

Groundwater Application Review Summary Form

Application # G- 18910

GW Reviewer Karl Wozniak Date Review Completed: 2-19-2020

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).

PUBLIC INTEREST REVIEW FOR GROUNDWATER APPLICATIONS

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

A1. Applicant(s) seek(s) 1.3369 cfs from 4 well(s) in the Willamette 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**	1.3369	13S/1W-2 NW/SW	750'N, 540' E fr NE cor DLC 38
2	Proposed	2	Bedrock**	1.3369	13S/1W-2 SW/SW	395'S, 160' E fr NE cor DLC 38
3	Proposed	3	Bedrock**	1.3369	13S/1W-2 SE/SW	690'S, 1420' E fr NE cor DLC 38
4	Proposed	4	Bedrock**	1.3369	13S/1W-2 NE/SW	1160'N, 1780' E 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

Use data from application for proposed wells.

A4. **Comments:** The applicant seeks a maximum of 1.3369 cfs (600 gpm) from any combination of 4 proposed wells for primary irrigation of 25.7 acres and supplemental irrigation of 85.4 acres using a maximum annual volume of 39 acre feet/acre for primary irrigation and an unspecified volume for supplemental irrigation.

The application map incorrectly states that Proposed Well 1 is 750 feet east and 540 feet north of the northeast corner of DLC 38 but the plotted location is actually 750 feet north and 540 feet east of the said corner. This review assumes that the plotted location is correct and shows the corrected location in table A3 and on the enclosed map.

**The application did not specify a proposed aquifer or any specific well construction because of uncertainties about the nature of water-bearing strata in the area. The surficial sediments appear to be very thin and poorly productive in the area of the proposed wells whereas moderate yields are possible from deeper, confined zones in the underlying bedrock aquifer. Therefore, this review is based on a presumption that the wells will produce from the bedrock aquifer. If the applicant finds, and wishes to exploit productive water-bearing zones in the sediments, an additional Groundwater Section review would be necessary.

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): See B3.

- B3. **Groundwater availability remarks:** The applicant requests a maximum rate of 1.3369 cfs (600 gpm) from any combination of 4 proposed wells for primary irrigation of 25.7 acres and supplemental irrigation of 85.4 acres.

Not enough information is available to determine if the groundwater resource is over appropriated as 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. However, the available data and the general characteristics of the bedrock aquifer indicate that it is highly unlikely that groundwater will be available, in the amounts requested, within the capacity of the resource. This finding could be mitigated if the applicant is willing to accept a more reasonable maximum rate of no more than 300 gpm (0.6684 cfs), which is probably the maximum likely potential yield from the proposed wells.

Proposed Well 3 is about 250 feet from several domestic wells on adjacent tax lots to the south. One of these, LINN 1573 (probably representative of both wells), produces from a thin water-bearing zone in the bedrock aquifer at a depth of 60-68 feet (The well log for the second well could not be identified). Prediction of hydraulic interference in the bedrock aquifer is generally subject to large uncertainties but professional judgment indicates that injurious interference with these domestic wells is highly likely if a high-yield bedrock well is developed at the location of Proposed Well 3, especially as there is no clear evidence of additional water-bearing zones at greater depths. Therefore, groundwater will not likely be available without injury to prior water rights. This finding can be mitigated if the applicant drops Proposed Well 3 from the application (A second option would be to move the location farther north and west, to a location agreeable to the Groundwater Section, in order to substantially decrease the likelihood of injurious interference, but the location would also have to be greater than 1320 feet from the river to avoid the potential for substantial interference with the South Santiam River). Injurious interference with other domestic wells is less likely since tax lot maps and aerial imagery indicate that the other proposed wells are probably no closer than 600 feet to other domestic wells, although the precise location of these wells is uncertain.

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.

Given uncertainties about the potential for interference in the bedrock aquifer system and the relatively high recommended maximum rate of 300 gpm, it would be prudent to include water-level and water-use monitoring conditions if the Department issues a permit.

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 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?			Potential for Subst. Interfer. Assumed?	
						YES	NO	ASSUMED	YES	NO
1	1	South Santiam River		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		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		410-440	1080	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4	1	South Santiam River		410-440	210	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
1	2	Noble Creek		420-480	3140	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2	2	Noble Creek		420-480	3050	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3	2	Noble Creek		420-480	4340	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4	2	Noble Creek		420-480	4330	<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

(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: NA. 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

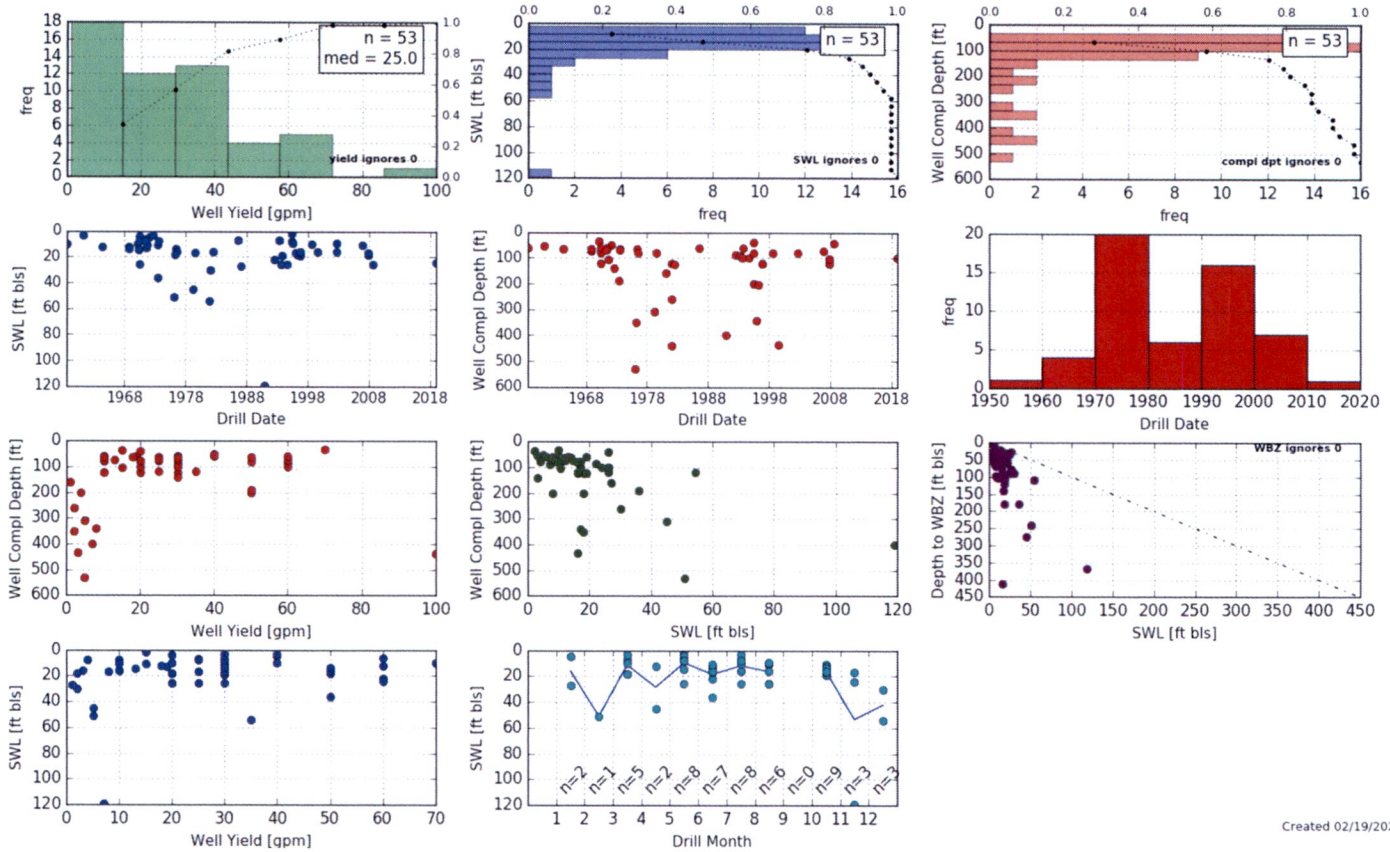
D1. **Well #:** _____ **Logid:** _____

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 Table

DETAILED REPORT ON THE WATER AVAILABILITY CALCULATION

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

Watershed ID #: 159
Time: 12:14 PM

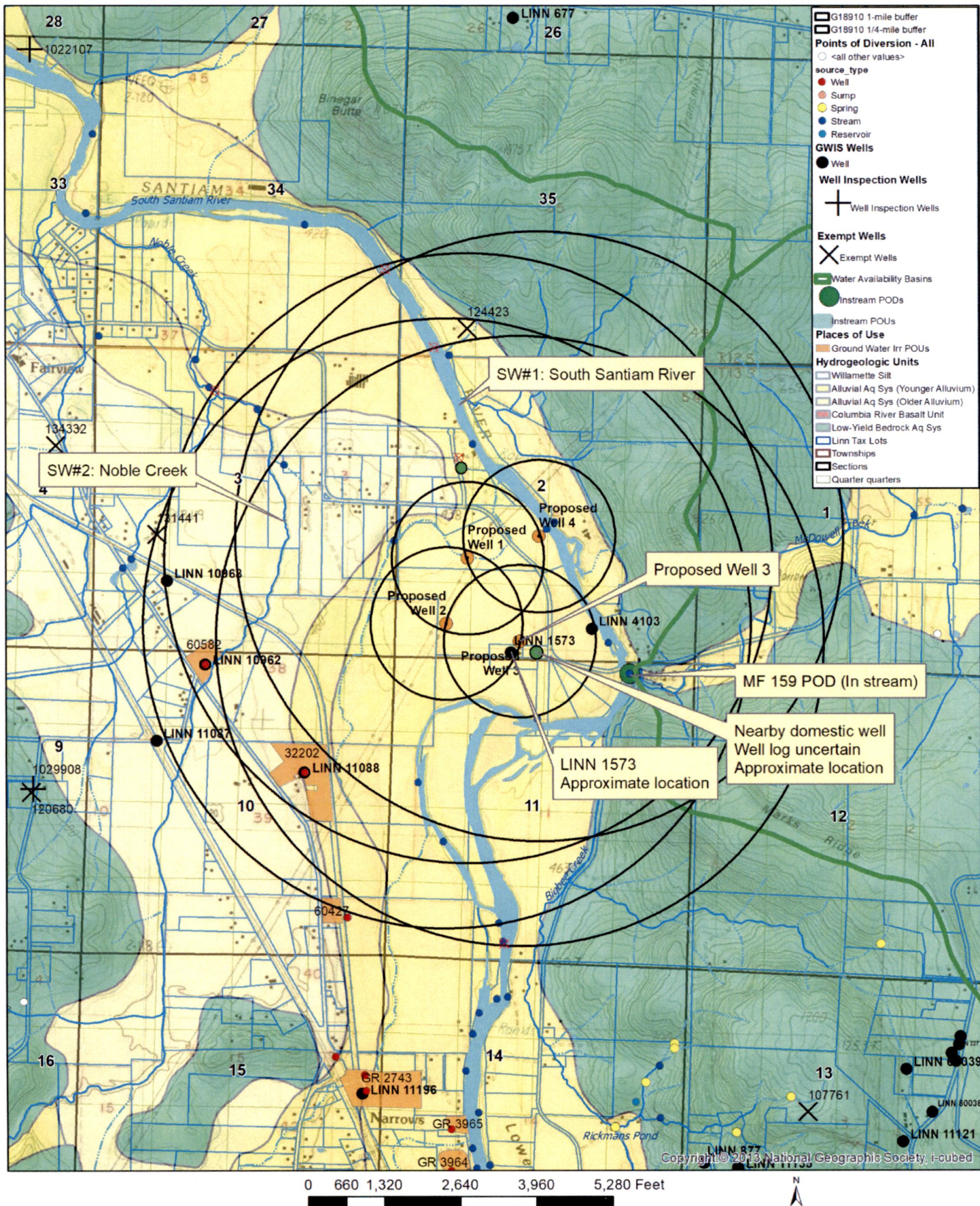
Exceedance Level: 80
Date: 02/18/2020

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	22.80	168.00	0.00	170.00	-1.85
SEP	167.00	19.90	147.00	0.00	170.00	-22.90
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



Selected Well Logs

RECEIVED

135/1w/2
40407

STATE OF OREGON
WATER WELL REPORT
(as required by ORS 537.765)

LINN
1573

JUL 15 1992

WATER RESOURCES DEPT. (START CARD) #

(1) OWNER: Well Number DR-676
Name WINNIFRED BATES
Address 40686 McDowell Creek Dr.
City LEBANON State ORE Zip 97355

(2) TYPE OF WORK:
 New Well Deepen Recondition Abandon

(3) DRILL METHOD:
 Rotary Air Rotary Mud Cable
 Other

(4) PROPOSED USE:
 Domestic Community Industrial Irrigation
 Thermal Injection Other

(5) BORE HOLE CONSTRUCTION:
Special Construction approval Yes No Depth of Completed Well 86 ft.
Explosives used Yes No Type _____ Amount _____

HOLE			SEAL			Amount	
Diameter	From	To	Material	From	To	sacks	pounds
10"	0	18'	BENTONITE	0	18'	12	SACKS
6"	18	86					

How was seal placed: Method A B C D E
 Other Pumped Dry #8

Backfill placed from _____ ft. to _____ ft. Material _____
Gravel placed from _____ ft. to _____ ft. Size of gravel _____

(6) CASING/LINER:

Diameter	From	To	Gauge	Steel	Plastic	Welded	Threaded
Casing: 6"	+1	18	1250	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Liner:				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Final location of shoe(s) 18'

(7) PERFORATIONS/SCREENS:

From	To	Slot size	Number	Diameter	Tel./pipe size	Casing	Liner
						<input type="checkbox"/>	<input type="checkbox"/>

(8) WELL TESTS: Minimum testing time is 1 hour

Pump Bailer Air Flowing Artesian
Yield gal/min 60+ Drawdown _____ Drill stem at 65' Time 1 hr.

Temperature of Water 53° Depth Artesian Flow Found _____
Was a water analysis done? Yes By whom _____
Did any strata contain water not suitable for intended use? Too little
 Salty Muddy Odor Colored Other _____
Depth of strata: _____

(9) LOCATION OF WELL by legal description:
County LINN Latitude _____ Longitude _____
Township 13 Range 1 or WM
Section 2 1/4 _____ 1/4 _____
Tax Lot 602 Lot _____ Block _____ Subdivision _____
Street Address of Well (or nearest address) SAME

(10) STATIC WATER LEVEL:
22 ft. below land surface. Date 6-26-92
Artesian pressure _____ lb. per square inch. Date _____

(11) WATER BEARING ZONES:
Depth at which water was first found 60'

From	To	Estimated Flow Rate	SWL
60	68	60 + 6pm	22'

(12) WELL LOG: _____ Ground elevation _____

Material	From	To	SWL
TOP SOIL	0	1	
CLAY - BROWN w/ lg. BOULDERS	1	12	
BASALT - GRAY	12	23	
BASALT - RED/BROWN	23	31	
BASALT - BLUE	31	46	
Volcanic - CONGLOMERATE	46	68	22'
BASALT - GRAY	68	70	
Volcanic - CONGLOMERATE	70	86	

Date started 6-18-92 Completed 6-26-92

(unbonded) Water Well Constructor Certification:
I certify that the work I performed on the construction, alteration, or abandonment of this well is in compliance with Oregon well construction standards. Materials used and information reported above are true to my best knowledge and belief.

Signed C/LARRY GRAY WWC Number 1581
Date 6-27-92

(bonded) Water Well Constructor Certification:
I accept responsibility for the construction, alteration, or abandonment work performed on this well during the construction dates reported above. All work performed during this time is in compliance with Oregon well construction standards. This report is true to the best of my knowledge and belief.

Signed Paul D. Lust WWC Number 664
Date 6-27-92