

North Mercer Island Interceptor and Enatai Interceptor Upgrade Project

City of Mercer Island Tree Management Plan

Final



NME Project: City of Mercer Island Tree Management Plan

September 2019

PREPARED FOR

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Wastewater Treatment Division**

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ACRONYMS/ABBREVIATIONS

Acronym or Abbreviation	Definition
ANSI	American National Standards Institute
ASCA	American Society of Consulting Arborists
BMP	best management practice
CAS	Critical Area Study
DSH	diameter at standard height
I-90	Interstate 90
ISA	International Society of Arboriculture
LOD	limits of disturbance
LS-11	Lift Station 11
MICC	Mercer Island City Code
NME Project	North Mercer Island Interceptor and Enatai Interceptor Upgrade Project
NMPS	North Mercer Pump Station
OHWM	ordinary high water mark
PLAN	Development Plan Set
PS	pump station
RLOD	recommended limits of disturbance
ROW	right-of-way
SMP	Shoreline Master Program
TPZ	tree protection zone
WSDOT	Washington State Department of Transportation
WTD	King County Wastewater Treatment Division

1. INTRODUCTION

King County Wastewater Treatment Division (WTD) is applying for environmental and construction permits from the City of Mercer Island (Mercer Island) for a project to improve reliability and increase the capacity of a portion of the existing regional wastewater system. King County’s Conveyance System Improvements Program identified a need for capacity upgrades for the North Mercer Island and Enatai interceptors. The North Mercer Island Interceptor and Enatai Interceptor Upgrade Project (NME Project) is intended to improve the existing facility and pipeline components of the regional wastewater system to convey the 20-year peak wastewater flows projected through the year 2060 from service areas in North Mercer Island, the southwest portion of Bellevue, and the Town of Beaux Arts Village (Figure 1).

Construction of the NME Project will result in the removal of trees on Mercer Island. This document serves to fulfill the requirements of Mercer Island City Code (MICC) 19.10.090.C *Tree Removal Application Requirements*, which are not met in full by the Development Plan Set (PLAN) or Arborist Report (Tree Solutions 2019). Tree application requirements, including the locations of all tree information within the land use package, are outlined in Sections 1.2 and 1.3 of this report. Tree removals are discussed within Section 2, tree protections are discussed within Section 3, and tree retention ratios and replacement strategies are discussed within Section 4 of this report.

There are six work areas of the NME Project proposed on Mercer Island (Table 1; Figure 2). Work within these areas includes constructing new pipe or upgrading pump stations of the regional wastewater system, and can be divided into five NME Project segments (refer to Table 1). These five NME Project segments that make up the proposed action on Mercer Island overlap in terms of the geographical work areas where construction will take place. Please note that the work area identified as the Interstate 90 (I-90) Trail is the proposed route that primarily follows the I-90 Trail, but also includes private land, Mercer Island right-of-ways (ROWs), Washington State Department of Transportation (WSDOT) ROWs, and WSDOT Limited Access ROWs. In this report we will be using the six NME work areas to reference tree locations and tree management areas.

Table 1. Construction Segments and Work Areas for the NME Project

NME Project Segment*	Work Area					
	NMPS and NMPS Stream	Street ROWs and I-90 Trail*	LS-11 (Fruitland Landing Park)	96 th Avenue Siphon	Mercer Island Boat Launch	East Channel
NMPS	●					
North Mercer Island Interceptor	●	●	●	●	●	
96 th Avenue Siphon				●		
LS-11			●			
East Channel Siphon						●

I-90 Trail = Interstate 90 Trail; LS-11 = Lift Station 11; NMPS = North Mercer Pump Station, ROW = right-of-way

● = at least a portion of the NME Project segment occurs in the identified work area.

*The North Mercer Island Interceptor proposed alignment primarily follows the I-90 Trail, but also includes private land, Mercer Island ROWs, and other WSDOT ROWs.

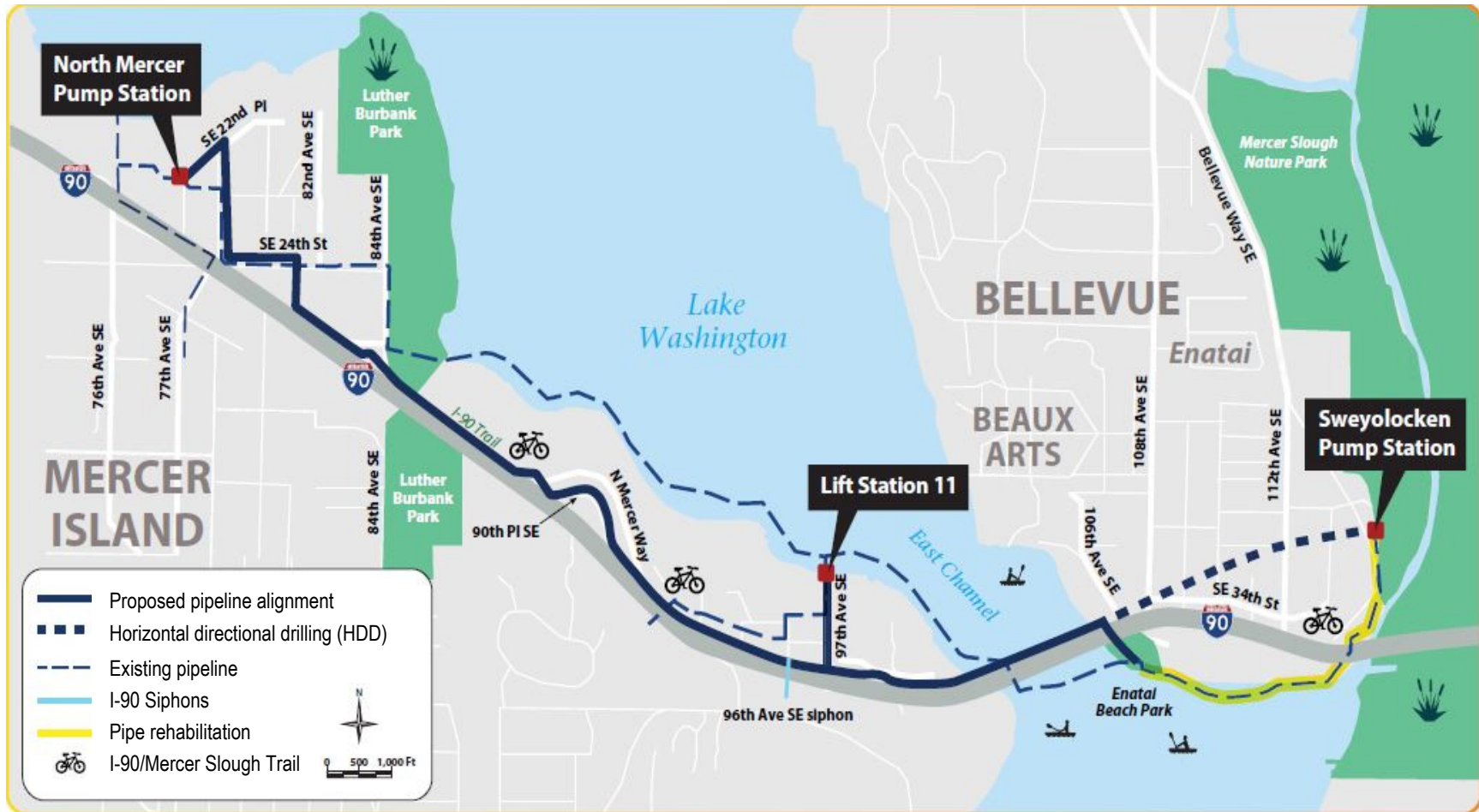


Figure 1. NME Project Alignment Overview



Pipeline Alignment

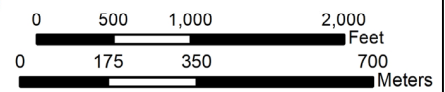
- Mercer Island Conveyance
- East Channel Siphon

Mercer Island Stream Classification

- Type F - Potential Fish
- Type Np - Perennial
- - - Type Ns - Seasonal
- Piped

- Stream Buffer (width based on type)

- Lake Washington OHWM
- Shoreland (OHWM 200-ft buffer)
- Park
- ROW (City and WSDOT)
- I-90 Trail System



*Note: I-90 Trail work area includes the extent of proposed pipeline along the I-90 trail

Figure 2. Work Areas, Watercourses, and Shorelands that Overlap with the NME Project on Mercer Island

1.1 KEY TERMS

There are several key terms for tree management identified in both the MICC and Arborist Report (Tree Solutions 2019). The location and types of trees determine the application requirements for a tree removal permit through Mercer Island and WSDOT, including the replacement ratios for trees that are removed. The following is a summary of the terms that will be used throughout this document that refer to the location and types of trees.

1.1.1 King County/ Private/ City of Mercer Island Trees

Specific types of trees are regulated by Mercer Island using criteria established under the MICC 19.16.010. Regulated improvements include “any development of any property within the city” with some exceptions that are not relevant to the NME Project. The definition of each type of regulated tree located on King County property, private property, or Mercer Island ROWs is provided below.

Exceptional Grove (Regulated): A group of 8 or more trees each 10 inches or more in diameter that form a continuous canopy. Trees that are part of a grove shall also be considered exceptional trees, unless they also meet the definition of a hazardous tree (MICC 19.16.010).

Exceptional Tree (Regulated): A tree or group of trees that because of its unique historical, ecological, or aesthetic value constitutes an important community resource. An exceptional tree is a tree that is rare or exceptional by virtue of its size, species, condition, cultural/historic importance, age, and/or contribution as part of a tree grove. Exceptional trees are trees measuring 36 inches in diameter at standard height (DSH) or greater, or with a diameter that is equal to or greater than the diameter listed in the Exceptional Tree Table (MICC 19.16.010).

Large Tree (Regulated): Any tree with a DSH of ≥ 10 inches, and any tree that meets the definition of an exceptional tree. Note that, specifically within the Mercer Island ROW, regulated trees also include all trees that are >6 inches in diameter, as requested by the Mercer Island arborist.

Small Tree (Unregulated): Any non-exceptional tree with a DSH of <10 inches on private property or Mercer Island property, and <6 inches in Mercer Island ROW.

1.1.2 WSDOT Trees

Trees that are located in WSDOT ROWs are regulated by a separate set of criteria. WSDOT manages roadsides, balancing operational and environmental functions and lowest life cycle costs consistent with a reliable, safe, and sustainable transportation system, and endeavors to preserve mature roadside vegetation and soils to the greatest extent feasible (WSDOT 2015). The definition of each type of regulated tree located within WSDOT ROWs is provided below.

Category 1 Tree¹ (Regulated): Mature, old-growth, large specimen or heritage trees >30 inches DSH

Category 2 Tree (Regulated): Moderate-size trees (excluding alder and cottonwood) with DSH between 4 inches and 30 inches

Category 3 Tree (Unregulated): Small-size trees (excluding alder and cottonwood) with DSH <4 inches

¹ Category 1, 2, and 3 trees are defined in WSDOT Roadside Policy Manual M 3110.03, dated August 2015.

Early Successional Species Tree: Early successional species trees such as red alder (*Alnus rubra*), willow (*Salix spp.*), and black cottonwood (*Populus trichocarpa*), which are only regulated if they are Category 1 or street trees.

Street Tree² (Regulated): The first row of trees that parallel a road, trail, or plaza to accentuate the pavement edge and/or provide user guidance, have an upright branching pattern to provide adequate vertical room for vehicles and bicyclists, provide canopy over the pavement, and typically have consistent spacing and setback along the pavement. Street trees are specifically identified by WSDOT Landscape Architect.

1.1.3 Additional Terms

Caliper: Tree diameter measured 6 inches above grade.

DSH: Diameter at standard height – the diameter of the trunk measured 54 inches (4.5 feet) above grade; if multiple stems, single-stem equivalent is used for replacement calculations per the *Plant Appraisal Guide* (ASCA 2018).

LOD: Limits of disturbance, calculated for each individual tree, delineated with tree protection barriers, determined by a qualified arborist (Tree Solutions 2019).

RLOD: Recommended limits of disturbance – as outlined in International Society of Arboriculture (ISA) *Best Management Practices: Managing Trees During Construction* (Fite and Smiley 2016). RLOD is calculated as a radial distance 8 times the trunk diameter. Some cases require 12 times the trunk diameter. For the purpose of this report, this represents the critical root zone (CRZ). The RLOD is determined by a qualified arborist.

TPZ: Tree protection zone, calculated for each individual tree, using a distance from each tree based on species tolerance to construction damage, relative tree age, and trunk diameter (Fite and Smiley 2016). The TPZ is determined by a qualified arborist.

1.2 TREE REMOVAL PERMIT AND APPLICATION REQUIREMENTS

This section focuses on the application requirements for a Tree Permit through Mercer Island. Although WSDOT requirements are identified throughout this document, the focus of the Tree Management Plan is addressing permit conditions for Mercer Island.

1.2.1 MICC 19.10.020 Applicability and Permit Required

According to MICC 19.10.020, the following provisions are required to be approved prior to removing trees on Mercer Island, with the exception of trees that are exempt pursuant to MICC 19.10.030.

- Permit approval to remove 1 or more nonhazardous trees may take the form of a tree removal permit or other construction permit approval.
- Permit approval to remove 1 or more trees that pose an imminent threat to life or property, such as tree limbs or trunks that are demonstrably cracked, leaning toward overhead utility lines or structures, or uprooted by flooding, heavy winds, or storm events, in which event the permit must be applied for within 14 days of the removal. Permit applications shall be accompanied by documentation of the imminent threat to life or property, ideally in the form of a report by a qualified arborist, but at least in

² Language in proposed WSDOT Roadside Policy Manual currently under revision, provided by a WSDOT Landscape Architect

the form of photographs that clearly depict the threat. Prior notice of the impending tree removal should be provided to the city.

- For the purposes of this section, tree removal includes the cutting or removing directly or indirectly through site grading of any tree, or root destruction that will result in a tree ultimately becoming a hazardous tree. (Ord. 17C-15 § 1 (Att. A)).

1.2.2 MICC 19.10.090 Tree Removal Application Requirements

The NME Project will comply with the tree removal application requirements described in MICC 19.10.090. Because the supporting documentation that shows compliance with these requirements will be spread across multiple documents within the land use package, Table 2 identifies the location of each of the requirements within the land use package and where the information can be found. Please note that the final tree permit will be applied for during the construction permit process (e.g., building permits, clearing and grading permits). Additional MICC code compliance related to tree and vegetation activities within the NME Project area is discussed in the Code Compliance Narrative.

Table 2. Locations of Tree Information within the NME Project Land Use Package for Mercer Island

Tree Removal Application Requirements	Located within the Land Use Package Document				
	Arborist Report	CAS	Land Use Drawings	Application Materials	Tree Management Plan
A. General Information					
1. Name, address, and telephone of applicant and property owners, and address of the property.	--	--	--	●	--
2. Proposed location, species, diameter, and number of trees proposed to be cut or pruned.	●	●	--	--	● (summary tables)
3. Proposed location and number of any required replacement trees.	--	--	● (portion of trees)	--	● (summary tables, remaining fee-in-lieu proposals)
4. Site plan reflecting the location of large trees and relative location of structures, driveways, and buildings.	●	--	●	--	● (summary tables)
5. Additional information required by the city to confirm compliance with this MICC 19.10.090 or MICC 19.07.	●	●	●	--	● (summary tables)
B. Critical Tree Area					
Trees located in a critical tree area, as defined in MICC 19.16, shall include a proposed time schedule for the cutting, land restoration, and implementation of erosion control and other measures to prevent damage in a critical tree area.	●	●	--	--	● (summary tables)
C. Development Plan Set (PLAN)					
1. Detailed Site Plan					
a. Location of all proposed improvements, including building footprint, access, utilities, applicable setbacks, buffers, and required landscaped areas, clearly identified;	●	--	●	--	--
b. Accurate location of large trees on the subject property (surveyed locations may be required). The site plan must also include the trunk location and critical root zone of large trees that are on adjacent property with driplines extending over the subject property line;	●	--	●	--	--

Table 2. Locations of Tree Information within the NME Project Land Use Package for Mercer Island

Tree Removal Application Requirements	Located within the Land Use Package Document				
	Arborist Report	CAS	Land Use Drawings	Application Materials	Tree Management Plan
c. Trees labeled corresponding to the tree inventory numbering system;	●	--	●	--	--
d. Location of tree protection measures;	●	--	●	--	--
e. LOD drawn to scale around all trees potentially impacted by site disturbances resulting from grading, demolition, or construction activities (including approximate LOD of offsite trees with overhanging driplines);	●	--	●	--	--
f. Proposed tree status (trees to be removed or retained) noted by an 'X' or by ghosting out;	●	--	●	--	--
g. Proposed locations of any required replacement trees.		--	● (portion of the trees)	--	● (summary tables, remaining fee-in-lieu proposals)
2. Tree Retention Plan or Arborist Report					
a. Tree inventory;	●	--	--	--	--
b. An arborist report, prepared by a qualified arborist.	●	--	--	--	--
3. Additional Information - the city arborist may require additional documentation, plans, or information as needed to ensure compliance with applicable city regulations.					
	●	--	--	--	--

CAS = Critical Area Study; LOD = limits of disturbance; MICC = Mercer Island City Code

● = located within the identified land use package document.

1.3 NME PROJECT TREE REMOVAL AND MICC CODE COMPLIANCE

Tree regulations identified in the MICC are to protect, enhance, and maintain trees that were identified as key community values expressed in the Mercer Island comprehensive plan. The purpose of the tree regulations on Mercer Island are to “encourage building and site design to minimize tree removal, and to establish standards and procedures that will result in the retention of trees on Mercer Island.”

The NME Project falls under the category identified in the MICC as a “Development Tree Removal.” The following requirements are needed for this type of tree removal (MICC 19.10.010.C):

1. A full application is required. The application provides details for the trees onsite, the removed trees, and the proposed protection measures for trees that will remain (see Section 1.2 above and MICC 19.10.090 for details).
2. Retention of some trees is required. At a minimum, 30% of the trees will need to be retained. Trees that are exceptional, are large, and have a high likelihood for long-term survival are prioritized for retention (see Section 4.1 below and MICC 19.10.060 for details).
3. Replacement trees are required for the tree(s) removed, typically between October 1 and April 1 following removal (see Section 4.2 below and MICC 19.10.070 for details). (Ord. 17C-15 § 1 (Att. A)).

In areas of the NME Project that fall within single-family residential zoning designations, the following additional requirements are needed for tree retention and removal (MICC 19.10.060.2-3):

1. Retention Requirement. Development proposals specified under subsection (A)(1) of this section shall retain trees as follows:
 - a. A minimum of 30% of trees with a diameter of 10 inches or greater, or that otherwise meet the definition of large tree, shall be retained over a rolling 5-year period.
 - b. In addition to the retention required in subsection (A)(2)(a) of this section, the development proposal shall be designed to further minimize the removal of large trees and maximize onsite tree retention as follows:
 - i. Site improvements, including but not limited to new single-family homes, additions to a single-family home, appurtenances, accessory structures, utilities, and driveways, shall be designed and located to minimize tree removal during and following construction.
 - ii. The following trees shall be prioritized for retention:
 - A. Exceptional trees;
 - B. Trees with a diameter of more than 24 inches;
 - C. Trees that have a greater likelihood of longevity; and
 - D. Trees that are part of a healthy grove.
 - iii. Trees shall not be removed outside the area of land disturbance except where necessary to install site improvements (e.g., driveways, utilities, etc.).
 - iv. Tree removal for the purposes of site landscaping should be limited to those trees that will pose a future safety hazard to existing or proposed site improvements.
 - c. Provide tree replacement pursuant to MICC 19.10.070.
2. Retention of Exceptional Trees. Development proposals specified under subsection (A)(1) of this section shall retain exceptional trees with a diameter of 24 inches or more. Exceptional trees with a diameter of 24 inches or more that are retained shall be credited towards compliance with the retention requirements of subsection (A)(2) of this section. Removal of exceptional trees with a diameter of 24 inches or more, shall be limited to the following circumstances:
 - a. Retention of an exceptional tree(s) with a diameter of 24 inches or more will result in an unavoidable hazardous situation; or
 - b. Retention of an exceptional tree(s) with a diameter of 24 inches or more will limit the constructible gross floor area to less than 85% of the maximum gross floor area allowed under Chapter 19.02 MICC; or,
 - c. Retention of an exceptional tree(s) with a diameter of 24 inches or more will prevent creation of a residential lot through a subdivision or short subdivision that is otherwise allowed by this title.

2. TREE REMOVALS SUMMARY

The NME Project proposes to remove a total of 380 live regulated trees within the construction limits on Mercer Island, and 67 live unregulated trees or small trees (Table 3). This section summarizes tree removals of regulated trees within critical areas and shorelands (Section 2.1) and outside of critical areas (Section 2.2). Tree removals are summarized by the NME Project work areas (excluding the East Channel of Lake Washington) and relevant jurisdictions.

2.1 TREE REMOVALS WITHIN CRITICAL AREAS AND SHORELANDS

Several critical areas and shorelands are identified within the NME Project on Mercer Island (Table 3). Please note that a full discussion of critical areas and shorelands is in the Critical Area Study (CAS) provided in the land use application package. Shorelands also have specific code requirements under the Shoreline Master Program (SMP) that will also be addressed in the CAS. Critical areas and shorelands within the NME Project, as they fall within NME Project work areas, are show above in Figure 2 above.

Table 3. Critical Areas and Shorelines in the City of Mercer Island

Critical Areas and Shorelines	Mercer Island Code	Buffer Width (feet)	Setback (feet)
Watercourses			
Stream adjacent to NMPS (Type F)	MICC 19.07.180	120	10
Stream adjacent to Luther Burbank Park parking lot and 96 th Avenue Siphon (Type Np) and the I-90 Trial (Type Ns)	MICC 19.07.180	60	10
Piped streams	MICC 19.07.180	No buffer	45 (covered) 15 (daylighted)
Geologically Hazardous Areas*			
Steep Slopes	MICC 19.07.160	75**	N/A
Shallow Landslide Hazard Areas	MICC 19.07.160	25	N/A
Deep-Seated Landslide Hazard Areas	MICC 19.07.160	75	N/A
Seismic Hazard Areas	MICC 19.07.160	50	N/A
Fish and Wildlife Habitat Conservation Areas			
Habitat for state or federally-listed endangered, threatened, sensitive, or candidate species, or species of local importance	MICC 19.07.170	Varied, species-specific	N/A
Priority habitats, as identified by WDFW	MICC 19.07.170	Varied, species-specific	N/A
Areas used by bald eagles for foraging, nesting, and roosting, or within 660 feet of a bald eagle nest	MICC 19.07.170	660 330 (minimum)	N/A
Watercourses and wetlands and their buffers	MICC 19.07.170	see watercourses	see watercourses
Biodiversity areas	MICC 19.07.170	N/A	N/A
Shoreline Master Program (SMP)			
Shorelands	MICC 19.13.050***	200****	25

*A geotechnical technical report was conducted for the NME Project (Shannon & Wilson 2018a,b).

**Buffer from top and toe of slope only.

***Note that this document uses the code references for the revised SMP (MICC 19.13), as provided by Mercer Island (2019b) because the older SMP references (MICC 19.07.110) overlap with Critical Area Studies within the revised CAO

****200 feet is the definition of shorelands, which is not technically a "buffer."

Potential impacts to critical areas and shorelands are analyzed for the purposes of preventing undue hazards to public health, safety, and welfare by minimizing impacts to critical areas; of implementing the Mercer Island's comprehensive plan; and responding to the goals and objectives of the Washington State Growth Management Act, while reflecting the local conditions and priorities of Mercer Island (MICC 19.070.010). Requirements of MICC 19.07.050 *Critical Area Study* include the identification of existing trees and vegetation, proposed removals of trees and vegetation, and proposed mitigation for tree and vegetation removal within critical areas on Mercer Island. Proposed tree removals within critical areas, critical area buffers, and shorelands are summarized in Table 4 by NME Project work area and jurisdiction. There are no tree removals within geologic hazardous areas. Note that the table below only includes *regulated* trees, as defined in Section 1.1 above.

Table 4. Proposed Tree Removal within Critical Areas and Buffers

Work Area and Jurisdiction	Total Regulated Tree Removals	Live/Dead	Qty Live Large/Moderate-Large*	Qty Live Exceptional/Mature*	Tree IDs	Land Use Drawing Sheet #
Watercourse Buffers						
NMPS and NMPS Stream						
King County	24	24 live/ 0 dead	17	7	1-16, 38, 45, 50-55	VI: D-101
Mercer Island	1	1 live/ 0 dead	1	--	19593	V2: C201
Private	--	--	--	--	--	--
WSDOT	--	--	--	--	--	--
Street ROWs and I-90 Trail						
King County	--	--	--	--	--	--
Mercer Island	--	--	--	--	--	--
Private	--	--	--	--	--	--
WSDOT	--	--	--	--	--	--
Steep Slopes/Landslide Hazard Areas						
Street ROWs and I-90 Trail						
King County	--	--	--	--	--	--
Mercer Island	3	3 live/ 0 dead	--	--	31452, 31453, 31097	V2: C223-224
Private	--	--	--	--	--	--
WSDOT	22	15 live/ 7 dead	15 (5 street)	--	31099-31100, 31425-27, 31803, 31998, 32058, 32064, 32085, 32087-88, 32114-15, 32118	V2: C221-222, C224
LS-11 (Fruitland Landing Park)						
King County	--	--	--	--	--	--
Mercer Island	--	--	--	--	--	--
Private	--	--	--	--	--	--
WSDOT	--	--	--	--	--	--
96 th Ave Siphon						
King County	--	--	--	--	--	--
Mercer Island	--	--	--	--	--	--
Private	--	--	--	--	--	--
WSDOT	4	4 live/ 0 dead	4	--	24340-41, 35757, 35761	V2: C212

Table 4. Proposed Tree Removal within Critical Areas and Buffers

Work Area and Jurisdiction	Total Regulated Tree Removals	Live/Dead	Qty Live Large/Moderate-Large*	Qty Live Exceptional/Mature*	Tree IDs	Land Use Drawing Sheet #
Mercer Island Boat Launch						
King County	--	--	--	--	--	--
Mercer Island	--	--	--	--	--	--
Private	--	--	--	--	--	--
WSDOT	--	--	--	--	--	--
Steep Slopes/Landslide Hazard Area Buffers						
Street ROWs and I-90 Trail						
King County	--	--	--	--	--	--
Mercer Island	5	5 live/ 0 dead	5	--	30112, 30904, 31454, 35515, 35517	V2: C214, C223, C225- C226
Private	--	--	--	--	--	--
WSDOT	183	171 live/ 12 dead	171 (33 street)	--	66, 68, 24135-38, 24140, 24142, 24144-48, 24155-57, 24162, 24164, 24166, 24171- 73, 24184, 24193, 24197, 24200, 24232-34, 24236, 24299, 24317, 30113, 30137- 38, 30887-92, 31101-04, 31422-24, 31436-37, 31455- 56, 31624-29, 31631-33, 31635, 31640-42, 31644-48, 31650-51, 31656, 31660-61, 31663, 31666-67, 31671, 31674, 31804-13, 31815, 31817, 31821, 31824, 31826, 31828, 31955, 31969, 31971, 31974, 31991-97, 34284, 34289-90, 34298-99, 34304, 34308, 34311-12, 34316, 34318, 34321, 34325-27, 34333, 34966-72, 34975, 35001, 35005, 35010, 35014- 15, 35020-25, 35072, 35075, 35078-79, 35083, 35086-87, 35089, 35218, 35221, 35228- 30, 35313, 35317, 35319-21, 35323-24, 35326, 35332, 35336-38, 35344, 35512-14	V2: C214- 218, C221- 226
LS-11 (Fruitland Landing Park)						
King County	--	--	--	--	--	--
Mercer Island	--	--	--	--	--	--
Private	--	--	--	--	--	--
WSDOT	--	--	--	--	--	--
96th Ave Siphon						
King County	--	--	--	--	--	--
Mercer Island	9	9 live/ 0 dead	9	--	35518-19, 35521, 35525-29, 35531	V2: C213

Table 4. Proposed Tree Removal within Critical Areas and Buffers

Work Area and Jurisdiction	Total Regulated Tree Removals	Live/Dead	Qty Live Large/Moderate-Large*	Qty Live Exceptional/Mature*	Tree IDs	Land Use Drawing Sheet #
Private	--	--	--	--	--	--
WSDOT	6	5 live/ 1 dead	5 (1 street)	--	19147, 35756, 35900-01, 35533	V2: C211- 213
Mercer Island Boat Launch						
King County	--	--	--	--	--	--
Mercer Island	--	--	--	--	--	--
Private	--	--	--	--	--	--
WSDOT	--	--	--	--	--	--
Seismic Hazard Areas						
Street ROWs and I-90 Trail						
King County	--	--	--	--	--	--
Mercer Island	2	2 live/ 0 dead	2	--	142, 24339	V2: C207, C228
Private	3	3 live/ 0 dead	1	2	21236, 41899, 41900	C228
WSDOT	--	--	--	--	--	--
LS-11 (Fruitland Landing Park)						
King County	--	--	--	--	--	--
Mercer Island	--	--	--	--	--	--
Private	--	--	--	--	--	--
WSDOT	--	--	--	--	--	--
96th Ave Siphon						
King County	--	--	--	--	--	--
Mercer Island	--	--	--	--	--	--
Private	--	--	--	--	--	--
WSDOT	--	--	--	--	--	--
Mercer Island Boat Launch						
King County	--	--	--	--	--	--
Mercer Island	--	--	--	--	--	--
Private	--	--	--	--	--	--
WSDOT	--	--	--	--	--	--
Subtotal						
King County	24	24 live/ 0 dead	17	7		
Mercer Island	20	20 live/ 0 dead	17	0		
Private	3	3 live/ 0 dead	1	2		
WSDOT	215	195 live/ 20 dead	195 (39 street)	0		
Total	262	242 live/ 20 dead	230	9		

DSH = diameter at standard height; LS-11 = Lift Station 11; MICC = Mercer Island City Code; NMPS = North Mercer Pump Station; ROW = right-of-way; WSDOT = Washington State Department of Transportation

*See Section 1.1 for definitions of trees.

Table 5. Proposed Tree Removal within Shorelands

Work Area and Jurisdiction	Total Regulated Tree Removals	Live/ Dead	Qty Live Large/ Moderate-Large*	Qty Live Exceptional/ Mature*	Tree IDs	Land Use Drawing Sheet #	Critical Area Overlap (accounted for)
Shorelands							
LS-11 (Fruitland Landing Park)							
King County	--	--	--	--	--	--	--
Mercer Island	1**	1 live/ 0 dead	--	1**	10855	VI: C602	Landslide Hazard Buffer
Private	--	--	--	--	--	--	--
WSDOT	--	--	--	--	--	--	--
Street ROWs and I-90 Trail							
King County	--	--	--	--	--	--	--
Mercer Island	--	--	--	--	--	--	--
Private	--	--	--	--	--	--	--
WSDOT	19	18 live/ 1 dead	18	--	156, 158, 160, 162, 164, 166, 168-69, 171-80	V2: C231	--
Mercer Island Boat Launch							
King County	--	--	--	--	--	--	--
Mercer Island	--	--	--	--	--	--	--
Private	--	--	--	--	--	--	--
WSDOT	11	live	11 (incl. 3 street)	--	93, 97, 13946- 13948, 14273- 14277, 16147	V2: C231, C232	no
Subtotal							
King County	--	--	--	--			
Mercer Island	1**	1 live/ 0 dead	--	1**			
Private	--	--	--	--			
WSDOT	30	29 live/ 1 dead	--	--			
Total	31	30 live/ 1 dead	29	1			

DSH = diameter at standard height; LS-11 = Lift Station 11; MICC = Mercer Island City Code; NMPS = North Mercer Pump Station; ROW = right-of-way; WSDOT = Washington State Department of Transportation

*See Section 1.1 for definitions of trees.

**Mercer Island has asked to take responsibility for replacement quantities and locations for this tree, therefore, this exceptional tree will not be accounted for within tree replacement quantities of the NME Project

2.2 TREE REMOVALS OUTSIDE OF CRITICAL AREAS AND SHORELANDS

Tree removals outside of critical areas and shorelands associated with development proposals are regulated under MICC 19.10.060, and require similar reporting requirements to critical area trees. Proposed tree removals outside of critical areas and shorelands are summarize in Table 6 by NME Project work area and jurisdiction. As in Section 2.1 above, the table only includes *regulated* trees, as defined in Section 1.1 above.

Table 6. Proposed Tree Removals Outside of Critical Areas and Shorelands

Work Area and Jurisdiction	Total Reg. Tree Removals	Live/Dead	Qty Live Large/Moderate-Large*	Qty Live Exceptional/Mature*	Tree IDs	Land Use Drawing Sheet #
NMPS and NMPS Stream						
King County	--	--	--	--	--	--
Mercer Island	--	--	--	--	--	--
Private	--	--	--	--	--	--
WSDOT	--	--	--	--	--	--
Street ROWs and I-90 Trail						
King County	--	--	--	--	--	--
Mercer Island	4	3 live/ 1 dead	3	--	10178, 31004, 30127	C224, C227
Private	9	9 live/ 0 dead	7	2	10171-72, 10172, 20183-85, 21318, 21320, 36485-86	C227, C228
WSDOT	63	57 live/ 5 dead	57 (26 street)	--	143, 149-50, 11174, 11228, 11230, 15276-79, 15297, 19667, 19672, 30114, 30131-36, 30883-86, 30986, 30991-92, 30994-95, 30997-100, 31003, 31005-07, 31009, 31011, 31105-06, 31419-20, 31438-40, 31964, 31970, 31972-73, 36459-65	C221, C223-227, C229-231
LS-11 (Fruitland Landing Park)						
King County	--	--	--	--	--	--
Mercer Island	--	--	--	--	--	--
Private	--	--	--	--	--	--
WSDOT	--	--	--	--	--	--
96th Avenue Siphon						
King County	--	--	--	--	--	--
Mercer Island	--	--	--	--	--	--
Private	--	--	--	--	--	--
WSDOT	19	16 live/ 3 dead	16	--	19010-11, 19013, 19117-22, 24343-45, 35753, 35755, 35770, 35786	V2: C211-213
Mercer Island Boat Launch						
King County	--	--	--	--	--	--
Mercer Island	--	--	--	--	--	--
Private	--	--	--	--	--	--
WSDOT	--	--	--	--	--	--
Subtotal						
King County	--	--	--	--	--	--
Mercer Island	4	3 live/ 1 dead	3	--	--	--
Private	9	9 live/ 0 dead	7	2	--	--
WSDOT	82	73 live/ 8 dead	73 (26 street)	--	--	--
Total	95	85 live/ 9 dead	83	2		

DSH = diameter at standard height; MICC = Mercer Island City Code; NMPS = North Mercer Pump Station; ROW = right-of-way; WSDOT = Washington State Department of Transportation

*See Section 1.1 for definitions of trees

3. TREE PROTECTION SUMMARY & STRATEGY

Mercer Island requires development projects to identify trees for protection and use best management practices (BMPs) to ensure the long-term viability of those trees (MICC 19.10.080). Below, is a summary of the proposed trees identified for protection (Section 3.1), tree protection criteria identified in the MICC (Section 3.2), and the NME Project’s tree protection techniques (Section 3.3). A tree protection plan is required by MICC 19.10.080 and is discussed in further detail in Section 4.3 of the Arborist Report (Tree Solutions 2019). An additional tree protection plan will be required as a submittal by the contractor's project arborist.

3.1 TREE PROTECTION SUMMARY

MICC 19.10.080 requires that a tree protection plan be prepared by a qualified arborist. The majority of details in the tree protection plan are provided in the Arborist Report (Tree Solutions 2019), which was prepared by a qualified arborist. Table 7 provides a summary of the proposed trees to be protected by work area and jurisdiction. Protected trees are those within 20 feet of the alignment which overlap with work limits or access and require protection action to preserve their current conditions. Further tree protection details are included in Sections 4.3 and Appendix F of the Arborist Report.

Table 7. Proposed Trees to be Protected

Work Area and Jurisdiction	# of Total Trees Protected	Quantity Large/Moderate-Large*	Quantity Exceptional/Mature*	Land Use Drawing Sheet #
NMPS and NMPS Stream				
King County	25	1	24	V1: D-C101
Mercer Island	1	--	1	V1: D-C101
Private	1	--	1	V1: D-C101
WSDOT	--	--	--	--
Street ROWs and I-90 Trail				
King County	--	--	--	--
Mercer Island	134	66	17	V2: C116, C162, C202-C208, C218, C220, C221, C225, C227, C230, C231
Private	21	16	4	V2: C202-C205, C218, C220, C227-C229
WSDOT	164	154	--	V2: C161, C209-C210, C214-C217, C221-C224, C226-C227, C229-C231
LS-11 (Fruitland Landing Park)				
King County	--	--	--	--
Mercer Island	8	7	1	V1: C602, C608
Private	--	--	--	--
WSDOT	--	--	--	--

Table 7. Proposed Trees to be Protected

Work Area and Jurisdiction	# of Total Trees Protected	Quantity Large/Moderate-Large*	Quantity Exceptional/Mature*	Land Use Drawing Sheet #
96th Avenue Siphon				
King County	--	--	--	--
Mercer Island	1	--	--	V2: C213
Private	7	5	1	V2: C211-212
WSDOT	36	34	--	V2: C211-C213
Mercer Island Boat Launch				
King County	--	--	--	--
Mercer Island	--	--	--	--
Private	--	--	--	--
WSDOT	47	38	--	V2: C131, C231
Subtotal				
King County	25	1	24	
Mercer Island	144	73	19	
Private	29	21	6	
WSDOT	247	226	0	
Total	445	321	49	


DSH = diameter at standard height; NMPS = North Mercer Pump Station; WSDOT = Washington State Department of Transportation

*See Section 1.1 for definitions of trees

3.2 TREE PROTECTION STANDARDS

As required by MICC 19.10.080, tree protection guidelines establish a TPZ for each individual tree. The TPZ uses a distance from each tree based on species tolerance to construction damage, relative tree age, and trunk diameter.

The TPZ for the NME Project was converted to an RLOD by a certified arborist (Arborist Report, Appendix F) and within the Site Plan. The RLOD is the distance from the trunk where no disturbance should occur. This distance is calculated by multiplying the trunk diameter by a TPZ factor. For most trees along the NME Project alignment, a certified arborist applied a TPZ factor of 8. For tree species with a low tolerance to construction damage (e.g., Katsuya, red alder, western red cedar, black cottonwood), and for mature trees greater than 30 inches in diameter, the arborist used a factor of 12. Further discussion of the RLOD calculations and caveats may be found in Section 4.3 of the Arborist Report (Tree Solutions 2019).

Within the Land Use Drawings Volumes I and II, the RLOD for each regulated tree is designated by  symbology. Within the Arborist Report, the RLOD for each tree is designated within Appendix F.

Based on MICC 19.10.080(B), the Mercer Island arborist may approve construction-related activity of work within the tree protection barriers (e.g., RLOD) if the Mercer Island arborist concludes that:

- Such activity of work will not threaten the long-term health of the retained tree(s).
- Such activity of work complies with the protective methods and best building practices established by the ISA.

3.3 TREE PROTECTION TECHNIQUES

Tree protection techniques are based on BMPs, as outlined by Fite and Smiley (2016). Trees proposed to be protected are designated within the Land Use Drawings using the symbology identified in Section 3.2 above. The

proposed tree protection technique for each tree is designated within Appendix F of the Arborist Report (Tree Solutions 2019).

Tree protection techniques proposed for use within the NME Project on Mercer Island include the following:

1. Primary proposed tree protection strategies for the majority of protected trees throughout the Mercer Island alignment.
 - a. **Tree Protection Fencing:** All trees planned for retention or on neighboring properties that overhang the site shall be protected when construction activities are occurring within the immediate vicinity. Tree protection fencing shall consist of 6-foot tall chain link fencing installed at the extent of the tree protection area. Fencing should encompass the entire area for groups of trees.
 - b. **Signage:** Fencing should also have clear, large signage noting that fencing cannot be moved without an arborist present.
 - c. **Soil Protection:** No parking, materials storage, or dumping (including excavated soils) are allowed within the tree protection area. Any heavy machinery should remain outside of the protection area unless soils are protected from the load. Acceptable methods of soil protection include applying 1-inch plywood over 3 to 4 inches of wood chip mulch, steel plates, or use of Alterna mats (or equivalent product).
2. Common proposed tree protection techniques for trees throughout the Mercer Island alignment:
 - a. **Clearance Pruning:** Any pruning required for construction and safety clearance shall be done with a pruning specification provided by the project arborist in accordance with 2008 American National Standards Institute (ANSI) A300 Standard Practices for Pruning. Use of an arborist with an ISA Certification to perform pruning is strongly advised.
 - b. **Duff/Mulch:** Retain and protect as much of the existing duff and understory as possible. Retained trees in areas where there are exposed soils shall have 4 to 6 inches of wood chips applied to help prevent water evaporation and compaction. Keep mulch 1 foot away from the base of the tree.
 - c. **Temporary Irrigation:** Retained trees will require supplemental water if construction occurs during summer drought periods.
3. Other tree protection techniques under consideration:
 - a. **Alternative Excavation:** Excavation done at or within the tree protection area should be carefully planned to minimize disturbance. Where feasible, consider using alternative methods such as pneumatic excavation using pressurized air to blow soil away from the root system, directional drilling to bore utility lines, or hand excavation to expose roots. Excavation done with machinery (backhoe) in proximity of trees should be performed slowly with flat front buckets, removing small amounts of soil at a time with one person on the ground spotting for roots. When roots are encountered, excavation should stop, and roots should be cleanly pruned as needed.
 - b. **Root Pruning:** Root pruning should be limited to the extent possible. All roots shall be pruned with a sharp saw making clean cuts. Avoid fracturing and breaking roots with excavation equipment. Root cuts shall be immediately covered with soil or mulch and kept moist.

Tree protection techniques should include limiting over-excavation by marking the trench width on the pavement prior to digging, using small equipment (as available) with a narrow flat front bucket, and having someone on the ground spotting for roots greater than 3 inches in diameter.

Alternative trenching methods may need to be considered if a significant root mass is uncovered (i.e., pneumatic /hydro excavation or directional boring), depending on the proposed construction. At this time, no proposed construction techniques would allow for these alternatives.

While not required specifically by WSDOT or Mercer Island, MICC states that BMPs should be followed for tree protection. The above listed methods are components of the BMPs.

4. TREE RETENTION & REPLACEMENT STRATEGY

Mercer Island requires development projects to identify a tree retention and replacement strategy (MICC 19.10.090). WSDOT (2015) also defines specific replacement criteria for trees within their jurisdiction. Below is a summary of the proposed tree retention (Section 4.1) and proposed tree replacements (Section 4.2) for Mercer Island and WSDOT.

4.1 TREE RETENTION

Specific tree retention is not identified under the WSDOT (2015) *Roadside Policy Manual*, but there are specific retention regulations for Mercer Island. According to MICC 19.10.010, a minimum of 30% of the trees within a development project need to be retained. No Action trees were surveyed within twenty feet of the alignment according to the 30% Design and require no action for the preservation of their current conditions. Protected or Removed trees within the survey overlap with work limits or access and require protection action to preserve their current conditions, or removal and replacement. Trees that are exceptional or large, and have a high likelihood for long-term survival, are prioritized for retention (see MICC 19.10.060 for details). Mercer Island tree retention regulations have been applied across all trees within the NME Project and across all jurisdictions on Mercer Island, including WSDOT ROW. The NME Project will retain 48% of impacted trees (Table 8), meeting Mercer Island's 30% minimum for tree retention, including 14 exceptional trees of ≥ 24 -inch DSH that shall be credited towards compliance with the retention requirements (MICC 19.10.060.3).

Table 8. Proposed Tree Retention for the NME Project

Proposed Action	Quantity of Trees
No Action (unimpacted)	224
Protected*	
Exceptional	62 (incl. 11 ≥ 24 -inches DSH**)
Large	313
Small (including early successional)	78
Dead (snag)	3
Total Protected	456
Removed*	
Exceptional	19
Large	361
Small (including early successional)	67
Dead	31
Total Removed	478
Total Trees Surveyed	1,158
Total Trees Impacted (Protected or Removed)	934
Percent Retention (Protected/Impacted)	49%

DSH = diameter at standard height; NMPS = North Mercer Pump Station; WSDOT = Washington State Department of Transportation

*See Section 1.1 for definitions of trees.

**Retention of exceptional trees ≥ 24 -inches DSH shall be credited towards compliance with the retention requirements (MICC 19.10.060.3).

4.2 TREE REPLACEMENTS

Trees that are removed are required to be replaced in accordance with MICC and WSDOT policies, depending on the location of the tree that is being removed. The following section provides information on the Mercer Island tree replacement requirements (Section 4.2.1), WSDOT tree replacement requirements (Section 4.2.2), tree replacement calculations and quantities (Section 4.2.3), tree replacement locations and design (Section 4.2.4), tree replacement schedule (Section 4.2.5), and in-lieu tree replacement fees (Section 4.2.6).

This information is a combination of direct consultation with Mercer Island and WSDOT on a tree replacement strategy and the requirements specified under each jurisdiction. Please note that the NME Project is in consultation with both Mercer Island and WSDOT on final tree replacement quantities. Replacement locations are being developed for offsite planting, but have not been fully determined. The Arborist Report (Tree Solutions 2019) further describes specifications for planting trees types (Appendix B) and tree replacement regulations for Mercer Island (Appendix C). A summary of tree replacement regulations for the NME Project was identified both above and below (Sections 3.3-3.4, 4.1-4.2).

4.2.1 Mercer Island Tree Replacement Requirements

Trees on King County property, within the Mercer Island ROW, or on private property are subject to replacement requirements under MICC 19.10.070 (Table 9). Additional discussions with Mercer Island on tree replacement requirements are on-going.

Table 9. Mercer Island Tree Replacement Requirements

Diameter of Removed Tree (inches)	Replacements Required (quantity of 6-inch conifer/1.5-inch caliper deciduous/\$500)
All exceptional trees	6
>36 (Exceptional - regulated)	6
24 – 36 (Large - regulated)	3
10 – 24 (Large - regulated)	2
< 10* (Small – unregulated)	1

*Trees of this size require replacement on private property only if they were initially planted as required replacement trees and have not yet reached 10 inches. Mercer Island ROW trees >6 inches will likely require a 1:1 replacement as well.

4.2.2 WSDOT Tree Replacement Requirements

Where preservation of vegetation and soil is not practical, WSDOT requires restoration of the disturbed area. This includes tree replacement for all WSDOT street trees, trees greater than 30 inches DSH, and trees (with the exception of red alders, willow, and black cottonwood) larger than 4 inches that will be removed (Table 10). These replacement requirements are based off the replacement ratios in the WSDOT (2015) *Roadside Policy Manual*, and from conversations with the current WSDOT landscape architect, who provided information regarding street tree definitions (WSDOT – Peterson, pers. comm., 2018). WSDOT intends to include street tree designations in their next revised *Roadside Policy Manual* and implement regulations for street trees for the NME Project. However, it is also understood that trees were originally planted at densities that were too high for survival along the I-90 Trail, and expected attrition from the regulated trees may need to be incorporated into the tree replacement requirements. Further discussion of WSDOT tree and vegetation replacement can be found within Section 3.3 of the Arborist Report, and are on-going for the NME Project with WSDOT.

Table 10. Tree Replacement Requirements (WSDOT)

Classification*	Diameter of Removed Tree (inches)	Replacements Required (qty of 1-gallon)	Replacements Required (qty of 2-gallon)	Replacements Required (qty of 2.5-inch caliper)
Category 1	>30	TBD**	--	--
Category 2	10+	10+***	5+	--
Category 2	9	9	4.5	--
Category 2	8	8	4	--
Category 2	7	7	3.5	--
Category 2	6	6	3	--
Category 2	5	5	2.5	--
Category 2	4	4	2	--
Category 3	n/a	1****	--	--
Street Tree	n/a	--	--	1

DSH = diameter at standard height; TBD = to be determined; WSDOT = Washington State Department of Transportation

*Category 1 = Mature trees >30 inches DSH; Category 2 = Moderate-sized trees with 4 inches to 30 inches DSH; Category 3 = Small trees <4-inch DSH; Street trees are designated by a WSDOT landscape architect. Early successional species (such as red alder (*Alnus rubra*), willow (*Salix* spp.), and black cottonwood (*Populus trichocarpa*) only require replacements if they are Category 1 or street trees.

**Category 1 tree replacement requirements (quantity and size) to be determined by highly qualified landscape architect.

***Category 2 trees should be replaced at a ratio of one 1-gallon replacement tree for each 1-inch of trunk diameter. The quantity of required replacements for Category 2 trees can be reduced if the size of nursery stock is increased.

****Category 3 trees should be replaced using a 1:1 ratio, following BMPs for restoration of disturbed areas. Planted material may be a mix of trees and shrubs.

4.2.3 Tree Replacement Calculations and Quantities

Basic tree replacements for the NME Project include all regulated trees by Mercer Island and WSDOT (Table 11), without consideration of existing densities that are not sustainable or other conversations that are on-going with both Mercer Island and WSDOT. This also does not include dead trees, small diameter trees, or early successional species identified in along the proposed NME Project alignment (see Arborist Report for this information).

Table 11. Summary of Required Tree Replacements

Location and Tree Type	Total Live Removals	Replacement Requirements	Quantity of Replacements Required*			
			6-Foot Conifer/ 1.5-Inch Caliper/ \$500	1-Gallon	2-Gallon Alternative	2.5-Inch Caliper
King County Property						
Exceptional	2	Six 6-foot conifer / 1.5" caliper deciduous / \$500	12	--	--	--
Exceptional - Grove	5	Six 6-foot conifer / 1.5" caliper deciduous / \$500	30	--	--	--
Large (Regulated) >10-inch DSH	17	Two 6-foot conifer / 1.5" caliper deciduous / \$500	34	--	--	--
Mercer Island ROW						
Exceptional	0	Six 6-foot conifer / 1.5" caliper deciduous / \$500	0	--	--	--
10- to 24-inch DSH	23	Two 6-foot conifer / 1.5" caliper deciduous / \$500	46	--	--	--
6- to 10-inch DSH	22	One 6-foot conifer / 1.5" caliper deciduous / \$500	22	--	--	--
<6-inch DSH**	8	One 6-foot conifer / 1.5" caliper deciduous / \$500	8	--	--	--
Private Property***						
Exceptional	2	Six 6-foot conifer / 1.5" caliper deciduous / \$500	12	--	--	--
Exceptional - Grove	9	Six 6-foot conifer / 1.5" caliper deciduous / \$500	54	--	--	--
Large (Regulated) >10-inch DSH	8	Two 6-foot conifer / 1.5" caliper deciduous / \$500	16	--	--	--
WSDOT ROW						
Category 2	245	Four to >ten 1-gallon (Alt: two to >five 2-gal)	--	2,414	1207	--
Street Tree	68	One 2.5-inch caliper	--	--	--	68
Category 3****	24	One 1-gallon (Alt: two to >five 2-gal)	--	24	12	--
Totals	433		234	2,438	1,219	68

*Quantities may be reduced if larger plants are installed, or based on other agreements with either Mercer Island or WSDOT.

**Mercer Island ROW trees >6-inch DSH will likely require a 1:1 replacement.

***Trees <10-inches DSH require replacement on private property only if they were initially planted as required replacement trees and have not yet reached 10 inches.

****Category 3 trees should be replaced using a 1:1 ratio, following BMPs for restoration of disturbed areas. Planted material may be a mix of trees and shrubs.

4.2.4 Tree Replacement Locations and Design

Based on the information presented above, a total of 234, 6-foot conifers, 2,438, 1-gallon trees (or 1,219, 2-gallon trees), and 68, 2.5-inch caliper trees are required to be replaced along the NME Project alignment. A total of 675 trees are currently proposed for replacement for the NME Project, with additional trees to be provided using fee-in-lieu of planting onsite or planting other offsite locations due to the restriction in the amount of planting area onsite. The currently proposed locations of the tree replacements proposed will occur in the following work areas:

- **NMPS and NMPS Stream:** The NME Project proposes to conduct facility improvements for the existing pump station located on Mercer Island. Trees will be replaced along the stream buffer on the King County property. The NME Project also proposes to replace the existing pipe by installing new sewer pipe using typical open cut-and-cover construction methods across the stream adjacent to NMPS on King County property. Access for the NMPS stream crossing work will be off the public ROW, and then through existing developed areas associated with the NMPS facility.
 - Conceptual restoration layout: PLAN (V1: L101 – L104; V2: C081 – C086, C401)
 - Total restoration area: 26,524 square feet
 - Proposed trees: A total of 173 trees within Planting Mix A through D and Planting Mix G
- **Street ROWs and I-90 Trail:** The NME Project proposes to install new pipe from the NMPS Stream to the Mercer Island Boat Launch, primarily along street ROWs and the I-90 Trail. Work along the I-90 Trail itself will include widening the trail from an average 10-foot width to an average 12-foot width with 2-foot shoulder on either side. This trail widening is based on requirements from Mercer Island, as defined in the Aubrey-Davis Master Plan (Mercer Island 2018). Trees will be replaced along the Street ROWs and I-90 Trail work area.
 - Conceptual restoration layout: PLAN (V2: C081 – C086, C402 – C431)
 - Total restoration area: 59,442 square feet (excluding lawn seeding)
 - Proposed trees: A total of 300 trees within Planting Mix A through D and Mix J through Q
- **LS-11 (Fruitland Landing Park):** The NME Project proposes to upgrade the pump station at Fruitland Landing Park to allow decommissioning of existing pipe in Lake Washington around the northeast end of Mercer Island and construct new pipe within upland areas. Trees will be replaced in the Fruitland Landing Park work area.
 - Conceptual restoration layout: PLAN (V1: L-602 – L-602)
 - Total restoration area: 331 square feet (excluding lawn seeding)
 - Proposed trees: A total of 1 tree within Planting Mix A.
- **96th Avenue Siphon:** The NME Project proposes to construct a new siphon close to an existing maintenance hole south of I-90 to allow decommissioning of existing pipe in Lake Washington around the northeast end of Mercer Island and construct new pipe within upland areas. Trees will be replaced in the 96th Avenue Siphon work area.
 - Conceptual restoration layout: PLAN (V2: C081 – C086, C427)
 - Restoration and Tress are accounted for within the I-90 Trail values (above)
- **Mercer Island Boat Launch:** The NME Project proposes to install pipe to connect the upland portions of the North Mercer Island Interceptor to the in-water portions of the East Channel Siphon. Upland areas on either side of the channel crossing will be restored with landscaping and habitat improvements (e.g., anchor logs, gravel).
 - Conceptual restoration layout: PLAN (V2: C087, C431 – C432)
 - Total restoration area: 13,125 square feet and 887 square feet of live stakes
 - Proposed trees: A total of 191 trees within the Shoreline Restoration Mix Planting Mix Vegetation and additional live stakes

The total number of trees proposed for replacement along the NME Project alignment is 675 trees (Table 12). These numbers are based on the general site restoration and enhancement plans for each work area and the

planting mixes proposed for each location. The locations of the planting mixes are identified in the PLAN drawings. Note that, due to space limitations and revised criteria for the widening of the I-90 Trail, not all trees will be replaced. The preference is to replace the area with lower-elevation shrubs that will not impact sight lines for trail users. The types and quantities of trees to be replaced along the I-90 Trail are based on negotiations with Mercer Island and WSDOT that pair the public need for an upgraded trail and the amount of trees to be removed.

Table 12. Proposed Tree Replacements

Common Name	Scientific Name	Quantity	Root Size	Height (feet)	Land Use Drawing Sheet #
City of Mercer Island (Mercer Island, Private, King County)					
Trees					
Incense cedar	<i>Calocedrus decurrens</i>	8	#95 CONT.	10-12	V1: L101; V2: C413
Magyar ginkgo	<i>Ginkgo biloba 'magyar'</i>	4	2.5 IN CAL., B&B	--	V2: C423, C424, C425
American hornbeam	<i>Carpinus caroliniana</i>	2	#5 CONT.	--	V2: C413
Red rage tupelo	<i>Nyssa silvatica 'red rage'</i>	8	2.5 IN CAL., B&B	--	V2: C413, C414, C426
Persian ironwood	<i>Parrotia persica</i>	3	2.5 IN CAL., B&B	--	V2: C414, C415
Vanessa Persian ironwood	<i>Parrotia persica 'Vanessa'</i>	3	2.0 IN. CAL., B&B		V1: L101
Italian oak	<i>Quercus frainetto</i>	7	2.5 IN CAL., B&B	--	V2: C424, C425
Legacy sugar maple	<i>Acer saccharum 'legacy'</i>	3	2.0 IN CAL, B&B	--	V1: L101
Vine maple	<i>Acer circinatum</i>	1	1.5 IN CAL, B&B	--	V1: L601
Redmond basswood	<i>Tilia americana 'redmond'</i>	13	2.5 IN CAL., B&B	--	V2: C413, C414
Chinese fringe tree	<i>Chionanthus retusus</i>	3	2.0 IN CAL, B&B	--	V1: L101
Western redcedar	<i>Thuja plicata</i>	2	#95 CONT.	10-12	V1: L101
Western redcedar	<i>Thuja plicata</i>	56	#2 CONT.	1.25	V1: L101
Excelsa western redcedar	<i>Thuja plicata 'excelsa'</i>	15	#95 CONT.	10-12	V1: L101
Western hemlock	<i>Tsuga heterophylla</i>	37	#2 CONT.	1.25	V1: L101
Cascara buckthorn	<i>Rhamnus purshiana</i>	21	#2 CONT.	--	V1: L101
Douglas-fir	<i>Pseudotsuga menziesii</i>	35	#2 CONT.	1.25	V1: L101
WSDOT Right-of-Way					
Trees					
Incense cedar	<i>Calocedrus decurrens</i>	130	#5 CONT.	1.5	V2: C411, C412, C413, C417, C421, C422, C423, C424
Eddie's white wonder dogwood	<i>Cornus 'eddie's white wonder'</i>	38	#5 CONT.	--	V2: C411, C412, C413, C417, C421, C422, C423, C424
Magyar ginkgo	<i>Ginkgo biloba 'magyar'</i>	3	2.5 IN CAL., B&B	--	V2: C423, C424
American hornbeam	<i>Carpinus caroliniana</i>	24	#5 CONT.	--	V2: C412, C413, C417, C423
Red rage tupelo	<i>Nyssa silvatica 'red rage'</i>	2	2.5 IN CAL., B&B	--	V2: C412,

Table 12. Proposed Tree Replacements

Common Name	Scientific Name	Quantity	Root Size	Height (feet)	Land Use Drawing Sheet #
Persian ironwood	<i>Parrotia persica</i>	9	2.5 IN CAL., B&B	0.5	V2: C412, C430, 432
Shore pine	<i>Pinus contorta</i>	24	#5 CONT.	--	V2: C411, C412, C417, C421, C422, C423, C424
Italian oak	<i>Quercus frainetto</i>	5	2.5 IN CAL., B&B	--	V2: C423, C424
Western redcedar	<i>Thuja plicata</i>	31	#5 CONT.	1.5	V2: C412, C417, C421
Willows	<i>Salix spp.</i>	188	Live Stakes	--	V2: C430, C432
Shrubs					
Compact strawberry tree	<i>Arbutus unedo</i> 'compacta'	33	#2 CONT.	--	V2: C412
Bitter cherry	<i>Prunus emarginata</i>	5	#2 CONT.	--	V2: C430, 432
Salal	<i>Gaultheria shallon</i>	291	#1 CONT.	--	V2: C430, 432
Tall Oregon-grape	<i>Mahonia aquifolium</i>	217	#2 CONT.	--	V2: C412, C413, C414, C415, C416, C417, C421, C428, C429, C430, 432
Low Oregon-grape	<i>Mahonia nervosa</i>	897	#1 CONT.	--	V2: C430, 432
Creeping Oregon-grape	<i>Mahonia repens</i>	681	#1 CONT.	--	V2: C430, 432
Indian plum	<i>Oemleria cerasiformis</i>	32	#1 CONT.	--	V2: C430, 432
Pacific wax myrtle	<i>Myrica californica</i>	107	#2 CONT.	--	V2: C412, C421, C428, C429
Pacific rhododendron	<i>Rhododendron macrophyllum</i>	7	#2 CONT.	--	V2: C430, 432
Beaked hazelnut	<i>Corylus cornuta</i>	32	#1 CONT.	--	V2: C430, 432
Vine maple	<i>Acer circinatum</i>	137	#2 CONT.	--	V2: C413, C414, C415, C416, C417, C421, C428, C429, C430, 432
Red osier dogwood	<i>Cornus sericea</i>	94	Live Stakes	--	V2: C430, 432
Kelsey dogwood	<i>Cornus sericea</i> 'Kelsey'	469	#1 CONT.	--	V2: C430, 432
Western serviceberry	<i>Amelanchier alnifolia</i>	38	#2 CONT.	--	V2: C413, C414, C415, C416, C417, C429
Evergreen huckleberry	<i>Vaccinium ovatum</i>	395	#1 CONT.	--	V2: C412, C413, C414, C415, C416, C417, C421, C428, C429, C430, 432
Thimbleberry	<i>Rubus parviflorus</i>	191	#1 CONT.	--	V2: C413, C414, C415, C416, C417, C421, C428, C429, C430, 432
Snowberry	<i>Symphoricarpos albus</i>	180	#1 CONT.	--	V2: C413, C414, C415, C416, C417, C429, C430, 432
Baldhip rose	<i>Rosa gymnocarpa</i>	214	#1 CONT.	--	V2: C430, 432
Mock orange	<i>Philadelphus spp.</i>	34	#1 CONT.	--	V2: C430, 432
Western sword fern	<i>Polystichum munitum</i>	244	#1 CONT.	--	V2: C430, 432

CONT. = container; B&B = balled and burlapped; CAL = caliper

4.2.5 Tree Replacement Schedule

In accordance with MICC 19.10.070(B), replacement trees shall be planted in the wet season (October 1 through April 1), following the applicable tree removal or, in the case of a development proposal, completion of the development work, provided the Mercer Island arborist authorizes an extension to ensure optimal planting conditions for tree survival. Table 13 provides the proposed tree replacement planting schedule for the NME Project within Mercer Island.

Table 13. General Construction Sequencing and Proposed Tree Planting Schedule

Work Area Activity	Construction Sequencing	Duration	Proposed Timing for Plantings
NMPS and NMPS Stream Facility upgrades/staging Stream crossing/outfall modifications	Apr 2021 to Dec 2023 Jul 2022 to Aug 2022	33 months 2 months	Fall 2023 (up to 9-month delay)
Street ROWs and I-90 Trail Pipe installation	Jul 2021 to Nov 2022	17 months	Jul 2021 to Nov 2022 (2- to 9-month delay)
LS-11 (Fruitland Landing Park) Facility upgrades	Mar 2021 to May 2022	14 months	Spring 2022 (no delay)
96 th Avenue Siphon Siphon/vault installation	May 2022 to Oct 2022	6 months	N/A
Mercer Island Boat Launch Pipe installation	Jun 2021 to Nov 2022	18 months	Fall 2022 (no delay)

LS-11 = Lift Station 11; NMPS = North Mercer Pump Station

4.2.6 NME Project Tree Replacement and Fee-in-Lieu

The NME Project would meet tree replacement requirements of Mercer Island and WSDOT through a combination of plantings and fee-in-lieu negotiations with each jurisdiction. Below, fee-in-lieu of tree replacement strategies for Mercer Island and WSDOT are discussed. An initial summary of NME Project replacements proposed in relation to each jurisdiction’s tree replacement regulations is provided in Table 14. As landscape and tree replacement proposals are reviewed by Mercer Island and WSDOT, this section will be finalized with negotiated quantities.

Mercer Island In-Lieu Tree Replacement Fees

In accordance with MICC 19.10.070(C), if the Mercer Island arborist determines that there is insufficient area to replant on the site or within the adjacent public ROW, then the Mercer Island arborist may authorize payment of a fee-in-lieu provided:

- There is insufficient area on the lot or adjacent ROW for proposed onsite tree replacement to meet the tree replacement requirements of this chapter (MICC 19.10.070(C)); or
- Tree replacement or management provided within public ROW or a city park in the vicinity will be of greater benefit to the community.
- Fees provided in-lieu of onsite tree replacement shall be determined based upon:
 - The expected tree replacement cost including labor, materials, and maintenance for each replacement tree; and
 - The most current Council of Tree and Landscaper Appraisers Guide for Plant Appraisal.
- Any fee-in-lieu is also optional for the applicant and requires an explicit written agreement.

WSDOT In-Lieu Tree Replacement Fees

As an alternative to replanting, WSDOT now has a tree mitigation program that allows for projects to fund replacement tree plantings elsewhere in the WSDOT ROW. This typically is about \$300 per DBH of impact (WSDOT – Peterson, pers. comm., 2018).

Table 14. Summary of Required Tree Replacements by Jurisdiction

Size of Replacement Required	Quantity of Replacements Required	Planned Replacements	Remainder	Maximum Fee-in-Lieu
City of Mercer Island (Mercer Island, Private, King County)				
Six 6-foot conifer / 1.5" caliper deciduous / \$500***	234	221*	13	\$6,500****
WSDOT ROW				
1-Gallon	2,438	--	1,428**	TBD*****
2-Gallon Alternative	1,219	--	--	--
5-Gallon Alternative	604	247	--	--
2.5-Inch Caliper*****	68	19	49*****	TBD*****
Live Stakes	--	188		
Medium and Large Shrubs	--	4,298	--	--

*Includes larger plantings

**1-Gallon equivalent, not including live stakes or shrubs

***Larger tree plantings may reduce the total amount of required replacements

****Fee-in-lieu to be negotiated with Mercer Island

*****Fee-in-lieu to be negotiated with WSDOT

*****Planted material replacing street trees may be a mix of trees and shrubs

4.2.7 Maintenance of Replacement Trees

According to MICC 19.10.070(D), the applicant shall maintain all replacement trees in a healthy condition for a period of five years after planting. According to the WSDOT (2015) *Roadside Policy Manual*, the requirements is for a three year maintenance period. The NME Project will provide maintenance of replacement trees within Mercer Island ROW, WSDOT ROW, and Mercer Island, private, or King County property. The specifics about maintenance and monitoring will be worked out through consultation with Mercer Island and WSDOT.

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