



State of Idaho

DEPARTMENT OF WATER RESOURCES

322 East Front Street • P.O. Box 83720 • Boise, Idaho 83720-0098

Phone: (208) 287-4800 • Fax: (208) 287-6700 • Website: www.idwr.idaho.gov

GARY SPACKMAN
Director

June 25, 2020

HAYDEN LAKE IRRIGATION DISTRICT
2160 W DAKOTA AVE
HAYDEN ID 83835-5122

PROOF DEFICIENCY LETTER

RE: Permit No. 95-16962

Dear Permit Holder:

The Department received the proof of beneficial use (proof) form you submitted for the above referenced permit.

I am returning the form and accompanying documents to you because information provided on the application is not sufficient or incomplete.

Condition no. 6 of this permit states:

"In connection with the proof of beneficial use submitted for this permit, the permit holder shall also submit a report showing the total annual volume, the maximum daily volume, and the maximum instantaneous rate of flow diverted from the point of diversions authorized for this permit during the development period. The report shall also show the maximum instantaneous rate of diversion, either measured or reasonably estimated by a qualified professional engineer, geologist, or certified water rights examiner."

Based on the information provided, the permit does not meet the Condition no. 6 requirements as follows:

- Total annual volume based on maximum diversion rate, rather than reporting actual annual volumes
- Maximum daily volume based on maximum diversion rate, rather than actual maximum daily volume
- It is unclear how the maximum diversion rate was measured or estimated

The permit requires that an engineer, geologist, or certified water rights examiner measures or estimates that rate. This may have been done, but the report does not explain how rates were measured or estimated.

On February 7, 2020, the Department sent a Lapse Notice to the permit holder of record providing a 60-day period to file either a proof or extension for this permit that would allow

for reinstatement of the lapsed permit. Because your proof statement was received by the Department as insufficient or incomplete it cannot be processed without additional requirements.

This letter is to provide you with information for reinstatement of a permit more than 60 days after notice of lapsing. Also, to inform you the priority date of the permit will be advanced to the date an acceptable proof is filed that complies with all of the requirements of Idaho Code § 42-218a (2), which reads:

In connection with a proof of beneficial use statement submitted more than sixty (60) days after such notice of lapsing, the director shall require all of the following items to be submitted to the Department: **(a)** A report prepared by a certified water right examiner as the result of an examination to clearly confirm and establish the extent of the beneficial use of water established in connection with the permit during the time authorized by the permit and any extensions of time previously approved. The report shall be on the form or forms specified by the director and shall provide the information specified in section 42-217, Idaho Code, for confirming beneficial use and such other information as may be required by the director. **(b)** A statement of reasonable cause for filing a late proof of beneficial use. **(c)** A reinstatement fee of two hundred fifty dollars (\$250). Upon finding that beneficial use had occurred during the authorized period and upon a showing of reasonable cause for filing a late proof of beneficial use, the director may reinstate the permit with the priority date advanced to the day that proof of beneficial use was received;

The field report required by statute 42-218a (2)(a) must clearly confirm and establish the extent of the beneficial use of water during the authorized development period of the permit from February 13, 2015 to February 1, 2020. The Request to Reinstate a Permit Lapsed more than Sixty Days form required under statute 42-218a (2)(b) must provide reasonable cause for filing proof late and be accompanied by a \$250.00 reinstatement application fee required under statute 42-218a (2)(c).

Permit 95-16962 remains lapsed and is of no force nor effect.

If you cannot meet the requirements explained above to reinstate this permit, you may be able to apply for a new water right permit or seek other remedies. Please contact our regional office in your area for information related to new appropriations or other options. Department forms are available from any Department office or at the Department's website at www.idwr.idaho.gov.

If you have any questions regarding this permit, please contact me at (208) 287-4920.

Sincerely,



Debbi Judd

Technical Records Specialist

Enclosure

RECEIVED

MAR 12 2020

DEPARTMENT OF
WATER RESOURCESSTATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
STATEMENT OF COMPLETION
FOR SUBMITTING PROOF OF BENEFICIAL USE

FOR OFFICE USE ONLY	
Amt. of Fee \$	225 ⁰⁰
Receipt No.	N035955
Received By	Ja
Date Received	3-9-2020

The Idaho Department of Water Resources considers this form a statement by the permit holder(s) that development of a water right has been **completed** and that water has been applied to beneficial use to the extent described below. **This form must be accompanied by an examination fee, when necessary, or by a completed Beneficial Use Field Report prepared by a certified water right examiner.** Please refer to the instructions and fee schedule for this form. If ownership of the permit has changed, contact any Department office or visit the Department's website at idwr.idaho.gov for an *Assignment of Permit* form. If you wish to relinquish your permit because you have not established the authorized use of the water and are **not** applying for an extension, please notify the Department in writing.

1. Permit No. 95-16962 Telephone No. 208-772-2612
2. Name of Permit Holder(s) Hayden Lake Irrigation District
3. Mailing Address 2160 W. Dakota City _____
State WA Zip 983835 Email district@haydenirrigation.com
3/9/2020
4. Source of Water Well If **GROUND WATER** (well), Date Drilled mo. _____ / yr. _____
Well Driller _____ Drilling Permit Number _____
5. Extent of use(s) completed as authorized by the water right permit:
Domestic (No. of households) 2900 Stockwater (No. and type of stock) _____
Irrigation (No. of acres) 3000 Other _____

6. Total rate of diversion or storage volume for which proof is submitted _____ cfs OR _____ acre-feet.
7. Compliance with a measuring device requirement, lockable controlling device requirement, and/or other conditions of permit:
Refer to the approval conditions on your permit and respond accordingly.

The Department will not issue a license if permit conditions are not met.

Measuring Device	Is a measuring device required?	Yes ☐	No ☒
	If yes, has the measuring device been installed?	Yes ☐	No ☒
Lockable Controlling Device	Is a lockable device required to control the diversion?	Yes ☐	No ☒
	If yes, has the lockable device been installed?	Yes ☐	No ☒
Fish Screen	Is a fish screen required?	Yes ☐	No ☒
	If yes, has the fish screen been installed?	Yes ☐	No ☒

Other Conditions of Permit

Do the approval conditions on your permit require you to submit additional information in connection with your proof of beneficial use? If yes, list the conditions below and attach documents with the required information.

Letter of Use & Peak Day diversion w/ Facility Plan Dated 9/5/2019 Completed? Yes ☒ No ☐

8. Fee Enclosed \$ 225 or not applicable ☐. See fee schedule on page 2 of the instructions.
Proof statements filed without an appropriate fee, will be considered incomplete.
9. Person to contact to accompany the Department representative during field examination of the water system.

Name Branden Rose Telephone Number 208-772-2612
Mailing Address 2160 W. Dakota Ave City Hayden
State Id Zip 83835 Email branden@haydenirrigation.com

The information given on this form is my true statement of the extent to which the above numbered permit has been developed and water has been diverted and applied to a beneficial use. I understand that any undeveloped portion of the permit is relinquished to the State of Idaho.

Signature of Permit Holder [Signature] Date 3/9/2020
(Include your title, if on behalf of company or organization)

Mail to: Idaho Department of Water Resources, PO Box 83720, Boise, ID 83720-0098

HAYDEN LAKE IRRIGATION DISTRICT

PO BOX 162 ♦ 2160 W. Dakota Ave.
Hayden, Idaho 83835-0162
24 hr (208) 772-2612 ♦ FAX (208) 772-5348

March 9, 2020

To whom it may concern,

Hayden Lake Irrigation District (District) is providing proof of beneficial use for permit Number 95-16962.

- 1) Attached is a copy of JUB Engineering Facility Plan pages 22-29 dated 9/5/2019 by Jon Baune. The attached page 26 depicts the District's 5 Wells current pumping rates in gallons per minute as combined 10,800 or 23.76 cfs rate of diversion. This would confirm line five's conditions; the combined rights 95-16962, 95-9212, 95-7800, 958269, 95-8279, 95-8581, and 95-9242 shall not exceed the total diversion rate of 30.88 cfs, under the conditions for approval for permit No. 95-16962.
- 2) Line 6 would like the annual yearly volume and the maximum daily volume and the maximum instantaneous rate of diversion, page 26 would also depict if the maximum rate of diversion is 1800 gpm X 1440 minutes 2,592,000 maximum daily diversion X 365 days a year 946,080,000 maximum annually produced for this well site, also page 26 depicts the maximum rate of diversion for the well. I also have attached the Well Construction and Pump Test Report Signed by Paul Klatt and Dated 6/30/17 of JUB Engineering.

If additional information is need please contact Branden Rose @ 1-208-772-2612 or ema

Sincerely,



Branden Rose
District Administrator

Hayden Lake Irrigation District Dakota Well No. 1

Well Construction and Pump Test Report

June 2017



J-U-B ENGINEERS, Inc.

Hayden Lake Irrigation District Dakota Well No. 1

Well Construction and Pump Test Report

June 2017

Updated 7/10/17

Prepared by



J-U-B ENGINEERS, Inc.
7825 Meadowlark Way
Coeur d'Alene, ID 83815
(208)762-8787

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1.0 Summary

Hayden Lake Irrigation District (HLID) authorized O’Keefe Drilling Company of Butte, Montana, to drill and construct one new municipal production well, Dakota Well No. 1, on September 17, 2014. The new well is located in the southwest quarter of the southeast quarter of Section 15, Township 51 North, Range 4 West with a street address of 2160 West Dakota Avenue, Hayden, Idaho. The site is a five-acre parcel north of Hayden Avenue and west of U.S. Highway 95 at the District offices. HLID has two existing wells at the same site, Dakota Well No. 2 and Dakota Well No.3, with maximum production rates of approximately 4,000 gallons per minute and 2,000 gpm, respectively. The Idaho Department of Environmental Quality (IDEQ) approved the well site on September 17, 2014. This Well Completion Report provides information on the design, construction, and testing of the new Dakota Well No. 1.

O’Keefe Drilling Company constructed Dakota Well No. 1 using a dual air rotary drilling rig in accordance with J-U-B ENGINEERS, Inc.’s plans and specifications approved by IDEQ on September 18, 2014. Construction of the well began in late September with completion in early December 2014.

Dakota Well No. 1 has a 16-inch-diameter casing from 2 feet above land surface to 387 +/- feet below ground surface (bgs). A 16-inch-diameter telescoping, stainless steel screen is located in the depth range of 388 feet to 448 +/- feet bgs. The screen is fully exposed and has a 10-foot-long “tight-wind zero slot” head pipe and a 10-inch-long tail pipe below it. The surface seal consists of a 2-inch-thick bentonite surface seal installed to a depth of 60 feet below the ground surface. The geologic information appears in the Well Driller’s Report in **Appendix A** with a summary in **Table 1**. O’Keefe performed surging and bailing of the completed well, but the District deferred test pumping and sampling to coincide with the selection and installation of the production pump. **Appendix C** contains the Record Drawings for the completed well, including a site location map and site plan.

IDEQ approved Dakota Well No. 1 plans and specifications for the pump, motor, piping, wellhouse and electrical work on July 5, 2016. The District procured construction contracts beginning at that time with the start-up phases of the project beginning in March 2017. Step testing and the 4-hour over-pumping performance testing of the well occurred in late May 2017. Those test results appear in **Figures 1 and 2**. Water level drawdown quickly stabilized at less than five feet within the new well. The over-pumping production rate was 2,250 gallons per minute (gpm), 25% higher flow than the design production rate of 1,800 gpm. No drawdown was discernible within the existing Dakota Well No. 3, which is located 243 feet from the new well. Drawdown and performance parameters are within the design performance requirements for this well.

HLID obtained water quality samples at the conclusion of the pump tests and had them analyzed by Accurate Testing with the analyses presented in **Appendix B**. **Figure 3** shows that turbidity testing conducted during the 4-hour over-pumping test fell to less than 1.0 NTU within 94 minutes and remained below 1.0 for the duration of the test. Sand content sampling conducted during the test pumping revealed sand production at less than 1.0 mg/L (below measureable rates). The water sampling efforts show that this well meets IDEQ requirements for public drinking water wells.

2.0 Construction and Testing of the Well

2.1 Well Construction Summary

O'Keefe Drilling Company of Butte, Montana utilized a dual air rotary well drilling rig to construct HLID's new Dakota Well No. 1 production well from September 29, 2014 to December 2, 2014, in accordance with IDEQ-approved plans and specifications.

In accordance with Idaho Department of Water Resources and IDEQ requirements, O'Keefe first disinfected their drill rig, equipment, casing and materials using a 500 part-per-million chlorine solution. Next, they drilled and advanced 20-inch steel casing to a depth of 60 feet bgs to allow placement of the required surface seal. The crew then centered 0.375-inch thickness, 16-inch diameter, solid steel casing inside the 20-inch casing and advanced it to 449+/- feet bgs with their dual rotary rig. Each length of casing was joined with a full-penetration butt-weld by a certified welder.

O'Keefe made visual observations of the material removed during the drilling process, as summarized in **Table 1**. They also obtained geologic/formation samples every five feet once they encountered groundwater. Geologic samples analyzed from 375 to 450 feet bgs to determine the size, location, and length of screen necessary to obtain the design production rate for the completed well, as detailed in the following section.

The drilling crew next conducted the required plumbness and alignment testing using a 14.25-inch plummet and recording its deviation from centerline as it was lowered the length of the casing. The well passed the plumbness requirement but drifted in a north-south direction sufficiently to necessitate the additional "dummy" testing required in the specifications. The "dummy" test required the driller to lower a 40-foot long by 14.75-inch diameter steel "dummy" slowly the full length of the casing to simulate the installation of a pump and discharge pipe assembly. J-U-B witnessed the "dummy" test, which produced no apparent binding or indication to expect difficulty with pump installation in the completed well. This procedure also provided more certainty that the installation of the 70-foot long screen assembly would pass unimpeded and undamaged to the bottom of the well.

Once the approved screen assembly arrived on site, the O'Keefe crew welded the sections together and slowly lowered the 70-foot long, 16-inch stainless steel telescoping screen (14.1 inches outside diameter) to the bottom of the steel casing. J-U-B again witnessed the screen installation, which produced no apparent binding or indication to expect difficulty with pump installation in the completed well. The crew then back-pulled the 16-inch casing to a depth of 387 feet +/- using casing jacks at the ground surface and cut off the back-pulled casing. O'Keefe utilized a stainless steel "tight wind" or "zero-slot opening" screen for the head pipe above the production screen, from 377.5 to 387.5 feet bgs. They also placed a "K-packer" seal on the outside and near the top of the head pipe to form a seal with the inside of the steel casing and prevent aquifer sands and gravels from entering into the well.

Finally, the drilling crew poured dry 3/8-inch nominal diameter bentonite chips into the annular space between 20-inch and 16-inch casing using a tremmie pipe to prevent bridging of the chips. Simultaneously, they slowly back-pulled the 20-inch casing with casing jacks. The continuous 2-inch-thick

bentonite seal extends from the ground surface to a depth of 60 feet bgs, in accordance with Idaho Department of Water Resources and IDEQ requirements.

As discussed in the following section, O'Keefe then conducted surging and bailing operations in the completed well to remove accumulated cuttings, scale, sand, and sediment. They also contracted for video inspection of the completed well, disinfected the well with 12.5% strength sodium hypochlorite approved for drinking water use, and welded a cap on the top of the casing with two, two inch threaded inspection ports.

The Well Driller's Report for the well is located in **Appendix A**. Record Drawings for the complete well are located in **Appendix C**.

Table 1 – Well Log Cutting Observations

Depth Range (feet)	Material Penetrated
0 to 15	Brown dirt and gravels
15 to 95	Sand and gravels
95 to 100	Boulders
100 to 272	Sand and gravels
280 to 300	Sand
300 to 372	Sand and gravels
372 to 435	Sand and gravels
435 to 449	Tan gravel; rusty looking sand

2.2 Sieve Analysis

Johnson Screens conducted a sieve analysis for O'Keefe on geologic formation samples taken in the water-bearing zone while drilling the production well. Material sizes for 90 percent retained and 40 percent retained appear in **Table 2**. Full sieve analyses and screen materials appear in **Appendix D**.

Table 2 – Sieve Analysis Data

Depth	90% Retained (inches)	40% Retained (inches)
380	0.0175	0.042
400	0.0375	0.1255
420	0.030	0.0855
440	.0455	0.140

Based on the approved sieve analyses, the completed well utilizes 100-slot screen (0.100-inch openings) from 388 to 418 feet bgs, 070-slot screen (0.070-inch openings) from 418 to 438 feet bgs, and 100-slot screen from 438 to 448 +/- feet bgs. The design yield of this screen assembly is approximately 3,200 gpm at 0.1 feet/sec average velocity through the screen. With good development of the well to achieve good well efficiency, we would expect less than 10 feet of drawdown at the design capacity in the Rathdrum Prairie Aquifer.

2.3 Well Development and Hydraulic Testing

O'Keefe used a surge block to develop the well. The surge block concentrates energy on the screen by pulling the tight-fitting block up along the well screen and a ball or flapper valve keeps the water progressing up the discharge pipe. The surge block also tends to push water out through the screens on the short downward stroke. The pulsing helps to pull additional sand and sediment from the formation in the aquifer around the well screens, creating a gradation of coarser material at the surface of the screen for more reliable, long-term water production without excessive sand production or draw-down (e.g. well efficiency). O'Keefe surge-developed the well several times throughout the screened portion until the amount of material removed in the discharge was minimal, as observed by J-U-B and the District. The surge block development time was 35 hours.

Further well development was accomplished through over-pumping. The test pumping was not completed at the time of the well construction, but was completed utilizing the production pump. The over-pumping and the aquifer step test were performed with the production pump used to discharge as much water and formation material as possible from the well.

United Crown, the District and J-U-B completed the initial step test on May 17, 2017 at flow rates of 1200, 1405, 1800, and 2300 gpm over a period of just under one and a half hours. The well was run at each flow rate until the turbidity, as monitored with a HACH handheld turbidimeter, was measured under 1.0 Nephelometric Turbidity Unit (NTU). The turbidity meter malfunctioned midway through the second step, so turbidity testing was terminated until a replacement meter could be borrowed from IDEQ. Testing resumed later during the pump test. A second test to monitor turbidity was conducted on May 22, 2017 at the flow rate of 2,250 gpm. The turbidity levels dropped below 1.0 NTU quickly after the pump start up and remained there through the entire test. Results for the May 17, 2017 turbidity testing can be seen in **Figure 3**.

J-U-B collected sand samples using a Rossum Sand Sampler at 0.5 gpm. Less than 1.0 mg/L of sand was observed in the samples taken during the step testing and during the four hours of over-pumping (less than seven total individual sand grains during the entire test duration).

The test pumping of the well was completed on May 17, 2017 at a flow rate of 2,250 gpm for four hours while discharging at into the adjacent drywell gallery. The production pump could not provide any higher flows at the reduced discharge head without exceeding the motor's over-current protection. IDEQ's Anna Moody was consulted prior to the test and agreed to the approach for developing and testing the well. **Figure 1** illustrates the water-level pattern at the new Dakota Well No. 1 during the 4-hour pump test. A steady drawdown level of approximately 4.68 feet was established in less than a

minute and observed throughout the pump test. During the pump test, water levels were also being measured from HLID's Dakota Well No. 3, located at a distance of 243.5 feet northwest of Dakota Well No. 1. **Figure 2** shows that there was no discernible water level drawdown pattern for Well No. 3 during the pumping. Water level measurements could not be obtained for Dakota Well No. 2 due to obstructions between the casing and the pump column.

The specific capacity of Dakota Well No. 1 approximately 484 gpm/feet at a discharge rate of 2,250 gpm and meets all design criteria and objections for this installation.

2.4 Water Quality

The District obtained water quality samples for Dakota Well No. 1 on May 17, 2017, approximately 10 minutes before the completion of the pump test. As expected, based on results from adjacent District wells and other area wells completed in the Rathdrum Prairie Aquifer, the water quality in the new well is very good. The only anomaly was for a corrosive potential, as measured with the Langelier Index of -0.42. Corrosion potential is normally associated with low alkalinity source waters, often under the influence of surface water. That situation is not present in HLID's Dakota Well No. 1. Since the District's adjacent wells do not indicate corrosion potential, Dakota Well No. 1 water quality should exhibit less corrosion potential over time as the surrounding aquifer formation continues to develop with production pumping. In addition, Dakota Well No. 1 discharge will continuously blend with the discharge from the adjacent Wells No. 2 and No. 3, which have little corrosion potential. Therefore, additional testing and monitoring but no treatment is necessary for Dakota Well No. 1 at this time. The complete water quality analysis for the well is included in **Appendix B**.

3.0 Conclusions

Based on the screens installed and test pumping results, Dakota Well No. 1 has more than enough capacity to meet the required design flow of 1,800 gpm. The water quality results for the well show all the tested water quality parameters within acceptable limits, although corrosion potential should be monitored.

Overall, the well appears to have high quality water and adequate capacity to meet the requirements of the Hayden Lake Irrigation District.

Figure 1 – Dakota Well No. 1 Drawdown During Pumping

HLID Dakota Well 1 - 2250-gpm Aquifer Test (5-17-17)

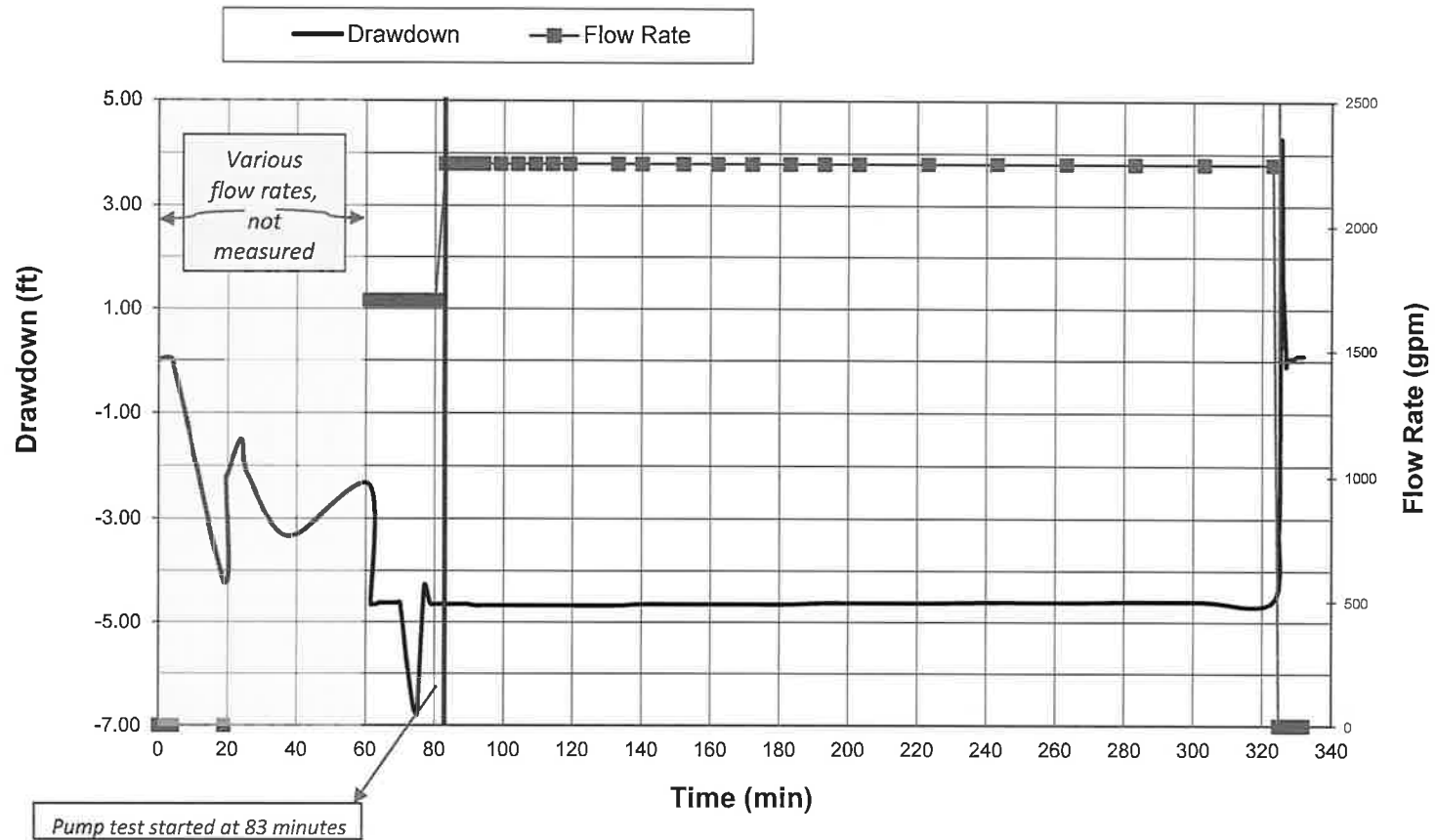


Figure 2 – Dakota Well No. 3 Drawdown During Pumping

HLID Dakota Well 3 - 2250-gpm Aquifer Test (5-17-17)
Monitoring Well

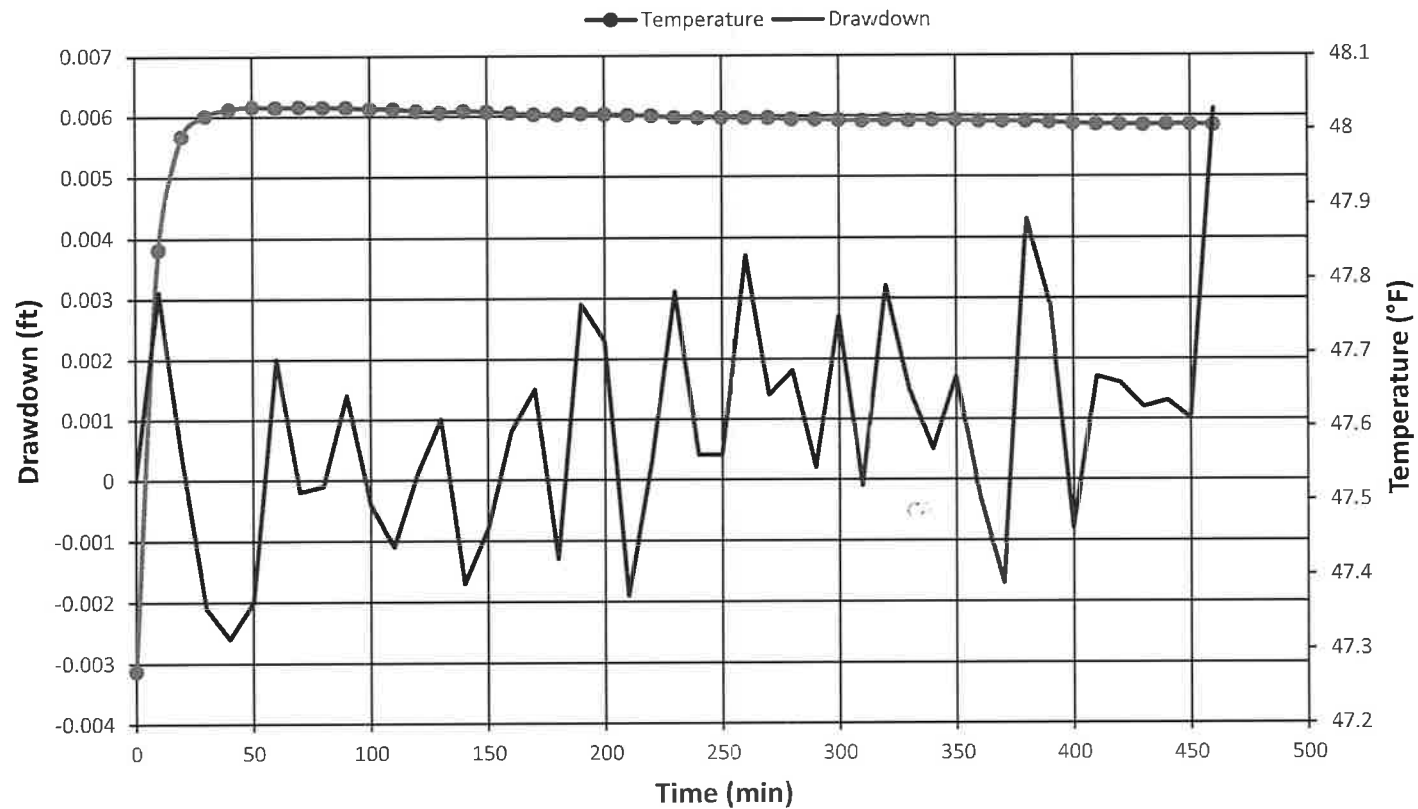
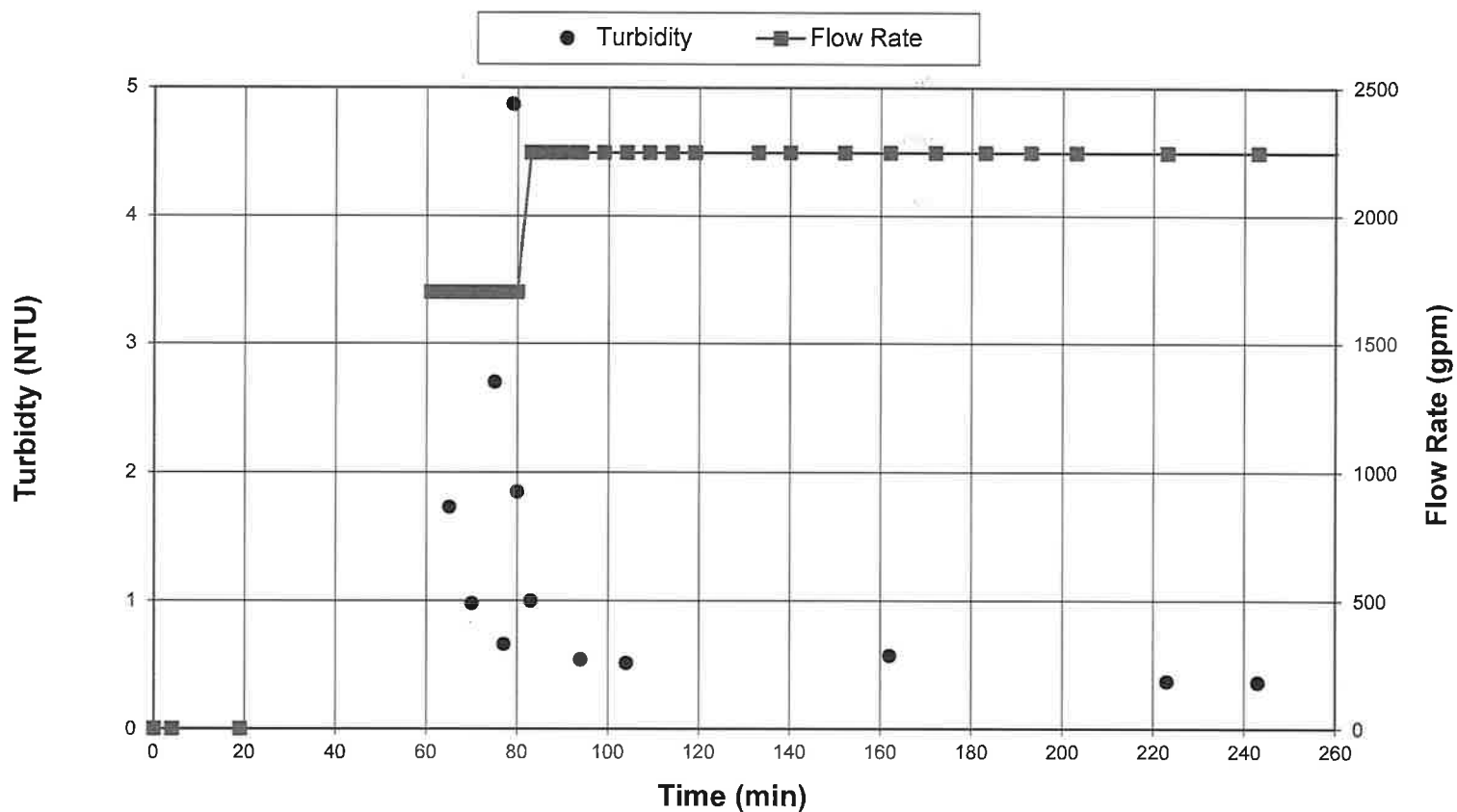


Figure 3 – Turbidity Test Results

HLID Dakota Well 1 - 2250-gpm Aquifer Test (5-17-17)
Turbidity and Flow Rate



Appendices

Appendix A – Well Driller's Report

Appendix B – Water Quality Results for Dakota Well No. 1

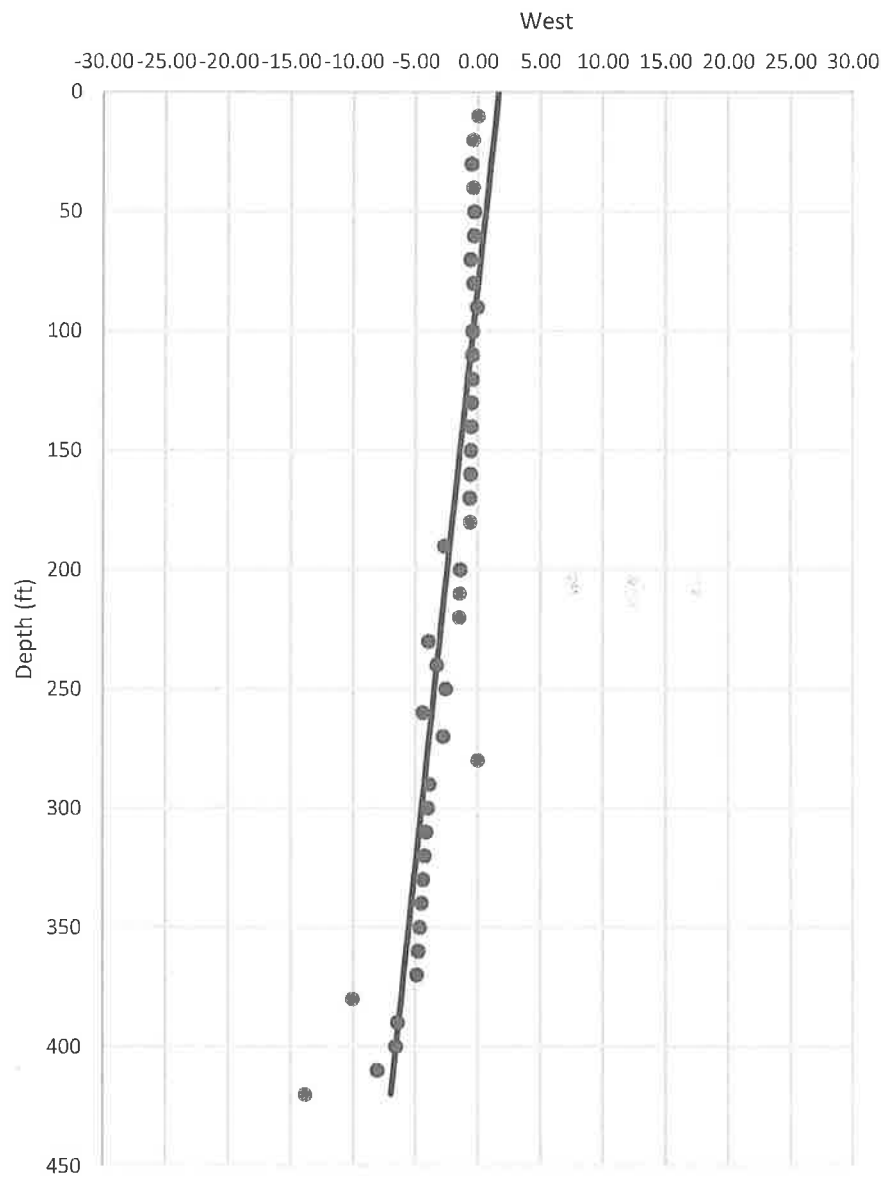
Appendix C – Well Record Drawings

Appendix D – Sieve Analysis Report

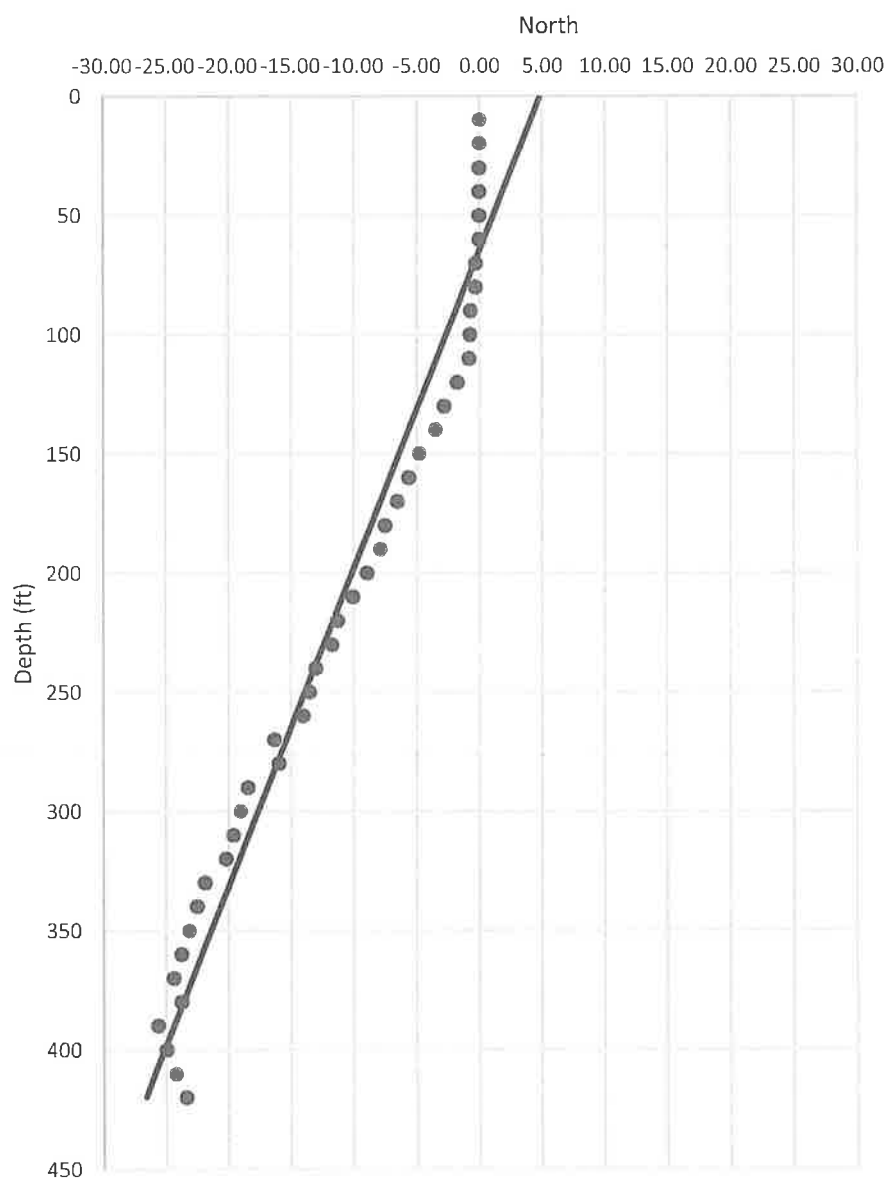
Appendix A

Well Driller's Report

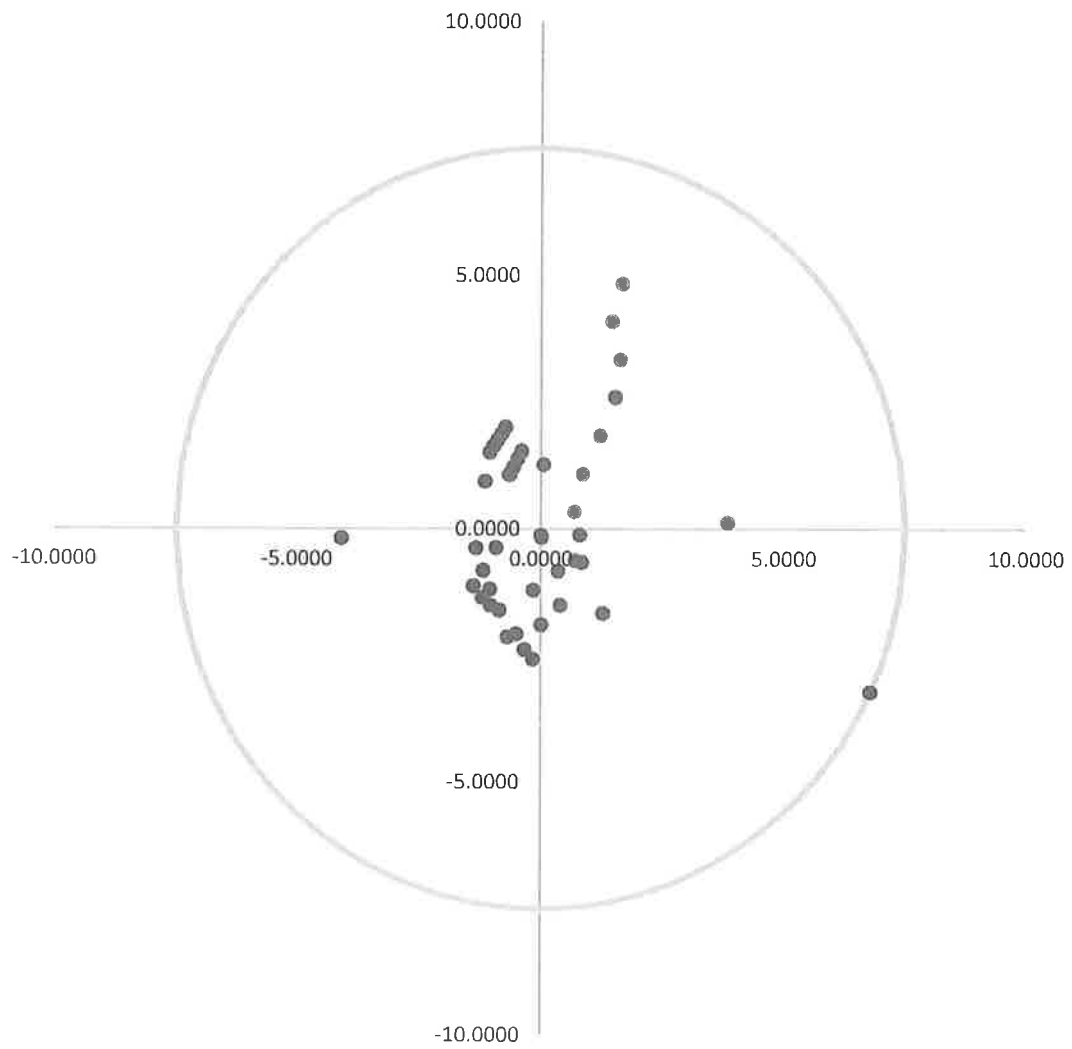
East-West Plane Drift (inches)



North-South Plane Drift (inches)



Alignment Doglegs (Inches)



Appendix B

Water Quality Results for Dakota Well No. 1

Water System Name: Hayden Lake Irrigation Dist.		PWS ID No.: 1280087 RE
Collector: Branden Rose	Date Collected: 05/17/2017	County: Kootenai
Report Results to: Hayden Lake Irrigation Dist. Branden Rose 2160 W. Dakota Hayden Lake, ID 83835		
Phone: (208) 772-2612	Fax: (208) 772-5348	
E-Mail: district@haydenirrigation.com, pwsreports@deq.idaho.gov, anna.moody@deq.idaho.gov		

COLIFORM BACTERIA
ANALYSIS REPORT
CONTAMINANT ID# 3100

Type of System:	Public
Type of Sample:	Non-Compliance Sample
Lab Order No.:	2017050341

Water system info must be fully filled out or samples will not be run. Private samples do not need PWS# or Chlorine residual. Your sample will be analyzed for TOTAL COLIFORMS unless you specify analysis under Remarks.

Laboratory Name:
Accurate Testing Labs, LLC
7950 Meadowlark Way
Coeur d'Alene, ID 83815
Phone (208) 762 8378 Fax (208) 762 9082
Web site: www.accuratetesting.com
E-mail: info@accuratetesting.com

Lab EPA ID No: ID00912

For PWS only, if this is a repeat sample, mark the date of the ORIGINAL POSITIVE SAMPLE.

Sample Number	Sample Type	Sample Location	Time Collected	Chlorine Residual ppm	Original Sample Date	Total Coliform Method: 9223B-PA	E. Coli Method: 9223B-PA
182225	C-Construction	Dakota Well # 1	16:00			Absent	Absent

Sample Transportation by (Name):	Branden Rose	Date/Time:	05/18/2017 07:46	Analyst: AC	Date Analyzed: 05/19/2017
Sample Received by (Name):	JM	Date/Time:	05/18/2017 07:46	Supervisor: Rhena Cooper	
Remarks:				Date Reviewed and Printed: 05/19/17	

Lab EPA ID No.: ID00912	Lab Sample#: 182226
Date Received: 05/18/2017	Date Reported by Lab: 06/02/17
Compliance or Replacement Sample: Compliance	
Date Collected: 05/17/2017	Time Collected: 16:00
Sample Type: Plant Tap	
PWS No.: 1280087 RE	PWS Name: Hayden Lake Irrigation Dist.
Sampling Location: Dakota Well # 1	Tag#
Collector: Branden Rose	Phone: (208) 772-2612

Laboratory Name:
Accurate Testing Labs, LLC
 7950 Meadowlark Way
 Coeur d'Alene, ID 83815
 Phone (208) 762 8378
 Fax (208) 762 9082
 Web site: www.accuratetesting.com
 E-mail: info@accuratetesting.com

Lab Order No.: 2017050342 1

Public Drinking Water System INORGANIC CHEMICAL (IOC) ANALYSIS REPORT:

Phase II								Phase V							
FRDS	Analytes	Results	MCL*	MDL*	Method	Analysis Date	Analyst	FRDS	Analytes	Results	MCL*	MDL*	Method	Analysis Date	Analyst
1010	Barium	ND	2.0	0.02	EPA 200.7	06/02/17	WM	1036	Nickel	ND	0.10	0.005	EPA 200.7	06/02/17	WM
1015	Cadmium	ND	0.001	0.001	EPA 200.7	05/26/17	WM	1074	Antimony	ND	0.006	0.003	EPA 200.9	05/30/17	WM
1020	Chromium	ND	0.10	0.007	EPA 200.7	05/26/17	WM	1075	Beryllium	ND	0.004	0.000	EPA 200.7	06/02/17	WM
1035	Mercury	ND	0.002	0.000	EPA 245.1	05/26/17	WM	1085	Thallium	ND	0.002	0.001	EPA 200.9	05/31/17	WM
1038	NO2/NO3	0.51	10.0	0.5	EPA 300.0	05/19/17	WM	Other IOCs							
1040	Nitrate-N	0.51	10.0	0.5	EPA 300.0	05/18/17	WM	1005	Arsenic	0.0019	0.010	0.001	EPA 200.9	05/26/17	WM
1041	Nitrite-N	ND	1	0.1	EPA 300.0	05/18/17	WM	1025	Fluoride	0.30	4.0	0.2	EPA 300.0	05/18/17	WM
1045	Selenium	ND	0.050	0.002	EPA 200.9	05/31/17	WM	1052	Sodium	2.38	500	0.3	EPA 200.7	05/22/17	WM
1024	Cyanide	ND	0.2	0.005	SM4500CN E	05/18/17	AC								
Secondary IOCs (optional)															
1002	Aluminum	ND		0.04	EPA 200.7	06/02/17	WM	1055	Sulfate	3.11	250	1.5	EPA 300.0	05/18/17	WM
1003	Ammonia							1095	Zinc	ND		0.013	EPA 200.7	05/25/17	WM
1016	Calcium	21.5		0.17	EPA 200.7	05/25/17	WM	1905	Color	ND		4	EPA 110.2	05/19/17	WM
1017	Chloride	3.39		0.5	EPA 300.0	05/18/17	WM	1915	Hardness						
1022	Copper	ND		0.01	EPA 200.7	06/02/17	WM	1920	Odor	ND		1	SM 2150B	05/19/17	WM
1027	Hyd. Sulfide							1925	pH						
1028	Iron	0.031		0.015	EPA 200.7	05/25/17	WM	1926	Conductivity						
1031	Magnesium	5.93		0.03	EPA 200.7	05/25/17	WM	1927	Alkalinity						
1032	Manganese	ND		0.01	EPA 200.7	05/25/17	WM	1930	Diss. Solids						
1042	Postassium							1997	Langlier Indx						
1049	Silica SiO2							2905	Surfactants						
1050	Silver	ND		0.01	EPA 200.7	06/02/17	WM	1030	Lead						

*Reported in mg/L unless otherwise noted, units differ for secondary MCLs depending on contaminant
 ND = Not detected within sensitivity of instrument
 Empty = No analysis performed for this contaminant
 MDL = Method detection limit
 MCL - Maximum Contaminant Level

Comments:



06/02/17

Hayden Lake Irrigation Dist.

2160 W. Dakota
 Hayden Lake, ID 83835

Laboratory
 Supervisor,
 Digitally signed by:
 Walter Mueller

Lab EPA ID No.: ID00912	Lab Sample#: 182227	Laboratory Name: Accurate Testing Labs, LLC 7950 Meadowlark Way Coeur d'Alene, ID 83815 Phone (208) 762 8378 Fax (208) 762 9082 Web site: www.accuratetesting.com E-mail: info@accuratetesting.com
Date Received: 05/18/2017	Date Reported by Lab: 06/15/17	
Compliance or Replacement Sample: Compliance		
Date Collected: 05/17/2017	Time Collected: 16:05	
Sample Type: Plant Tap		
PWS No.: 1280087 RE	PWS Name: Hayden Lake Irrigation Dist.	
Sample Location: Dakota Well # 1		
Collector: Branden Rose	Phone: (208) 772-2612	
		Lab Order No.: 2017050342 2

Public Drinking Water System VOLATILE ORGANIC (VOC) ANALYSIS REPORT:

Method:	EPA 524.3	Analyst:	ANA		Analysis Date: 05/30/17				
FRDS	Contaminant	Results*	MCL*	MDL*	FRDS	Contaminant	Results*	MCL*	MDL*
2378	1,2,4-Trichlorobenzene	ND	70.0	0.5	2979	trans-1,2-Dichloroethylene	ND	100.0	0.5
2380	cis-1,2-Dichloroethylene	ND	70.0	0.5	2980	1,2-Dichloroethane	ND	5.0	0.5
2950	Trihalomethanes-Total	ND	80	0.5	2981	1,1,1-Trichloroethane	ND	200	0.5
2943	Bromodichloromethane	ND		0.5	2982	Carbon Tetrachloride	ND	5.0	0.5
2942	Bromoform	ND		0.5	2983	1,2-Dichloropropane	ND	5.0	0.5
2941	Chloroform	ND		0.5	2984	Trichloroethylene	ND	5.0	0.5
2944	Dibromochloromethane	ND		0.5	2985	1,1,2-Trichloroethane	ND	5.0	0.5
2955	Xylenes-Total	ND	10000	0.5	2987	Tetrachloroethylene	ND	5.0	0.5
2964	Dichloromethane	ND	5.0	0.5	2989	Monochlorobenzene	ND	100	0.5
2968	o-Dichlorobenzene	ND	600	0.5	2990	Benzene	ND	5.0	0.5
2969	p(1,4)-Dichlorobenzene	ND	75.0	0.5	2991	Toluene	ND	1000	0.5
2976	Vinyl Chloride	ND	2.0	0.5	2992	Ethylbenzene	ND	700	0.5
2977	1,1-Dichloroethylene	ND	7.0	0.5	2996	Styrene	ND	100	0.5

*Reported in ug/L unless otherwise noted, units differ for secondary MCLs depending on contaminant

ND = Not detected within sensitivity of instrument

Empty = No analysis performed for this contaminant

MDL = Method detection limit

MCL - Maximum Contaminant Level

VOC: Sub_Lab: Anatek Labs, Inc.

Comments:

Hayden Lake Irrigation Dist.

2160 W. Dakota
Hayden Lake, ID 83835



Laboratory Supervisor

Digitally signed by:
Walter Mueller

06/15/17

Lab EPA ID No.: ID00912	Lab Sample#: 182228
Date Received: 05/18/2017	Date Reported by Lab: 06/15/17
Compliance or Replacement Sample: Compliance	
Date Collected: 05/17/2017	Time Collected: 16:05
Sample Type: Plant Tap	
PWS No.: 1280087 RE	PWS Name: Hayden Lake Irrigation Dist.
Sample Location: Dakota Well # 1	
Collector: Branden Rose	Phone: (208) 772-2612

Laboratory Name:
Accurate Testing Labs, LLC
 7950 Meadowlark Way
 Coeur d'Alene, ID 83815
 Phone (208) 762 8378 Fax (208) 762 9082
 Web site: www.accuratetesting.com
 E-mail: info@accuratetesting.com

Lab Order No.: **2017050342**

Public Drinking Water System SYNTHETIC ORGANIC (SOC) ANALYSIS REPORT:

FRDS	Contaminant	Results ug/L	Method:	MCL*	MDL*	Analysis Date	Analyst:
2005	Endrin	ND	EPA 505	2.0	0.01	05/28/17	ANA
2010	Lindane	ND	EPA 505	0.2	0.02	05/28/17	ANA
2015	Methoxychlor	ND	EPA 505	40	0.1	05/28/17	ANA
2020	Toxaphene	ND	EPA 505	3.0	1.0	05/28/17	ANA
2031	Dalapon	ND	EPA 515.3	200	1	05/30/17	ANA
2032	Diquat	ND	EPA 549.2	20	0.4	05/25/17	ANA
2033	Endothall	ND	EPA 548.1	100	9	05/24/17	ANA
2034	Glyphosate	ND	EPA 547	700	6	05/25/17	ANA
2035	Di(2-ethylhexyl)adipate	ND	EPA 525.2	400	0.6	06/05/17	ANA
2036	Oxamyl	ND	EPA 531.2	200	2	05/22/17	ANA
2037	Simazine	ND	EPA 525.2	4.0	0.07	06/05/17	ANA
2040	Picloram	ND	EPA 515.3	500	0.1	05/30/17	ANA
2041	Dinoseb	ND	EPA 515.3	7.0	0.2	05/30/17	ANA
2042	Hexachlorocyclopentadiene	ND	EPA 525.2	50	0.1	06/05/17	ANA
2046	Carbofuran	ND	EPA 531.2	40	0.9	05/22/17	ANA
2050	Atrazine	ND	EPA 525.2	3.0	0.1	06/05/17	ANA
2051	Alachlor	ND	EPA 525.2	2.0	0.2	06/05/17	ANA
2065	Heptachlor	ND	EPA 505	0.4	0.04	05/28/17	ANA
2067	Heptachlor Epoxide	ND	EPA 505	0.2	0.02	05/28/17	ANA
2105	2,4-D	ND	EPA 515.3	70	0.1	05/30/17	ANA
2110	2,4,5-TP	ND	EPA 515.3	50	0.2	05/30/17	ANA
2274	Hexachlorobenzene	ND	EPA 525.2	1.0	0.1	06/05/17	ANA
2039	Di(2-ethylhexyl)phthalate	ND	EPA 525.2	6.0	0.6	06/05/17	ANA
2306	Benzo[a]pyrene	ND	EPA 525.2	0.2	0.02	06/05/17	ANA
2326	Pentachlorophenol	ND	EPA 515.3	1.0	0.04	05/30/17	ANA
2383	PCB's	ND	EPA 505	0.5	0.2	05/28/17	ANA
2931	Dibromochloropropane (DBCP)	ND	EPA 504.1	0.2	0.04	05/25/17	ANA
2946	Ethylene Dibromide (EDB)	ND	EPA 504.1	0.05	0.01	05/25/17	ANA
2959	Chlordane	ND	EPA 505	2.0	0.2	05/28/17	ANA

Hayden Lake Irrigation Dist.

2160 W. Dakota
 Hayden Lake, ID 83835



Laboratory Supervisor *Walter Mueller*

06/15/17

ND = Not detected within sensitivity of instrument
Empty = No analysis performed for this contaminant
MDL = Method detection limit
MCL - Maximum Contaminant Level
Sub_Lab: Anatek Labs, Inc.

Comments:

Hayden Lake Irrigation Dist.

2160 W. Dakota
Hayden Lake , ID 83835



Laboratory Supervisor *Walter Mueller*

06/15/17

Lab EPA ID No.: ID00912	Lab Sample#: 182229
Date Received: 05/18/2017	Date Reported by Lab: 06/22/17
Compliance or Replacement Sample: Compliance	
Date Collected: 05/17/2017	Time Collected: 16:05
Sample Type: Plant Tap	
PWS No.: 1280087 RE	PWS Name: Hayden Lake Irrigation Dist.
Sample Location: Dakota Well # 1	
Collector: Branden Rose	Phone: (208) 772-2612

Laboratory Name:

Accurate Testing Labs, LLC

7950 Meadowlark Way
Coeur d'Alene, ID 83815
Phone (208) 762 8378 Fax (208) 762 9082
Web site: www.accuratetesting.com
E-mail: info@accuratetesting.com

Lab Order No.: 2017050342 4

Public Drinking Water System RADIOLOGICAL ANALYSIS REPORT:

FRDS	Contaminant	Results	Units	MCL	MDL	Analysis Date	Analyst	Method
4020	Radium 226	0.332 +/-0.363	pCi/L	5	1	05/25/17	ANA	EPA 903.0
4030	Radium 228	0.535 +/-0.373	pCi/L	5	1	06/16/17	ANA	EPA 904.0
4002	Alpha Activity	0.500 +/-0.367	pCi/L	15	1	06/05/17	ANA	EPA 900.0
4006	Uranium, Natural	ND	ug/L	30	1	06/01/07	ANA	EPA 200.8

ND = Not detected within sensitivity of instrument
Empty = No analysis performed for this contaminant
MDL = Method detection limit
MCL - Maximum Contaminant Level
Sub_Lab: Anatek Labs

Hayden Lake Irrigation Dist.
Branden Rose
2160 W. Dakota
Hayden Lake, ID 83835



06/22/17

Laboratory Supervisor, Digitally signed by: Walter

If the concentration of dissolved solids exceeds 10,000 mg/L, another window will appear and prompt you for more information to calculate the Stiff Davis Index.

Information for Langelier's Index and Ryzner's Index

Temperature of solution: °C

Concentration of dissolved solids: mg/L

pH of the solution:

Calcium concentration: mg/L Ca⁺⁺

Total alkalinity: mg/L CaCO₃

Calculate

Next Sample

The Langelier Index is: -0.4210 The water is corrosive

The Ryzner Index is: 8.9420 The water is corrosive

The Stiff Davis Index is: N/A Not Calculated



APPROVED

AC

Accurate Testing Labs, LLC

7950 Meadowlark Way
Coeur d'Alene, ID 83815
Phone (208) 762 8378 Fax (208) 762 9082
info@accuratetesting.com www.accuratetesting.com

Certificate of Analysis

Order No.: **2017050342**

Page: 1 of 1

Branden Rose
Hayden Lake Irrigation Dist.
2160 W. Dakota
Hayden Lake, ID 83835

Description: Hayden Lake Irrigation Dist
Date Received: 05/18/2017 07:46

Sample: **6**
Location: Dakota Well # 1
Sample Type: Plant Tap

Matrix: Drinking Water
D/T Collected: 05/17/2017 16:00
Collected by: Branden Rose

Analyte	Result	Unit	Method	PQL	Analysis Date	Analyst
Calcium	21.5	mg/L	EPA 200.7	0.17	05/25/17	WM
Hardness, Total (as CaCO ₃)	4.57	GPG	SM 2340	0.02	05/25/17	WM
Iron	0.031	mg/L	EPA 200.7	0.015	05/25/17	WM
Magnesium	5.93	mg/L	EPA 200.7	0.03	05/25/17	WM
Manganese	ND	mg/L	EPA 200.7	0.01	05/25/17	WM
pH	8.1	pH Units	EPA 150.1		05/18/17	AC

Water quality parameters:

pH: Normal range: 6.5 - 8.5

Iron: Maximum contaminants level: 0.3 mg/L
Sources: Naturally occurring, corrosion of pipe
Adverse effects: Objectionable taste and odor, discolors laundry and fixtures

Manganese: Maximum contaminants level: 0.05 mg/L
Sources: Naturally occurring
Adverse effects: Objectionable taste and odor, discolors laundry and fixtures

Hardness: 1 - 3.5 slightly hard 7.0 -10.5 hard
3.5 - 7.0 moderately hard 10.5 - over very hard

If the RESULT is 'ND' (Not Detected) or 'Absent', that means the concentration is less than the PQL (Practical Quantitation Limit for this method).



Laboratory Supervisor, Digitally signed by: Walter Mueller Date: 06/22/17

Accurate Testing Labs, LLC

7950 Meadowlark Way
Coeur d'Alene, ID 83815
Phone (208) 762 8378 Fax (208) 762 9082
www.accuratetesting.com
info@accuratetesting.com

Certificate of Analysis

Order No.: 2017050342

Page: 1 of 1

Hayden Lake Irrigation Dist.
2160 W. Dakota
Hayden Lake , ID 83835

Project: Hayden Lake Irrigation Dist

Date Received: 05/18/2017 07:46

Sample: 7 Matrix: Drinking Water
Location: Dakota Well # 1 D/T Collected: 05/17/2017 16:00
Sample Type: Plant Tap Collected by: Branden Rose

Analyte	Result	Unit	Method	PQL	Analysis Date	Analyst
Surfactants	ND	mg/L	SM 5540C	0.05	05/19/17	ANA

If the RESULT is 'ND' (Not Detected) or 'Absent', that means the concentration is less than the PQL (Practical Quantitation Limit for this method).

Comments:



Laboratory Supervisor, Digitally signed by: Walter Mueller Date: 06/15/17

Appendix C

Well Record Drawings

HAYDEN LAKE IRRIGATION DISTRICT NEW DAKOTA WELL DRILLING PROJECT SEPTEMBER 2014

OWNER

HAYDEN LAKE
IRRIGATION DISTRICT

2160 W. DAKOTA
HAYDEN, ID 83835

CHAIRMAN: BIJAY ADAMS
BOARD MEMBERS: BRIAN EIFLER
BERT ROHRBACH
ADMINISTRATOR: ALAN MILLER



J-U-B ENGINEERS, INC.

7825 Meadowlark Way, Coeur d'Alene, ID 83815
p | 208 762 8787 f | 208 762 9797 w | www.jub.com

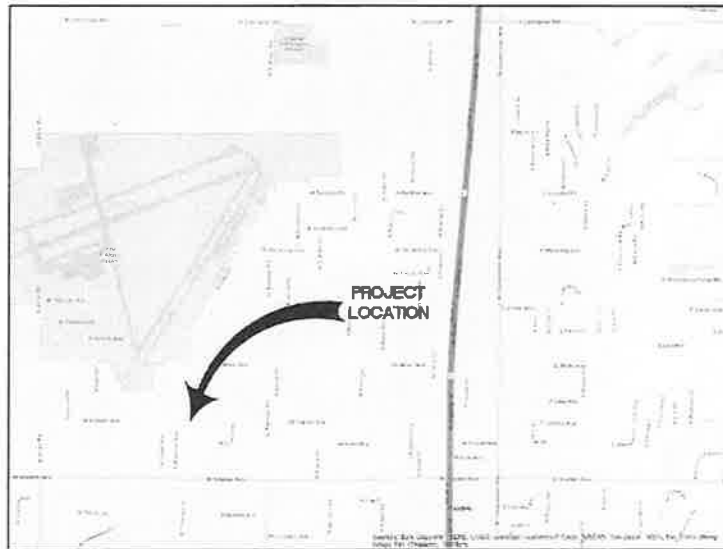
NOTICE AND DISCLAIMER

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VICINITY MAP
NOT TO SCALE

INDEX OF SHEETS

G-001-R COVER SHEET
C-101-R SITE PLAN AND DETAILS

RECORD

Michelle L. Johnson
6/23/17

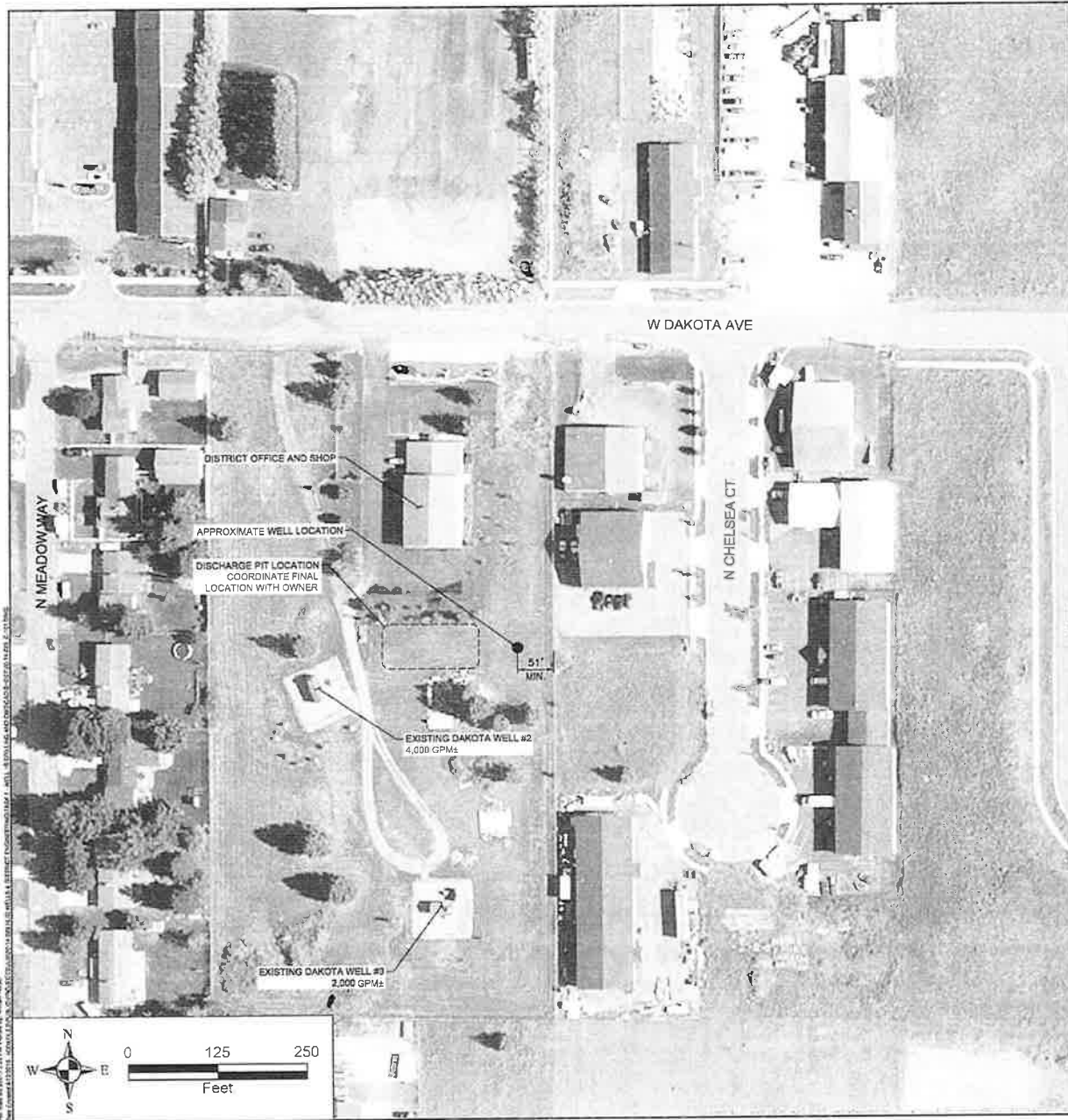
DRAWINGS

RECORD DRAWINGS

Michelle L. Johnson 6/23/17
MICHELLE L. JOHNSON DATE

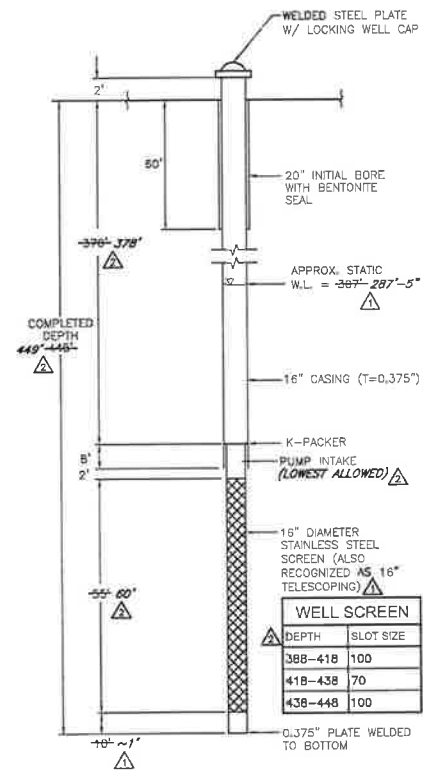
RECORD DRAWING CERTIFICATIONS

These Record Drawings represent the locations of improvements based on field observations made during construction and from information provided by others.



NOTES:

1. WELL CASING, SCREEN AND BLANK CASING LENGTHS AND LOCATIONS TO BE DETERMINED DURING CONSTRUCTION.
2. THE TOTAL DEPTH OF THE WELL AS SHOWN IS APPROXIMATE, IF INADEQUATE FORMATIONS ARE ENCOUNTERED THAT WILL NOT ALLOW THE DESIRED CAPACITY TO BE ACHIEVED, THE OWNER MAY ELECT TO DRILL DEEPER.
3. THE DEPTH OF THE SURFACE SEAL MAY BE ADJUSTED DURING CONSTRUCTION (MINIMUM 58 FEET).
4. THE CONTRACTOR MAY ELECT TO CONSTRUCT THE WELL WITHOUT UTILIZING TELESCOPING SCREENS AND BLANK CASING. THE CONTRACTOR MAY CONSTRUCT THE WELL UTILIZING A SINGLE CASING STRING.



NEW DAKOTA WELL DETAIL
NO SCALE



JUB ENGINEERS, INC.
7825 Meadowlark Way
Coeur d'Alene, ID 83815
Phone: 208.762.8787
Fax: 208.762.9797
www.jub.com

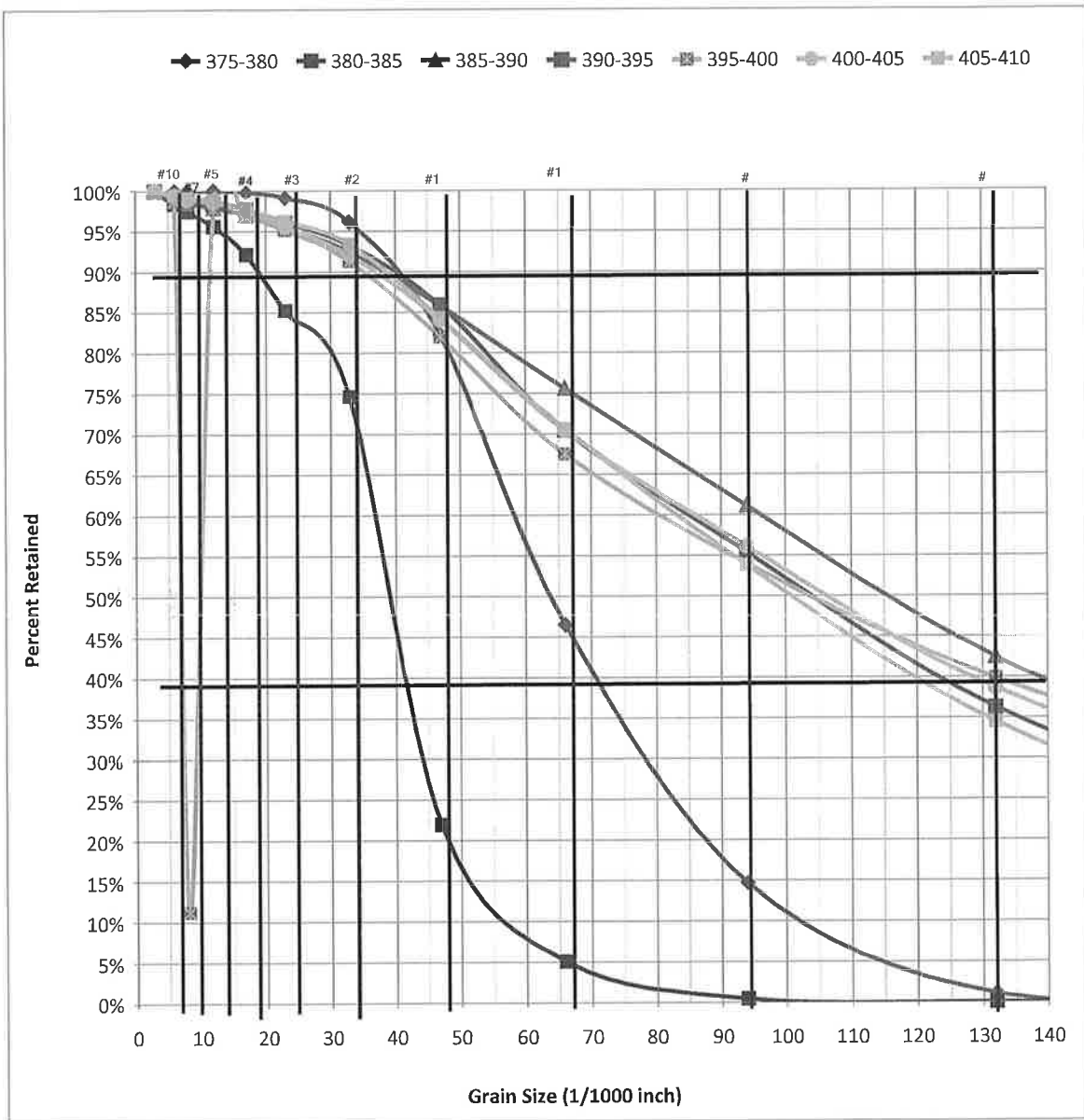


2014 MUNICIPAL WELL PROJECT
HAYDEN LAKE IRRIGATION DISTRICT
NEW DAKOTA WELL
SITE PLAN AND DETAILS

FILED	2014 APR 10
APPROVED BY	100-0000
DESIGNED BY	100-0000
CHECKED BY	100-0000
DATE	100-0000
PROJECT	100-0000
SHEET NUMBER	C-101-R

Appendix D

Sieve Analysis Report



Job Name
Location
Driller O'Keefe Drilling

Sample ID 101614-1
Analyzed by: Al Smith, 651-638-3160
Date: 10/16/2014

Casing ϕ 16"
Screen ϕ 16" Telescope Size

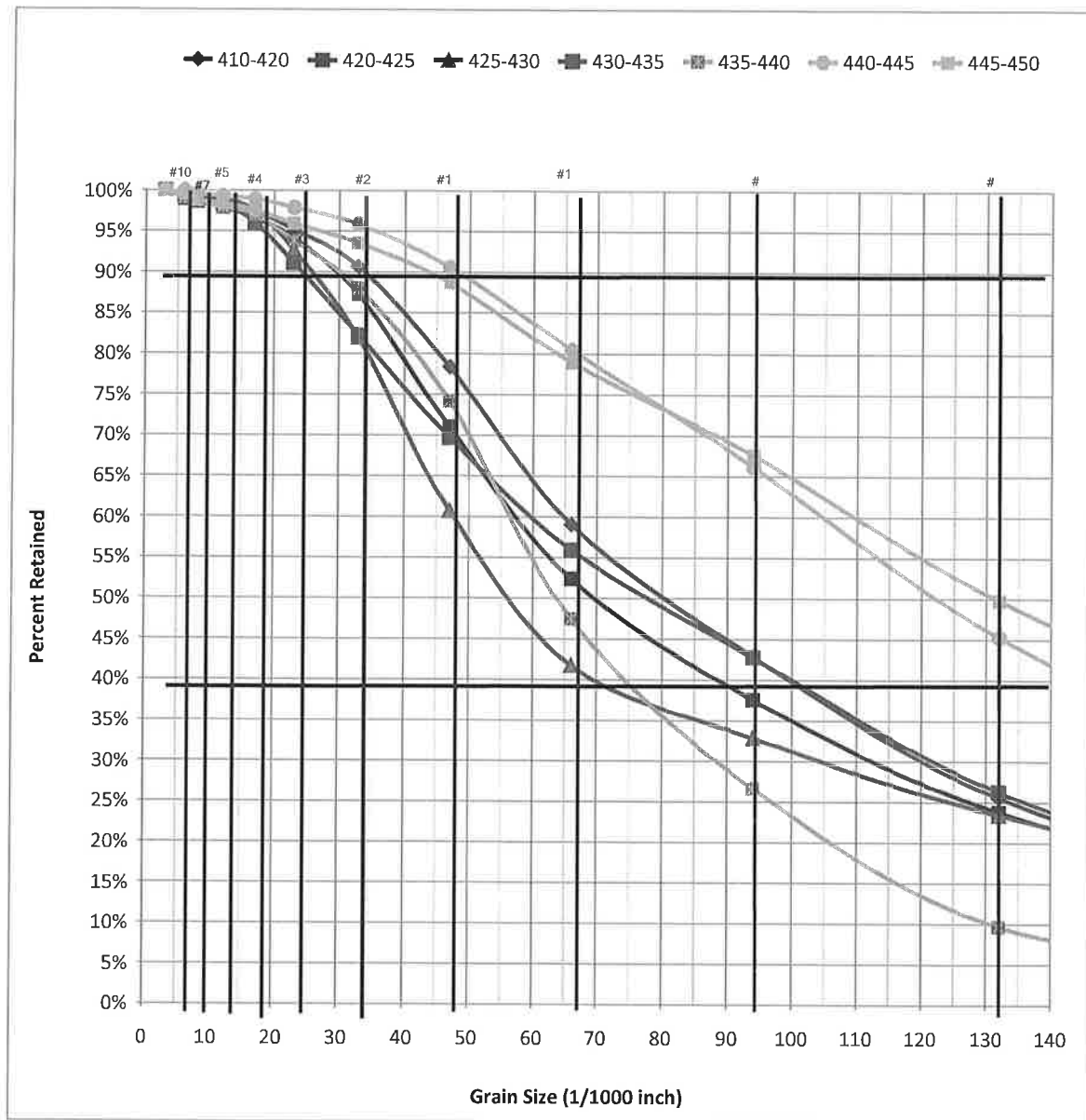
Yield 3000 GPM
SWL (ft)

Recommended Slot Size 100 Slot From 390' - 420', 80 Slot 420' - 450'

Based exclusively on the samples provided by the contractor, a sieve analysis graph and suggested screen slot size is provided as requested. Since numerous construction considerations and site circumstances influence successful well completion, Johnson Screens assumes no responsibility for final well performance nor awareness of local regulations pertaining to well installations.

#NAME?

Send Samples to 1950 Old Highway 8, New Brighton, MN 55112



Job Name
Location
Driller O'Keefe Drilling

Sample ID 101614-1
Analyzed by: Al Smith, 651-638-3160
Date: 10/16/2014

Casing ϕ 16"
Screen ϕ 16" Telescope Size

Yield 3000 GPM
SWL (ft)

Recommended Slot Size 100 Slot From 390' - 420', 80 Slot 420' - 450'

Based exclusively on the samples provided by the contractor, a sieve analysis graph and suggested screen slot size is provided as requested. Since numerous construction considerations and site circumstances influence successful well completion, Johnson Screens assumes no responsibility for final well performance nor awareness of local regulations pertaining to well installations.

#NAME?

Send Samples to 1950 Old Highway 8, New Brighton, MN 55112

Hayden Lake Irrigation District
Dakota Well No. 1 - Screen Capacity

Slot Size	Opening size (thousands of an inch)	Screen Diameter - Telescoping (in)	Capacity per foot of screen (gpm/ft)	Length of screen (ft)	Capacity of Screen (gpm)
70	168.5	16	52.235	20	1,045
100	213	16	66.03	40	2,641
					3,686

JOHNSON SCREENS LARGE DIAMETER FREE-FLOW SCREENS: SIZES 6P - 16T

Size In.	Max Depth: ft	OD: In.	ID: In.	Weight ¹ : lbs/ft	Recom. Hang Weight ² : lbs	Collapse Strength ¹ : PSI	Intake Area ³ - In ² /ft of Screen							
							Screen Slot Size in Thousandths of an Inch							
							10	20	30	40	50	60	80	100
6" P	100	6.5	6.0	4.4	4,300	87	35	61	82	98	111	123	140	153
	250	6.6	6.0	4.8	4,300	194	20	37	51	64	73	85	102	115
	500	6.7	5.9	6.0	8,800	185	20	37	52	65	76	86	103	117
	1,000	6.8	5.9	7.6	8,800	677	18	30	43	54	64	73	89	103
8" T	250	7.6	6.7	7.0	11,000	127	23	42	59	73	86	98	117	133
	1,000	7.7	6.7	8.9	11,000	468	18	34	48	61	73	83	101	116
8" P	250	8.7	7.9	7.9	12,100	85	26	48	67	84	99	112	134	152
	1,000	8.8	7.9	10.1	20,800	314	21	39	55	70	83	95	115	133
10" T	250	9.5	8.6	8.3	12,100	65	28	53	74	92	108	122	146	166
	1,000	9.6	8.6	10.7	12,100	242	23	43	60	76	90	103	126	145
10" P	600	10.8	9.8	12.6	15,400	170	25	48	68	86	102	116	142	163
	1,000	10.8	9.8	17.8	15,400	226	25	48	68	86	102	116	142	163
12" T	600	11.4	10.4	13.6	17,600	146	27	51	72	90	107	123	149	172
	1,000	11.4	10.4	19.0	17,600	192	27	51	72	90	107	123	149	172
12" P	250	12.8	11.8	14.8	17,600	103	30	57	80	102	121	138	168	193
	600	12.8	11.8	20.9	17,600	136	30	57	80	102	121	138	168	193
	1,000	12.9	11.8	25.2	17,600	193	29	55	78	98	117	134	163	188
14" T	250	12.6	11.6	13.6	14,300	108	30	56	79	100	119	136	165	190
	600	12.6	11.6	19.6	14,300	143	30	56	79	100	119	136	165	190
	1,000	12.6	11.6	24.0	14,300	207	28	53	76	96	114	131	160	184
14" P / 16" T	250	14.1	13.1	15.6	17,100	77	33	63	89	112	133	152	185	213
	600	14.1	13.1	22.2	17,100	102	33	63	89	112	133	152	185	213
	1,000	14.1	13.1	27.2	17,100	148	32	60	85	107	128	146	179	206

NOTES:

- Screens are available in up to 40 foot lengths of continuously wrapped screen with no mid-weld
- 316 stainless steel screen technical information is available upon request
- P - pipe size, T - telescope

1. Based on 0.030 In. slot size (collapse values contain no safety factor)
2. Recommended hang weight is 50 percent of the calculated tensile strength
3. Transmitting capacity in gpm/ft of screen = $\text{open area} \times 0.31$



Telescope size screens (left) install through the casing and usually have a Figure K packer as upper fitting. Pipe size screens (right) usually have weld rings at each end and attach directly to the casing.

Hayden Lake Irrigation District Water System Facility Plan



September 2019

Table 2-8 – J-U-B Fire Hydrant Testing Summary (September 2017)

Date	Location	Static (psi)	Residual (psi)	Flow (gpm)
09-05-2017	Wyoming Avenue & Cutlass Street	64	50	2,431
09-05-2017	Hayden Avenue & Access Road to K-9 Grooming	70	63	2,877
09-05-2017	Orange Blossom & Orchard Avenue	68	56	2,877
09-05-2017	Navion Drive & Dakota Avenue	68	44	2,431
09-05-2017	Broadmore Court	66	58	3,170
09-05-2017	Timberlake Loop	74	60	3,262

Table 2-9 – District Fire Hydrant Testing Summary (September 2017)

Date	Location	Static (psi)	Residual (psi)	Flow (gpm)
09-06-2017	Wyoming Avenue & Cutlass Street	68	52	2,431
09-06-2017	Hayden Avenue & Access Road to K-9 Grooming	68	64	2,877
09-06-2017	Getty Avenue & Orchard Avenue	68	60	3,075
09-06-2017	Navion Drive & Dakota Avenue	68	50	2,550
09-06-2017	Broadmore Court	66	54	3,027
09-06-2017	Timberlake Loop	74	58	3,216

2.4 Distribution System

Subsequent sections discuss the physical components of the District's existing water system. Detailed maps showing the location of supply, storage, and distribution components of the system are included **Appendix A-1**.

2.4.1 Water Rights

The Idaho Department of Water Resources (IDWR) administers water rights allocation in the State of Idaho. A water right is the right to divert the public waters of the State of Idaho and put them to a beneficial use, in accordance with the holder's priority date. The priority date is the date in which the water right was established. This date is important because the oldest water rights have priority for water when there is a shortage. This type of water right is based on the "appropriation doctrine" that the State of Idaho has adopted. Under Idaho's beneficial use requirement, a water right may be lost if it is not used to benefit the holder for a continuous five-year period. Copies of both of the District's water rights are located in **Appendix C** with a summary in **Table 2-10**.

Summary of Water Rights - The District currently has two active water rights described below:

- **98-7800** - The District's first water right has a priority date of November 16, 1977. Well #1 is located on the southwest corner of Lacey Avenue and US-95 (northeast ¼ of northeast ¼ of Section 14) and is the point of diversion for this water right. The allowed diversion rate for this water right is 3.8 cubic feet per second (cfs) or 1,705 gallons per minute (gpm).

- **98-8581** - The District's second water right has a priority date of April 25, 1988 and is located just south of Dakota Avenue, between Atlas Road and Ramsey Road in the southwest ¼ of the southeast ¼ of Section 15. Wells #2 and #3 are two points of diversion for the same water right, which have an allowed diversion rate of 12.92 cfs or 5,798 gpm. The beneficial water uses that are listed for the two Dakota wells are irrigation, fire protection, stock water, commercial, municipal, and domestic. These same uses are listed for Well #1 with the exception of fire protection.

Summary of Water Rights Adjudication Recommended/Claim – In addition to the Water Rights described above, the District currently has four active Water Rights Adjudication Recommended/Claim. The Water Rights Adjudication Recommended/Claims are described below:

- **95-9242** – This water right adjudication recommendation/claim has a priority date of March 9, 1966. The Adjudication Recommendation/Claim allows for the District to divert up to 1.26 cfs from four locations (generally referred to as the District's Larix Well, Dakota Well Field (two points of diversion, and the Lacey Well Field) yearly into the District boundary for distribution of municipal beneficial use to the service area of Hayden Lake Irrigation District.
- **95-8269** - This water right adjudication recommendation/claim has a priority date of March 11, 1983. The Adjudication Recommendation/Claim allows for the District to divert up to 1.56 cfs from one location (generally referred to as the District's Carrington Well No. 5) seasonally from March 15 to November 15 into a portion of the District service boundary (78 acres) for distribution of irrigation water.
- **95-8273** – This water right adjudication recommendation/claim has a priority date of March 16, 1966. The Adjudication Recommendation/Claim allows for the District to divert up to 2.0 cfs from four locations (generally referred to as the District's Larix Well, Dakota Well Field (two points of diversion, and the Lacey Well Field) yearly into the District boundary for distribution of municipal beneficial use to the service area of Hayden Lake Irrigation District. The licensed diversion capacity, however, is limited to 3.12 cfs when combined with 95-8279, described below.
- **95-8279** – This water right adjudication recommendation/claim has a priority date of March 16, 1966. The Adjudication Recommendation/Claim allows for the District to divert up to 3.0 cfs from four locations (generally referred to as the District's Larix Well, Dakota Well Field (two points of diversion, and the Lacey Well Field) yearly into the District boundary for distribution of municipal beneficial use to the service area of Hayden Lake Irrigation District. The licensed diversion capacity, however, is limited to 3.12 cfs when combined with 95-8273, described above.

Summary of Water Permits – In addition to the Water Rights described above, HLID currently has two active Water Permits. The Water Permits are described below:

- **95-9212** – This water permit has a priority date of August 7, 2002. The water permit allows for the District to divert up to 1.34 cfs from six locations (generally referred to as the District's Larix Well, Dakota Well Field [two points of diversion], and the Lacey Well Field [two points of diversion] and the Carrington Well No. 5 well site) yearly into the District boundary for distribution of municipal beneficial use to the service area of Hayden Lake Irrigation District. The permit has a Proof Due Date of May 1, 2020. There are several conditions of approval associated with this permit, summarized in **Appendix C**.
- **95-16962** – This water permit has a priority date of December 23, 2014. The water permit allows for the District to divert up to 5.0 cfs from five locations (generally referred to as the District's

Larix Well, Dakota Well Field [two points of diversion], and the Lacey Well Field [two points of diversion] and the Carrington Well No. 5 well site) yearly into the District boundary for distribution of municipal beneficial use to the service area of Hayden Lake Irrigation District. The permit has a Proof Due Date of February 1, 2020. There are several conditions of approval associated with this permit, summarized in **Appendix C**.

Table 2-10 – HLID Water Rights Summary

Water Right	Adjudication Recommended / Claim	Water Right Permit	IDWR No.	Status	Priority Date	Div. Rate	Water Use	Notes
	✓		95-9242	Active	3/9/1966	1.26 cfs (371 AF/acre/year)	MUNICIPAL	Heath transferred H2O right
✓	✓		95-7800	Active	11/16/1977	3.8 cfs (2,751.0 AF/acre/year)	MUNICIPAL	
✓	✓		95-8581	Active	4/25/1988	12.92 cfs (4,537 AF/acre/year)	IRRIGATION, MUNICIPAL	
	✓		95-8269	Active	3/11/1983	1.56 cfs (273.0 AF/acre/year)	IRRIGATION	Armstrong transferred water right is currently irrigation only, seasonal. The approximate value when irrigation water right is transferred to municipal water right is calculated by 1.56 cfs X 60% = 0.936 cfs
	✓		95-8273	Active	3/16/1983	0.12 cfs	MUNICIPAL	Armstrong transferred water rights of 2 cfs, however HLID is limited to 3.2 cfs combined with 92-8279 below
	✓		95-8279	Active	4/1/1983	3 cfs	MUNICIPAL	Armstrong transferred water rights of 3 cfs, however HLID is limited to 3.2 cfs combined with 92-8279 above
		✓	95-9212	Active	8/7/2002	1.34 cfs (2,751.0 AF/acre/year)	MUNICIPAL	Have until 2020 to develop
		✓	95-16962	Active	12/23/2014	5 cfs	MUNICIPAL	Have until 2020 to develop
TOTAL INCLUDING FULL IRRIGATION RIGHT BUT NO 2020 RIGHTS						22.66 cfs	IRRIGATION, MUNICIPAL	
TOTAL INCLUDING FULL IRRIGATION AND 2020 RIGHTS						29.00 cfs	IRRIGATION, MUNICIPAL	
TOTAL MUNICIPAL 2020 RIGHTS (IRRIGATION RIGHT 95-8269 NOT INCLUDED)						27.44 cfs	MUNICIPAL	Approx. value if irrigation water right 95-8269 is transferred to municipal at 0.936 cfs.

2.4.2 Source

All of the District's wells draw water from the Spokane Valley-Rathdrum Prairie Aquifer (SVRPA). The aquifer was designated as a "Sole-Source Aquifer" by the Environmental Protection Agency in 1978. The aquifer is supplied by several large surface water sources including Lake Coeur d'Alene, the Spokane River, Lake Pend Oreille, and Hayden Lake. Other small lake watersheds such as Hauser, Spirit, and Twin supply the balance of the surface water input to the aquifer. The Panhandle Health District estimates that precipitation supplies the aquifer with one third of its water (2000).

The SVRPA is comprised of a thin layer of soil overlaying 200 to 400 feet of coarse sands and gravels. The alluvial material was deposited by Ice Age floods from Glacial Lake Missoula about 12,000 years ago. The depth to groundwater in the District is approximately 300 feet and consistent to within about 20 feet at any given time.

The SVRPA provides excellent water quality for the District and surrounding water purveyors. The District regularly monitors water quality within the system. No treatment is required for the District at this time.

2.4.2.1 Existing Operations

The District has five active well sources on three well sites and one well currently under HLID ownership for future use (Carrington Well No. 5). All wells draw water from the Rathdrum Prairie Aquifer. Well construction information from the driller's logs, hydrogeological reports, and the 2016 Drinking Water Supply Report (DEQ) are listed in **Table 2-11**, well logs are included in **Appendix D**.

Table 2-11 – HLID Well Construction Information

Well	Total Well Depth (ft)	Static Water Level (ft)	Screen Depth From/To (ft) (ft)		Well Seal Depth (ft)	Casing Depth (ft)	Casing Diameter (inch)	Capacity (gpm)	Backup Power Generation
Lacey	440	313	341	419	100	422	20	1,800	Yes
Larix	372	302	346	372	20	346	16	1,800	Yes
Dakota No. 1	449	287	388	448	60	387	16	1,800	Yes, effective fall 2018
Dakota No. 2	450	305	389	445	20	393	20	3,600	No
Dakota No. 3	415	307	359	410	20	362	16	1,800	Yes
Carrington No. 5 (Future Well)	363	285	333	363	Not Available	333	16	NA	NA

The Lacey Well

The Lacey Well utilizes a Western Land Roller pump that was installed in 1982. This pump has a 300-horsepower motor with a 7-stage bowl assembly, and is rated to operate against a head of 525 feet. The line shaft bearings are lubricated by a food grade mineral oil drip tube. This pump is also equipped with a Safronics soft start, while using the original starter as a bypass. The well house is in fair condition, but space within the facility is limited, making it difficult to access some of the electrical

components located in the building. Avista Utilities provides 480-volt overhead electrical service to the Lacey Well. The well house is also equipped with a diesel generator so that the pump can still operate during a power outage.

The District anticipates an additional future well to be constructed at this site to support growth.

Dakota Well No. 1

Dakota Well 1 utilizes a General Electric premium efficiency motor, inverter-duty type that is rated at 300 hp for 460-volt, three-phase electrical power supply (Model 5KS447DAJ6029). The motor drives an American Marsh (Model 14LC-6 VT) six stage, line-shaft, vertical turbine pump with 367-feet of 10-inch steel column discharge pipe. The pump motor operates with a Square D/Schneider Electric (Model ATV630) variable frequency drive controller to provide variable flow and pressure that, in conjunction with the other District wells, matches the distribution system needs at any given time. Dakota Well No. 1 is located just south of the District's office on Dakota Avenue.

Dakota Well No. 2

Dakota Well 2 utilizes a Worthington pump with a 600-horsepower motor and a 7-stage bowl assembly. It is rated to operate against a head of 478 feet. Line shaft bearings receive system water pre-lubrication and product water lubrication during operation. The pump is equipped with an Allen-Bradley soft start with no bypass. The well house that serves Dakota Well 2 is located approximately 200 feet north of Dakota Well 3, located at the District's office on Dakota Avenue. A Worthington pump is also installed in Dakota 3.

Dakota Well No. 3

Dakota Well 3 utilizes a Worthington pump with a 300-horsepower motor with a 5-stage bowl assembly, and is capable of operating against a head of 495 feet. Line shaft bearings receive system water pre-lubrication and produce water lubrication during operation. The well house that serves Dakota 3 is located approximately 200 feet south of Dakota 3 located at the District's Office on Dakota Avenue. Dakota 3 is equipped with a Caterpillar generator similar to that at the Lacey Well. The District rebuilt the pump and motor bearings in Dakota 3 in the spring of 2000. The work completed at that time may account for the high pump system efficiency in Dakota 3.

Larix Well No. 4

The Larix Well was upgraded during the winter of 2017 through summer of 2018. The upgrade doubled the Larix Well pumping capacity. The upgraded Larix Well utilizes a General Electric premium efficiency motor, inverter-duty type that is rated at 300 hp for 460-volt, three-phase electrical power supply. The motor drives an America Marsh six stage, line-shaft, vertical turbine pump with 260- feet of 10-inch stainless steel column discharge pipe. The pump motor operates with a variable frequency drive controller to provide variable flow and pressure that, in conjunction with the four other District wells, matches the distribution system needs at any given time. The Larix Well is located in Sunshine Meadows at 2626 W. Larix Court in the City of Coeur d'Alene, Idaho.

Carrington Well No. 5

The District currently has a water right that expires in 2020 for the purposes of providing irrigation water for 78 acres in the district service area. The District is currently in the design phase to convert the existing irrigation well to a municipal well site. The existing well, also referred to as the Carrington well, is located in the west of Atlas Road and north of Hayden Avenue.

System Operations and Existing Pressures

The District's pumps operate in response to floats located in the reservoir outside of the District's boundary. Due to the flat terrain, the District has a single pressure zone controlled by the existing tank. Because of the small storage volume and high system demands during max day and peak hour, the District operates the tank level in a tight band at all times such that the systems pressures remain between 60 and 80 psi throughout the day. **Appendix A-2** shows system pressures, on a 24-hour basis, during maximum demand.

The District has three timeframes in which different pump operation patterns occur. The three timeframes are as follows:

- Morning Peak (3:00 a.m. to 9:00 a.m.)
- Evening Peak (9:00 a.m. to 6:00 p.m.)
- Night Operations (6:00 p.m. to 3:00 a.m.)

The District adjusts each timeframe pump operation pattern to account for the large fluctuation of water use throughout the day. The goal for the District's operating pattern is to run no more than four pumps at a time while keeping the tank level around 17.0 feet. Because the demand in the District is highly volatile and storage is minimal, the District has the ability to adjust pump start and stop levels easily. **Table 2-12** shows the pump operation patterns for summer of 2018.

Table 2-12– Summer 2018 Pump Operation Set Points

Pump	3:00 AM to 9:00 AM		9:00 AM to 6:00 PM		6:00 PM to 3:00 AM	
	Start (ft)	Stop (ft)	Start (ft)	Stop (ft)	Start (ft)	Stop (ft)
Lacey	9.0	19.0	9.0	18.5	10.0	19.0
Larix	6.5	17.0	6.5	17.0	9.0	17.0
Dakota No. 1	10.0	20.0	10.0	19.0	10.0	19.5
Dakota No. 2	8.0	17.0	12.0	20.0	9.0	18.0
Dakota No. 3	11.0	18.0	11.0	18.0	12.0	19.5

During the winter months, the District produces an average 4.89 million gallons per day. Because the water consumption rate is much lower, the District historically only needed to operate the Larix Well. The Larix Well operates continuously on a VFD matching the demand, while maintaining a system-wide pressure of 70.5 psi and tank level of 15.5 feet.

An existing pump station and intake is located at Hayden Lake that was used to serve the water system in its early years. This station was utilized from about 1957 until 1989. This surface water source was chlorinated, and then delivered directly to the distribution system. The water main from the lake pumps is still connected to the storage tank, however it is isolated from the system with closed valves. Recently

the District transferred the water right for the lake source to the Dalton Irrigation District, since the Hayden Lake Irrigation District no longer has a need for the lake water.

2.4.2.2 Observed Deficiencies

- The total supply capacity of the system with the largest well out of service (Dakota Well No. 2) is 7,200 gpm. The peak hour flow during the summer months is 11,040 gpm shown in **Table 2-4**. The existing supply (with the largest source out of service) is not currently able to support the growth the District is expecting.
- Total system supply is 10,800 gpm which is less than the 2017 peak hour demand (PHD) of 11,040 as noted in **Table 2-4**. During the summer of 2018, the District invoked mandatory odd-even watering days in order to sustain peak hour demands until additional supply is online.
- The supply for the District is centrally located, but growth for the District is expected on the West side.

2.4.3 Storage

2.4.3.1 Existing Operations

The District has one elevated steel reservoir with a capacity of 75,000 gallons that the Bureau built in 1955. The reservoir is located on the east side of the intersection of Lacey Avenue and Strahorn Road in the City of Hayden Lake. It connects to the system by a 27-inch reinforced concrete cylinder pipe. The reservoir support legs are located at an elevation of 2,302 feet above mean sea level according to the 1958 Bureau of Reclamation as-built drawings. The base of the storage portion of the tank is located at an elevation of 2,438 feet. The top of the tank is at an elevation of approximately 2,460 feet.

Components of finished water storage, as defined by the Idaho Administrative Code (IDAPA) 58.01.08, for the District are summarized below.

1. Dead Storage – Storage that is either not available for use in the system or can provide only substandard flows and pressures. All of the District's storage is available for use in the system to provide adequate flows and pressures. Therefore, the District does not need to account for any Dead Storage.
2. Effective Storage – Storage other than dead storage, including operational, equalization, fire suppression, and standby.
3. Operational Storage – Storage that supplies water when, under normal operating conditions, the sources are off. This component is the larger of 1) the volume required to prevent excess pump cycling and to ensure that the Equalization Storage, Fire Suppression Storage, and Standby Storage components are full and ready for use when needed or 2) the volume needed to compensate for the sensitivity of the water level sensors.
 - a. The District does not need to account for any operational storage because the system is continuously pumping.
4. Equalization Storage – Storage required to compensate for the difference between a water system's maximum firm supply capacity and peak hour demand. Peak hour demand is estimated at 2.45 times the average day production based on diurnal information calculated from August 2017 data (reference **Table 2-4**). The District's firm supply capacity (i.e., capacity with the largest