

Groundwater Review Summary Form

Application # G- 18381

GW Reviewer Mike Thorne Date Review Completed: 1/19/17

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.

→ needs more once PDA is completed

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 January 19, 2017
 FROM: Groundwater Section Michael J Thoma
Reviewer's Name
 SUBJECT: Application G- 18381 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: O.O. Agricultural County: Benton

A1. Applicant(s) seek(s) 1.11 cfs from 1 well(s) in the Willamette Basin,
Marys River subbasin

A2. Proposed use Irrigation (135 ac) Seasonality: March 1 – October 31 (244 d)

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	SUMP	Sump #1	Terrace Sediments	1.11	13S/05W-6 SWNW	2650'S, 700'E of NW cor S 6
2						

* 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	310	*	*	*	15	None	+1-15	-	5-15	*		

Use data from application for proposed wells.

A4. **Comments:** *Well #1 (a sump) is proposed and is to be collecting tile water from the surrounding fields.

A5. **Provisions of the** Willamette (OAR 690-502) 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) _____;
 - 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 15 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 are not sufficient OWRD observation well data in the vicinity of the proposed POA to determine groundwater over-appropriation. There is also only 1 permitted groundwater POA within 1 mile of the proposed POA so injury to existing permitted users is unlikely.

Regarding Capacity of the Resource: There are 31 well logs in the same township as the proposed POA and the median reported well yield of those logs is ~12 gpm. Of those, 6 were drilled to < 100 ft below land surface (bls) and those report yields of < 20 gpm (see attached figure). Therefore, it is highly unlikely that the weathered terrace alluvium that the proposed sump would be producing from will produce the requested 500 gpm (1.11 cfs). Furthermore, the reviewer finds that the proposed depth of 15 ft may not be sufficient to capture groundwater – most well logs for shallow wells (< 100 ft) in the area report SWLs > 10 ft bls – and thus there may not be a groundwater resource available to the POA as proposed. This finding is rebuttable and could be overturned if sufficient evidence is found that at 15 ft bls perennial groundwater occurs at sufficient quantities proposed by the applicant.

The applicants are proposing that the sump will be collecting tile water off of the field. The location of the sump would not be in a position to collect all water drained from the field so the amount of potential withdrawal (3.5 AF/acre per year x 135 acres = 472 AF/year) is greater than the potential “recharge” to the drain tiles. Therefore it seems likely that the sump will need to be intersecting perennial groundwater and will not be exclusively drain tile water.

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	Pleistocene Terrace Alluvium	<input type="checkbox"/>	<input checked="" type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>

Basis for aquifer confinement evaluation: given the geology and conceptual hydrogeology at the POA site the reviewer finds it very unlikely that the proposed depth of 15 ft will not encounter confined aquifer conditions

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	Beaver Cr	310	<260	5600	<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: GW elevation is above SW elevation implying that groundwater is flowing towards and discharging to surface water; the conceptual hydrogeologic model of the area suggests that the proposed POA would be intercepting shallow subsurface water (vadose zone) moving downslope and eventually discharging to surface water.

Water Availability Basin the well(s) are located within: Muddy Cr > Marys R – AB Evergreen Cr (ID# 30200320)

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?
		<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"/>

Comments: No surface water sources were evaluated within 1 mile

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
1	1	%	%	< 1 %	< 1 %	< 1 %	< 1 %	< 1 %	< 1 %	< 1 %	< 1 %	< 1 %	< 1 %
Well Q as CFS				0.70*	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0	0
Interference CFS				<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
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.				<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
(B) = 80 % Nat. Q	168	191	166	88.5	51.0	27.0	13.9	8.3	6.1	7.1	19.2	118	
(C) = 1 % Nat. Q	1.68	1.91	1.66	0.89	0.51	0.27	0.14	0.08	0.06	0.07	0.19	0.12	
(D) = (A) > (C)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
(E) = (A / B) x 100	%	%	< 1 %	< 1 %	< 1 %	< 1 %	< 1 %	< 1 %	< 1 %	< 1 %	< 1 %	< 1 %	< 1 %

(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: The Hunt (1999) analytical stream-depletion model was used to estimate impacts to surface water. Parameters used were considered in the range of weathered alluvial sediments.

*The rate evaluated was the full duty used over the irrigation season: 135 acres * 2.5 AF/acre per 244 d irrigation season = 0.7

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 at a distance of > 1 mile. However, the reviewer is unable to find a preponderance of evidence that the proposed use will have the Potential for Substantial Interference (PSI) with surface water.

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. 1999. *Unsteady Stream Depletion from Ground Water Pumping*. 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 1/19/2017.

D. WELL CONSTRUCTION, OAR 690-200

D1. Well #: 1 Logid: Proposed

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) **“Dug wells” (sumps) have specific well-construction standards so this application should be reviewed by the proper OWRD staff prior to the IR being issued.**

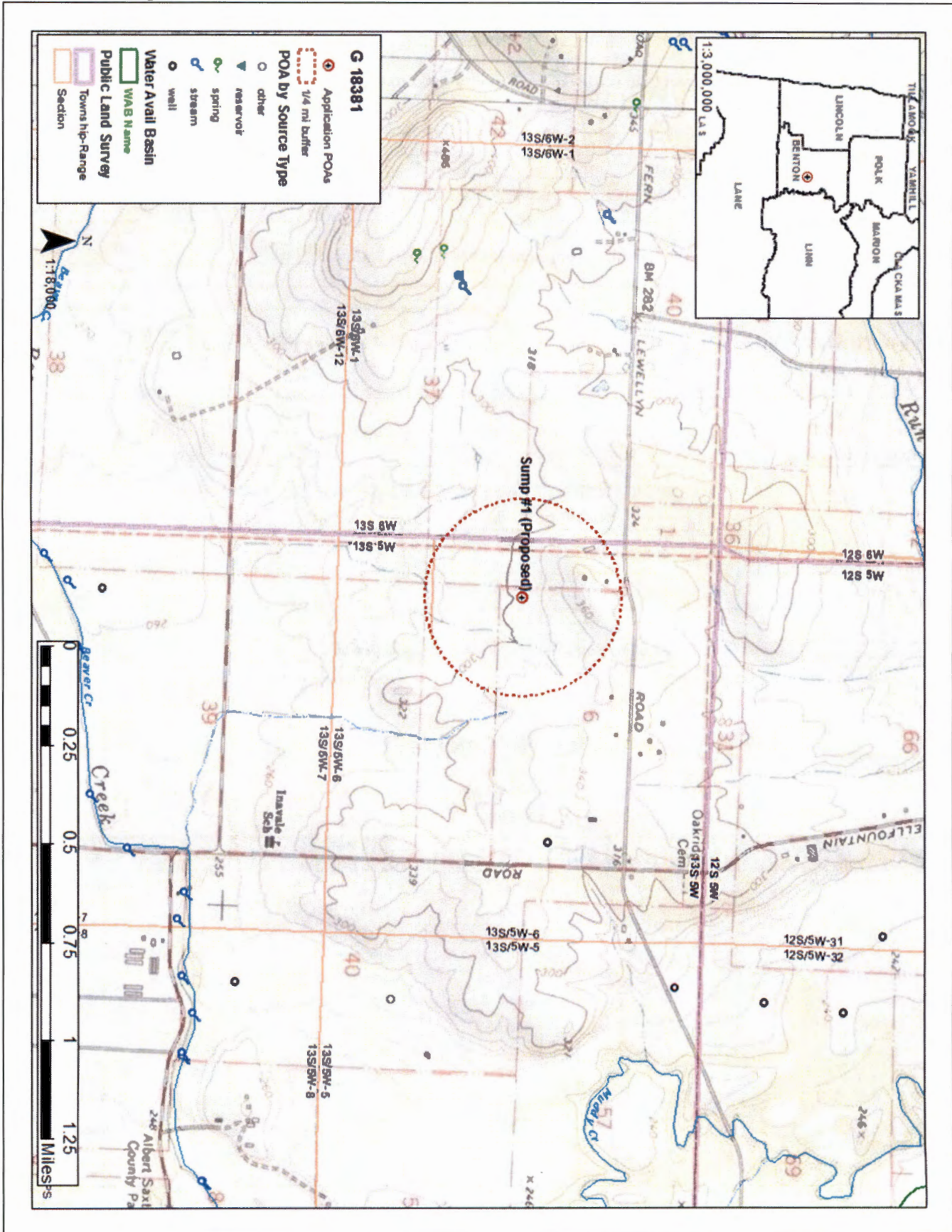
D3. THE WELL construction deficiency or other comment is described as follows: _____

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

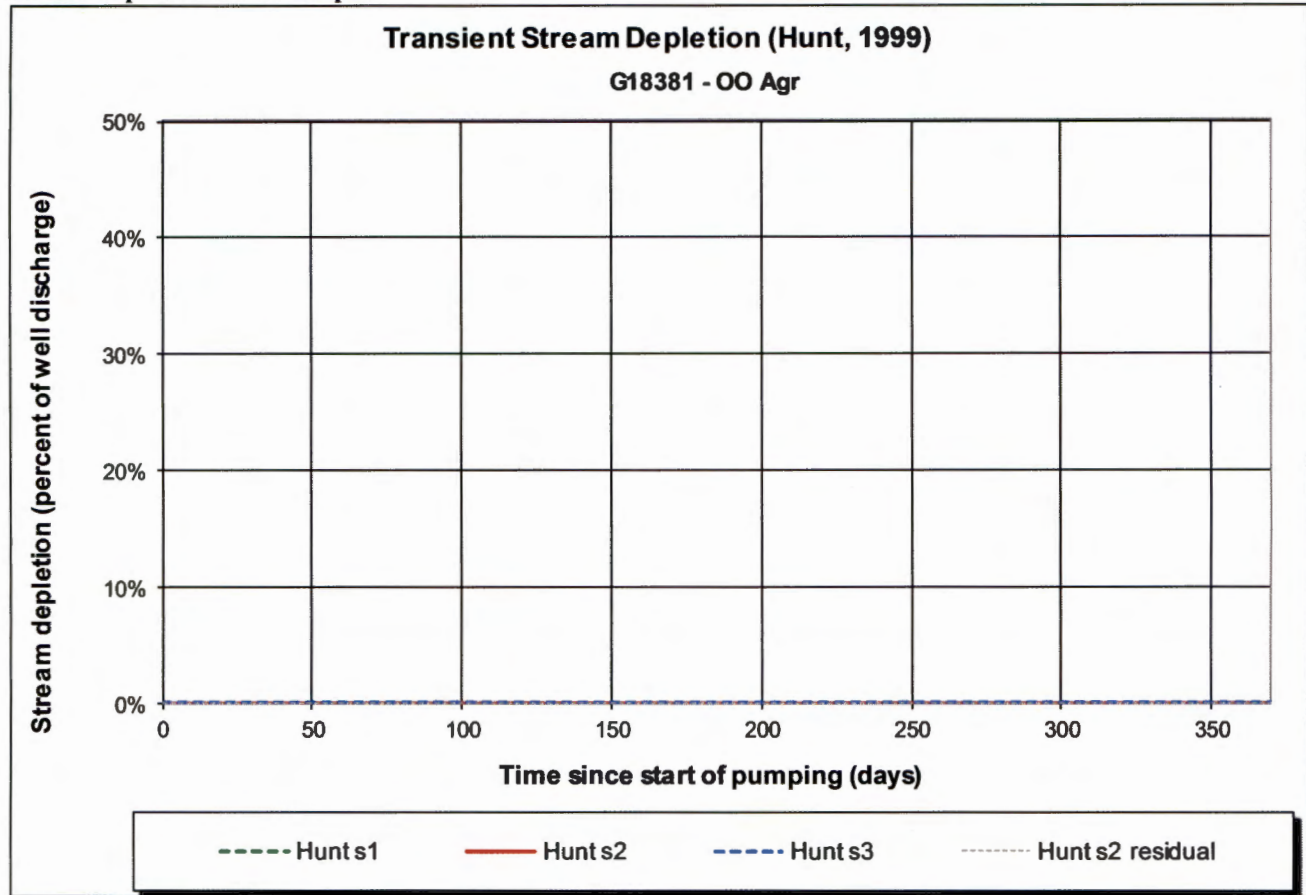
Water Availability Tables

MUDDY CR > MARYS R - AB EVERGREEN CR WILLAMETTE BASIN Water Availability as of 12/16/2016						
Watershed ID #: 30200320 (Map)				Exceedance Level: 80% ▾		
Date: 12/16/2016				Time: 10:01 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	168.00	2.88	165.00	0.00	0.00	165.00
FEB	191.00	2.61	188.00	0.00	0.00	188.00
MAR	166.00	2.34	164.00	0.00	0.00	164.00
APR	88.50	1.70	86.80	0.00	0.00	86.80
MAY	51.00	4.64	46.40	0.00	0.00	46.40
JUN	27.00	8.25	18.70	0.00	0.00	18.70
JUL	13.90	13.80	0.13	0.00	0.00	0.13
AUG	8.30	11.10	-2.77	0.00	0.00	-2.77
SEP	6.10	5.76	0.34	0.00	0.00	0.34
OCT	7.10	0.94	6.16	0.00	0.00	6.16
NOV	19.20	1.03	18.20	0.00	0.00	18.20
DEC	118.00	2.68	115.00	0.00	0.00	115.00
ANN	105,000.00	3,500.00	102,000.00	0.00	0.00	102,000.00

Well Location Map



Stream-depletion Model Output



Output for Hunt Stream Depletion, Scenerio 2 (s2): **Time pump on = 244 days**

Days	30	60	90	120	150	180	210	240	270	300	330	360
Qw, cfs	0.700	0.700	0.700	0.700	0.700	0.700	0.700	0.700	0.700	0.700	0.700	0.700
Jenk SD s2 %	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jen SD s2 cfs	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Hunt SD s2 %	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hunt SD s2 cfs	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Parameters:		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate	Qw	0.7	0.7	0.7	cfs
Distance to stream	a	5600	5600	5600	ft
Aquifer hydraulic conductivity	K	0.1	1	5	ft/day
Aquifer thickness	b	50	50	50	ft
Aquifer transmissivity	T	5	50	250	ft*ft/day
Aquifer storage coefficient	S	0.1	0.1	0.1	
Stream width	ws	5	5	5	ft
Streambed hydraulic conductivity	Ks	0.01	0.01	0.01	ft/day
Streambed thickness	bs	2	2	2	ft
Streambed conductance	sbc	0.025	0.025	0.025	ft/day
Stream depletion factor (Jenkins)	sdf	627200.0	62720.0	12544.0	days
Streambed factor (Hunt)	sbf	28.0	2.8	0.6	

Well Log Statistics for T13S/R05W-S06

