

**DOWNSTREAM ANALYSIS**  
**FOR**  
**SINGLE FAMILY RESIDENCE**  
**2247 66<sup>TH</sup> AVE SE**  
**MERCER ISLAND, WA 98040**

November 11, 2024



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# TABLE OF CONTENTS

I. PROJECT OVERVIEW .....	3
<b>A. Existing Site Conditions:</b> .....	3
<b>B. Post-Developed Conditions:</b> .....	3
II. OFFSITE ANALYSIS .....	11
Downstream Map:.....	15
<b>Downstream Photos</b> .....	16

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## **SECTION I**

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## **I. PROJECT OVERVIEW**

This project includes a redevelopment of a single-family residence lot. The site development will be required to follow the City of Mercer Island development standards for storm drainage improvements. The design will follow the city standards and the 2019 Stormwater Management Manual for Western Washington (SMMWW) as adopted by the city. The proposed development project site runoff discharges to Lake Washington through downstream drainage pipe system, flow control is exempt provided that the downstream system is free of capacity constraints. This downstream report is to analyze the downstream drainage system for any capacity constraints. The site address is 2247 66<sup>th</sup> Avenue SE, Mercer Island, (see Figure 1, Vicinity Map in Section I). The total lot area is approximately 15,124 s.f. and the proposed total new and replaced impervious area is approximately 4,996 s.f. (3,569 s.f. building roof, 227 s.f. of patio and walkway, 918 s.f. of driveway (including 405 s.f. within ROW), 160 s.f. of parking/turnaround and 122 s.f. of entrance.)

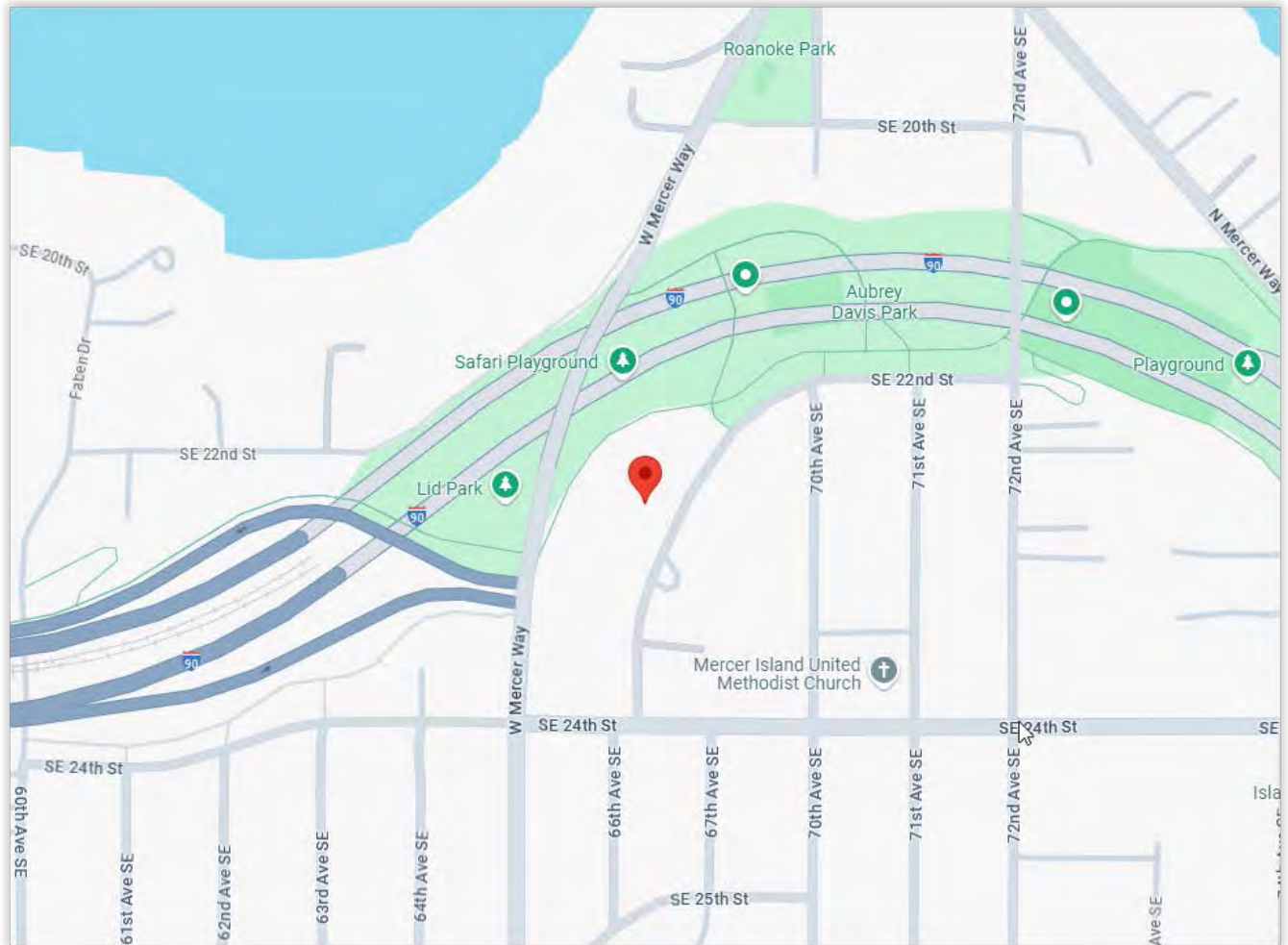
### **A. Existing Site Conditions:**

A review of the SCS soils map for the area (see Figure 2, SCS Soil Survey Map) indicates KpB – Kitsap silt loam, 2 to 8% slopes. These soils resemble Hydrologic Soil Group C. The soil is moderately well drained. The soil series descriptions follow Figure 2.

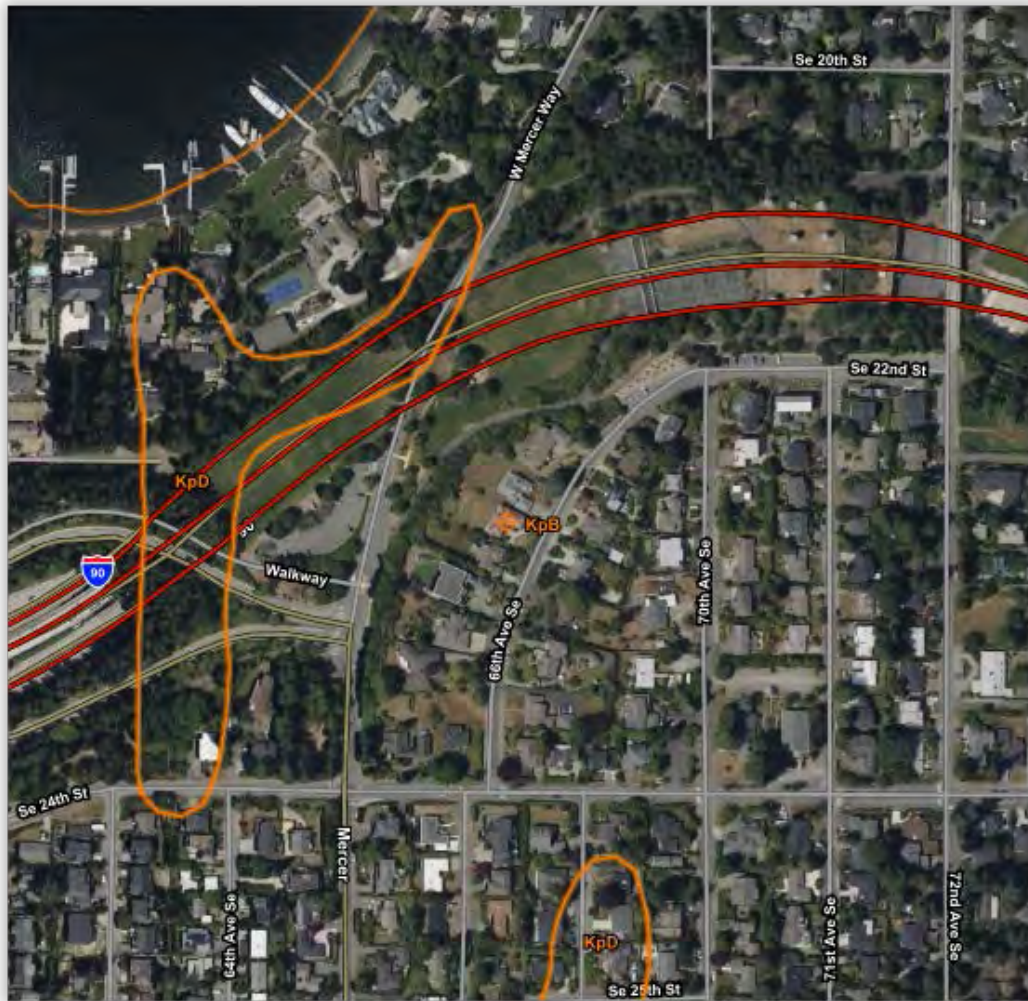
Presently, the site has a single-family home with garage, open lawn and trees. The lot is surrounded by single family residences and parks property on the west, and access from paved 66<sup>th</sup> Avenue SE to the east (See Figure 3 – Existing Site Development Map). A more detailed description of the existing drainage system is found in Section II, Off-site Analysis.

### **B. Post-Developed Conditions:**

All impervious runoff for the area of the proposed development will be collected and drained with storm pump to the existing conveyance system on the street. The roof runoff will be tightlined to the proposed pump system. The driveway and access pavement area will be collected by the garage trench drain and drain to a catch basin with oil-water separator and tightlined to the same storm pump system for discharge to existing street drainage system (see Figure 4 – Proposed Development Map).

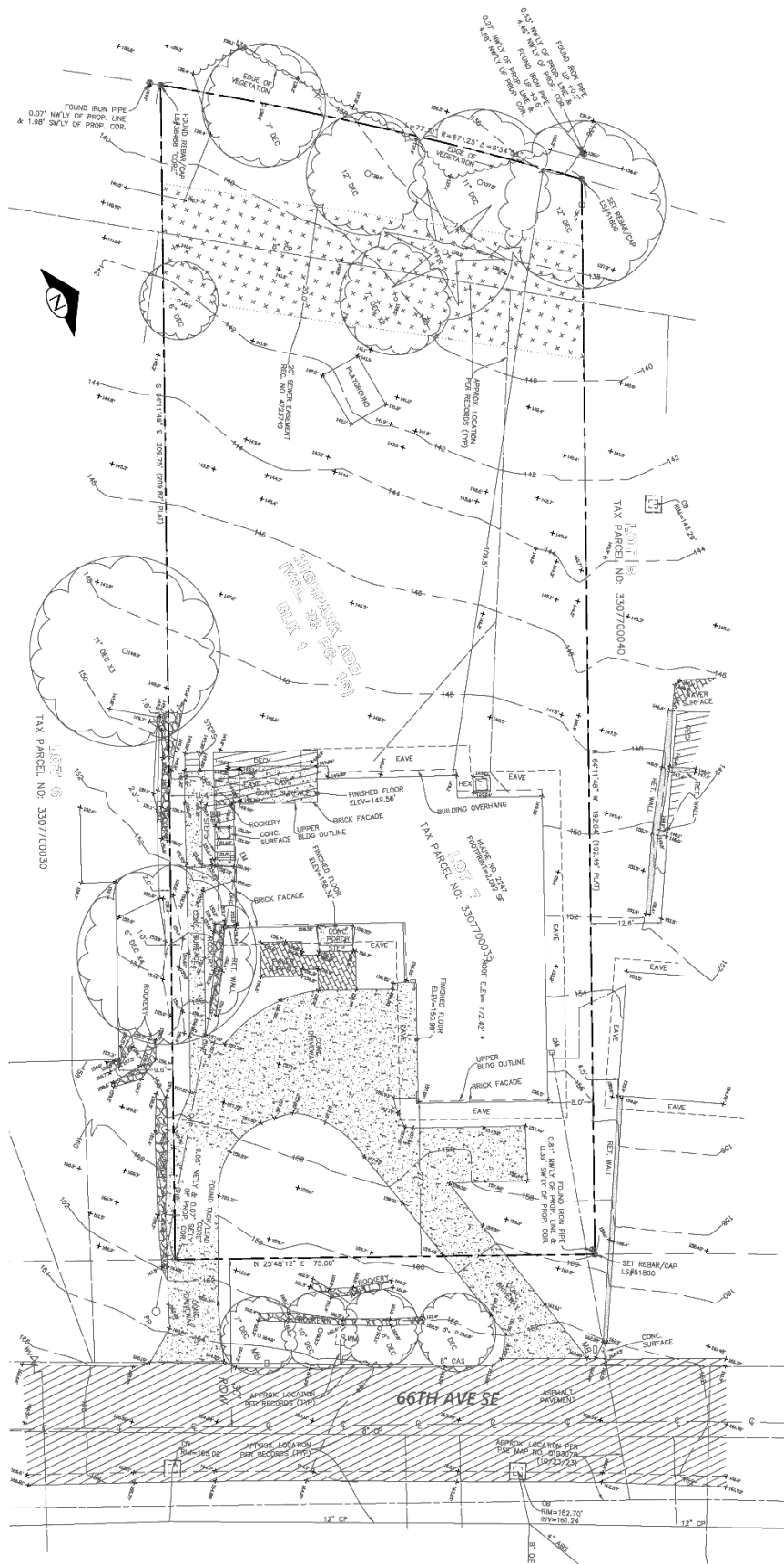


**FIGURE 1: VACINITY MAP (NTS)**

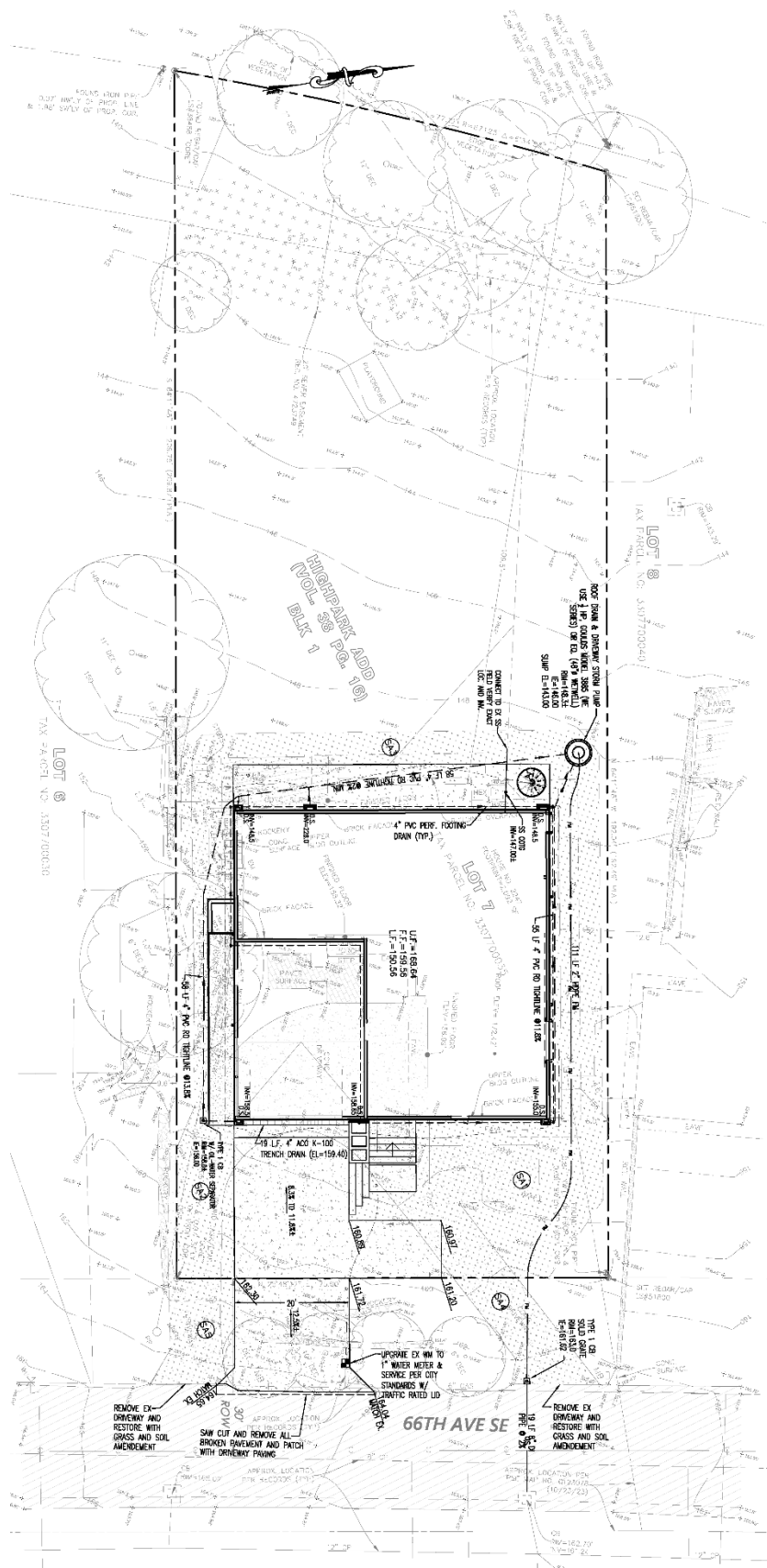


Map Unit Legend			
King County Area, Washington (WA633)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
KpB	Kitsap silt loam, 2 to 8 percent slopes	85.2	86.7%
KpD	Kitsap silt loam, 15 to 30 percent slopes	7.6	7.7%
<b>Totals for Area of Interest</b>		<b>98.3</b>	<b>100.0%</b>

FIGURE 2: SOIL SURVEY MAP (NTS)



**FIGURE 3: EXISTING SITE DEVELOPEMENT MAP (NTS)**



**FIGURE 3A: PROPOSED SITE DEVELOPEMENT MAP (NTS)**

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## **SECTION II**

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## II. OFFSITE ANALYSIS

### Upstream Analysis

Upstream area of the subject parcel consists of developed single-family residential buildings that have their own drainage system that discharges to the street drainage system. No sign of upstream drainage issue on subject property. The upstream drainage will not affect the drainage system on site. There is no likelihood that the proposed project activities could impact the upstream area with backwater conditions.

### Downstream drainage Analysis:

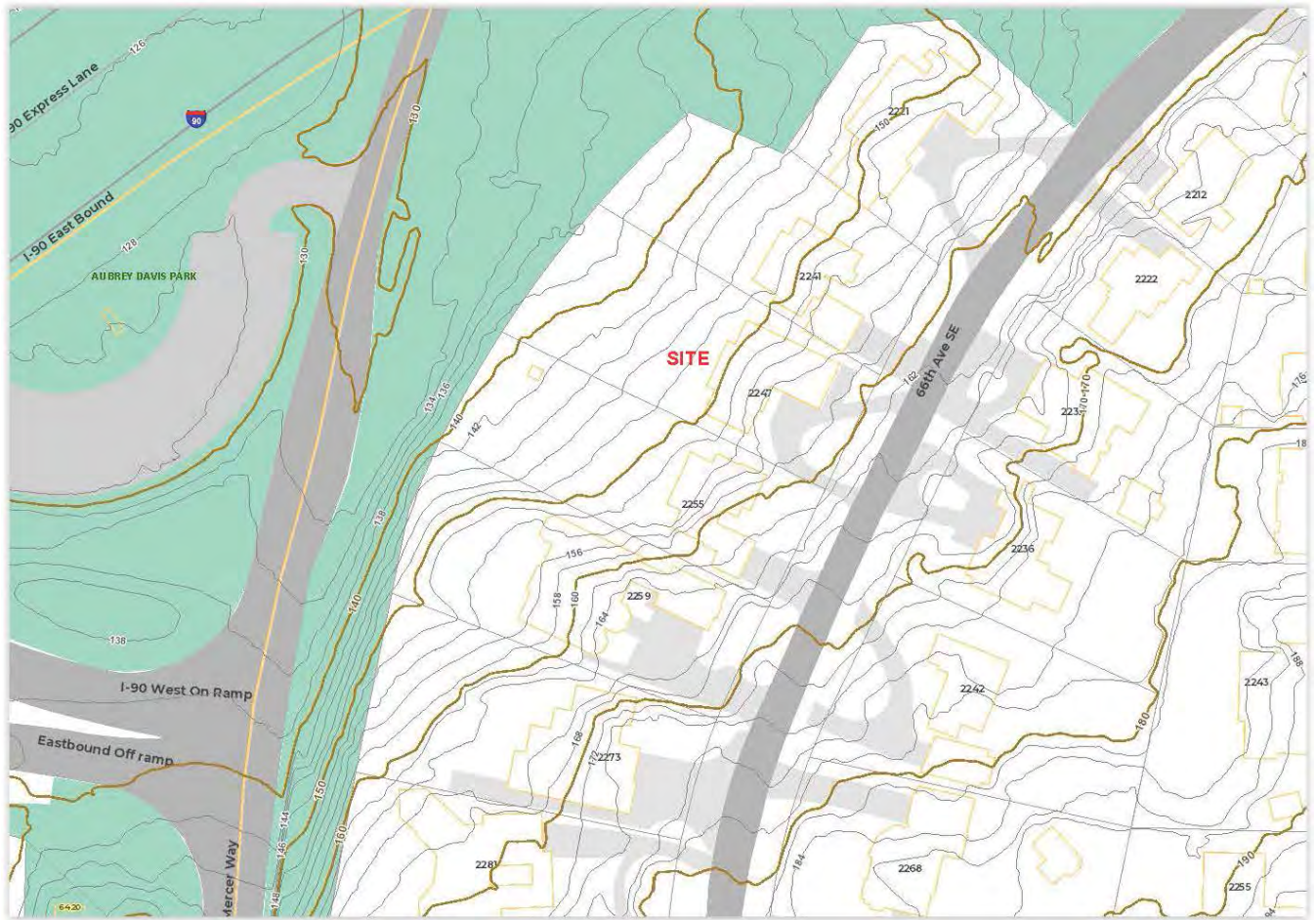
#### Task 1. Study Area Definition and Maps

The proposed drainage outlet from the project site will be discharged to the existing storm system along the 66<sup>th</sup> Avenue SE, east of the property street frontage. A reduced copy of the site conditions map is included as Figure 3, a site map showing the drainage of the lot. The end of downstream occurs at the on ramp of west I-90 off W Mercer Way, as shown on Figure 5 - Downstream Map. The drainage system discharges to Lake Washington.

#### Task 2. Resource Review

In our effort to determine, if there were any existing or potential problems with this downstream portion of the drainage system, the following resources were reviewed:

- a) Adopted Basin Plans: N/A (Not Applicable)
- b) Floodplain/floodway (FEMA) Maps: None
- c) Other Offsite Analysis Reports: N/A
- d) Sensitive Area Folio: None
- e) DNR Drainage Problem Maps: N/A
- f) U.S. Department of Agriculture Soil Survey: KpB – Kitsap silt loam
- g) Wetland Inventory Maps: None



**FIGURE 4: TOPOGRAPHIC MAP (NTS)** 

### **Task 3. Field Inspection**

A field observation was conducted to gather information for the Downstream Analysis and off-site conveyance system.

#### **Field Study**

1. Upstream area of the subject parcel consists of developed single-family residential buildings that have their own drainage system that discharges to the street drainage system. Only portion of unpaved area runoff will continue as is onto the site. No sign of upstream drainage issue on subject property.
2. No existing or potential constraint or lack of capacity in the existing drainage pipe system was apparent.
3. No sign of flooding areas was discovered along the flow path.
4. No existing/potential overtopping, scouring, bank sloughing, or sedimentation is apparent.
5. No known aquatic habitats in the conveyance route.
6. The downstream area consists of existing residential and roadway drainage system. The topography is generally moderately slope along the flow path with some flat area.
7. The pipe size encountered consists of 8-inch to 24-inch diameters of Concrete and DI pipes.
8. Offsite runoff areas tributary to the project site were consistent with the site map included.
9. No known complaints of flooding.
10. The site visit was conducted at 4:00 pm on November 06, 2024. The weather was sunny and 54 °F.

### **Task 4. Drainage System Description and Problem Descriptions**

#### **Upstream**

There is no likelihood that the proposed project activities could impact the upstream area as mentioned above with backwater conditions.

#### **Down Stream Drainage System Description: (**

- Presently, site runoff sheet flow at the west property line to the drainage system on Aubrey Davis Park drainage system that the 66<sup>th</sup> Ave SE drainage system is connected and discharge to. The proposed site drainage will discharge to the 66<sup>th</sup> Ave SE storm system at existing CB (A) with vaned grate on the street (See Figure 5, Downstream Map). This CB discharges easterly in an 8” DI pipe approximately 10 l.f. to another Type 1 CB (B) with solid locking lid located at the gravel shoulder. From here, runoff flows northerly in a 12” concrete pipe with PVC sleeve approximately 60 l.f. to another Type 1 CB (C) with vaned grate located on gravel shoulder. Runoff continues northerly for another 65 l.f. to yet another Type 1 CB (D) with vaned grate also in the gravel shoulder. It then continues northerly in a 12” concrete pipe approximately 90 l.f. to another Type 1 CB (E) with vaned grate on the paved shoulder east edge of the street. Then, it continues travels northerly approximately 25 l.f. to a Type 2 CB (F) with round solid lid located at the edge of travel way.
- From here, runoff travels westerly direction in an 18” concrete pipe approximately 110 l.f. to another Type 2 CB (H) with standard grate located within the Park property at the edge of a park trail. CB at point (G) shown on City GIS map is not visible in the field. Runoff then continues southwesterly along the east edge of trail approximately 85 l.f. to

another Type 2 CB (**I**) with standard grate. Then, it continues at the same side of the trails approximately 90 l.f. to another Type 2 CB (**J**) located at thick ground cover. At this point runoff continues northwesterly approximately 100 l.f. to another Type 2 CB (**K**) with standard grate location at the open lawn area near the playground. From here, it continues at southwesterly direction approximately 195 l.f. to another Type 2 CB (**L**) with vaned grate located at the east edge of W Mercer Way curb line. Then, it continues approximately 75 l.f. southerly to another Type 2 CB (**M**) at the same side of the street located at the curb line. From here, it continues to yet another Type 2 CB (**N**) with standard grate approximately 130 l.f. at the same street side curb line. Then, it travels westerly under open park area approximately 310 l.f. to another Type 2 CB with solid round grate located on the I-90 W on-ramp where the analysis is terminated for a total approximately distance of 1,345 l.f. During the downstream drainage field visit, no drainage issues were observed and no areas of any existing or potential major drainage problems were apparent.

**Problem description:**

The downstream drainage system as described above is not prone to stream bank erosion, siltation, and slide and does not threaten destruction of aquatic habitats. Catch basins as observed are mostly clean and sediment in the catch basins are below the invert of the outlet pipes. No open ditch existed along the route. Due to the fairly steep slope of the analysis route, the conveyance pipes system does not appear to have a capacity problem or show any sign of overtopping in any of the structure.

**Task 5. Mitigation of Existing or Potential Problems**

No off-site mitigation is necessary as there are no observed major drainage issues during the analysis for the downstream portion and runoff discharges from this site will be relatively minimal capacity to downstream system.

DOWNSTREAM MAP:



FIGURE 5: DOWNSTREAM MAP (NTS) ©

**DOWNSTREAM PHOTOS**



Catch Basin – At point A, Looking Downstream



Looking Downstream from Catch Basin – At Point B



Inside Catch Basin – At Point B



Catch Basin – Point C



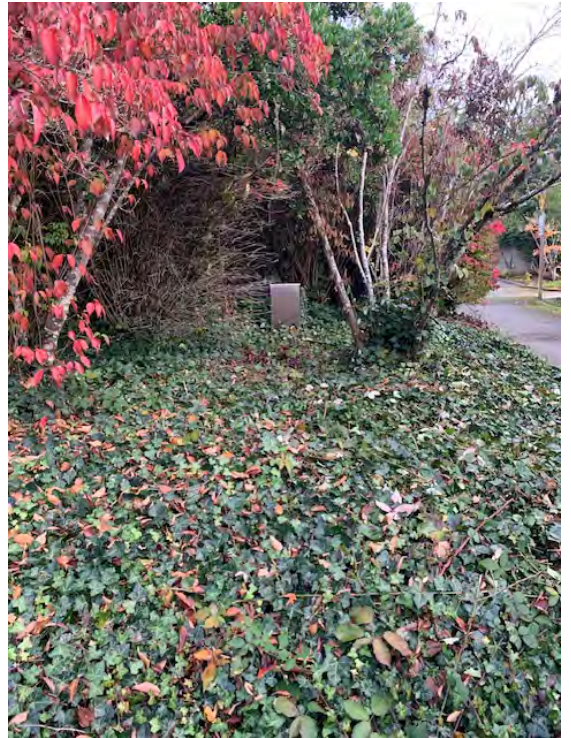
Catch Basin – Point D



Catch Basin at Point F



Catch Basin - Solid grate at E



Catch Basin at point G



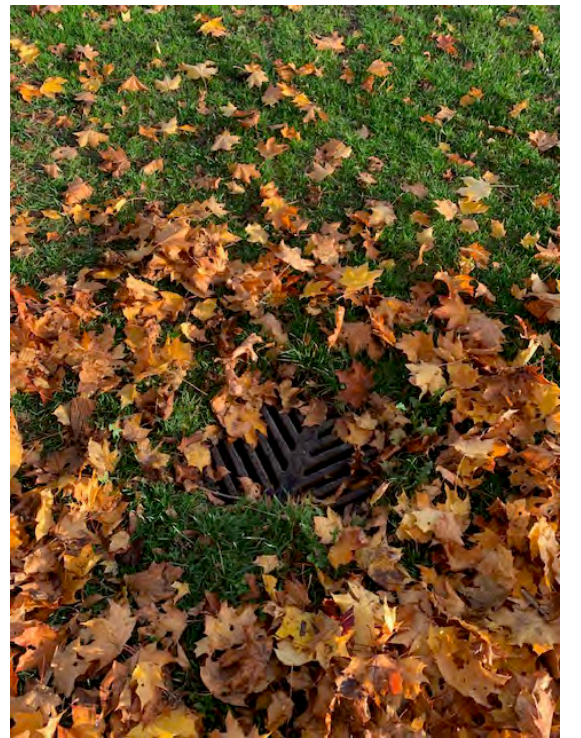
Catch Basin at Point H



Catch Basin at Point J



Catch Basin at Point I



Catch Basin at Point K



Catch Basin At Point L



Catch Basin At Point N



Catch Basin At Point M



Catch Basin At Point O -Far Side