

Groundwater Application Review Summary Form

Application # G- 18261 (RE-REVIEW)

GW Reviewer DENNIS ORLOWSKI Date Review Completed: 11/03/2016

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).

PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO: Water Rights Section Date 11/03/2017
 FROM: Groundwater Section Dennis Orłowski
Reviewer's Name
 SUBJECT: Application G- 18261 Supersedes review of 05/31/2016
Date of Review(s)

PUBLIC INTEREST PRESUMPTION; GROUNDWATER

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

A. GENERAL INFORMATION: Applicant's Name: Jay Thompson County: Marion

A1. Applicant(s) seek(s) 0.557 cfs from 1 well(s) in the Willamette Basin,
Molalla-Pudding River subbasin

A2. Proposed use irrigation (95.0 acres) Seasonality: March 1 – October 31

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

Well	Logid	Applicant's Well #	Proposed Aquifer*	Proposed Rate(cfs)	Location (T/R-S QQ-Q)	Location, metes and bounds, e.g. 2250' N, 1200' E fr NW cor S 36
1	MARI 66870	1	CRB	0.557	7S/2W – 25 SE-NE	2365'S, 1035'W fr NE cor S25

* 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	225	3	22	6/30/2017	504	0-219	+2-219	--	--	100	--	Air

Use data from application for proposed wells.

A4. **Comments:** This review supersedes a previous review dated 05/31/2016.

The original application proposed using MARI 17948 as the POA. The initial groundwater review concluded that there was hydraulic connection and PSI between MARI 17948 and two nearby streams (the Pudding River, and an unnamed tributary to the Pudding River). The hydraulic connection determination was due primarily to the shallow overall depth, with a correspondingly shallow seal depth, of MARI 17948. The IR (dated 06/24/2016) informed the applicant of the PSI finding and the unlikelihood that a permit would be issued.

Subsequent to IR issuance, the applicant and their agent consulted with OWRD hydrogeologists (A. Bouchier, K. Wozniak, D. Orłowski) to discuss potential remedies to the PSI finding. OWRD staff informed the applicant that a new basalt aquifer well at the same general location, but deeper overall and with a deeper seal than MARI 17948, would possibly not be found in hydraulic connection with the nearby streams (see attached e-mail correspondence).

Consequently, in June 2017 the applicant completed drilling of MARI 66870, which is the new proposed POA for this application. MARI 66870 is located approximately 75 feet northwest of MARI 17948. MARI 66870 is significantly deeper than MARI 17948 (504 ft vs 146 ft), and was constructed with a much deeper sealed interval (0-219 ft bgs vs 0-76 ft bgs) that reduces the likelihood of hydraulic connection between basalt water-bearing zones tapped by the new well and nearby streams.

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, MARI 66870, obtains groundwater from a confined basalt aquifer, so the pertinent rules (OAR 690-502-0240) do not apply.

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

Name of administrative area: Not applicable

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 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 Basin CRB), 7n (annual measurements), 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:** The area beneath the proposed POA (MARI 66870) is underlain by up to 300 feet of the Columbia River Basalt aquifer system. Basalt flow interiors are generally very dense with low permeability, and are typically separated by thinner and much more permeable interflow zones. This generalized structure of basalt aquifer systems leads to thin, tabular and often hydraulically-discrete aquifers corresponding to each interflow zone (Conlon and others, 2005; Gannett and Caldwell, 1998; Woodward and others, 1998).

The well log for MARI 66870 indicates the presence of three water-bearing interflow zones at the following depth intervals: 3-10 ft bgs, 88-114 ft bgs, and 238-366 ft bgs. The two shallower zones are those most likely in hydraulic connection with nearby reaches of the Pudding River to the northeast and of an unnamed tributary to the Pudding River to the southwest. Furthermore, these shallower water-bearing zones are also the source aquifer for many domestic wells in the area. Groundwater levels are not currently monitored in any of the domestic wells, but a least 40 wells have been deepened and 7 wells have been abandoned out of a total 306 wells in sections 23-26, 35, and 36 of T7S, R2W, and sections 19, 30, and 31 of T7S, R1W. These multiple deepenings suggests that the shallow water-bearing zones are already subject to undue interference. To mitigate potential impacts to both the nearby streams and other groundwater users, MARI 66870 is sealed through the two shallower basalt water-bearing interflow zones (per applicant discussions with OWRD groundwater staff, as noted in Section A4).

In general, water levels in nearby deeper basalt irrigation wells have been stable over the last twenty years. Limited data (primarily from MARI 53069, MARI 53068, and MARI 736) indicate that seasonal fluctuations are on the order of 10-20 feet. Many basalt irrigation rights have been issued in the area over the last 30 years but the extent to which all of these rights are exercised in any given year is unknown. However, stable water levels suggest some additional capacity for development. Well logs for nearby basalt wells show a median yield of 250 gpm and a range from 10-850 gpm. The well log for the proposed POA, MARI 66870 reports a yield of 100 gpm (air test). Groundwater may be available in the amount requested, although multiple wells may be required to obtain the amount.

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	Columbia River Basalt System	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Basis for aquifer confinement evaluation: In general, Columbia River Basalt aquifers (i.e., separate interflow zones) are confined by dense flow interiors which restrict vertical movement of groundwater. The well log for MARI 66870 indicates a static water level of 22 ft bgs, which is far above the first open water-bearing zone from 238-366 ft bgs, confirming confined conditions of the CRBG aquifer system at this location.

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	Unnamed tributary to Pudding River	~200	180-250	1200	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	2	Pudding River	~200	180-220	3000	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Basis for aquifer hydraulic connection evaluation: As discussed in Sections A4 and B3 of this review, the new proposed POA, MARI 66870, was constructed to minimize the potential for hydraulic connection with nearby streams. The open basalt water-bearing zones in MARI 66870 are located from 238-366 ft bgs, which corresponds to elevations -13 to -141 ft msl, far below the elevations of nearby streams. The physical separation afforded by approximately 15 ft of near-surface clay deposits and over 200 ft of underlying basalt is sufficient to assume that the proposed POA is not hydraulically connected to the surface waters.

Water Availability Basin the well(s) are located within: WID 152: Pudding River > Molalla River – above Howell Prairie

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?
		<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"/>

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													
(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:** _____

References Used:

Application file: G-18261

Conlon and Others, 2005, Ground-Water Hydrology of the Willamette Basin, Oregon, Scientific Report 2005-5168, USGS.

Gannett and Caldwell, 1998, Geologic Framework of the Willamette Lowland Aquifer System, Oregon and Washington, USGS Professional Paper 1424-A.

Woodward, Gannett and Vaccaro, 1998, Hydrogeologic Framework of the Willamette Lowland Aquifer System, Oregon and Washington, USGS Professional Paper 1424-B.

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:** _____

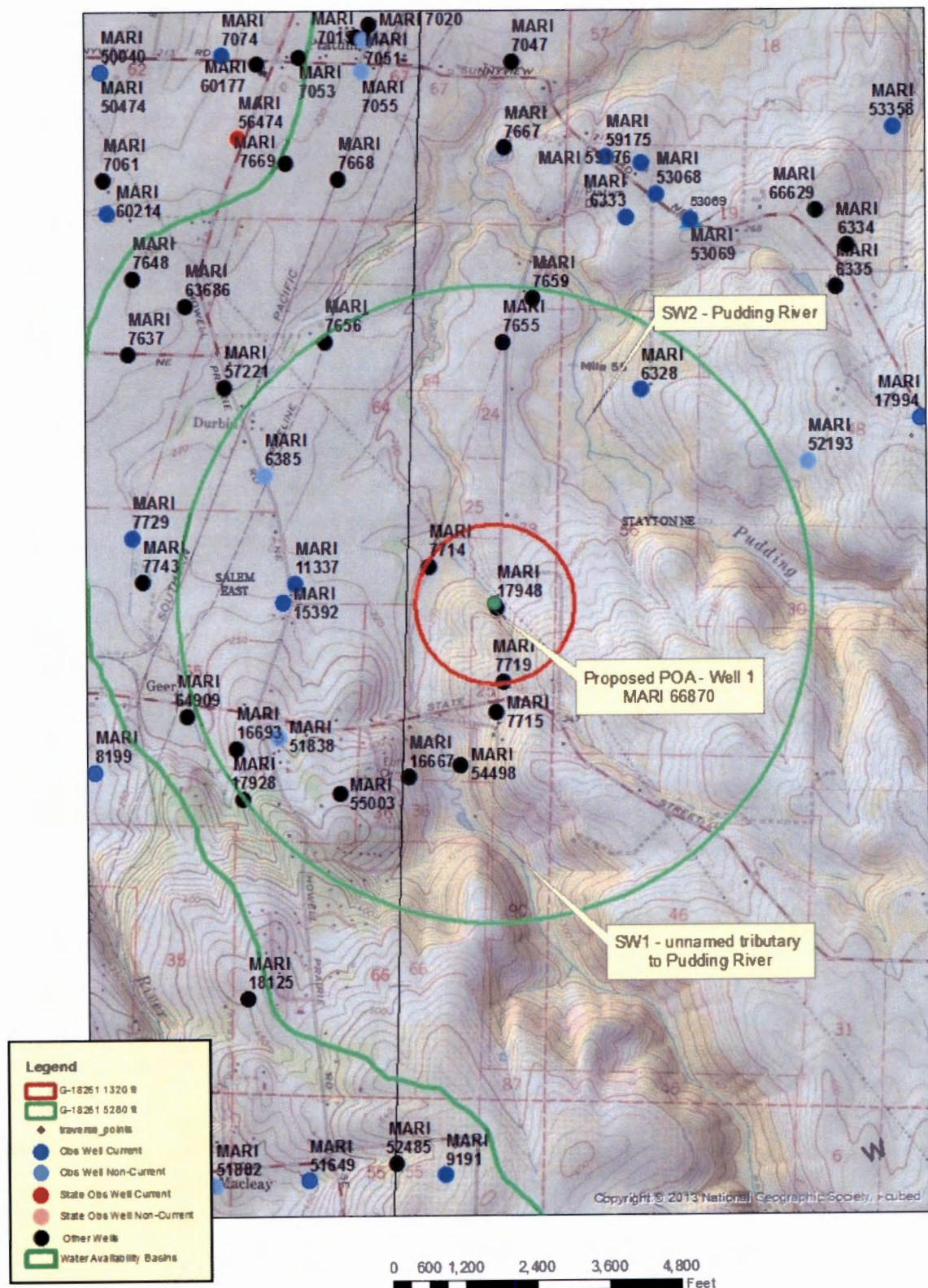
D4. **Route to the Well Construction and Compliance Section for a review of existing well construction.**

Water Availability Table

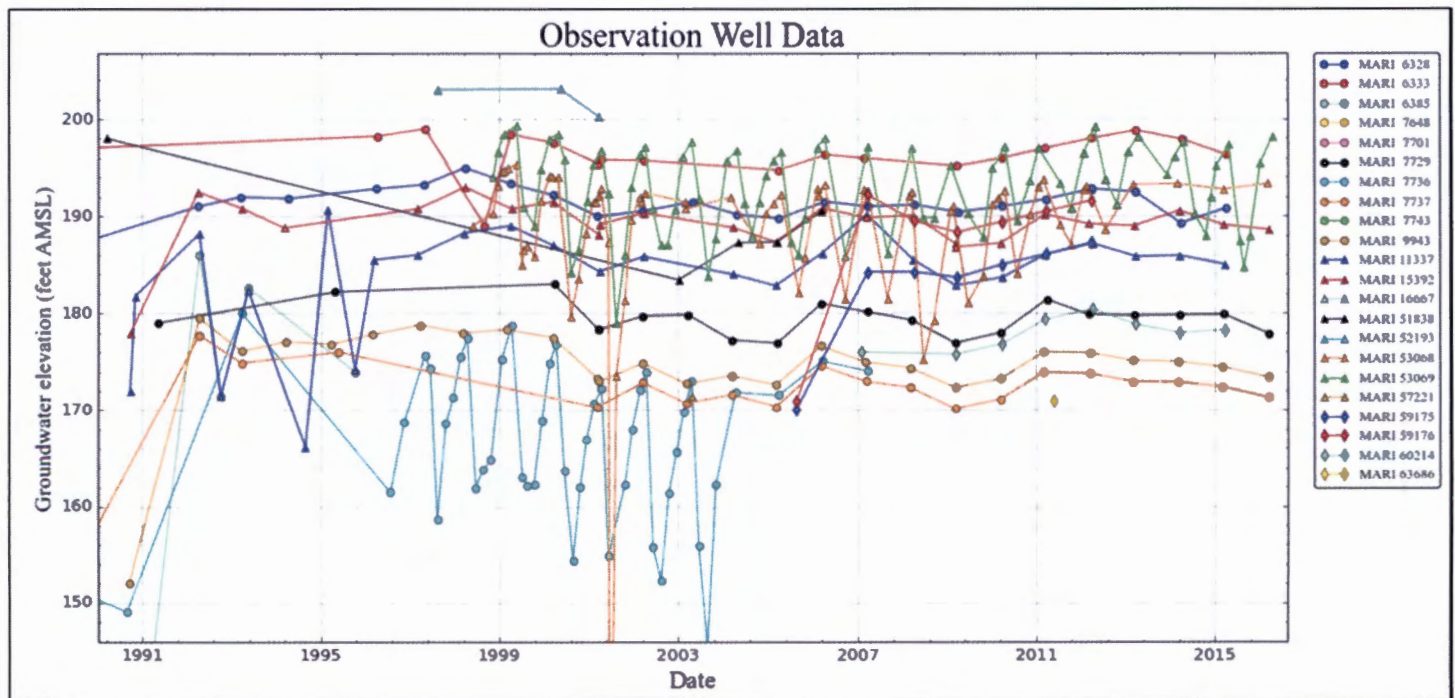
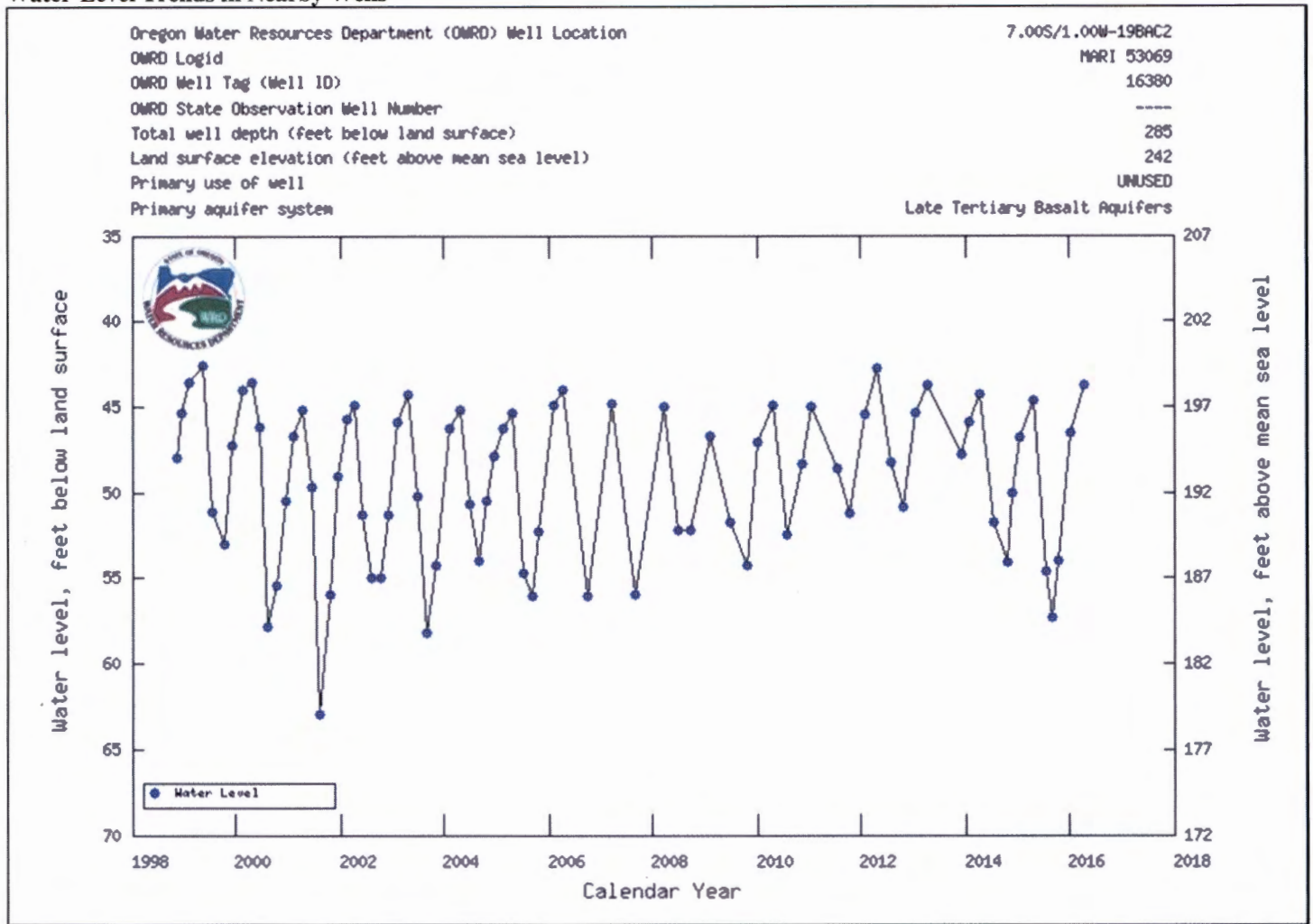
DETAILED REPORT ON THE WATER AVAILABILITY CALCULATION						
Watershed ID #: 152		PUDDING R > MOLALLA R - AB HOWELL PRAIRIE			Exceedance Level: 80	
Time: 12:14 PM		Basin: WILLAMETTE			Date: 05/31/2016	
Month	Natural Stream Flow	Consumptive Use and Storage	Expected Stream Flow	Reserved Stream Flow	Instream Requirements	Net water Available
Monthly values are in cfs. Storage is the annual amount at 50% exceedance in ac-ft.						
JAN	603.00	69.80	533.00	0.00	10.00	523.00
FEB	649.00	61.00	588.00	0.00	10.00	578.00
MAR	587.00	43.10	544.00	0.00	10.00	534.00
APR	451.00	24.60	426.00	0.00	10.00	416.00
MAY	235.00	17.10	218.00	0.00	10.00	208.00
JUN	111.00	32.20	78.80	0.00	10.00	68.80
JUL	43.60	47.80	-4.17	0.00	10.00	-14.20
AUG	24.70	40.20	-15.50	0.00	10.00	-25.50
SEP	22.70	25.30	-2.58	0.00	10.00	-12.60
OCT	38.90	7.35	31.50	0.00	10.00	21.50
NOV	233.00	18.50	215.00	0.00	10.00	205.00
DEC	608.00	63.80	544.00	0.00	10.00	534.00
ANN	385,000	27,200	358,000	0	7,240	352,000

Well Location Map

Application G-18261, Thompson (Re-review) T7S, R2W, Section 25



Water-Level Trends in Nearby Wells



E-mail correspondence (OWRD and applicant's agent)

From: ORLOWSKI Dennis R, * WRD
To: 'Jim Schuettle'
Cc: 'Jay Thompson'; 'FRENCH Kim R'; Floyd Sippel
Subject: RE: Jay Thompson Well File #: G-18261

Sent: Tue 3/21/2017 3:37

Jim,

The groundwater review for application G-18261 concluded that the existing well, MARI 17948, produced from shallow water-bearing zones in the basalt aquifer system that are hydraulically connected to nearby reaches of the Pudding River. A review of geologic maps in the area suggests that the water-bearing zone at 90-100 feet occurs at the base of the Silver Falls unit, and a probable water-bearing zone from 136-140 feet corresponds to the base of the Sentinel Bluffs unit (the total reported completion depth for MARI 17948 is 146 feet).

Because of the low vertical permeability of the basalt layers, a new well that produces from substantially deeper water-bearing zones than the existing well would likely be considered to not be hydraulically connected to the Pudding River.

If a new well is drilled adjacent to the existing location (within 100 feet and at approximately the same elevation at land surface) and is cased and sealed into hard dense basalt at least 100 feet below the 146-foot level in the existing well, the Groundwater Section would likely conclude that the well was not hydraulically connected to the Pudding River. If the new well is drilled more than 100 feet away from the existing wells, the seal and casing depth will have to be adjusted to account for the difference in elevation between the existing well and the new well. We anticipate that the new well would be completed in water-bearing zones in the Winter Water unit of the basalts.

This recommended construction does not guarantee that the new well would be deemed to not be hydraulically connected to the Pudding River system, as the determination of hydraulic connection would depend upon conditions encountered while drilling and reported on the well log. However, the deeper the casing and seal and the deeper the new water-bearing zone, the more likely that the production will be from an aquifer not hydraulically connected to the adjacent reaches of the river. It might be wise to have a registered geologist on site during the drilling process to ensure that the intent of our recommendation is met (deep casing and seal to produce from water-bearing zones in Winter Water or a deeper member of the Columbia River Basalt).

We would greatly appreciate it if the driller would collect drill cuttings in quart-size zip-lock bags at 10-foot intervals. We can arrange for pickup of the samples at the well site.

Please have the driller contact me to let me know when drilling will commence.

Regards, Dennis

Dennis Orłowski | Hydrogeologist – Groundwater Section

Oregon Water Resources Department

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