Groundwater Application Review Summary Form

Application # G- 19071

GW Reviewer Stacey Garrison/Travis Brown Date Review Completed: 6/17/2022

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 **_June 17 2022_**

TO: **Application** G-**_19071_**

FROM: **GW:** **_Stacey Garrison/Travis Brown_**
(Reviewer's Name)

SUBJECT: Scenic Waterway Interference Evaluation

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

☐ **YES**
☒ **NO** Use the Scenic Waterway Condition (Condition 7J)

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

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

DISTRIBUTION OF INTERFERENCE

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

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

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

PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO: Water Rights Section Date 6/17/2022
FROM: Groundwater Section Stacey Garrison/Travis Brown
Reviewer's Name
SUBJECT: Application G- **19071** 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: **Brian Zielinski** County: **Marion**

A1. Applicant(s) seek(s) 0.125 cfs from 1 well(s) in the Mainstem Willamette Basin, Willamette River subbasin

A2. Proposed use irrigation 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	Proposed	1	CRB[a]	0.125	8S/3W-18 SW-SE	300' N, 640' E fr S ¼ cor S 18[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	604[c]				220[a]	50[d]						

Use data from application for proposed wells.

A4. **Comments:** The POA/POU are located 1.25 miles southwest of Salem, Oregon. Applicant proposes to irrigate at a rate of 0.125 cfs (56 gpm) on up to 10 acres between March 1 and October 31. Total annual volume would be limited to 10 af/year, based on the maximum allowed duty of 1 af/acre under OAR 690-502-0200(1) (South Salem Hills Groundwater Limited Area; See Section A6, below).

[a] Proposed well construction from applicant.

[b] There appears to be a discrepancy in the Public Lands Survey System (PLSS) projection used in the application map and that used by Department. The "metes-and-bounds" location description provided in the application for the POA is 19 ft northwest of the mapped location. The mapped location is used for this review.

[c] Well head elevation estimated based on LIDAR measurements at proposed well location (Watershed Sciences, 2009).

[d] The applicant proposes a seal depth of at least 18 ft, however, in accordance with Special Conditions for Basalt Wells in the Willamette Valley, seal must be at least 50 ft (see Section B3, below). Furthermore, additional requirements in OARs 690-200 and 690-210 apply, i.e., 690-210-0155(1):"sealed at least five feet into the confining interval immediately overlying the artesian water-bearing zone".

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 POA will develop a basalt aquifer; the relevant Willamette Basin Rules (OAR 690-502-0050) are not activated by OAR 690-502-0240.

A6. ☒ **Well(s) # 1** tap(s) an aquifer limited by an administrative restriction.
Name of administrative area: **South Salem Hills Groundwater Limited Area**
Comments: Per OAR 690-502-0200(1), **groundwater in the basalt aquifers in the South Salem Hills Groundwater Limited Area is classified for exempt uses, irrigation and rural residential fire protection systems only.** Permits may be issued, for a **period not to exceed five years**, for fire protection and for **drip or equally efficient irrigation** provided the

Director finds the proposed use and amount do not pose a threat to the groundwater resource or existing permit holders. The amount of water used for **irrigation** shall be further **limited to one acre-foot per acre per year**. **Permits may be extended for additional five-year periods** if the Director finds that the groundwater resource can probably support the extended use.

B. GROUNDWATER AVAILABILITY CONSIDERATIONS, OAR 690-310-130, 400-010, 410-0070

B1. **Based upon available data**, I have determined that groundwater* for the proposed use:

a. ☐ **is** over appropriated, ☐ **is not** over appropriated, *or* ☒ **cannot be determined to be** over appropriated during any period of the proposed use. * This finding is limited to the groundwater portion of the over-appropriation determination as prescribed in OAR 690-310-130;

b. ☐ **will not** *or* ☐ **will** likely be available in the amounts requested without injury to prior water rights. * This finding is limited to the groundwater portion of the injury determination as prescribed in OAR 690-310-130;

c. ☒ **will not** *or* ☐ **will** likely to **be available within the capacity of the groundwater resource**; or

d. ☐ **will, if properly conditioned**, avoid injury to existing groundwater rights or to the groundwater resource:

i. ☒ The permit should contain condition #(s) **7i (Willamette basalt condition), 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 **50** ft. below land surface;

c. ☒ **Condition** to allow groundwater production only from the **CRBG** groundwater reservoir ~~between approximately _____ ft. and _____ ft. below land surface;~~

d. ☐ **Well reconstruction** is necessary to accomplish one or more of the above conditions. The problems that are likely to occur with this use and without reconstructing are cited below. Without reconstruction, I recommend withholding issuance of the permit until evidence of well reconstruction is filed with the Department and approved by the Groundwater Section.

Describe injury –as related to water availability– that is likely to occur without well reconstruction (interference w/ senior water rights, not within the capacity of the resource, etc): _____

B3. **Special Conditions:** The conditions detailed in B1(d)(i) and B2(c), above, are recommended for any permit issued pursuant to this application in order to protect the groundwater resource and senior users. In addition, the following Special Conditions should be applied:

1. Best management practices shall be used to maximize the efficiency of water use. Drip irrigation or low-pressure sprinklers shall be used. Use shall be limited to one acre-foot per acre per year.

2. Any well constructed or deepened under this or subsequent permits shall be open to a single aquifer of the Columbia River Basalt Group and shall meet the applicable well construction standards (OAR 690-200 and OAR 690-210). In addition, the open interval in each well shall be no greater than 100 feet. An open interval of greater than 100 feet may be allowed if substantial evidence of a single aquifer completion can be demonstrated to the satisfaction of the Department Hydrogeologists, using information from a video log, downhole flowmeter, water chemistry and temperature, or other downhole geophysical methods. These methods shall characterize the nature of the basalt rock and assess whether water is moving in the borehole. Any discernable movement of water within the well bore when the well is not being pumped shall be assumed as evidence of the presence of multiple aquifers in the open interval. If during well construction, it becomes apparent that the well can be constructed to eliminate interference with hydraulically connected streams in a manner other than specified in this permit, the permittee can contact the Department Hydrogeologist for this permit or the Ground Water/Hydrology Section Manager to request approval of such construction. The request shall be in writing and shall include a rough well log and a proposed construction design for approval by the Department. The request can be approved only if it is received and reviewed prior to placement of any permanent casing and sealing

material. If the request is made after casing and seal are placed, the requested modification will not be approved. If approved, the new well depth and construction specifications will be incorporated into any certificate issued for this permit.

3. For any well constructed under this or subsequent permits, a dedicated water-level measuring tube shall be installed in each well. The measuring tube shall meet the standards described in OAR 690-215-0060. When requested, access to the wells shall be provided to Department staff in order to make water-level measurements.

4. For any wells constructed or deepened under this or subsequent permits, the applicant shall coordinate with the driller to ensure that drill cuttings are collected at 10 ft intervals and at changes in formation in each well. A split of each sampled interval shall be provided to the Department.

5. If any geologic and hydrogeologic reports are completed for the permittee during the development of permitted wells, including geophysical well logs and borehole video logs, then copies of the reports shall be provided to the Department. Except for borehole video logs, two paper copies, or a single electronic copy, shall be provided of each report. Digital tables of any data shall be provided upon request.

Groundwater availability remarks: Groundwater for the proposed use cannot be determined to be over-appropriated due to insufficient available data regarding rates of recharge and the current quantity of groundwater withdrawals from the aquifer system.

The proposed POA is anticipated to develop a water-bearing zone of the Columbia River Basalt Group (CRBG), likely the Ortley member, *Tgo*, of the Grande Ronde Basalt (Beeson and Tolan 2001; Tolan and Beeson 2000). The proposed POA is anticipated to resemble MARI 17884, as MARI 17884 is ~116 ft to the northwest, is at a similar elevation to the proposed location, and on the same side of the Croisan Creek fault (see below). Aquifers in the CRBG are typically thin interflow zones between lava flows and confined by thicker flow interiors that have low porosity and low permeability (Conlon et al 2005, Gannett & Caldwell 1998, Reidel et al 2002). Comparison of the proposed POA location with local lithology indicates the POA is likely to develop an aquifer in the Ortley member; in this area, the Ortley member is reported as the oldest and therefore lowest CRBG unit before the Marine Sediment, *Tms*, is reached (Beeson and Tolan 2001; Tolan and Beeson 2000). In the South Salem Hills, the interface between the Ortley Member and the Marine Sediment is reported at varying altitudes, from 200 ft below median sea level to 800 ft above median sea level (msl) (Beeson and Tolan 2001; Tolan and Beeson 2000). The POA is in an area deformed by faults, possibly resulting in compartmentalization of aquifers (Beeson and Tolan 2001; Tolan and Beeson 2000; Foxworthy 1970). The degree of compartmentalization due to nearby faults, which is unknown at this time, may exacerbate well-to-well interference and longer-term water level declines in the local basalt aquifer. There are two faults near the proposed POA: the Croisan Creek fault is 310 ft south of the POA (Foxworthy 1970, Beeson and Tolan 2001); the Plank Hill fault is 2,333 ft northeast of the POA (Beeson and Tolan 2001; Tolan and Beeson 2000). Hydraulic barriers, such as the Croisan Creek and Plank Hill faults, will limit groundwater availability and exacerbate well-to-well interference.

A review of statistics for nearby well records was completed and compared with the proposed rate of 0.125 cfs (56 gpm) for this application (see **Well Statistics**). Median reported well yield is 20 gpm, and the maximum reported yield is 300 gpm. The proposed rate for this application is 281% of the median and 19% of the maximum reported yield. The yield for CRBG wells is highly variable, with no apparent trend in yield related to depth of the well or static water level (SWL). Of the 20 wells within a mile of the proposed POA, 14 have reported yields less than 60 gpm. MARI 52013, a 30 gpm well completed in a confined aquifer of the Ortley member [479-497 ft msl], is located 5,018 ft to the north of the POA. MARI 17844, a 75 gpm well completed in what is likely the Ortley member [498-556 ft msl], is 116 ft to the northwest of the POA; it is not clear if this is a confined or unconfined aquifer.

Nearby water level monitoring within the CRBG aquifer(s) does not indicate progressive or widespread declines (see **Water Level Measurements in Nearby Wells**). Groundwater supplies would therefore appear to be adequate for existing users. However, additional pumping may lead to rapid declines within the aquifer. Furthermore, the available observation wells are more than 0.5 miles away from the proposed POA. In the faulted and eroded terrain of the South Salem Hills, aquifer conditions may be expected to change substantially over short distances. The South Salem Hills Groundwater Limited Area has been designated to address the sensitivity of these aquifers to pumping.

The nearest groundwater user to the proposed POA is located on taxlot 700, approximately 211 ft east of the POA at 3371 Vitae Springs Rd S Salem, Oregon (an exempt domestic well). According to Marion County tax records, the residence at this location was constructed in 1964. The well logs in 8S/3W were queried for construction between 1963 and 1965; two wells, MARI 12115 and MARI 12116, were constructed in 1964 and were recorded in section 18 of 8S/3W. Without further information, it is assumed that one of these wells provides domestic water for 3371 Vitae Springs Rd S. An approximate location at the center of taxlot 700 was assumed. MARI 12115 utilizes an aquifer described as “a series of small seams” from 52 to 68 ft bls [552 to 536 ft msl]. MARI 12116 utilizes an aquifer with an open interval from 18 to 120 ft bls [484 to 586 ft msl]. The seal of the proposed POA will extend to at least 50 ft bls [554 ft msl]. It is likely the proposed use would cause

some degree of well-to-well interference with the domestic well at 3371 Vitae Springs. To assess the degree of drawdown, analysis was conducted for the proposed use using the Theis equation for drawdown in a confined aquifer (see **Theis Drawdown Analysis**). **Results indicate that well-to-well interference with the neighboring well would exceed 15 ft of drawdown within less than 1 week of continuous operation at the average rate of 0.02 cfs (9.2 gpm)*, which would require curtailment of the proposed use per Condition 7i, above. The proposed use is not likely within the capacity of the resource.**

Based on this analysis of the available data and under the assumptions previously identified, groundwater for the proposed use **is not likely available in the amounts requested within the capacity of the resource. If a water right is permitted for this application, the conditions specified in B1.d., B2.c, and B3 are strongly recommended to protect senior users and the groundwater resource.**

NOTE: This evaluation considers a conservative scenario for the nearest authorized POA not owned by the applicant. Other authorized POAs in the area may also experience an increase in interference as a result of this application, although to a lesser extent than the scenario evaluated here.

*The full pumping rate could not be utilized continuously for the entire 245-day period of use without exceeding the 10 ac-ft maximum allowed duty. For the maximum allowed duty of 10 ac-ft, continuous pumping would occur for 245 days at a rate of 0.02 cfs (9.2 gpm). Use at the maximum proposed rate of 0.125 cfs (56 gpm) would result in drawdown that exceeds 15 ft even sooner than with the average rate.

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
1a	**CRBG (Ortley-confined)**	☒	☐
1b	**CRBG (Ortley-unconfined)**	☐	☒

Basis for aquifer confinement evaluation: Well logs for 4 of the 6 of the closest wells lack clearly defined confining intervals[a]. The SWL in MARI 17884, approximately 100 ft northwest of the proposed POA, is recorded at 28 ft bls. In the well log, "Weathered Rock to Hard" is recorded from 23 to 40 ft bls. A confining interval with its base deeper than 28 ft would describe a confined aquifer, however, this is not clearly recorded. The well logs for MARI 8195, MARI 12115, and MARI 12116 are similarly lacking an adequate description to identify a confining interval with a base below the SWL. It's possible that the developed aquifer is the weathered, vesicular top of the Ortley member, and does not have a confining interval in the form of a CRBG flow interior (Riedel et al 2002). Without a confining interval of clay, or solid, unfractured, consolidated rock immediately overlying the WBZ, the aquifer is most likely unconfined. The other 2 wells, MARI 12102 and MARI 12101, appear to develop confined aquifers.

Out of the 20 wells within 1 mile of the proposed POA, the remaining 16 (including MARI 12102 and MARI 12101) appear to develop confined aquifers with SWLs above the base of the confining interval[b].

Due to the potential to develop an unconfined or confined aquifer, both scenarios are demonstrated in this review.

[a] Well logs that lack clearly defined confining interval and within 1 mile of proposed POA: MARI 17884, MARI 12115, MARI 12116, MARI 8195.

[b] Well logs with clearly defined confining interval(s) and within 1 mile of proposed POA: MARI 12102, 12101, MARI 55810, MARI 12191, MARI 14751, MARI 14754, MARI 52013, MARI 12103, MARI 12069, MARI 12070, MARI 59129, MARI 12080, MARI 12079, MARI 12082, MARI 12081, MARI 12115, MARI 12116, MARI 59221.

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
1a	**1**	**Croisan Creek**	**421-718[a]**	**456-715[b]**	**187**	☒	☐	☐	☐	☒
1a	**2**	**Unnamed tributary to Croisan Creek**	**421-718[a]**	**461-704[b]**	**3,080**	☒	☐	☐	☐	☒
1b	**1**	**Croisan Creek**	**421-718[a]**	**456-715[b]**	**187**	☐	☐	☒	☒	☐
1b	**2**	**Unnamed tributary to Croisan Creek**	**421-718[a]**	**461-704[b]**	**3,080**	☒	☐	☐	☐	☒

Basis for aquifer hydraulic connection evaluation: Numerous mapped springs and associated water rights emerge from exposures and contacts of the CRBG units near the proposed POA (Beeson and Tolan 2001; Tolan and Beeson 2000; Foxworthy 1970). Although Quaternary deposits are mapped as underlying SW 1 (Croisan Creek) in this area, further downstream it is underlain directly by the Winter Water member, *Tgww*, and incises into the Ortley member (Beeson and Tolan 2001). Quaternary deposits are likely thin in this reach of SW 1 and estimated at less than 30 ft thick under other streams in the area (Tolan and Beeson 2000). The perennial reach of SW 2 (Unnamed tributary to Croisan Creek) is mapped as heading within the Winter Water member (Beeson and Tolan 2001). The surface water elevations for SW 1 and SW 2 are coincident with or below the SWL elevations reported for all 20 wells within a mile of the proposed POA. For the 20 wells within a mile, 9 well logs report WBZ elevations entirely below SW 1 and SW 2 and are likely utilizing the thicker Ortley member WBZs. Of the 9 wells with WBZ elevations lower than SW 1 and SW 2: 8 are located on Winter Water member and are at least 3,700 ft to the northeast of the POA; the final well, MARI 12191, is located on Basalt of Silver Falls, *Tfsf*, and originally utilized a WBZ that is above SW 1 and SW 2, but was deepened to now access a WBZ that is lower than SW 1 and SW 2. Even in the wells tapping reported WBZs below the elevations of SW 1 and SW 2, the coincidence of SWLs with surface water elevations suggests hydraulic connection. Furthermore, SWL elevations in wells within the same fault block as the proposed POA are strongly correlated with surface elevation, even in wells tapping the deeper WBZs, suggesting there is general groundwater flow throughout the CRBG aquifer system toward the local topographic low points, SW 1 and SW 2. The Croisan Creek and Plank Hill faults may have enhanced vertical permeability across the basalt flow interiors such that hydraulic connection with surface water is possible. If the proposed POA taps an unconfined aquifer, hydraulic connection with SW 1 would be assumed regardless per OAR 690-009-0040(2) because it is within a quarter mile. In addition, because SW 1 is within a quarter mile of

the proposed POA, the POA would be assumed to have Potential for Substantial Interference (PSI) with SW 1 per OAR 690-009-0040(4)(a), regardless of whether the developed aquifer is confined or unconfined, as in either case it appears to be hydraulically connected to SW 1.

[a] Groundwater elevation calculated from SWL reported in well logs and/or latest static water level reported for MARI 17884, MARI 12115, MARI 12116, MARI 8195, MARI 12102, 12101, MARI 55810, MARI 12191, MARI 14751, MARI 14754, MARI 52013, MARI 12103, MARI 12069, MARI 12070, MARI 59129, MARI 12080, MARI 12079, MARI 12082, MARI 12081, MARI 12115, MARI 12116; well head elevations estimated based on LIDAR measurements at existing well locations (Watershed Sciences, 2009).
[b] Surface water elevations were estimated from land surface elevations along stream reaches (Watershed Sciences, 2009; USGS, 2013).

Water Availability Basin the well(s) are located within: WILLAMETTE R>COLUMBIA R-AB MILL CR AT GAGE 14191000

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?
1a	1	☒	☐			☐	**3,620**	☐	*	☒
1a	2	☐	☐			☐	**3,620**	☐	*	☐
1b	**1**	☒	☐			☐	**3,620**	☐	*	☒
1b	**2**	☐	☐			☐	**3,620**	☐	*	☐

Comments: * No appropriate analytical model is available for assessing depletion of these surface water sources due to pumping of the CRBG aquifer(s). However, it may be reasonably assumed, based on the typical behavior of basalt interflow aquifers, that the effects of pumping will propagate rapidly to the aquifer boundaries. Because of the proximity of the proposed POA to multiple hydraulic barriers – specifically the aquifer outcrop/boundary and nearby faults – the effects of pumping will be further exacerbated.

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: NA-Q is not distributed among wells.

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: NA-streams within 1 mile evaluated above.

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;

SW / GW Remarks and Conditions: If the proposed POA taps an unconfined aquifer, hydraulic connection with SW 1 would be assumed per OAR 690-009-00040(2) because it is within a quarter mile. Furthermore, because SW 1 is within a quarter mile of the proposed POA, the POA would be assumed to have Potential for Substantial Interference (PSI) with SW 1 per OAR 690-009-0040(4)(a), regardless of whether the developed aquifer is confined or unconfined, as in either case it appears to be hydraulically connected to SW 1.

References Used:

Application File: G-19071

Pumping Test Files: MARI 50507, MARI 11348, MARI 19217, MARI 12216, MARI 18891, MARI 12788, MARI 66387, MARI 12918, MARI 12958.

Well Reports: MARI 17884, MARI 12115, MARI 12116, MARI 8195, MARI 12102, 12101, MARI 55810, MARI 12191, MARI 14751, MARI 14754, MARI 52013, MARI 12103, MARI 12069, MARI 12070, MARI 59129, MARI 12080, MARI 12079, MARI 12082, MARI 12081, MARI 12115, MARI 12116, MARI 59221.

Beeson, M.H., and Tolan, T.L., 2001, Geologic map of the Salem West quadrangle, 1:24,000, unpublished data.

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*, Scientific Investigations Report 2005-5168: U. S. Geological Survey, Reston, VA.

Foxworthy, B. 1970. Hydrologic conditions and artificial recharge through a well in the Salem Heights area of Salem Oregon. U.S. Geological Survey Water Supply Paper 1594-F, 56 p.

Gannett, M.W. and Caldwell, R., 1998, *Geologic framework of the Willamette Lowland aquifer system, Oregon and Washington*, Professional Paper 1424-A, 32 p: U. S. Geological Survey, Reston, VA.

Reidel, S.P., Johnson, V.G., and Spane, F.A., 2002, Natural gas storage in basalt aquifers of the Columbia Basin, Pacific Northwest USA—A guide to site characterization: Richland, Wash., Pacific Northwest National Laboratory, 277 p.

Theis, C.V., 1935, The relation between the lowering of the piezometric surface and the rate and duration of discharge of a well using ground-water storage: American Geophysical Union transactions, v. 16, p. 519-524.

Tolan, T. L., and Beeson, M.H., 2000, Geologic map of Sidney quadrangle, 1:24,000, unpublished data.

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

United States Geological Survey, 2017a, Salem West quadrangle, Oregon [map], 1:24,000, 7.5 minute topographic series, U.S. Department of the Interior, Reston, Virginia.

United States Geological Survey, 2017b, Sidney quadrangle, Oregon [map], 1:24,000, 7.5 minute topographic series, U.S. Department of the Interior, Reston, Virginia.

Watershed Sciences, 2009, LIDAR remote sensing data collection, Department of Geology and Mineral Industries, Willamette Valley Phase I, Oregon: Portland, OR, December 21.

Woodward, D.G., Gannett, M.W., and Vaccaro, J.J., 1998, Hydrogeologic framework of the Willamette Lowland aquifer system, Oregon and Washington: U.S. Geological Survey Professional Paper 1424-B, 82 p.

D. WELL CONSTRUCTION, OAR 690-200

D1. **Well #**: **1** **Logid:** **PROPOSED**

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) **proposed construction and review of nearby geology**

D3. **THE WELL construction deficiency or other comment is described as follows:** There is some uncertainty whether the proposed POA would be completed in a confined or unconfined aquifer. If the proposed POA penetrates a water-bearing zone which is overlain by solid, unfractured, consolidated rock, then the well must comply with the provisions of OAR 690-210-0150 (Well Construction Standards); however, in that case, the currently proposed casing and seal depth (18 ft minimum) may be insufficient.

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

Water Availability Tables

Water Availability Analysis
Detailed Reports

WILLAMETTE R > COLUMBIA R - AB MILL CR AT GAGE 14191000
WILLAMETTE BASIN
Water Availability as of 4/25/2022

Watershed ID #: 183 (Map)
Date: 4/25/2022

Exceedance Level: 80%
Time: 11:37 AM

Water Availability Calculation | Consumptive Uses and Storages | Instream Flow Requirements | Reservations
Water Rights | Watershed Characteristics

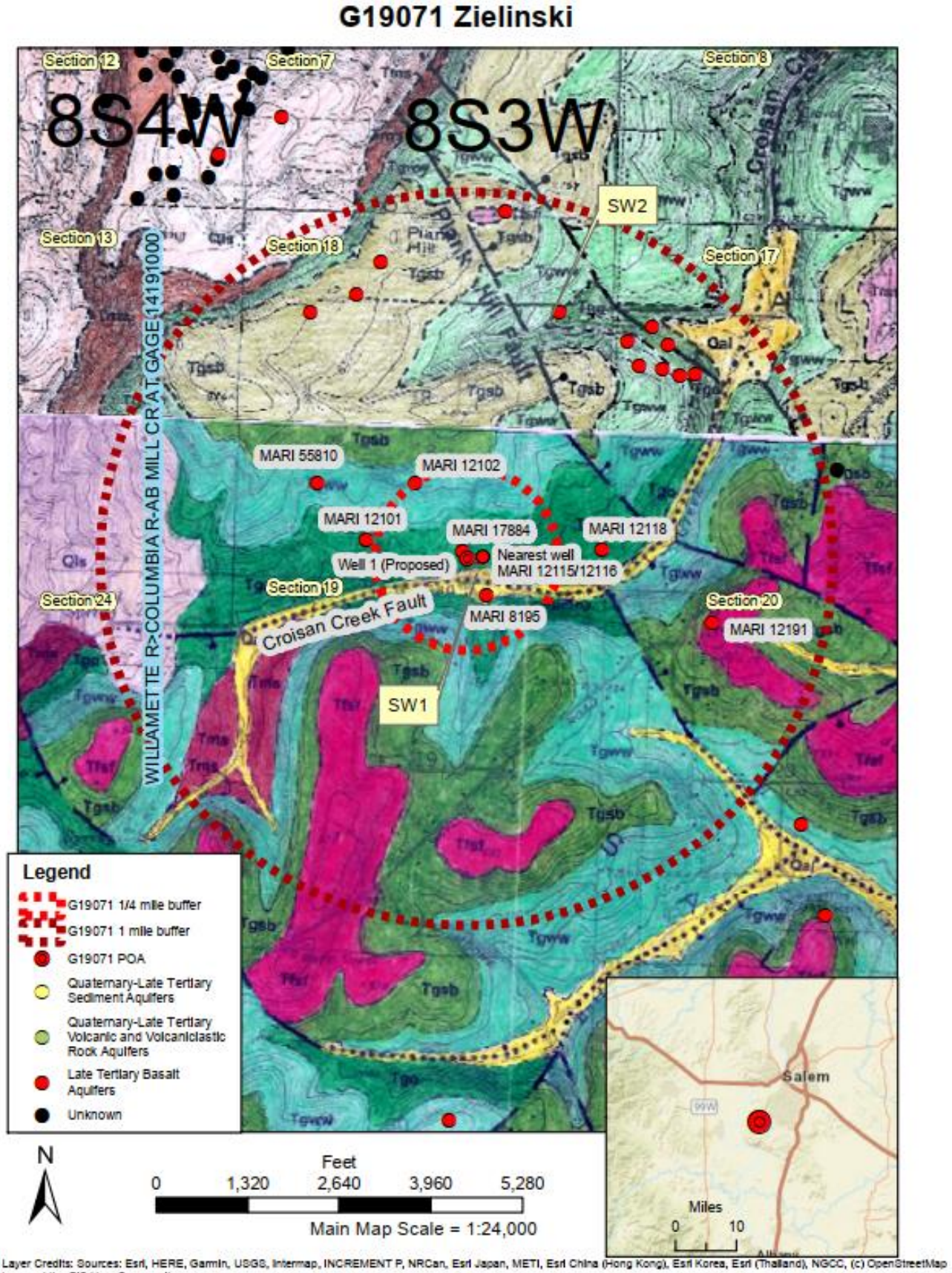
Water Availability Calculation

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	18,400.00	2,240.00	16,200.00	0.00	1,300.00	14,900.00
FEB	20,100.00	7,430.00	12,700.00	0.00	1,300.00	11,400.00
MAR	19,600.00	7,220.00	12,400.00	0.00	1,300.00	11,100.00
APR	18,000.00	6,870.00	11,100.00	0.00	1,300.00	9,830.00
MAY	15,500.00	4,180.00	11,300.00	0.00	1,300.00	10,000.00
JUN	8,310.00	1,690.00	6,620.00	0.00	1,300.00	5,320.00
JUL	4,710.00	1,450.00	3,260.00	0.00	1,300.00	1,960.00
AUG	3,620.00	1,330.00	2,290.00	0.00	1,300.00	989.00
SEP	3,680.00	1,150.00	2,530.00	0.00	1,300.00	1,230.00
OCT	4,650.00	745.00	3,900.00	0.00	1,300.00	2,600.00
NOV	9,400.00	855.00	8,550.00	0.00	1,300.00	7,250.00
DEC	16,700.00	916.00	15,800.00	0.00	1,300.00	14,500.00
ANN	13,500,000.00	2,160,000.00	11,300,000.00	0.00	942,000.00	10,400,000.00

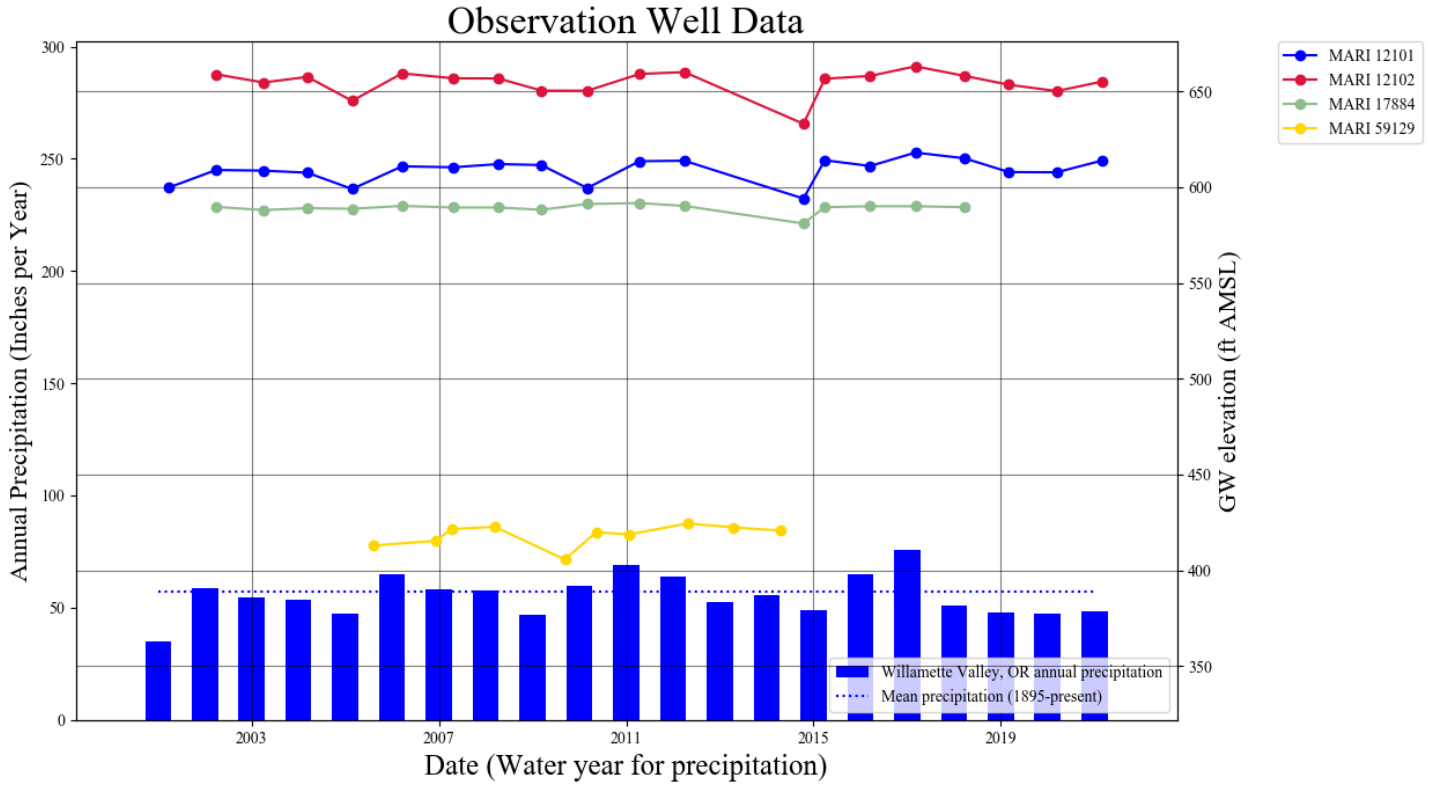
Download Data (Text - Formatted | Text - Tab Delimited | Excel)

Well Location Map

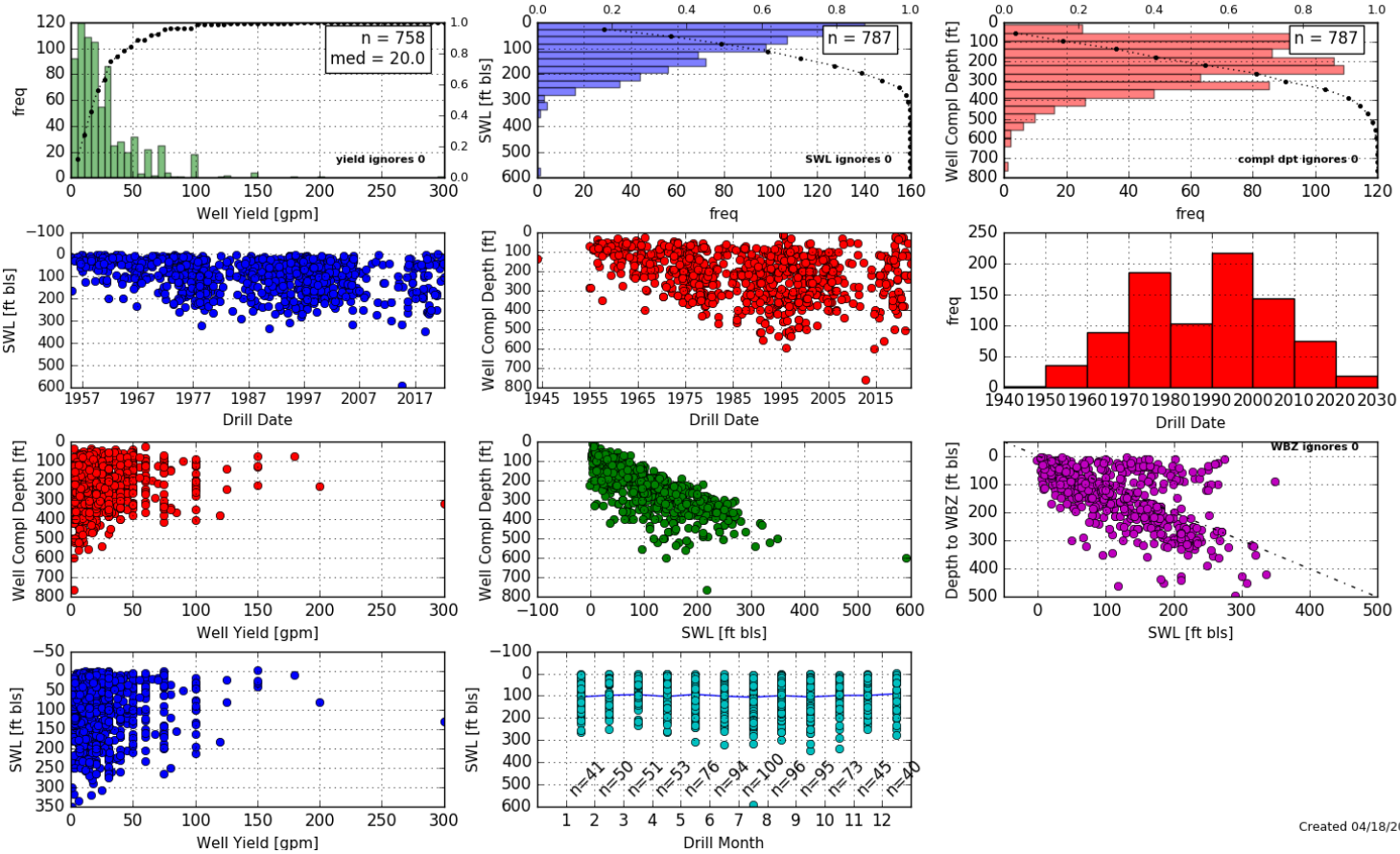


Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

Water-Level Measurements in Nearby Wells



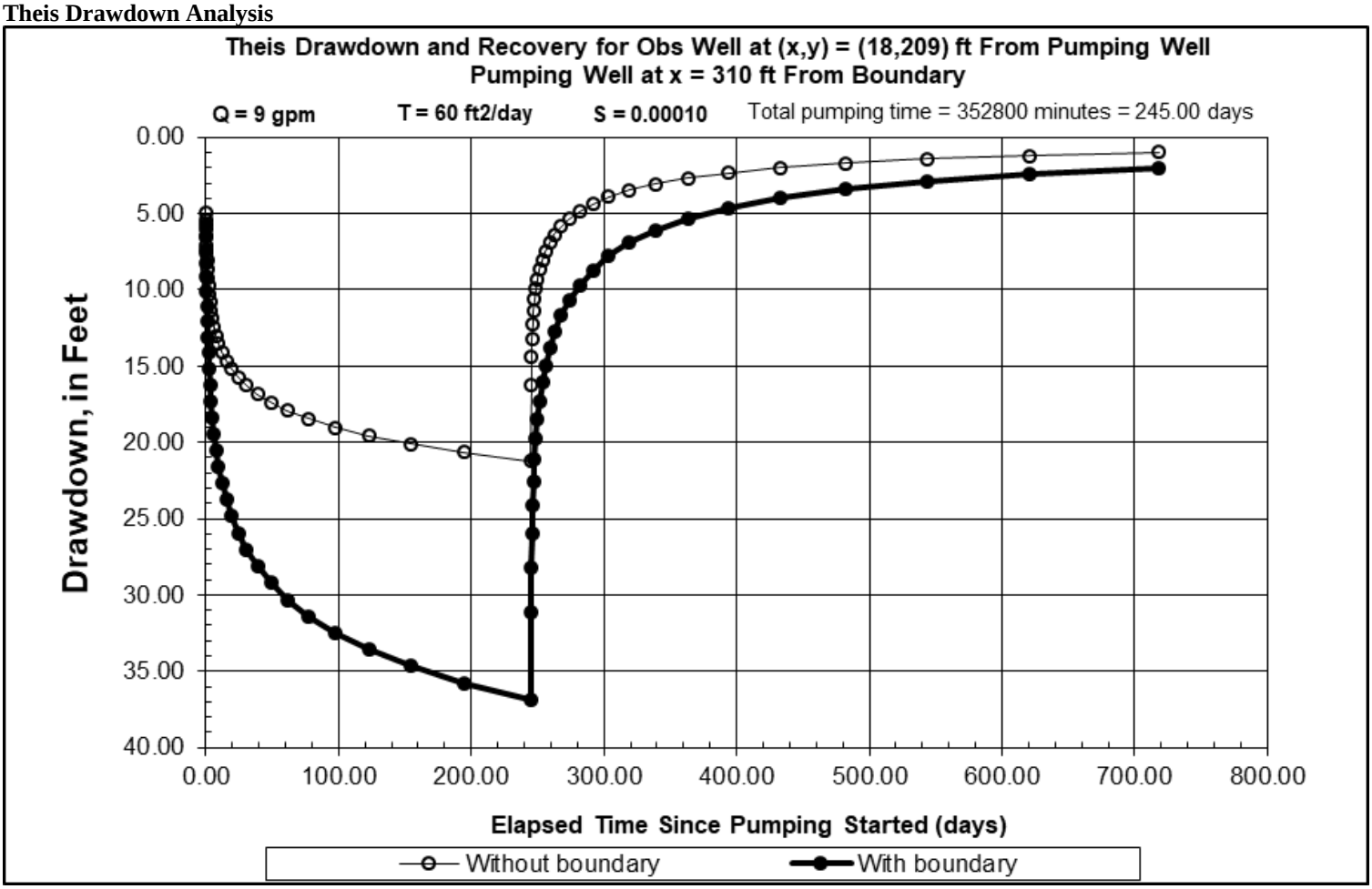
Well Statistics 8S/3W-18 and surrounding sections



Created 04/18/2022

Version: 07/28/2020

Theis Drawdown Analysis



Distance to Barrier/Boundary (aquifer boundary/contact) from Pumping Well (x): 310 ft

Distance from Pumping Well to Affected Well (MARI 12115 or 12116) (x,y): 18 ft, 209 ft

Pumping Rate (Q): 9.2 gpm [average pumping rate; the full pumping rate could not be utilized continuously for the entire 245-day period of use without exceeding the 10 ac-ft maximum allowed duty. For the maximum allowed duty of 10 ac-ft, continuous pumping would occur for 245 days at a rate of 0.02 cfs (9.2 gpm)]

Aquifer Transmissivity (T) = 445 gpd/ft (59.5 ft^2/day) [based on data from nearby pumping tests]

Aquifer Storativity (S) = $1x10^{-4}$ [aquifer test for MARI 12918, Table 2 Central CRB Conlon et al 2005]

Total Pumping Time = 245 days [irrigation season, March 1-October 31]