Groundwater Application Review Summary Form

Application # G- 18573

GW Reviewer Ben Saenderes / Dennis Orlowski **Date Review Completed:** 1/17/18

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:

[X] 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 1/17/2018

FROM: Groundwater Section Benjamin Scandella, Dennis Orlowski
Reviewer's Name

SUBJECT: Application G- 18573 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: Dale Werner County: Marion

A1. Applicant(s) seek(s) 1.06 cfs from 2 well(s) in the Willamette Basin, Middle Willamette (Champoeg Creek Watershed) subbasin.

A2. Proposed use Nursery (84.6 acres primary) Seasonality: Irrigation season (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	**MARI 2552**	**1**	**Alluvium**	**1.06**	**5S/2W-28 NE-NW**	**300' S, 2060' W fr NE Corn. Bihan DLC 89**
2	**MARI 2590**	**2**	**Alluvium**	**1.06**	**5S/2W-21 NE-NW**	**260'N, 3540' W fr NE Corn. Bihan DLC 89**

* 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	**180**	**103**	**18**	**11/6/1966**	**120**	**0-25**	**0-120**		**103-120**	**525**	**42**	**3-hr pump**
2	**180**	**130**	**9**	**4/18/1968**	**154**	**0-25**	**0-154**		**133-150**	**600**	**74**	**½-hr pump**

Use data from application for proposed wells.

A4. **Comments:** Wells 1 and 2 are located in the French Prairie region approximately 2 miles west-northwest of Gervais, Oregon. For the requested use of nursery use, the maximum allowable rate of diversion is 0.025 cfs per acre, or 2.12 cfs for 84.6 acres. However, the applicant has only requested 1.06 cfs, so this requested rate was evaluated. Also, the maximum duty is 5 acre-feet per acre, or 423 acre-feet for 84.6 acres, but the applicant has only requested 296 acre-feet, so this requested duty was evaluated. This duty would be reached after 141 days of continuous pumping at the requested rate of diversion.

A5. ☒ **Provisions of the** Willamette (OAR 690-502) 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 Wells 2 and 2 produce groundwater from a confined aquifer, and therefore the pertinent Willamette Basin rules (OAR 690-502-0240) do not apply.

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) **7C (7-year static water level reporting), 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 **Alluvial** 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 applicant's wells are located in an area that contains low-permeability silt and clay to a depth of approximately 90-130 feet below land surface. About 40-60 feet of primarily sand and gravel underlie the silt and clay, and Wells 1 and 2 are both completed in these lower sediments, which act as an aquifer system. The low permeability of the upper silt layer confines this aquifer system at the well location. Beneath these two units lie over 700 feet of predominantly clay and silt, with thin interbeds of sand and gravel (Gannett and Caldwell, 1998; Conlon and others, 2005).

The water table is about 10-30 feet below land surface. Water level data available from nearby wells in the sedimentary aquifer system show fairly stable trends over the past 85 years (see attached hydrographs). However, water-level data from MARI 2541 and MARI 2666 indicate that seasonal fluctuations range from 20-60 feet. These seasonal fluctuations are consistent with those found in much of the alluvial aquifer of the central Willamette Basin and likely reflect the combined interference from irrigation wells (Conlon and others, 2005).

Yields from nearby wells completed in the sedimentary aquifer system range from moderate to high (~100-2000 gpm). The well log for MARI 2552 shows yield of 525 gpm with 42 feet of drawdown after 3 hours of pumping. The well log for MARI 2590 shows a drawdown of 74 feet after a half-hour of pumping at 600 gpm. The potential for large drawdowns during pumping, combined with seasonal water level fluctuations, could create problems for well operation.

The stable annual water levels in nearby wells indicate that groundwater for the proposed use is likely available within the capacity of the resource, but if a permit is granted, the recommended permit conditions should be included to monitor and protect the 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	**Alluvium**	☒	☐
2	**Alluvium**	☒	☐

Basis for aquifer confinement evaluation: The well log for MARI 2552 and MARI 2590 indicate that both wells tap water-bearing sands and gravels that are confined by more than 90 ft of overlying low-permeability fine grained sediments (Willamette Silt). In the central Willamette Valley, Conlon and others (2005) report that fine-grained deposits (silt and clay) of more than 40 ft thickness typically create confined conditions in the underlying water-bearing sand/gravel deposits. Additionally, the reported static water level on the MARI 2552 and MARI 2590 logs and levels in nearby wells rise above the level of the water-bearing layers they access. These factors indicate that Wells 1 and 2 produce groundwater from a confined aquifer.

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? YES	NO	ASSUMED	Potential for Subst. Interfer. Assumed? YES	NO
1	1	**East Champoeg Creek**	**155-165**	**155-175**	**3,200'**	☒	☐	☐	☐	☒
2	1	**East Champoeg Creek**	**155-165**	**155-175**	**1,700'**	☒	☐	☐	☐	☒
1	2	**Willamette River**	**155-165**	**80-90**	**14,000'**	☒	☐	☐	☐	☒
2	2	**Willamette River**	**155-165**	**80-90**	**12,300'**	☒	☐	☐	☐	☒

Basis for aquifer hydraulic connection evaluation: Groundwater elevations in the alluvial aquifer in Wells 1and 2 are essentially equivalent to the elevation range of East Champoeg Creek (SW1) within approximately one mile of the wells. East Champoeg Creek becomes perennial as it progressively cuts through the Willamette Silt. These facts indicate that the alluvial groundwater flows toward and discharges into East Champoeg Creek. Water table maps indicate that groundwater flows toward, and discharges into, the Willamette River (Conlon and others, 2005; Gannett and Caldwell, 1998). This fact indicates that the alluvial aquifer is hydraulically connected to both of these surface water bodies.

East Champoeg Creek is within the Champoeg Creek Water Availability Basin (WAB), which has no instream water rights but a minimum monthly 80% exceedance natural stream flow of only 1.00 cfs (see appended table). The instream water right for the Willamette River (1,500 cfs) is much larger than the requested rate of diversion so would not be a source of potential for substantial interference. Thus, the evaluation within this WAB was limited to the nearest surface water source, East Champoeg Creek (SW1).

The depletion of East Champoeg Creek by proposed Well 1 will be buffered, but not eliminated, by the low vertical hydraulic conductivity (permeability) of the clays and silts that lie between the deeper sands and gravels and the stream beds. 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. At that time depletion is expected to be relatively constant throughout the year.

Water Availability Basin the well(s) are located within: Champoeg Creek > Willamette River – At Mouth (WID 30200708), Willamette River > Columbia River – Above Molalla River (WID 182);

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**	☐	☐			☐	**1.00**	☒	**<<25**	☒
2	**1**	☐	☐			☐	**1.00**	☒	**<<25**	☒

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?
			☐			☐		☐		☐
			☐			☐		☐		☐
			☐			☐		☐		☐
			☐			☐		☐		☐

Comments: Potential depletion of SW1 (East Champoeg Creek) by Well 2 was estimated using the Hunt 2003 analytical stream depletion model (Hunt, 2003). Given the geometry of the wells and streams under consideration, this combination of well and stream should yield the largest potential stream depletion. Aquifer parameters used for the models are typical of those reported for this hydrogeologic regime (Conlon and others, 2003, 2005; Iverson, 2002; Woodward and others, 1998); published transmissivity values were substantiated by derived results from nearby pumping tests (primarily from MARI 2789, which is about 1.5 miles SE of the applicant's wells and similarly completed, and MARI 2561, 1mile NW of the applicant's wells and similarly completed). The Hunt 2003 analytical modeling results indicate that stream depletion is expected to be much less than 25% after 30 days of continuous pumping. However, potential for substantial interference was determined because the proposed rate of diversion is greater than 1% of the 80% natural flow in the Champoeg Creek WAB.

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													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													

	%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS												
Interference CFS												
	%	%	%	%	%	%	%	%	%	%	%	%
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:

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-18573

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.

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.

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.**

Water Availability Tables

DETAILED REPORT ON THE WATER AVAILABILITY CALCULATION
Water Availability as of 3/11/2005 for
CHAMPOEG CR > WILLAMETTE R - AT MOUTH

Watershed ID #: 30200708 Basin: WILLAMETTE Exceedance Level: 80
Time: 08:37 Date: 03/11/2005

Month	Natural Stream Flow	CU + Stor Prior to 1/1/93	CU + Stor After 1/1/93	Expected Stream Flow	Reserved Stream Flow	Instream Water Rights	Net Water Available
1	37.30	6.59	0.00	30.70	0.00	0.00	30.70
2	51.70	6.11	0.00	45.60	0.00	0.00	45.60
3	22.40	3.06	0.00	19.30	0.00	0.00	19.30
4	10.90	1.88	0.00	9.02	0.00	0.00	9.02
5	6.15	3.87	0.00	2.28	0.00	0.00	2.28
6	3.04	6.45	0.00	-3.41	0.00	0.00	-3.41
7	2.94	10.60	0.00	-7.65	0.00	0.00	-7.65
8	1.88	8.41	0.00	-6.53	0.00	0.00	-6.53
9	1.08	4.11	0.00	-3.03	0.00	0.00	-3.03
10	1.00	0.30	0.00	0.70	0.00	0.00	0.70
11	10.10	3.74	0.00	6.36	0.00	0.00	6.36
12	47.80	9.46	0.00	38.30	0.00	0.00	38.30
Stor	28100	3910	0	25100	0	0	25100

WILLAMETTE R > COLUMBIA R - AB MOLALLA R

Watershed ID #: 182 Basin: WILLAMETTE Exceedance Level: 80

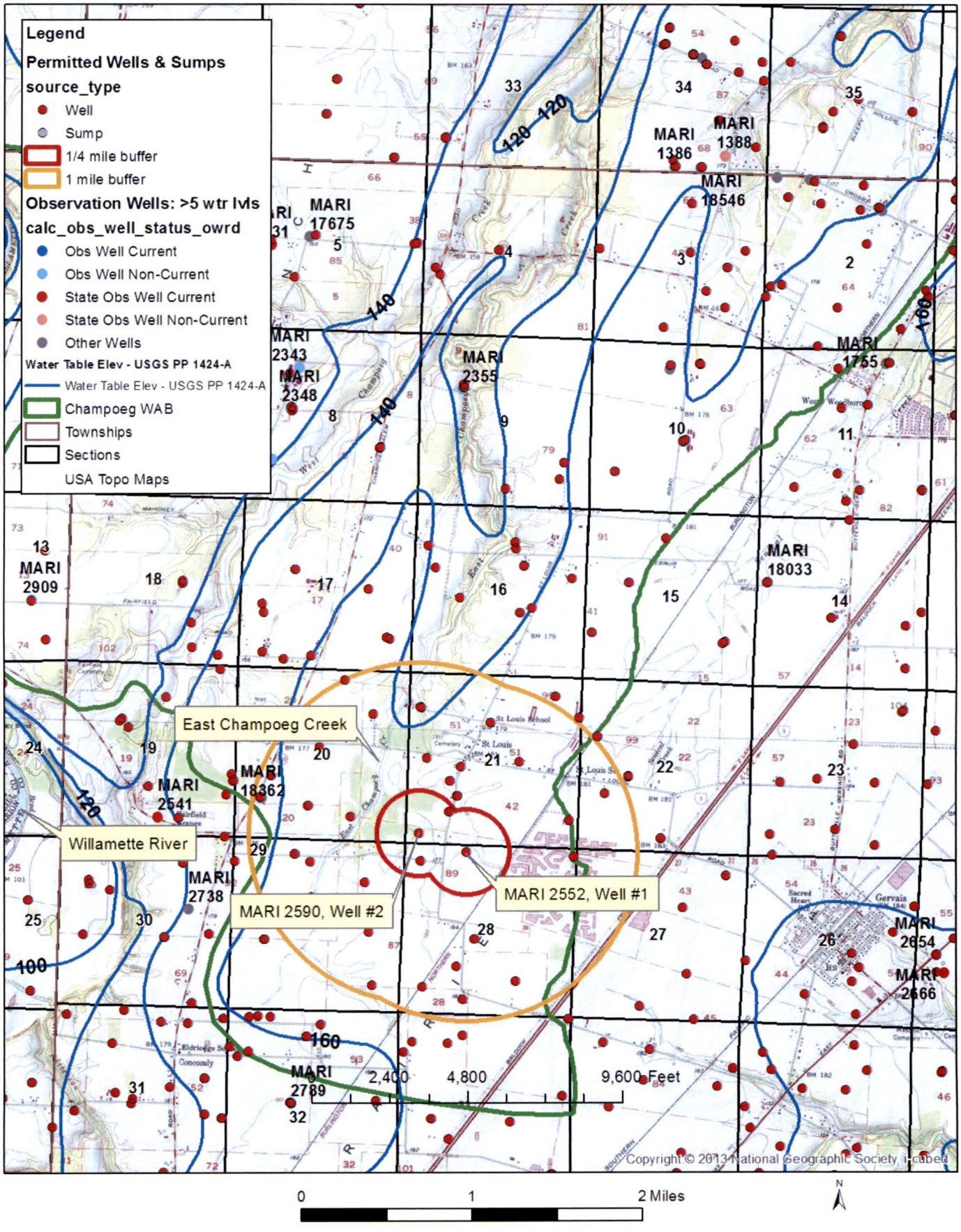
Time: 11:23 AM Date: 06/28/2017

Monthly values are in cfs.

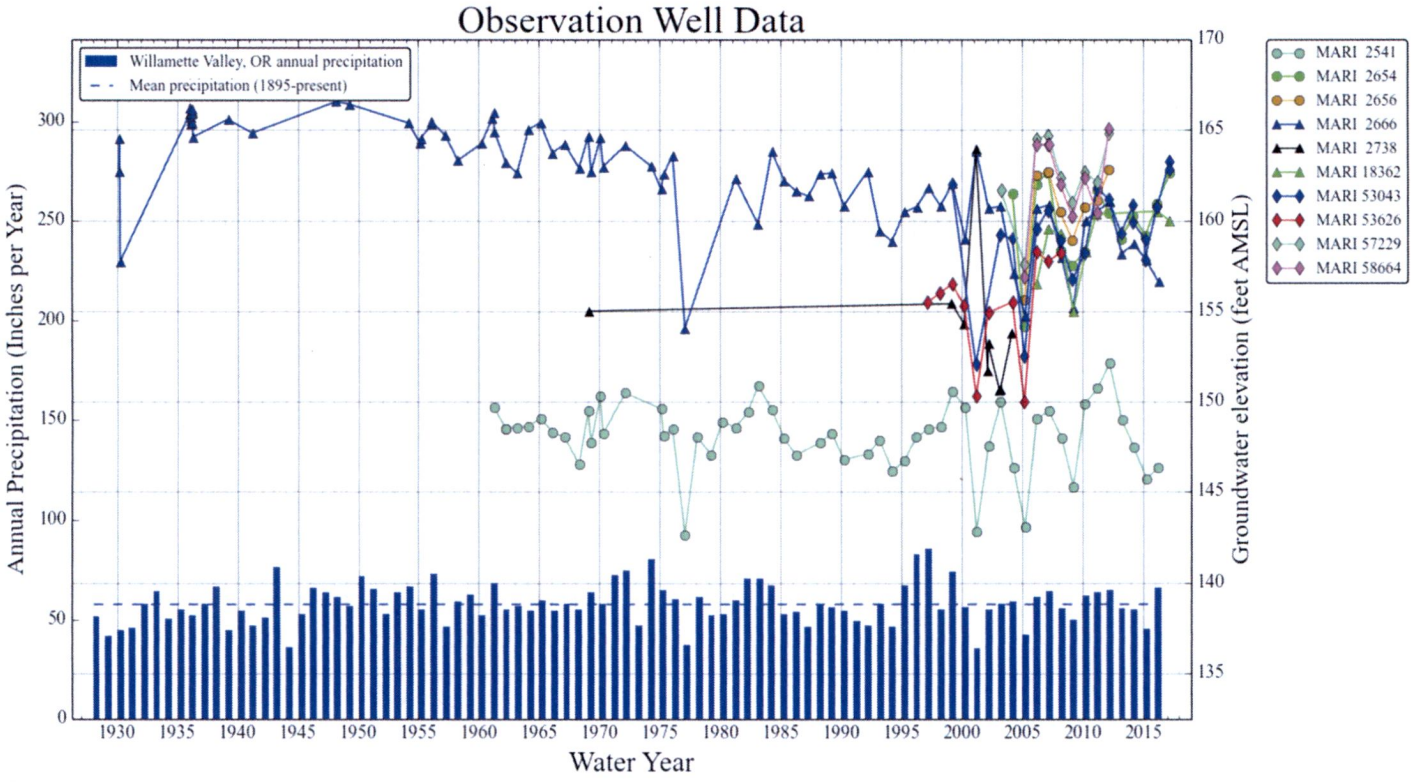
Storage is the annual amount at 50% exceedance in ac-ft.

Month	Natural Stream Flow	Consumptive Use and Storage	Expected Stream Flow	Reserved Stream Flow	Instream Requirements	Net Water Available
JAN	21,400.00	2,290.00	19,100.00	0.00	1,500.00	17,600.00
FEB	23,200.00	7,470.00	15,700.00	0.00	1,500.00	14,200.00
MAR	22,400.00	7,250.00	15,100.00	0.00	1,500.00	13,600.00
APR	19,900.00	6,910.00	13,000.00	0.00	1,500.00	11,500.00
MAY	16,600.00	4,230.00	12,400.00	0.00	1,500.00	10,900.00
JUN	8,740.00	1,980.00	6,760.00	0.00	1,500.00	5,260.00
JUL	4,980.00	1,800.00	3,180.00	0.00	1,500.00	1,680.00
AUG	3,830.00	1,640.00	2,190.00	0.00	1,500.00	685.00
SEP	3,890.00	1,390.00	2,500.00	0.00	1,500.00	996.00
OCT	4,850.00	748.00	4,100.00	0.00	1,500.00	2,600.00
NOV	10,200.00	881.00	9,320.00	0.00	1,500.00	7,820.00
DEC	19,300.00	962.00	18,300.00	0.00	1,500.00	16,800.00
ANN	15,200,000	2,250,000	13,000,000	0	1,090,000	11,900,000

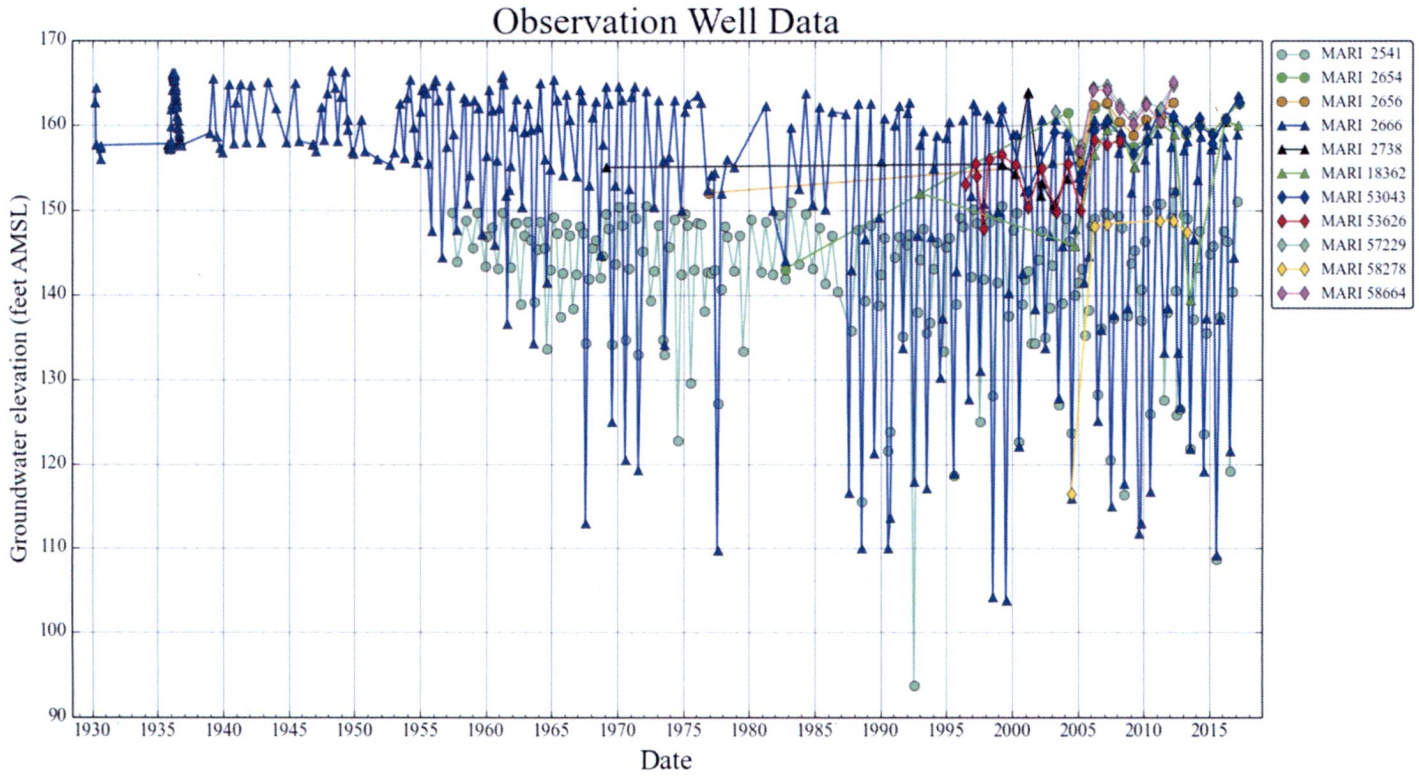
G-18573 Werner



Water-level trends from wells within approximately 1/2 mile of the applicant's wells (5S/2W, sections 19-21 and 25-30). Measurements shown were taken February through March and are only shown for wells with at least 5 measurements. Annual precipitation in the Willamette Valley (blue bars, left y-axis) shows that low winter water levels are often driven by below-average precipitation (e.g. 1930, 1977, 2001, 2005, and 2009).



All measurements from wells in the same spatial region as above, showing typical seasonal variability of 20-30 feet closer to the Willamette River to the west (for example, MARI 2541) and more than 50 feet to the east (for example, MARI 2666).



Analytical model results: impact of Well 2 on SW1. Given the geometry of the wells and streams under consideration, this combination of well and stream should yield the largest potential stream depletion.

Application type:	G
Application number:	18573
Well number:	2
Stream Number:	1
Pumping rate (cfs):	1.06
Pumping duration (days):	244.0

Parameter	Symbol	Scenario 1	Scenario 2	Scenario 3	Units
Distance from well to stream	a	1700.0	1700.0	1700.0	ft
Aquifer transmissivity	T	50000.0	5000.0	500.0	ft2/day
Aquifer storativity	S	0.0001	0.0001	0.0001	-
Aquitard vertical hydraulic conductivity	Kva	0.001	0.005	0.01	ft/day
Aquitard saturated thickness	ba	80	90.0	100	ft
Aquitard thickness below stream	babs	80	90.0	80.0	ft
Aquitard specific yield	Sya	0.2	0.2	0.2	-
Stream width	ws	5	10	15	ft

Stream depletion for Scenario 2:

Days	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
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