PUBLIC INTEREST REVIEW FOR GROUND WATER APPLICATIONS

TO: Water Rights Section Date **January 28, 2009**

FROM: Ground Water/Hydrology Section **Marc Norton**
Reviewer's Name

SUBJECT: Application G- **17149** 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 ground water 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: **Seneca Sawmill** County: **Lane**

A1. Applicant(s) seek(s) **0.89** cfs from **2** well(s) in the **Willamette River** Basin,
Long Tom River subbasin Quad Map: **Eugene West**

A2. Proposed use: **Industrial – Co-Gen Make-Up Water** 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	**Proposed**	**12**	**Alluvium**	**0.89**	**17S/04W-04 SE SW**	**1297' N, 880' E fr SW cor S 4**
2	**LANE63753**	**7**	**Alluvium**	**0.89**	**17S/04W-04 SW SE**	**412' S, 76' W fr SE 1/16 cor S 4**
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
12	**368**				**190**	**90 ?**	**130 ?**					
7	**372**	**17**	**12.8**	**6/18/01**	**180**	**0 – 80**	**122**	**--------**	**120 – 180**	**480**		**Air**
			12.9	**12/23/08**						**410**	**16.1**	**PT**

Use data from application for proposed wells.

A4. **Comments: See conceptual model discussion for more details on geology and ground water. There is an existing water right on well #7; Application G-15000 for 400 gpm for industrial use from LANE 63753. This application is for an additional 400 gpm for a co-gen plant. Water use from this well will be 24 hours a day, all year.**

Requested discharge rate is 400 gpm = 0.89 cfs

A5. ☒ **Provisions of the Willamette River** Basin rules relative to the development, classification and/or management of ground water hydraulically connected to surface water ☒ **are**, *or* ☐ **are not**, activated by this application. (Not all basin rules contain such provisions.)
Comments: **Well #12, at the proposed location, is greater than ¼ mile from the nearest creek, but well #7 is less than a ¼ mile from the creek.**

A6. ☐ **Well(s) #** ____, ____, ____, ____, ____, tap(s) an aquifer limited by an administrative restriction.
Name of administrative area: **NA**
Comments: ____________

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

B1. **Based upon available data**, I have determined that ground water* 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 ground water 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 ground water 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 ground water resource; or

d. ☒ **will, if properly conditioned**, avoid injury to existing ground water rights or to the ground water resource:
   i. ☒ The permit should contain condition #(s) **7B – Interference, 7N-Annual WL, 7P – Well tag & large monitoring and reporting with flow meters at all wells**;
   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 ground water production from no deeper than ________ ft. below land surface;

b. ☐ **Condition** to allow ground water production from no shallower than ________ ft. below land surface;

c. ☐ **Condition** to allow ground water production only from the ________________ ground water 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 Ground Water 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. **Ground water availability remarks: Nearby wells with water rights are shallow, in general less than 50 feet deep and are small in size. There will be interference with existing users, but there is more aquifer at depth – shallow wells would need to fully penetrate the aquifer for interference to be an issue.**

C. GROUND WATER/SURFACE WATER CONSIDERATIONS, OAR 690-09-040

C1. **690-09-040 (1):** Evaluation of aquifer confinement:

Well	Aquifer or Proposed Aquifer	Confined	Unconfined
12	**Alluvium**	☐	☒
7	**Alluvium**	☐	☒
		☐	☐
		☐	☐
		☐	☐

Basis for aquifer confinement evaluation: **Water bearing material from near surface with no major confining layer.**

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
12	**1**	**Un-named trib to Amazon Cr.**	**360**	**360**	**1410**	☒	☐	☐	☐	☒
7	**1**	**Un-named trib to Amazon Cr.**	**360**	**360**	**370**	☒	☐	☐	☒	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐

Basis for aquifer hydraulic connection evaluation: **Well #12 is located over ¼ mile from the stream. Well #7 is located 370' from the stream in an unconfined aquifer.**

Water Availability Basin the well(s) are located within: LONG TOM R> WILLAMETTE R- AB 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?
12	**1**	☒	☐		**NA**	☐	**32.1**	☐	**< 25%**	☒
7	**1**	☐	☐		**NA**	☐	**32.1**	☐	**< 25%**	☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐

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

	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: For well #7, see mitigation option from Application G-15000.

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													
		%	%	%	%	%	%	%	%	%	%	%	%
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.													
(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 ground water 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: See conceptual model discussion for more details.

Gannett and Caldwell, 1998, Geologic Framework of the Willamette Lowland Aquifer System, Oregon and Washington, USGS Professional Paper 1424-A

Woodward, Gannett and Vaccaro, 1998, Hydrogeologic Framework of the Willamette Lowland Aquifer System, Oregon and Washington, USGS Professional Paper 1424-B

Walton, William, 1962, Selected Analytical Methods for Well and Aquifer Evaluation, Bulletin 49, Illinois State Water Resources.

Freeze and Cherry, 1979, Groundwater, Prentice-Hall, Inc.

Conlon and Others, 2005, Ground-Water Hydrology of the Willamette Basin, Oregon, Scientific Report 2005-5168, USGS.

D. WELL CONSTRUCTION, OAR 690-200

D1. **Well #**: __________ **Logid:** __________

D2. **THE WELL does not 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**:
a. ☐ constitutes a health threat under Division 200 rules;
b. ☐ commingles water from more than one ground water reservoir;
c. ☐ permits the loss of artesian head;
d. ☐ permits the de-watering of one or more ground water reservoirs;
e. ☐ other: (specify) __________

D4. **THE WELL construction deficiency is described as follows:** __________

D5. **THE WELL** a. ☐ **was**, *or* ☐ **was not** constructed according to the standards in effect at the time of original construction or most recent modification.

b. ☐ I don't know if it met standards at the time of construction.

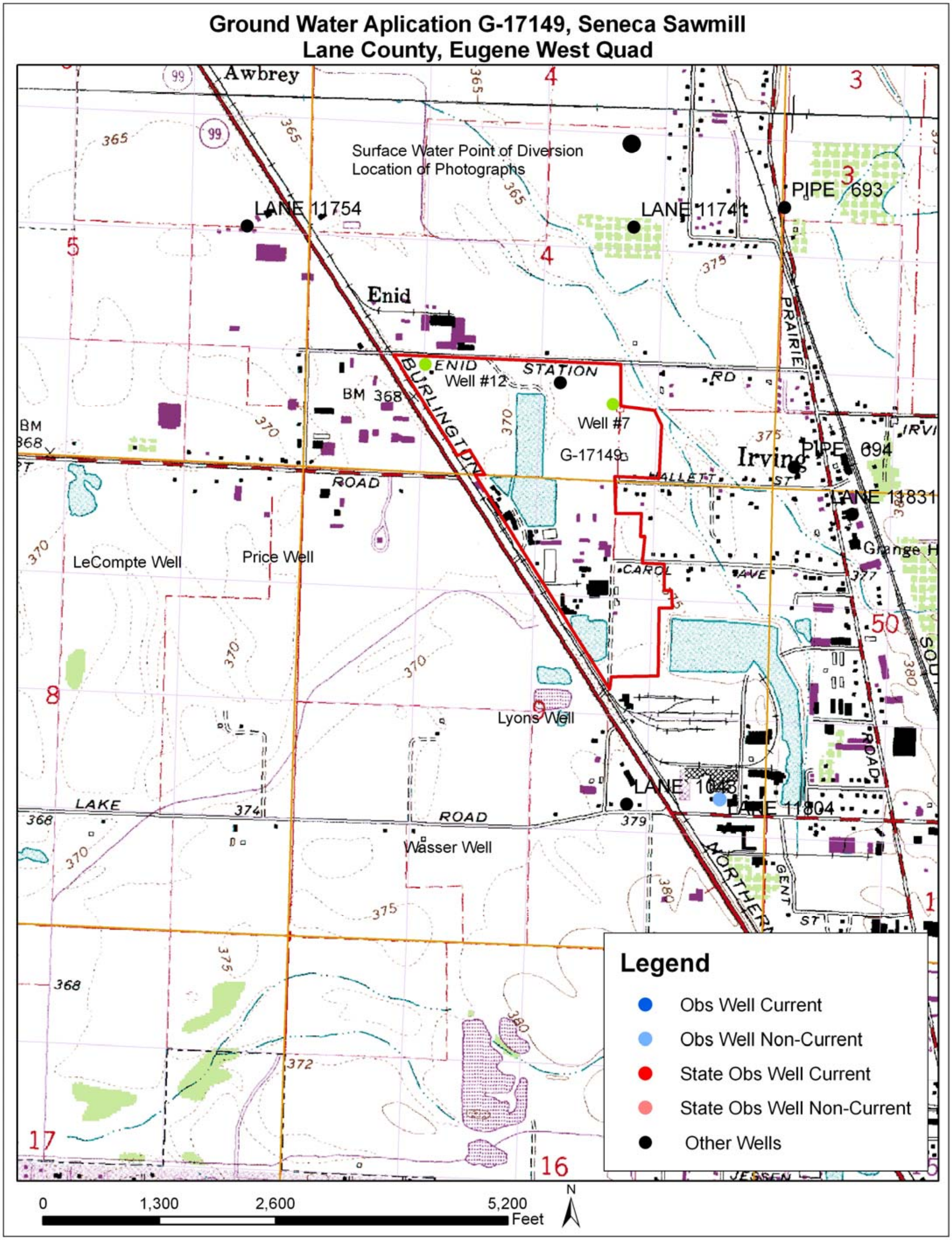
D6. ☐ **Route to the Enforcement Section.** I recommend withholding issuance of the permit until evidence of well reconstruction is filed with the Department and approved by the Enforcement Section and the Ground Water Section.

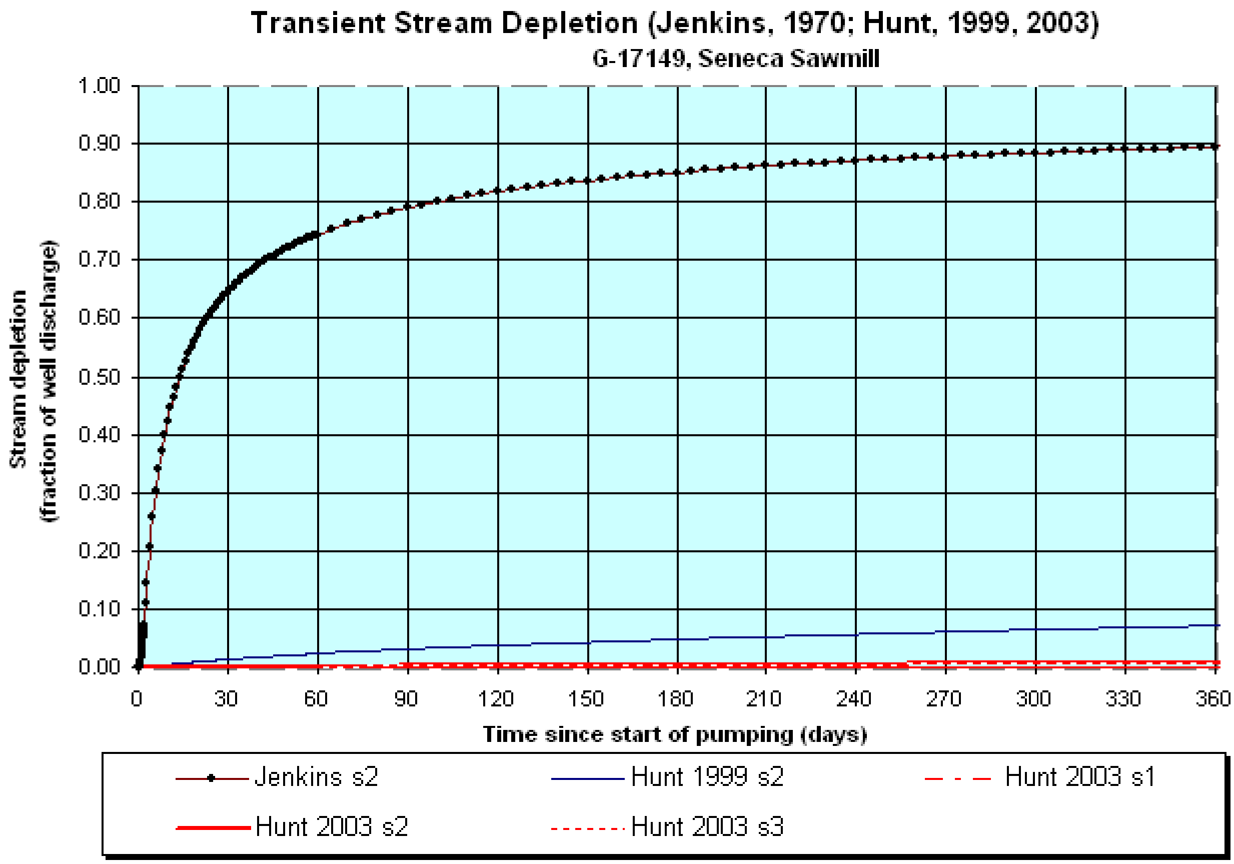
THIS SECTION TO BE COMPLETED BY ENFORCEMENT PERSONNEL

D7. ☐ Well construction deficiency has been corrected by the following actions: __________

__________ __________, 200____.
(Enforcement Section Signature)

D8. ☐ **Route to Water Rights Section (attach well reconstruction logs to this page).**


Ground Water Aplication G-17149, Seneca Sawmill
Lane County, Eugene West Quad
Surface Water Point of Diversion
Location of Photographs
LANE 11754
LANE 11741
PIPE 693
Enid
Well #12
Well #7
G-17149
Irving
PIPE 694
LANE 11831
LeCompte Well
Price Well
Lyons Well
LANE 1048
LANE 11804
Wasser Well
Legend
Obs Well Current
Obs Well Non-Current
State Obs Well Current
State Obs Well Non-Current
Other Wells
0
1,300
2,600
5,200
Feet
N



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	64.4%	74.4%	79.0%	81.7%	83.6%	85.0%	86.1%	87.0%	87.8%	88.4%	88.9%	89.4%
H SD 1999	1.4%	2.3%	3.1%	3.7%	4.3%	4.8%	5.2%	5.7%	6.1%	6.4%	6.8%	7.1%
H SD 2003	0.1%	0.1%	0.2%	0.2%	0.3%	0.4%	0.4%	0.5%	0.5%	0.6%	0.6%	0.7%
Qw, cfs	0.891	0.891	0.891	0.891	0.891	0.891	0.891	0.891	0.891	0.891	0.891	0.891
H SD 99, cfs	0.012	0.021	0.027	0.033	0.038	0.043	0.047	0.050	0.054	0.057	0.061	0.064
H SD 03, cfs	0.001	0.001	0.002	0.002	0.003	0.003	0.004	0.004	0.005	0.005	0.006	0.006

Parameters:		**Scenario 1**	**Scenario 2**	**Scenario 3**	**Units**
Net steady pumping rate of well	Qw	400.00	400.00	400.00	gpm
Time pump on (pumping duration)	tpon	365	365	365	days
Perpendicular from well to stream	a	1410	1410	1410	ft
Well depth	d	180	180	180	ft
Aquifer hydraulic conductivity	K	200	258	300	gpd/ft*ft
Aquifer saturated thickness	b	90	90	90	ft
Aquifer transmissivity	T				
Aquifer storativity or specific yield	S	0.02	0.02	0.02	
Aquitard vertical hydraulic conductivity	Kva	0	0.1	0.1	ft/day
Aquitard saturated thickness	ba	8	8	8	ft
Aquitard thickness below stream	babs	3	3	3	ft
Aquitard porosity	n	0.5	0.5	0.5	
Stream width	ws	2	2	2	ft
Streambed conductance (lambda)	sbc	0.000000	0.066667	0.066667	ft/day
Stream depletion factor	sdf	16.523320	12.808775	11.015547	days

Streambed factor	sbf	0.000000	0.030281	0.026041	
input #1 for Hunt's Q_4 function	t'	0.060521	0.078071	0.090781	
input #2 for Hunt's Q_4 function	K'	0.000000	8.005484	6.884717	
input #3 for Hunt's Q_4 function	epsilon'	0.040000	0.040000	0.040000	
input #4 for Hunt's Q_4 function	lamda'	0.000000	0.030281	0.026041	

Detailed Reports

LONG TOM R> WILLAMETTE R- AB MOUTH
WILLAMETTE BASIN

Water Availability as of 1/30/2009

Watershed ID #: 114

Exceedance Level: 80%

Date: 1/30/2009

Time: 11:30 AM

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

Water Availability Calculation

Monthly Streamflows in Cubic Feet per Second

Storage at 50% Exceedance in Acre-Feet

Month	Natural Stream Flow	Consumptive Use and Storage	Expected Stream Flow	Reserved Stream Flow	Instream Requirement	Net Water Available
Jan	568.00	149.00	419.00	0.00	0.00	419.00
Feb	697.00	388.00	309.00	0.00	0.00	309.00
Mar	596.00	555.00	40.90	0.00	0.00	40.90
Apr	373.00	249.00	124.00	0.00	0.00	124.00
May	215.00	63.80	151.00	0.00	0.00	151.00
Jun	105.00	29.60	75.40	0.00	0.00	75.40
Jul	50.60	47.90	2.67	0.00	0.00	2.67
Aug	35.40	38.70	-3.28	0.00	0.00	-3.28
Sep	32.10	21.20	10.90	0.00	0.00	10.90
Oct	35.30	5.32	30.00	0.00	0.00	30.00
Nov	82.50	5.08	77.40	0.00	0.00	77.40
Dec	364.00	105.00	259.00	0.00	0.00	259.00

Conceptual Model -- Generalized Ground Water Flow Systems.
Marc Norton
January 8, 2004

Based on:

OWRD GRID - Ground water Resource Information Distribution

OWRD Ground Water Database

Memo on Recommended Vertical Hydraulic Conductivity Values for the Willamette Silt Hydrogeologic Unit When Using the Hunt Analytical Model, Karl Wozniak, January 6, 2004.

Ground-Water Resources of the Willamette Valley, Oregon, 1942, Water-Supply Paper 890, Piper.

Hydrogeologic Framework of the Willamette Lowland Aquifer System, Oregon and Washington, 1998, US Geological Survey Professional Paper 1424 B, Woodward, Gannett, and Vaccaro.

GENERALIZED GEOLOGY

The Willamette Lowland in Oregon and Washington encompasses 3,700 square mile and includes the low-lying parts of the Willamette Valley in Oregon and most of Clark county in Washington. About 70% of the population of Oregon and Clark County reside in the lowlands. The lowland is 145 miles long and averages 10 to 15 miles in width. Water is recharged to the Willamette Lowland aquifer system primarily through the direct infiltration of precipitation on the lowland. The regional water-table map shows an overall pattern of ground-water flow to the major streams, indicating that the base flow of these streams is sustained by ground water discharge. This ground-water discharge fully supports the base flow of streams that head in the lowland and partially support the base flow of the other streams.

HYDROGEOLOGIC UNITS

The aquifer system is composed of five hydrogeologic units, from oldest to youngest:

1) the basement confining unit,
2) the Columbia River basalt aquifer,
3) the Willamette confining unit,
4) the Willamette aquifer, and
5) the Willamette silt unit.

The basement-confining unit forms the lateral and basal boundary to the Willamette aquifer system. The basement-confining unit includes all the stratigraphic units that underlie either the Columbia River Basalt Group in the northern part of the basin or the basin-fill deposits in the southern part. The unit is composed of marine sedimentary rocks and volcanic rocks of the Coast and Cascade ranges. The basement-confining unit is generally a low yielding aquifer where wells develop water primarily from fractures in the rock. Ground water can be found under unconfined conditions in the highlands and under confined conditions with greater depth and lower elevations. Yields are generally less than 10 gpm and usually decrease over time. The deeper the well, the greater the chance of brackish water being encountered.

The Columbia River basalt aquifer overlies the basement-confining unit and consists of layers of basalt flows of the Columbia River Basalt Group. The thickness of the aquifer generally is several hundred feet but locally is as much as 1000 feet. Ground water in the basalts is generally under confined conditions except in the foothills where they may be unconfined. Well yields vary from tens to hundreds of gallons per minutes. Brackish water has been encountered in several areas, particularly with depth.

The Willamette confining unit consists primarily of fine-grained, distal alluvial fan and low-gradient stream deposits. The fine-grained deposits are considered a regional confining unit because of their wide spread occurrence and low permeability. Ground water in the Willamette confining unit is generally under confined conditions and well yields are very low to "dry".

The Willamette aquifer consists primarily of coarse-grained proximal alluvial-fan and braided-stream deposits. The greatest thickness, and coarsest materials of the Willamette aquifer outside of the Portland Basin occur in six major alluvial fans that were deposited where major streams from the Cascade Range enter the Willamette Lowland. Ground water in the Willamette aquifer unit varies from unconfined to confined conditions, depending on location and depth. Vertical gradients are usually downward except near major streams. Deposits of lower permeable material can act as a confining layer but are generally of limited aerial extent.

The Willamette silt unit is deposited throughout much of the Willamette Lowland by glacial-outburst floods. The deposits range in thickness from 0 to 130 feet. They consist primarily of silt and fine sand of relatively uniform lithology. Ground water in the Willamette silt unit is generally under unconfined conditions and well yields are low, less than 5 to 10 gpm.

STRUCTURAL BASINS

Outcrops of folded and faulted basalt within the Willamette Valley divide the lowland into four separate areas or structural basins -- from north to south, **the Portland Basin, the Tualatin Basin, the central Willamette Valley, and the southern Willamette valley**. Each of these areas has decidedly different hydrologic and hydrogeologic properties. The aquifer system in each basin, although hydraulically connected through a series of restrictive water gaps, is distinctive.

Tualatin Basin. The Columbia River basalt aquifer and the Willamette confining unit are the only regional hydrogeologic units above the basement-confining unit in the Tualatin Basin. The Columbia River basalt aquifer underlies the entire basin, and its upper surface forms a sediment-filled bowl-like depression.

The Central Willamette Valley All five of the hydrogeologic units occur in the central Willamette Valley. The Columbia River basalt aquifer underlies the entire central Willamette Valley, except for small areas along the far eastern margin. A number of faults have been mapped in the central Willamette Valley, some of which offset the aquifer, and numerous other faults have been mapped in the uplands surrounding the basin where the aquifer crops out. The Willamette aquifer in the central Willamette Valley contains three major alluvial fans -- the Salem fan, the Molalla fan, and the Canby fan. The Willamette Silt unit overlies most of the central valley with a maximum thickness of about 130 feet near the center and thins towards the south and near the margins of the basin.

The Southern Willamette Valley In the southern Willamette Valley, all of the regional hydrogeologic units are present; however, the Columbia River basalt aquifer occurs only in the Stayton area. The Willamette confining unit is thinner in the southern Willamette Valley than elsewhere in the Willamette Lowland. The Willamette aquifer contains the Lebanon fan and the Stayton fan. The Willamette aquifer is much thinner (averaging only about 20 to 40 feet thick) between the alluvial fans of the southern Willamette Valley. The Willamette Silt unit covers most of the southern Willamette Valley and generally thin towards the south.