Groundwater Application Review Summary Form

Application # G- 18616

GW Reviewer Aurora Boschier **Date Review Completed:** 8/28/2018

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:

[ ] 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 Aug 28, 2018

TO: **Application G-** 18616

FROM: **GW:** Aaron Bouchier
(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

MEMO

To: Kristopher Byrd, Well Construction and Compliance Section Manager

From: Joel Jeffery, Well Construction Program Coordinator

Subject: Review of Water Right Application G-18616

Date: August 30, 2018

The attached application was forwarded to the Well Construction and Compliance Section by Water Rights. Aurora Bouchier reviewed the application. Please see Aurora's groundwater review and the Well Log.

Applicant's Well #1(LANE 8306): Based on a review of the Well Report Applicant's Well #1 appears to protect the groundwater resource.

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

WATER WELL REPORT
STATE OF OREGON

LANE 8306

RECEIVED
AUG 5 1981
WATER RESOURCES DEPT
SALEM, OREGON

State Well No. 16S/4W-34AA

State Permit No. .....

(1) OWNER:
Name GARY JONES
Address 91154 RIVER ROAD
City JUNCTION CITY State OR

(2) TYPE OF WORK (check):
New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:
Rotary Air ☒ Driven ☐
Rotary Mud ☐ Dug ☐
☐ Bored ☐

(4) PROPOSED USE (check):
Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☒ Test Well ☐ Other ☐
Thermal: ☐ Withdrawal ☐ Reinjection ☐

(5) CASING INSTALLED:
Steel ☒ Threaded ☐ Plastic ☐ Welded ☒
8" Diam. from +1½ ft. to 71½ ft. Gauge .250
" Diam. from ..... ft. to ..... ft. Gauge .....

LINER INSTALLED:
" Diam. from ..... ft. to ..... ft. Gauge .....

(6) PERFORATIONS:
Perforated? ☒ Yes ☐ No
Type of perforator used HOLTE
Size of perforations ¼ in. by 1¼ in.
120 perforations from 61 ft. to 71 ft.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.

(7) SCREENS:
Well screen installed? ☐ Yes ☒ No
Manufacturer's Name .....
Type ..... Model No. .....
Diam. ..... Slot Size ..... Set from ..... ft. to ..... ft.
Diam. ..... Slot Size ..... Set from ..... ft. to ..... ft.

(8) WELL TESTS:
Drawdown is amount water level is lowered below static level

a pump test made? ☐ Yes ☒ No If yes, by whom?
" gal./min. with ft. drawdown after hrs.
" " " "

Air test 70 gal./min. with drill stem at 75 ft. 2 hrs.
Bailer test gal./min. with ft. drawdown after hrs.
ian flow g.p.m.
erature of water Depth artesian flow encountered ..... ft.

(9) CONSTRUCTION:
Special standards: Yes ☐ No ☒
Well seal—Material used CEMENT
Well sealed from land surface to 18' ft.
Diameter of well bore to bottom of seal 12 in.
Diameter of well bore below seal 6 in.
Number of sacks of cement used in well seal 11 sacks
How was cement grout placed? PRESSURE GROUT

Was pump installed? YES Type SUB HP 3 Depth 65 ft.
Was a drive shoe used? ☒ Yes ☐ No Plugs ..... Size: location ..... ft.
Did any strata contain unusable water? ☐ Yes ☒ No
Type of Water? — depth of strata —
Method of sealing strata off —
Was well gravel packed? ☐ Yes ☒ No Size of gravel: —
Gravel placed from — ft. to — ft.

(10) LOCATION OF WELL:
County LANE Driller's well number
NE ¼ NE ¼ Section 34 T. 16S R. 4W W.M.
Tax Lot # 400 Lot Blk Subdivision
Address at well location: (1) OWNERS

(11) WATER LEVEL: Completed well.
Depth at which water was first found 18' ft.
Static level 15' ft. below land surface. Date
Artesian pressure — lbs. per square inch. Date —

(12) WELL LOG:
Diameter of well below casing 6
Depth drilled 82' ft. Depth of completed well 73 ft.
Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
RIVER LOAM	0	14	
SANDY GRAVEL 3/4 MINUS	14	33	15
SDY GRAVEL	33	45	"
CEMENTED GRAVEL	45	62	"
SANDY GRAVEL (WATER BEARING)	62	82	"

Work started 13 JULY 1981 Completed 14 JULY 1981
Date well drilling machine moved off of well 14 JULY 1981

Drilling Machine Operator's Certification:
This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.
[Signed] Walter M. White (Drilling Machine Operator) Date 30 July 1981
Drilling Machine Operator's License No. 1086

Water Well Contractor's Certification:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Name Walter M. White Drilling (Person, firm or corporation) (Type or print)
Address 91769 PRAIRIE RD. Junction City
[Signed] Walter M. White (Water Well Contractor)
Contractor's License No. 638 Date 30 July, 1981

NOTICE TO WATER WELL CONTRACTOR
The original and first copy of this report are to be filed with the
WATER RESOURCES DEPARTMENT, SALEM, OREGON 97310 within 30 days from the date of well completion.

SP*12658-690

LANE 8306

WELL IDENTIFICATION FORM

CURRENT WELL OWNER: Owner's Well Number: 2

Name: GARY & INEZ JONES

Mailing Address: 91154 RIVER RD.

City: JUNCTION CITY State: OR Zip: 97478

If a well report is available for this well, please attach a copy of it to this form and return. It is not necessary for you to complete the remainder of the form if the well report is attached. If a well report is not available, please complete the remainder of the form to the best of your ability.

WELL LOCATION: (LANE 8306)

RECEIVED
DEC 16 1999
WATER RESOURCES DEPT.
SALEM, OREGON

County: Lane Latitude: _____ Longitude: _____

Township: _____ N or S, Range: _____ E or W Section: _____ _____ 1/4 _____ 1/4

Tax Lot Number: 1604340000402

Street Address of Well (if different from above): _____

WELL INFORMATION:

Start Card Number: 2 Approx. Construction Date: 1980

Well Constructor: Unknown

Name of Owner at Time of Construction: Gary O. Jones

Well Depth (in feet): 60' Static Water Level (in feet): Unknown

Diameter of Exposed Well Casing (in inches): 8"

Does this well have a formal water right associated with it? Yes: _____ No: ✓ If yes:

Application #: _____ Permit #: _____ Certificate #: _____

Please Return Completed Form to: **Oregon Water Resources Department**
158 12th Street NE
Salem, OR 97310

(Office use only)

Well Identification Number: 39009

PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO: Water Rights Section Date 8/28/2018

FROM: Groundwater Section Aurora C Bouchier
Reviewer's Name

SUBJECT: Application G- 18616 Supersedes review of na
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: **Joseph W & Elizabeth N Thompson** County: **Lane**

A1. Applicant(s) seek(s) 0.44 cfs from 1 well(s) in the Willamette Basin, Upper Willamette subbasin

A2. Proposed use Irrigation (35 acres) Seasonality: March 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	LANE 8306	1	Alluvium	0.44	16S/4W-35 SW-NW	1515' S, 186' E fr NW cor S 35
2						
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	370	18	15	7/14/1981	82	0-18	-1.5-71.5	--	61-71	70	--	A

Use data from application for proposed wells.

A4. **Comments:** The application is for 0.44 cfs from 1 well (LANE 8306). The well log for LANE 8306 lists an estimated yield of 70 gpm. It is likely the well will not be capable of producing at the requested rate.

A5. ☒ **Provisions of the** Willamette 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: The proposed POA produces from unconfined alluvial aquifer, however is located greater than ¼-mile from a hydraulically connected surface water source, therefore the pertinent rule (OAR 690-502-0240) does not apply.

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); 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:** Nearby state observation well (LANE 8029, located approximately 3 miles to the north-northwest) has been monitored since the 1960's through present. This well shows a stable long-term trend; other wells in the area with less-extensive records show similar trends. This implies that groundwater is not over-appropriated in the area which is likely due to an efficient hydraulic connection between groundwater and surface water.

The proposed POA and other wells in the vicinity are producing from the Post-Missoula Flood Pleistocene sands and gravels mapped in this area (Unit Qg1 from O'Connor and others, 2002). Given the unconfined nature of the aquifer, the thickness of the sediments, and relatively high productivity of the aquifer (i.e., high K, high T), interference to nearby groundwater users will likely be insignificant to minor.

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**	☐	☒
		☐	☐
		☐	☐
		☐	☐
		☐	☐

Basis for aquifer confinement evaluation: The static water level listed on the log for LANE 8306 is approximately equal to the reported first water. Well logs for similarly constructed wells in the area also report static water levels coincident with the first water.

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**	**Flat Creek****	**~350-360**	**360-377**	**1,400**	☐	☒	☐	☐	☒
1	**2**	**Spring Creek**	**~350-360**	**350-375**	**1,550**	☒	☐	☐	☐	☒
1	**3**	**Willamette River**	**~350-360**	**350**	**5,110**	☒	☐	☐	☐	☒
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐

Basis for aquifer hydraulic connection evaluation: ** Flat Creek is mapped as intermittent on older USGS topographic maps and as perennial on more recent USGS topographic maps and NHD.

The groundwater elevations are estimated to be similar to or above the elevations of Spring Creek and the Willamette River, suggesting that groundwater is flowing towards and discharging into these surface water bodies.

Water Availability Basin the well(s) are located within: Willamette R > Columbia River – AB Periwinkle Cr At Gage 14174 (Watershed ID # 30200321).

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	**2**	☐	☐	**NA**	**NA**	☐	**2,540**	☐	**<<25%**	☐
1	**3**	☐	☐	**NA**	**NA**	☐	**2,540**	☐	**<<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: The Hunt (1999) stream-depletion model was used to calculate expected impacts from pumping; aquifer parameters were taken from Herrera et al. (2014) and assuming a 3 foot clogging layer beneath the streambed.

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: Not applicable.

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 well would be producing from an aquifer that has been found to be hydraulically connected to surface water, specifically Spring Creek and the Willamette River, at a distance of >1 mile. Analysis of expected impacts to surface water was done and there is not a preponderance of evidence to assume that the proposed use will have the Potential for Substantial Interference (PSI) with surface water.

References Used:

Application file: G-18616 and nearby G-18470.

Conlon, T. D., Wozniak, K. C., Woodcock, D., Herrera, N.B., Fischer, B.J. Morgan, D.S., Lee, K.K., and Hinkle, S.R., 2005, *Ground-Water Hydrology of the Willamette Basin, Oregon*: U. S. Geological Survey Scientific Investigations Report 2005-5168.

Gannett, Marshall W., and Caldwell, Rodney R., 1998, *Geologic Framework of the Willamette Lowland Aquifer System, Oregon and Washington*: U. S. Geological Survey Professional Paper 1424-A.

Herra, N. B., Burns, E. R., and Conlon, T. D, 2014, *Simulation of groundwater flow and the interaction of groundwater and surface water in the Willamette Basin and Central Willamette subbasin, Oregon*: U.S. Geologcal Survey Scientific Investigations Report 2014-5136, 152 p., http//dx.doi.org/10.3133/sir20155136.

Hunt, B., 1999, *Unsteady Steam Depletion from Ground Water Pumping*, Journal of Hydrologic Engineering, Vol 8(1), pp 12-19.

O'Connor, J. E., Sarna-Wojcicki, A., Wozniak, K. C., Polette, D. J., and Fleck, R. J., 2001, *Geologic map of Quaternary units in the Willamette Valley, Oregon*: Reston, Va., U.S. Geological Survey, Professional Paper 1620, map scale 1:250,000.

Woodward, Dennis G., Gannett, Marshall W., and Vaccaro, John J., 1998, *Hydrogeologic Framework of the Willamette Lowland Aquifer System, Oregon and Washington*: U. S. Geological Survey Professional Paper 1424-B.

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

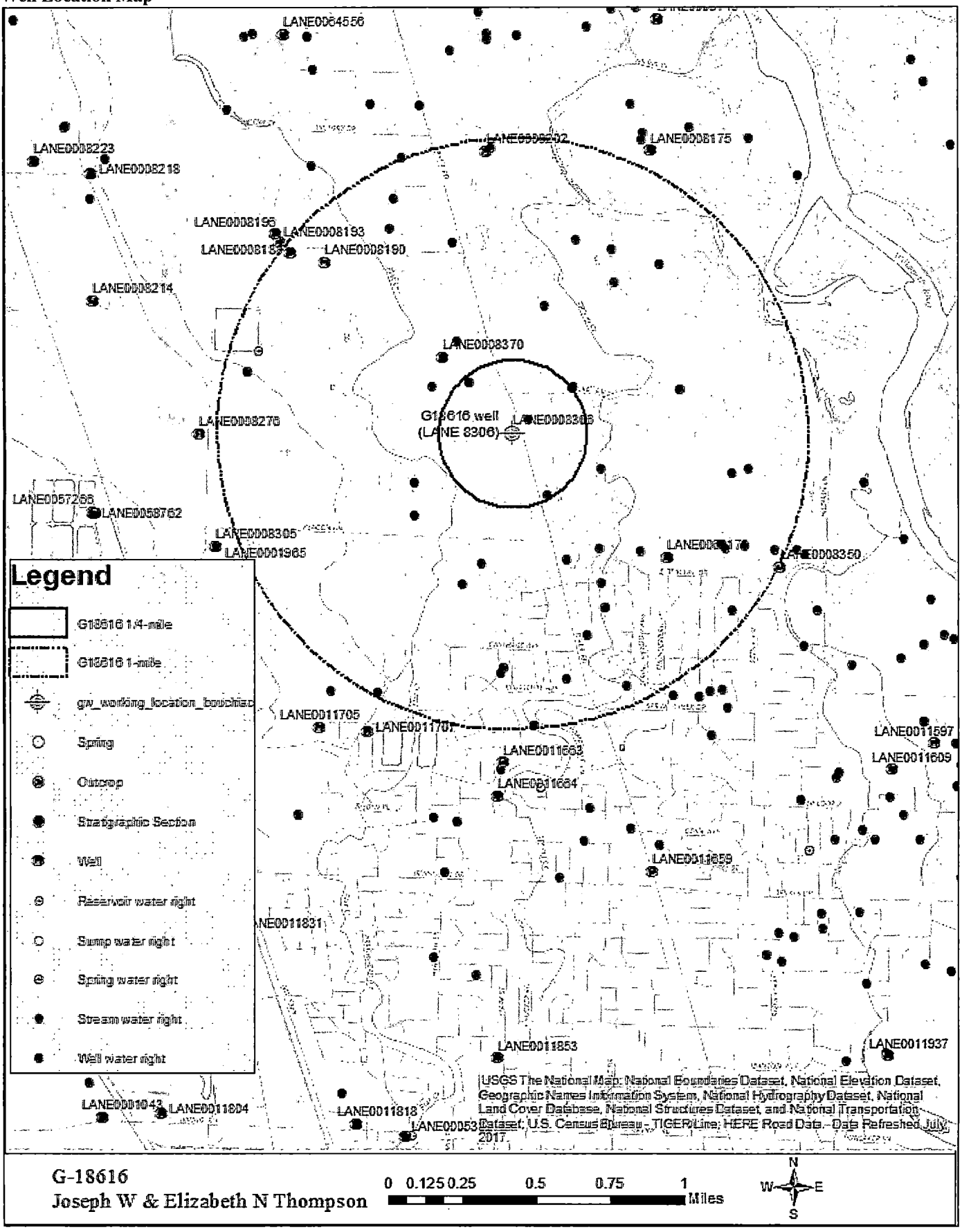
WILLAMETTE R > COLUMBIA R - AB PERIWINKLE CR AT GAGE 14174

Watershed ID #: 30200321 Basin: WILLAMETTE Exceedance Level: 80
Time: 12:38 PM Date: 08/28/2018

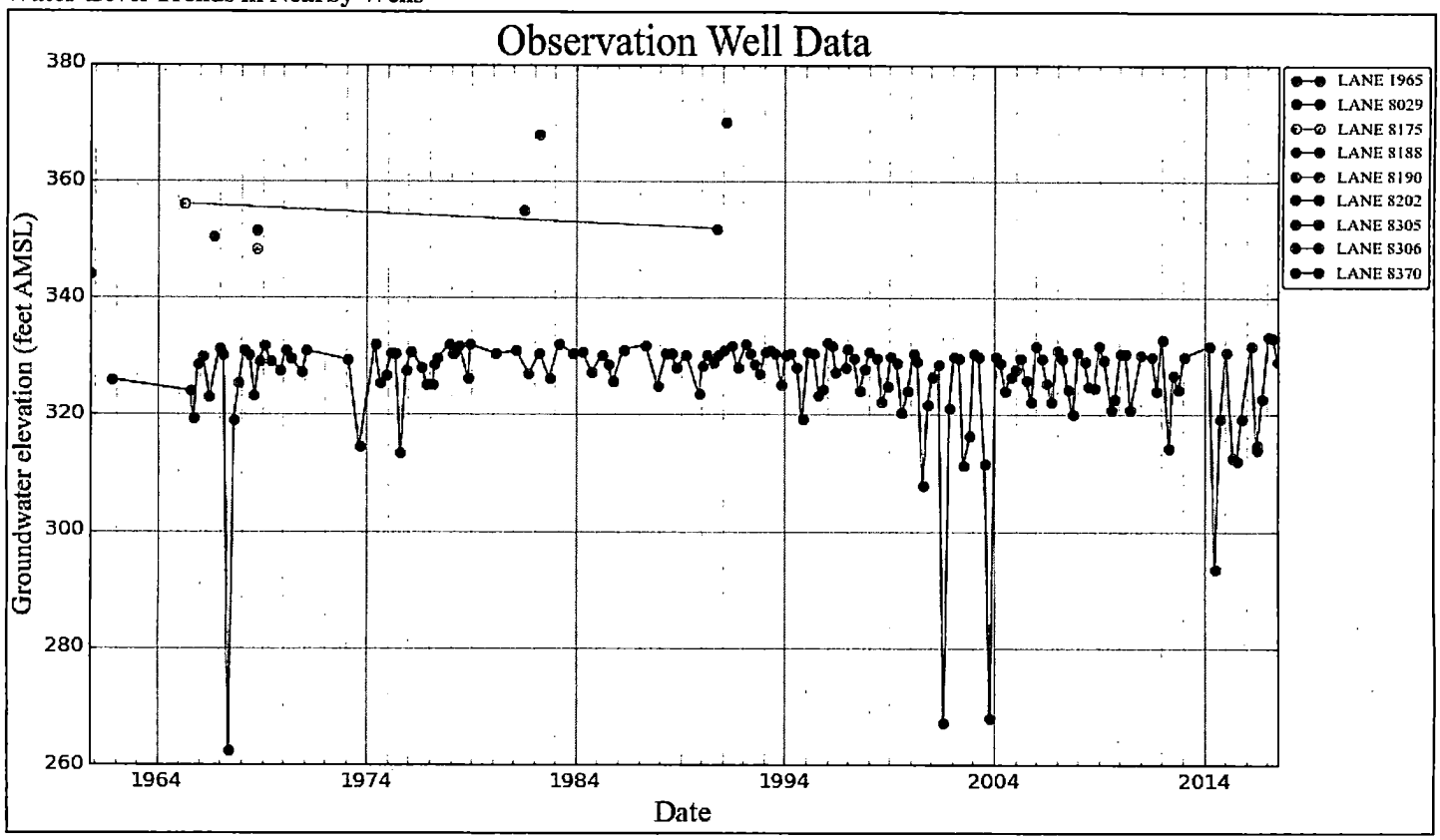
Monthly values are in cfs.
Storage is the annual amount at 50% exceedance in ac-ft.

Month	Natural Stream Flow	Consumptive Use and Storage	Expected Stream Flow	Reserved Stream Flow	Instream Requirements	Net Water Available
JAN	10,100.00	1,370.00	8,730.00	0.00	1,750.00	6,980.00
FEB	11,600.00	4,290.00	7,310.00	0.00	1,750.00	5,560.00
MAR	11,000.00	4,560.00	6,440.00	0.00	1,750.00	4,690.00
APR	9,760.00	4,260.00	5,500.00	0.00	1,750.00	3,750.00
MAY	8,430.00	2,560.00	5,870.00	0.00	1,750.00	4,120.00
JUN	5,360.00	856.00	4,500.00	0.00	1,750.00	2,750.00
JUL	3,270.00	662.00	2,610.00	0.00	1,750.00	858.00
AUG	2,560.00	601.00	1,960.00	0.00	1,750.00	209.00
SEP	2,540.00	517.00	2,020.00	0.00	1,750.00	273.00
OCT	2,860.00	270.00	2,590.00	0.00	1,750.00	840.00
NOV	4,170.00	355.00	3,820.00	0.00	1,750.00	2,070.00
DEC	8,150.00	380.00	7,770.00	0.00	1,750.00	6,020.00
ANN	7,460,000	1,240,000	6,230,000	0	1,270,000	4,960,000

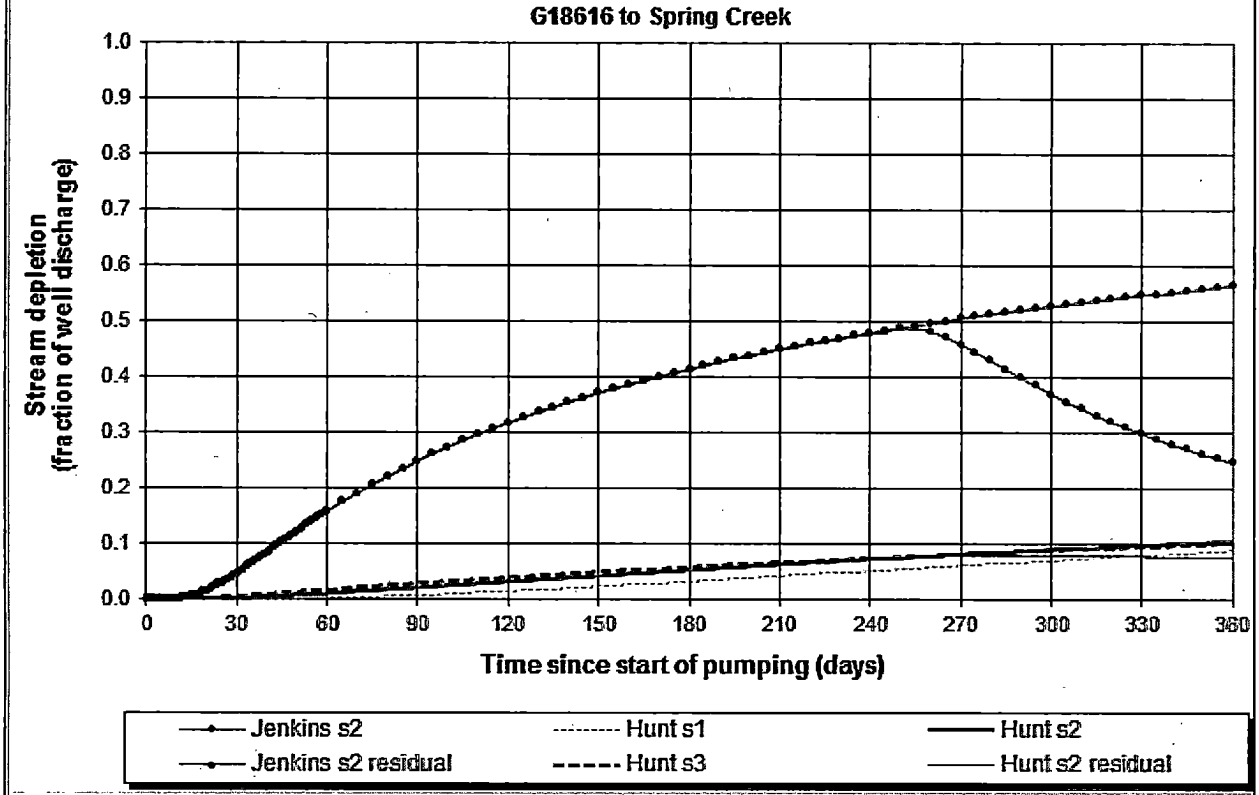
Well Location Map



Water-Level Trends in Nearby Wells

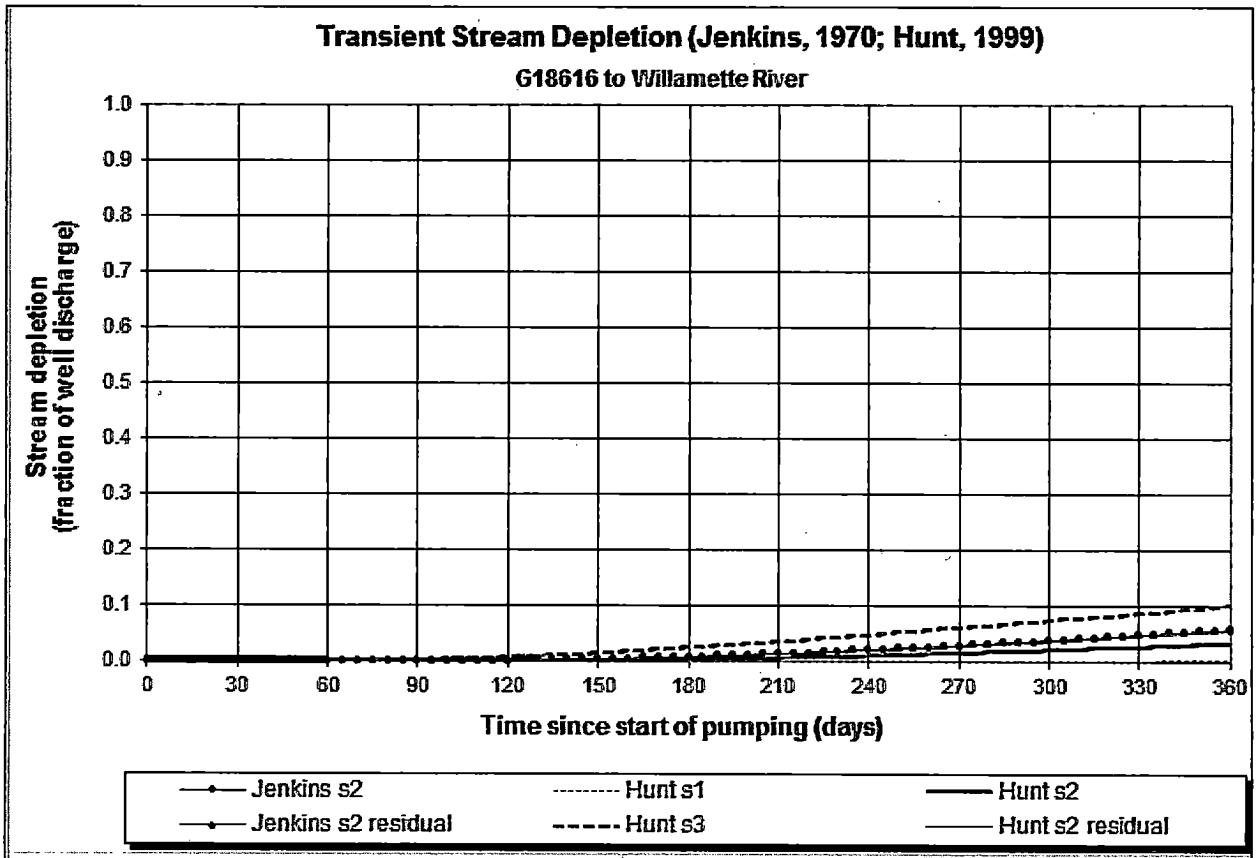


Stream Depletion Model Resultes



Output for Hunt Stream Depletion, Scenerio 2 (s2):						Time pump on = 240 days						
Days	30	60	90	120	150	180	210	240	270	300	330	360
Qw, cfs	0.440	0.440	0.440	0.440	0.440	0.440	0.440	0.440	0.440	0.440	0.440	0.440
Jenk SD s2 %	4.54	15.71	24.80	31.71	37.08	41.40	44.95	47.93	45.94	36.98	29.83	24.64
Jen SD s2 cfs	0.020	0.069	0.109	0.140	0.163	0.182	0.198	0.211	0.202	0.163	0.131	0.108
Hunt SD s2 %	0.17	0.93	2.04	3.14	4.22	5.26	6.25	7.19	7.91	7.93	7.71	7.33
Hunt SD s2 cfs	0.001	0.004	0.009	0.014	0.019	0.023	0.027	0.032	0.035	0.035	0.034	0.032

Parameters:		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate	Qw	0.44	0.44	0.44	cfs
Distance to stream	a	1550	1550	1550	ft
Aquifer hydraulic conductivity	K	20	50	100	ft/day
Aquifer thickness	b	50	50	50	ft
Aquifer transmissivity	T	1000	2500	5000	ft*ft/day
Aquifer storage coefficient	S	0.25	0.25	0.25	
Stream width	ws	20	20	20	ft
Streambed hydraulic conductivity	Ks	0.1	0.1	0.1	ft/day
Streambed thickness	bs	3	3	3	ft
Streambed conductance	sbc	0.666666667	0.666666667	0.666666667	ft/day
Stream depletion factor (Jenkins)	sdf	600.625	240.25	120.125	days
Streambed factor (Hunt)	sbf	1.033333333	0.413333333	0.206666667	



Output for Hunt Stream Depletion, Scenerio 2 (s2):						Time pump on = 240 days						
Days	30	60	90	120	150	180	210	240	270	300	330	360
Qw, cfs	0.440	0.440	0.440	0.440	0.440	0.440	0.440	0.440	0.440	0.440	0.440	0.440
Jenk SD s2 %	0.00	0.00	0.01	0.10	0.32	0.71	1.27	1.97	2.79	3.70	4.66	5.59
Jen SD s2 cfs	0.000	0.000	0.000	0.000	0.001	0.003	0.006	0.009	0.012	0.016	0.020	0.025
Hunt SD s2 %	0.00	0.00	0.00	0.03	0.13	0.31	0.61	1.00	1.49	2.06	2.69	3.35
Hunt SD s2 cfs	0.000	0.000	0.000	0.000	0.001	0.001	0.003	0.004	0.007	0.009	0.012	0.015

Parameters:		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate	Qw	0.44	0.44	0.44	cfs
Distance to stream	a	5110	5110	5110	ft
Aquifer hydraulic conductivity	K	20	50	100	ft/day
Aquifer thickness	b	50	50	50	ft
Aquifer transmissivity	T	1000	2500	5000	ft*ft/day
Aquifer storage coefficient	S	0.25	0.25	0.25	
Stream width	ws	200	200	200	ft
Streambed hydraulic conductivity	Ks	0.1	0.1	0.1	ft/day
Streambed thickness	bs	3	3	3	ft
Streambed conductance	sbc	6.666666667	6.666666667	6.666666667	ft/day
Stream depletion factor (Jenkins)	sdf	6528.025	2611.21	1305.605	days
Streambed factor (Hunt)	sbf	34.06666667	13.62666667	6.813333333	