

Groundwater Review Summary Form

Application # G- 18488

GW Reviewer M. Thoma Date Review Completed: 05-03-17

Summary of GW availability and Injury Review:

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

Summary of Potential for Substantial Interference Review:

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

Summary of Well Construction Assessment:

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

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

PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO: Water Rights Section Date May 3, 2017
 FROM: Groundwater Section Michael Thoma
Reviewer's Name
 SUBJECT: Application G- 18488 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: KC Solutions Unlimited LLC County: Lane

A1. Applicant(s) seek(s) 0.24 cfs from 3 well(s) in the Willamette Basin,
Main-stem Willamette subbasin

A2. Proposed use Nursery (9.7 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	Proposed	Well #1	Alluvium	0.24	16S/04W-10 NWNW	490'S, 50'E of NW cor S 10
2	Proposed	Well #2	Alluvium	0.24	16S/04W-9 NENE	370'S, 310'W of NW cor S 10
3	Proposed	Well #3	Alluvium	0.24	16S/04W-9 NENE	280'S, 670'W of NW cor S 10
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	340		12*	*	60	0-18	+1-18					
2	340		12*	*	60	0-18	+1-18					
3	340		12*	*	60	0-18	+1-18					

Use data from application for proposed wells.

A4. **Comments:** *Wells are proposed; median SWL report on well logs in the area is 12 ft and most are between 5 and 20 ft

A5. **Provisions of the** Willamette (OAR 690-502-0240) 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: See section C, Wells #1 and #2 will likely be producing from an unconfined aquifer and are within 1/4 mile of surface water so will be assumed to be hydraulically connected.

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:** Within 4 miles of the proposed POAs there are several wells with reported SWL data and these wells all show a stable long-term trend with SWLs primarily between 5 and 15 ft BLS. These data suggest that groundwater is not over-appropriated.

Within approx. 1 mile of the proposed POAs there are 75 mapped groundwater PODs (1/3 are groundwater claims or registrations). The shallow parts of the aquifer system in this area are likely strongly hydraulically connected to, and recharged by, the Willamette River and influenced by changes in river stage (which is inferred from stable SWL trends) so additional pumping will likely be offset by additional recharge from the river and not from reduction in storage or lowering of water levels in the aquifer. Additionally, the reviewer is unaware of past or current interference issues in the area.

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	Shallow Alluvium of Willamette Valley	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	Shallow Alluvium of Willamette Valley	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	Shallow Alluvium of Willamette Valley	<input type="checkbox"/>	<input checked="" type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>

Basis for aquifer confinement evaluation: Geologic reports do not describe a wide-spread confining layer for the shallow aquifer system; well logs from shallow wells in the area do not generally report SWLs significantly higher than First Water; SWLs are coincident with surface water elevation

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	Willamette River	~ 328	324-328	720	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	1	Willamette River	~ 328	324-328	1010	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	1	Willamette River	~ 328	324-328	1330	<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: Wells #1 and #2 are within ¼ mile of the Willamette and will be producing from an unconfined aquifer so hydraulic connection is assumed per OAR 690-502-0240; all wells show similar GW and SW elevations

Water Availability Basin the well(s) are located within: Willamette R > Columbia R – AB Periwinkle Cr at Gage 14174

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

Well	SW #	Well < ¼ mile?	Qw > 5 cfs?	Instream Water Right ID	Instream Water Right Q (cfs)	Qw > 1% ISWR?	80% Natural Flow (cfs)	Qw > 1% of 80% Natural Flow?	Interference @ 30 days (%)	Potential for Subst. Interfer. Assumed?
1	1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MF184A	1750	<input type="checkbox"/>	2540	<input type="checkbox"/>	< 5%	<input checked="" type="checkbox"/>
2	1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MF184A	1750	<input type="checkbox"/>	2540	<input type="checkbox"/>	< 1%	<input checked="" type="checkbox"/>
3	1	<input type="checkbox"/>	<input type="checkbox"/>	MF184A	1750	<input type="checkbox"/>	2540	<input type="checkbox"/>	< 1%	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>

Comments: Interference was calculated using the Hunt (1999) analytical stream-depletion model and aquifer parameters taken from Herrera et al. (2014); the presence of finer-grained river-bed sediment lining the river results in low impacts (interference) to surface water.

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	No surface water sources beyond 1 mile were evaluated												
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 review found that the applicant's proposed POAs will be producing from an unconfined aquifer hydraulically connected to the Willamette River. Proposed PODs Well #1 and Well #2 are within ¼ mile from the river so OAR 690-502-0240 required the Department assume the wells to be hydraulically connected. Well #3 was found to be hydraulically connected as well. OAR 690-009 requires that PODs Well #1 and Well #2 be assumed to have PSI with surface water. Well #3 is > ¼ mile from the river and this review did not find a preponderance of evidence to assume PSI.

References Used:

Gannett, M. W. and R. R. Caldwell. 1998. *Geologic Framework of the Willamette Lowland Aquifer System, Oregon and Washington*. USGS Professional Paper 1424-A.

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

OWRD Well Log Database – Accessed 5/3/2017.

Woodward, D. G., M. W. Gannett, and J. J. Vaccaro. 1998. *Hydrogeologic Framework of the Willamette Lowland Aquifer System, Oregon and Washington*. USGS 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) _____

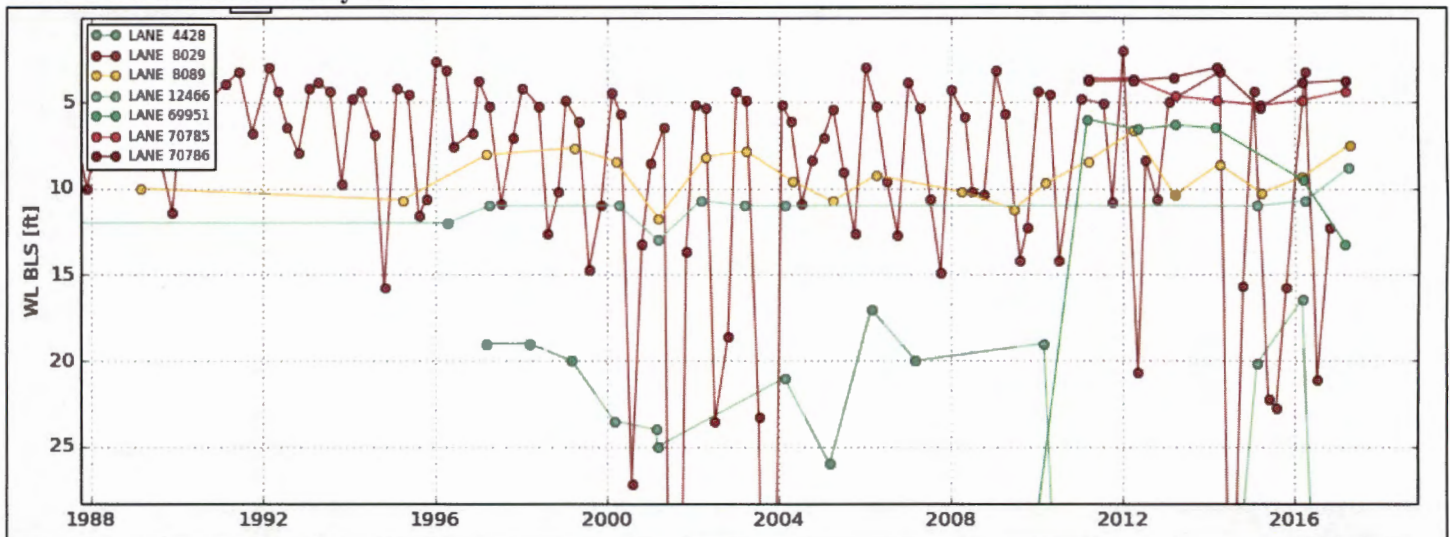
D3. **THE WELL construction deficiency or other comment is described as follows:** _____

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

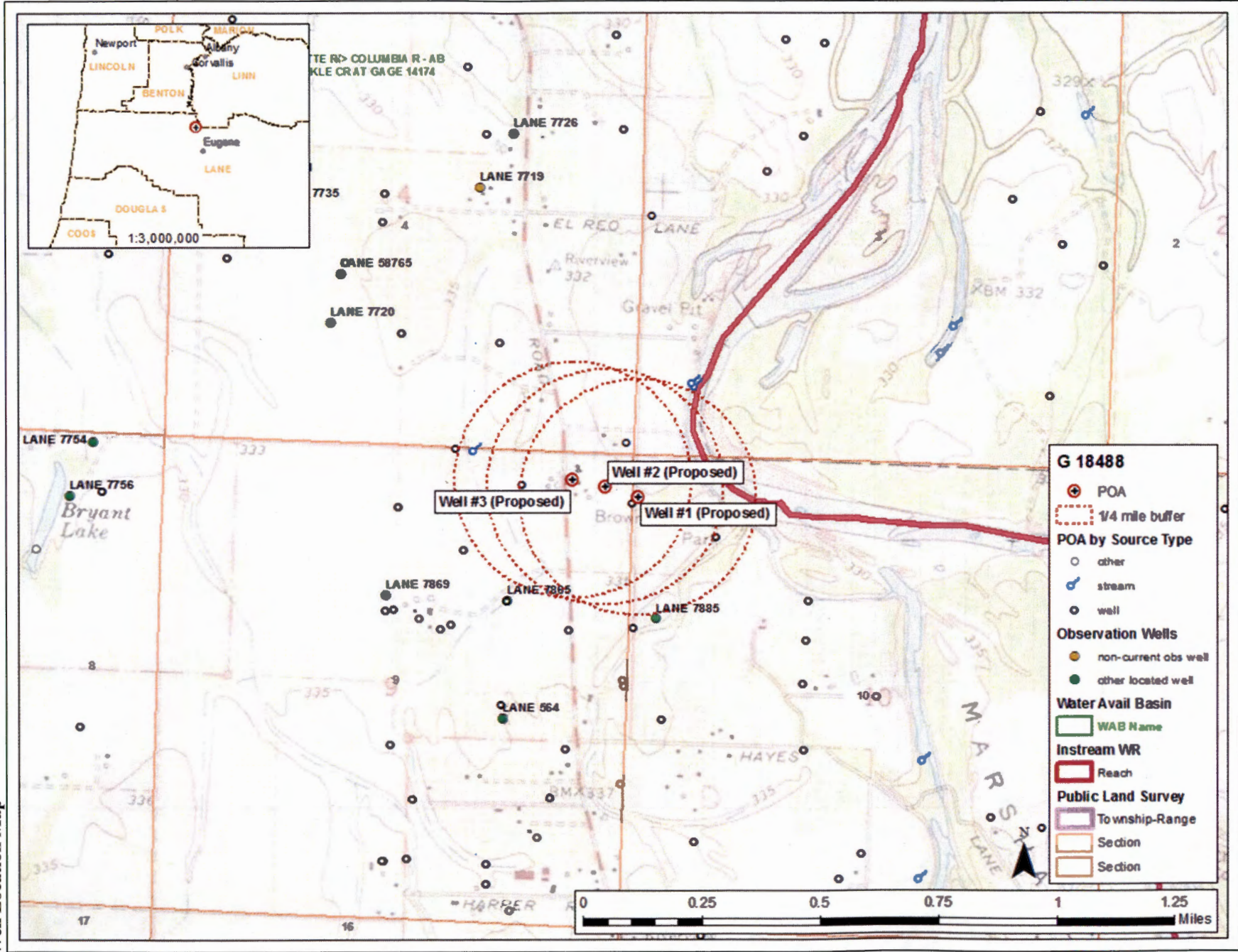
Water Availability Tables

WILLAMETTE R > COLUMBIA R - AB PERIWINKLE CR AT GAGE 14174							
WILLAMETTE BASIN							
Water Availability as of 5/3/2017							
Watershed ID #: 30200321 (Map)				Exceedance Level: 80%			
Date: 5/3/2017				Time: 9:27 AM			
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	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	2,540.00	5,890.00	0.00	1,750.00	4,140.00	
JUN	5,360.00	855.00	4,510.00	0.00	1,750.00	2,760.00	
JUL	3,270.00	661.00	2,610.00	0.00	1,750.00	859.00	
AUG	2,560.00	601.00	1,960.00	0.00	1,750.00	209.00	
SEP	2,540.00	516.00	2,020.00	0.00	1,750.00	274.00	
OCT	2,860.00	269.00	2,590.00	0.00	1,750.00	841.00	
NOV	4,170.00	353.00	3,820.00	0.00	1,750.00	2,070.00	
DEC	8,150.00	378.00	7,770.00	0.00	1,750.00	6,020.00	
ANN	7,460,000.00	1,230,000.00	6,230,000.00	0.00	1,270,000.00	4,960,000.00	

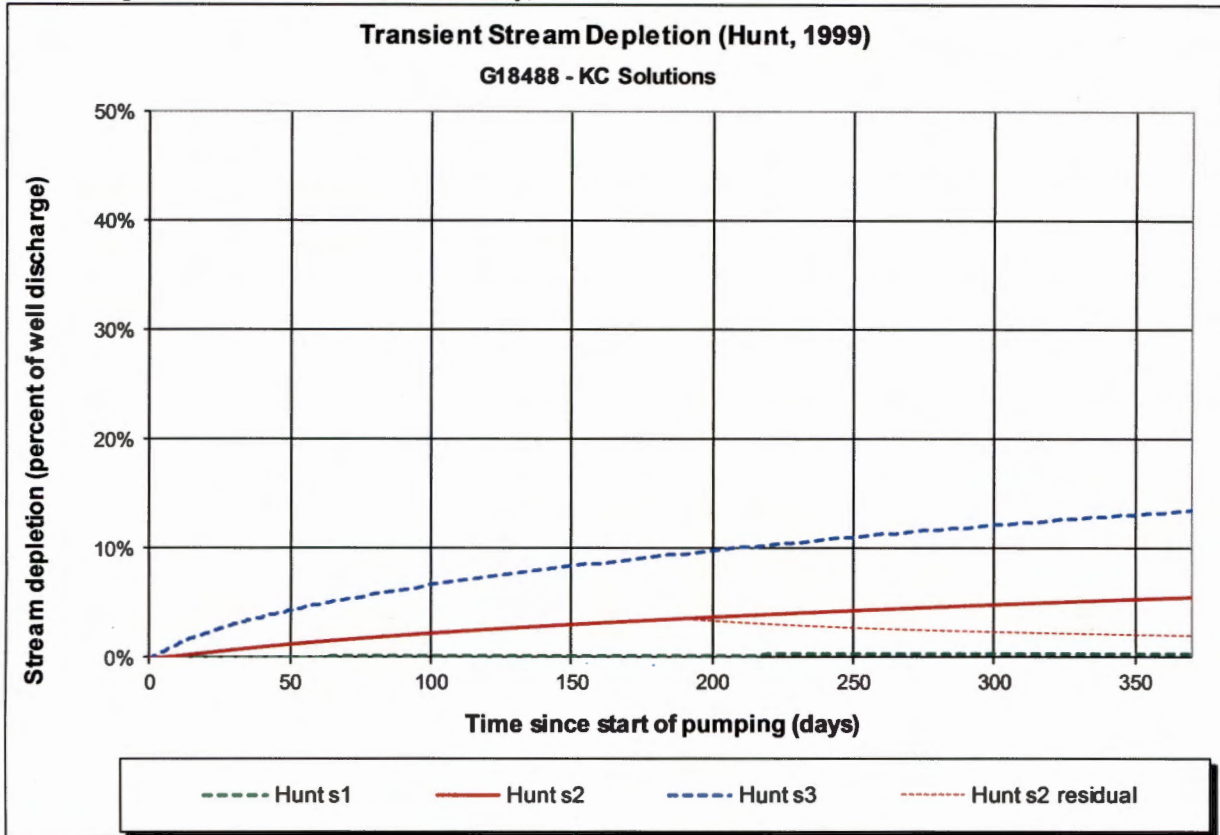
Water-Level Trends in Nearby Wells



Well Location Map



Stream-depletion Model Results (Well #3 only)



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

Days	30	60	90	120	150	180	210	240	270	300	330	360
Qw, cfs	0.240	0.240	0.240	0.240	0.240	0.240	0.240	0.240	0.240	0.240	0.240	0.240
Jenk SD s2 %	44.26	58.72	65.75	70.10	73.13	75.39	35.34	20.85	14.59	11.07	8.82	7.27
Jen SD s2 cfs	0.106	0.141	0.158	0.168	0.176	0.181	0.085	0.050	0.035	0.027	0.021	0.017
Hunt SD s2 %	0.70	1.42	2.02	2.54	3.00	3.42	3.19	2.81	2.54	2.33	2.17	2.03
Hunt SD s2 cfs	0.002	0.003	0.005	0.006	0.007	0.008	0.008	0.007	0.006	0.006	0.005	0.005

Parameters:		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate	Qw	0.24	0.24	0.24	cfs
Distance to stream	a	1330	1330	1330	ft
Aquifer hydraulic conductivity	K	50	100	500	ft/day
Aquifer thickness	b	50	50	50	ft
Aquifer transmissivity	T	2500	5000	25000	ft*ft/day
Aquifer storage coefficient	S	0.1	0.1	0.1	
Stream width	ws	400	400	400	ft
Streambed hydraulic conductivity	Ks	0.0001	0.002	0.01	ft/day
Streambed thickness	bs	5	5	5	ft
Streambed conductance	sbc	0.008	0.160	0.800	ft/day
Stream depletion factor (Jenkins)	sdf	70.8	35.4	7.1	days
Streambed factor (Hunt)	sbf	0.0	0.0	0.0	