



April 13, 2015

Mr. James Cefalo
Idaho Department of Water Resources
900 North Skyline Drive, Suite A
Idaho Falls, ID 83402-1718

RE: AQUIFER IMPACT ANALYSIS FOR GERALD AND DALE BEETON WATER
RIGHTS APPLICATION

Dear Mr. Cefalo:

The groundwater impact assessment provided here is for the Gerald and Dale Beeton Water Right Application. They have approximately 160 acres of land south of Malad City, Idaho (Figure 1) and their application is for 3.2 cfs. A pumping test was conducted on August 18, 2009 in an existing well 2.3 miles southeast of the propose drill site, labeled the Smith Well in Figure 1. The parameters from the aquifer test are used in a computer simulation to predict the potential impacts to neighboring wells within ½ mile of the proposed point of diversion (POD). The results of the computer analysis show that the proposed diversion rate will have a minimal impact on neighboring wells.

Nearby PODs

The proposed well location is 16S, 36E, 16 NW SW NE as shown in Figure 2. A search was made for all existing points of diversions (PODs), i.e. water rights near the Beeton property. In Figures 3 through 6, a blue circle is shown with a ½ mile radius centered on the proposed Beeton well location. The circle encompasses portions of sections 9 and 16, T16S, R36E. Another search was made for all wells in sections 16 and 9 T16S R36E. The results of the water right search are provided in Tables 1 and 2 and the results for the well search are provided in Tables 3 and 4. It should be noted that there is one surface water right in sections 16, T16S, R36E and no surface water rights in section 9, T16S, R36E. It should also be noted that, as Figures 4-6 show, the interactive map generator on the IDWR website shows that there are no water rights or wells within ½ mile of Beeton's proposed POD.

Nearby Wells

A search was performed of the IDWR drillers' log database for wells within ½ mile of the proposed well location. No wells could be found within ½ mile of the proposed POD, however, several well logs were found that are within a mile. These logs are provided in Attachment 1 to show the local hydrogeology. Basically, the well logs are consistent with geologic conceptual model of a steep sided normal fault graben (Basin and Range type) filled with unconsolidated alluvium and lacustrine sediments. The well logs east of the Beeton property show primarily unconsolidated sands, gravels and clay to total depth, while well logs to the west (the two Hannum wells) show unconsolidated sediment to ranging from 110 ft to 300 ft. Below this the drillers reported either quartzite or limestone. It is unclear exactly what these rocks are because some drillers have different classifications of rock types from normal geologic terms. The Salt Lake Formation is reported to contain fresh water limestone. Regardless, the rocks are hard and



represent the near proximity of the edge of the basin, either the Salt Lake Formation or the older basin and range meta sediments. The logs also report that these deeper rock units are fractured and water bearing.

Hydrogeology

The lithology in this area is a thought to be a series of unconsolidated sands, gravels and clays. As mentioned earlier, at depth the lithogy transitions to the older more consolidated Salt Lake Formation and beneath it are the old mountain forming meta sediments. There is not a marker layer or geologic unit that can be correlated over distances especially in the shallow unconsolidated sediments. The inability to correlate geologic layers is consistent with the area being situated in a cut and fill sequence of the Malad River. It is further complicated by waxing and waning cycles of Lake Bonneville. For the purposes of this investigation it is assumed that the aquifer thickness is 200 ft in this area. This is based on driller logs for three irrigations wells in Section 30, T15S, R36E about four miles northwest of the proposed POD and regional considerations of the hydrogeology. It is also consistent with the deep hard rock wells to the west of the site that each penetrated over 150 ft of saturated broken rock. It should be noted that the aquifer is not one homogenous layer but a sequence of permeable lens of sand and gravel stringers and broken rock, which are primarily confined. However, it is anticipated that locally the shallow sequences of the aquifer are unconfined.

Nearby Pumping Tests

The test well is an irrigation well located about 2.3 miles southeast of the location of the proposed Beeton POD (see Figure 1). The Smith irrigation well is 218 ft deep, having an 8" casing completion in cemented gravel from 145 to 218 ft. The well log for the Smith Irrigation well is provided in Attachment 1. From the pumping test the aquifer transmissivity was measured at 3.5×10^4 ft²/day and the storativity is 0.0012. Another pumping test was conducted in the town of Samaria 6.5 miles northwest of the Beeton site. The Jeff Davis Irrigation Well measured 6.24×10^4 ft²/day for the transmissivity and the Davis Stock Well had a measured transmissivity of 5.1×10^4 ft²/day. The measured transmissivity in the Smith Pumping Test is consistent with other area pumping tests, but the storativity value is a bit low for these types of unconsolidated aquifer materials (usual is about 0.01) (Freeze and Cherry, 1979).

For the pumping calculations, the aquifer values from the Smith Pumping test were used, even though there is some justification to raise them based on the results of the Davis tests. Refraining from raising the aquifer parameters was tempered by oral communication with Mr. Dennis Dunn, who indicated that there are some dry irrigation wells in the vicinity of the Beeton property. These may be the Hannum wells described earlier, although one well log specified that the flow from the well was 200 gpm. Low yield wells can be caused by local aquifer heterogeneity, poor well construction, lack of depth and poor development. The cause of the low yield wells is unknown, but it was deemed prudent not to be overly optimistic with the aquifer parameters. On the other hand, the Beeton location is closer to the axis of the valley than the Smith's well and it is reasonable to assume that the aquifer will be thicker toward the center of the valley.



Impact Assessment

Mr. Beeton wishes to irrigate 160 acres per IDWR estimates this should require 0.02 cfs per acre or 1436.3 gpm or 3.2 cfs. To estimate the long-term drawdown and impact to neighboring wells from pumping of the proposed Beeton Well, the forward solution capabilities of the AQTESOLV program were employed. The input parameters to the model are listed in Table 3-1 (see Attachment 3). Boundaries in AQTESOLV were enabled as shown in Figure 3-1 to represent Malad Valley. As depicted in Figure 3-1 and listed in Table 3-2 the model is 22,000 ft wide and 80,000 ft long. Because the Malad Valley is bounded by mountains consisting of Paleozoic and Mesozoic sedimentary rock that do not provide much water compared to the unconsolidated valley fill, the east and west boundaries are set as impermeable or "no flow" boundaries. The head is held constant at the north boundary. A no boundary was enabled for the southern boundary which means These assumptions prevail at that location.

In the model domain, the proposed Beeton POD well is located 8,540 ft east of the west boundary and 13,460 ft west of the east boundary. This represents the proximity of the proposed POD to the nearby mountains. The no flow boundaries have the effect of increasing drawdown.

Figure 4-2 shows the AQTESOLV[®] output plot of the forward calculation for the proposed well pumping at 3.2 cfs (1436 gpm) constantly for 6 months (April 15 to Oct 15). At the end of the time period the predicted drawdown is estimated to be 20.1 feet in the proposed POD. The calculated drawdown for a well ¼ mile north of the POD is predicted to be 10.1 ft. It is important to note that drawdown increases rapidly toward the end of the pumping period. The Beeton's will not pump continuously at the full diversion rate and the actual drawdown will be less.

It is my professional opinion that the Beeton's water right application will not excessively impact his neighbors' right to divert water. I believe that the calculated drawdown over estimates the actual drawdown to be expected for the following reasons: 1) Mr. Beeton will never pump continuously at the maximum rate for 180 days to consume 1142 acre – ft in a single year; 2) the Paleozoic/Mesozoic rocks of the mountains are not impermeable and will provide some water to the system, thus reducing drawdown, 3) several canals and the Malad River are within the domain of the model and no credit for recharge/leakage is taken in the model, and 4) the calculated impact used confined aquifer conditions for the entire domain, while it is known that unconfined leaky confined conditions exist over large parts of the area. Unconfined and leaky confined conditions will greatly reduce drawdown. All of these factors will reduce the predicted drawdown presented here.

Please do not hesitate to call me if you have any questions about this letter or the calculations presented.

Respectfully,

Thomas R. Wood, PhD, PG





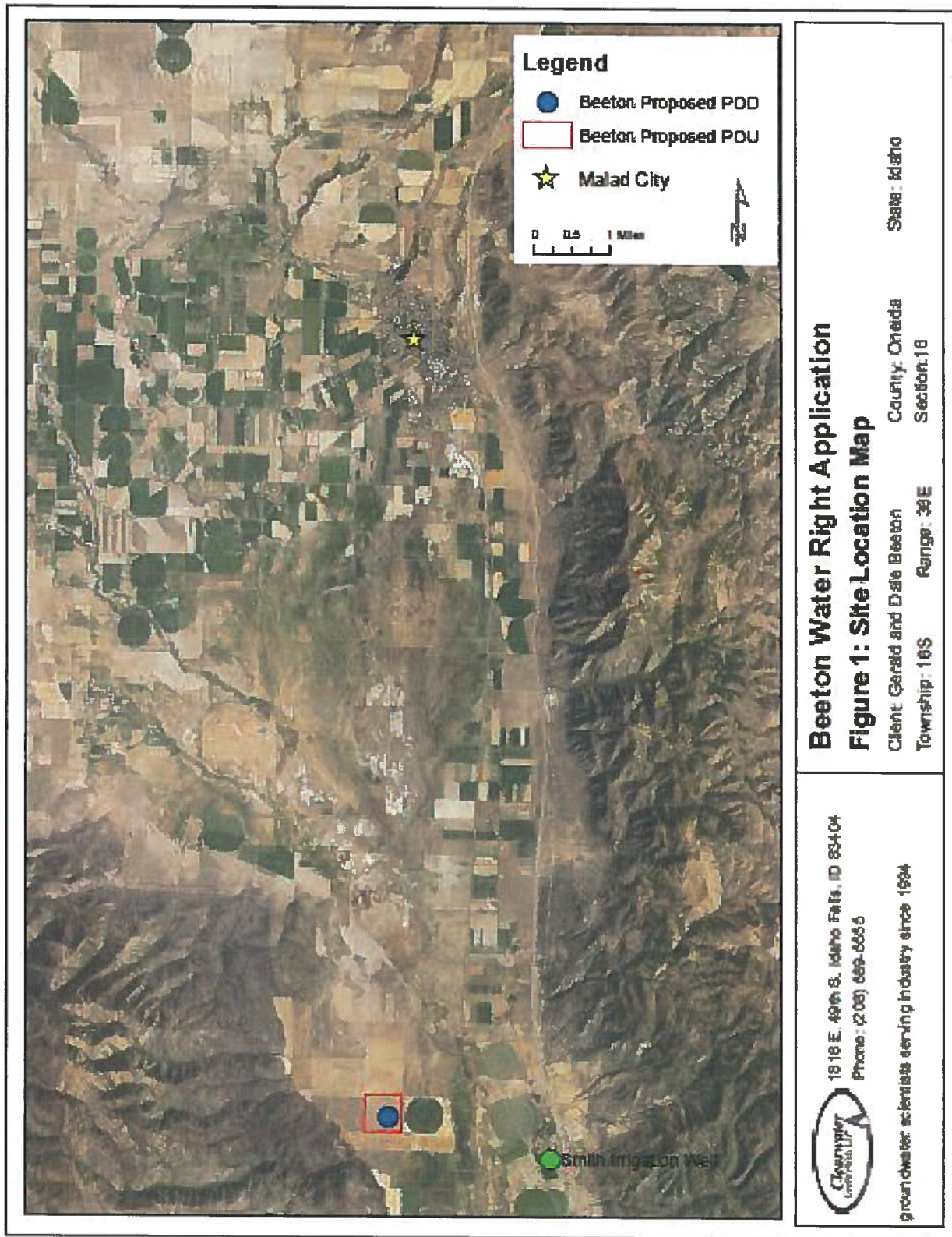
Clearwater Geosciences, LLP
Ground Water Development and Exploration

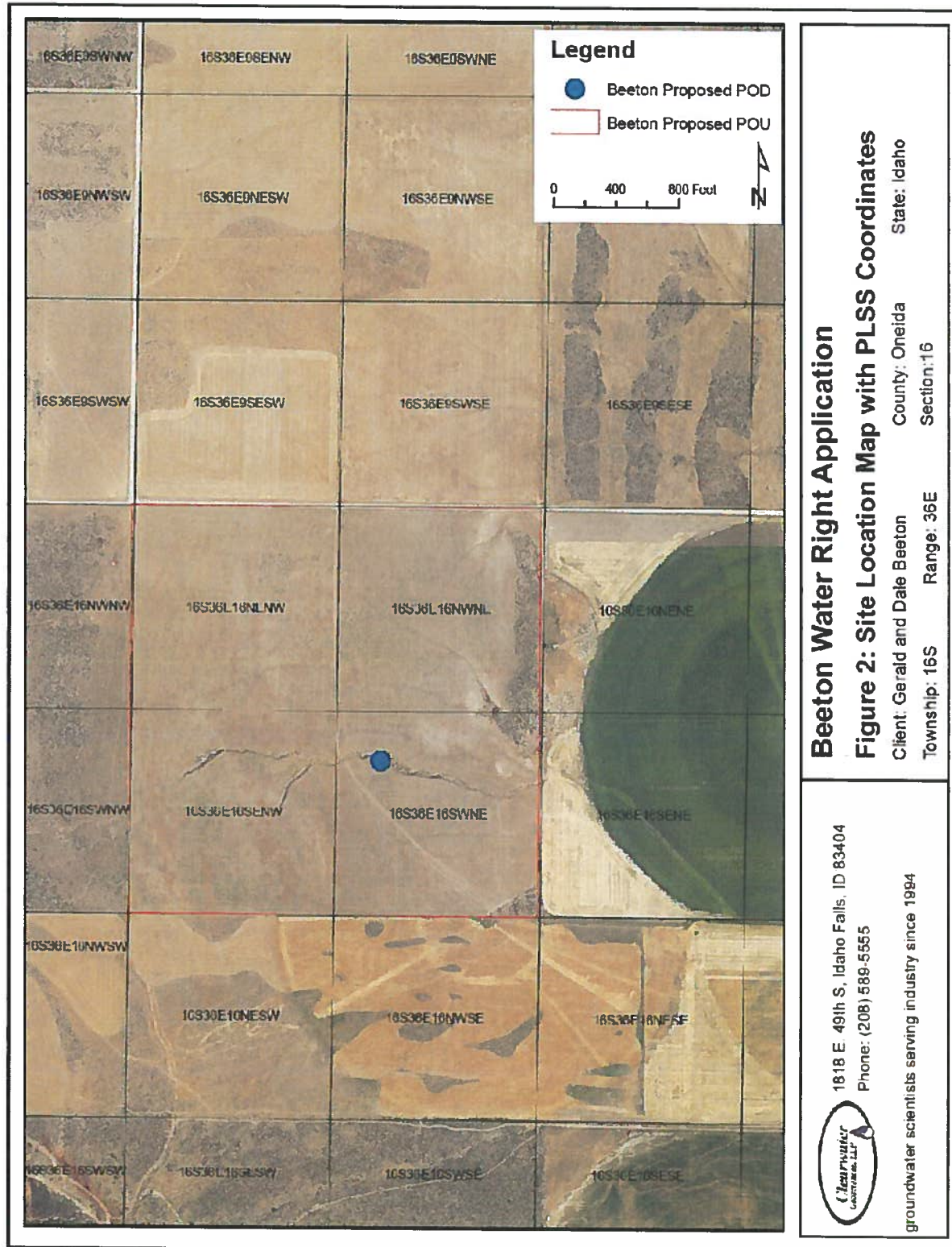
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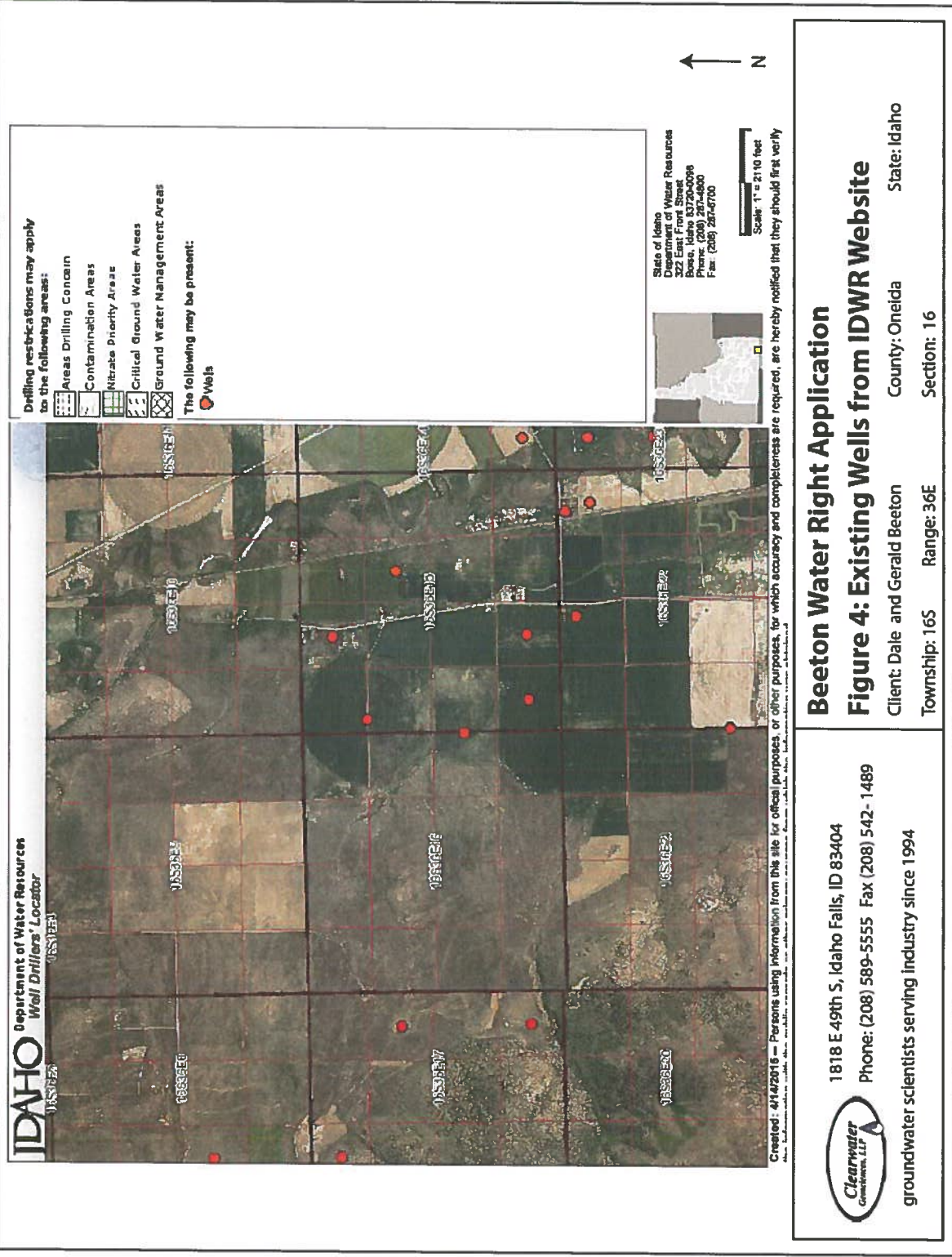
Gerald and Dale Beeton, 9124 Outlaw Pass Menon ID 83434

References

Freeze, R.A. and J.A. Cherry, 1979, Groundwater, ISBN 0-13-365312-9, Prentice-Hall, Inc., Englewood Cliffs, New Jersey 07632.









Drilling restrictions may apply to the following areas:

- Areas Drilling Concern
- Contamination Areas
- Nitrate Priority Areas
- Critical Ground Water Areas
- Ground Water Management Areas

The following may be present:

- POD - Water Rights

State of Idaho
Department of Water Resources
322 East Front Street
Boone, Idaho 83201-0049
Phone: (208) 379-6000
Fax: (208) 287-6000

3243 feet

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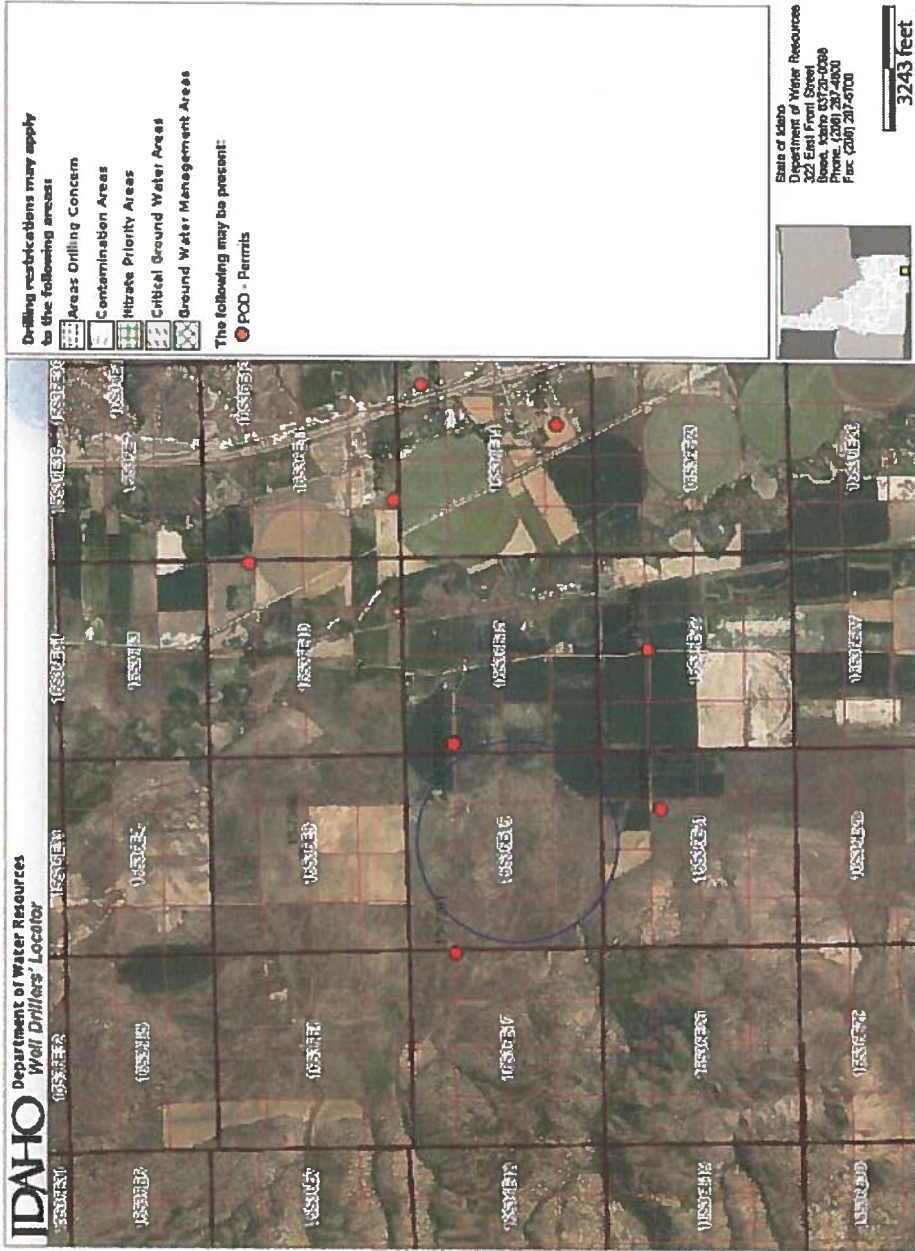
Beeton Water Right Application

Figure 5: Water Rights from IDWR Website

1818 E 49th S, Idaho Falls, ID 83404
Phone: (208) 589-5555 Fax (208) 542- 1489
groundwater scientists serving industry since 1994



Client: Dale and Gerald Beeton
Township: 16S Range: 36E Section: 16
County: Oneida
State: Idaho



Beeton Water Right Application
Figure 6: Water Right Permits from IDWR Website

Client: Dale and Gerald Beeton
 County: Oneida
 State: Idaho

Township: 16S
 Range: 36E
 Section: 16

1818 E 49th S, Idaho Falls, ID 83404
 Phone: (208) 589-5555 Fax (208) 542- 1489

Clearwater Geosciences, LLP
 groundwater scientists serving industry since 1994



Table 1 IDWR Search results for point of diversions in T16S, R36E, Section 16

Type	Basin	Sequence	Suffix	Application Number	Basis	Status	Priority Date	Div. Rate (cfs)	Source	Water Use	Owner
Water Right	15	4001			Statutory Claim	Active	05/27/1885	3	BRUSH CANYON CREEK	IRRIGATION, STOCKWATER	HOWELL, NORMAN L
Water Application	15	7399		79845		Active	1/16/2015	3.2	GROUND WATER	IRRIGATION	BEETON, DALE; BEETON, GERALD

Table 2 IDWR Search results for point of diversions in T14S, R35E, Section 9

Type	Basin	Sequence	Suffix	Application Number	Basis	Status	Priority Date	Div. Rate (cfs)	Source	Water Use	Owner
Water Permit	15	7366				Active	2/12/2013	4	GROUND WATER	IRRIGATION	NORTH RIDGE FARMS LLC



Attachment 1

REPRESENTATIVE WELL LOGS



Clearwater Geosciences, LLP
Ground Water Development and Exploration

Form 2387
IDWR

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

Office Use Only
Inspected by _____
Tap _____ Pipe _____ Sec _____
1/4 1/4 1/4
Lat _____ Long _____
☐ Pump ☐ Dailer ☒ Flaring Artesian

1. WELL TAG NO. D 0021299
DRILLING PERMIT NO. 771224
Other IDWR No. _____

2. OWNER:
Name Norman Howell
Address 1067 E Woodruff Ln
City Malad State ID Zip 83252

3. LOCATION OF WELL by legal description:
Sketch map location (see) agree with written location.

Tap <u>16</u>	North ☐ or South ☒
Age <u>76</u>	East ☐ or West ☐
Sec. <u>15</u>	1/4 NE 1/4 NW 1/4
Dist. Lat. _____	County <u>Blaine</u>
Lat. _____	Long. _____

Address of Well Site _____
City _____

1/4 1/4 1/4 1/4 1/4 1/4 1/4 1/4

4. USE:
☒ Domestic ☐ Municipal ☐ Waterflood ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other _____

5. TYPE OF WORK check all that apply (Replacement etc.)
☒ New Well ☐ Modify ☐ Abandonment ☐ Other _____

6. DRILL METHOD
☒ Air Rotary ☐ Cable ☐ Mud Rotary ☐ Other _____

SEAL/GROUT PACK				METHOD
Depth	From	To	Amount	
			Shots of Grout	
<u>Bentonite</u>	<u>0</u>	<u>20</u>	<u>6</u>	<u>Dry Pack</u>

Was drive shoe used? ☒ Yes ☐ No Shoe Depth 169'
Was drive shoe seal tested? ☐ Yes ☒ No

Depth	From	To	Grout	Material	Grout	Lines	Unfilled	Threated
<u>6</u>	<u>169</u>	<u>170</u>	<u>200</u>	<u>Steel</u>	☒	☐	☐	☐

Length of Headpipe _____ Length of Tailpipe _____

8. PERFORATIONS/SCREENS
Perforations _____ Method Touch
Screens _____ Screen Type _____

From	To	SPR. IN.	WEL. IN.	DEPTH	MATERIAL	Grout	Lines
<u>169</u>	<u>170</u>	<u>4 1/4</u>	<u>10</u>	<u>6"</u>	<u>Steel</u>	☒	☐

10. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
25 ft below ground Artesian pressure _____ lb.
Depth from waterlogged _____ ft. Describe access port or control devices: _____

11. WELL TESTS:

Test	Grout	Flow	Time
<u>30</u>			

Water Temp. cold Sediment hole temp. cold
Water Quality test or comments: good

12. LITHOLOGIC LOG: (Describe repairs or abandonment) Water

Depth	From	To	Material	Lithology	Water Quality & Temperature	Y	N
<u>0</u>	<u>20</u>			<u>Brown clay</u>		☒	
<u>20</u>	<u>40</u>			<u>Blue clay</u>		☒	
<u>40</u>	<u>60</u>			<u>Brown clay</u>		☒	
<u>60</u>	<u>65</u>			<u>Gravel & clay</u>		☒	
<u>65</u>	<u>90</u>			<u>Brown clay</u>		☒	
<u>90</u>	<u>95</u>			<u>Gravel</u>		☒	
<u>95</u>	<u>110</u>			<u>Brown clay</u>		☒	
<u>110</u>	<u>115</u>			<u>Gravel</u>		☒	
<u>115</u>	<u>165</u>			<u>Brown clay</u>		☒	
<u>165</u>	<u>169</u>			<u>Gravel</u>		☒	

RECEIVED

OCT 11 2001

RECEIVED

OCT 05 2001

Department of Water Resources
Eastern Region

Completed _____ Depth 169' (Measurable)
Date Started 9-21-01 Complete 9-22-01

13. DRILLER'S CERTIFICATION

I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Company Name North West Well Drilling Firm No. 5413

Firm Official Michael Frenkelson Date 10-8-01

and _____
Driller or Operator _____ Date _____

(Sign areas of Firm Official & Operator)

FORWARD WHITE COPY TO WATER RESOURCES



Clearwater Geosciences, LLP
Ground Water Development and Exploration

Form 236-7
8/90

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

Location Corrected by IDWR To:
T16S R36E Sec. 15 5NWN
By: ddunn 2012-02-27

State law requires that this report be filed with the Director, Department of Water Resources, within 30 days after the completion or abandonment of the well.

1. WELL OWNER Name <u>Norman Howell</u> Address <u>1030 Lower Wooding Road</u> Drilling Permit No. <u>15-92-C-001</u> Water Right Permit No. <u>15-7134</u>		7. WATER LEVEL Static water level <u>71</u> feet below land surface. Flowing? ☐ Yes ☒ No G.P.M. flow _____ Artesian closed-in pressure _____ p.s.i. Controlled by: ☐ Valve ☐ Cap ☐ Plug Temperature _____ OF. Quality _____ Describe strata or temperature zones below.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
2. NATURE OF WORK ☒ New well ☐ Deepened ☐ Replacement ☐ Well diameter increase ☐ Abandoned (describe abandonment procedures such as materials, plug depths, etc. in lithologic log)		8. WELL TEST DATA <u>Not available</u> ☐ Pump ☐ Bailer ☐ Air ☐ Other _____ <table border="1"><thead><tr><th>Discharge G.P.M.</th><th>Pumping Level</th><th>Hours Pumped</th></tr></thead><tbody><tr><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td></tr><tr><td> </td><td> </td><td> </td></tr></tbody></table>		Discharge G.P.M.	Pumping Level	Hours Pumped																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
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3. PROPOSED USE ☐ Domestic ☒ Irrigation ☐ Test ☐ Municipal ☐ Industrial ☐ Stock ☐ Waste Disposal or Injection ☐ Other _____ (specify type)		9. LITHOLOGIC LOG <u>84287</u> <table border="1"><thead><tr><th rowspan="2">Bore Diam.</th><th colspan="2">Depth</th><th rowspan="2">Material</th><th rowspan="2">Water Yield No.</th></tr><tr><th>From</th><th>To</th></tr></thead><tbody><tr><td>20</td><td>0</td><td>3</td><td>Top Soil</td><td>X</td></tr><tr><td>1</td><td>3</td><td>10</td><td>Thin light tan clay</td><td>X</td></tr><tr><td>10</td><td>10</td><td>62</td><td>Thin light gray gravel</td><td>X</td></tr><tr><td>62</td><td>62</td><td>75</td><td>Brown clay</td><td>X</td></tr><tr><td>75</td><td>128</td><td>145</td><td>Bottom of clay gravel</td><td>X</td></tr><tr><td>128</td><td>145</td><td>155</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>155</td><td>155</td><td>168</td><td>gravel</td><td>X</td></tr><tr><td>168</td><td>155</td><td>170</td><td>Thin Brown Clay</td><td>X</td></tr><tr><td>170</td><td>170</td><td>172</td><td>Bottom Clay gravel</td><td>X</td></tr><tr><td>172</td><td>172</td><td>181</td><td>gravel & Brown 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gravel</td><td>X</td></tr><tr><td>452</td><td>452</td><td>456</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>456</td><td>456</td><td>460</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>460</td><td>460</td><td>464</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>464</td><td>464</td><td>468</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>468</td><td>468</td><td>472</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>472</td><td>472</td><td>476</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>476</td><td>476</td><td>480</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>480</td><td>480</td><td>484</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>484</td><td>484</td><td>488</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>488</td><td>488</td><td>492</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>492</td><td>492</td><td>496</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>496</td><td>496</td><td>500</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>500</td><td>500</td><td>504</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>504</td><td>504</td><td>508</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>508</td><td>508</td><td>512</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>512</td><td>512</td><td>516</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>516</td><td>516</td><td>520</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>520</td><td>520</td><td>524</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>524</td><td>524</td><td>528</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>528</td><td>528</td><td>532</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>532</td><td>532</td><td>536</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>536</td><td>536</td><td>540</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>540</td><td>540</td><td>544</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>544</td><td>544</td><td>548</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>548</td><td>548</td><td>552</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>552</td><td>552</td><td>556</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>556</td><td>556</td><td>560</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>560</td><td>560</td><td>564</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>564</td><td>564</td><td>568</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>568</td><td>568</td><td>572</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>572</td><td>572</td><td>576</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>576</td><td>576</td><td>580</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>580</td><td>580</td><td>584</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>584</td><td>584</td><td>588</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>588</td><td>588</td><td>592</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>592</td><td>592</td><td>596</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>596</td><td>596</td><td>600</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>600</td><td>600</td><td>604</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>604</td><td>604</td><td>608</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>608</td><td>608</td><td>612</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>612</td><td>612</td><td>616</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>616</td><td>616</td><td>620</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>620</td><td>620</td><td>624</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>624</td><td>624</td><td>628</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>628</td><td>628</td><td>632</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>632</td><td>632</td><td>636</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>636</td><td>636</td><td>640</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>640</td><td>640</td><td>644</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>644</td><td>644</td><td>648</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>648</td><td>648</td><td>652</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>652</td><td>652</td><td>656</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>656</td><td>656</td><td>660</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>660</td><td>660</td><td>664</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>664</td><td>664</td><td>668</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>668</td><td>668</td><td>672</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>672</td><td>672</td><td>676</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>676</td><td>676</td><td>680</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>680</td><td>680</td><td>684</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>684</td><td>684</td><td>688</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>688</td><td>688</td><td>692</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>692</td><td>692</td><td>696</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>696</td><td>696</td><td>700</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>700</td><td>700</td><td>704</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>704</td><td>704</td><td>708</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>708</td><td>708</td><td>712</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>712</td><td>712</td><td>716</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>716</td><td>716</td><td>720</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>720</td><td>720</td><td>724</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>724</td><td>724</td><td>728</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>728</td><td>728</td><td>732</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>732</td><td>732</td><td>736</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>736</td><td>736</td><td>740</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>740</td><td>740</td><td>744</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>744</td><td>744</td><td>748</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>748</td><td>748</td><td>752</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>752</td><td>752</td><td>756</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>756</td><td>756</td><td>760</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>760</td><td>760</td><td>764</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>764</td><td>764</td><td>768</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>768</td><td>768</td><td>772</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>772</td><td>772</td><td>776</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>776</td><td>776</td><td>780</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>780</td><td>780</td><td>784</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>784</td><td>784</td><td>788</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>788</td><td>788</td><td>792</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>792</td><td>792</td><td>796</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>796</td><td>796</td><td>800</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>800</td><td>800</td><td>804</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>804</td><td>804</td><td>808</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>808</td><td>808</td><td>812</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>812</td><td>812</td><td>816</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>816</td><td>816</td><td>820</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>820</td><td>820</td><td>824</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>824</td><td>824</td><td>828</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>828</td><td>828</td><td>832</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>832</td><td>832</td><td>836</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>836</td><td>836</td><td>840</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>840</td><td>840</td><td>844</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>844</td><td>844</td><td>848</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>848</td><td>848</td><td>852</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>852</td><td>852</td><td>856</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>856</td><td>856</td><td>860</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>860</td><td>860</td><td>864</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>864</td><td>864</td><td>868</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>868</td><td>868</td><td>872</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>872</td><td>872</td><td>876</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>876</td><td>876</td><td>880</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>880</td><td>880</td><td>884</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>884</td><td>884</td><td>888</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>888</td><td>888</td><td>892</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>892</td><td>892</td><td>896</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>896</td><td>896</td><td>900</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>900</td><td>900</td><td>904</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>904</td><td>904</td><td>908</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>908</td><td>908</td><td>912</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>912</td><td>912</td><td>916</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>916</td><td>916</td><td>920</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>920</td><td>920</td><td>924</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>924</td><td>924</td><td>928</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>928</td><td>928</td><td>932</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>932</td><td>932</td><td>936</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>936</td><td>936</td><td>940</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>940</td><td>940</td><td>944</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>944</td><td>944</td><td>948</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>948</td><td>948</td><td>952</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>952</td><td>952</td><td>956</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>956</td><td>956</td><td>960</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>960</td><td>960</td><td>964</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>964</td><td>964</td><td>968</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>968</td><td>968</td><td>972</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>972</td><td>972</td><td>976</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>976</td><td>976</td><td>980</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>980</td><td>980</td><td>984</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>984</td><td>984</td><td>988</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>988</td><td>988</td><td>992</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>992</td><td>992</td><td>996</td><td>Thin brown clay gravel</td><td>X</td></tr><tr><td>996</td><td>996</td><td>1000</td><td>Thin brown clay gravel</td><td>X</td></tr></tbody></table>		Bore Diam.	Depth		Material	Water Yield No.	From	To	20	0	3	Top Soil	X	1	3	10	Thin light tan clay	X	10	10	62	Thin light gray gravel	X	62	62	75	Brown clay	X	75	128	145	Bottom of clay gravel	X	128	145	155	Thin brown clay gravel	X	155	155	168	gravel	X	168	155	170	Thin Brown Clay	X	170	170	172	Bottom Clay gravel	X	172	172	181	gravel & Brown Clay	X	181	181	191	gravel & clay gravel	X	191	191	217	Heavy gray gravel	X	217	217	222	Thin brown clay	X	222	222	238	Thin brown clay gravel	X	238	238	244	Heavy gray gravel	X	244	244	250	Thin brown clay gravel	X	250	250	256	Thin brown clay gravel	X	256	256	260	Thin brown clay gravel	X	260	260	264	Thin brown clay gravel	X	264	264	268	Thin brown clay gravel	X	268	268	272	Thin brown clay gravel	X	272	272	276	Thin brown clay gravel	X	276	276	280	Thin brown clay gravel	X	280	280	284	Thin brown clay gravel	X	284	284	288	Thin brown clay gravel	X	288	288	292	Thin brown clay gravel	X	292	292	296	Thin brown clay gravel	X	296	296	300	Thin brown clay gravel	X	300	300	304	Thin brown clay gravel	X	304	304	308	Thin brown clay gravel	X	308	308	312	Thin brown clay gravel	X	312	312	316	Thin brown clay gravel	X	316	316	320	Thin brown clay gravel	X	320	320	324	Thin brown clay gravel	X	324	324	328	Thin brown clay gravel	X	328	328	332	Thin brown clay gravel	X	332	332	336	Thin brown clay gravel	X	336	336	340	Thin brown clay gravel	X	340	340	344	Thin brown clay gravel	X	344	344	348	Thin brown clay gravel	X	348	348	352	Thin brown clay gravel	X	352	352	356	Thin brown clay gravel	X	356	356	360	Thin brown clay gravel	X	360	360	364	Thin brown clay gravel	X	364	364	368	Thin brown clay gravel	X	368	368	372	Thin brown clay gravel	X	372	372	376	Thin brown clay gravel	X	376	376	380	Thin brown clay gravel	X	380	380	384	Thin brown clay gravel	X	384	384	388	Thin brown clay gravel	X	388	388	392	Thin brown clay gravel	X	392	392	396	Thin brown clay gravel	X	396	396	400	Thin brown clay gravel	X	400	400	404	Thin brown clay gravel	X	404	404	408	Thin brown clay gravel	X	408	408	412	Thin brown clay gravel	X	412	412	416	Thin brown clay gravel	X	416	416	420	Thin brown clay gravel	X	420	420	424	Thin brown clay gravel	X	424	424	428	Thin brown clay gravel	X	428	428	432	Thin brown clay gravel	X	432	432	436	Thin brown clay gravel	X	436	436	440	Thin brown clay gravel	X	440	440	444	Thin brown clay gravel	X	444	444	448	Thin brown clay gravel	X	448	448	452	Thin brown clay gravel	X	452	452	456	Thin brown clay gravel	X	456	456	460	Thin brown clay gravel	X	460	460	464	Thin brown clay gravel	X	464	464	468	Thin brown clay gravel	X	468	468	472	Thin brown clay gravel	X	472	472	476	Thin brown clay gravel	X	476	476	480	Thin brown clay gravel	X	480	480	484	Thin brown clay gravel	X	484	484	488	Thin brown clay gravel	X	488	488	492	Thin brown clay gravel	X	492	492	496	Thin brown clay gravel	X	496	496	500	Thin brown clay gravel	X	500	500	504	Thin brown clay gravel	X	504	504	508	Thin brown clay gravel	X	508	508	512	Thin brown clay gravel	X	512	512	516	Thin brown clay gravel	X	516	516	520	Thin brown clay gravel	X	520	520	524	Thin brown clay gravel	X	524	524	528	Thin brown clay gravel	X	528	528	532	Thin brown clay gravel	X	532	532	536	Thin brown clay gravel	X	536	536	540	Thin brown clay gravel	X	540	540	544	Thin brown clay gravel	X	544	544	548	Thin brown clay gravel	X	548	548	552	Thin brown clay gravel	X	552	552	556	Thin brown clay gravel	X	556	556	560	Thin brown clay gravel	X	560	560	564	Thin brown clay gravel	X	564	564	568	Thin brown clay gravel	X	568	568	572	Thin brown clay gravel	X	572	572	576	Thin brown clay gravel	X	576	576	580	Thin brown clay gravel	X	580	580	584	Thin brown clay gravel	X	584	584	588	Thin brown clay gravel	X	588	588	592	Thin brown clay gravel	X	592	592	596	Thin brown clay gravel	X	596	596	600	Thin brown clay gravel	X	600	600	604	Thin brown clay gravel	X	604	604	608	Thin brown clay gravel	X	608	608	612	Thin brown clay gravel	X	612	612	616	Thin brown clay gravel	X	616	616	620	Thin brown clay gravel	X	620	620	624	Thin brown clay gravel	X	624	624	628	Thin brown clay gravel	X	628	628	632	Thin brown clay gravel	X	632	632	636	Thin brown clay gravel	X	636	636	640	Thin brown clay gravel	X	640	640	644	Thin brown clay gravel	X	644	644	648	Thin brown clay gravel	X	648	648	652	Thin brown clay gravel	X	652	652	656	Thin brown clay gravel	X	656	656	660	Thin brown clay gravel	X	660	660	664	Thin brown clay gravel	X	664	664	668	Thin brown clay gravel	X	668	668	672	Thin brown clay gravel	X	672	672	676	Thin brown clay gravel	X	676	676	680	Thin brown clay gravel	X	680	680	684	Thin brown clay gravel	X	684	684	688	Thin brown clay gravel	X	688	688	692	Thin brown clay gravel	X	692	692	696	Thin brown clay gravel	X	696	696	700	Thin brown clay gravel	X	700	700	704	Thin brown clay gravel	X	704	704	708	Thin brown clay gravel	X	708	708	712	Thin brown clay gravel	X	712	712	716	Thin brown clay gravel	X	716	716	720	Thin brown clay gravel	X	720	720	724	Thin brown clay gravel	X	724	724	728	Thin brown clay gravel	X	728	728	732	Thin brown clay gravel	X	732	732	736	Thin 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5. WELL CONSTRUCTION Casing schedule: ☒ Steel ☐ Concrete ☐ Other _____ Thickness _____ Diameter _____ From _____ To _____ Inches _____ inches _____ feet _____ feet Was casing drive shoe used? ☒ Yes ☐ No Was a packer or seal used? ☐ Yes ☒ No Perforated? ☒ Yes ☐ No How perforated? ☐ Factory ☒ Knife ☐ Torch ☐ Gun Size of perforation _____ inches by _____ inches Number _____ From _____ To _____ perforations _____ feet _____ feet perforations _____ feet _____ feet perforations _____ feet _____ feet Well screen installed? ☐ Yes ☒ No Manufacturer's name _____ Type _____ Model No. _____ Diameter _____ Slot size _____ Set from _____ feet to _____ feet Diameter _____ Slot size _____ Set from _____ feet to _____ feet Gravel packed? ☐ Yes ☐ No ☐ Size of gravel _____ Placed from _____ feet to _____ feet Surface seal depth _____ Material used in seal: ☐ Cement ☒ Bentonite ☒ Puddling clay ☐ Other _____ Sealing procedure used: ☐ Slurry pit ☐ Temp. surface seal ☒ Overbore to _____ depth Method of joining casing: ☐ Threaded ☒ Welded ☐ Other _____ ☐ Cemented between strata Describe screen port <u>In Side as per log</u>		11. DRILLERS CERTIFICATION I/We certify that all minimum well construction standards were complied with at the time the rig was removed. Firm Name <u>Wish Well Drilling</u> Firm No. <u>210</u> Address <u>632 E 4th St</u> Date <u>5-31-92</u> <u>DURLEY, IDAHO</u> Signed by (Firm Official) <u>[Signature]</u> and (Operator) <u>[Signature]</u>																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
6. LOCATION OF WELL Sketch map location <u>agrees</u> with written location. Subdivision Name _____ Lot No. _____ Block No. _____ County <u>Oneida</u> NW <u>1/4</u> NE <u>1/4</u> Sec. <u>15</u> T. <u>16</u> N. <u>1/4</u> R. <u>36</u> E. <u>1/4</u>		12. ADDITIONAL SHEETS IF NECESSARY - FORWARD THE WHITE COPY TO THE DEPARTMENT																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															



Clearwater Geosciences, LLP
Ground Water Development and Exploration

Form 2387
1998

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT
Use Typewriter or Ballpoint Pen

065905

Office Use Only			
Inspected by _____			
Twp _____	Rge _____	Sec _____	
1/4 _____	1/4 _____	1/4 _____	
Lat _____		Long _____	
☒ Air ☐ Flowing Artesian			

1. DRILLING PERMIT NO. 15-97-E-0034-000
Other IDWR No. _____

2. OWNER:
Name Norman Howell
Address 1030 Lower Woodruff Rd
City Malden State Idaho Zip 83252

3. LOCATION OF WELL by legal description:
Sketch map location must agree with written location.

Twp. <u>16</u> North ☐ or South ☒	
Rge. <u>36</u> East ☒ or West ☐	
Sec. <u>15</u>	1/4 <u>SE</u> 1/4 <u>SW</u> 1/4
Govt Lot _____	County <u>Oneida</u>
Lat. _____	Long. _____

Address of Well Site
Lower Woodruff Road City _____
(If on a highway, give milepost or distance to nearest landmark)

Lt. _____ Blk. _____ Sub. Name _____

4. USE:
☒ Domestic ☐ Municipal ☐ Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other _____

5. TYPE OF WORK check all that apply (Replacement etc.)
☒ New Well ☐ Modify ☐ Abandonment ☐ Other _____

6. DRILL METHOD
☒ Air Rotary ☐ Cable ☐ Mud Rotary ☐ Other _____

7. SEALING PROCEDURES

SEAL/FILTER PACK			AMOUNT	METHOD
Material	From	To	Sacks or Pounds	
Bentonite	0	20	4	Over Bore

Was drive shoe used? ☐ Y ☐ N Shoe Depth(s) _____
Was drive shoe seal tested? ☐ Y ☐ N How? _____

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Liner	Welded	Threaded
<u>8</u>	<u>0</u>	<u>80</u>	<u>250</u>	<u>Steel</u>	☒	☐	☐	☐
					☐	☐	☐	☐

Length of Headpipe _____ Length of Tailpipe _____

9. PERFORATIONS/SCREENS

☐ Perforations Method _____
☐ Screens Screen Type _____

From	To	Slot Size	Number	Diameter	Material	Casing	Liner
<u>None</u>							
						☐	☐

10. STATIC WATER LEVEL OR ARTESIAN PRESSURE:

30 ft. below ground Artesian pressure _____ lb.
Depth flow encountered _____ ft. Describe access port or control devices: _____

11. WELL TESTS:

Yield gal/min	Drawdown	Pumping Level	Time
<u>100</u>			

Water Temp. Cold Bottom hole temp. Cold
Water Quality test or comments: good

12. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore No.	From	To	Remarks: Lithology, Water Quality & Temperature	Y	N
<u>8</u>	<u>0</u>	<u>20</u>	<u>Brown clay</u>	☒	☐
<u>6</u>	<u>30</u>	<u>30</u>	<u>Brown clay</u>	☒	☐
<u>6</u>	<u>30</u>	<u>40</u>	<u>Blue clay</u>	☒	☐
<u>6</u>	<u>40</u>	<u>45</u>	<u>Blue clay & Gravel</u>	☒	☐
<u>6</u>	<u>45</u>	<u>55</u>	<u>Blue clay</u>	☒	☐
<u>6</u>	<u>55</u>	<u>70</u>	<u>Brown clay</u>	☒	☐
<u>6</u>	<u>70</u>	<u>80</u>	<u>Gravel</u>	☒	☐

RECEIVED

SEP 30 1997

Department of Water Resources
Eastern Region

RECEIVED

OCT 02 1997

Department of Water Resources

Completed Depth 80 (Measurable)
Date Started 8-26-97 Completed 8-26-97

13. DRILLER'S CERTIFICATION

I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Firm Name Mountain West Drilling Firm No. 543

Firm Official Mike Frandsen Date 9-15-97

and
Supervisor or Operator _____ Date _____
(Sign once if Firm Official & Operator)

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Clearwater Geosciences, LLP
Ground Water Development and Exploration

Form 358-1
1-97

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

16/000

Office Use Only
Inspected by _____
Twp _____ Rgn _____ Sec _____
Lot _____ 1/4 _____ 1/4 _____ 1/4 _____
Long _____
Short _____
Mining Adjoining _____

1. WELL TAG NO. 00014344
DRILLING PERMIT NO. _____
Other IDWR No. _____

2. OWNER:
Name Norman L. Howell
Address 10003 S. 300 E
City Malden State ID Zip 83252

3. LOCATION OF WELL by legal description:
Sketch map location (use grid with written location).

Map grid showing location:
Twp 16 North ☐ 41 South ☒
Rgn 36 East ☒ 34 West ☐
Sec 15 1/4 SW 1/4 NE 1/4
Don't Lot _____ Cont'd _____
Lat _____ Long _____
Address of Well Site S. 300 E 300th
City Malden

4. USE:
☒ Domestic ☐ Municipal ☐ Irrigation ☐ Other
☐ Thermal ☐ Injection ☐ Other

5. TYPE OF WORK check all that apply (Replacement only)
☒ New Well ☐ Modify ☐ Abandonment ☐ Other

6. DRILL METHOD
☒ Air Rotary ☐ Cable ☐ Mud Rotary ☐ Other

7. SEALING PROCEDURES

Material	Pack	Amount	Method
Bentonite	0	20	6
			Over Bore

When drive shaft used? ☒ Y ☐ N Shot Drilling? ☒ Y ☐ N
When drive shaft used? ☒ Y ☐ N Shot Drilling? ☒ Y ☐ N

8. CASING/LINER:

Depth	From	To	Depth	Material	Casing	Used	Welded	To
6"	0	120	120	Steel	✓	☐	☒	✓

Length of Headpipe _____ Length of Tailpipe _____

9. PERFORATIONS/SCREENS

Perforations Method None
Screens Screen Type _____

From	To	Str. Sys.	Material	Method	Notes

10. STATIC WATER LEVEL OR ARTESIAN PRESSURE:

20' below ground Artesian pressure b.
Depth flow encountered _____ ft. Describe access port or control devices: _____

11. WELL TESTS:

Field Station	Observations	Pumping Level	Time
50			

Water Temp. cold Depth hole temp cold
Water Quality test or comments: _____

12. LITHOLOGIC LOG: (Describe reports or abandonment)

Depth	From	To	Remarks: Lithology, Water Quality & Temperature	T	b
8"	0	20	Brown clay	☒	☐
6"	20	30	Brown clay	☐	☒
6"	30	58	Gray clay	☒	☒
6"	58	67	Gravel	☒	☐
6"	67	100	Brown clay & shale	☒	☒
6"	100	116	Brown clay & gravel	☒	☒
6"	116	120	Gravel	☒	☐

RECEIVED
OCT 10 2000
Department of Water Resources

13. DRILLER'S CERTIFICATION

I/We certify that all minimum well construction standards were complied with at the time the log was removed.

Company Name North Water Well Drilling Firm No. 543

For Official Mike Anderson Date 9-30-00

and _____ Date _____
Owner or Operator _____

FORWARD WHITE COPY TO WATER RESOURCES



Clearwater Geosciences, LLP
Ground Water Development and Exploration

Form 2057
b101

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

1. WELL TAG NO. D 0036793
DRILLING PERMIT NO. 1509752
Water Right or Injection Well No. _____

2. OWNER
Name Norman Howell
Address 1073 S. 300E
City Idaho Falls State ID Zip 83402

3. LOCATION OF WELL by legal description:
You must provide address or Loc. B#, Sub. or Dimensions to Well
Top: 16 North 11 or South 51
Rise: 26 East 26 or West 11
Sec: 31 Twp: 14 Rge: 14 S. 14
County _____
Lat: _____ Long: _____
Address of Well Site Basins South of Portland
City Idaho Falls

4. USE:
☐ Domestic ☐ Municipal ☐ Industrial ☒ Irrigation
☐ Thermal ☐ Injection ☐ Other _____

6. TYPE OF WORK check all that apply (Replacement ok.)
☒ New Well ☐ Modify ☐ Abandonment ☐ Other _____

6. DRILL METHOD:
☐ Air Rotary ☒ Cable ☐ Piled Rotary ☐ Other _____

7. SEALING PROCEDURES
Seal Material Pervent From 0 To 20 Weight/Volume _____ Seal Placement Method Drilling
Was drive shoe used? ☒ Y ☐ N Shoe Depth 200
Was down shoe put in? ☒ Y ☐ N How? _____

8. CASING/LINER:
Casing Type 16 3/4" 500 32 Steel Casing Length 20 Casing Weight 16 Casing Diameter 16
Length of Holeslip _____ Length of Reelup _____
Packer ☐ Y ☐ N Type _____

9. PERFORATIONS/SCREENS PACKER TYPE
Perforation Method Machine
Screen Type & Method of Installation _____
From 125 To 130 Screen 16 3/4" 500 32 Steel Casing 16 Casing 16
From 133 To 180 Screen 16 3/4" 500 32 Steel Casing 16 Casing 16

10. FILTER PACK
Filter Material _____ From _____ To _____ Weight/Volume _____ Placement Method _____

11. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
20' ft below ground Artesian pressure _____ lb
Depth how measured _____ ft. Describe access point or control device: _____

Office Use Only
Well ID No. _____
Inspected by _____
Twp _____ Rge _____ Sec _____
Lat _____ Long _____

12. WELL TESTS:
☐ Pump ☐ Baker ☐ Air ☐ Flowing Artesian
Water Temp Cold Bottom Hole Temp Cold
Water Quality test or comments Good
Depth first Water Encounter 85

13. LITHOLOGIC LOG: (Describe depths or abandonment)

Depth	From	To	Remarks: Lithology, Water Quality & Temperature	Water
0	0	5	Top Soil	X
5	5	10	light clay	X
10	10	15	light clay	X
15	15	20	light clay	X
20	20	25	light clay	X
25	25	30	gravel & sand	X
30	30	35	light clay	X
35	35	40	gravel & sand	X
40	40	45	light clay & gravel	X
45	45	50	light clay & gravel	X
50	50	55	light clay & gravel	X
55	55	60	light clay & gravel	X
60	60	65	light clay & gravel	X
65	65	70	light clay & gravel	X
70	70	75	light clay & gravel	X
75	75	80	light clay & gravel	X
80	80	85	light clay & gravel	X
85	85	90	light clay & gravel	X
90	90	95	light clay & gravel	X
95	95	100	light clay & gravel	X
100	100	105	light clay & gravel	X
105	105	110	light clay & gravel	X
110	110	115	light clay & gravel	X
115	115	120	light clay & gravel	X
120	120	125	light clay & gravel	X
125	125	130	light clay & gravel	X
130	130	135	light clay & gravel	X
135	135	140	light clay & gravel	X
140	140	145	light clay & gravel	X
145	145	150	light clay & gravel	X
150	150	155	light clay & gravel	X
155	155	160	light clay & gravel	X
160	160	165	light clay & gravel	X
165	165	170	light clay & gravel	X
170	170	175	light clay & gravel	X
175	175	180	light clay & gravel	X
180	180	185	light clay & gravel	X
185	185	190	light clay & gravel	X
190	190	195	light clay & gravel	X
195	195	200	light clay & gravel	X

RECEIVED
DEC 8 2005
Department of Water Resources
Eastern Region

14. DRILLER'S CERTIFICATION
We certify that all minimum well construction standards were complied with at the time this log was removed.
Company Name Mid West Well Drilling Firm No. 543
Drill Operator Michael F. Frazier Date 11-26-05
Driller or Operator II _____ Date _____
Geologist I _____ Date _____
Principal Driller and Rig Operator Required
Geologist I must have signature of Driller/Operator II

FORWARD WHITE COPY TO WATER RESOURCES



Clearwater Geosciences, LLP
Ground Water Development and Exploration

Form 238-7
8/02

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

1. WELL TAG NO. D 0054802
DRILLING PERMIT NO. _____
Water Right or Injection Well No. _____

2. OWNER: Hanna
Name Jack Hanna
Address 2470 S. 2300 W.
City Cooper State UT Zip 84401

3. LOCATION OF WELL by legal description:
You must provide address or Lot, Blk, Sub. or Directions to well.
Twp. 14 North ☐ or South ☒
Rge. 34 East ☒ or West ☐
Sec. 34 1/4 SE 1/4 SE 1/4
Gov't Lot _____
County San Juan
Lat: _____ Long: _____
Address of Well Site Exit 3 Woodruff
City Malad
Lt. _____ Blk. _____ Sub Name _____

4. USE:
☒ Domestic ☐ Municipal ☐ Monitor ☐ Irrigation
☐ Thermal ☐ Injection ☐ Other _____

5. TYPE OF WORK check all that apply (Replacement etc.)
☒ New Well ☐ Modify ☐ Abandonment ☐ Other _____

6. DRILL METHOD:
☒ Air Rotary ☐ Cable ☐ Mud Rotary ☐ Other _____

7. SEALING PROCEDURES

Seal Material	From	To	Weight / Volume	Seal Placement Method
<u>Benclite</u>	<u>0</u>	<u>20</u>	<u>10 bags</u>	<u>over bore</u>

Was drive shoe used? ☒ ☐ N Shoe Depth(s) 523
Was drive shoe seal tested? ☐ Y ☐ N How? _____

8. CASING/LINER:

Diameter	From	To	Gauge	Material	Casing	Lin	Welded	Threaded
<u>8"</u>	<u>0</u>	<u>523.25</u>	<u>Steel</u>	<u>Steel</u>	☒	☐	☒	☐

Length of Headpipe _____ Length of Tailpipe _____
Packer ☐ Y ☐ N Type _____

9. PERFORATIONS/SCREENS PACKER TYPE

Perforation Method touch
Screen Type & Method of Installation _____

From	To	S or Size	Number	Diameter	Material	Casing	Lin
<u>463</u>	<u>623</u>	<u>1/4-1/2</u>	<u>8</u>	<u>Steel</u>	<u>Steel</u>	☒	☐

10. FILTER PACK

Filter Material	From	To	Weight / Volume	Placement Method

11. STATIC WATER LEVEL OR ARTESIAN PRESSURE:

421 ft. below ground Artesian pressure _____ lb.
Depth flow encountered _____ ft. Describe access port or control device: _____

12. WELL TESTS:

☐ Pump	☐ Bailor	☒ Air	☐ Flowing Artesian
Yield gpm/min: <u>200</u>	Drawdown: _____	Pumping Level: _____	Time: _____

Water Temp. good Bottom hole temp. good
Water Quality test or comments: good Depth first Water Encounter 440

13. LITHOLOGIC LOG: (Describe repairs or abandonment)

Bore Dia.	From	To	Remarks: Lithology, Water Quality & Temperature	Y	N
<u>18"</u>	<u>0</u>	<u>15</u>	<u>Bm clay hardpan</u>	☒	☐
<u>18"</u>	<u>15</u>	<u>20</u>	<u>Bm clay gravel</u>	☒	☐
<u>18"</u>	<u>20</u>	<u>110</u>	<u>Bm clay gravel</u>	☒	☐
<u>18"</u>	<u>110</u>	<u>300</u>	<u>Broken quartz</u>	☒	☐
<u>18"</u>	<u>300</u>	<u>450</u>	<u>Broken quartz</u>	☒	☐
<u>18"</u>	<u>450</u>	<u>480</u>	<u>Solid lime</u>	☒	☐
<u>18"</u>	<u>480</u>	<u>485</u>	<u>Solid lime broken down</u>	☒	☐
<u>18"</u>	<u>485</u>	<u>520</u>	<u>quartz</u>	☒	☐
<u>18"</u>	<u>520</u>	<u>540</u>	<u>Broken quartz</u>	☒	☐
<u>18"</u>	<u>540</u>	<u>580</u>	<u>Broken v. soft quartz</u>	☒	☐

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FEB 17 2009

Department of Water Resources
Eastern Region

Completed Depth 580 (Measurable)
Date Started 12-15-08 Completed 12-31-08

14. DRILLER'S CERTIFICATION

I/We certify that all minimum well construction standards were complied with at the time the rig was removed.

Company Name Mt. West Well Drilling Firm No. 543

Principal Driller Michael Friedman Date 1-1-09

and Driller or Operator II Miles Friedman Date 1-1-09

Operator I _____ Date _____

Principal Driller and Rig Operator Required.
Operator I must have signature of Driller/Operator II.

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Clearwater Geosciences, LLP
Ground Water Development and Exploration

Form 238 7
6/02

IDaho DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

15

Office Use Only			
Well ID No. _____			
Inspected by _____			
lwp _____	Rge _____	Sec _____	
1/4 _____		1/4 _____	
Lat: _____	Long: _____	_____	

1. WELL TAG NO. D 00051484
DRILLING PERMIT NO. _____
Water Right or Injection Well No. _____

2. OWNER:
Name Jack Harman
Address 2480 S. 2300 W
City Ogden State Ut Zip 84401

3. LOCATION OF WELL by legal description:
You must provide address or Lot, Blk, Sub. or Directions to well.
Twp. 16 North ☐ or South ☒
Rgc. 3E East ☒ or West ☐
Sec. 14 1/4 SE 1/4 SE 1/4
Gov't Lot _____
County Garfield State Ut
Let: _____ Long: _____
Address of Well Site Exit 3 Woodhuff
City Malden
Lt. _____ Blk. _____ Sub. Name _____

4. USE:
☐ Domestic ☐ Municipal ☐ Monitor ☒ Irrigation
☐ Thermal ☐ Injection ☐ Other _____

5. TYPE OF WORK check all that apply (Replacement etc.)
☒ New Well ☐ Modify ☐ Abandonment ☐ Other _____

6. DRILL METHOD:
☒ Air Rotary ☐ Cable ☐ Mud Rotary ☐ Other _____

7. SEALING PROCEDURES
Seal Material Bentonite From 0 To 20 Weight/Volume 30 bags Seal Placement Method overhole
Was drive shoe used? ☒ Y ☐ N Shoe Depth(s) 472
Was drive shoe seal tested? ☐ Y ☐ N How? _____

8. CASING/LINER:
Diameter From To Gauge Material Casing Liner Welded Threaded
20" 1 265 250 Steel ☒ ☐ ☒ ☐
18" 0 472 250 Steel ☒ ☐ ☒ ☐
Length of Headpipe _____ Length of Tail pipe _____
Packer ☐ Y ☐ N Type _____

9. PERFORATIONS/SCREENS PACKER TYPE
Perforation Method machine
Screen Type & Method of Installation
From To Slot Size Number Diameter Material Casing Liner
360 450 4-38 225 18" Steel ☒ ☐
☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

10. FILTER PACK
Filter Material From To Weight/Volume Placement Method

11. STATIC WATER LEVEL OR ARTESIAN PRESSURE:
305 ft. below ground Artesian pressure _____ lb.
Depth (ft.) encountered _____ ft. Describe access port or control devices: _____

12. WELL TESTS:
☐ Pump ☐ Bailor ☒ Air ☐ Flowing Artesian
Yield gal./min. Drawdown Pumping Level Time

Water Temp cold Bottom hole temp. cold
Water Quality test or comments: good
Depth first Water Encounter 330

13. LITHOLOGIC LOG: (Describe depths or abandonment)				Water	
Start	From	To	Remarks: Lithology Water Quality & Temperature	Y	N
240	1	20	clay		X
240	1	20	cobbles gravel clay		X
205	20	225	clay rock gravel		X
205	20	225	cobbles		X
205	20	225	limestone		X
205	20	225	Hard Rock limestone	X	
183	330	360	Hard Rock limestone	X	
183	360	370	loose gravel	X	
183	370	380	Limestone		X
183	380	410	Gravel		X
183	410	472	loose Limestone		X

Completed Depth 472 (Measurement)
Date: Started 12-15-08 Completed 3-24-09

14. DRILLER'S CERTIFICATION
I/We certify that all minimum well construction standards were complied with at the time the rig was removed.
Company Name Mt. Westwell Drilling Firm No. 543
Principal Driller Michael Frazier Date 3-25-09
Driller or Operator II _____ Date _____
Operator I John Lee Date 3-25-09
Principal Driller and Rig Operator Required.



Attachment 2

PUMPING TEST RESULTS



The Smith Well and three observation wells were equipped with INSITU brand downhole pressure transducers and data loggers for collecting automated water levels during the pumping test (Figure 2-1). The pumping test began at noon on August 18, 2010 and the well was pumped at a steady rate of 220 gpm for 24 hours. The particulars regarding the wells can be found in Table 1. The pumped well experienced about 26 ft of drawdown from static during the test. The observation well data are noisy primarily because they are also domestic house wells, which were in use at the time of the pumping test. There also appears to be some background aquifer fluctuations probably caused by irrigation pumping in nearby wells. The observation wells were processed as follows. OB1 early time data was extremely noisy and the drawdown portion of the data was discarded in favor of the recovery data, which is more regular. Spikes in the OB1 data caused by the pump cycling on and off were removed and a plot of the processed OB1 data is attached. OB2 drawdown data was better, having fewer cycles of the pump being turned on and off. The data from this well was processed by removing the spikes caused by the pump cycling. OB3 well data were the most problematic. This well services two households and the pump cycles frequently. After removing the major spikes in the data, a 5 point running average was taken of the data to smooth out the data as much as possible. The plot of the processed data for OB3 is attached. The data are suspect and although they are included in the pumping test analyses the results are given less weight than wells OB1 and OB2.

On the basis of the Smith well log, the aquifer was assumed to be 140 ft thick. Several curve matching methods were conducted using the AQTESOLV aquifer test software. An output plot from the AQTESOLV program are attached. The best match of the late time data was to the drawdown curve of the Smith well to the Theis confined solution. The well appears to be inefficient as the drawdown distorts the match to the observation wells. The calculated transmissivity is about $3 \times 10^4 \text{ ft}^2/\text{day}$ and the storativity is meaningless from the single well match. Matches were made to OB1 and OB2 using both the confined and unconfined Theis solutions. Transmissivity ranges from 1.9 to $3.9 \times 10^4 \text{ ft}^2/\text{day}$ and the storativity ranges from 3.6×10^{-7} to 0.0012 . In my opinion, the best match to the data at the largest radial distance is the confined Theis solution match to OB2. The larger radial distance integrates a larger volume of the aquifer and is more appropriate for making large scale predictions for long term pumping. In this case, the best measurement of aquifer transmissivity is $3.5 \times 10^4 \text{ ft}^2/\text{day}$ and the storativity is 0.0012 .



Clearwater Geosciences, LLP
Ground Water Development and Exploration

Form 238-7
6/07

IDAHO DEPARTMENT OF WATER RESOURCES
WELL DRILLER'S REPORT

15

1. WELL TAG NO. D D0051338

Drilling Permit No. _____

Water right or injection well # _____

2. OWNER: Lex Smith

Name Lex Smith

Address 1496 S 19000 W

City Malden State TO Zip 83252

3. WELL LOCATION:

Twp. 16 North ☐ or South ☒ Rge. 36 East ☒ or West ☐

Sec. 14 SE 1/4 SW 1/4 SE 1/4

Gov't Lot _____ County Oneida

Lat. _____ (Deg. and Decimal minutes)

Long. _____ (Deg. and Decimal minutes)

Address of Well Site 1496 S 19000 W

City M

Lot _____ Blk. _____ Sub. Name _____

4. USE:

☒ Domestic ☐ Municipal ☐ Monitor ☒ Irrigation ☐ Thermal ☐ Injection

☐ Other _____

5. TYPE OF WORK:

☒ New well ☐ Replacement well ☐ Modify existing well

☐ Abandonment ☐ Other _____

6. DRILL METHOD:

☒ Air Rotary ☐ Mud Rotary ☐ Cable ☐ Other _____

7. SEALING PROCEDURES:

Seal material Portacrete From (ft) 0 To (ft) 78 Quantity (lbs or ft³) 27 bags Placement method/procedure Over bore

8. CASING/LINER:

Diameter (nominal) From (ft) To (ft) Gauge/Schedule Material Casing Liner Threaded Welded

8" 2.25 250 Steel ☒ ☐ ☐ ☒

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12. STATIC WATER LEVEL and WELL TESTS:

Depth first water encountered (ft) _____ Static water level (ft) 76'

Water temp. (°F) _____ Bottom hole temp. (°F) _____

Describe access point _____

Well test:

Drawdown (feet) Discharge or yield (gpm) Test duration (minutes) Test method

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RECEIVED

SEP 22 2008

Department of Water Resources
Eastern Region

Completed Depth (Measurable): 218'

Date Started: 9-1-08 Date Completed: 9-16-08

14. DRILLER'S CERTIFICATION:

We certify that all minimum well construction standards were complied with at the time the rig was removed.

Company Name Volmer Drilling Co. No. 383

Principal Driller: [Signature] Date 9-19-08

Driller: [Signature] Date 9/19/08

Operator II: [Signature] Date 9/19/08

Operator I: [Signature] Date 9/19/08

* Signature of Principal Driller and rig operator are required.

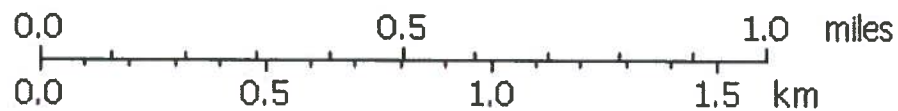
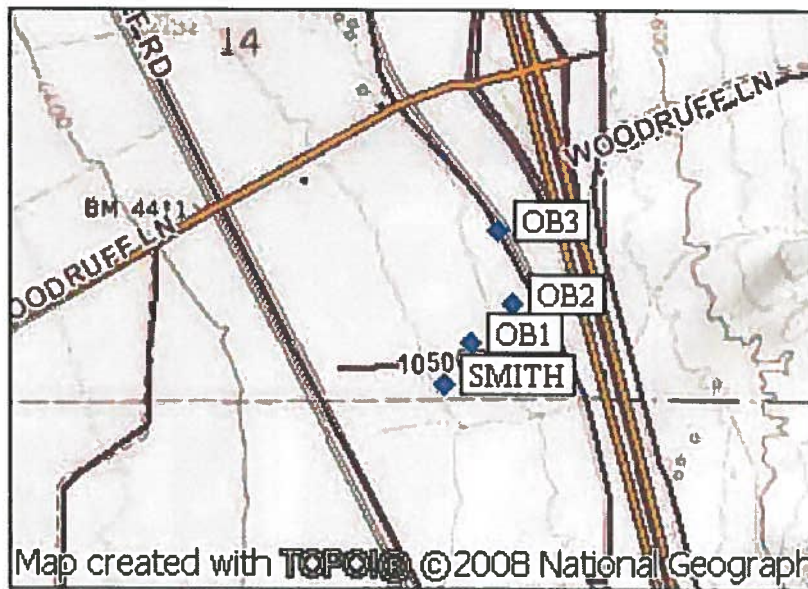


Figure 2-1. Map of pumped well (Smith) and observation wells for the Lex Smith Pumping Test

Table 1 Wells used in the Pumping Test.

Well Name	Owner Name	Tag #	Coords	Elevation	Radial Distance
Smith Well	Lex Smith	D0051338	12 T 399554 4653861	4437 ft	0
OB1	Allred	D0036075	12 T 399612 4653951	4455 ft	370 ft
OB2	Fullmer	D0026863	12 T 399708 4654040	4481 ft	800 ft
OB3	Richardson	N/A	12 T 399677 4654204	4496 ft	1200 ft

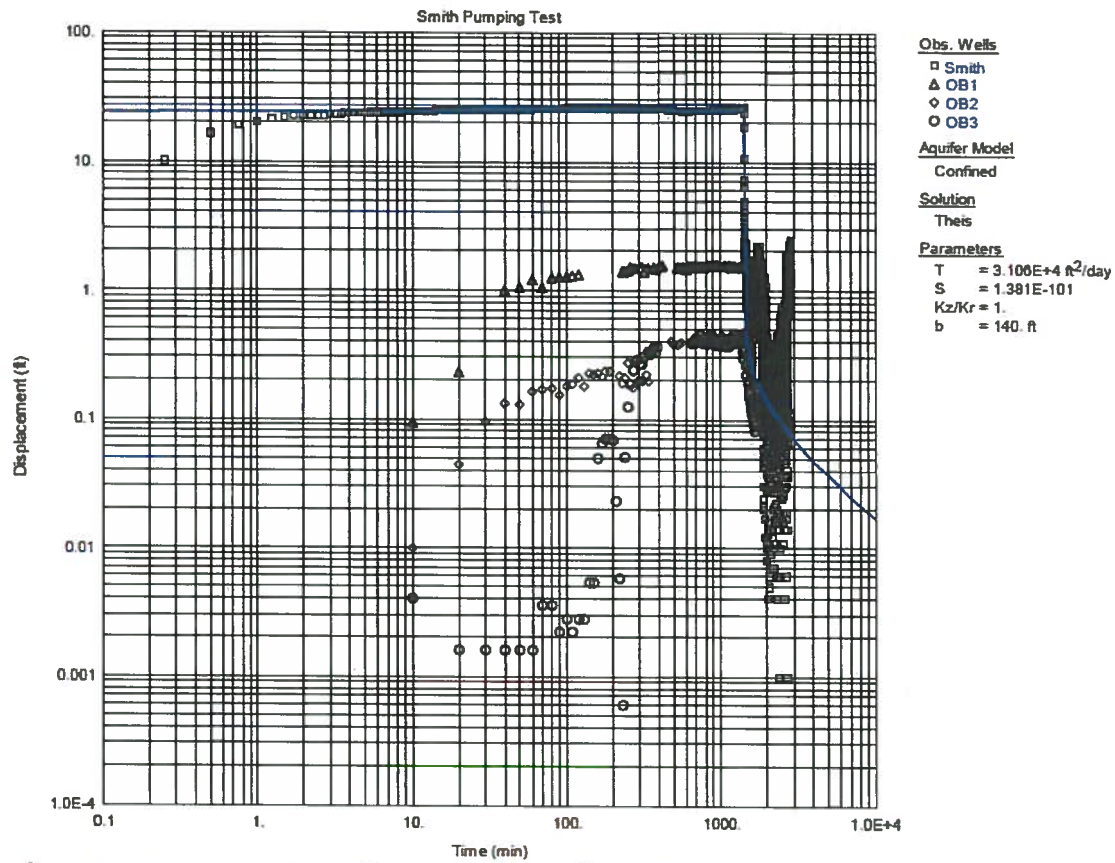


Figure 3-1 Theis confined solution matched to Smith Well.

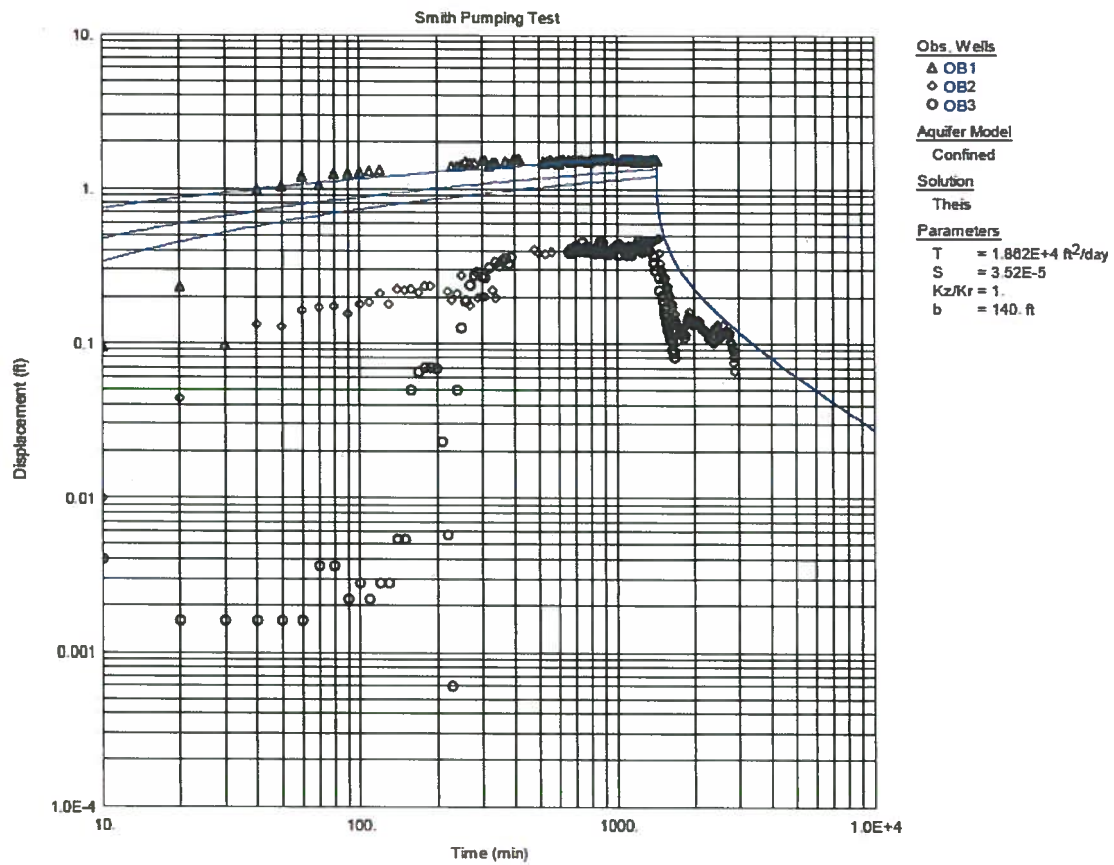


Figure 3-2 Theis confined solution matched to OB1.

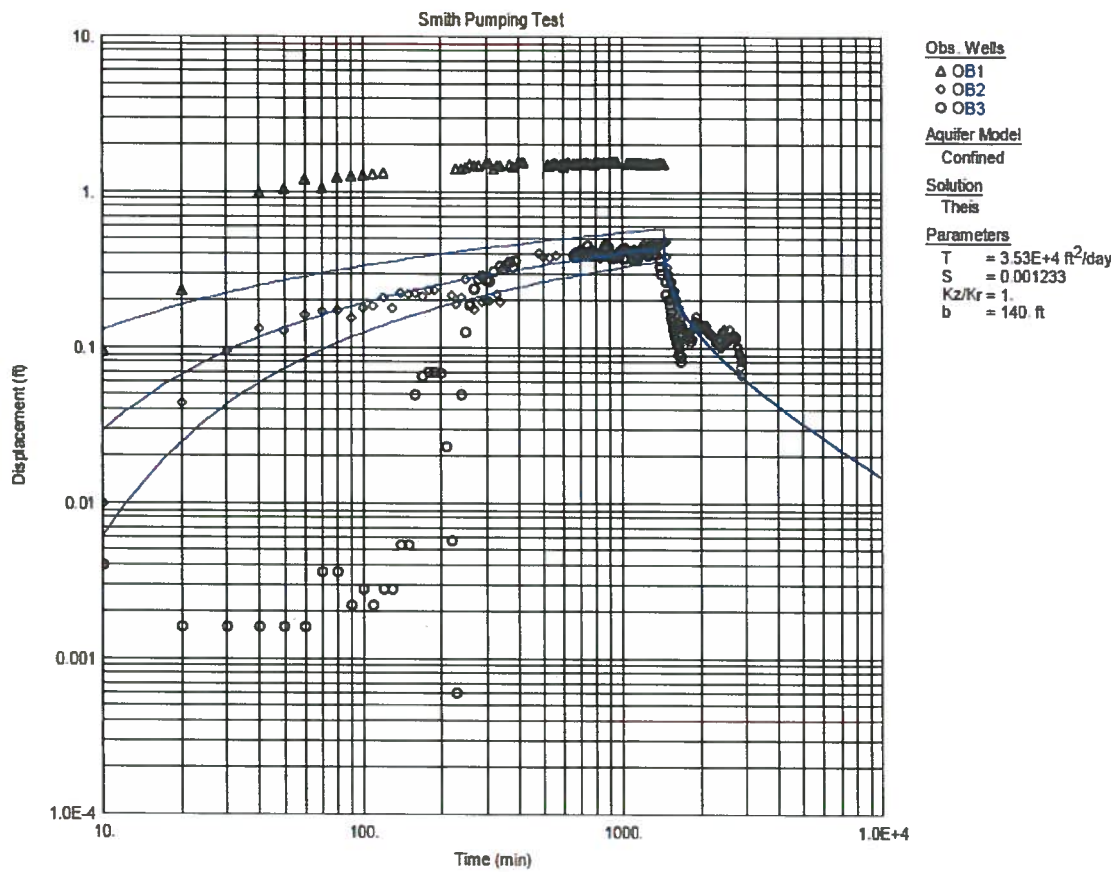


Figure 3-3 Theis confined solution matched to OB2.

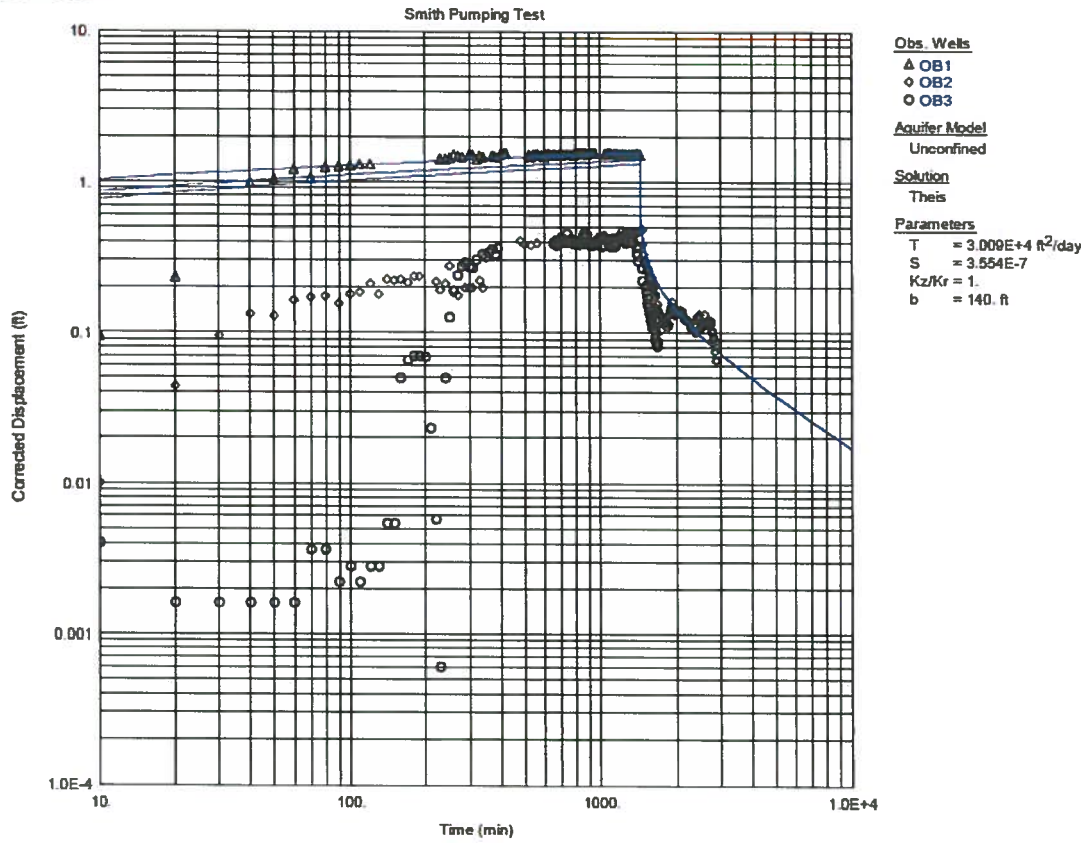


Figure 3-4 Theis unconfined solution matched to OB1

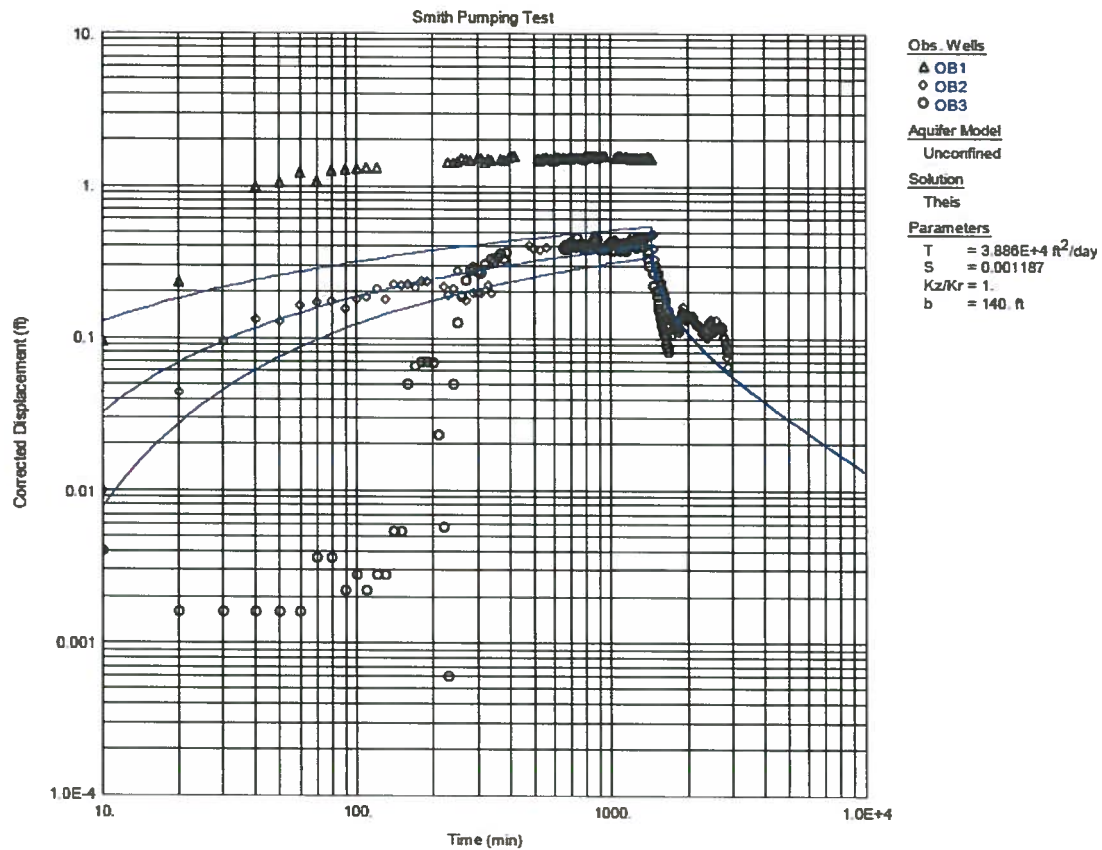


Figure 3-5 Theis unconfined solution matched to OB2.



Attachment 3

AQUIFER IMPACT ANALYSIS

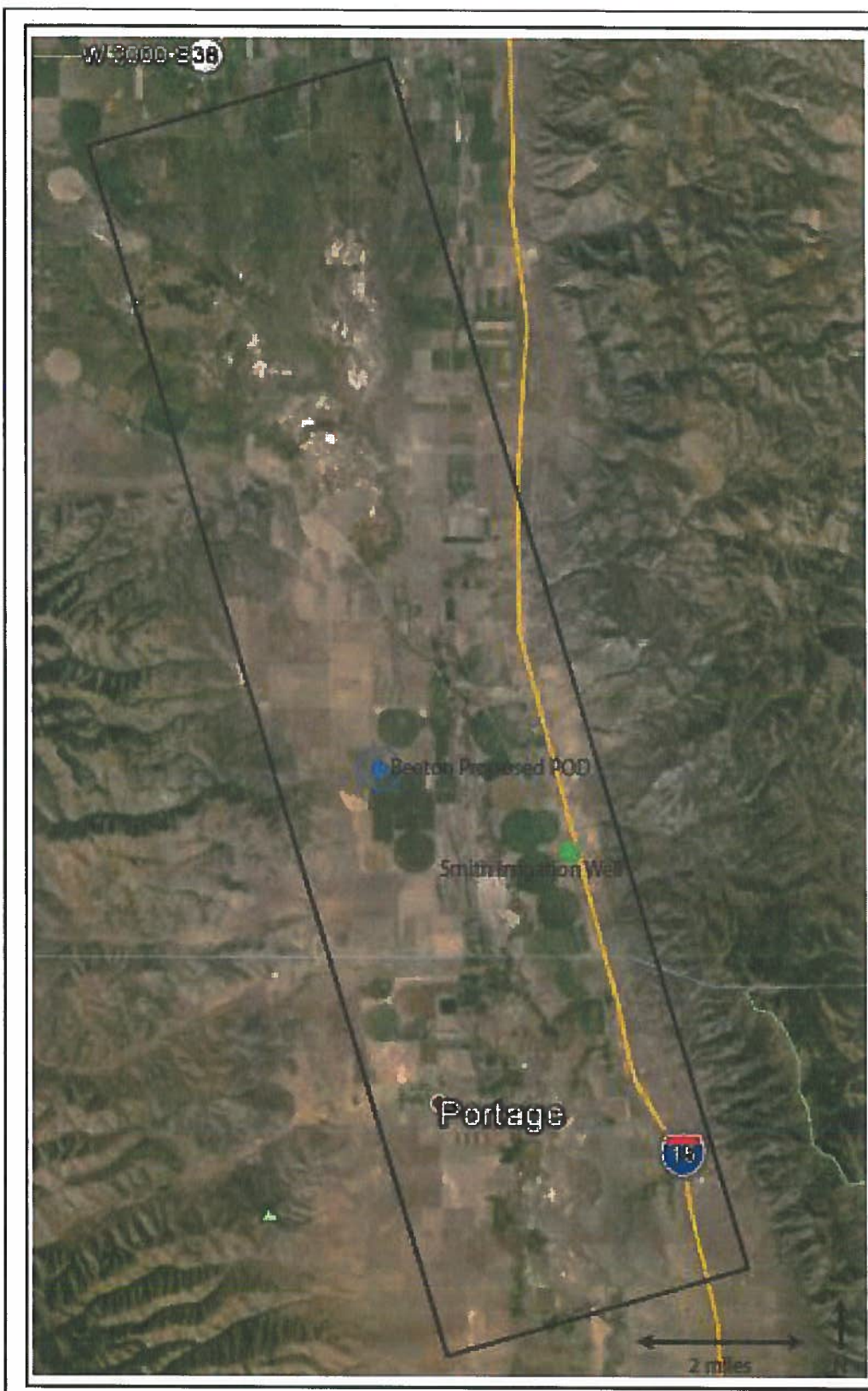


Table 4-1 Table of values used in AQTESOLV simulation.

Parameter	Value	Unit
Transmissivity	35,000	ft ² /d
Storativity	0.001	unitless
Flow Rate	1436	gpm
Duration	259,200	min
Total volume	1,142	ac-ft
aquifer thickness (b)	200	ft
kz/Kr	0.1	na

Table 4-2 Table of locations for various boundary corners and wells used in the AQESOLV simulation.

Location	x	y
NW Corner	0	80,000
NE Corner	22,000	80,000
SW Corner	0	0
SE Corner	22,000	0
Beeton POD	8,540	38,853
Smith	18,153	33,345
Hypothetical Well 1/2 Mile NW	9,760	41,040



Beeton Water Right Application
Figure 3-1: Outline of AQTESOLV Boundaries

Client: Gerald and Dale Beeton County: Oneida State: Idaho
 Township: 18S Range: 36E Section: 16

1818 E. 49th S, Idaho Falls, ID 83404
 Phone: (208) 559-5555



groundwater scientists serving industry since 1994

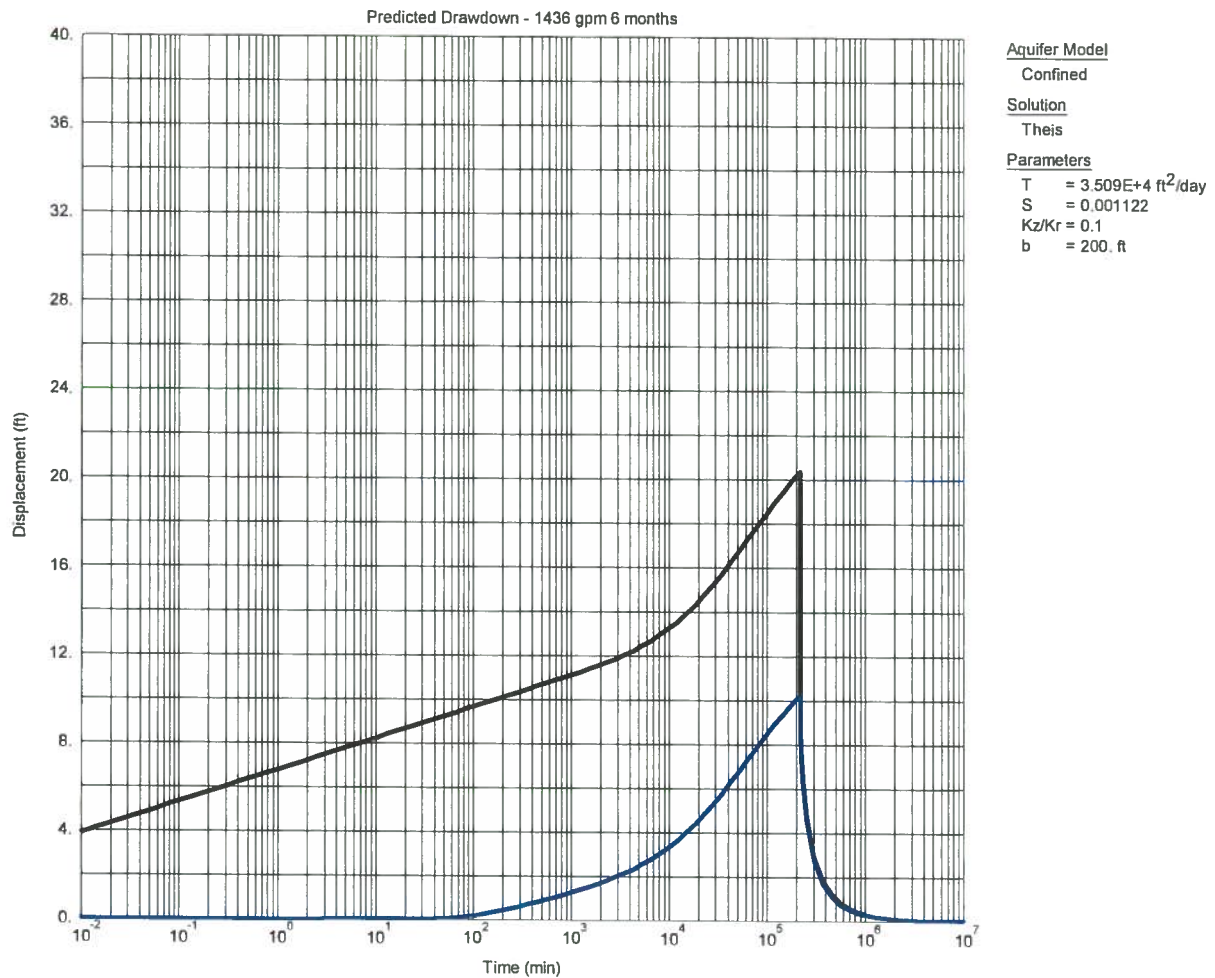


Figure 4-2 Predictive plot of drawdown at 1236 gpm or 3.2 cfs for the full period of use 180 days. The black line is for the water level in the proposed Beeton Well pumping and the blue line is the water level predicted in a well 1/2 mile north of the proposed Beeton Well.

Key to line colors

- Blue Imaginary well 1/2 mile northwest of the proposed POD
- Black Proposed POD for Beeton