PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO: Water Rights Section Date **August 16, 2016**

FROM: Groundwater Section **Phillip I. Marcy / Ivan K. Gall**
Reviewer's Name

SUBJECT: Application G- **17996** Supersedes review of **April 13, 2016**
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 ground water 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: **Wilks Ranch Oregon Limited** County: **Malheur**

A1. Applicant(s) seek(s) **5.19** cfs from **one** well(s) in the **Malheur** Basin, **Willow Creek** subbasin Quad Map: **Ironside**

A2. Proposed use **Multiple** Seasonality: **March 1 to October 31 (Irr.) / 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	**MALH 54260**	**1**	**Volcanic Rock**	**5.19**	**14S/39E-14 SW-SE**	**900' N, 2725' E fr SW cor S 14**
2						
3						

* 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	**3647**	**605**	**-60**	**08/16/2015**	**700**	**18-35; 360-570**	**+1-605**	**None**	**None**	**1100**	**0**	**Pump**

Use data from application for proposed wells.

A4. **Comments: Proposed uses are: Supplemental Irrigation of 451.9 acres (1355.7 AF/year), Domestic (2.0 AF/year), Stock Watering (70.0 AF/year), and Industrial (10.0 AF/year).**

A5. ☒ **Provisions of the Malheur** Basin rules relative to the development, classification and/or management of ground water hydraulically connected to surface water ☐ **are**, *or* ☒ **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:

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

B1. **Based upon available data**, I have determined that ground water* 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 ground water 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 ground water 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 ground water resource; or

d. ☒ **will, if properly conditioned**, avoid injury to existing ground water rights or to the ground water resource:
   i. ☐ The permit should contain condition #(s) _____;
   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 ground water production from no deeper than _____ ft. below land surface;

b. ☒ **Condition** to allow ground water production from no shallower than **605** ft. below land surface;

c. ☐ **Condition** to allow ground water production only from the _____ ground water 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 Ground Water 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. **Ground water availability remarks:** The proposed POA, MALH 54260, has been shown to be hydraulically connected to nearby well MALH 16 in a recent interference test conducted by the Department. Both wells are flowing artesian, have nearly identical head elevations, and produce water that is 96 degrees Fahrenheit from volcanic rock beneath hundreds of feet of valley-fill sediments. The Department suspects that groundwater levels within this deep volcanic aquifer have declined since MALH 16 was drilled in 1951. At that time the reported artesian flow was 1,800 gallons per minute, a rate that is far greater than what the well can produce at the present time (300-400 GPM, according to local Watermaster Ron Jacobs). Downhole video of MALH 16 from 2015 shows no collapse, fouling, or any other indication of a condition that would decrease the well's yield. Therefore, groundwater level declines in this aquifer system are the likely cause of declines in artesian production from MALH 16, causing concern about the stability of this resource and injury to senior users.

A Theis time-drawdown analysis calculates the expected drawdown from pumping MALH 54260 at the proposed rate over the course of an irrigation season (245 days) ranges between 12 and 82 feet of drawdown at MALH 16 (see attached) at a distance of 7,800 feet. However, the most likely interference projection is roughly 20 feet over 245 days, based upon aquifer parameters (Transmissivity of 5,600 ft^2/day, Storativity of 0.0021) estimated during a recent interference test that utilized MALH 54260 as the pumping/flowing well and MALH 16 as the observation well. Estimates of impacts to neighboring well MALH 16 are here based upon the new proposed rate of 2329 GPM.

If a permit is issued, the following standard conditions shall apply:

7N – Annual measurement condition, which stipulates "The water user shall discontinue use of, or reduce the rate or volume of withdrawal from, the well(s) if any of the following events occur:

- **A) Annual water-level measurements reveal an average water level decline of three or more feet per year for five consecutive years; or**
- **B) Annual water-level measurements reveal a water-level decline of 15 or more feet in fewer than five consecutive years; or**
- **C) Annual water-level measurements reveal a water-level decline of 25 or more feet; or**
- **D) Hydraulic interference leads to a total decline of 25 or more feet in any neighboring well with senior priority.**

The period of restricted use shall continue until the water level rises above the decline level which triggered the action or the Department determines, based on the permittee's and/or the Department's data and analysis, that no action is necessary because the aquifer in question can sustain the observed declines without adversely impacting the resource or causing substantial interference with senior water rights.

"Large Water Use Reporting"

Special Condition: Access to perform pressure measurements at MALH 54260 shall be granted to the Department. This access shall include an isolation valve or stopcock at the wellhead that can be used to install a pressure transducer and/or perform routine hand-held gauge measurements.

C. GROUND WATER/SURFACE WATER CONSIDERATIONS, OAR 690-09-040

C1. **690-09-040 (1):** Evaluation of aquifer confinement:

Well	Aquifer or Proposed Aquifer	Confined	Unconfined
1	**Fractured Basalt**	☒	☐
		☐	☐
		☐	☐
		☐	☐
		☐	☐

Basis for aquifer confinement evaluation: High head pressure is maintained within this system, and rises hundreds of feet above the depth at which this zone is accessed. Results of recent 72 hour interference test displayed no perceptible impacts to nearby wells within shallower portions of the aquifer system, including MALH 54212 at a distance of less than one quarter mile.

C2. **690-09-040 (2) (3):** Evaluation of distance to, and hydraulic connection with, surface water sources. All wells located a horizontal distance less than ¼ mile from a surface water source that produce water from an unconfined aquifer shall be assumed to be hydraulically connected to the surface water source. Include in this table any streams located beyond one mile that are evaluated for PSI.

Well	SW #	Surface Water Name	GW Elev ft msl	SW Elev ft msl	Distance (ft)	Hydraulically Connected? YES	NO	ASSUMED	Potential for Subst. Interfer. Assumed? YES	NO
1	1	**Willow Creek**	**3706±**	**3640**	**80**	☐	☒	☐	☐	☒
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐

Basis for aquifer hydraulic connection evaluation: To my knowledge, there is no evidence that Willow Creek receives water from the deep volcanic aquifer tapped by the proposed POA well within one mile.

Water Availability Basin the well(s) are located within: 31011926, WILLOW CR> MALHEUR R- AB LONG CR.

C3a. **690-09-040 (4):** Evaluation of stream impacts for each well that has been determined or assumed to be **hydraulically connected and less than 1 mile** from a surface water source. Limit evaluation to instream rights and minimum stream flows that are pertinent to that surface water source, and 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 by total appropriation for all wells determined or assumed to be **hydraulically connected and less than 1 mile** from a surface water source. **Complete only if Q is distributed among wells.** Otherwise same evaluation and limitations apply as in C3a above.

	SW #		Qw > 5 cfs?	Instream Water Right ID	Instream Water Right Q (cfs)	Qw > 1% ISWR?	80% Natural Flow (cfs)	Qw > 1% of 80% Natural Flow?	Interference @ 30 days (%)	Potential for Subst. Interfer. Assumed?
			☐			☐		☐		☐
			☐			☐		☐		☐
			☐			☐		☐		☐
			☐			☐		☐		☐

Comments: This section does not apply.

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													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(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: This section does not apply.

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 ground water use under this permit can be regulated if it is found to substantially interfere with surface water:

i. ☐ The permit should contain condition #(s)_____;

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

C6. **SW / GW Remarks and Conditions:**

References Used: Local well logs; water-level data at nearby wells; application file G-17996

Geology of the Oregon Part of the Baker 1° by 2° Quadrangle, by Brooks, et al, 1976 (GMS-7)

Hydrogeology of the Ontario Area, Malheur County, Oregon, by Gannett, 1990, OWRD Groundwater Report #34.

Results from 03/29/2016-04/01/2016 interference test conducted by OWRD staff.

Theis, C.V., 1941, The effect of a well on the flow of a nearby stream: Am. Geophys. Union Trans., v. 22, pt.3, p. 734-738.

Vorhis, R.C. 1979. Transmissivity from pumped well data. Well Log, National Water Well Association newsletter, vol. 10, no. 11, Dec. 1979, pg. 50-52.

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.**

Water Availability Tables

DETAILED REPORT ON THE WATER AVAILABILITY CALCULATION

WILLOW CR > MALHEUR R - AB LONG CR
Basin: MALHEUR

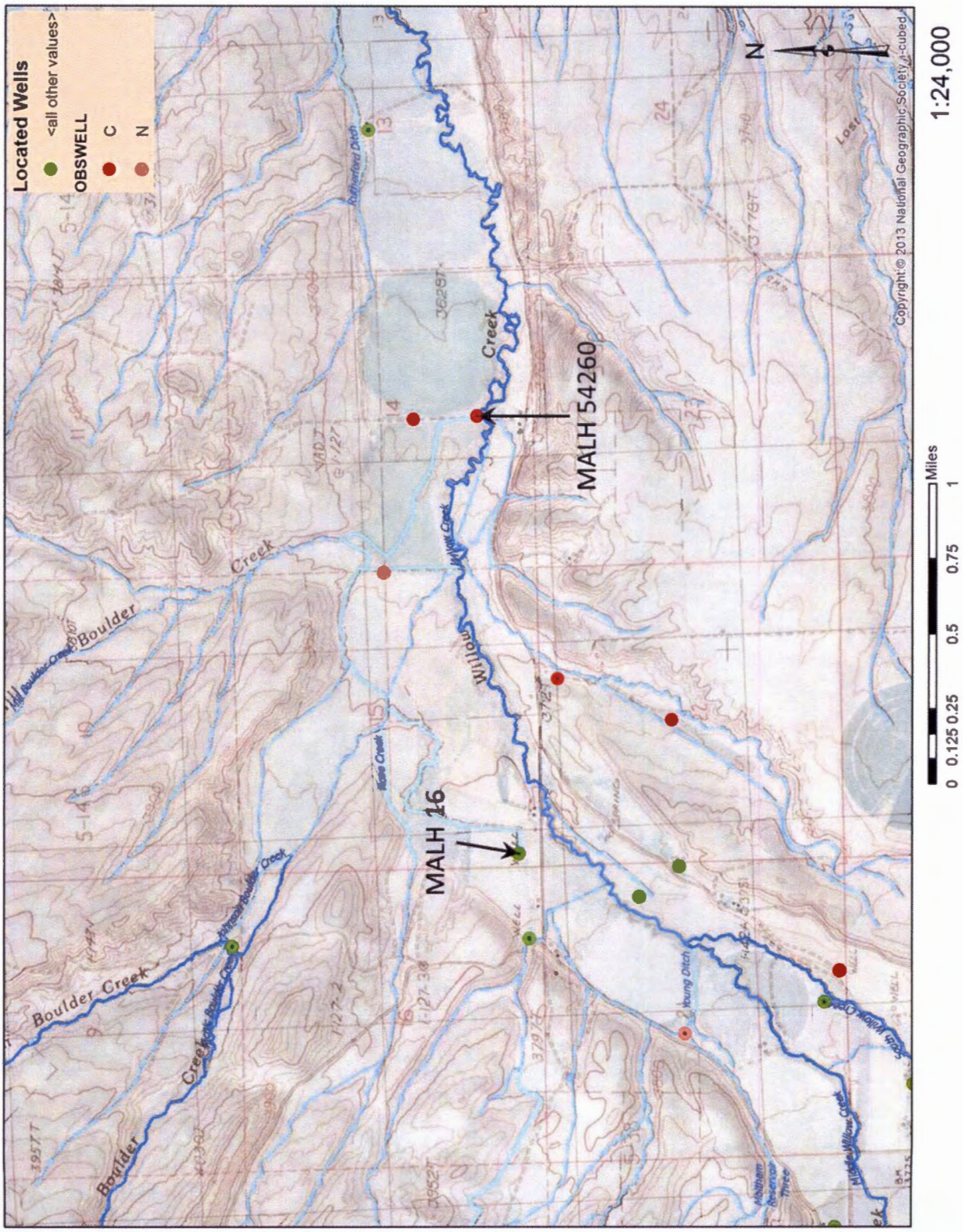
Watershed ID #: 31011926
Time: 4:19 PM

Exceedance Level: 80
Date: 07/07/2015

Monthly values are in cfs.
Storage is the annual amount at 50% exceedance in ac-ft.

Month	Natural Stream Flow	Consumptive Use and Storage	Expected Stream Flow	Reserved Stream Flow	Instream Requirements	Net Water Available
JAN	6.35	0.07	6.28	0.00	0.00	6.28
FEB	12.50	0.22	12.30	0.00	0.00	12.30
MAR	17.60	3.89	13.70	0.00	0.00	13.70
APR	32.20	17.90	14.30	0.00	0.00	14.30
MAY	29.20	45.10	-15.90	0.00	0.00	-15.90
JUN	21.50	36.50	-15.00	0.00	0.00	-15.00
JUL	7.90	12.20	-4.29	0.00	0.00	-4.29
AUG	3.25	4.88	-1.63	0.00	0.00	-1.63
SEP	2.10	2.53	-0.43	0.00	0.00	-0.43
OCT	2.75	1.25	1.50	0.00	0.00	1.50
NOV	5.42	0.07	5.35	0.00	0.00	5.35
DEC	5.75	0.07	5.68	0.00	0.00	5.68
ANN	14,200	7,550	7,940	0	0	7,940

Well Location Map



Nearby Water Level Data

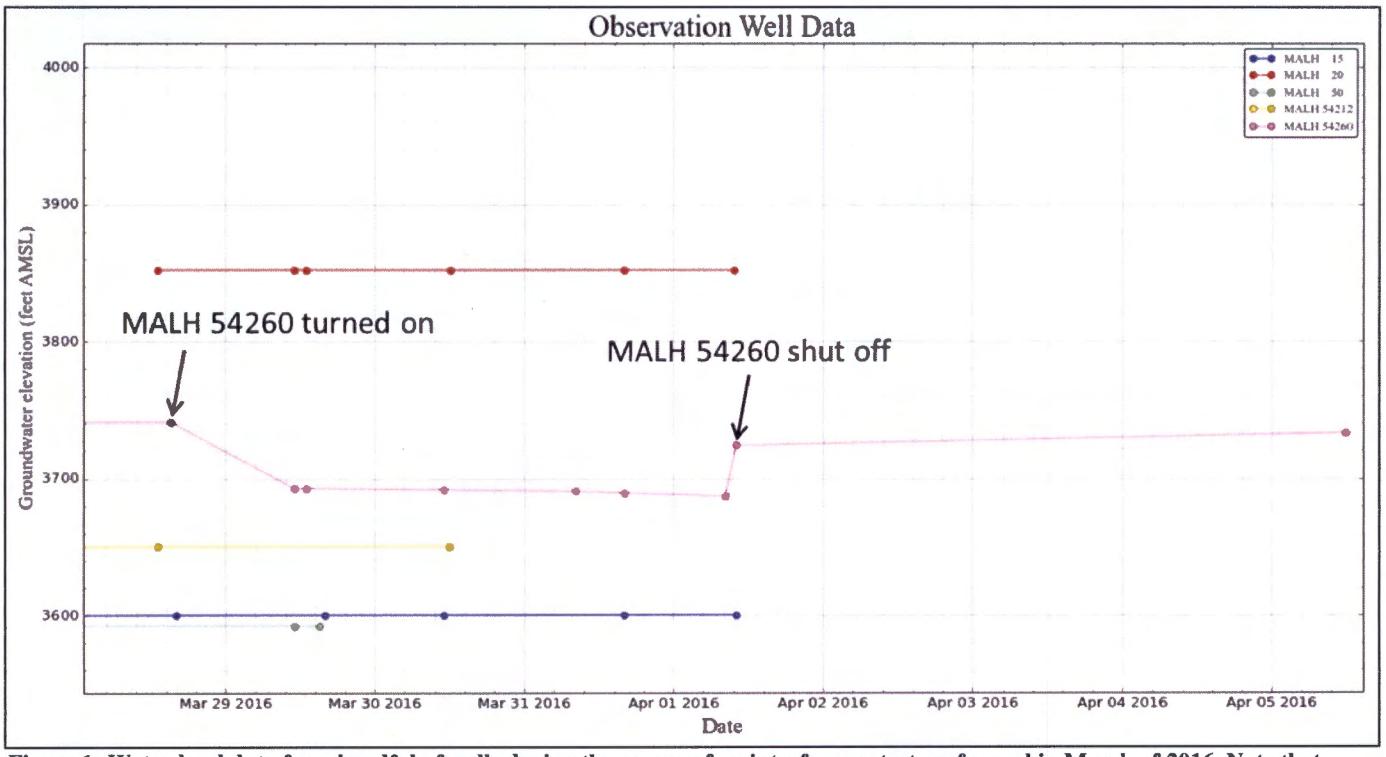


Figure 1: Water level data for a handful of wells during the course of an interference test performed in March of 2016. Note that MALH 16 (purple line) is the only nearby well that showed a measurable response to production from the proposed POA MALH 54260.

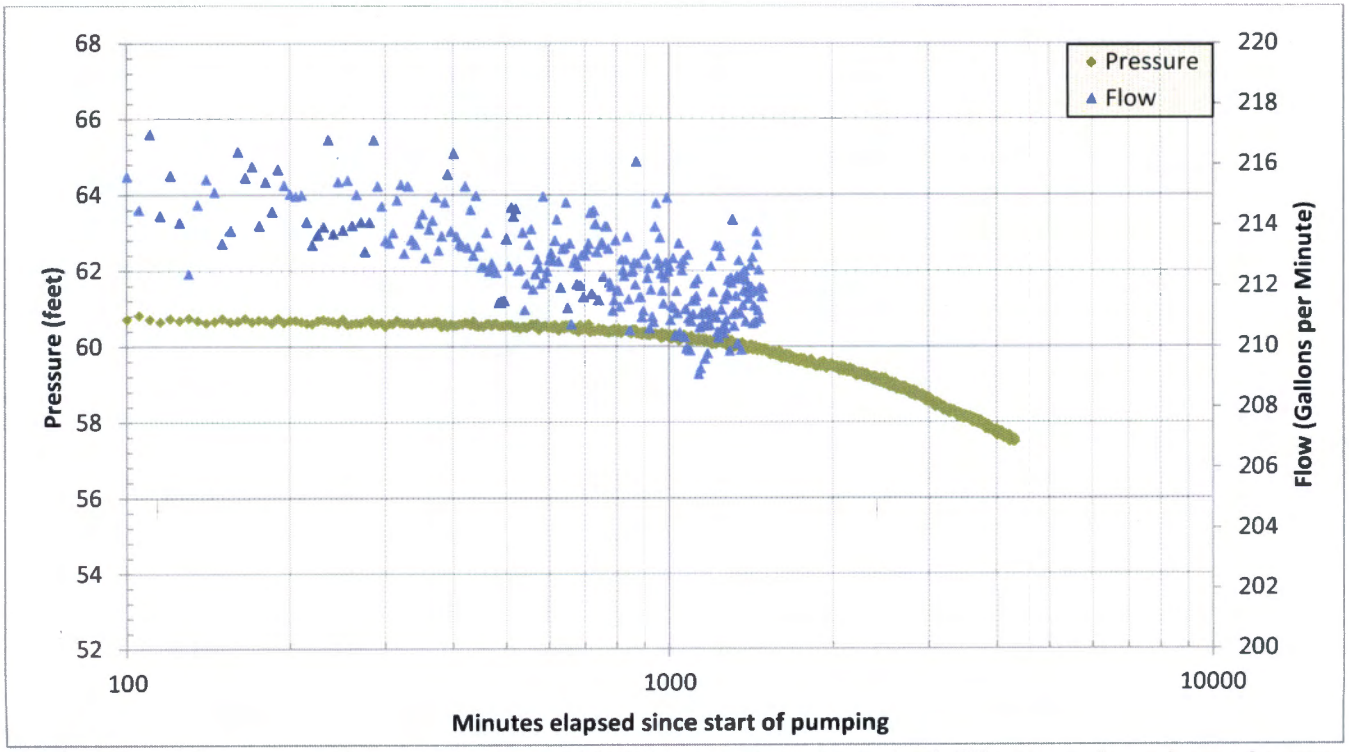


Figure 2: Pressure data collected from neighboring well MALH 16 (green) provide the head difference per log cycle over the course of the interference test used to calculate aquifer parameters for hydraulic conductivity and storativity.

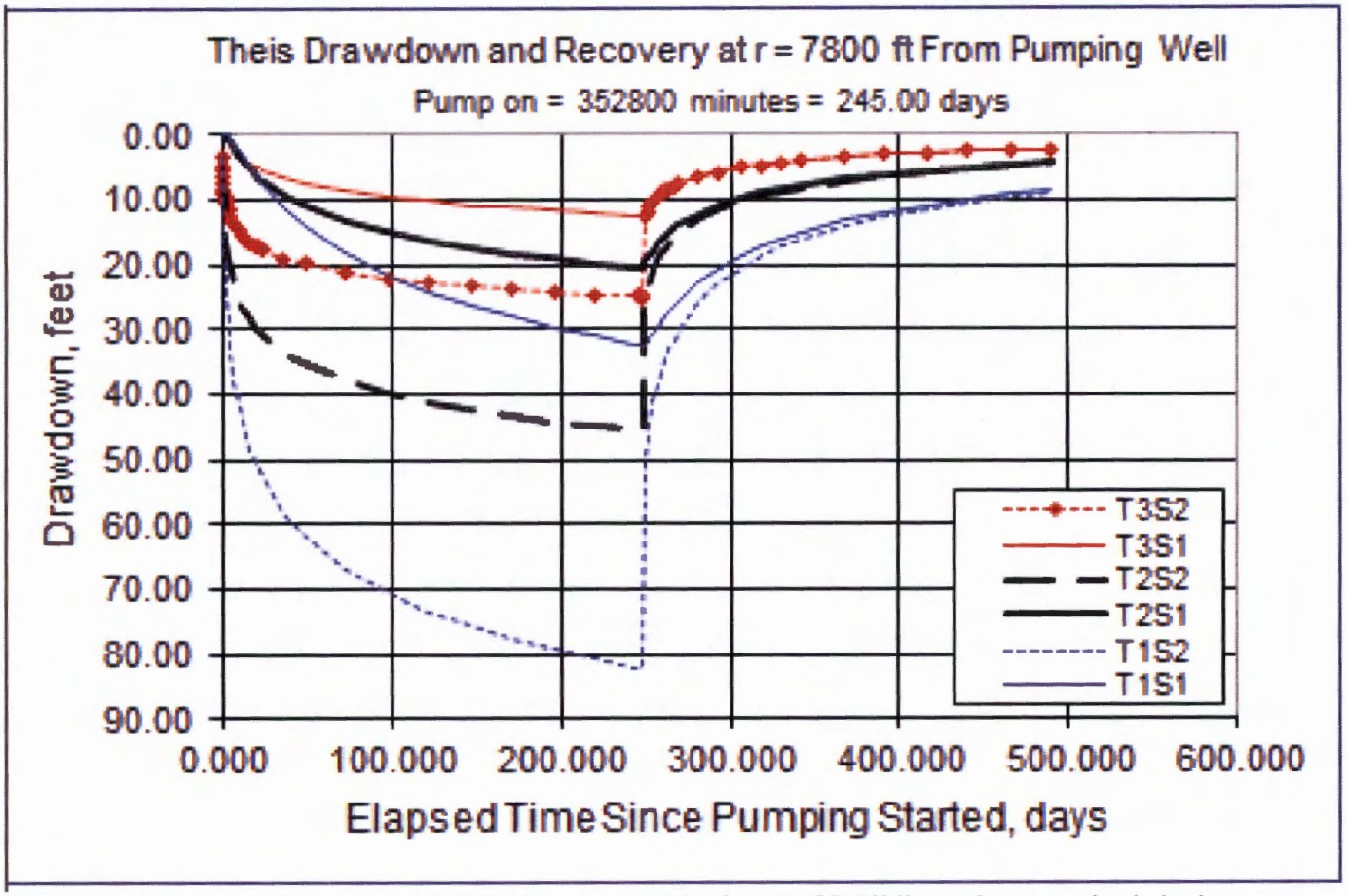


Figure 3: Probable impacts to nearby well MALH 16 due to production from MALH 54260 over the course of an irrigation season, based on a revised rate of 2329 GPM and a distance of 7800 feet. A variety of scenarios are displayed here, resulting from a range of values input for hydraulic conductivity and storativity. The solid black line (T2S1) represents the expected drawdown using the calculated values of hydraulic conductivity and storativity from the March 2016 interference test between the two wells.