

Groundwater Application Review Summary Form

Application # G- 19412

GW Reviewer: Aaron Orr Date Review Completed: 5/1/2025

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).

Scenic Waterway Interference Evaluation

Application # G- 19412

GW Reviewer: Aaron Orr Date Review Completed: 5/1/2025

☐ YES

The source of appropriation is hydraulically connected to a State Scenic Waterway or its tributaries

☐ NO

☐ YES

Use the Scenic Waterway Condition (Condition 7J)

☐ NO

☐ 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 the [_____] 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 1/17/2025
FROM: Groundwater Section Aaron Orr
Reviewer's Name
SUBJECT: Application G- 19412 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: Butter Creek Cattle c/o Steve Currin County: Morrow

A1. Applicant(s) seek(s) 2.45 cfs from 3 well(s) in the Umatilla Basin,
Little Butter Creek subbasin

A2. Proposed use Irrigation, 219 acres Seasonality: March 1st–October 31st

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	PROP 476	1	CRBG	0.89	2S/28E-2 SE-SE	605' N, 1180' W fr SE cor Sec 2
2	PROP 475	2	CRBG	1.34	1S/28E-28-NE-SE	1490' N, 1540' W fr SE cor Sec 28
3	MORR 1623	MORR 1623	CRBG	0.22	2S/28E-2 SE-SE	20' N and 315' W fr SE cor Sec 2

* Alluvium, CRBG, 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	2317	–	–	–	400	–	200	–	–	400	–	–
2	2040	–	–	–	400	–	200	–	–	600	–	–
3	2336	64	9	2/14/1994	109	48	48	–	–	100	-	Air

Use data from application for proposed wells.

A4. **Comments:** The POAs are approximately 12 miles east of the City of Heppner, OR.

A5. ☒ **Provisions of the** Umatilla 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 existing well for POA 3, MORR 1623, is likely in hydraulic connection with Little Butter Creek. POAs 1 and 3, when properly constructed, should not trigger the relevant basin rules in OAR 690-507-0080. See Section C for more details.

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

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) Large Water Use Reporting, 7RLN;
 - ii. ☒ The permit should be conditioned as indicated in item 2 below.

Wells shall be open to a single aquifer in the Columbia River Basalt Group and shall meet applicable well construction standards (OAR 690-200 and OAR 690-210). In addition, the open interval shall be no greater than 100 feet. However, a larger open interval may be approved by the Department if the applicant can demonstrate to the satisfaction of the Department that each well is only open to a single aquifer. Following well completion, the well shall be thoroughly developed to remove cuttings and drilling fluids. Substantial evidence of a single aquifer completion may be collected by video log, downhole flowmeter, water chemistry and temperature, or other downhole geophysical methods approved by the Department. 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.

Drill cuttings shall be collected at 10-foot intervals and at changes in formation in the well and a split of each sampled interval shall be provided to the Department.

- 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 200 ft. below land surface;
 - c. ☒ **Condition** to allow groundwater production only from the Basalt 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): N/A

B3. **Groundwater availability remarks:** The proposed POAs develop the basalt aquifer system in the Butter Creek Subbasin of the Umatilla Basin. Surficial geology is predominantly basalt of the Grande Ronde Formation, with Holocene alluvium mapped along Little Butter Creek. The existing and proposed wells will produce from one or more water-bearing zones in the Columbia River Basalt Group (CRBG), a series of lava flows with a composite thickness greater than 10,000 feet in the Columbia Plateau (Kahle et al., 2011). Each flow is characterized by a series of internal features, which generally include a thin rubble zone at the contact between flows and a thick, dense, low porosity and low permeability interior zone. In some cases, sedimentary layers were deposited during the time between basalt flow emplacements. A flow top, sedimentary interbed (if present) and flow bottom are collectively referred to as an interflow zone. Unconfined groundwater occurs near the weathered top of the basalts, but most water occurs in interflow zones under confining conditions at the contacts between lava flows. CRBG flow features result in a series of stacked, thin aquifers that are confined by dense flow

interiors. The low permeability of the basalt flow interiors usually results in little connection between stacked aquifers, which results in tabular aquifers with unique water level heads (Reidel et al., 2002).

The proposed POAs are located near a series of folds, northwest of the Reith Anticline and south-southeast of the Milk Canyon Fold Belt. Basalt dips gently northwest (Madin and Geitgey, 2007). Basalt formations in the area are either further classified by member (ex. Frenchman Springs) or magnetic polarity (ex. normal polarity or reverse polarity). Within a 6-mile radius of the proposed POAs, surficial basalt classification is limited to magnetic polarity of the Grande Ronde Formation. Based on the dip angle of the basalt and the distance between POA 2 and POAs 1 and 3, POA 2 may produce water from a different water bearing zone than POAs 1 and 3. There is not enough evidence to conclude that deeper water bearing zones will be part of the same aquifer. An average dip angle of 2 degrees from POA 2 to POAs 1 and 3 corresponds with an offset of 550 feet. With the difference in elevations (~300 feet) subtracted from the offset, the same basalt members may be ~250 feet deeper at POA 2 than at POAs 1 and 3.

The nearest stream is Little Butter Creek, which is less than 250 feet away from each POA. Water generally flows north. The Columbia River Basalt Aquifer is recharged through precipitation and infiltration where the hydrostratigraphic unit is exposed at land surface (Woodward et al., 1998; Reidel et al., 2002, U.S. DOE, 1988). Shallower basalt wells with flows in hydraulic connection with surface water are recharged by leakage from streams, canals, reservoirs, and infiltration of precipitation and irrigation water (Johnson et al., 2024).

There are 20 water wells completed in the Township(s)/Range(s) of the proposed POAs (T1S/R28E; T2S/R28E). The median reported yield for wells completed within the given TRS quadrants is 100 gpm, with a maximum of 600 gpm. Most of these wells appear to be completed in confined aquifers. The well specific rate for POA 2 (600 gpm) is the same as the maximum pumping rate for wells within these Township and Ranges. The well specific rates for POAs 1 (400 gpm) and 3 (100 gpm) are less than the maximum pumping rate for wells within these Township and Ranges but equal to or above the median pumping rate.

Given a rate of 600 gpm for POA 2, drawdown at the nearest well is estimated between 13 and 38 feet of drawdown over a 245-day (irrigation) pumping period. The nearest known well with location data (MORR 51162) completed in the same aquifer as proposed POA 2 is at least 2,400 feet northwest of the well location. This amount of drawdown is likely to cause interference but will not constitute injury to MORR 51162, which is a domestic well. POA 2 could also potentially interfere with MORR 92, another domestic well, though its location data are less certain. The nearest well (MORR 202) to POAs 1 and 3 is 3,500 and 2,500 feet southeast of the POAs, respectively, and combined drawdown at MORR 202 from pumping both POA 1 and 3 is estimated between 7 and 20 feet. Breakdowns of each parameter are described in the **Theis Interference Analysis** section of the appendix. **Because the requested rate is within the range of well yields in the area and will likely not cause injury to nearby wells, POAs 1 through 3 are likely within the capacity of the resource.**

Basalt wells with water level data are scarce in the area of the POAs. The nearest wells with water level data are MORR 202 and MORR 51717, completed approximately ½-mile and 1-mile southeast of POA 1, respectively. These wells are relatively shallow compared to the proposed depths of the POAs (150-210 feet bgs vs. 400 feet bgs). These wells only include water level data until 1993, which indicate a relatively stable trend. Significantly deeper (300+ feet completion) wells with water level data completed in the Grande Ronde are approximately 7 miles north of the POAs, completed near Butter Creek. Wells completed in the same aquifer system ~5+ miles to the west-northwest, to the southwest, and to the east show similar declining trends. Basalt wells to the north completed near Butter Creek show consistently declining water levels since the 1950s. Based on limited well location and water level data, it cannot be determined that groundwater is over appropriated at the proposed POAs. **In order to determine if groundwater is over appropriated within the vicinity of the POAs, modern day measurements at MORR 202 and MORR 51717 must be taken during the month of March.**

Constructing a well that is open to multiple water-bearing zones with distinct water level heads commingles multiple aquifers. When the pump is off, water migrates through the well bore from an aquifer of higher pressure to an aquifer of lower pressure. Over time, this can depressurize the aquifer and exacerbates water level decline. Well construction conditions are specified to protect the resource and other existing users.

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	CRBG	☒	☐
2	CRBG	☒	☐
3	CRBG	☒	☐

Basis for aquifer confinement evaluation: The well log for MORR 1623 reports the first water bearing zone is below the final static water level elevation, indicating a confined aquifer. Since the two proposed wells will be drilled and sealed to 200 feet below ground surface, it is presumed that the aquifer will also be confined in those wells.

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	Little Butter Creek	2317 – 2325*	2225-2385	144	☐	☒	☐	☐	☒
2	1	Little Butter Creek	1962**	1950-2120	233	☐	☒	☐	☐	☒
3	1	Little Butter Creek	2327.25***	2240-2405	85	☐	☐	☒	☒	☐

Basis for aquifer hydraulic connection evaluation:

*MORR 202 and MORR 51717 water level measurements are 20 – 25 feet blsd.

**MORR 51662 is the best analog that meets modern construction requirements. The water level measurement at MORR 51162 is 78 feet blsd (8/7/2003).

***MORR 1623 reported water level measurement. The surface water level at MORR 1623 is coincident with the water level in Little Butter Creek at its nearest point.

Water Availability Basin the well(s) are located within: Watershed ID# 30710306: LITTLE BUTTER CR > BUTTER CR - 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 (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?	Q _w > 5 cfs?	Instream Water Right ID	Instream Water Right Q (cfs)	Q _w > 1% ISWR?	80% Natural Flow (cfs)	Q _w > 1% of 80% Natural Flow?	Interference @ 30 days (%)	Potential for Subst. Interfer. Assumed?
1	1	☒	☐	n/a	n/a	☐	0.10	☒		☐
2	1	☒	☐	n/a	n/a	☐	0.10	☒		☐
3	1	☒	☐	n/a	n/a	☐	0.10	☒		☒

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.

Comments: There is no readily available model to estimate stream depletion by pumping a well that is located in an anisotropic fractured rock aquifer i.e. CRB. Potential for assumed interference is based on the coincident static water level of POA 3 and nearby surface water level of SW #1.

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: 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:
- ☐ The permit should contain condition #(s) _____;
 - ☐ The permit should contain special condition(s) as indicated in "Remarks" below;

C6. **SW / GW Remarks and Conditions:** The basalt aquifer is confined and likely does not intersect surface water within 1-mile of the proposed and existing POAs. While POA 3 is completed in a confined aquifer, MORR 1623 and nearby wells MORR 202 and MORR 51717 have groundwater measurements coincident with surface water elevations in SW #1. It is possible that these wells are not sealed deep enough to avoid hydraulic connection with the river. To avoid hydraulic connection with surface water bodies within 1 mile, POAs 1 and 2 must be constructed according to the condition outlined in Section B.

References Used:

- Johnson, H.M., Kate, E., Maher, A., 2024, Timing and Source of Recharge to the Columbia River Basalt Groundwater System in Northeastern Oregon, U.S. Geological Survey.
- Kahle, S.C., Morgan, D.S., Welch, W.B., Ely, D.M., Hinkle, S.R., Vaccaro, J. J., Orzol, L. L., 2011, Hydrogeologic Framework and Hydrologic Budget Components of the Columbia Plateau Regional Aquifer System, Washington, Oregon, and Idaho.
- Madin, I.P., Geitgey, R.P., 2007, Preliminary Geology Map of the Umatilla Basin, Morrow, and Umatilla Counties, Oregon, 19 p., 3 pl.
- 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: Pacific Northwest Laboratory, Richland, Washington, Report PNNL-13962.
- USDOE (U.S. Department of Energy), 1988, Site characterization plan, Reference Repository Location, Hanford Site, Washington - consultation draft: Washington, D.C., Office of Civilian Radioactive Waste Management, DOE/RW-0164, v. 1 - 9.
- 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:**

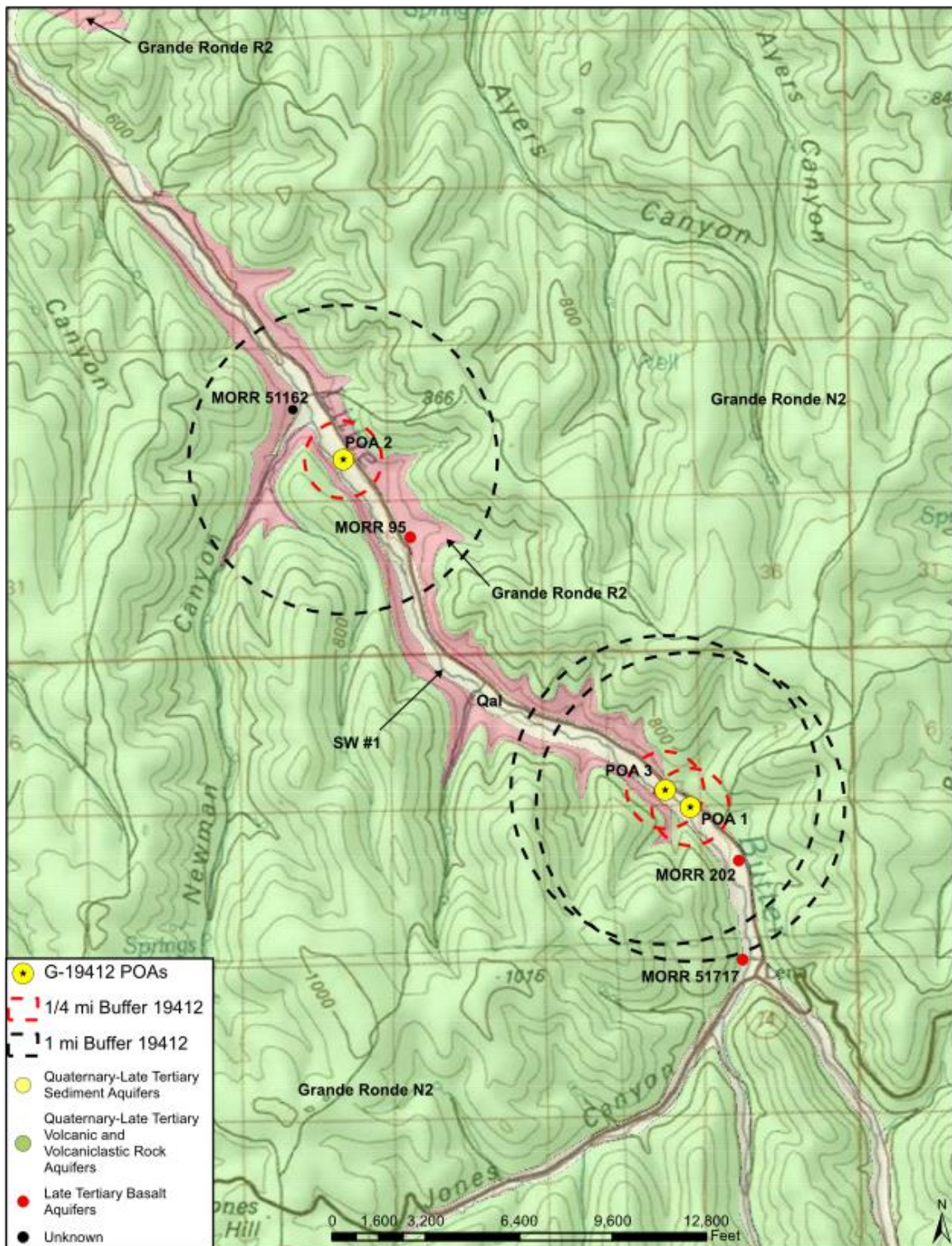
- a. ☐ review of the well log;
- b. ☐ field inspection by _____;
- c. ☐ report of CWRE _____;
- d. ☐ other: (specify) _____

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-19412



Water Availability Tables

Water Availability																
Select any Watershed for Details																
Nesting Order	Watershed ID #	Stream Name	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Sto	
1	221	UMATILLA R> COLUMBIA R - AT MOUTH	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes
2	30710305	BUTTER CR> UMATILLA R- AB WESTLAND CANAL	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes
3	30710306	LITTLE BUTTER CR> BUTTER CR - AT MOUTH	No	No	No	No	No	No	No	No	No	No	No	No	No	Yes

Limiting Watersheds																
Monthly Streamflow in Cubic Feet per Second Annual Volume at 50% Exceedance in Acre-Feet																
Month	Limiting Watershed ID #	Stream Name	Water Available?		Net Water Available											
JAN	221	UMATILLA R > COLUMBIA R - AT MOUTH	No		-342.00											
FEB	221	UMATILLA R > COLUMBIA R - AT MOUTH	No		-175.00											
MAR	221	UMATILLA R > COLUMBIA R - AT MOUTH	No		-165.00											
APR	221	UMATILLA R > COLUMBIA R - AT MOUTH	No		-126.00											
MAY	221	UMATILLA R > COLUMBIA R - AT MOUTH	No		-815.00											
JUN	221	UMATILLA R > COLUMBIA R - AT MOUTH	No		-856.00											
JUL	221	UMATILLA R > COLUMBIA R - AT MOUTH	No		-458.00											
AUG	221	UMATILLA R > COLUMBIA R - AT MOUTH	No		-351.00											
SEP	221	UMATILLA R > COLUMBIA R - AT MOUTH	No		-432.00											
OCT	221	UMATILLA R > COLUMBIA R - AT MOUTH	No		-370.00											
NOV	221	UMATILLA R > COLUMBIA R - AT MOUTH	No		-387.00											
DEC	221	UMATILLA R > COLUMBIA R - AT MOUTH	No		-392.00											
ANN	30710306	LITTLE BUTTER CR > BUTTER CR - AT MOUTH	Yes		2,520.00											

note: 80% exceedance was used but “50%” is incorrectly displayed in the tables.

Water Availability Analysis

Detailed Reports

LITTLE BUTTER CR > BUTTER CR - AT MOUTH

UMATILLA BASIN

Water Availability as of 10/17/2024

Watershed ID #: 30710306 (Map)

Date: 10/17/2024

Exceedance Level: 80%

Time: 8:55 AM

Water Availability Calculation

Water Rights

Consumptive Uses and Storages

Instream Flow Requirements

Reservations

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	2.55	1.06	1.49	0.00	0.00	1.49
FEB	7.39	2.93	4.46	0.00	0.00	4.46
MAR	11.30	10.10	1.19	0.00	0.00	1.19
APR	6.55	6.72	-0.17	0.00	0.00	-0.17
MAY	4.51	2.33	2.18	0.00	0.00	2.18
JUN	2.40	1.34	1.06	0.00	0.00	1.06
JUL	0.71	0.78	-0.07	0.00	0.00	-0.07
AUG	0.27	0.52	-0.25	0.00	0.00	-0.25
SEP	0.11	0.27	-0.16	0.00	0.00	-0.16
OCT	0.10	0.13	-0.03	0.00	0.00	-0.03
NOV	0.33	0.13	0.20	0.00	0.00	0.20
DEC	1.43	0.26	1.17	0.00	0.00	1.17
ANN	5,760.00	1,600.00	4,160.00	0.00	0.00	4,160.00

Download Data (

Text - Formatted

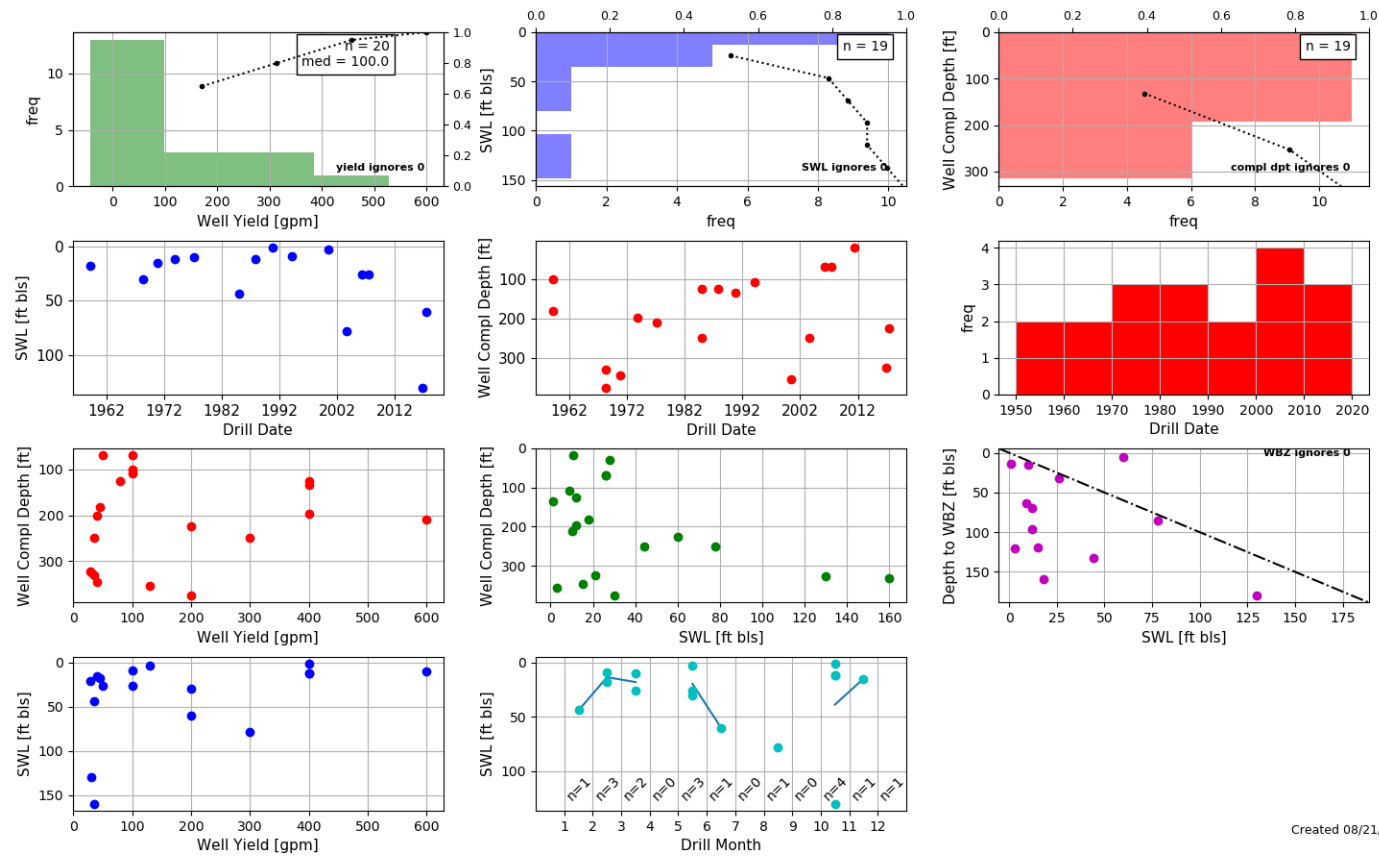
Text - Tab Delimited

Excel

)

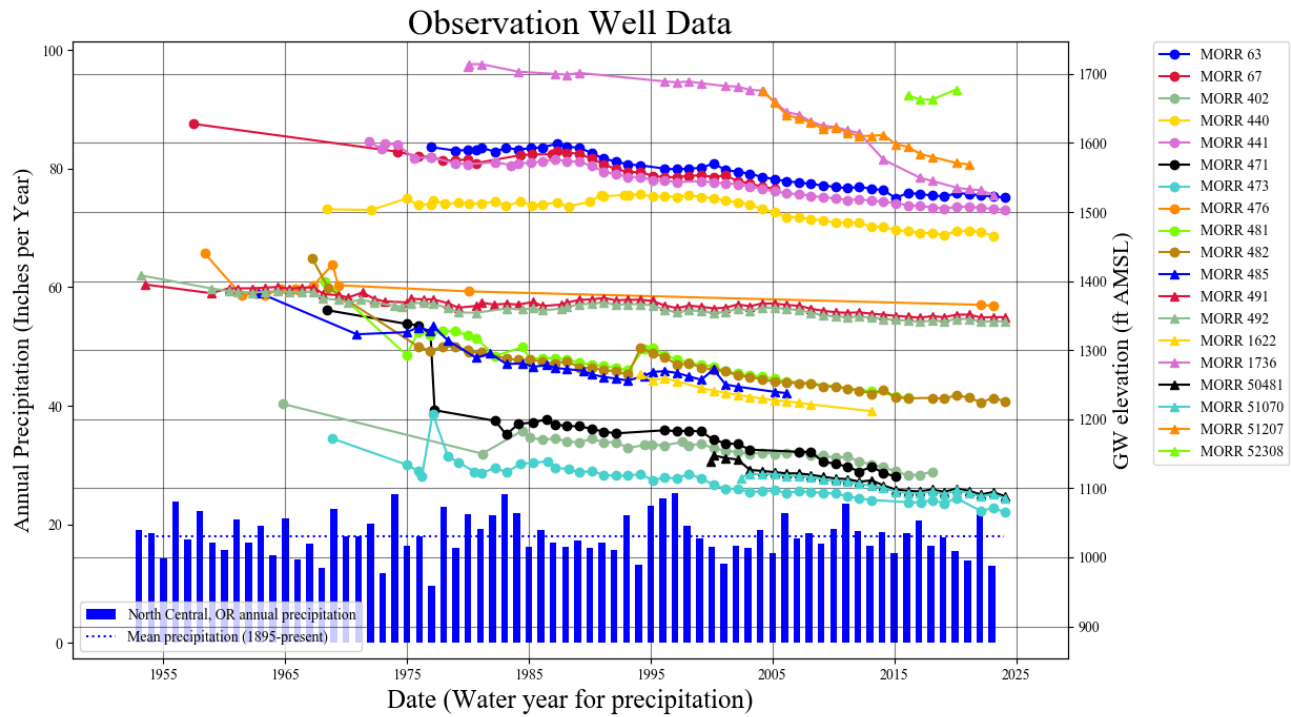
note: 80% exceedance was used but “50%” is incorrectly displayed in the tables.

Well Statistics (T1S/R28E & T2S/R28E, all sections)

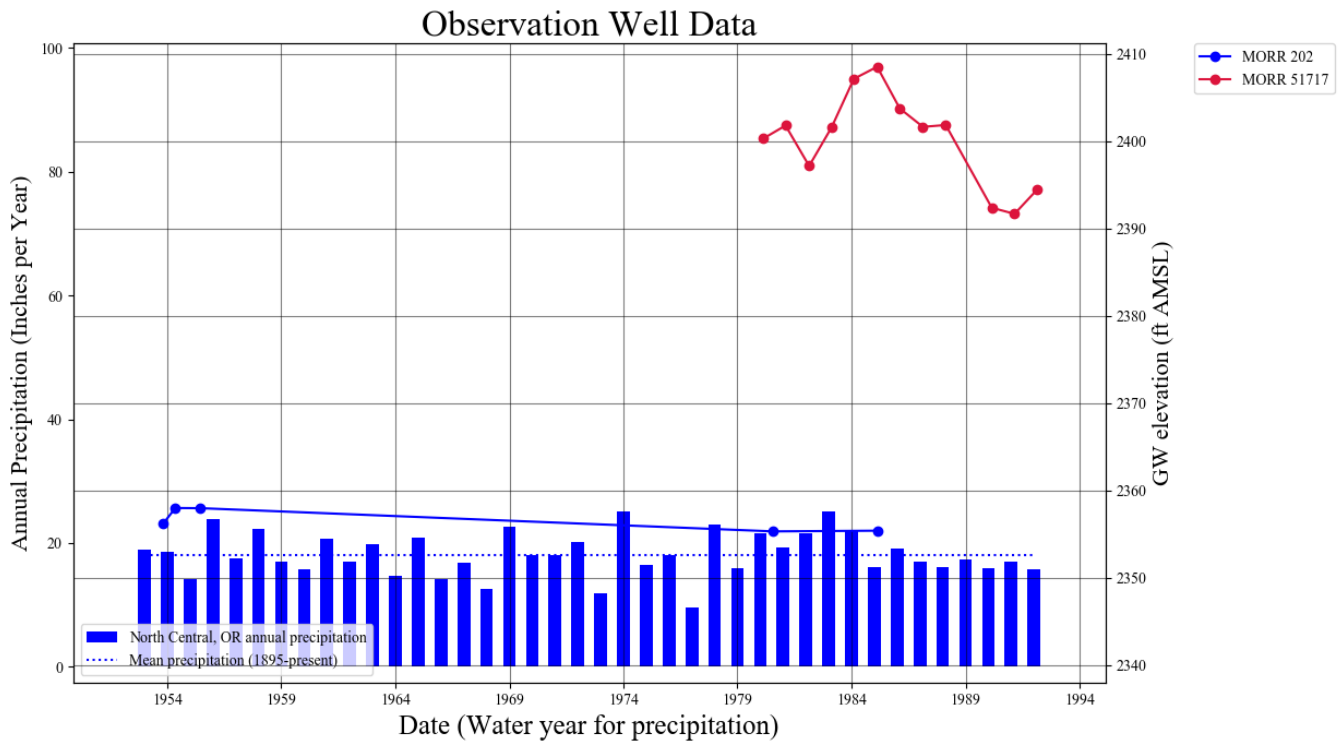


Created 08/21/2024

Water-Level Measurements in Nearby Wells



Wells approximately 7 miles north located along Butter Creek.



Wells within ~1 mile of POAs 1 and 3.

Theis Interference Analysis

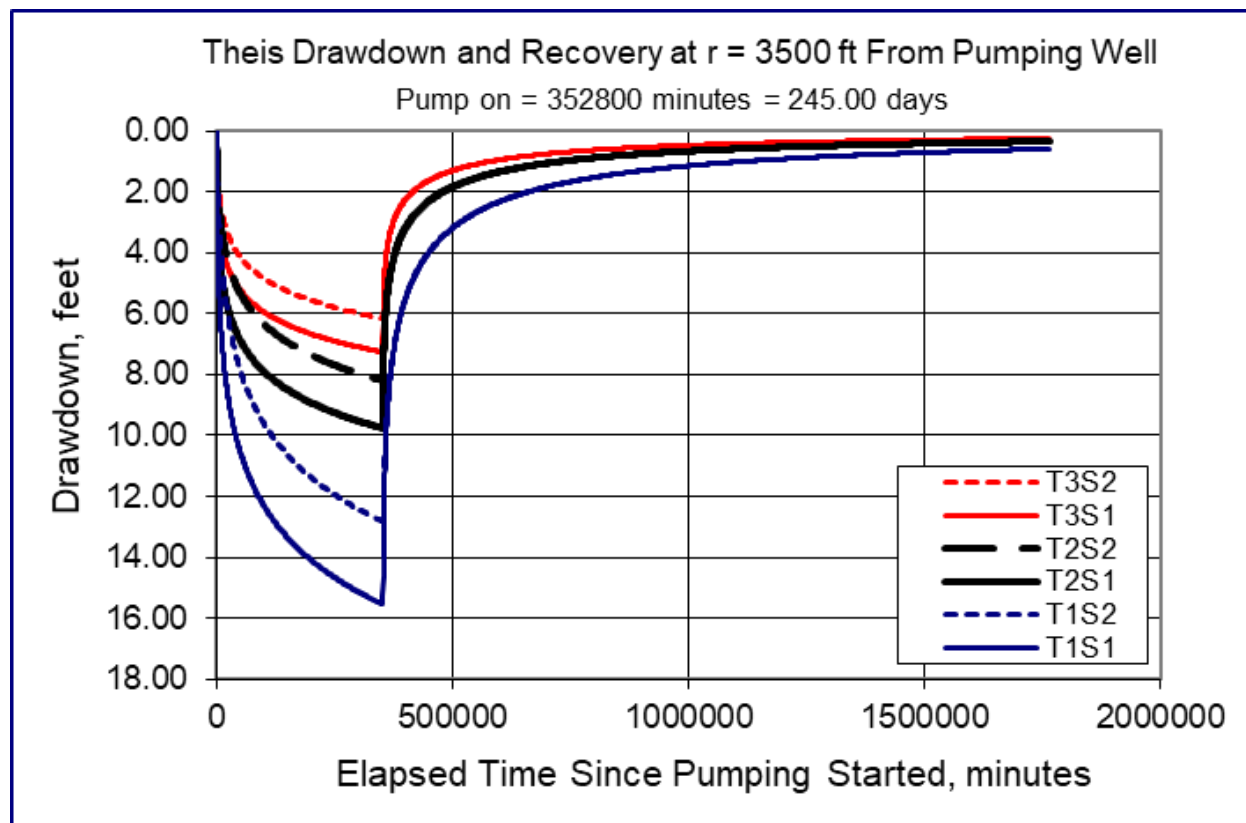
Hydraulic Conductivity: Values ranged from 2 ft/day (MORR 317 well test) to 36 ft/day (MORR 61 well test) over five well tests complete in the Grande Ronde Formation of the Columbia River Basalt Group (MORR 60, MORR 61, MORR 317, MORR 51098, MORR 51210). The final transmissivity estimates of 2,348, 4,090, and 5,796 were the 1st, 2nd, and 3rd quartiles from 200-model runs using a range of the previously stated hydraulic conductivity values.

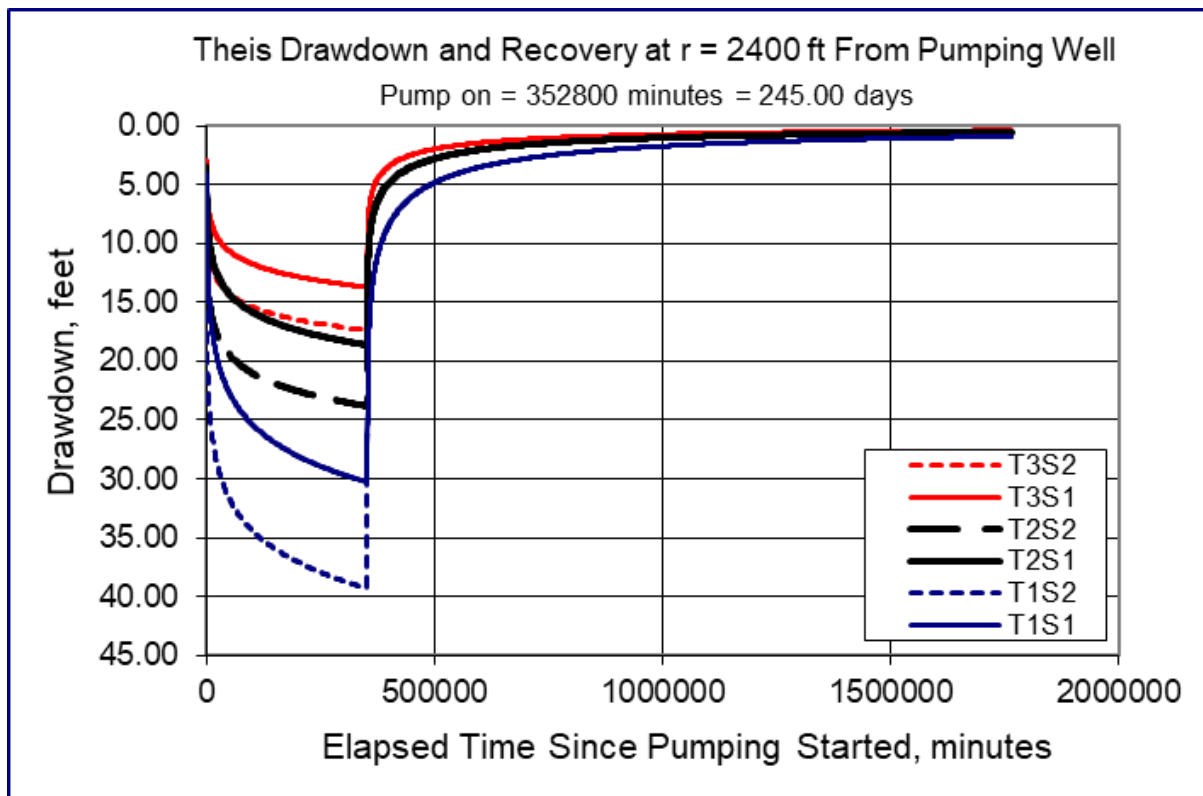
Storativity: 0.0001 to 0.00001 (USDOE, 1988; Porcello et al., 2009). The final storativity estimates of 0.00027 and 0.00077 are the 1st and 3rd quartiles from 200-model runs using this range of storativity values.

Time: 245 days (Irrigation Season).

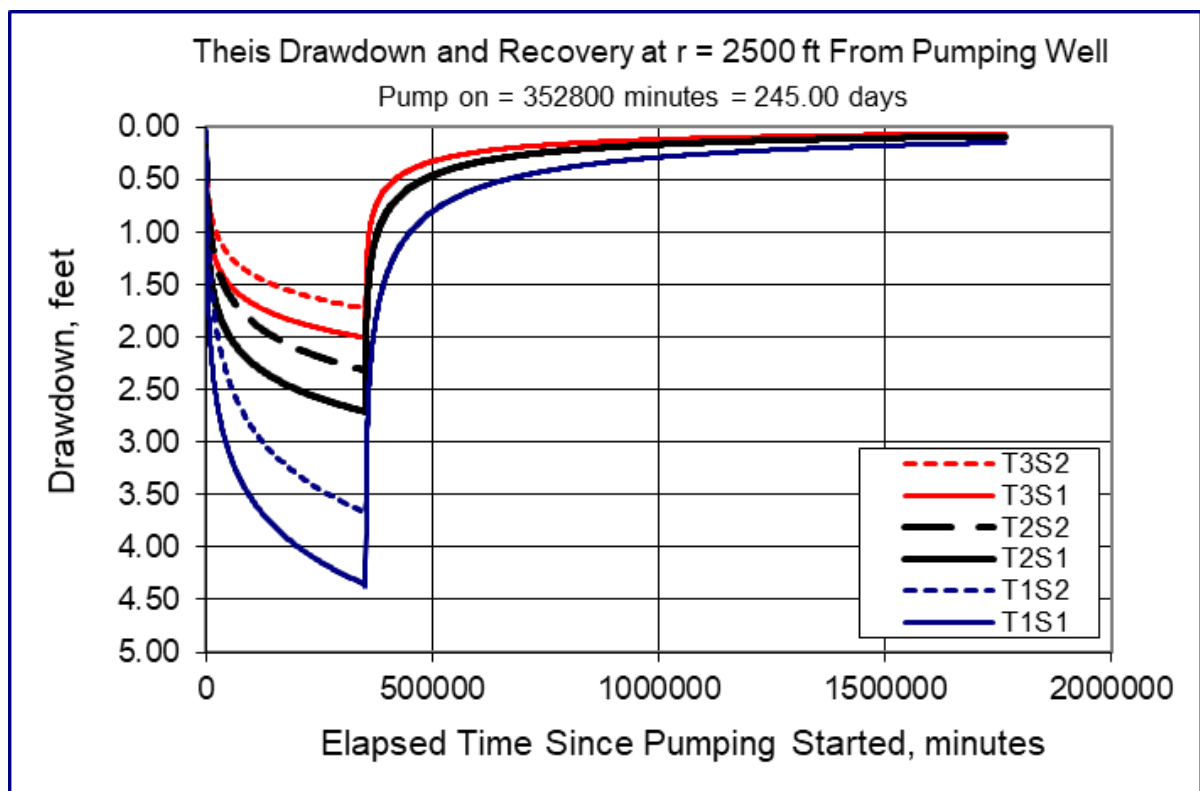
Rate: (1) 0.89 cfs (POA 1 Rate); (2) 1.34 cfs (POA 2 Rate); (3) 0.22 cfs (POA 3 rate); (4) 0.5 cfs (POA 2 suggested rate)

Distance: See plots below





POA 2 Rate and Distance



POA 3 Rate and Distance