

Groundwater Application Review Summary Form

Application # G- 18882

GW Reviewer Phil Marcy Date Review Completed: 12/17/2019

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).

MEMO

12/17, 20 19

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.**

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.

[illegible]

PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO: Water Rights Section Date 12/17/2019
 FROM: Groundwater Section Phillip I. Marcy
 Reviewer's Name
 SUBJECT: Application G- 18882 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: Gregory L. Bingaman County: Union

A1. Applicant(s) seek(s) 2.57 cfs from 1 well(s) in the Grande Ronde Basin,
 _____ subbasin

A2. Proposed use Irrigation (154.32 acres) Seasonality: March 1st – October 1st (214 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	Basalt	2.57	2S/38E-1 NW-NW	60'S, 60'E fr NW cor S 1
2	Proposed	2	Basalt	2.57	2S/38E-1 NW-NW	60'S, 1290' E fr NW cor S 1
3	Proposed	3	Basalt	2.57	2S/38E-1 NE-NW	210'S, 540'W fr N ¼ cor S 1
4	Proposed	4	Basalt	2.57	2S/38E-1 SW-NW	1450'S, 555'E fr NW cor S 1

* 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	2751	NA	NA	NA	1200+	TBD	TBD	Unknown	TBD	NA	NA	NA
2	2763	NA	NA	NA	1200+	TBD	TBD	Unknown	TBD	NA	NA	NA
3	2774	NA	NA	NA	1200+	TBD	TBD	Unknown	TBD	NA	NA	NA
4	2761	NA	NA	NA	1200+	TBD	TBD	Unknown	TBD	NA	NA	NA

Use data from application for proposed wells.

A4. **Comments:** The applicant has proposed 4 well locations, but intends to only develop one site as a POA, depending on site conditions. The proposed construction details include a planned seal 5 feet into competent basalt, with an anticipated well depth of about 1200', based upon nearby log for UNIO 173. The proposed rate of 2.57 cfs is based on a duty of 1/60th cfs/acre, versus the standard 1/80th cfs/acre due to the arid environment of the Grande Ronde basin.

A5. ☒ **Provisions of the** Grande Ronde 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) 7N; "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 Basalt 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:** The applicant proposes to develop groundwater from "Basalt". In our current conceptual hydrogeologic model, rocks of the Columbia River Basalt Group (CRBG) provide a high degree of confinement and vertical hydraulic isolation, due to the presence of laterally continuous lava flows that include dense interiors that are often tens of meters in thickness. Hydrologic characteristics of the Powder River Volcanics (PRV), which appear to be the targeted lithology of this proposed construction, are not as well understood. Nearby UNIO 54215, constructed under permit G-17020, and UNIO 50684, constructed under permit G-15504, access both PRV and CRBG interflow zones, with no noted head difference between the two sequences. In the case of UNIO 52415, the driller did note a head difference between the compound volcanic sequence and overlying sedimentary sequence, but no difference was noted between the two volcanic sequences. In the case of UNIO 50684, two water-bearing zones are reported within each of the volcanic sequences, but no head measurements are reported on the driller's log. Therefore, lacking any further information, an assessment of whether the CRBG, PRV, or any combination of thereof comprises a single aquifer system is not possible. As a result, more information is needed to approve construction of a POA well that does not risk commingling discreet aquifers, and furthermore to establish a reasonable basis for the conclusion that hydraulic connection with surface water has been avoided.
- _____
- _____

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	Powder River Volcanics	☒	☐
2	Powder River Volcanics	☒	☐
3	Powder River Volcanics	☒	☐
4	Powder River Volcanics	☒	☐
		☐	☐

Basis for aquifer confinement evaluation: Head elevations in nearby wells producing from PRV are typically hundreds of feet above where these zones are encountered, with some examples producing artesian flow. The application cites the stratigraphy reported in nearby UNIO 173 to determine the expected depth of volcanic rock at about 350 feet below land surface at the proposed POA locations less than one mile to the south. However, the geometry of fault blocks beneath the valley-fill sequence is poorly constrained due to the paucity of wells completed into volcanic rock at depth. UNIO 50684, roughly 2 miles south of the proposed POA locations, reports first encountering bedrock at nearly 2,000 feet below land surface. Therefore, at the given locations, these aquifers are anticipated to reside at depths between 350 and 2,000 feet below land surface, with resulting head expected to be less than 100' below land surface to greater than land surface, based on available data. **Therefore, it is recommended that if a permit is issued, a test hole be completed to determine site conditions prior to constructing the production well.**

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	Slide Creek	2805*	2720	3075	☐	☒	☐	☐	☒
2	1	Slide Creek	2805*	2720	4300	☐	☒	☐	☐	☒
3	1	Slide Creek	2805*	2720	5050	☐	☒	☐	☐	☒
4	1	Slide Creek	2805*	2720	3700	☐	☒	☐	☐	☒

Basis for aquifer hydraulic connection evaluation: It is unknown to what extent, if any, that groundwater in the deep PRV/CRBG aquifer contributes to surface water in this area.

Water Availability Basin the well(s) are located within: WILLOW CR > GRANDE RONDE R - AT MOUTH

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

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: This section does not apply.

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.

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:
- ☐ The permit should contain condition #(s) _____;
 - ☐ The permit should contain special condition(s) as indicated in "Remarks" below;

C6. **SW / GW Remarks and Conditions:**

If a permit is issued, the following special conditions shall apply:

1. Wells shall be open to a single aquifer in either the Powder River Volcanics or Columbia River Basalt Group and shall meet applicable well construction standards (OAR 690-200 and OAR 690-210). In addition, the open interval shall be no greater than 100 feet. However, a larger open interval may be approved by the Department if the applicant can demonstrate to the satisfaction of the Department that each well is only open to a single aquifer. Following well completion, the well shall be thoroughly developed to remove cuttings and drilling fluids. Substantial evidence of a single aquifer completion may be collected by video log, downhole flowmeter, water chemistry and temperature, or other downhole geophysical methods approved by the Department. These methods shall characterize the nature of the basalt rock and assess whether water is moving in the borehole. Any discernable movement of water within the well bore when the well is not being pumped shall be assumed as evidence of the presence of multiple aquifers in the open interval.
2. Whenever possible, drill cuttings shall be collected at 10-foot intervals and at changes in formation in the well and a split of each sampled interval shall be provided to the Department.

References Used: Local well logs, Application reviews G-16533, G-16602, G-17558, and G-18825.

Development Potential of Ground Water in the Grande Ronde Valley, Union County, Oregon, Ham, 1966

Ferns, M. L., McConnell, V. S., Madin, I. P., and Johnson, J. A., 2010, Geology of the upper Grande Ronde River basin, Union County, Oregon; Oregon Department of Geology and Mineral Industries Bulletin 107, scale 1:100,000, 65 p.

OWRD water level database.

D. WELL CONSTRUCTION, OAR 690-200

D1. Well #: _____ Logid: _____

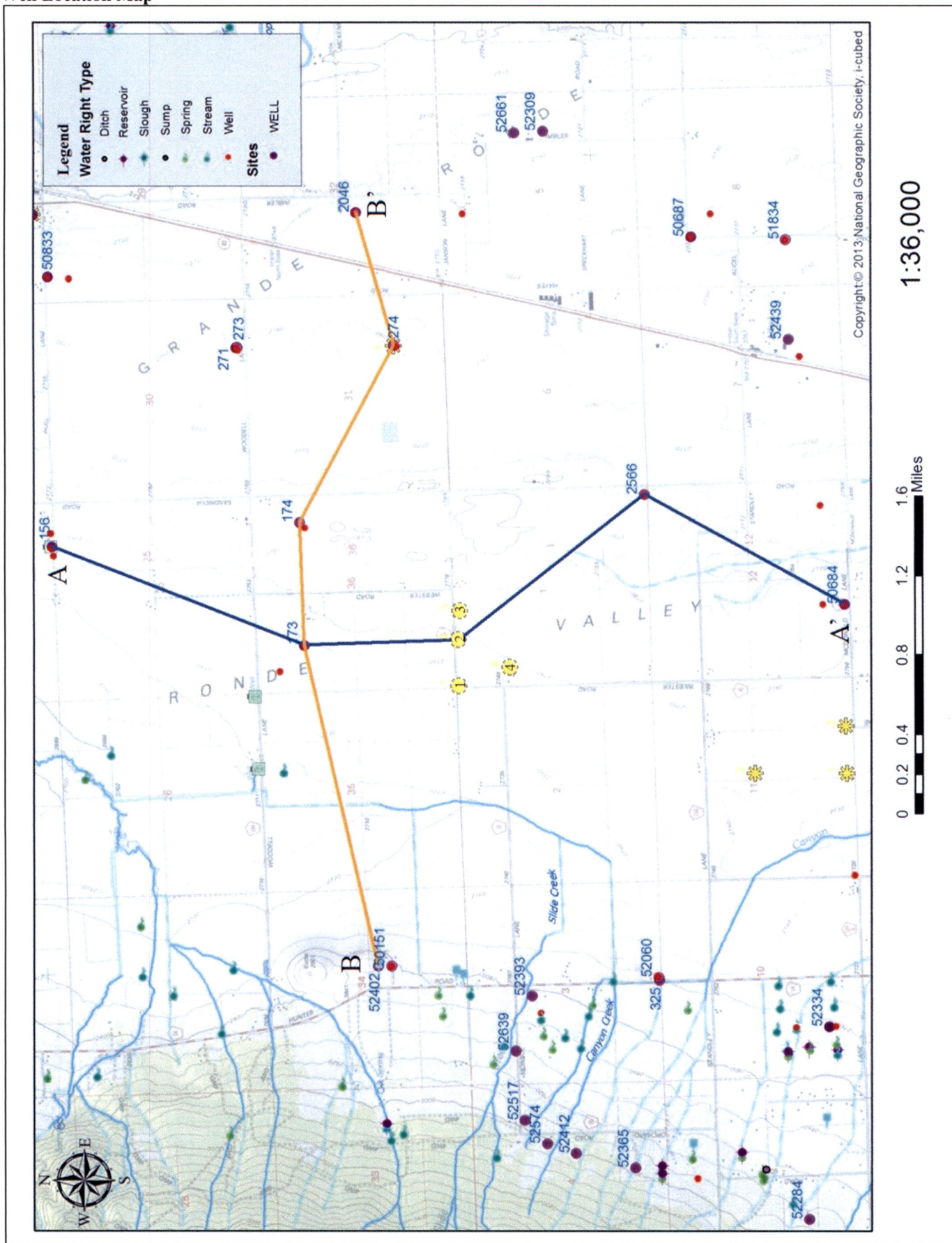
D2. **THE WELL does not appear to meet current well construction standards based upon:**

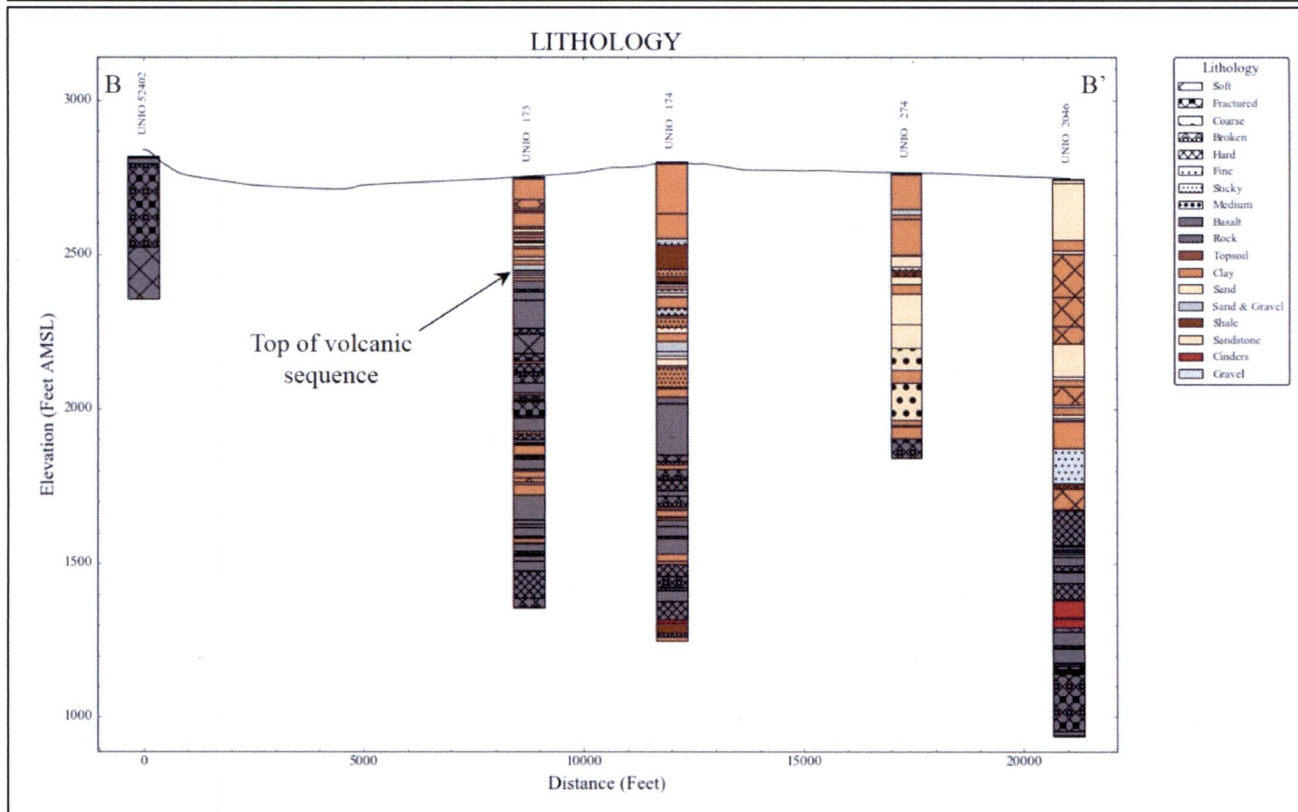
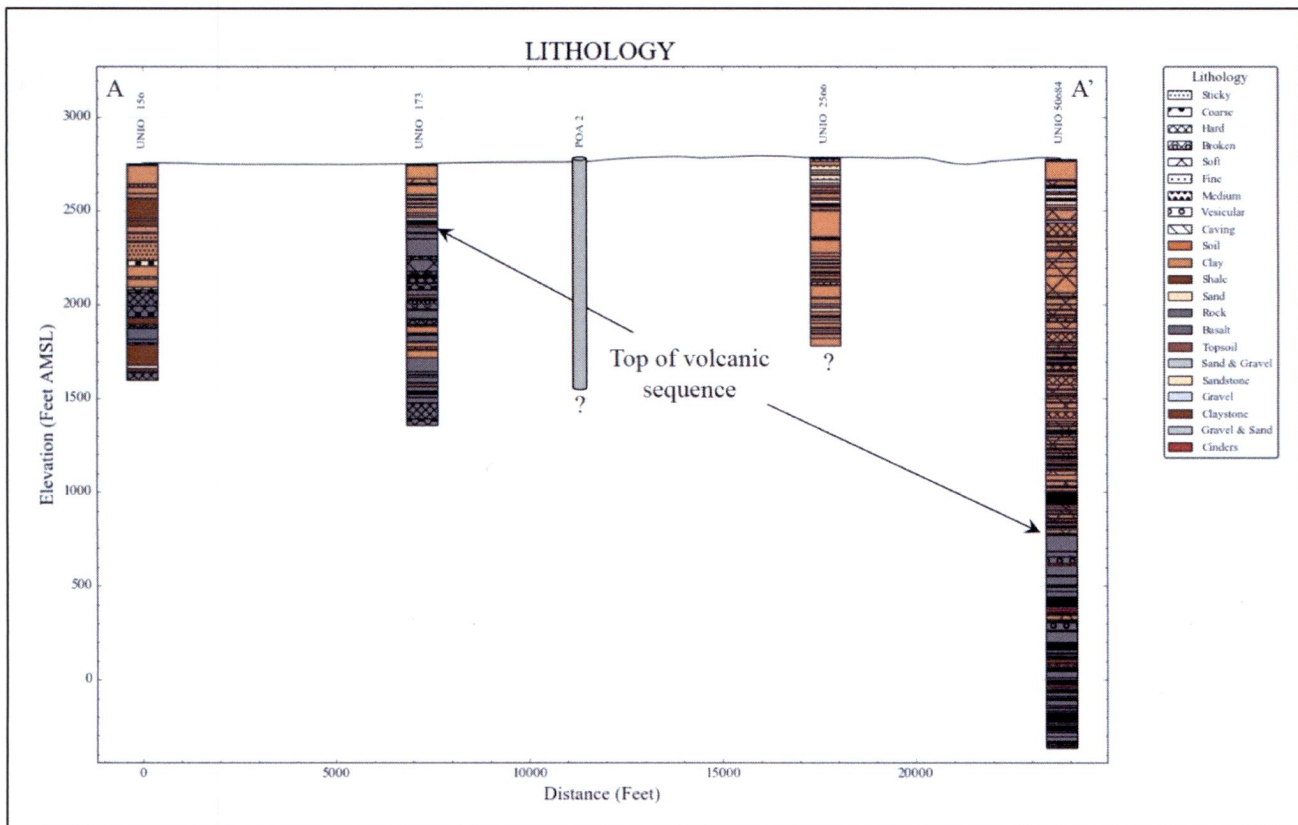
- a. ☐ review of the well log;
 b. ☐ field inspection by _____;
 c. ☐ report of CWRE _____;
 d. ☐ other: (specify) _____

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 #: 71669		WILLOW CR > GRANDE RONDE R - AT MOUTH			Exceedance Level: 80	
Time: 1:41 PM		Basin: GRANDE RONDE			Date: 12/10/2019	
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	11.60	0.23	11.40	0.00	13.00	-1.62
FEB	41.60	0.33	41.30	0.00	13.00	28.30
MAR	79.20	0.42	78.80	0.00	20.00	58.80
APR	72.40	8.55	63.80	0.00	34.00	29.80
MAY	54.80	51.30	3.50	0.00	34.00	-30.50
JUN	14.90	61.10	-46.20	0.00	20.00	-66.20
JUL	5.86	27.70	-21.80	0.00	8.03	-29.80
AUG	4.78	8.01	-3.23	0.00	7.34	-10.60
SEP	4.95	4.21	0.74	0.00	5.25	-4.51
OCT	5.05	0.15	4.90	0.00	6.89	-1.99
NOV	6.25	0.16	6.09	0.00	11.20	-5.11
DEC	9.52	0.19	9.33	0.00	13.00	-3.67
ANN	35,700	9,830	28,600	0	11,200	19,900

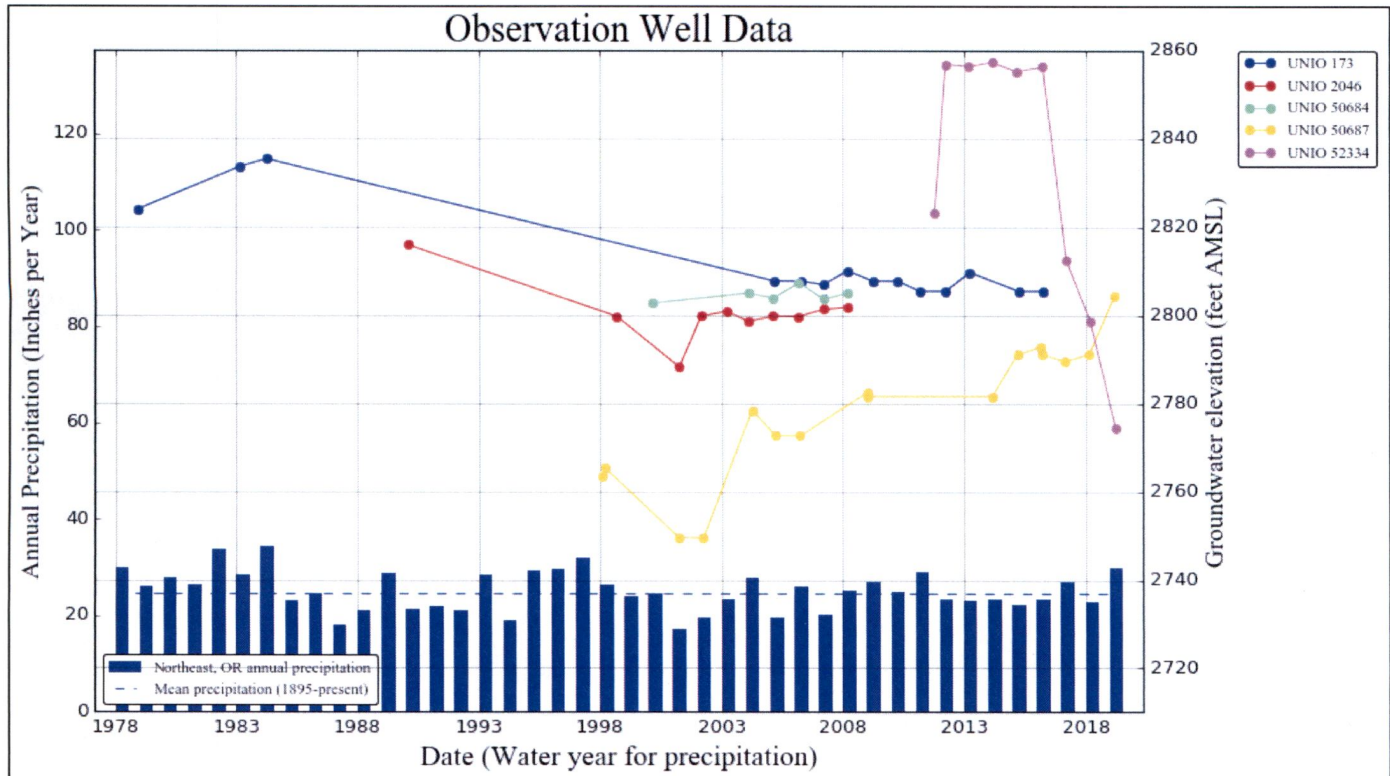
Well Location Map





Cross sections constructed from plotting reported lithology in well log reports suggest that depth to volcanic rock at the proposed POA location(s) may vary considerably, depending on the location of buried structures beneath the valley-fill sequence (top: A-A' cross-section; see attached map). Changes in elevation of the top of the volcanic sequence are not as dramatic in the E-W direction as from N-S in this area (bottom: B-B'). Unfortunately, at the present time, there are insufficient data to more accurately pinpoint subsurface faults.

Water-Level Trends in Nearby Wells



Water level data indicate that wells producing from volcanic rock at very different depths to the north and south (UNIO 173 and UNIO 50684) of the proposed POA locations have very similar head elevations. This suggests that either the hydraulic system is connected across a buried fault responsible for the offset observed here, or that possibly they are completed in the same fault block dipping generally toward the south.