

**Stormwater Drainage Report
9619 SE 34th Street
Su Residence
Mercer Island, Washington
KC Tax Parcel #413930-0025
Permit #: XXXX-XXX**

Prepared For:

**JayMarc Custom Homes, LLC
Attn.: Gary Upper
7525 SE 24th Street
Suite #520
Mercer Island, Washington 98040
425-281-2706
Gary@jaymarchomes.com**

December 18, 2023

Prepared By:

**Offe Engineers, PLLC
Darrell Offe, P.E.
13932 SE 159th Place
Renton, Washington 98058
425-260-3412
Darrell.Offe@comcast.net**

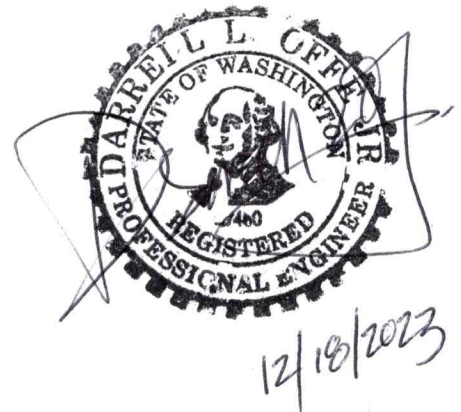


TABLE OF CONTENT

Section 1: Project Narrative

Section 2: Site Evaluation

Section 3: Minimum Requirements #1 - #9

Appendix A: Geotechnical Evaluation

Section 1: Project Narrative:

The subject property is located on the south side of SE 34th Street between 96th and 97th Avenue SE; on the north side of I-90. There is an existing residence and impervious surfaces on the property. All these features will be removed to provide space for the new residence and driveway. The subject property slopes from the southwest corner (elevation 71.20) towards the northeast corner (elevation 57.20). The current runoff from the subject property impervious surfaces is sheet flow discharge towards the northeast corner and into the southerly gutter on SE 34th Street.

The property was visited in June 2022 to verify runoff patterns and possible storm water discharge options. A downstream analysis from the subject property to Lake Washington was performed during the site visit in June. The subject property was visited again in November 2023 to confirm no changes.

The project will be evaluated for storm water treatment and control using the Amended December 2014 SWMMWW (DOE Manual).



LEGAL DESCRIPTION

THE LAND REFERRED TO IS SITUATED IN THE COUNTY OF KING, CITY OF
MERCER ISLAND, STATE OF WASHINGTON, AND IS DESCRIBED AS
FOLLOWS:

BEGINNING AT THE SOUTHEAST CORNER OF GOVERNMENT LOT 5,
SECTION 7, TOWNSHIP 24 NORTH, RANGE 5 EAST, W.M.;
THENCE WEST ALONG THE SOUTH LINE OF SAID GOVERNMENT LOT 5,
1,196.24 FEET; THENCE NORTH 0°11' WEST ON A LINE PARALLEL TO THE
EAST LINE OF SAID GOVERNMENT LOT 5, 478.0 FEET TO THE TRUE
POINT OF BEGINNING;
THENCE NORTH 0°11' EAST 160 FEET;
THENCE EAST 117.4 FEET;
THENCE SOUTH 0°11' EAST 160 FEET;
THENCE WEST 117.4 FEET TO THE TRUE POINT OF BEGINNING;

(ALSO KNOWN AS LOT 5, LAKEMONT ADDITION, AN UNRECORDED PLAT)

SITUATE IN THE COUNTY OF KING, STATE OF WASHINGTON

BASIS OF BEARINGS

ACCEPTED THE BEARING OF N 01°13'12" E BETWEEN MONUMENTS
FOUND IN CASE ALONG THE CENTERLINE OF 97TH AVE SE, PER
REFERENCE NO. 1.

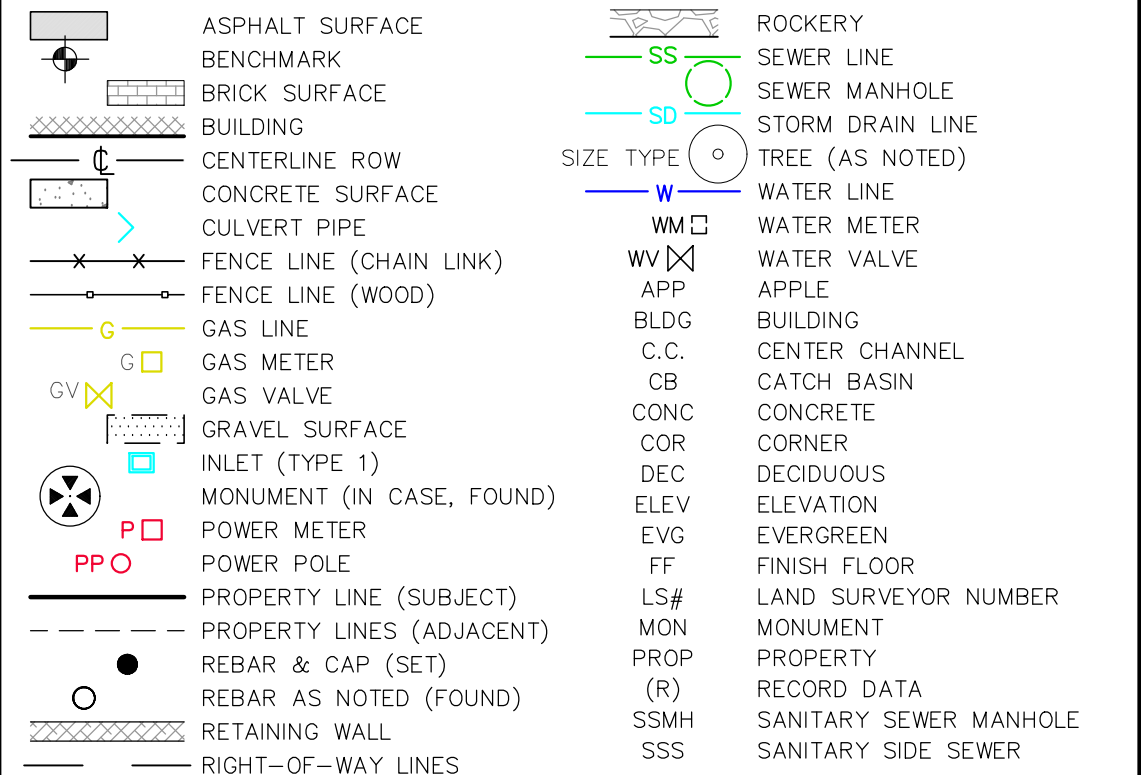
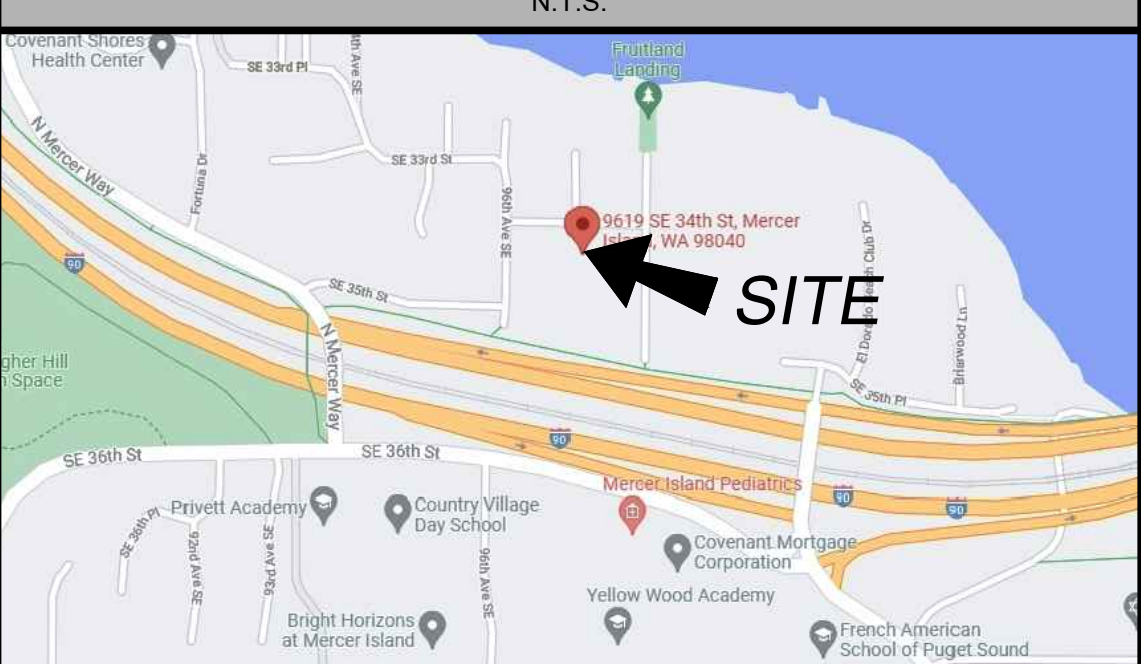
REFERENCES

R1. MERCER ISLAND SHORT PLAT NO. 90-08-19,
VOL. 77, PG. 293, RECORDS OF KING COUNTY, WASHINGTON.

SURVEYOR'S NOTES

1. THE TOPOGRAPHIC SURVEY SHOWN HEREON WAS PERFORMED IN JANUARY OF 2022. THE FIELD DATA WAS COLLECTED AND RECORDED ON MAGNETIC MEDIA THROUGH AN ELECTRONIC THEODOLITE. THE DATA FILE IS ARCHIVED ON DISC OR CD. WRITTEN FIELD NOTES MAY NOT EXIST. CONTOURS ARE SHOWN FOR CONVENIENCE ONLY. DESIGN SHOULD RELY ON SPOT ELEVATIONS.
2. ALL MONUMENTS SHOWN HEREON WERE LOCATED DURING THE COURSE OF THIS SURVEY UNLESS OTHERWISE NOTED.
3. THE TYPES AND LOCATIONS OF ANY UTILITIES SHOWN ON THIS DRAWING ARE BASED ON INFORMATION PROVIDED TO US, BY OTHERS OR GENERAL INFORMATION READILY AVAILABLE IN THE PUBLIC DOMAIN INCLUDING, AS APPLICABLE, IDENTIFYING MARKINGS PLACED BY UTILITY LOCATE SERVICES AND OBSERVED BY TERRANE IN THE FIELD. AS SUCH, THE UTILITY INFORMATION SHOWN ON THESE DRAWINGS ARE FOR INFORMATIONAL PURPOSES ONLY AND SHOULD NOT BE RELIED ON FOR DESIGN OR CONSTRUCTION PURPOSES; TERRANE IS NOT RESPONSIBLE OR LIABLE FOR THE ACCURACY OR COMPLETENESS OF THIS UTILITY INFORMATION. FOR THE ACCURATE LOCATION AND TYPE OF UTILITIES NECESSARY FOR DESIGN AND CONSTRUCTION, PLEASE CONTACT THE SITE OWNER AND THE LOCAL UTILITY LOCATE SERVICE (800-424-5555).
4. SUBJECT PROPERTY TAX PARCEL NO. 413930-0025
5. SUBJECT PROPERTY AREA PER THIS SURVEY IS 18,784 S.F. (0.43 ACRES)
6. THE PROPERTY DESCRIBED HEREON IS THE SAME AS THE PROPERTY DESCRIBED IN OLD REPUBLIC TITLE COMMITMENT NO. 5207174080, WITH AN EFFECTIVE DATE OF DECEMBER 30, 2021 AND THAT ALL EASEMENTS, COVENANTS, AND RESTRICTIONS REFERENCED IN SAID TITLE COMMITMENT OR APPARENT FROM A PHYSICAL INSPECTION OF THE PROPERTY OR OTHERWISE KNOWN TO ME HAVE BEEN PLOTTED HEREON OR OTHERWISE NOTED AS TO THEIR EFFECT ON THE PROPERTY.
7. EXISTING STRUCTURE(S) LOCATION AND DIMENSIONS ARE MEASURED FROM THE FACE OF THE SIDING UNLESS OTHERWISE NOTED.
8. FIELD DATA FOR THIS SURVEY WAS OBTAINED BY DIRECT FIELD MEASUREMENTS WITH A CALIBRATED ELECTRONIC 5-SECOND TOTAL STATION AND/OR SURVEY GRADE GPS OBSERVATIONS. ALL ANGULAR AND LINEAR RELATIONSHIPS ARE ACCURATE AND MEET THE STANDARDS SET BY WAC 332-130-090.

LEGEND

VICINITY MAP
NTS

SCHEDULE B ITEMS

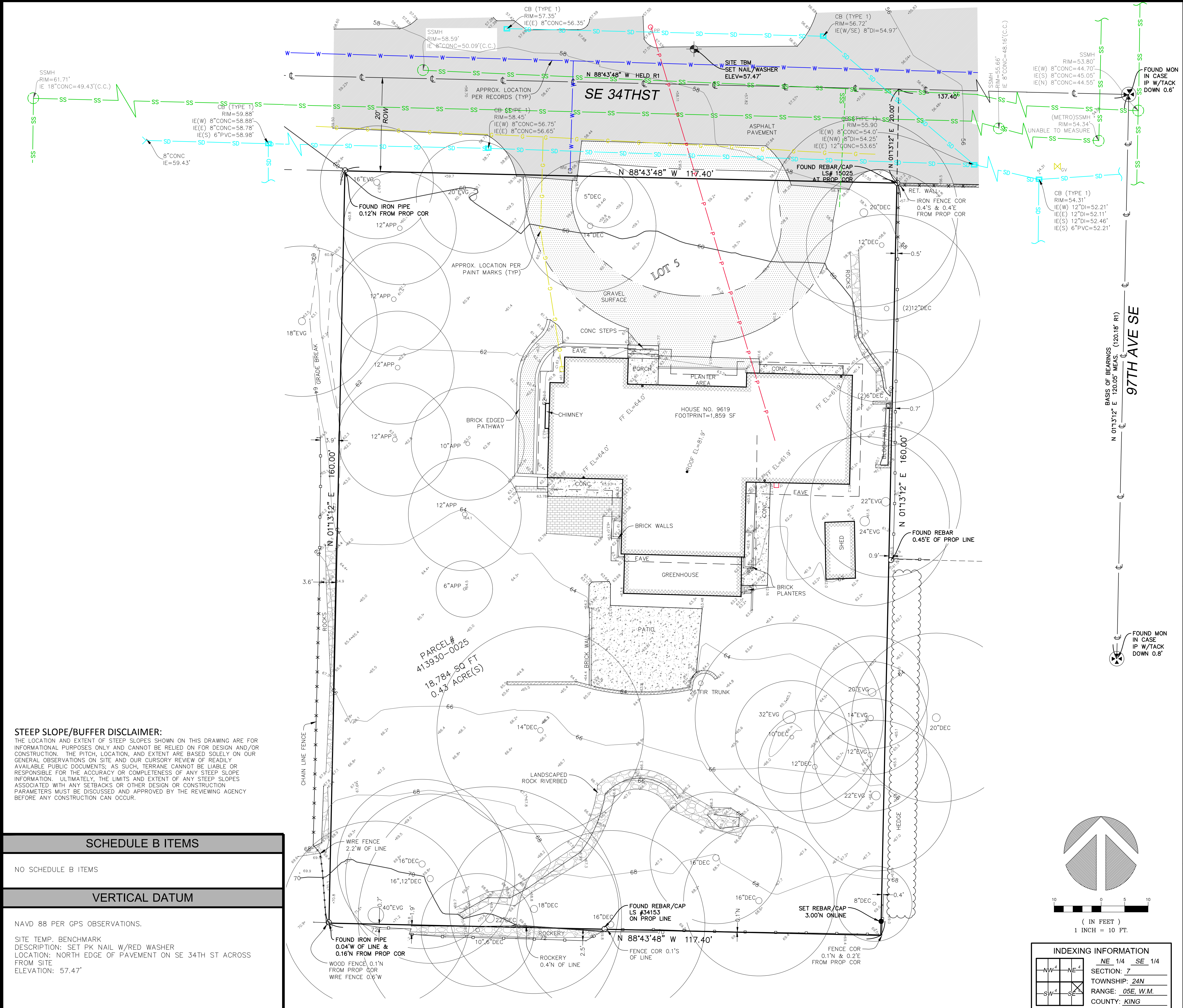
NO SCHEDULE B ITEMS

VERTICAL DATUM

NAVD 88 PER GPS OBSERVATIONS.

SITE TEMP. BENCHMARK
DESCRIPTION: SET PK NAIL W/RED WASHER
LOCATION: NORTH EDGE OF PAVEMENT ON SE 34TH ST ACROSS
FROM SITE
ELEVATION: 57.47'

TOPOGRAPHIC & BOUNDARY SURVEY



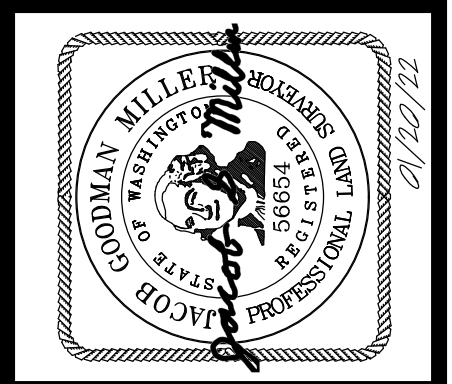
We are the measure | terrane.net

TOPOGRAPHIC & BOUNDARY SURVEY

PARCEL NO. 419890-0025

JAYMARC HOMES

9619 SE 34th ST
MERCER ISLAND, WA 98040



TERRANE

10801 Main Street, Suite 102
Bellevue, WA 98004
p: 425-458-4488 | e: info@terrane.net

JOB NUMBER:	220032
DATE:	1/20/22

DRAFTED BY:	TLR
CHECKED BY:	JGM/DRT

CHECKED BY:	DATE:
SCALE:	1" = 10'
REVISION HISTORY	

REVISION HISTORY	

SHEET NUMBER
1 OF 1

Section 2: Site Evaluation

Total Lot Area = 18,784 square feet (0.43 acres)

EXISTING CONDITIONS

Impervious:

House roof area = 2,389 sq. feet
Driveway ((PGHS)) = 1,195 sq. feet
Uncovered walkways/patio = 810 sq. feet
Greenhouse = 174 sq. feet
Shed = 76 sq. feet
Subtotal: *4,644 sq. feet*

Pervious:

Lawn, trees = *14,140 sq. feet*

DEVELOPED CONDITIONS

Impervious (hard) surfaces:

House roof area w/overhang = 4,855 sq. feet
Uncovered driveway ((PGHS)) = 811 sq. feet
Uncovered walkway/patio = 318 sq. feet

Total Impervious (Hard) Surfaces = 5,984 square feet

Pervious Surfaces:

Landscaping, Retained areas = 12,800 sq. feet

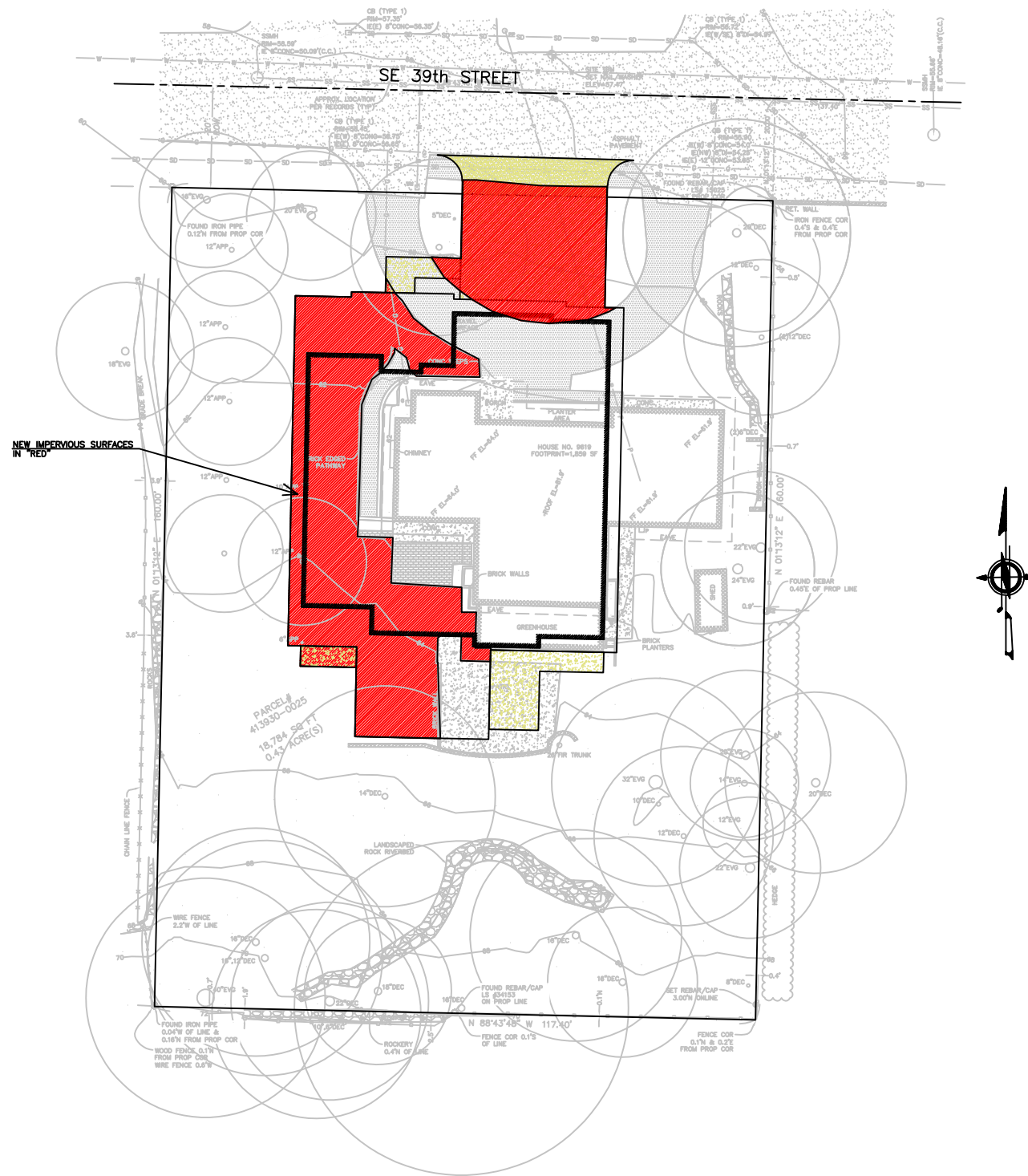
Total Pervious Surfaces = 12,800 square feet

((PGHS)) – Pollution generating Hard Surface

Summary of Project Information

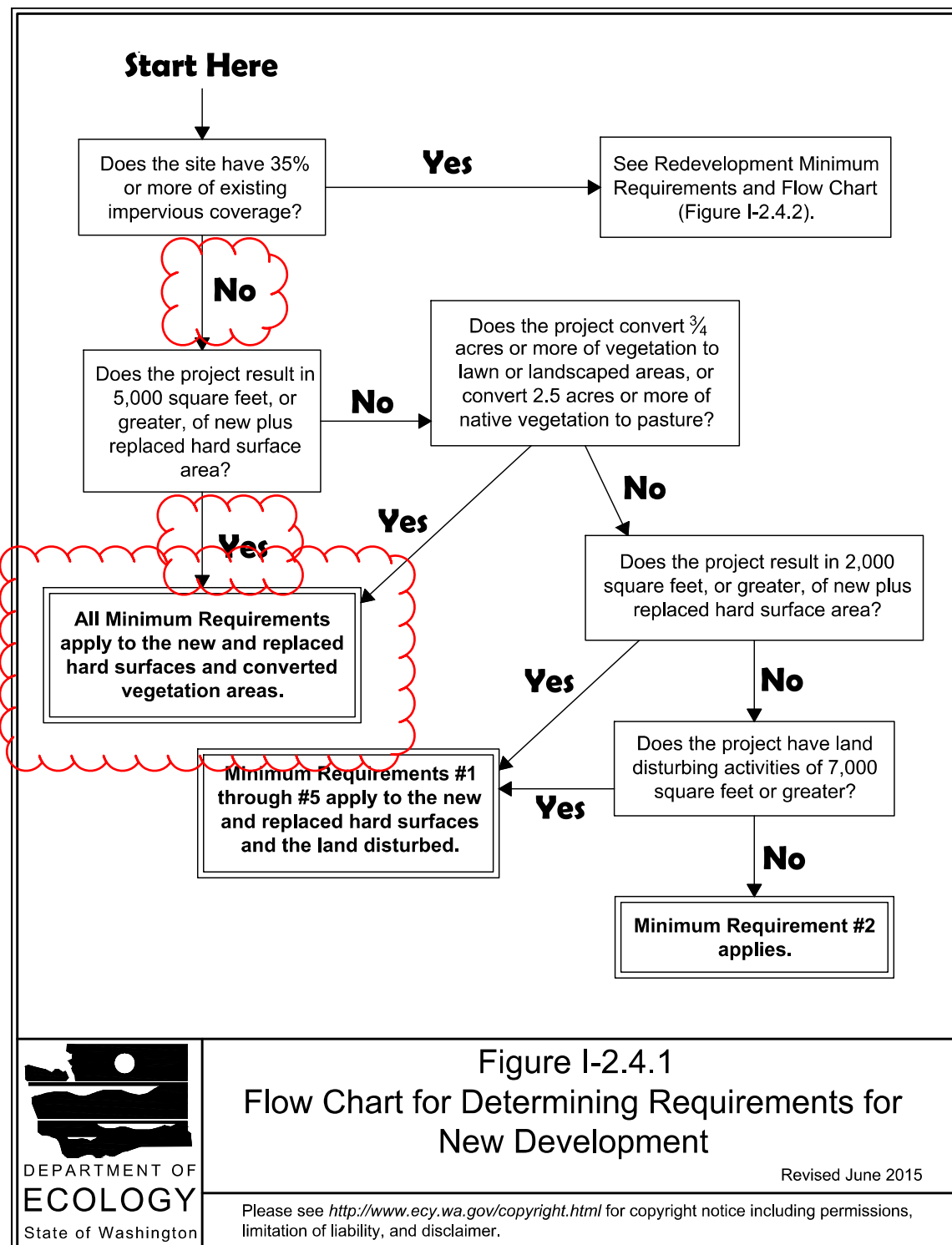
Project Site Area	18,784 square feet
Existing Impervious Area	4,644 sq. feet
Existing Impervious Coverage	24.7%
New Impervious Area	2,775 sq. feet
Replaced Impervious Area	3,209 sq. feet
New plus Replaced Impervious	5,984 square feet
Converted pervious: Native to lawn	0 sq. feet
Converted pervious: Native to pasture	0 sq. feet
Total Area of Land Disturbance	8,000 square feet

The subject property has less than 35% (24.7%) impervious coverage and the total proposed project new plus replaced impervious surfaces will be greater than 5,000 (5,984) square feet; using Figure I-2.4.1 – "Flow Chart for Determining Minimum Requirements for New Development" page 37, 2014 Stormwater Management Manual for Western Washington, Minimum Requirements #1 – #9 apply to this project.



FLOW CHART FIGURE II-2.4.1

Figure I-2.4.1 Flow Chart for Determining Requirements for New Development



Section 3: Minimum Requirements

Based upon the Flow Chart Figure I-2.4.1 and I-2.4.2 (Amended December 2014 SWMMWW, DOE Manual), all Minimum Requirements 1-9 apply to this project.

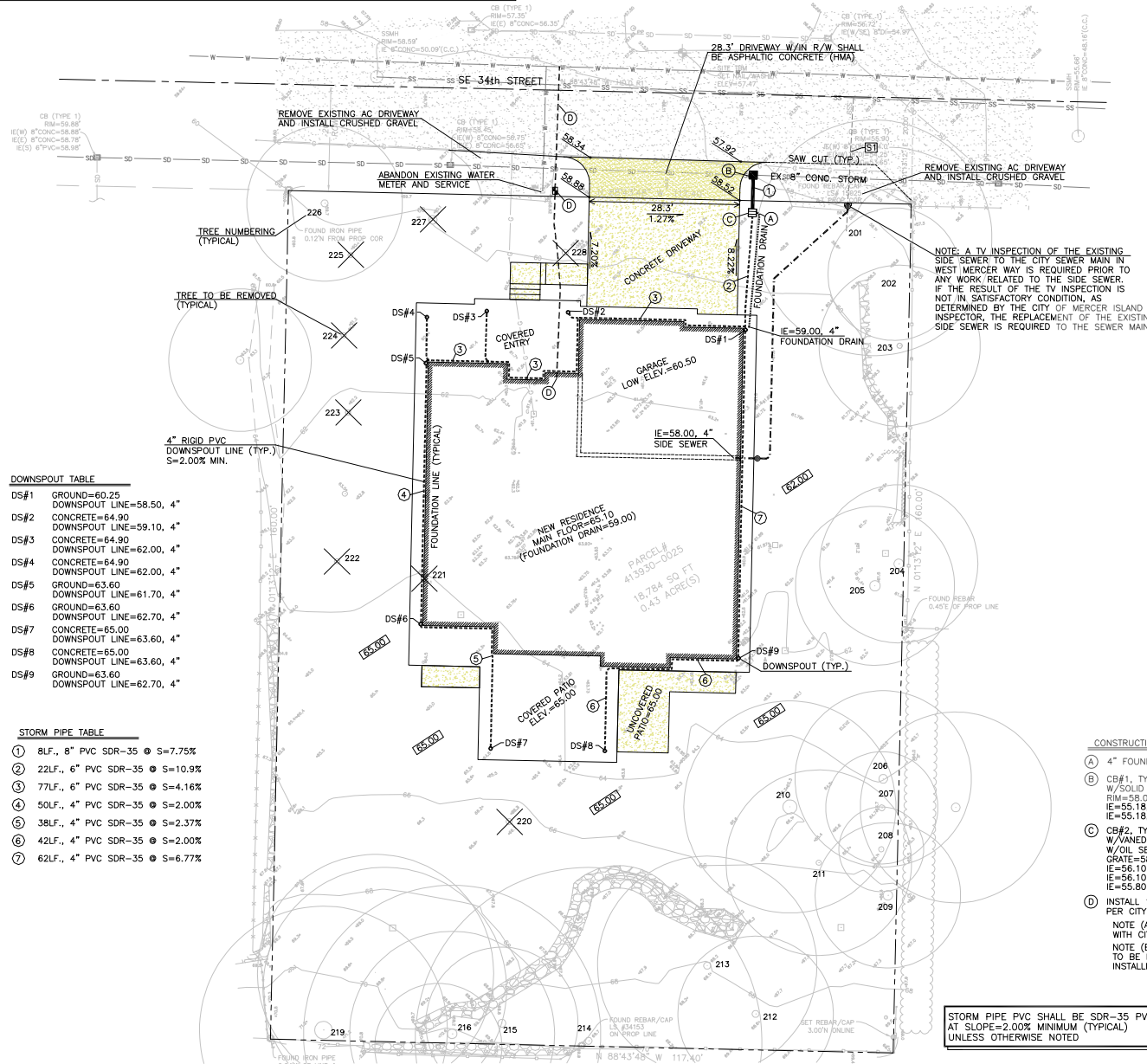
Section I-2.5.1 Minimum Requirement #1 – Preparation of Stormwater Site Plans

A Stormwater site plan (drainage plan) has been prepared for this project together with construction details for installation of the proposed drainage control system. The Stormwater site plans and drainage narrative shall be submitted and reviewed by the City of Mercer Island as part of the building permit application.

NE 1/4 OF THE SW 1/4 OF SECTION 18, TOWNSHIP 24 NORTH, RANGE 5 EAST, W.M., KING COUNTY, WA.

NOTE: THE LAWN AND LANDSCAPE AREAS ARE REQUIRED TO PROVIDE POST-CONSTRUCTION SOIL QUALITY AND DEPTH IN ACCORDANCE WITH BMP T5.13. THE PROJECT CIVIL ENGINEER MUST PROVIDE A LETTER OF CERTIFICATION TO ENSURE THAT THE LAWN AND LANDSCAPE AREAS ARE MEETING THE POST-CONSTRUCTION SOIL QUALITY AND DEPTH REQUIREMENTS SPECIFIED ON THE APPROVED PLAN SET PRIOR TO FINAL INSPECTION OF THE PROJECT.

EXISTING UTILITY LOCATIONS SHOWN HEREON ARE APPROXIMATE ONLY. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE EXACT VERTICAL AND HORIZONTAL LOCATION OF ALL EXISTING UNDERGROUND UTILITIES PRIOR TO COMMENCING CONSTRUCTION. NO REPRESENTATION IS MADE THAT ALL EXISTING UTILITIES ARE SHOWN HEREON. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR UTILITIES NOT SHOWN OR UTILITIES NOT SHOWN IN THEIR PROPER LOCATION.
CALL BEFORE YOU DIG: 811



DOWNSPOUT TABLE

DS#1	GROUND=60.25	DOWNPOUT LINE=58.50, 4"
DS#2	CONCRETE=64.90	DOWNPOUT LINE=59.10, 4"
DS#3	CONCRETE=64.90	DOWNPOUT LINE=62.00, 4"
DS#4	CONCRETE=64.90	DOWNPOUT LINE=62.00, 4"
DS#5	GROUND=63.60	DOWNPOUT LINE=61.70, 4"
DS#6	GROUND=63.60	DOWNPOUT LINE=62.70, 4"
DS#7	CONCRETE=65.00	DOWNPOUT LINE=63.60, 4"
DS#8	CONCRETE=65.00	DOWNPOUT LINE=63.60, 4"
DS#9	GROUND=63.60	DOWNPOUT LINE=62.70, 4"

STORM PIPE TABLE

- 8LF., 8" PVC SDR-35 @ S=7.75%
- 22LF., 6" PVC SDR-35 @ S=10.9%
- 77LF., 6" PVC SDR-35 @ S=4.16%
- 50LF., 4" PVC SDR-35 @ S=2.00%
- 38LF., 4" PVC SDR-35 @ S=2.37%
- 42LF., 4" PVC SDR-35 @ S=2.00%
- 62LF., 4" PVC SDR-35 @ S=6.77%

CONSTRUCTION NOTES

- 4" FOUNDATION DRAIN CONNECTION
- CB#11, TYPE 1 W/SOLID LOCKING LID RIM=58.00 IE=55.18, 8"(S)-NEW IE=55.18, 8"(E,W)-EXISTING
- CB#2, TYPE 1 W/VANED GRATE INLET W/OIL SEPARATOR GRATE=58.50 IE=56.10, 4"(E)-FOUNDATION DRAIN IE=56.10, 4"(S)-DOWNPOUT LINE IE=55.60, 8"(N)
- INSTALL 1" METER AND 1-1/2" SERVICE LINE PER CITY OF MERCER ISLAND STANDARD PLAN W-14.
NOTE (A): CONTRACTOR TO COORDINATE FINAL LOCATION OF NEW METER WITH CITY OF MERCER ISLAND INSPECTOR AT TIME OF CONSTRUCTION
NOTE (B): FINAL METER SIZE AND SERVICE LINE SIZE TO BE DETERMINED BY MECHANICAL CONTRACTOR INSTALLING FIRE SPRINKLER SYSTEM

SIDE SEWER NOTES

- APPROXIMATE LOCATION OF EXISTING SANITARY SIDE SEWER.
- INSTALL 58LF., 4" PVC SIDE SEWER @ MIN. 2% SLOPE W/SANITARY SEWER CLEANOUTS

LEGEND

ASPHALT SURFACE	EXISTING SPOT ELEVATIONS
BRICK SURFACE	MONUMENT IN CASE (FOUND)
BUILDING	POWER METER
CENTERLINE ROW	POWER (OVERHEAD)
CLEANOUT	POWER POLE
CULVERT PIPE	REBAR AS NOTED (FOUND)
CONCRETE SURFACE	REBAR & CAP (SET)
RETAINING WALL	ROCKERY
DECK	SEWER LINE
FENCE LINE (CHAIN LINK)	SEWER MANHOLE
FENCE LINE (WOOD)	STORM DRAIN LINE
GAS METER	TELEPHONE (OVERHEAD)
GRAVEL SURFACE	TELEPHONE SENTRY
HEDGE FOLIAGE LINE	WATER METER
INLET (TYPE 1)	POWER TRANSFORMER POLE
MAILBOX (RESIDENTIAL)	SIZE TYPE
	TREE (AS NOTED)

TREE TABLE

ID	Species	DHS	DSH	TPZ	MLOD	RLOD	RETAIN	REMOVE
201	European White Birch	21	21.4		9	14	x	
202	Hawthorn	11.5	12		6	8	x	
203	Hawthorn	17.1	7,11,11	14.7	7	11	x	
204	Western Red Cedar	23	14		10	15	x	
205	Western Red Cedar	25.4	14		11	21	x	
206	Western Red Cedar	19.9	15.8		8	17	x	
207	Western Red Cedar	11.8	10		6	10	x	
208	Lawson Cypress	11	7.5		6	9	x	
209	Grand Fir	19.6	12.8		8	16	x	
210	Doug-Fir	29	19		12	19	x	
211	Cherry Laurel	10.3	17		6	7	x	
212	Chinese photinia	12.8	11.6,5.4	14	6	9	x	
213	Horsechestnut	16.5	20		7	11	x	
214	Flowering Plum	17	12.1,12	32	7	11	x	
215	Horsechestnut	14.7	13.6		6	10	x	
216	Black Locust	20.7	18.4		9	14	x	
217	European White Birch	18.8	11.15,2	22.3	8	13	x	
218	European White Birch	15.3	21.6		6	10	x	
219	Western Red Cedar	40.1	21.7		17	27	x	
220	Black Locust	15.0	21		6	10	x	
221	Apple	12	12		6	8	x	
222	Apple	13	11		6	9	x	
223	Apple	11.3	12		6	8	x	
224	Apple	12.8	10.5		6	9	x	
225	Apple	10.5	14.9		6	7	x	
226	Lawson Cypress	14	12.6		6	12	x	
227	Lawson Cypress	12.8	11.8		8	16	x	
228	Hawthorn	16.6	16.7		7	11	x	

Percentage Saved 71.4%



GRAPHIC SCALE
0 5 10 20
1 inch = 10 feet
PERMIT #: 23xx-xxx

STORM PIPE PVC SHALL BE SDR-35 PVC AT SLOPE=2.00% MINIMUM (TYPICAL) UNLESS OTHERWISE NOTED

NOTE: 4" PERFORATED FOUNDATION DRAIN REQUIRED BUT NOT SHOWN ON PLAN, CONNECT WHERE SHOWN ON PLAN, CONNECT TO CB#1, ONLY!

IMPERVIOUS SURFACES:
ROOF AREA (UNDER EAVES) = 4,855 SQ. FEET
UNCOVERED DRIVEWAY AREA = 811 SQ. FEET
UNCOVERED PATIO/WALKWAYS = 318 SQ. FEET
TOTAL IMPERVIOUS AREAS = 5,984 SQ. FEET

LANDSCAPE AREAS NOTE:

DISTURBED LANDSCAPE AREAS SHALL BE TREATED AS AMENDED SOILS PER DOE FIGURE V-5.3.3, TYPICAL

PROJECT: 9619 SE 34th Street
CLIENT: JayMarc Custom Homes - Su Residence
SHEET CONTENT: Utility & Tree Plan
DATE: 12/18/2023
JOB NO.:
DWG NO.:
SHEET: 2 OF 4
CHECKED BY: DLO
DRAWN BY: SJJ
DESIGNED BY: DLO
OFFICE: OFFICE ENGINEERS
12/18/2023

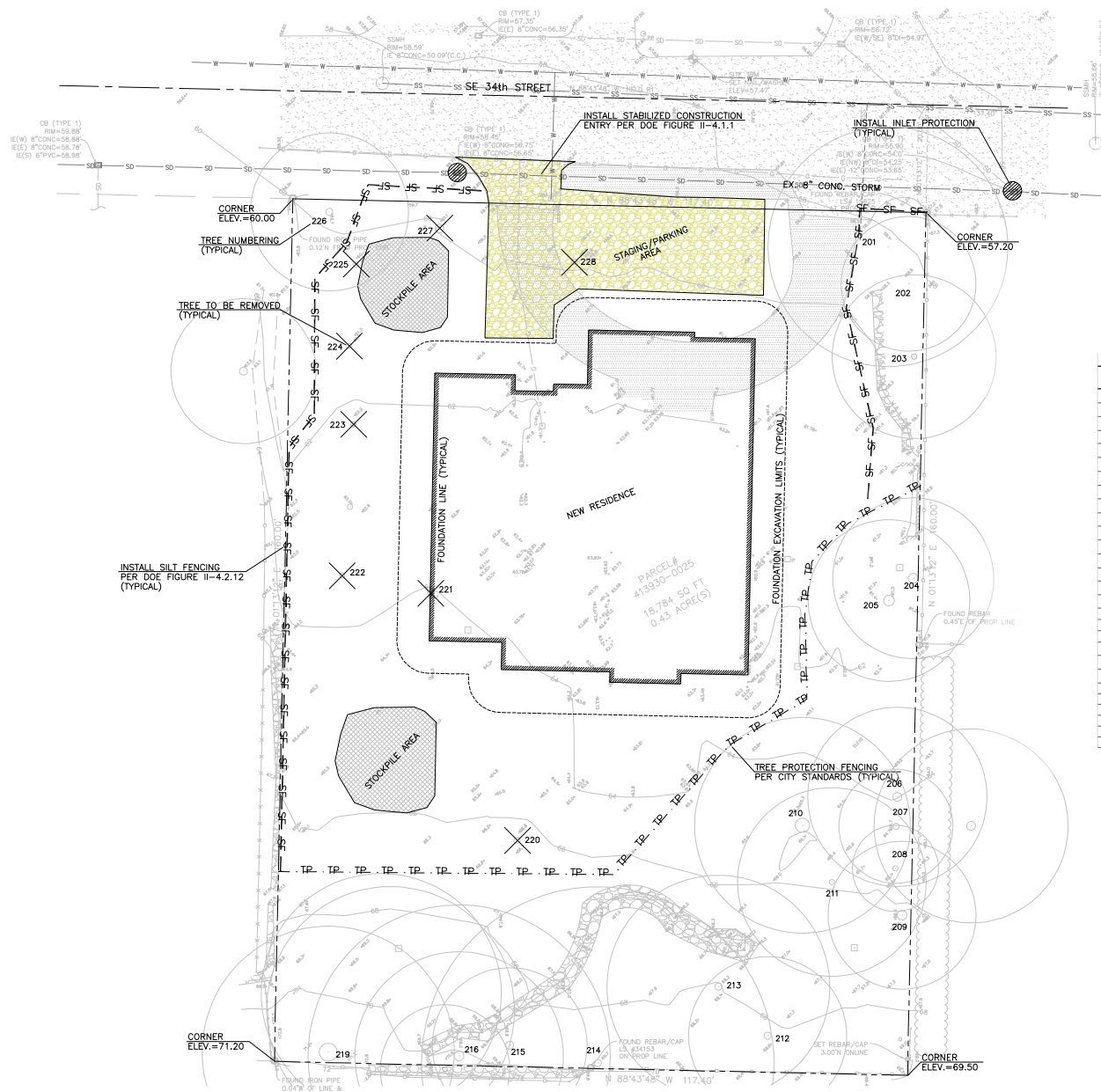
Section I-2.5.2 Minimum Requirement #2 - Construction Storm Water Pollution Prevention Plan (CSWPP)

A Construction Stormwater Pollution Prevention Plan (CSWPP) has been prepared and included within this Report. The CSWPP plan shall include construction installation of erosion control, establish a construction access, preservation of existing vegetation during construction, and protection of existing drainage inlets. This will include but not limited to: the use of the existing asphalt driveway (on the north side) to provide construction access from 83rd Avenue SE; installing filter fabric silt fencing along the down gradient property lines (west and south); installation of filter socks within the public catch basins located within 83rd Avenue SE; retention of native vegetated areas including tree/vegetation retention within the rear (east) and front (west) yards; and the use straw or chipped materials placed over exposed disturbed soils to prevent runoff from carrying solids.

NE 1/4 OF THE SW 1/4 OF SECTION 18, TOWNSHIP 24 NORTH., RANGE 5 EAST, W.M., KING COUNTY, WA.

EXISTING UTILITY LOCATIONS SHOWN HEREON ARE APPROXIMATE ONLY. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE EXACT VERTICAL AND HORIZONTAL LOCATION OF ALL EXISTING UNDERGROUND UTILITIES PRIOR TO COMMENCING CONSTRUCTION. NO REPRESENTATION IS MADE THAT ALL EXISTING UTILITIES ARE SHOWN HEREON. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR UTILITIES NOT SHOWN OR UTILITIES NOT SHOWN IN THEIR PROPER LOCATION.

CALL BEFORE YOU DIG: 811



LEGEND

- | | |
|-------------------------|------------------------|
| ASPHALT SURFACE | POWER METER |
| BRICK SURFACE | POWER (OVERHEAD) |
| BUILDING | POWER POLE |
| CENTERLINE ROW | REBAR AS NOTED (FOUND) |
| CLEANOUT | REBAR & CAP (SET) |
| CULVERT PIPE | ROCKERY |
| CONCRETE SURFACE | SEWER LINE |
| RETAINING WALL | SEWER MANHOLE |
| DECK | STORM DRAIN LINE |
| FENCE LINE (CHAIN LINK) | TELEPHONE (OVERHEAD) |
| FENCE LINE (WOOD) | TELEPHONE SENTRY |
| GAS METER | WATER METER |
| GRAVEL SURFACE | POWER TRANSFORMER POLE |
| HEDGE FOLIAGE LINE | TREE (AS NOTED) |
| INLET (TYPE 1) | |
| MAILBOX (RESIDENTIAL) | |

TREE TABLE

ID	Species	DHS	DSH	TPZ	MLOD	RLOD	RETAIN	REMOVE
201	European White Birch	21	21.4	9	14	x		
202	Hawthorn	11.5	12	6	8	x		
203	Hawthorn	17.1	7,11,11	14.7	7	11	x	
204	Western Red Cedar	23	14	10	15	x		
205	Western Red Cedar	25.4	14	11	21	x		
206	Western Red Cedar	10.9	15.8	8	17	x		
207	Western Red Cedar	11.8	10	6	10	x		
208	Lawson Cypress	11	7.5	6	9	x		
209	Grand Fir	10.6	12.8	8	16	x		
210	Deerp-Fir	29	19	12	19	x		
211	Cherry Laurel	10.3	17	6	7	x		
212	Chinese photinia	12.8	11.6,5.4	6	9	x		
213	Horsechestnut	16.5	20	7	11	x		
214	Flowering Plum	17	12.1,12	32	7	11	x	
215	Horsechestnut	14.7	13.6	6	10	x		
216	Black Locust	20.7	18.4	9	14	x		
217	European White Birch	18.8	11,15,2	22.3	8	13	x	
218	European White Birch	15.3	21.6	6	10	x		
219	Western Red Cedar	40.1	21.7	17	27	x		
220	Black Locust	15.0	21	6	10	x		
221	Apple	12	12	6	8	x		
222	Apple	13	11	6	9	x		
223	Apple	11.3	12	6	8	x		
224	Apple	12.8	10.5	6	9	x		
225	Apple	10.5	14.9	6	7	x		
226	Lawson Cypress	14	12.6	6	12	x		
227	Lawson Cypress	12.8	11.8	8	16	x		
228	Hawthorn	16.6	16.7	7	11	x		
Percentage Saved								71.4%

OFFICE ENGINEERS
JAY MARC CUSTOM HOMES - SU RESIDENCE
TEMP. EROSION & SEDIMENTATION CONTROL PLAN



PROJECT: 9619 SE 34th Street
CLIENT: JayMarc Custom Homes - Su Residence
SHEET CONTENT: Temp. Erosion & Sedimentation Control Plan
DATE: 12/18/2023
JOB NO.:
DWG NO.:
SHEET 1 OF 4
PERMIT #: 23xx-xxx

Section I-2.5.3 Minimum Requirement #3 - Source Control of Pollution

Source control BMP's will be utilized to contain pollution generating runoff. No concrete washout will be allowed on the property during construction. No fuel materials will be placed or stored on site during construction.

Section I-2.5.4 Minimum Requirement #4 - Preservation of Natural Drainage Systems and Outfalls

The subject property was visited in June 2022 and again in November 2023 to evaluate the site drainage patterns and perform a downstream analysis to the shoreline of Lake Washington. The subject property natural drainage outfall is sheet flow into the southerly gutter along SE 34th Street at the northeast corner of the subject property. The downstream drainage system was walked, inspected, and pictures taken from the subject property to the shoreline of Lake Washington.

The natural outfall of the subject property is into City of Mercer Island CB #3a-3, just east of the northeast corner. The downstream system consists of catch basins and conveyance pipes to the outfall into Lake Washington at Fruit and Landing Park. The following is a review and inspection of the conveyance system:

- CB# 3a-3 - Inlet clean, water flowing in conveyance pipe, CB sump has debris.
- CB# 3a-68 – Inlet clean, water flowing
- CB# 3a-64 – Inlet partially blocked, water flowing
- CB# 3a-65 – Looks like recently been replaced, inlet clean, water flowing, clean sump
- CB# 3a-66 – recently new CB, inlet clean, sump clean, flowing water
- CB# 3a-61 – solid locking lid, could not access
- CB# 3a-58 – solid locking lid, could not access
- Lake Outfall – flowing water, rip-rapped, no scouring or erosion present

The accessible portion of the downstream public storm system downgradient from the subject property natural outfall has no indications of flooding, overtopping, erosion, or scouring. The downstream system appears to have adequate capacity. A few of the existing catch basins need to have the sumps cleaned out due to debris build-up.

Section I-2.5.4 Minimum Requirement #4 - Preservation of Natural Drainage Systems and Outfalls

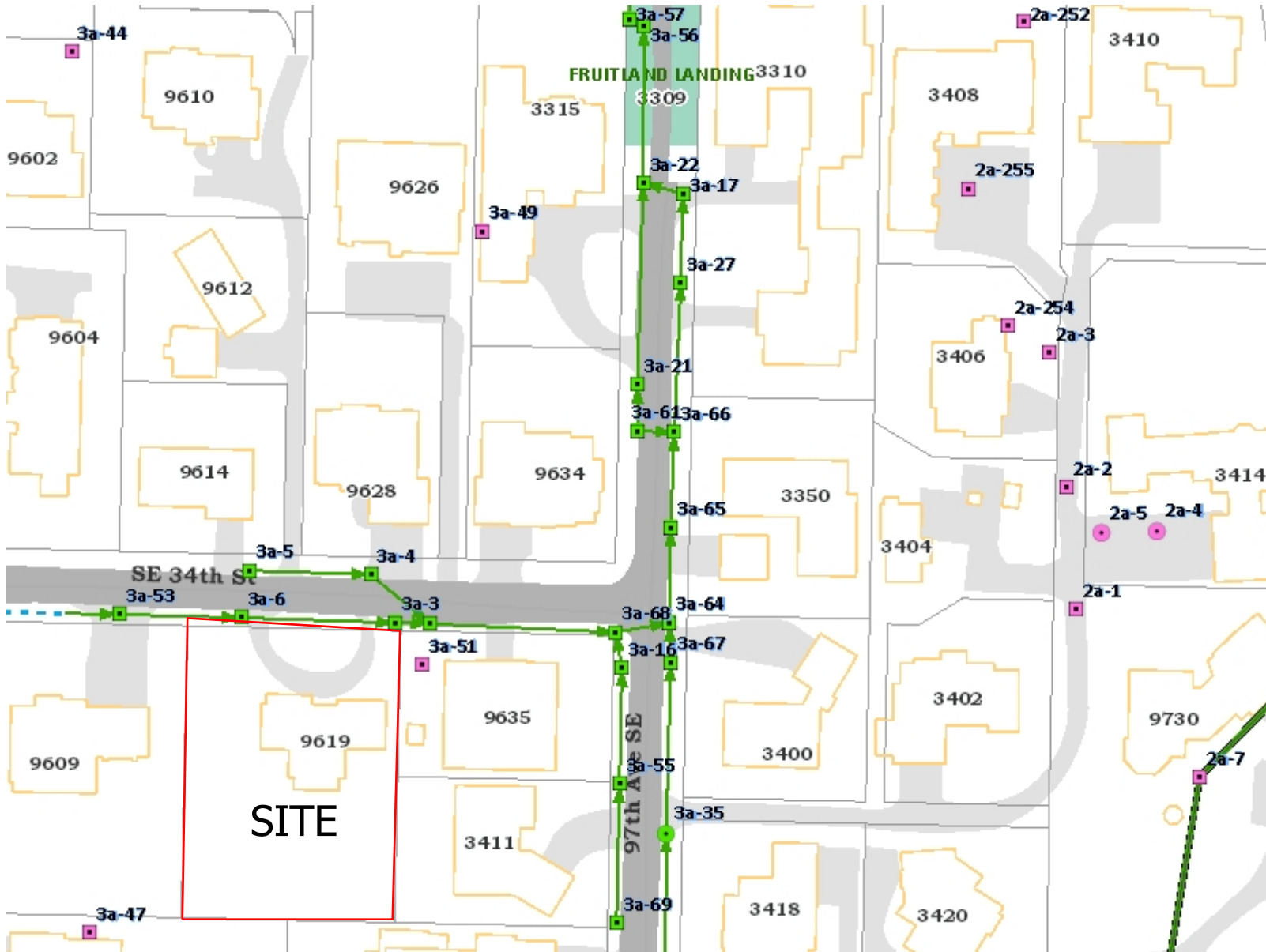
The subject property was visited in June 2022 and again in November 2023 to evaluate the site drainage patterns and perform a downstream analysis to the shoreline of Lake Washington. The subject property natural drainage outfall is sheet flow into the southerly gutter along SE 34th Street at the northeast corner of the subject property. The downstream drainage system was walked, inspected, and pictures taken from the subject property to the shoreline of Lake Washington.

The natural outfall of the subject property is into City of Mercer Island CB #3a-3, just east of the northeast corner. The downstream system consists of catch basins and conveyance pipes to the outfall into Lake Washington at Fruit and Landing Park. The following is a review and inspection of the conveyance system:

- CB# 3a-3 - Inlet clean, water flowing in conveyance pipe, CB sump has debris.
- CB# 3a-68 – Inlet clean, water flowing
- CB# 3a-64 – Inlet partially blocked, water flowing
- CB# 3a-65 – Looks like recently been replaced, inlet clean, water flowing, clean sump
- CB# 3a-66 – recently new CB, inlet clean, sump clean, flowing water
- CB# 3a-61 – solid locking lid, could not access
- CB# 3a-58 – solid locking lid, could not access
- Lake Outfall – flowing water, rip-rapped, no scouring or erosion present

The accessible portion of the downstream public storm system downgradient from the subject property natural outfall has no indications of flooding, overtopping, erosion, or scouring. The downstream system appears to have adequate capacity. A few of the existing catch basins need to have the sumps cleaned out due to debris build-up.

City of Mercer Island



Legend

Storm Catch Basin

- CB, City Owned
- CB, Private
- CB, Unknown
- Type 2, City Owned
- Type 2, Private
- Type 2, Unknown

Storm Main

- Pipe
- Open Watercourse
- Piped Watercourse
- - - Ditch
- - - Culvert
- - - Other

- Storm Main - Private
- Storm Discharge Point

Address

- Building
- Property Line
- Docks
- Freeway
- Major Street
- Street
- Paved Driveway
- Paved Road
- Paved Parking Area
- Parks
- Lake Washington

0 83 167
Feet

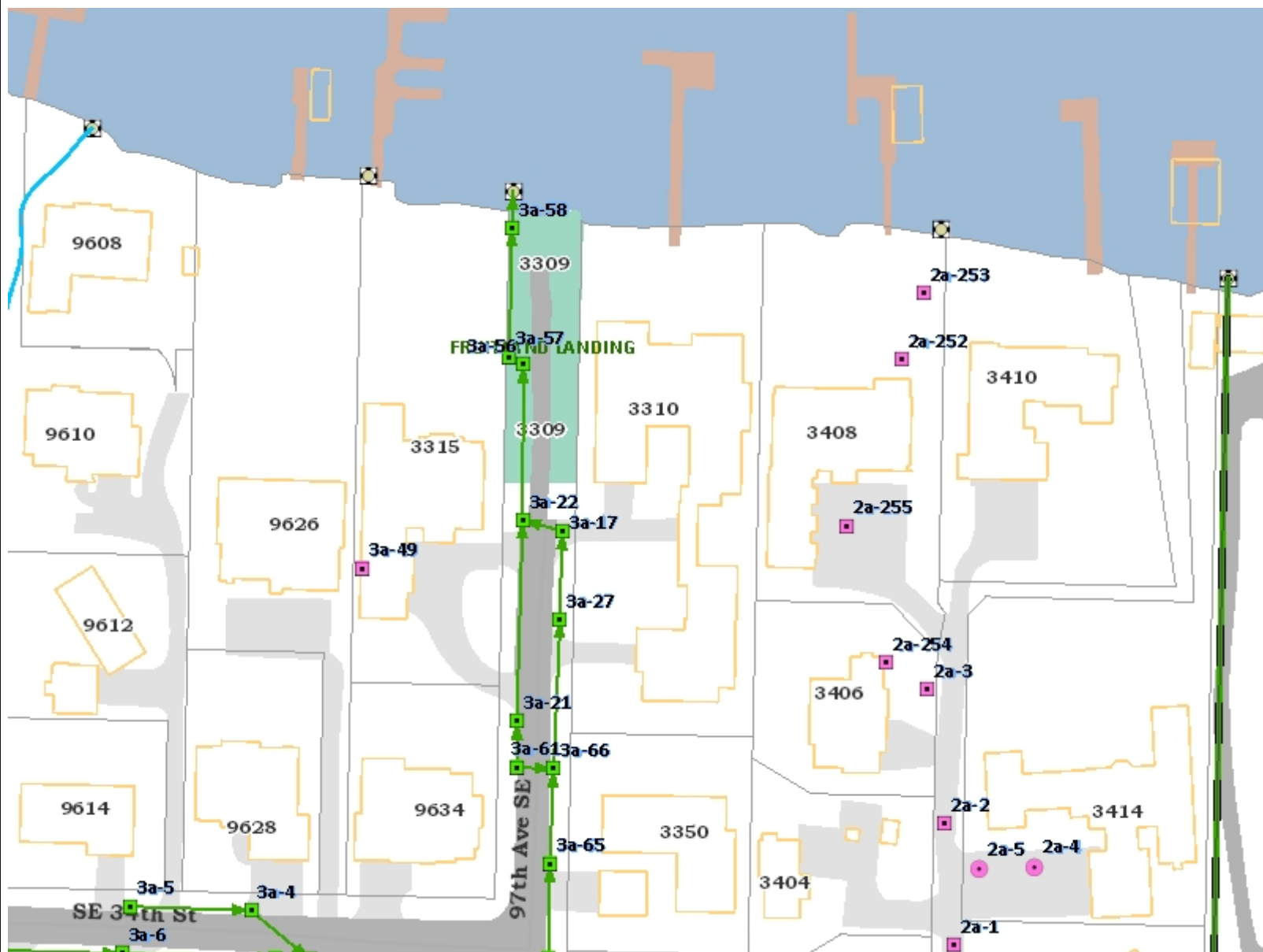
1 inch =
166.666666666667
feet



Disclaimer: These maps were developed by the City of Mercer Island and are intended to be a general purpose digital reference tool. These maps are not an accepted legal instrument for describing, establishing, recording or maintaining descriptions for property concerns or boundaries. The City makes no representation or warranty with respect to the accuracy or currency of these data sets, especially in regard to labeling of surveyed dimensions, or agreement with official sources such as records of survey, or mapped locations of features.

Notes

City of Mercer Island



Legend

Storm Catch Basin

- CB, City Owned
- CB, Private
- CB, Unknown
- Type 2, City Owned
- Type 2, Private
- Type 2, Unknown

Storm Main

- Pipe
- Open Watercourse
- Piped Watercourse
- - Ditch
- - Culvert
- - Other

Storm Main - Private

- Storm Discharge Point

Address

- Building
- Property Line
- Docks
- Freeway
- Major Street
- Street
- Paved Driveway
- Paved Road
- Paved Parking Area
- Parks
- Lake Washington

0 83 167
Feet

1 inch =
166.666666666667
feet



Disclaimer: These maps were developed by the City of Mercer Island and are intended to be a general purpose digital reference tool. These maps are not an accepted legal instrument for describing, establishing, recording or maintaining descriptions for property concerns or boundaries. The City makes no representation or warranty with respect to the accuracy or currency of these data sets, especially in regard to labeling of surveyed dimensions, or agreement with official sources such as records of survey, or mapped locations of features.

Notes

9616 SE 34th Street – Downsteam System

Photo #1 – Viewing northeast corner of subject property from SE 34th Street



Photo #2 – Viewing east along south side of SE 34th Street, CB#3a-6 – Subject property to right



Photo #3 – Viewing east along SE 34th Street, subject property NE corner (white post).
CB#3a-3 located at back of pickup truck



Photo #4 – Viewing from SE 34th Street towards 9635 SE 34th Street access



Photo #5 – Viewing east along SE 34th Street at int'x of 97th Avenue NE, CB #3a-68



Photo #6 – Viewing north along east side of 97th Avenue NE, CB #3a-64



Photo #7 – Viewing north along east side of 97th Avenue NE @ CB# 3a-65



Photo #8 – Viewing north along east side of 97th Avenue NE, CB# 3a-66



Photo #9 – Viewing north along west side of 97th Avenue NE, CB# 3a-61



Photo #10 – Northwest corner of Park, CB# 3a-58



Photo #11 – Viewing west at outfall into Lake Washinton at north end of Park



Section I-2.5.5 Minimum Requirement #5 - On-Site Stormwater Management

The proposed project discharge shall be evaluated using "*List #2, On-Site Stormwater Management BMPs for projects triggering Minimum Requirements #1 - #9*" – DOE Volume 1, Chapter 2, pages 57 and 58.

The subject property is located within an infiltration infeasibility area as shown the attached City of Mercer Island "*Infiltration Infeasibility Map*". A soils evaluation is not required.

List #1

Lawn and landscape areas – ***feasible*** - The use of Post-Construction Soil Quality and Depth shall be implemented within areas of the property that are not covered by hard surfaces and were disturbed during condition.

Roofs:

1.a. *Full Dispersion (BMP T5.30)* – ***infeasible*** due to lack of available 100' of vegetated flow path downgradient from the roof area.

1.b. *Full Infiltration (BMP T5.10A)*– ***infeasible*** due to lack of permeable soils based upon City of Mercer Island Infeasibility Maps

2. *Rain Garden/Bioretenction (BMP T7.30)* – ***infeasible*** due to lack of available area on the downgradient portion of the property (east side). Can not remove trees in this area nor work under.

3. *Downspout Dispersion System (BMP T5.10B)* – ***infeasible*** due to lack of available 50' flow path downgradient of the downspout leaders.

4. *Perforated Pipe Connection (BMP T5-10C)* – infeasible due to soils are not suitable for infiltration

Other Hard Surfaces:

1. *Full Dispersion (BMP T5.30)* – ***infeasible*** due to the lack of available 100' of vegetated flow path length.

2. *Permeable Pavement* – ***infeasible*** infiltration type BMP not recommended by City of Mercer Island Infiltration Infeasibility Map.

3. *Rain Garden/Bioretenction* – ***infeasible*** due to lack of available space on the downgradient portion of the property (east side).

4. *Sheet Flow Dispersion* – ***infeasible*** due to lack of available 25 feet of flow path downgradient from driveway.

There are no available BMPs to provide treatment, on site, of the roof area or other hard surfaces. Therefore, connection the public storm system within SE 34th Street will be provided.

Section I-2.5.6 Minimum Requirement #6 – Runoff Treatment

Determine if thresholds for runoff treatment have been exceeded:

- (a) *Projects that exceed 5,000 square feet of pollution generating hard surfaces (PGHS)*
 - The proposed project will generate 811 square feet of PGHS – threshold not exceeded
- (b) *Projects that create or modify $\frac{3}{4}$ acre (32,670 square feet) of pollution generating pervious surface (PGPS)* – The proposed project will create or modify 8,200 square feet (3/16 acre) of PGPS – threshold not exceeded.

The thresholds for runoff treatment have not been exceeded, therefore proposed project does not have to provide runoff treatment.

Section I-2.5.7 Minimum Requirement #7 – Flow Control

Project discharge and public downstream drainage system is man-made and discharges into Lake Washington (an exempt water body), therefore subject property is flow control exempt.

Section I-2.5.8 Minimum Requirement #8 – Wetlands Protection

Proposed project does not discharge into a wetland; therefore, Minimum Requirement #8 does not apply.

Section I-2.5.9 Minimum Requirement #9 – Operation and Maintenance

Attached

**Table V-4.5.2(3) Maintenance Standards - Closed Detention Systems
(Tanks/Vaults) (continued)**

Maintenance Component	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is Performed
	Locking Mechanism Not Working	Mechanism cannot be opened by one maintenance person with proper tools. Bolts into frame have less than 1/2 inch of thread (may not apply to self-locking lids).	Mechanism opens with proper tools.
	Cover Difficult to Remove	One maintenance person cannot remove lid after applying normal lifting pressure. Intent is to keep cover from sealing off access to maintenance.	Cover can be removed and reinstalled by one maintenance person.
	Ladder Rungs Unsafe	Ladder is unsafe due to missing rungs, misalignment, not securely attached to structure wall, rust, or cracks.	Ladder meets design standards. Allows maintenance person safe access.
Catch Basins	See "Catch Basins" (No. 5)	See "Catch Basins" (No. 5).	See "Catch Basins" (No. 5).

Table V-4.5.2(4) Maintenance Standards - Control Structure/Flow Restrictor

Maintenance Component	Defect	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
General	Trash and Debris (Includes Sediment)	Material exceeds 25% of sump depth or 1 foot below orifice plate.	Control structure orifice is not blocked. All trash and debris removed.
	Structural Damage	Structure is not securely attached to manhole wall. Structure is not in upright position (allow up to 10% from plumb). Connections to outlet pipe	Structure securely attached to wall and outlet pipe. Structure in correct position. Connections to outlet pipe are water tight; structure repaired or replaced and works as

Table V-4.5.2(4) Maintenance Standards - Control Structure/Flow Restrictor (continued)

Maintenance Component	Defect	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
		are not watertight and show signs of rust. Any holes - other than designed holes - in the structure.	designed. Structure has no holes other than designed holes.
Cleanout Gate	Damaged or Missing	Cleanout gate is not watertight or is missing. Gate cannot be moved up and down by one maintenance person. Chain/rod leading to gate is missing or damaged. Gate is rusted over 50% of its surface area.	Gate is watertight and works as designed. Gate moves up and down easily and is watertight. Chain is in place and works as designed. Gate is repaired or replaced to meet design standards.
Orifice Plate	Damaged or Missing	Control device is not working properly due to missing, out of place, or bent orifice plate.	Plate is in place and works as designed.
	Obstructions	Any trash, debris, sediment, or vegetation blocking the plate.	Plate is free of all obstructions and works as designed.
Overflow Pipe	Obstructions	Any trash or debris blocking (or having the potential of blocking) the overflow pipe.	Pipe is free of all obstructions and works as designed.
Manhole	See "Closed Detention Systems" (No. 3).	See "Closed Detention Systems" (No. 3).	See "Closed Detention Systems" (No. 3).
Catch Basin	See "Catch Basins" (No. 5).	See "Catch Basins" (No. 5).	See "Catch Basins" (No. 5).

Table V-4.5.2(5) Maintenance Standards - Catch Basins

Maintenance Component	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is performed
General	Trash & Debris	<p>Trash or debris which is located immediately in front of the catch basin opening or is blocking inletting capacity of the basin by more than 10%.</p> <p>Trash or debris (in the basin) that exceeds 60 percent of the sump depth as measured from the bottom of basin to invert of the lowest pipe into or out of the basin, but in no case less than a minimum of six inches clearance from the debris surface to the invert of the lowest pipe.</p> <p>Trash or debris in any inlet or outlet pipe blocking more than 1/3 of its height.</p> <p>Dead animals or vegetation that could generate odors that could cause complaints or dangerous gases (e.g., methane).</p>	<p>No Trash or debris located immediately in front of catch basin or on grate opening.</p> <p>No trash or debris in the catch basin.</p> <p>Inlet and outlet pipes free of trash or debris.</p> <p>No dead animals or vegetation present within the catch basin.</p>
	Sediment	Sediment (in the basin) that exceeds 60 percent of the sump depth as measured from the bottom of basin to invert of the lowest pipe into or out of the basin, but in no case less than a minimum of 6 inches clearance from the sediment surface to the invert of the lowest pipe.	No sediment in the catch basin
	Structure Damage to Frame and/or Top Slab	Top slab has holes larger than 2 square inches or cracks wider than 1/4 inch. (Intent is to make sure no material is running into basin).	Top slab is free of holes and cracks. Frame is sit-

Table V-4.5.2(5) Maintenance Standards - Catch Basins (continued)

Maintenance Component	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is performed
		Frame not sitting flush on top slab, i.e., separation of more than 3/4 inch of the frame from the top slab. Frame not securely attached	ting flush on the riser rings or top slab and firmly attached.
	Fractures or Cracks in Basin Walls/ Bottom	Maintenance person judges that structure is unsound. Grout fillet has separated or cracked wider than 1/2 inch and longer than 1 foot at the joint of any inlet/outlet pipe or any evidence of soil particles entering catch basin through cracks.	Basin replaced or repaired to design standards. Pipe is regouted and secure at basin wall.
	Settlement/ Misalignment	If failure of basin has created a safety, function, or design problem.	Basin replaced or repaired to design standards.
	Vegetation	Vegetation growing across and blocking more than 10% of the basin opening. Vegetation growing in inlet/outlet pipe joints that is more than six inches tall and less than six inches apart.	No vegetation blocking opening to basin. No vegetation or root growth present.
	Contamination and Pollution	See "Detention Ponds" (No. 1).	No pollution present.
Catch Basin Cover	Cover Not in Place	Cover is missing or only partially in place. Any open catch basin requires maintenance.	Catch basin cover is closed
	Locking Mechanism Not	Mechanism cannot be opened by one maintenance person with proper tools. Bolts into	Mechanism opens with

Table V-4.5.2(5) Maintenance Standards - Catch Basins (continued)

Maintenance Component	Defect	Conditions When Maintenance is Needed	Results Expected When Maintenance is performed
	Working	frame have less than 1/2 inch of thread.	proper tools.
	Cover Difficult to Remove	One maintenance person cannot remove lid after applying normal lifting pressure. (Intent is keep cover from sealing off access to maintenance.)	Cover can be removed by one maintenance person.
Ladder	Ladder Rungs Unsafe	Ladder is unsafe due to missing rungs, not securely attached to basin wall, misalignment, rust, cracks, or sharp edges.	Ladder meets design standards and allows maintenance person safe access.
Metal Grates (If Applicable)	Grate opening Unsafe	Grate with opening wider than 7/8 inch.	Grate opening meets design standards.
	Trash and Debris	Trash and debris that is blocking more than 20% of grate surface inletting capacity.	Grate free of trash and debris.
	Damaged or Missing.	Grate missing or broken member(s) of the grate.	Grate is in place and meets design standards.

Table V-4.5.2(6) Maintenance Standards - Debris Barriers (e.g., Trash Racks)

Maintenance Components	Defect	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
General	Trash and Debris	Trash or debris that is plugging more than 20% of the openings in the barrier.	Barrier cleared to design flow capacity.
Metal	Damaged/ Missing	Bars are bent out of shape more than 3 inches.	Bars in place with no bends more than 3/4

Appendix A: Geotechnical Evaluation



Cobalt Geosciences, LLC
P.O. Box 1792
North Bend, WA 98045

November 13, 2023

JayMarc Homes
C/O Darrell Offe
Darrell.offe@comcast.net

RE: Geotechnical Evaluation
Proposed Residence
9619 SE 34th Street
Mercer Island, Washington

In accordance with your authorization, Cobalt Geosciences, LLC has prepared this letter to discuss the results of our geotechnical evaluation at the referenced site.

The purpose of our evaluation was to provide recommendations for foundation design, grading, and earthwork.

Site and Project Description

The site is located at 9619 SE 34th Street in Mercer Island, Washington. The site consists of one nearly rectangular parcel (No. 4139300025) with a total area of 18,720 square feet.

The northern portion of the property is developed with a residence and driveway. The site generally slopes downward from south to north at magnitudes of about 5 to 30 percent and relief of about 16 feet.

The site is vegetated with grasses, bushes, local understory, and variable diameter trees. The site is bordered to the east, west, and south by residences, and to the north by SE 34th Street.

The proposed development includes a new residence and driveway in the central portion of the property.

Site grading may include cuts and fills of 3 feet or less and foundation loads are expected to be light. We should be provided with the final plans to verify that our recommendations remain valid and do not require updating.

Area Geology

The Geologic Map of Mercer Island, indicates that the site is underlain by Vashon Recessional Lacustrine Deposits.

These materials include silt and clay deposited in lake environments during glacial retreat. These materials are normally consolidated and typically soft to medium stiff near the ground surface, becoming stiff and locally very stiff at depth.

Soil & Groundwater Conditions

As part of our evaluation, we advanced two hand borings where accessible. The soils encountered were logged in the field and are described in accordance with the Unified Soil Classification System (USCS).

The hand borings encountered approximately 6 inches of topsoil and vegetation underlain by about 3 to 5 feet of medium stiff, silt trace to with clay (Weathered Recessional Lacustrine Deposits). These soils were underlain by stiff to very stiff, sandy silt trace gravel (Vashon Recessional Lacustrine Deposits) which continued to the termination depths of the hand borings.

Groundwater was not observed or encountered in the explorations. Light volumes of groundwater could be present on or within the silt and clay deposits at variable depths below grade.

We reviewed nearby boring and test pit logs which encountered variable density silt and clay (low to high plasticity) underlain by stiff or firmer silts and fine grained deposits. It appears that this area is underlain consistently by lacustrine silts and clays and not outwash sands, which often have susceptibility to seismic activity.

Water table elevations often fluctuate over time. The groundwater level will depend on a variety of factors that may include seasonal precipitation, irrigation, land use, climatic conditions and soil permeability. Water levels at the time of the field investigation may be different from those encountered during the construction phase of the project. It would be necessary to install a piezometer to determine groundwater depths over a typical year.

City of Mercer Island GIS Mapped Hazards

The City of Mercer Island GIS maps indicate that the site contains seismic hazards and potential landslide hazard areas. This designation is likely due to the mapped Vashon Recessional Outwash in the area. These deposits can include sands which can have susceptibility to liquefaction as well as some potential for landslide activity depending on topographic conditions.

It is our opinion that the seismic hazard risks are low due to the very fine-grained nature of the near surface soils. Mitigation for these hazards is not warranted. The risk of landslide activity is also very low at this time due to a lack of steeper topography and the current conditions (well developed area with streets and residences). There are no steep slope areas within at least 100 feet of the site.

Statement of Risk

Per Section 19.07.160B3 of the Mercer Island City Code, development within geologic hazard areas require that a Geotechnical Engineer licensed within the State of Washington provide a statement of risk with supporting documentation indicating that one of the following conditions can be met:

- a. The geologic hazard area will be modified, or the development has been designed so that the risk to the lot and adjacent property is eliminated or mitigated such that the site is determined to be safe; or
- b. An evaluation of site specific subsurface conditions demonstrates that the proposed development is not located in a geologic hazard area; or
- c. Development practices are proposed for the alteration that would render the development as safe as if it were not located in a geologic hazard area; or
- d. The alteration is so minor as not to pose a threat to the public health, safety and welfare.

The project meets the criteria of b from above. The site is underlain by very fine grained soils which have a low risk of liquefaction.

This proposed development can be completed without adversely affecting geologic hazards near or within the site.

Seismic Parameters

The overall subsurface profile corresponds to a Site Class *D* as defined by Table 1613.5.2 of the International Building Code (IBC). A Site Class *D* applies to an overall profile consisting of medium dense to very dense soils within the upper 100 feet.

We referenced the U.S. Geological Survey (USGS) Earthquake Hazards Program Website to obtain values for S_S , S_I , F_a , and F_v . The USGS website includes the most updated published data on seismic conditions. The following tables provide seismic parameters from the USGS web site with referenced parameters from ASCE 7-16.

Seismic Design Parameters (ASCE 7-16)

Site Class	Spectral Acceleration at 0.2 sec. (g)	Spectral Acceleration at 1.0 sec. (g)	Site Coefficients		Design Spectral Response Parameters		Design PGA
			F_a	F_v	S_{DS}	S_{D1}	
D	1.394	0.485	1.0	Null	0.929	Null	0.597

Additional seismic considerations include liquefaction potential and amplification of ground motions by soft/loose soil deposits. The liquefaction potential is highest for loose sand with a high groundwater table. The site has a relatively low likelihood of liquefaction. For items listed as "Null" see Section 11.4.8 of the ASCE.

Conclusions and Recommendations

General

The site is underlain by soils consistent with Vashon Recessional Lacustrine deposits. These soils become relatively dense/stiff below a weathered zone. The proposed residential structure may be supported on a shallow foundation system bearing on medium dense or firmer native soils or on structural fill placed on the native soils.

Local overexcavation of loose weathered native soils may be necessary depending on the proposed elevations and locations of the new footings. Please note that fine grained soils are easily disturbed by precipitation and equipment traffic. Work performed during the wet season will likely require additional excavation and soil replacement work.

Per the City of Mercer Island GIS maps, the site is within a Low Impact Development infeasibility area. Widespread infiltration is not feasible due to the soil conditions and anticipated seasonal groundwater conditions. We recommend utilizing direct connection to an approved conveyance.

Site Preparation

Trees, shrubs and other vegetation should be removed prior to stripping of surficial organic-rich soil and fill. Based on observations from the site investigation program, it is anticipated that the stripping depth will be 6 to 18 inches. Deeper excavations will be necessary below larger trees and foundation systems.

The native soils consist of silt with sand and clay. These soils should not be used as structural fill.

Imported structural fill should consist of a sand and gravel mixture with a maximum grain size of 3 inches and less than 5 percent fines (material passing the U.S. Standard No. 200 Sieve). Structural fill should be placed in maximum lift thicknesses of 12 inches and should be compacted to a minimum of 95 percent of the modified proctor maximum dry density, as determined by the ASTM D 1557 test method.

Temporary Excavations

Based on our understanding of the project, we anticipate that the grading could include local cuts on the order of approximately 3 feet or less for foundation and most of the utility placement. Temporary excavations should be sloped no steeper than 1.5H:1V (Horizontal:Vertical) in loose native soils and fill and 1H:1V in medium dense/stiff native soils. If an excavation is subject to heavy vibration or surcharge loads, we recommend that the excavations be sloped no steeper than 2H:1V, where room permits.

Temporary cuts should be in accordance with the Washington Administrative Code (WAC) Part N, Excavation, Trenching, and Shoring. Temporary slopes should be visually inspected daily by a qualified person during construction activities and the inspections should be documented in daily reports. The contractor is responsible for maintaining the stability of the temporary cut slopes and reducing slope erosion during construction.

Temporary cut slopes should be covered with visqueen to help reduce erosion during wet weather, and the slopes should be closely monitored until the permanent retaining systems or slope configurations are complete. Materials should not be stored or equipment operated within 10 feet of the top of any temporary cut slope.

Soil conditions may not be completely known from the geotechnical investigation. In the case of temporary cuts, the existing soil conditions may not be completely revealed until the excavation work exposes the soil. Typically, as excavation work progresses the maximum inclination of temporary slopes will need to be re-evaluated by the geotechnical engineer so that supplemental recommendations can be made. Soil and groundwater conditions can be highly variable. Scheduling for soil work will need to be adjustable, to deal with unanticipated conditions, so that the project can proceed and required deadlines can be met.

If any variations or undesirable conditions are encountered during construction, we should be notified so that supplemental recommendations can be made. If room constraints or groundwater conditions do not permit temporary slopes to be cut to the maximum angles allowed by the WAC, temporary shoring systems may be required. The contractor should be responsible for developing temporary shoring systems, if needed. We recommend that Cobalt Geosciences and the project structural engineer review temporary shoring designs prior to installation, to verify the suitability of the proposed systems.

Foundation Design

The proposed structure may be supported on a shallow spread footing foundation system bearing on undisturbed medium dense/stiff or firmer native soils or on properly compacted structural fill placed on the suitable native soils. Any undocumented fill and/or loose native soils should be removed and replaced with structural fill below foundation elements. Structural fill below footings should consist of clean angular rock 5/8 to 4 inches in size. We should verify soil conditions during foundation excavation work.

For shallow foundation support, we recommend widths of at least 16 and 24 inches, respectively, for continuous wall and isolated column footings supporting the proposed structure. Provided that the footings are supported as recommended above, a net allowable bearing pressure of 2,000 pounds per square foot (psf) may be used for design.

A 1/3 increase in the above value may be used for short duration loads, such as those imposed by wind and seismic events. Structural fill placed on bearing, native subgrade should be compacted to at least 95 percent of the maximum dry density based on ASTM Test Method D1557. Footing excavations should be inspected to verify that the foundations will bear on suitable material.

Exterior footings should have a minimum depth of 18 inches below pad subgrade (soil grade) or adjacent exterior grade, whichever is lower. Interior footings should have a minimum depth of 12 inches below pad subgrade (soil grade) or adjacent exterior grade, whichever is lower.

If constructed as recommended, the total foundation settlement is not expected to exceed 1 inch. Differential settlement, along a 25-foot exterior wall footing, or between adjoining column footings, should be less than 1/2 inch. This translates to an angular distortion of 0.002. Most settlement is expected to occur during construction, as the loads are applied. However, additional post-construction settlement may occur if the foundation soils are flooded or saturated. All footing excavations should be observed by a qualified geotechnical consultant.

Resistance to lateral footing displacement can be determined using an allowable friction factor of 0.30 acting between the base of foundations and the supporting subgrades. Lateral resistance for footings can also be developed using an allowable equivalent fluid passive pressure of 225 pounds per cubic foot (pcf) acting against the appropriate vertical footing faces (neglect the upper 12 inches below grade in exterior areas). The frictional and passive resistance of the soil may be combined without reduction in determining the total lateral resistance.

Care should be taken to prevent wetting or drying of the bearing materials during construction. Any extremely wet or dry materials, or any loose or disturbed materials at the bottom of the footing excavations, should be removed prior to placing concrete. The potential for wetting or drying of the bearing materials can be reduced by pouring concrete as soon as possible after completing the footing excavation and evaluating the bearing surface by the geotechnical engineer or his representative.

Stormwater Management Feasibility

The site is underlain by very fine-grained lacustrine deposits. Infiltration is not recommended or feasible in these soils, which act as an aquitard. We recommend direct connection of runoff devices to City infrastructure.

Slab-on-Grade

We recommend that the upper 18 inches of the existing native soils within slab areas be re-compacted to at least 95 percent of the modified proctor (ASTM D1557 Test Method).

Often, a vapor barrier is considered below concrete slab areas. However, the usage of a vapor barrier could result in curling of the concrete slab at joints. Floor covers sensitive to moisture typically requires the usage of a vapor barrier. A materials or structural engineer should be consulted regarding the detailing of the vapor barrier below concrete slabs. Exterior slabs typically do not utilize vapor barriers.

The American Concrete Institutes ACI 360R-06 Design of Slabs on Grade and ACI 302.1R-04 Guide for Concrete Floor and Slab Construction are recommended references for vapor barrier selection and floor slab detailing.

Slabs on grade may be designed using a coefficient of subgrade reaction of 180 pounds per cubic inch (pci) assuming the slab-on-grade base course is underlain by structural fill placed and compacted as outlined above. A 4- to 6-inch-thick capillary break layer should be placed over the prepared subgrade. This material should consist of pea gravel or 5/8 inch clean angular rock.

A perimeter drainage system is recommended unless interior slab areas are elevated a minimum of 12 inches above adjacent exterior grades. If installed, a perimeter drainage system should consist of a 4-inch diameter perforated drain pipe surrounded by a minimum 6 inches of drain rock wrapped in a non-woven geosynthetic filter fabric to reduce migration of soil particles into the drainage system. The perimeter drainage system should discharge by gravity flow to a suitable stormwater system.

Exterior grades surrounding buildings should be sloped at a minimum of one percent to facilitate surface water flow away from the building and preferably with a relatively impermeable surface cover immediately adjacent to the building.

Erosion and Sediment Control

Erosion and sediment control (ESC) is used to reduce the transportation of eroded sediment to wetlands, streams, lakes, drainage systems, and adjacent properties. Erosion and sediment control measures should be implemented, and these measures should be in general accordance with local regulations. At a minimum, the following basic recommendations should be incorporated into the design of the erosion and sediment control features for the site:

- Schedule the soil, foundation, utility, and other work requiring excavation or the disturbance of the site soils, to take place during the dry season (generally May through September). However, provided precautions are taken using Best Management Practices (BMP's), grading activities can be completed during the wet season (generally October through April).
- All site work should be completed and stabilized as quickly as possible.
- Additional perimeter erosion and sediment control features may be required to reduce the possibility of sediment entering the surface water. This may include additional silt fences, silt fences with a higher Apparent Opening Size (AOS), construction of a berm, or other filtration systems.
- Any runoff generated by dewatering discharge should be treated through construction of a sediment trap if there is sufficient space. If space is limited other filtration methods will need to be incorporated.

Utilities

Utility trenches should be excavated according to accepted engineering practices following OSHA (Occupational Safety and Health Administration) standards, by a contractor experienced in such work. The contractor is responsible for the safety of open trenches. Traffic and vibration adjacent to trench walls should be reduced; cyclic wetting and drying of excavation side slopes should be avoided. Depending upon the location and depth of some utility trenches, groundwater flow into open excavations could be experienced, especially during or shortly following periods of precipitation.

In general, silty soils were encountered at shallow depths in the explorations at this site. These soils have low cohesion and density and will have a tendency to cave or slough in excavations. Shoring or sloping back trench sidewalls is required within these soils in excavations greater than 4 feet deep.

All utility trench backfill should consist of imported structural fill or suitable on site soils. Utility trench backfill placed in or adjacent to buildings and exterior slabs should be compacted to at least 95 percent of the maximum dry density based on ASTM Test Method D1557. The upper 5 feet of utility trench backfill placed in pavement areas should be compacted to at least 95 percent of the maximum dry density based on ASTM Test Method D1557. Below 5 feet, utility trench backfill in pavement areas should be compacted to at least 90 percent of the maximum dry density based on ASTM Test Method D1557. Pipe bedding should be in accordance with the pipe manufacturer's recommendations.

The contractor is responsible for removing all water-sensitive soils from the trenches regardless of the backfill location and compaction requirements. Depending on the depth and location of the proposed utilities, we anticipate the need to re-compact existing fill soils below the utility structures and pipes. The contractor should use appropriate equipment and methods to avoid damage to the utilities and/or structures during fill placement and compaction procedures.

CONSTRUCTION FIELD REVIEWS

Cobalt Geosciences should be retained to provide part time field review during construction in order to verify that the soil conditions encountered are consistent with our design assumptions and that the intent of our recommendations is being met. This will require field and engineering review to:

- Monitor and test structural fill placement and soil compaction
- Observe bearing capacity at foundation locations
- Observe slab-on-grade preparation
- Monitor foundation drainage placement
- Observe excavation stability

Geotechnical design services should also be anticipated during the subsequent final design phase to support the structural design and address specific issues arising during this phase. Field and engineering review services will also be required during the construction phase in order to provide a Final Letter for the project.

CLOSURE

This report was prepared for the exclusive use of JayMarc Homes and their appointed consultants. Any use of this report or the material contained herein by third parties, or for other than the intended purpose, should first be approved in writing by Cobalt Geosciences, LLC.

The recommendations contained in this report are based on assumed continuity of soils with those of our test holes and assumed structural loads. Cobalt Geosciences should be provided with final architectural and civil drawings when they become available in order that we may review our design recommendations and advise of any revisions, if necessary.

Use of this report is subject to the Statement of General Conditions provided in Appendix A. It is the responsibility of JayMarc Homes who is identified as "the Client" within the Statement of General Conditions, and its agents to review the conditions and to notify Cobalt Geosciences should any of these not be satisfied.

Sincerely,

Cobalt Geosciences, LLC



11/13/2023
Phil Haberman, PE, LG, LEG
Principal

Statement of General Conditions

USE OF THIS REPORT: This report has been prepared for the sole benefit of the Client or its agent and may not be used by any third party without the express written consent of Cobalt Geosciences and the Client. Any use which a third party makes of this report is the responsibility of such third party.

BASIS OF THE REPORT: The information, opinions, and/or recommendations made in this report are in accordance with Cobalt Geosciences present understanding of the site specific project as described by the Client. The applicability of these is restricted to the site conditions encountered at the time of the investigation or study. If the proposed site specific project differs or is modified from what is described in this report or if the site conditions are altered, this report is no longer valid unless Cobalt Geosciences is requested by the Client to review and revise the report to reflect the differing or modified project specifics and/or the altered site conditions.

STANDARD OF CARE: Preparation of this report, and all associated work, was carried out in accordance with the normally accepted standard of care in the state of execution for the specific professional service provided to the Client. No other warranty is made.

INTERPRETATION OF SITE CONDITIONS: Soil, rock, or other material descriptions, and statements regarding their condition, made in this report are based on site conditions encountered by Cobalt Geosciences at the time of the work and at the specific testing and/or sampling locations. Classifications and statements of condition have been made in accordance with normally accepted practices which are judgmental in nature; no specific description should be considered exact, but rather reflective of the anticipated material behavior. Extrapolation of in situ conditions can only be made to some limited extent beyond the sampling or test points. The extent depends on variability of the soil, rock and groundwater conditions as influenced by geological processes, construction activity, and site use.

VARYING OR UNEXPECTED CONDITIONS: Should any site or subsurface conditions be encountered that are different from those described in this report or encountered at the test locations, Cobalt Geosciences must be notified immediately to assess if the varying or unexpected conditions are substantial and if reassessments of the report conclusions or recommendations are required. Cobalt Geosciences will not be responsible to any party for damages incurred as a result of failing to notify Cobalt Geosciences that differing site or sub-surface conditions are present upon becoming aware of such conditions.

PLANNING, DESIGN, OR CONSTRUCTION: Development or design plans and specifications should be reviewed by Cobalt Geosciences, sufficiently ahead of initiating the next project stage (property acquisition, tender, construction, etc), to confirm that this report completely addresses the elaborated project specifics and that the contents of this report have been properly interpreted. Specialty quality assurance services (field observations and testing) during construction are a necessary part of the evaluation of sub-subsurface conditions and site preparation works. Site work relating to the recommendations included in this report should only be carried out in the presence of a qualified geotechnical engineer; Cobalt Geosciences cannot be responsible for site work carried out without being present.




Approximate Hand Boring Location
HB-1

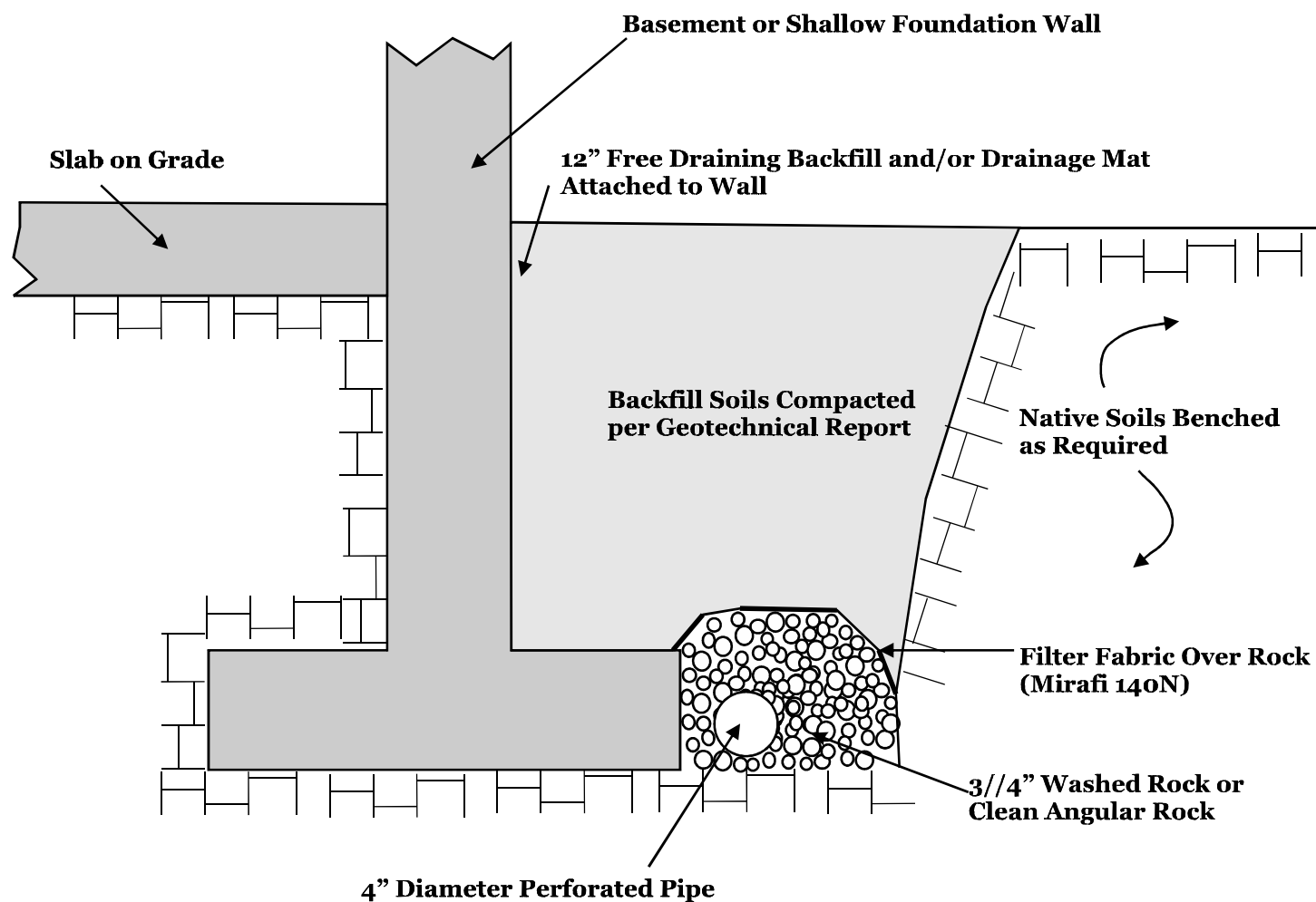
King County imap Image



Proposed Residence
 9619 SE 34th St
 Mercer Island, Washington

Site Image
Figure 1

Cobalt Geosciences, LLC
 P.O. Box 82243
 Kenmore, WA 98028
 (206) 331-1097
www.cobaltgeo.com
cobaltgeo@gmail.com



Not to Scale



Typical Foundation Drain Detail

Attachment

Cobalt Geosciences, LLC
 PO Box 1792
 North Bend, WA 98045
 (206) 331-1097
www.cobaltgeo.com
phil@cobaltgeo.com

Unified Soil Classification System (USCS)

MAJOR DIVISIONS			SYMBOL	TYPICAL DESCRIPTION
COARSE GRAINED SOILS (more than 50% retained on No. 200 sieve)	Gravels (more than 50% of coarse fraction retained on No. 4 sieve)	Clean Gravels (less than 5% fines)	GW	Well-graded gravels, gravels, gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels, gravel-sand mixtures, little or no fines
		Gravels with Fines (more than 12% fines)	GM	Silty gravels, gravel-sand-silt mixtures
			GC	Clayey gravels, gravel-sand-clay mixtures
	Sands (50% or more of coarse fraction passes the No. 4 sieve)	Clean Sands (less than 5% fines)	SW	Well-graded sands, gravelly sands, little or no fines
			SP	Poorly graded sand, gravelly sands, little or no fines
		Sands with Fines (more than 12% fines)	SM	Silty sands, sand-silt mixtures
			SC	Clayey sands, sand-clay mixtures
FINE GRAINED SOILS (50% or more passes the No. 200 sieve)	Silts and Clays (liquid limit less than 50)	Inorganic	ML	Inorganic silts of low to medium plasticity, sandy silts, gravelly silts, or clayey silts with slight plasticity
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
		Organic	OL	Organic silts and organic silty clays of low plasticity
	Silts and Clays (liquid limit 50 or more)	Inorganic	MH	Inorganic silts, micaceous or diatomaceous fine sands or silty soils, elastic silt
			CH	Inorganic clays of medium to high plasticity, sandy fat clay, or gravelly fat clay
		Organic	OH	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS	Primarily organic matter, dark in color, and organic odor		PT	Peat, humus, swamp soils with high organic content (ASTM D4427)

Classification of Soil Constituents

MAJOR constituents compose more than 50 percent, by weight, of the soil. Major constituents are capitalized (i.e., SAND).

Minor constituents compose 12 to 50 percent of the soil and precede the major constituents (i.e., silty SAND). Minor constituents preceded by "slightly" compose 5 to 12 percent of the soil (i.e., slightly silty SAND).

Trace constituents compose 0 to 5 percent of the soil (i.e., slightly silty SAND, trace gravel).

Relative Density (Coarse Grained Soils)

N, SPT, Blows/FT	Relative Density
0 - 4	Very loose
4 - 10	Loose
10 - 30	Medium dense
30 - 50	Dense
Over 50	Very dense

Consistency (Fine Grained Soils)

N, SPT, Blows/FT	Relative Consistency
Under 2	Very soft
2 - 4	Soft
4 - 8	Medium stiff
8 - 15	Stiff
15 - 30	Very stiff
Over 30	Hard

Grain Size Definitions

Description	Sieve Number and/or Size
Fines	< #200 (0.08 mm)
Sand	
-Fine	#200 to #40 (0.08 to 0.4 mm)
-Medium	#40 to #10 (0.4 to 2 mm)
-Coarse	#10 to #4 (2 to 5 mm)
Gravel	
-Fine	#4 to 3/4 inch (5 to 19 mm)
-Coarse	3/4 to 3 inches (19 to 76 mm)
Cobbles	3 to 12 inches (75 to 305 mm)
Boulders	>12 inches (305 mm)

Moisture Content Definitions

Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp but no visible water
Wet	Visible free water, from below water table

Soil Classification Chart

Figure C1



Cobalt Geosciences, LLC
P.O. Box 82243
Kenmore, WA 98028
(206) 331-1097
www.cobaltgeo.com
cobaltgeo@gmail.com

Log of Hand Boring HB-1


Date: November 2023	Depth: 6'	Initial Groundwater: None
Contractor:	Elevation:	Sample Type: Grab
Method: Hand Auger	Logged By: KK Checked By: PH	Final Groundwater: N/A

Depth (Feet)	Interval	% Recovery	Blows/6"	Graphic Log	USCS Symbol	Material Description	Groundwater	Moisture Content (%)	
								Plastic Limit	Liquid Limit
						Vegetation/Topsoil			
1					ML	Medium stiff, silt trace clay, locally mottled yellowish brown to grayish brown, moist. (Possible Fill over Weathered Lacustrine Deposits)			
2									
3									
4					ML	Stiff, silt trace clay, locally mottled olive brown to grayish brown, moist. (Lacustrine Deposits)			
5						Areas of SM-ML			
6						End of Hand Boring 6'			
7									
8									
9									
10									

Log of Hand Boring HB-2

Date: November 2023	Depth: 6'	Initial Groundwater: None
Contractor:	Elevation:	Sample Type: Grab
Method: Hand Auger	Logged By: KK Checked By: PH	Final Groundwater: N/A

Depth (Feet)	Interval	% Recovery	Blows/6"	Graphic Log	USCS Symbol	Material Description	Groundwater	Moisture Content (%)	
								Plastic Limit	Liquid Limit
						Vegetation/Topsoil			
1					ML	Medium stiff to stiff, silt trace clay some fine sand, locally mottled yellowish brown to grayish brown, moist to very moist. (Weathered Lacustrine Deposits)			
2									
3									
4									
5									
6					ML	Stiff to very stiff, silt trace clay, locally mottled olive brown to grayish brown, moist. (Lacustrine Deposits)			
7						End of Hand Boring 6'			
8									
9									
10									

 <p>COBALT GEOSCIENCES</p>	<p>Cobalt Geosciences, LLC P.O. Box 82243 Kenmore, WA 98028 (206) 331-1097 www.cobaltgeo.com cobaltgeo@gmail.com</p>	<p>Proposed Residence 9619 SE 34th Street Mercer Island, Washington</p>	<p>Hand Boring Log</p>
--	---	---	---------------------------------------