



Federal Transit  
Administration

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Madison Street Corridor Bus Rapid Transit (BRT)

# **Wildlife and Vegetation Technical Memorandum**

Prepared for

**Seattle Department of Transportation  
Federal Transit Administration**

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*Seattle Department of Transportation*

# 1 Introduction

Seattle Department of Transportation (SDOT) is proposing to provide new Bus Rapid Transit (BRT) corridors on Madison Street between 1st Avenue and Martin Luther King (MLK) Jr. Way East, Spring Street between 1st Avenue and 9th Avenue, and 1st Avenue and 9th Avenue between Madison Street and Spring Street in Seattle, Washington (Figures 1 and 2).

Because this Project is pursuing a federal Small Starts grant from the Federal Transit Administration (FTA), it is subject to review under the National Environmental Policy Act (NEPA). The purpose of this study is to make a general assessment of wildlife habitats and vegetation types in the Project area.

## 2 Project Description

### 2.1 Project Purpose and Background

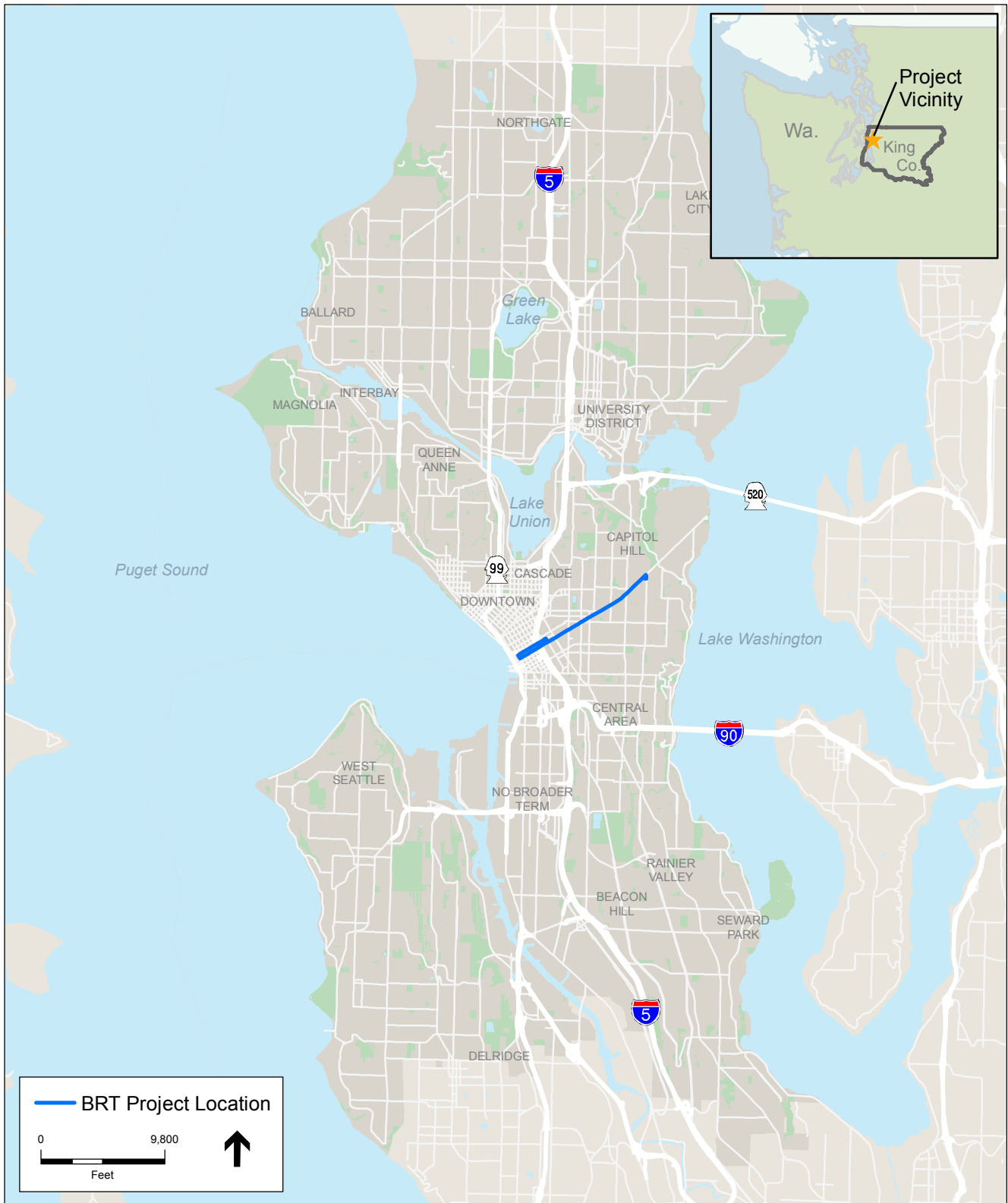
The Madison BRT Project is located in a dense and rapidly developing area that includes portions of Madison Valley, the Central District, Capitol Hill, First Hill, and Downtown Seattle. These areas are among the densest residential neighborhoods in the City and are sizable employment centers due to the presence of two major medical centers and Seattle University. Providing BRT service along this 2.4-mile corridor is identified in the Seattle Transit Master Plan and listed as a near-term action in the 2016 Move Seattle Strategic Vision. This project would improve transit capacity, travel time, reliability, and connectivity in an area that is highly urbanized and has a lower rate of automobile ownership than other parts of the city.

The 2.4-mile corridor would begin and end at MLK Jr. Way E in the east. Figure 2 shows that from MLK Jr. Way E the Madison BRT Project would head west on Madison Street for 2.26 mile to 1<sup>st</sup> Avenue, head north on 1<sup>st</sup> Avenue for 290 feet, head east on Spring Street for 0.43 mile, south on 9<sup>th</sup> Avenue for 290 feet, and head east on Madison Street for 1.78 miles.

### 2.2 Project Location and Site Description

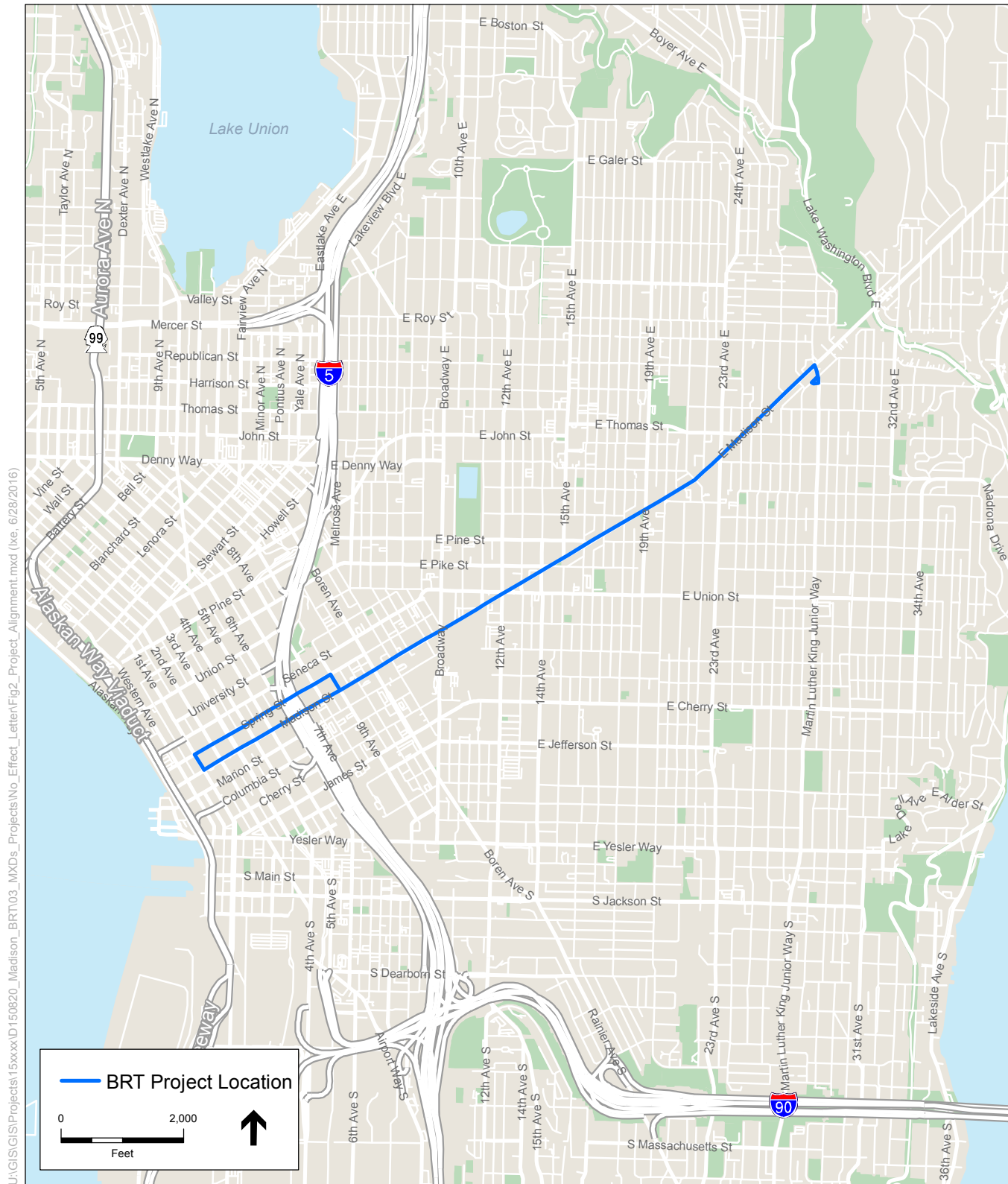
The proposed Project is located within the Central Puget Sound and Central Lake Washington basins. These basins are extensively developed and include a mixture of highly urbanized commercial and residential development, and are estimated to be nearly 100% covered in impervious surfaces. The Madison corridor spans several urban neighborhoods. Land use in these neighborhoods is briefly described below.

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SOURCE:  
Wa. Dept. of Ecology 2016; ESA 2016; OSM 2015.

SDOT Madison BRT Design . 150820  
**Figure 1**  
Project Vicinity



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SOURCE:  
 Wa. Dept. of Ecology 2016; ESA 2016; OSM 2015.

SDOT Madison BRT Design . 150820  
**Figure 2**  
 Project Alignment

- **Downtown** – The Downtown neighborhood is located at the westernmost end of the Project corridor from 1<sup>st</sup> Avenue to the Interstate 5 (I-5) crossing. Downtown Seattle is primarily commercial, including large office towers in the city center.
- **First Hill** – Moving east to First Hill, from I-5 to Broadway Avenue, the density decreases and there is a greater mixture of mid- and low-rise buildings with mixed residential-commercial uses. On the summit of First Hill, and heading east toward Broadway, institutional uses line the south side of Madison and commercial uses line the north.
- **Capitol Hill** – The Capitol Hill neighborhood is located to the north of the corridor from Broadway Avenue to 26<sup>th</sup> Avenue. The Pike-Pine Corridor, Madison Valley, and Broadway areas are located along the Madison Street Corridor. It includes Seattle University and other mid-rise development, transitioning into low-rise and mixed commercial and residential development.
- **The Central Area** – The Central Area neighborhood is located to the south of the corridor from Broadway Avenue to 26<sup>th</sup> Avenue. It includes mid-rise development, transitioning into low-rise and mixed commercial and residential development.
- **Madison Valley** – The Madison Valley neighborhood is located between 26<sup>th</sup> Avenue to MLK Jr. Way, and east of the Project corridor to Madison Park. Low-rise and mixed commercial and residential development dominates the corridor in this neighborhood.

The proposed alignment is comprised primarily of existing impervious surfaces including buildings, roadways, sidewalks, and parking lots. Vegetation is limited to residential and commercial landscaping and street trees. The occasional green-space, empty lot, or small park also provide areas of vegetation within the corridor; however, these areas are commonly dominated by weeds and non-native species due to lack of maintenance. No wetlands or streams exist in the proposed alignment or its vicinity.

## 2.3 Description of Proposed Work

The key elements to the Madison Street BRT Project include the construction and operation of:

- approximately 11 BRT station areas with 21 directional platforms;
- three curbside layover stalls located at the eastern terminus of the corridor;
- a total of 1.98 new miles of transit only lanes (TOL) and 0.82 mile of business access and transit (BAT) lanes throughout the corridor to ensure adequate transit flow;
- signal improvements, including Transit Signal Priority (TSP), to hold lights green for approaching BRT vehicles and shorten times for BRT vehicles at intersections;
- utility improvements for electrically powered busses using either electric trolleybus (ETB) technology requiring overhead contact systems (OCS) or a combination of ETB/OCS and emerging battery-powered technology allowing for substantial “off wire” operation;
- pedestrian and bicycle improvements including repair and restoration of sidewalks, protected bicycle lanes (PBSs), and additional crosswalk and bicycle crossings;
- landscape improvements throughout the corridor, including the installation of a 2,600 square-foot Pocket Plaza with sidewalk and landscaping at the intersection of Madison Street, E Pike Street and 14<sup>th</sup> Avenue;
- stormwater improvements including improving stormwater quality and detention where required per the City of Seattle’s stormwater code;
- utility relocations where roadway will be widened to accommodate BRT bus lanes and stations.

Approximately 10 acres of new and replaced roadway pavement and sidewalk would be placed under the project. The TOL pavement will be replaced with Portland cement concrete pavement to increase the life of the travel surface with BRT usage.

In order to complete construction of the stations and stops, lane widening, utility relocations, drainage improvements, and sidewalk and other frontage improvements, the project may remove approximately 70 street trees; however, this number will be refined during final design. All trees removed will be replaced in accordance with the City of Seattle's Tree Replacement Standards (SMC 15.43) and in coordination with SDOT Urban Forestry.

The project will replace existing stormwater infrastructure impacted by the Madison BRT Project. The majority of storm drainage impacts will be from proposed curbside bus stations. The Project would address the City's stormwater code, improving stormwater quality and detention where required. The project will evaluate stormwater BMPs including rain gardens and pervious surfaces to meet requirements of the City of Seattle 2016 Stormwater Manual.

As part of the project, SDOT will be installing a new 2,600 square-foot Pocket Plaza, or small urban park, with sidewalk and landscaping at the intersection of Madison Street, E Pike Street and 14<sup>th</sup> Avenue.

### **Construction Equipment and Noise**

The Project area is located within an urban setting and will require the use of heavy machinery including concrete saws, jackhammers, and excavators. The noise generated by these types of equipment is briefly discussed under *Construction Noise and Disturbance* to provide a context for discussion of disturbance impacts to terrestrial wildlife. No intensive noise generating construction activities, such as blasting or impact pile driving, are anticipated.

### **Construction Sequence and Schedule**

Construction would start in 2018 and conclude in the fall of 2019. It should be noted that this schedule is only a likely representation and that variations in work timing may occur due to delays in Project funding, permitting, or due to contractor delays or adverse weather conditions. The general sequence of construction activities is as follows (as applicable):

- Mobilize;
- Install temporary erosion and sediment control (TESC) measures and construction best management practices (BMPs);
- Install and maintain spill prevention control and countermeasures (SPCC)
- Clearing and grading;
- Install stormwater BMPs;
- Install site improvements;
- Complete paving and resurfacing;
- Complete planting and vegetation efforts;

- Remove BMPs; and
- Site cleanup and demobilize.

A detailed construction phasing plan will be developed during the Project Development phase. However, it is likely there will be a limit on how many block can be under construction at once.

## Stormwater

The Project limits are within five stormwater basins or threshold discharge areas (TDAs) including four combined sewer basins and one basin to Lake Union. The outfall for the combined sewer basins is the West Point Sewer Treatment Plant outfall. The TDA's are summarized in Table 1. The following is a description of the Project basin limits:

- **TDA 1: SODO/Waterfront Combined Sewer Basin** includes Spring Street and Madison Street from the project limits at First Avenue to Second Avenue.
- **TDA 2: Combined Sewer Basin** includes Spring Street and Madison Street from Second Avenue to Interstate 5.
- **TDA 3: Lake Union Basin** includes Madison Street from Interstate 5 to 17th Avenue.
- **TDA 4: Combined Sewer Basin** includes the area on Madison Street from 13th Avenue to 14th Avenue and East Pike Street.
- **TDA 5 (Sub-basin A): Combined Sewer Basin** includes Madison Street from the Lake Union basin limits at 17<sup>th</sup> Avenue to the project limits at Martin Luther King Junior Way East.
- **TDA 5 (Sub-basin B): Partially Separate/Combined Sewer Basin** includes portions of Madison Street that are partially separated and connect to the Washington Park detention facility. This basin is a combined sewer basin since the stormwater outfalls to the West Point Wastewater Treatment Plant.

TDAs 1, 2, 4, and 5 outfall to municipal sewer facilities with existing water quality treatment facilities, stormwater detention facilities, and flow control structures, before discharging to Puget Sound, project impacts in these areas will result in the same post-construction pollutants and flow levels that currently exist. TDA 3 discharges into Lake Union, which is a flow exempt waterbody.

## Staging and Stockpile Areas

Construction stockpiling and staging areas for the Project will be within paved areas adjacent to the site. Staging areas will be identified during the final design phase. No additional clearing or grading will be required for staging and stockpile areas.

## 3 Methodology

The purpose of this study is to make a general assessment of wildlife habitats and vegetation types in the Project area, but it does not include site-specific wildlife surveys. Environmental Science Associates (ESA) reviewed existing information about habitats and species in the Project vicinity, including the following: 1) King County sensitive areas mapping (iMap) (2016); 2) Washington Department of Fish and Wildlife (WDFW) Priority Habitats and Species (PHS) mapping (2016); and 3) Washington Department of Natural Resources (WNDR) rare plant database (2015). An ESA biologist conducted a walkthrough of the Project area (the proposed alignment) on May 20, 2016.

ESA biologists also evaluated the potential presence of species listed under the federal Endangered Species Act. Analysis methods and results are detailed in the *Madison Street Corridor Bus Rapid Transit (BRT) — Draft Biological Assessment Letter of “No Effect”* (ESA, 2016).

## **4 Affected Environment**

### **4.1 Habitats Present**

The Project is located in an urban setting along Madison Street between First Avenue in downtown Seattle and MLK Jr. Way. Terrestrial habitat is limited as the proposed alignment is comprised primarily of existing impervious surfaces including buildings, roadways, sidewalks, and parking lots. Vegetation within the corridor is minimal and is primarily street tree plantings dominated by scarlet sentinel maples. Some additional vegetation is present but limited to residential and commercial landscaping and mowed grass strips. Occasional green-spaces, empty lots, or small parks are also present but are commonly dominated by weeds and non-native species due to lack of maintenance. Common species in these areas include dandelion and English ivy. In addition to trees and vegetated areas discussed, roofs of buildings along the Project alignment may serve as habitat and resting areas for a variety of bird species accustomed to the urban environment. No wetlands, streams, or other aquatic habitats exist in the proposed alignment or its vicinity.

#### **Wildlife Use of Study Area**

Several species of birds and mammals likely use the project area. These include species that can tolerate or benefit from human disturbance, using landscape vegetation structures, garbage cans, and other human features for foraging, movement, shelter, and potentially even breeding sites. Examples include common avian species such as American crow and house sparrow; and mammals such as Norway rat and eastern grey squirrel.

### **4.2 Federally Listed Species**

No federally listed wildlife or plant species or suitable habitats have been identified or documented within the Project study area.

Because the Project will result in a minor increase in hard surface in the Lake Union Basin, and stormwater exiting the Lake Union outfall does not undergo any known treatment or detention, a change in pre-and post-Project conditions in Lake Union may occur. Therefore, an effects analysis was performed to analyze any impacts to listed species in Lake Union (primarily Chinook salmon, bull trout, and steelhead). Results can be found in the *Madison Street Corridor Bus Rapid Transit (BRT) — Draft Biological Assessment Letter of “No Effect”* (ESA 2016) and are summarized in Section 5.3.

As discussed in the Draft Letter of “No Effect,” the outfalls for the basins that discharge to municipal sewer plants are not further discussed because pre- and post-project conditions will not change due to existing water quality treatment facilities, stormwater detention facilities, and flow control structures at these outfalls.

### **4.3 State Priority Habitats and Species**

The PHS data show two peregrine falcon breeding areas approximately 200 meters outside of the western extent of the Project area. The most recent reporting of a peregrine falcon in this area was in May of 2015. The PHS data also maps the western pond turtle as occurring throughout the Project area.



However, due to the lack of aquatic habitat and built out environment in the Project vicinity, it is highly unlikely this species is present in the Project area.

The WDNR Natural Heritage Database does not indicate the present of federally-listed plants within the Project vicinity.

#### **4.4 Applicable Regulations**

There are no species listed under the federal Endangered Species Act that occur within the Project area. Further, no state-designated priority species or habitats were identified within the Project area.

The City of Seattle regulates the removal of street trees (Seattle Municipal Code (SMC) 25.11). The City standards for street right-of-way improvements include the preservation or planting of trees as part of the public infrastructure.

### **5 Construction Effects**

Because the study area is located in an urban setting and contains little native wildlife and vegetation or habitat, impacts resulting from the project would be minimal and are outlined below.

Potential impacts to terrestrial species would be minimized to the greatest extent possible through the use of BMPs. This section discusses the construction-related and operational impacts of the project, and measures to avoid and minimize such impacts.

#### **5.1 Noise and Disturbance**

Construction is anticipated to begin in the winter of 2016/2017 and be completed by the fall of 2019. Use of heavy construction equipment would increase the level of noise and visual disturbance in the area over this timeframe.

Typical heavy machinery anticipated for construction includes concrete saws, jackhammers, and excavators. Using the rules for decibel addition, the combined noise level of all construction equipment operating together was calculated. The three loudest pieces of equipment have typical noise levels of 90, 89, and 81 A-weighted decibels (dBA) at a distance of 50 feet from the source. Combined, the equipment will generate noise at about 94 dBA at 50 feet from the source. The standard reduction for point source noise, such as that generated from construction activities, is 6 dB per doubling of distance from the source.

Background noise is estimated to be about 65 dBA (Cavananugh and Tocci in WSDOT, 2015) for the Project area due to its setting passing through urban residential and commercial environments. It is likely that background noise levels are significantly higher in the area where the Project crosses I-5 or in the downtown portion of the corridor; however, the Project in general passes through primarily urban commercial and residential environments. Therefore, the Project has a terrestrial zone of effect related to construction noise extending in all directions from the Project area for a distance of 1,400 feet. This represents the area in which construction noise and activities could potentially disturb wildlife species. However, wildlife species that use the study areas are already exposed to noise and human activity and are likely to resume using the area during construction and after construction is complete.

#### **5.2 Impacts to Vegetation and Habitat**

The project will result in temporary impacts to vegetation and habitat in the Project area. A maximum of 70 street trees may be removed for project construction. Tree removal will be necessary for road

widening, station construction, and signal and utility improvements. In addition, multiple mowed grass and landscaped strips may be eliminated for project construction. Clearing of vegetation can indirectly affect terrestrial species as a result of habitat suitability; however, habitat in the Project area is low quality due to the built urban environment. Species accustomed to this environment can easily migrate to similar areas immediately adjacent to or outside of the Project area to find additional and comparable habitats during construction.

The Puget Sound area is located within the Pacific Flyway, which is a flight corridor for migrating waterfowl and other avian fauna. The Pacific Flyway extends south from Alaska to Mexico and South America. No portion of the Madison BRT Project would interfere with or alter the Pacific Flyway.

### **5.3 Stormwater Effects**

The project is anticipated to result in a net 0.91% increase of pollution generating hard surface (PGHS) in the Lake Union Basin. However, due to the already extensively built-out environment of the corridor, and the conversion of high capacity general purpose traffic lanes to lightly used BRT bus and trolley lanes, resulting in less cars, and an anticipated decrease in pollution, changes to water quality conditions are not anticipated at the Lake Union outfall. Therefore, the project is not anticipated to have an effect on any aquatic species or habitat within Lake Union.

As mentioned above, a detailed analysis of possible stormwater effects can be found in the *Madison Street Corridor Bus Rapid Transit (BRT) – Draft Biological Assessment Letter of “No Effect”* (ESA 2016). A summary of results is provided below.

The proposed Project will have no effect on any listed species, based on the following rationale:

- The Project will meet all local, state, and federal water quality regulations;
- The implementation of best management practices (BMPs) during construction will substantially minimize or completely eliminate the potential for increased turbidity and sedimentation within Lake Union;
- The Project occurs in the highly developed urban area of downtown Seattle, offering no habitat to listed species;
- There will be only a minor increase in PGHS in the basin, therefore no changes in pollutant loading are expected, as no changes in land use will occur;
- There will be a decrease in the level of service of the Project area roadways due to converting existing general purpose lanes to BRT, BAT, electric trolley, and bicycle uses, resulting in less potential for pollutant loading; and
- The limited potential for listed fish species to occur near the Lake Union outfall.

The project will also evaluate stormwater BMPs including rain gardens and pervious surfaces to meet requirements of the City of Seattle 2016 Stormwater Manual.

## 6 Operational Effects

With implementation of the avoidance, minimization and mitigation measures described in the previous section, the Project would not have long-term impacts on vegetation or wildlife. Due to the highly developed nature of the site and lack of suitable habitat discussed above, operation of the Project is not anticipated to have a negative impact on current conditions. Furthermore, through mitigation planting and landscaping, the Project will result in an overall net increase in vegetation throughout the corridor.

## 7 Mitigation Measures

Only trees located in areas needed for construction and operation of the Project will be removed. Post-construction, all trees removed will be replaced at a minimum 1:1 ratio in accordance with the City's street tree planting guidelines (SMC 25.11). In addition, vegetation (sidewalk, median, and curb planting strips; station planters; pocket park) will be added throughout the corridor, resulting in a net increase in vegetation post-construction.

Applicable BMPs will be incorporated into the proposed project to avoid and minimize short-term and long-term impacts to wildlife habitats in the Project area. With these measures in place, the Project would eliminate or minimize potential impacts to wildlife and vegetation during construction and over the long-term. All BMPs comply with the City of Seattle Construction Stormwater Manual (City of Seattle, 2015).

### 7.1 Erosion and Sediment Control BMPs

- Implement construction phasing that minimizes the amount of earthwork that exposes the ground surface to erosion.
- Implement a Temporary Erosion and Sediment Control (TESC) plan including sediment-control BMPs such as silt fences, check dams, sediment traps, sedimentation basins, and flocculation methods.
- Use erosion-control practices (seeding, mulching, use of geo-synthetics, erosion-control blankets, vegetative buffer strips).
- Use construction entrances, exits, parking areas, and wheel wash stations as appropriate to reduce tracking sediment onto public roads.
- Perform routine inspections of erosion-control and sediment-control BMPs and implement subsequent BMP maintenance.
- Implement construction BMPs to control dust and limit impacts to air quality.

### 7.2 Clearing/Vegetation Removal BMPs

- Install high-visibility construction fencing to define the perimeter of the work area and protect sensitive areas and trees from construction related impacts.
- Replace all trees removed at a minimum 1:1 ratio in accordance with the City's street tree planting guidelines. All temporarily cleared vegetation will be replanted to its pre-construction condition following construction.

- Clearly mark the limits of construction and protect vegetation remaining outside of these limits. Protect street trees as required by City code.

### **7.3 Stormwater Pollution/Spill Prevention BMPs**

A Spill Prevention Control and Countermeasure (SPCC) plan will be implemented. Elements of this plan will satisfy all pertinent requirements set forth by federal, state, and local laws and regulations. These measures include:

- All vehicles operated within the study area will be inspected daily for fluid leaks before leaving the vehicle staging area. Any leaks detected will be repaired before the vehicle resumes operation. When not in use, all vehicles will be stored in the staging areas or stored with spill containment pans or pads.
- Spill response equipment will be on-site, at all times during construction, to control and cleanup potential fluid leaks or spills.

All mechanical equipment will be fueled in designated areas, at least 50 feet from wetlands and watercourses.

## 8 References

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