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**CITY OF MERCER ISLAND**9611 SE 36<sup>th</sup> Street • Mercer Island, WA 98040-3732

(206) 275-7605 • FAX (206) 275-7726

www.mercergov.org

**CRITICAL AREAS DETERMINATION****NOTICE OF DECISION****April 2, 2018**

<b>Project Number:</b>	CAO17-011
<b>Description:</b>	Request to review a critical areas study and mitigation plan to reduce the wetland buffer to the minimum 25 feet along the western portion of the wetland
<b>Applicant:</b>	David Daniel Demco Law 5224 Wilson Ave S #220 Seattle WA 98118
<b>Owner:</b>	Edith Cropp 4803 Forest Ave SE Mercer Island WA 98040
<b>Site Address:</b>	4810 Forest Ave, Mercer Island WA 98040; Identified by King County Assessor tax parcel number 4045000145
<b>Zoning District:</b>	R-15
<b>SEPA Compliance:</b>	The proposal is categorically exempt from SEPA review per WAC 197-11-800(6)(e).
<b>Exhibits:</b>	<ol style="list-style-type: none"><li>1. Development Application for a Critical Area Determination, signed date July 25, 2017</li><li>2. Critical Areas Study prepared by Confluence Environmental Company, dated November 9, 2017</li><li>3. Peer review memo prepared by ESA, dated October 12, 2017</li><li>4. Critical Areas Study and mitigation plan prepared by Confluence Environmental Company, dated March 6, 2018</li><li>5. Peer review memo prepared by ESA, dated March 19, 2018</li><li>6. Public comment letters<ol style="list-style-type: none"><li>a. Hagen comment letter</li><li>b. Reynolds comment letter</li></ol></li></ol>

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**I. FINDINGS OF FACT**

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**1. Application Description and Project History:**

The applicant proposes future development on the subject site, and notes that the planned development would encroach into the standard 35 foot buffer (Exhibit 4, page 3). The applicant requests review of a critical areas study and mitigation plan to reduce the wetland buffer to the minimum 25 feet along the western portion of the wetland (Exhibit 4, page 5).

The project request has evolved from the original application request. The initial request was to have the City verify whether a watercourse was located on the site (Exhibit 1), as mapped in the City's GIS database. The applicant provided a critical areas study documenting how the area mapped as a watercourse in the City's GIS database did not meet the definition of a watercourse (Exhibit 2). Peer review of the critical area study and site concluded that a watercourse was not on site, but that a wetland might be on site (Exhibit 3). The applicant reviewed the site for wetlands, concluded that a wetland was present on site, and subsequently requested reduction of the wetland buffer (Exhibit 4). The applicant has also documented how the water flowing downslope of the wetland does not meet the definition of a watercourse (Exhibit 2).

**2. Zoning:**

The existing zoning of the subject site is Single Family Residential R-15 (Residential, 15,000 square foot minimum lot area).

**3. Site Description and Adjacent Land Uses:**

The site is currently developed with a detached garage and driveway leading to the garage entrance on the western side of the site. The site slopes somewhat steeply from the eastern property line down to the west. Land uses adjacent to the subject site include single family homes to the north, south, east, and west.

**4. Consistency with Land Use Code/Zoning Requirements:**

Mercer Island City Code (MICC) 19.07.070(B)(2) and 19.07.080(C)(2) allow for wetland buffers to be reduced "in accordance with an approved critical area study when [the code official] determines that a smaller area is adequate to protect the watercourse, the impacts will be mitigated by using combinations of the below mitigation options, and the proposal will result in no net loss of watercourse and buffer functions."

The applicant must provide mitigation as described in MICC 19.07.070(B)(2)(b). The applicant's revised critical area study and mitigation plan (Exhibit 4) verify that a reduced buffer is adequate to protect the watercourse and the proposal will result in no net loss of watercourse and buffer functions, based on the analysis below.

**5. State Environmental Policy Act (SEPA) Compliance:**

The proposal is categorically exempt from SEPA review per WAC 197-11-800(6)(e). Additional SEPA review and a threshold determination may be required for subsequent projects.

**6. Public Noticing and Comments:**

There is no public hearing requirement for a Critical Areas Determination (an administrative action) pursuant to MICC 19.15.010(E) and 19.15.020(F)(1). On September 18, 2017, City staff sent a Public Notice of Application to all property owners within 300 feet of the subject property and placed the Public Notice of Application in the City Weekly Permit Bulletin. A public comment period ran from September 18, 2017 through 5:00 P.M. on October 18, 2017. The City received two comment letters during the public comment period (Exhibits 6a and 6b) regarding the topics below:

- a. Suggestion that water flowing on to the subject property be piped end to end, instead of flowing down the hillside;

**Staff response:** *This design would be inconsistent with the City's critical areas code and can therefore not be accommodated. The City's critical areas code contains standards for wetlands and buffers, which are to remain unaltered and undeveloped.*

- b. Contention that there is not natural watercourse on site;

**Staff response:** This issue formed the basis for the initial critical areas determination application, and was independently verified by both a qualified professional hired by the applicant, as well as the City's peer reviewer (Exhibits 2 and 3);

- c. Concerns about alteration to drainage from upslope property

**Staff response:** No alteration to drainage patterns are being requested nor approved as part of this decision. No future development is proposed on the hillside adjacent to the upslope properties. The applicant has documented how hydrology will not be affected by the proposed wetland buffer reduction (Exhibit 4).

**7. MICC 19.07.080(B):**

Wetland Ratings. Wetlands shall be rated as Category I, Category II, Category III or Category IV according to the wetland classification system.

**Staff Analysis:**

The applicant provided a critical areas study (Exhibit 4) that identifies the wetland as a Category IV.

- 8. MICC 19.07.080(C):** 1. Standard Wetland Buffer Widths. The following standard buffer widths shall be established from the outer edge of wetland boundaries:

Wetland Type	Standard (Base) Buffer Width (feet)	Minimum Buffer Width with Enhancement (feet)
Category I	100	50
Category II	75	37
Category III	50	25
Category IV	35	25

**Staff Analysis:**

Both the City's resources and the applicant's critical areas study (Exhibit 2) identify the existing wetland as a Category IV. Category IV wetlands are subject to a 35-foot regulated buffer that may be reduced to 25 feet with an approved critical area determination.

**9. MICC 19.07.070(B)(2)(a):**

Reduction of Buffer Widths. The code official may allow the standard buffer width to be reduced to not less than the above listed minimum width in accordance with an approved critical area study when he/she determines that a smaller area is adequate to protect the watercourse, the impacts will be mitigated by using combinations of the below mitigation options, and the proposal will result in no net loss of watercourse and buffer functions. However, in no case shall a reduced buffer contain a steep slope.

**Staff Analysis:**

The applicant is requesting to reduce the buffers of the Category IV wetland on site to the minimum buffer widths allow by code (25 feet) on the western side of the wetland. The applicant is proposing to enhance the wetland buffer by installing native plants and monitoring, and if necessary, removing invasive species (Exhibit 4). An analysis provided in the critical area study states that these measures will create no net loss of ecological function by the reduce buffer width. A peer review of the critical area study concurred with this conclusion (Exhibit 5).

**13. MICC 19.07.040(J)(1):**

Maintenance and Monitoring. Landscape maintenance and monitoring may be required for up to five years from the date of project completion if the code official determines such condition is necessary to ensure mitigation success and critical area protection.

**Staff Analysis**

*The applicant proposes annual monitoring of the proposed mitigation for five years. Additionally, the project approval is conditioned with a request for a bond quantity worksheet, which will provide the basis for a potential future financial guarantee.*

**14. MICC 19.07.040(J)(2):**

Maintenance and Monitoring. Where monitoring reveals a significant variance from predicted impacts or a failure of protection measures, the applicant shall be responsible for appropriate corrective action, which may be subject to further monitoring.

**Staff Analysis**

*Staff finds that this requirement is appropriate as a condition of approval.*

**15. Permit Expiration:**

MICC 19.15.020(K) states “Except for building permits or unless otherwise conditioned in the approval process, permits shall expire one year from the date of notice of decision if the activity approved by the permit is not exercised. Responsibility for knowledge of the expiration date shall be with the applicant.”

**Staff Analysis**

*A condition of approval has been added to this decision, setting an expiration date consistent with this code standard.*

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**II. CONCLUSIONS OF LAW**

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Based on the above Findings of Facts, the following Conclusions of Law have been made:

1. The subject property contains a Category IV wetland which require buffers as described in MICC 19.07.080.
2. The buffers will not be less than the minimum widths specified in MICC 19.07.080(C)(1).
3. A critical area study consistent with MICC 19.07.050 was submitted (Exhibit 4).
4. The proposed buffer widths plus mitigation measures will cause no net loss of ecological function.
5. As shown in Exhibit 4, no portion of the reduced buffer is on a steep slope.

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**III. DECISION**

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Based upon the above noted Findings of Fact and Conclusions of Law, critical areas determination application CAO17-011 to reduce the width of a Category IV wetland buffer from 35 feet to 25 feet as depicted by Exhibit 4, is hereby **APPROVED** subject to the Conditions of Approval. This decision is final, unless appealed in writing consistent with adopted appeal procedures.

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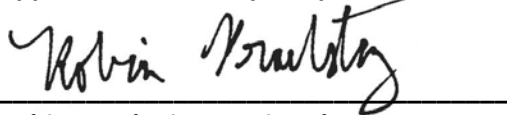
**IV. CONDITIONS OF APPROVAL**

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1. The following conditions shall be binding on the “Applicant,” which shall include the owner or owners of the property, heirs, assign and successors.
2. The proposed mitigation shall substantially comply with the mitigation plan shown in Exhibit 4.

3. Upon completion of the mitigation work, a letter written by a qualified professional detailing compliance with the approved mitigation plan shall be submitted to the City of Mercer Island Development Services Group. The compliance letter shall be accompanied by a set of as-built drawings depicting type and location of mitigation plantings. A maintenance and monitoring memo shall be submitted to the City of Mercer Island Development Services Group annually for a period of five years. Plant survival rates are to meet or exceed the performance standards listed in Exhibit 4.
4. This permit approval shall expire one year from the date of notice of decision if the activity approved by the permit is not exercised.
5. The applicant shall install and have inspected full temporary erosion and sediment control measures prior to construction.

**Approved this 2<sup>nd</sup> day of April 2018.**



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**Robin Proebsting, Senior Planner  
Development Services Group  
City of Mercer Island**

Parties of record have the right to appeal the decision on this action when it is issued. If at that time you desire to file an appeal, you must submit the appropriate form, available from the Development Services Group, and file it with the City Clerk within fourteen (14) days from the date this decision is signed. Upon receipt of a timely complete appeal application and appeal fee, an appeal hearing will be scheduled. To reverse, modify or remand this decision, the appeal hearing body must find that there has been substantial error, the proceedings were materially affected by irregularities in procedure, the decision was unsupported by material and substantial evidence in view of the entire record, or the decision is in conflict with the city's applicable decision criteria.

Please note that the City will provide notice of this decision to the King County Department of Assessment, as required by State Law (RCW 36.70B.130). Pursuant to RCW 84.41.030(1), affected property owners may request a change in valuation for property tax purposes notwithstanding any program of revaluation by contacting the King County Department of Assessment at (206) 296-7300.

**CITY OF MERCER ISLAND**  
**DEVELOPMENT SERVICES GROUP**  
 9611 SE 36TH STREET | MERCER ISLAND, WA 98040  
 PHONE: 206.275.7605 | [www.mercergov.org](http://www.mercergov.org)



CITY USE ONLY		
PERMIT #	RECEIPT #	FEE
Date Received:		

**DEVELOPMENT APPLICATION**

Received By:

STREET ADDRESS/LOCATION <b>4803 Forest Ave SE, M.I.</b>		ZONE
COUNTY ASSESSOR PARCEL #'S <b>LOT 2 = 404500 - 0145 / LOT 2 = 257730 - 0021</b>		PARCEL SIZE (SQ. FT.) <b>LOT 2 = 14.7K SQ. FT. LOT 2 = 17.5K SQ. FT.</b>
PROPERTY OWNER (required) <b>EDITH CROPP</b>	ADDRESS (required) <b>4803 FOREST AVE SE</b>	CELL/OFFICE (required) <b>(206) 203-6000</b> E-MAIL (required) <b>DDANIEL@PEMCO.LAW.COM</b>
PROJECT CONTACT NAME <b>DAVID C. DANIEL</b>	ADDRESS <b>5224 Wilson Ave. S. #200 SEATTLE, WA 98118</b>	CELL/OFFICE <b>''</b> E-MAIL <b>''</b>
TENANT NAME <b>N/A</b>	ADDRESS <b>N/A</b>	CELL PHONE <b>N/A</b> E-MAIL <b>N/A</b>

**DECLARATION:** I HEREBY STATE THAT I AM THE OWNER OF THE SUBJECT PROPERTY OR I HAVE BEEN AUTHORIZED BY THE OWNER(S) OF THE SUBJECT PROPERTY TO REPRESENT THIS APPLICATION, AND THAT THE INFORMATION FURNISHED BY ME IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE.

*[Signature]*  
 SIGNATURE

**7/25/2017**  
 DATE

**PROPOSED APPLICATION(S) AND CLEAR DESCRIPTION OF PROPOSAL** (PLEASE USE ADDITIONAL PAPER IF NEEDED):  
*seeking verification of presence or absence of watercourse on site and if present, what type of watercourse.*

ATTACH RESPONSE TO DECISION CRITERIA IF APPLICABLE

**CHECK TYPE OF LAND USE APPROVAL REQUESTED:**

APPEALS	DEVIATIONS Continued	SUBDIVISION SHORT PLAT Continued
<input type="checkbox"/> Building (+cost of file preparation)	<input type="checkbox"/> Impervious Surface (5% Lot overage)	<input type="checkbox"/> Short Plat Amendment
<input type="checkbox"/> Land use (+cost of verbatim transcript)	<input type="checkbox"/> Shoreline	<input type="checkbox"/> Final Short Plat Approval
<input type="checkbox"/> Code Interpretation	<input type="checkbox"/> Wet Season Construction Moratorium	<b>VARIANCES (Plus Hearing Examiner Fee)</b>
<b>CRITICAL AREAS</b>	<b>ENVIRONMENTAL REVIEW (SEPA)</b>	<input type="checkbox"/> Type 1**
<input checked="" type="checkbox"/> Determination	<input type="checkbox"/> Checklist: Single Family Residential Use	<input type="checkbox"/> Type 2***
<input type="checkbox"/> Reasonable Use Exception	<input type="checkbox"/> Checklist: Non-Single Family Residential Use	<b>OTHER LAND USE</b>
<b>DESIGN REVIEW</b>	<input type="checkbox"/> Environmental Impact Statement	<input type="checkbox"/> Accessory Dwelling Unit
<input type="checkbox"/> Administrative Review	<b>SHORELINE MANAGEMENT</b>	<input type="checkbox"/> Code Interpretation Request
<input type="checkbox"/> Design Review – Major	<input type="checkbox"/> Exemption	<input type="checkbox"/> Comprehensive Plan Amendment (CPA)
<input type="checkbox"/> Design Review – Minor	<input type="checkbox"/> Semi-Private Recreation Tract (modification)	<input type="checkbox"/> Conditional Use (CUP)
<b>WIRELESS COMMUNICATIONS FACILITIES</b>	<input type="checkbox"/> Semi-Private Recreation Tract (new)	<input type="checkbox"/> Lot Line Revision
<input type="checkbox"/> Wireless Communications Facilities-6409 Exemption	<input type="checkbox"/> Substantial Dev. Permit	<input type="checkbox"/> Lot Consolidation
<input type="checkbox"/> New Wireless Communications Facility	<b>SUBDIVISION LONG PLAT</b>	<input type="checkbox"/> Noise Exception
<b>DEVIATIONS</b>	<input type="checkbox"/> Long Plat	<input type="checkbox"/> Reclassification of Property (Rezoning)
<input type="checkbox"/> Changes to Antenna requirements	<input type="checkbox"/> Subdivision Alteration to Existing Plat	<input type="checkbox"/> ROW Encroachment Agreement (requires separate ROW Use Permit)
<input type="checkbox"/> Changes to Open Space	<input type="checkbox"/> Final Subdivision Review	<input type="checkbox"/> Zoning Code Text Amendment
<input type="checkbox"/> Fence Height	<b>SUBDIVISION SHORT PLAT</b>	
<input type="checkbox"/> Critical Areas Setback	<input type="checkbox"/> Short Plat	
	<input type="checkbox"/> Deviation of Acreage Limitation	

\*\*Includes all variances of any type or purpose in all zones other than single family residential zone: B, C-O, PBZ, MF-2, MF2L, MF-2L, MF-3, TC, P)

\*\*\*Includes all variances of any type or purpose in single family residential zone: R-8.4, R-9.6, R-12, R-15)



To: Laurie Cropp, Homeowner  
cc: Richard Flake, RWF Homes

From: Kerrie McArthur

A handwritten signature in blue ink, appearing to read "Kerrie McArthur".

and

Christina Merten

A handwritten signature in blue ink, appearing to read "Christina Merten".

Date: April 18, 2017

**Re: 4803 Forest Ave SE Watercourse Evaluation**

Enclosures: Photo Appendix  
Online GIS Databases Results  
Topographic and Boundary Survey  
Modeling Results

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Confluence Environmental Company (Confluence) was contracted to conduct a watercourse evaluation on two properties located at 4803 Forest Ave SE, Mercer Island, Washington (Tax parcels 2577300021 and 4045000145). The watercourse evaluation was conducted to determine the presence and extend of any watercourse on the properties, as requested by the City of Mercer Island (City).

## **METHODS**

This section describes the methods used to evaluate the presence and extend of watercourses on the property.

### **Desktop Analysis**

Confluence searched online GIS databases to determine if others have identified watercourses on the property. The following online GIS databases were searched:

- Washington Department of Natural Resources Water Type GIS Database (DNR 2017)
- Washington Department of Fish and Wildlife Priority Habitat and Species GIS Database (WDFW 2015)

- King County iMAP Hydrology GIS Database (King County 2015)
- City IGS Database (Mercer Island 2017)

In addition, the Washington State Stream Catalog was also searched for records of a possible watercourse on the property (Williams et al 1975)

### **Site Visit**

On July 22, 2015, Confluence conducted a site visit to evaluate the site for the presence and extent of watercourses on the property. Confluence assessed the watercourse according to the City and Washington Administrative Code (WAC). The WAC defines the ordinary high water mark (OHWM) as “that mark that will be found by examining the bed and banks and ascertaining where the presence and action of waters are so common and usual, and so long continued in all ordinary years, as to mark upon the soil a character distinct from that of the abutting upland” (RCW 90.58.030). The Washington State Department of Ecology (Ecology) has published a guide (Olson and Stockdale 2010) to interpret the code and provide guidance for field OHWM determinations.

The City of Mercer Island City Code (MICC) defines watercourses as a course or route, formed by nature and generally consisting of a channel with a bed, banks, or sides throughout substantially all its length, along which surface waters, with some regularity (annually in the rainy season), naturally and normally flow in draining from higher to lower lands. This definition does not include irrigation and drainage ditches, grass-lined swales, canals, storm water runoff devices, or other courses unless they are used by fish or to convey waters that were naturally occurring prior to construction.

During the site visit, Confluence evaluated the property for indicators of OHWM, beds, banks, or any other indications that a watercourse was present.

### **Modeling**

Surface water runoff was analyzed for the contributing basin using the Western Washington Hydrologic Model 2012 (WWHM2012) (Clear Creek Solutions 2014) to determine what flows may have been seen prior to development and what flows are estimated through the current stormwater control system. Land use areas used for modeling the contributing basin were determined using aerial photo interpretation. The pre-developed and developed land covers were estimated using the 1936 and 2013 aerial photos on King County’s iMAP website, respectively (King County 2015a and 2015b).

## **RESULTS**

### **Desktop Analysis**

Several state and local databases were searched for the recorded presence of a watercourse on or adjacent to the property. Only one database, the City’s IGS database, identified a watercourse on the property. Confluence contacted the City’s GIS Department and requested the metadata used to create



the watercourse feature. According to the City's GIS Department, the watercourse feature was generated from a report prepared by Adolfson Associates, Inc. (2005) for the City. Adolfson Associates, Inc. (Adolfson) prepared the report to describe the watercourse inventory it conducted, and the peer review conducted for the City during the development of proposed updated to the MICC Chapter 19.07 that pertains to watercourses and wetlands. According to Adolfson, the watercourse inventories conducted in 2002 (by Watershed Company) and 2005 (by Adolfson) used GIS analysis of King County LIDAR imagery with limited field verifications. The GIS analysis takes topographic data from LIDAR and delineates basins and models watercourses within each of the basins. Field verifications of the GIS generated watercourses were limited to observations of watercourses made from public properties such as right of ways or parks.

According to Adolfson (2005), the watercourse mapped on the property was rated as "not rated". A "not rated" rating indicates that the GIS generated watercourse was not directly observed because the area either occurred on private property or the area was densely vegetated. Adolfson suggested that in the absence of direct observations, it should be assumed that the "not rated" GIS generated watercourses be identified as a Type III watercourse, unless direct observations result in a different rating; thus the Type III Watercourse rating in the City's GIS database.

### Site Visit

During the site visit, no signs of a stream or watercourses were observed on the properties. Photos of the site and relevant features are attached.

The eastern portion of the property is a vegetated slope, dominated by giant horsetail (*Equisetum giganteum*), English ivy (*Hedera helix*), Himalayan blackberry (*Rubus armeniacus*), field bindweed (*Convolvulus arvensis*) and big leaf maple (*Acer macrophyllum*) (Photo 1).

At the base of the hillslope is a concrete pond (Topographic and Boundary Survey; Photo 3). The inlet of the pond is a 6-inch diameter corrugated plastic pipe (Photo 4). The pipe extended upslope approximately 30 feet east before it was no longer observed (Photos 5 and 6). The inlet of the pipe was not found. The pipe appears to have been laid in the low spot of the hillslope. No visual indicators of a watercourse were identified adjacent to the pipe or upslope of where the pipe could be seen (Photos 5, 6, 7 and 8).

The pond discharges into another 6-inch diameter corrugated plastic pipe via a perched outlet pipe (Photos 2 and 3). This corrugated plastic pipe goes west approximately 20 feet where it discharges into a catch basin (Photo 9). Stormwater runoff from the garage and upper driveway also enter this catch basin. This catch basin enters Lake Washington via a 12-inch diameter corrugated metal pipe (Photo 10). Water from the house and lower driveway enter the 12-inch diameter corrugated metal pipe downslope of the catch basin. The outlet of this pipe is located above the ordinary high water of the lake, in the yard. Despite the collection and concentrated discharge of runoff, there are no indicators of a watercourse or stream between the pipe outlet and the lake.

## Modeling

Results from the analysis of the contributing basin based on WWHM<sub>2012</sub> are attached. Based on a review of the aerial photos and observations made during the site visit, the post-developed contributing basin is assumed to be slightly smaller than the pre-developed basin due to roof drains being routed outside of the contributing basin.

The WWHM<sub>2012</sub> model results show that annual peak flow into Lake Washington from the pre-developed basin ranged from 0.0021 cubic feet per second (cfs) to 0.0485 cfs for the period of record analyzed (1949 to 2009). Development of the basin has resulted in increased runoff due to increased impervious surface. These runoffs are now estimated to be in the range of 0.4719 cfs to 1.4141 cfs for the same period of record.

## DISCUSSION

Based on the desktop analysis, a Type III watercourse was mapped on the property. However, further investigation into the attribute data of the watercourse lead to the determination that the watercourse was a result of GIS and LIDAR analysis, was never field verified and a preliminary rating of Type III was given to the watercourse, on the recommendation of the Adolfsen report.

During the site visit, no watercourse was observed. Runoff from the hillslope is collected into a concrete pond and discharged to Lake Washington via a series of catch basins and pipes. In addition, runoff from the properties impervious surfaces (i.e. roof and driveway) is collected into this pipe system and discharged to the Lake. The lack of a visible watercourse at the outlet of the pipe indicated that despite this collection and concentrated discharge, there is not sufficient water volume to create a watercourse at the pipe outlet. If this water volume is insufficient to create a watercourse, which includes the site's impervious surface runoff, then the volume of water generated by the hillslope is not sufficient to generate a watercourse.

Based on model results using WWHM<sub>2012</sub>, stormwater runoff in the contributing basin would not have resulted in enough flow to create a defined water course. The stormwater control system that was observed during the field visit would be large enough to contain the majority of flows that would come from the developed house and driveway impervious surfaces. Therefore, it is not likely that a defined watercourse would have existed in this area prior to development and the development has been constructed such that the additional runoff from impervious surfaces is adequately contained.

In summary, the Type III watercourse mapped on the properties in the City's online IGS database was generated by GIS analysis and had not been field verified. Confluence did not observe any indicators of an ordinary high water mark or a watercourse. In addition, WWHM<sub>2012</sub> modeling of pre-development runoff in the basin indicates that the pre-development runoff from the basin was not sufficient to create a defined watercourse. Based on this analysis, there is no watercourse on the properties.

Ms. Laurie Cropp  
April 18, 2017



## REFERENCES

Clear Creek Solutions (Clear Creek Solutions, Inc.). 2014. Western Washington Hydrology Model 2012.

DNR (Washington Department of Natural Resources). 2017. Forest Practices Application Mapping Tool: Water Type Map for Township 24N, Range 4E, Section 24. Washington Department of Natural Resources, Forest Practices, Olympia, WA.

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King County. 2015. King County iMAP – 2013 air photo. King County GIS Center, Seattle WA.

<http://gismaps.kingcounty.gov/iMap/> (accessed August 3, 2015).

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Watershed Company. 2002. Use of Best Available Science in the City of Mercer Island Critical Areas Regulations for Watercourses and Wetlands. Prepared for the City of Mercer Island, WA by the Watershed Company, Kirkland, WA.

WDFW (Washington Department of Fish and Wildlife). 2015. PHS on the Web.

<http://wdfw.wa.gov/mapping/phs/> (accessed July 20, 2015)

Williams, R.W., R.M. Laramie, and J.J. Ames. 1975. A catalog of Washington streams and salmon utilization. Washington Department of Fisheries, Olympia, Washington.

1128-001 Cropp Watercourse memo 041817.doc

## PHOTO APPENDIX



Photo 1— View to east of hillside east of proposed development; where Mercer Island IGS has mapped watercourse.



Photo 2— View to west at toe of hillside, where Mercer Island IGS has mapped watercourse.



Photo 3— Concrete pond at toe of hillside. Screened, perched outlet in foreground.



Photo 4— Inlet of runoff collection basin. Note lack of channel.



Photo 5— Upslope of inlet pipe.



Photo 6— Upslope of inlet pipe with vegetation cleared. Note lack of channel.



Photo 7— Upslope of Photo 6. Note lack of channel



Photo 8— Upslope of Photo 7. Note lack of channel.



Photo 9— Catch basin collecting roof, driveway, and collection basin runoff.



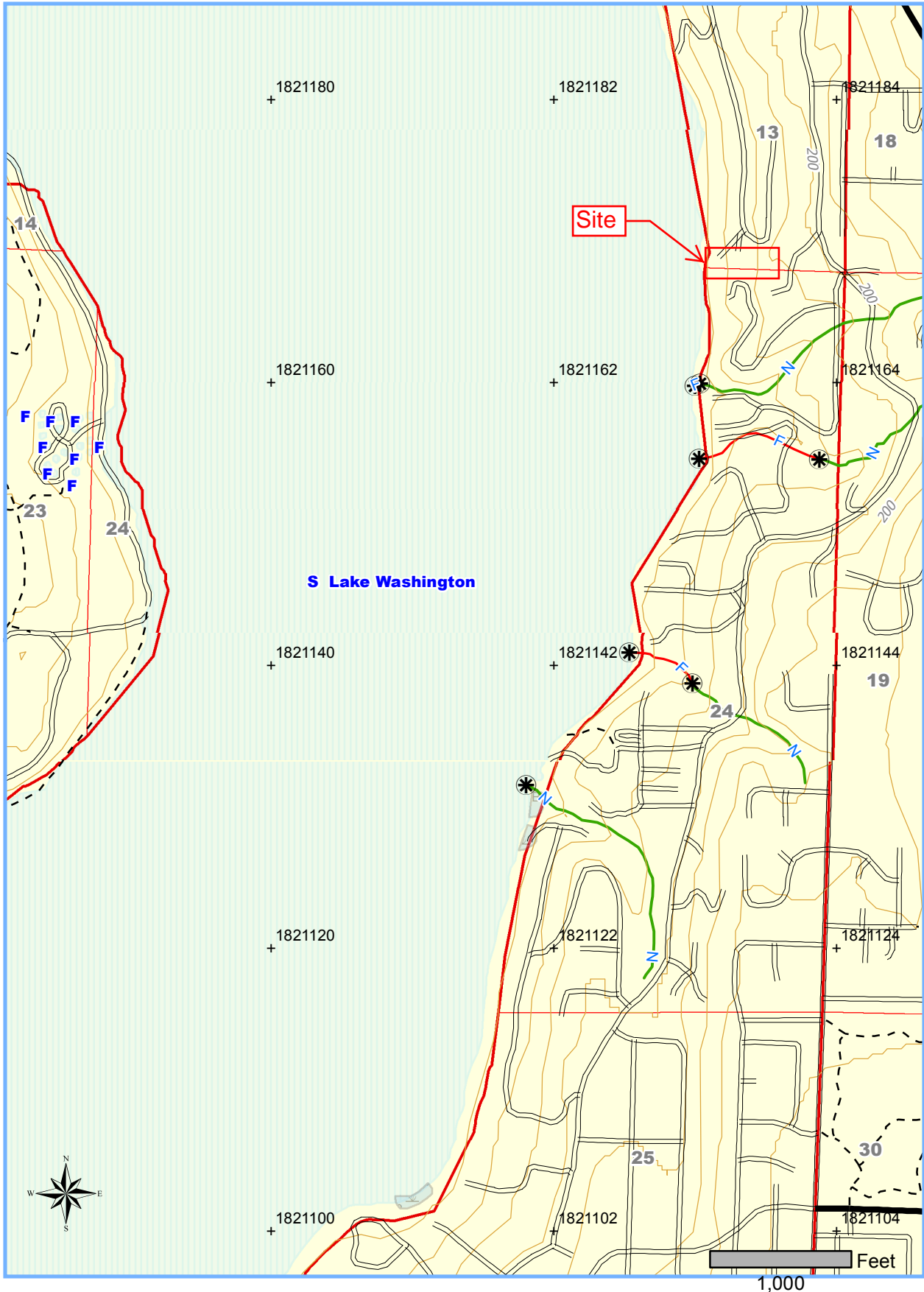
Photo 10— Outlet downslope of catch basin. Note lack of channel.



# FOREST PRACTICE WATER TYPE MAP

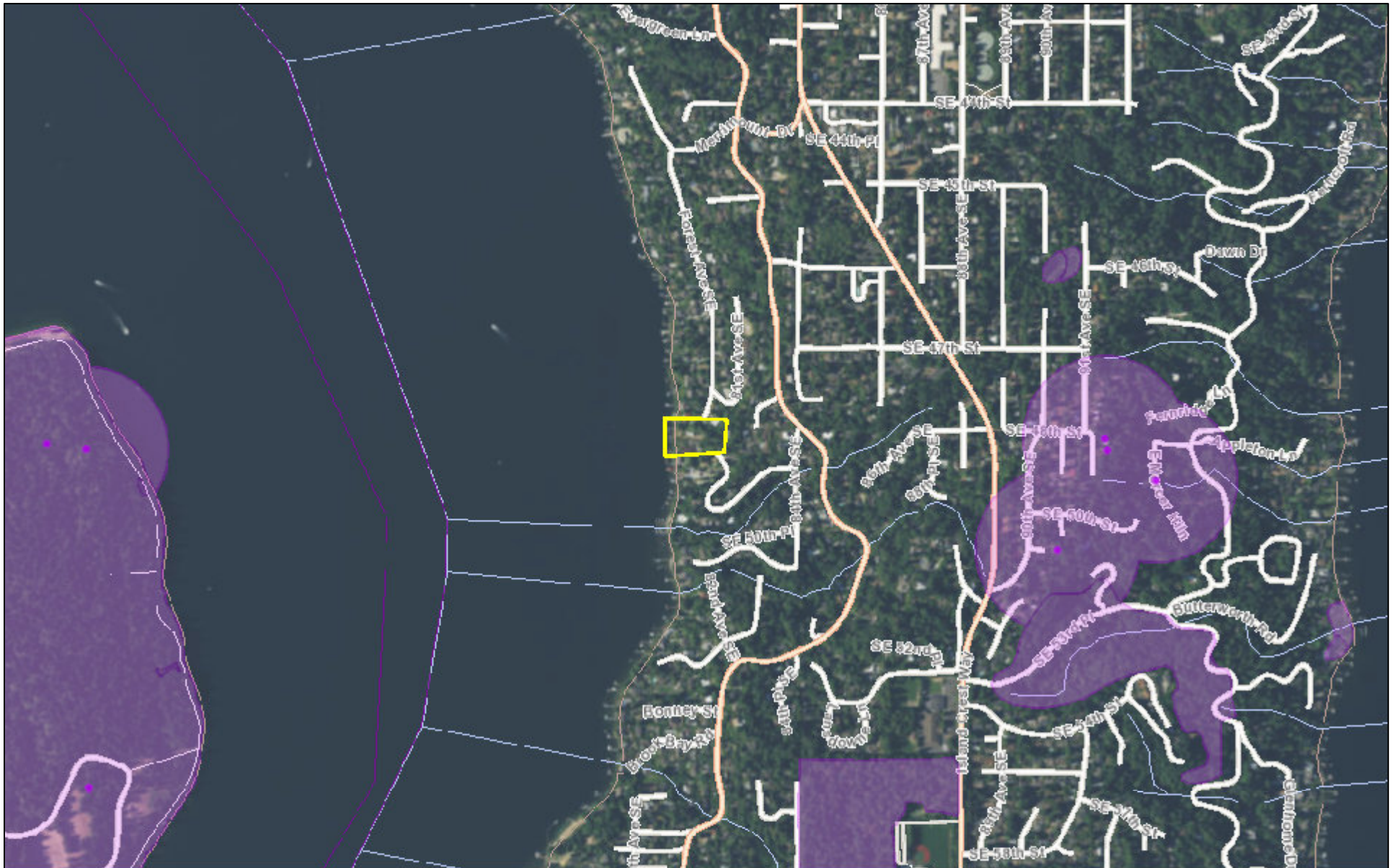
TOWNSHIP 24 NORTH HALF 0, RANGE 04 EAST (W.M.) HALF 0, SECTION 24

Application #: \_\_\_\_\_










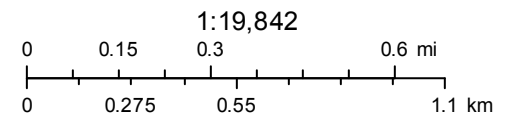
Date: 4/18/2017 Time: 1:23:48 PM  
NAD 83  
Contour Interval: 40 Feet

# WDFW Test Map



April 18, 2017

- |   |                      |   |   |   |          |
|---|----------------------|---|---|---|----------|
|  | PHS Report Clip Area | <b>POLY</b>   |  | QTR-TWP   |          |
|  | PT                   |  | AS MAPPED   |  | TOWNSHIP |
|  | LN                   |  | SECTION   |   |          |



Washington Fish and Wildlife  
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus



# WASHINGTON DEPARTMENT OF FISH AND WILDLIFE PRIORITY HABITATS AND SPECIES REPORT

SOURCE DATASET: PHSPublic  
REPORT DATE: 04/18/2017 1.43

Query ID: P170418134252

Common Name	Site Name	Priority Area	Accuracy	Federal Status	Sensitive Data	Source Entity
Scientific Name	Source Dataset	Occurrence Type		State Status	Resolution	Geometry Type
Notes	Source Record	More Information (URL)		PHS Listing Status		
	Source Date	Mgmt Recommendations				

DISCLAIMER. This report includes information that the Washington Department of Fish and Wildlife (WDFW) maintains in a central computer database. It is not an attempt to provide you with an official agency response as to the impacts of your project on fish and wildlife. This information only documents the location of fish and wildlife resources to the best of our knowledge. It is not a complete inventory and it is important to note that fish and wildlife resources may occur in areas not currently known to WDFW biologists, or in areas for which comprehensive surveys have not been conducted. Site specific surveys are frequently necessary to rule out the presence of priority resources. Locations of fish and wildlife resources are subject to variation caused by disturbance, changes in season and weather, and other factors. WDFW does not recommend using reports more than six months old.

# King County iMap

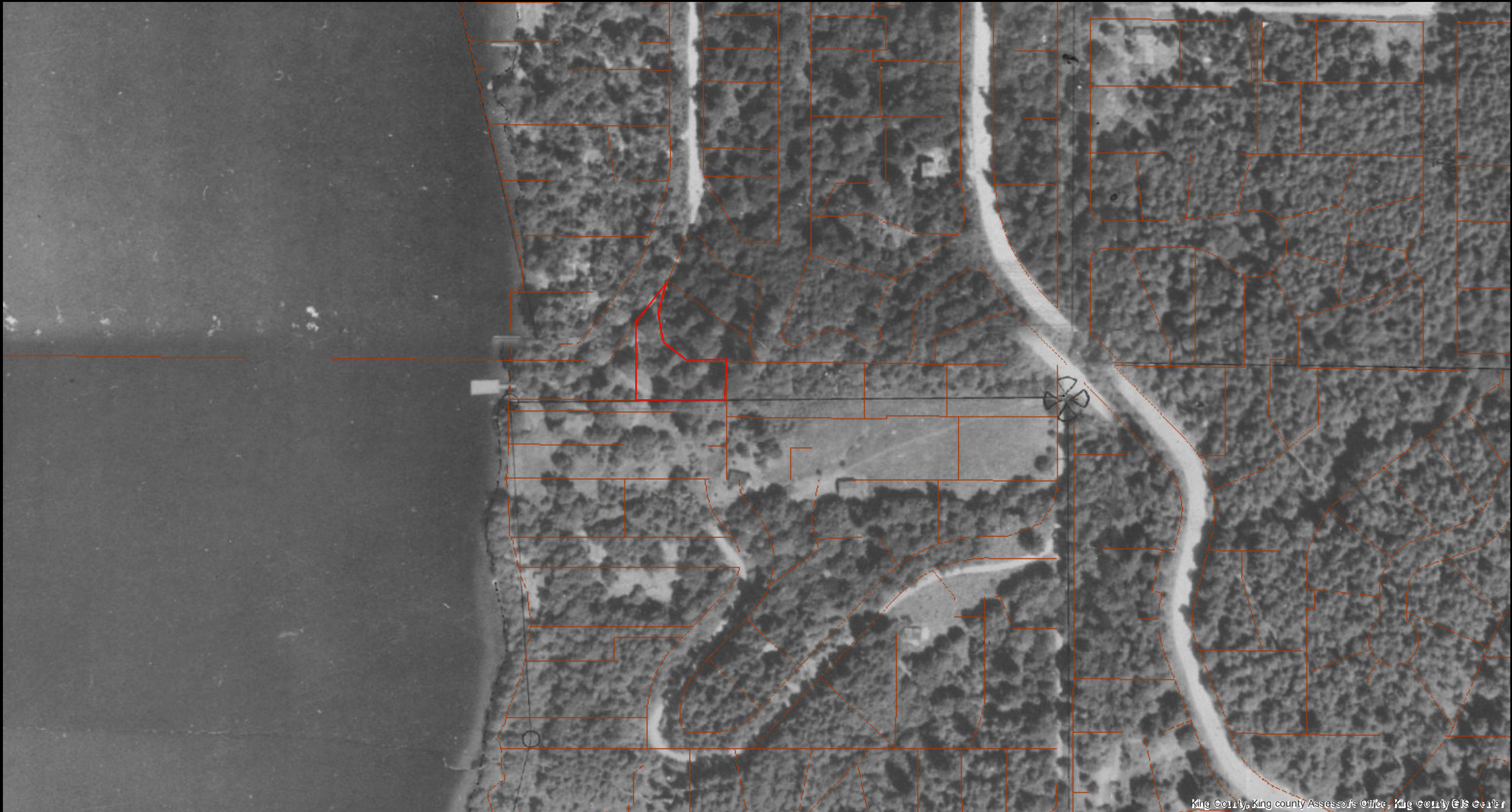


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Date: 8/3/2015

Notes:

# King County

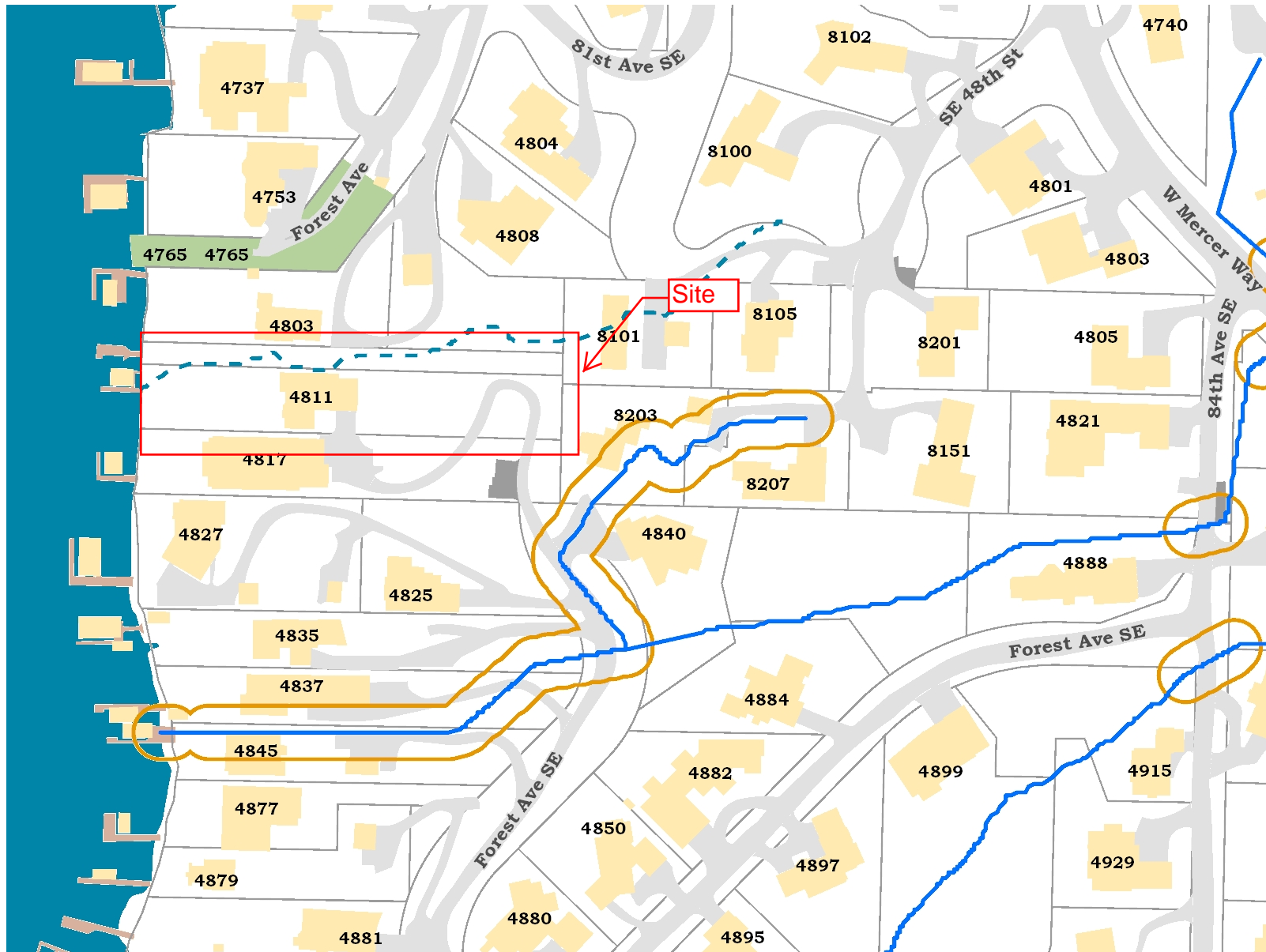


King County, King county Assessor's Office, King County GIS Center

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Date: 7/22/2015





**Legend**

- Eagle Nest
- Eagle Nest Buffer
  - 330 Ft
  - 660 Ft
- Watercourse
  - 1-Potential Fish Use
  - 2-Perennial
  - 3-Seasonal
- Piped WaterCourses 25ft Buffer
- Bridge
- Paved Road
- Streets
- SideWalk
- Paved Driveway
- Paved Parking Area
- Address
- Building
- Parcels
- Docks
- Parks

1:1,700



283.3                      0                      141.67                      283.3 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**

LEGAL DESCRIPTION



BASIS OF BEARINGS

PER PLAT OF LAKE ISLE CENTERLINE OF FOREST AVE SE BEARS N 00°05'56" W BETWEEN FOUND MONUMENTS.

REFERENCES

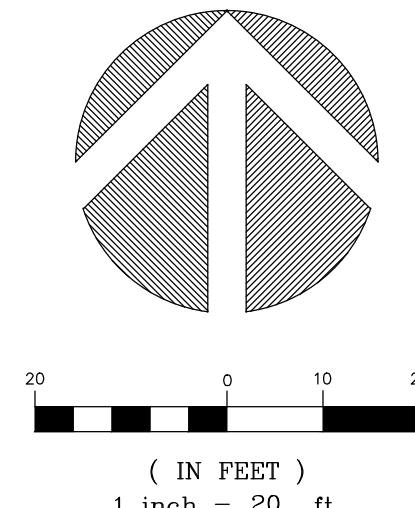
- LAKE ISLE, RECORDED IN VOL. 19 OF PLATS, PAGE 35, IN KING COUNTY, WASHINGTON.
- FLOODS ACRE GARDENS, RECORDED IN VOL. 7 OF PLATS, PAGE 26, IN KING COUNTY, WASHINGTON.

VERTICAL DATUM

PER US ARMY CORPS OF ENGINEERS MONITORING OF LAKE WASHINGTON - BALLARD DATUM

SURVEYOR'S NOTES

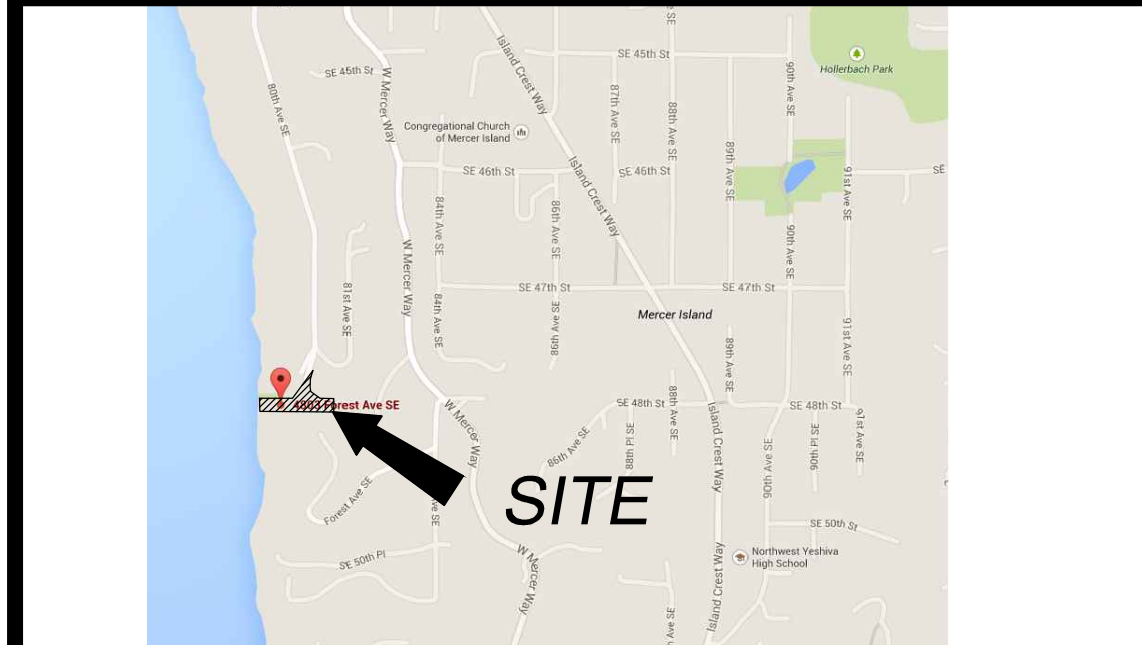
- THE TOPOGRAPHIC SURVEY SHOWN HEREON WAS PERFORMED IN MARCH OF 2015. THE FIELD DATA WAS COLLECTED AND RECORDED ON MAGNETIC MEDIA THROUGH AN ELECTRONIC THEODOLITE. THE DATA FILE IS ARCHIVED ON DISC OR CD. WRITTEN FIELD NOTES MAY NOT EXIST. CONTOURS ARE SHOWN FOR CONVENIENCE ONLY. DESIGN SHOULD RELY ON SPOT ELEVATIONS.
- BURIED UTILITIES SHOWN BASED ON RECORDS FURNISHED BY OTHERS AND VERIFIED WHERE POSSIBLE IN THE FIELD. GEODIMENSIONS ASSUMES NO LIABILITY FOR THE ACCURACY OF THOSE RECORDS OR ACCEPT RESPONSIBILITY FOR UNDERGROUND LINES WHICH ARE NOT MADE PUBLIC RECORD. FOR THE FINAL LOCATION OF EXISTING UTILITIES IN AREAS CRITICAL TO DESIGN CONTACT THE UTILITY OWNER/AGENCY. AS ALWAYS, CALL 1-800-424-5555 BEFORE CONSTRUCTION.
- SUBJECT PROPERTY TAX PARCEL NO. 404500-0145 & 257730-0021
- SUBJECT PROPERTY AREA PER THIS SURVEY IS MEASURED TO THE ORDINARY HIGH WATER LINE  
PARCEL NO. 404500-0145 = 14,656± S.F. (0.34 ACRES)  
PARCEL NO. 257730-0021 = 17,448± S.F. (0.40 ACRES)
- THIS SURVEY WAS PERFORMED WITHOUT THE BENEFIT OF A TITLE REPORT. EASEMENTS AND OTHER ENCUMBRANCES MAY EXIST THAT ARE NOT SHOWN HEREON.
- INSTRUMENTATION FOR THIS SURVEY WAS A TRIMBLE ELECTRONIC DISTANCE MEASURING UNIT. PROCEDURES USED IN THIS SURVEY WERE DIRECT AND REVERSE ANGLES, NO CORRECTION NECESSARY. MEETS STATE STANDARDS SET BY WAC 332-130-090.



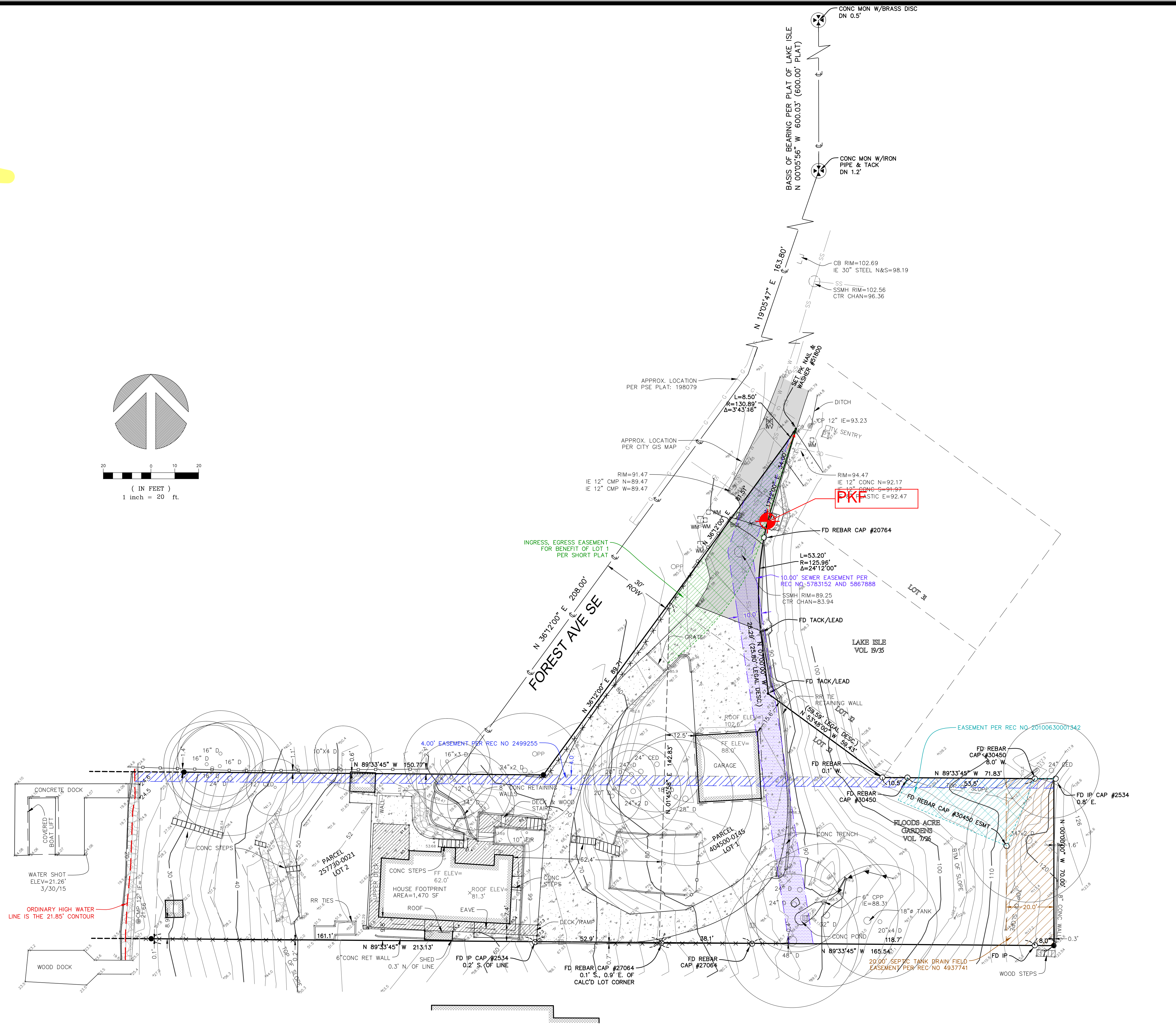
LEGEND

	AREA DRAIN		PIPE END
	ASPHALT SURFACE		POWER METER
	BOLLARD		POWER TRANSFORMER
	BUILDING		REBAR AS NOTED-FOUND
	CENTERLINE ROW		REBAR & CAP-SET (L.S. #51800)
	CONCRETE SURFACE		ROCKERY
	CONCRETE WALL		SEWER LINE
	DECK		SEWER MAINTENANCE
	DITCH (FLOWLINE)		STORM DRAIN LINE
	FENCE LINE (CHAIN LINK)		TREE (W/D RIP LINE)
	FENCE LINE (WOOD)		WATER LINE
	GAS LINE		WATER METER (FOUND)
	INLET (STORM DRAIN)		WATER VALVE
	IRON PIPE (FOUND)		
	NAIL AS NOTED		
	MAIL BOX		
	MAINTENANCE HOLE		
	MONUMENT IN CASE (FOUND)		

VICINITY MAP  
N.T.S.



TOPOGRAPHIC & BOUNDARY SURVEY



measure success

TOPOGRAPHIC & BOUNDARY SURVEY  
SE 1/4 OF THE SE 1/4 OF SEC. 13, TWP. 24N., RGE. 4E., W.M.  
TAX PARCEL NO. 257730-0021 & 404500-0145

CROPP RESIDENCE  
4803 FOREST AVE SE  
MERCER ISLAND, WA



**GeoDimensions**  
GeoDimensions, Inc., 10801 Main Street, Suite 102, Bellevue, WA 98004  
support@geodimensions.net  
phone 425-458-4488  
www.geodimensions.net

JOB NUMBER:	150317
DATE:	4/2/15
DRAFTED BY:	TLR
CHECKED BY:	SRM
SCALE:	1"= 20'
REVISION HISTORY	
SHEET NUMBER	
1 OF 1	

**WWHM2012**  
**PROJECT REPORT**



## General Model Information

Project Name: default[1]  
Site Name: Cropp  
Site Address: 4803 Forest Ave SE  
City: Mercer Island  
Report Date: 8/4/2015  
Gage: Seatac  
Data Start: 1948/10/01  
Data End: 2009/09/30  
Timestep: 15 Minute  
Precip Scale: 1.00  
Version: 2014/09/12

## POC Thresholds

---

Low Flow Threshold for POC1: 50 Percent of the 2 Year  
High Flow Threshold for POC1: 50 Year

---

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## Landuse Basin Data

### Predeveloped Land Use

#### Forest Avenue

Bypass: No

GroundWater: No

Pervious Land Use Acres

A B, Forest, Mod 3.32

A B, Pasture, Flat 0.22

Pervious Total 3.54

Impervious Land Use Acres

Impervious Total 0

Basin Total 3.54

Element Flows To:  
Surface

Interflow

Groundwater

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## Mitigated Land Use

### Forest Avenue

Bypass: No

GroundWater: No

Pervious Land Use Acres

A B, Forest, Mod 1.49

A B, Pasture, Flat 0.12

Pervious Total 1.61

Impervious Land Use Acres

ROADS MOD 0.5

ROOF TOPS FLAT 0.86

DRIVEWAYS MOD 0.36

Impervious Total 1.72

Basin Total 3.33

Element Flows To:

Surface

Interflow

Groundwater

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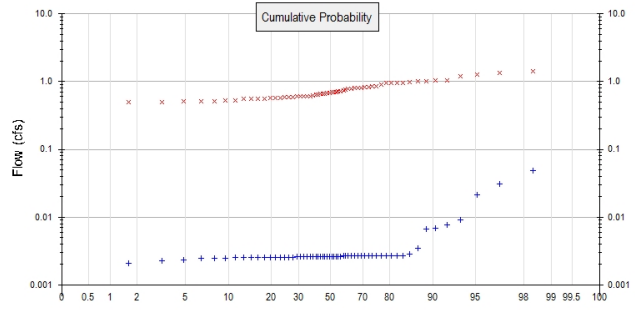
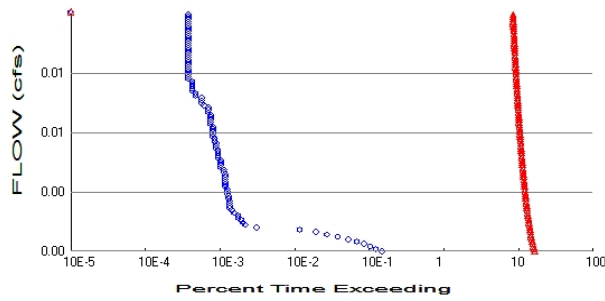
*Routing Elements*  
*Predeveloped Routing*

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# Analysis Results

## POC 1



+ Predeveloped    x Mitigated

### Predeveloped Landuse Totals for POC #1

Total Pervious Area: 3.54  
Total Impervious Area: 0

### Mitigated Landuse Totals for POC #1

Total Pervious Area: 1.61  
Total Impervious Area: 1.72

Flow Frequency Method: Log Pearson Type III 17B

### Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	Flow(cfs)
2 year	0.00293
5 year	0.00505
10 year	0.006999
25 year	0.010244
50 year	0.013347
100 year	0.017148

### Flow Frequency Return Periods for Mitigated. POC #1

Return Period	Flow(cfs)
2 year	0.704983
5 year	0.893351
10 year	1.021653
25 year	1.188403
50 year	1.316248
100 year	1.447373

## Annual Peaks

### Annual Peaks for Predeveloped and Mitigated. POC #1

Year	Predeveloped	Mitigated
1949	0.002	0.908
1950	0.009	0.963
1951	0.008	0.554
1952	0.003	0.472
1953	0.003	0.554
1954	0.003	0.567
1955	0.003	0.669
1956	0.003	0.609
1957	0.003	0.695
1958	0.003	0.583

1959	0.003	0.622
1960	0.003	0.600
1961	0.003	0.586
1962	0.003	0.526
1963	0.003	0.608
1964	0.003	0.604
1965	0.003	0.711
1966	0.003	0.491
1967	0.003	0.841
1968	0.003	1.042
1969	0.003	0.652
1970	0.003	0.653
1971	0.003	0.787
1972	0.021	0.762
1973	0.003	0.505
1974	0.003	0.727
1975	0.003	0.803
1976	0.003	0.575
1977	0.002	0.596
1978	0.003	0.810
1979	0.002	1.032
1980	0.003	0.986
1981	0.003	0.709
1982	0.003	1.006
1983	0.003	0.828
1984	0.003	0.504
1985	0.003	0.690
1986	0.002	0.611
1987	0.003	0.950
1988	0.003	0.581
1989	0.003	0.863
1990	0.003	1.189
1991	0.007	1.003
1992	0.003	0.507
1993	0.002	0.559
1994	0.003	0.527
1995	0.003	0.636
1996	0.031	0.749
1997	0.003	0.648
1998	0.003	0.676
1999	0.007	1.414
2000	0.002	0.676
2001	0.003	0.797
2002	0.003	0.837
2003	0.003	0.776
2004	0.003	1.351
2005	0.003	0.563
2006	0.003	0.515
2007	0.048	1.267
2008	0.003	0.953
2009	0.003	0.957

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### Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	0.0485	1.4141
2	0.0306	1.3507
3	0.0211	1.2673

4	0.0092	1.1891
5	0.0077	1.0421
6	0.0069	1.0316
7	0.0066	1.0065
8	0.0035	1.0026
9	0.0028	0.9855
10	0.0027	0.9633
11	0.0027	0.9573
12	0.0027	0.9529
13	0.0027	0.9501
14	0.0027	0.9079
15	0.0027	0.8630
16	0.0027	0.8412
17	0.0027	0.8373
18	0.0027	0.8281
19	0.0027	0.8098
20	0.0027	0.8031
21	0.0027	0.7971
22	0.0027	0.7874
23	0.0027	0.7761
24	0.0027	0.7623
25	0.0027	0.7494
26	0.0026	0.7267
27	0.0026	0.7113
28	0.0026	0.7090
29	0.0026	0.6953
30	0.0026	0.6902
31	0.0026	0.6760
32	0.0026	0.6756
33	0.0026	0.6688
34	0.0026	0.6532
35	0.0026	0.6524
36	0.0026	0.6483
37	0.0026	0.6364
38	0.0026	0.6220
39	0.0026	0.6111
40	0.0026	0.6089
41	0.0026	0.6079
42	0.0026	0.6045
43	0.0026	0.6002
44	0.0026	0.5959
45	0.0026	0.5855
46	0.0026	0.5832
47	0.0026	0.5811
48	0.0026	0.5745
49	0.0026	0.5672
50	0.0025	0.5634
51	0.0025	0.5592
52	0.0025	0.5538
53	0.0025	0.5535
54	0.0025	0.5272
55	0.0025	0.5262
56	0.0025	0.5153
57	0.0025	0.5070
58	0.0024	0.5051
59	0.0022	0.5035
60	0.0021	0.4910
61	0.0021	0.4719

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## Duration Flows

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0015	3136	349707	11151	Fail
0.0016	2609	343076	13149	Fail
0.0017	2186	337087	15420	Fail
0.0018	1798	331526	18438	Fail
0.0019	1450	326393	22509	Fail
0.0021	1116	321260	28786	Fail
0.0022	808	316768	39203	Fail
0.0023	580	312490	53877	Fail
0.0024	407	308426	75780	Fail
0.0025	249	304577	122320	Fail
0.0027	65	300940	462984	Fail
0.0028	46	297518	646778	Fail
0.0029	43	294096	683944	Fail
0.0030	41	290888	709482	Fail
0.0031	37	287893	778089	Fail
0.0033	37	284899	769997	Fail
0.0034	33	282118	854903	Fail
0.0035	31	279552	901780	Fail
0.0036	29	276985	955120	Fail
0.0037	29	274418	946268	Fail
0.0039	29	272066	938158	Fail
0.0040	29	269713	930044	Fail
0.0041	28	267360	954857	Fail
0.0042	28	265221	947217	Fail
0.0043	27	263082	974377	Fail
0.0045	27	260943	966455	Fail
0.0046	27	259018	959325	Fail
0.0047	25	257093	1028372	Fail
0.0048	25	254954	1019816	Fail
0.0049	25	253243	1012972	Fail
0.0051	25	251318	1005272	Fail
0.0052	25	249607	998428	Fail
0.0053	25	247896	991584	Fail
0.0054	24	246185	1025770	Fail
0.0055	24	244474	1018641	Fail
0.0057	22	242977	1104440	Fail
0.0058	22	241266	1096663	Fail
0.0059	22	239768	1089854	Fail
0.0060	22	238271	1083050	Fail
0.0061	20	236774	1183870	Fail
0.0063	20	235277	1176385	Fail
0.0064	20	233993	1169965	Fail
0.0065	20	232496	1162480	Fail
0.0066	19	231213	1216910	Fail
0.0067	19	229716	1209031	Fail
0.0069	19	228432	1202273	Fail
0.0070	18	227149	1261938	Fail
0.0071	18	225866	1254811	Fail
0.0072	17	224796	1322329	Fail
0.0073	17	223513	1314782	Fail
0.0075	17	222230	1307235	Fail
0.0076	17	221160	1300941	Fail
0.0077	17	219877	1293394	Fail
0.0078	16	218807	1367543	Fail

0.0079	16	217524	1359525	Fail
0.0081	16	216455	1352843	Fail
0.0082	16	215385	1346156	Fail
0.0083	16	214316	1339475	Fail
0.0084	15	213246	1421640	Fail
0.0085	15	212156	1414373	Fail
0.0087	15	211193	1407953	Fail
0.0088	13	210188	1616830	Fail
0.0089	12	209204	1743366	Fail
0.0090	12	208177	1734808	Fail
0.0091	12	207172	1726433	Fail
0.0093	10	206209	2062090	Fail
0.0094	10	205247	2052469	Fail
0.0095	9	204263	2269588	Fail
0.0096	9	203343	2259366	Fail
0.0097	9	202445	2249388	Fail
0.0099	9	201525	2239166	Fail
0.0100	9	200670	2229666	Fail
0.0101	8	199814	2497675	Fail
0.0102	8	198937	2486712	Fail
0.0103	8	198103	2476287	Fail
0.0105	8	197312	2466400	Fail
0.0106	8	196371	2454637	Fail
0.0107	8	195494	2443675	Fail
0.0108	8	194638	2432975	Fail
0.0109	8	193804	2422550	Fail
0.0111	8	193034	2412925	Fail
0.0112	8	192200	2402500	Fail
0.0113	8	191344	2391800	Fail
0.0114	8	190617	2382712	Fail
0.0115	8	189783	2372287	Fail
0.0117	8	189013	2362662	Fail
0.0118	8	188307	2353837	Fail
0.0119	8	187558	2344475	Fail
0.0120	8	186831	2335387	Fail
0.0121	8	186083	2326037	Fail
0.0123	8	185313	2316412	Fail
0.0124	8	184628	2307850	Fail
0.0125	8	183922	2299025	Fail
0.0126	8	183216	2290200	Fail
0.0127	8	182511	2281387	Fail
0.0129	8	181805	2272562	Fail
0.0130	8	181099	2263737	Fail
0.0131	8	180350	2254375	Fail
0.0132	8	179730	2246625	Fail
0.0133	8	179046	2238075	Fail

The development has an increase in flow durations from 1/2 Predeveloped 2 year flow to the 2 year flow or more than a 10% increase from the 2 year to the 50 year flow.

The development has an increase in flow durations for more than 50% of the flows for the range of the duration analysis.

## Water Quality

Water Quality BMP Flow and Volume for POC #1

On-line facility volume: 0 acre-feet

On-line facility target flow: 0 cfs.

Adjusted for 15 min: 0 cfs.

Off-line facility target flow: 0 cfs.

Adjusted for 15 min: 0 cfs.

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## *Model Default Modifications*

Total of 0 changes have been made.

### *PERLND Changes*

No PERLND changes have been made.

### *IMPLND Changes*

No IMPLND changes have been made.

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*Appendix*  
*Predeveloped Schematic*



Mitigated Schematic





# Predeveloped UCI File

RUN

GLOBAL

```
WVHM4 model simulation
START      1948 10 01      END      2009 09 30
RUN INTERP OUTPUT LEVEL   3      0
RESUME     0 RUN         1
UNIT SYSTEM 1
```

END GLOBAL

FILES

```
<File> <Un#> <-----File Name----->***
<-ID->                                     ***
WDM      26      default[1].wdm
MESSU    25      Predefault[1].MES
          27      Predefault[1].L61
          28      Predefault[1].L62
          30      POCdefault[1]1.dat
```

END FILES

OPN SEQUENCE

```
INGRP          INDELT 00:15
  PERLND        2
  PERLND        4
  COPY          501
  DISPLY        1
```

END INGRP

END OPN SEQUENCE

DISPLY

DISPLY-INFO1

```
# - #<-----Title----->***TRAN PIVL DIG1 FIL1 PYR DIG2 FIL2 YRND
1   Forest Avenue          MAX          1   2   30   9
```

END DISPLY-INFO1

END DISPLY

COPY

TIMESERIES

```
# - # NPT NMN ***
1   1   1
501 1   1
```

END TIMESERIES

END COPY

GENER

OPCODE

```
# # OPCD ***
```

END OPCODE

PARM

```
# # K ***
```

END PARM

END GENER

PERLND

GEN-INFO

```
<PLS ><-----Name----->NBLKS Unit-systems Printer ***
# - # User t-series Engl Metr ***
          in out ***
2   A/B, Forest, Mod      1   1   1   1   27   0
4   A/B, Pasture, Flat    1   1   1   1   27   0
```

END GEN-INFO

\*\*\* Section PWATER\*\*\*

ACTIVITY

```
<PLS > ***** Active Sections *****
# - # ATMP SNOW PWAT SED PST PWG PQAL MSTL PEST NITR PHOS TRAC ***
2   0   0   1   0   0   0   0   0   0   0   0   0
4   0   0   1   0   0   0   0   0   0   0   0   0
```

END ACTIVITY

PRINT-INFO

```
<PLS > ***** Print-flags ***** PIVL PYR
# - # ATMP SNOW PWAT SED PST PWG PQAL MSTL PEST NITR PHOS TRAC *****
```

```

2      0  0  4  0  0  0  0  0  0  0  0  0  1  9
4      0  0  4  0  0  0  0  0  0  0  0  0  1  9
END PRINT-INFO

```

```

PWAT-PARM1
<PLS > PWATER variable monthly parameter value flags ***
# - # CSNO RTOP UZFG VCS VUZ VNN VIFW VIRC VLE INFC HWT ***
2      0  0  0  0  0  0  0  0  0  0  0  0
4      0  0  0  0  0  0  0  0  0  0  0  0
END PWAT-PARM1

```

```

PWAT-PARM2
<PLS > PWATER input info: Part 2 ***
# - # ***FOREST LZSN INFILT LSUR SLSUR KVARY AGWRC
2      0  5  2  400 0.1 0.3 0.996
4      0  5  1.5 400 0.05 0.3 0.996
END PWAT-PARM2

```

```

PWAT-PARM3
<PLS > PWATER input info: Part 3 ***
# - # ***PETMAX PETMIN INFEXP INFILD DEEPFR BASETP AGWETP
2      0  0  2  2  0  0  0
4      0  0  2  2  0  0  0
END PWAT-PARM3

```

```

PWAT-PARM4
<PLS > PWATER input info: Part 4 ***
# - # CEPSC UZSN NSUR INTFW IRC LZETP ***
2      0.2 0.5 0.35 0 0.7 0.7
4      0.15 0.5 0.3 0 0.7 0.4
END PWAT-PARM4

```

```

PWAT-STATE1
<PLS > *** Initial conditions at start of simulation
ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
# - # *** CEPS SURS UZS IFWS LZS AGWS GWVS
2      0  0  0  0  3  1  0
4      0  0  0  0  3  1  0
END PWAT-STATE1

```

END PERLND

IMPLND

```

GEN-INFO
<PLS ><-----Name-----> Unit-systems Printer ***
# - # User t-series Engl Metr ***
in out ***
END GEN-INFO
*** Section IWATER***

```

```

ACTIVITY
<PLS > ***** Active Sections *****
# - # ATMP SNOW IWAT SLD IWG IQAL ***
END ACTIVITY

```

```

PRINT-INFO
<ILS > ***** Print-flags ***** PIVL PYR
# - # ATMP SNOW IWAT SLD IWG IQAL *****
END PRINT-INFO

```

```

IWAT-PARM1
<PLS > IWATER variable monthly parameter value flags ***
# - # CSNO RTOP VRS VNN RTLI ***
END IWAT-PARM1

```

```

IWAT-PARM2
<PLS > IWATER input info: Part 2 ***
# - # *** LSUR SLSUR NSUR RETSC
END IWAT-PARM2

```

IWAT-PARM3



SPEC-ACTIONS  
 END SPEC-ACTIONS  
 FTABLES  
 END FTABLES

EXT SOURCES

<-Volume->	<Member>	SsysSgap	<--Mult-->	Tran	<-Target vols>	<-Grp>	<-Member->	***
<Name>	#	<Name>	#	tem strg	<-factor->	strg	<Name>	# # ***
WDM	2	PREC		ENGL	1		PERLND	1 999 EXTNL PREC
WDM	2	PREC		ENGL	1		IMPLND	1 999 EXTNL PREC
WDM	1	EVAP		ENGL	0.76		PERLND	1 999 EXTNL PETINP
WDM	1	EVAP		ENGL	0.76		IMPLND	1 999 EXTNL PETINP

END EXT SOURCES

EXT TARGETS

<-Volume->	<-Grp>	<-Member->	<--Mult-->	Tran	<-Volume->	<Member>	Tsys	Tgap	Amd	***
<Name>	#	<Name>	#	#<-factor->	strg	<Name>	#	<Name>	tem strg	strg***
COPY	501	OUTPUT	MEAN	1 1	48.4	WDM	501	FLOW	ENGL	REPL

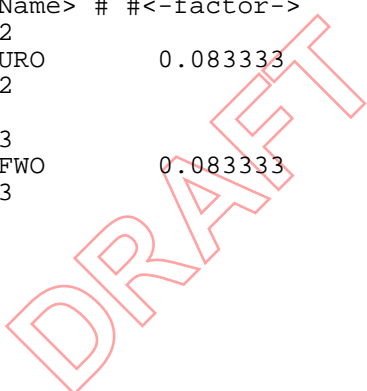
END EXT TARGETS

MASS-LINK

<Volume>	<-Grp>	<-Member->	<--Mult-->	<Target>	<-Grp>	<-Member->	***
<Name>	#	<Name>	#	#<-factor->	<Name>	#	#***
MASS-LINK			12				
PERLND	PWATER	SURO		0.083333	COPY	INPUT	MEAN
END MASS-LINK			12				
MASS-LINK			13				
PERLND	PWATER	IFWO		0.083333	COPY	INPUT	MEAN
END MASS-LINK			13				

END MASS-LINK

END RUN



# Mitigated UCI File

RUN

GLOBAL

```
WVHM4 model simulation
START      1948 10 01      END      2009 09 30
RUN INTERP OUTPUT LEVEL   3      0
RESUME     0 RUN         1
UNIT SYSTEM                1
END GLOBAL
```

FILES

```
<File> <Un#> <-----File Name----->***
<-ID->                                     ***
WDM      26      default[1].wdm
MESSU    25      Mitdefault[1].MES
          27      Mitdefault[1].L61
          28      Mitdefault[1].L62
          30      POCdefault[1]1.dat
END FILES
```

OPN SEQUENCE

```
INGRP                INDELT 00:15
  PERLND              2
  PERLND              4
  IMPLND              2
  IMPLND              4
  IMPLND              6
  COPY                501
  DISPLY              1
END INGRP
```

END OPN SEQUENCE

DISPLY

```
DISPLY-INFO1
# - #<-----Title----->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
1   Forest Avenue          MAX          1   2   30   9
END DISPLY-INFO1
```

END DISPLY

COPY

```
TIMESERIES
# - # NPT NMN ***
1   1   1
501 1   1
END TIMESERIES
```

END COPY

GENER

```
OPCODE
#   # OPCD ***
END OPCODE
PARM
#   #           K ***
END PARM
```

END GENER

PERLND

```
GEN-INFO
<PLS ><-----Name----->NBLKS  Unit-systems  Printer ***
# - #                               User  t-series  Engl Metr ***
                               in  out
2   A/B, Forest, Mod           1   1   1   1   27   0
4   A/B, Pasture, Flat         1   1   1   1   27   0
END GEN-INFO
*** Section PWATER***
```

ACTIVITY

```
<PLS > ***** Active Sections *****
# - # ATMP SNOW PWAT  SED  PST  PWG  PQAL MSTL  PEST  NITR  PHOS  TRAC ***
2   0   0   1   0   0   0   0   0   0   0   0   0
4   0   0   1   0   0   0   0   0   0   0   0   0
END ACTIVITY
```

```

PRINT-INFO
<PLS > ***** Print-flags ***** PIVL  PYR
# - # ATMP SNOW PWAT  SED  PST  PWG  PQAL MSTL PEST NITR PHOS TRAC  *****
2     0    0    4    0    0    0    0    0    0    0    0    0    0    1    9
4     0    0    4    0    0    0    0    0    0    0    0    0    0    1    9
END PRINT-INFO

```

```

PWAT-PARM1
<PLS >  PWATER variable monthly parameter value flags ***
# - # CSNO RTOP UZFG  VCS  VUZ  VNM VIFW VIRC  VLE INFC  HWT ***
2     0    0    0    0    0    0    0    0    0    0    0
4     0    0    0    0    0    0    0    0    0    0    0
END PWAT-PARM1

```

```

PWAT-PARM2
<PLS >      PWATER input info: Part 2          ***
# - # ***FOREST      LZSN      INFILT      LSUR      SLSUR      KVARY      AGWRC
2     0            5            2            400      0.1        0.3        0.996
4     0            5            1.5          400      0.05       0.3        0.996
END PWAT-PARM2

```

```

PWAT-PARM3
<PLS >      PWATER input info: Part 3          ***
# - # ***PETMAX      PETMIN      INFEXP      INFILD      DEEPFR      BASETP      AGWETP
2     0            0            2            2            0            0            0
4     0            0            2            2            0            0            0
END PWAT-PARM3

```

```

PWAT-PARM4
<PLS >      PWATER input info: Part 4          ***
# - #      CEPSC      UZSN      NSUR      INTFW      IRC      LZETP ***
2     0.2          0.5      0.35      0          0.7      0.7
4     0.15        0.5      0.3       0          0.7      0.4
END PWAT-PARM4

```

```

PWAT-STATE1
<PLS > *** Initial conditions at start of simulation
ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
# - # *** CEPS  SURS  UZS  IFWS  LZS  AGWS  GWVS
2     0      0      0      0      3      1      0
4     0      0      0      0      3      1      0
END PWAT-STATE1

```

END PERLND

IMPLND

```

GEN-INFO
<PLS ><-----Name----->  Unit-systems  Printer ***
# - #      User  t-series  Engl Metr ***
           in  out
2     ROADS/MOD      1    1    1    27    0
4     ROOF TOPS/FLAT  1    1    1    27    0
6     DRIVEWAYS/MOD   1    1    1    27    0
END GEN-INFO
*** Section IWATER***

```

```

ACTIVITY
<PLS > ***** Active Sections *****
# - # ATMP SNOW IWAT  SLD  IWG IQAL  ***
2     0    0    1    0    0    0
4     0    0    1    0    0    0
6     0    0    1    0    0    0
END ACTIVITY

```

```

PRINT-INFO
<ILS > ***** Print-flags ***** PIVL  PYR
# - # ATMP SNOW IWAT  SLD  IWG IQAL  *****
2     0    0    4    0    0    0    1    9
4     0    0    4    0    0    0    1    9
6     0    0    4    0    0    0    1    9
END PRINT-INFO

```

```

IWAT-PARM1
<PLS > IWATER variable monthly parameter value flags ***
# - # CSNO RTOP VRS VNN RTLI ***
2 0 0 0 0 0
4 0 0 0 0 0
6 0 0 0 0 0
END IWAT-PARM1

```

```

IWAT-PARM2
<PLS > IWATER input info: Part 2 ***
# - # *** LSUR SLSUR NSUR RETSC
2 400 0.05 0.1 0.08
4 400 0.01 0.1 0.1
6 400 0.05 0.1 0.08
END IWAT-PARM2

```

```

IWAT-PARM3
<PLS > IWATER input info: Part 3 ***
# - # ***PETMAX PETMIN
2 0 0
4 0 0
6 0 0
END IWAT-PARM3

```

```

IWAT-STATE1
<PLS > *** Initial conditions at start of simulation
# - # *** RETS SURS
2 0 0
4 0 0
6 0 0
END IWAT-STATE1

```

END IMPLND

```

SCHEMATIC
<-Source-> <--Area--> <-Target-> MBLK ***
<Name> # <-factor-> <Name> # Tbl# ***
Forest Avenue***
PERLND 2 1.49 COPY 501 12
PERLND 2 1.49 COPY 501 13
PERLND 4 0.12 COPY 501 12
PERLND 4 0.12 COPY 501 13
IMPLND 2 0.5 COPY 501 15
IMPLND 4 0.86 COPY 501 15
IMPLND 6 0.36 COPY 501 15

```

```

*****Routing*****
END SCHEMATIC

```

```

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member-> ***
<Name> # <Name> # #<-factor->strg <Name> # # <Name> # # ***
COPY 501 OUTPUT MEAN 1 1 48.4 DISPLY 1 INPUT TIMSER 1

```

```

<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member-> ***
<Name> # <Name> # #<-factor->strg <Name> # # <Name> # # ***
END NETWORK

```

```

RCHRES
GEN-INFO
RCHRES Name Nexits Unit Systems Printer ***
# - #<-----><----> User T-series Engl Metr LKFG ***
in out ***
END GEN-INFO
*** Section RCHRES***

```

ACTIVITY

```

<PLS > ***** Active Sections *****
# - # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
END ACTIVITY

PRINT-INFO
<PLS > ***** Print-flags ***** PIVL  PYR
# - # HYDR ADCA CONS HEAT  SED  GQL  OXRX NUTR PLNK PHCB PIVL  PYR  *****
END PRINT-INFO

HYDR-PARM1
RCHRES  Flags for each HYDR Section *****
# - # VC A1 A2 A3  ODFVFG for each *** ODGTFG for each  FUNCT for each
      FG FG FG FG  possible exit *** possible exit  possible exit
      * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
END HYDR-PARM1

HYDR-PARM2
# - # FTABNO          LEN          DELTH          STCOR          KS          DB50          ***
<-----><-----><-----><-----><-----><-----><-----><----->
END HYDR-PARM2

HYDR-INIT
RCHRES  Initial conditions for each HYDR section *****
# - # *** VOL          Initial value of COLIND          Initial value of OUTDGT
      *** ac-ft          for each possible exit          for each possible exit
<-----><----->          <-----><-----><-----><----->          *** <-----><-----><-----><----->
END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member-> ***
<Name> # <Name> # tem strg<-factor->strg <Name> # # <Name> # # ***
WDM      2 PREC      ENGL      1          PERLND  1 999 EXTNL  PREC
WDM      2 PREC      ENGL      1          IMPLND  1 999 EXTNL  PREC
WDM      1 EVAP      ENGL      0.76      PERLND  1 999 EXTNL  PETINP
WDM      1 EVAP      ENGL      0.76      IMPLND  1 999 EXTNL  PETINP
END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name> #          <Name> # #<-factor->strg <Name> # <Name>          tem strg strg***
COPY      1 OUTPUT MEAN  1 1          48.4      WDM      701 FLOW      ENGL      REPL
COPY      501 OUTPUT MEAN  1 1          48.4      WDM      801 FLOW      ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume> <-Grp> <-Member-><--Mult-->          <Target>          <-Grp> <-Member->***
<Name>          <Name> # #<-factor->          <Name>          <Name> # #***
MASS-LINK          12
PERLND  PWATER  SURO          0.083333  COPY          INPUT  MEAN
END MASS-LINK          12

MASS-LINK          13
PERLND  PWATER  IFWO          0.083333  COPY          INPUT  MEAN
END MASS-LINK          13

MASS-LINK          15
IMPLND  IWATER  SURO          0.083333  COPY          INPUT  MEAN
END MASS-LINK          15

END MASS-LINK

END RUN

```



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# memorandum

date            October 12, 2017

to              Robin Proebsting, Senior Planner

from            Jessica Redman, Ecologist, ESA

subject        Cropp Residence (CAO17-011) – Draft Critical Area Determination to Verify a Watercourse

Environmental Science Associates (ESA) has prepared this memorandum on behalf of the City of Mercer Island (City). The purpose of the memo is to perform a critical area determination to verify the accuracy of a watercourse evaluation on two properties located at 4803 Forest Avenue SE, Mercer Island, Washington (Tax Parcels 2577300021 and 404500145). The watercourse evaluation was performed by the applicant's biologist, Confluence Environmental Company (Confluence), on July 22, 2015. Results of the evaluation were presented in the memo titled *4803 Forest Ave SE Watercourse Evaluation* (Confluence, April 18, 2017) and submitted with the development application for CAO17-011. The applicant proposes to construct a two-story single family residence on one of the two parcels, replacing the existing house. However, the City's Information & Geographic Services Database (IGS) maps a Type III watercourse flowing through the property, which has the potential to encumber the proposed development. The focus of this review is to determine if a watercourse, as defined by Mercer Island City Code (MICC) 19.07.070 is present on the property. In the April 18, 2017 memo, Confluence concluded that a watercourse did not exist onsite and the presence of a mapped stream in the City's IGS Database was the result of GIS and LiDAR modeling and not field verified.

## **Review of Existing Information**

In addition to the Confluence April 18, 2017 memo, ESA reviewed several existing stream maps including:

- Washington Department of Fish and Wildlife (WDFW) Priority Habitat Species Online Database (WDFW, 2017),
- WDFW SalmonScape Online Database (WDFW, 2017),
- King County Interactive Mapping (iMap) Hydrology (King County, 2017), and
- City of Mercer Island IGS Database (Mercer Island, 2017).

The only online mapping resource reviewed that contains the watercourse in question is the City's IGS Database mapping. IGS stream maps are based on the results of a watercourse inventory update presented in the *Use of Best Available Science in the City of Mercer Island Critical Areas Regulations for Watercourses and Wetlands – Peer Review* (Adolfson Associates, 2005). This document was also briefly reviewed.

### **Review of Site Conditions**

ESA scientist Jessica Redman conducted a field visit on September 29, 2017, meeting on-site with Robin Proebsting (City of Mercer Island).

At the time of the September 29, 2017 site visit, limited flow was observed discharging from a culvert located at the top of the steep slope immediately east of Parcel 404500145. Below the culvert, water was observed flowing down the slope on the subject property as sheet flow. No defined channel was observed. At the bottom of the slope, in the center of the parcel, there were several areas of inundation in a terraced portion of the parcel. A narrow channel was observed in this area and contained shallow (< 1-inch) flowing water; however, the bed and banks of the channel only extended for approximately 10 – 15 feet before water was dispersed into sheet flow again or collected in depressions. Because the channelized portion of this feature was only 10 –15 feet in length and no channelization was observed upslope or downslope of this feature, ESA does not consider this a watercourse as defined by the City. The terraced area generally contained soils saturated to the surface and a mixture of upland (e.g., English ivy), facultative (e.g., giant horsetail), and facultative wet vegetation (e.g., fringed willow herb). At the time of the September 29, 2017 site visit, no water was observed in the concrete pond located down slope, suggesting that the majority of water observed in the terrace area infiltrated into the soil. However, sediment deposits in the concrete pond indicate that during high flows, water likely enters the ponds before being discharged into a catch basin downslope in Parcel 2577300021. From the catch basin, water is conveyed underground through a pipe before discharging into Lake Washington. No watercourses were observed on this portion of the property.

### **Conclusion and Recommendations**

ESA did not observe a watercourse on either of the applicant’s parcels and agrees with Confluence’s conclusion that the Type III watercourse mapped on the City’s IGS Database is likely a result of GIS and LiDAR mapping error. According to maps in the *Use of Best Available Science in the City of Mercer Island Critical Areas Regulations for Watercourses and Wetlands – Peer Review* (Adolfson Associates, 2005), the watercourse on the applicant’s property was defined as a “not rated” watercourse, meaning it had not been field verified. Per the report’s recommendation, all “not rated” watercourses should be assumed a Type III watercourse for planning purposes but should be field verified when evaluating development proposals to ensure accuracy. Based on our field verification, there is no watercourse on the properties.

However, based on the topography of the site and observed soil saturation and hydrophytic vegetation during ESA’s field visit, it is possible that the terraced portion of Parcel 404500145 may meet the definition of wetland. Furthermore, it appears that the terraced portion of the site is intercepting runoff from the adjacent hillslope and therefore, provides a hydrologic function at the site. We suggest a wetland investigation be performed in this area to verify the presence or absence of a wetland to ensure any adjacent development is consistent with the provisions in the City’s Critical Area Ordinance (MICC 19.07 – Environment).

If you have any questions, please call me at (206) 789-9658.



**CONFLUENCE**  
ENVIRONMENTAL COMPANY

4803 Forest Avenue SE  
**MITIGATION PLAN**

*Prepared for:*

**Laurie Cropp**  
March 6, 2018



# 4803 Forest Avenue SE MITIGATION PLAN

Prepared for:

Laurie Cropp  
4803 Forest Avenue SE  
Mercer Island, WA 98040

Authored by:

Kerrie McArthur, PWS  
Confluence Environmental Company

March 6, 2018

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## 1.0 INTRODUCTION

Confluence Environmental Company (Confluence) conducted site visits at 4803 Forest Avenue SE, Mercer Island, Washington (tax parcel 4045000145) (Figure 1). The purpose of the site visits was to determine the presence and extent of streams and wetlands on and the property. Critical areas such as erosion hazard areas, steep slopes, and landslide hazard areas were not evaluated (Confluence 2017a, b). The site visit identified and delineated one Category V wetland on the property (Confluence 2017a, b).

The owners are proposing to construct a single-family home on the property. Because of the size and shape of the property and the location of the wetland, impacts to the wetland buffer cannot be avoided. This report documents the mitigation that would be implemented to compensate for unavoidable impacts.

## 2.0 EXISTING SITE CONDITIONS

The site is currently partially developed. The western portion is developed with a detached garage, driveway, and yard. The eastern portion of the property, where the wetland is located, is undeveloped.

One wetland, identified as Wetland A, was delineated on the property (Confluence 2017b). Wetland A is slope wetland located in the eastern portion of the property (Figure 1) and is 638 square feet in size. It begins at the outlet of the stormwater pipe in the eastern portion of the property and ends at the lined basin in the central portion of the property. The existing stormwater pipe discharging at the top of the slope appears to be the primary source of hydrology for Wetland A.

According to the Cowardin classification (Cowardin et al. 1979), Wetland A is an emergent wetland. Wetland A is dominated by giant horsetail (*Equisetum telmateia*). The boundary of Wetland A was determined by topographic break, evidence of standing water or saturated soils, and the vegetative shift to non-hydrophytic vegetation. According to the 2004 Wetland Rating System (Hruby 2004), Wetland A was rated as a Category IV wetland.

According to Mercer Island City Code (MICC) 19.07.080, Category IV wetlands have a standard buffer of 35 feet but buffers can be reduced to a minimum width of 25 feet with enhancement. The upland (including the buffer) surrounding the wetland is dominated by invasive species such as Himalayan blackberry (*Rubus armeniacus*), English ivy (*Hedera helix*) and laurel (*Daphne* sp.). Figure 1 shows the wetland and the standard buffer.



Figure 1. Site Vicinity and Delineated Wetland

### 3.0 PROPOSED DEVELOPMENT

The proposed development is a new single-family residence. As part of the development, the existing garage would be demolished and a 2,217-square-foot home would be constructed (Figure 2). Because of the unusual shape of the property and the presence of steep slopes in the eastern portion of the property, development is limited to the western portion of the property.

Figure 2 shows the proposed development in relation to the wetland and standard 35-foot buffer and reduced 25-foot buffer. Because of the unusual shape of the property and location of the wetland, the proposed development would encroach into the standard 35-foot buffer.

### 4.0 IMPACTS TO CRITICAL AREAS

The proposed development would not impact Wetland A; however, both permanent and temporary impacts to the standard buffer would occur. According to MICC 19.07.030.A(13), Category IV wetlands of low value under 2,500 square feet can have their buffers altered and the applicant is not required to comply with the other regulations of the chapter, subject to an applicant meeting the specific conditions to the satisfaction of the code official. However, there are no specific set of conditions under 19.07.030.A(13) like there are under all the other specified allowed alterations. Nor does 19.07.030.A(13) refer to other sections of the code that need to be complied with, like other allowed alterations have. While there are no specific conditions or code sections to be met, the proposed mitigation would meet the minimum buffer width of 25 feet for Category IV wetlands described in MICC 19.07.080.

To avoid impacts to the wetland buffer to the maximum extent, the project proposes to reduce the standard buffer width from 35 feet to a minimum width of 25 feet in the western portion of the buffer only (Figure 2). This results in a buffer reduction of approximately 650 square feet (sq ft). Currently there is approximately 430 sq ft of impervious surface (as driveway) within the buffer reduction area. The remaining portion of the buffer within the proposed buffer reduction area is lawn. Using buffer reduction with enhancement, as allowed under MICC 19.07.00, results in no permanent impacts to the wetland buffer from the proposed development. Details on the proposed mitigation are in Section 5.0.

Temporary impacts to the reduced buffer would occur during construction. Currently the area where temporary impacts would occur is either impervious surfaces (e.g., the driveway) or lawn. Once construction is completed, the impervious surface will be gone and all disturbed soils in the reduced buffer area would be revegetated with grass seed.

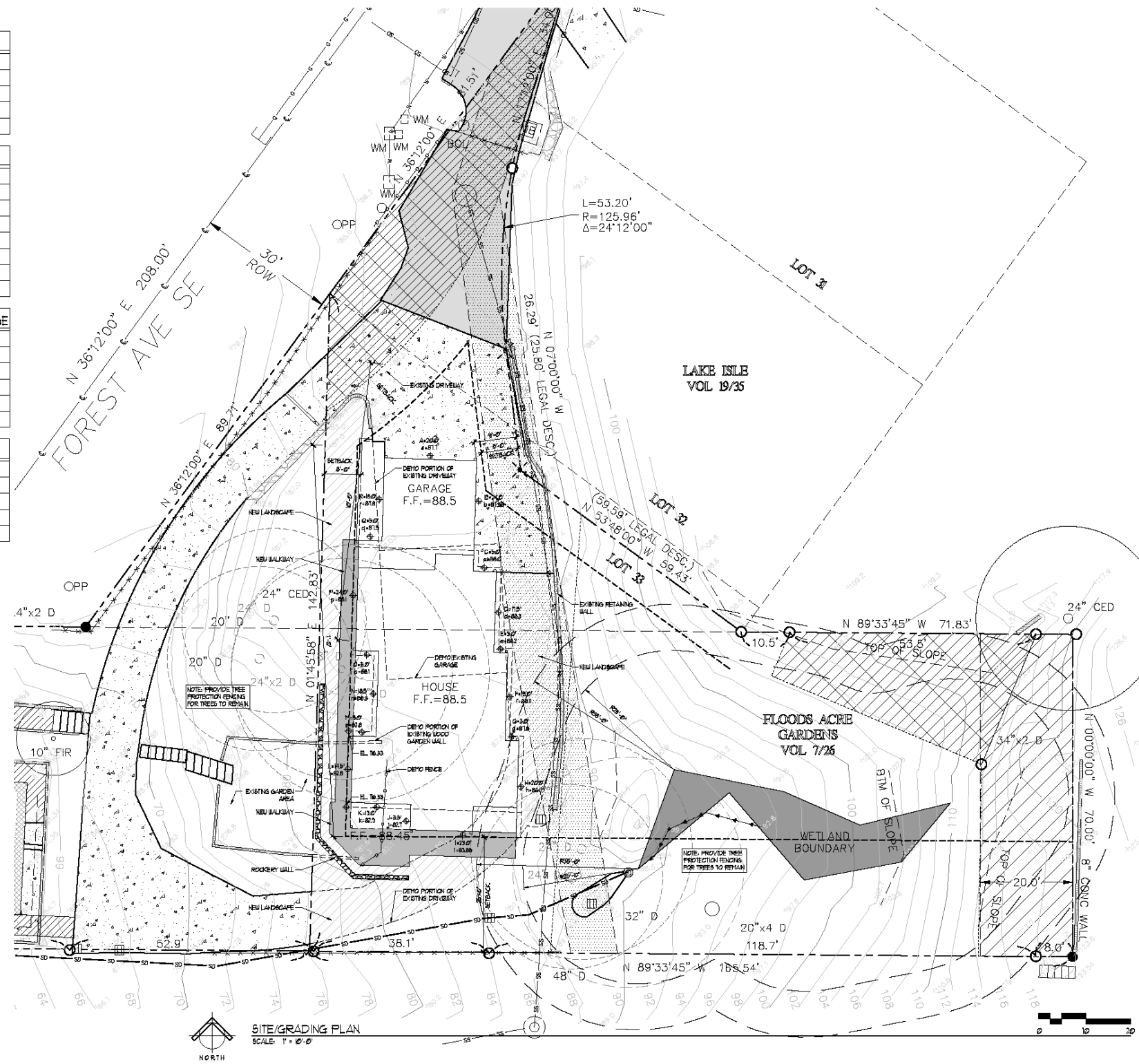
LENGTH	ELEVATION	LENGTH x ELEVATION
A = 30.0'	a = 81.1	2433.0
B = 24.0'	b = 81.36	1952.6
C = 3.0'	c = 82.0	246.0
D = 7.0'	d = 86.3	604.1
E = 3.0'	e = 86.2	258.6
F = 10.0'	f = 86.1	861.0
G = 3.0'	g = 81.6	244.8
H = 70.0'	h = 86.7	6069.0
I = 22.0'	i = 89.8	1965.6
J = 3.0'	j = 85.1	255.3
K = 10.0'	k = 85.3	853.0
L = 14.0'	l = 85.8	1199.2
M = 5.0'	m = 82.0	410.0
N = 10.0'	n = 86.3	863.0
O = 3.0'	o = 88.1	264.3
P = 24.0'	p = 88.1	2114.4
Q = 5.0'	q = 81.5	407.5
R = 10.0'	r = 81.8	818.0
TOTAL		70542.8
243.0'		70542.8
AREA = 289428 / 243.0' = 1191.1		
ROOF PITCH = 16.53		

FAR CALCULATIONS	
LOWER FLOOR ENCLOSED SF:	1371 SF.
UPPER FLOOR ENCLOSED SF:	1695 SF.
TOTAL ENCLOSED SF. (FROM OUTSIDE OF EXTENSION WALL IN):	3066 SF. /
TOTAL LOT SF:	16391 SF.
FAR:	20.1 %

LOT COVERAGE BY STRUCTURE	
HOUSE FOOTPRINT w/ GARAGE:	2317 SF.
COVERED DRIVEWAY:	1019 SF.
COVERED PORCH 1:	719 SF.
COVERED PATIO 2:	925 SF.
COVERED DECK:	719 SF.
TOTAL:	5990 SF. /
TOTAL LOT SF:	16391 SF.
% OF LOT:	36.6 %

IMPERVIOUS SURFACE COVERAGE	
ALL ROOFS (INCLUDING EAVES):	2491 SF.
DRIVEWAYS:	2620 SF.
WALKWAYS:	363 SF.
TOTAL:	5474 SF.
TOTAL LOT SF:	16391 SF.
% OF LOT:	33.5 %

LOT SLOPE	
HIGHEST ELEVATION POINT OF LOT:	127.6
LOWEST ELEVATION POINT OF LOT:	76.0
ELEVATION DIFFERENCE:	51.6
HORIZ. DIFFERENCE BETWEEN HIGH & LOW:	94.44'
LOT SLOPE: 51.6/94.44	54.7%



REGISTERED ARCHITECT  
RICHARD W. FLAKE  
STATE OF WASHINGTON

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CROPP RESIDENCE  
 PROPOSED SINGLE FAMILY HOME  
 4803 FOREST AVE SE  
 MERCER ISLAND, WA 98040

DESIGN:	RF
DRAWN:	RF
CHECKED:	RF
REVISIONS:	
NOV. 13, 2011	
A-11	

Figure 2. Proposed Development

## 5.0 PROPOSED MITIGATION

As stated above, the proposed development would reduce the buffer to 25 feet in the western portion of the wetland. The 25-foot buffer width would extend for a linear distance of approximately 67 feet before extending back out to 35 feet. This buffer reduction would only occur downslope of the wetland. Reducing the buffer from 35 feet to 25 feet along the western portion of the wetland results in a total buffer reduction of 650 sq ft. Table 1 summarizes the impacts and mitigation. Figure 3 presents the buffer reduction and mitigation areas.

**Table 1. Summary of Impacts and Mitigation**

Project Element	Impact Type	Impacts Area (sq ft)	Mitigation Type	Mitigation Area (sq ft)
Proposed House	Permanent	650	Buffer enhancement	650
Construction	Temporary	160	Restore to lawn (i.e., pre-impact condition)	160

The scientific literature recognizes that buffers provide important functions that protect wetlands (Sheldon et al 2005). Buffer functions are generally lumped into the following three categories:

- Hydrology
- Water Quality
- Habitat

For slope wetlands, such as Wetland A, the downslope portion of the wetland does not provide any hydrology or water quality functions to protect the wetland. Since proposed development would only reduce the buffer area downslope of the wetland, the development would not alter the current hydrology and water quality functions of the buffer.

Impervious surfaces provide no habitat function and lawn provides very little habitat function. Therefore, reducing the buffer from 35 feet to a minimum of 25 feet would not decrease existing habitat functions of the buffer, since habitat functions do not exist or are of very low quality within the reduced buffer area.

As stated above, according to MICC 19.07.080, reducing the buffer from 35 feet to 25 feet is allowed as long as the buffer reduction includes buffer enhancement and does not result in a net loss of functions. The proposed development reduces only the western (downslope) portion of the wetland, which provides little to no function. The reduced buffer comes to within 1-2 feet of the house; therefore, to maintain access to the house and allow for home maintenance, the reduced buffer area would either be converted from driveway to lawn or remain as lawn (once temporary impacts are finished). Having the reduced buffer area as lawn would not result in a

loss of function because, as described above, the existing conditions of the downslope portion of the buffer provides little to no water quality, hydrology, or habitat functions.

Rather than enhance the reduced buffer area, this mitigation proposes to enhance 650 sq ft of the buffer upslope of the reduced buffer area and within the standard buffer area (Figure 2). By enhancing the buffer in the proposed location, buffer functions are expected to increase. Since wetland buffers downslope of a slope wetland do not provide hydrology or water quality functions, enhancing the reduced buffer area would only increase the habitat function of that portion of the buffer. By enhancing the buffer on the slope, the plantings will not only increase habitat functions, they will increase water quality and hydrology functions.

## 6.0 MITIGATION PLAN

This section describes the goals, objectives, and performance standards of the buffer enhancement that will occur at 4803 Forest Avenue SE, Mercer Island, Washington. This section also describes the monitoring requirements of the planting plan. Table 2 summarizes the planting scheme.

**Table 2. Planting Scheme**

Common Name	Scientific Name	Container Size	Spacing	Quantity
Buffer Enhancement for Permanent Impacts (approximately 650 sq ft)				
Nootka rose	<i>Rosa nutkana</i>	1 gallon	5 ft OC	10
Oceanspray	<i>Holodiscus discolor</i>	1 gallon	5 ft OC	8
Salmonberry	<i>Rubus spectabilis</i>	1 gallon	5 ft OC	10
Western red cedar	<i>Thuja plicata</i>	5 gallon	5 ft OC	2
Total				30
Buffer Restoration for Temporary Impacts (approximately 160 sq ft)				
Seed mix	<i>Lolium sp. / Festuca sp.</i>	Seed	N/A	0.8 lb*

OC – On Center

\*Based on 5 pounds per 1,000 sq ft. Sod can be substituted for seed mix

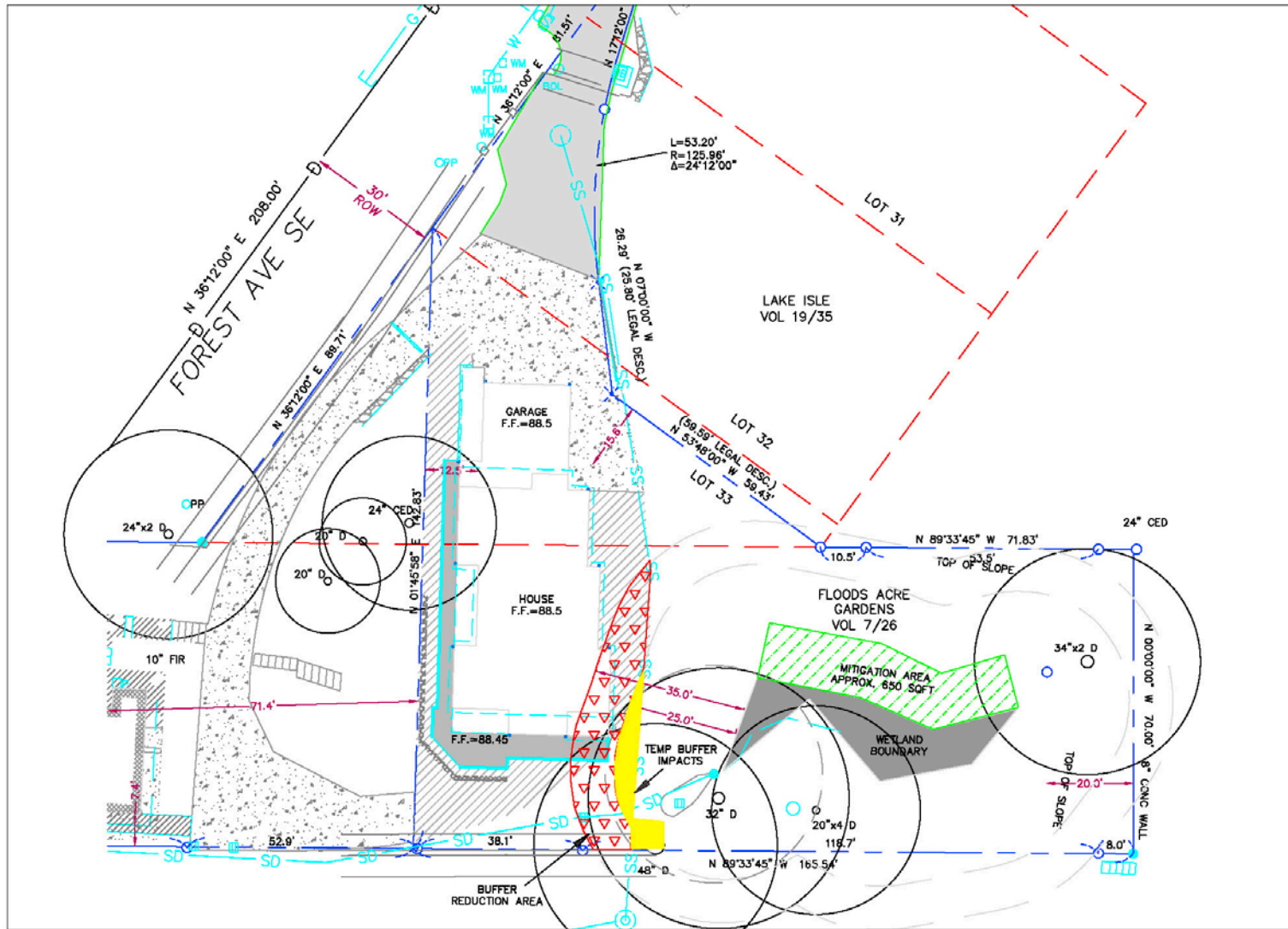


Figure 3. Buffer Reduction and Mitigation Areas



## 7.0 GOALS, OBJECTIVES, AND PERFORMANCE STANDARDS

### 7.1 Goals and Objectives

The goal of this mitigation plan is to enhance 650 sq ft of a Category IV wetland buffer. The objective is that the mitigation area will be dominated with healthy, native plants.

### 7.2 Performance Standards

The following performance standards are to be monitored to document that the goals and objectives of the mitigation plan are being met. Table 3 summarizes the performance standards.

Table 3. Performance Standards

Performance Standard	Success Criteria				
	Year 1	Year 2	Year 3	Year 4	Year 5
PS1 – Percent Survival	100 %	100 %	NC	NC	NC
PS 2 – Percent Cover Native Species	NC	30	50	60	>75
PS 3 – Percent Cover Invasive Species	NC	≤10	≤10	≤10	≤10

PS – Performance Standard

NC – No Criterion

#### 7.2.1 Performance Standard 1 – Percent Survival

Planted vegetation and natural recruits will be monitored for survival for 2 years (Year 1 and Year 2). Monitoring will occur during the growing season after deciduous plants have flowered or leafed-out for easier identification. Table 3 shows the success criteria for plant survival for each year of monitoring.

High mortality could result from improper installation, diseased or infested plants, inadequate watering, or extreme weather. If more than 25 percent of new plantings die in a single year, the cause of the high losses will be investigated and corrected before dead plants are replaced. Dead plant material will only be removed after that year's scheduled monitoring. If less than 80 percent of the total plants installed have survived during the Year 5 monitoring, additional plants will be installed to bring the planting schedule back into original specifications and yearly monitoring will continue for two additional years.

### ***7.2.2 Performance Standard 2 – Percent Cover of Native Species***

Planted vegetation and natural recruits will also be monitored for percent cover for 5 years (Year 1, Year 2, Year 3, Year 4, and Year 5). Monitoring will occur during the growing season after deciduous plants have flowered or leafed-out for easier identification. Table 3 shows the success criterion for percent cover of native species for each year of monitoring.

Five years of monitoring are planned; however, if the success criteria of Year 5 are met in Years 3 or 4, the site will be considered successful and no further monitoring will be conducted.

Plant growth, as determined by percent cover, could be negatively affected by improper installation, diseased or infested plants, inadequate watering, or extreme weather. If the percent cover success criterion is not met, the cause will be investigated and corrected. Correction measures may include increased watering, soil amendments, fertilizing, or revision of planting palette and additional plantings.

### ***7.2.3 Performance Standard 2 – Percent Cover of Invasive Species***

The percent cover of area dominated by invasive species will be monitored for 5 years (Year 1, Year 2, Year 3, Year 4, and Year 5). Monitoring will occur during the growing season after deciduous plants have flowered or leafed-out for easier identification. Table 3 shows the success criterion for percent cover of invasive species for each year of monitoring.

Five years of monitoring are planned; however, if the success criteria of Year 5 are met in Years 3 or 4, the site will be considered successful and no further monitoring will be conducted.

Dominance by invasive species could result from the disturbance of the soil, a high mortality rate of the native planted vegetation, or colonization by windborne seeds. To reduce colonization by invasive species, a site maintenance plan is described in Section 9.0. If more than 10 percent of area is covered by invasive species, the cause of infestation will be investigated and corrective actions will be taken before weeds are removed. Contingency measures could include increasing the frequency of weeding until native vegetation can grow and dominate the area, increasing the density of native vegetation with additional plantings, or planting the buffers with woody species to shade out invasive species in the buffer.

## **8.0 MONITORING PLAN**

A monitoring period of 5 years is proposed to ensure that plantings survive and establish successfully.

Data collected in Year 0 will provide the baseline for the success criteria for Years 1, 2, 3, 4, and 5 monitoring. Should the ecologist determine that any portion of the mitigation area needs to be replanted, a survey will be conducted after the replanting has been completed. This survey will then become the baseline for other monitoring surveys. For example, if survival success

criterion is not met in Year 2 and the ecologist determines that additional trees or shrubs need to be planted, a survey will be conducted after the addition of new plants. This survey will then provide the baseline for remaining monitoring events.

## 8.1 Plant Survival

Because of the small size of the mitigation area, all installed plants will be counted during each monitoring period. The number of living plants will be divided by the number of plants installed to determine the percent survival.

## 8.2 Percent Cover

Interim and final success will be defined by meeting the success criteria for percent cover and invasive species performance standards shown in Table 3. Up to 4 plots, no greater than 10 feet by 10 feet, will be established to calculate the aerial percent cover (i.e., “bird’s eye view”) of vegetation.

The location of each plot will be determined during the Year 0 monitoring. Each plot must be at least 30 feet apart from each other. In each circular plot, the percent cover of all vegetation, by species, and bare ground, will be estimated and recorded.

## 8.3 Photo Documentation

Photos of the mitigation area will be taken during each monitoring event to provide visual documentation of the mitigation area. Permanent photo points will be established at one corner of each plot to document the site over time. At each of the photo points, a fixed-lens digital camera will be used to take photographs, either a panoramic photo or one at every 90 degrees of the compass.

## 8.4 Frequency

Monitoring will occur during the growing season after deciduous plants have flowered or leafed-out. The Year 0 monitoring event will occur within 30 days after trees and shrubs have been installed. Each of the monitoring events will occur within 30 days of the calendar date of the Year 0 monitoring.

## 8.5 Reporting

For each monitoring event, the ecologist will prepare a report. One copy of each report will be provided to the King County project manager. The following will be included in each report:

- data tables;
- species lists;
- date of survey;

- a narrative description of methods and contingency measures taken;
- identified planted and naturally recruited trees and shrubs;
- interpretation of results; and
- color photos.

## 8.6 Year 0 Report (As-Built)

The Year 0 report will be submitted within 30 days after construction is completed. In addition to the general reporting requirements stated above, the following will be included in the Year 0 report:

- actual planting density (container size, average offset);
- description of any changes from the original design; and
- planting schedule.

## 8.7 Yearly Reports

The first yearly report is due within 1 year after the City's acceptance of the as-built report. All yearly reports will be submitted within 30 days of conducting the monitoring survey.

## 9.0 MAINTENANCE PLAN

Maintenance activities in the mitigation area will change throughout the duration of the monitoring and maintenance period. These activities will be concentrated immediately after installation and continue through the first and second year's post-installation as the vegetation survives and grows. If permits are received in time, installation will occur by fall of 2018.

## 9.1 Watering

Watering may be necessary depending on the date of planting and the amount of rainfall that year. If installation occurs before May 1, the plants will receive at least 1.5 inches of water (or equivalent of rainfall) twice per month during the spring of the first season and once per week during the summer months. Watering will be more crucial if installation occurs after May 1, because the plants will not have a chance to establish themselves during the rainy season. Biweekly watering (or rainfall equivalent) will be provided if plantings occur after May 1. Monitoring of rainfall and/or soil moisture will be used to determine the need for watering during the summer and early fall period. Watering will be less critical if planting occurs in the fall. Watering may be necessary during the summers of 2019, 2020, and 2021 to assist survival and establishment of plantings. Watering will be accomplished using a watering truck or temporary irrigation system.

## 9.2 Weeding

Weeding around shrubs will be important during the summer of the first year to ensure establishment and prevent stress to the plants from competition for resources. In the first growing season following installation, weeding will occur once monthly through August. All invasive species will be removed.

Weeding will also occur during the early and intermediate growing season of the second year after planting. The frequency can be gauged by necessity but should occur at least twice during the spring (ideally May and June), and then once more during the summer months (August or September). This weeding will also occur in the final year during establishment of the mitigation site. In other words, if planting occurs in the spring of 2019, the intensive weeding will occur during the summer of 2019 and the reduced intensity maintenance will occur in 2020 and 2021.

No weed whacking will be allowed around plantings. Weeding will be done using simple hand tools (e.g., rakes and hoes). No herbicide will be allowed. Removal of the highly invasive species such as Scotch broom (*Cytisus scoparius*), Himalayan blackberry, and reed canarygrass (*Phalaris arundinacea*) is especially important in the Northwest, and emphasis should be given to their removal to prevent invasion into the planted areas. Other native but weedy species such as horsetail may need to be weeded around installed plants to ensure installed plants are not choked out by the native, weedy species.

## 9.3 Mowing

No mowing will occur in the mitigation area.

## 9.4 Dead Plant Removal

Dead plant material will only be removed after scheduled monitoring. This will allow for the accurate assessment of planting success needed for the monitoring program. Replacement planting will be detailed in a section of the report from the monitoring program.

## 10.0 REFERENCES

Confluence (Confluence Environmental Company). 2017a. 4803 Forest Avenue Southeast watercourse evaluation. Prepared for Laurie Cropp, Mercer Island by Confluence Environmental Company, Seattle, Washington.

Confluence (Confluence Environmental Company). 2017b. 4803 Forest Avenue Southeast critical areas study update. Prepared for Laurie Cropp, Mercer Island by Confluence Environmental Company, Seattle, Washington.

- Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States: U.S. Fish and Wildlife Service, Office of Biological Services, Publication FWS/OBS/79/31, Washington, D.C.
- Hruby, T. 2004. Washington State wetland rating system for western Washington, 2006 update. Washington State Department of Ecology, Publication # 04-06-025, Olympia, Washington.
- Sheldon, D., T. Hruby, P. Johnson, K. Harper, A. McMillan, T. Granger, S. Stanley, and E. Stockdale. March 2005. Wetlands in Washington State - Volume 1: A Synthesis of the Science. Washington State Department of Ecology. Publication #05-06-006. Olympia, WA. Available at <https://fortress.wa.gov/ecy/publications/documents/0506006.pdf> (accessed November 15, 2017).





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# memorandum

date March 19, 2018  
to Robin Proebsting, Senior Planner  
from Jessica Redman, Ecologist, ESA  
subject Cropp Residence (CAO17-011) –Mitigation Plan Review

Environmental Science Associates (ESA) has prepared this memorandum on behalf of the City of Mercer Island (City). ESA reviewed the *4803 Forest Avenue SE Mitigation Plan* prepared by Confluence Environmental Company (dated March 6, 2018 and hereinafter referred to as the Mitigation Plan). The purpose of the memo is to verify the accuracy of the findings within the Mitigation Plan submitted with development application CAO17-011. This memo also discusses the adequacy of the proposed measures to mitigate project impacts and achieve the standard of no net loss of ecologic function as required by the Mercer Island Municipal Code (MICC).

The site is located at 4803 Forest Avenue SE within the City of Mercer Island, Washington (Parcel #4045000145). The applicant proposes to demolish the existing garage on the parcel and construct a 2,217 single family residence (SFR). ESA previously reviewed this property to evaluate the existence of a potential watercourse. ESA scientist Jessica Redman conducted a field visit on September 29, 2017, meeting on-site with Robin Proebsting (City of Mercer Island). ESA concluded that a Type III watercourse mapped on the City's IGS Database was likely a result of GIS and LiDAR mapping error and presented this finding to the City in the *Cropp Residence (CAO17-011) – Draft Critical Area Determination to Verify a Watercourse* technical memorandum (dated October 12, 2017). ESA also concluded that the eastern portion of the site likely contained a wetland and recommended that an investigation be performed to verify its presence.

A wetland evaluation was performed by the applicant's consultant, Confluence Environmental Company (Confluence), on November 6, 2017, which determined that one wetland (Wetland A) occurred onsite. The delineation and wetland rating are documented in the *4803 Forest Avenue SE Critical Areas Study Update* (Confluence, 2017). The wetland is a slope, palustrine emergent (PEM) wetland, located in the eastern portion of the parcel. The primary hydrological input to the wetland is discharge from a stormwater pipe at the top of the slope. The wetland is categorized as a Category IV wetland that requires a standard buffer width of 35 feet (MICC 19.07.080.C). According to MICC 19.07.070.2(a), a standard buffer width may be reduced if it is determined that a smaller area is adequate to protect the wetland, impacts will be mitigated for, and the proposal will not result in a net loss of wetland and wetland buffer functions.

The applicant proposes to reduce approximately 67 linear feet of the western extent of the buffer to 25 feet, the minimum allowed by MICC 19.07.080.C, resulting in a total reduction of approximately 650 square feet (SF) of buffer. Approximately 430 SF of the area proposed for buffer reduction is currently impervious surface (driveway), the remaining 220 SF is lawn. Post-construction, the reduced buffer would be entirely lawn. Temporary impacts to the reduced buffer would occur during construction. No permanent impacts to the reduced



buffer will occur. In order to offset the impacts of the buffer reduction, the applicant proposes to enhance 650 SF of the buffer upslope of the reduced buffer area and within the standard buffer area. Enhancement will include the removal of invasive species including Himalayan blackberry, English ivy, and laurel. Subsequent planting of native shrubs and trees will occur and include Nootka rose, oceanspray, salmonberry, and western red cedar. Temporary impacts to the reduced buffer will be treated with grass seed post-construction and converted to lawn. A detailed 5-year monitoring plan is also included within the Mitigation Plan.

Based on our review, we have determined that the Mitigation Plan is consistent with MICC 19.07.070.2(a). The 650 SF of proposed mitigation planting will offset impacts resulting from the 650 SF of buffer reduction. The area of proposed buffer reduction is downslope of Wetland A and is composed largely of impervious surface, therefore providing little habitat, water quality, or hydrologic buffer function to the wetland. The removal of invasive vegetation and subsequent planting of native species upslope of Wetland A will provide an increase in water quality and hydrologic function of the wetland buffer and provide a lift in habitat function. With successful implementation of the mitigation and monitoring plan the proposed buffer reduction would not result in a loss of ecological functions within Wetland A or its associated buffer.

## Robin Proebsting

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**From:** Henning Hagen <henning.hagen@gmail.com>  
**Sent:** Monday, October 9, 2017 5:05 PM  
**To:** Robin Proebsting  
**Cc:** Trudi Hoogenboom  
**Subject:** File #: CAO17-011  
**Attachments:** Public Notice of Application.pdf

**Follow Up Flag:** Follow up  
**Flag Status:** Completed

Hi Robin,

I hope you are doing well!

We - along with our neighbors (the Reynolds) - received the attached documentation in the mail.

I assume this email will serve as the written request to become a party of record in this matter, in future construction plans for the Cropp's property (both parcels), and to provide us automatic updates on the process of this specific watercourse discussion, as well as the right to appeal a decision later on.

Could you please confirm that is the case/our understanding of the process is correct?

With regards to the matter itself, we believe there are two separate things for the City to consider.

One is the storm water drain system that starts where West Mercer Way and SE 48th Street meet (way up the hill). There are several lots and city property including the public road SE 48th St itself that slope in such a way that rain water collects in an underground pipe system/storm drain that eventually collects underground on our property, runs through pipes under our house (8101 SE 48th St), still runs under ground into the Cropp's property, and daylight onto their hill (fairly high up).

We believe a better solution (and likely the original one before its condition deteriorated?) was that the rain water did not exit onto the hill but continued to be channeled through underground pipes into a city sewer or the lake. We don't know if the status quo is a hill stability issue or not but imagine hill stability would benefit from an end-to-end channel solution for all collected storm/rain water. We are hopeful that this would be taking into account and solved for as part of the new building plans for that property.

Second is the question of 'natural water course' or not. We believe there is no natural watercourse on our lot or up the hill from us.

We do not know if there is natural watercourse (seasonal or otherwise) on the Cropp's property but would like to be informed on the ongoing evaluation the Cropps and the City of MI are undertaking to answer that question.

Please don't hesitate to contact us to clarify or discuss.

Thank you and best regards!

Henning and Trudi Hagen

## Robin Proebsting

---

**From:** Craig Reynolds <craig.reynolds@milliman.com>  
**Sent:** Wednesday, October 11, 2017 6:37 PM  
**To:** Robin Proebsting  
**Cc:** Jane Reynolds  
**Subject:** File #: CAO17-011 comment

**Follow Up Flag:** Follow up  
**Flag Status:** Completed

Robin:

Thank you for taking the time to speak with me last week about the above-referenced case for the Cropp property.

We are not trained engineers and therefore cannot offer a meaningful opinion about whether the water flow on the Cropp property is sufficient to be legally considered a water course.

However, we do wish to point out that there is a drain outflow on their property that we believe originates high on SE 48<sup>th</sup> St., feeding into an underground pipe via an entrance that is just north of our home on the other side of SE 48<sup>th</sup> St.

At least some runoff from our property and SE 48<sup>th</sup> St directly or indirectly feeds into this drain, as documented in the drainage plan that was approved for our house when it was built five years ago.

With this note we wish to document our belief that we are entitled to continued right to use this drainage course, and ask that any Cropp construction plans take this drainage into account and appropriately mitigate any harm to this drainage flow. In particular, we are counting on our continued ability for runoff to proceed in this manner.

Please keep us informed of any future permit or planning issues related to this property. As I mentioned, in at least one case in the past, we did not receive written notice of a city comment period related to the Cropp request for waiver of setback requirements, despite the fact that our property (257730TRCT, shared with the Hagen-Hoogenboom family) abuts the Cropp property, and our homesite (2577300020, 8105 SE 48<sup>th</sup> St) is only about 100 feet away from the Cropp property border.

Thank you in advance for giving due consideration for this comment on the above-referenced case.

**Craig W. Reynolds, FSA, MAAA**  
Principal & Consulting Actuary

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