December 28, 2022

To: Permitting Project Manager

(Please send me notification of any official notices concerning this application – Fall City Water District, PO Box 1059, Fall City WA 98024 – 425-222-7882)

RE: File No.: PLAT22-0005 Hazel 16

Hazel 16 Subdivision (King County Tax Parcel Nos. 094310-0384 & 094310-0390):

Fall City Water District Comment:

Fall City Water District requests the proposed large on-site septic system (LOSS) be relocated outside the District’s Wellhead Protection area and its designated 6-month critical aquafer recharge area(CARA) to the northeastern portion of the development property along 332nd Ave SE. (See Map)

Although the original LOSS location has been moved farther away from the District’s Well 1 and 2 wellheads, the proposed location is still within District’s Well 1 and 2 Wellhead Protection Plan and its designated 6-month critical aquifer recharge area (CARA)). Well 1 and 2 supply approximately 86% of Fall City’s drinking water.

The District’s hydrogeologist, Robinson Noble, Inc. reviewed wells 1 and 2 well logs, the District’s Wellhead Protection Plan, studies from R.W. Beck and geologic mapping of the area with respect to the proposed LOSS.

**Robinson Noble, Inc. Findings**

*District’s Wellhead Protection and its designated 6-month critical aquafer recharge area (CARA).*

*Fall City is built on a topographic terrace on the southern side of the Snoqualmie River Valley, near the confluence of the Raging and Snoqualmie Rivers. This terrace is a complex mixture of alluvial and glacial deposits, comprised of the alluvial fan formed at the mouth of the Raging River, as well as the recent alluvium deposited by the Snoqualmie River, all overlying older glacial and non-glacial sequences. The geology of the area has been described through several studies, the most recent of which was completed by Dragovich, et al. in 2007.*

*Wells 1 and 2 both produce water from the same confined sand and gravel aquifer. The aquifer was encountered at a depth of approximately 178 feet below ground at Well 1 and at 165 feet below ground in Well 2. The static water level in the aquifer is about 34 feet below land surface. The aquifer is confined by lower-permeability materials such as silts, clays, and clayey or silty sands that start at approximately 85 feet below ground. The lower permeability layers overlying the aquifer are approximately 77 feet thick in well 1, but 26 feet thick in Well 2. However, the well logs indicate that these lower permeability layers are rather heterogeneous and differ in character and thickness between the wells.*

*Though described as Vashon-age sediments in the District’s Water System Plan, the current interpretation of the geology of the area describes the aquifer as glacial outwash sediments from a pre-Olympia-age glaciation, specifically deposits of the Possession Glaciation.*

*Studies and geologic mapping have identified two separate aquifer systems in the shallower portion (less than 250 feet deep) of the unconsolidated materials filling the valley. The shallower of the two aquifers is a water table aquifer that is formed in the shallower sands and gravels of the alluvial fan deposits that form the surficial materials in the area. The deeper aquifer system is the sand and gravel found beneath lower-permeability glaciolacustrine deposits and underlying non-glacial deposits.*

*Generally speaking, groundwater flow is towards the north in both the shallow and deeper aquifer systems described. Locally, there may be geologic conditions that alter the flow rates and directions; that sort of a definition is beyond the scope of this review.*

*The siting of a LOSS near the District’s wellfield is a concern. Septic systems are specifically designed to inject waste water into the subsurface and are known to increase nitrate concentrations in groundwater. Additionally, should a release of other contaminants occur via septic discharge, there is no surficial evidence of the contamination. Septic systems are identified as the main hazard to the District’s wells in the District’s current Wellhead Protection Plan.*

*The presence of a denser residential development served by a single LOSS poses even more of a threat than multiple residences each served by their own septic systems and drainfields because the large on-site system will allow increased housing density and concentrate the septic effluent in one compact area. The increased housing density will result in a commensurate increase in effluent loading, requiring a higher total septic system capacity to accommodate the loading from more residences. This results in a larger waste stream being applied in a more concentrated drainfield area than occurs under existing conditions.*

*The fact remains that the proposed drainfield is very close to the wellheads. The heterogeneity of the subsurface materials is such that the local flow directions are not as well understood as the general regional flow directions. Indeed, the mounding of effluent underneath the drainfield of the proposed LOSS may be sufficient to locally alter groundwater flow directions, with the result that some of the effluent flows towards the wellheads.*

*While Well 1 is constructed with a sanitary surface seal of bentonite to 26 feet below surface, Well 2 was constructed prior to the enactment of the laws dictating sealing requirements. There is an indication that Well 2 may have a surface seal to 20 feet, but the sealing material is not specifically identified. Additionally, these surface seals do not extend into the confining layer, described above, that occurs at about 85 to 90 feet below ground. It is possible, should effluent migrate toward the wells, that it will encounter the well casings below the surface seals and potentially migrate further along the casings, through the confining layer, and into the aquifer.*

*The proposed application of an increased amount of septic effluent to the subsurface via a single large drainfield in close proximity to the wellheads represents an increased risk to the groundwater resources when compared to the current condition.*

*The District’s wells produce water from a confined aquifer separated from a shallower water-table aquifer by a series of low permeability layers. This deeper aquifer is generally protected from surficial impacts by these lower-permeability materials between land surface and the top of the aquifer. However, the effectiveness of the protection afforded by these low permeability layers is reduced because the well’s surface seals terminate above the low permeability layers. Regardless, the wells have historically experienced no contamination issues due to the operation of septic systems for wastewater disposal. However, historically, septic loading has occurred in a more diffuse manner than will occur with the planned LOSS.*

*Ideally, the proposed LOSS drainfield should be located as far away from the District’s wellheads as possible within the constraints of the development plans. This would ideally position the drainfield in the northeastern portion of the property.*

The District’s water supply must be protected from possible contamination. Therefore, the District request the proposed LOSS drainfield is located outside the District’s Wellhead Protection area and its designated 6-month critical aquafer recharge area (CARA). A permissible location would be on the northeastern portion of the development property along 332nd Ave SE.

Please contact me if you have any questions.

Sincerely,

Dusty Possert

Operations Manager