APPENDIX M

Noise Analysis Report

Will County, Illinois, and Lake County, Indiana

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Indiana Department of Transportation

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Executive Summary

The purpose of this noise analysis is to assess traffic noise and its potential impact on noise sensitive land uses near the proposed Illiana Corridor (the Corridor), which extends between Interstate 55 (I-55) in the City of Wilmington, Illinois, and Interstate 65 (I-65) in Lake County, Indiana.

Illinois and Indiana traffic noise policies for the portions of the project in their respective state were used. For the portions of the corridor located in Illinois, the study was conducted in accordance with the Illinois Department of Transportation (IDOT) Noise Analyses policy (Chapter 26-6, Bureau of Design and Environment Manual, 2011) and similarly for the roadway potions in of the study in Indiana, the Indiana Department of Transportation (INDOT) Traffic Noise Analysis Procedure (2011) were followed. Each state has developed traffic noise policies following Federal Highway Administration (FHWA) regulations as defined by 23 CFR 772. The regulations contain traffic noise impact criteria which establish noise exposure limits for various land use activity categories to assess noise impacts of proposed roadway improvements under the future design year worst-case traffic conditions. The noise impact assessment was primarily considered at exterior areas of frequent human use.

Land use along the proposed project consists of mostly rural farm lands or open space with isolated areas of single family homes. The majority of the residential areas are primarily in Wilmington, Illinois, between South Riley Road and I-55. In general, within the Corridor, most of the noise sensitive areas (NSAs) consisted primarily of only one to two homes located within 800 feet of the proposed project. Therefore, with the exception of a few locations, the receivers represent one or two homes.

Noise measurements were sampled at 51 representative monitoring locations identified along the Corridor of which long term continuous 24 hour readings were collected at five sites and short-term measurements of 15 minutes duration were collected at 46 receptor sites. All the sites represent Activity Category B land uses except M74, which represents the Wauponsee Glacial Trail (Activity Category C). There were no Activity Category E properties identified within the project study area corridor. Appendix B contains aerial maps depicting the noise measurement and modeling locations.

Traffic counts were recorded simultaneously during each noise measurement at 20 of the 51 short term monitoring sites identified within 800 feet of existing I-55, I-57, and I-65 in Indiana and in Illinois adjacent to existing IL-53, US 45, IL-1, and US 41. The noise measurements and traffic counts were used to validate the Traffic Noise Model (TNM) 2.5 model for its accuracy to reliably estimate noise levels at each of the 20 representative sites where traffic counts were collected within the project Study Area.

The validation yielded noise level estimates within a plus or minus 3 decibel (dB) (A) range of the corresponding measured noise level. Measured versus predicted levels within 3 dB(A) range are considered within a reasonable agreement and indicates that the TNM 2.5 model developed for the Study Area would provide a reasonable accurate estimate of noise levels under varying future traffic conditions.

Description of Land Uses: Land use in the project area can be generally characterized as primarily consisting of single family homes sitting on large land parcels, located adjacent to 20 foot wide paved and graveled roadways. The roads generally run north to south along the properties with a housing density of about one home per half mile. Fifteen (15) of these receptor sites where identified as representative of a larger area consisting of multiple residential properties with the following assumptions used in the analysis:

Illinois

- Sites 8, 9, M12, and M13 represent 42 homes in the City of Wilmington.
- Site M11 and M72 represent single family homes that are also considered Section 4(f) properties because they are historic properties.
- Sites 15 and M25 represent the six homes in Symerton between Symerton Road and the Wauponsee Glacial Trail and Site M75 represents the Wauponsee Glacial Trail.
- Site 24 represents the seven condominiums on Oriole Drive, east of I-57.

Indiana

- At the intersection of White Oak Avenue and the Corridor, Sites 36 and M48 represent the 5 homes north of the project and west of White Oak Avenue.
- Sites M50 and M51 represent the three homes south of the project and west of White Oak Avenue.
- Site M64 represents the three homes between the project and 163 Road, between SR 55 and Hamilton Road.
- Sites M67, 44, and M68 represent the group of 12 homes south of 163 Road between Harrison and Broadway Streets.

All other receptor sites modeled consisted of single family residential properties. For receptors located in Illinois and in accordance with IDOT traffic noise modeling policy requirements, the existing worst-case (loudest) noise conditions are determined using level of service (LOS) C traffic volumes, which IDOT considers the highest possible traffic volumes under free flow conditions. In Illinois, the roadways modeled were: I-55, River Road, IL-53, Peotone/Wilmington Road, 96th Avenue/US 45, I-57, Governors Highway, and Dixie Highway.

In accordance with INDOT traffic noise modeling policy requirements, for receptor sites in Indiana, the existing worst-case (loudest) noise levels were predicted using LOS D traffic volumes, which INDOT considers the highest traffic volumes under free flow conditions. In Indiana, the roadways modeled were: US 41 and I-65.

Existing and Future No Build Findings: Existing noise levels at 31 of the 51 receptor sites could not be determined using the TNM model because there are no existing active roadways located within the 800 feet of these receptors. For these 31 sites, existing noise levels were determined using background field noise measurements. Twenty-eight (28) short-term and three 24-hour measurements were collected at sites with no dominant traffic noise sources. The existing/worst case noise levels for these sites were estimated by comparing the short-term measurements with each other and the continuous 24-hour 1-hour Leq's collected at the nearest 24-hour measurement site along the Corridor. The estimated existing/worst case noise levels at the 32 receptor sites was determined, using the difference between the short-term measurement and nearest 24-hour measurement site. The difference was then applied to the worst-hour noise level at the 24-hour measurement site to estimate the existing/worst case noise levels at the short-term measurement locations. The levels at the sites between major roadways were compared to each other to estimate existing/worst case noise levels for all the receivers in between those major roadways. The estimated levels are based on many factors including: relevant nearby measured levels, proximity of the site to existing roadways, adjustment of measured levels if field measurements note louder than normal bird calls, distant trains, or rustling leaves due to wind.

A summary of existing and future No-Action predicted worst-case noise levels for each build alternative and the six IL-53 interchange design options are provided in Tables A-1 to A-18 in Appendix A.

Build Alternatives Findings:

For Alternative 1, in Illinois, depending on the interchange design option selected at IL-53, the build noise levels are predicted to be above the NAC at nine to 10 sites, with a substantial noise level increase of 14 dB(A) or greater projected at seven resulting in a total of 23 to 26 impacts. In Indiana build noise impacts are fewer with levels predicted to be above the NAC at four sites, with a substantial noise level increase of 15 dB(A) or greater projected at nine sites. Moreover, both impact conditions are expected to occur at six-11 sites resulting in a total of 19 impacts.

For Alternative 2, in Illinois, depending on the interchange design option selected at IL-53, the build noise levels are predicted to be above the NAC at nine to 10 sites, with a substantial noise level increase of 14 dB(A) or greater projected at nine to 10 sites. Furthermore, both impact conditions are expected to occur at five to six sites resulting in a total of 24 to 25 impacts. In Indiana build noise impacts are fewer with build levels predicted to be above the NAC at one site, with a substantial noise level increase of 15 dB(A) or greater projected at 11 sites. Moreover, both impact conditions are expected to occur at seven sites resulting in a total of 19 impacts.

For Alternative 3, in Illinois, depending on the interchange design option selected at IL-53, the build noise levels are predicted to be above the NAC at nine to 10 sites, with a substantial noise level increase of 14 dB(A) or greater projected at seven to eight sites. Furthermore, both impact conditions are expected to occur at six to seven sites resulting in a total of 22 to 25 impacts. In Indiana build noise levels are not expected to exceed the NAC, however a substantial noise level increase of 15 dB(A) or greater projected at 10 sites and both impact conditions are expected to occur at 11 sites resulting in a total of 21 impacts.

Noise Abatement Criteria and Findings:

Noise barriers were modeled along the right-of-way of each alternative in areas where noise impacts were projected to occur under future build conditions. The noise barrier modeling was done to determine if the noise barrier s could be designed satisfying each state DOT noise abatement policy requirements governing feasibility and reasonableness. In Illinois, IDOT sets a design goal of achieving a noise reduction of 8 dBA at one property to be considered feasible. Whereas in Indiana to be considered feasible, INDOT maintains a noise barrier must achieve a noise reduction of 7 dB(A) at a majority of first row receivers behind a proposed noise barrier. To be considered reasonable the barrier must not exceed the allowable noise abatement cost per benefited receptor. Both IDOT and INDOT define a benefited receptor as a receptor that achieves a noise reduction of 5 dB(A) or more. INDOT sets a maximum cost per benefited receptor of $30,000. Whereas in Illinois, the cost per benefited receptor set by IDOT starts as $24,000 but can be as high as $37,000, after consideration of reasonableness factors are used to adjust the cost. These factors included the absolute noise level of the benefited receptors in the design year, before noise abatement; the increase between the existing noise level and the predicted noise level, before noise abatement; and if the receptors existed prior to construction of the highway.

Noise impacts under the Alternative 1 build design were identified at 40-42 sites (see Tables A-1 to A-5). Thirty-three (33) noise barriers along the right-of-way were modeled to determine if the barriers would be built satisfying feasibility and reasonableness requirements for cost and acoustic effectiveness.

A summary of the Alternative 1 noise abatement analysis findings is provided in Table 7-4 and it shows none of the 33 sound barriers evaluated were found to be feasible and reasonable. For 21 of the 33 sound barriers modeled, it was found that the maximum height and length would not reduce the noise levels enough to s satisfy the design goals of the state they are located within. The other 12 sound barriers were found feasible, but the cost of the barriers exceeds the reasonable cost limit.

Noise impacts under the Alternative 2 build design were identified at 39-42 sites (see Tables A-6 to A-10). Thirty-four (34) noise barriers along the right-of-way were modeled to determine if the barriers would be feasible and reasonable. A summary of the Alternative 2 noise abatement analysis findings is provided in Table 7-5 and it shows none of the 34 sound barriers evaluated were found to be feasible and reasonable. For 19 of the 34 sound barriers modeled, it was found that the maximum height and length would not reduce the noise levels enough to satisfy the design goals of the state they are located within. The other 15 sound barriers were found feasible, but the cost of the barriers exceeds the reasonable cost limit.

Noise impacts under the Alternative 3 build design were identified at 41-44 sites (see Tables A-11 to A-15). Thirty-five (35) noise barriers along the right-of-way were modeled to determine if the barriers would be feasible and reasonable. A summary of the Alternative 3 noise abatement analysis findings are provided in Table 7-6 and it shows none of the 35 sound barriers evaluated were found to be feasible and reasonable. For 19 of the 35 sound barriers modeled, it was found that the maximum height and length would not reduce the noise levels enough to satisfy the design goals of each state where they are located. The other 16 sound barriers were found feasible, but the cost of the barriers exceeds the reasonable cost limit.

Construction Noise Findings:

Trucks and machinery used for construction produce noise which may impact some land uses and activities during some phases of the construction period depending on the types, duration, and distances of each of these activities from the nearest noise sensitive receptors. At varying times, during the construction phase schedule, residents living adjacent to the alignment would experience perceptible level of construction noise of varying intensity and duration. The contractor will be required to implement mitigation measures that will minimize or eliminate construction noise exposure on the adjacent communities. Therefore to minimize noise exposure and potential annoyance to the adjacent residences near the construction activities in Illinois, the contractor will be required to comply with IDOT's *Standard Specifications for Road and Bridge Construction* as Article 107.35 (IDOT, 2012b) and in Indiana, the INDOT Noise Policy states, "INDOT will be sensitive to local needs and may make adjustments to work practices in order to reduce inconvenience to the public."

Typically the construction methods for project implementation are established during the final engineering and preparation of contract plans and specifications. Construction noise mitigation can be accomplished by various methods such as construction staging, sequencing of operations, or alternate construction methods. Construction noise abatement and mitigation will be considered and incorporated into the plans where applicable.

Because the land use in the project area includes areas of undeveloped open space and farm land, it is possible these areas may be developed in the future. When considering future land use zoning and development along the project alignment, NAC level for activity categories B and C could be exceeded up to 250 feet from the edge of pavement, and the NAC for Activity Category E, could be exceeded up to 150 feet from the edge of pavement. Copies of the letters with this information sent to local officials are contained in Appendix C.

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1.0 Introduction

The purpose of this noise analysis is to evaluate potential traffic noise impacts for noise sensitive areas near the proposed Illiana Corridor (Corridor B3), between Interstate 55 (I-55) in the City of Wilmington, Illinois and Interstate 65 (I-65) in Lake County, Indiana.

1.1 Project Description

The Tier One combined Final Environmental Impact Statement (FEIS)/Record of Decision (ROD) approved Corridor B3 (herein referred to as the Corridor), which is an approximately 2,000 foot wide, 47-mile long east-west oriented corridor with a western terminus at I-55 just north of the City of Wilmington in Illinois and an eastern terminus at I-65 approximately 3 miles north of State Route (SR) 2 in Indiana. The specific alternative alignment within the Corridor, along with appropriate mitigation measures, is being analyzed and refined as part of the Tier Two National Environmental Policy Act (NEPA) process.

The result of the Tier Two alternatives analysis process was the development of three representative alternatives that are generally confined within the limits of the Corridor and extend from I-55 on the west to I-65 on the east. The three alternatives, referred to as Alternative 1, Alternative 2, and Alternative 3, primarily follow the same alignment within the Corridor.

Tier Two expands on Tier One with detailed engineering and environmental analysis that refine the project features, impacts, and right-of-way footprint generally within the Corridor.

1.2 Existing Land Use

The project area is mostly rural farm lands and open space with isolated areas of single family homes. The majority of the residential areas are in Wilmington, Illinois, between South Riley Road and I-55. Three major Interstates cross the project corridor; including I-55 on the west, I-65 on the east, and I-57 in the middle of the project corridor. The proposed alignment also crosses US highways 45 and 41, IL-1, 50 and 53, SR 41, 45, and 42. The primary noise source for area within 800 feet of roadway with where the roadway traffic in the dominate noise source. While traffic noise does have some influence on the overall noise levels, the dominant noise source along the rural roadways is wildlife, mostly birds and rustling leaves, due to wind.

1.3 Zoning and Comprehensive Land Use Plan Designations

Land use along the proposed project is mostly rural farm lands or open space with isolated areas of single family homes. With the expectation of where the Wauponsee Glacial Trail crosses the study alternative. The majority of the residential areas are in Wilmington, Illinois, between South Riley Road and I-55.

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2.0 Noise Background and Regulations

2.1 Noise Background

Sound can be described as the mechanical energy of vibrating object transmitted by pressure waves through a liquid or gaseous medium (e.g. air) to a hearing organ, like the human ear. Noise is defined as loud unexpected or annoying sound.

The loudness of the noise source and the obstructions or atmospheric factors that affect the propagation of the sound energy to the receiver determines the sound level and how the noise is perceived by the receiver.

Sound is measured in micro-Pascals (mPa). One mPa is approximately one hundred billionth (0.00000000001) of normal atmospheric pressure and can range from 100 to 100,000,000 mPa. Due to the huge range in mPa values, sound is more commonly described using a logarithmic scale, in terms of decibels (dB).

Sound is composed of a wide range of frequencies, but the human ear is capable of perceiving sound from a limited portion of the full sound spectrum range. To approximate for the hearing range of the human ear, the individual frequency bands are weighted, depending on the human sensitivity to those frequencies. The sound level is then considered “A-weighted” and is expressed in units of dB(A). The dB(A) units have been adopted as the basic unit of environmental noise assessment and exposure by many government agencies around the world because it approximates best to the human ear’s sensitivity, matches attitudinal surveys of noise annoyance better than others and it is easily measured.

Leq (h) or equivalent sound level is the preferred noise descriptor used by government agencies to quantify traffic noise exposure and its associated community impact. The Leq (h) represents the A-weighted sum of the total acoustic energy over a one hour time period and allows for a single metric measure value of the actual time-varying sounds over the same one hour time period.

2.2 Federal Regulations

Federal Highway Administration (FHWA) Highway Traffic Noise and Construction Noise Part 772 Procedures for Abatement of Highway Traffic Noise states that a noise impact occurs when the predicted traffic noise levels for a project approach or exceed the NAC criteria for land use Activity Categories shown in Table 2-1 or there is a substantial increase in the noise level. FHWA does not define a “substantial” noise increase. Each State’s noise policy is required to define what levels are considered “approaching” the NAC, and what levels are considered a “substantial” increase.

Table 2-1. FHWA Noise Abatement Criteria – Hourly Weighted Sound Level

Activity Category	Leq(h) dB(A)	Evaluation Locations	Description of Activity Category
A	57	Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B[1]	67	Exterior	Residential
C[1]	67	Exterior	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails and trail crossings.
D	52	Interior	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E[1]	72	Exterior	Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A-D or F.
F	-	-	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing.
G	-	-	Undeveloped lands that are not permitted

1. [1] Includes undeveloped lands permitted for this activity category.

2.3 State Regulations

The study was conducted in accordance with the IDOT Noise Analyses policy (Chapter 26-6, Bureau of Design and Environment Manual, 2011), for roadway sections in Illinois and for roadway sections in Indiana the INDOT Traffic Noise Analysis Procedure (2011) was applied. While both are based on FHWA noise regulations, 23 CFR Part 772 "Procedures for Abatement of Highway Traffic Noise and Construction Noise," there are differences between the two state policies.

2.3.1 Illinois

The IDOT traffic noise policy guidelines and procedures are contained in the *Highway Traffic Noise Assessment Manual* (IDOT, June 2011a). The manual establishes the traffic noise analysis requirements for all Type I projects whether they are federally funded or state only funded. Type I projects, such as this project, are those that involve modifications to the horizontal or vertical alignment of existing roadways or the creation of new roadway alignments. The IDOT Noise Policy uses the same land use categories established in the FHWA NAC and has defined a traffic noise impact as follows:

- Design year (typically 20 years into the future) traffic noise levels predicted to approach, meet, or exceed the NAC, with approach defined as 1 dB(A) less than the NAC; or
- Design year (typically 20 years into the future) traffic noise levels are predicted to substantially increase (greater than 14 dB (A)) over the existing noise levels.
- The IDOT *Highway Traffic Noise Assessment* can be found at: http://www.dot.state.il.us/desenv/noise.html

IDOT defines a receptor as a discrete or representative location of a *common noise environment* (CNE) for any of the activity categories listed in Table 2-1. The IDOT *Highway Traffic Noise Assessment Manual* suggests selecting receptor sites by completing an initial review of all land uses within 500 feet of the proposed roadway improvement. Highway traffic noise is not generally a dominant noise source at distances greater than 500 feet from the primary roadway improvement. If however, there are sensitive receptors further than 500 feet from the roadway, these should be considered on a case-by-case basis in the traffic noise analysis, dependent upon the sensitivity of the receptor (*e.g.*, nursing home).

2.3.2 Indiana

The INDOT traffic noise policy guidelines are contained in the *Traffic Noise Analysis Procedure* (INDOT, 2011c). The INDOT Noise Policy uses the same land use categories established in the FHWA NAC and has defined a traffic noise impact as follows:

- Approach to be within 1 dB(A) of the appropriate FHWA NAC; or
- Substantial noise increase is an increase in which future noise levels exceed the existing noise levels by 15 dB(A).
- The INDOT *Traffic Noise Analysis Procedure* can be found at: http://www.in.gov/indot/files/INDOT_Noise_Policy_June_2011.pdf

INDOT defines a receptor as a discrete or representative location of a *common noise environments* or CNE for any of the activity categories listed in Table 2-1. To determine potential traffic noise impacts, INDOT Noise Policy states that all land use activity categories for receptors within 500 feet of the edge of the outside travel lane must be identified. If it is shown that potential traffic noise impacts could occur at a distance greater than 500 feet, then the noise analysis can be extended to 800 feet. Traffic noise analysis of receptors beyond 800 feet from the outside travel lane should not be conducted because the FHWA Traffic Noise Model Version 2.5 (TNM 2.5) model does not provide accurate prediction of noise levels beyond that distance.

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3.0 Noise Receptor Selection

The traffic noise study uses common noise environments (CNEs) to evaluate the proposed projects affect on the noise environment. The closest receptor in a CNE is used to represent the worst case noise condition for each CNE.

Land use along the proposed project consists of mostly rural farm lands or open space with isolated areas of single family homes. The majority of the residential areas are in Wilmington, Illinois, between South Riley Road and I-55. For this project, most of the CNEs had only one to two homes located within 800 feet of the proposed project, so with the exception of the few locations, the receivers represent only one or two homes. Receptors that represents a single home or a number of homes in an area of a CNE is shown in Table A-1 found in Appendix A. Figures in Appendix B show the noise receptor locations along the Corridor. The field measurements sites are shown with just a number while the modeled sites are shown with the letter "M" and then a number.

The location of noise receptors sites are within the first row of residences or those receivers that have a direct line of sight to existing roadway traffic. The IDOT and INDOT noise policies state that noise sensitive land uses within at least 500 feet of the proposed edge of pavement should be included in the traffic noise modeling. In addition, IDOT's noise policy states that if sensitive receptors are found to be further than 500 feet from the roadway, could be included on a case-by-case basis in the traffic noise analysis, dependent upon the sensitivity of the receptor. INDOT's noise policy states that if impacts are identified at 500 feet for the build scenario, the screen distance is expanded to 800 feet from the edge of pavement, which is the limit that TNM 2.5 can be used to model traffic noise levels. Measurement locations will also follow the FHWA guidance found in "Measurements of Highway Related Noise" (FHWA-RD-96-046, DOT-FHWA-96-5, May 1996).

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4.0 Noise Monitoring

Noise monitoring was undertaken for this project for the purpose of documenting the background ambient noise levels in areas where the traffic noise is not a dominate noise source. Conversely, at other locations noise measurements were collected to use for model validation at representative receptor sites located within 800 feet of roadways where traffic noise is the dominate noise source.

4.1 Field Noise Measurement Methodology

Traffic noise level measurements were recorded at 51 monitoring locations identified along the Corridor. Long term readings of 24 hour continuous duration were collected at five sites and short-term measurements of 15 minutes duration were collected at 47 sites. Four of the long-term and 45 short-term measurements were collected adjacent to outside areas of single family homes. In addition, one long-term measurement and one short-term reading were recorded within Midewin National Tallgrass Prairie. Measurement and modeling locations are show in Appendix B. All measurements were taken in accordance with FHWA's "Measurement of Highway Related Noise" (FHWA-PD-96-046, DOTVNTSC-FHWA-96.5) and consistent with the noise policies of both IDOT and INDOT.

Traffic counts were recorded simultaneously at 20 noise measurement locations located within 800 feet of the existing I-55, I-57 and I-65 or the existing IL-53, US 45, IL-1, and US 41. The noise measurements and traffic counts were used to validate the accuracy of the TNM 2.5 model to predict traffic noise levels for the project.

4.2 Monitoring Results

TNM modeling was completed for the area within 800 feet of roadways where traffic noise is the dominate noise source. The traffic counts taken during the measurements were expanded to one hour counts. The validation runs noise levels must be within +/-3 dB(A) for the TNM models to be considered validated. Table 4-1 provides a summary of the TNM validation runs. Table 4-2 shows the measured and calculated peak hour noise levels at the sites that are in areas where traffic noise is not the dominate noise source. The major sources of noise of the measured levels shown in Table 4-2 are from bird chirpings and wind rustled leaves. For receptor sites shown in Table 4-2, the TNM model was not used to calculate the noisiest hour. The calculated peak hour noise levels provided in Table 4-2 were determined using the measured levels. The "Difference" field in the table shows the difference between the noise level during the time of the measurement and the noisiest hour at the site. The calculated Leq is the peak hour noise level used to measure the increase in noise level before and after the project. The calculated Leq were obtained by comparing the short-term readings to each other and the closest 24 hour measurement. The off-set between the short-term measurement and the 24-hour at the time of the measurement at the short-term was added to the peak noise level measured at the 24-hour sites, to calculated the peak hour noise level at the short-term measurement sites, after factors such as excess noise from wind effects were accounted for as part of the short-term measurements. The calculated Leq's range from 40 dB(A) to 55 dB(A), the lower range is for receivers on local, paved or gravel roadways used only to access the homes in between the north and south cross streets. The higher levels are for receivers closer to, but still over 800 feet away from higher volume paved roadways.

Table 4-1. TNM Model Validation

Noise Receptor Site	Measurement	Dominate Roadway	Measured Leq	Modeled Leq	Difference
1	1	I-55	68	68	0
1	2	I-55	67	68	-1
2	1	I-55	68	69	-1
2	2	I-55	67	68	-1
3	1	IL-129	56	55	1
3	2	IL-129	55	53	2
4	1	I-55	66	67	-1
4	2	I-55	66	67	-1
7	1	Widows Road	55	55	0
8	1	River Road	47	45	2
9	1	River Road	46	46	0
10	1	IL-53	62	61	1
19	1	Wilmington/Peotone Road	56	53	3
21	1	US 45	59	60	-1
23	1	I-57	59	58	1
23	2	I-57	59	57	2
24	1	I-57	52	52	0
24	2	I-57	52	53	-1
31	1	Dixie Highway	64	63	1
31	2	Dixie Highway	64	63	1
37	1	US 41	62	60	2
38	1	US 41	59	57	2
43	1	Grant Road	43	43	0
46	1	I-65	54	56	-2
46	2	I-65	56	57	-1
47	1	I-65	57	54	3

Table 4-2. Field Noise Measurements at Locations without Dominate Traffic Noise

Noise Receptor Site	Measurement	Closest Roadway	Measured L_{eq}	Calculated Worst Hour L_{eq}	Difference
5	1	Widows Road	56	54	-2
6	1	Widows Road	44	45	1
6	2	Widows Road	45	45	0
M11	1	Widows Road	44	46	2
M11	2	Widows Road	44	46	2
M72	1	Widows Road	46	46	0
M72	2	Widows Road	46	46	0
11	1	IL-53	47	50	3
12	1	Riley Road	51	50	-1
12	2	Riley Road	55	50	-5
13	1	Indian Trail	51	50	-1
14	1	Chicago Road	55	50	-5
15	1	Symerton Road	55	50	-5
15	2	Symerton Road	41	50	9
16	24-Hour	Warner Bridge Road	54	54	0
17	1	Tulley Road	45	50	+5
18	1	Cedar Road	52	50	-2
20	1	120th Avenue	49	50	1
20	2	120th Avenue	47	50	3
22	1	104th Avenue	54	55	1
22	2	104th Avenue	58	55	-3
25	1	Kennedy Road	39	45	6
26	1	Drecksler Road	49	55	+6
27	24-Hour	Egyptian Trails Road	53	55	2
28	1	Will Center Road	49	55	6
29	1	Kedizie Avenue	45	50	5
30	1	Western Avenue	47	50	6
32	1	Cottage Grove Avenue	47	50	6
33	1	Yates Avenue	42	45	3
34	1	State Line Road	48	50	2
35	1	Sheffield Avenue	37	40	3
36	1	White Oak Avenue	35	40	5
39	1	Parrish Avenue	43	45	2
40	24-Hour	Morse Street	52	52	0
41	1	Mount Street	44	45	1
42	1	Hendricks Street	51	50	-1
44	1	163rd Avenue	41	45	4
45	1	Broadway Street	42	45	3
45	2	Broadway Street	44	45	1

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5.0 Noise Analysis Methodology

FHWA approved TNM 2.5 was used to model the 116 receptors located within 800 feet of the edge of pavement for all roadway improvements identified for competition of the proposed project. Noise level predictions are the first step in identify potential noise impacts and studying potential abatement strategies. Traffic levels for existing (2013) and future (2040) were used to predict the existing and build worst noise hour levels.

The TNM model inputs include: traffic volume, traffic mix (cars, heavy trucks and medium trucks), receptor locations, elevations, and average vehicle travel speeds during free flowing conditions. Sources for the information used for the noise analysis are described below.

5.1 Traffic Volumes

FHWA policy states that the worst-hour traffic noise levels are typically generated under design hourly volumes, which is generally when traffic is operating under LOS 'D' for Indiana and LOS 'C' for Illinois. The IDOT web site was used to obtain existing (2013) traffic information (http://idot.ms2soft.com/tcds/tsearch.asp?loc=Idot&mod=TCDS). The traffic numbers used are as follows:

- I-55, I-57, I-65, and the Illiana Corridor – 10 percent of the average daily traffic (ADT) for each section as defined in the Traffic Report prepared by Parsons Brinckerhoff (November 2013)
- Other major local roadways (with ADT above 4,000 vehicles) volumes: 10 percent of the ADT
- Other local roadways (with ADT between 1,000 and 4,000 vehicles) volumes: 6 percent of the ADT

5.2 Traffic Composition

The mix of vehicles types for TNM input, included cars, medium trucks and heavy trucks. Traffic mix for the existing roadway in Illinois was taken from the peak hour levels for each roadway as found on the IDOT web site: (http://idot.ms2soft.com/tcds/tsearch.asp?loc=Idot&mod=TCDS). For roadways in Indiana the existing traffic mix was taken from the traffic counts taken during the noise measurements.

Vehicles for the proposed project roadways were taken from the Traffic Report prepared by Parsons Brinckerhoff (November 2013).

5.3 Receptor Locations and Elevation

Noise receptor locations were chosen by aerial mapping and verified in the field. Fifteen (15) of these receptor sites are representative of a larger area consisting of multiple residential properties with the following assumptions used in the analysis:

Illinois

- Sites 8, 9, M12, and M13 represent 42 homes in the City of Wilmington.
- Site M11 and M72 represent both single family homes that are also considered Section 4(f) property because they are historic properties.
- Sites 15 and M25 represent the six homes in Symerton between Symerton Road and the Wauponsee Glacial Trail and Site M75 represents the Wauponsee Glacial Trail.
- Site 24 represents the seven condominiums on Oriole Drive, east of I-57.

Indiana

- At the intersection of White Oak Avenue and the Corridor, Sites 36 and M48 represent the five homes north of the project and west of White Oak Avenue.
- Sites M50 and M51 represent the three homes south of the project and west of White Oak Avenue.
- Site M64 represents the three homes between the project and 163 Road, between SR 55 and Hamilton Road.
- Sites M67, 44, and M68 represent the group of 12 homes south of 163 Road between Harrison and Broadway Streets.

All other receptor sites modeled represent a single property. Elevation for receptors and existing roadways were obtained from a 3D geographic information system (GIS) terrain map. The terrain map was created using LIDAR contours for Will County and US Geological Survey (USGS) digital terrain models for Lake County.

5.4 Speed Conditions

The post speed on for each existing roadway was used for the input into the TNM model. The post speed for the proposed roadway will be 65 miles per hour (MPH) for all cars and trucks.

6.0 TNM Results

The results of the TNM noise modeling are shown below for each alternative and IL-53 interchange design options. Tables A-1 to A-18 in Appendix A provide a summary of existing/No-Action and predicted worst-case noise levels for each build alternative and the six IL-53 interchange design options.

6.1 Alternative 1

6.1.1 Alternative 1 Design Option 2

Noise levels with Alternative 1 Design Option 2 will range from 51 to 73 dB(A). Noise levels are predicted to approach or exceed the NAC at 22 sites, with impacts reported at 13 sites in Illinois and nine sites in Indiana. Of the sites that approach or exceed the NAC, four sites in Illinois and seven sites in Indiana will experience a substantial noise level increase. Moreover, at 10 sites in Illinois, the noise levels will be below the NAC but will increase by more than 14 dB(A), while nine sites in Indiana will be below the NAC but will experience noise increase of 15 dB(A) or more. Within the project study corridor under this alternative a grand total of 41 noise impacts are projected to occur with 23 impacts identified in Illinois and 18 in Indiana. Table A-1 provides a summary of existing, no-build, build predicted noise levels and impact assessment evaluation completed for this proposed design alignment option.

6.1.2 Alternative 1 Design Option 3

Noise levels with Alternative 1 Design Option 3 will range from 51 to 73 dB(A). Noise levels are predicted to approach or exceed the NAC at 22 sites, with impacts reported at 13 sites in Illinois and nine sites in Indiana. Of the sites that approach or exceed the NAC, four sites in Illinois and seven sites in Indiana will experience a substantial noise level increase. Moreover, at 11 sites in Illinois, the noise levels will be below the NAC but will increase by more than 14 dB(A), while nine sites in Indiana will be below the NAC but will experience a noise increase of 15 dB(A) or more. Within the project study corridor under this alternative a grand total of 42 noise impacts are projected to occur with 24 impacts identified in Illinois and 18 in Indiana. Table A-2 provides a summary of existing, no-build, build predicted noise levels and impact assessment evaluation completed for this proposed design alignment option.

6.1.3 Alternative 1 Design Option 4

Noise levels with Alternative 1 Design Option 4 will range from 51 to 74 dB(A). Noise levels are predicted to be approach or exceed the NAC at 27 sites, with impacts reported at 17 sites in Illinois and 10 sites in Indiana. Of the sites that approach or exceed the NAC, eight sites in Illinois and six sites in Indiana will experience a substantial noise level increase. Moreover, at eight sites in Illinois, the noise levels will be below the NAC but will increase by more than 14 dB(A), while nine sites in Indiana will be below the NAC but will experience a noise increase of 15 dB(A) or more. Within the project study corridor under this alternative a grand total of 44 noise impacts are projected to occur with 25 identified in Illinois and 19 in Indiana. Table A-3 provides a summary of existing, no-build, d build predicted noise levels and impact assessment evaluation completed for this proposed design alignment option.

6.1.4 Alternative 1 Design Option 5

Noise levels with Alternative 1 Design Option 5 will range from 51 to 74 dB(A). Noise levels are predicted to be approach or exceed the NAC at 23 sites, with impacts reported at 14 sites in Illinois and nine sites in Indiana. Of the sites that approach or exceed the NAC, five sites in Illinois and seven sites in Indiana will experience a substantial noise level increase. Moreover, at 10 sites in Illinois, the noise levels will be below the NAC but will increase by more than 14 dB(A), while nine sites in Indiana will be below the NAC but will experience a noise increase of 15 dB(A) or more. Within the project study corridor under this alternative a grand total of 42 noise impacts are projected to occur with 24 impacts identified in Illinois and 18 in Indiana. Table A-4 provides a summary of existing, no-build, build predicted noise levels and impact assessment evaluation completed for this proposed design alignment option.

6.1.5 Alternative 1 Design Option 6

Noise levels with Alternative 1 Design Option 6 will range from 50 to 73 dB(A). Noise level is predicted to be approach or exceed the NAC at 26 sites, with impacts reported at 16 sites in Illinois and 10 sites in Indiana. Of the sites that approach or exceed the NAC, six sites in Illinois and six sites in Indiana will experience a substantial noise level increase. Moreover, at seven sites in Illinois, the noise levels will be below the NAC but will increase by more than 14 dB(A), while nine sites in Indiana will be below the NAC but will experience a noise increase of 15 dB(A) or more. Within the project study corridor under this alternative a grand total of 44 noise impacts are projected to occur with 26 in Illinois and 18 in Indiana. Table A-5 provides a summary of existing, no-build, build predicted noise levels and impact assessment evaluation completed for this proposed design alignment option.

6.2 Alternative 2

6.2.1 Alternative 2 Design Option 2

Noise levels with Alternative 2 Design Option 2 will range from 51 to 73 dB(A). Noise levels are predicted to be approach or exceed the NAC at 23 sites, with impacts reported at 15 sites in Illinois and eight sites in Indiana. Of the sites that approach or exceed the NAC, five sites in Illinois and seven sites in Indiana will experience a substantial noise level increase. Moreover, at nine sites in Illinois, the noise levels will be below the NAC but will increase by more than 14 dB(A), while 11 sites in Indiana will be below the NAC but will experience a noise increase of 15 dB(A) or more. Within the project study corridor under this alternative a grand total of 43 noise impacts are projected to occur with 24 impacts identified in Illinois and 19 in Indiana. Table A-6 provides a summary of existing, no-build, build predicted noise levels and impact assessment evaluation completed for this proposed design alignment option.

6.2.2 Alternative 2 Design Option 3

Noise levels with Alternative 2 Design Option 3 will range from 51 to 73 dB(A). Noise levels are predicted to be approach or exceed the NAC at 24 sites, with impacts reported at 16 sites in Illinois and eight sites in Indiana. Of the sites that approach or exceed the NAC, six sites in Illinois and seven sites in Indiana will experience a substantial noise level increase. Moreover, at nine sites in Illinois, the noise levels will be below the NAC but will increase by more than 14 dB(A), while 11 sites in Indiana will be below the NAC but will experience a noise increase of 15 dB(A) or more. Within the project study corridor under this alternative a grand total of 44 noise impacts are projected to occur with 25 impacts identified in Illinois and 19 in Indiana. Table A-7 provides a summary of existing, no-build, build predicted noise levels and impact assessment evaluation completed for this proposed design alignment option.

6.2.3 Alternative 2 Design Option 4

Noise levels with Alternative 2 Design Option 4 will range from 52 to 73 dB(A). Noise levels are predicted to be approach or exceed the NAC at 24 sites, with impacts reported at 16 sites in Illinois and eight sites in Indiana. Of the sites that approach or exceed the NAC, 6 sites in Illinois and seven sites in Indiana will experience a substantial noise level increase. Moreover, at nine sites in Illinois, the noise levels will be below the NAC but will increase by more than 14 dB(A), while 11 sites in Indiana will be below the NAC but will experience a noise increase of 15 dB(A) or more. Within the project study corridor under this alternative a grand total of 44 noise impacts are projected to occur with 25 in Illinois and 19 in Indiana. Table A-8 provides a summary of existing, no-build, build predicted noise levels and impact assessment evaluation completed for this proposed design alignment option.

6.2.4 Alternative 2 Design Option 5

Noise levels with Alternative 2 Design Option 5 will range from 51 to 73 dB(A). Noise levels are predicted to be approach or exceed the NAC at 22 sites, with impacts reported at 14 sites in Illinois and eight sites in Indiana. Of the sites that approach or exceed the NAC, five sites in Illinois and seven sites in Indiana will experience a substantial noise level increase. Moreover, at 10 sites in Illinois, the noise levels will be below the NAC but will increase by more than 14 dB(A), while 11 sites in Indiana will be below the NAC but will experience a noise increase of 15 dB(A) or more. Within the project study corridor under this alternative a grand total of 43 noise impacts are projected to occur with 24 in Illinois and 19 in Indiana. Table A-9 provides a summary of existing, no-build, build predicted noise levels, and noise impact determination for all the alignment options and impact assessment evaluation completed for this proposed design alignment option.

6.2.5 Alternative 2 Design Option 6

Noise levels with Alternative 2 Design Option 6 will range from 51 to 74 dB(A). Noise level is predicted to be approach or exceed the NAC at 22 sites, with impacts reported at 14 sites in Illinois and eight sites in Indiana. Of the sites that approach or exceed the NAC, five sites in Illinois and seven sites in Indiana will experience a substantial noise level increase. Moreover, at 10 sites in Illinois, the noise levels will be below the NAC but will increase by more than 14 dB(A), while 11 sites in Indiana will be below the NAC but will experience a noise increase of 15 dB(A) or more. Within the project study corridor under this alternative a grand total of 43 noise impacts are projected to occur with 24 in Illinois and 19 in Indiana. Table A-10 provides a summary of existing, no-build, build predicted noise levels and impact assessment evaluation completed for this proposed design alignment option.

6.3 Alternative 3

6.3.1 Alternative 3 Design Option 2

Noise levels with Alternative 3 Design Option 2 will range from 51 to 73 dB(A). Noise level is predicted to be approach or exceed the NAC at 26 sites, with impacts reported at 15 sites in Illinois and 11 sites in Indiana. Of the sites that approach or exceed the NAC, six sites in Illinois and 11 sites in Indiana will experience a substantial noise level increase. Moreover, at seven sites in Illinois, the noise levels will be below the NAC but will increase by more than 14 dB(A), while 10 sites in Indiana will be below the NAC but will experience a noise increase of 15 dB(A) or more. Within the project study corridor under this alternative a grand total of 43 noise impacts are projected to occur with 22 in Illinois and 21 in Indiana. Table A-11 provides a summary of existing, no-build, build predicted noise levels and impact assessment evaluation completed for this proposed design alignment option.

6.3.2 Alternative 3 Design Option 3

Noise levels with Alternative 3 Design Option 3 will range from 52 to 73 dB(A). Noise level is predicted to be approach or exceed the NAC at 26 sites, with impacts reported at 15 sites in Illinois and 11 sites in Indiana. Of the sites that approach or exceed the NAC, six sites in Illinois and 11 sites in Indiana will experience a substantial noise level increase. Moreover, at seven sites in Illinois, the noise levels will be below the NAC but will increase by more than 14 dB(A), while 10 sites in Indiana will be below the NAC but will experience a noise increase of 15 dB(A) or more. Within the project study corridor under this alternative a grand total of 43 noise impacts are projected to occur with 22 in Illinois and 21 in Indiana. Table A-12 provides a summary of existing, no-build, build predicted noise levels and impact assessment evaluation completed for this proposed design alignment option.

6.3.3 Alternative 3 Design Option 4

Noise levels with Alternative 3 design Option 4 will range from 52 to 73 dB(A). Noise level is predicted to be approach or exceed the NAC at 27 sites, with impacts reported at 16 sites in Illinois and 11 sites in Indiana. Of the sites that approach or exceed the NAC, seven sites in Illinois and 11 sites in Indiana will experience a substantial noise level increase. Moreover, at seven sites in Illinois, the noise levels will be below the NAC but will increase by more than 14 dB(A), while 10 sites in Indiana will be below the NAC but will experience a noise increase of 15 dB(A) or more. Within the project study corridor under this alternative a grand total of 44 noise impacts are projected to occur with 23 in

Illinois and 21 in Indiana. Table A-13 provides a summary of existing, no-build, build predicted noise levels and impact assessment evaluation completed for this proposed design alignment option.

6.3.4 Alternative 3 Design Option 5

Noise levels with Alternative 3 Design Option 5 will range from 52 to 74 dB(A). Noise level are predicted to be approach or exceed the NAC at 26 sites, with impacts reported at 15 sites in Illinois and 10 sites in Indiana. Of the sites that approach or exceed the NAC, six sites in Illinois and 10 sites in Indiana will experience a substantial noise level increase. Moreover, at eight sites in Illinois, the noise levels will be below the NAC but will increase by more than 14 dB(A), while 10 sites in Indiana will be below the NAC but will experience a noise increase of 15 dB(A) or more. Within the project study corridor under this alternative a grand total of 43 noise impacts are projected to occur with 23 in Illinois and 20 in Indiana. Table A-14 provides a summary of existing, no-build, build predicted noise levels and impact assessment evaluation completed for this proposed design alignment option.

6.3.5 Alternative 3 Design Option 6

Noise levels with Alternative 3 design Option 6 will range from 52 to 74 dB(A). Noise levels are predicted to be approach or exceed the NAC at 27 sites, with impacts reported at 16 sites in Illinois and 11 sites in Indiana. Of the sites that approach or exceed the NAC, seven sites in Illinois and 11 sites in Indiana will experience a substantial noise level increase. Moreover, at seven sites in Illinois, the noise levels will be below the NAC but will increase by more than 14 dB(A), while 10 sites in Indiana will be below the NAC but will experience a noise increase of 15 dB(A) or more. Within the project study corridor under this alternative a grand total of 44 noise impacts are projected to occur with 23 in Illinois and 21 in Indiana. Table A-15 provides a summary of existing, no-build, build predicted noise levels and impact assessment evaluation completed for this proposed design alignment option.

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7.0 Abatement Analysis

7.1 Abatement Measures

FHWA regulations state that traffic noise abatement should be considered when predicted future traffic noise levels approach or exceed the NAC, or when the predicted build noise levels substantially increase over comparable existing noise levels. There are 18 to 23 receptor sites with Build traffic noise levels that approach or exceed the NAC. Furthermore, an additional 18 to 21 receptor sites are expected to experience a substantial traffic noise increase over existing noise levels. There are several ways to reduce or eliminate traffic noise impacts and these include: traffic system management (TSM) measures, alignment modification, property acquisitions, land use controls, and installation of noise barriers. In most cases, noise barriers provide the most feasible, reasonable, most acoustically effective abatement measure and per IDOT and INDOT Policies, only sound barriers are evaluated for noise mitigation.

Noise barriers were modeled along the right-of-way of each alternative in areas where noise impacts at receptor sites were projected to occur under build conditions. The noise barrier modeling was done to determine if the noise barriers identified in each state, could be designed satisfying the particular requirements governing feasibility and reasonableness as defined in IDOT and INDOT traffic noise abatement policy guidelines. To be acoustically feasible, both DOT's stipulate that a noise barrier must provide a 5 dBA reduction for a majority of the impacted receptors. In Illinois, to be considered reasonable IDOT sets a design goal of requiring a sound barrier to achieve a noise reduction of at least 8 dB(A) at one property. Whereas in Indiana to be considered reasonable, INDOT maintains a noise barrier must achieve a noise reduction of 7 dB(A) at a majority of first row receivers behind a proposed barrier. To be considered reasonable the barrier must not exceed the allowable noise abatement cost per benefited receptor. Both IDOT and INDOT define a benefited receptor as a receptor that achieves a noise reduction of 5 dB(A) or higher. INDOT sets a maximum cost per benefited receptor of $30,000. Whereas in Illinois, the cost per benefited receptor set by IDOT varies and starts as $24,000 but can be as high as $37,000, because consideration of reasonableness factors are applied to adjust the cost. The cost adjustment factors include: (1) the absolute noise level of the benefited receptors before abatement in the design year; (2) the increase between the existing noise level; and (3) the predicted unabated build noise level and if the properties represented by the TNM modeled receptors existed prior to construction of the highway. The dollar adjustment factors added to base value unit barrier cost per benefited receptor are provided in Table 7-1 to Table 7-3.

Table 7-1. IDOT Absolute Noise Level Consideration

Incremental Increase Between Existing Noise Levels and Predicted Build Noise Levels Without Abatement	Dollars Added to Base Value Cost per Benefited Receptor
Less than 5 dB(A)	$0
5 to 9 dB(A)	$1,000
10 to 14 dB(A)	$2,000
15 dB(A) or greater	$4,000

Table 7-2. IDOT Increase in Noise Level Consideration

Predicted Build Noise Level Without Abatement	Dollars Added to Base Value Cost per Benefited Receptor
Less than 70 dB(A)	$0
70 to 74 dB(A)	$1,000
75 to 78 dB(A)	$2,000
80 dB(A) or greater	$4,000

Table 7-3. IDOT New Alignment/Construction Date Consideration

Project is on New Alignment OR the Receptor Existed Prior to the Original Construction of the Highway	Dollars Added to Base Value Cost per Benefited Receptor
No for both	$0
Yes for either	$5,000

7.2 Noise Barrier Analysis

7.2.1 Alternative 1

Noise impacts were identified at 40-42 sites for Alternative 1. Design Option 2 has one less noise impact because the site is located within the proposed interchange right-of-way. Thirty-three (33) noise barriers locations along the right-of-way were identified and modeled. A summary of the Alternative 1 noise abatement analysis findings are provided in Table 7-4 and it shows that none of the 33 sound barriers evaluated were found to be feasible and reasonable. The abatement analysis findings indicate that at 21 out of 33 proposed sound barriers modeled, the maximum height and length would not reduce the noise levels enough to satisfy the design goals of the state they are located within. Furthermore, the other 12 proposed sound barriers were found feasible, but the cost of the barriers exceeded the reasonable cost limit.

Table 7-4. Alternative 1 Barrier Analysis

Barrier Number	Receptor Site #	Height [Length] of Barrier Needed for 8 dB(A) Noise Reduction at One Receptor (IDOT) or for 7 dB(A) Noise Reduction Majority of Receptor (INDOT)	Number of Receptor Sites that have a 5 dB(A) Reduction (Benefited Sites)	Total Barrier Cost	Cost per Benefited Receptor	Barrier Analyze Findings
ILLINOIS						
Barrier 1	LR1-LR2	16 [1,405 ft.]	7	$562,000	$80,286	Not Reasonable (Exceeds Cost Limit)
Barrier 2	2	16 [550 ft.]	3	$220,000	$73,333	Not Reasonable (Exceeds Cost Limit)
Barrier 3	M2	22 [705 ft.]	1	$387,750	$387,750	Not Reasonable (Exceeds Cost Limit)
Barrier 4	4	20 [800 ft.]	2	$400,000	$200,000	Not Reasonable (Exceeds Cost Limit)
Barrier 5	1	20 [1,505 ft.]	3	$752,500	$250,833	Not Reasonable (Exceeds Cost Limit)
Barrier 6	M7	14 [930 ft.]	1	$372,000	$372,000	Not Reasonable (Exceeds Cost Limit)
Barrier 7	6	n/a	-	-	-	Barrier not Feasible (Does not meet design goal)
Barrier 8	M71	n/a	-	-	-	Barrier not Feasible (Does not meet design goal)
Barrier 36	7	n/a	-	-	-	Barrier not Feasible (Does not meet design goal)
Barrier 9	M11	n/a	-	-	-	Barrier not Feasible (Does not meet design goal)
Barrier 10	M10-8-M12	n/a	-	-	-	Barrier not Feasible (Does not meet design goal)

Barrier Number	Receptor Site #	Height [Length] of Barrier Needed for 8 dB(A) Noise Reduction at One Receptor (IDOT) or for 7 dB(A) Noise Reduction Majority of Receptor (INDOT)	Number of Receptor Sites that have a 5 dB(A) Reduction (Benefited Sites)	Total Barrier Cost	Cost per Benefited Receptor	Barrier Analyze Findings
Barrier 11	9-M13	n/a	-	-	-	Barrier not Feasible (Does not meet design goal)
Barrier 12	10-M14-M15	n/a	-	-	-	Barrier not Feasible (Does not meet design goal)
Barrier 13	12	n/a	-	-	-	Barrier not Feasible (Does not meet design goal)
Barrier 16	25-M32-M33	n/a	-	-	-	Barrier not Feasible (Does not meet design goal)
Barrier 17	30	n/a	1	-	-	Barrier not Feasible (Does not meet design goal)
Barrier 18	M40	20 [505 ft.]	1	$250,000	$250,000	Not Reasonable (Exceeds Cost Limit)
Barrier 19	31	n/a	-	-	-	Barrier not Feasible (Does not meet design goal)
Barrier 20	M44	n/a	-	-	-	Barrier not Feasible (Does not meet design goal)
Barrier 21	34	22 [805 ft.]	2	$442,750	$221,375	Not Reasonable (Exceeds Cost Limit)
INDIANA						
Barrier 22	M46	n/a	-	-	-	Barrier not Feasible (Does not meet design goal)

Barrier Number	Receptor Site #	Height [Length] of Barrier Needed for 8 dB(A) Noise Reduction at One Receptor (IDOT) or for 7 dB(A) Noise Reduction Majority of Receptor (INDOT)	Number of Receptor Sites that have a 5 dB(A) Reduction (Benefited Sites)	Total Barrier Cost	Cost per Benefited Receptor	Barrier Analyze Findings
Barrier 23	35	n/a	-	-	-	Barrier not Feasible (Does not meet design goal)
Barrier 24	M48-36-M47	24 [4,140 ft.]	7	$2,484,000	$354,857	Not Reasonable (Exceeds Cost Limit)
Barrier 25	M49-M49A	12 [1,185 ft.]	2	$354,000	$177,000	Not Reasonable (Exceeds Cost Limit)
Barrier 26	M50-M51	18 [1,870 ft.]	2	$841,500	$420,750	Not Reasonable (Exceeds Cost Limit)
Barrier 35	M77	n/a	-	-	-	Barrier not Feasible (Does not meet design goal)
Barrier 28	41	n/a	-	-	-	Barrier not Feasible (Does not meet design goal)
Barrier 29	M59	n/a	-	-	-	Barrier not Feasible (Does not meet design goal)
Barrier 30	M60	n/a	-	-	-	Barrier not Feasible (Does not meet design goal)
Barrier 31	43-M64	n/a	-	-	-	Barrier not Feasible (Does not meet design goal)
Barrier 32	M65	n/a	-	-	-	Barrier not Feasible (Does not meet design goal)
Barrier 33	M67-44-M68	22 [2,575 ft.]	12	$1,158,750	$96,563	Not Reasonable (Exceeds Cost Limit)

Barrier Number	Receptor Site #	Height [Length] of Barrier Needed for 8 dB(A) Noise Reduction at One Receptor (IDOT) or for 7 dB(A) Noise Reduction Majority of Receptor (INDOT)	Number of Receptor Sites that have a 5 dB(A) Reduction (Benefited Sites)	Total Barrier Cost	Cost per Benefited Receptor	Barrier Analyze Findings
Barrier 34	45	n/a	-	-	-	Barrier not Feasible (Does not meet design goal)

1-Maximum Height barrier does not meet design goal

7.2.2 Alternative 2

Noise impacts were identified at 39-42 sites for Alternative 2. Design Option 2 has one less noise impact because the site is located within the proposed interchange right-of-way. Thirty-four (34) noise barriers locations along the right-of-way were identified and modeled. A summary of the Alternative 2 noise abatement analysis findings are provided in Table 7-5 and it shows that none of the 34 sound barriers evaluated were found to be feasible and reasonable. The abatement analysis findings indicate that at 19 out of 34 proposed sound barriers modeled, the maximum height and length would not reduce the noise levels enough to satisfy the design goals of the state they are located within. Furthermore the other 15 proposed sound barriers were found feasible, but the cost of the barriers exceeded the reasonable cost limit.

Table 7-5. Alternative 2 Barrier Analysis

Barrier Number	Receptor Site #	Height [Length] of Barrier Needed for 8 dB(A) Noise Reduction at One Receptor (IDOT) or for 7 dB(A) Noise Reduction Majority of Receptor (INDOT)	Number of Receptor Sites that have a 5 dB(A) Reduction (Benefited Sites)	Total Barrier Cost	Cost per Benefited Receptor	Barrier Analyze Findings
ILLINOIS						
Barrier 1	LR1-LR2	16 [1,405 ft.]	7	$562,000	$80,286	Not Reasonable (Exceeds Cost Limit)
Barrier 2	2	16 [550 ft.]	3	$220,000	$73,333	Not Reasonable (Exceeds Cost Limit)
Barrier 3	M2	22 [705 ft.]	1	$387,750	$387,750	Not Reasonable (Exceeds Cost Limit)
Barrier 4	4	20 [800 ft.]	2	$400,000	$200,000	Not Reasonable (Exceeds Cost Limit)
Barrier 5	1	20 [1,505 ft.]	3	$752,500	$250,833	Not Reasonable (Exceeds Cost Limit)
Barrier 6	6	20 [1,905 ft.]	1	$952,500	$952,500	Not Reasonable (Exceeds Cost Limit)

Barrier Number	Receptor Site #	Height [Length] of Barrier Needed for 8 dB(A) Noise Reduction at One Receptor (IDOT) or for 7 dB(A) Noise Reduction Majority of Receptor (INDOT)	Number of Receptor Sites that have a 5 dB(A) Reduction (Benefited Sites)	Total Barrier Cost	Cost per Benefited Receptor	Barrier Analyze Findings
Barrier 7	M8	n/a	-	-	-	Barrier not Feasible (Does not meet design goal)
Barrier 36	7	n/a	-	-	-	Barrier not Feasible (Does not meet design goal)
Barrier 9	M11	n/a	-	-	-	Barrier not Feasible (Does not meet design goal)
Barrier 10	M10-8-M12	n/a	-	-	-	Barrier not Feasible (Does not meet design goal)
Barrier 11	9-M13	n/a	-	-	-	Barrier not Feasible (Does not meet design goal)
Barrier 12	10-M14-M15	n/a	-	-	-	Barrier not Feasible (Does not meet design goal)
Barrier 13	12	n/a	-	-	-	Barrier not Feasible (Does not meet design goal)
Barrier 14	M27	14 [1,100 ft.]	1	$385,000	$385,000	Not Reasonable (Exceeds Cost Limit)

Barrier Number	Receptor Site #	Height [Length] of Barrier Needed for 8 dB(A) Noise Reduction at One Receptor (IDOT) or for 7 dB(A) Noise Reduction Majority of Receptor (INDOT)	Number of Receptor Sites that have a 5 dB(A) Reduction (Benefited Sites)	Total Barrier Cost	Cost per Benefited Receptor	Barrier Analyze Findings
Barrier 15	20	20 [540 ft.]	1	$270,000	$270,000	Not Reasonable (Exceeds Cost Limit)
Barrier 16	25-M32-M33	n/a	-	-	-	Barrier not Feasible (Does not meet design goal)
Barrier 17	30	n/a	-	-	-	Barrier not Feasible (Does not meet design goal)
Barrier 18	M40	20 [505 ft.]	1	$250,000	$250,000	Not Reasonable (Exceeds Cost Limit)
Barrier 19	31	n/a	-	-	-	Barrier not Feasible (Does not meet design goal)
Barrier 20	M44	n/a	-	-	-	Barrier not Feasible (Does not meet design goal)
Barrier 21	34	22 [805 ft.]	2	$442,750	$221,375	Not Reasonable (Exceeds Cost Limit)

Barrier Number	Receptor Site #	Height [Length] of Barrier Needed for 8 dB(A) Noise Reduction at One Receptor (IDOT) or for 7 dB(A) Noise Reduction Majority of Receptor (INDOT)	Number of Receptor Sites that have a 5 dB(A) Reduction (Benefited Sites)	Total Barrier Cost	Cost per Benefited Receptor	Barrier Analyze Findings
INDIANA						
Barrier 22	M46	n/a	-	-	-	Barrier not Feasible (Does not meet design goal)
Barrier 23	35	n/a	-	-	-	Barrier not Feasible (Does not meet design goal)
Barrier 24	M48-36-M47	24 [4,140 ft.]	7	$2,070,000	$295,714	Not Reasonable (Exceeds Cost Limit)
Barrier 25	M49-M49A	12 [1,180 ft.]	2	$354,000	$177,000	Not Reasonable (Exceeds Cost Limit)
Barrier 26	M50-M51	18 [1,870 ft.]	2	$841,500	$420,750	Not Reasonable (Exceeds Cost Limit)
Barrier 35	M77	n/a	-	-	-	Barrier not Feasible (Does not meet design goal)
Barrier 27	39	8 [900 ft.]	2	$180,000	$90,000	Not Reasonable (Exceeds Cost Limit)
Barrier 28	41	n/a	-	-	-	Barrier not Feasible (Does not meet design goal)

Barrier Number	Receptor Site #	Height [Length] of Barrier Needed for 8 dB(A) Noise Reduction at One Receptor (IDOT) or for 7 dB(A) Noise Reduction Majority of Receptor (INDOT)	Number of Receptor Sites that have a 5 dB(A) Reduction (Benefited Sites)	Total Barrier Cost	Cost per Benefited Receptor	Barrier Analyze Findings
Barrier 29	M59	n/a	-	-	-	Barrier not Feasible (Does not meet design goal)
Barrier 30	M60	n/a	-	-	-	Barrier not Feasible (Does not meet design goal)
Barrier 31	43-M64*	24 [1,050 ft.]	2	$210,000	$105,000	Not Reasonable (Exceeds Cost Limit)
Barrier 32	M65	24 [720 ft.]	1	$144,000	$144,000	Not Reasonable (Exceeds Cost Limit)
Barrier 33	M67-44-M68	n/a	-	-	-	Barrier not Feasible (Does not meet design goal)
Barrier 34	45	n/a	-	-	-	Barrier not Feasible (Does not meet design goal)

1-Maximum Height barrier does not meet design goal

7.2.3 Alternative 3

Noise impacts were identified at 41-44 sites for Alternative 3. Design Option 2 has one less noise impact because the site is located within the proposed interchange right-of-way. Thirty-five (35) noise barriers locations along the right-of-way were identified and modeled. A summary of the Alternative 3 noise abatement analysis findings are provided in Table 7-6 and it shows that none of the 35 sound barriers evaluated were found to be feasible and reasonable. The abatement analysis findings indicate that at 19 out of 35 proposed sound barriers modeled, it was found that the maximum height and length would not reduce the noise levels enough to satisfy the design goals of the state they are located within. Furthermore, the other 16 proposed sound barriers were found feasible, but the cost of the barriers exceeded the reasonable cost limit.

Table 7-6. Alternative 3 Barrier Analysis

Barrier Number	Receptor Site #	Height [Length] of Barrier Needed for 8 dB(A) Noise Reduction at One Receptor (IDOT) or for 7 dB(A) Noise Reduction Majority of Receptor (INDOT)	Number of Receptor Sites that have a 5 dB(A) Reduction (Benefited Sites)	Total Barrier Cost	Cost per Benefited Receptor	Barrier Analyze Findings
ILLINOIS						
Barrier 1	LR1-LR2	16 [1,405 ft.]	7	$562,000	$80,286	Not Reasonable (Exceeds Cost Limit)
Barrier 2	2	16 [550 ft.]	3	$220,000	$73,333	Not Reasonable (Exceeds Cost Limit)
Barrier 3	M2	22 [705 ft.]	1	$387,750	$387,750	Not Reasonable (Exceeds Cost Limit)
Barrier 4	4	20 [800 ft.]	2	$400,000	$200,000	Not Reasonable (Exceeds Cost Limit)
Barrier 5	1	20 [1,505 ft.]	3	$752,500	$250,833	Not Reasonable (Exceeds Cost Limit)
Barrier 6	M7	14 [930 ft.]	1	$325,500	$325,500	Not Reasonable (Exceeds Cost Limit)

Barrier Number	Receptor Site #	Height [Length] of Barrier Needed for 8 dB(A) Noise Reduction at One Receptor (IDOT) or for 7 dB(A) Noise Reduction Majority of Receptor (INDOT)	Number of Receptor Sites that have a 5 dB(A) Reduction (Benefited Sites)	Total Barrier Cost	Cost per Benefited Receptor	Barrier Analyze Findings
Barrier 7	6	n/a	-	-	-	Barrier not Feasible (Does not meet design goal)
Barrier 8	M71	n/a	-	-	-	Barrier not Feasible (Does not meet design goal)
Barrier 9	M11	n/a	-	-	-	Barrier not Feasible (Does not meet design goal)
Barrier 10	M10-8-M12	n/a	-	-	-	Barrier not Feasible (Does not meet design goal)
Barrier 11	9-M13	n/a	-	-	-	Barrier not Feasible (Does not meet design goal)
Barrier 12	10-M14-M15	n/a	-	-	-	Barrier not Feasible (Does not meet design goal)
Barrier 13	12	n/a	-	-	-	Barrier not Feasible (Does not meet design goal)
Barrier 14	M27	14 [1,100 ft.]	1	$385,000	$385,000	Not Reasonable (Exceeds Cost Limit)
Barrier 15	20	20 [540 ft.]	1	$270,000	$270,000	Not Reasonable (Exceeds Cost Limit)

Barrier Number	Receptor Site #	Height [Length] of Barrier Needed for 8 dB(A) Noise Reduction at One Receptor (IDOT) or for 7 dB(A) Noise Reduction Majority of Receptor (INDOT)	Number of Receptor Sites that have a 5 dB(A) Reduction (Benefited Sites)	Total Barrier Cost	Cost per Benefited Receptor	Barrier Analyze Findings
Barrier 16	25-M32-M33	n/a	-	-	-	Barrier not Feasible (Does not meet design goal)
Barrier 17	30	n/a	-	-	-	Barrier not Feasible (Does not meet design goal)
Barrier 18	M40	20 [505 ft.]	1	$250,000	$250,000	Not Reasonable (Exceeds Cost Limit)
Barrier 19	31	n/a	-	-	-	Barrier not Feasible (Does not meet design goal)
Barrier 20	M44	n/a	-	-	-	Barrier not Feasible (Does not meet design goal)
Barrier 21	34	22 [805 ft.]	2	$442,750	$221,375	Not Reasonable (Exceeds Cost Limit)
INDIANA						
Barrier 22	M46	n/a	-	-	-	Barrier not Feasible (Does not meet design goal)
Barrier 23	35	n/a	-	-	-	Barrier not Feasible (Does not meet design goal)
Barrier 24	M48-36-M47	24 [4,140 ft.]	7	$2,070,000	$295,714	Not Reasonable (Exceeds Cost Limit)

Barrier Number	Receptor Site #	Height [Length] of Barrier Needed for 8 dB(A) Noise Reduction at One Receptor (IDOT) or for 7 dB(A) Noise Reduction Majority of Receptor (INDOT)	Number of Receptor Sites that have a 5 dB(A) Reduction (Benefited Sites)	Total Barrier Cost	Cost per Benefited Receptor	Barrier Analyze Findings
Barrier 25	M49-M49A	12 [1,180 ft.]	2	$354,000	$177,000	Not Reasonable (Exceeds Cost Limit)
Barrier 26	M50-M51	18 [1,870 ft.]	2	$841,500	$420,750	Not Reasonable (Exceeds Cost Limit)
Barrier 35	M77	n/a	-	-	-	Barrier not Feasible (Does not meet design goal)
Barrier 27	39	8 [900 ft.]	2	$180,000	$90,000	Not Reasonable (Exceeds Cost Limit)
Barrier 28	41	n/a	-	-	-	Barrier not Feasible (Does not meet design goal)
Barrier 29	M59	n/a	-	-	-	Barrier not Feasible (Does not meet design goal)
Barrier 30	M60	n/a	-	-	-	Barrier not Feasible (Does not meet design goal)
Barrier 31	43-M64*	24 [1,050 ft.]	2	$210,000	$105,000	Not Reasonable (Exceeds Cost Limit)
Barrier 32	M65	24 [720 ft.]	1	$144,000	$144,000	Not Reasonable (Exceeds Cost Limit)

Barrier Number	Receptor Site #	Height [Length] of Barrier Needed for 8 dB(A) Noise Reduction at One Receptor (IDOT) or for 7 dB(A) Noise Reduction Majority of Receptor (INDOT)	Number of Receptor Sites that have a 5 dB(A) Reduction (Benefited Sites)	Total Barrier Cost	Cost per Benefited Receptor	Barrier Analyze Findings
Barrier 33	M67-44-M68	n/a	-	-	-	Barrier not Feasible (Does not meet design goal)
Barrier 34	45	n/a	-	-	-	Barrier not Feasible (Does not meet design goal)

1-Maximum Height barrier does not meet design goal

8.0 Construction Noise

Trucks and machinery used for construction produce noise which may impact some land uses and activities during some phases of the construction period depending on the types, duration and distances of each of these activities from the nearest noise sensitive receptors. At varying times during the construction phase of the proposed project, residents living adjacent to the alignment would experience perceptible construction noise. The contractor will be required to implement mitigation measures that will minimize or eliminate construction noise exposure on the adjacent communities. Furthermore, for all construction activities in Illinois, the contractor will be required to comply with IDOT's *Standard Specifications for Road and Bridge Construction* as Article 107.35(IDOT, 2012b) and in Indiana, the INDOT Noise Policy states, "INDOT will be sensitive to local needs and may make adjustments to work practices in order to reduce inconvenience to the public."

8.1 Construction Noise Levels

Trucks and machinery used for construction produce noise which may impact some land uses and activities during the construction period. At varying times, during the construction phase of the proposed project, residents living adjacent to the alignment would experience perceptible construction noise. The contractor will be required to implement mitigation measures that will minimize or eliminate construction noise exposure on the adjacent communities. Furthermore, for all construction activities in Illinois, the contractor will be required to comply with IDOT's *Standard Specifications for Road and Bridge Construction* as Article 107.35 (IDOT, 2012b) and in Indiana, the INDOT Noise Policy states, "INDOT will be sensitive to local needs and may make adjustments to work practices in order to reduce inconvenience to the public."

8.2 Construction Noise Abatement

Typically the construction methods for project implementation are established during the final engineering and preparation of contract plans and specifications. Construction noise mitigation can be accomplished by various methods such as construction staging, sequencing of operations, or alternate construction methods. Construction noise abatement and mitigation will be considered and incorporated into the plans where applicable.

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9.0 Conclusions and Statement of Likelihood

Based on the noise barrier analysis studies completed thus far, no noise barriers were found to satisfy IDOT and INDOT cost and acoustic effectiveness requirements. As such, no noise barriers along any portion of the Illiana Corridor evaluated, as part of this study, were recommended for further consideration. However, the noise abatement analysis findings provided in this report are based upon preliminary highway design plans and profiles. If during final design, the highway design plans have substantially changed, further consideration for abatement may be necessary. Therefore, the final decision on the feasibility and reasonableness of noise barriers will be made upon completion of the project's final design phase and the public involvement processes.

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10.0 Coordination with Local Government Officials

10.1 Noise Levels Predicted for Undeveloped Lands and Zoned Agricultural Lands

Since the predominate land use along the studied alignments in zoned for agricultural uses, the distance to the noise impacts thresholds is required to be provide to local government officials for use in future land use planning. The noise levels will vary depending on the distance between the edge of pavement of the roadway and the final right-of-way line for the alignment.

10.2 Noise Compatible Land Use Planning Information

Because the land use in the project area includes areas of undeveloped open space and farm land, it is possible these areas may be developed in the future. When considering future land use zoning and development along the project alignment, NAC level for activity categories B and C could be exceed up to 250 feet from the edge of pavement, and the NAC for Activity Category E, could be exceed up to 150 feet from the edge of pavement. The noise levels at the right-of-way lines will be between 66 dB(A) to 74 dB(A). Copies of the letters send to local officials are contained in Appendix C.

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Appendix A

TNM Results

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Table A-1. Noise Impact Summary – Alternative 1 Design Option 2

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No-Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
LR1	B	3	72	72	73	1	NAC
LR2	B	3	70	70	73	3	NAC
LR3	B	4	61	61	62	1	None
1	B	3	69	69	69	0	NAC
M1	B	1	61	61	65	4	None
2	B	3	70	70	73	3	NAC
M2	B	1	69	69	72	2	NAC
4	B	2	68	68	72	4	NAC
3	B	1	60	60	59	-1	None
M3	B	1	62	62	64	2	None
M4	B	1	59	59	63	4	None
M5	B	1	59	59	61	2	None
5	B	1	54	54	59	7	None
M6	B	1	54	54	57	3	None
M7	B	1	47	47	68	21	NAC/SI
6	B	1	45	45	62	17	SI
M8	B	1	45	45	56	11	None
M9	B	1	45	45	52	7	None
M70	B	1	57	57	60	3	None
M71	B	1	60	60	65	5	None
7	B	1	62	62	67	5	NAC
M10	B	1	46	46	62	16	SI
M11	B	1	46	46	65	19	SI
M72	B	1	46	46	55	9	None
M73	B	1	46	46	53	9	None
8	B	5	46	46	61	15	SI
M12	B	3	46	46	59	13	None
9	B	1	46	46	65	19	NAC/SI
M13	B	3	44	44	64	20	SI

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No-Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
10	B	2	64	64	67	3	NAC
M14	B	2	64	64	65	1	None
M15	B	1	64	64	62	8	None
M16	B	2	54	54	57	5	None
M17	B	2	52	52	54	2	None
11	B	7	52	52	56	6	None
M18	B	2	50	50	55	5	None
12	B	1	50	50	Site in ROW	NA	NAI
M19	B	1	50	50	56	6	None
M20	B	1	50	50	51	1	None
M74	B	4	50	50	51	1	None
M21	B	1	50	50	59	9	None
M22	B	1	50	50	62	12	None
M23	B	1	50	50	64	14	None
13	B	1	50	50	64	14	None
14	B	1	50	50	52	2	None
M24	B	1	50	50	55	5	None
M25	B	1	50	50	54	4	None
15	B	1	50	50	54	4	None
M75	C	1	50	50	54	54	None
M26	B	1	50	50	56	6	None
16	B	1	54	54	59	5	None
17	B	1	50	50	58	8	None
M27	B	1	50	50	66	16	NAC/SI
M76	B	1	50	50	52	2	None
M28	B	1	52	52	58	6	None
19	B	1	56	56	56	0	None
20	B	1	50	50	70	20	NAC, SI
21	B	1	65	65	65	0	None
M29	B	1	58	58	58	0	None

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No-Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
22	B	2	55	55	63	7	None
M30	B	2	55	55	64	9	None
23	B	1	58	58	62	4	None
M31	B	1	60	60	60	0	None
24	B	4	55	55	55	0	None
M32	B	1	45	45	60	15	SI
M33	B	1	45	45	63	18	SI
25	B	2	45	45	63	18	SI
26	B	1	55	55	63	8	None
M34	B	1	55	55	65	10	None
M35	B	1	55	55	57	2	None
M36	B	1	55	55	59	4	None
M37	B	1	55	55	60	5	None
27	B	1	55	55	57	2	None
M38	B	1	55	55	65	10	None
29	B	1	55	55	56	1	None
30	B	1	50	50	71	21	NAC, SI
M39	B	1	50	50	64	14	None
M40	B	1	50	50	69	19	NAC, SI
31	B	1	66	66	67	1	NAC
M41	B	1	49	49	56	7	None
32	B	1	50	50	64	14	None
M42	B	1	50	50	58	8	None
33	B	1	45	45	59	14	None
M43	B	1	45	45	59	14	None
M44	B	1	45	45	60	15	SI
34	B	2	50	50	67	17	NAC, SI
M45	B	1	50	50	62	12	None
M62	B	1	50	50	52	2	None
M46	B	1	40	40	64	24	SI
35	B	1	40	40	58	18	SI
M47	B	1	40	40	60	20	SI

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No-Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
36	B	1	40	40	67	27	SI
M48	B	1	45	45	68	22	NAC, SI
M49	B	1	45	45	65	20	SI
M50	B	1	45	45	64	19	SI
M51	B	1	40	40	61	21	SI
M52	B	1	45	45	59	14	None
M53	B	1	45	45	59	14	None
M54	B	1	45	45	56	11	None
37	B	1	68	68	68	0	NAC
39	B	1	45	45	56	11	None
M55	B	1	45	45	56	11	None
M77	B	1	50	50	67	17	NAC, SI
M56	B	1	50	50	63	11	None
40	B	2	52	52	64	12	None
M57	B	1	55	55	61	6	None
M58	B	1	55	55	65	10	None
41	B	2	45	45	63	18	SI
M59	B	1	45	45	64	19	SI
M60	B	1	45	45	64	19	SI
M61	B	1	50	50	55	5	None
M62	B	1	50	50	62	12	None
42	B	1	50	50	54	4	None
43	B	2	55	55	67	12	NAC
M63	B	1	55	55	58	3	None
M64	B	2	45	45	67	22	NAC, SI
M65	B	1	45	45	68	23	NAC, SI
M66	B	1	45	45	58	13	None
M67	B	2	45	45	66	21	NAC, SI
44	B	2	45	45	63	18	SI
M68	B	3	45	45	65	20	SI
45	B	1	45	45	66	21	NAC, SI

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No-Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
M69	B	1	45	45	59	14	None
46	B	1	61	61	63	1	None
47	B	3	59	59	73	14	NAC, SI

1 – None = No Impact, NAC = Approaching or Existing Noise Abatement Criteria, SI= Substantial Increase

Source: Parsons Brinckerhoff, 2013

Table A-2. Noise Impact Summary – Alternative 1 Design Option 3

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No-Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
LR1	B	3	72	72	73	1	NAC
LR2	B	3	70	70	73	3	NAC
LR3	B	4	61	61	62	1	None
1	B	3	69	69	69	0	NAC
M1	B	1	61	61	65	4	None
2	B	3	70	70	73	3	NAC
M2	B	1	69	69	72	2	NAC
4	B	2	68	68	72	4	NAC
3	B	1	60	60	59	-1	None
M3	B	1	62	62	64	2	None
M4	B	1	59	59	63	4	None
M5	B	1	59	59	61	2	None
5	B	1	54	54	59	6	None
M6	B	1	54	54	57	3	None
M7	B	1	47	47	68	21	NAC/SI
6	B	1	45	45	62	17	SI
M8	B	1	45	45	56	11	None
M9	B	1	45	45	52	7	None
M70	B	1	57	57	60	3	None
M71	B	1	60	60	65	5	None
7	B	1	62	62	67	5	NAC
M10	B	1	46	46	62	16	SI
M11	B	1	46	46	65	19	SI
M72	B	1	46	46	55	9	None
M73	B	1	46	46	53	7	None
8	B	5	46	46	61	15	SI
M12	B	3	46	46	59	13	None
9	B	1	46	46	65	19	NAC/SI
M13	B	3	44	44	64	20	SI
10	B	2	64	64	67	3	NAC
M14	B	2	64	64	65	1	None
M15	B	1	54	54	62	8	None
M16	B	2	54	54	57	5	None
M17	B	2	52	52	54	2	None

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No-Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
11	B	7	52	52	56	4	None
M18	B	2	50	50	55	5	None
12	B	1	50	50	65	15	NAC
M19	B	1	50	50	56	6	None
M20	B	1	50	50	53	3	None
M74	B	4	50	50	51	1	None
M21	B	1	50	50	59	9	None
M22	B	1	50	50	62	12	None
M23	B	1	50	50	64	14	None
13	B	1	50	50	64	14	None
14	B	1	50	50	52	2	None
M24	B	1	50	50	55	5	None
M25	B	1	50	50	54	4	None
15	B	1	50	50	54	4	None
M75	C	1	50	50	54	54	None
M26	B	1	50	50	56	6	None
16	B	1	54	54	59	5	None
17	B	1	50	50	58	8	None
M27	B	1	50	50	66	16	NAC/SI
M76	B	1	50	50	52	2	None
M28	B	1	52	52	58	6	None
19	B	1	56	56	56	0	None
20	B	1	50	50	70	20	NAC, SI
21	B	1	65	65	65	0	None
M29	B	1	58	58	58	0	None
22	B	2	55	55	63	7	None
M30	B	2	55	55	64	9	None
23	B	1	58	58	62	4	None
M31	B	1	60	60	60	0	None
24	B	4	55	55	55	0	None
M32	B	1	45	45	60	15	SI
M33	B	1	45	45	63	18	SI
25	B	2	45	45	63	18	SI
26	B	1	55	55	63	8	None
M34	B	1	55	55	65	10	None

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No-Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
M35	B	1	55	55	57	2	None
M36	B	1	55	55	59	4	None
M37	B	1	55	55	60	5	None
27	B	1	55	55	57	2	None
M38	B	1	55	55	65	10	None
29	B	1	55	55	56	1	None
30	B	1	50	50	71	21	NAC, SI
M39	B	1	50	50	64	14	None
M40	B	1	50	50	69	19	NAC, SI
31	B	1	66	66	67	1	NAC
M41	B	1	49	49	56	7	None
32	B	1	50	50	64	14	None
M42	B	1	50	50	58	8	None
33	B	1	45	45	59	14	None
M43	B	1	45	45	59	14	None
M44	B	1	45	45	60	15	SI
34	B	2	50	50	67	17	NAC, SI
M45	B	1	50	50	62	12	None
M62	B	1	50	50	52	2	None
M46	B	1	40	40	64	24	SI
35	B	1	40	40	58	18	SI
M47	B	1	40	40	60	20	SI
36	B	1	40	40	67	27	SI
M48	B	1	45	45	68	22	NAC, SI
M49	B	1	45	45	65	20	SI
M50	B	1	45	45	64	19	SI
M51	B	1	40	40	61	21	SI
M52	B	1	45	45	59	14	None
M53	B	1	45	45	59	14	None
M54	B	1	45	45	56	11	None
37	B	1	68	68	68	0	NAC
39	B	1	45	45	56	11	None
M55	B	1	45	45	56	11	None
M77	B	1	50	50	67	17	NAC, SI
M56	B	1	50	50	63	11	None

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No-Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
40	B	2	52	52	64	12	None
M57	B	1	55	55	61	6	None
M58	B	1	55	55	65	10	None
41	B	2	45	45	63	18	SI
M59	B	1	45	45	64	19	SI
M60	B	1	45	45	64	19	SI
M61	B	1	50	50	55	5	None
M62	B	1	50	50	62	12	None
42	B	1	50	50	54	4	None
43	B	2	55	55	67	12	NAC
M63	B	1	55	55	58	3	None
M64	B	2	45	45	67	22	NAC, SI
M65	B	1	45	45	68	23	NAC, SI
M66	B	1	45	45	58	13	None
M67	B	2	45	45	66	21	NAC, SI
44	B	2	45	45	63	18	SI
M68	B	3	45	45	65	20	SI
45	B	1	45	45	66	21	NAC, SI
M69	B	1	45	45	59	14	None
46	B	1	61	61	63	1	None
47	B	3	59	59	73	14	NAC, SI

1 – None = No Impact, NAC = Approaching or Existing Noise Abatement Criteria, SI= Substantial Increase

Source: Parsons Brinckerhoff, 2013

Table A-3. Noise Impact Summary – Alternative 1 Design Option 4

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No-Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
LR1	B	3	72	72	73	1	NAC
LR2	B	3	70	70	73	3	NAC
LR3	B	4	61	61	62	1	None
1	B	3	69	69	69	0	NAC
M1	B	1	61	61	65	4	None
2	B	3	70	70	73	3	NAC
M2	B	1	69	69	72	2	NAC
4	B	2	68	68	72	4	NAC
3	B	1	60	60	59	-1	None
M3	B	1	62	62	64	2	None
M4	B	1	59	59	63	4	None
M5	B	1	59	59	61	2	None
5	B	1	54	54	59	5	None
M6	B	1	54	54	57	3	None
M7	B	1	47	47	68	21	NAC/SI
6	B	1	45	45	62	17	None
M8	B	1	45	45	56	11	None
M9	B	1	45	45	52	7	None
M70	B	1	57	57	60	3	None
M71	B	1	60	60	65	5	None
7	B	1	62	62	67	5	NAC
M10	B	1	46	46	62	16	SI
M11	B	1	46	46	65	19	SI
M72	B	1	46	46	55	9	None
M73	B	1	46	46	53	7	None
8	B	5	46	46	61	15	SI
M12	B	3	46	46	59	13	None
9	B	1	46	46	65	19	SI
M13	B	3	44	44	64	20	SI
10	B	2	64	64	67	3	NAC
M14	B	2	64	64	65	1	None
M15	B	1	54	54	63	9	None
M16	B	2	54	54	57	5	None
M17	B	2	52	52	54	2	None

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No-Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
11	B	7	52	52	56	4	None
M18	B	2	50	50	53	3	None
12	B	1	50	50	68	18	NAC/SI
M19	B	1	50	50	58	8	None
M20	B	1	50	50	52	2	None
M74	B	4	50	50	52	2	None
M21	B	1	50	50	59	9	None
M22	B	1	50	50	62	12	None
M23	B	1	50	50	64	14	None
13	B	1	50	50	64	14	None
14	B	1	50	50	52	2	None
M24	B	1	50	50	55	5	None
M25	B	1	50	50	54	4	None
15	B	1	50	50	54	4	None
M75	C	1	50	50	54	54	None
M26	B	1	50	50	56	6	None
16	B	1	54	54	59	5	None
17	B	1	50	50	58	8	None
M27	B	1	50	50	66	16	NAC/SI
M76	B	1	50	50	52	2	None
M28	B	1	52	52	58	6	None
19	B	1	56	56	56	0	None
20	B	1	50	50	70	20	NAC, SI
21	B	1	65	65	65	0	None
M29	B	1	58	58	58	0	None
22	B	2	55	55	63	7	None
M30	B	2	55	55	64	9	None
23	B	1	58	58	62	4	None
M31	B	1	60	60	60	0	None
24	B	4	55	55	55	0	None
M32	B	1	45	45	60	15	SI
M33	B	1	45	45	63	18	SI
25	B	2	45	45	63	18	SI
26	B	1	55	55	63	8	None
M34	B	1	55	55	65	10	None

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No-Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
M35	B	1	55	55	57	2	None
M36	B	1	55	55	59	4	None
M37	B	1	55	55	60	5	None
27	B	1	55	55	57	2	None
M38	B	1	55	55	65	10	None
29	B	1	55	55	56	1	None
30	B	1	50	50	71	21	NAC, SI
M39	B	1	50	50	64	14	None
M40	B	1	50	50	69	19	NAC, SI
31	B	1	66	66	67	1	NAC
M41	B	1	49	49	56	7	None
32	B	1	50	50	64	14	None
M42	B	1	50	50	58	8	None
33	B	1	45	45	59	14	None
M43	B	1	45	45	59	14	None
M44	B	1	45	45	60	15	SI
34	B	2	50	50	67	17	NAC, SI
M45	B	1	50	50	62	12	None
M62	B	1	50	50	52	2	None
M46	B	1	40	40	64	24	SI
35	B	1	40	40	58	18	SI
M47	B	1	40	40	60	20	SI
36	B	1	40	40	67	27	SI
M48	B	1	45	45	68	22	NAC, SI
M49	B	1	45	45	65	20	SI
M50	B	1	45	45	64	19	SI
M51	B	1	40	40	61	21	SI
M52	B	1	45	45	59	14	None
M53	B	1	45	45	59	14	None
M54	B	1	45	45	56	11	None
37	B	1	68	68	68	0	NAC
39	B	1	45	45	56	11	None
M55	B	1	45	45	56	11	None
M77	B	1	50	50	67	17	NAC, SI
M56	B	1	50	50	63	11	None

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No-Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
40	B	2	52	52	64	12	None
M57	B	1	55	55	61	6	None
M58	B	1	55	55	65	10	None
41	B	2	45	45	63	18	SI
M59	B	1	45	45	64	19	SI
M60	B	1	45	45	64	19	SI
M61	B	1	50	50	55	5	None
M62	B	1	50	50	62	12	None
42	B	1	50	50	54	4	None
43	B	2	55	55	67	12	NAC
M63	B	1	55	55	58	3	None
M64	B	2	45	45	67	22	NAC, SI
M65	B	1	45	45	68	23	NAC, SI
M66	B	1	45	45	58	13	None
M67	B	2	45	45	66	21	NAC, SI
44	B	2	45	45	63	18	SI
M68	B	3	45	45	65	20	SI
45	B	1	45	45	66	21	NAC, SI
M69	B	1	45	45	59	14	None
46	B	1	61	61	63	1	None
47	B	3	59	59	73	14	NAC, SI

1 – None = No Impact, NAC = Approaching or Existing Noise Abatement Criteria, SI= Substantial Increase

Source: Parsons Brinckerhoff, 2013

Table A-4. Noise Impact Summary – Alternative 1 Design Option 5

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No-Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
LR1	B	3	72	72	73	1	NAC
LR2	B	3	70	70	73	3	NAC
LR3	B	4	61	61	62	1	None
1	B	3	69	69	69	0	NAC
M1	B	1	61	61	65	4	None
2	B	3	70	70	74	4	NAC
M2	B	1	69	69	72	2	NAC
4	B	2	68	68	71	3	NAC
3	B	1	60	60	59	-1	None
M3	B	1	62	62	64	2	None
M4	B	1	59	59	63	4	None
M5	B	1	59	59	61	2	None
5	B	1	54	54	58	5	None
M6	B	1	54	54	56	2	None
M7	B	1	47	47	67	20	NAC/SI
6	B	1	45	45	61	16	SI
M8	B	1	45	45	55	10	None
M9	B	1	45	45	52	7	None
M70	B	1	57	57	59	2	None
M71	B	1	60	60	65	5	None
7	B	1	62	62	67	5	NAC
M10	B	1	46	46	61	15	SI
M11	B	1	46	46	65	19	SI
M72	B	1	46	46	55	9	None
M73	B	1	46	46	53	7	None
8	B	5	46	46	61	15	SI
M12	B	3	46	46	58	12	None
9	B	1	46	46	65	19	NAC/SI
M13	B	3	44	44	63	19	SI
10	B	2	64	64	68	4	NAC
M14	B	2	64	64	65	1	None
M15	B	1	54	54	63	9	None
M16	B	2	54	54	57	5	None
M17	B	2	52	52	55	3	None

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No-Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
11	B	7	52	52	57	5	None
M18	B	2	50	50	55	5	None
12	B	1	50	50	67	17	NAC/SI
M19	B	1	50	50	58	8	None
M20	B	1	50	50	52	2	None
M74	B	4	50	50	51	1	None
M21	B	1	50	50	58	8	None
M22	B	1	50	50	62	12	None
M23	B	1	50	50	64	14	None
13	B	1	50	50	63	13	None
14	B	1	50	50	53	3	None
M24	B	1	50	50	55	5	None
M25	B	1	50	50	54	4	None
15	B	1	50	50	54	4	None
M75	C	1	50	50	54	54	None
M26	B	1	50	50	56	6	None
16	B	1	54	54	59	5	None
17	B	1	50	50	58	8	None
M27	B	1	50	50	66	16	NAC/SI
M76	B	1	50	50	52	2	None
M28	B	1	52	52	58	6	None
19	B	1	56	56	56	0	None
20	B	1	50	50	70	20	NAC, SI
21	B	1	65	65	65	0	None
M29	B	1	58	58	58	0	None
22	B	2	55	55	63	7	None
M30	B	2	55	55	64	9	None
23	B	1	58	58	62	4	None
M31	B	1	60	60	60	0	None
24	B	4	55	55	55	0	None
M32	B	1	45	45	60	15	SI
M33	B	1	45	45	63	18	SI
25	B	2	45	45	63	18	SI
26	B	1	55	55	63	8	None
M34	B	1	55	55	65	10	None

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No-Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
M35	B	1	55	55	57	2	None
M36	B	1	55	55	59	4	None
M37	B	1	55	55	60	5	None
27	B	1	55	55	57	2	None
M38	B	1	55	55	65	10	None
29	B	1	55	55	56	1	None
30	B	1	50	50	71	21	NAC, SI
M39	B	1	50	50	64	14	None
M40	B	1	50	50	69	19	NAC, SI
31	B	1	66	66	67	1	NAC
M41	B	1	49	49	56	7	None
32	B	1	50	50	64	14	None
M42	B	1	50	50	58	8	None
33	B	1	45	45	59	14	None
M43	B	1	45	45	59	14	None
M44	B	1	45	45	60	15	SI
34	B	2	50	50	67	17	NAC, SI
M45	B	1	50	50	62	12	None
M62	B	1	50	50	52	2	None
M46	B	1	40	40	64	24	SI
35	B	1	40	40	58	18	SI
M47	B	1	40	40	60	20	SI
36	B	1	40	40	67	27	SI
M48	B	1	45	45	68	22	NAC, SI
M49	B	1	45	45	65	20	SI
M50	B	1	45	45	64	19	SI
M51	B	1	40	40	61	21	SI
M52	B	1	45	45	59	14	None
M53	B	1	45	45	59	14	None
M54	B	1	45	45	56	11	None
37	B	1	68	68	68	0	NAC
39	B	1	45	45	56	11	None
M55	B	1	45	45	56	11	None
M77	B	1	50	50	67	17	NAC, SI
M56	B	1	50	50	63	11	None

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No-Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
40	B	2	52	52	64	12	None
M57	B	1	55	55	61	6	None
M58	B	1	55	55	65	10	None
41	B	2	45	45	63	18	SI
M59	B	1	45	45	64	19	SI
M60	B	1	45	45	64	19	SI
M61	B	1	50	50	55	5	None
M62	B	1	50	50	62	12	None
42	B	1	50	50	54	4	None
43	B	2	55	55	67	12	NAC
M63	B	1	55	55	58	3	None
M64	B	2	45	45	67	22	NAC, SI
M65	B	1	45	45	68	23	NAC, SI
M66	B	1	45	45	58	13	None
M67	B	2	45	45	66	21	NAC, SI
44	B	2	45	45	63	18	SI
M68	B	3	45	45	65	20	SI
45	B	1	45	45	66	21	NAC, SI
M69	B	1	45	45	59	14	None
46	B	1	61	61	63	1	None
47	B	3	59	59	73	14	NAC, SI

1 – None = No Impact, NAC = Approaching or Existing Noise Abatement Criteria, SI= Substantial Increase

Source: Parsons Brinckerhoff, 2013

Table A-5. Noise Impact Summary – Alternative 1 Design Option 6

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No-Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
LR1	B	3	72	72	73	1	NAC
LR2	B	3	70	70	73	3	NAC
LR3	B	4	61	61	62	1	None
1	B	3	69	69	69	0	NAC
M1	B	1	61	61	65	4	None
2	B	3	70	70	73	3	NAC
M2	B	1	69	69	71	2	NAC
4	B	2	68	68	71	3	NAC
3	B	1	60	60	59	-1	None
M3	B	1	62	62	64	2	None
M4	B	1	59	59	63	4	None
M5	B	1	59	59	61	2	None
5	B	1	54	54	57	3	None
M6	B	1	54	54	56	2	None
M7	B	1	47	47	67	20	NAC/SI
6	B	1	45	45	61	16	SI
M8	B	1	45	45	55	10	None
M9	B	1	45	45	52	7	None
M70	B	1	57	57	59	2	None
M71	B	1	60	60	65	5	None
7	B	1	62	62	67	5	NAC
M10	B	1	46	46	61	15	SI
M11	B	1	46	46	65	19	SI
M72	B	1	46	46	54	8	None
M73	B	1	46	46	53	7	None
8	B	5	46	46	60	16	SI
M12	B	3	46	46	58	13	None
9	B	1	46	46	65	19	NAC/SI
M13	B	3	44	44	63	19	SI
10	B	2	64	64	68	3	NAC
M14	B	2	64	64	65	1	None
M15	B	1	54	54	62	8	None
M16	B	2	54	54	56	2	None
M17	B	2	52	52	54	2	None

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No-Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
11	B	7	52	52	55	2	None
M18	B	2	50	50	56	4	None
12	B	1	50	50	67	17	NAC/SI
M19	B	1	50	50	58	8	None
M20	B	1	50	50	52	2	None
M74	B	4	50	50	51	1	None
M21	B	1	50	50	58	8	None
M22	B	1	50	50	62	12	None
M23	B	1	50	50	63	13	None
13	B	1	50	50	63	13	None
14	B	1	50	50	52	2	None
M24	B	1	50	50	55	5	None
M25	B	1	50	50	54	4	None
15	B	1	50	50	54	4	None
M75	C	1	50	50	54	54	None
M26	B	1	50	50	56	6	None
16	B	1	54	54	59	5	None
17	B	1	50	50	58	8	None
M27	B	1	50	50	66	16	NAC/SI
M76	B	1	50	50	52	2	None
M28	B	1	52	52	58	6	None
19	B	1	56	56	56	0	None
20	B	1	50	50	70	20	NAC, SI
21	B	1	65	65	65	0	None
M29	B	1	58	58	58	0	None
22	B	2	55	55	63	7	None
M30	B	2	55	55	64	9	None
23	B	1	58	58	62	4	None
M31	B	1	60	60	60	0	None
24	B	4	55	55	55	0	None
M32	B	1	45	45	60	15	SI
M33	B	1	45	45	63	18	SI
25	B	2	45	45	63	18	SI
26	B	1	55	55	63	8	None
M34	B	1	55	55	65	10	None

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No-Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
M35	B	1	55	55	57	2	None
M36	B	1	55	55	59	4	None
M37	B	1	55	55	60	5	None
27	B	1	55	55	57	2	None
M38	B	1	55	55	65	10	None
29	B	1	55	55	56	1	None
30	B	1	50	50	71	21	NAC, SI
M39	B	1	50	50	64	14	None
M40	B	1	50	50	69	19	NAC, SI
31	B	1	66	66	67	1	NAC
M41	B	1	49	49	56	7	None
32	B	1	50	50	64	14	None
M42	B	1	50	50	58	8	None
33	B	1	45	45	59	14	None
M43	B	1	45	45	59	14	None
M44	B	1	45	45	60	15	SI
34	B	2	50	50	67	17	NAC, SI
M45	B	1	50	50	62	12	None
M62	B	1	50	50	52	2	None
M46	B	1	40	40	64	24	SI
35	B	1	40	40	58	18	SI
M47	B	1	40	40	60	20	SI
36	B	1	40	40	67	27	SI
M48	B	1	45	45	68	22	NAC, SI
M49	B	1	45	45	65	20	SI
M50	B	1	45	45	64	19	SI
M51	B	1	40	40	61	21	SI
M52	B	1	45	45	59	14	None
M53	B	1	45	45	59	14	None
M54	B	1	45	45	56	11	None
37	B	1	68	68	68	0	NAC
39	B	1	45	45	56	11	None
M55	B	1	45	45	56	11	None
M77	B	1	50	50	67	17	NAC, SI
M56	B	1	50	50	63	11	None

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No-Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
40	B	2	52	52	64	12	None
M57	B	1	55	55	61	6	None
M58	B	1	55	55	65	10	None
41	B	2	45	45	63	18	SI
M59	B	1	45	45	64	19	SI
M60	B	1	45	45	64	19	SI
M61	B	1	50	50	55	5	None
M62	B	1	50	50	62	12	None
42	B	1	50	50	54	4	None
43	B	2	55	55	67	12	NAC
M63	B	1	55	55	58	3	None
M64	B	2	45	45	67	22	NAC, SI
M65	B	1	45	45	68	23	NAC, SI
M66	B	1	45	45	58	13	None
M67	B	2	45	45	66	21	NAC, SI
44	B	2	45	45	63	18	SI
M68	B	3	45	45	65	20	SI
45	B	1	45	45	66	21	NAC, SI
M69	B	1	45	45	59	14	None
46	B	1	61	61	63	1	None
47	B	3	59	59	73	14	NAC, SI

1 – None = No Impact, NAC = Approaching or Existing Noise Abatement Criteria, SI= Substantial Increase

Source: Parsons Brinckerhoff, 2013

Table A-6. Noise Impact Summary – Alternative 2 Design Option 2

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No-Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
LR1	B	3	72	72	73	1	NAC
LR2	B	3	70	70	73	3	NAC
LR3	B	4	61	61	62	1	None
1	B	3	69	69	68	-1	NAC
M1	B	1	61	61	65	4	None
2	B	3	70	70	73	3	NAC
M2	B	1	69	69	71	2	NAC
4	B	2	68	68	71	3	NAC
3	B	1	60	60	59	-1	None
M3	B	1	62	62	64	2	None
M4	B	1	59	59	63	4	None
M5	B	1	59	59	61	2	None
5	B	1	54	54	59	5	None
M6	B	1	54	54	57	3	None
M7	B	1	47	47	61	14	None
6	B	1	45	45	68	23	NAC/SI
M8	B	1	45	45	62	17	SI
M9	B	1	45	45	59	14	None
M70	B	1	57	57	58	1	None
M71	B	1	60	60	62	2	None
7	B	1	62	62	69	7	NAC
M10	B	1	46	46	63	17	SI
M11	B	1	46	46	65	19	SI
M72	B	1	46	46	57	11	None
M73	B	1	46	46	55	9	None
8	B	5	46	46	64	28	SI
M12	B	3	46	46	59	13	None
9	B	1	46	46	66	20	NAC/SI
M13	B	3	44	44	64	20	SI
10	B	2	64	64	69	4	NAC
M14	B	2	64	64	67	3	NAC
M15	B	1	54	54	63	9	None
M16	B	2	54	54	58	4	None
M17	B	2	52	52	56	4	None

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No-Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
11	B	7	52	52	56	4	None
M18	B	2	50	50	56	6	None
12	B	1	50	50	NA	NA	None
M19	B	1	50	50	58	8	None
M20	B	1	50	50	53	3	None
M74	B	4	50	50	51	1	None
M21	B	1	50	50	59	9	None
M22	B	1	50	50	62	12	None
M23	B	1	50	50	64	14	None
13	B	1	50	50	63	13	None
14	B	1	50	50	52	2	None
M24	B	1	50	50	55	5	None
M25	B	1	50	50	54	4	None
15	B	1	50	50	54	4	None
M75	C	1	50	50	54	54	None
M26	B	1	50	50	56	6	None
16	B	1	54	54	59	5	None
17	B	1	50	50	58	8	None
M27	B	1	50	50	61	11	None
M76	B	1	50	50	52	2	None
M28	B	1	52	52	60	8	None
19	B	1	56	56	58	2	None
20	B	1	50	50	59	9	None
21	B	1	65	65	65	0	None
M29	B	1	58	58	58	0	None
22	B	2	55	55	56	1	None
M30	B	2	55	55	64	9	None
23	B	1	58	58	62	4	None
M31	B	1	60	60	60	0	None
24	B	4	55	55	57	2	None
M32	B	1	45	45	60	15	SI
M33	B	1	45	45	63	18	SI
25	B	2	45	45	63	18	SI
26	B	1	55	55	63	8	None
M34	B	1	55	55	65	10	None

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No-Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
M35	B	1	55	55	57	2	None
M36	B	1	55	55	59	4	None
M37	B	1	55	55	60	5	None
27	B	1	55	55	57	2	None
M38	B	1	55	55	65	10	None
29	B	1	55	55	56	1	None
30	B	1	50	50	71	21	NAC, SI
M39	B	1	50	50	64	14	None
M40	B	1	50	50	69	19	NAC, SI
31	B	1	66	66	67	1	NAC
M41	B	1	49	49	58	9	None
32	B	1	50	50	62	12	None
M42	B	1	50	50	59	9	None
33	B	1	45	45	58	13	None
M43	B	1	45	45	60	15	SI
M44	B	1	45	45	61	16	SI
34	B	2	50	50	66	16	NAC, SI
M45	B	1	50	50	64	14	None
M62	B	1	50	50	52	2	None
M46	B	1	40	40	63	23	SI
35	B	1	40	40	58	18	SI
M47	B	1	40	40	59	19	SI
36	B	1	40	40	65	25	SI
M48	B	1	45	45	66	21	NAC, SI
M49	B	1	45	45	64	19	SI
M50	B	1	45	45	65	20	SI
M51	B	1	40	40	62	22	SI
M52	B	1	45	45	59	14	None
M53	B	1	45	45	59	14	None
M54	B	1	45	45	60	15	SI
37	B	1	68	68	68	0	NAC
39	B	1	45	45	71	26	SI
M55	B	1	45	45	60	15	SI
M77	B	1	50	50	67	17	NAC, SI
M56	B	1	50	50	62	12	None

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No-Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
40	B	2	52	52	64	12	None
M57	B	1	55	55	61	6	None
M58	B	1	55	55	64	9	None
41	B	2	45	45	63	18	SI
M59	B	1	45	45	64	19	SI
M60	B	1	45	45	64	19	SI
M61	B	1	50	50	53	3	None
M62	B	1	50	50	61	11	None
42	B	1	50	50	57	7	None
43	B	2	55	55	68	13	None
M63	B	1	55	55	60	5	None
M64	B	2	45	45	68	23	NAC, SI
M65	B	1	45	45	69	24	NAC, SI
M66	B	1	45	45	58	13	None
M67	B	2	45	45	68	23	NAC, SI
44	B	2	45	45	62	17	SI
M68	B	3	45	45	64	19	SI
45	B	1	45	45	67	22	NAC, SI
M69	B	1	45	45	59	14	None
46	B	1	61	61	62	1	None
47	B	3	59	59	62	3	None

1 – None = No Impact, NAC = Approaching or Existing Noise Abatement Criteria, SI= Substantial Increase

Source: Parsons Brinckerhoff, 2013

Table A-7. Noise Impact Summary – Alternative 2 Design Option 3

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
LR1	B	3	72	72	73	1	NAC
LR2	B	3	70	70	73	3	NAC
LR3	B	4	61	61	62	1	None
1	B	3	69	69	68	-1	NAC
M1	B	1	61	61	65	4	None
2	B	3	70	70	72	2	NAC
M2	B	1	69	69	71	2	NAC
4	B	2	68	68	71	3	NAC
3	B	1	60	60	59	-1	None
M3	B	1	62	62	64	2	None
M4	B	1	59	59	63	4	None
M5	B	1	59	59	61	2	None
5	B	1	54	54	59	5	None
M6	B	1	54	54	56	2	None
M7	B	1	47	47	61	14	None
6	B	1	45	45	68	23	NAC/SI
M8	B	1	45	45	62	17	SI
M9	B	1	45	45	59	14	None
M70	B	1	57	57	58	1	None
M71	B	1	60	60	62	2	None
7	B	1	62	62	69	7	NAC
M10	B	1	46	46	63	17	SI
M11	B	1	46	46	65	19	SI
M72	B	1	46	46	57	11	None
M73	B	1	46	46	55	9	None
8	B	5	46	46	63	18	SI
M12	B	3	46	46	60	14	None
9	B	1	46	46	67	21	NAC/SI
M13	B	3	44	44	64	20	SI
10	B	2	64	64	70	6	NAC
M14	B	2	64	64	67	3	NAC
M15	B	1	54	54	65	11	None
M16	B	2	54	54	59	5	None
M17	B	2	52	52	57	5	None

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
11	B	7	52	52	57	5	None
M18	B	2	50	50	56	6	None
12	B	1	50	50	67	17	NAC/SI
M19	B	1	50	50	58	8	None
M20	B	1	50	50	53	3	None
M74	B	4	50	50	51	1	None
M21	B	1	50	50	59	9	None
M22	B	1	50	50	62	12	None
M23	B	1	50	50	64	14	None
13	B	1	50	50	64	14	None
14	B	1	50	50	52	2	None
M24	B	1	50	50	55	5	None
M25	B	1	50	50	54	4	None
15	B	1	50	50	54	4	None
M75	C	1	50	50	54	54	None
M26	B	1	50	50	56	6	None
16	B	1	54	54	59	5	None
17	B	1	50	50	58	8	None
M27	B	1	50	50	61	11	None
M76	B	1	50	50	52	2	None
M28	B	1	52	52	60	8	None
19	B	1	56	56	58	2	None
20	B	1	50	50	59	9	None
21	B	1	65	65	65	0	None
M29	B	1	58	58	58	0	None
22	B	2	55	55	56	1	None
M30	B	2	55	55	64	9	None
23	B	1	58	58	62	4	None
M31	B	1	60	60	60	0	None
24	B	4	55	55	57	2	None
M32	B	1	45	45	60	15	SI
M33	B	1	45	45	63	18	SI
25	B	2	45	45	63	18	SI
26	B	1	55	55	63	8	None
M34	B	1	55	55	65	10	None

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
M35	B	1	55	55	57	2	None
M36	B	1	55	55	59	4	None
M37	B	1	55	55	60	5	None
27	B	1	55	55	57	2	None
M38	B	1	55	55	65	10	None
29	B	1	55	55	56	1	None
30	B	1	50	50	71	21	NAC, SI
M39	B	1	50	50	64	14	None
M40	B	1	50	50	69	19	NAC, SI
31	B	1	66	66	67	1	NAC
M41	B	1	49	49	58	9	None
32	B	1	50	50	62	12	None
M42	B	1	50	50	59	9	None
33	B	1	45	45	58	13	None
M43	B	1	45	45	60	15	SI
M44	B	1	45	45	61	16	SI
34	B	2	50	50	66	16	NAC, SI
M45	B	1	50	50	64	14	None
M62	B	1	50	50	52	2	None
M46	B	1	40	40	63	23	SI
35	B	1	40	40	58	18	SI
M47	B	1	40	40	59	19	SI
36	B	1	40	40	65	25	SI
M48	B	1	45	45	66	21	NAC, SI
M49	B	1	45	45	64	19	SI
M50	B	1	45	45	65	20	SI
M51	B	1	40	40	62	22	SI
M52	B	1	45	45	59	14	None
M53	B	1	45	45	59	14	None
M54	B	1	45	45	60	15	SI
37	B	1	68	68	68	0	NAC
39	B	1	45	45	71	26	SI
M55	B	1	45	45	60	15	SI
M77	B	1	50	50	67	17	NAC, SI
M56	B	1	50	50	62	12	None

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
40	B	2	52	52	64	12	None
M57	B	1	55	55	61	6	None
M58	B	1	55	55	64	9	None
41	B	2	45	45	63	18	SI
M59	B	1	45	45	64	19	SI
M60	B	1	45	45	64	19	SI
M61	B	1	50	50	53	3	None
M62	B	1	50	50	61	11	None
42	B	1	50	50	57	7	None
43	B	2	55	55	68	13	None
M63	B	1	55	55	60	5	None
M64	B	2	45	45	68	23	NAC, SI
M65	B	1	45	45	69	24	NAC, SI
M66	B	1	45	45	58	13	None
M67	B	2	45	45	68	23	NAC, SI
44	B	2	45	45	62	17	SI
M68	B	3	45	45	64	19	SI
45	B	1	45	45	67	22	NAC, SI
M69	B	1	45	45	59	14	None
46	B	1	61	61	62	1	None
47	B	3	59	59	62	3	None

1 – None = No Impact, NAC = Approaching or Existing Noise Abatement Criteria, SI= Substantial Increase

Source: Parsons Brinckerhoff, 2013

Table A-8. Noise Impact Summary – Alternative 2 Design Option 4

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No-Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
LR1	B	3	72	72	73	1	NAC
LR2	B	3	70	70	73	3	NAC
LR3	B	4	61	61	62	1	None
1	B	3	69	69	68	-1	NAC
M1	B	1	61	61	65	4	None
2	B	3	70	70	73	3	NAC
M2	B	1	69	69	71	2	NAC
4	B	2	68	68	71	3	NAC
3	B	1	60	60	59	-1	None
M3	B	1	62	62	64	2	None
M4	B	1	59	59	63	4	None
M5	B	1	59	59	61	2	None
5	B	1	54	54	59	5	None
M6	B	1	54	54	57	3	None
M7	B	1	47	47	61	14	None
6	B	1	45	45	68	23	NAC/SI
M8	B	1	45	45	62	17	SI
M9	B	1	45	45	59	14	None
M70	B	1	57	57	58	1	None
M71	B	1	60	60	62	2	None
7	B	1	62	62	69	7	NAC
M10	B	1	46	46	63	17	SI
M11	B	1	46	46	65	19	SI
M72	B	1	46	46	57	11	None
M73	B	1	46	46	55	9	None
8	B	5	46	46	62	16	SI
M12	B	3	46	46	59	13	None
9	B	1	46	46	66	20	NAC/SI
M13	B	3	44	44	64	20	SI
10	B	2	64	64	69	4	NAC
M14	B	2	64	64	67	3	NAC
M15	B	1	54	54	64	10	None
M16	B	2	54	54	58	4	None
M17	B	2	52	52	56	4	None

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No-Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
11	B	7	52	52	57	5	None
M18	B	2	50	50	55	5	None
12	B	1	50	50	69	19	NAC/SI
M19	B	1	50	50	59	9	None
M20	B	1	50	50	54	4	None
M74	B	4	50	50	52	2	None
M21	B	1	50	50	59	9	None
M22	B	1	50	50	62	12	None
M23	B	1	50	50	64	14	None
13	B	1	50	50	63	13	None
14	B	1	50	50	52	2	None
M24	B	1	50	50	55	5	None
M25	B	1	50	50	54	4	None
15	B	1	50	50	54	4	None
M75	C	1	50	50	54	54	None
M26	B	1	50	50	56	6	None
16	B	1	54	54	59	5	None
17	B	1	50	50	58	8	None
M27	B	1	50	50	60	10	None
M27	B	1	50	50	61	11	None
M76	B	1	50	50	52	2	None
M28	B	1	52	52	60	8	None
19	B	1	56	56	58	2	None
20	B	1	50	50	59	9	None
21	B	1	65	65	65	0	None
M29	B	1	58	58	58	0	None
22	B	2	55	55	56	1	None
M30	B	2	55	55	64	9	None
23	B	1	58	58	62	4	None
M31	B	1	60	60	60	0	None
24	B	4	55	55	57	2	None
M32	B	1	45	45	60	15	SI
M33	B	1	45	45	63	18	SI
25	B	2	45	45	63	18	SI
26	B	1	55	55	63	8	None

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No-Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
M34	B	1	55	55	65	10	None
M35	B	1	55	55	57	2	None
M36	B	1	55	55	59	4	None
M37	B	1	55	55	60	5	None
27	B	1	55	55	57	2	None
M38	B	1	55	55	65	10	None
29	B	1	55	55	56	1	None
30	B	1	50	50	71	21	NAC, SI
M39	B	1	50	50	64	14	None
M40	B	1	50	50	69	19	NAC, SI
31	B	1	66	66	67	1	NAC
M41	B	1	49	49	58	9	None
32	B	1	50	50	62	12	None
M42	B	1	50	50	59	9	None
33	B	1	45	45	58	13	None
M43	B	1	45	45	60	15	SI
M44	B	1	45	45	61	16	SI
34	B	2	50	50	66	16	NAC, SI
M45	B	1	50	50	64	14	None
M62	B	1	50	50	52	2	None
M46	B	1	40	40	63	23	SI
35	B	1	40	40	58	18	SI
M47	B	1	40	40	59	19	SI
36	B	1	40	40	65	25	SI
M48	B	1	45	45	66	21	NAC, SI
M49	B	1	45	45	64	19	SI
M50	B	1	45	45	65	20	SI
M51	B	1	40	40	62	22	SI
M52	B	1	45	45	59	14	None
M53	B	1	45	45	59	14	None
M54	B	1	45	45	60	15	SI
37	B	1	68	68	68	0	NAC
39	B	1	45	45	71	26	SI
M55	B	1	45	45	60	15	SI
M77	B	1	50	50	67	17	NAC, SI

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No-Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
M56	B	1	50	50	62	12	None
40	B	2	52	52	64	12	None
M57	B	1	55	55	61	6	None
M58	B	1	55	55	64	9	None
41	B	2	45	45	63	18	SI
M59	B	1	45	45	64	19	SI
M60	B	1	45	45	64	19	SI
M61	B	1	50	50	53	3	None
M62	B	1	50	50	61	11	None
42	B	1	50	50	57	7	None
43	B	2	55	55	68	13	None
M63	B	1	55	55	60	5	None
M64	B	2	45	45	68	23	NAC, SI
M65	B	1	45	45	69	24	NAC, SI
M66	B	1	45	45	58	13	None
M67	B	2	45	45	68	23	NAC, SI
44	B	2	45	45	62	17	SI
M68	B	3	45	45	64	19	SI
45	B	1	45	45	67	22	NAC, SI
M69	B	1	45	45	59	14	None
46	B	1	61	61	62	1	None
47	B	3	59	59	62	3	None

1 – None = No Impact, NAC = Approaching or Existing Noise Abatement Criteria, SI= Substantial Increase

Source: Parsons Brinckerhoff, 2013

Table A-9. Noise Impact Summary – Alternative 2 Design Option 5

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No-Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
LR1	B	3	72	72	73	1	NAC
LR2	B	3	70	70	73	3	NAC
LR3	B	4	61	61	62	1	None
1	B	3	69	69	69	0	NAC
M1	B	1	61	61	65	4	None
2	B	3	70	70	73	3	NAC
M2	B	1	69	69	71	2	NAC
4	B	2	68	68	71	3	NAC
3	B	1	60	60	59	-1	None
M3	B	1	62	62	64	2	None
M4	B	1	59	59	63	4	None
M5	B	1	59	59	61	2	None
5	B	1	54	54	58	4	None
M6	B	1	54	54	56	2	None
M7	B	1	47	47	60	13	None
6	B	1	45	45	68	23	NAC/SI
M8	B	1	45	45	61	16	SI
M9	B	1	45	45	58	13	None
M70	B	1	57	57	58	1	None
M71	B	1	60	60	62	2	None
7	B	1	62	62	68	6	NAC
M10	B	1	46	46	62	16	SI
M11	B	1	46	46	64	18	SI
M72	B	1	46	46	56	10	None
M73	B	1	46	46	54	8	None
8	B	5	46	46	61	15	SI
M12	B	3	46	46	58	12	None
9	B	1	46	46	65	19	NAC/SI
M13	B	3	44	44	63	19	SI
10	B	2	64	64	68	4	NAC
M14	B	2	64	64	65	1	None
M15	B	1	54	54	62	8	None
M16	B	2	54	54	57	3	None
M17	B	2	52	52	54	2	None

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No-Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
11	B	7	52	52	55	3	None
M18	B	2	50	50	55	5	None
12	B	1	50	50	67	17	NAC/SI
M19	B	1	50	50	61	11	None
M20	B	1	50	50	52	2	None
M74	B	4	50	50	51	1	None
M21	B	1	50	50	58	8	None
M22	B	1	50	50	62	12	None
M23	B	1	50	50	64	14	None
13	B	1	50	50	63	13	None
14	B	1	50	50	53	3	None
M24	B	1	50	50	55	5	None
M25	B	1	50	50	54	5	None
15	B	1	50	50	54	4	None
M75	C	1	50	50	54	54	None
M26	B	1	50	50	56	6	None
16	B	1	54	54	59	5	None
17	B	1	50	50	58	8	None
M27	B	1	50	50	61	11	None
M76	B	1	50	50	52	2	None
M28	B	1	52	52	60	8	None
19	B	1	56	56	58	2	None
20	B	1	50	50	59	9	None
21	B	1	65	65	65	0	None
M29	B	1	58	58	58	0	None
22	B	2	55	55	56	1	None
M30	B	2	55	55	64	9	None
23	B	1	58	58	62	4	None
M31	B	1	60	60	60	0	None
24	B	4	55	55	57	2	None
M32	B	1	45	45	60	15	SI
M33	B	1	45	45	63	18	SI
25	B	2	45	45	63	18	SI
26	B	1	55	55	63	8	None
M34	B	1	55	55	65	10	None

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No-Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
M35	B	1	55	55	57	2	None
M36	B	1	55	55	59	4	None
M37	B	1	55	55	60	5	None
27	B	1	55	55	57	2	None
M38	B	1	55	55	65	10	None
29	B	1	55	55	56	1	None
30	B	1	50	50	71	21	NAC, SI
M39	B	1	50	50	64	14	None
M40	B	1	50	50	69	19	NAC, SI
31	B	1	66	66	67	1	NAC
M41	B	1	49	49	58	9	None
32	B	1	50	50	62	12	None
M42	B	1	50	50	59	9	None
33	B	1	45	45	58	13	None
M43	B	1	45	45	60	15	SI
M44	B	1	45	45	61	16	SI
34	B	2	50	50	66	16	NAC, SI
M45	B	1	50	50	64	14	None
M62	B	1	50	50	52	2	None
M46	B	1	40	40	63	23	SI
35	B	1	40	40	58	18	SI
M47	B	1	40	40	59	19	SI
36	B	1	40	40	65	25	SI
M48	B	1	45	45	66	21	NAC, SI
M49	B	1	45	45	64	19	SI
M50	B	1	45	45	65	20	SI
M51	B	1	40	40	62	22	SI
M52	B	1	45	45	59	14	None
M53	B	1	45	45	59	14	None
M54	B	1	45	45	60	15	SI
37	B	1	68	68	68	0	NAC
39	B	1	45	45	71	26	SI
M55	B	1	45	45	60	15	SI
M77	B	1	50	50	67	17	NAC, SI
M56	B	1	50	50	62	12	None

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No-Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
40	B	2	52	52	64	12	None
M57	B	1	55	55	61	6	None
M58	B	1	55	55	64	9	None
41	B	2	45	45	63	18	SI
M59	B	1	45	45	64	19	SI
M60	B	1	45	45	64	19	SI
M61	B	1	50	50	53	3	None
M62	B	1	50	50	61	11	None
42	B	1	50	50	57	7	None
43	B	2	55	55	68	13	None
M63	B	1	55	55	60	5	None
M64	B	2	45	45	68	23	NAC, SI
M65	B	1	45	45	69	24	NAC, SI
M66	B	1	45	45	58	13	None
M67	B	2	45	45	68	23	NAC, SI
44	B	2	45	45	62	17	SI
M68	B	3	45	45	64	19	SI
45	B	1	45	45	67	22	NAC, SI
M69	B	1	45	45	59	14	None
46	B	1	61	61	62	1	None
47	B	3	59	59	62	3	None

1 – None = No Impact, NAC = Approaching or Existing Noise Abatement Criteria, SI= Substantial Increase

Source: Parsons Brinckerhoff, 2013

Table A-10. Noise Impact Summary – Alternative 2 Design Option 6

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No-Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
LR1	B	3	72	72	73	1	NAC
LR2	B	3	70	70	73	3	NAC
LR3	B	4	61	61	62	1	None
1	B	3	69	69	68	-1	NAC
M1	B	1	61	61	64	3	None
2	B	3	70	70	73	3	NAC
M2	B	1	69	69	71	2	NAC
4	B	2	68	68	71	3	NAC
3	B	1	60	60	59	-1	None
M3	B	1	62	62	64	2	None
M4	B	1	59	59	63	4	None
M5	B	1	59	59	61	2	None
5	B	1	54	54	57	3	None
M6	B	1	54	54	56	2	None
M7	B	1	47	47	60	13	None
6	B	1	45	45	67	22	NAC/SI
M8	B	1	45	45	61	16	SI
M9	B	1	45	45	58	13	None
M70	B	1	57	57	58	1	None
M71	B	1	60	60	62	2	None
7	B	1	62	62	68	6	NAC
M10	B	1	46	46	62	16	SI
M11	B	1	46	46	64	18	SI
M72	B	1	46	46	56	10	None
M73	B	1	46	46	54	8	None
8	B	5	46	46	60	14	None
M12	B	3	46	46	58	12	None
9	B	1	46	46	65	19	NAC/SI
M13	B	3	44	44	63	19	SI
10	B	2	64	64	68	4	NAC
M14	B	2	64	64	65	1	None
M15	B	1	54	54	62	8	None
M16	B	2	54	54	56	2	None
M17	B	2	52	52	54	2	None

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No-Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
11	B	7	52	52	55	3	None
M18	B	2	50	50	54	4	None
12	B	1	50	50	67	17	NAC/SI
M19	B	1	50	50	58	8	None
M20	B	1	50	50	52	2	None
M74	B	4	50	50	51	1	None
M21	B	1	50	50	58	8	None
M22	B	1	50	50	62	12	None
M23	B	1	50	50	64	14	None
13	B	1	50	50	63	13	None
14	B	1	50	50	52	2	None
M24	B	1	50	50	54	4	None
M25	B	1	50	50	54	4	None
15	B	1	50	50	54	4	None
M75	C	1	50	50	54	54	None
M26	B	1	50	50	55	5	None
16	B	1	54	54	58	4	None
17	B	1	50	50	58	8	None
M27	B	1	50	50	61	11	None
M76	B	1	50	50	52	2	None
M28	B	1	52	52	60	8	None
19	B	1	56	56	58	2	None
20	B	1	50	50	59	9	None
21	B	1	65	65	65	0	None
M29	B	1	58	58	58	0	None
22	B	2	55	55	56	1	None
M30	B	2	55	55	64	9	None
23	B	1	58	58	62	4	None
M31	B	1	60	60	60	0	None
24	B	4	55	55	57	2	None
M32	B	1	45	45	60	15	SI
M33	B	1	45	45	63	18	SI
25	B	2	45	45	63	18	SI
26	B	1	55	55	63	8	None
M34	B	1	55	55	65	10	None

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No-Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
M35	B	1	55	55	57	2	None
M36	B	1	55	55	59	4	None
M37	B	1	55	55	60	5	None
27	B	1	55	55	57	2	None
M38	B	1	55	55	65	10	None
29	B	1	55	55	56	1	None
30	B	1	50	50	71	21	NAC, SI
M39	B	1	50	50	64	14	None
M40	B	1	50	50	69	19	NAC, SI
31	B	1	66	66	67	1	NAC
M41	B	1	49	49	58	9	None
32	B	1	50	50	62	12	None
M42	B	1	50	50	59	9	None
33	B	1	45	45	58	13	None
M43	B	1	45	45	60	15	SI
M44	B	1	45	45	61	16	SI
34	B	2	50	50	66	16	NAC, SI
M45	B	1	50	50	64	14	None
M62	B	1	50	50	52	2	None
M46	B	1	40	40	63	23	SI
35	B	1	40	40	58	18	SI
M47	B	1	40	40	59	19	SI
36	B	1	40	40	65	25	SI
M48	B	1	45	45	66	21	NAC, SI
M49	B	1	45	45	64	19	SI
M50	B	1	45	45	65	20	SI
M51	B	1	40	40	62	22	SI
M52	B	1	45	45	59	14	None
M53	B	1	45	45	59	14	None
M54	B	1	45	45	60	15	SI
37	B	1	68	68	68	0	NAC
39	B	1	45	45	71	26	SI
M55	B	1	45	45	60	15	SI
M77	B	1	50	50	67	17	NAC, SI
M56	B	1	50	50	62	12	None

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No-Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
40	B	2	52	52	64	12	None
M57	B	1	55	55	61	6	None
M58	B	1	55	55	64	9	None
41	B	2	45	45	63	18	SI
M59	B	1	45	45	64	19	SI
M60	B	1	45	45	64	19	SI
M61	B	1	50	50	53	3	None
M62	B	1	50	50	61	11	None
42	B	1	50	50	57	7	None
43	B	2	55	55	68	13	None
M63	B	1	55	55	60	5	None
M64	B	2	45	45	68	23	NAC, SI
M65	B	1	45	45	69	24	NAC, SI
M66	B	1	45	45	58	13	None
M67	B	2	45	45	68	23	NAC, SI
44	B	2	45	45	62	17	SI
M68	B	3	45	45	64	19	SI
45	B	1	45	45	67	22	NAC, SI
M69	B	1	45	45	59	14	None
46	B	1	61	61	62	1	None
47	B	3	59	59	62	3	None

1 – None = No Impact, NAC = Approaching or Existing Noise Abatement Criteria, SI= Substantial Increase

Source: Parsons Brinckerhoff, 2013

Table A-11. Noise Impact Summary – Alternative 3 Design Option 2

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No-Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
LR1	B	3	72	72	73	1	NAC
LR2	B	3	70	70	73	3	NAC
LR3	B	4	61	61	62	1	None
1	B	3	69	69	69	0	NAC
M1	B	1	61	61	65	4	None
2	B	3	70	70	73	3	NAC
M2	B	1	69	69	72	3	NAC
4	B	2	68	68	72	4	NAC
3	B	1	60	60	59	-1	None
M3	B	1	62	62	64	2	None
M4	B	1	59	59	63	4	None
M5	B	1	59	59	61	2	None
5	B	1	54	54	59	5	None
M6	B	1	54	54	57	3	None
M7	B	1	47	47	68	23	NAC/SI
6	B	1	45	45	62	17	SI
M8	B	1	45	45	56	11	None
M9	B	1	45	45	52	7	None
M70	B	1	57	57	57	0	None
M71	B	1	60	60	67	7	NAC
7	B	1	62	62	64	2	None
M10	B	1	46	46	61	15	SI
M11	B	1	46	46	63	17	SI
M72	B	1	46	46	58	12	None
M73	B	1	46	46	57	11	None
8	B	5	46	46	66	20	NAC,SI
M12	B	3	46	46	63	17	SI
9	B	1	46	46	NA	NA	NA
M13	B	3	44	44	68	24	NAC,SI
10	B	2	64	64	67	3	NAC
M14	B	2	64	64	65	1	None
M15	B	1	54	54	62	8	None

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No-Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
M16	B	2	54	54	57	3	None
M17	B	2	52	52	54	2	None
11	B	7	52	52	56	4	None
M18	B	2	50	50	55	5	None
12	B	1	50	50	NA	NA	NA
M19	B	1	50	50	55	5	None
M20	B	1	50	50	51	1	None
M74	B	4	50	50	51	1	None
M21	B	1	50	50	59	9	None
M22	B	1	50	50	62	12	None
M23	B	1	50	50	64	14	None
13	B	1	50	50	64	14	None
14	B	1	50	50	52	2	None
M24	B	1	50	50	55	5	None
M25	B	1	50	50	54	4	None
15	B	1	50	50	54	4	None
M75	C	1	50	50	54	54	None
M26	B	1	50	50	56	6	None
16	B	1	54	54	59	5	None
17	B	1	50	50	58	8	None
M27	B	1	50	50	61	11	None
M76	B	1	50	50	52	2	None
M28	B	1	52	52	60	8	None
19	B	1	56	56	58	2	None
20	B	1	50	50	59	9	None
21	B	1	65	65	65	0	None
M29	B	1	58	58	58	0	None
22	B	2	55	55	56	1	None
M30	B	2	55	55	64	9	None
23	B	1	58	58	62	4	None
M31	B	1	60	60	60	0	None
24	B	4	55	55	57	2	None
M32	B	1	45	45	60	15	SI

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No-Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
M33	B	1	45	45	63	18	SI
25	B	2	45	45	63	18	SI
26	B	1	55	55	63	8	None
M34	B	1	55	55	65	10	None
M35	B	1	55	55	57	2	None
M36	B	1	55	55	59	4	None
M37	B	1	55	55	60	5	None
27	B	1	55	55	57	2	None
M38	B	1	55	55	65	10	None
29	B	1	55	55	56	1	None
30	B	1	50	50	71	21	NAC, SI
M39	B	1	50	50	64	14	None
M40	B	1	50	50	69	19	NAC, SI
31	B	1	66	66	67	1	NAC
M41	B	1	49	49	56	7	None
32	B	1	50	50	64	14	None
M42	B	1	50	50	58	8	None
33	B	1	45	45	59	14	None
M43	B	1	45	45	59	14	None
M44	B	1	45	45	60	15	SI
34	B	2	50	50	67	17	NAC, SI
M45	B	1	50	50	62	12	None
M62	B	1	50	50	52	2	None
M46	B	1	40	40	64	24	SI
35	B	1	40	40	58	18	SI
M47	B	1	40	40	60	20	SI
36	B	1	40	40	67	27	NAC, SI
M48	B	1	45	45	68	22	NAC, SI
M49	B	1	45	45	65	19	SI
M50	B	1	45	45	64	19	SI
M51	B	1	40	40	61	21	SI
M52	B	1	45	45	59	14	None
M53	B	1	45	45	59	14	None

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No-Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
M54	B	1	45	45	58	13	None
37	B	1	68	68	68	0	NAC
39	B	1	45	45	71	26	NAC, SI
M55	B	1	45	45	59	14	None
M77	B	1	50	50	67	17	NAC, SI
M56	B	1	50	50	63	13	None
40	B	2	52	52	63	11	None
M57	B	1	55	55	61	6	None
M58	B	1	55	55	65	10	None
41	B	2	45	45	63	18	SI
M59	B	1	45	45	64	19	SI
M60	B	1	45	45	64	19	SI
M61	B	1	50	50	56	6	None
M62	B	1	50	50	62	12	None
42	B	1	50	50	60	10	None
43	B	2	55	55	70	15	NAC, SI
M63	B	1	55	55	61	6	None
M64	B	2	45	45	71	26	NAC, SI
M65	B	1	45	45	71	26	NAC, SI
M66	B	1	45	45	61	16	SI
M67	B	2	45	45	69	24	NAC, SI
44	B	2	45	45	66	19	NAC, SI
M68	B	3	45	45	68	23	NAC, SI
45	B	1	45	45	69	24	NAC, SI
M69	B	1	45	45	62	17	SI
46	B	1	61	61	62	1	None
47	B	3	59	59	60	1	None

1 – None = No Impact, NAC = Approaching or Existing Noise Abatement Criteria, SI= Substantial Increase

Source: Parsons Brinckerhoff, 2013

Table A-12. Noise Impact Summary – Alternative 3 Design Option 3

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No-Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
LR1	B	3	72	72	73	1	NAC
LR2	B	3	70	70	73	3	NAC
LR3	B	4	61	61	62	1	None
1	B	3	69	69	69	0	NAC
M1	B	1	61	61	65	4	None
2	B	3	70	70	73	3	NAC
M2	B	1	69	69	72	3	NAC
4	B	2	68	68	72	4	NAC
3	B	1	60	60	59	-1	None
M3	B	1	62	62	64	2	None
M4	B	1	59	59	63	4	None
M5	B	1	59	59	61	2	None
5	B	1	54	54	59	5	None
M6	B	1	54	54	57	3	None
M7	B	1	47	47	68	23	NAC/SI
6	B	1	45	45	62	17	SI
M8	B	1	45	45	56	11	None
M9	B	1	45	45	52	7	None
M70	B	1	57	57	57	0	None
M71	B	1	60	60	67	7	NAC
7	B	1	62	62	64	2	None
M10	B	1	46	46	61	15	SI
M11	B	1	46	46	63	17	SI
M72	B	1	46	46	58	12	None
M73	B	1	46	46	56	10	None
8	B	5	46	46	66	20	NAC,SI
M12	B	3	46	46	63	17	SI
9	B	1	46	46	NA	NA	NA
M13	B	3	44	44	68	24	NAC,SI
10	B	2	64	64	67	3	NAC
M14	B	2	64	64	65	1	None
M15	B	1	54	54	62	8	None

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No-Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
M16	B	2	54	54	57	3	None
M17	B	2	52	52	54	2	None
11	B	7	52	52	56	4	None
M18	B	2	50	50	55	5	None
12	B	1	50	50	65	15	SI
M19	B	1	50	50	56	6	None
M20	B	1	50	50	53	3	None
M74	B	4	50	50	51	1	None
M21	B	1	50	50	59	9	None
M22	B	1	50	50	62	12	None
M23	B	1	50	50	64	14	None
13	B	1	50	50	63	13	None
14	B	1	50	50	52	2	None
M24	B	1	50	50	55	5	None
M25	B	1	50	50	54	4	None
15	B	1	50	50	54	4	None
M75	C	1	50	50	54	54	None
M26	B	1	50	50	56	6	None
16	B	1	54	54	59	5	None
17	B	1	50	50	58	8	None
M27	B	1	50	50	61	11	None
M76	B	1	50	50	52	2	None
M28	B	1	52	52	60	8	None
19	B	1	56	56	58	2	None
20	B	1	50	50	59	9	None
21	B	1	65	65	65	0	None
M29	B	1	58	58	58	0	None
22	B	2	55	55	56	1	None
M30	B	2	55	55	64	9	None
23	B	1	58	58	62	4	None
M31	B	1	60	60	60	0	None
24	B	4	55	55	57	2	None
M32	B	1	45	45	60	15	SI

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No-Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
M33	B	1	45	45	63	18	SI
25	B	2	45	45	63	18	SI
26	B	1	55	55	63	8	None
M34	B	1	55	55	65	10	None
M35	B	1	55	55	57	2	None
M36	B	1	55	55	59	4	None
M37	B	1	55	55	60	5	None
27	B	1	55	55	57	2	None
M38	B	1	55	55	65	10	None
29	B	1	55	55	56	1	None
30	B	1	50	50	71	21	NAC, SI
M39	B	1	50	50	64	14	None
M40	B	1	50	50	69	19	NAC, SI
31	B	1	66	66	67	1	NAC
M41	B	1	49	49	56	7	None
32	B	1	50	50	64	14	None
M42	B	1	50	50	58	8	None
33	B	1	45	45	59	14	None
M43	B	1	45	45	59	14	None
M44	B	1	45	45	60	15	SI
34	B	2	50	50	67	17	NAC, SI
M45	B	1	50	50	62	12	None
M62	B	1	50	50	52	2	None
M46	B	1	40	40	64	24	SI
35	B	1	40	40	58	18	SI
M47	B	1	40	40	60	20	SI
36	B	1	40	40	67	27	NAC, SI
M48	B	1	45	45	68	22	NAC, SI
M49	B	1	45	45	65	19	SI
M50	B	1	45	45	64	19	SI
M51	B	1	40	40	61	21	SI
M52	B	1	45	45	59	14	None
M53	B	1	45	45	59	14	None

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No-Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
M54	B	1	45	45	58	13	None
37	B	1	68	68	68	0	NAC
39	B	1	45	45	71	26	NAC, SI
M55	B	1	45	45	59	14	None
M77	B	1	50	50	67	17	NAC, SI
M56	B	1	50	50	63	13	None
40	B	2	52	52	63	11	None
M57	B	1	55	55	61	6	None
M58	B	1	55	55	65	10	None
41	B	2	45	45	63	18	SI
M59	B	1	45	45	64	19	SI
M60	B	1	45	45	64	19	SI
M61	B	1	50	50	56	6	None
M62	B	1	50	50	62	12	None
42	B	1	50	50	60	10	None
43	B	2	55	55	70	15	NAC, SI
M63	B	1	55	55	61	6	None
M64	B	2	45	45	71	26	NAC, SI
M65	B	1	45	45	71	26	NAC, SI
M66	B	1	45	45	61	16	SI
M67	B	2	45	45	69	24	NAC, SI
44	B	2	45	45	66	19	NAC, SI
M68	B	3	45	45	68	23	NAC, SI
45	B	1	45	45	69	24	NAC, SI
M69	B	1	45	45	62	17	SI
46	B	1	61	61	62	1	None
47	B	3	59	59	60	1	None

1 – None = No Impact, NAC = Approaching or Existing Noise Abatement Criteria, SI= Substantial Increase

Source: Parsons Brinckerhoff, 2013

Table A-13. Noise Impact Summary – Alternative 3 Design Option 4

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No-Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
LR1	B	3	72	72	73	1	NAC
LR2	B	3	70	70	73	3	NAC
LR3	B	4	61	61	62	1	None
1	B	3	69	69	69	0	NAC
M1	B	1	61	61	65	4	None
2	B	3	70	70	73	3	NAC
M2	B	1	69	69	72	3	NAC
4	B	2	68	68	72	4	NAC
3	B	1	60	60	59	-1	None
M3	B	1	62	62	64	2	None
M4	B	1	59	59	63	4	None
M5	B	1	59	59	61	2	None
5	B	1	54	54	59	5	None
M6	B	1	54	54	57	3	None
M7	B	1	47	47	68	23	NAC/SI
6	B	1	45	45	62	17	SI
M8	B	1	45	45	56	11	None
M9	B	1	45	45	52	8	None
M70	B	1	57	57	57	0	None
M71	B	1	60	60	67	7	NAC
7	B	1	62	62	64	2	None
M10	B	1	46	46	61	15	SI
M11	B	1	46	46	63	17	SI
M72	B	1	46	46	58	12	None
M73	B	1	46	46	56	10	None
8	B	5	46	46	66	20	NAC,SI
M12	B	3	46	46	63	17	SI
9	B	1	46	46	NA	NA	NA
M13	B	3	44	44	68	24	NAC,SI
10	B	2	64	64	67	2	NAC
M14	B	2	64	64	65	1	None
M15	B	1	54	54	63	9	None

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No-Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
M16	B	2	54	54	57	3	None
M17	B	2	52	52	54	2	None
11	B	7	52	52	56	4	None
M18	B	2	50	50	53	3	None
12	B	1	50	50	68	18	NAC,SI
M19	B	1	50	50	58	8	None
M74	B	4	50	50	52	2	None
M20	B	1	50	50	54	4	None
M21	B	1	50	50	59	9	None
M22	B	1	50	50	62	12	None
M23	B	1	50	50	64	14	None
13	B	1	50	50	63	13	None
14	B	1	50	50	52	2	None
M24	B	1	50	50	55	5	None
M25	B	1	50	50	54	4	None
15	B	1	50	50	54	4	None
M75	C	1	50	50	54	54	None
M26	B	1	50	50	56	6	None
16	B	1	54	54	59	5	None
17	B	1	50	50	58	8	None
M27	B	1	50	50	61	11	None
M76	B	1	50	50	52	2	None
M28	B	1	52	52	60	8	None
19	B	1	56	56	58	2	None
20	B	1	50	50	59	9	None
21	B	1	65	65	65	0	None
M29	B	1	58	58	58	0	None
22	B	2	55	55	56	1	None
M30	B	2	55	55	64	9	None
23	B	1	58	58	62	4	None
M31	B	1	60	60	60	0	None
24	B	4	55	55	57	2	None
M32	B	1	45	45	60	15	SI

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No-Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
M33	B	1	45	45	63	18	SI
25	B	2	45	45	63	18	SI
26	B	1	55	55	63	8	None
M34	B	1	55	55	65	10	None
M35	B	1	55	55	57	2	None
M36	B	1	55	55	59	4	None
M37	B	1	55	55	60	5	None
27	B	1	55	55	57	2	None
M38	B	1	55	55	65	10	None
29	B	1	55	55	56	1	None
30	B	1	50	50	71	21	NAC, SI
M39	B	1	50	50	64	14	None
M40	B	1	50	50	69	19	NAC, SI
31	B	1	66	66	67	1	NAC
M41	B	1	49	49	56	7	None
32	B	1	50	50	64	14	None
M42	B	1	50	50	58	8	None
33	B	1	45	45	59	14	None
M43	B	1	45	45	59	14	None
M44	B	1	45	45	60	15	SI
34	B	2	50	50	67	17	NAC, SI
M45	B	1	50	50	62	12	None
M62	B	1	50	50	52	2	None
M46	B	1	40	40	64	24	SI
35	B	1	40	40	58	18	SI
M47	B	1	40	40	60	20	SI
36	B	1	40	40	67	27	NAC, SI
M48	B	1	45	45	68	22	NAC, SI
M49	B	1	45	45	65	19	SI
M50	B	1	45	45	64	19	SI
M51	B	1	40	40	61	21	SI
M52	B	1	45	45	59	14	None
M53	B	1	45	45	59	14	None

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No-Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
M54	B	1	45	45	58	13	None
37	B	1	68	68	68	0	NAC
39	B	1	45	45	71	26	NAC, SI
M55	B	1	45	45	59	14	None
M77	B	1	50	50	67	17	NAC, SI
M56	B	1	50	50	63	13	None
40	B	2	52	52	63	11	None
M57	B	1	55	55	61	6	None
M58	B	1	55	55	65	10	None
41	B	2	45	45	63	18	SI
M59	B	1	45	45	64	19	SI
M60	B	1	45	45	64	19	SI
M61	B	1	50	50	56	6	None
M62	B	1	50	50	62	12	None
42	B	1	50	50	60	10	None
43	B	2	55	55	70	15	NAC, SI
M63	B	1	55	55	61	6	None
M64	B	2	45	45	71	26	NAC, SI
M65	B	1	45	45	71	26	NAC, SI
M66	B	1	45	45	61	16	SI
M67	B	2	45	45	69	24	NAC, SI
44	B	2	45	45	66	19	NAC, SI
M68	B	3	45	45	68	23	NAC, SI
45	B	1	45	45	69	24	NAC, SI
M69	B	1	45	45	62	17	SI
46	B	1	61	61	62	1	None
47	B	3	59	59	60	1	None

1 – None = No Impact, NAC = Approaching or Existing Noise Abatement Criteria, SI= Substantial Increase

Source: Parsons Brinckerhoff, 2013

Table A-14. Noise Impact Summary – Alternative 3 Design Option 5

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No-Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
LR1	B	3	72	72	73	1	NAC
LR2	B	3	70	70	73	3	NAC
LR3	B	4	61	61	62	1	None
1	B	3	69	69	69	0	NAC
M1	B	1	61	61	65	4	None
2	B	3	70	70	73	3	NAC
M2	B	1	69	69	71	2	NAC
4	B	2	68	68	71	3	NAC
3	B	1	60	60	59	-1	None
M3	B	1	62	62	64	2	None
M4	B	1	59	59	63	4	None
M5	B	1	59	59	61	2	None
5	B	1	54	54	58	4	None
M6	B	1	54	54	56	2	None
M7	B	1	47	47	67	22	NAC/SI
6	B	1	45	45	61	16	SI
M8	B	1	45	45	55	10	None
M9	B	1	45	45	52	8	None
M70	B	1	57	57	57	0	None
M71	B	1	60	60	66	6	NAC
7	B	1	62	62	64	2	None
M10	B	1	46	46	60	14	None
M11	B	1	46	46	63	17	SI
M72	B	1	46	46	58	12	None
M73	B	1	46	46	56	10	None
8	B	5	46	46	65	19	SI
M12	B	3	46	46	63	17	SI
9	B	1	46	46	NA	NA	NA
M13	B	3	44	44	67	23	NAC,SI
10	B	2	64	64	68	3	NAC
M14	B	2	64	64	65	1	None
M15	B	1	54	54	63	9	None

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No-Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
M16	B	2	54	54	56	2	None
M17	B	2	52	52	55	3	None
11	B	7	52	52	57	5	None
M18	B	2	50	50	56	6	None
12	B	1	50	50	68	18	NAC,SI
M19	B	1	50	50	59	9	None
M20	B	1	50	50	52	2	None
M21	B	1	50	50	58	8	None
M22	B	1	50	50	62	12	None
M23	B	1	50	50	64	14	None
13	B	1	50	50	63	13	None
14	B	1	50	50	53	3	None
M24	B	1	50	50	55	5	None
M25	B	1	50	50	54	4	None
15	B	1	50	50	54	4	None
M75	C	1	50	50	54	54	None
M26	B	1	50	50	56	6	None
16	B	1	54	54	59	5	None
17	B	1	50	50	58	8	None
M27	B	1	50	50	61	11	None
M76	B	1	50	50	52	2	None
M28	B	1	52	52	60	8	None
19	B	1	56	56	58	2	None
20	B	1	50	50	59	9	None
21	B	1	65	65	65	0	None
M29	B	1	58	58	58	0	None
22	B	2	55	55	56	1	None
M30	B	2	55	55	64	9	None
23	B	1	58	58	62	4	None
M31	B	1	60	60	60	0	None
24	B	4	55	55	57	2	None
M32	B	1	45	45	60	15	SI
M33	B	1	45	45	63	18	SI

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No-Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
25	B	2	45	45	63	18	SI
26	B	1	55	55	63	8	None
M34	B	1	55	55	65	10	None
M35	B	1	55	55	57	2	None
M36	B	1	55	55	59	4	None
M37	B	1	55	55	60	5	None
27	B	1	55	55	57	2	None
M38	B	1	55	55	65	10	None
29	B	1	55	55	56	1	None
30	B	1	50	50	71	21	NAC, SI
M39	B	1	50	50	64	14	None
M40	B	1	50	50	69	19	NAC, SI
31	B	1	66	66	67	1	NAC
M41	B	1	49	49	56	7	None
32	B	1	50	50	64	14	None
M42	B	1	50	50	58	8	None
33	B	1	45	45	59	14	None
M43	B	1	45	45	59	14	None
M44	B	1	45	45	60	15	SI
34	B	2	50	50	67	17	NAC, SI
M45	B	1	50	50	62	12	None
M62	B	1	50	50	52	2	None
M46	B	1	40	40	64	24	SI
35	B	1	40	40	58	18	SI
M47	B	1	40	40	60	20	SI
36	B	1	40	40	67	27	NAC, SI
M48	B	1	45	45	68	22	NAC, SI
M49	B	1	45	45	65	19	SI
M50	B	1	45	45	64	19	SI
M51	B	1	40	40	61	21	SI
M52	B	1	45	45	59	14	None
M53	B	1	45	45	59	14	None
M54	B	1	45	45	58	13	None

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No-Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
37	B	1	68	68	68	0	NAC
39	B	1	45	45	71	26	NAC, SI
M55	B	1	45	45	59	14	None
M77	B	1	50	50	67	17	NAC, SI
M56	B	1	50	50	63	13	None
40	B	2	52	52	63	11	None
M57	B	1	55	55	61	6	None
M58	B	1	55	55	65	10	None
41	B	2	45	45	63	18	SI
M59	B	1	45	45	64	19	SI
M60	B	1	45	45	64	19	SI
M61	B	1	50	50	56	6	None
M62	B	1	50	50	62	12	None
42	B	1	50	50	60	10	None
43	B	2	55	55	70	15	NAC, SI
M63	B	1	55	55	61	6	None
M64	B	2	45	45	71	26	NAC, SI
M65	B	1	45	45	71	26	NAC, SI
M66	B	1	45	45	61	16	SI
M67	B	2	45	45	69	24	NAC, SI
44	B	2	45	45	66	19	NAC, SI
M68	B	3	45	45	68	23	NAC, SI
45	B	1	45	45	69	24	NAC, SI
M69	B	1	45	45	62	17	SI
46	B	1	61	61	62	1	None
47	B	3	59	59	60	1	None

1 – None = No Impact, NAC = Approaching or Existing Noise Abatement Criteria, SI= Substantial Increase

Source: Parsons Brinckerhoff, 2013

Table A-15. Noise Impact Summary – Alternative 3 Design Option 6

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No-Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
LR1	B	3	72	72	73	1	NAC
LR2	B	3	70	70	73	3	NAC
LR3	B	4	61	61	62	1	None
1	B	3	69	69	68	-1	NAC
M1	B	1	61	61	64	3	None
2	B	3	70	70	73	3	NAC
M2	B	1	69	69	71	2	NAC
4	B	2	68	68	71	3	NAC
3	B	1	60	60	59	-1	None
M3	B	1	62	62	64	2	None
M4	B	1	59	59	63	4	None
M5	B	1	59	59	61	2	None
5	B	1	54	54	57	3	None
M6	B	1	54	54	57	3	None
M7	B	1	47	47	67	22	NAC/SI
6	B	1	45	45	61	16	SI
M8	B	1	45	45	55	10	None
M9	B	1	45	45	52	7	None
M70	B	1	57	57	57	0	None
M71	B	1	60	60	66	6	NAC
7	B	1	62	62	64	2	None
M10	B	1	46	46	60	14	None
M11	B	1	46	46	63	17	SI
M72	B	1	46	46	58	12	None
M73	B	1	46	46	56	10	None
8	B	5	46	46	66	20	NAC,SI
M12	B	3	46	46	63	17	NAC,SI
9	B	1	46	46	NA	NA	NA
M13	B	3	44	44	67	23	NAC,SI
10	B	2	64	64	68	4	NAC
M14	B	2	64	64	65	1	None
M15	B	1	54	54	62	8	None

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No-Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
M16	B	2	54	54	56	2	None
M17	B	2	52	52	55	3	None
11	B	7	52	52	55	3	None
M18	B	2	50	50	54	4	None
12	B	1	50	50	67	17	NAC,SI
M19	B	1	50	50	58	8	None
M20	B	1	50	50	52	2	None
M74	B	4	50	50	51	1	None
M21	B	1	50	50	58	8	None
M22	B	1	50	50	62	12	None
M23	B	1	50	50	63	13	None
13	B	1	50	50	63	13	None
14	B	1	50	50	52	2	None
M24	B	1	50	50	54	4	None
M25	B	1	50	50	54	4	None
15	B	1	50	50	54	4	None
M75	C	1	50	50	54	54	None
M26	B	1	50	50	55	5	None
16	B	1	54	54	58	4	None
17	B	1	50	50	58	8	None
M27	B	1	50	50	61	11	None
M76	B	1	50	50	52	2	None
M28	B	1	52	52	60	8	None
19	B	1	56	56	58	2	None
20	B	1	50	50	59	9	None
21	B	1	65	65	65	0	None
M29	B	1	58	58	58	0	None
22	B	2	55	55	56	1	None
M30	B	2	55	55	64	9	None
23	B	1	58	58	62	4	None
M31	B	1	60	60	60	0	None
24	B	4	55	55	57	2	None
M32	B	1	45	45	60	15	SI

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No-Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
M33	B	1	45	45	63	18	SI
25	B	2	45	45	63	18	SI
26	B	1	55	55	63	8	None
M34	B	1	55	55	65	10	None
M35	B	1	55	55	57	2	None
M36	B	1	55	55	59	4	None
M37	B	1	55	55	60	5	None
27	B	1	55	55	57	2	None
M38	B	1	55	55	65	10	None
29	B	1	55	55	56	1	None
30	B	1	50	50	71	21	NAC, SI
M39	B	1	50	50	64	14	None
M40	B	1	50	50	69	19	NAC, SI
31	B	1	66	66	67	1	NAC
M41	B	1	49	49	56	7	None
32	B	1	50	50	64	14	None
M42	B	1	50	50	58	8	None
33	B	1	45	45	59	14	None
M43	B	1	45	45	59	14	None
M44	B	1	45	45	60	15	SI
34	B	2	50	50	67	17	NAC, SI
M45	B	1	50	50	62	12	None
M62	B	1	50	50	52	2	None
M46	B	1	40	40	64	24	SI
35	B	1	40	40	58	18	SI
M47	B	1	40	40	60	20	SI
36	B	1	40	40	67	27	NAC, SI
M48	B	1	45	45	68	22	NAC, SI
M49	B	1	45	45	65	19	SI
M50	B	1	45	45	64	19	SI
M51	B	1	40	40	61	21	SI
M52	B	1	45	45	59	14	None
M53	B	1	45	45	59	14	None

Receptor Location	Activity Category	Number of Represented Receptors	Existing Worst Case Noise level in dB(A)	2040 No-Action Worst Case Noise level in dB(A)	2040 Build Worst Case Noise level in dB(A)	Change in Worst Case Noise Level in dB(A)	Impact Type (None, NAC, SI)[1]
M54	B	1	45	45	58	13	None
37	B	1	68	68	68	0	NAC
39	B	1	45	45	71	26	NAC, SI
M55	B	1	45	45	59	14	None
M77	B	1	50	50	67	17	NAC, SI
M56	B	1	50	50	63	13	None
40	B	2	52	52	63	11	None
M57	B	1	55	55	61	6	None
M58	B	1	55	55	65	10	None
41	B	2	45	45	63	18	SI
M59	B	1	45	45	64	19	SI
M60	B	1	45	45	64	19	SI
M61	B	1	50	50	56	6	None
M62	B	1	50	50	62	12	None
42	B	1	50	50	60	10	None
43	B	2	55	55	70	15	NAC, SI
M63	B	1	55	55	61	6	None
M64	B	2	45	45	71	26	NAC, SI
M65	B	1	45	45	71	26	NAC, SI
M66	B	1	45	45	61	16	SI
M67	B	2	45	45	69	24	NAC, SI
44	B	2	45	45	66	19	NAC, SI
M68	B	3	45	45	68	23	NAC, SI
45	B	1	45	45	69	24	NAC, SI
M69	B	1	45	45	62	17	SI
46	B	1	61	61	62	1	None
47	B	3	59	59	60	1	None

1 – None = No Impact, NAC = Approaching or Existing Noise Abatement Criteria, SI= Substantial Increase

Source: Parsons Brinckerhoff, 2013

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Appendix B

Noise Measurement and Modeling Location Maps
(Available electronically upon request)

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Appendix C

Letters to Local Government Officials (Available electronically upon request)

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