



April 19, 2017

Ms. Taine Wilton
Edmonds School District #15
20420 68th Avenue West
Lynnwood, WA 98036

**RE: DRAFT GROUNDWATER MONITORING PLAN FOR STORMWATER
MANAGEMENT, MADRONA SCHOOL REPLACEMENT PROJECT**

Dear Ms. Wilton:

This letter presents a summary of the draft groundwater monitoring plan for the Madrona School Replacement Project (the Project). This draft groundwater monitoring plan is based on our discussions with the Edmonds School District (District) and with Ms. Mary Shaleen-Hansen of the Washington State Department of Ecology (Ecology) Water Quality Program.

The District plans to utilize bioretention facilities and underground injection control (UIC) wells to provide onsite stormwater management for the new Madrona School Replacement Project (Project). Most of the Project stormwater will be managed using UIC wells; these wells will terminate about 50 feet above the regional aquifer that is present in the Vashon Advance Outwash deposits (Qva aquifer). The Project stormwater management facilities have been designed in accordance with applicable stormwater codes, both local (City of Edmonds) and state (Ecology). These codes are intended to protect groundwater and surface water quality through appropriate stormwater management techniques. Applicable stormwater codes/guidance for this Project include:

- Stormwater Code Supplement to Edmonds Community Development Code Chapter 18.30 (Edmonds, Washington, 2010);
- Guidance for UIC Wells that Manage Stormwater (Ecology, 2006); and
- Stormwater Management Manual for Western Washington (Ecology, 2005).

The Project is located within the mapped ten-year time of travel zone for the Deer Creek Group A municipal water supply source, operated by Olympic View Water and Sewer District. A requirement of the applicable stormwater code is that the infiltrated stormwater not cause a violation of Ecology's Groundwater Quality Standards. To address this requirement, the

Stormwater Management Manual for Western Washington has defined Site Suitability Criteria (SSC) for infiltration facilities to include:

1. SSC-1, Setback Criteria, recommends that stormwater infiltration facilities be set back at least 100 feet from wells and springs used for public drinking water supplies. SSC-1 also states that infiltration facilities located within the ten-year time of travel zone of a drinking water supply must comply with Washington State Department of Health wellhead protection program requirements.
2. SSC-2, Ground Water Protection Areas, recommends verification testing of completed infiltration facilities within wellhead protection zones.
3. To verify that the infiltration facilities do not cause a violation of Ecology's Groundwater Quality Standards, SSC-9, Verification of Performance, typically includes the use of groundwater monitoring wells for groundwater level and groundwater quality monitoring.

The District is developing a Project Operations and Maintenance Manual for the stormwater facilities, as well as a Landscape Management Plan that includes pesticide and herbicide management. These documents, and ongoing Madrona School maintenance staff training, are intended to reduce the potential for contamination of Project stormwater and surface water and to establish protocols to mitigate potential releases.

To demonstrate that the Project on-site stormwater management approach does not endanger the Qva regional aquifer, the District will perform groundwater level and groundwater quality monitoring. The groundwater level monitoring is intended to verify that a separation continues to exist between the top of the Qva regional aquifer and the UIC wells. The groundwater quality monitoring is intended to verify that the Qva aquifer groundwater quality is not degraded by the Project stormwater management approach.

The District's groundwater monitoring approach includes the following elements:

- Continue to monitor groundwater levels in the two existing monitoring wells, OW-1 and OW-2, that are located on the Project site. Monitoring is currently in progress and includes the use of water level data logging transducers. Monitoring will continue for a minimum of two years after the UIC wells have been brought online.
- Install and develop one to two additional monitoring wells on District property, located downgradient of the Project UICs. Monitoring well drilling is planned for late spring or early summer 2017. Placement of the well(s) will preferentially target the area downgradient of the parking lot UIC wells. The parking lot stormwater will

- enter the parking lot UIC wells after being treated by code-approved bioretention and oil/water separation facilities. The additional monitoring well(s) will likely be drilled approximately 500 to 600 feet to the northwest of the parking lot UIC well array, on District property. The well(s) will likely be equipped with 20 feet of screen, installed from about 5 feet above to about 15 feet below the top of the Qva regional aquifer.
- Evaluate the Qva regional aquifer gradient beneath the Project, based on the new and existing Project monitoring wells. If existing well OW-1 (south end of the track) is found to be upgradient of the site in general, it may be used as a background water quality monitoring well. If OW-1 is not determined to be upgradient, then the District proposes to install a new upgradient monitoring well, likely situated on the east-central portion of the Project site and screened within the upper 10 to 15 feet of the Qva regional aquifer.
 - Monitor groundwater levels in the new monitoring well(s) using data logging transducers for a minimum of two years after the UIC wells have been brought online.
 - Prior to the UIC wells being brought online, perform one baseline sampling of the downgradient and upgradient Project monitoring wells for the following:
 - Field parameters (pH, temperature, specific conductance, dissolved oxygen, and turbidity);
 - Primary and secondary drinking water inorganic chemical characteristics and physical characteristics listed in Tables 5 and 6 of Washington Administrative Code 246-290-310;
 - Selected petroleum hydrocarbon-related constituents (diesel-, oil-, and gasoline-range organics and benzene, toluene, ethylbenzene, and xylenes);
 - Polycyclic aromatic hydrocarbons;
 - Pesticides and herbicides;
 - Other analytes, if any, required by Ecology.
 - Perform seven additional baseline samplings of the upgradient and downgradient Project monitoring wells. Anticipated analytes include the selected petroleum hydrocarbon-related constituents and the analytes detected in the first sampling event; however, the actual list of analytes may differ, based on permit requirements from Ecology. The baseline sampling events will be spread out evenly over the year prior to the UIC wells being brought online, on approximately eight-week intervals, with the final baseline sampling to culminate in approximately October 2018.

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- Once the UIC wells are operational, perform eight quarterly samplings of the upgradient and downgradient Project monitoring wells for the permit-required analytes. This sampling will be started approximately three months after the UIC wells have been brought online.
- Upon completion of the eight quarterly sampling events, perform a statistical analysis of the baseline and quarterly sampling to evaluate if UIC stormwater is impacting the Qva aquifer groundwater quality downgradient of the Project UIC wells.
- If a spill or release is known to occur at the Project site, and if the District considers that release to have a reasonable chance of reaching the UIC wells, additional groundwater sampling may be performed.

Sincerely,

SHANNON & WILSON, INC.

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Senior Hydrogeologist

Jim Bailey, LHG, PG
Senior Associate
National Well Services Director

PVH:JSB:SWG/pvh

Enc: Figure 1 – Proposed Groundwater Monitoring Locations

REFERENCES

- Edmonds, Washington, 2010, Exhibit A - Stormwater code supplement to Edmonds Community Development Code Chapter 18.30: Edmonds, Wash., April 20, available: <http://www.edmondswa.gov/development-a-design-stds-text/engineering-codes-design.html>.
- Washington State Department of Ecology (Ecology), 2005, Stormwater management manual for western Washington: Olympia, Wash., Washington State Department of Ecology Publication nos. 05-10-029 through 05-10-033, 5 v.
- Washington State Department of Ecology (Ecology), 2006, Guidance for UIC wells that manage stormwater: Olympia, Wash., Washington State Department of Ecology Publication no. 05-10-067, 50 p.