

Groundwater Application Review Summary Form

Application # G- 18868

GW Reviewer Travis Brown Date Review Completed: 11/26/2019

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.
sh 11/27/19

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

A handwritten signature in blue ink, appearing to be "Joel Jeffery", is located in the upper right quadrant of the page.

To: Kristopher Byrd, Well Construction and Compliance Section Manager
From: Joel Jeffery, Well Construction Program Coordinator
Subject: Review of Water Right Application G-18868
Date: November 27, 2019

The attached application was forwarded to the Well Construction and Compliance Section by Water Rights. Travis Brown reviewed the application. Please see Travis's Groundwater Review and the Well Log.

Applicant's Well #1 (CLAC 72984) Based on a review of the Well Report, Applicant's Well #1 seems to protect the groundwater resource.

The construction of Applicant's Well #1 may not satisfy hydraulic connection issues.

STATE OF OREGON
 WATER SUPPLY WELL REPORT
 (as required by ORS 537.765 & OAR 690-205-0210)

Westerberg Drilling, Inc.
36728 S. Kropf Rd.
Molalla, OR 97038

WELL I.D. LABEL# L 121535
 START CARD # 213206
 ORIGINAL LOG #

(1) LAND OWNER Owner Well I.D.
 First Name Steve & Karen Last Name Stadel
 Company _____
 Address 36728 S. Kropf Rd.
 City Molalla State OR Zip 97038

(2) TYPE OF WORK New Well Deepening Conversion
 Alteration (complete 2a & 10) Abandonment (complete 5a)

(2a) PRE-ALTERATION
 Casing: Dia + From To Gauge Stl Plstc Wld Thrd
 Material From To Amt sacks/lbs
 Seal: _____

(3) DRILL METHOD
 Rotary Air Rotary Mud Cable Auger Cable Mud
 Reverse Rotary Other _____

(4) PROPOSED USE Domestic Irrigation Community
 Industrial/ Commercial Livestock Dewatering
 Thermal Injection Other _____

(5) BORE HOLE CONSTRUCTION Special Standard (Attach copy)
 Depth of Completed Well 235 ft.

BORE HOLE			SEAL			sacks/ lbs
Dia	From	To	Material	From	To	
10	0	160	Bentonite	0	4	2 S
6.25	160	235				Calculated 2
			Cement	4	160	90 S
						Calculated 43

How was seal placed: Method A B C D E
 Other bent prd & probed
 Backfill placed from _____ ft. to _____ ft. Material _____
 Filter pack from _____ ft. to _____ ft. Material _____ Size _____
 Explosives used: Yes Type _____ Amount _____

(5a) ABANDONMENT USING UNHYDRATED BENTONITE
 Proposed Amount Pounds Actual Amount Pounds

(6) CASING/LINER
 Casing Liner Dia + From To Gauge Stl Plstc Wld Thrd
 Shoe Inside Outside Other Location of shoe(s) 161
 Temp casing Yes Dia 10 From + 1 To 6

(7) PERFORATIONS/SCREENS
 Perforations Method Saw
 Screens Type _____ Material _____

Perf/Screen	Casing/Screen	Liner	Dia	From	To	Scrn/slot width	Slot length	# of slots	Tele/pipe size
			4.5	175	235	.125	3	360	4.5

(8) WELL TESTS: Minimum testing time is 1 hour
 Pump Bailer Air Flowing Artesian
 Yield gal/min 96 Drawdown 235 Drill stem/Pump depth 1 Duration (hr) _____
 Temperature 56 °F Lab analysis Yes By _____
 Water quality concerns? Yes (describe below) TDS amount 125

From	To	Description	Amount	Units

(9) LOCATION OF WELL (legal description)
 County CLACKAMAS Twp 5 S N/S Range 2 E E/W WM
 Sec 24 NE 1/4 of the SW 1/4 Tax Lot 1700
 Tax Map Number _____ Lot _____
 Lat _____ or _____ DMS or DD
 Long _____ or _____ DMS or DD
 Street address of well Nearest address
17259 S. Callahan Rd., Molalla, OR 97038

(10) STATIC WATER LEVEL

Existing Well / Pre-Alteration	Date	SWL (psi)	+ SWL (ft)
Completed Well	03-03-2017		96.3

 Flowing Artesian? Dry Hole?
 WATER BEARING ZONES Depth water was first found 50

SWL Date	From	To	Est Flow	SWL (psi)	+ SWL (ft)
	50	55	1		
	75	95	1		
	115	150	5		
03-03-2017	175	235	96		96.3

(11) WELL LOG
 Ground Elevation _____

Material	From	To
soil	0	2
clay brown	2	4
weathered rock	4	42
clay grey	42	44
weathered rock brown	44	55
clay tan with weathered rock brown	55	95
clay grey	95	101
rock blue grey	101	125
siltstone blue grey	125	168
rock dark blue & grey	168	180
siltstone blue grey	180	215
rock grey & green	215	224
siltstone & claystone grey & lavender	224	235

RECEIVED BY OWRD
MAR 20 2017

Date Started 02-27-2017 Completed 03-03-2017
 SALEM, OR

(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.
 License Number 1358 Date 03-03-2017
 Signed Byron B. Hope

(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.
 License Number 688 Date 03-07-2017
 Signed Steven N. Stadel
 Contact Info (optional) _____

PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO: Water Rights Section Date 11/26/2019
 FROM: Groundwater Section Travis Brown
 SUBJECT: Application G- 18868 Reviewer's Name Travis Brown
 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 to 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: Steven N. and Karen L. Stadel County: CLACKAMAS

A1. Applicant(s) seek(s) 0.45 cfs from 1 well(s) in the Willamette Basin, Molalla-Pudding subbasin

A2. Proposed use Irrigation (36.0 acres; 90 af/yr) 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	CLAC 72984	Well	Bedrock ¹	0.4456 ²	5S/2E-24 NE-SW	Text: 495' S, 330' W fr C1/4 cor S 24³ Map: 970' S, 355' W fr C1/4 cor S 24

* 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	~654 ⁴	50	96.3	3/3/2017	235	0-160	+1.5-161 (6")	15-175 (4.5")	175-235 (Perf)	96		Air (1 hr)

Use data from application for proposed wells.

A4. **Comments:** The proposed POA/POU is ~3 miles southeast of the city of Molalla, Oregon.

¹ Although Section 3 of the application lists "Source Aquifer" as "Alluvium," based on the proposed POA's well log and nearby geologic mapping, the proposed POA is completed in and will produce water from the volcanoclastic Molalla Formation (Fmn) of Miller and Orr (1984). Therefore, the proposed aquifer has been designated as "Bedrock" in this section (A) of the review.

² Section 3 of the Application lists the "Well-Specific Rate (gpm)" as "200 gpm" (~0.446 cfs). However, the "Total maximum rate requested" is listed as 0.45 cfs. This review will use the higher rate as the more conservative value.

³ **There is a ~470 ft discrepancy between the described metes-and-bounds coordinates of the proposed POA location and the proposed POA location marked on the application map.** The metes-and-bounds coordinates (using the Department PLSS projection) of the proposed POA location marked on the application map are listed in the table in A3, above. **The location marked on the application map is considered the accurate location for purposes of this review.** Applicant should revise the application map so that the described metes-and-bounds coordinates coincide with the location marked on the application map. If the metes-and-bounds coordinates of the proposed POA are revised, an additional (re-)review should not be necessary.

⁴ Ground surface elevation at the proposed POA location estimated from LIDAR (WatershedSciences, 2009).

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 proposed POA produces water from a confined, volcanoclastic rock aquifer and is greater than 1/4 mile from the nearest surface water source. Therefore, per OAR 690-502-0240, the relevant basin rules do not apply.

A6. **Well(s) #** _____, _____, _____, _____, _____, tap(s) an aquifer limited by an administrative restriction.

Name of administrative area: N/A

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 (annual water level measurements), 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 Molalla Formation groundwater reservoir between approximately 18 ft. and 350 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:** Groundwater for the proposed use cannot be determined to be over-appropriated due to insufficient available data regarding rates of recharge and the current quantity of groundwater withdrawals from the aquifer system.

The proposed POA produces water from the lower Miocene Molalla Fmn described by Miller and Orr (1984), which is typically included in the Little Butte Volcanic Series of Peck et al. (1964). In this area, the Molalla Fmn consists of more than 200 ft of tuffaceous paleosols, volcanic conglomerates and agglomerates, and aquagene tuff (hyaloclastite). Groundwater is most likely produced from fractures or hyaloclastite layers.

There appears to be a residence (Clackamas County Tax Lot 2200) ~560 ft northeast of the proposed POA. Although a water well log has not been correlated to this site, it is highly likely that the residence is supplied by a well. However, since details are not available regarding the well's construction or location, an estimate of the impact of the proposed use cannot be generated. The nearest known groundwater use to the proposed POA is CLAC 66204, an exempt use well ~3,250 ft south of the proposed POA. At such a large radial distance, the proposed use is not anticipated to cause injury to CLAC 66204 or similarly distant water rights.

The proposed POA has a reported yield of 96 gpm (~0.214 cfs), based on only a 1-hour air test during completion of the well. This yield is anomalously high compared to reported yields for other wells in the same and adjacent sections (see attached Well Statistics). The reported yield for the proposed POA is more than 530 percent of the median reported yield in this area (~18 gpm) and nearly 130 percent of the next highest reported yield of 75 gpm (CLAC 54633). Based on the nearby well statistics, it would appear highly possible that the reported yield of 96 gpm for the proposed POA is an overestimate of the well's sustainable yield. Furthermore, even at the reported yield of 96 gpm, the proposed POA would only be capable of supplying ~48 percent of the total maximum rate requested of 0.45 cfs. **Therefore, the proposed POA would appear unable to provide the requested allocation within the capacity of the groundwater resource.**

The nearest relevant observation well (CLAC 55698) to the proposed POA shows a very modest decline over the past decade, with considerable year-to-year variability (see attached Hydrograph). The conditions detailed in Item B1(d)(i) and B2(c), above, are recommended for any permit issued pursuant to this application in order to protect senior users and the groundwater resource.

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	Molalla Fmn (Bedrock)	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Basis for aquifer confinement evaluation: The well log for the proposed POA (CLAC 72984) reports a static water level above the applicable water-bearing zone. Reported static water levels for nearby wells are also generally above the reported water-bearing zone (see Well Statistics, attached). Based on the available evidence, the aquifer is confined.

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	Dickey Creek	~558	431-843	2,070	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1	2	Sorenson Creek	~558	577-853	3,130	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Basis for aquifer hydraulic connection evaluation: The lower reaches of SW 1 (Dickey Creek) are approximately coincident with the elevations of water-bearing zones noted in the well log for the proposed POA (CLAC 72984). Likewise, the reported static water level elevation for the proposed POA is coincident with or above nearby elevations of SW 1 (Dickey Creek). Therefore, the proposed POA is hydraulically connected to SW 1 (Dickey Creek).

Nearby elevations of SW 2 (Sorenson Creek) are above the reported static water level for the proposed POA. Furthermore, the well log for the proposed POA (CLAC 72984) reports substantial amounts of rock and fine-grained material between the well seal depth and the nearby elevations of SW 2 (Sorenson Creek). Therefore, the proposed POA is not hydraulically connected to SW 2 within 1 mile of the proposed POA, although it may be connected to more distant sections of SW 2 as the stream incises to lower elevations.

Water Availability Basin the well(s) are located within: SW 1: MOLALLA R > WILLAMETTE R – AB MILK 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"/>	N/A	N/A	<input type="checkbox"/>	54.50	<input type="checkbox"/>	<<25%	<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: To assess the potential for interference with surface water due to the proposed use, the Hunt (2003) analytical model was used. Hydraulic parameters used for the analysis were derived from regional data and studies (Conlon et al., 2003, 2005; Hampton, 1972; McFarland and Morgan, 1996) or are within a typical range of values for the given parameter within the hydrogeologic regime (Freeze and Cherry, 1979; Domenico and Mifflin, 1965). Results of the analysis indicate that the proposed use is unlikely to cause interference exceeding 25 percent of the rate of withdrawal within the first 30 days of continuous pumping.

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													
(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: N/A

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:

Conlon, T.D., Lee, K.K., and Risley, J.R., 2003, Heat tracing in streams in the central Willamette Basin, Oregon, in Stonestrom, D.A. and Constantz, Jim, eds., Heat as a tool for studying the movement of groundwater near streams: U.S. Geological Survey Circular 1260, chapter 5, p. 29-34. Conlon et al., 2005

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, Groundwater hydrology of the Willamette Basin, Oregon, Scientific Investigations Report 2005-5168: U. S. Geological Survey, Reston, VA.

Domenico, P.A. and Mifflin, 1965, Water from low-permeability sediments and land subsidence: Water Resource Research, v. 1, no. 4, p. 563-576.

Freeze, R.A. and Cherry, J.A., 1979, Groundwater, Prentice Hall, Englewood Cliffs, New Jersey, 604 p.

Hampton, E. R., 1972, Geology and Ground Water of the Molalla-Salem Slope Area, Northern Willamette Valley, Oregon, Water-Supply Paper 1997: U. S. Geological Survey, Reston, VA.

Hunt, B., 2003, Unsteady stream depletion when pumping from semiconfined aquifer: Journal of Hydrologic Engineering, January/February, Vol 8, p. 12-19.

McFarland, W.D., and Morgan, D.S., 1996, Description of the Ground-Water Flow System in the Portland Basin, Oregon and Washington, Water Supply Paper 2470-A, 58 p: U. S. Geological Survey, Reston, VA.

Miller, P. R. and Orr, W. N., 1984, Geologic Map of the Wilhoit Quadrangle, Oregon [map], 1:24,000, GMS-32: Oregon Department of Geology and Mineral Industries, Portland, OR.

Peck, D. L., Griggs, A. B., Schlicker, H. G., Wells, F. G., and Dole, H. M., 1964, Geology of the central and northern parts of the Western Cascade Range in Oregon, Professional Paper 449: U. S. Geological Survey, Reston, VA.

United States Geological Survey, 2017, Wilhoit quadrangle, Oregon [map], 1:24,000, 7.5 minute topographic series, U.S. Department of the Interior, Reston, VA.

Watershed Sciences, 2009, LIDAR remote sensing data collection, Department of Geology and Mineral Industries, Willamette Valley Phase I, Oregon: Portland, OR, December 21.

D. WELL CONSTRUCTION, OAR 690-200

D1. **Well #:** _____ **Logid:** _____

D2. **THE WELL does not appear to meet current well construction standards based upon:**

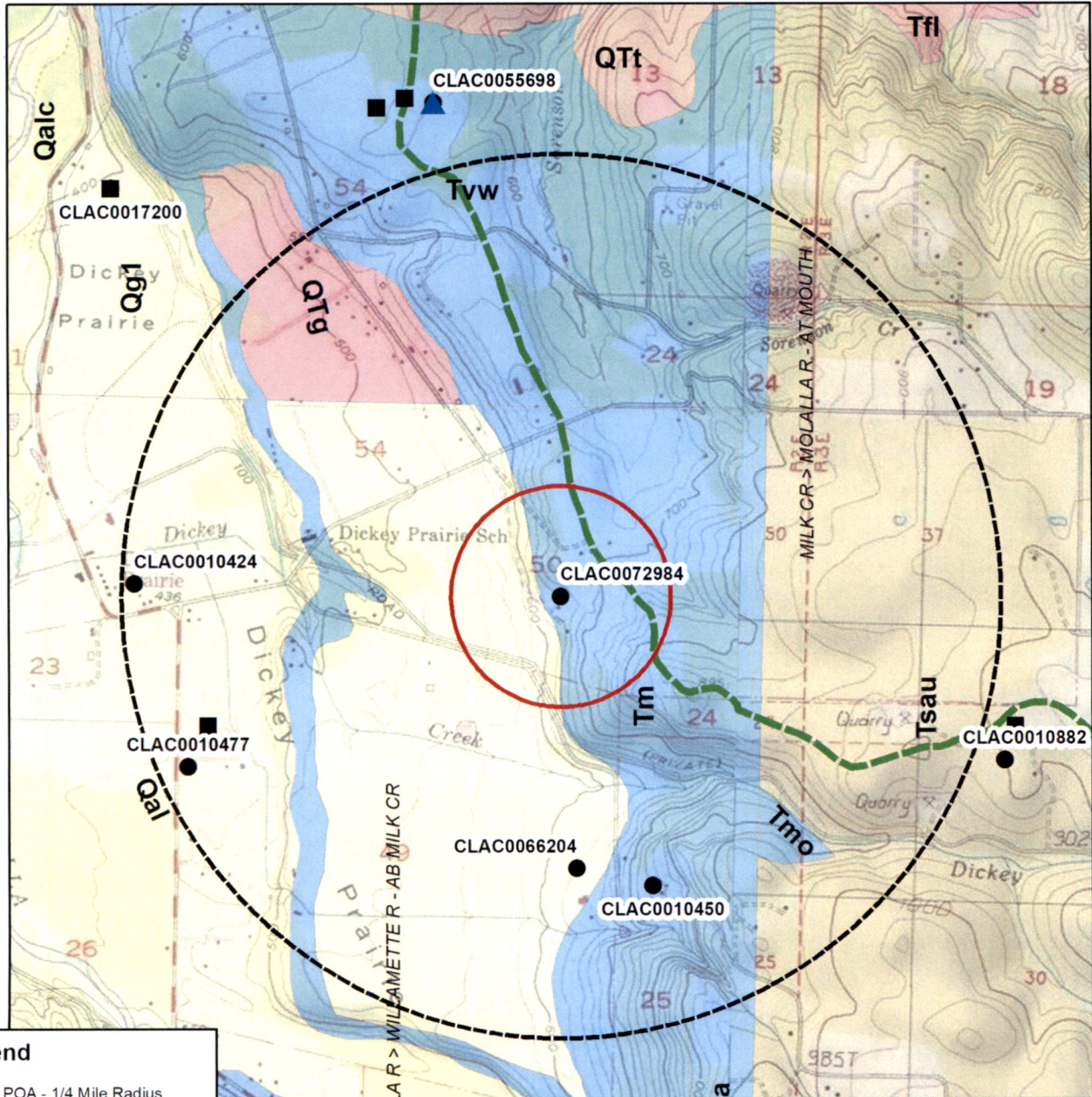
- a. review of the well log;
- b. field inspection by _____;
- c. report of CWRE _____;
- d. other: (specify) _____

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.**

Well Location Map

G-18868 Stadel

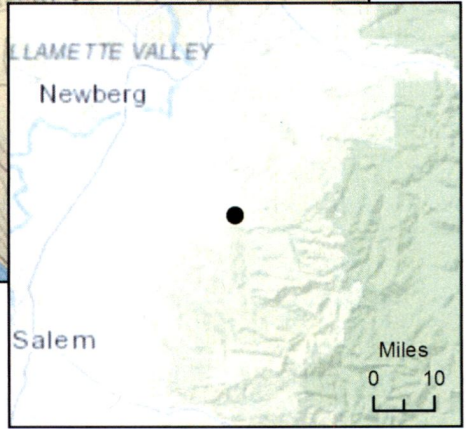
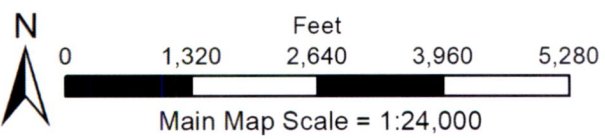


Legend

- POA - 1/4 Mile Radius
- POA - 1 Mile Radius
- Water Availability Basins
- GW Right
- Well
- Observation Well

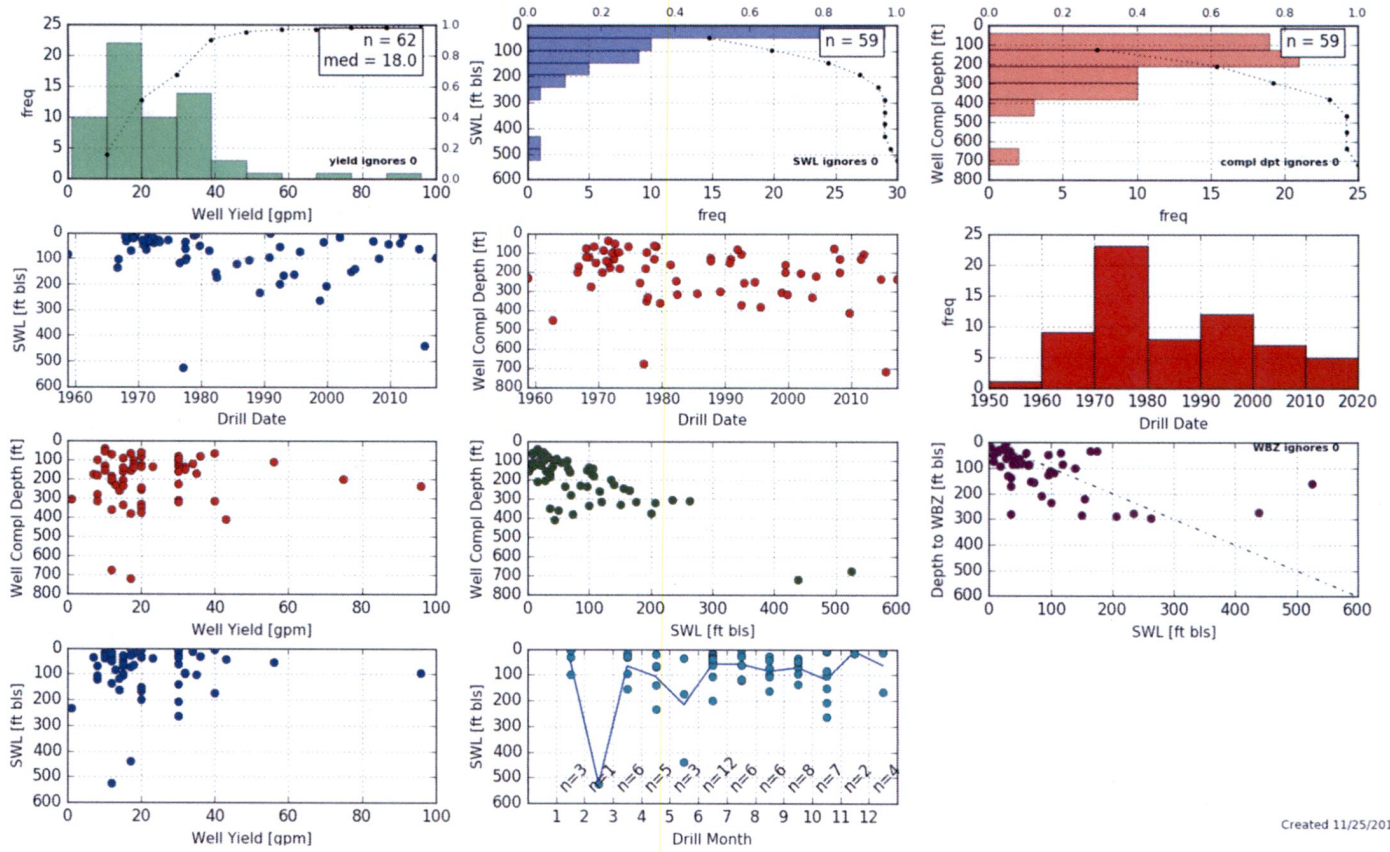
Geology

- Late Western Cascade Volcanics
- Little Butte Volcanics
- Quaternary surficial deposits
- Willamette Group



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 Copyright © 2013 National Geographic Society, i-cubed

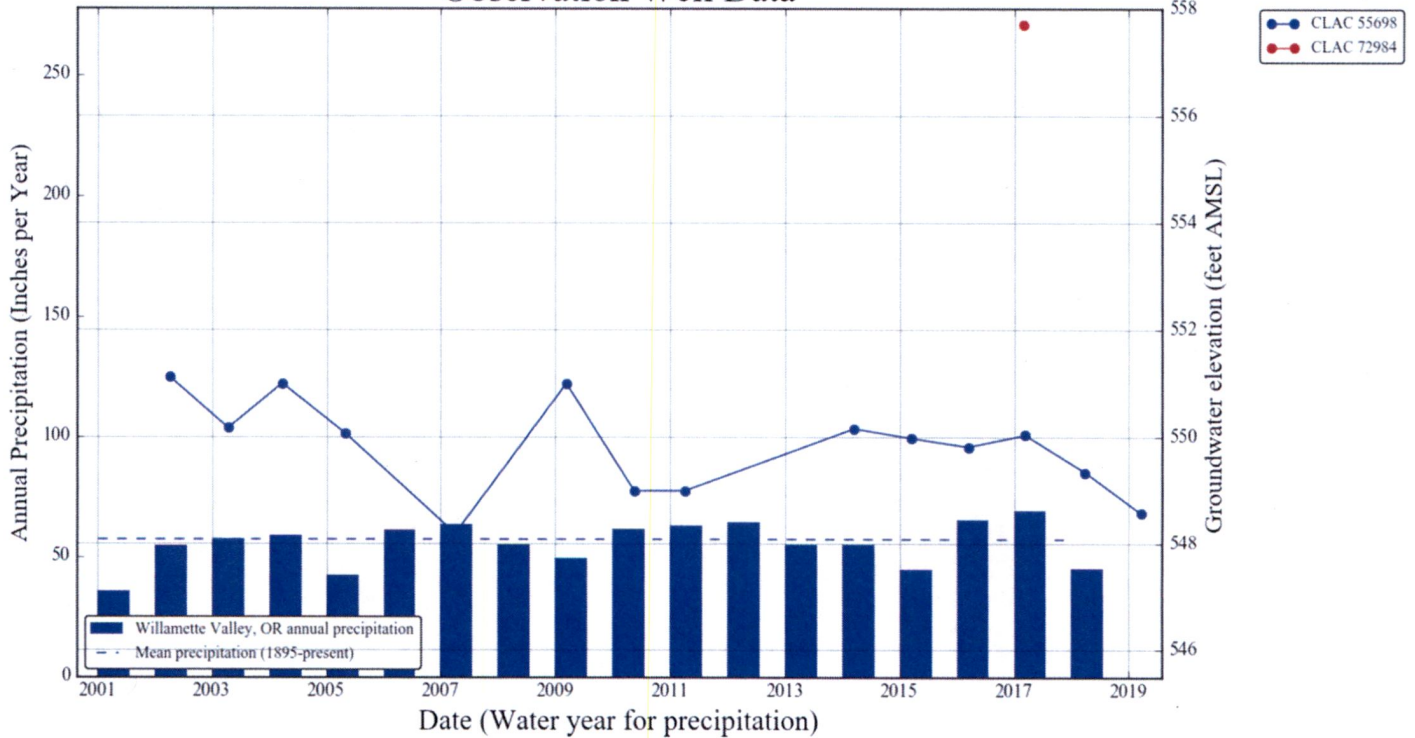
Well Statistics – T5S/R2W Sections 13, 24, and 25



Created 11/25/2019

Hydrograph

Observation Well Data



Water Availability Analysis Detailed Reports

MOLALLA R > WILLAMETTE R - AB MILK CR
WILLAMETTE BASIN

Water Availability as of 11/26/2019

Watershed ID #: 70747 (Map)

Date: 11/26/2019

Exceedance Level: 80%

Time: 10:37 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 Requirements	Net Water Available
JAN	531.00	1.45	530.00	0.00	300.00	230.00
FEB	541.00	1.43	540.00	0.00	300.00	240.00
MAR	569.00	1.46	568.00	0.00	300.00	268.00
APR	591.00	1.74	589.00	0.00	300.00	289.00
MAY	466.00	5.03	461.00	0.00	300.00	161.00
JUN	207.00	7.02	200.00	0.00	200.00	-0.02
JUL	85.90	12.20	73.70	0.00	100.00	-26.30
AUG	55.70	9.98	45.70	0.00	78.70	-33.00
SEP	54.50	4.16	50.30	0.00	88.90	-38.60
OCT	90.40	1.54	88.90	0.00	166.00	-77.10
NOV	273.00	1.42	272.00	0.00	300.00	-28.40
DEC	560.00	1.46	559.00	0.00	300.00	259.00
ANN	454,000.00	2,970.00	451,000.00	0.00	165,000.00	287,000.00

Stream Depletion Analysis

Application type:	G
Application number:	18868
Well number:	1
Stream Number:	1
Pumping rate (cfs):	0.45
Pumping duration (days):	245
Pumping start month number (3=March)	3.0

Parameter	Symbol	Scenario 1	Scenario 2	Scenario 3	Units
Distance from well to stream	a	2070	2070	2070	ft
Aquifer transmissivity	T	8000.0	2500	200	ft ² /day
Aquifer storativity	S	0.001	0.0001	0.00001	-
Aquitard vertical hydraulic conductivity	Kva	10	0.1	0.001	ft/day
Aquitard saturated thickness	ba	80	80	80	ft
Aquitard thickness below stream	babs	80	40	3	ft
Aquitard specific yield	Sya	0.2	0.13	0.06	-
Stream width	ws	5	5	5	ft

Stream depletion for Scenario 2:

Days	10	330	360	30	60	90	120	150	180	210	240	270	300
Depletion (%)	0	0	0	0	0	0	0	0	0	0	0	0	0
Depletion (cfs)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

