STRIDE
BRT General Engineering Consultant

Memorandum

SR 522/NE 145th Bus Rapid Transit (BRT) Additional Environmental Analysis

Date:	August 2024
Project Name:	Stride S3 Line (SR 522/NE 145th BRT)
Project No:	D3458616.04
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1. Introduction

The SR 522/NE 145th Bus Rapid Transit (BRT) project, also known as the Stride S3 Line, will serve the growing north Lake Washington communities from Shoreline and Seattle to Bothell. The project will connect riders to Link light rail at Shoreline South/148th at the corridor's western end, and to the I-405 BRT (S2 Stride Line) in Bothell, the area's eastern end. S2 and S3 will connect at the State Route (SR) 522/I-405 Transit Hub with transit service provided by Sound Transit, Community Transit, and King County Metro. A State Environmental Policy Act (SEPA) Checklist for the project (2021 SEPA Checklist) was completed by Sound Transit in March 2021, and a Determination of Non-significance (DNS) was issued (Sound Transit 2021). The 2021 SEPA Checklist described and analyzed the following project components based on the then-available 30 percent (%) conceptual design:

- Two BRT stations in Shoreline/Seattle, three in Lake Forest Park, three in Kenmore, and four in Bothell
- New park-and-ride garages in Lake Forest Park, Kenmore and Bothell
- Transit queue bypass, business access and transit (BAT), and bus-only lanes
- Transit signal priority (TSP) improvements at certain intersections
- Bicycle and pedestrian improvements
- New fleet of buses (10 battery electric, 2 diesel hybrid propulsion)

Design has since advanced past the 90% milestone. The additional analysis presented here addresses the final design refinements and evaluates them for potential different or greater environmental impacts during operation and construction than identified in the 2021 SEPA Checklist. Mitigation or minimization measures identified in the 2021 SEPA Checklist remain the same unless otherwise noted. Updates to compensatory mitigation plans for ecosystem services are also addressed.

Consistent with the 2021 SEPA Checklist, the properties along the corridor are referenced by a BRS number, which is Sound Transit's property identification number. For the updated list of affected parcels along the BRT Project corridor, refer to **Appendix A**.

2. Design Refinements

The Stride S3 Line final design plans were reviewed for refinements that could warrant additional environmental analysis (**Table 1**). These are discussed by segment as they were described in the 2021 SEPA Checklist (Sound Transit 2021):

- Segment 1: Seattle/Shoreline
- Segment 2: Lake Forest Park
- Segment 3: Kenmore
- Segment 4: Bothell

Table 1. Project Refinements since the 30% Design Milestone

Project Segment	Jurisdiction	Design Refinements	
Segment 1	Seattle	General Design	▪ Curb radius changes at 17th Avenue NE and 30th Avenue NE. ▪ TSP added to existing traffic signals at NE 145th Street/20th Ave NE and NE 145th Street/25th Avenue NE intersections. ▪ Raised curb island on NE 145th Street removed from design and replaced by striping channelization.
		Retaining Walls	▪ Retaining wall at 15th Avenue NE removed from design.
	Shoreline	General Design	▪ Curb radius changes at 17th Avenue NE and 30th Avenue NE. ▪ TSP added to existing traffic signals at NE 145th Street intersections with 20th Avenue NE and 25th Avenue NE. ▪ Raised curb island on NE 145th Street removed from design and replaced by striping channelization.
		Retaining Walls	▪ Retaining walls newly proposed at 12th Avenue NE and 17th Avenue NE.
		Station Changes	▪ Revised sidewalk design as part of 30th Avenue westbound station reconfiguration.
Segment 2	Lake Forest Park	General Design	▪ Access management refinements adjusted design to include area up to 41st Avenue NE. ▪ Utility poles were relocated from the southbound side of SR 522 to the northbound side to eliminate large notches, which reduced the height of the proposed retaining wall near live wires. ▪ Smaller curb radii were implemented to improve pedestrian crossings. ▪ Revised channelization of southbound SR 522 to accommodate a BAT lane adds a 100-foot left-turn pocket at the 41st Avenue NE/NE 153rd Street intersection, and removed an existing two-way left-turn lane, replacing it with a raised median. ▪ Reduced the southbound SR 522 channelized left pocket at NE 153rd Street to 100-foot queue length, to accommodate adding a northbound BAT lane while maintaining the existing Washington State Department of Transportation (WSDOT) wall at Bsche'tla Creek. ▪ Relocated pedestrian facilities adjacent the south side of SR 522 moves the walkway behind the existing 200-foot-long soldier pile fill wall and adds a 6-foot-wide cantilevered walkway structure

Project Segment	Jurisdiction	Design Refinements	
			over the Bsche'tla Creek ravine. Refinements added a cast-in-place concrete moment slab on the side of the existing wall, supported by micropiles or lightweight concrete fill behind the wall. ▪ Pedestrian bridge over McAleer Creek between 45th Avenue NE and McAleer Creek was removed from design to avoid maintenance activity conflicts. ▪ A connection to the Burke-Gilman Trail off 41st Avenue NE that includes a short, low pedestrian bridge structure. ▪ TSP added to existing traffic signals at SR 522/ NE 153rd Street and at SR 522/170th Street. ▪ Storm drainage swale added at Lake Forest Park Town Center eastbound station. ▪ Stormwater detention vaults removed from design and replaced by existing high flow bypass system with pipe crossing at McAleer Creek.
		Retaining Walls	▪ Thicker soldier pile walls will replace the tie-back retaining walls along the west side of SR 522 north of the intersection of NE 165th Street. ▪ Removed proposed work on new and existing retaining features within the Bsche'tla Creek ravine. ▪ New retaining wall added on the east of 41st Avenue NE adjacent to the Burke-Gilman Trail.
		Station Changes	▪ Improved connection to the plaza on the east end of the Lake Forest Park Town Center eastbound station. ▪ NE 153rd Street eastbound station moved from the north to the south side of NE 153rd Street.
		Updated Mitigation Measures	▪ Compensatory mitigation site added on a portion of the Pfingst Animal Acres Park (Brookside Boulevard NE and NE 178th Street).
Segment 3	Kenmore	General Design	▪ Pedestrian signal at corner of 73rd Avenue NE/NE Bothell Way relocated from the southeast to the west corner. ▪ TSP added to existing traffic signals at SR 522 intersections with 77th Court NE, 80th Avenue NE, and 83rd Place NE.
		Station Changes	▪ Utility connection refinements at eastbound stations adjacent to the Burke-Gilman Trail at 68th Avenue NE and at 73rd Avenue NE.

Project Segment	Jurisdiction	Design Refinements	
			▪ Existing vehicle access at the east and west entrance to the Kenmore Park-and-Ride will remain open, with a reduced size of westbound station zone near 73rd Avenue SE. ▪ Station design changes at the southbound 68th Avenue NE station added areas of construction staging and easements.
Segment 4	Bothell	General Design	▪ Removal of eastbound right-turn pocket at the NE 185th Street/104th Avenue NE intersection.
		Retaining Walls	▪ Refined design of retaining wall along the east side of SR 522, south of Hall Road, to accommodate stormwater flow needs. ▪ Retaining wall added behind the proposed westbound station at University of Washington (UW) Bothell. ▪ Existing retaining wall at SR 522 near Park at Bothell Landing to be shifted east. ▪ Existing retaining wall modifications at Beardslee Boulevard between Beardslee Place and NE 185th Street.
		Updated Mitigation Measures	▪ Compensatory mitigation site added on a portion of the Bothell Landing Park (9929 NE 180th Street).

Note: Refer to **Appendix A** for the updated list of affected parcels and associated Parcel Identification Numbers (PINs) and BRS numbers.

The refinements evaluated in this memorandum are those with potential to result in different or greater impacts than identified in the 2021 SEPA Checklist. Refer to **Table 1** for the full list of design refinements addressed in this analysis. The park-and-ride garages evaluated in the 2021 SEPA Checklist were deferred to 2044 for the Lake Forest Park garage and 2034 for the Kenmore and Bothell garages, per Sound Transit Resolution R2021-05 (August 2021). As the garage designs have not advanced past the conceptual design evaluated in the 2021 SEPA Checklist, there are no design refinements to evaluate; however, any changes to environmental effects for the interim condition, between the start of BRT service and the completion of the garages, are described accordingly.

3. Changes in Potential Impacts

The following sections describe the changes in potential operation and construction impacts to resources since the 30% design milestone. There are no notable changes in impacts to the following 2021 SEPA Checklist (Sound Transit 2021) sections, so they are not discussed in this analysis: Air, Animals, Energy and Natural Resources, Housing, Light and Glare, and Recreation. Minimization measures remain the same as the 2021 SEPA Checklist, unless otherwise noted in this section. Refer to Section 4 for ecosystem compensatory mitigation plans in Lake Forest Park and Bothell.

3.1 Earth

The 2021 SEPA Checklist evaluated in Lake Forest Park the design of a pedestrian walkway along the south side of SR 522 between 153rd and 155th that involved a steel catwalk support system along the face of an existing soldier pile wall. Additional geotechnical investigations since the 2021 SEPA Checklist revealed liquefiable soils in the soil-fill layer supporting SR-522 behind the existing retaining wall within Bsche'tla Creek ravine. Because of the steep slope of the hillside, the liquefied soil could impart lateral spreading loads onto the wall not previously considered. Therefore, the existing wall was determined not to have sufficient reserve capacity to support the steel catwalk design.

To mitigate lateral spreading demands of the liquefiable soils behind the existing wall and meet current life safety requirements, final design refinements propose a structurally-separated cantilever walkway with an independent foundation system of either micropiles or lightweight concrete fill capable of supporting the lateral load of the overhang. Some excavation and/or grading may be necessary within the ravine to stabilize soils and to allow access to the slab construction area and temporary scaffolding.

3.2 Water

As described in the 2021 SEPA Checklist, the proposed project has been designed to avoid and minimize impacts to streams to the greatest extent practicable. Since the 2021 SEPA Checklist, additional fieldwork identified, further characterized water resources, and refined existing delineations in Lake Forest Park and Bothell. In Lake Forest Park, additional details were documented for Wetland WLFP-6 and Wetland WLFP-10. Wetland WLFP-6 remains as it is described in the 2021 SEPA Checklist, but it was further determined that most of the 105-foot buffer of WLFP-6 overlaps with the 115-foot stream buffer for McAleer Creek. Wetland WLFP-10 was delineated and it is located at the downstream end of the Lyon Creek culvert under SR 522, between the road and the Burke-Gilman Trail. It is an isolated fringe Category III palustrine emergent riverine wetland providing moderate water quality function and low hydrologic/habitat function. The buffer of Wetland WLFP-10 is limited by adjacent development and is entirely within the stream buffer for Lyon Creek.

In Bothell, wetlands, streams, and associated buffers were further characterized. Jacobs performed fieldwork confirming that no Stream SBO-2 channel is present upstream of Wetland WBO-1. The 2021 SEPA Checklist assumed that SBO-2 occurred upstream of Wetland WBO-1, but the fieldwork determined this was instead a vegetated swale, which results in fewer buffer impacts than previously understood, as described later in this section. Further, Wetland WBO-1 had been assumed to extend near the outlet of

Stream SBO-1 in proximity to SR 522/Bothell Way NE, very close to project work and within the construction area for the proposed retaining wall. Sound Transit delineated the western boundary of Wetland WBO-1 in 2019 and 2023 and determined it to exclude Stream SBO-1, about 50 feet east of the City of Bothell's boundary. The delineated boundary of Wetland WBO-1 is downslope from the project's permanent and temporary impacts.

There are no changes to impacts to water resources in Seattle, Shoreline, or Kenmore. Changes analyzed in Lake Forest Park and Bothell segments are detailed in the following subsections.

3.2.1 Segment 2: Lake Forest Park

The project proposes no new permanent or temporary impacts to streams or wetlands in Lake Forest Park. There is no new work over, in, or adjacent to surface waters. Refer to **Table 2** for total change in impacts to wetland buffers and stream buffers since 30% design.

Design refinements since 30% have resulted a change in anticipated stream and stream buffer impacts. At Bsche'tla Creek ravine, refinements have removed from the project both the new and reconstructed retaining walls, reducing stream buffer impacts. The refined design for the pedestrian walkway will impact stream buffers because of the required formwork for the cast-in-place slab. Temporary scaffolding and slab construction will require some additional soil excavation and/or grading within the Bsche'tla Creek stream buffer to stabilize soils. Cement will be poured into forms hanging above the stream buffer. Trees within stream buffer that abut the wall will remain, but limbs growing into the pedestrian area will need to be periodically trimmed. The sidewalk will shade the portion of stream buffer directly below the retaining wall. Before construction of the overhang, the existing barrier and a portion of the concrete fascia and steel pile at the top of the wall will need to be removed. This will be completed outside the stream buffer using tarps to collect debris. Some debris may fall into the area and will need to be cleared.

At McAleer Creek, refinements have removed from the project the pedestrian bridge over McAleer Creek, eliminating the stream shading impacts discussed in the 2021 SEPA Checklist. The refined design modifies an existing storm drain connection on the north side of SR 522 to discharge to McAleer Creek on the south side of the roadway. Construction of the stormwater utility drainpipe abutments at the creek crossing will result in new impacts to the wetland and stream buffers.

Changes to permanent and temporary impacts to stream buffers are summarized in **Table 2** and wetland buffers in **Table 3**. Temporary impacts will be in the disturbed outer road prism adjacent to SR 522 where general design refinements occurred, in areas dominated by grasses and invasive species. There is no new work proposed directly in the wetland or stream. Construction of the stormwater utility crossing proposed at McAleer Creek will result in temporary impacts to the stream buffer.

Design refinements include onsite restoration of temporary impacts to Bsche'tla Creek stream buffer and offsite habitat enhancement (1:1 ratio) at Animal Acres Park in stream buffer. Enhancement onsite will include removing non-native plants and planting native plants within permanently shaded and temporarily impacted construction areas. Compensatory mitigation for impacts to critical areas such as wetlands and stream buffers have also been updated since the 2021 SEPA Checklist. In Lake Forest Park, limitations within the right-of-way necessitated offsite mitigation at the newly identified, city-owned Pfingst Animal Acres Park at Brookside Boulevard NE and NE 178th Street (refer to Section 4).

Table 2. Permanent and Temporary Stream Buffer Impacts

Stream Name	30% Design	Final Design	Total Change
Permanent Impacts – Stream Buffer			
McAleer Creek	300 sq. ft[a]	107 sq. ft[b]	-203 sq. ft.
Lyon Creek	0 sq. ft	542 sq. ft	+542 sq. ft
Temporary Impacts – Stream Buffer			
Bsche'tla Creek	1,639 sq. ft	1674 sq. ft	+34 sq. ft
McAleer Creek	1,924 sq. ft	1646 sq. ft[b]	-247 sq. ft
Lyon Creek	1,548 sq. ft	3,145 sq. ft[c]	-48 sq. ft

[a] Shading impacts only
[b] A portion of stream buffer impact overlaps the buffer of Wetlands WLFP-3 and WLFP-6.
[c] Total stream impact overlaps the buffer of Wetland WLFP-10.
sq. ft = square foot (feet)

Table 3. Permanent and Temporary Wetland Buffer Impacts

Wetland Name	Impacted Parcels (BRS #)	30% Design	Final Design	Total Change
Permanent Impacts – Wetland Buffer				
WLFP-3, WLFP-6	Right-of-way	926 sq. ft	107 sq. ft	-819 sq. ft
Temporary Impacts – Wetland Buffer				
WLFP-3, WLFP-6	Right-of-way BRS 341	544 sq. ft	1,646 sq. ft	+1,102 sq. ft
WLFP-10	Right-of-way BRS 341 BRS 351	N/A	820 sq. ft	+820 sq. ft

N/A = not applicable

3.2.2 Segment 4: Bothell

There will be minor changes in impacts to the buffer of Wetland WBO-1 and new impacts to the buffer of Stream SBO-1 because of the refinement of stream delineations and general design. Permanent impacts will occur where the existing retaining wall (south of Hall Road) will be moved into the buffer of Wetland WBO-1 (and overlapping Stream SBO-1 buffer). This includes a permanent maintenance easement. There is no new work over, in, or adjacent to surface waters. **Table 4** summarizes the changes.

Changes in delineated wetland and stream buffers, along with general design refinements along the corridor in Bothell, resulted in some increases in impacts to water resources (**Table 5**). Temporary impacts to WBO-1 buffer (and overlapping SBO-1 buffer) will result in a loss of vegetated buffers and associated function during retaining wall construction and modification of existing driveways.

Table 4. Bothell Permanent and Temporary Stream Buffer Impacts

Stream Name	30% Design	Final Design	Total Change
Permanent Impacts – Stream Buffer			
SBO-1	0 sq. ft	[Included within WBO-1 buffer permanent impacts]	4,208 sq. ft
SBO-2	600 sq. ft	0 sq. ft	-600 sq. ft
Temporary Impacts – Stream Buffer			
SBO-1	0 sq. ft	10,336 sq. ft	+10,336 sq. ft
SBO-2	1,140 sq. ft	0 sq. ft	-1,140 sq. ft

Compensatory mitigation for impacts to critical areas such as wetlands and stream buffers have also been updated since the 2021 SEPA Checklist. In Bothell, an onsite mitigation plan has been refined to include Bothell Landing Park at 17800 Bothell Way NE (refer to Section 4).

Table 5. Bothell Permanent and Temporary Wetland Buffer Impacts

Wetland Name	30% Design	Final Design	Total Change
Permanent Impacts – Wetland Buffer			
WBO-1	1,562 sq. ft	4,208 sq. ft[a]	+2,646 sq. ft
Temporary Impacts – Wetland Buffer			
WBO-1	3,073 sq. ft	10,336 sq. ft[a]	+7,152 sq. ft

[a] WBO-1 buffer impacts are overlapping stream buffer impacts to SBO-1.

3.3 Plants

The types of vegetation that may be removed or altered include deciduous trees, conifers, shrubs, and landscape plants that exist along the project corridor. The number of trees that will likely require removal has changed since the 30% design milestone. In **Table 6**, approximate removals by jurisdiction are compared at 30% and final design. Overall, the number of trees removed along the SR 522 corridor has been reduced from what was assumed in the 2021 SEPA Checklist.

Shoreline is the only jurisdiction that will require a minor increase in tree removals. Otherwise, design refinements between 30% and final design resulted in an overall reduction in tree removals.

In Lake Forest Park, impacts to trees in the Bsche'tla Creek stream buffer are reduced due to the retaining wall improvements having been removed from the project since 30% design. The cantilevered walkway will not remove trees within the Bsche'tla Creek ravine and will have fewer impacts to trees than the previous design. Trees within the stream buffer that abut the wall will remain, but limbs growing in the walkway will need to be periodically trimmed. The walkway will shade the portion of the stream buffer directly below the existing retaining wall. At some locations where the slab is wider and lower, the area directly below the slab may not receive the light and precipitation needed for healthy plant growth. Temporary vegetation impacts in the stream buffer will include clearing and grading to accommodate temporary construction scaffolding.

Additionally in Lake Forest Park, the thicker soldier pile walls along the west side of the intersection at NE 165th Street will remove more trees and vegetation than the previously proposed tie-back walls in order to meet WSDOT standards for drainage and maintenance.

Table 6. Total Change in Total Proposed Trees Removals by Segment

Jurisdiction	Total Tree Removals		Total Change
	30% Design	Final Design	
Seattle/Shoreline	112	116	+4
Lake Forest Park	439	399	-40
Kenmore	35	11	-24
Bothell	141	77	-64
Total	**727**	**603**	**-124**

Note: Total equals deciduous and conifers (6+ inch diameter at breast height).

3.4 Environmental Health - Noise

To assess potential noise impacts due to design changes since the 30% design milestone, the *Noise Report – Additional Analysis* (2024 Noise Report) was completed (**Appendix B**). The *Noise and Vibration Analysis* (2021 Noise Report) done at 30% design predicted no operational noise or vibration impacts. Sound Transit has since received comments from the public expressing concern about the shift of the roadway alignment through parts of Lake Forest Park. The effects of the roadway alignment shift along the SR 522 corridor between NE 155th Street and NE 170th Street were covered in the 2021 Noise Report and 2021 SEPA Checklist. The 2024 Noise Report (**Appendix B**) provides analysis of potential noise impacts due to the design refinements in Seattle/Shoreline and Lake Forest Park. Kenmore and Bothell are not discussed in the 2024 Noise Report because no design refinements are expected to affect the noise analysis there.

Project operational changes since 30% design, including changing the 2 diesel hybrid buses to battery electric buses (BEBs) for a completely electrified bus fleet of 12 BEBs total, will result in no new noise impacts. Project design refinements since the 30% design submittal with the potential to change the noise environment include newly proposed demolition of building structures, as well as new and revised retaining walls. At locations near demolished buildings, there is a potential for general purpose traffic noise increases of 1 to 4 decibels (dB) because of structural shielding being removed. However, even with these slight increases, project noise levels remain below the appropriate residential noise criteria established by the Federal Transit Administration (FTA) for transit-related projects.

There have been no horizontal changes to the roadway alignment between the design phases, since the 2021 Noise Report was completed; therefore, there are no new impacts due to the roadway alignment. At 30% design, there were no anticipated noise impacts related to the operation of the parking garages; therefore, deferring the garages to a later date (2034 for Kenmore and Bothell and 2044 for Lake Forest Park) does not result in a change in noise impacts.

Similar to the 2021 Noise Report, noise levels remain essentially the same as the current condition, therefore no additional noise impacts are anticipated. Overall, project noise levels remain below the appropriate residential noise criteria established by the FTA for transit-related projects. The change to a completely electrified fleet will result in a small overall reduction in total noise, as the 2021 Noise Report assumed 10 BEBs and 2 diesel hybrid buses.

Overall, noise levels will remain the same as current conditions with slight variations at sites with removed building structures, new retaining walls. Discussed in the following subsections are six proposed building demolitions with potential to change the noise environment due to structural shielding being removed. All other proposed displacements/demolitions resulting from the project are in commercial areas and not considered noise sensitive. A complete discussion is included in Section 3.2 of **Appendix B**.

Noise impacts during construction are essentially the same as provided in the 2021 Noise Report. Construction activities along NE 145th Street, SR 522, NE 185th, and Beardslee Boulevard will occur within a few feet of some residences and businesses. These activities could result in short-term increases in noise levels that are the same as those associated with city roadway construction activity.

3.4.1 Segment 1: Seattle/Shoreline

Four duplexes south of NE 145th Street (BRS-123, BRS-125, BRS-127, and BRS-129) at the intersection with 12th Avenue NE in Seattle were identified for displacement and demolition in the final design phase. Removal of these buildings could allow noise from NE 145th Street traffic to propagate to residences south of the duplexes that were previously shielded from traffic noise, including a four-story apartment building and one single-family residence south of NE 145th Street. Locations south of the four potentially displaced residential structures were assessed for potential increases in noise. While the noise increases slightly at most noise receiver locations, none of them meet the WSDOT noise abatement criteria (NAC). Therefore, no traffic noise impacts were identified.

In Shoreline, there is one full acquisition and demolition of a single-family residence building at 620 NE 145th Street (BRS-107) where removal of this structure could increase traffic noise levels at residences currently shielded by this building. The overall change in the wall heights since 30% design is negligible in most locations; however, the top-of-wall elevations are now smoother and vary less than in the 30% design. There is no new noise impact.

3.4.2 Segment 2: Lake Forest Park

There is one full acquisition of a commercial office building at 15500 Bothell Way (BRS-253) where removal of this structure could increase SR 522 traffic noise levels at residences currently shielded by this building. To address the effects of noise reflections off the retaining wall structures on SR 522 between NE 155th Street and NE 170th Street in Lake Forest Park, additional traffic noise modeling was performed. Most residences at this location will have no measurable change in noise levels, while others will benefit from the new retaining walls and may experience overall noise reductions. Further information on reflected noise is provided in **Appendix B** to inform retaining wall design, including designs intended to reduce noise reflection impacts (Lake Forest Park Ordinance 23-1270).

In response to public comment, the roadway alignment shift previously analyzed in the 2021 Noise Report was reevaluated for traffic noise impacts to adjacent residences. Results were consistent with those from the 2021 Noise Report, which concluded that the noise from the SR 522 general purpose traffic lanes is not increased by 3 dBs or more; therefore, the roadway alignment shift is not sufficient to meet the requirements for traffic noise abatement measures.

3.5 Land and Shoreline Use

Changes in property acquisition needs for refinements to stations, pedestrian facilities, retaining walls, driveway access, and drainage connections will not change the overall land use impact for the project. Once the project is constructed, land uses adjacent to the project components will benefit from access to the BRT service, which will provide increased regional mobility and improved transit speed and reliability. Land use types that will experience a change in right-of-way acquisition and permanent easement needs include residential (single-family and multifamily), office, services (automotive), parking, public park, and a fire station.

Right-of-way needs have been further assessed for acquisitions or easements since the 30% design milestone. **Table 7** summarizes the changes in effects on some adjacent residential and commercial properties. **Appendix A** contains an updated list of all parcels that will be fully or partially acquired due to impacts associated with the final design. Additional changes to property needs may be identified between final design and construction.

At 30% design, the project was expected to need full acquisition of 3 parcels (including 1 vacant parcel) and partial acquisitions at 134 parcels. Refinements since 30% design result in a total of 6 full acquisitions and 127 partial acquisitions (**Table 8**). In all segments, changes to right-of-way needs are generally due to refined design of roadway improvements, sidewalks, and construction easements. In Seattle, changes in right-of-way needs for staging added along NE 145th Street between 28th Avenue NE and 30th Avenue NE; 12th Avenue NE and 17th Avenue NE; and 6th Avenue NE and 10th Avenue NE. In Bothell, additional right-of-way was needed for a retaining wall and easements added behind the westbound station at UW Bothell. Also in Bothell, the refined design of driveway restorations, sidewalk connections, and utility connections resulted in changes to right-of-way needs.

Mitigation for property acquisitions, as stated in the 2021 SEPA Checklist, will be completed and relocation assistance will be provided in compliance with Sound Transit's Real Property Acquisitions and Relocation Policy, Procedures and Guidelines and Revised Code of Washington (RCW) 8.26 Relocation Assistance – Real Property Acquisition Policy, which requires entities acquiring properties through eminent domain to pay just compensation for the property. In addition to payment, RCW 8.26 requires that persons displaced from the property receive relocation assistance, including assistance with moving costs, costs of reestablishing businesses or other similar costs.

As described in the 2021 SEPA Checklist, property impacts during construction will consist of temporary construction easements and staging areas. Sound Transit will compensate property owners fairly for use of sites for staging through the legal/temporary construction easement process. During construction, Sound Transit, and the contractor will ensure access is retained to properties not being altered or located adjacent to or near properties that are expected to have acquisition or easements.

Table 7. Changes in Right-of-way Needs since 30% Design

Jurisdiction	Type	New Full and Partial Acquisitions	No Longer Acquired
Seattle	Commercial	BRS-218, BRS-219	N/A
	Residential	BRS-144, BRS-204	N/A
Shoreline	Commercial	BRS-216, BRS-217	BRS-135
	Residential	BRS-122	N/A
Lake Forest Park	Commercial	BRS-223, BRS-337	BRS-236[a]
	Residential	BRS-251, BRS-262, BRS-310, BRS-329, BRS-331, BRS-332	N/A
Kenmore	Commercial	N/A	N/A
	Residential	N/A	N/A
Bothell	Commercial	BRS-526, BRS-540, BRS-592, BRS-604, BRS-605	BRS-517, BRS-585, BRS-609
	Residential	BRS-528	N/A

[a] BRS-235 and BRS-236 have been combined under BRS-236.
Note: Refer to **Appendix A** for the updated list of affected parcels and associated PIN and BRS numbers.

Table 8. Number of Full and Partial Property Acquisitions by Jurisdiction

Jurisdiction	Number of Full		Number of Partial	
	30% Design	Final Design	30% Design	Final Design
Seattle	2	1	10	15
Shoreline	0	0	23	18
Lake Forest Park	0	1	62	65
Kenmore	0	3	9	4
Bothell	1	0	30	25
Totals	**3**	**5**	**134**	**127**

Table 9. Change in Total Building Demolitions by Jurisdiction

Jurisdiction	Number of Residential		Number of Commercial	
	30% Design	Final Design	30% Design	Final Design
Seattle	0	4	2	2
Shoreline	0	0	0	0
Lake Forest Park	0	0	1	1
Kenmore	0	0	0	3
Bothell	0	0	0	0
Totals	**0**	**4**	**3**	**6**

3.5.1 Residential

Changes in right-of-way acquisition needs (**Table 7**) proposed since 30% design are comparable to the effects to residential properties in the 2021 SEPA Checklist. Project-wide, the number of full residential acquisitions will increase and partial residential acquisitions will decrease (**Table 8**). Final design refinements result in an estimated five residential property displacements, compared to no residential displacement anticipated at 30% design. Additional acquisitions in Seattle will increase total residential displacements by approximately 20 residents.

In Seattle, this includes the full property acquisition and demolition of four multifamily residential duplexes (BRS-123, BRS-125, BRS-127, and BRS-129) due to right-of-way needs and temporary construction easements for sidewalk construction and staging. **Table 9** summarizes the change in residential demolitions. In Shoreline, a partial acquisition of BRS-108 for wall and maintenance easement, as well as temporary construction easement, will result in the displacement of a mobile home and two residents. In Lake Forest Park, a full acquisition of a single-family residence at BRS-310 for temporary construction easement and driveway configuration, which displaces two residents but does not demolish the structure.

3.5.2 Commercial

Changes in right-of-way acquisition needs (**Table 7**) proposed since 30% design are comparable to the effects to commercial properties in the 2021 SEPA Checklist. Decreases in commercial property acquisition needs will occur in Bothell and Seattle, whereas these needs will increase in Shoreline, Lake Forest Park, and Kenmore (**Table 8**). The final design refinements will result in a decrease in overall business displacement impacts for the project. An estimated total of 7 business displacements (Seattle =

2, Shoreline = 1, Lake Forest Park = 2, Kenmore = 2) will result, compared to 14 business displacements at 30% (Seattle = 3, Lake Forest Park = 9, Shoreline = 2).

Final design refinements will eliminate the need for full property acquisition and demolition of the Pizza Hut (BRS-137B) in Seattle; however, the business is displaced. In Bothell, property acquisition for future park-and-ride is not occurring at this time; therefore, at this time, the project will not fully acquire the vacant commercial property in the southwest quadrant of 98th Avenue NE and Pop Keeney Way. In Kenmore, three new full commercial property acquisitions (BRS-437, BRS-438, and BRS-439) are needed near the 68th Avenue NE westbound platform, due to loss of driveway access to those properties. This will result in the displacement of two commercial businesses (Fix-it Auto Service and Repair stations).

In Lake Forest Park, the Professional Building at the Town Center will not be removed at this time due the deferral of the parking garage until 2044; therefore, the displacement of the following nine businesses will occur in the future, prior to and closer in time to the parking garage construction: Chase Bank, Forest Park Insurance, UW Medicine Northwest Primary Care Lake Forest Park Clinic, YouthCare non-profit youth resource center, Lake Forest Park Dog Detection Center, Yen Design Inc., Seattle Engraving Center, Northwest Foot & Ankle, and Minahan Dental.

Refer to **Table 10** summarizes the change in commercial demolitions since 30% design. Refer to **Table 10** for the change in potential business and employee displacement since 30% design.

Table 10. Changes in Business and Employee Displacements

Jurisdiction	Business Displacements (BRS number)	Total Employees Displaced[a]	
		30% Design	Final Design
Seattle	1 bank remains displaced (BRS-137A) 1 restaurant no longer demolished (BRS-137B) 1 car wash remains displaced (BRS-138)	36	8
Shoreline	1 business no longer displaced (BRS-135) 1 espresso stand newly displaced (BRS-136)	10	4
Lake Forest Park	1 siding company newly displaced (BRS-235, BRS-236) 1 espresso stand newly displaced (BRS-243) 1 office newly displaced (BRS-253) 9 businesses no longer displaced[b] (BRS-236)	90	42
Kenmore	2 businesses confirmed as displacements[c] (BRS-437, BRS-438, BRS-439)	0	16
Bothell	No change in business displacements	0	0

Note: Refer to **Appendix A** for the updated list of affected parcels and associated PIN and BRS numbers.

[a] The 2021 SEPA Checklist provided rough estimates for employee displacements. This 2024 additional analysis estimated 10 employees per business based on size and type of business, unless otherwise noted.

[b] Business and employee displacement identified in the 2021 SEPA Checklist at the Lake Forest Town Center parking garage has not advanced into final design.

[c] The 2021 SEPA Checklist included potential business displacement but did not quantify employee displacement.

3.6 Aesthetics

To assess potential impacts to visual resources due to design changes since the 30% design milestone, the *Visual and Aesthetic Resources Technical Report – Additional Analysis* (2024 Visual Report) was completed (**Appendix C**). This document describes the change in visual resource impacts expected from

the final design refinements compared to the 2021 Visual Report. The 2024 Visual Report also discusses the overall reduction in the number of trees to be removed along the project corridor compared to what was identified in the 2021 SEPA Checklist. Refer to **Appendix C** for a detailed analysis of potential visual impacts due to the final design refinements.

Project design refinements proposed since 30% design were evaluated in comparison to the analysis completed for the 2021 SEPA Checklist and documented in the 2021 Visual Report. This evaluation is summarized in the following subsections. There are no changes to temporary impacts as a result of the design refinements since the 30% design milestone.

3.6.1 Segment 1: Seattle/Shoreline

A new viewpoint was added from NE 145th Street looking east near the 12th Avenue NE intersection in Shoreline where four duplexes will be removed at SR 523. New trees planted in the right-of-way will help obscure any future development as the vegetation matures, and the resulting degree of visual quality impact at this location is neutral. This new landscaped section slightly obscures the road and vehicles in the distance, also increasing the naturalness of this view.

3.6.2 Segment 2: Lake Forest Park

Compared to the 30% design, final design will increase the thickness of the retaining wall for soldier piles, drainage, and maintenance access features. This requires more property behind the retaining wall and the removal of additional mature vegetation on the hillside. This retaining wall is in the same location and is the same size as it was in the 30% design; therefore, no change to the degree of impact at SR 522 (Bothell Way NE) looking north near NE 165th Street compared to the 2021 Visual Report. This location will continue to experience a high level of visual change, moderate visual sensitivity, and adverse visual quality impact.

3.6.3 All Segments

Segments 1, 3, and 4 will have neutral visual impacts, and Segment 2 will have neutral to adverse visual impacts. The 2021 SEPA Checklist described the removal of tall trees as an adverse effect that was less compatible with the existing visual character. Removal of fewer trees throughout the corridor will reduce the impact originally anticipated in the 2021 Visual Report; except Shoreline, where six more trees will be removed. Since 30% design, the project has worked to minimize tree removals, preserving mature trees to the maximum extent practicable.

3.7 Historic and Cultural Preservation

Final design refinements required the expansion of the project's area of impacts (AI) to include additional parcels in all segments. To assess potential impacts to cultural resources in the expanded AI, the *Historic and Cultural Preservation Report – Additional Analysis* (**Appendix D**) was completed (hereafter referred to as the 2024 Historic and Cultural Report). The following summarizes the changes in impacts since Sound Transit completed the *Historic and Cultural Preservation Technical Report* (hereafter referred to as the 2021 Historic and Cultural Report). The cultural resources survey for the additional analysis included archaeological and built environment survey of seven expanded sections of the original AI and one discontinuous expanded AI section. The expanded AI was delineated using the same methodology used in the 2021 Historic and Cultural Report. Refer to **Appendix D** for the expanded AI and the Historic Property Inventory Forms recorded in the Washington Information System for Architectural and Archaeological Records Data (WISAARD) database within the expanded AI.

A field survey was conducted on July 26, 2023, to identify any potential surface or subsurface cultural resources that may be present within the expanded AI. No archaeological materials (historical or

precontact) were identified during subsurface survey. The potential for deeply buried archaeological materials still exists. No archaeological resources were observed during the pedestrian survey, and due to the level of development of the expanded AI, the potential to encounter aboveground intact archaeological resources is very low.

A built environment survey of the expanded AI was conducted on July 26, 2023, and September 5, 2023. A total of 35 additional resources located on 34 parcels were recorded. Vacant parcels or properties built after 1975 in the expanded AI were not included in the survey. Of the 35 built environment resources recorded and evaluated in the expanded AI, two are recommended eligible for listing in the National Register of Historic Places (NRHP) (a single-family residence in Seattle at 14343 19th Avenue NE and a one-story commercial building, Kenmore Tavern, in Kenmore at 18017 68th Avenue NE). In addition, one resource within the original AI, Sheridan Market, 15348 Bothell Way NE, Lake Forest Park, previously recommended as not eligible for listing in the NRHP/Washington Heritage Register (WHR), has since been listed in the WHR in 2022. The 2021 SEPA Checklist had a finding of adverse effect to historic properties as the result of the proposed demolition of the Washington Federal Savings and Loan building at 14360 15th Avenue NE in Seattle. Under the design refinements, this building is no longer planned for demolition or alterations.

The project, including the design refinements, will not adversely impact any historic built environment resources within the original AI or expanded AI footprints. There are no permanent adverse impacts to cultural resources from the project design refinements in any segment. Similarly, there are no temporary adverse impacts to cultural resources from the project design refinements.

3.8 Transportation

Additional transportation analysis was conducted to assess any potential transportation impacts that may result from the design refinements since the 30% design milestone. No transportation impacts were predicted in the *2021 Transportation Technical Memorandum* (2021 Transportation Memo), and no new transportation impacts are predicted by this additional analysis of design refinements. Refer to **Appendix E** for the 2024 Transportation Report, which details the results of the additional analysis, which included traffic operations, parking, safety, freight movement and non-motorized transportation.

The design refinements and their potential to affect transportation are discussed by segment in this section. In summary, design refinements will affect traffic operations, parking, safety, and non-motorized transportation across all segments. Minimal changes in intersection delay are projected and all intersections are projected to operate at the same level of service (LOS) or better. No design refinements are expected to affect freight movement in any segment.

There is no change in the general scope of construction for the project. Sound Transit's commitment to best practices stated in the 2021 Transportation Memo will continue to avoid or minimize transportation impacts during construction and no new mitigation measures are proposed.

3.8.1 Segment 1: Seattle/Shoreline

- Proposed TSP at two intersections along SR 522 (NE 145th Street at 20th Avenue NE and 25th Avenue NE) has the potential to increase delay at cross streets, but both intersections are projected to continue to operate at an acceptable LOS.
- Proposed removal of an additional 39 off-street parking stalls (33 commercial and 6 residential) for increased right-of-way needs, which may result in a slight increase in nearby on-street parking demand due to the decrease in off-street parking availability for employees, customers, and residents.
- Proposed increase in curb radius at the NE 145th Street/17th Avenue NE intersection and the NE 145th Street/30th Avenue NE intersection to allow for higher speeds through right-turn movements, which may increase the frequency/severity of pedestrian crashes in the area.

- Raised curb island proposed on NE 145th Street east of SR 522 has been removed from design and is not likely to result in changes to safety impacts.
- Design changes to the 30th Avenue westbound station will allow pedestrians and bicyclists to pass through the station rather than behind, which could result in slightly more conflicts with transit users boarding at this station.

3.8.2 Segment 2: Lake Forest Park

- Deferral of the proposed parking garage near the intersection of SR 522/Ballinger Way NE could result in riders seeking on-street parking nearby. Security enforcement and time-limited parking will minimize this potential at the Lake Forest Park Town Center station.
- Proposed TSP at two intersections along SR 522 Beach Drive NE and NE 153rd Street has the potential to increase delay at cross streets, but both intersections are projected to continue to operate at an acceptable LOS.
- Removal of an existing two-way left-turn lane at NE 153rd Street restricts left-turn access to and from some sites along the corridor. Some residents will be required to divert to an adjacent signal to make a U-turn. Design revisions proposed to accommodate the additional U-turn include a northbound turn pockets of approximately 150 to 200 feet at NE 165th Street and NE 170th Street and a reduced southbound left-turn bay at NE 153rd Street, from approximately 200 feet to 100 feet.
- Project refinements will improve Burke-Gilman Trail access at the Lake Forest Park Town Center. Construction of a BAT lane at NE 153rd Street and 41st Avenue NE will remove an existing two-way left-turn lane, replacing it with a raised median restricting left-turn access to and from some sites along the corridor. Some residents will be required to divert to an adjacent signal to make a U-turn.
- Design changes to the approximately 260-foot southwest-bound left-turn pocket at the 35th Avenue NE/Bothell Way NE intersection, currently serving apartment complexes on the east side of SR 522, will be shortened from 260 feet to approximately 120 feet. Refer to the 2024 Transportation Report (**Appendix E)** for a discussion of the turn pocket analysis completed by DKS Associates in June 2022. Channelization will result in improvement or only minor increases in queue length, and the intersection will continue to operate at acceptable LOS.

3.8.3 Segment 3: Kenmore

- Deferral of the proposed parking garage could result in riders seeking on-street parking near the Bothell Way NE/73rd Avenue NE intersection. Time-limited parking will minimize this near the Kenmore Park-and-Ride station.
- Proposed TSP at three intersections along (77th Court NE, 80th Avenue NE, and 83rd Place NE) has the potential to increase delay at cross streets, but all three intersections are projected to continue to operate at an acceptable LOS.
- Restored access from SR 522 to Kenmore Park-and-Ride east entrance will improve internal circulation and help prevent vehicles from queueing onto westbound SR 522.
- Relocating the pedestrian signal on the southeast corner of 73rd Avenue NE/NE Bothell Way from the east side to the west side of the north-facing ramp will improve pedestrian access to the ramp and landing area.

3.8.4 Segment 4: Bothell

- Deferral of the proposed parking garage could result in riders seeking on-street parking near the southwest corner of Pop Keeney Way/Thorsk Street intersection. Time-limited parking will minimize this potential at the 98th Avenue NE station.
- Removing the right-turn lane at the NE 185th Street/104th Avenue NE intersection will reduce the amount of time pedestrians are in the roadway and will reduce intersection delay.

4. Updated Compensatory Mitigation

Impacts analyzed in the 2021 SEPA Checklist will remain unchanged unless otherwise noted in this section. Work in stream and wetland buffers and fish and wildlife habitat conservation areas will require restoration and mitigation. No updated mitigation measures are proposed in Seattle/Shoreline, or Kenmore. The mitigation measures proposed in the 2021 SEPA Checklist remain relevant for the project and no new mitigation measures are proposed.

Mitigation sites and activities identified for the project since the completion of the 2021 SEPA Checklist are described in the following subsections. The following compensatory mitigation measures are intended to offset impacts identified in the original 2021 SEPA Checklist, as well as for any new impacts anticipated as a result of the project refinements since the 30% design milestone.

4.1 Segment 2: Lake Forest Park

Sound Transit evaluated potential options and identified an offsite mitigation location at Pfingst Animal Acres Park (BRS-340.01). The park is at Brookside Boulevard NE and NE 178th Street, within the same watershed and about 0.4 mile upstream from the McAleer Creek buffer impacts area. The goal is to provide a more complex, multistory forested vegetation community, to improve visual screening within the stream buffer, food sources for wildlife, and to enhance the stream buffer's ability to function as a wildlife corridor.

McAleer Creek flows through Pfingst Animal Acres Park and most of the buffer contains dense plant cover composed of native trees and shrubs underlain by a mix of native soils and fill. The northern portion along NE 178th Street includes approximately 5,000 square feet of degraded critical areas. This proposed mitigation site includes approximately 1,000 square feet in wetland buffer and 4,000 square feet in wetland; both areas overlap stream buffer. The wetland portion of the site has shallow groundwater in winter and pockets of water sitting on the surface. The site is dominated by non-native plant species and wildlife habitat is fragmented. It is adjacent to higher-quality critical habitat to the south; thus, enhancement will increase the amount of contiguous, high-quality habitat.

Planned compensatory mitigation activities will improve critical area functions, adding diverse plantings to provide more wildlife habitat functions than the smaller, fragmented habitat present in the areas impacted by the project. Existing soils will be maintained unless soil amendments are deemed necessary. Plantings will provide additional woody stems to an area that may reduce overland flow and allow water to infiltrate rather than flow directly into McAleer Creek. During plantings, soil disturbance will be minimized due to the high groundwater table. Non-native plants at the site will be replaced with a more diverse community of native shrubs and trees. Existing native trees will be maintained. Replacing the cover of English ivy with woody-stemmed material will restore the degraded stream/wetland buffer areas to a condition that has equal or enhanced functions to the existing condition, with more resistance to erosion. Invasive plant removal here will also reduce a seed source currently encroaching on more pristine habitat.

Plantings will be selected for their ability to succeed around a forested slope wetland. Normal planting times may be adjusted to avoid seasons with higher groundwater. Details of the mitigation work will meet both City of Lake Forest Park and U.S. Army Corps of Engineers permitting requirements for work in wetlands. Sound Transit is committed to monitoring the mitigation site plantings for 5 years.

4.2 Segment 4: Bothell

Sound Transit evaluated potential options and identified an opportunity for onsite mitigation at Bothell Landing Park (BRS-527). The site is at 9929 NE 180th Street, within the buffer area of the same wetland affected by the project (Wetland WBO-1). The site provides several opportunities to improve buffer function and values. The existing vegetation has sparse trees and is heavily dominated by thick hedges of Himalayan blackberry. The site was selected to provide enhancement and tree replacement (1:1 ratio) onsite at the temporary impact location where non-native plants will be restored with native plant mix. More diverse plant types will be added adjacent to a large area of contiguous habitat along the Sammamish River and will be placed partially in overlapping stream buffer for Stream SBO-1. Sound Transit is committed to monitoring the mitigation site plantings for 5 years.

5. Conclusion

Overall, the impacts from the BRT Project final design refinements are of similar type and magnitude to the impacts identified for the 2021 SEPA Checklist and DNS. The anticipated impacts are within the range disclosed previously. The refinements will not result in significant impacts, and impacts identified in the 2021 SEPA Checklist and this additional analysis will be mitigated. Although some additional resources will be affected as a result of the refinements, potential impacts are minor and will be mitigated consistent with existing environmental commitments. The temporarily impacted areas will be restored to existing or better condition than before construction. Further analysis of the design refinements has informed proposed compensatory mitigation for impacts to water resources in both Lake Forest Park and Bothell, as described above.

6. References

Sound Transit. 2021. *SR 522 Bus Rapid Transit (BRT) SEPA Environmental Checklist*. March.

Acronyms and Abbreviations

AI	area of impact(s)
BAT	business access and transit
BEB	battery electric bus
BRT	Bus Rapid Transit
dB	decibel(s)
DNS	Determination of Non-significance
FTA	Federal Transit Administration
LOS	level of service
N/A	not applicable
NRHP	National Register of Historic Places
PIN	Parcel Identification Number
RCW	Revised Code of Washington
SEPA	State Environmental Policy Act
sq. ft	square foot (feet)
SR	State Route
TSP	transit signal priority
UW	University of Washington
WHR	Washington Heritage Register
WSDOT	Washington State Department of Transportation

STRIDE
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Appendix A
Property Acquisitions

STRIDE
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Appendix B
2024 Noise Report

STRIDE
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Appendix C
2024 Visual Memo

STRIDE
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Appendix D
2024 Historic and Cultural Report

STRIDE
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Appendix E
2024 Transportation Report