2015 Groundwater Monitoring Report

Gull Lake Area

Tp 041 to 043 from R 28, W4M to R 02, W5M

Prepared for
Ponoka County

Prepared by
hydrogeological consultants ltd. **(HCL)**
1.800.661.7972

December 2016

HCL Project No.: MR-0323.15

PERMIT TO PRACTICE
HYDROGEOLOGICAL CONSULTANTS LTD.
Signature _____
Date DEC 13 2016
PERMIT NUMBER P 385
The Association of Professional Engineers and Geoscientists of Alberta (APEGA)

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This report includes information to December 31, 2015

1. Introduction

1.1. Purpose

The purpose of this project is to gather groundwater-level data in the vicinity of Gull Lake, Alberta, to assist in the management of the water resources of the Gull Lake Watershed. The five water wells in which groundwater levels are being measured at this time are completed in four different aquifers within the Sunchild Member of the Paskapoo Formation. The aquifer naming in the table in Section 2.1 is based on the number of metres that the top of each Aquifer is above the base of the Sunchild Member. The index map below shows the Gull Lake Watershed within the South Saskatchewan River Basin.

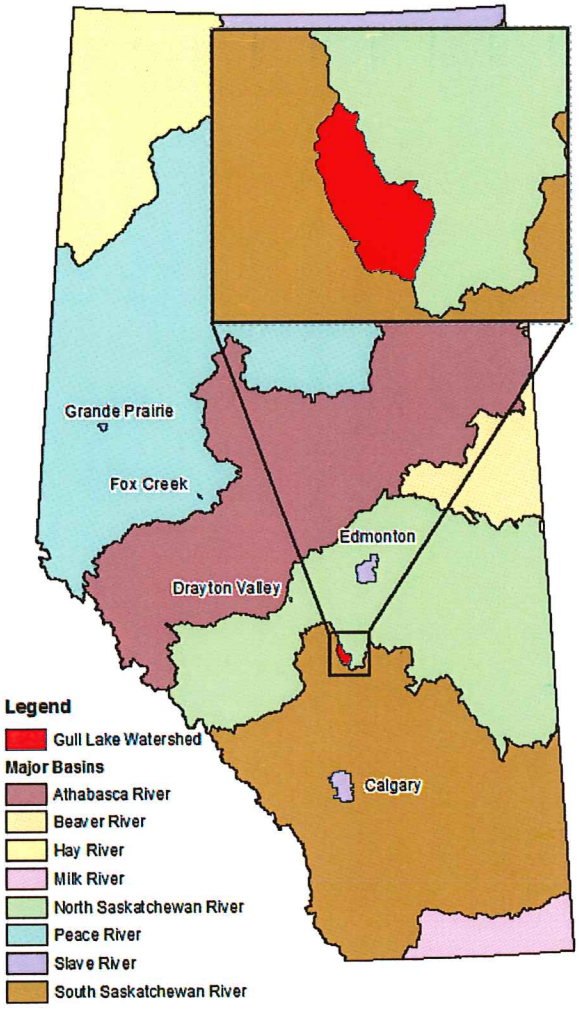

Figure 1. Index Map

1.2. Scope

Hydrogeological Consultants Ltd. (HCL) was retained by Ponoka County (the County) in May 2011 to initiate an ongoing groundwater monitoring program that would involve recording changes in groundwater levels over time. Approval for the activities is in Appendix A. The site map below shows the locations of the five water wells that are being used to monitor groundwater levels and identifies the aquifer in which each water well is completed.

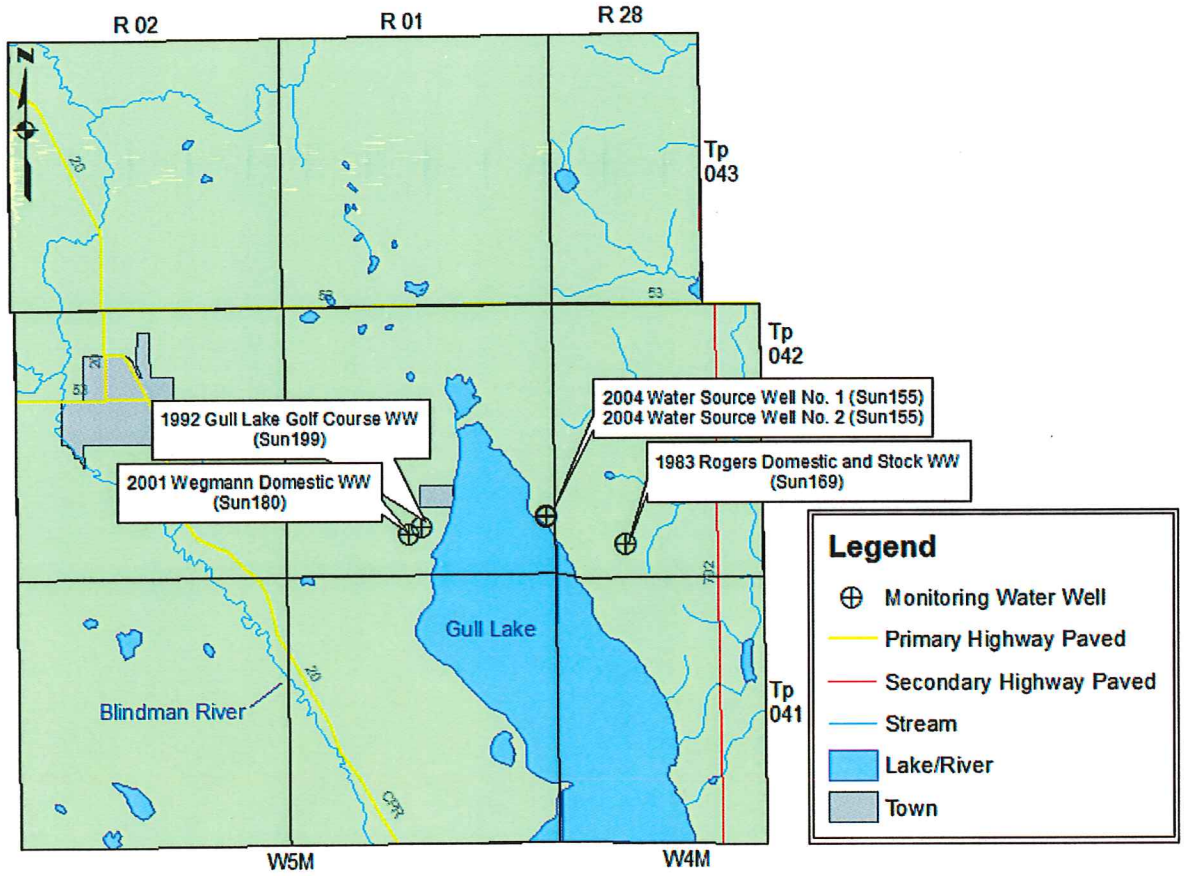

Figure 2. Site Map

2. Groundwater Monitoring Summary

2.1. Water Well Details

GCID	Water Well Name	Water Well Owner	Legal Location	Aquifer	Depth Completed (metres BGL)	Gull Lake Side
M35377.069370	1983 Rogers Domestic and Stock Water Well	Dennis and Monica Rogers	09-04-042-28 W4M	Sun169	63.7	East
M35379.066969	1992 Gull Lake Golf Course Water Well	Gull Lake Golf Course	04-10-042-01 W5M	Sun199	32.0	West
M37490.034988	2001 Wegmann Domestic Water Well	Herman Wegmann	16-04-042-01 W5M	Sun180	54.9	West
M39227.478953	2004 Water Source Well No. 1	Norval Horner/Inshore Developments	08-12-042-01 W5M	Sun155	24.4	East
M39227.478952	2004 Water Source Well No. 2	Norval Horner/Inshore Developments	08-12-042-01 W5M	Sun155	24.4	East

metres BGL - metres below ground level

2.2. Water Levels

Level TROLL data loggers were installed in the five monitoring water wells on June 28, 2011, and the data have been downloaded on an annual basis. The highest and lowest water-level measurements from 2011 through 2015 are summarized in the table below. Additional water well details and hydrographs for the five water wells are in Appendix B.

	Water Level (depth to water below reference point)									
	2011		2012		2013		2014		2015	
Water Well Designation	Highest (m)	Lowest (m)	Highest (m)	Lowest (m)	Highest (m)	Lowest (m)	Highest (m)	Lowest (m)	Highest (m)	Lowest (m)
1983 Rogers Domestic and Stock Water Well	45.2	50.5	45.0	50.0	45.0	49.2	44.0	48.7	45.2	50.0
1992 Gull Lake Golf Course Water Well	19.8	21.4	19.7	20.5	20.5	21.7	21.0	21.9	21.9	22.6
2001 Wegmann Domestic Water Well	34.9	37.3	35.0	37.1	34.5	38.3	35.0	38.0	35.2	38.7
2004 Water Source Well No. 1	4.4	9.6	4.2	10.2	4.2	9.2	4.1	7.8	4.4	9.5
2004 Water Source Well No. 2	4.6	6.8	4.5	7.4	4.5	6.9	4.3	6.2	4.6	7.3

In addition to the hydrographs for the water wells in Appendix B, a hydrograph showing the water-level elevations of Gull Lake compared to the water-level elevations of the monitoring water wells from June 2011 through December 2015 is in Section 2.4. The water-level data for Gull Lake are archived by the Water Survey of Canada.

2.3. Groundwater Quality

	Analysis Date
Water Well Designation	Most Recent
1983 Rogers Domestic and Stock Water Well	Jun 2014
1992 Gull Lake Golf Course Water Well	Jun 2014
2001 Wegmann Domestic Water Well	Jun 2014
2004 Water Source Well No. 1	Jun 2014
2004 Water Source Well No. 2	Jun 2014

2.4. Water-Level Summary

The highest daily water-level elevations of two water wells (those owned by Rogers and the Gull Lake Golf Course) are more than 10 metres above the elevation of Gull Lake, and three water wells (those owned by Inshore Developments and Wegmann) have highest daily water-level elevations that are mainly within 3 metres of the elevation of Gull Lake, as shown in the hydrograph on the following page.

During the monitoring interval, similar rising and declining trends in the highest daily water levels in all monitoring water wells were noted, with the main difference being the length of the trend. A natural water-level rise is evident each spring, followed by a gradual water-level decline; however, the rising and declining of the water levels change slightly from year to year and from location to location.

Between August 2011 and December 2015, a general decline in water level was recorded in the 1992 Gull Lake Golf Course Water Well (1992 Golf Course WW); the rise in water level in April 2014 may indicate spring recharge. The sharp decline in water level in June 2013 is thought to be related to watering of the golf course. The 1992 Golf Course WW is completed in the Sun199 Aquifer, which is above the level of 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, 2015).

The water-level trends in the 1983 Rogers Domestic and Stock Water Well (1983 Rogers WW) show a strong correlation to spring recharge in the month of May from 2012 through 2014, as shown by the rise in water levels, followed by a decline throughout the remainder of the year. In 2015, the 1983 Rogers WW did not show a rise in water levels in the spring, which is not consistent with previous water-level trends in the spring. The 1983 Rogers WW is completed in the Sun169 Aquifer, which may be hydraulically connected to Gull Lake (HCL, 2015).

The 2004 Water Source Well No. 1 (2004 WSW 1), the 2004 Water Source Well No. 2 (2004 WSW 2) and the 2001 Wegmann Domestic Water Well (2001 Wegmann WW) show similar water-level trends. The 2004 WSWs 1 and 2 are both completed in the Sun155 Aquifer and have very similar water levels, which is expected based on the identical completion intervals of the water source wells and a lateral distance of 29 metres between the two water source wells (HCL, 2015). The 2004 WSWs 1 and 2 show a slight rise in water level each spring and a decline throughout the remainder of the year, although the rise in the spring of 2015 was less than in previous years. The top of the Sun155 Aquifer is below the base of Gull Lake, and no hydraulic connection is expected between the Aquifer and the Lake.

The 2001 Wegmann WW is completed in the Sun180 Aquifer, which may be hydraulically connected to Gull Lake (HCL, 2015). In 2015, the 2001 Wegmann WW showed a decline in water levels in the spring. This water-level decline is not consistent with previous water-level trends in the spring but does correlate with the other monitoring water wells, which show either a reduced rise in water levels in the spring of 2015 or no discernible rise.

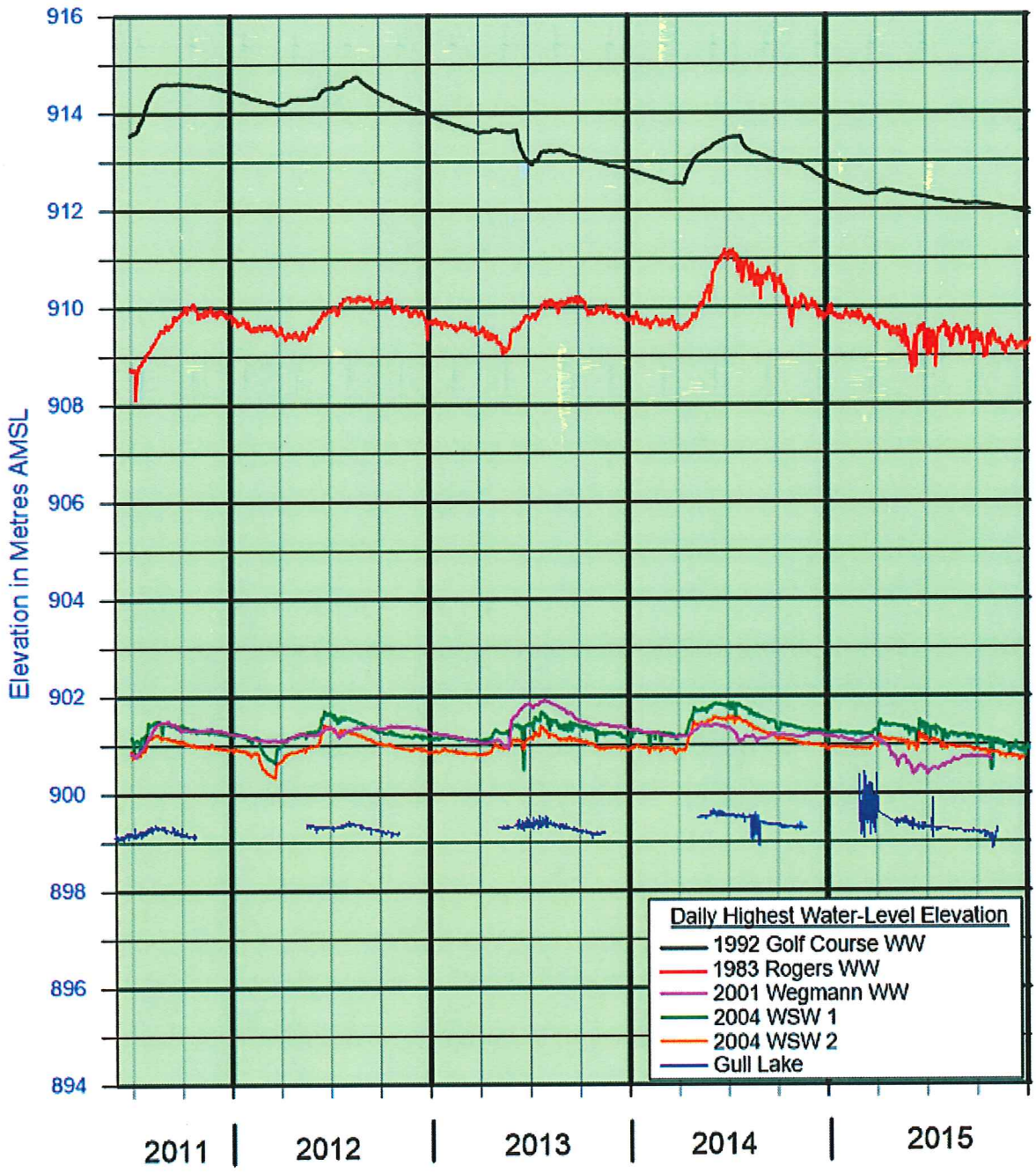

Figure 3. Hydrograph of Monitoring Water Wells and Gull Lake Water Levels

3. Groundwater Quality Summary

Groundwater samples collected from each of the monitoring water wells from 2012 through 2014, the 1986 groundwater sample from the 1983 Rogers WW, and the 2004 groundwater sample from the 2004 WSW 1 are represented on the Piper tri-linear diagram below. In 2015, groundwater samples were not collected from any of the monitoring water wells.

The chemical analysis results for 2014 are in Appendix B.

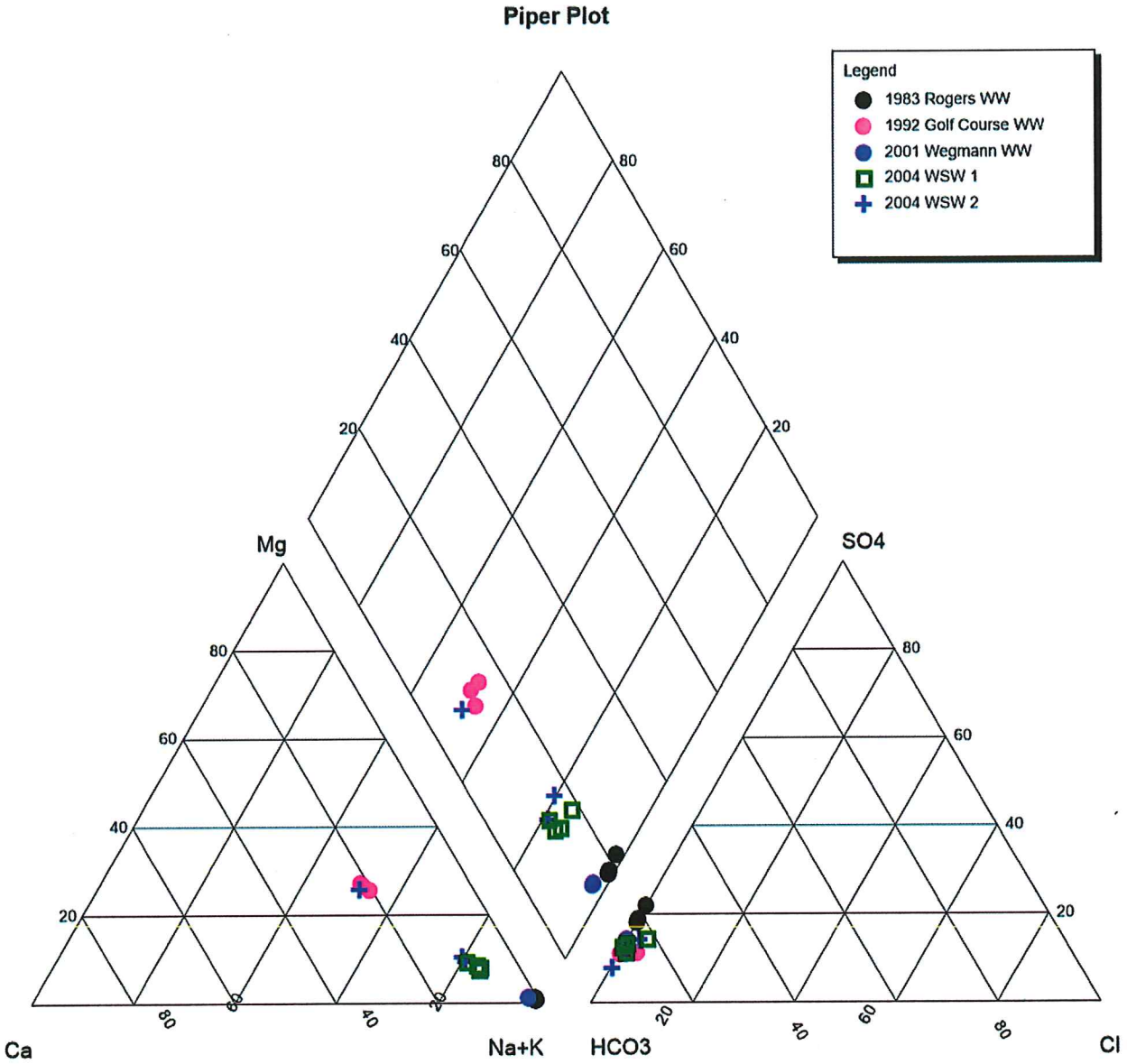

Figure 4. Piper Tri-Linear Diagram

4. Conclusions and Recommendations

The 2015 study conducted by Hydrogeological Consultants Ltd. (HCL, 2015) involved the interaction of groundwater between aquifers within the Gull Lake Watershed and Gull Lake itself. It was determined that the 1983 Rogers Domestic and Stock Water Well and the 2001 Wegmann Domestic Water Well are completed in aquifers that are expected to be directly or indirectly connected to the Lake. The 1992 Gull Lake Golf Course Water Well is completed in an aquifer that is above the level of Gull Lake. The Inshore Developments 2004 Water Source Well No. 1 and the 2004 Water Source Well No. 2 are completed in an aquifer that is expected to be below the base of Gull Lake, with no hydraulic connection to the Lake. However, additional groundwater level monitoring data will be required in order to determine the relationship between Gull Lake and the Aquifer in which the Inshore Developments water source wells are completed.

It is recommended that annual groundwater samples be collected by HCL from each of the five monitoring water wells for routine chemical analysis, and that water levels be downloaded from each water well at least once per year. It is recommended that HCL schedule the next site visit for October 2017.

Prepared by:

B Fossum

Brenna Fossum, B.Sc., G.I.T.
Junior Hydrogeologist

Reviewed by:

Jim Touw, P.Geol.
Senior Hydrogeologist

5. Bibliography

Hydrogeological Consultants Ltd. November 2015. Groundwater Impact on Gull Lake Water Level. Part of the Red Deer River Watershed. Tp 040 to 043 from R 27, W4M to R 02, W5M. Prepared for the Gull Lake Water Quality Management Society. [14-0219.01].

Appendix A – Project Approval

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Project Approval

Ponoka County

VIA EMAIL ONLY TO: Gill@HCL.ca

January 20, 2011

HYDROGEOLOGICAL CONSULTANTS LTD.
10704 – 181 Street
EDMONTON, AB
T5S 1K8

ATTENTION: Gill Poulter, P. Geol.
Project Hydrogeologist

Dear Ms. Poulter:

RE: Gull Lake Monitoring Program

In follow-up to the HCL groundwater report, the Ponoka County would like to proceed with a monitoring program in 2011.

Five locations have been confirmed with property owners and are listed as follows complete with contact numbers;

1. N.E. 4-42-28-W4 - Dennis & Monica Rogers PH: 403-782-9962
2. S.W. 10-42-1-W5 - Gull Lake Golf Course
   Carla McCann PH: 403-843-2188
3. N.E. 4-42-1-W5 - Herman Wegmann PH: 403-748-2893
4. S.E. 12-42-1-W5 - Meridian Beach
   (2 Wells @ different Aquifers)
   Norval Horner PH: 403-803-6914

I've had discussions with Mike Semple and he indicated that he would like to install the data loggers in each well prior to the May long weekend.

.....2

4205 Highway #2A
Ponoka, Alberta T4J 1V9
Phone: (403) 783-3333
Fax: (403) 783-6965

Ponoka County

Hydrogeological Consultants Ltd.
January 20, 2011
Page 2

I assume the cost estimates provided in your proposal are still relevant, however, if you anticipate significant increases, please advise.

Should more locations or details be required, please call.

Sincerely yours,

Thomas G. Webber
A.C.A.O.

TGW/lc

cc. Charlie Cutforth

4205 Highway #2A
Ponoka, Alberta T4J 1V9
Phone: (403) 783-3333
Fax: (403) 783-6965

Appendix B – Water Well Details

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1983 Rogers Domestic and Stock Water Well

(1983 Rogers WW)

09-04-042-28 W4M

(M35377.069370)

Well Spatial Location:

Easting: ***70,162***
Northing: ***5,824,898***
(spatial accuracy MT GPS — 10TM NAD83)

Ground Elevation AMSL (m): ***955***
(elevation accuracy MT DEM)

Date Completed: ***June 14, 1983***

Depth Drilled (m): ***63.7***

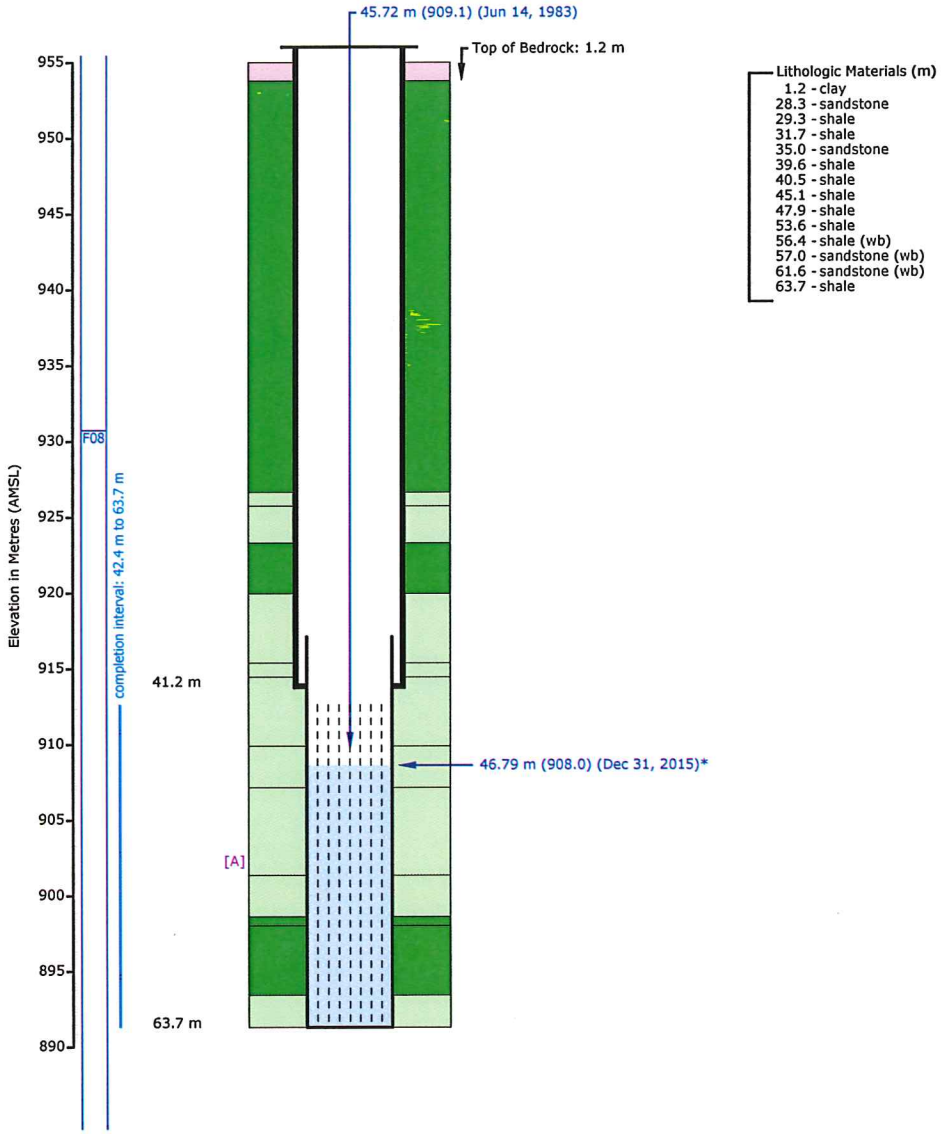
Completion Interval (m): ***42.4*** – ***63.7 ****
(TGWC determined value)*

Earliest Water Level (m): ***45.72*** – ***1983-06-14***

Most Recent Water Level (m): ***46.79*** – ***2015-12-31***

GIC ID: ***275201***

1983 Rogers Domestic and Stock Water Well
Water Well Diagram



Lithology Legend

Surficial: Unsorted; Fine Grained; Coarse Grained

Bedrock: Fine Grained; Coarse Grained

Other

Geologic Unit Legend (Top) - Regional Analysis

F08 - Dalehurst Member

Summary

TGWC ID: M35377.069370
Well Name: 1983 Rogers Domestic and Stock Water Well
Legal Location: 09-04-042-28 W4M
Casing (OD): 177.8 mm; Steel (7.0")
Liner (OD): 141.2 mm; Steel (5.6")
Casing Stick-Up: 0.4 m (not drawn to scale)
Completion [A]: 42.4 to 63.7 m; Slotted
*Water Level (recent): 46.79 m (908.0m AMSL) on December 31, 2015 @ 23:00 - Reference Point: Top of Casing
Water Level (oldest): 45.72 m (909.1m AMSL) on June 14, 1983 @ 11:00

** Water-Level Measurements are measured from reference point listed.*
NOTE: Geologic Unit is a guide based on a regional groundwater assessment completed by Hydrogeological Consultants Ltd. (HCL) (http://www.hcl.ca) on behalf of Ponoka County in conjunction with Prairie Farm Rehabilitation Administration (P.F.R.A.).
Drawn: November 17, 2016 11:06 --- http://www.tgwc.com

Owner: *Rogers, Dennis & Monica*

Contractor: *Forrester Water Well Drilling (1981) Ltd.*
Name: *1983 Rogers Domestic and Stock Water Well (1983 Rogers WW)*

Field Survey: *May 18, 2011 - Confirmed - Physically*
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*

METRIC REPORT

Easting (m): *70,162.00* ** 75/80
Northing (m): *5,824,898.00* **
Elevation (m): *955* ***
Lot:
Block:
Plan:
Presence of Gas: *No*

09-04-042-28 W4M
M35377.069370
210221 – 1 Google

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

General Details

Depth Completed (m)*: *63.7*
Depth Drilled (m): *63.7*
Completion Aquifer: *Dalehurst Member **
Top of Bedrock (m): *1.2 **
Completion Interval (m): *42.4 – 63.7 **

Completion Details

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

Lithology Details

Elevation (AMSL)	Depth (BGL)	Lithology Descriptions (rate Lpm)
953.6	1.2	Brown Clay
926.4	28.3	Hard Brown Sandstone
925.5	29.3	Dark Grey Shale
923.1	31.7	Grey Shale
919.7	35.0	Grey Sandstone
915.2	39.6	Dark Grey Shale
914.2	40.5	Light Grey Shale
909.7	45.1	Sandy Blue & Grey Shale
906.9	47.9	Blue & Grey Shale
901.1	53.6	Grey Shale
898.4	56.4	Water-Bearing Grey Shale
897.8	57.0	Water-Bearing Grey Sandstone
893.2	61.6	Water-Bearing Grey Sandstone
891.1	63.7	Sandy Grey Shale

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

Sampling Details: *May 30, 2014 @ 13:50*
Analysis Details: *June 9, 2014 - Exova Canada Inc. (1005908-5)*

Constituent	Result	Constituent	Result	Constituent	Result
Conductivity (µS/cm)	926	Nitrate as N	< 0.01	Colour (TCU)	< 5
Total Dissolved Solids	556	Nitrite as N	< 0.005	Turbidity (NTU)	0.3
Hardness (as CaCO3)	4.3	pH (pH Unit)	9.02	Fluoride	1.43
T-Alkalinity (as CaCO3)	428	Ion Balance (%)	95	Carbonate	44
P-Alkalinity (as CaCO3)	36	Total Coliforms:		Bicarbonate	433
Nitrate + Nitrite as N	< 0.01	Fecal Coliforms:		Hydroxide	< 5
Total Suspended Solids:		Escherichia coli:		Total Iron:	
Sulfate Reducing Bacteria*:				Total Mn:	
Iron Related Bacteria**:				Temperature (°C)	19.6

Constituent	Extractable	Dissolved	Constituent	Extractable	Dissolved
Calcium	1.4		Mercury:		
Chloride:		0.9	Molybdenum		
Iron:	0.03		Magnesium	0.2	
Manganese:	< 0.005		Sodium	219	
Aluminum:			Potassium	0.4	
Arsenic:			Vanadium:		
Barium:			Strontium:		
Beryllium:			Nickel:		
Cadmium:			Zinc:		
Chromium:			Copper:		
Cobalt:			Lead:		
Sulfate	77.1		Uranium:		

12/31/2015
Comments: *Sampled by HCL field department.*

(1 / 4)
Extractable - unfiltered
Dissolved - filtered
*** MAC Exceedence
194786

Note: Constituents have been compared to the maximum acceptable concentration, Health Canada. 2014. Guidelines for Canadian Drinking Water Quality – Summary Table. Water and Air Quality Bureau, Healthy Environments and Consumer Safety Branch. Health Canada. Ottawa. Ontario.

General Comments / Observations

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

Most Recent Water Level (m): *46.79 m – December 31, 2015*
Pump Intake BTOC (m): *57.9 on June 14, 1983*

Aquifer Tests

	Date & Time	Testing Method	Depth of Test Interval	Duration (minutes) Pumping	Duration (minutes) Recovery	Avg. Rate (Lpm)	NPWL (metres)	Drawdown (metres)	Pump (metres)	Q20 (m³/day)* Apparent	Q20 (m³/day)* Effective	Transmissivity (m²/day)* Apparent	Transmissivity (m²/day)* Aquifer	Transmissivity (m²/day)* Effective
1	1983-06-14 11:00	Bailer	[unknown]			45.5	45.7	11.9	57.9					

Alias IDs

GIC ID: *275201*
GIC (WellReportID): *275201*

** The Groundwater Centre (TGWC) calculated or determined value.*
*** 75 - MT GPS — 10TM NAD83*
**** 80 - MT DEM — {Ground; AMSL}*

1983 Rogers Domestic and Stock Water Well
AEP – Water Well Drilling Report

Alberta

Water Well Drilling Report

View in Imperial | Export to Excel

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.

GIC Well ID 275201
GoA Well Tag No.
Drilling Company Well ID
Date Report Received 1983/10/05

GOWN ID

Well Identification and Location

Measurement in Metric

Owner Name	Address	Town	Province	Country	Postal Code
STREET, MARTY	P.O. BOX 2167 LACOMBE				

Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description
	NE	04	042	28	4				

Measured from Boundary of
m from
m from

GPS Coordinates in Decimal Degrees (NAD 83)
Latitude 52.591814 Longitude -113.969188
How Location Obtained
Map

Elevation m
How Elevation Obtained
Not Obtained

Drilling Information

Method of Drilling
Cable Tool

Proposed Well Use
Domestic & Stock

Type of Work
New Well

Formation Log

Measurement in Metric

Depth from ground level (m)	Water Bearing	Lithology Description
1.22		Brown Clay
28.35		Brown Hard Sandstone
29.26		Dark Gray Shale
31.70		Gray Shale
35.05		Gray Sandstone
39.62		Dark Gray Shale
40.54		Light Gray Shale
45.11		Blue Gray Sandy Shale
47.85		Blue Gray Shale
53.64		Gray Shale
56.39	Yes	Gray Water Bearing Shale
57.00	Yes	Gray Water Bearing Sandstone
61.57	Yes	Gray Water Bearing Sandstone
63.70		Gray Sandy Shale

Yield Test Summary

Measurement in Metric

Recommended Pump Rate 0.00 L/min

Test Date	Water Removal Rate (L/min)	Static Water Level (m)
1983/06/14	45.46	45.72

Well Completion

Measurement in Metric

Total Depth Drilled	Finished Well Depth	Start Date	End Date
63.70 m		1983/06/08	1983/06/14

Borehole

Diameter (cm)	From (m)	To (m)
0.00	0.00	63.70

Surface Casing (if applicable)
Steel
Size OD : 17.78 cm
Wall Thickness : 0.691 cm
Bottom at : 41.15 m

Well Casing/Liner
Steel
Size OD : 14.12 cm
Wall Thickness : 0.795 cm
Top at : 38.10 m
Bottom at : 63.70 m

Perforations

From (m)	To (m)	Diameter or Slot Width (cm)	Slot Length (cm)	Hole or Slot Interval(cm)
42.37	63.70	0.635		15.24

Perforated by Torch

Annular Seal Driven
Placed from 0.00 m to 41.15 m
Amount

Other Seals

Type	At (m)

Screen Type
Size OD : 0.00 cm

From (m)	To (m)	Slot Size (cm)

Attachment
Top Fittings Bottom Fittings

Pack
Type Grain Size
Amount

Contractor Certification

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

Company Name
FORRESTER WATER WELL DRILLING (1981) LTD.

Certification No
1

Copy of Well report provided to owner *Date approval holder signed*

Alberta

Water Well Drilling Report

View in Imperial | Export to Excel

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.

GIC Well ID 275201
GoA Well Tag No.
Drilling Company Well ID
Date Report Received 1983/10/05

GOWN ID

Well Identification and Location

Measurement in Metric

Owner Name	Address	Town	Province	Country	Postal Code
STREET, MARTY	P.O. BOX 2167 LACOMBE				

Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description
	NE	04	042	28	4				

Measured from Boundary of
m from
m from

GPS Coordinates in Decimal Degrees (NAD 83)
Latitude 52.591814 Longitude -113.969188
How Location Obtained
Map

Elevation m
How Elevation Obtained
Not Obtained

Additional Information

Measurement in Metric

Distance From Top of Casing to Ground Level cm
Is Artesian Flow
Rate L/min
Is Flow Control Installed
Describe

Recommended Pump Rate 0.00 L/min
Recommended Pump Intake Depth (From TOC) 0.00 m
Pump Installed Depth m
Type Make H.P.
Model (Output Rating)

Did you Encounter Saline Water (>4000 ppm TDS) Depth m
Gas Depth m
Well Disinfected Upon Completion
Geophysical Log Taken
Submitted to ESRD
Sample Collected for Potability
Submitted to ESRD Yes

Additional Comments on Well
DRILLER REPORTS SOFT WATER.

Yield Test

Taken From Ground Level
Depth to water level

Measurement in Metric

Test Date	Start Time	Static Water Level
1983/06/14	12:00 AM	45.72 m

Drawdown (m)	Elapsed Time Minutes:Sec	Recovery (m)

Method of Water Removal
Type Bailer
Removal Rate 45.46 L/min
Depth Withdrawn From 57.91 m

If water removal period was < 2 hours, explain why

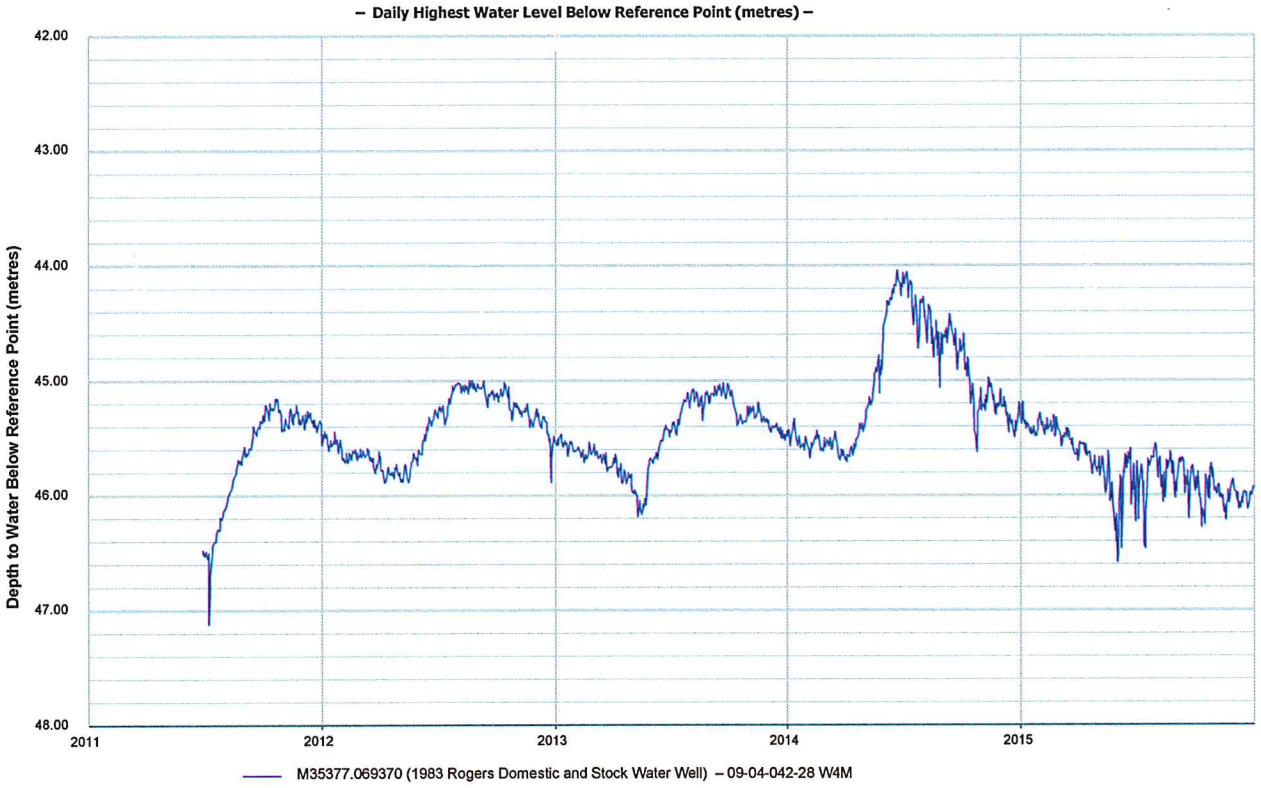
Water Diverted for Drilling

Water Source	Amount Taken	Diversion Date & Time
	L	

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 Rogers Domestic and Stock Water Well
2011 – 2015 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 MT GPS — 10TM NAD83)

Ground Elevation AMSL (m): ***934***
(elevation accuracy MT DEM)

Date Completed: ***July 15, 1992***

Depth Drilled (m): ***32.0***

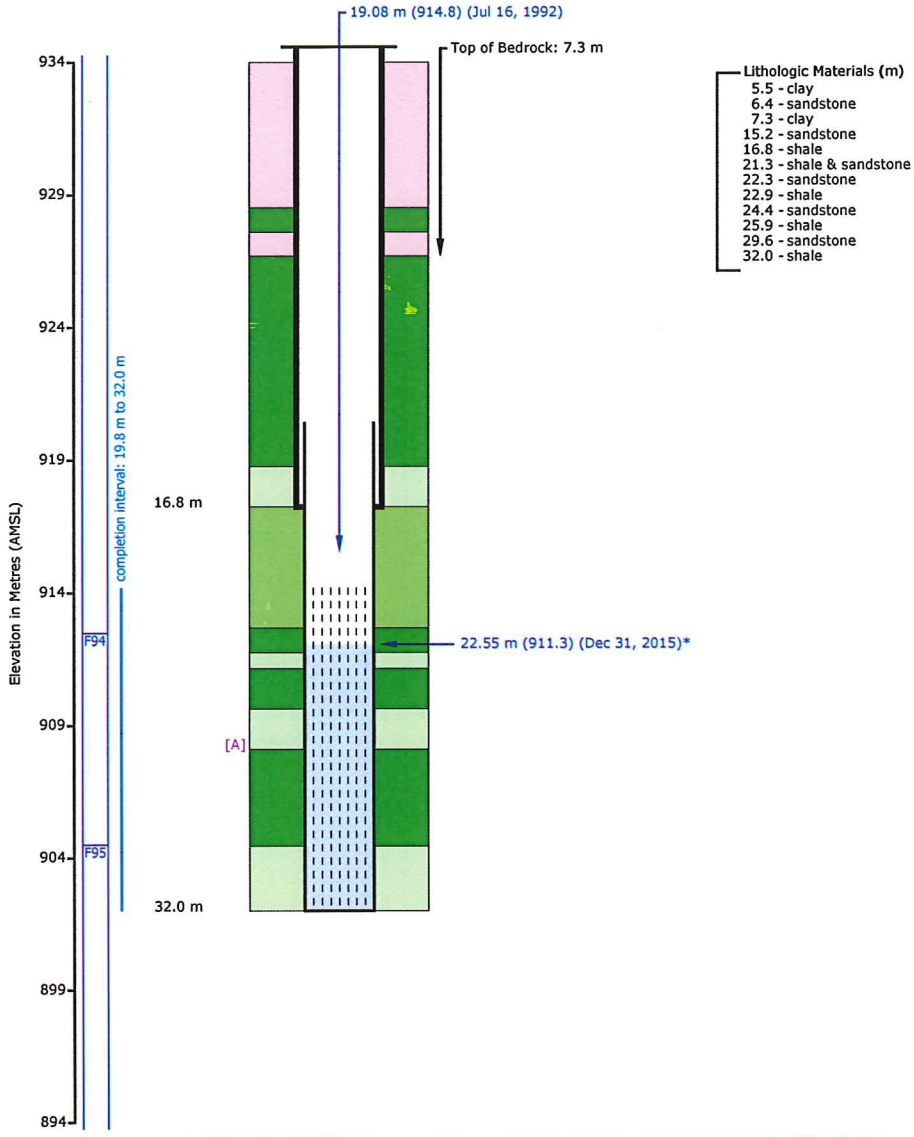
Completion Interval (m): ***19.8 – 32.0 ****
(TGWC determined value)*

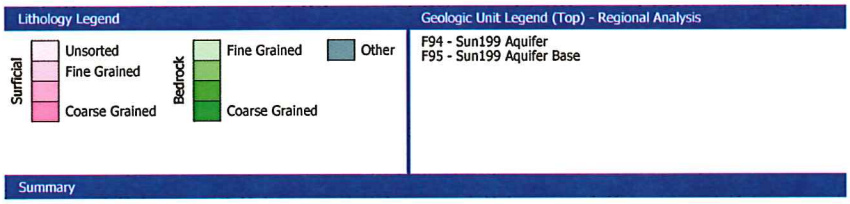
Earliest Water Level (m): ***19.08 – 1992-07-16***

Most Recent Water Level (m): ***22.55 – 2015-12-31***

GIC ID: ***365500***

1992 Gull Lake Golf Course Water Well
Water Well Diagram





Summary

TGWC ID: M35379.066969
Well Name: 1992 Gull Lake Golf Course Water Well
Legal Location: 04-10-042-01 W5M
Casing (OD): 141.2 mm; Steel (5.6")
Liner (OD): 114.3 mm; Plastic (4.5")
Casing Stick-Up: 0.6 m (not drawn to scale)
Completion [A]: 19.8 to 32.0 m; Slotted
*Water Level (recent): 22.55 m (911.3m AMSL) on December 31, 2015 @ 23:00 - Reference Point: Top of Casing
Water Level (oldest): 19.08 m (914.8m AMSL) on July 16, 1992 @ 08:00

** Water-Level Measurements are measured from reference point listed.*
NOTE: Geologic Unit is a guide based on a regional groundwater assessment completed by Hydrogeological Consultants Ltd. (HCL) (http://www.hcl.ca) on behalf of Ponoka County In conjunction with Prairie Farm Rehabilitation Administration (P.F.R.A.).
Drawn: November 17, 2016 11:06 --- http://www.tgwc.com

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 Survey: *May 18, 2011 - Confirmed - Physically*
Work Type: *New Well* — Date Started: *July 12, 1992*
Drilling Method: *Rotary* — Date Completed: *July 15, 1992*
Proposed Use: *Industrial* — Well Status: *Producing*
Completion Type: *Casing/Perforated Liner* — Feature Class: *Water Well*

METRIC REPORT

Easting (m): *62,813.00* ** 75/80
Northing (m): *5,825,524.00* **
Elevation (m): *934* ***
Lot:
Block:
Plan:
Presence of Gas: *No*

04-10-042-01 W5M
M35379.066969
210223 – 1 Google

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

General Details

Depth Completed (m)*: *32.0*
Depth Drilled (m): *32.0*
Completion Aquifer: *Dalehurst Member **
Top of Bedrock (m): *7.3 **
Completion Interval (m): *19.8 – 32.0 **

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)*

Intervals

Slotted: 19.8 to 32.0 m - 0.125 x 12 - Method: Machine
Driven: 0.0 to 16.8 m

Lithology Details

Elevation (AMSL)	Depth (BGL)	Lithology Descriptions (rate Lpm)
928.4	5.5	Clay
927.5	6.4	Grey Sandstone
926.6	7.3	Clay
918.6	15.2	Loss Circulation Brown Sandstone
917.1	16.8	Brown Shale
912.6	21.3	Brown Shale & Sandstone
911.6	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

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

Sampling Details: *May 30, 2014 @ 10:40*
Analysis Details: *June 9, 2014 - Exova Canada Inc. (1005908-1)*

Constituent	Result	Constituent	Result	Constituent	Result
Conductivity (µS/cm)	1020	Nitrate as N	1.89	Colour (TCU)	< 5
Total Dissolved Solids	607	Nitrite as N	< 0.005	Turbidity (NTU)	0.2
Hardness (as CaCO3)	264	pH (pH Unit)	8.16	Fluoride	0.09
T-Alkalinity (as CaCO3)	518	Ion Balance (%)	90	Carbonate	< 6
P-Alkalinity (as CaCO3)	< 5	Total Coliforms:		Bicarbonate	631
Nitrate + Nitrite as N	1.89	Fecal Coliforms:		Hydroxide	< 5
Total Suspended Solids:		Escherichia coli:		Total Iron:	
Sulfate Reducing Bacteria*:				Total Mn:	
Iron Related Bacteria**:				Temperature (°C)	19.9

Constituent	Extractable	Dissolved	Constituent	Extractable	Dissolved
Calcium	47.6		Mercury:		
Chloride:		16.4	Molybdenum		
Iron:	< 0.01		Magnesium	35.1	
Manganese:	< 0.005		Sodium	132	
Aluminum:			Potassium	2.1	
Arsenic:			Vanadium:		
Barium:			Strontium:		
Beryllium:			Nickel:		
Cadmium:			Zinc:		
Chromium:			Copper:		
Cobalt:			Lead:		
Sulfate	62.9		Uranium:		

Extractable - unfiltered
Dissolved - filtered

(1 / 3)

*** MAC Exceedence

194775

12/31/2015
Comments: *Sample collected by HCL field department.*

Note: Constituents have been compared to the maximum acceptable concentration, Health Canada. 2014. Guidelines for Canadian Drinking Water Quality – Summary Table. Water and Air Quality Bureau, Healthy Environments and Consumer Safety Branch. Health Canada. Ottawa. Ontario.

General Comments / Observations

Most Recent Water Level (m): *22.55 m – December 31, 2015*
Pump Intake BTOC (m): *27.4 on July 16, 1992*

Aquifer Tests

	Date & Time	Testing Method	Depth of Test Interval	Duration (minutes) Pumping	Duration (minutes) Recovery	Avg. Rate (Lpm)	NPWL (metres)	Drawdown (metres)	Pump (metres)	Q20 (m³/day)* Apparent	Q20 (m³/day)* Effective	Transmissivity (m²/day)* Apparent	Transmissivity (m²/day)* Aquifer	Transmissivity (m²/day)* Effective
1	1992-07-16 08:00	Pump	[unknown]	720	120	54.6	19.1	0.1	27.4	477.1				

Alias IDs

GIC ID: *365500*
GIC (WellReportID): *365500*

** The Groundwater Centre (TGWC) calculated or determined value.*
*** 75 - MT GPS — 10TM NAD83*
**** 80 - MT DEM — (Ground; AMSL)*

1992 Gull Lake Golf Course Water Well
AEP – Water Well Drilling Report

Alberta

Water Well Drilling Report

View in Imperial | Export to Excel

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

GIC Well ID 365500
GoA Well Tag No.
Drilling Company Well ID
Date Report Received 1992/08/04

Well Identification and Location

Measurement in Metric

Owner Name	Address	Town	Province	Country	Postal Code
GULL LAKE GOLF COURSE	P.O. BOX 6 RR2 SITE 10,	RED DEER			

Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description
	4	10	42	1	5	1	3	9023426	

Measured from Boundary of
m from
m from

GPS Coordinates in Decimal Degrees (NAD 83)
Latitude 52.596994 Longitude -114.071579
How Location Obtained
Map

Elevation m
How Elevation Obtained
Not Obtained

Drilling Information

Method of Drilling
Rotary

Proposed Well Use
Industrial

Type of Work
New Well

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

Yield Test Summary

Measurement in Metric

Recommended Pump Rate 0.00 L/min

Test Date	Water Removal Rate (L/min)	Static Water Level (m)
1992/07/16	54.55	19.08

Well Completion

Measurement in Metric

Total Depth Drilled	Finished Well Depth	Start Date	End Date
32.00 m		1992/07/12	1992/07/15

Borehole

Diameter (cm)	From (m)	To (m)
0.00	0.00	32.00

Surface Casing (if applicable)
Steel
Size OD : 14.12 cm
Wall Thickness : 0.478 cm
Bottom at : 16.76 m

Well Casing/Liner
Plastic
Size OD : 11.43 cm
Wall Thickness : 0.620 cm
Top at : 13.72 m
Bottom at : 32.00 m

Perforations

From (m)	To (m)	Diameter or Slot Width (cm)	Slot Length (cm)	Hole or Slot Interval(cm)
19.81	32.00	0.318		30.48

Perforated by Machine

Annular Seal Driven
Placed from 0.00 m to 16.76 m
Amount

Other Seals

Type	At (m)

Screen Type
Size OD : 0.00 cm

From (m)	To (m)	Slot Size (cm)

Attachment
Top Fittings Bottom Fittings

Pack
Type Grain Size
Amount

Contractor Certification

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

Company Name
G&S WATER WELL SERVICING

Certification No
1

Copy of Well report provided to owner Date approval holder signed

Alberta

Water Well Drilling Report

View in Imperial | Export to Excel

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.

GIC Well ID 365500
GoA Well Tag No.
Drilling Company Well ID
Date Report Received 1992/08/04

GOWN ID

Well Identification and Location

Measurement in Metric

Owner Name	Address	Town	Province	Country	Postal Code
GULL LAKE GOLF COURSE	P.O. BOX 6 RR2 SITE 10,	RED DEER			

Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description
	4	10	42	1	5	1	3	9023426	

Measured from Boundary of
m from
m from

GPS Coordinates in Decimal Degrees (NAD 83)
Latitude 52.596994 Longitude -114.071579
How Location Obtained
Map

Elevation m
How Elevation Obtained
Not Obtained

Additional Information

Measurement in Metric

Distance From Top of Casing to Ground Level cm
Is Artesian Flow
Rate L/min

Is Flow Control Installed
Describe

Recommended Pump Rate 0.00 L/min
Recommended Pump Intake Depth (From TOC) 0.00 m

Pump Installed Depth m
Type Make H.P.
Model (Output Rating)

Did you Encounter Saline Water (>4000 ppm TDS) Depth m
Gas Depth m

Well Disinfected Upon Completion
Geophysical Log Taken
Submitted to ESRD

Sample Collected for Potability Submitted to ESRD

Additional Comments on Well

Contractor Certification

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

Company Name
G&S WATER WELL SERVICING

Certification No
1

Copy of Well report provided to owner Date approval holder signed

Alberta

Water Well Drilling Report

View in Imperial | Export to Excel

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.

GIC Well ID 365500
GoA Well Tag No.
Drilling Company Well ID
Date Report Received 1992/08/04

GOWN ID

Well Identification and Location

Measurement in Metric

Owner Name	Address	Town	Province	Country	Postal Code
GULL LAKE GOLF COURSE	P.O. BOX 6 RR2 SITE 10,	RED DEER			

Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description
	4	10	42	1	5	1	3	9023426	

Measured from Boundary of
m from
m from

GPS Coordinates in Decimal Degrees (NAD 83)
Latitude 52.596994 Longitude -114.071579
How Location Obtained
Map

Elevation m
How Elevation Obtained
Not Obtained

Yield Test

Taken From Ground Level
Depth to water level

Measurement in Metric

Test Date	Start Time	Static Water Level
1992/07/16	12:00 AM	19.08 m

Method of Water Removal

Type Pump
Removal Rate 54.55 L/min
Depth Withdrawn From 27.43 m

If water removal period was < 2 hours, explain why

Drawdown (m)	Elapsed Time Minutes:Sec	Recovery (m)
19.08	0:00	19.17
19.15	0:30	19.11
19.15	1:00	19.10
19.15	1:30	19.10
19.15	2:00	19.10
19.15	3:00	19.10
19.15	4:00	19.10
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	Diversion Date & Time
	L	

Contractor Certification

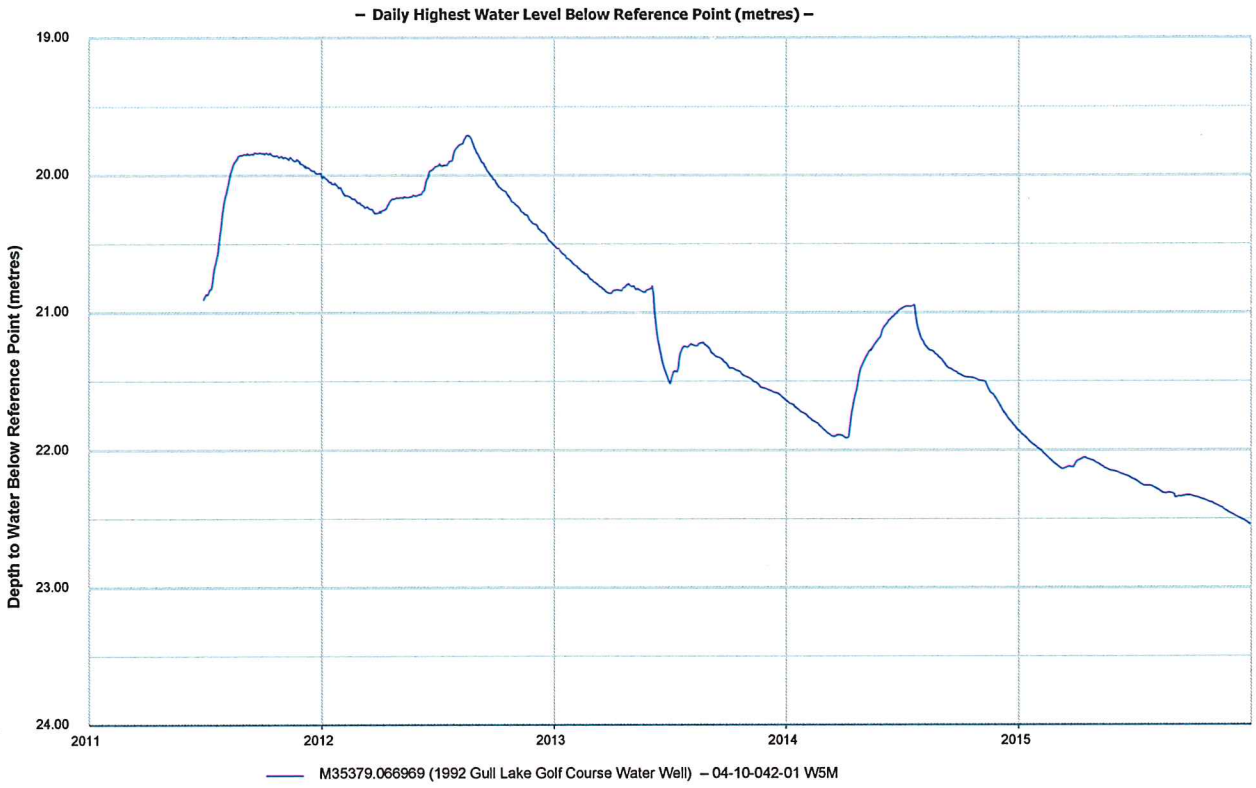
Name of Journeyman responsible for drilling/construction of well
UNKNOWN NA DRILLER

Certification No
1

Company Name
G&S WATER WELL SERVICING

Copy of Well report provided to owner | Date approval holder signed

1992 Gull Lake Golf Course Water Well
2011 – 2015 Hydrograph



2001 Wegmann Domestic Water Well

(2001 Wegmann WW)

16-04-042-01 W5M

(M37490.034988)

Well Spatial Location:

Easting: ***62,345***
Northing: ***5,825,262***
(spatial accuracy MT GPS — 10TM NAD83)

Ground Elevation AMSL (m): ***936***
(elevation accuracy MT DEM)

Date Completed: ***September 2, 2001***

Depth Drilled (m): ***54.9***

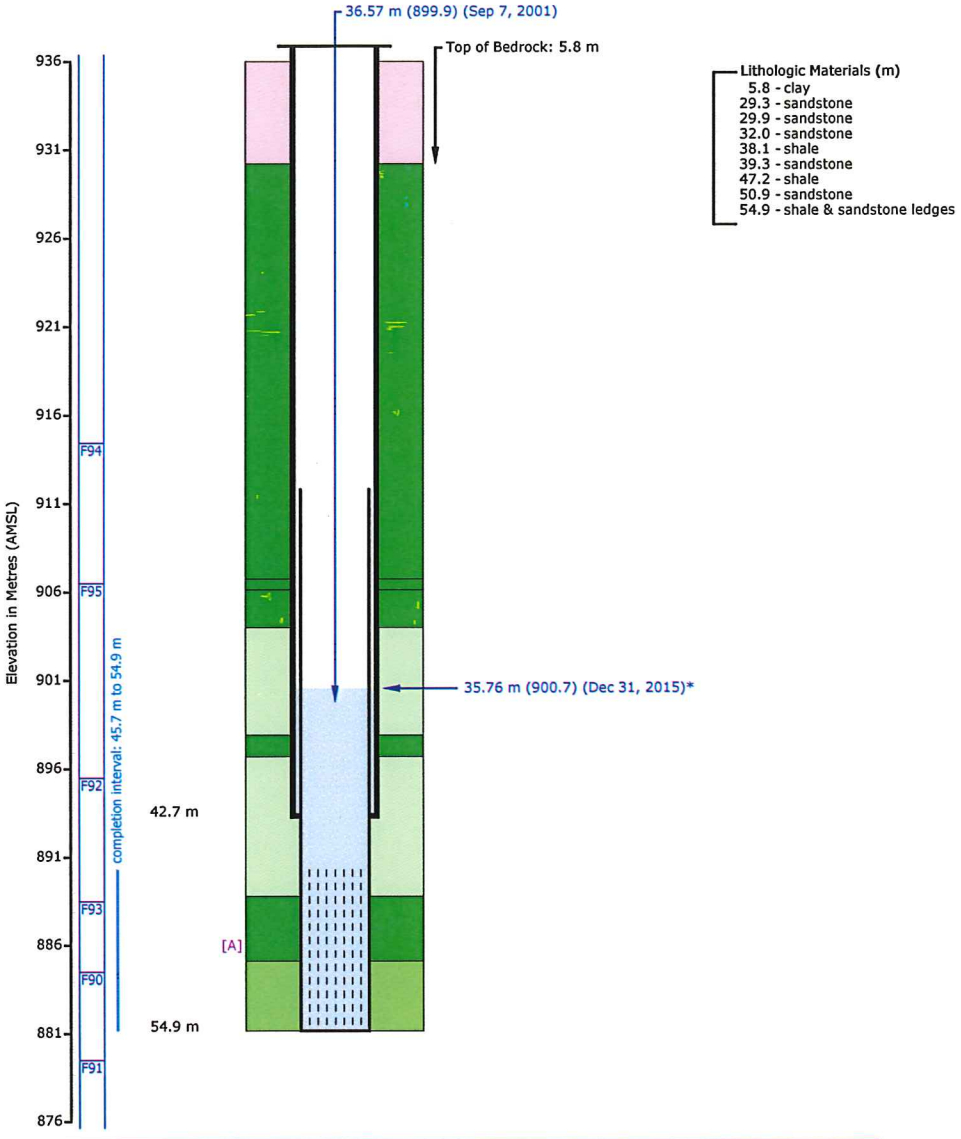
Completion Interval (m): ***45.7*** – ***54.9 ****
(TGWC determined value)*

Earliest Water Level (m): ***36.57*** – ***2001-09-07***

Most Recent Water Level (m): ***35.76*** – ***2015-12-31***

GIC ID: ***499682***

2001 Wegmann Domestic Water Well
Water Well Diagram



Summary

TGWC ID: M37490.034988
Well Name: 2001 Wegmann Domestic Water Well
Legal Location: 16-04-042-01 W5M
Casing (OD): 139.7 mm; Steel (5.5")
Liner (OD): 114.3 mm; Plastic (4.5")
Casing Stick-Up: 0.3 m (not drawn to scale)
Completion [A]: 45.7 to 54.9 m; Slotted
*Water Level (recent): 35.76 m (900.7m AMSL) on December 31, 2015 @ 23:00 - Reference Point: Top of Casing
Water Level (oldest): 36.57 m (899.9m AMSL) on September 7, 2001 @ 11:00

** Water-Level Measurements are measured from reference point listed.*
NOTE: Geologic Unit is a guide based on a regional groundwater assessment completed by Hydrogeological Consultants Ltd. (HCL) (http://www.hcl.ca) on behalf of Ponoka County in conjunction with Prairie Farm Rehabilitation Administration (P.F.R.A.).
Drawn: November 17, 2016 11:07 --- http://www.tgwc.com

Owner: *Wegmann, Herman*
538 Madeira Drive N.E., Calgary, AB T2A 4M8
Contractor: *Alken Basin Drilling Ltd.*
Name: *2001 Wegmann Domestic Water Well (2001 Wegmann WW)*

Field Survey: *June 28, 2011 - Confirmed - Physically*
Work Type: *New Well* | Date Started: *September 2, 2001*
Drilling Method: *Rotary* | Date Completed: *September 2, 2001*
Proposed Use: *Domestic* | Well Status: *Producing*
Completion Type: *Casing/Perforated Liner* | Feature Class: *Water Well*

METRIC REPORT

Easting (m): *62,345.00* ** 75/80
Northing (m): *5,825,262.00* **
Elevation (m): *936* ***
Lot: *11*
Block:
Plan:
Presence of Gas: *No*

16-04-042-01 W5M
M37490.034988
210222 – 1 Google

Elog Taken: *No*
Gamma Taken: *No*
Flowing: *No*
Stick Up (m): *0.3*

General Details

Depth Completed (m)*: *54.9*
Depth Drilled (m): *54.9*
Completion Aquifer: *Dalehurst Member **
Top of Bedrock (m): *5.8 **
Completion Interval (m): *45.7 – 54.9 **

Completion Details

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: [unknown]
Driven & Bentonite: 0.0 to 42.7 m

Lithology Details

Elevation (AMSL)	Depth (BGL)	Lithology Descriptions (rate Lpm)
930.6	5.8	Brown Clay
907.2	29.3	Brown Sandstone
906.6	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
881.6	54.9	Grey Shale & Sandstone Ledges

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

Sampling Details: *May 30, 2014 @ 11:18*
Analysis Details: *June 9, 2014 - Exova Canada Inc. (1005908-2)*

Constituent	Result	Constituent	Result	Constituent	Result
Conductivity (µS/cm)	1080	Nitrate as N	< 0.01	Colour (TCU)	< 5
Total Dissolved Solids	653	Nitrite as N	< 0.005	Turbidity (NTU)	0.3
Hardness (as CaCO3)	15	pH (pH Unit)	8.55	Fluoride	0.47
T-Alkalinity (as CaCO3)	528	Ion Balance (%)	93	Carbonate	19
P-Alkalinity (as CaCO3)	16	Total Coliforms:		Bicarbonate	605
Nitrate + Nitrite as N	< 0.01	Fecal Coliforms:		Hydroxide	< 5
Total Suspended Solids:		Escherichia coli:		Total Iron:	
Sulfate Reducing Bacteria*:				Total Mn:	
Iron Related Bacteria**:				Temperature (°C)	19.8

Constituent	Extractable	Dissolved	Constituent	Extractable	Dissolved
Calcium	4.3		Mercury:		
Chloride:		0.6	Molybdenum		
Iron:	< 0.01		Magnesium	1	
Manganese:	< 0.005		Sodium	252	
Aluminum:			Potassium	0.7	
Arsenic:			Vanadium:		
Barium:			Strontium:		
Beryllium:			Nickel:		
Cadmium:			Zinc:		
Chromium:			Copper:		
Cobalt:			Lead:		
Sulfate:	77.4		Uranium:		

(1 / 3)
Extractable - unfiltered
Dissolved - filtered
*** MAC Exceedence
194779

12/31/2015
Comments: *Sampled by HCL field department.*

Note: Constituents have been compared to the maximum acceptable concentration, Health Canada. 2014. Guidelines for Canadian Drinking Water Quality – Summary Table. Water and Air Quality Bureau, Healthy Environments and Consumer Safety Branch. Health Canada. Ottawa. Ontario.

General Comments / Observations

Initial Comments, Sep 2, 2001: 5 - 120 minutes recovery stayed at 120'.

Most Recent Water Level (m): *35.76 m – December 31, 2015*
Pump Intake BTOC (m): *54.9 on September 7, 2001*

Aquifer Tests

	Date & Time	Testing Method	Depth of Test Interval	Duration (minutes) Pumping	Duration (minutes) Recovery	Avg. Rate (Lpm)	NPWL (metres)	Drawdown (metres)	Pump (metres)	Q20 (m³/day)* Apparent	Q20 (m³/day)* Effective	Transmissivity (m²/day)* Apparent	Transmissivity (m²/day)* Aquifer	Transmissivity (m²/day)* Effective
1	2001-09-07 11:00	Air	[unknown]	120	120		36.6	18.3	54.9					

Alias IDs

GIC ID: *499682*
GIC (WellReportID): *499682*

** The Groundwater Centre (TGWC) calculated or determined value.*
*** 75 - MT GPS — 10TM NAD83*
**** 80 - MT DEM — (Ground; AMSL)*

2001 Wegmann Domestic Water Well
AEP – Water Well Drilling Report

Alberta

Water Well Drilling Report

View in Imperial | Export to Excel

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GOWN ID

GIC Well ID 499682
GoA Well Tag No.
Drilling Company Well ID
Date Report Received 2001/09/27

Well Identification and Location

Measurement in Metric

Owner Name	Address	Town	Province	Country	Postal Code
WEGMAN, HERMAN	538 MADEIRA DR NE, CALGARY				T2A 4M8

Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description
	NE	04	042	01	5	11			

Measured from Boundary of
m from
m from

GPS Coordinates in Decimal Degrees (NAD 83)
Latitude 52.592444 Longitude -114.079858
How Location Obtained
Not Verified

Elevation m
How Elevation Obtained
Not Obtained

Drilling Information

Method of Drilling
Rotary

Proposed Well Use
Domestic

Type of Work
New Well

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 Ledges

Yield Test Summary

Measurement in Metric

Recommended Pump Rate 45.46 L/min

Test Date	Water Removal Rate (L/min)	Static Water Level (m)
2001/09/07	113.65	36.58

Well Completion

Measurement in Metric

Total Depth Drilled	Finished Well Depth	Start Date	End Date
54.86 m		2001/09/02	2001/09/02

Borehole

Diameter (cm)	From (m)	To (m)
0.00	0.00	54.86

Surface Casing (if applicable)
Steel
Size OD : 13.97 cm
Wall Thickness : 0.620 cm
Bottom at : 42.67 m

Well Casing/Liner
Plastic
Size OD : 11.43 cm
Wall Thickness : 0.602 cm
Top at : 24.38 m
Bottom at : 54.86 m

Perforations

From (m)	To (m)	Diameter or Slot 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)	Slot Size (cm)

Attachment
Top Fittings Bottom Fittings

Pack
Type Grain Size
Amount

Contractor Certification

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

Company Name
ALKEN BASIN DRILLING LTD.

Certification No
1

Copy of Well report provided to owner Date approval holder signed

Alberta

Water Well Drilling Report

View in Imperial | Export to Excel

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GIC Well ID 499682
GoA Well Tag No.
Drilling Company Well ID
Date Report Received 2001/09/27

GOWN ID

Well Identification and Location

Measurement in Metric

Owner Name	Address	Town	Province	Country	Postal Code
WEGMAN, HERMAN	538 MADEIRA DR NE, CALGARY				T2A 4M8

Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description
	NE	04	042	01	5	11			

Measured from Boundary of
m from
m from

GPS Coordinates in Decimal Degrees (NAD 83)
Latitude 52.592444 Longitude -114.079858
How Location Obtained
Not Verified

Elevation m
How Elevation Obtained
Not Obtained

Additional Information

Measurement in Metric

Distance From Top of Casing to Ground Level cm
Is Artesian Flow
Rate L/min
Is Flow Control Installed
Describe

Recommended Pump Rate 45.46 L/min
Recommended Pump Intake Depth (From TOC) 47.24 m
Pump Installed Depth m
Type Make H.P.
Model (Output Rating)

Did you Encounter Saline Water (>4000 ppm TDS) Depth m
Gas Depth m
Well Disinfected Upon Completion
Geophysical Log Taken
Submitted to ESRD
Sample Collected for Potability Submitted to ESRD

Additional Comments on Well
DRILLER REPORTS DISTANCE FROM TOP OF CASING TO GROUND LEVEL: 3'. 5-120 MIN RECOVERY STAYED AT 120'.

Yield Test

Measurement in Metric

Test Date 2001/09/07
Start Time 12:00 AM
Static Water Level 36.58 m

Taken From Ground Level
Depth to water level

Method of Water Removal
Type Air
Removal Rate 113.65 L/min
Depth Withdrawn From 54.86 m

Drawdown (m)	Elapsed Time Minutes:Sec	Recovery (m)
	0:00	54.86
	1:00	49.07
	2:00	42.67
	3:00	36.88
	4:00	36.58
	120:00	36.58

If water removal period was < 2 hours, explain why

Water Diverted for Drilling

Water Source	Amount Taken	Diversion Date & Time
	L	

Contractor Certification

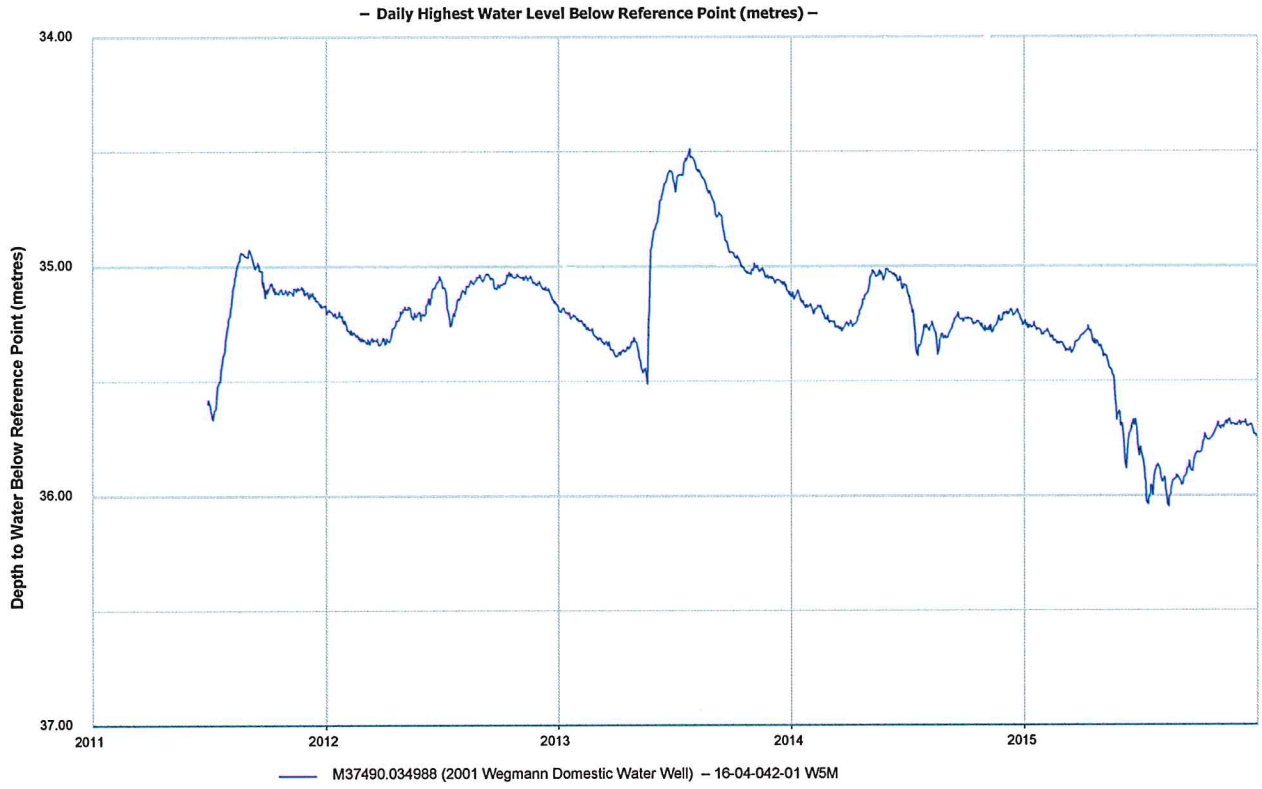
Name of Journeyman responsible for drilling/construction of well
UNKNOWN NA DRILLER

Certification No
1

Company Name
ALKEN BASIN DRILLING LTD.

Copy of Well report provided to owner Date approval holder signed

2001 Wegmann Domestic Water Well
2011 – 2015 Hydrograph



2004 Water Source Well No. 1

(2004 Meridian Beach Water Well No. 1)

08-12-042-01 W5M

(M39227.478953)

Well Spatial Location:

Easting: ***67,275***
Northing: ***5,825,894***
(spatial accuracy MT GPS — 10TM NAD83)

Ground Elevation AMSL (m): ***905.4***
(elevation accuracy Surveyed (other))

Date Completed: ***April 22, 2004***

Depth Drilled (m): ***30.5***

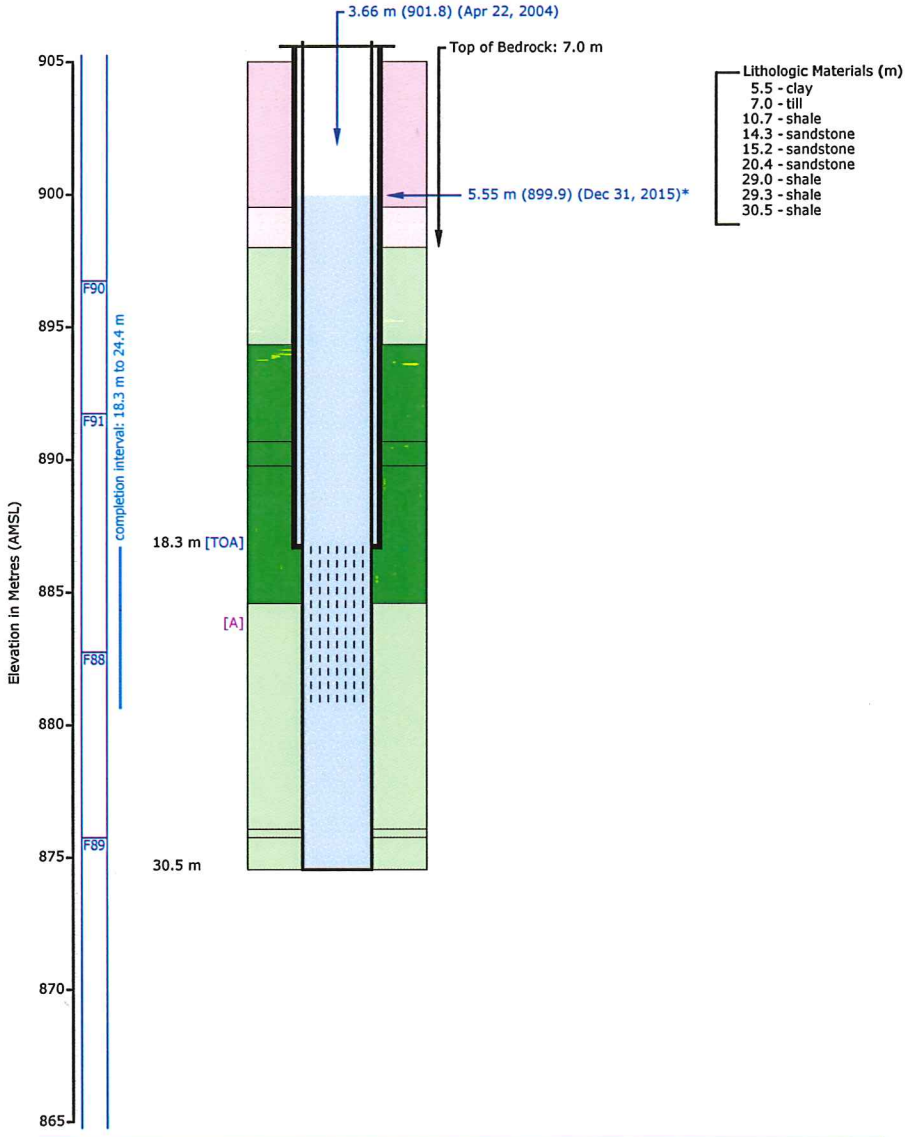
Completion Interval (m): ***18.3 – 24.4 ****
(TGWC determined value)*

Earliest Water Level (m): ***3.66 – 2004-04-22***

Most Recent Water Level (m): ***5.55 – 2015-12-31***

GIC ID: ***1035048***

2004 Water Source Well No. 1
Water Well Diagram



Summary

TGWC ID: M39227.478953
Well Name: 2004 Water Source Well No. 1
Legal Location: 08-12-042-01 W5M
Casing (OD): 141.3 mm; Steel (5.6")
Liner (OD): 114.3 mm; Plastic (4.5")
Casing Stick-Up: 0.5 m (not drawn to scale)
Completion [A]: 18.3 to 24.4 m; Slotted
Top of Aquifer [TOA]: 18.3 m on April 22, 2004
*Water Level (recent): 5.55 m (899.9m AMSL) on December 31, 2015 @ 23:00 - Reference Point: Top of Casing
Water Level (oldest): 3.66 m (901.8m AMSL) on April 22, 2004 @ 11:00

** Water-Level Measurements are measured from reference point listed.*
NOTE: Geologic Unit is a guide based on a regional groundwater assessment completed by Hydrogeological Consultants Ltd. (HCL) (http://www.hcl.ca) on behalf of Ponoka County in conjunction with Prairie Farm Rehabilitation Administration (P.F.R.A.).
Drawn: November 17, 2016 11:07 --- http://www.tgwc.com

Owner: *Horner, Norval/Inshore Developments*
209 Scarboro Avenue SW, Calgary, AB T3C 2H4
Contractor: *Aero Drilling & Consulting Ltd.*
Name: *2004 Water Source Well No. 1 (2004 Meridian Beach Water Well No. 1)*

Field Survey: *May 18, 2011 - Confirmed - Physically*
Work Type: *New Well* — Date Started: *April 22, 2004*
Drilling Method: *Rotary* — Date Completed: *April 22, 2004*
Proposed Use: *Municipal* — Well Status: *Producing*
Completion Type: *Casing/Perforated Liner* — Feature Class: *Water Well*

METRIC REPORT

Easting (m): *67,275.00* ** 75/83
Northing (m): *5,825,894.00* **
Elevation (m): *905.4* ***
Lot:
Block:
Plan:
Presence of Gas: *No*

08-12-042-01 W5M
M39227.478953
210220 – 1 Google

Elog Taken: *No*
Gamma Taken: *No*
Flowing: *No*
Stick Up (m): *0.5*

General Details

Depth Completed (m)*: *24.4*
Depth Drilled (m): *30.5*
Completion Aquifer: *Dalehurst Member **
Top of Bedrock (m): *7.0 **
Completion Interval (m): *18.3 – 24.4 **

Completion Details

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: -0.6 (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

Lithology Details

Elevation (AMSL)	Depth (BGL)	Lithology Descriptions (rate Lpm)
899.9	5.5	Sandy Brown Clay
898.4	7.0	Grey Till
894.8	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
876.2	29.3	Green Shale
874.9	30.5	Grey Shale

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

Sampling Details: *May 30, 2014 @ 12:55*
Analysis Details: *June 9, 2014 - Exova Canada Inc. (1005908-4)*

Constituent	Result	Constituent	Result	Constituent	Result
Conductivity (µS/cm):	965	Nitrate as N:	0.04	Colour (TCU):	5
Total Dissolved Solids:	585	Nitrite as N:	< 0.005	Turbidity (NTU):	0.9
Hardness (as CaCO3):	79	pH (pH Unit):	8.38	Fluoride:	0.30
T-Alkalinity (as CaCO3):	450	Ion Balance (%):	94	Carbonate:	8
P-Alkalinity (as CaCO3):	7	Total Coliforms:		Bicarbonate:	533
Nitrate + Nitrite as N:	0.04	Fecal Coliforms:		Hydroxide:	< 5
Total Suspended Solids:		Escherichia coli:		Total Iron:	
Sulfate Reducing Bacteria*:				Total Mn:	
Iron Related Bacteria**:				Temperature (°C):	19.6

Constituent	Extractable	Dissolved	Constituent	Extractable	Dissolved
Calcium:	17.0		Mercury:		
Chloride:		16.2	Molybdenum		
Iron:	0.12		Magnesium:	8.7	
Manganese:	0.034		Sodium:	200	
Aluminum:			Potassium:	1.7	
Arsenic:			Vanadium:		
Barium:			Strontium:		
Beryllium:			Nickel:		
Cadmium:			Zinc:		
Chromium:			Copper:		
Cobalt:			Lead:		
Sulfate:	71.0		Uranium:		

(1 / 4)
Extractable - unfiltered
Dissolved - filtered
*** MAC Exceedence
194785

12/31/2015
Comments: *Sampled by HCL field department.*

Note: Constituents have been compared to the maximum acceptable concentration, Health Canada. 2014. Guidelines for Canadian Drinking Water Quality – Summary Table. Water and Air Quality Bureau, Healthy Environments and Consumer Safety Branch. Health Canada. Ottawa. Ontario.

General Comments / Observations

Initial Comments, Apr 22, 2004: Shale trap 4 x 5 at 60 feet. PERFS are MILLED SLOTS.

Most Recent Water Level (m): *5.55 m – December 31, 2015*
Pump Intake BTOC (m): *30.5 on April 22, 2004*

Aquifer Tests

	Date & Time	Testing Method	Depth of Test Interval	Duration (minutes) Pumping	Duration (minutes) Recovery	Avg. Rate (Lpm)	NPWL (metres)	Drawdown (metres)	Pump (metres)	Q20 (m³/day)* Apparent	Q20 (m³/day)* Effective	Transmissivity (m²/day)* Apparent	Transmissivity (m²/day)* Aquifer	Transmissivity (m²/day)* Effective
	2015-06-15 11:20	--- Used as Observation Water Well During Aquifer Test No. 2 with M42165.794093 ---											174.0	174.0
2	2004-04-26 12:00	Pump	18.3 to 24.4	2,880	70	150.0	3.0	7.5	—	261.9				
1	2004-04-22 11:00	Air	18.3 to 24.4	120	120	272.8	3.7	26.8	30.5	101.8				

Alias IDs

GIC ID: *1035048*
GIC (WellReportID): *10820026*

** The Groundwater Centre (TGWC) calculated or determined value.*
*** 75 - MT GPS — 10TM NAD83*
**** 83 - Surveyed (other) — (Ground; AMSL)*

2004 Water Source Well No. 1
AEP – Water Well Drilling Report

Alberta

Water Well Drilling Report

View in Imperial **Export to Excel**

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.

GIC Well ID 1035048
GOWN ID
GoA Well Tag No.
Drilling Company Well ID
Date Report Received

Well Identification and Location

Measurement in Metric

Owner Name	Address	Town	Province	Country	Postal Code
HORNER, NORVAL/INSHORE DEV	209 SCARBORO AVE SW	CALGARY	ALBERTA	CA	T3C 2H4

Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description
	SE	12	42	1	5				#2 MAIN

Measured from Boundary of
m from
m from

GPS Coordinates in Decimal Degrees (NAD 83)
Latitude 52.599615 Longitude -114.007878
How Location Obtained
Not Verified

Elevation m
How Elevation Obtained
Not Obtained

Drilling Information

Method of Drilling
Rotary

Proposed Well Use
Industrial

Type of Work
New Well

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

Yield Test Summary

Measurement in Metric

Recommended Pump Rate 272.77 L/min

Test Date	Water Removal Rate (L/min)	Static Water Level (m)
2004/04/22	272.77	3.66

Well Completion

Measurement in Metric

Total Depth Drilled	Finished Well Depth	Start Date	End Date
30.48 m		2004/04/22	2004/04/22

Borehole

Diameter (cm)	From (m)	To (m)
12.70	0.00	30.48

Surface Casing (if applicable)
Steel
Size OD : 14.13 cm
Wall Thickness : 0.655 cm
Bottom at : 18.29 m

Well Casing/Liner
Plastic
Size OD : 11.43 cm
Wall Thickness : 0.602 cm
Top at : 0.00 m
Bottom at : 30.48 m

Perforations

From (m)	To (m)	Diameter or Slot Width (cm)	Slot Length (cm)	Hole or Slot Interval(cm)
18.29	24.38	0.508		

Perforated by Machine

Annular Seal Driven & Bentonite
Placed from 0.00 m to 18.29 m
Amount

Other Seals

Type	At (m)

Screen Type Slotted PVC
Size OD : 11.43 cm

From (m)	To (m)	Slot Size (cm)
18.29	24.38	0.508

Attachment Unknown
Top Fittings Unknown
Bottom Fittings Unknown

Pack
Type Unknown
Grain Size
Amount Unknown

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

Alberta

Water Well Drilling Report

View in Imperial | Export to Excel

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.

GIC Well ID 1035048
GOWN ID
GoA Well Tag No.
Drilling Company Well ID
Date Report Received

Well Identification and Location

Measurement in Metric

Owner Name	Address	Town	Province	Country	Postal Code
HORNER, NORVAL/INSHORE DEV	209 SCARBORO AVE SW	CALGARY	ALBERTA	CA	T3C 2H4

Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description
	SE	12	42	1	5				#2 MAIN

Measured from Boundary of
m from
m from

GPS Coordinates in Decimal Degrees (NAD 83)
Latitude 52.599615 Longitude -114.007878
How Location Obtained
Not Verified

Elevation m
How Elevation Obtained
Not Obtained

Additional Information

Measurement in Metric

Distance From Top of Casing to Ground Level 91.44 cm
Is Artesian Flow
Rate L/min
Is Flow Control Installed
Describe

Recommended Pump Rate 272.77 L/min
Recommended Pump Intake Depth (From TOC) 21.34 m
Pump Installed Depth m
Type Make H.P.
Model (Output Rating)

Did you Encounter Saline Water (>4000 ppm TDS) Depth m
Gas Depth m
Well Disinfected Upon Completion
Geophysical Log Taken
Submitted to ESRD
Sample Collected for Potability Submitted to ESRD

Additional Comments on Well
TOP OF LINER +2 NOT 2FT. ALSO SHALE TRAP 4X5 AT 60 FT. PERFS ARE MILLED SLOTS.

Yield Test

Taken From Ground Level
Depth to water level

Measurement in Metric

Test Date	Start Time	Static Water Level
2004/04/22	12:00 AM	3.66 m

Method of Water Removal
Type Air
Removal Rate 272.77 L/min
Depth Withdrawn From 30.48 m

If water removal period was < 2 hours, explain why

Drawdown (m)	Elapsed Time Minutes:Sec	Recovery (m)
	0:00	30.48
	1:00	12.50
	2:00	5.79
	3:00	4.57
	4:00	3.96
	5:00	3.66
	6:00	3.66
	7:00	3.66
	10:00	3.66
30.48	120:00	3.66

Water Diverted for Drilling

Water Source	Amount Taken	Diversion Date & Time
	L	

Contractor Certification

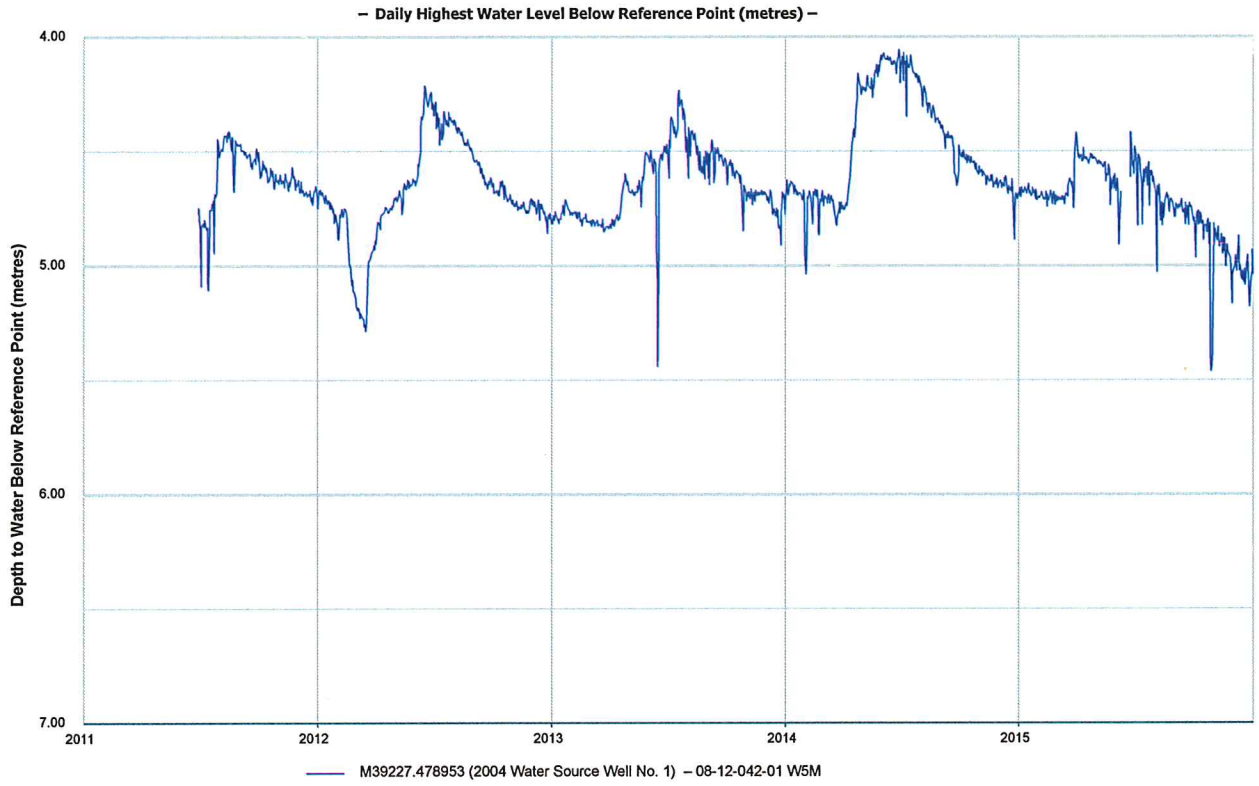
Name of Journeyman responsible for drilling/construction of well
SHAWN CROWELL

Certification No
18687A

Company Name
AERO DRILLING & CONSULTING LTD.

Copy of Well report provided to owner Date approval holder signed

2004 Water Source Well No. 1
2011 – 2015 Hydrograph



2004 Water Source Well No. 2

(2004 Meridian Beach Water Well No. 2)

08-12-042-01 W5M

(M39227.478952)

Well Spatial Location:

Easting: ***67,302***
Northing: ***5,825,900***
(spatial accuracy MT GPS — 10TM NAD83)

Ground Elevation AMSL (m): ***905.3***
(elevation accuracy Surveyed (other))

Date Completed: ***April 21, 2004***

Depth Drilled (m): ***30.5***

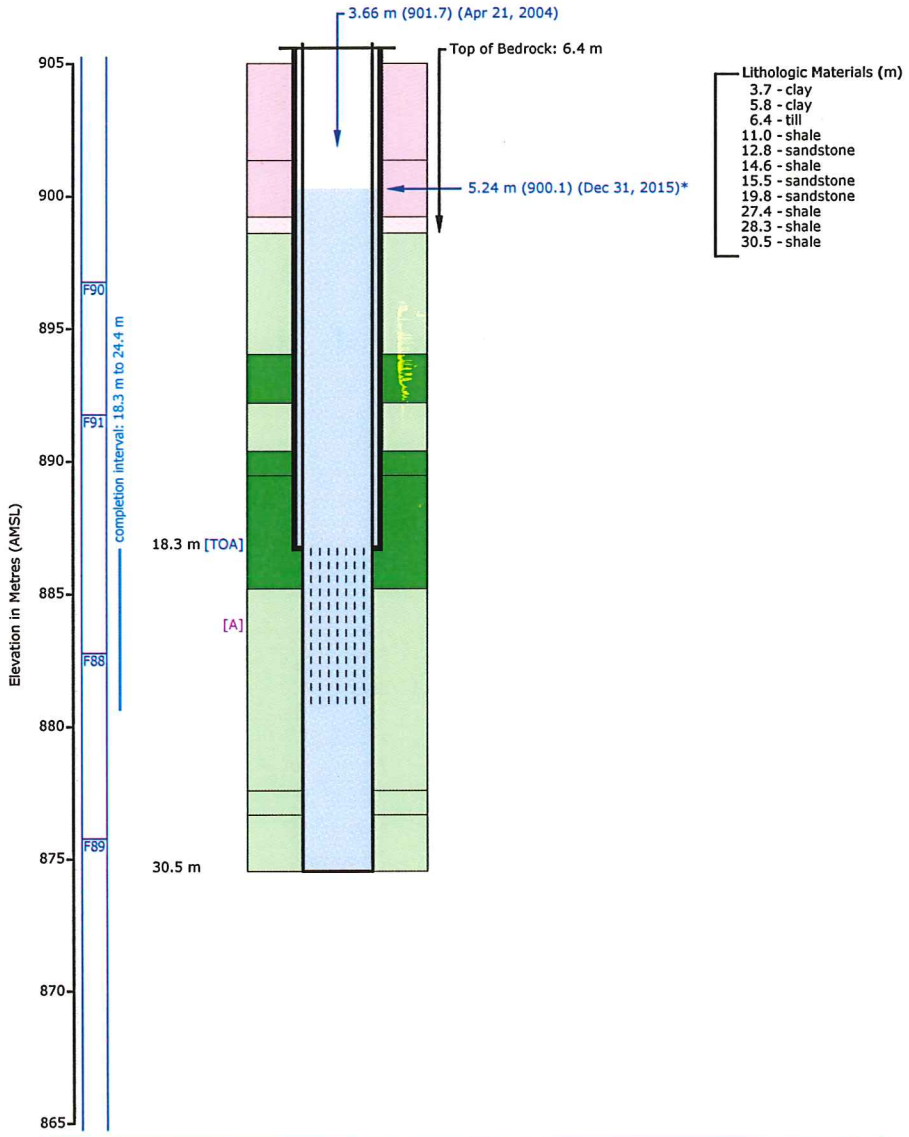
Completion Interval (m): ***18.3*** – ***24.4 ****
(TGWC determined value)*

Earliest Water Level (m): ***3.66*** – ***2004-04-21***

Most Recent Water Level (m): ***5.24*** – ***2015-12-31***

GIC ID: ***1035047***

2004 Water Source Well No. 2
Water Well Diagram



Summary

TGWC ID: M39227.478952
Well Name: 2004 Water Source Well No. 2
Legal Location: 08-12-042-01 W5M
Casing (OD): 141.3 mm; Steel (5.6")
Liner (OD): 114.3 mm; Plastic (4.5")
Casing Stick-Up: 0.5 m (not drawn to scale)
Completion [A]: 18.3 to 24.4 m; Slotted
Top of Aquifer [TOA]: 18.3 m on April 21, 2004
*Water Level (recent): 5.24 m (900.1m AMSL) on December 31, 2015 @ 23:00 - Reference Point: Top of Casing
Water Level (oldest): 3.66 m (901.7m AMSL) on April 21, 2004 @ 11:00

** Water-Level Measurements are measured from reference point listed.*
NOTE: Geologic Unit is a guide based on a regional groundwater assessment completed by Hydrogeological Consultants Ltd. (HCL) (http://www.hcl.ca) on behalf of Ponoka County in conjunction with Prairie Farm Rehabilitation Administration (P.F.R.A.).
Drawn: November 17, 2016 11:07 --- http://www.tgwc.com

Owner: *Horner, Norval/Inshore Developments*
209 Scarboro Avenue SW, Calgary, AB T3C 2H4
Contractor: *Aero Drilling & Consulting Ltd.*
Name: *2004 Water Source Well No. 2 (2004 Meridian Beach Water Well No. 2)*

Field Survey: *May 18, 2011 - Confirmed - Physically*
Work Type: *New Well* — Date Started: *April 21, 2004*
Drilling Method: *Rotary* — Date Completed: *April 21, 2004*
Proposed Use: *Municipal* — Well Status: *Producing*
Completion Type: *Casing/Perforated Liner* — Feature Class: *Water Well*

METRIC REPORT

Easting (m): *67,302.00* ** 75/83
Northing (m): *5,825,900.00* **
Elevation (m): *905.3* ***
Lot:
Block:
Plan:
Presence of Gas: *No*

08-12-042-01 W5M
M39227.478952
210218 – 2 Google

Elog Taken: *No*
Gamma Taken: *No*
Flowing: *No*
Stick Up (m): *0.5*

General Details

Depth Completed (m)*: *24.4*
Depth Drilled (m): *30.5*
Completion Aquifer: *Dalehurst Member **
Top of Bedrock (m): *6.4 **
Completion Interval (m): *18.3 – 24.4 **

Completion Details

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: -0.6 (m); Bottom: 30.5 (m)*

Intervals

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

Lithology Details

Elevation (AMSL)	Depth (BGL)	Lithology Descriptions (rate Lpm)
901.7	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
874.8	30.5	Grey Shale

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

Sampling Details: *May 30, 2014 @ 12:45*
Analysis Details: *June 9, 2014 - Exova Canada Inc. (1005908-3)*

Constituent	Result	Constituent	Result	Constituent	Result
Conductivity (µS/cm):	933	Nitrate as N:	0.02	Colour (TCU):	5
Total Dissolved Solids:	561	Nitrite as N:	< 0.005	Turbidity (NTU):	1
Hardness (as CaCO3):	99.7	pH (pH Unit):	8.35	Fluoride:	0.39
T-Alkalinity (as CaCO3):	441	Ion Balance (%):	94	Carbonate:	< 6
P-Alkalinity (as CaCO3):	< 5	Total Coliforms:		Bicarbonate:	538
Nitrate + Nitrite as N:	0.02	Fecal Coliforms:		Hydroxide:	< 5
Total Suspended Solids:		Escherichia coli:		Total Iron:	
Sulfate Reducing Bacteria*:				Total Mn:	
Iron Related Bacteria**:				Temperature (°C):	19.8

Constituent	Extractable	Dissolved	Constituent	Extractable	Dissolved
Calcium:	20.0		Mercury:		
Chloride:		10.2	Molybdenum		
Iron:	0.25		Magnesium:	12.1	
Manganese:	0.032		Sodium:	182	
Aluminum:			Potassium:	1.4	
Arsenic:			Vanadium:		
Barium:			Strontium:		
Beryllium:			Nickel:		
Cadmium:			Zinc:		
Chromium:			Copper:		
Cobalt:			Lead:		
Sulfate:	70.6		Uranium:		

(1 / 3)
Extractable - unfiltered
Dissolved - filtered
*** MAC Exceedence
194784

12/31/2015
Comments: *Sample collected by HCL field department.*

Note: Constituents have been compared to the maximum acceptable concentration, Health Canada. 2014. Guidelines for Canadian Drinking Water Quality – Summary Table. Water and Air Quality Bureau, Healthy Environments and Consumer Safety Branch. Health Canada. Ottawa. Ontario.

General Comments / Observations

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

Most Recent Water Level (m): *5.24 m – December 31, 2015*
Pump Intake BTOC (m): *30.5 on April 21, 2004*

Aquifer Tests

	Date & Time	Testing Method	Depth of Test Interval	Duration (minutes) Pumping	Recovery	Avg. Rate (Lpm)	NPWL (metres)	Drawdown (metres)	Pump (metres)	Q20 (m³/day)* Apparent	Effective	Transmissivity (m²/day)* Apparent	Aquifer	Effective
	2015-06-15 11:20	--- Used as Observation Water Well During Aquifer Test No. 2 with M42165.794093 ---											157.0	157.0
	2004-04-26 12:00	--- Used as Observation Water Well During Aquifer Test No. 2 with M39227.478953 ---												
1	2004-04-21 11:00	Air	18.3 to 24.4	120	10	272.8	3.7	26.8	30.5	101.8				

Alias IDs

GIC ID: *1035047*
GIC (WellReportID): *10819987*

** The Groundwater Centre (TGWC) calculated or determined value.*
*** 75 - MT GPS — 10TM NAD83*
**** 83 - Surveyed (other) — (Ground; AMSL)*

2004 Water Source Well No. 2
AEP – Water Well Drilling Report

Alberta

Water Well Drilling Report

View in Imperial | Export to Excel

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.

GIC Well ID 1035047
GOWN ID
GoA Well Tag No.
Drilling Company Well ID
Date Report Received

Well Identification and Location

Measurement in Metric

Owner Name	Address	Town	Province	Country	Postal Code
HORNER, NORVAL/INSHORE DEV	209 SCARBORO AVE SW	CALGARY	ALBERTA	CA	T3C 2H4

Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description
	SE	12	42	1	5				#1 OBSERVATION

Measured from Boundary of
m from
m from

GPS Coordinates in Decimal Degrees (NAD 83)
Latitude 52.599615 Longitude -114.007878
How Location Obtained
Not Verified

Elevation m
How Elevation Obtained
Not Obtained

Drilling Information

Method of Drilling
Rotary

Type of Work
New Well

Proposed Well Use
Industrial

Formation Log

Measurement in Metric

Depth from ground level (m)	Water Bearing	Lithology Description
3.66		Brown Sandy Clay
5.79		Brown Clay
6.40		Gray Till
10.97		Gray Shale
12.80		Gray Sandstone
14.63		Gray Shale
15.54		Brown Sandstone
19.81		Gray Sandstone
27.43		Gray Shale
28.35		Green Shale
30.48		Gray Shale

Yield Test Summary

Measurement in Metric

Recommended Pump Rate 272.77 L/min

Test Date	Water Removal Rate (L/min)	Static Water Level (m)
2004/04/21	272.77	3.66

Well Completion

Measurement in Metric

Total Depth Drilled	Finished Well Depth	Start Date	End Date
30.48 m		2004/04/21	2004/04/21

Borehole

Diameter (cm)	From (m)	To (m)
12.70	0.00	30.48

Surface Casing (if applicable)
Steel
Size OD : 14.13 cm
Wall Thickness : 0.655 cm
Bottom at : 18.29 m

Well Casing/Liner
Plastic
Size OD : 11.43 cm
Wall Thickness : 0.602 cm
Top at : 0.00 m
Bottom at : 30.48 m

Perforations

From (m)	To (m)	Diameter or Slot Width (cm)	Slot Length (cm)	Hole or Slot 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

Type	At (m)

Screen Type
Size OD : cm

From (m)	To (m)	Slot Size (cm)

Attachment
Top Fittings Bottom Fittings

Pack
Type Unknown Grain Size
Amount Unknown

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

Alberta

Water Well Drilling Report

View in Imperial | Export to Excel

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.

GIC Well ID 1035047
GOWN ID
GoA Well Tag No.
Drilling Company Well ID
Date Report Received

Well Identification and Location

Measurement in Metric

Owner Name	Address	Town	Province	Country	Postal Code
HORNER, NORVAL/INSHORE DEV	209 SCARBORO AVE SW	CALGARY	ALBERTA	CA	T3C 2H4

Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description
	SE	12	42	1	5				#1 OBSERVATION

Measured from Boundary of
m from
m from

GPS Coordinates in Decimal Degrees (NAD 83)
Latitude 52.599615 Longitude -114.007878
How Location Obtained
Not Verified

Elevation m
How Elevation Obtained
Not Obtained

Additional Information

Measurement in Metric

Distance From Top of Casing to Ground Level 91.44 cm
Is Artesian Flow
Rate L/min
Is Flow Control Installed
Describe

Recommended Pump Rate 272.77 L/min
Recommended Pump Intake Depth (From TOC) 21.34 m
Pump Installed Depth m
Type Make H.P.
Model (Output Rating)

Did you Encounter Saline Water (>4000 ppm TDS) Depth m
Gas Depth m
Well Disinfected Upon Completion
Geophysical Log Taken
Submitted to ESRD
Sample Collected for Potability Submitted to ESRD

Additional Comments on Well
TOP OF LINER AT +2 NOT 2FT BELOW GROUND LEVEL. GROUTED SHALE TRAP 4X5 AT 60 FT.

Yield Test

Taken From Ground Level
Depth to water level

Measurement in Metric

Test Date	Start Time	Static Water Level
2004/04/21	12:00 AM	3.66 m

Method of Water Removal
Type Air
Removal Rate 272.77 L/min
Depth Withdrawn From 30.48 m

If water removal period was < 2 hours, explain why

Drawdown (m)	Elapsed Time Minutes:Sec	Recovery (m)
	0:00	30.48
	1:00	13.11
	2:00	4.88
	3:00	4.27
	4:00	3.66
	5:00	3.66
	6:00	3.66
	10:00	3.66
30.48	120:00	

Water Diverted for Drilling

Water Source	Amount Taken	Diversion Date & Time
	L	

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

2004 Water Source Well No. 2
2011 – 2015 Hydrograph