#### WATER RESOURCES DEPARTMENT

MEMO

August R ,2015

TO: Application G-18076

FROM: GW: Auror Bouchier (Reviewer's Name)

#### **SUBJECT: Scenic Waterway Interference Evaluation**

	YES	The source of appropriation is within or should a Spania Waterman
X	NO	The source of appropriation is within or above a Scenic Waterway
	YES	Use the Seconda Weterway condition (Condition 71)
Ø	NO	Use the Scenic Waterway condition (Condition 7J)

- Per ORS 390.835, the Groundwater Section is **able** to calculate ground water interference with surface water that contributes to a Scenic Waterway. The calculated interference is distributed below.
- Per ORS 390.835, the Groundwater Section is **unable** to calculate ground water interference with surface water that contributes to a scenic waterway; **therefore**, **the Department is unable to find that there is a preponderance of evidence that the proposed use will measurably reduce the surface water flows necessary to maintain the free-flowing character of a scenic waterway**.

#### DISTRIBUTION OF INTERFERENCE

Calculate the percentage of consumptive use by month and fill in the table below. If interference cannot be calculated, per criteria in 390.835, do not fill in the table but check the "unable" option above, thus informing Water Rights that the Department is unable to make a Preponderance of Evidence finding.

Exercise of this permit is calculated to reduce monthly flows in \_\_\_\_\_\_ Scenic Waterway by the following amounts expressed as a proportion of the consumptive use by which surface water flow is reduced.

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

## PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO:		Wate	r Rights S	ection				Da	te	Augu	<u>st 12, 20</u>	15	
FRON	<b>/</b> :	Grou	ndwater S	ection		Auro	ra C. Bo	uchier					
						Revi	ewer's Nam	e		- 10 A			
SUBJ	ECT:	Appli	ication G-	<u>18076</u>		_ Su	persedes	review of _r	a				
											Date of Re-	view(s)	
OAR ( welfard to dete	<b>590-310-1</b> e, safety a rmine who	<b>30</b> (1) <i>I</i> <i>nd heal</i> ether th	The Depart th as descr e presumpt	ibed in ORS	resume tha 537.525. I ished. OAF	<i>it a proposi</i> Department R 690-310-	<i>ed ground</i> staff revi 140 allow	dwater use will iew groundwa is the proposed and agency po	er applica I use be m	tions u odified	nder OAl l or condi	R 690-31 tioned to	0-140 meet
A. <u>G</u>	ENERAL	INFC	ORMATIC	<u>ON</u> : Aj	pplicant's l	Name:	Meza			(	County: _	Clacka	mas
A1.	Applica	nt(s) se	ek(s) _0.2	<b>5</b> cfs (11)	2 gpm) fro	m <u>2</u> we	ll(s) in th	e <u>Willamett</u>	e				_Basin,
						subb	asin						
A2.	Propose	ed use _	Irr	igation of	20 acres	Seas	onality:	March 1 -	October	31	······		
A3.	Well an	d aquif	er data ( <b>att</b>	tach and nu	mber logs	for existin	g wells; i	mark propose	d wells as				
Well	Logic	i	Applicant Well #	's Propos	ed Aquifer*	Prop Rate		Locatio (T/R-S Q			tion, mete 'N, 1200'		
1	CLAC 2		1		lluvium	0.2		T5S/R1W-14	NWSE	505' S, 100' E fr CENTER S		R S 14	
2 3	PROPOS	SED	2	A	lluvium	0.2	25	T5S/R1W-14	T5S/R1W-14-NWSE		875' S, 80' E fr CNETER S		
4													
5													
* Alluv	ium, CRB,	Bedroc	k										
Well	Well Elev ft msl	First Water ft bls	ft bls	SWL Date	Well Depth (ft)	Seal Interval (ft)	Casing Interval (ft)		Perfora Or Scr (ft	reens	Well Yield (gpm)	Draw Down (ft)	Test Type
1	190	18	47	November 1972	89	0-32	0-89				35	27	Bailer
2	190				160(+/-)	0-40	160(+/-)	)	120-	60			
Use dat	a from app	lication	for proposed	d wells.									
A4.	section. review	The ap are esti	plication d mated base	oes not proved on the info	vide meets a	and bounds ovided. Th	for the e ere are so	es from the proxisting well. To me discrepance a note on the v	he meets a vies betwe	and bou en the	unds prov well log f	ided in the for CLAC	<u>his</u> 2 2150

For the purpose of this review, the full rate is evaluated at each well rather than being distributed between the wells.

from SE corner of house". Other well logs in the immediate area provide similar lithology.

A5.

Provisions of the Willamette	Basin rules relative to the development, classification and/or
management of groundwater hydraulically connected to surface	e water $\square$ are, or $\boxtimes$ are not, activated by this application.
(Not all basin rules contain such provisions.)	
Comments: The applicant's wells are greater than 1/4 mile from	a perennial surface water body, so the pertinent basin rules
(OAR 690-502-0240) do not apply.	-

A6. Well(s) # \_

\_\_\_\_\_, \_\_\_\_, \_\_\_\_, tap(s) an aquifer limited by an administrative restriction.

Name of administrative area: Comments:

\_\_\_\_\_,\_\_\_\_

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

- B1. Based upon available data, I have determined that groundwater\* for the proposed use:
  - a. **is** over appropriated, **is not** over appropriated, *or* **is 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. in will, if properly conditioned, avoid injury to existing groundwater rights or to the groundwater resource:
     i. The permit should contain condition #(s)
    - ii. The permit should be conditioned as indicated in item 2 below.
    - iii. The permit should contain special condition(s) as indicated in item 3 below;
- B2. a. Condition to allow groundwater production from no deeper than \_\_\_\_\_\_ ft. below land surface;
  - b. Condition to allow groundwater production from no shallower than \_\_\_\_\_\_ ft. below land surface;
  - c. Condition to allow groundwater production only from the groundwater reservoir between approximately \_\_\_\_\_\_ ft. and \_\_\_\_\_\_ ft. below land surface;
  - d. Well reconstruction is necessary to accomplish one or more of the above conditions. The problems that are likely to occur with this use and without reconstructing are cited below. Without reconstruction, I recommend withholding issuance of the permit until evidence of well reconstruction is filed with the Department and approved by the Groundwater Section.

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

#### B3. Groundwater availability remarks: \_

Over 900 feet of alluvial sediments occur beneath land surface in the vicinity of the proposed POA. The water table occurs 30-60 feet below land surface in this region. Productive sand and gravel beds occur throughout the sequence separated layers of lower permeability silts and clay which progressively confine deeper water-bearing zones (Gannet and Caldwell, 1998, and Woodward et al., 1998).

Observation from nearby wells indicate relatively stable long-term trends for alluvial wells in the immediate vicinity of the proposed POA (see attached hydrograph), but increased groundwater development in the area indicates a need for additional water-level monitoring (7N) if this permit is issued. According to the Water Master Joel Plahn (personal communication, 8/12/2015) both Butte Creek and the Pudding River (which Butte Creek is tributary to), are currently regulated. Any additional withdrawals from the streams would be undesirable.

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#### 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	Alluvium	$\square$	
2	Alluvium	$\square$	

**Basis for aquifer confinement evaluation:** The well logs for nearby wells indicate static water levels above the water-bearing zones. Published maps of the groundwater table corroborate this (Woodward et al., 1998).

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)	Co	raulically nnected? O ASSUMED	Potentia Subst. Int Assum YES	erfer.
1	1	Butte Creek	~140	~105- 120	2,220				
2	1	Butte Creek	~140	~105- 120	2,030				$\boxtimes$

**Basis for aquifer hydraulic connection evaluation:** : <u>Published water-table maps indicate that groundwater in the alluvial</u> aquifer flows toward, and discharges to, Butte Creek (Woodward et al., 1998).

Water Availability Basin the well(s) are located within: 69799 (BUTTE CR< PUDDING R- AT MOUTH)

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 < 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?
1	1			69799	12	$\boxtimes$	9.78	$\boxtimes$	12.6%	$\boxtimes$
2	1			69799	12	$\boxtimes$	9.78	$\square$	13.3%	$\boxtimes$

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.

evaluation and m					0.00	0 10		Detential
SW #	Qw > 5 cfs?	Instream Water Right ID	Instream Water Right Q (cfs)	Qw> 1% ISWR?	80% Natural Flow (cfs)	Qw > 1% of 80% Natural Flow?	Interference @ 30 days (%)	Potential for Subst. Interfer. Assumed?

Comments: <u>Stream depletion was estimated using the Hunt 2003 model (see attached results)</u>. An aquifer saturated thickness value of 40 feet was used based upon published maps (Gannet and Caldwell, 1998). Butte Creek cuts through the Willamette Silt in this region. Therefore, stream clogging was modeled by using an aquitard thickness below stream value of 3 feet.

# 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		<u></u>							_			
Well	SW#	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		%	%	%	%	%	%	%	%	%	%	%	%
	Q as CFS												
Interfer	rence CFS												
Distrib	outed Well	6											
Well	SW#	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		%	%	%	%	%	%	%	%	%	%	%	%
Well (	Q as CFS												
Interfer	rence CFS												
		%	%	%	%	%	%	%	%	%	%	%	%
Well (	Q as CFS												
Interfer	rence CFS												
		%	%	%	%	%	%	%	%	%	%	%	%
	Q as CFS												
Interfer	rence CFS												
		%	%	%	%	%	%	%	%	%	%	%	%
	Q as CFS												
Interfer	rence CFS												
		%	%	%	%	%	%	%	%	%	%	%	%
	Q as CFS												
Interfer	rence CFS												
		%	%	%	%	%	%	%	%	%	%	%	%
	Q as CFS												
Interfet	rence CFS												
(A) = T	otal Interf.												
( <b>B</b> ) = 80	) % Nat. Q												
(C) = 1	% Nat. Q												
(D) =	(A) > (C)												
	(A) > (C) (A) x 100	%	%	%	%	%	%	%	%	%	%	%	%
$(\mathbf{E}) = (\mathbf{A})$	(/B)X100	-70	-/0	-/0	-70	-70	-70	-70	70	-70	-70	-70	-/0

	al interference as CFS; (B) = WAB calculated natural flow at 80% exceed. as CFS; (C) = 1% of calculated natural flow at 80% exceed. b) = 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:
_	asis for impact evaluation:
-	
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. (	690-09-040 (5) (b) The potential to impair or detrimentally affect the public interest is to be determined by the W Rights Section.
	If properly conditioned, the surface water source(s) can be adequately protected from interference, and/or groundwater 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;
sw	/ GW Remarks and Conditions:
_	
	erences Used:
Gan	
Gar and Hur	nett, Marshall W., and Caldwell, Rodney R., 1998, Geologic Framework of the Willamette Lowland Aquifer System, Ore
Gan Ind Hur ani	inett, Marshall W., and Caldwell, Rodney R., 1998, Geologic Framework of the Willamette Lowland Aquifer System, Ore Washington: U. S. Geological Survey Professional Paper 1424-A. ht, B., 2003, Unsteady stream depletion when pumping from semiconfined aquifer: Journal of Hydrologic Engineering, uary/February, 2003.
Gan and Hur ani Wo	inett, Marshall W., and Caldwell, Rodney R., 1998, Geologic Framework of the Willamette Lowland Aquifer System, Ore Washington: U. S. Geological Survey Professional Paper 1424-A. ht, B., 2003, Unsteady stream depletion when pumping from semiconfined aquifer: Journal of Hydrologic Engineering, Lary/February, 2003.
Gan and Hur Janu Wo	inett, Marshall W., and Caldwell, Rodney R., 1998, Geologic Framework of the Willamette Lowland Aquifer System, Ore Washington: U. S. Geological Survey Professional Paper 1424-A. ht, B., 2003, Unsteady stream depletion when pumping from semiconfined aquifer: Journal of Hydrologic Engineering, uary/February, 2003.
Gar and Hur Jan Wo Lov	<ul> <li>Inett, Marshall W., and Caldwell, Rodney R., 1998, Geologic Framework of the Willamette Lowland Aquifer System, Ore Washington: U. S. Geological Survey Professional Paper 1424-A.</li> <li>Int, B., 2003, Unsteady stream depletion when pumping from semiconfined aquifer: Journal of Hydrologic Engineering, uary/February, 2003.</li> <li>Indward, Dennis BG., Gannett, Marshall W., and Vaccaro, John J., 1998 Hydrogeologic Framework of the Willamette wland Aquifer System, Oregon and Washington: U. S. Geological Survey Professional Paper 1424-B.</li> <li>Inty well logs and water level data, especially well logs for: CLAC 2123, CLAC 2150, CLAC 2153, CLAC 2154, and wateles for: CLAC 2051, CLAC 2054, CLAC 2083, CLAC 2114, CLAC 2164, CLAC 2171, CLAC 2173, CLAC 2175, CLAC 3, CLAC 2952, CLAC 55526, MARI 1756, MARI 1758, MARI 1936, MARI 1944, MARI 2004, MARI 54954, and MAR</li> </ul>

## D. WELL CONSTRUCTION, OAR 690-200

D1.	Well #:	Logid:
D2.	THE WELL does not appear to meet c         a.       review of the well log;         b.       field inspection by	current well construction standards based upon:
D3.		r other comment is described as follows:

D4. D Route to the Well Construction and Compliance Section for a review of existing well construction.

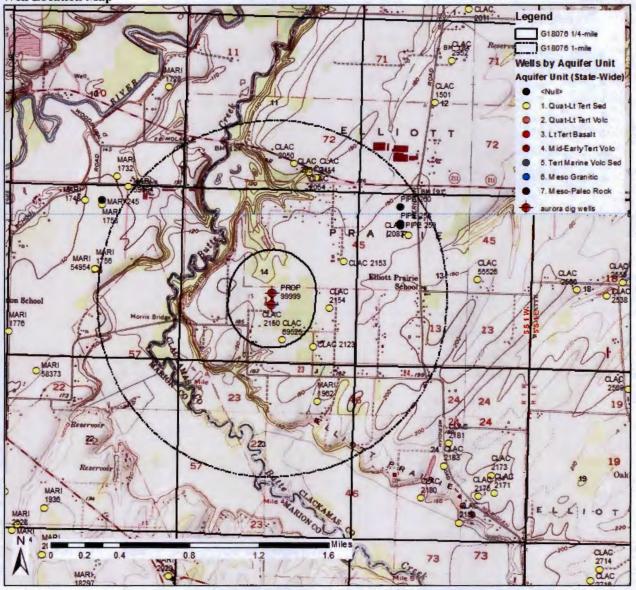
### Water Availability Tables

Watershed ID #: Time: 12:21 PM	69799		dance Level: 80 ate: 08/11/2015			
Month	Natural Stream Flow	Consumptive Use and Storage	Expected Stream Flow	Reserved Stream Flow	Instream Requirements	Net Water Available
		Storage is t	Monthly values a the annual amount at	re in cfs. 50% exceedance i	in ac-ft.	
JAN	169.00	3.93	165.00	0.00	75.00	90.10
FEB	181.00	3.76	177.00	0.00	75.00	102.00
MAR	172.00	2.82	169.00	0.00	75.00	94.20
APR	142.00	2.34	140.00	0.00	75,00	64.70
MAY	89.20	5.61	83.60	0.00	75.00	8.59
JUN	39.00	10.30	28.70	0.00	75.00	-46.30
JUL	15.10	17.00	-1.87	0.00	25.00	-26.90
AUG	9.90	13.60	-3.70	0.00	12.00	-15.70
SEP	9.78	6.97	2.81	0.00	20.00	-17.20
	15.10	1.00	14.10	0.00	75.00	-60.90
OCT		1.90	64.10	0.00	75.00 75.00	-10.90
OCT NOV	66.00	4 00				
OCT	170.00 121,000	4.09 4,440	166.00 117,000	0.00	44,100	78,900

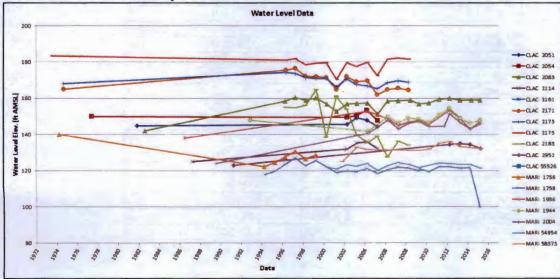
Watershed ID # Time: 12:24 PM				DOTTE		DING K -		•				in: WILL te: 08/1	
Application Number	Status	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	ост	NOV	DEC
						Monthly	values a	are in c	fs.				
IS69799A C	ERTIFICATE	75.0	75.0	75.0	75.0	75.0	75.0	25.0	12.0	20.0	75.0	75.00	75.0
MAXIMUM		75.0	75.0	75.0	75.0	75.0	75.0	25.0	12.0	20.0	75.0	75.0	75.0

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#### Well Location Map



Water-Level Trends in Nearby Wells



Version: 04/20/2015

## **Stream Depletion Results**

1.000 0.900 0.800

0.700 0.600 0.500

0.400 0.300 0.200

0.100 0.000

0

30

Jenkins s2 -

80

90

Hunt 1999 s2 - -

Stream depletion (fraction of well discharge)

Application G-18076

							Date	e: Augu	ist 12, 20	015
ults										_
Transier	nt Stream	-	-	nkins, Vell 1 to			999, 20	03)		
				-	-	1				
	-	-				N				

270

- Hunt 2003 s2 --

300

330

Hunt 2003 s3

360

Output for §	Stream I	Depletio	n, Scen	erio 2 (s	2):	Time p	ump on	(pumpir	ng durat	ion) = 24	10 days	
Days	30	60	90	120	150	180	210	240	270	300	330	36
J SD	83.9%	88.6%	90.7%	91.9%	92.8%	93.4%	93.9%	94.3%	10.7%	6.3%	4.4%	3.49
H SD 1999	35.6%	46.7%	53.1%	57.5%	60.9%	63.5%	65.6%	67.4%	33.3%	23.6%	18.4%	15.09
H SD 2003	12.59%	12.82%	13.01%	13.21%	13.40%	13.59%	13.78%	13.97%	1.57%	1.53%	1.52%	1.519
Qw, cfs	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.25
H SD 99, cfs	0.089	0.117	0.133	0.144	0.152	0.159	0.164	0.169	0.083	0.059	0.046	0.03
H SD 03, cfs	0.031	0.032	0.033	0.033	0.034	0.034	0.034	0.035	0.004	0.004	0.004	0.00

120 150 180 210 240 Time since start of pumping (days)

Hunt 2003 s1 -

Parameters:		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate of well	Qw	0.25	0.25	0.25	cfs
Time pump on (pumping duration)	tpon	240	240	240	days
Perpendicular from well to stream	8	2220	2220	2220	ft
Well depth	d	89	89	89	ft
Aquifer hydraulic conductivity	K	50	50	50	ft/day
Aquifer saturated thickness	b	40	40	40	ft
Aquifer transmissivity	Т	2000	2000	2000	ft*ft/day
Aquifer storativity or specific yield	S	0.001	0.001	0.001	
Aquitard vertical hydraulic conductivity	Kva	0.01	0.01	0.01	ft/day
Aquitard saturated thickness	ba	65	65	65	ft
Aquitard thickness below stream	babs	3	3	3	ft
Aquitard porosity	n	0.2	0.2	0.2	
Stream width	WS	100	100	100	ft
Streambed conductance (lambda)	sbc	0.333333	0.333333	0.333333	ft/day
Stream depletion factor	sdf	2.464200	2.464200	2.464200	days
Streambed factor	sbf	0.370000	0.370000	0.370000	
input #1 for Hunt's Q_4 function	ť	0.405811	0.405811	0.405811	
input #2 for Hunt's Q_4 function	ĸ	0.379108	0.379108	0.379108	
input #3 for Hunt's Q_4 function	epsilon'	0.005000	0.005000	0.005000	
input #4 for Hunt's Q_4 function	lamda'	0.370000	0.370000	0.370000	

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Page

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			Tran	sient S	itream				970; Hu lutte Cre	nt, 1999	9, 2003	)	
	1.000	1			1		1007011			T			-
	0.900		-										_
	0.800	1											_
(eg	0.700	1		-							_		_
ion scha	0.600	1						-	-				
Stream depletion (fraction of well discharge)	0.500	1			-	-							
of w			/						t				
otio	0.400	1								V			
(fra	0.300	1/	1										
	0.200	1/							-			-	
	0.100	1							- 1	-			-
	0.000									-			
		0	30 (	80 1	30 T	20 15 ne since	start of p	umping	days) 240	270	300	330	360
	E	- Jen	kins s2 -	-Hu	int 1999	s2	Hunt 2	003 s1 -	-Hu	int 2003 :	s2	Hunt 20	03 s3
Dutpu	t for S	itream [	Depletio	n, Scen	erio 2 (s		Time p	ump on		-		240 days	
Days		30	60	90	120	150	180	210			300		36
J SD		85.3%	89.6%	91.5%	92.6%	93.4%	94.0%	94.4%			5.8%		3.1
H SD 1		36.4%	47.3%	53.7%	58.1%	61.4%	64.0%	66.1%		_		_	14.8
I SD 2		13.27%		13.70%	13.89%	14.09%	14.28%	14.48%			1.55%	4 6 4 9 / 1	
Qw, c	fs	0.250	0 250	n 250						1.59%			
IL DD C			0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.250	0.25
_	99, cfs	0.091	0.118	0.134	0.250 0.145 0.035	0.250 0.153 0.035			0.250	0.250		0.250	0.25
H SD C	99, cfs 03, cfs	0.091	0.118	0.134	0.145	0.153	0.250 0.160 0.036	0.250 0.165 0.036	0.250 0.170 0.037	0.250 0.082 0.004	0.250 0.058 0.004	0.250	0.25
H SD (	99, cfs 03, cfs neters	0.091 0.033	0.118 0.034	0.134 0.034	0.145	0.153	0.250 0.160 0.036 mario 1	0.250 0.165 0.036	0.250 0.170 0.037 enario 2	0.250 0.082 0.004	0.250 0.058 0.004 enario 3	0.250	0.25 0.03 0.00
H SD ( Paran Net ste	99, cfs 03, cfs neters eady pu	0.091 0.033 : umping ra	0.118 0.034	0.134 0.034	0.145 0.035 Qw	0.153	0.250 0.160 0.036 mario 1 0.25	0.250 0.165 0.036	0.250 0.170 0.037 enario 2 0.25	0.250 0.082 0.004 Sce	0.250 0.058 0.004 enario 3 0.25	0.250	0.29 0.03 0.00 Unit
H SD ( Param Net ste Time p	99, cfs 03, cfs neters eady pu	0.091 0.033 : imping ra	0.118 0.034 ate of we	0.134 0.034	0.145 0.035 Qw tpon	0.153	0.250 0.160 0.036 mario 1 0.25 240	0.250 0.165 0.036	0.250 0.170 0.037 enario 2 0.25 240	0.250 0.082 0.004 Sce	0.250 0.058 0.004 enario 3 0.25 240	0.250	0.29 0.03 0.00 Unit
H SD C Param Net ste Time p Perper	99, cfs 03, cfs neters eady pu oump on ndicular	0.091 0.033 : imping ra	0.118 0.034	0.134 0.034	0.145 0.035 Qw tpon a	0.153	0.250 0.160 0.036 mario 1 0.25 240 2030	0.250 0.165 0.036	0.250 0.170 0.037 enario 2 0.25 240 2030	0.250 0.082 0.004 Sce	0.250 0.058 0.004 enario 3 0.25 240 2030	0.250	0.29 0.03 0.00 Unit
Param Net ste Time p Perper Well de	99, cfs 03, cfs neters eady pu oump on ndicular epth	0.091 0.033 : imping rate (pumping from we	0.118 0.034 ate of we og duratio ell to stre	0.134 0.034	0.145 0.035 Qw tpon a d	0.153	0.250 0.160 0.036 mario 1 0.25 240	0.250 0.165 0.036	0.250 0.170 0.037 enario 2 0.25 240	0.250 0.082 0.004 Sce	0.250 0.058 0.004 enario 3 0.25 240	0.250	0.25 0.03 0.00 Unit c: day
Param Net ste Time p Perper Well de Aquife	99, cfs 03, cfs eady pu pump on ndicular epth er hydra	0.091 0.033 : imping rate (pumping from we	0.118 0.034 ate of we og duratio ell to stre ductivity	0.134 0.034	0.145 0.035 Qw tpon a	0.153	0.250 0.160 0.036 mario 1 0.25 240 2030 160	0.250 0.165 0.036	0.250 0.170 0.037 enario 2 0.25 240 2030 160	0.250 0.082 0.004 Sce	0.250 0.058 0.004 enario 3 0.25 240 2030 160	0.250 0.045 0.004	0.25 0.03 0.00 Unit c: day
H SD C Param Net ste Time p Perper Well de Aquife Aquife	99, cfs 03, cfs neters eady pu oump on ndicular epth er hydra er satur er trans	0.091 0.033 : imping rate (pumping from we aulic contained thic missivity	0.118 0.034 ate of we og duratio ell to stre ductivity kness	0.134 0.034	0.145 0.035 Qw tpon a d K b T	0.153	0.250 0.160 0.036 enario 1 0.25 240 2030 160 50	0.250 0.165 0.036	0.250 0.170 0.037 enario 2 0.25 240 2030 160 50	0.250 0.082 0.004 Sce	0.250 0.058 0.004 enario 3 0.25 240 2030 160 50 40 2000	0.250 0.045 0.004	0.25 0.03 0.00 Unit c: day ft/da
H SD ( Param Net ste Time p Perper Well de Aquife Aquife Aquife	99, cfs 03, cfs neters eady pu nump on ndicular epth er hydra er satur er trans er stora	0.091 0.033 : imping rate (pumping from wo aulic contraction ated thic missivity tivity or s	0.118 0.034 ate of we og duratio ell to stre ductivity kness	0.134 0.034 II n) am	0.145 0.035 Qw tpon a d K b T S	0.153	0.250 0.160 0.036 enario 1 0.25 240 2030 160 50 40	0.250 0.165 0.036	0.250 0.170 0.037 enario 2 0.25 240 2030 160 50 40 2000 0.001	0.250 0.082 0.004 Sce	0.250 0.058 0.004 enario 3 0.25 240 2030 160 50 40 2000 0.001	0.250 0.045 0.004	0.25 0.03 0.00 Unit c: day ft/da
H SD ( Param Net ste Time p Perper Well de Aquife Aquife Aquife Aquife	99, cfs 03, cfs 03, cfs eady pu pump on indicular epth er hydra er satur er trans er stora r stora	0.091 0.033 imping rate (pumping from wo aulic contained thic missivity tivity or sized hydra	0.118 0.034 ate of we og duratio ell to stre ductivity kness specific y aulic cond	0.134 0.034 II n) am	0.145 0.035 Qw tpon a d K b T S S Kva	0.153	0.250 0.160 0.036 enario 1 0.25 240 2030 160 50 40 2000 0.001 0.01	0.250 0.165 0.036	0.250 0.170 0.037 enario 2 0.25 240 2030 160 50 40 2000 0.001 0.001	0.250 0.082 0.004 Sce	0.250 0.058 0.004 enario 3 0.25 240 2030 160 50 40 2000 0.001 0.001	0.250 0.045 0.004	0.25 0.03 0.00 Unit c: day ft/da
H SD ( Param Net ste Time p Perper Well de Aquife Aquife Aquife Aquife Aquife Aquife	29, cfs 03, cfs 03, cfs eady pu pump on indicular epth er hydra er satur er trans er stora rd verti ird satu	0.091 0.033 imping rate (pumping from wo aulic con- ated thic missivity tivity or s ical hydra rated thic	0.118 0.034 ate of we og duratio ell to stre ductivity kness specific y aulic cond ckness	0.134 0.034 II n) am ield ductivity	0.145 0.035 Qw tpon a d K b T S Kva ba	0.153	0.250 0.160 0.036 enario 1 0.25 240 2030 160 50 40 2000 0.001 0.01 65	0.250 0.165 0.036	0.250 0.170 0.037 enario 2 0.25 240 2030 160 50 40 2000 0.001 0.01 65	0.250 0.082 0.004 Sce	0.250 0.058 0.004 enario 3 0.25 240 2030 160 50 40 2000 0.001 0.001 65	0.250 0.045 0.004	0.25 0.03 0.00 Unit c: day ft/da ft/da
A SD ( Param Net ster Time p Perper Well de Aquife Aquife Aquife Aquife Aquife Aquita	99, cfs 03, cfs neters eady pu ump on ndicular epth er hydra er satur er trans er stora ard verti ird satu rd satu	0.091 0.033 imping rational form we from we aulic constant of the missivity tivity or standard thic rated thic rated thic rated this	0.118 0.034 ate of we og duratio ell to stre ductivity kness specific y aulic cond	0.134 0.034 II n) am ield ductivity	0.145 0.035 Qw tpon a d K b T S Kva babs	0.153	0.250 0.160 0.036 enario 1 0.25 240 2030 160 50 40 2000 0.001 0.01 65 3	0.250 0.165 0.036	0.250 0.170 0.037 enario 2 0.25 240 2030 160 50 40 2000 0.001 0.001 65 3	0.250 0.082 0.004 Sce	0.250 0.058 0.004 enario 3 0.25 240 2030 160 50 40 2000 0.001 0.001 65 3	0.250 0.045 0.004	0.25 0.03 0.00 Unit c: day ft/da ft/da
A SD ( Param Net ste Time p Perper Well de Aquife Aquife Aquife Aquife Aquita Aquita Aquita	99, cfs 03, cfs neters eady pu pump on ndicular epth er hydra er satur er trans er stora rd verti ird satur rd satur rd thick rd poro	0.091 0.033 imping rate (pumping from we aulic contained thic missivity tivity or s ical hydra rated thic mass be sity	0.118 0.034 ate of we og duratio ell to stre ductivity kness specific y aulic cond ckness	0.134 0.034 II n) am ield ductivity	0.145 0.035 Qw tpon a d K b T S Kva babs n	0.153	0.250 0.160 0.036 enario 1 0.25 240 2030 160 50 40 2000 0.001 0.01 65 3 0.2	0.250 0.165 0.036	0.250 0.170 0.037 enario 2 0.25 240 2030 160 50 40 2000 0.001 0.01 65 3 0.2	0.250 0.082 0.004 Sce	0.250 0.058 0.004 enario 3 0.25 240 2030 160 50 40 2000 0.001 0.001 65 3 0.2	0.250 0.045 0.004	0.25 0.03 0.00 Unit c: day ft/da ft*ft/da
A SD ( Param Net ste Time p Perper Vell de Aquife Aquife Aquife Aquife Aquita Aquita Aquita Strean	99, cfs 03, cfs 03, cfs eady pu oump on ndicular epth er hydra er satur er trans er storal rd verti rd satu rd thick rd poro n width	0.091 0.033 imping rate (pumping from we aulic con- ated thic missivity tivity or s ical hydra rated thic mess be sity	0.118 0.034 ate of we og duratio ell to stre ductivity kness specific y aulic cond ckness low strea	0.134 0.034 II n) am ield ductivity	0.145 0.035 Qw tpon a d K b T S Kva babs n ws	0.153 0.035 Sce	0.250 0.160 0.036 enario 1 0.25 240 2030 160 50 40 2000 0.001 0.01 65 3 0.2 100	0.250 0.165 0.036	0.250 0.170 0.037 enario 2 0.25 240 2030 160 50 40 2000 0.001 0.01 65 3 0.2 100	0.250 0.082 0.004 Sce	0.250 0.058 0.004 enario 3 0.25 240 2030 160 50 40 2000 0.001 0.01 65 3 0.2 100	0.250 0.045 0.004	0.25 0.03 0.00 Unit c: day ft/da ft*ft/da
A SD ( Param Net ste Time p Perper Vell de Aquife Aquife Aquife Aquife Aquifa Aquita Aquita Stream	29, cfs 03, cfs 03, cfs eady pu oump on ndicular epth er hydra er satur er trans er storal er storal rd verti rd satu rd verti rd satu rd thick rd poro n width nbed co	0.091 0.033 imping rate (pumping from we aulic con- ated thic missivity tivity or s ical hydra rated thic rated thic rated thic rated thic aness be sity	0.118 0.034 ate of we og duratio ell to stre ductivity kness specific y aulic cond ckness low strea	0.134 0.034 II n) am ield ductivity	0.145 0.035 Qw tpon a d K b T S Kva babs n ws sbc	0.153 0.035 Sce	0.250 0.160 0.036 enario 1 0.25 240 2030 160 50 40 2000 0.001 0.01 65 3 0.2 100 .333333	0.250 0.165 0.036 Sce	0.250 0.170 0.037 enario 2 0.25 240 2030 160 50 40 2000 0.001 0.01 65 3 0.2 100 0.333333	0.250 0.082 0.004 Sce	0.250 0.058 0.004 enario 3 0.25 240 2030 160 50 40 2000 0.001 0.001 0.01 65 3 0.2 100 0.333333	0.250 0.045 0.004	0.25 0.03 0.00 Unit c: day ft/da ft/da ft/da
H SD ( Param Net ste Time p Perper Well de Aquife Aquife Aquife Aquife Aquife Aquita Aquita Stream Stream	29, cfs 03, cfs 03, cfs eady pu oump on indicular epth er hydra er satur- er trans er storal re	0.091 0.033 imping rate (pumping from wo aulic contract aulic contract aulic contract missivity tivity or s ical hydra rated thic mess be usity onductant tion factor	0.118 0.034 ate of we og duratio ell to stre ductivity kness specific y aulic cond ckness low strea	0.134 0.034 II n) am ield ductivity	0.145 0.035 Qw tpon a d K b b T S Kva babs n ws sbc sdf	0.153 0.035 Sce	0.250 0.160 0.036 enario 1 0.25 240 2030 160 50 40 2000 0.001 0.01 65 3 0.2 100 .333333 .060450	0.250 0.165 0.036 Sce	0.250 0.170 0.037 enario 2 0.25 240 2030 160 50 40 2000 0.001 0.001 65 3 0.2 100 0.333333 2.060450	0.250 0.082 0.004 Sce	0.250 0.058 0.004 enario 3 0.25 240 2030 160 50 40 2000 0.001 0.001 0.001 0.01 65 3 0.2 100 .333333	0.250 0.045 0.004	0.25 0.03 0.00 Unit c: day ft/da ft/da ft/da
H SD ( Param Net ste Time p Perper Well de Aquife Aquife Aquife Aquife Aquife Aquita Aquita Stream Stream	29, cfs 03, cfs 03, cfs eady pu oump on indicular epth er hydra er satur er trans er storal rd verti rd satur rd satur r	0.091 0.033 imping rate (pumping from wo autic const ated thic missivity tivity or s ical hydra rated thic mess be sity anductant ion factor ctor	0.118 0.034 ate of we og duratio ell to stre ductivity kness specific y aulic cond ckness low strea ce (lambo	0.134 0.034 II n) am ield ductivity am	0.145 0.035 Qw tpon a d K b b T S Kva ba ba ba ba ba s b c s df s bf	0.153 0.035 Sce	0.250 0.160 0.036 enario 1 0.25 240 2030 160 50 40 2000 0.001 0.01 65 3 0.2 100 .333333 .060450 .338333	0.250 0.165 0.036 Sce	0.250 0.170 0.037 enario 2 0.25 240 2030 160 50 40 2000 0.001 0.001 0.01 65 3 0.22 100 0.333333 .060450 0.338333	0.250 0.082 0.004 Sce	0.250 0.058 0.004 enario 3 0.25 240 2030 160 50 40 2000 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.005 0.004 0.005 0.004 0.004 0.005 0.004 0.004 0.005 0.004 0.005 0.004 0.004 0.005 0.004 0.005 0.004 0.005 0.004 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.000 0.000 0.000 0.00100000000	0.250 0.045 0.004	0.25 0.03 0.00 Unit c: day ft/da ft/da ft/da
H SD ( Param Net ste Time p Perper Well do Aquife Aquife Aquife Aquife Aquife Aquita Aquita Aquita Stream Stream Stream	29, cfs 03, cfs 03, cfs eady pu oump on indicular epth er hydra er satur er trans er stora rd verti rd satu rd	0.091 0.033 imping rational sector (pumping rational sector (pumping rated thick missivity tivity or sized hydra rated thick mess be sity onductant tion factor ctor unt's Q_	0.118 0.034 ate of we og duratio ell to stre ductivity kness specific y aulic cond ckness low strea ce (lambo or	0.134 0.034 II n) am ield ductivity am	0.145 0.035 0.035 0 ww tpon a d K b b T S Kva ba b ba b s b c s df s b f ť	0.153 0.035 Sce 0 0 2 0 0 0	0.250 0.160 0.036 mario 1 0.25 240 2030 160 50 40 2000 0.001 0.01 65 3 0.2 100 .33333 .060450 .338333 .485331	0.250 0.165 0.036 Sce 0 0 0 2 0 0 0 0	0.250 0.170 0.037 enario 2 0.25 240 2030 160 50 40 2000 0.001 0.01 65 3 0.02 100 0.33333 2.060450 0.338333 0.485331	0.250 0.082 0.004 Sce	0.250 0.058 0.004 enario 3 0.25 240 2030 160 50 40 2000 0.001 0.01 65 3 0.22 100 0.33333 0.2 100 0.338333 0.485331	0.250 0.045 0.004	0.25 0.03 0.00 Unit c: day ft/da ft/da ft/da
H SD ( Param Net ste Time p Perper Well do Aquife Aquife Aquife Aquife Aquife Aquife Aquita Aquita Aquita Stream Stream Stream Stream	29, cfs 03, cfs 03, cfs eady pu oump on indicular epth er hydra er satur er trans er storal rd verti rd satu rd thick rd poro n width nbed co n deplet fa for H 2 for H	0.091 0.033 imping rational sector (pumping rational sector missivity tivity or size hydra rated thick mess be sity onductantion factor ctor unt's Q_ unt's Q_	0.118 0.034 ate of we og duratio ell to stre ductivity kness specific y aulic cond ckness low strea ce (lambo	0.134 0.034 II n) am ield ductivity am da)	0.145 0.035 Qw tpon a d K b b T S Kva ba ba ba ba ba s b c s df s bf	0.153 0.035 Sce 0 0 0 2 0 0 0 0 0	0.250 0.160 0.036 enario 1 0.25 240 2030 160 50 40 2000 0.001 0.01 65 3 0.2 100 .333333 .060450 .338333	0.250 0.165 0.036 Sce 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.250 0.170 0.037 enario 2 0.25 240 2030 160 50 40 2000 0.001 0.001 0.01 65 3 0.22 100 0.333333 .060450 0.338333	0.250 0.082 0.004 Sce 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.250 0.058 0.004 enario 3 0.25 240 2030 160 50 40 2000 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.005 0.004 0.005 0.004 0.004 0.005 0.004 0.004 0.005 0.004 0.005 0.004 0.004 0.005 0.004 0.005 0.004 0.005 0.004 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.005 0.000 0.000 0.000 0.00100000000	0.250 0.045 0.004	1.53 0.25 0.03 0.00 Unit ch day ft/da ft/da ft/da