

August 17, 2016

Mr. Kevin Ryan, P.E.  
Staff Engineer  
Department of Environmental Quality  
Boise Regional Office  
1445 North Orchard Street  
Boise, Idaho 83706-2259

RECEIVED

AUG 18 2016

DEPARTMENT OF  
ENVIRONMENTAL QUALITY  
BOISE REGIONAL OFFICE



**Subject:** Public Drinking Water System Well Completion Report City of Eagle Spring Valley Well #2

Dear Kevin:

### Overview

On behalf of my client M3 Eagle, LLC, in agreement with the City of Eagle, Idaho, and under cover of this letter, I transmit the "Record Drawing" submittals of the as-built details of well construction, hydraulic testing results, ground water chemistry/water-quality analyses (New Source Monitoring), and the Idaho Department of Water Resources (IDWR) Well Driller's Report for the newly completed City of Eagle Spring Valley Municipal Supply Well #2 (Figures 1 and 2). The Idaho Department of Environmental Quality (IDEQ) may refer to this document as the Final Well Completion Report for the Spring Valley Well #2 (SV Well #2). Under agreements between the City of Eagle and M3 Eagle, LLC, the City of Eagle will become the ultimate owner/operator of this Public Drinking Water System well facility and it already owns the municipal water right for the property.

This project has been completed as planned, designed, and submitted to IDEQ by Hydro Logic, Inc. (HLI), and approved by IDEQ. With this submittal, all remaining conditions of IDEQ's well site, ground water sampling for New Source Monitoring and well construction approvals are deemed to be met.

Included within this transmittal are the following documents:

- 1) As-built details of final well construction with respect to the drilled geologic section (Figure 3).
- 2) Tabulated constant-discharge hydraulic testing results (Table 1) and plots (Figures 4 and 5).
- 3) Laboratory ground water chemistry analyses for the New Source Monitoring requirements for Public Drinking Water System wells (Table 2 and Appendix A).
- 4) State of Idaho Well Driller's Report by Post Drilling Inc. (Appendix B).
- 5) Conditional IDEQ well site/well construction approval letters dated April 16, 2008, January 25, 2013, and February 11, 2016 (Appendix C).
- 6) Ground Water Not Under the Direct Influence of Surface Water Confirmation (see below).
- 7) This cover letter.

## Hydrogeologic Evaluation of Ground Water under the Direct Influence of Surface Water

The purpose of this section of the report is to inform IDEQ that HLI supports the Department's original classification of the SV Well #2 ground water as a "**Ground Water**" source. We have taken a second look at this new City of Eagle well with respect to GWUDI, not so much because it is adjacent (within 240 feet) to the ephemeral Big Gulch Creek<sup>1</sup> (Figures 1 and 2) but, because the future development of the site is not known to a certainty and amenity ponds could always be a future option. In the end, though, and as a result of M3 Eagle's insistence on good on-site hydrogeological supervision, inspection services, and research, we agree that the SV Well #2 is *not*, and will never be, under the direct influence of surface water because of the following multiple evidences to the contrary: **1)** a thick (~100 ft) unsaturated zone overlying the aquifer at this location as shown by the nearby multi-depth monitoring well (Figure 6), **2)** ground water geochemistry differences from surface water chemistry of the Boise River (Table 3), **3)** the observed confined responses to hydraulic testing (Figures 4 and 5), **4)** analysis of the stratigraphic layering of the drilled geologic section including over 220 feet of low-permeability sticky clay sediments between the well completion interval and land surface (Figures 3 and 7), **5)** the confining artesian pressure within the completion aquifer, and **6)** the 365-foot long full-depth annular casing seal construction of the supply well (Figure 3). Each of these circumstances is explained separately below:

The Presence of Low-Permeability Strata (Aquitards) Overlying the Completion Aquifer: Between land surface and the uppermost completion interval of the new SV Well #2, we use high-quality borehole geophysical logs and continuously-sampled (by HLI) drill-cuttings from multiple borings on the well site to document a cumulative thickness of approximately 220 feet of low-permeability sticky clay sediments (Figures 3 and 6). Based on the thicknesses of these aquitards, with single units reaching 60 feet thick, and the geologic depositional processes responsible for this hydrogeologic setting, the confining units should be expected to extend long distances (many miles) laterally from the well site in all directions (Figures 7 and 8) thus precluding a *direct* hydraulic connection of the SV Well #2 completion zone to surface water. Downward vertical permeability and the cross-bed percolation of surface waters into the aquifer system are controlled by the lowest permeability stratum no matter its thickness under prevailing gradients. In terms of a direct hydraulic interconnection, we believe a significant physical hydraulic impedance exists between the screen completion zone of SV Well #2 and any surface water bodies to preclude a *direct* hydraulic connection.

### Ground Water Pressures and Confining Conditions:

Other than the 27-foot deep air-rotary "starter pipe" bore for the M3 Eagle Test Well #4 (Figure 6), we have not measured the precise depth of the uppermost ground water in this geologic setting. This is because we used the direct mud-rotary drilling method for the test well and the new municipal well where the boreholes were filled with weighted drilling mud until the wells were completely constructed and developed. However, the adjacent M3 Eagle Test Well #4 was constructed with four separate screened intervals completed to various depths of the aquifer. The uppermost tube well of this "nest" of tube-wells, with a screened interval of 61-to-71 ft below ground level (bgl), is unsaturated and the electrical borehole geophysical logs strongly suggest the first (uppermost/shallowest) saturated sediments occur at ~ 100 ft bgl (Figure 6).

### Ground Water/Surface Water Geochemistry Differences:

The geochemistry of the ground water produced from the new SV Well #2 is, expectedly, very similar to the same aquifer depth intervals in the M3 Eagle Test Well #4 and, as pointed out in HLI's initial submittals to IDEQ, markedly different from the geochemistry of surface waters in the Boise Valley (Table 3). For purposes

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<sup>1</sup> Big Gulch Creek has not had overland flow in its creek bed for decades according to the long-term land owners and ranchers in the area. In the 10 years HLI has been working on this project, the only running water we have observed in Big Gulch Creek is our pumped ground water from pumping test discharges.

of this comparison, we use average Boise River geochemistry analyses from USGS (Glenwood Bridge) to compare to ground water samples we obtained from the SV Well #2 after 5.25-hours and 72 hours of constant-rate discharge pumping at 2,125 gallons per minute (gpm) during the period July 16-to-20, 2016 (Figure 5). Adjacent Big Gulch Creek was dry but we were hesitant to discharge to the creek because of a tenant onion farming operation approximately  $\frac{3}{4}$  mile downstream.<sup>2</sup> For this reason, we discharged the pumped ground water from the SV Well #2 hydraulic test through an 1,800-foot long pipeline in the opposite direction with multiple spill points into the desert scablands (Figure 9).

For the purposes of this evaluation, specific conductance, alone, is definitive because it has far fewer variables that can have an effect on the comparison. The dissolved concentrations of this parameter differ appreciably (Table 3). This is significant because the higher conductivity of the ground water is caused by increased dissolved solids content from the dissolution of the host rocks (residence time in the aquifer matrix). The dilution rates along natural flow-paths in the granitic sediments of the Idaho Batholith are extremely low such that these measured concentrations indicate a relatively long residence time in terms of distance and time (to be able to dissolve this level of solids); this is *not* a near-well phenomenon.

#### Full Depth Annular Well Seal:

Hydro Logic, Inc. hydrogeologists were on site for all aspects of the drilling, construction and sealing of the SV Well #2. In other words, we sampled the drilling, conducted the caliper surveys of the uncased well bores (geophysical logs), and measured and documented the depths/lengths of the installed casings and bores, and the volumes of pumped grout materials (with consistent regular tagging of the top surface of the grout) first hand. We are confident that the naturally occurring stratigraphic layering of the geologic section that separates the well's completion interval from all other water sources has been maintained in the details of well construction. In other words, the full depth surface seal installed in the supply well overbore has ensured that the existing natural low-permeability impedance to vertical ground water movement has remained intact (see Figure 3).

The 17.1-inch-outside diameter surface/pump-chamber casing has been sealed from 365 feet bgl to land surface with various lengths of cement/bentonite mix grout, straight cement grout, and solid chipped bentonite from nationally certified suppliers (Figure 3). Centralizing staves were used every 20 feet to center the 17.1-inch pump chamber PVC casing within the 23-inch-diameter well bore and 24-inch diameter steel surface casing, resulting in a uniform, 3-inch (minimum) annular seal surrounding the entire length of the PVC casing. In short, the well was thoroughly sealed from land surface to the top of the completion aquifer.

#### Hydraulic Testing and Analysis:

The SV Well #2 has a relatively high calculated specific capacity of 36 gpm per foot of drawdown (gpm/ft) after 96-hours of high volume pumping at 2,125 gpm. Similarly, the aquifer of completion has a high-range (for the Treasure Valley area) near-well transmissivity of 124,667 gpd/ft (16,700 ft<sub>2</sub>/day) and a longer-term apparent transmissivity of 187,000 gpd/ft (25,000 ft<sub>2</sub>/day) as shown on Figure 4. This plot shows the pumping water level versus the logarithm of time in the SV Well #2 during the 96-hour constant-rate discharge pumping test. The pumping water level draws down according to predictable exponential relationships of accepted hydraulic theory for confined aquifers. In other words, the aquifer pressure, as evidenced by the drawdown in response to pumping SV Well #2, does not cease to drawdown as it would if a constant head hydraulic boundary (surface water source) were to be reached by the expanding cone of depression even though the cone of depression extended for miles around the well very shortly after the onset of pumping. Indeed, within the pumping well, the discharge of 2,125

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<sup>2</sup> Big Gulch Creek does not have a defined creek bed in the vicinity of the Farmer's Union Ditch, which is now just graded agricultural fields. Had we discharged 2,125 gpm for an extended period to the creek bed at the SV Well #2 location, it likely would have eventually flooded and damaged the farmer's planted fields.

gpm for 96-continuous hours lowered the water level by only 59 feet (44 feet of which occurred almost instantaneously as frictional well loss). Although a very slight (and short-lived) negative hydraulic boundary and a more significant positive subsurface hydraulic boundary were reached by the expanding cone of depression of the pumping well, all segments of the drawdown curve form straight lines on this semi-logarithmic plot. The hydraulic testing data in no way indicates a hydraulic interconnection between the completion interval of the SV Well #2 and surface water sources.

#### GWUDI Summary:

Individually, each measured/observed parameter explained above strongly suggests that there is *not* a direct hydraulic interconnection between the ground water aquifer drawn on by the newly completed SV Well #2 and surface water bodies, and no measurement shows this to be a possibility. All of this information, together, tells us that there is *not* a direct connection between surface water sources and the SV Well #2 ground water anywhere close to the well. Instead, all indications are that the ground water produced from SV Well #2 is recharged far (many miles) up-gradient in the ground water flow path. Therefore, HLI supports IDEQ's initial recommendation of a designation of "**Ground Water**" for the SV Well #2 (Appendix C).

#### **Well Head Transition:**

Owing to the PVC composition of the primary well casing, it is necessary to provide physical and ultraviolet protection at the well head. Furthermore, the current plan is to equip this well facility with a submersible pumping plant with the supply well located outside the planned pump control house to facilitate future maintenance on the well and pumping plant. To accommodate these future designs, a municipal pit-less unit would eventually be installed. To that end, HLI designed and constructed a PVC/steel well casing transition (Figure 10) that protects the wellhead now and which allows for either a line-shaft turbine or submersible turbine pumping plant application when the final distribution system designs are settled upon. All annular well seals have been continued into and through this design feature to land surface (Figure 10).

#### **Sustainable Productive Yield of the SV Well #2:**

The 96-hour specific capacity of 36 gpm/ft, aquifer transmissivity of 187,000 gpd/ft, and the available drawdown within the SV Well #2 combine to show a large capacity water well with a calculated (*theoretical*) short-term (90-days of continuous pumping) sustainable productive yield of around 5,000 gpm<sup>3</sup> with sufficient pump intake submergence and water level in the well above the screens. The consistent exponential rate of pumping water level drawdown shows that there are no nearby negative sub-surface hydraulic barriers to ground water flow toward the well (Figure 4). From the relatively low projected drawdown per log cycle ( $\Delta s$ ) of -3 ft, we show that after a year of non-interrupted, constant-rate pumping at 2,125 gpm, over 140 feet of available drawdown would remain in the well.

The test pump intake for the 96-hour hydraulic test of this well was set at a depth of ~281-feet bgl.

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<sup>3</sup> As a practical matter, the SV Well #2 will likely never be pumped at such a high rate or for such a prolonged non-interrupted period; but it certainly could be. Frictional well losses would also play a role in the ultimate maximum pumping rate and draw down. Flow velocities would be higher than typical due to the somewhat restrictive casing diameter and associated column pipe.

### **Water Level Recovery from Pumping:**

According to generally accepted hydraulic theory, within an ideal aquifer under ideal conditions (These Assumptions met), the water level in a pumped well would “recover” to pre-test levels after the same amount of time that the well was pumped; in this case, 96 hours. HLI’s continuous water level monitoring in the SV Well #2 returned to within 0.05 feet of the pre-test non-pumping water level in the supply well after 96-hours of recovery (Figure 5, Table 1). The water level recovery in the SV Well #2 shows a robust and dynamic aquifer that should be assuring to the City of Eagle with respect to the future use and operation of this well.

### **Well Head Vulnerability to Flooding:**

The SV Well #2 is currently located outside the floodplain of Big Gulch Creek (Figure 10) in FEMA’s FIRM Zone X. In my professional opinion, the possibility of this well site being flooded is practically non-existent.

### **New Source Water Quality Monitoring:**

All measured water quality and water chemistry results meet USEPA and IDEQ requirements for Public Drinking Water Systems. The well was rigorously checked continuously for sand-production during well development and hydraulic testing using a *Rossum*® sand sampling unit and found to produce clear, sand-free ground water. The certified laboratory analytical results from the SV Well #2 ground water are included herein as Appendix A and summarized on Table 2.

A digital copy of this entire submittal is included on the attached compact disc. Please call me on my direct line at 631-6781 with any questions you may have concerning this evaluation and submittal. On behalf of HLI, M3 Eagle, LLC, and the City of Eagle, we have appreciated IDEQ’s able and timely assistance with this project; thank you.

Respectfully,

Ed Squires, RPG.

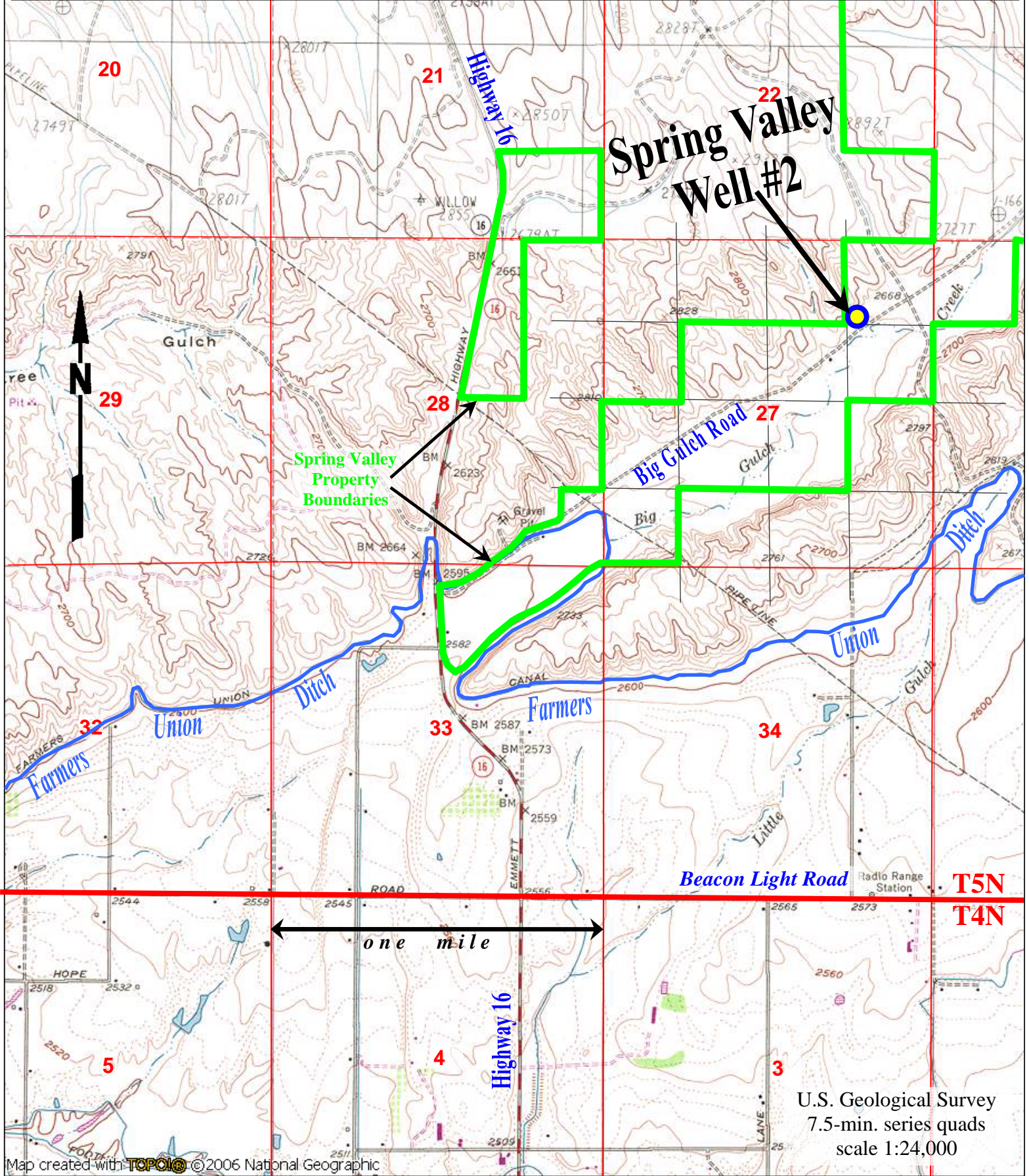
c:

Bill Brownlee, Managing Partner, M3 Eagle, LLC  
Ken Acuff, Eagle Water Department, Superintendent  
Richard Lee, IDEQ – GWUDI digital courtesy copy  
Brandon Lowder, IDEQ – New Source Monitoring –digital copy  
Scott Wonders, J-U-B- Engineers, Inc.



## **FIGURES**

**Vicinity Map of City of Eagle Spring Valley Municipal Well #2**  
T. 5 N., R. 1 W., Section 27, SW<sup>1</sup>/<sub>4</sub>, NE<sup>1</sup>/<sub>4</sub>, NE<sup>1</sup>/<sub>4</sub> - Latitude 43° 44' 48.68" Longitude 116° 26' 13.94"



U.S. Geological Survey  
7.5-min. series quads  
scale 1:24,000

Map created with **TOPIC** ©2006 National Geographic

**Figure 1.**

# City of Eagle Spring Valley Municipal Supply Well #2 Site Map

Hydro Logic, Inc.  
Boise, Idaho

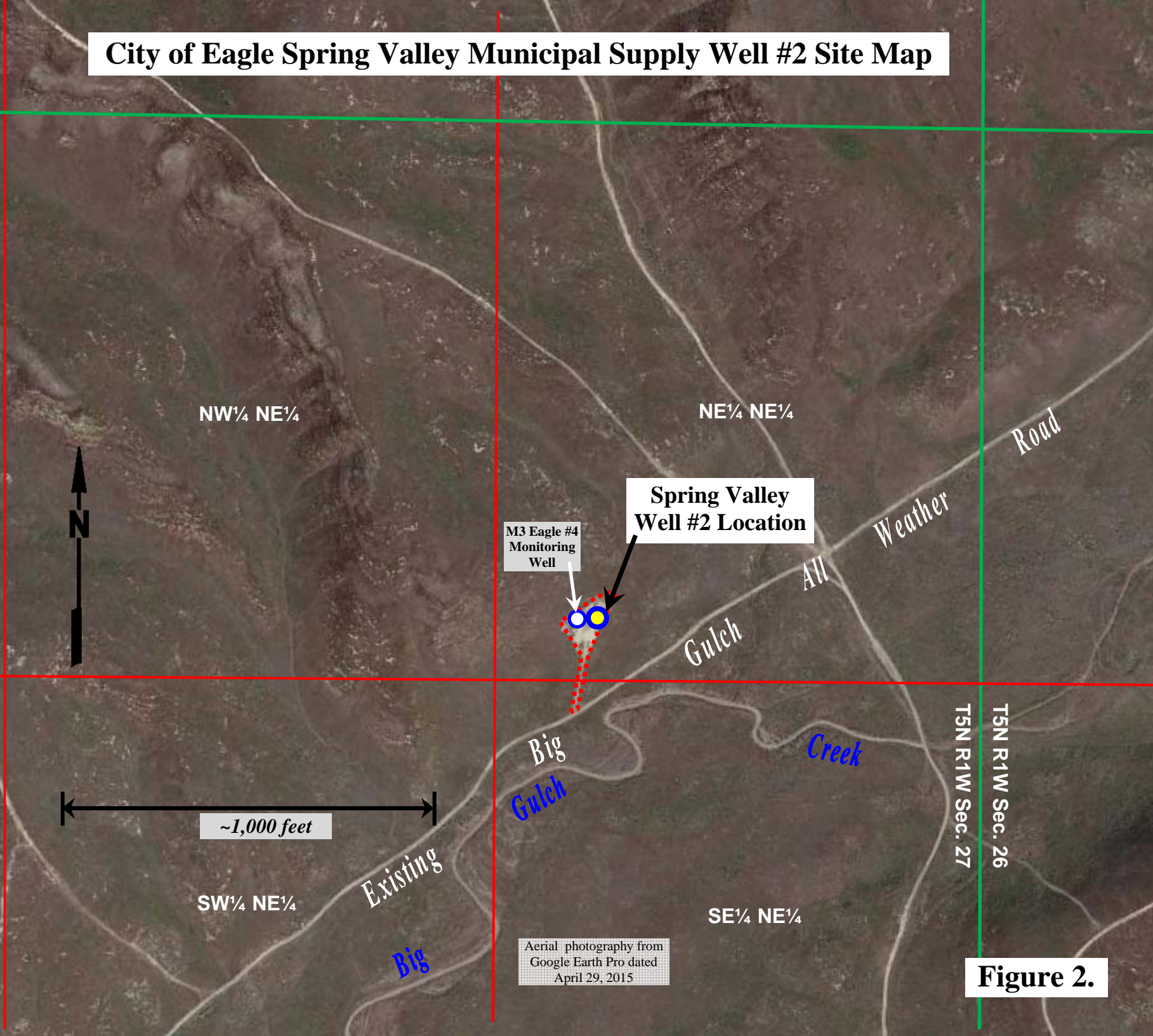
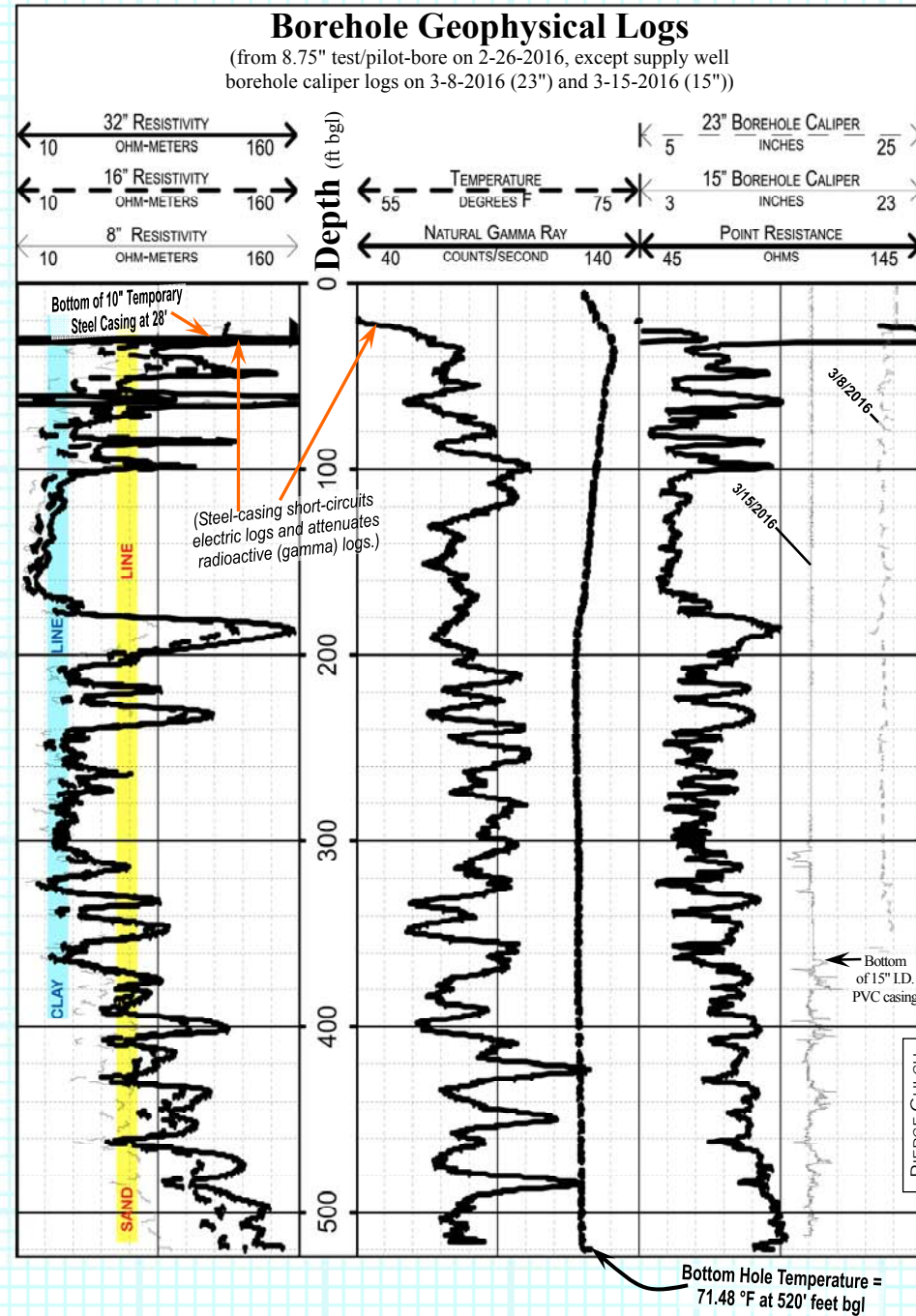


Figure 2.

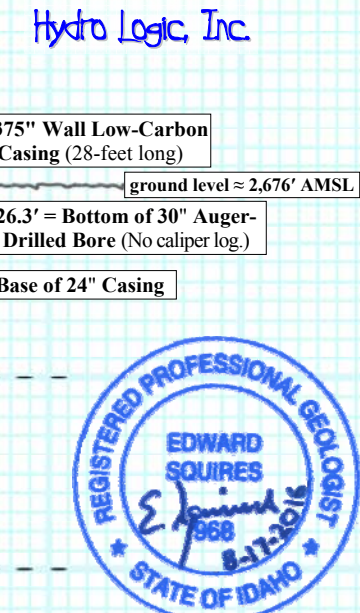
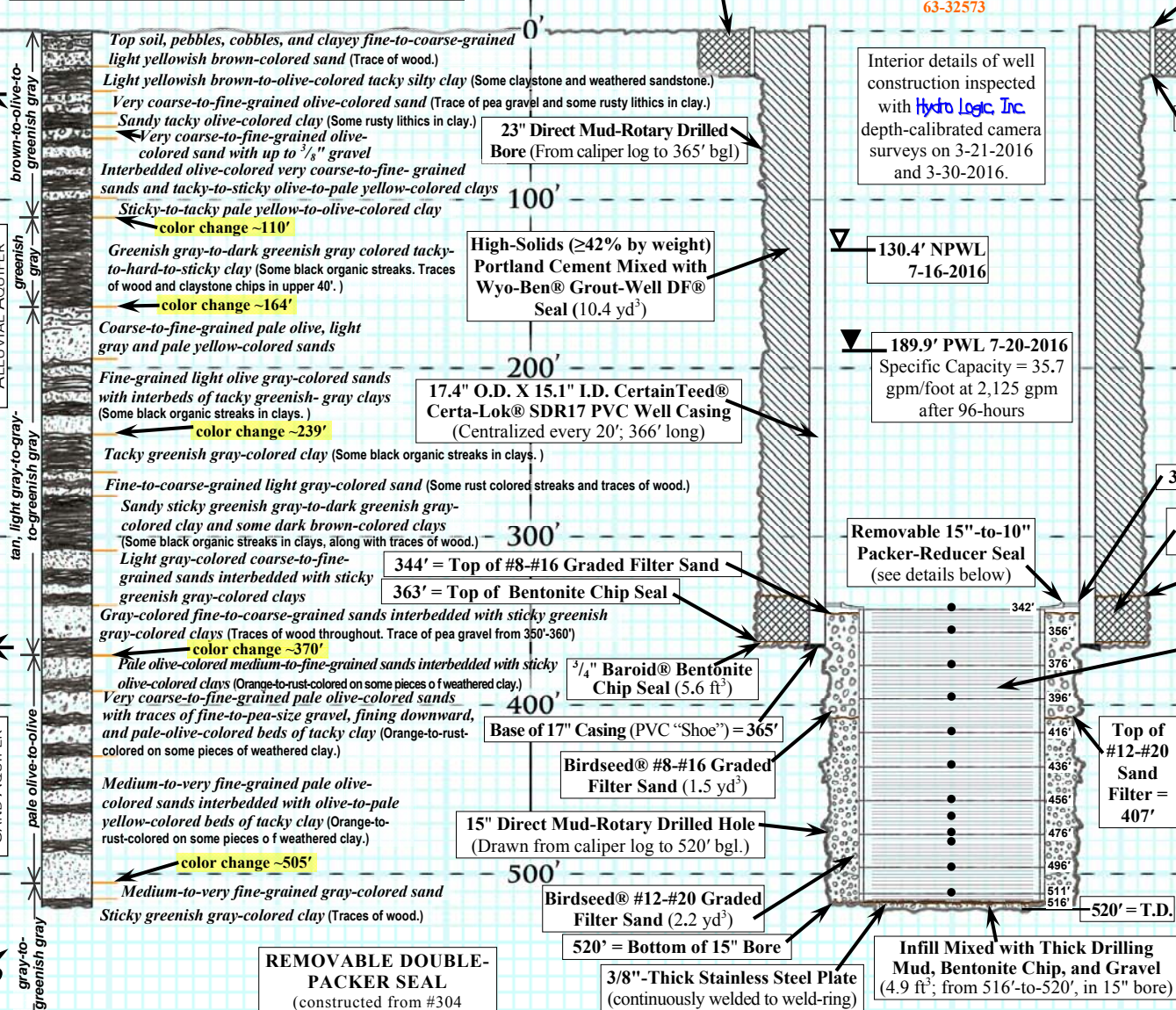
Figure 2.

- Project administration by Bill Brownlee and Tom Warley, M3 Eagle, LLC, Eagle, ID.
- Well design, hydraulic testing design, final review of diagram, and project management by Ed Squires, Hydro Logic, Inc., R.P.G.
- On site inspection, documentation, water level measurement, and water quality sampling by Kurt Newbry and Loren Pearson of Hydro Logic, Inc., Boise, ID.
- Auger drilling, direct mud-rotary drilling, well construction, and well development by George Post and Greg Mitchell of Post Drilling Inc., Weiser, ID.
- Test pump installation, discharge line setup and pump operation by Post Drilling Inc., Weiser, ID and Hydro Logic, Inc., Boise, ID.
- After pumping 72-hours at 2,125 gallons/minute on 07-19-2016 (constant-rate discharge test) a complete municipal well suite of water samples were acquired by Hydro Logic, Inc. and shipped to Energy Laboratories in Casper, Wyoming for analysis. Analytical Laboratories in Boise, Idaho was used for five analyses (see below).



### Lithology

Hydro Logic, Inc. lithologic log is interpreted and drawn from geophysical logs of the Spring Valley #2 (8.75") pilot-bore and analysis of auger/direct mud-rotary drill cuttings, sampled by the on-site geologist (K. Newbry) from the Spring Valley #2 (8.75") test/pilot-bore 75-feet away.



### Geochemistry

(Screened interval 365-to-516 ft bgl)

Analyte (in mg/L unless noted)	Result (Sampled 7-16-2016 17:15 at 2,125 gpm after 5.25 hours)	Result (Sampled 7-19-2016 12:00 at 2,125 gpm after 72 hours)
Alkalinity	128	129
Aluminum	<0.1	<0.1
Ammonia as N	not tested	<0.05
Antimony	not tested	<0.005
Arsenic	0.003	0.003
Barium	not tested	<0.1
Beryllium	not tested	<0.001
Cadmium	not tested	<0.001
Calcium	35	36
Chloride	4	4
Chromium	not tested	<0.05
Color (color units)	not tested	<5.0
Conductivity (µS)	272	300
Copper	not tested	<0.01
Corrosivity (Langlier Index)	-0.42	-0.34
Cyanide (total)	not tested	<0.005
Fluoride	0.4	0.4
Hardness	115	120
Iron (total)	<0.03	<0.03
Iron (dissolved)	<0.03	<0.03
Lead	not tested	<0.001
Magnesium	7	7
Manganese (dissolved)	0.006	<0.008
Mercury	not tested	<0.0001
Nitrate NO <sub>3</sub> as N	0.3	0.4
Nitrite NO <sub>2</sub> as N	not tested	<0.1
Orthophosphate	not tested	<0.2
pH (S.U.)	7.31	7.38
Potassium	2	2
Silica	35	33
SOC's	not tested	none detected
Sodium	19	19
Sulfate	23	22
Sulfide	not tested	<0.04
Suspended Solids	not tested	<10
Total Coliform	absent	absent
Total Dissolved Solids	204	190
Total Kjeldahl Nitrogen	<0.5	<0.5
Total Organic Carbon	<0.5	<0.5
VOC's	not tested	none detected

### Radiology (in pCi/L unless noted)

Gross Alpha	2.3 ± 1.8	1.9 ± 1.7
Gross Beta	0.9 ± 2.1	3.5 ± 2.0
Uranium (pCi/L (µg/L))	not tested	1.2 (1.8)
Adjusted Gross Alpha	not tested	0.7
Radium 226	not tested	0.4 ± 0.1
Radium 228	not tested	1.9 ± 0.9

### Field Measured (by Hydro Logic, Inc.) Parameters

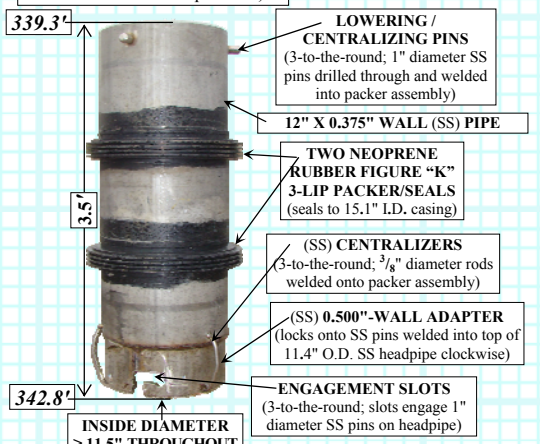
Field Conductivity (µS)	262	266
Field Dissolved Oxygen	3.56	3.45
Field Odor (describe)	none	None
Field O.R.P. (mV)	67.6	55.8
Field pH (S.U.)	7.18	7.15
Field Temperature (°F)	65.1	65.3

Sampled 07-16-2016 and 07-19-2016 by Hydro Logic, Inc. after pumping at 2,125 gpm for 5.25 and 72 hours. Analyses by Energy Laboratories, Inc., Casper, WY and by Analytical Laboratories, Inc., Boise, ID.

Calibrated borehole geophysics conducted by K. Newbry of Hydro Logic, Inc. on February 26<sup>th</sup>, 2016 in the 8.75-inch diameter, mud-filled, direct mud-rotary Spring Valley Well #2 pilot bore, to 520 feet below ground, immediately after removal of the drill steel. The caliper logs are the final caliper logs of the upper 23-inch bore on March 8<sup>th</sup>, 2016 and the lower 15-inch bore on March 15<sup>th</sup>, 2016.  
Borehole geophysical logs interpreted by E. Squires and L. Pearson of Hydro Logic, Inc.

### Well Development

The well development program for the constructed Spring Valley well #2 designed by Hydro Logic, Inc., consisted of evacuating all of the drilling mud by submersible pumping from the top of the well until the water was mostly clear. The screened-interval was then pumped from the water-table down to the bottom of the screen assembly using an isolation-pumping assembly (with a 3-foot spread between packer-seals), to clear remaining sediment/mud from the well and screens. For 8-hours the aquifer/screen section of the well was isolation-pumped at 300 gallons/minute with a swabbing-and-surfing action until all intervals were free of mud and sand. Following the initial isolation-pumping a 300-to-500 PSI water-jet (with mud-dispersant additive) was employed to clean any remaining drilling mud and/or formation clays from the screens, sand filter and borehole wall. "Baroid" brand AQUA-CLEAR® PFD, a mud-dispersing agent, mixed at ratio of 1-gallon Aqua-clear to 500-gallons of water (the factory recommended ratio), was jetted into/through the screen assembly from the bottom-up at a rate of 1-minute-per-foot and several revolutions-per-minute and then allowed to stand for 6-days. Following high-pressure jetting, the well was again isolation pumped from the top-down, for 4-hours until all intervals of the pumped water were clear and sand free.



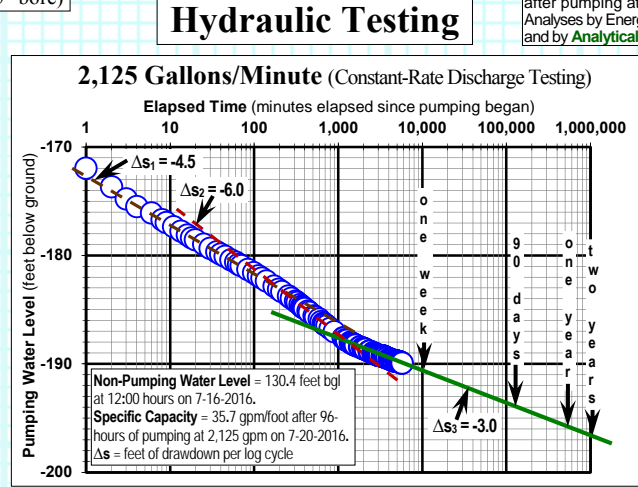
Note: All grout seals were pumped from the bottom-up under pressure using a tremie pipe and tagged into place with an incremented sounding line by the on-site geologist (Kurt Newbry, HLI).

All Portland cement / Wyo-Ben® cement-bentonite grout batches contained at least 42% solids (by weight). Cement-bentonite grouts were utilized to help protect the integrity of the well construction by lessening settlement and to lower the heat of hydration in caved areas.

All Portland cement grout batches contained at least 65% solids (by weight).

All Birdseed® graded sand filters and Baroid® bentonite chip seals were poured into place through a mud-filled bore and tagged into place with an incremented sounding line by the on-site geologist (Kurt Newbry, HLI).

All seal and filter pack material volumes were checked against volumetric calculations from the caliper logs of the boreholes and pipe sizes. The grout seal volume for the 30" bore used 37% more material and the 23" bore used 32% less material than was calculated. The sand filter volume for the 15" bore was 12% more material than was calculated.

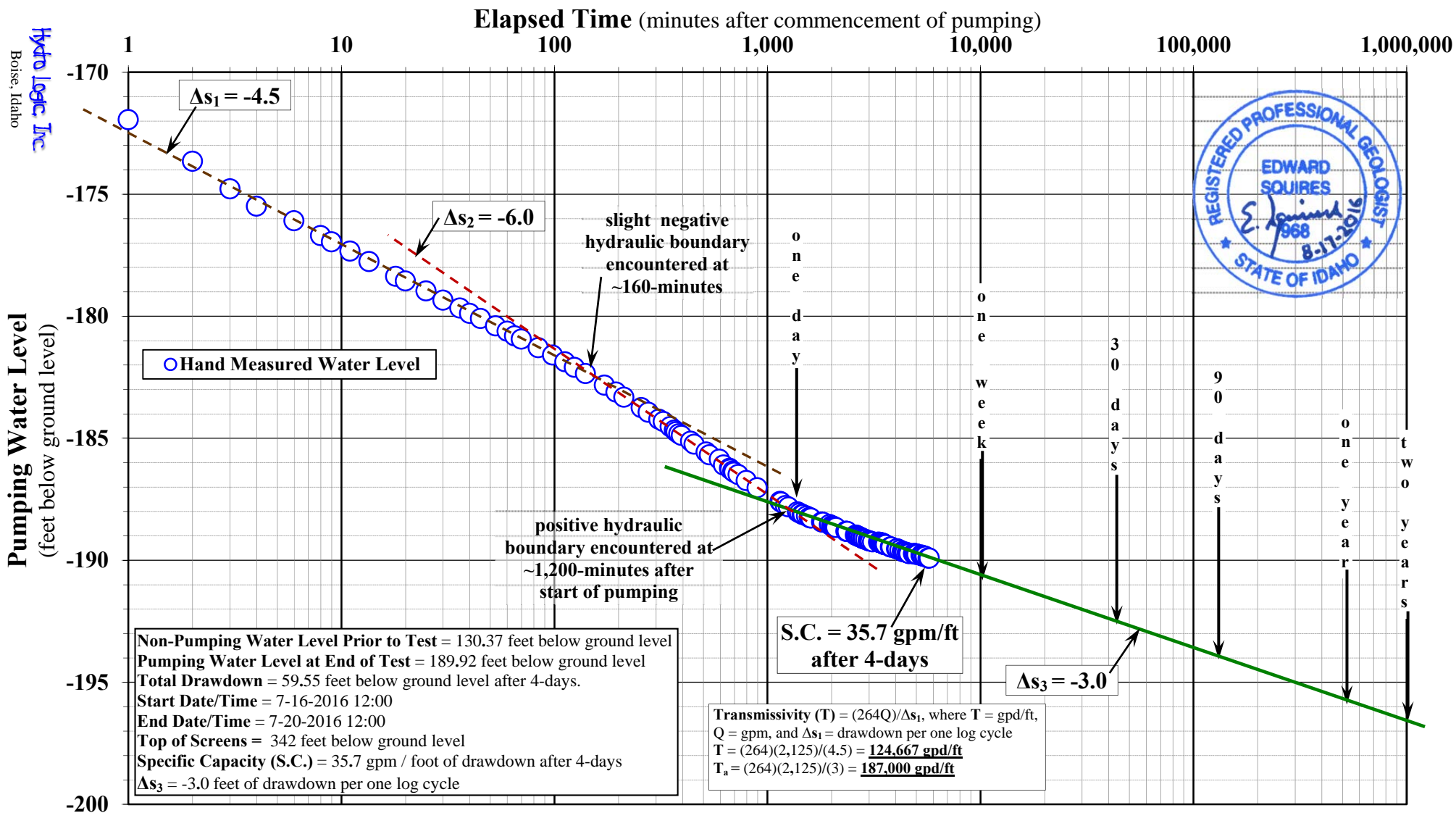


Hydro Logic, Inc.  
1002 W. Franklin St.  
Boise, Idaho 83702  
(208) 342-8369  
hl@hydrologicinc.net

Figure 3.

# 4-Day Constant-Rate Discharge Test of Spring Valley Supply Well #2 at 2,125 Gallons/Minute

Test Conducted July 16th, 2016 through July 20th, 2016



**Figure 4.** – Preliminary plot of pumping water level versus the logarithm of time for the initial hydraulic testing of the newly completed Spring Valley Well #2. The semi-log hydrograph shows predictable drawdown response to constant-rate pumping at 2,125 gallons per minute (gpm), or about 3 million gallons per day, for 96-hours. With only a few very slight perturbations, due to adjusting the flow rate, the pumping rate and the rate of observed drawdown both remained very consistent throughout the testing as shown by the predictable straight-line relationship on the plot. These relationships signify a generally steady and even expansion of the cone of depression away from the pumping well with no apparent significant negative subsurface hydraulic boundaries. Idaho Department of Water Resources Hydrology staff have hypothesized that the aquifer at this location was bounded by nearby subsurface geologic structural faults that could be a constraint to ground water flow to wells within the aquifer. This high-discharge testing, in concert with previous HLI aquifer tests at this location, refutes the idea of a "compartmentalized" aquifer that would inhibit production of ground water supplies at this location. The drawdown per log cycle ( $\Delta s$ ) can be projected to show future drawdown at continuous pumping at this high pumping rate (still 145 feet of additional available drawdown in the well after 2 years of continuous constant-rate pumping) that is already ~ ¼ of the maximum-day ground water demand of the entire Spring Valley community at full build-out. Although it certainly could be, the well would never practically be pumped at this high rate continuously, but this test does illustrate the productive and highly-transmissive nature of the regional Pierce Gulch Sand Aquifer at this location and goes a very long way towards proving up the availability of the needed ground water supplies for the Spring Valley development and the City of Eagle.

**Figure 4.**

# 4-Day (96-hour) Constant-Rate Discharge Test of Spring Valley Supply Well #2 at 2,125 Gallons/Minute

Test conducted July 16<sup>th</sup>, 2016 through July 20<sup>th</sup>, 2016

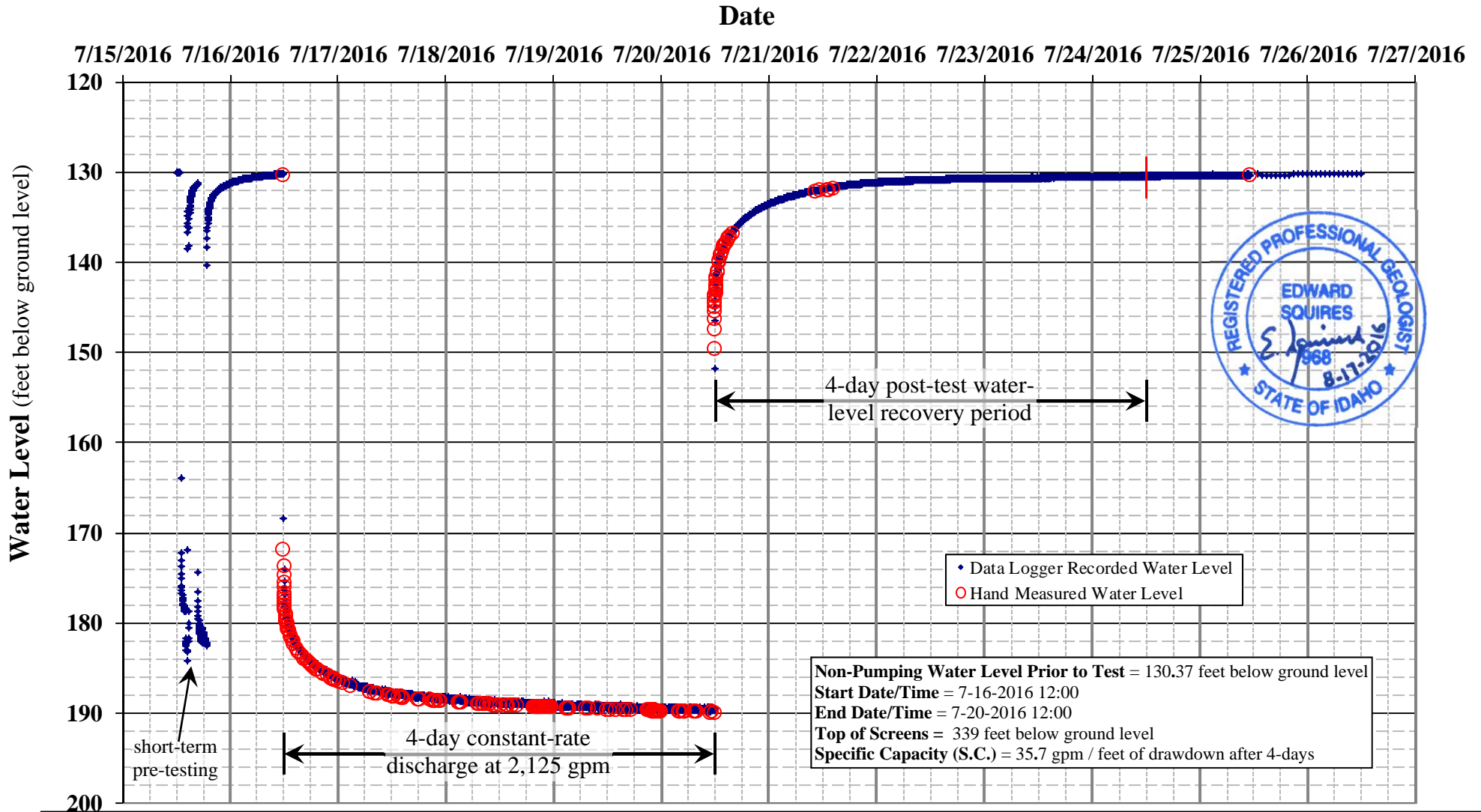
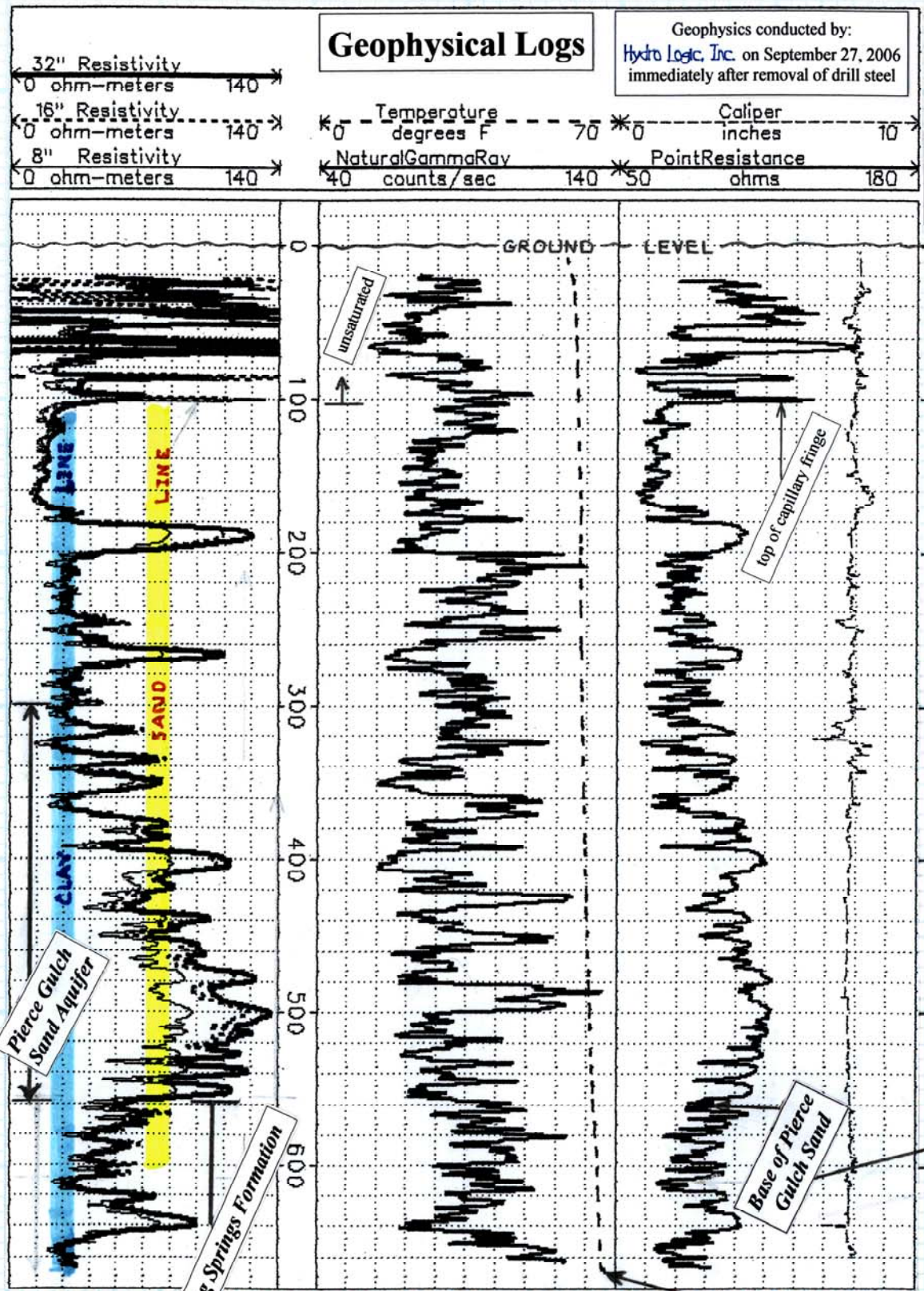


Figure 5.

**Figure 5.** – Arithmetic plot of water level versus time before, during, and after the initial hydraulic testing of the newly completed Spring Valley Well #2. The hydrograph shows a drawdown and recovery response to constant-rate discharge pumping at 2,125 gpm continuously for 4-days. According to generally accepted hydraulic theory, within an ideal aquifer under ideal conditions (Theis Assumptions met), the water level in a pumped well would “recover” to pre-test levels after the same amount of time that the well was pumped; in this case, 4-days. The water level in SV Well #2 returned to within 0.05-ft of the pre-test level (130.37’) in the well after 4-days of recovery on July 26<sup>th</sup>, 2016. For all intents and purposes, this is full recovery and so insignificant with respect to trends and barometric effects. The water level recovery in the SV Well #2 is robust and assuring with respect to the future use and operation of this well. **Figure 5.**



**Depth**  
(feet below ground level)

### Lithology

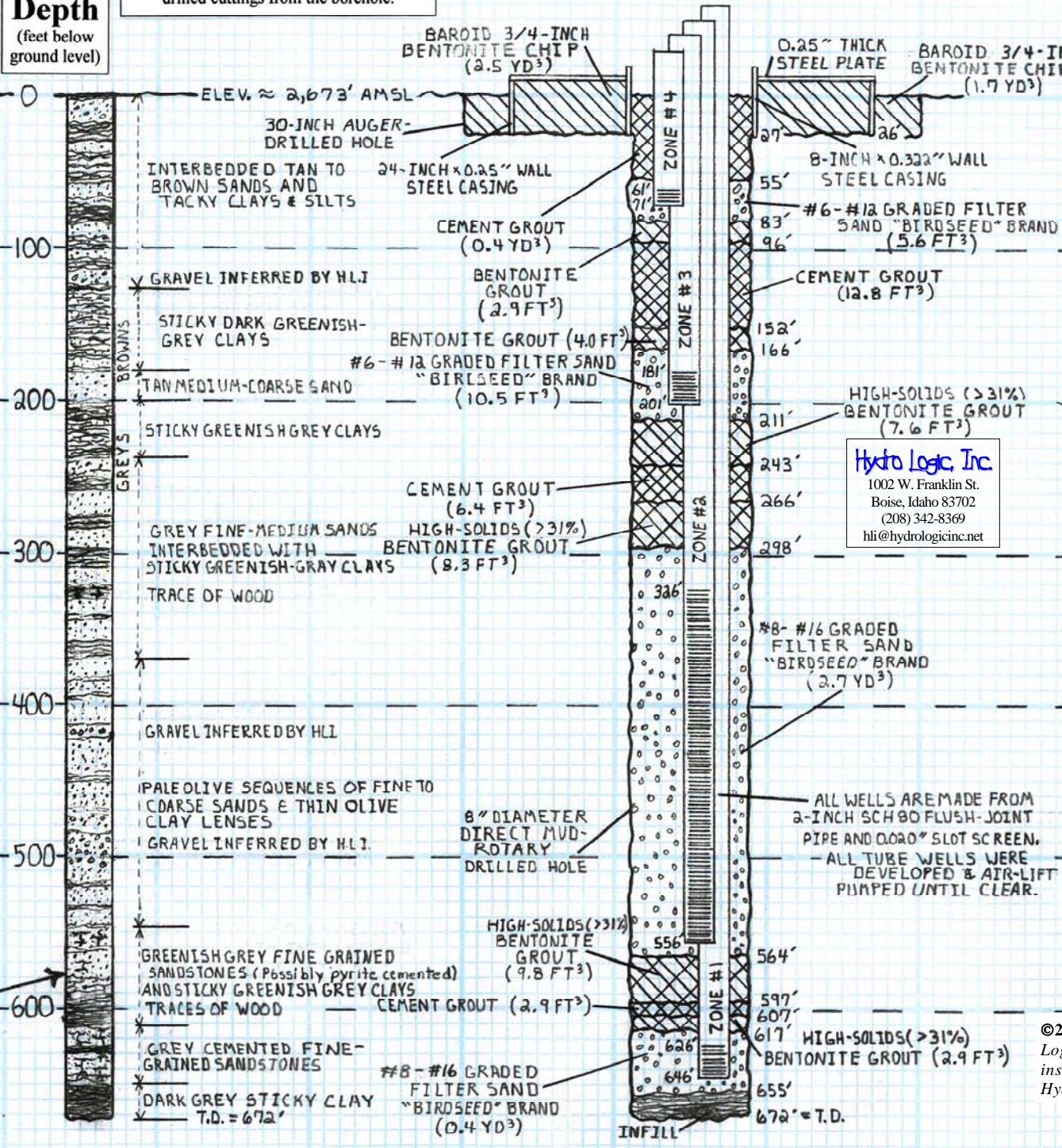
Hydro Logic, Inc. lithologic log is interpreted and drawn from geophysical logs and drilled cuttings from the borehole.

### As-Built Well Construction

(horizontal scale 0.1"=1.0")  
(vertical scale 1"=100')

### M3 Eagle #4 Monitor Well

T. 5 N., R. 1 W., Section 27, SW¼, NE¼, NE¼  
 Latitude 43° 44' 48.68" Longitude 116° 26' 13.94"  
 Well construction completed March 6, 2008.



### Ground Water Chemistry

Analysis (in mg/L unless noted)	ZONE #1 (646 - 626 ft bgl)	ZONE #2 (556 - 326 ft bgl)
Alkalinity	128.0	122.0
Ammonia as N	0.11	<0.01
Arsenic	0.0029	0.0066
Calcium as CaCO <sub>3</sub>	83.9	81.0
Chloride	4.13	4.57
Color (apparent)	<1	<1
Conductivity (µS)	307.0	300.0
Corrosivity	-0.45	-0.46
Fluoride	0.48	0.43
Hardness	118.0	109.0
Iron (total)	0.31	0.02
Iron (dissolved)	0.27	0.01
Magnesium	8.33	6.81
Manganese (dissolved)	0.07	0.01
Nitrate as N	<0.10	0.39
Nitrite as N	<0.01	<0.01
Odor	<1	<1
Orthophosphate	0.104	0.133
pH - Lab (S.U.)	7.45	7.52
Potassium	2.52	2.28
Silica	37.2	32.5
Sodium	24.0	25.8
Sulfate	21.2	23.0
Sulfide	<0.05	<0.05
Total Dissolved Solids	225.0	223.0
Total Kjeldahl Nitrogen	0.11	<0.10
Total Organic Carbon	<1.0	1.00
Field Conductivity (µS)	316 to 333	303 to 334
Field Dissolved Oxygen	0.09	2.26
Field O.R.P. (mV)	-122 to -105	+99 to +116
Field pH (S.U.)	7.48 to 7.64	7.53 to 7.70
Field Temperature (°F)	68.9	64.6

Water samples and field parameters collected on April 3, 2008 by Hydro Logic, Inc.  
 Each field parameter (except DO) was acquired with two separate calibrated meters to validate measurements.  
 Analyses by Alchem Laboratories, Inc., Boise, ID

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> Project administration by Bill Brownlee and Tom Warley, M3 Eagle LLC, Eagle, ID.  
 > Well design, final review of diagram, and project management by Ed Squires, Hydro Logic, Inc., R.P.G.  
 > On site inspection, documentation, water level measurement, and water quality sampling by Loren Pearson of Hydro Logic, Inc., Boise, ID.  
 > Direct mud-rotary drilling and well construction by Del Leavitt of Treasure Valley Drilling and Pump, Inc., Weiser, ID.  
 > Well development by Daniel McLeran, McLeran Water Well Drilling LLC, Payette, ID.



NOTES: ALL GROUTS PUMPED FROM THE BOTTOM UP THROUGH TREMLE AND TAGGED INTO PLACE.  
 ALL BENTONITE GROUTS CONTAIN GREATER THAN 31% SOLIDS BY WEIGHT.  
 ALL CEMENT GROUTS WERE MADE WITH 6 GALLONS OF WATER MIXED WITH 94 POUNDS OF PORTLAND CEMENT.

Interpretations and Final Diagram Revisions March 17, 2008 by Hydro Logic, Inc. Loren Pearson and Ed Squires

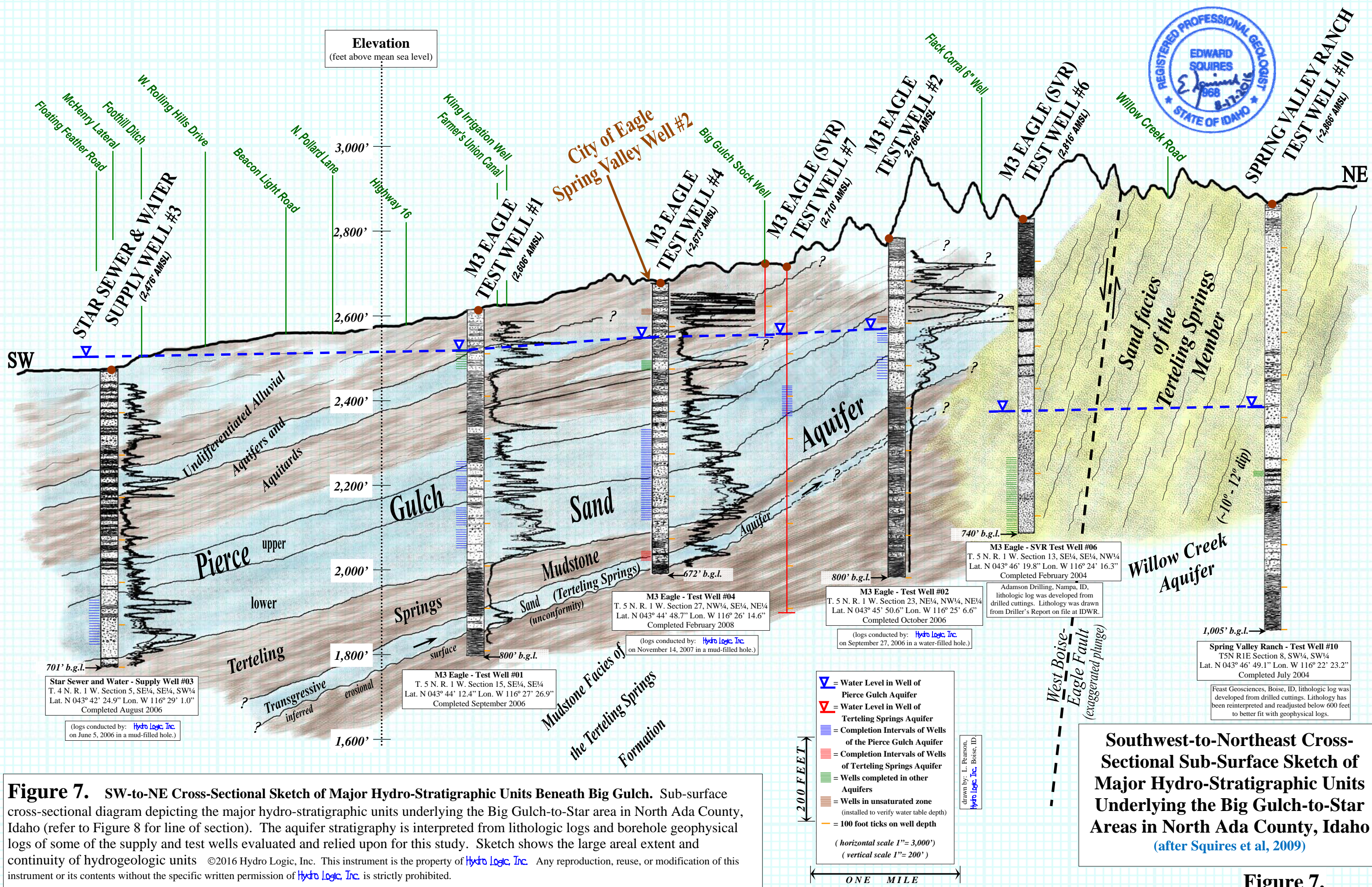
### Water Levels

(feet below measure point = 3.5 feet above ground)

Date / Time (24-hr clock)	ZONE #1 (646 - 626 ft bgl)	ZONE #2 (556 - 326 ft bgl)	ZONE #3 (201 - 181 ft bgl)	ZONE #4 (61 - 71 ft bgl)
3/07/08 18:31	130.25	130.72	134.76	unsaturated zone (installed to confirm vadose zone)
3/14/08 17:12	130.25	130.73	134.20	
3/20/08 12:27	130.32	130.79	134.49	
3/22/08 18:12	130.43	130.92	134.74	
3/31/08 14:51	130.11	130.60	134.56	

Water levels recorded by Hydro Logic

Figure 6.

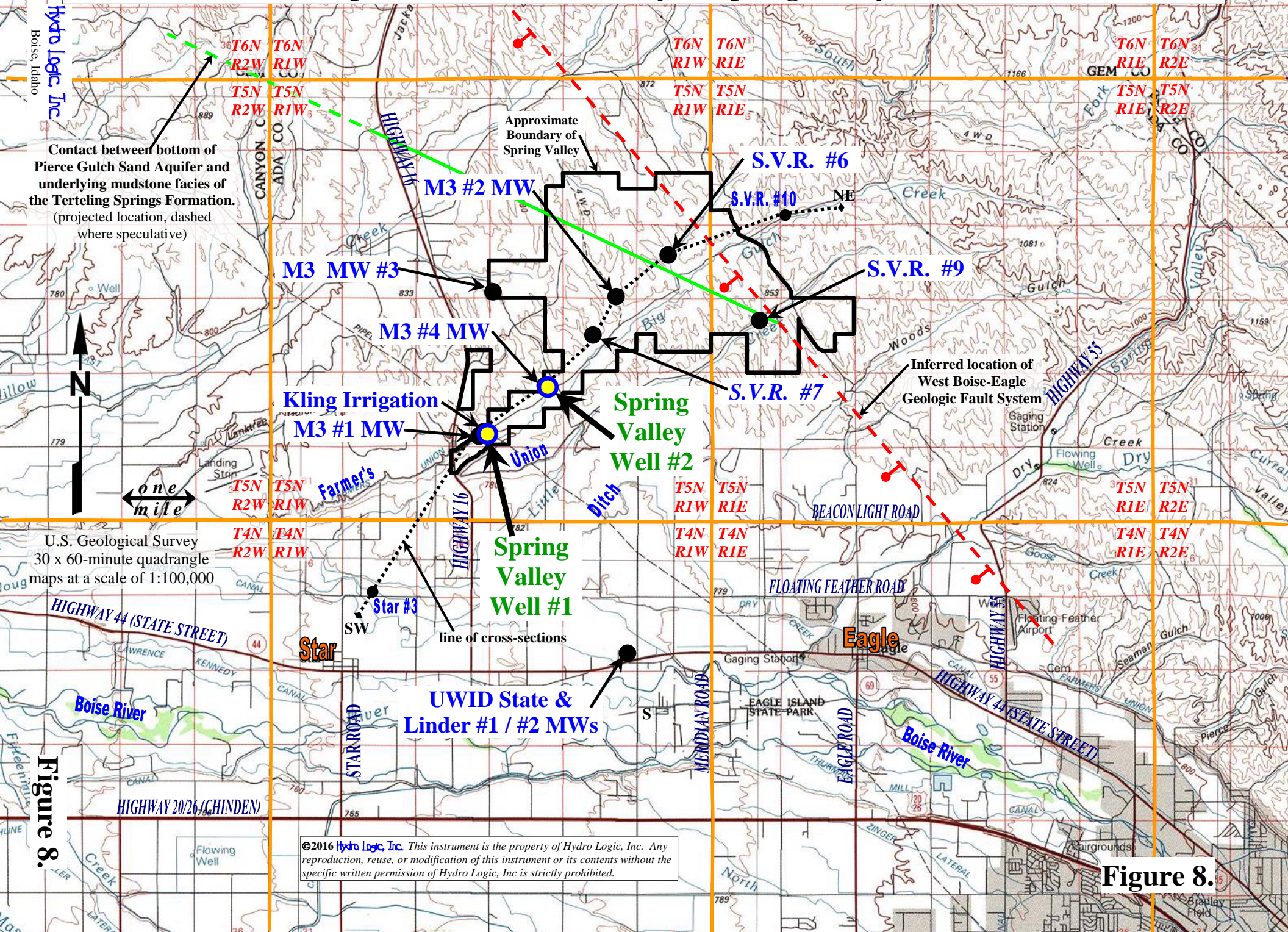


**Figure 7.** SW-to-NE Cross-Sectional Sketch of Major Hydro-Stratigraphic Units Beneath Big Gulch. Sub-surface cross-sectional diagram depicting the major hydro-stratigraphic units underlying the Big Gulch-to-Star area in North Ada County, Idaho (refer to Figure 8 for line of section). The aquifer stratigraphy is interpreted from lithologic logs and borehole geophysical logs of some of the supply and test wells evaluated and relied upon for this study. Sketch shows the large areal extent and continuity of hydrogeologic units ©2016 Hydro Logic, Inc. This instrument is the property of [Hydro Logic, Inc.](http://HydroLogic.com) Any reproduction, reuse, or modification of this instrument or its contents without the specific written permission of [Hydro Logic, Inc.](http://HydroLogic.com) is strictly prohibited.

**Southwest-to-Northeast Cross-Sectional Sub-Surface Sketch of Major Hydro-Stratigraphic Units Underlying the Big Gulch-to-Star Areas in North Ada County, Idaho**  
(after Squires et al, 2009)

**Figure 7.**

# Location Map of Wells in the Vicinity of Spring Valley Wells #1 and #2



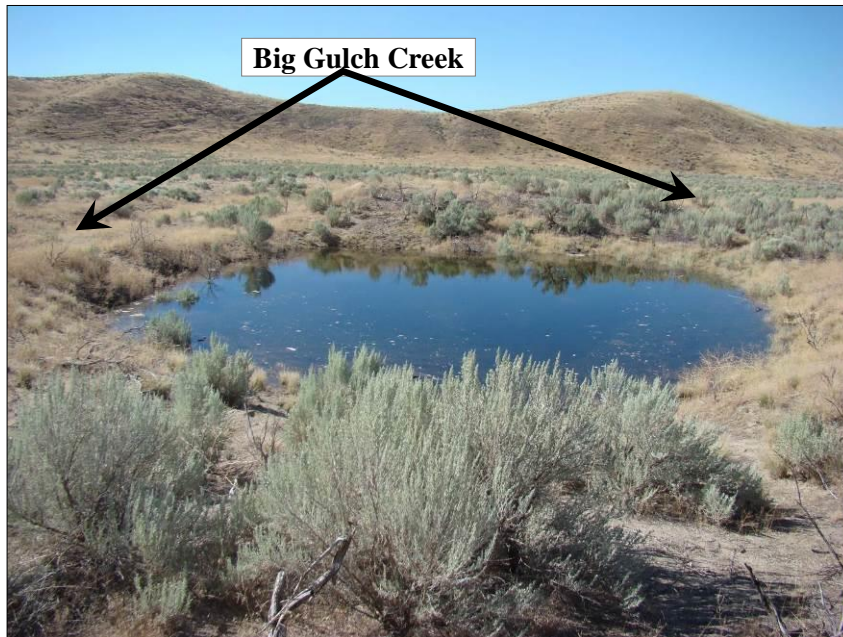
**Figure 8.**



7-17-2016 – Aquifer test discharge routed through ~1,800' of 10" Victolic clamped pipe with seventeen 4" discharge outlets along pipeline spreading water over large areas to prevent water from going to farmer's fields.



7-17-2016 – Flow-meter registering ~2,125 gallons/minute during second day of 4-day (96-hour) long aquifer test of Spring Valley Municipal Well #2. At end of the test, totalized flow matched the instantaneous readings and pumping time.



7-18-2016 – Old, (normally dry) shallow, pond located between Spring Valley Well #2 and SVR Well #7 that was utilized to direct and temporarily divert/store some water during the aquifer test.



7-17-2016 – HLI sampling equipment being used for field-measured water chemistry parameters for IDEQ “New Source Monitoring” of SV Well #2 discharge water during 2,125 gallons/minute aquifer test.

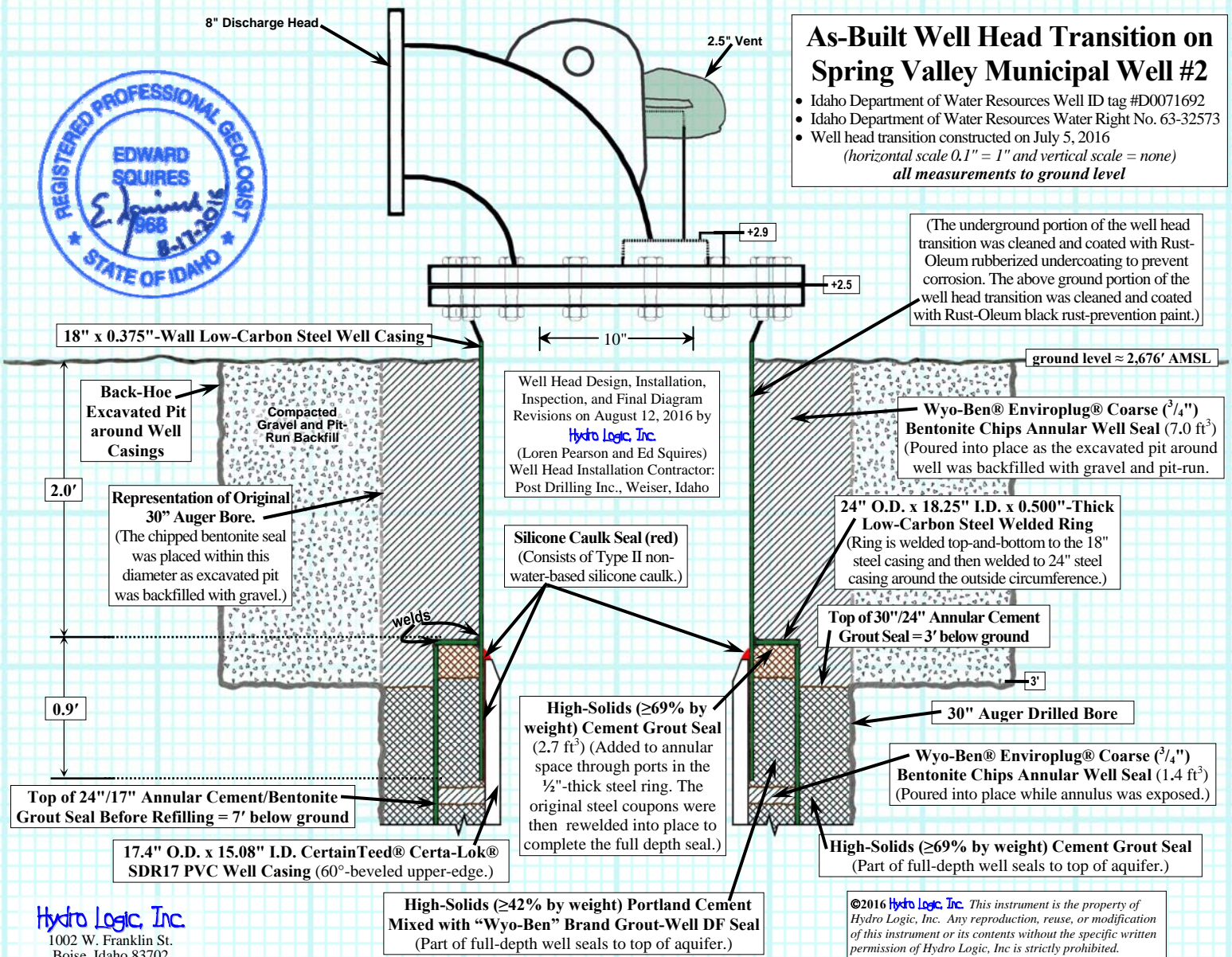
**Figure 9.**

**Figure 9.**



## As-Built Well Head Transition on Spring Valley Municipal Well #2

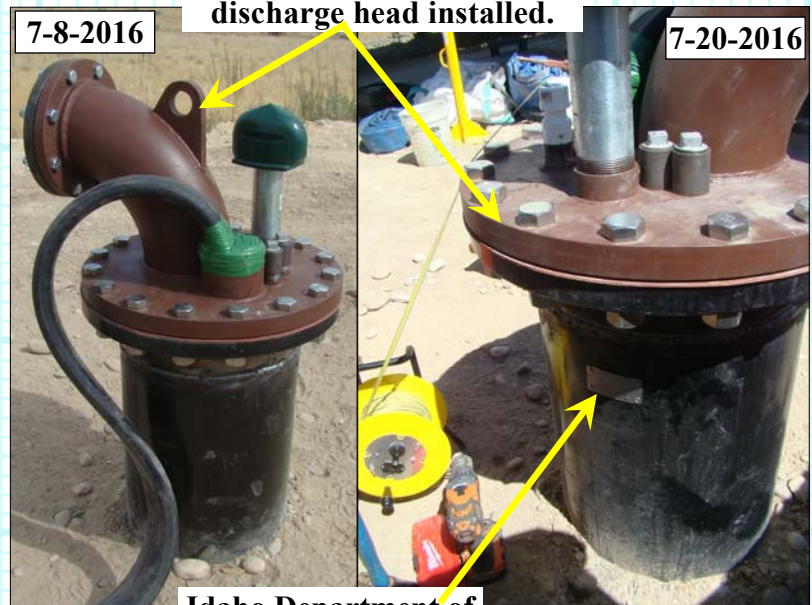
- Idaho Department of Water Resources Well ID tag #D0071692
- Idaho Department of Water Resources Water Right No. 63-32573
- Well head transition constructed on July 5, 2016  
(horizontal scale 0.1" = 1" and vertical scale = none)  
all measurements to ground level



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Continuation of the full-depth annular well seal around the municipal well head using chipped bentonite clay around casing.



Idaho Department of Water Resources Well Identification Tag #D0071692

Figure 10.

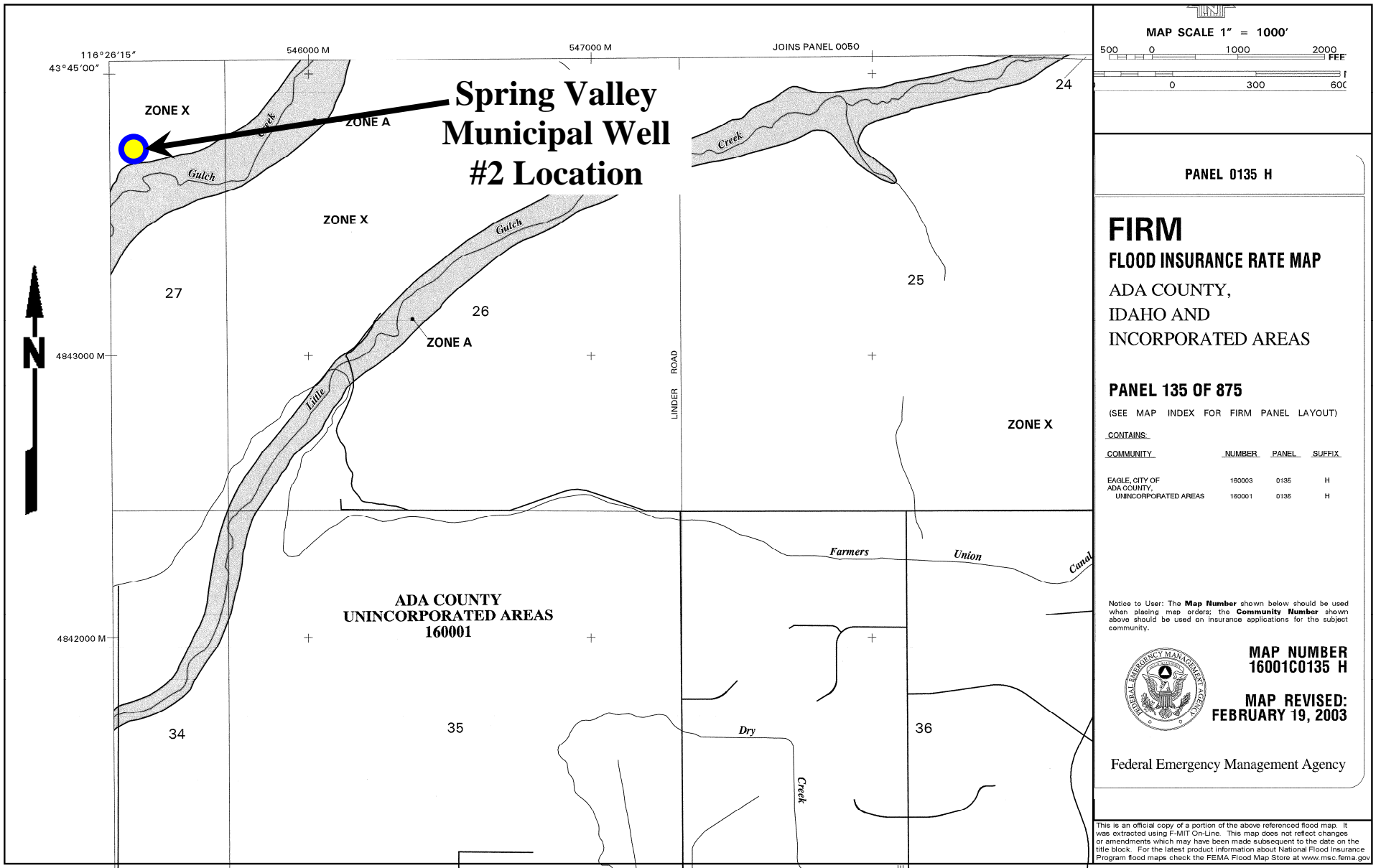


Figure 11.

Figure 11.

## **TABLES**

**Table 1. - City of Eagle Spring Valley Municipal Well #2**  
**Data for 4-Day 2,125 Gallons / Minute Constant-Rate Discharge Test**

Testing conducted by HLI from July 16<sup>th</sup> through July 20<sup>th</sup>, 2016

Elapsed Time (minutes)	Date/Time (24 hour)	Water Level (feet below measure point = 2.9 ft above ground)	Water Level (feet below ground)	Drawdown (feet)	Comments
-	07/16/2016 11:53	133.27	130.37	-	non-pumping water level (NPWL)
0	07/16/2016 12:00	133.27	130.37	0.00	<b>PUMP ON; Totalizer = 57,545,500 gallons (starting value); sand in Rossum sampler = 0.0 mL (starting value), and flow through sand sampler = 0.5 gpm</b>
1	07/16/2016 12:01	174.85	171.95	41.58	58 PSI
2	07/16/2016 12:02	176.56	173.66	43.29	59 PSI
3	07/16/2016 12:03	177.68	174.78	44.41	closing valves 1 and 2 in discharge line
4	07/16/2016 12:04	178.40	175.50	45.13	60 PSI
6	07/16/2016 12:06	178.99	176.09	45.72	63 PSI
8	07/16/2016 12:08	179.60	176.70	46.33	
9	07/16/2016 12:09	179.86	176.96	46.59	
11	07/16/2016 12:11	180.24	177.34	46.97	63 PSI
13.5	07/16/2016 12:13	180.66	177.76	47.39	61 PSI; Rossum = 0.0 mL and sampler flow = 0.5 gpm
16	07/16/2016 12:16	181.00	178.10	47.73	62.5 PSI
18	07/16/2016 12:18	181.27	178.37	48.00	62.5 PSI
20	07/16/2016 12:20	181.46	178.56	48.19	
25	07/16/2016 12:25	181.87	178.97	48.60	YSI Pro Plus model # 13L101309 (Pro Plus #2) calibrated and installed in a closed loop system. Two YSI Pro Plus field parameter units were used for ensured accuracy of results. Only Pro Plus #2 results recorded here.
30	07/16/2016 12:30	182.25	179.35	48.98	
36	07/16/2016 12:36	182.57	179.67	49.30	Pro Plus #2 field parameters: temperature (T) = 65.4 °F, dissolved oxygen (D.O.) = +4.09 mg/L, conductivity = 257.5 µS, pH = 7.17, oxidation reduction potential (O.R.P.) = +329.5 mV
40	07/16/2016 12:40	182.79	179.89	49.52	
45	07/16/2016 12:45	183.00	180.10	49.73	62.5 PSI; Pro Plus #2 field parameters: T = 65.3 °F, D.O. = +3.67 mg/L, conductivity = 254.6 µS, pH = 7.17, O.R.P. = +287.8 mV
53	07/16/2016 12:53	183.30	180.40	50.03	62.0 PSI
56	07/16/2016 12:56	-	-	-	Test Well #4 Zone 2 (T4Z2) = 149.24 ft btoc
60	07/16/2016 13:00	183.52	180.62	50.25	62.0 PSI; Pro Plus #2 field parameters: T = 65.4 °F, D.O. = +3.65 mg/L, conductivity = 254.6 µS, pH = 7.17, O.R.P. = +230.0 mV; no sand
65	07/16/2016 13:05	183.71	180.81	50.44	
70	07/16/2016 13:10	183.84	180.94	50.57	62.0 PSI
76	07/16/2016 13:16	-	-	-	T4Z2 = 149.84ft btoc
79	07/16/2016 13:19	-	-	-	Test Well #4 Zone 1 (T4Z1) = 136.25 ft btoc
81	07/16/2016 13:21	-	-	-	Test Well #4 Zone 3 (T4Z3) = 137.64 ft btoc; Test Well #4 Zone 4 (T4Z4) = "dry" (bottom tags at 70 ft)
84	07/16/2016 13:24	184.19	181.29	50.92	62.0 PSI; Pro Plus #2 field parameters: T = 65.5 °F, D.O. = +3.52 mg/L, conductivity = 255.0 µS, pH = 7.18, O.R.P. = +212.0 mV
98	07/16/2016 13:38	184.50	181.60	51.23	62 PSI; no sand, no odor, tastes good
112	07/16/2016 13:52	184.77	181.87	51.50	62 PSI
124	07/16/2016 14:04	185.00	182.10	51.73	
140	07/16/2016 14:20	185.26	182.36	51.99	62 PSI
155	07/16/2016 14:35	-	-	-	furthest east discharge, just now going into wash
172	07/16/2016 14:52	185.73	182.83	52.46	62.0 PSI; Pro Plus #2 field parameters: T = 65.5 °F, D.O. = +3.50 mg/L, conductivity = 260.0 µS, pH = 7.18, O.R.P. = +80.0
195	07/16/2016 15:15	186.01	183.11	52.74	62 PSI
200	07/16/2016 15:20	-	-	-	T4Z2 = 151.80 ft btoc
204	07/16/2016 15:24	-	-	-	T4Z1 = 138.59 ft btoc
206	07/16/2016 15:26	-	-	-	T4Z3 = 137.63 ft btoc; T4Z4 = "dry" (bottom tags at 70 ft)

Elapsed Time (minutes)	Date/Time (24 hour)	Water Level (feet below measure point = 2.9 ft above ground)	Water Level (feet below ground)	Drawdown (feet)	Comments
212	07/16/2016 15:32	186.22	183.32	52.95	62 PSI; Pro Plus #2 field parameters: T = 65.7 °F, D.O. = +3.65 mg/L, conductivity = 260.0 µS, pH = 7.19, O.R.P. = +73.3 mV
256	07/16/2016 16:16	186.65	183.75	53.38	62 PSI; Pro Plus #2 field parameters: T = 65.8 °F, D.O. = +3.53 mg/L, pH = 7.19, O.R.P. = +68.9 mV
276	07/16/2016 16:36	186.84	183.94	53.57	62 PSI
309	07/16/2016 17:09				open valve to sample hose and adjust flow to Pro Plus #2
310	07/16/2016 17:10	187.12	184.22	53.85	62 PSI
315	07/16/2016 17:15	-	-	-	sample first set of water samples; Pro Plus #2 field parameters: T = 65.1 °F, D.O. = +3.56 mg/L, conductivity = 262.0 µS, pH = 7.18, O.R.P. = +67.6 mV; no sand, minor degassing, no odor, clean taste
325	07/16/2016 17:25	187.22	184.32	53.95	
350	07/16/2016 17:50	187.43	184.53	54.16	62 PSI; Pro Plus #2 field parameters: T = 65.3 °F, D.O. = +3.54 mg/L, conductivity = 260.0 µS, pH = 7.18, O.R.P. = +67.4 mV
366	07/16/2016 18:06	187.57	184.67	54.30	62 PSI
371.5	07/16/2016 18:11				small increase in flow
373	07/16/2016 18:13	187.64	184.74	54.37	61 PSI
384	07/16/2016 18:24	187.72	184.82	54.45	61 PSI
395	07/16/2016 18:35	187.79	184.89	54.52	61 PSI; Pro Plus #2 field parameters: T = 65.1 °F, D.O. = +3.52 mg/L, conductivity = 259.8 µS, pH = 7.18, O.R.P. = +69.1 mV
420	07/16/2016 19:00	-	-	-	eastern most discharge point surface water flow approximately 20 ft down Big Gulch Creek bed (creek) and water SW of discharge pond (pond) just now going into creek
436	07/16/2016 19:16	188.03	185.13	54.76	61 PSI
453	07/16/2016 19:33	188.15	185.25	54.88	61 PSI
516	07/16/2016 20:36	188.47	185.57	55.20	61 PSI
535	07/16/2016 20:55	188.59	185.69	55.32	61 PSI
575	07/16/2016 21:35	188.77	185.87	55.50	61 PSI; Pro Plus #2 field parameters: T = 64.5 °F, D.O. = +3.52 mg/L, conductivity = 258.0 µS, pH = 7.19, O.R.P. = +72.9 mV
591	07/16/2016 21:51	-	-	-	discharge east of pond only 30 ft down creek, discharge SW of pond only moved 10 ft in creek, and nothing else has made it to the creek
623	07/16/2016 22:23	189.00	186.10	55.73	61 PSI
664	07/16/2016 23:04	189.14	186.24	55.87	
669.5	07/16/2016 23:09	189.17	186.27	55.90	small increase in flow; 61 PSI
670	07/16/2016 23:10	189.17	186.27	55.90	
688	07/16/2016 23:28	189.25	186.35	55.98	61 PSI; Pro Plus #2 field parameters: T = 64.5 °F, D.O. = +3.49 mg/L, conductivity = 259.0 µS, pH = 7.19, O.R.P. = +71.0 mV
696	07/16/2016 23:36				small bump up in flow; 61 PSI
697	07/16/2016 23:37	189.30	186.40	56.03	fuel in tank down to 13/16
730	07/17/2016 00:10	189.39	186.49	56.12	60.5 PSI
796	07/17/2016 01:16	189.64	186.74	56.37	60 PSI; Pro Plus #2 field parameters: T = 64.4 °F, D.O. = +3.53 mg/L, conductivity = 259.0 µS, pH = 7.19, O.R.P. = +76 mV
895	07/17/2016 02:55	189.93	187.03	56.66	60 PSI; Pro Plus #2 field parameters: T = 64.3 °F, D.O. = +3.60 mg/L, conductivity = 258.0 µS, pH = 7.19, O.R.P. = +74.0 mV
1,147	07/17/2016 07:07	190.49	187.59	57.22	60 PSI
1,159	07/17/2016 07:19	190.52	187.62	57.25	
1,171	07/17/2016 07:31	-	-	-	pond is ~2.5 ft from overflow, discharge east of pond is now ~80 ft from entrance, discharge SW of pond only moved ~10 ft in creek from entrance, none of the other discharges have reached the creek (they are >50 ft away), move pond discharge to the south to get less to pond and more into the wash
1,216	07/17/2016 08:16	190.66	187.76	57.39	60 PSI; Pro Plus #2 field parameters: T = 64.8 °F, D.O. = +3.53 mg/L, conductivity = 261.0 µS, pH = 7.18, O.R.P. = +67.8 mV
1,256	07/17/2016 08:56	190.72	187.82	57.45	60 PSI
1,385	07/17/2016 11:05	190.92	188.02	57.65	60 PSI; Pro Plus #2 field parameters: T = 65.0 °F, D.O. = +3.54 mg/L, conductivity = 262.0 µS, pH = 7.18, O.R.P. = +62.0 mV
1,412	07/17/2016 11:32	190.97	188.07	57.70	60 PSI
1,417	07/17/2016 11:37	-	-	-	decrease flow slightly; 61 PSI

Elapsed Time (minutes)	Date/Time (24 hour)	Water Level (feet below measure point = 2.9 ft above ground)	Water Level (feet below ground)	Drawdown (feet)	Comments
1,418	07/17/2016 11:38	190.97	188.07	57.70	61 PSI
1,430	07/17/2016 11:50	190.97	188.07	57.70	61 PSI; Pro Plus #2 field parameters: T = 65.1 °F, D.O. = +3.54 mg/L, conductivity = 262.0 µS, pH = 7.18, O.R.P. = +65.6 mV
1,457	07/17/2016 12:17	191.02	188.12	57.75	61 PSI; discharge east of pond has gone 90 ft past entrance to creek and discharge SW of pond has gone 40 ft past entrance to creek
1,472	07/17/2016 12:32	191.03	188.13	57.76	61 PSI
1,527	07/17/2016 13:27	191.09	188.19	57.82	61 PSI
1,575	07/17/2016 14:15	191.15	188.25	57.88	61 PSI
1,580	07/17/2016 14:20				small increase in flow
1,581	07/17/2016 14:21	191.16	188.26	57.89	60.5 PSI
1,592	07/17/2016 14:32	191.18	188.28	57.91	60.5 PSI
1,603	07/17/2016 14:43	191.18	188.28	57.91	60.5 PSI
1,798	07/17/2016 17:58	191.34	188.44	58.07	60.5 PSI
1,822	07/17/2016 18:22	191.35	188.45	58.08	60.5 PSI; discharges pooling in creek SW of pond
1,957	07/17/2016 20:37	191.44	188.54	58.17	60.5 PSI
2,001	07/17/2016 21:21	191.50	188.60	58.23	60.5 PSI
2,013	07/17/2016 21:33	191.50	188.60	58.23	60.5 PSI
2,022	07/17/2016 21:42	191.50	188.60	58.23	60.5 PSI
2,038	07/17/2016 21:58	191.52	188.62	58.25	discharge spreading 2 ft./hour east of pond and 3-4 ft./hour SW of pond
2,070	07/17/2016 22:30	191.55	188.65	58.28	60.5 PSI
2,098	07/17/2016 22:58	191.56	188.66	58.29	60.5 PSI
2,337	07/18/2016 02:57	191.72	188.82	58.45	60 PSI
2,357	07/18/2016 03:17	191.73	188.83	58.46	60 PSI
2,371	07/18/2016 03:31	191.73	188.83	58.46	60 PSI
2,593	07/18/2016 07:13	191.88	188.98	58.61	60.5 PSI; install new batteries in Pro Plus #2 and restart
2,615	07/18/2016 07:35	191.88	188.98	58.61	60.5 PSI
2,653	07/18/2016 08:13	191.92	189.02	58.65	east creek 150 ft of discharge, 30 ft. / 12 hours and SW creek 180 ft. of discharge 60 ft. / 12 hours
2,681	07/18/2016 08:41	191.93	189.03	58.66	60 PSI
2,706	07/18/2016 09:06	191.94	189.04	58.67	60 PSI
2,718	07/18/2016 09:18	-	-	-	- T4Z3 = 137.76 ft btoc
2,721	07/18/2016 09:21	-	-	-	- T4Z1 = 145.49 ft btoc
2,724	07/18/2016 09:24	-	-	-	- T4Z2 = 157.10 ft btoc
2,749	07/18/2016 09:49	191.97	189.07	58.70	60.5 PSI
2,795	07/18/2016 10:35				finish monitoring loop with C. McMahon
2,800	07/18/2016 10:40	192.01	189.11	58.74	
2,813	07/18/2016 10:53	-	-	-	- T4Z1 = 145.55 ft btoc
2,817	07/18/2016 10:57	-	-	-	- T4Z2 = 157.13 ft btoc
2,820	07/18/2016 11:00	-	-	-	- T4Z3 = 137.81 ft btoc
2,827	07/18/2016 11:07	192.03	189.13	58.76	
2,852	07/18/2016 11:32	-	-	-	- pond ~3 ft below southern embankment
2,855	07/18/2016 11:35	-	-	-	- Ken Acuff with the City of Eagle on site; Ken took a few pictures and then talked to me for ~20 minutes
2,884	07/18/2016 12:04	-	-	-	- Ken Acuff leaves the site
2,886	07/18/2016 12:06	-	-	-	- Pro Plus #2 field parameters: T = 65.3 °F, D.O. = +3.65 mg/L, conductivity = 264.6 µS, pH = 7.17, O.R.P. = +48.8 mV
2,890	07/18/2016 12:10	192.06	189.16	58.79	PSI = 63.0 and 59.5
2,920	07/18/2016 12:40	192.08	189.18	58.81	Pro Plus #2 field parameters: T = 65.3 °F, D.O. = +3.56 mg/L, conductivity = 261.6 µS, pH = 7.17, O.R.P. = +43.8 mV
2,974	07/18/2016 13:34	192.10	189.20	58.83	finish checking drainage/pipeline, acquire site photographs and GPS locations of discharge, pond, and creek wetting; PSI = 63.0 and 59.5
2,980	07/18/2016 13:40				Pro Plus #2 field parameters: T = 65.3 °F, D.O. = +3.60 mg/L, conductivity = 260.6 µS, pH = 7.17, O.R.P. = +18.8; mercury thermometer T = 65.0 °F, taste is superb, very smooth, and refreshing, no odors, minor degassing with very tiny bubbles, and no sand
3,001	07/18/2016 14:01	192.11	189.21	58.84	

Elapsed Time (minutes)	Date/Time (24 hour)	Water Level (feet below measure point = 2.9 ft above ground)	Water Level (feet below ground)	Drawdown (feet)	Comments
3,047	07/18/2016 14:47	192.12	189.22	58.85	61 PSI; Pro Plus #2 field parameters: T = 65.6 °F, D.O. = +3.65 mg/L, conductivity = 267.0 µS, pH = 7.17, O.R.P. = +29.4 mV
3,064	07/18/2016 15:04	192.14	189.24	58.87	
3,114	07/18/2016 15:54	192.15	189.25	58.88	61 PSI
3,135	07/18/2016 16:15	192.14	189.24	58.87	61 PSI
3,328	07/18/2016 19:28	192.16	189.26	58.89	61 PSI; Pro Plus #2 field parameters: T = 65.2 °F, D.O. = +3.52 mg/L, conductivity = 264.7 µS, pH = 7.17, O.R.P. = +41.2 mV
3,342	07/18/2016 19:42	192.16	189.26	58.89	61 PSI
3,358	07/18/2016 19:58	192.18	189.28	58.91	61 PSI
3,371	07/18/2016 20:11	192.18	189.28	58.91	61 PSI
3,379	07/18/2016 20:19	192.18	189.28	58.91	61 PSI
3,390	07/18/2016 20:30	192.18	189.28	58.91	61 PSI; Pro Plus #2 field parameters: T = 65.0 °F, D.O. = +3.52 mg/L, conductivity = 264.8 µS, pH = 7.17, O.R.P. = +46.5 mV
3,400	07/18/2016 20:40	192.18	189.28	58.91	61 PSI
3,410	07/18/2016 20:50	-	-	-	small increase in flow
3,411	07/18/2016 20:51	192.19	189.29	58.92	61 PSI
3,429	07/18/2016 21:09	192.20	189.30	58.93	61 PSI
3,440	07/18/2016 21:20	192.20	189.30	58.93	61 PSI
3,450	07/18/2016 21:30	192.20	189.30	58.93	61 PSI; Pro Plus #2 field parameters: T = 64.8 °F, D.O. = +3.44 mg/L, conductivity = 263.1 µS, pH = 7.18, O.R.P. = +52.2 mV
3,469	07/18/2016 21:49	192.21	189.31	58.94	61 PSI
3,488	07/18/2016 22:08	192.21	189.31	58.94	61 PSI
3,492	07/18/2016 22:12	-	-	-	open valve
3,502	07/18/2016 22:22	192.23	189.33	58.96	61 PSI
3,513	07/18/2016 22:33	192.23	189.33	58.96	61 PSI; Pro Plus #2 field parameters: T = 64.8 °F, D.O. = +3.51 mg/L, conductivity = 262.2 µS, pH = 7.18, O.R.P. = +54.5 mV
3,519	07/18/2016 22:39	-	-	-	open valve
3,527	07/18/2016 22:47	192.24	189.34	58.97	61 PSI
3,539	07/18/2016 22:59	192.27	189.37	59.00	61 PSI
3,553	07/18/2016 23:13	192.27	189.37	59.00	61 PSI
3,571	07/18/2016 23:31	192.27	189.37	59.00	61 PSI
3,583	07/18/2016 23:43	192.27	189.37	59.00	61 PSI; Pro Plus #2 field parameters: T = 64.8 °F, D.O. = +3.43 mg/L, conductivity = 263.9 µS, pH = 7.18, O.R.P. = +54.6 mV
3,784	07/19/2016 03:04	192.36	189.46	59.09	60.5 PSI
3,800	07/19/2016 03:20	192.36	189.46	59.09	61 PSI; Pro Plus #2 field parameters: T = 64.4 °F, D.O. = +3.49 mg/L, conductivity = 262.2 µS, pH = 7.18, O.R.P. = +57.0 mV
3,813	07/19/2016 03:33	192.36	189.46	59.09	61 PSI
4,041	07/19/2016 07:21	192.44	189.54	59.17	61 PSI; Pro Plus #2 field parameters: T = 64.6 °F, D.O. = +3.48 mg/L, conductivity = 262.6 µS, pH = 7.17, O.R.P. = +57.0 mV
4,075	07/19/2016 07:55	192.44	189.54	59.17	61 PSI
4,191	07/19/2016 09:51	192.48	189.58	59.21	61 PSI
4,311	07/19/2016 11:51	192.54	189.64	59.27	60.5 PSI; Pro Plus #2 field parameters: T = 65.2 °F, D.O. = +3.46 mg/L, conductivity = 264.8 µS, pH = 7.17, O.R.P. = +40.5 mV
4,320	07/19/2016 12:00				sample water; Pro Plus #1 field parameters: T = 65.48 °F, D.O. = +2.12 mg/L (problem with D.O. calibration on this probe), conductivity = 268.2 µS, pH = 7.12, O.R.P. = +72.7.6 mV; Pro Plus #2 field parameters: T = 65.2 °F, D.O. = +3.45 mg/L, conductivity = 264.8 µS, pH = 7.17, O.R.P. = +38.9 mV; no sand, minor degassing, no odor, clean taste
4,366	07/19/2016 12:46	192.56	189.66	59.29	60.5 PSI
4,439	07/19/2016 13:59	192.57	189.67	59.30	60.5 PSI
4,521	07/19/2016 15:21	192.57	189.67	59.30	60.5 PSI; Pro Plus #2 field parameters: T = 65.5 °F, D.O. = +3.43 mg/L, conductivity = 265.7 µS, pH = 7.17, O.R.P. = +45.3 mV
4,535	07/19/2016 15:35	-	-	-	open valve #14 three turns on discharge line
4,539	07/19/2016 15:39	192.60	189.70	59.33	60.25 PSI
4,552	07/19/2016 15:52	192.60	189.70	59.33	60.25 PSI
4,569	07/19/2016 16:09	192.61	189.71	59.34	60.25 PSI

Elapsed Time (minutes)	Date/Time (24 hour)	Water Level (feet below measure point = 2.9 ft above ground)	Water Level (feet below ground)	Drawdown (feet)	Comments
4,602	07/19/2016 16:42	192.62	189.72	59.35	60.25 PSI
4,616	07/19/2016 16:56	192.62	189.72	59.35	60.25 PSI
4,620	07/19/2016 17:00	-	-	-	open valve slightly at #12 valve on discharge line to slightly increase the flow
4,621	07/19/2016 17:01	192.62	189.72	59.35	60 PSI
4,634	07/19/2016 17:14	192.64	189.74	59.37	60 PSI
4,650	07/19/2016 17:30	192.65	189.75	59.38	60 PSI
4,655	07/19/2016 17:35	192.63	189.73	59.36	60 PSI
4,689	07/19/2016 18:09	192.63	189.73	59.36	60 PSI
4,708	07/19/2016 18:28	192.63	189.73	59.36	60 PSI
4,823	07/19/2016 20:23	192.63	189.73	59.36	60 PSI; Pro Plus #2 field parameters: T = 64.9 °F, D.O. = +3.47 mg/L, conductivity = 264.0 μS, pH = 7.17, O.R.P. = +67.1 mV
4,860	07/19/2016 21:00	192.64	189.74	59.37	60 PSI
4,869	07/19/2016 21:09	-	-	-	extent of discharge in west creek = N 43° 44' 42.8", W 116° 26' 18.9", and 2,680 ft. elevation
4,883	07/19/2016 21:23	192.64	189.74	59.37	60 PSI
4,900	07/19/2016 21:40	192.64	189.74	59.37	60 PSI
4,912	07/19/2016 21:52	192.65	189.75	59.38	60 PSI
4,920	07/19/2016 22:00	-	-	-	decrease flow slightly using valve at wellhead
4,930	07/19/2016 22:10	192.64	189.74	59.37	60 PSI
4,938	07/19/2016 22:18	192.65	189.75	59.38	60 PSI
4,950	07/19/2016 22:30	192.64	189.74	59.37	60 PSI
4,963	07/19/2016 22:43	192.65	189.75	59.38	60 PSI
4,976	07/19/2016 22:56	192.65	189.75	59.38	60 PSI
4,989	07/19/2016 23:09	192.65	189.75	59.38	60 PSI; Pro Plus #2 field parameters: T = 64.9 °F, D.O. = +3.48 mg/L, conductivity = 264.8 μS, pH = 7.18, O.R.P. = +45.9 mV
5,010	07/19/2016 23:30	192.65	189.75	59.38	60 PSI
5,041	07/20/2016 00:01	192.67	189.77	59.40	60 PSI; discharge is 0.4 mi. from onion field in wash
5,276	07/20/2016 03:56	192.69	189.79	59.42	60 PSI; Pro Plus #2 field parameters: T = 64.3 °F, D.O. = +4.16 mg/L, conductivity = 263.7 μS, pH = 7.18, O.R.P. = +51.2
5,294	07/20/2016 04:14	192.70	189.80	59.43	60 PSI; discharge in wash has moved ~30 ft. since 00:00 and is still 0.4 mi. from onion field
5,307	07/20/2016 04:27	192.72	189.82	59.45	59.5 PSI
5,317	07/20/2016 04:37	192.70	189.80	59.43	60 PSI
5,320	07/20/2016 04:40	192.70	189.80	59.43	60 PSI; closed valve slightly
5,339	07/20/2016 04:59	192.70	189.80	59.43	60 PSI
5,354	07/20/2016 05:14	192.72	189.82	59.45	60 PSI
5,369	07/20/2016 05:29	192.73	189.83	59.46	60 PSI
5,472	07/20/2016 07:12	192.75	189.85	59.48	60 PSI
5,477	07/20/2016 07:17	-	-	-	60 PSI; closed valve slightly
5,499	07/20/2016 07:39	192.75	189.85	59.48	60 PSI; Pro Plus #2 field parameters: T = 64.6 °F, D.O. = +3.76 mg/L, conductivity = 264.4 μS, pH = 7.17
5,522	07/20/2016 08:02	192.74	189.84	59.47	60 PSI
5,691	07/20/2016 10:51	192.82	189.92	59.55	60 PSI; Rossum = 0 mL
5,694	07/20/2016 10:54	-	-	-	Pro Plus #2 field parameters: T = 65.1 °F, D.O. = +3.41 mg/L, conductivity = 265.2 μS, pH = 7.17, O.R.P. = +39.7 mV
5,718	07/20/2016 11:18	192.81	189.91	59.54	60 PSI
5,758	07/20/2016 11:58	192.82	189.92	59.55	60 PSI
5,760	07/20/2016 12:00	-	-	-	<b>PUMP OFF; Totalizer = 69,795,000 gallons (total accumulated); Total Gallons Pumped = 5,162,160 gallons Average Flow = 2,127 gallons/minute</b>
1	07/20/2016 12:01	152.53	149.63	19.26	recovering water level
2	07/20/2016 12:02	150.29	147.39	17.02	recovering water level
3	07/20/2016 12:03	149.15	146.25	15.88	recovering water level
4	07/20/2016 12:04	148.42	145.52	15.15	recovering water level
5	07/20/2016 12:05	147.85	144.95	14.58	recovering water level
6	07/20/2016 12:06	147.39	144.49	14.12	recovering water level

Elapsed Time (minutes)	Date/Time (24 hour)	Water Level (feet below measure point = 2.9 ft above ground)	Water Level (feet below ground)	Drawdown (feet)	Comments
7	07/20/2016 12:07	147.27	144.37	14.00	recovering water level
8	07/20/2016 12:08	146.78	143.88	13.51	recovering water level
9	07/20/2016 12:09	146.51	143.61	13.24	recovering water level
10	07/20/2016 12:10	146.29	143.39	13.02	recovering water level
11	07/20/2016 12:11	146.08	143.18	12.81	recovering water level
12	07/20/2016 12:12	145.90	143.00	12.63	recovering water level
14	07/20/2016 12:14	145.57	142.67	12.30	recovering water level
16	07/20/2016 12:16	145.30	142.40	12.03	recovering water level
18	07/20/2016 12:18	145.65	142.75	12.38	recovering water level
20	07/20/2016 12:20	144.85	141.95	11.58	recovering water level
24	07/20/2016 12:24	144.48	141.58	11.21	recovering water level
30	07/20/2016 12:30	144.04	141.14	10.77	recovering water level
33	07/20/2016 12:33	143.86	140.96	10.59	recovering water level
53	07/20/2016 12:53	142.93	140.03	9.66	recovering water level
61	07/20/2016 13:01	142.66	139.76	9.39	recovering water level
76	07/20/2016 13:16	142.22	139.32	8.95	recovering water level
83	07/20/2016 13:23	142.04	139.14	8.77	recovering water level
94	07/20/2016 13:34	141.78	138.88	8.51	recovering water level
119	07/20/2016 13:59	141.28	138.38	8.01	recovering water level
129	07/20/2016 14:09	141.10	138.20	7.83	recovering water level
137	07/20/2016 14:17	140.96	138.06	7.69	recovering water level
143	07/20/2016 14:23	140.87	137.97	7.60	recovering water level
151	07/20/2016 14:31	140.74	137.84	7.47	recovering water level
170	07/20/2016 14:50	140.46	137.56	7.19	recovering water level
187	07/20/2016 15:07	140.22	137.32	6.95	recovering water level
202	07/20/2016 15:22	140.04	137.14	6.77	recovering water level
230	07/20/2016 15:50	139.70	136.80	6.43	recovering water level
1,340	07/21/2016 10:20	135.07	132.17	1.80	recovering water level
1,403	07/21/2016 11:23	134.98	132.08	1.71	recovering water level
1,492	07/21/2016 12:52	134.87	131.97	1.60	recovering water level
1,516	07/21/2016 13:16	134.83	131.93	1.56	recovering water level
1,573	07/21/2016 14:13	134.74	131.84	1.47	recovering water level
7,147	07/25/2016 11:07	133.32	130.42	0.05	recovering water level

**Aquifer Test Measurements and Pump Design by:** [Hydro Logic, Inc](#) for M3 Eagle, LLC (K. Newbry, C. McMahon, and L. Pearson on-site hydrogeologists).

**Pump Contractor:** Post Drilling Inc. (installed the pumping plant, plumbing, and 10" aluminum pipeline under inspection by HLI).

**Pumping Plant:** Goulds 11" bowl diameter, 3-stage (7.875"-trim) submersible turbine pump, set on 276' of 8" galvanized steel pump column



## Table 2.

### Ground Water Chemistry Summary of Spring Valley Municipal Well #2

Analyte	Result (in mg/L unless noted)
Alkalinity	129
Aluminum	<0.1
Ammonia (as N)	<0.05
Antimony	<0.005
Arsenic	0.003
Barium	<0.1
Beryllium	<0.001
Cadmium	<0.001
Calcium	36
Chloride	4
Chlorine Demand (instantaneous)	not tested
Chromium	<0.05
Color (color units)	<5.0
Conductivity (µS)	300
Copper	<0.01
Corrosivity (Langlier Index)	-0.34
Cyanide (total)	<0.005
Fluoride	0.4
Hardness	120
Iron (total)	<0.03
Iron (dissolved)	<0.03
Lead	<0.001
Magnesium	7
Manganese (dissolved)	<0.008
Mercury	<0.0001
Nickel	<0.05
Nitrate NO <sub>3</sub> (as N)	0.4
Nitrite NO <sub>2</sub> (as N)	<0.1
Orthophosphate	<0.2
pH (S.U.)	7.38
Potassium	2
Selenium	<0.001
Silica	33
Silver	<0.01
Synthetic Organic Compounds	none detected
Sodium	19
Sulfate	22
Sulfide	<0.04
Surfactants	<0.01
Suspended Solids	<10
Thallium	<0.0004
Total Coliform	absent
Total Dissolved Solids	190
Total Kjeldahl Nitrogen	<0.5
Total Organic Carbon	<0.5
Volatile Organic Coumpounds	none detected
Zinc	0.02

Analyte	Result (in mg/L unless noted)
<b>Radiology</b> (in pCi/L except Uranium which is pCi/L and (µg/L); Uranium pCi/L = 0.67 x µg/L)	
Gross Alpha	1.9 ± 1.7
Gross Beta	3.5 ± 2.0
Uranium [pCi/L (µg/L)]	1.2 (1.8)
Adjusted Gross Alpha	0.7
Radium 226	0.4 ± 0.1
Radium 228	1.9 ± 0.9
<b>Field Measured</b> (by <a href="#">Hydro Logic, Inc.</a> ) <b>Parameters</b> (each measurement is the average of two calibrated meters)	
<i>Field Conductivity (µS)</i>	266.4
<i>Field Dissolved Oxygen</i>	3.45
<i>Field Odor (describe)</i>	none
<i>Field O.R.P. (mV)</i>	55.8
<i>Field pH (S.U.)</i>	7.15
<i>Field Temperature (°F)</i>	65.34
<i>Field Visible Gas (describe)</i>	none
Sampled July 19, 2016 by <a href="#">Hydro Logic, Inc.</a> Analyses by Energy Laboratories, Inc., Casper, WY and Analytical Laboratories, Boise, ID. Sampled after 72-hours of pumping at 2,125 gallons/minute. Completion interval of Well #2 = 365-to-516-feet below ground.	

**Table 3.**

<b>Table 3. – Water Chemistry of the Boise River Compared to Spring Valley Municipal Well #2</b>			
<b>Results (in mg/L unless otherwise noted)</b>			
<b>Constituent</b>	<b>Boise River</b> (Averaged values from USGS' Glenwood Bridge Station 1970-2016)	<b>Spring Valley Well #2</b> (Sampled on 7-16-2016 17:15 at 2,125 gpm after 5.25-hours)	<b>Spring Valley Well #2</b> (Sampled on 7-19-2016 12:00 at 2,125 gpm after 72-hours)
<b>Total Dissolved Solids (TDS)</b>	82	204	190
<b>Calcium (Ca)</b>	13	35	36
<b>Sodium (Na)</b>	9	19	19
<b>Potassium (K)</b>	1	2	2
<b>Sulfate (SO<sub>4</sub>)</b>	7	23	22
<b>Dissolved Oxygen (O<sub>2</sub>)</b>	12	3.56	3.45
<b>Specific Conductance (μS/cm)</b>	112	272	300
<b>pH - Field (standard units)</b>	8	7.18	7.17

## **APPENDICES**

## **Appendix A.**

**Ground Water Geochemistry Laboratory Analyses for the Initial Sampling of  
the Newly Completed Spring Valley Municipal Supply Well #2  
("New Source Monitoring" Reporting for Public Drinking Water Systems)**

**WATER QUALITY ANALYSES REQUEST FORM**

RESULTS TO: Hydro Logic, Inc. PROJECT/JOB: Spring Valley Supply Well #2  
 ATTENTION: Ed Squires BILL TO: Hydro Logic, Inc.  
 SAMPLE SOURCE: Spring Valley Well #2  
 TIME (24-hour clock): 12:00  
 DATE COLLECTED: 7/19/2016  
 COMPLIANCE  
 SAMPLES (yes or no) Yes SUBMITTED BY: K. Newbry, C. MacMahon

**STANDARD TESTS REQUESTED (please check analytes to be tested):**

*Acute IOC Contaminants:*

nitrate (as N)       nitrite (as N)       sulfate

*Primary IOC Contaminants:*

fluoride       sodium

*Secondary & Other IOC Contaminants:*

alkalinity       ammonia (as N)       calcium (as CaCO<sub>3</sub>)       chloride       conductivity  
 corrosivity       hardness       sulfide       iron (total)       magnesium  
 manganese (diss.)       potassium       silica       total dissolved solids

**OPTIONAL TESTS REQUESTED (please check analytes to be tested)**

aluminum       antimony       arsenic       bacteria (total coliform)       barium  
 beryllium       cadmium       chromium       chlorine demand       color  
 copper       cyanide       gross α and β       iron (dissolved)       Kjeldahl nitrogen (total)  
 lead       mercury       nickel       odor       organic carbon (total)  
 orthophosphate       pH       radium 226       radium 228       radon 222  
 selenium       silver       surfactants       suspended solids       thallium  
 uranium       zinc

**SOC's**

carbamates (531.1)       dalapon (515.4)       diquat (549.1)       EDB/DBCP (504.1)       endoathal (548.1)  
 glyphosate (547)       herbicides (515.4)       pesticides/PCBS (508)       semivolatiles (525.2)  
 VOC's (524.2)

**FIELD WATER QUALITY PARAMETERS (must be completed prior to submitting samples)**

Parameter Set No. 1	Meter #	Parameter Set No. 2	Meter #	Physical Descriptions
Field Conductivity = 268	µS P <sub>ro</sub>	Field Conductivity = 269.8	µS P <sub>ro</sub>	Odor (describe) <u>None</u>
Field Dissolved Oxygen = 2.12	mg/L P <sub>ro</sub>	Field Dissolved Oxygen = 2.45	mg/L P <sub>ro</sub>	Taste (describe) <u>None</u>
Field pH = 7.12	SU P <sub>ro</sub>	Field pH = 7.17	SU P <sub>ro</sub>	Sand Production (yes or no) <u>No</u>
Field ORP = 72.7	mV P <sub>ro</sub>	Field ORP = 38.9	mV P <sub>ro</sub>	Visible Gas (describe) <u>none (fling bubbles)</u>
Field Temperature = 65.48	°F #1	Field Temperature = 65.2	°F #1	

available to  
 Colibact  
 D.O.



# Chain of Custody and Analytical Request Record

PLEASE PRINT (Provide as much information as possible.)

Company Name: <b>HydroLogic Inc</b>	Project Name, PWS, Permit, Etc. <b>Spring Valley Well #2</b>	Sample Origin State: <b>Idaho</b>	EPA/State Compliance: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Report Mail Address (Required): <b>1002 W Franklin St Boise ID 83702</b>	Contact Name: <b>Kurt Newbery</b> Phone/Fax: <b>208-631-6783</b>	Cell: <b>208-631-6783</b>	Sampler: (Please Print) <b>Kurt Newbery</b>
Invoice Contact & Phone: <b>Kurt Newbery</b>		Purchase Order:	Quote/Bottle Order:

Invoice Address (Required):  
**1002 W Franklin St  
Boise, ID 83702**

No Hard Copy Email: **Kurt@hydrologicinc.net**

Number of Containers	ANALYSIS REQUESTED											
	AW	VS	PO	DW								
Sample Type: <input type="checkbox"/> Air Water <input type="checkbox"/> Soils/Solids <input type="checkbox"/> Vegetation <input type="checkbox"/> Bioassay <input type="checkbox"/> Other	SEE ATTACHED											
DW - Drinking Water												

Standard Turnaround (TAT)

R  
U  
S  
H

Contact ELI prior to RUSH sample submittal for charges and scheduling - See instruction Page

Comments:  
**50  
RS-2  
12/14**

Shipped by: **ACP**

Cooler ID(s):

Receipt Temp: **13.0 °C**

On Ice:  N

Custody Seal  
On Bottle:  N  
On Cooler:  N

Intact:  N

Signature Match:  N

Special Report/Formats:

DW  EDD/EDT (Electronic Data)

POTW/WWTP  Format: \_\_\_\_\_

State: \_\_\_\_\_  LEVEL IV

Other: \_\_\_\_\_  NELAC

SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time	MATRIX																
1 <b>Spring Valley Well #2</b>	<b>7/19/16</b>	<b>12:00</b>	<b>DW</b>																
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			

LABORATORY USE ONLY

**Chloroform**

<b>Custody Record MUST be Signed</b>	Relinquished by (print): <b>Kurt Newbery</b> Date/Time: <b>7/19/2016 1300</b> Signature: <i>[Signature]</i>	Received by (print): <b>Conner MacMahon</b> Date/Time: <b>7/19/16 1300</b> Signature: <i>[Signature]</i>
	Relinquished by (print): <b>Conner MacMahon</b> Date/Time: <b>7/19/2016 1400</b> Signature: <i>[Signature]</i>	Received by (print): <b>Chris Stubb</b> Date/Time: <b>7/20/2016</b> Signature: <i>[Signature]</i>
	Sample Disposal: Return to Client: _____ Lab Disposal: _____	

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All sub-contract data will be clearly notated on your analytical report. For more information, visit [www.energylab.com](http://www.energylab.com) for additional information, downloadable fee schedule, forms, and links.



# ANALYTICAL SUMMARY REPORT

August 16, 2016

Hydro Logic Inc  
1002 W Franklin St  
Boise, ID 83702-5431

Work Order: C16070635

Project Name: Spring Valley Well #2

Energy Laboratories, Inc. Casper WY received the following 1 sample for Hydro Logic Inc on 7/20/2016 for analysis.

Lab ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
C16070635-001	Spring Valley Well #2	07/19/16 12:00	07/20/16	Drinking Water	Metals by ICP/ICPMS, Dissolved Metals by ICP/ICPMS, Drinking Water Alkalinity Anion - Cation Balance Chlorine, Residual Color Conductivity Carbon, Total Organic Mercury, Drinking Water Mercury Analysis Prep Extra Bottle Client Provided Field Parameters Sample Filtering Fluoride Foaming Agents, Low Level Hardness E300.0 Anions E300.0 Anions Langelier Index Nitrogen, Ammonia Nitrogen, Nitrite Nitrogen, Nitrate + Nitrite Nitrogen, Total Kjeldahl Odor pH Preservation by the Laboratory Metals Preparation by EPA 200.2 Prep for Foaming Agent Test - Surfactants TKN Prep Gross Alpha, Gross Beta Radium 226 + Radium 228 Radium 226, Total Radium 228, Total  Solids, Total Dissolved Solids, Total Suspended Sulfide, Methylene Blue Colorimetric

The results as reported relate only to the item(s) submitted for testing. The analyses presented in this report were performed at Energy Laboratories, Inc., 2393 Salt Creek Hwy., Casper, WY 82601, unless otherwise noted. Radiochemistry analyses were performed at Energy Laboratories, Inc., 2325 Kerzell Lane, Casper, WY 82601, unless otherwise noted. Any exceptions or problems with the analyses are noted in the Laboratory Analytical Report, the QA/QC Summary Report, or the Case Narrative.

If you have any questions regarding these test results, please call.



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College Station, TX 888.690.2218 • Gillette, WY 866.686.7175 • Helena, MT 877.472.0711

## ANALYTICAL SUMMARY REPORT

Report Approved By:

*Kathy Hamre*  
Report Proofing Specialist

Digitally signed by  
Kathy Hamre  
Date: 2016.08.16 15:08:18 -06:00



### LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

**Client:** Hydro Logic Inc  
**Project:** Spring Valley Well #2  
**Lab ID:** C16070635-001  
**Client Sample ID:** Spring Valley Well #2

**Report Date:** 08/16/16  
**Collection Date:** 07/19/16 12:00  
**Date Received:** 07/20/16  
**Matrix:** Drinking Water

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
<b>MAJOR IONS</b>							
Alkalinity, Total as CaCO3	129	mg/L		5		A2320 B	07/25/16 16:40 / wc
Calcium	36	mg/L		1		E200.7	07/21/16 20:07 / sf
Chloride	4	mg/L		1		E300.0	07/21/16 00:23 / wc
Fluoride	0.4	mg/L		0.1		A4500-F C	07/22/16 12:56 / ljl
Magnesium	7	mg/L		1		E200.7	07/21/16 20:07 / sf
Nitrogen, Ammonia as N	ND	mg/L		0.05		A4500-NH3 G	07/26/16 12:24 / ljl
Nitrogen, Nitrate+Nitrite as N	0.4	mg/L		0.1	10	E353.2	07/25/16 14:16 / ljl
Nitrogen, Kjeldahl, Total as N	ND	mg/L		0.5		E351.2	07/26/16 10:06 / eli-b
Nitrogen, Nitrite as N	ND	mg/L		0.1	1	A4500-NO2 B	07/21/16 11:26 / lr
Phosphorus, Orthophosphate as P	ND	mg/L		0.2		E300.0	07/21/16 00:23 / wc
Potassium	2	mg/L		1		E200.7	07/21/16 20:07 / sf
Silica	33	mg/L		0.2		E200.8	07/26/16 04:35 / sf
Sodium	19	mg/L		1		E200.7	07/21/16 20:07 / sf
Sulfate	22	mg/L		1		E300.0	07/21/16 00:23 / wc
<b>NON-METALS</b>							
Organic Carbon, Total (TOC)	ND	mg/L		0.5		A5310 C	07/21/16 01:06 / ljl
Sulfide	ND	mg/L		0.04		A4500-S D	07/22/16 17:14 / eli-b
<b>PHYSICAL PROPERTIES</b>							
Chlorine, Residual Total	0.02	mg/L	H	0.02		H8021	07/21/16 15:08 / lr
Color	ND	c.u.		5.0		A2120 B	07/20/16 17:41 / wc
Conductivity @ 25 C	300	umhos/cm		5		A2510 B	07/21/16 15:45 / ljl
Hardness as CaCO3	120	mg/L		1		A2340 B	07/22/16 12:40 / smm
MBAS, calculated as LAS, MW 342	ND	mg/L		0.1	0.5	A5540 C	07/21/16 11:17 / ljl
Odor	NOO	T.O.N.		1		A2150 B	07/21/16 09:45 / lr
pH	7.38	s.u.	H	0.01		A4500-H B	07/21/16 15:45 / ljl
Solids, Total Dissolved TDS @ 180 C	190	mg/L		10		A2540 C	07/21/16 09:01 / smm
Solids, Total Suspended TSS @ 105 C	ND	mg/L		10		A2540 D	07/21/16 12:20 / smm
- Color measured at pH 7.2. - NOO = No odor observed.							
<b>METALS - DISSOLVED</b>							
Iron	ND	mg/L		0.03		E200.7	07/21/16 20:07 / sf
Manganese	ND	mg/L	D	0.008		E200.7	07/21/16 20:07 / sf
<b>METALS - TOTAL</b>							
Aluminum	ND	mg/L		0.1	0.2	E200.8	07/26/16 04:35 / sf
Arsenic	0.003	mg/L		0.001	0.01	E200.8	07/26/16 04:35 / sf
Barium	ND	mg/L		0.1	2	E200.8	07/26/16 04:35 / sf
Beryllium	ND	mg/L		0.001	0.004	E200.8	07/26/16 04:35 / sf
Cadmium	ND	mg/L		0.001	0.005	E200.8	07/26/16 04:35 / sf
Chromium	ND	mg/L		0.05	0.1	E200.8	07/26/16 04:35 / sf
Copper	ND	mg/L		0.01	1.3	E200.8	07/26/16 04:35 / sf

**Report Definitions:**  
RL - Analyte reporting limit.  
QCL - Quality control limit.  
D - RL increased due to sample matrix.

MCL - Maximum contaminant level.  
ND - Not detected at the reporting limit.  
H - Analysis performed past recommended holding time.



### LABORATORY ANALYTICAL REPORT

Prepared by Casper, WY Branch

**Client:** Hydro Logic Inc  
**Project:** Spring Valley Well #2  
**Lab ID:** C16070635-001  
**Client Sample ID:** Spring Valley Well #2

**Report Date:** 08/16/16  
**Collection Date:** 07/19/16 12:00  
**Date Received:** 07/20/16  
**Matrix:** Drinking Water

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
<b>METALS - TOTAL</b>							
Iron	ND	mg/L		0.03	0.3	E200.8	07/26/16 04:35 / sf
Lead	ND	mg/L		0.001	0.015	E200.8	07/26/16 04:35 / sf
Mercury	ND	mg/L		0.0001	0.002	E245.1	08/01/16 15:07 / rso
Nickel	ND	mg/L		0.05	0.1	E200.8	07/26/16 04:35 / sf
Selenium	ND	mg/L		0.001	0.05	E200.8	07/26/16 04:35 / sf
Silver	ND	mg/L		0.01	0.1	E200.8	07/26/16 04:35 / sf
Thallium	ND	mg/L		0.0004	0.002	E200.8	07/26/16 04:35 / sf
Uranium	0.0018	mg/L		0.0003	0.03	E200.8	07/26/16 04:35 / sf
Zinc	0.02	mg/L		0.01	5	E200.8	07/26/16 04:35 / sf
<b>RADIONUCLIDES - TOTAL</b>							
Gross Alpha	1.9	pCi/L			15	E900.0	08/01/16 21:58 / trs
Gross Alpha precision (±)	1.7	pCi/L				E900.0	08/01/16 21:58 / trs
Gross Alpha MDC	1.2	pCi/L				E900.0	08/01/16 21:58 / trs
Gross Beta	3.5	pCi/L			50	E900.0	08/01/16 21:58 / trs
Gross Beta precision (±)	2.0	pCi/L				E900.0	08/01/16 21:58 / trs
Gross Beta MDC	2.1	pCi/L				E900.0	08/01/16 21:58 / trs
Radium 226	0.4	pCi/L			5	E903.0	08/02/16 11:13 / dmf
Radium 226 precision (±)	0.1	pCi/L				E903.0	08/02/16 11:13 / dmf
Radium 226 MDC	0.1	pCi/L				E903.0	08/02/16 11:13 / dmf
Radium 228	1.9	pCi/L			5	RA-05	08/02/16 12:02 / plj
Radium 228 precision (±)	0.9	pCi/L				RA-05	08/02/16 12:02 / plj
Radium 228 MDC	0.8	pCi/L				RA-05	08/02/16 12:02 / plj
Radium 226 + Radium 228	2.3	pCi/L				A7500-RA	08/03/16 20:01 / smm
Radium 226 + Radium 228 precision (±)	0.9	pCi/L				A7500-RA	08/03/16 20:01 / smm
Radium 226 + Radium 228 MDC	0.8	pCi/L				A7500-RA	08/03/16 20:01 / smm
<b>DATA QUALITY</b>							
A/C Balance	1.33	%				A1030 E	08/16/16 12:51 / sec
Anions	3.21	meq/L				A1030 E	08/16/16 12:51 / sec
Cations	3.30	meq/L				A1030 E	08/16/16 12:51 / sec
TDS Ratio	0.89	unitless				A1030 E	08/16/16 12:51 / sec
<b>LANGELIER INDEX</b>							
Langelier Index	-0.34					A2330 B	08/16/16 12:51 / sec
<b>CLIENT PROVIDED FIELD PARAMETERS</b>							
Field Conductivity	266.4	umhos/cm				FIELD	07/19/16 12:00 / ***
Field Dissolved Oxygen	2.285	ppm				FIELD	07/19/16 12:00 / ***
Field pH	7.145	s.u.				FIELD	07/19/16 12:00 / ***
Field Temperature, F	65.34	°F				FIELD	07/19/16 12:00 / ***

**Report** RL - Analyte reporting limit.  
**Definitions:** QCL - Quality control limit.  
MDC - Minimum detectable concentration

MCL - Maximum contaminant level.  
ND - Not detected at the reporting limit.

Hydro Logic, Inc.

1002 W. Franklin Street, Boise, ID 83702 (208) 342-8369, Fax (208) 342-3100, hli@hydrologicinc.net

WATER QUALITY ANALYSES REQUEST FORM

RESULTS TO: Hydro Logic, Inc. PROJECT/JOB: Spring Valley Supply Well #2
ATTENTION: Ed Squires BILL TO: Hydro Logic Inc.
SAMPLE SOURCE: Spring Valley S.W. #2
TIME (24-hour clock): 12:00
DATE COLLECTED: 7/19/2016
COMPLIANCE
SAMPLES (yes or no) Yes SUBMITTED BY: Connor MacMahon

STANDARD TESTS REQUESTED (please check analytes to be tested):

Acute IOC Contaminants:

nitrate (as N) nitrite (as N) sulfate

Primary IOC Contaminants:

fluoride sodium

Secondary & Other IOC Contaminants:

alkalinity ammonia (as N) calcium (as CaCO3) chloride conductivity
corrosivity hardness sulfide iron (total) magnesium
manganese (diss.) potassium silica total dissolved solids

OPTIONAL TESTS REQUESTED (please check analytes to be tested)

aluminum antimony arsenic bacteria (total coliform) barium
beryllium cadmium chromium chlorine demand color
copper cyanide gross alpha and beta iron (dissolved) Kjeldahl nitrogen (total)
lead mercury nickel odor organic carbon (total)
orthophosphate pH radium 226 radium 228 radon 222
selenium silver surfactants suspended solids thallium
uranium zinc

SOC's
carbamates (531.1) dalapon (515.4) diquat (549.1) EDB/DBCP (504.1) endoathal (548.1)
glyphosate (547) herbicides (515.4) pesticides/PCBS (508) semivolatiles (525.2)
VOC's (524.2)

FIELD WATER QUALITY PARAMETERS (must be completed prior to submitting samples)

Table with 4 columns: Parameter Set No. 1, Meter #, Parameter Set No. 2, Meter #, Physical Descriptions. Includes handwritten values for conductivity, dissolved oxygen, pH, ORP, and temperature, and physical descriptions like 'None' for odor and taste, and 'minor (tiny bubbles)' for visible gas.

unable to calibrate D.O.





## Laboratory Analysis Report

Sample Number: 1632010

FIELD TEMP=18.6°C/65.48°F, FIELD COND=268, FIELD DO=2.12, FIELD PH=7.12, FIELD ORP=72.7; EPA Methods 504.1, 505, 515.4, 525.2, 531.2, and 549.2 were performed by Anatek Labs (ATL).

Test Requested	MCL	Analysis Result	Units	MDL	Method	Date Completed	Analyst
Pentachlorophenol	1.00	<0.04	ug/L	0.04	EPA 515.4	8/3/2016	ATL
Picloram	500	<0.1	ug/L	0.1	EPA 515.4	8/3/2016	ATL
Silvex	50.0	<0.2	ug/L	0.2	EPA 515.4	8/3/2016	ATL
Bis(2-ethylhexyl)adipate	400	<0.2	ug/L	0.2	EPA 525.2	8/4/2016	ATL
Bis(2-ethylhexyl)phthalate	6	<0.6	ug/L	0.6	EPA 525.2	8/4/2016	ATL
Simazine	4	<0.15	ug/L	0.15	EPA 525.2	8/4/2016	ATL
Hexachlorocyclopentadiene	50	<0.2	ug/L	0.2	EPA 525.2	8/4/2016	ATL
Atrazine	3	<0.2	ug/L	0.2	EPA 525.2	8/4/2016	ATL
Alachlor (Lasso)	2	<0.4	ug/L	0.4	EPA 525.2	8/4/2016	ATL
Hexachlorobenzene	1	<0.2	ug/L	0.2	EPA 525.2	8/4/2016	ATL
Benzo(a)pyrene	0.2	<0.02	ug/L	0.02	EPA 525.2	8/4/2016	ATL
Butachlor	UR	<0.4	ug/L	0.4	EPA 525.2	8/4/2016	ATL
Metolachlor	UR	<1	ug/L	1	EPA 525.2	8/4/2016	ATL
Metribuzin	UR	<0.2	ug/L	0.2	EPA 525.2	8/4/2016	ATL
Propachlor	UR	<0.2	ug/L	0.2	EPA 525.2	8/4/2016	ATL
Aldicarb	3.0	<2.0	ug/L	2	EPA 531.2	8/9/2016	ATL
Aldicarb sulfone	2.0	<2.0	ug/L	2	EPA 531.2	8/9/2016	ATL
Aldicarb sulfoxide	4.0	<2.0	ug/L	2	EPA 531.2	8/9/2016	ATL
Carbaryl	UR	<2.0	ug/L	2	EPA 531.2	8/9/2016	ATL
Carbofuran	40	<2.0	ug/L	2	EPA 531.2	8/9/2016	ATL
3-Hydroxycarbofuran	UR	<2.0	ug/L	2	EPA 531.2	8/9/2016	ATL
Methomyl	UR	<2.0	ug/L	2	EPA 531.2	8/9/2016	ATL
Oxamyl	200	<4.0	ug/L	4	EPA 531.2	8/9/2016	ATL
Glyphosate	700	<10.0	ug/L	10	EPA 547	7/26/2016	CY
Endothall	100	<10	ug/L	10	EPA 548.1	8/4/2016	CG
Diquat	20.0	<0.8	ug/L	0.8	EPA 549.2	8/15/2016	ATL
Benzene	5	<0.5	ug/L	0.5	EPA 524.2	7/22/2016	CY
Carbon tetrachloride	5	<0.5	ug/L	0.5	EPA 524.2	7/22/2016	CY
Chlorobenzene	100	<0.5	ug/L	0.5	EPA 524.2	7/22/2016	CY
1,2-Dichlorobenzene	600	<0.5	ug/L	0.5	EPA 524.2	7/22/2016	CY
1,4-Dichlorobenzene	75	<0.5	ug/L	0.5	EPA 524.2	7/22/2016	CY

MCL = Maximum Contamination Level  
MDL = Method/Minimum Detection Limit  
UR = Unregulated

# Laboratory Analysis Report

Sample Number: 1632010

FIELD TEMP=18.6°C/65.48°F, FIELD COND=268, FIELD DO=2.12, FIELD PH=7.12, FIELD ORP=72.7; EPA Methods 504.1, 505, 515.4, 525.2, 531.2, and 549.2 were performed by Anatek Labs (ATL).

Test Requested	MCL	Analysis Result	Units	MDL	Method	Date Completed	Analyst
1,2-Dichloroethane	5	<0.5	ug/L	0.5	EPA 524.2	7/22/2016	CY
1,1-Dichloroethene	7	<0.5	ug/L	0.5	EPA 524.2	7/22/2016	CY
cis-1,2-Dichloroethene	70	<0.5	ug/L	0.5	EPA 524.2	7/22/2016	CY
trans-1,2-Dichloroethene	100	<0.5	ug/L	0.5	EPA 524.2	7/22/2016	CY
1,2-Dichloropropane	5	<0.5	ug/L	0.5	EPA 524.2	7/22/2016	CY
Ethylbenzene	700	<0.5	ug/L	0.5	EPA 524.2	7/22/2016	CY
Styrene	100	<0.5	ug/L	0.5	EPA 524.2	7/22/2016	CY
Tetrachloroethene	5	<0.5	ug/L	0.5	EPA 524.2	7/22/2016	CY
Toluene	1000	<0.5	ug/L	0.5	EPA 524.2	7/22/2016	CY
1,2,4-Trichlorobenzene	70	<0.5	ug/L	0.5	EPA 524.2	7/22/2016	CY
1,1,1-Trichloroethane	200	<0.5	ug/L	0.5	EPA 524.2	7/22/2016	CY
1,1,2-Trichloroethane	200	<0.5	ug/L	0.5	EPA 524.2	7/22/2016	CY
Trichloroethene	5	<0.5	ug/L	0.5	EPA 524.2	7/22/2016	CY
Vinyl chloride	2	<0.5	ug/L	0.5	EPA 524.2	7/22/2016	CY
Total THM's	80	<2.0	ug/L	2	EPA 524.2	7/22/2016	CY
Bromodichloromethane	----	<0.5	ug/L	0.5	EPA 524.2	7/22/2016	CY
Bromoform	----	<0.5	ug/L	0.5	EPA 524.2	7/22/2016	CY
Chloroform	----	<0.5	ug/L	0.5	EPA 524.2	7/22/2016	CY
Dibromochloromethane	----	<0.5	ug/L	0.5	EPA 524.2	7/22/2016	CY
Xylene, Total	10000	<0.5	ug/L	0.5	EPA 524.2	7/22/2016	CY
Dichloromethane	5	<0.5	ug/L	0.5	EPA 524.2	7/22/2016	CY
Methyl-tert-butylether	UR	<0.5	ug/L	0.5	EPA 524.2	7/22/2016	CY
Dibromofluoromethane (Surr)		94.6	% 70-130		EPA 524.2	7/22/2016	CY
Toluene-d5 Surrogate		100	% 70-130		EPA 524.2	7/22/2016	CY
Bromofluorobenzene Surrogate		97.0	% 70-130		EPA 524.2	7/22/2016	CY
Cyanide, Total	0.20	< 0.005	mg/L	0.005	EPA 335.4	7/29/2016	DS

MCL = Maximum Contamination Level  
MDL = Method/Minimum Detection Limit  
UR = Unregulated

CC: KURT@HYDROLOGICINC.NET

*c/o: JH*  
  
8/16/16

Thank you for choosing Analytical Laboratories for your testing needs.

If you have any questions concerning this report,

please contact your client manager: **James Hibbs**


<b>SAMPLE TYPE CODE</b> S - Routine Sample P - Repeat sample (at original tap) E - Enforcement (chain of custody) U - Upstream repeat D - Downstream repeat X - Other Repeat W - Untreated V - Invalidated by Lab C - Construction / Special	<b>ANALYTICAL LABORATORIES, INC.</b> ID00020 1804 N. 33rd Street Boise, Idaho 83703 1-800-574-5773 1-208-342-5515 www.analyticallaboratories.com		
	Public Water Supply		X Private Water Supply
	Other _____		
	NAME OF WATER SYSTEM		
	COUNTY		PWS
	REPORT RESULTS TO:		
	ED SQUIRES HYDRO LOGIC INC 1002 W FRANKLIN ST BOISE, ID 83702		

DATE RECEIVED	7/19/2016
TIME RECEIVED	15:00
DATE ANALYZED	7/19/2016
TIME ANALYZED	16:45

SEND ADDITIONAL COPIES TO: KURT@HYDROLOGICINC.NET	IF RETEST, ORIGINAL SAMPLE DATE			
e-mail:				
Phone (208) 342-8369	Ext	Fax (208) 342-4334	CHILLED 10 C	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO

COLLECTED BY: K. NEWBY		TRANSPORTED BY: CONNOR M.				
SAMPLE TYPE	COLLECTION DATE/TIME	Sampling Location	CI res	TOTAL COLIFORMS SM 9223	E. COLI SM 9223	HPC SM 9215

<b>C</b>	7/19/2016	LAB# <b>1632009</b>		<b>ABSENCE</b>	<b>ABSENCE</b>
	12:00	SPRING VALLEY SUPPLY WELL #2			

REMARKS: FT = 18.6 C/65.48 F FIELD COND=268 FIELD DO = 2.12 FIELD PH = 7.12 FIELD ORP = 72.7	ANALYST: LM DATE PRINTED: 7/20/2016
<b>ANALYTICAL METHODS</b> <u>Total Coliforms</u> <b>SM 9222</b> Membrane Filter Technique, Parts 909 and 909A, Standard Methods...16th ed., 1985 <b>SM 9221</b> Multiple Tube Fermentation, Parts 908 and 908A, and 908B, Standard Methods...16th ed., 1985 <b>SM 9223</b> MMO-MUG Test Per 40 CFR141.21(f)(3)(IV)	<b>E. coli</b> MUG Test Per 141.214(x)(7) and 40 CFR 141.21(f)(6)(III) <b>HPC</b> Pour Plate, Part 907, Standard Methods... 16th ed., 1
Records shall be retained and destroyed in accordance with IDAPA 58.01.08 and 40 CFR 141.33. In general, records shall not be retained beyond prescribed retention times.	Analytical Laboratories, Inc.  Brian McGovern Date Laboratory Supervisor

## **Appendix B.**

**State of Idaho Well Driller's Report for  
City of Eagle Spring Valley Municipal Supply Well #2**

IDAHO DEPARTMENT OF WATER RESOURCES  
WELL DRILLER'S REPORT

RECEIVED

JUL 27 2016

WATER RESOURCES  
WESTERN REGION

1. WELL TAG NO. D 0071692 Page 1 of 2

Drilling Permit No. 971742-877799  
Water right or injection well # 63-32573

2. OWNER

Name City of Eagle - Spring Valley Municipal Well #2  
Address 660 East Civic Lane  
City Eagle State ID Zip 83616

3. WELL LOCATION:

Twp. 05 North  or South  Rge. 01 East  or West   
Sec. 27 SW 1/4 NE 1/4 NE 1/4  
10 acres 40 acres 160 acres

Gov't Lot N/A County Ada

Lat. 43° 44.811' North (Deg. and Decimal minutes)

Long. 116° 26.232' West (Deg. and Decimal minutes)

Address of Well Site 1.55-miles northeast of State Highway 16 on Big Gulch Road. City Eagle

Lot. N/A Blk. N/A Sub. Name Spring Valley

4. USE:

Domestic  Municipal  Monitor  Irrigation  Thermal  Injection  
 Other

5. TYPE OF WORK check all that apply (Replacement etc.)

New Well  Replacement well  Modify existing well  
 Abandonment  Other

6. DRILL METHOD:

Air Rotary  Mud Rotary  Cable  Other Auger drilled to 27 ft bgl

7. SEALING PROCEDURES

Seal material	From (ft)	To (ft)	Quantity (lbs or ft³)	Placement method/procedure
				SEE TABLE PAGE 2

8. CASING/LINER:

Diameter (nominal)	From (ft)	To (ft)	Gauge/Schedule	Material	Casing	Liner	Threaded	Welded
24-inch	2'	27'	0.375"	steel	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
18-inch	+3	2'	0.375"	steel	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
17.4-inch	2'	365'	SDR17	splined PVC	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Was drive shoe used?  Y  N Shoe Depth(s) Casings pushed into clay

9. PERFORATIONS/SCREENS:

Perforations  Y  N Method Welded Vee-wire screens (304 SS)  
Manufactured screen  Y  N Type Johnson "Hi-Flow" stainless steel  
Method of installation Lowered, centralized and enveloped with filter sand

From (ft)	To (ft)	Slot size	Number/ft	Diameter (nominal)	Material	Gauge or Schedule
342'	356'	0.030"	119 / ft	11-inch	stainless steel	Sch. 40 with
356'	416'	0.030"	119 / ft	11-inch	stainless steel	6-inch long
Also	see	table	on	page 2.		weld rings

Length of Headpipe 23-ft of screen Length of Tailpipe No tailpipe

Packer  Y  N Type Removable 12" w/ two 3-lip Figure "K" packers

10. FILTER PACK:

Filter Material	From (ft)	To (ft)	Quantity (lbs or ft³)	Placement method
#8-#16 sand gradation	344'	407'	40.5 ft³	Pour and tag into place "Birdseed" brand

11. FLOWING ARTESIAN:

Flowing Artesian?  Y  N Artesian Pressure (PSIG) 102 PSI (235 ft. water)

Describe control device 24"-to-18" steel well-head transition / discharge head

In addition to our drillers' observations of the cuttings and rig behavior, this log also has the benefit of an on-site geologist, Kurt Newbry (HLI), during sampling and HLI borehole geophysical logs were also used to develop the best record possible of the drilled section. - GP

12. STATIC WATER LEVEL and WELL TESTS:

Depth first water encountered (ft) mud drill Static water level (ft) 130.37 ft bgl (7-16-2016)

Water temp. (°F) 65.2 °F Bottom hole temp. (°F) 71.48 °F at 520 ft bgl

Describe access port Lockable steel security shelter over 1" monitoring tubes

Drawdown (feet)	Discharge or yield (gpm)	Test duration (minutes)	Test method:			
			Pump	Bailer	Air	Flowing artesian
Testing by: <u>Hydro Logic, Inc.</u>			<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<u>59.55 feet</u>	<u>2,125 gpm</u>	<u>96 hours</u>	Water Chemistry: pH=7.17; cond.=265µS; DO=+3.5; ORP=-38.9mV			
Constant-rate discharge testing.						

Water Quality test or comments: good taste, no sand, clear, no odor, min. gas

13. LITHOLOGIC LOG and/or repairs or abandonment:

Bore Dia. (in)	From (ft)	To (ft)	Remarks, lithology or description of repairs or abandonment, water temp.	Water	
				Y	N
30"	0'	2'	Pit run gravel pad and top soil (drill pad)		<input checked="" type="checkbox"/>
30"	2'	12'	Clayey tan-colored fine-to-medium-grained sand		<input checked="" type="checkbox"/>
30"	12'	22'	Fine-to-coarse-grained tan-colored sand		<input checked="" type="checkbox"/>
30"	22'	27'	Brown-colored tacky silty clay		<input checked="" type="checkbox"/>
23"	27'	36'	Brown-colored tacky silty clay	n/a	n/a
23"	36'	48'	Fine-to-coarse-grained olive-colored sand		
23"	48'	57'	Sandy tacky olive-colored clay		
23"	57'	63'	Fine-to-very coarse-grained olive-colored sand with gravel up to 7/8-inch diameter		
23"	63'	99'	Interbedded olive-colored clay and fine-to-very coarse-grained olive-colored sand lenses		
23"	99'	110'	Olive-colored tacky-to-sticky clay		
23"	110'	163'	Greenish-gray colored tacky-to-sticky clay		
23"	163'	194'	Coarse-to-fine-grained pale olive-colored sand		
23"	194'	239'	Fine-grained light olive gray-colored sand with interbeds of tacky greenish gray clays		
23"	239'	262'	Tacky greenish-gray-colored clay		
23"	262'	276'	Fine-to-coarse-grained light gray-colored sand		
23"	276'	307'	Sandy sticky greenish-gray-colored clay		
23"	307'	340'	Coarse-to-fine-grained light gray-colored sands with sticky greenish gray-colored clays		
23"	340'	370'	Gray-colored fine-to-coarse-grained sands with sticky greenish gray colored clays		
15"	370'	392'	Pale olive-colored medium-to-fine-grained sands with sticky olive-colored clays		
15"	392'	430'	Very coarse-to-fine-grained pale olive-colored sands with some gravel and beds of tacky clay		
15"	430'	505'	Medium-to-very fine-grained pale olive-colored sands with olive-to-pale yellow-colored beds of tacky clay		
15"	505'	514'	Medium-to-very fine-grained gray-colored sand		
15"	514'	520'	Sticky greenish gray-colored clay		

=mud filled bore during drilling.

Completed Depth (Measurable) 516 feet below ground

Date: Started February 23, 2016 Completed July 20, 2016

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 Post Drilling Inc. Co. No. 670

\*Principal Driller George Post Date 7-27-2016

\*Driller Greg Mitchell Date 7-27-2016

\*Operator II \_\_\_\_\_ Date \_\_\_\_\_

Operator I \_\_\_\_\_ Date \_\_\_\_\_

\* Signature of Principal Driller and rig operator are required.

Bottom hole temperature was measured in the 8-inch diameter test-bore with a calibrated (on-site) geophysical probe left on bottom until readings were stable at 600-feet below ground.

IDAHO DEPARTMENT OF WATER RESOURCES  
WELL DRILLER'S REPORT

1. WELL TAG NO. **D 0071692** Page 2 of 2

Drilling Permit No. **971742-877799**  
Water right or injection well # **63-32573**

2. OWNER

Name **City of Eagle - Spring Valley Municipal Well #2**  
Address **660 East Civic Lane**  
City **Eagle** State **ID** Zip **83616**

3. WELL LOCATION:

Twp. **05** North  or South  Rge. **01** East  or West   
Sec. **27** SW 1/4 NE 1/4 NE 1/4  
Gov't Lot **N/A** County **Ada**

Lat. **43° 44.811' North** (Deg. and Decimal minutes)  
Long. **116° 26.232' West** (Deg. and Decimal minutes)

Address of Well Site **1.55-miles northeast of State Highway 16 on Big Gulch Road.** City **Eagle**

Lot. **N/A** Blk. **N/A** Sub. Name **Spring Valley**

4. USE:

Domestic  Municipal  Monitor  Irrigation  Thermal  Injection  
 Other

5. TYPE OF WORK check all that apply (Replacement etc.)

New Well  Replacement well  Modify existing well  
 Abandonment  Other

6. DRILL METHOD:

Air Rotary  Mud Rotary  Cable  Other **Auger drilled to 27 ft bgl**

7. SEALING PROCEDURES

Seal material	From (ft)	To (ft)	Quantity (lbs or ft³)	Placement method/procedure
				SEE TABLE AT RIGHT

8. CASING/LINER:

Diameter (nominal)	From (ft)	To (ft)	Gauge/Schedule	Material	Casing	Liner	Threaded	Welded
24-inch	2'	27'	0.375"	steel	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
18-inch	+3	2'	0.375"	steel	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
17.4-inch	2'	365'	SDR17	splined PVC	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Was drive shoe used?  Y  N Shoe Depth(s) **Casings pushed into clay**

9. PERFORATIONS/SCREENS:

Perforations  Y  N Method **Welded Vee-wire screens (304 SS)**  
Manufactured screen  Y  N Type **Johnson "Hi-Flow" stainless steel**  
Method of installation **Lowered, centralized and enveloped with filter sand**

Lengths	From (ft)	To (ft)	Slot size	Number/ft	Diameter (nominal)	Material	Gauge or Schedule
20'	416'	496'	0.015"	139 / ft	11-inch	stainless steel	Sch. 40 with
15'	496'	511'	0.015"	139 / ft	11-inch	stainless steel	6-inch long
5'	511'	516'	0.015"	139 / ft	11-inch	stainless steel	weld rings

Length of Headpipe **23-ft of screen** Length of Tailpipe **No tailpipe**  
Packer  Y  N Type **Removable 12" w/ two 3-lip Figure "K" packers**

10. FILTER PACK:

Filter Material	From (ft)	To (ft)	Quantity (lbs or ft³)	Placement method
#12-#20 sand	407'	516'	59.4 ft³	Pour and tag into place
gradation				"Birdseed" brand

11. FLOWING ARTESIAN:

Flowing Artesian?  Y  N Artesian Pressure (PSIG) **102 PSI (235 ft. water)**  
Describe control device **24"-to-18" steel well-head transition / discharge head**

12. STATIC WATER LEVEL and WELL TESTS:

Depth first water encountered (ft) **mud drill** Static water level (ft) **130.37 ft bgl (7-16-2016)**  
Water temp. (°F) **65.2°F** Bottom hole temp. (°F) **71.48°F at 520 ft bgl**  
Describe access port **Lockable steel security shelter over 1" monitoring tubes**

Drawdown (feet)	Discharge or yield (gpm)	Test duration (minutes)	Test method:			
			Pump	Bailer	Air	Flowing artesian
Testing by: <b>Hydro Logic, Inc.</b>			<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>59.55 feet</b>	<b>2,125 gpm</b>	<b>96 hours</b>	Water Chemistry: pH=7.17; cond.=265µS; DO=+3.5; ORP=-38.9mV			
Constant-rate discharge testing.						

Water Quality test or comments: **good taste, no sand, clear, no odor, min. gas**

13. LITHOLOGIC LOG and/or repairs or abandonment:


Bore Dia. (in)	From (ft)	To (ft)	Remarks, lithology or description of repairs or abandonment, water temp.	Water Y	N
SEALING PROCEDURES					
30"	0'	26'	Cement grout - pumped thru tremie - 72.9 ft³		
30"	0'	4'	3/4" bentonite chip - poured and tagged- 7.0 ft³		
23"	4'		Cement / Wyo-Ben Grout Well DF grout mixture		
		335'	pumped thru tremie - 280.8 ft³		
23"	335'	363'	Cement grout - pumped thru tremie - 18.9 ft³		
23"	363'	365'	3/4" bentonite chip - poured and tagged- 5.6 ft³		

SEALS AND SAND FILTER:  
-Seals and sand filter depths were verified by tagging in the annulus between the mud-filled borehole and casings.  
-Volumes of materials used were compared to volume calculations of the borehole caliper log minus the volume of the screen/casing (= annulus) and to the estimated volume of material removed from the borehole during drilling.

GROUT SEALS:  
-Neat cement grout was mixed at a rate of 6-gallons of water to 94-pounds of Portland Type I/II cement powder.  
-Cement/bentonite grout was mixed at rate of 24-gallons of water to 94-pounds of Portland Type I/II cement powder and 50-pounds of "Wyo-Ben" brand Grout Well DF bentonite powder.  
-Grouts were pumped under pressure from the bottom-up.  
-Chipped bentonite is 3/4" Baroid Hole Plug.

ALL STAINLESS STEEL PACKER-REDUCER:

- total length = 3.5 feet
- 12" barrel = 3.0 feet
- two 3-lip Figure "K" neoprene packers
- top of packer assembly = 339.3 feet bgl
- overshot with three "I"-shaped slots that turn on clockwise over the three 1"-pins on headpipe
- turn packer counter-clockwise to remove
- packer design by E. Squires
- packer-reducer fabrication by Advantage Machine & Hydraulic, Nampa, Idaho
- Neoprene packers constructed by Western Rubber & Manufacturing



339.3' bgl  
342.8' bgl

Completed Depth (Measurable) **516 feet below ground**

Date: Started **February 23, 2016** Completed **July 20, 2016**

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 **Post Drilling Inc.** Co. No. **670**  
\*Principal Driller **George Post** Date **7-27-2016**  
\*Driller **Greg Mitchell** Date **7-27-2016**  
\*Operator II \_\_\_\_\_ Date \_\_\_\_\_  
Operator I \_\_\_\_\_ Date \_\_\_\_\_

<p>PROJECT MANAGER: Bill Brownlee, Partner, M3 Eagle, LLC., Eagle, ID</p> <p>INSPECTION, HYDRAULIC TESTING, AND BOREHOLE GEOPHYSICS BY: Hydro Logic, Inc., Boise, ID</p> <p>WELL DRILLING, CONSTRUCTION, and DEVELOPMENT BY: Post Drilling Inc., Weiser, ID</p>	<p>PROJECT HYDROGEOLOGIST AND WELL DESIGN: Ed Squires, RPG, Hydro Logic, Inc., Boise, ID</p> <p>SITE GEOLOGIST (DRILL, CONSTRUCT, DEVELOP, AND CAMERA): Kurt Newbry, PG, Hydro Logic, Inc. - Boise, ID</p> <p>PUMP CONTRACTOR: Hydro Logic, Inc., Boise, ID</p> <p>CITY OF EAGLE PROJECT MANAGER: Ken Acuff, Superintendent, Eagle, ID</p>
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## **Appendix C.**

**Original (2008) and Updated (2016) Idaho Department of  
Environmental Quality Approval Letters for the  
City of Eagle Spring Valley Municipal Supply Well #2 Construction and Well Site  
Including the Approval Page for Standard Plans and Specifications for Wells.**

(As a point of clarification, Spring Valley Well #2 was formerly submitted as Spring Valley Well #1 in 2008 before the order of drilling and sites were switched, i.e. Spring Valley Well #1 of the 2008 submittals is now Spring Valley Well #2)



STATE OF IDAHO  
DEPARTMENT OF  
ENVIRONMENTAL QUALITY

1445 North Orchard • Boise, Idaho 83706 • (208) 373-0550  
www.deq.idaho.gov

C.L. "Butch" Otter, Governor  
John H. Tippetts, Director

February 11, 2016

Thomas Warley  
M3 Eagle, LLC  
533 E. Riverside Dr., Suite 110  
Eagle, ID 83616

RE: Spring Valley (M3 Eagle) - Well 2 (Eagle, Ada County)  
Extension of Project Approval  
Well Construction

Dear Mr. Warley:

This project was approved by this office on April 16, 2008. Your consultant has certified that no significant design modifications have been made for this project. The approval of the plans and specifications for this phase of the project is extended through February 11, 2017, subject to the conditions listed in the original approval letter.

Please call me with any questions at (208) 373-0184 or contact me via e-mail at [kevin.ryan@deq.idaho.gov](mailto:kevin.ryan@deq.idaho.gov).

Sincerely,

A handwritten signature in blue ink, appearing to read "Kevin Ryan", with a long horizontal flourish extending to the right.

Kevin Ryan, P.E.  
Staff Engineer

ec: Ed Squires, P.E., Hydrologic  
Todd Crutcher, P.E., DEQ Boise Regional Office  
TRIM Record #2016AGD407

# Hydro Logic, Inc.

1002 W. Franklin Street, Boise, ID 83702 (208) 342-8369, Fax (208) 342-3100, hli@hydrologicinc.net

January 25, 2016

Mr. Kevin Ryan, P.E.  
Boise Regional Office – Engineering  
Department of Environmental Quality  
Boise Regional Office  
1445 North Orchard Street  
Boise, Idaho 83706-2249

RECEIVED

JAN 25 2016

DEPARTMENT OF  
ENVIRONMENTAL QUALITY  
BOISE REGIONAL OFFICE

**Subject:** Spring Valley (M3 Eagle, LLC) Request for Re-approvals of Municipal Supply Well #2 Preliminary Engineering Report, Construction Specifications, Public Drinking Water System Well Site Evaluation and Hydrogeologic Evaluation for GWUDI.

Dear Kevin:

As we have recently discussed, I write to request re-approval from the Idaho Department of Environmental Quality (DEQ) for the details of well construction design and the surrounding well site for a new municipal Public Drinking Water System water supply well for the Spring Valley Planned Community Development (formerly known as M3 Eagle) in the foothills north of Eagle, Idaho. This is the follow up well to Well #1 which your office approved in October 2015.

I originally filed, and received DEQ approval for, 1) Preliminary Engineering Report, 2) Well Site, 3) Well Construction, 4) GWUDI, and 5) Standard Well Technical Specifications for this well in 2008 (see attached approval letters). At that time, the development was referring to this new proposed PDWS well as "Well #1 (the title on the approval letters) because it was to become the *first* constructed municipal well for the development. This facility is now referred to as "Well #2" because it will be the *second* constructed municipal well for the development (as you are well aware because you recently approved the Spring Valley Well #1 which is currently under construction). As you will recall from our conversation, only the numbering system has changed. The well sites and proposed details of well construction are exactly the same as were previously presented to, and approved by, DEQ.

Shortly after receiving those DEQ approvals, and after commencing the Well #2 with a drilling pad, surface casing and pilot bore, the development was put on temporary hold by the developer in late 2008 because of the economic collapse of the housing industry in what we are now calling the "Great Depression". With the recent improving economy and housing market, the developer now seeks to reactivate the project beginning with the drilling and construction of, both, Spring Valley Well #1 and Well #2.

With DEQ's recent reapproval of SV Well #1, that well is currently under construction. I now seek to obtain re-approval of the second well (Well #2). There are no changes or variations to the original well construction approved by DEQ and the well site is also exactly the same.

As with Well #1, I reviewed the current DEQ Administrative Rules for Public Drinking Water System (PDWS) wells and well sites and found no significant changes to those rules since DEQ's approval of the Spring Valley "Standard" Well Construction Technical Specifications on file at DEQ that would affect the project as originally presented. Similarly, there have been no relevant changes



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DEPARTMENT OF  
ENVIRONMENTAL QUALITY

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C.L. "Butch" Otter, Governor  
Curt Fransen, Director

January 25, 2013

Thomas H. Warley  
M3 Eagle, LLC  
533 E. Riverside Dr., Suite 110  
Eagle, ID 83616

RE: Spring Valley (M3 Eagle) - Well 1 Well Plan and Specs (Eagle, Ada County)  
Water and Sewer Mains

Dear Mr. Warley:

The plans and specifications for the subject project appear to meet State of Idaho standards and are approved based on the conditions listed below.

**I. STANDARD CONDITIONS**

- A. All conditions of this letter must be met. The standard conditions on the Department of Environmental Quality (DEQ) review stamp are part of this approval. Supporting reports or documents are considered to be part of the approved documents.
- B. No work may begin until a copy of this approval letter and the plans and specifications bearing the DEQ approval stamp are delivered to and kept on the job site. As the project owner, you must ensure the contractor, the construction inspector, and the certifying engineer are aware of the approval conditions.
- C. This approval will be voided if: 1) construction is not completed by January 25, 2014; 2) the project is improperly constructed, operated, or maintained; or 3) the project fails to function as intended.
- D. No material deviations can be made from the approved plans without DEQ's prior written approval.
- E. Per the project documents, the Land Developer or Owner or his representative shall ensure a professional engineer with Hydro Logic Inc. provides supervision of construction and written documentation as follows.
- F. Within thirty (30) days after completion of construction, the Land Developer or Owner or his representative shall provide DEQ with one of the following documents.
  - 1. Record plans and specifications prepared and sealed by the professional engineer responsible for observation on behalf of the owner. These plans and specifications shall depict significant deviations in the actual construction and illustrate alterations or modifications performed, based on as-built drawings provided by the contractor and field observations made by observer(s) under the direction of the professional engineer.

Thomas H. Warley  
M3 Eagle, LLC  
Spring Valley (M3 Eagle) - Well 1 Well Plan and Specs  
January 25, 2013  
Page 2

2. If actual construction does not have significant deviations from the originally approved plans and specifications, the system owners may submit a written statement to DEQ to this effect, prepared and sealed by the professional engineer. This statement shall be based on as-built drawings provided by the contractor and field observations made by observer(s) under the direction of the professional engineer.

## **II. PROJECT SPECIFIC CONDITIONS:**

DEQ has not conducted design review for stormwater plans and specifications and has made no determination regarding whether the plans and specifications include appropriate BMPs to protect ground water and surface water quality.

If the construction phase of this project is anticipated to disturb one acre or more of land, or is part of a larger project that disturbs one acre or more of land, the project may be subject to regulation under the Federal Clean Water Act National Pollution Discharge Elimination System program administered by the U.S. Environmental Protection Agency. Stormwater events that occur during construction should be managed according to the site-specific Stormwater Pollution Prevention Plan and the other requirements of the general permit. The on-line Construction General Permit and Notice of Intent can be found at <http://www.epa.gov/npdes>.

If this project uses underground injection control (UIC) devices to treat and dispose of stormwater, the project may be subject to regulation under the "Rules And Minimum Standards For The Construction And Use Of Injection Wells In The State Of Idaho" (IDAPA 37.03.03) administered by the Idaho Department of Water Resources (IDWR) or under authority of local government. Additional information on IDWR's UIC program can be found at: <http://www.idwr.idaho.gov/water/well/injection/injectionedit.htm>.

It is the project owner's responsibility to use appropriate stormwater best management practices to prevent ground and surface water contamination.

Please call me with any questions at (208) 373-0184 or contact me via e-mail at [kevin.ryan@deq.idaho.gov](mailto:kevin.ryan@deq.idaho.gov).

Sincerely,



Kevin P. Ryan, P.E.  
Staff Engineer

KPR/vas

PDF: Todd Crutcher, P.E., Boise Regional Office  
Ed Squires, P.E., Hydro Logic Inc. (w/approved and stamped set of plans)  
TRIM Record #2013AGD247

APPROVED

By: \_\_\_\_\_

*br*  
IDAHO DEQ  
Boise Regional Office

Date: \_\_\_\_\_

*Jan-26-2013*

Spring Valley (formerly M<sub>3</sub> Eagle)  
Supply Well #1 "Standard" Well  
Construction Technical Specifications,  
Public Drinking Water System Well Site  
Evaluation, and Hydrogeologic  
Evaluation for GWUDI



January 9, 2013

A submittal to Idaho Department of Environmental Quality  
by Hydro Logic, Inc. Boise Idaho





STATE OF IDAHO  
DEPARTMENT OF  
ENVIRONMENTAL QUALITY

1410 North Hilton • Boise, Idaho 83706 • (208) 373-0502

C.L. "Butch" Otter, Governor  
Toni Hardesty, Director

**TSP&S-65/2008**

April 16, 2008

Bill Brownlee  
M3 Eagle, LLC  
533 E. Riverside Drive, Suite 110  
Eagle, Idaho 83616

RE: M3 Eagle - Municipal Water Supply Wells (*Ada County*)  
Standard Construction Specifications

Dear Mr. Brownlee:

The standard technical specifications for the M3 Eagle project appear to meet state of Idaho standards, and are conditionally approved as noted below, with respect to the overall project requirements and compliance with the rules and regulations in the *Idaho Rules for Public Drinking Water Systems* (IDAPA 58.01.08). This approval does not specify the method to be used by the driller in the construction of the well.

**I. PROJECT SPECIFIC CONDITIONS:**

- A. This approval is valid only for drinking water wells constructed for the M3 Eagle development.
- B. A Preliminary Engineering Report and a Well Site Evaluation is required for each future well proposed for the M3 Eagle development. This report must include any individual well specifications that may be required for the specific well, and must include a description, conceptual design and specific well features such as screened depth. A copy of Figure 1, updated for each well, and a copy of this approval letter will also be required for each report that utilizes the standard specifications as the construction specifications.

Please call me with any questions at (208) 373-0151, or contact me via e-mail at [jennifer.wester@deq.idaho.gov](mailto:jennifer.wester@deq.idaho.gov).

Sincerely,

Jennifer L. Wester, E.I.T.  
Associate Engineer

JLW:slt

Enclosures: One Set(s) of Approved and Stamped Standard Technical Specifications

- C: Mark Mason, P.E., Boise Regional Office  
Tiffany Floyd, Boise Regional Office  
Michael Stambulis, P.E., DEQ State Office  
Ed Squires, P.E., Hydro Logic Inc.  
Rob Whitney, IDWR-Boise Field Office  
Source File 1 Eng  
TSP&S Reading File



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C.L. "Butch" Otter, Governor  
Toni Hardesty, Director

**TSP&S-67/2008**

April 16, 2008

Bill Brownlee  
M3 Eagle, LLC  
533 E. Riverside Drive, Suite 110  
Eagle, Idaho 83616

RE: M3 Eagle Supply Well #1 (*Ada County*)  
Public Drinking Water System - Preliminary Engineering Report

Dear Mr. Brownlee:

Typically, a facility plan is required to be approved by DEQ prior to the submission of plans and specifications for well construction; however, your consultant has demonstrated the need for M3 Eagle to construct a large capacity aquifer test well, and has requested that DEQ provide approvals such that this well may be used as a future Public Drinking Water Supply Well.

The referenced project appears to meet state of Idaho standards, and is approved based on the conditions listed below.

**I. PROJECT SPECIFIC CONDITIONS:**

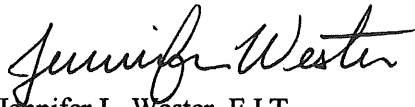
- A. This project will be a new public water system. Per IDAPA 58.01.08 the following items must be submitted to DEQ for review and approval:
1. **Facility Plan:** must be submitted and approved prior to the submittal of plans and specifications for any additional water system components (IDAPA 58.01.08.502)
  2. **Preliminary Engineering Report(s):** must be submitted and approved prior to the submittal of plans and specifications for all water system components such as storage reservoirs, booster stations, additional wells, or well pump houses (IDAPA 58.01.08.053).
  3. **Technical Financial and Managerial demonstration:** must be submitted to and approved prior to or concurrent with the submittal of plans and specifications for water system components (IDAPA 58.01.08.500).
- B. Part of the documentation provided with this preliminary engineering report was a copy of the Application for Permit to appropriate the public waters of the State of Idaho from the Idaho Department of Water Resources, rather than the preferred Permit to Appropriate Water. DEQ will also accept the Application at the plans and specifications stage of well construction. However, a copy of Permit to Appropriate Water must be provided to DEQ as part of the process required by this office before it will authorize the release of Sanitary Restrictions or issue written authorization to serve the public.

Bill Brownlee, M3 Eagle, LLC  
M3 Eagle Supply Well #1  
April 16, 2008  
Page 2

- C. DEQ recommends you contact Vicki Everhart at 373-0249 to schedule a pre-design conference, prior to preparing these items, or other portions of the design package. For your reference, I have enclosed a copy of the Boise Regional Office's policy for the review and approval of a new public water system titled *New PWS Submittal and Review General Guideline*.

Please call me with any questions at (208) 373-0151, or contact me via e-mail at [jennifer.wester@deq.idaho.gov](mailto:jennifer.wester@deq.idaho.gov).

Sincerely,



Jennifer L. Wester, E.I.T.  
Associate Engineer

JLW:slt

Enclosures: One Approved and Stamped Preliminary Engineering Report  
New PWS Submittal and Review General Guideline

- C: Mark Mason, P.E., Boise Regional Office  
Michael Stambulis, P.E., State Office  
Ed Squires, P.E., Hydro Logic Inc. (*w/approved and stamped PER*)  
BRO Source File 1-eng, M3 Eagle Supply Well #1  
TSP&S Reading File



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C.L. "Butch" Otter, Governor  
Toni Hardesty, Director

**TSP&S-66/2008**

April 16, 2008

Bill Brownlee  
M3 Eagle, LLC  
533 E. Riverside Drive, Suite 110  
Eagle, Idaho 83616

RE: M3 Eagle Supply Well #1 Construction Specifications (*Ada County*)  
A. Well Conditional Approval  
B. Recent Federal Regulations

Dear Mr. Brownlee:

Typically, a facility plan is required to be approved by DEQ prior to the submission of plans and specifications for well construction; however, your consultant has demonstrated the need for M3 Eagle to construct a large capacity aquifer test well and has requested that DEQ provide approvals such that this well may be used as a future Public Drinking Water Supply Well. The plans and specifications for the subject project appear to meet state of Idaho standards, and are conditionally approved as noted below:

**I. STANDARD CONDITIONS:**

- A. All conditions of this letter must be met. The standard conditions on the Department of Environmental Quality (DEQ) review stamp are part of this approval. Supporting reports or documents are considered to be part of the approved documents.
- B. The approval applies to the drilling of the well only. Separate plans and specifications for the pump, pump house, and appurtenances must be approved by DEQ prior to construction. The design package needs to include at least the following:
  - 1. General Plan and Specification Checklist.
  - 2. Drinking Water Distribution System Checklist.
  - 3. Drinking Water Pumping Station Checklist
  - 4. Well House and Equipment Design Checklist.
  - 5. Other items required per the checklists.
  - 6. Other site specific items deemed appropriate by the consultant.
  - 7. An evaluation of how disinfection and contact time would be installed, should that prove necessary.
- C. No work may begin until a copy of this approval letter and the plans and specifications bearing the DEQ approval stamp are delivered to and kept on the job site. As the project owner, you must ensure that the contractor, the construction inspector, and the certifying engineer are aware of the approval conditions.
- D. This approval will be voided if: 1) construction is not completed by April 16, 2009; 2) the project is improperly constructed, operated or maintained; or 3) the project fails to function as intended.
- E. No significant deviations can be made from the approved plans without DEQ's prior written approval.

- F. Per the project documents, the Land Developer or Owner or his representative shall ensure that a professional engineer with Hydro Logic Inc. provides supervision of construction and written documentation as follows.
- G. The *Application For Drilling Permit* approved by IDWR contains conditions that are an essential part of the subject plans and specifications. A copy of the *Application For Drilling Permit* approved by IDWR and the DEQ approved plans and specification must be maintained at the drill site.
- H. The project engineer must stake where the well will be drilled in accordance with the DEQ approved well site plan.
- I. Before this well can be put into service and the water distributed to the public, DEQ must issue a final approval of the well and/or water system, and DEQ must issue written authorization to serve water to the public. Approvals of other portions of this project and/or the lifting of sanitary restrictions shall not be interpreted as authorization to serve the public.
- J. Before DEQ can issue final approval, a well completion report must be submitted to and approved by DEQ. This report must at a minimum include:
  - 1. Results of new source monitoring samples collected by the owner and tested by a certified laboratory. A detailed list of parameters that need to be tested is attached (this includes sand, corrosivity, and secondary contaminants).
  - 2. Results from pump tests conducted after construction. These results shall include the requirements listed in section 510.06.c of the Idaho Rules for Public Drinking Water Systems (IDAPA 58.01.08).
  - 3. Documentation that the project was completed as approved, an as-built schematic of the well, and the well drillers log.
- K. A copy of the Permit to Appropriate Water from the Idaho Department of Water Resources must be provided to the Boise Regional Office before DEQ will recommend the release of Sanitary Restrictions or issue written authorization to serve the public. We recommend that a copy of the Permit be provided to DEQ as part of the Well Completion Report.
- L. DEQ will advise you if a final inspection and/or initial sanitary survey will be required prior to final approval.

## II. PROJECT SPECIFIC CONDITIONS:

- A. This project will be a new public water system. Per IDAPA 58.01.08 the following items must be submitted to DEQ for review and approval:
  - 1. **Facility Plan:** must be submitted and approved prior to the submittal of plans and specifications for any additional water system components (IDAPA 58.01.08.502)
  - 2. **Preliminary Engineering Report(s):** must be submitted and approved prior to the submittal of plans and specifications for all water system components such as storage reservoirs, booster stations, additional wells, or well pump houses (IDAPA 58.01.08.053).

3. **Technical Financial and Managerial demonstration:** must be submitted to and approved prior to or concurrent with the submittal of plans and specifications for water system components (IDAPA 58.01.08.500).
- B. DEQ recommends you contact Vicki Everhart at 373-0249 to schedule a pre-design conference, prior to preparing these items, or other portions of the design package.
- C. As required by the Idaho Rules for Drinking Water Systems (IDAPA 58.01.08), the owner of each well shall retain all records pertaining to each well until the well has been properly abandoned (Subsection 510.03.e).
- D. The owner of the well needs to obtain a drilling permit from the Idaho Department of Water Resources prior to well construction.


### RECENT FEDERAL REGULATIONS

You should be aware that recent federal regulations could affect the design and operation of water systems utilizing groundwater sources.

- A. The "Groundwater Rule" (71 FR 65574, November 8, 2006) will provide for evaluating groundwater sources that are not under the direct influence of surface water, for vulnerability to microbial contamination. If a source is found to be vulnerable, it may be necessary to install disinfection and contact time prior to distribution to the first customer. To provide for that possibility, the planning and layout of the facility needs to include an evaluation of the how the system could be modified to supply a minimum effective "CT" (disinfectant concentration times contact time) of 12 mg-min/L (as chlorine).
- B. The new "Stage 2 Disinfectants and Disinfection By-Products Rule" (71 FR 388, January 4, 2006) regulates certain compounds that are formed when disinfectants combine with certain naturally occurring, organic constituents in water.

Please call me with any questions at (208) 373-0151, or contact me via e-mail at [jennifer.wester@deq.idaho.gov](mailto:jennifer.wester@deq.idaho.gov).

Sincerely,



Jennifer L. Wester, E.I.T.  
Associate Engineer

JLW:sjt

Enclosures: One Set(s) of Approved and Stamped Specifications  
Drinking Water Monitoring Requirements for New Sources

- C: Mark Mason, P.E., Boise Regional Office  
Tiffany Floyd, Boise Regional Office  
Michael Stambulis, P.E., DEQ State Office  
Ed Squires, P.E., Hydro Logic Inc.  
Rob Whitney, IDWR-Boise Field Office  
Source File 1 Eng, M3 Eagle Supply Well #1 Construction Specifications  
TSP&S Reading File



STATE OF IDAHO  
DEPARTMENT OF  
ENVIRONMENTAL QUALITY

1410 North Hilton • Boise, Idaho 83706 • (208) 373-0502

C.L. "Butch" Otter, Governor  
Toni Hardesty, Director

**TSP&S-68/2008**

April 16, 2008

Bill Brownlee  
M3 Eagle, LLC  
533 E. Riverside Drive, Suite 110  
Eagle, Idaho 83616

RE: M3 Eagle Supply Well #1 (*Ada County*)  
A. Well Site Conditional Approval  
B. Groundwater Under Direct Influence of Surface Water (GWUDI) Determination  
C. Recent Federal Regulations

Dear Mr. Brownlee:

**WELL SITE CONDITIONAL APPROVAL**

Typically, a facility plan is required to be approved by DEQ prior to the submission of plans and specifications for well construction; however, your consultant has demonstrated the need for M3 Eagle to construct a large capacity aquifer test well, and has requested that DEQ provide approvals such that this well may be used as a future Public Drinking Water Supply Well. Your consultant submitted the required information on the well site, and has certified that the site is generally acceptable for a new Public Water System well. We have reviewed that information, and are approving the site per the *Idaho Rules for Public Drinking Water Systems (IRPDWS)*, subject to the following conditions:

**I. STANDARD CONDITIONS:**

- A. The approval is for the well site only. Construction of the well, pump house, and distribution system components cannot begin until plans and specifications are approved by the Department of Environmental Quality (DEQ). The plans, specifications, and related documents will have to verify and augment the data provided in the initial Well Site Evaluation, ensuring full conformance to the IRPDWS.
- B. To assist you in obtaining a timely review of this project, please avoid the following errors that have been found in recent plans, specifications, and related documents:
1. Improper separation distances between the well and pavement, property lines, and public easements.
  2. Failure to divert runoff as far from the well site as practical (minimum of 50 feet).
  3. Improper use of the well site for parking and storage of inappropriate materials (petroleum products, chemicals, etc).
- C. New source monitoring will need to be collected by the owner, tested by a certified laboratory, and approved by DEQ; before the water may be distributed to the public. The detailed list of parameters that need to be tested will be forwarded when the well construction is approved.

- D. You must receive written authorization from DEQ before you are allowed to serve water to the public. Approvals of other portions of this project and/or the lifting of sanitary restrictions shall not be interpreted as authorization to serve the public
- E. This approval will be voided if: 1) well construction is not completed by April 8, 2009; 2) the well is improperly constructed, operated, or maintained; or 3) the site conditions change before well construction has commenced.

**II. PROJECT SPECIFIC CONDITIONS:**

- A. This project will be a new public water system. Per IDAPA 58.01.08 the following items must be submitted to DEQ for review and approval:
  - 1. **Facility Plan:** must be submitted and approved prior to the submittal of plans and specifications for any additional water system components (IDAPA 58.01.08.502)
  - 2. **Preliminary Engineering Report(s):** must be submitted and approved prior to the submittal of plans and specifications for all water system components such as storage reservoirs, booster stations, additional wells, or well pump houses (IDAPA 58.01.08.053).
  - 3. **Technical Financial and Managerial demonstration:** must be submitted to and approved prior to or concurrent with the submittal of plans and specifications for water system components (IDAPA 58.01.08.500).
- B. DEQ recommends you contact Vicki Everhart at 373-0249 to schedule a pre-design conference, prior to preparing these items, or other portions of the design package.
- C. As required by the Idaho Rules for Drinking Water Systems (IDAPA 58.01.08), the owner of each well shall retain all records pertaining to each well until the well has been properly abandoned (Subsection 510.03.e).

**GROUNDWATER UNDER DIRECT INFLUENCE OF SURFACE WATER (GWUDI)**

Idaho is required by federal drinking water regulations to determine whether groundwater sources serving public drinking water systems are directly influenced by surface water. "Groundwater Under the Direct Influence of Surface Water" (GWUDI) may contain disease causing organisms which are normally found only in surface water, and may require additional treatment including filtration and/or disinfection and contact time.

From our review of the materials submitted for this project, we have classified this source as:

**"Groundwater"** - No further action is necessary

Please call Brandon Lowder of this office 373-0550 with any questions on the classification.

**RECENT FEDERAL REGULATIONS:**

You should be aware that recent federal regulations could affect the design and operation of water systems utilizing groundwater sources.

Bill Brownlee, M3 Eagle, LLC  
M3 Eagle Supply Well #1  
April 16, 2008  
Page 3

- A. The "Groundwater Rule" (71 FR 65574, November 8, 2006) will provide for evaluating groundwater sources that are not under the direct influence of surface water, for vulnerability to microbial contamination. If a source is found to be vulnerable, it may be necessary to install disinfection and contact time prior to distribution to the first customer. To provide for that possibility, the planning and layout of the facility needs to include an evaluation of the how the system could be modified to supply a minimum effective "CT" (disinfectant concentration times contact time) of 12 mg-min/L (as chlorine).
- B. The new "Stage 2 Disinfectants and Disinfection By-Products Rule" (71 FR 388, January 4, 2006) regulates certain compounds that are formed when disinfectants combine with certain naturally occurring, organic constituents in water.

Please call me with any questions at (208) 373-0151, or contact me via e-mail at [jennifer.wester@deq.idaho.gov](mailto:jennifer.wester@deq.idaho.gov).

Sincerely,



Jennifer L. Wester, E.I.T.  
Associate Engineer

JLW:slt

Enclosures: GWUDI Field Evaluation

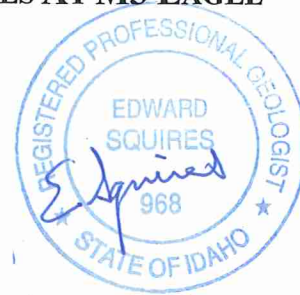
- C: Mark Mason, P.E., Boise Regional Office  
Tiffany Floyd, Boise Regional Office  
Michael Stambulis, P.E., State Office  
Ed Squires, P.E., Hydro Logic Inc.  
Brandon Lowder, Boise Regional Office  
Rob Whitney, IDWR-Boise Field Office  
BRO Source File 1 Eng, M3 Eagle Supply Well #1  
TSP&S Reading File

RECEIVED STANDARD TECHNICAL SPECIFICATIONS FOR DRILLING, CONSTRUCTION AND TESTING OF MUNICIPAL WATER SUPPLY WELLS AT M3 EAGLE

MAR 06 2008

DEPARTMENT OF ENVIRONMENTAL QUALITY BOISE REGIONAL OFFICE

Well Drilling



PART 1 - GENERAL

1.01 Scope

- A This Specification covers the general requirements for the well drilling operations including security, safety, working hours, material disposal, utilities, site clean up and other work related to the construction of a public drinking water supply well. The Owner reserves the right to substitute items listed in the supplemental bid schedule as may be, in the Owner's sole judgment, to be in the Owner's best interest, depending upon conditions encountered or observed during drilling.
B It is recognized by the Owner that various Contractors may have specific methods and/or equipment that they are familiar with or that work best for them. The Owner further recognizes that there is more than one way to drill and complete a well. These specifications are directed toward the direct-mud rotary drilling method, which is required. The Owner is willing to consider variations to methods provided they produce the desired result and that the Contractor develops a proposal for any changes to the specifications as presented herein and obtain written permission from the Geologist to utilize such changes. Direct questions concerning the technical specifications to Ed Squires, Hydro Logic, Inc. at 342-8369 (office) or 631-6781 (cell).

PART 2 - PRODUCTS

2.01 General

- A Provide all materials, equipment, and experience required to accomplish the completion of the water supply production well. All products shall be transported and stored on site in a clean, dry, and protected condition off of the ground. All equipment and/or materials used in well construction shall be National Sanitation Foundation (NSF) Standard 61 approved or equivalent.

APPROVED By: Jennifer Wester IDAHO DEQ Boise Regional Office Date: 4/16/08

PART 3 - EXECUTION

3.01 Minimum Well Construction Standards

- A The Contractor shall be required to conform to the applicable portions of the Minimum Well Construction Standards established by the Idaho Department of Water Resources (IDWR), the Recommended Standards for Water Works (so called Ten States Standards), the Idaho Rules for Public Drinking Water Systems of the Idaho Department of Environmental Quality (IDEQ), and this specification.
B Set up well drilling equipment within the area and as designated on the Site Plan in "Drawings". Perform all work in accordance with these Specifications. All work associated with this contract shall be done in accordance with the conditions, regulations and requirements set forth in the drilling permit issued by the State of Idaho Department of Water Resources. The Owner will supply the drilling permit upon award of the contract.