Groundwater Application Review Summary Form

Application # G- <u>19434</u>

GW Reviewer <u>Darrick E. Boschmann</u> Date Review Completed: <u>04/10/2024</u>

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

04/10/2024

TO: Application G-<u>19434</u>

FROM: GW: <u>Darrick E. Boschmann</u> (Reviewer's Name)

SUBJECT: Scenic Waterway Interference Evaluation

- □ YES The source of appropriation is hydraulically connected to a State Scenic Waterway or its tributaries
- □ 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 <u>[Enter]</u> 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	04/10/2024
FROM:	Groundwater Section	Darrick E. Boschmann	
		Reviewer's Name	
SUBJECT:	Application G- 19434	Supersedes review of N/A	
		· · · · · · · · · · · · · · · · · · ·	Date of Review(s)
PUBLIC INT	EREST PRESUMPTION; G	ROUNDWATER	

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. <u>GENERAL INFORMATION</u>: Applicant's Name: <u>Tree Top Ranches LP</u> County: <u>Harney</u>

A1. Applicant(s) seek(s) <u>7.95</u> cfs from <u>2</u> well(s) in the <u>Malheur</u> Basin, Upper Malheur subbasin

A2. Proposed use Irrigation – 138.2 acres supplemental; 497.3 acres primary Seasonality: March 1 – October 31

A3. Well and aquifer data (attach and number logs for existing wells; mark proposed wells as such under logid):

POA 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	HARN 1522	3	Volcanic/sedimentary rocks	5.17	27.00S-36.00E-29-SE SW	564 FEET NORTH AND 3418 FEET WEST FROM SE CORNER, SECTION 29
2	HARN 1523	4	Volcanic/sedimentary rocks	2.78	27.00S-36.00E-33- NE SW	1437 FEET NORTH AND 3158 FEET WEST FROM SE CORNER, SECTION 33
3						
4						

* Alluvium, CRB, Bedrock

POA Well	Well Depth (ft)	Seal Interval (ft)	Casing Intervals (ft)	Liner Intervals (ft)	Perforations Or Screens (ft)	Well Yield (gpm)	Drawdown (ft)	Test Type
1	116	0-18	+1-20	None	None	3400	0.5	Р
2	400	0-41	0-100	None	None	1070	60	Р
3								
4								

POA	Land Surface Elevation at Well	Depth of First Water	SWL	SWL	Reference Level	Reference Level
Well	(ft amsl)	(ft bls)	(ft bls)	Date	(ft bls)	Date
1	4034	77	80.10	03/27/2024	71	06/16/1988
2	4001	16	43.00	3/27/2024	35	2/09/1980
3						
4						

Use data from application for proposed wells.

A4. Comments: _____

The area underlying the proposed wells is an area of complex geology mapped by Greene, 1972 at a scale of 1:250,000. A variety of sedimentary and volcanic units of varying age are present here, including Greene's Qb (basalt – Quaternary) which, in this area is correlative with the Voltage lava field of Piper and others (1939) and the Voltage Flow of Camp and others (2003).

Proposed well HARN 1522 develops groundwater from formations described by the driller as hard, black, broken rock. Based on these descriptions and the unusually high yield it is very likely this well is developing groundwater from the Voltage basalt, which is known to have very high transmissivity.

<u>Proposed well HARN 1522 develops groundwater from formations described by the driller as clay, claystone, sand, sandstone, gravel, and rock. Based on these formation descriptions and the mapped geology this well is likely developing groundwater from Greene's Tts unit (tuffaceous sedimentary rocks) and the underlying Tba unit (basalt and andesite) or Trd</u>

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unit (Rhyodacite).

Groundwater occurs in multiple hydrostratigraphic units, and groundwater within these units is hydraulically connected, making a single groundwater system composed of multiple hydrostratigraphic units (Gingerich and others, 2022).

Previously, two permits have been issued for the same wells and essentially the same lands that are proposed under this application. Permit G-12562 was issued in 1996 and was cancelled in 2003 for failure to submit proof of completion under the terms of the permit. Permit G-16201 was issued in 2007 and cancelled in 2021 for failure to submit proof of completion under the terms of the permit.

It is not clear if any water was ever used under permit G-12562. Water use was reported under permit G-16201 for two years 2013-2014.

A5. **Provisions of the** <u>Malheur</u> Basin rules relative to the development, classification and/or management of groundwater hydraulically connected to surface water \Box are, or \boxtimes are not, activated by this application. (Not all basin rules contain such provisions.) Comments:

A6. Well(s) # _____, ____, ____, ____, tap(s) an aquifer limited by an administrative restriction.

Name of administrative area: ____ Comments: Currently no administrative area.

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

- B1. **Based upon available data**, I have determined that <u>groundwater</u>* 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. \square will not or \square will likely to be available within the capacity of the groundwater resource; or
 - d. uill, if properly conditioned, avoid injury to existing groundwater rights or to the groundwater resource:
 - i. \Box The permit should contain condition #(s)
 - ii. \Box The permit should be conditioned as indicated in item 2 below.
 - iii. \Box 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:

Groundwater level data has been reported to the Department for the two proposed wells (HARN 1522; HARN 1523) since 2010, and drillers' measurements are available for these wells from the 1980s. These two hydrographs indicate approximately 7 to 10 feet of overall decline since the 1980s.

Approximately 1.75 to 2.75 miles to the south, HARN 1566 was measured by the USGS in 1977, and was again measured by OWRD staff from 2016 to 2018. The hydrograph for this well indicates more than 17 feet of decline since 1977.

Approximately 7 miles to the northwest in Virginia Valley, many wells are declining at a rate of approximately 0.7 feet per year.

The available water level record does not meet the Division 8 definition of excessively declining or declined excessively (for the *storage* portion of the source of water to wells).

The nearest authorized wells are over 7 miles away, and any interference resulting from the proposed use is unlikely to meet the standard for substantial or undue interference.

The proposed project area has a similar climate and underlying geology as other nearby areas that are experiencing water level declines in response to groundwater development. Groundwater level declines have already occurred in this area even though groundwater pumping in this immediate area has been minimal. Issuance of a permit for groundwater withdrawals at the rate and duty proposed here will likely contribute to and exacerbate these ongoing groundwater level declines and could impair the function of the aquifer by precluding its perpetual use. Therefore, the proposed use is found to be not within the capacity of the resource as defined in OAR 690-400-0010.

If a permit is issued the following conditions are recommended:

7RLA: Annual Measurement and Decline Condition

7P: Well Tag Condition

7T: Dedicated Measuring Tube Condition for all POA wells

Flow meter condition: Use the water rights "large" permit condition requiring a totalizing flow meter and reporting

Special Permit Condition:

The permittee shall construct one (1) minimum six-inch diameter observation well to penetrate the same aquifer as the production wells. The well shall meet the Department's minimum well construction standards and shall be drilled, cased and sealed to the same depth as the production wells. The well shall be constructed at a location approved by the Department for the purpose of instrumentation with continuous water-level monitoring equipment. The landowner, permittee, or agent shall consult with the Department on the details of well construction and well location prior to construction of the well. The landowner or permittee shall provide access to Department staff to install and maintain the monitoring equipment. The well shall be completed prior to water use under the terms of any permit issued. Water level data collected by the Department from the observation well will be used in addition to water level data collected under condition 7RLA for any evaluation of water level decline or interference.

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	Volcanic/sedimentary rocks		\boxtimes
2	Volcanic/sedimentary rocks		\boxtimes

Basis for aquifer confinement evaluation:

The upper sedimentary deposits and shallow volcanic/sedimentary rocks are likely unconfined. Groundwater in these formations likely becomes semi-confined at depth.

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 ¹/₄ 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)	H YES	Iydra Conn NO	ulically ected? ASSUMED	Potential for Subst. Interfer. Assumed? YES NO	
1	1	Indian Creek	3954	3965	8,170	\boxtimes				\boxtimes
2	1	Indian Creek	3959	3965	13,000	\boxtimes				\boxtimes
1	2	Unnamed Spring (145653886)*	3954	3958	10,840	\boxtimes				\boxtimes
2	2	Unnamed Spring (145653886)*	3959	3958	16,090	\boxtimes				\boxtimes

Basis for aquifer hydraulic connection evaluation: _

Groundwater in this area is flowing northward down the valley of Indian Creek toward the South Fork Malheur River. The groundwater elevations here are nearly coincident with the elevations of the nearest perennial reach of Indian Creek and

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unnamed spring (145653886).

The SW elevation and distance cited above for Indian Creek are based on the nearest perennial reach as depicted in the NHD.

The GW elevations cited above are from the 3/27/2024 static water level measurements reported to the Department.

*Unnamed Spring; NHD Permanent Identifier 145653886.

Water Availability Basin the well(s) are located within: <u>INDIAN CR > S FK MALHEUR R - AT MOUTH</u>

C3a. **690-09-040** (4): Evaluation of stream impacts for <u>each well</u> 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?

C3b. **690-09-040** (**4**): Evaluation of stream impacts <u>by total appropriation</u> 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:

This section does not apply. The proposed wells are located more than one mile from hydraulically connected surface water.

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-D	istributed	Wells											
Well	SW#	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	1	.16 %	.16 %	.04 %	.06 %	.08 %	.10 %	.12 %	.14 %	.16 %	.18 %	.16 %	.16 %
Well (Q as CFS	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92	3.92
Interfei	rence CFS	.006	.006	.002	.002	.003	.004	.005	.005	.006	.007	.006	.006
D: / !!													
Distrit	buted Well	ls					-			~	~		-
Well	SW#	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		%	%	%	%	%	%	%	%	%	%	%	%
Well (Q as CFS												
Interfe	rence CFS												
		%	%	%	%	%	%	%	%	%	%	%	%
Well (Q as CFS												
Interfe	rence CFS												
(A) = T	otal Interf.	.006	.006	.002	.002	.003	.004	.005	.005	.006	.007	.006	.006
(B) = 80) % Nat. Q	1.97	4.07	6.89	12.90	10.30	8.08	2.54	1.07	0.82	1.01	1.64	1.66
(C) = 1	% Nat. Q	0.019 7	0.040 7	0.068 9	0.129	0.103	0.080 8	0.0254	0.010 7	0.008 2	0.010 1	0.016 4	0.0166
										1			
(D) =	(A) > (C)	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
$(\mathbf{E}) = (\mathbf{A})$	/ B) x 100	.30	.15	.03	.02	.03	.05	.20	.47	.73	.69	.37	.36 %
(,	%	%	%	%	%	%	%	%	%	%	%	

(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:

Hunt (2003) was used to calculate the interference between Well 1 and SW 1. The values used for the calculation are conservative and appropriate until better values become available. The calculations used the median transmissivity for the Voltage basalt from Gingerich and others, 2022 (28,000 ft2/day). Additionally, the calculation used an assumed intermediate storage coefficient (0.001). The pumping rate used is the prorated rate of the full duty over the irrigation season (3.92 cfs). Interference is less than 1% of the 80% natural flow in all months. See report attached.

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. \Box The permit should contain condition #(s)

ii. \Box The permit should contain special condition(s) as indicated in "Remarks" below;

C6. SW / GW Remarks and Conditions:

C1. 690-09-040 (1)

It is determined that all proposed wells will produce water from an unconfined aquifer.

C2. 690-09-040 (2) (3)

It is determined that all proposed wells are hydraulically connected with Indian Creek and Unnamed Spring (145653886).

<u>C3a. 690-09-040(4)</u>

This section does not apply. The proposed wells are located more than one mile from hydraulically connected surface water.

<u>C3b. 690-09-040(4)</u>

This section does not apply

C4a. 690-09-040(5)

Interference is less than 1% of the 80% natural flow in all months.

References Used: _____

Camp, V.E., Ross, M.E. and Hanson, W.E., 2003, Genesis of flood basalts and Basin and Range volcanic rocks from Steens Mountain to the Malheur River Gorge, Oregon: *Geological Society of America Bulletin*, 115(1), pp.105-128.

Gingerich, S.B., Johnson, H.M., Boschmann, D.E., Grondin, G.H., Garcia, C.A, 2022, Groundwater Resources of the Harney Basin, Oregon: U.S. Geological Survey Scientific Investigations Report 2021-5103, 116 p.

Greene, R.C., Walker, G.W., and Corcoran, R.E., 1972, Geologic map of the Burns quadrangle, Oregon: U.S. Geological Survey Miscellaneous Geologic Investigations Map I-680, scale 1:250,000.

Piper, A.M., Robinson, T.W., and Park, C.F., 1939, Geology and ground-water resources of the Harney Basin, Oregon, with a statement on precipitation and tree growth: U.S. Geological Survey Water Supply Paper 841, 189 p.

USGS National Hydrology Dataset

OWRD water well reports, water level data, and/or hydrographs

Oregon Administrative Rules

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D. WELL CONSTRUCTION, OAR 690-200

D1.	Well #:	Lo	ogid:			
D2.	THE WELL does n	ot appear to meet curi	rent well constructio	on standards base	d upon:	
	a. \Box review of the	ne well log;				
	b. 🗌 field inspec	tion by				
	$c \square report of C$	WPF				
	d.	1fy)				
D3.	THE WELL constr	uction deficiency or ot	her comment is desc	cribed as follows:		
D4. [Route to the Well	Construction and Com	pliance Section for a	a review of existin	ng well construction.	
Water	r Availability Tables	DETAILED REPORT	ON THE WATER AVAILA	ABILITY CALCULATIO	N	
Water	r Availability Tables	DETAILED REPORT	ON THE WATER AVAILA	ABILITY CALCULATIO	DN	
Water Waters Time:	r Availability Tables shed ID #: 31011632 9:39 AM	DETAILED REPORT	ON THE WATER AVAILA CR > S FK MALHEUR R Basin: MALHEU	ABILITY CALCULATIO - AT MOUTH JR	DN Exceed Da	dance Level: 80 ate: 04/10/2025
Waters Waters Time: Month	r Availability Tables shed ID #: 31011632 9:39 AM Natural Stream Flow	DETAILED REPORT INDIAN (Consumptive Use and Storage	ON THE WATER AVAILA CR > S FK MALHEUR R Basin: MALHEU Expected Stream Flow	ABILITY CALCULATIO - AT MOUTH JR Reserved Stream Flow	DN Exceed Da Instream Requirements	dance Level: 80 ate: 04/10/2025 Net Water Available
Waters Waters Time: Month	r Availability Tables shed ID #: 31011632 9:39 AM Natural Stream Flow	DETAILED REPORT INDIAN (Consumptive Use and Storage	ON THE WATER AVAILA CR > S FK MALHEUR R Basin: MALHEU Expected Stream Flow Monthly values a	ABILITY CALCULATIO	DN Exceed Da Instream Requirements	dance Level: 80 ate: 04/10/2025 Net Water Available
Waters Waters Time: Month	r Availability Tables shed ID #: 31011632 9:39 AM Natural Stream Flow	DETAILED REPORT INDIAN (Consumptive Use and Storage Storage is t	ON THE WATER AVAILA CR > S FK MALHEUR R Basin: MALHEU Expected Stream Flow Monthly values a the annual amount at	ABILITY CALCULATIO - AT MOUTH JR Reserved Stream Flow are in cfs. 50% exceedance d	DN Exceed Da Instream Requirements in ac-ft.	dance Level: 80 ate: 04/10/2025 Net Water Available
Waters Time: Month	r Availability Tables shed ID #: 31011632 9:39 AM Natural Stream Flow 1.97	DETAILED REPORT INDIAN (Consumptive Use and Storage Storage is 1 0.86	ON THE WATER AVAILA CR > S FK MALHEUR R Basin: MALHEU Expected Stream Flow Monthly values a the annual amount at 1.11	ABILITY CALCULATIO - AT MOUTH JR Reserved Stream Flow are in cfs. 50% exceedance 1 0.00	DN Exceed Da Instream Requirements in ac-ft. 0.00	dance Level: 80 ate: 04/10/2025 Net Water Available
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Waters Time: Month JAN FEB MAR	r Availability Tables shed ID #: 31011632 9:39 AM Natural Stream Flow 1.97 4.07 6.89	DETAILED REPORT INDIAN (Consumptive Use and Storage Storage is 1 0.86 3.07 5.87	ON THE WATER AVAILA CR > S FK MALHEUR R Basin: MALHEU Expected Stream Flow Monthly values a the annual amount at 1.11 1.00 1.02	ABILITY CALCULATIO - AT MOUTH Reserved Stream Flow are in cfs. 50% exceedance : 0.00 0.00 0.00 0.00	DN Exceed Da Instream Requirements in ac-ft. 0.00 0.00 0.00 0.00	dance Level: 80 ate: 04/10/2025 Net Water Available 1.11 1.00 1.02
Waters Time: Month JAN FEB MAR APR	r Availability Tables shed ID #: 31011632 9:39 AM Natural Stream Flow 1.97 4.07 6.89 12.90	DETAILED REPORT INDIAN (Consumptive Use and Storage Storage is 1 0.86 3.07 5.87 12.10	ON THE WATER AVAILA CR > S FK MALHEUR R Basin: MALHEU Expected Stream Flow Monthly values a the annual amount at 1.11 1.00 1.02 0.79	ABILITY CALCULATIO - AT MOUTH Reserved Stream Flow are in cfs. 50% exceedance : 0.00 0.00 0.00 0.00 0.00 0.00 0.00	DN Exceed Da Instream Requirements in ac-ft. 0.00 0.00 0.00 0.00 0.00	dance Level: 80 ate: 04/10/2025 Net Water Available 1.11 1.00 1.02 0.79
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Waters Time: Month FEB MAR APR MAY JUN	r Availability Tables shed ID #: 31011632 9:39 AM Natural Stream Flow 1.97 4.07 6.89 12.90 10.30 8.08	DETAILED REPORT INDIAN (Consumptive Use and Storage Storage is f 0.86 3.07 5.87 12.10 18.30 14.40	ON THE WATER AVAILA CR > S FK MALHEUR R Basin: MALHEU Expected Stream Flow Monthly values a the annual amount at 1.11 1.00 1.02 0.79 -7.95 -6.33	ABILITY CALCULATIO - AT MOUTH Reserved Stream Flow are in cfs. 50% exceedance : 0.00 0.0	DN Exceed Da Instream Requirements in ac-ft. 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0	dance Level: 80 ate: 04/10/2025 Water Available 1.11 1.00 1.02 0.79 -7.95 -6.33
Waters Time: Month FEB MAR APR MAY JUN JUL	r Availability Tables shed ID #: 31011632 9:39 AM Natural Stream Flow 1.97 4.07 6.89 12.90 10.30 8.08 2.54	DETAILED REPORT INDIAN (Consumptive Use and Storage Storage is 1 0.86 3.07 5.87 12.10 18.30 14.40 4.83	ON THE WATER AVAILA CR > S FK MALHEUR R Basin: MALHEU Expected Stream Flow Monthly values a the annual amount at 1.11 1.00 1.02 0.79 -7.95 -6.33 -2.29	ABILITY CALCULATIO - AT MOUTH Reserved Stream Flow are in cfs. 50% exceedance : 0.00 0.0	DN Exceed Da Instream Requirements in ac-ft. 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0	dance Level: 80 ate: 04/10/2025 Net Water Available 1.11 1.00 1.02 0.79 -7.95 -6.33 -2.29
Waters Time: Month JAN FEB MAR APR MAY JUN JUL AUG	r Availability Tables shed ID #: 31011632 9:39 AM Natural Stream Flow 1.97 4.07 6.89 12.90 10.30 8.08 2.54 1.07	DETAILED REPORT INDIAN (Consumptive Use and Storage Storage is 1 0.86 3.07 5.87 12.10 18.30 14.40 4.83 1.98	ON THE WATER AVAILA CR > S FK MALHEUR R Basin: MALHEU Expected Stream Flow Monthly values a the annual amount at 1.11 1.00 1.02 0.79 -7.95 -6.33 -2.29 -0.91	ABILITY CALCULATIO - AT MOUTH Reserved Stream Flow are in cfs. 50% exceedance : 0.00 0.0	DN Exceed Da Instream Requirements in ac-ft. 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0	dance Level: 80 ate: 04/10/2025 Net Water Available 1.11 1.00 1.02 0.79 -7.95 -6.33 -2.29 -0.91
Waters Time: Month JAN FEB MAR APR MAY JUN JUL AUG SEP	r Availability Tables shed ID #: 31011632 9:39 AM Natural Stream Flow 1.97 4.07 6.89 12.90 10.30 8.08 2.54 1.07 0.82	DETAILED REPORT INDIAN (Consumptive Use and Storage Storage is 1 0.86 3.07 5.87 12.10 18.30 14.40 4.83 1.98 1.14	ON THE WATER AVAILA CR > S FK MALHEUR R Basin: MALHEU Expected Stream Flow Monthly values a the annual amount at 1.11 1.00 1.02 0.79 -7.95 -6.33 -2.29 -0.91 -0.32	ABILITY CALCULATIO - AT MOUTH Reserved Stream Flow are in cfs. 50% exceedance 5 0.00 0.0	DN Exceed Da Instream Requirements in ac-ft. 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0	dance Level: 80 ate: 04/10/2025 Net Water Available 1.11 1.00 1.02 0.79 -7.95 -6.33 -2.29 -0.91 -0.32
Waters Time: Month JAN FEB MAR APR MAY JUN JUL AUG SEP OCT	r Availability Tables shed ID #: 31011632 9:39 AM Natural Stream Flow 1.97 4.07 6.89 12.90 10.30 8.08 2.54 1.07 0.82 1.01	DETAILED REPORT INDIAN (Consumptive Use and Storage Storage is 1 0.86 3.07 5.87 12.10 18.30 14.40 4.83 1.98 1.14 0.78	ON THE WATER AVAILA CR > S FK MALHEUR R Basin: MALHEU Expected Stream Flow Monthly values a the annual amount at 1.11 1.00 1.02 0.79 -7.95 -6.33 -2.29 -0.91 -0.32 0.23	ABILITY CALCULATIO - AT MOUTH JR Reserved Stream Flow are in cfs. 50% exceedance 5 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.	DN Exceed Da Instream Requirements in ac-ft. 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0	dance Level: 80 ate: 04/10/2025 Net Water Available 1.11 1.00 1.02 0.79 -7.95 -6.33 -2.29 -0.91 -0.32 0.23
Waters Time: Month JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV	r Availability Tables shed ID #: 31011632 9:39 AM Natural Stream Flow 1.97 4.07 6.89 12.90 10.30 8.08 2.54 1.07 0.82 1.01 1.64	DETAILED REPORT INDIAN (Consumptive Use and Storage Storage is (0.86 3.07 5.87 12.10 18.30 14.40 4.83 1.98 1.14 0.78 0.65	ON THE WATER AVAILA CR > S FK MALHEUR R Basin: MALHEU Expected Stream Flow Monthly values a the annual amount at 1.11 1.00 1.02 0.79 -7.95 -6.33 -2.29 -0.91 -0.32 0.23 0.99	ABILITY CALCULATIO - AT MOUTH Reserved Stream Flow are in cfs. 50% exceedance 5 0.00 0.0	DN Exceed Da Instream Requirements in ac-ft. 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0	dance Level: 80 ate: 04/10/2025 Net Water Available 1.11 1.00 1.02 0.79 -7.95 -6.33 -2.29 -0.91 -0.32 0.23 0.99
Waters Time: Month JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC	r Availability Tables shed ID #: 31011632 9:39 AM Natural Stream Flow 1.97 4.07 6.89 12.90 10.30 8.08 2.54 1.07 0.82 1.01 1.64 1.66	DETAILED REPORT INDIAN (Consumptive Use and Storage Storage is 1 0.86 3.07 5.87 12.10 18.30 14.40 4.83 1.98 1.14 0.78 0.65 0.75	ON THE WATER AVAILA CR > S FK MALHEUR R Basin: MALHEU Expected Stream Flow Monthly values a the annual amount at 1.11 1.00 1.02 0.79 -7.95 -6.33 -2.29 -0.91 -0.32 0.23 0.99 0.91	ABILITY CALCULATIO - AT MOUTH Reserved Stream Flow are in cfs. 50% exceedance 3 0.00 0.0	DN Exceed Da Instream Requirements in ac-ft. 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0	dance Level: 80 ate: 04/10/2025 Net Water Available 1.11 1.00 1.02 0.79 -7.95 -6.33 -2.29 -0.91 -0.32 0.23 0.99 0.91

Well Location Map



Water-Level Measurements in Nearby Wells



Virginia Valley Wells:



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Stream Depletion (Hunt) Model Analysis

		-	Trans	sient St	ream De	epletio	ion (Jenkins, 1970; Hunt, 1999, 2003)																
																	Input data	hine and					
	1.000		1					G-1943	4					yellow = re	quirea	norio 1	Feenaria 2	Diue = rec		Descriptio			
	0.900			_			••••	••••			_			Paramete	a Scel	nario i	Scenario 2	Scenario S	Unit	Descriptio	n		
														FIOL TILLE			3 02	-54	ofe	Not stoody	numping r	ato of woll	
	0.800													tron			244		davs	Time nump	on (numnii	ng duration)	
ge)	0.700													a		8170	8170	8170	ft	Perpendicu	lar distance	e from well to s	stream
har		I							11					d			116		ft	Well depth			
letic	0.600	+												к		93.35	93.35	93.35	ft/day	Aquifer hyd	raulic cond	luctivity	-
dep /ell	0.500	1										Jenkins s	2	b		300	300	300	ft	Aquifer satu	urated thick	iness	
e a		I										Hunt 1999) s2	S		0.001	0.001	0.001		Aquifer stor	ativity or sp	pecific yield	
on	0.400	-										Hunt 2003	i s1	Kva		0.05	0.05	0.05	ft/day	Aquitard ve	rtical hydra	ulic conductivi	ty
acti	0 200								1			Hunt 2003	s2	ba		20	20	20	ft	Aquitard sa	turated thic	ckness	
÷	0.300	1							٩			Hunt 2003	s3	babs		20	20	20	ft	Aquitard thi	ckness bel	ow stream	
	0.200	+	_							\downarrow	<u> </u>		T	n		0.2	0.2	0.2		Aquitard po	rosity		
		1												WS		20	20	20	ft	Stream wid	th	-	
	0.100	1									*****	-					Recalculate						
	0.000	-											- 1										
		0	30 (50 9	90 1 1 2	ine sinte	start of	umping (d	lays) ²⁴⁰	270	300	330	360										
														Paramote	r Sco	nario 1	Sconario 2	Sconario 3	Unite				
														Ow	JUCE	3 02	3 92	3 02	offs	1			
														Т		28.005	28.005	28.005	ft*ft/day	– K*b			
Outpu	t for St	ream De	pletion.	Scenerio	2 (s2):		Time p	ump on (i	oumping	duration)	= 244 da	vs		Ť		209.477	209.477	209.477	apd/ft	= K*b			
Davs		30	60	90	120	150	180	210	240	270	300	330	360	sbc	0	.050000	0.050000	0.050000	ft/dav	= Ks*ws/bs	5		
J SD		84.2%	88.8%	90.8%	92.1%	92.9%	93.5%	94.0%	94.4%	11.7%	6.6%	4.6%	3.5%	sdf	2	.383464	2.383464	2.383464	days	= (a^2*S)/(T)		
H SD	1999	2.2%	3.3%	4.2%	4.9%	5.5%	6.1%	6.6%	7.1%	5.5%	4.7%	4.2%	3.9%	sbf	0	.014587	0.014587	0.014587		= sbc*a/T			
H SD :	2003	0.04%	0.06%	0.08%	0.10%	0.12%	0.14%	0.16%	0.18%	0.16%	0.16%	0.16%	0.16%	ť	0	.419557	0.419557	0.419557	1/days	= T/(a^2*S) input #1	for Hunt's Q_4	4 function
Qw, cf	s	3.920	3.920	3.920	3.920	3.920	3.920	3.920	3.920	3.920	3.920	3.920	3.920	K'	5	.958659	5.958659	5.958659		= (Ks/bs)*a	a^2/T inpu	it #2 for Hunt's	Q_4 function
H SD 9	99, cfs	0.086	0.131	0.165	0.193	0.217	0.239	0.260	0.278	0.217	0.186	0.167	0.152	epsilon'	0	.005000	0.005000	0.005000		= S/n inpu	ut #3 for Hu	unt's Q_4 funct	lion
H SD	03, cfs	0.002	0.002	0.003	0.004	0.005	0.005	0.006	0.007	0.006	0.006	0.006	0.006	lamda'	0	.014587	0.014587	0.014587		= sbc*a/T	input #4 fo	or Hunt's Q_4	lunction
Param	neters:					S	cenario 1	Sc	cenario 2	Sc	enario 3		Units										
Net ste	eady pu	mping ra	e of well		Qw		3.92		3.92		3.92		cfs										
l ime p	oump on	(pumpin	g duratioi	ו)	tpon		244	-	244		244		days										
Perpe	ndicular	from we	to strear	n	a		8170		8170		8170		π 4										
Aquifo	r bydrau	ilic condi	uctivity.		u K		02.26		02.25		02.25		ft/day		_								
Aquife	r səturə	ted thick	Dese		h		30.00		30.00		30.00		ft ft										
Aquife	r transm	issivity	1033		т		28005		28005		28005		ft*ft/day										
Aquife	r storati	vitv or sp	ecific viel	d	S		0.001		0.001		0.001												
Aquita	rd vertic	al hydrau	ulic condu	ctivity	Kva		0.05	5	0.05		0.05		ft/day										
Aquita	rd satur	ated thicl	kness		ba		20)	20		20		ft										
Aquita	rd thickr	ness belo	w stream		babs		20)	20		20		ft										
Aquita	rd poros	sity			n		0.2		0.2		0.2												
Stream	n width				WS		20)	20		20		ft										
Stream	nbed co	nductanc	e (lambda	a)	sbc		0.050000)	0.050000	C	0.050000		ft/day										
Stream	n deplet	ion facto			sdf		2.383464	-	2.383464	2	2.383464		days										
Stream	nbed fac	tor			sbf		0.014587		0.014587	C	0.014587												
input #	1 for Hu	unt's Q_4	function		ť		0.419557		0.419557	0).419557												
input #	2 for Hu	unt's Q_4	function		K'		5.958659	1	5.958659	5	5.958659												
input #	3 for Hu	unt's Q_4	tunction		epsilon'		0.005000	1	0.005000	C	0.005000												
linput #	4 for Hu	unt's Q 4	function		lamda'	1	0.014587	1	0.014587	1 0	0.014587												