

Groundwater Application Review Summary Form

Application # G- 18910

GW Reviewer Karl Wozniak Date Review Completed: 04/15/2020

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.

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

April 15, 2020

TO: Application G- 18910

FROM: GW: Karl Wozniak
(Reviewer's Name)

SUBJECT: Scenic Waterway Interference Evaluation

YES The source of appropriation is hydraulically connected to a State Scenic Waterway or its tributaries

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

PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

TO: Water Rights Section Date April 15, 2020
 FROM: Groundwater Section Karl Wozniak Reviewer's Name
 SUBJECT: Application G- 18910 Supersedes review of February 19, 2020 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: South Santiam River Farm, LLC County: Linn

A1. Applicant(s) seek(s) 0.6684 cfs from 4 well(s) in the _____ Basin, South Santiam River subbasin

A2. Proposed use Irrigation Seasonality: March 1 – October 30

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	1	Bedrock	0.6684	13S/1W-2 NW/SW	750' N, 540' E fr NE cor DLC 38
2	Proposed	2	Bedrock	0.6684	13S/1W-2 NW/SW	395' S, 160' E fr NE cor DLC 38
3	Proposed	3	Bedrock	0.6684	13S/1W-2 SW/SW	995' N, 530' W fr NE cor DLC 38
4	Proposed	4	Bedrock	0.6684	13S/1W-2 SW/SW	125' N, 555' W fr NE cor DLC 38

* 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	440											
2	446											
3	443											
4	446											

Use data from application for proposed wells.

A4. **Comments:** The original application received a negative review for a variety of reasons. This revised application reduces the total requested rate to 300 gpm (0.6684 cfs), to be used in rotation at any or all of the wells; revises an incorrect well location for Well 1; specifies that the proposed aquifer is bedrock; and changes the location of Wells 3 & 4 to reduce the likelihood of substantial interference with nearby wells and the nearest surface water sources. The revised application also requests a maximum annual volume of 39 acre feet/acre for primary irrigation of 25.7 acres and supplemental irrigation of 85.4 acres. Construction of the wells will be determined by the well driller dependent upon circumstances encountered at each well site.

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: The proposed wells will be limited to production from the confined bedrock aquifer so the pertinent rules (OAR 690-502-0240) do not apply.

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, 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 bedrock aquifer 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 requests a maximum rate of 0.6684 cfs (300 gpm) from any combination of 4 proposed bedrock aquifer wells for primary irrigation of 25.7 acres, supplemental irrigation of 85.4 acres, and a total annual volume of 39 acre feet.

Special Conditions: Use under this permit shall be limited to a total annual volume of 39 acre feet.

Not enough information is available to determine if the groundwater resource is over appropriated as prescribed in OAR 690-310-130.

The proposed wells are located in the South Santiam River valley about 3 miles upstream from the town of Waterloo. The river is entrenched in a 2-mile wide canyon bounded on the east and west by older volcanic rocks of the Western Cascades which are part of the low-yield bedrock aquifer system. The valley floor is underlain by up to 100 feet of sediments deposited by the river which comprise the alluvial aquifer system. The depth to bedrock varies considerably but appears to be quite shallow on the eastern side of the valley adjacent to the river but becomes progressively deeper to the west. The proposed wells are on the eastern side of the valley where the alluvial sediments form a thin veneer that is typically only a few tens of feet thick and is not likely productive enough to supply sufficient water for intense irrigation. Some wells, however, report relatively high yields from bedrock water-bearing zones at depth.

General experience indicates that productive zones in the bedrock aquifer are likely to be water-bearing fractures because the primary porosity in the older host rocks is generally destroyed by alteration and secondary mineralization. As a result, the bedrock aquifer is typically characterized by low permeability, low porosity, low well yield, considerable anisotropy, and excessive pumping drawdowns; it is generally not capable of producing sustainable yields for irrigation of high water-use crops.

Well density in the area is relatively low. The OWRD well log database contains records of about 55 wells in adjacent sections 2 and 3. Most of these are domestic wells. The only permitted wells are a number of wood-products-industry wells on the west side of the valley. Reported well yields range from 1-100 gpm but the median yield is 25 gpm and the distribution is skewed toward the lower end (see enclosed plot). Differences in yield between the alluvial and the bedrock aquifers could not be readily determined based on the available data but a random sampling of well logs indicates that moderate yields (20-60 gpm) are attainable from either aquifer. Most of the wells in this dataset are domestic wells with 6-inch casing so it is possible that properly designed, large-diameter irrigation wells could produce somewhat higher yields but the available data indicate that a sustained yield of greater than 75 gpm from any individual well is highly unlikely.

Tax lots and aerial imagery indicate that the closest domestic well is about 400 feet to the northwest of Proposed Well 3 on improved tax lot 401. However, the precise location of the well is unknown and the well log could not reliably be identified to determine if the well produces from the bedrock aquifer. Prediction of hydraulic interference in the bedrock aquifer is generally subject to large uncertainties but professional judgement indicates that it is not likely to be excessive at this distance. However, because of the large uncertainties about the potential for interference in the bedrock aquifer, the close proximity of a few domestic wells, and the relatively high maximum rate of 300 gpm, water-level and water-use monitoring conditions are recommended if the Department issues a permit.

The closest permitted wells, at about 3/4 of a mile to the southwest, are irrigation wells LINN 10962 (certificate 60582) and LINN 11088 (certificate 32202). Both produce from the alluvial aquifer system so injurious interference is relatively unlikely, especially at these distances.

No observation wells are available in the surrounding area but local well reports show no obvious trend in static water levels over time (see attached plot). This fact and the relatively low density of wells in the area indicate that groundwater levels are probably stable at the present time.

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	Bedrock	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	Bedrock	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3	Bedrock	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4	Bedrock	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Basis for aquifer confinement evaluation: Well logs for bedrock wells in the area report static water levels that are significantly higher than the associated water bearing zones. These observations and general knowledge of the bedrock aquifer indicate 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 1/4 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?			Potential for Subst. Interfer. Assumed?	
						YES	NO	ASSUMED	YES	NO
1	1	South Santiam River	430	410-440	1380	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	1	South Santiam River	430	410-440	1320	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	1	South Santiam River	430	410-440	1930	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4	1	South Santiam River	430	410-440	2020	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	2	Noble Creek	430	420-480	3140	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	2	Noble Creek	430	420-480	3050	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	2	Noble Creek	430	420-480	2060	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4	2	Noble Creek	430	420-480	2250	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Basis for aquifer hydraulic connection evaluation: A published water-table map (Helm & Leonard, 1977) indicates that the South Santiam River is a discharge boundary for the local watershed. Water levels in local wells in the bedrock uplands (above stream levels) show hydraulic heads that are above local stream levels, consistent with general observations and published

reports in the Willamette basin that indicate that the water table in the bedrock aquifer mimics topography and discharges to local streams.

Water Availability Basin the well(s) are located within: WAB #159, S Santiam River > Santiam R – AB Hamilton Crk

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 (SW) source. Limit evaluation to instream rights and minimum stream flows that are pertinent to that SW source, 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	<input type="checkbox"/>	<input type="checkbox"/>	MF 159	170	<input type="checkbox"/>	167	<input type="checkbox"/>		<input type="checkbox"/>
2	1	<input type="checkbox"/>	<input type="checkbox"/>	MF 159	170	<input type="checkbox"/>	167	<input type="checkbox"/>		<input type="checkbox"/>
3	1	<input type="checkbox"/>	<input type="checkbox"/>	MF 159	170	<input type="checkbox"/>	167	<input type="checkbox"/>		<input type="checkbox"/>
4	1	<input type="checkbox"/>	<input type="checkbox"/>	MF 159	170	<input type="checkbox"/>	167	<input type="checkbox"/>		<input type="checkbox"/>
1	2	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	167	<input type="checkbox"/>		<input type="checkbox"/>
2	2	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	167	<input type="checkbox"/>		<input type="checkbox"/>
3	2	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	167	<input type="checkbox"/>		<input type="checkbox"/>
4	2	<input type="checkbox"/>	<input type="checkbox"/>			<input type="checkbox"/>	167	<input type="checkbox"/>		<input type="checkbox"/>

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?
	<input type="checkbox"/>			<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>

Comments: Interference @ 30 days was not calculated because of the lack of a readily available model to simulate pumping impacts in the bedrock aquifer; however, impacts are expected to be less than 25% after 30 days since they should be buffered by confining layers that occur between the streams and productive water-bearing zones at depth. Table C3b is not applicable because the rates are not distributed to specific wells.

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													
(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: Section C4a is not pertinent as impacts are expected to be limited to the streams listed in table C2.

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:

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.

Helm, D.C., and Leonard, A.R., 1977, Ground-water resources of the lower Santiam River basin, middle Willamette valley, Oregon: Oregon Water Resources Department Groundwater Report No. 25.

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.

D. WELL CONSTRUCTION, OAR 690-200

D1. **Well #:** _____ **Logid:** _____

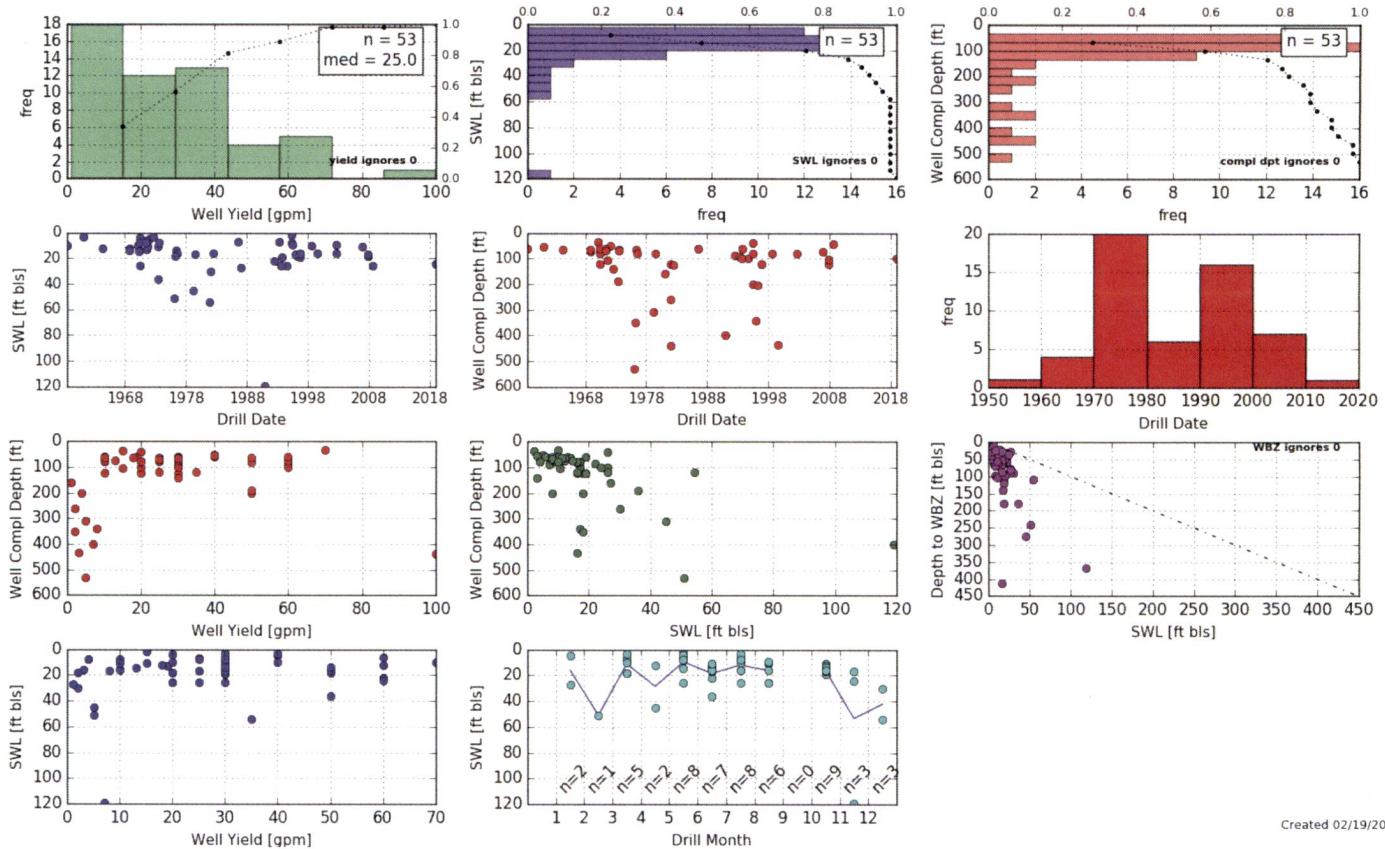
D2. **THE WELL does not appear to meet current well construction standards based upon:**

- 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.**

Well Statistics (Sections 2 & 3, 13S/1W)



Created 02/19/2020

Water Availability Tables

DETAILED REPORT ON THE WATER AVAILABILITY CALCULATION

S SANTIAM R > SANTIAM R - AB HAMILTON CR
Basin: WILLAMETTE

Watershed ID #: 159
Time: 5:52 PM

Exceedance Level: 80
Date: 04/15/2020

Month	Natural Stream Flow	Consumptive Use and Storage	Expected Stream Flow	Reserved Stream Flow	Instream Requirements	Net Water Available
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Monthly values are in cfs.

Storage is the annual amount at 50% exceedance in ac-ft.

JAN	1,970.00	139.00	1,830.00	0.00	170.00	1,660.00
FEB	2,210.00	1,400.00	805.00	0.00	170.00	635.00
MAR	2,100.00	1,130.00	971.00	0.00	170.00	801.00
APR	2,080.00	920.00	1,160.00	0.00	170.00	990.00
MAY	1,550.00	582.00	968.00	0.00	170.00	798.00
JUN	696.00	30.40	666.00	0.00	170.00	496.00
JUL	326.00	23.80	302.00	0.00	170.00	132.00
AUG	191.00	22.50	168.00	0.00	170.00	-1.55
SEP	167.00	19.60	147.00	0.00	170.00	-22.60
OCT	234.00	13.80	220.00	0.00	170.00	50.20
NOV	981.00	13.80	967.00	0.00	170.00	797.00
DEC	2,070.00	15.50	2,050.00	0.00	170.00	1,880.00
ANN	1,590,000	256,000	1,340,000	0	123,000	1,210,000

Well Location Map

