

PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO: Water Rights Section Date January 21, 2016

FROM: Groundwater Section Aurora C. Bouchier / Karl C. Wozniak
Reviewer's Name

SUBJECT: Application G- 18166 Supersedes review of January 7, 2016
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: Perrydale Domestic Water Ass County: Polk

A1. Applicant(s) seek(s) 2 cfs from 1 well(s) in the Willamette Basin,
Middle Willamette subbasin

A2. Proposed use OM (quasi-municipal) Seasonality: Jan 1 – Dec 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	POLK 1109	Radley	Alluvium	2.41	6S/3W-29 SE-NW	2220' S, 2470' E fr NW cor S 29
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	121	33	24	4/18/1976	70	0-18	+1-70	na	44-64	1180+	8	2

Use data from application for proposed wells.

A4. **Comments:** POLK 1109 is authorized for 0.41 cfs under Certificate 50346 for irrigation. This evaluation analyzes the combined uses at a rate of 2.41 cfs to account for the water stacking.

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 at just over 1/4-mile from a surface water body, 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: Eola Hills Ground Water Limited Area

Comments: The well is completed in the gravels overlying the CRBG controlled by the Eola Hills Ground Water Limited Area; therefore the limited area rules do not impact this application.

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, ideally a flowmeter for the total water pumped and a separate flowmeter to monitor the diversion for Perrydale;
 - 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 well (POLK 1109) develops water from unconfined, 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). POLK 1109 is located on a bench above the floodplain of the Willamette River, but below a pronounced terrace which essentially coincides with the boundary where the Willamette Silt has been removed. Since the water levels in this system are closely tied to the Willamette Stream stage, the long term stability of the aquifer is not likely to be a problem, but the saturated thickness of the aquifer could crop substantially in late summer in conjunction with lower stream stage. The seasonal fluctuations are unknown at this time. Interference with nearby water users may be a problem. The nearest well, also located within the unconsolidated Holocene floodplain, with long term water level reporting is POLK 1688 (located ~ 3.5 miles to the south-southeast). The hydrograph for POLK 1688 shows no long term decline and a strong correlation to the flow of the Willamette River as measured at the station in Salem.

SPECIAL CONDITION: a dedicated observation well shall be constructed and maintained by the permittee to assess the impacts of use of the permitted well. The observation well shall be drilled at a distance of 100 to 200 feet east of the well or at a different location that is agreeable to the Groundwater Section of the Water Resources Department. The observation well shall be at least 6 inches in diameter, shall fully penetrate the sand and gravel aquifer (an expected total depth of about 65 feet), shall be open to at least the basal 20 feet of the aquifer, and shall not be completed in the underlying fine-grained sediments. After the observation well is completed, Department staff shall be allowed access to the well to run video and

geophysical logs as needed and to install and maintain automatic water-level monitoring equipment to assess on-going impacts from the production well. Drill cuttings shall be collected at 10-foot intervals and at changes in formation, and a split of each sampled interval shall be provided to the Department.

The permittee shall conduct a constant-rate aquifer test of the production well before beneficial use begins to determine aquifer properties and to assess potential impacts from use of the well. The test shall be designed and conducted by an Oregon Registered Geologist, and the test design shall be subject to the approval of the Groundwater Section of the Department prior to the test. At a minimum, the test shall include discharge and water-level measurements in the pumping well and simultaneous water-level measurements in the dedicated observation well. If practicable, water-level measurements shall also be made in nearby wells. Pumping duration for the test shall be determined by the Department after well yield and specific capacity are determined. The results of the aquifer test shall be presented in a report to the Department that includes an analysis of aquifer properties, aquifer boundaries, and the potential impact on nearby wells that is likely to occur at the maximum permitted rate.

Copies of all geologic and hydrogeologic reports completed for the permittee during the construction and development of the observation well, and testing of the production well, including geophysical well logs and borehole video logs, shall be provided to the Department before beneficial use begins. Except for borehole video logs, two paper copies, or a single electronic copy, shall be provided of each report. Digital tables of any data shall be provided upon request. The Department must find the reports acceptable before beneficial use begins

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	~100	100	~1400	<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"/>

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).

Water Availability Basin the well(s) are located within: 182: WILLAMETTE R > COLUMBIA R- AB MOLALLA R

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"/>	MF182A	1500	<input type="checkbox"/>	3830	<input type="checkbox"/>	>25%	<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"/>

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"/>
		<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 nearby wells which are similarly located in the meander belt/flood deposits of the Willamette River (MARI 5336 located ~ 0.8 miles to the east-northeast across the river, and a pump test conducted for water right G-5421 located ~0.4 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: _____

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:** _____

References Used: _____
Application files for G-18166 and nearby G-17130.

Conlon, T.D., Wozniak, K.C., Woodcock, D., Herrera, N.B., Fisher, 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 Report 2005-5168.

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

Hunt, B., 1999. Unsteady stream depletion from ground water pumping; Groundwater, v. 37, no. 1, p. 98-102.

Hunt, B., 2003. Unsteady stream depletion when pumping from semiconfined aquifer: Journal of Hydrologic Engineering, January/February, 2003.

OWRD well log and water level reports for POLK 1109 and POLK 1688, and pump tests for permit G-5421 and MARI 5336.

Woodward, D.G., Gannett, M.G., and Vaccaro, J.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 #: 1 Logid: POLK 1109

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:** _____

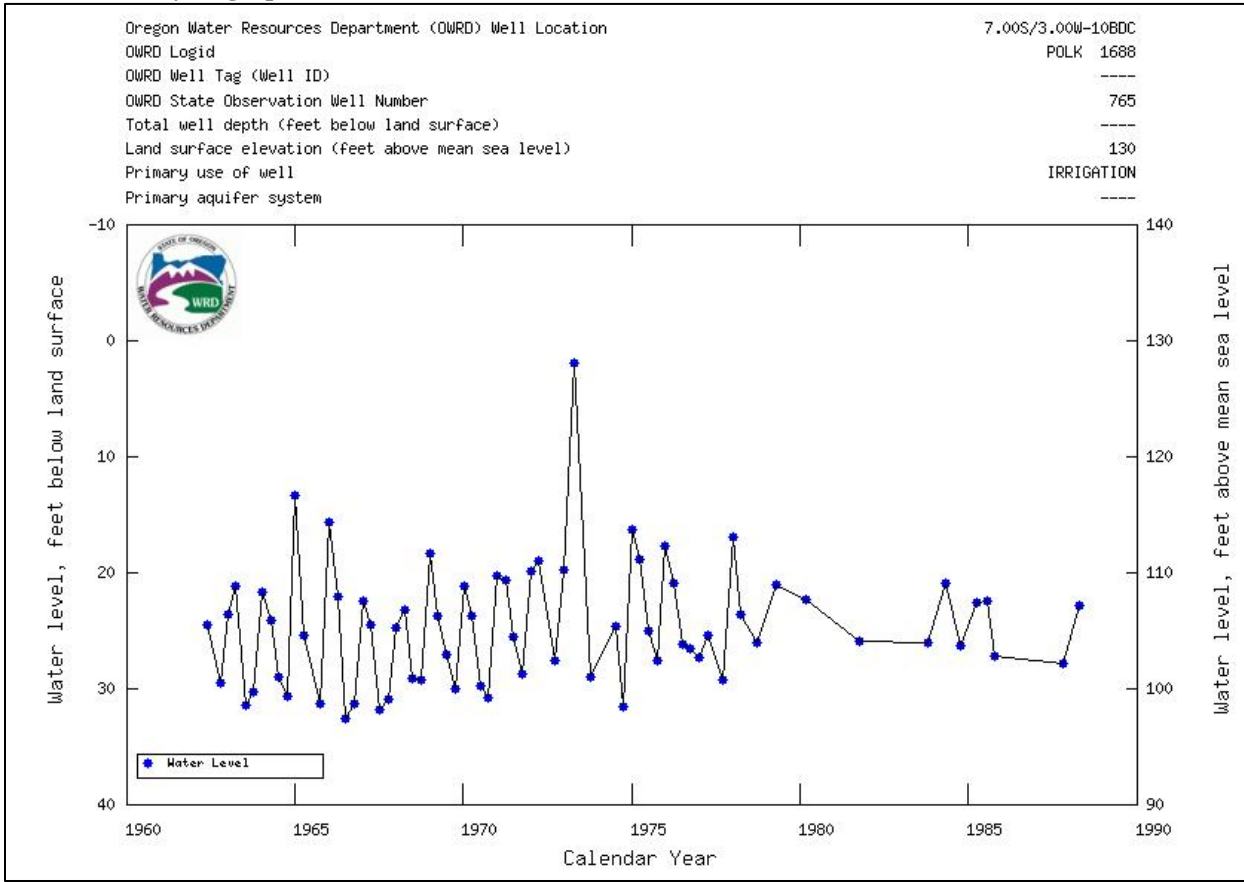
D4. **Route to the Well Construction and Compliance Section for a review of existing well construction.**

Water Availability Tables

DETAILED REPORT ON THE WATER AVAILABILITY CALCULATION						
Watershed ID #: 182		WILLAMETTE R > COLUMBIA R - AB MOLALLA R			Exceedance Level: 80	
Time: 9:30 AM		Basin: WILLAMETTE			Date: 01/07/2016	
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	21,400.00	2,290.00	19,100.00	0.00	1,500.00	17,600.00
FEB	23,200.00	7,470.00	15,700.00	0.00	1,500.00	14,200.00
MAR	22,400.00	7,250.00	15,200.00	0.00	1,500.00	13,700.00
APR	19,900.00	6,910.00	13,000.00	0.00	1,500.00	11,500.00
MAY	16,600.00	4,230.00	12,400.00	0.00	1,500.00	10,900.00
JUN	8,740.00	1,970.00	6,770.00	0.00	1,500.00	5,270.00
JUL	4,980.00	1,800.00	3,180.00	0.00	1,500.00	1,680.00
AUG	3,830.00	1,640.00	2,190.00	0.00	1,500.00	686.00
SEP	3,890.00	1,390.00	2,500.00	0.00	1,500.00	996.00
OCT	4,850.00	747.00	4,100.00	0.00	1,500.00	2,600.00
NOV	10,200.00	877.00	9,320.00	0.00	1,500.00	7,820.00
DEC	19,300.00	958.00	18,300.00	0.00	1,500.00	16,800.00
ANN	15,200,000	2,250,000	13,000,000	0	1,090,000	11,900,000

DETAILED REPORT OF INSTREAM REQUIREMENTS													
Watershed ID #: 182		WILLAMETTE R > COLUMBIA R - AB MOLALLA R										Basin: WILLAMETTE	
Time: 9:30 AM												Date: 01/07/2016	
Application Number	Status	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Monthly values are in cfs.													
MF182A	APPLICATION	1500.0	1500.0	1500.0	1500.0	1500.0	1500.0	1500.0	1500.0	1500.0	1500.0	1500.0	1500.0
MAXIMUM		1500.0	1500.0	1500.0	1500.0	1500.0	1500.0	1500.0	1500.0	1500.0	1500.0	1500.0	1500.0

Water-Level Hydrograph for POLK 1688



Willamette River at Salem

Station ID: 14191000 [View: Map - Driving Directions - Station Info - Historical Stats - Rating Curve \(USGS\)](#)

Name: WILLAMETTE R AT SALEM, OR

Operator: USGS Status: Near Real Time Drainage Area: 7280 sqmi
 Latitude: 44° 56' 39.438" Longitude: -123° 2' 40.353" Datum: NAD83

Period of Operation: 10/1/1909 ~ Present

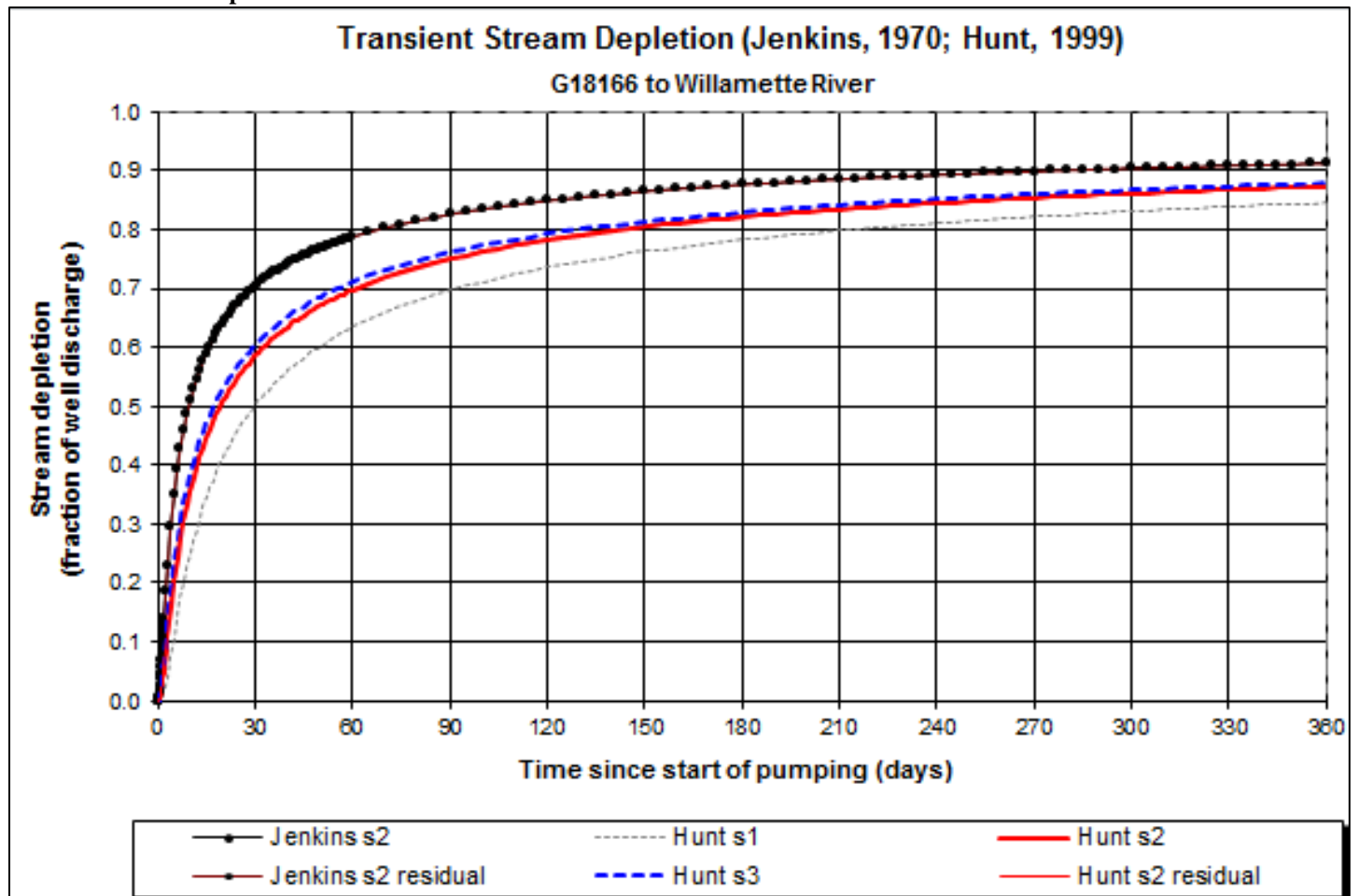
Most Recent Values: Mean Daily Flow: 73200 cfs @ 01/19/2016
 Instantaneous Flow: [See USGS website](#)
 Instantaneous Stage: 19.27 ft @ 01/21/2016 09:00

Starting Date: Ending Date: Dataset:

Graph Options: Show Measurements: Download Format:

Mean Daily Flow

Transient Stream Depletion



Output for Hunt Stream Depletion, Scenerio 2 (s2): Time pump on = 365 days												
Days	30	60	90	120	150	180	210	240	270	300	330	360
Qw, cfs	2.410	2.410	2.410	2.410	2.410	2.410	2.410	2.410	2.410	2.410	2.410	2.410
Jenk SD s2 %	70.32	78.76	82.59	84.89	86.47	87.64	88.55	89.28	89.89	90.41	90.85	91.24
Jen SD s2 cfs	1.695	1.898	1.990	2.046	2.084	2.112	2.134	2.152	2.166	2.179	2.190	2.199
Hunt SD s2 %	58.58	69.78	75.05	78.27	80.50	82.16	83.46	84.51	85.38	86.12	86.76	87.31
Hunt SD s2 cfs	1.412	1.682	1.809	1.886	1.940	1.980	2.011	2.037	2.058	2.075	2.091	2.104

Parameters:		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate	Qw	2.41	2.41	2.41	cfs
Distance to stream	a	1400	1400	1400	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	18.66666667	8.711111111	6.533333333	days
Streambed factor (Hunt)	sbf	9.444444444	4.407407407	3.305555556	

Predicted Hydraulic Interference Plots at 100 and 200 Feet From Production Well

