Approved: 

MEMO

To: Kristopher Byrd, Well Construction and Compliance Section Manager

From: Travis Kelly, Well Construction Program Coordinator

Subject: Review of Water Right Application G-18908

Date: May 26, 2020

The attached application was forwarded to the Well Construction and Compliance Section by the Ground Water Section. Travis Brown reviewed the application. Please see Travis's Groundwater Review and the Well Report.

Applicant's Well #1 (MARI 17438): Based on a review of the Well Report, Applicant's Well #1 does not appear to comply with current minimum well construction standards (See OAR 690 Division 210). The problem is that the Well Report indicates that the well is open to multiple water bearing zones. In order to meet minimum well construction standards, the well must be reconstructed to only be open to one water bearing zone. This repair entails either: sealing and casing to a minimum depth of 111 feet below land surface, or by permanently abandoning the lower portion of the well below 103 feet.

My recommendation is that the Department **not issue** a permit for Applicant's Well #1: unless it is brought into compliance with current minimum well construction standards or information is provided showing that it is constructed to meet current minimum well construction standards.

The repair of Applicant's Well #1 may not satisfy hydraulic connection issues.

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WATER WELL REPORT
STATE OF OREGON

RECEIVED
AUG 19 1991
WATER RESOURCES DEPT
SALEM, OREGON

MAR 17438

State Well No. 8562/4

State Permit No. .....

PLEASE TYPE or PRINT IN INK

(1) OWNER:
Name BEN Bello
Address 1832 59TH SE
City SALEM State ORE

(2) TYPE OF WORK (check):
New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 12.

(3) TYPE OF WELL:
Rotary Air ☐ Driven ☐
Rotary Mud ☐ Dug ☐
Cable ☒ Bored ☐

(4) PROPOSED USE (check):
Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☒ Test Well ☐ Other ☐
Thermal: Withdrawal ☐ Reinjection ☐

(5) CASING INSTALLED:
Steel Threaded ☒ Plastic Welded ☐
6" Diam. from +1½ ft. to 109 ft. Gauge 250
~~10~~" Diam. from 0 ft. to ..... ft. Gauge .....

LINER INSTALLED:
..... " Diam. from ..... ft. to ..... ft. Gauge .....

(6) PERFORATIONS:
Perforated? ☐ Yes ☒ No
Type of perforator used
Size of perforations in. by in.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.

(7) SCREENS:
Well screen installed? ☐ Yes ☒ No
Manufacturer's Name .....
Type ..... Model No. .....
Diam. ..... Slot Size ..... Set from ..... ft. to ..... ft.
Diam. ..... Slot Size ..... Set from ..... ft. to ..... ft.

(8) WELL TESTS:
Drawdown is amount water level is lowered below static level

Was a pump test made? ☐ Yes ☒ No If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
Air test 135 gal./min. with drill stem at 217 ft. 6 hrs.
Bailer test gal./min. with ft. drawdown after hrs.
Artesian flow g.p.m.
Temperature of water 53 Depth artesian flow encountered ..... ft.

(9) CONSTRUCTION:
Special standards: Yes ☐ No ☒
Well seal—Material used NEAT CEMENT
Well sealed from land surface to 35 ft.
Diameter of well bore to bottom of seal 10 in.
Diameter of well bore below seal 6 in.
Number of sacks of cement used in well seal 23 sacks
How was cement grout placed? PUMPED AS 10" SURFACE CASING WAS PULLED BACK FROM 35 FT
Was pump installed? NO Type ..... HP ..... Depth ..... ft.
Was a drive shoe used? ☒ Yes ☐ No Plugs ..... Size: location ..... ft.
Did any strata contain unusable water? ☐ Yes ☒ No
Type of Water? depth of strata
Method of sealing strata off
Was well gravel packed? ☐ Yes ☒ No Size of gravel: .....
Gravel placed from ..... ft. to ..... ft.

(10) LOCATION OF WELL:
RECEIVED
NOV 25 1991
WATER RESOURCES DEPT
SALEM, OREGON

County MARION Driller's well number
¼ ¼ Section 4 T. 8 R. 2 W W.M.
Tax Lot # Lot Blk Subdivision
Address at well location: 1832 59TH SE

(11) WATER LEVEL: Completed well.
Depth at which water was first found 5 ft.
Static level 5 ft. below land surface. Date
Artesian pressure lbs. per square inch. Date

(12) WELL LOG:
Diameter of well below casing 6
Depth drilled 217 ft. Depth of completed well 217 ft.

Formation: Describe color, texture, grain size and structure of materials; and show thickness and nature of each stratum and aquifer penetrated, with at least one entry for each change of formation. Report each change in position of Static Water Level and indicate principal water-bearing strata.

MATERIAL	From	To	SWL
TOP SOIL GRAY	0	1	
CLAY GRAY	1	5	
CLAY GRAY SANDY	5	16	
SANDY CLAY W/BOULDERS	16	21	
SANDY GRAVEL W/COBBLES	21	28	
CLAY BLUE	28	73	
SANDY CLAY W GRAVEL	73	94	21
SAND FINE W/CLAY	94	103	
BASALT SOFT	103	106	
BASALT HARD MED	106	146	
BASALT HARD	146	177	
BASALT BROKEN FINE	177	183	
BASALT FRACTURED	183	193	27
BASALT BROKEN	193		
WEATHERED		206	
BASALT BROKEN	206	215	
BASALT HARD	215	217	

Work started 6/6 19 88 Completed 10/2 19 88
Date well drilling machine moved off of well 19

(unbonded) Water Well Constructor Certification (if applicable):
This well was constructed under my direct supervision. Materials used and information reported above are true to my best knowledge and belief.
[Signed] Ben Bello Date 11/1, 1989

Bonded Water Well Constructor Certification:
Bond (number) Issued by: Surety Company Name
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.
Name Bello Well Drilling (Person, firm or corporation) (Type or print)
Address 4711 Wayne Ave SE
[Signed] Ben Bello Water Well Constructor
Date 11/1, 1989

NOTICE TO WATER WELL CONSTRUCTOR
The original and first copy of this report are to be filed with the WATER RESOURCES DEPARTMENT, SALEM, OREGON 97310 within 30 days from the date of well completion.

SP*45292-690

Groundwater Application Review Summary Form

Application # G- _18908_

GW Reviewer _Travis Brown_ Date Review Completed: _5/26/2020_

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 **May 26 , 2020**

TO: **Application** G-**18908**

FROM: **GW: Travis Brown**
(Reviewer's Name)

SUBJECT: Scenic Waterway Interference Evaluation

☐ **YES**
☒ **NO** The source of appropriation is hydraulically connected to a State Scenic Waterway or its tributaries

☐ **YES**
☒ **NO** Use the Scenic Waterway Condition (Condition 7J)

☐ 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: 5/26/2020
FROM: Groundwater Section Travis Brown
Reviewer's Name
SUBJECT: Application G- 18908 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: **Fruitland, LLC** County: **MARION**

A1. Applicant(s) seek(s) 0.0891 cfs from 1 well(s) in the Willamette Basin, Pudding-Molalla subbasin

A2. Proposed use Nursery (12.0 af), Commercial (5.6 af) 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	MARI 17438	1	**CRB**[a]	0.0891	8S/2W-4 NE-NW	870' S, 225' W fr N ¼ cor S 4

* 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	242[b]	5	5[c]	10/2/1989	217	**0-35**[a]	+1.5-109			135		Air (6 hr)

Use data from application for proposed wells.

A4. **Comments:** The proposed POA/POU is just east of the City of Salem, Oregon.

[a] **The proposed POA appears to be open to both the alluvial aquifer system ("Sandy Clay w Gravel", 73-94 ft below land surface [bls]) and the Columbia River Basalt (CRB) aquifer system ("Basalt Fractured", 183-193 ft bls). The application indicates "Basalt" as the target aquifer. The proposed well would require repair to comply with the Well Construction Rules (OAR 690-200 and 690-210). See Section D for more information.**

[b] Land surface elevation at proposed POA location estimated from LIDAR (Watershed Sciences, 2009).

[c] The water well report for MARI 17438 listed the SWL as 5 ft bls under Section (11); however, the lithologic log lists the SWL of the target water-bearing zone (183-193 ft bls) as 27 ft bls.

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 POA is completed in a confined aquifer; therefore, per OAR 690-502-0240, the relevant basin rules do not apply.

A6. ☐ **Well(s) #** _____ , _____ , _____ , _____ , _____ , tap(s) an aquifer limited by an administrative restriction.

Name of administrative area: **N/A**

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) **7i (Willamette basalt), medium 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 **Columbia River Basalt Group** groundwater reservoir between approximately **117** ft. and **217** 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): **The proposed POA is not completely sealed into hard, dense basalt overlying the intended production zone (~183-193 ft bls). Without reconstruction, the well may allow commingling of groundwater in the shallower alluvial aquifer system and the deeper basalt aquifer system. See Section D for more information.**

B3. **Groundwater availability remarks:** Groundwater for the proposed use cannot be determined to be over-appropriated due to insufficient available data regarding rates of recharge and the current quantity of groundwater withdrawals from the basalt aquifer system.

The proposed POA produces water from a zone of fractured basalt between ~49-59 ft above mean sea level (amsl) (~183-193 ft bls). Thickness mapping in this area estimates the total basalt thickness as ~100 ft (Conlon et al., 2005). Top of basalt bedrock is estimated at ~100 ft amsl, though the proposed POA encountered hard basalt at ~136 ft amsl (~106 ft bls) (Gannett and Caldwell, 1998). Geologic mapping in this area suggests that the proposed POA may be within a down-thrown fault block with a displacement of at least 40 ft relative to the exposed basalt of the Waldo Hills, southeast of the proposed POA (Tolan and Beeson, 2001); this may limit groundwater availability in the basalt aquifer system and exacerbate well-to-well interference, depending on the degree of compartmentalization of the fault block.

The nearest known neighboring basalt well is MARI 9590, a domestic well ~800 ft northeast of the proposed POA. Based on the Water Well Completion Report, the total depth of MARI 9590 is ~103 ft shallower than the proposed POA, and its targeted water-bearing zone occurs ~100 ft above that noted on the log for the proposed POA. In fact, MARI 9590 may be producing water from a saturated zone at the weathered top of the basalt bedrock, rather than from a deeper interflow zone as appears to be the case for the proposed POA. Regardless, due to the low total rate requested in this application (40 gpm), neither MARI 9590 nor similarly located wells are likely to be deprived of their customary use of groundwater as a result of the use proposed in this application.

Reported water levels in this area indicate general stability within the basalt aquifer system, although the wells nearest to the proposed POA do indicate modest declines (see attached Hydrographs). Due to the unknown degree of compartmentalization in this area as well as the potential for the basalt aquifer system to contain multiple, hydraulically-distinct aquifers stacked on top of each other, the extent to which broader aquifer system trends reflect the status of the aquifer tapped by the proposed

POA is unknown. **As such, the conditions specified above are strongly recommended. Additionally, the following Special Conditions are recommended:**

A. Each basalt well shall be open to a single aquifer of the Columbia River Basalt Group and shall meet the applicable well construction standards (OAR 690-200 and OAR 690-210).

In addition, the open interval in each well shall be no greater than 100 feet. An open interval of greater than 100 feet may be allowed if substantial evidence of a single aquifer completion can be demonstrated to the satisfaction of the Department Hydrogeologists, using information from a video log, downhole flowmeter, water chemistry and temperature, or other downhole geophysical methods. These methods shall characterize the nature of the basalt rock and assess whether water is moving in the borehole. Any discernable movement of water within the well bore when the well is not being pumped shall be assumed as evidence of the presence of multiple aquifers in the open interval.

If during well construction, it becomes apparent that the well can be constructed to eliminate the commingling of aquifers and/or interference with hydraulically connected streams in a manner other than specified in this permit, the permittee can contact the Department Hydrogeologist for this permit or the Groundwater Section Manager to request approval of such construction. The request shall be in writing and shall include a rough well log and a proposed construction design for approval by the Department. The request can be approved only if it is received and reviewed prior to placement of any permanent casing and sealing material. If the request is made after casing and seal are placed, the requested modification will not be approved. If approved, the new well depth and construction specifications will be incorporated into any certificate issued for this permit.

B. A dedicated water level measuring tube shall be installed in each well. The measuring tube shall meet the standards described in OAR 690-215-0060. When requested, access to the wells shall be provided to Department staff in order to make water level measurements.

C. For any wells constructed under this or subsequent permits, the permittee shall coordinate with the driller to ensure that drill cuttings are collected at 10-foot intervals and at changes in formation in each well. A split of each sampled interval shall be provided to the Department.

D. If any geologic and hydrogeologic reports are completed for the permittee during the development of permitted wells, including geophysical well logs and borehole video logs, then copies of the reports shall be provided to the Department. Except for borehole video logs, two paper copies or a single electronic copy shall be provided of each report. Digital tables of any data shall be provided upon request.

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	**Columbia River Basalt Group**	☒	☐

Basis for aquifer confinement evaluation: The target water-bearing zone (~183-193 ft bls) is overlain by at least 71 ft of hard, dense basalt (~106-177 ft bls) according to the well log for MARI 17438. The noted static water level on the log is well above the target water-bearing zone. Additionally, potentiometric mapping in this area estimated the static water level in the basalt aquifer system at ~200 ft amsl (~40 ft bls) at the location of the proposed POA (Conlon et al., 2005). Based on the available evidence, the proposed aquifer is 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**	**Fruitland Creek**	**~193-237[a]**	**~199-329[b]**	**~570**	☐	☒	☐	☐	☒

Basis for aquifer hydraulic connection evaluation: As currently constructed, the proposed POA may allow for hydraulic connection with SW 1 through the alluvial aquifer system (see Section D for more information); however, if repaired or reconstructed to comply with the Water Well Construction Standards (OAR 690-200 and OAR 690-210) and the conditions specified in Section B2(c) and B3, the basalt aquifer that supplies the well is unlikely to have an effective hydraulic connection with the local stream network due to the very low vertical permeability of the overlying basalt flow interior.

[a] Range of water levels reported for nearby observation wells MARI 9426, 61370, and 64807, although these wells were constructed with much larger open intervals in the basalt than the proposed POA and therefore could represent water levels in different or multiple aquifers. There is some uncertainty about the water level listed on the Water Well Report for MARI 17438 (the proposed POA), which could be either 5 ft bls (~237 ft amsl) or 27 ft bls (~215 ft amsl) (see *Note* [c] in Section A4).

[b] Within 1 mile of proposed POA; estimated from LIDAR (Watershed Sciences, 2009).

Water Availability Basin the well(s) are located within: WID #151 PUDDING R > MOLALLA R – AB MILL CR

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?
		☐	☐			☐		☐		☐

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: N/A

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													
(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: N/A

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:** The proposed POA is not anticipated to have hydraulic connection with the local stream network if repaired or reconstructed (see Section D).

References Used:

Application File: G-18908

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, Scientific Investigations Report 2005-5168: U. S. Geological Survey, Reston, VA.

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

Tolan, Terry L. and Beeson, Marvin H., 2000, Geologic Map of the Salem East and Turner 7.5 Minute Quadrangles, Marion County, Oregon: A Digital Database [map], 1:24,000, Open File Report 00-351: U. S. Geological Survey, Reston, VA.

United States Geological Survey, 2014, National Hydrography Dataset (NHD), 1:24,000, U. S. Department of the Interior, Reston, VA.

United States Geological Survey, 2017, Salem East quadrangle, Oregon [map], 1:24,000, 7.5 minute topographic series, U.S. Department of the Interior, Reston, VA.

Watershed Sciences, 2009, LIDAR remote sensing data collection, Department of Geology and Mineral Industries, Willamette Valley Phase I, Oregon: Portland, OR, December 21.

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

D. WELL CONSTRUCTION, OAR 690-200

D1. **Well #**: **1** **Logid: MARI 17438**

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 _____;

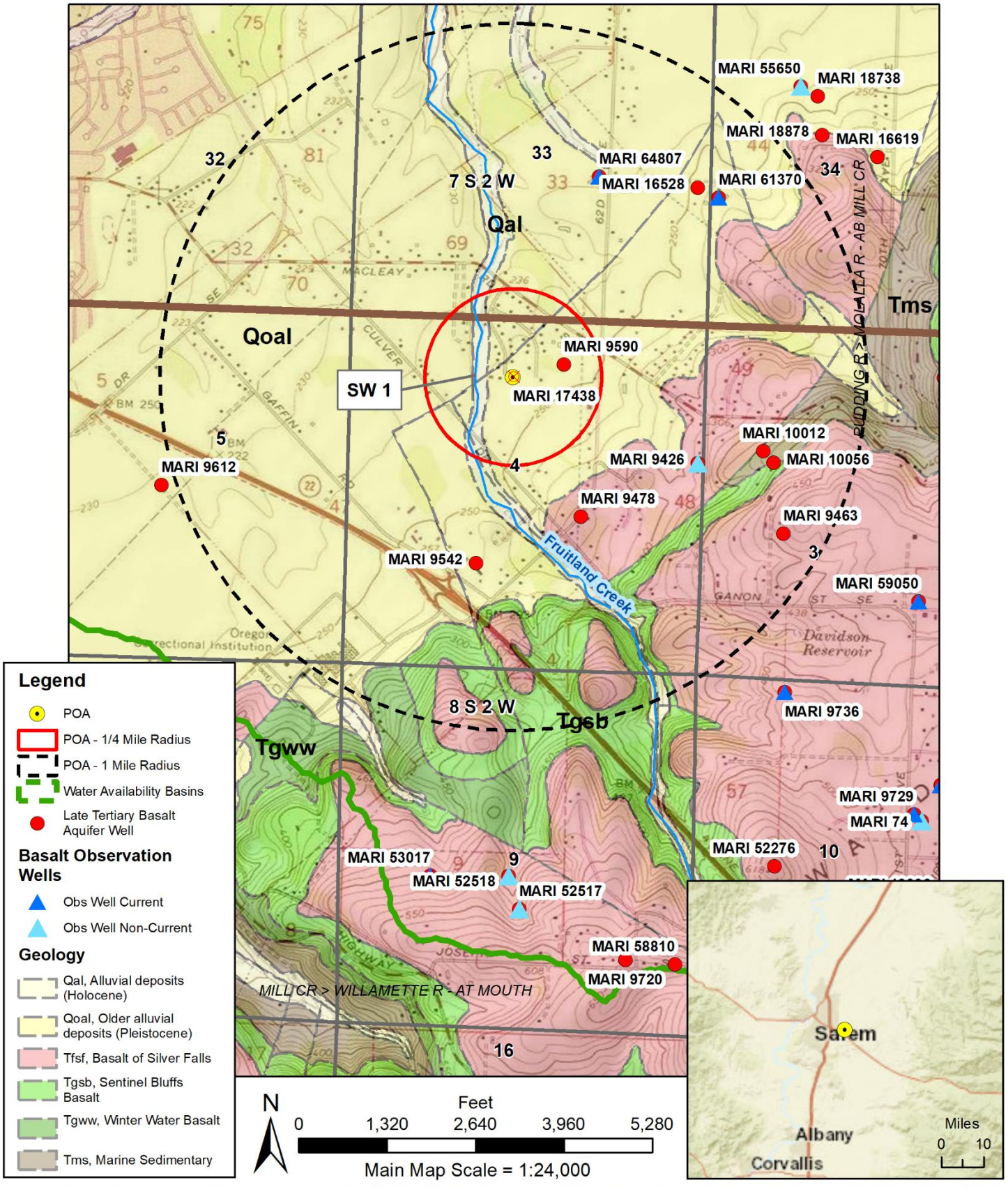
d. ☐ other: (specify) _____

D3. **THE WELL construction deficiency or other comment is described as follows:** The well appears to be open to both the alluvial aquifer system ("Sandy Clay w Gravel", depth 73-94 ft bls, static water level [SWL] 21 ft bls) and the Columbia River Basalt (CRB) aquifer system ("Basalt Fractured", depth 183-193 ft bls, SWL 27 ft bls) (see attached Well Construction Diagram), possibly allowing for commingling. The seal ("Neat Cement") extends only to 35 ft bls; however, competent basalt ("Basalt Hard Med") is not reported until 106 ft bls, with at least one alluvial water-bearing zone in the intervening depths. The application indicates "Basalt" as the target aquifer. Based on the well log for MARI 17438 and the Well Construction Rules (OAR 690-200 and 690-210), the seal for MARI 17438 should extend at least 5 ft into hard, dense basalt – to at least 111 ft bls.

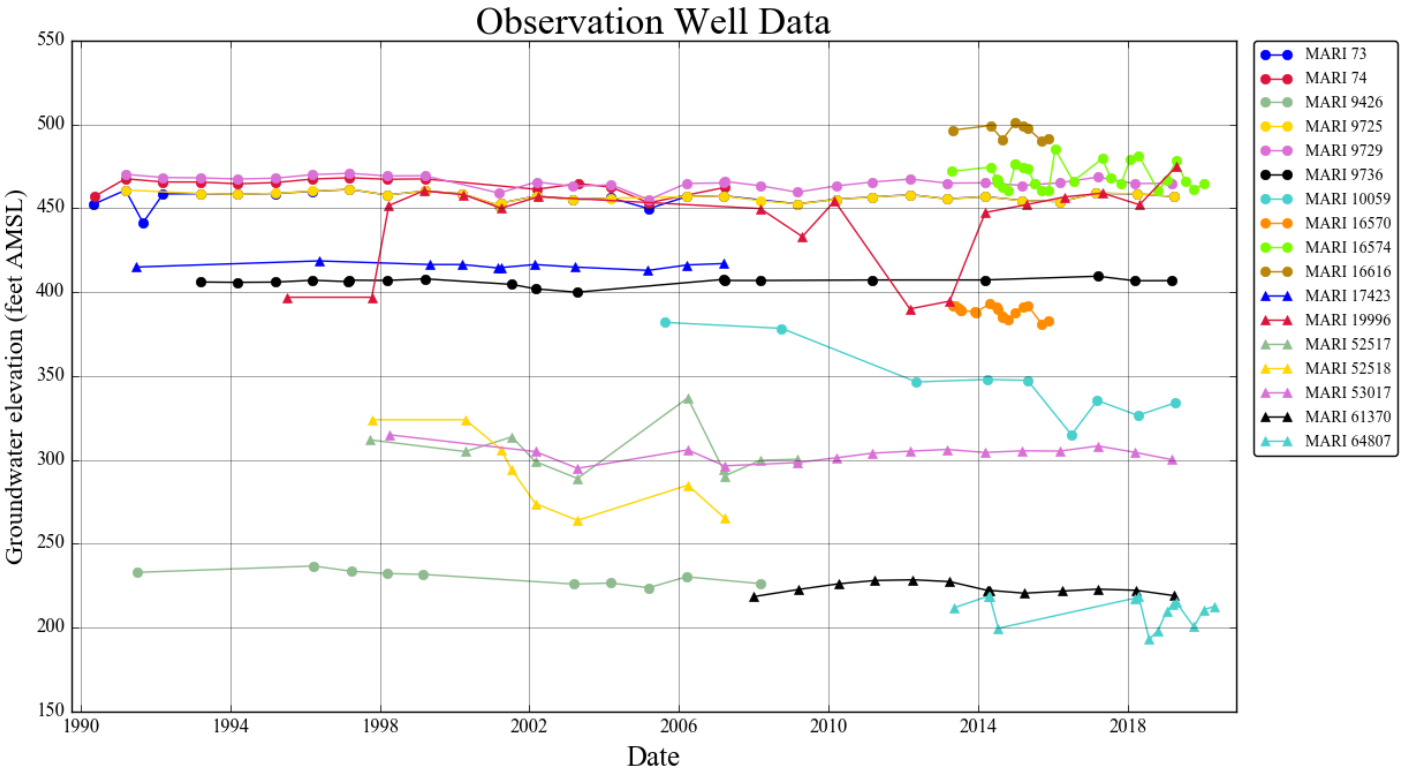
D4. ☒ **Route to the Well Construction and Compliance Section for a review of existing well construction.**

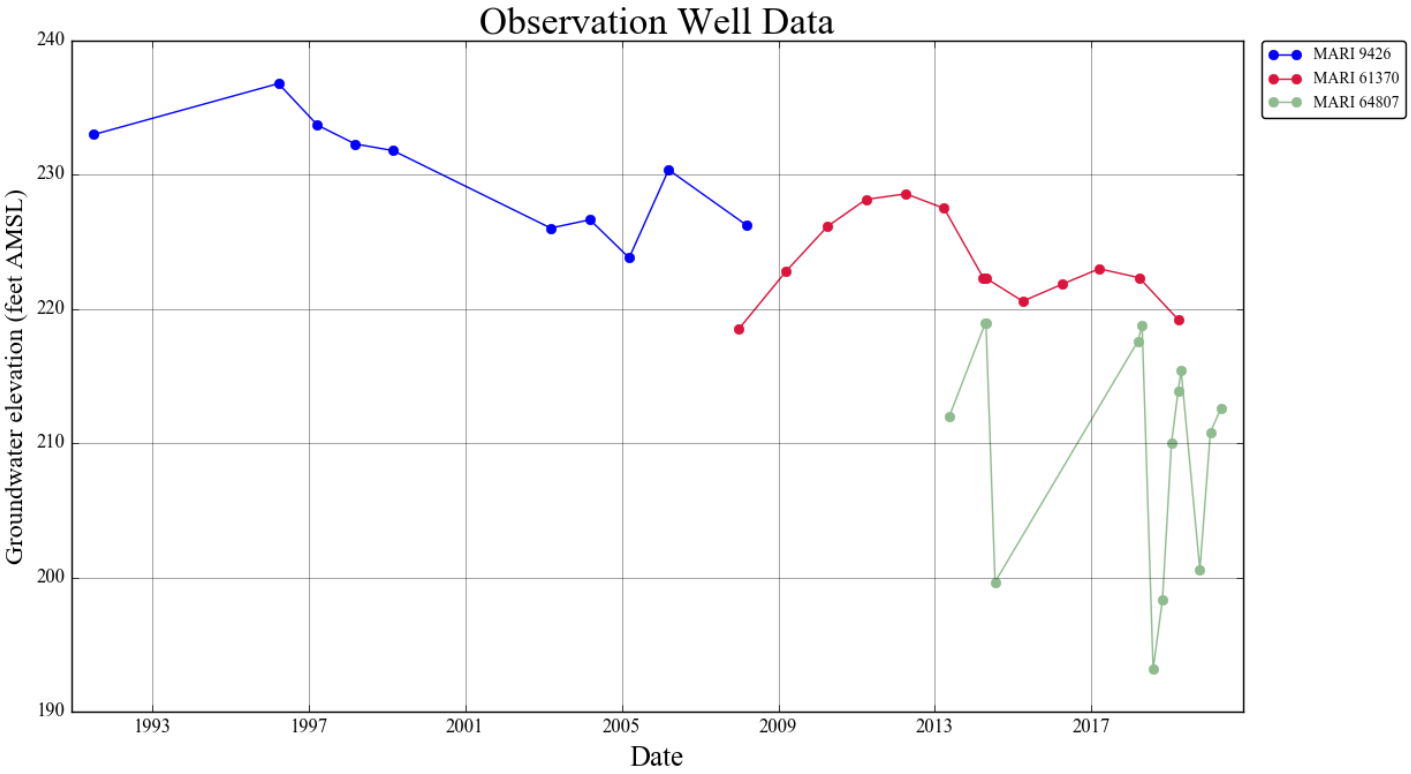
Well Location Map

G-18908 Fruitland, LLC



Hydrographs





Well Construction Diagram (POA Current Construction)