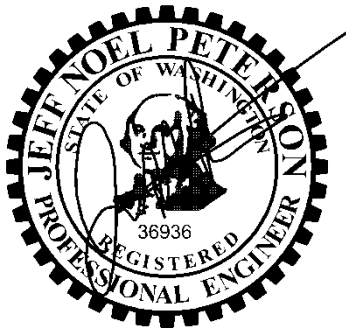


ENGINEERING REPORT

Conceptual Drainage Report

3003 77th Avenue SW
Mercer Island, WA
August 13, 2021



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I. PROJECT OVERVIEW

The following Technical Information Report (TIR) provides the technical information and design analysis required for developing the permanent drainage and Temporary Erosion and Sedimentation Control plans (TESC) for the project at 3003 77th Ave SE, known as Mercer Island Townhomes (hereby referred to as Mercer Island Townhomes in this report). The stormwater design for this project is based on the requirements set forth in the 2019 Department of Ecology Stormwater Management Manual for Western Washington as adopted by City of Mercer Island.

The approximately 2-acre project site is located at 3003 77th Ave SE, an existing office building to the south, 77th Ave SE to the east, SE 29th Street to the north, and parking for the office building to the west. The site is in the NE ¼ of Section 12, Township 24N, Range 4E.

The Mercer Island Townhomes project site is currently occupied by a parking garage and parking lot and associated utilities. The proposed development is a new 48-unit townhome development with associated below grade parking.

The proposed project will require the demolition of the existing structures, surrounding paving, and associated landscaping/utilities, as outlined in the Demolition Plan.

There are no critical areas located on-site.

Existing Site Conditions

The site is currently occupied by a parking garage, parking lot, existing stormwater detention pipes and conveyance, water and electrical utilities. The existing storm pipes generally discharge northeast, into the storm main under 29th Ave Street. The site is generally flat, with paving covering most of the project site, however, there are a few small patches of landscaped area.

Proposed Site Conditions

The project is proposing to develop the site to the proposed development is a new 48-unit townhome development with associated below grade parking, landscaping, and sidewalk areas. The site is 2.03-acres and will consist primarily of impervious surface. Proposed developments will be in accordance with the City of Mercer Island for site and right-of-way improvements. A new sanitary connection will be made to the existing sewer main located underneath 77th Avenue SE.

Proposed On-site Stormwater Management

The proposed drainage system will utilize stormwater detention pipes located below the parking garage and will be designed to meet peak flow standards. The existing stormwater detention pipe that serves the parking garage to the north of the site will be demolished as a part of this project. Therefore, this project will provide additional detention to meet the flow control standards for the existing site to the north. Stormwater from the detention pipes will discharge into the City's existing storm main located under SE 29th Street NW. The stormwater design will be in accordance with 2019 DOE Stormwater Management Manual for Western Washington. The detention system will be sized to detain maximum allowable peak discharge rates. Water Quality treatment will be provided using Modular Wetland treatment systems.

II. PROPOSED ON-SITE STORMWATER MANAGEMENT

When determining the Minimum Requirements for redevelopment projects, the Flow Chart in Figures 1-3.2: Flow Chart for Determining Requirements for Redevelopment were used. The flow chart shows that all Minimum Requirements apply to both new and replaced impervious surfaces as well as converted vegetation areas, as the project will result in more than 5,000-square feet of new plus replaced hard surface areas. The following is a summary of the minimum requirements as they apply to this development.

MR-1: Preparation of Storm Water Site Plans

Stormwater plans and reports that address each of the applicable minimum requirements will be prepared by a licensed civil engineer. The report shall be in compliance with 2019 DOE Stormwater Management Manual for Western Washington.

MR-2: Construction Storm Water Pollution Prevention Plan

Since the project will result in disturbing more than 2,000-square feet, a Stormwater Pollution Prevention Plan is required. The SWPPP will be submitted as a separate document with the Building Permit Submittal. As this site exceeds 1-acre of disturbed area, it will also be required to obtain independent coverage under the state Department of Ecology Construction Stormwater Discharge Permit.

MR-3: Source Control of Pollution

The site does not contain any significant sources of pollution; the parking lot is not considered high-use (less than 100 vehicles per 1000 square feet), there is not a maintenance shop, nor will handling of harmful or dangerous wastes happen on-site. Because of this, source control of pollutants has not been evaluated.

MR-4: Preservation of Natural Drainage System and Outfalls

The project site discharges to the existing city storm system in 77th Avenue SE, this point of discharge will not change.

MR-5: On-site Storm Water Management

The project used Figure I-3.3 of the 2019 DOE Stormwater Management Manual for Western Washington to determine the minimum requirement #5. The project will comply with all applicable On-site Stormwater Management BMPs that fall within the thresholds of List #2 which outlines applicable BMPs starting with lawn and landscape, then roof, and lastly, other hardscape.

FOR ALL SURFACES:

1. Infiltration is deemed partially feasible per the infiltration feasibility map. The LID Infeasibility map shows shallow groundwater.

LAWN AND LANDSCAPED AREAS:

1. Post Construction Soil Quality and Depth will be in compliance with BMP T5.13.

ROOF:

1. Full Dispersion: Full dispersion is **infeasible**: 65:10 ratio for natural vegetation to impervious area is unobtainable on this developed site.
2. Rain Gardens: Rain gardens is **infeasible** due to impermeable native soils.
3. Downspout Dispersion: Dispersion is **infeasible**, minimum flow path is unachievable due to available site area.
4. Perforated Stub-out Connections: Infiltration is **infeasible**, see above for rational.

OTHER HARD SURFACES:

1. Full Dispersion: Dispersion is **infeasible**, see above for rational.
2. Permeable Pavement: infiltration systems are feasible.
3. Sheet Flow Dispersion: Dispersion is **infeasible**, minimum flow path is unachievable due to available site area.

MR-6: Runoff Treatment

The project will utilize a Modular Wetland system for water quality treatment of runoff from pollution-generating surfaces in order to meet Minimum Requirement #6.

MR-7: Flow Control

The proposed drainage system will utilize stormwater detention pipes located below the parking garage and will be designed to meet peak flow standards per 2019 DOE SWMMWW requirements.

MR-8: Wetland Protection

Minimum Requirement #8 is not required as the project site does not drain to any wetlands.

MR-9: Operations and Maintenance

An Operation and Maintenance manual will be included as a separate document. The storm system will be privately owned and maintained by City of Bellevue Fire Department.

III. OFF-SITE ANALYSIS

Downstream Analysis

The project site is located in the Basin #10 – see Basin Map in Appendix. The storm system for the Mercer Island Townhomes project will be connected to the City's existing storm system. From there the runoff is conveyed north and eventually makes its way to Lake Washington. See Downstream Maps in Appendix.

Upstream Analysis

The project does not experience significant upstream flows from surrounding properties. The proposed site will match existing grades at the property boundaries so as to not alter existing flow paths or drainage basins outside of the project area. Upstream water will be routed around the new development to be discharged to the City storm system.

The project does replace a detention system used to control runoff from the existing parking garage to the west of the site. Stormwater calculations for this system will be provided in the final report.

IV. FLOW CONTROL ANALYSIS & DESIGN

On-site Stormwater Management

To satisfy the requirement to minimize runoff generation, BMPs will be implemented to the maximum extent feasible.

Runoff Treatment

Minimum Requirement #6 applies to the project, so runoff treatment will be required for this site. The project is located in Basin #10 and will utilize Modular Wetland systems to meet runoff treatment requirements. Water quality sizing calculations will be provided in the final report.

Flow Control System

Detention system calculations will be performed using a DOE approved continuous storm water modeling software. Stormwater discharges will match developed peak flows and discharge durations to existing conditions. The proposed detention facility has been designed in conformance with the 2019 DOE SWMMWW. The storm calculations and all supporting documents will be included at the end of this section.

In order to meet existing runoff conditions, a detention pipe system will be utilized. The system that will be located underneath the parking garage and discharge to the existing City storm system.

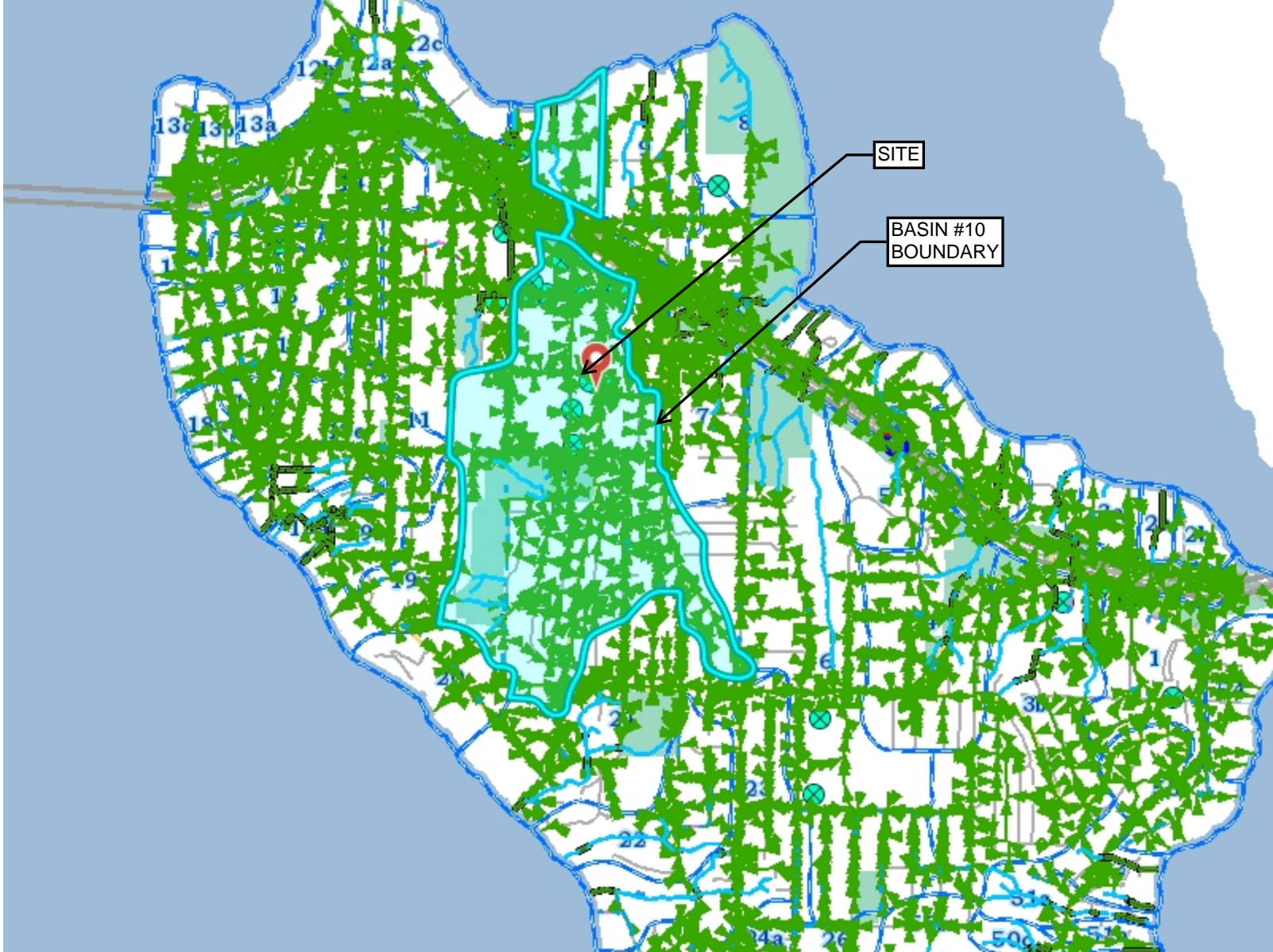
The detention output from approved modeling software will be provided after this section.

V. OTHER PERMITS

An NPDES Construction Storm Water permit from the Washington State Department of Ecology will be required for the project. The NPDES will include a SWPPP and a spill prevention and cleanup report which will be included in the SWPPP.

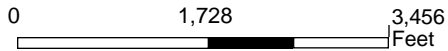
VI. APPENDIX

FIGURES



Legend

- Storm Main
 - Pipe
 - Open Watercourse
 - Piped Watercourse
 - Ditch
 - Culvert
 - Other
- Storm Main - Private
- Model Toxic Control Sites
- Drainage Basin
- Freeway
- Major Street
- Street
- Parks
- Lake Washington



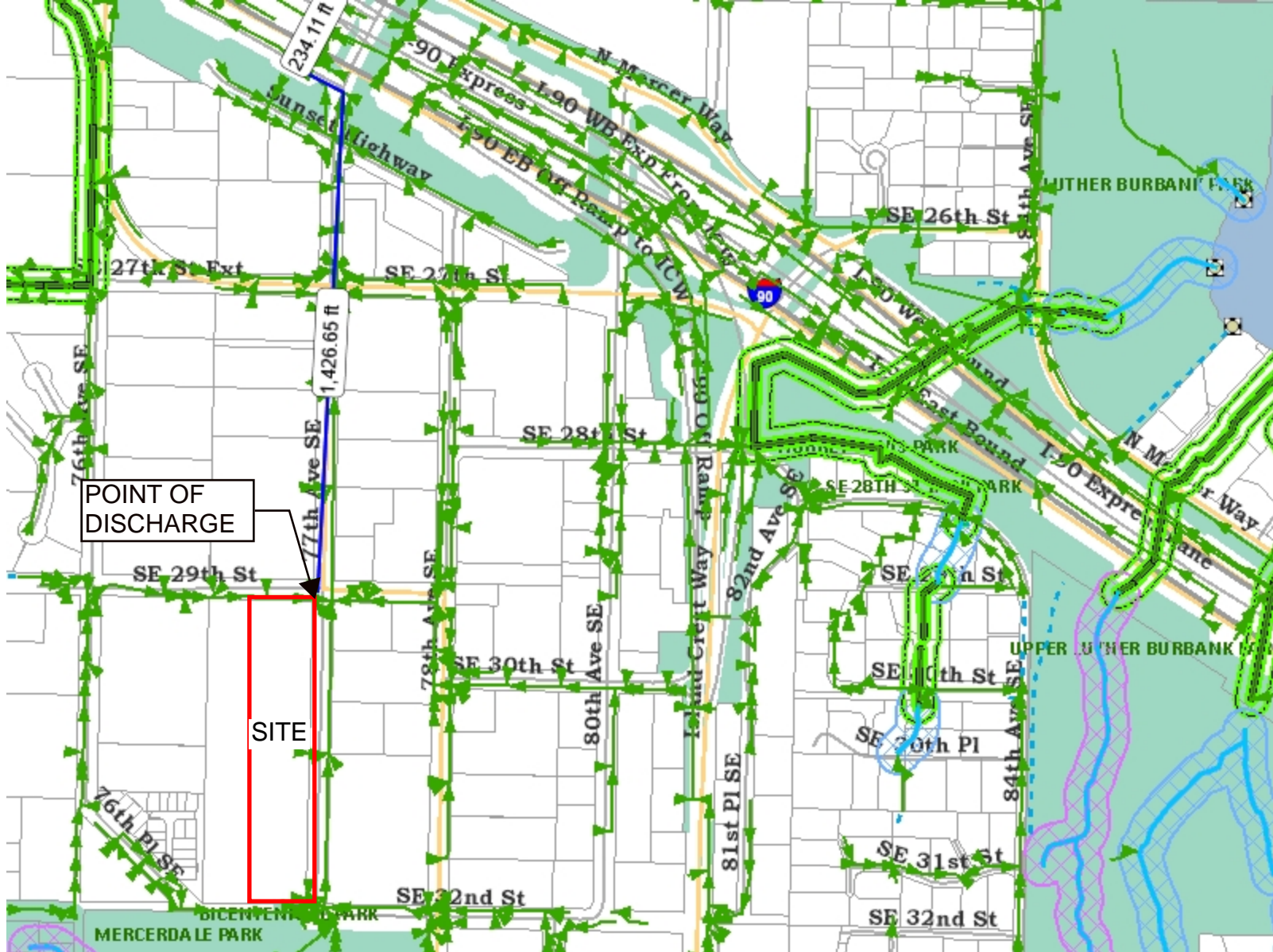
1 inch =
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Disclaimer: These maps were developed by the City of Mercer Island and are intended to be a general purpose digital reference tool. These maps are not an accepted legal instrument for describing, establishing, recording or maintaining descriptions 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.

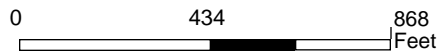
Notes

Mercer Island Townhomes



Legend

- Storm Main**
 - Pipe
 - Open Watercourse
 - Piped Watercourse
 - Ditch
 - Culvert
 - Other
- Storm Discharge Point
- Unpiped Watercourse**
 - Type "F" = Fish
 - Type "Np" = Non-Fish
 - Type "Ns" = Non-Fish Seasonal
 - Type "Np" (Unverified)
 - Type "Ns" (Unverified)
- Piped Watercourse
- Watercourse Buffer/Setback**
 - Type "F" = 120-Ft Buffer
 - Type "Np" = 60-Ft Buffer
 - Type "Ns" = 60-Ft Buffer
 - Type "Np" Unverified = 60-Ft Buffer
 - Type "Ns" Unverified = 60-Ft Buffer
 - Piped Type F/Np/Ns = 45-Ft Setback
- Property Line
- Freeway
- Major Street
- Street
- Parks
- Lake Washington



1 inch =
868.079510833333
feet

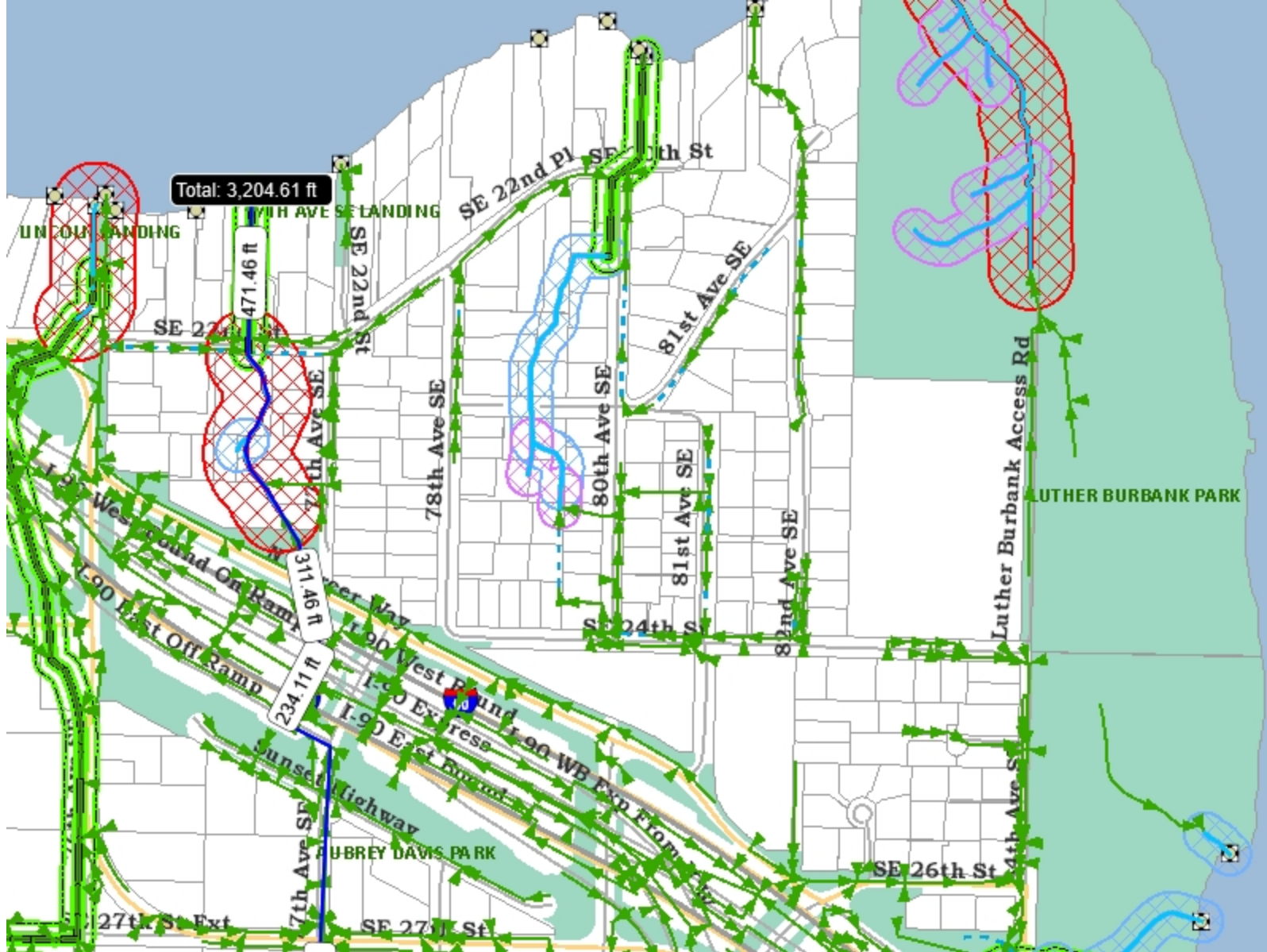


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Notes

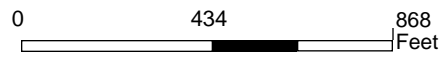
Downstream Flowpath

Mercer Island Townhomes



Legend

- Storm Main**
 - Pipe
 - Open Watercourse
 - Piped Watercourse
 - Ditch
 - Culvert
 - Other
- Storm Discharge Point**
- Unpiped Watercourse**
 - Type "F" = Fish
 - Type "Np" = Non-Fish
 - Type "Ns" = Non-Fish Seasonal
 - Type "Np" (Unverified)
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- Piped Watercourse**
- Watercourse Buffer/Setback**
 - Type "F" = 120-Ft Buffer
 - Type "Np" = 60-Ft Buffer
 - Type "Ns" = 60-Ft Buffer
 - Type "Np" Unverified = 60-Ft Buffer
 - Type "Ns" Unverified = 60-Ft Buffer
 - Piped Type F/Np/Ns = 45-Ft Setback
- Property Line
- Freeway
- Major Street
- Street
- Parks
- Lake Washington



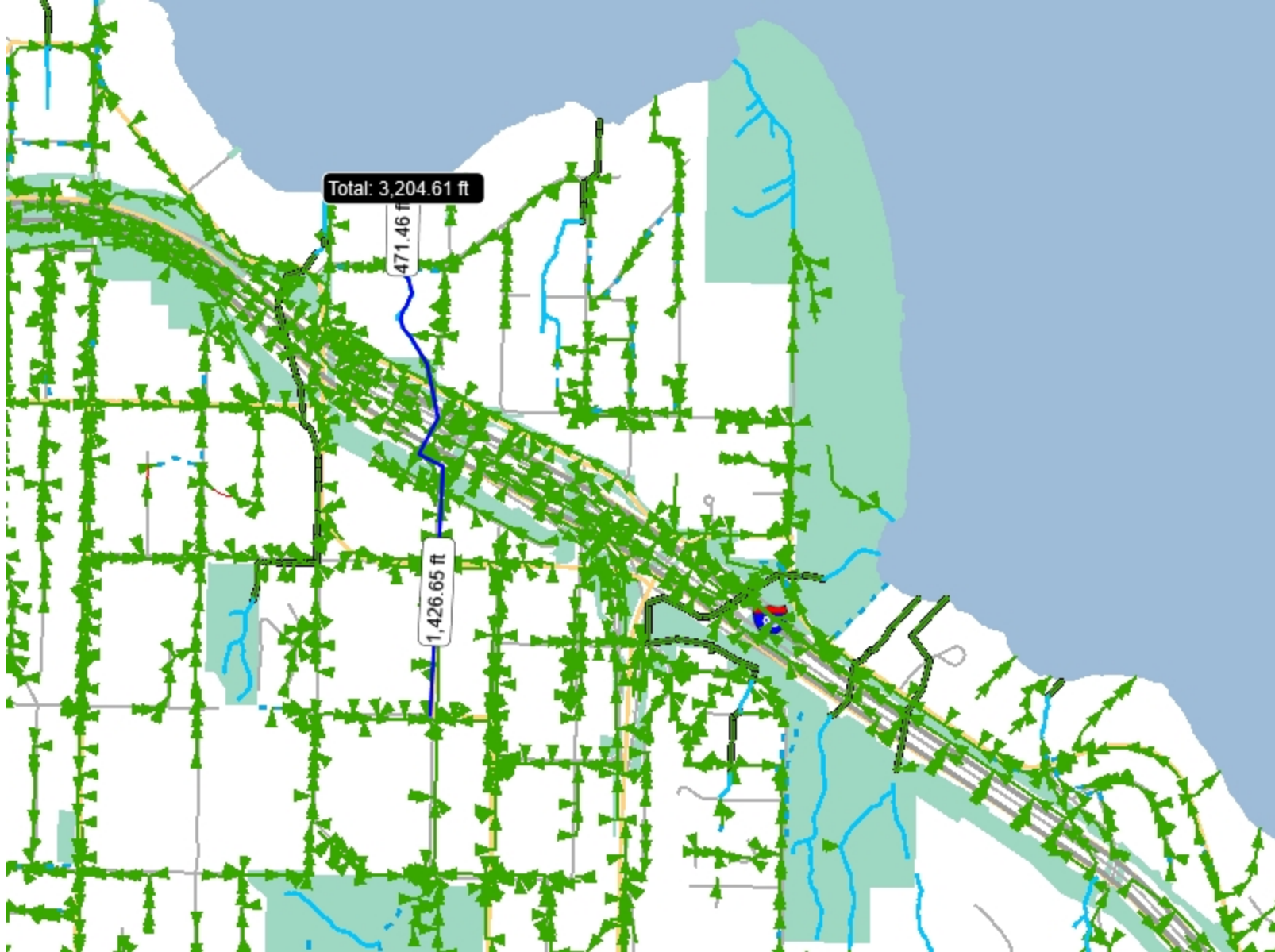
1 inch =
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feet



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Notes
Downstream Flowpath
Part 2

Mercer Island Townhomes



Legend

- Storm Main
 - Pipe
 - Open Watercourse
 - Piped Watercourse
 - - Ditch
 - - Culvert
 - Other
- Freeway
- Major Street
- Street
- Parks
- Lake Washington

0 868 1,736
Feet

1 inch =
1736.15902183333
feet

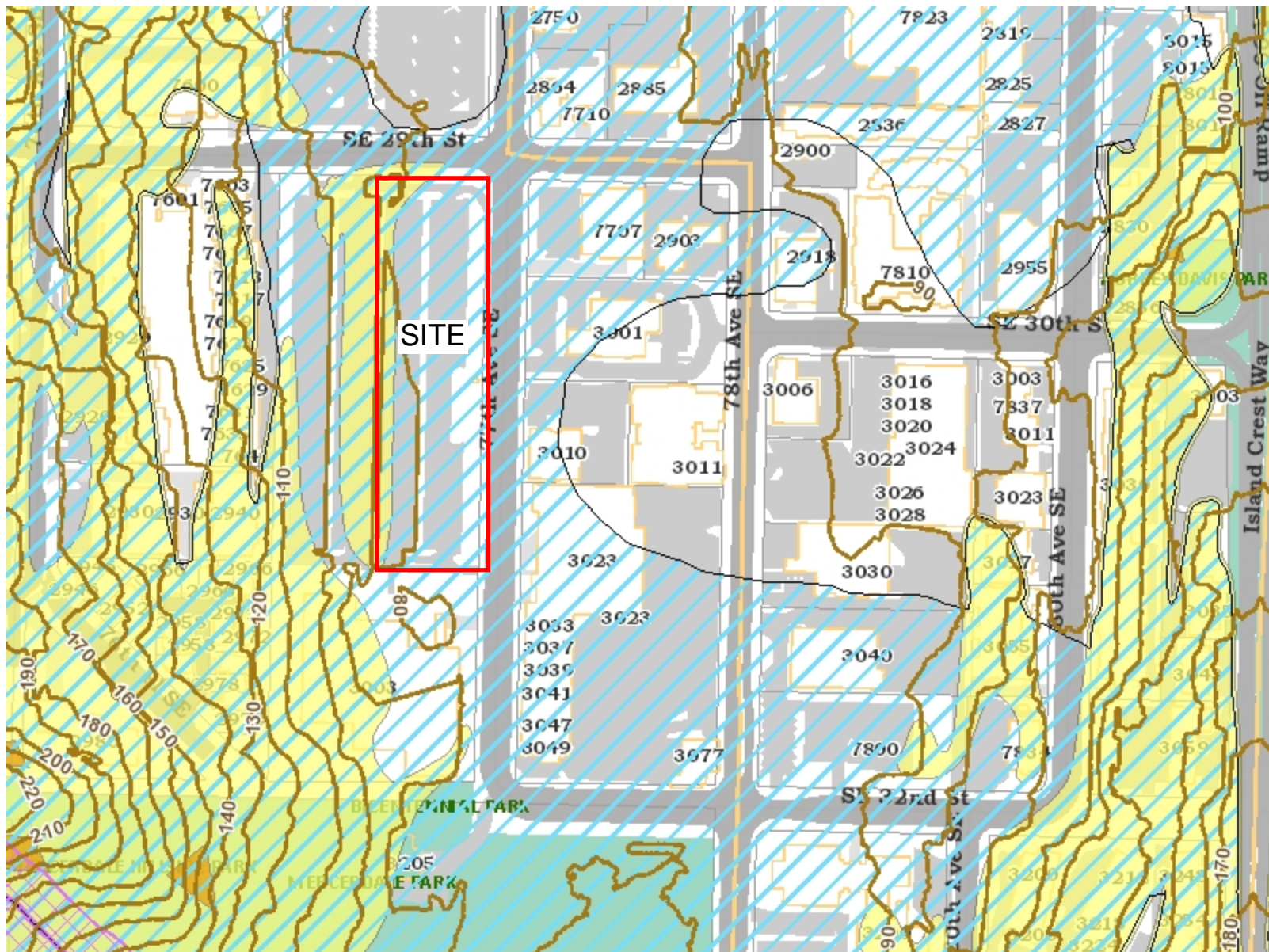


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Notes

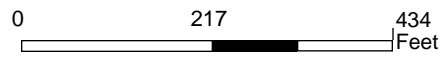
Downstream Flowpath

Mercer Island Townhomes



Legend

- 10ft Lidar Contours (2016)
- Unpiped Watercourse
 - Type "F" = Fish
 - Type "Np" = Non-Fish
 - Type "Ns" = Non-Fish Seasonal
 - Type "Np" (Unverified)
 - Type "Ns" (Unverified)
- Piped Watercourse
- Watercourse Buffer/Setback
 - Type "F" = 120-Ft Buffer
 - Type "Np" = 60-Ft Buffer
 - Type "Ns" = 60-Ft Buffer
 - Type "Np" Unverified = 60-Ft Buffer
 - Type "Ns" Unverified = 60-Ft Buffer
 - Piped Type F/Np/Ns = 45-Ft Setback
- Potential Slide
- Steep Slope
- Erosion
- Address
- Building
- Property Line
- Docks
- Freeway
- Major Street
- Street
- Paved Driveway
- Paved Road
- Paved Parking Area
- Parks
- Lake Washington

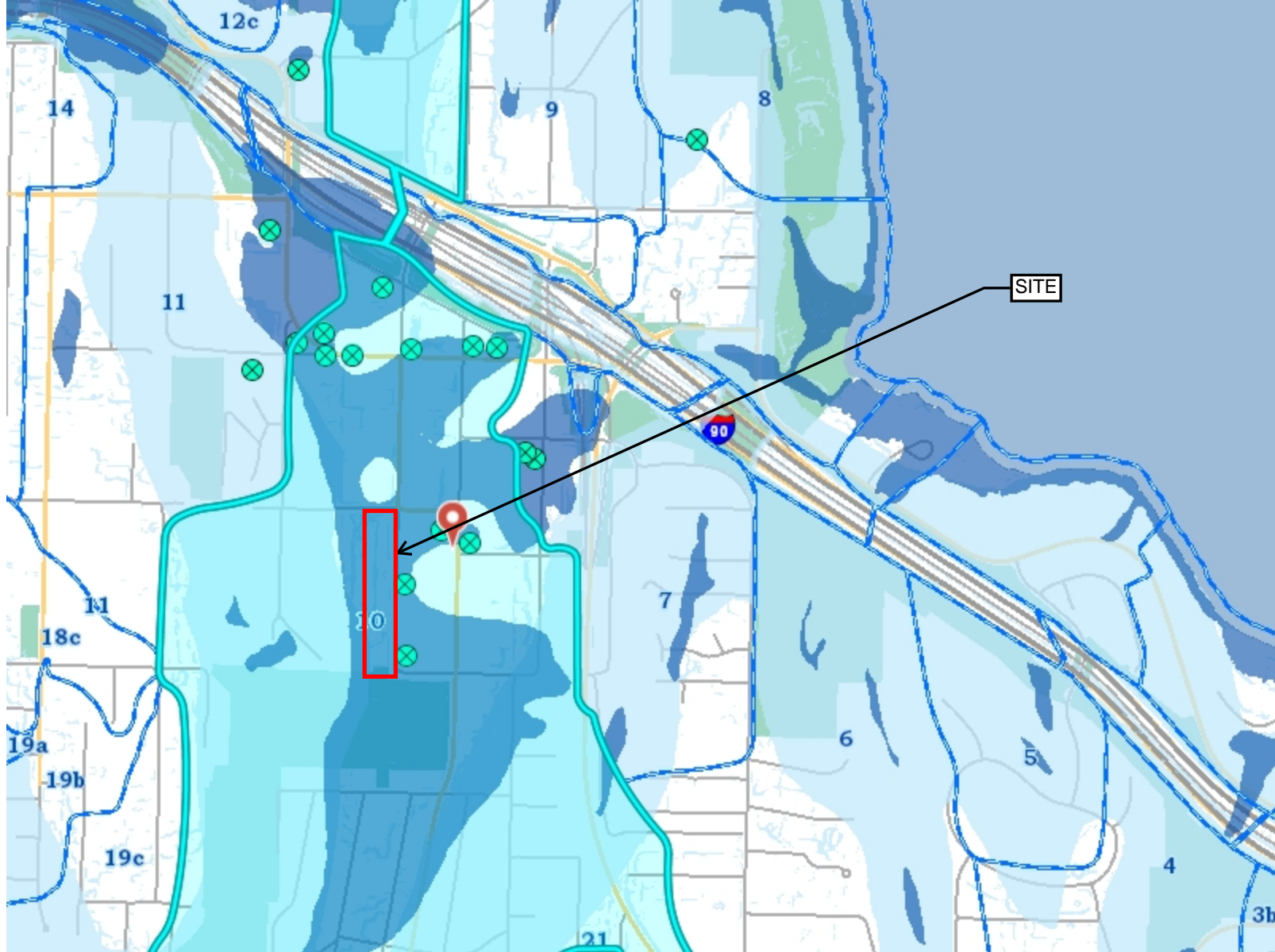


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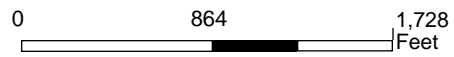


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Notes
Hazards Map



- Legend**
- Model Toxic Control Sites
 - Drainage Basin
 - Shallow Groundwater
 - Areas Infeasible For Infiltration
 - Freeway
 - Major Street
 - Street
 - Parks
 - Lake Washington



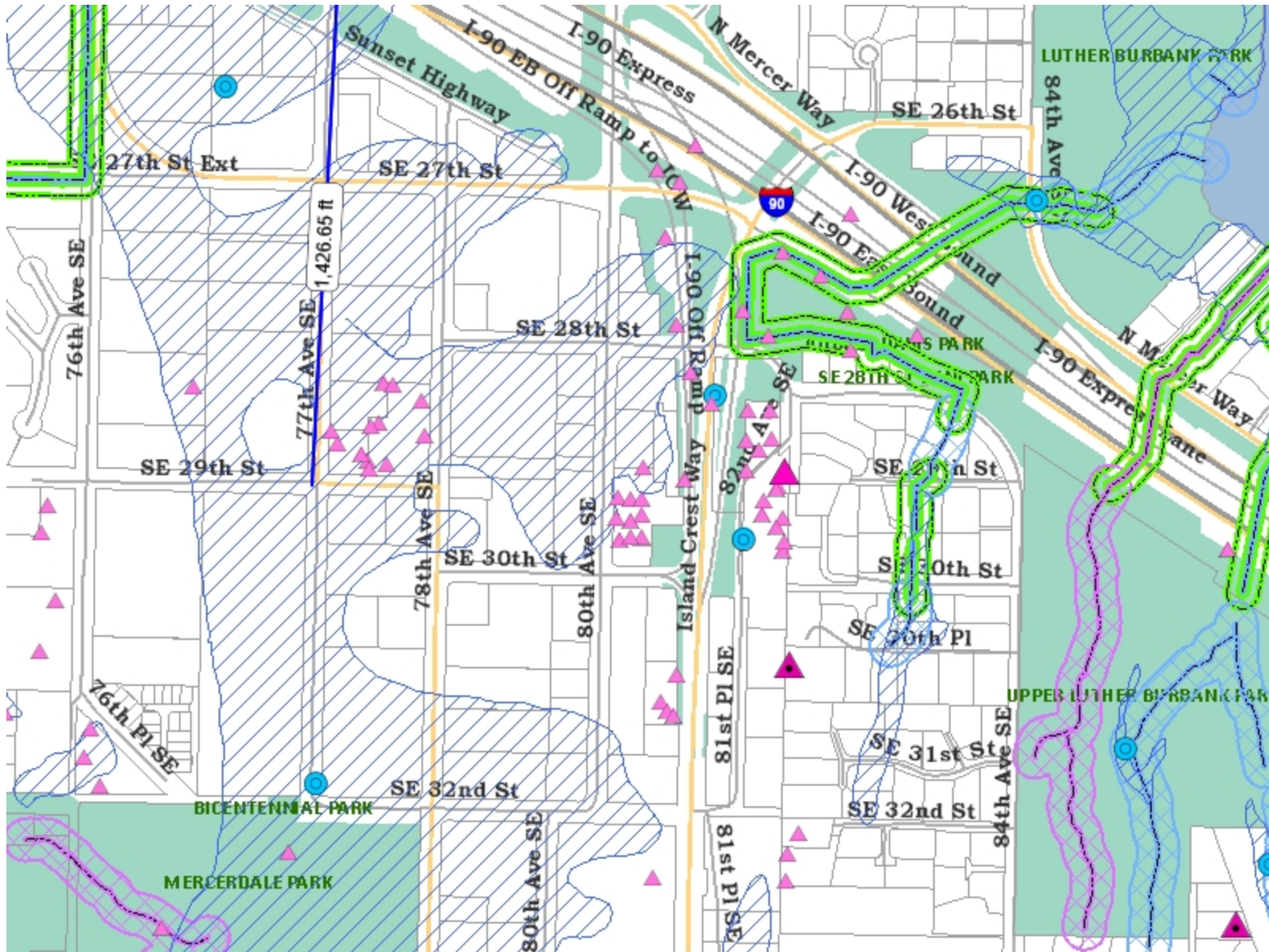
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feet



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Notes

Mercer Island Townhomes



Legend

Identified Landslide Location

- ▲ Documented
- ▲ No Documentation
- ▲ Ancient Slide (Test Pit)

● Spring Locations

⊕ Springs Mapped

▨ Water < 10 ft below ground surface

Unpiped Watercourse

- Type "F" = Fish
- Type "Np" = Non-Fish
- Type "Ns" = Non-Fish Seasonal
- Type "Np" (Unverified)
- Type "Ns" (Unverified)

▬ Piped Watercourse

Watercourse Buffer/Setback

- ▨ Type "F" = 120-Ft Buffer
- ▨ Type "Np" = 60-Ft Buffer
- ▨ Type "Ns" = 60-Ft Buffer
- ▨ Type "Np" Unverified = 60-Ft Buffer
- ▨ Type "Ns" Unverified = 60-Ft Buffer
- ▨ Piped Type F/Np/Ns = 45-Ft Setback

▭ Property Line

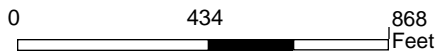
— Freeway

— Major Street

— Street

■ Parks

■ Lake Washington

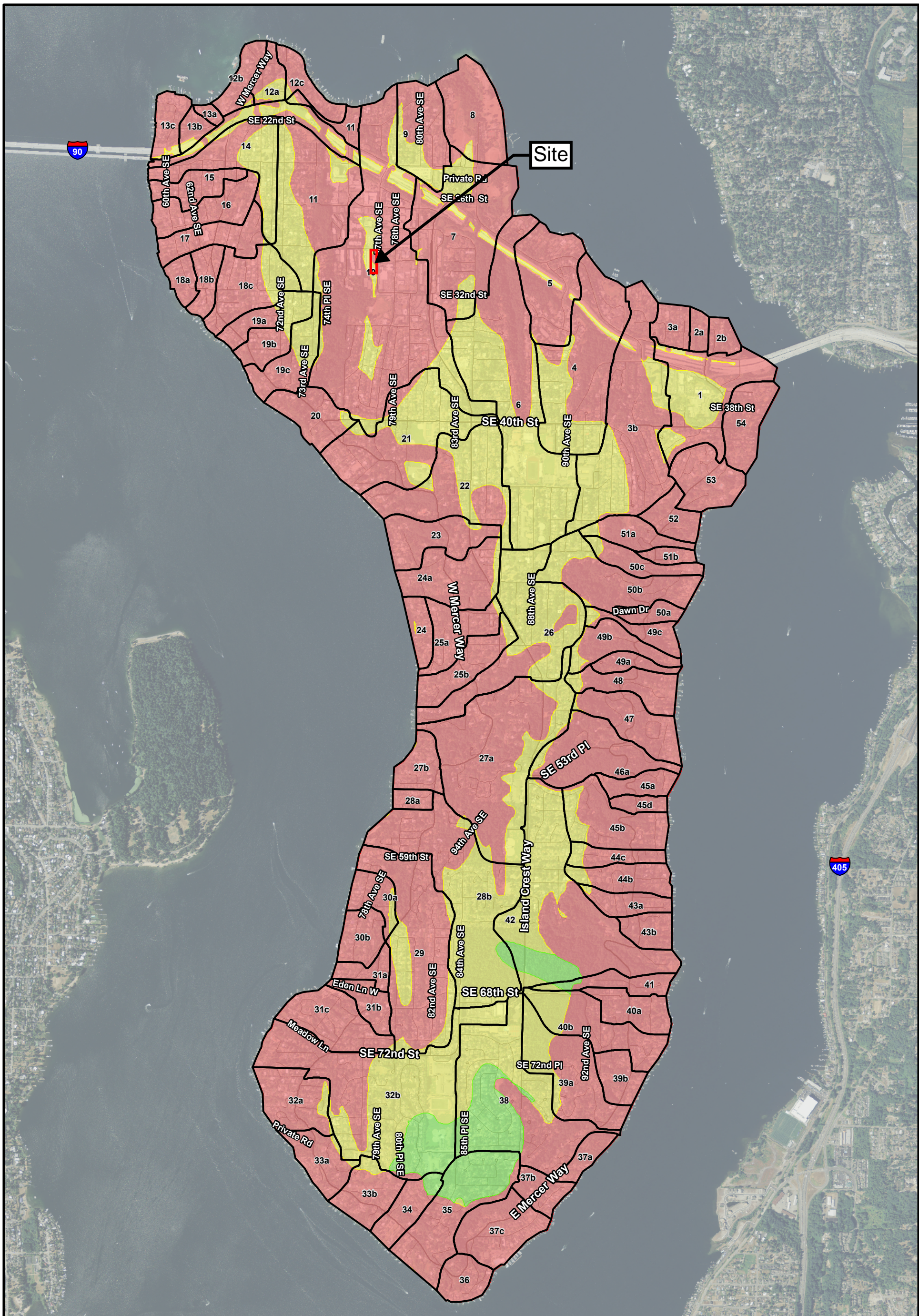


1 inch =
868.079510833333
feet



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Notes
Hazards Map
Springs and Water <10 ft below surface

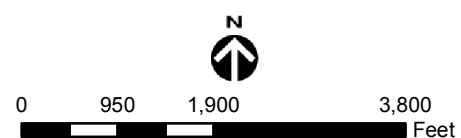


Legend

- Infiltrating LID facilities may be feasible, and soil has high infiltration potential
- Infiltrating LID facilities may be feasible, and soil has moderate infiltration potential
- Infiltrating LID facilities are not permitted
- Storm drainage basin

* Map is intended to be used for planning purposes only. Site-specific analysis is required prior to design and construction of LID facilities.

Figure 3. Low impact development infiltration feasibility on Mercer Island.



Aerial photography: USDA (2009)

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