EDMONDS SCHOOL DISTRICT No. 15

Madrona Stormwater Presentation

EDMONDS SCHOOL DISTRICT No. 15

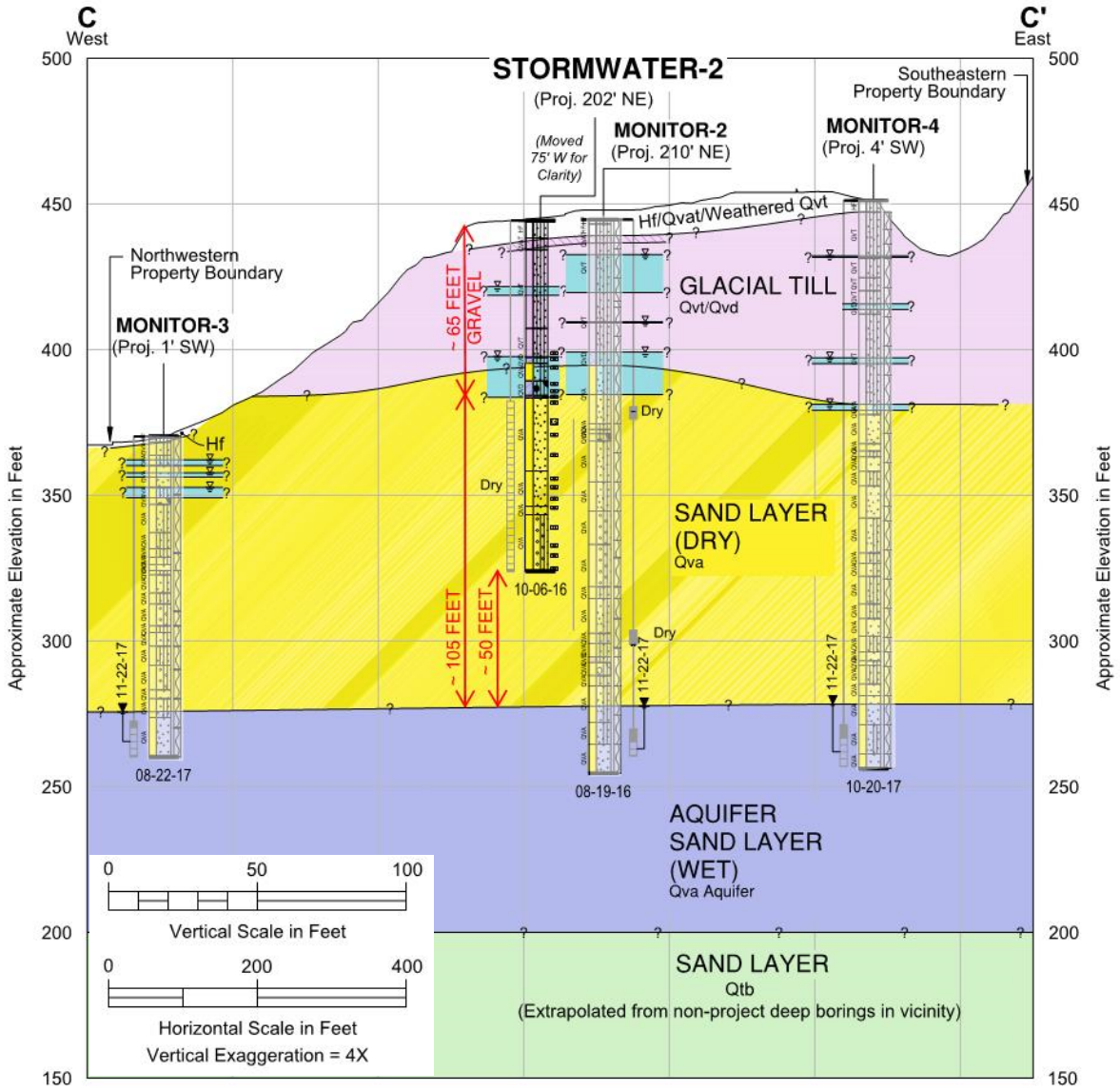
New Madrona School Stormwater System

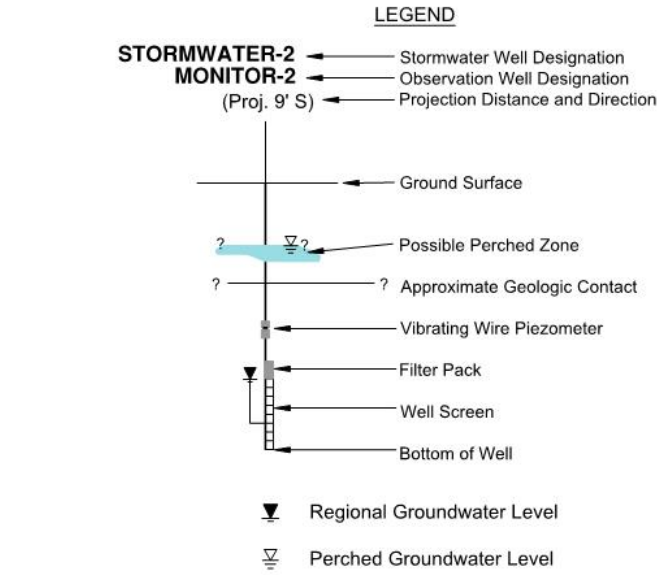
- Environmentally Safe & Friendly Design
- Highly Qualified Experts
- Complies with & exceeds City of Edmonds & Dept. of Ecology requirements
- Responds to Drinking Water Concerns
- Independently Reviewed

Edmonds
SCHOOL DISTRICT

EDMONDS SCHOOL DISTRICT No. 15

New Madrona Stormwater Well Cross Section





GEOLOGIC UNIT

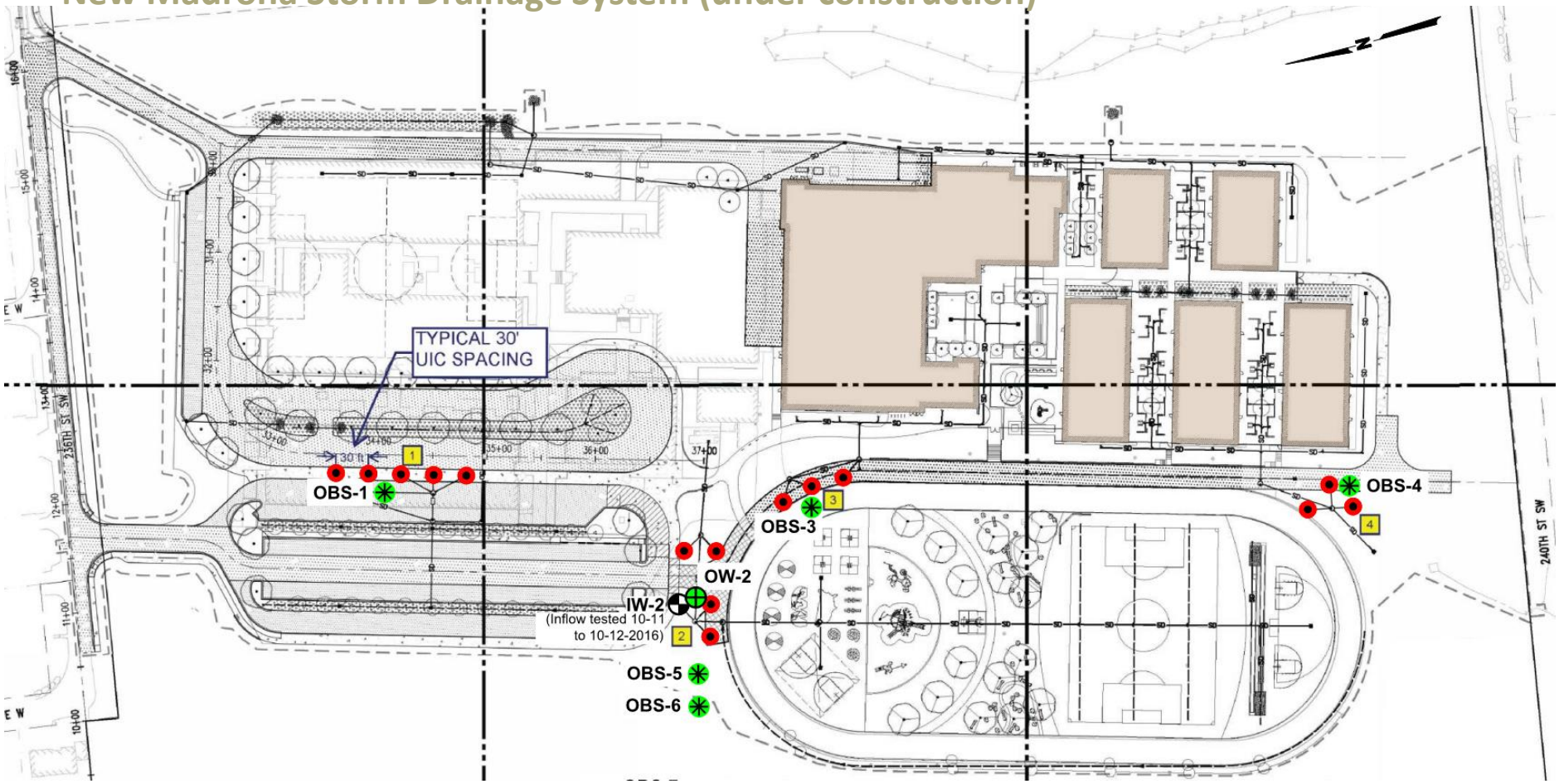
	Hf	Fill
GLACIAL TILL	Qvat	Vashon Ablation Till
GLACIAL TILL	Qvt	Vashon Lodgement Till
GLACIAL TILL	Qvd	Vashon Till-like Deposits
SAND LAYER	Qva	Vashon Advance Outwash (Unsaturated)
SAND LAYER	Qva	Vashon Advance Outwash (Saturated)
SAND LAYER	Qtb	Transitional Beds (Fine Grained)

GENERALIZED SUBSURFACE PROFILE C-C'

Edmonds SCHOOL DISTRICT

EDMONDS SCHOOL DISTRICT No. 15

New Madrona Storm Drainage System (under construction)



EDMONDS SCHOOL DISTRICT No. 15

New Madrona Storm Drainage System

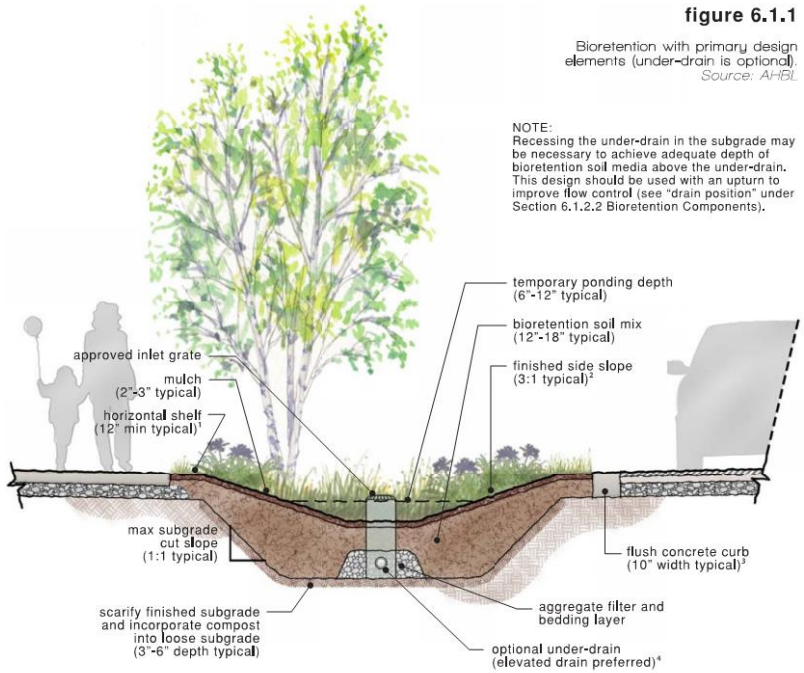


figure 6.1.1

Bioretention with primary design elements (under-drain is optional).
Source: AHBL

NOTE:
Recessing the under-drain in the subgrade may be necessary to achieve adequate depth of bioretention soil media above the under-drain. This design should be used with an upturn to improve flow control (see "drain position" under Section 6.1.2.2 Bioretention Components).

GENERAL NOTES:

- Area and depth of facility are based upon engineering calculations and right-of-way constraints.
- Check dams may be required depending on slope and flow velocities.
- Bottom width should be a minimum of 2 feet to prevent channelization.

FOOTNOTES:

1. Horizontal shelf between sidewalk or road and bioretention area slope for safety.
2. Steeper side slopes may be necessary depending on setting and require additional attention for erosion control, plant selection vehicle and pedestrian safety, etc.
3. See Section 6.1.2.2 for additional curb designs.
4. Elevated drain provides benefits compared to an under-drain placed on bottom of facility including improved stormwater, retention, plant survival in drier months and nitrogen removal.

L.A. Zoo's new bioswale median captures parking lot runoff - photo by Ciara Gonzalez

2012 Low Impact Development Technical Guidance Manual for Puget Sound

Edmonds SCHOOL DISTRICT

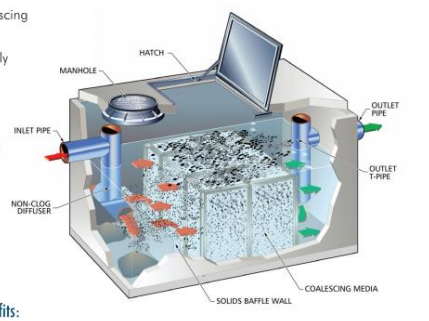
EDMONDS SCHOOL DISTRICT No. 15

New Madrona Storm Drainage System

SUPERIOR OIL/WATER SEPARATION

CONTECH ENGINEERED SOLUTIONS

The VortClarex® system is an oil/water separator that utilizes coalescing media to efficiently remove freely dispersed oil and other liquid pollutants from urban runoff and industrial discharges. It specifically targets oil and grease and is designed for sites where removal of these pollutants is of greatest concern or where oil and grease effluent targets are specified. It is typically installed belowground and in-line with the piping system and can also be installed in pre-assembled concrete manhole or vault designs.



Conventional oil/water separators provide gravity separation by using baffles or T-sections, but are only effective on oil droplets greater than 150 microns. The VortClarex coalescing media maximizes surface area, increasing performance and effluent quality. It is typically sized to remove oil droplets as small as 60 microns and achieve an effluent concentration of 10 mg/L or less.

The VortClarex coalescing media is housed within a precast concrete vault. Unlike other oil/water separators constructed of fiberglass or steel, it does not require anti-floatation hold-down straps or concrete traffic collars. Maintaining the system is easy using a standard water hose and vacuum truck, and the media can be cleaned either inside or outside the structure.

In most cases the system will be installed belowground to treat stormwater runoff; however treating oily water from floor drains and vehicle wash down pads is also possible with the VortClarex. In addition to belowground applications, the VortClarex can also be used to treat process and pumped flow applications in an aboveground configuration.

Features and Benefits:

- Polypropylene coalescing media
  - o Removes up to 99% of free oil droplets down to 60 microns (standard design)
  - o Effluent has TPH concentrations of 10 mg/L or less in typical stormwater applications
- Non-turbulent flow through the system
  - o Maximizes efficiency by increasing rise rate and size of droplets
- Precast concrete structure housing
  - o Ensures durability
  - o Meets HS-20 loading requirements
  - o Provides for a shallow installation
- Belowground system maximizes land use
- Meets Spill Prevention, Control and Counter Measure (SPCC) requirements
- Standard and custom models available

How it Works:

Flows enter the VortClarex system via a non-clog diffuser and are distributed across the chamber width. The influent passes over a solids baffle wall where settlable solids drop out, reducing the amount of solids in the flow as it enters the coalescing media. As the flow passes through the media, oily pollutants accumulate on the surface and come into contact with others to form larger, more buoyant droplets. These buoyant droplets rise upward through the media and are released near the water surface. The oil is trapped behind the outlet T-pipe, and treated water exits the system.

VortClarex specifically targets oil and grease

Learn more at www.ContechES.com 800.338.1122

RED TOP

H-30 LINE GATE

- **Iron seats (bronze seats optional)**
- **Each gate is hydrostatically tested**
- **60 feet maximum seating (face) pressure**
- **10 feet maximum unseating (back) pressure**
- **Non-rising stainless steel stems, double leads**
- **Bronze packing gland nut and lift nut**
- **Handwheel standard, 2" square operating nut optional**
- **NEW! Grease fitting on packing gland for continued ease of actuation**

H-30-1 Hub End

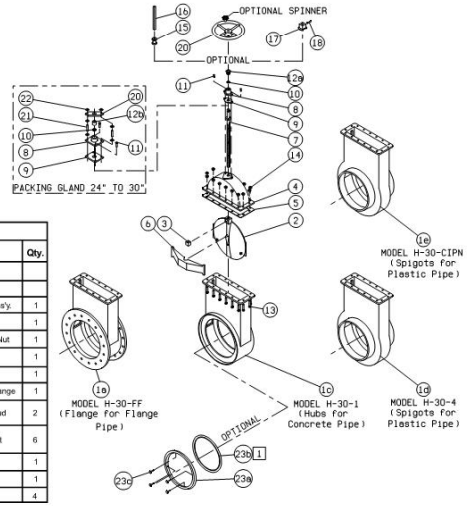
USES:

The Red Top Line Gate is designed for installation in pipe lines to eliminate the use of capped stands or standpipes. It is of heavy construction engineered to withstand constant usage over long periods of time.

FEATURES:

The gate is constructed of cast iron with a non-rising stainless steel screw which has also proven popular in the Waterman Pressure Gate. A screw with the standard Waterman double lead "Acme" type threads is offered.A handwheel is furnished.

The packing gland is made of cast iron with a bronze packing nut which eliminates "freezing" due to rust. A single wrench is required to adjust it.



PARTS LIST

No.	Name	Qty.	No.	Name	Qty.
1	Body	1	13	Bonnet Bolt	
2	Cover	1	14	Hex Nut	
3	Screw Nut	1	15	Stem Coupling Ass'y.	1
4	Bonnet	1	16	Extension Stub	1
5	Bonnet Gasket	1	17	2" Sq. Operating Nut	1
6	Arch	1	18	Pin	1
7	Screw w/Collar	1	19	Handwheel	1
8	Packing Gland Body	1	20	Pack. Retainer Flange	1
9	Packing Gland Gasket	1	21	Packing Gland Stud	2
10	Packing Gland Packing	2	22	Packing Gland Nut	6
11	Packing Gland Bolt	2	23a	Bronze Seat	1
12a	Packing Gland Nut	1	23b	O-Ring	1
12b	Packing Gland Sleeve	1	23c	Seat Screws	4

Waterman Industries

Edmonds SCHOOL DISTRICT

EDMONDS SCHOOL DISTRICT No. 15

Stormwater Monitoring Plan

Analytes	Lynndale ES			Shorewood HS			Madrona School				Notes
	Baseline	First 8 quarters (years 1, 2)	Annually (years 3, 4, 5)	Baseline	First 8 quarters (years 1, 2)	Next 12 quarters (years 3, 4, 5)	Baseline	First 4 quarters (year 1)	Second 4 quarters (year 2)	Annually (years 3, 4, 5)	
Field Parameters											
pH	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Field parameter
Specific Conductance	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Field parameter
Dissolved Oxygen	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Field parameter
Temperature	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Field parameter
Turbidity	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Field parameter
Bacteriological											
Coliform - Total	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	
Coliform - Fecal	No	No	No	No	No	No	Yes	Yes	Yes	Yes	
Total Metals											
Antimony (Sb)	Yes	No	No	No	No	No	Yes	Yes	Yes	Yes	
Arsenic (As)	Yes	No	No	No	No	No	Yes	Yes	Yes	Yes	
Asbestos	No	No	No	No	No	No	No	No	No	No	
Barium (Ba)	Yes	No	No	No	No	No	Yes	Yes	Yes	Yes	
Beryllium (Be)	Yes	No	No	No	No	No	Yes	Yes	Yes	Yes	
Cadmium (Cd)	Yes	No	No	No	No	No	Yes	Yes	Yes	Yes	
Chromium (Cr)	Yes	No	No	No	No	No	Yes	Yes	Yes	Yes	
Copper (Cu)	Yes	No	No	No	No	No	Yes	Yes	Yes	Yes	
Iron (Fe)	Yes	No	No	No	No	No	Yes	Yes	Yes	Yes	
Lead (Pb)	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	
Manganese (Mn)	Yes	No	No	No	No	No	Yes	Yes	Yes	Yes	
Mercury (Hg)	Yes	No	No	No	No	No	Yes	Yes	Yes	Yes	
Nickel (Ni)	Yes	No	No	No	No	No	Yes	Yes	Yes	Yes	
Selenium (Se)	Yes	No	No	No	No	No	Yes	Yes	Yes	Yes	
Silver (Ag)	No	No	No	No	No	No	Yes	Yes	Yes	Yes	
Sodium (Na)	Yes	No	No	No	No	No	Yes	Yes	Yes	Yes	
Thallium (Tl)	Yes	No	No	No	No	No	Yes	Yes	Yes	Yes	
Zinc (Zn)	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	
Anions											
Chloride (Cl)	Yes	No	No	No	No	No	Yes	Yes	Yes	Yes	
Cyanide (HCN)	Yes	No	No	No	No	No	Yes	Yes	Yes	Yes	
Fluoride (F)	Yes	No	No	No	No	No	Yes	Yes	Yes	Yes	
Nitrate (as N)	Yes	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	
Nitrite (as N)	Yes	No	No	No	No	No	Yes	Yes	Yes	Yes	
Ortho-phosphate (as P)	No	No	No	No	No	No	Yes	Yes	Yes	Yes	For comparison to Total P
Sulfate	Yes	No	No	No	No	No	Yes	Yes	Yes	Yes	
Total Phosphorus (as P)	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Per OVWSD's request
Petroleum Hydrocarbon-Related											
Diesel (Fuel Oil)	Yes	No	No	No	No	No	Yes	Yes	Yes	Yes	
Heavy Oil	Yes	No	No	No	No	No	Yes	Yes	Yes	Yes	
Gasoline	Yes	No	No	No	No	No	Yes	Yes	Yes	Yes	
Volatile Organic Compounds											
Benzene, Toluene, Ethylbenzene, & Xylene (BTEX)	Yes	No	No	No	No	No	Yes	Yes	Yes	Yes	
Polycyclic aromatic hydrocarbons (PAHs)	No	No	No	No	No	No	Yes	Yes	Yes	Yes	
Pesticides	No	No	No	No	No	No	Yes	Yes	Yes	Yes	
Herbicides	No	No	No	No	No	No	Yes	Yes	Yes	Yes	
PCBs	No	No	No	No	No	No	Yes	Yes	Annually	Yes	
Bis(2-Ethylhexl) Phthalate	No	No	No	No	No	No	Yes	Yes	Annually	Yes	
Physical Characteristics											
Color	No	No	No	No	No	No	Yes	Yes	Yes	Yes	
Total Dissolved Solids (TDS)	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	
Total Organic Carbon	No	No	No	No	Yes	Yes	No	No	No	No	This requirement has been dropped

Groundwater Monitoring Requirements Comparison

Department of Ecology Presumptive Project Application Requirements for Stormwater Well Monitoring

Other ways besides the highlighted cells in the table that the project exceeds typical DOE requirements:

Additional Analytes:

The detection limits need to be as low as the Ground Water Quality Standard criteria or lower.

4/28/2017, OVWSD/DOH requested coliform and phosphorus, both of which we have elected to include in the upgradient and downgradient well sampling suites.

Additional Design Elements:

Design and construction includes an oil/water separator in addition to the required biofiltration to meet City of Edmonds codes.

Flow Control - Shut off values for all stormwater well groups.

Enhanced treatment provided with raingardens.

Increased Duration:

Original plan included 2 years after establishement of baseline. The plan now includes 5 years after baseline is established, plus in the event of a major spill.

Legend

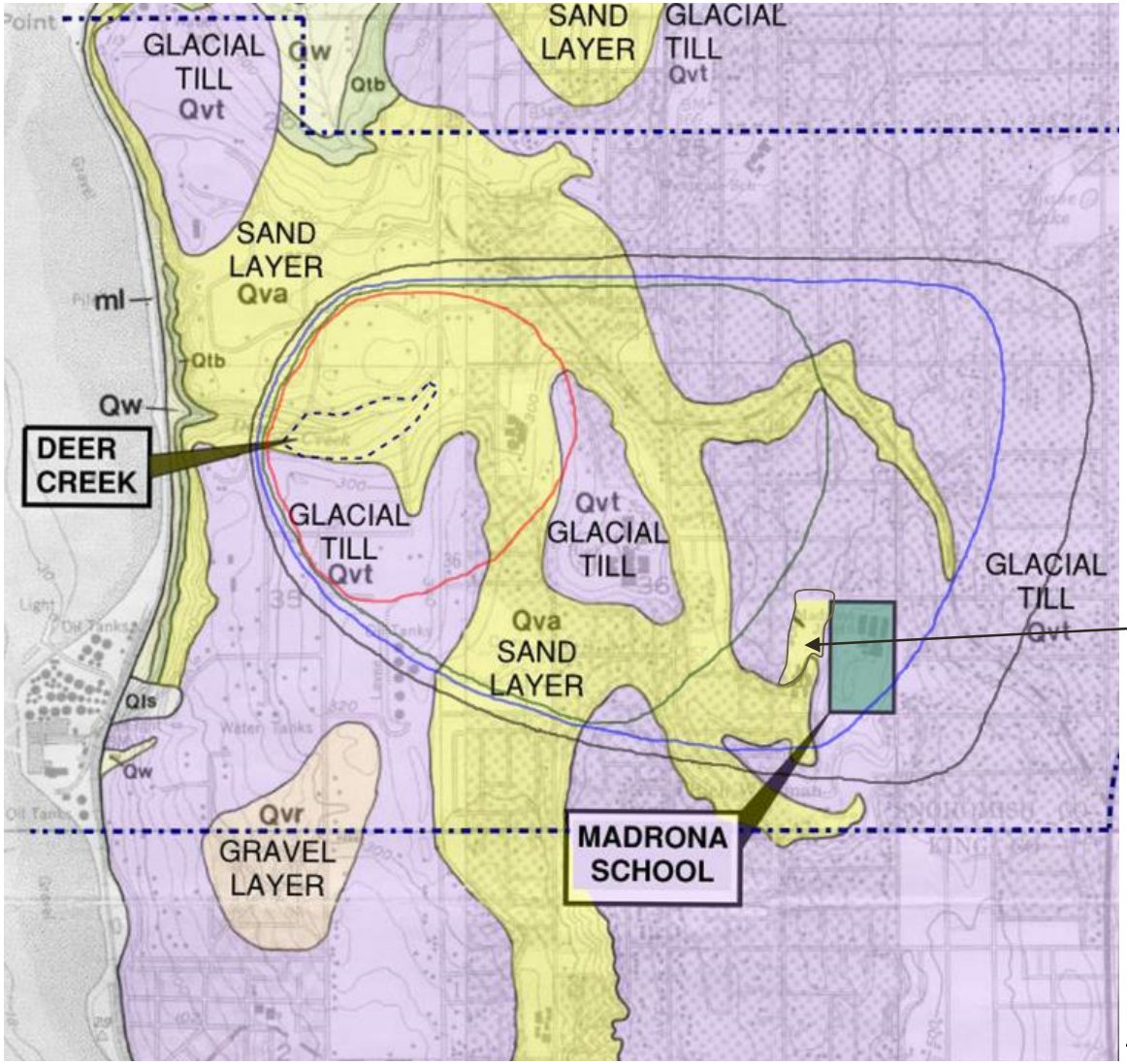
Yellow highlight = Additional Analytes not typically required by DOE

Green highlight = Baselines are not required, ESD completed baseline anyway for best practices.

Edmonds SCHOOL DISTRICT

EDMONDS SCHOOL DISTRICT No. 15

OVWSD Wellhead Protection Area showing groundwater travel times



LEGEND

- ml - Modified Land
- Qls - Landslide Deposits
- Qvr - Vashon RecessionalOutwash
- Qvt - Vashon Till
- Qva - Vashon Advance Outwash
- Qtb - Transitional Beds
- Qw - Whidbey Formation

- 1 Year Zone
- 5 Year Zone
- 10 Year Zone
- Buffer Zone
- Controlled Watershed Boundary
- Location (Approximate) of Non-Project Well

Area mapped by S&W

0 2000 4000

Approximate Scale in Feet

Hydrogeologic Report
New Madrona K-8 Project
Edmonds, Washington

SURFICIAL GEOLOGIC MAP

November 2016 21-1-22082-003

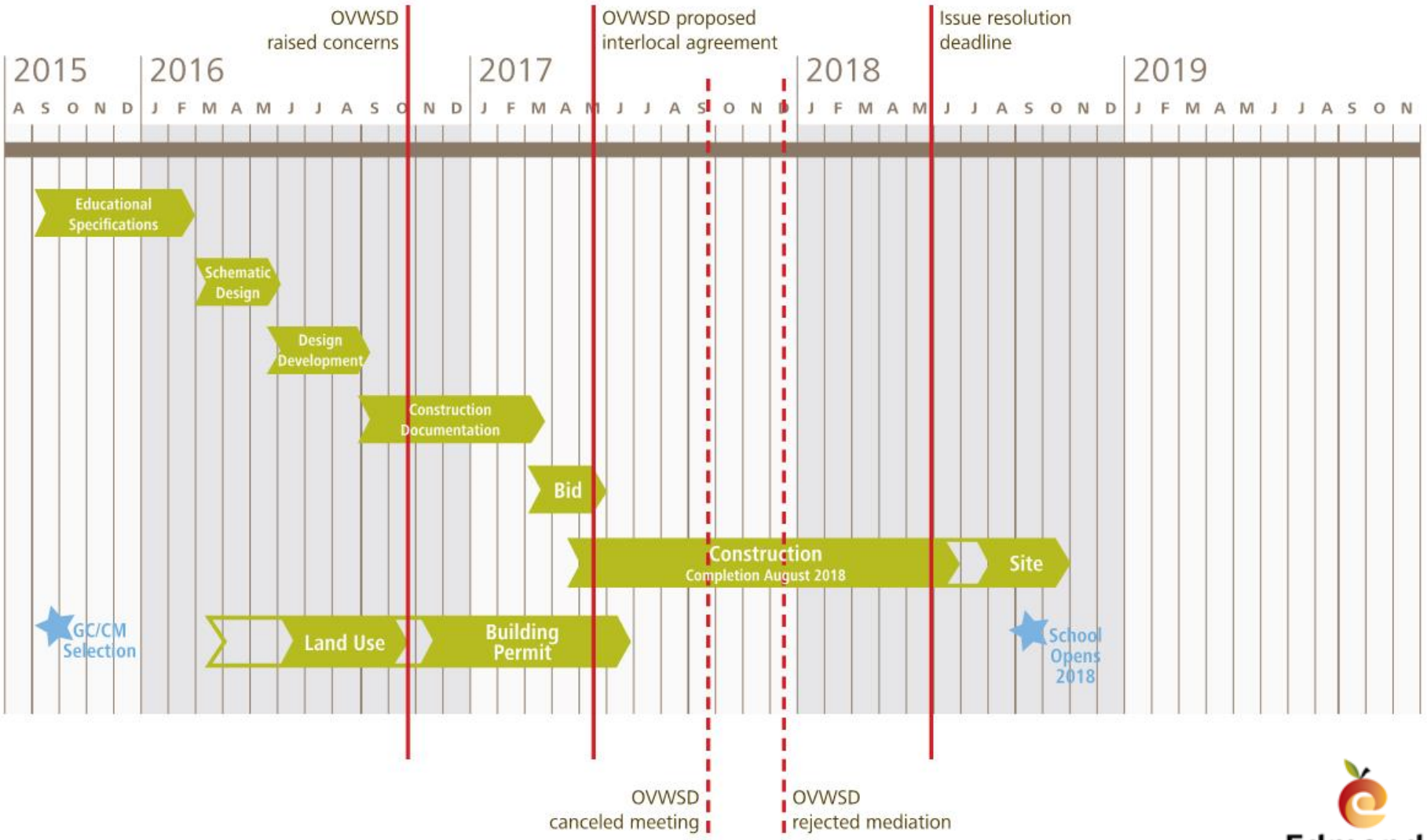
SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

FIG. 3

Edmonds SCHOOL DISTRICT

EDMONDS SCHOOL DISTRICT No. 15

Madrona School Replacement Accelerated Schedule



Edmonds SCHOOL DISTRICT

EDMONDS SCHOOL DISTRICT No. 15

Appendices – Background Information

- Existing Conditions
- New Madrona stormwater design features
- Watershed Characteristics
- ILA Discussion
- Dept. of Ecology & Dept. of Health Requirements
- ESD Monitoring plan features
- Madrona project schedule

Edmonds
SCHOOL DISTRICT

EDMONDS SCHOOL DISTRICT No. 15

Existing Madrona Site Constraints

mahlum

SITE ANALYSIS
MADRONA SCHOOL REPLACEMENT
EDMONDS SCHOOL DISTRICT | 29 JUNE 2017
MAHLUM ARCHITECTS INC

0 50' 100' 200'

Edmonds SCHOOL DISTRICT
Each student learning, every day!

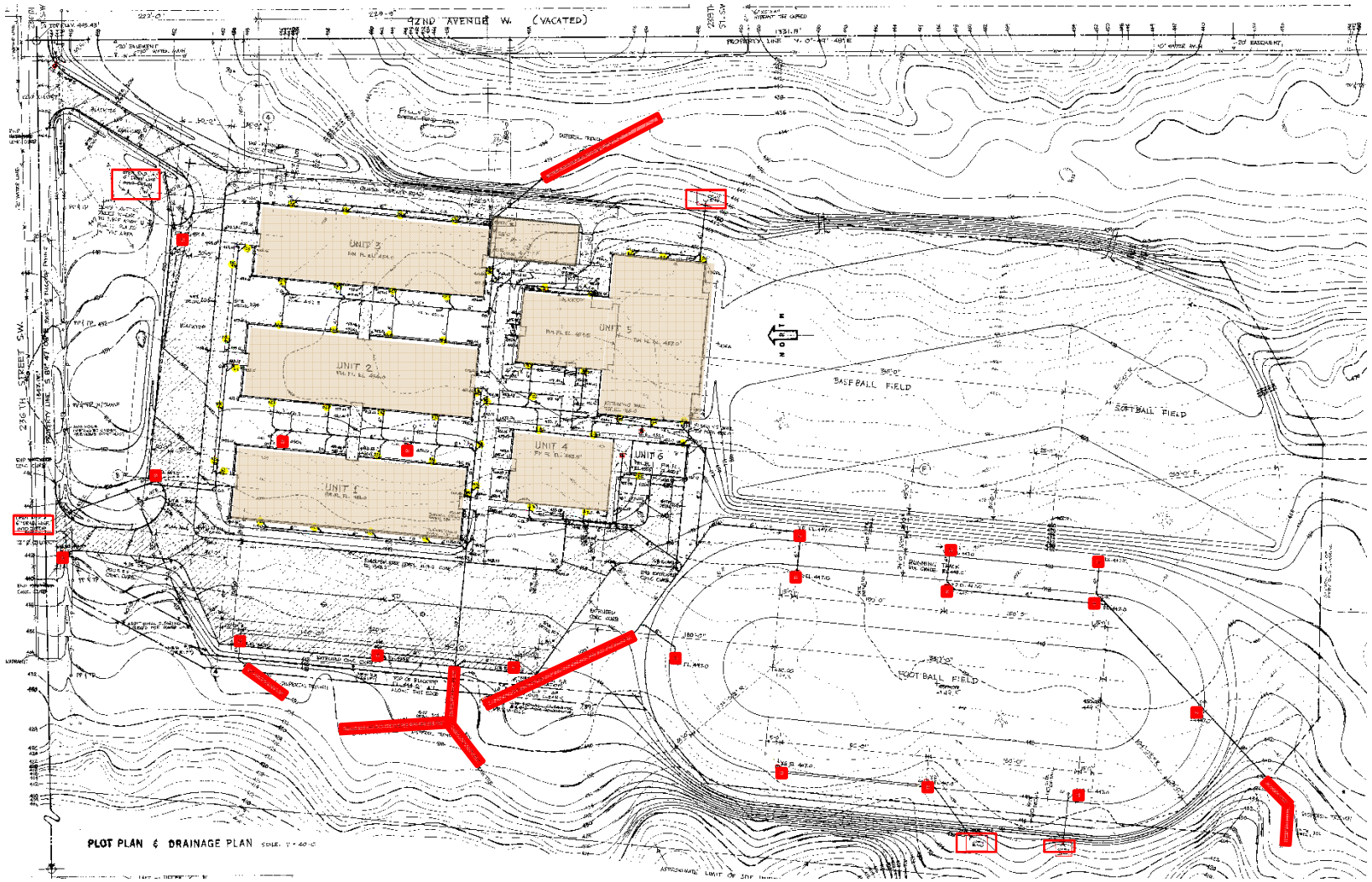
Edmonds SCHOOL DISTRICT

EDMONDS SCHOOL DISTRICT No. 15

Existing Madrona Storm Drainage System

Existing Catch Basin

Existing dispersal trench



Edmonds SCHOOL DISTRICT

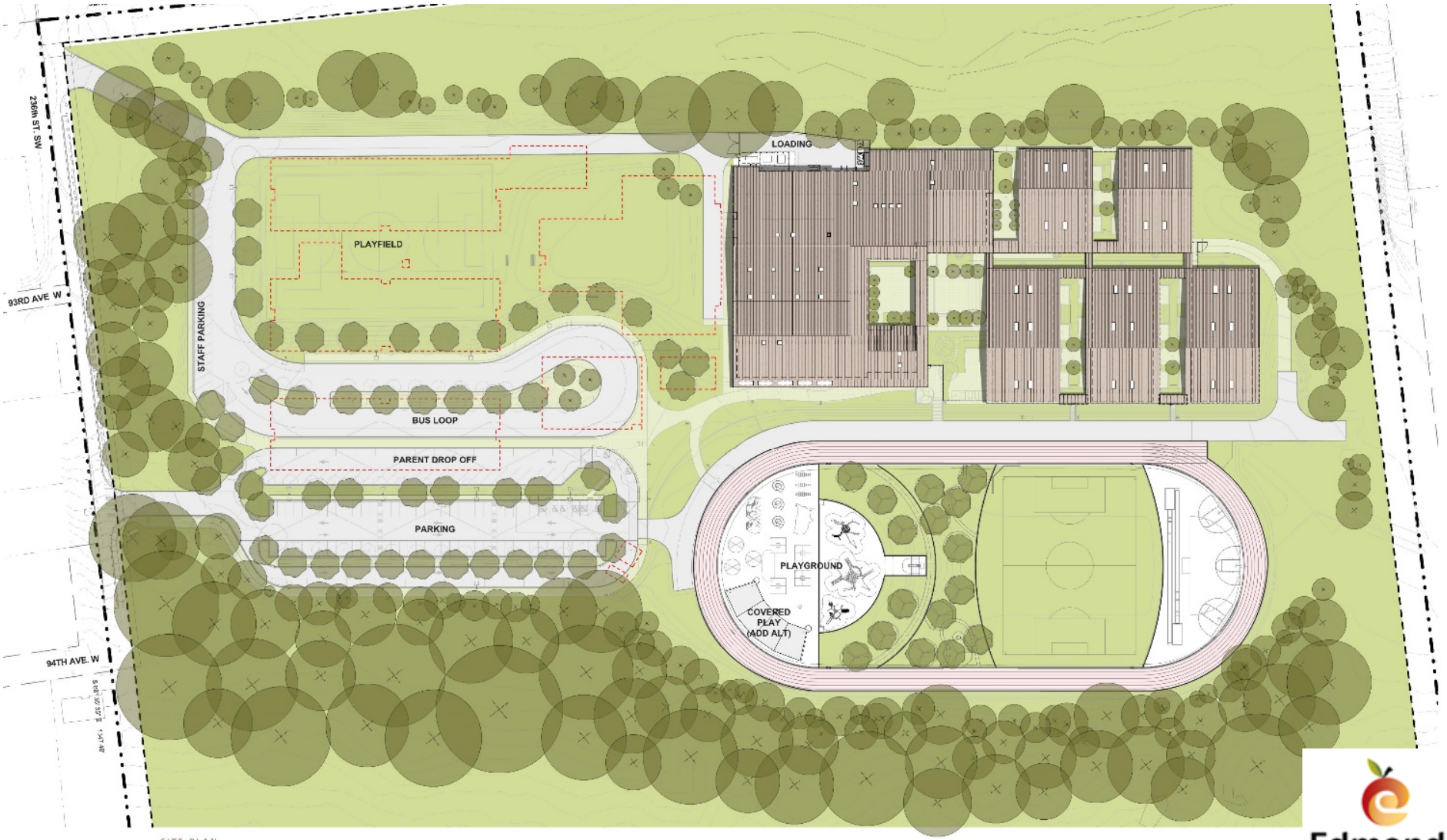
EDMONDS SCHOOL DISTRICT No. 15

Photos of Existing Slope - Biofiltration

Edmonds
SCHOOL DISTRICT

EDMONDS SCHOOL DISTRICT No. 15

New Madrona School Site Plan (under construction)



mahlum

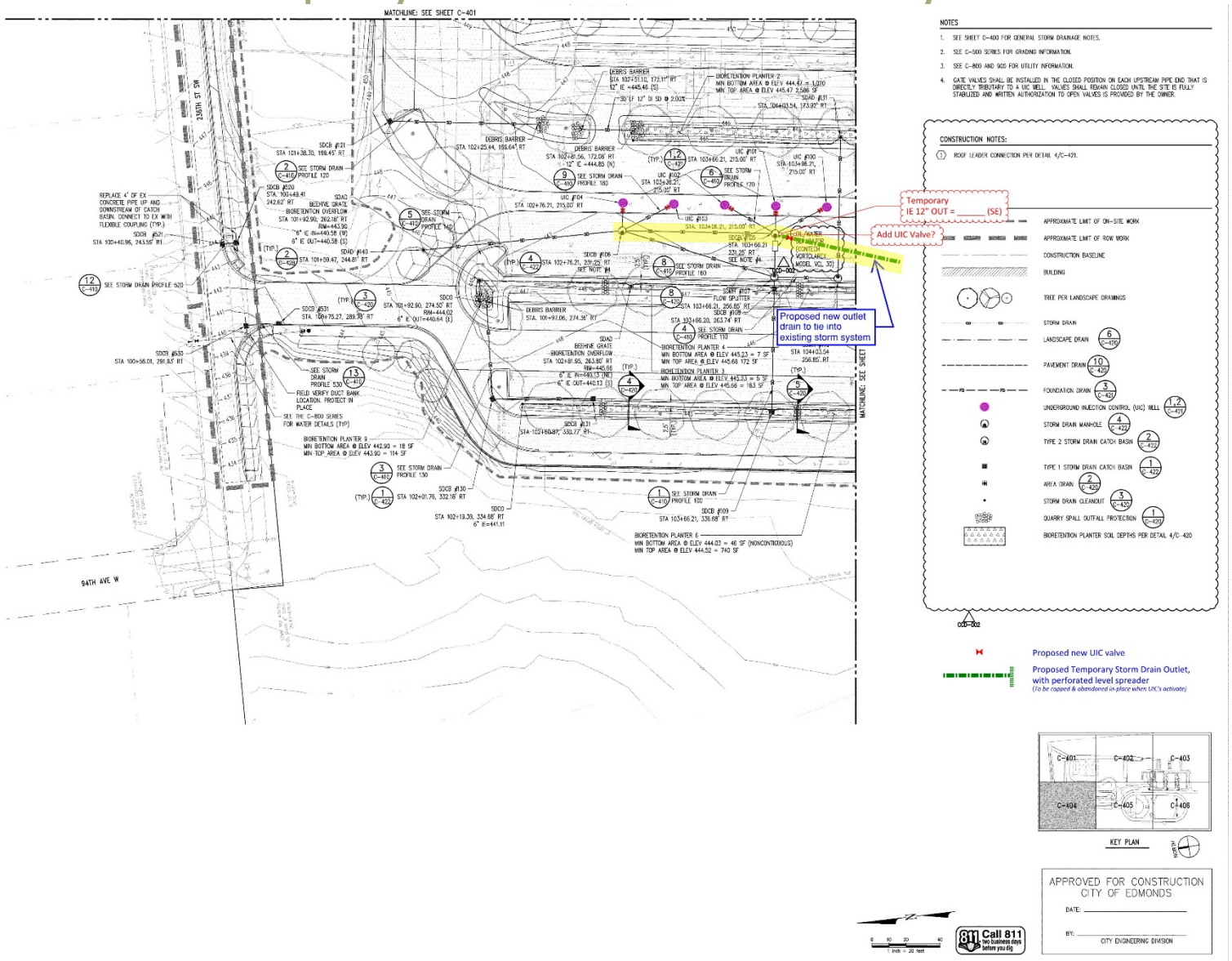
SITE PLAN
MADRONA SCHOOL REPLACEMENT
EDMONDS SCHOOL DISTRICT | 29 JUNE 2017
MAHLUM ARCHITECTS INC

0 20' 40' 80'

Edmonds SCHOOL DISTRICT

EDMONDS SCHOOL DISTRICT No. 15

Proposed Madrona Temporary Construction Storm Overflow System



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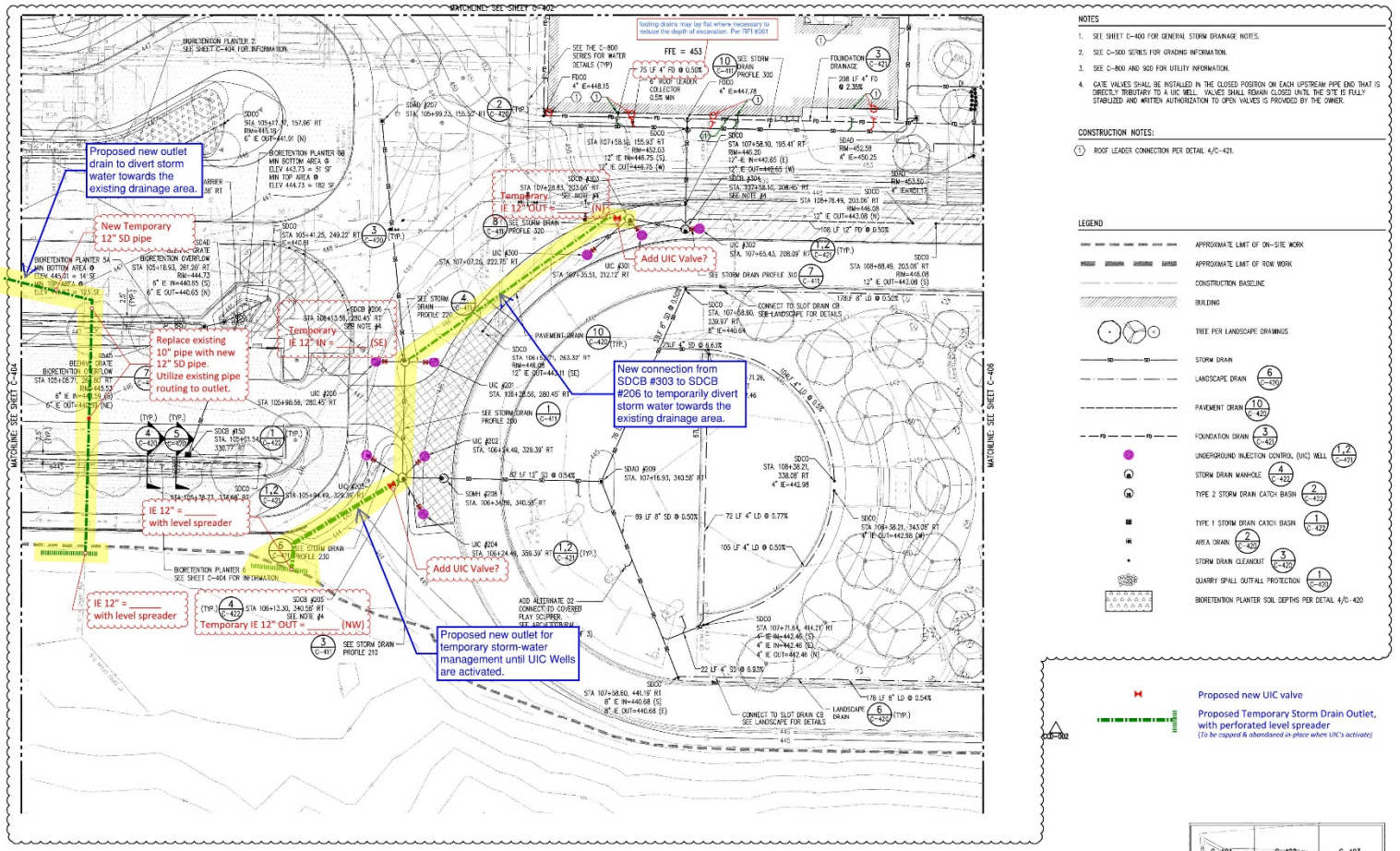

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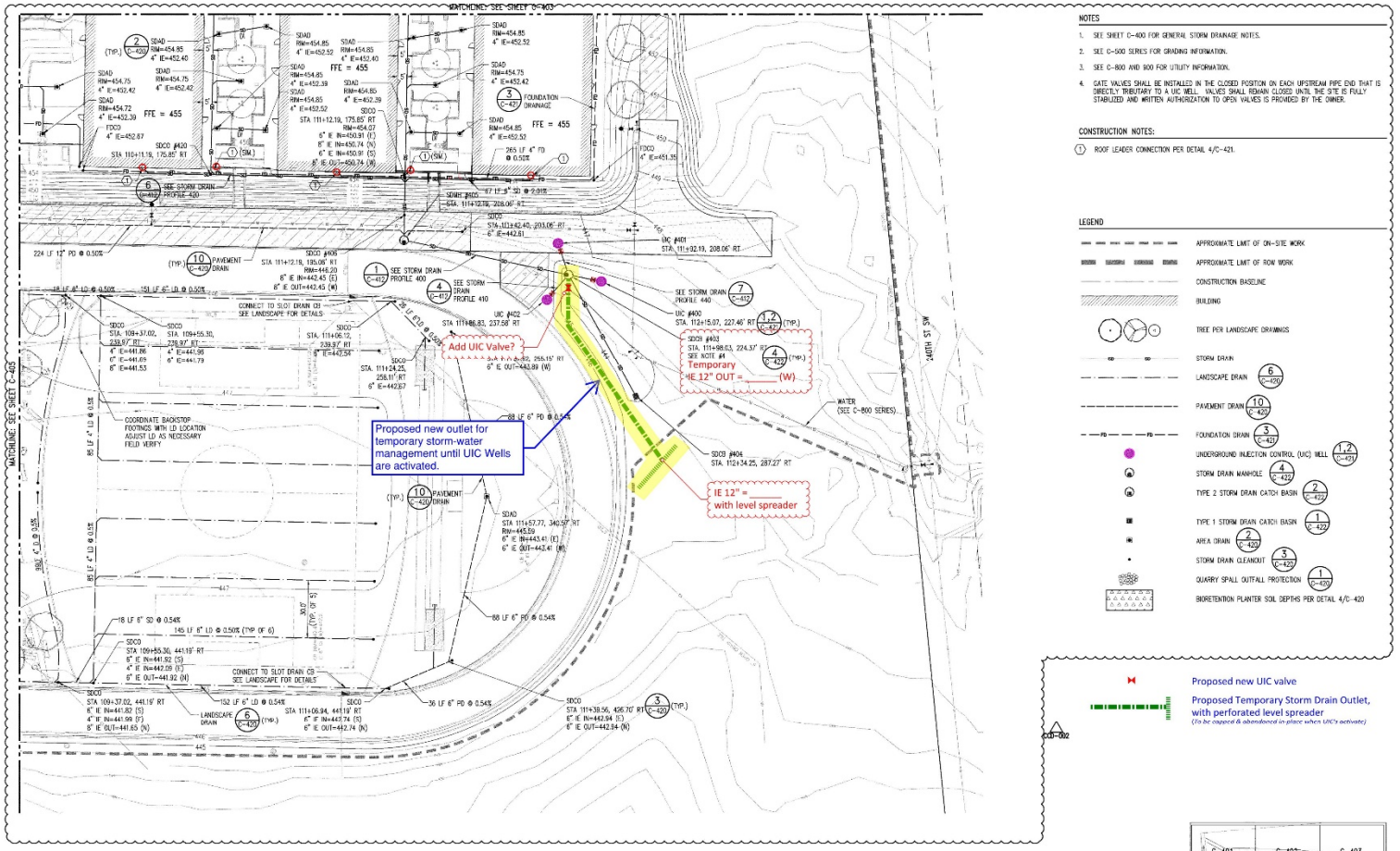
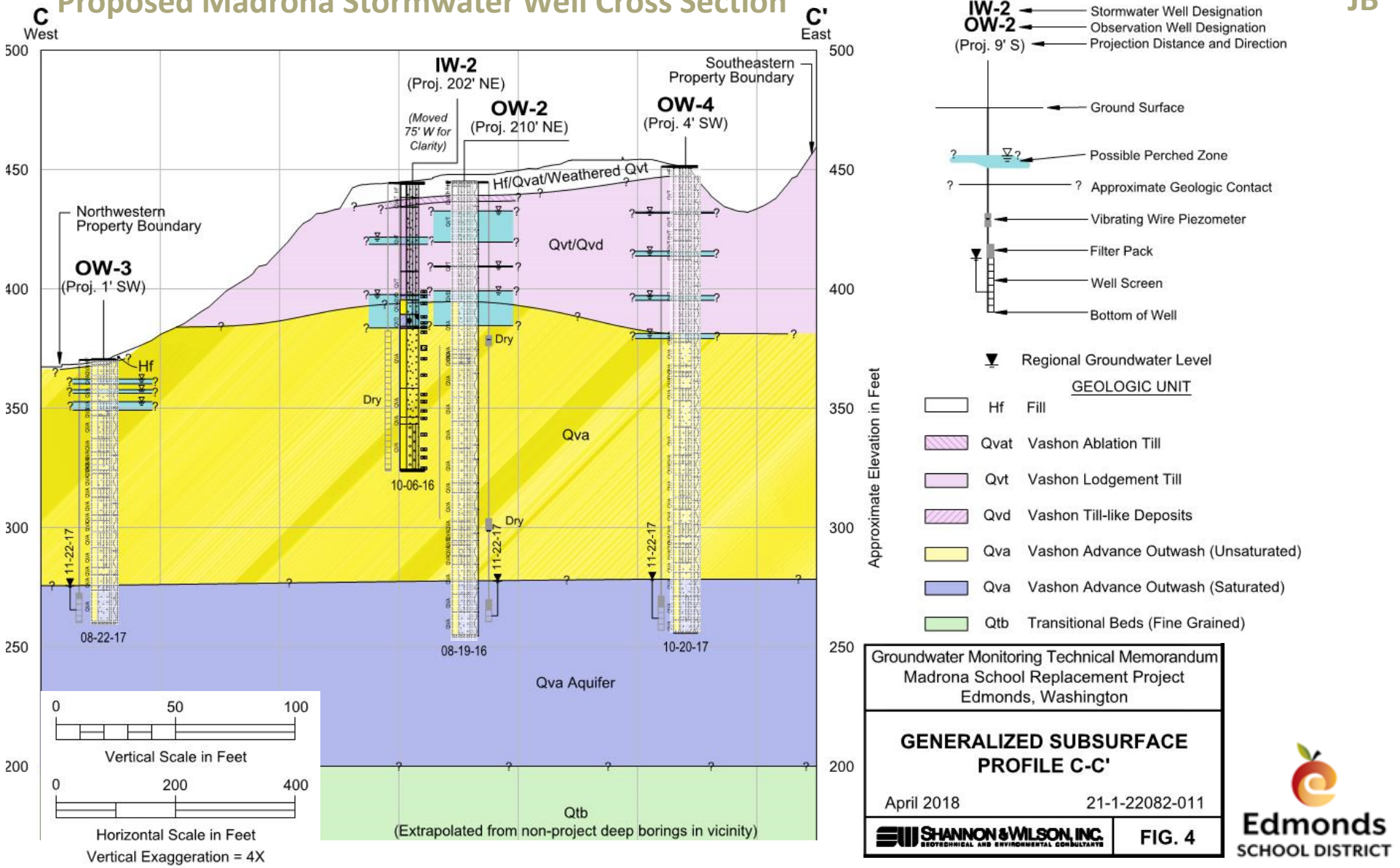


Edmonds SCHOOL DISTRICT

EDMONDS SCHOOL DISTRICT No. 15

Proposed Madrona Stormwater Well Cross Section

JB



Groundwater Monitoring Technical Memorandum
Madrona School Replacement Project
Edmonds, Washington

GENERALIZED SUBSURFACE PROFILE C-C'

April 2018 21-1-22082-011

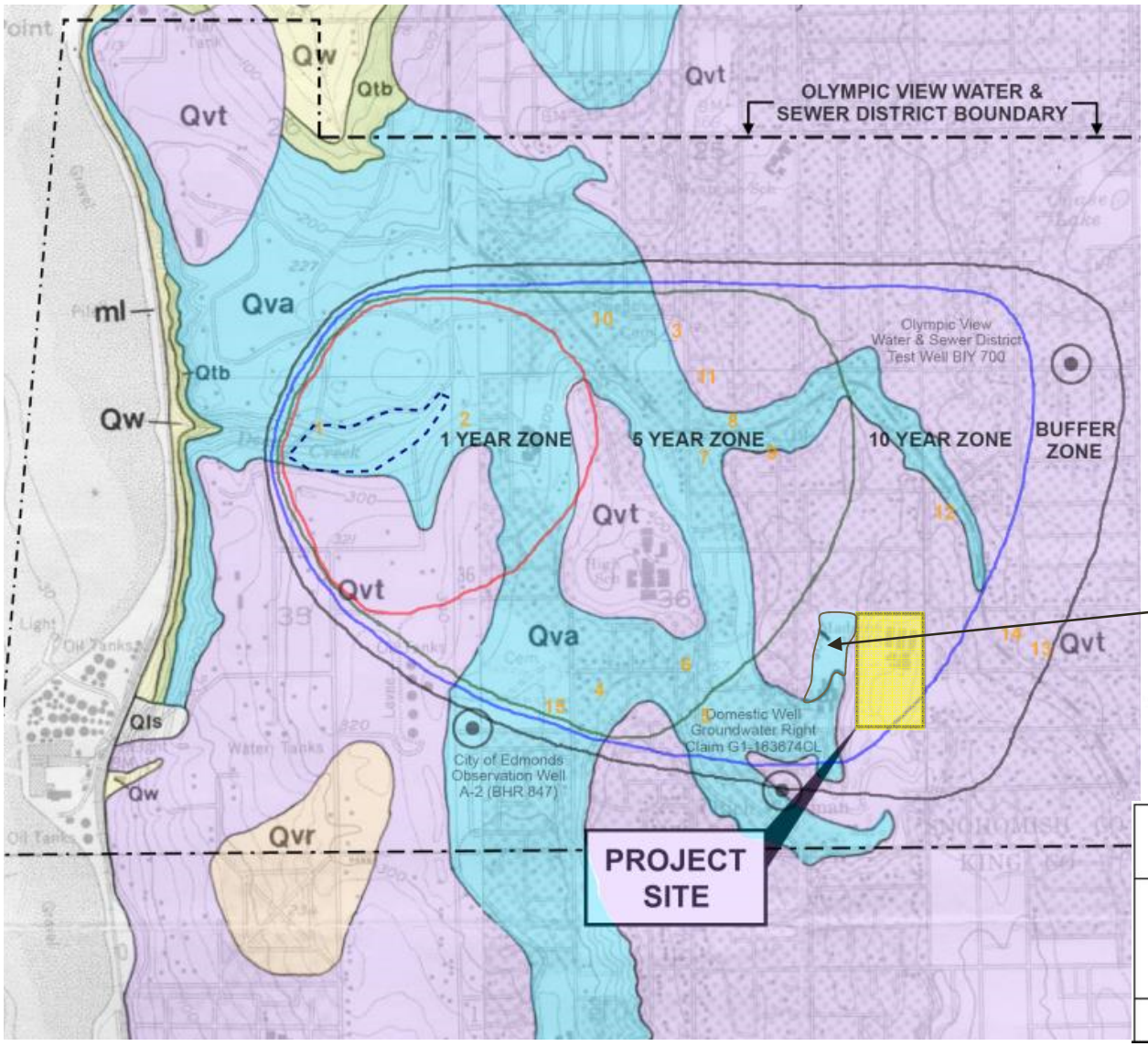
SHANNON & WILSON, INC. GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS | FIG. 4

Edmonds SCHOOL DISTRICT

EDMONDS SCHOOL DISTRICT No. 15

OVWSD Wellhead Protection Area showing groundwater travel times

JB



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- Controlled Watershed Boundary
- Location (Approximate) of Non-Project Well

Area mapped by S&W

0 2000 4000

Approximate Scale in Feet

Hydrogeologic Report
New Madrona K-8 Project
Edmonds, Washington

SURFICIAL GEOLOGIC MAP

November 2016 21-1-22082-003

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

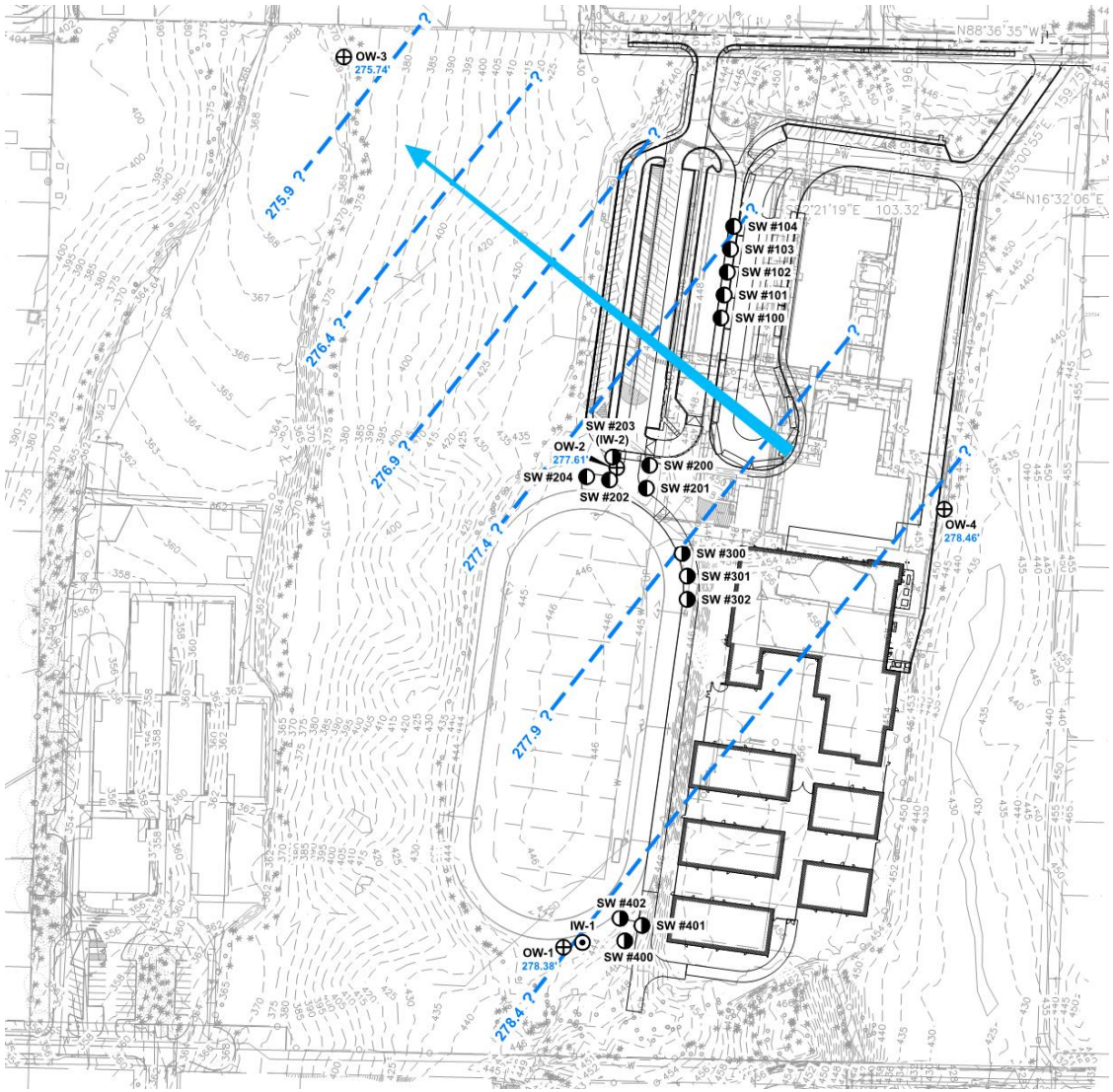
FIG. 3

Edmonds SCHOOL DISTRICT

EDMONDS SCHOOL DISTRICT No. 15

Proposed Stormwater and Monitor Well locations on Composite Site

JB



LEGEND

- OW-1 ⊕ Monitoring Well Designation and Approximate Location
- IW-1 ⊙ Test Stormwater Well Designation and Approximate Location
- SW #300 ◑ Installed Stormwater Well Designation and Approximate Location
- SW #100 ◑ Planned Stormwater Well Designation and Approximate Location
- Approximate Aquifer Gradient
- 278.4 ? Approximate Groundwater Elevation, Feet NAVD88 (As of 11/22/2017)

NOTE

OW-4 is the designated upgradient groundwater quality monitoring location, and OW-3 is the designated downgradient groundwater quality monitoring location.

N

0 140 280

Scale in Feet

Groundwater Monitoring Plan
Madrona School Replacement Project
Edmonds, Washington

GROUNDWATER ELEVATIONS NOVEMBER 22, 2017

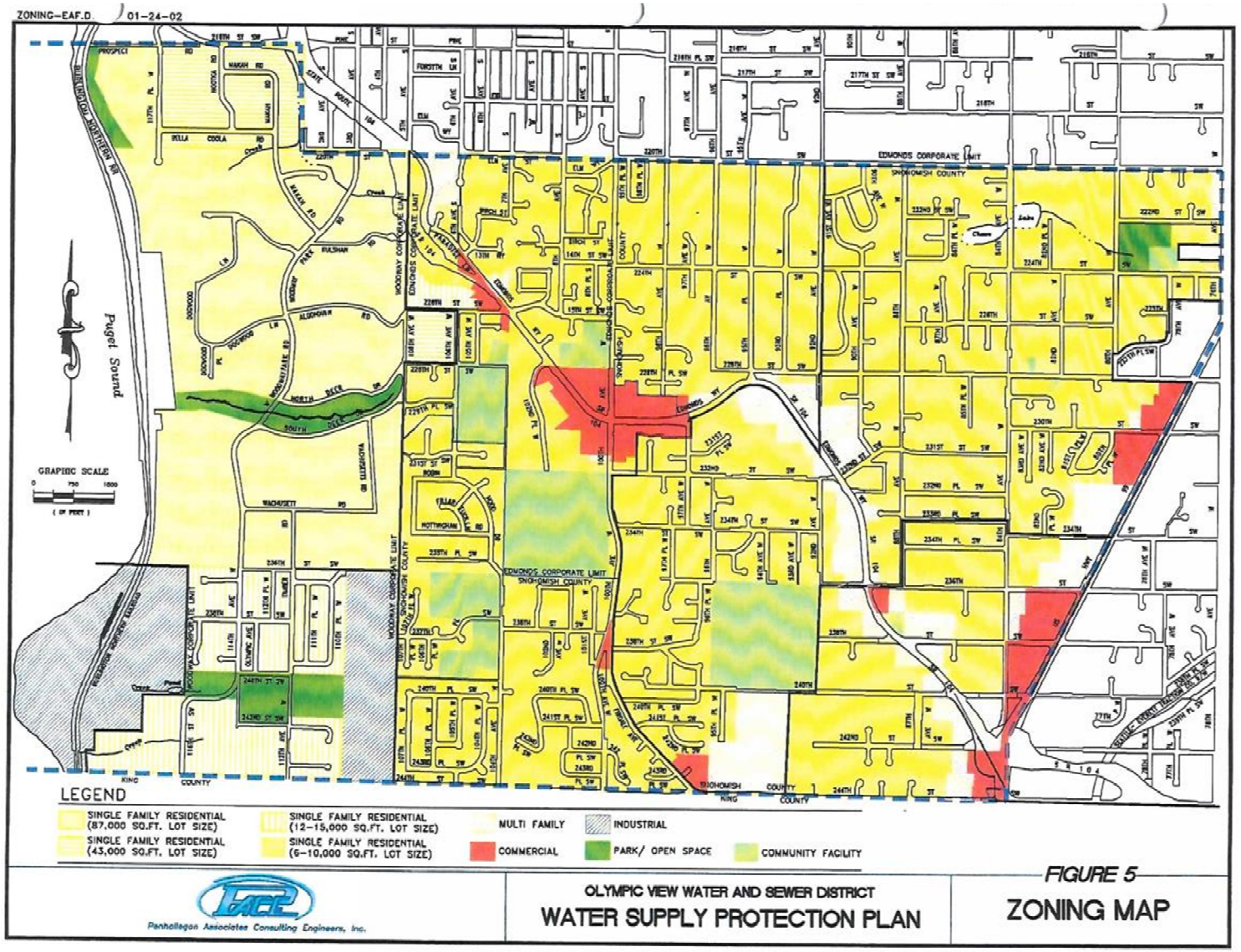
February 2018 21-1-22082-011

SHANNON & WILSON, INC. GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS | FIG. 1

Edmonds SCHOOL DISTRICT

EDMONDS SCHOOL DISTRICT No. 15

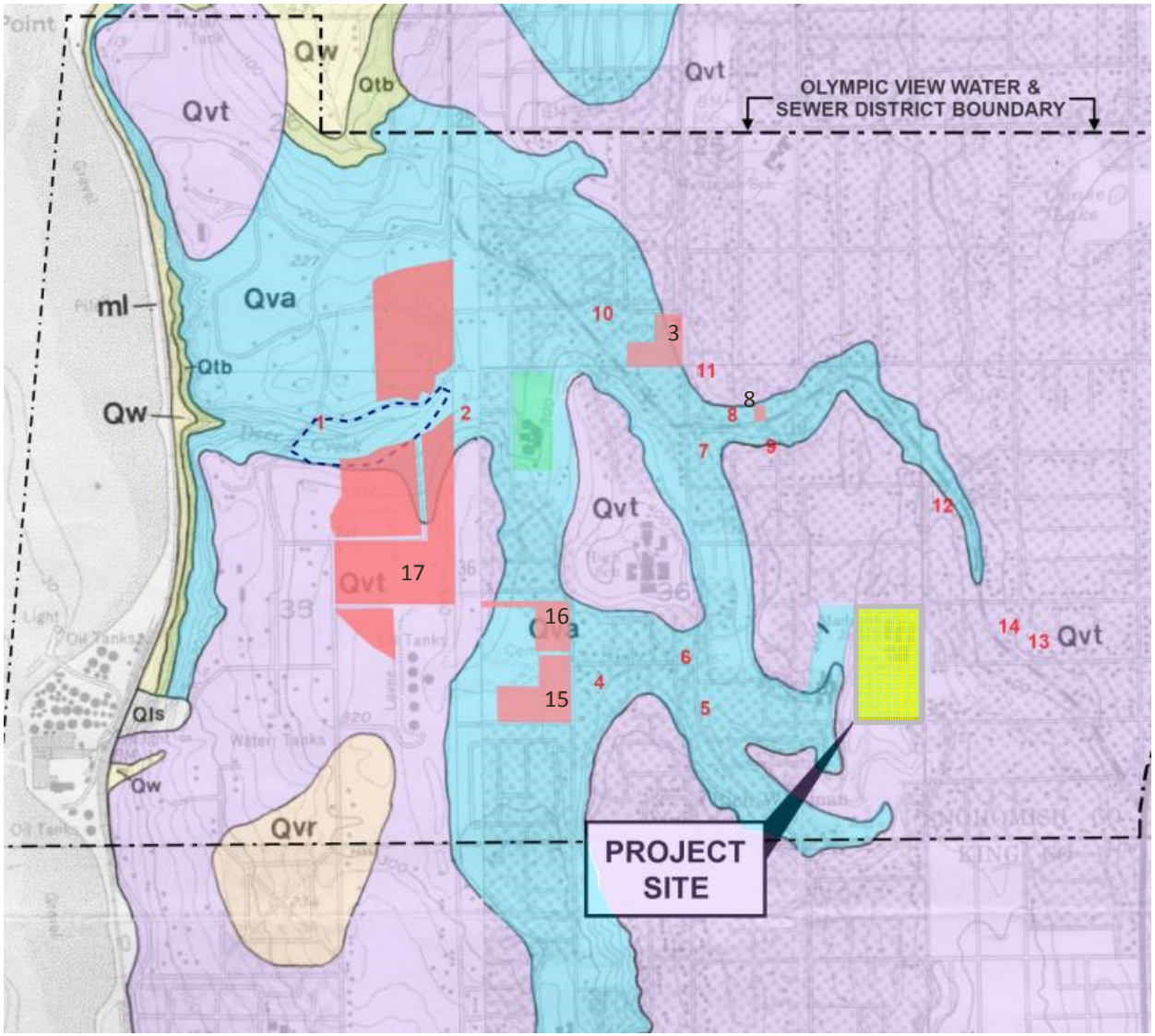
OVWSD Boundaries with Land Use Categories



Edmonds SCHOOL DISTRICT

EDMONDS SCHOOL DISTRICT No. 15

OVWSD Boundaries with existing facilities



LEGEND

- Sherwood Elementary = .5 year
- **Potential Contaminant Area:**
  - 3 Edmonds Memorial Cemetery = 5 year zone
  - 8 76 Gas Station = 5 year zone
  - 15 Restlawn Cemetary = 5 year zone
  - 16 Hickman Park = 5 year zone
  - 17 Unsewered Area

0 2000 4000

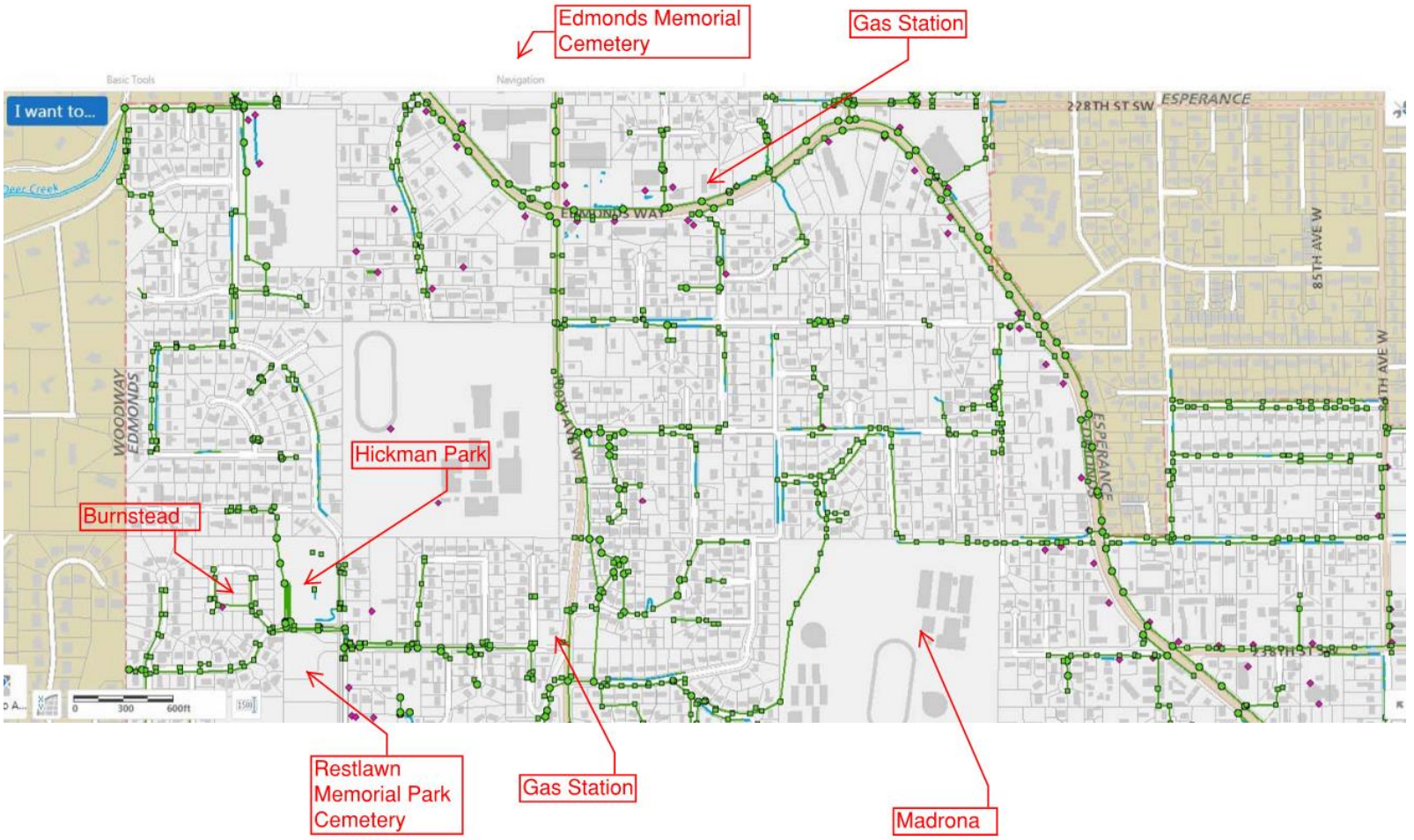
Approximate Scale in Feet

Edmonds SCHOOL DISTRICT

EDMONDS SCHOOL DISTRICT No. 15

Roadway Drainage in OVWSD Watershed

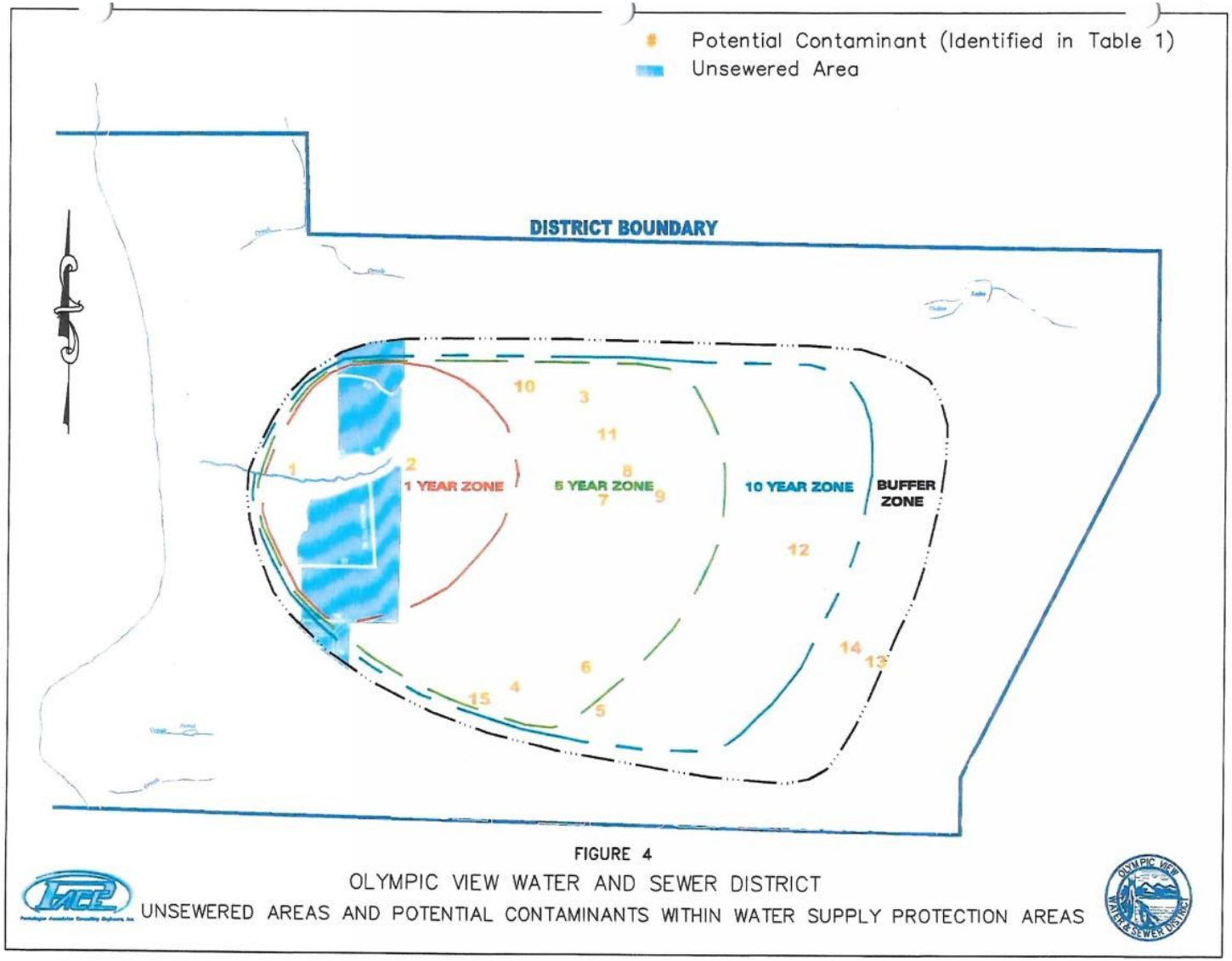
Blue lines = open ditches
Green lines = storm drains



Edmonds SCHOOL DISTRICT

EDMONDS SCHOOL DISTRICT No. 15

Areas not served by sanitary sewer – OVWSD Watershed



Edmonds SCHOOL DISTRICT

Discussion – Blue text indicates OVWSD Comments from 9/12/2017

Monitoring:

- In the absence of an established watershed-wide program ESD will monitor wells per DOE requirements.
  - When will testing be required,
  - Where, within the proposed system, will testing occur,
  - The type of testing that will be required,
  - The interval at which testing will occur,
  - The duration of the testing,
  - Who is responsible for gathering the tests,
  - Who is responsible for the costs of the test,
- ESD Will participate in OVWSD Watershed-wide Monitoring Program, when established, subject to School District review and approval of those procedures.

Edmonds SCHOOL DISTRICT

Discussion – Blue text indicates OVWSD Comments from 9/12/2017

Maintenance:

- ESD will maintain Stormwater System in accordance with DOE requirements and protocols and provide annual reporting on maintenance to the Authorities Having Jurisdiction: COE and DOE.
- ESD will share reports with OVWSD and DOH.

Discussion – Blue text indicates OVWSD Comments from 9/12/2017

Catastrophic Damage Procedures:

- ESD will participate in OVWSD Watershed-wide procedures, when established, subject to School District review and approval of those procedures.
  - Who and to whom are incidents to be reported
  - How will the Water District be made whole in the unlikely event that a contamination occurs and requires additional treatment to raw water to meet DOH standards
  - How will the Water District be made whole in the unlikely event that the aquifer is contaminated and the Water District is not able to use either of its' water sources.

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Conclusions: Comparison of the Drinking Water Quality Standards (DWQS) and the Ground Water Quality Standards (GWQS) MSH

Element	Definition	Groundwater Quality Standards	Drinking Water Standards
		Chapter 173-200 WAC	Chapter 246-290 WAC
Goal		Protect existing groundwater quality	Ensure public water is safe to drink
Level of protection		• All beneficial uses • Human health • Protect the natural environment	Human health
Basis	• MCL takes into account health effects, treatment technologies and cost of treatment. • MCLGs are no observable health effects.	• Numeric criteria (MCLs, MCLGs, 1 in a million cancer risk, whichever is most stringent) • Antidegradation • AKART	MCLs
Regulated contaminants		• More extensive list of criteria than drinking water. • MCLs, MCLGs, carcinogens, any contaminant that would degrade a beneficial use.	MCLs
Narrative standards	• Includes any contaminant besides those specifically listed	Yes	No
Antidegradation	• Protect existing groundwater, prevent degradation up to the standard	Yes	No
Beneficial Uses		• Drinking water • Irrigated crops • Livestock watering • Aquatic life	• Drinking water (stringent enough to also protect irrigation and livestock, but not aquatic life)

*Draft Guidance for Aquifer Storage and Recovery AKART Analysis and Overriding Consideration of the Public Interest Demonstration.

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WAC 173-218-100 (1) (i):

- *Stormwater wells that only receive runoff from a roof coated with an inert, nonleachable material and a roof that is not subject to venting of manufacturing, commercial, or other indoor pollutants.*

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Roofing Material: Soprema Sopralene Flam 180 FR GR Capsheet

- Roofing material complies with this WAC and is subject to DOE review.
- **Roofing Materials Assessment Investigation of Toxic Chemicals in Roof Runoff** by
  Nancy L. Winters, Environmental Assessment Program and Kyle Graunke, Water Quality Program Washington State Department of Ecology, Olympia

"Concentrations of PAHs in runoff from the new roofing panels were low and not distinguishable from concentrations from the glass control panels, even in those roofs which have asphalt components (such as asphalt shingle and built-up roofing)."

- ESD Maintenance conducts annual inspections to ensure asphalt is not exposed to weathering.
- Coliform bacteria does not survive below 4' underground

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Conclusions: Comparison of the Drinking Water Quality Standards (DWQS) and the Ground Water Quality Standards (GWQS)

Conclusions:

- Dept. of Ecology standards are as protective and even more conservative for some contaminants than the Dept. of Health's Drinking Water Quality Standards.
- A stormwater system that meets Dept. of Ecology standards should not pose a significant threat to drinking water.

City of Redmond (CRWS) Water System Program for Stormwater Wells

MSH

- The CRWS relies on an aquifer much shallower than OVWSD and encourages ground water recharge via systems (e.g. Costco).
- CRWS accepts Dept of Ecology standards.
- The CRWS conducts its own extensive monitoring program.
- The CRWS would allow a School stormwater well system located at the same distance from the wellhead as Madrona is from the OVWSD well head.

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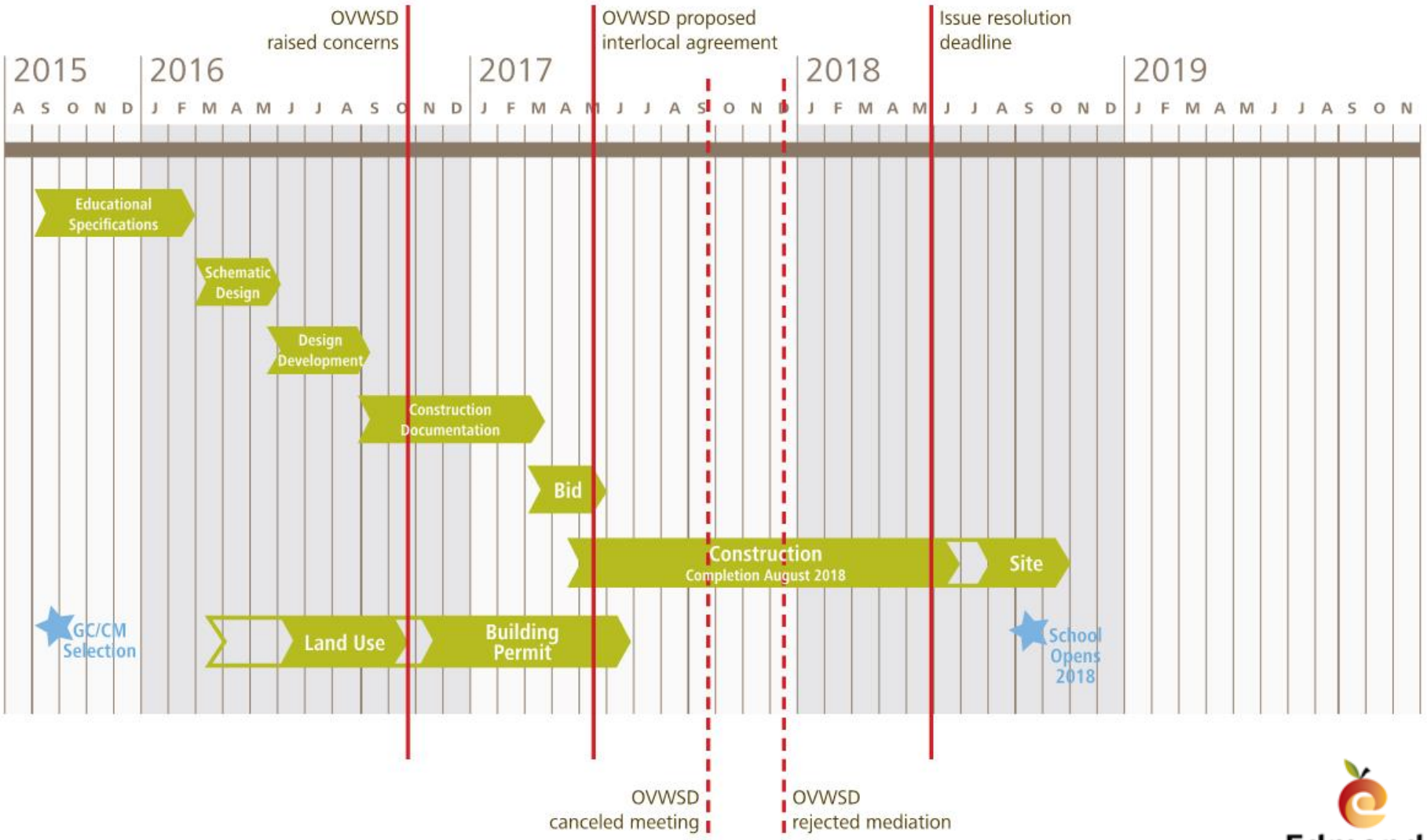
Madrona School Replacement Accelerated Schedule



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How are the UIC Program, the Stormwater Program, the Drinking Water Quality (DWQS) and Ground Water Quality Standards (GWQS) related? MSH

Two main requirements for UIC rule authorization

Registration

- Discharges must meet the **GWQS** at the top of the groundwater
- **GWQS** protects all beneficial uses such as **drinking water**. GWQS must be as stringent as **DWQS** to protect.
- **GWQS** requires all known, available, and reasonable methods of prevention, control and treatment (AKART) is required for all discharges.
- AKART for **stormwater** discharges – UIC rule requirements, build and design to current Ecology guidance manual best management practices (BMPs).
- Madrona meets the **UIC rule and stormwater** guidance BMPs

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Comparison of the Drinking Water Quality Standards (DWQS) and the Ground Water Quality Standards (GWQS)

MSH

The DWQS and the GWQS have different goals:

- DWQS ensure the public water supply is acceptable for drinking and other consumptive uses at the point of use.
- GWQS are discharge standards and protect existing ambient groundwater conditions and support all beneficial uses.

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Comparison of the Drinking Water Quality Standards (DWQS) and the Ground Water Quality Standards (GWQS)

The criteria were determined differently too:

- The DWQS maximum contaminant levels (MCL) were set as close as possible to the MCL goal (where no known or anticipated adverse effect on the health of an individual occur) as feasible using the best available treatment technology and taking cost into the consideration.
- The GWQS standards criteria were chosen as the most conservative of the 3 criteria; MCL, MCLG, and the concentration anticipated to result in a 1 in a million cancer risk. Treatment technology and cost were not factors considered when determining the criteria.

Antidegradation and the Narrative Standards :

- GWQS include a narrative standard for any contaminant. The GWQS antidegradation policy protects existing groundwater and can prevent degradation up to the standard.
- The DWQS only regulate those contaminants with an MCL (maximum contaminant level).

Response to OVWSD Requests

EJP

Maintenance:

- ESD will maintain Stormwater System in accordance with DOE requirements and protocols and provide annual reporting on maintenance to the Authorities Having Jurisdiction: COE and DOE.
- ESD share report with OVWSD and DOH.

Monitoring:

- In the absence of an established watershed-wide program ESD will monitor wells per DOE requirements.
- ESD will participate in OVWSD Watershed-wide Monitoring Program, when established, subject to School District review and approval of those procedures.

Catastrophic Damage Procedures:

- ESD will participate in OVWSD Watershed-wide procedures, when established, subject to School District review and approval of those procedures.

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Appendix

TABLE 1 - POTENTIAL CONTAMINANT INVENTORY

	Facility Name/Address	Type of Use	Priority	Reason	Capture Zone Location	Contact Address/Phone
1	Deer Creek Water Treatment Plant 23003 Woodway Park Rd (In watershed)	Water Treatment Facility	Low Downstream of source	Potassium Permanganate Calcium Hypochlorite Sodium Hypochlorite Aluminum Sulfate	1 Year	Olympic View Water & Sewer District
2	Westgate Lift Station 23005 108th Avenue SW	Sewer Lift Station	High	Wastewater storage	1 Year	Olympic View Water & Sewer District
3	Edmonds Memorial Cemetery	Cemetery	Low	Cemetery	5 Year	City of Edmonds
4	Klayaha Swim and Tennis Club 10307 238th Street SW	Swimming Pool	Low	Chlorine	5 Year	Klayaha Swim and Tennis Club 10307 238th Street SW
5	City Transmission and Auto 23900 Firdale Ave	Auto Repair	Moderate	Gasoline Transmission Fluids	5 Year	City Transmission and Auto 23900 Firdale Ave
6	Texaco Service Station 23726 100th Avenue West	Service Station	Moderate	Gasoline Underground Storage	5 Year	Texaco Service Station 23726 100th Avenue West
7	Westgate Chevron 9930 Edmonds Way	Service Station	Moderate	Gasoline Underground Storage	5 Year	Westgate Chevron 9930 Edmonds Way
8	J&V Cleaners 9804 Edmonds Way	Dry Cleaning	Moderate	Chemical Storage	5 Year	J&V Cleaners 9804 Edmonds Way
9	Kwick & Clean Carwash 9715 Edmonds Way	Service Station	Moderate	Gasoline Underground Storage	5 Year	Kwick & Clean Carwash 9715 Edmonds Way
10	Westgate Vet Hospital 700 Edmonds Way	Veterinary	Low	Storage	5 Year	Westgate Vet Hospital 700 Edmonds Way
11	VIP Cleaners 22810 10th Ave. W	Dry Cleaning	Moderate	Chemical Storage	5 Year	VIP Cleaners 22810 10th Ave. W
12	Woodhaven Vet Clinic 23204 Edmonds Way	Veterinary	Low	Storage	10 Year	Woodhaven Vet Clinic 23204 Edmonds Way
13	District Office 23725 Edmond Way	Utility District Shop	Low	Above Ground Fuel Storage	10 Year	Olympic View Water & Sewer District
14	Olympic Fuel/Laurelhurst Oil 23600 Edmonds Way	Fuel Supply	Moderate	Above Ground Fuel Storage	10 Year	
15	Restlawn Cemetery 10350 237th Place SW	Cemetery	Low	Cemetery	10 year	Restlawn Cemetery 10350 237th Place SW
	Septic Tanks Various Locations	Residential	Low	Wastewater Storage	1 Year 5 Year 10 Year	See Figure 4.

NOTE: Potential Contaminants are indicated on Figure 4 and correlated with numbering shown above.

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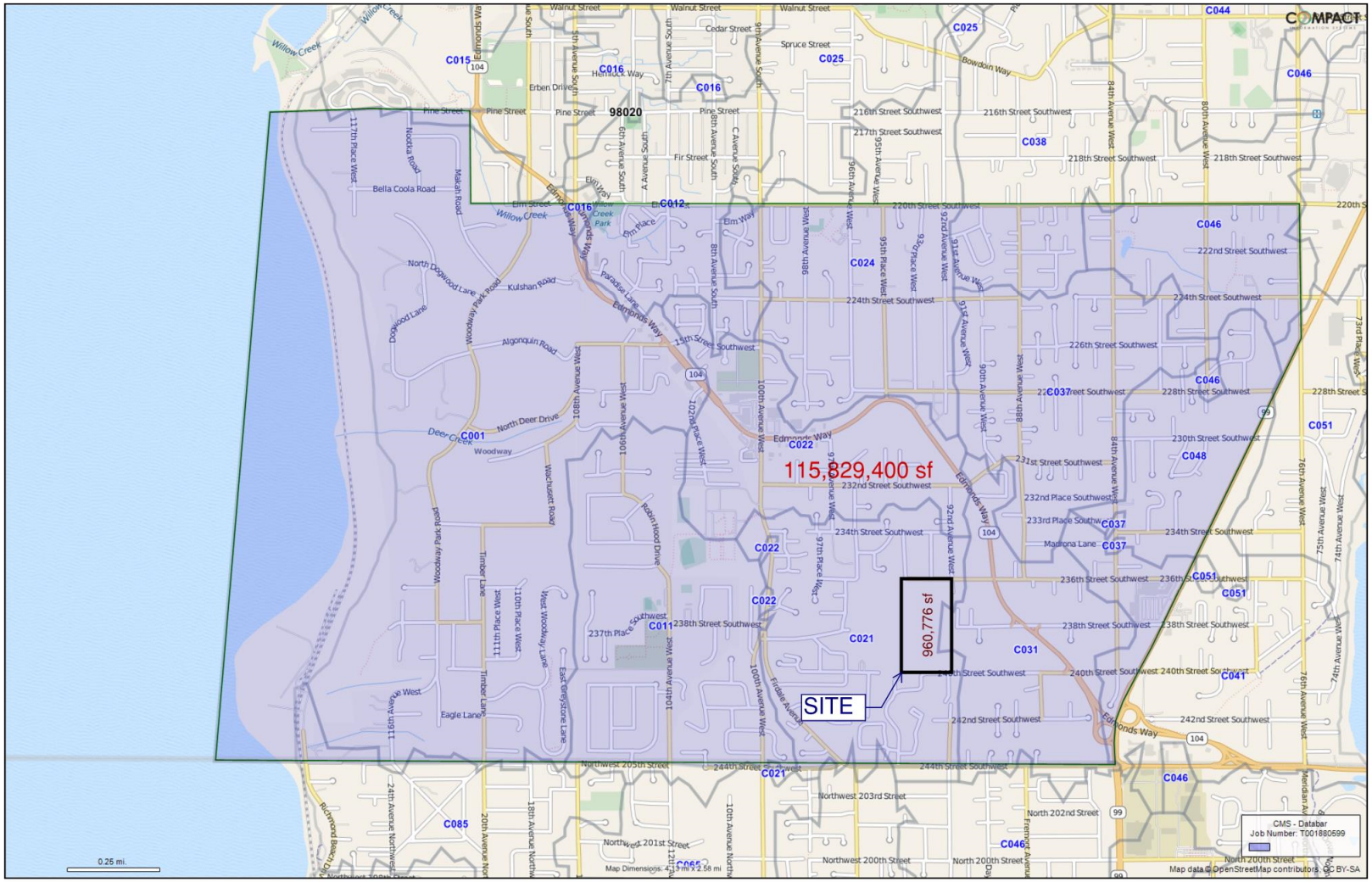
Appendix



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Interesting Stormwater Well Numbers

% of Till and Sand w/in Wellhead Protection Area:

Qva (Sand Zone) = 46%

Qvt (Till Zone) = 54%

Annual Gallons of water from Deer Creek and Site:

Deer Creek: 365 million gallons Annual Treatment Capacity

Madrona: 6.2 million gallons Annual Storm Water

Or 1.7% of Deer Creek Capacity

Area of OVWSD and Site in Square Feet:

OVWSD = approx. 2,659 Acres

Madrona = approx. 22 Acres

Or .83 % of OVWSD Area

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