



BURNSIDE

**2025 Biennial Groundwater Monitoring  
Report - Willard Well Field (G15)**

**The Region of Waterloo**



**BURNSIDE**

# **2025 Biennial Groundwater Monitoring Report - Willard Well Field (G15)**

## **The Region of Waterloo**

**R.J. Burnside & Associates Limited  
292 Speedvale Avenue West Unit 20  
Guelph ON N1H 1C4 CANADA**

**June 2026  
HA0464020.2024**



**Distribution List**

No. of Hard Copies	PDF	Email	Organization Name
0	Yes	Yes	The Ministry of Environment, Conservation and Parks (MECP)
0	Yes	Yes	The Region of Waterloo

**Record of Revisions**

Revision	Date	Description
0	April 2026	Draft Submission to the Region of Waterloo
1	June 2026	Final Submission to the MECP

**R.J. Burnside & Associates Limited**

**Report Prepared By:**



Sean Quinlan, B.E.S., C.Tech.  
Environmental Technologist  
SQ:js

**Report Reviewed By:**

Dave Hopkins, P.Geo.  
Senior Hydrogeologist  
DH:js



## Table of Contents

<b>1.0</b>	<b>Introduction</b> .....	<b>3</b>
1.1	Scope of Work.....	3
<b>2.0</b>	<b>Site Setting</b> .....	<b>4</b>
2.1	Well Field Description.....	4
2.1.1	Pumping Wells.....	4
2.1.2	Monitoring Wells.....	5
2.2	Regional Geology and Hydrostratigraphy.....	6
2.2.1	Surficial Geology and Conceptual Hydrostratigraphy.....	6
2.2.2	Bedrock Geology and Conceptual Hydrostratigraphy.....	8
2.3	Local Geology.....	10
2.3.1	Bedrock Geology.....	10
<b>3.0</b>	<b>2024 / 2025 Results</b> .....	<b>10</b>
3.1	Precipitation.....	10
3.2	Monitoring Results.....	11
<b>4.0</b>	<b>Impact Assessment</b> .....	<b>12</b>
4.1	Well Interference.....	12
4.2	Aquifer Response to Pumping and Precipitation.....	13
<b>5.0</b>	<b>Conclusions</b> .....	<b>14</b>
<b>6.0</b>	<b>References</b> .....	<b>15</b>

### Tables

Table 1:	Production Well Construction Details.....	4
Table 2:	Annual Water Taking 2024 / 2025.....	4
Table 3:	Well Nomenclature.....	5
Table 4:	Monitoring Well Construction Details.....	5
Table 5:	Summary of Precipitation Data.....	11
Table 6:	PTTW (Groundwater) in Vicinity of Willard Well Field.....	13

### Figures

- Figure 1: Well Field Location Map
- Figure 2: Willard Well Field and Monitoring Network
- Figure 3: Well Location Map
- Figure 4: Surficial Geology
- Figure 5: Willard Well Field Cross Section A – A’
- Figure 6: Willard Well Field Cross Section B – B’

### Appendices

- Appendix A Permit To Take Water
- Appendix B Well Records
- Appendix C Monitoring Data (Pumped Volumes and Hydrographs)
- Appendix D Precipitation Data
- Appendix E Monitoring Program Overview

## 1.0 Introduction

The Regional Municipality of Waterloo (the Region) is unique in Ontario in that it is the largest urban municipality to rely almost exclusively on groundwater supplies for its drinking-water (Region of Waterloo, 2015). Figure 1 shows the location of municipal well fields within the Region.

The Permit to Take Water (PTTW 6132-AKURBN) for the Willard Well Field requires submission of a well field specific biennial report to the Ministry of Environment, Conservation and Parks (MECP) which documents production well (G15) pumping volumes and water levels in specific monitoring wells during 2024 and 2025. This report has been prepared to meet the reporting condition of the PTTW for 2024 and 2025. A copy of the PTTW is included in Appendix A.

The location of the Willard Well Field is shown in Figure 1 and the production wells in Cambridge are shown in Figure 2 with the monitoring network for G15 shown in Figure 3. Well records for the production and monitoring wells are found in Appendix B.

### 1.1 Scope of Work

The Region records water levels on a regular basis within a network of monitoring wells to satisfy the requirements of their PTTW and to confirm that water taking is sustainable in the long term. The monitoring wells are concentrated near the production wells. The data from these wells and regular measurements of pumping volume obtained from the production wells are used to evaluate the impact of Region pumping on aquifers and potential impacts to private wells, other water takers and the natural environment.

The Region has developed a monitoring program for Willard Well Field (G15) in accordance with PTTW 6132-AKURBN which consists of the following activities:

- Measuring the daily volume pumped from G15 (Condition 4.1 of the PTTW);
- Measuring the water levels in monitoring wells C-WD-OW1-14-ABCD and C-WD-OW1-87-A (Condition 4.2 of the PTTW);
- Review of precipitation data from the nearest GRCA / Environment Canada weather station (Condition 4.3 of the PTTW); and
- Completion of a biennial report (every 2 years) that presents data in compliance with condition 4.3 of the PTTW.

The Monitoring data (pumped volumes and hydrographs) are found in Appendix C with precipitation data in Appendix D. The monitoring program procedures and methodology are included in Appendix E.

## 2.0 Site Setting

### 2.1 Well Field Description

The Willard Well Field production well is located about 200 m east of the intersection of West River Road and Gaskin Avenue immediately north of the southern boundary of the City of Cambridge. The closest municipal well field is the Middleton Well Field which is located about 1.5 km to the north (Figure 2). The closest surface water feature to the G15 site is the Grand River which is located just 35 m to the east (Figure 3).

#### 2.1.1 Pumping Wells

Well records for the production wells are found in Appendix B. Production well G15 obtains water from the Bedrock Aquifer Eramosa / Goat Island / Upper Gasport Formation. G15 was originally constructed in 1987 in the bedrock with an open hole interval from 11.9 to 51.8 metres below ground level (mbgl). In 2014, the well was deepened to 91.6 mbgl, but then backfilled to 62.5 mbgl after it was found that water quality from the deeper bedrock was poor. A liner was installed with the resulting open hole interval from 29.0 to 59.0 mbgl.

A summary of the production well construction details is provided in Table 1 below.

**Table 1: Production Well Construction Details**

Well Name	Year Built	Casing Diameter (mm)	Open Hole Diameter (mm)	Open Hole interval (mbgs)	Aquifer
G15	1987	300 (liner)	400	29.0-59.0	Eramosa / Goat Island / Upper Gasport Formation

The water taking volumes for the Willard Well Field are regulated by Condition 3.2 of the PTTW and are summarized in Table 2 below.

**Table 2: Annual Water Taking 2024 / 2025**

Well	PTTW Details	2024			2025		
		Avg. Daily Water Taking (m <sup>3</sup> )	Max Taken per Day (m <sup>3</sup> )	Total Volume Pumped (m <sup>3</sup> )	Avg. Daily Water Taking (m <sup>3</sup> )	Max Taken per Day (m <sup>3</sup> )	Total Volume Pumped (m <sup>3</sup> )
G15	6,552	3,801	3,890	1,387,238	3,364	3,600	1,228,033

2025 Biennial Groundwater Monitoring Report - Willard Well Field (G15)  
June 2026

The pumping volumes are based on the total daily volumes as recorded by the Region's SCADA system and are presented in Appendix C as total monthly volumes. Pumping volumes from the well field ranged from 103,144 m<sup>3</sup>/month to 120,231 m<sup>3</sup>/month in 2024, and from 94,056 m<sup>3</sup>/month to 106,740 m<sup>3</sup>/month in 2025. In total, 1,387,238 m<sup>3</sup> was produced at this well field in 2024 and 1,228,033 m<sup>3</sup> was produced in 2025. The volumes for both 2024 and 2025 are within the historical ranges and remain below the permitted volume of 2,391,480 m<sup>3</sup> per year (Table C-1).

### 2.1.2 Monitoring Wells

The Region updated their well naming protocol in 2017 and as a result, the well names in EQuIS may vary from the names listed on the PTTW. The well names on the PTTW are shown below along with the updated name that is used by the Region. The updated Region names will be used throughout this report.

**Table 3: Well Nomenclature**

Monitoring well names as they appear on the PTTW	Revised well names consistent with Region nomenclature
C-WD-OW1-87	C-WD-OW1-87-A
C-WD-OW1A-14	C-WD-OW1-14-A
C-WD-OW1B-14	C-WD-OW1-14-B
C-WD-OW1C-14	C-WD-OW1-14-C
C-WD-OW1D-14	C-WD-OW1-14-D

Observation wells C-WD-OW1-14-ABCD and C-WD-OW1-87-A are located adjacent to well G15 (Figure 3).

Construction and monitoring details of C-WD-OW1-14-ABCD and C-WD-OW1-87-A are described in the table below. Well records for the monitoring wells are provided in Appendix B.

**Table 4: Monitoring Well Construction Details**

Monitoring Well ID	Year Built	Screened Depth (mbgs)	Screened Formation	Distance to G15 (m)
C-WD-OW1-87-A	1987	5.18-6.70	Overburden (AFD1)	12.1
C-WD-OW1-14-A	2014	82.00-85.00	Middle to Upper Gasport Formation	5.0
C-WD-OW1-14-B	2014	58.00-61.00	Goat Island to Upper Gasport Formation	5.0
C-WD-OW1-14-C	2014	32.92-35.97	Eramosa Formation	5.0
C-WD-OW1-14-D	2014	21.03-24.08	Lower Guelph Formation	5.0

## 2.2 Regional Geology and Hydrostratigraphy

The following sections provide a brief overview of the regional geology and hydrogeology of the Willard Well Field. The surficial geology based on regional OGS mapping is provided in Figure 4. Representative cross-sections showing the stratigraphy in the vicinity of the Willard Well Field (G15) are included as Figures 5 and 6 to visualize the stratigraphy described in this section. The cross-section locations are provided in Figure 3.

The cross-sections are provided as a visual aid and do not necessarily contain all wells in the monitoring program for the Willard Well Field. The layers displayed were generated from results of the Hydrogeological Characterization and Conceptual Model Tier 3 Assessment Update Project (Aqua Insight et al, 2023) and associated hydrogeological modelling work.

### 2.2.1 Surficial Geology and Conceptual Hydrostratigraphy

The surficial geology of the Study Area has been mapped and described by Karrow (1987). Along the eastern side of the Grand River and the south side of the Speed River, the surficial geology (Figure 4) largely consists of sand and gravel outwash deposits (Units 7a and 7b in Figure 4). Ice-contact kame stratified sands and gravels (Unit 6 in Figure 4) are present east of the outwash deposits and extend towards Puslinch Lake.

The thickness of overburden deposits generally range from approximately 5 to 10 m in areas of outwash deposits, however can be up to approximately 30 to 40 m thick in areas of the Paris and Galt moraines to the east of Cambridge. In the vicinity of the Shade's Mills, Clemens Mill and Pinebush Well Fields, the overburden thickness is generally 20 to 40 m. In the Hespeler Well Field area in northern Cambridge adjacent to the Speed River, overburden thickness is generally less than 20 m and the overburden is thin or absent in the Speed River valley. West of the Grand River near the Willard Well Field the overburden thickness is approximately 7 m.

The Quaternary Geology of the Cambridge area typically includes the following units (Lotowater 1997, Karrow 1987 and Bajc and Shirota, 2007). These units are described in more detail below.

#### **Aquitard ATA1 / AFA1 / ATA2 - Wentworth Till**

The Wentworth Till was deposited by the last glacier to advance in the area. It is described as a stony, sandy silt to sand textured till, and is often inter-bedded with sand and gravel. In the Cambridge area, the Wentworth Till is generally less than 10 m thick. Due to the loose, coarse-grained nature of the till, the unit behaves as a leaky aquitard or poor aquifer that is readily recharged from precipitation.

**Aquifer AFA2 - Outwash Deposits**

The outwash sand and gravel sediments of AFA2 are present within the Grand River Valley and vicinity, however extensive deposits have also been identified underlying the Wentworth Till in the Paris and Galt moraines. These outwash deposits are interpreted as the main production aquifer for the Shade's Mills municipal wells.

**Aquitard ATB1 - Port Stanley Till**

The Port Stanley Till is a sandy silt to silty sand till, with occasionally stony texture. The Port Stanley Till was deposited by ice advancing from the Erie-Ontario ice lobe. In other parts of the Region, Bajc and Shirota (2007) have also used unit ATB1 to represent Tavistock, Mornington and Upper Maryhill Tills. In the Grand River and Speed River valleys this unit has been largely removed by erosion. This unit is generally finer grained than the Wentworth Till and behaves as an aquitard.

**Aquifer AFB1 / ATB2 / AFB2 - Upper Waterloo Moraine Stratified Sediments and Equivalent**

Significant thicknesses of aquifer AFB1 are interpreted to occur southeast of the Speed River and west of Puslinch Lake and generally corresponds with mapped surficial ice-contact sands and gravels. AFB1 is generally fine sand with some gravel and is often slightly finer grained than unit AFA2, which typically contains greater amounts of gravel. Since AFB1 and AFA2 both behave as aquifers, differentiation of these units is not critical from a hydraulic perspective, although it is necessary to represent AFB1 separately from AFA2 to allow sequential layers for aquifer units both above and below the Port Stanley Till (ATB1), where this situation occurs. Where AFB1 is not present, Port Stanley Till may directly overlie Maryhill Till and Catfish Creek Till (described below), forming a single combined aquitard unit composed of these tills.

**Aquitard ATB3 / AFB3 / ATC1 / AFC1 / ATC2 - Lower Maryhill Till**

Fine grained till and glaciolacustrine deposits of the Lower Maryhill Till ATB3 generally separate AFB1 from the underlying Catfish Creek Till. The Lower Maryhill Till is described as a dense, dark brown, clayey silt to silty clay till and is interpreted to be present in the Fountain Street (Well P16) well field area above the Catfish Creek and below the Port Stanley Till. Aquitard ATB3 can be difficult to distinguish from ATB1 throughout most of Cambridge due to the similar lithologies of these units. Lotowater (1997) grouped the Port Stanley and Maryhill Tills as a single aquitard hydrostratigraphic unit, which is a reasonable approach where no significant thickness of sand and gravel separate these units.

**Aquifer AFD1 / ATE1 / AFF1 / ATG1 - Pre-Catfish Sand and Gravel**

The Pre-Catfish sand and gravel aquifer is present below the Ice-Contact Stratified Deposits in the Willard Well Field but is not a significant unit elsewhere in the Cambridge area except for the Fountain Street well field. This unit is the main municipal aquifer for the Fountain Street Well Field. The Pre-Catfish Sand and Gravel is found directly overlying bedrock in the Willard and Fountain Street Well Field area and is hydraulically connected with the upper weathered portion of the bedrock aquifer. Aquifer AFD1 corresponds to sands and gravel reworked from Catfish Creek and Pre Catfish Creek Tills.

**2.2.2 Bedrock Geology and Conceptual Hydrostratigraphy**

The stratigraphy discussed below is consistent with the revised stratigraphic framework described by the OGS (Brunton, 2009) and is also used in the Tier 3 Study of the area (Golder, 2011). A brief description (from Stantec, 2013) of each bedrock formation and conceptual hydrostratigraphic units typically present in Cambridge is provided below (from youngest to oldest).

**Guelph Formation**

The Guelph Formation is a cream-coloured fossiliferous dolostone that represents an important aquifer in the Cambridge and Guelph area, where it is most often the uppermost bedrock unit. The Guelph Formation is approximately 6 m deep and ranges in thickness from 8 to 28 m.

**Eramosa Formation**

The Upper Eramosa Formation is described by Brunton (2009) as light brown to cream coloured, pseudonodular, thickly bedded and coarsely crystalline dolostone. The formation consists of the Reformatory Quarry Member, and the Vinemount Member.

The Reformatory Quarry Member is susceptible to karstification due to its uniform fine dolomite crystallinity (Brunton, 2009), and also often contains mud-rich and microbial mat-bearing lithofacies. As a result, this unit generally represents a poor aquifer or poor

aquitard. This unit was described as either the Guelph Formation or Eramosa Member in previous studies within the Region.

The Vinemount Member is comprised of thinly bedded, fine crystalline dolostone with shaley beds that give off a distinctive petroliferous odour when broken (Brunton, 2009). This unit represents an aquitard when present within the Cambridge and Guelph areas. The Eramosa Formation is approximately 20 m deep and ranges in thickness from 20 to 35 m.

### **Goat Island Formation**

The Goat Island Formation consists of the upper Ancaster Member and lower Niagara Falls Member. The Ancaster Member is a chert rich, finely crystalline dolostone that is medium to ash grey in colour. The Niagara Falls Member is a finely crystalline and cross laminated crinoidal grainstone with small reef mounds. The finely crystalline nature of these Members results in a lower hydraulic conductivity and transmissivity compared to the underlying Gasport Formation (Brunton, 2009). Conceptually, the two members of the Goat Island Formation are treated as a single hydrostratigraphic unit. The Goat Island Formation is approximately 53 m deep and ranges in thickness from 5 to 12 m.

### **Gasport (Amabel) Formation**

The Gasport Formation is a cross-bedded crinoidal grainstone-packstone with sequences of reef mound and coquina (shell bed) lithofacies. This unit has commonly been referred to as the Amabel Formation in previous studies in the Region. Upper, middle and lower hydrostratigraphic units of the Gasport have been defined to allow for general representation of the vertical distribution of the more transmissive reef mound and coquina bed lithofacies. Highly transmissive reef mounds, crinoidal grainstones and coquina beds are generally present in the upper and middle portions of the formation, and are largely absent from the lower 10 m to 20 m. The Upper Gasport Formation is approximately 59 m deep and ranges in thickness from 15 to 25 m. The Middle Gasport Formation is approximately 59 m deep and ranges in thickness from 15 to 25 m.

The lower portion of the Gasport Formation is often grouped with the Rochester, Irondequoit, Rockway, and Merriton Formations due to the difficulty in distinguishing the various units from available borehole data and geophysical logs. All four formations, as well as the base of the Gasport Formation, are relatively less permeable than the upper sections of the Gasport Formation. The Lower Gasport Formation is approximately 96 m deep.

## 2.3 Local Geology

Figure 3 displays the Willard Well Field well plan and cross-section locations. Representative cross-sections are included as Figures 5 and 6 to visualize the stratigraphy described in this section.

The majority of the Willard area was mapped as glaciofluvial sands (likely AFA2). More recent alluvium deposits of gravel, sand, silt and clay (ATB3 / AFB3 / ATC1 / AFC1 / ATC2) are identified in the Grand River valley. Areas outside the river valley are mapped as silty to sandy till (ATA1 / AFA1 / ATA2).

The overburden thickness in Willard ranges from 0 m beneath the Grand River (Karrow, 1987), situated just east of G15, to 6.7 m at C-WD-OW1-87 and C-WD-OW1-14-ABCD both situated a few metres away from G15. The overburden at C-WD-OW1-87 and C-WD-OW1-14-ABCD is described as sand and gravel (AFD1 / ATE1 / AFF1 / ATG1).

### 2.3.1 Bedrock Geology

Based on the results of drilling investigations at the site, the bedrock surface is encountered at 6.7 mbgs (Appendix B). At C-WD-OW1-14-ABCD, the upper 45 m of bedrock is not classified in the borehole log, but based in Figures 7 and 8 is likely dolostone of Guelph / Eramosa / Goat Island Formations. The Gasport Formation is about 49 m thick and is described as blue-grey dolostone with numerous fractures from 70 to 78 m bgs. The Rochester / Irondequoit / Rockway / and / or Merriton Formations are about 8 m thick and are underlain by the Cabot Head Formation.

## 3.0 2024 / 2025 Results

### 3.1 Precipitation

Longer term precipitation trends can have an impact on water levels in the supply aquifer. To assess the potential influence, monthly precipitation is plotted for comparison to water levels and pumping and presented in Appendix C.

Since variations in precipitation totals can occur throughout the Region due to localized events, monthly precipitation data from the GRCA and Environment Canada station located closest to the production wells are used. The closest GRCA weather station relative to the Willard G15 well field is the Shades Mills Dam station located 4.8 km northeast. The closest Environment Canada station is the Waterloo International Airport (WIA) located 14 km to the northwest. The locations of the meteorological stations are shown in Figure 1.

Annual precipitation data from the past 10 years for all stations are compared with long term averages in Table D.1, Appendix D. At Shades Mills Dam, the long-term average

was calculated from when measurements started until the end of 2025. The WIA has “Climate Normals” calculated by Environment Canada for 1971 to 2000.

Annual 2024 / 2025 precipitation data for all the meteorological stations closest to the Willard G15 well field are presented in Table 5 below. WIA was missing 6 days of data in 2024 and 6 days in 2025. As a result, the precipitation totals at this station may be under reported.

**Table 5: Summary of Precipitation Data**

Station	2024 Precipitation (mm)	2024 Deviation (mm)	Long-Term Average (mm)	2025 Precipitation (mm)	2025 Deviation (mm)
Region of Waterloo International Airport <sup>(A)</sup>	874	+23	851 <sup>o</sup>	723	-128
Shades Mills Dam <sup>(B)</sup>	976	+67	909 <sup>A</sup>	895	-14

Sources: Environment Canada (1), GRCA (2)  
<sup>A</sup> 1991 to 2020 Normal  
<sup>B</sup> Average annual precipitation since monitoring began to the end of 2025

Water levels typically follow a seasonal trend with highest levels occurring in the spring with the depth and water content of the snowpack having a significant influence on water levels. Lowest levels occurring in July / August. Widespread synoptic rainfall events can also result in Region-wide water level responses. Summer thunderstorms tend to be short lived and occur over a smaller area resulting in short term, localized water level rises not typically seen in the monitoring wells.

The 2024 total precipitation at Shades Mills station was 976 mm, which is 67 mm above the long-term average, indicating 2024 was wetter-than-average at the well field A similar above long-term average trend is noted at the WIA station. The March 1 GRCA snow survey indicated a snowpack across the Region that was low compared to normal. In 2025, the total precipitation was 895 mm, which is 14 mm below the long-term average. Similarly, the total precipitation at the WIA station was 128 mm below the long-term average, indicating 2025 was a drier-than-average year. However WIA was missing 12 days of data in 2024/2025 and as a result, precipitation totals may be under reported. The snow survey conducted by the GRCA on March 15, 2025, showed that the stations in the Region had a high to very high measured snow water equivalent.

### 3.2 Monitoring Results

Hydrographs showing the results of water level monitoring over the past 10 years are provided in Appendix C. The method used to collect the water levels (manual or electronic) is indicated on the graphs in Appendix C.

### **C-WD-OW1-87-A**

Overburden monitoring well C-WD-OW1-87-A is located about 12m from G15 and is screened in the sand and gravel (AFD1) overburden just above the Guelph Formation. Water levels in 2024 and 2025 are within the normal historical range.

Manual monthly water level monitoring began in 2002 and indicates that C-WD-OW1-87-A does not respond to pumping of G15. This is evident through no observable changes in water levels when the well was off line for an extended period in 2022. Water levels are stable with short term fluctuations of 1 m that typically occur in the spring and may be related to the spring snow melt and / or changes in water levels in the Grand River.

### **C-WD-OW1-14-ABCD**

C-WD-OW1-14-ABCD are located about 5 m from G15 and monitor water levels at four distinct bedrock depths. Water level monitoring began in January 2016 for the A and B screens, and in October 2015 for the C and D screens. Monitoring is completed using electronic data loggers at C-WD-OW1-14-CD. Monthly manual water level monitoring is conducted at C-WD-OW1-14-AB. Water level variability due to short term changes in pumping during 2024 and 2025 is consistent with historical patterns.

Water level data from all four well screens show a response to pumping at G15. In the Eramosa Formation (screen C) and the Lower Guelph Formation (screen D), electronically recorded water levels display daily fluctuations of approximately 2 m due to the pumping of G15. Monthly manual measurements from the Middle to Upper Gasport Formation (screen A) and the Goat Island to Upper Gasport Formation (screen B) follow the same pattern observed in screens C and D. Water levels decline from April 2019 to April 2021 before rising when pumping is decreased In October and November 2021 and from June 2022 to December 2022. Levels then decline starting in December 2022 when pumping is increased with levels in August 2025 levels approximately 5 m below 2019.

Seasonal variations are not discernable in the bedrock monitoring wells.

## **4.0 Impact Assessment**

### **4.1 Well Interference**

PTTW Condition 5.1 states, "The Permit Holder shall immediately notify the local District Office of any complaint arising from the taking of water authorized under this Permit and shall report any action which has been taken or is proposed with regard to such complaint. The Permit Holder shall immediately notify the local District Office if the taking of water is observed to have any significant impact on the surrounding waters. After hours, calls shall be directed to the Ministry's Spills Action Centre at 1-800-268-6060."

2025 Biennial Groundwater Monitoring Report - Willard Well Field (G15)  
June 2026

There are properties within 500 m of the G15 well that are not serviced with municipal water. In the event that a well interference complaint is received, the Region has a Well Interference Policy in place. A copy of the policy is presented in Appendix F of the 2019 Biennial Groundwater Monitoring Report – Multiple Well Fields (Burnside, 2020). There were no well interference complaints related to pumping at the Willard Well Field received in 2024 and 2025.

There are other groundwater takings registered in the MECP PTTW database within 2 km of the well field which are mapped in Figure 3 and summarized below in Table 6. No visible water level impacts are observed at the monitoring wells from these additional water takings.

**Table 6: PTTW (Groundwater) in Vicinity of Willard Well Field**

Permit Number	Permit Holder	Purpose	Max Liters per Day	Source	Distance (km) from G15 Supply Wells	Expiry Date
2765-CNVS57	Waynco Limited	Industrial	8,064,000	Ground Water	1.2	2033-02-01

## 4.2 Aquifer Response to Pumping and Precipitation

PTTW Condition 4.3 states: "The Permit Holder shall prepare and submit a report every two years by June 30, that presents the results of the well field water level monitoring for the two preceding calendar years, assesses changes in water levels in the supply aquifer(s) in relation to precipitation and water taking from the aquifer(s)".

Water levels in the overburden (AFD1), monitored at well C-WD-OW1-87-A, does not show a response to pumping. Instead, the groundwater elevations in AFD1 appear to correlate with precipitation events. Precipitation data from the Shades Mills weather station generally align with the observed water-level changes, although interpretation is limited by monthly manual measurements. It is likely that water levels are also influenced by the spring snowmelt and changes in water levels in the nearby Grand River.

The monitoring data indicates that pumping at G15 results in water level declines of up to 5 m in the Guelph, Eramosa, Upper, and Middle Gasport Formations. The most significant drawdown occurred in the Eramosa Formation, which serves as the primary aquifer for G15. During the 2022 shutdown of G15, water rose approximately 4 m in the Middle Gasport Formation, 4.5 m in the Upper Gasport Formation, 5 m in the Eramosa Formation, and 3 meters in the Guelph Formation. Groundwater levels have declined steadily from highs of approximately 258 mASL in 2019 to sustained lows near 250 mASL in 2025, indicating a long-term downward trend across all screens.

2025 Biennial Groundwater Monitoring Report - Willard Well Field (G15)  
June 2026

The groundwater levels in Eramosa, Guelph, Upper and Middle Formations did not display a correlation with precipitation events. The 2024 / 2025 precipitation data from the nearest weather station did not correlate with any specific water level response.

## 5.0 Conclusions

Impacts from pumping the municipal wells at the Willard Well Field (G15) were evaluated through implementation of the Groundwater Monitoring Program. Based on the information contained in the report, Burnside offers the following conclusions:

- The information presented in this report satisfies condition 4.3 of PTTW 6132-AKURBN;
- 2024 and 2025 pumping volumes were within the permitted range;
- There were no reported well interference complaints arising from water taking at the Willard well field;
- Water levels in the overburden (AFD1) do not show a measurable response to pumping and follow seasonal trends;
- Water levels in Eramosa, Guelph, Upper and Middle Formations do not follow seasonal trends; and
- Water levels in the Eramosa, Guelph and Upper and Middle Gasport Formations show a measurable response to pumping, within a 5 m range and show a long-term declining trend.

## 6.0 References

Aqua Insight Inc., Technical Memorandum Numerical Model Surface Transfer, March 2026.

Aqua Insight Inc., Stantec Consulting Ltd, S.S. Papadopulos and Associates Inc. and WSP Canada Inc., 2023. Hydrogeologic Characterization and Conceptual Model Updates, Region of Waterloo Tier Three Update Project. Final Report, June 2023.

Aqua Insight Inc., Stantec Consulting Ltd, S.S. Papadopulos and Associates Inc., 2024. Updates to the Moraine and Cambridge Model following Model Calibration Reporting, July 2024.

Aqua Insight Inc. 2023. Moraine Model Update and Recalibration Report. Region of Waterloo Tier Three Update Project. Final Report, June 2023.

Bajc, A.F. and Shirota J., 2007. Three-dimensional mapping of surficial deposits in the Regional Municipality of Waterloo, southwestern Ontario; report in Ontario Geological Survey, Groundwater Resources Study 3, p. 42.

Barnett, P.J., Cowan, W.R. and Henry, A.P., 1991. Quaternary Geology of Ontario, Southern Sheet Ontario Geological Survey, Map 2556, Scale 1:1000000.

Brunton, F.R., Preliminary Revisions to the Early Silurian Stratigraphy of Niagara Escarpment: Integration of Sequence Stratigraphy, Sedimentology and Hydrogeology to Delineate Hydrogeologic Units., Summary of Field Work and Other Activities 2008, Ontario Geological Survey, Open File Report 6226, P31-1 to 31-18.

Karrow 1987, Quaternary geology of the Hamilton-Cambridge Area, Southern Ontario. Ontario Geological Survey, Report 255, 94 p.

Lotowater Ltd. 1997, Study of the Hydrogeology of the Cambridge Area, The Regional Municipality of Waterloo, 93p.

Matrix Solutions Inc., 2015. Technical Memorandum: Numerical Model Surfaces Data Transfer. Region of Waterloo, June 5, 2015.

R.J. Burnside & Associates Limited, 2024. Seasonal Water Level Report, Region of Waterloo, June 27, 2025

R.J. Burnside & Associates Limited, 2024. 2023 Biennial Groundwater Monitoring Report – Willard Field, Region of Waterloo.

R.J. Burnside & Associates Limited, 2010. Production Well G4A Construction and Testing Report Cambridge, Ontario.

Stantec, 2011. Tier 3 Water Budget and Local Area Risk Assessment Cambridge Southwest Characterization Study.

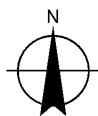
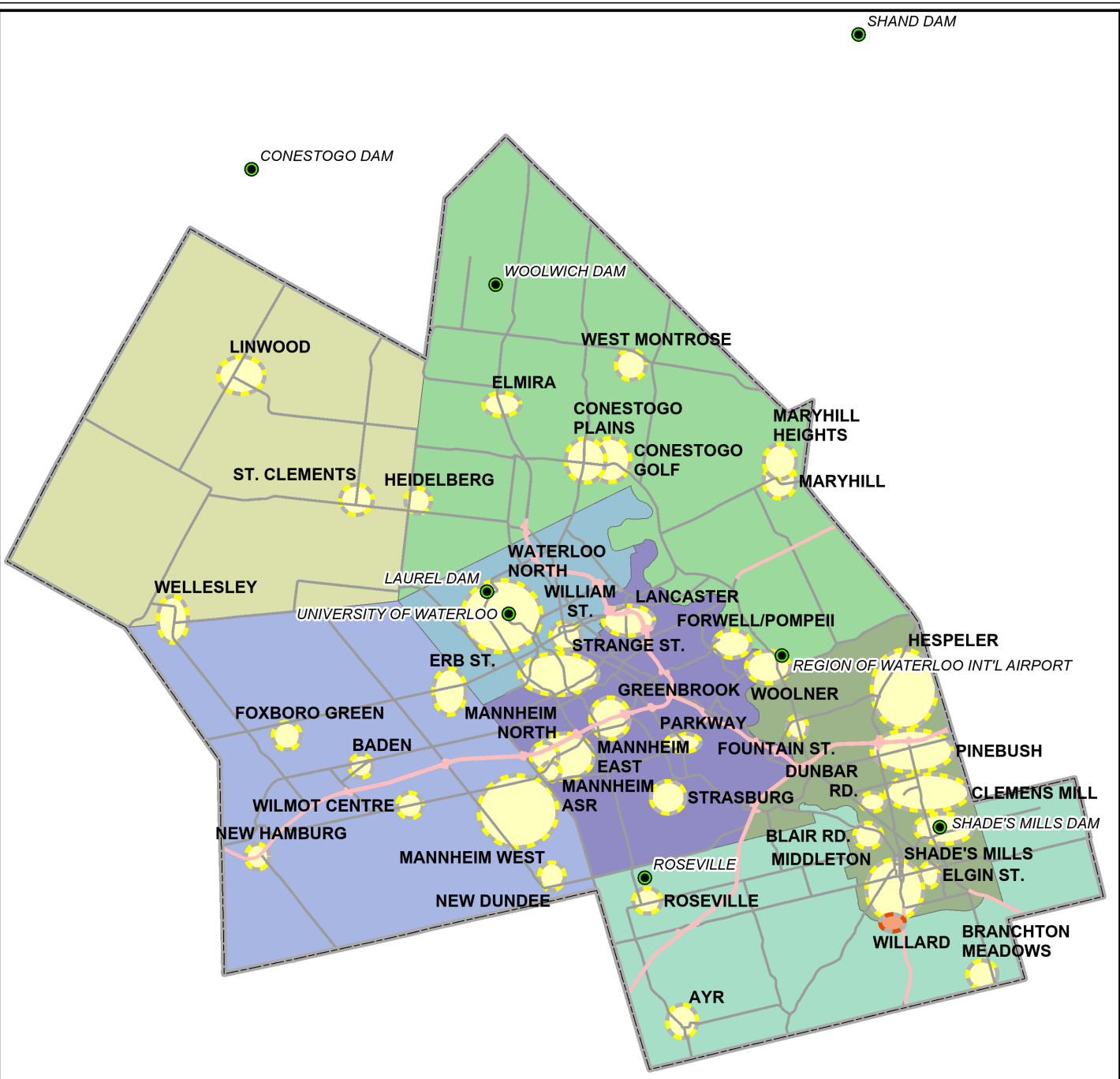


# BURNSIDE

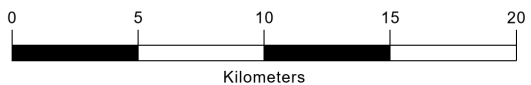
[ THE DIFFERENCE IS OUR PEOPLE ]



**Figures**



Data Source:  
Region of Waterloo; Includes material © 2012 of the Queen's  
Printer for Ontario. All rights reserved.



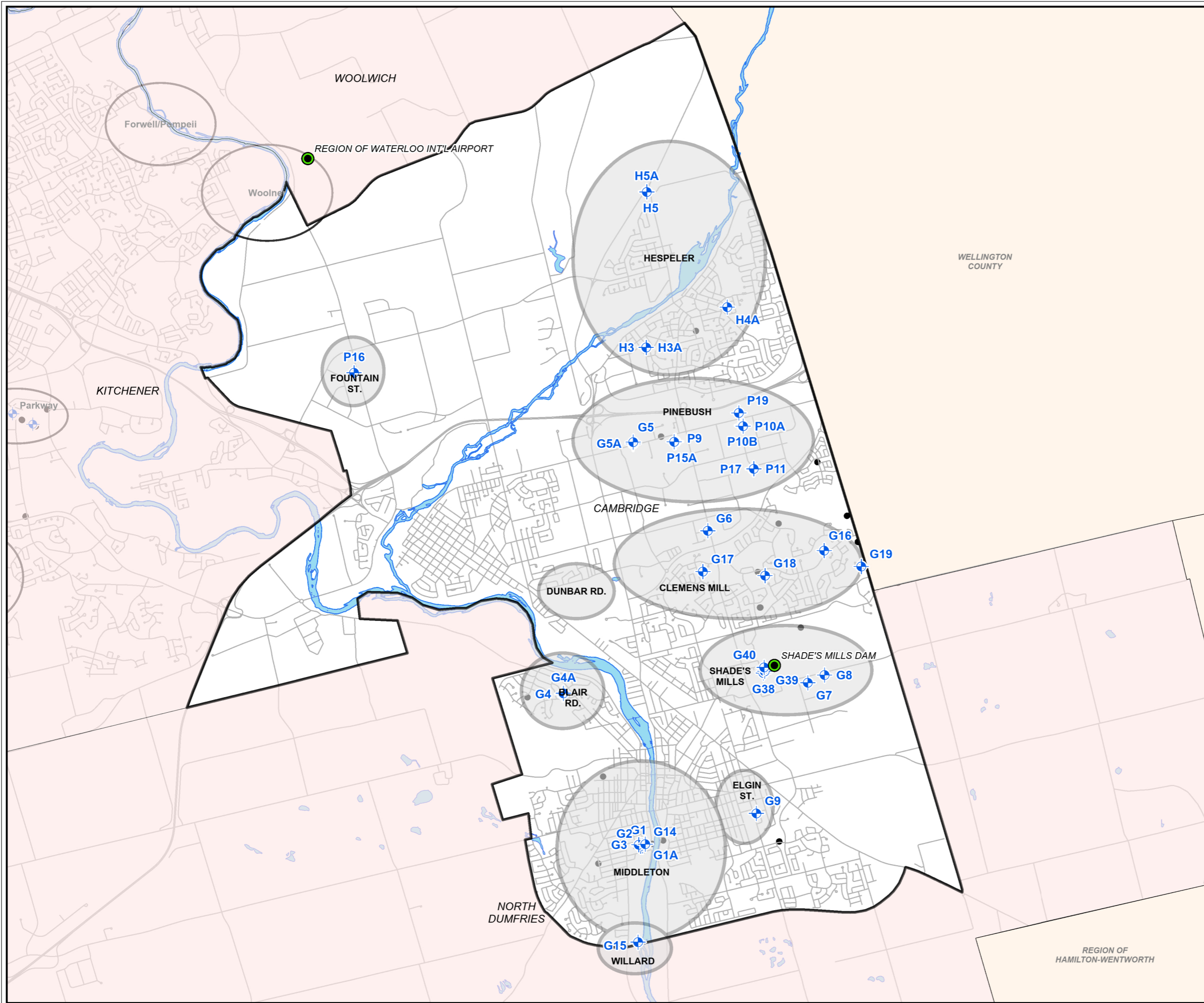
- Well Field Location
- Well Fields
- Regional Municipal Boundaries
- City of Cambridge
- City of Kitchener
- City of Waterloo
- Township of North Dumfries
- Township of Wellesley
- Township of Wilmot
- Township of Woolwich
- Meteorological Monitoring Locations



Map Title  
**2025 GROUNDWATER MONITORING REPORT - WILLARD WELL FIELD**  
**WELL FIELD LOCATION MAP**

Client  
**REGION OF WATERLOO**

Drawn	Checked	Date	Figure No. <b>1</b>
HN	SQ	February 2026	
Scale	Project No.		
1:300,000		HA0464020	



**LEGEND**

- Production Well Location
- Monitoring Well Location
- Well Fields
- Cambridge Municipal Boundary
- Meteorological Monitoring Locations

Sources:

1. Ministry of Natural Resources, © Queen's Printer for Ontario
2. Natural Resources Canada © Her Majesty the Queen in Right of Canada.

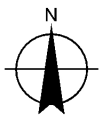
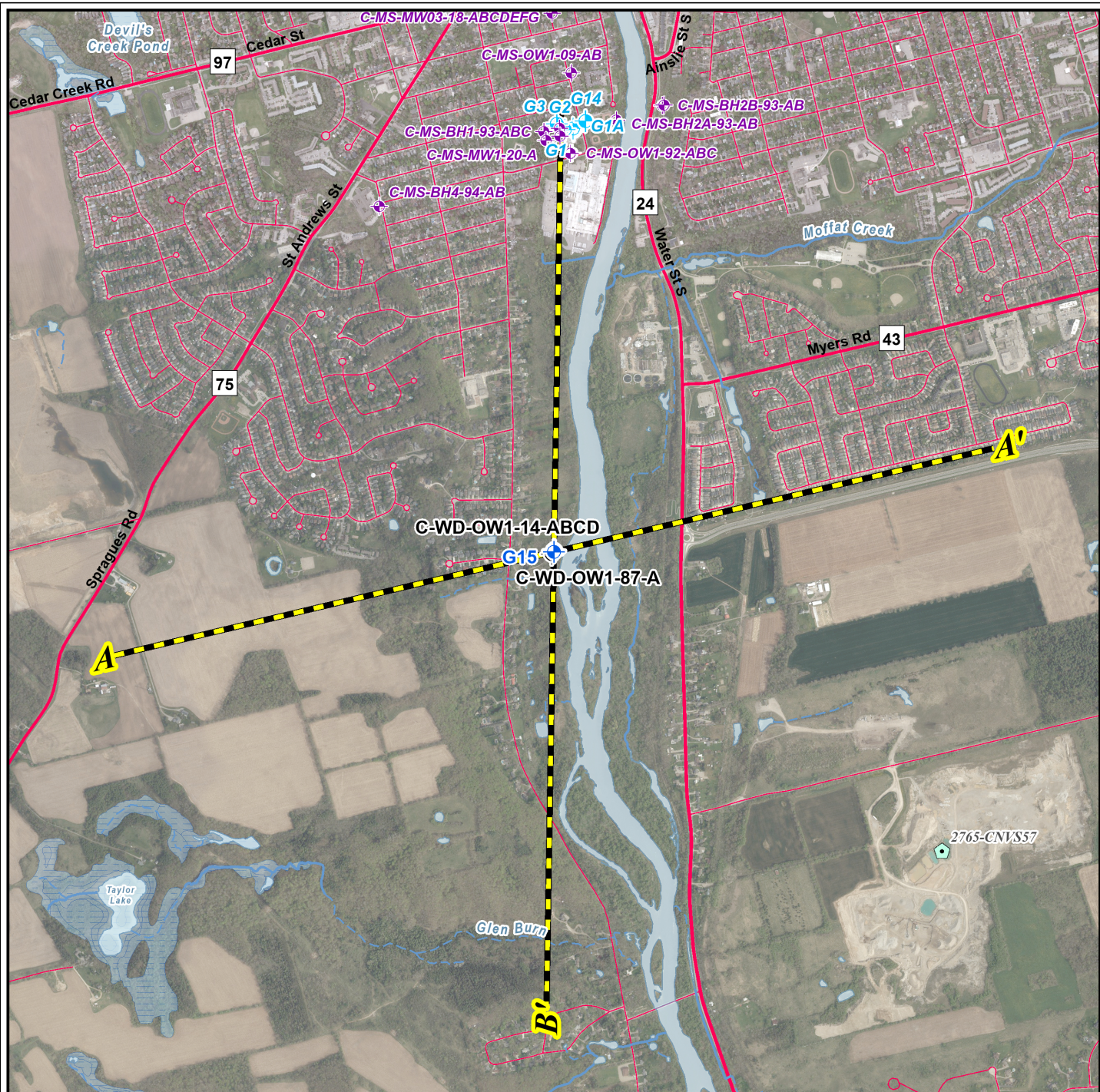
Datum: North American 1983 CSRS  
 Coord. System: NAD 1983 CSRS UTM Zone 17N



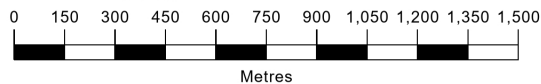
Client  
**REGION OF WATERLOO**

Figure Title  
**2025 GROUNDWATER MONITORING REPORT - WILLARD WELL FIELD**  
**CAMBRIDGE WELL FIELDS AND MONITORING NETWORK**

Drawn	Checked	Date	Figure No. <b>2</b>
HN	SQ	March 2026	
Scale	Project No.		
1:65,000	HA0464020		



Data Source:  
 Region of Waterloo GIS Data; Background 2018 Air Photo;  
 ArcGIS Image Service Region of Waterloo; Ministry of  
 Natural Resources, © Queen's Printer for Ontario; Natural  
 Resources Canada © Her Majesty the Queen in Right of  
 Canada.



- |                                 |                                       |  |
|---------------------------------|---------------------------------------|--|
| Production Well Location        | <b>Additional MECP PTTW Locations</b> | Waterbody                              |
| Nearby Monitoring Well Location | Groundwater                           | Provincially Significant Wetland (MNR) |
| Nearby Production Well Location | Cross Section Orientation             | Provincial Highway                     |
|                                 | Intermittent Creek                    | Regional Road                          |
|                                 | Creek                                 | Local Road                             |



Map Title

## 2025 GROUNDWATER MONITORING REPORT - WILLARD WELL FIELD

### WELL LOCATION MAP

Client

**REGION OF WATERLOO**

Drawn

HN

Scale

1:22,500

Checked

SQ

Date

March 2026

Project No.

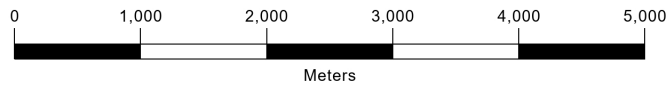
HA0464020

Figure No.

**3**



Data Source:  
 1. Ontario Geological Survey 2003. Surficial Geology of Southern Ontario; Ontario Geological Survey, Miscellaneous Release--Data 128.  
 2. Region of Waterloo GIS



- |                          |  |  |  |                                |                         |
|--------------------------|--|--|--|--------------------------------|-------------------------|
| RMOV Supply Well         | 5b: Stone-poor, carbonate-derived silty to sandy till (ATA2/ATB1 - Aquitard) | 7a: Glaciofluvial deposits: Sandy deposits (AFA2 - Aquifer)    | 8a: Fine-textured glaciolacustrine deposits: Massive-well laminated (ATA1) | 20: Organic deposits           | Trench                  |
| Watercourse              | 6: Ice-contact stratified deposits (AFB1 - Aquifer)                          | 7b: Glaciofluvial deposits: Gravelly deposits (AFA2 - Aquifer) | 9: Coarse-textured glaciolacustrine deposits                               | Quarry (Point)                 | Delta, glaciolacustrine |
| Waterbody                | 3: Paleozoic bedrock   |  | 19: Modern alluvial deposits   | Sand and Gravel Pit            | Sample Location         |
| <b>Surficial Geology</b> |  |  |  | Beach                          | Hummocky Topography     |
|                          |  |  |  | Esker: Direction of Flow Known | Unit Contact            |
|                          |  |  |  | Ice-Contact Slope              | Boundary                |



Map Title  
**2025 GROUNDWATER MONITORING REPORT - WILLARD WELL FIELD**

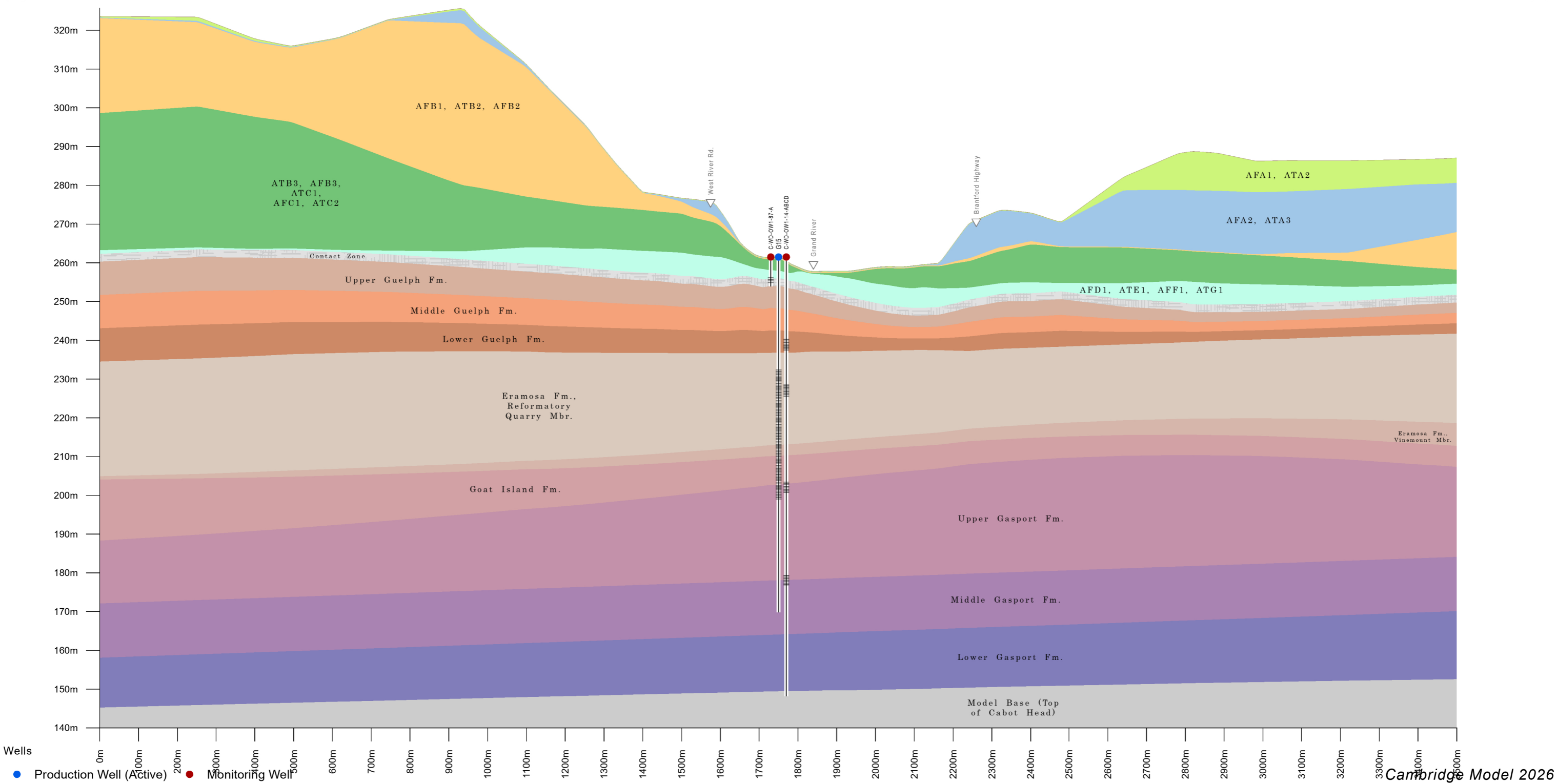
**SURFICIAL GEOLOGY**

Client  
**REGION OF WATERLOO**

Drawn	Checked	Date	Figure No. <b>4</b>
HN	SQ	February 2026	
Scale	Project No.		
1:60,000	HA0464020		

A

A'



Wells

- Production Well (Active)
- Monitoring Well

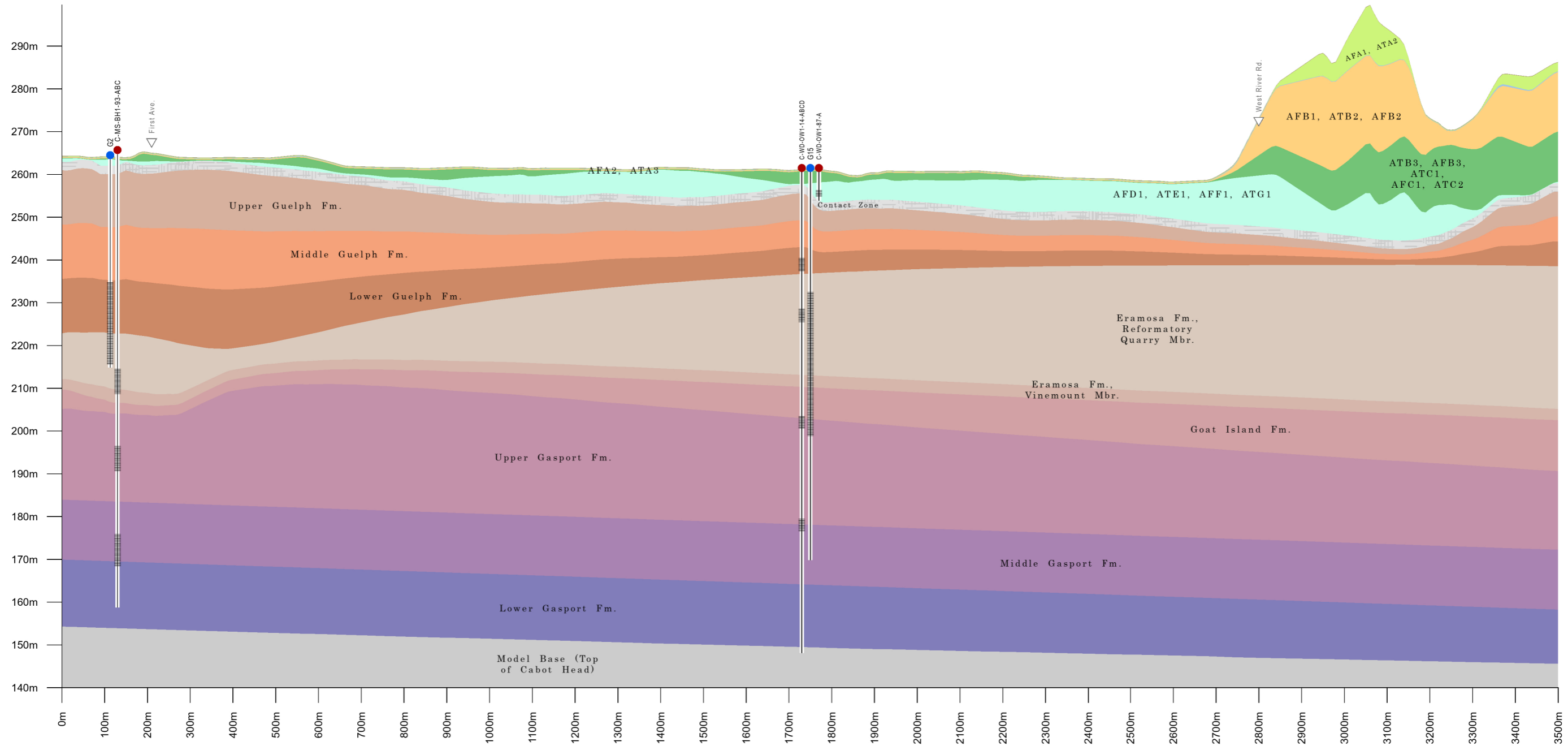
<ul style="list-style-type: none"> <li>Surficial Geology, Whittlesey Clay (ATA1)</li> <li>Whittlesey Sand (AFA1), Wentworth Till (ATA2)</li> <li>Grand River Valley Outwash Deposits (AFA2), Fine Grain Deposits in the Grand River Valley (ATA3)</li> </ul>	<ul style="list-style-type: none"> <li>Upper Waterloo Moraine Stratified Sediments &amp; Equivalents (AFB1), Middle Maryhill Till &amp; Equivalents (AFB2), Middle Waterloo Moraine Stratified Sediments &amp; Equivalents (AFB2)</li> <li>Lower Maryhill Till &amp; stratified Equivalents (ATB3), Lower Waterloo Moraine Stratified Sediments or Catfish Creek Till Outwash (AFB3), Upper / Main Catfish Creek Till (ATC1), Middle Catfish Creek Stratified Deposits (AFC1), Lower Catfish Creek Till (ATC2)</li> </ul>	<ul style="list-style-type: none"> <li>Pre-Catfish Creek Coarse-Grained Glaciofluvial/ Lacustrine Deposits (AFD1), Canning Drift: Till &amp; Fine Textured Glaciolacustrine Deposits (ATE1), Pre-Canning Coarse-Textured Glaciofluvial/ Glaciolacustrine Deposits (AFF1), Pre-Canning Coarse-Textured Till (ATG1)</li> <li>Weathered Bedrock</li> </ul>	<ul style="list-style-type: none"> <li>Bedrock: Upper Guelph Fm.</li> <li>Bedrock: Middle Guelph Fm.</li> <li>Bedrock: Lower Guelph Fm.</li> <li>Bedrock: Eramosa Fm., Reformatory Quarry Mbr.</li> </ul>	<ul style="list-style-type: none"> <li>Bedrock: Eramosa Fm., Vinemount Mbr.</li> <li>Bedrock: Goat Island Fm.</li> <li>Bedrock: Lower Gasport Fm.</li> <li>Bedrock: Upper Gasport Fm.</li> </ul>	<ul style="list-style-type: none"> <li>Bedrock: Middle Gasport Fm.</li> <li>Model Base (Top of Cabot Head)</li> </ul>	Wellhead Well Screen or Open Hole
--	---	---	---	--	---	---

Client  
**REGION OF WATERLOO**

Figure Title			
<b>GEOLOGIC CROSS SECTION REGION OF WATERLOO</b>			
Willard Cross Section A - A'			
Drawn	Checked	Date	Figure No.
PS	DH	2026/06/01	5
Horizontal Scale 1:10,000		Project No.	
Vertical Ex.:10x		HA046402	

B

B'

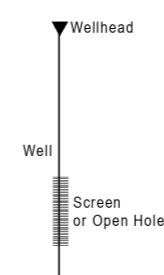


Wells

- Production Well (Active)
- Monitoring Well

Cambridge Model 2026

Surficial Geology, Whittlesey Clay (ATA1)	Upper Waterloo Moraine Stratified Sediments & Equivalents (AFB1), Middle Maryhill Till & Equivalents (ATB2), Middle Waterloo Moraine Stratified Sediments & Equivalents (AFB2)	Pre-Catfish Creek Coarse-Grained Glaciofluvial/Lacustrine Deposits (AFD1), Canning Drift: Till & Fine Textured Glaciolacustrine Deposits (ATE1), Pre-Canning Coarse-Textured Glaciofluvial/Glaciolacustrine Deposits (AFF1), Pre-Canning Coarse-Textured Till (ATG1)	Bedrock: Upper Guelph Fm.	Bedrock: Eramosa Fm., Vinemount Mbr.	Bedrock: Middle Gasport Fm.
Whittlesey Sand (AFA1), Wentworth Till (ATA2)	Lower Maryhill Till & stratified Equivalents (ATB3), Lower Waterloo Moraine Stratified Sediments or Catfish Creek Till Outwash (AFB3), Upper / Main Catfish Creek Till (ATC1), Middle Catfish Creek Stratified Deposits (AFC1), Lower Catfish Creek Till (ATC2)	Weathered Bedrock	Bedrock: Middle Guelph Fm.	Bedrock: Goat Island Fm.	Model Base (Top of Cabot Head)
Grand River Valley Outwash Deposits (AFA2), Fine Grain Deposits in the Grand River Valley (ATA3)			Bedrock: Lower Guelph Fm.	Bedrock: Lower Gasport Fm.	
			Bedrock: Eramosa Fm., Reformatory Quarry Mbr.	Bedrock: Upper Gasport Fm.	



Client  
**REGION OF WATERLOO**

Figure Title <b>GEOLOGIC CROSS SECTION REGION OF WATERLOO</b> Willard Cross Section B - B'			
Drawn PS	Checked DH	Date 2026/06/01	Figure No. 6
Horizontal Scale 1:10,000		Project No. HA046402	
Vertical Ex.:10x			



BURNSIDE

[ THE DIFFERENCE IS OUR PEOPLE ]

---

**Appendix A**

**Permit To Take Water**

Appendix A

**PERMIT TO TAKE WATER**  
Ground Water  
NUMBER 6132-AKURBN

*Pursuant to Section 34.1 of the Ontario Water Resources Act, R.S.O. 1990 this Permit To Take Water is hereby issued to:*

The Regional Municipality of Waterloo  
150 Frederick St 7th Floor  
Kitchener, Ontario  
N2G 4J3

*For the water taking from:* Municipal Well #G15

*Located at:* 325 West River Rd  
Cambridge, Regional Municipality of Waterloo

*For the purposes of this Permit, and the terms and conditions specified below, the following definitions apply:*

**DEFINITIONS**

- (a) "Director" means any person appointed in writing as a Director pursuant to section 5 of the OWRA for the purposes of section 34.1, OWRA.
- (b) "Provincial Officer" means any person designated in writing by the Minister as a Provincial Officer pursuant to section 5 of the OWRA.
- (c) "Ministry" means Ontario Ministry of the Environment and Climate Change.
- (d) "District Office" means the Guelph District Office.
- (e) "Permit" means this Permit to Take Water No. 6132-AKURBN including its Schedules, if any, issued in accordance with Section 34.1 of the OWRA.
- (f) "Permit Holder" means The Regional Municipality of Waterloo.
- (g) "OWRA" means the *Ontario Water Resources Act*, R.S.O. 1990, c. O. 40, as amended.

*You are hereby notified that this Permit is issued subject to the terms and conditions outlined below:*

## **TERMS AND CONDITIONS**

### **1. Compliance with Permit**

- 1.1 Except where modified by this Permit, the water taking shall be in accordance with the application for this Permit To Take Water, dated January 20, 2017 and signed by Richard Wootton, and all Schedules included in this Permit.
- 1.2 The Permit Holder shall ensure that any person authorized by the Permit Holder to take water under this Permit is provided with a copy of this Permit and shall take all reasonable measures to ensure that any such person complies with the conditions of this Permit.
- 1.3 Any person authorized by the Permit Holder to take water under this Permit shall comply with the conditions of this Permit.
- 1.4 This Permit is not transferable to another person.
- 1.5 This Permit provides the Permit Holder with permission to take water in accordance with the conditions of this Permit, up to the date of the expiry of this Permit. This Permit does not constitute a legal right, vested or otherwise, to a water allocation, and the issuance of this Permit does not guarantee that, upon its expiry, it will be renewed.
- 1.6 The Permit Holder shall keep this Permit available at all times at or near the site of the taking, and shall produce this Permit immediately for inspection by a Provincial Officer upon his or her request.
- 1.7 The Permit Holder shall report any changes of address to the Director within thirty days of any such change. The Permit Holder shall report any change of ownership of the property for which this Permit is issued within thirty days of any such change. A change in ownership in the property shall cause this Permit to be cancelled.

### **2. General Conditions and Interpretation**

- 2.1 Inspections  
The Permit Holder must forthwith, upon presentation of credentials, permit a Provincial Officer to carry out any and all inspections authorized by the OWRA, the *Environmental Protection Act*, R.S.O. 1990, the *Pesticides Act*, R.S.O. 1990, or the *Safe Drinking Water Act*, S. O. 2002.
- 2.2 Other Approvals  
The issuance of, and compliance with this Permit, does not:
  - (a) relieve the Permit Holder or any other person from any obligation to comply with any other

applicable legal requirements, including the provisions of the *Ontario Water Resources Act* , and the *Environmental Protection Act* , and any regulations made thereunder; or

(b) limit in any way any authority of the Ministry, a Director, or a Provincial Officer, including the authority to require certain steps be taken or to require the Permit Holder to furnish any further information related to this Permit.

### 2.3 Information

The receipt of any information by the Ministry, the failure of the Ministry to take any action or require any person to take any action in relation to the information, or the failure of a Provincial Officer to prosecute any person in relation to the information, shall not be construed as:

(a) an approval, waiver or justification by the Ministry of any act or omission of any person that contravenes this Permit or other legal requirement; or

(b) acceptance by the Ministry of the information's completeness or accuracy.

### 2.4 Rights of Action

The issuance of, and compliance with this Permit shall not be construed as precluding or limiting any legal claims or rights of action that any person, including the Crown in right of Ontario or any agency thereof, has or may have against the Permit Holder, its officers, employees, agents, and contractors.

### 2.5 Severability

The requirements of this Permit are severable. If any requirements of this Permit, or the application of any requirements of this Permit to any circumstance, is held invalid or unenforceable, the application of such requirements to other circumstances and the remainder of this Permit shall not be affected thereby.

### 2.6 Conflicts

Where there is a conflict between a provision of any submitted document referred to in this Permit, including its Schedules, and the conditions of this Permit, the conditions in this Permit shall take precedence.

## **3. Water Takings Authorized by This Permit**

### **3.1 Expiry**

This Permit expires on **March 31, 2027**. No water shall be taken under authority of this Permit after the expiry date.

### **3.2 Amounts of Taking Permitted**

The Permit Holder shall only take water from the source, during the periods and at the rates and amounts of taking specified in Table A. Water takings are authorized only for the purposes specified in Table A.

**Table A**

	Source Name / Description:	Source: Type:	Taking Specific Purpose:	Taking Major Category:	Max. Taken per Minute (litres):	Max. Num. of Hrs Taken per Day:	Max. Taken per Day (litres):	Max. Num. of Days Taken per Year:	Zone/ Easting/ Northing:
1	Municipal Well #G15	Well Drilled	Municipal	Water Supply	4,550	24	6,552,000	365	17 555169 4798054
						<b>Total Taking:</b>	6,552,000		

#### **4. Monitoring**

- 4.1 Under section 9 of O. Reg. 387/04, and as authorized by subsection 34(6) of the *Ontario Water Resources Act*, the Permit Holder shall, on each day water is taken under the authorization of this Permit, record the date, the volume of water taken on that date and the rate at which it was taken. The daily volume of water taken shall be measured by a flow meter or calculated in accordance with the method described in the application for this Permit, or as otherwise accepted by the Director. The Permit Holder shall keep all records required by this condition current and available at or near the site of the taking and shall produce the records for inspection by a Provincial Officer upon his or her request. The Permit Holder, unless otherwise required by the Director, shall submit, on or before March 31<sup>st</sup> in every year, the records required by this condition to the ministry's Water Taking Reporting System.
- 4.2 The Permit Holder shall measure and record water levels once a month in the following monitoring wells:  
C-WD-OW1AB-14  
C-WD-OW1CD-14  
C-WD-OW1-87
- 4.3 The Permit Holder shall prepare and submit a report every two years by June 30th commencing June 30, 2018, that presents the results of the well field water level monitoring for the two preceding calendar years, assesses changes in water levels in the supply aquifer in relation to the precipitation and the water taking from the aquifer, and provides a summary for all interference complaints received by the Permit Holder related to this permit and reported in the District Office in accordance with Condition 5.1 and the manner in which the Permit Holder has dealt with the complaint.

#### **5. Impacts of the Water Taking**

##### **5.1 Notification**

The Permit Holder shall immediately notify the local District Office of any complaint arising from the taking of water authorized under this Permit and shall report any action which has been taken or is proposed with regard to such complaint. The Permit Holder shall immediately notify the local District Office if the taking of water is observed to have any significant impact on the surrounding waters. After hours, calls shall be directed to the Ministry's Spills Action Centre at

1-800-268-6060.

5.2 For Groundwater Takings

If the taking of water is observed to cause any negative impact to other water supplies obtained from any adequate sources that were in use prior to initial issuance of a Permit for this water taking, the Permit Holder shall take such action necessary to make available to those affected, a supply of water equivalent in quantity and quality to their normal takings, or shall compensate such persons for their reasonable costs of so doing, or shall reduce the rate and amount of taking to prevent or alleviate the observed negative impact. Pending permanent restoration of the affected supplies, the Permit Holder shall provide, to those affected, temporary water supplies adequate to meet their normal requirements, or shall compensate such persons for their reasonable costs of doing so.

If permanent interference is caused by the water taking, the Permit Holder shall restore the water supplies of those permanently affected.

**6. Director May Amend Permit**

The Director may amend this Permit by letter requiring the Permit Holder to suspend or reduce the taking to an amount or threshold specified by the Director in the letter. The suspension or reduction in taking shall be effective immediately and may be revoked at any time upon notification by the Director. This condition does not affect your right to appeal the suspension or reduction in taking to the Environmental Review Tribunal under the *Ontario Water Resources Act*, Section 100 (4).

*The reasons for the imposition of these terms and conditions are as follows:*

1. Condition 1 is included to ensure that the conditions in this Permit are complied with and can be enforced.
2. Condition 2 is included to clarify the legal interpretation of aspects of this Permit.
3. Conditions 3 through 6 are included to protect the quality of the natural environment so as to safeguard the ecosystem and human health and foster efficient use and conservation of waters. These conditions allow for the beneficial use of waters while ensuring the fair sharing, conservation and sustainable use of the waters of Ontario. The conditions also specify the water takings that are authorized by this Permit and the scope of this Permit.

*In accordance with Section 100 of the Ontario Water Resources Act, R.S.O. 1990, you may by written Notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 101 of the Ontario Water Resources Act, R.S.O. 1990, as amended, provides that the Notice requiring the hearing shall state:*

1. The portions of the Permit or each term or condition in the Permit in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

*In addition to these legal requirements, the Notice should also include:*

- a. The name of the appellant;
- b. The address of the appellant;
- c. The Permit to Take Water number;
- d. The date of the Permit to Take Water;
- e. The name of the Director;
- f. The municipality within which the works are located;

*This notice must be served upon:*

*The Secretary  
Environmental Review Tribunal  
655 Bay Street, 15th Floor  
Toronto ON  
M5G 1E5  
Fax: (416) 326-5370  
Email: ERTTribunalsecretary@ontario.ca*

AND

*The Director, Section 34.1, Ministry of the  
Environment and Climate Change  
12th Floor  
119 King St W  
Hamilton ON L8P 4Y7  
Fax: (905) 521-7820*

***Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal:***

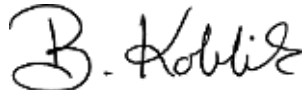
by Telephone at  
(416) 212-6349  
Toll Free 1(866) 448-2248

by Fax at  
(416) 326-5370  
Toll Free 1(844) 213-3474

by e-mail at  
[www.ert.gov.on.ca](http://www.ert.gov.on.ca)

This Permit cancels and replaces Permit Number 2245-78PSA6, issued on 2001/11/15.

Dated at Hamilton this 29th day of March, 2017.



Belinda Koblik  
Director, Section 34.1  
*Ontario Water Resources Act* , R.S.O. 1990

## **Schedule A**

This Schedule "A" forms part of Permit To Take Water 6132-AKURBN, dated March 29, 2017.



# BURNSIDE

[ THE DIFFERENCE IS OUR PEOPLE ]

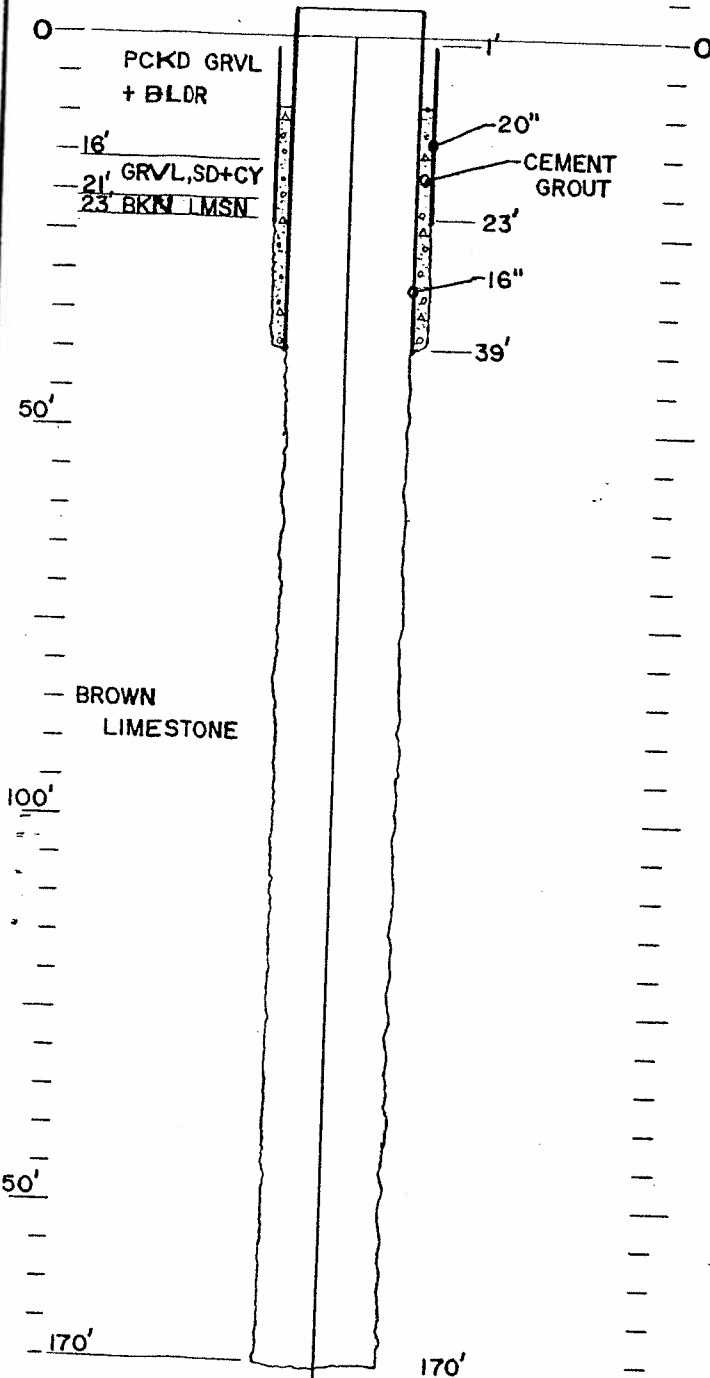
---

## Appendix B

### Well Records

**WELL DIAGRAM**

**LOG**



**WELL MATERIAL**

Outer Casing: 20 " dia., 0.375 " Wall Thk. Matl.: STL  
 Cemented from 0 ' - " to 39 ' - "  
 Inner Casing: 16 " dia., 0.375 " Wall Thk. Matl.: STL  
 Screen: Make - " dia., Opening & Matl.: -  
 Plug: Type - , Matl - , Other: -  
 Gravel: Type - , Size - , Quantity -

**WELL TEST DATA**

Preliminary Test Date: \_\_\_\_\_ by \_\_\_\_\_  
 Static Level: \_\_\_\_\_ " below M.P. \_\_\_\_\_  
 Pumping Rate IGM: \_\_\_\_\_  
 Pumping Duration: \_\_\_\_\_ hrs. \_\_\_\_\_ min.  
 Pumping Level at Test End: \_\_\_\_\_ "  
 Performance Plots: dd-t Dwg. \_\_\_\_\_  
 dd-r Dwg. \_\_\_\_\_  
 Step Test \_\_\_\_\_

Final Test: Date MARCH 4/87 by N.B.  
 Rated Well Capacity IGM \_\_\_\_\_  
 Pumping Rate IGM 995 Static level 10 ' 10 "  
 Pumping level 28 ' 6 " at 24 hrs. 0 min.  
 Pump pressure: \_\_\_\_\_ psi; Main pressure \_\_\_\_\_ psi  
 Shut off: AGH \_\_\_\_\_ psi; W.L. \_\_\_\_\_ "  
 Clear Well Depth from B.P. \_\_\_\_\_ " Air Line \_\_\_\_\_ "

**PUMP & MOTOR DATA**

Pump Make \_\_\_\_\_ Rating \_\_\_\_\_ IGM @ \_\_\_\_\_ ' TH  
 Head: Type \_\_\_\_\_ S.N. \_\_\_\_\_  
 Column: \_\_\_\_\_ ' X \_\_\_\_\_ " X \_\_\_\_\_ " : Shaft Mtl: \_\_\_\_\_  
 Bowl: \_\_\_\_\_ Stage \_\_\_\_\_ : Curve: \_\_\_\_\_  
 Suction: \_\_\_\_\_ " dia. \_\_\_\_\_ " Long  
 Special: Zinc Sleeves \_\_\_\_\_ : Taped Oil Line \_\_\_\_\_  
 Other \_\_\_\_\_  
 Motor Make: \_\_\_\_\_ Frame: \_\_\_\_\_ SN: \_\_\_\_\_  
 \_\_\_\_\_ HP, \_\_\_\_\_ ph, \_\_\_\_\_ hz, \_\_\_\_\_ rpm, \_\_\_\_\_ Volts  
 Bearing No. Upper \_\_\_\_\_  
 Lower \_\_\_\_\_

*Special Equipment*

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**WELL REVISIONS AND REHABILITATION**

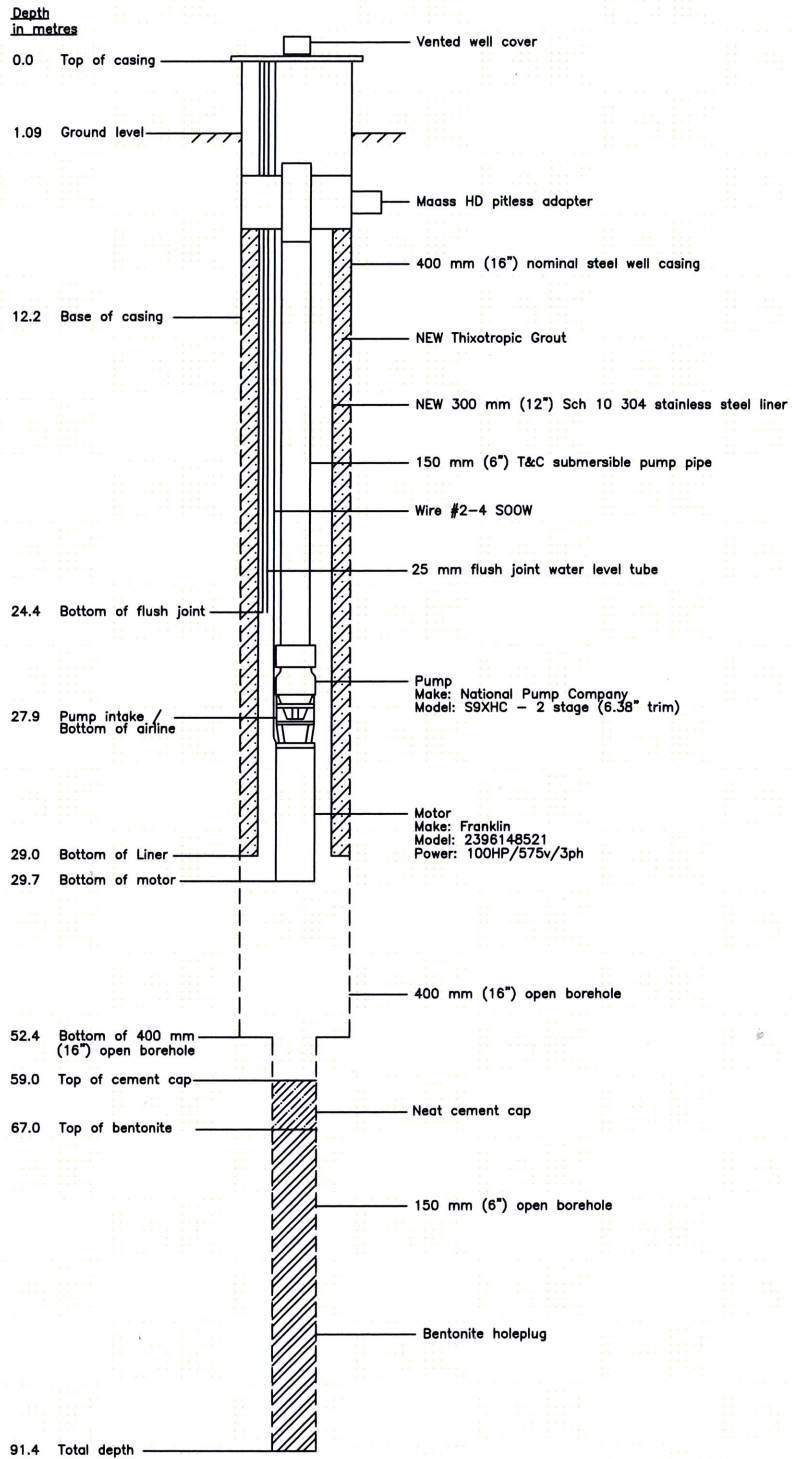
DATE	WORK DONE	BY

**International Water Supply Limited**

SASKATOON - BARRIE - MONTREAL

CLIENT: REGION OF WATERLOO  
 WELL NO: WILLARD WELL

DRILLED BY: N. BARNHARDT DATE: FEB. 87 DRAWN: M.P.  
 INSTALLED BY: \_\_\_\_\_ DATE: \_\_\_\_\_



CLIENT

**Regional Municipality of Waterloo**

TITLE

**Well G15 Liner  
Installation Drawing**

PROJECT No. <b>006-279</b>		G:\Lotowater Projects\006 Region of Waterloo\279 G6, G15 & P9 Liners\Well G15\Packer Test Setup.dwg		<b>FIGURE 6</b>
DESIGN		REVISION No. 2014/06/10	SCALE <b>N.T.S.</b>	
DRAWN	<b>EH 2014/03/11</b>			
CHECKED	<b>BP 2014/03/18</b>			

# Monitoring Well: C-WD-OW1A/B-14

**Project:** 2013 Well Construction and Testing  
**Client:** Regional Municipality of Waterloo  
**Location:** Region of Waterloo; Willard Well Field  
**Number:** 1609-00734

**Field Investigator:** J. Koch  
**Contractor:** International Water Supply / Durl Hopper Ltd.  
**Drilling method:** Ingersoll Rand T4 Mud Rotary  
**Date started/completed:** 14-Feb-1970 / 10-Mar-2014

**Ground surface elevation:** 261.93 m AMSL  
**Top of casing elevation:** 262.68 / 262.66 m AMSL  
**Easting:** 555168  
**Northing:** 4798059

C-WD-OW1-14-(A-B)

## SUBSURFACE PROFILE



Screen Interval: 58.00 - 61.00; 82.00 - 85.00 m BGS  
 Sand Pack Interval: 58.00 - 61.00; 82.00 - 85.00 m BGS  
 Well Seal Interval: 0.00 - 55.00; 62.20 - 68.90 m BGS

Notes:  
 m AMSL - metres above mean sea level  
 m BGS - metres below ground surface  
 m BTOC - metres below top of casing

Surface casing (254 mm OD) from 0 to 7 m.  
 Elevation data from Stantec Survey (Nov, 2014)

C-WD-TW2-70 converted to C-WD-OW1AB-14  
 C-WD-OW1A-14 refers to the monitoring well at 85 m BGS  
 C-WD-OW1B-14 refers to the monitoring well at 61 m BGS

n/a - not available/applicable

WRAS No. 9207088

Drawn By/Checked By: NSLV





Measurements recorded in:  Metric  Imperial

A156814

Page of

Well Owner's Information

First Name, Last Name / Organization, E-mail Address, Mailing Address (Street Number/Name), Municipality, Province, Postal Code, Telephone No. (inc. area code)

Well Location

Address of Well Location (Street Number/Name), Township, Lot, Concession, County/District/Municipality, City/Town/Village, Province, Postal Code, UTM Coordinates, Zone, Easting, Northing, Municipal Plan and Sublot Number, Other

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

Table with columns: General Colour, Most Common Material, Other Materials, General Description, Depth (m/ft) From, To

Annular Space table with columns: Depth Set at (m/ft) From, To, Type of Sealant Used (Material and Type), Volume Placed (m³/ft³)

Method of Construction and Well Use checkboxes

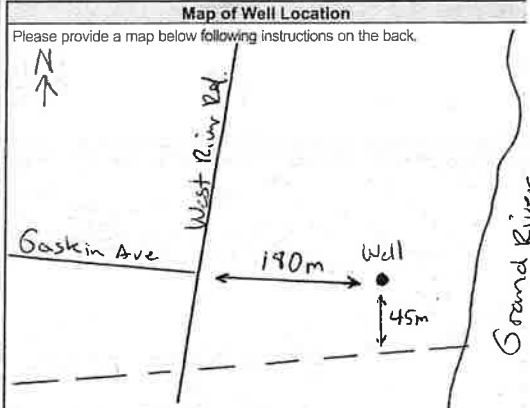
Construction Record - Casing table with columns: Inside Diameter (cm/in), Open Hole OR Material, Wall Thickness (cm/in), Depth (m/ft) From, To, Status of Well

Construction Record - Screen table with columns: Outside Diameter (cm/in), Material, Slot No., Depth (m/ft) From, To

Water Details and Hole Diameter tables

Well Contractor and Well Technician Information form

Results of Well Yield Testing table with columns: Draw Down, Recovery, Time (min), Water Level (m/ft)



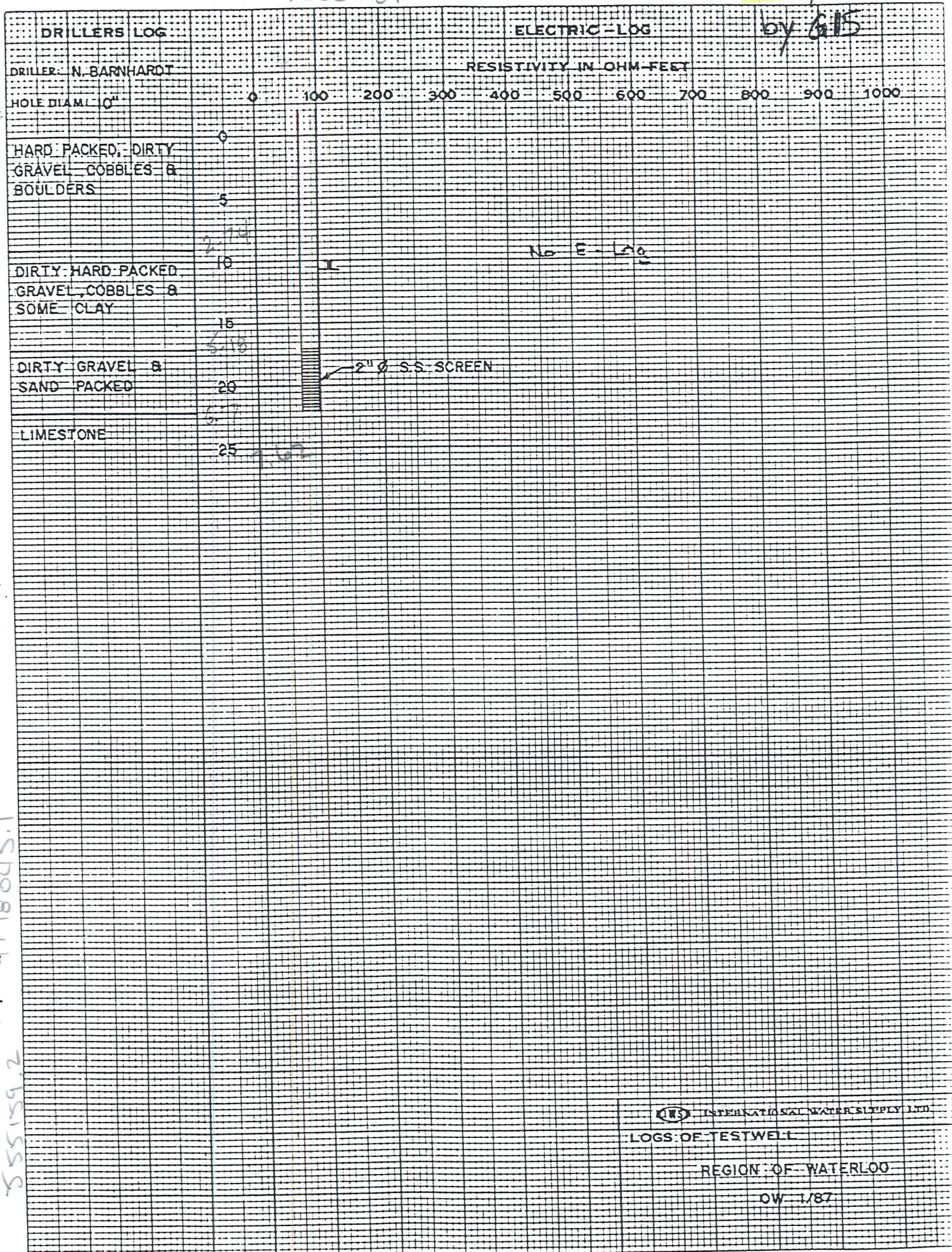
Comments, Well owner's information package delivered, Date Package Delivered, Ministry Use Only, Audit No., Date Work Completed

1000381

9200630

OW1/87

C-WD-OW1-87-A



MADE IN CANADA

12 SOURCE TO THE OFFICE OF THE REGISTRAR OF DRAWING PAPER

479805.1  
555189.2

INTERNATIONAL WATER SUPPLY LTD.

LOGS OF TESTWELL

REGION OF WATERLOO

OW 1/87



BURNSIDE

[ THE DIFFERENCE IS OUR PEOPLE ]

---

## Appendix C

### Monitoring Data (Pumped Volumes and Hydrographs)



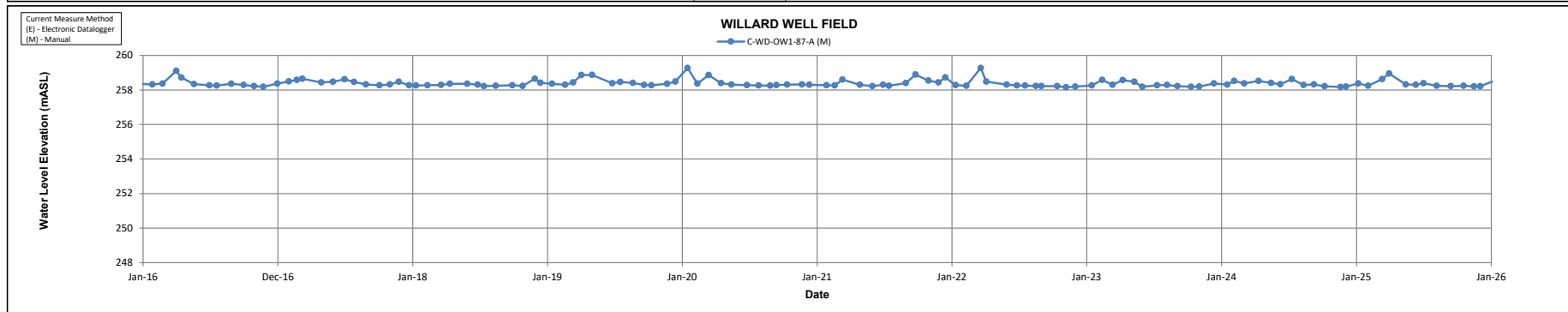
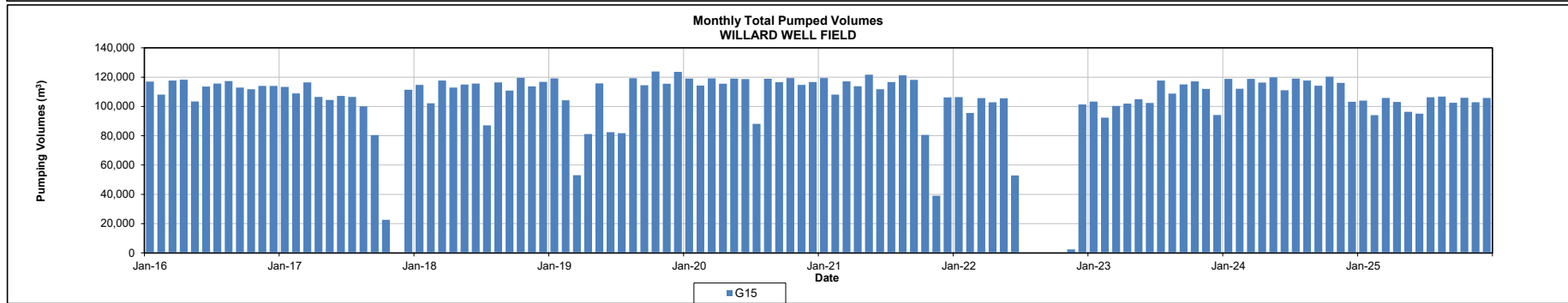
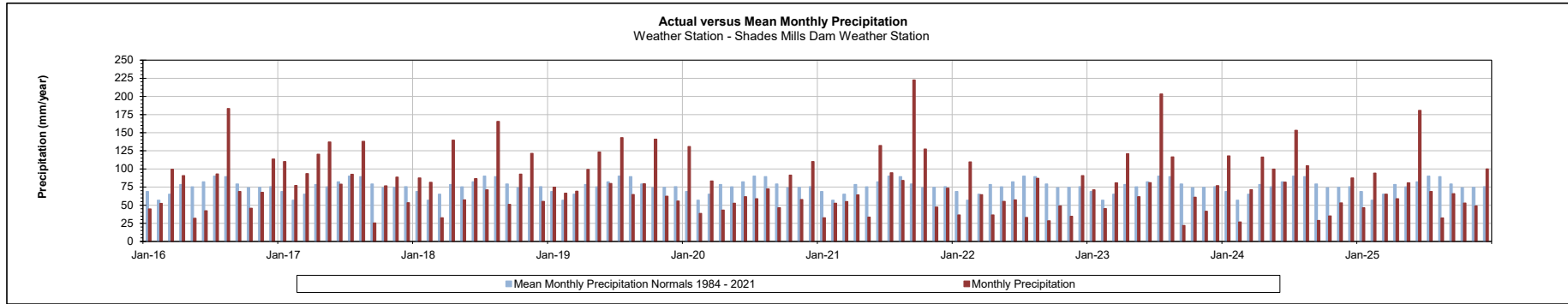
TABLE C-1  
WELL FIELD WATER PRODUCTION SUMMARY  
REGION OF WATERLOO - 2025 GROUNDWATER MONITORING REPORT



Well Field	Major or Minor Supply	Production Well Name	Permit to Take Water Details			2021 Production Summary			2022 Production Summary			2023 Production Summary			2024 Production Summary			2025 Production Summary		
			MOE Permit Number	Permitted Capacity (total m <sup>3</sup> /year)*	Permitted Rate (L/s)*	Total Production Well Volume (total m <sup>3</sup> /year)	Average Daily Rate (m <sup>3</sup> /day)	Average Rate (L/s)	Total Production Well Volume (total m <sup>3</sup> /year)	Average Daily Rate (m <sup>3</sup> /day)	Average Rate (L/s)	Total Production Well Volume (total m <sup>3</sup> /year)	Average Daily Rate (m <sup>3</sup> /day)	Average Rate (L/s)	Total Production Well Volume (total m <sup>3</sup> /year)	Average Daily Rate (m <sup>3</sup> /day)	Average Rate (L/s)	Total Production Well Volume (total m <sup>3</sup> /year)	Average Daily Rate (m <sup>3</sup> /day)	Average Rate (L/s)
Willard	Minor	G15	6132-AKURBN			1,273,456	3,489	40.4	673,133	1,844	21.3	1,269,695	3,479	40.3	1,387,238	3,801	44.0	1,228,033	3,364	38.9
			<b>Well Field Total</b>	<b>2,391,480</b>	<b>75.8</b>	<b>1,273,456</b>	<b>3,489</b>	<b>40.4</b>	<b>673,133</b>	<b>1,844</b>	<b>21.3</b>	<b>1,269,695</b>	<b>3,479</b>	<b>40.3</b>	<b>1,387,238</b>	<b>3,801</b>	<b>44.0</b>	<b>1,228,033</b>	<b>3,364</b>	<b>38.9</b>

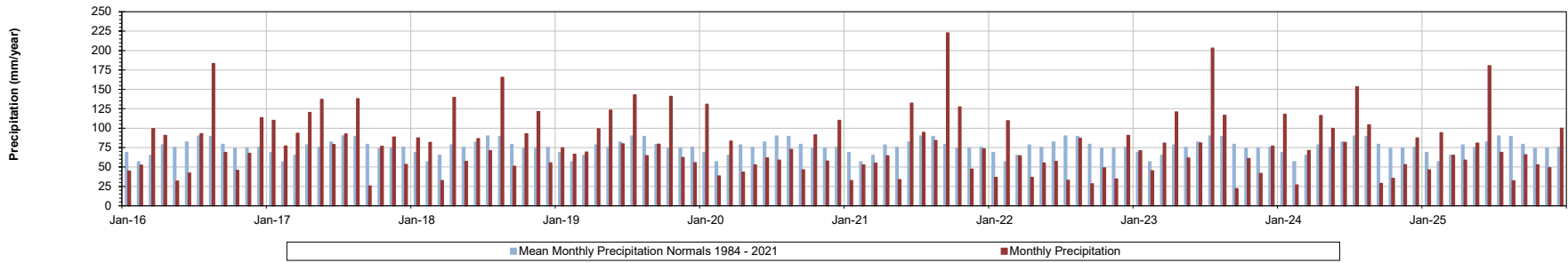
Notes:  
 - = no applicable data  
 n/a = data not available  
 \* = rates and volumes based on permitted L/day

REGION OF WATERLOO  
2025 GROUNDWATER MONITORING REPORT -  
WILLARD

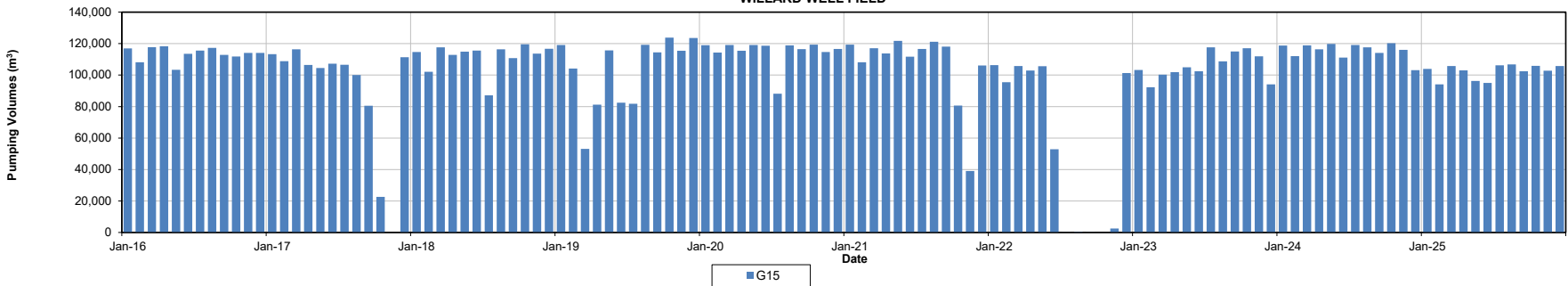


REGION OF WATERLOO  
2025 GROUNDWATER MONITORING REPORT -  
WILLARD

**Actual versus Mean Monthly Precipitation**  
Weather Station - Shades Mills Dam Weather Station

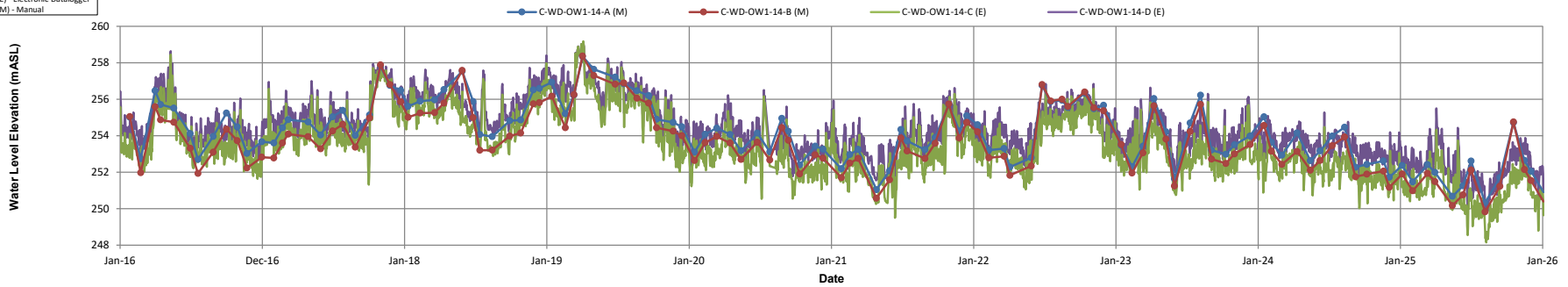


**Monthly Total Pumped Volumes**  
WILLARD WELL FIELD



**WILLARD WELL FIELD**

Current Measure Method  
(E) - Electronic Datalogger  
(M) - Manual





BURNSIDE

[ THE DIFFERENCE IS OUR PEOPLE ]

---

## Appendix D

### Precipitation Data

**Table D-1  
Precipitation Variation from Average  
Region of Waterloo - 2025 Groundwater Monitoring Report**

Year	Kitchener/Waterloo Weather Station Established 1966		
	Annual Precipitation (mm)	30-yr NORMAL Precipitation 1981-2010 (mm)	Difference (mm)
2016	748	851	-103
2017	818	851	-33
2018	749	851	-102
2019	695	851	-156
2020	689	851	-162
2021	772	851	-79
2022	438	851	-413
2023	813	851	-38
2024	874	851	23
2025	723	851	-128

Year	University of Waterloo Station Established 1988		
	Annual Precipitation (mm)	Average Precipitation 1998-2024 (mm)	Difference (mm)
2016	891	871	20
2017	989	871	118
2018	950	871	79
2019	923	871	52
2020	953	871	82
2021	1022	871	151
2022	578	871	-293
2023	959	871	88
2024	763	871	-108
2025	943	871	72

Year	Shand Dam Established 1939		
	Annual Precipitation (mm)	Average Precipitation 1940-2025 (mm)	Difference (mm)
2016	976	926	50
2017	1093	926	167
2018	849	926	-77
2019	1081	926	155
2020	1017	926	91
2021	876	926	-50
2022	798	926	-128
2023	1015	926	89
2024	994	926	68
2025	995	926	69

Year	Conestogo Dam Established 1961		
	Annual Precipitation (mm)	Average Precipitation 1961-2025 (mm)	Difference (mm)
2016	983	990	-7
2017	1210	990	220
2018	962	990	-28
2019	992	990	2
2020	1021	990	31
2021	975	990	-15
2022	907	990	-83
2023	1053	990	63
2024	972	990	-18
2025	1025	990	35

Year	Woolwich Dam Established 1960		
	Annual Precipitation (mm)	Average Precipitation 1960-2025 (mm)	Difference (mm)
2016	844	835	9
2017	986	835	151
2018	869	835	34
2019	824	835	-11
2020	862	835	27
2021	649	835	-186
2022	668	835	-167
2023	859	835	24
2024	793	835	-42
2025	732	835	-103

Year	Shade's Mills Dam Established 1960		
	Annual Precipitation (mm)	Average Precipitation 1960-2025 (mm)	Difference (mm)
2016	934	909	24
2017	1092	909	183
2018	1042	909	133
2019	1059	909	150
2020	848	909	-62
2021	1020	909	111
2022	682	909	-227
2023	982	909	73
2024	976	909	67
2025	895	909	-14

Year	Laurel Dam Established 1960		
	Annual Precipitation (mm)	Average Precipitation 1960-2025 (mm)	Difference (mm)
2016	985	938	47
2017	1062	938	124
2018	1071	938	133
2019	940	938	2
2020	938	938	0
2021	1027	938	89
2022	689	938	-249
2023	921	938	-17
2024	907	938	-31
2025	894	938	-44

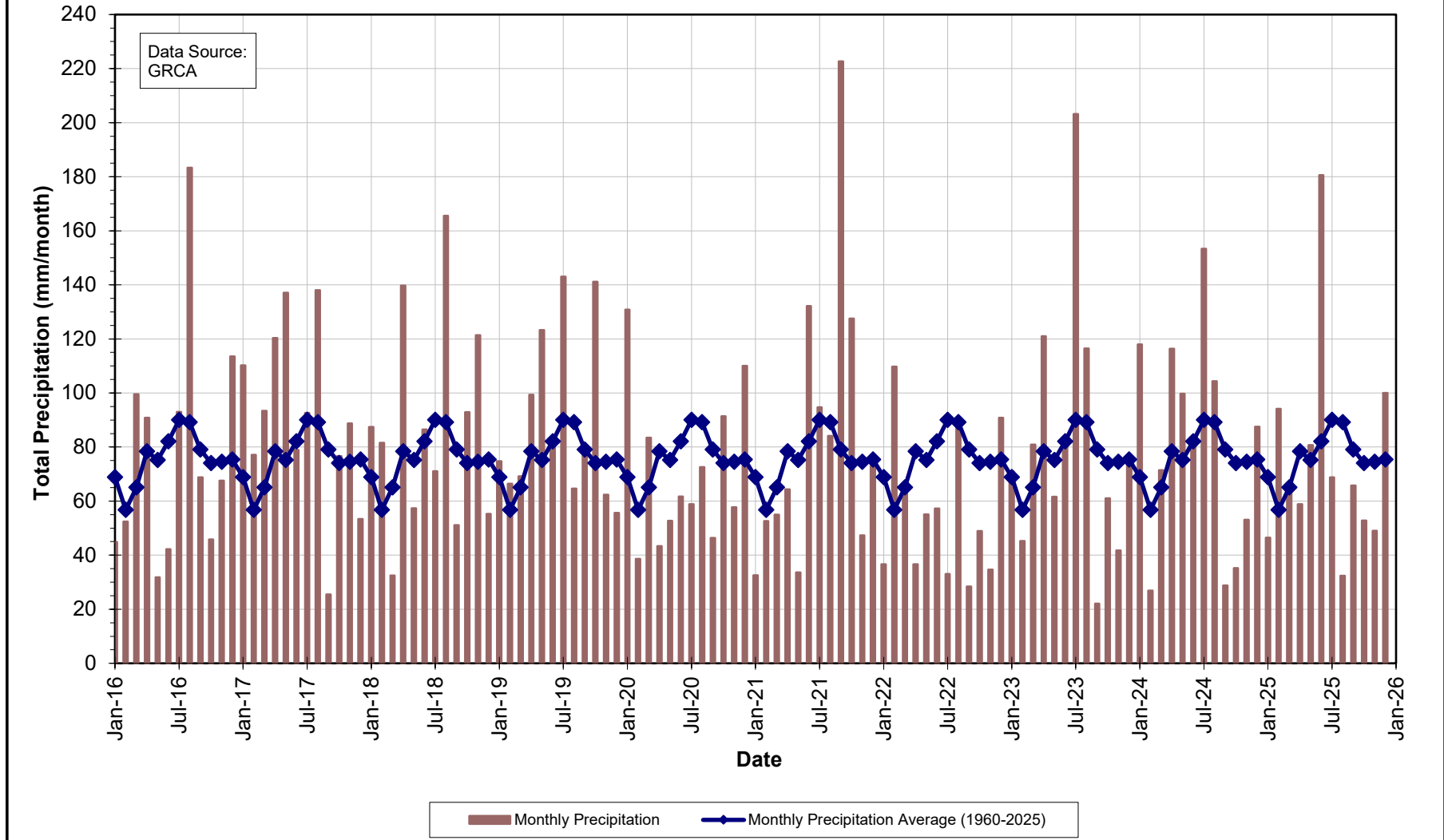
Year	Roseville Weather Station Established 1972		
	Annual Precipitation (mm)	30-yr NORMAL Precipitation 1981-2010 (mm)	Difference (mm)
2016	899	919	-20
2017	882	919	-37
2018	905	919	-14
2019	957	919	38
2020	817	919	-102
2021	832	919	-87
2022	637	919	-282
2023	945	919	26
2024	856	919	-63
2025	786	919	-133

**NOTES:**

WIA station data is not subject to review by the National Climate Archives, therefore, undergoes very limited quality checking.  
GRCA Dam stations data is not reviewed extensively and undergoes limited quality checking.

Region of Waterloo – 2025 Groundwater Monitoring Report

Figure D.1  
Shade's Mills Dam  
Monthly Precipitation





BURNSIDE

[ THE DIFFERENCE IS OUR PEOPLE ]

---

## Appendix E

### Monitoring Program Overview

## GROUNDWATER LEVEL MONITORING PROGRAM PROCEDURES

### E.1 Overview

The Region of Waterloo (Region) collects water level measurements at specific monitoring wells to ensure sustainable long-term water supply and to meet monitoring and reporting requirements for the Region's water-taking permits. The goal of the program is to manage and protect the Region's groundwater supply and to assess the potential impact of municipal pumping on the groundwater and surface water resources in the Region. The ongoing collection and assessment of groundwater level data is integral to assess any changes to the water resources that may occur due to pumping.

#### E.1.1 Production Well Pumping and Water Levels

In 2023 the Region managed approximately 132 production wells with status defined as:

- Commissioned – Active wells
- New Not-Commissioned – Well are inactive or locked out until future demand or repairs/maintenance of other wells requires activating them

The well fields are referred to as Urban (Kitchener, Waterloo, and Cambridge) and Rural (North Dumfries, Woolwich, Wilmot, and Wellesley). Well fields in Kitchener, Waterloo, and Cambridge are referred to as the Integrated Urban System (IUS).

The Region's active production wells are monitored through the Region's SCADA (Supervisory Control and Data Acquisition) system, which reads and records the volume pumped on a daily basis. A few wells do not have their own meter but are combined with other nearby well(s) in the well field and the combined flow is divided into a record for each source. Water level measurements are obtained from the production wells where required. All manual measurements are obtained using either an air line or a water level tape.

### E.1.2 Monitoring Wells and Surface Water levels

Water levels are measured at monitoring wells and at some surface water features. The objective of this monitoring is to collect data to ensure that the Region's water taking has minimal impact on the environment and on private water takers.

Water levels in the Region's monitoring wells are measured either electronically or manually. Most of the wells that are monitored electronically use datalogger equipment manufactured by *In-Situ Inc.*® LevelTROLLs® and RuggedTROLLs®, as well as, by *Van Essen Instruments (formerly Schlumberger Water Services)* Mini-Divers®, Micro-Divers®, and TD-Divers®; or by *Solinst*® Levelloggers®. The datalogger pressure sensor models used may be either vented (gauged) or non-vented (absolute) for *In-Situ Inc.*®; whereas, for *Van Essen Instruments* and for *Solinst*®, non-vented (absolute) models are used. Barometric dataloggers by each manufacturer suspended in select well locations are also used with the non-vented (absolute) models to provide the required barometric pressure compensation necessary in producing the water level data. Manual monitoring is done using a *Solinst*® and/or *Heron Instruments Inc.* electronic water level meter with both visual and audio indicators.

The electronically monitored wells are typically measured every hour, with increased frequency as required. At the hourly frequency, the following trends can be distinguished in an individual monitoring well:

- Seasonal climate trends;
- Water level changes in the aquifer that is being pumped;
- Water level changes in aquifers connected to the pumped aquifer; and
- Individual precipitation events in unconfined aquifers.

The manually monitored wells are measured once per month. At this frequency only the first three responses listed above can be distinguished.

### E.1.3 Climatological Data

To evaluate the reaction of water levels to changes in climatic conditions, precipitation data are monitored at various locations throughout the Region. Within the Region of Waterloo, climate data is collected by Environment Canada at the Region of Waterloo International Airport (WIA) and the Roseville weather station, by the Grand River Conservation Authority (GRCA) at various Dam locations and by the University of Waterloo at a weather station located on the north campus.

## **E.2 Groundwater Level Collection Protocols**

### **E.2.1 Groundwater Level Monitoring Network Summary Well Checklist**

A well checklist and data entry spreadsheet are prepared of all the measuring points where water levels will be collected on a monthly basis. The checklist and spreadsheet are organized by well field so wells in close proximity are grouped together and indicates whether locations are measured with electronic dataloggers or manual measurements only. Once a well is visited, data is entered in the spreadsheet and the well is checked off the list; thus, the checklist and spreadsheet provides an obvious indication that work is unfinished if a location is unchecked and has no data.

### **E.2.2 Well Inspection**

Upon visiting a well for the first time, the well/casing/equipment details are noted, photos taken, and GPS coordinates are recorded in a field book and/or in the monthly data entry spreadsheet. Well/casing/equipment details includes: location, access, condition, materials, diameters, casing security, surface seal condition, requiring repair or not, well/casing stickup measurements from ground level, well total depth, and the type of datalogger and/or sampling equipment installed. Any notable deficiencies, concerns, problems, or changes in the well condition are recorded in a field book and/or in the monthly data entry spreadsheet, as well as, photos are taken. Also, any observed activities taking place around or near the well that are worth noting are recorded in a field book and/or in the monthly data entry spreadsheet.

### **E.2.3 Monitoring Well Manual Water Level Measurement Procedure**

- Unlock well casing and open well casing lid.
- Remove well cap (if present).
- Use an Electronic Water Level meter and lower the probe down the well until the meter beeps to indicate the probe has encountered water.
- The probe is raised up until the beep of the meter stops, indicating the probe is now above the water.
- Then the probe is slowly lowered down until the probe just contacts the water level surface causing the meter to beep.
- At this point the depth (in meters) is read off the water level meter tape from the measuring point of the well (in most cases is the top of the casing or pipe) and this provides the water level depth below the measuring point.
- The date, time, and water level depth measured is recorded in a field book and/or in the monthly data entry spreadsheet.
- This procedure is repeated for each of the well screens inside the well casing.

- Replace well caps.
- Close well casing lid and lock well casing.

#### **E.2.4 Downloading of Water Levels from Electronic Dataloggers Procedure**

##### **For Non-Vented (Absolute) Datalogger Models:**

*In-Situ Inc.*® LevelTROLLs® and RuggedTROLLs®, *Van Essen Instruments Divers*®, and *Solinst*® Levelloggers®

- Prior to downloading data from the datalogger, a manual water level is measured in each well screen containing a datalogger.
- The datalogger is pulled out of the well, unthreaded from the cap that is attached to a wire cable and connected to (or placed in) the corresponding datalogger communication device. The communication device is connected to a laptop/tablet PC or a RuggedReader® Handheld PC and the associated datalogger software is started.
- Water level data stored in the datalogger is subsequently downloaded and viewed using the datalogger software and saved on the hard drive/memory.
- Note: downloading data from the datalogger does not automatically stop the datalogger from recording.
- The status of the datalogger is viewed and checked for correct operation and to confirm that the datalogger is hanging in the well water within its operating range.
- Select datalogger details such as the battery level and free/used memory are recorded in a field book and/or in the monthly data entry spreadsheet.
- If the datalogger does not require restarting to free up memory or to change the sample rate, then the datalogger is removed from the communication device and is threaded back onto its cap and lowered back down the well on the wire cable.
- If the datalogger does require restarting to free up memory or to change the sample rate, then the datalogger is stopped, reprogrammed, and restarted using the datalogger software and, as a result, erases the previous data stored in memory on the datalogger.
- This procedure is repeated for each datalogger within each of the well screens inside the well casing.
- After all the non-vented (absolute) dataloggers have been downloaded then the Barometric dataloggers are downloaded following the same procedure as above.

**For Vented (Gauged) Datalogger Models:***In-Situ Inc.*® LevelTROLLs®

- Prior to downloading data from the datalogger, a manual water level is measured in each well screen containing a datalogger.
- The desiccant tube is unconnected from the datalogger cable.
- The datalogger cable is connected to a communication cable device that is connected to a laptop/tablet PC or a RuggedReader® Handheld PC and the datalogger software is started.
- Water level data stored in the datalogger is subsequently downloaded and viewed using the datalogger software and saved on the hard drive/memory.
- Note: downloading data from the datalogger does not automatically stop the datalogger from recording.
- The status of the datalogger is viewed and checked for correct operation and to confirm that the datalogger is hanging in the well water within its operating range.
- Select datalogger details such as the battery level, free/used memory, and desiccant condition (colour) are recorded in a field book and/or in the monthly data entry spreadsheet.
- The desiccant tube condition is checked and replaced if necessary.
- If the datalogger does not require restarting to free up memory or to change the sample rate, then the communication cable device is disconnected from the datalogger cable and the desiccant tube is reconnected.
- If the datalogger does require restarting to free up memory or to change the sample rate, then the datalogger is stopped, reprogrammed, and restarted using the datalogger software and, as a result, erases the previous data stored in memory on the datalogger.
- This procedure is repeated for each datalogger within each of the well screens inside the well casing.

**E.2.5 Data Entry and Processing into the Burnside MS ACCESS/SQL® Database**

- All field data collected (i.e. date, time, manual water level depth measured, comments) and recorded for each well screen and datalogger in a field book is entered into the monthly data entry spreadsheet, unless already entered in the field using a laptop/tablet PC.
- The monthly data entry spreadsheet is checked and reviewed prior to importing the data into a database table using Burnside Water Level Data Tools software. Manual water level depth values are converted into water level elevation values using the software during this import process.
- Any associated well notes, comments, and datalogger details are entered into a database table under the appropriate well and screen.

## 2025 Groundwater Level Monitoring Program Report – APPENDIX E

- Water level data from the dataloggers downloaded to a laptop/tablet PC or a RuggedReader® Handheld PC are transferred to Burnside file folder network upon returning to the office.
- These datalogger water level data files are subsequently read and the data is imported into a database table using Burnside Water Level Data Tools software.
- Using Burnside Water Level Data Tools software, the datalogger water level data are reviewed and processed (as described below) resulting in corrected water level depth values and corrected water level elevation values that are stored in a database table.
- *For Non-Vented (Absolute) Datalogger Models:*  
Datalogger water level data is first barometric pressure compensated using selected Barometric datalogger data, then a manual water level depth value measured at the time of the most recent download is applied and used to convert the barometric compensated water level data into corrected water level depth values, which are converted into water level elevation values that are appended to a database table.
- *For Vented (Gauged) Datalogger Models:*  
A manual water level depth value measured at the time of the most recent download is applied to the datalogger water level data to convert the water level data into corrected water level depth values, which are converted into water level elevation values that are appended to a database table.
- Temperature data recorded by the dataloggers are also imported into a database table.
- Hydrographs are subsequently created for each well and screen from the water level elevation data in the database for review and presentation. If there are some data points that are erroneous, then these data points are marked as non-reportable (invalid) within the database and/or are removed resulting in them not being plotted on the hydrographs.
- An updated data file is provided to the Region on a quarterly basis for upload into their eWRAS EQUIS database.

