

Groundwater Application Review Summary Form

Application # G- 18547

GW Reviewer D. BOSCHMANN Date Review Completed: 08/28/2017

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

08/28, 2017

TO: Application G- 18547

FROM: GW: D. BOSCHMANN
(Reviewer's Name)

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 John Day 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
0.095	0.091	0.091	0.076	0.072	0.072	0.075	0.081	0.088	0.092	0.092	0.088

PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO: Water Rights Section Date 8/28/2017
 FROM: Groundwater Section Darrick E. Boschmann
 Reviewer's Name
 SUBJECT: Application G- 18547 Supersedes review of NA
 Date of Review(s)

PUBLIC INTEREST PRESUMPTION; GROUNDWATER

OAD 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 M COOMBS RANCH County: GRANT

A1. Applicant(s) seek(s) 2.03 cfs from 2 well(s) in the John Day Basin,
Upper John Day subbasin

A2. Proposed use Irrigation (320.0 acres primary) Seasonality: 3/1 – 10/31

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	GRAN 50836	WELL #2	Bedrock	780*	12.00S-33.00E-34-NW NW	1290 FEET SOUTH AND 1230 FEET EAST FROM NW CORNER, SECTION 34
2	GRAN 50838	WELL #4	Bedrock	130*	12.00S-33.00E-34-SE NW	1450 FEET SOUTH AND 1700 FEET EAST FROM NW CORNER, SECTION 34
3						
4						
5						

* 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	3921	61	5	9-6-06	306	0-79	0-80	NA	NA	780	NA	AIR
2	3942	79	15.67	9-25-06	306	0-75	0-76.5	NA	NA	130	NA	AIR

Use data from application for proposed wells.

A4. **Comments:** _____

The proposed wells are located in Grant County in the Upper John Day subbasin, about two miles northwest of Prairie City, along an unnamed tributary to the John Day River west of Dixie Creek. The area immediately underlying the wells is mapped as Tc (Clarno Formation) by Thayer, 1967. Thayer describes the Clarno FM within the Prairie City quadrangle north of the John Day River as "mostly hornblende andesite flows and breccias". Within less than a mile of the wells exposures of the underlying Paleozoic cherty shales and metavolcanic rocks, as well as the overlying Columbia River Basalt Group and Rattlesnake Formation are found (Thayer, 1967).

GRAN 50836 penetrated a thin layer of hard clay underlain by gray and brown "basalt" to total depth as reported by the driller on the well log. This is consistent with the andesites of the Clarno FM, which are easily mistaken for basalt.

GRAN 50838 penetrated a thin layer of topsoil and weathered rock underlain by gray and black "basalt" with one minor interbed to total depth as reported by the driller on the well log. This is consistent with the andesites of the Clarno FM, which are easily mistaken for basalt.

Note: Both proposed wells are currently authorized for municipal use under permit G-15077. The authorized locations under G-15077 are not consistent with the locations provided on this application. For the purposes of this review the locations provided on this application are used.

A5. **Provisions of the John Day** _____ 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: _____

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

Comments: _____

Currently no administrative area.

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) 7B, 7F, 7N, 7P, 7T, flow meter, 7J;
 - 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:** _____

The proposed wells produce groundwater from the Clarno Formation (see above comments A4). Gannet (1984) compiles data for the Clarno FM that indicate a low groundwater potential, stating that obtaining adequate well yields for even domestic or stock use is extremely difficult in many areas. The proposed wells under this application have low to moderate well yields according to the drillers air tests.

If a permit is issued, the following conditions are recommended:

7B: Interference Condition

7F: Proposed Well location Condition

7N: Annual Measurement and Decline Condition

7P: Well Tag Condition

7T: Dedicated Measuring Tube Condition for all POA wells

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

7J: Scenic waterway condition

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	Bedrock (Clarno FM)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	Bedrock (Clarno FM)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>

Basis for aquifer confinement evaluation: _____

Although the reported water bearing zones and static water levels on the well logs for both proposed wells show that the water level in the wells rose ~60 feet above the elevation of the water bearing zones penetrated, the occurrence of numerous springs at elevations roughly coincident with the static water levels in the wells, as well as the position of the wells relative to the recharge areas and the John Day River suggests this is a groundwater discharge area, and the rising head is a result of the vertical components of gradient in the flow field.

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	Unnamed trib to JD River	3916	3883	612	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
1	2	Dixie Creek	3916	3660	5230	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	3	John Day River	3916	3475	12000	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	1	Unnamed trib to JD River	3926	3883	675	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	2	Dixie Creek	3926	3660	4740	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	3	John Day River	3926	3475	12000	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" 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"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Basis for aquifer hydraulic connection evaluation: _____

See comments in C1. above.

Within the uncertainty of the groundwater elevation estimate, the groundwater elevation for wells 1 and 2 are roughly coincident with or above the elevation of the closest reach of the unnamed tributary to the John Day River, Dixie Creek, and the John Day River; suggesting that groundwater provides baseflow to these surface water bodies at this location.

Water Availability Basin the well(s) are located within: JOHN DAY R > COLUMBIA R - AB LITTLE PINE CR

C3a. **690-09-040 (4):** Evaluation of stream impacts for each well that has been determined or assumed to be **hydraulically connected and less than 1 mile** from a surface water source. Limit evaluation to instream rights and minimum stream flows that are pertinent to that surface water source, and not lower SW sources to which the stream under evaluation is tributary. Compare the requested rate against the 1% of 80% *natural* flow for the pertinent Water Availability Basin (WAB). If Q is not distributed by well, use full rate for each well. Any checked box indicates the well is assumed to have the potential to cause PSI.

Well	SW #	Well < ¼ mile?	Qw > 5 cfs?	Instream Water Right ID	Instream Water Right Q (cfs)	Qw > 1% ISWR?	80% Natural Flow (cfs)	Qw > 1% of 80% Natural Flow?	Interference @ 30 days (%)	Potential for Subst. Interfer. Assumed?
1	1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MF213A	15	<input checked="" type="checkbox"/>	55.20	<input checked="" type="checkbox"/>	*	<input checked="" type="checkbox"/>
1	2	<input type="checkbox"/>	<input type="checkbox"/>	NA	NA	<input type="checkbox"/>	1.36	<input checked="" type="checkbox"/>	*	<input checked="" type="checkbox"/>
2	1	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MF213A	15	<input checked="" type="checkbox"/>	55.20	<input type="checkbox"/>	*	<input checked="" type="checkbox"/>
2	2	<input type="checkbox"/>	<input type="checkbox"/>	NA	NA	<input type="checkbox"/>	1.36	<input checked="" type="checkbox"/>	*	<input checked="" 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"/>	<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"/>

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?
1	<input type="checkbox"/>	MF213A	15	<input checked="" type="checkbox"/>	55.20	<input checked="" type="checkbox"/>	*	<input checked="" type="checkbox"/>
2	<input type="checkbox"/>	NA	NA	<input type="checkbox"/>	1.36	<input checked="" type="checkbox"/>	*	<input checked="" 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"/>

Comments: _____

C3a. *Interference at 30 days not calculated here due to triggering of PSI under other criteria.

C3b. *Interference at 30 days not calculated here due to triggering of PSI under other criteria.

WABS evaluated: JOHN DAY R > COLUMBIA R - AB LITTLE PINE CR; DIXIE CR > JOHN DAY R - AT MOUTH

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
2	3	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
(A) = Total Interf.		0	0	0	0	0	0	0	0	0	0	0	0
(B) = 80 % Nat. Q													
(C) = 1 % Nat. Q													
(D) = (A) > (C)		NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
(E) = (A / B) x 100		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%

(A) = total interference as CFS; (B) = WAB calculated natural flow at 80% exceed. as CFS; (C) = 1% of calculated natural flow at 80% exceed. as CFS; (D) = highlight the checkmark for each month where (A) is greater than (C); (E) = total interference divided by 80% flow as percentage.

Basis for impact evaluation:

Hunt (1999) was used to calculate the interference between wells 1 and 2 SW #3. The values used for the calculation are conservative and appropriate until better values become available. The calculations used a transmissivity of 20 ft²/day, which is the median transmissivity reported for the Clarno Formation in Gannett, 1984. Additionally, the calculation used a storage coefficient of 0.02, as reported in Gannett, 1984 for the Clarno Formation. The hydraulic conductivity assigned to the bed of the stream is 0.023 feet/day. The pumping rate used (1.98 cfs) represents the maximum allowable duty prorated over the irrigation season. See reports attached.

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

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:** _____

C1. 690-09-040 (1)

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

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

It is determined that all wells are hydraulically connected with Unnamed Tributary to the John Day River, Dixie Creek, and the John Day River.

C3a./C3b. 690-09-040 (4)

PSI is assumed for all wells to all surface water bodies evaluated.

C4a. 690-09-040 (5)

Interference is less than 1% of the 80% flow in all months evaluated between well 2 and SW 3.

If a permit is issued, the following conditions are recommended:

7B: Interference Condition

7F: Proposed Well location Condition

7N: Annual Measurement and Decline Condition

7P: Well Tag Condition

7T: Dedicated Measuring Tube Condition for all POA wells

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

7J: Scenic waterway condition

References Used:

Thayer, 1967

Gannet, M., 1984, Ground Water Assessment of the John Day Basin. Oregon Water Resources Department, Salem, Oregon.

Thayer, T.P., Brown, C.E., Hay, R.L., Preliminary geologic map of the Praire City Quadrangle, Grant County, Oregon. U.S. Geological Survey Open-File Report 67-214, scale 1:62,500.

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

Oregon Administrative Rules

D. WELL CONSTRUCTION, OAR 690-200

D1. Well #: _____ Logid: _____

D2. **THE WELL does not appear to meet current well construction standards based upon:**

- a. review of the well log;
- b. field inspection by _____;
- c. report of CWRE _____;
- d. other: (specify) _____

D3. **THE WELL construction deficiency or other comment is described as follows:** _____

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

Water Availability Tables

**Water Availability Analysis
Detailed Reports**

JOHN DAY R - COLUMBIA R - AB LITTLE PINE CR
JOHN DAY BASIN

Water Availability as of 8/28/2017

Watershed ID #: 211 (Map) Exceedance Level: 80%
Date: 8/28/2017 Time: 9:30 AM

Water Availability Calculation

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

Month	Natural Stream Flow	Consumption Uses and Storages	Expected Stream Flow	Reserved Stream Flow	Instream Flow Requirements	Net Water Available
JAN	99.00	1.35	97.65	0.00	25.00	72.65
FEB	124.00	1.54	122.46	0.00	25.00	97.46
MAR	165.00	1.71	163.29	0.00	34.00	129.29
APR	229.00	17.30	211.70	5.00	34.00	177.70
MAY	242.00	30.10	211.90	0.00	34.00	177.90
JUN	150.00	30.40	119.60	0.00	25.00	94.60
JUL	151.00	72.40	78.60	4.00	15.00	59.60
AUG	64.50	14.25	50.25	0.00	14.00	36.25
SEP	88.00	37.30	50.70	0.00	34.00	16.70
OCT	87.10	14.70	72.40	0.00	25.00	47.40
NOV	94.00	1.50	92.50	0.00	25.00	67.50
DEC	100.00	1.20	98.80	0.00	25.00	73.80
ANN	133,000.00	17,900.00	115,100.00	0.00	20,200.00	94,900.00

**Water Availability Analysis
Detailed Reports**

ODDE CR - JOHN DAY R - AT MOUTH
JOHN DAY BASIN

Water Availability as of 8/28/2017

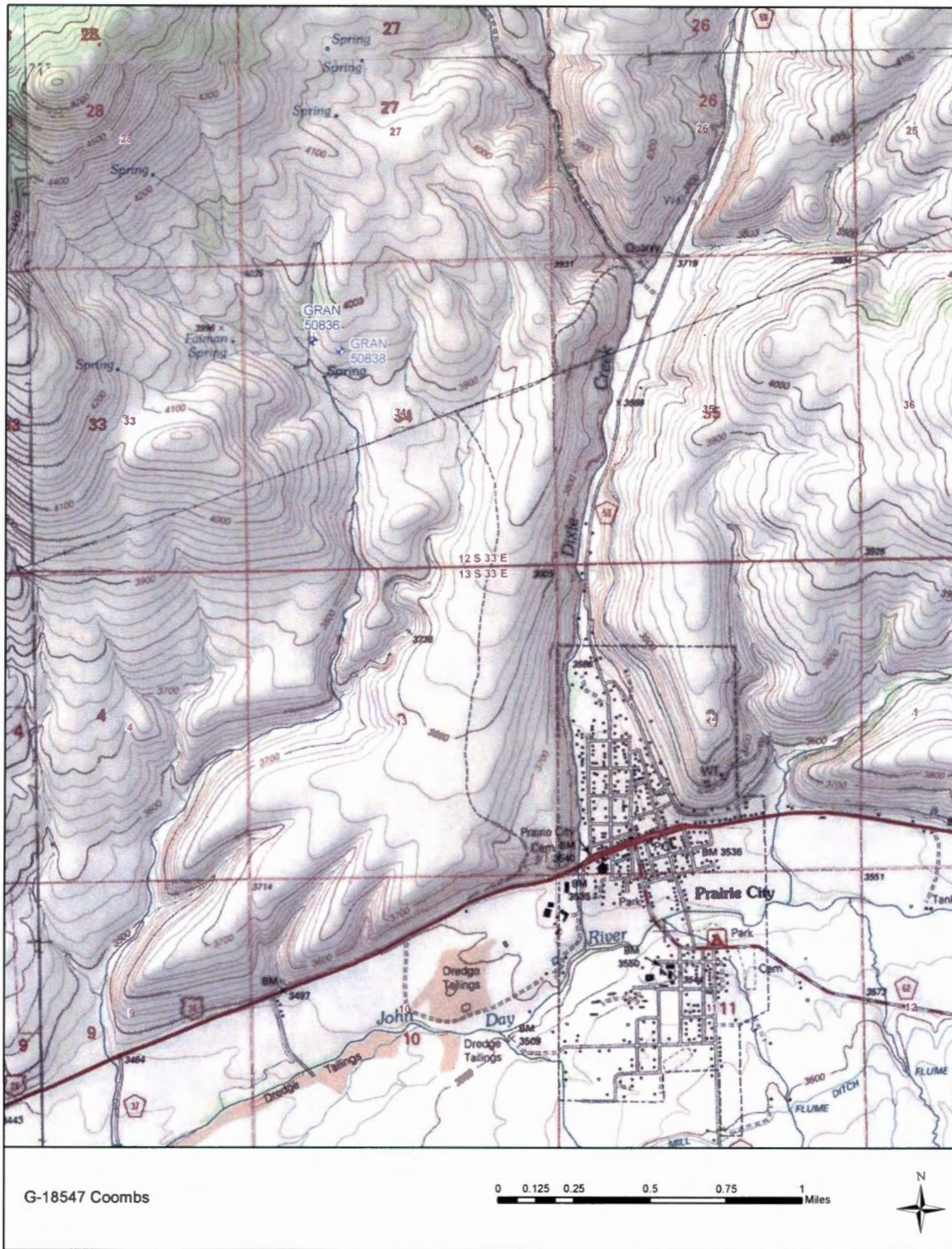
Watershed ID #: 20620122 (Map) Exceedance Level: 80%
Date: 8/28/2017 Time: 9:23 AM

Water Availability Calculation

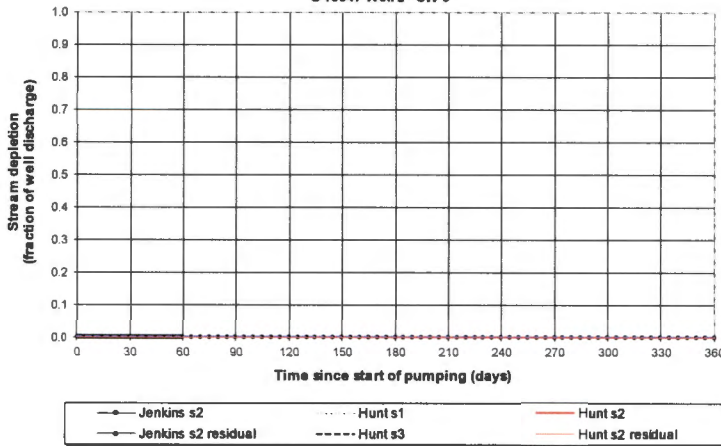
Monthly Streamflow in Cubic Feet per Second
Annual Volume at 50% Exceedance in Acre-Feet

Month	Natural Stream Flow	Consumption Uses and Storages	Expected Stream Flow	Reserved Stream Flow	Instream Flow Requirements	Net Water Available
JAN	3.15	1.13	2.02	0.00	0.00	2.02
FEB	5.42	1.14	4.28	0.00	0.00	4.28
MAR	8.86	1.14	7.72	0.00	0.00	7.72
APR	13.50	1.71	11.79	0.00	0.00	11.79
MAY	19.00	2.80	16.20	0.00	0.00	16.20
JUN	12.28	7.21	5.07	0.00	0.00	5.07
JUL	3.45	4.84	-1.39	0.00	0.00	-1.39
AUG	1.64	3.46	-1.82	0.00	0.00	-1.82
SEP	2.71	2.71	0.00	0.00	0.00	0.00
OCT	1.42	1.65	-0.23	0.00	0.00	-0.23
NOV	2.28	1.13	1.15	0.00	0.00	1.15
DEC	2.17	1.13	1.04	0.00	0.00	1.04
ANN	8,879.00	1,520.00	7,359.00	0.00	0.00	7,359.00

Well Location Map



Transient Stream Depletion (Jenkins, 1970; Hunt, 1999)
G-18547 Well 2 - SW 3



Output for Hunt Stream Depletion, Scenario 2 (s2): Time pump on = 245 days

Days	30	60	90	120	150	180	210	240	270	300	330	360
Qw, cfs	1.980	1.980	1.980	1.980	1.980	1.980	1.980	1.980	1.980	1.980	1.980	1.980
Jenk SD s2 %	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Jen SD s2 cfs	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Hunt SD s2 %	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hunt SD s2 cfs	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Parameters:

	Scenario 1	Scenario 2	Scenario 3	Units	
Net steady pumping rate	Qw	1.98	1.98	1.98	cfs
Distance to stream	a	12000	12000	12000	ft
Aquifer hydraulic conductivity	K	0.5	0.5	0.5	ft/day
Aquifer thickness	b	40	40	40	ft
Aquifer transmissivity	T	20	20	20	ft*ft/day
Aquifer storage coefficient	S	0.02	0.02	0.02	
Stream width	ws	25	25	25	ft
Streambed hydraulic conductivity	Ks	0.023	0.023	0.023	ft/day
Streambed thickness	bs	3	3	3	ft
Streambed conductance	sbc	0.191666667	0.191666667	0.191666667	ft/day
Stream depletion factor (Jenkins)	sdf	144000	144000	144000	days
Streambed factor (Hunt)	sbf	115	115	115	

Input data:

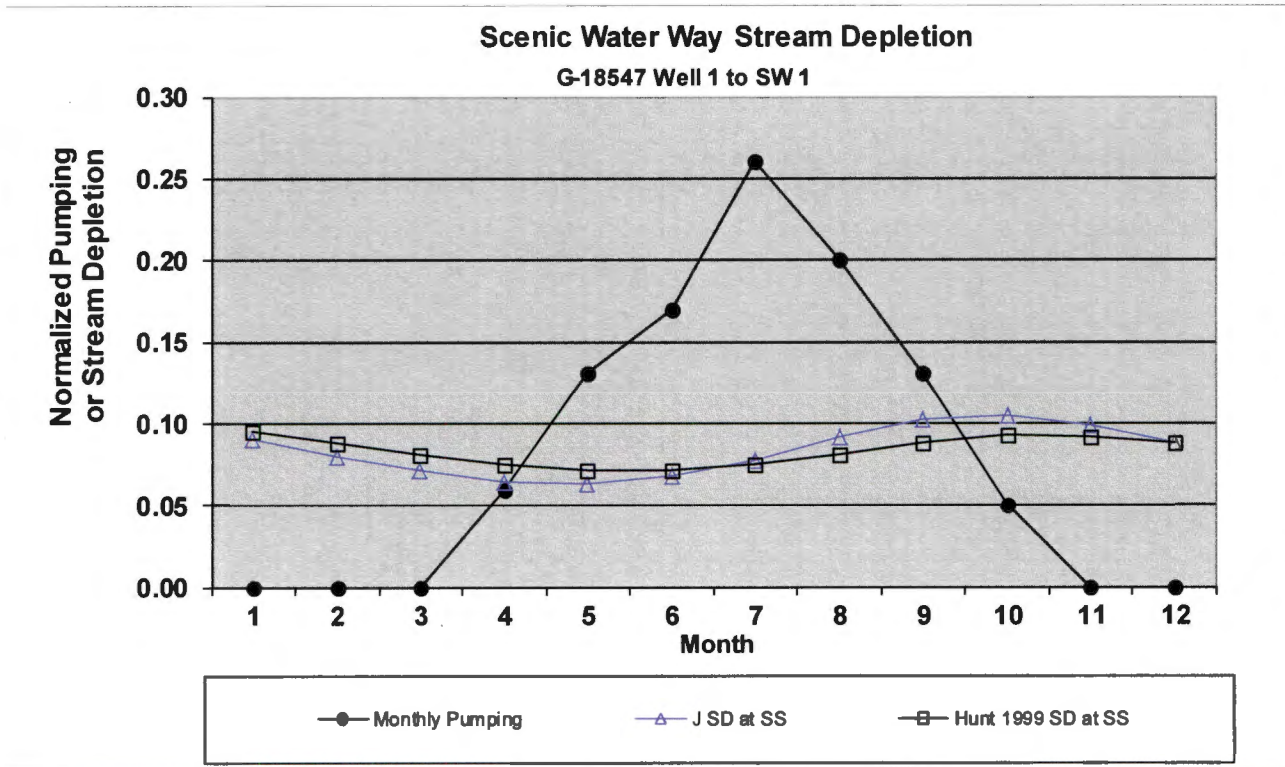
yellow = required blue = recommended

Name	Scenario 1	Scenario 2	Scenario 3	Unit	Description
Well	G-18547 Well 2 - SW 3				Well owner or well number
Qw	1.98			cfs	Net steady pumping rate of well
a	12000			ft	Perpendicular distance from well to stream
b	40			ft	Aquifer thickness
d	300			ft	Well depth
K	0.5	0.5	0.5	ft/day	Aquifer hydraulic conductivity
S		0.02			Aquifer storativity or specific yield
Ks	0.023	0.023	0.023	ft/day	Streambed hydraulic conductivity
ws		25		ft	Stream width
bs	3	3	3	ft	Streambed thickness
tpon		245		days	Time pump on

Recalculate

Time pump on = 245 days

	Scenario 1	Scenario 2	Scenario 3	Units
Qw	1.98	1.98	1.98	cfs
a	12000	12000	12000	ft
K	0.5	0.5	0.5	ft/day
b	40	40	40	ft
T	20	20	20	ft*ft/day
S	0.02	0.02	0.02	
ws	25	25	25	ft
Ks	0.023	0.023	0.023	ft/day
bs	3	3	3	ft
sbc	0.191666667	0.191666667	0.191666667	ft/day
sdf	144000	144000	144000	days
sbf	115	115	115	



Region	21 Steady state stream depletion as a fraction of pumping normalized to crop water use consumption.												
Month	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec	Resid
Qw	0.00	0.00	0.00	0.06	0.13	0.17	0.26	0.20	0.13	0.05	0.00	0.00	0.00
J SD SS	0.091	0.080	0.071	0.065	0.063	0.068	0.077	0.091	0.102	0.105	0.099	0.089	0.000
H99 SD SS	0.095	0.088	0.081	0.076	0.072	0.072	0.075	0.081	0.088	0.092	0.092	0.088	0.000

Parameters:		Values	Units	
Maximum number of years pumped	yrmax	25	years	
Days pumped each month	tpoff	30.4375	days/month	
Perpendicular from well to stream	a	612	ft	
Well depth	d	300	ft	
Aquifer hydraulic conductivity	K	0.6	ft/day	
Aquifer saturated thickness	b	40	ft	
Aquifer transmissivity	T_ft	24	ft*ft/day	= K*b
Aquifer transmissivity	T_gal	180	gpd/ft	= K*b
Aquifer storativity or specific yield	S	0.02		
Streambed conductivity (Hunt 1999)	Ks	0.023	ft/day	
Streambed thickness, Hunt 1999	bs	3	ft	
Stream width (Hunt 1999)	ws	25	ft	
Streambed conductance (lambda)	sbc	0.1917	ft/day	= Ks*ws/bs
Stream depletion factor	sdf	312.1200	days	= (a^2*S)/(T)
Streambed factor	sbf	4.8875		= sbc*a/T