

Approved:



MEMO

To: Kristopher Byrd, Well Construction Manager
From: Tommy Laird, Well Construction Program Coordinator
Subject: Review of Water Right Application G-19038
Date: October 30, 2023

The attached application was forwarded to the Well Construction Section by the Groundwater Section. Stacey Garrison and Travis Brown reviewed the application. Please see Stacey and Travis' Groundwater Review and the Well Reports.

Applicant's Well #1 (CLAC 69616): Based on a review of the Well Report, the construction of Applicant's Well #1 seems to protect the groundwater resource.

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

Applicant's Well #2 (CLAC 70813): Based on a review of the Well Report, the construction of Applicant's Well #2 seems to protect the groundwater resource.

The construction of Applicant's Well #2 may not satisfy hydraulic connection issues.

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

CLAC 69616
SKYLES DRILLING, INC.

WELL ID # L **110858**
 START CARD # **W1019309**

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

503-656-2683

(1) **OWNER:** Well Number: **5**
 Name **Clackamas County Facilities/Barton Park Well**
 Address **1710 Red Soils Ct., Suite 200**
 City **Oregon City** State **OR** Zip **97045**

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

(3) **DRILL METHOD:**
 Rotary Air Rotary Mud Cable Auger
 Other **Holte**

(4) **PROPOSED USE:**
 Domestic Community Industrial Irrigation
 Thermal Injection Livestock Other

(5) **BORE HOLE CONSTRUCTION:**
 Special Construction approval Yes No Depth of Completed Well **762** ft.
 Explosives used Yes No Type _____ Amount _____

HOLE		SEAL		Amount	
Diameter	From To	Material	From To	sacks or pounds	
11.6	0 49	Bentonite	20 0	13 Sacks	
7.6	49 707	Cem w/5%Ben	49 20	13 Sacks	
8	707 717	Cement	717 707	5 Sacks	
6	717 762				

How was seal placed: Method A B C D E
 Other **Poured bentonite**
 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: 6	+3	717	.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) _____

(7) **PERFORATIONS/SCREENS:**

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
None						<input 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
110		760	0.25 hr.
42		300	0.25 hr.
16		200	1.00 hr.

Temperature of Water **60** 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 **Fine Sand & Mica**
 Depth of strata: **140-208'**

(9) **LOCATION OF WELL by legal description:**
 County **Clackamas** Latitude _____ Longitude _____
 Township **2SOUTH** N or S. Range **3EAST** E or W. of WM.
 Section **23A** **SE** 1/4 **NW** 1/4
 Tax lot **00500** Lot _____ Block _____ Subdivision _____
 Street Address of Well (or nearest address) **19009 SE Barton Park Rd, Boring, OR**

(10) **STATIC WATER LEVEL:**
149 ft. below land surface. Date **4/3/2013**
 Artesian pressure _____ lb. per square inch. Date _____

(11) **WATER BEARING ZONES:**
 Depth at which water was first found **20'**

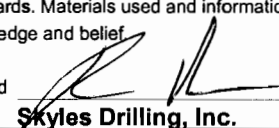
From	To	Estimated Flow Rate	SWL
20	41	Trace	20
140	208	10	70
717	762	110	149

(12) **WELL LOG:**

Material	From	To	SWL
Gravel	0	1	
Clay, brown w/cobbles	1	5	
Cobbles w/gravel & boulders	5	41	
Clay, blue	41	55	
Clay, gray gritty	55	99	
Clay, gray very sandy	99	127	
Clay, gray sandy w/layers of sand, fine w/mica & wood	127	180	
Sand, fine w/mica	180	208	
Clay, gray	208	254	
Clay, gray sandy	254	269	
Clay, bluish-gray sandy	269	282	
Clay, gray	282	289	
Clay, bluish-gray sandy	289	292	
Clay, dark gray	292	297	
Sand, multicolored coarse w/pumice	297	298	
Clay, blue & gray sandy	298	303	
Clay, gray sandy	303	305	
Sandstone, gray	305	308	
Claystone or clay, gray sandy	308	319	
Clay, blue	319	328	
Clay, gray	328	340	
Clay, mc sandy	340	344	

Continued on next page

Date started **3/19/2013** Completed **4/3/2013**

(unbonded) **Water Well Constructor Certification:**
 I certify that the work I performed on the construction, 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.
 Signed  WWC Number **1715**
 Date **4/4/2013**

(bonded) **Water Well Constructor Certification:**
 I accept responsibility for the construction, 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.
 Signed  WWC Number **1592**
 Date **4/4/2013**

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

503-656-2683

(1) OWNER: Well Number: **5**
 Name **Clackamas County Facilities/Barton Park Well**
 Address **1710 Red Soils Ct., Suite 200**
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(2) TYPE OF WORK:
 New Well Deepening Alteration (repair/recondition) Abandonment

(3) DRILL METHOD:
 Rotary Air Rotary Mud Cable Auger
 Other

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

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

HOLE			SEAL			Amount
Diameter	From	To	Material	From	To	

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

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

(7) PERFORATIONS/SCREENS:

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
						<input type="checkbox"/>	<input type="checkbox"/>
						<input type="checkbox"/>	<input type="checkbox"/>
						<input type="checkbox"/>	<input type="checkbox"/>
						<input 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

Temperature of Water _____ 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 by legal description:
 County **Clackamas** Latitude _____ Longitude _____
 Township **2SOUTH** N or S. Range **3EAST** E or W. of WM.
 Section **23A** **SE** 1/4 **NW** 1/4
 Tax lot **00500** Lot _____ Block _____ Subdivision _____
 Street Address of Well (or nearest address) **19009 SE Barton Park Rd, Boring, OR**

(10) STATIC WATER LEVEL:
 _____ ft. below land surface. Date _____
 Artesian pressure _____ lb. per square inch. Date _____

(11) WATER BEARING ZONES:
 Depth at which water was first found _____

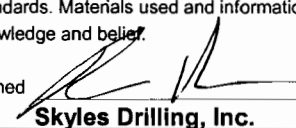
From	To	Estimated Flow Rate	SWL

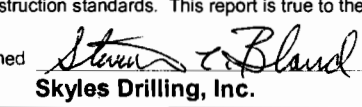
(12) WELL LOG:

Material	Ground elevation		SWL
	From	To	
Clay, gray	344	347	
Clay, blue	347	361	
Clay, gray sandy	361	369	
Claystone &/or clay, blue & gray	369	420	
Lava, gray & brown porous & fractured soft	420	432	
Clay, gray sandy	432	440	
Claystone, brown & blue	440	446	
Claystone, gray & brown	446	473	
Shale, dark brown	473	481	
Claystone, gray & brown	481	520	
Shale, dark brown	520	524	
Claystone, gray & brown w/seams of lava, brown or gray	524	655	
Claystone, brown fractured	655	691	
Sandstone, gray	691	695	
Claystone, brown	695	703	
Basalt, gray fractured	703	707	
Basalt, gray	707	717	
Basalt, gray & black fractured	717	754	149
Basalt, gray & black semi-porous	754	762	149

RECEIVED BY OWRD

Date started **3/19/2013** Completed **4/3/2013**

(unbonded) Water Well Constructor Certification:
 I certify that the work I performed on the construction, 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.
 Signed  WWC Number **1715**
 Date **4/4/2013**

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 I accept responsibility for the construction, 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.
 Signed  WWC Number **1592**
 Date **4/4/2013**

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

CLAC 70813
10/30/2014

WELL I.D. LABEL# L 112817
START CARD # 1021423
ORIGINAL LOG #

(1) LAND OWNER
Owner Well I.D.
First Name RICK Last Name GRUEN
Company CLACKAMAS COUNTY PARKS
Address 150 BEAVERCREEK RD
City OREGONCITY State OR Zip 97045

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

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

(3) DRILL METHOD
[X] Rotary Air [] Rotary Mud [] Cable [] Auger [] Cable Mud
[] Reverse Rotary [] Other

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

(5) BORE HOLE CONSTRUCTION
Special Standard [] (Attach copy)
Depth of Completed Well 762.00 ft.
BORE HOLE SEAL sacks/lbs
Dia From To Material From To Amt lbs
10 0 20 Cement 0 680 5400 P
8 20 701 Cement 680 701 600 P
5.5 701 762

How was seal placed: Method [] A [] B [X] C [X] D [] E
[] Other
Backfill placed from 20 ft. to 701 ft. Material CEMENT
Filter pack from ft. to ft. Material Size
Explosives used: [] Yes Type Amount

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

(6) CASING/LINER
Casing Liner Dia + From To Gauge Stl Plstc Wld Thrld
[] [] [] [] [] [] [] [] [] []
6 [X] 2.5 701 250 [] [] [] [] [] []
Shoe [X] Inside [] Outside [] Other Location of shoe(s) 701
Temp casing [X] Yes Dia 10 From 0 To 20

(7) PERFORATIONS/SCREENS
Perforations Method
Screens Type Material
Perf/ Casing/ Screen Scrn/slot Slot # of Tele/
Screen Liner Dia From To width length slots pipe size

(8) WELL TESTS: Minimum testing time is 1 hour
[] Pump [] Bailer [X] Air [] Flowing Artesian
Yield gal/min Drawdown Drill stem/Pump depth Duration (hr)
100 760 1.5
80 600 0.5
72 500

Temperature 56 °F Lab analysis [] Yes By
Water quality concerns? [] Yes (describe below) TDS amount
From To Description Amount Units

(9) LOCATION OF WELL (legal description)
County CLACKAMAS Twp 2.00 S N/S Range 3.00 E E/W WM
Sec 23 NE 1/4 of the SW 1/4 Tax Lot 500
Tax Map Number Lot
Lat " or " DMS or DD
Long " or " DMS or DD
[] Street address of well [] Nearest address
19009SE BARTON PARK RD

(10) STATIC WATER LEVEL
Date SWL(psi) + SWL(ft)
Existing Well / Pre-Alteration
Completed Well 11/8/2013 100
Flowing Artesian? [] Dry Hole? []

WATER BEARING ZONES
Depth water was first found 707.00
SWL Date From To Est Flow SWL(psi) + SWL(ft)
11/8/2013 707 762 100 100

(11) WELL LOG
Ground Elevation
Material From To
brown clay 0 8
brown clay w/ cobbles 8 14
gray clay 14 28
blue clay 28 72
gritty blue clay 72 132
blue & gray clay 132 280
multi colored sandstone 280 283
gray clay 283 289
rhododendron rock 289 370
gray rock 370 420
blue & brown claystone 420 425
brown claystone 425 430
red rock 430 436
black & gray rock 436 515
red clay 515 520
rhododendron rock 520 605
brown claystone 605 655
gray clay stone 655 682
black basalt 682 707

Date Started 10/17/2013 Complete 11/8/2013

(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 Date
Signed

(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 1771 Date 10/30/2014
Signed GEORGE YOUNGBERG (E-filed)
Contact Info (optional) Youngberg pump & well drilling ph. 503-630-3970

Groundwater Application Review Summary Form

Application # G- 19038

GW Reviewer Stacey Garrison/Travis Brown Date Review Completed: 2/13/2023

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.

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).

WATER RESOURCES DEPARTMENT

MEMO

February 13 2023

TO: **Application G- 19038**

FROM: **GW: Stacey Garrison/Travis Brown**
 (Reviewer's Name)

SUBJECT: Scenic Waterway Interference Evaluation

YES The source of appropriation is hydraulically connected to a State Scenic
 NO Waterway or its tributaries

YES
 NO Use the Scenic Waterway Condition (Condition 7J)

Per ORS 390.835, the Groundwater Section is **able** to calculate ground water interference with surface water that contributes to a Scenic Waterway. The calculated interference is distributed below

Per ORS 390.835, the Groundwater Section is **unable** to calculate ground water interference with surface water that contributes to a scenic waterway; **therefore, the Department is unable to find that there is a preponderance of evidence that the proposed use will measurably reduce the surface water flows necessary to maintain the free-flowing character of a scenic waterway**

DISTRIBUTION OF INTERFERENCE

Calculate the percentage of consumptive use by month and fill in the table below. If interference cannot be calculated, per criteria in 390.835, do not fill in the table but check the "unable" option above, thus informing Water Rights that the Department is unable to make a Preponderance of Evidence finding.

Exercise of this permit is calculated to reduce monthly flows in [Enter] Scenic Waterway by the following amounts expressed as a proportion of the consumptive use by which surface water flow is reduced.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO: Water Rights Section Date 2/13/2023
 FROM: Groundwater Section Stacey Garrison/Travis Brown
 Reviewer's Name
 SUBJECT: Application G- 19038 Supersedes review of 1/18/2022
 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: Clackamas County Parks County: Clackamas

- A1. Applicant(s) seek(s) 0.22 cfs from 2 well(s) in the Willamette Basin,
Clackamas subbasin
- A2. Proposed use Irrigation Seasonality: Mar 1-Oct 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 69616	1	CRB ^a	0.22	2S/3E-23 NE-SW	2190' N, 2690' W fr NE cor DLC 46
2	CLAC 70813	2	CRB	0.22	2S/3E-23 SE-NW	1075' N, 2915 W fr NE cor DLC 46
3						
4						

* 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	260 ^a	20	149	4/3/2013	762	0-49, 707-717	0-717			110		Air
2	211 ^a	707	100	11/8/2013	762	0-701	0-701			100		Air

Use data from application for proposed wells.

A4. **Comments:** The proposed POAs/POU are ~ 5 miles southeast of Damascus. Applicant proposes to irrigate up to 8.6 acres between March 1 and October 31 with the maximum annual volume of 21.5 af, based on the maximum allowed duty of 2.5 af/acre.

^a Well locations were projected in OWRD's database according to the metes and bounds descriptions provided on the application map. Well elevation data from LiDAR ground surface elevation at the projected locations (Watershed Sciences 2009, USGS 2013).

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 is less than 1/4-mile from the nearest surface water source, but will develop a confined aquifer; therefore, per OAR 690-502-0240, the relevant Willamette Basin rules (OAR 690-502-0040 and OAR 690-502-0140) do not apply.

A6. **Well(s) #** _____, _____, _____, _____, _____, tap(s) an aquifer limited by an administrative restriction.
 Name of administrative area: Not applicable

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) **7i (Willamette Basalt Condition) and 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 Columbia River Basalt 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. **Special Conditions:**

1. Each basalt well shall be cased and continuously sealed from land surface to a depth of at least 49 feet to preclude hydraulic connection to nearby streams.
2. Any well added to or deepened under this or subsequent permits shall be open to a single aquifer of the Columbia River Basalt Group and shall meet the applicable well construction standards (OAR 690-200 and OAR 690-210). In addition, the open interval in each well shall be no greater than 100 feet. An open interval of greater than 100 feet may be allowed if substantial evidence of a single aquifer completion can be demonstrated to the satisfaction of the Department Hydrogeologists, using information from a video log, downhole flowmeter, water chemistry and temperature, or other downhole geophysical methods. These methods shall characterize the nature of the basalt rock and assess whether water is moving in the borehole. Any discernable movement of water within the well bore when the well is not being pumped shall be assumed as evidence of the presence of multiple aquifers in the open interval. If during well construction, it becomes apparent that the well can be constructed to eliminate interference with hydraulically connected streams in a manner other than specified in this permit, the permittee can contact the Department Hydrogeologist for this permit or the Ground Water/Hydrology Section Manager to request approval of such construction. The request shall be in writing, and shall include a rough well log and a proposed construction design for approval by the Department. The request can be approved only if it is received and reviewed prior to placement of any permanent casing and sealing material. If the request is made after casing and seal are placed, the requested modification will not be approved. If approved, the new well depth and construction specifications will be incorporated into any certificate issued for this permit.
3. For any well constructed under this or subsequent permits, a dedicated water-level measuring tube shall be installed in each well. The measuring tube shall meet the standards described in OAR 690-215-0060. When requested, access to the wells shall be provided to Department staff in order to make water-level measurements.

4. For any wells constructed or deepened under this or subsequent permits, the applicant shall coordinate with the driller to ensure that drill cuttings are collected at 10 ft intervals and at changes in formation in each well. A split of each sampled interval shall be provided to the Department.
5. If any geologic and hydrogeologic reports are completed for the permittee during the development of permitted wells, including geophysical well logs and borehole video logs, then copies of the reports shall be provided to the Department. 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.

Groundwater availability remarks: POA 1 (CLAC 69616) and POA 2 (CLAC 70813) utilize a water-bearing zone within the Columbia River Basalt Group (CRBG); aquifers in the CRBG are typically thin interflow zones between lava flows and confined by thicker flow interiors that have low porosity and low permeability (Conlon et al 2005, Gannet and Caldwell 1998, Reidel et al 2002). Comparison of the POA well logs with local lithology indicates the POAs likely utilize water from the Frenchman Springs member of the Wanapum Basalt, or the Grand Ronde Basalt given the extent of anticlinal activity in the area (Anderson 1978, Madin and Staub 1994, McFarland 1996, Madin 2004). The POAs are located within the Portland Hills-Clackamas River Fault Zone, which is deformed by predominantly southeast by northwest trending faults, possibly resulting in compartmentalization of aquifers (Anderson 1978, Madin and Staub 1994). There is a northwest trending fault less than a mile to the northwest of the POAs (Madin 2004). The degree of compartmentalization due to nearby faults, which is unknown at this time, may exacerbate well-to-well interference and longer-term water level declines in the local basalt aquifer.

A review of statistics for nearby well records was completed and compared with the proposed rate of 0.22 cfs (100 gpm) for this application (see Well Statistics 2S/3E). There is some uncertainty regarding the ability of the groundwater resource to sustain the proposed use of 0.22 cfs (100 gpm); median reported well yield is 20 gpm, however, the proposed rate is less than the maximum reported yield of 545 gpm. The proposed rate for this application is 500 percent of the median, and 18 percent of the maximum reported yield. However, few of these wells appear to be in the CRBG. Previous studies have reported yields for wells utilizing the CRBG in the Clackamas River drainage ranging from 20 to 350 gpm (Leonard and Collins 1983). Water level trends for nearby wells that utilize the CRBG appear to be declining (see Water Level Measurements in Nearby Wells). One nearby well, CLAC 4817, appears to have Declined Excessively per OAR 690-008-0001(4)(d) (see attached Hydrograph). **Therefore, the CRBG aquifer tapped by the proposed POA is over-appropriated.**

Water levels appear to be declining persistently and substantially in both CLAC 4817 and CLAC 12303 (see attached Hydrograph). **Based on these declines, the proposed use does not appear to be within the capacity of the groundwater resource.**

A Theis drawdown analysis was completed to assess well-to-well interference and identify the radius of influence that would experience 15 feet of drawdown. The 15 feet of drawdown represents the threshold for the permit standard condition for basalt aquifers in the Willamette Basin. Results indicate that the 15 feet of drawdown threshold would be exceeded for wells within 5.5 feet of either Well 1 or Well 2, and that this would occur after 244 days of continuous pumping (see Theis Drawdown Analysis Threshold Radius). This minimal impact appears to be largely due to the low pumping rate. The nearest groundwater user to Well 1 (CLAC 69616) and Well 2 (CLAC 70813) that utilizes the CRBG is CLAC 4817, which is 3,227 feet away from Well 1 and 4,242 feet away from Well 2. Results indicate that the proposed use is not likely to cause well-to-well interference with CLAC 4817 that exceeds the standard permit conditions for basalt aquifers in the Willamette Basin. **The conditions specified in B1.d, B2.c, and the Special Conditions in B3 are strongly recommended for any permit issued pursuant to this application 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	CRB	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	CRB	<input checked="" type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>

Basis for aquifer confinement evaluation: POA 1 (CLAC 69616) has a SWL reported to be 149 ft bls (111 ft msl). POA 2 (CLAC 70813) has a SWL reported to be 100 ft bls (111 ft msl). CLAC 69616 well log reports Basalt from 707 to 717 ft bls, indicating 10 ft of confining layer (-447 to -457 ft msl). CLAC 70813 well log reports Black Basalt from 682 to 707 ft bls, indicating at least 25 feet of confining layer reaching up to 682 ft bls (-471 to -496 ft msl). The SWL is above the overlying confining layer.

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	Clackamas River	111 ^a	135-155	686	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	2	Goose Creek	111 ^a	155-181	338	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	3	Deep Creek	111 ^a	234-282	3,255	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	1	Clackamas River	111	135-155	1,089	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	2	Goose Creek	111	155-181	1,592	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	3	Deep Creek	111	234-282	2,748	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Basis for aquifer hydraulic connection evaluation: CLAC 69616 is continuously sealed to 49 ft bls (211 ft msl), with a split seal from 707 to 717 ft bls (-447 to -557 ft msl) and a water-bearing zone at -502 to -457 ft msl. CLAC 70813 is continuously sealed into hard dense basalt to an elevation of around -490 ft msl with a water-bearing zone at -496 ft msl to -551 ft msl. Static water level in both proposed POAs is 111 ft msl. The local streambeds are around 139 to 257 ft msl in elevation. The nearby surface water sources do not appear to have incised through the confining layer (Black Basalt) overlying the water-bearing zone. The aquifer utilized by the POAs should be isolated from overlying local streams.

^a Calculated based on the land surface elevation of the proposed well location and reported static water levels in nearby wells utilizing the same proposed aquifer.

Water Availability Basin the well(s) are located within: CLACKAMAS R> WILLAMETTE R – AT MOUTH

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 (SW) source. Limit evaluation to instream rights and minimum stream flows that are pertinent to that SW source, 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"/>
		<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"/>

Comments: Not applicable

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													
(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: Not applicable

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:** Not applicable

References Used:

Application File: G-19038

Water Well reports: CLAC 70813, CLAC 69616, CLAC 5052, CLAC 5047, CLAC 4817, CLAC 12303

- Anderson, J.L., 1978. The stratigraphy and structure of the Columbia River Basalt in the Clackamas River Drainage. Thesis for Master of Science in Geology, Portland State University, 150 p.
- 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 Investigations Report 2005-5168.
- Gannett, M.W. and Caldwell, R., 1998, Geologic framework of the Willamette Lowland aquifer system, Oregon and Washington: U.S. Geological Survey Professional Paper 1424-A, 32 p.
- Leonard, A.R., and Collins, C.A., 1983. Ground water in the northern part of Clackamas County, Oregon: Oregon Water Resources Department Ground Water Report 29. 85 p.
- Madin, I.P. and Staub, P.E. 1994. Geologic Map of the Damascus Quadrangle, Clackamas and Multnomah Counties, Oregon.
- Madin, I.P. 2004. Geologic mapping and database for Portland area fault studies: final technical report. Oregon Department of Geology and Mineral Industries. Open file report O-2004-02, 18 p.
- McFarland, W.D., and Morgan, D.S., 1996, Description of the Ground-Water Flow System in the Portland Basin, Oregon and Washington: U.S. Geological Survey Water Supply Paper 2470-A, 58 p.
- Reidel, S.P., Johnson, V.G., and Spane, F.A., 2002, Natural gas storage in basalt aquifers of the Columbia Basin, Pacific Northwest USA—A guide to site characterization: Richland, Wash., Pacific Northwest National Laboratory, 277 p.
- Theis, C.V., 1935. The relation between the lowering of the piezometric surface and the rate and duration of discharge of a well using groundwater storage, American Geophysical Union Transactions, vol. 16, p. 519-524.
- United States Geological Survey, 2013, National Elevation Dataset (NED) [DEM geospatial data], 1/9th arc-second, updated 2013.
- United States Geological Survey, 2020, Damascus quadrangle, Oregon [map], 1:24,000, 7.5 minute topographic series, U.S. Department of the Interior, Reston, Virginia.
- Watershed Sciences, 2009, LIDAR remote sensing data collection, Department of Geology and Mineral Industries, Willamette Valley Phase I, Oregon: Portland, OR, December 21
- Woodward, D.G., Gannett, M.W., and Vaccaro, J.J., 1998, Hydrogeologic framework of the Willamette Lowland aquifer system, Oregon and Washington: U.S. Geological Survey Professional Paper 1424-B, 82 p.

D. WELL CONSTRUCTION, OAR 690-200

D1. Well #: 1 Logid: CLAC 69616

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

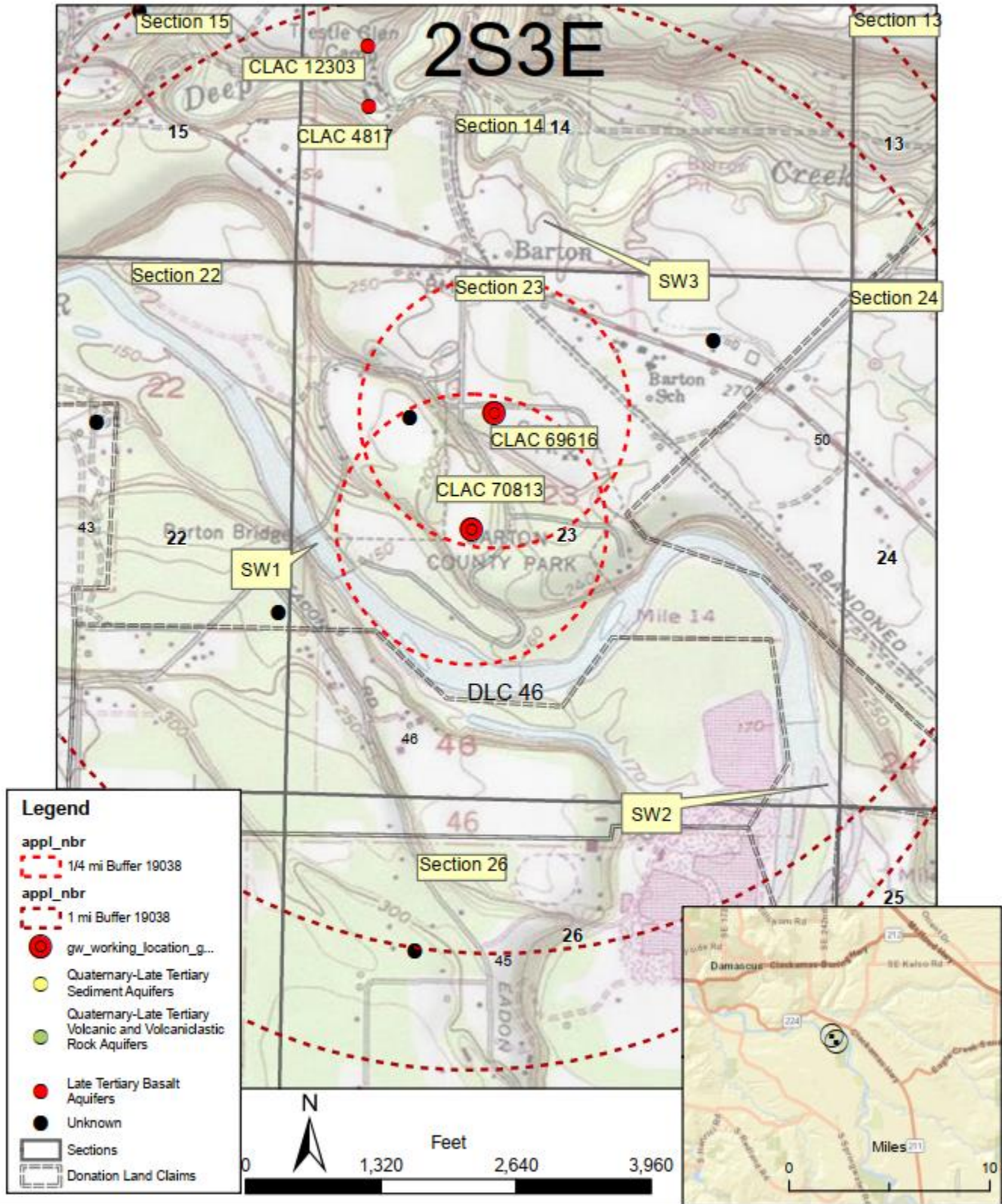
- a. review of the well log;
- b. field inspection by _____;
- c. report of CWRE _____;
- d. other: (specify) _____

D3. **THE WELL construction deficiency or other comment is described as follows:** Well 1 (CLAC 69616) appears to have been completed with a split seal but the lower, under-reamed drillhole does not extend at least fifteen feet into solid, unfractured, consolidated rock overlying the water-bearing rock formation per OAR 690-210-0150(1)(c) Method 3. The under-reamed (8" diameter) portion of CLAC 69616 is only 10, from 707 to 717 ft bls.

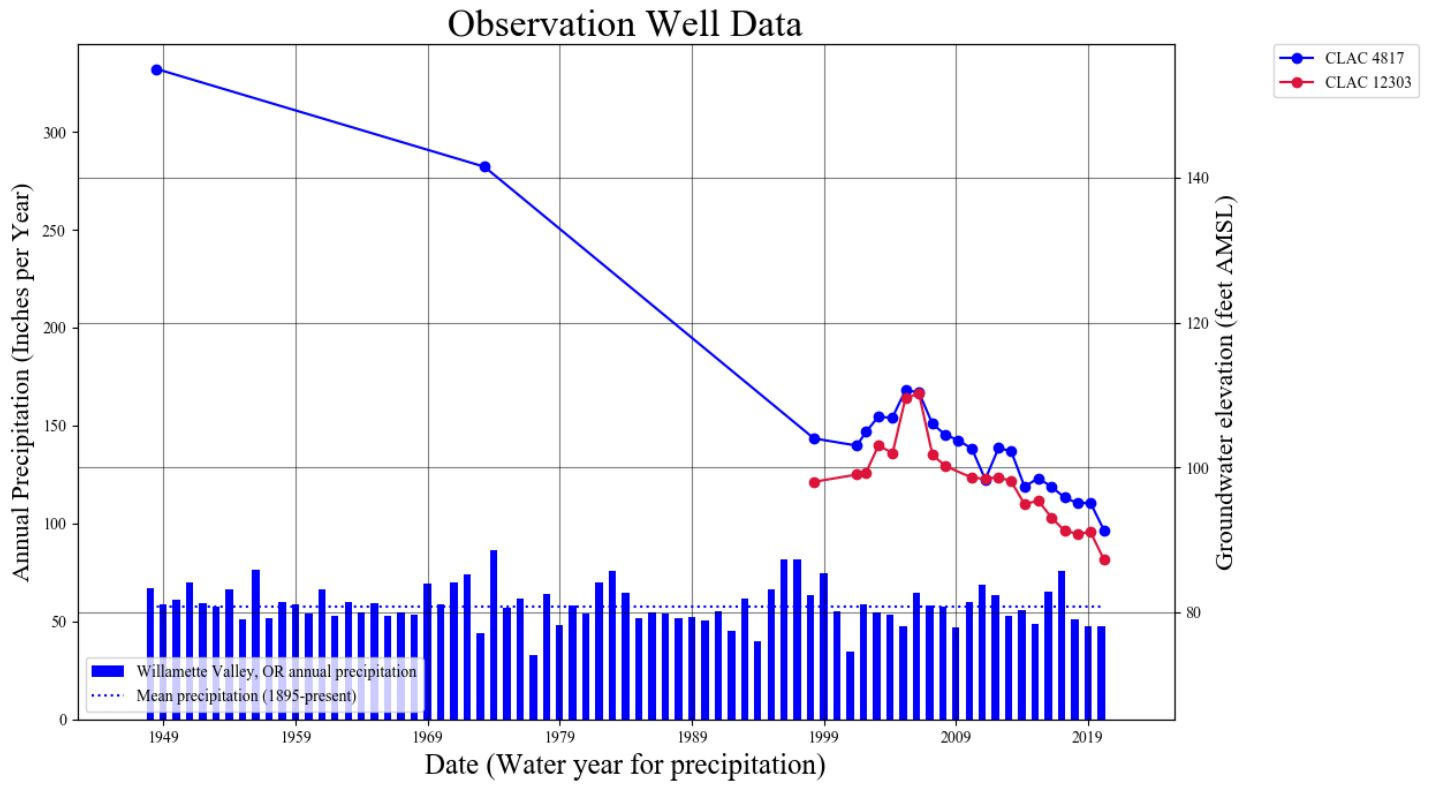
D4. **Route to the Well Construction and Compliance Section for a review of existing well construction.**

Well Location Map

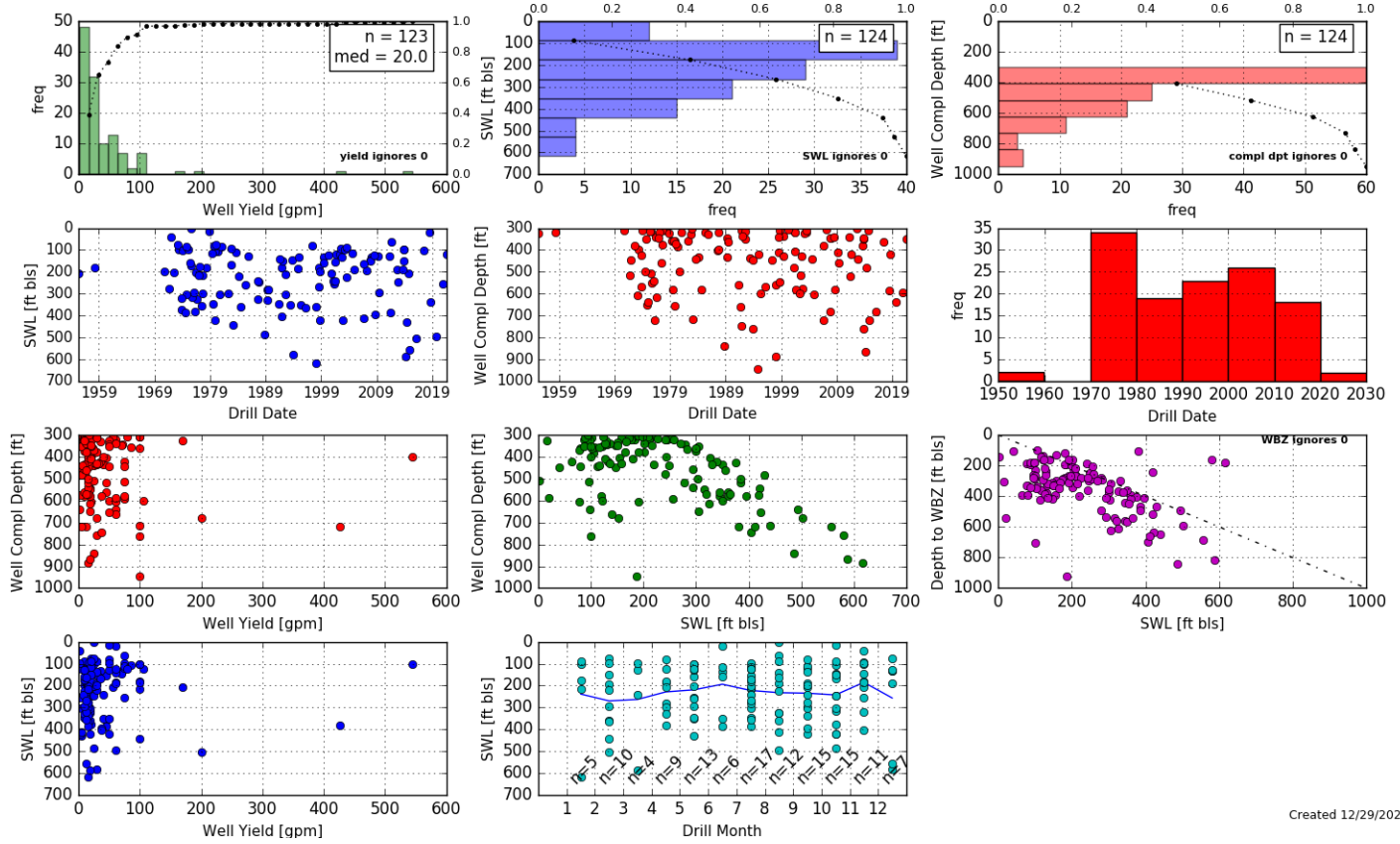
G19038 Clackamas County Parks



Water-Level Measurements in Nearby Wells

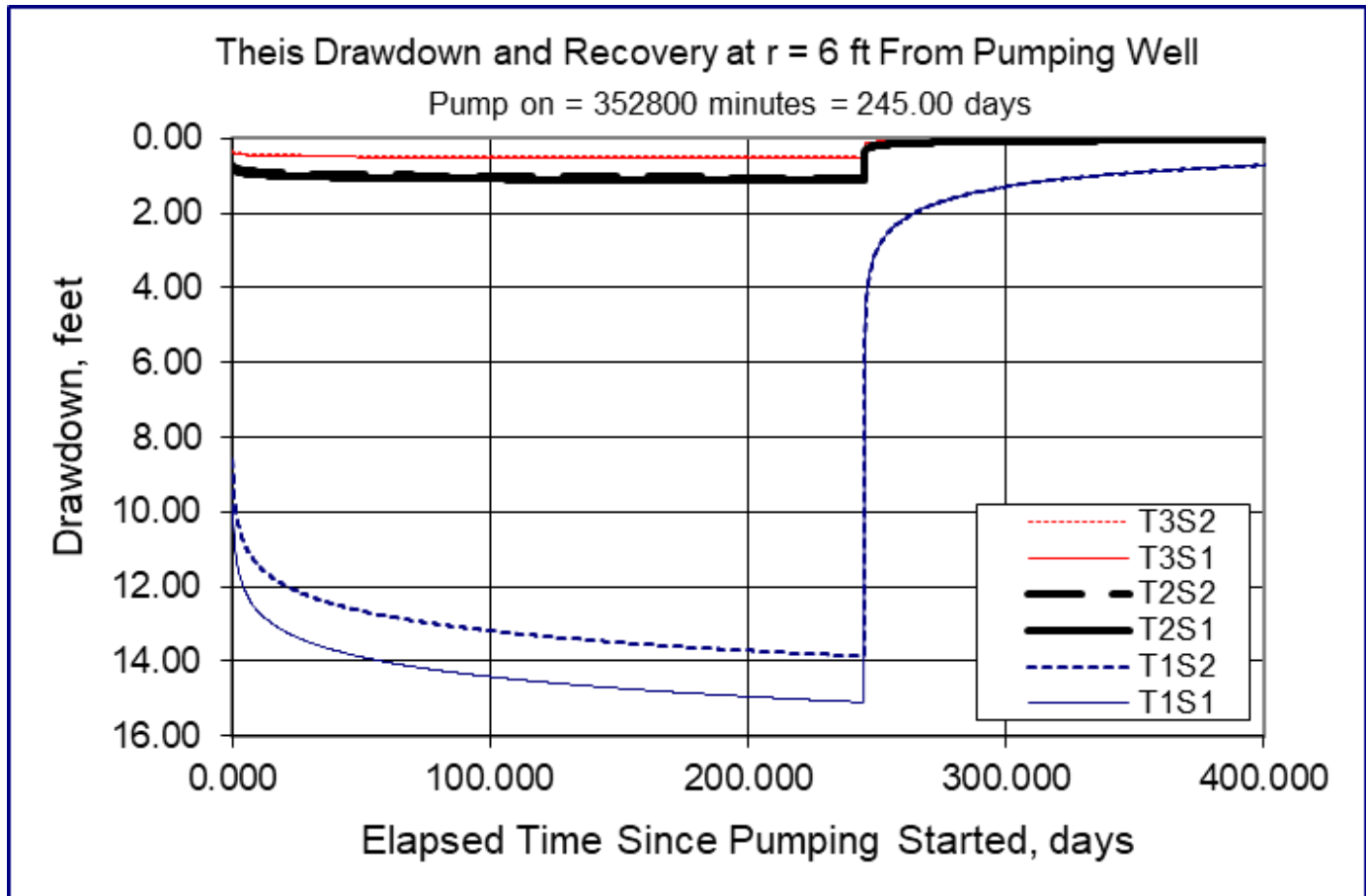


Well Statistics 2S/3E



Created 12/29/2021

Theis Drawdown Analysis Threshold Radius



Radial distance from pumping well (r)=5.5 feet [radius of influence for 15 feet of drawdown]

Pumping Rate (Q)= 100 gpm (0.22 cfs) [proposed rate]

Aquifer Transmissivity (T1)= 14,960 gpd/ft (2,000 ft²/day), (T2)= 225,497 gpd/ft (30,147 ft²/day), (T3)= 489,940 gpd/ft (65,500 ft²/day) [Conlon et al 2005, Table 2 values for Central CRB; Leonard and Collins 1983]

Storativity (s1) = 1 X 10⁻⁴, (s2) = 5 X 10⁻⁴ [Conlon et al 2005, Table 2 values for Central CRB]

Total pumping time = 245 days [irrigation season, March 1-October 31]