mg/L	<0.010	TW 2	<0.010	TW 2
Total Kjeldahl Nitrogen		0.050	mg/L				
Total Organic Nitrogen		0.050	mg/L				
Phosphorus, Total		0.0500	mg/L	<0.050	TW 2	<0.050	TW 2
Sulfate (SO4)			mg/L				
Sulphide (as S)			mg/L				
Cyanides (Water)							
Cyanide, Free	200 (U)		ug/L				
Organic / Inorganic Carbon (Water)							
Dissolved Carbon Filtration Location			-				
Dissolved Organic Carbon			mg/L				
Bacteriological Tests (Water)							
Escherichia Coli	0 (U)	1	MPN/100mL	<1	TW 2	<1	TW 2
Heterotrophic Plate Count		1	CFU/mL	13	TW 2	31	TW 2
Total Coliforms	0 (U)	1	MPN/100mL	<1	TW 2	<1	TW 2
Total Metals (Water)							

Antimony (Sb)	6 (U)	0.10	ug/L	0.3	TW 2	0.67	TW 2
Arsenic (As)	10 (U)	0.10	ug/L	0.95	TW 2	1.87	TW 2
Barium (Ba)	1000 (U)	0.10	ug/L	37	TW 2	41.1	TW 2
Boron (B)	5000 (U)	10	ug/L	46	TW 2	47	TW 2
Cadmium (Cd)	5 (U)	0.005	ug/L	0.0203	TW 2	0.0621	TW 2
Calcium (Ca)		0.05	mg/L	73.6	TW 2	80.7	TW 2
Chromium (Cr)	50 (U)	0.5	ug/L	1.69	TW 2	1.91	TW 2
Magnesium (Mg)		0.005	mg/L	31.1	TW 2	32.8	TW 2
Selenium (Se)	50 (U)	0.05	ug/L	<0.05	TW 2	<0.05	TW 2
Uranium (U)	20 (U)	0.01	ug/L	0.028	TW 2	0.074	TW 2

Volatile Organic Compounds (Water)

Benzene	1 (U)		ug/L				
Carbon tetrachloride	2 (U)		ug/L				
Monochlorobenzene	80 (U)		ug/L				
1,2-Dichlorobenzene	200 (U)		ug/L				
1,4-Dichlorobenzene	5 (U)		ug/L				
1,2-Dichloroethane	5 (U)		ug/L				
1,1-dichloroethylene (vinylidene chlorid	14 (U)		ug/L				
Dichloromethane	50 (U)		ug/L				
Ethylbenzene	140 (U)		ug/L				
Tetrachloroethylene (perchloroethylene)	10 (U)		ug/L				
Toluene	60 (U)		ug/L				
Trichloroethylene	5 (U)		ug/L				
Vinyl chloride	1 (U)		ug/L				
o-xylene			ug/L				
m/p-xylene			ug/L				
Xylenes (Total)	90 (U)		ug/L				
4-Bromofluorobenzene			%				
1,4-Difluorobenzene			%				

Polycyclic Aromatic Hydrocarbons (Water)

Benzo(a)pyrene	0.01 (U)		ug/L				
Chrysene d12			%				

Semi-Volatile Organics (Water)

Aldrin + Dieldrin	0.7 (U)		ug/L				
N-Nitrosodimethylamine	0.009 (U)		ug/L				
N-Nitrosodimethylamine-d6			%				

Organochlorine Pesticides (Water)

a-chlordane			ug/L				
g-chlordane			ug/L				
pp-DDD			ug/L				
pp-DDE			ug/L				
op-DDT			ug/L				

pp-DDT		ug/L
Oxychlordane		ug/L
Decachlorobiphenyl		%
Tetrachloro-m-xylene		%

Herbicides (Water)

AMPA		ug/L
Bromoxynil	5 (U)	ug/L
2,4-D	100 (U)	ug/L
Dicamba	120 (U)	ug/L
Dinoseb	10 (U)	ug/L
Glyphosate	280 (U)	ug/L
MCPA	100 (U)	ug/L
Picloram	190 (U)	ug/L
2,4,5-TP		ug/L
2,4-Dichlorophenylacetic Acid		%

Carbamate Pesticides (Water)

Aldicarb	9 (U)	ug/L

Pesticides (Water)

Alachlor	5 (U)	ug/L
Atrazine		ug/L
Atrazine & Metabolites	5 (U)	ug/L
Azinphos-methyl	20 (U)	ug/L
Carbaryl	90 (U)	ug/L
Carbofuran	90 (U)	ug/L
Chlorpyriphos	90 (U)	ug/L
Diazinon	20 (U)	ug/L
2,4-Dichlorophenol	900 (U)	ug/L
Dimethoate	20 (U)	ug/L
Diquat	70 (U)	ug/L
Diuron	150 (U)	ug/L
Atrazine-desethyl		ug/L
Malathion	190 (U)	ug/L
Diclofop-methyl	9 (U)	ug/L
Metolachlor	50 (U)	ug/L
Metribuzin	80 (U)	ug/L
Paraquat	10 (U)	ug/L
Pentachlorophenol	60 (U)	ug/L
Phorate	2 (U)	ug/L
Prometryne	1 (U)	ug/L
Simazine	10 (U)	ug/L
Terbufos	1 (U)	ug/L
2,3,4,6-Tetrachlorophenol	100 (U)	ug/L
Triallate	230 (U)	ug/L

2,4,6-Trichlorophenol	5 (U)	ug/L
Trifluralin	45 (U)	ug/L
2-Fluorobiphenyl		%
2,4,6-Tribromophenol		%

Qualifier Legend
HTC
DLDS
SRU

Exceeds Guideline Limit

Detection Limit Exceeds Guideline

Results Summary WT2223236

Date Received 26-Nov-2022 12:30
Report Date 06-Dec-2022 10:30
Report Version 0

Guideline: [Suite] - ON-DW-STANDARD+GUIDELINES - Ontario Drinking Water Regulation (ODWQS) JAN.1,2020
Category: Ontario DW Aesthetic and Operational Guidelines (June, 2006)

Parameter	Guideline Limit	Lowest Detection Limit	Units	Min	Client Sample ID (Min)	Max	Client Sample ID (Max)
Physical Tests (Water)							
Color, True			T.C.U.				
Hardness (as CaCO3)	80 -> 100		mg/L				
pH	6.5 -> 8.5		pH units				
Total Dissolved Solids	500 (U)		mg/L				
Anions and Nutrients (Water)							
Alkalinity, Total (as CaCO3)	30 -> 500		mg/L				
Ammonia, Total (as N)			mg/L				
Chloride (Cl)	250 (U)		mg/L				
Fluoride (F)			mg/L				
Nitrate (as N)		0.020	mg/L	4.74	TW 3	5.31	TW 3
Nitrite (as N)		0.010	mg/L	<0.010	TW 3	<0.010	TW 3
Total Kjeldahl Nitrogen		0.050	mg/L				
Total Organic Nitrogen		0.050	mg/L				
Phosphorus, Total		0.0500	mg/L	<0.05	TW 3	0.101	TW 3
Sulfate (SO4)	500 (U)		mg/L				
Sulphide (as S)	0.05 (U)		mg/L				
Cyanides (Water)							
Cyanide, Free			ug/L				
Organic / Inorganic Carbon (Water)							
Dissolved Carbon Filtration Location			-				
Dissolved Organic Carbon	5 (U)		mg/L				
Bacteriological Tests (Water)							
Escherichia Coli		1	MPN/100mL	<1	TW 3	<1	TW 3
Heterotrophic Plate Count		1	CFU/mL	6	TW 3	11	TW 3
Total Coliforms		1	MPN/100mL	<1	TW 3	<1	TW 3
Total Metals (Water)							

Antimony (Sb)		0.10	ug/L	0.52	TW 3	0.78	TW 3
Arsenic (As)		0.10	ug/L	20.3	TW 3	50.2	TW 3
Barium (Ba)		0.10	ug/L	59.4	TW 3	69.3	TW 3
Boron (B)		10	ug/L	15	TW 3	17	TW 3
Cadmium (Cd)		0.005	ug/L	0.148	TW 3	0.307	TW 3
Calcium (Ca)		0.05	mg/L	89.3	TW 3	90.7	TW 3
Chromium (Cr)		0.5	ug/L	2.76	TW 3	4.87	TW 3
Magnesium (Mg)		0.005	mg/L	34.9	TW 3	35.3	TW 3
Selenium (Se)		0.05	ug/L	0.22	TW 3	0.23	TW 3
Uranium (U)		0.01	ug/L	0.78	TW 3	1.03	TW 3
Volatile Organic Compounds (Water)							
Benzene			ug/L				
Carbon tetrachloride			ug/L				
Monochlorobenzene	30 (U)		ug/L				
1,2-Dichlorobenzene	3 (U)		ug/L				
1,4-Dichlorobenzene	1 (U)		ug/L				
1,2-Dichloroethane			ug/L				
1,1-dichloroethylene (vinylidene chlorid			ug/L				
Dichloromethane			ug/L				
Ethylbenzene	2.4 (U)		ug/L				
Tetrachloroethylene (perchloroethylene)			ug/L				
Toluene	24 (U)		ug/L				
Trichloroethylene			ug/L				
Vinyl chloride			ug/L				
o-xylene			ug/L				
m/p-xylene			ug/L				
Xylenes (Total)	300 (U)		ug/L				
4-Bromofluorobenzene			%				
1,4-Difluorobenzene			%				
Polycyclic Aromatic Hydrocarbons (Water)							
Benzo(a)pyrene			ug/L				
Chrysene d12			%				
Semi-Volatile Organics (Water)							
Aldrin + Dieldrin			ug/L				
N-Nitrosodimethylamine			ug/L				
N-Nitrosodimethylamine-d6			%				
Organochlorine Pesticides (Water)							
a-chlordane			ug/L				
g-chlordane			ug/L				
pp-DDD			ug/L				
pp-DDE			ug/L				
op-DDT			ug/L				

pp-DDT		ug/L
Oxychlordane		ug/L
Decachlorobiphenyl		%
Tetrachloro-m-xylene		%

Herbicides (Water)

AMPA		ug/L
Bromoxynil		ug/L
2,4-D		ug/L
Dicamba		ug/L
Dinoseb		ug/L
Glyphosate		ug/L
MCPA		ug/L
Picloram		ug/L
2,4,5-TP		ug/L
2,4-Dichlorophenylacetic Acid		%

Carbamate Pesticides (Water)

Aldicarb		ug/L

Pesticides (Water)

Alachlor		ug/L
Atrazine		ug/L
Atrazine & Metabolites		ug/L
Azinphos-methyl		ug/L
Carbaryl		ug/L
Carbofuran		ug/L
Chlorpyriphos		ug/L
Diazinon		ug/L
2,4-Dichlorophenol	0.3 (U)	ug/L
Dimethoate		ug/L
Diquat		ug/L
Diuron		ug/L
Atrazine-desethyl		ug/L
Malathion		ug/L
Diclofop-methyl		ug/L
Metolachlor		ug/L
Metribuzin		ug/L
Paraquat		ug/L
Pentachlorophenol	30 (U)	ug/L
Phorate		ug/L
Prometryne		ug/L
Simazine		ug/L
Terbufos		ug/L
2,3,4,6-Tetrachlorophenol	1 (U)	ug/L
Triallate		ug/L

2,4,6-Trichlorophenol	2 (U)	ug/L
Trifluralin		ug/L
2-Fluorobiphenyl		%
2,4,6-Tribromophenol		%

Qualifier Legend
HTC
DLDS
SRU

Exceeds Guideline Limit

Detection Limit Exceeds Guideline

Results Summary WT2223236

Date Received 26-Nov-2022 12:30
Report Date 06-Dec-2022 10:30
Report Version 0

Guideline: [Suite] - ON-DW-STANDARD+GUIDELINES - Ontario Drinking Water Regulation (ODWQS) JAN.1,2020
Category: Schedule 1 (Microbiological) and 2 (Chemical) Standards (JAN,2020)

Parameter	Guideline Limit	Lowest Detection Limit	Units	Min	Client Sample ID (Min)	Max	Client Sample ID (Max)
Physical Tests (Water)							
Color, True			T.C.U.				
Hardness (as CaCO3)			mg/L				
pH			pH units				
Total Dissolved Solids			mg/L				
Anions and Nutrients (Water)							
Alkalinity, Total (as CaCO3)			mg/L				
Ammonia, Total (as N)			mg/L				
Chloride (Cl)			mg/L				
Fluoride (F)	1.5 (U)		mg/L				
Nitrate (as N)	10 (U)	0.020	mg/L	4.74	TW 3	5.31	TW 3
Nitrite (as N)	1 (U)	0.010	mg/L	<0.010	TW 3	<0.010	TW 3
Total Kjeldahl Nitrogen		0.050	mg/L				
Total Organic Nitrogen		0.050	mg/L				
Phosphorus, Total		0.0500	mg/L	<0.05	TW 3	0.101	TW 3
Sulfate (SO4)			mg/L				
Sulphide (as S)			mg/L				
Cyanides (Water)							
Cyanide, Free	200 (U)		ug/L				
Organic / Inorganic Carbon (Water)							
Dissolved Carbon Filtration Location			-				
Dissolved Organic Carbon			mg/L				
Bacteriological Tests (Water)							
Escherichia Coli	0 (U)	1	MPN/100mL	<1	TW 3	<1	TW 3
Heterotrophic Plate Count		1	CFU/mL	6	TW 3	11	TW 3
Total Coliforms	0 (U)	1	MPN/100mL	<1	TW 3	<1	TW 3
Total Metals (Water)							

Antimony (Sb)	6 (U)	0.10	ug/L	0.52	TW 3	0.78	TW 3
Arsenic (As)	10 (U)	0.10	ug/L	20.3	TW 3	50.2	TW 3
Barium (Ba)	1000 (U)	0.10	ug/L	59.4	TW 3	69.3	TW 3
Boron (B)	5000 (U)	10	ug/L	15	TW 3	17	TW 3
Cadmium (Cd)	5 (U)	0.005	ug/L	0.148	TW 3	0.307	TW 3
Calcium (Ca)		0.05	mg/L	89.3	TW 3	90.7	TW 3
Chromium (Cr)	50 (U)	0.5	ug/L	2.76	TW 3	4.87	TW 3
Magnesium (Mg)		0.005	mg/L	34.9	TW 3	35.3	TW 3
Selenium (Se)	50 (U)	0.05	ug/L	0.22	TW 3	0.23	TW 3
Uranium (U)	20 (U)	0.01	ug/L	0.78	TW 3	1.03	TW 3

Volatile Organic Compounds (Water)

Benzene	1 (U)		ug/L				
Carbon tetrachloride	2 (U)		ug/L				
Monochlorobenzene	80 (U)		ug/L				
1,2-Dichlorobenzene	200 (U)		ug/L				
1,4-Dichlorobenzene	5 (U)		ug/L				
1,2-Dichloroethane	5 (U)		ug/L				
1,1-dichloroethylene (vinylidene chlorid	14 (U)		ug/L				
Dichloromethane	50 (U)		ug/L				
Ethylbenzene	140 (U)		ug/L				
Tetrachloroethylene (perchloroethylene)	10 (U)		ug/L				
Toluene	60 (U)		ug/L				
Trichloroethylene	5 (U)		ug/L				
Vinyl chloride	1 (U)		ug/L				
o-xylene			ug/L				
m/p-xylene			ug/L				
Xylenes (Total)	90 (U)		ug/L				
4-Bromofluorobenzene			%				
1,4-Difluorobenzene			%				

Polycyclic Aromatic Hydrocarbons (Water)

Benzo(a)pyrene	0.01 (U)		ug/L				
Chrysene d12			%				

Semi-Volatile Organics (Water)

Aldrin + Dieldrin	0.7 (U)		ug/L				
N-Nitrosodimethylamine	0.009 (U)		ug/L				
N-Nitrosodimethylamine-d6			%				

Organochlorine Pesticides (Water)

a-chlordane			ug/L				
g-chlordane			ug/L				
pp-DDD			ug/L				
pp-DDE			ug/L				
op-DDT			ug/L				

pp-DDT		ug/L
Oxychlordane		ug/L
Decachlorobiphenyl		%
Tetrachloro-m-xylene		%

Herbicides (Water)

AMPA		ug/L
Bromoxynil	5 (U)	ug/L
2,4-D	100 (U)	ug/L
Dicamba	120 (U)	ug/L
Dinoseb	10 (U)	ug/L
Glyphosate	280 (U)	ug/L
MCPA	100 (U)	ug/L
Picloram	190 (U)	ug/L
2,4,5-TP		ug/L
2,4-Dichlorophenylacetic Acid		%

Carbamate Pesticides (Water)

Aldicarb	9 (U)	ug/L

Pesticides (Water)

Alachlor	5 (U)	ug/L
Atrazine		ug/L
Atrazine & Metabolites	5 (U)	ug/L
Azinphos-methyl	20 (U)	ug/L
Carbaryl	90 (U)	ug/L
Carbofuran	90 (U)	ug/L
Chlorpyriphos	90 (U)	ug/L
Diazinon	20 (U)	ug/L
2,4-Dichlorophenol	900 (U)	ug/L
Dimethoate	20 (U)	ug/L
Diquat	70 (U)	ug/L
Diuron	150 (U)	ug/L
Atrazine-desethyl		ug/L
Malathion	190 (U)	ug/L
Diclofop-methyl	9 (U)	ug/L
Metolachlor	50 (U)	ug/L
Metribuzin	80 (U)	ug/L
Paraquat	10 (U)	ug/L
Pentachlorophenol	60 (U)	ug/L
Phorate	2 (U)	ug/L
Prometryne	1 (U)	ug/L
Simazine	10 (U)	ug/L
Terbufos	1 (U)	ug/L
2,3,4,6-Tetrachlorophenol	100 (U)	ug/L
Triallate	230 (U)	ug/L

2,4,6-Trichlorophenol	5 (U)	ug/L
Trifluralin	45 (U)	ug/L
2-Fluorobiphenyl		%
2,4,6-Tribromophenol		%

Qualifier Legend
HTC
DLDS
SRU

Exceeds Guideline Limit

Detection Limit Exceeds Guideline