

Groundwater Application Review Summary Form

Application # G- 19070

GW Reviewer Joe Kemper Date Review Completed: 3/18/2021

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

March 18, 2021

TO: Application G- 19070

FROM: GW: Joe Kemper
(Reviewer's Name)

SUBJECT: Scenic Waterway Interference Evaluation

☐ YES The source of appropriation is hydraulically connected to a State Scenic
☒ NO 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 NA 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 3/18/2021
 FROM: Groundwater Section Joe Kemper
 Reviewer's Name
 SUBJECT: Application G- 19070 Supersedes review of NA
 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: Hackett Investments LLC County: Coos

A1. Applicant(s) seek(s) 0.03 cfs from 2 well(s) in the South Coast Basin,
Coquille subbasin

A2. Proposed use Irrigation/Nursery (0.7 ac) & Ag. Uses (17 AF total) Seasonality: Year round

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	Bedrock	0.03	27S/13W-21 NW-SE	488' N, 483' E fr CS1/16, sec 21
2	Proposed	2	Bedrock	0.03	27S/13W-21 NW-SE	112' N, 264' E fr CS1/16, sec 21
3						
4						

* 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	47	na	*25-50	na	200	0-20	0-125	na	40-125	na	na	na
2	80	na	*25-50	na	200	0-20	0-125	na	40-125	na	na	na

Use data from application for proposed wells.

A4. **Comments:** Both wells are proposed and the construction details above were copied from well report for the adjacent COOS 52923. Total depth and completed intervals may change depending on conditions encountered while drilling, but the applicant asserts that wells will conform to all applicable well construction standards.

*SWLs are estimated based on observations in other bedrock wells in the vicinity and COOS 52923.

A5. ☒ **Provisions of the** South Coast (OAR 690-517) 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 South Coast basin rules contains no such provisions.

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

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

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

- a. ☐ **is** over appropriated, ☐ **is not** over appropriated, or ☒ **cannot be determined to be** over appropriated during any period of the proposed use. * This finding is limited to the groundwater portion of the over-appropriation determination as prescribed in OAR 690-310-130;
- b. ☐ **will not** or ☐ **will** likely be available in the amounts requested without injury to prior water rights. * This finding is limited to the groundwater portion of the injury determination as prescribed in OAR 690-310-130;
- c. ☐ **will not** or ☐ **will** likely to be available within the capacity of the groundwater resource; or
- d. ☒ **will, if properly conditioned**, avoid injury to existing groundwater rights or to the groundwater resource:
 - i. ☒ The permit should contain condition #(s) 7C, 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 _____ groundwater reservoir between approximately _____ ft. and _____ ft. below land surface;
 - d. ☐ **Well reconstruction** is necessary to accomplish one or more of the above conditions. The problems that are likely to occur with this use and without reconstructing are cited below. Without reconstruction, I recommend withholding issuance of the permit until evidence of well reconstruction is filed with the Department and approved by the Groundwater Section.

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

- B3. **Groundwater availability remarks:** The applicant's wells will access an aquifer hosted in the sandstone of the Upper Member of the Coaledo Formation (Tecu). The Bastendorff Shale (Teb), a sequence of mostly fine-grained sedimentary units, conformably overlies Tecu immediately to the NW of the applicant's well and may be encountered near the surface by. Bedding planes of both units dip moderately to the SE, and there is a concealed thrust fault ~2000 feet to the northwest striking NE-SW (Wiley et al., 2015). Groundwater is likely stored and transmitted by bedding planes and fractures within the bedrock units. The applicant's wells are located specifically on an isolated topographic bedrock high which rises ~150 feet above the surrounding floodplain sediments of the Coquille River system. These sediments are a few tens to 100 feet thick. The applicant's wells would first produce water from the bedrock. If the resulting cone of depression spread sufficiently to encounter these sediments, they would likely act as an additional source of water to the wells and buffer impacts to the bedrock system.

Well yields in the area are predominately low (median yield in well reports for TRS 27S/13W-21 = 7 gpm) and typically decrease with depths beyond 200 feet BLS. Individual well reports typically indicate static water levels (SWLs) of 20-50 feet BLS with no marked change with depth. These observations are consistent with a fractured bedrock aquifer conceptual model. There are no OWRD observation wells in the vicinity with recent water level records that would indicate the resource is over appropriated.

There are no other permitted wells within a mile of the applicant's well. However, there are several permitted springs within ¼ mile and adjacent tax lots are likely supplied by exempt-use domestic wells. The topographic low between the applicant's wells and the springs combined with the surrounding floodplain sediments will likely buffer pumping impacts to these groundwater sources. Maximum well-to-well interference to the closest tax lot is estimated to be 5-15 feet using a Theis-distance drawdown model (Theis, 1935). The low requested rate and hydrogeologic setting reduces the likelihood of injury. The above permit conditions should be applied in case these estimates are exceeded.

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	Bedrock of Coaledo Formation	☐	☒
2	Bedrock of Coaledo Formation	☐	☒
		☐	☐
		☐	☐

Basis for aquifer confinement evaluation: In fractured-bedrock aquifer systems, water is stored and transmitted primarily by discrete but connected fracture sets. These fractures generally extend to near the surface, so water within these fractures is likely under atmospheric pressure (unconfined) despite an overall low storage coefficient for the aquifer system as a whole and static water levels often reported above water-bearing zones on driller's logs.

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	Beaver Slough	0-25	~5	1380	☒	☐	☐	☐	☒
2	1	Beaver Slough	30-55	~5	1490	☒	☐	☐	☐	☒
1	2	Coquille River	0-25	~5	7175	☒	☐	☐	☐	☒
2	2	Coquille River	30-55	~5	7600	☒	☐	☐	☐	☒

Basis for aquifer hydraulic connection evaluation: Groundwater level elevations are above or commensurate with adjacent surface water sources without a definitive confining geologic unit in between. This indicates that groundwater can flow towards and discharge to adjacent streams. Aerial imagery shows an extensive network of open ditches in the surrounding floodplain sediments that were constructed to drain water to allow for agricultural operations. These ditches are not considered to be surface water sources for the purpose of this review.

Water Availability Basin the well(s) are located within: COQUILLE R > PACIFIC OCEAN - 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	☐	☐	NA	NA	☐	77	☐	NA	☐
2	1	☐	☐	NA	NA	☐	77	☐	NA	☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐

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 #		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?
			☐			☐		☐		☐
			☐			☐		☐		☐

Comments: Stream depletion is not estimated here because the two hydrogeologic units present (Tecu and alluvium) likely have quite very different hydraulic properties and are not horizontally bedded, which violate key assumptions of appropriate analytical models e.g. Hunt (1999) or Hunt (2003).

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
1 or 2	2	NA %	NA %	NA %	NA %	NA %	NA %	NA %	NA %	NA %	NA %	NA %	NA %
Well Q as CFS		0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Interference CFS		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
(A) = Total Interf.													
(B) = 80 % Nat. Q		2180	2890	2630	1520	731	358	165	86.4	77	102	541	1890
(C) = 1 % Nat. Q		21.8	28.9	26.3	15.2	7.31	3.58	1.65	0.864	0.77	1.02	5.41	18.9
(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: Analysis is not performed in section C4a because of the points expressed in section C3b and because the maximum pumping rate (0.03) cfs is less than 1% of the 80% exceedance flow in September for the pertinent WAB (1% of 77 cfs or 0.77 cfs). Stream depletion could not exceed this benchmark and result in a finding of PSI.

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;

This image shows a full page of white paper with horizontal black lines, resembling notebook paper. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Hunt, B. 1999. Unsteady stream depletion from ground water pumping. Ground Water 37, no. 1: 98–102.

Hunt, B. 2003. Unsteady stream depletion when pumping from semiconfined aquifer. Journal of Hydrologic Engineering 8, no. 1. 12–19.

OWRD Groundwater Information System Database – Accessed 3/18/2021.

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, Am. Geophys. Union Trans., vol. 16, pp. 519-524.

Wiley, T.J., McClaughry, J.D., Niewendorp, C.N., Ma, L., Herinckx, H.H., and Mickelson, K.A., 2015, Geologic map of the southern Oregon coast between Bandon, Coquille, and Sunset Bay, Coos County, Oregon, Oregon Department of Geology and Mineral Industries, Open-File Report O-15-04, 1:24,000.

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:** NA. Wells are proposed.
- D4. ☐ **Route to the Well Construction and Compliance Section for a review of existing well construction.**

Water Availability Tables

Water Availability Analysis

Detailed Reports

COQUILLE R > PACIFIC OCEAN - AT MOUTH
SOUTH COAST BASIN

Water Availability as of 3/18/2021

Watershed ID #: 384 ([Map](#))

Date: 3/18/2021

Exceedance Level: 80% ▾

Time: 4:19 AM

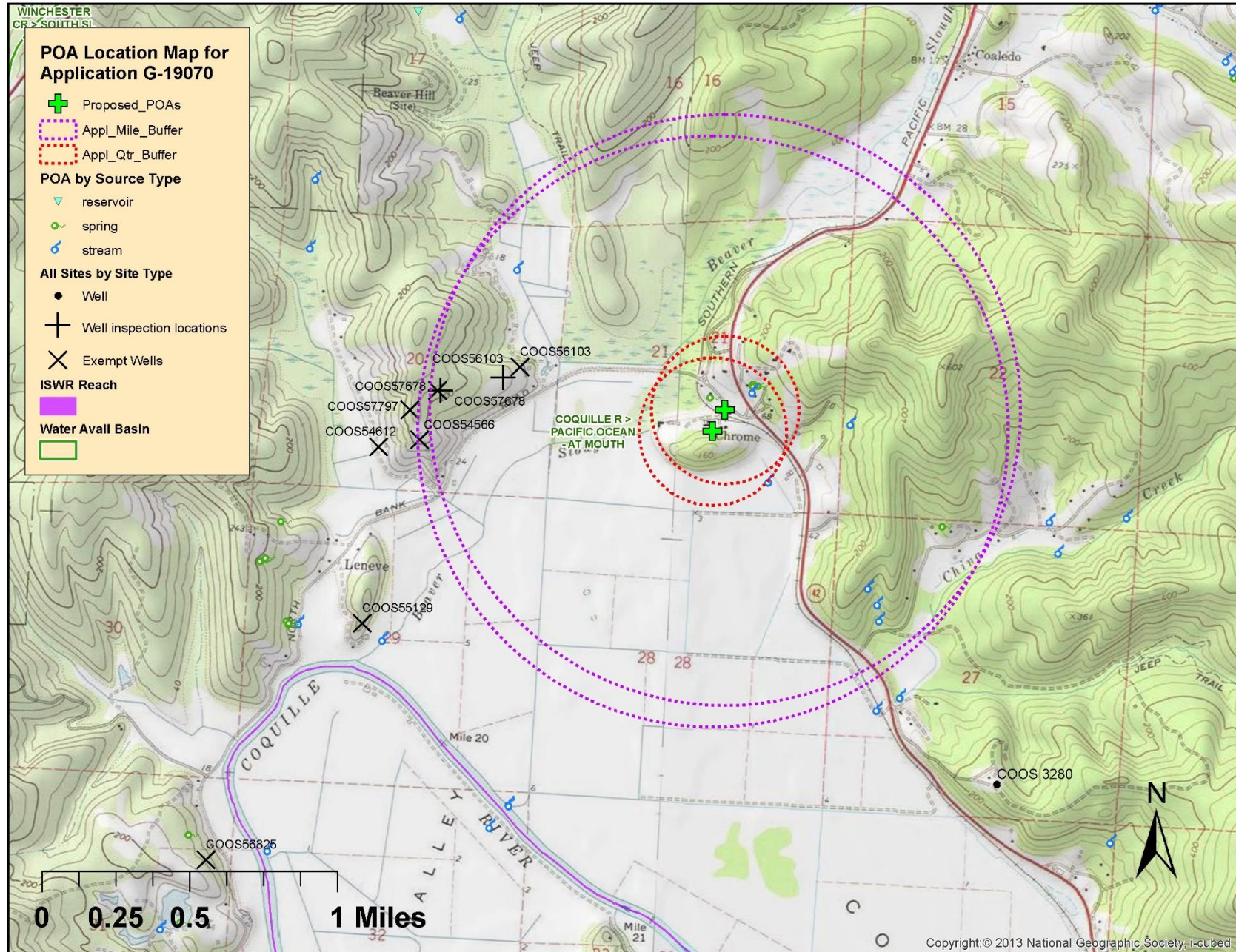
Water Availability Calculation	Consumptive Uses and Storages	Instream Flow Requirements	Reservations
Water Rights		Watershed Characteristics	

Water Availability Calculation

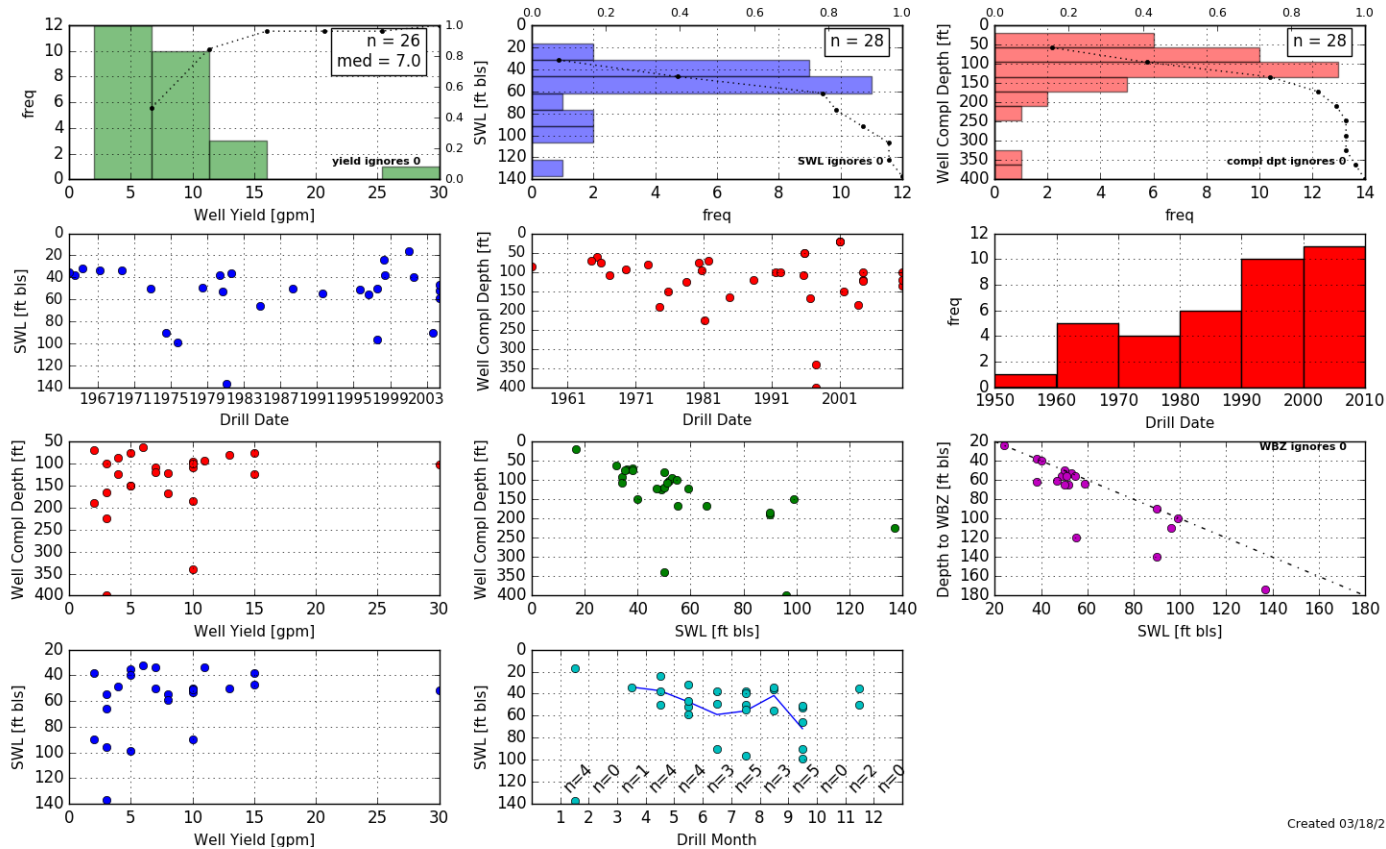
Monthly Streamflow in Cubic Feet per Second
Annual Volume at 50% Exceedance in Acre-Feet

Month	Natural Stream Flow	Consumptive Uses and Storages	Expected Stream Flow	Reserved Stream Flow	Instream Flow Requirement	Net Water Available
JAN	2,180.00	20.50	2,160.00	0.00	360.00	1,800.00
FEB	2,890.00	21.30	2,870.00	0.00	340.00	2,530.00
MAR	2,630.00	17.20	2,610.00	0.00	340.00	2,270.00
APR	1,520.00	16.50	1,500.00	0.00	340.00	1,160.00
MAY	731.00	25.40	706.00	0.00	340.00	366.00
JUN	358.00	50.80	307.00	0.00	200.00	107.00
JUL	165.00	71.60	93.40	0.00	71.00	22.40
AUG	86.40	60.20	26.20	0.00	71.00	-44.80
SEP	77.00	32.70	44.30	0.00	71.00	-26.70
OCT	102.00	12.20	89.80	0.00	380.00	-290.00
NOV	541.00	13.60	527.00	0.00	380.00	147.00
DEC	1,890.00	18.90	1,870.00	0.00	360.00	1,510.00
ANN	1,710,000.00	21,900.00	1,690,000.00	0.00	196,000.00	1,500,000.00

Well Location Map



Summary Statics for Well Reports Filed in TRS 27S/13W-21



Created 03/18/2021

Well-to-Well Interference Modeling (Theis, 1935) This represents a worst-case scenario where the entire requested volume is pumped continuously from Well 2 and impacts are assessed to the house on tax lot 2301.

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		285		d	
Radial distance from pumped well:	r		375		ft	Q conversions
Pumping rate	Q		13.5		gpm	13.50 gpm
Hydraulic conductivity	K	1	3.2	10	ft/day	0.03 cfs
Aquifer thickness	b		100		ft	1.80 cfm
Storativity	S_1		0.001			2,598.93 cfd
	S_2		0.0001			0.06 af/d
Transmissivity Conversions	T_f2pd	100	320	1000	ft ² /day	
	T_ft2pm	0.0694444	0.2222222	0.6944444	ft ² /min	
	T_gpdpt	748	2393.6	7480	gpd/ft	

Use the Recalculate button if recalculation is set to manual

