WATER RESOURCES DEPARTMENT MEMO March 23, 2015

TO: **Application G-** 17978

FROM: Jen Woody **- Groundwater Section**

SUBJECT: **Scenic Waterway Interference Evaluation**

_____ YES
__X__ NO

The source of appropriation is within or above a Scenic Waterway

_____ YES
__X__ NO

Use the Scenic Waterway condition (condition 7J)

_____ Per ORS 390.835, the Groundwater Section is able to calculate groundwater interference with surface water that contributes to a Scenic Waterway. The calculated interference distribution is provided below.

_____Per ORS 390.835, the Groundwater Section is unable to calculate groundwater 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 flows necessary to maintain the free-flowing character of a scenic waterway.

DISTRIBUTION OF INTERFERENCE

Calculate interference as the monthly fraction of the annual consumptive use and fill in the table below. If interference cannot be calculated, per criteria in 390.839, do not fill in the table but check the "unable" option above, thus informing the Water Rights Section that the Department is unable to make a Preponderance of Evidence finding.

Exercise of this permit is calculated to reduce monthly flows in the _____ Scenic Waterway by the following amounts, expressed as a proportion of the annual consumptive use pumped from the well.

Monthly Fraction of Annual Consumptive Use

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

PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO: Water Rights Section Date 3/24/2015

FROM: Groundwater Section Jen Woody
Reviewer's Name

SUBJECT: Application G- 17978 Supersedes review of n/a
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: Island Lakes Condominiums County: Lane

A1. Applicant(s) seek(s) 0.08 cfs from 1 well(s) in the Willamette Basin, Main Stem Willamette River subbasin Quad Map: Eugene East

A2. Proposed use Irrigation Seasonality: May-September

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	**NLOG 999999**	**L116121**	**Alluvium**	**0.08**	**T17S/R4W-S13 SE SE**	**1185'N, 475'W fr SE cor S13**
2						
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	**395**				**80**							

Use data from application for proposed wells.

A4. **Comments:** L116121 is not in OWRD's well log database, so well construction cannot be confirmed. For the purposes of this review, a minimum casing and seal of 18' below land surface is assumed. It is not clear whether the well has been drilled or is proposed, but the presence of a tag number suggests the well exists.

A5. ☒ **Provisions of the** Willamette 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: 690-502-0050 (1)(d) applies to the pertinent river reach. 690-502-0240 classifies groundwater in unconfined alluvium within ¼ mile of surface waters. The applicant's well is greater than ¼ mile from surface water, so the Basin Rule classifications are not activated.

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) **7C**;
   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 **alluvial** 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 well accesses the Willamette Aquifer of Gannett and Caldwell (1998), which consists of up to 120 feet of alluvial fan deposits overlain by recent alluvial sand and gravels in this area. The Willamette Aquifer overlies 20 to 60 feet of the Willamette Confining Unit of Gannett and Caldwell (1998), which is generally fine-grained clay with minor interbeds of sand and gravel (Conlon et al, 2005). There are no nearby wells with water level data on file with the department, but given the proximity to the river and the permeability of the geologic materials, the groundwater level is expected to be largely controlled by surface water.

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: The well is located on Goodpasture Island, between the Willamette River and a slough. Nearby well logs report sand and gravel at the surface without a significant surficial confining layer (see LANE 11227).

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**	**Willamette River**	**380**	**380-390**	**2170**	☒	☐	☐	☐	☒
1	**2**	**Slough tributary to Willamette**	**380**	**380-390**	**1500**	☒	☐	☐	☐	☒
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐

Basis for aquifer hydraulic connection evaluation: Groundwater is roughly coincident with the river and the slough, based on other nearby well logs and water table elevation contours reported by Gannett and Caldwell (1998). The proximity to the river and the water level in other nearby well logs indicate hydraulic connection.

Water Availability Basin the well(s) are located within: Watershed ID #: 185, WILLAMETTE R > COLUMBIA R - AB MCKENZIE R WILLAMETTE BASIN

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**	☐	☐	MF185A	**2000**	☐	**789**	☐	**<25%**	☐
1	**2**	☐	☐			☐		☐	**<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: A range of aquifer parameters for the Willamette aquifer were used to estimate stream depletion. As shown in Figure 2, stream depletion is less than 25% at 30 days using the Hunt (1999) model.

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													

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(A) = Total Interf.												
(B) = 80 % Nat. Q												
(C) = 1 % Nat. Q												
(D) = (A) > (C)												
(E) = (A / B) x 100	%	%	%	%	%	%	%	%	%	%	%	%

(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:

Conlon, T.D., Wozniak, K.C., Woodcock, D., Herrera, N.B., Fisher, B.J., Morgan, D.S., Lee, K.K., and Hinkle, S.R., 2005, Ground-water hydrology of the Willamette Basin, Oregon: U.S. Geological Survey Scientific Investigations Report 2005-5168.

Gannett, M.W. and Caldwell, R., 1998, Geologic framework of the Willamette Lowland aquifer system, Oregon and Washington: U.S. Geological Survey Professional Paper 1424-A, 32 p.

Hunt, Bruce. 2003. Unsteady Stream Depletion when pumping from a semi-confined aquifer. Journal of Hydrologic Engineering. p. 12-19.

Woodward, D.G., Gannett, M.W., and Vaccaro, J.J., 1998, Hydrogeologic framework of the Willamette Lowland aquifer system, Oregon and Washington: U.S. Geological Survey Professional Paper 1424-B, 82 p.

US Geological Survey Topographic Quadrangle Maps.

OWRD water level database, includes reported water levels, accessed 3/23/2015.

D. WELL CONSTRUCTION, OAR 690-200

D1. **Well #:** 1 **Logid:** no log found

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:** There is no log associated with the tag #L 116121 in the well log database. There is no record associated with the tag number either. Therefore, well construction cannot be confirmed to meet current standards.

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

Figure 1. Water Availability Tables

Water Availability Analysis

Detailed Reports

WILLAMETTE R > COLUMBIA R - AB MCKENZIE R
WILLAMETTE BASIN

Water Availability as of 3/23/2015

Watershed ID #: 185 (Map) Exceedance Level: 80%

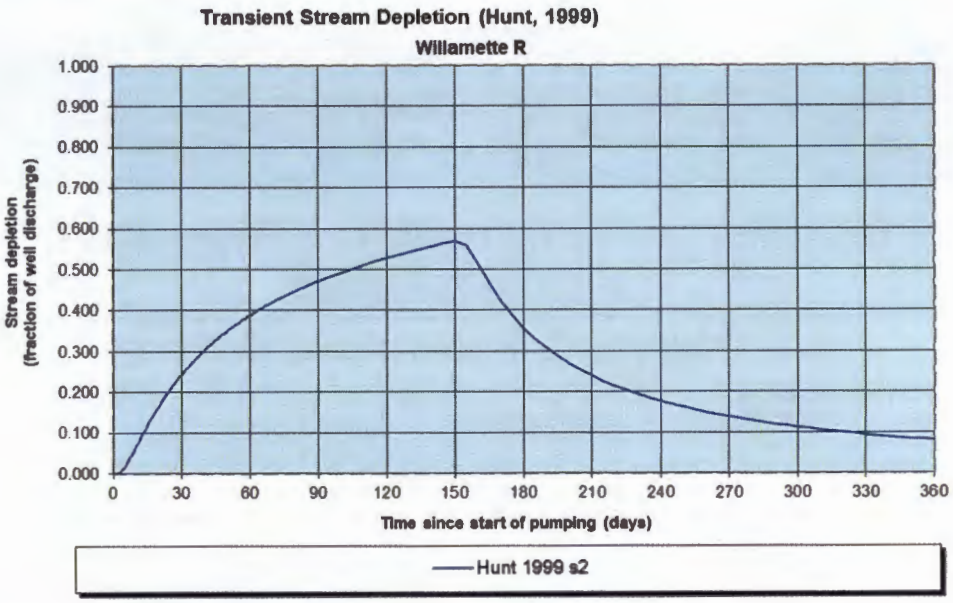
Date: 3/23/2015 Time: 10:46 AM

Water Availability Calculation

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

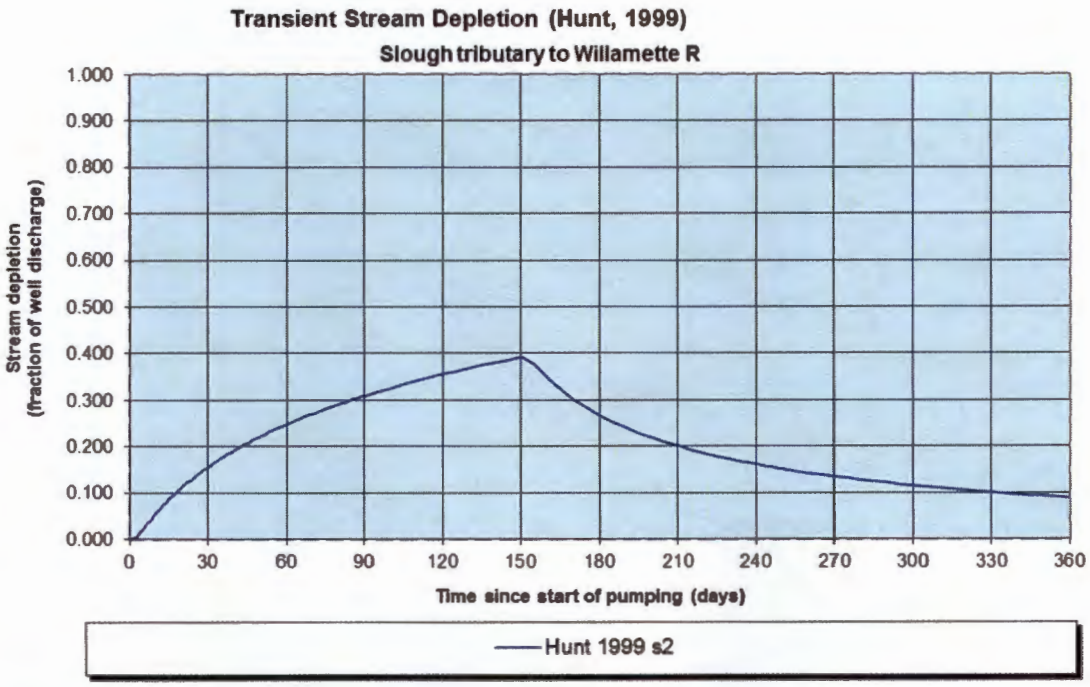
Month	Natural Stream Flow	Consumptive Uses and Storages	Expected Stream Flow	Reserved Stream Flow	Instream Flow Requirement	Net Water Available
JAN	3,490.00	784.00	2,710.00	0.00	2,500.00	206.00
FEB	4,210.00	2,770.00	1,440.00	0.00	2,500.00	-1,060.00
MAR	4,360.00	2,880.00	1,480.00	0.00	2,500.00	-1,020.00
APR	4,340.00	2,820.00	1,520.00	0.00	2,500.00	-983.00
MAY	3,720.00	1,750.00	1,970.00	0.00	2,500.00	-532.00
JUN	1,910.00	336.00	1,570.00	0.00	2,000.00	-426.00
JUL	1,040.00	109.00	931.00	0.00	2,000.00	-1,070.00
AUG	788.00	102.00	686.00	0.00	2,000.00	-1,310.00
SEP	789.00	88.00	701.00	0.00	2,000.00	-1,300.00
OCT	938.00	57.10	881.00	0.00	2,000.00	-1,120.00
NOV	1,510.00	143.00	1,370.00	0.00	2,500.00	-1,130.00
DEC	3,310.00	59.00	3,250.00	0.00	2,500.00	751.00
ANN	3,000,000.00	710,000.00	2,290,000.00	0.00	1,660,000.00	861,000.00

Figure 2. Stream depletion calculations



Output for Stream Depletion, Scenerio 2 (s2):						Time pump on (pumping duration) = 150 days						
Days	30	60	90	120	150	180	210	240	270	300	330	360
J SD	46.9%	60.9%	67.6%	71.8%	74.6%	29.8%	17.6%	12.2%	9.2%	7.3%	6.0%	5.0%
H SD 1999	24.4%	38.8%	47.1%	52.8%	56.9%	35.7%	23.9%	17.7%	13.9%	11.3%	9.4%	8.0%
H SD 2003	12.30%	24.44%	32.72%	38.75%	43.40%	34.82%	25.76%	20.09%	16.29%	13.60%	11.63%	10.10%
Qw, cfs	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080
H SD 99, cfs	0.020	0.031	0.038	0.042	0.046	0.029	0.019	0.014	0.011	0.009	0.008	0.006
H SD 03, cfs	0.010	0.020	0.026	0.031	0.035	0.028	0.021	0.016	0.013	0.011	0.009	0.008

Parameters:		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate of well	Qw	36.00	36.00	36.00	gpm
Time pump on (pumping duration)	tpon	150	150	150	days
Perpendicular from well to stream	a	2170	2170	2170	ft
Well depth	d	80	80	80	ft
Aquifer hydraulic conductivity	K	500	500	500	ft/day
Aquifer saturated thickness	b	60	60	60	ft
Aquifer transmissivity	T	30000	30000	30000	ft*ft/day
Aquifer storativity or specific yield	S	0.2	0.2	0.2	
Aquitard vertical hydraulic conductivity	Kva	0.5	0.5	0.5	ft/day
Aquitard saturated thickness	ba	3	3	3	ft
Aquitard thickness below stream	babs	3	3	3	ft
Aquitard porosity	n	0.2	0.2	0.2	
Stream width	ws	200	200	200	ft
Streambed conductance (lambda)	sbc	33.333333	33.333333	33.333333	ft/day
Stream depletion factor	sdf	31.392667	31.392667	31.392667	days
Streambed factor	sbf	2.411111	2.411111	2.411111	
input #1 for Hunt's Q_4 function	t'	0.031855	0.031855	0.031855	
input #2 for Hunt's Q_4 function	K'	26.160556	26.160556	26.160556	
input #3 for Hunt's Q_4 function	epsilon'	1.000000	1.000000	1.000000	
input #4 for Hunt's Q_4 function	lamda'	2.411111	2.411111	2.411111	



Output for Stream Depletion, Scenerio 2 (s2):						Time pump on (pumping duration) = 150 days						
Days	30	60	90	120	150	180	210	240	270	300	330	360
J SD	61.7%	72.4%	77.3%	80.3%	82.3%	22.1%	12.6%	8.7%	6.5%	5.1%	4.2%	3.5%
H SD 1999	15.5%	24.7%	30.9%	35.5%	39.2%	26.7%	20.0%	16.1%	13.4%	11.5%	10.0%	8.9%
H SD 2003	8.57%	15.59%	20.72%	24.76%	28.09%	22.34%	17.77%	14.80%	12.69%	11.10%	9.86%	8.86%
Qw, cfs	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080	0.080
H SD 99, cfs	0.012	0.020	0.025	0.028	0.031	0.021	0.016	0.013	0.011	0.009	0.008	0.007
H SD 03, cfs	0.007	0.013	0.017	0.020	0.023	0.018	0.014	0.012	0.010	0.009	0.008	0.007

Parameters:		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate of well	Qw	36.00	36.00	36.00	gpm
Time pump on (pumping duration)	tpon	150	150	150	days
Perpendicular from well to stream	a	1500	1500	1500	ft
Well depth	d	80	80	80	ft
Aquifer hydraulic conductivity	K	500	500	500	ft/day
Aquifer saturated thickness	b	60	60	60	ft
Aquifer transmissivity	T	30000	30000	30000	ft*ft/day
Aquifer storativity or specific yield	S	0.2	0.2	0.2	
Aquitard vertical hydraulic conductivity	Kva	0.5	0.5	0.5	ft/day
Aquitard saturated thickness	ba	3	3	3	ft
Aquitard thickness below stream	babs	3	3	3	ft
Aquitard porosity	n	0.2	0.2	0.2	
Stream width	ws	60	60	60	ft
Streambed conductance (lambda)	sbc	10.000000	10.000000	10.000000	ft/day
Stream depletion factor	sdf	15.000000	15.000000	15.000000	days
Streambed factor	sbf	0.500000	0.500000	0.500000	
input #1 for Hunt's Q_4 function	t'	0.066667	0.066667	0.066667	
input #2 for Hunt's Q_4 function	K'	12.500000	12.500000	12.500000	
input #3 for Hunt's Q_4 function	epsilon'	1.000000	1.000000	1.000000	
input #4 for Hunt's Q_4 function	lamda'	0.500000	0.500000	0.500000	

Figure 3. Well location Map