Groundwater Application Review Summary Form

Application # G- 18550

GW Reviewer J. Hackett **Date Review Completed:** 8/20/2018

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.
JH 8/22/18

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 August 20, 2018

TO: **Application** G- 18550

FROM: **GW:** J. Hackett
(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 _____ 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

MEMO

To: Kris Byrd, Manager Well Construction and Compliance Section

From: Joel Jeffery, Well Construction Coordinator

Subject: Review of Water Right Application G-18550

Date: August 22, 2018

The attached application was forwarded to the Well Construction and Compliance Section by Water Rights. Josh Hackett reviewed the application. Please see Josh's Groundwater Review and the Well Log.

Applicant's Well #1 (HOOD 50299): Based on a review of the Well Report, Applicant's Well #1 does not appear to comply with current minimum well construction standards (See OAR 690 Division 210). In order to meet the minimum well construction standards, the well must be continuously cased and continuously sealed to a depth of 450 feet below land surface.

My recommendation is that the Department **not issue a permit** for Applicant's Well #1 (HOOD 50299) 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 #1 into compliance with minimum well construction standards may not satisfy hydraulic connection issues.

RECEIVED HOOD 50299

STATE OF OREGON

WATER SUPPLY WELL REPORT OCT 29 2001

(as required by ORS 537.765)

Instructions for completing this report are on the last page of this form WATER RESOURCES DEPT. SALEM, OREGON

Hood 50299

WELL ID # L L42232

(START CARD) # 134419

(1) OWNER:

Name Cascade Orchards Inc. (George Wertgen)

Address 2875 Fir Mt. Rd.

City Hood River State OR Zip 97031

(2) TYPE OF WORK:

[X] New Well [ ] Deepening [ ] Alteration (repair/recondition) [ ] Abandonment

(3) DRILL METHOD:

[X] Rotary Air [ ] Rotary Mud [ ] Cable [ ] Auger

[ ] Other

(4) PROPOSED USE:

[ ] Domestic [ ] Community [ ] Industrial [X] Irrigation

[ ] Thermal [ ] Injection [ ] Livestock [ ] Other

(5) BORE HOLE CONSTRUCTION:

Special Construction approval [ ] Yes [X] No Depth of Completed Well 722 ft.

Explosives used [ ] Yes [X] No Type Amount

HOLE Diameter	From	To	SEAL Material	From	To	Amount sacks or pounds
16"	0	25	Cement	0	25	11 Bags
12"	25	340				
10"	340	722				

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

[ ] Other

Backfill placed from ft. to ft. Material

Gravel placed from ft. to ft. Size of gravel

(6) CASING/LINER:

	Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing:	12"	+1	24	.250	X		X	
	10"	+1.5	323.5	.250	X		X	
Liner:								

Final location of shoe(s) 323.5

(7) PERFORATIONS/SCREENS:

[ ] Perforations Method

[ ] Screens Type Material

From	To	Slot size	Number	Diameter	Tele/pipe size	Casing	Liner

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

[ ] Pump [ ] Bailer [X] Air [ ] Flowing Artesian

Yield gal/min	Drawdown	Drill stem at	Time
100		720	1 hr.

Temperature of Water 54 Depth Artesian Flow found

Was a water analysis done? [ ] Yes By whom

Did any strata contain water not suitable for intended use? [ ] Too little

[ ] Salty [ ] Muddy [ ] Odor [ ] Colored [ ] Other

Depth of strata:

(9) LOCATION OF WELL by legal description:

County Hood River Latitude Longitude

Township 1N N or S. Range 10E E or W. of WM.

Section 1 SW 1/4 SW 1/4

Tax lot 1900 Lot Block Subdivision

Street Address of Well (or nearest address) 4700 Norman Rd. Hood River, Or.

(10) STATIC WATER LEVEL:

532 ft. below land surface. Date 08/31/2001

Artesian pressure lb. per square inch. Date

(11) WATER BEARING ZONES:

Depth at which water was first found 680

From	To	Estimated Flow Rate	SWL
680	722	100	532

(12) WELL LOG:

Ground elevation

Material	From	To	SWL
Clay Stone Hard Brown	0	33	
Sandstone Fine Brown	33	47	
Clay Stone & Sandstone Fine Brown	47	95	
Sandstone Coarse Brown	95	120	
Gravel Med. Brown	120	135	
Clay Soft Brown	135	145	
Rock Broken Brown	145	176	
Gravel Med. Multi Color	176	245	
Rock Soft Brown	245	280	
Rock Soft Fract. Black	280	320	
Rock Broken Black	320	354	
Basalt Hard Fract. Black	354	367	
Basalt Hard Black	367	405	
Basalt Soft Fact. Black	405	410	
Basalt Hard Fract. Gray	410	445	
Basalt Hard Gray	445	455	
Sandstone Coarse Brown	455	630	
Rock Soft Black	630	680	
Rock Broken Black	680	722	532

RECEIVED SEP 07 2001 WATER RESOURCES DEPT. SALEM, OREGON

Date started 05/30/2001 Completed 08/31/2001

(unbonded) Water Well Constructor Certification:

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

WWC Number

Signed Date

(bonded) Water Well Constructor Certification:

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

WWC Number 790

Signed Charles Austin Date 09/05/2001

ORIGINAL - WATER RESOURCES DEPARTMENT FIRST COPY - CONSTRUCTOR SECOND COPY - CUSTOMER

PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO: Water Rights Section Date August 20, 2018
FROM: Groundwater Section J. Hackett
Reviewer's Name
SUBJECT: Application G- 18550 Supersedes review of
Date of Review(s)

PUBLIC INTEREST PRESUMPTION; GROUNDWATER

OAR 690-310-130 (1) *The Department shall presume that a proposed groundwater use will ensure the preservation of the public welfare, safety and health as described in ORS 537.525.* Department staff review groundwater applications under OAR 690-310-140 to determine whether the presumption is established. OAR 690-310-140 allows the proposed use be modified or conditioned to meet the presumption criteria. **This review is based upon available information and agency policies in place at the time of evaluation.**

A. GENERAL INFORMATION: Applicant's Name: **Bear Mountain LLC** County: **Hood**

A1. Applicant(s) seek(s) 1.00 cfs from 2 well(s) in the Hood Basin,
subbasin

A2. Proposed use Irrigation Seasonality: March 1 – October 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	HOOD 50299	1	**High Cascades Volcanics**	0.20	1N/10E-1 SW-SW	1115' N, 1475' E fr SW cor S 1
2	Proposed	2	**High Cascades Volcanics**	0.80	1N/10E-11 NE-NE	1205' S, 1140' W fr NE cor S11
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	1589	680	549	3/9/2017	722	0-25	0-324			100		A
2	1715				700-900 est.	0-60	0-60					

Use data from application for proposed wells.

A4. **Comments:**

A5. ☒ **Provisions of the** HOOD 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:

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) **7N; Large water-use reporting**;
   ii. ☐ The permit should be conditioned as indicated in item 2 below.
   iii. ☐ The permit should contain special condition(s) as indicated in item 3 below;

B2. a. ☐ **Condition** to allow groundwater production from no deeper than _____ ft. below land surface;

b. ☐ **Condition** to allow groundwater production from no shallower than _____ ft. below land surface;

c. ☐ **Condition** to allow groundwater production only from the _____ 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 applicant's wells produce from water-bearing zones in Pleistocene volcanic material of High Cascades origin. Water levels in nearby wells have remained relatively stable over time, suggesting the groundwater system is not over appropriated and can sustain additional use (see attached hydrograph).

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	**High Cascades Volcanics/Volcaniclastics**	☒	☐
2	**High Cascades Volcanics/Volcaniclastics**	☒	☐
		☐	☐
		☐	☐
		☐	☐

Basis for aquifer confinement evaluation: Water levels in nearby wells rise above the zones in which it was encountered, indicating semi-confined to confined conditions.

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

Well	SW #	Surface Water Name	GW Elev ft msl	SW Elev ft msl	Distance (ft)	Hydraulically Connected? YES	NO	ASSUMED	Potential for Subst. Interfer. Assumed? YES	NO
1	1	**West Fork Neal Creek**	**1045**	**1400-1200**	**3300**	☐	☒	☐	☐	☒
2	1	**West Fork Neal Creek**	**1045**	**1400-1200**	**1675**	☐	☒	☐	☐	☒
1	2	**Neal Creek**	**1045**	**865**	**6100**	☒	☐	☐	☐	☒
2	2	**Neal Creek**	**1045**	**865**	**9500**	☒	☐	☐	☐	☒
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐

Basis for aquifer hydraulic connection evaluation: The applicant's wells produce from water-bearing zones much lower in elevation than the nearby reach of West Fork Neal Creek. Additionally, a normal fault with several hundred feet of vertical offset lies between the wells and the creek (McClaughry and others, 2012). This fault likely limits interaction between the wells and the creek. These factors suggest the applicant's wells will not be hydraulically connected to the West Fork Neal Creek. Water level in the applicant's existing well is higher in elevation than the nearby reach of Neal Creek, indicating a groundwater flow gradient toward the creek and suggesting hydraulic connection between the local aquifer system and Neal Creek.

Water Availability Basin the well(s) are located within: 195: NEAL CR > HOOD R – AT MOUTH

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

Well	SW #	Well < ¼ mile?	Qw > 5 cfs?	Instream Water Right ID	Instream Water Right Q (cfs)	Qw > 1% ISWR?	80% Natural Flow (cfs)	Qw > 1% of 80% Natural Flow?	Interference @ 30 days (%)	Potential for Subst. Interfer. Assumed?
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐

C3b. **690-09-040 (4):** Evaluation of stream impacts by total appropriation for all wells determined or assumed to be **hydraulically connected and less than 1 mile** from a surface water source. **Complete only if Q is distributed among wells.** Otherwise same evaluation and limitations apply as in C3a above.

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

Comments: _____

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
1	**1**	**2.14 %**	**2.18 %**	**2.18 %**	**0.01 %**	**0.13 %**	**0.35 %**	**0.61 %**	**0.89 %**	**1.17 %**	**1.45 %**	**1.73 %**	**1.99 %**
Well Q as CFS		**0**	**0**	**0.20**	**0.20**	**0.20**	**0.20**	**0.20**	**0.20**	**0.20**	**0.20**	**0**	**0**
Interference CFS		0.004	0.004	0.004	0.000	0.000	0.001	0.001	0.002	0.002	0.003	0.003	0.004
1	**2**	**0.98 %**	**1.12 %**	**1.22 %**	**0.00 %**	**0.01 %**	**0.05 %**	**0.12 %**	**0.22 %**	**0.35 %**	**0.50 %**	**0.65 %**	**0.82 %**
Well Q as CFS		**0**	**0**	**0.80**	**0.80**	**0.80**	**0.80**	**0.80**	**0.80**	**0.80**	**0.80**	**0**	**0**
Interference CFS		0.008	0.009	0.010	0.000	0.000	0.000	0.001	0.002	0.003	0.004	0.005	0.007
		%	%	%	%	%	%	%	%	%	%	%	%
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.		**0.012**	**0.013**	**0.014**	**0.000**	**0.000**	**0.001**	**0.002**	**0.004**	**0.005**	**0.007**	**0.008**	**0.011**
(B) = 80 % Nat. Q		**10.20**	**19.50**	**18.10**	**16.00**	**6.59**	**3.65**	**1.76**	**1.46**	**1.68**	**2.48**	**3.40**	**4.35**
(C) = 1 % Nat. Q		**0.102**	**0.195**	**0.181**	**0.160**	**0.0659**	**0.0365**	**0.0176**	**0.0146**	**0.0168**	**0.0248**	**0.0340**	**0.0435**
(D) = (A) > (C)		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
(E) = (A / B) x 100		**0.12%**	**0.067%**	**0.077%**	**0.00%**	**0.00%**	**0.027%**	**0.11%**	**0.27%**	**0.30%**	**0.28%**	**0.24%**	**0.25%**

(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: Impacts to Neal Creek from pumping at HOOD 50299 and at the Proposed Well were calculated for the first year of pumping. A hydraulic conductivity of 50 ft/day, which is appropriate for permeable lava flows, and a storativity of 0.05 were used in the calculation. Modeling results indicate that pumping impacts will be less than 1% of the natural flow in Neal Creek for all months. See attached model outputs for details.

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:**

References Used:

McClaughry, J.D., Wiley, T.J., Conrey, R.M., Jones, C.B., Lite, K.E. Jr, 2012, Digital Geologic Map of The Hood River Valley, Hood River and Wasco Counties, Oregon, Oregon Department of Geology and Mineral Industries, Open File Report O-12-03, 142 p. 1 plate.

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

NEAL CR > HOOD R - AT MOUTH
HOOD BASIN

Water Availability as of 5/21/2018

Watershed ID #: 195 (Map) Exceedance Level: 80%

Date: 5/21/2018 Time: 8:40 AM

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

Water Availability Calculation

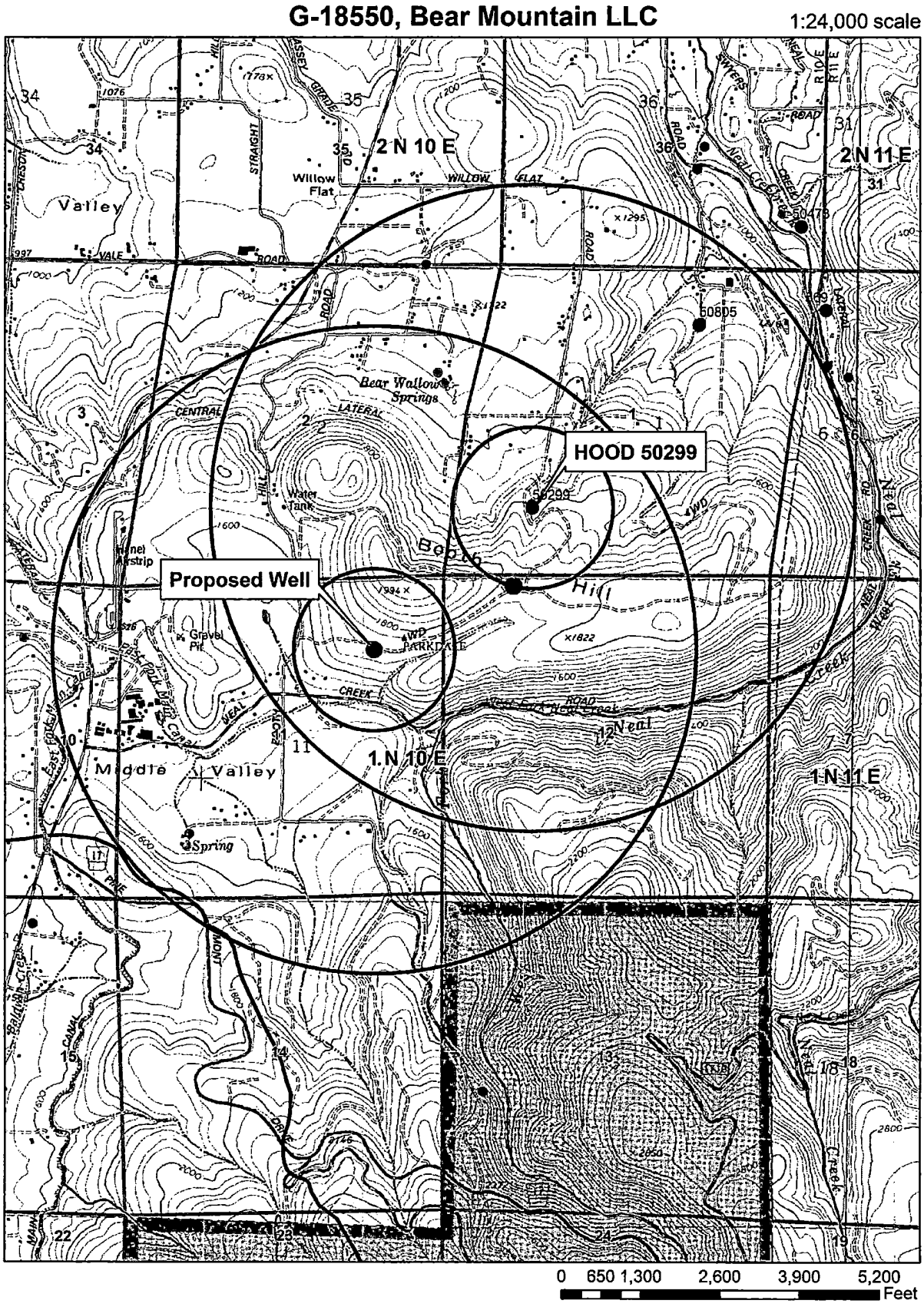
Monthly Streamflow in Cubic Feet per Second
Annual Volume at 50% Exceedance in Acre-Feet

Month	Natural Stream Flow	Consumptive Uses and Storages	Expected Stream Flow	Reserved Stream Flow	Instream Flow Requirement	Net Water Available
JAN	10.20	0.03	10.20	14.80	26.40	-31.00
FEB	19.50	0.05	19.50	25.50	41.90	-48.00
MAR	18.10	0.04	18.10	24.30	40.10	-46.30
APR	16.00	2.24	13.80	13.00	27.60	-26.90
MAY	6.59	6.09	0.50	0.00	20.00	-19.50
JUN	3.65	5.07	-1.42	0.00	20.00	-21.40
JUL	1.76	1.54	0.22	0.00	13.00	-12.80
AUG	1.46	0.80	0.67	0.00	13.00	-12.30
SEP	1.68	0.79	0.89	0.00	5.00	-4.11
OCT	2.48	0.03	2.45	0.00	20.00	-17.60
NOV	3.40	0.03	3.37	2.01	20.00	-18.60
DEC	4.35	0.03	4.32	4.44	13.00	-13.10
ANN	10,500.00	1,010.00	9,500.00	5,000.00	15,600.00	0.00

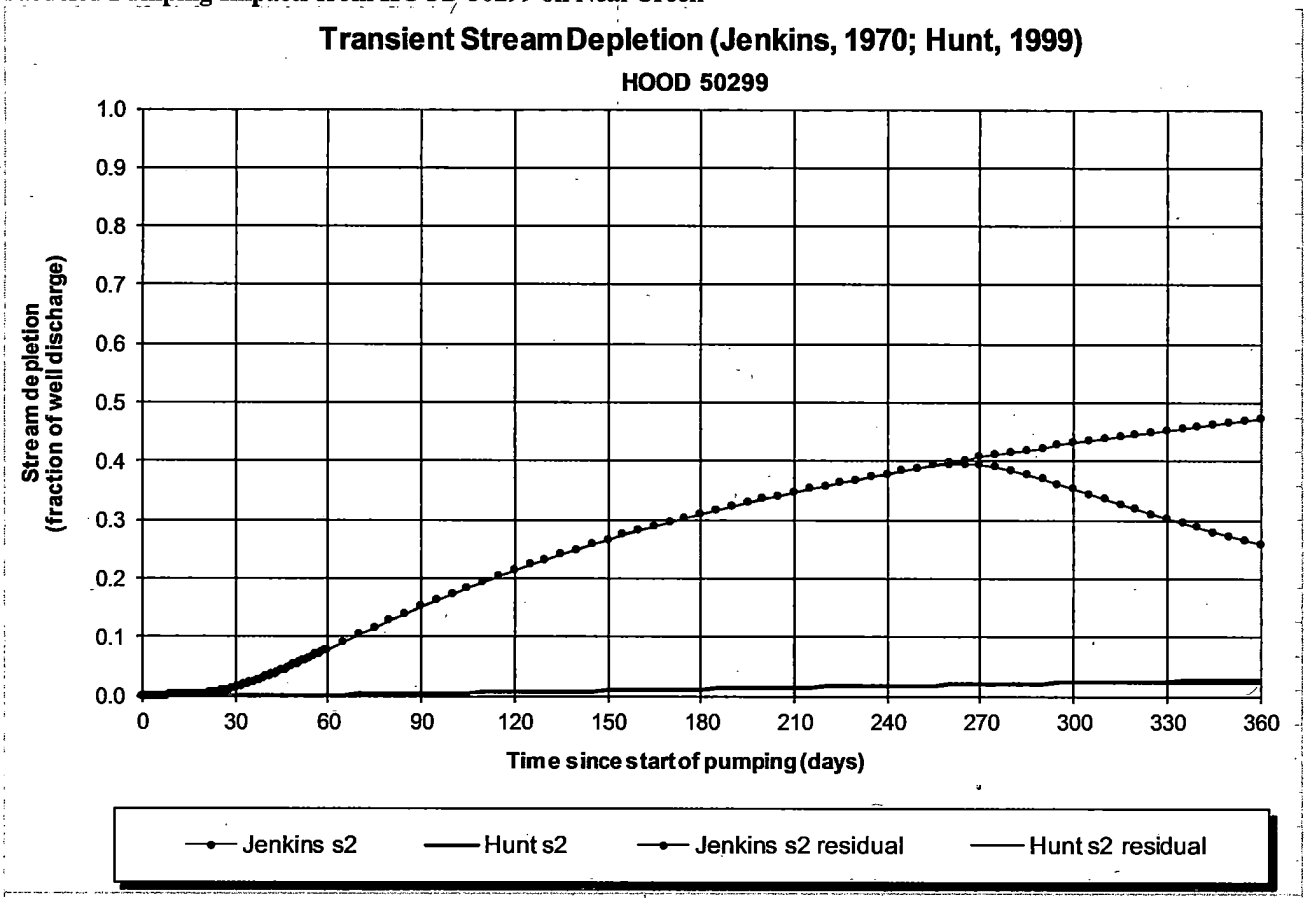
Detailed Report of Instream Flow Requirements
Instream Flow Requirements in Cubic Feet per Second

Application #	Status	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
MF195A	CERTIFICATE	13.00	13.00	13.00	20.00	20.00	20.00	13.00	13.00	5.00	20.00	20.00	13.00
IS88327A	APPLICATION	26.40	41.90	40.10	27.60	9.98	4.91	2.41	1.95	2.15	2.96	4.80	10.60
Maximum		**26.40**	**41.90**	**40.10**	**27.60**	**20.00**	**20.00**	**13.00**	**13.00**	**5.00**	**20.00**	**20.00**	**13.00**

Well Location Map



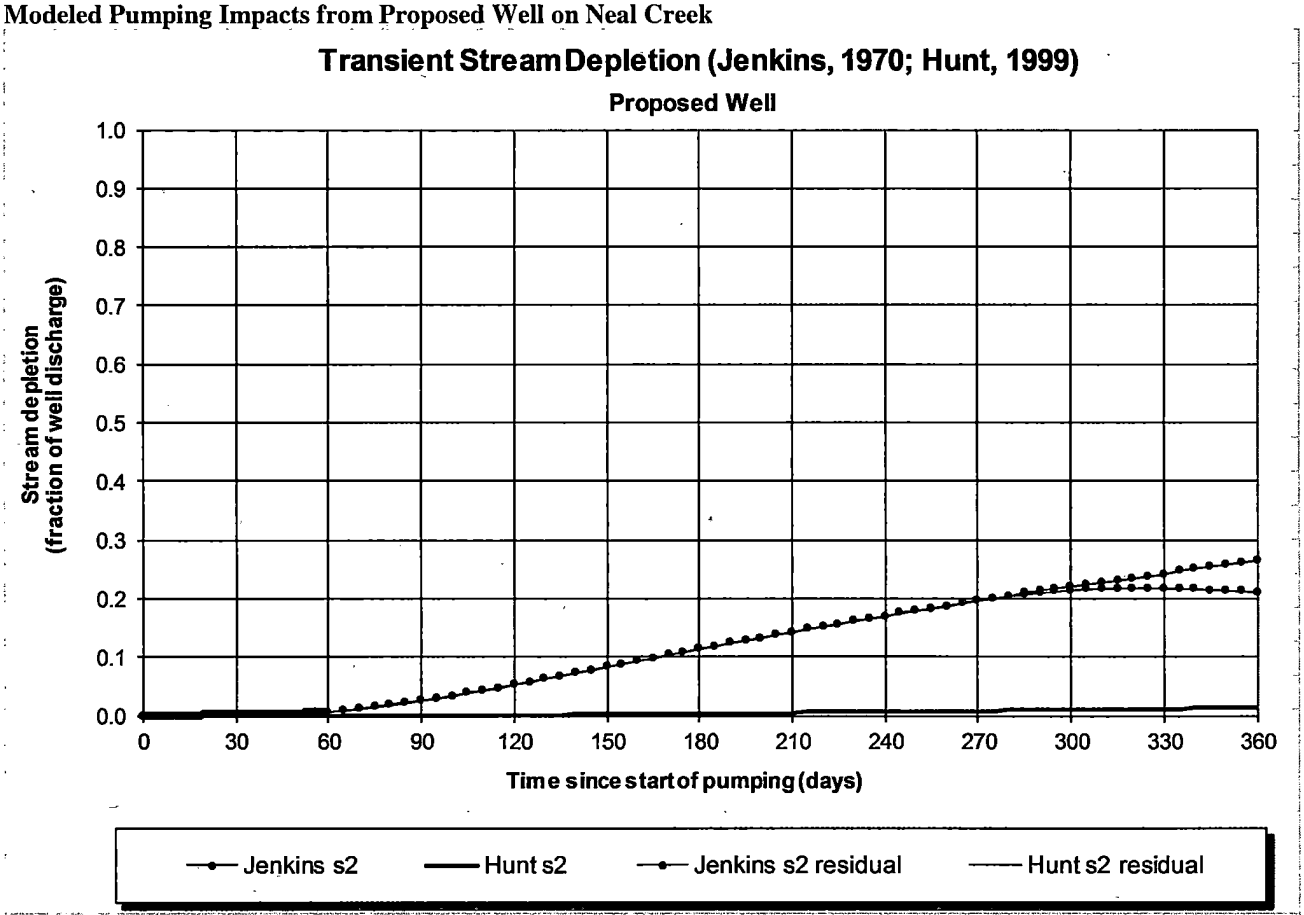
Modeled Pumping Impacts from HOOD 50299 on Neal Creek



Output for Hunt Stream Depletion, Scenerio 2 (s2):						Time pump on = 240 days						
Days	**30**	60	90	120	150	180	210	240	270	300	330	360
Qw, cfs	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200	0.200
Jenk SD s2 %	**1.28**	7.83	15.05	21.31	26.54	30.93	34.66	37.86	39.37	35.27	30.22	25.91
Jen SD s2 cfs	0.003	0.016	0.030	0.043	0.053	0.062	0.069	0.076	0.079	0.071	0.060	0.052
Hunt SD s2 %	0.01	0.13	0.35	0.61	0.89	1.17	1.45	1.73	1.99	2.14	2.18	2.18
Hunt SD s2 cfs	0.000	0.000	0.001	0.001	0.002	0.002	0.003	0.003	0.004	0.004	0.004	0.004

Parameters:		**Scenario 1**	**Scenario 2**	**Scenario 3**	**Units**
Net steady pumping rate	Qw	0.2	0.2	0.2	cfs
Distance to stream	a	6100	6100	6100	ft
Aquifer hydraulic conductivity	K	50	50	50	ft/day
Aquifer thickness	b	200	200	200	ft
Aquifer transmissivity	T	10000	10000	10000	ft*ft/day
Aquifer storage coefficient	S	0.1	0.1	0.1	
Stream width	ws	15	15	15	ft
Streambed hydraulic conductivity	Ks	0.01	0.05	0.1	ft/day
Streambed thickness	bs	3	3	3	ft
Streambed conductance	sbc	0.05	0.25	0.5	ft/day
Stream depletion factor (Jenkins)	sdf	372.1	372.1	372.1	days
Streambed factor (Hunt)	sbf	0.0305	0.1525	0.305	

Modeled Pumping Impacts from Proposed Well on Neal Creek



Output for Hunt Stream Depletion, Scenerio 2 (s2):						Time pump on = 240 days						
Days	**30**	60	90	120	150	180	210	240	270	300	330	360
Qw, cfs	0.800	0.800	0.800	0.800	0.800	0.800	0.800	0.800	0.800	0.800	0.800	0.800
Jenk SD s2 %	**0.01**	0.61	2.51	5.25	8.28	11.33	14.27	17.03	19.60	21.39	21.71	21.04
Jen SD s2 cfs	0.000	0.005	0.020	0.042	0.066	0.091	0.114	0.136	0.157	0.171	0.174	0.168
Hunt SD s2 %	0.00	0.01	0.05	0.12	0.22	0.35	0.50	0.65	0.82	0.98	1.12	1.22
Hunt SD s2 cfs	0.000	0.000	0.000	0.001	0.002	0.003	0.004	0.005	0.007	0.008	0.009	0.010

Parameters:		**Scenario 1**	**Scenario 2**	**Scenario 3**	**Units**
Net steady pumping rate	Qw	0.8	0.8	0.8	cfs
Distance to stream	a	9500	9500	9500	ft
Aquifer hydraulic conductivity	K	50	50	50	ft/day
Aquifer thickness	b	200	200	200	ft
Aquifer transmissivity	T	10000	10000	10000	ft*ft/day
Aquifer storage coefficient	S	0.1	0.1	0.1	
Stream width	ws	15	15	15	ft
Streambed hydraulic conductivity	Ks	0.01	0.05	0.1	ft/day
Streambed thickness	bs	3	3	3	ft
Streambed conductance	sbc	0.05	0.25	0.5	ft/day
Stream depletion factor (Jenkins)	sdf	902.5	902.5	902.5	days
Streambed factor (Hunt)	sbf	0.0475	0.2375	0.475	

Water levels in nearby wells