PUBLIC INTEREST REVIEW FOR GROUND WATER APPLICATIONS

TO: Water Rights Section Date **February 23, 2010**

FROM: Ground Water/Hydrology Section Karl Wozniak
Reviewer's Name

SUBJECT: Application G- 17289 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: David A. & Kathryn S. Rogers County: Linn

A1. Applicant(s) seek(s) 1.337 cfs from 2 well(s) in the Calapooia River Basin, Courtney Creek subbasin Quad Map: Union Point

A2. Proposed use: **Irrigation & reservoir maintenance** 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	**LINN 57626**	**400-1**	**Alluvium**	**1.337**	**14S/02W-07 NW/NW**	**2860' N, 1160' W fr NW cor DLC 61**
1	**LINN 57386**	**600-1**	**Alluvium**	**1.337**	**14S/02W-07 NW/SE**	**1090' N, 530' E fr NW cor DLC 61**

* 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	**328**	**75**	**14**	**12/30/2006**	**93**	**0-25**	**-1-92**		**75-90**	**100+**		**Air**
2	**333**	**65**	**17**	**08/19/2006**	**67**	**0-39**	**-1-66**			**60+**		**Air**

Use data from application for proposed wells.

A4. **Comments:**

A5. ☒ **Provisions of the** 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: The wells produce from a confined aquifer so the pertinent basin rules do not apply.

A6. ☐ **Well(s) #** , , , , , tap(s) an aquifer limited by an administrative restriction.
Name of administrative area:
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) **7C, 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 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:** The subject wells are located in a narrow, east-west-trending alluvial valley that is entrenched between bedrock highs north of the Calapooia River and south of Courtney Creek. The area in the vicinity of the wells is underlain by about 100 feet of sediments which overlie low permeability bedrock. The upper 65 feet of sediments are predominantly fine-grained but the subject well logs and well logs for nearby wells indicate that some sand and gravel beds occur within this interval. The main productive interval in both wells is a layer of sand and gravel at depths of about 65-90 feet. The alluvial sediments thin to a zero edge against bedrock outcrop south of Courtney Creek and just north of the Calapooia River.

No long-term observation wells exist in the area. Only a few permitted irrigation wells occur in the area and tax lot maps and our well log database indicate that domestic well density is low. Therefore, it is likely that groundwater is not over appropriated in the area.

The applicant is applying for a rate of 1.337 cfs (600 gpm). Yields reported on the well logs for the proposed POAs are 100+ and 60+ gpm for a total of 160 gpm. However, these yields are likely to be optimistic as they were determined during air tests which, in our experience, tend to overestimate well yield. Therefore, it is highly unlikely that the proposed rate can be met by the existing wells.

Well 400-1, LINN 67626, is within 1000 feet of three permitted irrigation wells (LINN 1062, LINN 13416, and LINN 13420). If Well 400-1 is pumped for 100 gpm for 240 days, conservative parameters (K = 100 ft/day, b = 25 feet, S = 0.0001) indicate that a maximum hydraulic interference of about 10 feet could be expected in the closest well, LINN 1062 (See attached plot). Interference would be less in the other wells as they are somewhat farther away. If the other wells are reasonably efficient, this magnitude of interference is unlikely to cause problems. However, if the well is pumped at higher rates or for a longer interval, greater interference would be expected. Similarly, if the well is pumped intermittently, less interference would be expected. Because of these uncertainties, water-level measurement, hydraulic interference, and decline conditions are recommended. A water-use reporting condition should also be included to provide context for the water-level measurements.

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
1	**Alluvium**	☒	☐
2	**Alluvium**	☒	☐
		☐	☐
		☐	☐
		☐	☐

Basis for aquifer confinement evaluation: The water-bearing sands and gravels in the wells occur beneath about 65 feet of fine-grained sediments that are saturated to within a few feet of land surface. This indicates confined conditions, consistent with drillers' reports of shallow static water levels but deeper first found (productive) water.

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**	**Courtney Creek**	**315**	**320-360**	**1650**	☒	☐	☐	☐	☒
1	**2**	**Calapooia River**	**315**	**320-340**	**7000**	☒	☐	☐	☐	☒
2	**1**	**Courtney Creek**	**315**	**320-360**	**600**	☒	☐	☐	☐	☒
2	**2**	**Calapooia River**	**315**	**320-340**	**7500**	☒	☐	☐	☐	☒
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐

Basis for aquifer hydraulic connection evaluation: U.S. Geological Survey water-table maps indicate that the water table occurs within a few feet of land surface. This is consistent with shallow static water levels reported on well logs that are essentially equivalent to local stream elevations. Water table maps also indicate a component of groundwater flow toward, and discharge into, Courtney Creek and the Calapooia River. Water table contours from USGS Professional Paper 1424-B are included on the attached map. These facts indicate that the aquifer system and the streams are hydraulically connected.

Water Availability Basin the well(s) are located within: Calapooia 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?
1	**1**	☐	☐			☐	**0.227**	☒	**<25**	☒
2	**1**	☒	☐			☐	**0.227**	☒	**<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: Stream depletion at 30 days is expected to be much less than 25% because of the thick confining layer that overlies the producing sands and gravels.

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: Impacts on the Calapooia were not evaluated as modeling in similar circumstances indicates that impacts within the first year are likely to be well below 1% of the natural flow of the river.

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:

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, 32p.

O'Connor, J.E., Sarna-Wojcicki, A., Wozniak, K.C., Polette, D.J., and Fleck, R.J., 2001: U.S. Geological Survey Professional Paper 1620.

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, 82p.

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).**

Water Availability Tables

Water Availability Analysis
Detailed Reports

CALAPOOIA R > WILLAMETTE R - AB MOUTH
WILLAMETTE BASIN

Water Availability as of 2/19/2010

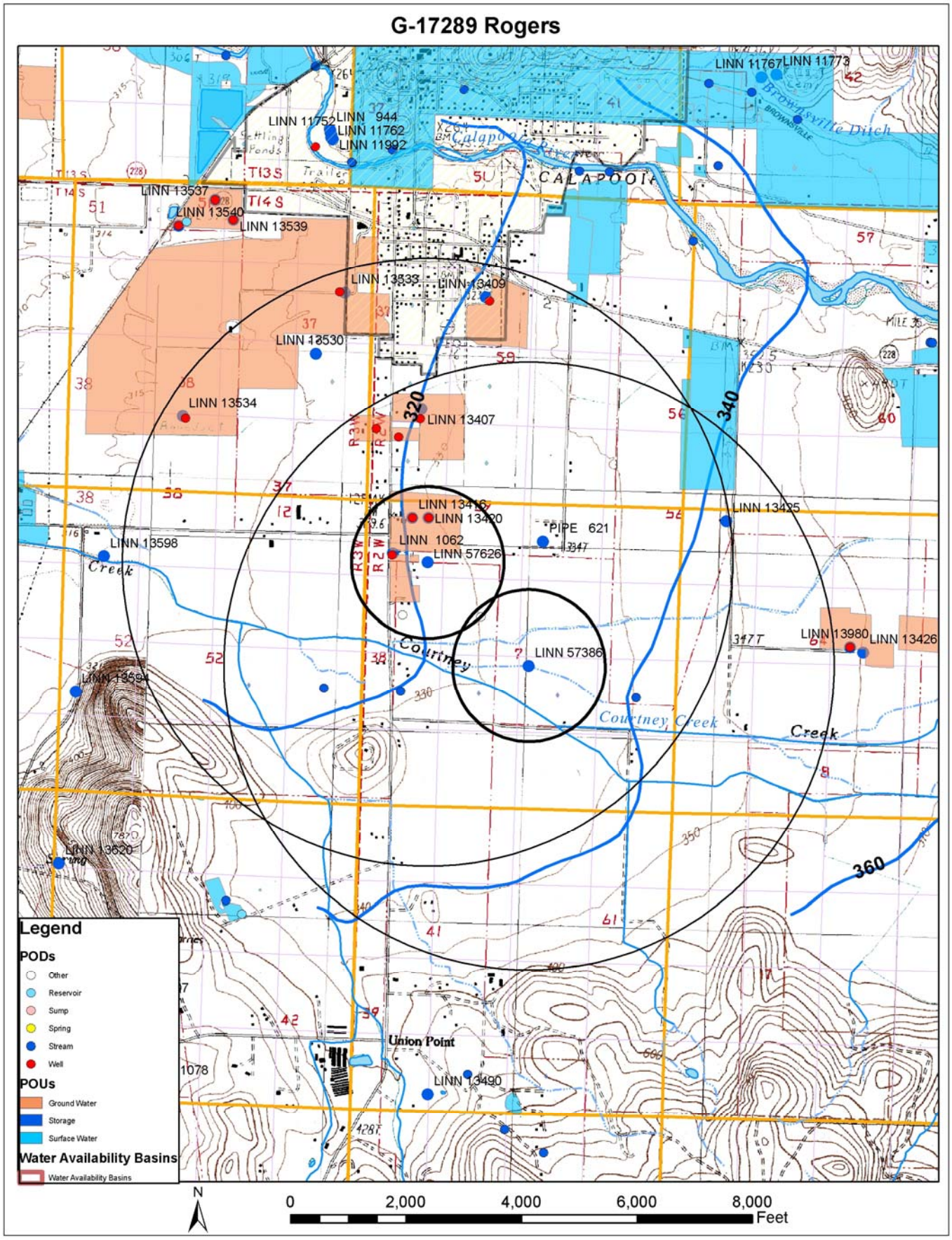
Watershed ID #: 76
Exceedance Level: 80%
Date: 2/19/2010
Time: 2:20 PM

Water Availability Calculation

Monthly Streamflows in Cubic Feet per Second
Storage 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	592.00	1.51	590.00	0.00	20.00	570.00
FEB	650.00	1.48	649.00	0.00	20.00	629.00
MAR	575.00	1.34	574.00	0.00	20.00	554.00
APR	423.00	1.22	422.00	0.00	20.00	402.00
MAY	234.00	6.20	228.00	0.00	20.00	208.00
JUN	111.00	11.90	99.10	0.00	20.00	79.10
JUL	49.00	19.10	29.90	0.00	20.00	9.88
AUG	26.00	13.90	12.10	0.00	20.00	-7.91
SEP	22.70	7.31	15.40	0.00	20.00	-4.61
OCT	29.60	0.77	28.80	0.00	20.00	8.83
NOV	133.00	1.00	132.00	0.00	20.00	112.00
DEC	499.00	1.48	498.00	0.00	20.00	478.00
STO	404,000.00	4,080.00	400,000.00	0.00	14,500.00	385,000.00

Location Map



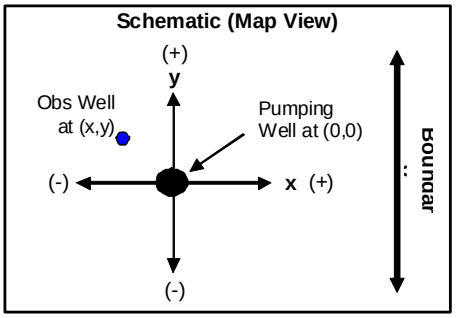
Hydraulic Interference Analysis

Hydraulic conductivity = 100 ft/day and aquifer thickness = 25 ft.

Theis Time Drawdown with Boundary Worksheet

Written by Karl C. Wozniak (OWRD) November 1999
References: Theis (1935), Freeze and Cherry (1979)
See bottom of worksheet for detailed references and model assumptions.

Calculates Theis nonequilibrium drawdown and recovery versus time at any specified observation well location.
Allows for one recharge or barrier boundary.
Pumping well is at (0,0)
Observation well is at user specified (x,y)
Boundary is at user specified distance from pumping well.



Input Data:

Boundary type (Recharge, Barrier, None)	No_flow			
x coordinate for boundary (ft), a	4,000	[ft]		
x coordinate for observation well (ft)	0	For drawdown at pumping well use -1.		
y coordinate for observation well	-600	For drawdown at pumping well use 0.		
Net Steady Pumping Rate of Pumped Well, Q:	100	[gpm]	13.369 [ft^3/min]	0.22 [ft^3/s]
Time Duration of Pumping (Total Pumping Time), t:	240.0000	d	345,600 [minutes]	240.000 [days]
Transmissivity of Aquifer, T:	2,500	ft2pd	12.986 [gal/min/ft]	1.74 [ft^2/min]
Storativity of Aquifer, S:	0.0001