



**SEPA ADDENDUM TO THE ENVIRONMENTAL CHECKLIST
FOR
THE MADRONA K-8 SCHOOL REPLACEMENT PROJECT**

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1. Purpose of the Addendum

A Mitigated Determination of Non-Significance (MDNS) was issued for the Madrona K-8 School Replacement Project on June 17, 2016. On October 27, 2016, the Olympic View Water and Sewer District (OVWSD) requested that additional analysis be conducted on the effect of the stormwater treatment approach on OVWSD's Deer Creek water treatment plant supply.

The proposed stormwater treatment approach includes the use of Underground Injection Control (UIC) wells to infiltrate treated stormwater runoff on the Madrona K-8 School site. These UIC wells would be located within the OVWSD's 10-year time of travel zone for the Deer Creek municipal water supply surface water source, which consists of a spring tapping the regional Vashon advance outwash aquifer (Qva). The spring provides approximately 40 percent of OVWSD's water supply (Danielson, 2016). The purpose of this Addendum to the SEPA Checklist is to evaluate the potential impacts that infiltrated project stormwater could have on the OVWSD water supply.

Shannon & Wilson (an engineering consultant for the Edmonds School District) conducted a study that evaluated the feasibility and impact of using UIC wells for project stormwater discharge management. The findings presented in the resulting Hydrogeologic Report (Shannon & Wilson, 2016) were used as the primary source of information for this addendum.

SEPA regulations state that an addendum may be prepared to address new project-related environmental information that does not substantially change the analysis of significant impacts (see WAC 197-11- 600(4)(c)). An addendum is defined in the State's SEPA Rules (WAC 197.11.706) as follows:

An environmental document used to provide additional information or analysis that does not substantially change the analysis of significant impacts and alternatives in the existing environmental document.

This addendum to the SEPA Checklist and MDNS has been prepared to provide additional analysis regarding potential water quality impacts associated with the UIC wells. On review of this additional analysis, Edmonds School District (the District) finds that this additional information does not substantially change the prior mitigated determination of no significant impacts (MDNS) in the existing environmental documentation.

2. Project Description

The District proposes to construct a new elementary school to replace the existing approximately 86,500 square-foot Madrona School. The new school facility would be constructed on the baseball field south of the existing school. The facility would be approximately 80,000 square feet in size, include six new single-story buildings, a 2,500 square foot covered play area, covered walkways, parking areas, and playground equipment. A full project description is provided in the SEPA Checklist and the MDNS prepared for this project. The project description provided in this Addendum includes updated information and additional detail regarding the stormwater treatment approach. Stormwater at the existing school is directed into dispersal trenches to the west of the parking area and roof drain trenches to the east of the school. During storm events and periods of high stormwater flows, water often pours over the edges of these trenches and into the forested slopes to the west of the school and the ravine to the east.

For the proposed project, stormwater runoff will be collected on roofs, in catch basins, and in bioretention planters. It will be conveyed, via gravity flow, either to the adjacent wetland east of the

development or to a series of UIC wells. Stormwater conveyed to the wetland maintains the base-flow required for wetland functionality. The project proposes the use of approximately 16 UIC wells in four array clusters (either 3 or 5 wells per cluster) to infiltrate stormwater runoff. The UIC wells within each cluster will be approximately 30 to 50 feet apart.

The proposed stormwater management approach is designed to meet or exceed the City of Edmonds (Edmonds) and the Washington State Department of Ecology (Ecology) stormwater and UIC design manual requirements (Edmonds, 2010; Ecology, 2005 and 2006). Stormwater from “pollution generating” areas (the parking lot) will be pre-treated using best management practices (BMPs) for target pollutants and sediments before discharge to the UIC wells. Pretreatment will include use of bioretention planters. In areas where the immediately underlying soils have sufficient permeability, the planters will also provide some flow control benefits via infiltration. The bioretention planters have been designed in accordance with the Edmonds stormwater code (Edmonds, 2010) and as described in the Low Impact Development Technical Guidance Manual for Puget Sound (Puget Sound Action Team, 2005; Puget Sound Partnership, 2012). Additionally, an oil/water separator will be used to further treat runoff from the parking lot areas, per Edmonds standards, prior to its conveyance to UIC wells. The UIC wells will be constructed in parallel with a manifold distribution system. This system will use dead storage to form a level pool for stormwater to evenly distribute to each well. Additionally, the dead storage will encourage sedimentation prior to conveyance to the UIC wells. A valve is included upstream of each UIC well that can be closed during maintenance or emergency operations (e.g., fire suppression activities). From the UIC wells, the water will be infiltrated into the underlying unsaturated Qva soils at approximately 47 feet above the top of the Qva aquifer. No onsite detention of storm flows will be required.

Most of the site is considered to be “non-pollution generating” by Edmonds and Ecology codes. Accordingly, these non-pollution generating areas have not been provided with runoff treatment. These areas include lawns, landscape planters, pedestrian facilities, the running track, occasionally used maintenance drives, and roofs. The project will implement a landscape management plan designed to eliminate the use of pesticides, minimize the use of fertilizers, and reduce pollutants throughout all areas of the site that drain into the UIC wells.

3. Water Quality Assessment

This section provides additional detail regarding potential project-related water quality impacts. It includes a discussion of applicable plans, policies, and guidance materials; a summary of existing conditions; an assessment of potential impacts; and a list of potential mitigation measures.

3.1 Applicable Plans, Policies, and Guidance Materials

The following plans, policies, and guidance materials provide the framework for water quality protection in the study area and the use of bioretention and UIC wells for managing stormwater runoff.

Groundwater

Water Quality Standards for Groundwaters of the State of Washington (Washington Administrative Code [WAC] Chapter 173-200). This code implements the Water Pollution Control Act (Chapter 90.48 RCW) and the Water Resources Act of 1971 (Chapter 90.54 RCW) and sets groundwater quality standards. There are no standards related directly to stormwater infiltration or UIC wells. However, the code does provide guidance regarding designation of groundwater special protection areas.

[Snohomish County Ground Water Management Plan \(1999\)](#). This plan protects groundwater resources in Snohomish County by identifying and addressing issues concerning groundwater quantity and quality, and providing the framework for continued groundwater resource protection. The plan identifies stormwater infiltration facilities as being a potential source of contamination, and it states that “infiltration of stormwater to the subsurface should not have adverse impacts to groundwater quality on a sub-basin scale” (Snohomish County, 1999).

Surface Water

[Water Quality Standards for Surface Waters of the State of Washington \(Chapter 173-201A WAC\)](#). This code establishes water quality standards for surface waters of the state, pursuant to the Water Pollution Control Act (Chapter 90.48 RCW), that promote public health and enjoyment of the waters, as well as the propagation and protection of fish, shellfish, and wildlife. The use of infiltration to “capture pollutants and reduce surface runoff,” is discussed in terms of preventing or minimizing water quality impacts.

[Sediment Management Standards \(Chapter 173-204 WAC\)](#). This code establishes marine, low salinity, and freshwater surface sediment management standards for Washington State. The purpose of this chapter is to reduce and ultimately eliminate adverse effects on biological resources and significant health threats to humans from surface sediment contamination by: establishing standards for the quality of surface sediments, applying these standards as the basis for management and reduction of pollutant discharges, and providing a management and decision process for the cleanup of contaminated sediments. None of the sediment management standards are specific to stormwater infiltration or use of UIC wells.

[Edmonds Community Development Code, Storm Water Management \(Chapter 18.30\)](#). This code protects water resources, reduces the discharge of pollutants to the maximum extent practicable, and satisfies the state requirement to apply all known, available, and reasonable methods of prevention, control, and treatment to stormwater runoff prior to discharge to receiving waters (Chapter 90.48 RCW, Water Pollution and Control). Infiltration devices are considered to be a type of stormwater facility under the code; therefore, inspection and maintenance requirements stipulated in the code would apply to UIC wells.

[2005 Stormwater Management Manual for Western Washington](#). This plan identifies minimum requirements for development and redevelopment projects to control the quantity and quality of stormwater produced, ensuring compliance with water quality standards. It also provides the following set-back guidance, which is specific to stormwater infiltration facilities such as UIC wells (Ecology, 2005):

- Stormwater infiltration facilities should be set back at least 100 feet from drinking water wells, septic tanks or drainfields, and springs used for public drinking water supplies.
- Infiltration facilities upgradient of drinking water supplies and within 1, 5, and 10-year time of travel zones must comply with Department of Health (DOH) requirements (Washington State Wellhead Protection Program Guidance Document, DOH).
- Infiltration systems that qualify as UIC wells must comply with Chapter 173-218 WAC.
- Additional setbacks must be considered if roadway deicers or herbicides are likely to be present in the influent to the infiltration system
- From building foundations; ≥ 20 feet downslope and ≥ 100 feet upslope
- From a Native Growth Protection Easement (NGPE); ≥ 20 feet
- From the top of slopes $>15\%$; ≥ 50 feet.

- Evaluate on-site and off-site structural stability due to extended subgrade saturation and/or head loading of the permeable layer, including the potential impacts to downgradient properties, especially on hills with known side-hill seeps.

Wellhead Protection Areas

Snohomish County Code 30.62C, Critical Aquifer Recharge Areas. This code designates and protects critical aquifer recharge areas, which includes: sole source aquifers, Group A wellhead protection areas, and areas sensitive to groundwater contamination. Sole source aquifers are designated by the Environmental Protection Agency in accordance with the Safe Drinking Water Act of 1974. Group A wellhead protection areas are within the 10-year travel zone of Group A wellheads, determined in accordance with delineation methodologies specified by the Washington Department of Health under authority of Chapter 246-290 WAC. Areas of high, medium, and low sensitivity to groundwater contamination are based on depth to groundwater and in accordance with the investigation *The Ground-Water System and Ground-Water Quality in Western Snohomish County, Washington* (United States Geological Survey, Water Resources Investigations, Report #96-4312, 1997).

Edmonds City Code and Community Development Code 23.60, Critical Aquifer Recharge Areas. This code upholds the definition of critical aquifer recharge areas provided in WAC 365-190-030(3), which defines them as “areas with a critical recharging effect on aquifers used for potable water, including areas where an aquifer that is a source of drinking water is vulnerable to contamination that would affect the potability of the water, or is susceptible to reduced recharge.” As such, the code states that “no areas meeting criteria for CARAs exist in the vicinity of the city of Edmonds,” and therefore does not provide additional specific provisions for protection.

Deer Creek Water Supply Protection Plan (2001). The purpose of the Plan was to develop and document a program for protection and enhancement of the water supply obtained from OVWSD's Deer Creek Water Supply Facility. It includes guidelines recommended for consideration for long-term protection of the Deer Creek Watershed and public water supply facilities. Applicable guidelines (such as those that apply to the 10-year capture zone) are summarized below:

- Require that oil based and detergent based waste materials are treated by the sanitary sewer system.
- Consider potential impacts on the watershed in reviewing development proposals.
- Discourage use of chemical fertilizers by parks departments, businesses, and residences in the capture zones.
- Protect surface water bodies and groundwater wells through public awareness, etc., to assist in the water supply protection efforts of OVWSD.
- Notify OVWSD of potential threats to the water supply system (e.g., spills, septic tank failures, or other threats) through coordination with local emergency response participants, and coordinate remedial activities associated with the watershed with OVWSD.

Underground Injection Control

Washington Administrative Code (WAC), Chapter 173-218 Underground Injection Control Program. This code prevents groundwater contamination by regulating the discharge of fluids into UIC wells. It satisfies the intent and requirements of Part C of the Federal Safe Drinking Water Act and the Washington State Water Pollution Control Act (Chapter 90.48 RCW). It allows for discharge of

uncontaminated or properly treated stormwater to dry-wells so long as it is in compliance with Ecology's UIC regulations.

Guidance for UIC Wells that Manage Stormwater (2006). This document provides technical guidance for stormwater wells regulated under the UIC program, including design and pretreatment BMPs for UIC wells used along roads and parking areas, and those used for the treatment of roof runoff.

3.2 Existing Conditions

The project site is located in the Cedar/ Sammamish Water Resource Inventory Area (WRIA). The closest waterbodies include Echo Lake (approximately 1 mile away), Deer Creek (approximately 1.1 miles away), Lake Ballinger (approximately 1.2 miles away), and Willows Creek (approximately 1.3 miles away).

Deer Creek, located west of 108th Avenue West (between North Deer Drive and South Deer Drive), is fed by springs in the Deer Creek ravine produced from the Qva aquifer (Shannon & Wilson, 2016). The OVWSD uses the Deer Creek spring as a municipal water supply source. OVWSD provides domestic water and sanitary sewer services to the Town of Woodway, the southwest portion of the City of Edmonds (including the project site), and a portion of unincorporated Snohomish County. The Deer Creek water supply and treatment facility supplies approximately 40 percent of OVWSD's total supply (Penhallegon Associates Consulting Engineers, Inc., and Robinson & Noble, Inc., 2001).

In 2001, the OVWSD adopted a Water Supply Protection Plan for the Deer Creek water supply (see Section 3.1). The Plan delineates time-related capture zones to assign Wellhead Protection Areas. A time-related capture zone represents the time it takes for a particle of water to move along the flow path to the point of withdrawal. According to the Plan, the Madrona School project UIC well arrays would be located within the 10-year capture zone, which the Plan recommends as a Wellhead Protection Area (Zone 3)¹ for the Deer Creek water supply.

The project site is near two of OVWSD's test municipal supply wells ("Test Well" and "Shop Well"). Both of these wells are reportedly screened in the Qva aquifer; the project UIC wells are proposed to infiltrate stormwater into a shallower, unsaturated portion the Qva deposits. OVWSD does not currently use either of these wells for municipal water supply, although the Test Well may eventually be put into service as a municipal supply source, according to OVWSD. The Shop Well was previously screened in an aquifer underlying the Qva aquifer, and OVWSD was granted a water right for use of that aquifer as a municipal supply source. The Shop Well was later reconstructed with a shallower screened zone that is within the Qva aquifer. The Shop Well is located within the Lake Washington hydrologic basin, which, according to Robinson Noble (OVWSD's hydrogeologic consultant), is closed to new water supply allocations from the Qva aquifer. As a result, according to OVWSD and Robinson Noble, Ecology denied OVWSD continued use of its water right for the Shop Well location because the reconstructed Shop Well was now screened in the Qva aquifer. The previously granted water right for the Shop Well is in the process of being transferred to the Test Well site, according to Robinson Noble. OVWSD also has a Qva aquifer observation well south of Deer Creek ("Spring Well"), near the OVWSD spring collector pipe system. Table 1 summarizes the test and observation well details.

¹ Note: OVWSD's designation of time of travel zones has not been incorporated into the Washington State Department of Health (DOH) online mapping system. According to the DOH's Source Water Assessment Program, the project site lies outside of the 10-year time of travel (Group A wellhead protection area) for Deer Creek Springs (DOH, 2016).

Table 1. OVWSD Test and Observation Well Details

OVWSD Wells	Approximate Distance from Madrona Site	Use	Approximate 1/4/2017 Groundwater Elevation (Feet NAVD88)
8605 228 th St SW ("Test Well")	3,300 feet to the NE	Test well; may eventually be used for municipal supply	277
8128 228 th St SW ("Shop Well")	4,000 feet to the NE	Former municipal supply and test well; use now limited to seasonal irrigation supply for OVWSD shop/office area	276
S Deer Dr/108 th Ave W ("Spring Well")	5,000 feet to the NW	Observation well near the Deer Creek Spring OVWSD collector pipes	242

On January 4, 2017, personnel from OVWSD, Robinson Noble, and Shannon & Wilson together measured groundwater depths at the Test Well, the Shop Well, and the Spring Well. Survey data were unavailable for these wells. Therefore, Shannon & Wilson estimated the groundwater elevations for these wells (Table 1) by comparing the measured groundwater depth to ground elevations estimated from light detection and ranging (LiDAR) data. Shannon & Wilson also measured groundwater elevations on January 4, 2017, at the project observation wells (approximately 276.8 feet at OW-1 and 276.0 feet at OW-2) and at City of Edmonds observation well A-2 (approximately 261.0 feet). These well locations are identified in the project hydrogeologic report. The groundwater level data from the wells indicate that the local hydraulic gradient for the Qva aquifer is to the west/northwest at approximately 0.004 to 0.006 foot/foot. The OVWSD Test Well groundwater elevation is similar to that measured at the project site, indicating that the Test Well is cross-groundwater gradient from the project.

No municipal water supply wells are reported to be within 0.25 mile of the site. Although there are multiple irrigation and domestic wells in southwest Edmonds that are screened in the Qva aquifer, only one of these wells appears to be within 0.25 mile of the portion of the site undergoing redevelopment (Shannon & Wilson, 2016). One domestic use groundwater right has been registered for a well near Firdale Village. The well's exact location is not specified in the groundwater right; based on the owner's address, it is possible that it may be located within 0.25 mile of the site, cross-groundwater gradient to the project.

3.3 Assessment of Impacts

Most of the project site is located within OVWSD's 10-year WHPA for its Deer Creek spring source (which is a Group A municipal water supply). The spring produces water from the Qva aquifer. The project is being designed in accordance with the local stormwater code to prevent degradation of groundwater, thereby meeting the groundwater nonendangerment standard for UIC wells, as required by WAC 173-218-080.

For site areas classified as pollution generating (i.e., the parking lot), the planned BMPs (bioretention planters coupled with oil/water separation) are acceptable means of pretreatment under the local stormwater code. The project operation and maintenance procedures will address maintaining the functionality of the bioretention planters, e.g., via replacement of the bioretention soils if they become excessively contaminated (e.g., as the result of a spill). Under the stormwater code, most of the project site is considered to be non-pollution generating. UICs receiving stormwater from non-pollution generating surfaces automatically meet the nonendangerment standard (WAC 173-218-100 (h)). To protect groundwater quality, the stormwater routed to the UICs would be discharged into the underlying unsaturated Qva soils at approximately 47 feet above the of the Qva aquifer, which has filtration capability (Shannon & Wilson, 2016).

The project will implement a landscape management plan designed to eliminate the use of pesticides, minimize the use of fertilizers, and reduce pollutants throughout all areas of the site that drain into the UIC wells. Stormwater runoff from pollution generating surfaces such as streets and parking areas may contain chemical and biological contaminants in excess of state water quality criteria. Therefore, stormwater runoff from the site parking lot, which is considered to be a pollution generating surface, will be treated using BMPS to meet both Edmonds and Ecology water quality standards, in accordance with the locally approved stormwater code. Parking lot stormwater treatment will include filtration through bioretention planters and routing through an oil/water separator before being discharged into the UIC wells, thereby reducing the degree of contamination before the water is infiltrated into the ground.

The sorption characteristics of the vadose zone above an aquifer are directly dependent on the soil's physical and chemical characteristics. The greatest sorption capacity for removal of stormwater pollutants occurs when unsaturated soils consist of clays or silts with substantial clay present. These systems tend to have low infiltration rates; therefore, to be effective in infiltrating urban area and highway stormwater runoff for potential pollutant removal, these systems need large areas for infiltration (Lee, G.F., A. Jones-Lee, and S. Taylor, 1998). Shannon & Wilson determined that the concentrated infiltration of large volumes of stormwater would generally not be feasible for most of the shallow site soils, but infiltration into the underlying unsaturated sandy Qva soils would be feasible (Shannon & Wilson, 2016). Based on criteria presented by Ecology (2006), the soil treatment capacity of the unsaturated Qva soils between the target UIC depth (about 120 feet below the surface) and the top of the Qva regional aquifer (about 167 feet deep, or an additional 47 feet below the surface) is predominantly low to medium, indicating that these soils have some filtering/treatment capability (Shannon & Wilson, 2016).

The project would treat site stormwater for target pollutants and sediments in accordance with the local stormwater code requirements (City of Edmonds, 2010; Ecology, 2005 and 2006). The proposed stormwater treatment plan for the project incorporates bioretention planters for treatment and infiltration of site stormwater produced by pollution generating surfaces; drainage from the bioretention planters will be routed to an oil/water separator prior to conveyance to UIC wells. Studies have shown that the biofiltration process reduces the contamination risk to acceptable levels (Miller, et al., 2005). Concentrations of contaminants in the soils at stormwater infiltration sites, e.g., bioretention facilities, tend to be relatively high within the first inches from the point of infiltration. However, these concentrations typically are lower about a foot below the infiltration sites. Even in the long-term, soil contamination typically extends less than 2 feet depth (Barraud, et al., 2005). Although limited contamination of soils underlying infiltration systems is likely to occur, it is not often that such contamination results in contaminated groundwater, except in areas where an infiltration basin is underlain by a shallow groundwater table (Lee, G.F., A. Jones-Lee, and S. Taylor, 1998). This is not the

case for the proposed Madrona UIC well system, which will infiltrate at approximately 47 feet above the aquifer.

The height of the water table and excessive mounding of the water table due to infiltration affect the vulnerability of groundwater to contamination. Shallow water tables that persist for long periods increase the risk of contamination. The project hydrogeologic study included field testing of a full-size project pilot UIC well at greater than the design storm inflow rate, as well as modeling of the anticipated mounding effect of the proposed UIC arrays. The testing and modeling results indicated that the planned UIC wells would not discharge directly into groundwater, i.e., temporary water mounding due to infiltration would not create a continuous connection between the top of the Qva aquifer and the UIC wells. The modeling also indicated that the UIC arrays would not have an adverse effect on the adjacent slope (Shannon & Wilson, 2016). The project team recognizes that the introduction of nutrients into UIC wells may contribute to biofouling (plugging) of UIC wells, thereby reducing their effective life span (Shannon & Wilson, 2016). Therefore, to manage potential phosphorus and nitrogen exports from the bioretention planters, only mature, stable compost without biosolids or manure constituents will be used within bioretention planters, and elevated under-drains will be utilized to create a fluctuating anoxic/aerobic zone below the drain pipes (Shannon & Wilson, 2016).

3.4 Mitigation Measures

The following mitigation measures will be employed to further minimize potential impacts to water quality:

- Coordinate stormwater infiltration efforts in the project area with OVWSD to facilitate OVWSD's compliance with Washington State Department of Health source water protection requirements established under the Watershed Control Program (see protective measures stated in Section 3.1, Deer Creek Water Supply Protection Plan).
- Monitor the performance of the UIC clusters so that appropriate maintenance or UIC well rehabilitation can be scheduled.
- Install and monitor data logging transducers in some or all of the wells, and conduct periodic manual water level measurements.
- Provide stormwater valves at each UIC well to protect the wells during maintenance or emergency operations.
- Implement a landscape management plan designed to eliminate the use of pesticides, minimize the use of fertilizers, and reduce pollutants throughout all areas of the site that drain into the UIC wells, in accordance with the local stormwater code requirements.
- Implement an operations and maintenance manual for maintenance of the bioretention facilities, and UIC's including soil cleanup and replacement from spill contamination.
- Perform a regular and perpetual maintenance program for all of the site infiltration facilities to reduce siltation and bio-fouling, in accordance with the local stormwater code requirements.
- Perform bioretention facility soil cleanup and replacement if spills occur, in accordance with the local stormwater code requirements.
- Protect groundwater observation wells through the facility construction process, and use them to facilitate measurement of facility performance.
- Repair or properly abandon wells damaged during construction in accordance with WAC 173-160.

4. Conclusion

The proposed bioretention and UIC stormwater approach was designed to meet or exceed the Edmonds and Ecology stormwater design manual requirements (Edmonds, 2010; Ecology, 2005 and 2006). The bioretention planters are also being designed in accordance with the Low Impact Development Technical Guidance Manual for Puget Sound (Puget Sound Action Team, 2005; Puget Sound Partnership, 2012). Stormwater from pollution generating areas will be treated using BMPs for target pollutants and sediments prior to stormwater discharge to the UIC wells. The UICs will discharge the treated water into unsaturated soils deemed appropriate for stormwater injection under the stormwater code, based on unsaturated soil thickness and filtration capacity.

Because the mitigation measures set forth in Section 3.4 will be utilized, no significant adverse effects to the Qva aquifer or OVWSD's water supply are anticipated.

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