

# Groundwater Application Review Summary Form

Application # G- 18751

GW Reviewer Aurora Bouchier Date Review Completed: 2/6/2019

## 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.

↘ 2/6/19

*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).*







# MEMO

**To:** Kristopher Byrd, Well Construction and Compliance Section Manager  
**From:** Joel Jeffery, Well Construction Program Coordinator  
**Subject:** Review of Water Right Application G-18751  
**Date:** February 7, 2019

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 (MARI 58808): Based on a review of the Well Report, Applicant's Well #1 appears to protect the groundwater resource.

The construction of Applicants Well #1 may not satisfy hydraulic connection issues.



STATE OF OREGON  
WATER SUPPLY WELL REPORT  
(as required by ORS 537.765)

MARI 58808  
Westerberg Drilling, Inc.  
36728 S. Kropf Rd.  
Molalla, OR 97038  
829-2526

Amended Mari 58808  
WELL I.D. # L 71454  
START CARD # 171839

Instructions for completing this report are on the last page of this form.

(1) LAND OWNER Well Number \_\_\_\_\_  
Name Carl Jensen Farms  
Address 6532 Howell Prairie Rd. NE  
City Silverton State OR Zip 97381

(2) TYPE OF WORK  New Well  
 Deepening  Alteration (repair/recondition)  Abandonment  Conversion

(3) DRILL METHOD  
 Rotary Air  Rotary Mud  Cable  Auger  Cable Mud  
 Other \_\_\_\_\_

(4) PROPOSED USE  
 Domestic  Community  Industrial  Irrigation  
 Thermal  Injection  Livestock  Other \_\_\_\_\_

(5) BORE HOLE CONSTRUCTION Special Construction:  Yes  No  
Depth of Completed Well 239 ft.  
Explosives used:  Yes  No Type \_\_\_\_\_ Amount \_\_\_\_\_

BORE HOLE			SEAL			
Diameter	From	To	Material	From	To	Sacks or Pounds
16"	0	58	Cement	0	58	48 sacks
12"	58	239				

How was seal placed: Method  A  B  C  D  E  
 Other \_\_\_\_\_

Backfill placed from \_\_\_\_\_ ft. to \_\_\_\_\_ ft. Material \_\_\_\_\_  
Gravel placed from \_\_\_\_\_ ft. to \_\_\_\_\_ ft. Size of gravel \_\_\_\_\_

(6) CASING/LINER

Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing: 12"	+1.5	238	.250	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Liner: None				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Drive Shoe used  Inside  Outside  None  
Final location of shoe(s) 238'

(7) PERFORATIONS/SCREENS  
 Perforations Method Holte air perforator  
 Screens Type \_\_\_\_\_ Material \_\_\_\_\_

From	To	Slot Size	Number	Diameter	Tele/pipe size	Casing	Liner
150	230	1/4x2	3840			<input checked="" type="checkbox"/>	<input type="checkbox"/>

(8) WELL TESTS: Minimum testing time is 1 hour  
 Pump  Bailer  Air  Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
960	35'		4 hr.

Temperature of water 54 Depth Artesian Flow Found \_\_\_\_\_  
Was a water analysis done?  Yes By whom \_\_\_\_\_  
Did any strata contain water not suitable for intended use?  Too little  
 Salty  Muddy  Odor  Colored  Other \_\_\_\_\_  
Depth of strata: \_\_\_\_\_

(9) LOCATION OF WELL (legal description)  
County Marion  
Tax Lot 100 Lot \_\_\_\_\_  
Township 6 S Range 2 W WM  
Section 24 NE 1/4 SE 1/4

Lat \_\_\_\_\_ " or \_\_\_\_\_ (degrees or decimal)  
Long \_\_\_\_\_ " or \_\_\_\_\_ (degrees or decimal)

Street Address of Well (or nearest address) 7832 Howell Prairie Rd. NE  
Silverton, OR 97381

(10) STATIC WATER LEVEL  
58 ft. below land surface. Date 3-1-05  
\_\_\_\_\_ ft. below land surface. Date \_\_\_\_\_  
Artesian pressure \_\_\_\_\_ lb. per square inch Date \_\_\_\_\_

(11) WATER BEARING ZONES  
Depth at which water was first found 110'

From	To	Estimated Flow Rate	SWL
110	230	>1000 gpm	58'

(12) WELL LOG Ground Elevation \_\_\_\_\_

Soil	Material	From	To	SWL
Clay silty brown		0	2	
Clay silty blue		2	20	
Clay grey sticky w/ siltstone		20	45	
Siltstone brown		45	64	
Cemented sand w/ gravel		64	85	
Sand & gravel brown		85	93	
Sand & gravel loose		93	110	
Brown sand med		110	116	
Cemented gravel		116	118	
Sand brown w/ gravel		118	124	
Cemented gravel brown		124	128	
Cemntd gravel brn water bearing		128	148	
Cemented gravel brn dry		148	175	
Cemntd gravel brn water bearing		175	180	
continued on page 2		180	196	

Date Started 2-21-05 Completed 3-1-05

(unbonded) Water Well Constructor Certification  
I certify that the work I performed on the construction, deepening, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.

WWC Number 1358 Date 3-17-05  
Signed [Signature]

(bonded) Water Well Constructor Certification  
I accept responsibility for the construction, deepening, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.

WWC Number 688 Date 3-17-05  
Signed [Signature]

RECEIVED

MAY 11 2005  
WATER RESOURCES DEPT  
SALEM, OREGON







PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO: Water Rights Section Date 2/6/2019  
 FROM: Groundwater Section Aurora C Bouchier  
 Reviewer's Name  
 SUBJECT: Application G- 18751 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: Jensen Family Farm County: Marion

- A1. Applicant(s) seek(s) 2.0 cfs from 1 well(s) in the Willamette Basin,  
Pudding River subbasin
- A2. Proposed use Irrigation (175.2 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	MARI 58808	1	Alluvium	2.0	6S/2W-1 NE-SE	660' S, 80' W fr E ¼ cor S 24
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	200	110	58	3/1/2005	239	0-58	-1.5-238	Na	150-230	960	35	P

Use data from application for proposed wells.

- A4. **Comments:** The well and lands were authorized under permit G-15851 (app G-16203), however the water right holder failed to provide proof of appropriation within the deadline and the water right was canceled. Permit G-15851 authorized production out of three wells (including MARI 58808 as well 2) for a total maximum rate of 2.0 cfs from March 1 – May 31, and 0.67 cfs from June 1 – October 31 of each year due to water availability considerations. The groundwater review for the original application evaluated against individual well rates of 0.668 cfs and therefore PSI was not triggered in table C3a.

This application requests the full rate of 2.0 cfs out of 1 well (MARI 58808) and does not mention the rate reduction for part of the year.

- 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 well produces from a confined aquifer, so the pertinent rules do 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, Large 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:** \_\_\_\_\_

About 100 feet of saturated sands and gravels are confined beneath about 80 feet of Willamette Silt in the vicinity of the subject wells. Seasonal water-level fluctuations in the sand and gravel aquifer are estimated to be 30-40 feet/year based on the hydrograph for MARI 3280, a nearby observation well (located approximately 2.3 miles to the east-southeast across the Pudding River). Both the proposed well (MARI 58808) and well 3 (MAI 50725) from the cancelled permit (G-15851) were measured as a permit condition. The hydrograph (see below) shows fairly stable spring water levels at MARI 3280 and water levels at the applicant's location showing a somewhat cyclic pattern possibly driven by climatic factors.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



**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 Sediments – Willamette Valley	<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"/>

**Basis for aquifer confinement evaluation:** The aquifer is overlain by about 80 feet of saturated, fine-grained Willamette Silt in the area (Gannett and Caldwell, 1998). A nearby aquifer test indicates a storativity of about 10E-4 for the alluvial aquifer (Iverson, 2002), which indicates confined 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	Howell Prairie Creek	140-150	140-160	3300	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	2	Unnamed trib to L Pudding River	140-150	140-145	5780	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	3	Woods Creek	140-150	140-150	6900	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	4	Pudding River	140-150	145	7770	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	5	Little Pudding River	140-150	125	8540	<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"/>

**Basis for aquifer hydraulic connection evaluation:** Water-level maps indicate that ground water discharges from the alluvial aquifer to streams in the area (Woodward and others, 1998, Plate 1). However, streams such as the Pudding River and its tributaries are not fully incised through the Willamette Silt so the connection between these streams and the underlying sand and gravel aquifer will be very inefficient due to the resistance to flow caused by the intervening, low permeability silt beds.

**Water Availability Basin the well(s) are located within:** 151 [PUDDING R > MOLALLA R – AB MILL CR]

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"/>	na	na	<input type="checkbox"/>	67.30	<input checked="" 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"/>
		<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:** Potential depletion of Howell Prairie Creek by production at the proposed POA (MARI 58808) was estimated using the Hunt 2003 stream depletion analytical model. Analytical modeling results for the proposed POA shows that estimated interference at 30 days is less than 25% of well production. The thickness of the silt and associated fine-grained sediments in the area between the well and the stream (about 50 feet) was estimated based on maps in Gannett and Caldwell (1998), nearby wells, and land surface elevations from topographic maps. Aquifer thickness averages about 100 feet in the vicinity of the proposed wells.

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.

<b>Non-Distributed Wells</b>													
Well	SW#	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
<b>Distributed Wells</b>													
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													
(A) = Total Interf.													
(B) = 80 % Nat. Q													
(C) = 1 % Nat. Q													
(D) = (A) > (C)													
(E) = (A / B) x 100		%	%	%	%	%	%	%	%	%	%	%	%





**D. WELL CONSTRUCTION, OAR 690-200**

D1. Well #: 1 Logid: MARI 58808

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.

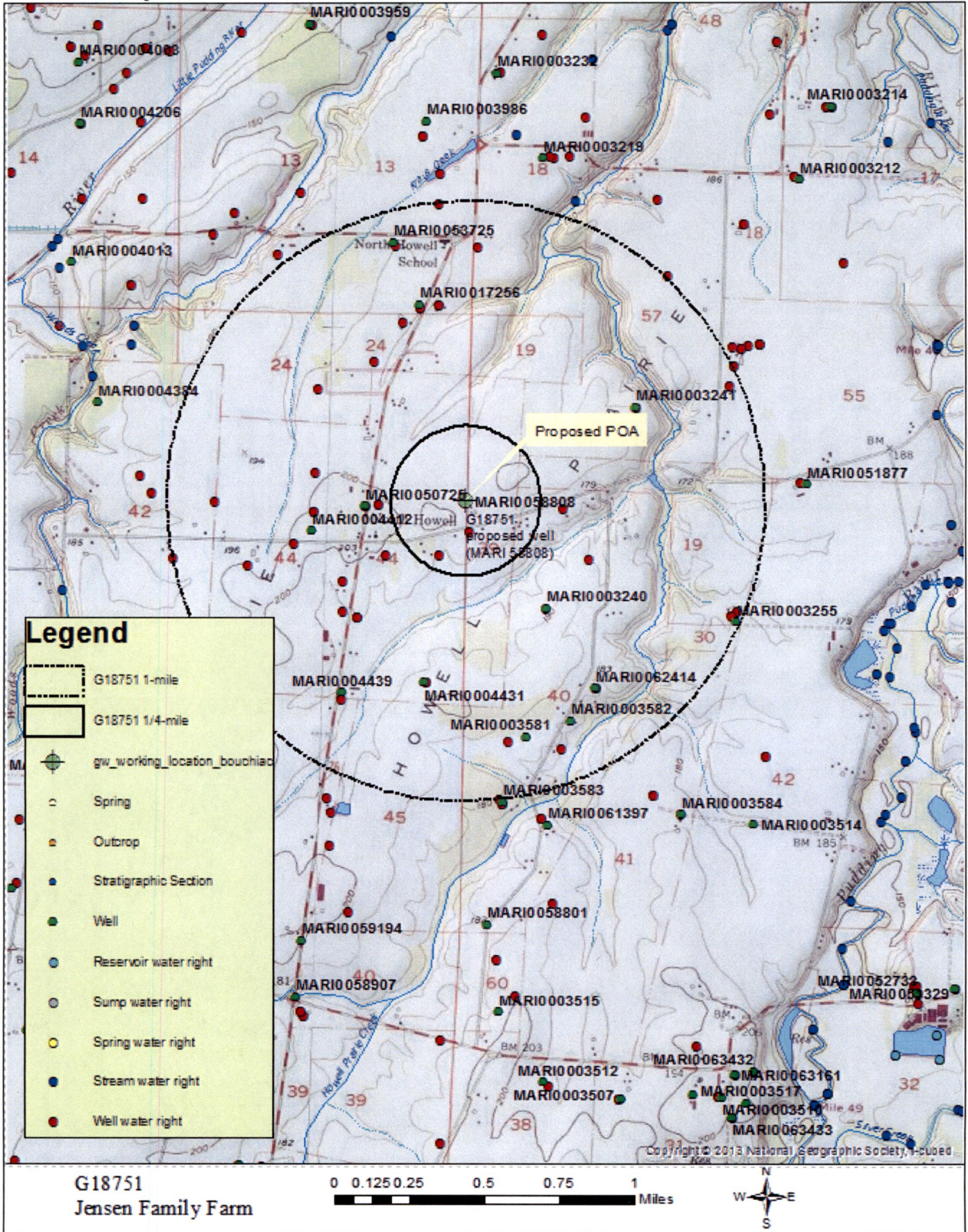
**Water Availability Tables**

WATER AVAILABILITY TABLE															
Watershed ID #:		PUDDING R > MOLALLA R - AB MILL CR										Exceedance Level: 80			
Time: 9:00 AM		Basin: WILLAMETTE										Date: 02/06/2019			
# watershed	Nest ID	Stream Name	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	STOR
1	181	WILLAMETTE R > COLUMBIA R - AT MOUTH	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
2	69796	MOLALLA R > WILLAMETTE R - AT MOUTH	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	YES	YES	YES
3	69998	PUDDING R > MOLALLA R - AT MOUTH	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	YES	YES	YES
4	151	PUDDING R > MOLALLA R - AB MILL CR	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	YES	YES	YES

DETAILED REPORT ON THE WATER AVAILABILITY CALCULATION							
Watershed ID #:		PUDDING R > MOLALLA R - AB MILL CR					Exceedance Level: 80
Time: 9:01 AM		Basin: WILLAMETTE					Date: 02/06/2019
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	1,040.00	124.00	916.00	0.00	36.00	880.00	
FEB	1,180.00	114.00	1,070.00	0.00	36.00	1,030.00	
MAR	1,010.00	75.70	934.00	0.00	36.00	898.00	
APR	787.00	51.60	735.00	0.00	36.00	699.00	
MAY	425.00	49.10	376.00	0.00	36.00	340.00	
JUN	224.00	70.20	154.00	0.00	36.00	118.00	
JUL	109.00	111.00	-1.52	0.00	36.00	-37.50	
AUG	71.00	90.60	-19.60	0.00	36.00	-55.60	
SEP	67.30	51.60	15.70	0.00	36.00	-20.30	
OCT	91.60	11.00	80.60	0.00	36.00	44.60	
NOV	363.00	48.30	315.00	0.00	36.00	279.00	
DEC	957.00	118.00	839.00	0.00	36.00	803.00	
ANN	706,000	55,200	651,000	0	26,100	627,000	

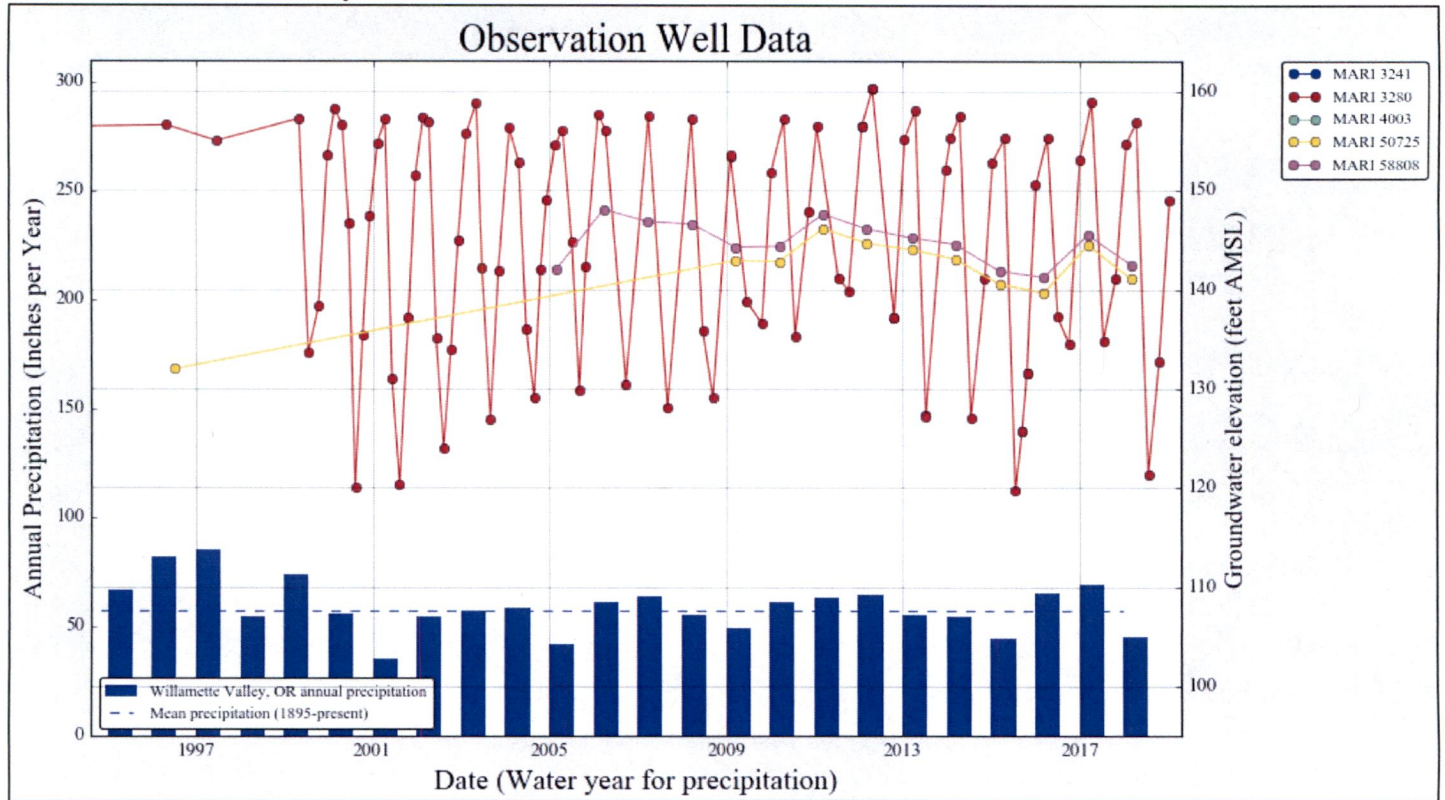


Well Location Map



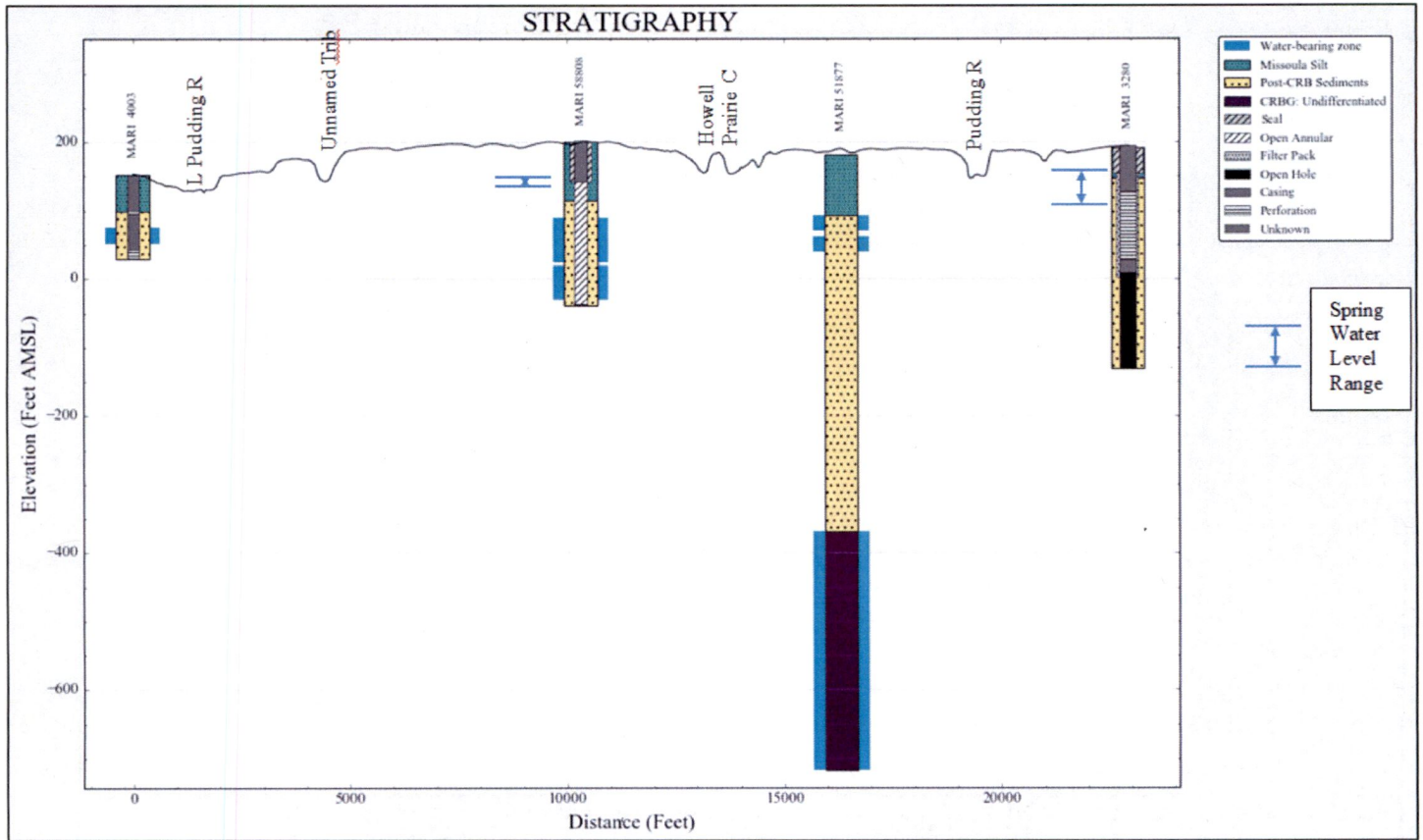


### Water-Level Trends in Nearby Wells



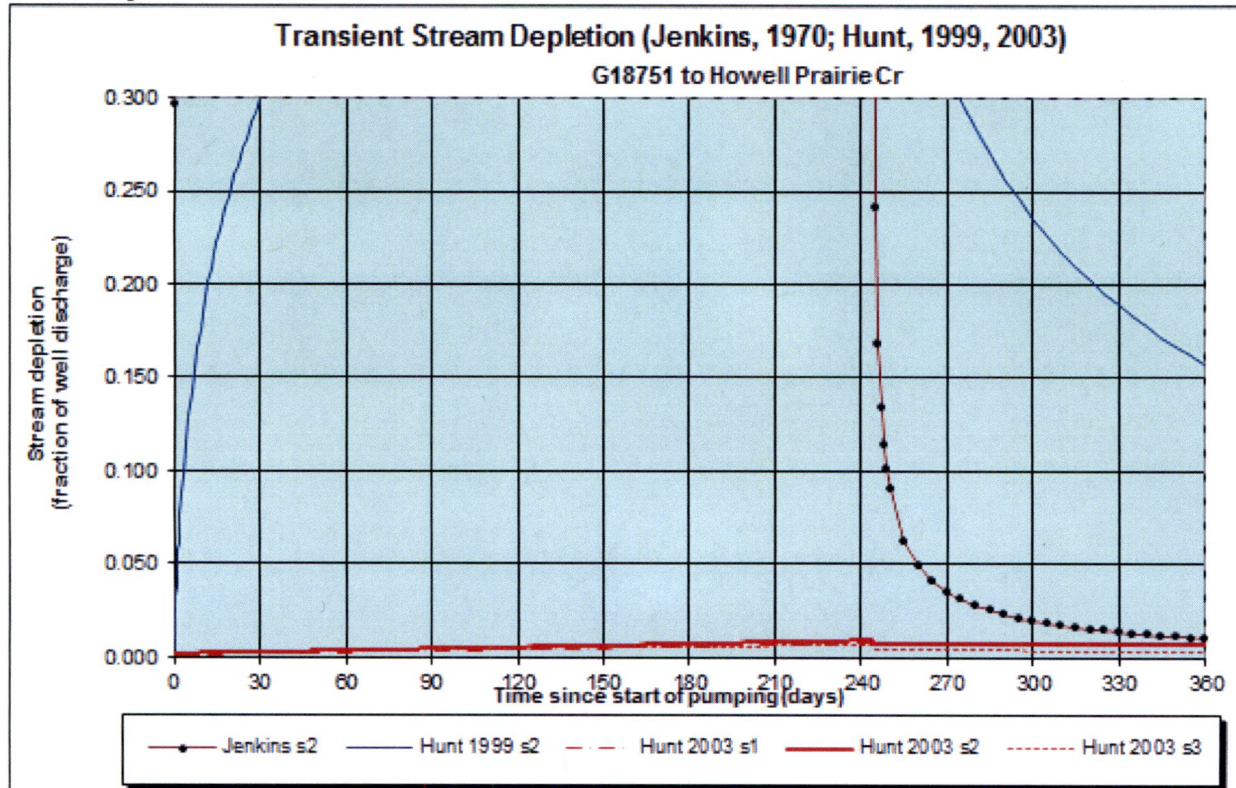


Cross Section/Profile





Stream Depletion Model Results



Output for Stream Depletion, Scenerio 2 (s2):						Time pump on (pumping duration) = 244 days						
Days	30	60	90	120	150	180	210	240	270	300	330	360
J SD	95.2%	96.6%	97.2%	97.6%	97.9%	98.0%	98.2%	98.3%	3.6%	2.0%	1.4%	1.1%
H SD 1999	30.0%	38.9%	44.5%	48.6%	51.8%	54.3%	56.5%	58.4%	31.7%	23.5%	18.9%	15.8%
H SD 2003	0.28%	0.37%	0.47%	0.56%	0.66%	0.75%	0.84%	0.94%	0.76%	0.76%	0.76%	0.75%
Qw, cfs	0.668	0.668	0.668	0.668	0.668	0.668	0.668	0.668	0.668	0.668	0.668	0.668
H SD 99, cfs	0.200	0.260	0.297	0.324	0.346	0.363	0.378	0.390	0.212	0.157	0.126	0.106
H SD 03, cfs	0.002	0.003	0.003	0.004	0.004	0.005	0.006	0.006	0.005	0.005	0.005	0.005

Parameters:		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate of well	Qw	0.67	0.67	0.67	cfs
Time pump on (pumping duration)	tpon	244	244	244	days
Perpendicular from well to stream	a	3300	3300	3300	ft
Well depth	d	200	200	200	ft
Aquifer hydraulic conductivity	K	25	50	500	ft/day
Aquifer saturated thickness	b	100	100	100	ft
Aquifer transmissivity	T	2500	5000	50000	ft <sup>2</sup> /day
Aquifer storativity or specific yield	S	0.0001	0.0001	0.0001	
Aquitard vertical hydraulic conductivity	Kva	0.1	0.1	0.1	ft/day
Aquitard saturated thickness	ba	50	50	50	ft
Aquitard thickness below stream	babs	20	20	20	ft
Aquitard porosity	n	0.2	0.2	0.2	
Stream width	ws	20	20	20	ft
Streambed conductance (lambda)	sbc	0.100000	0.100000	0.100000	ft/day
Stream depletion factor	sdf	0.435600	0.217800	0.021780	days
Streambed factor	sbf	0.132000	0.066000	0.006600	
input #1 for Hunt's Q_4 function	t'	2.295684	4.591368	45.913682	
input #2 for Hunt's Q_4 function	K'	8.712000	4.356000	0.435600	
input #3 for Hunt's Q_4 function	epsilon'	0.000500	0.000500	0.000500	
input #4 for Hunt's Q_4 function	lamda'	0.132000	0.066000	0.006600	