

Approved:



MEMO

To: Kristopher Byrd, Well Construction and Compliance Section Manager
From: Travis Kelly, Well Construction Compliance Coordinator
Subject: Review of Water Right Application G-19153
Date: February 4, 2022

The attached application was forwarded to the Well Construction and Compliance Section by the Groundwater Section. Mike Thoma reviewed the application. Please see Mike's Groundwater Review and the Well Reports.

Applicant's Well #1 (CROO 2757): Based on a review of the Well Report, Applicant's Well #1 does not appear to comply with current minimum well construction standards (See OAR 690 Division 210). The problem is that the Well Report indicates that the well head is flush with land surface. In order to meet minimum well construction standards, the well head must be extended so that it is at least one-foot above land surface.

My recommendation is that the Department **not issue** a permit for Applicant's Well #1 unless it is brought into compliance with current minimum well construction standards or information is provided showing that it is constructed to meet current minimum well construction standards.

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

Applicant's Well #2 (CROO 2758): Based on a review of the Well Report, Applicant's Well #2 does not appear to comply with current minimum well construction standards (See OAR 690 Division 210). The problem is that the Well Report indicates that the well head is flush with land surface. In order to meet minimum well construction standards, the well head must be extended so that it is at least one-foot above land surface.

My recommendation is that the Department **not issue** a permit for Applicant's Well #2 unless it is brought into compliance with current minimum well construction standards or information is provided showing that it is constructed to meet current minimum well construction standards.

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

NOTICE TO WATER WELL CONTRACTOR
The original and first copy
of this report are to be
filed with the

STATE ENGINEER, SALEM, OREGON 97310
within 30 days from the date
of well completion.

CROO
2751

WATER WELL REPORT

STATE OF OREGON
(Please type or print)

RECEIVED

State Well No. 165/24E-3/bc

(Do not write above this line) MAR - 3 1977 State Permit No.

(1) OWNER:

Name James Layton
Address Paulina Oregon

(2) TYPE OF WORK (check):

New Well Deepening Reconditioning Abandon
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:

Rotary Driven
Cable Jetted
Dug Bored

(4) PROPOSED USE (check):

Domestic Industrial Municipal
Irrigation Test Well Other

(5) CASING INSTALLED:

Threaded Welded
" Diam. from 0 ft. to 25 ft. Gage 250
" Diam. from _____ ft. to _____ ft. Gage _____
" Diam. from _____ ft. to _____ ft. Gage _____

(6) PERFORATIONS:

Perforated? Yes No.

Type of perforator used _____

Size of perforations in. by in.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.

(7) SCREENS:

Well screen installed? Yes No

Manufacturer's Name _____
Type _____ Model No. _____
Diam. _____ Slot size _____ Set from _____ ft. to _____ ft.
Diam. _____ Slot size _____ Set from _____ ft. to _____ ft.

(8) WELL TESTS:

Drawdown is amount water level is lowered below static level

Was a pump test made? Yes No If yes, by whom? ART REEP
Yield: 1800 gal./min. with 6 ft. drawdown after 6 hrs.
" " " " " "
" " " " " "
Bailer test gal./min. with _____ ft. drawdown after _____ hrs.
Artesian flow g.p.m. _____
Temperature of water _____ Depth artesian flow encountered _____ ft.

(9) CONSTRUCTION:

Well seal—Material used CEMENT
Well sealed from land surface to 25 ft.
Diameter of well bore to bottom of seal 14 in.
Diameter of well bore below seal 10 in.
Number of sacks of cement used in well seal _____ sacks
Number of sacks of bentonite used in well seal _____ sacks
Brand name of bentonite _____
Number of pounds of bentonite per 100 gallons _____
of water _____ lbs./100 gals.
Was a drive shoe used? Yes No Plugs _____ Size: location _____ ft.
Did any strata contain unusable water? Yes No
Type of water? _____ depth of strata _____
Method of sealing strata off _____
Was well gravel packed? Yes No Size of gravel: _____
Gravel placed from _____ ft. to _____ ft.

(10) LOCATION OF WELL:

County CROOK Driller's well number _____
SW 1/4 NW 1/4 Section 31 T. 16S R. 24E W.M. _____
Bearing and distance from section or subdivision corner _____

(11) WATER LEVEL: Completed well.

Depth at which water was first found 160 ft.
Static level 10' ft. below land surface. Date _____
Artesian pressure _____ lbs. per square inch. Date _____

(12) WELL LOG:

Diameter of well below casing 10'
Depth drilled 385 ft. Depth of completed well 385 ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
TOP SOIL	0	15	
BASALT	15	160	
- WATER	160	180	10'
BASALT	180	360	
- WATER	360	385	

Work started SEPT 19 75 Completed SEPT 1975
Date well drilling machine moved off of well _____ 19 _____

Drilling Machine Operator's Certification:

This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.

[Signed] _____ Date _____, 19____
(Drilling Machine Operator)

Drilling Machine Operator's License No. _____

Water Well Contractor's Certification:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Name DICK AKINS
(Person, firm or corporation) (Type or print)

Address _____

[Signed] _____
(Water Well Contractor)

Contractor's License No. _____ Date _____, 19____

NOTICE TO WATER WELL CONTRACTOR
The original and first copy
of this report are to be
filed with the

WATER WELL REPORT

STATE OF OREGON
(Please type or print)

RECEIVED

Well No. 165/24E-31bc

STATE ENGINEER, SALEM, OREGON 97301
within 30 days from the date
of well completion.

CROOK
2758

(Do not write above this line) MAR - 3 1977 State Permit No. _____

G-7-147

WATER RESOURCES DEPT.

(1) OWNER:

Name James Layton
Address Paulina, Oregon

(2) TYPE OF WORK (check):

New Well Deepening Reconditioning Abandon

If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:

Rotary Driven
Cable Jetted
Dug Bored

(4) PROPOSED USE (check):

Domestic Industrial Municipal
Irrigation Test Well Other

(5) CASING INSTALLED:

Threaded Welded
7.0" Diam. from 0 ft. to 25 ft. Gage 250
" Diam. from ft. to ft. Gage
" Diam. from ft. to ft. Gage

PERFORATIONS:

Perforated? Yes No.

Type of perforator used

Size of perforations in. by in.
perforations from ft. to ft.
perforations from ft. to ft.
perforations from ft. to ft.

(7) SCREENS:

Well screen installed? Yes No

Manufacturer's Name _____
Type _____ Model No. _____
Diam. _____ Slot size _____ Set from _____ ft. to _____ ft.
Diam. _____ Slot size _____ Set from _____ ft. to _____ ft.

(8) WELL TESTS:

Drawdown is amount water level is lowered below static level

Was a pump test made? Yes No If yes, by whom? ART REED
Yield: 1800 gal./min. with 6 ft. drawdown after 6 hrs.
" " " " " "
" " " " " "
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m.
Temperature of water Depth artesian flow encountered ft.

(9) CONSTRUCTION:

Well seal—Material used CEMENT
Well sealed from land surface to 25 ft.
Diameter of well bore to bottom of seal 19 in.
Diameter of well bore below seal 10 in.
Number of sacks of cement used in well seal _____ sacks
Number of sacks of bentonite used in well seal _____ sacks
Brand name of bentonite _____
Number of pounds of bentonite per 100 gallons _____
of water _____ lbs./100 gals.
Was a drive shoe used? Yes No Plugs _____ Size: location _____ ft.
Did any strata contain unusable water? Yes No
Type of water? _____ depth of strata _____
Method of sealing strata off _____
Was well gravel packed? Yes No Size of gravel: _____
Gravel placed from _____ ft. to _____ ft.

(10) LOCATION OF WELL:

County CROOK Driller's well number _____
SW 1/4 NW 1/4 Section 31 T. 16S R. 24E W.M.
Bearing and distance from section or subdivision corner

WELL # 10

(11) WATER LEVEL: Completed well.

Depth at which water was first found 160 ft.
Static level 10' ft. below land surface. Date _____
Artesian pressure _____ lbs. per square inch. Date _____

(12) WELL LOG:

Diameter of well below casing 10'
Depth drilled 385 ft. Depth of completed well 385 ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
<u>TOPSOIL</u>	<u>0</u>	<u>15</u>	
<u>BASALT</u>	<u>15</u>	<u>160</u>	
<u>-WATER</u>	<u>160</u>	<u>180</u>	<u>10'</u>
<u>BASALT</u>	<u>180</u>	<u>360</u>	
<u>-WATER</u>	<u>360</u>	<u>385</u>	

Work started SEPT 1975 Completed SEPT 1975
Date well drilling machine moved off of well _____ 19 _____

Drilling Machine Operator's Certification:

This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.

[Signed] _____ Date _____, 19____
(Drilling Machine Operator)

Drilling Machine Operator's License No. _____

Water Well Contractor's Certification:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Name DICK ARINS
(Person, firm or corporation) (Type or print)

Address _____

[Signed] _____
(Water Well Contractor)

Contractor's License No. _____ Date _____, 19____

Groundwater Application Review Summary Form

Application # G- 19153

GW Reviewer M. Thoma Date Review Completed: 12/01/2021

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

12/01/2021

TO: Application G- **19153**

FROM: GW: **M. Thoma**
(Reviewer's Name)

SUBJECT: Scenic Waterway Interference Evaluation

YES The source of appropriation is hydraulically connected to a State Scenic Waterway or its tributaries

NO

YES Use the Scenic Waterway Condition (Condition 7J)

NO

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 Deschutes 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
0.083	0.083	0.083	0.083	0.083	0.083	0.083	0.083	0.083	0.083	0.083	0.083

PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO: Water Rights Section Date 12/01/2021
 FROM: Groundwater Section M. Thoma
Reviewer's Name
 SUBJECT: Application G- 19153 Supersedes review of _____
Date of Review(s)

PUBLIC INTEREST PRESUMPTION; GROUNDWATER

OAR 690-310-130 (1) *The Department shall presume that a proposed groundwater use will ensure the preservation of the public welfare, safety and health as described in ORS 537.525.* Department staff review groundwater applications under OAR 690-310-140 to determine whether the presumption is established. OAR 690-310-140 allows the proposed use be modified or conditioned to meet the presumption criteria. **This review is based upon available information and agency policies in place at the time of evaluation.**

A. GENERAL INFORMATION: Applicant's Name: Hermreck at the Y Ranch County: Crook

A1. Applicant(s) seek(s) 0.47 cfs from 2 well(s) in the Deschutes Basin,
Crooked River / Beaver Creek subbasin

A2. Proposed use Irrigation (51.5 acres) Seasonality: April 1 – October 1 (184 d)

A3. Well and aquifer data (**attach and number logs for existing wells; mark proposed wells as such under logid**):

Well	Logid	Applicant's Well #	Proposed Aquifer*	Proposed Rate(cfs)	Location (T/R-S QQ-Q)	Location, metes and bounds, e.g. 2250' N, 1200' E fr NW cor S 36
1	CROO0002757	1	Bedrock	0.47	16.00S-24.00E-31-SW NW	1860 FEET SOUTH AND 250 FEET EAST FROM NW CORNER, SECTION 31
2	CROO0002758	2	Bedrock	0.47	16.00S-24.00E-31-SW NW	1860 FEET SOUTH AND 250 FEET EAST FROM NW CORNER, SECTION 31
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	3750	165	29.6*	10/12/21	385	0-25	0-25	-	-	1800		
2	3750	160	28.6*	3/13/20	385	0-25	0-25	-	-	1800		

Use data from application for proposed wells.

A4. **Comments:** SWL taken from last reported measurement

A5. **Provisions of the** Deschutes (OAR 690-505) 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 POAs are not within the Deschutes Groundwater Study Area

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 (Annual SWL); 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:** Water level data for the two wells proposed as POAs on this application along with other wells in the area show a small, but persistent trend of decline of less than 5 ft since approximately 2010. This may be related to climate change or to groundwater pumping but is insufficient to establish a preponderance of evidence that new use is not within the capacity of the resource and so conditions in B1(d) should be applied

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	Bedrock (Picture Gorge Basalt)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	Bedrock (Picture Gorge Basalt)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>

Basis for aquifer confinement evaluation: _____

C2. **690-09-040 (2) (3):** Evaluation of distance to, and hydraulic connection with, surface water sources. All wells located a horizontal distance less than ¼ mile from a surface water source that produce water from an unconfined aquifer shall be assumed to be hydraulically connected to the surface water source. Include in this table any streams located beyond one mile that are evaluated for PSI.

Well	SW #	Surface Water Name	GW Elev ft msl	SW Elev ft msl	Distance (ft)	Hydraulically Connected?			Potential for Subst. Interfer. Assumed?	
						YES	NO	ASSUMED	YES	NO
1	1	Beaver Creek	3720	~3700	7150	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	1	Beaver Creek	3720	~3700	7150	<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"/>

Basis for aquifer hydraulic connection evaluation: GW elevation is above SW elevation implying that groundwater is flowing towards, and discharging to, surface water

Water Availability Basin the well(s) are located within: BEAVER CR > CROOKED R – AT MOUTH (ID# 70605)

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"/>

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: _____

C4a. **690-09-040 (5):** Estimated impacts on **hydraulically connected surface water sources greater than one mile** as a percentage of the proposed pumping rate. Limit evaluation to the effects that will occur up to one year after pumping begins. This table encompasses the considerations required by 09-040 (5)(a), (b), (c) and (d), which are not included on this form. Use additional sheets if calculated flows from more than one WAB are required.

Non-Distributed Wells													
Well	SW#	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	1	%	%	%	< 1 %	< 1 %	< 1 %	< 1 %	< 1 %	< 1 %	< 1 %	< 1 %	< 1 %
Well Q as CFS					0.47	0.47	0.47	0.47	0.47	0.47			
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.					< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
(B) = 80 % Nat. Q		19.8	45.0	100	137	97.8	76.7	23.5	10.9	11.5	7.53	10.2	15.7
(C) = 1 % Nat. Q		0.20	0.45	1.0	1.37	0.98	0.77	0.24	0.11	0.12	0.08	0.10	0.16
(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: Stream-depletion estimates were attempted using both the Hunt-1999 and Hunt-2003 stream-depletion models with parameter values weighted toward those that would produce higher values of stream depletion while still being within the range of what would be expected for the geologic material present – providing a “worst-case” scenario. Even with these exaggerated parameter values, stream-depletion estimates are less than 1%, which is unsurprising given the distance between the POAs and surface water. Model estimates are not shown.

C4b. **690-09-040 (5) (b) The potential to impair or detrimentally affect the public interest is to be determined by the Water Rights Section.**

- C5. **If properly conditioned**, the surface water source(s) can be adequately protected from interference, and/or groundwater use under this permit can be regulated if it is found to substantially interfere with surface water:
- i. The permit should contain condition #(s) _____;
 - ii. The permit should contain special condition(s) as indicated in “Remarks” below;

C6. **SW / GW Remarks and Conditions:** The applicant’s proposed POAs would be producing from an aquifer that has been found to be hydraulically-connected to surface water – specifically to Beaver Creek, a tributary to the Crooked River. The distance between the POAs and Beaver Creek is greater than one mile and estimated stream-depletion is less than 1% of the 80%-exceedance natural flows and so potential for substantial interference cannot be assumed per OAR 690-505. Despite insufficient evidence to establish PSI, the proposed POAs are hydraulically-connected to a tributary of the Deschutes State Scenic Waterway and will have a long-term impact on flows necessary for the scenic waterway. Given the distance between the POAs and Beaver Creek, and the river-distance between Beaver Creek near the POAs and the Deschutes State Scenic Waterway, along with the reservoirs in between, the impact from the proposed use on the scenic waterway will likely be evenly distributed throughout the entire year (see Scenic Waterway Memo on page 2).

References Used:

Brown, C. E. and T. P. Thayer. 1966. Geologic Map of the Canyon City Quadrangle, Northeastern Oregon. USGS Miscellaneous Geologic Investigations Map I-447.

Gannett, M. W. and K. E. Lite. 2004. Simulation of Regional Ground-Water Flow in the Upper Deschutes Basin, Oregon. USGS Water Resources Investigations Report 2003-4195

Gannett, M. W. and K. E. Lite. 2013. Analysis of 1997-2009 Groundwater Level Changes in the Upper Deschutes Basin, Central Oregon. USGS Scientific Investigations Report 2013-5092

Gannett, M. W., Lite, K. E., Risley, J. C., Pischel, E. M., and J. L. LaMarche. 2017. Simulation of Groundwater and Surface-Water Flow in the Upper Deschutes Basin, Oregon. USGS Scientific Investigations Report 2017-5097

Hunt, B. 2003. Unsteady Stream Depletion when Pumping from a Semiconfined Aquifer. Journal of Hydrologic Engineering. Vol 8(1), pp 12-19

Lite, K. E. and M. W. Gannett. 2002. Geologic Framework of the Regional Ground-Water Flow System in the Upper Deschutes Basin, Oregon. USGS Water-Resources Investigations Report 02-4015

McClaghry, J. D., Ferns, M. L., and C. L. Gordon. 2021. Geology of the North Half of the Lower Crooked River Basin, Crook, Deschutes, Jefferson, and Wheeler Counties, Oregon. DOGAMI Bulletin 108.

OWRD Well Log Database, Accessed 11/30/2021 [https://apps.wrd.state.or.us/apps/gw/well_log/Default.aspx]

OWRD Groundwater Information System Database, Accessed 11/30/2021 [https://apps.wrd.state.or.us/apps/gw/gw_info/gw_info_report/gw_search.aspx]

Swanson, D. A. 1969. Reconnaissance Geologic Map of the East Half of the Bend Quadrangle, Crook, Wheeler, Jefferson, Wasco, and Deschutes Counties, Oregon. USGS Miscellaneous Geologic Investigations Map I-568

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) _____

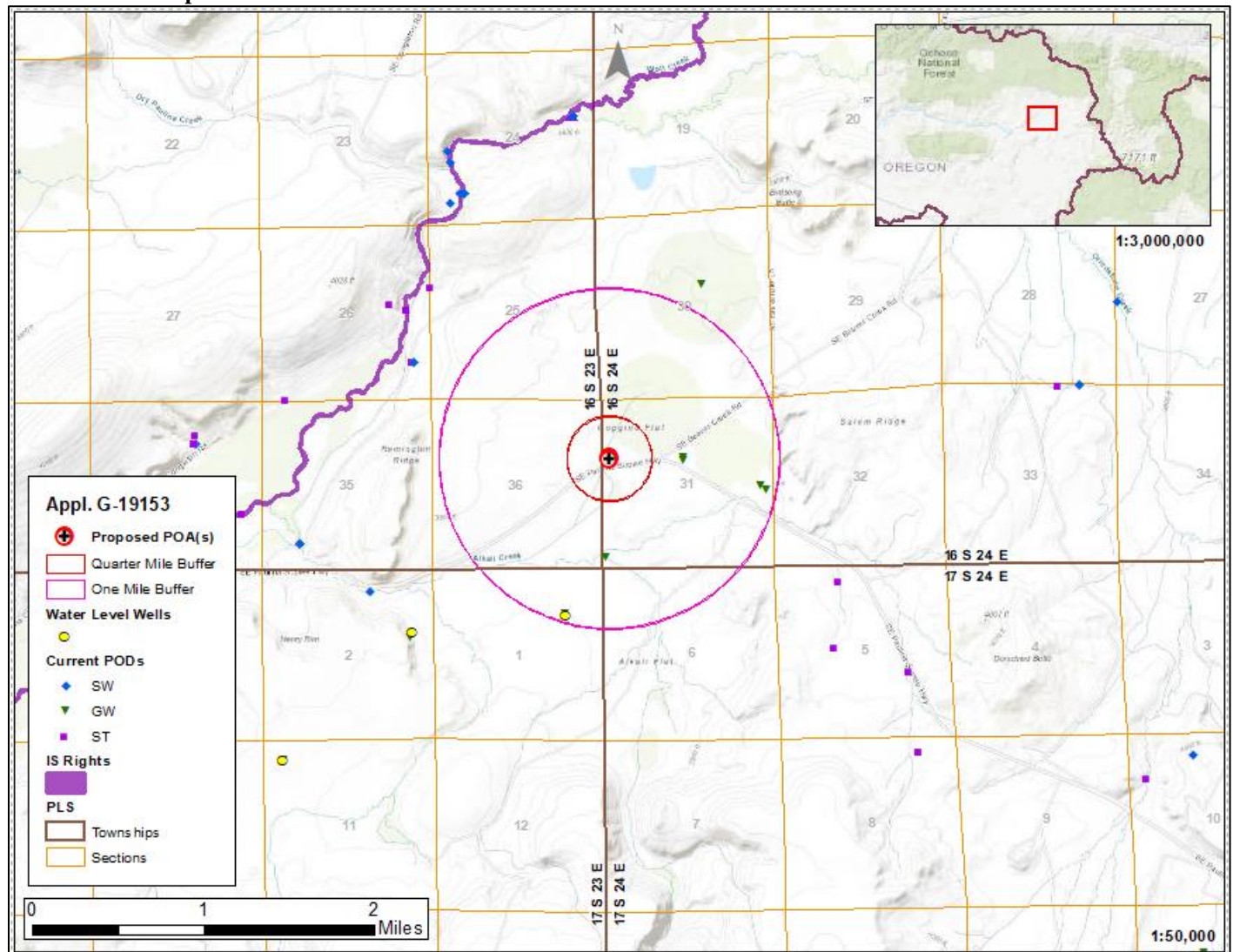
D3. **THE WELL construction deficiency or other comment is described as follows:** _____

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

Water Availability Tables

DETAILED REPORT ON THE WATER AVAILABILITY CALCULATION						
Watershed ID #: 70605		BEAVER CR > CROOKED R - AT MOUTH			Exceedance Level: 80	
Time: 4:12 PM		Basin: DESCHUTES			Date: 11/30/2021	
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	19.80	1.09	18.70	0.00	34.00	-15.30
FEB	45.00	2.21	42.80	0.00	50.00	-7.21
MAR	100.00	14.70	85.30	0.00	84.00	1.30
APR	137.00	40.80	96.20	0.00	84.00	12.20
MAY	97.80	95.00	2.78	0.00	84.00	-81.20
JUN	76.70	77.10	-0.41	0.00	80.40	-80.80
JUL	23.50	22.20	1.27	0.00	25.30	-24.00
AUG	10.90	11.30	-0.39	0.00	11.50	-11.90
SEP	11.50	11.70	-0.17	0.00	12.20	-12.40
OCT	7.53	5.72	1.81	0.00	13.30	-11.50
NOV	10.20	0.38	9.82	0.00	14.10	-4.28
DEC	15.70	0.72	15.00	0.00	32.80	-17.80
ANN	61,400	17,100	44,300	0	31,700	22,200

Well Location Map



Water-Level Measurements in Nearby Wells

