Groundwater Transfer Review Summary Form

Transfer/PA # T- _14441_

GW Reviewer _Grayson Fish_ Date Review Completed: _6/26/2024_

Summary of Same Source Review:

☒ The proposed change in point of appropriation is not within the same aquifer as per OAR 690-380-2110(2).

Summary of Injury Review:

☒ The proposed transfer will result in another, existing water right not receiving previously available water to which it is legally entitled or result in significant interference with a surface water source as per 690-380-0100(3).

Summary of GW-SW Transfer Similarity Review:

☒ The proposed SW-GW transfer doesn't meet the definition of "similarly" as per OAR 690-380-2130.

This is only a summary. Documentation is attached and should be read thoroughly to understand the basis for determinations.

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Ground Water Review Form:

- ☐ **Water Right Transfer**
- ☒ **Permit Amendment**
- ☐ **GR Modification**
- ☐ **Other**

Application: T-14441 Applicant Name: City of Bandon

Proposed Changes: ☐ POA ☐ APOA ☒ SW→GW ☐ RA ☐ USE ☐ POU ☐ OTHER

Reviewer(s): Grayson Fish Date of Review: 6/26/2024

Date Reviewed by GW Mgr. and Returned to WRSD: JTI 8/15/25

The information provided in the application is insufficient to evaluate whether the proposed transfer may be approved because:

☐ The water well reports provided with the application do not correspond to the water rights affected by the transfer.

☐ The application does not include water well reports or a description of the well construction details sufficient to establish the ground water body developed or proposed to be developed.

☐ Other _____

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1. Basic description of the changes proposed in this transfer: The applicant proposes to transfer a 1 cfs portion authorized under surface water permit **S-3011** from surface water PODs 1 and 2 to proposed groundwater POA Wells 1 – 6. The applicant has provided a technical memorandum titled "*Supporting Data for a Change from Surface Water PODs to Groundwater POAs*" (the memorandum) prepared by Summit Water Resources, LLC and dated February 1, 2024. The memorandum was reviewed as part of this SW-GW transfer review.
2. Will the proposed POA develop the same aquifer (source) as the existing authorized POA?
   For POD #1: ☐ Yes ☒ No
   For POD #2: ☒ Yes ☐ No

Comments: POD 1 is a diversion from Geiger Creek Reservoir (Figure 1). POD 2 is a diversion from Ferry Creek below the confluence with Geiger Creek, which enters Ferry Creek from the south. The proposed POAs will source water from the unconsolidated sands and gravels of the Pleistocene aged Pioneer marine terrace sediments north of Ferry Creek (sediments). The thickness of the sediments appears to be approximately 60 to 100 feet thick with a saturated thickness of approximately 30 to 50 feet in the vicinity of the proposed well field based on nearby well logs. Static water levels in sedimentary wells near the proposed POA tend to have static water levels that closely match the elevation at which water is first encountered when drilling indicating that the sedimentary aquifer is unconfined in the vicinity of the proposed POA.

The sediments are underlain by Cretaceous to Jurassic aged mélange of the Sixes River terrane that constitutes the bedrock of the area (bedrock, Wiley et. al., 2014). This underlying bedrock is expected to be much less permeable than the sediments. Mapped outcrops of the bedrock along Ferry Creek indicate that the stream has incised though the sediments, and the sedimentary aquifer is not hydraulically contiguous across the stream. This suggests that the proposed POAs would not source water from the same aquifer as POD 1 on Geiger Creek.

It is likely that groundwater within the sediments in the vicinity of the proposed POAs is flowing toward the margins of the terrace where Ferry Creek has incised through it, and that groundwater discharges at the contact of the terrace and the bedrock and then flows subaerially to Ferry Creek. Therefore, groundwater in the vicinity of the wellfield is tributary to Ferry Creek which is the location of POD 2 (below the confluence with Geiger Creek).

Additional discussion regarding whether groundwater appropriation would affect surface water "similarly" as defined in OAR 690-380-2130 is included in item 6 of this transfer review form.

3. Is there more than one source developed under the right (e.g., basalt and alluvium)?
☐ Yes ☒ No N/A

b) If yes, estimate the portion of the right supplied by each of the sources and describe any limitations that will need to be placed on the proposed change (rate, duty, etc.): _____

4. a) Will this proposed change, at its maximum allowed rate of use, likely result in an increase in interference with **another ground water right**?
☒ Yes ☐ No Comments: Changing from a surface water POD to groundwater POAs is likely to result in an increase in interference with wells in the vicinity of the proposed well field that source water from the marine terrace sediment aquifer. A POA (COOS 3899) for groundwater permit G-13568 is located approximately 600 feet from proposed POA Well 1 in addition to numerous exempt wells located to the northeast of the proposed well field.

b) If yes, would this proposed change, at its maximum allowed rate of use, likely result in another groundwater right not receiving the water to which it is legally entitled?

☒ Yes ☐ No If yes, explain: The Theis time-distance drawdown equation was used to estimate potential drawdown in nearby wells. Aquifer properties were referenced from the "Phase Two Groundwater Resources Study" prepared by Golder Associates Inc. for the Bandon Cranberry Water Control District (2004). Given that it is unlikely that a single proposed well would be able to produce at the maximum allowable rate of 1 cfs, the center of the well field was used to simulate the drawdown center if all wells were pumping at a total combined rate of 1 cfs.

COOS 3899, a POA for groundwater permit G-13568 with a priority date of 2/20/1998, is located approximately 1,200 feet northwest of the well field pumping center. The well log of COOS 3899 states that the well had a static water level of 18 feet in October of 1985 with a total depth of 102 feet. The Theis equation predicts 47 to 72 feet of drawdown at 1,200 feet if the well field was to be pumped at a combined rate of 1 cfs for 365 days. If pumping time was reduced to 30 days, estimated drawdown is between 32 to 50 feet. The predicted amount of well-to-well interference would likely prevent G-13568 from receiving the water it is legally entitled to.

There are numerous domestic wells located northeast of the proposed well field at distances of approximately 1,000 to 4,400 feet. Well logs such has COOS 58016, COOS 57774, and COOS 56659 show a 30 to 50 foot thick zone of saturated marine terrace sediments with bottoms of the wells terminating several feet into "clay" or "sandstone" suggesting that bottom the marine terrace aquifer was reached. The Theis equation predicts 49 to 75 feet of drawdown at 1,000 feet and 32 to 49 feet of drawdown at 4,400 feet if the well field was to be pumped at a combined rate of 1 cfs for 365 days. If pumping time was reduced to 30 days, estimated drawdown is 35 to 52 feet at a distance of 1,000 feet and 16 to 28 feet at a distance of 4,400 feet. Exempt wells in the area likely fully penetrate the marine terrace aquifer, therefore the predicted amount of well-to-well interference would likely prevent exempt wells in the vicinity of the proposed well field from receiving the water they are legally entitled to.

It should be noted that the permit proposed for transfer, S-3011, has a priority date of 6/19/1916 and is likely the most senior right in the area. Additionally, the memorandum supplied by the applicant states "Potential interference effects of pumping at the proposed POAs on these nearby domestic wells will be evaluated as part of the test well drilling to be completed at the start of project implementation."

5. a) Will this proposed change, at its maximum allowed rate of use, likely result in an increase in interference with **another surface water source**?

☒ Yes ☐ No Comments: This SW-GW transfer as it is proposed will likely result in a decrease in groundwater discharge via seeps between the contact of the marine terrace sediments and bedrock which flow into Ferry Creek above the confluence of Ferry and Geiger Creek.

b) If yes, at its maximum allowed rate of use, what is the expected change in degree of interference with any **surface water sources** resulting from the proposed change?

Stream: Ferry Creek ☒ Minimal ☐ Significant

Stream: _____ ☐ Minimal ☐ Significant

Provide context for minimal/significant impact: The proposed well field would result in a

decrease in groundwater discharge to Ferry Creek upstream of the location of POD 2 which is below the confluence of Ferry and Geiger Creek. S-3011, has a priority date of 6/19/1916, and is the most senior right on Ferry and Geiger Creeks. Discussions with the District 15 Watermaster suggested regulation on Ferry Creek was rare and that flow can be augmented by releasing stored water from reservoirs on Ferry and Geiger Creeks. Impacts on surface water resulting from this SW-GW transfer is expected to be minimal compared to the current SW use and management regime.

6. For SW-GW transfers, will the proposed change in point of diversion affect the surface water source similarly (as per OAR 690-380-2130) to the authorized point of diversion specified in the water use subject to transfer?

☐ Yes ☒ No Comments: Given that the location of the proposed well field is located greater than 500' from the confluence of Ferry and Geiger Creek, one of the points of surface water diversion, the applicant has provided a memorandum prepared by a licensed geologist as per the requirement of OAR 690-380-2130(2)(e). The memorandum states that "it appears highly likely that the marine terrace deposits are in hydraulic connection with the authorized surface water source" and provides cross sections depicting quaternary Pioneer Terrace Sediments in direct contact with Holocene alluvium deposits of Ferry Creek (Figures 2, 3, and 4 of the memorandum). This interpretation does not appear to be supported by the geologic map (Wiley et. al., 2014) reviewed by the Department. Wiley et. al. depicts older bedrock (KJss, KJs and Tefm) along much of the hillside of Ferry and Geiger Creeks and quaternary alluvium or modern fill in the valley bottoms (Figure 2). This suggests that Ferry and Geiger Creek have eroded though the overlying quaternary marine terrace sediments and into the older bedrock, vertically separating Ferry and Gieger Creeks and the marine terrace sediments.

As part of this technical review, the reviewer conducted a site visit on July 18, 2024 to make field observations. An outcrop of sandstone bedrock was observed near the base of the hillside north of Ferry Creek during a site visit (Photo 1) matching the geology as mapped in Wiley et. al. Additionally, water was observed flowing down a ravine on the north side of Ferry Creek into a PVC intake pipe that discharged to the creek (Photo 2 and 3). This observation suggests that groundwater is discharging further up the hillslope, possibly from the contact of the marine terrace deposits and bedrock, and traveling subaerially to Ferry Creek.

Using a preponderance of the evidence standard (51% certainty), it appears that groundwater in the vicinity of proposed POAs do not have a direct connection to Ferry or Geiger Creeks and therefor the use of stream depletions models Jenkins (1970) or Hunt (1999) are not appropriate to determine if groundwater use will affect the surface water source "similarly" as defined in OAR 690-380-2130(11)(b). However, if the applicant is able to pump at the maximum proposed rate of 1 cfs, it is possible that the well field may be able to capture 0.5 cfs of marine terrace groundwater that would have otherwise discharged to Ferry Creek within 10 days, meeting the functional meaning of "similarly".

As discussed in Section 2 of this review form, POD 1 drawing from Geiger Reservoir is not hydraulically connected to or the same source as the proposed POA wellfield. Pumping from the proposed POA will not affect Geiger Creek nor POD 1 "similarly" as defined in OAR 690-380-2130.

As discussed in Section 2, POD 2 draws from Ferry Creek below its confluence with Geiger Creek and Geiger Reservoir. Building on the conceptual model in Section 2, the proposed POA wellfield is expected to capture groundwater that would otherwise have discharged to Ferry Creek. The lack of hydraulic connection of groundwater in the vicinity of the proposed well field and Geiger Creek means that the proposed change in point of diversion is NOT LIKELY to affect the surface water source similarly.

7. What conditions or other changes in the application are necessary to address any potential issues identified above: _____

8. Any additional comments:_____

References:

Golder Associates, Inc. 2004. *Phase Two Groundwater Resources Study Bandon, Oregon.*

Summit Water Resources, LLC. 2024. *Supporting Data for a Change from Surface Water PODs to Groundwater POAs.*

Theis, Charles. "The Relation between the Lowering of the Piezometric Surface and the Rate and Duration of Discharge of a Well Using Ground Water Storage." Ground Water Notes Hydraulics 5 (1952): 9.

Thomas J. Wiley, Jason D. McClaughry, Lina Ma, Katherine A. Mickelson, Clark A. Niewendorp, Laura L. Stimely, Heather H. Herinckx, and Jonathan Rivas. 2014. *Geologic map of the southern Oregon coast between Port Orford and Bandon, Curry and Coos Counties, Oregon*. Open-File Report 02014-01. Oregon Department of Geology and Mineral Industries.

Figure 1

T-14441 SW-GW Transfer

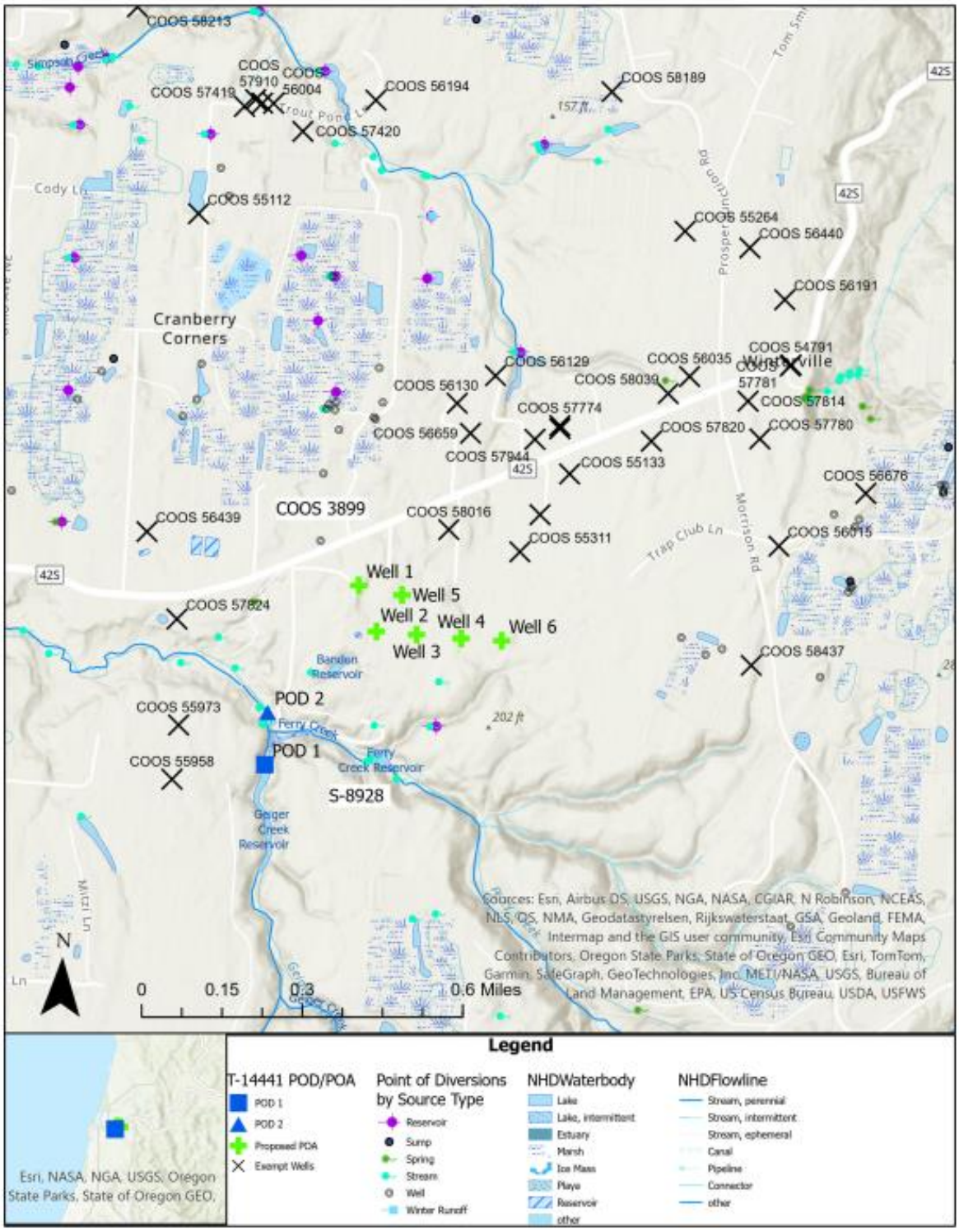
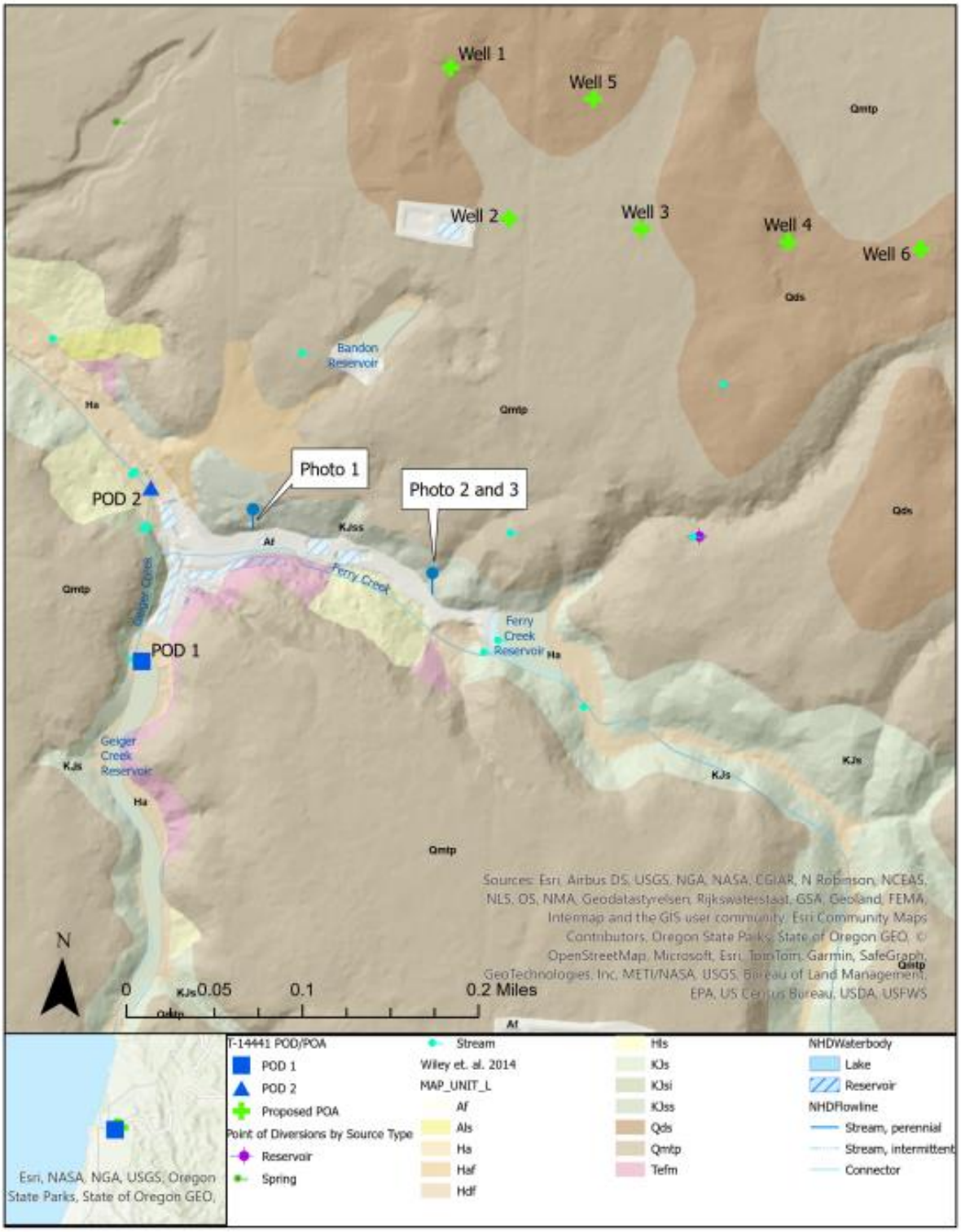


Figure 2

T-14441 SW-GW Transfer - Geology



Theis Time-Drawdown

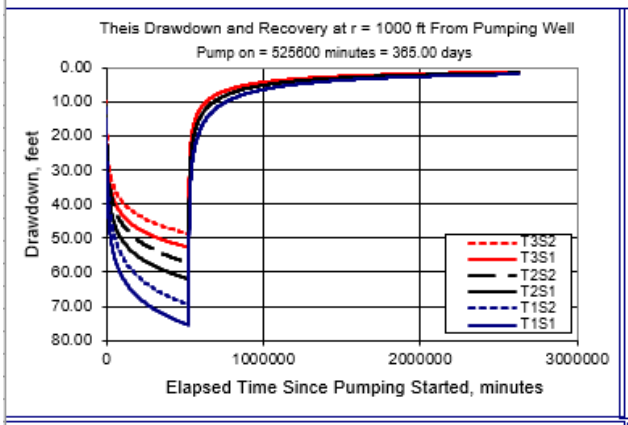
Theis Time-Drawdown Workshee v.5.00

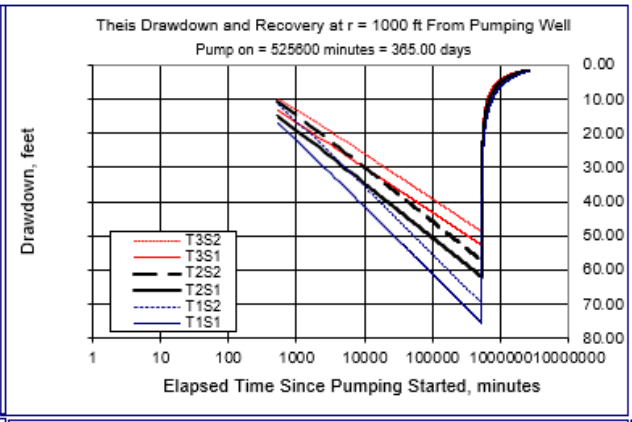
Calculates Theis nonequilibrium drawdown and recovery at any arbitrary radial distance, r, from a pumping well for 3 different T values and radial distance, r, from a pumping well for 3 different T values and 2 different S values.

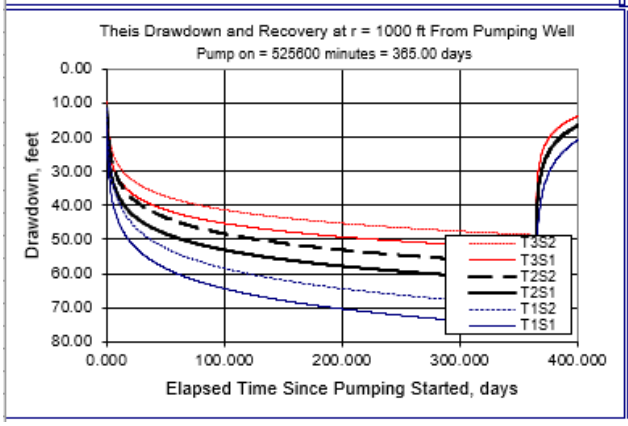
Written by Karl C. Wozniak September 1992. Last modified December 17, 2019

Input Data:	Var Name	Scenario 1	Scenario 2	Scenario 3	Units	
Total pumping time	t		365		d	
Radial distance from pumped well:	r		1000		ft	Q conversions
Pumping rate	Q		1		cfs	448.80 gpm
Hydraulic conductivity	K	8	10	12	ft/day	1.00 cfs
Aquifer thickness	b		100		ft	60.00 cfm
Storativity	S_1		0.0001			86,400.00 cfd
	S_2		0.0002			1.98 af/d
Transmissivity Conversions	T_f2pd	800	1000	1200	ft2/day	
	T_ft2pm	0.5555556	0.6944444	0.8333333	ft2/min	Recalculate
	T_gpdpft	5984	7480	8976	gpd/ft	

Use the Recalculate button if recalculation is set to manual







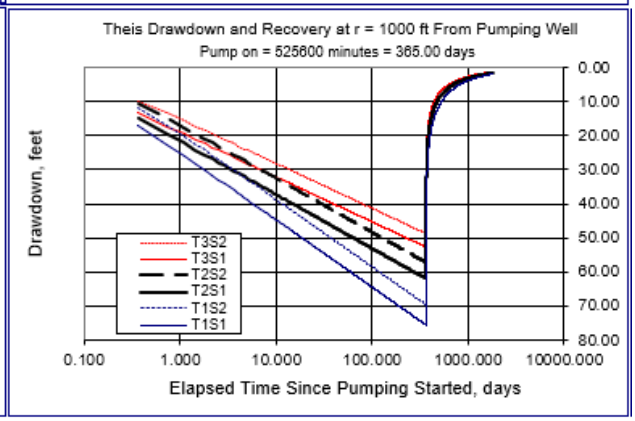


Photo 1: Sandstone bedrock observed at the base of the hill side north of Ferry Creek

Photo 2: Ravine obscured by vegetation. Flowing water observed near skunk cabbage in bottom left of photo.

Photo 3: PVC pipe visible in center of photo. Pipe discharges to Ferry Creek to the south.