

## **ATTACHMENTS**

- A. Project Vicinity Map
- B. Site Layout and Configuration (March 25, 2016)
- C. Updated Site Layout and Configuration
- D. ESA Screening Checklist Update
- E. Train Operations Technical Memorandum Update
- F. Noise and Vibration Technical Memorandum Update
- G. Transportation Technical Memorandum Update

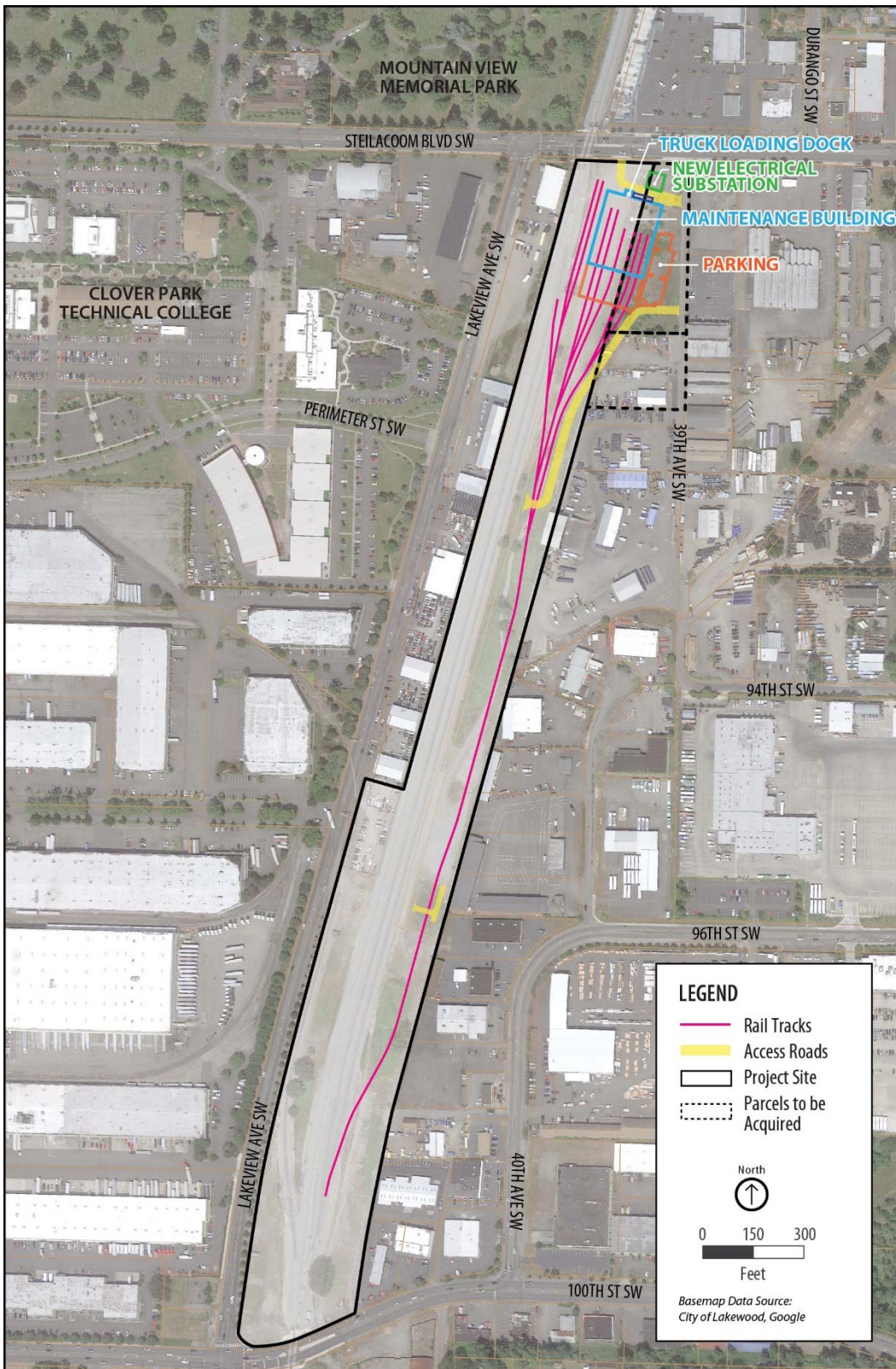
**Sound Transit**  
**Sounder Yard and Shops Facility Project**

ATTACHMENT A. Project Vicinity Map



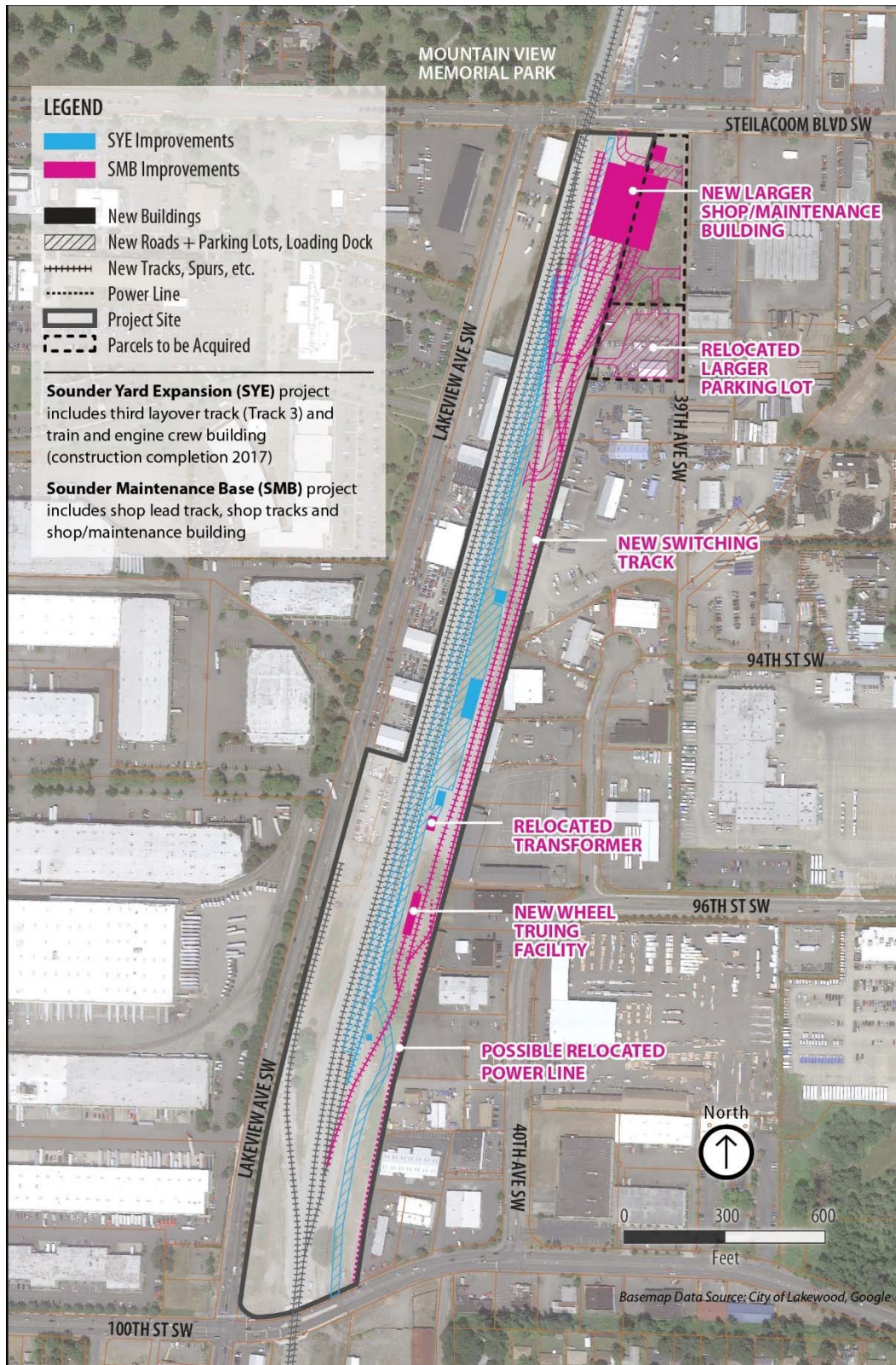
**Sound Transit**  
**Sounder Yard and Shops Facility Project**

### ATTACHMENT B. Site Layout and Configuration (March 25, 2016)



**Sound Transit**  
**Sounder Yard and Shops Facility Project**

## ATTACHMENT C. Updated Site Layout and Configuration



**Sound Transit**  
**Sounder Yard and Shops Facility Project**



**ATTACHMENT D**  
**ESA Screening Checklist Update**

**Sound Transit**  
**Sounder Yard and Shops Facility Project**

## ESA SCREENING CHECKLIST

Note: The purpose of this checklist is to assist sponsoring agencies and FTA in gathering and organizing materials for environmental analysis required under the Endangered Species Act (ESA). Submission of the checklist by itself does not meet ESA requirements. This checklist is intended solely for Region X use. Please contact the FTA Region 10 office at (206) 220-7954 if you have any questions regarding this worksheet.

Sponsoring Agency Sound Transit		Date Submitted 12-05-17
Project Title Sounder Yard and Shops Facility Project (now known as Sounder Maintenance Base Project)		FTA Project Number (if known)
Project Location (Include Street Address, City, County) Between Lakeview Avenue SW and 40th Avenue SW, and between 100th Street SW and Steilacoom Blvd. SW		
Project Contact: Lauren Swift, Senior Environmental Planner	Phone Number 206-398-5302	E-mail Address (if available) lauren.swift@soundtransit.org

Please answer the following questions as completely as possible. If the question is not applicable, check "NA" in the space to the right

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1. Describe the project and its purpose. Identify the jurisdiction(s) and watersheds (Watershed Resource Inventory Area/WRIA or Hydrologic Unit Code/HUC) in which the project is located.

The project is located in the City of Lakewood, Pierce County, in WRIA 12, (Chambers/Clover) (see Figure 1). It is in the Puget Sound subbasin; the hydrologic unit code (HUC) is 17110019. The legal description is Township 19 North, Range 2 East, Section 36 and Township 20 North, Range 2 East, Section 1.

Design refinements are now proposed for the Sounder Yard and Shops Facility Project, now known as the Sounder Maintenance Base Project, which would support planned and future Sound Transit Sounder commuter rail service (see Figure 2). The design refinements would provide sufficient capacity to maintain the Sounder fleet expansion planned as part of the ST2 program (starting in 2017). Recent Sounder ridership forecasts, however, determined that the rate of expansion of the Sounder services associated with the 2016-adopted ST3 program was faster than originally anticipated (ST Sounder Maintenance Base, Ridership Forecast and Fleet Size Analysis Technical Memorandum, May 18, 2017). So, where Sound Transit had not originally anticipated a near-term need to expand the maintenance base facility, the new ridership forecasting anticipates required expansion about 10 years after the initial start of operations at the Sounder Maintenance Base now planned for 2023. Considering the time it would take to prepare a conceptual plan to remodel the maintenance facility, complete the environmental review, obtain construction permits, and complete project construction, Sound Transit has decided it would be more efficient and less costly if the design of the Sounder Maintenance Base was refined at this time to accommodate anticipated maintenance services needed in 2023 and long term from about 2032 through 2040.

There are six key elements to the design refinements proposed at this time. All other elements of the proposed project would remain unchanged with the exception that the construction period has shifted one year such that operations would begin in 2023.

1. Construction of a larger maintenance base building: The original design for a one-story, six-bay, six repair position maintenance base has been updated to a partial two-story, six-bay, and 10 repair positions. The size of the building has increased from approximately 40,000 square feet to up to 60,000 square feet, but the maximum height of the building remains approximately 50 feet.

2. Relocation and construction of a larger parking lot: The original design of the parking lot was east of the maintenance building, but due to the slightly larger footprint of the maintenance building, the parking lot would be shifted to the south. The larger maintenance facility would employ more workers so the parking lot would be expanded from approximately 40 parking spaces to up to 60 parking spaces for employees, ADA disability parking, Sound Transit security and staff, and visitors. This larger parking lot would accommodate the anticipated 45 employees (41 dayshift, 4 nightshift), an increase from 31 employees.

3. Construction of a new switching track to the maintenance base building: To assist with moving the train cars into the repair positions at the maintenance building, a new switching track would be constructed adjacent to the shop lead track. The switching track would allow trains comprised of vehicles requiring maintenance to move back and forth on the site tracks to get the vehicles into the repair positions and avoid additional maintenance-related train crossings of local roads. The new switching track also would likely require the construction of a retaining wall along the eastern boundary of the site to create a level site.

4. Construction of a new wheel truing building on a new spur track: To accommodate the long-term maintenance needs of the Sounder fleet, Sound Transit has decided to include this facility at this time. The wheel truing building would be constructed to the south of the T&E building currently under construction as part of the Sounder Yard Expansion Project. The proposed wheel truing building would be approximately 200 feet long by 40 feet wide and 35 feet in height. Exterior lighting would be installed at the eve line. Like the original description of the maintenance building, the proposed exterior of the wheel truing building would be primarily composed of insulated metal panels mounted on top of an 8-foot pre-cast concrete base.

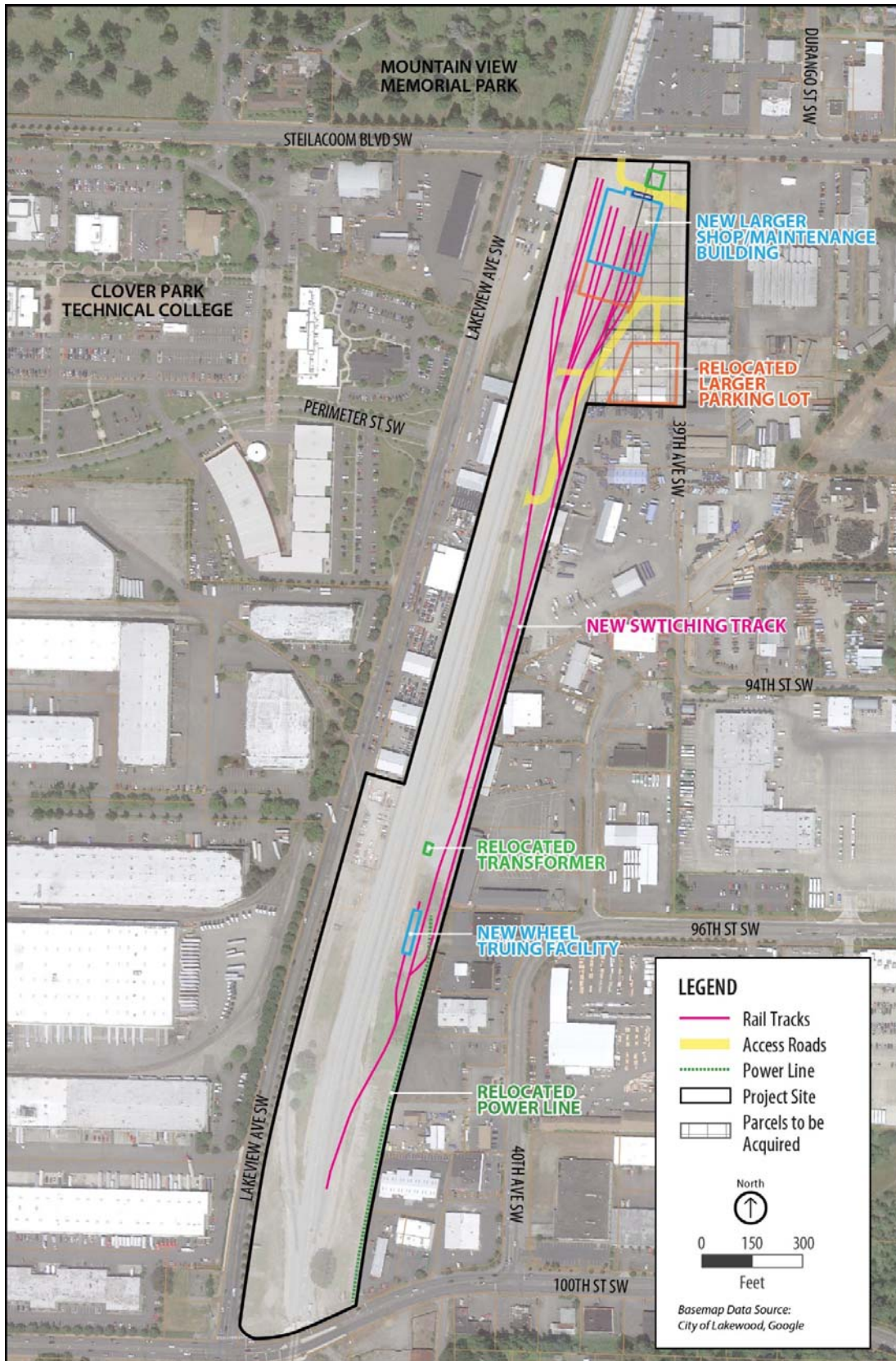
5. Possible relocation of the Puget Sound Energy Power Line: The original design for the Sounder Maintenance Base included the relocation of an existing Tacoma Public Utilities power line in the northern portion of the Century Yard site; however, the updated Sounder Maintenance Base Project may also require the relocation of a power line owned by Puget Sound Energy located in the southern portion of the site. This power line is about 25-50 feet from the eastern boundary of the site. To make space for the new switching track, the Puget Sound Energy power line would be relocated. Additional minor communication utility relocations may also be required, including existing bundled fiber optic lines which would be coordinated with the fiber optic utility

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**Figure 1: Project Vicinity Map**



Figure 2: Update Project Design



providers.

6. Relocation of the existing transformer: The original design for the Sounder Maintenance Base Project did not include the relocation of the existing transformer located south of the T&E building currently under construction as part of the Sounder Yard Expansion Project. The existing transformer needs to be relocated close to the existing rail tracks to make space for the two new rail tracks – the shop lead track and the new switching track. The proposed location is adjacent and south the compressor building south of the T&E building that are currently under construction as part of the Sounder Yard Expansion Project.

2. Have all other NEPA requirements been completed for this project?

Yes  No

If so, under which NEPA Class does this project fall? (Refer to DCE letter, FONSI, or ROD)

Class I  Class II  Class III

3. Does the project qualify as a CE or a DCE?

Yes  No

Has a Region X Documented Categorical Exclusion Worksheet been completed?

Yes  No

Will the project include Best Management Practices / Conservation Measures?

Yes  No

Has the BMP / CM Checklist (Appendix A) been completed?

Yes  No

*(Note: If the project: 1) includes in-water work or work below the ordinary high water mark (OHWM) of a waterbody with listed salmonids, 2) adds > 5,000 square feet of impervious surface, OR 3) includes any new impervious surface within 150 feet of a stream waterbody with listed salmonids, it may need to go through formal consultation with the NMFS and USFWS)*

4. Has the applicant obtained Endangered/Threatened Species lists and critical habitat lists from both National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS) for the project area?

Yes  No

List NMFS species/habitat here (and attach documentation):

Endangered: none

Threatened: There are no threatened species in the project area. Puget Sound steelhead are presumed present in Flett Creek, approximately 0.4 mile northwest of the project area and in Clover Creek, approximately 1.5 miles southwest of the project area (see Table 1). The project would have no impacts on Flett Creek or Clover Creek.

Proposed: none

List USFWS species/habitat here (and attach documentation):

Endangered: Three endangered species are listed as occurring in Pierce County, however no suitable habitat is present in the project area for any of the species (see Table 1).

Threatened: Thirteen threatened species are listed as occurring in Pierce County, however no suitable habitat is present in the project area for any of the species (see Table 1).

Proposed: One proposed species is listed as occurring in Pierce County, however no suitable habitat is present in the project area for this species (see Table 1).

5. Has the applicant obtained Essential Fish Habitat (EFH) lists from the NMFS website (as required by the Magnuson-Stevens Fishery Conservation and Management Act (MSA)) for the project area?

Yes  No

List Essential Fish Habitat here (and attach documentation):

The Puget Sound subbasin is listed EFH for Chinook Salmon, Coho Salmon (see Appendix B).

6. List the names of your partners for the project. Identify the project lead agency.

N/A

Sound Transit & Federal Transit Administration (lead agency for NEPA)

7. Check the federal permits needed for your project. List the numbers of the nationwide permits if needed.

	N/A	Pending	Approved
ACOE Nationwide _____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ACOE Individual _____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
NPDES (Gen. or Ind.) _____	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Other _____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

8. Check State and local permits needed for your project. Circle jurisdiction.

	N/A	Pending	Approved
HPA	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Surface Mining	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Forest Practices	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shoreline	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shoreline Exemption	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Clearing and Grading	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Building or Subdivision	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sensitive Areas Ordinance	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other _____	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



**Table 1.**  
**U.S. Fish and Wildlife Service and National Oceanic and Atmospheric Administration**  
**Threatened and Endangered Species Considered for**  
**the Souder Maintenance Base Facility Project**

Species	Federal Status	Designated Critical Habitat (CH)	CH in Project Area?	Effect Determination	Suitable Habitat in Project Vicinity?
<b>Puget Sound Fish Species (NMFS)<sup>1</sup></b>					
Puget Sound Steelhead ( <i>Oncorhynchus mykiss</i> )	Listed Threatened May 11, 2007	Designated	No	No effect	No. Occurs in Flett Creek and Clover Creek winter run (migration only) approximately 0.4 mile northwest and 1.5 mile southwest of project area, respectively. <sup>3</sup>
Puget Sound Chinook ( <i>Oncorhynchus tshawytscha</i> )	Listed Threatened March 24, 1999	Designated	No	No effect	No. Not occurring within 1.5 miles of the project area. <sup>3</sup>
<b>Pierce County T&amp;E (USFWS)<sup>2</sup></b>					
Oregon Spotted frog ( <i>Rana pretiosa</i> )	Listed Threatened September 9, 2014	Designated	No	No effect	No. Occurs in wetlands within forested landscapes.
Marbled murrelet ( <i>Brachyramphus marmoratus</i> )	Listed Threatened September 28, 1992	Designated	No	No effect	No suitable habitat in the project vicinity.
Northern Spotted Owl ( <i>Strix occidentalis caurina</i> )	Listed Threatened June 26, 1990	Designated	No	No effect	No suitable habitat in the project vicinity.
Yellow-Billed Cuckoo ( <i>Coccyzus americanus</i> )	Listed Threatened November 3, 2014	Proposed	No	No effect	No. Breeds in wooded riparian areas.
Streaked Horned lark ( <i>Eremophila alpestris strigata</i> )	Listed Threatened April 3, 2013	Designated	No	No effect	No suitable habitat in the project vicinity. Breeding area 1 mile southeast of project area at Joint Base Lewis-McChord Airforce Base. Habitat consists of large expanses of bare or thinly vegetated land, including fields, prairies, dunes, upper beaches, airports, and similar areas with low/sparse grassy vegetation (Natureserve).

Species	Federal Status	Designated Critical Habitat (CH)	CH in Project Area?	Effect Determination	Suitable Habitat in Project Vicinity?
Taylor's (whulge) Checkerspot ( <i>Euphydryas editha taylori</i> )	Listed Endangered November 4, 2013	Designated	No	No effect	No suitable habitat in the project vicinity; the species occupies open habitat dominated by grassland vegetation, glacial outwash prairies and shallow-soil treeless slopes (77 FR 61937)
Bull Trout ( <i>Salvelinus confluentus</i> )	Listed Threatened November 1, 1999	Designated	No	No effect	No, closest occurrence is Puyallup River which is approximately 6.5 miles northeast of the project area (migration).
Golden Paintbrush ( <i>Castilleja levisecta</i> )	Listed Threatened June 11, 1997	None	Not Applicable (NA)	No effect	No suitable habitat in the project vicinity. Occurs in open grasslands at elevations below 100 m. Often on glacial outwash or deposits (Natureserve).
Marsh Sandwort ( <i>Arenaria paludicola</i> )	Listed Endangered August 3, 1993	None	NA	No effect	No suitable habitat in the project vicinity. Plants have been found in areas with shallow standing water and with no standing water. Substrates are saturated, acidic, organic bog soils (Natureserve).
Water howellia ( <i>Howellia aquatilis</i> )	Listed Threatened July 14, 1994	None	NA	No effect	No suitable habitat in the project vicinity. Habitat is small vernal wetlands with firmly consolidated bottoms (Natureserve).
Canada Lynx ( <i>Lynx canadensis</i> )	Listed Threatened March 24, 2000	Designated	No	No effect	No suitable habitat in the project vicinity.
Gray wolf ( <i>Canis lupus</i> )	Listed Endangered March 9, 1978	None	NA	No effect	No suitable habitat in the project vicinity.
North American Wolverine ( <i>Gulo gulo luscus</i> )	Proposed Threatened	None	NA	No effect	No suitable habitat in the project vicinity.
Olympia Pocket Gopher ( <i>Thomomys mazama pugetensis</i> )	Listed Threatened April 9, 2014	Designated	No	No effect	No suitable habitat in the project vicinity; this species is associated with glacial outwash prairies (79 FR 19759)
Roy Prairie pocket gopher ( <i>Thomomys mazama glacialis</i> )	Listed Threatened April 9, 2014	Designated	No	No effect	No suitable habitat in the project vicinity; this species is associated with glacial outwash prairies (79 FR 19759)

Tenino Pocket Gopher ( <i>Thomomys mazama tumuli</i> )	Listed Threatened April 9, 2014	Designated	No	No effect	No suitable habitat in the project vicinity; this species is associated with glacial outwash prairies (79 FR 19759)
Yelm Pocket Gopher ( <i>Thomomys mazama yelmensis</i> )	Listed Threatened April 9, 2014	Designated	No	No effect	No suitable habitat in the project vicinity; this species is associated with glacial outwash prairies (79 FR 19759)

NOTES:

<sup>1</sup> Source: NOAA Fisheries, ESA Species List available online at [http://www.westcoast.fisheries.noaa.gov/protected\\_species/species\\_list/species\\_lists.html](http://www.westcoast.fisheries.noaa.gov/protected_species/species_list/species_lists.html), accessed on June 26, 2017.

<sup>2</sup> Source: USFWS, iPAC official species list available online at <https://ecos.fws.gov/ipac/>, accessed on June 26, 2017.

<sup>3</sup> Source: Streamnet Fish Data, available online

at:<http://psmfc.maps.arcgis.com/apps/webappviewer/index.html?id=3be91b0a32a9488a901c3885bbfc2b0b>, accessed on June 26, 2017.

9. Which federal, State, or tribal agencies have you contacted regarding your project and its impacts?

N/A

FTA has been contacted and agrees with the CE approach.

Describe any modifications to the project as a result of these contacts:

No modifications have been requested or needed.

10. What is the specific location of your project? Provide the zoning designation and the ¼ section, section, township, WRIA(s), and range.

The improvements associated with the Sounder Maintenance Base Project would extend south from Steilacoom Boulevard SW to 100th Street SW (see Figure 2). It is anticipated that Sound Transit plans to purchase two additional parcels at the northern end of the existing yard near Steilacoom Boulevard SW to accommodate the shops and vehicle parking. The acquisition of these parcels is covered under a separate NEPA/SEPA checklist.

The legal description is Township 19 North Range 2 East Section 1 and Township 20 North Range 2 East Section 36. The site is in WRIA 12 (Chambers/Clover). It is zoned industrial and commercial. Land uses adjacent to the property on the east and west are Industrial/Warehouse and Industrial/Commercial. South of 100th Street SW adjacent to the west side of the right-of-way are industrial uses, with residential land uses on the west side of Lakeview Avenue SW. To the east of the right-of-way in this area are a school and residential land uses. North of Steilacoom Boulevard SW is a cemetery and commercial uses.

Does the project occur within an existing transportation corridor?

Yes  No

11. Is the project within 150 feet of a lake, river, stream or bay, etc.?  Yes  No

If so, name the waterbodies.

Do these waterbodies contain listed salmonids or bull trout?  Yes  No

If so, name the listed species and agency with jurisdiction (USFWS or NMFS).

12. a. Will blasting or pile-driving occur within 1 mile of suitable owl or murrelet habitat (specifically, old growth tree(s) or forest)?  Yes  No (if no, go to 12b)

b. Is the project within 0.25 miles of suitable owl or murrelet habitat?  Yes  No

13. a. Will blasting or pile-driving occur within 1 mile of a known bald eagle nest? (Contact the State Department of Fish & Wildlife for nest locations.)  Yes  No (must answer both 13a and 13b)

b. Is the project within 0.5 miles (line-of-sight) or 0.25 miles (non-line-of-sight) of a bald eagle nest, wintering concentration, roost, or foraging area?

Yes  No

14. What is the size of the project (list area or length of disturbance), the amount of new impervious surface, and the total impervious surface?

N/A

The entire site is approximately 35 acres. The amount of new impervious surface is 118,781 square feet.

*In answering the following questions, please describe the impacts assuming no mitigation:*

## IMPACT ASSESSMENT

15. Describe the potential beneficial and adverse impacts upon aquatic resources that will be caused by construction of the project:  N/A

The site is within the Clover Creek/Chambers or Murray Creek drainage basins. There are two wetlands mapped by the Pierce County Wetland Inventory on the site, however a site visit performed for the Sounder Yard and Shops Facility Project in 2016 confirmed that there were no surface-water features or hydrophytic vegetation on the site.

- The project would increase impervious surface coverage. Drainage facilities will be provided and/or updated.
- No impacts on Flett Creek, which is approximately 0.3 mile north of Steilacoom Boulevard SW, are expected with BMPs to control stormwater runoff and erosion.
- Site disturbance and associated grading activities during construction could temporarily affect surface-water quality, but these impacts are expected to be avoided or minimized with appropriate BMPs.

16. Describe the potential beneficial and adverse impacts upon aquatic resources resulting from the maintenance, use, or operation of the project (post-construction impacts):  N/A

Currently stormwater runoff on the Century Yard site is managed through pre-treatment prior to infiltration. A water quality/infiltration ditch provides pre-treatment of precipitation which is then infiltrated into subsurface soil. Runoff treatment will be provided for all new and replaced pollution generating impervious surfaces. Full infiltration is proposed for this site due to the favorable on-site soils that are well suited to infiltration. All runoff from impervious surfaces, both new and replaced, will be treated and infiltrated.

Rooftops and paved areas not subject to vehicular use are considered non-pollution generating, and do not require runoff treatment. However, if flow from non-pollution generating surfaces mixes with flow from pollution generating surfaces, then it will also be treated.

17. Describe the potential beneficial and adverse impacts upon terrestrial resources that will be caused by construction of the project:  N/A

The project area provides minimal, low-quality habitat for wildlife and migratory bird species and therefore adverse impacts to these terrestrial resources are not anticipated. In addition, large vegetated open space areas located immediately north of the project site, provide more opportunity for nesting and foraging habitat.

There is an osprey nest approximately 0.8 miles west of the project site. While short-term construction noise could potentially disturb the osprey, migratory birds and any other wildlife in the vicinity, species present in the project area are likely accustomed to human-induced noise associated with the existing industrial land uses. Any avoidance of the area during construction would be temporary and species would be expected to return to their pre-construction behavior after completion of the project.

There is a small patch of Garry oak (*Quercus garryana*) at the south end of the project site, approximately 90 feet north of 100th Street SW. Garry oak is Washington's only native oak and is the "official tree" of the City of Lakewood. The oak trees will be protected and maintained during construction according to Lakewood City Ordinance No. 00157.

18. Describe the potential beneficial and adverse impacts upon terrestrial resources resulting from the maintenance, use, or operation of the project (post-construction impacts):  N/A

- Removing vegetation such as grasses and small shrubs east of the rail bed would remove habitat and could displace small mammals and birds.
- Train traffic and maintenance activities could disrupt wildlife; however, the site is in an urbanized area with existing rail traffic and industrial noise.

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## MITIGATION

19. Is the project likely to alter the water quality of any water bodies such as bays, estuaries, lakes, streams, rivers or wetlands (through sedimentation, urban runoff, toxics, turbidity, etc.)?

Yes  No (If yes, answer a and b.)

a. What mitigation is proposed for construction impacts?

b. What mitigation is proposed for long-term impacts?

- 
20. Will the project discharge water or generate runoff to any water bodies such as bays, estuaries, lakes, streams, rivers or wetlands?

Yes  No (If yes, answer a and b.)

a. What mitigation is proposed for construction impacts?

b. What mitigation is proposed for long-term impacts?

- 
21. Are clearing and grading activities part of the project? What is the area of direct disturbance? Include soil-disturbing activities, tree/shrub removal, and alteration of upland habitat.

Yes  No (If yes, answer a and b.)

a. What mitigation is proposed for construction impacts?

Construction BMPs (see Appendix A), such as the use of stabilized construction entrances, silt fencing, sediment traps, application of seeding or mulching for soil stabilization, or other techniques, would be implemented as necessary in accordance with requirements of the NPDES permit for construction.

Measures would be implemented before and during project construction to avoid or minimize effects on vegetation and wildlife resources. Examples of these measures are minimizing vegetation clearing, restoring temporarily affected areas, preparing and implementing a revegetation plan, and implementing construction methods to avoid impacts on migratory birds. The existing patch of Garry oak located in the far south portion of the project area, approximately 90 feet north of 100th Street SW, would not be disturbed to minimize impacts to vegetation and wildlife habitat. The oaks would be surrounded by a temporary three-foot high chain-link fence during construction to avoid damage to the trees or their root systems.

In accordance with the Migratory Bird Treaty Act, Sound Transit would consult with the U.S. Fish and Wildlife Service on measures to avoid impacts on migratory birds. Measures likely to be required may include preconstruction surveys for migratory birds and/or restrictions on vegetation clearing during the breeding season for migratory birds. Except where hazard trees pose an immediate threat to rail safety or reliability, vegetation maintenance and hazard tree removal would be conducted outside of the breeding season for migratory birds.

b. What mitigation is proposed for long-term impacts?

none

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22. Will the project remove or modify riparian vegetation within 150 feet of a water body?

Yes  No (If yes, answer a and b.)

a. What mitigation is proposed for construction impacts?

b. What mitigation is proposed for long-term impacts?

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23. Will the project place a structure within—or cause any change to—the bed or banks of a body of water?

Yes  No (If yes, answer a and b.)

a. What mitigation is proposed for construction impacts?

b. What mitigation is proposed for long-term impacts?

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24. Will the project place fill or structures within any 100-year floodplain?

Yes  No (If yes, answer a and b.)

a. What mitigation is proposed for construction impacts?

b. What mitigation is proposed for long-term impacts?

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25. Will the project divert water to or from the bay, estuary, lake, stream, river or wetland?

Yes  No (If yes, answer a and b.)

a. What mitigation is proposed for construction impacts?

b. What mitigation is proposed for long-term impacts?

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26. Will construction and/or operation of the project produce noise above ambient levels?

Yes  No

If so, explain:

Elements that contribute to noise and vibration resulting from the short-term construction and long-term operation of the project include:

- Train operation and horn blows, as required for train movements across 100th Street SW for nighttime maintenance work
- Train idling time in the yard
- Train brake squeal and air release

- Wheel squeal associated with the track curves
- Guideway type
- Track crossover/switches for trains entering and exiting the yard
- Updates to current train traffic and vehicular traffic data
- Proposed shop facilities
- Additional noise sources from the yard including maintenance operations, building components, parking, etc.

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27. Has all necessary environmental documentation been provided to FTA (request letters, agency response documentation, permit approvals)?

Yes  No



## Appendix A

### Best Management Practices (BMPs) / Conservation Measures (CM) Checklist

Please confirm use of the following measures in your project. If the question is not applicable, check "NA" in the space to the right and provide an explanation of why. Consult your FTA Region 10 contact for more information on this checklist.

#### Conservation Measures During Construction

##### Exposed Soils/Riparian Vegetation:

- Yes  No  N/A Minimize the areal extent of exposed soil at any given time. Stabilize all unstable slopes with the potential to impact listed fish-bearing waters.
- Yes  No  N/A Replant disturbed riparian areas outside of the 150 foot setback with native species at a 2:1 ratio, including the removal of mature trees (greater than 6 inches diameter breast height, or dbh).
- Yes  No  N/A Do not place temporary material storage piles (>12 hours storage) in the 100-year floodplain during the rainy season unless storage occurs when flooding is not imminent, and storage piles with erosive material are covered with plastic tarps (or similar) and surrounded with erosion control devices.
- Yes  No  N/A Conduct extensive soil-disturbing work, including excavation, in the "dry" season (generally from June to October).
- Yes  No  N/A Prepare a Temporary Erosion and Sediment Control (TESC) Plan prior to construction to identify standard erosion and sediment control procedures.

##### Stormwater Maintenance:

- Yes  No  N/A Develop and implement a Stormwater Site Plan for > 1 acres of clearing, grading, or grubbing.
- Yes  No  N/A No untreated, undetained stormwater or dewatering will leave the limits of the construction site.
- Yes  No  N/A Discharged water will not exceed existing (baseline) conditions based on a 2-year storm event.

##### Spill Controls

- Yes  No  N/A Restrict vehicle use in wetland and/or riparian areas.
- Yes  No  N/A Maintain a 300 ft setback for construction staging areas and equipment refueling near wetlands, streams, rivers, or drainages.
- Yes  No  N/A Prepare a Spill Prevention, Containment, and Control Plan (SPCCP) prior to construction to address potentially toxic materials used on-site during construction.
- Yes  No  N/A Keep spill clean-up equipment available onsite during construction, and include a spill control separator in the overall drainage system, if necessary.
- Yes  No  N/A Paving, chip sealing, and/or painting should occur in dry weather. Use 2-gallon pails and drip pans/protective devices when available.
- Yes  No  N/A For projects involving concrete, establish concrete truck chute cleanout areas to properly contain wet concrete. Protect all inlets and catchments from fresh concrete, tackifier, paving, or paint stripping if inclement weather unexpectedly occurs.
- Yes  No  N/A Collect and dispose debris accumulations prior to fresh water flushing. Use clean water only.
- Yes  No  N/A Clean paint materials and maintenance equipment outside of surface waters. Do not discharge cleaning runoff into surface waters.

**Long-Term Conservation Measures**

- Yes  No  N/A All construction & operation will occur greater than 150 feet from a listed salmonid-bearing waterbody.
- Yes  No  N/A Oil-water separators, bioswales, or other appropriate water quality treatment will be provided for 100% of all new and disturbed impervious surfaces..
- Yes  No  N/A Stormwater infiltration facilities will be designed with appropriate infiltration conditions and will be upgraded to handle increased flows or treatment.
- Yes  No  N/A Stream modifications or in-stream structures will not occur.

## Appendix B



# United States Department of the Interior



FISH AND WILDLIFE SERVICE  
Washington Fish And Wildlife Office  
510 Desmond Drive Se, Suite 102  
Lacey, WA 98503-1263  
Phone: (360) 753-9440 Fax: (360) 753-9405  
<http://www.fws.gov/wafwo/>

In Reply Refer To:

June 26, 2017

Consultation Code: 01EWF00-2017-SLI-1094

Event Code: 01EWF00-2017-E-01899

Project Name: Sounder Maintenance Base

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, and proposed species, designated and proposed critical habitat, and candidate species that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. The species list is currently compiled at the county level. Additional information is available from the Washington Department of Fish and Wildlife, Priority Habitats and Species website: <http://wdfw.wa.gov/mapping/phs/> or at our office website: [http://www.fws.gov/wafwo/species\\_new.html](http://www.fws.gov/wafwo/species_new.html). Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether or not the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species, and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

<http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF>

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 et seq.). You may visit our website at

<http://www.fws.gov/pacific/eagle/for> information on disturbance or take of the species and information on how to get a permit and what current guidelines and regulations are. Some projects affecting these species may require development of an eagle conservation plan: ([http://www.fws.gov/windenergy/eagle\\_guidance.html](http://www.fws.gov/windenergy/eagle_guidance.html)). Additionally, wind energy projects should follow the wind energy guidelines (<http://www.fws.gov/windenergy/>) for minimizing impacts to migratory birds and bats.

Also be aware that all marine mammals are protected under the Marine Mammal Protection Act (MMPA). The MMPA prohibits, with certain exceptions, the "take" of marine mammals in U.S. waters and by U.S. citizens on the high seas. The importation of marine mammals and marine mammal products into the U.S. is also prohibited. More information can be found on the MMPA website: <http://www.nmfs.noaa.gov/pr/laws/mmpa/>.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Related website:

National Marine Fisheries Service:

[http://www.nwr.noaa.gov/protected\\_species/species\\_list/species\\_lists.html](http://www.nwr.noaa.gov/protected_species/species_list/species_lists.html)

Attachment(s):

- Official Species List
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**Appendix B**

## Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

**Washington Fish And Wildlife Office**  
510 Desmond Drive Se, Suite 102  
Lacey, WA 98503-1263  
(360) 753-9440

## Project Summary

Consultation Code: 01EWF00-2017-SLI-1094

Event Code: 01EWF00-2017-E-01899

Project Name: Souder Maintenance Base

Project Type: TRANSPORTATION

Project Description: Addendum to NEPA/SEPA submitted March 2016

Project Location:

Approximate location of the project can be viewed in Google Maps:

<https://www.google.com/maps/place/47.066613079133845N122.0392669933961W>



Counties: Pierce, WA

## Endangered Species Act Species

There is a total of 18 threatened, endangered, or candidate species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area. Please contact the designated FWS office if you have questions.

## Mammals

NAME	STATUS
<p>Canada Lynx (<i>Lynx canadensis</i>)            Population: Contiguous U.S. DPS            There is a <b>final critical habitat</b> designated for this species. Your location is outside the designated critical habitat.            Species profile: <a href="https://ecos.fws.gov/ecp/species/3652">https://ecos.fws.gov/ecp/species/3652</a></p>	Threatened
<p>Gray Wolf (<i>Canis lupus</i>)            Population: U.S.A.: All of AL, AR, CA, CO, CT, DE, FL, GA, IA, IN, IL, KS, KY, LA, MA, MD, ME, MI, MO, MS, NC, ND, NE, NH, NJ, NV, NY, OH, OK, PA, RI, SC, SD, TN, TX, VA, VT, WI, and WV; and portions of AZ, NM, OR, UT, and WA. Mexico.            No critical habitat has been designated for this species.            Species profile: <a href="https://ecos.fws.gov/ecp/species/4488">https://ecos.fws.gov/ecp/species/4488</a></p>	Endangered
<p>North American Wolverine (<i>Gulo gulo luscus</i>)            No critical habitat has been designated for this species.            Species profile: <a href="https://ecos.fws.gov/ecp/species/5123">https://ecos.fws.gov/ecp/species/5123</a></p>	Proposed Threatened
<p>Olympia Pocket Gopher (<i>Thomomys mazama pugetensis</i>)            There is a <b>final critical habitat</b> designated for this species. Your location is outside the designated critical habitat.            Species profile: <a href="https://ecos.fws.gov/ecp/species/6713">https://ecos.fws.gov/ecp/species/6713</a></p>	Threatened
<p>Roy Prairie Pocket Gopher (<i>Thomomys mazama glacialis</i>)            No critical habitat has been designated for this species.            Species profile: <a href="https://ecos.fws.gov/ecp/species/7821">https://ecos.fws.gov/ecp/species/7821</a></p>	Threatened
<p>Tenino Pocket Gopher (<i>Thomomys mazama tumuli</i>)            There is a <b>final critical habitat</b> designated for this species. Your location is outside the designated critical habitat.            Species profile: <a href="https://ecos.fws.gov/ecp/species/6290">https://ecos.fws.gov/ecp/species/6290</a></p>	Threatened
<p>Yelm Pocket Gopher (<i>Thomomys mazama yelmensis</i>)            There is a <b>final critical habitat</b> designated for this species. Your location is outside the designated critical habitat.            Species profile: <a href="https://ecos.fws.gov/ecp/species/7257">https://ecos.fws.gov/ecp/species/7257</a></p>	Threatened

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## Birds

NAME	STATUS
<p>Marbled Murrelet (<i>Brachyramphus marmoratus</i>)</p> <p>Population: U.S.A. (CA, OR, WA)</p> <p>There is a <b>final</b> <a href="#">critical habitat</a> designated for this species. Your location overlaps the designated critical habitat.</p> <p>Species profile: <a href="https://ecos.fws.gov/ecp/species/4467">https://ecos.fws.gov/ecp/species/4467</a></p>	Threatened
<p>Northern Spotted Owl (<i>Strix occidentalis caurina</i>)</p> <p>There is a <b>final</b> <a href="#">critical habitat</a> designated for this species. Your location overlaps the designated critical habitat.</p> <p>Species profile: <a href="https://ecos.fws.gov/ecp/species/1123">https://ecos.fws.gov/ecp/species/1123</a></p>	Threatened
<p>Streaked Horned Lark (<i>Eremophila alpestris strigata</i>)</p> <p>There is a <b>final</b> <a href="#">critical habitat</a> designated for this species. Your location is outside the designated critical habitat.</p> <p>Species profile: <a href="https://ecos.fws.gov/ecp/species/7268">https://ecos.fws.gov/ecp/species/7268</a></p>	Threatened
<p>Yellow-billed Cuckoo (<i>Coccyzus americanus</i>)</p> <p>Population: Western U.S. DPS</p> <p>There is a <b>proposed</b> <a href="#">critical habitat</a> for this species. Your location is outside the proposed critical habitat.</p> <p>Species profile: <a href="https://ecos.fws.gov/ecp/species/3911">https://ecos.fws.gov/ecp/species/3911</a></p>	Threatened

## Amphibians

NAME	STATUS
<p>Oregon Spotted Frog (<i>Rana pretiosa</i>)</p> <p>There is a <b>final</b> <a href="#">critical habitat</a> designated for this species. Your location is outside the designated critical habitat.</p> <p>Species profile: <a href="https://ecos.fws.gov/ecp/species/6633">https://ecos.fws.gov/ecp/species/6633</a></p>	Threatened

## Fishes

NAME	STATUS
<p>Bull Trout (<i>Salvelinus confluentus</i>)</p> <p>Population: U.S.A., conterminous, lower 48 states</p> <p>There is a <b>final</b> <a href="#">critical habitat</a> designated for this species. Your location overlaps the designated critical habitat.</p> <p>Species profile: <a href="https://ecos.fws.gov/ecp/species/8212">https://ecos.fws.gov/ecp/species/8212</a></p>	Threatened

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## Insects

NAME	STATUS
Taylor's (=whulge) Checkerspot ( <i>Euphydryas editha taylori</i> ) There is a <b>final critical habitat</b> designated for this species. Your location is outside the designated critical habitat. Species profile: <a href="https://ecos.fws.gov/ecp/species/5907">https://ecos.fws.gov/ecp/species/5907</a>	Endangered

## Flowering Plants

NAME	STATUS
Marsh Sandwort ( <i>Arenaria paludicola</i> ) No critical habitat has been designated for this species. Species profile: <a href="https://ecos.fws.gov/ecp/species/2229">https://ecos.fws.gov/ecp/species/2229</a>	Endangered
Water Howellia ( <i>Howellia aquatilis</i> ) No critical habitat has been designated for this species. Species profile: <a href="https://ecos.fws.gov/ecp/species/7090">https://ecos.fws.gov/ecp/species/7090</a>	Threatened
Golden Paintbrush ( <i>Castilleja levisecta</i> ) No critical habitat has been designated for this species. Species profile: <a href="https://ecos.fws.gov/ecp/species/7706">https://ecos.fws.gov/ecp/species/7706</a>	Threatened

## Conifers and Cycads

NAME	STATUS
Whitebark Pine ( <i>Pinus albicaulis</i> ) No critical habitat has been designated for this species. Species profile: <a href="https://ecos.fws.gov/ecp/species/1748">https://ecos.fws.gov/ecp/species/1748</a>	Candidate

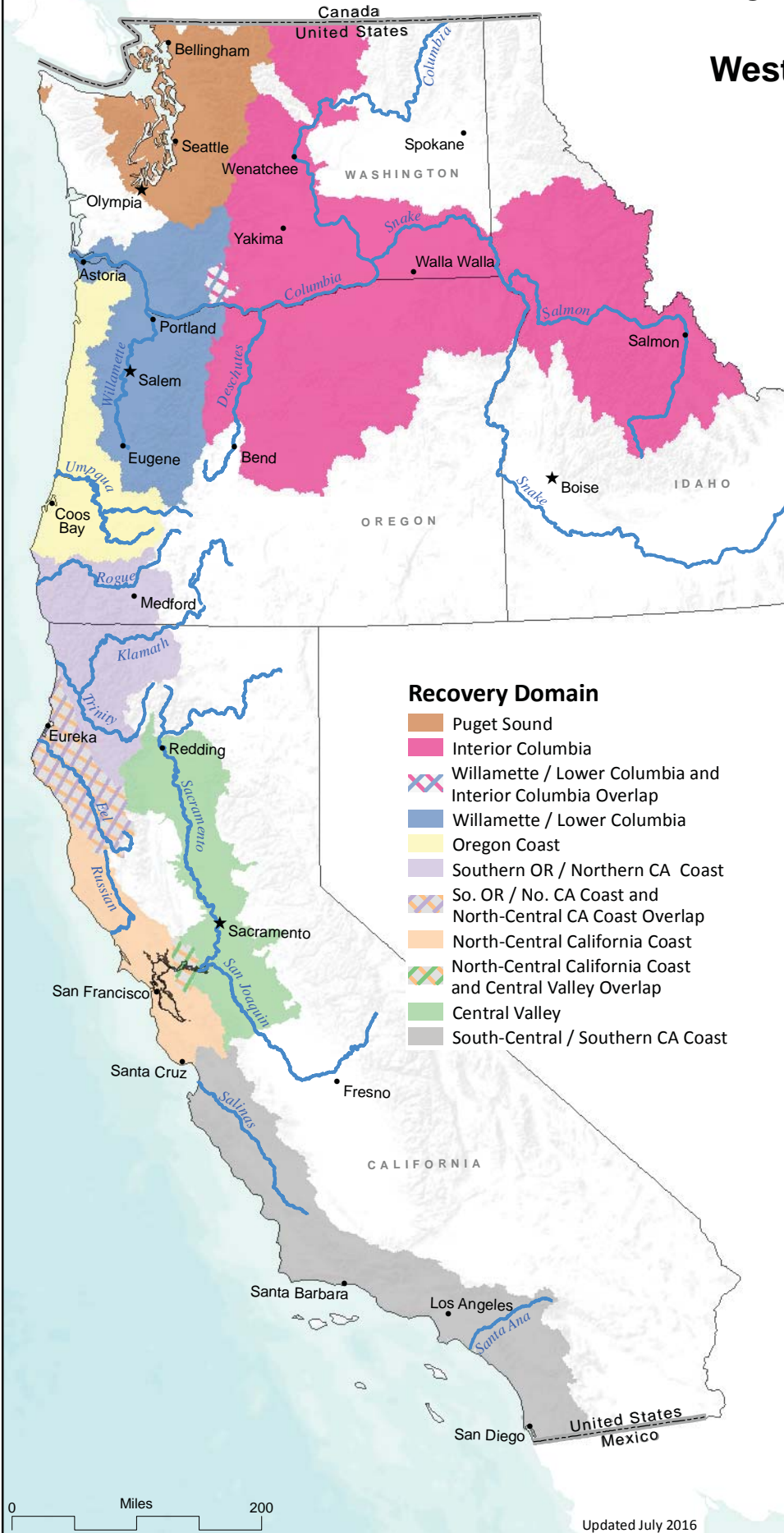
## Critical habitats

There are 3 critical habitats wholly or partially within your project area.

NAME	STATUS
Bull Trout ( <i>Salvelinus confluentus</i> )	Final designated
Marbled Murrelet ( <i>Brachyramphus marmoratus</i> )	Final designated
Northern Spotted Owl ( <i>Strix occidentalis caurina</i> )	Final designated

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# Status of ESA Listings & Critical Habitat Designations for West Coast Salmon & Steelhead



- Recovery Domain**
- Puget Sound
  - Interior Columbia
  - Willamette / Lower Columbia and Interior Columbia Overlap
  - Willamette / Lower Columbia
  - Oregon Coast
  - Southern OR / Northern CA Coast
  - So. OR / No. CA Coast and North-Central CA Coast Overlap
  - North-Central California Coast
  - North-Central California Coast and Central Valley Overlap
  - Central Valley
  - South-Central / Southern CA Coast

Evolutionarily Significant Unit / Distinct Population Segment	ESA Status	Date of ESA Listing	Date of CH Designation
<b>Puget Sound Recovery Domain</b>			
Hood Canal Summer-run Chum Salmon	T	3/25/1999	9/2/2005
Ozette Lake Sockeye Salmon	T	3/25/1999	9/2/2005
Puget Sound Chinook Salmon	T	3/24/1999	9/2/2005
Puget Sound Steelhead	T	5/11/2007	2/24/2016

<b>Interior Columbia Recovery Domain</b>			
Middle Columbia River Steelhead	T	3/25/1999 1/5/2006	9/2/2005
Snake River Fall-run Chinook Salmon	T	4/22/1992	12/28/1993
Snake River Spring / Summer-run Chinook Salmon	T	4/22/1992	10/25/1999
Snake River Sockeye Salmon	E	11/20/1991	12/28/1993
Snake River Steelhead	T	8/18/1997 1/5/2006	9/2/2005
Upper Columbia River Spring-run Chinook Salmon	E	3/24/1999	9/2/2005
Upper Columbia River Steelhead	T	8/18/1997 1/5/2006	9/2/2005

<b>Willamette / Lower Columbia Recovery Domain</b>			
Columbia River Chum Salmon	T	3/25/1999	9/2/2005
Lower Columbia River Chinook Salmon	T	3/24/1999	9/2/2005
Lower Columbia River Coho Salmon	T	6/28/2005	2/24/2016
Lower Columbia River Steelhead	T	3/19/1998 1/5/2006	9/2/2005
Upper Willamette River Chinook Salmon	T	3/24/1999	9/2/2005
Upper Willamette River Steelhead	T	3/25/1999 1/5/2006	9/2/2005

<b>Oregon Coast Recovery Domain</b>			
Oregon Coast Coho Salmon	T	2/11/2008	2/11/2008

<b>Southern Oregon / Northern California Coast Recovery Domain</b>			
Southern OR / Northern CA Coasts Coho Salmon	T	5/6/1997	5/5/1999

<b>North-Central California Coast Recovery Domain</b>			
California Coastal Chinook Salmon	T	9/16/1999	9/2/2005
Central California Coast Coho Salmon	E	10/31/1996 (T) 6/28/2005 (E) 4/2/2012 (RE)	5/5/1999
Central California Coast Steelhead	T	8/18/1997 1/5/2006	9/2/2005
Northern California Steelhead	T	6/7/2000 1/5/2006	9/2/2005

<b>Central Valley Recovery Domain</b>			
California Central Valley Steelhead	T	3/19/1998 1/5/2006	9/2/2005
Central Valley Spring-run Chinook Salmon	T	9/16/1999	9/2/2005
Sacramento River Winter-run Chinook Salmon	E	11/5/1990 (T) 1/4/1994 (E)	6/16/1993

<b>South-Central / Southern California Coast Recovery Domain</b>			
South-Central California Coast Steelhead	T	8/18/1997 1/5/2006	9/2/2005
Southern California Steelhead	E	8/18/1997 5/1/2002 (RE) 1/5/2006	9/2/2005

ESA = Endangered Species Act, CH = Critical Habitat, RE = Range Extension  
E = Endangered, T = Threatened

## *Appendix B*

### Critical Habitat Rules Cited

- 2/24/2016 (81 FR 9252) Final Critical Habitat Designation for Puget Sound Steelhead and Lower Columbia River Coho Salmon
- 2/11/2008 (73 FR 7816) Final Critical Habitat Designation for Oregon Coast Coho Salmon
- 9/2/2005 (70 FR 52630) Final Critical Habitat Designation for 12 ESU's of Salmon and Steelhead in WA, OR, and ID
- 9/2/2005 (70 FR 52488) Final Critical Habitat Designation for 7 ESU's of Salmon and Steelhead in CA
- 10/25/1999 (64 FR 57399) Revised Critical Habitat Designation for Snake River Spring/Summer-run Chinook Salmon
- 5/5/1999 (64 FR 24049) Final Critical Habitat Designation for Central CA Coast and Southern OR/Northern CA Coast Coho Salmon
- 12/28/1993 (58 FR 68543) Final Critical Habitat Designation for Snake River Chinook and Sockeye Salmon
- 6/16/1993 (58 FR 33212) Final Critical Habitat Designation for Sacramento River Winter-run Chinook Salmon

### ESA Listing Rules Cited

- 4/2/2012 (77 FR 19552) Final Range Extension for Endangered Central California Coast Coho Salmon
- 2/11/2008 (73 FR 7816) Final ESA Listing for Oregon Coast Coho Salmon
- 5/11/2007 (72 FR 26722) Final ESA Listing for Puget Sound Steelhead
- 1/5/2006 (71 FR 5248) Final Listing Determinations for 10 Distinct Population Segments of West Coast Steelhead
- 6/28/2005 (70 FR 37160) Final ESA Listing for 16 ESU's of West Coast Salmon
- 5/1/2002 (67 FR 21586) Range Extension for Endangered Steelhead in Southern California
- 6/7/2000 (65 FR 36074) Final ESA Listing for Northern California Steelhead
- 9/16/1999 (64 FR 50394) Final ESA Listing for Two Chinook Salmon ESUs in California
- 3/25/1999 (64 FR 14508) Final ESA Listing for Hood River Canal Summer-run and Columbia River Chum Salmon
- 3/25/1999 (64 FR 14517) Final ESA Listing for Middle Columbia River and Upper Willamette River Steelhead
- 3/25/1999 (64 FR 14528) Final ESA Listing for Ozette Lake Sockeye Salmon
- 3/24/1999 (64 FR 14308) Final ESA Listing for 4 ESU's of Chinook Salmon
- 3/19/1998 (63 FR 13347) Final ESA Listing for Lower Columbia River and Central Valley Steelhead
- 8/18/1997 (62 FR 43937) Final ESA Listing for 5 ESU's of Steelhead
- 5/6/1997 (62 FR 24588) Final ESA Listing for Southern Oregon / Northern California Coast Coho Salmon
- 10/31/1996 (61 FR 56138) Final ESA Listing for Central California Coast Coho Salmon
- 1/4/1994 (59 FR 222) Final ESA Listing for Sacramento River Winter-run Chinook Salmon
- 4/22/1992 (57 FR 14653) Final ESA Listing for Snake River Spring/summer-run and Snake River Fall Chinook Salmon
- 11/20/1991 (56 FR 58619) Final ESA Listing for Snake River Sockeye Salmon
- 11/5/1990 (55 FR 46515) Final ESA Listing for Sacramento River Winter-run Chinook Salmon

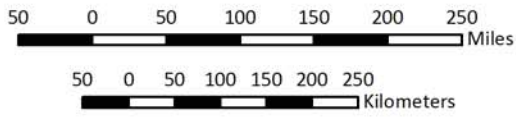
# Chinook Salmon West Coast States Essential Fish Habitat (EFH)

Salmonid EFH described in "Fisheries Off West Coast States; West Coast Salmon Fisheries; Amendment 18 to the Salmon Fishery Management Plan" published in the Federal Register / Vol. 79, No. 243/ Thursday, December 18, 2014.

Appendix B



Impassable Dam	Chinook Salmon EFH (2014)	Marine Salmon EFH (2014)	4th Field Hydrologic Unit (HU)
Natural Barrier			



12/2014, C. Gavette Chinook\_EFH\_2014.mxd  
**UNITED STATES DEPARTMENT OF COMMERCE**  
 National Oceanic and Atmospheric Administration  
 NATIONAL MARINE FISHERIES SERVICE  
 WEST COAST REGION  
 777 Sonoma Ave., Room 325  
 SANTA ROSA, CALIFORNIA 95404

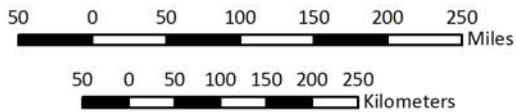
# Coho Salmon West Coast States Essential Fish Habitat (EFH)

Salmonid EFH described in "Fisheries Off West Coast States; West Coast Salmon Fisheries; Amendment 18 to the Salmon Fishery Management Plan" published in the Federal Register / Vol. 79, No. 243/ Thursday, December 18, 2014.

Appendix B



Impassable Dam	Coho Salmon EFH (2014)	Marine Salmon EFH (2014)	4th Field Hydrologic Unit (HU)
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12/2014, C. Gavette Coho\_EFH\_2014.mxd  
**UNITED STATES DEPARTMENT OF COMMERCE**  
 National Oceanic and Atmospheric Administration  
 NATIONAL MARINE FISHERIES SERVICE  
 WEST COAST REGION  
 777 Sonoma Ave., Room 325  
 SANTA ROSA, CALIFORNIA 95404



**ATTACHMENT E**  
**Train Operations Technical Memorandum Update**

**Sound Transit**  
**Sounder Yard and Shops Facility Project**



# MEMORANDUM

**TO:** Lauren Swift, Senior Environmental Planner  
**FROM:** Lesley Maurer and Keith Nakano, WSP USA, Inc.  
**SUBJECT:** Train Operations Technical Memorandum Update  
**DATE:** December 5, 2017

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## **Introduction**

This Train Operations Technical Memorandum Update provides supporting documentation for the Sounder Yard & Shops Project (now called the Sounder Maintenance Base Project) SEPA Addendum to address the revised Sounder Maintenance Base design and train movement operations. Attachment G to the March 25, 2016 SEPA Environmental Checklist (SEPA Checklist) provided information on the original design for the facility and maintenance train movements and local road crossing effect. The purpose of this memorandum is to address the environmental impacts resulting from the updated maintenance base facility design. The updated facility design concept includes a larger maintenance building to accommodate a larger fleet size based on the Sounder fleet expansions for the ST2 program, as well as the ST3 program fleet expansion— as the fleet size expands from 81 vehicles in 2017 to 106 vehicles by 2040. With construction of the new facility completed in 2023, the Sounder Maintenance Base Project would accommodate the 106-vehicle fleet. Key elements of the updated facility concept are as follows:

- Building expanded from approximately 40,000 square feet to up to 60,000 square feet to accommodate more operations. Six bays with a total of ten repair positions (eight of which are “stacked,” meaning two per bay with one in front of the other)
- Parking lot expanded from approximately 40 spaces up to 60 spaces and shifted to the south
- New switching track located off of the shop lead track
- New wheel truing facility located off of the shop lead track
- Relocation of the existing transformer toward the interior of the site

**Sound Transit  
Souder Yard and Shops Facility Project**

- Possible relocation of the existing Puget Sound Energy power line to the eastern property boundary
- Maintenance-related train crossings of Steilacoom Boulevard SW for train units entering the maintenance yard directly via the north maintenance yard lead track

The updated facility design concept along with changed off- and on-site train movements associated with maintenance activities would affect the train maintenance operations at the site and the number of crossings required across Steilacoom Boulevard SW and 100th Street SW. The new switching track allows vehicles requiring maintenance to be staged and stored on-site, substantially reducing the need to cross 100th Street SW. It is planned that the switching track would accommodate 10-car train units.

Souder trains would be stored overnight at the Century Yard for cleaning and light maintenance and redeployed the following morning, or they could be staged for movement into the maintenance building for preventive maintenance or unscheduled maintenance. Preventive maintenance (PM) is federally mandated work that is required on a time-schedule basis, and unscheduled maintenance (UM) is the maintenance/repair of equipment that has unexpectedly failed while in service.

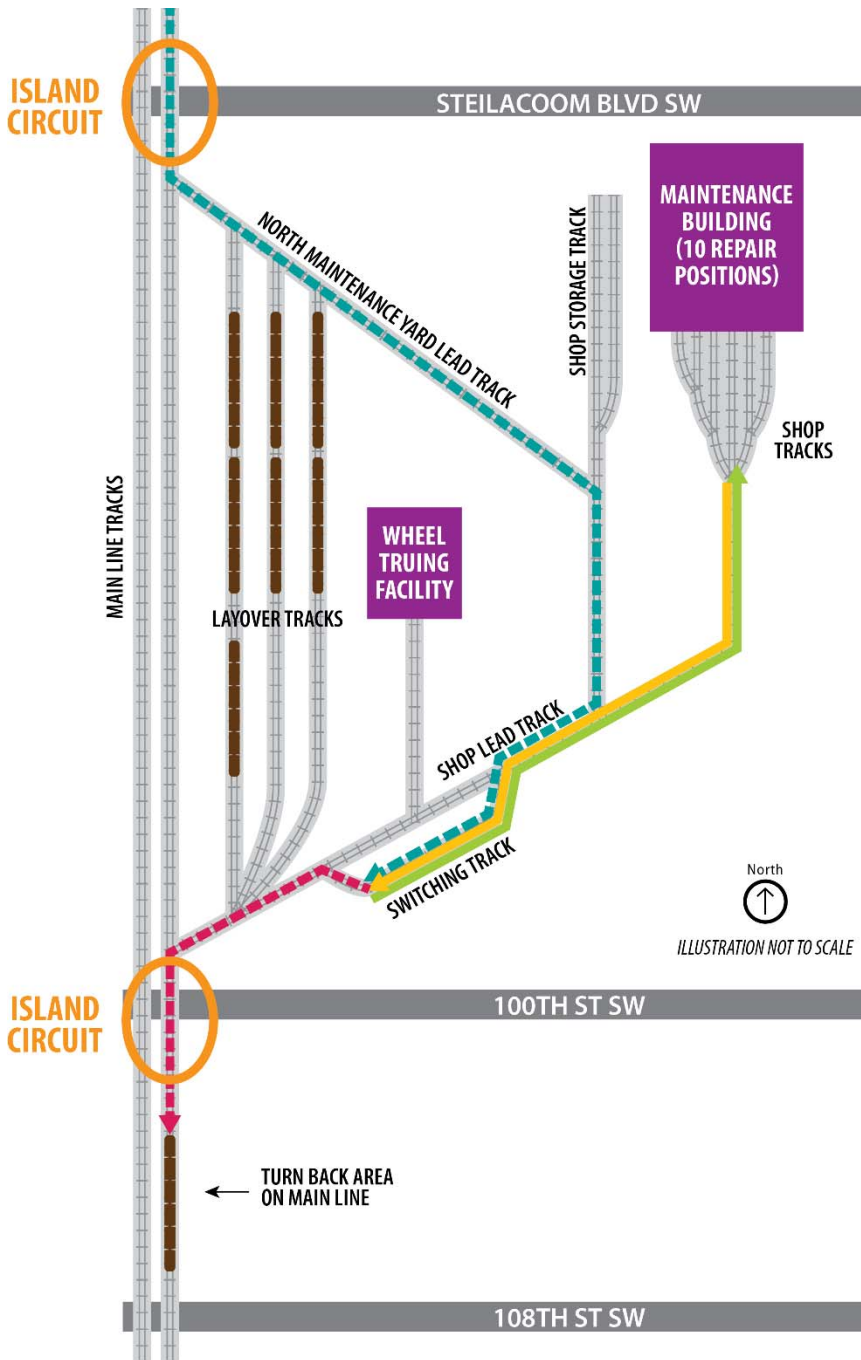
The operations and operational impacts for both PM and UM work are discussed in detail below.

## **Preventive Maintenance**

### **Train Operations**

Trains would arrive for PM work at the shop two times per week, based on a five-day work schedule. The contracted maintainer of the Souder equipment would be required to combine all of the equipment that is due regular scheduled PM work into a single train at the Amtrak Holgate Yard in South Seattle before being dispatched to the maintenance base. A total of two trains (referred to here as "units") per week would be delivered at the end of the service day to the Century Yard, with each unit delivered on different nights. The majority of units requiring PM at the maintenance building would arrive from the north, cross Steilacoom Boulevard SW, and enter the maintenance yard directly via the north maintenance yard lead track rather than staging within Century Yard (Figure 1). The unit would be stored on the switching track awaiting the equipment to be moved

Figure 1: Preventive Maintenance (PM) Train Movements



**TRAIN MOVEMENTS**

- - - - - ➔ Evening revenue service to switching track for next day preventive maintenance
- — — — — ➔ Night time movement from switching track to maintenance building
- — — — — ➔ Night time movement from maintenance building to switching track for next day return to revenue service
- - - - - ➔ Morning return to revenue service

**Sound Transit  
Souder Yard and Shops Facility Project**

into the maintenance building by the night shift. Vehicle movement from the switching track to the maintenance building and vice versa would occur without the vehicles having to leave the maintenance yard (or crossing local roads). The equipment leaving the shop upon completion of PM would be assembled into a train and stored on the switching track, again without the need to cross local roads. In the morning, the train crew would bring the unit back into revenue service by departing directly from the switching track and heading south on the main line track across 100th Street SW toward the Lakewood Station. Figure 1 depicts the movements into and out of the maintenance yard by one PM unit. However, the staging of the PM unit on the switching track the night before maintenance and storage of the PM unit after maintenance until revenue service begins in the morning results in the switching track being unavailable for unscheduled maintenance storage for four of the five weeknights.

The PM unit crossings at Steilacoom Boulevard SW and 100th Street SW during arrival and departure from the maintenance yard are the same as a revenue service train arriving from Seattle at the end of the day, being stored overnight at the Century Yard, and then being dispatched south to the Lakewood Station to begin service the following day.

## **Operational Impacts**

Scheduled PM work requires that the equipment due for maintenance be assembled into a unit prior to arriving at Century Yard. The movement into the maintenance yard requires crossing Steilacoom Boulevard SW upon arrival and 100th Street SW upon departure. However, the PM unit would be delivered to the maintenance yard before the start of the 8 p.m. night shift, and the PM unit that has completed maintenance would depart from the maintenance yard to begin revenue service in the morning resulting in no nighttime PM unit crossings of Steilacoom Boulevard SW or 100th Street SW. The total duration for the PM units crossing local roads occurs upon arrival and departures and is approximately 3 minutes (for an 8-car train) and 3.5 minutes (for a 10-car train).

The updated train operations for PM work is substantially affected by the switching track design element, which would allow for train storage to occur within the maintenance yard. This reduces the need to move trains from the layover yard to the maintenance yard and crossing 100th Street SW as described in Appendix G, Train Operations Technical Memorandum of the SEPA Checklist.

A new addition to the updated design layout is the wheel truing facility, which would be located off of the shop lead track. Any vehicle entering or leaving this facility would remain within the maintenance yard tracks and would not require additional crossings at either Steilacoom Boulevard SW or 100th Street SW until re-entering revenue service.

## **Unscheduled Maintenance**

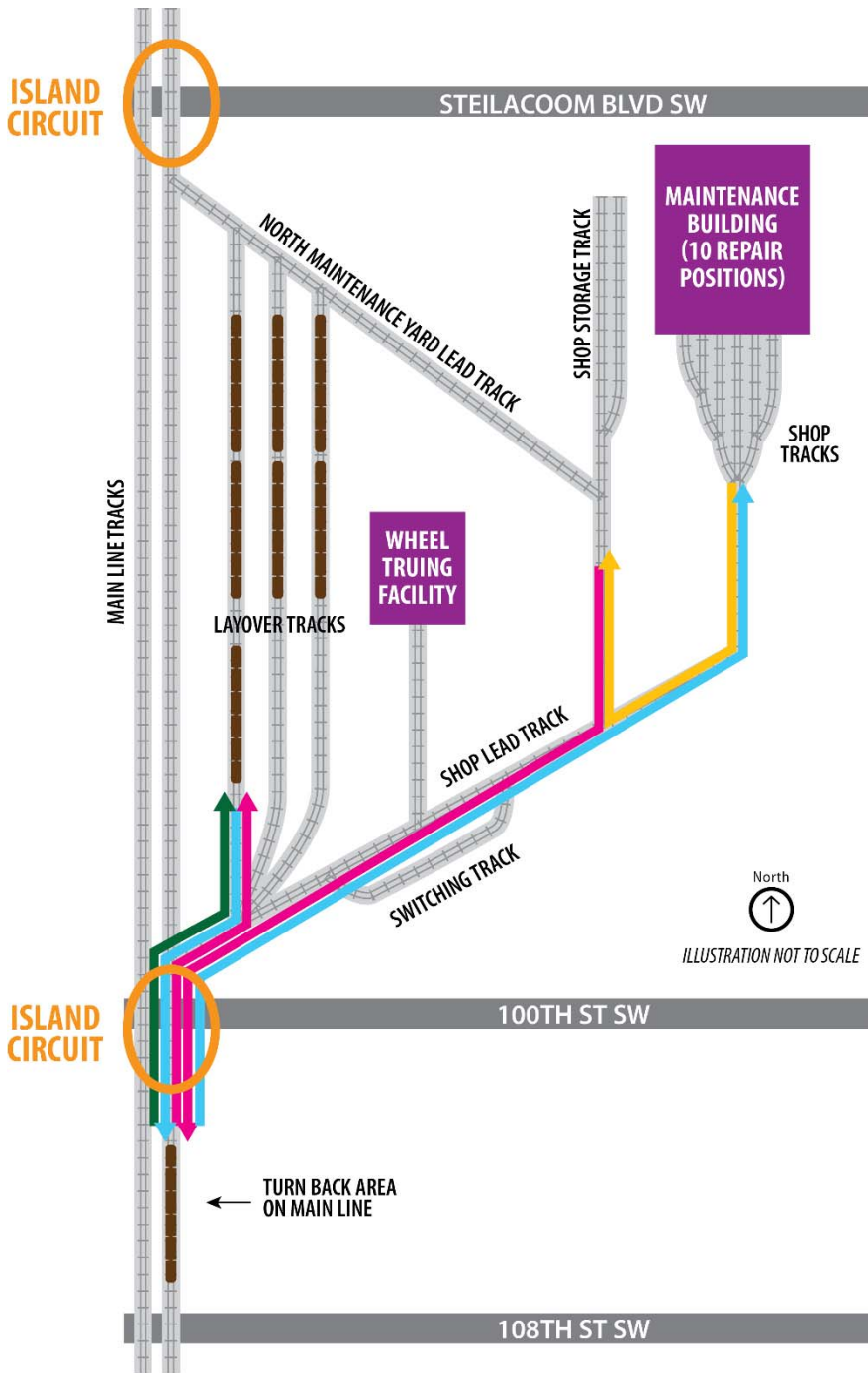
### **Train Operations**

Unscheduled maintenance consists of unanticipated repairs to cars or locomotives. The UM work at the maintenance building would be accommodated up to three days per week (when PM work is not being performed), based on a five-day work schedule. The vehicles requiring unscheduled maintenance would not be pre-assembled before reaching Century Yard, so each vehicle (and locomotive) would be moved individually or as part of a longer train. Should a unit require UM work during the time PM work is occurring, the UM unit would be stored in the Century Yard until space is available in the maintenance building or yard space becomes available. Since PM units would occupy the switching tracks for four of the five weeknights, the UM units for most of the time would be dispatched to the maintenance building from the Century Yard layover tracks.





#### *Switching Track Occupied (Movement from Century Yard Layover Tracks to Maintenance Yard)*

If the switching track is being used by a PM unit, then the UM unit would be stored in the layover yard and moved into the shop when space is available. This movement would require the UM unit to cross 100th Street SW or Steilacoom Boulevard SW twice. The first crossing would occur when leaving the layover yard and stopping at a turn-back point on the mainline beyond the island circuit, and the second would occur to access the shop lead track en route to the maintenance building. Replacement of the bad order equipment with a spare unit from the shop storage tracks would require two more crossings of 100th Street SW or Steilacoom Boulevard SW. Under most UM scenarios, the UM train unit would require a total of four crossings of a local road for each UM unit coming from the Century Yard layover tracks to the shop for maintenance. Figure 2 depicts the movements required for one UM unit entering and leaving the maintenance shop from the south side of the Century Yard layover tracks. Movement of UM units stored on the north end of the layover tracks would be similar—crossing Steilacoom Boulevard SW instead and entering the maintenance yard via the north maintenance yard lead track.

Figure 2: Unscheduled Maintenance (UM) Train Movements



**TRAIN MOVEMENTS**

-  Delivery of unscheduled maintenance vehicle(s) to layover track
-  Nighttime movement from layover tracks to maintenance building for next day repairs
-  Nighttime leave yard with replacement vehicle for revenue service
-  Nighttime movement of repaired vehicle from maintenance building to storage track

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*Non-occupied Switching Track (Movement from Main Line to Maintenance Yard and Back)*

If the switching track is unoccupied (on days it is not being used by a PM train), the unit with equipment requiring UM could be brought directly from the main line onto the switching track crossing the local road only once. Upon completion of repairs, the train crew could redeploy the train from the switching track southbound to begin revenue service at the Lakewood Station the next morning. The assumption here is that staging the UM unit for repairs the next day would not occur on the same nights that the PM units would be dispersed or reassembled. In this scenario, the UM train unit would require two crossings of a local road, once at arrival and once upon departure. However, once the switching track is occupied, any other UM unit arriving for maintenance would experience the same movements as in the switching track occupied scenario described previously.

Each train movement entering or leaving the maintenance yard from the main line would stop traffic on a local road between 2 minutes (for a locomotive plus 1-car train) and up to 3.5 minutes (for a 10-car train) for each crossing.

*Frequency*

Locomotives, cab cars, and coach cars may all require UM work, but locomotive failures are the most prevalent. Sound Transit currently owns and operates 14 locomotives, but with the ST3 expansion, the locomotive fleet would expand to 16 locomotives. Historical records kept by Sound Transit's maintenance provider, Amtrak, indicate rates of monthly breakdown of failures that would require the equipment to be taken out of service for UM work. These historic frequencies were used to calculate the proportional increase in frequencies as the fleet size expands from 81 vehicles in 2017 to 106 vehicles by 2040. The near-term unscheduled maintenance work will continue to be performed by a contractor until construction of the maintenance base has been completed in 2023. At that time, the unscheduled maintenance work would be transferred to Century Yard as shown in Table 1.

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Souder Yard and Shops Facility Project**

Table 1 Frequency of Unscheduled Maintenance (UM)

Equipment	Frequency of Monthly Unscheduled Maintenance		Weekly Unscheduled Maintenance	
	2023 Fleet	2040 Fleet	2023 Fleet	2040 Fleet
Locomotives	9	10	2.1	2.3
Cab Cars	5	8	1.2	1.8
Coach Cars	2	3	0.5	0.7
<b>TOTALS:</b>	<b>16</b>	<b>21</b>	<b>3.8 (4)</b>	<b>4.8 (5)</b>

Source: Sound Transit maintenance data as reported by service provider, Amtrak (2017).

### Operational Impacts

During operation, it is assumed that the switching track would not be available, so the UM unit would need to be moved from the Century Yard layover tracks into the maintenance building and then replaced with approved working equipment and stored on the Century Yard layover tracks. Two more local road crossings would be required to accommodate this movement. In this scenario, the UM unit would require a total of four crossings of the local road for each unit coming into the maintenance building for unscheduled maintenance. To be conservative, four local road crossings are assumed for each UM unit. An estimate of crossings of the local roads is shown in Table 2.

Table 2 Number of Unscheduled Maintenance Train Crossings

UM Fleet Scenario	Average per Week		Average per Night <sup>1</sup>	
	No. of Units	Total Crossings	No. of Units	Total Crossings
Local Road Crossings <sup>2</sup>				
81-vehicle fleet	4 max	16 max	2 max	8 max
106-vehicle fleet	5 max	20 max	2 max	8 max
Key : UM= Unscheduled Maintenance				
Notes: 1) UM unit movement occurs up to 3 nights per week 2) Assumes 4 crossings per UM unit				

Each train movement entering or leaving the shop would stop traffic on either Steilacoom Boulevard SW or 100th Street SW between approximately 1.75 minutes (for a locomotive plus 1-car train) and up to 3.5 minutes (for a 10-car train) for each crossing.



## **Crossing Impacts**

Potential traffic and noise impacts are assessed on a daily rather than weekly basis. Table 1 and Table 2 above show the breakdown of train crossings for the 81-vehicle fleet (year 2017) scenario and the 106-vehicle fleet (by 2040) scenario for UM activities. The estimates reflect no PM crossings of local roads (they are considered revenue service crossings) and the “maximum” average UM crossings for the total number of evening crossings of either or a combination of both Steilacoom Boulevard SW and 100th Street SW. The number of crossings indicated above represents the reduced range of train maintenance crossings under the updated design and operation of the Souder Maintenance Base Project.

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**ATTACHMENT F**  
**Noise and Vibration Technical Memorandum Update**

**Sound Transit**  
**Sounder Yard and Shops Facility Project**

# MEMORANDUM

**TO:** Lauren Swift, Senior Environmental Planner  
**FROM:** Patrick Romero, WSP USA Inc.  
**SUBJECT:** Noise and Vibration Technical Memorandum Update  
**DATE:** December 5, 2017

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## **Introduction**

This Noise and Vibration Technical Memorandum Update provides supporting documentation for the Sounder Yard and Shops Project (now called the Sounder Maintenance Base Project) SEPA Addendum to address the revised project design and train operations. Attachment G to the March 25, 2016, SEPA Environmental Checklist (SEPA Checklist) provided information on the worst-case scenario maintenance train movements and local road crossing effects. The purpose of this memorandum is to address the noise and vibration impacts resulting from an updated maintenance base facility design. The updated design includes a larger maintenance building to accommodate a larger fleet size based on the Sounder fleet expansions for the ST2 program (2017), as well as the ST3 program fleet expansion—an increase of the 81-vehicle fleet in 2017 to 106 vehicles by 2040. With construction of the new facility completed in 2023, the Sounder Maintenance Base Project would accommodate the 106-vehicle fleet. Key elements of the updated facility concept are as follows:

- Building expansion from approximately 40,000 square feet to up to 60,000 square feet to accommodate more operations. Six bays with a total of ten repair positions (eight of which are “stacked,” meaning two per bay with one in front of the other)
- Parking lot expanded from approximately 40 spaces to up to 60 spaces and shifted to the south
- New switching track located off of the shop lead track
- New wheel truing facility located off of the shop lead track
- Relocation of the existing transformer toward the interior of the site

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- Possible relocation of the existing Puget Sound Energy power line to the eastern property boundary
- Maintenance-related train crossings of Steilacoom Boulevard SW for train units entering the maintenance yard directly via the north maintenance yard lead track

These design elements, along with changed off- and on-site train movements associated with maintenance activities, would affect the train maintenance operations at the site and the number of crossings required across Steilacoom Boulevard SW and 100th Street SW. The new switching track allows vehicles requiring maintenance to be staged and stored on-site, substantially reducing the need to cross 100th Street SW. It is planned that the switching track would accommodate 10-car train sets.

Souder trains would be stored overnight at the Century Yard layover tracks for cleaning and light maintenance and redeployment the following morning, or they could be staged for movement into the maintenance building for preventive maintenance (PM) or unscheduled maintenance (UM). The PM is federally mandated work that is required on a time-schedule basis, and UM is the maintenance/repair of equipment that has unexpectedly failed while in service. Please reference the Train Operations Technical Memorandum Update for additional operations information. Project elements are shown in Figure 1.

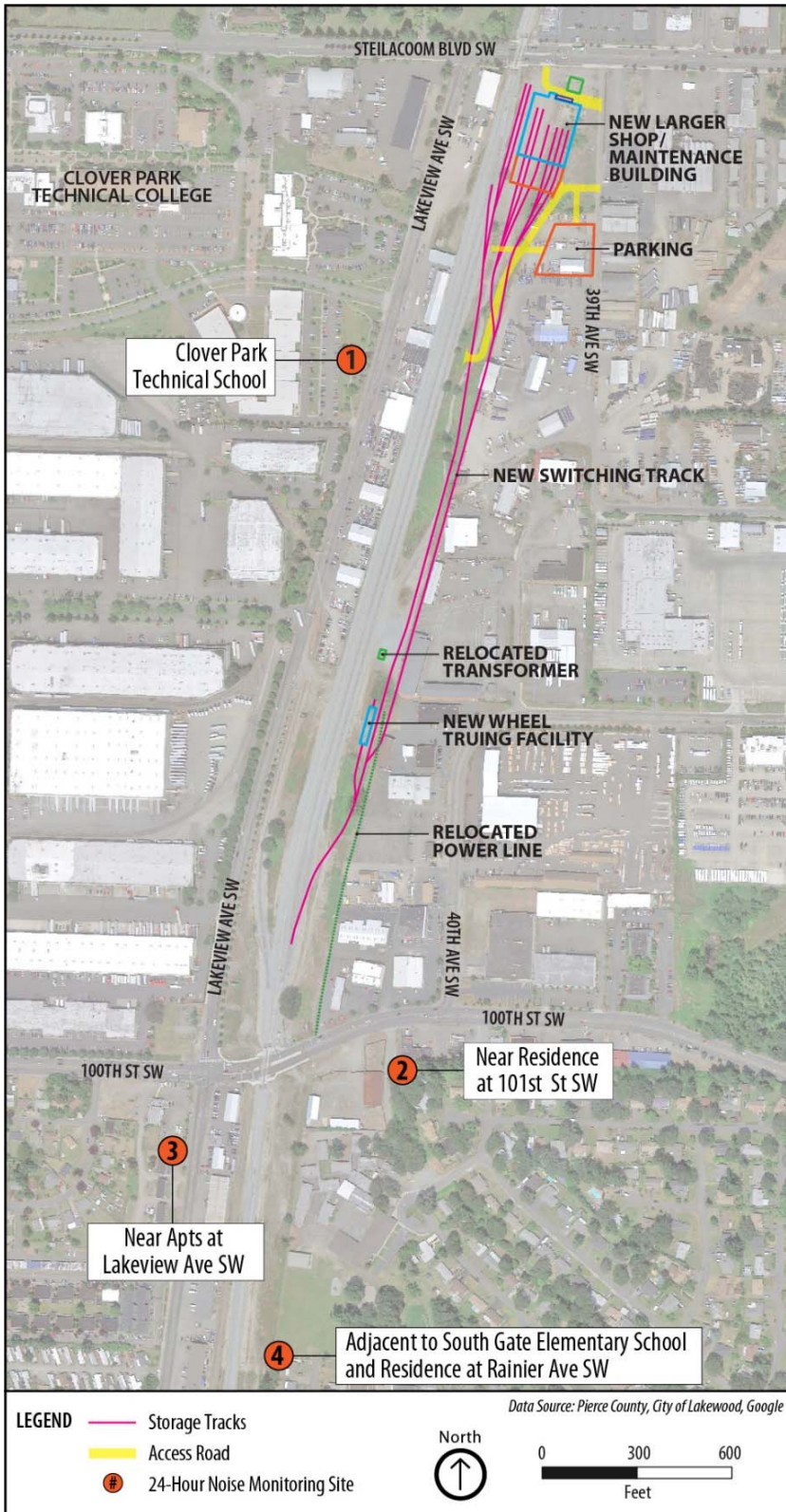
## **Noise and Vibration**

The analysis of noise and vibration impacts of the Souder Maintenance Base Project is based on a comparison of noise caused by the project with existing noise levels and Federal Transit Administration (FTA) impact levels to determine if noise levels would exceed FTA Criteria. Construction noise impacts are described based on maximum noise levels of construction equipment published by the U.S. Environmental Protection Agency (EPA). Train noise exposure is predicted at noise-sensitive receptors based on project operations using the FTA noise assessment spreadsheet model. Mitigation measures are described, where appropriate, to avoid or reduce potential noise impacts.

The noise impact analysis for the proposed project considered all project improvements for construction and operations at the Souder Maintenance Base Project, including the larger

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Sounder Yard and Shops Facility Project**

Figure 1. Sounder Maintenance Base Project Updated Design



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maintenance building and parking lot, new switching track, new indoor wheel truing facility, relocation of the existing transformer, and possible relocation of the existing Puget Sound Energy power line. Overall, these project elements are anticipated to result in a reduction in the number of maintenance-related trains crossing of local roadways – 100th Street SW and Steilacoom Boulevard SW. These train movements would require at most 8 nighttime (8 p.m. to 4 a.m.) crossings of 100th Street SW or Steilacoom Boulevard SW, resulting in roadway blockages of approximately 2 minutes (for a locomotive plus 1-car train) and up to 3.5 minutes (for a 10-car train) for each crossing. The wheel truing facility would not result in an increase in noise levels at the noise-sensitive sites located closest to the Century Yard because all wheel grinding activities would occur during daytime hours within an enclosed building more than 600 feet from the nearest noise-sensitive land uses.

Potential noise-sensitive land uses and vibration-sensitive buildings were identified by reviewing previous noise and vibration studies that included the Sounder Maintenance Base Project and a field survey of the study area. No noise-sensitive land uses are located in close proximity to the rail crossing at Steilacoom Boulevard SW, but several are located near the rail crossing at 100<sup>th</sup> Street SW. Noise levels were measured at multiple locations near the proposed project improvements to establish the existing noise environment. Predicted future noise levels in the study area are based on measured levels conducted as a part of this study and approved future daily rail operations. For information on the previous field survey of the study area or noise monitoring, refer to the Noise and Vibration Technical Memorandum (March, 25, 2016).

## **Impacts**

Substantial transportation-related noise already exists in the project area, including noise from train and vehicular traffic, as well as aircraft flying to and from Joint Base Lewis-McChord and Clover Park Vocational Technical School Airport. Noise exposure from the project would range between 50 and 59 dBA day-night sound level (Ldn) at the modeled noise-sensitive land uses (Table 1). The update project design and operations resulting in fewer nighttime crossings of local roadways and potentially longer duration of train crossings would result in noise levels that are predicted to increase by 1 or 2 dBA (Ldn) above existing noise levels at residences in close proximity to the rail crossing at 100<sup>th</sup> Street SW. Project noise levels are predicted to result in no change in noise levels



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**Table 1. Modeled Sound Levels of Project-Related Noise (dBA)**

Site # & Name	FTA Land Use Category <sup>1</sup>	Measured Noise Levels 2015 <sup>2</sup> (Existing <sup>3</sup> )	FTA Thresholds for Moderate/ Severe Impact <sup>4</sup>	Sounder Maintenance Base Project Noise Exposure <sup>5</sup>	Future Total Noise Exposure <sup>6</sup>	Calculated Total Noise Increase	FTA Impact with Project (Moderate or Severe)
Site 1: Clover Park Technical College	3	60 Leq	63-68/ >68	53 Leq	61 Leq	1	None
Site 2: Residences at 101st Street SW	2	60 Ldn	58-63 >63	55 Ldn	61 Ldn	1	None
Site 3: Residences at Lakewood Avenue SW	2	62 Ldn	59-64/ >64	59 Ldn	64 Ldn	2	Moderate
Site 4A: Residences at Rainier Avenue S	2	60 Ldn	58-63 >63	54 Ldn	61 Ldn	1	None
Site 4 B: Southgate Elementary School	3	60 Leq	64-69 >69	50 Leq	60 Leq	0	None

Notes:

<sup>1</sup> FTA Land Use Categories are described in Chapter 4 of the Sounder Yard and Shops Facility Project Noise and Vibration Technical Memorandum.

<sup>2</sup> Measured noise levels were collected as part of this study.

<sup>3</sup> Existing L<sub>dn</sub> is reported for residential areas; L<sub>eq</sub> is reported for other noise-sensitive areas.

<sup>4</sup> FTA Noise Impact Criteria are L<sub>dn</sub> or L<sub>eq</sub> values as appropriate, calculated from Figure 4-3 in Chapter 4.0 of the Sounder Yard and Shops Facility Project Noise and Vibration Technical Memorandum.

<sup>5</sup> Sounder Maintenance Base Project noise exposure includes noise from the increased future transit noise associated with project operations; non-project-related noise sources are not included.

<sup>6</sup> Future noise exposure includes noise from the increased future transit noise associated with project operations and non-project-related noise sources.

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at Southgate Elementary School and to increase by 1 dBA (Leq) at Clover Park Technical College. Predicted future noise-level increases would occur between 8 p.m. and 4 a.m. based on the updated maintenance-related train movements described in the Train Operations Technical Memorandum Update. The location of each noise-sensitive land use where noise levels were predicted is shown in Figure 1.

Predicted noise levels with the Sounder Maintenance Base Project are within 1 dBA of all predicted noise levels previously calculated for the project, with reductions of 1 dBA at Site 2 and Site 4A. Future total noise exposure levels and impacts are consistent. The frequency of noise peaks (Lmax noise levels) could increase as Sounder maintenance operations increase in the project area. Future Sounder staging to accommodate future operations could also increase noise levels at resulting from Century Yard.

Moderate noise impacts under the FTA criteria are predicted to occur at one of the four locations (Site 3, Figure 1) evaluated for the project, representing 12 multifamily residences and 4 single-family residences. Impacts at the 12 multifamily residences and 4 single-family residences are consistent with the impacts presented in the previous analysis. Impacts for the updated project design are likely to occur. The predicted noise levels and resulting impacts documented in the previous analysis represent additional noise produced by additional nighttime train crossings.

Construction activities would generate temporary noise and vibration during the construction period – similar to those described in the previous analysis. Nighttime construction may require coordination with the City of Lakewood and the Contractor. Construction noise levels could be reduced by implementing the construction practices identified in Chapter 7.0 of the Sounder Yard and Shops Facility Project, Noise and Vibration Technical Memorandum (March, 25, 2016).

## **Mitigation**

Moderate noise impacts under the FTA criteria are predicted to occur at one of the four locations evaluated for the project based on the updated design and operation for the Sounder Maintenance Base Project. This one site represents 12 multifamily residences and 4 single-family residences. The impacts would result from warning devices sounded at the 100th Street SW crossing during nighttime hours. Because the impacts would result from safety devices located at a roadway

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crossing, constructing barriers to shield residences from noise is not possible while maintaining access to the crossing and continuing to provide an audible warning to approaching traffic. Instead, residential sound insulation will be evaluated for the 12 multifamily residences and 4 single-family residences that would experience moderate impacts and offered at properties where the existing building does not already achieve a sufficient exterior-to-interior reduction of noise levels. During final design, all predicted noise levels and mitigation measures will be reviewed. If equivalent mitigation can be achieved by a less costly means, such as operational changes, or if the final design analysis shows no impact, then the mitigation measure may be modified or eliminated.

## **References**

FTA (U.S. Department of Transportation, Federal Transit Administration), 1995. *Rail Noise and Vibration Impact Assessment*. Washington D.C.

FTA, 2006. *Transit Noise and Vibration Impact Assessment, Final Report*. FTA-VA-90-1003-06.

HMMH, 2007. *Description of FTA General Noise Assessment Spreadsheet*. Technical Memorandum from Harris Miller & Hanson to FTA. Burlington, MA.

Sound Transit, 2002. *Lakewood-to-Tacoma Commuter Rail and SR-512 Park-and-Ride Lot Expansion Final Environmental Impact Statement (EIS)*. May. Seattle, Washington.

Sound Transit, 2005. *SEPA Addendum to the Lakewood-to-Tacoma Commuter Rail and SR-512 Park-and-Ride Lot Expansion Final Environmental Impact Statement (EIS)*. October. Seattle, Washington.

Sound Transit, 2009. *Seattle to Tacoma Sounder Commuter Rail Easements and Improvements (Easements 1 and 2) NEPA DCE*. November. Seattle, Washington.

Sound Transit, 2011. *Seattle to Tacoma Sounder Commuter Rail Easements and Improvements (Easements 3 and 4) NEPA DCE*. November. Seattle, Washington.

Sound Transit, 2013. *Sounder Yard Expansion Phase 2 Project Final Noise and Vibration Technical Report*. August 2013. Seattle, Washington.

**Sound Transit  
Souder Yard and Shops Facility Project**

Sound Transit, 2015. Souder Yard and Shops Facility Project, Noise and Vibration Assumptions and Methodology Memorandum. Prepared by Parsons Brinckerhoff. July 17, 2015.

Sound Transit, 2016. Souder Yard and Shops Facility Project, Noise and Vibration Technical Memorandum. Prepared by Parsons Brinckerhoff. March 25, 2016.

**ATTACHMENT G**  
**Transportation Technical Memorandum Update**

**Sound Transit**  
**Sounder Yard and Shops Facility Project**

# MEMORANDUM

TO: Lauren Swift, Senior Environmental Planner  
FROM: Tony Lo, WSP USA Inc.  
SUBJECT: Transportation Technical Memorandum Update  
DATE: December 5, 2017

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## 1 Introduction

This Transportation Technical Memorandum Update provides supporting documentation for the Souder Yard and Shops Facility Project (now called the Souder Maintenance Base Project) SEPA Addendum to address the updated Souder Maintenance Base design and operations. The purpose of the addendum is to address the transportation impacts resulting from the updated maintenance base facility design. The updated design concept includes the following:

- Maintenance building expanded from approximately 40,000 square feet to up to 60,000 square feet to accommodate a larger fleet size based on the Souder fleet expansions for the ST2 program (2017), as well as the ST3 program fleet expansion
- Parking lot expanded from approximately 40 spaces to up to 60 spaces and shifted to the south
- New switching track located off of the shop lead track
- New wheel truing facility located off of the shop lead track
- Relocation of the existing transformer toward the interior of the site
- Possible relocation of the existing Puget Sound Energy power line to the eastern property boundary
- Maintenance-related train crossings of Steilacoom Boulevard SW for train units entering the maintenance yard directly via the north maintenance yard lead track

## 2 Project Description

The updated maintenance facility concept includes a total of six bays with 10 repair positions. Of the 10 repair positions, eight are "stacked positions," translating to two repair positions per bay,

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one in front of the other. A new element of the updated design layout is the wheel truing facility, which would be located off of the shop lead track. Along with the increase in fleet size and expanded facilities, the number of expected daytime employees to meet the need to provide maintenance services for the 10-car train sets at the site would increase from 27 to 41 by 2040. The employee count for nighttime operations would remain the same at four employees.

The number of potential nighttime crossings of 100th Street SW was originally estimated at 12 one-way crossings, which covers preventive maintenance (PM) train movements and unscheduled maintenance (UM) movements. The new site operating plan would contain all PM switching activity and movements on site through a new switching track, thereby reducing nighttime crossings to eight UM trains. Access into the yard for UM trains could occur from the north or south, however, so the eight nighttime crossings could affect 100th Street SW or Steilacoom Boulevard SW.

With the longer train sets (expanding from 8- to 10-car trains by 2040), the eight UM train crossings of 100th Street SW or Steilacoom Boulevard SW could last up to 3.5 minutes (compared to 3 minutes as previously documented) per one-way crossing for a 10-car train.

### **3 Methodology**

This memorandum provides a qualitative assessment of how the updated design and operations compare to the previous analysis. Included in the assessment are the transportation impacts related to changes in employee activity levels, train operations, peak-hour traffic conditions, and nighttime train blockage delays on 100th Street SW and Steilacoom Boulevard SW.

### **4 Existing Conditions**

Existing transportation conditions for the Souder Maintenance Base Project (reflecting year 2015) in terms of the roadway network, signals, transit service levels, crashes, non-motorized amenities, and freight activity within the study area are the same as previously described in the *Souder Yard and Shops Facility Transportation Technical Memorandum* (March 25, 2016). In addition, AM and PM peak-hour traffic congestion levels for the five study intersections, shown in Table 1, are the same as previously summarized, which indicated low to moderate average vehicle delays and acceptable level of service for all locations.



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Table 1. Existing (2015) Peak Hour Level of Service

Intersection	Control	AM Peak Hour		PM Peak Hour	
		LOS	Delay <sup>1</sup>	LOS	Delay <sup>1</sup>
Steilacoom Blvd SW/Lakeview Ave SW	Signal	A	6	A	10
Steilacoom Blvd SW/39th Ave SW	Stop <sup>2</sup>	B	11	C	18
Steilacoom Blvd SW/Durango St SW	Stop <sup>2</sup>	C	16	C	16
100th Street SW/Lakeview Ave SW	Signal	B	15	C	20
100th Street SW/40th Ave SW	Signal	B	17	B	15

<sup>1</sup>Delays are represented by average intersection estimates given in seconds per vehicle.

<sup>2</sup>Stop control intersection delay reflects worst-case approach (minor street).

## 5 Future Conditions

Future transportation conditions described in this addendum reflect the anticipated changes for the Sounder Maintenance Base site that include a larger vehicle fleet to maintain, an increase in the number of on-site staff, and revisions to train movements for PM and UM train movements. The focus of this discussion is on arterial and intersection traffic operations during staff shift changes (morning and evening) and nighttime crossing impacts on 100th Street SW or Steilacoom Boulevard SW as they compare to the previous findings. Future impacts to non-motorized demands, and/or freight movements are not expected to change.

### 5.1 Roadway Network Changes

Planned or proposed changes to the study area arterials captured in the 2015-2020 City of Lakewood Six-Year Comprehensive Transportation Improvement Program were described in the previous Transportation Technical Memorandum. These network changes, representing a modest set of improvements (repaving, new sidewalks and a new signal), included the following:

- Roadway restoration: Steilacoom Boulevard SW from Lakewood Drive to S. Tacoma Way (2015)
- Replace existing signal: Steilacoom Boulevard SW and Lakeview Avenue SW (2015-2016)
- New traffic signal: Steilacoom Boulevard SW and Durango Street SW (2015-2016)

Of these projects, the roadway restoration for Steilacoom Boulevard SW was completed in late 2016, while the signal replacement at Steilacoom Boulevard SW / Lakeview Avenue SW and

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installation of a new signal at Steilacoom Boulevard SW/Durango Street SW are currently awaiting full funding in 2017 or 2018.

**5.2 Future Traffic Volumes**

Background growth in traffic volume was described previously with the assumption that future traffic levels on the main study arterials of Steilacoom Boulevard SW, 100th Street SW, and Lakeview Avenue SW would increase by approximately 1.5 percent through 2020 on an annualized basis from 2015 and this analysis assumes the same growth rate. This level of background growth is assumed to be retained for the Souder Maintenance Base Project. With the expanded vehicle fleet and revised train operations, trip generation for the site is expected to increase slightly during the critical shift changes in the morning and evening because of the elevated daytime staffing requirements from 27 to 41 persons by 2040. There is no change anticipated in nighttime staffing, which remains at 4 employees.

Consistent with the original project, the maintenance base shift changes are assumed to coincide with the typical commute periods, which provides a conservative assessment of traffic impacts. All shifts begin and end at off-peak times. The actual shift change activity in the morning would occur around 4 to 5 a.m., well before the typical AM peak commute period. Evening shift change activity would occur around 7 to 8 p.m., which is later than the typical PM peak commute period. A summary of the revised trip generation for the Souder Maintenance Base Project based on the increased number of employees at the site is provided in Table 2.

Table 2. Project Trip Generation Summary

Time Period	Souder Yard and Shops Facility (previous)		Souder Maintenance Base Project (updated)		Difference	
	Entering	Exiting	Entering	Exiting	Entering	Exiting
Morning Peak Hour (7 to 8 a.m.)	30	10	45	10	15	0
Evening Peak Hour (4 to 5 p.m.)	10	30	10	45	0	15
Mid-day (10 a.m. to 3 p.m.) <sup>1</sup>	20	20	25	25	5	5
Daily (24-hour period)	60	60	80	80	20	20

Source: Sound Transit and BNSF Railway

<sup>1</sup>Reflects staff break and delivery trips

Similar to the trip assignment patterns assumed in the previous memo, the additional 15 entering trips estimated for the morning peak hour and 15 exiting trips for the evening peak hour would be distributed evenly to the three driveways serving the site to/from Steilacoom Boulevard SW and 100th Street SW. The resulting change in traffic demand would be 5 additional entering trips at each driveway movement during the AM peak hour and 5 additional exiting trips at each driveway movement during the PM peak hour. This would translate to a total of 10 additional trips to/from Steilacoom Boulevard SW and 5 additional trips to/from 100th Street SW for both the AM and PM peak hours. As such, the increase in trip generation due to additional employees for the start of operations in 2023 would not differ from the conclusions presented in the previous analysis, and the small increase hired to accommodate the 10-car train sets by 2040 would not be a substantial increase.

### **5.3 Intersection Traffic Operations**

Operational analysis of future Baseline and Build conditions for the AM and PM peak hours was previously performed using Synchro (Version 9) analysis software. No major roadway network changes were included for the future Baseline and Build scenarios compared to existing conditions. In addition, no signal phasing or timing optimization adjustments for the Steilacoom Boulevard SW / Lakeview Avenue SW, 100th Street SW/Lakeview Avenue SW, or 100th Avenue SW / 40th Avenue SW intersections were incorporated.

The planned signal at Steilacoom Boulevard SW and Durango Street SW is not yet funded (based on information obtained from City of Lakewood staff); therefore, the signal was not included in the updated analysis in order to provide a worst-case scenario in terms of potential project impacts.

The previous results of the 2020 analyses for Baseline and Build conditions are shown in Table 3.

The updated analysis conservatively assumes all of the new employees needed by 2040 would be working at the start of operations in 2023. The increase, however, is only a modest increase above the site-generated trips previously analyzed, i.e. an additional 5 to 10 additional trips during both the AM and PM peak hours. In addition, the three-year shift in the year of opening to 2023 would not substantially change peak-hour delay or level of service for the study intersections. All of the intersections listed above would be expected to continue to operate at acceptable levels of delay and congestion during the AM and PM peak hours.

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Table 3. Future 2020 Peak-Hour Level of Service

Intersection	2020 Baseline Conditions				2020 Build Conditions			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
	LOS	Delay <sup>1</sup>	LOS	Delay <sup>1</sup>	LOS	Delay <sup>1</sup>	LOS	Delay <sup>1</sup>
Steilacoom Blvd SW/ Lakeview Ave SW	A	7	B	11	A	7	B	11
Steilacoom Blvd SW/ 39th Ave SW <sup>2</sup>	B	14	C	23	B	14	D	27
Steilacoom Blvd SW/ Durango St SW <sup>2</sup>	C	20	C	20	C	20	C	20
100th Street SW/ Lakeview Ave SW	B	17	C	21	B	17	C	21
100th Street SW/ 40th Ave SW	B	19	B	16	B	20	B	16
100th Street SW/ Site Driveway <sup>2</sup>	B	13	B	13	B	14	B	13

<sup>1</sup>Delays are represented by average intersection estimates given in seconds per vehicle.

<sup>2</sup>Delays and LOS reflect minor-street approach only.

#### 5.4 Nighttime Train Switching Impacts

Consistent with the original project, nighttime switching at the south end of the site across 100th Street SW would be required for train maintenance to move vehicles into the repair positions. However, because of the reconfigured site and modified operations, movements across either 100th Street SW or Steilacoom Boulevard SW would now occur, but only for crossing movements associated with unscheduled maintenance.

Two different types of nighttime switching maneuvers would be required:

- Trains moving southbound across 100th Street SW and then back north across 100th Street SW again into the yard and the designated layover track
- Trains moving northbound across Steilacoom Boulevard SW and then back across Steilacoom Boulevard SW onto the designated track and again into the yard.

A total of four crossings would be involved for each unscheduled maintenance train set. Based on estimates for unscheduled maintenance, up to two train sets may be serviced per weeknight, translating to an average of up to eight at-grade crossings and blockages at either 100th Street SW or Steilacoom Boulevard SW between 8 p.m. and 4 a.m. For additional information about the

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movement of trains and the anticipated onsite and offsite switching patterns, refer to the Train Operations Technical Memorandum Update.

Based on 24-hour arterial counts taken over a three-day period in 2015, the highest documented hourly volumes between 8 p.m. and 4 a.m. on either 100th Street SW or Steilacoom Boulevard SW were from 8 to 10 p.m. Volumes between 10 and 11 p.m. are approximately 33 percent lower than the 9 to 10 p.m. hour with progressively declining volumes after 11 p.m. To develop 2023 arterial volume projections representing a slightly delayed year-of-opening (original year-of-opening was 2020), a conservative background growth rate of 1.5 percent per year used for the intersection forecasts was applied to the directional hourly volume data (Tables 4 and 5).

**Table 4. Estimated 2023 Arterial Volumes on 100th Street SW (Nighttime)**

Time Period	2015 Count Volumes (veh/hr) <sup>1</sup>			2023 Volume Projections (veh/hr)		
	EB	WB	Total	EB	WB	Total
8 to 9 p.m.	500	410	910	560	460	1,020
9 to 10 p.m.	365	320	685	410	360	770
8 to 10 p.m. (avg.)	430	365	795	480	410	890

<sup>1</sup>Count taken on 100th Street SW just east of Lakeview Avenue SW.

**Table 5. Estimated 2023 Arterial Volumes on Steilacoom Boulevard SW (Nighttime)**

Time Period	2015 Count Volumes (veh/hr) <sup>1</sup>			2023 Volume Projections (veh/hr)		
	EB	WB	Total	EB	WB	Total
8 to 9 p.m.	460	360	820	515	405	920
9 to 10 p.m.	330	280	610	370	315	685
8 to 10 p.m. (avg.)	395	320	715	440	360	800

<sup>1</sup>Count taken on Steilacoom Boulevard SW west of Lakeview Avenue SW.

Based on train length and speed limits in the maintenance base yard, the total duration of unscheduled maintenance train blockages for 100th Street SW or Steilacoom Boulevard SW could range from 2 minutes (for a locomotive plus 1-car train) to 3.5 minutes. The lengthier duration, however, would not occur until sometime by 2040 when expanded service involves 10-car train sets.

As noted in the previous memorandum, blockages of this magnitude are similar to what occurs for current Sounder layover access and is considered modest in terms of impacts to local streets. The previous estimate for nighttime train crossings was up to 12 one-way train movements across

100th Street SW with blockage durations of up to 3 minutes for a total blockage time of up to 36 minutes per night. The updated site design and maintenance-related train movements would reduce the upper train movement estimate to only 8 nighttime crossings, but the blockage durations for either 100th Street SW or Steilacoom Boulevard SW could increase to 3.5 minutes when the vehicle fleet is ultimately expanded to 106-vehicle fleet by 2040. The total blockage time with the expanded fleet would be approximately 28 minutes over the 8-hour nighttime period. As such, the total duration of the worst-case blockages with 10-car train sets would be reduced and likely affect two arterials, 100<sup>th</sup> Street SW and Steilacoom Boulevard SW, instead of just one arterial as presented in the previous analysis.

In summary, the updated operations along with changes to nighttime train movements and the delayed project opening to 2023 would not result in any greater impacts to the primary east–west arterials than what was previously documented. Due to the slightly lower nighttime traffic volumes on Steilacoom Boulevard SW at the rail crossing compared to 100<sup>th</sup> Street SW, queues that would form on Steilacoom Boulevard SW during train blockages would be slightly shorter than those on 100<sup>th</sup> Street SW. Regardless, the impacts of train blockage queues on east-west traffic flow and access along either 100<sup>th</sup> Street SW or Steilacoom Boulevard SW are expected to be modest overall.

## **6 Mitigation**

Because of the modest changes in site trip generation for the updated Souder Maintenance Base Project operations compared to previously documented conditions, no mitigation measures would be needed to ensure reasonable arterial/intersection operations during weekday peak traffic periods. In addition, despite the potentially longer crossing/blockage durations (3.5 minutes versus 3 minutes previously documented) for nighttime unscheduled maintenance train movements, the overall nighttime train blockage duration would be slightly reduced since the number of nighttime crossing movements would decrease from 12 crossings (previously documented) to 8 crossings. As such, no specific mitigation would be needed to address queueing or delays to vehicles traveling on 100th Street SW or Steilacoom Boulevard SW between 8 p.m. and 4 a.m. As stated in the previous memo, alternative routes are available via 100th Street SW, Steilacoom Boulevard SW or 108th Street SW for bikes, pedestrians, and general purpose traffic.

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Consistent with the original project, Sound Transit and Pierce Transit will continue discussions through final design to identify opportunities to further minimize potential impacts to public transit riders and non-revenue buses. In spring 2017, Pierce Transit restructured some of their bus routes such that buses travel along both 100<sup>th</sup> Street SW (Route 4) and Steilacoom Boulevard SW (Route 48). Coordination with Pierce Transit would identify potential opportunities to further minimize nighttime impacts to both Route 4 and Route 48 transit riders and non-revenue (deadheading) buses resulting from train blockages on 100th Street SW and Steilacoom Boulevard SW, respectively. Potential options may include temporary (time of day) rerouting of buses and deadheading buses or permanent route realignment to circumvent blockages on 100th Street SW or Steilacoom Boulevard SW.

Emergency responders (police, fire, and ambulance) using 100th Street SW or Steilacoom Boulevard SW could be disrupted as a result of nighttime train switching activity. However, alternate routes via Lakeview Avenue SW, 100th Street SW, or Steilacoom Boulevard SW will be available and are not expected to substantially increase response times.

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