

Approved:



MEMO

To: Kristopher Byrd, Well Construction Section Manager
From: Tommy Laird, Well Construction Program Coordinator
Subject: Review of Water Right Application LL-1869
Date: October 26, 2023

The attached application was forwarded to the Well Construction Section by the Groundwater Section. Stacey Garrison and Travis Brown reviewed the application. Please see Stacey's and Travis' Groundwater Review and the Well Reports.

Applicant's Well #1 (MARI 54600): Based on a review of the Well Report, Well #1 seems to protect the groundwater resource.

The construction of Well #1 may not satisfy hydraulic connection issues or the Groundwater Application Review Special Conditions.

Applicant's Well #2 (MARI 7750): Based on a review of the Well Report, Applicant's Well #2 does not appear to comply with current minimum well construction standards (See OAR 690 Division 210). The problem is that according to the Water Supply Well Report, the well was not sealed to the proper depth. In order to meet minimum construction standards, the well must be continuously resealed with an approved grout to a minimum depth of 158 feet below land surface.

My recommendation is that the Department **not issue** a permit for Applicant's Well #2 unless it is brought into compliance with current minimum well construction standards or information is provided showing that it is constructed to meet current minimum well construction standards.

The construction of Well #2 may not satisfy hydraulic connection issues or the Groundwater Application Review Special Conditions.

Applicant's Well #3 (MARI 16624): Based on a review of the Well Report, Applicant's Well #3 does not appear to comply with current minimum well construction standards (See OAR 690 Division 210). The problem is that according to the Water Supply Well Report, the well was not sealed to the proper depth. In order to meet minimum construction standards, the well must be resealed with an approved grout to a minimum depth of 104 feet below land surface.

My recommendation is that the Department **not issue** a permit for Applicant's Well #3 unless it is brought into compliance with current minimum well construction standards or information is provided showing that it is constructed to meet current minimum well construction standards.

The construction of Well #3 may not satisfy hydraulic connection issues or the Groundwater Application Review Special Conditions.

MARI 54600

FEB 04 2000

Pg 1 of 2

STATE OF OREGON WATER SUPPLY WELL REPORT (as required by ORS 537.765)

WATER RESOURCES DEPT. SALEM, OREGON

WELL I.D. # L 31926 START CARD # 121164

Instructions for completing this report are on the last page of this form.

(1) OWNER: Well Number Name Myron Kuenzi Address 6500 State St City Salem State OR Zip 97301

(2) TYPE OF WORK [X] New Well [] Deepening [] Alteration (repair/recondition) [] Abandonment

(3) DRILL METHOD: [X] Rotary Air [] Rotary Mud [] Cable [] Auger [] Other

(4) PROPOSED USE: [] Domestic [] Community [] Industrial [X] Irrigation [] Thermal [] Injection [] Livestock [] Other

(5) BORE HOLE CONSTRUCTION: Special Construction approval [] Yes [X] No Depth of Completed Well 400. Explosives used [] Yes [X] No Type Amount

Table with columns: HOLE Diameter, SEAL Material, Sacks or pounds. Rows include 14" 0' 25' Cement, 13 1/2" 25' 30', 12" 30' 112', 10" 112' 400'.

How was seal placed: Method [] A [] B [X] C [X] D [] E [] Other

Backfill placed from ft. to ft. Material Gravel placed from ft. to ft. Size of gravel

(6) CASING/LINER: Table with columns: Diameter, From, To, Gauge, Steel, Plastic, Welded, Threaded. Rows for Casing (10 in +1 112 .25) and Liner (8 in +8 in 400 .188).

(7) PERFORATIONS/SCREENS: Table with columns: From, To, Slot size, Number, Diameter, Tele/pipe size, Casing, Liner. Row: 295 395 3/4 x 8 96

(8) WELL TESTS: Minimum testing time is 1 hour. [] Pump [] Bailer [X] Air [] Artesian. Yield gal/min 450 + Drawdown Drill stem at 399 Time 1 hr.

Temperature of water 54 Depth of strata 54. Was a water analysis done? [] Yes [] No. Did any strata contain water not suitable for intended use? [] Too little [] Salty [] Muddy [] Odor [] Colored [] Other.

(9) LOCATION OF WELL by legal description: County Marion Latitude Longitude Township 7-S N or S Range 2-W E or W. WM. Section 34 NE 1/4 NE 1/4. Tax Lot 00500 Lot Block Subdivision. Street Address of Well (or nearest address) 585 74th Ave SE Salem OR

(10) STATIC WATER LEVEL: 73 ft. below land surface. Date 1-28-00. Artesian pressure lb. per square inch. Date

(11) WATER BEARING ZONES: Depth at which water was first found 8 ft

Table with columns: From, To, Estimated Flow Rate, SWL. Rows: 8 8 2.5 25ft, 20 40 5 25ft, 78 84 30 25ft, 195 397 400+ 73

(12) WELL LOG: Ground Elevation

Table with columns: Material, From, To, SWL. Rows: Top Soil (0-2), Red + brown Clay (2-8), Decomposed basalt with broken claystone - caving (8-14), Red + brown Clay (14-30), Decomposed basalt with brown Clay (20-40), Weathered basalt with red + brown Clay (40-50), Gray basalt Firm (50-78), Red + brown cinders with weathered basalt (78-84), Black basalt (84-86), Weathered basalt (86-88), Black basalt (88-91), Gray basalt (91-163), Black basalt simi-fractured (163-177).

Date started 1-10-00 Completed 1-28-00

(unbonded) Water Well Constructor Certification: I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.

Signed [Signature] WWC Number 1629 Date 1-28-00

(bonded) Water Well Constructor Certification: I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.

Signed [Signature] WWC Number 1273 Date 1-28-00

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54600

FEB 04 2000

Pg 2 of 3

STATE OF OREGON
WATER SUPPLY WELL REPORT
(as required by ORS 537.765)

WELL I.D. # L. 31926
START CARD # 121164

WATER RESOURCES DEPT.
SALEM, OREGON

Instructions for completing this report are on the last page of this form.

(1) OWNER: Well Number _____
Name Myron Kuenzi
Address 6500 State St
City Salem State OR Zip 97301

(2) TYPE OF WORK
 New Well Deepening Alteration (repair/recondition) Abandonment

(3) DRILL METHOD:
 Rotary Air Rotary Mud Cable Auger
 Other

(4) PROPOSED USE:
 Domestic Community Industrial Irrigation
 Thermal Injection Livestock Other

(5) BORE HOLE CONSTRUCTION:
Special Construction approval Yes No Depth of Completed Well 400 ft.
Explosives used Yes No Type _____ Amount _____

HOLE			SEAL			Sacks or pounds
Diameter	From	To	Material	From	To	

How was seal placed: Method A B C D E
 Other

Backfill placed from _____ ft. to _____ ft. Material _____
Gravel placed from _____ ft. to _____ ft. Size of gravel _____

(6) CASING/LINER:

Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Liner:				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Final location of shoe(s) _____

(7) PERFORATIONS/SCREENS:

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
						<input type="checkbox"/>	<input type="checkbox"/>
						<input type="checkbox"/>	<input type="checkbox"/>
						<input type="checkbox"/>	<input type="checkbox"/>
						<input type="checkbox"/>	<input type="checkbox"/>

(8) WELL TESTS: Minimum testing time is 1 hour

Yield gal/min	Drawdown	Drill stem at	Flowing Time
			1 hr.

Pump Bailer Air Artesian

Temperature of water _____ Depth Artesian _____
Was a water analysis done? Yes By whom _____
Did any strata contain water not suitable for intended use? Too little
 Salty Muddy Odor Colored Other _____
Depth of strata: _____

(9) LOCATION OF WELL by legal description:
County Marion Latitude _____ Longitude _____
Township 7-S N or S Range 2-W E or W. WM.
Section 34 NE 1/4 NE 1/4
Tax Lot 00500 Lot _____ Block _____ Subdivision _____
Street Address of Well (or nearest address) 585 74th Ave SE Salem

(10) STATIC WATER LEVEL:
73 ft. below land surface. Date 1-28-00
Artesian pressure _____ lb. per square inch. Date _____

(11) WATER BEARING ZONES:

Depth at which water was first found _____

From	To	Estimated Flow Rate	SWL

(12) WELL LOG:

Ground Elevation _____

Material	From	To	SWL
Gray basalt Simi-fractured	177	195	
Weathered basalt	195	226	
Black basalt soft	226	230	
Fractured black basalt with claystone layers	230	266	
Black basalt fractured	266	290	
Weathered basalt	290	309	
Soft black basalt with weathered seams	309	366	
Black basalt Simi-fractured	366	378	
Black basalt with fractured seams	378	392	
Gray basalt very fractured	392	397	
Soft gray basalt	397	400	

Date started 1-10-00 Completed 1-28-00

(unbonded) Water Well Constructor Certification:
I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon water supply well construction standards. Materials used and information reported above are true to the best of my knowledge and belief.
Signed _____ WWC Number 1629
Date 1-28-00

(bonded) Water Well Constructor Certification:
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon water supply well construction standards. This report is true to the best of my knowledge and belief.
Signed Floyd G. Sipe WWC Number 1273
Date 1-28-00

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MAR 24 2000

WATER RESOURCES DEPT.
SALEM, OREGON

STATE OF OREGON
WATER WELL REPORT
 (as required by ORS 537.765)

RECEIVED MAR 7 7:50

JUL - 2 1986 PLEASE TYPE or PRINT IN INK

7/3/2W-27dc

(for official use only)

(1) OWNER:

Name Carl Jensen Jr.
 Address 6532 Howell Prairie Rd. NE
 City Salem State Or.

WATER RESOURCES DEPT
SALEM, OREGON

(2) TYPE OF WORK (check):

New Well Deepening Reconditioning Abandon

If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:

Rotary Air Driven
 Rotary Mud Dug
 Cable Bored

(4) PROPOSED USE (check):

Domestic Industrial Municipal
 Irrigation Thermal:
 Other: Withdrawal Reinjection
 Piezometric Grounding Test

(5) CASING INSTALLED:

Steel Threaded Plastic Welded
 12" Diam. from + 1 ft. to 160 ft. Gauge .250
 " Diam. from ft. to ft. Gauge

LINER INSTALLED:

Steel Threaded Plastic Welded

(6) PERFORATIONS:

Perforated? Yes No
 Size of perforations in. by in.
 perforations from ft. to ft.
 perforations from ft. to ft.
 perforations from ft. to ft.

(7) SCREENS:

Well screen installed? Yes No
 Manufacturer's Name
 Type Model No.
 Diam. Slot Size Set from ft. to ft.
 Diam. Slot Size Set from ft. to ft.

(8) WELL TESTS:

Drawdown is amount water level is lowered below static level
 Was a pump test made? Yes No If yes, by whom?
 Yield: Air 500-600 gal./min. with ft. drawdown after hrs.
 Air test 500-600 gal./min. with drill stem at 350 ft. 2 hrs.
 Bailer test gal./min. with ft. drawdown after hrs.
 Artesian flow g.p.m.
 Temperature of water Depth artesian flow encountered ft.

(9) CONSTRUCTION:

Special standards: Yes No
 Well seal—Material used Cement grout
 Well sealed from land surface to 20 & 12 bags @ 150-160' ft.
 Diameter of well bore to bottom of seal 16" in.
 Diameter of well bore below seal 12" in.
 Amount of sealing material 47 sacks pounds
 How was cement grout placed? Pumped with dia. pump thru 2" pipes, up to 150', gravel 3/4" from 150 up to 20' Cement to 1s
 Was pump installed? NO Type HP Depth ft.
 Was a drive shoe used? Yes No Plugs Size: location ft.
 Did any strata contain unusable water? Yes No
 Type of Water? depth of strata
 Method of sealing strata off
 Was well gravel packed? Yes No Size of gravel:
 Gravel placed from ft. to ft.

(10) LOCATION OF WELL by legal description:

County Marion SW $\frac{1}{4}$ SE $\frac{1}{4}$ of Section 27 of
 Township T7S, Range 2W, WM.
 (Township is North or South) (Range is East or West)

Tax Lot Lot Block Subdivision

MAILING ADDRESS OF WELL (or nearest address) 1 1/2 miles west of Howell Prairie Rd. on North side of State St.

(11) WATER LEVEL of COMPLETED WELL:

Depth at which water was first found 55 ft.
 Static level 70 ft. below land surface. Date 6-27-86
 Artesian pressure lbs. per square inch. Date

(12) WELL LOG:

Diameter of well below casing 12"
 Depth drilled 400 ft. Depth of completed well 400 ft.
 Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
Soil med brown	0	2	
Clay med brown	2	20	
Clay brwn, gravel mix	20	39	
Clay med brown	39	55	
Cemented gravel tight	55	81	H2o
Sand med gray	81	86	
Conglomerate grey	86	147	
Decomposed cap rock red	147	153	
Basalt hard grey	153	162	
Weatherd basalt brn-red	162	201	
Basalt hard grey-fract	201	206	H2O
Basalt med hard blk	206	242	H2O
Basalt hard grey	242	291	
Basalt hard semi fract	291	325	H2O
Basalt hard gry-fract	325	338	H2O
Basalt visic gry	338	375	H2O
Basalt hard gry	375	398	
Basalt fract grey	398	400	

Date work started 6-13-86 /completed 6-27-86
 Date well drilling machine moved off of well 6-27-86 19

(unbonded) Water Well Constructor Certification (if applicable):

This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.

[Signed] Date , 19

(bonded) Water Well Constructor Certification:

Bond (number) Issued by: (Surety Company Name)
 On behalf of Staco Well Services, Inc. (type or print name of Water Well Constructor)

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief:

(Signed) Chuck Stadeli (Water Well Constructor)

(Dated) 6-30-86

NOTICE TO WATER WELL CONSTRUCTOR
 The original and first copy of this report are to be filed with the

WATER RESOURCES DEPARTMENT,
 SALEM, OREGON 97310
 within 30 days from the date of well completion.

SP*46866-690

STATE OF OREGON
WATER WELL REPORT
 (as required by ORS 537.765)

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 JUN 8 1989

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 JUN 8 1989
 16621

(START CARD) # 9141

2/20/356

WATER RESOURCES DEPT

(1) OWNER: Well Number **EM. OREGON**
 Name **PFENNIG FARMS**
 Address **6092 Macleay Road S.E.**
 City **Salem** State **Oregon** Zip **97301**

(2) TYPE OF WORK:
 New Well Deepen Recondition Abandon

(3) DRILL METHOD
 Rotary Air Rotary Mud Cable
 Other

(4) PROPOSED USE:
 Domestic Community Industrial Irrigation
 Thermal Injection Other

(5) BORE HOLE CONSTRUCTION:
 Special Construction approval Yes No Depth of Completed Well **258** ft.
 Yes No XX
 Explosives used Type _____ Amount _____

HOLE			SEAL			Amount sacks or pounds
Diameter	From	To	Material	From	To	
12"	0'	79'	Cement	0'	79'	38
8"	79'	258'				

How was seal placed: Method A B C D E
 Other _____
 Backfill placed from _____ ft. to _____ ft. Material _____
 Gravel placed from _____ ft. to _____ ft. Size of gravel _____

(6) CASING/LINER:

Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing: 8"	+1'	79'	.250	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Liner: 6"	-4'	258'	PVC	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
			SDR 26	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Final location of shoe(s) _____

(7) PERFORATIONS/SCREENS:
 Perforations Method **Electric Drill**
 Screens Type _____ Material _____

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner
223'	258'		250	1/2" Round		<input type="checkbox"/>	<input checked="" type="checkbox"/>

(8) WELL TESTS: Minimum testing time is 1 hour
 Pump Bailer Air Flowing Artesian
 Yield gal/min **250** Drawdown _____ Drill stem at **252 Ft** Time **1 hr.**

Temperature of water _____ Depth Artesian Flow Found _____
 Was a water analysis done? Yes By whom _____
 Did any strata contain water not suitable for intended use? Too little
 Salty Muddy Odor Colored Other _____
 Depth of strata: _____

(9) LOCATION OF WELL by legal description:
 County **Marion** Latitude _____ Longitude _____
 Township **7 South** N or S, Range **2 West** E or W, WM.
 Section **35** SW 1/4 NW 1/4
 Tax Lot _____ Lot _____ Block _____ Subdivision _____
 Street Address of Well (or nearest address) _____
7505 Babcock Salem, Oregon

(10) STATIC WATER LEVEL:
105 ft. below land surface. Date **6-3-89**
 Artesian pressure _____ lb. per square inch. Date _____

(11) WATER BEARING ZONES:
 Depth at which water was first found **136 Feet**

From	To	Estimated Flow Rate	SWL
136 Ft	252 Ft	250 GPM	105'

(12) WELL LOG: Ground elevation _____

Material	From	To	SWL
Soil	0	2	
Brown Clay	2	14	
Large Boulder	14	21	
Weathered Rock	21	70	
Gray Basalt Firm	70	86	
Multi-Colored Weathered Rock	86	99	
Black Basalt	99	124	
Gray Basalt Firm	124	136	
Black Basalt Medium WB	136	187	
Black Broken Basalt	187	203	
Gray Basalt Very Firm	203	246	
Gray Broken Basalt WB	246	252	
Gray Basalt Firm	252	258	105'

Air Test May Fluctuate.
 5% Bentonite Used To Seal Well.

Date started **5-31-890** Completed **6-3-89**

(unbonded) Water Well Constructor Certification:
 I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to my best knowledge and belief.
 WWC Number _____
 Signed _____ Date _____

(bonded) Water Well Constructor Certification:
 I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. all work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief. **MONDERS DRILLING, INC.** WWC Number **1325**
 Signed *D. Monders* Date **6-3-89**

Groundwater Application Review Summary Form

Application # LL- 1869

GW Reviewer Stacey Garrison/Travis Brown Date Review Completed: 8/10/2023

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).

PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO: Water Rights Section Date 8/10/2023
 FROM: Groundwater Section Stacey Garrison/Travis Brown
 Reviewer's Name
 SUBJECT: Application LL- 1869 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: J and J Family LLC County: Marion

A1. Applicant(s) seek(s) 0.77 cfs from 3 well(s) in the Willamette River Basin,
Molalla-Pudding River subbasin

A2. Proposed use irrigation Seasonality: Mar 1-Oct 31

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	MARI 54600	1	CRB	0.77	7S/2W-34 NE-NE	724' N, 375' W fr NW cor DLC 46 ^a
2	MARI 7750	2	CRB	0.77	7S/2W-27 NW-SE	1380' N, 1850' W fr SE cor S 27 ^a
3	MARI 16624	3	CRB	0.77	7S/2W-35 NW-NW	700' N, 420' E fr NW cor DLC 46 ^a

* 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	249 ^b	8	67.17	3/31/2015	400	0-112	0-112	0-400	295-395, perf.	450		air
2	230 ^b	55	54.9	3/22/2021	400	0-20, 150-160	0-160			500		air
3	263 ^b	136	105	6/3/1989	258	0-79	0-79		223-258, perf.	250		air

Use data from application for proposed wells.

A4. **Comments:** The POA/POU are located 2.5 miles east of Salem, Oregon. Applicant proposes to irrigate up to 61.4 acres with the maximum annual volume of 153.5 af, based on the maximum allowed duty of 2.5 af/acre. Well 1 is also authorized for: Nursery Use on 41 ac at a maximum rate of 1 cfs and a maximum annual volume of 205 af under Cert 79611 (priority date 8/24/1999); Irrigation Use on 17.2 ac and Supplemental Irrigation Use on 23.4 ac at a maximum rate of 0.09 cfs and a maximum annual volume of 101.5 af under Permit G 17778 (priority date 10/21/2015)^c. Well 1 will therefore be assessed at a total combined rate of **1.86 cfs** (~835 gpm) and a **maximum annual volume of 460 af**. Well 2 is also authorized for Irrigation Use on 154.1 ac at a maximum rate of 1.93 cfs (1.51 cfs with priority date of 12/4/1989, 0.42 cfs with priority date of 6/18/1990) and a maximum annual volume of 385.25 af under Cert 72183. Well 2 will therefore be assessed at a total combined rate of **2.7 cfs** (~1,212 gpm) and a **maximum annual volume of 538.75 af**.

^a There appears to be a discrepancy in the Public Lands Survey System (PLSS) projection used in the application map and that used by Department. The "metes-and-bounds" location description provided in the application Wells 1 and 2 do not align with the Department's existing location for these wells; the Department's existing location is used for Wells 1 and 2. For Well 3, the "metes-and-bounds" location description provided in the application is 64 ft west of the mapped location; the applicant's mapped location for Well 3 is used for this review.

^b Well head elevation estimated based on LIDAR measurements at well locations (Watershed Sciences, 2009).

^c Well 1 is authorized for the full rate of 0.51 cfs under Permit G-17778, however this permit has another POA (MARI 62761) with a specified maximum rate of 0.42 cfs. For Permit G-17778, a rate of 0.09 cfs is used in this review for Well 1 (MARI 54600) under the assumption that the remaining 0.42 cfs would be supplied by MARI 62761.

A5. **Provisions of the** Willamette 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 proposed POAs will develop a confined aquifer; therefore, per OAR 690-502-0240, the relevant Willamette Basin rules (OAR 690-502-0120) do not apply.

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

Name of administrative area: _____

Comments: NA-not in area with administrative restriction.

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) 7i (Willamette Basalt Condition), large 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 Columbia River 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): _____

B3. **Special Conditions:**

1. Each basalt well shall be cased and continuously sealed from land surface to a depth of at least 50 feet to preclude hydraulic connection to nearby streams.
2. Any well authorized as a Point of Appropriation (POA) under this or subsequent permits shall be open to a single aquifer of the Columbia River Basalt Group and shall meet the applicable well construction standards (OAR 690-200 and OAR 690-210). In addition, the open interval in each well shall be no greater than 100 feet. An open interval of greater than 100 feet may be allowed if substantial evidence of a single aquifer completion can be demonstrated to the satisfaction of the Department Hydrogeologists, using information from a video log, downhole flowmeter, water chemistry and temperature, or other downhole geophysical methods. 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. Single aquifer completion

for any well with an open interval greater than 100 ft should be demonstrated to the satisfaction of the Department Hydrogeologists prior to authorization as a POA under this or subsequent permits.

If, during well construction or repair, it becomes apparent that the well can be constructed to eliminate aquifer commingling or interference with hydraulically connected streams in a manner other than specified in this permit, the permittee can contact the Department Hydrogeologist for this permit or the Ground Water/Hydrology Section Manager to request approval of such construction. The request shall be in writing and shall include a rough well log and a proposed construction design for approval by the Department. The request can be approved only if it is received and reviewed prior to placement of any new permanent casing and sealing material. If the request is made after casing and seal are placed, the requested modification will not be approved. If approved, the new well depth and construction specifications will be incorporated into any certificate issued for this permit.

3. For any well constructed under this or subsequent permits, a dedicated water-level measuring tube shall be installed in each well. The measuring tube shall meet the standards described in OAR 690-215-0060. When requested, access to the wells shall be provided to Department staff in order to make water-level measurements.
4. For any wells constructed or deepened under this or subsequent permits, the applicant shall coordinate with the driller to ensure that drill cuttings are collected at 10 ft intervals and at changes in formation in each well. A split of each sampled interval shall be provided to the Department.
5. If any geologic and hydrogeologic reports are completed for the permittee during the development of permitted wells, including geophysical well logs and borehole video logs, then copies of the reports shall be provided to the Department. Except for borehole video logs, two paper copies or a single electronic copy shall be provided of each report. Digital tables of any data shall be provided upon request.

Groundwater availability remarks: The POAs (MARI 54600, MARI 7750, MARI 16624) utilize water-bearing zones (WBZs) within the Columbia River Basalt Group (CRBG). Aquifers in the CRBG are typically thin interflow zones between lava flows and confined by thicker flow interiors that have low porosity and low permeability (Conlon et al 2005, Gannett & Caldwell 1998, Reidel et al 2002). The interconnected pore spaces of the thin interflow zones have limited storage space for water and are thus more likely to experience rapid drawdown (Tolan & Beeson 2001). Comparison of the POA well logs with local lithology indicates the POAs likely utilize water from the Sentinel Bluffs and/or Winter Water members of the Grand Ronde Basalt, or Basalt of Silver Falls from the Frenchman Springs member (Tolan & Beeson 2001). The POA is in an area deformed by faults, possibly resulting in compartmentalization of aquifers (Tolan & Beeson 2001). There is a concealed northeast trending fault that separates Well 2 from Wells 1 and 3; two northwest-trending faults parallel one another and flank the POAs approximately 0.5 miles to the east and 0.75 miles to the west (Tolan & Beeson 2001). The degree of compartmentalization due to nearby faults, which is unknown at this time, may exacerbate well-to-well interference and longer-term water level declines in the local basalt aquifer.

For Well 1, the existing rate from Cert 79611 is 1.0 cfs and from Permit G17778 is 0.09 cfs. If all authorizations are utilized, including the proposed rate of 0.77 cfs for this review, **total pumping rate is 1.86 cfs, or ~835 gpm.** For Well 2, the existing rate from Cert 72183 is 1.93 cfs. If all authorizations are utilized, including the proposed rate of 0.77 cfs for this review, **total pumping rate is 2.7 cfs or ~ 1,212 gpm.** Well 3 does not have any known pre-existing water right claims, and **the rate is the 0.77 cfs, or ~ 346 gpm.** The yield for Well 1 (MARI 54600) recorded on the well log is 450 gpm and for Well 2 (MARI 7750) is 600 gpm, however these air tests may not be reliable. Department-reviewed pump tests on Wells 1 and 2 provide more accurate estimates of maximum yield rates: 1,240 gpm for Well 1 and 2,480 gpm for Well 2. The yield for Well 3 (MARI 16624) recorded on the well log is 250 gpm, which is 72 percent of the total pumping rate for this review. The proposed POAs appear capable of supplying the proposed rate.

Water level trends for nearby (0 to 2 miles from POA) wells that utilize the CRBG and have SWLs within 100 ft in elevation to the POAs are relatively stable (see **Water Levels Measurements in Nearby Wells**). Of the 10 wells included, 5 have declined between 1 and 2 ft in the prior 10 years (MARI 7729, MARI 7737, MARI 8199, MARI 9943, MARI 60214). The remaining 5 wells have essentially remained stable in last 10 years (MARI 7750, MARI 11337, MARI 15392, MARI 19261, MARI 20055). Six of the wells have datasets around 30 years that show declines less than 7 ft (MARI 7729, MARI 7737, MARI 9943, MARI 11337, MARI 15392). Well 2 (MARI 7750) has an extended dataset, with a water level decline of 15.1 ft since 1986 (see **Water Levels Measurements** MARI 7750). Overall, the water level trends are stable but the conditions specified in B1.d., B2.c. and B3 are strongly recommended to protect senior users and the groundwater resource. The nearest CRB groundwater user to Well 1 is MARI 19360 (an exempt domestic well), located ~223 ft southeast of the POA, at an elevation of ~259 ft msl. The well log does not record the latitude or longitude for MARI 19360, but it is recorded to be located on taxlot 500 at 585 74th Ave SE Salem, Oregon. Due to the domestic use indicated on the well log, it was assumed that MARI 19360 is co-located in the vicinity of the developed structures on taxlot 500. MARI 19360 is completed to a depth of 197 ft bls and with a WBZ at 155-197 ft bls [62-104 ft mls]. The seal of the POA extends to 112 ft bls [137 ft msl]. It is likely the proposed use would cause some degree of well-to-well interference with MARI 19360. To assess the degree of drawdown, a Theis drawdown analysis was conducted for the proposed use (**see attached Theis Drawdown**)

Analysis-Well 1). Results indicate that the proposed **use is likely to cause well-to-well interference** with MARI 19360 that exceeds the threshold under the standard condition for basalt aquifers in the Willamette Basin.

The nearest CRB groundwater user to Well 2 is MARI 56896 (an exempt domestic well), located ~ 1,357 ft to the south of the POA, at an elevation of ~226 ft msl. The well log does not record the latitude or longitude for MARI 56896, but it is recorded to be located on taxlot 200 at 7235 State St NE Salem, Oregon. The center of the taxlot is the assumed location of MARI 56896. MARI 56896 utilizes a WBZ from 330 to 537 ft bls [-104 to -311 ft msl]. This POA has a split seal, with the upper portion extending from the surface to 20 ft bls [230 to 210 ft msl] and the lower portion from 150 to 160 ft bls [70 to 80 ft msl], likely not sealing through the WBZ that MARI 56896 utilizes. It is likely the proposed use would cause some degree of well-to-well interference with MARI 56896. To assess the degree of drawdown, a Theis drawdown analysis was conducted for the proposed use (see attached Theis Drawdown Analysis-Well 2). Results indicate that the proposed **use is likely to cause well-to-well interference** with MARI 56896 that exceeds the threshold under the standard condition for basalt aquifers in the Willamette Basin.

The nearest CRB groundwater user to Well 3 is MARI 16615 (an exempt domestic well), located ~ 510 ft to the southwest of the POA, at an elevation of ~283 ft msl. The well log does not record the latitude or longitude for MARI 16615, but it is recorded to be located at 616 74th Ave SE Salem, Oregon. Without additional location information, it was assumed the well is located in the center of the developed area at the indicated address. MARI 16615 utilizes a WBZ from 188 ft bls to the completed depth 200 ft bls [83 to 95 ft msl]. The seal of the POA extends to 79 ft bls [184 ft msl]. It is likely the proposed use would cause some degree of well-to-well interference with MARI 16615. To assess the degree of drawdown, a Theis drawdown analysis was conducted for the proposed use (see attached Theis Drawdown Analysis-Well 3). Results indicate that the proposed **use is not likely to cause well-to-well interference** with MARI 19360 that exceeds the threshold under the standard condition for basalt aquifers in the Willamette Basin.

Based on this analysis of the available data and under the assumptions previously identified, **groundwater for the proposed use is not likely available in the amounts requested and within capacity of the resource. If a water right is permitted for this application, the conditions specified in B1.d., B2.c, and B3 are strongly recommended to protect senior users and the groundwater resource.**

NOTE: This evaluation considers a conservative scenario for the nearest authorized POA not owned by the applicant. Other authorized POAs in the area may also experience an increase in interference as a result of this application, although to a lesser extent than the scenario evaluated here.

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	Columbia River Basalt	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	Columbia River Basalt	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	Columbia River Basalt	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Basis for aquifer confinement evaluation: The SWL for Well 1 (MARI 54600) is recently reported at 67.17 ft bls [elevation of 181.83 ft msl], with a confining layer from 88 to 163 bls [86 to 161 msl]. The SWL for Well 2 (MARI 7750) is most recently reported at 54.9 ft bls [175.1 ft msl], with a confining layer from 153 to 162 ft bls [68 to 77 ft msl] and another confining layer from 242 to 291 ft bls [-61 to -12 ft msl]. The SWL for Well 3 (MARI 16624) is 105 ft bls [158 ft msl], with a confining layer from 203 to 246 ft bls [17 to 60 ft msl]. In all three wells, the elevation of the SWL is above the bottom of the overlying confining layer, indicating the wells utilize confined aquifers.

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 Pudding River	182 ^a	177-337 ^b	1,597	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	1	Little Pudding River	175 ^a	173-210 ^b	1,576	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	1	Little Pudding River	158 ^a	179-350 ^b	1,122	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Basis for aquifer hydraulic connection evaluation: Well 1 (MARI 54600) is continuously sealed into basalt to an elevation of 137 ft msl, a SWL at 182 ft msl, and WBZ from -148 to 54 ft msl. Well 2 (MARI 7750) is sealed to 230 to 210 ft msl and from 70 to 80 ft msl, a SWL at 175 ft msl, and WBZs from -145 to -61 ft msl and -12 to 29 ft msl. Well 3 (MARI 16624) is continuously sealed into hard dense basalt to an elevation of 184 ft msl, a SWL at 158 ft msl, and a utilized WBZ from 11 to 17 ft msl. The nearby surface water sources do not appear to have incised through the confining layer overlying the WBZs utilized by the proposed POAs. The aquifer utilized by the Well 1 should be isolated from overlying local streams. Wells 2 and 3 are not continuously cased or sealed into the confining interval that overlies the water-bearing zone utilized by the wells; these wells may not meet well construction standards under OAR 690-210 (see Section D, below). The Little Pudding River flows over the Sentinel Bluffs member of the Grande Ronde Basalt within a mile of Wells 2 and 3; a northwest-trending concealed normal fault, downthrown toward the west, is located between the Wells and the Little Pudding River (Tolan & Beeson 2001). The fault likely provides compartmentalization to isolate the basalt aquifers from the stream.

^a Groundwater elevation calculated from static water level reported in well logs and/or latest static water level reported for MARI 54600, MARI 7750, and MARI 16624 and well head elevations estimated based on LIDAR measurements at existing well locations (Watershed Sciences, 2009).

^b Surface water elevations were estimated from land surface elevations along stream reaches (Watershed Sciences, 2009; USGS, 2013).

Water Availability Basin the well(s) are located within: PUDDING R MOLALLA R-AB MILL 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 (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?
		<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>

Comments: NA-no hydraulic connection with surface water within 1 mile of the POAs.

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?
	<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>

Comments: NA-Q not distributed among wells.

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:

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. 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:** No hydraulically connected surface water sources were identified within 1 mile of the proposed POA.

References Used:

Application file: LL-1869

Pumping Test Files: MARI 7729, MARI 7750, MARI 9736, MARI 9943, MARI 11337, MARI 15392, MARI 19261, MARI 51649, MARI 51838, MARI 54600, MARI 63686

Well Reports: MARI 54600, MARI 7750, MARI 16624, MARI 19360, MARI 56896, MARI 16615

Conlon, T.D., Wozniak, K.C., Woodcock, D., Herrera, N.B., Fisher, B.J., Morgan, D.S., Lee, K.K., and Hinkle, S.R., 2005, Ground-water hydrology of the Willamette Basin, Oregon: U.S. Geological Survey Scientific Investigations Report 2005-5168.

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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: Richland, Wash., Pacific Northwest National Laboratory, 277 p.

Theis, C.V., 1935, The relation between the lowering of the piezometric surface and the rate and duration of discharge of a well using ground-water storage: American Geophysical Union transactions, v. 16, p. 519-524.

Tolan, T.L. and Beeson, M.H. Digital Database By DuRoss, C.B. 2001. Geologic Map and Database of the Salem East and Turner 7.5-Minute Quadrangles, Marion County, Oregon: A Digital Database: U.S. Geological Survey Open-file Report 00-351, <https://pubs.usgs.gov/of/2000/0351/>.

United States Geological Survey, 2013, National Elevation Dataset (NED) [DEM geospatial data]. 1/9th arc-second, updated 2013.

United States Geological Survey, 2014, Salem East quadrangle, Oregon [map], 1:24,000, 7.5 minute topographic series, U.S. Department of the Interior, Reston, Virginia.

Watershed Sciences, 2009, LIDAR remote sensing data collection, Department of Geology and Mineral Industries, Willamette Valley Phase I, Oregon, Portland, OR, December 21.

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 #: 1,2,3 Logid: MARI 54600, MARI 7750, MARI 16624
- D2. **THE WELL does not appear to meet current well construction standards based upon:**
- review of the well log;
 - field inspection by _____;
 - report of CWRE _____;
 - other: (specify) _____
- D3. **THE WELL construction deficiency or other comment is described as follows:** Well 1 (MARI 54600) has an open interval from 112 to 400 ft below land surface, which is greater than the 100 ft maximum in Special Condition (2). Well 2 (MARI 7750) is not continuously sealed to at least 5 ft into the confining interval immediately overlying the artesian water-bearing zone in accordance with OAR 690-210-0155. Well 2 is not cased/sealed to at least 50 ft below land surface as specified in Special Condition (1). Well 2 has an open interval from 160 to 400 ft below land surface, which is greater than the 100 ft maximum in Special Condition (2). Also in conflict with Special Condition (2), Well 2 appears to access multiple aquifers of the CRBG. Well 3 (MARI 16624) is not sealed or cased continuously at least 5 ft into the confining interval immediately overlying the artesian water-bearing zone in accordance with OAR 690-210-0155. Well 3 has an open interval from 79 to 258 ft below land surface, which is greater than the 100 ft maximum in Special Condition (2).
- D4. **Route to the Well Construction and Compliance Section for a review of existing well construction.**

Water Availability Table

Oregon Water Resources Department
Water Availability Analysis

Main Help
Return Contact Us

Water Availability Analysis
Detailed Reports

PUDDING R > MOLALLA R - AB MILL CR
WILLAMETTE BASIN

Watershed ID #: 151 (Map)
Date: 4/11/2022

Water Availability as of 4/11/2022

Exceedance Level: 80%
Time: 2:27 PM

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

Water Availability Calculation

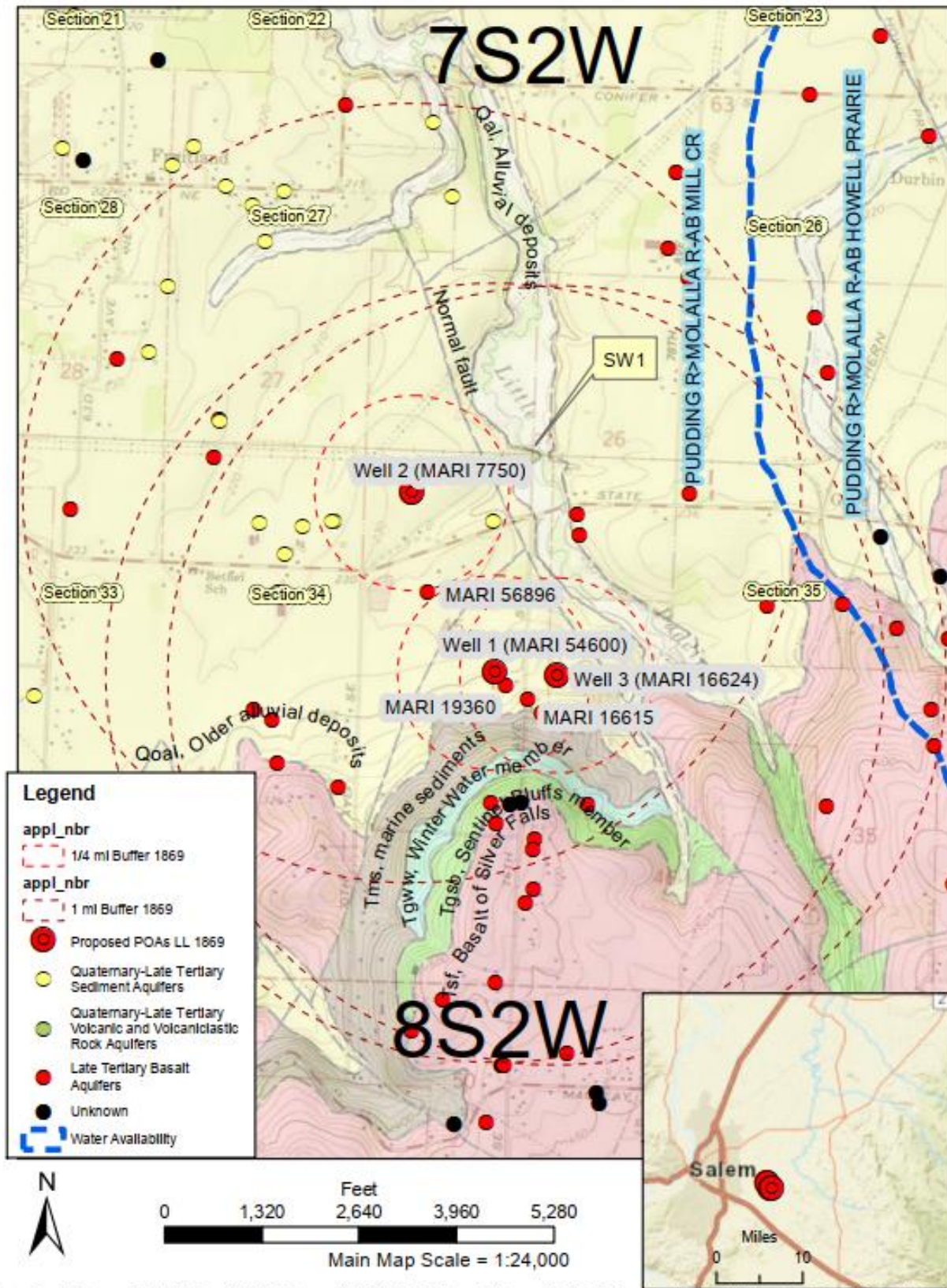
Monthly Streamflow in Cubic Feet per Second
Annual Volume at 50% Exceedance in Acre-Feet

Month	Natural Stream Flow	Consumptive Uses and Storages	Expected Stream Flow	Reserved Stream Flow	Instream Flow Requirement	Net Water Available
JAN	1,040.00	125.00	915.00	0.00	36.00	879.00
FEB	1,180.00	115.00	1,070.00	0.00	36.00	1,030.00
MAR	1,010.00	76.50	933.00	0.00	36.00	897.00
APR	787.00	52.50	735.00	0.00	36.00	699.00
MAY	425.00	50.90	374.00	0.00	36.00	338.00
JUN	224.00	73.00	151.00	0.00	36.00	115.00
JUL	109.00	115.00	-5.81	0.00	36.00	-41.80
AUG	71.00	94.10	-23.10	0.00	36.00	-59.10
SEP	67.30	53.40	13.90	0.00	36.00	-22.10
OCT	91.60	11.60	80.00	0.00	36.00	44.00
NOV	363.00	48.70	314.00	0.00	36.00	278.00
DEC	957.00	119.00	838.00	0.00	36.00	802.00
ANN	706,000.00	56,300.00	650,000.00	0.00	26,100.00	626,000.00

Download Data ([Text - Formatted](#), [Text - Tab Delimited](#), [Excel](#))

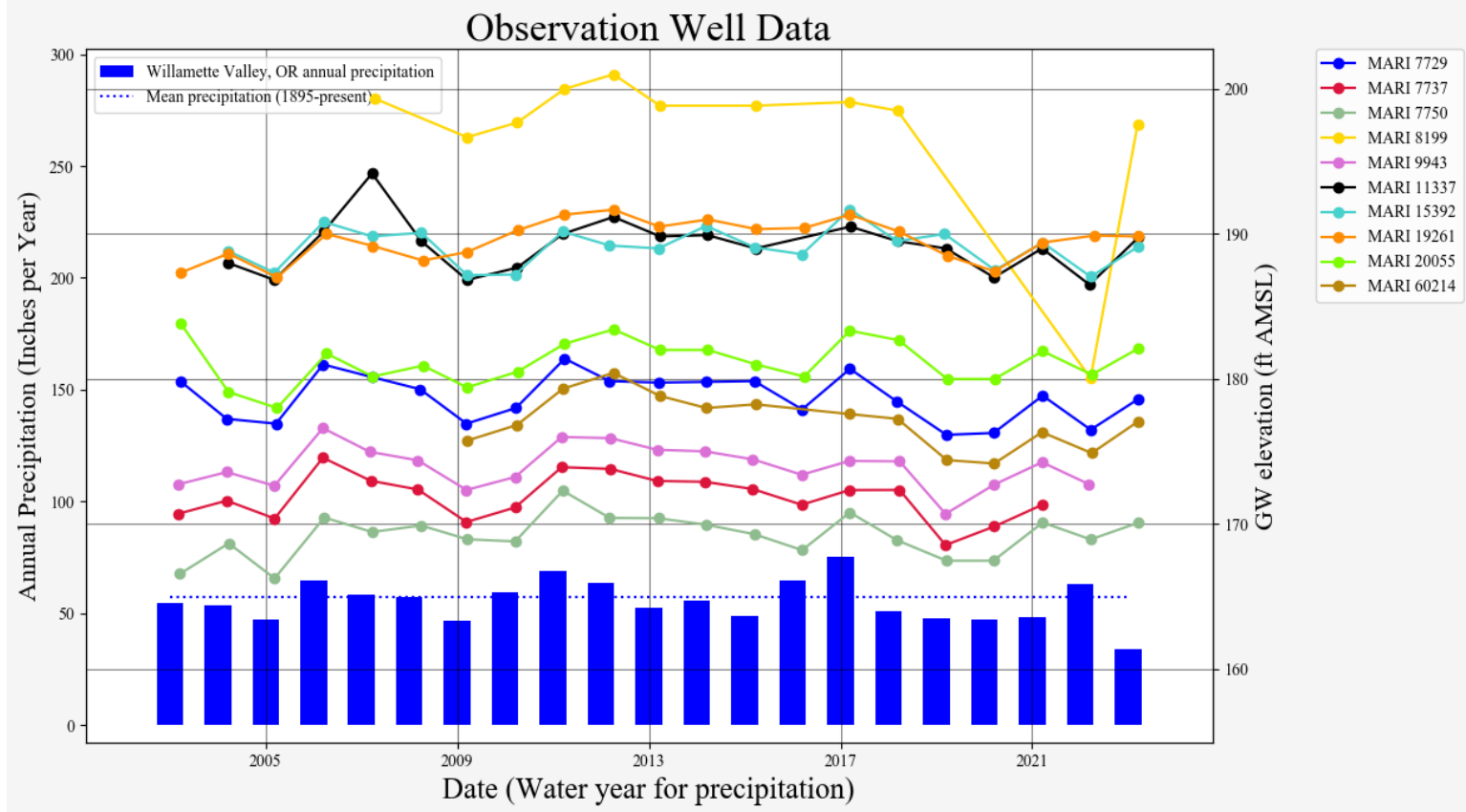
Well Location Map

LL1869 J and J Family LLC

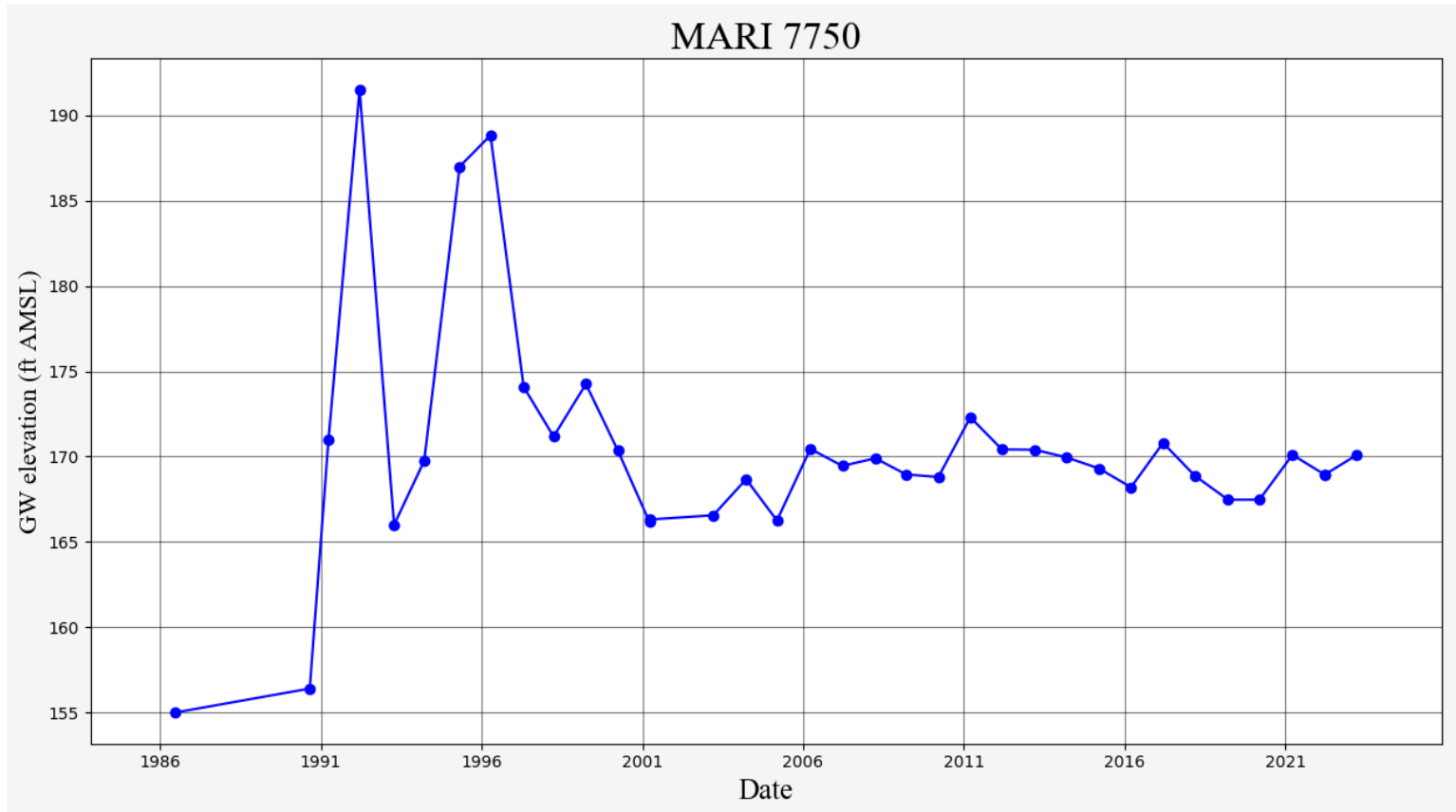


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Copyright:© 2013 National Geographic Society, I-cubed

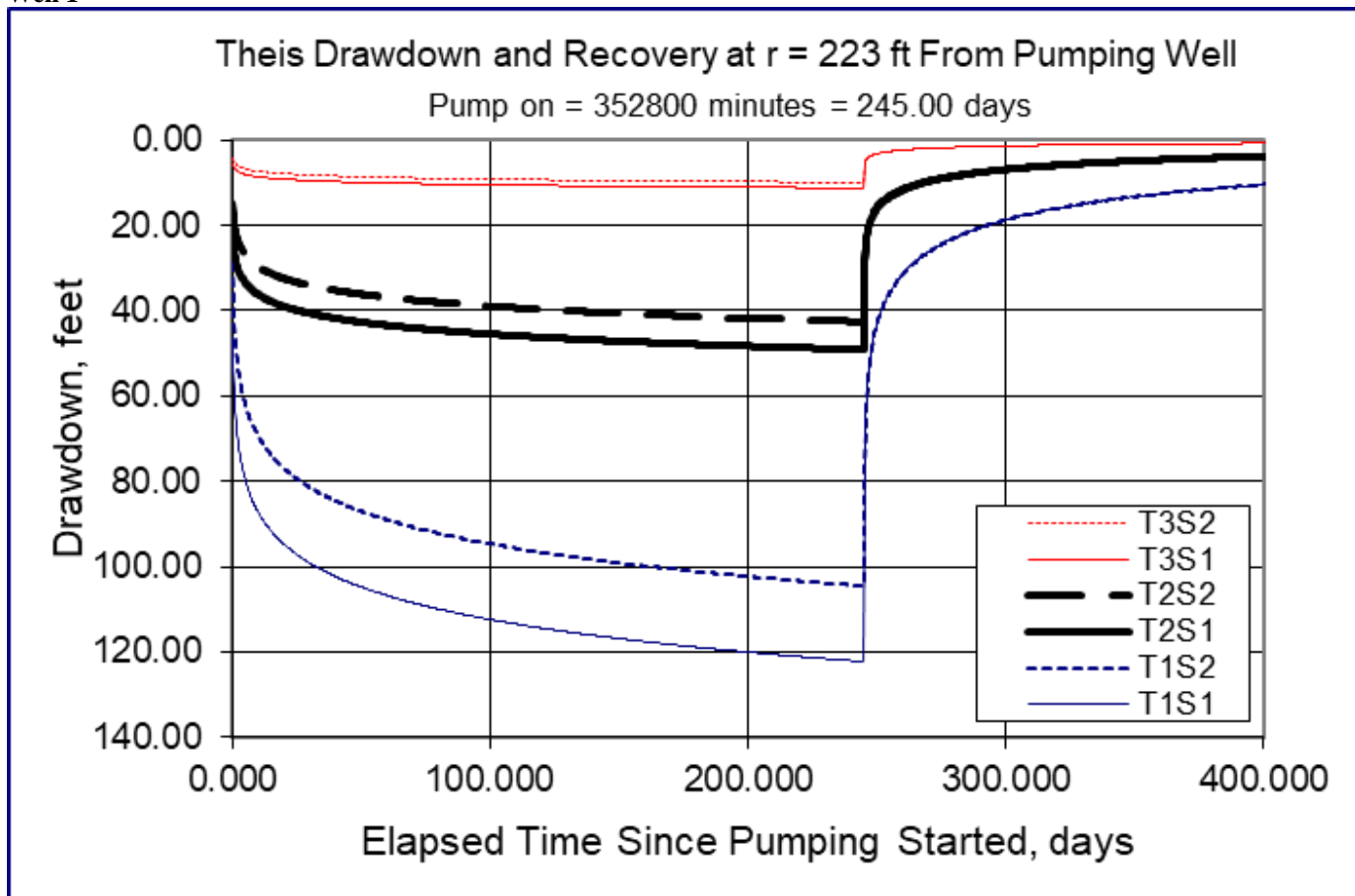
Water-Level Measurements in Nearby Wells



Water-Level Measurements MARI 7750



**Theis Drawdown Analysis
Well 1**



Radial distance from pumping well (r)=223 ft [estimated radial distance to nearest user, MARI 19360]

Pumping Rate (Q)= 0.95 cfs (~425 gpm)*

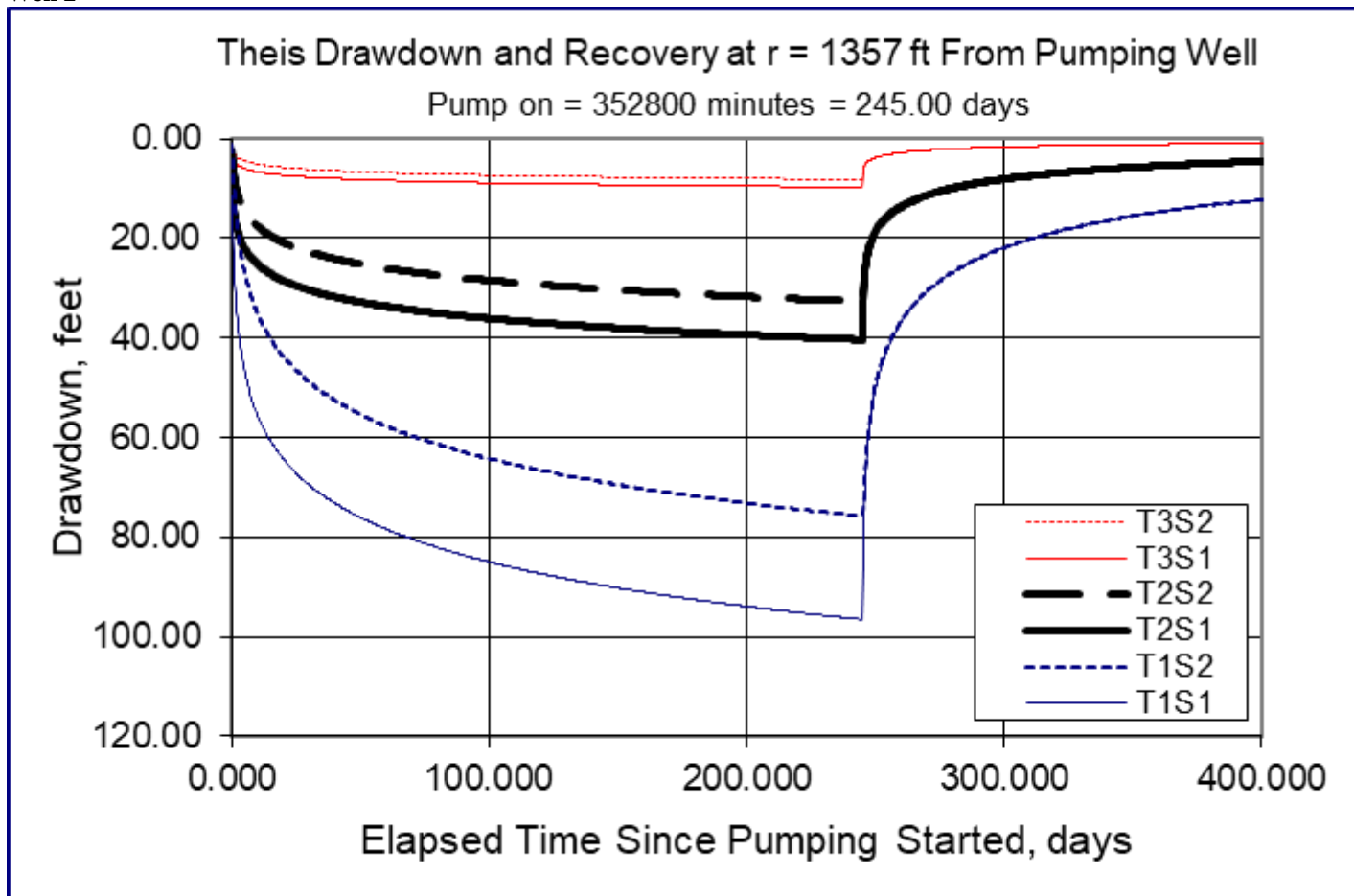
Aquifer Transmissivity (T1)= 4,413 gpd/ft (590 ft²/day), (T2)= 11,968 gpd/ft (1,600 ft²/day), (T3)= 59,092 gpd/ft (7,900 ft²/day)

Storativity (s1) = 0.0001, (s2) = 0.0005 [Conlon et al 2005, Table 2 values for Central CRB]

Total pumping time=245 days [irrigation season, March 1-October 31]

*The full pumping rate could not be utilized continuously for the entire 245-day period of use without exceeding the 460 ac-ft maximum allowed duty. For the maximum allowed duty of 460 ac-ft, continuous pumping would occur for 245 days at a rate of 0.9466 cfs (~425 gpm).

Well 2



Radial distance from pumping well (r)=1,357 ft [estimated radial distance to nearest user, MARI 56896]

Pumping Rate (Q)= 1.109 cfs (~498 gpm) *

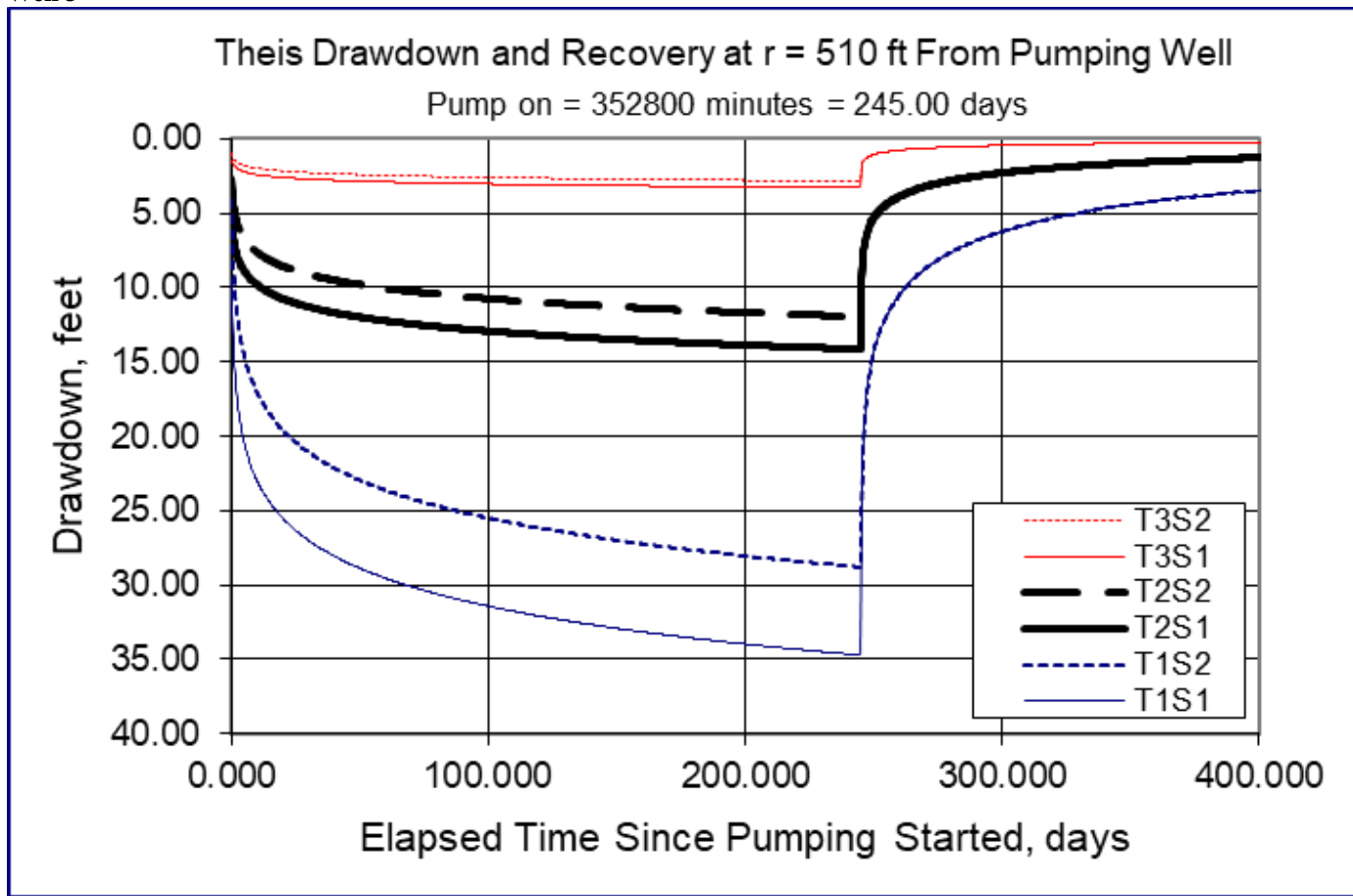
Aquifer Transmissivity (T1)= 4,413 gpd/ft (590 ft²/day), (T2)= 11,968 gpd/ft (1,600 ft²/day), (T3)= 59,092 gpd/ft (7,900 ft²/day)

Storativity (s_1) = 0.0001, (s_2) = 0.0005 [Conlon et al 2005, Table 2 values for Central CRB]

Total pumping time=245 days [irrigation season, March 1-October 31]

*The full pumping rate could not be utilized continuously for the entire 245-day period of use without exceeding the 538.75 ac-ft maximum allowed duty. For the maximum allowed duty of 538.75 ac-ft, continuous pumping would occur for 245 days at a rate of 1.109 cfs (~498 gpm).

Well 3



Radial distance from pumping well (r)=510 ft [estimated radial distance to nearest user, MARI 16615]

Pumping Rate (Q)= 0.316 cfs (~142 gpm)*

Aquifer Transmissivity (T1)= 4,413 gpd/ft (590 ft²/day), (T2)= 11,968 gpd/ft (1,600 ft²/day), (T3)= 59,092 gpd/ft (7,900 ft²/day)

Storativity (s1) = 0.0001, (s2) = 0.0005 [Conlon et al 2005, Table 2 values for Central CRB]

Total pumping time=245 days [irrigation season, March 1-October 31]

*The full pumping rate could not be utilized continuously for the entire 245-day period of use without exceeding the 153.5 ac-ft maximum allowed duty. For the maximum allowed duty of 153.5 ac-ft, continuous pumping would occur for 245 days at a rate of 0.316 cfs (~142 gpm).