

Groundwater Review Summary Form

Application # G- 18424

GW Reviewer Phil Marcy Date Review Completed: 1/18/2017

Summary of GW availability and Injury Review:

Groundwater for the proposed use is either over appropriated, will not likely be available in the amounts requested without injury to prior water rights, OR will not likely be available within the capacity of the groundwater resource per Section B of the attached review form.

Summary of Potential for Substantial Interference Review:

There is the potential for substantial interference per Section C of the attached review form.

Summary of Well Construction Assessment:

The well does not appear to meet current well construction standards per Section D of the attached review form. Route through Well Construction and Compliance Section.

This is only a summary. Documentation is attached and should be read thoroughly to understand the basis for determinations and for conditions that may be necessary for a permit (if one is issued).

PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO: Water Rights Section Date 01/17/2017
 FROM: Groundwater Section Phillip I. Marcy
Reviewer's Name
 SUBJECT: Application G- 18424 Supersedes review of _____
Date of Review(s)

PUBLIC INTEREST PRESUMPTION; GROUNDWATER

OAR 690-310-130 (1) *The Department shall presume that a proposed groundwater use will ensure the preservation of the public welfare, safety and health as described in ORS 537.525. Department staff review groundwater applications under OAR 690-310-140 to determine whether the presumption is established. OAR 690-310-140 allows the proposed use be modified or conditioned to meet the presumption criteria. This review is based upon available information and agency policies in place at the time of evaluation.*

A. GENERAL INFORMATION: Applicant's Name: Barber Ranch LLC; David J. Barber County: Baker

A1. Applicant(s) seek(s) 0.345 cfs from 2 well(s) in the Powder Basin,
Burnt River subbasin

A2. Proposed use Supplemental Irrigation (27.6 acres) Seasonality: April 1st – October 1st (183 days)

A3. Well and aquifer data (attach and number logs for existing wells; mark proposed wells as such under logid):

Well	Logid	Applicant's Well #	Proposed Aquifer*	Proposed Rate(cfs)	Location (T/R-S QQ-Q)	Location, metes and bounds, e.g. 2250' N, 1200' E fr NW cor S 36
1	Proposed	1	Volcanics/Limestone	0.345	14S/45E-17 SW-NW	2040'S, 55'E fr NW cor S 17
2	Proposed	2	Alluvium	0.345	14S/45E-17 SW-NW	2145'S, 130'E fr NW cor S 17
3						
4						
5						

* Alluvium, CRB, Bedrock

Well	Well Elev ft msl	First Water ft bls	SWL ft bls	SWL Date	Well Depth (ft)	Seal Interval (ft)	Casing Intervals (ft)	Liner Intervals (ft)	Perforations Or Screens (ft)	Well Yield (gpm)	Draw Down (ft)	Test Type
1	2078	NA	NA	NA	100-150	>18'	TBD	TBD	TBD	NA	NA	NA
2	2084	NA	NA	NA	18	0-15	TBD	TBD	TBD	NA	NA	NA

Use data from application for proposed wells.

A4. **Comments:** The applicant has expressed that their preference is to construct a dug well (well 2 on this application), with a depth of 18' into shallow alluvial gravels. The applicant would proceed with drilling of "Well 1" if the Department denies permission to construct a dug well or if the dug well does not produce sufficient water. Domestic well BAKE 51764 is located on the property and its construction is similar to what is proposed for "Well 1" on this application.

A5. **Provisions of the** Powder Basin rules relative to the development, classification and/or management of groundwater hydraulically connected to surface water **are, or** **are not,** activated by this application. (Not all basin rules contain such provisions.)
 Comments: _____

A6. **Well(s) #** _____, _____, _____, _____, _____, tap(s) an aquifer limited by an administrative restriction.
 Name of administrative area: _____
 Comments: _____

B. GROUNDWATER AVAILABILITY CONSIDERATIONS, OAR 690-310-130, 400-010, 410-0070

B1. **Based upon available data**, I have determined that groundwater* for the proposed use:

- a. is over appropriated, is not over appropriated, or cannot be determined to be over appropriated during any period of the proposed use. * This finding is limited to the groundwater portion of the over-appropriation determination as prescribed in OAR 690-310-130;
- b. will not or will likely be available in the amounts requested without injury to prior water rights. * This finding is limited to the groundwater portion of the injury determination as prescribed in OAR 690-310-130;
- c. will not or will likely to be available within the capacity of the groundwater resource; or
- d. will, if properly conditioned, avoid injury to existing groundwater rights or to the groundwater resource:
 - i. The permit should contain condition #(s) “Large Water Use Reporting”;
 - ii. The permit should be conditioned as indicated in item 2 below.
 - iii. The permit should contain special condition(s) as indicated in item 3 below;

- B2. a. **Condition** to allow groundwater production from no deeper than _____ ft. below land surface;
- b. **Condition** to allow groundwater production from no shallower than _____ ft. below land surface;
- c. **Condition** to allow groundwater production only from the _____ groundwater reservoir between approximately _____ ft. and _____ ft. below land surface;
- d. **Well reconstruction** is necessary to accomplish one or more of the above conditions. The problems that are likely to occur with this use and without reconstructing are cited below. Without reconstruction, I recommend withholding issuance of the permit until evidence of well reconstruction is filed with the Department and approved by the Groundwater Section.

Describe injury –as related to water availability– that is likely to occur without well reconstruction (interference w/ senior water rights, not within the capacity of the resource, etc): _____

B3. **Groundwater availability remarks:** There is little groundwater data available for this area. A shallow dug well would likely be in good hydraulic connection to the Burnt River, based upon regional geologic mapping of Brooks and others (1979), who described the Quaternary sediments here as fluvial deposits with a grain size distribution from silt to gravel in size. These surficial sediments are underlain by Imnaha Basalts of the CRBG, depending on location, with the basement rock primarily Mesozoic volcanic and metasedimentary rock of the Olds Ferry Terrane. Both nearby domestic well BAKE 51764 and City of Huntington municipal well BAKE 1544 (two miles west) appear to produce from fractured Imnaha Basalt, which is likely in poor hydraulic connection with local surface waters.

C. GROUNDWATER/SURFACE WATER CONSIDERATIONS, OAR 690-09-040

C1. **690-09-040 (1):** Evaluation of aquifer confinement:

Well	Aquifer or Proposed Aquifer	Confined	Unconfined
1	Immaha Basalt/Mesozoic Rock	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	Quaternary alluvium	<input type="checkbox"/>	<input checked="" type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>

Basis for aquifer confinement evaluation: Fractured bedrock in nearby domestic well is fairly thin (~25'), with static water level reported by driller to be at equilibrium with atmospheric pressure (BAKE 51764). Quaternary alluvium is incised by nearby Burnt River, with no confining bed present above 15' below land surface.

C2. **690-09-040 (2) (3):** Evaluation of distance to, and hydraulic connection with, surface water sources. All wells located a horizontal distance less than ¼ mile from a surface water source that produce water from an unconfined aquifer shall be assumed to be hydraulically connected to the surface water source. Include in this table any streams located beyond one mile that are evaluated for PSI.

Well	SW #	Surface Water Name	GW Elev ft msl	SW Elev ft msl	Distance (ft)	Hydraulically Connected?			Potential for Subst. Interfer. Assumed?	
						YES	NO	ASSUMED	YES	NO
1	1	Burnt River	2074	2081	1375	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	1	Burnt River	2074	2081	1510	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Basis for aquifer hydraulic connection evaluation: Groundwater and surface water have equivalent elevations, there are no laterally extensive, unfractured confining units above the potential water-bearing zones within each proposed POA, and the Burnt River incises the Quaternary alluvium into which "Well 2" is proposed to be constructed.

Water Availability Basin the well(s) are located within: Burnt River > Snake River – At Mouth (72168)

C3a. **690-09-040 (4):** Evaluation of stream impacts for each well that has been determined or assumed to be **hydraulically connected and less than 1 mile** from a surface water source. Limit evaluation to instream rights and minimum stream flows that are pertinent to that surface water source, and not lower SW sources to which the stream under evaluation is tributary. Compare the requested rate against the 1% of 80% natural flow for the pertinent Water Availability Basin (WAB). If Q is not distributed by well, use full rate for each well. Any checked box indicates the well is assumed to have the potential to cause PSI.

Well	SW #	Well < ¼ mile?	Qw > 5 cfs?	Instream Water Right ID	Instream Water Right Q (cfs)	Qw > 1% ISWR?	80% Natural Flow (cfs)	Qw > 1% of 80% Natural Flow?	Interference @ 30 days (%)	Potential for Subst. Interfer. Assumed?
1	1	<input type="checkbox"/>	<input type="checkbox"/>	IS72168A	50.00	<input type="checkbox"/>	39.4	<input type="checkbox"/>	0.03	<input type="checkbox"/>
2	1	<input type="checkbox"/>	<input type="checkbox"/>	IS72168A	50.00	<input type="checkbox"/>	39.4	<input type="checkbox"/>	0.00	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>

C3b. **690-09-040 (4):** Evaluation of stream impacts by total appropriation for all wells determined or assumed to be **hydraulically connected and less than 1 mile** from a surface water source. **Complete only if Q is distributed among wells.** Otherwise same evaluation and limitations apply as in C3a above.

	SW #		Qw > 5 cfs?	Instream Water Right ID	Instream Water Right Q (cfs)	Qw > 1% ISWR?	80% Natural Flow (cfs)	Qw > 1% of 80% Natural Flow?	Interference @ 30 days (%)	Potential for Subst. Interfer. Assumed?
			<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
			<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
			<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
			<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>

Comments: Using the model of Hunt (1999), pumping at the rate of 0.345 cfs, it appears unlikely that either proposed POA well will produce more than 30% of its pumpage from water intercepted from the Burnt River. The parameters for these model results include the presence of a thin streambed clogging layer, and hydraulic conductivity of the aquifer ranging from 1- 100 ft²/day.

C4a. **690-09-040 (5):** Estimated impacts on **hydraulically connected surface water sources greater than one mile** as a percentage of the proposed pumping rate. Limit evaluation to the effects that will occur up to one year after pumping begins. This table encompasses the considerations required by 09-040 (5)(a), (b), (c) and (d), which are not included on this form. Use additional sheets if calculated flows from more than one WAB are required.

Non-Distributed Wells													
Well	SW#	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
Distributed Wells													
Well	SW#	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
(A) = Total Interf.													
(B) = 80 % Nat. Q													
(C) = 1 % Nat. Q													
(D) = (A) > (C)		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
(E) = (A / B) x 100		%	%	%	%	%	%	%	%	%	%	%	%

(A) = total interference as CFS; (B) = WAB calculated natural flow at 80% exceed. as CFS; (C) = 1% of calculated natural flow at 80% exceed. as CFS; (D) = highlight the checkmark for each month where (A) is greater than (C); (E) = total interference divided by 80% flow as percentage.

D. WELL CONSTRUCTION, OAR 690-200

D1. Well #: _____ Logid: _____

D2. **THE WELL does not appear to meet current well construction standards based upon:**

- a. review of the well log;
- b. field inspection by _____;
- c. report of CWRE _____;
- d. other: (specify) _____

D3. **THE WELL construction deficiency or other comment is described as follows:** _____

D4. Route to the Well Construction and Compliance Section for a review of existing well construction.

Water Availability Tables

DETAILED REPORT ON THE WATER AVAILABILITY CALCULATION						
Watershed ID #: 72168		BURNT R > SNAKE R - AT MOUTH			Exceedance Level: 80	
Time: 2:12 PM		Basin: POWDER			Date: 01/18/2017	
Month	Natural Stream Flow	Consumptive Use and Storage	Expected Stream Flow	Reserved Stream Flow	Instream Requirements	Net Water Available
Monthly values are in cfs. Storage is the annual amount at 50% exceedance in ac-ft.						
JAN	71.70	47.50	24.20	31.10	25.00	-31.90
FEB	123.00	60.40	62.60	35.80	40.00	-13.30
MAR	166.00	114.00	51.50	44.40	50.00	-42.80
APR	370.00	207.00	163.00	127.00	50.00	-13.50
MAY	335.00	283.00	52.30	109.00	50.00	-107.00
JUN	168.00	230.00	-62.00	0.00	50.00	-112.00
JUL	63.50	98.80	-35.30	0.00	25.00	-60.30
AUG	44.90	51.40	-6.46	0.00	25.00	-31.50
SEP	39.40	32.20	7.19	0.00	25.00	-17.80
OCT	40.40	13.50	26.90	29.70	25.00	-27.80
NOV	51.40	40.90	10.50	29.80	25.00	-44.30
DEC	59.80	45.50	14.30	29.50	25.00	-40.20
ANN	167,000	73,900	93,000	26,300	25,000	46,800

Well Location Map



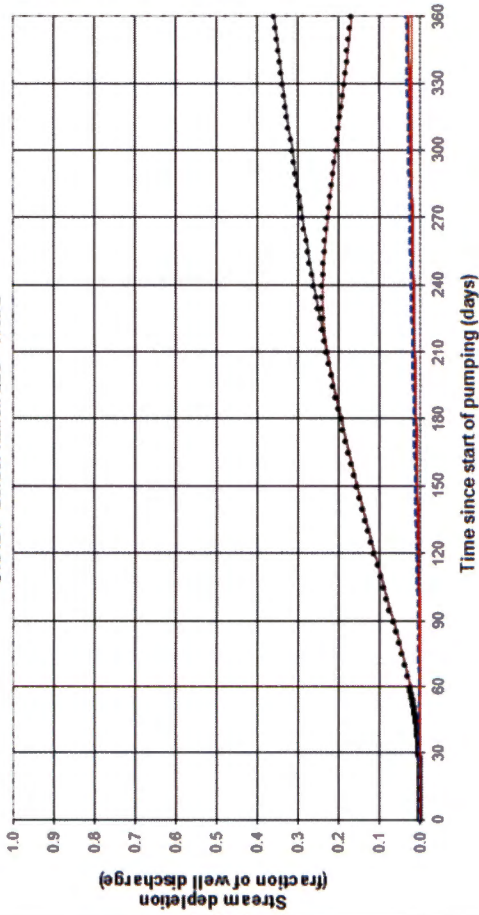
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1:12,000



Transient Stream Depletion (Jenkins, 1970; Hunt, 1999)

G18424 - Barber Ranch LLC - Well 2



Output for Hunt Stream Depletion, Scenario 2 (s2): Time pump on = 183 days

Days	30	60	90	120	150	180	210	240	270	300	330	360
Qw, cfs	0.345	0.345	0.345	0.345	0.345	0.345	0.345	0.345	0.345	0.345	0.345	0.345
Jenk SD s2 %	0.15	2.44	6.61	11.15	15.46	19.37	22.81	23.95	22.71	20.71	18.67	16.81
Jen SD s2 cfs	0.001	0.008	0.023	0.038	0.053	0.067	0.079	0.083	0.078	0.071	0.064	0.058
Hunt SD s2 %	0.00	0.06	0.21	0.43	0.71	1.01	1.33	1.61	1.79	1.90	1.96	1.98
Hunt SD s2 cfs	0.000	0.000	0.001	0.001	0.002	0.003	0.005	0.006	0.006	0.007	0.007	0.007

Input data:

yellow = required blue = recommended

Name	Scenario 1	Scenario 2	Scenario 3	Unit	Description
Well	G18424 - Barber Ranch LLC - Well 2				Well owner or well number
Qw	0.345	0.345		cfs	Net steady pumping rate of well
a	1510	1510		ft	Perpendicular distance from well to stream
b	15	15		ft	Acquifer thickness
d	18	18		ft	Well depth
K	1	50	100	ft/day	Acquifer hydraulic conductivity
S	0.2	0.2			Acquifer storativity or specific yield
Ks	0.01	0.01	0.01	ft/day	Streambed hydraulic conductivity
ws	15	15		ft	Stream width
bs	1	1	1	ft	Streambed thickness
tpon	183	183		days	Time pump on
Recalculate					

Time pump on = 183 days

	Scenario 1	Scenario 2	Scenario 3	Units
Qw	0.345	0.345	0.345	cfs
a	1510	1510	1510	ft
K	1	50	100	ft/day
b	15	15	15	ft
T	15	750	1500	ft ² /day
S	0.2	0.2	0.2	
ws	15	15	15	ft
Ks	0.01	0.01	0.01	ft/day
bs	1	1	1	ft
sbc	0.15	0.15	0.15	ft/day
sdf	30401.3333	608.026667	304.013333	days
sbf	15.1	0.302	0.151	