Oregon
Kate Brown, Governor

Water Resources Department
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Salem, OR 97301
(503) 986-0900
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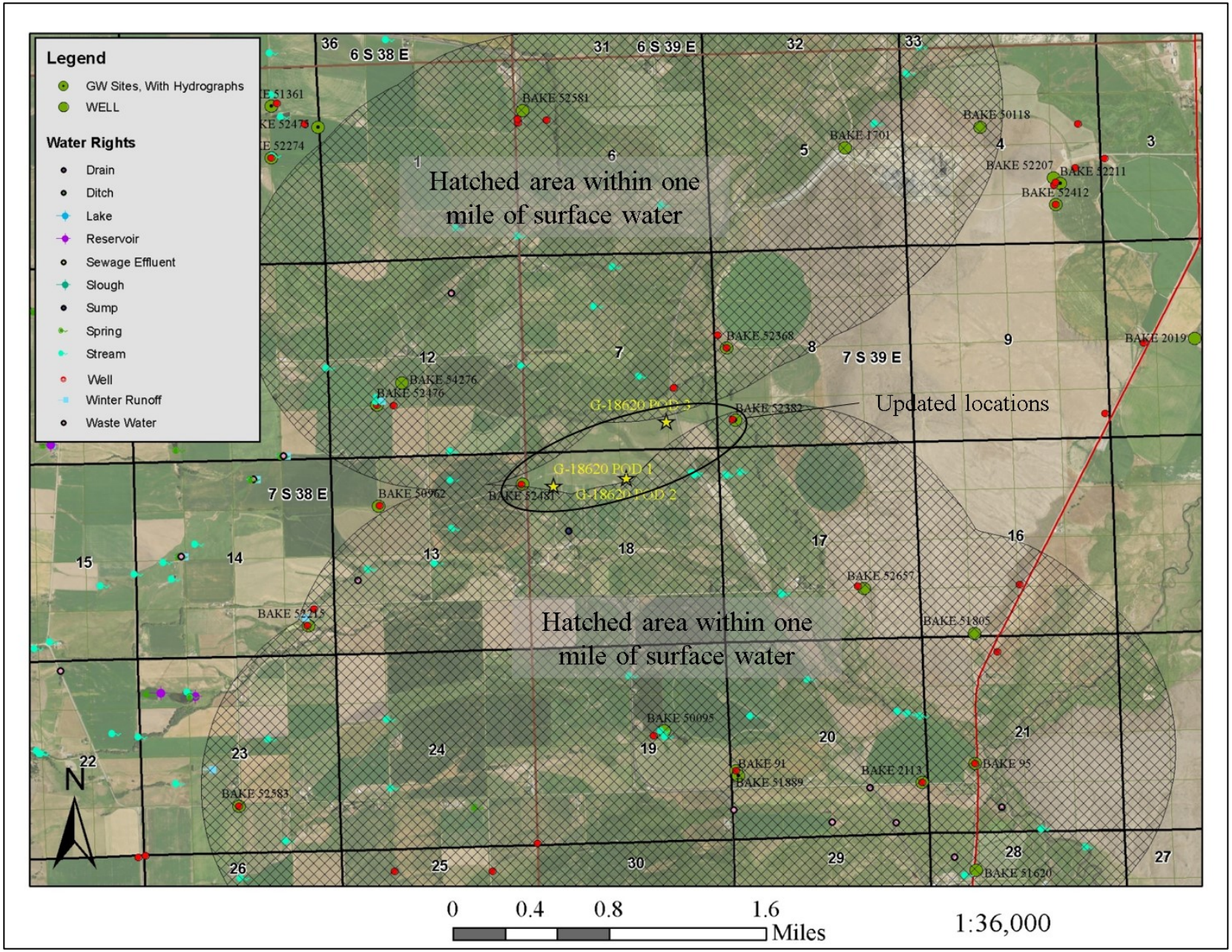
MEMORANDUM

DATE: 06/04/2020
TO: Application File G-18620
FROM: Phillip Marcy
SUBJECT: Changes in proposed POA locations

This memo addresses proposed changes in POA locations for Wells 1, 2, and 3 on application G-18620, for John and Zach Wilson. In the groundwater review dated 11/13/2018, PSI was triggered with nearby surface water for all three POA locations, based upon establishment of hydraulic connection to these streams and their location less than one mile from perennial surface water. In the updated map submitted by the CWRE, metes and bounds locations place all three POA locations outside of one mile from nearby surface water sources (see attached map), therefore rendering the finding of PSI with surface water no longer valid.

Phil Marcy
Hydrogeologist
Groundwater Section


Legend
GW Sites, With Hydrographs
WELL
Water Rights
Drain
Ditch
Lake
Reservoir
Sewage Effluent
Slough
Sump
Spring
Stream
Well
Winter Runoff
Waste Water
Hatched area within one mile of surface water
Hatched area within one mile of surface water
Updated locations
G-18620 POD 1
G-18620 POD 2
G-18620 POD 3
6 S 38 E
6 S 39 E
7 S 38 E
7 S 39 E
BAKE 52581
BAKE 50118
BAKE 1701
BAKE 52207
BAKE 52211
BAKE 52412
BAKE 52368
BAKE 2019
BAKE 54276
BAKE 52476
BAKE 52382
BAKE 50962
BAKE 52481
BAKE 52657
BAKE 51805
BAKE 50095
BAKE 91
BAKE 51889
BAKE 2113
BAKE 95
BAKE 52583
BAKE 51620
N
0 0.4 0.8 1.6
Miles
1:36,000

Groundwater Application Review Summary Form

Application # G- 18620

GW Reviewer Phil Marcy **Date Review Completed:** 11/13/2018

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:

[X] 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).

WATER RESOURCES DEPARTMENT

MEMO November 13, 2018

TO: **Application G-** 18620

FROM: **GW:** Phil Marcy
(Reviewer's Name)

SUBJECT: Scenic Waterway Interference Evaluation

☐ YES
The source of appropriation is within or above a Scenic Waterway
☒ NO

☐ YES
Use the Scenic Waterway condition (Condition 7J)
☒ NO

☐ Per ORS 390.835, the Groundwater Section is **able** to calculate ground water interference with surface water that contributes to a Scenic Waterway. The calculated interference is distributed below.

☐ Per ORS 390.835, the Groundwater Section is **unable** to calculate ground water interference with surface water that contributes to a scenic waterway; **therefore, the Department is unable to find that there is a preponderance of evidence that the proposed use will measurably reduce the surface water flows necessary to maintain the free-flowing character of a scenic waterway.**

DISTRIBUTION OF INTERFERENCE

Calculate the percentage of consumptive use by month and fill in the table below. If interference cannot be calculated, per criteria in 390.835, do not fill in the table but check the "unable" option above, thus informing Water Rights that the Department is *unable to make a Preponderance of Evidence finding.*

Exercise of this permit is calculated to reduce monthly flows in _____ Scenic Waterway by the following amounts expressed as a proportion of the consumptive use by which surface water flow is reduced.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO: Water Rights Section Date 11/13/2018

FROM: Groundwater Section Phillip I. Marcy
Reviewer's Name

SUBJECT: Application G- 18620 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: **John Wilson; Zach Wilson** County: **Baker**

A1. Applicant(s) seek(s) 4.99 cfs from 3 well(s) in the Powder Basin, _____ subbasin

A2. Proposed use Supplemental Irrigation (555.9 acres); Primary Irrigation (522.2 acres)

Seasonality: Supplemental: March 1 – October 1; Primary: October 1 – October 31

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	Alluvium	4.99	7S/39E-18 SW-NW	2050' S, 4410' W FR NE COR, S18
2	Proposed	2	Alluvium	4.99	7S/39E-18 SW-NE	1800' S, 2465' W FR NE COR, S18
3	Proposed	3	Alluvium	4.99	7S/39E-7 SW-SE	1115' N, 1385' W FR NE COR, S18
4						

* 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	3412	NA	NA	NA	500	0-215	0-500	?	Unknown	NA	NA	NA
2	3399	NA	NA	NA	500	0-215	0-500	?	Unknown	NA	NA	NA
3	3384	NA	NA	NA	500	0-215	0-500	?	Unknown	NA	NA	NA

Use data from application for proposed wells.

A4. **Comments:** The majority of the proposed groundwater use is for supplemental purposes, covering land under Certificates 83734 (50.8 acres; 0.64 cfs), 83738 (992.0 acres; 2480 AF/year), and 83760 (14.4 acres; 0.36 cfs). No specific rates were listed for proposed POA wells, therefore each will be evaluated at the rate of 4.99 cfs. Proposed well construction for all POA wells is similar to construction of existing well BAKE 52481, which is about 1,500' from the proposed location of POA 1, and 3,000' from POA 2. Thus, proposed POA wells are likely to produce from sand and gravel beneath a succession of clays, and resulting static heads may be higher than those in wells open to shallow alluvium at depths less than 150' BLS.

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"; Condition 7N**;
   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:** Expected seasonal drawdown at the nearest neighboring well (BAKE 52481) with similar construction was computed to fall within the range of less than 2 feet, to roughly 150 feet within a pumping season. This assumes the full-time use of the proposed POA well closest to neighboring wells for the duration of the proposed pumping season at the maximum pumping rate. The most likely scenario, using transmissivity from a pump test performed on BAKE 52481 (T2, S2 in the attached model run output), resulted in a predicted seasonal drawdown of 21 feet. The Theis time drawdown model was utilized for these calculations, with parameter values determined by the well log and pump test data for nearby BAKE 52481, which the proposed POA construction appears to be based upon.

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	**Alluvium**	☒	☐
2	**Alluvium**	☒	☐
3	**Alluvium**	☒	☐
		☐	☐
		☐	☐

Basis for aquifer confinement evaluation: Based upon the nearby well BAKE 52481, there appears to be localized confinement in the deeper sand and gravel aquifer, separated from overlying gravels by a succession of clay. When drilled in 2016, productive water-bearing zones encountered below 200' produced artesian pressure above land surface, whereas thise above 200' did not. This area likely represents a discharge zone, where deeper groundwater flow paths, recharged in the surrounding uplands, push toward the land surface, producing an upward gradient in the local system.

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? YES	NO	ASSUMED	Potential for Subst. Interfer. Assumed? YES	NO
1	1	**Little Muddy Creek**	**3427**	**3442-3370**	**2150**	☒	☐	☐	☐	☒
2	1	**Little Muddy Creek**	**3427**	**3442-3370**	**1700**	☒	☐	☐	☐	☒
3	1	**Little Muddy Creek**	**3427**	**3442-3370**	**4730**	☒	☐	☐	☐	☒
1	2	**Unnamed trib to Muddy Ck.**	**3427**	**3370-3400**	**2900**	☒	☐	☐	☐	☒
2	2	**Unnamed trib to Muddy Ck.**	**3427**	**3370-3400**	**1550**	☒	☐	☐	☐	☒
3	2	**Unnamed trib to Muddy Ck.**	**3427**	**3370-3400**	**1450**	☒	☐	☐	☐	☒
3	3	**Warm Springs Creek**	**3427**	**3350-3373**	**1020**	☒	☐	☐	☒	☐

Basis for aquifer hydraulic connection evaluation: Water level data from local wells suggest this area is a discharge zone, with artesian pressure higher in aquifer units under some degree of local confinement. As such, the movement of groundwater is likely slow, and upward toward the surface, where it discharges into shallower aquifer materials and surface waters.

Water Availability Basin the well(s) are located within: Powder R > Snake R – AB UNN STR (ID # 72191)

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**	☐	☐	**IS72191A**	**25**	☒	**70.3**	☒	**<<25%**	☒
2	**1**	☐	☐	**IS72191A**	**25**	☒	**70.3**	☒	**<<25%**	☒
3	**1**	☐	☐	**IS72191A**	**25**	☒	**70.3**	☒	**<<25%**	☒
1	**2**	☐	☐	**IS72191A**	**25**	☒	**70.3**	☒	**<<25%**	☒
2	**2**	☐	☐	**IS72191A**	**25**	☒	**70.3**	☒	**<<25%**	☒
3	**2**	☐	☐	**IS72191A**	**25**	☒	**70.3**	☒	**<<25%**	☒
3	**3**	☒	☐	**IS72191A**	**25**	☒	**70.3**	☒	**<<25%**	☒
		☐	☐			☐		☐		☐

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?
			☐			☐		☐		☐
			☐			☐		☐		☐
			☐			☐		☐		☐
			☐			☐		☐		☐

Comments: At the proposed pumping rate and given locations, all three proposed POAs trigger Potential to Substantially Interfere (PSI). Instream water right IS72191A, requiring a minimum flow of 25 cfs for the selected Water Availability Basin (WAB) restricts withdrawal of more than 0.25 cfs (1% of IS right) for the months of July-January for hydraulically connected groundwater less than one mile from a surface water source. At 30 days, the calculated interference at each stream due to pumping is a small fraction of the total pumping rate, due to the thick succession of clays between the productive zones and the connected surface water.

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													
		%	%	%	%	%	%	%	%	%	%	%	%
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.

Basis for impact evaluation: This section does not apply.

C4b. **690-09-040 (5) (b) The potential to impair or detrimentally affect the public interest is to be determined by the Water Rights Section.**

C5. ☐ **If properly conditioned**, the surface water source(s) can be adequately protected from interference, and/or groundwater use under this permit can be regulated if it is found to substantially interfere with surface water:

i. ☐ The permit should contain condition #(s)_____;

ii. ☐ The permit should contain special condition(s) as indicated in "Remarks" below;

C6. **SW / GW Remarks and Conditions:** Although saturated and in hydraulic connection to deeper portions of the aquifer, the low conductivity of upper clay zones likely will reduce the efficiency of hydraulic connection and thus reduce impacts of pumping to nearby surface water sources. Pumping from deeper in the aquifer will further reduce impacts to surface water by further reducing the efficiency of hydraulic connection and by spreading the impacts over a larger area. Due to the high proposed pumping rate and concerns of interference with nearby water rights, especially permit G-17457, if a permit is issued, **standard drawdown conditions are appropriate and need to be enforced.**

References Used:

"Powder River Basin". June 1967. State Water Resources Board. Salem, OR.

Trauger, F. D. 1951. "Ground Water Resources of Baker Valley, Baker County, Oregon". U.S. Geological Survey Open File Report.

Brooks, H. C., J. R. McIntyre, and G. W. Walker. 1976. "Geology of the Oregon Part of the Baker 1 by 2 Quardrangle". Dept. of Geology and Mineral Industries, Geological Map Series GMS-7.

Hunt, B. 2003. Unsteady stream depletion when pumping a semi-confined aquifer. Journal of Hydrologic Engineering. Jan/Feb, 2003.

Application G-17858 groundwater review.

OWRD well log database, OWRD water level database

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

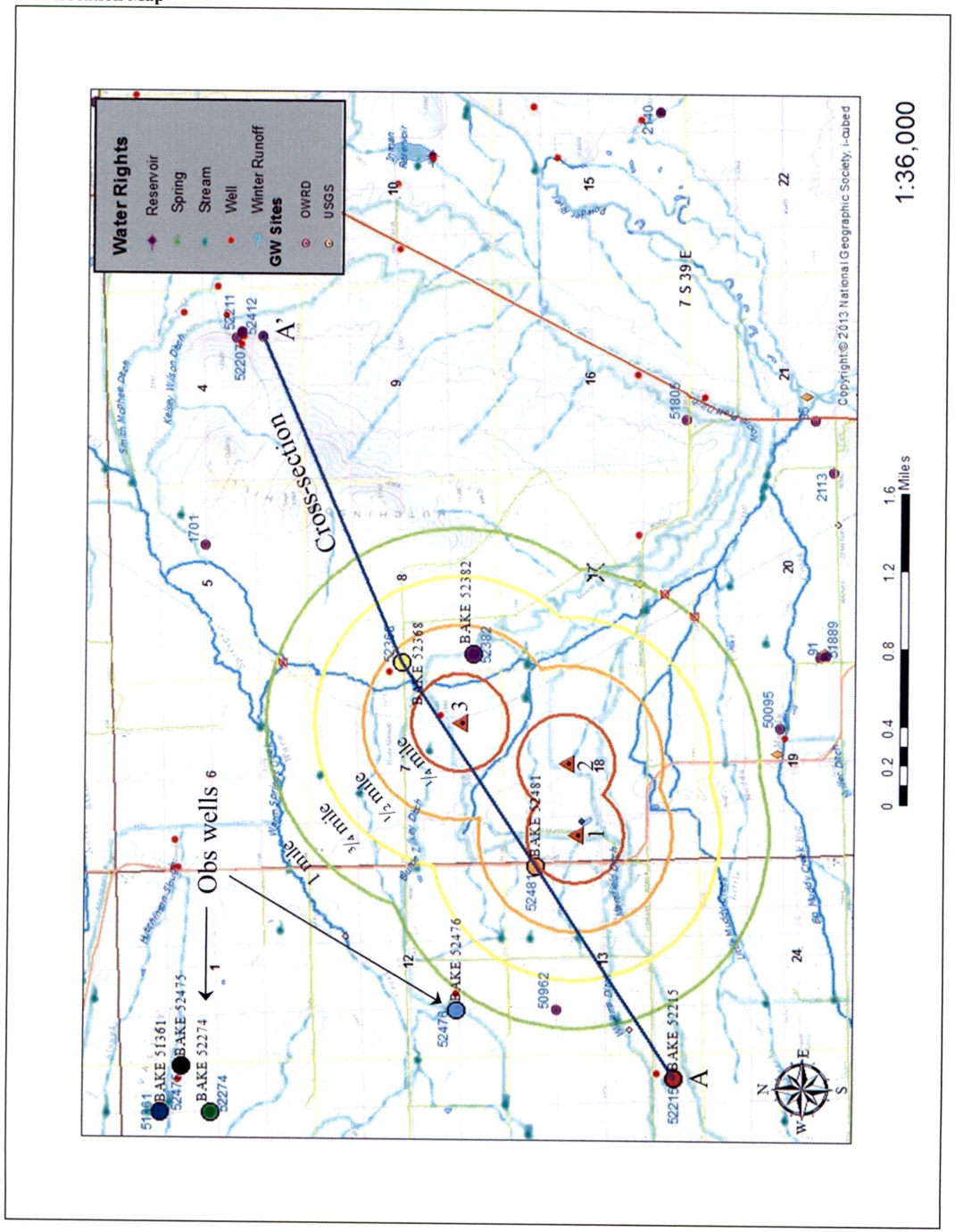
Watershed ID #: 72191
Time: 11:44 AM

POWDER R > SNAKE R - AB UNN STR
Basin: POWDER

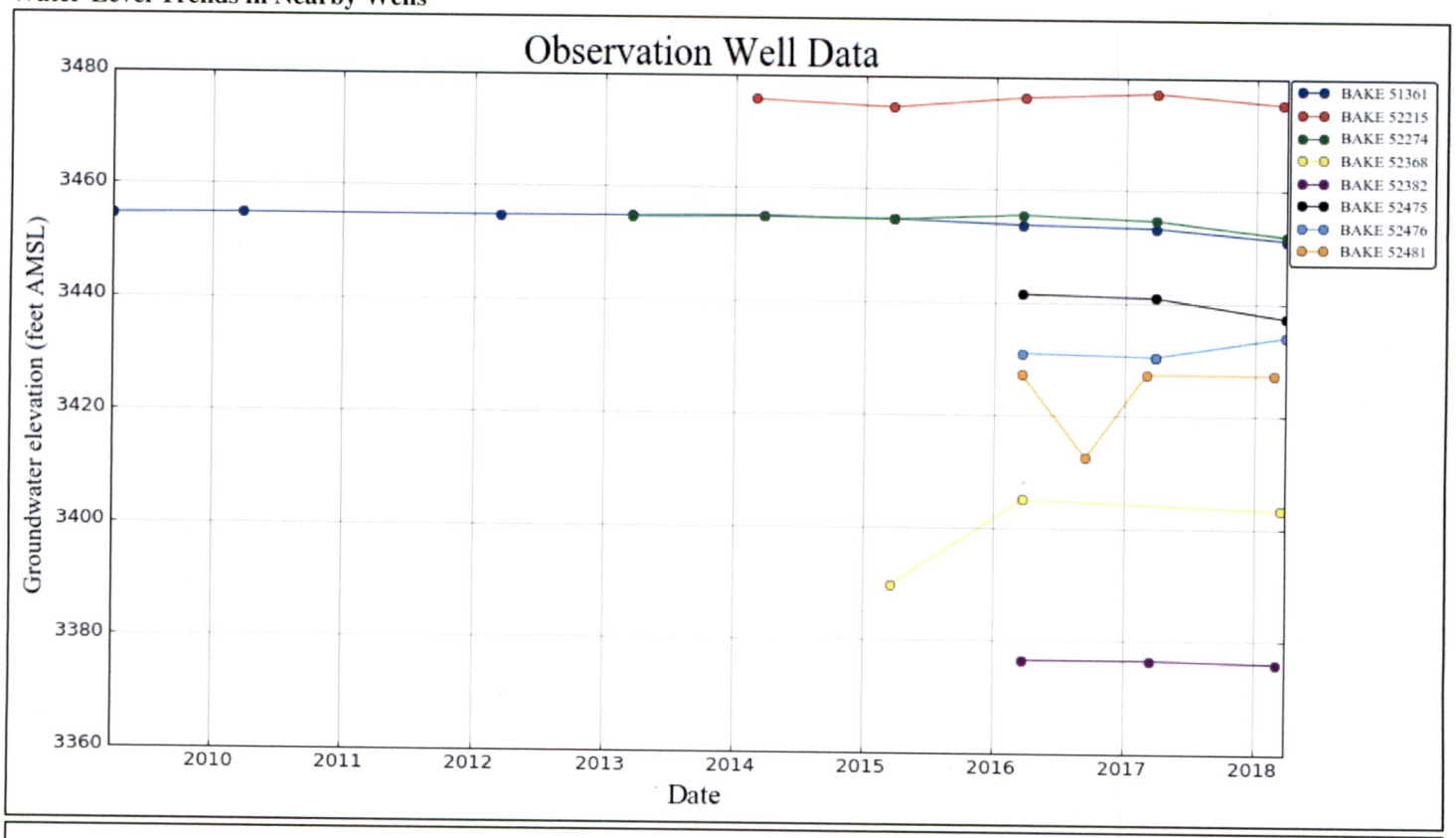
Exceedance Level: 80
Date: 11/13/2018

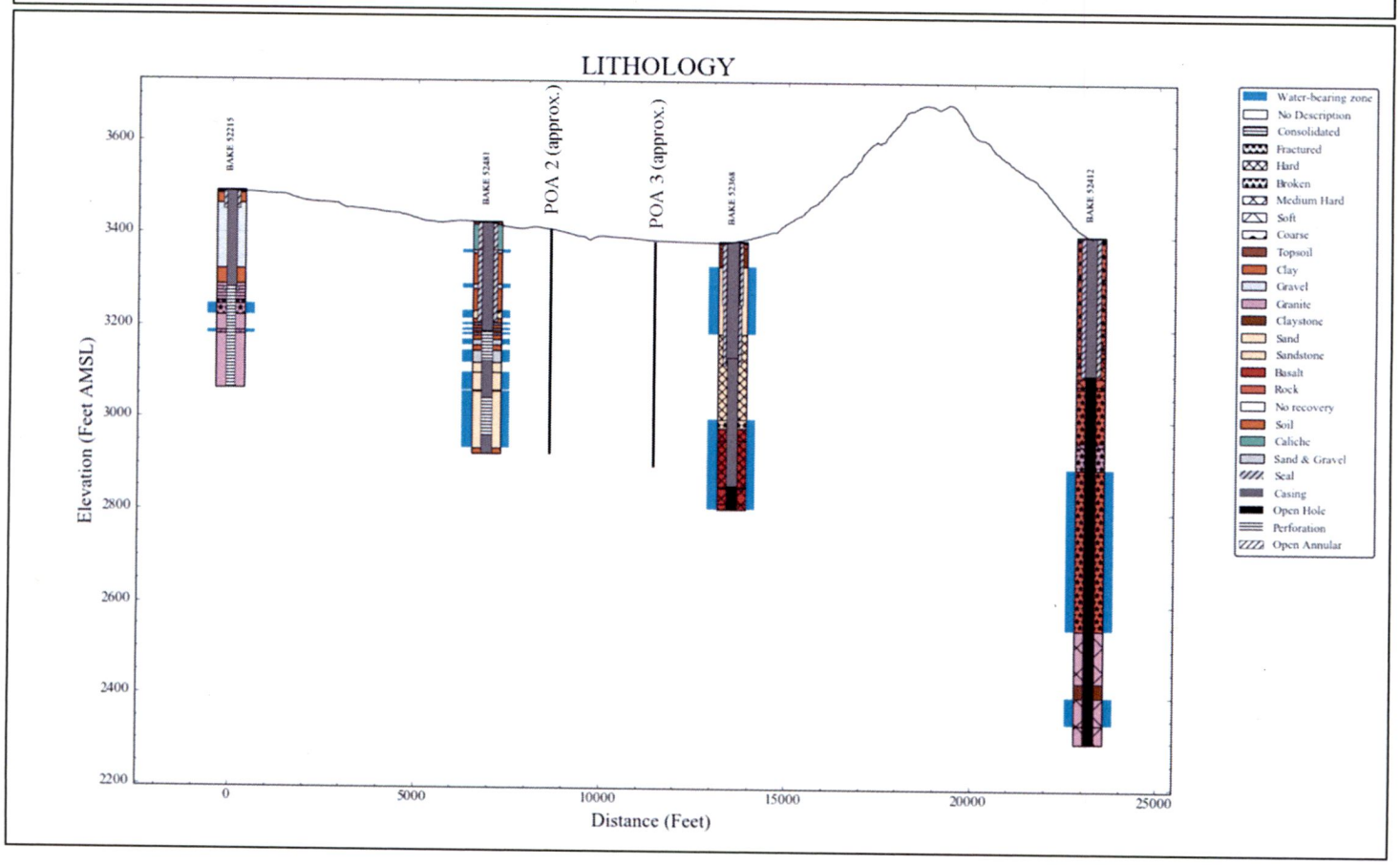
Month	Natural Stream Flow	Consumptive Use and Storage	Expected Stream Flow	Reserved Stream Flow	Instream Requirements	Net Water Available
	Monthly values are in cfs. Storage is the annual amount at 50% exceedance in ac-ft.					
JAN	65.90	89.00	-23.10	6.37	25.00	-54.50
FEB	103.00	108.00	-5.34	20.60	30.00	-56.00
MAR	203.00	193.00	10.20	61.60	40.00	-91.40
APR	456.00	353.00	103.00	251.00	40.00	-189.00
MAY	714.00	843.00	-129.00	140.00	40.00	-309.00
JUN	593.00	995.00	-402.00	0.00	40.00	-442.00
JUL	204.00	529.00	-325.00	0.00	25.00	-350.00
AUG	107.00	313.00	-206.00	0.00	25.00	-231.00
SEP	72.70	240.00	-167.00	0.00	25.00	-192.00
OCT	70.30	90.40	-20.10	4.67	25.00	-49.70
NOV	75.10	71.30	3.82	5.56	25.00	-26.70
DEC	77.90	82.90	-5.00	6.14	25.00	-36.10
ANN	241,000	236,000	47,000	29,900	22,000	5,270

Well Location Map



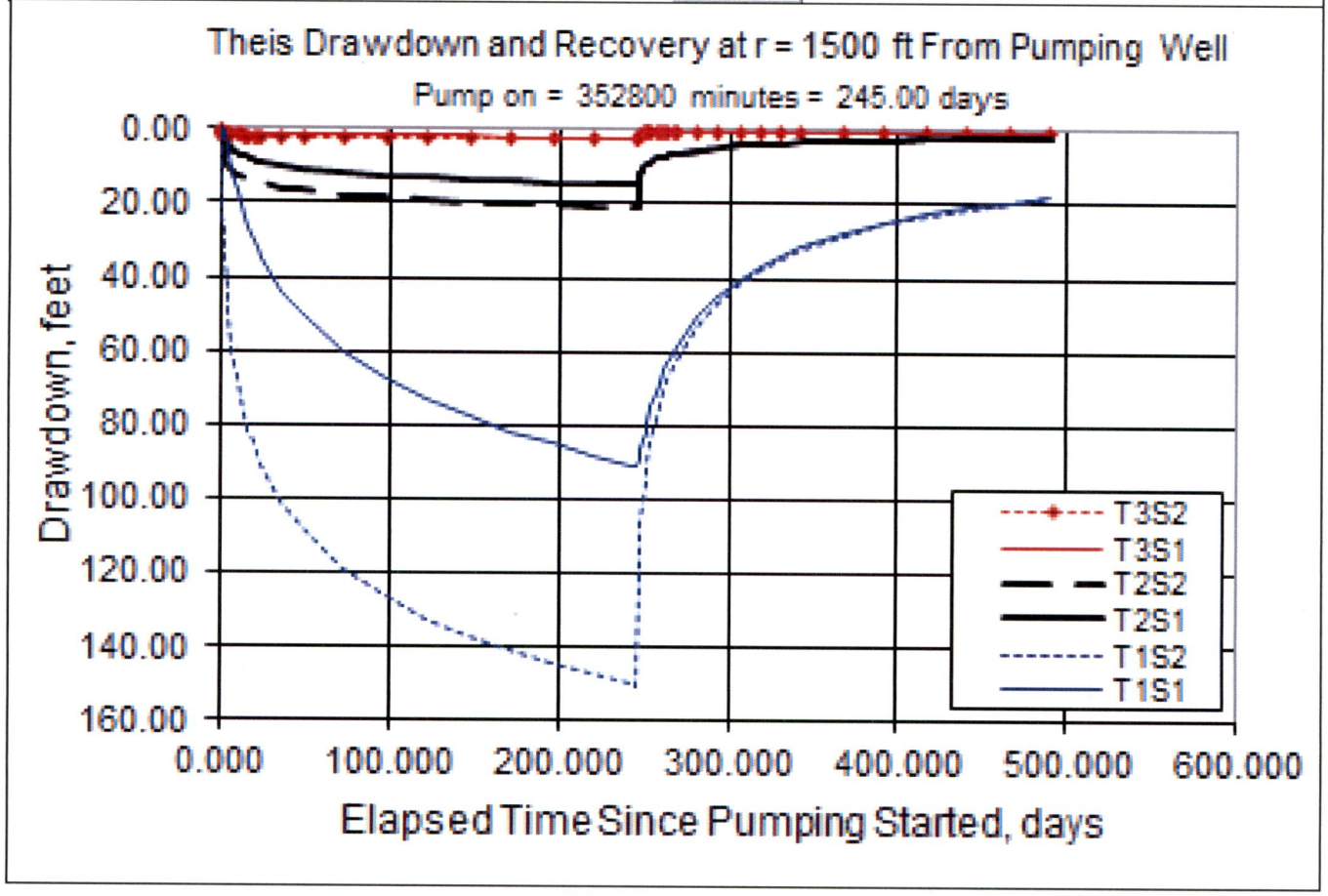
Water-Level Trends in Nearby Wells

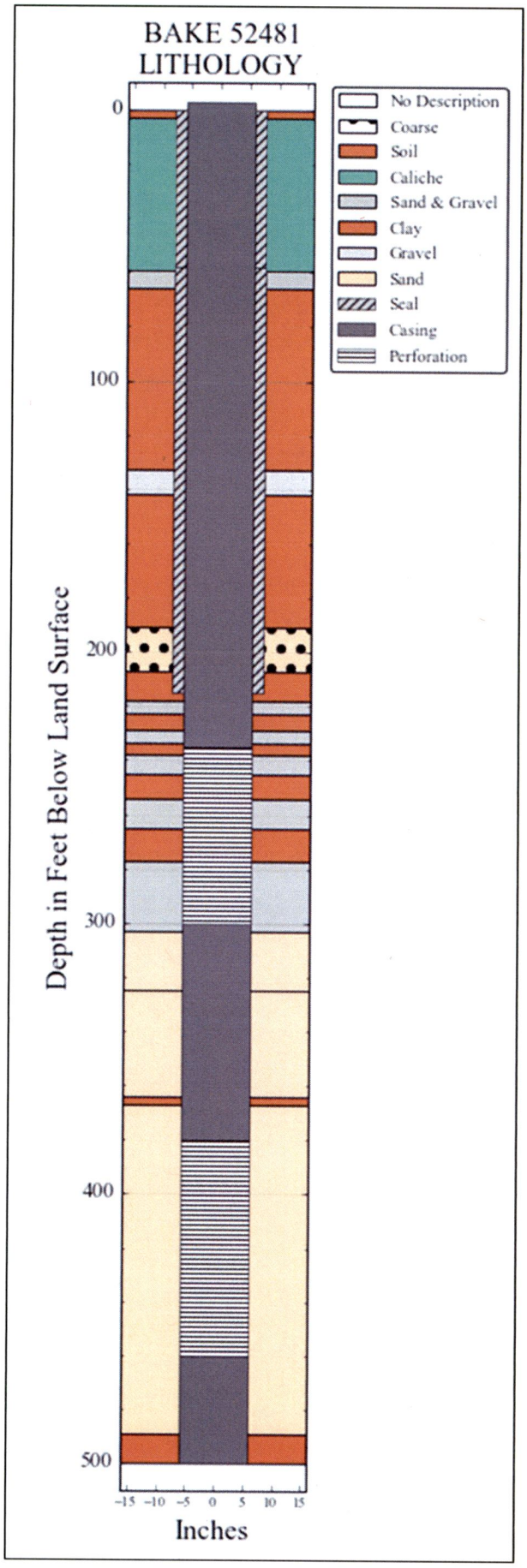




Input Data:	Var Name	Scenario 1	Scenario 2	Scenario 3	Units	
Total pumping time	t		245		d	
Radial distance from pumped well:	r		1500.00		ft	Q conversions
Pumping rate	Q		5.0		cfs	2,239.51 gpm
Hydraulic conductivity	K	66	660	6,600	ft/day	4.99 cfs
Aquifer thickness	b		20		ft	299.40 cfm
Storativity	S_1		0.01000			431,136.00 cfd
	S_2		0.00100			9.90 af/d
Transmissivity Conversions	T_f2pd	1,320	13,200	132,000	ft2/day	
	T_ft2pm	0.9167	9.1667	91.6667	ft2/min	
	T_gpdpft	9,874	98,736	987,360	gpd/ft	
			Recalculate		Use the Recalculate button if recalculation is set to manual	

PT value




BAKE 52481
LITHOLOGY
No Description
Coarse
Soil
Caliche
Sand & Gravel
Clay
Gravel
Sand
Seal
Casing
Perforation
Depth in Feet Below Land Surface
0
100
200
300
400
500
-15 -10 -5 0 5 10 15
Inches