PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO: Water Rights Section Date **December 16, 2015**

FROM: Groundwater Section **Michael J. Thoma**
Reviewer's Name

SUBJECT: Application G- **18160** 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: **Crystal Harder** County: **Lane**

A1. Applicant(s) seek(s) **0.0557** cfs from **1** well(s) in the **Willamette** Basin, **Long Tom** subbasin

A2. Proposed use **Nursery/Ag (10 acres Primary)** Seasonality: **Year-round**

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	LANE 12203	1	Alluvium	0.0057	17S/04W-18 SENW	2406'S, 1735'E of NW cor S18
2						

* 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	370		17	8/28/2015	30	0-18	0-30			25	15	B

Use data from application for proposed wells.

A4. **Comments:** _____

A5. ☒ **Provisions of the** Willamette (OAR 690-502) Basin rules relative to the development, classification and/or management of groundwater hydraulically connected to surface water ☐ **are**, *or* ☒ **are not**, activated by this application. (Not all basin rules contain such provisions.)
Comments: The proposed POA is not within ¼ mile of perennial surface water nor is it in a groundwater limited area

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) **'Small' 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:** There are only a few, small groundwater rights in the immediate vicinity of the proposed POA and a nearby state observation well (LANE 13051) shows stable water levels over the past several decades. Therefore it appears unlikely that the proposed use will lead to injury to existing users or the groundwater resource.

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**	☒	☐
		☐	☐

Basis for aquifer confinement evaluation: Many well logs in the area of the proposed POA show SWLs slightly higher than reported water-bearing zones and identify several feet of clay near the surface.

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**	**Amazon Cr**	**363**	**355-365**	**1330**	☒	☐	☐	☐	☐
						☐	☐	☐	☐	☐

Basis for aquifer hydraulic connection evaluation: coincident water levels; shallow completed depth of well; proximity to creek.

Water Availability Basin the well(s) are located within: Long Time R > Willamette R – AB Mouth (ID# 114)

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**	☐	☐			☐	**32.10**	☐	**< 1%**	☐
		☐	☐			☐		☐		☐

Comments: Interference @ 30 d was estimated using the Hunt (2003) and Hunt (1999) stream-depletion models and with parameter values taken from Herrera et al. (2014). Model results are presented below but, overall, the circumstances do not appear favorable to lead to significant interference.

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
		%	%	%	%	%	%	%	%	%	%	%	%
Well Q as CFS													
Interference CFS													
(A) = Total Interf.													
(B) = 80 % Nat. Q													
(C) = 1 % Nat. Q													
(D) = (A) > (C)		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
(E) = (A / B) x 100		%	%	%	%	%	%	%	%	%	%	%	%

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

Basis for impact evaluation: _____

C4b. **690-09-040 (5) (b) The potential to impair or detrimentally affect the public interest is to be determined by the Water Rights Section.**

C5. ☐ **If properly conditioned**, the surface water source(s) can be adequately protected from interference, and/or groundwater use under this permit can be regulated if it is found to substantially interfere with surface water:

i. ☐ The permit should contain condition #(s)_____;

ii. ☐ The permit should contain special condition(s) as indicated in "Remarks" below;

C6. **SW / GW Remarks and Conditions:** _____

References Used:

Gannet, M. W. and R. R. Caldwell. 1998. *Geologic Framework of the Willamette Lowland Aquifer System, Oregon and Washington*. USGS Professional Paper 1424-A.

Herrera, N. B., Burns, E. R., and T. D. Conlon. 2014. *Simulation of Groundwater Flow and the Interaction of Groundwater and Surface Water in the Willamette Basin and Central Willamette Subbasin*, Oregon. USGS Scientific Investigations Report 2014-5136.

Hunt, B. 1999. *Unsteady Stream Depletion from Ground Water Pumping*. Journal of Hydrologic Engineering, Vol 8(1), pp 12-19

Hunt, B. 2003. *Unsteady Stream Depletion when Pumping from a Semiconfined Aquifer*. Journal of Hydrologic Engineering. Vol 8(1), pp 12-19

Woodward, D. G., M. W. Gannett, and J. J. Vaccaro. 1998. *Hydrogeologic Framework of the Willamette Lowland Aquifer System, Oregon and Washington*. USGS Professional Paper 1424-B.

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

LONG TOM R > WILLAMETTE R - AB MOUTH
WILLAMETTE BASIN

Water Availability as of 12/16/2015

Watershed ID #: 114 (Map) Exceedance Level: 80%
Date: 12/16/2015 Time: 9:41 AM

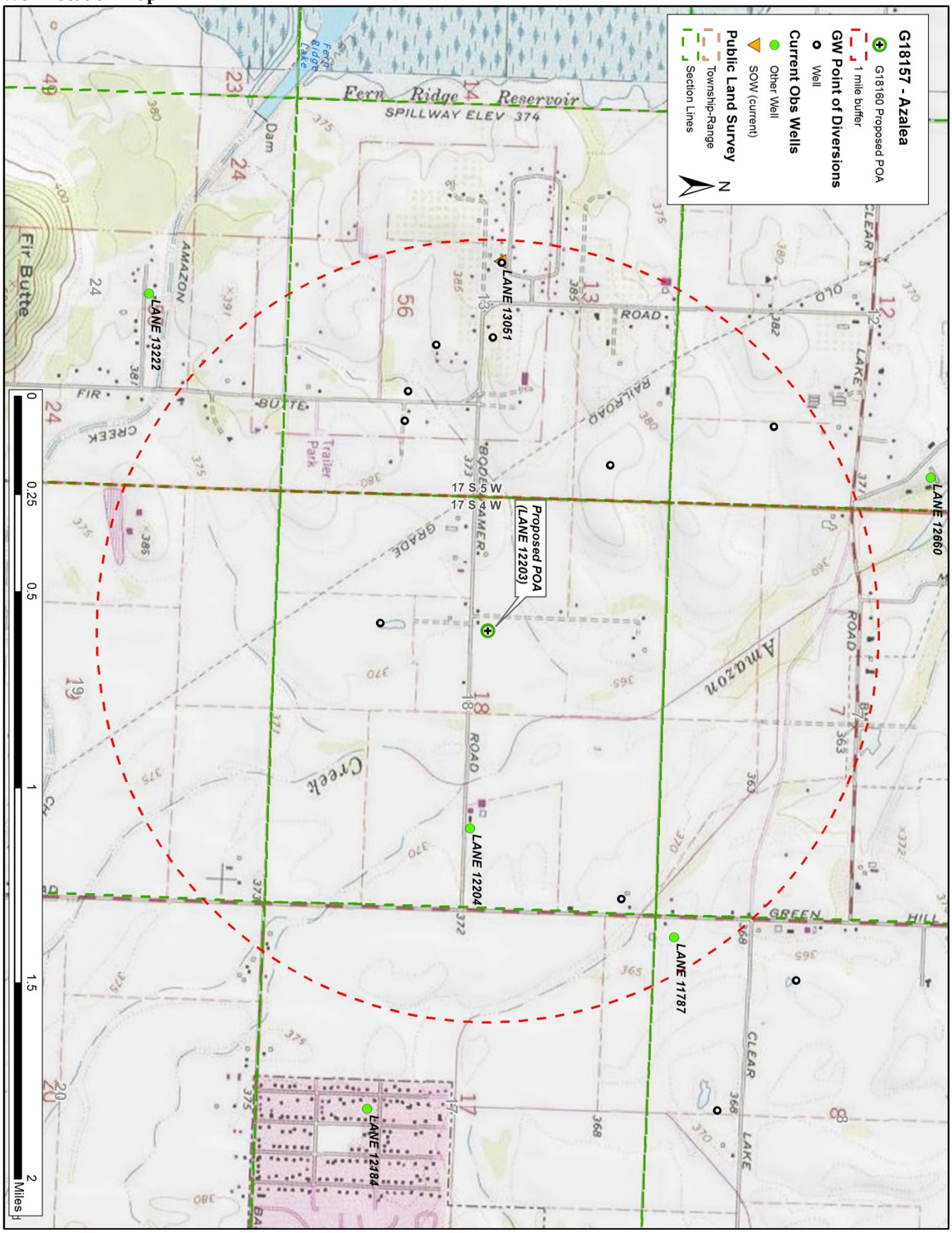
Water Availability Calculation | Consumptive Uses and Storages | Instream Flow Requirements | Reservations
Water Rights | Watershed Characteristics

Water Availability Calculation

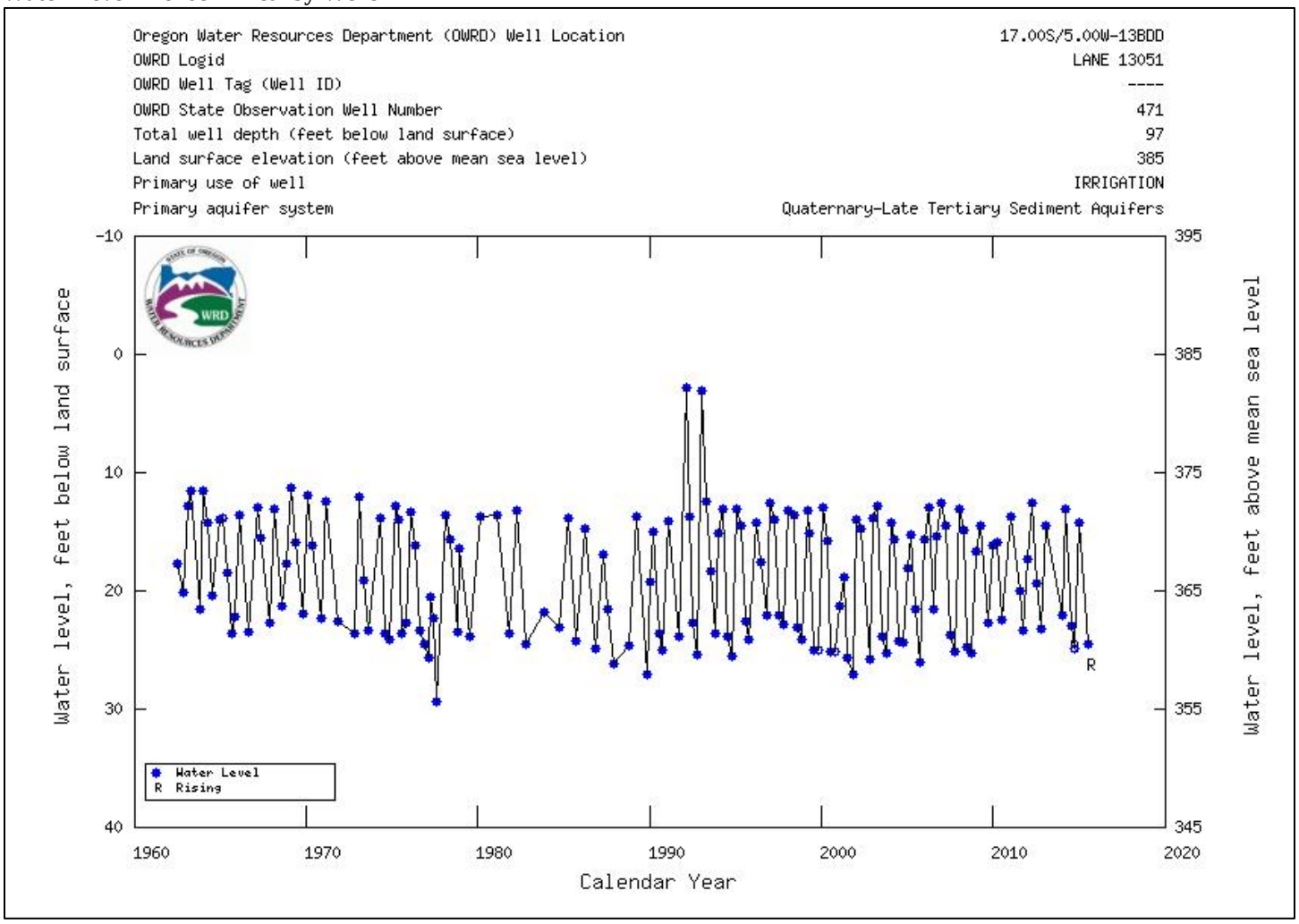
Monthly Streamflow in Cubic Feet per Second
Annual Volume at 50% Exceedance in Acre-Feet

Month	Natural Stream Flow	Consumptive Uses and Storages	Expected Stream Flow	Reserved Stream Flow	Instream Flow Requirement	Net Water Available
JAN	568.00	149.00	419.00	0.00	0.00	419.00
FEB	697.00	389.00	308.00	0.00	0.00	308.00
MAR	596.00	556.00	40.30	0.00	0.00	40.30
APR	373.00	250.00	123.00	0.00	0.00	123.00
MAY	215.00	64.70	150.00	0.00	0.00	150.00
JUN	105.00	30.30	74.70	0.00	0.00	74.70
JUL	50.60	47.60	2.99	0.00	0.00	2.99
AUG	35.40	38.40	-2.97	0.00	0.00	-2.97
SEP	32.10	22.20	9.93	0.00	0.00	9.93
OCT	35.30	6.49	28.80	0.00	0.00	28.80
NOV	82.50	6.20	76.30	0.00	0.00	76.30
DEC	364.00	106.00	258.00	0.00	0.00	258.00
ANN	362,000.00	99,700.00	262,000.00	0.00	0.00	262,000.00

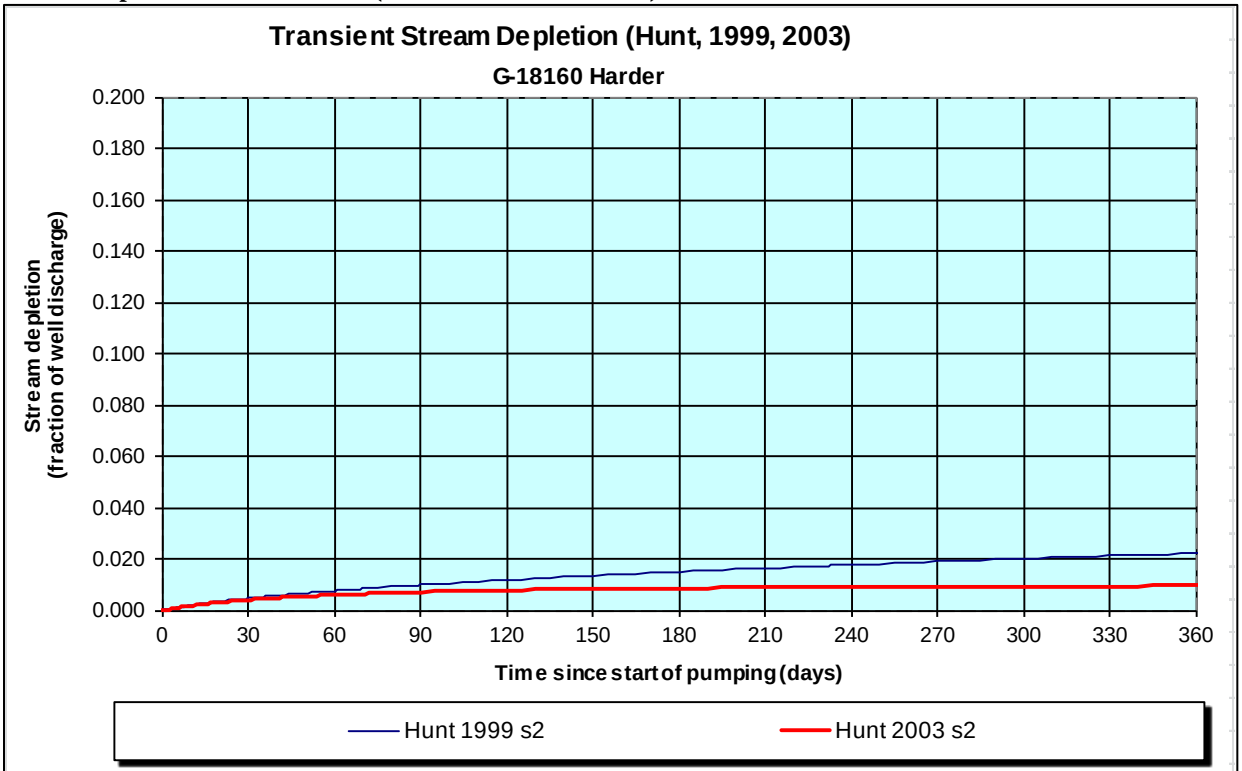
Well Location Map



Water-Level Trends in Nearby Wells



Stream-depletion Model Results (Hunt, 1999; Hunt, 2003)



Output for Stream Depletion, Scenerio 2 (s2):						Time pump on (pumping duration) = 365 days						
Days	30	60	90	120	150	180	210	240	270	300	330	360
J SD	73.1%	80.8%	84.3%	86.4%	87.8%	88.9%	89.7%	90.3%	90.9%	91.4%	91.8%	92.1%
H SD 1999	0.5%	0.8%	1.0%	1.2%	1.3%	1.5%	1.6%	1.8%	1.9%	2.0%	2.1%	2.2%
H SD 2003	**0.41%**	0.59%	0.70%	0.77%	0.82%	0.86%	0.88%	0.90%	0.92%	0.93%	0.94%	0.95%
Qw, cfs	0.056	0.056	0.056	0.056	0.056	0.056	0.056	0.056	0.056	0.056	0.056	0.056
H SD 99, cfs	0.000	0.000	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
H SD 03, cfs	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.001	0.001

Parameters:		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate of well	Qw	25.00	**25.00**	25.00	gpm
Time pump on (pumping duration)	tpon	365	**365**	365	days
Perpendicular from well to stream	a	1330	**1330**	1330	ft
Well depth	d	30	**30**	30	ft
Aquifer hydraulic conductivity	K	10	**50**	100	ft/day
Aquifer saturated thickness	b	50	**50**	50	ft
Aquifer transmissivity	T	500	**2500**	5000	ft*ft/day
Aquifer storativity or specific yield	S	0.001	**0.01**	0.0001	
Aquitard vertical hydraulic conductivity	Kva	0.001	**0.001**	0.001	ft/day
Aquitard saturated thickness	ba	10	**10**	10	ft
Aquitard thickness below stream	babs	5	**5**	5	ft
Aquitard porosity	n	0.25	**0.25**	0.25	
Stream width	ws	60	**60**	60	ft
Streambed conductance (lambda)	sbc	0.012	**0.012**	0.012	ft/day
Stream depletion factor	sdf	3.538	**7.076**	0.035	days
Streambed factor	sbf	0.032	**0.006**	0.003	
input #1 for Hunt's Q_4 function	t'	0.283	**0.141**	28.266	
input #2 for Hunt's Q_4 function	K'	0.354	**0.071**	0.035	
input #3 for Hunt's Q_4 function	epsilon'	0.004	**0.040**	0.000	
input #4 for Hunt's Q_4 function	lamda'	0.032	**0.006**	0.003	