Groundwater Application Review Summary Form

Application # G- _18983_

GW Reviewer _Travis Brown_ Date Review Completed: _~~8/20/2020~~ revised 10/20/2020_

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 **~~August 20, 2020~~ revised October 20, 2020**

TO: **Application** G-**18983**

FROM: **GW:** **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 ~~8/20/2020~~ revised 10/20/2020
FROM: Groundwater Section Travis Brown
Reviewer's Name
SUBJECT: Application G- **18983** Supersedes review of 8/20/2020
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: **Paul & Susan Fobert** County: **MARION**

A1. Applicant(s) seek(s) 0.365 cfs from 2 well(s) in the Willamette Basin, Pudding – Molalla subbasin

A2. Proposed use Irrigation (29.2 acres; 73 af/yr) 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 ID	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	Well G	Alluvium	~~0.365~~ 0.16	4S/1W-26 SE-SE	2035' S, ~~1200'~~ 1170' E fr NE cor DLC 63
2	Proposed	Well H	Alluvium	~~0.365~~ 0.16	4S/1W-26 SE-SE	2825' S, 1270' E fr NE cor DLC 63

* 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	~155[a]	N/A	N/A	N/A	250	0-50	0-250 (8")		TBD	N/A	N/A	N/A
2	~154[a]	N/A	N/A	N/A	250	0-50	0-250 (8")		TBD	N/A	N/A	N/A

Use data from application for proposed wells.

A4. **Comments:** The proposed POA/POU are ~1.5 miles east of Hubbard, Oregon.

[a] Ground surface elevation at proposed well location, estimated from LIDAR (Watershed Sciences, 2009)

Applicant revised their application on September 22, 2020 via their agent to reduce the proposed rate to 0.16 cfs and move proposed POA 1 ~30 ft to the west, placing it more than ¼ mile from the nearest surface water source (SW 1, Pudding River).

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 water from a confined aquifer; therefore, per OAR 690-502-0240, the relevant basin rules do not apply.

A6. ☐ **Well(s) #** _____ , _____ , _____ , _____ , _____ , tap(s) an aquifer limited by an administrative restriction.
Name of administrative area: **N/A**
Comments: _____

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

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

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

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

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

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

i. ☒ The permit should contain condition #(s) **7n (annual measurement), medium 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:** 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.

Based on the proposed construction, the POA will produce groundwater from saturated sands and gravels of the Willamette Aquifer (~40-80 ft amsl) and coarse-grained interbeds of the underlying Willamette Confining Unit (Gannett and Caldwell, 1998).

The nearest known neighboring well to the propoed POA is MARI 1021, ~340 ft southeast of proposed POA 2 ("Well H"). MARI 1021 is an authorized POA under **Certificate 29402*** for up to 0.2 cfs of Irrigation on 24.6 acres. Although the proposed total depth (250 ft bls) of POA 2 ("Well H") is substantially deeper than the total reported depth (118 ft bls) of MARI 1021, the proposed seal depth of POA 2 ("Well H") is only 50 ft bls; thus, it is anticipated that POA 2 ("Well H") would produce water from the same water-bearing zones as MARI 1021. The Theis (1935) equation for drawdown in a confined aquifer was used to estimate the potential interference with MARI 1021 due to the proposed use. Results of the analysis indicate that continuously pumping POA 2 ("Well H") at an average rate of 0.150 cfs (based on the maximum duty [73 af] distributed evenly over the irrigation season [245 days]) would likely cause less than ~25 ft of interference with MARI 1021 by the end of the irrigation season (see attached Interference Analysis). Therefore, the proposed use seems unlikely to cause injury to MARI 1021 or similar neighboring groundwater rights.

Median reported well yield near the proposed POA is ~60 gpm (~0.134 cfs), with reported yields ranging from 15 to 2000 gpm (~0.033 to 4.456 cfs) (see attached Well Statistics). To satisfy the maximum requested rate (0.365 cfs), each of the proposed POA would need to produce at least ~82 gpm (0.1825 cfs), which is well within the range of nearby reported yields. Water level information in this area is scarce. However, water levels from wells in surrounding areas indicate relative stability (see attached Hydrographs).

In order to protect senior users and the groundwater resource, the conditions specified in B1(d)(i) and B2(c) are strongly recommended for any permit issued pursuant to this application.

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: Geologic mapping in this area estimates the top of the Willamette aquifer at ~60-80 ft amsl, while estimated water table elevations are ~100-120 ft amsl (Gannett and Caldwell, 1998; Woodward et al., 1998). Nearby well logs also report static water levels above the targeted water-bearing zones. The available evidence indicates the aquifer is confined.

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**	**Pudding River**	**~100-120[a]**	**~85-91**	**~1,300**	☒	☐	☐	☐	☒
2	**1**	**Pudding River**	**~100-120[a]**	**~85-91**	**~1,550**	☒	☐	☐	☐	☒
1	**2**	**Unnamed tributary to Pudding River**	**~100-120[a]**	**~85-145**	**~1,900**	☒	☐	☐	☐	☒
2	**2**	**Unnamed tributary to Pudding River**	**~100-120[a]**	**~85-145**	**~2,650**	☒	☐	☐	☐	☒
1	**3**	**Rock Creek**	**~100-120[a]**	**~88-95**	**~3,090**	☒	☐	☐	☐	☒
2	**3**	**Rock Creek**	**~100-120[a]**	**~88-95**	**~3,150**	☒	☐	☐	☐	☒
1	**4**	**Brandy Creek**	**~100-120[a]**	**~90-103**	**~4,300**	☒	☐	☐	☐	☒
2	**4**	**Brandy Creek**	**~100-120[a]**	**~90-103**	**~3,560**	☒	☐	☐	☐	☒

Basis for aquifer hydraulic connection evaluation: Estimated groundwater elevations near the proposed POA are coincident with or above surface water elevations for SW 1-4 within 1 mile of the proposed POA. Water table mapping in this area indicates discharge to surface water for SW 1-3. The available evidence indicates that the proposed POA are hydraulically connected to SW 1-4.

[a] Groundwater elevations estimated from water table mapping (Woodward et al., 1998).

Water Availability Basin the well(s) are located within: WID #151 PUDDING R > MOLALLA R – AB MILL CR

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?
1	**1**	☐	☐	**IS73533**	**16**	☐	**67.30**	☐	**<25%**	☐
2	**1**	☐	☐	**IS73533**	**16**	☐	**67.30**	☐	**<25%**	☐
1	**2**	☐	☐	**N/A**	**N/A**	☐	**67.30**	☐	**<25%**	☐
2	**2**	☐	☐	**N/A**	**N/A**	☐	**67.30**	☐	**<25%**	☐
1	**3**	☐	☐	**N/A**	**N/A**	☐	**67.30**	☐	**<25%**	☐
2	**3**	☐	☐	**N/A**	**N/A**	☐	**67.30**	☐	**<25%**	☐
1	**4**	☐	☐	**N/A**	**N/A**	☐	**67.30**	☐	**<25%**	☐
2	**4**	☐	☐	**N/A**	**N/A**	☐	**67.30**	☐	**<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: ~~**Proposed POA 1 ("Well G") is within ¼ mile of SW 1 (Pudding River); per OAR 690-009-0040(4)(a), the Potential for Substantial Interference (PSI) is assumed.**~~

~~**The maximum rate requested (0.365 cfs) is greater than 1 percent (0.16 cfs) of the applicable instream water right (16 cfs) for SW 1 (Pudding River); per OAR 690-009-0040(c), PSI is assumed.**~~

The Hunt (2003) equation was used to quantitatively estimate interference with surface water due to the proposed use. Hydraulic parameters used for the analysis were derived from regional data and studies (Pumping Test Reports; Conlon et al., 2003, 2005; Iverson, 2002; McFarland and Morgan, 1996; Woodward et al., 1998) or are within a typical range of values for the given parameter within the hydrogeologic regime (Domenico and Mifflin, 1965; Freeze and Cherry, 1979; Halford and Kuniansky, 2002). Results of the analysis indicate that interference with surface water is unlikely to exceed 25 percent of the pumping rate within 30 days of constant pumping (see attached Stream Depletion Analysis).

Depletion of local surface water will be buffered by the low vertical hydraulic conductivity of fine-grained sediments between the relevant water-bearing zones and local streambeds. However, there will still be some depletion of surface water. 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 which time surface water depletion is anticipated to be relatively constant throughout the year.

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: N/A

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:** ~~**PSI was assumed because the location of proposed POA 1 was within ¼ mile of SW 1 (Pudding River); this assumption may be avoided by revising the location of POA 1 to greater than ¼ mile from SW 1 (Pudding River). Additionally, PSI was assumed because the total requested rate (0.365 cfs) is greater than 1 percent (0.16 cfs) of the applicable instream water right for SW 1 (Pudding River); this assumption may be avoided by reducing the total requested rate to 0.16 cfs or less.**~~

Applicant revised their application on September 22, 2020 via their agent to reduce the proposed rate to 0.16 cfs and move proposed POA 1 ~30 ft to the west, placing it more than ¼ mile from the nearest surface water source (SW 1, Pudding River). Based on the revisions, PSI is no longer assumed.

References Used:

Application File: G-18983

Certificate: 29402*

Pumping Test Reports: CLAC 17196, CLAC 56004, CLAC 70439, MARI 490, MARI 538, MARI 543, MARI 692, MARI 723, MARI 793, MARI 884, MARI 1017, MARI 1488, MARI 1717, MARI 1728, MARI 2011, MARI 17630, MARI 19191, MARI 55251, MARI 55994, MARI 58399, MARI 58546

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

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, Professional Paper 1424-A, 32 p: U. S. Geological Survey, Reston, VA.

Halford, K.J., and Kuniansky, E.L., 2002, Documentation of Spreadsheets for the Analysis of Aquifer-Test and Slug-Test Data, Open File Report 02-197, 51 p: U. S. Geological Survey, Reston, VA.

Hunt, B., 2003, Unsteady stream depletion when pumping from semiconfined aquifer: Journal of Hydrologic Engineering, January/February, Vol 8, p. 12-19.

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.

McFarland, W.D., and Morgan, D.S., 1996, Description of the Ground-Water Flow System in the Portland Basin, Oregon and Washington, Water Supply Paper 2470-A, 58 p: U. S. Geological Survey, Reston, VA.

O'Connor, J. E., Sarna-Wojcicki, A., Wozniak, K. C., Polette, D. J., Fleck, R. J., 2001, Origin, Extent, and Thickness of Quaternary Units in the Willamette Valley, Oregon, Professional Paper 1620: U. S. Geological Survey, Reston, VA.

Swanson, R. D., McFarland, W. D., Gonthier, J. B., and Wilkinson, J. M., 1993, A description of hydrogeologic units in the Portland Basin, Oregon and Washington, Water-Resources Investigations Report 90-4196, 56 p.: U. S. Geological Survey, Reston, VA.

Theis, C.V., 1935, The relation between the lowering of the piezometric surface and the rate and duration of discharge of a well using groundwater storage, American Geophysical Union Transactions, vol. 16, p. 519-524.

United States Geological Survey, 2014, National Hydrography Dataset (NHD), 1:24,000, U. S. Department of the Interior, Reston, VA.

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

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 #**: _____ **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) _____

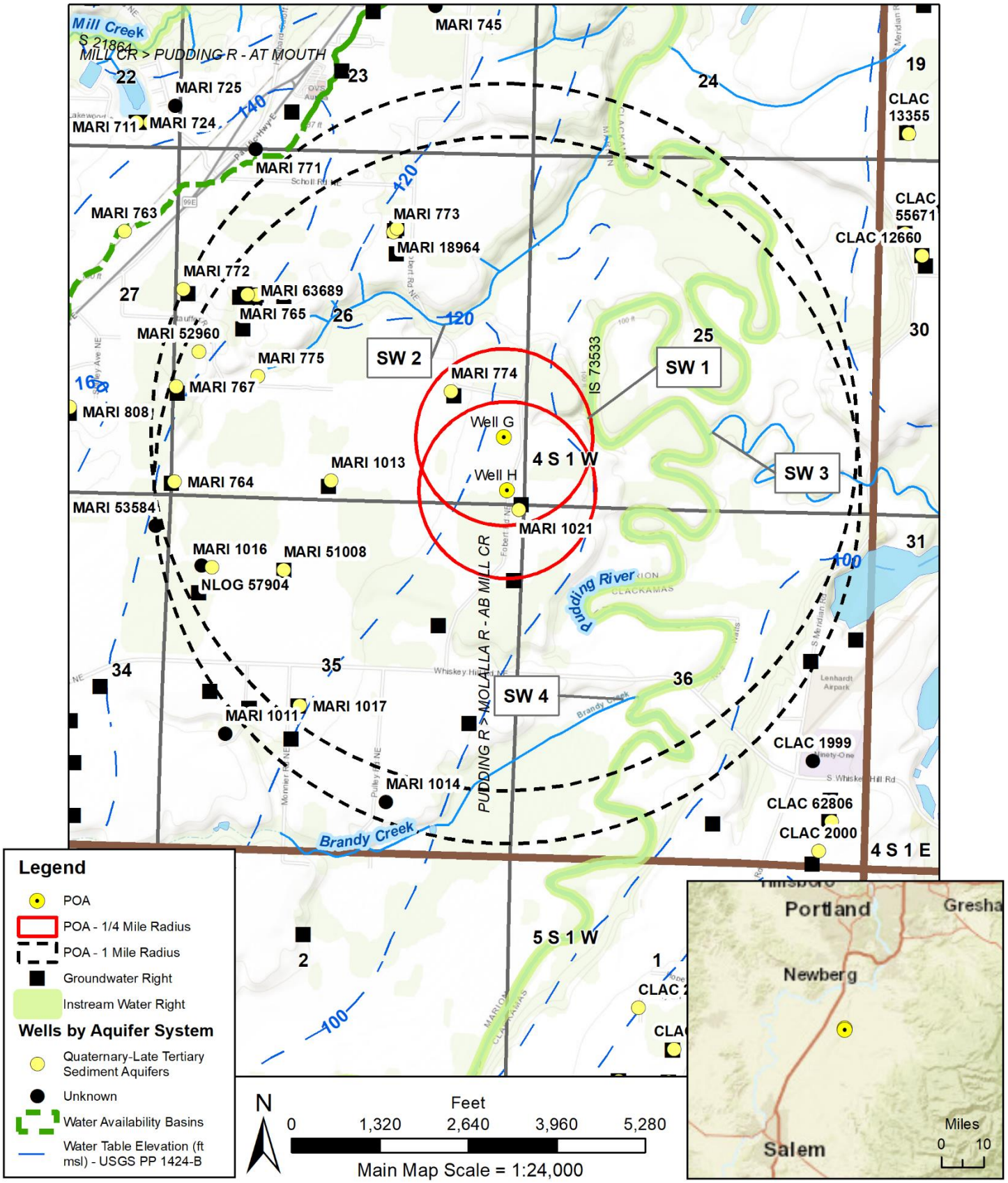
_____

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-18983 Fobert



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
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community

Version: 07/28/2020

Well Interference Analysis

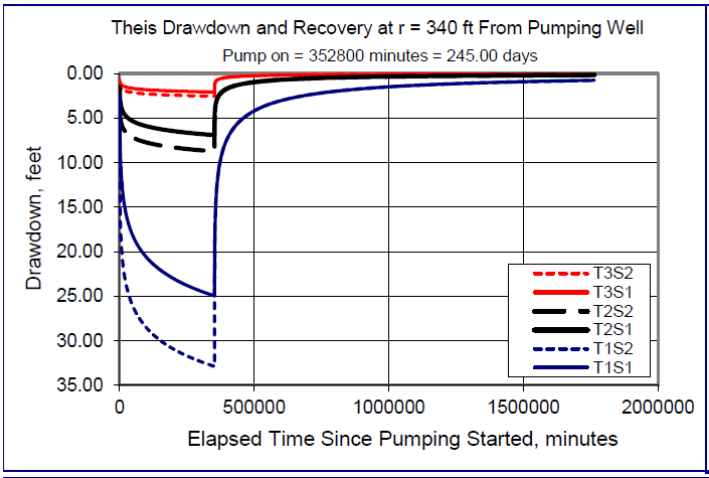
Theis Time-Drawdown Worksheet v.3.00

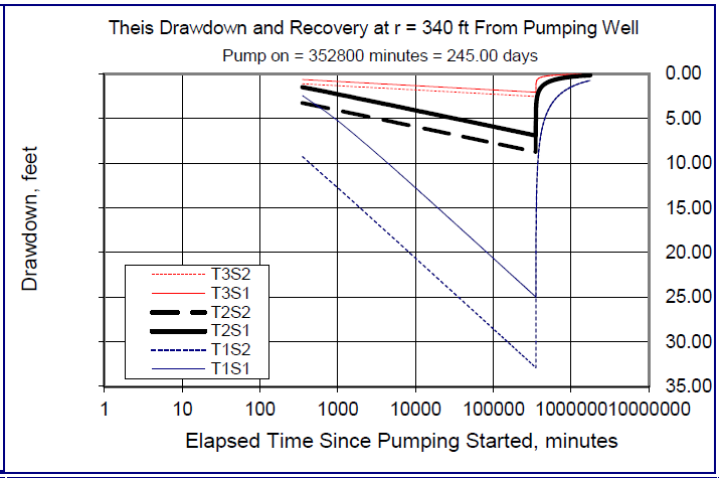
Calculates Theis nonequilibrium drawdown and recovery at any arbitrary radial distance, r, from a pumping well for 3 different T values and radial distance, r, from a pumping well for 3 different T values and 2 different S values.

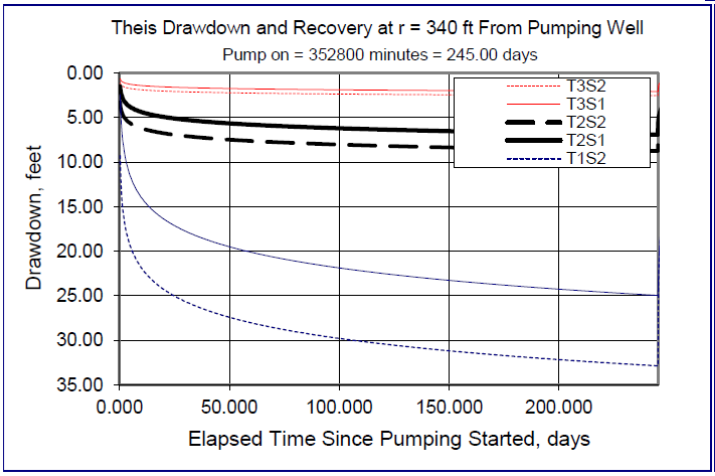
Written by Karl C. Wozniak September 1992. Last modified December 17, 2019

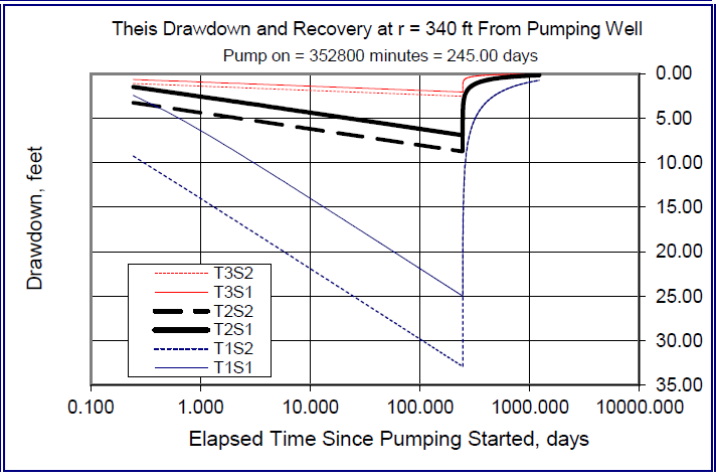
Input Data:	Var Name	Scenario 1	Scenario 2	Scenario 3	Units	
Total pumping time	t		245		d	
Radial distance from pumped well:	r		340		ft	**Q conversions**
Pumping rate	Q		0.15		cfs	67.32 gpm
Hydraulic conductivity	K	6	26	100	ft/day	0.15 cfs
Aquifer thickness	b		50		ft	9.00 cfm
Storativity	S_1		0.001			12,960.00 cfd
	S_2		0.0001			0.30 af/d
Transmissivity Conversions	T_f2pd	300	1300	5000	ft2/day	
	T_ft2pm	0.2083333	0.9027778	3.4722222	ft2/min	
	T_gpdpft	2244	9724	37400	gpd/ft	

Use the Recalculate button if recalculation is set to manual





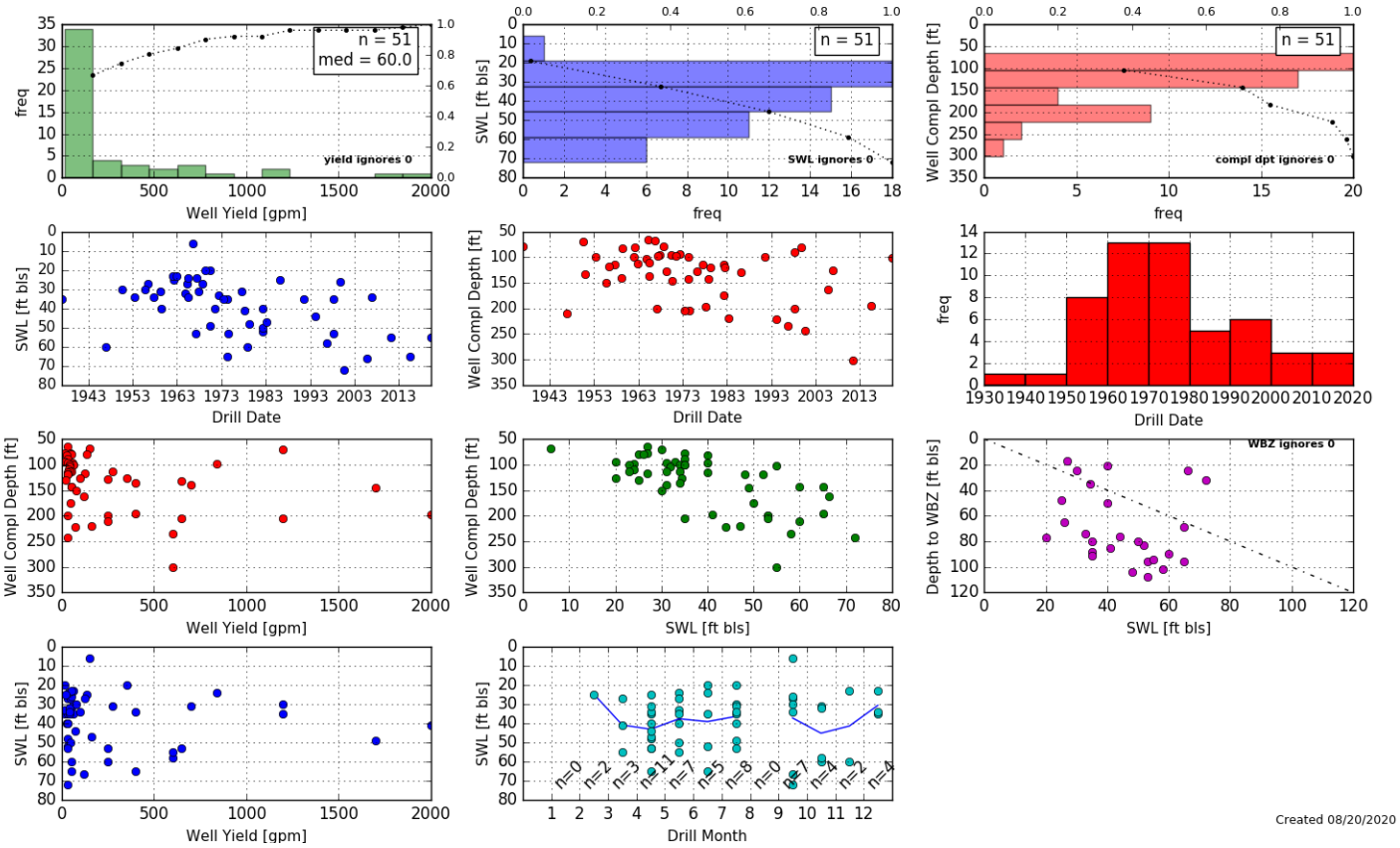




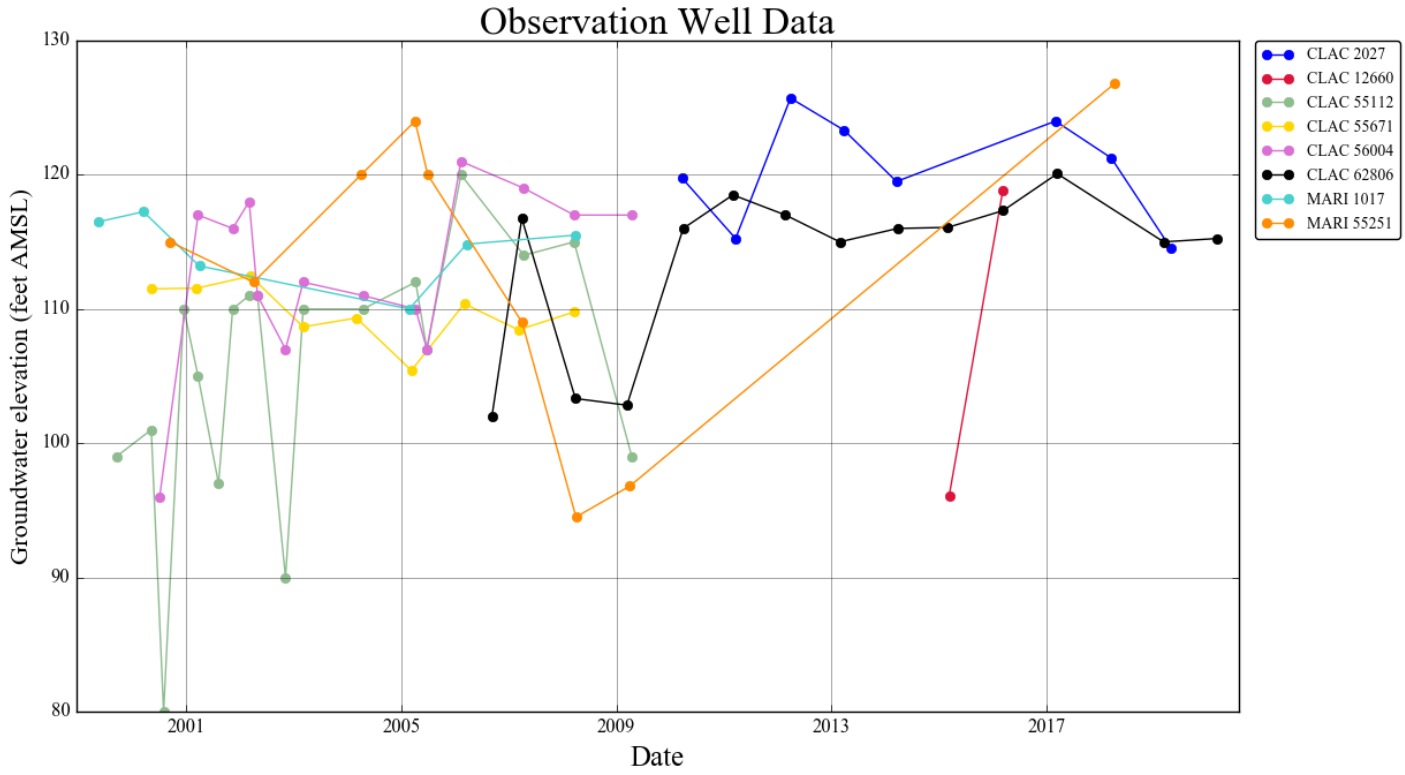
Transmissivity values from nearby pumping tests

Storativity values from McFarland and Morgan (1996)

Well Statistics – 4S/1W-25 & 36



Hydrographs



Stream Depletion Analysis

Application type:	G
Application number:	18983
Well number:	1
Stream Number:	1
Pumping rate (cfs):	0.15
Pumping duration (days):	245.0
Pumping start month number (3=March)	3.0

Parameter	Symbol	Scenario 1	Scenario 2	Scenario 3	Units
Distance from well to stream	a	1300.0	1300.0	1300.0	ft
Aquifer transmissivity	T	300	1500.0	5000	ft2/day
Aquifer storativity	S	0.001	0.0005	0.0001	-
Aquitard vertical hydraulic conductivity	Kva	0.01	0.05	0.1	ft/day
Aquitard saturated thickness	ba	30.0	25.0	20.0	ft
Aquitard thickness below stream	babs	10.0	5.0	3.0	ft
Aquitard specific yield	Sya	0.2	0.2	0.2	-
Stream width	ws	70.0	70.0	70.0	ft

Stream depletion for Scenario 2:

Days	10	330	360	30	60	90	120	150	180	210	240	270	300
Depletion (%)	4	9	8	5	6	8	9	10	11	13	14	10	9
Depletion (cfs)	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.01	0.01