

2022 to 2023 Groundwater Monitoring Report

Gull Lake Area Tp 040 to 042, R 28, W4M, and Tp 040 to 042, R 01, W5M

Prepared for Ponoka County

October 2023

HCL Project No.: MR-0323.23

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Signatures

Version	Date	Description	Prepared by	Reviewed by
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Signature_____
Date

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The Association of Professional Engineers and Geoscientists of Alberta (APEGA)



TABLE OF CONTENTS

Signatures	i
1. Introduction	1
1.1. Project Overview	1
1.2. Purpose	1
1.3. Scope	1
2. Background	2
2.1. Previous Work	2
2.2. Water Well Details	2
2.3. Site Maps	3
3. Groundwater Monitoring Summary	8
3.1. Water-Level Summary	8
3.2. Groundwater Sampling	8
4. Discussion	9
4.1. Water Levels	9
4.2. Groundwater Quality	13
5. Conclusions and Recommendations	16
6. Bibliography	17
LIST OF FIGURES	
Figure 1. Index Map	1
Figure 2. Site Map – Gull Lake and Water Wells	
Figure 3. Site Map – 1992 Gull Lake Golf Course WW	4
Figure 4. Site Map – 2001 Wegmann WW	
Figure 5. Site Map – 1983 Jeffrey WW	6
Figure 6. Site Map – 2004 WSW – Meridian 1 and 2004 WSW – Meridian 2	
Figure 7. Hydrograph of the Daily Highest Water-Level Elevations in the Five Water Wells and Gull Lake	9
Figure 8. Hydrograph – 1983 Jeffrey WW	11
Figure 9. Hydrograph of the Daily Highest Water-Level Elevations in Gull Lake	12
Figure 10. Piper Tri-Linear Diagram – 1992 Gull Lake Golf Course WW	13
Figure 11. Groundwater Quality – 2004 WSW – Meridian 1	14
Figure 12. Groundwater Quality – 2004 WSW – Meridian 2	15



LIST OF TABLES

Table 1. Water Well Details	2
Table 2. Water-Level Summary	8

LIST OF APPENDICES

Appendix A - Water Well Details



1. Introduction

1.1. Project Overview

Gull Lake is in Tp 040 to 042, R 28, W4M, and Tp 040 to 042, R 01, W5M, approximately 100 kilometres southwest of Edmonton, Alberta, and is in the South Saskatchewan River Basin, as shown in Figure 1. The Lake sees a significant amount of recreational use. Water wells are used to supply groundwater to most of the residents in the area.

In 2011, Ponoka County (the County) initiated a groundwater monitoring program to track changes in the water levels and the chemical quality of the groundwater from five water wells in the Gull Lake Watershed within the County.

1.2. Purpose

Hydrogeological Consultants Ltd. (HCL) was retained by the County to gather groundwater monitoring data from five water wells in the Gull Lake Watershed. The data collected were reviewed and validated, and are summarized in reports that have been prepared approximately annually by HCL since 2012; the present report includes data collected to August 29, 2023.

1.3. Scope

Water-level data and groundwater samples for chemical-quality analysis were collected from the following water wells:

- 1992 Gull Lake Golf Course Water Well (1992 Gull Lake Golf Course WW) [GIC ID: 365500; M35379.066969]
- 2001 Wegmann Domestic Water Well (2001 Wegmann WW) [GIC ID: 499682; M37490.034988]
- 1983 Jeffrey Domestic and Stock Water Well (1983 Jeffrey WW) [GIC ID: 275201; M35377.069370]
 - o In previous reports, the 1983 Jeffrey WW was referred to as the 1983 Witham Domestic and Stock Water Well or the 1983 Rogers Domestic and Stock Water Well; water well names are changed to reflect the current landowner.
- 2004 Water Source Well Meridian Beach 1 (2004 WSW Meridian 1) [GIC ID: 1035048; M39227.478953]
- 2004 Water Source Well Meridian Beach 2 (2004 WSW Meridian 2) [GIC ID: 1035047; M39227.478952]

In addition to the collection of water-level data from the five water wells, water-level data for Gull Lake were obtained from the Water Survey of Canada (WSC).

The groundwater samples were submitted to an accredited laboratory in Alberta.



Figure 1. Index Map

2. Background

2.1. Previous Work

In 2015, HCL was retained by the Gull Lake Water Quality Management Society to study potential groundwater connectivity to Gull Lake (HCL, 2015a). Four local aquifers were identified: the Sun155, the Sun169, the Sun180, and the Sun199 aquifers; the aquifer nomenclature is based on the number of metres that the top of each Aquifer is above the base of the Sunchild Member of the Paskapoo Formation. For example, the top of the Sun155 Aquifer is 155 metres above the base of the Sunchild Member. The Sunchild Member, sometimes referred to as the Sunchild Aquifer or the Dalehurst Member, is the uppermost member of the Paskapoo Formation.

Water wells that are completed in the Sun155 Aquifer have non-pumping water-level elevations that may be either above or below the Lake elevation of 900 metres above mean sea level (AMSL). The water levels in the two Meridian Beach water source wells, which are both completed in the Sun155 Aquifer, are approximately 1 metre above the Lake level. However, analysis of the water well data indicates that there is no direct hydraulic connection between the Lake and the Sun155 Aquifer (HCL, 2015a). HCL concluded that the Sun169 and the Sun180 aquifers may be hydraulically connected to Gull Lake (HCL, 2015a). The base of the Sun199 Aquifer is above the Lake level, indicating that there is no direct connection between the Aquifer and the Lake.

2.2. Water Well Details

The five water wells shown in Table 1 are completed in four different aquifers in the Sunchild Member of the Paskapoo Formation.

Water Well Designation	Location	Aquifer	Aquifer Connection to Gull Lake	Depth Completed (m BGL)	Side of Gull Lake
1992 Gull Lake Golf Course WW	04-10-042-01 W5M	Sun199	No direct hydraulic connection	32.0	West
2001 Wegmann WW	16-04-042-01 W5M	Sun180	Possible hydraulic connection	54.9	West
1983 Jeffrey WW	09-04-042-28 W4M	Sun169	Possible hydraulic connection	63.7	East
2004 WSW - Meridian 1	08-12-042-01 W5M	Sun155	No direct hydraulic connection	24.4	East
2004 WSW – Meridian 2	08-12-042-01 W5M	Sun155	No direct hydraulic connection	24.4	East

m BGL - metres below ground level

Table 1. Water Well Details

2.3. Site Maps

Figure 2 is a site map showing Gull Lake and the locations of the five water wells included in the groundwater monitoring program; site maps for the five water wells are also shown in Figures 3 through 6.

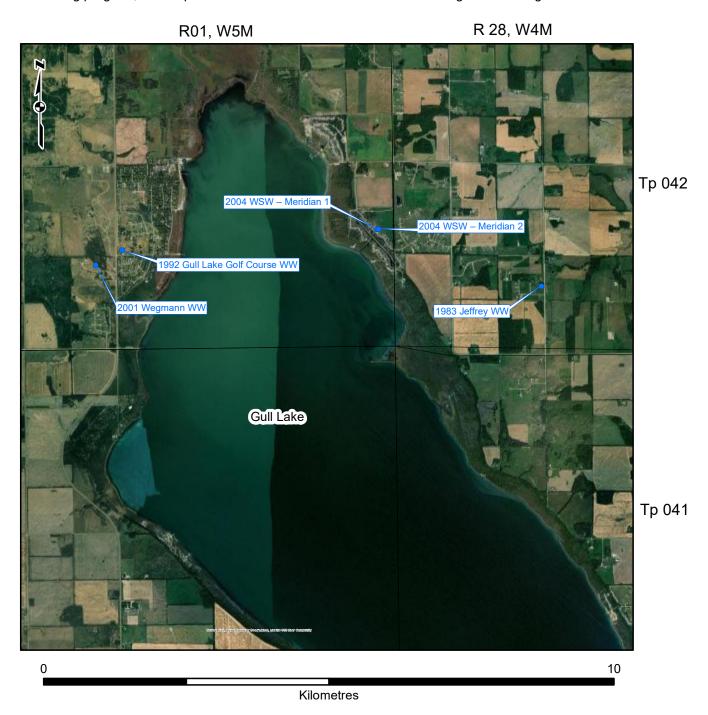


Figure 2. Site Map - Gull Lake and Water Wells

10-042-01 W5M



Figure 3. Site Map - 1992 Gull Lake Golf Course WW

04-042-01 W5M



Figure 4. Site Map - 2001 Wegmann WW



Figure 5. Site Map - 1983 Jeffrey WW



Figure 6. Site Map - 2004 WSW - Meridian 1 and 2004 WSW - Meridian 2

3. Groundwater Monitoring Summary

3.1. Water-Level Summary

Level TROLL data loggers were installed in the five water wells by HCL personnel on June 28, 2011, and have been programmed to record 24 water-level measurements per day. The water-level data have been downloaded on an annual basis by HCL personnel. The highest and lowest water-level measurements from January 1, 2022, through August 29, 2023, are summarized in Table 2. Additional water well details and hydrographs for the five water wells are in Appendix A.

	Water Level (metres below reference point)				
	2022	2	2	023*	
Water Well Designation	Highest (m)	Lowest (m)	Highest (m)	Lowest (m)	
1992 Gull Lake Golf Course WW	21.40	22.11	21.64	22.30	
2001 Wegmann WW	35.91	39.23	36.26	40.22	
1983 Jeffrey WW	46.05	52.08	45.84	53.28	
2004 WSW - Meridian 1	4.60	10.99	5.11	11.08	
2004 WSW – Meridian 2	4.76	7.84	5.28	7.81	

^{*} Water-level measurements to 2023-08-29

Table 2. Water-Level Summary

3.2. Groundwater Sampling

On August 29, 2023, HCL personnel collected groundwater samples from each of the five water wells. The samples were submitted to Element Materials Technology Canada Inc. (Element) for analysis of routine chemical and physical parameters. The previous groundwater sampling event was in August 2022.

4. Discussion

4.1. Water Levels

4.1.1. General

Figure 7 is a comparative hydrograph showing the daily highest water-level elevations over time for the five water wells and Gull Lake. Over the monitoring interval, the water-level elevations have varied between 898 and 914 metres AMSL. The elevations of the highest daily water levels in the 1992 Gull Lake Golf Course WW (Sun199 Aquifer) and the 1983 Jeffrey WW (Sun169 Aquifer) are more than 9 metres above the elevation of Gull Lake, with the exception of the anomalously low water-level elevations in the 1983 Jeffrey WW in August 2023. The elevations of the highest daily water levels in the 2001 Wegmann WW (Sun180 Aquifer), the 2004 WSW – Meridian 1 (Sun155 Aquifer), and the 2004 WSW – Meridian 2 (Sun155 Aquifer) are within 3 metres of the elevation of Gull Lake.

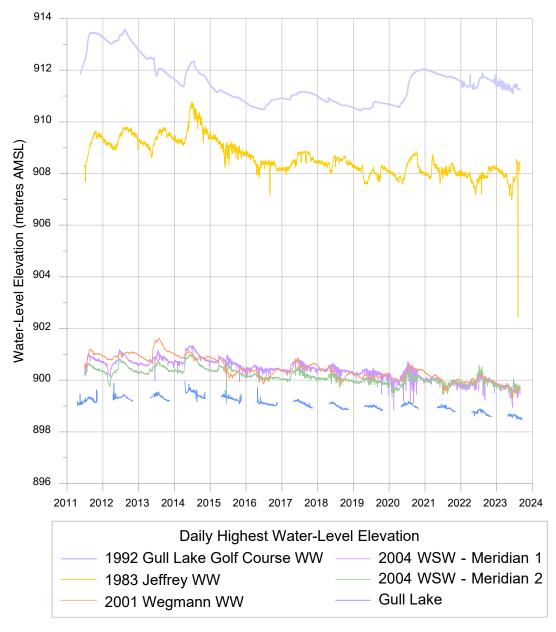


Figure 7. Hydrograph of the Daily Highest Water-Level Elevations in the Five Water Wells and Gull Lake

In most years, each water well exhibits a water-level rise in the spring, followed by a decline until the following spring. This is considered to be a normal seasonal fluctuation and is a result of snow melt infiltrating into the subsurface, causing water levels in the aquifers to rise. This phenomenon is referred to as spring recharge. The timing and degree of spring recharge is expected to vary based on climatic conditions. Water levels typically decline after the spring recharge event because, in Alberta, the volume of precipitation is less than evaporation and vegetation uptake. In some years, there may be a minor water-level rise in the fall that correlates with precipitation and because of the decline in vegetation, resulting in reduced water uptake. In the winter, water levels are expected to decline, as there is typically no liquid precipitation to recharge the aquifer during this period.

4.1.2. 1992 Gull Lake Golf Course Water Well

The 1992 Gull Lake Golf Course WW is completed in the Sun199 Aquifer, which is above the water level in Gull Lake. The Sun199 Aquifer does not have a direct hydraulic connection to Gull Lake and is expected to discharge onto the land surface (HCL, 2015a). Over the monitoring interval, there has been an overall water-level decline of approximately 2 metres. It should be noted that the most recent water levels are still approximately 1 metre higher than the lowest recorded water levels in 2019.

Between 2022 and 2023, there was a greater degree of water-level fluctuation in the 1992 Gull Lake Golf Course WW than has been historically measured and is likely a result of a change in pump operation. In the summer of 2022, there was a water-level rise of approximately 0.5 metres, followed by a decline until the summer of 2023. In the summer of 2023, a minor water-level rise of about 0.1 metres was observed and can be considered to be late spring recharge. The water level in the 1992 Gull Lake Golf Course WW has since declined by approximately 0.1 metres.

4.1.3. 1983 Jeffrey Domestic and Stock Water Well

The 1983 Jeffrey WW is completed in the Sun169 Aquifer, which may be hydraulically connected to Gull Lake (HCL, 2015a). Over the monitoring interval, the water level in the 1983 Jeffrey WW has exhibited a decline of approximately 1 metre.

In 2022, the water level declined in the late spring, but rose in the summer to recover to similar elevations as those in the winter of 2021. The rising trend continued until the end of the year. In 2023, the water level declined by approximately 1.25 metres until the summer, when the water level rose by approximately 1.5 metres.

The highest daily water levels below an elevation of approximately 907 metres AMSL are a result of nearly continuous groundwater diversion from the 1983 Jeffrey WW between August 5 and 7, 2023; previously, the pump was operated in short intervals only, allowing water levels to recover the same day. Figure 8 on the following page depicts the raw water-level data from the 1983 Jeffrey WW and demonstrates a pattern of drawdown and recovery in the water well.

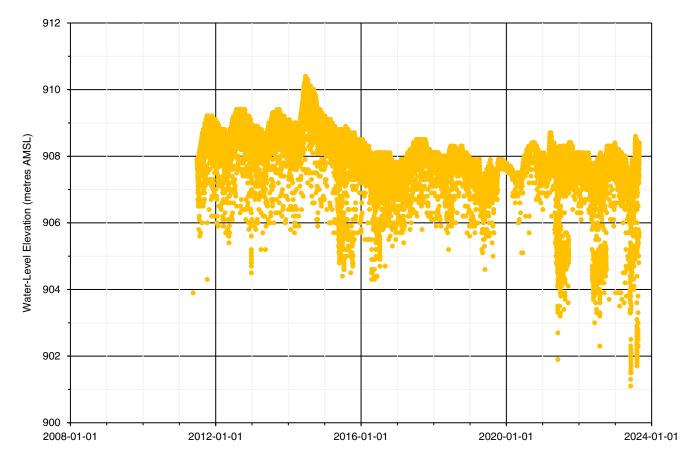


Figure 8. Hydrograph - 1983 Jeffrey WW

4.1.4. 2001 Wegmann Domestic Water Well

The 2001 Wegmann WW is completed in the Sun180 Aquifer and may be hydraulically connected to Gull Lake (HCL, 2015a). Over the monitoring interval, the water level in the 2001 Wegmann WW has exhibited an overall decline of approximately 1.25 metres.

Two water-level rises were observed in the spring and summer of 2022. The first water-level rise was approximately 0.1 metres; the second rise was approximately 0.2 metres and was followed by a water-level decline. A very slight water-level rise of less than 0.1 metres was observed in the spring of 2023, followed by a decline of approximately 0.25 metres. Following the decline, the water level in the 2001 Wegmann WW exhibited a slight rising trend into the fall of 2023.

4.1.5. Meridian Beach Water Source Wells

The top of the Sun155 Aquifer is below the base of Gull Lake; no hydraulic connection is expected between the Aquifer and the Lake (HCL, 2015a). The 2004 WSW – Meridian 1 and the 2004 WSW – Meridian 2 are in close proximity to each other and are both completed in the Sun155 Aquifer. Both water source wells have similar water-level trends, with the 2004 WSW – Meridian 1 having slightly higher water levels. Over the monitoring interval, the water levels in both water source wells have exhibited a declining trend of approximately 1 metre.

In the spring of 2022, there was a small water-level decline in the two water source wells. The 2022 recharge event for both water source wells took place in July 2022, which was later than in previous years. Following this water-level rise, water levels in the water source wells declined by approximately 0.5 metres until the summer of 2023, when water levels rose by approximately 0.25 metres and have since been on a declining trend.



4.1.6. Gull Lake

Water-level data for Gull Lake are collected by the WSC. Per the WSC, water-level measurements from October 25, 1999, through September 21, 2023, are considered to be provisional and preliminary. Figure 9 shows the water-level data for Gull Lake from 2011 through September 21, 2023, at a higher resolution than in Figure 7; the water level in Gull Lake has declined by approximately 1.3 metres during this time. The data collected during the 2022 to 2023 monitoring interval show an overall water-level decline of approximately 0.2 metres. In 2023, the water level in the Lake was the lowest it has been since the start of the monitoring program.

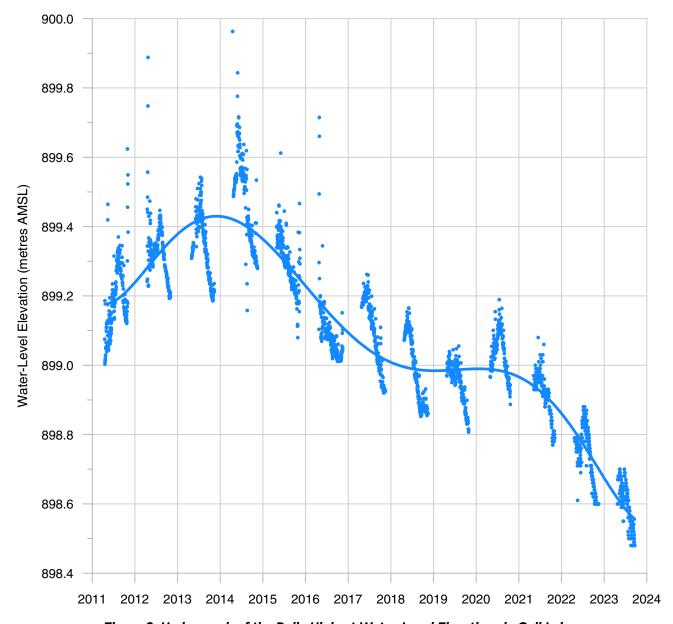


Figure 9. Hydrograph of the Daily Highest Water-Level Elevations in Gull Lake

https://rivers.alberta.ca

4.2. Groundwater Quality

Groundwater samples from the five water wells were collected by HCL personnel on August 29, 2023, and submitted to Element for analysis of routine chemical and physical parameters. A sample from Gull Lake was not collected in 2023. The analysis results were reported by Element on September 5, 2023; copies of the results are in Appendix A. The 2023 analysis results showed that there was no significant change in the chemical quality of the groundwaters from the 2001 Wegmann WW or the 1983 Jeffrey WW.

An anomaly was observed in the 2022 analysis results for the 1992 Gull Lake Golf Course WW. Figure 10 is a Piper tri-linear diagram showing all available analysis results for the 1992 Gull Lake Golf Course WW. In 2022, a chloride concentration of 64.4 milligrams per litre (mg/L) was reported, which is significantly higher than the historical average chloride concentration of 8.7 mg/L. This higher value can be attributed to shock chlorination of the water well, which occurred shortly before the groundwater sample was collected. The 2023 chloride concentration was 9.9 mg/L, which is in line with the historical analysis results.

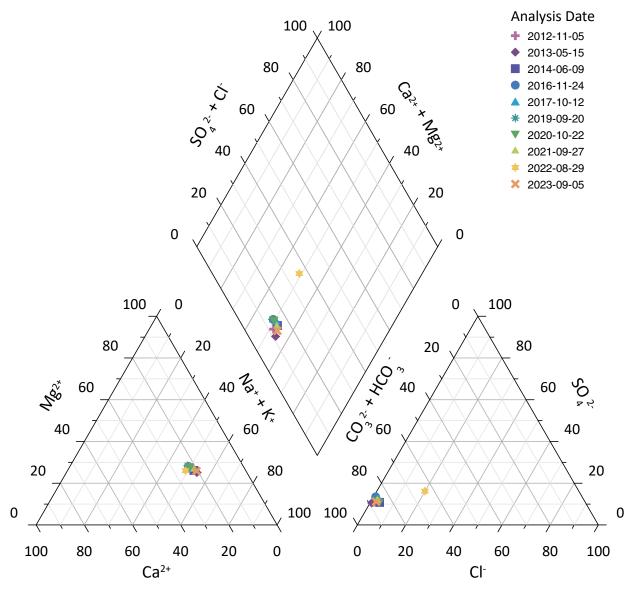


Figure 10. Piper Tri-Linear Diagram - 1992 Gull Lake Golf Course WW

Groundwaters from the 2004 WSW – Meridian 1 and the 2004 WSW – Meridian 2 have exhibited chemical-quality changes over the monitoring interval. In the 2004 WSW – Meridian 1, the changing groundwater quality can be attributed to an increasing trend in the concentrations of calcium, magnesium, and chloride, accompanied by an overall declining trend in the concentration of sodium, as seen in Figure 11.

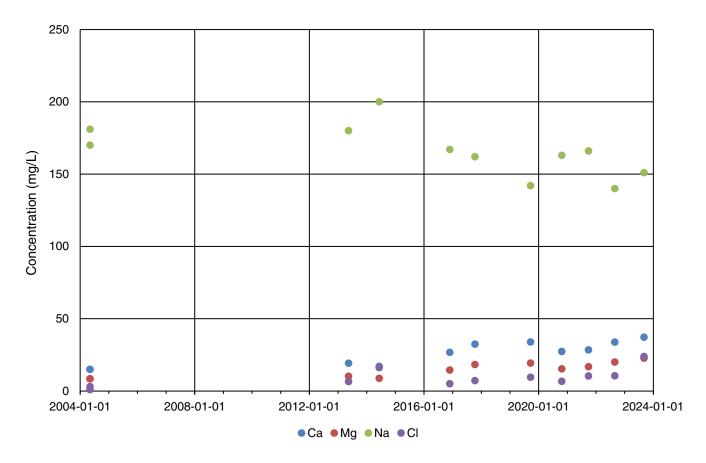


Figure 11. Groundwater Quality - 2004 WSW - Meridian 1

Figure 12 on the following page shows the concentrations of constituents in the groundwater from the 2004 WSW – Meridian 2 over time. Similar to the 2004 WSW – Meridian 1, the groundwater from the 2004 WSW – Meridian 2 shows an increasing trend in the concentrations of calcium and magnesium, accompanied by a decreasing trend in the concentration of sodium, with the exception of the 2012 measurements. While the chloride concentration in the groundwater from the 2004 WSW – Meridian 2 has varied over time, there is no apparent trend.

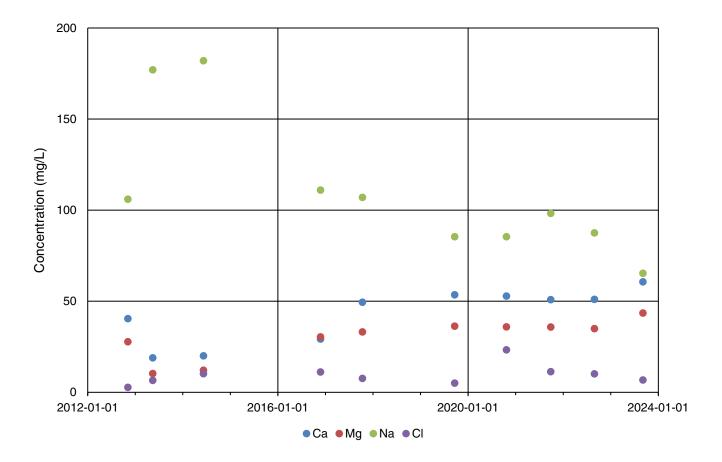


Figure 12. Groundwater Quality - 2004 WSW - Meridian 2

At this time, the water-quality changes in the groundwaters from both Meridian water source wells appear to be displaying trends over time, but the reason for the apparent trends is not known. Further investigation is needed to determine the cause.

5. Conclusions and Recommendations

While all five water wells have exhibited the expected seasonal fluctuations in water levels, an overall declining trend of between 0.5 metres and 2.0 metres has been observed over the monitoring interval. In addition, the water level in Gull Lake has declined by approximately 1.3 metres during this time.

The analysis results indicate that the groundwater quality for the 1992 Gull Lake Golf Course Water Well, the 2001 Wegmann Domestic Water Well, and the 1983 Jeffrey Domestic and Stock Water Well have been consistent over the monitoring interval, with the exception of the 2022 analysis results for the 1992 Gull Lake Golf Course WW. This is an anomalous result and can be disregarded, as the high chloride concentration can be attributed to shock chlorination of the water well prior to groundwater sampling. Both the 2004 Water Source Well – Meridian 1 and the 2004 Water Source Well – Meridian 2 have shown apparent trends in groundwater-quality changes over time.

It is recommended that the annual groundwater monitoring program, consisting of an annual download of the data loggers installed in the water wells and the collection of groundwater samples for routine chemical and physical analysis by an accredited laboratory, be continued. As well, additional monitoring sites should be considered to increase the understanding of local aquifers and their interaction with Gull Lake. As Lake elevations are on a declining trend, it is also recommended that a water sample be collected from Gull Lake annually and submitted to an accredited laboratory for routine chemical and physical analysis.

It is recommended that the cause of the groundwater-quality fluctuations in the 2004 WSW – Meridian 1 and the 2004 WSW – Meridian 2 be investigated.

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Appendix A - Water Well Details

TABLE OF CONTENTS

1983 Jeffrey Domestic and Stock Water Well	3
Water Well Diagram	
TGWC – Water Well Drilling Report	
AEPA – Water Well Drilling Report [GIC ID: 275201]	
Chemical Analysis Results (September 5, 2023)	
2022 – 2023 Hydrograph	
1992 Gull Lake Golf Course Water Well	
Water Well Diagram	
TGWC – Water Well Drilling Report	
AEPA – Water Well Drilling Report [GIC ID: 365500]	
Chemical Analysis Results (September 5, 2023)	
2022 – 2023 Hydrograph	
2001 Wegmann Domestic Water Well	
Water Well Diagram	26
TGWC – Water Well Drilling Report	27
AEPA – Water Well Drilling Report [GIC ID: 499682]	28
Chemical Analysis Results (September 5, 2023)	30
2022 – 2023 Hydrograph	35
2004 Water Source Well – Meridian Beach 1	36
Water Well Diagram	37
TGWC – Water Well Drilling Report	
AEPA – Water Well Drilling Report [GIC ID: 1035048]	39
Chemical Analysis Results (September 5, 2023)	41
2022 – 2023 Hydrograph	46
2004 Water Source Well – Meridian Beach 2	47
Water Well Diagram	48
TGWC – Water Well Drilling Report	
AEPA – Water Well Drilling Report [GIC ID: 1035047]	
Chemical Analysis Results (September 5, 2023)	
2022 – 2023 Hydrograph	57



1983 Jeffrey Domestic and Stock Water Well

(1983 Rogers Domestic and Stock Water Well, 1983 Witham Domestic and Stock Water Well)

09-04-042-28 W4M

(M35377.069370)



Well Spatial Location:

Easting: **70,162**Northing: **5,824,898**

(spatial accuracy HCL GPS — 10TM Resource NAD83)

Ground Elevation AMSL (m): 955
(elevation accuracy HCL DEM (2016))

Date Completed: June 14, 1983

Depth Drilled (m): 63.7

Completion Interval (m): 42.4 - 63.7 *

(* TGWC determined value)

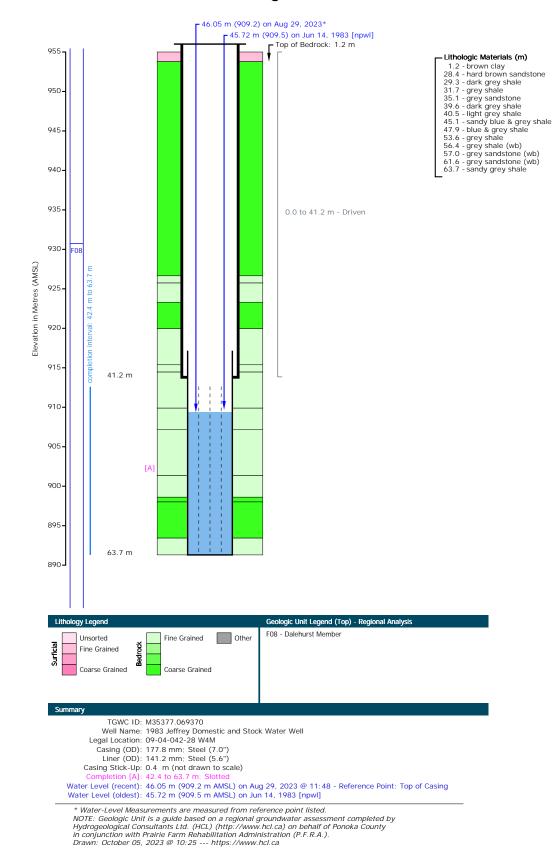
Earliest Water Level (m): 45.72 - June 14, 1983

Most Recent Water Level (m): 46.05 - August 29, 2023 @ 11:48

GIC ID: **275201**



1983 Jeffrey Domestic and Stock Water Well Water Well Diagram



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Owner: Jeffrey, David

Site 7 Comp 2 RR 3, Lacombe, AB T4L 2N3

Contractor: Forrester Water Well Drilling (1981) Ltd.

Name: 1983 Jeffrey Domestic and Stock Water Well (1983 Rogers Domestic and Stock Water Well)

Field Action: Confirmed - Physically, May 18, 2011

Work Type: New Well Date Started: June 8, 1983 Drilling Method: Cable Tool Date Completed: June 14, 1983 Proposed Use: Domestic & Stock Well Status: Producing Completion Type: Casing/Perforated Liner Feature Class: Water Well

Depth Completed (m)*: 63.7 Top of Bedrock (m): 1.22 *

Completion Interval (m): 42.4 - 63.7 *

Completion Aquifer: Dalehurst Member

Most Recent Water Level (m): 46.05 m - August 29, 2023

Depth Drilled (m): 63.7

Surface Casing: Steel - 177.8 mm (O.D.) x 6.90 mm (thick) x 41.2 m (bottom) Liner: Steel - 141.2 mm (O.D.) x 8.00 mm (thick); Top: 38.1 (m); Bottom: 63.7 (m)

Intervals

Slotted: 42.4 to 63.7 m - 0.25 x 6 - Method: Torch

Driven: 0.0 to 41.2 m

Chemistry Summary Details (mg/L, except as noted)

Sampling Details: August 29, 2023 @ 12:10

Analysis Date: September 5, 2023 - Element Materials Technology Canada Inc. (1675279-3)

Constituent Result Conductivity (µS/cm): 896 Total Dissolved Solids: 571 Hardness (as CaCO3): 4.7 T-Alkalinity (as CaCO3): 465 P-Alkalinity (as CaCO3): 37 Nitrate + Nitrite as N: < 0.01 Total Suspended Solids: Temperature (°C): 20.9

Nitrate as N: < 0.01 Nitrite as N: < 0.005 pH (pH Unit): 8.96 Colour (TCU): < 5 Ion Balance (%): 97
Total Coliforms:**: Fecal Coliforms:**: Escherichia coli:**:

Constituent

Constituent Result Turbidity (NTU):1.0 Fluoride:1.21 Carbonate:44 Bicarbonate:477 Hvdroxide: < 5 Total Iron:

(recently sampled first)

Constituent Calcium:		Dissolved
Chloride:		1.2
Iron:	0.11	
Manganese:	< 0.005	
Aluminum:		
Arsenic:		
Barium:		
Beryllium:		
Cadmium:		
Chromium:		
Cobalt:		

Sulfate: 56.6

Constituent Mercury:	Extractable	Dissolved	
Molybdenum			
Magnesium:	0.2		8
Sodium:	232		Extractable - unfiltered Dissolved - filtered
Potassium:	0.4		tractable - unfilter Dissolved - filtered
Vanadium:			- - -
Strontium:			l pe
Nickel:			sso
Zinc:			₩ ä
Copper:			ш
Lead:			
Uranium:			

Result

Comments: Sample collected by Hydrogeological Consultants Ltd. personnel.

Note: Constituents have been compared to the maximum acceptable concentration, Health Canada. 2022. Guidelines for Canadian Drinking Water Quality – Summary Tables. Water and Air Quality Bureau, Healthy 28182; 1 / 1 Environments and Consumer Safetv Branch. Health Canada. Ottawa. Ontario.

METRIC REPORT

955***

Easting (m): 70.162.00 Northing (m): 5,824,898.00 **

Elevation (m): Lot: Block: Plan:

Presence of Gas: No

09-04-042-28 W4M

M35377.069370

528182; 111124; core

Elog Taken: No Gamma Taken: No Flowing: No Stick Up (m): 0.4

Lith	ology D	etails	
Ele	vation	Depth	
<u>(A</u>	MSL)	(BGL)	Lithology Descriptions
	953.6	1.2	Brown Clay
	926.5	28.4	Hard Brown Sandstone
	925.5	29.3	Dark Grey Shale
	923.1	31.7	Grey Shale
	919.8	35.1	Grey Sandstone
	915.2	39.6	Dark Grey Shale
	914.3	40.5	Light Grey Shale
	909.7	45.1	Sandy Blue & Grey Shale
	907.0	47.9	Blue & Grey Shale
	901.2	53.6	Grey Shale
- 8	898.4	56.4	Water-Bearing Grey Shale
· ·	897.8	57.0	Water-Bearing Grey Sandstone
- 8	893.2	61.6	Water-Bearing Grey Sandstone
· ·	891.1	63.7	Sandy Grey Shale

Comments & Observations (4 total events)

General, Aug 29, 2023: Previous owners are Jordan and Kelsey Whitham.

General, Oct 15, 2020: Previous owners are Dennis and Monica Rogers; date of ownership transfer to the Withams is unknown.

General, Oct 30, 2019: Previous owner is Marty Street; date of ownership transfer to the Rogers is unknown

Initial, Jun 14, 1983: Stock water well in green casing.

Aquifer Tests Testing Depth of Test Duration (minutes) Avg. Rate NPWL Drawdown Pump Q20 (m³/day)* Transmissivity (m²/day)* Apparent Effective Apparent Aquifer Effective Date & Time Method / Type Interval Pumping Recovery (Lpm) (metres) (metres) (metres) 1 1983-06-14 45.5

Alias IDs

GIC ID: 275201

GIC (WellReportId): 275201

* The Groundwater Centre (TGWC) calculated or determined value. * HCL GPS — 10TM Resource NAD83 *** HCL DEM (2016) — {Ground; AMSL}

Created on: October 05, 2023 — Data "AS IS"; no warranty either expressed or implied. [52.590564 -113.963870 (WGS 84)], INT Date End: 2099-12-31



1983 Jeffrey Domestic and Stock Water Well AEPA - Water Well Drilling Report



Water Well Drilling Report View in Imperial Export to Excel

a (pen		The driller supplies the data	contained in this report. The Proportion this report will be retained in a	ovince disclaims responsibility	Go Go	C Well ID A Well Tag No. Iling Company We	275201 II ID
WN ID			iri tilis report will be retailled iir a	public database.		te Report Receive	d 1983/10/05
Well Identification	on and Lo						Measurement in N
Owner Name STREET, MARTY	′	Address P.O. BOX 2167 LAC	Tow OMBE	'n	Province	Country	Postal Co
Location 1/4 NE	or LSD	SEC TWP RGE 4 42 28	W of MER Lot	Block Plan	Additional	Description	
Measured from B		f m from m from	GPS Coordinates in Do Latitude 52.591814 How Location Obtained Map		69188 E	levation ow Elevation Obta ot Obtained	
Prilling Informate Inferted of Drilling Informate Inferted Inferte	g Ise		Type of Work New Well				
ormation Log		M	easurement in Metric	Yield Test Summar	V		Measurement in M
Ū	Water			Recommended Pump		0.00 L/min	dada.di.i.di.i.di.i.di.
epth from round level (m)	Water Bearing	Lithology Description			er Removal Rat		Static Water Level (m)
1.22		Brown Clay		1983/06/14	45.46	. ,	45.72
28.35		Brown Hard Sandstone		Well Completion			Measurement in N
29.26		Dark Gray Shale		Total Depth Drilled F	inished Well De	pth Start Date	End Date
31.70		Gray Shale		63.70 m		1983/06/08	1983/06/14
35.05		Gray Sandstone		Borehole			
39.62		Dark Gray Shale		Diameter (cm)	Fr	rom (m)	To (m)
40.54		Light Gray Shale		0.00 Surface Casing (if ap	nlicable)	0.00 Well Casing/L	63.70
45.11		Blue Gray Sandy Shale		Steel Steel	piicabie)	Steel	iner
47.85		Blue Gray Shale		Size OD :	17.78 cm	Size C	DD: 14.12 cm
53.64		Gray Shale		Wall Thickness :	0.691 cm	Wall Thickne	ss: 0.795 cm
56.39	Yes	Gray Water Bearing Shale		Bottom at :	41.15 m		at: 38.10 m
57.00	Yes	Gray Water Bearing Sandston	e	Perforations		Bottom	at: 63.70 m
61.57	Yes	Gray Water Bearing Sandston	e	renorations	Diameter o	r	
63.70		Gray Sandy Shale		From (m) To (m) 42.37 63.70 Perforated by To	0.635	Slot Length (cm)	Hole or Slot Interval(cm) 15.24
				Annular Seal Driver Placed from Amount Other Seals	0.00 m to	41.15 m	
				Туре	!		At (m)
				Screen Type Size OD: From (m)	0.00 cm	To (m)	Slot Size (cm)
				Attachment		5 5	
				Top Fittings		Bottom Fittin	gs
				Pack Type Amount		Grain Size	
ontractor Cert	ification						

Copy of Well report provided to owner Date approval holder signed

FORRESTER WATER WELL DRILLING (1981) LTD.



Alberta Water Well Drilling Report

View in Imperial Export to Excel

275201

GIC Well ID GoA Well Tag No.

WN ID		ac	ccuracy. The in	formation on t	his report will be	etained in a p	ublic databas	e.		Date Report Re		1983/10/05
Nell Identi	fication and L	ocation									N	leasurement in M
Owner Nam STREET, M			Address P.O. BOX 2	2167 LACON	МВЕ	Town			Province	Coun	ntry	Postal Cod
Location	1/4 or LSD NE	SEC 4	<i>TWP</i> 42	RGE 28	W of MER 4	Lot	Block	Plan	Additio	nal Description		
Measured fr	rom Boundary (of m from m from			GPS Coordin Latitude 5 How Location Map	2.591814	-		*	Elevation How Elevation Not Obtained		
Additional	Information										N	Measurement in M
	rom Top of Cas n Flow Rate		_			Is	s Flow Cont		de			
Recommer	nded Pump Ra				0.00 L/mir	n Pump	Installed			Depth		m
	nded Pump Inta		From TOC)			Туре	· —		Make		H.F	P
										Model (Outpi	– ut Rating	g)
Did you E	Encounter Salir			DS) Gas						Completion g Taken		
Did you E Remedia Additiona	Encounter Salir Il Action Taken al Comments of	n Well	(m	Ge	ophysical Log Submitted to	Completion g Taken o ESRD		
Did you E Remedia Additiona	al Action Taken al Comments o	n Well	(m	Ge bllected for	ophysical Log Submitted to Potability ken From G	Completion g Taken g ESRD	Submitted	
Did you E Remedia Additiona DRILLER F	al Action Taken al Comments o	n Well		Gas			m Sample Co	Ge bllected for	ophysical Log Submitted to Potability ken From G Dept	Completion	Submitted	d to ESRD <u>Yes</u>
Did you E Remedia Additiona DRILLER F Yield Test Test Date 1983/06/14 Method of	al Action Taken al Comments o	on Well Start Tim 12:00 AN	e 1 45.46 L/m <u>i</u> n	Static	Depth		m Sample Co	Ge bllected for	ophysical Log Submitted to Potability ken From G Dept	Completion g Taken D ESRD Sround Level th to water level clapsed Time	Submitted	d to ESRD <u>Yes</u> Measurement in M
Did you E Remedia Additiona DRILLER F (ield Test Test Date 1983/06/14 Method of R Depth With	al Comments of REPORTS SOF Water Remov Type Editor Rate hadrawn From	Start Tim 12:00 AM al Bailer 28 < 2 hour	45.46 <u>L/min</u>	Static	Depth		m Sample Co	Ge bllected for	ophysical Log Submitted to Potability ken From G Dept	Completion g Taken D ESRD Sround Level th to water level clapsed Time	Submitted	d to ESRD <u>Yes</u> Measurement in M
Did you E Remedia Additiona DRILLER F (ield Test Test Date 1983/06/14 Method of R Depth With	al Comments of REPORTS SOF	Start Tim 12:00 AM al Bailer 28 < 2 hour	45.46 <u>L/min</u>	Static	Depth		m Sample Co	Ge bllected for	ophysical Log Submitted to Potability ken From G Dept E	Completion g Taken D ESRD Sround Level th to water level clapsed Time	Submitted	d to ESRD <u>Yes</u> Measurement in M

Contractor Certification		
Name of Journeyman responsible for drilling/construction of well UNKNOWN NA DRILLER	Certification No 1	
Company Name FORRESTER WATER WELL DRILLING (1981) LTD.	Copy of Well report provided to owner	Date approval holder signed

1983 Jeffrey Domestic and Stock Water Well Chemical Analysis Results (September 5, 2023)



Element 7217 Roper Road NW Edmonton, Alberta T6B 3J4, Canada

Page 1 of 5

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Analytical Report

Bill To: Hydrogeological Consultants

17740 - 118 Avenue Edmonton, AB, Canada

Attn: Accounts Payable

Sampled By: Scott Thompson

Company: HCL

Project ID: MR-0323.22

Project Name: County of Ponoka GW

Monitoring Project Location: Gull Lake Area Various Legal Locations

LSD: P.O.: 19729

Proj. Acct. code:

Lot ID: 1675279

Control Number:

Date Received: Aug 29, 2023 Date Reported: Sep 5, 2023 Report Number: 2908485

Reference Number Sample Date

August 29, 2023 Sample Time 12:10

Sample Location Rogers Dom ww Sample Description M35377.069370 / 1.7°c

1675279-3

Sample Matrix Water

				Nominal Detection	Guideline	Guideline
Analyte		Units	Result	Limit	Limit	Comments
Physical and Aggregate F	Properties					
Colour	Apparent, Potable	Colour units	<5	5	15	Below AO
Turbidity		NTU	1.0	0.1	0.1/0.3/1.0 OG	
Routine Water						
рН			8.96	1	7.0-10.5	Within OG Range
Temperature of observed pH		°C	20.9			
Electrical Conductivity	at 25 °C	μS/cm	896	1		
Calcium	Extractable	mg/L	1.5	0.2		
Magnesium	Extractable	mg/L	0.2	0.2		
Sodium	Extractable	mg/L	232	0.4	200	Above AO
Potassium	Extractable	mg/L	0.4	0.4		
Iron	Extractable	mg/L	0.11	0.01	0.3	Below AO
Manganese	Extractable	mg/L	<0.005	0.005	0.02 AO; 0.12 MAC	Below AO
Chloride	Dissolved	mg/L	1.2	0.4	250	Below AO
Fluoride		mg/L	1.21	0.05	1.5	Below MAC
Nitrate - N		mg/L	<0.01	0.01	10	Below MAC
Nitrite - N		mg/L	< 0.005	0.005	1	Below MAC
Nitrate and Nitrite - N		mg/L	<0.01	0.01	10	Below MAC
Sulfate (SO4)	Extractable	mg/L	56.6	0.9	500	Below AO
Hydroxide		mg/L	<5			
Carbonate		mg/L	44			
Bicarbonate		mg/L	477			
P-Alkalinity	as CaCO3	mg/L	37	5		
T-Alkalinity	as CaCO3	mg/L	465	5		
Total Dissolved Solids		mg/L	571	1	500	Above AO
Hardness	as CaCO3	mg/L	4.7			
Ionic Balance		%	97			

Approved by:

tothony Weuman Anthony Neumann, MSc General Manager

Data have been validated by Analytical Quality Control and Element's Integrated Data Validation System (IDVS).

Generation and distribution of the report, and approval by the digitized signature above, are performed through a secure and controlled automatic process





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Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue

Edmonton, AB, Canada

T5S 2W3

Attn: Accounts Payable

Sampled By: Scott Thompson

Company: HCL

Project ID: MR-0323.22

Project Name: County of Ponoka GW

Monitoring Gull Lake Area

Project Location: Gull Lake Area
LSD: Various Legal Locations

P.O.: 19729

Proj. Acct. code:

Lot ID: 1675279

Control Number:

Date Received: Aug 29, 2023
Date Reported: Sep 5, 2023
Report Number: 2908485

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed (
Turbidity	NTU	0.094	-0.1	0.1	>
Date Acquired:	August 31, 2023				
Turbidity	NTU	0.119	0.0	0.1)
Date Acquired:	August 31, 2023				
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed (
Turbidity	NTU	1940	1799.3	2005.7	>
Date Acquired:	August 31, 2023				
Turbidity	NTU	5580	4441.7	6661.7)
Date Acquired:	August 31, 2023				
Colour	Colour units	10	10	10)
Turbidity	NTU	149	132.1	162.1	,
Date Acquired:	August 31, 2023				
Turbidity	NTU	14.3	12.6	15.6)
Date Acquired:	August 31, 2023				
Turbidity	NTU	1.7	1.0	2.2	,
Date Acquired:	August 31, 2023				,
Client Sample Rep		Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria Passed (
Turbidity	NTU	0.2	0.2	10	0.2
Date Acquired:	August 31, 2023				,
•					
Routine Water					
Blanks	Units	Measured	Lower Limit	Upper Limit	Passed (
Chloride	mg/L	0.22	-0.4	0.4	>
Fluoride	mg/L	0	-0.05	0.05	>
Nitrate - N	mg/L	0.0083299	-0.01	0.01)
Nitrite - N	mg/L	0	-0.005	0.005	>
Calcium	mg/L	0.0761978	-0.1	0.1	>
Magnesium	mg/L	0.0194014	-0.1	0.1	>
Sodium	mg/L	0.102083	-0.4	0.3	>
Sulfur	mg/L	0.104134	-0.3	0.3	>
Potassium	mg/L	0.233221	-0.4	0.4	>
Iron	mg/L	0.00345156	-0.02	0.02)
Manganese	mg/L	0.000828697	-0.003	0.003)
Date Acquired:	August 31, 2023				
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed (
	mg/L	2020	1847.4	2256.0	>
Chloride					
	August 31, 2023				
Chloride		32.2	27.200	36.800)
Chloride Date Acquired:	•	32.2	27.200	36.800)
Chloride Date Acquired: Electrical Conduc	ctivity dS/m	32.2 9.15	27.200 8.90	36.800 9.44)
Chloride Date Acquired: Electrical Conduct Date Acquired:	ctivity dS/m August 30, 2023				

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Lot ID: 1675279

Date Reported: Sep 5, 2023

Report Number: 2908485

Aug 29, 2023



Element 7217 Roper Road NW Edmonton, Alberta T6B 3J4, Canada

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Control Number:

Date Received:

Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue

Edmonton, AB, Canada

T5S 2W3

Attn: Accounts Payable Sampled By: Scott Thompson

Company: HCL

Fluoride

Nitrate - N

Nitrite - N

Calcium

Sodium

Sulfur

Iron

Magnesium

Potassium

Nitrate and Nitrite - N

Routine Water - Continued

Project ID: MR-0323.22

Project Name: County of Ponoka GW

Monitoring

Project Location: Gull Lake Area LSD: Various Legal Locations

P.O.: 19729

Proj. Acct. code:

ontrol Sample	Units	Measured	Lower Limit	Upper Limit	Passed Q
P-Alkalinity	mg/L	530	442	584	ye
T-Alkalinity	mg/L	989	958	1059	ye
Fluoride	mg/L	10.1	9.39	10.59	ye
Nitrate - N	mg/L	10.2	9.03	11.13	ye
Nitrite - N	mg/L	10.0	9.010	10.990	ye
Nitrate and Nitrite - N	mg/L	20.2	19.10	20.90	ye
Calcium	mg/L	253	230.0	260.0	ye
Magnesium	mg/L	98.2	92.4	103.0	yes
Sodium	mg/L	256	231.0	261.0	ye
Sulfur	mg/L	152	141.3	156.9	ye
Potassium	mg/L	258	229.0	259.0	ye
Iron	mg/L	9.94	9.27	10.23	ye
Manganese	mg/L	2.46	2.260	2.560	ye
Date Acquired: August	31, 2023				
pН		6.89	6.79	6.97	ye
Temperature of observed	°C	20.5	15.5	24.5	ye
Electrical Conductivity	dS/m	0.076	0.069	0.085	ye
P-Alkalinity	mg/L	59	28	72	ye
T-Alkalinity	mg/L	125	114	140	ye
Chloride	mg/L	83.1	74.9	86.9	ye
Fluoride	mg/L	4.88	4.56	5.22	ye
Nitrate - N	mg/L	4.85	4.37	5.33	ye
Nitrite - N	mg/L	4.86	4.370	5.330	ye
Nitrate and Nitrite - N	mg/L	9.72	8.80	10.60	ye
Date Acquired: August	31, 2023				
Chloride	mg/L	15.6	13.3	16.5	ye:

0.49

0.51

0.500

1.01

5.2

2.1

5.2

3.1

5.2

0.20

0.45

0.42

0.455

0.85

4.6

1.9

4.7

2.7

4.5

0.18

0.57

0.57

0.557

1.15

5.7

2.2

5.7

3.2

5.5

0.24

	•					•
Manganese	mg/L	0.051	0.046	0.058		yes
Date Acquired: Aug	gust 31, 2023					
Client Sample Replicate	es Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
рН		5.71	5.64	0	0.10	yes
Electrical Conductivity	dS/m	0.023	0.023	10	0.002	yes
Hydroxide	mg/L	<5	<5	10		yes
Carbonate	mg/L	<6	<6	10	6	yes
Bicarbonate	mg/L	16	15	10	6	yes

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yes

yes

yes

yes

ves

yes

yes

yes

yes

yes

mg/L





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Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue

Edmonton, AB, Canada

T5S 2W3

Attn: Accounts Payable Sampled By: Scott Thompson

Company: HCL

Project ID: MR-0323.22

Project Name: County of Ponoka GW

Monitoring Gull Lake Area

Project Location: Gull Lake Area
LSD: Various Legal Locations

P.O.: 19729

Proj. Acct. code:

Lot ID: 1675279

Control Number:

Date Received: Aug 29, 2023
Date Reported: Sep 5, 2023
Report Number: 2908485

Routine Water - Continued						
Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
P-Alkalinity	mg/L	<5	<5	10	5	yes
T-Alkalinity	mg/L	13	12	10	5	yes
Chloride	mg/L	<0.4	<0.4	10	0.5	yes
Fluoride	mg/L	0.11	0.12	10	0.05	yes
Nitrate - N	mg/L	<0.01	<0.01	10	0.01	yes
Nitrite - N	mg/L	< 0.005	< 0.005	10	0.010	yes
Calcium	mg/L	1.5	1.4	10	0.6	yes
Magnesium	mg/L	0.2	0.2	10	0.4	yes
Sodium	mg/L	232	229	10	1.2	yes
Sulfur	mg/L	18.9	18.7	10	0.1	yes
Potassium	mg/L	0.4	0.5	10	1.2	yes
Iron	mg/L	0.11	0.08	10	0.05	yes
Manganese	mg/L	<0.005	<0.005	10	0.010	yes

Date Acquired: August 31, 2023





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Methodology and Notes

Company: HCL

Bill To: Hydrogeological Consultants

17740 - 118 Avenue

Edmonton, AB, Canada

T5S 2W3

Sampled By: Scott Thompson

Attn: Accounts Payable

Project ID: Project Name:

Proj. Acct. code:

MR-0323.22 County of Ponoka GW

Monitoring

Project Location: Gull Lake Area LSD: Various Legal Locations

P.O.: 19729 Lot ID: 1675279

Control Number:

Date Received: Aug 29, 2023 Date Reported: Sep 5, 2023 Report Number: 2908485

Method of Analysis		
Method Name	Reference	Method Date Analysis Location Started
Alkalinity, pH, and EC in water	APHA	* Alkalinity - Titration Method, 2320 B Aug 30, 2023 Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B Aug 30, 2023 Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B Aug 30, 2023 Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	* Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B Aug 31, 2023 Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 Sep 1, 2023 Element Edmonton - Roper E Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-Cl- Aug 31, 2023 Element Edmonton - Roper E Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B Aug 31, 2023 Element Edmonton - Roper Road
Metals Trace (Extractable) in water	APHA	Hardness by Calculation, 2340 B Aug 31, 2023 Element Edmonton - Roper Road
Metals Trace (Extractable) in water	APHA	* Inductively Coupled Plasma (ICP) Aug 31, 2023 Element Edmonton - Roper Method, 3120 B Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B Aug 31, 2023 Element Edmonton - Roper Road

^{*} Reference Method Modified

References

APHA Standard Methods for the Examination of Water and Wastewater

Guidelines

Guideline Description Health Canada GCDWQ

Guidelines for Canadian Drinking Water Quality, Health Canada, Sept 2020 Guideline Source

Guideline Comments MAC = Maximum Acceptable Concentration

AO = Aesthetic Objective

OG = Operational Guideline for Water Treatment Plants

(does not apply to private groundwater wells).

Refer to Health Canada for complete guidelines at www.hc-sc.gc.ca

Comments:

• Aug 30, 2023 - Sample 1675279-3; 8807137: Sample received at 1.7°c

The comparison of test results to guideline limits is provided for information purposes only. This is not to be taken as a statement of conformance / nonconformance to any guideline, regulation or limit. The data user is responsible for all conclusions drawn with respect to the data and is advised to consult official regulatory references when evaluating compliance.

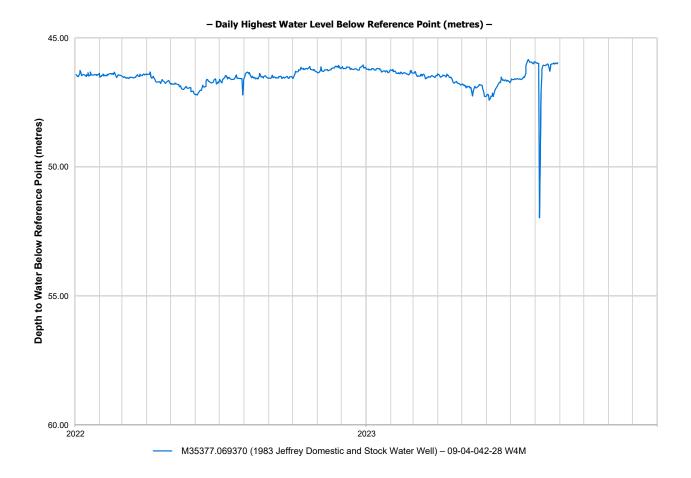
Please direct any inquiries regarding this report to our Client Services group. Results relate only to samples as submitted.

The test report shall not be reproduced except in full, without the written approval of the laboratory.

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1983 Jeffrey Domestic and Stock Water Well 2022 - 2023 Hydrograph



1992 Gull Lake Golf Course Water Well

04-10-042-01 W5M

(M35379.066969)



Well Spatial Location:

Easting: **62,813**Northing: **5,825,524**

(spatial accuracy HCL GPS — 10TM Resource NAD83)

Ground Elevation AMSL (m): 934
(elevation accuracy HCL DEM (2016))

Date Completed: July 15, 1992

Depth Drilled (m): 32.0

Completion Interval (m): 19.8 - 32.0 *

(* TGWC determined value)

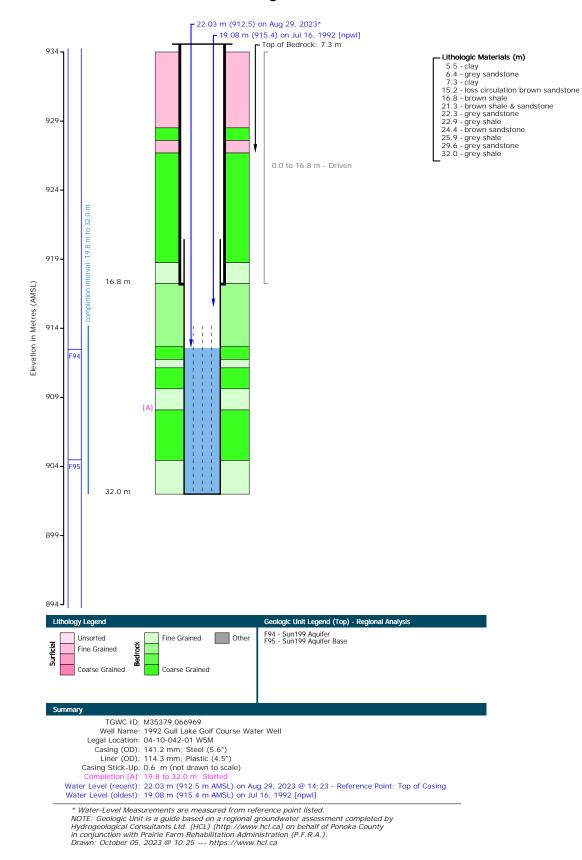
Earliest Water Level (m): 19.08 - July 16, 1992

Most Recent Water Level (m): 22.03 - August 29, 2023 @ 14:23

GIC ID: **365500**



1992 Gull Lake Golf Course Water Well Water Well Diagram



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Owner: Gull Lake Golf Course

RR 2 Site 10 (Box 6), Red Deer, AB T4N 5E2 Contractor: G & S Water Well Servicing Name: 1992 Gull Lake Golf Course Water Well

Field Action: Confirmed - Physically, May 18, 2011

Work Type: New Well Drilling Method: Rotary Proposed Use: Industrial Completion Type: Casing/Perforated Liner

Depth Completed (m)*: 32.0

Depth Drilled (m): 32.0

Date Started: July 12, 1992 Date Completed: July 15, 1992 Well Status: Producing

Feature Class: Water Well

Top of Bedrock (m): 7.31 * Completion Interval (m): 19.8 - 32.0 *

Completion Aquifer: Dalehurst Member *

Most Recent Water Level (m): 22.03 m - August 29, 2023 Pump Intake BTOC (m): 27.4 on July 16, 1992

Completion Details

Surface Casing: Steel - 141.2 mm (O.D.) x 4.80 mm (thick) x 16.8 m (bottom) Liner: Plastic - 114.3 mm (O.D.) x 6.20 mm (thick); Top: 13.7 (m); Bottom: 32.0 (m)

Slotted: 19.8 to 32.0 m - 0.125 x 12 - Method: Machine

Driven: 0.0 to 16.8 m

Chemistry Summary Details (mg/L, except as noted)

Sampling Details: August 29, 2023 @ 14:40 Analysis Date: September 5, 2023 - Element Materials Technology Canada Inc. (1675279-5)

Constituent Result Conductivity (µS/cm): 1030 Total Dissolved Solids: 655 Hardness (as CaCO3): 285 T-Alkalinity (as CaCO3): 558 P-Alkalinity (as CaCO3): < 5 Nitrate + Nitrite as N: 1.80 Total Suspended Solids: Temperature (°C): 20.8

Constituent Extractable Dissolved

Calcium: 50.4

Manganese: < 0.005

Iron: < 0.01

Chloride:

Aluminum:

Arsenic:

Barium:

Beryllium:

Cadmium:

Chromium:

Cobalt:

Sulfate: 69.1

Nitrate as N: 1.80 Nitrite as N: < 0.005 pH (pH Unit): 7.77 Colour (TCU): < 5 Ion Balance (%): 94
Total Coliforms:**: Fecal Coliforms:**: Escherichia coli:**:

Constituent

Turbidity (NTU):0.1 Fluoride:0.07 Carbonate: < 6 Bicarbonate:681 Hvdroxide: < 5 Total Iron:

Constituent

(recently sampled first)

Result

Constituent Extractable Dissolved Mercury: Molybdenum Magnesium: 38.6 Sodium: 150 Potassium: 2.3 Vanadium: Dissolved Strontium: Nickel: Zinc: Copper: Lead: Uranium:

Result

Comments: Sample collected by Hydrogeological Consultants Ltd. personnel.

Note: Constituents have been compared to the maximum acceptable concentration, Health Canada. 2022. Guidelines for Canadian Drinking Water Quality – Summary Tables. Water and Air Quality Bureau, Healthy . 28184: 1 / 10 Environments and Consumer Safetv Branch. Health Canada. Ottawa. Ontario.

METRIC REPORT

62.813.00 Easting (m): 5,825,524.00 ** Northing (m): Elevation (m): 934***

> Lot: Block: Plan:

Presence of Gas: No

04-10-042-01 W5M

M35379.066969

528184; 240218; core Elog Taken: No

Gamma Taken: No Flowing: No Stick Up (m): 0.6

Lithology D	etails	
Elevation	Depth	
(AMSL)	(BGL)	<u>Lithology Descriptions</u>
928.4	5.5	Clay
927.5	6.4	Grey Sandstone
926.6	7.3	Clay
918.7	15.2	Loss Circulation Brown Sandstone
917.1	16.8	Brown Shale
912.6	21.3	Brown Shale & Sandstone
911.7	22.3	Grey Sandstone
911.0	22.9	Grey Shale
909.5	24.4	Brown Sandstone
908.0	25.9	Grey Shale
904.3	29.6	Grey Sandstone
901.9	32.0	Grey Shale

Comments & Observations

Aquifer Tests Testing Depth of Test Duration (minutes) Avg. Rate NPWL Drawdown Pump Q20 (m³/day)* Transmissivity (m²/day)* Apparent Effective Apparent Aquifer Effective Date & Time Method / Type Interval Pumping Recovery (metres) (metres) (Lpm) (metres) 1 1992-07-16 720 54.6 0.1 27.4 1.725

Alias IDs

GIC ID: 365500 GIC (WellReportId): 365500 * The Groundwater Centre (TGWC) calculated or determined value. * HCL GPS — 10TM Resource NAD83 *** HCL DEM (2016) — {Ground; AMSL}

Created on: October 05, 2023 — Data "AS IS"; no warranty either expressed or implied. [52.597093 -114.072262 (WGS 84)], INT Date End: 2099-12-31



1992 Gull Lake Golf Course Water Well AEPA - Water Well Drilling Report



Water Well Drilling Report

View in Imperial Export to Excel

GIC Well ID GoA Well Tag No. Drilling Company Well ID

1992/08/04

Measurement in Metric

365500

The driller supplies the data contained in this report. The Province disclaims responsibility for its accuracy. The information on this report will be retained in a public database. GOWN ID Date Report Received Well Identification and Location Measurement in Metric Owner Name Address Province Country Postal Code Town GULL LAKE GOLF COURSE P.O. BOX 6 RR2 SITE 10, RED DEER TWP RGF W of MER Block Plan 1/4 or LSD SEC Lot Additional Description Location 9023426 4 10 42 5 3 GPS Coordinates in Decimal Degrees (NAD 83) Measured from Boundary of Elevation _ Latitude <u>52.596994</u> Longitude -114.071579 m m from How Location Obtained How Elevation Obtained m from Not Obtained Мар

Drilling Information Type of Work Method of Drilling Rotary New Well Proposed Well Use Industrial

Yield Test Summary

Recommended Pump Rate

maasma		•
Formation Log		Measurement in Metric
Depth from ground level (m)	Water Bearing	Lithology Description
5.49		Clay
6.40		Gray Sandstone
7.32		Clay
15.24		Brown Lost Circulation Sandstone
16.76		Brown Shale
21.34		Brown Shale & Sandstone
22.25		Gray Sandstone
22.86		Gray Shale
24.38		Brown Sandstone
25.91		Gray Shale
29.57		Gray Sandstone
32.00		Gray Shale

Test Date	Water	Removal Rate (/min) Static Water Level (m)				
1992/07/16		54.55			19.	08	
Well Comple					Measure	ement in N	1etric
Total Depth D	rilled Finis	hed Well Depth	Start	Date	En	nd Date	
32.00 m			1992	/07/12	19	92/07/15	
Borehole							
	er (cm)					(m)	
0.0			00			2.00	
Surface Casi Steel		•	Well Ca Plastic	asing/Lii			
		14.12 cm				11.43 cm	
		0.478 cm	Wall 7	Thickness	s:	0.620 cm	
Bottom	n at :	16.76 m				13.72 m	
				Bottom a	t:	32.00 m	
Perforations							
From (m)	To (m)	Diameter or Slot Width	Slot L	ength	Hole o		
	32.00	(cm) 0.318	(CI	11)		.48	
Amoun	n0.	00 m to		6 m			
Other Seals							
	Type				At (m)		
Screen Type							
Size	OD :	0.00 cm					
From	(m)	То	(m)		Slot S	iize (cm)	
Attachm	ent						
				m Fitting	s		_
Pack							
Туре			Grain	Size		_	
Amount	<u>-</u>						

0.00 L/min

Contractor Certification		
Name of Journeyman responsible for drilling/construction of well UNKNOWN NA DRILLER	Certification No	
Company Name G&S WATER WELL SERVICING	Copy of Well report provided to owner	Date approval holder signed

Printed on 10/5/2023 10:25:11 AM Page: 1 / 3

A - 16



Water Well Drilling Report

View in Imperial Export to Excel

365500

GIC Well ID GoA Well Tag No. Drilling Company Well ID Data Report Received

1992/08/04

The driller supplies the data contained in this report. The Province disclaims responsibility for its accuracy. The information on this report will be retained in a public database.

OWNIN										Date Report Re	ceiveu	1992/06/04
Well Identi	ification and L	ocation									Mea	surement in Metric
Owner Nam GULL LAKE	ne E GOLF COURS	SE	Address P.O. BOX	6 RR2 SITE	i 10,	Town RED DI	EER		Province	Cour	ntry	Postal Code
Location	1/4 or LSD 4	SEC 10	<i>TWP</i> 42	RGE 1	W of MER 5	Lot 1	Block 3	<i>Plan</i> 9023426	Addition	al Description		
Measured fi		m from m from				inates in Decir 52.596994 on Obtained			1579	Elevation How Elevation Not Obtained		<u>m</u>
Additional	Information										Mea	surement in Metric
Distance F Is Artesia	rom Top of Cas n Flow Rate	sing to Grou	_		cm	Is	Flow Coi	ntrol Installed				
Recommer	nded Pump Rate	e	<u> </u>		0.00 L/mi	n Pump	Installed	Describe .		Depth	m	-
	nded Pump Inta		From TOC)			_ ′			Make			
										Model (Outp	ut Rating) _	
	Encounter Salin	e Water (>		DS) Gas		h h		Geop		Completion Taken ESRD		
Addition	al Comments or	n Well				\$	Sample C	Collected for Po			Submitted to	ESRD

Contractor Certification

Name of Journeyman responsible for drilling/construction of well

UNKNOWN NA DRILLER

Company Name

Copy of Well report provided to owner

Date approval holder signed

G&S WATER WELL SERVICING

HCL



Water Well Drilling Report

View in Imperial Export to Excel

365500 GIC Well ID

GoA Well Tag No. Drilling Company Well ID

1992/08/04

The driller supplies the data contained in this report. The Province disclaims responsibility for its accuracy. The information on this report will be retained in a public database. GOWN ID Date Report Received Well Identification and Location Measurement in Metric Owner Name Address Province Country Postal Code Town GULL LAKE GOLF COURSE P.O. BOX 6 RR2 SITE 10, RED DEER TWP RGE W of MER Block Plan 1/4 or LSD SEC Lot Additional Description Location 9023426 4 42 10 1 3 5 GPS Coordinates in Decimal Degrees (NAD 83) Measured from Boundary of Elevation _ Latitude <u>52.596994</u> Longitude -114.071579 m m from How Location Obtained How Elevation Obtained m from Мар Not Obtained

Yield Test			Taken	From Ground Level	Measurement in Metri
Test Date	Start Time	Static Water Level		Depth to water level	
1992/07/16	12:00 AM	19.08 m	Pumping (m)	Elapsed Time Minutes:Sec	Recovery (m)
			19.08	0:00	19.17
Method of Water R	Removal		19.15	0:30	19.11
-	Type Pump		19.15	1:00	19.10
	Rate 54.55 L/min		19.15	1:30	19.10
			19.15	2:00	19.10
Depth Withdrawn F	From 27.43 m		19.15	3:00	19.10
			19.15	4:00	19.10
If water removal pe	riod was < 2 hours, explain wh	/	19.16	5:00	19.10
			19.16	6:00	19.10
			19.16	7:00	19.10
			19.16	8:00	19.10
			19.16	9:00	19.10
			19.16	10:00	19.10
			19.16	12:00	19.10
			19.16	14:00	19.10
			19.16	16:00	19.10
			19.16	18:00	19.10
			19.16	20:00	19.10
			19.16	25:00	19.10
			19.16	30:00	19.10
			19.16	35:00	19.10
			19.16	40:00	19.10
			19.16	50:00	19.10
			19.16	60:00	19.10
			19.16	75:00	18.91
			19.16	90:00	19.08
			19.16	105:00	19.08
			19.16	120:00	19.08
			19.16	150:00	
			19.16	180:00	
			19.16	210:00	
			19.16	240:00	
			19.17	300:00	
			19.17	360:00	
			19.17	420:00	
			19.17	480:00	
			19.17	600:00	
			19.17	720:00	

Water Diverted for Drilling			
Water Source	Amount Taken L	Diversion Date & Time	

Contractor Certification

Name of Journeyman responsible for drilling/construction of well UNKNOWN NA DRILLER

Certification No

Company Name G&S WATER WELL SERVICING Copy of Well report provided to owner Date approval holder signed

Printed on 10/5/2023 10:25:11 AM

Page: 3 / 3

1992 Gull Lake Golf Course Water Well Chemical Analysis Results (September 5, 2023)



Element 7217 Roper Road NW Edmonton, Alberta T6B 3J4, Canada

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W: www.element.com

Analytical Report

Bill To: Hydrogeological Consultants

17740 - 118 Avenue

Edmonton, AB, Canada

Attn: Accounts Payable

Sampled By: Scott Thompson Company: HCL

Project ID: Project Name: MR-0323.22 County of Ponoka GW

Monitoring Gull Lake Area

1675279-5

Project Location: LSD: Various Legal Locations P.O.: 19729

Proj. Acct. code:

Lot ID: 1675279

Control Number:

Date Received: Aug 29, 2023 Date Reported: Sep 5, 2023 Report Number: 2908487

Reference Number Sample Date

August 29, 2023 Sample Time 14:40 Sample Location Gull Lake GCC ww

Sample Description M35379.066969 / 1.7°c

> Sample Matrix Water

				Nominal Detection	Guideline	Guideline
Analyte		Units	Result	Limit	Limit	Comments
Physical and Aggregate F	Properties					
Colour	Apparent, Potable	Colour units	<5	5	15	Below AO
Turbidity		NTU	0.1	0.1	0.1/0.3/1.0 OG	
Routine Water						
рН			7.77	1	7.0-10.5	Within OG Range
Temperature of observed pH		°C	20.8			
Electrical Conductivity	at 25 °C	μS/cm	1030	1		
Calcium	Extractable	mg/L	50.4	0.2		
Magnesium	Extractable	mg/L	38.6	0.2		
Sodium	Extractable	mg/L	150	0.4	200	Below AO
Potassium	Extractable	mg/L	2.3	0.4		
Iron	Extractable	mg/L	<0.01	0.01	0.3	Below AO
Manganese	Extractable	mg/L	<0.005	0.005	0.02 AO; 0.12 MAC	Below AO
Chloride	Dissolved	mg/L	9.9	0.4	250	Below AO
Fluoride		mg/L	0.07	0.05	1.5	Below MAC
Nitrate - N		mg/L	1.80	0.01	10	Below MAC
Nitrite - N		mg/L	<0.005	0.005	1	Below MAC
Nitrate and Nitrite - N		mg/L	1.80	0.01	10	Below MAC
Sulfate (SO4)	Extractable	mg/L	69.1	0.9	500	Below AO
Hydroxide		mg/L	<5			
Carbonate		mg/L	<6			
Bicarbonate		mg/L	681			
P-Alkalinity	as CaCO3	mg/L	<5	5		
T-Alkalinity	as CaCO3	mg/L	558	5		
Total Dissolved Solids		mg/L	655	1	500	Above AO
Hardness	as CaCO3	mg/L	285			
Ionic Balance		%	94			

Approved by:

tothony Weuman Anthony Neumann, MSc General Manager

Data have been validated by Analytical Quality Control and Element's Integrated Data Validation System (IDVS). Generation and distribution of the report, and approval by the digitized signature above, are performed through a secure and controlled automatic process



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Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue

Edmonton, AB, Canada

Edmonton, AB, Canada

T5S 2W3
Attn: Accounts Payable

Sampled By: Scott Thompson

Company: HCL

Project ID: MR-0323.22

Project Name: County of Ponoka GW

Monitoring

Project Location: Gull Lake Area
LSD: Various Legal Locations

P.O.: 19729

Proj. Acct. code:

Lot ID: 1675279

Control Number:

Date Received: Aug 29, 2023
Date Reported: Sep 5, 2023
Report Number: 2908487

Physical and Aggr	egate Properties					
Blanks	Units	Measured	Lower Limit	Upper Limit		Passed QC
Turbidity	NTU	0.094	-0.1	0.1		yes
Date Acquired: A	august 31, 2023					
Turbidity	NTU	0.119	0.0	0.1		yes
Date Acquired: A	august 31, 2023					
Control Sample	Units	Measured	Lower Limit	Upper Limit		Passed QC
Turbidity	NTU	1940	1799.3	2005.7		yes
Date Acquired: A	august 31, 2023					
Turbidity	NTU	5580	4441.7	6661.7		yes
Date Acquired: A	August 31, 2023					·
Colour	Colour units	10	10	10		yes
Turbidity	NTU	149	132.1	162.1		yes
Date Acquired: A	august 31, 2023					
Turbidity	NTU	14.3	12.6	15.6		yes
Date Acquired: A	rugust 31, 2023					
Turbidity	NTU	1.7	1.0	2.2		yes
Date Acquired: A	august 31, 2023					
Client Sample Replic	ates Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Turbidity	NTU	0.2	0.2	10	0.2	yes
Date Acquired: A	August 31, 2023					
Routine Water						
Blanks	Units	Measured	Lower Limit	Upper Limit		Passed QC
Chloride	mg/L	0.22	-0.4	0.4		yes
Fluoride	mg/L	0	-0.05	0.05		yes
Nitrate - N	mg/L	0.0083299	-0.01	0.01		yes
Nitrite - N	mg/L	0	-0.005	0.005		yes
Calcium	mg/L	0.0761978	-0.1	0.1		yes
Magnesium	mg/L	0.0194014	-0.1	0.1		yes
Sodium	mg/L	0.102083	-0.4	0.3		yes
Sulfur	mg/L	0.104134	-0.3	0.3		yes
Potassium	mg/L	0.233221	-0.4	0.4		yes
Iron	mg/L	0.00345156	-0.02	0.02		yes
Manganese	mg/L	0.000828697	-0.003	0.003		yes
Date Acquired: A	rugust 31, 2023					
Control Sample	Units	Measured	Lower Limit	Upper Limit		Passed QC
Chloride	mg/L	2020	1847.4	2256.0		yes
Date Acquired: A	rugust 31, 2023					
Electrical Conductivi	ty dS/m	32.2	27.200	36.800		yes
Date Acquired: A	August 30, 2023					
рН		9.15	8.90	9.44		yes
Temperature of obse	erved °C	20.7	15.5	24.5		yes
Electrical Conductivi	ty dS/m	2.68	2.631	2.829		yes





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Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue

Edmonton, AB, Canada

T5S 2W3

Attn: Accounts Payable Sampled By: Scott Thompson

Company: HCL

Project ID: MR-0323.22

Project Name: County of Ponoka GW

Monitoring

Project Location: Gull Lake Area
LSD: Various Legal Locations

P.O.: 19729

Proj. Acct. code:

Control Number:

Date Received: Aug 29, 2023
Date Reported: Sep 5, 2023
Report Number: 2908487

Routine Water - Continu	ıed					
Control Sample	Units	Measured	Lower Limit	Upper Limit		Passed QC
P-Alkalinity	mg/L	530	442	584		yes
T-Alkalinity	mg/L	989	958	1059		yes
Fluoride	mg/L	10.1	9.39	10.59		yes
Nitrate - N	mg/L	10.2	9.03	11.13		yes
Nitrite - N	mg/L	10.0	9.010	10.990		yes
Nitrate and Nitrite - N	mg/L	20.2	19.10	20.90		yes
Calcium	mg/L	253	230.0	260.0		yes
Magnesium	mg/L	98.2	92.4	103.0		yes
Sodium	mg/L	256	231.0	261.0		yes
Sulfur	mg/L	152	141.3	156.9		yes
Potassium	mg/L	258	229.0	259.0		yes
Iron	mg/L	9.94	9.27	10.23		yes
Manganese	mg/L	2.46	2.260	2.560		yes
Date Acquired: August	31, 2023					
pН		6.89	6.79	6.97		yes
Temperature of observed	°C	20.5	15.5	24.5		yes
Electrical Conductivity	dS/m	0.076	0.069	0.085		yes
P-Alkalinity	mg/L	59	28	72		yes
T-Alkalinity	mg/L	125	114	140		yes
Chloride	mg/L	83.1	74.9	86.9		yes
Fluoride	mg/L	4.88	4.56	5.22		yes
Nitrate - N	mg/L	4.85	4.37	5.33		yes
Nitrite - N	mg/L	4.86	4.370	5.330		yes
Nitrate and Nitrite - N	mg/L	9.72	8.80	10.60		yes
Date Acquired: August	31, 2023					
Chloride	mg/L	15.6	13.3	16.5		yes
Fluoride	mg/L	0.49	0.45	0.57		yes
Nitrate - N	mg/L	0.51	0.42	0.57		yes
Nitrite - N	mg/L	0.500	0.455	0.557		yes
Nitrate and Nitrite - N	mg/L	1.01	0.85	1.15		yes
Calcium	mg/L	5.2	4.6	5.7		yes
Magnesium	mg/L	2.1	1.9	2.2		yes
Sodium	mg/L	5.2	4.7	5.7		yes
Sulfur	mg/L	3.1	2.7	3.2		yes
Potassium	mg/L	5.2	4.5	5.5		yes
Iron	mg/L	0.20	0.18	0.24		yes
Manganese	mg/L	0.051	0.046	0.058		yes
Date Acquired: August	31, 2023					•
Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
рН		5.71	5.64	0	0.10	yes
Electrical Conductivity	dS/m	0.023	0.023	10	0.002	yes
Hydroxide	mg/L	<5	<5	10		yes
Carbonate	mg/L	<6	<6	10	6	yes
Bicarbonate	mg/L	16	15	10	6	yes
	J					,







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Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue

Edmonton, AB, Canada

T5S 2W3

Attn: Accounts Payable Sampled By: Scott Thompson

Company: HCL

Project ID: MR-0323.22

Project Name: County of Ponoka GW

Monitoring Gull Lake Area

Project Location: Gull Lake Area
LSD: Various Legal Locations

P.O.: 19729

Proj. Acct. code:

Lot ID: 1675279

Control Number:

Date Received: Aug 29, 2023
Date Reported: Sep 5, 2023
Report Number: 2908487

Routine Water - Contin	ued					
Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
P-Alkalinity	mg/L	<5	<5	10	5	yes
T-Alkalinity	mg/L	13	12	10	5	yes
Chloride	mg/L	<0.4	<0.4	10	0.5	yes
Fluoride	mg/L	1.21	1.21	10	0.05	yes
Nitrate - N	mg/L	<0.01	<0.01	10	0.01	yes
Nitrite - N	mg/L	< 0.005	< 0.005	10	0.010	yes
Calcium	mg/L	1.5	1.4	10	0.6	yes
Magnesium	mg/L	0.2	0.2	10	0.4	yes
Sodium	mg/L	232	229	10	1.2	yes
Sulfur	mg/L	18.9	18.7	10	0.1	yes
Potassium	mg/L	0.4	0.5	10	1.2	yes
Iron	mg/L	0.11	0.08	10	0.05	yes
Manganese	mg/L	<0.005	<0.005	10	0.010	yes

Date Acquired: August 31, 2023





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Methodology and Notes

Bill To: Hydrogeological Consultants

17740 - 118 Avenue Edmonton, AB, Canada

T5S 2W3

Attn: Accounts Payable

Sampled By: Scott Thompson Company: HCL

Project ID: MR-0323.22

Project Name: County of Ponoka GW

Monitoring

Project Location: Gull Lake Area
LSD: Various Legal Locations

P.O.: 19729

Proj. Acct. code:

Lot ID: 1675279

Control Number:

Date Received: Aug 29, 2023
Date Reported: Sep 5, 2023
Report Number: 2908487

Method of Analysis				
Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* Alkalinity - Titration Method, 2320 B	Aug 30, 2023	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	Aug 30, 2023	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Aug 30, 2023	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	 * Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B 	Aug 31, 2023	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	Sep 1, 2023	Element Edmonton - Roper Road
Chloride in Water	APHA	 * Automated Ferricyanide Method, 4500-CI- E 	Aug 31, 2023	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	Aug 31, 2023	Element Edmonton - Roper Road
Metals Trace (Extractable) in water	APHA	Hardness by Calculation, 2340 B	Aug 31, 2023	Element Edmonton - Roper Road
Metals Trace (Extractable) in water	APHA	 * Inductively Coupled Plasma (ICP) Method, 3120 B 	Aug 31, 2023	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	Aug 31, 2023	Element Edmonton - Roper Road
		* Reference Method Medified		

^{*} Reference Method Modified

References

APHA Standard Methods for the Examination of Water and Wastewater

Guidelines

Guideline Description Health Canada GCDWQ

Guideline Source Guidelines for Canadian Drinking Water Quality, Health Canada, Sept 2020

Guideline Comments MAC = Maximum Acceptable Concentration

AO = Aesthetic Objective

OG = Operational Guideline for Water Treatment Plants

(does not apply to private groundwater wells).

Refer to Health Canada for complete guidelines at www.hc-sc.gc.ca

Comments:

• Aug 30, 2023 - Sample 1675279-5; 8807139: Sample received at 1.7°c

The comparison of test results to guideline limits is provided for information purposes only. This is not to be taken as a statement of conformance / nonconformance to any guideline, regulation or limit. The data user is responsible for all conclusions drawn with respect to the data and is advised to consult official regulatory references when evaluating compliance.

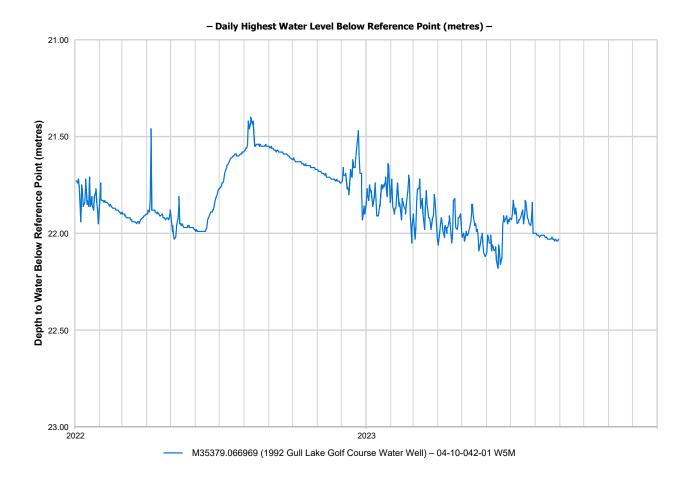
Please direct any inquiries regarding this report to our Client Services group.

Results relate only to samples as submitted.

The test report shall not be reproduced except in full, without the written approval of the laboratory.



1992 Gull Lake Golf Course Water Well 2022 - 2023 Hydrograph



2001 Wegmann Domestic Water Well

16-04-042-01 W5M

(M37490.034988)



Well Spatial Location:

Easting: **62,345**Northing: **5,825,262**

(spatial accuracy HCL GPS — 10TM Resource NAD83)

Ground Elevation AMSL (m): 936
(elevation accuracy HCL DEM (2016))

Date Completed: September 2, 2001

Depth Drilled (m): 54.9

Completion Interval (m): 45.7 - 54.9 *

(* TGWC determined value)

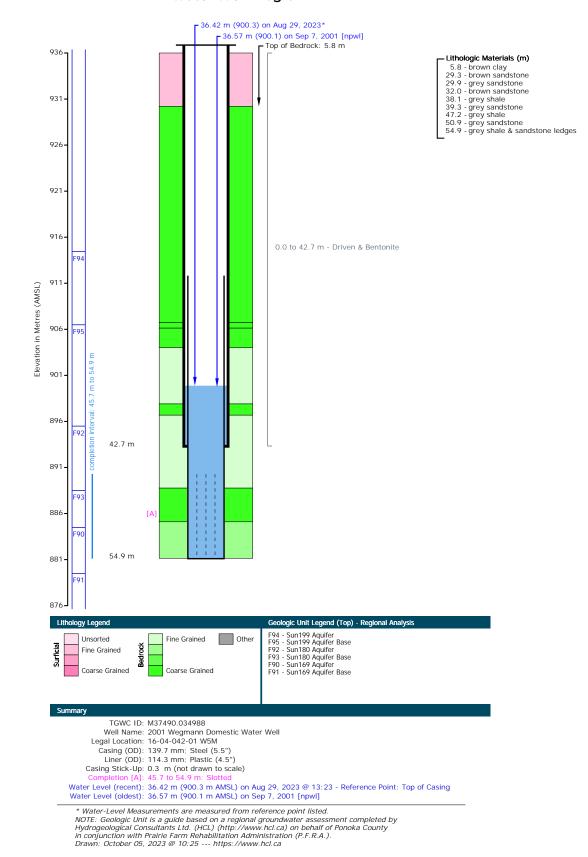
Earliest Water Level (m): 36.57 - September 7, 2001

Most Recent Water Level (m): 36.42 - August 29, 2023 @ 13:23

GIC ID: 499682



2001 Wegmann Domestic Water Well Water Well Diagram



do not copy, cite, or distribute without the express written consent of The Groundwater Centre, a division of hydrogeological consultants ltd.



Owner: Wegmann, Herman

538 Madeira Drive N.E., Calgary, AB T2A 4M8

Contractor: Alken Basin Drilling Ltd. Name: 2001 Wegmann Domestic Water Well

Field Action: Confirmed - Physically, June 28, 2011

Work Type: New Well Drilling Method: Rotary Proposed Use: Domestic

Depth Completed (m)*: 54.9

Date Started: September 2, 2001 Date Completed: September 2, 2001

Well Status: Producing

Completion Interval (m): 45.7 - 54.9 *

Top of Bedrock (m): 5.79 *

Feature Class: Water Well Presence of Gas: No

Depth Drilled (m): 54.9 Completion Aquifer: Dalehurst Member

Completion Type: Casing/Perforated Liner

Most Recent Water Level (m): 36.42 m - August 29, 2023

Surface Casing: Steel - 139.7 mm (O.D.) x 6.20 mm (thick) x 42.7 m (bottom) Liner: Plastic - 114.3 mm (O.D.) x 6.00 mm (thick); Top: 24.4 (m); Bottom: 54.9 (m)

Intervals

Slotted: 45.7 to 54.9 m - 0.375 x 0.375 - Method: Hand Drill

Driven & Bentonite: 0.0 to 42.7 m

Chemistry Summary Details (mg/L, except as noted)

Sampling Details: August 29, 2023 @ 13:35

Analysis Date: September 5, 2023 - Element Materials Technology Canada Inc. (1675279-4) Constituent Result

Constituent Result Conductivity (µS/cm): 1080 Total Dissolved Solids: 683 Hardness (as CaCO3): 14 T-Alkalinity (as CaCO3): 526 P-Alkalinity (as CaCO3): 18 Nitrate + Nitrite as N: < 0.01 Total Suspended Solids: Temperature (°C): 20.8

Nitrate as N: < 0.01 Nitrite as N: < 0.005 pH (pH Unit): 8.55 Colour (TCU): < 5 Ion Balance (%): 101
Total Coliforms:**: Fecal Coliforms:**: Escherichia coli:**:

Constituent Result Turbidity (NTU):0.4 Fluoride:0.34 Carbonate:21 Bicarbonate:597 Hvdroxide: < 5 Total Iron: Total Mn:

(recently sampled first)

Constituent Extractable Dissolved Calcium: 4.0 Chloride: Iron: 0.01 Manganese: < 0.005 Aluminum: Arsenic Barium: Beryllium: Cadmium: Chromium: Cobalt:

Constituent Extractable Dissolved Mercury: Molybdenum Magnesium: 0.9 Sodium: 277 Potassium: 0.8 Vanadium: Dissolved Strontium: Nickel: Zinc: Copper: Lead: Uranium:

Comments: Sample collected by Hydrogeological Consultants Ltd. personnel.

Note: Constituents have been compared to the maximum acceptable concentration, Health Canada. 2022. Guidelines for Canadian Drinking Water Quality – Summary Tables. Water and Air Quality Bureau, Healthy 8183: 1 / 1 Environments and Consumer Safety Branch. Health Canada. Ottawa. Ontario.

METRIC REPORT

62.345.00 Easting (m): Northing (m): 5,825,262.00 **

Elevation (m): 936*** Lot: 11 Block: Plan:

16-04-042-01 W5M M37490.034988

528183; 842683; core

Elog Taken: No Gamma Taken: No Flowing: No

Stick Up (m): 0.3

Lithology D	etails	
Elevation	Depth	
(AMSL)	(BGL)	<u>Lithology Descriptions</u>
930.6	5.8	Brown Clay
907.1	29.3	Brown Sandstone
906.5	29.9	Grey Sandstone
904.4	32.0	Brown Sandstone
898.3	38.1	Grey Shale
897.1	39.3	Grey Sandstone
889.2	47.2	Grey Shale
885.5	50.9	Grey Sandstone
881.5	54.9	Grey Shale & Sandstone Ledges

Comments & Observations

Initial, Sep 2, 2001: Driller reports distance from top of casing to ground level: 3' 5-120 Minutes of recovery, stayed at 120'

Date & Time	Testing Method / Type	Depth of Test Interval	Duration (r Pumping F	minutes) Recovery	Avg. Rate (Lpm)	NPWL (metres)	<u>Drawdown</u> (metres)	Pump (metres)	Q20 (m³/day)* Apparent Effective	Transmissivity (m²/day)* <u>Apparent Aquifer Effective</u>
1 2001-09-07	Air	[unknown]	120	120	113.7	36.6	_	_		

Alias IDs

GIC ID: 499682

Aguifer Tests

Sulfate: 84.1

GIC (WellReportId): 499682

* The Groundwater Centre (TGWC) calculated or determined value. * HCL GPS — 10TM Resource NAD83 *** HCL DEM (2016) — {Ground; AMSL}

Created on: October 05, 2023 — Data "AS IS"; no warranty either expressed or implied. [52.594790 -114.079223 (WGS 84)], INT Date End: 2099-12-31



2001 Wegmann Domestic Water Well AEPA - Water Well Drilling Report



Water Well Drilling Report

View in Imperial Export to Excel

GIC Well ID GoA Well Tag No. Drilling Company Well ID

reived 2001/09/27

499682

The driller supplies the data contained in this report. The Province disclaims responsibility for its accuracy. The information on this report will be retained in a public database.

30WN ID										Date Report Receive	ed 2001/09/27
Well Ident	ification and L	ocation									Measurement in Metric
Owner Nan WEGMAN,			Address 538 MADE	IRA DR NE	E, CALGARY	Town			Province	Country	Postal Code T2A 4M8
Location	1/4 or LSD NE	SEC 4	<i>TWP</i> 42	RGE 1	W of MER 5	Lot 11	Block	Plan	Additio	onal Description	
Measured f	rom Boundary	of			GPS Coordin	nates in Dec	imal Degre	es (NAD 83 ₎)		
		m from			Latitude 5	2.592444	Longi	tude <u>-114.0</u>	79858	Elevation	m
		m from			How Location	n Obtained				How Elevation Obta	ained
					Not Verified					Not Obtained	

Drilling Information				
Method of Drilling Rotary	Type of Work New Well			
Proposed Well Use Domestic				
Formation Log	Measurement in Metric	Yield Test Summary		Measurement in Metric
Depth from Water Lithology Description		Recommended Pump Rate	45.46 L/min	

Formation Log			Measurement in Metric
Depth from ground level (m)	Water Bearing	Lithology Description	
5.79		Brown Clay	
29.26		Brown Sandstone	
29.87		Gray Sandstone	
32.00		Brown Sandstone	
38.10		Gray Shale	
39.32		Gray Sandstone	
47.24		Gray Shale	
50.90		Gray Sandstone	
54.86		Gray Shale & Sandstone L	edges

Vell Completion	Test Date		Removal Rate (I	L/min)	Static Water Level (m)				
Diameter (cm)	2001/09/07	1/09/07 113.65							
Diameter (cm)	Well Comple	etion			١	Measurement in Metric			
Diameter (cm)	Total Depth D	Drilled Fini	shed Well Depth						
Diameter (cm)	54.86 m			2001	/09/02	2001/09/02			
Surface Casing (if applicable) Steel Size OD : 13.97 cm Size OD : 11.43 cm Wall Thickness : 0.620 cm Bottom at : 42.67 m Bottom at : 54.86 m Perforations	Borehole								
Surface Casing (if applicable) Steel Size OD : 13.97 cm Plastic Size OD : 11.43 cm Wall Thickness : 0.620 cm Wall Thickness : 0.602 cm Top at : 24.38 m Bottom at : 54.86 m Perforations									
Steel Size OD : 13.97 cm Size OD : 11.43 cm									
Wall Thickness:	Steel				asing/Lin	er			
Perforations Diameter or Slot Width (cm) To (m) To (m) (cm) (cm)									
Perforations Diameter or Slot Width (cm) Interval(cm) Interval(cm) At5.72 54.86 0.953 0.95	Wall Thickn	ess:	0.620 cm	Wall 7	Thickness	: 0.602 cm			
Perforations From (m) To (m) Cind Width (cm) Slot Length (cm) Hole or Slot Interval(cm) 45.72 54.86 0.953 0.95 Perforated by Hand Drill Annular Seal Driven & Bentonite Placed from 0.00 m to 42.67 m Amount Other Seals Type At (m) Screen Type Size OD: 0.00 cm From (m) To (m) Attachment Top Fittings Bottom Fittings Pack Type Grain Size	Botton	n at :	42.67 m		Top at	: 24.38 m			
Diameter or Slot Width (cm) Hole or Slot Interval(cm)				I	Bottom at	: 54.86 m			
From (m) To (m) Slot Width (cm) Hole or Slot Interval(cm)	Perforations								
From (m) To (m) (cm) (cm) Interval(cm)				61					
45.72	From (m)	To (m)		Slot L	ength n)				
Annular Seal Driven & Bentonite Placed from 0.00 m to 42.67 m Amount				(CI	,				
Screen Type Size OD : 0.00 cm From (m) To (m) Slot Size (cm) Attachment Top Fittings Bottom Fittings Pack Type Grain Size	Placed froi Amoui	n 0	.00 m to	42.67	7 m				
Size OD :		Type			At (m)				
From (m) To (m) Slot Size (cm) Attachment			0.00 cm						
Top Fittings Bottom Fittings Pack Type Grain Size				(m)		Slot Size (cm)			
Top Fittings Bottom Fittings Pack Type Grain Size	A 1								
Pack Type Grain Size	Aπachn	ierit		Do#-	na Fittin	 			
Type Grain Size		rigs		DOTTO	ııı rıttıngs				
					0.				
Amount				Grain	Size				
	Amount								

Contractor Certification		
Name of Journeyman responsible for drilling/construction of well UNKNOWN NA DRILLER	Certification No 1	
Company Name ALKEN BASIN DRILLING LTD.	Copy of Well report provided to owner	Date approval holder signed

Printed on 10/5/2023 10:25:15 AM Page: 1/2

A - 28



Alberta Water Well Drilling Report

View in Imperial Export to Excel

499682

GIC Well ID GoA Well Tag No.

DWN ID		ac	ccuracy. The inf	formation on	this report will be i	etained in a pu	ublic databas	se.		Drilling Company \ Date Report Rece		
Well Ident	tification and L	Location									Measurement	in Metr
Owner Nan WEGMAN,	ne HERMAN		Address 538 MADEI	IRA DR NE	, CALGARY	Town			Province	Country	Posta T2A 4	l Code M8
Location	1/4 or LSD NE	SEC 4	<i>TWP</i> 42	RGE 1	W of MER 5	Lot 11	Block			nal Description		
Measured f	from Boundary (of m from m from			GPS Coordir Latitude 5 How Location Not Verified	2.592444				Elevation How Elevation On Not Obtained		
Additional	Information										Measurement	in Met
Distance F Is Artesia	From Top of Cas an Flow Rate				cm	Is	Flow Con	trol Installed	d			
	ended Pump Ra	te			45.46 L/mir 47.24 m	n Pump	Installed				m H.P.	
7.000777770	naoa r amp mie	ano Dopar (,,,,,				Model (Output I	Rating)	
Did you i	Encounter Salir	ne Water (>	∙4000 ppm TL	DS)	Depth		m			Completion		
Addition	al Action Taken nal Comments o	on Well		Gas		;	Sample Co	ollected for	Submitted to	Sub	omitted to ESRD	
Addition	nal Comments o	on Well			Depth	;	Sample Co	ollected for	Submitted to Potability STAYED AT	Sub		
Addition DRILLER I	nal Comments o	on Well	OM TOP OF	CASING 1	Depth	;	Sample Co	ollected for	Submitted to Potability STAYED AT ken From (Dept	Sub	omitted to ESRD	in Met
Addition DRILLER I Yield Test Test Date 2001/09/07	nal Comments o	Start Tim 12:00 AM	OM TOP OF	CASING 1	Depth FO GROUND LE	;	Sample Co	ECOVERY S	Submitted to Potability STAYED AT ken From (Dept	Sub- 120'. Ground Level th to water level Elapsed Time	omitted to ESRD	in Met
Addition DRILLER I Yield Test Test Date 2001/09/07 Method of	nal Comments of REPORTS DIS	Start Tim 12:00 AM	OM TOP OF	CASING T	Depth FO GROUND LE	;	Sample Co	ECOVERY S	Submitted to Potability STAYED AT ken From (Dept	Sub- 120'. Ground Level th to water level Elapsed Time Minutes: Sec 0:00 1:00 2:00 3:00 4:00	Measurement Recovery (m) 54.86 49.07 42.67 36.88 36.58	in Met
Addition DRILLER I Yield Test Test Date 2001/09/07 Method of F Depth Wit	REPORTS DIS	Start Tim 12:00 AM val Air 1:00 as < 2 hour	OM TOP OF	CASING T	Depth FO GROUND LE	;	Sample Co	ECOVERY S	Submitted to Potability STAYED AT ken From (Dept	Sub- 120'. Ground Level th to water level Elapsed Time Minutes: Sec 0:00 1:00 2:00 3:00 4:00	Measurement Recovery (m) 54.86 49.07 42.67 36.88 36.58	in Metr

Contractor Certification		
Name of Journeyman responsible for drilling/construction of well UNKNOWN NA DRILLER	Certification No 1	
Company Name ALKEN BASIN DRILLING LTD.	Copy of Well report provided to owner	Date approval holder signed



Page: 2 / 2

2001 Wegmann Domestic Water Well Chemical Analysis Results (September 5, 2023)



Element 7217 Roper Road NW Edmonton, Alberta T6B 3J4, Canada T: +1 (780) 438-5522 Page 1 of 5

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Analytical Report

Bill To: Hydrogeological Consultants

17740 - 118 Avenue

Edmonton, AB, Canada

T5S 2W3
Attn: Accounts Payable

Sampled By: Scott Thompson

Company: HCL

Project ID: MR-0323.22

Project Name: County of Ponoka GW

Monitoring Gull Lake Area

1675279-4

Project Location: Gull Lake Area
LSD: Various Legal Locations
P.O.: 19729

P.O.: 19 Proj. Acct. code: Lot ID: 1675279
Control Number:

Date Received: Aug 29, 2023

Date Reported: Sep 5, 2023 Report Number: 2908486

Reference Number Sample Date

Sample Date August 29, 2023 **Sample Time** 13:35

Sample Location Wegmann Dom ww Sample Description M37490.034988 / 1.7°c

Sample Matrix Water

				Nominal Detection	Guideline	Guideline
Analyte		Units	Result	Limit	Limit	Comments
Physical and Aggregate F	Properties					
Colour	Apparent, Potable	Colour units	<5	5	15	Below AO
Turbidity		NTU	0.4	0.1	0.1/0.3/1.0 OG	
Routine Water						
pН			8.55	1	7.0-10.5	Within OG Range
Temperature of observed pH		°C	20.8			
Electrical Conductivity	at 25 °C	μS/cm	1080	1		
Calcium	Extractable	mg/L	4.0	0.2		
Magnesium	Extractable	mg/L	0.9	0.2		
Sodium	Extractable	mg/L	277	0.4	200	Above AO
Potassium	Extractable	mg/L	0.8	0.4		
Iron	Extractable	mg/L	0.01	0.01	0.3	Below AO
Manganese	Extractable	mg/L	<0.005	0.005	0.02 AO; 0.12 MAC	Below AO
Chloride	Dissolved	mg/L	0.6	0.4	250	Below AO
Fluoride		mg/L	0.34	0.05	1.5	Below MAC
Nitrate - N		mg/L	<0.01	0.01	10	Below MAC
Nitrite - N		mg/L	<0.005	0.005	1	Below MAC
Nitrate and Nitrite - N		mg/L	<0.01	0.01	10	Below MAC
Sulfate (SO4)	Extractable	mg/L	84.1	0.9	500	Below AO
Hydroxide		mg/L	<5			
Carbonate		mg/L	21			
Bicarbonate		mg/L	597			
P-Alkalinity	as CaCO3	mg/L	18	5		
T-Alkalinity	as CaCO3	mg/L	526	5		
Total Dissolved Solids		mg/L	683	1	500	Above AO
Hardness	as CaCO3	mg/L	14			
Ionic Balance		%	101			

Approved by:

Anthony Weumann, MSc
General Manager

Data have been validated by Analytical Quality Control and Element's Integrated Data Validation System (IDVS).

Generation and distribution of the report, and approval by the digitized signature above, are performed through a secure and controlled automatic process

Lot ID: 1675279

Date Received: Aug 29, 2023

Date Reported: Sep 5, 2023

Report Number: 2908486



Element 7217 Roper Road NW Edmonton, Alberta T6B 3J4, Canada T: +1 (780) 438-5522 F: +1 (780) 434-8586 E: info.Edmonton@element.com

W: www.element.com

Control Number:

Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue

Edmonton, AB, Canada

Edmonton, AB, Canada

T5S 2W3

Attn: Accounts Payable Sampled By: Scott Thompson

Company: HCL

Project ID: MR-0323.22

Project Name: County of Ponoka GW

Monitoring Gull Lake Area

Project Location: Gull Lake Area
LSD: Various Legal Locations

P.O.: 19729

Proj. Acct. code:

Units	Measured	Lower Limit	Upper Limit	Passed
NTU	0.094	-0.1	0.1	
August 31, 2023				
NTU	0.119	0.0	0.1	
August 31, 2023				
Units	Measured	Lower Limit	Upper Limit	Passed
NTU	1940	1799.3	2005.7	
August 31, 2023				
NTU	5580	4441.7	6661.7	
August 31, 2023				
Colour units	10	10	10	,
NTU	149	132.1	162.1	
August 31, 2023				
NTU	14.3	12.6	15.6	
August 31, 2023				
NTU	1.7	1.0	2.2	,
				•
=	Renlicate 1	Renlicate 2	% RSD Criteria	Absolute Criteria Passed
	•	•		0.2
August 31, 2023				
Units	Measured	Lower Limit	Upper Limit	Passed
	0.22	-0.4	0.4	. 45554
mg/L	0	-0.05	0.05	
mg/L	0.0083299	-0.01	0.01	· ·
mg/L	0	-0.005	0.005	
mg/L	0.0761978	-0.1	0.1	
mg/L	0.0194014	-0.1	0.1	
mg/L	0.102083	-0.4	0.3	:
mg/L	0.104134		0.3	:
•				!
•				
· ·	0.000828697	-0.003	0.003	
August 31, 2023				
Units	Measured	Lower Limit	Upper Limit	Passed
•	2020	1847.4	2256.0	!
August 31, 2023				
tivity dS/m	32.2	27.200	36.800	
•				
August 30, 2023				
•	9.15	8.90	9.44	
	NTU August 31, 2023	NTU 0.094 August 31, 2023	NTU 0.094 -0.1 August 31, 2023 NTU 0.119 0.0 August 31, 2023 Units Measured Lower Limit NTU 1940 1799.3 August 31, 2023 NTU 5580 4441.7 August 31, 2023 Colour units 10 10 NTU 149 132.1 August 31, 2023 NTU 14.3 12.6 August 31, 2023 NTU 14.3 12.6 August 31, 2023 NTU 1.7 1.0 August 31, 2023 NTU 1.7 1.0 August 31, 2023 NTU 1.7 2.0 August 31, 2023 Ilicates Units Replicate 1 NTU 0.2 0.2 August 31, 2023 Units Measured Lower Limit mg/L 0.0761978 -0.1 mg/L 0.0194014 -0.1 mg/L 0.0345156 -0.02 mg/L 0.00345156 -0.02 mg/L 0.000828697 -0.003 August 31, 2023 Units Measured Lower Limit mg/L 0.000828697 -0.003 August 31, 2023 Units Measured Lower Limit mg/L 0.000828697 -0.003	NTU



Lot ID: 1675279

Date Received: Aug 29, 2023

Date Reported: Sep 5, 2023

Report Number: 2908486



Element 7217 Roper Road NW Edmonton, Alberta T6B 3J4, Canada

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Control Number:

Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue

Edmonton, AB, Canada

T5S 2W3

Attn: Accounts Payable

Project ID: MR-0323.22

Project Name: County of Ponoka GW

Monitoring

Project Location: Gull Lake Area LSD: Various Legal Locations

P.O.: 19729

Sampled By: Scott Thompson Company: HCL		Proj. Acct. code:							
Routine Water - Continued									
Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC				
P-Alkalinity	mg/L	530	442	584	yes				
T-Alkalinity	mg/L	989	958	1059	yes				
Fluoride	mg/L	10.1	9.39	10.59	yes				
Nitrate - N	mg/L	10.2	9.03	11.13	yes				
Nitrite - N	mg/L	10.0	9.010	10.990	yes				
Nitrate and Nitrite - N	mg/L	20.2	19.10	20.90	yes				
Calcium	mg/L	253	230.0	260.0	yes				

1-Alkallilly	mg/L	303	330	1000		yes
Fluoride	mg/L	10.1	9.39	10.59		yes
Nitrate - N	mg/L	10.2	9.03	11.13		yes
Nitrite - N	mg/L	10.0	9.010	10.990		yes
Nitrate and Nitrite - N	mg/L	20.2	19.10	20.90		yes
Calcium	mg/L	253	230.0	260.0		yes
Magnesium	mg/L	98.2	92.4	103.0		yes
Sodium	mg/L	256	231.0	261.0		yes
Sulfur	mg/L	152	141.3	156.9		yes
Potassium	mg/L	258	229.0	259.0		yes
Iron	mg/L	9.94	9.27	10.23		yes
Manganese	mg/L	2.46	2.260	2.560		yes
Date Acquired: August	31, 2023					
рН		6.89	6.79	6.97		yes
Temperature of observed	°C	20.5	15.5	24.5		yes
Electrical Conductivity	dS/m	0.076	0.069	0.085		yes
P-Alkalinity	mg/L	59	28	72		yes
T-Alkalinity	mg/L	125	114	140		yes
Chloride	mg/L	83.1	74.9	86.9		yes
Fluoride	mg/L	4.88	4.56	5.22		yes
Nitrate - N	mg/L	4.85	4.37	5.33		yes
Nitrite - N	mg/L	4.86	4.370	5.330		yes
Nitrate and Nitrite - N	mg/L	9.72	8.80	10.60		yes
Date Acquired: August	31, 2023					
Chloride	mg/L	15.6	13.3	16.5		yes
Fluoride	mg/L	0.49	0.45	0.57		yes
Nitrate - N	mg/L	0.51	0.42	0.57		yes
Nitrite - N	mg/L	0.500	0.455	0.557		yes
Nitrate and Nitrite - N	mg/L	1.01	0.85	1.15		yes
Calcium	mg/L	5.2	4.6	5.7		yes
Magnesium	mg/L	2.1	1.9	2.2		yes
Sodium	mg/L	5.2	4.7	5.7		yes
Sulfur	mg/L	3.1	2.7	3.2		yes
Potassium	mg/L	5.2	4.5	5.5		yes
Iron	mg/L	0.20	0.18	0.24		yes
Manganese	mg/L	0.051	0.046	0.058		yes
Date Acquired: August	31, 2023					
lient Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
pH		5.71	5.64	0	0.10	yes
Electrical Conductivity	dS/m	0.023	0.023	10	0.002	yes
Hydroxide	mg/L	<5	<5	10		yes
Carbonate	mg/L	<6	<6	10	6	yes

es es yes mg/L mg/L 16 15 10 Bicarbonate yes







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Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue

Edmonton, AB, Canada

T5S 2W3

Attn: Accounts Payable Sampled By: Scott Thompson

Date Acquired: August 31, 2023

Company: HCL

Project ID: MR-0323.22

Project Name: County of Ponoka GW

Monitoring Gull Lake Area

Project Location: Gull Lake Area
LSD: Various Legal Locations

P.O.: 19729

Proj. Acct. code:

Lot ID: 1675279

Control Number:

Date Received: Aug 29, 2023
Date Reported: Sep 5, 2023
Report Number: 2908486

outine Water - Continu	ued					
Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed Q0
P-Alkalinity	mg/L	<5	<5	10	5	yes
T-Alkalinity	mg/L	13	12	10	5	yes
Chloride	mg/L	<0.4	<0.4	10	0.5	yes
Fluoride	mg/L	1.21	1.21	10	0.05	yes
Nitrate - N	mg/L	<0.01	<0.01	10	0.01	yes
Nitrite - N	mg/L	< 0.005	< 0.005	10	0.010	yes
Calcium	mg/L	1.5	1.4	10	0.6	yes
Magnesium	mg/L	0.2	0.2	10	0.4	yes
Sodium	mg/L	232	229	10	1.2	yes
Sulfur	mg/L	18.9	18.7	10	0.1	yes
Potassium	mg/L	0.4	0.5	10	1.2	yes
Iron	mg/L	0.11	0.08	10	0.05	yes
Manganese	mg/L	<0.005	< 0.005	10	0.010	yes







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Methodology and Notes

Bill To: Hydrogeological Consultants

17740 - 118 Avenue

Edmonton, AB, Canada

T5S 2W3

Attn: Accounts Payable Sampled By: Scott Thompson

Company: HCL

Project ID: MR-0323.22

Project Name: County of Ponoka GW

Monitoring

Project Location: Gull Lake Area LSD: Various Legal Locations

P.O.: 19729

Proj. Acct. code:

Lot ID: 1675279

Control Number:

Date Received: Aug 29, 2023 Date Reported: Sep 5, 2023 Report Number: 2908486

Method of Analysis				
Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* Alkalinity - Titration Method, 2320 B	Aug 30, 2023	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	Aug 30, 2023	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Aug 30, 2023	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	 * Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B 	Aug 31, 2023	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	Sep 1, 2023	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-CI-E	Aug 31, 2023	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	Aug 31, 2023	Element Edmonton - Roper Road
Metals Trace (Extractable) in water	APHA	Hardness by Calculation, 2340 B	Aug 31, 2023	Element Edmonton - Roper Road
Metals Trace (Extractable) in water	APHA	 * Inductively Coupled Plasma (ICP) Method, 3120 B 	Aug 31, 2023	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	Aug 31, 2023	Element Edmonton - Roper Road

^{*} Reference Method Modified

References

APHA Standard Methods for the Examination of Water and Wastewater

Guidelines

Guideline Description Health Canada GCDWQ

Guidelines for Canadian Drinking Water Quality, Health Canada, Sept 2020 Guideline Source

Guideline Comments MAC = Maximum Acceptable Concentration

AO = Aesthetic Objective

OG = Operational Guideline for Water Treatment Plants

(does not apply to private groundwater wells).

Refer to Health Canada for complete guidelines at www.hc-sc.gc.ca

Comments:

• Aug 30, 2023 - Sample 1675279-4; 8807138: Sample received at 1.7°c

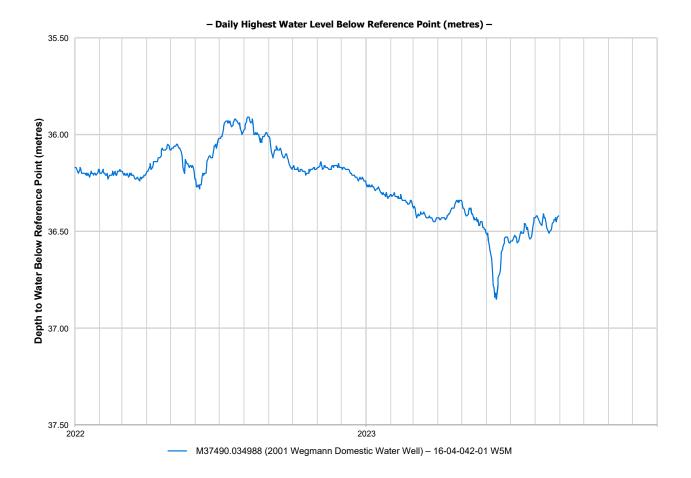
The comparison of test results to guideline limits is provided for information purposes only. This is not to be taken as a statement of conformance / nonconformance to any guideline, regulation or limit. The data user is responsible for all conclusions drawn with respect to the data and is advised to consult official regulatory references when evaluating compliance.

Please direct any inquiries regarding this report to our Client Services group. Results relate only to samples as submitted.

The test report shall not be reproduced except in full, without the written approval of the laboratory.



2001 Wegmann Domestic Water Well 2022 - 2023 Hydrograph



2004 Water Source Well - Meridian Beach 1

08-12-042-01 W5M

(M39227.478953)



Well Spatial Location:

Easting: **67,275**Northing: **5,825,894**

(spatial accuracy HCL GPS — 10TM Resource NAD83)

Ground Elevation AMSL (m): 905.4

(elevation accuracy Surveyed (other))

Date Completed: April 22, 2004

Depth Drilled (m): 30.5

Completion Interval (m): 18.3 - 24.4 *

(* TGWC determined value)

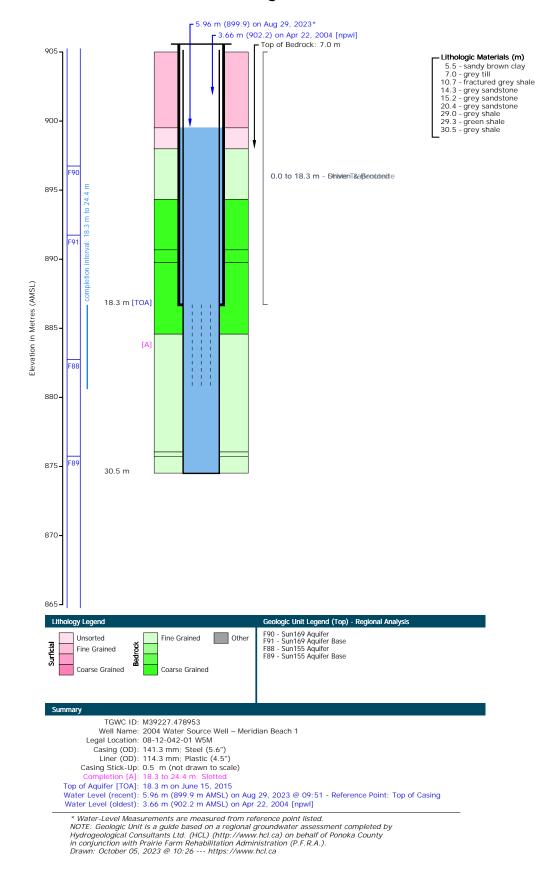
Earliest Water Level (m): 3.66 - April 22, 2004

Most Recent Water Level (m): 5.96 - August 29, 2023 @ 09:51

GIC ID: 1035048



2004 Water Source Well - Meridian Beach 1 Water Well Diagram



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Owner: Horner, Norval/Inshore Developments 209 Scarboro Avenue SW, Calgary, AB T3C 2H4

Contractor: Aero Drilling & Consulting Ltd. Name: 2004 Water Source Well - Meridian Beach 1

Field Action: Confirmed - Physically, May 18, 2011

Work Type: New Well Drilling Method: Rotary Proposed Use: Municipal Completion Type: Casing/Perforated Liner

Depth Completed (m)*: 24.4

Depth Drilled (m): 30.5

Date Started: April 22, 2004 Date Completed: April 22, 2004 Well Status: Producing

Completion Interval (m): 18.3 - 24.4 *

Feature Class: Water Well Top of Bedrock (m): 7.01 *

Completion Aquifer: Dalehurst Member

Most Recent Water Level (m): 5.96 m - August 29, 2023

Surface Casing: Steel - 141.3 mm (O.D.) x 6.60 mm (thick) x 18.3 m (bottom) Liner: Plastic - 114.3 mm (O.D.) x 6.00 mm (thick); Top: 0.0 (m); Bottom: 30.5 (m)

Intervals

Slotted: 18.3 to 24.4 m - 0.200 Inches - Method: Machine

Shale Trap: 0.0 to 18.3 m Driven & Bentonite: 0.0 to 18.3 m Driven & Grouted: 0.0 to 18.3 m

Chemistry Summary Details (mg/L, except as noted)

Sampling Details: August 29, 2023 @ 09:10

Analysis Date: September 5, 2023 - Element Materials Technology Canada Inc. (1675279-1) Constituent Result Conductivity (µS/cm): 892 Total Dissolved Solids: 571 Hardness (as CaCO3): 186.0 T-Alkalinity (as CaCO3): 464 P-Alkalinity (as CaCO3): < 5 Nitrate + Nitrite as N: 0.04

Temperature (°C): 20.6

Total Suspended Solids:

Sulfate: 55.5

Constituent Result Nitrate as N: 0.04 Nitrite as N: < 0.005 pH (pH Unit): 7.83 Colour (TCU): 5 Ion Balance (%): 93
Total Coliforms:**: Fecal Coliforms:**: Escherichia coli:**:

Constituent Result Turbidity (NTU):0.3 Fluoride:0.10 Carbonate: < 6 Bicarbonate:566 Hvdroxide: < 5 Total Iron: Total Mn:

(recently sampled first)

Constituent Extractable Dissolved Calcium: 37.2 Chloride: Iron: 0.21 Manganese: 0.043 Aluminum: Arsenic: Barium: Beryllium: Cadmium: Chromium: Cobalt:

Constituent Extractable Dissolved Mercury: Molybdenum Magnesium: 22.7 Sodium: 151 Potassium: 2.3 Vanadium: Dissolved Strontium: Nickel: Zinc: Copper: Lead: Uranium:

Comments: Sample collected by Hydrogeological Consultants Ltd. personnel.

Note: Constituents have been compared to the maximum acceptable concentration, Health Canada. 2022. Guidelines for Canadian Drinking Water Quality – Summary Tables. Water and Air Quality Bureau, Healthy 28180; 1 / 1 Environments and Consumer Safety Branch. Health Canada. Ottawa. Ontario.

METRIC REPORT

905.4***

Easting (m): 67.275.00 5,825,894.00 ** Northing (m):

Elevation (m): Lot: Block: Plan:

Presence of Gas: No

08-12-042-01 W5M

M39227.478953

528180; 1349050; core

Elog Taken: No Gamma Taken: No Flowing: No

Stick Up (m): 0.5

Lithology D	etails		
Elevation	Depth		
(AMSL)	(BGL)		Lithology Descriptions
899.9	5.5	Sandy Brown Clay	
898.4	7.0	Grey Till	
894.7	10.7	Fractured Grey Shale	
891.1	14.3	Grey Sandstone	
890.2	15.2	Grey Sandstone	
885.0	20.4	Grey Sandstone	
876.5	29.0	Grey Shale	
876.1	29.3	Green Shale	
874.9	30.5	Grey Shale	

Comments & Observations

itial, Apr 22, 2004: Shale trap 4 x 5 at 60 feet. Perfs are milled slots

Date & Time	Testing Method / Type	Depth of Test Interval		(minutes) <u>Recovery</u>	Avg. Rate (Lpm)	NPWL (metres)	<u>Drawdown</u> (metres)	Pump (metres)	Q20 (m³/day)* <u>Apparent</u> <u>Effective</u>		smissivity Aquifer E	(m²/day)* <u>Effective</u>
2015-06-15 11:20	OBSERVATION	18.3 to 24.4	4.320	2.890		4.6	1.5				174	174
2 2004-04-26 12:00	Pump	18.3 to 24.4	2.880	70	150.0	3.0	7.5	_	261.9	45.3		
1 2004-04-22	Air	18.3 to 24.4	120	120	272.8	3.7	26.8	_	101.8	18.3		

GIC ID: 1035048

GIC (WellReportId): 10820026

* The Groundwater Centre (TGWC) calculated or determined value. * HCL GPS — 10TM Resource NAD83 *** Surveyed (other) — {Ground; AMSL}

Created on: October 05, 2023 — Data "AS IS"; no warranty either expressed or implied. [52.599885 -114.006294 (WGS 84)], INT Date End: 2099-12-31



2004 Water Source Well - Meridian Beach 1 AEPA - Water Well Drilling Report



Water Well Drilling Report

View in Imperial Export to Excel 1035048

Measurement in Metric

GIC Well ID GoA Well Tag No. Drilling Company Well ID

The driller supplies the data contained in this report. The Province disclaims responsibility for its accuracy. The information on this report will be retained in a public database. GOWN ID Date Report Received Well Identification and Location Measurement in Metric Owner Name Address Province Country Postal Code Town HORNER, NORVAL/INSHORE 209 SCARBORO AVE SW CALGARY ALBERTA CA T3C 2H4 Location 1/4 or LSD TWP RGE Lot Additional Description SE 12 42 #2 MAIN GPS Coordinates in Decimal Degrees (NAD 83) Measured from Boundary of Longitude -114.007878 Latitude 52.599615 Elevation m from How Elevation Obtained How Location Obtained m from Not Verified Not Obtained Drilling Information

Type of Work Method of Drilling Rotary New Well Proposed Well Use Industrial

Yield Test Summary

Formation Log			Measurement in Metric
Depth from ground level (m)	Water Bearing	Lithology Description	
5.49		Brown Sandy Clay	
7.01		Gray Till	
10.67		Gray Fractured Shale	
14.33		Gray Sandstone	
15.24		Gray Sandstone	
20.42		Gray Sandstone	
28.96		Gray Shale	
29.26		Green Shale	
30.48		Gray Shale	

Recommended Pump Rate272.77 L/min								
		emoval Rate		Static Water Level (m)				
2004/04/22		272.77		3.66				
Well Completi	on			ľ	Measurement in Met	ric		
Total Depth Dri	lled Finish	ed Well Depti		art Date End Date				
30.48 m			2004/04/22 2004/04/22					
Borehole								
	(cm)		n (m)		To (m)			
12.70		0.			30.48			
Surface Casing Steel		•	Plastic	asing/Lin				
	D: <u>1</u>				: 11.43 cm			
			Wall 7		0.602 cm			
Bottom a	at :1	8.29 m			0.00 m			
Perforations			I	Bottom at	30.48 m			
From (m) 18.29	To (m) 24.38	Diameter or Slot Width (cm) 0.508	Slot Lo (cr	ength n)	Hole or Slot Interval(cm)			
Annular Seal Placed from	Perforated by Machine Annular Seal Driven & Bentonite Placed from							
	Screen Type Slotted PVC Size OD: 11.43 cm							
From (r			(m)		Slot Size (cm)			
18.29		24	.38		0.508			
	Unknow		Potto	m Eittinaa	Linknown			
	Top Fittings Unknown				Unknown			
Pack								
Type Unkno		Grain	Size					
Amount	U	nknown						

272.77 L/min

<u> </u>		
Contractor Certification		
Name of Journeyman responsible for drilling/construction of well SHAWN CROWELL	Certification No 18687A	
Company Name AERO DRILLING & CONSULTING LTD.	Copy of Well report provided to owner	Date approval holder signed

Printed on 10/5/2023 10:25:19 AM Page: 1 / 2





Water Well Drilling Report

View in Imperial Export to Excel

1035048

GIC Well ID GoA Well Tag No. Drilling Company Well ID

The driller supplies the data contained in this report. The Province disclaims responsibility for its accuracy. The information on this report will be retained in a public database.

JVVIN ID										Date Report Recen	veu
Well Identifica	ation and Lo	ocation									Measurement in Me
Owner Name HORNER, NOF DEV	RVAL/INSHO	RE	Address 209 SCARE	BORO AVE	SW	Town CALG			Province ALBERTA		Postal Cod T3C 2H4
	1/4 or LSD SE	SEC 12	TWP 42	RGE 1	W of MER 5			-	#2 MAII	al Description	
Measured from		m from m from			GPS Coording Latitude 5 How Location Not Verified	2.599615	U			Elevation How Elevation Ob Not Obtained	
Additional Info	ormation										Measurement in Me
Distance From Is Artesian Fl	low				91.44 cm	l:					
Recommende			<u> </u>		272.77 L/min	Disease	Inotallad	Describe		Danth	
			(F TOO)		2/2.// L/min	Pump	installed_		1.4-1	Depth	
Recommenae	a Pump Intar	te Deptn	(From TOC)		21.34 M	. Type			wake		H.P.
											Rating)
Did you Enc	counter Saline	Water (:	>4000 ppm Tl	OS)	Depth		m	Well Disin	fected Upon	Completion Taken	
				as	 Depth		m	Geo	physical Log	Taken	
Remedial A	ction Taken				_				Submitted to		
	Comments on		O SHALE TRA	.P 4X5 AT (60 FT. PERFS /	ARE MILLE				Subi	mitted to ESRD Measurement in Me
		O44 Ti-		01-11-	M/=t==L===L			1 4.		to water level	moded on one in the
Test Date 2004/04/22		Start Tin 12:00 Al		Static	Water Level 3.66 m		Pum	nping (m)		apsed Time Iinutes:Sec	Recovery (m)
										0:00	30.48
Method of Wa										1:00	12.50
	Type Ai					_				2:00	5.79
Rem	noval Rate	2	72.77 L/min							3:00 4:00	4.57 3.96
Depth Withdra	awn From		30.48 m							5:00	3.66
										6:00	3.66
If water remov	al period was	s < 2 hou	ırs, explain wh	У						7:00	3.66
										10:00	3.66
								30.48		120:00	3.66
Water Diverte	ed for Drillin	g									
Water Source				Amo	unt Taken				Diversion	n Date & Time	
				7.1110	L				211013101	. 20.0 0 111110	

Conf	tractor	Certif	fication	1

Name of Journeyman responsible for drilling/construction of well SHAWN CROWELL

Company Name
AERO DRILLING & CONSULTING LTD.

Certification No

Copy of Well report provided to owner Date approval holder signed

Page: 2 / 2 Printed on 10/5/2023 10:25:19 AM

2004 Water Source Well - Meridian Beach 1 Chemical Analysis Results (September 5, 2023)



Element 7217 Roper Road NW Edmonton, Alberta T6B 3J4, Canada

Page 1 of 5 T: +1 (780) 438-5522 F: +1 (780) 434-8586

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Analytical Report

Bill To: Hydrogeological Consultants

17740 - 118 Avenue Edmonton, AB, Canada

Attn: Accounts Payable

Sampled By: Scott Thompson

Company: HCL

Project ID: MR-0323.22

Project Name: County of Ponoka GW

Monitoring Gull Lake Area

1675279-1

Project Location: LSD: Various Legal Locations

P.O.: 19729

Proj. Acct. code:

Lot ID: 1675279 Control Number:

Date Received: Aug 29, 2023 Date Reported: Sep 5, 2023

Report Number: 2908483

Reference Number Sample Date

August 29, 2023 Sample Time 09:10

Sample Location Meridian Beach #1 Sample Description M39227.478953 / 1.7°c

> Sample Matrix Water

				Nominal Detection	Guideline	Guideline
Analyte		Units	Result	Limit	Limit	Comments
Physical and Aggregate F	Properties					
Colour	Apparent, Potable	Colour units	5	5	15	Below AO
Turbidity		NTU	0.3	0.1	0.1/0.3/1.0 OG	
Routine Water						
рН			7.83	1	7.0-10.5	Within OG Range
Temperature of observed pH		°C	20.6			
Electrical Conductivity	at 25 °C	μS/cm	892	1		
Calcium	Extractable	mg/L	37.2	0.2		
Magnesium	Extractable	mg/L	22.7	0.2		
Sodium	Extractable	mg/L	151	0.4	200	Below AO
Potassium	Extractable	mg/L	2.3	0.4		
Iron	Extractable	mg/L	0.21	0.01	0.3	Below AO
Manganese	Extractable	mg/L	0.043	0.005	0.02 AO; 0.12 MAC	Above AO
Chloride	Dissolved	mg/L	23.9	0.4	250	Below AO
Fluoride		mg/L	0.10	0.05	1.5	Below MAC
Nitrate - N		mg/L	0.04	0.01	10	Below MAC
Nitrite - N		mg/L	< 0.005	0.005	1	Below MAC
Nitrate and Nitrite - N		mg/L	0.04	0.01	10	Below MAC
Sulfate (SO4)	Extractable	mg/L	55.5	0.9	500	Below AO
Hydroxide		mg/L	<5			
Carbonate		mg/L	<6			
Bicarbonate		mg/L	566			
P-Alkalinity	as CaCO3	mg/L	<5	5		
T-Alkalinity	as CaCO3	mg/L	464	5		
Total Dissolved Solids		mg/L	571	1	500	Above AO
Hardness	as CaCO3	mg/L	186.0			
Ionic Balance		%	93			

Approved by:

tothery Weuman Anthony Neumann, MSc General Manager

Data have been validated by Analytical Quality Control and Element's Integrated Data Validation System (IDVS).

Generation and distribution of the report, and approval by the digitized signature above, are performed through a secure and controlled automatic process



Lot ID: 1675279



Element 7217 Roper Road NW Edmonton, Alberta T6B 3J4, Canada T: +1 (780) 438-5522 F: +1 (780) 434-8586 E: info.Edmonton@element.com W: www.element.com

Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue

Edmonton, AB, Canada

Edmonton, AB, Canada T5S 2W3

Attn: Accounts Payable

Sampled By: Scott Thompson

Company: HCL

Project ID: MR-0323.22

Project Name: County of Ponoka GW

Monitoring Gull Lake Area

Project Location: Gull Lake Area
LSD: Various Legal Locations

P.O.: 19729

Proj. Acct. code:

oka GW	Control Number:	
	Date Received:	Aug 29, 2023
_ocations	Date Reported:	Sep 5, 2023
2004110110	Report Number:	2908483

-	-					_
-				• •		Passed QC
		0.094	-0.1	0.1		yes
August 31, 2	2023					
N.	TU	0.119	0.0	0.1		yes
August 31, 2	2023					
U	nits	Measured	Lower Limit	Upper Limit		Passed QC
N ⁻	TU	1940	1799.3	2005.7		yes
August 31, 2	2023					
N ⁻	TU	5580	4441.7	6661.7		yes
August 31, 2	2023					
C	olour units	10	10	10		yes
N ⁻	TU	149	132.1	162.1		yes
August 31, 2	2023					
N.	TU	14.3	12.6	15.6		yes
August 31, 2	2023					
N'	TU	1.7	1.0	2.2		yes
August 31, 2	2023					-
icates U	nits	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
		0.2	0.2	10	0.2	yes
August 31, 2	2023					
U	nits	Measured	Lower Limit	Upper Limit		Passed QC
m	g/L	0.22	-0.4	0.4		yes
m	g/L	0	-0.05	0.05		yes
m	g/L	0.0083299	-0.01	0.01		yes
m	g/L	0				yes
	•					yes
	•					yes
	•					yes
	•					yes
	•					yes yes
	•					yes
	•	0.000020007	0.000	0.003		you
		Magaurad	Lower Limit	Unner Limit		Passed QC
						yes
	•	2020	1047.4	2230.0		yes
		22.2	27 200	20,000		
ivity dS	D/111	32.2	21.200	36.800		yes
A	2022					
August 30, 2	2023					
August 30, 2		9.15 20.7	8.90 15.5	9.44 24.5		yes yes
	August 31, 2 N August 31, 2 Icates U m m m m m m m m m m m m m m m m m	NTU August 31, 2023 Units mg/L mg/L mg/L mg/L mg/L mg/L mg/L mg/L	Units Measured NTU 0.094 August 31, 2023 0.119 August 31, 2023 0.119 Units Measured NTU 1940 August 31, 2023 0.000 August 31, 2023 0.000 NTU 14.3 August 31, 2023 0.01 NTU 1.7 August 31, 2023 0.22 Icates Units Replicate 1 NTU 0.2 August 31, 2023 0.0083299 mg/L 0.0083299 mg/L 0.0761978 mg/L 0.0194014 mg/L 0.102083 mg/L 0.104134 mg/L 0.233221 mg/L 0.00345156 mg/L 0.000828697 August 31, 2023 Units Measured mg/L 0.000828697 August 31, 2023 Units Measured	Units NTU 0.094 -0.1	Units NTU Measured 0.094 Lower Limit -0.1 Upper Limit 0.1 August 31, 2023 NTU 0.119 0.0 0.1 August 31, 2023 Units Measured NTU Lower Limit 1940 Upper Limit 1993 Upper Limit 2005.7 August 31, 2023 NTU 5580 4441.7 6661.7 August 31, 2023 10 10 10 10 NTU 149 132.1 162.1 162.1 August 31, 2023 NTU 1.7 1.0 2.2 August 31, 2023 NTU 0.2 9.2 % RSD Criteria NTU 0.2 0.2 % RSD Criteria 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	Units Measured Lower Limit Upper Limit NTU 0.094 -0.1 0.1 0.1





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Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue

Edmonton, AB, Canada

T5S 2W3

Attn: Accounts Payable Sampled By: Scott Thompson

Company: HCL

Project ID: MR-0323.22

Project Name: County of Ponoka GW

Monitoring Gull Lake Area

Project Location: Gull Lake Area
LSD: Various Legal Locations

P.O.: 19729

Proj. Acct. code:

Lot ID: 1675279

Control Number:

Date Received: Aug 29, 2023
Date Reported: Sep 5, 2023
Report Number: 2908483

Control Sample	Units	Measured	Lower Limit	Upper Limit		Passed Q
P-Alkalinity	mg/L	530	442	584		1 40004 \
T-Alkalinity	mg/L	989	958	1059		, \
Fluoride	mg/L	10.1	9.39	10.59		,
Nitrate - N	mg/L	10.2	9.03	11.13		,
Nitrite - N	mg/L	10.0	9.010	10.990		,
Nitrate and Nitrite - N	mg/L	20.2	19.10	20.90		,
Calcium	mg/L	253	230.0	260.0		,
Magnesium	mg/L	98.2	92.4	103.0		,
Sodium	mg/L	256	231.0	261.0		,
Sulfur	mg/L	152	141.3	156.9		,
Potassium	mg/L	258	229.0	259.0		,
Iron	mg/L	9.94	9.27	10.23		•
Manganese	mg/L	2.46	2.260	2.560		,
•	st 31, 2023	2.10	2.200	2.000		
	1 31, 2023					
pH		6.89	6.79	6.97		
Temperature of observed		20.5	15.5	24.5		
Electrical Conductivity	dS/m	0.076	0.069	0.085		
P-Alkalinity	mg/L	59	28	72		
T-Alkalinity	mg/L	125	114	140		
Chloride	mg/L	83.1	74.9	86.9		
Fluoride	mg/L	4.88	4.56	5.22		
Nitrate - N	mg/L	4.85	4.37	5.33		
Nitrite - N	mg/L	4.86	4.370	5.330		
Nitrate and Nitrite - N	mg/L	9.72	8.80	10.60		
Date Acquired: Augus	t 31, 2023					
Chloride	mg/L	15.6	13.3	16.5		
Fluoride	mg/L	0.49	0.45	0.57		
Nitrate - N	mg/L	0.51	0.42	0.57		
Nitrite - N	mg/L	0.500	0.455	0.557		
Nitrate and Nitrite - N	mg/L	1.01	0.85	1.15		
Calcium	mg/L	5.2	4.6	5.7		
Magnesium	mg/L	2.1	1.9	2.2		
Sodium	mg/L	5.2	4.7	5.7		
Sulfur	mg/L	3.1	2.7	3.2		
Potassium	mg/L	5.2	4.5	5.5		
Iron	mg/L	0.20	0.18	0.24		
Manganese	mg/L	0.051	0.046	0.058		
Date Acquired: Augus	st 31, 2023					
Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed
pH	Omis	5.71	5.64	% KSD Citteria	0.10	rasseu
Electrical Conductivity	dS/m	0.023	0.023	10	0.002	
Hydroxide	mg/L	0.023 <5	0.023 <5	10	0.002	
Carbonate	•	<5 <6	<5 <6	10	6	
Carbonate	mg/L	<6 16	<0	10	6	







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Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue

Edmonton, AB, Canada

T5S 2W3

Attn: Accounts Payable Sampled By: Scott Thompson

Company: HCL

Project ID: MR-0323.22

Project Name: County of Ponoka GW

Monitoring

Project Location: Gull Lake Area
LSD: Various Legal Locations

P.O.: 19729

Proj. Acct. code:

Lot ID: 1675279

Control Number:

Date Received: Aug 29, 2023
Date Reported: Sep 5, 2023
Report Number: 2908483

Routine Water - Contini	ued					
Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed Q0
P-Alkalinity	mg/L	<5	<5	10	5	yes
T-Alkalinity	mg/L	13	12	10	5	yes
Chloride	mg/L	<0.4	<0.4	10	0.5	yes
Fluoride	mg/L	0.11	0.12	10	0.05	yes
Nitrate - N	mg/L	<0.01	<0.01	10	0.01	yes
Nitrite - N	mg/L	< 0.005	< 0.005	10	0.010	yes
Calcium	mg/L	1.5	1.4	10	0.6	yes
Magnesium	mg/L	0.2	0.2	10	0.4	yes
Sodium	mg/L	232	229	10	1.2	yes
Sulfur	mg/L	18.9	18.7	10	0.1	yes
Potassium	mg/L	0.4	0.5	10	1.2	yes
Iron	mg/L	0.11	0.08	10	0.05	yes
Manganese	mg/L	<0.005	<0.005	10	0.010	yes

Date Acquired: August 31, 2023





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Methodology and Notes

Bill To: Hydrogeological Consultants

17740 - 118 Avenue

Edmonton, AB, Canada

T5S 2W3

Attn: Accounts Payable Sampled By: Scott Thompson

Sampled By: Scott The Company: HCL

Project ID: MR-0323.22

Project Name: County of Ponoka GW

Monitoring

Project Location: Gull Lake Area
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P.O.: 19729

Proj. Acct. code:

Lot ID: 1675279

Control Number:

Date Received: Aug 29, 2023
Date Reported: Sep 5, 2023
Report Number: 2908483

Method of Analysis				
Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* Alkalinity - Titration Method, 2320 B	Aug 30, 2023	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	Aug 30, 2023	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Aug 30, 2023	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	 * Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B 	Aug 31, 2023	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	Sep 1, 2023	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-CI-E	Aug 31, 2023	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	Aug 31, 2023	Element Edmonton - Roper Road
Metals Trace (Extractable) in water	APHA	Hardness by Calculation, 2340 B	Aug 31, 2023	Element Edmonton - Roper Road
Metals Trace (Extractable) in water	APHA	 * Inductively Coupled Plasma (ICP) Method, 3120 B 	Aug 31, 2023	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	Aug 31, 2023	Element Edmonton - Roper Road

^{*} Reference Method Modified

References

APHA Standard Methods for the Examination of Water and Wastewater

Guidelines

Guideline Description Health Canada GCDWQ

Guideline Source Guidelines for Canadian Drinking Water Quality, Health Canada, Sept 2020

Guideline Comments MAC = Maximum Acceptable Concentration

AO = Aesthetic Objective

OG = Operational Guideline for Water Treatment Plants

(does not apply to private groundwater wells).

Refer to Health Canada for complete guidelines at www.hc-sc.gc.ca

Comments:

• Aug 30, 2023 - Sample 1675279-1; 8807135: Sample received at 1.7°c

The comparison of test results to guideline limits is provided for information purposes only. This is not to be taken as a statement of conformance / nonconformance to any guideline, regulation or limit. The data user is responsible for all conclusions drawn with respect to the data and is advised to consult official regulatory references when evaluating compliance.

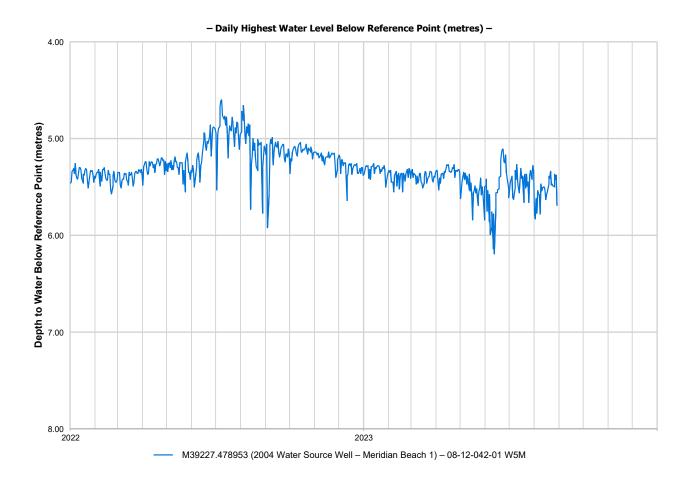
Please direct any inquiries regarding this report to our Client Services group.

Results relate only to samples as submitted.

The test report shall not be reproduced except in full, without the written approval of the laboratory.



2004 Water Source Well - Meridian Beach 1 2022 - 2023 Hydrograph





2004 Water Source Well - Meridian Beach 2

08-12-042-01 W5M

(M39227.478952)



Well Spatial Location:

Easting: **67,302**Northing: **5,825,900**

(spatial accuracy HCL GPS — 10TM Resource NAD83)

Ground Elevation AMSL (m): 905.3

(elevation accuracy Surveyed (other))

Date Completed: April 21, 2004

Depth Drilled (m): 30.5

Completion Interval (m): 18.3 - 24.4 *

(* TGWC determined value)

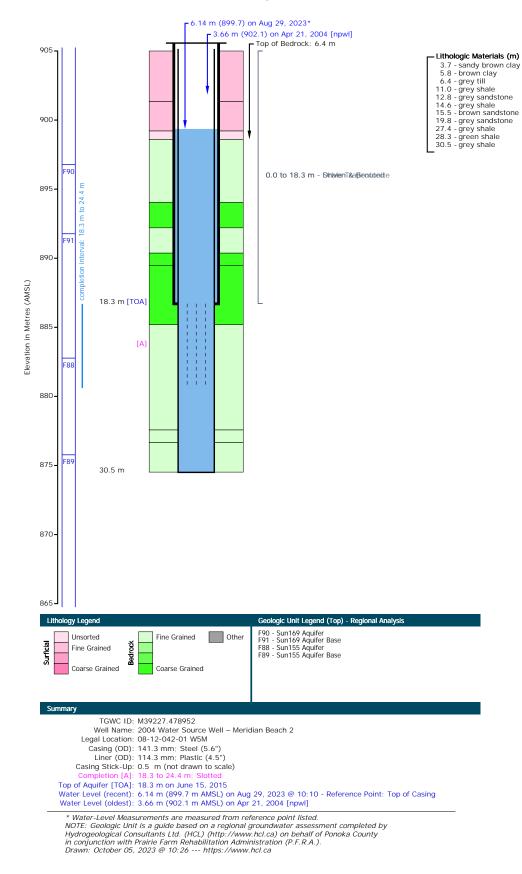
Earliest Water Level (m): 3.66 - April 21, 2004

Most Recent Water Level (m): 6.14 - August 29, 2023 @ 10:10

GIC ID: 1035047



2004 Water Source Well - Meridian Beach 2 Water Well Diagram



do not copy, cite, or distribute without the express written consent of The Groundwater Centre, a division of hydrogeological consultants Itd.



Owner: Horner, Norval/Inshore Developments 209 Scarboro Avenue SW, Calgary, AB T3C 2H4

Contractor: Aero Drilling & Consulting Ltd. Name: 2004 Water Source Well - Meridian Beach 2

Field Action: Confirmed - Physically, May 18, 2011

Work Type: New Well Drilling Method: Rotary Proposed Use: Municipal Completion Type: Casing/Perforated Liner

Depth Completed (m)*: 24.4

Depth Drilled (m): 30.5

Date Started: April 21, 2004 Date Completed: April 21, 2004 Well Status: Producing

Completion Interval (m): 18.3 - 24.4 *

Feature Class: Water Well

Top of Bedrock (m): 6.40 *

Completion Aquifer: Dalehurst Member

Most Recent Water Level (m): 6.14 m - August 29, 2023

Surface Casing: Steel - 141.3 mm (O.D.) x 6.60 mm (thick) x 18.3 m (bottom) Liner: Plastic - 114.3 mm (O.D.) x 6.00 mm (thick); Top: 0.0 (m); Bottom: 30.5 (m)

Intervals

Slotted: 18.3 to 24.4 m - 0.375 x 0.375 Inches - Method: Hand Drill

Shale Trap: 0.0 to 18.3 m Driven & Bentonite: 0.0 to 18.3 m Driven & Grouted: 0.0 to 18.3 m

Chemistry Summary Details (mg/L, except as noted)

(recently sampled first) Sampling Details: August 29, 2023 @ 09:20

Constituent

Analysis Date: September 5, 2023 - Element Materials Technology Canada Inc. (1675279-2) Constituent Result Conductivity (µS/cm): 797 Total Dissolved Solids: 495 Hardness (as CaCO3): 331 T-Alkalinity (as CaCO3): 444 P-Alkalinity (as CaCO3): < 5 Nitrate + Nitrite as N: < 0.01 Total Suspended Solids:

Nitrate as N: < 0.01 Nitrite as N: < 0.005 pH (pH Unit): 7.64 Colour (TCU): 15 Ion Balance (%): 94
Total Coliforms:**: Fecal Coliforms:**: Escherichia coli:**:

Constituent Result Turbidity (NTU):0.5 Fluoride:0.08 Carbonate: < 6 Bicarbonate:541 Hvdroxide: < 5 Total Iron: Total Mn:

Constituent Extractable Dissolved Calcium: 60.6 Chloride: Iron: 0.48 Manganese: 0.067 Aluminum: Arsenic: Barium: Beryllium: Cadmium: Chromium: Cobalt:

Sulfate: 49.5

Temperature (°C): 20.6

Constituent Extractable Dissolved Mercury: Molybdenum Magnesium: 43.5 Sodium: 65.3 Potassium: 2.7 Vanadium: Dissolved Strontium: Nickel: Zinc: Copper: Lead: Uranium:

Result

Comments: Sample collected by Hydrogeological Consultants Ltd. personnel.

Note: Constituents have been compared to the maximum acceptable concentration, Health Canada. 2022. Guidelines for Canadian Drinking Water Quality – Summary Tables. Water and Air Quality Bureau, Healthy 28181: 1 / 1 Environments and Consumer Safety Branch. Health Canada. Ottawa. Ontario.

METRIC REPORT

30.5 Grey Shale

67.302.00 Easting (m): 5,825,900.00 ** Northing (m):

Elevation (m): 905.3*** Lot: Block: Plan:

Presence of Gas: No

08-12-042-01 W5M

M39227.478952 528181; 1349631; core

Elog Taken: No Gamma Taken: No Flowing: No

Stick Up (m): 0.5

Lithology D	etails	
Elevation	Depth	
(AMSL)	(BGL)	<u>Lithology Descriptions</u>
901.6	3.7	Sandy Brown Clay
899.5	5.8	Brown Clay
898.9	6.4	Grey Till
894.3	11.0	Grey Shale
892.5	12.8	Grey Sandstone
890.7	14.6	Grey Shale
889.8	15.5	Brown Sandstone
885.5	19.8	Grey Sandstone
877.9	27.4	Grey Shale
877.0	28.3	Green Shale

Comments & Observations

itial, Apr 21, 2004: Grouted Shale trap 4 x 5 at 60 feet.

Α	quifer Tests												
	Date & Time	Testing Method / Type	Depth of Test Interval		(minutes) Recovery	Avg. Rate (Lpm)	NPWL (metres)	<u>Drawdown</u> (metres)	Pump (metres)	Q20 (m³/day)* <u>Apparent</u> <u>Effective</u>			ity (m²/day)* <u>Effective</u>
	2015-06-15 11:20	OBSERVATION	18.3 to 24.4	4.320	2.890		4.8	1.4				157	157
	2004-04-26 12:00	OBSERVATION	18.3 to 24.4	2,880	70		3.2	1.2					
1	2004-04-21	Air	18.3 to 24.4	120	10	272.8	3.7	26.8	_	101.8	18.3		

Alias IDs

GIC ID: 1035047

GIC (WellReportId): 10819987

* The Groundwater Centre (TGWC) calculated or determined value. * HCL GPS — 10TM Resource NAD83 *** Surveyed (other) — {Ground; AMSL}

Created on: October 05, 2023 — Data "AS IS"; no warranty either expressed or implied. [52.599936 -114.005894 (WGS 84)], INT Date End: 2099-12-31



2004 Water Source Well - Meridian Beach 2 AEPA - Water Well Drilling Report



Water Well Drilling Report

View in Imperial Export to Excel 1035047

GIC Well ID GoA Well Tag No. Drilling Company Well ID

Alberta

The driller supplies the data contained in this report. The Province disclaims responsibility for its accuracy. The information on this report will be retained in a public database. **GOWN ID** Date Report Received Well Identification and Location Measurement in Metric Owner Name Address Province Postal Code Town Country HORNER, NORVAL/INSHORE 209 SCARBORO AVE SW CALGARY ALBERTA T3C 2H4 CA Location 1/4 or LSD TWP RGE Additional Description SE 12 42 #1 OBSERVATION GPS Coordinates in Decimal Degrees (NAD 83) Measured from Boundary of Latitude <u>52.59961</u>5 Longitude -114.007878 Flevation m from How Location Obtained How Elevation Obtained m from Not Verified Not Obtained **Drilling Information** Method of Drilling Type of Work New Well Rotary Proposed Well Use Industrial Yield Test Summary Formation Log Measurement in Metric Measurement in Metric 272.77 L/min Recommended Pump Rate Depth from Water Lithology Description ground level (m) Bearing Test Date Water Removal Rate (L/min) Static Water Level (m) 3.66 Brown Sandy Clay 2004/04/21 272.77 3.66 5.79 Brown Clay Well Completion Measurement in Metric 6.40 Gray Till Total Depth Drilled Finished Well Depth Start Date Fnd Date 30.48 m 2004/04/21 2004/04/21 10.97 Gray Shale 12.80 Gray Sandstone Diameter (cm) From (m) To (m) 14.63 Gray Shale 12.70 0.00 Brown Sandstone 15.54 Surface Casing (if applicable) Well Casing/Liner Gray Sandstone Plastic 19.81 Steel Size OD: Size OD: 14.13 cm 11.43 cm Gray Shale 27.43 0.655 cm Wall Thickness : 0.602 cm Wall Thickness: 28.35 Green Shale Bottom at : 18.29 m Top at: 0.00 m 30.48 Gray Shale 30.48 m Bottom at: Perforations Diameter or Slot Width Slot Length Hole or Slot To (m) From (m) (cm) (cm) Interval(cm) 18.29 24.38 0.953 0.95 Perforated by Hand Drill Annular Seal Driven & Bentonite Placed from 0.00 m_ to 18.29 m Amount Other Seals At (m) Screen Type Size OD From (m) Slot Size (cm) Attachment Top Fittings Bottom Fittings Grain Size _ Type Unknown Amount Unknown

Contractor Certification Name of Journeyman responsible for drilling/construction of well

SHAWN CROWELL

AERO DRILLING & CONSULTING LTD.

Certification No

Copy of Well report provided to owner Date approval holder signed

Printed on 10/5/2023 10:25:21 AM



Alberta Water Well Drilling Report

View in Imperial Export to Excel

1035047

GIC Well ID GoA Well Tag No. Drilling Company Well ID

The driller supplies the data contained in this report. The Province disclaims responsibility for its

									[Date Report Recei	ved	
Well Identif	fication and L	ocation.									Measurer	ment in Met
Owner Name HORNER, N DEV	e IORVAL/INSHO	ORE	Address 209 SCAR	BORO AV	E SW	Town CALG			Province ALBERTA	,		Postal Code T3C 2H4
Location	1/4 or LSD SE	SEC 12	<i>TWP</i> 42	RGE 1	W of MER 5			Plan	#1 OBSE	al Description ERVATION		
Measured fro	om Boundary o	of m from			GPS Coordir Latitude 5		_			Elevation	m	_
		m from			How Location	n Obtained				How Elevation Ob	otained	
					Not Verified					Not Obtained		
Additional I	nformation										Measurer	nent in Met
Distance Fr	om Top of Cas	ina to Gra	ound Level		91.44 cm							
	Flow						ls Flow Cor	ntrol Installed				
	Rate											
	ded Pump Rat				272.77 L/mis	Disease	n Inatallad					
	,		(F TOO)		272.77 L/mir						m	
Recommen	aea Pump Inta	ке Deptn	(From TOC)		21.34 m	. Typ	e		Маке		Н.Р.	
										Model (Output F	Rating)	
Did you E	ncounter Salin	e Water (:	>4000 ppm Ti	DS)	Depth	1	m	Well Disin	fected Upon (Completion		
			(Gas						Taken		
	Action Taken		(Gas				Geo		Taken		
Remedial Additiona	al Comments o						m Sample C	Geo	ophysical Log Submitted to	Taken		0
Remedial Additiona	al Comments o				Depth		m Sample C	Ged ollected for F FT.	ophysical Log Submitted to	Taken ESRD Sub	mitted to ESRI	D
Additiona TOP OF LIN Yield Test	al Comments o	T 2FT BE	LOW GROUP	ND LEVEI	Depth		m Sample C	Ged ollected for F FT.	Submitted to see Potability See From Gr	Taken ESRD Sub	mitted to ESRI	
Remedial Additiona TOP OF LIN	al Comments on NER AT +2 NO		LOW GROUN	ND LEVEI	Depth		m Sample C	Ged ollected for F FT.	physical Log Submitted to Potability Ken From Gr Depth	ESRD Sub	mitted to ESRI	ment in Meti
Additiona TOP OF LIN Yield Test Test Date 2004/04/21	al Comments oi NER AT +2 NO	Start Tin 12:00 AM	LOW GROUN	ND LEVEI	Depth GROUTED SH		m Sample C	Geo ollected for F FT. Tal	physical Log Submitted to Potability Ken From Gr Depth	Sub Sound Level to water level apped Time inutes: Sec 0:00	Measurer Recover	ment in Metr ry (m)
Additiona TOP OF LIN Yield Test Test Date 2004/04/21	al Comments or NER AT +2 NO	Start Tin 12:00 AM	LOW GROUN	ND LEVEI	Depth GROUTED SH		m Sample C	Geo ollected for F FT. Tal	physical Log Submitted to Potability Ken From Gr Depth	Sub Sub Sub Sub Sub Sub Sub Sub	Measurer Recover 30.4	ment in Metr ry (m) 48
Additiona TOP OF LIN Yield Test Test Date 2004/04/21 Method of	al Comments or NER AT +2 NO Water Remove Type A	Start Tin 12:00 AM	LOW GROUN	ND LEVEI	Depth GROUTED SH		m Sample C	Geo ollected for F FT. Tal	physical Log Submitted to Potability Ken From Gr Depth	Sub Sub Sound Level to water level apsed Time inutes: Sec 0:00 1:00 2:00	Measurer Recove 30. 13.	nent in Metroy (m) 148 11
Additiona TOP OF LIN Yield Test Test Date 2004/04/21 Method of	al Comments or NER AT +2 NO	Start Tin 12:00 AM	LOW GROUN	ND LEVEI	Depth GROUTED SH		m Sample C	Geo ollected for F FT. Tal	physical Log Submitted to Potability Ken From Gr Depth	Sub Sub Sub Sub Sub Sub Sub Sub	Measurer Recove 30.4 4.8	nent in Metrony (m) 48 11 8
Additiona TOP OF LIN Yield Test Test Date 2004/04/21 Method of	al Comments or NER AT +2 NO Water Remove Type A	Start Tin 12:00 AM	ne M	ND LEVEI	Depth GROUTED SH		m Sample C	Geo ollected for F FT. Tal	physical Log Submitted to Potability Ken From Gr Depth	Sub Sub Sound Level to water level apsed Time inutes: Sec 0:00 1:00 2:00	Measurer Recove 30. 13.	nent in Metroy (m) 48 11 8 7 7
Additiona TOP OF LIN Yield Test Test Date 2004/04/21 Method of	Water Remove Type A emoval Rate	Start Tin 12:00 AM	ne M	ND LEVEI	Depth GROUTED SH		m Sample C	Geo ollected for F FT. Tal	physical Log Submitted to Potability Ken From Gr Depth	Sub Sub Sound Level to water level apped Time inutes: Sec 0:00 1:00 2:00 3:00 4:00	Measurer Recover 30.4.8 4.2 3.6	nent in Metr y (m) 48 11 8 7 7 6
Additiona TOP OF LIN Yield Test Test Date 2004/04/21 Method of Re Depth With	Water Remove Type A emoval Rate	Start Tin 12:00 AM	72.77 L/min 30.48 m	ND LEVEI	Depth GROUTED SH		M Sample C 4X5 AT 60	Geo ollected for F FT. Tal	physical Log Submitted to Potability Ken From Gr Depth	Sub Sub Sub Sub Sub Sub Sub Sub	Measurer Recover 30. 13. 4.8 4.2 3.6. 3.6	nent in Metrony (m) 48 11 8 7 6 6 6

Water Diverted for Drilling		
Water Source	Amount Taken L	Diversion Date & Time

Contractor Certification

Name of Journeyman responsible for drilling/construction of well SHAWN CROWELL

Company Name
AERO DRILLING & CONSULTING LTD.

Certification No

Copy of Well report provided to owner Date approval holder signed

Page: 2 / 2 Printed on 10/5/2023 10:25:21 AM

2004 Water Source Well - Meridian Beach 2 Chemical Analysis Results (September 5, 2023)



Element 7217 Roper Road NW Edmonton, Alberta T6B 3J4, Canada

Page 1 of 5 T: +1 (780) 438-5522 F: +1 (780) 434-8586

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Analytical Report

Bill To: Hydrogeological Consultants

17740 - 118 Avenue

Edmonton, AB, Canada

Attn: Accounts Payable Sampled By: Scott Thompson

Company: HCL

Project ID: MR-0323.22

Project Name: County of Ponoka GW

Monitoring

Project Location: Gull Lake Area LSD: Various Legal Locations

P.O.: 19729

Proj. Acct. code:

Lot ID: 1675279

Control Number:

Date Received: Aug 29, 2023 Date Reported: Sep 5, 2023 Report Number: 2908484

Reference Number

1675279-2 Sample Date August 29, 2023 Sample Time 09:20

Sample Location Meridian Beach #2

Sample Description M39227.478952 / 1.7°c

Sample Matrix Water

				Nominal Detection	Guideline	Guideline
Analyte		Units	Result	Limit	Limit	Comments
Physical and Aggregate F	Properties					
Colour	Apparent, Potable	Colour units	15	5	15	Below AO
Turbidity		NTU	0.5	0.1	0.1/0.3/1.0 OG	
Routine Water						
рН			7.64	1	7.0-10.5	Within OG Range
Temperature of observed pH		°C	20.6			
Electrical Conductivity	at 25 °C	μS/cm	797	1		
Calcium	Extractable	mg/L	60.6	0.2		
Magnesium	Extractable	mg/L	43.5	0.2		
Sodium	Extractable	mg/L	65.3	0.4	200	Below AO
Potassium	Extractable	mg/L	2.7	0.4		
Iron	Extractable	mg/L	0.48	0.01	0.3	Above AO
Manganese	Extractable	mg/L	0.067	0.005	0.02 AO; 0.12 MAC	Above AO
Chloride	Dissolved	mg/L	6.7	0.4	250	Below AO
Fluoride		mg/L	0.08	0.05	1.5	Below MAC
Nitrate - N		mg/L	<0.01	0.01	10	Below MAC
Nitrite - N		mg/L	< 0.005	0.005	1	Below MAC
Nitrate and Nitrite - N		mg/L	<0.01	0.01	10	Below MAC
Sulfate (SO4)	Extractable	mg/L	49.5	0.9	500	Below AO
Hydroxide		mg/L	<5			
Carbonate		mg/L	<6			
Bicarbonate		mg/L	541			
P-Alkalinity	as CaCO3	mg/L	<5	5		
T-Alkalinity	as CaCO3	mg/L	444	5		
Total Dissolved Solids		mg/L	495	1	500	Below AO
Hardness	as CaCO3	mg/L	331			
Ionic Balance		%	94			

Approved by:

tothony Weuman Anthony Neumann, MSc General Manager

Data have been validated by Analytical Quality Control and Element's Integrated Data Validation System (IDVS).

Generation and distribution of the report, and approval by the digitized signature above, are performed through a secure and controlled automatic process





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Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue

Edmonton, AB, Canada

T5S 2W3

Attn: Accounts Payable

Sampled By: Scott Thompson

Company: HCL

Project ID: MR-0323.22

Project Name: County of Ponoka GW

Monitoring

Project Location: Gull Lake Area
LSD: Various Legal Locations

P.O.: 19729

Proj. Acct. code:

Lot ID: 1675279

Control Number:

Date Received: Aug 29, 2023
Date Reported: Sep 5, 2023
Report Number: 2908484

	regate Properties					
Blanks	Units	Measured	Lower Limit	Upper Limit		Passed QC
Turbidity	NTU	0.094	-0.1	0.1		yes
Date Acquired:	August 31, 2023					
Turbidity	NTU	0.119	0.0	0.1		yes
Date Acquired:	August 31, 2023					
Control Sample	Units	Measured	Lower Limit	Upper Limit		Passed QC
Turbidity	NTU	1940	1799.3	2005.7		yes
Date Acquired:	August 31, 2023					
Turbidity	NTU	5580	4441.7	6661.7		yes
Date Acquired:	August 31, 2023					
Colour	Colour units	10	10	10		yes
Turbidity	NTU	149	132.1	162.1		yes
Date Acquired:	August 31, 2023					
Turbidity	NTU	14.3	12.6	15.6		yes
Date Acquired:	August 31, 2023					•
Turbidity	NTU	1.7	1.0	2.2		yes
Date Acquired:	August 31, 2023					,
Client Sample Repli	,	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Turbidity	NTU	0.2	0.2	10	0.2	yes
Date Acquired:	August 31, 2023					,
Routine Water						
Blanks	Units	Measured	Lower Limit	Upper Limit		Passed QC
Chloride	mg/L	0.22	-0.4	0.4		yes
Fluoride	mg/L	0	-0.05	0.05		yes
Nitrate - N	mg/L	0.0083299	-0.01	0.01		yes
Nitrite - N	mg/L	0	-0.005	0.005		yes
Calcium	mg/L	0.0761978	-0.1	0.1		yes
Magnesium	mg/L	0.0194014	-0.1	0.1		yes
Sodium Sulfur	mg/L	0.102083	-0.4 -0.3	0.3 0.3		yes
Potassium	mg/L mg/L	0.104134 0.233221	-0.3 -0.4	0.3		yes
Iron	mg/L	0.00345156	-0.4	0.02		yes yes
Manganese	mg/L	0.000828697	-0.003	0.003		yes
Date Acquired:	August 31, 2023	0.000020001	0.000	0.000		you
Control Sample	Units	Measured	Lower Limit	Upper Limit		Passed QC
Chloride	mg/L	2020	1847.4	2256.0		ves
Date Acquired:	August 31, 2023	2020	1047.4	2230.0		yes
·		32.2	27.200	36.800		
Electrical Conducti	•	32.2	27.200	36.800		yes
Date Acquired:	August 30, 2023	<u> </u>				
pH	20 de la companya de	9.15	8.90	9.44		yes
Temperature of ob		20.7	15.5	24.5		yes
Electrical Conducti	ivity dS/m	2.68	2.631	2.829		yes





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Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue

Edmonton, AB, Canada

T5S 2W3

Attn: Accounts Payable

Sampled By: Scott Thompson

Company: HCL

Project ID: MR-0323.22

Project Name: County of Ponoka GW

Monitoring

Project Location: Gull Lake Area LSD: Various Legal Locations

P.O.: 19729

Proj. Acct. code:

Lot ID:	1675279
antral Number	

Control Number:

Date Received: Aug 29, 2023 Date Reported: Sep 5, 2023 Report Number: 2908484

Routine Water - Continued							
Control Sample	Units	Measured	Lower Limit	Upper Limit		Passed QC	
P-Alkalinity	mg/L	530	442	584		yes	
T-Alkalinity	mg/L	989	958	1059		yes	
Fluoride	mg/L	10.1	9.39	10.59		yes	
Nitrate - N	mg/L	10.2	9.03	11.13		yes	
Nitrite - N	mg/L	10.0	9.010	10.990		yes	
Nitrate and Nitrite - N	mg/L	20.2	19.10	20.90		yes	
Calcium	mg/L	253	230.0	260.0		yes	
Magnesium	mg/L	98.2	92.4	103.0		yes	
Sodium	mg/L	256	231.0	261.0		yes	
Sulfur	mg/L	152	141.3	156.9		yes	
Potassium	mg/L	258	229.0	259.0		yes	
Iron	mg/L	9.94	9.27	10.23		yes	
Manganese	mg/L	2.46	2.260	2.560		yes	
Date Acquired: August	31, 2023						
pН		6.89	6.79	6.97		yes	
Temperature of observed	°C	20.5	15.5	24.5		yes	
Electrical Conductivity	dS/m	0.076	0.069	0.085		yes	
P-Alkalinity	mg/L	59	28	72		yes	
T-Alkalinity	mg/L	125	114	140		yes	
Chloride	mg/L	83.1	74.9	86.9		yes	
Fluoride	mg/L	4.88	4.56	5.22		yes	
Nitrate - N	mg/L	4.85	4.37	5.33		yes	
Nitrite - N	mg/L	4.86	4.370	5.330		yes	
Nitrate and Nitrite - N	mg/L	9.72	8.80	10.60		yes	
Date Acquired: August	31, 2023						
Chloride	mg/L	15.6	13.3	16.5		yes	
Fluoride	mg/L	0.49	0.45	0.57		yes	
Nitrate - N	mg/L	0.51	0.42	0.57		yes	
Nitrite - N	mg/L	0.500	0.455	0.557		yes	
Nitrate and Nitrite - N	mg/L	1.01	0.85	1.15		yes	
Calcium	mg/L	5.2	4.6	5.7		yes	
Magnesium	mg/L	2.1	1.9	2.2		yes	
Sodium	mg/L	5.2	4.7	5.7		yes	
Sulfur	mg/L	3.1	2.7	3.2		yes	
Potassium	mg/L	5.2	4.5	5.5		yes	
Iron	mg/L	0.20	0.18	0.24		yes	
Manganese	mg/L	0.051	0.046	0.058		yes	
Date Acquired: August	31, 2023						
Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC	
рН		5.71	5.64	0	0.10	yes	
Electrical Conductivity	dS/m	0.023	0.023	10	0.002	yes	
Hydroxide	mg/L	<5	<5	10		yes	
Carbonate	mg/L	<6	<6	10	6	yes	
Bicarbonate	mg/L	16	15	10	6	yes	







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Quality Control

Bill To: Hydrogeological Consultants 17740 - 118 Avenue

Edmonton, AB, Canada

T5S 2W3

Attn: Accounts Payable Sampled By: Scott Thompson

Company: HCL

Project ID: MR-0323.22

Project Name: County of Ponoka GW

Monitoring Gull Lake Area

Project Location: Gull Lake Area
LSD: Various Legal Locations

P.O.: 19729

Proj. Acct. code:

Lot ID: 1675279

Control Number:

Date Received: Aug 29, 2023
Date Reported: Sep 5, 2023
Report Number: 2908484

Client Sample Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
P-Alkalinity	mg/L	<5	<5	10	5	yes
T-Alkalinity	mg/L	13	12	10	5	yes
Chloride	mg/L	<0.4	<0.4	10	0.5	yes
Fluoride	mg/L	0.11	0.12	10	0.05	yes
Nitrate - N	mg/L	<0.01	<0.01	10	0.01	yes
Nitrite - N	mg/L	<0.005	< 0.005	10	0.010	yes
Calcium	mg/L	1.5	1.4	10	0.6	yes
Magnesium	mg/L	0.2	0.2	10	0.4	yes
Sodium	mg/L	232	229	10	1.2	yes
Sulfur	mg/L	18.9	18.7	10	0.1	yes
Potassium	mg/L	0.4	0.5	10	1.2	yes
Iron	mg/L	0.11	0.08	10	0.05	yes
Manganese	mg/L	<0.005	< 0.005	10	0.010	yes
Date Acquired: August	31, 2023					·

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Methodology and Notes

Bill To: Hydrogeological Consultants

17740 - 118 Avenue Edmonton, AB, Canada

Edmonton, AB, Canada

T5S 2W3

Attn: Accounts Payable Sampled By: Scott Thompson

- 118 Avenue Project

Project ID: MR-0323.22
Project Name: County of Ponoka GW

Monitoring
Project Location: Gull Lake Area
LSD: Various Legal Locations

P.O.: 19729

Lot ID: **1675279**

Control Number:
Date Received: Aug 29, 2023
Date Reported: Sep 5, 2023
Report Number: 2908484

Company: HCL Proj. Acct. code:

Method of Analysis				
Method Name	Reference	Method	Date Analysis Started	Location
Alkalinity, pH, and EC in water	APHA	* Alkalinity - Titration Method, 2320 B	Aug 30, 2023	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* Conductivity, 2510 B	Aug 30, 2023	Element Edmonton - Roper Road
Alkalinity, pH, and EC in water	APHA	* pH - Electrometric Method, 4500-H+ B	Aug 30, 2023	Element Edmonton - Roper Road
Anions (Routine) by Ion Chromatography	APHA	 * Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B 	Aug 31, 2023	Element Edmonton - Roper Road
Approval-Edmonton	APHA	Checking Correctness of Analyses, 1030 E	Sep 1, 2023	Element Edmonton - Roper Road
Chloride in Water	APHA	* Automated Ferricyanide Method, 4500-CI-E	Aug 31, 2023	Element Edmonton - Roper Road
Colour (Apparent) in water	APHA	* Visual Comparison Method, 2120 B	Aug 31, 2023	Element Edmonton - Roper Road
Metals Trace (Extractable) in water	APHA	Hardness by Calculation, 2340 B	Aug 31, 2023	Element Edmonton - Roper Road
Metals Trace (Extractable) in water	APHA	 * Inductively Coupled Plasma (ICP) Method, 3120 B 	Aug 31, 2023	Element Edmonton - Roper Road
Turbidity in Water	APHA	* Turbidity - Nephelometric Method, 2130 B	Aug 31, 2023	Element Edmonton - Roper Road

^{*} Reference Method Modified

References

APHA Standard Methods for the Examination of Water and Wastewater

Guidelines

Guideline Description Health Canada GCDWQ

Guideline Source Guidelines for Canadian Drinking Water Quality, Health Canada, Sept 2020

Guideline Comments MAC = Maximum Acceptable Concentration

AO = Aesthetic Objective

OG = Operational Guideline for Water Treatment Plants

(does not apply to private groundwater wells).

Refer to Health Canada for complete guidelines at www.hc-sc.gc.ca

Comments:

• Aug 30, 2023 - Sample 1675279-2; 8807136: Sample received at 1.7°c

The comparison of test results to guideline limits is provided for information purposes only. This is not to be taken as a statement of conformance / nonconformance to any guideline, regulation or limit. The data user is responsible for all conclusions drawn with respect to the data and is advised to consult official regulatory references when evaluating compliance.

Please direct any inquiries regarding this report to our Client Services group.

Results relate only to samples as submitted.

The test report shall not be reproduced except in full, without the written approval of the laboratory.



2004 Water Source Well - Meridian Beach 2 2022 - 2023 Hydrograph

