Groundwater Application Review Summary Form

Application # G- 18690
Application # G- 18690 GW Reviewer J. Woody Date Review Completed: 1-23-2019
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** Application G- 8690 TO: GW: J. Woody (Reviewer's Name) FROM: **SUBJECT: Scenic Waterway Interference Evaluation** YES The source of appropriation is within or above a Scenic Waterway NO 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 _____ Waterway by the following amounts expressed as a proportion of the consumptive use by

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

which surface water flow is reduced.



MEMO

To:

Kristopher Byrd, Well Construction and Compliance Section Manager

From:

Joel Jeffery, Well Construction Program Coordinator

Subject:

Review of Water Right Application G-18690

Date:

March 14, 2019

The attached application was forwarded to the Well Construction and Compliance Section by Water Rights. Jen Woody reviewed the application. Please see Jen's Groundwater Review and the Well Logs.

Applicant's Well POA3 (MARI 1243): Based on a review of the Well Report, Applicant's Well POA3 does not appear to comply with current minimum well construction standards (See OAR 690 Division 210). The Well Report indicates that the top terminal height of the well casing is at land surface. In order to meet the minimum well construction standards, the top terminal height of the Water Supply Well must be at least one foot above land surface, the pump house floor or the local surface run off level.

My recommendation is that the Department **not issue** a permit for Applicant's Well POA3 (MARI 1243) unless it is brought into compliance with current minimum well construction standards or information is provided showing that it is in compliance with current minimum well construction standards.

Bringing Applicant's Well POA3 (MARI 1243) into compliance with minimum well construction standards may not satisfy hydraulic connection issues.

Applicant's Well POA4 (MARI 1337 and MARI 1336 the reconditioning of MARI 1337): Based on a review of the Well Reports, Applicant's Well POA4 does not appear to comply with current minimum well construction standards (See OAR 690 Division 210). The Well Report indicates that the top terminal height of the well casing is at land surface. In order to meet the minimum well construction standards, the top terminal height of the Water Supply Well must be at least one foot above land surface land surface, the pump house floor or the local surface run off level. In addition, the well report (MARI 1337) does not describe an annular seal for the 8-inch diameter gravel feed tube placed two feet west of the 12-inch diameter casing.

My recommendation is that the Department **not issue** a permit for Applicant's Well POA4 (MARI 1337 and MARI 1336 the reconditioning of MARI 1337) unless it is brought into compliance with current minimum well construction standards or information is provided showing that it is in compliance with current minimum well construction standards.

Bringing Applicant's Well POA4 (MARI 1337 and MARI 1336 the reconditioning of MARI 1337) into compliance with minimum well construction standards may not satisfy hydraulic connection issues.

Applicant's Well POA7 (MARI 1221): Based on a review of the Well Report, Applicant's Well POA7 does not appear to comply with current minimum well construction standards (See OAR 690 Division 210). The Well Report indicates that the top terminal height of the well casing is at land surface. In order to meet the minimum well construction standards, the top terminal height of the Water Supply Well must be at least one foot above land surface, the pump house floor or the local surface runoff level. The report also indicates that the constructor received approval from the Department for the sealing method, so that portion of the construction will not be reviewed.

My recommendation is that the Department **not issue** a permit for Applicant's Well POA7 (MARI 1221) unless it is brought into compliance with current minimum well construction standards or information is provided showing that it is in compliance with current minimum well construction standards.

Bringing Applicant's Well POA7 (MARI 1221) into compliance with minimum well construction standards may not satisfy hydraulic connection issues.

Applicant's Well POA8 (MARI 1441): Based on a review of the well report, Applicant's Well POA8 seems to protect the groundwater resource.

The construction of Applicants Well POA8 may not satisfy hydraulic connection issues.

PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO:	8						Dat	e	1/23/2	019			
FROM	:	Grou	ndwater S	ection									
SUBJE	ECT:	Appl	ication G-	18690			ewer's Name persedes	review of <u>n/</u>	a		Date of Re	view(s)	
Dribri		an Far		A A DOTA O A L	CDOUN		ъ						
				MPTION;				water use will	anguna th		um ation o	f the nub	dia
welfare, to determ	safety ar	<i>nd heal</i> ether th	<i>th as descr</i> e presumpt	ribed in ORS tion is establ	537.525. Dished. OAR	Department R 690-310-	staff revie 140 allow	ew groundwate s the proposed nd agency pol	er applica use be m	tions u odified	nder OAl l or condi	R 690-31 tioned to	0-140 meet
A. <u>GE</u>	NERAL	INFO	ORMATIO	<u>ON</u> : A	pplicant's N	Name:	C & E Bı	entano Famil	y LP	(County: _	Marion	
A1.	Applica	nt(s) se	eek(s) <u>9.7</u>	cfs from	om 4 well(s) in the Willamette								_ Basin,
	I	Middle	Willamette	e/Champoeg		subb	asin						
A2.	Propose	ed use _	Irrigation(0.95 cfs), Nu	ursery (7.38	s cfs), Defi	ciencies ir	n Rates (1.37 c	fs) Seaso	nality:			
A3.	Well an	d aquif			mber logs			nark proposed					
Well	Logic	i	Applicant Well #	r's Propos	ed Aquifer*	Prop Rate		Location (T/R-S QQ	-Q)	Location, metes and bounds, e. 2250' N, 1200' E fr NW cor S 3			_
1	MARI 1243 POA3				lluvium	9.22		4S/2W-20 SW ¹ / ₄ SE ¹ / ₄		490' S, 2230'W fr NW cor Leard D 95			eard DLC
2	MARI POA4 1337/1336		A	Alluvium		22	4S/2W-29 NW	1/4 NE 1/4	1840	' S, 3270'E DI	fr NW cor LC 94	Servant	
3	MARI 1221 POA7		A	Alluvium		22	4S/2W-19 SE !	4 SE 1/4	1070'	N, 30' W f		uve DLC	
4	MARI 1		POA8	A	lluvium	0.5	51	4S/3W-24 SW 1/	4 NW 1/4	10	60'N, 30'E		r S 24
* Alluviu	um, CRB,	Bedroc	k										
337-11	Well	First	\ \W\I	SWL	Well	Seal	Casing	Liner	Perfora		Well	Draw	Test
Well	Elev ft msl	Water ft bls	I ff ble	Date	Depth (ft)	Interval (ft)	Intervals (ft)	Intervals (ft)	Or Scr (ft		Yield (gpm)	Down (ft)	Type
1	173	unk	20	4/27/1965	155	0-20	0-18	n/a	n/a	ı	480	26	pump
3	170 172	unk unk	34 64	6/20/1967 7/11/1968	159 172	0-20 0-20	0-158.5 0-174	n/a n/a	118.5-1		1500 1500	84 62	pump
4	114	unk	31	1/2/1976	203	0-62	0-205.5	n/a	106.5-		unk	unk	pump unk
Use data	from app	lication	for propose	d wells.									
A4.	Commo	ents: 1	There are m	ultiple uses	and rates as	ssociates w	ith each w	vell, see Sectio	n C3b for	details	S.		
A5. 🗌	manage	ment o		mette ater hydrauli in such provi	cally conne	ected to sur	Basin	rules relative t	to the dev	elopmet, activa	ent, class ated by th	ification is application	and/or ation.
						ned aquife	r, therefor	e the pertinent	rules (OA	AR 690)-502-240) do not	apply.
A6. 🗌	Name o	f admir	nistrative a	rea:				tap(s) an aquif					
	Comme	ents: N	/A				45					*	

Version: 05/07/2018

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

B1.	Base	ed 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.	\square will not or \square 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)
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):
В3.	The under sedin wide Will occur dept conf	proposed wells are located on a terrace about 70 feet above the floodplain of the Willamette River. The terrace is relain by a thick sequence of fine-grained sediments that extends to depths of approximately 1000 feet. The bulk of the ments are clays and silts that encase a few relatively thin beds of sand and gravel that do not appear to be continuous over respread areas. The upper 80-100 feet of sediments are a sequence of graded beds of fine sand, silt, and clay (the amette Silt) deposited by a series of Pleistocene glacial floods which inundated the Willamette Valley. The water table rs at shallow depths within the Willamette Silt, which acts as a leaky confining layer for productive sands and gravel at the Thin zones of sands and gravels are likely the primary water bearing units. The thin, discontinuous geometry and ined conditions suggest that the aquifer system could be vulnerable to long term drawdown and/or interference. Lyield in 4S/2W-19, 20, 29, 30 ranges from 20 to 1620 gpm, with a median yield of 100 gpm. The requested rates of 9.2 4,140 gpm) for wells 1/MARI 1243, 2/MARI 1337, and 3/ MARI 1221 may be possible as a combined rate of the osed POAs. Let let loat a from state observation well MARI 2331 indicates seasonal fluctuations of about 20 feet, but relatively stable ditions over the last 50 years for shallow wells (see hydrograph in Fig. 3). The thin, lenticular geometry of the watering zones and the large proposed rate indicate that water-use reporting and water-level measurement conditions are ent (Conlon and others, 2005).

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	Alluvial	\boxtimes	
2	Alluvial	\boxtimes	
3	Alluvial	\boxtimes	
4	Alluvial	\boxtimes	

Basis for aquifer confinement evaluation: Water-bearing sands and gravels in the area are overlain by 80 to 100 feet of saturated Willamette Silt. The water table occurs at depths of less than 50 feet within the silt unit, whereas water bearing zones are typically below 100 ft blsd. The available data indicates the silt unit acts as a leaky confining unit for sands and gravels 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 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)	1	Hydraul Connec NO A	-	Potential for Subst. Interfer. Assumed? YES NO	
1	1	Mission Creek	130-	130-	3450	\boxtimes				
			140	140						
2	1	Mission Creek	130-	130-	4300					\boxtimes
			140	140						
3	1	Mission Creek	130-	130-	1140	\square				\boxtimes
			140	140		_	_	_		
4	2	Horseshoe Lake	90-100	80-90	2450	\boxtimes				
4	3	Unnamed tributary to	90-100	100	2630	\boxtimes				\boxtimes
		Willamette River								

Basis for aquifer hydraulic connection evaluation: Mission Creek has its headwaters in the terrace underlain by the Willamette Silt. As these stream drainages traverse the terrace toward the northeast, they progressively cut into the Willamette Silt until they intersect the water table, at which point they transition from ephemeral to perennial streams. This is consistent with published water level maps which indicate that groundwater in the alluvial aquifer system flows toward and discharges into the local stream network (Woodward and others, 1998). These facts indicate that the alluvial aquifer system is hydraulically connected to the local stream network. The depletion of local streams on the terrace by the proposed wells will be buffered, but not eliminated, by the low vertical hydraulic conductivity of the Willamette Silt and other clays and silts that lie above the deeper sands and gravels.

Water Availability Basin the well(s) are located within: Well #4 is in Watershed ID #182: WILLAMETTE R > COLUMBIA R - AB MOLALLA R; Wells 1, 2 & 3 are in Watershed ID #30200708: Champoeg Creek > Willamette

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 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 < 1/4 mile?	Qw > 5 cfs?	Instream Water Right ID	Instream Water Right Q (cfs)	Qw > 1% ISWR?	1% Natural Flow		Interference @ 30 days (%)	Potential for Subst. Interfer. Assumed?
1	1			none	n/a		1.00	\boxtimes	<25%	\boxtimes
2	1			none	n/a		1.00	\boxtimes	<25%	\boxtimes
3	1	\boxtimes		none	n/a		1.00	\boxtimes	<25%	\boxtimes
4	2			n/a	n/a		3830		<25%	
4	3			n/a	n/a		3830		<25%	

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.

Cvaraati	on and	minterions	appro as	III C3a abov						
Well	SW #	Well < 1/4 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?
1	1			none	n/a		1.00	\boxtimes		\boxtimes
2	1			none	n/a		1.00	\boxtimes		\boxtimes
3	1	\boxtimes		none	n/a		1.00	\boxtimes		\square
4	2			n/a	n/a		3830			
4	3			n/a	n/a		3830			

Comments: The application has distributed rates for the four wells as follows:

Well 1/MARI 1243/POA3: 360 gpm irrigation, 3321 gpm nursery, 459 deficiency in rate

Well 2/MARI 1337/POA4: 360 gpm irrigation, 3321 gpm nursery, 459 deficiency in rate

Well 3/MARI 1221/POA7: 360 gpm irrigation, 3321 gpm nursery, 459 deficiency in rate

Well 4/MARI 1441/POA8: 72 gpm irrigation, 158 gpm deficiency in rate

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.

	istributed SW#		Eab	Mor	A ===	Mov	Lun	Jul	Aug	Son	Oct	Nov	Dec
Well	SW#	Jan	Feb	Mar	Apr	May	Jun		Aug	Sep			
		%	%	%	%	%	%	%	%	%	%	%	%
	as CFS												
Interfer	ence CFS												
D:-4-'L	uted Well												
Distrib Well	SW#	s Jan	Feb	Mar	Ann	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
wen	3 W #		The second secon		Apr				The second secon	Control of the Contro			
111 11 6	ara ara	%	%	%	%	%	%	%	%	%	%	%	9
) as CFS												
Interfer	ence CFS												
		%	%	%	%	%	%	%	%	%	%	%	g
-	Q as CFS												
Interfer	ence CFS												
		%	%	%	%	%	%	%	%	%	%	%	q
Well (as CFS		29										
Interfer	ence CFS												
		%	%	%	%	%	%	%	%	%	%	%	9
Well (Q as CFS												
Interfer	ence CFS												
		%	%	%	%	%	%	%	%	%	%	%	9
Well (as CFS												
Interfer	ence CFS												
		%	%	%	%	%	%	%	%	%	%	%	9
Well (Q as CFS	1											
	ence CFS												
											1400		
(A) = Tc	otal Interf.												
(B) = 80	% Nat. Q												
(C) = 1	% Nat. Q												

$(\mathbf{D}) = (\mathbf{A}) > (\mathbf{C})$		5.		6	V	-	9	4	V.		V	
$E(x) = (A / B) \times 100$	%	%	%	%	%	%	%	%	%	%	%	%
= total interference S; (D) = highligh Basis for im	t the checl	kmark for e	ach month	ed natural where (A)	flow at 80% is greater	% exceed. a	as CFS; (C (E) = total i) = 1% of one	calculated n	atural flov / 80% flov	v at 80% exc v as percenta	eed. as
									·			
,											, , , , , , , , , , , , , , , , , , ,	
									× ,			
690-09-04 Rights		The pot	ential to	impair or	detrime	ntally affo	ect the pu	blic inter	est is to b	e determ	ined by th	e Wat
☐ If properl under this i. ☐ ii. ☐	permit ca The pe		lated if it d contain	is found to	o substant #(s)	ially inter	fere with	surface w	ater:	ce, and/or	groundwa	iter use
SW / GW Ren												
hydraulically c for substantial					ment find	s that the	proposed	use at wel	lls 1, 2, an	d 3 will h	ave the pot	ential
References Us Conlon, T.D.,		K.C. Wo	odcock I	Harrar	a N.P. E	ishar D I	Morgan	DS La	VV on	d Hinkle	S.D. 2005	
Ground-water												
Hunt, B., 2003 January/Februa			depletion	when pun	nping fron	n semicon	fined aqui	fer: Journ	nal of Hyd	rologic E	ngineering.	1.
OWRD water l					-							
<u>US Geological</u> Woodward, D.			•		•	-		Lowland	Aquifer S	vstem O	regon and	
Washington. U					June Wol	or the f	mament	20 mand	- Iquilei 0	jotom, O	. Jon unu	

D. WELL CONSTRUCTION, OAR 690-200

D1.	Well #:	Logid:n/a	
D2.		es not appear to meet current well construction standards based upon: of the well log;	
	b. [field insp	spection by	;
	c. report of	f CWRE	
	d. other: (s)	specify)	
D3.		nstruction deficiency or other comment is described as follows:	
D4. [Route to the We	ell Construction and Compliance Section for a review of existing well construction.	

Figure 1. Water Availability Tables

DETAILED REPORT ON THE WATER AVAILABILITY CALCULATION Water Availability as of $3/11/2005~{ m for}$

CHAMPOEG CR > WILLAMETTE R - AT MOUTH
Watershed ID #: 30200708 Basin: WILLAMETTE Exceedance Level: 80

T	ime:	08	3:37					Date:	03/11/2005
-	Month	15	Stream	CU + Stor Prior to 1/1/93	After	Stream	Stream	Water	Net Water Available
1	1	1	37.30	6.591	0.00	30.70	0.00	0.00	30.70
1	2	1	51.70	6.11	0.00	45.60	0.00	0.00	45.601
1	3	1	22.40	3.06	0.00	19.30	0.00	0.00	19.30
1	4	1	10.90	1.88	0.00	9.02	0.00	0.00	9.021
1	5	1	6.15	3.871	0.00	2.28	0.00	0.00	2.281
1	6	1	3.04	6.451	0.00	-3.41	0.00	0.00	-3.41
	7	1	2.94	10.60	0.00	-7.65	0.00	0.00	-7.65
	8	1	1.88	8.411	0.00	-6.53	0.00	0.00	-6.531
1	9	1	1.08	4.111	0.00	-3.03	0.00	0.00	-3.03
1	10	1	1.00	0.301	0.00	0.70	0.00	0.00	0.701
1	11	1	10.10	3.741	0.00	6.36	0.00	0.00	6.361
1	12	1	47.80	9.461	0.00	38.30	0.00	0.00	38.301
1	Stor	-	28100	3910	0	25100	0	1 0	25100
1									

Water Availability Analysis

Detailed Reports

WILLAMETTE R > COLUMBIA R - AB MOLALLA R WILLAMETTE BASIN

Water Availability as of 1/22/2019

Watershed ID #: 182 (Map)

Exceedance Level:80%

Date: 1/22/2019

Time: 11:12 AM

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	21,400.00	2,290.00	19,100.00	0.00	1,500.00	17,600.00
FEB	23,200.00	7,470.00	15,700.00	0.00	1,500.00	14,200.00
MAR	22,400.00	7,250.00	15,200.00	0.00	1,500.00	13,700.00
APR	19,900.00	6,900.00	13,000.00	0.00	1,500.00	11,500.00
MAY	16,600.00	4,240.00	12,400.00	0.00	1,500.00	10,900.00
JUN	8,740.00	1,970.00	6,770.00	0.00	1,500.00	5,270.00
JUL	4,980.00	1,800.00	3,180.00	0.00	1,500.00	1,680.00
AUG	3,830.00	1,650.00	2,180.00	0.00	1,500.00	684.00
SEP	3,890.00	1,390.00	2,500.00	0.00	1,500.00	998.00
OCT	4,850.00	745.00	4,100.00	0.00	1,500.00	2,600.00
NOV	10,200.00	878.00	9,320.00	0.00	1,500.00	7,820.00
DEC	19,300.00	960.00	18,300.00	0.00	1,500.00	16,800.00
ANN	15,200,000.00	2,250,000.00	13,000,000.00	0.00	1,090,000.00	11,900,000.00

Figure 2. Well Location Map

G18690 T4S/R2W-Section 19, 20, 29; T4S/R3W-Section 24

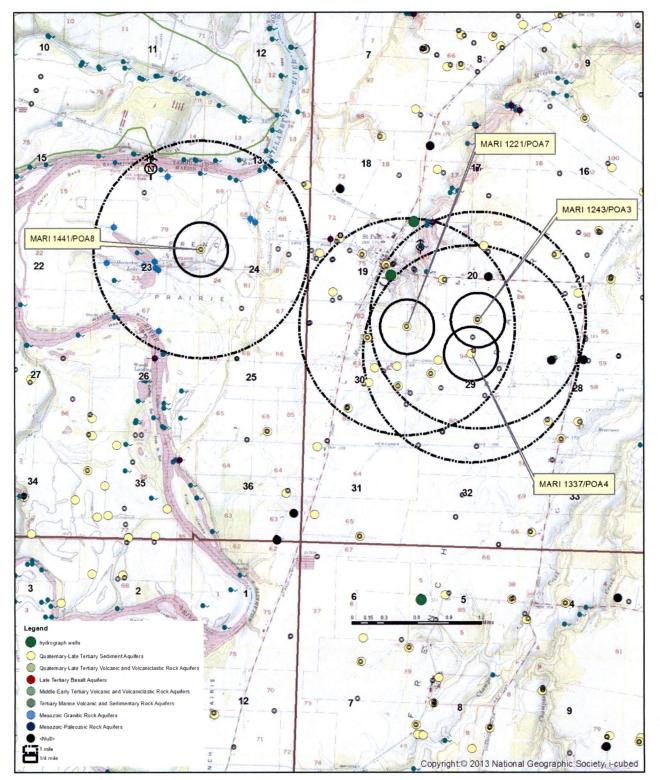
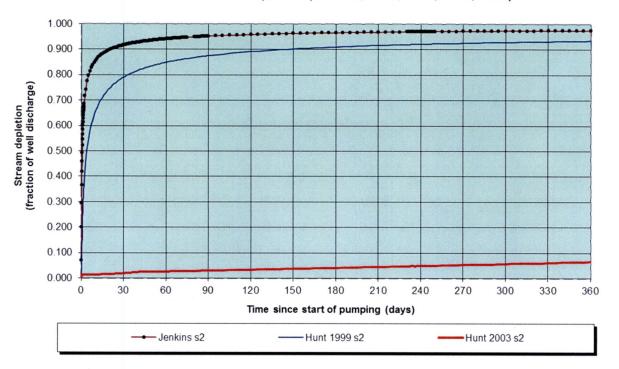


Figure 3. Stream depletion POAs 1,2,3 and Mission Creek

Transient Stream Depletion (Jenkins, 1970; Hunt, 1999, 2003)

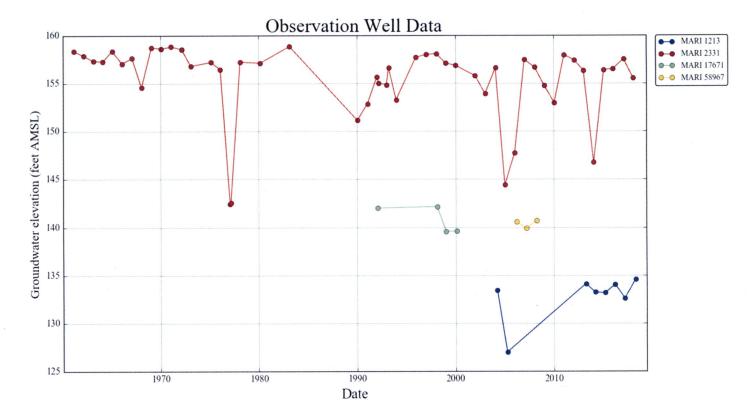


Output for Stream Depletion, Scenerio 2 (s2):				Time pump on (pumping duration) = 360 days								
Days	30	60	90	120	150	180	210	240	270	300	330	360
JSD	91.7%	94.1%	95.2%	95.8%	96.3%	96.6%	96.8%	97.0%	97.2%	97.4%	97.5%	97.6%
H SD 1999	79.1%	84.9%	87.5%	89.1%	90.2%	91.0%	91.6%	92.1%	92.6%	92.9%	93.2%	93.5%
H SD 2003	1.93%	2.64%	2.98%	3.34%	3.73%	4.08%	4.51%	4.89%	5.33%	5.74%	6.13%	6.59%
Qw, cfs	7.400	7.400	7.400	7.400	7.400	7.400	7.400	7.400	7.400	7.400	7.400	7.400
H SD 99, cfs	5.851	6.283	6.478	6.595	6.675	6.734	6.781	6.818	6.849	6.875	6.898	6.918
H SD 03, cfs	0.143	0.195	0.221	0.247	0.276	0.302	0.334	0.362	0.395	0.425	0.453	0.488

Parameters:		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate of well	Qw	3321.00	3321.00	3321.00	gpm
Time pump on (pumping duration)	tpon	360	360	360	days
Perpendicular from well to stream	а	1140	3450	4300	ft
Well depth	d	125	125	125	ft
Aquifer hydraulic conductivity	K	1.29	12.9	129	ft/day
Aquifer saturated thickness	b	140	140	140	ft
Aquifer transmissivity	Т	180.6	1806	18060	ft*ft/day
Aquifer storativity or specific yield	S	0.0001	0.0001	0.0001	
Aquitard vertical hydraulic conductivity	Kva	0.1	0.1	0.1	ft/day
Aquitard saturated thickness	ba	90	90	90	ft
Aquitard thickness below stream	babs	3	3	3	ft
Aquitard porosity	n	0.2	0.2	0.2	
Stream width	ws	20	20	20	ft

Page

Figure 4. Water-Level Trends in Nearby Wells



NOTICE TO WATER WELL CONTRACTOR 243 The original and first copy of this report are to be filed with the

filed with the STATE ENGINEER, SALEM, OREGON 9810

within 30 days from the date MAY 5 1965 (Please to of well completion.	type or print) STATE ENGS NATION No.		
(1) OWNER;	(11) WELL TESTS: Drawdown is amount lowered below static l	water level	l is
Name Can Brantani	Was a pump test made? Yes \(\sigma\) No If yes, by whom	(//	ر دالا
Address AV TOLAS	Yield: 2460 gal./min. with 8/) ft. drawdo	V	hrs.
The Carela (Osca)	" 1706 " 67 "		7 "
(2) LOCATION OF WELL: Appl 3088	" 980 " 40 "	•	75 "
ha \	Baller test 480 gal./min. with ft. drawd	own after	hrs.
County Driller's well number	- Artesian flow g.p.m. Date		
5 W 1/4 Section 20 T. 45 R. 2 W W.M.	Temperature of water Was a chemical analysis	made? 🔲 Y	es □ No
Bearing and distance from section or subdivision corner	(12) WELL LOG: Diameter of well below of	osing A	
do. 260 and that \$160 of	- Land School of Well School of		
NE CON & let vout Whe	Depth drilled / 57 ft. Depth of completed w		5 ft.
3 ,2	Formation: Describe by color, character, size of materi show thickness of aquifiers and the kind and nature of stratum penetrated, with at least one entry for each	ıl and struc the materi	cture, and al in each
	stratum penetrated, with at least one entry for each o	hange of f	formation.
	MATERIAL	FROM	TO
(3) TYPE OF WORK (check):	top 1	0	2
New Well Deepening Reconditioning Abandon	Brew Clay	2	15
adonment, describe material and procedure in Item 12.	Sanda Book Clarenter	15	24
(4) PROPOSED USE (check): (5) TYPE OF WELL:		24	38
Rotary C Driven C	Lott Blue Clay	38	50
Domestic Industrial Municipal Cable Jetted	Hold Brown Elde	55	7/
Irrigation Test Well Other Dug Bored	Lilt " "	7/	73
(6) CASING INSTALLED: Threaded □ Welded	Blue Clay Storal	73	94
18 " Diam. from O ft. to 15 ft. Gage . 250	Seft Brown Plan w/ Sand	94	98
12 " Diam. from 0 ft. to 157 ft. Gage 1 257	Dark Brown Olan	98	120
18 " Diam, from 157 ft. to 158 ft. Gage 1375	Landy Brown Clay	120	138
	Sand & Wayel	138	154
(7) PERFORATIONS: Perforated? A Yes No	B+ Clay	156	158
Type of perforator used Bay 8" 4 ouverd V torch	V		
Size of perforations in. by in.			
perforations from a ft. to ft.			
perforations fromft. toft.		-	
216 Medications from 136 ft to 157 ft.			
perforations from ft. to ft.			
perforations from ft. to ft.			
(8) SCREENS: Well screen installed? ☐ Yes No			
Manufacturer's Name		-	
Model No.			
Slot size Set from ft. to ft.	Work started / 2- 3- 6419 . Completed		10
Diam. Slot size Set from ft. to ft.	·ho	- 57	19
(9) CONSTRUCTION:	Date well drilling machine moved off of well	2/	1980
(i) constitueiton.	(13) PUMP:		
Well seal—Material used in seal	Manufacturer's Name dayne & Bowl	~	************
Depth of seal ft. Was a packer used?	Type: tutting class Well	H.P. 60)
Diameter of well bore to bottom of sealin.	Water Wall Contractoria Contitional		
Were any loose strata cemented off? 🗆 Yes 🌶 No 🔻 Depth	Water Well Contractor's Certification:		
Was a drive shoe used? H Yes No	This well was drilled under my jurisdiction	and this	report is
Was well gravel packed? ☐ Yes ☐ No Size of gravel:	true to the best of my knowledge and belief.	6	
Gravel placed from D tt. to 156 the description	NAME Mila Chneeder Caux	<u>`</u>	
Did any strata contain unusuable water? Yes No	(Person, fium or corporation) (Ty	pe or print)	1000
Type of water? depth of strata	Address Nor Halle 130/17	100	win
Method of sealing strata off	Drilling Machine Operator's License No	12	
(10) WATER LEVELS:	Maria Machine Operator's Interior 140.		
Static level 20	[Signed] Mile Sallnedg		
Static level ft. below land surface Date	(Water Well Contractor)	27	65
Artesian pressure lbs. per square inch Date	Contractor's License No. Date Date	04/	., 19

RECEIVED MARI. 133 NOTICE TO WATER WELL CONTRA The original and first copy of this report are to be filed with the 4/2W-29 B STATE ENGINEER, SALEM, OREGON STANTE ENGINEER OF OREGON G-4171 within 30 days from the date of well completion.

SALEM. OREGON 6-4171 GR-137 SALEM, OREGON type or print) GR-1377 State Permit No. . (1) OWNER: (11) WELL TESTS: Drawdown is amount water level is lowered below static level Was a pump test made?

Yes

No If yes, by whom? 1500 gal./min. with ft. drawdown after hrs. 1220 800 (2) LOCATION OF WELL: Patter test 5 40 gal./min. with 2 ft. drawdown after hrs. County Driller's well number Artesian flow g.p.m. Date 14 Section 29 T. 45 Temperature of water 34 Was a chemical analysis made?

Yes No Bearing and distance from section or subdivision corner (12) WELL LOG: Diameter of well below casing Depth drilled 158 ft. Depth of completed well Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation. MATERIAL (3) TYPE OF WORK (check): Was Maw Well Deepening [Reconditioning D Abandon [andonment, describe material and procedure in Item 12. (4) PROPOSED USE (check): (5) TYPE OF WELL: Driven [Rotary [Domestic | Industrial | Municipal Cable Jetted [Irrigation Test Well | Other Bored (6) CASING INSTALLED: Threaded, | Welded 12-" Diam. from 0 ft. to 158/2ft. Gage 1250 8" Diam. from 0 ft. to 9/ ft. Gage 250 .. ft. to" Diam. from ... (7) PERFORATIONS: Perforated? Yes | No Type of perforator used in. by 18 in. Size of perforations 480 perforations from ... 15 ... perforations from perforations from ... ft. to perforations from perforations from .. ft. to (8) SCREENS: Well screen installed? | Yes | No Manufacturer's Name -Model No Slot size Set from Completed Diam. Slot size Set from ft. to ... Date well drilling machine moved off of well (9) CONSTRUCTION: (13) PUMP: Well seal-Material used in seal Manufacturer's Nam Depth of seal _____ft. Was a packer used? ___ Type: Water Well Contractor's Certification: Were any loose strata cemented off? Yes No Depth .. Was a drive shoe used? ☐ Yes ØNo This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief Was well gravel packed? Ares No Size of gravel: NAME / Did any strata contain unusable water? Tyes to No depth of strata Type of water? Method of sealing strata off Drilling Machine Operator's Ligense No.

[Signed]

Contractor's License No. 3. 8

(10) WATER LEVELS:

Static level

Artesian pressure

ft. below and surface

lbs, persquare inch

. T. MILLER

Well Drilling Contractor
AURORA, OREGON

Ted Van Dyke, ST.Paul Ore. RECEIVED

PHONE SEIA

Log Of Well.

STATE ENGINEER

0-3surface
3-7 clay
7-35 blue clay
35-68 hard grey clay
68-70 blue clay
70-80 broken clay with sand and water
80-87 grey clay
87-104 soft sandy clay
104-106 broken hard sand
106-111 blue clay
111-123 grey clay with small red asrdy streaks
123-139 fine black sand
139-150 coarse black sand , small gravel
150-152 gravel.

set 12 inch pire 110 ft.

set 152 ft % in. perforaced 8 in. pipe
at 140 to 150 and 95 to 99 ft., graveled between
12 and 8 inch pipe, put 0 yards in.

Static water level 21 ft.

Drawdown on test
280 gal.per.min. 30 ft.
400 " " " 42 "
600 " " " 57 ".

i

			seres.	Trifgation of 29.7
				REMARKS:
	ts9T 19liupAsizv		J. T. Miller Level Measurements	:ATAC JANOITICGA
			ATION T NOITA	SOURCE OF INFORM
G.P.M.	009	ponts	it, after	Drawdown awobward
G.P.M.	280	ponts	te. after	MELL TESTS:
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11 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2			(55-	SI LEVEL:
	A CONTRACTOR OF THE CONTRACTOR			AQUIFERS:
	•		orsted from 95 to 99 ft	
			eff on the to 110 ft.	
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	And Co	.M.W.W.	Z H. S. 44 T 62	
***************************************	ST Paul, Oregon	CILK PND	Owner's No.	LOCATION OF WELL
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		WAILING	M. Van Dyke	OMNEE: Theodore
- ZZET '	APPLICATION NOGB	788T -	CB CBB	M
T'862"	CONNIX WATTON FAST	Record	IIəW Ail. 1974	STATE ENGINEER STATE ENGINEER

STATE ENGINEER Salem, Oregon

State Well No. 4/2W-29B
CountyMarion
Application No. GR- 1377

Well Log

vner: Theodore M. Van Dyke	Owner's No#1				
iller: J. T. Miller	Date Drilled	1955			
CHARACTER OF MATERIAL	(Feet below lan	ed surface) To	Thickness (feet)		
Surface soil	0	3	3		
Clay	3	7	4		
Blue clay	7	35	2.8		
Hard gray clay	35	68	33		
Blue clay	68	70	2		
Broken clay with sand & water	70	80	1.0_		
Gray clay	80	87	7		
Soft sandy clay	87	104	27		
Broken hard sand	104	106	2		
Blue clay	1.06	111	5		
Gray clay with small red sandy streaks	111	123	12		
Fine black sand	123	139	16		
Coarse black sand, small gravel	1.39	1.50	11_		
Gravel_	1.50	152	2		
		1			
			7		
The second secon					

NOTICE TO WATER WELL CONTRACTOR The original and first copy ATER WELL REPORT of this report are to be State Well No. 4/26-19 dddc STATE OF OREGON STATE ENGINEER, SALEM, O (Please type or print). within 30 days from the da (Do not write above this line) State Permit No. of well completion ATE ENGINEER SALEM URESON (11) LOCATION OF WELL: (1) OWNER: County Marion Name Driller's well number 1/4 Section 19 T.45 R.2W Bearing and distance from section or subdivision corner (2) TYPE OF WORK (check): New Well Deepening [Reconditioning [Abandon [If abandonment, describe material and procedure in Item 12. (3) TYPE OF WELL: (4) PROPOSED USE (check): (12) WELL LOG: Diameter of well below casing Domestic | Industrial | Municipal | Cable Jetted [Depth drilled ft. Depth of completed well Irrigation Test Well Other Dug Bored | Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, CASING INSTALLED: Threaded | Welded | with at least one entry for each change of formation. Report each change " Diam. from 0 ft. to 174 ft. Gage 250 in position of Static Water Level as drilling proceeds. Note drilling rates. " Diam. from 0 ft. to 100 ft. Gage 250 MATERIALft. to ft. Gage 27 PERFORATIONS: Perforated? PYes | No. Type of perforator used Joseph Size of perforations in. by 80 720 perforations from 104 tt. to 164 _ perforations from 98 .. perforations from 110 perforations from 102 perforations from (7) SCREENS: Well screen installed?
Yes No Manufacturer's Name Type .. Diam. Slot size Set from This well leaked around concrete so we had Diam. Slot size Set from ft. to ... to gravel pack & develop upper portion (8) WATER LEVEL: Completed well. after completion we dug out with back hoe to 12' and mixed bentonite to fill back Static level 6 ft. below land surface Date then boured concrete slad over it as per lbs. per square inch Date ian pressure phone conversation with Mr. Bartholomew Drawdown is amount water level is lowered below static level (9) WELL TESTS: Was a pump test made? Yes \(\subseteq \text{No If yes, by whom?} \) 19 68 Completed Work started gal./min. with 12 ft. drawdown after hrs. Date well drilling machine moved off of well Drilling Machine Operator's Certification: This well was constructed under my direct supervision. Mategal./min. with ft. drawdown after Bailer test hrs. rials used and information reported above are true to my best knowledge and belief. g.p.m. Date Artesian flow ... Date 8-10 1968 [Signed] Temperature of water Was a chemical analysis made?

Yes (10) CONSTRUCTION: Drilling Machine Operator's License No. Water Well Contractor's Certification: This well was drilled under my jurisdiction and this report is true to the best of myknowledge and belief.
NAME Milaschneider Equip Were any loose strata cemented off? Yes No Depth Was a drive shoe used?
Yes No

(USE ADDITIONAL SHEETS IF NECESSARY)

Contractor's License No. 38.7... Date ...

Did any strata contain unusable water? Yes No

Was well gravel packed? Yes No Size of gravel:

Type of water?

Method of sealing strata off

Gravel placed from

depth of strata

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

STATE ENGINEER, SALEM, OREGON 97310 within 30 days from the date of well completion.

WATER WELL REPORT

STATE OF OREGON

(Please type or print (Do not write above this line)

State Well No.

45/3W-24

above this line)

State Permit No.

(1) OWNER:	(10) LOCATION OF WELL:
Name Harold Brentano	County Marion Driller's well number 7601
Address Star Rt., Box 48	34 34 Section 24 T.4S R. 3W W.M.
St. Paul, Ore. 97137	Bearing and distance from section or subdivision corner
(2) TYPE OF WORK (check):	South State of the
New Well Deepening Reconditioning Abandon	
If abandonment, describe material and procedure in Item 12.	(11) WATER LEVEL. Completed well
	(11) WATER LEVEL: Completed well.
Rev _{Rotary} Driven D Domestic D Industrial Municipal D	Depth at which water was first found 46 ft.
Rotary Driven Domestic Municipal Domestic Municipal	Static level 31 ft. below land surface. Date 1-2-76
☐ Bored ☐ Irrigation 🗷 Test Well ☐ Other ☐	Artesian pressure Ibs. per square inch. Date
(5) CASING INSTALLED: 16	(12) WELL LOG: Diameter of well below casing
Type of perforator used cutting torch	MATERIAL From To SWL
Size of perforations 3/8 in. by in. 6	See sheet attached
1240 perforations from 106'65" ft. to 188'15" ft.	* Gravel feed
perforations from ft. to ft.	
perforations fromft. toft.	
77.77	The second secon
(7) SCREENS: Well screen installed? Yes No	770
Manufacturer's Name	
TypeModel No.	1. 1. 1.
Diam. Slot size Set from ft. to ft.	The second secon
Diam. Slot size Set from ft. to ft.	
(8) WELL TESTS: Drawdown is amount water level is lowered below static level	AFR. 61973
Was a pump test made? ■Yes □ No II yes, by whom?	WATER RESOURCES NEET
i: gal./min. with ft. drawdown after hrs.	SALEM. CRECON
" See sheet attached " "	
" " " " " " "	The state of the s
The second secon	
Bailer test gal./min. with ft. drawdown after hrs.	The state of the s
estan flow g.p.m.	
Temperature of water Depth artesian low encountered ft.	Work started 10-24 1975 Completed 3-18- 19 76
(9) CONSTRUCTION: pressure grouted intrusion aid	Date well drilling machine moved off of well 3-1 19 76
Well seal-Material used coment & admix	Drilling Machine Operator's Certification: This well was constructed under my direct supervision.
Well sealed from land surface to 0 to 24 & 33 to 62 ft.	Materials used and information reported above are true to my
Diameter of well bore to bottom of seal in.	best knowledge and belief.
Diameter of well bore below seal in 68	[Signed] / Date 3-19 , 1976
Number of sacks of cement used in well see your many manufacture sacks	Drilling Machine Operator's License No. 212
Number of cooks of Boatanta uced in well-sal	
Brand name of Marke aggregat/ zonolite	Water Well Contractor's Certification:
Number of pounds of bentonite per includens of water lbs./100 gals.	This well was drilled under my jurisdiction and this report is
of water	true to the best of my knowledge and belief.
Did any strata contain unusable water Yes No	(Parson firm or comparation)
	Address Star Rt., Box 97. St. Paul. Ore.
	Ma-0 111 -0
Method of sealing strata off Was well gravel packed? E Yes 1 to Size of gravel: 3/4 - 1	[Signed] / July full (Water Well Contractor)
hottom	
Graver practu from	
(USE ADDITIONAL SE	HEETS IF NECESSARY) SP*45658-119

Harold Brentano

		Material	From	То
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		soil	4 .	17
		wn clay	17	20
		ht gray clayt	20	28
		wn sandy clay	28	43
	Fin	e brown sand	43	46
	Coa	rse gravel (to 5")	46	48
	Gra	y clay	48	56
	Dar	k gray sandy clay	56	63
	Bro	wn sandy clay	63 .	66 .
		rse black sand to 1"	66	70
		wn sandy clay	70	71
		y sandy clay	71	72
		rse black sand	72	81
		ie clay	81	85
	Gre	y clay		
	Gre	ay sandy clay w/ wood fibre & small amounts of medium sand	85	90
			90	96
	Gre	ay clay	96	107
	Sar	ndy gray clay ack sand (medium to coarse w/ some		•
	BTS	ack sand (medium to coarse ", some	107	115
	מ .	gray clay ack sand w/ small pebbles .083.	115	126
	BIE	ack sand wy small possible ves	126	136
	GIE	ay clay rk gray sandy clay - large amounts		
	Dai	rk gray sandy clay - large amount	136	140
	D 3	medium sand ack sand - coarse w/ wood fibre &:		
	BIS	small pebbles .083	140	156
	a	avel fine to coarse .08 - 5"	156	183
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