City of Bellevue

East Link Light Rail B7/C9T to NE 2nd Portal (B7 – Revised) Alternative

TM09 - Noise Impact Assessment

215382/TM09

Final | June 2011

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1 Executive summary

A noise impact assessment and mitigation design has been carried out based on the B7-Revised alignment designed for the East Link Light Rail Project.

239 noise impacts were identified along the B7-Revised alignment which compares with 182 reported in the SDEIS. The location and severity of the impacts are broadly similar to those reported in the Supplemental Draft Environmental Impact Statement (SDEIS) except that impacts were also noted along SE Lake Road and on 113th Avenue SE adjacent to the A-2 Station and Park-and-Ride. A further 25 impacts related to the Residence Inn, which was constructed since the SDEIS analysis, were noted and apply to both alternatives.

Mitigation measures developed are thus similar to the mitigation measures developed for the B7 alignment assessed in the DEIS except at SE Lake Road, A-2 Station and the Residence Inn where additional mitigation is required.

Noise impacts

- Noise impacts in most areas are similar to the SDEIS. At some locations the number or severity of noise impacts has increased, which will require more extensive mitigation measures.
- Several new noise impacts have been identified at locations not assessed in the DEIS. These include:
  - Rail noise at the proposed A-2 Station
  - A number of new potential impacts to the south of I90 which would impact B7 and B7- Revised alternatives similarly
- A Traffic Noise Model may be required to address vehicular traffic at north end of 113th Avenue SE.

2 Background

2.1 Project description

The East Link project is an extension to Sound Transit's Link light rail system that will provide light rail service across Lake Washington, linking Seattle, Bellevue, and Redmond (Overlake).

For the segment of East Link between the Lake Washington crossing and downtown Bellevue, Sound Transit has developed the B7 alternative to a conceptual engineering level of design (approximately five percent design) as part of the Draft Environmental Impact Statement (DEIS) for the project which was issued in December 2008.

A Supplemental Draft EIS, which analyzes new alternatives developed since the DEIS, was published in November 2010. That supplemental document includes updated conceptual engineering for the Sound Transit B7 alternative and a C9T alternative that could connect B7 to a station at the Bellevue Transit Center. A Final EIS is expected in the summer of 2011.

At the September 13, 2010, Bellevue City Council Study Session, the council discussed the need for design variations and for additional analysis of revised East Link B7 and C9T alternatives. The objectives of the additional analysis would be to improve performance, to reduce impacts, and to reduce costs, as compared with the Sound Transit B7 and C9T alternatives. As a result of that discussion the council initiated the development of a modified B7 alternative ("B7-Revised"). The council directed City staff to develop an "apples-to-apples" comparison of the Sound Transit B7 and C9T alternatives with a B7-Revised alternative. Arup were commissioned by the City to develop the B7-Revised alternative.

The B7-Revised alternative begins at the transition from East Link Segment A to Segment B at the east shore of Lake Washington and connects with a new elevated station (A-2 Station) over south Bellevue Way/I-90 ramps. The alignment continues east from the station along the north side of I-90 and turns north into the BNSF corridor with an at-grade profile. The alignment transitions to elevated as it leaves the BNSF corridor, crosses over SE 8th Street, and transitions back to at-grade prior to a new station (East Main Station) just south of Main Street on the current Red Lion Hotel site. The alignment crosses under Main Street and turns west on the current Sheraton Hotel site before entering a tunnel portal at NE 2nd Street. The B7-Revised alternative is approximately three miles long with a combination of at-grade, elevated, and open-cut sections.

2.2 Technical memo scope

The scope of the work completed for this study was to conduct noise analysis to predict potential noise levels associated with B7-Revised alternative. The analysis included independent measurement of ambient sound; construction of computer models to predict sound levels utilizing Sound Transit noise data; a review of

FTA regulations and identification of impact under these regulations; and the identification of mitigation recommendations.

2.3 Technical memo objectives

The objective of this Technical Memo is to describe the analysis carried out, and identify and mitigate potential noise impacts associated with the B7-Revised alternative.

2.4 Key meetings and background documents

A teleconference was held to obtain information and clarify modeling assumptions. The details of this meeting are as follows:

Date	Agency/Stakeholder	Attendees
9-Feb-11	Sound Transit	James Irish (Sound Transit), Maher Welaye (Bellevue Department of Transportation), Richard Prust (Arup), Vahndi Minah (Arup), Michael Minor (Michael Minor & Associates)

Relevant documents and reports used to support the analysis included the following:

- East Link Light Rail Draft Environmental Impact Statement (DEIS)
- Acoustical Peer-Review Concepts Design Report – Noise Analysis (Greenbusch Group Inc., 28 December, 2010)
- Sound and Vibration Peer Review Supplemental Draft Environmental Impact Statement (Greenbusch Group Inc., 14 July, 2010)
- FTA Transit Noise and Vibration Impact Assessment Manual, (FTA-VA-90-1003-06, May 2006)
- East Link Light Rail Modeling Assumptions (Michael Minor & Associates, 28 February, 2011)
- GIS Aerial Mapping and Associated Files (City of Bellevue)

3 Methodology and data

The project team has been directed by Bellevue City Council to prepare an "apples-to-apples" comparison of the B7-Revised alternative with the Sound Transit Draft Environmental Impact Statement (DEIS) and Supplemental Draft Environmental Impact Statement (SDEIS) B7/C9T alternative. Such a comparison requires consistency of three elements – base data and information, key assumptions, and methodology. The following sections and tables outline the key aspects of the noise evaluation, how these aspects were addressed for the Sound Transit B7/C9T alternative and whether this analysis is considered a true "apples-to-apples" comparison. Comment is made particularly for changes in approach.

3.1 Base data and information

B7-Revised	B7/C9T	"Apples-to-Apples"	Comment
Noise measurements - Independent short term measurements were taken to supplement the short and long term measurements provided by Sound Transit	Short and long term measurements were taken for SDEIS	Yes	
Alignment - B7-R alignment files were used in noise model	B7 and C9T alignment files were used in noise model	Yes	
Additional noise-sensitive receptors were added.	Fewer receptors under the B7/C9T analysis	No	The number of receptor locations studied in the DEIS for the B7 and C9T alignments was not considered sufficient to assess the B7-Revised alignment. Specifically, receptors were added in the following locations: – 22 receptors along SE Lake Road (it is not known why these were not previously included as they are approximately the same distance from the alignment as those along SE 34th Street) – 10 receptors along 113th Avenue SE. – 25 receptors were added due to the recent construction of the Residence Inn Hotel.

B7-Revised	B7/C9T	"Apples-to-Apples"	Comment
Train and track noise characteristics - Based on information from ST and FTA	Based on information from ST and FTA	Yes	
Bus schedule and traffic in park and ride developed from traffic model for transit noise assessment associated with A-2 park and ride.	NA	No	Since the previous alignment did not contain the A-2 Station this was not part of the SDEIS assessment.

Table 1 - Comparison with Sound Transit DEIS and SDEIS base data and information

3.2 Key assumptions

B7-Revised	B7/C9T	"Apples-to-Apples"	Comment
Modeling assumptions used for the SDEIS model are given in 'East Link Light Rail Modeling Assumptions' (Michael Minor & Associates, 28 February, 2011)	Same	Yes	The modeling assumptions were input into a model of the previous alignment and predictions were made which were in agreement with the SDEIS.

Table 2 - Comparison with Sound Transit DEIS and SDEIS key assumptions

3.3 Methodology

B7-Revised	B7/C9T	"Apples-to-Apples"	Comment
FTA Transit Noise and Vibration Impact Assessment Manual	Same	Yes	

Table 3 - Comparison with Sound Transit DEIS and SDEIS key assumptions

4 Noise survey

On 26th and 27th January 2011, environmental noise measurements were taken at 14 locations along the alignment. Short term readings were taken, as access to properties to install longer term monitoring was not available. These measurements were taken in order to supplement the measurements taken for the DEIS and used as the baseline for the DEIS and SDEIS, with locations pertaining to the B7-Revised alignment. In order to ensure that the baseline levels obtained at the new locations were coherent with the baseline obtained for the DEIS and SDEIS, certain measurement locations from the DEIS measurements were measured again.

The noise measurements were largely in agreement with the DEIS measurements, subject to the typical variations that could be expected for short measurement durations. Since the DEIS measurements consisted of several long-term measurements, which are a more reliable representation of the daily noise level, we have used DEIS noise measurements in the projection of Ldn levels throughout the route, except at locations where noise measurements were not taken for the DEIS.

Where we have used new short-term measurements to project Ldn levels, we have used the methods described in the FTA Noise and Vibration Impact Assessment Manual, in combination with new and DEIS measured noise levels.

A map of the DEIS and B7-Revised survey locations is given in Appendix A2. The measured levels and projected Ldn levels are listed in Appendix A1.

5 Noise assessment

5.1 Receptors in study

All of the receptors studied for the B7 and C9T alignments in the SDEIS were included in the noise model, with the exception of one single-family house on the east side of 113th Avenue SE, which was removed due to the planned location of the A-2 Station. Due to the A-2 Station, 10 additional receptors (single-family homes along 113th Avenue SE) were also added to the B7-Revised Noise Assessment.

22 receptors were also added to the B7-Revised Noise Assessment along SE Lake Road - all single-family homes. These receptors are at a comparable distance to the B7-Revised alignment as the receptors along SE 34th Street.

5.2 Light rail noise

There are 3 major noise sources considered for typical Light-Rail systems:

- Rolling noise from the light rail vehicles and the interaction with the various track-forms along the alignment, including crossovers and wheel squeal.
- Noise from train-mounted bells as the trains approach and pass through at-grade crossings, and also entering and exiting stations.
- Gated warning bells for at-grade crossings.

Noise levels from the light-rail system were assessed at receptors along the B7-Revised alignment, using the modeling assumptions provided by Sound Transit, and the new alignment designed by Arup. Modeling assumptions used were provided in 'East Link Light Rail Modeling Assumptions' (Michael Minor & Associates, 28 February, 2011).

5.3 Traffic noise

The DEIS states that "For those locations where project construction required a substantial movement of the horizontal alignment or vertical profile of existing roadways, a traffic noise analysis was also performed."

In general no significant changes are being made to roadways in the vicinity of receptors around the alignment, with the exception of the north end of 113th Avenue SE. A TNM model (Traffic Noise Model using the Federal Highways Agency's prediction method) has not been constructed to assess impacts, as the current level of detail on future traffic movements is not considered sufficient to warrant construction of a TNM model.

Potential impacts have therefore been assessed as transit noise sources.

5.4 Transit noise

Station A-2 is predicted to cause some additional noise to the new receptors added along 113th Avenue SE. The major noise sources from the Station / Park and Ride facility are buses and cars. Assumptions on the number of cars and buses expected to use the facility have been developed by the project team (TM03 Station Concept Report).

Transit noise from the Station / Park and Ride facility was assessed assuming stationary noise sources as per section 5.2.3 of the FTA Noise and Vibration Impact Assessment Manual.

5.5 Noise impacts

5.5.1 Numbers and locations

The SDEIS study of the B7 / C9T alignment indicates a total of 113 moderate impacts and 69 severe impacts, totaling 182 noise impacts altogether.

The B7-Revised assessment has identified a total of 193 moderate and 46 severe impacts were identified at several locations along the alignment, totaling 239 noise impacts.

18 of the new impacts are at single-family properties along SE Lake Road. These were not part of the B7 / C9T assessment so should be discounted for the purposes of comparison between the SDEIS and Arup alignments. The primary source of these noise impacts is rolling noise. However noise from warning bells near Station A-2 also contributes to the overall noise levels.

Four new impacts are caused at single-family properties at the new receptors on 113th Avenue SE. These are primarily due to transit noise from the Station A-2 Park and Ride facility, although rolling noise from the railway and warning bells from near to the station also contribute to the overall noise level at these receptors.

34 new impacts are caused at the apartment complex around Station 2060+00. These new impacts are partly due to the location of the crossover, and to the differences in track elevation compared to the B7 alignment.

The remaining changes in impacts are located at the 118th Avenue SE Apartments. In this area, some properties are predicted to be impacted more severely than before, and some less severely. Some of the changes in impact levels here are due to different track elevations and horizontal location of the alignment in comparison to the B7 alignment.

In addition to the above 25 new impacts are identified at the new receptors representing the Residence Inn Hotel which was not constructed when the SDEIS analysis was carried out. These were not previously assessed in the SDEIS, but are expected to impact both the B7-Revised and the B7 alternatives similarly.

5.5.2 Light rail noise impacts

Noise from each of the sources outlined in Section 5.2 above contributes to the overall noise level at each receptor. However, most impacts associated with the B7-Revised alignment are predicted to be caused primarily by rolling noise.

5.5.2.1 Crossover

There is one crossover planned for the alignment, located at approximately Station 2060+00. This crossover is the cause of several severe impacts at the multi-family housing units adjacent. This crossover causes or increases the severity of noise impacts at 40 receptors. Receptors impacted by the crossover are indicated in Appendix B1.

5.5.2.2 Wheel squeal

The SDEIS states that wheel squeal noise can occur in areas where the curvature of the alignment is less than 600 feet. This assessment has identified 2 locations along the B7-Revised alignment where the radius of curvature of the track meets this criterion. These are listed in Appendix C.

5.5.3 Transit noise impacts

The design of Station A-2 is such that four noise impacts are currently predicted to be caused by buses and automobiles using the Park and Ride facility. These impacts are to single family receptors at the southern end of 113th Avenue SE.

5.6 Noise mitigation

5.6.1 Noise barriers

Most of the noise impacts identified along the route are primarily due to rolling noise, and can be mitigated by use of noise barriers, which would either be built onto the structure for elevated sections of rail, or installed adjacent to the alignment, for at-grade sections.

The noise impacts along SE 34th Street and SE Lake Road can be mitigated with the addition of noise barriers on both sides of the alignment which would be built onto the structure. These noise barriers will need to be 4 to 5 feet above rail height.

The noise impacts at the multi-family units between Station 2056+00 and 2107+00 can also be mitigated by the use of noise barriers on the western side of the alignment. These noise barriers will vary between 3 and 6 feet in height above rail.

The new noise impacts at the Residence Inn Hotel will also need to be mitigated by a noise barrier, which extends from 2132+00 to 2142+00. This barrier will have a height of 5ft above rail.

5.6.2 Crossovers

The Acoustical Peer-Review Concept Design Report of July 14 2010 by the Greenbusch Group indicates that Sound Transit was evaluating crossover noise as part of the East Link project and will install noise reducing track-work where crossovers create noise impacts.

Noise reducing track-work may be used in conjunction with barriers in the location of the crossover to mitigate noise impacts predicted from the B7-Revised Alignment.

5.6.3 Wheel squeal

The recommended measure for mitigating potential wheel-squeal noise impacts at the locations described in Section 5.5.2.2 is rail-face lubrication, as described in Appendix A1 of Greenbusch Group's Acoustical Peer-Review Concept Design Report.

5.6.4 Station design

The design of the station should include mitigation measures to address the impacts described in Section 5.5.3. The assessment indicates that the mitigated noise levels given in Appendix B1 are achievable.

5.6.5 Residual impacts

Residual impacts are noise impacts which are lessened, but not eliminated, after noise mitigation measures have been introduced. The assessment indicates that the mitigation measures identified will not leave any residual impacts.

6 Ground-borne noise and vibration

There were no receptors identified for potential ground-borne noise and vibration impacts in the DEIS. The B7-Revised Alignment does not alter the alignment to any area where additional ground-borne noise or vibration impacts would be expected to occur.

7 Conclusions

The study conducted for the B7-Revised alignment has identified a number of new receptors compared to the SDEIS. The new receptors are due to the addition of Station A-2, and to the identification of receptors on SE Lake Road. In addition the newly constructed Residence Inn Hotel results in additional receptors that would be applied to both B7-Revised and B7 alternatives.

A number of impacts have been identified along the B7-Revised alignment. The majority of noise impacts identified are similar in location and scope to the SDEIS. However there are some additional impacts in these areas, which will be mitigated by increasing the extents of the SDEIS mitigation measures.

A number of new impacts have also been identified at the locations of the new receptors, along SE Lake Road and 113th Avenue SE, and at the Residence Inn Hotel. The assessment has indicated that these can be mitigated such that there are no residual impacts.

8 Next steps

As the design of the Station A-2 and the traffic predictions for the roads serving it are progressed, a traffic noise model may be required in order to verify that the noise impacts identified along 113th Avenue SE will be mitigated.

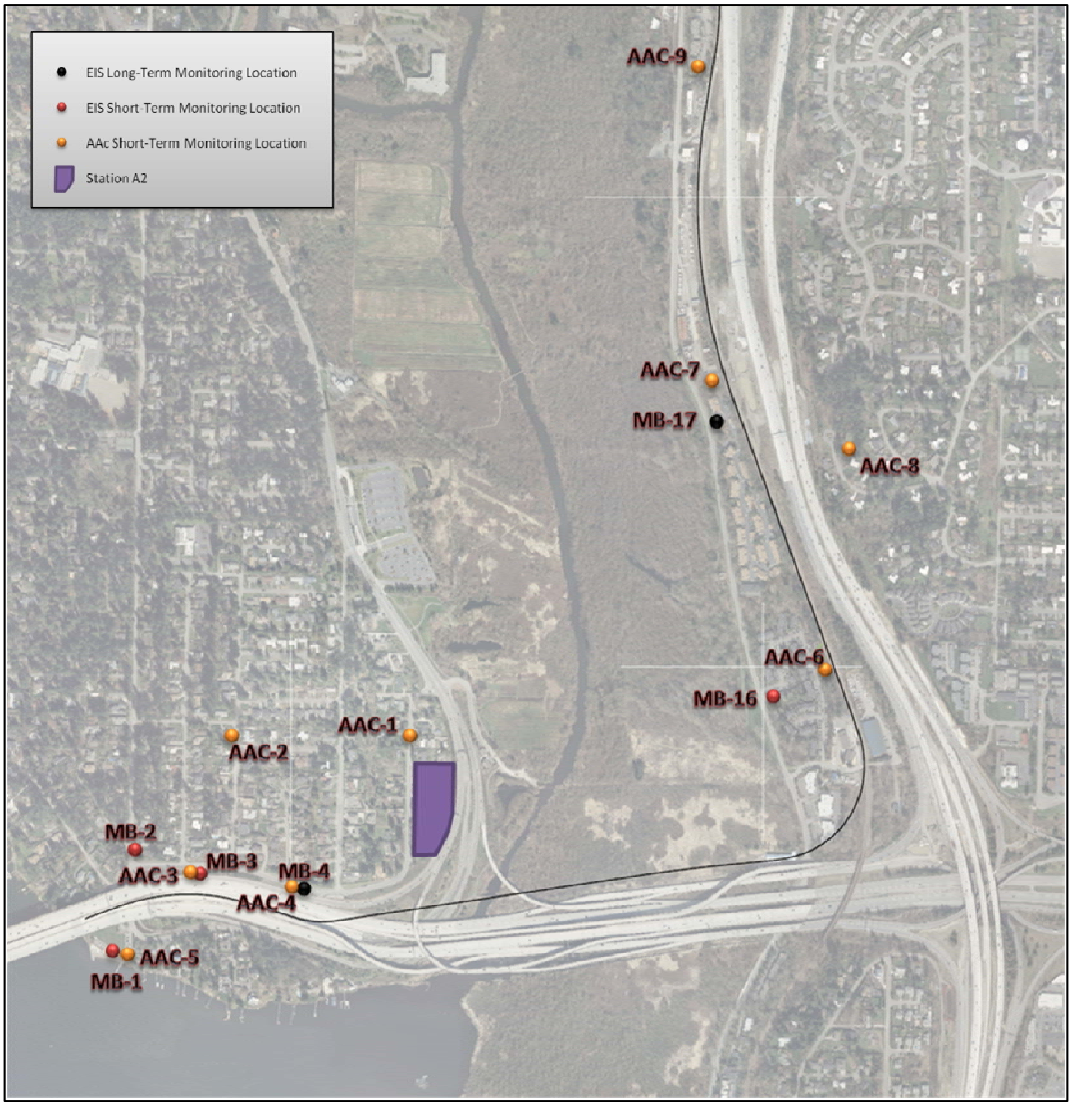
Appendix A

Noise survey results

A1 Table of survey measurements

Measurement Time	Location	Measurement Duration	LAeq Noise Level	Projected Ldn
8:55 AM	AAc-1	15 minutes	65	63
9:18 AM	AAc-2	15 minutes	54	N/A
9:39 AM	AAc-3	15 minutes	72	72
9:58 AM	AAc-4	15 minutes	68	66
10:18 AM	AAc-5	15 minutes	65	62
11:58 AM	AAc-6	15 minutes	58	60
12:27 PM	AAc-7	15 minutes	66	64
12:56 PM	AAc-8	15 minutes	61	N/A
1:20 PM	AAc-9	15 minutes	67	62
1:45 PM	AAc-10	15 minutes	67	65
2:07 PM	AAc-11A	15 minutes	56	N/A
9:15 AM	AAc-11B	15 minutes	67	71
2:31 PM	AAc-12	15 minutes	57	55
2:51 PM	AAc-13	15 minutes	65	N/A
3:14 PM	AAc-14	15 minutes	65	N/A

A2 Plan of survey locations


EIS Long-Term Monitoring Location
EIS Short-Term Monitoring Location
AAc Short-Term Monitoring Location
Station A2
AAC-9
AAC-7
MB-17
AAC-8
AAC-6
MB-16
AAC-1
AAC-2
MB-2
AAC-3
MB-3
MB-4
AAC-4
AAC-5
MB-1

Appendix B

Noise Impacts

B1 Table of noise impacts

Receptor Description	Station	Receptor Location	Ambient Noise Level	Number of Receptors	Project Noise		Impact Level	
					B7 / C9T	B7 Revised	B7 / C9T	B7 Revised
Enatai Beach Park	2000+60	1303829, 214191	62 Leq,D	1	N/A	50	None	None
108th Ave SE @ SE 34th St	2004+50	1304078, 214769	67 Ldn	1	66	63	Moderate	Moderate
109th Ave SE @ SE 34th St (W)	2005+60	1304213, 214768	67 Ldn	1		63		Moderate
109th Ave SE @ SE 34th St (E)	2007+30	1304408, 214767	67 Ldn	1	66	63	Moderate	Moderate
110th Ave SE @ SE 34th St (W)	2007+80	1304478, 214767	67 Ldn	1		63		Moderate
SE Lake Road	2003+30	1304086, 214223	62 Ldn	1	N/A	58	N/A	None
SE Lake Road	2004+00	1304138, 214230	62 Ldn	1	N/A	59	N/A	Moderate
SE Lake Road	2004+80	1304201, 214237	63 Ldn	1	N/A	59	N/A	None
SE Lake Road	2005+60	1304264, 214245	64 Ldn	1	N/A	60	N/A	None
SE Lake Road	2006+20	1304309, 214251	64 Ldn	1	N/A	60	N/A	None
SE Lake Road	2006+80	1304361, 214257	65 Ldn	1	N/A	61	N/A	Moderate
SE Lake Road	2008+10	1304463, 214270	66 Ldn	1	N/A	63	N/A	Moderate
SE Lake Road	2008+90	1304527, 214277	62 Ldn	1	N/A	63	N/A	Moderate
SE Lake Road	2009+60	1304583, 214284	67 Ldn	1	N/A	63	N/A	Moderate
SE Lake Road	2009+90	1304581, 214157	64 Ldn	1	N/A	61	N/A	Moderate
SE Lake Road	2010+30	1304579, 214037	62 Ldn	1	N/A	60	N/A	Moderate
SE Lake Road	2010+30	1304642, 214284	67 Ldn	1	N/A	64	N/A	Moderate
SE Lake Road	2011+00	1304699, 214239	67 Ldn	1	N/A	63	N/A	Moderate
SE Lake Road	2011+10	1304720, 214271	66 Ldn	1	N/A	64	N/A	Moderate
SE Lake Road	2012+00	1304721, 213961	62 Ldn	1	N/A	60	N/A	Moderate

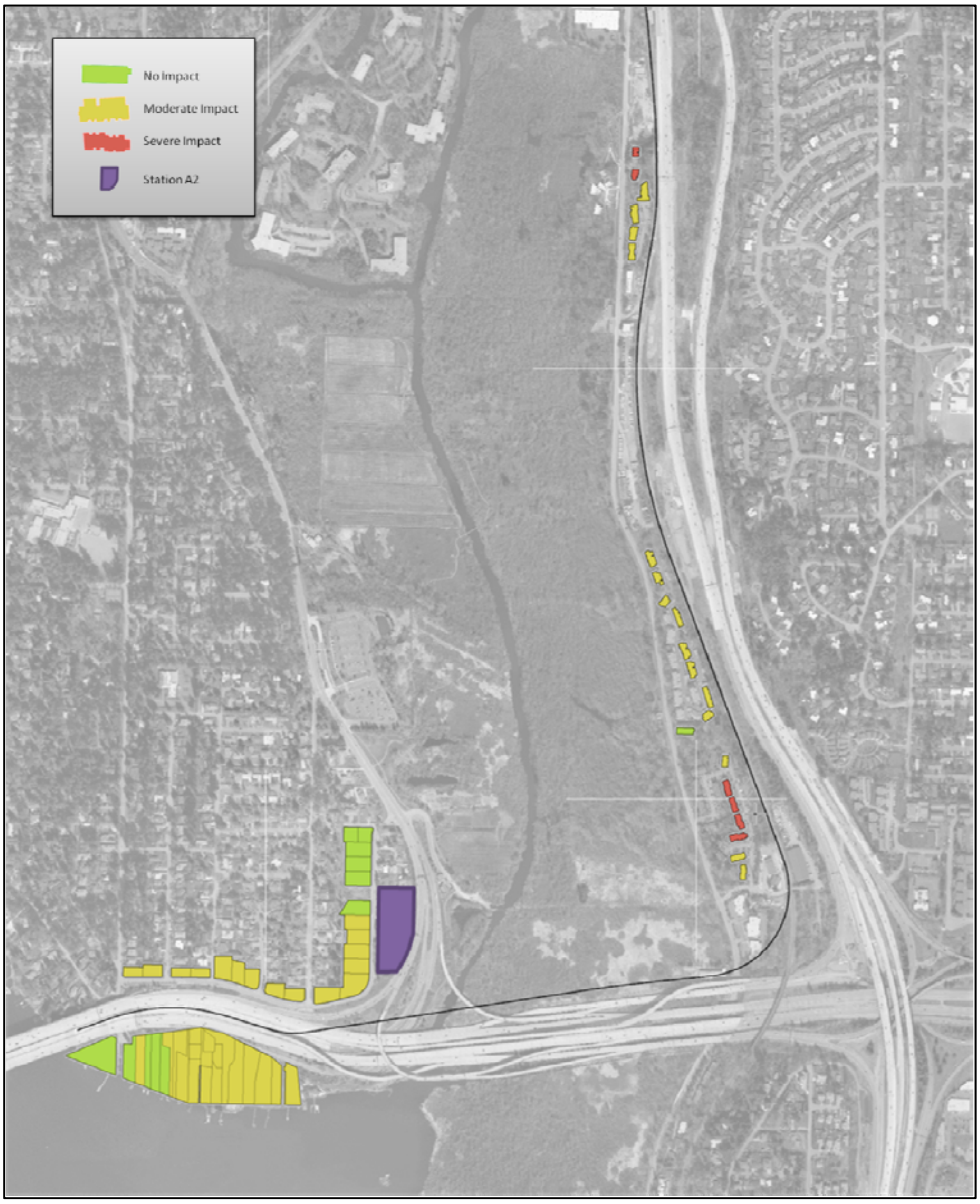
Receptor Description	Station	Receptor Location	Ambient Noise Level	Number of Receptors	Project Noise		Impact Level	
					B7 / C9T	B7 Revised	B7 / C9T	B7 Revised
SE Lake Road	2012+00	1304775, 214159	65 Ldn	1	N/A	62	N/A	Moderate
SE Lake Road	2012+10	1304739, 213992	62 Ldn	1	N/A	60	N/A	Moderate
SE Lake Road	2013+50	1304944, 214182	65 Ldn	1	N/A	63	N/A	Moderate
SE Lake Road	2014+40	1305048, 214130	64 Ldn	1	N/A	63	N/A	Moderate
SE Lake Road	2015+20	1305162, 214073	63 Ldn	1	N/A	62	N/A	Moderate
SE Lake Road	2015+76	1305248, 214015	62 Ldn	1	N/A	60	N/A	Moderate
SE Lake Road	2016+20	1305318, 213992	62 Ldn	1	N/A	60	N/A	Moderate
110th Ave SE @ SE 34th St (E)	2009+33	1304658, 214756	67 Ldn	1	65	63	Moderate	Moderate
SE 34th Street @ 110th Ave SE & 111th Ave SE	2011+00	1304837, 214711	67 Ldn	1		63		Moderate
111th Avenue SE	2011+70	1304912, 214685	67 Ldn	1		63		Moderate
111th Ave SE @ SE 34th St (E)	2013+60	1305087, 214624	67 Ldn	1	64	63	Moderate	Moderate
112th Ave SE @ SE 34th St (W)	2016+10	1305243, 214598	67 Ldn	1		64		Moderate
112th Ave SE @ SE 34th St (E)	2017+50	1305375, 214585	68 Ldn	1	64	64	Moderate	Moderate
113th Ave SE @ SE 34th St	2019+30	1305554, 214625	69 Ldn	1		64		Moderate
113th Avenue SE	2020+30	1305622, 214792	69 Ldn	1	62	64	None	Moderate
113th Avenue SE	2020+40	1305624, 214892	69 Ldn	1	N/A	64	N/A	Moderate
113th Avenue SE	2020+70	1305638, 214992	68 Ldn	1	N/A	64	N/A	Moderate
113th Avenue SE	2020+90	1305629, 215192	67 Ldn	1	N/A	61	N/A	None
113th Avenue SE	2020+90	1305640, 215092	68 Ldn	1	N/A	63	N/A	Moderate
113th Avenue SE	2021+30	1305591, 215693	63 Ldn	1	N/A	59	N/A	None

Receptor Description	Station	Receptor Location	Ambient Noise Level	Number of Receptors	Project Noise		Impact Level	
					B7 / C9T	B7 Revised	B7 / C9T	B7 Revised
113th Avenue SE	2021+30	1305633, 215392	66 Ldn	1	N/A	60	N/A	None
113th Avenue SE	2021+50	1305635, 215492	65 Ldn	1	N/A	60	N/A	None
113th Avenue SE	2021+60	1305636, 215592	64 Ldn	1	N/A	59	N/A	None
113th Avenue SE	2022+20	1305680, 215691	63 Ldn	1	N/A	59	N/A	None
Apartment Complex	2056+20	1308347, 215529	64 Ldn	3	59	62	None	Moderate
Apartment Complex	2057+00	1308342, 215612	64 Ldn	3		61		Moderate
Apartment Complex	2058+30	1308357, 215755	64 Ldn	4		69*		Severe*
Apartment Complex	2059+20	1308335, 215834	64 Ldn	12	66	70*	Moderate	Severe*
Apartment Complex	2060+90	1308278, 215988	64 Ldn	12	66	70*	Severe	Severe*
Apartment Complex	2062+50	1308225, 216139	64 Ldn	12	66	68*	None	Severe*
Apartment Complex	2064+20	1308219, 216320	64 Ldn	8	56	62	None	Moderate
New Condos	2066+80	1307987, 216515	64 Ldn	4	55	59	None	None
Lake Washington Blvd SE Apartments	2067+40	1308114, 216620	64 Ldn	8	65	63	Moderate	Moderate
Lake Washington Blvd SE Apartments	2069+30	1308072, 216806	64 Ldn	16		64		Moderate
Lake Washington Blvd SE Apartments	2071+00	1307986, 216958	64 Ldn	12	62	63	Moderate	Moderate
Lake Washington Blvd SE Apartments	2071+80	1307955, 217037	64 Ldn	12		63		Moderate
Lake Washington Blvd SE Apartments	2074+50	1307888, 217292	64 Ldn	16	66	64	Severe	Moderate
Lake Washington Blvd SE Apartments	2075+80	1307813, 217402	64 Ldn	6	63	63	Moderate	Moderate
Lake Washington Blvd SE Apartments	2076+80	1307777, 217505	64 Ldn	6		63		Moderate

Receptor Description	Station	Receptor Location	Ambient Noise Level	Number of Receptors	Project Noise		Impact Level	
					B7 / C9T	B7 Revised	B7 / C9T	B7 Revised
Lake Washington Blvd SE Apartments	2078+40	1307726, 217653	64 Ldn	8		63		Moderate
118th Avenue SE Apartments	2099+60	1307565, 219791	62 Ldn	12	63	63	Moderate	Moderate
118th Avenue SE Apartments	2101+50	1307585, 219981	62 Ldn	9	64	62	Severe	Moderate
118th Avenue SE Apartments	2102+00	1307589, 220031	62 Ldn	6	60	62	Moderate	Moderate
118th Avenue SE Apartments	2103+60	1307658, 220172	62 Ldn	3	60	64	Moderate	Moderate
118th Avenue SE Apartments	2105+30	1307590, 220342	62 Ldn	3	57	65	None	Severe
118th Avenue SE Apartments	2106+71	1307590, 220481	62 Ldn	3	57	66	None	Severe
Residence Inn	2317+00	1306688, 223257	65 Ldn	25	N/A	67	N/A	Severe
Hilton Pool	2149+31	1306171, 224387	69 Leq,D	1	58	57	None	None
Bellevue Hilton	2152+11	1306110, 224659	71 Ldn	32	74	66	Severe	Moderate
112th Ave SE	2154+51	1305493, 224675	55 Ldn	24	N/A	55	N/A	None
112th Ave SE	2158+21	1305494, 225074	55 Ldn	17	N/A	55	N/A	None
112th Ave SE	2158+61	1305548, 225137	55 Ldn	1	N/A	55	N/A	None
SE 1st Place	2160+11	1305549, 225308	55 Ldn	1	N/A	54	N/A	None
SE 1st Place	2160+41	1305455, 225302	55 Ldn	1	N/A	54	N/A	None

* Indicates an impact from the planned crossover

B2 Plans of noise impact locations


No Impact
Moderate Impact
Severe Impact
Station A2

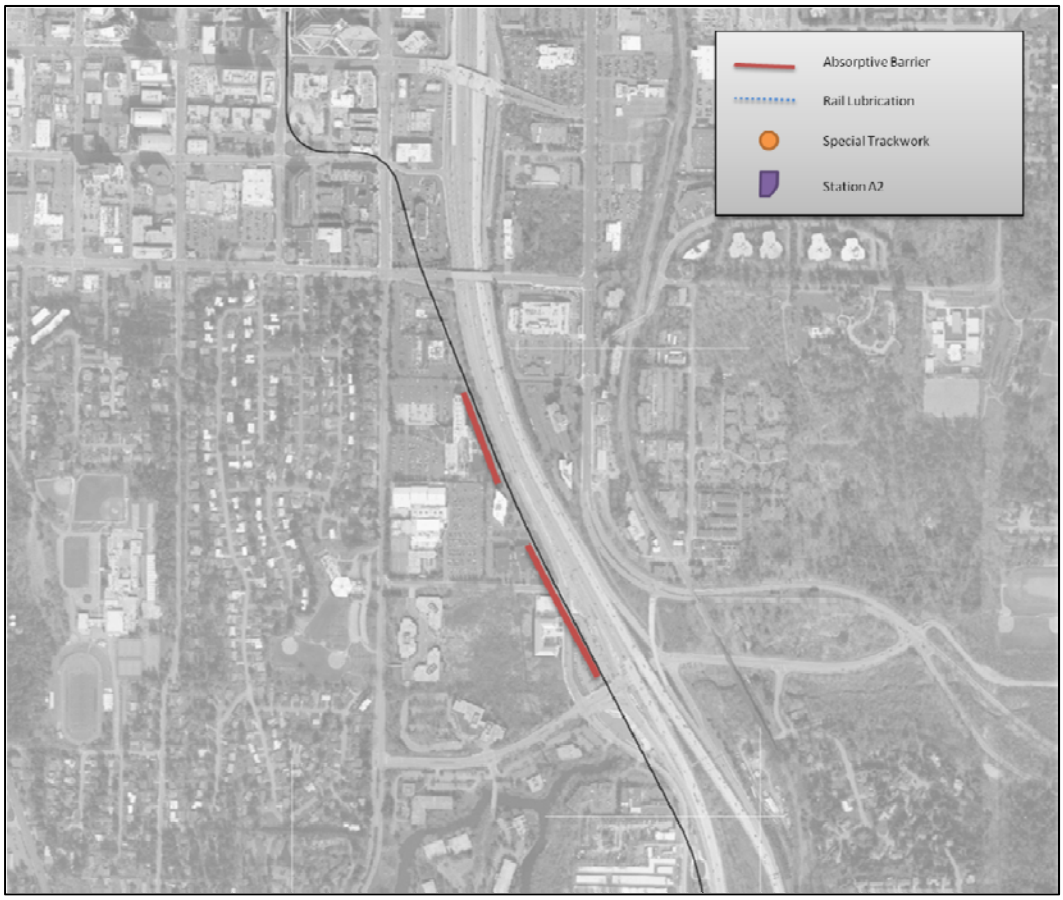
Appendix C

Noise mitigation

C1 Table of noise mitigation locations

Station		Mitigation Measure	Location	Dimensions	Details
Start	End				
2005+00	2021+00	Noise barrier	North of alignment	5ft above rail	Absorptive
2005+00	2018+00	Noise barrier	South of alignment	4ft above rail	Absorptive
2014+40	2015+80	Rail lubricators	Applied to track	N/A	Sound Transit to provide data on the performance of the lubricators
2046+00	2054+30	Rail lubricators	Applied to track	N/A	Sound Transit to provide data on the performance of the lubricators
2051+00	2080+00	Noise barrier	West of alignment	3 - 6ft above rail	Absorptive
2060+00		Special trackwork	At crossover	N/A	
2096+00	2114+00	Noise barrier	West of alignment	6ft above rail	Absorptive
2132+00	2142+00	Noise barrier	West of alignment	5ft above rail	Absorptive
2147+00	2153+00	Noise barrier	West of alignment	5ft above rail	Absorptive

C2 Plans of noise mitigation locations



Absorptive Barrier
Rail Lubrication
Special Trackwork
Station A2