Storm Drainage Report

For

Hu Residence

At 30XX 69th Avenue SE

Mercer Island, WA

2/26/2024

February, 2024

Table of Contents

1.0 Project Overview

This proposed single-family resident development is a 0.190 acres lot project located in City of Mercer Island, King County, Washington. See Figure 1 for project Vicinity Map.

The subject property address is at 30xx 69th Avenue SE in Mercer Island, Washington. The new single-family house will be a two-story wood framed structure in the central portion of the site, accessible from 69th Avenue SE.

A primary component of the new development project plans is the satisfaction of current stormwater management requirements commensurate with Department of Ecology 2014 Stormwater Management manual for Western Washington (SWWMM) and/or City of Mercer Island Storm Management Standards. This stormwater report describes the existing drainage characteristics in the project area and presents the proposed On-Site stormwater management within the project to mitigate for the project impacts.

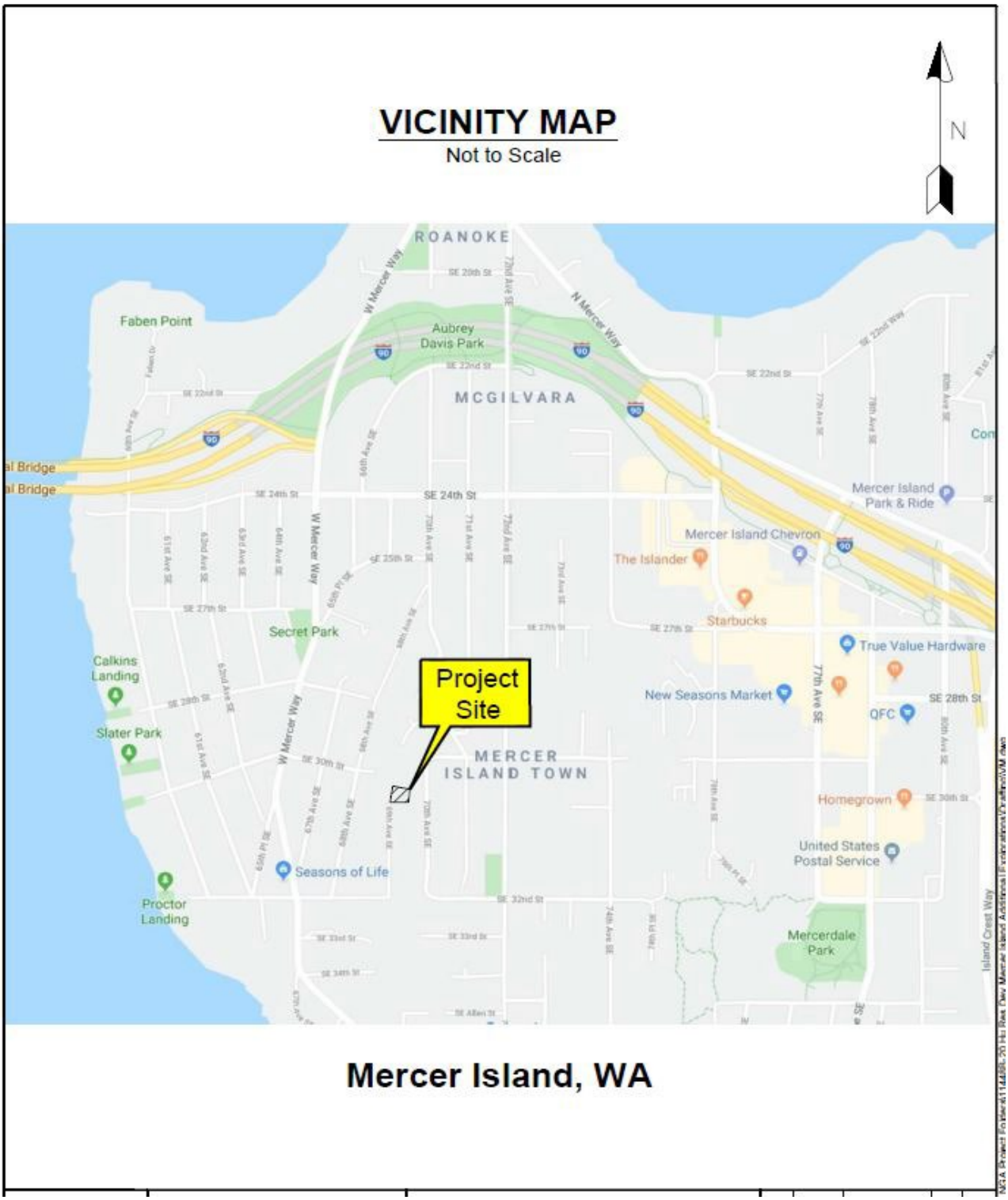


Figure 1: Vicinity Map

2.0 Site Conditions

2.1 Existing Site Conditions

The existing parcel is a irrectangular shaped lot located at 30xx 69th Avenue SE Mercer Island, WA. The property is bounded by 69th Avenue SE to west, single-family residents to north and east, vacant lot to the south.

The project site covers an area of approximately 0.19 acres and is currently vacant. The ground surface within the site slopes gently to steeply down from the upper eastern portion of the site to the western portion of the site. Vegetation within the site consists of grass yard areas and a few trees. A small concrete slab about 570 sf from an old basketball court occupies the south central portion of the site.

See Appendix A for existing site conditions and photo.

There is currently no stormwater management facilities located on the property. The existing stromwater runoff for the site disposal by infiltration or surface dispersion. The existing land cover is outlined in the Table 1.0.

Table 1.0: Existing Land Cover

Summary of Existing Site Conditions			
Surface Type	**Area**	**Units**	**Notes**
Total Lot	8,277	**SF**	
Concrete Area	570	SF	
Impervious Subtotal	**570**	**SF**	
Trees	180	SF	
Lawn/Landscape	7,527	SF	
Pervious Total	**7,707**	**SF**	

2.2 Existing Hydraulic Features

At this time, there is no stormwater drainage system on the site to collect stormwater runoff. The site stormwater disperse across the site from east to west direction. No wetlands or stream has been identified on or adjacent to the site.

2.3 Soils Information

The Geologic Map of Mercer Island, WA, by Kathy G Troost & Aaron P. Wisher, it al (USGS, Ocober 2006) was reviewed for the parcel. The parcel is mapped as Vashon Advance Outwash (Qva) with Lawton Clay (Qvlc) mapped in the immediate vicinity downslope of the property. The Advance Outwash is described as well-sorted sand and gravel deposits with local silt lenses, and grades downward into the Lawton Clay with increasing silt content towards the contact. The Lawton Clay is describes as laminted to massive silt, clayey silt, and silty clay with scattered gravel dropstones, In general, we encountered a layer of surficial undocumented fill of varying depths in each of our explorations underlain by oxidized silty fine to medium sand and gravel which we interpreted as native glacial Advance Outwash deposits, slowly grading into a brownish gray to blue silt with fine sand and trace gravel at depth, which we interpreted as native Lawton Clay deposits.

See Appendix F for Geotechnical Engineering Evaluation Report.

3.0 Developed Conditons

3.1 Design References

The following design references were utilized in development of the stormwater design:

* Department of Ecology Stormwater Management Manual for Western Washington (SWWMM) 2019

3.2 Minimum Requirements

Summary of project information for determining minimum stormwater requirements			
Key	**Component**	**Value**	**Notes**
A	Project Site Area	8,277 SF	
B	Existing Impervious Area	570 SF	
C	Existing Impervious Area Coverage	0.60%	Calculated as B/A100%
D	New Impervious Area	2,338 SF	New roof area – New driveway
E	Replaced Impervious Area	570 SF	Existing concrete pad
F	New Plus Replaced Impervious Area	2,908 SF	Calculated as D+E
G	Proposed Impervious Area	2,908 SF	Existing + Replaced Areas
H	Converted pervious: Native vegetation converted to lawn or landscape	0.00 SF	N/A
I	Converted Pervious: Native vegetation converted to pasture	0.00 SF	N/A
J	Total Area of Land Disturbing Activity	3,337 SF	

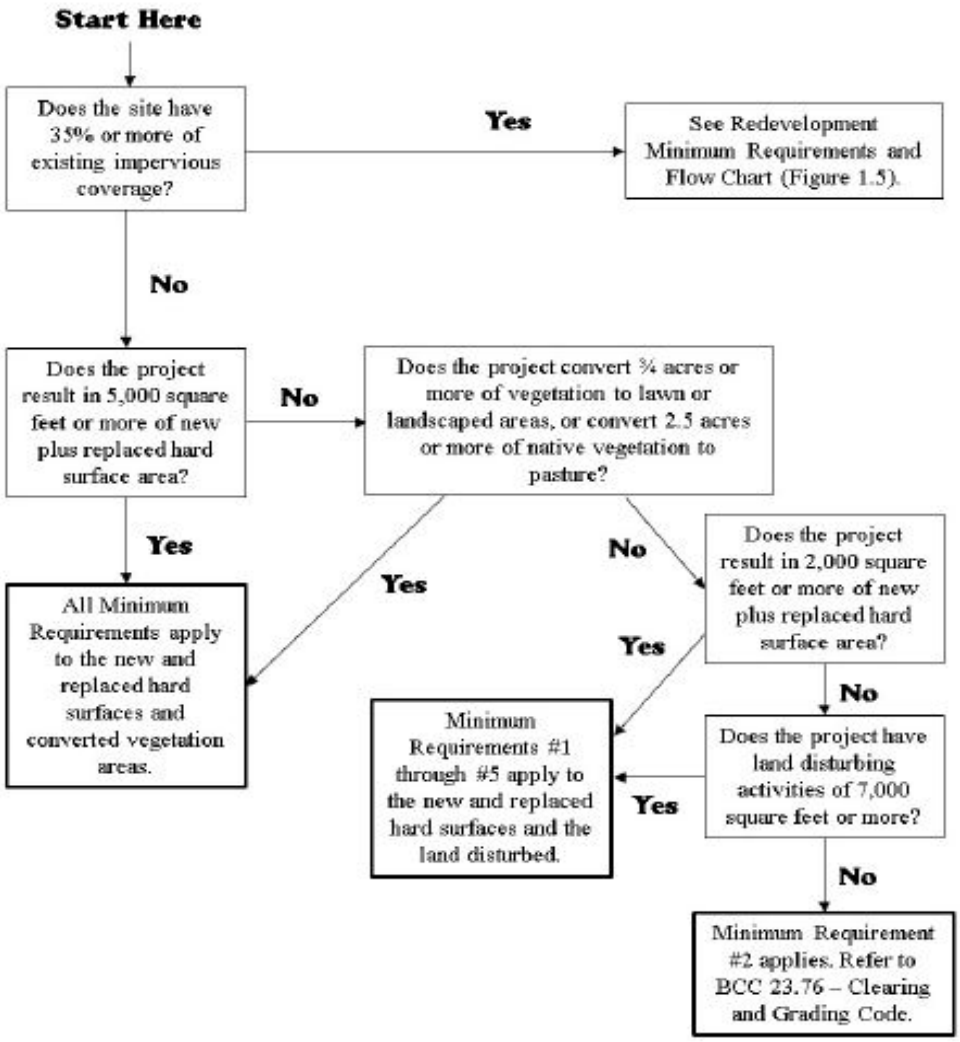


Figure 1.4 – Flow Chart for Determining Minimum Requirements for New Development Projects

Source: Adapted from Figure 2.4.1 of Volume I of the DOE Manual.

According to the above Flow Chart for determining requirements for New Development project, Minimum Requirements #1 - #5 SWWMM 2019 apply to the new and replaced impervious surfaces and the land disturbed.

3.3 Proposed Development and On-Site Stormwater Management

The new development proposed to construct a single-family residence on the site. The new residence will be multi-level and utilize a daylight basement deep foundation design, with an underground level and garage. Retaining walls are proposed for the residence foundations and along the driveway for access to the underground garage. A new deck will also be construct for the new residence and associate landscape and front yard improvements.

See Appendix B for the proposed site conditions. The proposed land cover is outlined in Table 2.0.

Table 2.0: Developed Land Cover

Summary of Proposed Site Conditions			
Surface Type	**Area**	**Units**	**Notes**
Total Lot	**8,277**	**SF**	
New Roof	1,915	SF	
Conc. Driveway	423	SF	
Impervious Subtotal	**2,338**	**SF**	
Trees	180	SF	
Existing Lawn/Landscape	5,518	SF	
Pervious Total	**5,939**	**SF**	

3.4 Design Satisfaction of SMMWW Minimum Requirements

The following sections outline how the new single-family residential new development project design satisfies the #1 – 5 minimum SMMWW requirements.

MR #1 – Stormwater Site Plans

Stormwater Site Plans will be prepared for the single- family residential new development. This report and other supporting studies and drawings will comprise the component Stormwater Site Plan.

MR #2 – Construction Stormwater Pollution Prevention

The single-family residential new development project will include in the contract plans, the TESC plan sheets to address erosion. The SPCC will be a stand alone document prepared by the contractor to address potential mechanical or construction related spills that could potentially contaminate stormwater or soils.

MR #3 – Source Control of Pollutants

Pollutants will be prevented from coming in contact and mixing with stormwater by using silt fence along the property line to keep stormwater within construction site. Construction entrance will be implemented prior to construction to prevent wheel tracking pollutant from construction site into the roadway.

MR #4 – Maintaining the Natural drainage System

Drainage patterns will be maintained as a result of the Single-family residential new development project.

MR #5 – On-Site Stormwater Management

This new developed project will provide flow control by implementing detention pipe system for the total new plus replaced surfaces of 2,908 sf. Using the On-Site Detention Table 1 to size the requirement detention pipe for 2,908 sf of total proposed impervious surfaces. According to the On-Site Detention Table 1, with 2,908 sf, it is requires the a detention pipe of 60 inches in diameter, 20 feet in length, 0.5 in lowest orifice, 3.7 ft distance from the outlet invert to second orifice, and 1.1 in for second orifice. The outlet for the detention pipe will be connected to an existing drainage system under 69th Ave. SE. See drainage plan for detention pipe system locations, cross-sections and details. See Appendix D for detention pipe design guidelines and standard maintenance.

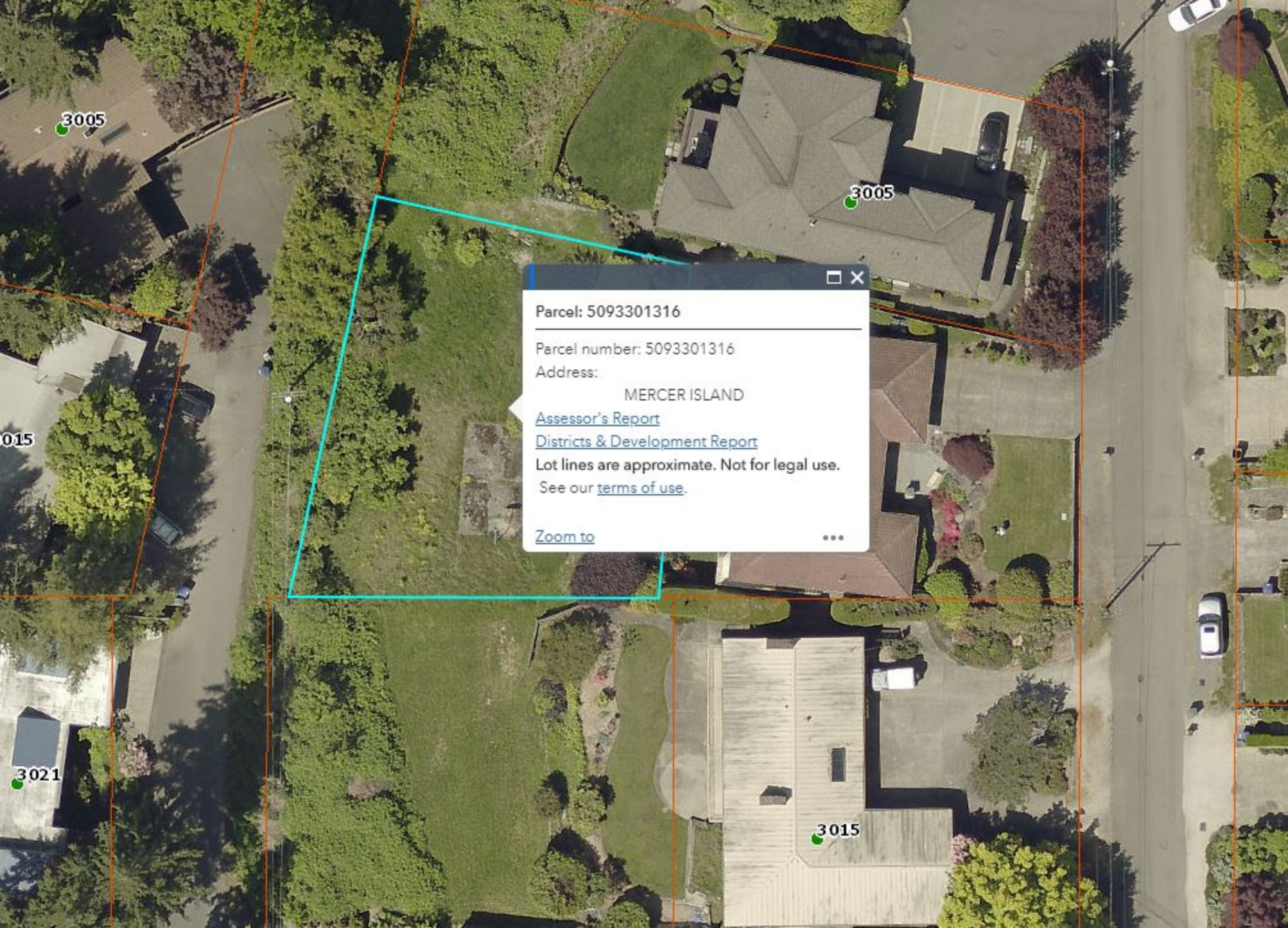
4.0 Operations and Maintenance

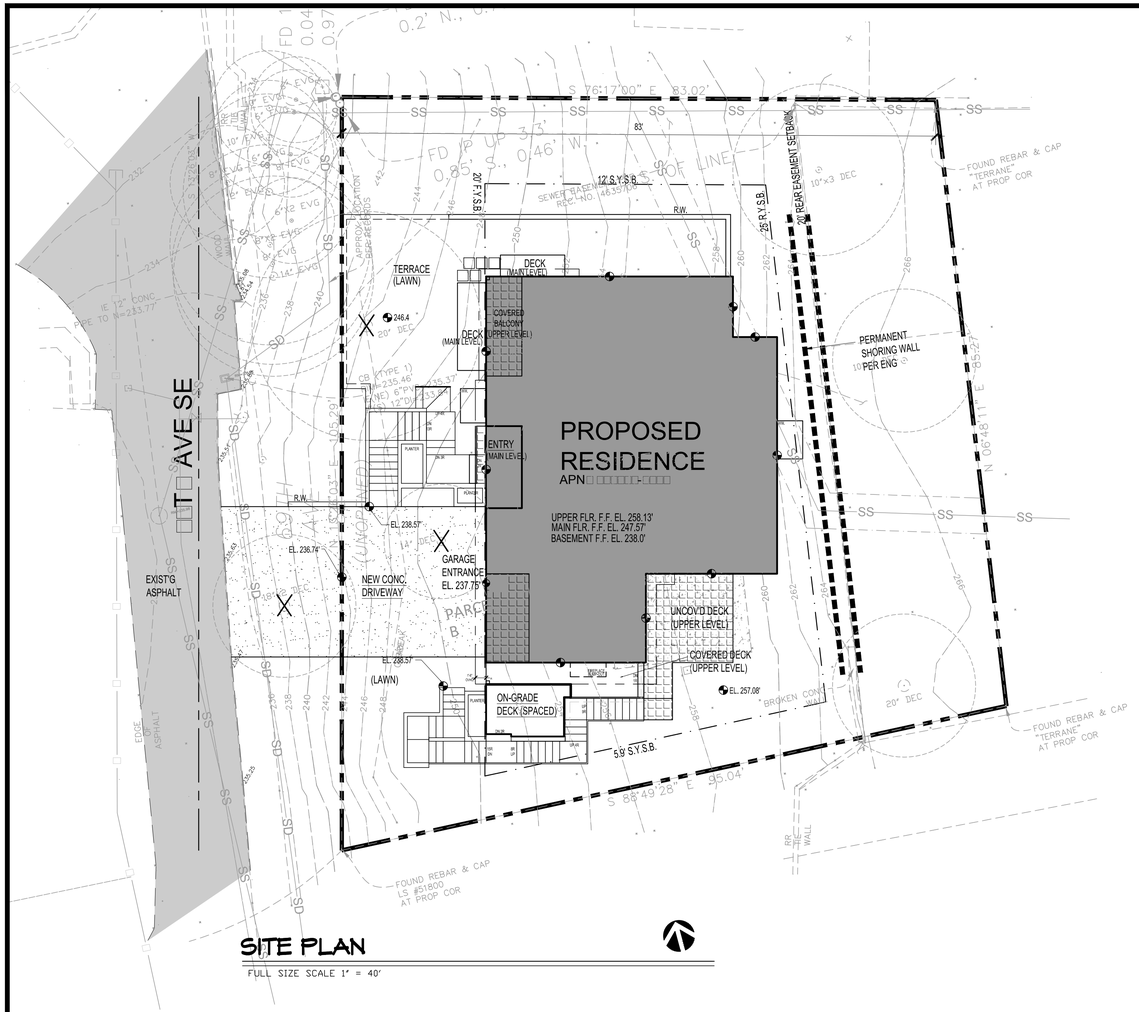
The owner will needs to perform appropriate preventive maintenance steps to ensure that on-site stormwater management facilities are adequately maintained and allow for continued operations

according to the maintenance section of the SMMWW 2019.

Appendix A

Existing Site Conditions and Photos


3005
3005
015
3021
3015
Parcel: 5093301316
Parcel number: 5093301316
Address:
MERCER ISLAND
Assessor's Report
Districts & Development Report
Lot lines are approximate. Not for legal use.
See our terms of use.
Zoom to



SITE PLAN

FULL SIZE SCALE 1" = 40'

PRO□ECT TEAM

OWNER
□UI □OME LLC
ADDRESS
ADDRESS
P□:
EMAIL

APPLICANT CONTACT
□□□ □□M□

ARC□ITECT
ATLAS ARC□ITECTS
□□□□ □I□□LAND DRIVE
BELLEVUE WA □□□□□

CONTACT: □EN□ TAN
CONTRACTORS

STRUCTURAL EN□INEER
DI□ON□ S□AO□S□E□

CIVIL EN□INEER
TANDEM EN□INEERIN□

□EOTEC□NICAL EN□INEER
NELSON □EOTEC□
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SURVEYOR
TERRANE

ARBORIST

LANDSCAPE

PROPERTY IN□O

PROPERTY ADDRESS
□□□

□URISDICTION
□□□

PARCEL NUMBER

LOT AREA
□□□□□ S□

LE□AL DESCRIPTION
MAPLE □ROVE PAR□ SUBDIV E
SEATTLE PARCEL "B" MERCER
ISLAND LLA □SUB□□-□□□REC
□□□□□□□□□□□□□□□SD LLA BEIN□ POR
O□ LOTS □-□□ □-□O□ BL□ □O□SD
ADD
PL□□B□□□: □
P□□L□□: □-□

AREA TABULATION

CONDITIONED AREA	
BASEMENT □LOOR	□□□S□
MAIN □LOOR	□□□□S□
UPPER □LOOR	□□□□S□
TOTAL CONDITIONED AREA	□□□□S□
UNCONDITIONED AREA	
□ARA□E	
DEC□	

LAND USE DATA

□ONIN□
R-□□

SETBAC□S
□RONT YARD SETBAC□: □□ □T
REAR YARD SETBAC□S: □□ □T

SIDE YARD SETBAC□S:
□□□□□ □□□□ □ □□□ □EET TOTAL
□□□□ □□□ □ □□□MIN□SIDE YARD S□B□

NORT□ SIDE YARD S□B□□ □□ □T
SOUT□ SIDE YARD S□B□□ □□□ □T

□ROSS □LOOR AREA
NET LOT AREA
□□□□ □□□□ □ □□□□S□ ALLOWABLE □ □□A

STRUCTURAL □EI□□T LIMIT

LOT SLOPE
□□□□- □□□□ □ □□□ □□□□ SLOPE
--□ □□□ LOT COVERA□E

STRUCTURAL □EI□□T LIMIT

LOT COVERA□E
□IMPERVIOUS SUR□ACES LIMIT□

□□□□ □□□ □ □□□□S□ O□LOT COVERA□E

□ROSS □LOOR AREA
□□□□ □□□ □ □□□□S□

BASEMENT LEVEL
MAIN □LOOR LEVEL
UPPER □LOOR LEVEL □□□□S□

SC□EMATIC □

□ □□□□□□

A RESIDENTIAL NEW CONSTRUCTION
□U RESIDENCE

OB □

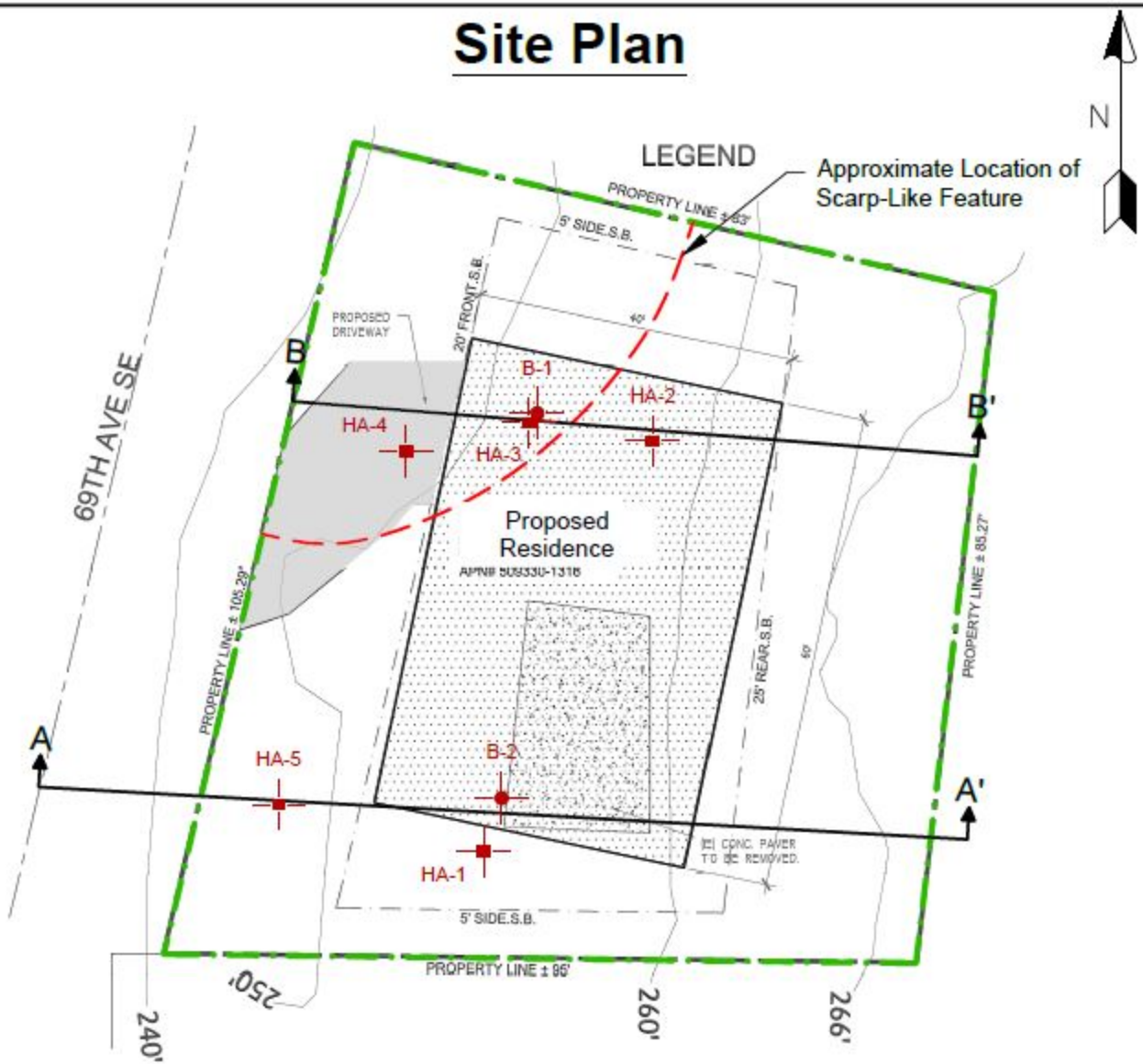
REV	DESCRIPTION	DATE

Dr□□□B□: M□□□-□□□
Dr□□□□ T□□:

SITE PLAN

S□□ C□□□

Site Plan



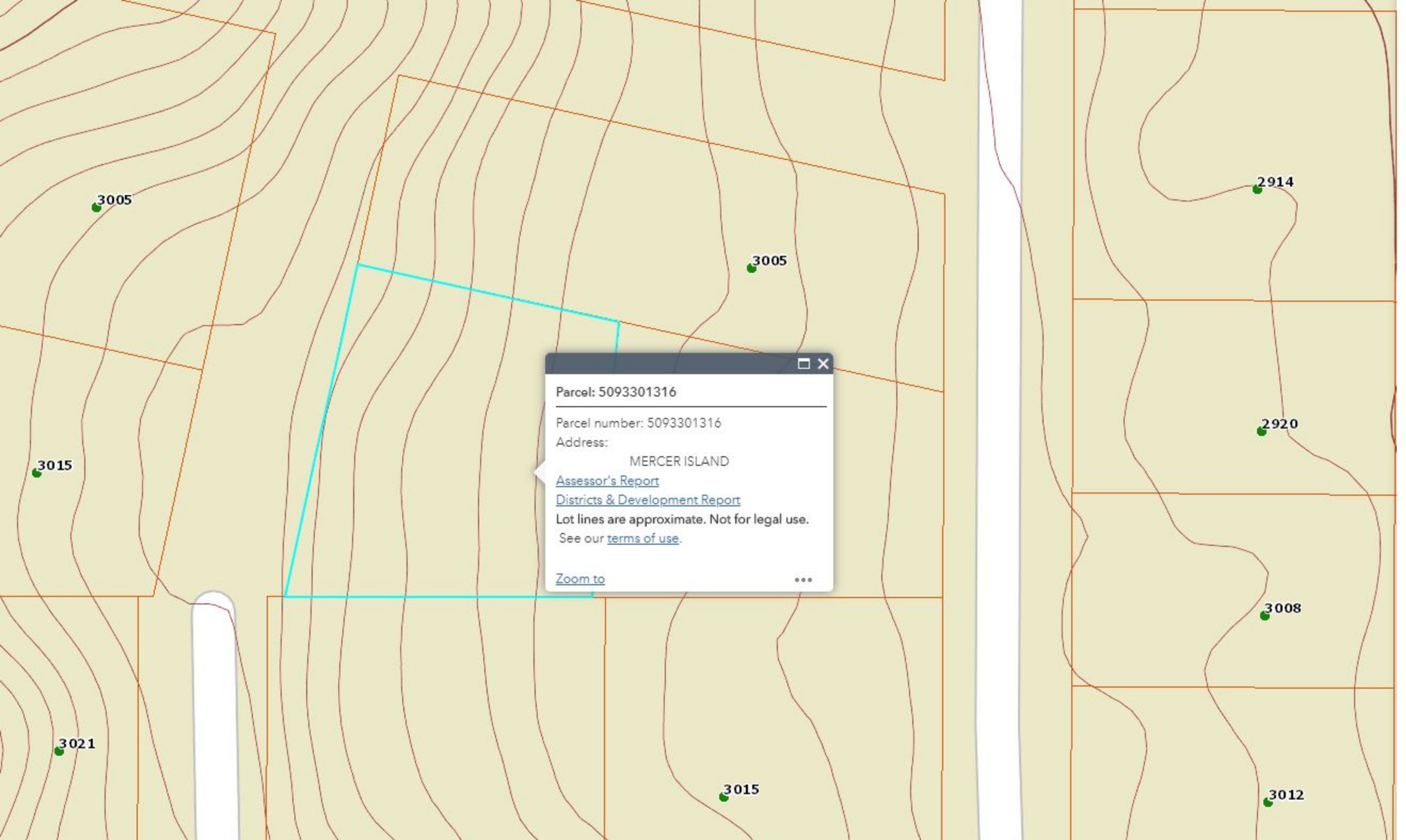
LEGEND

- Property line
- B-1 — Number and approximate location of boring
- HA-1 — Number and approximate location of hand auger
- A — A' — Approximate location of cross-section

0 20 40

Scale: 1 inch = 20 feet

Reference: Site Plan based on a plan dated June 24, 2018 titled " Site Plan "


3005
3005
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3021
3015
2914
2920
3008
3012
Parcel: 5093301316
Parcel number: 5093301316
Address:
MERCER ISLAND
Assessor's Report
Districts & Development Report
Lot lines are approximate. Not for legal use.
See our terms of use.
Zoom to
King County Address Po
Property Layers
Administrative Areas
Electoral Districts
Elevation Contours
Environmentally Sensitiv
Flooding info
Groundwater
Hydrography and Hydro
Landslides
Noxious Weeds
Parks and Trails
Planning
Reference Layers
King County Roads
Stormwater Services

Appendix B

Developed Site
Conditions and Drainage
plan & Detail

4" PERFORATED FOOTING DRAIN

POINT	INVERT	LENGTH	S
A	235.6	43	1.0%
B	235.18	32	1.0%
C	234.86	24	1.0%
D	234.62	22	1.0%
E	234.40		
A	235.5	35	1.0%
F	235.15	24	1.0%
E	234.40	33	2.3%

4" PVC ROOF DRAIN

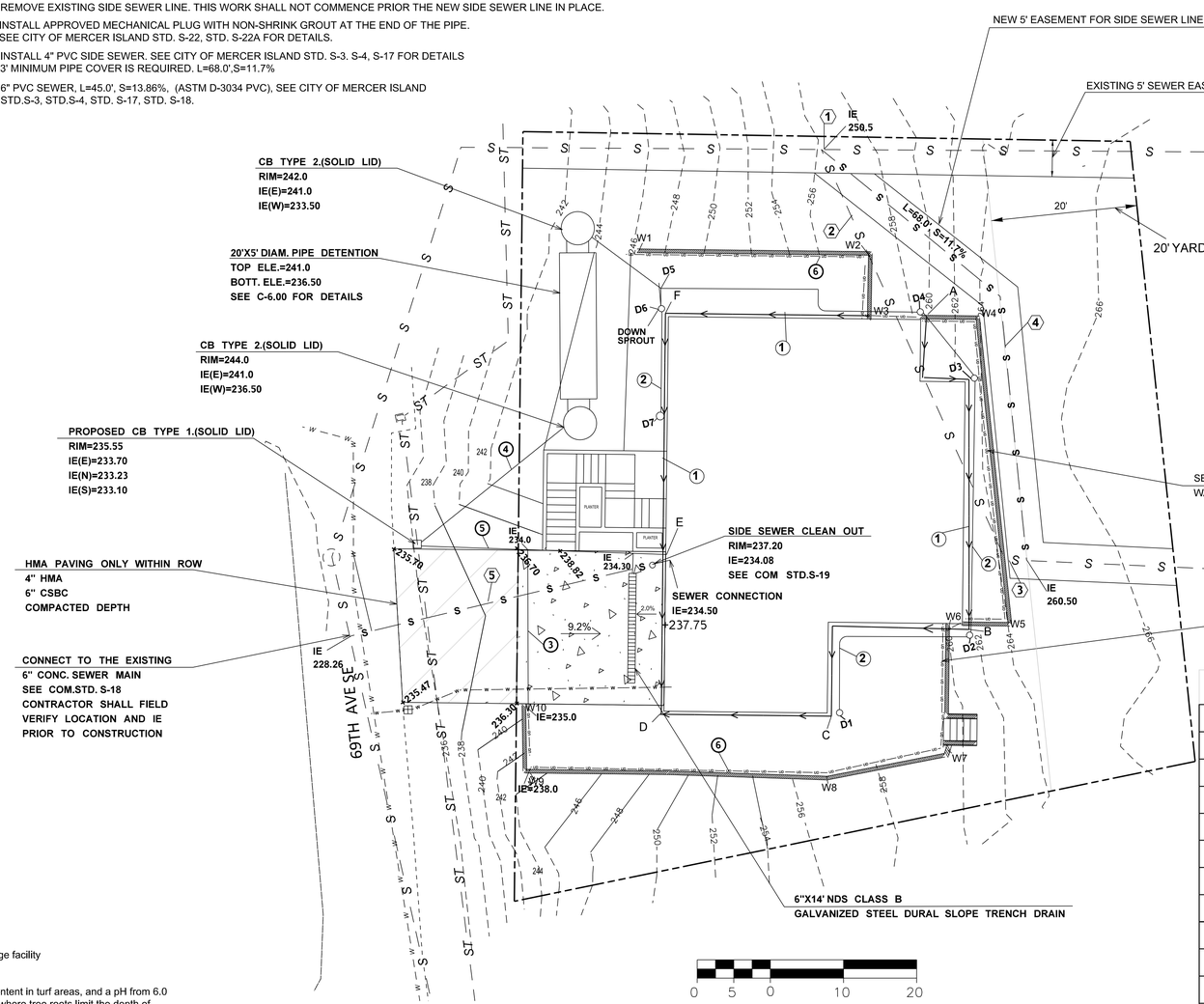
POINT	INVERT	LENGTH	S
D-1	256	28	1.8%
D2	255.50	35	4.3%
D3	254.00	11	7.3%
D4	253.20	38	26.8%
D5	243.00	13	15.4%
TY 2. CB	241.00		
D6	243.20	3	6.67%
D7	244.50	14	9.29%

STORM DRAIN NOTES

1. 4" FOOTING DRAIN MIN 2% GRADE (ASTM D-3034 PVC)
2. 4" ROOF DRAIN MIN 2% GRADE (ASTM D-3034 PVC)
3. 4" STORM DRAIN, L=22.0', S=4.5 %, (D.I CL 52)
4. 6" STORM DRAIN, L=25.0', S=11.8%,(D.I CL 52)
5. 4" PVC STORM DRAIN, L=34.0, S=2.0%, (ASTM D-3034 PVC)
6. 4" PVC UNDER DRAIN, MIN. S=1%, (ASTM D-3034 PVC)

SIDE SEWER NOTES

1. 1. CUT AND REMOVE THE EXISTING SIDE SEWER LINE, CONTRACTOR SHALL NOTIFY THE ADJACENT PROPERTIES OWNERS PRIOR TO CONDUCT THIS WORK.
   2. CONTRACTOR SHALL FIELD VERIFY THE PIPE LOCATION AND INVERT ELEVATION.
   3. CONTRACTOR SHALL MAINTAIN THE SIDESEWER IN FULL FUNCTION DURING THE CONSTRUCTION.
   4. CONTRACTOR SHALL INSTALL THE RELOCATE SIDE SEWER LINE IN PLACE PRIOR REMOVING THE EXISTING SIDE SEWER LINE.
   5. CONNECT RELOCATED SEWER LINE WITH EXISTING SIDE SEWER LINE. SEE CITY OF MERCER ISLAND STD. S-17 FOR DETAILS
2. REMOVE EXISTING SIDE SEWER LINE. THIS WORK SHALL NOT COMMENCE PRIOR THE NEW SIDE SEWER LINE IN PLACE.
3. INSTALL APPROVED MECHANICAL PLUG WITH NON-SHRINK GROUT AT THE END OF THE PIPE. SEE CITY OF MERCER ISLAND STD. S-22, STD. S-22A FOR DETAILS.
4. INSTALL 4" PVC SIDE SEWER. SEE CITY OF MERCER ISLAND STD. S-3. S-4, S-17 FOR DETAILS 3' MINIMUM PIPE COVER IS REQUIRED. L=68.0',S=11.7%
5. 6" PVC SEWER, L=45.0', S=13.86%, (ASTM D-3034 PVC), SEE CITY OF MERCER ISLAND STD.S-3, STD.S-4, STD. S-17, STD. S-18.



LEGEND

- PROPOSED SIDE SEWER
- EXISTING SEWER LINE
- EXISTING EDGE OF PAVEMENT
- SPOT ELEVATION +236
- EXISTING STORM LINE
- EXISTING WATER LINE
- PROPOSED WATER IINE
- PROPOSED WATER METER
- WALL UNDERDRAIN
- TREE DRIP LINES
- PROPOSED FOOTING DRAIN
- EXISTING LOT LINE
- EXISTING CONTOUR
- PROPOSED CONTOUR

WALL SPOT ELEVATION*

SPOT	TOP ELEVATION	BOTTOM ELEVATION
W1	246.4	237.0
W2	258.0	237.0
W3	258.0	237.0
W4	257.0	237.0
W5	257.0	237.0
W6	257.0	237.0
W7	254	237.0
W8	246.0	237.0
W9	245.0	235.0
W10	240.0	236.0

* WALL SPOTS ELEVATION ARE FOR REFERENCED ONLY
SEE THE STRUCTURE PLANS FOR ELEVATION AND DETAILS.

Post Construction Soil Quality

All areas subject to clearing and grading that have not been covered by impervious surface, incorporated into a drainage facility or engineered as structure fill or slope shall, at project completion, demonstrate the following:

1. A topsoil layer with a minimum organic matter content of 10% dry weight in planting beds, and 5% organic matter content in turf areas, and a pH from 6.0 to 8.0 or matching the pH of the undisturbed soil. The topsoil layer shall have a minimum depth of eight inches except where tree roots limit the depth of incorporation of amendments needed to meet the criteria. Subsoils below the topsoil layer should be scarified at least 4 inches with some incorporation of the upper material to avoid stratified layers, where feasible.

2. Mulch planting beds with 2 inches of organic material

3. Use compost and other materials that meet these organic content requirements:

a. The organic content for "pre-approved" amendment rates can be met only using compost meeting the compost specification for BMP T7.30: Bioretention Cells, Swales, and Planter Boxes (p.959), with the exception- that the compost may have up to 35% biosolids or manure.The compost must also have an organic matter content of 40% to 65%, and a carbon to nitrogen ratio below 25:1.The carbon to nitrogen ratio may be as high as 35:1 for plantings composed entirely of plants native to the Puget Sound Lowlands region.

b. Calculated amendment rates may be met through use of composted material meeting (a.) above; or other organic materials amended to meet the carbon to nitrogen ratio requirements, and not exceeding the contaminant limits identified in Table 220-B, Testing Parameters, in WAC 173-350-220.

Maintenance

1. Establish soil quality and depth toward the end of construction and once established, protect from compaction, such as from large machinery use, and from erosion.
2. Plant vegetation and mulch the amended soil area after installation.
3. Leave plant debris or its equivalent on the soil surface to replenish organic matter.
4. Reduce and adjust, where possible, the use of irrigation, fertilizers, herbicides and pesticides, rather than continuing to implement formerly established practices.

NOTE
NO EXCAVATION ENCROACHMENT INTO TREE DRIP LINE

Know what's below. Call before you dig.

CATCH BASIN TYPE I WITH OIL/WATER SEPARATED

NTS

FIELD BOOK:
SURVEYED:
SURVEY BASE MAP:
DESIGN ENTERED: J.W
DESIGNED S.W
CHECKED: S.W

SHAO MIN WU STATE OF WASHINGTON 36653 REGISTERED PROFESSIONAL ENGINEER

TANDEM ENGINEERING CONSULTANT LLC
8822 NE 178TH ST
BOTHELL, WA 98011
(206) 795-5674

DRAINAGE & GRADATION PLAN

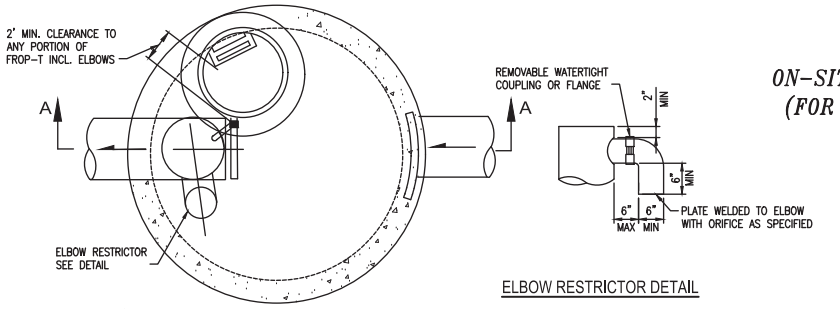
HU'S RESIDENCE
30XX 69TH AVE SE
MERCER ISLAND WA 98040

SHEET 5 OF 6 SHEETS

C-5.00

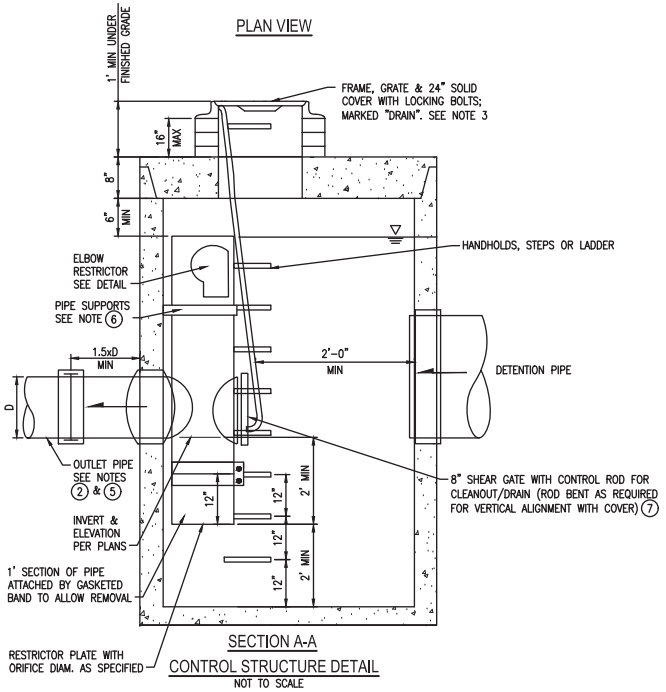
ATTACHMENT 1
CITY OF MERCER ISLAND
ON-SITE DETENTION SYSTEM WORKSHEET
(FOR NEW PLUS REPLACED IMPERVIOUS AREA OF 9,500 SF OR LESS)

OWNER: Ze Wen Hu
ADDRESS: 30xx 69th Ave SE
PREPARED BY: _____
PERMIT #: _____
PHONE: _____
DATE: _____
NEW PLUS REPLACED IMPERVIOUS SURFACE AREA (SF): 2,908
DETENTION PIPE DIA (INCH): 60
DETENTION PIPE LENGTH (FT): 20
ORIFICE #1 DIA 0.5 INCH, ELEV _____
SOIL TYPE: c
PIPE MATERIAL: Reinforced Conc pipe
ORIFICE #2 DIA 1.1 INCH, ELEV _____



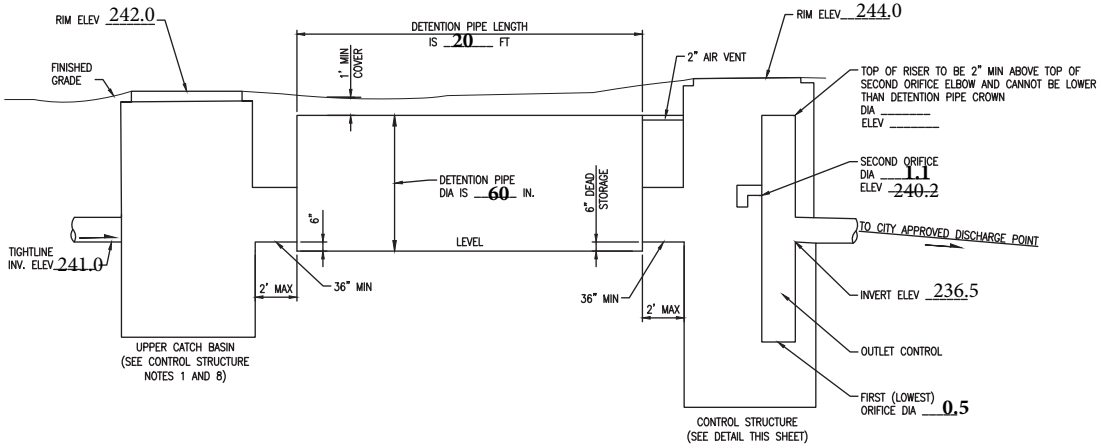
ELBOW RESTRICTOR DETAIL

PLAN VIEW



SECTION A-A

CONTROL STRUCTURE DETAIL
NOT TO SCALE



ON-SITE DETENTION SYSTEM
NOT TO SCALE (ENGINEER TO FILL IN BLANKS)

CONTROL STRUCTURE NOTES:

1. USE A MINIMUM OF A 54 IN. DIAM. TYPE 2 CATCH BASIN. THE ACTUAL SIZE IS DEPENDENT ON CONNECTING PIPE MATERIAL AND DIAMETER.
2. OUTLET PIPE: MIN. 6 INCH.
3. METAL PARTS: CORROSION RESISTANT. NON-GALVANIZED PARTS PREFERRED. GALVANIZED PIPE PARTS TO HAVE ASPHALT TREATMENT 1.
4. FRAME AND LADDER OR STEPS OFFSET SO:
   A. CLEANOUT GATE IS VISIBLE FROM TOP;
   B. CLIMB-DOWN SPACE IS CLEAR OF RISER AND CLEANOUT GATE;
   C. FRAME IS CLEAR OF CURB.
5. IF METAL OUTLET PIPE CONNECTS TO CEMENT CONCRETE PIPE, OUTLET PIPE TO HAVE SMOOTH O.D. EQUAL TO CONCRETE PIPE I.D. LESS 1/4 IN.
6. PROVIDE AT LEAST ONE 3 X 0.090 GAUGE SUPPORT BRACKET ANCHORED TO CONCRETE WALL WITH 5/8 IN. STAINLESS STEEL EXPANSION BOLTS OR EMBEDDED SUPPORTS 2 IN. INTO CATCH BASIN WALL (MAXIMUM 3'-0" VERTICAL SPACING).
7. THE SHEAR GATE SHALL BE MADE OF ALUMINUM ALLOY IN ACCORDANCE WITH ASTM B 26M AND ASTM B 275, DESIGNATION ZG32A; OR CAST IRON IN ACCORDANCE WITH ASTM A 48, CLASS 30B.
   THE LIFT HANDLE SHALL BE MADE OF A SIMILAR METAL TO THE GATE (TO PREVENT GALVANIC CORROSION), IT MAY BE OF SOLID ROD OR HOLLOW TUBING, WITH ADJUSTABLE HOOK AS REQUIRED.
   A NEOPRENE RUBBER GASKET IS REQUIRED BETWEEN THE RISER MOUNTING FLANGE AND THE GATE FLANGE. INSTALL THE GATE SO THAT THE LEVEL-LINE MARK IS LEVEL WHEN THE GATE IS CLOSED.
   THE MATING SURFACES OF THE LID AND THE BODY SHALL BE MACHINED FOR PROPER FIT.
   ALL SHEAR GATE BOLTS SHALL BE STAINLESS STEEL.
8. THE UPPER CATCH BASIN IS REQUIRED IF THE LENGTH OF THE DETENTION PIPE IS GREATER THAN 50 FT.

ON-SITE DETENTION SYSTEM NOTES:

1. CALL DEVELOPMENT SERVICES (206-275-7605) 24 HOURS IN ADVANCE FOR A DETENTION SYSTEM INSPECTION BEFORE BACKFILLING AND FOR FINAL INSPECTIONS.
2. RESPONSIBILITY FOR OPERATION AND MAINTANANCE OF DRAINAGE SYSTEMS ON PRIVATE PROPERTY IS RESPONSIBILITY OF THE PROPERTY OWNER. MATERIAL ACCUMULATED IN THE STORAGE PIPE MUST BE REMOVED FROM CATCH BASINS TO ALLOW PROPER OPERATION. THE OUTLET CONTROL ORIFICE MUST BE KEPT OPEN AT ALL TIMES.
3. PIPE MATERIAL, JOINT, AND PROTECTIVE TREATMENT SHALL BE IN ACCORDANCE WITH SECTION 7.04 AND 9.05 OF THE WSDOT STANDARD SPECIFICATION FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION, LATEST VERSION. SUCH MATERIALS INCLUDE THE FOLLOWING, LINED CORRUGATED POLYETHYLENE PIPE (LCPE), ALUMINIZED TYPE 2 CORRUGATED STEEL PIPE AND PIPE ARCH (MEETS AASHTO DESIGNATIONS M274 AND M36), CORRUGATED OR SPIRAL RIB ALUMINUM PIPE, OR REINFORCED CONCRETE PIPE. CORRUGATED STEEL PIPE IS NOT ALLOWED.
4. FOOTING DRAINS SHALL NOT BE CONNECTED TO THE DETENTION SYSTEM.

Appendix C

TESC Plan and Details

Appendix D

Design Guidelines and
Maintenance Standards

CITY OF MERCER ISLAND

DEVELOPMENT SERVICES GROUP
9611 SE 36TH STREET | MERCER ISLAND, WA 98040
PHONE: 206.275.7605 | www.mercergov.org
Inspection Requests: Online: www.MyBuildingPermits.com VM: 206.275.7730

ON-SITE DETENTION DESIGN REQUIREMENTS

General Requirements

This guidance applies only to projects that meet the thresholds specified below in "Is On-site Detention Required for My Project?" if all of the on-site stormwater BMPs included on List #1 and List #2 are determined to be infeasible for roofs and/or other hard surfaces.

Is On-site Detention Required For My Project?

YES, if my project:

1) Results in 2,000 square feet, or greater, of new plus replaced hard surface area, or
2) Has a land disturbing activity or 7,000 square feet or greater, or
3) Results in a ***net increase*** of impervious surface of 500 square feet or greater.

AND

1) All of the on-site stormwater BMPs included on List #1 and List #2 are determined to be infeasible for roofs and/or other hard surfaces, and
2) Drainage from the site will be discharged to a storm and surface water system that includes a watercourse or there is a capacity constraint in the system.

NO, if my project:

1) Results in less than 2,000 square feet of new plus replaced hard surface area, and
2) Has a land disturbing activity less than 7,000 square feet, and
3) Results in a **net increase of less than 500 square feet** of impervious surface area.
4) The project discharges ***directly*** to Lake Washington, or findings from a ¼-mile downstream analysis confirm that the downstream system is free of capacity constraints.

Designing Your On-Site Detention System

All on-site detention system designs must be prepared by a professional engineer registered in the State of Washington. The Standard On-site Detention System worksheet (Attachment 1) must be submitted on 18" x 24" (minimum) size sheets.

Construction that results in 500 to 9,500 square feet of new plus replaced impervious surfaces: Size system according to Table 1. The configuration of the on-site detention system shall be as shown on Attachment 1 (Standard On-Site Detention Systems Worksheet) or as specifically designed by the engineer for the site.

Note:

- The applicant may pay a fee-in-lieu-of constructing an on-site detention system when allowed by the City Engineer. The fee will not be an option when in the opinion of the City Engineer, undetained runoff from the development may adversely exacerbate an existing problem (MICC 15.11) or if flow control is required by Minimum Requirement #7.
- **Construction that results in more than 9,500 square feet of new plus replaced impervious surfaces and/or exceeds a 100-year flow frequency of 0.15 cubic feet per second (for moderate and steep sloped sites greater than a 5% slope):** Size system according to Minimum Requirement #7 (Flow Control) in the Stormwater Management Manual for Western Washington (Ecology 2014).

Table 1

ON-SITE DETENTION DESIGN FOR PROJECTS BETWEEN 500 SF AND 9,500 SF NEW PLUS REPLACED IMPERVIOUS SURFACE AREA

New and Replaced Impervious Surface Area (sf)	Detention Pipe Diameter (in)	Detention Pipe Length (ft)		Lowest Orifice Diameter (in)[3]		Distance from Outlet Invert to Second Orifice (ft)		Second Orifice Diameter (in)	
		B soils	C soils	B soils	C soils	B soils	C soils	B soils	C soils
500 to 1,000 sf	36"	30	22	0.5	0.5	2.2	2.0	0.5	0.8
	48"	18	11	0.5	0.5	3.3	3.2	0.9	0.8
	60"	11	7	0.5	0.5	4.2	3.4	0.5	0.6
1,001 to 2,000 sf	36"	66	43	0.5	0.5	2.2	2.3	0.9	1.4
	48"	34	23	0.5	0.5	3.2	3.3	0.9	1.2
	60"	22	14	0.5	0.5	4.3	3.6	0.9	0.9
2,001 to 3,000 sf	36"	90	66	0.5	0.5	2.2	2.4	0.9	1.9
	48"	48	36	0.5	0.5	3.1	2.8	0.9	1.5
	60"	30	20	0.5	0.5	4.2	3.7	0.9	1.1
3,001 to 4,000 sf	36"	120	78	0.5	0.5	2.4	2.2	1.4	1.6
	48"	62	42	0.5	0.5	2.8	2.9	0.8	1.3
	60"	42	26	0.5	0.5	3.8	3.9	0.9	1.3
4,001 to 5,000 sf	36"	134	91	0.5	0.5	2.8	2.2	1.7	1.5
	48"	73	49	0.5	0.5	3.6	2.9	1.6	1.5
	60"	46	31	0.5	0.5	4.6	3.5	1.6	1.3
5,001 to 6,000 sf	36"	162	109	0.5	0.5	2.7	2.2	1.8	1.6
	48"	90	59	0.5	0.5	3.5	2.9	1.7	1.5
	60"	54	37	0.5	0.5	4.6	3.6	1.6	1.4
6,001 to 7,000 sf	36"	192	128	0.5	0.5	2.7	2.2	1.9	1.8
	48"	102	68	0.5	0.5	3.7	2.9	1.9	1.6
	60"	64	43	0.5	0.5	4.6	3.6	1.8	1.5
7,001 to 8,000 sf	36"	216	146	0.5	0.5	2.8	2.2	2.0	1.9
	48"	119	79	0.5	0.5	3.8	2.9	2.2	1.7
	60"	73	49	0.5	0.5	4.5	3.6	2.0	1.6
8,001 to 8,500 sf[1]	36"	228	155	0.5	0.5	2.8	2.2	2.1	1.9
	48"	124	84	0.5	0.5	3.7	2.9	1.9	1.8
	60"	77	53	0.5	0.5	4.6	3.6	2.0	1.6
8,501 to 9,000 sf	36"	NA [1]	164	0.5	0.5	NA [1]	2.2	NA [1]	1.9
	48"	NA [1]	89	0.5	0.5	NA [1]	2.9	NA [1]	1.9
	60"	NA [1]	55	0.5	0.5	NA [1]	3.6	NA [1]	1.7
9,001 to 9,500 sf[2]	36"	NA [1]	174	0.5	0.5	NA [1]	2.2	NA [1]	2.1
	48"	NA [1]	94	0.5	0.5	NA [1]	2.9	NA [1]	2.0
	60"	NA [1]	58	0.5	0.5	NA [1]	3.7	NA [1]	1.7

Notes:

▪ Minimum Requirement #7 (Flow Control) is required when the 100-year flow frequency causes a 0.15 cubic feet per second increase (when modeled in WWHM with a 15-minute timestep). Breakpoints shown in this table are based on a flat slope (0-5%). The 100-year flow frequency will need to be evaluated on a site-specific basis for projects on moderate (5-15%) or steep (> 15%) slopes.

▪ Soil type to be determined by geotechnical analysis or soil map.

▪ Sizing includes a Volume Correction Factor of 120%.

▪ Upper bound contributing area used for sizing.

[1] On Type B soils, new plus replaced impervious surface areas exceeding 8,500 sf trigger Minimum Requirement #7 (Flow Control)

[2] On Type C soils, new plus replaced impervious surface areas exceeding 9,500 sf trigger Minimum Requirement #7 (Flow Control)

[3] Minimum orifice diameter = 0.5 inches

in = inch

ft = feet

sf = square feet

Basis of Sizing Assumptions:

Sized per MR#5 in the Stormwater Management Manual for Puget Sound Basin (1992 Ecology Manual)

SBUH, Type 1A, 24-hour hydrograph

2-year, 24-hour storm = 2 in; 10-year, 24-hour storm = 3 in; 100-year, 24-hour storm = 4 in

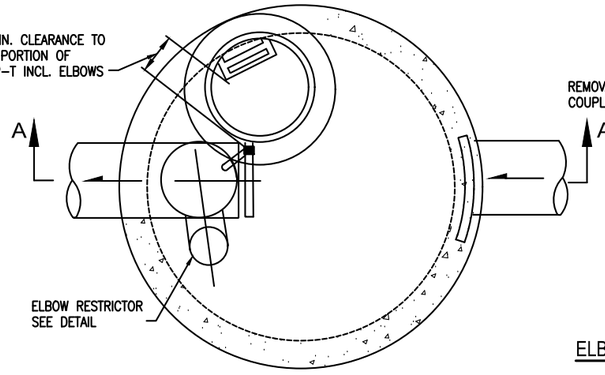
Predeveloped = second growth forest (CN = 72 for Type B soils, CN = 81 for Type C soils)

Developed = impervious (CN = 98)

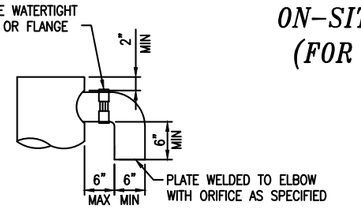
0.5 foot of sediment storage in detention pipe

Overland slope = 5%

ATTACHMENT 1
CITY OF MERCER ISLAND
ON-SITE DETENTION SYSTEM WORKSHEET
(FOR NEW PLUS REPLACED IMPERVIOUS AREA OF 9,500 SF OR LESS)

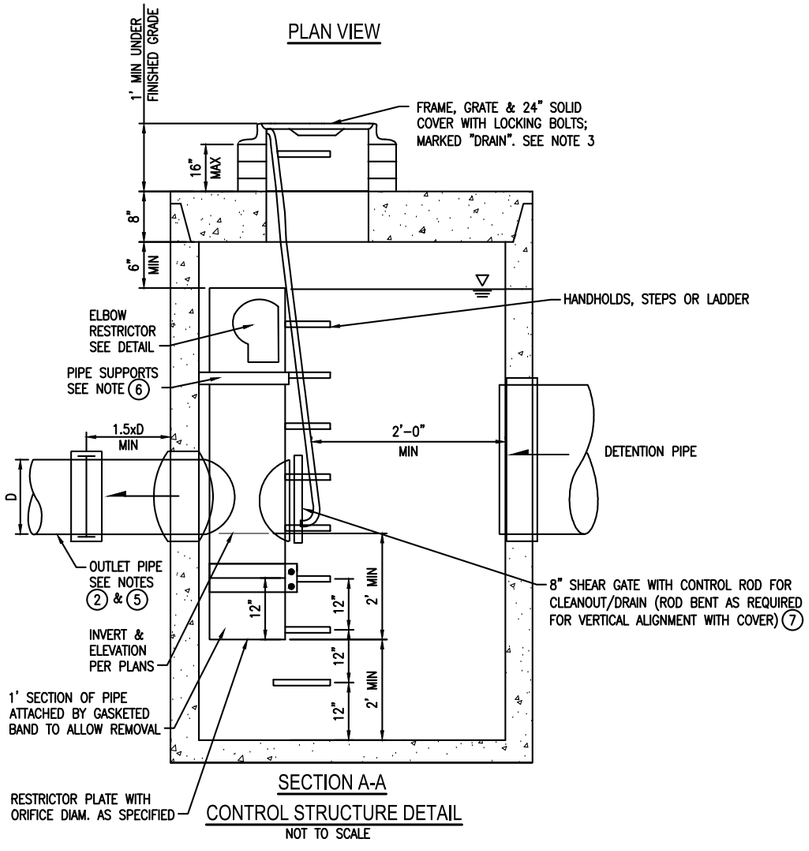


PLAN VIEW



ELBOW RESTRICTOR DETAIL

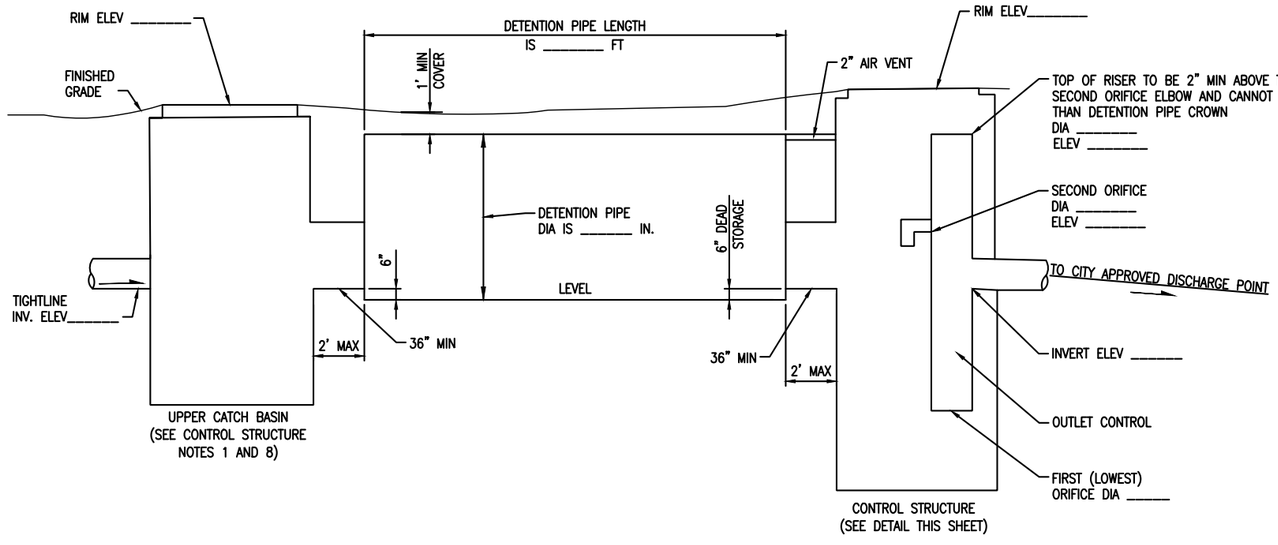
OWNER: _____	ADDRESS: _____	PREPARED BY: _____
PERMIT #: _____	_____	PHONE: _____
		DATE: _____
NEW PLUS REPLACED IMPERVIOUS SURFACE AREA (SF): _____	DETENTION PIPE DIA (INCH): _____	DETENTION PIPE LENGTH (FT): _____
SOIL TYPE: _____	PIPE MATERIAL: _____	



SECTION A-A

CONTROL STRUCTURE DETAIL

NOT TO SCALE



ON-SITE DETENTION SYSTEM

NOT TO SCALE (ENGINEER TO FILL IN BLANKS)

CONTROL STRUCTURE NOTES:

1. USE A MINIMUM OF A 54 IN. DIAM. TYPE 2 CATCH BASIN. THE ACTUAL SIZE IS DEPENDENT ON CONNECTING PIPE MATERIAL AND DIAMETER.
2. OUTLET PIPE: MIN. 6 INCH.
3. METAL PARTS: CORROSION RESISTANT. NON-GALVANIZED PARTS PREFERRED. GALVANIZED PIPE PARTS TO HAVE ASPHALT TREATMENT 1.
4. FRAME AND LADDER OR STEPS OFFSET SO:
   A. CLEANOUT GATE IS VISIBLE FROM TOP;
   B. CLIMB-DOWN SPACE IS CLEAR OF RISER AND CLEANOUT GATE;
   C. FRAME IS CLEAR OF CURB.
5. IF METAL OUTLET PIPE CONNECTS TO CEMENT CONCRETE PIPE, OUTLET PIPE TO HAVE SMOOTH O.D. EQUAL TO CONCRETE PIPE I.D. LESS 1/4 IN.
6. PROVIDE AT LEAST ONE 3 X 0.090 GAUGE SUPPORT BRACKET ANCHORED TO CONCRETE WALL WITH 5/8 IN. STANLESS STEEL EXPANSION BOLTS OR EMBEDDED SUPPORTS 2 IN. INTO CATCH BASIN WALL (MAXIMUM 3'-0" VERTICAL SPACING).
7. THE SHEAR GATE SHALL BE MADE OF ALUMINUM ALLOY IN ACCORDANCE WITH ASTM B 26M AND ASTM B 275, DESIGNATION ZG32A; OR CAST IRON IN ACCORDANCE WITH ASTM A 48, CLASS 30B.
   THE LIFT HANDLE SHALL BE MADE OF A SIMILAR METAL TO THE GATE (TO PREVENT GALVANIC CORROSION), IT MAY BE OF SOLID ROD OR HOLLOW TUBING, WITH ADJUSTABLE HOOK AS REQUIRED.
   A NEOPRENE RUBBER GASKET IS REQUIRED BETWEEN THE RISER MOUNTING FLANGE AND THE GATE FLANGE. INSTALL THE GATE SO THAT THE LEVEL-LINE MARK IS LEVEL WHEN THE GATE IS CLOSED.
   THE MATING SURFACES OF THE LID AND THE BODY SHALL BE MACHINED FOR PROPER FIT.
   ALL SHEAR GATE BOLTS SHALL BE STAINLESS STEEL.
8. THE UPPER CATCH BASIN IS REQUIRED IF THE LENGTH OF THE DETENTION PIPE IS GREATER THAN 50 FT.

ON-SITE DETENTION SYSTEM NOTES:

1. CALL DEVELOPMENT SERVICES (206-275-7605) 24 HOURS IN ADVANCE FOR A DETENTION SYSTEM INSPECTION BEFORE BACKFILLING AND FOR FINAL INSPECTIONS.
2. RESPONSIBILITY FOR OPERATION AND MAINTANANCE OF DRAINAGE SYSTEMS ON PRIVATE PROPERTY IS RESPONSIBILITY OF THE PROPERTY OWNER. MATERIAL ACCUMULATED IN THE STORAGE PIPE MUST BE REMOVED FROM CATCH BASINS TO ALLOW PROPER OPERATION. THE OUTLET CONTROL ORIFICE MUST BE KEPT OPEN AT ALL TIMES.
3. PIPE MATERIAL, JOINT, AND PROTECTIVE TREATMENT SHALL BE IN ACCORDANCE WITH SECTION 7.04 AND 9.05 OF THE WSDOT STANDARD SPECIFICATION FOR ROAD, BRIDGE, AND MUNICIPAL CONSTRUCTION, LATEST VERSION. SUCH MATERIALS INCLUDE THE FOLLOWING, LINED CORRUGATED POLYETHYLENE PIPE (LCPE), ALUMINIZED TYPE 2 CORRUGATED STEEL PIPE AND PIPE ARCH (MEETS AASHTO DESIGNATIONS M274 AND M36), CORRUGATED OR SPIRAL RIB ALUMINUM PIPE, OR REINFORCED CONCRETE PIPE. CORRUGATED STEEL PIPE IS NOT ALLOWED.
4. FOOTING DRAINS SHALL NOT BE CONNECTED TO THE DETENTION SYSTEM.

Appendix E

Sensitive Areas Map

Parcel: 5093301316

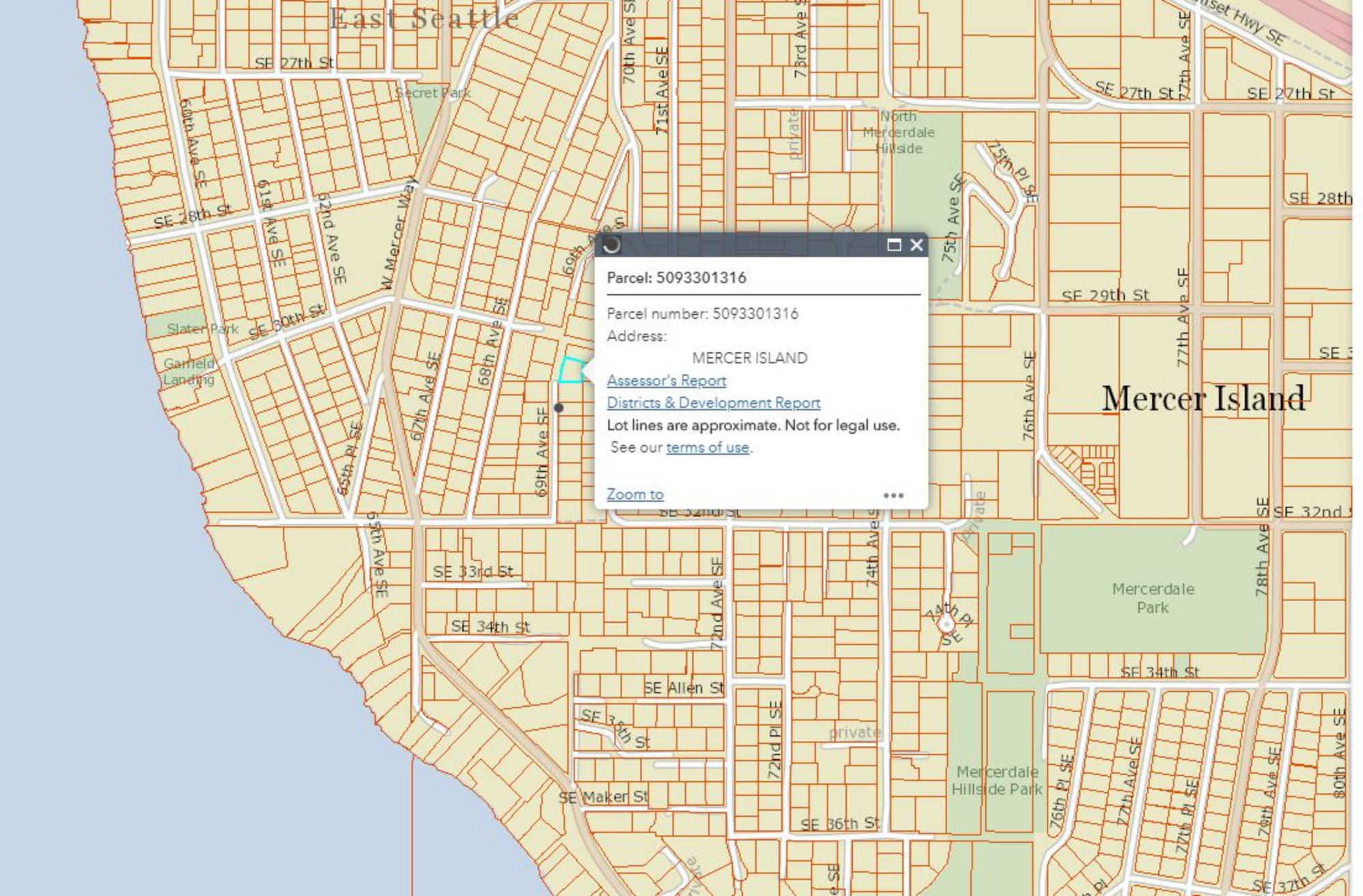
Parcel number: 5093301316
Address:
MERCER ISLAND
Assessor's Report
Districts & Development Report
Lot lines are approximate. Not for legal use.
See our terms of use.

Zoom to

Secret Park
First Hill Park
Mercer Island
North Mercerdale Hillside
Private
SE 27th St
SE 28th St
SE 29th St
SE 32nd St
SE 33rd St
71st Ave SE
69th Ave SE
68th Ave SE
67th Ave SE
66th Ave SE
74th Ave SE
75th Ave SE
75th Pl SE

Layer List

- Elevation Contours
- Environmentally Sensitive Areas
  - Tributary basins (2005 CAO)
  - Potential landslide hazard areas (2016, see explanation--->)
  - Potential landslide hazard areas 50-foot buffer (2016)
  - Landslide hazards, incorporated KC (1990)
  - Potential steep slope hazard areas (2016, see explanation--->)
  - Basin condition (2005 CAO)
  - Shoreline condition (2005 CAO)
  - Erosion hazard (1990 SAO)
  - Seismic hazard (1990 SAO)
  - Coal mine hazard (1990 SAO)
  - Stream (1990 SAO)
    - class 1
    - class 2 perennial
    - class 2 salmonid
    - class 3
    - unclassified
  - Wetland (1990 SAO)
  - Sensitive area notice on title
  - Chinook distribution



- Administrative Areas
- Electoral Districts
- Elevation Contours
- Environmentally Sensitive Areas
- Flooding info
  - River gages
  - Flood photos
  - River facilities
  - Flood phases
  - Elevation certificates
  - Letter of Map Amendment and Revisions
  - FEMA cross-sections
  - FEMA FIRM panels
  - FEMA floodway
  - FEMA 100 year floodplain
  - FEMA 500 year floodplain
  - FEMA area with reduced risk due to levee
- Groundwater

Appendix F

Geotechnical Report