

WATER RESOURCES DEPARTMENT

MEMO

April 15, 2016

TO: Application G- 18217

FROM: GW: Aurora 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

PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO: Water Rights Section Date April 15, 2016

FROM: Groundwater Section Aurora C Bouchier
Reviewer's Name

SUBJECT: Application G- 18217 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: WK & K Land, LP County: Benton

A1. Applicant(s) seek(s) 2.277 cfs from 1 well(s) in the Willamette Basin,
Upper Willamette subbasin

A2. Proposed use: Primary Irrigation (146.14 acres) Seasonality: March 1 – October 21

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	2.277	11S/4W-08 NW-SE	1165' Sm 161' E fr Center S 8
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	190		Est 2-10		Est 99	Est 0-18	Est +1-100		Est 18-99	Est 1022		

Use data from application for proposed wells.

A4. **Comments:** The applicant is requesting 1022 gpm, or 2.277 cfs. The proposed use is primary irrigation of 146.14 acres, which would result in a maximum rate allowable of 146.14 acres * 1/80 cfs per acre = 1.83 cfs (821 gpm). However, this review is based on the requested rate of 2.277 cfs (1022 gpm).

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: Well is producing from an unconfined aquifer over 1/4-mile from a surface water body (aside from man-made gravel pits), so 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) 7N – water levels, 7T – dedicated measuring tube, + large monitoring and reporting plus a flowmeter ;
 - 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:** _____

The proposed well will develop water from unconfined, predominately course-grained Holocene flood deposits that have a saturated thickness of 20-40 feet (Conlon et al., 2005, P. 9). Water levels in the aquifer are closely tied to stream stage in the Willamette River (Conlon et al., 2005, P. 50). The proposed well is located within the floodplain/within old meander loops of the Willamette River where the Willamette Silt has been removed. Since the water levels in this system are closely tied to the Willamette River stage, the long term stability of the aquifer is not likely to be a problem, but the saturated thickness of the aquifer could drop substantially in late summer in conjunction with lower stream stage. The seasonal fluctuations are unknown at this time. Given the distance, interference with nearby water users at the requested pumping rate may be a problem. The nearest well similarly located within the unconsolidated Holocene floodplain, with long term water level reporting is BENT 1558 (located ~ 5.7 miles to the northeast). The hydrograph for BENT 1558 shows no long term decline and a correlation to the flow of the Willamette River as measured at the station in Albany.

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	Alluvial	<input type="checkbox"/>	<input checked="" type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>

Basis for aquifer confinement evaluation: The well is located within the unconfined Holocene flood deposits of the Willamette River (Conlon et al., 2005, P. 9).

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	~188-180	185	5280	<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"/>
						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
						<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Basis for aquifer hydraulic connection evaluation: The well is producing water from Holocene floodplain deposits adjacent to the Willamette River. An efficient hydraulic connection exists between the Willamette River and the Holocene floodplain deposits (Conlon et al., 2005, P. 50). Barrow pit ponds and ponds in the abandoned meander (Kiger Cutoff) exist, however they appear to represent daylighting of groundwater and are not evaluated against in this review.

Water Availability Basin the well(s) are located within: 30200321: 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 type="checkbox"/>	<input type="checkbox"/>	MF 184	1,750.00	<input type="checkbox"/>	2,540.00	<input type="checkbox"/>	11%	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>

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"/>
	<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>

Comments: The interference at 30 days was estimated using the Hunt 1999 model (unconfined aquifer with a streambed clogging layer) and assuming a 3 foot streambed clogging layer. A transmissivity value range from 20,000 – 60,000 ft²/day was estimated based on single well pump tests from wells which are similarly located in the meander belt/flood deposits of the Willamette River (MARI 5336 and a pump test conducted for water right G-5421, both located ~28 miles to the north-northeast)

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													
(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: _____

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:** _____

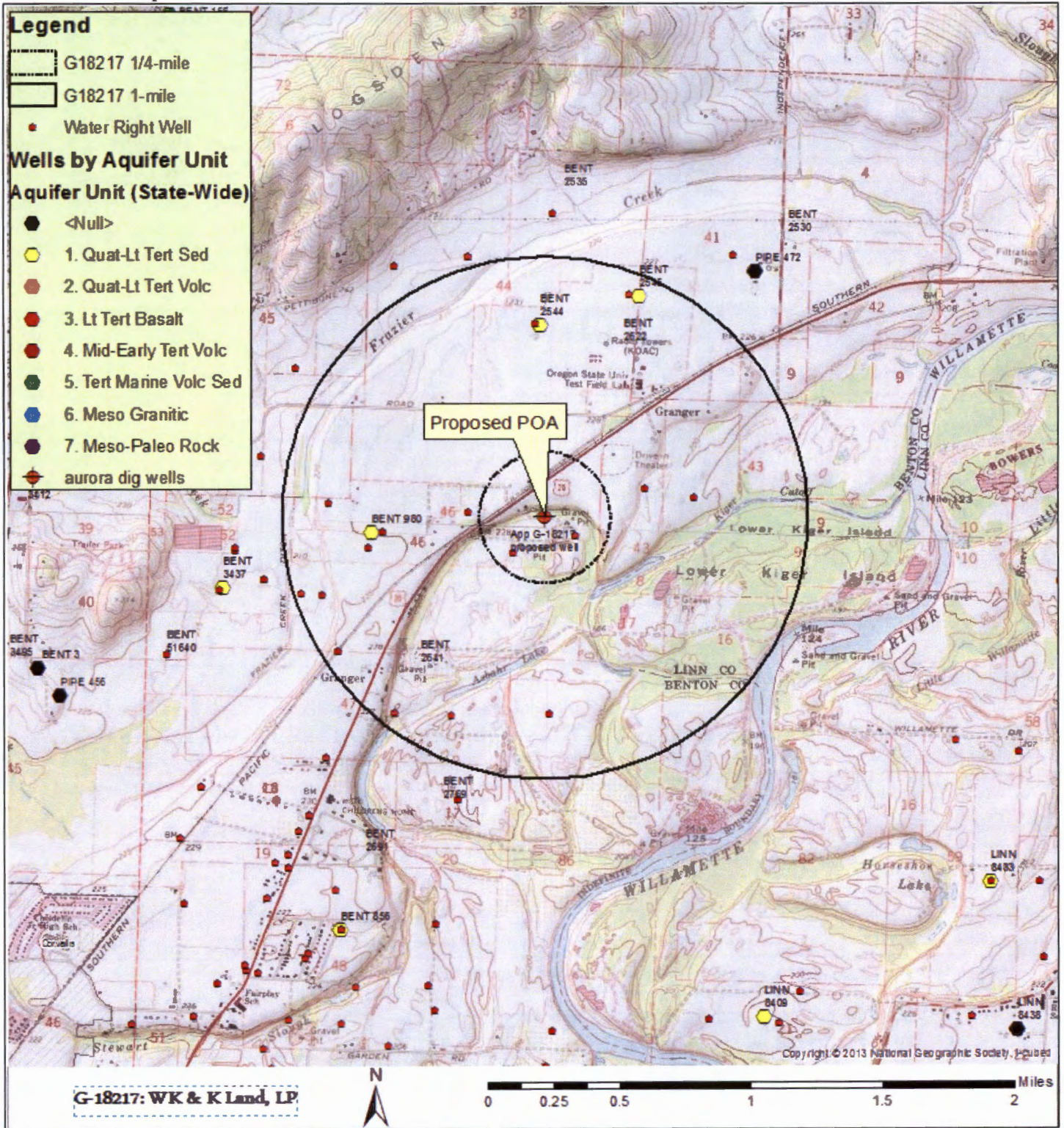
D4. **Route to the Well Construction and Compliance Section for a review of existing well construction.**

Water Availability Tables

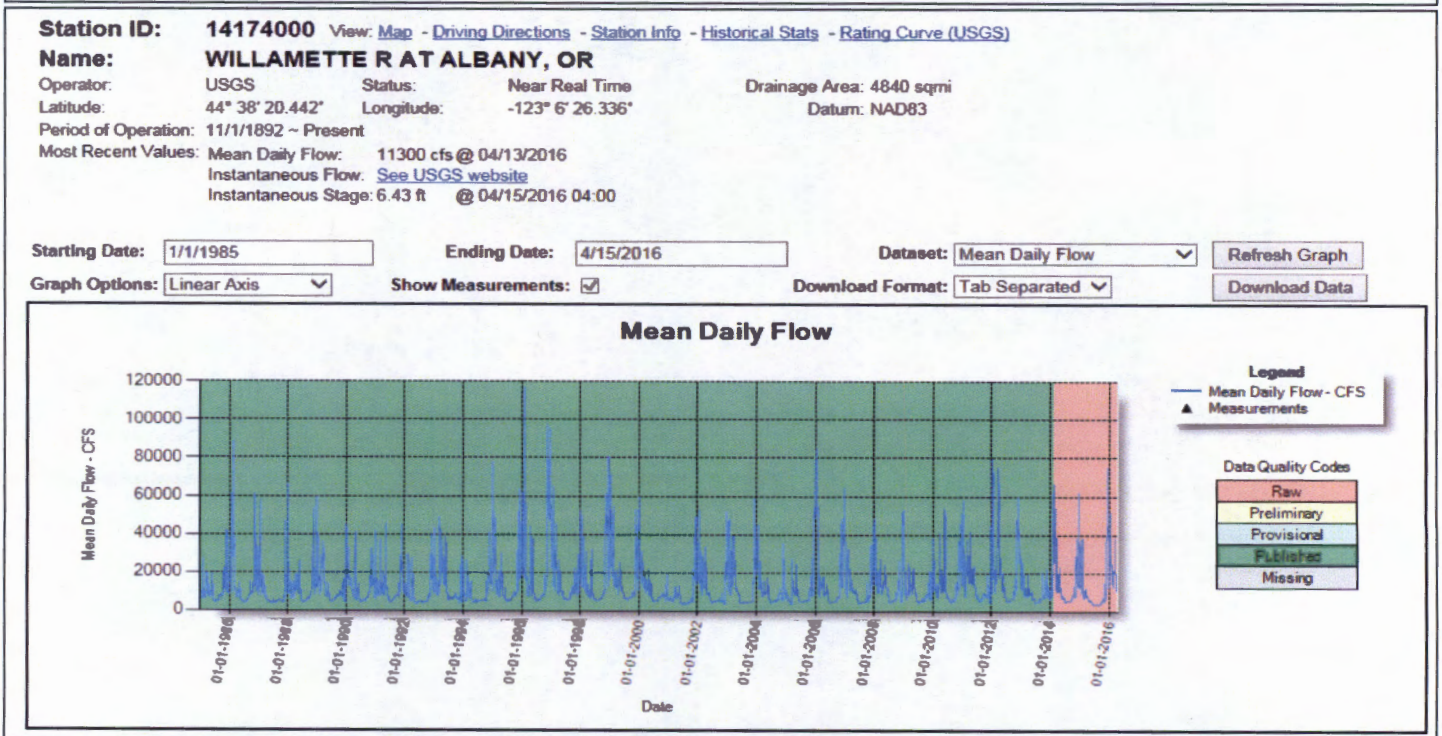
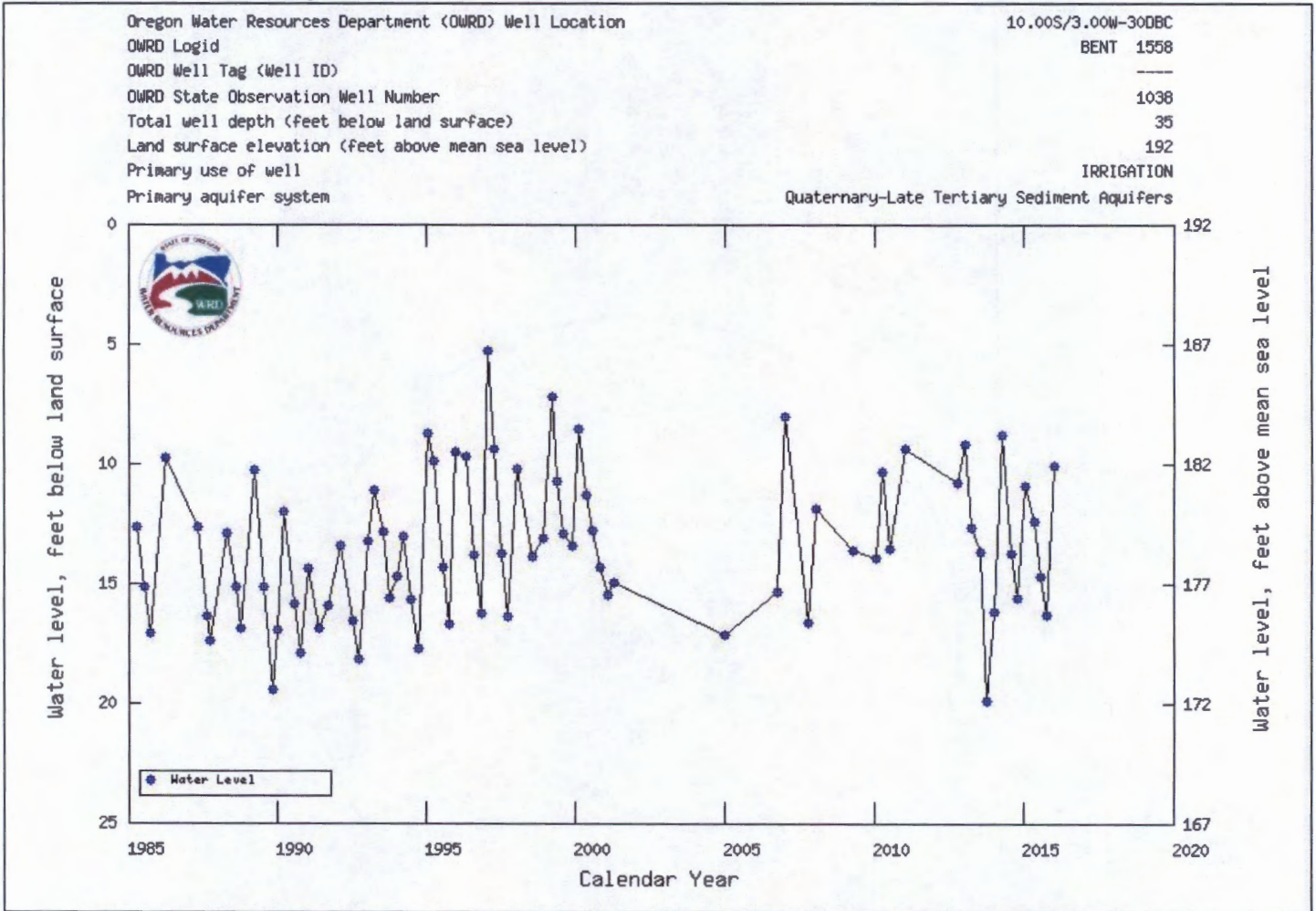
DETAILED REPORT ON THE WATER AVAILABILITY CALCULATION						
Watershed ID #: 30200321 Time: 11:24 AM		WILLAMETTE R > COLUMBIA R - AB PERIWINKLE CR AT GAGE 14174 Basin: WILLAMETTE			Exceedance Level: 80 Date: 04/15/2016	
Month	Natural Stream Flow	Consumptive Use and Storage	Expected Stream Flow	Reserved Stream Flow	Instream Requirements	Net water Available
Monthly values are in cfs. Storage is the annual amount at 50% exceedance in ac-ft.						
JAN	10,100.00	1,370.00	8,730.00	0.00	1,750.00	6,980.00
FEB	11,600.00	4,280.00	7,320.00	0.00	1,750.00	5,570.00
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	854.00	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	600.00	1,960.00	0.00	1,750.00	210.00
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	375.00	7,770.00	0.00	1,750.00	6,020.00
ANN	7,460,000	1,230,000	6,230,000	0	1,270,000	4,960,000

DETAILED REPORT OF INSTREAM REQUIREMENTS													
Watershed ID #: 30200321 Time: 11:24 AM		WILLAMETTE R > COLUMBIA R - AB PERIWINKLE CR AT GAGE 14174 Basin: WILLAMETTE										Date: 04/15/2016	
Application Number	Status	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Monthly values are in cfs.													
MF184A	APPLICATION	1750.0	1750.0	1750.0	1750.0	1750.0	1750.0	1750.0	1750.0	1750.0	1750.0	1750.0	1750.0
MAXIMUM		1750.0	1750.0	1750.0	1750.0	1750.0	1750.0	1750.0	1750.0	1750.0	1750.0	1750.0	1750.0

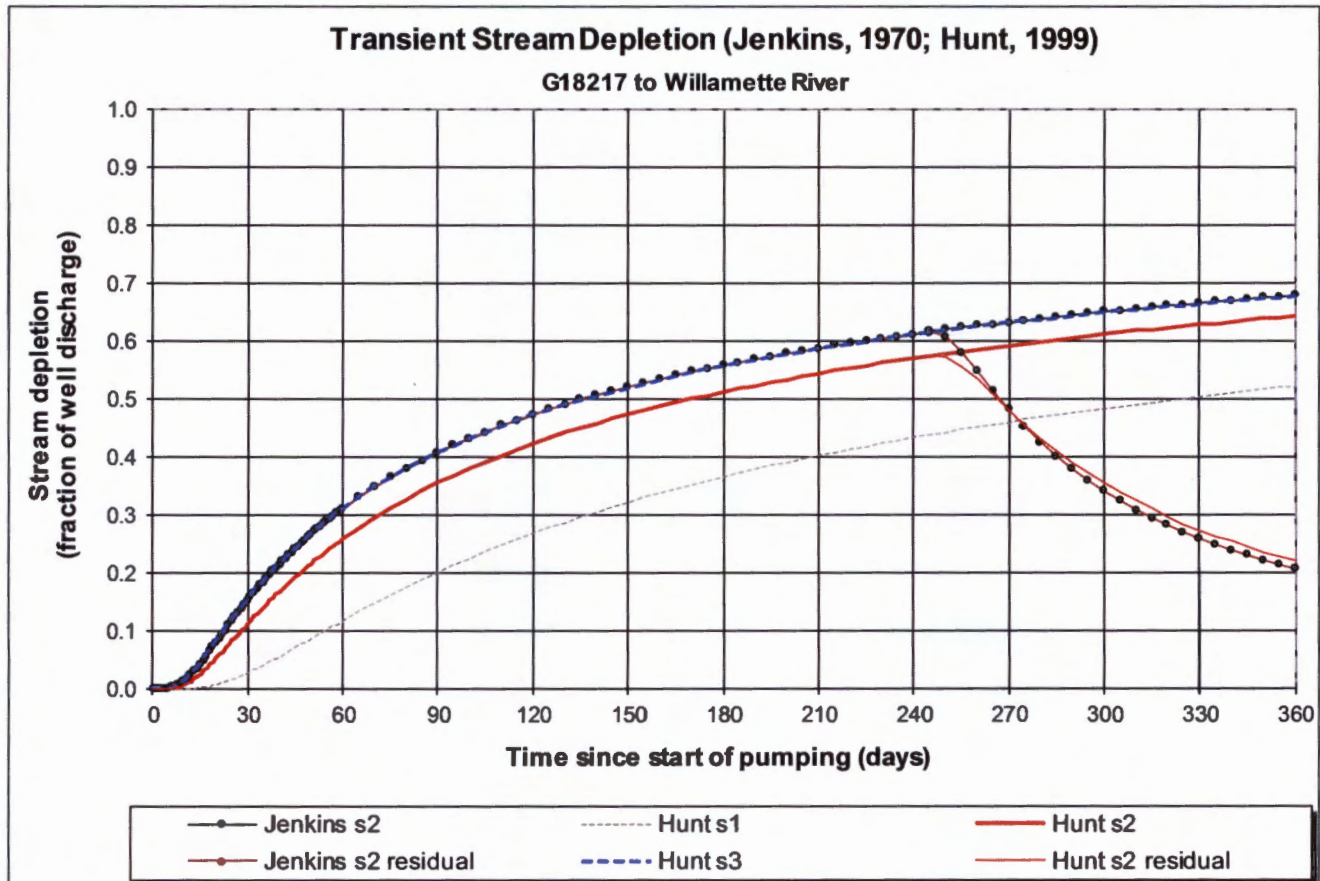
Well Location Map



Water-Level Trends in Nearby Wells



Transient Stream Depletion



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	2.277	2.277	2.277	2.277	2.277	2.277	2.277	2.277	2.277	2.277	2.277	2.277
Jenk SD s2 %	15.07	30.96	40.67	47.24	52.04	55.74	58.70	61.14	48.12	34.00	25.81	20.58
Jen SD s2 cfs	0.343	0.705	0.926	1.076	1.185	1.269	1.337	1.392	1.096	0.774	0.588	0.469
Hunt SD s2 %	11.21	25.84	35.50	42.26	47.29	51.21	54.37	57.00	48.01	35.29	27.29	22.00
Hunt SD s2 cfs	0.255	0.588	0.808	0.962	1.077	1.166	1.238	1.298	1.093	0.803	0.621	0.501

Parameters:		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate	Qw	2.277	2.277	2.277	cfs
Distance to stream	a	5280	5280	5280	ft
Aquifer hydraulic conductivity	K	700	1500	2000	ft/day
Aquifer thickness	b	30	30	30	ft
Aquifer transmissivity	T	21000	45000	60000	ft*ft/day
Aquifer storage coefficient	S	0.2	0.2	0.2	
Stream width	ws	850	850	850	ft
Streambed hydraulic conductivity	Ks	0.5	0.5	0.5	ft/day
Streambed thickness	bs	3	3	3	ft
Streambed conductance	sbc	141.6666667	141.6666667	141.6666667	ft/day
Stream depletion factor (Jenkins)	sdf	265.5085714	123.904	92.928	days
Streambed factor (Hunt)	sbf	35.61904762	16.62222222	12.46666667	

Predicted Hydraulic Interference Plots at 725 Feet From Production Well

Input Data:	Var Name	Scenario 1	Scenario 2	Scenario 3	Units	
Total pumping time	t		240		d	
Radial distance from pumped well:	r		725.00		ft	Q conversions
Pumping rate	Q		2.2		cfs	999.48 gpm
Hydraulic conductivity	K	700	1,500	2,000	ft/day	2.23 cfs
Aquifer thickness	b		30		ft	133.62 cfm
Storativity	S_1		0.20000			192,412.80 cfd
	S_2		0.20000			4.42 af/d
Transmissivity Conversions	T_ft2pd	21,000	45,000	60,000	ft ² /day	
	T_ft2pm	14.5833	31.2500	41.6667	ft ² /min	
	T_gpdft	157,080	336,600	448,800	gpd/ft	

Recalculate Use the Recalculate button if recalculation is set to manual

