Water Right Conditions Tracking Slip

Groundwater/Hydrology Section

FILE # # G - 17540

ROUTED TO: Water Rights

TOWNSHIP/
RANGE-SECTION: 7S/1W-8

CONDITIONS ATTACHED?: [ ] yes [ ] no

REMARKS OR FURTHER INSTRUCTIONS:

Reviewer: J. Hackett

WATER RESOURCES DEPARTMENT

MEMO July 26, 2012

TO: **Application G-** 17540

FROM: **GW:** J. Hackett
(Reviewer's Name)

SUBJECT: **Scenic Waterway Interference Evaluation**

_____YES
__✓__NO The source of appropriation is within or above a Scenic Waterway

_____YES
__✓__NO Use the Scenic Waterway condition (Condition 7J)

_____Per ORS 390.835, the Ground Water 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 Ground Water 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 GROUND WATER APPLICATIONS

TO: Water Rights Section Date July 26, 2012

FROM: Ground Water/Hydrology Section J. Hackett
Reviewer's Name

SUBJECT: Application G- 17540 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**: Toby Stadeli **County:** Marion

A1. Applicant(s) seek(s) 1.0 cfs from 3 well(s) in the **Willamette** Basin, _____ subbasin Quad Map: Stayton NE

A2. Proposed use: Irrigation Seasonality: March 1 to October 31

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	MARI 6145	1	CRB	1.0	7S/1W-8 NW-NE	960' S, 1350' W fr NE cor S 8
2	Proposed	2	CRB	1.0	7S/1W-8 NW-NE	20' S, 1350' W fr NE cor S 8
3	Proposed	3	CRB	1.0	7S/1W-8 NW-NW	110' S, 1270' E fr NW cor S 8
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	**198**		**50**	**08/20/1970**	**146**	**0-98**	**0-98**			**60**		**A**
2	**208**				**150 est.**	**0-100 est.**	**0-100 est.**		**100-150 est.**			
3	**197**				**150 est.**	**0-100 est.**	**0-100 est.**		**100-150 est.**			

Use data from application for proposed wells.

A4. **Comments:** _____

A5. ☒ **Provisions of the** Willamette 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 applicant's 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) _____;
   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 applicant's wells (MARI 6145, Proposed Well #2, and Proposed Well #3) produce/will produce from several water-bearing zones in the Columbia River Basalt Group (CRBG), a series of lava flows with a composite thickness that ranges up to 500 feet in the area. Although unconfined ground water occurs near the surface of the basalts, most water occurs in confined aquifers that occupy thin rubble zones (interflow zones) at the contacts between lava flows. The interiors of the basalt flows generally have low porosity and permeability and act as confining beds. This geometry generally produces a stack of thin aquifers (interflow zones) separated by thick confining beds (flow interiors). The low permeability of the basalt flow interiors probably limits the natural vertical connection between overlying aquifers. Because the aquifers are confined (storativity is estimated to be 0.0001), pumping impacts will propagate outward at rapid rates and are likely to reach aquifer boundaries (streams, faults, and truncated basalt flow margins) within a fractions of an hour. Therefore, hydraulic interference with nearby wells, springs, and streams will occur rapidly once pumping begins if nearby streams and wells are connected to the same water-bearing zones that are open in the well.

Geologic maps (Tolan and Beeson, 1999) show that southeast of the applicant's wells, the basalts are broken into many fault-bounded blocks. In the area surrounding the applicant's wells, the basalts are overlain by approximately 100 feet of alluvial sediments. A northwest-trending normal fault is mapped to the east of the applicant's wells, but is concealed by sediments, so its exact location is uncertain. The degree to which this fault impedes horizontal flow or enhances vertical flow of groundwater is also uncertain.

Groundwater declines have been documented in Columbia River Basalt aquifers in many areas on the east side of the Willamette Basin. In fact, several groundwater restricted areas have been created to address the decline problems. The applicant's wells are located southwest of the Mt. Angel Groundwater Limited Area and the Victor Point Groundwater Withdrawn Area, and northwest of The South Salem Hills Groundwater Limited Area. Water-level declines, however, are not limited to these classified areas and occur over a broad area near the towns of Silverton and Mt. Angel (see Figure 1 for well

locations and Figure 2 for hydrographs). As shown in Figure 2, two groups of wells can be formed on the basis of hydraulic head and water-level trends. Hydraulic heads in wells north of the Mt. Angel fault range from 50 to 100 feet above mean sea level and have been declining at an average rate of 3.4 feet/year. In wells south of the fault, heads range from 110 to 165 feet above mean sea level and have been declining at an average rate of 2.4 feet/year. The applicant's wells are located south of the Mt. Angel fault in the vicinity of several wells that have been experiencing water-level declines.

In the immediate vicinity of the applicant's wells two distinct water level trends are present among CRBG wells (see Figure 3 for location map and Figure 4 for hydrographs). Water levels in wells located to the west of a concealed fault appear to have declined less than water levels in wells east of the fault (Figure 4). However, the two wells with long-term water levels on the west side of the fault (MARI 6118 and MARI 6153) are not sealed into competent basalt and may commingle the alluvial and basalt aquifers. Water levels for a nearby alluvial well (MARI 17590) are shown on Figure 4 for comparison. The trends in MARI 6118 and MARI 6153 are very similar to the trend in MARI 17590; however the heads in MARI 6118 and MARI 6153 are about 10 feet lower than the head in MARI 17590. This suggests that the water levels in MARI 6118 and MARI 6153 may represent a composite head of the alluvial and basalt aquifer systems.

Any new use from CRBG aquifers is likely to exacerbate water level declines that have been occurring over a large area on the east side of the Willamette Valley.

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	**CRBG**	☒	☐
2	**CRBG**	☒	☐
3	**CRBG**	☒	☐
		☐	☐
		☐	☐

Basis for aquifer confinement evaluation: Our general experience indicates that Columbia River Basalt Group aquifers are confined.

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	**Pudding River**	**135**	**160-150**	**1200**	☐	☒	☐	☐	☒
1	2	**Drift Creek**	**135**	**200-160**	**900**	☐	☒	☐	☐	☒
2	1	**Pudding River**	**135**	**160-150**	**975**	☐	☒	☐	☐	☒
2	2	**Drift Creek**	**135**	**200-160**	**1200**	☐	☒	☐	☐	☒
3	1	**Pudding River**	**135**	**160-150**	**1025**	☐	☒	☐	☐	☒
3	2	**Drift Creek**	**135**	**200-160**	**1580**	☐	☒	☐	☐	☒
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐
						☐	☐	☐	☐	☐

Basis for aquifer hydraulic connection evaluation: Water-bearing zones are well below the elevations of nearby stream reaches. Aquifers at depth are unlikely to have any effective connection to these reaches because of an intervening thickness of basalt which is likely to have very low vertical permeability.

Water Availability Basin the well(s) are located within: 152: PUDDING R > MOLALLA R – AB HOWELL PRARIE; 70781: DRIFT CR > PUDDING R – AT 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?
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐
		☐	☐			☐		☐		☐

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: ______

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:

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.

Tolan, T.L., Beeson, M.H., DuRoss, C.B.,2000, Geologic Map and Database of the Salem East and Turner 7.5-Minute Quadrangles, Marion County, Oregon: A Digital Database, U.S. Geological Survey Open-File Report 00-351.

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.

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).**

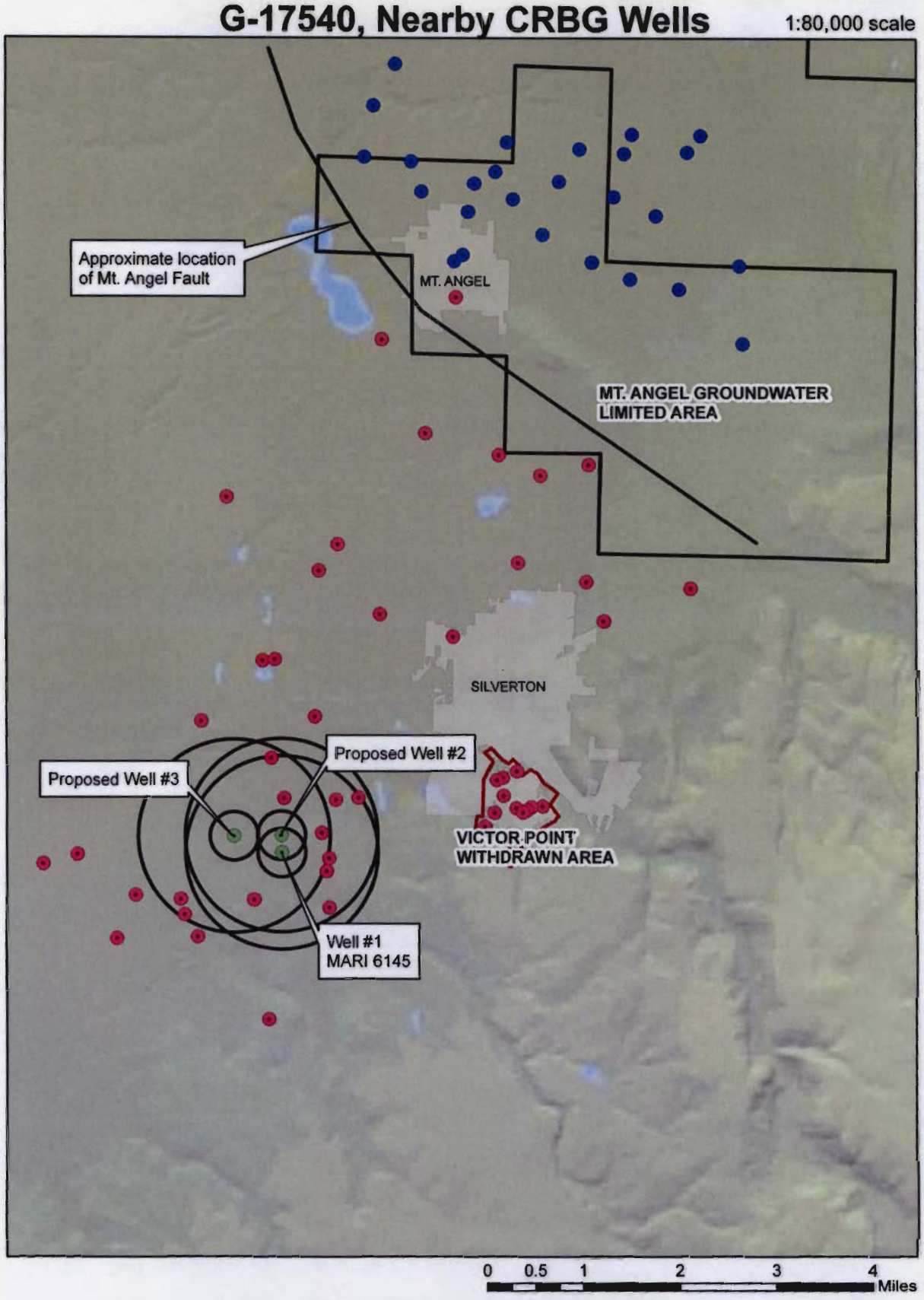

Figure 1. Location of selected CRBG wells near the towns of Mt. Angel and Silverton.

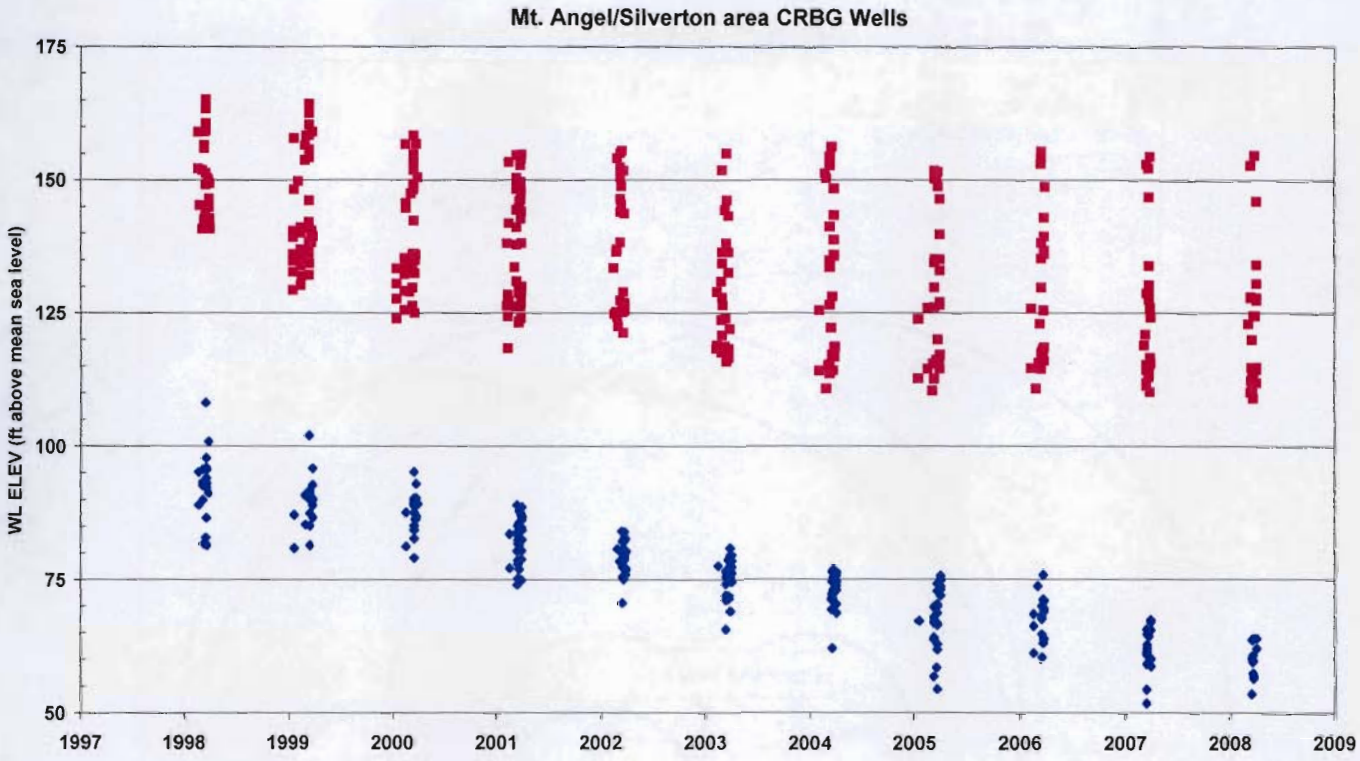

Figure 2. Water level elevation trends in selected CRBG wells near the towns of Mt. Angel and Silverton.

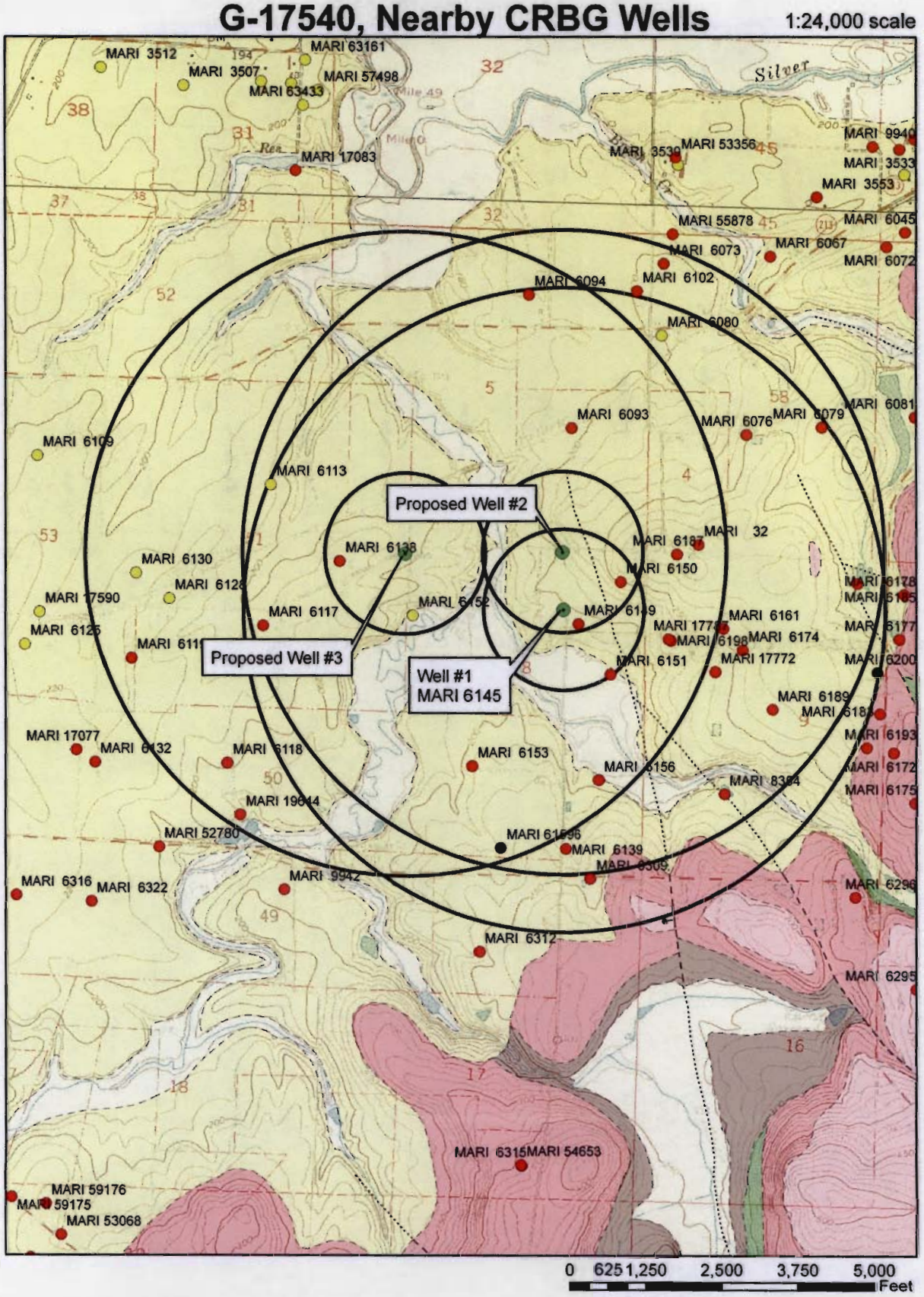

Figure 3. Well location map.

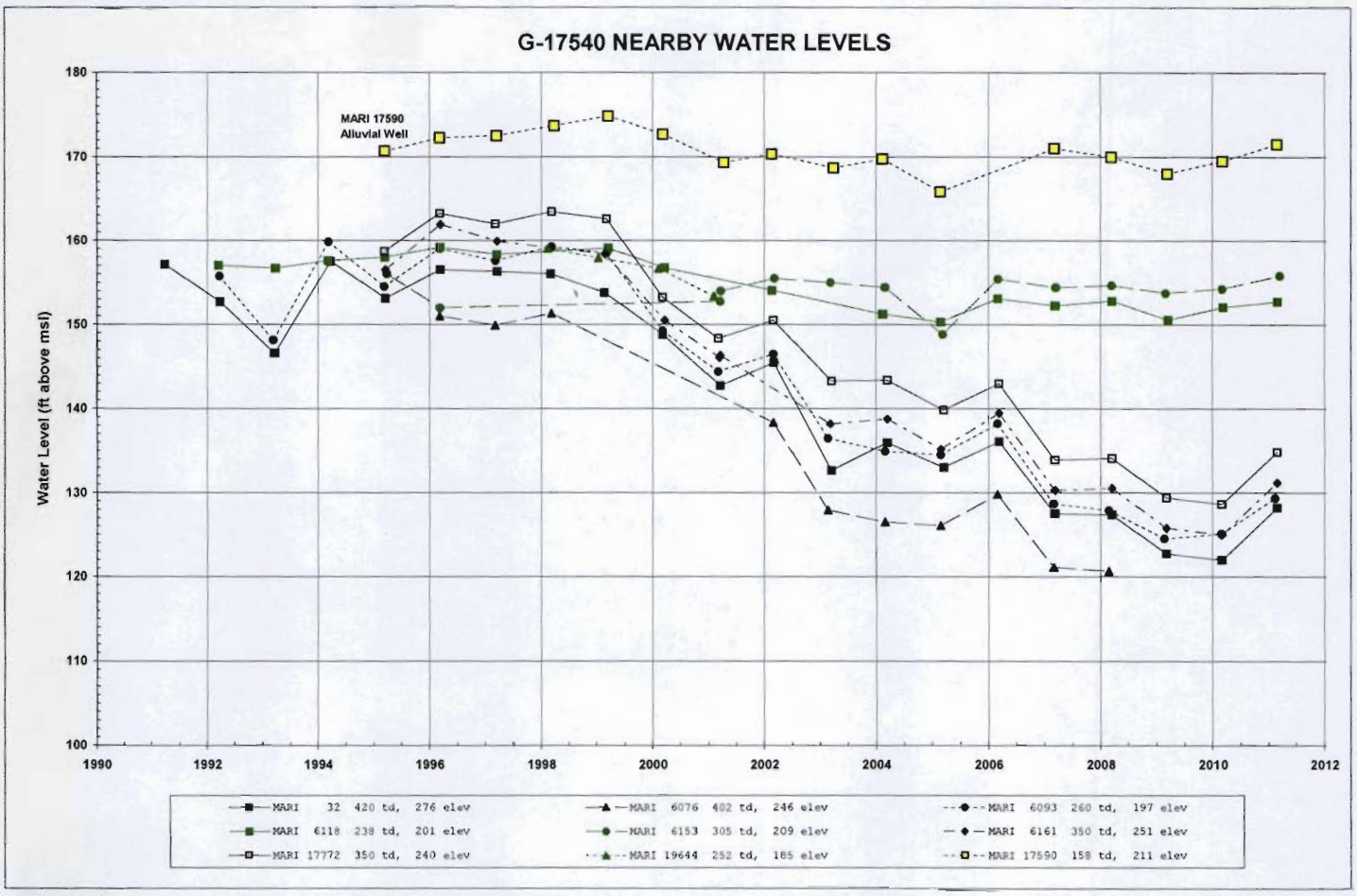

Figure 4. Water level elevation trends in nearby wells. Green trends are CRBG wells west of mapped fault, black trends are CRBG wells east of fault, and yellow and black trend is a nearby alluvial well with long-term water levels.