

RECEIVED**AUG 29 2012**Department of Water Resources
Eastern RegionSTATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
APPLICATION FOR PERMITIdent. No. 35-14283

To appropriate the public waters of the State of Idaho

Idaho Falls School District 91 (208) 525-7500
 1. Name of Applicant Attn: W. Kevin Klingler, Director of Operations Phone (208) 525-7585 x 50286
 Name connector (check one): ☐ and ☐ or ☒ and/or

Mailing address 690 John Adams Parkway City Idaho Falls
 State Idaho Zip 83401 Email klinkevi@dg1.k12.id.us
 c/o Keith C. Wilson Rocky Mountain Environmental Associates, Inc. Email kwilson@rockymountainenvironmental.com
 482 Constitution Way, Ste 303, Idaho Falls ID 83402 (208) 524-2353 Fax 208) 524-1795

2. Source of water supply Ground Water which is a tributary of _____

3. Location of point of diversion:

Twp	Rge	Sec	Govt Lot	1/4	1/4	1/4	County	Source	Local Name or tag #
2N	37E	23			SW	NE	Bonneville	Ground Water	Ethel Boyes School

4. Water will be used for the following purposes:

Amount 1.34 cfs for Heating purposes from 01/01 to 12/31 (both dates inclusive)
 (cfs or acre-feet per year)

Amount 1.34 cfs for Cooling purposes from 01/01 to 12/31 (both dates inclusive)
 (cfs or acre-feet per year)

Amount _____ for _____ purposes from _____ to _____ (both dates inclusive)
 (cfs or acre-feet per year)

5. Total quantity to be appropriated is (a) 1.34 cubic feet per second (cfs) and/or (b) _____ Acre-feet per year (af)

6. Proposed diverting works:

a. Describe type and size of devices used to divert water from the source Production well pump mainline to Heat Exchanger to Injection well for a closed loop heat pump system.

b. Height of storage dam _____ feet; active reservoir capacity _____ acre-feet; total reservoir capacity _____ acre-feet. If the reservoir will be filled more than once each year, describe the refill plan in item 11
 For dams 10 feet or more in height OR reservoirs with a total storage capacity of 50 acre-feet or more, submit a separate Application for Construction or Enlargement of a New or Existing Dam. Application required? ☐ Yes ☐ No

c. Proposed well diameter is 10 inches; proposed depth of well is 285 feet.

d. Is ground water with a temperature of greater than 85°F being sought? ☐ Yes ☒ No

e. If well is already drilled, when? _____; drilling firm _____
 Well was drilled for (well owner) _____; Drilling Permit No. _____

7. Description of proposed uses (if irrigation only, go to item 8):

a. Hydropower; show total feet of head and proposed capacity in kW. _____

b. Stockwatering; list number and kind of livestock. _____

c. Municipal; show name of municipality or the applicant's qualifications as a municipal provider. _____

d. Domestic; show number of households. _____

e. Other; describe fully. Closed Loop Heat Pump System for Heating & Cooling for District 91, Ethel Boyes School,
Located at: 1875 Brentwood Drive, Idaho Falls, Id 83402

8. Description of place of use:

- a. If water is for irrigation, indicate acreage in each subdivision in the tabulation below.
- b. If water is used for other purposes, place a symbol of the use (example: *D* for Domestic) in the corresponding place of use below. See instructions for standard symbols.

Twp	Rge	Sec	NE ¼				NW ¼				SW ¼				SE ¼				Totals
			NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	NE	NW	SW	SE	
2N	37E	23			C/L														

Total Number of acres to be irrigated _____

9. Describe any other water rights used for the same purposes as described above. Include water delivered by a municipality, canal company, or irrigation district. If this application is for domestic purposes, do you intend to use this water, water from another source, or both, to irrigate your lawn, garden, and/or landscaping?

N/A

10. a. Who owns the property at the point of diversion? Applicant
- b. Who owns the land to be irrigated or place of use? Applicant
- c. If the property is owned by a person other than the applicant, describe the arrangement enabling the applicant to make this filing: _____

11. Describe your proposal in narrative form, and provide additional explanation for any of the items above. Attach additional pages if necessary. Proposed project is for a heat pump system on a closed-loop to a heat exchanger for heating and cooling of Ethel Boyes School. Water will be diverted from the supply well through the closed-loop heat exchanger and then into the injection well. Both supply and Injection wells are located in the SW¼NE¼ Sec 23, T2N, R37E. This permit application is for Non-Consumptive Use.

12. Time required for completion of works and application of water to proposed beneficial use is 3 years (minimum 1 year).

13. **MAP OF PROPOSED PROJECT REQUIRED** - Attach an 8½"x11" map clearly identifying the proposed point of diversion, place of use, section #, township & range. A photocopy of a USGS 7.5 minute topographic quadrangle map is preferred.

The information contained in this application is true to the best of my knowledge. I understand that any willful misrepresentations made in this application may result in rejection of the application or cancellation of an approval.

W. Kevin Klingler
Signature of Applicant

Signature of Applicant

W. Kevin Klingler, Director of Operations
Print Name (and title, if applicable)

Print Name (and title, if applicable)

For Department Use:

Received by _____ Date _____ Time _____ Preliminary check by _____

Fee \$ _____ Receipted by _____ Receipt No. E037991 Date 9-7-12



Idaho Department of Water Resources

Application

35-14283

Cooling/Heating

● Point of Diversion

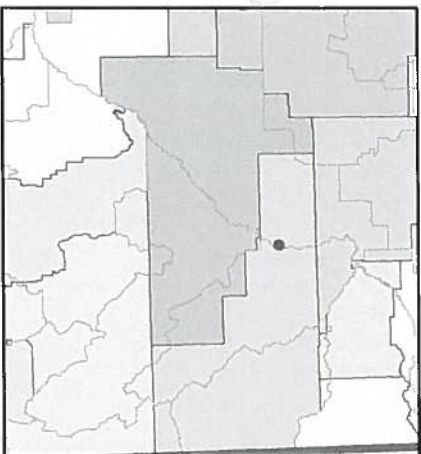
□ Place of Use

□ State Outline

□ Townships

□ PLS Sections

□ Quarter Quarters



Bonneville County

IDWR Basin 35

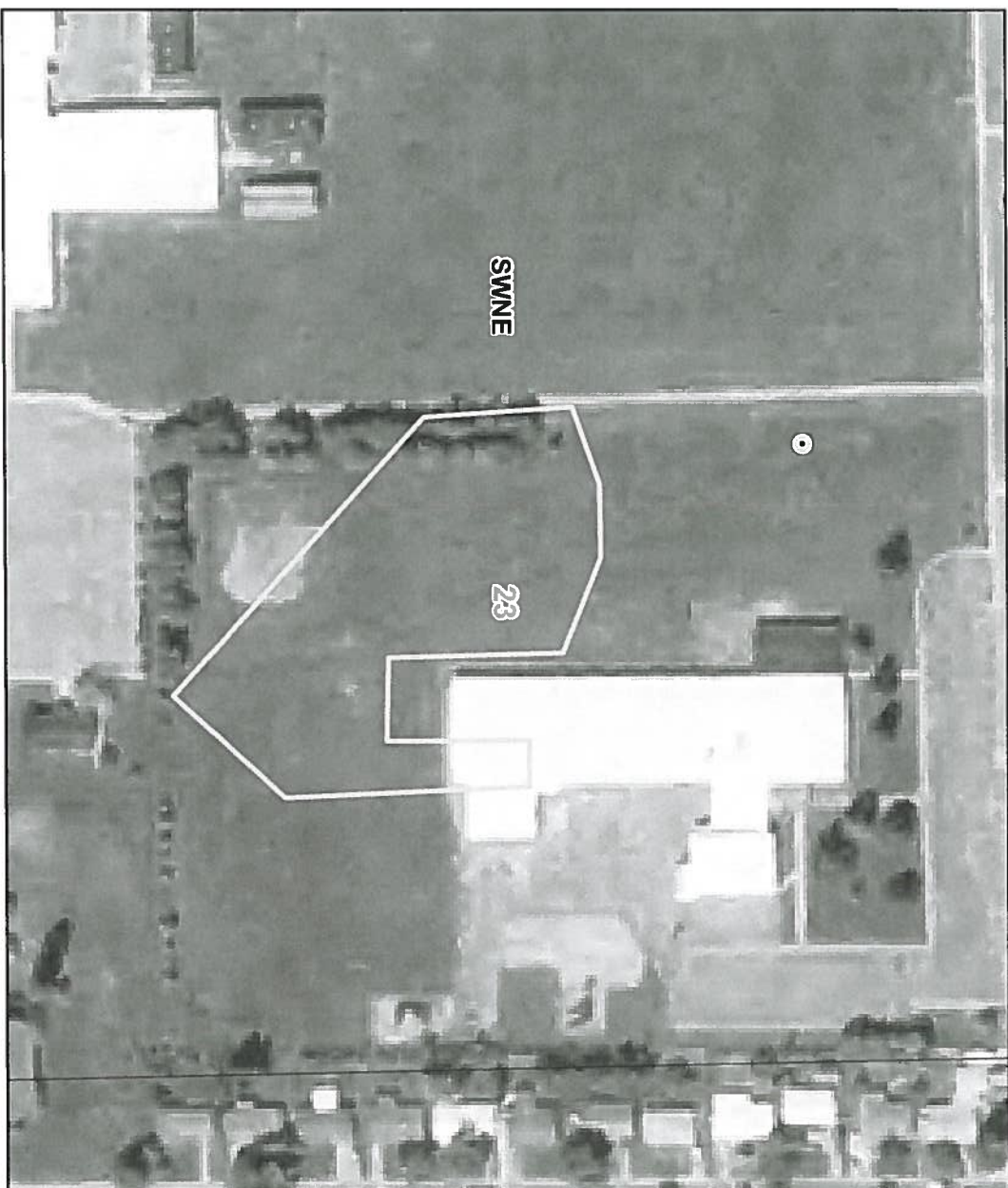
Prepared by Kidman, Denise

2009 Aerial Photography



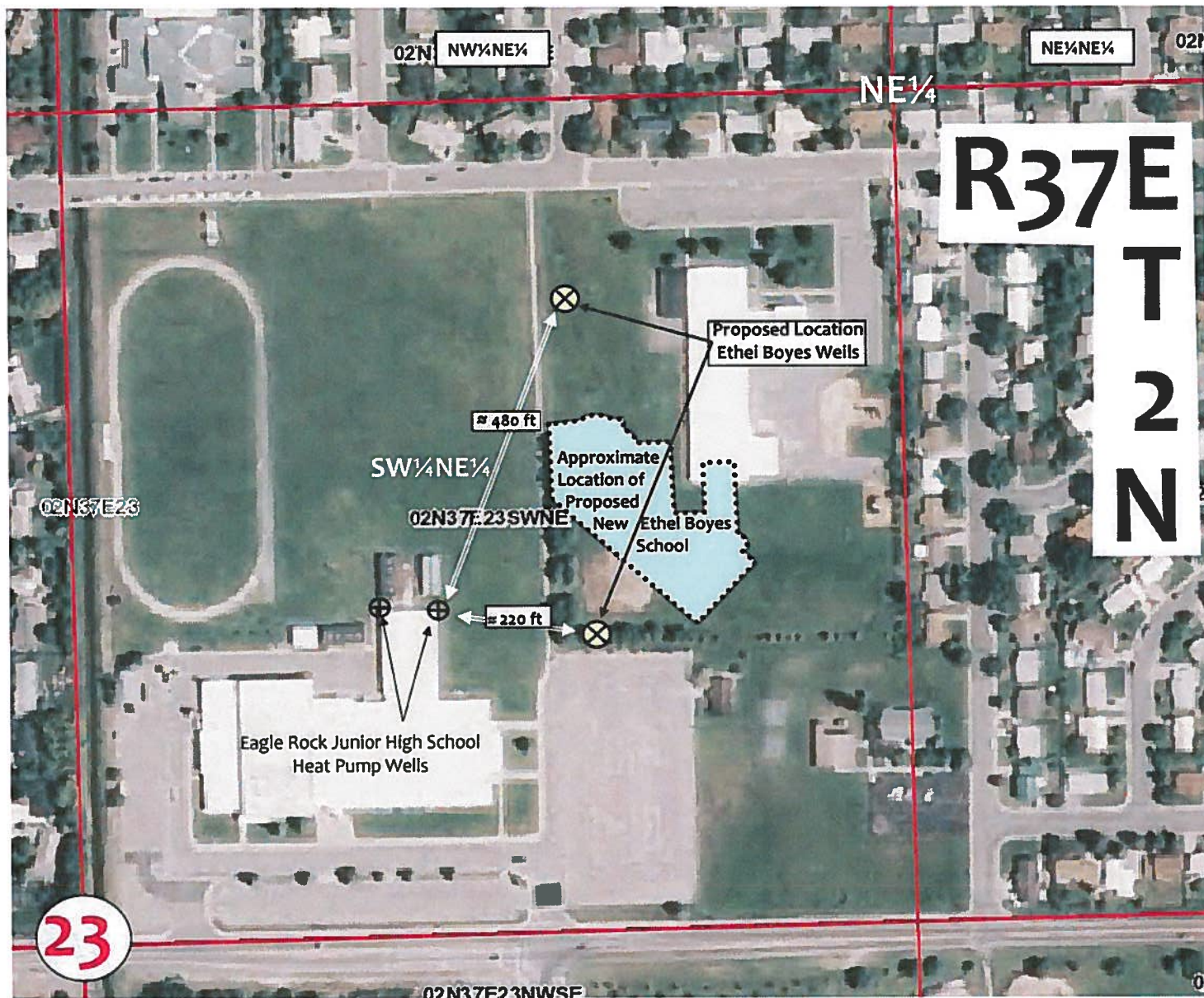
T02N

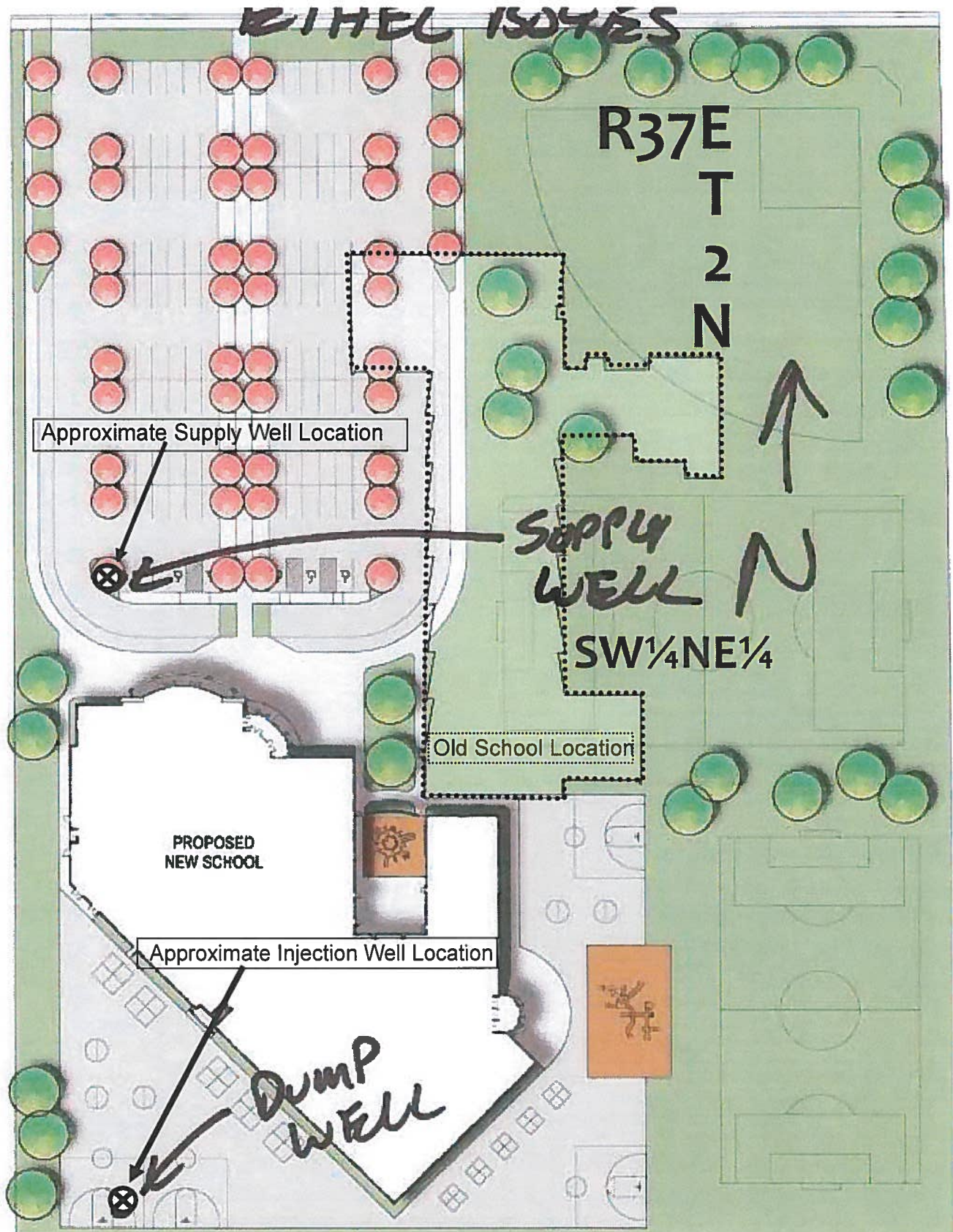
R37E



0 0.0325 0.065 0.13 Miles

35-14283





CLOSEST WELLS

DOMESTIC, SUPPLY & INJECTOR WELLS



Data Provided by
Bill O'Donnell, P.E.
Quantum Group Engineering, PC
543 W. 19th
PO Box 51353
Idaho Falls, ID 83402
(208) 523-8068 Fax (208) 524-8235

- 1) Well pump will need to pump a maximum of 600gpm during morning warm up during cold wintertime conditions (late November, December, January, and mid February), or from about 6am to 8am and then run much of the occupied day at 300gpm, Monday through Friday. Once class is over for the day and over the weekend and holidays, the well pump will be off and will start and run a number of times throughout the night and weekend, at 300gpm.
- 2) Early and late winter, well pump will be on and off throughout the day and be off at night.
- 3) Spring and fall the well pump will cycle a few times during the occupied day and not at night. Once class is over for the day and over the weekend the well pump will be off and may start and run a few times throughout the night.
- 4) Summer the well pump will be off and would only run if there is special a school activity and the school is occupied.
- 5) Well pump is controlled by a variable speed drive that speeds the pump up and down depending on the heating or cooling demand. When running it will spend the majority of its run time at minimum speed or about 300gpm. It will be off for a majority of the year (winter/summer).
- 6) This is non-consumptive use and well water may be cooled to about 42F in winter (at 600 gpm) and heated to about 60F in summer when the pump is running at 300gpm (building will be heating dominant).

Methods for Determining Rates of Flow for Geothermal Heating Systems Application Processing #23

Data supplied by applicant's engineer

1. Engineering Estimate Maximum Required Flow Rate = 600 gpm = 1.34 cfs
2. Estimated Designed Floor Space = 66,000 ft²

IDWR Guideline for determining Design Heat Load:

$$E = (e)(\Delta T)(A) = \text{BTU/hr}$$

e = efficiency factor BTU/hr-sq.ft.-°F Assume = 0.67

A = Floor space = 66,000 ft²

ΔT = Design Temperature difference ($t_i - t_o$) = [(70°F) - (-11°F)] = 81°F

t_i = Inside Temp = 70°F

t_o = Outside Temp = [(70°F) - (-11°F)] = 81°F

Assume = (- 11° F)* *Design Outside Design Temperature for Idaho Falls area.

0.28 – Best Energy Efficiency
0.44 – Better Energy Efficiency
0.67 – Average Residential Efficiency
1.11 – Poor Energy Efficiency

Boise	4° F
Lewiston	6° F
Pocatello	- 8° F
Idaho Falls	- 11° F (Assumed)

$$E = (0.67)(81^\circ)(66,000 \text{ ft}^2) = 3,581,820 \text{ BTU/hr}$$

IDWR Guideline for estimating Rate of Flow for Geothermal Heating Systems:

Temperature Drop: $\Delta T_s = (0.3)(S - t)$

S = Geothermal Source Temp °F

t = Temperature required by system °F

Note: Heat pump – source temperature becomes system temperature.

Assume 56.8 ° F (See Monthly Climate Summary Below)

$$\Delta T_s = (.3)(56.8^\circ \text{F}) = 17.04^\circ \text{F}$$

Flow Rate Required: $W = O \div (500)(\Delta T_s)$

O = Space Heat Load in BTU/hr = 3,581,820 BTU/hr

$$W = (3,581,820 \text{ BTU/hr}) \div [(500)(17.04^\circ \text{F})] = 420.4 \text{ gpm} = 0.9367 \text{ cfs} = 0.94 \text{ cfs}$$

The IDWR guidelines are not for the design of heating systems and do not provide for an outside temperature for the Idaho Falls area (Design Heat Load).

The engineering data provided estimated the maximum design flow of 600 gpm (1.34 cfs) as a reasonable flow rate.

IDAHO FALLS FAA ARPT, IDAHO (104457)

Period of Record Monthly Climate Summary:

8/ 1/1948 to 5/31/2012

Record as of 07/10/2012

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	27.2	33.6	44.2	57.0	66.9	76.2	85.9	84.4	73.7	60.4	42.4	30.1	56.8
Average Min. Temperature (F)	10.2	15.3	23.6	31.2	39.0	45.5	50.8	49.1	40.6	31.1	22.0	12.5	30.9

Percent of possible observations for period of record:

Maximum Temperature: 99.9%

Minimum Temperature: 99.9%

Source: <http://www.wrcc.dri.edu/summary/Climsmsid.html>

Permit No. _____



**APPLICATION FOR PERMIT TO CONSTRUCT, MODIFY
OR MAINTAIN AN INJECTION WELL**

IDAHO DEPARTMENT OF WATER RESOURCES

322 East Front St., PO Box 83720, Boise, ID 83720-0098

Under the Provisions of Title 42, Chapter 39 of the Idaho Code

I. INFORMATION REQUIRED FOR ALL INJECTION WELLS

A. Application Type:

- ☒ New Injection Well Operating Permit (A Drilling Permit is also required prior to construction)
☐ Permit to Modify an Existing Injection Well
☐ Renew Operating Permit of an Existing Injection Well

Prepared by: Keith C. Wilson Rocky Mountain Environmental Associates Inc.
482 Constitution Way, Suite 303
Idaho Falls, ID 83402 (208) 524-2353 / 524-1795 Fax

B. Legal Owner:

Name Idaho Falls School District 91, Attn: W. Kevin Klingler, Director of Operations
Organization Name Ethel Boyes School
Mailing Address 690 John Adams Parkway
City Idaho Falls State Idaho Zip Code 83401
Phone No. 1 (208) 525-7500 Phone No. 2 (208) 525-7585 Ext: 50286

**If the property will change ownership soon, provide contact information for future owner:
N/A

C. Well Location:

Facility Name Ethel Boyes School
Address 1875 Brentwood Drive
City Idaho Falls State Idaho Zip Code 83402
County Bonneville Facility Phone No. (208) 525-7630

Provide one of the following two options:

1) GPS Location (Datum = WGS84):

Latitude _____ Longitude _____

(You can check the accuracy of your GPS data with the "Well Diller's Locator Tool" here:
"http://maps.idwr.idaho.gov/locator/default.aspx")

2) A USGS Topographic Map or aerial photo with the well location marked and Township,
Range, Section information.

Township	Range	Section	1/4, 1/4, 1/4 Section	1/4, 1/4 Section	1/4 Section
2N	37E	23		SW	NE

(Get free maps using this tool: <http://maps.idwr.idaho.gov/IrrigationRightsFinder>)

D. Well Operation:

Frequency of Injection: ☐ Continuous (24 hr/day, 7 day/wk) ☒ Intermittent

Maximum Average Weekly Rate 1.34 ☒ cfs ☐ gpm
(guidance attached)

E. Injection Well Classification: (Circle the proper code. In PDF version use: Tools → Comments & Markup → Oval Tool)

Code:	Injection Activity Associated With:	Code:	Injection Activity Associated With:
5A5	Electric Power Generation	5W10	Cesspools
5A6	Geothermal Heat (Source H ₂ O Temp > 85° F)	5W11	Septic Systems (General)
5A7	Closed-Loop Heat Pump Return (Source H ₂ O Temp < 85° F)	5W12	Water Treatment Plant Effluent
5A8	Aquaculture Return Flow	5W20	Industrial Process Water
5A19	Cooling Water Return (Industrial Cooling)	5W31	Septic Systems (Well Disposal)
5B22	Saline Water Intrusion Barrier	5W32	Septic Systems (w/ Drainfield)
5D2	Storm Water Runoff (Roadway/Pavement Drainage)	5X13	Mine Tailing Backfill
5D3	Improved Sinkholes	5X14	Solution Mining
5D4	Industrial Storm Runoff (Building/Pavement Drainage)	5X15	In-Situ Fossil Fuel Recovery
5F1	Agricultural Runoff Waste (Agricultural Drainage)	5X16	Spent Brine Return Flow
5G30	Special Drainage Water (Rarely Used)	5X25	Experimental Technology
5N24	Low-Level Radioactive Waste	5X26	Aquifer Remediation
5R21	Aquifer Storage & Recharge	5X27	Other Wells (Rarely Used)
5S23	Subsidence Control	5X28	Service Station Wells (Motor Vehicle Waste Disposal)
5W9	Untreated Sewage	5X29	Abandoned Drinking Wells (Converted from Domestic)

F. Well Construction Information: (Attach well log, if available)

☐ As Built
 ☒ Expected Construction
 ☐ Well Modification

Total Well Depth: 370 (ft)

Well Casing: Diameter 10 (in) Depth 200 (ft)

Ht. above Ground Surface 1 (ft) Casing Type Steel

Perforation: From None (ft) To (ft)

Surface Seal: Depth 140 (ft) Seal Type Bentonite Clay Chip Seal

Construction Date (Indicate Actual, Approximate or Anticipated): Sept. - October 2012

Driller's Name: Denning Well Drilling

For well modifications describe purpose and intended changes:

G. Adjacent Features:

Depth to Groundwater ≈ 170 (ft) ☒ Estimate ☐ Measured Date Measured

Distance to Nearest Domestic Well 2246 (ft) Direction South-East

NOTE: The closest non-domestic well(s) are the Heat Pump System Supply & Injection wells for Eagle Rock Junior High (ERJH). The East ERJH Well is ≈220 ft. West of the South Ethel Boyes well, and ≈480 ft. SW of the North Ethel Boyes well. See attached aerial. Both Eagle Rock Junior High & Ethel Boyes Schools are in School District 91.

See Attached Letter from the Project Engineer RE: Well interference.

II. INFORMATION REQUIRED ONLY FOR HEAT EXCHANGE (CLASS 5A7) INJECTION WELLS

Please check all of your domestic uses served by your groundwater well:

- ☐ Household ☐ Irrigation ($\leq \frac{1}{2}$ acre) ☐ Livestock
☒ Heat Pump ☒ Other Heat Exchanger

Water flows through a closed loop system to the heat exchanger used by heat pumps.

What is your total domestic groundwater usage? 290462.4 Gallons Per Day
(Guidance on page 6)

Are you connected to a city or community drinking water system? ☒ Yes ☐ No

Do you have a water right for the heat pump? ☐ Yes ☒ No Water Right # _____

Have you applied for a water right for the heat pump? ☒ Yes ☐ No Water Right Application # _____

See Attached Permit Application

* Attach documentation from your heat pump manufacturer that indicates how many gallons per day your heat pump will use during peak heating and cooling days.

** Applicants seeking permits for a Heat Exchange Injection Well can skip Section III.

III. INFORMATION REQUIRED FOR ALL INJECTION WELLS, EXCEPT HEAT EXCHANGE (CLASS 5A7) INJECTION WELLS

A. Alternative Methods to Injection Well Use:

Describe alternatives to the use of an injection well for waste disposal _____

Why were the above alternative methods rejected? _____

B. Water Treatment Prior to Injection:

- ☐ None ☐ Chemical Treatment ☐ Ultra-Violet Treatment
☒ Settling Pond ☐ Filtration
☐ Other _____

C. Is this injection well part of a contamination remediation system? ☐ Yes ☐ No
If yes, please attach a copy of the signed regulatory approval for the remediation action, description of the remediation system, and intended use of the injection well.

D. Constituents in Waste Stream:

- ☐ None ☐ Hazardous wastes ☐ Automotive fluids ☐ Pesticides
☐ Herbicides ☐ Other additives or chemicals _____



August 17, 2012

Bill O'Donnell, P.E.
Quantum Group Engineering, PC
PO Box 51353
Idaho Falls, ID 83402

RE: WELL INTERFERENCE BETWEEN GEOTHERMAL WELLS- EAGLE ROCK J.H.S. AND
ETHEL BOYES

Dear Mr. Donnell:

As part of the permitting process for the geothermal wells at Ethel Boyes Elementary School, Mr. Keith Wilson is considering the proximity of existing wells to the proposed wells in the application process. The question has come up relative well interference of the proposed wells with existing geothermal wells at the adjacent Eagle Rock Junior High School. Since we installed and tested the Eagle Rock geothermal wells last summer, we know quite a bit about the local hydrogeology and I am able to assess the possibility of well interference.

Figure 1 is a Google Earth image that shows the approximate locations of the wells under consideration. The ERJHS East Well is completed to a depth of 365 ft and the ERJHS West Well is completed to a depth of 369 ft. The depth to water in this area is about 170 ft, thus the wells tap a layer of the aquifer that is approximately 200 ft thick. We conducted pumping tests in both wells and found the specific capacity of the East and West Well to be 406 and 650 gpm/ft, respectively. Both are very high numbers indicating the aquifer is very transmissive in this area. The proposed Ethel Boyes Wells will be constructed in a similar manner and have the capability to be used as either an injection or as an extraction well.

A four hour pumping test was conducted on the West Well on August 2, 2011 at a flow rate of 715 gpm. The drawdown to 1.1 feet below static in the pumped well was instantaneous and it remained steady throughout the test. The water level in the East Well was also monitored during the pumping test and an instantaneous drawdown of 0.05 ft was observed when the pump was turned on. However, rising water levels during the test of about 0.125 ft nearly mask the pumping induced changes in water levels. The data indicate that there is communication between the two wells but the aquifer transmissivity is so large that it is barely detectable. The impact is so small that background aquifer "noise" tends to swamp the signal.

Figure 1 also shows the locations of the two proposed geothermal wells for Ethel Boyes. The South Well is approximately 220 ft east of the ERJHS (shown by red line). The test data indicate that any drawdown caused by the ERJHS will be so small that it will be undetectable above background noise at either proposed well location. The aquifer is so prolific here that well interference (i.e. quantity of water) will not be a problem. It is further noted that this use of water is non consumptive and that there is a net zero impact overall to the aquifer at some distance from the wells (i.e. the amount pump out of the aquifer and returned to the aquifer are the same).

It is noted that the change in water temperature caused heating or cooling is only about 5 degrees. Thus, the thermal plumes will tend to dissipate rather quickly to ambient aquifer temperatures. The thermal plumes created by the heating/cooling process at the two schools will



Clearwater Geosciences, LLP
Ground Water Development and Exploration

Engineer Response re: Well Interference

Page 2 of 3

move in the aquifer under the natural geothermal gradient. The regional flow direction is to the Southwest. The East ERJHS Well and the South Ethel Boyes Well are cross gradient and it is unlikely that thermal interference between the wells will be an issue. This is further supported by the fact that the ERJHS wells, which are situated 100 ft apart have operated successfully for a year without thermal break through or other problems. It can be concluded that thermal short-circuiting between the geothermal supply wells and the geothermal injection wells between the two schools very is unlikely. Natural advection, dispersion and diffusion in the aquifer are sufficient to preclude short-circuiting and recycling of the heating/cooling water between wells.

Please call me at the number below if you have any questions about this letter.

Respectfully,

A handwritten signature in black ink, appearing to read "Thomas R. Wood".

Thomas R. Wood, PhD, PG





Figure 1 Image showing the approximate locations of the Eagle Rock and Ethel Boyes wells.



State of Idaho

DEPARTMENT OF WATER RESOURCES

Eastern Region, 900 North Skyline Drive, Suite A • Idaho Falls, Idaho 83402-1718

Phone: (208) 525-7161 • Fax: (208) 525-7177 • Web Site: www.idwr.idaho.gov

September 12, 2012

C. L. "BUTCH" OTTER
Governor

GARY SPACKMAN
Interim Director

IDAHO FALLS SCHOOL DISTRICT 91
690 JOHN ADAMS PARKWAY
IDAHO FALLS, ID 83401

Application For Permit No. 35-14283

Dear Applicant(s):

The Department of Water Resources has received your water right application. Please refer to the number referenced above in all future correspondence regarding this application.

A legal notice of the application has been prepared and is scheduled for publication in the POST-REGISTER on September 20 and 27, 2012. Protests to this application may be submitted for a period ending ten (10) days after the second publication.

If the application is protested, you will be sent a copy of each protest. All protests must be resolved before the application can be considered for approval. If the protest(s) cannot be resolved voluntarily, the Department will conduct a conference and/or hearing on the matter.

If the application is not protested, the Department will process your application and notify you of any action taken on the application. If your application is approved, the Department will send you a copy of the permit.

Please contact this office if you have any questions regarding the application.

Sincerely,

Sharla Cox
Administrative Assistant

CC: ROCKY MOUNTAIN ENVIRONMENTAL ASSOC
C/O KEITH C WILSON
482 CONSTITUTION WAY STE 303
IDAHO FALLS, ID 83402

Cox, Sharla

From: Cox, Sharla
Sent: Thursday, September 13, 2012 8:24 AM
To: 'Post Register (legalnotices@postregister.com)'
Subject: Legal Notice for your paper
Attachments: Post Register E-Mail.doc

Contacts: Post Register

Sharla

Sharla Cox
Administrative Assistant
Idaho Department of Water Resources
900 N. Skyline Dr. Ste. A
Idaho Falls ID 83402
208-525-7161 - telephone
208-525-7177 - fax
sharla.cox@idwr.idaho.gov

The following application(s) have been filed to appropriate the public waters of the State of Idaho:

35-14283

IDAHO FALLS SCHOOL DISTRICT 91

690 JOHN ADAMS PARKWAY

IDAHO FALLS, ID 83401

Point of Diversion SWNE S23 T02N R37E

BONNEVILLE County

Source GROUND WATER Tributary

Use: COOLING and HEATING

01/01 to 12/31 1.34 CFS

Total Diversion: 1.34 CFS

Date Filed: 8/29/2012

Place Of Use: COOLING and HEATING

T02N R37E S23 SWNE

Permits will be subject to all prior water rights. For additional information concerning the property location, contact Eastern Region office at (208) 525-7161. Protests may be submitted based on the criteria of Idaho Code § 42-203A. Any protest against the approval of this application must be filed with the Director, Dept. of Water Resources, Eastern Region, 900 N Skyline Dr Ste A, Idaho Falls ID 83402 together with a protest fee of \$25.00 for each application on or before October 9, 2012. The protestant must also send a copy of the protest to the applicant.

GARY SPACKMAN, Director

Published on September 20 and 27, 2012