

Approved: 

MEMO

To: Kristopher Byrd, Well Construction and Compliance Section Manager
From: Travis Kelly, Well Construction Program Coordinator
Subject: Review of Water Right Application G-18914
Date: August 12, 2020

The attached application was forwarded to the Well Construction and Compliance Section by the Groundwater Section. Mike Thoma reviewed the application. Please see Mike's Groundwater Review and the Well Report.

Applicant's Well #1 (LANE 68563): Based on a review of the Well Report, Applicant's Well #1 seems to protect the groundwater resource.

The construction of Applicant's Well #1 may not satisfy hydraulic connection issues.

Applicant's Well #2 (Proposed Well): Is a proposed well, therefore it cannot be reviewed for construction. Construction of the proposed well shall be completed in a manner that protects ground water resources as required under Oregon Administrative Rules 690-200 through 690-240. During construction of the well, specific attention should be paid to ensure sealing requirements are met and that the well does not commingle aquifers.

The construction of proposed Well #2 may not satisfy hydraulic connection issues.

STATE OF OREGON
 WATER SUPPLY WELL REPORT
 (as required by ORS 537.765 & OAR 690-205-0210)

WELL LABEL # L 93182

START CARD # 197536

(1) LAND OWNER Owner Well I.D. _____
 First Name Sihu Last Name Klest
 Company _____
 Address 3326 Videra Drive
 City Eugene State OR Zip 97405

(2) TYPE OF WORK New Well Deepening Conversion
 Alteration (repair/recondition) Abandonment

(3) DRILL METHOD
 Rotary Air Rotary Mud Cable Auger Cable Mud
 Reverse Rotary Other _____

(4) PROPOSED USE Domestic Irrigation Community
 Industrial/ Commercial Livestock Dewatering
 Thermal Injection Other _____

(5) BORE HOLE CONSTRUCTION Special Standard (Attach copy)
 Depth of Completed Well 140 ft.

BORE HOLE			SEAL				sacks/ lbs
Dia	From	To	Material	From	To	Amt	
12	0	18	Bentonite	0	18	12	S
8	18	140					

How was seal placed: Method A B C D E
 Other Poured
 Backfill placed from _____ ft. to _____ ft. Material _____
 Filter pack from _____ ft. to _____ ft. Material _____ Size _____
 Explosives used: Yes Type _____ Amount _____

(6) CASING/LINER

Casing	Liner	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	8		<input checked="" type="checkbox"/> 2	128	.250	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

Shoe Inside Outside Other Location of shoe(s) _____
 Temp casing Yes Dia _____ From _____ To _____

(7) PERFORATIONS/SCREENS
 Perforations Method Hot
 Screens Type _____ Material _____

Perf/ Screen	Casing/ Liner	Screen Dia	From	To	Scm/slot width	Slot length	# of slots	Tele/ pipe size
Perf	Casing	8	80	128	25	2	864	

(8) WELL TESTS: Minimum testing time is 1 hour

Pump Bailer Air Flowing Artesian

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration (hr)
100		140	1

Temperature 56 °F Lab analysis Yes By _____
 Water quality concerns? Yes (describe below)

From	To	Description	Amount	Units

(9) LOCATION OF WELL (legal description)
 County LANE Twp 18 S N/S Range 2 W E/W WM
 Sec 19 SW 1/4 of the SW 1/4 Tax Lot 2603
 Tax Map Number _____ Lot _____
 Lat _____ ° 0 ' " or 0 DMS or DD
 Long _____ ° 0 ' " or 0 DMS or DD
 Street address of well Nearest address

34714 Highway 58, Eugene

(10) STATIC WATER LEVEL

Existing Well / Predeepening	Date	SWL(psi)	+ SWL(ft)
Completed Well	05-08-2008		8

Flowing Artesian? Dry Hole?

WATER BEARING ZONES Depth water was first found 30

SWL Date	From	To	Est Flow	SWL(psi)	+ SWL(ft)
05-09-2008	30	125	100		8

(11) WELL LOG Ground Elevation _____

Material	From	To
Brown Clay	0	17
Sand and Gravel	17	82
Course Gravel	82	90
Sand and Gravel	90	125
Blue Sandstone	125	140

RECEIVED

JUN 27 2008

WATER RESOURCES DEPT.
SALEM, OREGON

Date Started 05-08-2008 Completed 05-12-2008

(unbonded) Water Well Constructor Certification
 I certify that the work I performed on the construction, deepening, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.
 License Number _____ Date _____
 Password : (if filing electronically) _____
 Signed _____

(bonded) Water Well Constructor Certification
 I accept responsibility for the construction, deepening, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.
 License Number 153 Date 15-14-08
 Password : (if filing electronically) _____
 Signed [Signature]
 Contact Info (optional) _____

Groundwater Application Review Summary Form

Application # G- 18914

GW Reviewer M. Thoma

Date Review Completed: 08/06/2020

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).

WATER RESOURCES DEPARTMENT

MEMO

08/06/2020

TO: **Application G- 18914**

FROM: **GW: M. Thoma**
 (Reviewer's Name)

SUBJECT: Scenic Waterway Interference Evaluation

YES The source of appropriation is hydraulically connected to a State Scenic Waterway or its tributaries

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 [Enter] 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 08/06/2020
 FROM: Groundwater Section M. Thoma
Reviewer's Name
 SUBJECT: Application G- 18914 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: Sheila Klest / Trillium County: Lane

A1. Applicant(s) seek(s) 0.67 cfs from 2 well(s) in the Willamette Basin,
Coast Fk Willamette subbasin

A2. Proposed use Nursery (24.39 acres) Seasonality: Year-round

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	LANE0068563	1	Alluvium	0.67	18S/02W-19 NWSW	2084 ft N, 632 ft E of SW cor S19
2	PROPOSED	2	Alluvium	0.67	18S/02W-19 NWSW	1886 ft N, 945 ft E of SW cor S19
3						
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	485	30	8	5/9/2008	140	0-18	+2-128	-	80-128	100	-	A
2	485	-	-	-	-	-	-	-	-	-	-	-

Use data from application for proposed wells.

A4. **Comments:** Well #2 is a proposed well and is proposed to be of similar depth as Well #1 and so will likely encounter similar geology and hydrologic conditions as Well #1

A5. **Provisions of the Willamette (OAR 590-515)** 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) **7C (7-year SWL Reporting); Medium 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 water level data in the immediate area of the proposed POA so long-term trends cannot be identified. Additionally, a rigorous analysis of the water-balance for the aquifer system in the area has not been performed and so Over-Appropriation cannot be determined.

The nearest permitted groundwater right is approximately ¾ of a mile from the proposed POAs. At this distance and given a range of likely hydraulic parameter values, interference at the existing permitted POAs is likely to be only a few feet and thus not likely to cause injury. However, standard interference conditions shall apply.

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	consolidated alluvial deposits	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	consolidated alluvial deposits	<input checked="" type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>

Basis for aquifer confinement evaluation: reported SWL is above reported First Water on the applicant's well log for POA #1; at the total depth of the proposed POAs there is likely to be some level of confinement in the aquifer 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?			Potential for Subst. Interfer. Assumed?	
						YES	NO	ASSUMED	YES	NO
1	1	Coast Fk Willamette	~475	~470	2200	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	1	Coast Fk Willamette	~475	~470	2300	<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"/>

Basis for aquifer hydraulic connection evaluation: groundwater elevations are similar to surface water elevations suggesting that water can flow freely between the aquifer and surface water.

Water Availability Basin the well(s) are located within: COAST FK WILLAMETTE R > WILLAMETTE 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 (SW) source. Limit evaluation to instream rights and minimum stream flows that are pertinent to that SW source, 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"/>	IS 81887*	200	<input type="checkbox"/>	65.6	<input checked="" type="checkbox"/>	< 10	<input type="checkbox"/>
2	1	<input type="checkbox"/>	<input type="checkbox"/>	IS 81887	200	<input type="checkbox"/>	65.6	<input checked="" type="checkbox"/>	< 10	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>

Comments: Stream-depletion was estimated using the Hunt-2003 stream-depletion model with hydraulic parameters within a range of values likely for the aquifer systems in the area.

*There are two instream rights on the Coast Fork Willamette River WAB: MF532 has lower required flows but extends only 1 mile above the confluence and not to the reach adjacent to the applicant's proposed POA. IS81887 covers the reach adjacent to the proposed POAs and so was evaluated in Table C3a

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"/>

Comments: _____

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													
(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: _____

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: The applicant's proposed POAs would be producing from an aquifer that has been found to be hydraulically-connected to surface water – specifically the Coast Fork Willamette River – at a distance of less than 1 mile. The applicant's proposed rate is greater than 1% of the 80%-exceedance flows for the encompassing WAB and so the Potential for Substantial Interference (PSI) is assumed per OAR 690-009. A reduction of the rate of appropriation to less than 0.656 would avoid the automatic assumption of PSI.

References Used:

Herrera, N. B., Burns, E. R., and T. D. Conlon. 2014. *Simulation of Groundwater Flow and the Interaction of Groundwater and Surface Water in the Willamette Basin and Central Willamette Subbasin, Oregon.* USGS Scientific Investigations Report 2014-5136.

Hunt, B. 2003. *Unsteady Stream Depletion when Pumping from a Semiconfined Aquifer.* Journal of Hydrologic Engineering. Vol 8(1), pp 12-19

McClaghry, J. D., T. J. Wiley, M. L. Ferns, and I. P Madin. 2010. *Digital Geologic Map of the Southern Willamette Valley, Benton, Lane, Linn, Marion, and Polk Counties, Oregon.* Oregon Dept. of Geology and Mineral Industries. Open File Report O-10-13.

OWRD Well Log Database – Accessed 08/06/2020

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

(Instream Flow Requirements listed in this table refer to MF532 which does not extend to the reach adjacent to the applicant's proposed POAs)

Water Availability Analysis

Detailed Reports

COAST FK WILLAMETTE R > WILLAMETTE R - AT MOUTH
WILLAMETTE BASIN

Water Availability as of 8/6/2020

Watershed ID #: 532 ([Map](#))

Date: 8/6/2020

Exceedance Level: 80%

Time: 1:11 PM

Water Availability Calculation

Consumptive Uses and Storages

Instream Flow Requirements

Reservations

Water Rights

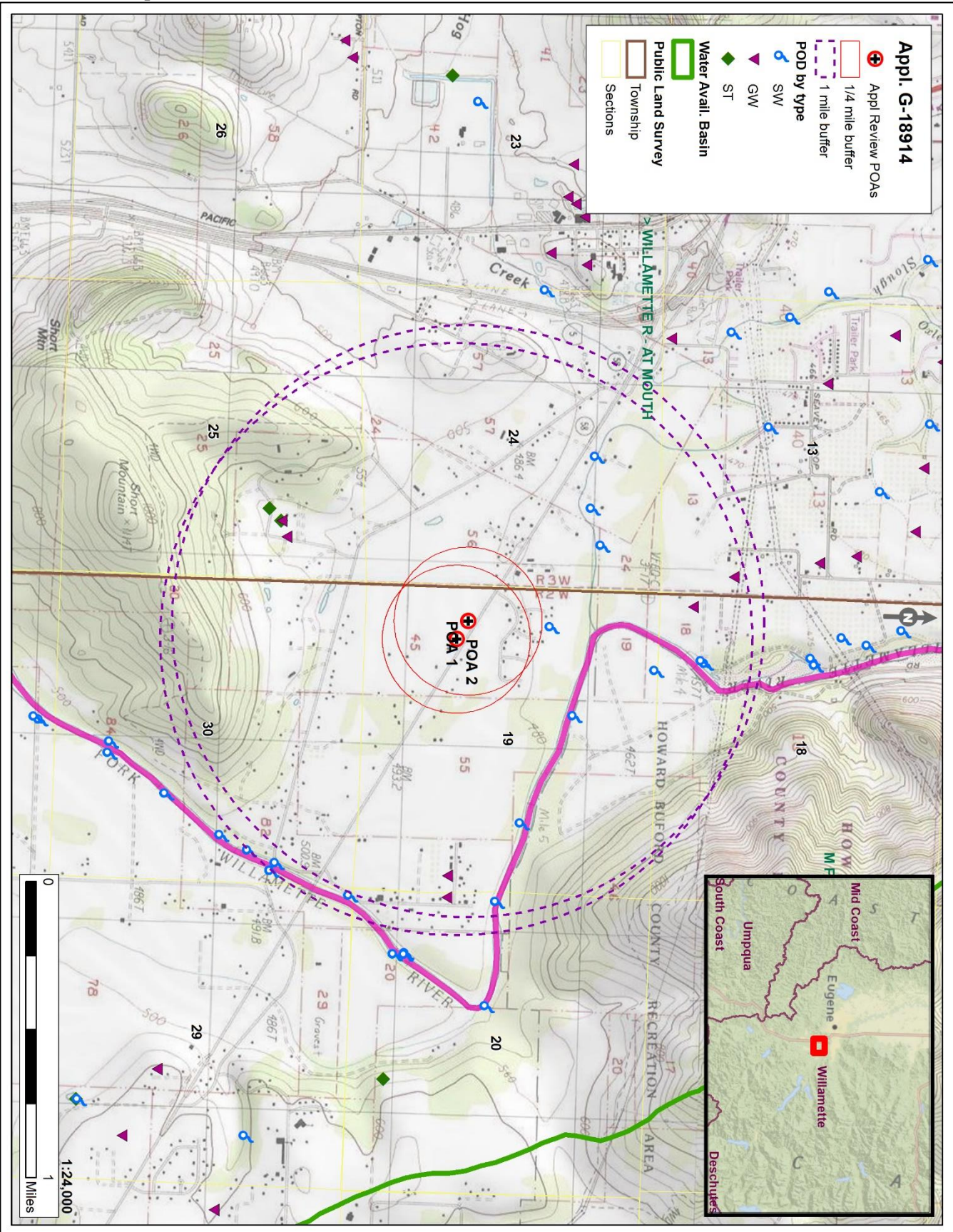
Watershed Characteristics

Water Availability Calculation

Monthly Streamflow in Cubic Feet per Second
Annual Volume at 50% Exceedance in Acre-Feet

Month	Natural Stream Flow	Consumptive Uses and Storages	Expected Stream Flow	Reserved Stream Flow	Instream Flow Requirement	Net Water Available
JAN	955.00	123.00	832.00	0.00	200.00	632.00
FEB	1,080.00	297.00	783.00	0.00	200.00	583.00
MAR	1,080.00	467.00	613.00	0.00	200.00	413.00
APR	928.00	369.00	559.00	0.00	40.00	519.00
MAY	531.00	236.00	295.00	0.00	40.00	255.00
JUN	216.00	28.60	187.00	0.00	40.00	147.00
JUL	108.00	37.30	70.70	0.00	40.00	30.70
AUG	70.50	33.10	37.40	0.00	40.00	-2.59
SEP	65.60	24.80	40.80	0.00	40.00	0.84
OCT	86.40	8.15	78.20	0.00	40.00	38.20
NOV	268.00	93.70	174.00	0.00	200.00	-25.70
DEC	761.00	9.05	752.00	0.00	200.00	552.00
ANN	754,000.00	104,000.00	651,000.00	0.00	77,000.00	574,000.00

Well Location Map



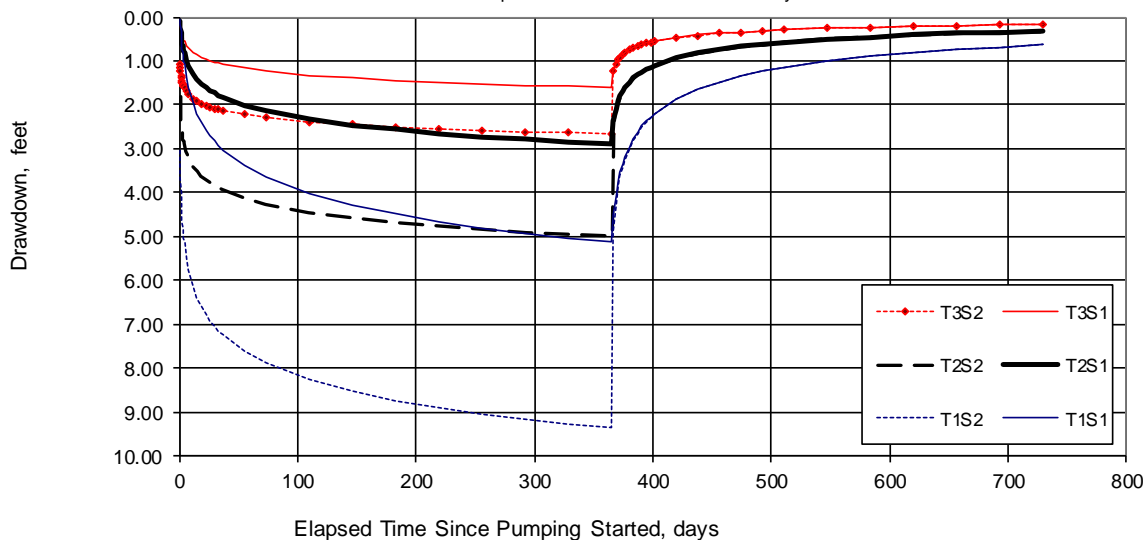
Interference Model Results

This Time-Drawdown Worksheet v.3.00
 Calculates Theis nonequilibrium drawdown and recovery at any arbitrary radial distance, r, from a pumping well for 3 different T values and radial distance, r, from a pumping well for 3 different T values and 2 different S values.
 Written by Karl C. Wozniak September 1992. Last modified December 30, 2014


Input Data:	Var Name	Scenario 1	Scenario 2	Scenario 3	Units	
Total pumping time	t		365		d	
Radial distance from pumped well:	r		3960.00		ft	Q conversions
Pumping rate	Q		0.670		cfs	300.70 gpm
Hydraulic conductivity	K	50.000	100.000	200.000	ft/day	0.67 cfs
Aquifer thickness	b		100		ft	40.20 cfm
Storativity	S_1		0.00100			57,888.00 cfd
	S_2		0.00001			1.33 af/d
Transmissivity Conversions	T_f2pd	5,000	10,000	20,000	ft ² /day	
	T_ft2pm	3.4722	6.9444	13.8889	ft ² /min	
	T_gpdpft	37,400	74,800	149,600	gpd/ft	

This Drawdown and Recovery at r = 3960 ft From Pumping Well

Pump on = 525600 minutes = 365.00 days



Stream-Depletion Model Results

 PyHunt stream depletion analysis tool

Application type:	G
Application number:	18914
Well number:	1
Stream Number:	1
Pumping rate (cfs):	0.67
Pumping duration (days):	365
Pumping start month number (3=March)	1

Parameter	Symbol	Scenario 1	Scenario 2	Scenario 3	Units
Distance from well to stream	a	2200	2200	2200	ft
Aquifer transmissivity	T	25000	10000	5000	ft ² /day
Aquifer storativity	S	1e-3	0.0001	1e-5	-
Aquitard vertical hydraulic conductivity	Kva	1e-3	5e-3	1e-2	ft/day
Aquitard saturated thickness	ba	10	10	10	ft
Aquitard thickness below stream	babs	10	10	10	ft
Aquitard specific yield	Sya	0.001	0.001	0.001	-
Stream width	ws	150	150	150	ft

Stream depletion for Scenario 2:

Days	10	30	60	90	120	150	180	210	240	270	300	330	360
Depletion (%)	3	6	8	10	12	13	14	15	16	17	18	19	20
Depletion (cfs)	0.02	0.04	0.06	0.07	0.08	0.09	0.10	0.10	0.11	0.12	0.12	0.13	0.13

Hunt (2003) transient stream depletion model

