

STATE OF IDAHO
DEPARTMENT OF WATER RESOURCES
BENEFICIAL USE FIELD REPORT

A. GENERAL INFORMATION

Permit No: 75-14272

Exam Date: 8/1/2007

1. Current Owner: CARLA J BEVAN
531 PANTHER CREEK RD
SHOUP ID 83469
(208)394-2222
2. Accompanied by: Carla Bevan and Bob Foster from IDWRs Salmon office
Phone No: 208-394-2222
Address: 531 Panther Creek Rd
Relationship to Permit Holder:

3. SOURCE

BEAVER CREEK

TRIBUTARY

PANTHER CREEK

B. OVERLAP REVIEW

1. Other water rights with the same place of use: none
2. Other water rights with the same point of diversion: 75-2095

C. DIVERSION AND DELIVERY SYSTEM**1. LOCATION OF POINT(S) OF DIVERSION:**

BEAVER CREEK

SW 1/4SE1/4

Sec. 34, Twp 23N, Rge 18E, B.M.

LEMHI County

Method of Determination:

Point of diversion was determined by a comparison of the USGS quad map provided by the right holder, to aerial photos, and IDWRs ArcMap Recommendation POD layer.

The diversion and stilling pond for this power use are also used for right 75-2095. Point-of-diversion ID #650817, a GPS point collected for the SRBA file 75-2095, was selected as the best fit for a POD for this right. POD #650817 is also consistent with the lat & long coordinates provided on the right holder's quad map.

In this canyon, the quality of GPS reception varies. At the time of the exam, reception was poor. Bob Foster collected a reading but when plotted it was found to be outside of the known QQ, so it was not used.

2. PLACE OF USE: POWER

Twp	Rge	Sec	NE				NW				SW				SE				Totals
			<u>NE</u>	<u>NW</u>	<u>SW</u>	<u>SE</u>	<u>NE</u>	<u>NW</u>	<u>SW</u>	<u>SE</u>	<u>NE</u>	<u>NW</u>	<u>SW</u>	<u>SE</u>	<u>NE</u>	<u>NW</u>	<u>SW</u>	<u>SE</u>	
23N	18E	34												X					

Method of Determination:

Place of use was determined by site visit and aerial photos.

The place of use lat & long coordinates provided on the application quad map is a match for the coordinates given by ArcMap to my location of the powerhouse.

3. ☒ Delivery System Diagram Attached (required). Indicate all major components and distances between components. Indicate weir size/pipe as applicable.
- ☐ Map Attached Showing Location(s) of point(s) of diversion and place(s) of use (required). Scale must be 1:24,000 or greater.
- ☒ Aerial Photo Attached (required for irrigation of 10+ acres).
- ☒ Photo of Diversion and System Attached

4.

<u>Well or Diversion ID No.*</u>	<u>Turbine Make</u>	<u>Hp</u>	<u>Motor Serial No.</u>	<u>Pump Make</u>	<u>Pump Serial No. or Discharge Size</u>
ES&D	Stream	Engine with 2 nozzles			2 x 3/4 inch or 2 x 7/8 inch nozzles

*Code to correspond with No. on map and aerial photo

D. FLOW MEASUREMENTS

1.

<u>Measurement Equipment</u>	<u>Type</u>	<u>Make</u>	<u>Model No.</u>	<u>Serial No.</u>	<u>Size</u>	<u>Calib. Date</u>
	propeller	Swoffer	2100			5-2007

2. Measurements:

The maximum power use was not occurring at the time of the measurement.

Meter measurement in the open channel of the tailrace = 0.21 cfs

Bob Foster took an open channel measurement at the point of discharge before return into Beaver Creek. The measurement included a small amount of spring water which entered the tailrace channel under the powerhouse.

E. FLOW CALCULATIONS X Additional Computation Sheets Attached

Measured Method:

See the attached measurement summary chart generated by Bob Foster.

The measurement channel site was less than ideal. The measurements were less thorough than standard (e.g. only one measurement per meter setup). So, I am comfortable adding 0.02 cfs (10% of 0.21) to the rate and recommendation for licensing.

Theoretical Flow Calculations

A pressure gauge near the powerhouse read 42 psi on pipe that shared the trench with the penstock. Carla Bevan stated that it always reads 42 psi. I was not able to confirm if the gauge was working properly but I believe that the companion pipe and the penstock share the same POD elevation and static head. I used that pressure reading as the static head on the penstock. $42 \text{ psi} \times 2.31 = 97 \text{ ft}$ of static head.

The right holder stated that her son had GPS'd the change in elevation and found it to be 123 ft. Although other GPS points provided by the right holder have proven to be correct, GPS elevations may only be accurate +/- 50 ft. Available topo maps show the elevation changes at least 100 ft from the headwater pond to the tailrace channel where the water discharges to Beaver Creek.

The right holder stated that the penstock length was 1750 ft. An as-the-crow-flies estimate of the distance from aerial photography indicated that the penstock would be at least 1650 ft.

The right holder stated that the flow in the penstock was 330 gpm before the addition of the powerhouse. This is the rate she expected by the proof of beneficial use statement. A hydropower analysis based on pipe friction and power equations indicate that less than 330 gpm is used. (See the attached spreadsheet.)

This is the second turbine set designed for the Bevan power configuration. I asked for and received a copy of documents showing the parameters for the first design. It is unlikely that key design conditions would have changed between the first and second turbine set.

F. VOLUME CALCULATIONS

1. Volume Calculations for Irrigation: N/A

 $V_{I.R.} = (\text{Acres Irrigated}) \times (\text{Irrigation Requirement}) =$ $V_{D.R.} = [\text{Diversion Rate (cfs)}] \times (\text{Days in Irrigation season}) \times 1.9835 =$ $V = \text{Smaller of } V_{I.R.} \text{ and } V_{D.R.} =$

2. Volume Calculations for Other Uses:

Data from Idaho Power Company shows that the average, annual, weather-adjusted power use in 2007 was 12940 kWh per residential customer. This reduces to a daily average of 1.48 kW per customer. (The calculation is $12940 \text{ kWh} / (365 \text{ days} \times 24 \text{ hr/day}) = 1.48 \text{ kW}$.) The Bevan powerplant can generate this daily average kW using approximately 0.27 cfs. (See the attached spreadsheet.) However, I recommend a volume based on 0.23 cfs, the adjusted, measured flow rate. The volume calculation is $1.9835 \times 365 \times 0.23 = 167 \text{ AF}$.

G. NARRATIVE/REMARKS/COMMENTS

The official survey address for this property is Homestead Entry Survey (H.E.S.) #390. I overlaid H.E.S. 390 with a virtual Public Land Survey grid in order to provide PLS addresses compatible with IDWR data requirements. The property is also identified by PIN #RP23N18E346001

The water used for power is diverted from Beaver Creek into a small pond which allows for particle settling and flow stabilization. Two overflow culverts return excess pond water back to Beaver Creek. The penstock intake is submerged in the pond and is screened to exclude fish and debris. The penstock is 4-inch PVC and the right holder stated that the penstock is 1750 ft long. The majority of that length is buried. The penstock pipe emerges from a culvert which passes under the Panther Creek road, a few feet upstream of the power house. Control valves and a pressure gauge are accessible at that location. Ahead of the powerhouse, the pipe reduces in size, and is fit with valves and elbows, such that I did not find a suitable length of pipe for an ultrasonic measurement.

The power is used in a single family home that is isolated from any electric grid. The right holder stated that she does not have electric heat or air conditioning in the home. Power use records from the development period for this home are not available. The IDWR does not have a standard method for determining a volume for this type of power use. Data provided by Idaho Power Company (see Figure 5, Appendix A, Integrated Resource Plan 2009) offers a good upper boundary for a volume. Off-grid homes typically use less power than homes that are served by an electrical grid so a volume recommendation based on residential use data for grid-tied home, would be generous for an off-grid home.

At the time of the exam the weather was temperate and the day was sunny. Power use in a household has a diurnal cycle. Maximum power demand on this system would not have been occurring. However, in micro hydroelectric systems such as this one, the turbine is expected to run continuously, utilizing water at the same constant rate. The same level of power is generated even if there is little power utilization.

The Bevan system is a battery-inverter system and a bank of batteries was housed inside the powerhouse. Battery charging would be as constant as the streamflow but the batteries were protected from overcharging by a power shunt or dump. A good design sizes the power dump to handle the entire turbine generation capacity. I found that the turbine was operating and the system's power dump, an 1800-watt ceramic heater in the power house was in service and very warm. Therefore, I believe that the turbine is capable of generating 1800 watts.

Inverters convert DC power stored in batteries to AC power used by typical household appliances. Instantaneous peak demand on the Bevan would be limited to the size of the inverter, not to the water or turbine potential.

At the time of the exam, the turbine was generating power in excess of the real-time demand. However, I considered the power utilized by the ceramic heater as a beneficial use of hydro power. This is consistent with department thinking. In an agricultural setting, the actual water used by a crop would be less than the amount delivered to the field. Irrigation water lost to soil and air are not subtracted from the beneficial use. Those are acceptable losses. So too would the power shunted to the ceramic heater be considered an acceptable loss and not subtracted from beneficial use.

The right holder had more than one pair of nozzles available for use in the turbine. I did not ask to have the system shut down to confirm the nozzle size in use. The right holder stated that she had either 3/4 inch or 7/8 inch nozzles in place. Nozzles are the final constraint to the volume of water used for power. According to the ES&D (Energy Systems and Design Ltd) nozzle chart for the Stream Engine, the nozzles available to the right holder can efficiently deliver 100-150 gpm of water at 85 ft of head. This volume is not limited by the nozzle size.

Have conditions of permit approval been met? ____ Yes X No

The permit required a measuring device. There was no device installed. On May 23, 2007, the permit holder requested a waiver of the condition.

I recommend that the condition be removed from the license. The water path from headwater to turbine is piped so there are no seepage losses. The use is non consumptive. The water is returned to the source via an existing spring which is tributary to Beaver Creek.

H. RECOMMENDATIONS**1. Recommended Amounts**

<u>BENEFICIAL USE</u>	<u>PERIOD OF USE</u>	<u>DIVERSION RATE</u>	<u>ANNUAL VOLUME</u>
POWER	01/01 to 12/31	0.23 CFS	167.0 AF
	<u>Totals:</u>	0.23 CFS	167.0 AF

2. Recommended Amendments

☐ Change P.D. as reflected above ☐ Add P.D. as reflected above ☒ None
☐ Change P.U. as reflected above ☐ Add P.U. as reflected above ☐ Other

I. AUTHENTICATION

Field Examiner's Name Michelle Gell Date 2/3/2011
Reviewer _____ Date _____

HYDROPOWER ANALYSIS SHEET

Bevan Hydro on Beaver Cr

	Static Head ----- Penstock Length -		97 Feet 1750 Feet			Nominal Pipe Size- Turbine Type ----- %		4.00 Inches I.D. ES&D turgo w/ 2 nozzles	
	FLOW CFS	FLOW GPM	BYPASS CFS	POWER CFS	SPILL CFS	VELOCITY Feet/Sec	TOTAL efficiency %	NET HEAD Feet	POWER WATTS
	0	0	0	0	0	0	0	97.00	0.00
	0	0	0	0	0	0	0	97.00	0.00
	0	0	0	0	0	0	0	97.00	0.00
	0.050	22.4	0	0.050	0.0	0.57	80	96.28	326.10
	0.075	33.7	0	0.075	0.0	0.86	80	95.48	485.06
	0.100	44.9	0	0.100	0.0	1.15	80	94.40	639.49
	0.125	56.1	0	0.125	0.0	1.43	80	93.08	788.11
	0.150	67.3	0	0.150	0.0	1.72	80	91.50	929.71
	0.175	78.5	0	0.175	0.0	2.01	80	89.68	1,063.12
	0.200	89.8	0	0.200	0.0	2.29	80	87.63	1,187.18
measure	0.225	101.0	0	0.225	0.0	2.58	80	85.34	1,300.76
	0.250	112.2	0	0.250	0.0	2.86	80	82.83	1,402.76
	0.275	123.4	0	0.275	0.0	3.15	80	80.10	1,492.08
	0.300	134.6	0	0.300	0.0	3.44	80	77.14	1,567.67
	0.325	145.9	0	0.325	0.0	3.72	80	73.97	1,628.45
design ?	0.350	157.1	0	0.350	0.0	4.01	80	70.58	1,673.39
	0.375	168.3	0	0.375	0.0	4.30	80	66.98	1,701.45
max power	0.400	179.5	0	0.400	0.0	4.58	80	63.17	1,711.61
	0.425	190.8	0	0.425	0.0	4.87	80	59.15	1,702.85
	0.450	202.0	0	0.450	0.0	5.16	80	54.92	1,674.19
	0.475	213.2	0	0.475	0.0	5.44	80	50.49	1,624.61
	0.500	224.4	0	0.500	0.0	5.73	80	45.86	1,553.14
	0.525	235.6	0	0.525	0.0	6.02	80	41.02	1,458.79
	0.550	246.9	0	0.550	0.0	6.30	80	35.98	1,340.60
	0.575	258.1	0	0.575	0.0	6.59	80	30.75	1,197.61
	0.600	269.3	0	0.600	0.0	6.88	80	25.31	1,028.84
	0.625	280.5	0	0.625	0.0	7.16	80	19.68	833.36
	0.650	291.7	0	0.650	0.0	7.45	80	13.86	610.22
	0.675	303.0	0	0.675	0.0	7.73	80	7.84	358.48
	0.700	314.2	0	0.700	0.0	8.02	80	1.63	77.20
	0.725	325.4	0	0.725	0.0	8.31	80	-4.78	-234.55
	0.750	336.6	0	0.750	0.0	8.59	80	-11.37	-577.69

created by Michele Edl, associate engineer
created on February 3, 2011

DETERMINING NOZZLE SIZE

Optimal nozzle size can be determined from the design example using the Nozzle Flow Chart.

Two types of turbine runners are offered for the Stream Engine. A standard turgo runner and a high head low flow runner.

The standard turgo runner can use nozzles of up to one inch in diameter. This is used for higher flow sites which are associated with lower heads. The universal type of nozzle is supplied with the conventional runner. With the universal nozzle, it is possible to create any size nozzle jet that might be required by simply cutting the nozzle to the appropriate length. Cutting can be done with a hacksaw, or any other fine toothed saw. The end of the nozzle should then be finished with a piece of sandpaper. This is best done by placing the sandpaper on a flat surface and moving the nozzle against it. Markings are on the nozzle to assist in cutting to the correct size. The numbers are in millimeters and correspond to inches as follows:

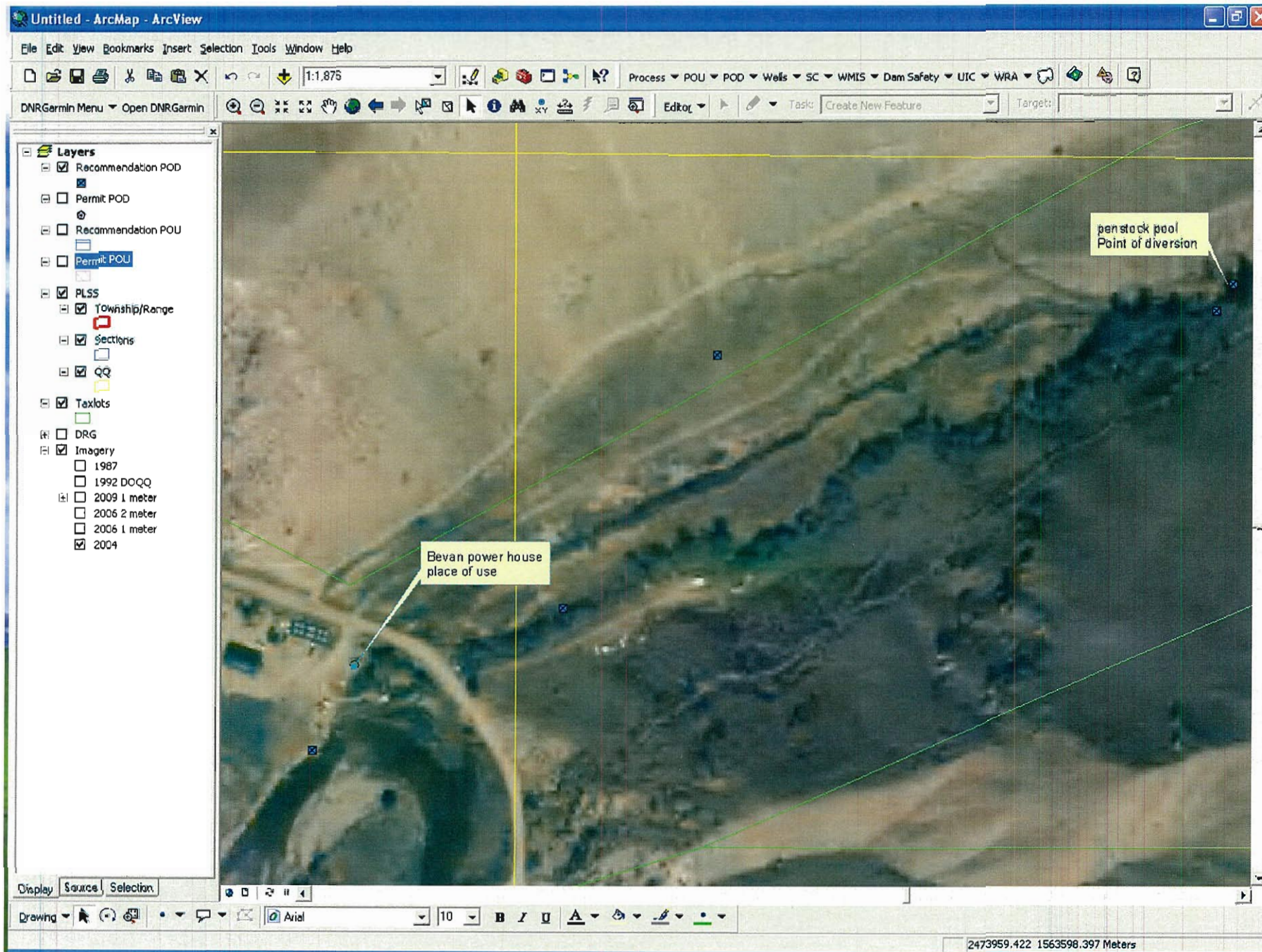
mm	3	4.5	6	8	10	13	16	19	22	25
inches	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	7/8	1

The low flow runner comes with brass nozzle inserts that are supplied in sizes of 1/8" to 1/2" in increments of 1/16" which are screwed into a plastic flange.

Both the standard Stream Engine and the low flow version are supplied with nozzles flanges that have a 1 1/2" pipe thread that is connected to the incoming plumbing.

NOZZLE FLOW CHART FLOW RATE IN U.S. GALLONS PER MINUTE

Head Feet	Pressure PSI	Nozzle Diameter, inches											Turbine RPM
		1/8	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4	7/8	1.0	
5	2.2					6.18	8.40	11.0	17.1	24.7	33.6	43.9	460
10	4.3			3.88	6.05	8.75	11.6	15.6	24.2	35.0	47.6	62.1	650
15	6.5		2.68	4.76	7.40	10.7	14.6	19.0	29.7	42.8	58.2	76.0	800
20	8.7	1.37	3.09	5.49	8.56	12.4	16.8	22.0	34.3	49.4	67.3	87.8	925
30	13.0	1.68	3.78	6.72	10.5	15.1	20.6	26.9	42.0	60.5	82.4	107	1140
40	17.3	1.94	4.37	7.76	12.1	17.5	23.8	31.1	48.5	69.9	95.1	124	1310
50	21.7	2.17	4.88	8.68	13.6	19.5	26.6	34.7	54.3	78.1	106	139	1470
60	26.0	2.38	5.35	9.51	14.8	21.4	29.1	38.0	59.4	85.6	117	152	1600
80	34.6	2.75	6.18	11.0	17.1	24.7	33.6	43.9	68.6	98.8	135	176	1850
100	43.3	3.07	6.91	12.3	19.2	27.6	37.6	49.1	76.7	111	150	196	2070
120	52.0	3.36	7.56	13.4	21.0	30.3	41.2	53.8	84.1	121	165	215	2270
150	65.0	3.76	8.95	15.0	23.5	33.8	46.0	60.1	93.9	135	184	241	2540
200	86.6	4.34	9.77	17.4	27.1	39.1	53.2	69.4	109	156	213	278	2930
250	108	4.86	10.9	19.9	30.3	43.6	59.4	77.6	121	175	238	311	3270
300	130	5.32	12.0	21.3	33.2	47.8	65.1	85.1	133	191	261	340	3591
400	173	6.14	13.8	24.5	38.3	55.2	75.2	98.2	154	221	301	393	4140



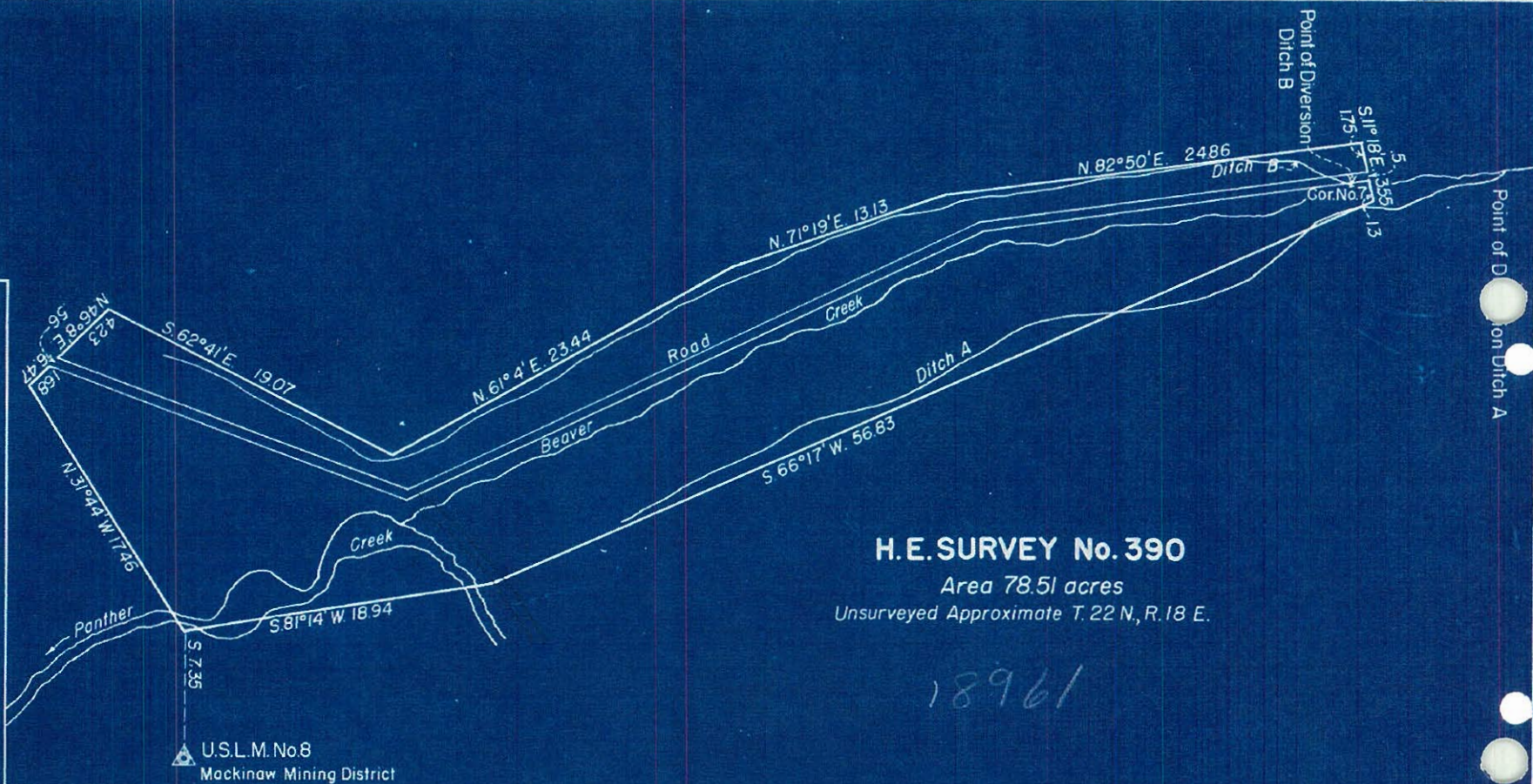


Drawn and Traced by A.C.M.
SCALE: 1 INCH = 500 FEET

4:10:40

400410

MAP accompanying the Application of
MAGNUS BEVAN
To Appropriate Water from Beaver Creek
IN LEMHI COUNTY, STATE OF IDAHO



Edl, Michele

From: Keen, Shelley
Sent: Friday, March 21, 2008 9:01 AM
To: Edl, Michele
Subject: RE: Carla Bevans exemption?

Michele,

The measuring device requirement placed in condition no. 3 of Carla Bevan's permit was to ensure that the field examiner could get a measurement to quantify beneficial use. The condition provides for a computation as an alternative to the measuring device requirement.

As you point out, the permit also should have been a candidate for measuring device and data logger requirements under the Wild & Scenic Rivers stipulated agreement. For some reason, those conditions were not included. Apparently it was an oversight.

Now that we have confirmed that the measuring device is not in place and Carla Bevan has asked IDWR to waive the requirement, we have to ask whether the measuring device requirement is necessary for either or both of the reasons listed above.

Because this is a longstanding diversion for a non-consumptive use, I am inclined not to require the measuring device at this time to satisfy the Wild and Scenic Agreement. We can use conditions 197 and 198 to notify Carla Bevan that she may be required to install a measuring device and report diversions when/if Basin 75 becomes part of Water District 170. That way, she will be on equal footing with other long-time water users in Basin 75.

The remaining question is for you, as the field examiner. Do you need for her to have a measuring device so that you can quantify her beneficial use of water, or can you calculate it? If you need the measuring device, then the condition gives IDWR the authority to require that she install one. If you do not need it, then IDWR can waive the requirement.

Let's put this email exchange in the water right file to document our thought process.

Thanks.

Shelley Keen

From: Edl, Michele
Sent: Thursday, March 20, 2008 4:57 PM
To: Keen, Shelley
Subject: CarlaBevans exemption?

Shelley,
Slowly but surely, I'm working around to your way of thinking. I made a connection this afternoon that I should have made sooner. Carla Bevan's hydro 75-14272 is in the Wild and Scenic Rivers area and therefore can't be made exempt from the measuring device requirement.

So she is not in compliance with permit conditions and all my reasons to the contrary don't make it so. I can't license her project without a device in place and I need to formally communicate that to her.

I know this will be a topic for our Tues meeting, but do we have a letter template that I can start with?
Michele

3/25/2008

Edl, Michele

From: Foster, Bob
Sent: Tuesday, August 07, 2007 3:46 PM
To: Edl, Michele
Cc: Keen, Shelley
Subject: RE: supplemental data request
Attachments: bevpod.txt

Michele, here is the info on my flow meter.

Type: propeller
Make: Swoffer
Model: 2100
Serial: none
Calibration date: 05-2007

I have also attached the GPS point.

Hope this helps, Bob.

From: Edl, Michele
Sent: Tue 8/7/2007 2:33 PM
To: Foster, Bob
Subject: supplemental data request

Bob,
I am writing up the Beneficial Use exam for Carla Bevan.
I received the FAX from Backwoods Solar stating that their design flow for her 1st setup was no more than 160 gpm.

Because I want to use the measurement you made as a complement to the design flow, I need to get some more information from you. I have a copy of your printout but it looks like I need the measuring equipment specs too. The form expects the following for the measurement equip:

- type,
- make,
- model no.,
- serial no.,
- size, and
- calib. date.

Would you please send me what you can?

The coordinates that Carla gave us are:
POD N45degrees 16.576', W114degrees 19.725'
POU N45degrees 16.465' W114degrees 20.105'

I haven't asked Shelley if you sent him your GPS for the POD. But would you mind sharing that with me too?

Thanks
Michele

8/8/2007



BACKWOODS SOLAR ELECTRIC SYSTEMS, INC. —

1589 Rapid Lightning Creek Rd., Sandpoint, ID 83864

Phone (208) 263-4290 • FAX (208) 265-4788

E-Mail: info@backwoodssolar.com • Website: www.backwoodssolar.com

Aug 6, 2007

Attn Michelle Edl

p. 1 OF 4

RECEIVED
AUG 06 2007
Department of Water Resources

7/19/01 7010344-1
 Carla Bevan
 218 W Willow
 Absarokee, MT 59001

7/19/01 7010344-1
 Carla Bevan
 218 W Willow
 Absarokee, MT 59001



BACKWOODS SOLAR ELECTRIC SYSTEMS, INC.

1589 Rapid Lightning Creek Rd., Sandpoint, ID 83864
 (208) 263-4290 FAX (208) 265-4788

E-Mail: info@backwoodssolar.com • Website: www.backwoodssolar.com

INVOICE

INVOICE NO. **7010344**

CUSTOMER NO. **25339**

SOLD TO

(208) 394-2222

SHIP TO

Carla Bevan
 P O Box 817
 Absarokee, MT 59001

Carla Bevan
 218 W Willow
 Absarokee, MT 59001

INVOICE DATE	DATE TO SHIP	DATE SHIPPED	YOUR ORDER NO.	SALESPERSON	TERMS	SHIPPED VIA				
7/19/01				3	PAID IN FULL					
QUANTITY			ITEM NO.	DESCRIPTION	PRICE	AMC				
ORDERED	SHIPPED	BACK ORDERED								
1	1		W-HYDROBASE	Drain base/1 plug/1 dschg adt	40.00					
1	1		C-40DD	Xantrex C40 cntrl+dig mtr P-24	258.00	2				
1	1		C+EM AIR4030	DISCONTINUED ITEM	200.00	2				
1	1		C-PC 175/60	DISCONTINUED ITEM	585.00	5				
1	1		SPECIAL	PC load breakers 20/60	0.00					
1	1		M-TRI-48	48v adapter/lightning protect	35.00					
1	1		I+SW4048	Xantrex 4000W 48V invrtr Neon	3,146.00	3,1				
1	1		I-BC10 4/0	4/0 inverter cable set 10'	78.00					
8	8		B+L16HC	DISCONTINUED ITEM	220.00	1,7				
1	1		B-FREE HYDR	DISCONTINUED ITEM	0.00					
2	2		B-FREE AU2/0	DISCONTINUED ITEM	0.00					
1	1		B-FREE BOOK	DISCONTINUED ITEM	0.00					
1	1		B-FREE GOOP	DISCONTINUED ITEM	0.00					
1	1		O-DCBB	Xantrex ground bonding block	50.00					
1	1		SPECIAL	22awg 4 cond wire 200'	20.00					
7	7		O-BIC 2	15" 2ga battery interconnect	4.00					
ITEMS ORDERED		DISCOUNT		TOTAL AFTER DISC.	ADJUSTMENT	STATE TAX	LOCAL TAX	SHIP/HAND	INSURANCE	
		%	AMOUNT							
STATE TAXABLE	LOCAL TAXABLE	TOTAL		PAST DUE	INVOICE TOTAL	RECEIVED	REFUND/CREDIT	PAYMENT DUE		
								\$		

AUG-7-2007 01:50P FROM: BACKWOODS SOLAR
BACKWOODS SOLAR ELECTRIC SYSTEMS, INC.
 1589 Rapid Lightning Creek Rd
 Sandpoint, ID 83864

2082654788

TO: 12082876700

P.3 0/1

BACKWOODS SOLAR ELECTRIC SYSTEMS, INC.
 1589 Rapid Lightning Creek Rd.
 Sandpoint, ID 83864

7/19/01 7010344-1
 Carla Bevan
 218 W Willow
 Absarokee, MT 59001

7/19/01 7010344-1
 Carla Bevan
 218 W Willow
 Absarokee, MT 59001



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 (208) 263-4290 FAX (208) 265-4788

E-Mail: info@backwoodssolar.com • Website: www.backwoodssolar.com

(208) 394-2222

INVOICE

INVOICE NO. 7010344-

CUSTOMER NO. 25339

SOLD TO

Carla Bevan
 P O Box 817
 Absarokee, MT 59001

SHIP TO

Carla Bevan
 218 W Willow
 Absarokee, MT 59001

INVOICE DATE	DATE TO SHIP	DATE SHIPPED	YOUR ORDER NO.	SALESPERSON	TERMS	SHIPPED VIA				
7/19/01				3	PAID IN FULL					
QUANTITY			ITEM NO.	DESCRIPTION	PRICE	AMOU				
ORDERED	SHIPPED	BACK ORDERED								
1	1		NOTE	Wiring diagram	0.00					
1	1		M-DIG AMP	DISCONTINUED ITEM	59.00	5				
1	1		SPECIAL	10awg 4 cond wire 200'	20.00	2				
Batteries Missoula MT Call w/details										
ITEMS ORDERED		DISCOUNT		TOTAL AFTER DISC.	ADJUSTMENT	STATE TAX	LOCAL TAX	SHIP/HAND	INSURANCE	SH
		%	AMOUNT							
6,279.00		0.00	0.00	6,279.00	0.00	0.00	0.00	104.00	0.00	
STATE TAXABLE	LOCAL TAXABLE	TOTAL		PAST DUE	INVOICE TOTAL	RECEIVED	REFUND/CREDIT	PAYMENT DUE		
0.00	0.00	6,383.00			6,383.00	6,383.00	0.00	\$		0.00

AUG-7-2007 01:50P FROM: BACKWOODS SOLAR
BACKWOODS SOLAR ELECTRIC SYSTEMS, INC.
 1589 Rapid Lightning Creek Rd.
 Sandpoint, ID 83864

2082654788

TO: 12082876700

P.4 0/

BACKWOODS SOLAR ELECTRIC SYSTEMS, INC.
 1589 Rapid Lightning Creek Rd.
 Sandpoint, ID 83864

7/5/01 7010073-1
 Carla Bevan
 218 W. Willow
 Absarokee, MT 59001

7/5/01 7010073-1
 Carla Bevan
 218 W. Willow
 Absarokee, MT 59001



BACKWOODS SOLAR ELECTRIC SYSTEMS, INC.

1589 Rapid Lightning Creek Rd., Sandpoint, ID 83864
 (208) 263-4290 FAX (208) 265-4788

E-Mail: info@backwoodssolar.com • Website: www.backwoodssolar.com

INVOICE

INVOICE NO. 7010073-

CUSTOMER NO. 25339

SOLD TO

(208) 394-2222

SHIP TO

Carla Bevan
 PO Box 817
 Absarokee, MT 59001

Carla Bevan
 218 W. Willow
 Absarokee, MT 59001

INVOICE DATE	DATE TO SHIP	DATE SHIPPED	YOUR ORDER NO.	SALESPERSON	TERMS	SHIPPED VIA				
7/5/01				5	PAID IN FULL					
QUANTITY			ITEM NO.	DESCRIPTION	PRICE	AMOUNT				
ORDERED	SHIPPED	BACK ORDERED								
1	1		W+H4	4 nozzle Harris hydro generator	1,080.00	1,080.00				
1	1		W+46VOLT	Harris 46V Motorcraft alternator	140.00	140.00				
The Visa account ending with 2818, in the name of Carla Bevan, will be charged \$1,245.00. Auth. 295572										
100' head; 42 psi; 330 avail; will use about 160 gpm; 1775' of 4" pipe; estimated										
ITEMS ORDERED		DISCOUNT		TOTAL AFTER DISC.	ADJUSTMENT	STATE TAX	LOCAL TAX	SHIP/HAND	INSURANCE	S
		%	AMOUNT							
1,220.00		0.00	0.00	1,220.00	0.00	0.00	0.00	25.00	0.00	
STATE TAXABLE	LOCAL TAXABLE	TOTAL		PAST DUE	INVOICE TOTAL	RECEIVED	REFUND/CREDIT	PAYMENT DUE		
0.00	0.00	1,245.00			1,245.00	1,245.00	0.00	\$ 0.00		

8-1-07

photo 1 intake

P2 - inlet to power house

GPS - Rev P&D

measured take at powerhouse

330gpm prior to installation of
alternator

E + S B Steam engine

Solar Reserve Mtrs.

ref: Steve Jacquin

Backwoods Solar

Missoula

photo 1 - intake

photo 2 inlet to powerhouse

photo 3 alternator unit

System not at capacity at time
of exam

```
filename: c:\docs\forms\ditch_flow_computations_upgraded.xls
```

Measurement done by: B. Foster/M. Edl

Date of measurement: 8/1/2007

REW value: 1.00

LEW value: 2.50

Space between

readings (ft): 0.30

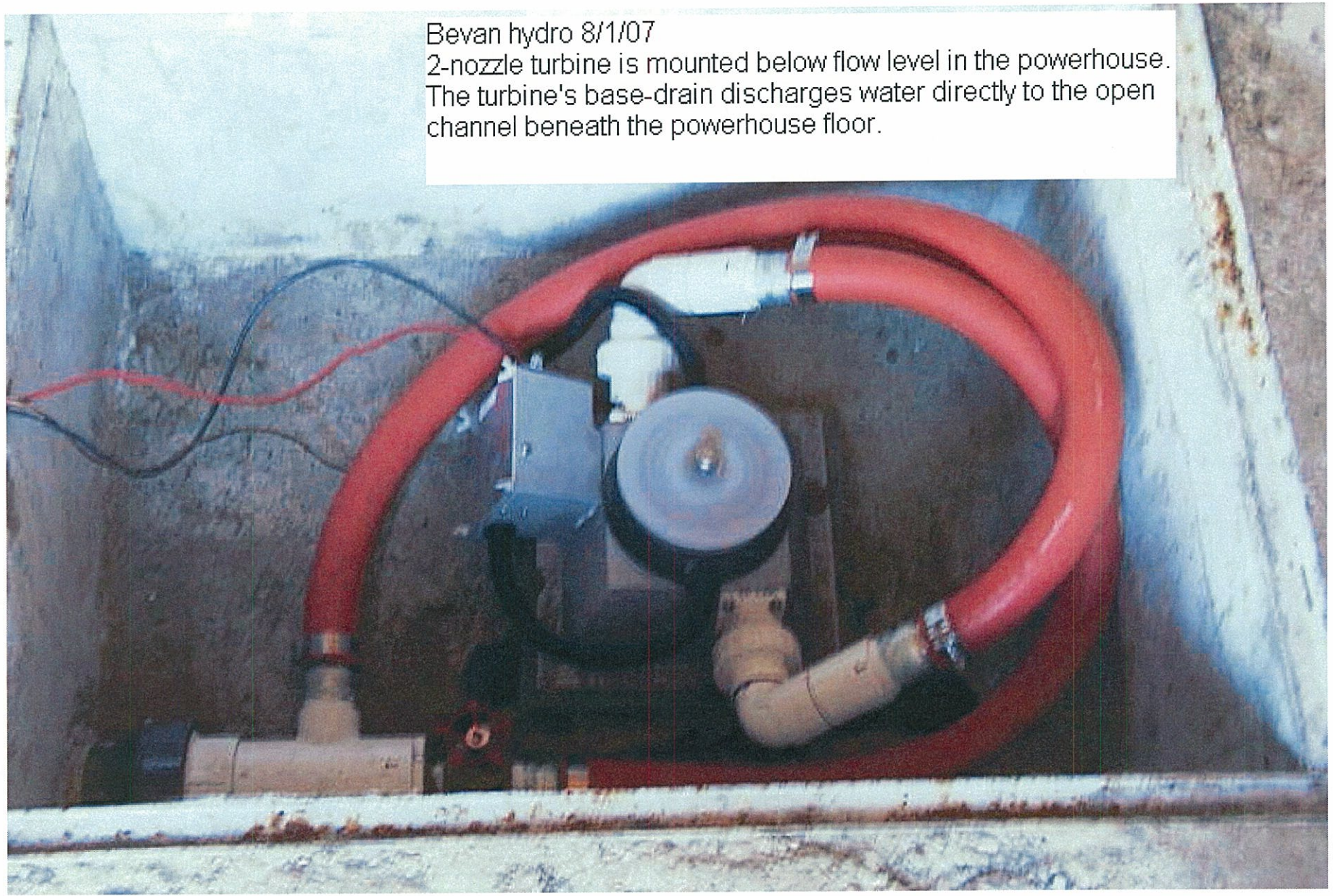
Make entries in cells without shading.

[illegible]



Bevan hydro 8/1/07

2-nozzle turbine is mounted below flow level in the powerhouse.
The turbine's base-drain discharges water directly to the open
channel beneath the powerhouse floor.



Open channel
measurement was
taken at approximately
this location.



Beaver Creek is downstream



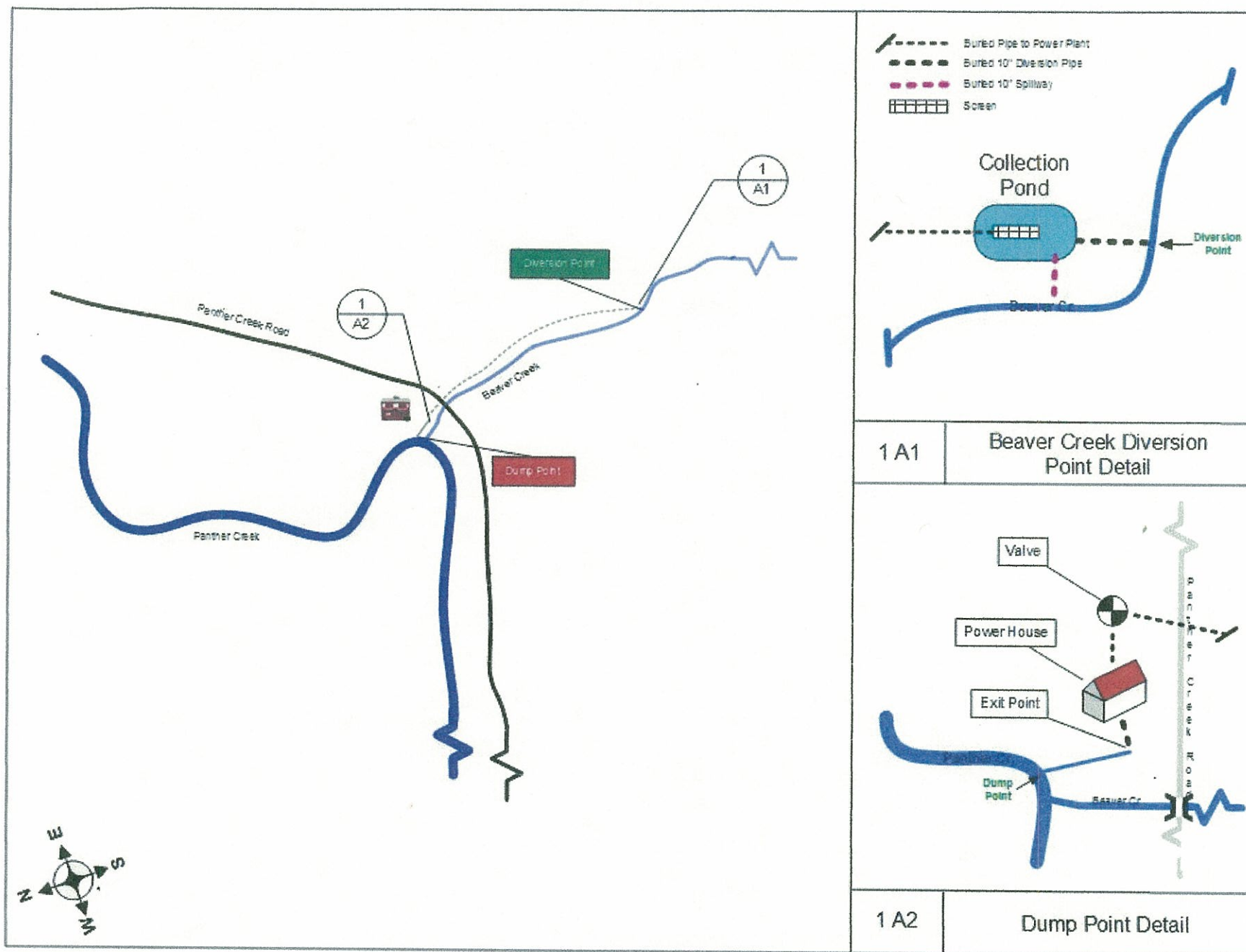


high level spillback to
Beaver Creek

low level spillback to
Beaver Creek

fish screen surrounding
intake opening

Bevan hydro
stilling pond 8/1/07



Type	WR #	Owner	Source	TRS	NENE	NWNE	SWNE	SENE	NENW	NWNW	SWNW	SENW	NESW	NWSW	SWSW	SESW	NESE	NWSE	SWSE	SESE	Total
Claim	75 2095	CARLA J BEVAN,	BEAVER CREEK	23N18E34											5.2	16.4	1.7	2.8	15	8	49.1
Permit	75 14272	CARLA J BEVAN,	BEAVER CREEK	23N18E34											X						0
Rec	75 2095	CARLA J BEVAN,	BEAVER CREEK	23N18E34	Bevan irrigation										5.2	16.4	1.7	2.8	15	8	49.1
Right	75 2065	WILLARD ROOD,	BEAVER CREEK	23N18E34																	0
Right	75 2095	MAGNUS BEVAN,	BEAVER CREEK	23N18E34																	0
Right	75 2105	MAE ROOD,	BEAVER CREEK	23N18E34																	0
Right	75 10828	CARLA J BEVAN,	SPRING	23N18E34	Bevan home domestic use													X			0
Right	75 14272	CARLA J BEVAN,	BEAVER CREEK	23N18E34	Bevan hydro										X						0

Type	WR #	Owner	Source	TRS	NENE	NWNE	SWNE	SENE	NENW	NWNW	SWNW	SENW	NESW	NWSW	SWSW	SESW	NESE	NWSE	SWSE	SESE	Total
Claim	75 2095	CARLA J BEVAN,	BEAVER CREEK	23N18E34											5.2	16.4	1.7	2.8	15	8	49.1
Permit	75 14272	CARLA J BEVAN,	BEAVER CREEK	23N18E34											X						0
Rec	75 2095	CARLA J BEVAN,	BEAVER CREEK	23N18E34											5.2	16.4	1.7	2.8	15	8	49.1
Right	75 2065	WILLARD ROOD,	BEAVER CREEK	23N18E34																	0
Right	75 2095	MAGNUS BEVAN,	BEAVER CREEK	23N18E34																	0
Right	75 2105	MAE ROOD,	BEAVER CREEK	23N18E34																	0
Right	75 10828	CARLA J BEVAN,	SPRING	23N18E34															X		0



Idaho Department of Water Resources

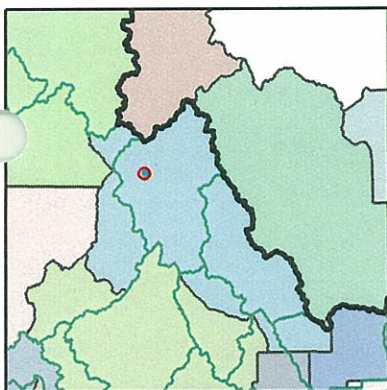
Permit Number:

75-14272

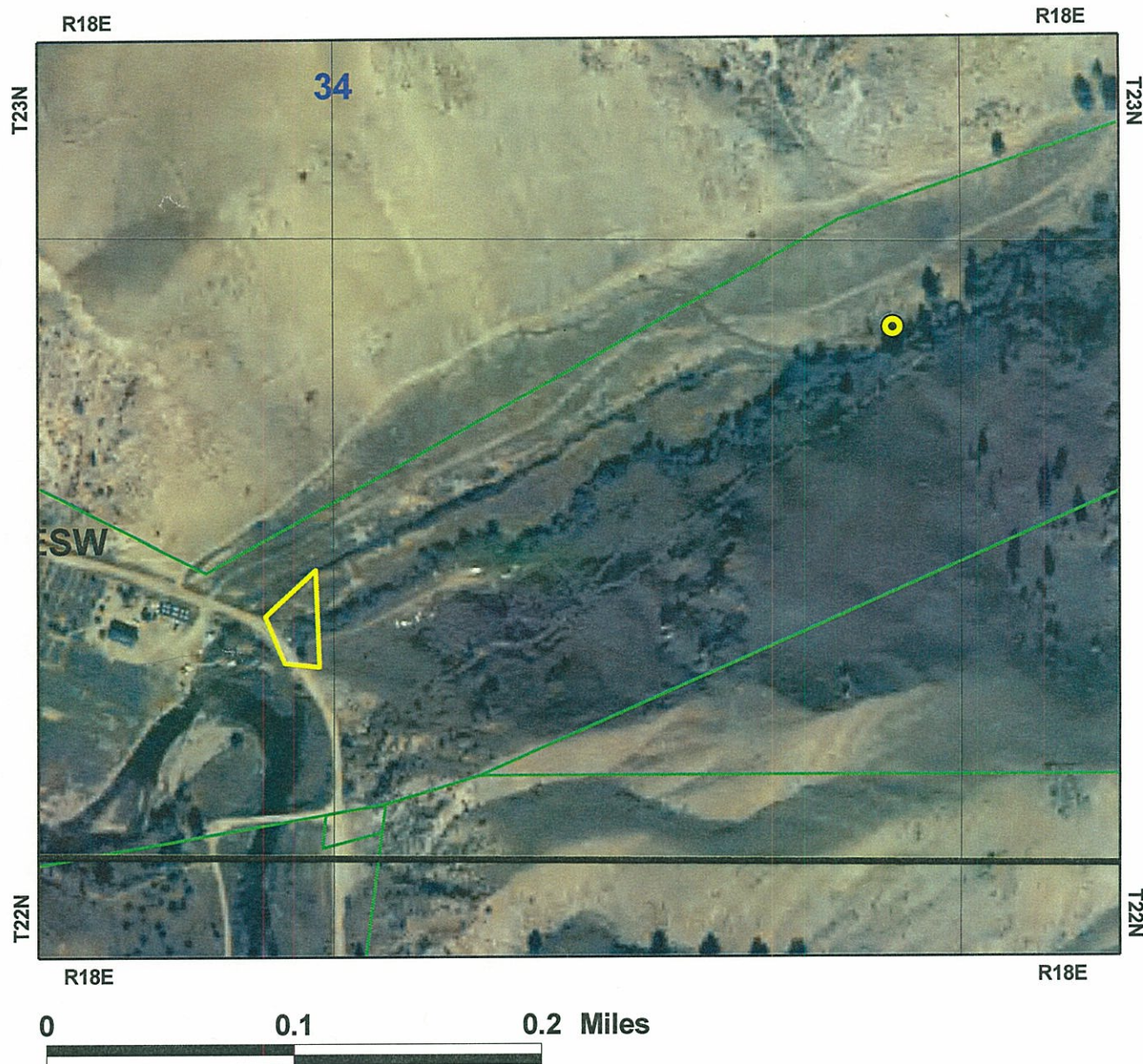
(Power)

Legend

-  Point of Diversion
-  Place of Use
-  Townships
-  PLS Sections
-  Quarter Quarters
-  Parcels



Lemhi County
IDWR Basin 75



Prepared by M. Edl
On Monday, July 30, 2007
2004 Aerial Photography

Owner: Carla J Bevan

NOTE: Only one owner is listed. There may or may not be more than this in the IDWR database.