

## Groundwater Application Review Summary Form

Application # G- 18702

GW Reviewer Travis Brown/Dennis Orlovski Date Review Completed: 12/19/2018

### 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.

on 12/19/18

*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).*



OK  
KJE

# MEMO

**To:** Kristopher Byrd, Well Construction and Compliance Section Manager  
**From:** Joel Jeffery, Well Construction Program Coordinator  
**Subject:** Review of Water Right Application G-18702  
**Date:** December 20, 2018

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

Applicant's Well #2a (MARI 62290): Based on a review of the Well Report, Applicant's Well #2a seems to protect the groundwater resource.

Bringing Applicant's Well #2a into compliance with minimum well construction standards may not satisfy hydraulic connection issues.

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

WELL LABEL # L 93531
START CARD # 190387

(1) LAND OWNER
Owner Well I.D.
First Name Thomas Last Name Barnett
Company
Address 23301 Schultz Rd. NE
City Aurora State OR Zip 97002

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

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

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

(5) BORE HOLE CONSTRUCTION Special Standard [ ] Attach copy
Depth of Completed Well 240 ft.

Table with columns: Dia, From, To, Material, SEAL, Amt, sacks/lbs. Rows include Cement and Bentonite.

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

(6) CASING/LINER
Casing Liner Dia + From To Gauge Stl Plstc Wld Thrd
Shoe [ ] Inside [X] Outside [ ] Other Location of shoe(s) 199.75
Temp casing [ ] Yes Dia From To

(7) PERFORATIONS/SCREENS
Table with columns: Perf/Screen, Casing/Liner, Dia, From, To, Scrn/slot width, Slot length, # of slots, Tele/pipe size

(8) WELL TESTS: Minimum testing time is 1 hour
Pump [ ] Bailer [ ] Air [X] Flowing Artesian
Yield gal/min Drawdown Drill stem/Pump depth Duration (hr)

Temperature 53 °F Lab analysis [ ] Yes [ ] No
Water quality concerns? [ ] Yes (describe below)
From To Description Amount Units

(9) LOCATION OF WELL (legal description)
County MARION Twp 4 S N/S Range 1 W E/W WM
Sec 3 NE 1/4 of the NW 1/4 Tax Lot 800
Tax Map Number Lot
Lat " or DMS or DD
Long " or DMS or DD
Street address of well [X] Nearest address [ ]
12814 Arndt Rd. NE Aurora, OR 97002

(10) STATIC WATER LEVEL
Date SWL(psi) + SWL(ft)
Existing Well / Predeepening
Completed Well 01-05-2009 53
Flowing Artesian? [ ] Dry Hole? [ ]
WATER BEARING ZONES Depth water was first found 182
SWL Date From To Est Flow SWL(psi) + SWL(ft)

(11) WELL LOG
Table with columns: Material, From, To, Ground Elevation
Clay brown, Clay gray sticky, Clay blue-green sticky, Clay gray silty, Clay brown, Clay brown, sand, Clay gray, gravel & sand, Sand & silt gray, Clay green & gray, Sand & silt gray, Sand brown, gravel with silt, Clay gray, sand with gravel, Sand black & gravel 50%, Sand brown & gravel 50%, Sand black & brown, Sand black 50% & gravel, Sand black 70% & gravel, Sand black 70% & gravel, Sand black

(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 1704 Date 01-26-2009
Password: (if filing electronically)
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 783 Date 01-26-2009
Password: (if filing electronically)
Signed [Signature]
Contact Info (optional) Grosser Well Drilling (503) 982-2060

THIS REPORT MUST BE SUBMITTED TO THE WATER RESOURCES DEPARTMENT WITHIN 30 DAYS OF COMPLETION OF WORK Form Version: 0.88

WATER RESOURCES DEPT
SALEM, OREGON

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**PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS**

TO: Water Rights Section Date 12/19/2018  
 FROM: Groundwater Section Travis Brown, Dennis Orlowski  
Reviewer's Name  
 SUBJECT: Application G- 18702 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: Margaret and Thomas Barnett County: Marion

A1. Applicant(s) seek(s) 0.026 cfs from 1 well(s) in the Willamette Basin,  
Pudding River subbasin

A2. Proposed use Irrigation (Nursery Operation) Seasonality: Dec 1 – May 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 62290	<b>2<sup>a</sup></b>	Alluvium	0.026	4S/1W-3 NE-NW	<b>530' S, 1920' E fr NE cor S 4<sup>a</sup></b>

\* 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	187 <sup>b</sup>	182 <sup>c</sup>	53 <sup>c</sup>	1/5/09 <sup>c</sup>	240 <sup>c</sup>	0-122 <sup>c</sup>	0-196.66 <sup>c</sup> 235-240		Screen 196.66-235 <sup>c</sup>	600 <sup>c</sup>		Air <sup>c</sup>

Use data from application for proposed wells.

A4. **Comments:** The proposed POA/POU is located in the Pudding River basin approximately 2.5 miles northwest of the city of Aurora, Oregon.

**<sup>a</sup> There is a discrepancy in the owner's designation of this well. In a previous groundwater permit application (G-17196, referenced in Section 10 of the current application [G-18702]), applicant referred to the proposed POA (MARI 62290) as "Well 1"; however, this application G-18702 refers to the proposed POA as "Well 2". MARI 62290 was also the subject of a temporary transfer application (T-12463) in which the well was referred to as "Proposed Well 2".**

**There is also a discrepancy in the location of this well. Application G-17196 located the proposed POA as "620' south and 600 east of NE ¼, NW ¼, Section 3", whereas applications G-18702 and T-12463 located the proposed POA as "440' S & 1995' E OF NE COR SECTION 4". A well inspection for MARI 62290 on 9/21/2008 identified the well location at 45.25823° latitude, -122.79794° longitude, a point corresponding to approximately 530 feet south and 1,920 ft east of the northeast corner of Section 4. The well inspection location has been determined as the most reliable location of MARI 62290 and has been used in this review.**

<sup>b</sup> Land surface elevation at MARI 62290 well location (Watershed Sciences, 2009; USGS, 2013)

<sup>c</sup> Values from well report for MARI 62290

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 will produce groundwater from a confined aquifer; therefore, per OAR 690-502-0240, the relevant Willamette Basin rules 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:
- 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;
  - 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;
  - will not** *or*  **will** likely to be available within the capacity of the groundwater resource; *or*
  - will, if properly conditioned**, avoid injury to existing groundwater rights or to the groundwater resource:
    - The permit should contain condition #(s) **7N (annual measurement condition and medium water-use reporting)**;
    - The permit should be conditioned as indicated in item 2 below.
    - The permit should contain special condition(s) as indicated in item 3 below;
- B2.  **Condition** to allow groundwater production from no deeper than \_\_\_\_\_ ft. below land surface;
- Condition** to allow groundwater production from no shallower than \_\_\_\_\_ ft. below land surface;
- Condition** to allow groundwater production only from the \_\_\_\_\_ groundwater reservoir between approximately \_\_\_\_\_ ft. and \_\_\_\_\_ ft. below land surface;
- 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 well report for the proposed POA, existing well MARI 62290, indicates fine-grained clay and silt to a depth of approximately 100 feet below land surface (bls). From approximately 100 to 190 feet bls, the well report indicates interlayered clays, silts and sands with some thin beds of gravel. From approximately 190 to 230 feet bls, the well report indicates a layer of water-bearing black or brown sand and gravel. The well is open to water-bearing sands and gravels below approximately 125 feet bls. The Willamette aquifer in this area is estimated to be from 20 to greater than 40 feet thick (Woodward et al., 1998).

The reported yield of 600 gpm after completion of MARI 62290 indicates that it should be sufficient to sustain the requested allocation of 11.5 gpm. The vast majority of nearby water wells have reported yields greater than the requested allocation.

The groundwater review for transfer application T-12463 found that pumping of MARI 62290 at a rate of 0.266 cfs (~119 gpm) for a period of 156 days would not likely injuriously impact the nearest permitted wells: MARI 175/176 and MARI 18911. Given that the rate of diversion requested in this application (G-18702) is approximately an order of magnitude less than the rate used in the analysis for T-12463, it is unlikely that the allocation requested in G-18702 would be problematic for nearby water wells.

Water levels in nearby wells show no obvious declines in recent years, and in several cases appear to be slightly increasing within the past decade (see attached hydrographs).

**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	Alluvium	<input checked="" type="checkbox"/>	<input type="checkbox"/>

**Basis for aquifer confinement evaluation:** The well report for MARI 62290, the proposed POA, indicates more than 180 feet of fine-grained sediments overlying the sands and gravels through which the well is screened. The reported static water level for MARI 62290 was 53 feet bls in January 2009, which is within the overlying fine-grained sediments, indicating confined aquifer conditions. Similar lithology and water levels are reported for nearby water wells screened in the alluvial aquifer, which is in general agreement with the hydrogeologic regime interpreted for this area by the USGS (OWRD well log query report; Gannett and Caldwell, 1998; Woodward et al., 1998).

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	Deer Creek	130-140 <sup>a</sup>	165-140 <sup>b</sup>	880	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

**Basis for aquifer hydraulic connection evaluation:** Static groundwater elevations reported for MARI 62290 and in nearby observation wells are sufficiently similar with local stream elevations to indicate hydraulic connection. Additionally, potentiometric surface (“water table”) maps for the area suggest that groundwater may be discharging to surface water in the lower reaches of Deer Creek, which would also indicate a hydraulic connection between groundwater and surface water (Woodward et al., 1998).

The depletion of local streams by MARI 62290 will be attenuated – *but not eliminated* – by the low vertical hydraulic conductivity (permeability) of the silt and other fine-grained sediments between the stream bed and the deeper, water-bearing sands and gravels. Net impacts will be small at the onset of pumping but will increase with time until a new equilibrium between local recharge and discharge is reached, after which depletion is expected to be relatively constant throughout the year.

<sup>a</sup> The groundwater elevation in the proposed POA (MARI 62290) was calculated based on the land surface elevation at the location of MARI 62290 and the static water level depth for January 2009 recorded in the well report for MARI 62290 (Watershed Sciences, 2009; USGS, 2013). Groundwater elevations in nearby observation wells over the past decade range from approximately 115 ft msl (in MARI 59101) to greater than 141 ft msl (in MARI 18911, the closest observation well to MARI 62290 – approximately 1,250 ft away). The USGS Willamette aquifer potentiometric map for this area indicates a groundwater elevation above 160 ft msl (Woodward et al., 1998).

<sup>b</sup> Surface water elevations were estimated as land surface elevations along stream reaches within 1 mile of the proposed POA (MARI 62290) (Watershed Sciences, 2009; USGS, 2013).

**Water Availability Basin the well(s) are located within:** SW1: MILL CR > PUDDING 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 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 checked="" type="checkbox"/>	<input type="checkbox"/>	N/A	N/A	<input type="checkbox"/>	1.88	<input checked="" type="checkbox"/>	<<25%	<input checked="" 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:** C3a: Due to the hydraulic connection between the alluvial aquifer and surface water plus the proposed POA's (MARI 62290) proximity to Deer Creek (less than ¼ mile away), per OAR 690-09-040(4)(a), the potential for substantial interference with surface water is assumed. Furthermore, the requested allocation of 0.026 cfs (11.5 gpm) is in excess of 1 percent (0.0188 cfs) of the discharge from the MILL CR > PUDDING R – AT MOUTH Water Availability Basin (WAB) that is equaled or exceeded 80 percent of time (1.88 cfs) and, per OAR 690-09-040(4)(c), the potential for substantial interference with surface water is also assumed on that basis. **Note that reducing the requested allocation to less than 1% of the 80% natural flow will still not preclude PSI because the proposed POA is within ¼ mile of the stream.**

Potential interference with SW1 (Deer Creek) was assessed using the Hunt 2003 analytical stream depletion model (Hunt, 2003). Hydraulic parameters used for the model are derived either from regional data or studies of the hydrogeologic regime (OWRD Well Log Query Report; Conlon et al., 2003, 2005; Iverson, 2002; Woodward et al, 1998), or are within a typical range of values for the parameter within the hydrogeologic regime (Freeze and Cherry, 1979; Domenico and Mifflin, 1965). See attached "Stream Depletion Analysis (SW1 – Deer Creek)" for the specific parameters used in the analysis. Note that the pumping rate used in the stream depletion analysis has been prorated over the requested season of use (December 1 – May 31) so as to not exceed the requested annual volume (maximum allowed duty) of 5 acre-feet.

The Hunt 2003 analytical model results indicate that depletion of (interference with) SW1 is anticipated to be much less than 25% of the well discharge at 30 days of continuous pumping. This is most likely due to the substantial thickness of silt underlying Deer Creek causing a very inefficient hydraulic connection between surface water and the alluvial aquifer. A graph of the anticipated stream depletion (interference) over time is included in the attached "Stream Depletion Analysis (SW1 – Deer Creek)".

C3b: 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:** MARI 62290 is close to the WILLAMETTE R > COLUMBIA R – AB MOLALLA R and PUDDING R > MOLALLA R – AT MOUTH Water Availability Basins (WABs). However, 1 percent of the 80 percent exceedance flow for these WABs would equal 38.3 cfs (~17,189 gpm) and 0.679 cfs (~305 gpm), respectively – both of which are far greater than the requested allocation of 0.026 cfs (11.5 gpm). Therefore, there does not appear to be a potential for substantial interference with these particular surface water sources.

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:**

C1 (OAR 690-09-0040(1)): The proposed POA (MARI 62290) produces groundwater from a confined alluvial aquifer.

C2 (OAR 690-08-0040(2)(3)): MARI 62290 is determined to be hydraulically connected to SW1 (Deer Creek), a perennial stream tributary to Mill Creek, tributary to the Pudding River.

C3a (OAR 690-09-0040(4)): MARI 62290 is within ¼ mile of SW1 (Deer Creek), to which it is hydraulically connected. The requested allocation is also greater than 1 percent of the 80 percent exceedance stream flow for the MILL CR > PUDDING R – AT MOUTH Water Availability Basin. Therefore, the potential for substantial interference is assumed. **Reducing the requested allocation to less than 1% of the 80% natural flow will still not preclude PSI because the proposed POA is within ¼ mile of the stream.**

#### References Used:

Application files G-17196 and T-12463

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, 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.

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.

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.

Hunt, B., 2003, Unsteady stream depletion when pumping from semiconfined aquifer: *Journal of Hydrologic Engineering*, January/February, 2003.

Iverson, J., 2002, Investigation of the hydraulic, physical, and chemical buffering capacity of Missoula flood deposits for water quality and supply in the Willamette Valley of Oregon: Unpublished M.S. thesis, Oregon State University, 147 p.

United States Geological Survey, 2013, National Elevation Dataset (NED) [DEM geospatial data]. 1/9<sup>th</sup> arc-second, updated 2013.

United States Geological Survey, 2017, *Sherwood 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, Hood to Coast 2009, Portland, OR, May 27.

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 #: \_\_\_\_\_ 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:** \_\_\_\_\_

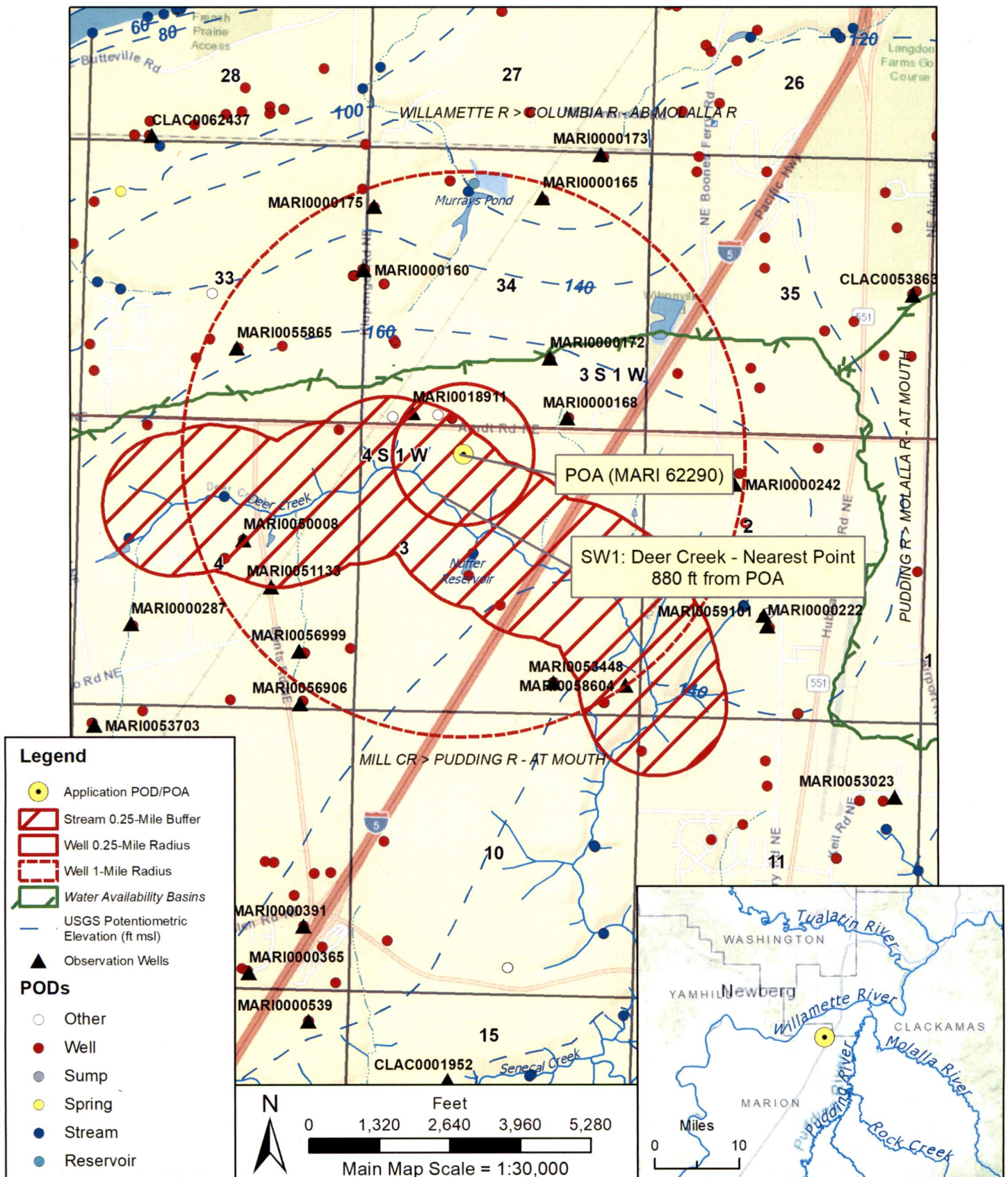
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

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

\_\_\_\_\_

Well Location Map

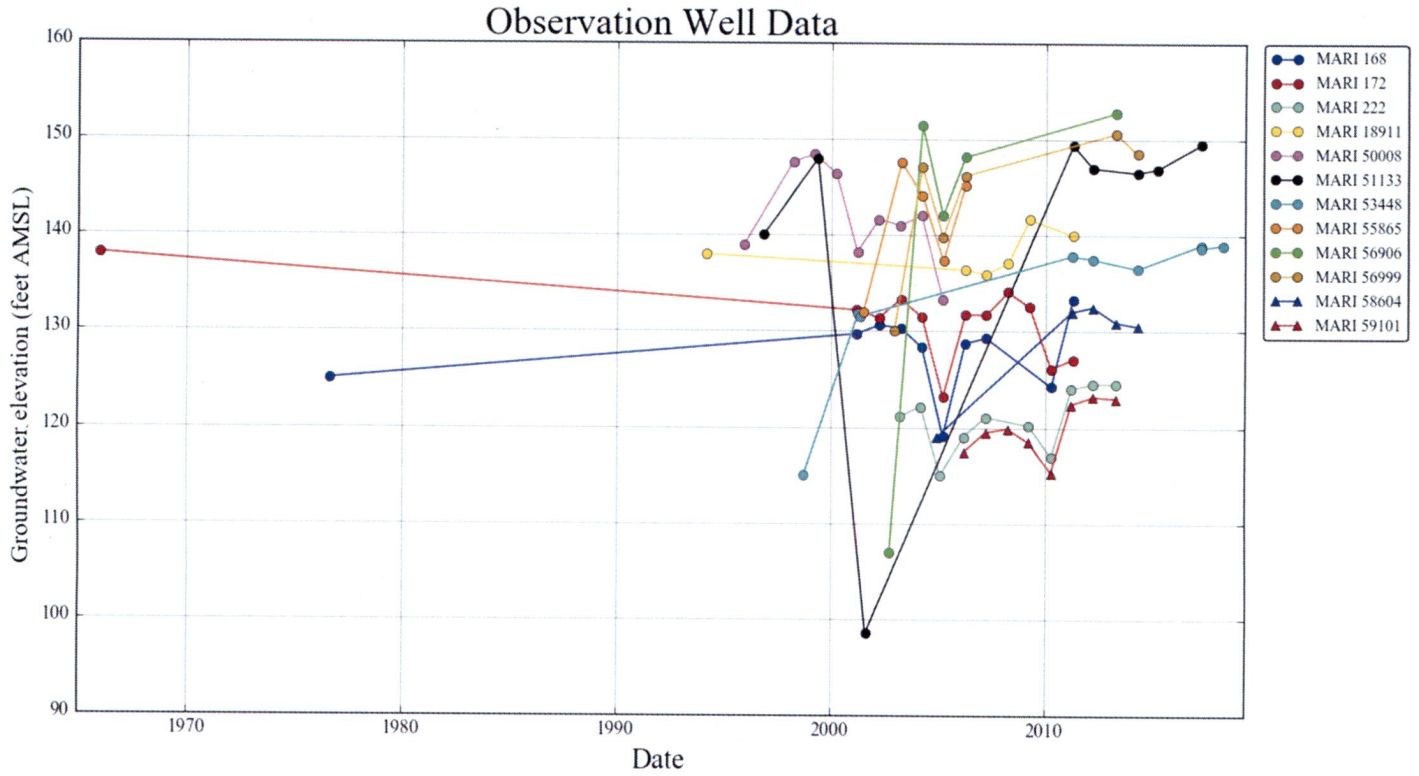
# G-18702 Barnett



**NOTE: This is not a survey document and should not be used as such.**

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Water-Level Trends in Nearby Wells



Water Availability Tables

## Water Availability Analysis

### Detailed Reports

MILL CR > PUDDING R - AT MOUTH  
WILLAMETTE BASIN

Water Availability as of 12/17/2018

Watershed ID #: 30200901 [\(Map\)](#)  
Date: 12/17/2018

Exceedance Level: 80%   
Time: 8:35 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 Requirement	Net Water Available
JAN	39.20	9.85	29.30	0.00	0.00	29.30
FEB	53.90	10.00	43.90	0.00	0.00	43.90
MAR	38.40	9.56	28.80	0.00	0.00	28.80
APR	27.60	7.13	20.50	0.00	0.00	20.50
MAY	13.70	5.68	8.02	0.00	0.00	8.02
JUN	8.72	6.93	1.79	0.00	0.00	1.79
JUL	3.79	10.60	-6.82	0.00	0.00	-6.82
AUG	2.09	8.63	-6.54	0.00	0.00	-6.54
SEP	1.88	4.71	-2.83	0.00	0.00	-2.83
OCT	2.39	1.24	1.15	0.00	0.00	1.15
NOV	6.05	7.24	-1.19	0.00	0.00	-1.19
DEC	25.90	9.66	16.20	0.00	0.00	16.20
ANN	30,000.00	5,500.00	25,300.00	0.00	0.00	25,300.00

Stream Depletion Analysis (SW1 – Deer Creek)

Application type:	G
Application number:	18702
Well number:	1
Stream Number:	1
Pumping rate (cfs):	0.014
Pumping duration (days):	182.0

Parameter	Symbol	Scenario 1	Scenario 2	Scenario 3	Units
Distance from well to stream	a	880.0	880.0	880.0	ft
Aquifer transmissivity	T	720.0	3700.0	6680.0	ft <sup>2</sup> /day
Aquifer storativity	S	0.001	0.0005	0.0001	-
Aquitard vertical hydraulic conductivity	Kva	0.001	0.005	0.01	ft/day
Aquitard saturated thickness	ba	150.0	150.0	150.0	ft
Aquitard thickness below stream	babs	150.0	150.0	150.0	ft
Aquitard specific yield	Sya	0.2	0.2	0.2	-
Stream width	ws	15.0	15.0	15.0	ft

Stream depletion for Scenario 2:

Days	10	30	60	90	120	150	180	210	240	270	300	330	360
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

