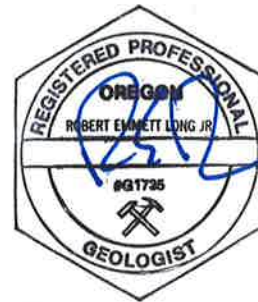




July 15, 2020

Laura Cochran  
18925 NE Jaquith Road  
Newberg, Oregon 97132



**RE: ASSESSMENT OF IMPACT OF APPLICATION G-18843 ON LOCAL GROUNDWATER AVAILABILITY AND WATER RESOURCE USERS**

Dear Ms. Cochran:

This letter provides an overview of the results of the work proposed by CwM-H2O, LLC (CwM) in the June 26, 2020 letter. The objective of this work was the review and assessment of groundwater application G-18843 submitted to Oregon Water Resources Department (Department or OWRG), and its potential for injury to your water resources and other senior exempt water users. This letter is intended to summarize the conclusions of this review and the present the professional opinions that CwM can provide on the proposed groundwater usage.

Based on our analysis CwM recommends that the Department deny additional development of groundwater within the Columbia River Basalt Group due the high potential for injury to existing senior water users and surface water certificate holders, potential injury to state and federally list fish species, and limited groundwater availability at the top of this groundwater flow system.

### **Local Hydrogeology**

The Cochran property is located at the crest of the northwest-southeast trending ridge of the Chehalem Mountains. This ridge consists of successive layers of basalt lava belonging to the Columbia River Basalt Group (CRBG) that are tilting strongly to the northeast (USGS, 2018). The southwest side of the ridge steeply drops approx. 700 ft over half of a mile and cuts almost perpendicularly through the layered basalts, forming a series of springs. The northeast slope of the ridge dips much more gently but exceeds the dip of the basalt layers, cutting into them more obliquely. General speaking, the CRBG can yield significant amounts of water. However, most productive wells are completed in the deep, confined portions of the CRBG, such as in the Tualatin Valley to the north (Wilson, 1998). By comparison, the exposed highland CRBG basalts in the Chehalem Mountains have a limited extent (storage) and very limited recharge area.

Well logs around the Cochran property indicate that there are multiple water-bearing zones (WBZs) locally within the CRBG. Groundwater within the CRBG is typically stored within porous "interflow zones" between successive lava flows, both within the same unit and between units

(Newcomb, 1969; Davies-Smith *et al.*, 1988). Although water can flow efficiently within interflow zones, the dense basalt between them can completely isolate them from each other. The different water levels observed in the Cochran area wells correspond to these hydraulically separated zones.

There are five members, or sub-units, of the CRBG mapped at the site: The Ginkgo Basalt, Sentinel Bluffs Basalt, Winter Water Basalt, Ortley Basalt, and the Wapshilla Basalt (USGS, 2018). Based on ground surface, WBZ, and static water level elevations for 14 well logs north and south of the Cochran well, there appear to be three or four distinct WBZs, perhaps correlating to the interflow zones of each of these CRBG members. The static water levels in each of these WBZs show similar patterns, yet at different elevations: highest elevations underneath the ridge crest, decreasing slightly to spring elevations on the southwest slope of the ridge, and decreasing along with surface elevation to the northeast. Recharge to these water-bearing units is restricted to surface infiltration of precipitation on the ridge top.

The shallowest WBZ hosts the 200-ft deep Royer well (YAMH 917) and only produces 2 – 7 gpm over a 50-ft thick zone. Most wells in the area including the Cochran (YAHM 55490), Quinby (YAMH 57902), Tintera (WASH 13168), Braun (YAMH 57088), and McLean (WASH 812) are sourced from the second deepest WBZ. Yields in this zone are typically 27 – 30 gpm but are as low as 5 gpm in some wells (Tintera). This primary WBZ appears to be approx. 200 ft thick based on well logs, and likely corresponds to vesicular layers of the Sentinel Bluffs member of the CRBG (Ahern, 2017). Yields in the lower two WBZs range from 3 to 20 gpm.

Springs on both the southwest and northeast slopes of the Chehalem ridge are fed by these water-bearing basalt units. Gordon Springs (elev. ~700 ft AMSL) and the springs that supply the City of Newberg surface water rights south of the Cochran property appears to be an outflow from the lowest observed WBZ. The elevations of the un-named spring east of Gordon Springs (elev. ~875 ft AMSL), Skelton Springs and Snider Springs to the west (elev. ~880 ft AMSL) are related to the primary WBZ that hosts the Cochran and neighboring wells. Several unmapped springs along the un-named tributary of McFee Creek about a mile to the north are also likely connected to this WBZ. Springs on the crest of the ridge, including those related to Cert. 8639, Cert. 7689, Cert. 92233, Cert. 44800, and Cert. 58897, are connected to the low-yielding shallow WBZ that sources the 200-ft deep Royer well.

The CRBG basalts continue below the lowest WBZ identified in this review. Based on regional geologic mapping and nearby deep well logs (WASH 73137), the layered basalts have a vertical thickness of 850 – 950 ft. Underlying the CRBG is the Scappoose Formation, which consists of interbedded sandstones, conglomerates, and mudstones and may be locally water-bearing (Ahern, 2017).

### Application G-18843 and Water Availability

Application G-18843 was filed on October 21, 2019 proposing the appropriation of 0.019 CFS (8.5 gpm) of water from a new well on Tax Lot 3201. The proposed water right would be for irrigation (March – October) and nursery use (year-round) of approximately 20 acres. The Initial Review and Groundwater Review are inconsistent in their use of the proposed acreage and at times use 21 acres and at other times 20 acres. For this review, CwM will use 20 acres of irrigation as the applicants requested place of use. It is understood that previous groundwater appropriation by the applicant has been unpermitted and that the point of appropriation used for unpermitted pumping was not identified. Based on local geology, pumping from this undocumented POA could have significant effects on neighbors' springs (as reported).

The location of the new well proposed, Tax Lot 3201, borders the Cochran property to the south, with the property line less than 100 ft from the Cochran home. The proposed new well is located at the southwest corner of Tax Lot 3201, ~1,300 ft south of the Cochran well and less than 400 ft from two other neighbor's wells. The Cochran well is located at the crest of the ridge (elev. ~1,360 ft AMSL) while the proposed well under G-18843 would be at the top of the southwest slope of the ridge (elev. ~1,280 ft AMSL). The proposed design (400 ft deep) places the bottom of the well only 40 ft above the bottom of the Cochran well and in the same WBZ. Furthermore, because of its location, the proposed well would be located upgradient of many neighboring wells to the north and several important springs to the south fed by the same WBZ.

The site is located within the Chehalem Mountain Groundwater Limited Area (CMGLA). Although water levels for most CRBG monitoring wells in the region have stabilized since the CMGLA was formed, some still show declining trends (WASH 3443, approx. 2.9 miles north). The proposed rate of 0.019 CFS (8.5 gpm) is within the range of yields observed in this WBZ. However, CwM believes that pumping at the proposed location, depth, and rate could have significant impacts on neighboring wells. Hydrogeologic properties of the water-bearing basalts and the very limited recharge area for these WBZs makes the system sensitive to overdraft. This conclusion was supported by John Rehm, RG (CWRE G-1137) in an September 27, 2019 letter regarding application G-18843, where he stated "*these rocks are good for domestic use, but cannot endure heavy use for broad irrigation of lawns or for other greater water uses*". Springs on the ridge that contribute to flows in Chehalem Creek could be heavily impacted by changes in static water level. The April 3, 2020 OWRD groundwater review states that there is potential for substantial interference with these springs. Furthermore, the review states that the maximum rate allowable in the Chehalem Creek basin based on 80% low-flow exceedance would be 1.75 gpm, not the proposed 8.5 gpm, which is approximately five times the rate estimated by OWRD's technical review.

### Recommendation to Deny

It is the professional opinion of CwM-H2O that the OWRD should deny the groundwater appropriation as proposed in Application G-18843 and as allowed by rule at a rate of 1.75 gpm. This conclusion is based on the following facts supported by the hydrogeologic framework described above:

- Although multiple water-bearing zones exist, groundwater availability on the crest of the Chehalem Mountains is severely limited by aquifer properties and a small recharge area. Any additional use will diminish groundwater availability to senior priority residential users.
- The location of the proposed point of appropriation within the CMGLA and Chehalem Creek basin restricts any new groundwater use for irrigation to a maximum allowed rate of 1.75 gpm in the irrigation season from March – June and October, and no use in July, August, and September. Continuous pumping at 1.75 gpm over the available period would yield 1.2 acre-feet per year of water, which is a fraction of the proposed water demand needed for the 20- acre growing facility, which would be 20 acre-feet. Based on this finding alone the Department should note that the groundwater resource is insufficient for the proposed beneficial use.
- It is speculation on the part of the OWRD reviewer to suggest that the applicants proposed rate for 8.5 gpm, nearly five times greater than the allowable rate, will have a similar impact to nearby wells as the allowed rate of 1.75 gpm. The greater rate will have a greater detrimental impact on existing senior residential water users, and it is five times greater than the allowed rate of 1.75 gpm calculated by OWRD and based on limiting detrimental impacts to surface water flow.
- Additional appropriation from any water-bearing zone has the potential to cause injury to multiple senior priority domestic groundwater users that rely on neighboring wells, which are completed to various depths in all identified WBZs within the CRBG. Any new well would have to appropriate groundwater from below ~ 500 ft AMSL (depth at the site of ~790 ft) to avoid direct impacts to other water users and be sealed to that depth.
- Additional appropriation from any water-bearing zone has the potential to diminish flow from multiple local springs, which supply senior surface water users as well as in-stream flows for state and federal listed fish species.
- The applicant's proposed use of groundwater to support irrigation for a commercial agriculture operation at this location is the result of poor water resource due diligence and business planning on the part of the applicant. The Department's analysis clearly

shows that there is not a sufficient groundwater resource within the WBZs of the CRBG to support the applicants proposed use.

Thank you for considering these recommendations concerning Application G-18843. If you have any questions, please contact the undersigned at (503) 799-0304.

Sincerely,

**CwM-H2O, L.L.C.**



Robert Long, RG, LHG, CWRE  
Principal Consultant

## References

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