

# Groundwater Transfer Review Summary Form

Transfer/PA # T- 13757

GW Reviewer Jen Woody Date Review Completed: 5/2/2022

## Summary of Same Source Review:

The proposed change in point of appropriation is not within the same aquifer as per OAR 690-380-2110(2).

## Summary of Injury Review:

The proposed transfer will result in another, existing water right not receiving previously available water to which it is legally entitled or result in significant interference with a surface water source as per 690-380-0100(3).

## Summary of GW-SW Transfer Similarity Review:

The proposed SW-GW transfer doesn't meet the definition of "similarly" as per OAR 690-380-2130.

*This is only a summary. Documentation is attached and should be read thoroughly to understand the basis for determinations.*



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## Ground Water Review Form:

- Water Right Transfer**
- Permit Amendment**
- GR Modification**
- Other**

Application: T-13757

Applicant Name: Pendleton Land LLC

Proposed Changes:     POA             APOA             SW→GW             RA  
                                   USE                 POU                 OTHER

Reviewer(s): Jen Woody

Date of Review: 5/2/2022

Date Reviewed by GW Mgr. and Returned to WRSD: JTI 5/29/22

The information provided in the application is insufficient to evaluate whether the proposed transfer may be approved because:

- The water well reports provided with the application do not correspond to the water rights affected by the transfer.
- The application does not include water well reports or a description of the well construction details sufficient to establish the ground water body developed or proposed to be developed.
- Other \_\_\_\_\_

1. Basic description of the changes proposed in this transfer: T-13757 proposes multiple changes to multiple Certificates, the net effect being 3 wells will be replaced as follows:

**Table 1: Summary of proposed changes and aquifers affected**

Certificate	Authorized well(s) to change	Authorized Aquifer (per subject well)	Proposed replacement (new, not yet drilled)	Proposed Aquifer	Same Aquifer?
30636: 1 well	UMAT 4178/ WW1	Sediments: 50%	710' well, cased and sealed into single aquifer in CRBG/WW1R	Basalt	50% no
		Basalt: 50%			50% yes
42976	UMAT 4627/U-452	Sediments	250' well/R-U-452	Sediments	yes
89896: 9 wells	UMAT 4178/ WW1	Sediments: 50%	710' well, cased and sealed into single aquifer in CRBG// WW1R	Basalt	50% no
		Basalt: 50%			50% yes
95268	UMAT 4627/U-452	Sediments	250' well/R-U-452	Sediments	yes
	UMAT 53646/Well 4	Sediments	660' well/R-4	Sediments	yes

2. Will the proposed POA develop the same aquifer (source) as the existing authorized POA?  
 Yes    No   See Table 1.

Comments related to UMAT 4178: UMAT 4178 commingles multiple aquifers, while the other wells in this transfer have a single aquifer completion. The well log for UMAT 4178 reports casing to 60 feet and the presence of a seal is unknown. Top of basalt is reported at 75 feet and basalt extends to the bottom of the well. The amended application proposes a replacement well for UMAT 4178 that is continuously cased and continuously sealed into a single basalt aquifer. A portion of UMAT 4178 accesses the same aquifer.

Basalt wells produce from one or more water-bearing zones in the Columbia River Basalt Group (CRBG), a series of lava flows with a composite thickness greater than 10,000 feet in the Columbia Plateau. Each flow is characterized by a series of internal features, which generally include a thin rubble zone at the contact between flows and a thick, dense, low porosity and low permeability interior zone. In some cases, sedimentary layers were deposited during the time between basalt flow emplacements. A flow top, sedimentary interbed (if present) and flow bottom are collectively referred to as an interflow zone. Unconfined groundwater occurs near the weathered top of the basalts, but most water occurs in interflow zones under confining conditions at the contacts between lava flows. CRBG flow features result in a series of stacked, thin aquifers that are confined by dense flow interiors. The low permeability of the basalt flow interiors usually results in little connection between stacked aquifers, which results in tabular aquifers with unique water level heads (Reidel et al., 2002).

Constructing a well that is open to multiple water-bearing zones with distinct water level heads commingles multiple aquifers. When the pump is off, water migrates through the well bore from an aquifer of higher pressure to an aquifer of lower pressure. Over time, this can depressurize the aquifer and exacerbates water level decline. Well construction conditions are specified to protect the resource and other existing users.

The water level at UMAT 4178 increases on the order of 50 feet in elevation when there is water in Pine Creek, which is located within 20 feet of this well. As shown in Figure 2, other nearby basalt wells show a total seasonal range of 20 feet between annual highs and lows (see UMAT 4179, UMAT 58119, UMAT 4167, UMAT 53529). The large increase in water level elevation at UMAT 4178 and the presence of gravel below the bottom of the casing indicates there is an efficient connection between this well and both a sedimentary and a basalt aquifer.

3. a) Is there more than one source developed under the right (e.g., basalt and alluvium)?  
 Yes: see UMAT 4178 comments in section 2.    No See Table 1.

b) If yes, estimate the portion of the right supplied by each of the sources and describe any limitations that will need to be placed on the proposed change (rate, duty, etc.): There are no available data with which to determine the exact proportions of sedimentary versus basalt aquifer contributions to this well; for administrative purposes it is recommended split 50% sedimentary and 50% basalt.

4. a) Will this proposed change, at its maximum allowed rate of use, likely result in an increase in interference with **another ground water right**?

Yes  No Comments: The replacements for UMAT 4178 and UMAT 53646 are less than 100 feet from the current POAs. This change is not expected to measurably change interference with other fully penetrating, reasonably efficient wells. UMAT 4627's replacement is located at a greater distance from other wells in the same aquifer, so well-to-well interference is not expected to increase.

**Table 2: Summary of Interference Changes**

Certificate	Authorized well(s) to change	Proposed replacement (not drilled)	Increases gw interference?	Prevents gw access?	Increases sw interference?	Significant sw change?
30636	UMAT 4178/ WW1	710' well/ WW1R	No	No	No	No
42976	UMAT 4627/U-452	250' well/ R-U-452	No	No	No	No
89896	UMAT 4178/ WW1	710' well/ WW1R	No, if replaced with 2 wells: 1 sedimentary and 1 basalt	No	No	No
95268	UMAT 4627/U-452	250' well/ R-U-452	No	No	No	No
	UMAT 53646/Well 4	660' well/ R-4	No	No	Yes	No

b) If yes, would this proposed change, at its maximum allowed rate of use, likely result in another groundwater right not receiving the water to which it is legally entitled?

Yes  No If yes, explain: N/A

5. a) Will this proposed change, at its maximum allowed rate of use, likely result in an increase in interference with **another surface water source**?

Yes  No Comments: See Table 2. New POA locations are less than 100' from current pumping locations for UMAT 53646 and UMAT 4178 replacements. The replacement for UMAT 4627 is located 1000 feet from the current location, but both locations are approximately 2800 feet from Pine Creek. The change in interference with surface water is expected to be largest at UMAT 53646 because it is the POA located closest to a creek. The new POA will be 50 feet closer to Pine creek.

b) If yes, at its maximum allowed rate of use, what is the expected change in degree of interference with any **surface water sources** resulting from the proposed change?

Stream: Pine Creek  Minimal  Significant

Stream: \_\_\_\_\_  Minimal  Significant

Provide context for minimal/significant impact: The change resulting from moving the POA associated with UMAT 53646 increases stream depletion estimates by 0.001% after 365 days of pumping.

6. For SW-GW transfers, will the proposed change in point of diversion affect the surface water source similarly (as per OAR 690-380-2130) to the authorized point of diversion specified in the water use subject to transfer?

Yes  No Comments: N/A

7. What conditions or other changes in the application are necessary to address any potential issues identified above:

Because it develops at least 2 aquifers, UMAT 4178 will need to be abandoned and replaced by a basalt well that meets current well construction standards. 50% of the water right rate and annual volume associated with UMAT 4178 is transferrable to the new basalt point of appropriation.

The basalt well drilled to replace UMAT 4178 shall be open to a single aquifer in the Columbia River Basalt Group and shall meet applicable well construction standards (OAR 690-200 and OAR 690-210). The open interval may be approved by the Department if the applicant can demonstrate to the satisfaction of the Department that each well is only open to a single aquifer. Following well completion, the well shall be thoroughly developed to remove cuttings and drilling fluids. Substantial evidence of a single aquifer completion may be collected by video log, downhole flowmeter, water chemistry and temperature, or other downhole geophysical methods approved by the Department. These methods shall characterize 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.

Drill cuttings shall be collected at 10-foot intervals and at changes in formation in the well and a split of each sampled interval shall be provided to the Department.

8. Any additional comments: \_\_\_\_\_

### References

GSI Water Solutions, Inc., 2007, Geologic Setting of the Miocene to Recent Suprabasalt Sediments of the Walla Walla Basin, Southeastern Washington and Northeastern Oregon, prepared for Walla Walla Basin Watershed Council and the Washington Department of Ecology, 41 p.

Hunt, B., 2003, Unsteady stream depletion when pumping from semiconfined aquifer: Journal of Hydrologic Engineering, January/February, 2003.

Newcomb, R.C., 1965, Geology and Groundwater Resources of the Walla Walla River Basin Washington-Oregon, State of Washington Division of Water Resources Water Supply Bulletin No. 21, 162 p.

OWRD Groundwater Information System water level data, well logs, pump test data from UMAT 52037.

Reidel, Stephen P., and Hooper, Peter R., eds., 1989. Volcanism and Tectonism in the Columbia River Flood-Basalt Province: Geological Society of America Special Paper 239.

Scherberg, Jacob N., 2012, The development of a hydrological model of the Walla Walla Basin using Integrated Water Flow Model, Graduate Thesis, Oregon State University, 149 p.

Figure 1. Well location map

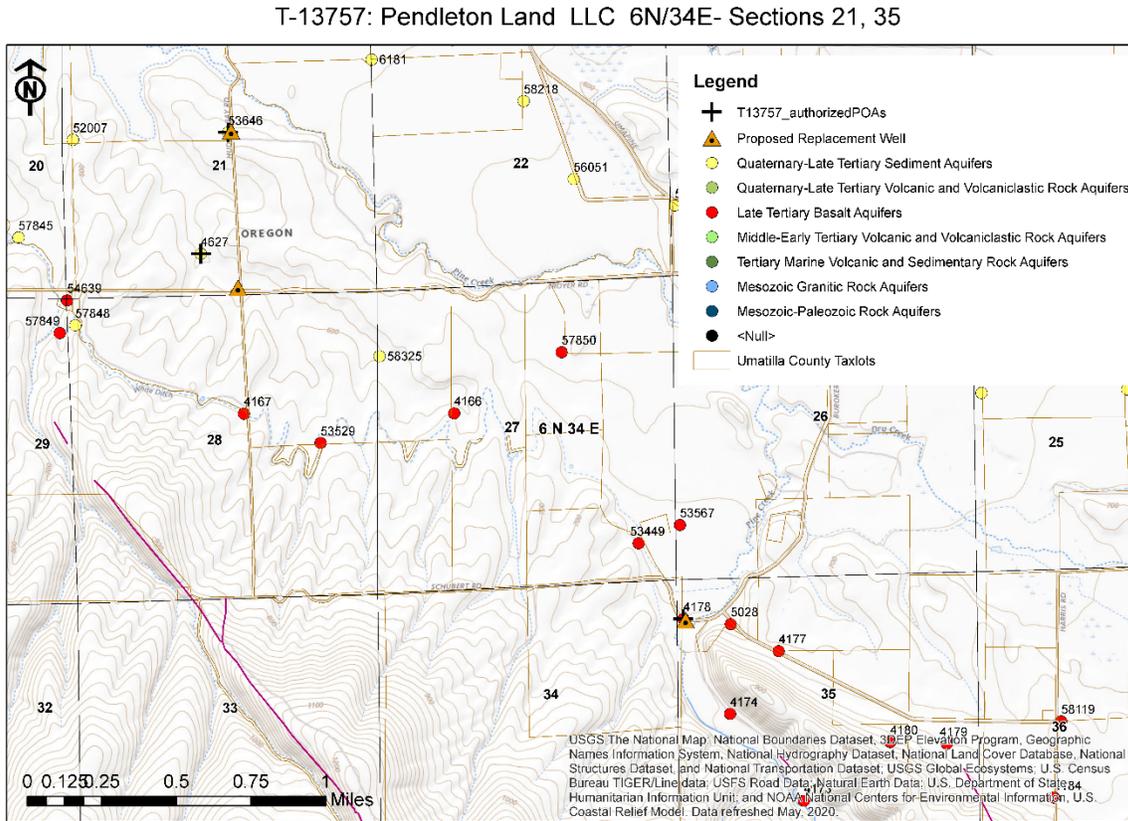


Figure 2. Hydrograph of nearby basalt wells and UMAT 4178

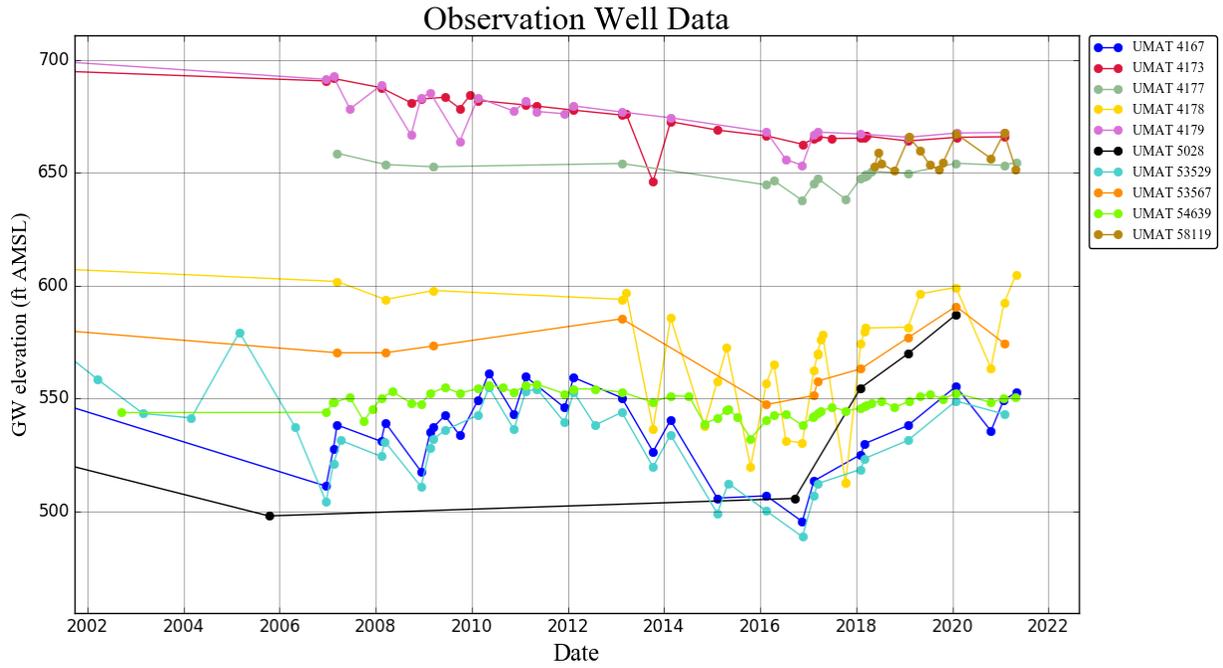
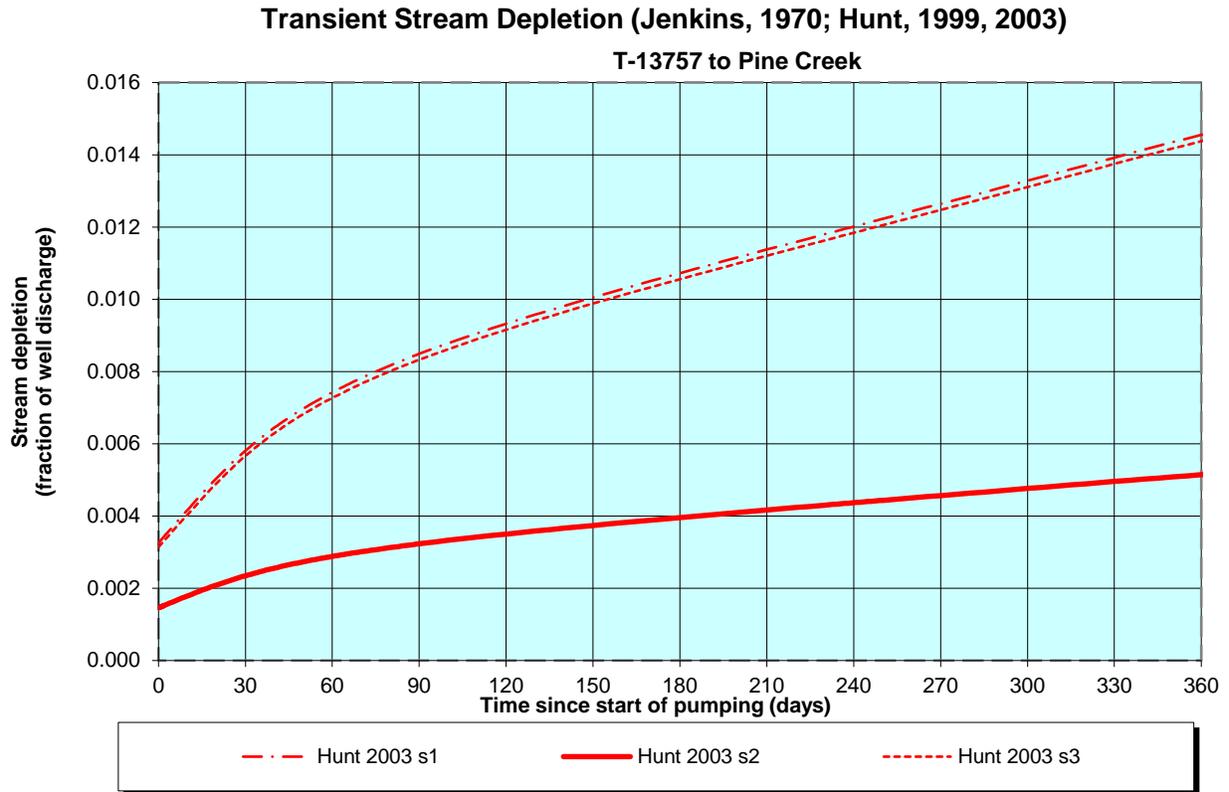


Figure 3. Stream depletion estimates for sedimentary well



Parameters:		Scenario 1	Scenario 2	Scenario 3	Units
Net steady pumping rate of well	Qw	3.00	3.00	3.00	cfs
Time pump on (pumping duration)	tpon	365	365	365	days
Perpendicular from well to stream	a	700	700	750	ft
Well depth	d	250	250	250	ft
Aquifer hydraulic conductivity	K	200	2000	200	ft/day
Aquifer saturated thickness	b	80	80	80	ft
Aquifer transmissivity	T	16000	160000	16000	ft*ft/day
Aquifer storativity or specific yield	S	0.00001	0.00001	0.00001	
Aquitard vertical hydraulic conductivity	Kva	1	1	1	ft/day
Aquitard saturated thickness	ba	120	120	120	ft
Aquitard thickness below stream	babs	80	80	80	ft
Aquitard porosity	n	0.2	0.2	0.2	
Stream width	ws	10	10	10	ft