Appendix E – Additional and Updated Studies/Memoranda

E1 - Final Noise Study March 2019

E2 - Environmental Management Plan dated March 29, 2019

E3 - Updated Wetland Two Part Finding dated February 2019

Appendix E1 – Final Noise Study March 2019

I-94 Unbonded Overlay

TRAFFIC NOISE STUDY

Rogers to Maple Grove

I-94 Unbonded Overlay

SP 2780-97

Rogers to Maple Grove, MINNESOTA

Prepared for

Minnesota Department of Transportation

December 2018

HNTB

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1.0 TRAFFIC NOISE STUDY

Introduction

The Minnesota Department of Transportation (MnDOT) is proposing modifications to Interstate 94 (I-94) from Rogers to Maple Grove in Hennepin County. The purpose of the noise analysis is to document the effect of the project on traffic generated noise levels and analyze the possible installation of noise barriers for properties along the project area in order to mitigate noise impacts.

Federal and state funding sources are included in the proposed project. Traffic noise impacts from the project will be evaluated based on Federal Noise Abatement Criteria in conformance with corresponding Federal and State regulations and guidance, and the National Environmental Policy Act (NEPA). This traffic noise analysis was completed consistent with the guidance and requirements described in the *Noise Requirements for MnDOT and other Type I Federal-aid Projects* (effective July 10, 2017).

General Project Description

The I-94 Unbonded Overlay (UBOL) Resurfacing and Brockton Interchange Project (the project) will resurface 9.6 miles of the existing pavement on I-94 between the I-494/I-694 interchange in Maple Grove to Rogers, MN. Resurfacing will be accomplished by placing an unbonded concrete overlay over the existing concrete traffic lanes and over the existing bituminous shoulders. The project also includes the construction of a new interchange to the east of Brockton Lane in the City of Dayton. The new interchange will be a four-lane diverging diamond interchange and include intersection improvements at Brockton Lane on the west and CSAH 81 on the east. Finally, the project will also involve the addition of a new travel lane in both the westbound and eastbound directions of I-94 from TH 610 to TH 101. To accommodate the addition of the eastbound travel lane near TH 101, an additional lane will be added on eastbound I-94 from the end of the exit ramp to TH 101 to the end of the entrance ramp from TH 101.

Other portions of the project include repaving and expanding the truck parking capacity at the Elm Creek Rest Area in Maple Grove; modifying trails and sidewalks within the MnDOT right of way to make them ADA compliant; replacing deficient stormwater management systems; and constructing a commercial vehicle enforcement lane in the westbound direction between CSAH 81 and TH 101 in the City of Rogers. **Figure 1** provides an overview of the project location.

Document Path: N:\61509 - I-94 Maple Grove MN\GIS\MXD\ReceiverMap_Overview_091218.mxd

Author: Jennifer Rybarczyk, HNTB Corporation

Date: 9/14/2018

DEPARTMENT OF TRANSPORTATION

Figure 1 - Traffic Noise Study Overview
I-94 UBOL Resurfacing Maple Grove to Rogers and Brockton Interchange

S.P. 2780-97
MnDOT and City of Dayton, Minnesota

N

0 1 Miles

1 inch = 1 miles

HNTB WSB

Background Information on Noise

Noise is defined as any unwanted sound. Sound travels in a wave motion and is measured as a sound pressure level. This sound pressure level is commonly measured in decibels. Decibels (dB) represent the logarithm of the ratio of a sound energy relative to a reference sound energy. For highway traffic noise, an adjustment, or weighting, of the high-and low-pitched sound is made to approximate the way that an average person hears sound. The adjusted sound levels are stated in units of "A-weighted decibels" (dBA). A sound level increase of 3 dBA is barely noticeable by the human ear, a 5 dBA increase is clearly noticeable, and a 10 dBA increase is heard as twice as loud. For example, if the sound energy is doubled (i.e., the amount of traffic doubles), there is a 3 dBA increase in noise, which is just barely noticeable to most people. On the other hand, if traffic increases by a factor of ten times, the resulting sound level will increase by about 10 dBA and be heard to be twice as loud.

Traffic noise impacts in Minnesota are evaluated by measuring and/or modeling the worst-hour traffic noise levels using the equivalent sound pressure level (Leq) noise descriptor. Leq is defined as the continuous steady sound level that would have the same total A-weighted sound energy as the real fluctuating sound measured over a given period of time.

Factors such as traffic volume, types of vehicles, operating speed, topography, and distance from the road to the receptor influence the traffic noise level at the receptor. The sound level decreases as distance from a source increases. A general rule regarding sound level decrease due to increasing distance from a line source (roadway) that is commonly used is: beyond approximately 50 feet from the sound source, each doubling of distance from the line source over hard ground (such as pavement or water) will reduce the sound level by 3 dBA, whereas each doubling of distance over soft ground (such as vegetated or grassy ground) results in a sound level decrease of 4.5 dBA. **Table 1** provides a rough comparison of the noise levels of common noise sources.

Table 1: Decibel Levels of Common Noise Sources

Sound Pressure Level (dBA)	Noise Source	Source:
140	Jet Engine (at 25 meters)	"A Guide to Noise Control in Minnesota," Minnesota Pollution Control Agency **http://www.pca.state.mn.us/programs/pubs/noise.pdf;** and "Highway Traffic Noise," FHWA, http://www.fhwa.dot.gov/environment/htnoise.htm
130	Jet Aircraft (at 100 meters)	
120	Rock and Roll Concert	
110	Pneumatic Chipper	
100	Jointer/Planer	
90	Chainsaw	
80	Heavy Truck Traffic	
70	Business Office	
60	Conversational Speech	
50	Library	
40	Bedroom	
30	Secluded Woods	
20	Whisper	

Federal Traffic Noise Regulations

The Federal Highway Administration's (FHWA) Procedures for Abatement of Highway Traffic Noise and Construction Noise is presented in the Code of Federal Regulations, Title 23 Part 772 (23 CFR 772). 23 CFR 772 requires the identification of highway traffic noise impacts and the evaluation of potential noise abatement measures, along with other considerations, in conjunction with the planning and design of a Federal-aid highway project. The MnDOT policy for implementation of the requirements of 23 CFR 772 is described in the *Noise Requirements for MnDOT and other Type I Federal-aid Projects* (effective July 10, 2017). The *MnDOT Noise Requirements* apply to all projects that receive Federal-aid funds or projects that are subject to FHWA approval.

A traffic noise impact analysis is required for all Type I Federal-aid projects. Type I projects are defined in 23 CFR 772.5. The proposed project meets the definition of a Type I project due to the addition of an interchange and auxiliary lanes. Therefore, a traffic noise analysis following the requirements of 23 CFR 772 is required for the project.

This regulation established the noise abatement criteria (NAC) for various land uses. Noise abatement measures will be considered when the predicted noise levels approach or exceed those values shown for the appropriate activity category in **Table 2**, or when the predicted traffic noise levels substantially exceed the existing noise levels.

The FHWA defines a traffic noise impact as follows: A traffic noise impact occurs if predicted traffic noise levels approach (defined by MnDOT as within 1 dBA) or exceed the FHWA noise abatement criteria (NAC), or when the predicted traffic noise levels substantially exceed existing noise levels (MnDOT considers an increase of 5 dBA or greater in the L_{eq} a substantial noise level increase). In predicting noise levels and assessing noise impacts, traffic characteristics are used which yield the worst hourly traffic noise impact on a regular basis for the design year.

Table 2: FHWA Noise Abatement Criteria

Activity Category	Activity Criteria L_{eq} (h), dBA (1) (2)	Description of Activity Category
A	57 dBA (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(3)	67 dBA (Exterior)	Residential
C(3)	67 dBA (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 dBA (Interior)	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, pubic meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools and television studios.
E(3) (4)	72 dBA (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)..... L_{eq} (h) shall be used for impact assessment.

(2)..... The L_{eq} (h) Activity Criteria values are for impact determination only, and are not design standards for noise abatement measures.

(3)..... Includes undeveloped lands permitted for this activity category.

(4)..... Hotels and motels that function as apartment buildings are classified under Activity Category B.

Minnesota State Noise Standards

In 2016, the Commissioners of the MPCA and MnDOT agreed that the traffic noise regulations and mitigation requirements from the FHWA are sufficient to determine reasonable mitigation measures for highway noise. By this agreement, existing and newly constructed segments of highway projects under MnDOT's jurisdiction are statutorily exempt from the Minnesota State Noise Standard (MN Rule 7030) if the project applies the FHWA traffic noise requirements. As a result, any required noise analysis will follow FHWA criteria and regulations only, and projects will no longer directly address Minnesota Rule 7030 (MnDOT Noise Requirements, 2017).

2.0 ANALYSIS METHODOLOGY

Affected Environment

The adjacent land within the project area falls under Federal Land Use Categories B, C, E, and F. Interior noise levels were considered for one Category D facility (Rogers Library) that also has outdoor use. Primary land uses consist of residential, trails, recreational, industrial, and commercial land uses. The existing noise environment is dominated by traffic noise from I-94.

The project area includes I-94 from the I-494/I-694 Interchange in Maple Grove to the I-94/TH 101 Interchange in Rogers. The project area also extends from CSAH 81 to Brockton Lane N in the vicinity of the proposed Brockton Interchange, which is located approximately 3,000 feet southeast of Brockton Lane N. Receptors within approximately 500' of the proposed auxiliary lanes on eastbound and westbound I-94, the proposed Interchange in Dayton, and the proposed truck parking expansion at the Elm Creek Rest Area were modeled.

For the traffic noise study, the project area was divided into thirteen noise sensitive areas (NSA):

- NSA-A represents the commercial area north of the I-494/I-694 Interchange along westbound I-94 from approximately 1,000 feet west of Hemlock Lane N to Weaver Lake Road, including hotels, offices, and restaurants. It also includes City of Maple Grove trails along local roadways (recreational land use/Activity Category C), several retail facilities and a car wash (industrial land use/Activity Category F).
- NSA-B represents the largely residential and recreational area along westbound I-94 from Weaver Lake Road to 93rd Avenue N. The City of Maple Grove and Three Rivers District trails comprise most of the recreational land use (Activity Category C) in this area. This area also includes an office (commercial land use/Activity Category E) and an outdoor playground at the Cradle Club (recreational land use/Activity Category C).
- NSA-C represents the commercial area along westbound I-94 from 93rd Avenue N to approximately 1,000 feet north of Maple Grove Parkway. This NSA also contains City of Maple Grove trails along local roadways (recreational land use/Activity Category C), Aldi Food Market and a gas station (industrial land use/Activity Category F).
- NSA-D represents undeveloped lands and 3 residential receptors along westbound I-94 from approximately 1,000 feet north of Maple Grove Parkway to approximately 3,000 feet north of 105th Avenue N. This NSA also contains City of Maple Grove trails along local roadways (recreational land use/Activity Category C).
- NSA-E represents the largely industrial and undeveloped area along westbound I-94 from approximately 3,000 feet north of 105th Avenue N to Brockton Lane N. One residential receptor (Activity Category B) is located in this area. This NSA extends to CSAH 81 approximately 2,500 feet from I-94 due to the proposed Brockton Interchange and connection with CSAH 81. This NSA largely consists of manufacturing and retail facilities (industrial land use/Activity Category F).
- NSA-F represents undeveloped lands and 3 residential receptors along westbound I-94 from Brockton Lane N to approximately 1,000 feet north of Rogers Drive. This NSA also contains several manufacturing and retail facilities (industrial land use/Activity Category F).
- NSA-G represents the commercial area along westbound I-94 from approximately 1,000 feet north of Rogers Drive to approximately 2,000 feet north of TH 101. This NSA also contains City of Rogers trails along local roadways (recreational land use/Activity Category C) and several manufacturing and retail facilities (industrial land use/Activity Category F).

- NSA-H represents undeveloped lands and the commercial area along eastbound I-94 from approximately 2,000 feet north of TH 101 to approximately 1,000 feet north of Rogers Drive. This area also includes outdoor use at Rogers Library and City of Rogers trails along local roadways (recreational land use/Activity Category C). This NSA also contains several manufacturing and retail facilities (industrial land use/Activity Category F).
- NSA-I represents undeveloped lands and the residential area along eastbound I-94 from approximately 1,000 feet north of Rogers Drive to Brockton Lane N, including the permitted use at the proposed Laurel Creek development. This NSA extends to Brockton Lane N approximately 2,000 feet from I-94 due to the proposed Brockton Interchange and connection with Brockton Lane N. This NSA also contains several manufacturing and retail facilities (industrial land use/Activity Category F).
- NSA-J represents the commercial area along eastbound I-94 from approximately 1,000 feet north of Maple Grove Parkway to 93rd Avenue N. It also includes City of Maple Grove trails along local roadways (recreational land use/Activity Category C) and several retail facilities (industrial land use/Activity Category F).
- NSA-K represents the largely residential and recreational area along eastbound I-94 from 93rd Avenue to Weaver Lake Road. The City of Maple Grove and Three Rivers District trails comprise the recreational land use in this area, along with picnic areas at the Elm Creek Rest Area (recreational land use/Activity Category C). There are also 2 restaurants (commercial land use/Activity Category E) in this area.
- NSA-L represents the largely residential area along eastbound I-94 and southbound I-494 from Weaver Lake Road to approximately 73rd Avenue N. This area also includes City of Maple Grove trail receptors, an outdoor playground at New Horizon Academy (recreational land use/Activity Category C), offices and a funeral chapel (commercial land use/Activity Category E).
- NSA-M represents the largely residential area along northbound I-494 and eastbound I-94 from approximately 73rd Avenue N to approximately 1,000 feet west of Hemlock Lane N. This area also includes City of Maple Grove trail receptors (recreational land use/Activity Category C).

The NSAs are shown on **Figures 2 through 16** in **Appendix A**.

Noise Monitoring

Noise level monitoring is performed during a noise study to document existing noise levels. Existing noise levels can be used as a "baseline" against which future scenarios are compared. In addition, when studying future noise levels projected with computer models, monitored noise levels for existing conditions are compared to modeled results for existing conditions to validate the computer modeling techniques and results.

Existing noise level measurements were conducted on June 5, 2018 at twelve representative sites in the project vicinity. The measurements were made in accordance with FHWA and MnDOT guidelines using an integrating sound level analyzer meeting ANSI and IEC Type 1 specifications. Noise measurement procedures were consistent with the methodologies contained in the FHWA publication titled Measurement of Highway Related Noise (May 1996). Thirty-minute measurements were taken at each site. Traffic counts were taken at each site, concurrent with the noise measurements. Monitored L_{eq} noise levels can be found in **Table 3**.

FHWA's Traffic Noise Model Version 2.5 (TNM 2.5) was used to model the twelve field sites using traffic counts taken in the field. TNM 2.5 uses traffic volumes, speed, vehicle classes, and the typical characteristics of the roadway being analyzed (e.g., roadway horizontal and vertical alignment). The results of the modeling were then compared to the measured noise levels.

Comparing the modeled noise levels to the measured noise levels confirms the applicability of the computer model to the specific project. The site by site comparison is presented in **Table 3**.

Table 3: Existing Noise Levels and Model Validation

Location[1]	Date	Time	L_{eq} (dBA) Monitored	L_{eq} (dBA) Modeled	Difference
FS-1	6/5/2018	9:07:00	57.9	57.5	-0.4
FS-2	6/5/2018	9:47:00	75.1	74.4	-0.7
FS-3	6/5/2018	10:41:00	69.9	71.8	1.9
FS-4	6/5/2018	11:37:00	61.7	64.3	2.6
FS-6	6/5/2018	13:39:00	70.3	68.6	-1.7
FS-8	6/5/2018	14:25:00	74.1	75.3	1.2
FS-9	6/5/2018	13:39:00	70.1	72.7	2.6
FS-10	6/5/2018	12:32:00	76.5	75.1	-1.4
FS-11	6/5/2018	11:37:00	72.8	73.5	0.7
FS-12	6/5/2018	10:41:00	66.5	68.7	2.2
FS-13	6/5/2018	9:47:00	75.6	76.0	0.4
FS-14	6/5/2018	9:07:00	59.6	60.3	0.7

[1] Site numbers FS-5 and FS-7 were not used in the noise analysis due to complications in the field.

Modeled noise levels at the twelve measurement sites were within ±3 decibels of the measured noise levels. Field measurement locations are shown on **Figures 2 through 16 (see Appendix A)**. Noise measurement data sheets are provided in **Appendix B**.

Worst Hourly Traffic Noise Analysis

In general, higher traffic volumes, vehicle speeds, and number of heavy trucks increase the loudness of highway traffic noise. The worst hourly traffic noise impact typically occurs when traffic is flowing more freely and when heavy truck volumes are the greatest. For determining the worst-case traffic noise hour, traffic noise levels for eight time periods were modeled at seventeen representative receptor locations along the I-94 project corridor under existing conditions, considering the appropriate vehicle mix (i.e., cars, medium trucks, heavy trucks), and directional split in traffic volume (i.e., northbound versus southbound).

The L_{eq} level for each of the eight modeled time periods are summarized in **Table 4** below. Based on this analysis, it was determined that the time period from 12:00 PM to 1:00 PM represents the worst-case traffic noise hour.

Table 4: Worst Hourly Traffic Noise Summary

Receptor ID	Modeled Level (dBA) by Time Period (Hour Starting)							
	7:00 AM Leq	8:00 AM Leq	9:00 AM Leq	10:00 AM Leq	11:00 AM Leq	12:00 PM Leq	4:00 PM Leq	5:00 PM Leq
D-1	60.0	62.8	63.5	63.5	63.1	64.3	61.0	61.0
E-2	59.6	62.0	62.8	62.5	62.3	63.1	61.5	61.3
F-2	**67.4**	**69.7**	**70.5**	**70.3**	**70.1**	**70.9**	**69.3**	**69.2**
F-9	58.2	60.3	61.1	60.8	60.7	61.4	60.0	59.8
G-9	**66.9**	**69.0**	**69.5**	**69.6**	**69.4**	**70.3**	**68.5**	**68.3**
H-3	**71.0**	**74.0**	**74.5**	**74.2**	**73.9**	**74.8**	**73.4**	**73.4**
I-44	**66.3**	**69.7**	**70.3**	**69.8**	**69.6**	**70.2**	**69.2**	**69.1**
B-9	**68.2**	**69.6**	**70.6**	**70.6**	**70.5**	**71.3**	**67.2**	**69.4**
B-11	57.7	60.0	61.2	60.7	60.7	61.4	58.8	59.8
B-43	61.6	64.1	65.4	64.8	64.8	**65.6**	63.1	64.1
B-44	59.4	61.8	63.0	62.5	62.5	63.2	60.7	61.7
B-46	57.4	59.7	60.9	60.4	60.4	61.2	58.5	59.6
C-19	59.6	61.5	62.0	62.3	62.1	63.0	58.5	61.3
J-15	56.6	60.1	60.9	60.6	60.3	61.1	58.8	59.3
K-19	52.2	54.6	55.5	55.0	55.0	55.6	53.6	54.2
K-28	63.6	**68.7**	**70.4**	**69.2**	**69.2**	**69.9**	**69.0**	**68.8**
K-29	59.4	63.3	64.9	63.9	63.9	64.6	63.2	63.3

Bold numbers approach or exceed Federal noise abatement criteria B (NAC B).

3.0 PREDICTED NOISE LEVELS AND NOISE IMPACTS

Noise Receptors and Modeling Assumptions

Noise modeling was completed using TNM 2.5. Noise model input files were developed based on the following assumptions:

- Traffic data included existing (2017) and future No Build and Build (2040) forecasted traffic volumes.
- The 12:00 PM to 1:00 PM period of the day was selected as the loudest hour based on eastbound and westbound traffic data on I-94 from TH 101 to Weaver Lake Road.
- A stationary source modeling procedure for parked and idling trucks and truck parking expansion was competed for the Elm Creek Rest Stop per MnDOT's 2017 guidance.

Available project engineering plans, topographic contours and aerial imagery were used to create a three-dimensional model in TNM of the geometry of the existing and future design roadway configurations and the surrounding terrain and buildings.

Inputs to the model include three-dimensional physical characteristics of road alignments (e.g., curves, hills, depressed, elevated, etc.); hourly traffic volumes in defined vehicle classes (e.g., cars, medium trucks, heavy trucks, buses, and motorcycles); vehicle speeds; receptor location and height; and data on the characteristics and locations of specific ground types, topographical features, and other features likely to influence the propagation of traffic noise between the roadway and receptors. Existing barriers in the project area were included in the model.

Noise impacts were assessed by modeling noise levels at 715 representative locations in the project area. These receivers were selected to model the noise levels at 17 office and bank buildings, 16 restaurants (7 with outdoor use), four hotels (2 with outdoor use), one movie theater, three rest stop picnic areas, 144 recreational facilities (library, playgrounds and trails), 60 industrial facilities, and 588 residential receptors (modeled as 470 noise receivers). The locations of the receivers are shown on **Figures 2 through 16 (Appendix A)**. Land uses (residential, commercial, etc.) and the number of receptors per receiver are listed for each receiver location in **Table 5**.

Noise Model Results

The results of the modeling for the 715 representative receivers are presented in **Table 5**. The table presents the receiver identifications, the land use, the number of receptors per receiver, the modeled Existing, future No-Build and future Build Leq noise levels, the dBA difference between future No-Build and Existing, the difference between future Build and Existing, and the FHWA NAC. Noise levels that approach or exceed the FHWA NAC are **boldfaced**. Noise levels that result in substantial increase are underlined; however, no substantial increase noise impacts are predicted with the project.

Existing L_{eq}: The existing L_{eq} noise levels at modeled receptors varied between 46.1 dBA and 81.3 dBA. The existing L_{eq} noise levels approach or exceed federal noise abatement criteria at 148 receptors.

Future No Build L_{eq}: Future 2040 No Build L_{eq} noise levels were predicted to range between 46.7 dBA and 81.8 dBA. The future 2040 No build L_{eq} noise levels approach or exceed federal noise abatement criteria at 162 receptors.

Future Build L_{eq}: Future 2040 Build L_{eq} noise levels were predicted to range between 46.9 dBA and 82.1 dBA. The 2040 build L_{eq} noise levels approach or exceed federal noise abatement criteria at 171 receptors. These include 74 NAC B receptors and 97 NAC C receptors.

In general, the proposed improvements would result in minor changes in traffic noise levels compared to existing conditions. Changes in L_{eq} noise levels under the future Build conditions will range from 0 to 4.7 decibels compared to existing conditions.

Interior noise levels were analyzed for one Category D facility (Rogers Library), as this was the only potential Category D receptor where exterior noise levels (Category C) result in impact and noise barrier abatement is not feasible and reasonable. A building noise reduction factor of 20 dB was used for this analysis as a conservative estimate compared to both the FHWA publication *FHWA-DP-45-1R, Sound Procedures for Measuring Highway Noise: Final Report* and MnDOT requirements for estimating interior noise levels.

Table 5: Noise Model Results

Receiver ID	NSA	Land Use	FHWA NAC	Number of Receptors	Existing Conditions (2017) Leq	Future No-Build (2040) Leq	Difference No-Build (2040) - Existing (2017)	Future Build (2040) Leq	Difference Build (2040) - Existing (2017)
A-1	A	Industrial	F	1	70.4	71.0	0.6	71.1	0.7
A-2	A	Industrial	F	1	70.2	70.8	0.6	70.9	0.7
A-3	A	Commercial	E	1	69.4	70.0	0.6	70.1	0.7
A-4	A	Industrial	F	1	65.7	66.4	0.7	66.6	0.9
A-5	A	Industrial	F	1	63.8	64.4	0.6	64.7	0.9
A-6	A	Commercial	E	1	68.0	68.6	0.6	68.9	0.9
A-7	A	Commercial	E	1	68.3	68.9	0.6	69.1	0.8
A-8	A	Commercial	E	1	47.7	48.3	0.6	48.5	0.8
A-9	A	Commercial	E	1	67.4	67.9	0.5	68.1	0.7
A-10[1]	A	Commercial	E	1	71.6	72.2	0.6	72.4	0.8
A-11[1]	A	Commercial	E	1	71.4	72.0	0.6	72.2	0.8
A-12	A	Commercial	E	1	62.6	63.2	0.6	63.4	0.8
A-13	A	Industrial	F	1	73.9	74.4	0.5	74.6	0.7
A-14[1]	A	Commercial	E	1	76.6	77.1	0.5	77.3	0.7
A-15	A	Industrial	F	1	75.2	75.7	0.5	75.9	0.7
A-16[1]	A	Commercial	E	1	72.5	73.1	0.6	73.3	0.8
A-17	A	Industrial	F	1	67.7	68.2	0.5	68.4	0.7
A-18	A	Industrial	F	1	72.6	73.0	0.4	73.3	0.7
A-19	A	Commercial	E	1	60.8	61.3	0.5	61.6	0.8
A-20	A	Recreational	C	1	**81.3**	**81.8**	0.5	**82.1**	0.8
A-21	A	Recreational	C	1	**70.3**	**70.8**	0.5	**71.0**	0.7
A-22	A	Recreational	C	1	60.7	61.2	0.5	61.4	0.7
A-23	A	Recreational	C	1	58.3	58.8	0.5	59.0	0.7
B-1	B	Recreational	C	1	**67.6**	**68.1**	0.5	**68.4**	0.8
B-2	B	Recreational	C	1	61.6	62.1	0.5	62.5	0.9
B-3	B	Commercial	E	1	65.9	66.4	0.5	66.8	0.9
B-4	B	Recreational	C	1	65.5	**66.0**	0.5	**66.7**	1.2
B-5	B	Recreational	C	1	65.9	**66.4**	0.5	**66.6**	0.7
B-6	B	Daycare	C	1	62.7	63.2	0.5	63.6	0.9
B-7	B	Recreational	C	1	61.3	61.8	0.5	62.2	0.9
B-8	B	Recreational	C	1	**67.6**	**68.1**	0.5	**68.5**	0.9
B-9	B	Recreational	C	1	**70.5**	**71.0**	0.5	**71.6**	1.1
B-10	B	Recreational	C	1	**66.9**	**67.4**	0.5	**68.1**	1.2
B-11	B	Recreational	C	1	60.0	60.5	0.5	60.9	0.9
B-12	B	Recreational	C	1	**72.0**	**72.4**	0.4	**72.8**	0.8
B-13	B	Residential	B	2	59.1	59.6	0.5	59.9	0.8
B-14	B	Recreational	C	1	**71.5**	**72.0**	0.5	**72.4**	0.9
B-15	B	Recreational	C	1	**73.3**	**73.8**	0.5	**73.7**	0.4
B-16	B	Recreational	C	1	**80.1**	**80.6**	0.5	**80.9**	0.8
B-17	B	Recreational	C	1	**78.2**	**78.7**	0.5	**79.2**	1.0

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FHWA Activity Category B, C	66	66	-	66	-
FHWA Activity Category E	71	71	-	71	-

Receiver ID	NSA	Land Use	FHWA NAC	Number of Receptors	Existing Conditions (2017) Leq	Future No-Build (2040) Leq	Difference No-Build (2040) - Existing (2017)	Future Build (2040) Leq	Difference Build (2040) - Existing (2017)
B-18	B	Recreational	C	1	**72.4**	**72.9**	0.5	**73.4**	1.0
B-19	B	Recreational	C	1	**73.1**	**73.6**	0.5	**74.0**	0.9
B-20	B	Recreational	C	1	**77.0**	**77.5**	0.5	**77.9**	0.9
B-21	B	Recreational	C	1	**76.8**	**77.4**	0.6	**77.8**	1.0
B-22	B	Recreational	C	1	**75.8**	**76.3**	0.5	**76.9**	1.1
B-23	B	Recreational	C	1	65.4	65.9	0.5	**66.7**	1.3
B-24	B	Recreational	C	1	65.6	**66.0**	0.4	**67.1**	1.5
B-25	B	Recreational	C	1	64.1	64.5	0.4	65.6	1.5
B-26	B	Recreational	C	1	**69.0**	**69.5**	0.5	**69.9**	0.9
B-27	B	Recreational	C	1	62.1	62.6	0.5	63.1	1.0
B-28	B	Recreational	C	1	**72.4**	**72.9**	0.5	**73.3**	0.9
B-29	B	Recreational	C	1	**74.0**	**74.6**	0.6	**74.9**	0.9
B-30	B	Recreational	C	1	**75.4**	**76.0**	0.6	**76.3**	0.9
B-31	B	Recreational	C	1	**72.9**	**73.5**	0.6	**73.8**	0.9
B-32	B	Recreational	C	1	**79.3**	**79.8**	0.5	**80.2**	0.9
B-33	B	Recreational	C	1	**79.9**	**80.5**	0.6	**80.9**	1.0
B-34	B	Recreational	C	1	**74.7**	**75.3**	0.6	**75.8**	1.1
B-35	B	Recreational	C	1	**75.6**	**76.2**	0.6	**76.7**	1.1
B-36	B	Recreational	C	1	**74.3**	**75.0**	0.7	**75.5**	1.2
B-37	B	Recreational	C	1	**66.9**	**67.7**	0.8	**68.1**	1.2
B-38	B	Recreational	C	1	**69.9**	**70.7**	0.8	**71.2**	1.3
B-39	B	Residential	B	1	63.0	63.7	0.7	64.2	1.2
B-40	B	Residential	B	1	62.0	62.7	0.7	63.2	1.2
B-41	B	Recreational	C	1	61.9	62.6	0.7	63.1	1.2
B-42	B	Residential	B	1	61.7	62.3	0.6	62.8	1.1
B-43	B	Recreational	C	1	64.1	64.9	0.8	65.3	1.2
B-44	B	Residential	B	1	62.2	62.9	0.7	63.4	1.2
B-45	B	Residential	B	1	60.4	61.1	0.7	61.6	1.2
B-46	B	Residential	B	1	59.2	59.9	0.7	60.4	1.2
B-47	B	Residential	B	1	62.1	62.9	0.8	63.3	1.2
B-48	B	Recreational	C	1	63.0	63.8	0.8	64.2	1.2
B-49	B	Residential	B	1	58.2	58.8	0.6	59.3	1.1
B-50	B	Residential	B	1	64.9	65.7	0.8	**66.2**	1.3
B-51	B	Recreational	C	1	63.6	64.3	0.7	64.7	1.1
B-52	B	Residential	B	1	59.4	60.1	0.7	60.5	1.1
B-53	B	Residential	B	1	65.7	**66.4**	0.7	**66.9**	1.2
B-54	B	Residential	B	1	58.6	59.3	0.7	59.8	1.2
B-55	B	Residential	B	1	59.0	59.7	0.7	60.2	1.2
B-56	B	Residential	B	1	65.9	**66.7**	0.8	**67.2**	1.3
B-57	B	Residential	B	1	58.1	58.8	0.7	59.3	1.2
B-58	B	Residential	B	1	58.5	59.3	0.8	59.7	1.2
B-59	B	Residential	B	1	**66.7**	**67.5**	0.8	**67.9**	1.2

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FHWA Activity Category B, C	66	66	-	66	-
FHWA Activity Category E	71	71	-	71	-

Receiver ID	NSA	Land Use	FHWA NAC	Number of Receptors	Existing Conditions (2017) Leq	Future No-Build (2040) Leq	Difference No-Build (2040) - Existing (2017)	Future Build (2040) Leq	Difference Build (2040) - Existing (2017)
B-60	B	Residential	B	1	59.7	60.4	0.7	60.9	1.2
B-61	B	Residential	B	1	57.7	58.5	0.8	58.9	1.2
B-62	B	Residential	B	1	**67.6**	**68.4**	0.8	**68.9**	1.3
B-63	B	Residential	B	1	58.8	59.5	0.7	60.0	1.2
B-64	B	Residential	B	1	**67.4**	**68.2**	0.8	**68.6**	1.2
B-65	B	Recreational	C	1	**66.3**	**67.0**	0.7	**67.5**	1.2
B-66	B	Residential	B	1	57.2	58.0	0.8	58.4	1.2
B-67	B	Residential	B	1	59.3	60.1	0.8	60.5	1.2
B-68	B	Residential	B	1	**67.2**	**68.0**	0.8	**68.4**	1.2
B-69	B	Residential	B	1	60.2	61.0	0.8	61.4	1.2
B-70	B	Residential	B	1	57.1	57.8	0.7	58.3	1.2
B-71	B	Residential	B	1	**66.8**	**67.6**	0.8	**68.0**	1.2
B-72	B	Residential	B	1	57.6	58.3	0.7	58.8	1.2
B-73	B	Residential	B	1	**67.0**	**67.7**	0.7	**68.2**	1.2
B-74	B	Residential	B	1	56.8	57.6	0.8	58.1	1.3
B-75	B	Residential	B	1	58.5	59.3	0.8	59.7	1.2
B-76	B	Residential	B	1	**67.3**	**68.1**	0.8	**68.5**	1.2
B-77	B	Recreational	C	1	**67.3**	**68.1**	0.8	**68.5**	1.2
B-78	B	Residential	B	1	55.8	56.5	0.7	57.0	1.2
B-79	B	Residential	B	1	56.2	57.0	0.8	57.4	1.2
B-80	B	Residential	B	1	**67.2**	**67.9**	0.7	**68.4**	1.2
B-81	B	Residential	B	1	56.6	57.3	0.7	57.8	1.2
B-82	B	Residential	B	1	57.8	58.6	0.8	59.0	1.2
B-83	B	Residential	B	1	**68.2**	**68.9**	0.7	**69.3**	1.1
B-84	B	Residential	B	1	57.1	57.8	0.7	58.3	1.2
B-85	B	Residential	B	1	60.5	61.3	0.8	61.7	1.2
B-86	B	Residential	B	1	**69.0**	**69.7**	0.7	**70.2**	1.2
B-87	B	Residential	B	1	58.0	58.8	0.8	59.3	1.3
B-88	B	Residential	B	1	58.7	59.5	0.8	59.9	1.2
B-89	B	Residential	B	1	**70.0**	**70.7**	0.7	**71.2**	1.2
B-90	B	Residential	B	1	59.4	60.1	0.7	60.6	1.2
B-91	B	Recreational	C	1	**72.6**	**73.2**	0.6	**73.7**	1.1
B-92	B	Residential	B	1	64.5	65.1	0.6	65.6	1.1
B-93	B	Residential	B	1	**70.3**	**71.0**	0.7	**71.5**	1.2
B-94	B	Residential	B	1	64.0	64.7	0.7	65.2	1.2
B-95	B	Residential	B	1	61.8	62.5	0.7	63.0	1.2
B-96	B	Residential	B	1	**70.2**	**70.9**	0.7	**71.4**	1.2
B-97	B	Residential	B	1	64.8	65.5	0.7	**66.0**	1.2
B-98	B	Residential	B	1	63.0	63.8	0.8	64.2	1.2
B-99	B	Recreational	C	1	**69.8**	**70.5**	0.7	**71.0**	1.2
B-100	B	Residential	B	1	65.4	**66.1**	0.7	**66.6**	1.2
B-101	B	Residential	B	1	**68.5**	**69.2**	0.7	**69.7**	1.2

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FHWA Activity Category B, C	66	66	-	66	-
FHWA Activity Category E	71	71	-	71	-

Receiver ID	NSA	Land Use	FHWA NAC	Number of Receptors	Existing Conditions (2017) Leq	Future No-Build (2040) Leq	Difference No-Build (2040) - Existing (2017)	Future Build (2040) Leq	Difference Build (2040) - Existing (2017)
B-102	B	Residential	B	1	55.7	56.5	0.8	56.9	1.2
B-103	B	Residential	B	1	**67.6**	**68.3**	0.7	**68.8**	1.2
B-104	B	Residential	B	1	**67.4**	**68.1**	0.7	**68.6**	1.2
B-105	B	Recreational	C	1	**67.2**	**67.9**	0.7	**68.4**	1.2
B-106	B	Residential	B	1	**66.6**	**67.3**	0.7	**67.8**	1.2
B-107	B	Recreational	C	1	**68.4**	**69.1**	0.7	**69.6**	1.2
B-108	B	Recreational	C	1	**66.0**	**66.7**	0.7	**67.2**	1.2
B-109	B	Recreational	C	1	**67.5**	**68.2**	0.7	**68.7**	1.2
B-110	B	Residential	B	1	50.7	51.2	0.5	52.2	1.5
B-111	B	Residential	B	1	51.6	52.1	0.5	52.9	1.3
B-112	B	Residential	B	1	52.2	52.6	0.4	53.5	1.3
B-113	B	Residential	B	1	64.2	64.6	0.4	65.0	0.8
B-114	B	Residential	B	1	64.7	65.2	0.5	65.6	0.9
B-115	B	Residential	B	1	64.4	64.9	0.5	65.2	0.8
B-116	B	Residential	B	1	65.3	65.8	0.5	**66.2**	0.9
B-117	B	Residential	B	1	65.6	**66.1**	0.5	**66.5**	0.9
B-118	B	Residential	B	1	64.9	65.4	0.5	65.7	0.8
B-119	B	Residential	B	1	53.1	53.6	0.5	54.3	1.2
B-120	B	Residential	B	1	52.5	53.0	0.5	53.7	1.2
B-121	B	Residential	B	1	51.6	52.1	0.5	52.9	1.3
B-122	B	Residential	B	1	**66.2**	**66.6**	0.4	**66.9**	0.7
B-123	B	Residential	B	1	**66.2**	**66.7**	0.5	**67.1**	0.9
B-124	B	Residential	B	1	65.4	65.9	0.5	**66.3**	0.9
B-125	B	Residential	B	1	54.0	54.5	0.5	55.1	1.1
B-126	B	Residential	B	1	53.8	54.3	0.5	54.9	1.1
B-127	B	Residential	B	1	53.1	53.5	0.4	54.2	1.1
B-128	B	Residential	B	1	57.9	58.4	0.5	58.8	0.9
B-129	B	Residential	B	1	59.8	60.3	0.5	60.7	0.9
B-130	B	Residential	B	1	57.9	58.4	0.5	58.9	1.0
B-131	B	Residential	B	1	**66.8**	**67.3**	0.5	**67.6**	0.8
B-132	B	Recreational	C	1	64.9	65.4	0.5	65.7	0.8
B-133	B	Recreational	C	1	58.4	58.9	0.5	59.2	0.8
B-134	B	Recreational	C	1	56.9	57.4	0.5	57.7	0.8
B-135	B	Residential	B	2	56.1	56.5	0.4	57.1	1.0
B-136	B	Residential	B	2	53.2	53.6	0.4	54.1	0.9
B-137	B	Residential	B	2	58.4	58.9	0.5	59.3	0.9
B-138	B	Residential	B	2	57.4	57.9	0.5	58.3	0.9
B-139	B	Residential	B	2	56.6	57.1	0.5	57.7	1.1
B-140	B	Residential	B	2	56.5	56.9	0.4	57.5	1.0
B-141	B	Residential	B	1	56.2	56.7	0.5	57.3	1.1
B-142	B	Residential	B	1	58.7	59.3	0.6	59.9	1.2
B-143	B	Residential	B	1	57.9	58.6	0.7	59.1	1.2

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FHWA Activity Category B, C	66	66	-	66	-
FHWA Activity Category E	71	71	-	71	-

Receiver ID	NSA	Land Use	FHWA NAC	Number of Receptors	Existing Conditions (2017) Leq	Future No-Build (2040) Leq	Difference No-Build (2040) - Existing (2017)	Future Build (2040) Leq	Difference Build (2040) - Existing (2017)
B-144	B	Residential	B	1	57.8	58.4	0.6	59.0	1.2
B-145	B	Residential	B	1	58.1	58.7	0.6	59.3	1.2
B-146	B	Residential	B	1	57.6	58.2	0.6	58.8	1.2
B-147	B	Residential	B	1	57.5	58.2	0.7	58.8	1.3
B-148	B	Residential	B	1	56.8	57.4	0.6	58.0	1.2
B-149	B	Residential	B	1	56.6	57.2	0.6	57.8	1.2
B-150	B	Residential	B	1	56.8	57.4	0.6	58.0	1.2
B-151	B	Residential	B	1	55.6	56.3	0.7	56.8	1.2
B-152	B	Residential	B	1	54.9	55.5	0.6	56.1	1.2
B-153	B	Residential	B	1	54.9	55.6	0.7	56.1	1.2
B-154	B	Residential	B	1	54.3	55.0	0.7	55.5	1.2
B-155	B	Residential	B	1	62.0	62.7	0.7	63.2	1.2
B-156	B	Residential	B	1	58.9	59.7	0.8	60.1	1.2
B-157	B	Residential	B	1	65.5	**66.2**	0.7	**66.7**	1.2
B-158	B	Residential	B	1	64.7	65.4	0.7	65.9	1.2
B-159	B	Residential	B	1	60.9	61.7	0.8	62.2	1.3
B-160	B	Residential	B	1	57.3	58.0	0.7	58.5	1.2
B-161	B	Residential	B	1	55.3	56.0	0.7	56.6	1.3
B-162	B	Residential	B	1	50.3	51.1	0.8	51.5	1.2
B-163	B	Residential	B	1	51.6	52.4	0.8	52.8	1.2
B-164	B	Residential	B	1	52.9	53.7	0.8	54.1	1.2
B-165	B	Residential	B	1	53.3	54.1	0.8	54.5	1.2
B-166	B	Residential	B	1	55.8	56.6	0.8	57.0	1.2
B-167	B	Residential	B	1	56.5	57.3	0.8	57.7	1.2
B-168	B	Residential	B	1	60.2	61.0	0.8	61.4	1.2
B-169	B	Residential	B	1	60.8	61.5	0.7	62.0	1.2
B-170	B	Residential	B	1	62.5	63.2	0.7	63.7	1.2
B-171	B	Residential	B	1	58.8	59.6	0.8	60.0	1.2
B-172	B	Residential	B	1	55.9	56.5	0.6	57.1	1.2
B-173	B	Residential	B	1	58.4	59.2	0.8	59.6	1.2
B-174	B	Residential	B	1	60.3	61.0	0.7	61.4	1.1
B-175	B	Residential	B	1	57.7	58.4	0.7	58.9	1.2
B-176	B	Residential	B	1	54.7	55.4	0.7	55.9	1.2
B-177	B	Residential	B	1	57.0	57.6	0.6	58.1	1.1
B-178	B	Residential	B	1	55.0	55.7	0.7	56.2	1.2
B-179	B	Residential	B	1	55.4	56.1	0.7	56.6	1.2
B-180	B	Residential	B	1	55.1	55.8	0.7	56.3	1.2
B-181	B	Residential	B	2	57.2	57.9	0.7	58.4	1.2
B-182	B	Residential	B	2	54.9	55.6	0.7	56.1	1.2
B-183	B	Residential	B	2	54.9	55.6	0.7	56.1	1.2
B-184	B	Recreational	C	1	**70.5**	**71.2**	0.7	**71.8**	1.3
B-185	B	Residential	B	1	56.7	57.1	0.4	57.9	1.2

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C-1	C	Commercial	E	1	68.7	69.5	0.8	69.9	1.2
C-2	C	Recreational	C	1	65.9	**66.7**	0.8	**67.1**	1.2
C-3	C	Recreational	C	1	56.3	57.0	0.7	57.4	1.1
C-4	C	Recreational	C	1	57.4	58.3	0.9	58.8	1.4
C-5	C	Industrial	F	1	59.6	60.5	0.9	60.9	1.3
C-6	C	Commercial	E	1	63.9	64.8	0.9	65.1	1.2
C-7	C	Commercial	E	1	60.5	61.4	0.9	61.7	1.2
C-8	C	Commercial	E	1	61.0	62.0	1.0	62.1	1.1
C-9	C	Recreational	C	1	**74.3**	**75.1**	0.8	**75.6**	1.3
C-10	C	Recreational	C	1	**67.3**	**68.1**	0.8	**68.6**	1.3
C-11	C	Recreational	C	1	**67.4**	**68.5**	1.1	**68.2**	0.8
C-12	C	Recreational	C	1	58.0	59.0	1.0	59.3	1.3
C-13	C	Recreational	C	1	55.8	56.7	0.9	57.1	1.3
C-14	C	Recreational	C	1	**71.0**	**71.8**	0.8	**72.3**	1.3
C-15	C	Recreational	C	1	65.7	**66.5**	0.8	**67.0**	1.3
C-16	C	Recreational	C	1	61.6	62.6	1.0	62.7	1.1
C-17	C	Recreational	C	1	57.0	58.0	1.0	58.3	1.3
C-18	C	Industrial	F	1	58.1	59.0	0.9	59.4	1.3
C-19	C	Commercial	E	1	62.4	63.1	0.7	63.7	1.3
D-1	D	Residential	B	1	64.4	65.7	1.3	**67.1**	2.7
D-2	D	Residential	B	1	56.4	57.5	1.1	58.8	2.4
D-3	D	Residential	B	1	57.2	58.4	1.2	59.6	2.4
D-4	D	Recreational	C	1	63.9	65.0	1.1	**66.8**	2.9
D-5	D	Recreational	C	1	64.3	65.5	1.2	**67.1**	2.8
D-6	D	Recreational	C	1	**71.6**	**72.7**	1.1	**74.4**	2.8
D-7	D	Recreational	C	1	**71.1**	**72.2**	1.1	**74.1**	3.0
E-1	E	Industrial	F	1	73.1	74.1	1.0	75.2	2.1
E-2	E	Residential	B	1	63.0	63.9	0.9	64.5	1.5
E-3	E	Industrial	F	1	56.4	57.3	0.9	57.8	1.4
E-4	E	Industrial	F	1	54.1	55.0	0.9	56.4	2.3
E-5	E	Industrial	F	1	54.7	55.7	1.0	55.5	0.8
E-6	E	Industrial	F	1	56.7	57.7	1.0	57.7	1.0
E-7	E	Industrial	F	1	63.2	64.2	1.0	64.0	0.8
E-8	E	Industrial	F	1	52.2	53.1	0.9	53.1	0.9
E-9	E	Industrial	F	1	53.4	54.3	0.9	54.1	0.7
E-10	E	Industrial	F	1	65.3	66.3	1.0	66.4	1.1
E-11	E	Industrial	F	1	54.5	55.5	1.0	54.8	0.3
E-12	E	Industrial	F	1	56.4	57.3	0.9	59.8	3.4
E-13	E	Industrial	F	1	57.9	58.8	0.9	58.9	1.0
E-14	E	Industrial	F	1	58.1	59.0	0.9	59.2	1.1
E-15	E	Industrial	F	1	52.8	53.7	0.9	53.9	1.1
E-16	E	Industrial	F	1	53.2	54.2	1.0	54.7	1.5

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FHWA Activity Category B, C	66	66	-	66	-
FHWA Activity Category E	71	71	-	71	-

Receiver ID	NSA	Land Use	FHWA NAC	Number of Receptors	Existing Conditions (2017) Leq	Future No-Build (2040) Leq	Difference No-Build (2040) - Existing (2017)	Future Build (2040) Leq	Difference Build (2040) - Existing (2017)
E-17	E	Industrial	F	1	61.9	62.9	1.0	63.6	1.7
E-18	E	Industrial	F	1	56.6	57.5	0.9	57.9	1.3
F-1	F	Residential	B	1	**69.0**	**69.9**	0.9	**70.0**	1.0
F-2	F	Residential	B	1	**71.4**	**72.3**	0.9	**72.2**	0.8
F-3	F	Industrial	F	1	65.1	66.0	0.9	66.4	1.3
F-4	F	Industrial	F	2	67.6	68.5	0.9	69.3	1.7
F-5	F	Industrial	F	2	67.5	68.4	0.9	68.9	1.4
F-6	F	Industrial	F	1	68.8	69.7	0.9	69.7	0.9
F-7	F	Industrial	F	1	67.7	68.7	1.0	69.1	1.4
F-8	F	Industrial	F	1	62.5	63.4	0.9	64.0	1.5
F-9	F	Residential	B	1	61.4	62.3	0.9	62.8	1.4
G-1	G	Commercial	E	1	66.0	67.0	1.0	67.5	1.5
G-2	G	Industrial	F	1	65.8	66.7	0.9	67.1	1.3
G-3	G	Industrial	F	1	70.7	71.6	0.9	72.0	1.3
G-4	G	Industrial	F	1	72.3	73.2	0.9	73.8	1.5
G-5	G	Industrial	F	1	70.8	71.8	1.0	72.3	1.5
G-6	G	Industrial	F	1	70.8	71.8	1.0	72.3	1.5
G-7	G	Industrial	F	1	71.1	72.1	1.0	72.6	1.5
G-8	G	Industrial	F	1	70.7	71.6	0.9	72.2	1.5
G-9	G	Commercial	E	1	69.2	70.1	0.9	70.7	1.5
G-10	G	Industrial	F	1	66.8	67.7	0.9	68.2	1.4
G-11	G	Industrial	F	1	66.6	67.5	0.9	67.9	1.3
G-12	G	Industrial	F	1	65.9	66.8	0.9	67.2	1.3
G-13	G	Commercial	E	1	62.6	63.5	0.9	64.0	1.4
G-14	G	Industrial	F	1	59.7	60.6	0.9	61.1	1.4
G-15	G	Industrial	F	1	61.0	61.9	0.9	62.4	1.4
G-16	G	Industrial	F	1	62.1	63.2	1.1	63.7	1.6
G-17	G	Commercial	E	1	67.9	68.9	1.0	69.4	1.5
G-18	G	Recreational	C	1	59.5	60.5	1.0	61.2	1.7
G-19	G	Recreational	C	1	61.5	62.6	1.1	63.6	2.1
G-20	G	Recreational	C	1	**67.5**	**68.4**	0.9	**69.1**	1.6
G-21	G	Recreational	C	1	**66.3**	**67.2**	0.9	**67.9**	1.6
G-22	G	Recreational	C	1	65.7	**66.7**	1.0	**67.4**	1.7
G-23	G	Recreational	C	1	**70.2**	**71.1**	0.9	**71.6**	1.4
H-1	H	Industrial	F	1	73.0	73.9	0.9	74.3	1.3
H-2	H	Library	C / D	1	**69.2** / 49.2	**70.2** / 50.2	1.0	**70.6** / 50.6	1.4
H-3[1]	H	Commercial	E	1	73.7	74.6	0.9	74.8	1.1
H-4[1]	H	Commercial	E	1	70.8	71.7	0.9	71.6	0.8
H-5	H	Industrial	F	1	70.7	71.6	0.9	71.5	0.8
H-6[1]	H	Commercial	E	1	73.1	74.0	0.9	73.4	0.3
H-7	H	Commercial	E	1	66.5	67.4	0.9	66.7	0.2
H-8	H	Commercial	E	1	62.6	63.5	0.9	63.3	0.7

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FHWA Activity Category B, C	66	66	-	66	-
FHWA Activity Category E	71	71	-	71	-

Receiver ID	NSA	Land Use	FHWA NAC	Number of Receptors	Existing Conditions (2017) Leq	Future No-Build (2040) Leq	Difference No-Build (2040) - Existing (2017)	Future Build (2040) Leq	Difference Build (2040) - Existing (2017)
H-9	H	Industrial	F	1	61.5	62.6	1.1	62.7	1.2
H-10	H	Industrial	F	1	57.9	59.0	1.1	59.2	1.3
H-11	H	Commercial	E	1	61.4	62.7	1.3	62.9	1.5
H-12	H	Commercial	E	1	61.4	63.3	1.9	63.1	1.7
H-13	H	Industrial	F	1	61.0	62.3	1.3	62.4	1.4
H-14	H	Industrial	F	1	64.1	65.3	1.2	65.3	1.2
H-15	H	Recreational	C	1	**78.1**	**79.0**	0.9	**79.3**	1.2
H-16	H	Recreational	C	1	**69.8**	**70.8**	1.0	**70.4**	0.6
H-17	H	Recreational	C	1	61.5	62.5	1.0	62.7	1.2
I-1	I	Industrial	F	1	64.1	65.4	1.3	66.1	2.0
I-2	I	Recreational	C	1	**73.5**	**74.7**	1.2	**75.5**	2.0
I-3	I	Recreational	C	1	64.9	**66.1**	1.2	**67.1**	2.2
I-4	I	Recreational	C	1	**73.0**	**74.2**	1.2	**75.1**	2.1
I-5	I	Recreational	C	1	64.0	65.2	1.2	**66.4**	2.4
I-6	I	Residential	B	1	58.7	59.7	1.0	60.2	1.5
I-7	I	Residential	B	1	65.6	**66.5**	0.9	**66.3**	0.7
I-8	I	Residential	B	1	64.0	64.9	0.9	65.0	1.0
I-9	I	Residential	B	1	62.8	63.7	0.9	63.4	0.6
I-10	I	Residential	B	1	61.4	62.3	0.9	62.2	0.8
I-11	I	Residential	B	1	60.6	61.5	0.9	61.4	0.8
I-12	I	Residential	B	1	59.0	60.0	1.0	60.0	1.0
I-13	I	Residential	B	1	48.1	49.0	0.9	49.7	1.6
I-14	I	Residential	B	1	48.1	49.0	0.9	49.7	1.6
I-15	I	Residential	B	1	48.1	49.0	0.9	49.6	1.5
I-16	I	Residential	B	1	55.8	56.7	0.9	56.7	0.9
I-17	I	Residential	B	1	58.8	59.7	0.9	59.6	0.8
I-18	I	Residential	B	1	55.7	56.6	0.9	56.5	0.8
I-19	I	Residential	B	1	60.4	61.3	0.9	61.4	1.0
I-20	I	Residential	B	1	60.2	61.1	0.9	61.1	0.9
I-21	I	Residential	B	1	60.0	60.9	0.9	60.8	0.8
I-22	I	Residential	B	1	56.9	57.9	1.0	57.8	0.9
I-23	I	Residential	B	1	46.5	47.4	0.9	48.4	1.9
I-24	I	Residential	B	1	46.7	47.6	0.9	48.7	2.0
I-25	I	Residential	B	1	46.5	47.4	0.9	48.5	2.0
I-26	I	Residential	B	1	54.8	55.7	0.9	56.1	1.3
I-27	I	Residential	B	1	58.4	59.3	0.9	59.5	1.1
I-28	I	Residential	B	1	54.0	54.9	0.9	55.5	1.5
I-29	I	Residential	B	1	54.0	54.9	0.9	55.4	1.4
I-30	I	Residential	B	1	54.1	55.0	0.9	55.1	1.0
I-31	I	Residential	B	1	54.0	54.9	0.9	55.0	1.0
I-32	I	Residential	B	1	53.7	54.7	1.0	55.2	1.5
I-33	I	Residential	B	1	53.2	54.1	0.9	54.8	1.6

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FHWA Activity Category B, C	66	66	-	66	-
FHWA Activity Category E	71	71	-	71	-

Receiver ID	NSA	Land Use	FHWA NAC	Number of Receptors	Existing Conditions (2017) Leq	Future No-Build (2040) Leq	Difference No-Build (2040) - Existing (2017)	Future Build (2040) Leq	Difference Build (2040) - Existing (2017)
I-34	I	Residential	B	1	53.7	54.6	0.9	55.4	1.7
I-35	I	Residential	B	1	52.6	53.5	0.9	54.1	1.5
I-36	I	Residential	B	1	58.8	59.8	1.0	59.7	0.9
I-37	I	Residential	B	1	58.8	59.7	0.9	59.7	0.9
I-38	I	Residential	B	1	59.6	60.5	0.9	60.6	1.0
I-39	I	Residential	B	1	59.6	60.5	0.9	60.6	1.0
I-40	I	Residential	B	1	62.4	63.3	0.9	63.3	0.9
I-41	I	Residential	B	1	65.1	**66.0**	0.9	**66.2**	1.1
I-42	I	Residential	B	1	55.5	56.5	1.0	56.8	1.3
I-43	I	Residential	B	1	56.6	57.5	0.9	57.8	1.2
I-44	I	Residential	B	1	58.8	59.7	0.9	59.6	0.8
I-45	I	Residential	B	1	**70.1**	**71.0**	0.9	**71.2**	1.1
I-46	I	Residential	B	1	64.6	65.5	0.9	65.8	1.2
I-47	I	Industrial	F	1	66.5	67.4	0.9	68.1	1.6
I-48	I	Residential	B	1	62.9	63.8	0.9	65.0	2.1
I-49	I	Industrial	F	1	72.6	73.5	0.9	74.0	1.4
I-50	I	Industrial	F	1	73.9	74.8	0.9	75.6	1.7
I-51	I	Industrial	F	1	73.2	74.1	0.9	75.1	1.9
I-52	I	Industrial	F	1	75.3	76.2	0.9	76.8	1.5
J-1	J	Recreational	C	1	**69.5**	**70.4**	0.9	**70.7**	1.2
J-2	J	Recreational	C	1	65.5	**66.5**	1.0	**66.8**	1.3
J-3	J	Recreational	C	1	60.3	61.2	0.9	61.5	1.2
J-4	J	Recreational	C	1	57.4	58.2	0.8	58.6	1.2
J-5	J	Commercial	E	1	63.7	64.8	1.1	64.9	1.2
J-6	J	Recreational	C	1	**69.7**	**70.6**	0.9	**71.0**	1.3
J-7	J	Recreational	C	1	**69.2**	**70.2**	1.0	**70.0**	0.8
J-8	J	Recreational	C	1	57.9	58.9	1.0	59.2	1.3
J-9	J	Recreational	C	1	**70.2**	**71.0**	0.8	**71.6**	1.4
J-10	J	Recreational	C	1	**67.2**	**68.2**	1.0	**68.1**	0.9
J-11	J	Recreational	C	1	58.5	59.4	0.9	59.9	1.4
J-12	J	Commercial	E	1	59.4	60.3	0.9	60.7	1.3
J-13	J	Commercial	E	1	62.0	62.9	0.9	63.4	1.4
J-14	J	Industrial	F	1	70.0	70.9	0.9	71.5	1.5
J-15	J	Commercial	E	1	60.7	61.8	1.1	62.5	1.8
J-16	J	Industrial	F	1	74.2	75.2	1.0	75.9	1.7
K-1	K	Recreational	C	1	**67.1**	**68.5**	1.4	**68.6**	1.5
K-2	K	Recreational	C	1	62.1	62.6	0.5	63.0	0.9
K-3	K	Recreational	C	1	60.5	61.0	0.5	61.4	0.9
K-4	K	Commercial	E	1	63.6	64.1	0.5	64.4	0.8
K-5	K	Commercial	E	1	68.2	69.4	1.2	69.5	1.3
K-6	K	Recreational	C	1	64.2	64.7	0.5	65.2	1.0
K-7	K	Recreational	C	1	**68.7**	**69.2**	0.5	**69.9**	1.2

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FHWA Activity Category E	71	71	-	71	-

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K-8	K	Recreational	C	1	**71.8**	**72.4**	0.6	**73.1**	1.3
K-9	K	Recreational	C	1	**66.2**	**66.7**	0.5	**67.3**	1.1
K-10	K	Recreational	C	1	64.0	64.5	0.5	65.3	1.3
K-11	K	Recreational	C	1	**68.1**	**68.7**	0.6	**69.3**	1.2
K-12	K	Recreational	C	1	**75.1**	**75.7**	0.6	**76.0**	0.9
K-13	K	Recreational	C	1	**69.5**	**70.0**	0.5	**71.1**	1.6
K-14	K	Recreational	C	1	**66.0**	**66.4**	0.4	**68.2**	2.2
K-15	K	Recreational	C	1	62.8	63.1	0.3	65.1	2.3
K-16	K	Residential	B	1	62.3	62.6	0.3	64.6	2.3
K-17	K	Residential	B	1	61.2	61.4	0.2	64.0	2.8
K-18	K	Residential	B	1	59.6	59.8	0.2	61.5	1.9
K-19	K	Residential	B	1	60.3	60.5	0.2	62.3	2.0
K-20	K	Residential	B	1	61.7	62.0	0.3	63.3	1.6
K-21	K	Recreational	C	1	**75.5**	**75.7**	0.2	**80.2**	4.7
K-22	K	Recreational	C	1	**72.3**	**72.4**	0.1	**73.5**	1.2
K-23	K	Recreational	C	1	**67.0**	**67.4**	0.4	**67.9**	0.9
K-24	K	Recreational	C	1	**72.2**	**72.9**	0.7	**73.5**	1.3
K-25	K	Recreational	C	1	**72.2**	**73.2**	1.0	**73.7**	1.5
K-26	K	Recreational	C	1	**72.4**	**73.5**	1.1	**73.9**	1.5
K-27	K	Recreational	C	1	**71.9**	**73.0**	1.1	**73.4**	1.5
K-28	K	Recreational	C	1	**68.9**	**70.0**	1.1	**70.4**	1.5
K-29	K	Recreational	C	1	63.9	64.8	0.9	65.3	1.4
K-30	K	Residential	B	1	**70.7**	**71.7**	1.0	**72.2**	1.5
K-31	K	Residential	B	1	63.3	64.3	1.0	64.8	1.5
K-32	K	Residential	B	1	61.7	62.6	0.9	63.0	1.3
K-33	K	Recreational	C	1	**66.1**	**66.9**	0.8	**67.3**	1.2
K-34	K	Recreational	C	1	62.4	63.3	0.9	63.6	1.2
K-35	K	Recreational	C	1	59.7	60.6	0.9	60.8	1.1
K-36	K	Recreational	C	1	57.6	58.4	0.8	58.7	1.1
L-1	L	Residential	B	2	61.8	62.6	0.8	62.8	1.0
L-2	L	Residential	B	2	64.5	65.4	0.9	65.6	1.1
L-3	L	Residential	B	2	61.2	62.1	0.9	62.3	1.1
L-4	L	Residential	B	4	60.1	61.0	0.9	61.1	1.0
L-5	L	Residential	B	2	**70.1**	**71.0**	0.9	**71.2**	1.1
L-6	L	Residential	B	2	65.6	**66.4**	0.8	**66.5**	0.9
L-7	L	Residential	B	2	**69.5**	**70.4**	0.9	**70.5**	1.0
L-8	L	Residential	B	2	**69.6**	**70.5**	0.9	**70.6**	1.0
L-9	L	Residential	B	2	**68.4**	**69.2**	0.8	**69.3**	0.9
L-10	L	Residential	B	2	**69.3**	**70.1**	0.8	**70.2**	0.9
L-11	L	Residential	B	4	59.2	60.0	0.8	60.2	1.0
L-12	L	Residential	B	2	61.0	61.8	0.8	61.9	0.9
L-13	L	Residential	B	2	60.1	60.9	0.8	61.0	0.9

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L-14	L	Residential	B	2	59.4	60.2	0.8	60.3	0.9
L-15	L	Residential	B	2	56.0	56.7	0.7	56.9	0.9
L-16	L	Residential	B	2	58.6	59.4	0.8	59.5	0.9
L-17	L	Residential	B	1	56.0	56.8	0.8	57.0	1.0
L-18	L	Residential	B	1	56.2	56.9	0.7	57.1	0.9
L-19	L	Residential	B	1	56.4	57.2	0.8	57.3	0.9
L-20	L	Residential	B	1	56.6	57.3	0.7	57.5	0.9
L-21	L	Residential	B	2	48.2	48.8	0.6	49.0	0.8
L-22	L	Residential	B	2	49.2	49.9	0.7	50.1	0.9
L-23	L	Residential	B	1	56.0	56.7	0.7	56.9	0.9
L-24	L	Residential	B	1	56.0	56.8	0.8	56.9	0.9
L-25	L	Residential	B	2	48.1	48.7	0.6	48.9	0.8
L-26	L	Residential	B	1	55.5	56.2	0.7	56.3	0.8
L-27	L	Residential	B	1	55.0	55.7	0.7	55.9	0.9
L-28	L	Residential	B	2	48.7	49.3	0.6	49.5	0.8
L-29	L	Residential	B	2	53.3	54.0	0.7	54.2	0.9
L-30	L	Residential	B	1	48.3	49.0	0.7	49.2	0.9
L-31	L	Residential	B	1	46.5	47.1	0.6	47.3	0.8
L-32	L	Residential	B	1	46.1	46.7	0.6	46.9	0.8
L-33	L	Residential	B	2	53.7	54.4	0.7	54.6	0.9
L-34	L	Residential	B	1	46.2	46.8	0.6	47.0	0.8
L-35	L	Residential	B	1	54.8	55.5	0.7	55.6	0.8
L-36	L	Residential	B	2	49.9	50.5	0.6	50.7	0.8
L-37	L	Residential	B	1	54.7	55.4	0.7	55.5	0.8
L-38	L	Residential	B	1	47.3	48.0	0.7	48.1	0.8
L-39	L	Residential	B	1	54.6	55.3	0.7	55.4	0.8
L-40	L	Residential	B	2	49.2	49.8	0.6	50.0	0.8
L-41	L	Residential	B	1	46.7	47.4	0.7	47.6	0.9
L-42	L	Residential	B	1	54.5	55.2	0.7	55.4	0.9
L-43	L	Residential	B	2	53.0	53.8	0.8	53.9	0.9
L-44	L	Residential	B	1	47.5	48.2	0.7	48.3	0.8
L-45	L	Residential	B	1	50.2	50.8	0.6	51.0	0.8
L-46	L	Residential	B	2	53.1	53.8	0.7	53.9	0.8
L-47	L	Residential	B	1	55.0	55.6	0.6	55.8	0.8
L-48	L	Residential	B	2	47.4	48.1	0.7	48.3	0.9
L-49	L	Residential	B	1	55.1	55.8	0.7	56.0	0.9
L-50	L	Residential	B	1	55.1	55.7	0.6	55.9	0.8
L-51	L	Residential	B	2	46.7	47.3	0.6	47.5	0.8
L-52	L	Residential	B	2	51.9	52.6	0.7	52.8	0.9
L-53	L	Residential	B	1	55.0	55.6	0.6	55.8	0.8
L-54	L	Residential	B	1	51.1	51.6	0.5	51.8	0.7
L-55	L	Residential	B	2	51.7	52.4	0.7	52.5	0.8

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FHWA Activity Category B, C	66	66	-	66	-
FHWA Activity Category E	71	71	-	71	-

Receiver ID	NSA	Land Use	FHWA NAC	Number of Receptors	Existing Conditions (2017) Leq	Future No-Build (2040) Leq	Difference No-Build (2040) - Existing (2017)	Future Build (2040) Leq	Difference Build (2040) - Existing (2017)
L-56	L	Residential	B	1	50.4	51.0	0.6	51.2	0.8
L-57	L	Residential	B	1	49.6	50.2	0.6	50.4	0.8
L-58	L	Residential	B	1	50.1	50.6	0.5	50.8	0.7
L-59	L	Residential	B	2	52.4	53.1	0.7	53.2	0.8
L-60	L	Residential	B	2	51.6	52.3	0.7	52.4	0.8
L-61	L	Residential	B	1	54.8	55.4	0.6	55.6	0.8
L-62	L	Residential	B	1	54.5	55.0	0.5	55.2	0.7
L-63	L	Residential	B	1	54.1	54.7	0.6	54.9	0.8
L-64	L	Residential	B	1	53.8	54.4	0.6	54.6	0.8
L-65	L	Residential	B	1	52.3	52.9	0.6	53.0	0.7
L-66	L	Residential	B	1	51.7	52.3	0.6	52.5	0.8
L-67	L	Residential	B	1	52.6	53.2	0.6	53.4	0.8
L-68	L	Residential	B	1	51.4	52.0	0.6	52.2	0.8
L-69	L	Residential	B	1	53.1	53.7	0.6	53.9	0.8
L-70	L	Residential	B	1	51.0	51.6	0.6	51.8	0.8
L-71	L	Residential	B	1	54.2	54.8	0.6	55.0	0.8
L-72	L	Residential	B	1	50.8	51.4	0.6	51.6	0.8
L-73	L	Residential	B	2	53.7	54.2	0.5	54.4	0.7
L-74	L	Residential	B	2	57.7	58.2	0.5	58.4	0.7
L-75	L	Residential	B	2	55.4	55.9	0.5	56.1	0.7
L-76	L	Residential	B	2	58.2	58.7	0.5	58.9	0.7
L-77	L	Residential	B	2	53.4	54.0	0.6	54.2	0.8
L-78	L	Residential	B	1	59.6	60.1	0.5	60.3	0.7
L-79	L	Residential	B	1	55.8	56.4	0.6	56.6	0.8
L-80	L	Residential	B	2	50.2	50.8	0.6	51.0	0.8
L-81	L	Residential	B	1	59.8	60.3	0.5	60.5	0.7
L-82	L	Residential	B	1	56.0	56.5	0.5	56.7	0.7
L-83	L	Residential	B	2	53.4	53.9	0.5	54.1	0.7
L-84	L	Residential	B	2	49.9	50.5	0.6	50.7	0.8
L-85	L	Residential	B	1	60.3	60.8	0.5	61.0	0.7
L-86	L	Residential	B	1	56.1	56.6	0.5	56.8	0.7
L-87	L	Residential	B	1	60.8	61.3	0.5	61.6	0.8
L-88	L	Residential	B	1	57.1	57.6	0.5	57.8	0.7
L-89	L	Residential	B	2	56.8	57.3	0.5	57.5	0.7
L-90	L	Residential	B	1	62.0	62.5	0.5	62.8	0.8
L-91	L	Residential	B	2	47.9	48.5	0.6	48.7	0.8
L-92	L	Residential	B	1	62.2	62.7	0.5	62.9	0.7
L-93	L	Residential	B	2	58.1	58.6	0.5	58.8	0.7
L-94	L	Residential	B	2	58.2	58.8	0.6	59.0	0.8
L-95	L	Residential	B	1	59.7	60.2	0.5	60.4	0.7
L-96	L	Residential	B	1	62.8	63.3	0.5	63.5	0.7
L-97	L	Residential	B	1	60.1	60.6	0.5	60.8	0.7

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FHWA Activity Category B, C	66	66	-	66	-
FHWA Activity Category E	71	71	-	71	-

Receiver ID	NSA	Land Use	FHWA NAC	Number of Receptors	Existing Conditions (2017) Leq	Future No-Build (2040) Leq	Difference No-Build (2040) - Existing (2017)	Future Build (2040) Leq	Difference Build (2040) - Existing (2017)
L-98	L	Residential	B	1	63.2	63.7	0.5	63.9	0.7
L-99	L	Residential	B	1	60.6	61.1	0.5	61.3	0.7
L-100	L	Residential	B	1	61.2	61.7	0.5	61.9	0.7
L-101	L	Recreational	C	1	60.0	60.6	0.6	60.7	0.7
L-102	L	Recreational	C	1	65.1	65.6	0.5	65.8	0.7
L-103	L	Residential	B	1	61.5	62.1	0.6	62.2	0.7
L-104	L	Residential	B	1	59.7	60.3	0.6	60.4	0.7
L-105	L	Residential	B	1	**66.3**	**66.9**	0.6	**67.1**	0.8
L-106	L	Residential	B	1	**67.2**	**67.7**	0.5	**67.9**	0.7
L-107	L	Residential	B	1	60.4	60.9	0.5	61.1	0.7
L-108	L	Residential	B	1	59.6	60.1	0.5	60.3	0.7
L-109	L	Residential	B	1	56.1	56.6	0.5	56.6	0.5
L-110	L	Residential	B	1	59.2	59.7	0.5	59.9	0.7
L-111	L	Recreational	C	1	60.7	61.3	0.6	61.4	0.7
L-112	L	Residential	B	1	54.8	55.3	0.5	55.4	0.6
L-113	L	Residential	B	1	63.3	63.9	0.6	64.1	0.8
L-114	L	Residential	B	1	61.7	62.3	0.6	62.4	0.7
L-115	L	Residential	B	1	61.4	61.9	0.5	62.1	0.7
L-116	L	Residential	B	1	63.4	63.9	0.5	64.0	0.6
L-117	L	Residential	B	1	57.3	57.8	0.5	57.9	0.6
L-118	L	Residential	B	1	54.1	54.6	0.5	54.5	0.4
L-119	L	Residential	B	1	**66.5**	**67.0**	0.5	**67.2**	0.7
L-120	L	Residential	B	1	50.4	50.9	0.5	50.8	0.4
L-121	L	Residential	B	1	59.9	60.4	0.5	60.6	0.7
L-122	L	Residential	B	1	65.0	65.5	0.5	65.7	0.7
L-123	L	Residential	B	1	60.5	61.1	0.6	61.2	0.7
L-124	L	Residential	B	1	55.4	55.9	0.5	55.9	0.5
L-125	L	Residential	B	1	60.3	60.8	0.5	60.9	0.6
L-126	L	Residential	B	1	63.5	64.1	0.6	64.2	0.7
L-127	L	Residential	B	1	54.3	54.8	0.5	54.8	0.5
L-128	L	Residential	B	1	58.0	58.6	0.6	58.7	0.7
L-129	L	Residential	B	1	62.8	63.4	0.6	63.5	0.7
L-130	L	Residential	B	1	50.4	51.0	0.6	50.9	0.5
L-131	L	Residential	B	1	53.1	53.7	0.6	53.7	0.6
L-132	L	Residential	B	1	60.0	60.5	0.5	60.7	0.7
L-133	L	Residential	B	1	63.9	64.4	0.5	64.6	0.7
L-134	L	Residential	B	1	60.1	60.6	0.5	60.8	0.7
L-135	L	Residential	B	1	51.0	51.5	0.5	51.2	0.2
L-136	L	Residential	B	1	63.4	64.0	0.6	64.1	0.7
L-137	L	Residential	B	1	49.6	50.2	0.6	50.0	0.4
L-138	L	Residential	B	1	60.1	60.6	0.5	60.8	0.7
L-139	L	Residential	B	1	59.5	60.1	0.6	60.2	0.7

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FHWA Activity Category B, C	66	66	-	66	-
FHWA Activity Category E	71	71	-	71	-

Receiver ID	NSA	Land Use	FHWA NAC	Number of Receptors	Existing Conditions (2017) Leq	Future No-Build (2040) Leq	Difference No-Build (2040) - Existing (2017)	Future Build (2040) Leq	Difference Build (2040) - Existing (2017)
L-140	L	Residential	B	1	52.1	52.6	0.5	52.6	0.5
L-141	L	Residential	B	1	59.4	60.0	0.6	60.1	0.7
L-142	L	Residential	B	1	65.1	65.6	0.5	65.8	0.7
L-143	L	Residential	B	1	65.2	65.7	0.5	65.9	0.7
L-144	L	Residential	B	1	59.8	60.3	0.5	60.5	0.7
L-145	L	Residential	B	1	58.0	58.5	0.5	58.6	0.6
L-146	L	Residential	B	1	53.9	54.4	0.5	54.5	0.6
L-147	L	Residential	B	1	54.4	54.9	0.5	55.0	0.6
L-148	L	Residential	B	1	57.2	57.8	0.6	57.9	0.7
L-149	L	Residential	B	1	55.7	56.2	0.5	56.4	0.7
L-150	L	Residential	B	1	**66.3**	**66.8**	0.5	**67.0**	0.7
L-151	L	Residential	B	1	56.0	56.5	0.5	56.6	0.6
L-152	L	Residential	B	1	61.2	61.7	0.5	61.9	0.7
L-153	L	Residential	B	1	57.7	58.2	0.5	58.4	0.7
L-154	L	Residential	B	1	53.6	54.2	0.6	54.3	0.7
L-155	L	Residential	B	1	**66.2**	**66.7**	0.5	**66.9**	0.7
L-156	L	Residential	B	1	60.3	60.8	0.5	61.0	0.7
L-157	L	Residential	B	1	62.0	62.5	0.5	62.7	0.7
L-158	L	Residential	B	1	64.8	65.3	0.5	65.5	0.7
L-159	L	Residential	B	1	64.0	64.6	0.6	64.8	0.8
L-160	L	Commercial	E	1	66.0	66.5	0.5	66.7	0.7
L-161[1]	L	Commercial	E	1	76.2	76.7	0.5	77.0	0.8
L-162	L	Residential	B	1	61.5	62.0	0.5	62.3	0.8
L-163[1]	L	Commercial	E	1	75.8	76.3	0.5	76.6	0.8
L-164	L	Residential	B	1	63.1	63.6	0.5	63.8	0.7
L-165	L	Residential	B	1	63.3	63.8	0.5	64.0	0.7
L-166	L	Residential	B	1	**67.3**	**67.8**	0.5	**68.1**	0.8
L-167	L	Daycare	C	1	**70.8**	**71.3**	0.5	**71.6**	0.8
L-168	L	Residential	B	1	63.3	63.8	0.5	64.0	0.7
L-169	L	Residential	B	1	**68.9**	**69.4**	0.5	**69.6**	0.7
L-170	L	Residential	B	1	**67.7**	**68.2**	0.5	**68.5**	0.8
L-171	L	Residential	B	1	64.6	65.1	0.5	65.3	0.7
L-172	L	Residential	B	1	57.9	58.4	0.5	58.6	0.7
L-173	L	Residential	B	1	58.5	59.0	0.5	59.2	0.7
L-174	L	Residential	B	1	**66.9**	**67.4**	0.5	**67.7**	0.8
L-175	L	Residential	B	1	64.4	64.9	0.5	65.1	0.7
L-176	L	Residential	B	1	62.9	63.4	0.5	63.6	0.7
L-177	L	Residential	B	1	52.0	52.5	0.5	52.6	0.6
L-178	L	Residential	B	1	61.8	62.3	0.5	62.5	0.7
L-179	L	Residential	B	1	55.7	56.2	0.5	56.4	0.7
L-180	L	Residential	B	1	**68.3**	**68.8**	0.5	**69.1**	0.8
L-181	L	Residential	B	1	59.7	60.2	0.5	60.5	0.8

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FHWA Activity Category E	71	71	-	71	-

Receiver ID	NSA	Land Use	FHWA NAC	Number of Receptors	Existing Conditions (2017) Leq	Future No-Build (2040) Leq	Difference No-Build (2040) - Existing (2017)	Future Build (2040) Leq	Difference Build (2040) - Existing (2017)
L-182	L	Residential	B	1	55.1	55.6	0.5	55.8	0.7
L-183	L	Residential	B	1	54.4	54.9	0.5	55.1	0.7
L-184	L	Residential	B	1	55.9	56.4	0.5	56.0	0.1
L-185	L	Residential	B	1	**70.7**	**71.2**	0.5	**71.5**	0.8
L-186	L	Residential	B	1	60.4	60.9	0.5	61.2	0.8
L-187	L	Residential	B	1	64.4	64.9	0.5	65.2	0.8
L-188	L	Residential	B	1	52.9	53.4	0.5	52.9	0.0
L-189	L	Residential	B	1	**68.0**	**68.5**	0.5	**68.7**	0.7
L-190	L	Residential	B	1	**71.8**	**72.3**	0.5	**72.6**	0.8
L-191	L	Residential	B	1	**66.1**	**66.6**	0.5	**66.9**	0.8
L-192	L	Residential	B	1	60.5	61.0	0.5	61.1	0.6
L-193	L	Residential	B	1	57.1	57.6	0.5	57.8	0.7
L-194	L	Residential	B	1	60.5	61.0	0.5	61.0	0.5
L-195	L	Residential	B	1	58.8	59.3	0.5	59.5	0.7
L-196	L	Residential	B	1	63.8	64.3	0.5	64.6	0.8
L-197	L	Residential	B	1	**68.6**	**69.1**	0.5	**69.4**	0.8
L-198	L	Residential	B	1	57.1	57.6	0.5	57.8	0.7
L-199	L	Residential	B	1	**67.4**	**67.9**	0.5	**68.2**	0.8
L-200	L	Residential	B	1	**72.2**	**72.6**	0.4	**72.9**	0.7
L-201	L	Residential	B	1	**68.4**	**68.9**	0.5	**69.1**	0.7
L-202	L	Residential	B	1	**70.8**	**71.3**	0.5	**71.6**	0.8
L-203	L	Residential	B	1	**66.6**	**67.1**	0.5	**67.3**	0.7
L-204	L	Residential	B	1	**66.5**	**67.0**	0.5	**67.3**	0.8
L-205	L	Residential	B	1	62.4	62.9	0.5	63.1	0.7
L-206	L	Residential	B	1	63.4	63.9	0.5	64.2	0.8
L-207[1]	L	Commercial	E	1	73.1	73.6	0.5	73.9	0.8
L-208	L	Residential	B	1	64.7	65.2	0.5	65.5	0.8
L-209	L	Residential	B	1	65.9	**66.4**	0.5	**67.3**	1.4
L-210	L	Residential	B	1	**67.4**	**67.9**	0.5	**68.2**	0.8
L-211	L	Residential	B	1	**67.8**	**68.3**	0.5	**68.6**	0.8
L-212	L	Residential	B	1	**68.1**	**68.6**	0.5	**68.9**	0.8
L-213	L	Residential	B	1	**69.0**	**69.5**	0.5	**69.8**	0.8
L-214	L	Residential	B	1	62.6	63.2	0.6	63.4	0.8
L-215	L	Recreational	C	1	62.1	62.6	0.5	62.8	0.7
L-216	L	Recreational	C	1	63.2	63.7	0.5	64.0	0.8
L-217	L	Recreational	C	1	**66.5**	**67.0**	0.5	**67.2**	0.7
L-218	L	Recreational	C	1	**70.3**	**70.8**	0.5	**71.0**	0.7
L-219	L	Recreational	C	1	**74.1**	**74.6**	0.5	**74.9**	0.8
L-220	L	Recreational	C	1	**74.1**	**74.6**	0.5	**74.9**	0.8
L-221	L	Recreational	C	1	**66.8**	**67.2**	0.4	**67.5**	0.7
L-222	L	Recreational	C	1	61.5	62.0	0.5	62.1	0.6
L-223	L	Recreational	C	1	**74.1**	**74.6**	0.5	**74.9**	0.8

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Receiver ID	NSA	Land Use	FHWA NAC	Number of Receptors	Existing Conditions (2017) Leq	Future No-Build (2040) Leq	Difference No-Build (2040) - Existing (2017)	Future Build (2040) Leq	Difference Build (2040) - Existing (2017)
L-224	L	Recreational	C	1	**74.2**	**74.7**	0.5	**75.0**	0.8
L-225	L	Recreational	C	1	**74.6**	**75.1**	0.5	**75.3**	0.7
L-226	L	Recreational	C	1	**70.6**	**71.1**	0.5	**71.3**	0.7
L-227	L	Recreational	C	1	62.7	63.2	0.5	63.4	0.7
L-228	L	Recreational	C	1	60.2	60.8	0.6	61.0	0.8
L-229	L	Recreational	C	1	61.2	61.7	0.5	62.0	0.8
L-230	L	Recreational	C	1	63.4	64.2	0.8	64.4	1.0
L-231	L	Recreational	C	1	**67.5**	**68.1**	0.6	**68.3**	0.8
L-232	L	Recreational	C	1	**78.0**	**78.4**	0.4	**78.7**	0.7
M-1	M	Residential	B	2	60.3	61.1	0.8	61.2	0.9
M-2	M	Residential	B	2	61.1	61.9	0.8	62.0	0.9
M-3	M	Residential	B	2	59.2	60.1	0.9	60.2	1.0
M-4	M	Residential	B	2	57.6	58.4	0.8	58.6	1.0
M-5	M	Residential	B	2	57.0	57.8	0.8	57.9	0.9
M-6	M	Residential	B	2	58.0	58.8	0.8	58.9	0.9
M-7	M	Residential	B	3	53.3	54.1	0.8	54.3	1.0
M-8	M	Residential	B	3	52.4	53.2	0.8	53.3	0.9
M-9	M	Residential	B	2	57.0	57.7	0.7	57.9	0.9
M-10	M	Residential	B	3	54.7	55.3	0.6	55.4	0.7
M-11	M	Residential	B	2	58.4	59.2	0.8	59.3	0.9
M-12	M	Residential	B	2	54.0	54.8	0.8	54.9	0.9
M-13	M	Recreational	C	1	55.9	56.5	0.6	56.6	0.7
M-14	M	Residential	B	2	54.8	55.4	0.6	55.5	0.7
M-15	M	Recreational	C	1	57.7	58.3	0.6	58.4	0.7
M-16	M	Residential	B	2	51.5	52.1	0.6	52.3	0.8
M-17	M	Residential	B	2	53.0	53.6	0.6	53.8	0.8
M-18	M	Residential	B	2	55.3	55.8	0.5	56.0	0.7
M-19	M	Residential	B	2	53.6	54.4	0.8	54.5	0.9
M-20	M	Residential	B	2	49.8	50.5	0.7	50.6	0.8
M-21	M	Residential	B	2	48.9	49.6	0.7	49.7	0.8
M-22	M	Recreational	C	1	63.8	64.4	0.6	64.5	0.7
M-23	M	Residential	B	2	58.2	59.0	0.8	59.1	0.9
M-24	M	Residential	B	2	51.2	51.8	0.6	52.0	0.8
M-25	M	Residential	B	2	54.3	54.9	0.6	55.0	0.7
M-26	M	Residential	B	1	52.9	53.5	0.6	53.6	0.7
M-27	M	Residential	B	1	53.1	53.7	0.6	53.8	0.7
M-28	M	Residential	B	1	52.7	53.4	0.7	53.5	0.8
M-29	M	Residential	B	1	53.7	54.2	0.5	54.4	0.7
M-30	M	Residential	B	1	52.6	53.3	0.7	53.5	0.9
M-31	M	Residential	B	3	54.5	55.0	0.5	55.2	0.7
M-32	M	Residential	B	2	50.9	51.5	0.6	51.6	0.7
M-33	M	Residential	B	1	51.0	51.7	0.7	51.8	0.8

If noise level approach or exceeds FHWA NAC – **Boldface**; substantial increase – Underlined

[1] Receptor does not have an outdoor use area and is therefore not considered impacted for this analysis.

FHWA Activity Category B, C	66	66	-	66	-
FHWA Activity Category E	71	71	-	71	-

Receiver ID	NSA	Land Use	FHWA NAC	Number of Receptors	Existing Conditions (2017) Leq	Future No-Build (2040) Leq	Difference No-Build (2040) - Existing (2017)	Future Build (2040) Leq	Difference Build (2040) - Existing (2017)
M-34	M	Residential	B	2	52.3	53.0	0.7	53.2	0.9
M-35	M	Residential	B	1	51.7	52.2	0.5	52.4	0.7
M-36	M	Residential	B	2	53.3	53.8	0.5	54.0	0.7
M-37	M	Residential	B	2	53.9	54.7	0.8	54.8	0.9
M-38	M	Residential	B	2	51.6	52.2	0.6	52.3	0.7
M-39	M	Residential	B	1	53.9	54.5	0.6	54.6	0.7
M-40	M	Residential	B	2	54.4	55.0	0.6	55.1	0.7
M-41	M	Residential	B	1	56.2	56.8	0.6	56.9	0.7
M-42	M	Residential	B	1	52.7	53.4	0.7	53.5	0.8
M-43	M	Residential	B	2	57.0	57.8	0.8	57.9	0.9
M-44	M	Residential	B	2	51.2	51.8	0.6	51.9	0.7
M-45	M	Residential	B	3	50.0	50.6	0.6	50.7	0.7
M-46	M	Residential	B	2	53.5	54.1	0.6	54.2	0.7
M-47	M	Residential	B	2	53.6	54.3	0.7	54.5	0.9
M-48	M	Residential	B	2	53.7	54.3	0.6	54.4	0.7
M-49	M	Residential	B	2	50.7	51.3	0.6	51.5	0.8
M-50	M	Residential	B	2	49.4	50.0	0.6	50.1	0.7
M-51	M	Residential	B	2	51.6	52.2	0.6	52.3	0.7
M-52	M	Residential	B	2	56.4	57.0	0.6	57.1	0.7
M-53	M	Residential	B	2	55.3	55.9	0.6	56.0	0.7
M-54	M	Residential	B	2	54.0	54.8	0.8	55.0	1.0
M-55	M	Residential	B	2	51.2	51.9	0.7	52.1	0.9
M-56	M	Residential	B	2	54.6	55.2	0.6	55.3	0.7
M-57	M	Residential	B	1	53.7	54.4	0.7	54.5	0.8
M-58	M	Residential	B	2	52.3	52.9	0.6	53.0	0.7
M-59	M	Residential	B	2	54.7	55.3	0.6	55.5	0.8
M-60	M	Residential	B	1	54.2	54.8	0.6	55.0	0.8
M-61	M	Residential	B	2	56.1	56.7	0.6	56.8	0.7
M-62	M	Residential	B	2	55.8	56.4	0.6	56.5	0.7
M-63	M	Residential	B	1	53.9	54.6	0.7	54.7	0.8
M-64	M	Residential	B	1	57.4	57.9	0.5	58.1	0.7
M-65	M	Residential	B	1	57.9	58.5	0.6	58.6	0.7
M-66	M	Residential	B	1	56.7	57.2	0.5	57.4	0.7
M-67	M	Residential	B	1	56.4	57.0	0.6	57.1	0.7
M-68	M	Residential	B	1	56.0	56.6	0.6	56.8	0.8
M-69	M	Residential	B	1	60.6	61.2	0.6	61.3	0.7
M-70	M	Residential	B	1	55.3	56.0	0.7	56.2	0.9
M-71	M	Residential	B	2	60.1	60.7	0.6	60.9	0.8
M-72	M	Residential	B	2	58.7	59.3	0.6	59.5	0.8
M-73	M	Residential	B	2	59.0	59.7	0.7	59.8	0.8
M-74	M	Residential	B	2	61.1	61.7	0.6	61.8	0.7
M-75	M	Residential	B	2	61.0	61.5	0.5	61.7	0.7

If noise level approach or exceeds FHWA NAC – **Boldface**; substantial increase – Underlined

[1] Receptor does not have an outdoor use area and is therefore not considered impacted for this analysis.

FHWA Activity Category B, C	66	66	-	66	-
FHWA Activity Category E	71	71	-	71	-

Receiver ID	NSA	Land Use	FHWA NAC	Number of Receptors	Existing Conditions (2017) Leq	Future No-Build (2040) Leq	Difference No-Build (2040) - Existing (2017)	Future Build (2040) Leq	Difference Build (2040) - Existing (2017)
M-76	M	Residential	B	2	61.3	61.9	0.6	62.0	0.7
M-77	M	Residential	B	2	62.0	62.6	0.6	62.7	0.7
M-78	M	Residential	B	2	59.7	60.4	0.7	60.5	0.8
If noise level approach or exceeds FHWA NAC – **Boldface**; substantial increase – Underlined [1] Receptor does not have an outdoor use area and is therefore not considered impacted for this analysis.									
FHWA Activity Category B, C					66	66	-	66	-
FHWA Activity Category E					71	71	-	71	-

Land Use Planning and Traffic Noise

The following analysis provides information regarding modeled noise levels along I-94 from TH 101 to the I-494/I-694 Interchange for use in community and land use planning.

The prevention of future traffic noise impacts is an important component of noise control. Local governments, through their authority to regulate land development, can help prevent future traffic noise impacts through proper zoning of non-noise-sensitive land uses adjacent to a highway or by ensuring that developments are planned, designed and implemented is such a way to minimize traffic noise impacts. Predicted build-condition traffic noise level contours are not a definitive means by which to assess traffic noise level impacts. Although FHWA regulation prohibits the use of noise level contours for traffic noise impact prediction, noise level contours can aid in future land use planning efforts in presently undeveloped areas (NAC G).

Table 6 below presents the approximate distance from the nearest edge of pavement reached by build noise level contours correlating to the traffic noise impact thresholds for NAC E and NAC B and C land uses. A 71 dBA hourly-equivalent noise level correlates to the impact threshold for a NAC E land use. An hourly-equivalent noise level of 66 dBA correlates to the impact threshold for NAC B and C land uses. The distances at which 71 dBA and 66 dBA hourly-equivalent traffic noise levels are predicted to occur vary depending on traffic conditions throughout the project area and were derived via modeling results. Traffic noise levels were modeled using 10-foot increments from 10 feet to 300 feet, then using 20-foot increments from 320 feet to 500 feet from the edge of the nearest pavement. The modeling locations were placed in undeveloped areas of the corridor without any intervening barriers or structures.

Table 6: Land Use Planning and Traffic Noise

NSA	Build Alternative Contour Distances (ft)	
	66 dBA	71 dBA
D	390	200
E	460	250
F	480	250
H	460	250
I	440	245
K	400	240

4.0 CONSIDERATION OF NOISE ABATEMENT

According to the definitions in 23 CFR 772 the proposed project is considered a Type I project. 23 CFR 772.15(c) describes noise abatement measures that are to be considered when a noise impact has been identified with a Type I highway project. These noise abatement measures include:

- Construction of noise barriers, including acquisition of property rights, either within or outside the highway right of way. Landscaping is not a viable noise abatement measure.
- Traffic management measures including, but not limited to, traffic control devices and signing for prohibition of certain vehicle types, time-use restrictions for certain vehicle types, modified speed limits, and exclusive lane designations.
- Alteration of horizontal and vertical alignments.
- Acquisition of real property or interests therein (predominantly unimproved property) to serve as a buffer zone to preempt development which would be adversely impacted by traffic noise.
- Noise insulation of certain facilities, including: auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, pubic meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools and television studios.

Noise Barrier Evaluation

MnDOT's policies and procedures for evaluating noise barrier feasibility and reasonableness are set forth in Section 5.2 (Feasibility) and Section 5.3 (Reasonableness) of the *MnDOT Noise Requirements*. The factors for determining noise barrier feasibility and reasonableness as described in the *MnDOT Noise Requirements* are summarized below. Noise barrier construction decisions are based on a study of feasibility and reasonableness.

Acoustic feasibility requires that a noise abatement measure must achieve a 5 dBA reduction at an impacted receptor for that receptor to be considered benefited. Engineering feasibility is determined by physical and/or engineering constraints taking into consideration safety topography, drainage, utilities and maintenance. MnDOT has established a maximum noise barrier height of 20 feet above the finished ground line at the noise barrier.

There are three reasonableness factors that must be met for a noise abatement measure to be considered reasonable;

- One benefited receptor must achieve the noise reduction design goal of at least 7 dBA,
- The cost effectiveness (CE) of the noise barrier cannot exceed $78,500 per benefited receptor (determined by dividing the total cost of the noise barrier by the number of benefited receptors) based on an estimated noise barrier construction cost of $36/sq. ft. plus any additional costs for rub rails, retaining wall reinforcement, etc., and
- The viewpoints of benefited residents and property owners must be solicited, recorded and considered in reaching a decision on the proposed noise abatement measure.

The feasibility of noise barrier construction is sometimes dependent on design details that are not known until the final design phase of the project. It is assumed that any utilities located within the project corridor can be relocated to accommodate noise barriers. The proposed improvement project is to be constructed entirely within the existing right of way.

The noise reduction provided by a noise barrier is a function of vehicle mix (percent automobiles, medium trucks and heavy trucks), the height of the traffic noise sources, the distance from the

traffic noise source to the receiver, and the height of the noise barrier. Noise barriers were evaluated in areas where there are impacted receivers with the future (2040) Build Alternative. The noise barriers are identified throughout the report, in **Tables 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18 and 19** and on **Figures 2 through 16 (Appendix A)** with the following nomenclature, Noise Barrier (NB) 1 through NB 13.

There are several additional scattered receptors that approach or exceed the NAC along Maple Grove trails in transportation-use corridors and on bridges where noise barriers were not analyzed due to feasibility issues. *MnDOT Noise Requirements* specify no more than one receptor per 250 feet of trail. Noise barriers along I-94 would not be feasible because of the elevation difference to the trail receptors, and noise barriers along the bridge structures themselves would not sufficiently abate noise because they would not block the line of sight from the local road adjacent to the trail receptors. In addition, local roads and I-94 interchange ramps create multiple locations where openings in the barrier would be required, making them less effective[1]. Noise barriers considered for these areas are discussed in the next section under the NSAs in which the trail receptors are located.

A noise barrier that is located along a concrete barrier on an existing bridge must meet crash impact specifications and be lightweight. Because of these requirements, a barrier mounted noise barrier on a bridge has a greater estimated construction cost compared to the standard MnDOT noise barrier construction cost of $36 per square foot. The estimated cost for a test level-4 (TL-4) crash tested noise barrier is $135 per square foot, and these portions of a noise barrier must be limited to 10 feet in height. A 20-foot high noise barrier is MnDOT's maximum noise barrier height.

Noise Barrier Results

NSAs A and L

Based on the costs for a crash tested, barrier mounted noise barrier on bridges and the required number of benefited trail receptors, it is not possible to construct a noise barrier that would meet MnDOT's cost effectiveness criteria for the impacted trail receptors located in these NSAs.

A noise barrier along the Weaver Lake Road bridge would be 600 feet long between the interchange ramps. This barrier would consist of 200 feet off the bridge and 400 feet on the bridge. The portion on the bridge is limited to 10 feet in height. A barrier with 200 feet of 20 foot high barrier and 400 feet of 10 foot high barrier would cost $684,000. As there are only 2 receptor locations on the trail between the interchange ramps, the CE would be $342,000 per receptor which exceeds $78,500. If a 10 foot high barrier were constructed for the entire length of 700 feet, it would cost $612,000. The resulting CE for 2 receptors would be $306,000 per receptor which, also exceeds $78,500. Clearly there is no reasonable barrier available.

NSA B

For the barriers along Rice Lake (NB1, NB2 and NB3), noise barrier panels were not feasible to analyze on the existing bridge structures. These bridges are not currently designed to withstand the load of a test level-4 (TL-4) crash tested barrier and would need to be retrofitted, resulting in design changes that are out of the project scope and increasing barrier cost. Because of the gaps required to accommodate the bridges, Barriers NB1, NB2, and NB3 are being analyzed as three separate barriers and must be able to individually meet feasibility and reasonableness criteria in order for the barrier to be proposed.

[1] Highway Traffic Noise: Analysis and Abatement Guidance, U.S. Department of Transportation, Federal Highway Administration, 2011, Page 56.

NB1

East of I-94, Weaver Lake Road to City of Maple Grove Trail Bridge

Receivers B-1 to B-16 and B-110 to B-141.

The land use in this area is 30 residential receptors (representing 37 dwelling units), 16 City of Maple Grove trail receptors, one office building and one recreational receptor at the Cradle Club. The 2040 build L_{eq} noise levels would range from 52.1 to 80.9 dBA L_{eq}, with 16 receptors approaching or exceeding the FHWA NAC.

A noise barrier approximately 2,255 feet long was modeled within MnDOT right of way along I-94 from Weaver Lake Road to the City of Maple Grove Trail Bridge. The noise barrier was modeled at heights of 20 feet (with the end tapered at Weaver Lake Road) and 17 feet. The 20 foot tall noise barrier provided noise level reductions ranging from 0.1 to 9.8 decibels and would cost $1,637,490 at a cost of $36 per sq. ft., including the addition of 1,250 ft. of guardrail at $15 per ft. as part of the barrier is within the clear zone. The cost per benefited receptor was $77,976 which is below MnDOT's cost effectiveness threshold of $78,500 per benefited receptor. The 17 foot tall noise barrier provided noise level reductions ranging from 0.1 to 9.0 decibels, and the cost per benefited receptor was $88,573 which is above MnDOT's cost effectiveness threshold of $78,500 per benefited receptor. Because the 20 foot tall noise barrier meets MnDOT's cost effectiveness threshold, the 20 foot tall noise barrier for NB1 is proposed.

Noise Mitigation Cost Effectiveness Results for NB1 are shown in **Table 7.**

NB2

East of I-94, City of Maple Grove Trail Bridge to Three Rivers Park District Trail Bridge

Receivers B-17 to B-32 and B-185.

The land use in this area is 16 City of Maple Grove trail receptors and 1 residential receptor on the peninsula of Rice Lake. The 2040 build L_{eq} noise levels would range from 58.0 to 80.2 dBA L_{eq}, with 14 receptors approaching or exceeding the FHWA NAC.

A noise barrier approximately 3,880 feet long was modeled within MnDOT right of way along I-94 from the City of Maple Grove Trail Bridge to the Three Rivers Park District Trail Bridge. The noise barrier was modeled at heights of 20 feet, 14 feet and 8 feet. The 20 foot tall noise barrier provided noise level reductions ranging from 2.7 to 14.7 decibels and would cost $2,823,600 at a cost of $36 per sq. ft., including the addition of 2,000 ft. of guardrail at $15 per ft. as part of the barrier is within the clear zone. The cost per benefited receptor was $176,475 which is above MnDOT's cost effectiveness threshold of $78,500 per benefited receptor. The 14 foot tall noise barrier provided noise level reductions ranging from 2.1 to 12.4 decibels, and the cost per benefited receptor was $141,823 which is above MnDOT's cost effectiveness threshold of $78,500 per benefited receptor. The 8 foot tall noise barrier provided noise level reductions ranging from 0.8 to 8.6 decibels, and the cost per benefited receptor was $163,920 which is above MnDOT's cost effectiveness threshold of $78,500 per benefited receptor. None of the barriers modeled result in cost per benefited receptor values that are below MnDOT's cost effectiveness threshold, with the 14 foot barrier having the lowest cost per benefited receptor achievable; therefore, NB2 is not proposed. The greatest number of benefited receptors was achieved with the 20 foot barrier, as shown in **Appendix A**.

Noise Mitigation Cost Effectiveness Results for NB2 are shown in **Table 8**.

NB3

East of I-94, Three Rivers Park District Trail Bridge to 93rd Avenue N

Receivers B-33 to B-109 and B-142 to B-184.

The land use in this area is 101 residential receptors (representing 104 dwelling units) and 19 recreational receptors on trails (14 on Three Rivers Park District trails, 5 on City of Maple Grove trails). The 2040 build L_{eq} noise levels would range from 51.5 to 80.9 dBA L_{eq}, with 38 receptors approaching or exceeding the FHWA NAC.

A noise barrier approximately 3,255 feet long was modeled within MnDOT right of way along I-94 from the Three Rivers Park District Trail Bridge to 93rd Avenue N. The noise barrier was modeled at heights of 20 feet (with the end tapered at 93rd Avenue N) and 17 feet. The 20 foot tall noise barrier provided noise level reductions ranging from 1.4 to 12.5 decibels and would cost $2,348,490 at a cost of $36 per sq. ft., including the addition of 650 ft. of guardrail at $15 per ft. as part of the barrier is within the clear zone. The cost per benefited receptor was $44,311 which is below MnDOT's cost effectiveness threshold of $78,500 per benefited receptor. The 17 foot tall noise barrier provided noise level reductions ranging from 0.9 to 11.7 decibels, and the cost per benefited receptor was $54,599 which is below MnDOT's cost effectiveness threshold of $78,500 per benefited receptor. Both barriers modeled result in cost per benefited receptor values that are below MnDOT's cost effectiveness threshold; therefore, the 20 foot tall noise barrier for NB3 is proposed.

Noise Mitigation Cost Effectiveness Results for NB3 are shown in **Table 9**.

NSAs C and J

Based on the costs for a crash tested, barrier mounted noise barrier on bridges and the required number of benefited trail receptors, it is not possible to construct a noise barrier that would meet MnDOT's cost effectiveness criteria for the impacted trail receptors located in these NSAs.

A noise barrier along the Maple Grove Parkway bridge would be 1,100 feet long between the interchange ramps. This barrier would consist of 750 feet off the bridge and 350 feet on the bridge. The portion on the bridge is limited to 10 feet in height. A barrier with 750 feet of 20 foot high barrier and 350 feet of 10 foot high barrier would cost $1,012,500. As there are only 3 receptor locations on the trail between the interchange ramps, the CE would be $337,500 per receptor which exceeds $78,500. If a 10 foot high barrier were constructed for the entire length of 700 feet, it would cost $742,500. The resulting CE for 3 receptors would be $247,500 per receptor which, also exceeds $78,500. Clearly there is no reasonable barrier available.

NSA D

<u>NB4</u>

East of I-94, TH 610 to 950 feet north of 105th Avenue

Receivers D-1 to D-7.

The land use in this area consists of 3 residential receptors and 4 trail receptors. The 2040 build L_{eq} noise levels would range from 58.8 to 74.4 dBA L_{eq}, with 5 receptors approaching or exceeding the FHWA NAC.

A noise barrier approximately 2,880 feet long was modeled within MnDOT right of way along I-94 from TH 610 to approximately 950 feet north 105th Avenue. The noise barrier was modeled at heights of 20 feet and 17 feet. The 20 foot tall noise barrier provided noise level reductions ranging from 2.7 to 7.5 decibels. and would cost $2,095,500 at a cost of $36 per sq. ft., including the addition of 1460 ft. of guardrail at $15 per ft. as part of the barrier is within the clear zone. The cost per benefited receptor was $698,500 which is above MnDOT's cost effectiveness threshold of $78,500 per benefited receptor. The 17 foot tall noise barrier provided noise level reductions ranging from 2.4 to 6.6 decibels, and the cost per benefited receptor was $1,784,460 which is above MnDOT's cost effectiveness threshold of $78,500 per benefited receptor. Since this barrier could only attain the 7 dBA reduction design goal with MnDOT's maximum barrier

height of 20 feet, and the cost for this barrier exceeds the cost effectiveness threshold of $78,500 per benefited receptor, noise barrier NB4 is not proposed.

Noise Mitigation Cost Effectiveness Results for NB4 are shown in **Table 10**.

NSAs D and I

Based on the costs for a crash tested, barrier mounted noise barrier on bridges and the required number of benefited trail receptors, it is not possible to construct a noise barrier that would meet MnDOT's cost effectiveness criteria for the impacted trail receptors located in these NSAs.

A noise barrier along the 105th Avenue bridge would be 1,200 feet long within the 500-foot study area along 105th Avenue. This barrier would consist of 750 feet off the bridge and 450 feet on the bridge. The portion on the bridge is limited to 10 feet in height. A barrier with 750 feet of 20 foot high barrier and 450 feet of 10 foot high barrier would cost $1,147,500. As there are only 4 receptor locations on the trail, the Cost Effectiveness (CE) would be $286,875 per receptor which exceeds $78,500. If a 10 foot high barrier were constructed for the entire length of 1,200 feet, it would cost $877,500. The resulting CE for 4 receptors would be $219,375 per receptor which, also exceeds $78,500. Clearly there is no reasonable barrier available.

NSA F

<u>NB5</u>

East of I-94, Brockton Lane to Territorial Road

Receivers F-1 to F-3.

The land use in this area consists of 2 residential receptors and 1 industrial receptor. The 2040 build L_{eq} noise levels would range from 66.4 to 72.2 dBA L_{eq}, with 2 receptors approaching or exceeding the FHWA NAC.

A noise barrier approximately 1,305 feet long was modeled within MnDOT right of way along I-94 from Territorial Road to Brockton Lane. The noise barrier was modeled at heights of 20 feet and 17 feet. The 20 foot tall noise barrier provided noise level reductions ranging from 5.6 to 8.3 decibels. and would cost $939,600 at a cost of $36 per sq. ft. The cost per benefited receptor was $313,200 which is above MnDOT's cost effectiveness threshold of $78,500 per benefited receptor. The 17 foot tall noise barrier provided noise level reductions ranging from 4.4 to 6.5 decibels, and the cost per benefited receptor was $399,330 which is above MnDOT's cost effectiveness threshold of $78,500 per benefited receptor. Since this barrier can only attain the 7 dBA reduction design goal with MnDOT's maximum barrier height of 20 feet, and the 20 foot tall barrier exceeds the cost effectiveness threshold of $78,500 per benefited receptor, noise barrier NB5 is not proposed.

Noise Mitigation Cost Effectiveness Results for NB5 are shown in **Table 11.**

NSAs G and H

Based on the costs for a crash tested, barrier mounted noise barrier on bridges and the required number of benefited trail receptors, it is not possible to construct a noise barrier that would meet MnDOT's cost effectiveness criteria for the impacted trail receptors located in these NSAs.

A noise barrier along the TH 101 bridge would be 700 feet long between the interchange ramps. This barrier would consist of 350 feet off the bridge and 350 feet on the bridge. The portion on the bridge is limited to 10 feet in height. A barrier with 350 feet of 20 foot high barrier and 350 feet of 10 foot high barrier would cost $724,500. As there are only 2 receptor locations on the trail between the interchange ramps, the CE would be $362,250 per receptor which exceeds $78,500. If a 10 foot high barrier were constructed for the entire length of 700 feet, it would cost $598,500. The resulting CE for 2 receptors would be $299,250 per receptor which, also exceeds $78,500. Clearly there is no reasonable barrier available.

NSA H

NB6

West of I-94, TH 101 to Church Avenue

Receivers H-1 to H-6.

The land use in this area consists of 1 recreational receptor at Rogers Library, 2 industrial receptors, and 3 commercial receptors. The 2040 build L_{eq} noise levels would range from 70.6 to 74.8 dBA L_{eq}, with 1 receptor approaching or exceeding the FHWA NAC.

A noise barrier approximately 1,260 feet long was modeled within MnDOT right of way along I-94 from TH 101 to Church Avenue. The noise barrier was modeled at heights of 20 feet, 17 feet, 14 feet and 11 feet. The 20 foot tall noise barrier provided noise level reductions ranging from 5.4 to 10.8 decibels. and would cost $907,200 at a cost of $36 per sq. ft. The cost per benefited receptor was $151,200 which is above MnDOT's cost effectiveness threshold of $78,500 per benefited receptor. The 11 foot tall noise barrier provided noise level reductions ranging from 3.6 to 7.2 decibels, and the cost per benefited receptor was $99,792 which is above MnDOT's cost effectiveness threshold of $78,500 per benefited receptor. Although this barrier can still attain the 7 dBA reduction design goal at a height of 11 feet, this barrier still exceeds the cost effectiveness threshold of $78,500 per benefited receptor; therefore, NB6 is not proposed.

Noise Mitigation Cost Effectiveness Results for NB6 are shown in **Table 12**.

NSA I

NB7

West of I-94, CSAH 81 to Brockton Lane

Receivers I-6 to I-46.

The land use in this area consists of 41 residential receptors. The 2040 build L_{eq} noise levels would range from 48.4 to 71.2 dBA L_{eq}, with 3 receptors approaching or exceeding the FHWA NAC.

A noise barrier approximately 2,325 feet long was modeled within MnDOT right of way along I-94 from CSAH 81 to Brockton Lane. The noise barrier was modeled at heights of 20 feet and 17 feet. The 20 foot tall noise barrier provided noise level reductions ranging from 0 to 9.3 decibels and would cost $1,674,000 at a cost of $36 per sq. ft. The cost per benefited receptor was $279,000 which is above MnDOT's cost effectiveness threshold of $78,500 per benefited receptor. The 17 foot tall noise barrier provided noise level reductions ranging from 0 to 7.9 decibels, and the cost per benefited receptor was $355,725 which is above MnDOT's cost effectiveness threshold of $78,500 per benefited receptor. The modeled barrier was not able to achieve 5 dBA of noise reduction at most of the receptors due to an existing 14' block fence that is already blocking the line of sight to I-94 and Territorial Road, thus providing noise shielding. Because both barriers result in cost per benefited receptor values that are above MnDOT's cost effectiveness threshold, NB7 is not proposed. The greatest number of benefited receptors was achieved with the 20 foot barrier, as shown in **Appendix A**.

Noise Mitigation Cost Effectiveness Results for NB7 are shown in **Table 13**.

NSAs J and K

NB8

West of I-94, Maple Grove Parkway to 93rd Avenue N

Receivers J-1 to J-5, J-7, J-8, and K-33 to K-36.

The land use in this area consists of 1 commercial receptor with outdoor use and 10 trail receptors. The 2040 build L_{eq} noise levels would range from 58.6 to 70.7 dBA L_{eq}, with 4 receptors approaching or exceeding the FHWA NAC.

A noise barrier approximately 890 feet long was modeled within MnDOT right of way along the I-94 EB on ramp from Maple Grove Parkway to 93rd Avenue N. The noise barrier was modeled at heights of 20 feet and 15 feet. The 20 foot tall noise barrier provided noise level reductions ranging from 0.8 to 7.3 decibels. and would cost $640,800 at a cost of $36 per sq. ft. The cost per benefited receptor was $320,400 which is above MnDOT's cost effectiveness threshold of $78,500 per benefited receptor. The 15 foot tall noise barrier provided noise level reductions ranging from 0.8 to 6.0 decibels, and the cost per benefited receptor was $480,600 which is above MnDOT's cost effectiveness threshold of $78,500 per benefited receptor. Since this barrier could only attain the 7 dBA reduction design goal with MnDOT's maximum barrier height of 20 feet, and the cost for this barrier exceeds the cost effectiveness threshold of $78,500 per benefited receptor, noise barrier NB8 is not proposed.

Noise Mitigation Cost Effectiveness Results for NB8 are shown in **Table 14**.

NSA K

<u>NB9</u>

West of I-94, Weston Lane to Three Rivers Park District Trail Bridge

Receivers K-24 to K-32.

The land use in this area consists of 3 residential receptors and 6 Three Rivers Park District trail receptors. The 2040 build L_{eq} noise levels would range from 63.0 to 73.9 dBA L_{eq}, with 6 receptors approaching or exceeding the FHWA NAC.

A noise barrier approximately 1,860 feet long was modeled within MnDOT right of way along I-94 from Weston Lane to the Three Rivers Park District Trail Bridge. The noise barrier was modeled at heights of 20 feet, 17 feet, 14 feet and 11 feet. The 20 foot tall noise barrier provided noise level reductions ranging from 0.3 to 12.1 decibels. and would cost $1,365,900 at a cost of $36 per sq. ft., including the addition of 1780 ft. of guardrail at $15 per ft. as part of the barrier is within the clear zone. The cost per benefited receptor was $195,129 which is above MnDOT's cost effectiveness threshold of $78,500 per benefited receptor. The 11 foot tall noise barrier provided noise level reductions ranging from 0.1 to 9.1 decibels, and the cost per benefited receptor was $127,210 which is above MnDOT's cost effectiveness threshold of $78,500 per benefited receptor. Although this barrier can still attain the 7 dBA reduction design goal at a height of 11 feet, this barrier still exceeds the cost effectiveness threshold of $78,500 per benefited receptor; therefore, NB9 is not proposed.

Noise Mitigation Cost Effectiveness Results for NB9 are shown in **Table 15**.

<u>NB10</u>

West of I-94, Between Elm Creek Rest Area Ramps

Receivers K-18 to K-23.

The land use in this area consists of 3 residential receptors and 3 Elm Creek Rest Area recreational receptors. The 2040 build L_{eq} noise levels would range from 61.5 to 80.2 dBA L_{eq}, with the 3 receptors at the rest area approaching or exceeding the FHWA NAC. The residences within close proximity of the rest area are not impacted by the idling trucks.

A noise barrier approximately 1,470 feet long was modeled within MnDOT right of way along I-94 between Elm Creek Rest Area Ramps. The noise barrier was modeled at the MnDOT maximum noise barrier height of 20 feet. The 20 foot tall noise barrier provided noise level reductions ranging from 0.1 to 1.2 decibels. and would cost $1,058,400 at a cost of $36 per sq. ft.

The barrier was not able to provide benefit to any receptors behind the barrier. The noise levels at the Elm Creek Rest Area receptors are dominated by idling truck noise from the truck parking expansion at the rest area. Because this barrier cannot achieve 5 dBA reduction or the 7 dBA reduction design goal at a height of 20 feet, NB10 is not feasible and is not proposed.

Noise Mitigation Cost Effectiveness Results for NB10 are shown in **Table 16**.

NB11

West of I-94, Shadow Creek Road to 850 feet south of City of Maple Grove Trail Bridge

Receivers K-6 to K-14.

The land use in this area consists of 9 City of Maple Grove trail receptors. The 2040 build L_{eq} noise levels would range from 65.2 to 76.0 dBA L_{eq}, with 7 receptors approaching or exceeding the FHWA NAC.

A noise barrier approximately 2,280 feet long was modeled within MnDOT right of way along I-94 from Shadow Creek Road to 850 feet south of City of Maple Grove Trail Bridge. The noise barrier was modeled at heights of 20 feet, 17 feet, 14 feet and 11 feet. The 20 foot tall noise barrier provided noise level reductions ranging from 5.3 to 14.4 decibels. and would cost $1,656,600 at a cost of $36 per sq. ft., including the addition of 1000 ft. of guardrail at $15 per ft. as part of the barrier is within the clear zone. The cost per benefited receptor was $184,067, which is above MnDOT's cost effectiveness threshold of $78,500 per benefited receptor. The 11 foot tall noise barrier provided noise level reductions ranging from 3.2 to 10.3 decibels, and the cost per benefited receptor was $152,980, which is above MnDOT's cost effectiveness threshold of $78,500 per benefited receptor. Although this barrier can still attain the 7 dBA reduction design goal at a height of 11 feet, this barrier still exceeds the cost effectiveness threshold of $78,500 per benefited receptor; therefore, NB11 is not proposed.

Noise Mitigation Cost Effectiveness Results for NB11 are shown in **Table 17**.

NSA L

For the barrier west of I-94 and south of Weaver Lake Road (NB12), the noise barrier was not feasible to analyze farther north than approximately 250 feet south of the traffic meter for the I-94 eastbound onramp. There is not sufficient space to place a barrier between Fish Lake Road and the onramp due to the need for snow storage, safety guardrails on either side, and width of the barrier itself. Fish Lake Road would need to be realigned, resulting in design changes that are out of the project scope and increasing barrier cost.

NB12

West of I-94, 650 feet south of Weaver Lake Road to existing barrier at Wedgewood Way N

Receivers L-101 to L-210 and L-215 to L-224.

The land use in this area consists of 105 residential receptors, 10 City of Maple Grove trail receptors, 3 office buildings, 1 funeral chapel, and 1 recreational receptor at New Horizon Academy. The 2040 build L_{eq} noise levels would range from 50.0 to 77.0 dBA L_{eq}, with 31 receptors approaching or exceeding the FHWA NAC.

A noise barrier approximately 3,765 feet long was modeled within MnDOT right of way along I-94 from approximately 650 feet south of Weaver Lake Road to existing barrier at Wedgewood Way N. The noise barrier was modeled at heights of 20 feet (with the end tapered between the I-94 ramp and Fish Lake Road) 17 feet, and 14 feet. The 20 foot tall noise barrier provided noise level reductions ranging from 0.5 to 15.6 decibels and would cost $2,701,080 at a cost of $36 per sq. ft., including the addition of 2300 ft. of guardrail at $15 per ft. as part of the barrier is within the clear zone. The cost per benefited receptor was $28,735 which is below MnDOT's cost effectiveness threshold of $78,500 per benefited receptor. The 17 foot tall noise barrier provided

noise level reductions ranging from 0.3 to 14.4 decibels, and the cost per benefited receptor was $26,619 which is below MnDOT's cost effectiveness threshold of $78,500 per benefited receptor. The 14 foot tall noise barrier provided noise level reductions ranging from 0.2 to 12.9 decibels, and the cost per benefited receptor was $27,637 which is below MnDOT's cost effectiveness threshold of $78,500 per benefited receptor. The three barriers modeled result in cost per benefited receptor values that are below MnDOT's cost effectiveness threshold; therefore, the 20 foot tall noise barrier for NB12 is proposed.

Noise Mitigation Cost Effectiveness Results for NB12 are shown in **Table 18**.

NB13

West of I-494, At Vinewood Lane N, between Wedgewood Way N and 73rd Avenue N

Receivers L-1 to L-16.

The land use in this area consists of 16 residential receptors, representing 36 total dwelling units. The 2040 build L_{eq} noise levels would range from 56.9 to 71.2 dBA L_{eq}, with 6 receptors (12 dwelling units) approaching or exceeding the FHWA NAC.

A noise barrier approximately 1,190 feet long was modeled within MnDOT right of way along I-94 at Vinewood Lane N. The noise barrier was modeled at heights of 20 feet, 17 feet and 14 feet. The 20 foot tall noise barrier provided noise level reductions ranging from 3.3 to 11.7 decibels and would cost $870,300 at a cost of $36 per sq. ft., including the addition of 900 ft. of guardrail at $15 per ft. as part of the barrier is within the clear zone. The cost per benefited receptor was $29,010 which is below MnDOT's cost effectiveness threshold of $78,500 per benefited receptor. The 17 foot tall noise barrier provided noise level reductions ranging from 3.0 to 10.7 decibels, and the cost per benefited receptor was $30,908 which is below MnDOT's cost effectiveness threshold of $78,500 per benefited receptor. The 14 foot tall noise barrier provided noise level reductions ranging from 2.1 to 9.3 decibels, and the cost per benefited receptor was $49,980 which is below MnDOT's cost effectiveness threshold of $78,500 per benefited receptor. The three barriers modeled result in cost per benefited receptor values that are below MnDOT's cost effectiveness threshold; therefore, the 20 foot tall noise barrier for NB13 is proposed.

Noise Mitigation Cost Effectiveness Results for NB13 are shown in **Table 19**.

Table 7: Noise Mitigation Cost Effectiveness Results – NB1

20 Foot Barrier

NB1 (Weaver Lake Road to City of Maple Grove Trail Bridge)

Receptors	Activity Category	Preferred Alternative Leq Noise Levels (dBA)		Reduction (in dBA)(2)	Number of Units	Number of Benefited Receptors	Number of Receptors Meeting Design Goal Reduction(3)	Average Decibel Reduction	Length of barrier (feet)	Barrier Area (SF) (4)	Total cost of barrier $36/sq. ft(5)	Cost / benefited receptor(6)
		2040 (No Barrier) (1)	2040 (With Barrier) (1)									
B-1	C	68.4	63.4	**5.0**	1	1	0					
B-2	C	62.5	61.1	1.3	1	0	0					
B-3	E	66.7	62.7	4.0	1	0	0					
B-4	C	66.7	58.8	**7.6**	1	1	1					
B-5	C	66.6	58.8	**7.9**	1	1	1					
B-6	C	63.6	58.4	**5.2**	1	1	0					
B-7	C	62.2	56.9	**5.2**	1	1	0					
B-8	C	68.5	60.2	**8.2**	1	1	1					
B-9	C	71.6	61.9	**9.5**	1	1	1					
B-10	C	68.1	60.6	**7.3**	1	1	1					
B-11	C	60.9	56.3	4.6	1	0	0	4.1	2,255	44,965	$1,637,490	$77,976
B-12	C	72.8	63.0	**9.8**	1	1	1					
B-13	B	59.9	55.2	4.8	2	0	0					
B-14	C	72.4	64.3	**8.1**	1	1	1					
B-15	C	73.7	66.3	**7.4**	1	1	1					
B-16	C	80.9	75.5	**5.4**	1	1	0					
B-110	B	52.1	52.0	0.1	1	0	0					
B-111	B	52.9	52.7	0.2	1	0	0					
B-112	B	53.5	53.3	0.2	1	0	0					
B-113	B	65.1	58.1	**6.9**	1	1	0					
B-114	B	65.6	58.7	**6.9**	1	1	0					

20 Foot Barrier

NB1 (Weaver Lake Road to City of Maple Grove Trail Bridge)

Receptors	Activity Category	Preferred Alternative Leq Noise Levels (dBA)		Reduction (in dBA)(2)	Number of Units	Number of Benefited Receptors	Number of Receptors Meeting Design Goal Reduction(3)	Average Decibel Reduction	Length of barrier (feet)	Barrier Area (SF) (4)	Total cost of barrier $36/sq. ft(5)	Cost / benefited receptor(6)
		2040 (No Barrier) (1)	2040 (With Barrier) (1)									
B-115	B	65.2	58.7	**6.5**	1	1	0					
B-116	B	66.1	59.8	**6.4**	1	1	0					
B-117	B	66.5	59.8	**6.7**	1	1	0					
B-118	B	65.8	59.0	**6.8**	1	1	0					
B-119	B	54.3	54.1	0.2	1	0	0					
B-120	B	53.7	53.4	0.3	1	0	0					
B-121	B	52.9	52.7	0.2	1	0	0					
B-122	B	66.9	61.9	**5.1**	1	1	0					
B-123	B	67.1	61.1	**5.9**	1	1	0					
B-124	B	66.3	60.0	**6.2**	1	1	0					
B-125	B	55.1	54.8	0.3	1	0	0					
B-126	B	54.9	54.5	0.4	1	0	0	4.1	2,255	44,965	$1,637,490	$77,976
B-127	B	54.2	53.9	0.3	1	0	0					
B-128	B	58.8	57.6	1.2	1	0	0					
B-129	B	60.7	58.7	2.0	1	0	0					
B-130	B	58.9	57.4	1.5	1	0	0					
B-131	B	67.6	63.9	3.7	1	0	0					
B-132	C	65.7	64.9	0.8	1	0	0					
B-133	C	59.2	59.0	0.2	1	0	0					
B-134	C	57.7	57.6	0.1	1	0	0					
B-135	B	57.1	52.5	4.5	2	0	0					
B-136	B	54.1	49.5	4.6	2	0	0					
B-137	B	59.3	55.0	4.4	2	0	0					

20 Foot Barrier

NB1 (Weaver Lake Road to City of Maple Grove Trail Bridge)

Receptors	Activity Category	Preferred Alternative Leq Noise Levels (dBA)		Reduction (in dBA)(2)	Number of Units	Number of Benefited Receptors	Number of Receptors Meeting Design Goal Reduction(3)	Average Decibel Reduction	Length of barrier (feet)	Barrier Area (SF) (4)	Total cost of barrier $36/sq. ft(5)	Cost / benefited receptor(6)
		2040 (No Barrier) (1)	2040 (With Barrier) (1)									
B-138	B	58.3	54.5	3.9	2	0	0	4.1	2,255	44,965	$1,637,490	$77,976
B-139	B	57.7	54.3	3.3	2	0	0					
B-140	B	57.5	54.2	3.3	2	0	0					
B-141	B	57.3	54.2	3.1	1	0	0					

(1) Underlined numbers represent any value approaching or exceeding the Federal Noise Abatement Criteria
(2) **Bold** Numbers represent benefited receptors (5 decibel reduction or greater)
(3) For the barrier to be reasonable, the design goal is to achieve at least 7 dBA reduction for at least one receptor.
(4) Barrier area incorporates barrier taper at Weaver Lake Road for the proposed barrier.
(5) The cost for a barrier is $36/sqft. Cost includes the addition of 1250 ft. guardrail at a cost of $15 per ft.
(6) The maximum cost/benefited receptor is $78,500 for a barrier to be considered reasonable.

17 Foot Barrier

NB1 (Weaver Lake Road to City of Maple Grove Trail Bridge)

Receptors	Activity Category	Preferred Alternative Leq Noise Levels (dBA)		Reduction (in dBA)[2]	Number of Units	Number of Benefited Receptors	Number of Receptors Meeting Design Goal Reduction[3]	Average Decibel Reduction	Length of barrier (feet)	Barrier Area (SF)	Total cost of barrier $36/sq. ft[4]	Cost / benefited receptor[5]
		2040 (No Barrier) [1]	2040 (With Barrier) [1]									
B-1	C	68.4	62.7	**5.7**	1	1	0					
B-2	C	62.5	61.2	1.2	1	0	0					
B-3	E	66.8	63.2	3.5	1	0	0					
B-4	C	66.7	59.6	**6.8**	1	1	0					
B-5	C	66.6	59.5	**7.2**	1	1	1					
B-6	C	63.6	59.3	4.3	1	0	0					
B-7	C	62.2	57.4	4.7	1	0	0					
B-8	C	68.5	61.0	**7.4**	1	1	1					
B-9	C	71.6	62.7	**8.7**	1	1	1					
B-10	C	68.1	61.3	**6.6**	1	1	0					
B-11	C	60.9	56.8	4.1	1	0	0					
B-12	C	72.8	63.8	**9.0**	1	1	1	3.6	2,285	38,845	$1,417,170	$88,573
B-13	B	59.9	55.7	4.3	2	0	0					
B-14	C	72.4	65.0	**7.4**	1	1	1					
B-15	C	73.7	66.7	**7.0**	1	1	1					
B-16	C	80.9	75.5	**5.4**	1	1	0					
B-110	B	52.1	52.0	0.1	1	0	0					
B-111	B	52.9	52.8	0.1	1	0	0					
B-112	B	53.5	53.4	0.1	1	0	0					
B-113	B	65.1	59.1	**5.9**	1	1	0					
B-114	B	65.6	59.7	**5.9**	1	1	0					
B-115	B	65.2	59.6	**5.6**	1	1	0					
B-116	B	66.1	61.2	**5.0**	1	1	0					

17 Foot Barrier

NB1 (Weaver Lake Road to City of Maple Grove Trail Bridge)

Receptors	Activity Category	Preferred Alternative Leq Noise Levels (dBA)		Reduction (in dBA)[2]	Number of Units	Number of Benefited Receptors	Number of Receptors Meeting Design Goal Reduction[3]	Average Decibel Reduction	Length of barrier (feet)	Barrier Area (SF)	Total cost of barrier $36/sq. ft[4]	Cost / benefited receptor[5]
		2040 (No Barrier) [1]	2040 (With Barrier) [1]									
B-117	B	66.5	61.0	**5.5**	1	1	0					
B-118	B	65.8	60.2	**5.6**	1	1	0					
B-119	B	54.3	54.1	0.2	1	0	0					
B-120	B	53.7	53.5	0.2	1	0	0					
B-121	B	52.9	52.8	0.1	1	0	0					
B-122	B	66.9	63.0	4.0	1	0	0					
B-123	B	67.1	62.4	4.6	1	0	0					
B-124	B	66.3	61.5	4.7	1	0	0					
B-125	B	55.1	54.9	0.2	1	0	0					
B-126	B	54.9	54.6	0.3	1	0	0					
B-127	B	54.2	54.0	0.2	1	0	0					
B-128	B	58.8	57.9	0.9	1	0	0	3.6	2,285	38,845	$1,417,170	$88,573
B-129	B	60.7	59.3	1.4	1	0	0					
B-130	B	58.9	57.8	1.1	1	0	0					
B-131	B	67.6	64.8	2.8	1	0	0					
B-132	C	65.7	64.8	0.9	1	0	0					
B-133	C	59.2	58.9	0.3	1	0	0					
B-134	C	57.7	57.5	0.2	1	0	0					
B-135	B	57.1	53.2	3.8	2	0	0					
B-136	B	54.1	50.2	3.9	2	0	0					
B-137	B	59.3	55.5	3.9	2	0	0					
B-138	B	58.3	55.0	3.4	2	0	0					
B-139	B	57.7	54.8	2.8	2	0	0					

17 Foot Barrier

NB1 (Weaver Lake Road to City of Maple Grove Trail Bridge)

Receptors	Activity Category	Preferred Alternative Leq Noise Levels (dBA)		Reduction (in dBA)(2)	Number of Units	Number of Benefited Receptors	Number of Receptors Meeting Design Goal Reduction(3)	Average Decibel Reduction	Length of barrier (feet)	Barrier Area (SF)	Total cost of barrier $36/sq. ft(4)	Cost / benefited receptor(5)
		2040 (No Barrier) (1)	2040 (With Barrier) (1)									
B-140	B	57.5	54.8	2.7	2	0	0	3.6	2,285	38,845	$1,417,170	$88,573
B-141	B	57.3	54.7	2.6	1	0	0					

(1) Underlined numbers represent any value approaching or exceeding the Federal Noise Abatement Criteria
(2) **Bold** Numbers represent benefited receptors (5 decibel reduction or greater)
(3) For the barrier to be reasonable, the design goal is to achieve at least 7 dBA reduction for at least one receptor.
(4) The cost for a barrier is $36/sqft. Cost includes the addition of 1250 ft. guardrail at a cost of $15 per ft.
(5) The maximum cost/benefited receptor is $78,500 for a barrier to be considered reasonable.

Table 8: Noise Mitigation Cost Effectiveness Results – NB2

20 Foot Barrier

NB2 (City of Maple Grove Trail Bridge to Three Rivers Park District Trail Bridge)

Receptors	Activity Category	Preferred Alternative Leq Noise Levels (dBA)		Reduction (in dBA)(2)	Number of Units	Number of Benefited Receptors	Number of Receptors Meeting Design Goal Reduction(3)	Average Decibel Reduction	Length of barrier (feet)	Barrier Area (SF)	Total cost of barrier $36/sq. ft(4)	Cost / benefited receptor(5)
		2040 (No Barrier) (1)	2040 (With Barrier) (1)									
B-17	C	79.2	72.3	**6.9**	1	1	0	9.3	3,880	77,600	$2,823,600	$176,475
B-18	C	73.4	65.3	**8.1**	1	1	1					
B-19	C	74.0	64.6	**9.4**	1	1	1					
B-20	C	77.9	65.2	**12.7**	1	1	1					
B-21	C	77.8	64.9	**12.9**	1	1	1					
B-22	C	76.9	62.2	**14.7**	1	1	1					
B-23	C	66.7	60.7	**6.0**	1	1	0					
B-24	C	67.1	60.5	**6.6**	1	1	0					
B-25	C	65.6	60.1	**5.4**	1	1	0					
B-26	C	69.9	61.2	**8.7**	1	1	1					
B-27	C	63.1	56.8	**6.3**	1	1	0					
B-28	C	73.3	62.3	**11.0**	1	1	1					
B-29	C	74.9	62.7	**12.2**	1	1	1					
B-30	C	76.3	63.2	**13.1**	1	1	1					
B-31	C	73.8	63.9	**9.9**	1	1	1					
B-32	C	80.2	69.2	**11.0**	1	1	1					
B-185	B	58.0	55.2	2.7	1	0	0					

(1) Underlined numbers represent any value approaching or exceeding the Federal Noise Abatement Criteria
(2) **Bold** Numbers represent benefited receptors (5 decibel reduction or greater)
(3) For the barrier to be reasonable, the design goal is to achieve at least 7 dBA reduction for at least one receptor.
(4) The cost for a barrier is $36/sqft. Cost includes the addition of 2000 ft. guardrail at a cost of $15 per ft.
(5) The maximum cost/benefited receptor is $78,500 for a barrier to be considered reasonable.

14 Foot Barrier

NB2 (City of Maple Grove Trail Bridge to Three Rivers Park District Trail Bridge)

Receptors	Activity Category	Preferred Alternative Leq Noise Levels (dBA)		Reduction (in dBA)(2)	Number of Units	Number of Benefited Receptors	Number of Receptors Meeting Design Goal Reduction(3)	Average Decibel Reduction	Length of barrier (feet)	Barrier Area (SF)	Total cost of barrier $36/sq. ft(4)	Cost / benefited receptor(5)
		2040 (No Barrier) (1)	2040 (With Barrier) (1)									
B-17	C	79.2	72.7	**6.5**	1	1	0	7.7	3,880	54,320	$1,985,520	$141,823
B-18	C	73.4	66.3	**7.1**	1	1	1					
B-19	C	74.0	65.9	**8.1**	1	1	1					
B-20	C	77.9	67.4	**10.5**	1	1	1					
B-21	C	77.8	67.4	**10.4**	1	1	1					
B-22	C	76.9	64.5	**12.4**	1	1	1					
B-23	C	66.7	62.1	4.6	1	0	0					
B-24	C	67.1	61.8	**5.3**	1	1	0					
B-25	C	65.6	61.5	4.1	1	0	0					
B-26	C	69.9	63.1	**6.8**	1	1	0					
B-27	C	63.1	58.1	**5.0**	1	1	0					
B-28	C	73.3	64.7	**8.6**	1	1	1					
B-29	C	74.9	64.8	**10.1**	1	1	1					
B-30	C	76.3	65.1	**11.2**	1	1	1					
B-31	C	73.8	65.5	**8.3**	1	1	1					
B-32	C	80.2	70.1	**10.1**	1	1	1					
B-185	B	58.0	55.9	2.1	1	0	0					

(1) Underlined numbers represent any value approaching or exceeding the Federal Noise Abatement Criteria
(2) **Bold** Numbers represent benefited receptors (5 decibel reduction or greater)
(3) For the barrier to be reasonable, the design goal is to achieve at least 7 dBA reduction for at least one receptor.
(4) The cost for a barrier is $36/sqft. Cost includes the addition of 2000 ft. guardrail at a cost of $15 per ft.
(5) The maximum cost/benefited receptor is $78,500 for a barrier to be considered reasonable.

8 Foot Barrier

NB2 (City of Maple Grove Trail Bridge to Three Rivers Park District Trail Bridge)

Receptors	Activity Category	Preferred Alternative Leq Noise Levels (dBA)		Reduction (in dBA)(2)	Number of Units	Number of Benefited Receptors	Number of Receptors Meeting Design Goal Reduction(3)	Average Decibel Reduction	Length of barrier (feet)	Barrier Area (SF)	Total cost of barrier $36/sq. ft(4)	Cost / benefited receptor(5)
		2040 (No Barrier) (1)	2040 (With Barrier) (1)									
B-17	C	79.2	74.1	**5.1**	1	1	0	4.5	3,880	31,040	$1,147,440	$163,920
B-18	C	73.4	69.6	3.8	1	0	0					
B-19	C	74.0	69.8	4.2	1	0	0					
B-20	C	77.9	72.8	**5.1**	1	1	0					
B-21	C	77.8	73.0	4.8	1	0	0					
B-22	C	76.9	68.6	**8.3**	1	1	1					
B-23	C	66.7	64.0	2.7	1	0	0					
B-24	C	67.1	63.3	3.8	1	0	0					
B-25	C	65.6	63.3	2.2	1	0	0					
B-26	C	69.9	66.5	3.4	1	0	0					
B-27	C	63.1	60.5	2.6	1	0	0					
B-28	C	73.3	69.4	3.9	1	0	0					
B-29	C	74.9	69.7	**5.2**	1	1	0					
B-30	C	76.3	70.1	**6.2**	1	1	0					
B-31	C	73.8	68.2	**5.6**	1	1	0					
B-32	C	80.2	71.6	**8.6**	1	1	1					
B-185	B	58.0	57.1	0.8	1	0	0					

(1) Underlined numbers represent any value approaching or exceeding the Federal Noise Abatement Criteria
(2) **Bold** Numbers represent benefited receptors (5 decibel reduction or greater)
(3) For the barrier to be reasonable, the design goal is to achieve at least 7 dBA reduction for at least one receptor.
(4) The cost for a barrier is $36/sqft. Cost includes the addition of 2000 ft. guardrail at a cost of $15 per ft.
(5) The maximum cost/benefited receptor is $78,500 for a barrier to be considered reasonable.

Table 9: Noise Mitigation Cost Effectiveness Results – NB3

20 Foot Barrier

NB3 (Three Rivers Park District Trail Bridge to 93rd Avenue N)

Receptors	Activity Category	Preferred Alternative Leq Noise Levels (dBA)		Reduction (in dBA)[2]	Number of Units	Number of Benefited Receptors	Number of Receptors Meeting Design Goal Reduction[3]	Average Decibel Reduction	Length of barrier (feet)	Barrier Area (SF)[4]	Total cost of barrier $36/sq. ft[5]	Cost / benefited receptor[6]
		2040 (No Barrier)[1]	2040 (With Barrier)[1]									
B-33	C	80.9	74.0	**6.9**	1	1	0					
B-34	C	75.8	66.0	**9.8**	1	1	1					
B-35	C	76.7	64.2	**12.5**	1	1	1					
B-36	C	75.5	64.4	**11.1**	1	1	1					
B-37	C	68.1	62.9	**5.2**	1	1	0					
B-38	C	71.2	64.1	**7.1**	1	1	1					
B-39	B	64.2	61.8	2.4	1	0	0					
B-40	B	63.2	60.2	3.0	1	0	0					
B-41	C	63.1	59.1	4.0	1	0	0					
B-42	B	62.8	59.2	3.6	1	0	0					
B-43	C	65.3	63.1	2.2	1	0	0	5.0	3,255	64,965	$2,348,490	$44,311
B-44	B	63.4	61.3	2.1	1	0	0					
B-45	B	61.6	57.9	3.7	1	0	0					
B-46	B	60.4	57.0	3.4	1	0	0					
B-47	B	63.3	60.6	2.7	1	0	0					
B-48	C	64.2	60.6	3.6	1	0	0					
B-49	B	59.3	57.9	1.4	1	0	0					
B-50	B	66.2	61.6	4.6	1	0	0					
B-51	C	64.7	62.2	2.5	1	0	0					
B-52	B	60.5	58.4	2.1	1	0	0					
B-53	B	66.9	61.3	**5.6**	1	1	0					
B-54	B	59.8	57.9	1.9	1	0	0					

20 Foot Barrier

NB3 (Three Rivers Park District Trail Bridge to 93rd Avenue N)

Receptors	Activity Category	Preferred Alternative Leq Noise Levels (dBA)		Reduction (in dBA)[2]	Number of Units	Number of Benefited Receptors	Number of Receptors Meeting Design Goal Reduction[3]	Average Decibel Reduction	Length of barrier (feet)	Barrier Area (SF)[4]	Total cost of barrier $36/sq. ft[5]	Cost / benefited receptor[6]
		2040 (No Barrier)[1]	2040 (With Barrier)[1]									
B-55	B	60.2	57.1	3.1	1	0	0					
B-56	B	67.2	60.8	**6.4**	1	1	0					
B-57	B	59.3	57.0	2.3	1	0	0					
B-58	B	59.7	57.0	2.7	1	0	0					
B-59	B	67.9	60.5	**7.4**	1	1	1					
B-60	B	60.9	56.4	4.5	1	0	0					
B-61	B	58.9	56.1	2.8	1	0	0					
B-62	B	68.9	61.1	**7.8**	1	1	1					
B-63	B	60.0	56.7	3.3	1	0	0					
B-64	B	68.6	60.9	**7.7**	1	1	1					
B-65	C	67.5	60.7	**6.8**	1	1	0					
B-66	B	58.4	55.6	2.8	1	0	0	5.0	3,255	64,965	$2,348,490	$44,311
B-67	B	60.5	56.0	4.5	1	0	0					
B-68	B	68.4	60.7	**7.7**	1	1	1					
B-69	B	61.4	56.1	**5.3**	1	1	0					
B-70	B	58.3	55.0	3.3	1	0	0					
B-71	B	68.0	60.6	**7.4**	1	1	1					
B-72	B	58.8	55.5	3.3	1	0	0					
B-73	B	68.2	61.0	**7.2**	1	1	1					
B-74	B	58.1	55.2	2.9	1	0	0					
B-75	B	59.7	55.4	4.3	1	0	0					
B-76	B	68.5	61.3	**7.2**	1	1	1					
B-77	C	68.5	62.1	**6.4**	1	1	0					

20 Foot Barrier

NB3 (Three Rivers Park District Trail Bridge to 93rd Avenue N)

Receptors	Activity Category	Preferred Alternative Leq Noise Levels (dBA)		Reduction (in dBA)(2)	Number of Units	Number of Benefited Receptors	Number of Receptors Meeting Design Goal Reduction(3)	Average Decibel Reduction	Length of barrier (feet)	Barrier Area (SF) (4)	Total cost of barrier $36/sq. ft(5)	Cost / benefited receptor(6)
		2040 (No Barrier) (1)	2040 (With Barrier) (1)									
B-78	B	57.0	54.3	2.7	1	0	0					
B-79	B	57.4	54.6	2.8	1	0	0					
B-80	B	68.4	61.2	**7.2**	1	1	1					
B-81	B	57.8	55.1	2.7	1	0	0					
B-82	B	59.0	55.1	3.9	1	0	0					
B-83	B	69.3	61.7	**7.6**	1	1	1					
B-84	B	58.3	54.9	3.4	1	0	0					
B-85	B	61.7	55.5	**6.2**	1	1	0					
B-86	B	70.2	61.9	**8.3**	1	1	1					
B-87	B	59.3	55.6	3.7	1	0	0					
B-88	B	59.9	55.2	4.7	1	0	0					
B-89	B	71.2	62.2	**9.0**	1	1	1	5.0	3,255	64,965	$2,348,490	$44,311
B-90	B	60.6	55.9	4.7	1	0	0					
B-91	C	73.7	61.8	**11.9**	1	1	1					
B-92	B	65.6	57.2	**8.4**	1	1	1					
B-93	B	71.5	62.4	**9.1**	1	1	1					
B-94	B	65.2	56.9	**8.3**	1	1	1					
B-95	B	63.0	56.9	**6.1**	1	1	0					
B-96	B	71.4	62.1	**9.3**	1	1	1					
B-97	B	66.0	58.9	**7.1**	1	1	1					
B-98	B	64.2	57.3	**6.9**	1	1	0					
B-99	C	71.0	61.0	**10.0**	1	1	1					
B-100	B	66.6	58.5	**8.1**	1	1	1					

20 Foot Barrier

NB3 (Three Rivers Park District Trail Bridge to 93rd Avenue N)

Receptors	Activity Category	Preferred Alternative Leq Noise Levels (dBA)		Reduction (in dBA)[2]	Number of Units	Number of Benefited Receptors	Number of Receptors Meeting Design Goal Reduction[3]	Average Decibel Reduction	Length of barrier (feet)	Barrier Area (SF)[4]	Total cost of barrier $36/sq. ft[5]	Cost / benefited receptor[6]
		2040 (No Barrier)[1]	2040 (With Barrier)[1]									
B-101	B	69.7	61.6	**8.1**	1	1	1					
B-102	B	56.9	53.8	3.1	1	0	0					
B-103	B	68.8	60.7	**8.1**	1	1	1					
B-104	B	68.6	60.8	**7.8**	1	1	1					
B-105	C	68.4	60.0	**8.4**	1	1	1					
B-106	B	67.8	60.2	**7.6**	1	1	1					
B-107	C	69.6	60.2	**9.4**	1	1	1					
B-108	C	67.2	59.4	**7.8**	1	1	1					
B-109	C	68.7	59.6	**9.1**	1	1	1					
B-142	B	59.9	56.7	3.2	1	0	0					
B-143	B	59.1	56.2	2.9	1	0	0					
B-144	B	59.0	56.1	2.9	1	0	0	5.0	3,255	64,965	$2,348,490	$44,311
B-145	B	59.3	56.4	2.9	1	0	0					
B-146	B	58.8	56.2	2.6	1	0	0					
B-147	B	58.8	56.7	2.1	1	0	0					
B-148	B	58.0	56.0	2.0	1	0	0					
B-149	B	57.8	56.0	1.8	1	0	0					
B-150	B	58.0	56.1	1.9	1	0	0					
B-151	B	56.8	55.2	1.6	1	0	0					
B-152	B	56.1	54.3	1.8	1	0	0					
B-153	B	56.1	54.2	1.9	1	0	0					
B-154	B	55.5	53.6	1.9	1	0	0					
B-155	B	63.2	56.8	**6.4**	1	1	0					

20 Foot Barrier

NB3 (Three Rivers Park District Trail Bridge to 93rd Avenue N)

Receptors	Activity Category	Preferred Alternative Leq Noise Levels (dBA)		Reduction (in dBA)(2)	Number of Units	Number of Benefited Receptors	Number of Receptors Meeting Design Goal Reduction(3)	Average Decibel Reduction	Length of barrier (feet)	Barrier Area (SF) (4)	Total cost of barrier $36/sq. ft(5)	Cost / benefited receptor(6)
		2040 (No Barrier) (1)	2040 (With Barrier) (1)									
B-156	B	60.1	56.0	4.1	1	0	0					
B-157	B	66.7	59.7	**7.0**	1	1	1					
B-158	B	65.9	58.7	**7.2**	1	1	1					
B-159	B	62.2	56.0	**6.2**	1	1	0					
B-160	B	58.5	54.4	4.1	1	0	0					
B-161	B	56.6	54.0	2.6	1	0	0					
B-162	B	51.5	48.7	2.8	1	0	0					
B-163	B	52.8	49.5	3.3	1	0	0					
B-164	B	54.1	50.2	3.9	1	0	0					
B-165	B	54.5	50.7	3.8	1	0	0					
B-166	B	57.0	51.1	**5.9**	1	1	0					
B-167	B	57.7	52.3	**5.4**	1	1	0	5.0	3,255	64,965	$2,348,490	$44,311
B-168	B	61.4	55.0	**6.4**	1	1	0					
B-169	B	62.0	55.7	**6.3**	1	1	0					
B-170	B	63.7	56.6	**7.1**	1	1	1					
B-171	B	60.0	53.2	**6.8**	1	1	0					
B-172	B	57.1	53.6	3.5	1	0	0					
B-173	B	59.6	53.6	**6.0**	1	1	0					
B-174	B	61.4	54.9	**6.5**	1	1	0					
B-175	B	58.9	54.7	4.2	1	0	0					
B-176	B	55.9	53.8	2.1	1	0	0					
B-177	B	58.1	55.5	2.6	1	0	0					
B-178	B	56.2	54.3	1.9	1	0	0					

20 Foot Barrier

NB3 (Three Rivers Park District Trail Bridge to 93rd Avenue N)

Receptors	Activity Category	Preferred Alternative Leq Noise Levels (dBA)		Reduction (in dBA)(2)	Number of Units	Number of Benefited Receptors	Number of Receptors Meeting Design Goal Reduction(3)	Average Decibel Reduction	Length of barrier (feet)	Barrier Area (SF) (4)	Total cost of barrier $36/sq. ft(5)	Cost / benefited receptor(6)
		2040 (No Barrier) (1)	2040 (With Barrier) (1)									
B-179	B	56.6	54.4	2.2	1	0	0	5.0	3,255	64,965	$2,348,490	$44,311
B-180	B	56.3	54.0	2.3	1	0	0					
B-181	B	58.4	54.5	3.9	2	0	0					
B-182	B	56.1	54.0	2.1	2	0	0					
B-183	B	56.1	54.1	2.0	2	0	0					
B-184	C	71.8	67.2	4.6	1	0	0					

(1) Underlined numbers represent any value approaching or exceeding the Federal Noise Abatement Criteria
(2) **Bold** Numbers represent benefited receptors (5 decibel reduction or greater)
(3) For the barrier to be reasonable, the design goal is to achieve at least 7 dBA reduction for at least one receptor.
(4) Barrier area incorporates barrier taper at Maple Grove Parkway for the proposed barrier.
(5) The cost for a barrier is $36/sqft. Cost includes the addition of 650 ft. guardrail at a cost of $15 per ft.
(6) The maximum cost/benefited receptor is $78,500 for a barrier to be considered reasonable.

17 Foot Barrier

NB3 (Three Rivers Park District Trail Bridge to 93rd Avenue N)

Receptors	Activity Category	Preferred Alternative Leq Noise Levels (dBA)		Reduction (in dBA)[2]	Number of Units	Number of Benefited Receptors	Number of Receptors Meeting Design Goal Reduction[3]	Average Decibel Reduction	Length of barrier (feet)	Barrier Area (SF)	Total cost of barrier $36/sq. ft[4]	Cost / benefited receptor[5]
		2040 (No Barrier) [1]	2040 (With Barrier) [1]									
B-33	C	80.9	74.1	**6.8**	1	1	0					
B-34	C	75.8	66.5	**9.3**	1	1	1					
B-35	C	76.7	65.0	**11.7**	1	1	1					
B-36	C	75.5	65.4	**10.1**	1	1	1					
B-37	C	68.1	63.8	4.3	1	0	0					
B-38	C	71.2	65.4	**5.8**	1	1	0					
B-39	B	64.2	61.9	2.3	1	0	0					
B-40	B	63.2	60.7	2.5	1	0	0					
B-41	C	63.1	59.5	3.6	1	0	0					
B-42	B	62.8	59.7	3.1	1	0	0					
B-43	C	65.3	63.6	1.7	1	0	0					
B-44	B	63.4	62.1	1.3	1	0	0	3.9	3,285	55,845	$2,020,170	$54,599
B-45	B	61.6	58.3	3.3	1	0	0					
B-46	B	60.4	57.4	3.0	1	0	0					
B-47	B	63.3	61.6	1.7	1	0	0					
B-48	C	64.2	61.6	2.6	1	0	0					
B-49	B	59.3	58.4	0.9	1	0	0					
B-50	B	66.2	62.8	3.4	1	0	0					
B-51	C	64.7	61.0	3.7	1	0	0					
B-52	B	60.5	59.1	1.4	1	0	0					
B-53	B	66.9	62.7	4.2	1	0	0					
B-54	B	59.8	58.4	1.4	1	0	0					
B-55	B	60.2	57.9	2.3	1	0	0					

17 Foot Barrier

NB3 (Three Rivers Park District Trail Bridge to 93rd Avenue N)

Receptors	Activity Category	Preferred Alternative Leq Noise Levels (dBA)		Reduction (in dBA)[2]	Number of Units	Number of Benefited Receptors	Number of Receptors Meeting Design Goal Reduction[3]	Average Decibel Reduction	Length of barrier (feet)	Barrier Area (SF)	Total cost of barrier $36/sq. ft[4]	Cost / benefited receptor[5]
		2040 (No Barrier) [1]	2040 (With Barrier) [1]									
B-56	B	67.2	62.3	4.9	1	0	0	3.9	3,285	55,845	$2,020,170	$54,599
B-57	B	59.3	57.6	1.7	1	0	0					
B-58	B	59.7	57.8	1.9	1	0	0					
B-59	B	67.9	62.2	**5.7**	1	1	0					
B-60	B	60.9	57.0	3.9	1	0	0					
B-61	B	58.9	56.8	2.1	1	0	0					
B-62	B	68.9	62.7	**6.2**	1	1	0					
B-63	B	60.0	57.6	2.4	1	0	0					
B-64	B	68.6	62.4	**6.2**	1	1	0					
B-65	C	67.5	61.7	**5.8**	1	1	0					
B-66	B	58.4	56.3	2.1	1	0	0					
B-67	B	60.5	56.8	3.7	1	0	0					
B-68	B	68.4	62.2	**6.2**	1	1	0					
B-69	B	61.4	57.1	4.3	1	0	0					
B-70	B	58.3	55.7	2.6	1	0	0					
B-71	B	68.0	62.0	**6.0**	1	1	0					
B-72	B	58.8	56.2	2.6	1	0	0					
B-73	B	68.2	62.6	**5.6**	1	1	0					
B-74	B	58.1	56.0	2.1	1	0	0					
B-75	B	59.7	56.2	3.5	1	0	0					
B-76	B	68.5	63.0	**5.5**	1	1	0					
B-77	C	68.5	63.3	**5.2**	1	1	0					
B-78	B	57.0	54.8	2.2	1	0	0					

17 Foot Barrier

NB3 (Three Rivers Park District Trail Bridge to 93rd Avenue N)

Receptors	Activity Category	Preferred Alternative Leq Noise Levels (dBA)		Reduction (in dBA)[2]	Number of Units	Number of Benefited Receptors	Number of Receptors Meeting Design Goal Reduction[3]	Average Decibel Reduction	Length of barrier (feet)	Barrier Area (SF)	Total cost of barrier $36/sq. ft[4]	Cost / benefited receptor[5]
		2040 (No Barrier) [1]	2040 (With Barrier) [1]									
B-79	B	57.4	55.4	2.0	1	0	0					
B-80	B	68.4	62.7	**5.7**	1	1	0					
B-81	B	57.8	55.8	2.0	1	0	0					
B-82	B	59.0	56.0	3.0	1	0	0					
B-83	B	69.3	63.2	**6.1**	1	1	0					
B-84	B	58.3	55.6	2.7	1	0	0					
B-85	B	61.7	56.6	**5.1**	1	1	0					
B-86	B	70.2	63.5	**6.7**	1	1	0					
B-87	B	59.3	56.4	2.9	1	0	0					
B-88	B	59.9	56.2	3.7	1	0	0					
B-89	B	71.2	64.0	**7.2**	1	1	1					
B-90	B	60.6	56.8	3.8	1	0	0	3.9	3,285	55,845	$2,020,170	$54,599
B-91	C	73.7	63.0	**10.7**	1	1	1					
B-92	B	65.6	58.6	**7.0**	1	1	1					
B-93	B	71.5	64.7	**6.8**	1	1	0					
B-94	B	65.2	58.3	**6.9**	1	1	0					
B-95	B	63.0	58.0	**5.0**	1	1	0					
B-96	B	71.4	64.4	**7.0**	1	1	1					
B-97	B	66.0	60.5	**5.5**	1	1	0					
B-98	B	64.2	58.6	**5.6**	1	1	0					
B-99	C	71.0	62.0	**9.0**	1	1	1					
B-100	B	66.6	61.1	**5.5**	1	1	0					
B-101	B	69.7	64.0	**5.7**	1	1	0					

17 Foot Barrier

NB3 (Three Rivers Park District Trail Bridge to 93rd Avenue N)

Receptors	Activity Category	Preferred Alternative Leq Noise Levels (dBA)		Reduction (in dBA)(2)	Number of Units	Number of Benefited Receptors	Number of Receptors Meeting Design Goal Reduction(3)	Average Decibel Reduction	Length of barrier (feet)	Barrier Area (SF)	Total cost of barrier $36/sq. ft(4)	Cost / benefited receptor(5)
		2040 (No Barrier) (1)	2040 (With Barrier) (1)									
B-102	B	56.9	54.5	2.4	1	0	0	3.9	3,285	55,845	$2,020,170	$54,599
B-103	B	68.8	63.3	**5.5**	1	1	0					
B-104	B	68.6	63.5	**5.1**	1	1	0					
B-105	C	68.4	61.5	**6.9**	1	1	0					
B-106	B	67.8	62.7	**5.1**	1	1	0					
B-107	C	69.6	61.1	**8.5**	1	1	1					
B-108	C	67.2	61.7	**5.5**	1	1	0					
B-109	C	68.7	60.8	**7.9**	1	1	1					
B-142	B	59.9	57.1	2.8	1	0	0					
B-143	B	59.1	56.5	2.6	1	0	0					
B-144	B	59.0	56.4	2.6	1	0	0					
B-145	B	59.3	56.7	2.6	1	0	0					
B-146	B	58.8	56.5	2.3	1	0	0					
B-147	B	58.8	56.6	1.9	1	0	0					
B-148	B	58.0	56.2	1.8	1	0	0					
B-149	B	57.8	56.2	1.6	1	0	0					
B-150	B	58.0	56.5	1.5	1	0	0					
B-151	B	56.8	55.5	1.3	1	0	0					
B-152	B	56.1	54.7	1.4	1	0	0					
B-153	B	56.1	54.6	1.5	1	0	0					
B-154	B	55.5	54.0	1.6	1	0	0					
B-155	B	63.2	59.4	3.8	1	0	0					
B-156	B	60.1	57.3	2.8	1	0	0					

17 Foot Barrier

NB3 (Three Rivers Park District Trail Bridge to 93rd Avenue N)

Receptors	Activity Category	Preferred Alternative Leq Noise Levels (dBA)		Reduction (in dBA)[2]	Number of Units	Number of Benefited Receptors	Number of Receptors Meeting Design Goal Reduction[3]	Average Decibel Reduction	Length of barrier (feet)	Barrier Area (SF)	Total cost of barrier $36/sq. ft[4]	Cost / benefited receptor[5]
		2040 (No Barrier) [1]	2040 (With Barrier) [1]									
B-157	B	66.7	62.2	4.5	1	0	0	3.9	3,285	55,845	$2,020,170	$54,599
B-158	B	65.9	61.3	4.6	1	0	0					
B-159	B	62.2	58.2	4.0	1	0	0					
B-160	B	58.5	55.7	2.8	1	0	0					
B-161	B	56.6	54.5	2.1	1	0	0					
B-162	B	51.5	49.5	2.0	1	0	0					
B-163	B	52.8	50.5	2.3	1	0	0					
B-164	B	54.1	51.2	2.9	1	0	0					
B-165	B	54.5	51.7	2.8	1	0	0					
B-166	B	57.0	52.4	4.6	1	0	0					
B-167	B	57.7	53.4	4.3	1	0	0					
B-168	B	61.4	56.6	4.8	1	0	0					
B-169	B	62.0	57.5	4.5	1	0	0					
B-170	B	63.7	58.9	4.8	1	0	0					
B-171	B	60.0	55.4	4.6	1	0	0					
B-172	B	57.1	54.6	2.5	1	0	0					
B-173	B	59.6	55.3	4.3	1	0	0					
B-174	B	61.4	57.2	4.2	1	0	0					
B-175	B	58.9	56.0	2.9	1	0	0					
B-176	B	55.9	54.2	1.7	1	0	0					
B-177	B	58.1	56.1	2.0	1	0	0					
B-178	B	56.2	54.8	1.4	1	0	0					
B-179	B	56.6	54.9	1.7	1	0	0					

17 Foot Barrier

NB3 (Three Rivers Park District Trail Bridge to 93rd Avenue N)

Receptors	Activity Category	Preferred Alternative Leq Noise Levels (dBA)		Reduction (in dBA)(2)	Number of Units	Number of Benefited Receptors	Number of Receptors Meeting Design Goal Reduction(3)	Average Decibel Reduction	Length of barrier (feet)	Barrier Area (SF)	Total cost of barrier $36/sq. ft(4)	Cost / benefited receptor(5)
		2040 (No Barrier) (1)	2040 (With Barrier) (1)									
B-180	B	56.3	54.5	1.8	1	0	0	3.9	3,285	55,845	$2,020,170	$54,599
B-181	B	58.4	55.1	3.3	2	0	0					
B-182	B	56.1	54.5	1.6	2	0	0					
B-183	B	56.1	54.5	1.6	2	0	0					
B-184	C	71.8	68.6	3.2	1	0	0					

(1) Underlined numbers represent any value approaching or exceeding the Federal Noise Abatement Criteria
(2) **Bold** Numbers represent benefited receptors (5 decibel reduction or greater)
(3) For the barrier to be reasonable, the design goal is to achieve at least 7 dBA reduction for at least one receptor.
(4) The cost for a barrier is $36/sqft. Cost includes the addition of 650 ft. guardrail at a cost of $15 per ft.
(5) The maximum cost/benefited receptor is $78,500 for a barrier to be considered reasonable.

Table 10: Noise Mitigation Cost Effectiveness Results – NB4

20 Foot Barrier

NB4 (TH 610 to 950 feet north of 105th Avenue)

Receptors	Activity Category	Preferred Alternative Leq Noise Levels (dBA)		Reduction (in dBA)(2)	Number of Units	Number of Benefited Receptors	Number of Receptors Meeting Design Goal Reduction(3)	Average Decibel Reduction	Length of barrier (feet	Barrier Area (SF)	Total cost of barrier $36/sq. ft(4)	Cost / benefited receptor(5)
		2040 (No Barrier) (1)	2040 (With Barrier) (1)									
D-1	B	67.1	59.6	**7.5**	1	1	1	4.9	2,880	57,600	$2,095,500	$698,500
D-2	B	58.8	56.1	2.7	1	0	0					
D-3	B	59.6	55.5	4.1	1	0	0					
D-4	C	66.8	61.7	**5.1**	1	1	0					
D-5	C	67.1	61.2	**5.9**	1	1	0					
D-6	C	74.4	70.1	4.3	1	0	0					
D-7	C	74.1	69.6	4.5	1	0	0					
17 Foot Barrier												
D-1	B	67.1	60.5	**6.6**	1	1	0	3.8	2,880	48,960	$1,784,460	$1,784,460
D-2	B	58.8	56.4	2.4	1	0	0					
D-3	B	59.6	56.0	3.6	1	0	0					
D-4	C	66.8	63.1	3.7	1	0	0					
D-5	C	67.1	62.4	4.7	1	0	0					
D-6	C	74.4	71.7	2.7	1	0	0					
D-7	C	74.1	71.1	3.0	1	0	0					

(1) Underlined numbers represent any value approaching or exceeding the Federal Noise Abatement Criteria
(2) **Bold** Numbers represent benefited receptors (5 decibel reduction or greater)
(3) For the barrier to be reasonable, the design goal is to achieve at least 7 dBA reduction for at least one receptor.
(4) The cost for a barrier is $36/sqft. Cost includes the addition of 1460 ft. guardrail at a cost of $15 per ft.
(5) The maximum cost/benefited receptor is $78,500 for a barrier to be considered reasonable.

Table 11: Noise Mitigation Cost Effectiveness Results – NB5

20 Foot Barrier

NB5 (Brockton Lane to Territorial Road)

Receptors	Activity Category	Preferred Alternative Leq Noise Levels (dBA)		Reduction (in dBA)(2)	Number of Units	Number of Benefited Receptors	Number of Receptors Meeting Design Goal Reduction(3)	Average Decibel Reduction	Length of barrier (feet	Barrier Area (SF)	Total cost of barrier $36/sq. ft(4)	Cost / benefited receptor(5)
		2040 (No Barrier) (1)	2040 (With Barrier) (1)									
F-1	B	70.0	62.9	**7.1**	1	1	1	5.4	1,305	26,100	$939,600	$313,200
F-2	B	72.2	63.9	**8.3**	1	1	1					
F-3	F	66.4	60.8	**5.6**	1	1	0					
17 Foot Barrier												
F-1	B	70.0	63.9	**6.1**	1	1	0	4.3	1,305	22,185	$798,660	$399,330
F-2	B	72.2	65.7	**6.5**	1	1	0					
F-3	F	66.4	62.0	4.4	1	0	0					

(1) Underlined numbers represent any value approaching or exceeding the Federal Noise Abatement Criteria
(2) **Bold** Numbers represent benefited receptors (5 decibel reduction or greater)
(3) For the barrier to be reasonable, the design goal is to achieve at least 7 dBA reduction for at least one receptor.
(4) The cost for a barrier is $36/sqft.
(5) The maximum cost/benefited receptor is $78,500 for a barrier to be considered reasonable.

Table 12: Noise Mitigation Cost Effectiveness Results – NB6

20 Foot Barrier

NB6 (TH 101 to Church Avenue)

Receptors	Activity Category	Preferred Alternative Leq Noise Levels (dBA)		Reduction (in dBA)(2)	Number of Units	Number of Benefited Receptors	Number of Receptors Meeting Design Goal Reduction(3)	Average Decibel Reduction	Length of barrier (feet)	Barrier Area (SF)	Total cost of barrier $36/sq. ft(4)	Cost / benefited receptor(5)
		2040 (No Barrier) (1)	2040 (With Barrier) (1)									
H-1	F	74.3	68.9	**5.4**	1	1	0	7.6	1,260	25,200	$907,200	$151,200
H-2	C	70.6	62.1	**8.5**	1	1	1					
H-3	E*	74.8	64.5	**10.3**	1	1	1					
H-4	E*	71.6	61.9	**9.7**	1	1	1					
H-5	F	71.5	63.2	**8.3**	1	1	1					
H-6	E*	73.4	62.6	**10.8**	1	1	1					
17 Foot Barrier												
H-1	F	74.3	69.2	**5.1**	1	1	0	6.9	1,260	21,420	$771,120	$128,520
H-2	C	70.6	62.8	**7.8**	1	1	1					
H-3	E*	74.8	65.3	**9.5**	1	1	1					
H-4	E*	71.6	62.8	**8.8**	1	1	1					
H-5	F	71.5	64.0	**7.5**	1	1	1					
H-6	E*	73.4	63.7	**9.7**	1	1	1					

* Receptor does not have an outdoor use area and is therefore not considered impacted for this analysis.

(1) Underlined numbers represent any value approaching or exceeding the Federal Noise Abatement Criteria
(2) **Bold** Numbers represent benefited receptors (5 decibel reduction or greater)
(3) For the barrier to be reasonable, the design goal is to achieve at least 7 dBA reduction for at least one receptor.
(4) The cost for a barrier is $36/sqft.
(5) The maximum cost/benefited receptor is $78,500 for a barrier to be considered reasonable.

14 Foot Barrier

NB6 (TH 101 to Church Avenue)

Receptors	Activity Category	Preferred Alternative Leq Noise Levels (dBA)		Reduction (in dBA)(2)	Number of Units	Number of Benefited Receptors	Number of Receptors Meeting Design Goal Reduction(3)	Average Decibel Reduction	Length of barrier (feet)	Barrier Area (SF)	Total cost of barrier $36/sq. ft(4)	Cost / benefited receptor(5)
		2040 (No Barrier) (1)	2040 (With Barrier) (1)									
H-1	F	74.3	69.6	4.7	1	0	0	6.2	1,260	17,640	$635,040	$127,008
H-2	C	70.6	63.7	**6.9**	1	1	0					
H-3	E*	74.8	66.3	**8.5**	1	1	1					
H-4	E*	71.6	63.8	**7.8**	1	1	1					
H-5	F	71.5	64.8	**6.7**	1	1	0					
H-6	E*	73.4	64.8	**8.6**	1	1	1					

11 Foot Barrier

H-1	F	74.3	70.7	3.6	1	0	0	5.0	1,260	13,860	$498,960	$99,792
H-2	C	70.6	65.5	**5.1**	1	1	0					
H-3	E*	74.8	67.6	**7.2**	1	1	1					
H-4	E*	71.6	65.0	**6.6**	1	1	0					
H-5	F	71.5	66.1	**5.4**	1	1	0					
H-6	E*	73.4	66.5	**6.9**	1	1	0					

* Receptor does not have an outdoor use area and is therefore not considered impacted for this analysis.

(1) Underlined numbers represent any value approaching or exceeding the Federal Noise Abatement Criteria
(2) **Bold** Numbers represent benefited receptors (5 decibel reduction or greater)
(3) For the barrier to be reasonable, the design goal is to achieve at least 7 dBA reduction for at least one receptor.
(4) The cost for a barrier is $36/sqft.
(5) The maximum cost/benefited receptor is $78,500 for a barrier to be considered reasonable.

Table 13: Noise Mitigation Cost Effectiveness Results – NB7

20 Foot Barrier

NB7 (CSAH 81 to Brockton Lane)

Receptors	Activity Category	Preferred Alternative Leq Noise Levels (dBA)		Reduction (in dBA)[2]	Number of Units	Number of Benefited Receptors	Number of Receptors Meeting Design Goal Reduction[3]	Average Decibel Reduction	Length of barrier (feet)	Barrier Area (SF)	Total cost of barrier $36/sq. ft[4]	Cost / benefited receptor[5]
		2040 (No Barrier) [1]	2040 (With Barrier) [1]									
I-6	B	60.2	59.5	0.7	1	0	0	2.6	2,325	46,500	$1,674,000	$279,000
I-7	B	66.3	59.4	**6.9**	1	1	0					
I-8	B	65.0	58.9	**6.1**	1	1	0					
I-9	B	63.4	59.3	4.1	1	0	0					
I-10	B	62.2	58.9	3.3	1	0	0					
I-11	B	61.4	58.4	3.0	1	0	0					
I-12	B	60.0	56.9	3.1	1	0	0					
I-13	B	49.7	49.4	0.3	1	0	0					
I-14	B	49.7	49.4	0.3	1	0	0					
I-15	B	49.6	49.3	0.3	1	0	0					
I-16	B	56.7	54.6	2.1	1	0	0					
I-17	B	59.6	57.0	2.6	1	0	0					
I-18	B	56.5	54.7	1.8	1	0	0					
I-19	B	61.4	58.5	2.9	1	0	0					
I-20	B	61.1	58.3	2.8	1	0	0					
I-21	B	60.8	58.1	2.7	1	0	0					
I-22	B	57.8	55.3	2.5	1	0	0					
I-23	B	48.4	48.4	0.0	1	0	0					
I-24	B	48.7	48.7	0.0	1	0	0					
I-25	B	48.5	48.5	0.0	1	0	0					
I-26	B	56.1	54.0	2.1	1	0	0					
I-27	B	59.5	56.2	3.3	1	0	0					

20 Foot Barrier

NB7 (CSAH 81 to Brockton Lane)

Receptors	Activity Category	Preferred Alternative Leq Noise Levels (dBA)		Reduction (in dBA)(2)	Number of Units	Number of Benefited Receptors	Number of Receptors Meeting Design Goal Reduction(3)	Average Decibel Reduction	Length of barrier (feet)	Barrier Area (SF)	Total cost of barrier $36/sq. ft(4)	Cost / benefited receptor(5)
		2040 (No Barrier) (1)	2040 (With Barrier) (1)									
I-28	B	55.5	54.3	1.2	1	0	0					
I-29	B	55.4	54.4	1.0	1	0	0					
I-30	B	55.1	54.0	1.1	1	0	0					
I-31	B	55.0	53.8	1.2	1	0	0					
I-32	B	55.2	54.6	0.6	1	0	0					
I-33	B	54.8	54.1	0.7	1	0	0					
I-34	B	55.4	54.1	1.3	1	0	0					
I-35	B	54.1	53.2	0.9	1	0	0					
I-36	B	59.7	57.1	2.6	1	0	0					
I-37	B	59.7	56.9	2.8	1	0	0	2.6	2,325	46,500	$1,674,000	$279,000
I-38	B	60.6	57.7	2.9	1	0	0					
I-39	B	60.6	57.3	3.3	1	0	0					
I-40	B	63.3	58.3	**5.0**	1	1	0					
I-41	B	66.2	59.3	**6.9**	1	1	0					
I-42	B	56.8	55.5	1.3	1	0	0					
I-43	B	57.8	56.2	1.6	1	0	0					
I-44	B	59.6	55.4	4.2	1	0	0					
I-45	B	71.2	61.9	**9.3**	1	1	1					
I-46	B	65.8	59.8	**6.0**	1	1	0					

(1) Underlined numbers represent any value approaching or exceeding the Federal Noise Abatement Criteria
(2) **Bold** Numbers represent benefited receptors (5 decibel reduction or greater)
(3) For the barrier to be reasonable, the design goal is to achieve at least 7 dBA reduction for at least one receptor.
(4) The cost for a barrier is $36/sqft.
(5) The maximum cost/benefited receptor is $78,500 for a barrier to be considered reasonable.

17 Foot Barrier

NB7 (CSAH 81 to Brockton Lane)

Receptors	Activity Category	Preferred Alternative Leq Noise Levels (dBA)		Reduction (in dBA)[2]	Number of Units	Number of Benefited Receptors	Number of Receptors Meeting Design Goal Reduction[3]	Average Decibel Reduction	Length of barrier (feet)	Barrier Area (SF)	Total cost of barrier $36/sq. ft[4]	Cost / benefited receptor[5]
		2040 (No Barrier) [1]	2040 (With Barrier) [1]									
I-6	B	60.2	59.6	0.6	1	0	0					
I-7	B	66.3	61.1	**5.2**	1	1	0					
I-8	B	65.0	60.4	4.6	1	0	0					
I-9	B	63.4	60.5	2.9	1	0	0					
I-10	B	62.2	60.1	2.1	1	0	0					
I-11	B	61.4	59.7	1.7	1	0	0					
I-12	B	60.0	58.6	1.4	1	0	0					
I-13	B	49.7	49.7	0.0	1	0	0					
I-14	B	49.7	49.7	0.0	1	0	0					
I-15	B	49.6	49.6	0.0	1	0	0					
I-16	B	56.7	55.8	0.9	1	0	0					
I-17	B	59.6	58.4	1.2	1	0	0	1.6	2,325	39,525	$1,422,900	$355,725
I-18	B	56.5	55.7	0.8	1	0	0					
I-19	B	61.4	60.1	1.3	1	0	0					
I-20	B	61.1	59.9	1.2	1	0	0					
I-21	B	60.8	59.6	1.2	1	0	0					
I-22	B	57.8	56.6	1.2	1	0	0					
I-23	B	48.4	48.4	0.0	1	0	0					
I-24	B	48.7	48.7	0.0	1	0	0					
I-25	B	48.5	48.5	0.0	1	0	0					
I-26	B	56.1	55.1	1.0	1	0	0					
I-27	B	59.5	56.8	2.7	1	0	0					
I-28	B	55.5	55.0	0.5	1	0	0					

17 Foot Barrier

NB7 (CSAH 81 to Brockton Lane)

Receptors	Activity Category	Preferred Alternative Leq Noise Levels (dBA)		Reduction (in dBA)(2)	Number of Units	Number of Benefited Receptors	Number of Receptors Meeting Design Goal Reduction(3)	Average Decibel Reduction	Length of barrier (feet)	Barrier Area (SF)	Total cost of barrier $36/sq. ft(4)	Cost / benefited receptor(5)
		2040 (No Barrier) (1)	2040 (With Barrier) (1)									
I-29	B	55.4	55.1	0.3	1	0	0	1.6	2,325	39,525	$1,422,900	$355,725
I-30	B	55.1	54.7	0.4	1	0	0					
I-31	B	55.0	54.6	0.4	1	0	0					
I-32	B	55.2	55.2	0.0	1	0	0					
I-33	B	54.8	54.8	0.0	1	0	0					
I-34	B	55.4	54.9	0.5	1	0	0					
I-35	B	54.1	53.7	0.4	1	0	0					
I-36	B	59.7	58.6	1.1	1	0	0					
I-37	B	59.7	58.4	1.3	1	0	0					
I-38	B	60.6	59.2	1.4	1	0	0					
I-39	B	60.6	58.9	1.7	1	0	0					
I-40	B	63.3	59.7	3.6	1	0	0					
I-41	B	66.2	60.6	**5.6**	1	1	0					
I-42	B	56.8	56.2	0.6	1	0	0					
I-43	B	57.8	57.0	0.8	1	0	0					
I-44	B	59.6	56.2	3.4	1	0	0					
I-45	B	71.2	63.3	**7.9**	1	1	1					
I-46	B	65.8	60.7	**5.1**	1	1	0					

(1) Underlined numbers represent any value approaching or exceeding the Federal Noise Abatement Criteria
(2) **Bold** Numbers represent benefited receptors (5 decibel reduction or greater)
(3) For the barrier to be reasonable, the design goal is to achieve at least 7 dBA reduction for at least one receptor.
(4) The cost for a barrier is $36/sqft.
(5) The maximum cost/benefited receptor is $78,500 for a barrier to be considered reasonable.

Table 14: Noise Mitigation Cost Effectiveness Results – NB8

20 Foot Barrier

NB8 (Maple Grove Parkway to 93rd Avenue N)

Receptors	Activity Category	Preferred Alternative Leq Noise Levels (dBA)		Reduction (in dBA)(2)	Number of Units	Number of Benefited Receptors	Number of Receptors Meeting Design Goal Reduction(3)	Average Decibel Reduction	Length of barrier (feet)	Barrier Area (SF) (1)	Total cost of barrier $36/sq. ft(4)	Cost / benefited receptor(5)
		2040 (No Barrier) (1)	2040 (With Barrier) (1)									
J-1	C	70.7	66.7	4.0	1	0	0	3.2	890	17,800	$640,800	$320,400
J-2	C	66.8	60.9	**5.9**	1	1	0					
J-3	C	61.5	57.2	4.3	1	0	0					
J-4	C	58.6	56.8	1.8	1	0	0					
J-5	E	64.9	57.6	**7.3**	1	1	1					
J-7	C	70.0	68.4	1.6	1	0	0					
J-8	C	59.2	58.4	0.8	1	0	0					
K-33	C	67.3	65.8	1.5	1	0	0					
K-34	C	63.6	60.5	3.1	1	0	0					
K-35	C	60.8	57.6	3.2	1	0	0					
K-36	C	58.7	56.6	2.1	1	0	0					

(1) Underlined numbers represent any value approaching or exceeding the Federal Noise Abatement Criteria
(2) **Bold** Numbers represent benefited receptors (5 decibel reduction or greater)
(3) For the barrier to be reasonable, the design goal is to achieve at least 7 dBA reduction for at least one receptor.
(4) The cost for a barrier is $36/sqft.
(5) The maximum cost/benefited receptor is $78,500 for a barrier to be considered reasonable.

15 Foot Barrier

NB8 (Maple Grove Parkway to 93rd Avenue N)

Receptors	Activity Category	Preferred Alternative Leq Noise Levels (dBA)		Reduction (in dBA)(2)	Number of Units	Number of Benefited Receptors	Number of Receptors Meeting Design Goal Reduction(3)	Average Decibel Reduction	Length of barrier (feet)	Barrier Area (SF) (1)	Total cost of barrier $36/sq. ft(4)	Cost / benefited receptor(5)
		2040 (No Barrier) (1)	2040 (With Barrier) (1)									
J-1	C	70.7	67.3	3.4	1	0	0	2.2	890	13,350	$480,600	$480,600
J-2	C	66.8	65.3	1.5	1	0	0					
J-3	C	61.5	58.4	3.1	1	0	0					
J-4	C	58.6	57.1	1.5	1	0	0					
J-5	E	64.9	58.9	**6.0**	1	1	0					
J-7	C	70.0	68.5	1.5	1	0	0					
J-8	C	59.2	58.4	0.8	1	0	0					
K-33	C	67.3	66.1	1.2	1	0	0					
K-34	C	63.6	62.6	1.0	1	0	0					
K-35	C	60.8	58.4	2.4	1	0	0					
K-36	C	58.7	57.0	1.7	1	0	0					

(1) Underlined numbers represent any value approaching or exceeding the Federal Noise Abatement Criteria
(2) **Bold** Numbers represent benefited receptors (5 decibel reduction or greater)
(3) For the barrier to be reasonable, the design goal is to achieve at least 7 dBA reduction for at least one receptor.
(4) The cost for a barrier is $36/sqft.
(5) The maximum cost/benefited receptor is $78,500 for a barrier to be considered reasonable.

Table 15: Noise Mitigation Cost Effectiveness Results – NB9

20 Foot Barrier

NB9 (Weston Lane to Three Rivers Park District Trail Bridge)

Receptors	Activity Category	Preferred Alternative Leq Noise Levels (dBA)		Reduction (in dBA)(2)	Number of Units	Number of Benefited Receptors	Number of Receptors Meeting Design Goal Reduction(3)	Average Decibel Reduction	Length of barrier (feet)	Barrier Area (SF)	Total cost of barrier $36/sq. ft(4)	Cost / benefited receptor(5)
		2040 (No Barrier) (1)	2040 (With Barrier) (1)									
K-24	C	73.5	67.3	**6.2**	1	1	0	8.0	1,860	37,200	$1,365,900	$195,129
K-25	C	73.7	63.2	**10.5**	1	1	1					
K-26	C	73.9	61.8	**12.1**	1	1	1					
K-27	C	73.4	61.4	**12.0**	1	1	1					
K-28	C	70.4	60.5	**9.9**	1	1	1					
K-29	C	65.3	58.5	**6.8**	1	1	0					
K-30	B	72.2	62.7	**9.5**	1	1	1					
K-31	B	64.8	60.2	4.6	1	0	0					
K-32	B	63.0	63.0	0.3	1	0	0					
17 Foot Barrier												
K-24	C	73.5	67.4	**6.1**	1	1	0	7.4	1,860	31,620	$1,165,020	$166,431
K-25	C	73.7	63.8	**9.9**	1	1	1					
K-26	C	73.9	62.6	**11.3**	1	1	1					
K-27	C	73.4	62.4	**11.0**	1	1	1					
K-28	C	70.4	61.4	**9.0**	1	1	1					
K-29	C	65.3	59.0	**6.3**	1	1	0					
K-30	B	72.2	63.4	**8.8**	1	1	1					
K-31	B	64.8	60.6	4.2	1	0	0					
K-32	B	63.0	63.0	0.3	1	0	0					

(1) Underlined numbers represent any value approaching or exceeding the Federal Noise Abatement Criteria
(2) **Bold** Numbers represent benefited receptors (5 decibel reduction or greater)
(3) For the barrier to be reasonable, the design goal is to achieve at least 7 dBA reduction for at least one receptor.
(4) The cost for a barrier is $36/sqft. Cost includes the addition of 1780 ft. guardrail at a cost of $15 per ft.
(5) The maximum cost/benefited receptor is $78,500 for a barrier to be considered reasonable.

14 Foot Barrier

NB9 (Weston Lane to Three Rivers Park District Trail Bridge)

Receptors	Activity Category	Preferred Alternative Leq Noise Levels (dBA)		Reduction (in dBA)(2)	Number of Units	Number of Benefited Receptors	Number of Receptors Meeting Design Goal Reduction(3)	Average Decibel Reduction	Length of barrier (feet)	Barrier Area (SF)	Total cost of barrier $36/sq. ft(4)	Cost / benefited receptor(5)
		2040 (No Barrier) (1)	2040 (With Barrier) (1)									
K-24	C	73.5	67.7	**5.8**	1	1	0					
K-25	C	73.7	64.5	**9.2**	1	1	1					
K-26	C	73.9	63.5	**10.4**	1	1	1					
K-27	C	73.4	63.6	**9.8**	1	1	1					
K-28	C	70.4	62.6	**7.8**	1	1	1	6.6	1,860	26,040	$964,140	$137,734
K-29	C	65.3	59.9	**5.4**	1	1	0					
K-30	B	72.2	64.5	**7.7**	1	1	1					
K-31	B	64.8	61.5	3.3	1	0	0					
K-32	B	63.0	62.8	0.2	1	0	0					

11 Foot Barrier

K-24	C	73.5	68.1	**5.4**	1	1	0					
K-25	C	73.7	65.5	**8.2**	1	1	1					
K-26	C	73.9	64.8	**9.1**	1	1	1					
K-27	C	73.4	65.1	**8.3**	1	1	1					
K-28	C	70.4	65.3	**5.1**	1	1	0	5.3	1,860	20,460	$763,260	$127,210
K-29	C	65.3	61.7	3.6	1	0	0					
K-30	B	72.2	66.8	**5.4**	1	1	0					
K-31	B	64.8	62.6	2.2	1	0	0					
K-32	B	63.0	62.9	0.1	1	0	0					

(1) Underlined numbers represent any value approaching or exceeding the Federal Noise Abatement Criteria
(2) **Bold** Numbers represent benefited receptors (5 decibel reduction or greater)
(3) For the barrier to be reasonable, the design goal is to achieve at least 7 dBA reduction for at least one receptor.
(4) The cost for a barrier is $36/sqft. Cost includes the addition of 1780 ft. guardrail at a cost of $15 per ft.
(5) The maximum cost/benefited receptor is $78,500 for a barrier to be considered reasonable.

Table 16: Noise Mitigation Cost Effectiveness Results – NB10

20 Foot Barrier

NB10 (Between Elm Creek Rest Area Ramps)

Receptors	Activity Category	Preferred Alternative Leq Noise Levels (dBA)		Reduction (in dBA)(2)	Number of Units	Number of Benefited Receptors	Number of Receptors Meeting Design Goal Reduction(3)	Average Decibel Reduction	Length of barrier (feet)	Barrier Area (SF) (1)	Total cost of barrier $36/sq. ft(4)	Cost / benefited receptor(5)
		2040 (No Barrier) (1)	2040 (With Barrier) (1)									
K-18	B	61.5	61.4	0.1	1	0	0	0.5	1,470	29,400	$1,058,400	N/A
K-19	B	62.3	62.2	0.1	1	0	0					
K-20	B	63.3	63.2	0.1	1	0	0					
K-21	C	80.2	79.7	0.5	1	0	0					
K-22	C	73.5	72.7	0.8	1	0	0					
K-23	C	67.9	66.7	1.2	1	0	0					

(1) Underlined numbers represent any value approaching or exceeding the Federal Noise Abatement Criteria
(2) **Bold** Numbers represent benefited receptors (5 decibel reduction or greater)
(3) For the barrier to be reasonable, the design goal is to achieve at least 7 dBA reduction for at least one receptor.
(4) The cost for a barrier is $36/sqft.
(5) The maximum cost/benefited receptor is $78,500 for a barrier to be considered reasonable.

Table 17: Noise Mitigation Cost Effectiveness Results – NB11

20 Foot Barrier

NB11 (Shadow Creek Road to 850 feet south of City of Maple Grove Trail Bridge)

Receptors	Activity Category	Preferred Alternative Leq Noise Levels (dBA)		Reduction (in dBA)(2)	Number of Units	Number of Benefited Receptors	Number of Receptors Meeting Design Goal Reduction(3)	Average Decibel Reduction	Length of barrier (feet)	Barrier Area (SF)	Total cost of barrier $36/sq. ft(4)	Cost / benefited receptor(5)
		2040 (No Barrier) (1)	2040 (With Barrier) (1)									
K-6	C	65.2	58.5	**6.7**	1	1	0	8.7	2,280	45,600	$1,656,600	$184,067
K-7	C	69.9	61.2	**8.7**	1	1	1					
K-8	C	73.1	65.9	**7.2**	1	1	1					
K-9	C	67.3	61.2	**6.1**	1	1	0					
K-10	C	65.3	60.0	**5.3**	1	1	0					
K-11	C	69.3	61.0	**8.3**	1	1	1					
K-12	C	76.0	61.6	**14.4**	1	1	1					
K-13	C	71.1	59.4	**11.7**	1	1	1					
K-14	C	68.2	58.1	**10.1**	1	1	1					
17 Foot Barrier												
K-6	C	65.2	58.9	**6.3**	1	1	0	8.0	2,280	38,760	$1,410,360	$156,707
K-7	C	69.9	61.7	**8.2**	1	1	1					
K-8	C	73.1	66.1	**7.0**	1	1	1					
K-9	C	67.3	62.0	**5.3**	1	1	0					
K-10	C	65.3	60.3	**5.0**	1	1	0					
K-11	C	69.3	61.7	**7.6**	1	1	1					
K-12	C	76.0	62.7	**13.3**	1	1	1					
K-13	C	71.1	60.5	**10.6**	1	1	1					
K-14	C	68.2	59.3	**8.9**	1	1	1					

(1) Underlined numbers represent any value approaching or exceeding the Federal Noise Abatement Criteria
(2) **Bold** Numbers represent benefited receptors (5 decibel reduction or greater)
(3) For the barrier to be reasonable, the design goal is to achieve at least 7 dBA reduction for at least one receptor.
(4) The cost for a barrier is $36/sqft. Cost includes the addition of 1000 ft. guardrail at a cost of $15 per ft.
(5) The maximum cost/benefited receptor is $78,500 for a barrier to be considered reasonable.

14 Foot Barrier

NB11 (Shadow Creek Road to 850 feet south of City of Maple Grove Trail Bridge)

Receptors	Activity Category	Preferred Alternative Leq Noise Levels (dBA)		Reduction (in dBA)(2)	Number of Units	Number of Benefited Receptors	Number of Receptors Meeting Design Goal Reduction(3)	Average Decibel Reduction	Length of barrier (feet)	Barrier Area (SF)	Total cost of barrier $36/sq. ft(4)	Cost / benefited receptor(5)
		2040 (No Barrier) (1)	2040 (With Barrier) (1)									
K-6	C	65.2	59.5	**5.7**	1	1	0	7.2	2,280	31,920	$1,164,120	$166,303
K-7	C	69.9	62.3	**7.6**	1	1	1					
K-8	C	73.1	66.5	**6.6**	1	1	0					
K-9	C	67.3	63.1	4.2	1	0	0					
K-10	C	65.3	60.8	4.5	1	0	0					
K-11	C	69.3	62.5	**6.8**	1	1	0					
K-12	C	76.0	64.0	**12.0**	1	1	1					
K-13	C	71.1	61.5	**9.6**	1	1	1					
K-14	C	68.2	60.4	**7.8**	1	1	1					

11 Foot Barrier

K-6	C	65.2	60.5	4.7	1	0	0	6.1	2,280	25,080	$917,880	$152,980
K-7	C	69.9	64.1	**5.8**	1	1	0					
K-8	C	73.1	67.0	**6.1**	1	1	0					
K-9	C	67.3	64.1	3.2	1	0	0					
K-10	C	65.3	61.3	4.0	1	0	0					
K-11	C	69.3	63.4	**5.9**	1	1	0					
K-12	C	76.0	65.7	**10.3**	1	1	1					
K-13	C	71.1	62.7	**8.4**	1	1	1					
K-14	C	68.2	61.6	**6.6**	1	1	0					

(1) Underlined numbers represent any value approaching or exceeding the Federal Noise Abatement Criteria
(2) **Bold** Numbers represent benefited receptors (5 decibel reduction or greater)
(3) For the barrier to be reasonable, the design goal is to achieve at least 7 dBA reduction for at least one receptor.
(4) The cost for a barrier is $36/sqft. Cost includes the addition of 1000 ft. guardrail at a cost of $15 per ft.
(5) The maximum cost/benefited receptor is $78,500 for a barrier to be considered reasonable.

Table 18: Noise Mitigation Cost Effectiveness Results – NB12

20 Foot Barrier

NB12 (650 feet south of Weaver Lake Road to existing barrier at Wedgewood Way N)

Receptors	Activity Category	Preferred Alternative Leq Noise Levels (dBA)		Reduction (in dBA)(2)	Number of Units	Number of Benefited Receptors	Number of Receptors Meeting Design Goal Reduction(3)	Average Decibel Reduction	Length of barrier (feet)	Barrier Area (SF) (4)	Total cost of barrier $36/sq. ft(5)	Cost / benefited receptor(6)
		2040 (No Barrier) (1)	2040 (With Barrier) (1)									
L-101	C	60.7	53.9	**6.8**	1	1	0					
L-102	C	65.8	56.1	**9.7**	1	1	1					
L-103	B	62.2	53.5	**8.7**	1	1	1					
L-104	B	60.4	52.5	**7.9**	1	1	1					
L-105	B	67.1	56.1	**11.0**	1	1	1					
L-106	B	67.9	57.0	**10.9**	1	1	1					
L-107	B	61.1	53.1	**8.0**	1	1	1					
L-108	B	60.3	51.5	**8.8**	1	1	1					
L-109	B	56.6	49.9	**6.7**	1	1	0					
L-110	B	59.9	50.4	**9.5**	1	1	1					
L-111	C	61.4	53.0	**8.4**	1	1	1	7.2	3,765	75,030	$2,701,080	$28,735
L-112	B	55.4	50.1	**5.3**	1	1	0					
L-113	B	64.1	53.2	**10.9**	1	1	1					
L-114	B	62.4	54.5	**7.9**	1	1	1					
L-115	B	62.1	54.3	**7.8**	1	1	1					
L-116	B	64.0	54.5	**9.5**	1	1	1					
L-117	B	57.9	51.8	**6.1**	1	1	0					
L-118	B	54.5	50.0	4.5	1	0	0					
L-119	B	67.2	58.0	**9.2**	1	1	1					
L-120	B	50.8	46.5	4.3	1	0	0					
L-121	B	60.6	52.3	**8.3**	1	1	1					
L-122	B	65.7	57.5	**8.2**	1	1	1					

20 Foot Barrier

NB12 (650 feet south of Weaver Lake Road to existing barrier at Wedgewood Way N)

Receptors	Activity Category	Preferred Alternative Leq Noise Levels (dBA)		Reduction (in dBA)(2)	Number of Units	Number of Benefited Receptors	Number of Receptors Meeting Design Goal Reduction(3)	Average Decibel Reduction	Length of barrier (feet)	Barrier Area (SF) (4)	Total cost of barrier $36/sq. ft(5)	Cost / benefited receptor(6)
		2040 (No Barrier) (1)	2040 (With Barrier) (1)									
L-123	B	61.2	54.2	**7.0**	1	1	1					
L-124	B	55.9	50.4	**5.5**	1	1	0					
L-125	B	60.9	54.0	**6.9**	1	1	0					
L-126	B	64.2	57.5	**6.7**	1	1	0					
L-127	B	54.8	50.3	4.5	1	0	0					
L-128	B	58.7	51.5	**7.2**	1	1	1					
L-129	B	63.5	57.5	**6.0**	1	1	0					
L-130	B	50.9	46.3	4.6	1	0	0					
L-131	B	53.7	49.2	4.5	1	0	0					
L-132	B	60.7	53.9	**6.8**	1	1	0					
L-133	B	64.6	57.4	**7.2**	1	1	1					
L-134	B	60.8	53.7	**7.1**	1	1	1	7.2	3,765	75,030	$2,701,080	$28,735
L-135	B	51.2	47.1	4.1	1	0	0					
L-136	B	64.1	57.4	**6.7**	1	1	0					
L-137	B	50.0	46.3	3.7	1	0	0					
L-138	B	60.8	52.1	**8.7**	1	1	1					
L-139	B	60.2	53.6	**6.6**	1	1	0					
L-140	B	52.6	48.0	4.6	1	0	0					
L-141	B	60.1	53.6	**6.5**	1	1	0					
L-142	B	65.8	57.8	**8.0**	1	1	1					
L-143	B	65.9	57.8	**8.1**	1	1	1					
L-144	B	60.5	52.0	**8.5**	1	1	1					
L-145	B	58.6	52.0	**6.6**	1	1	0					

20 Foot Barrier

NB12 (650 feet south of Weaver Lake Road to existing barrier at Wedgewood Way N)

Receptors	Activity Category	Preferred Alternative Leq Noise Levels (dBA)		Reduction (in dBA)(2)	Number of Units	Number of Benefited Receptors	Number of Receptors Meeting Design Goal Reduction(3)	Average Decibel Reduction	Length of barrier (feet)	Barrier Area (SF) (4)	Total cost of barrier $36/sq. ft(5)	Cost / benefited receptor(6)
		2040 (No Barrier) (1)	2040 (With Barrier) (1)									
L-146	B	54.5	48.2	**6.3**	1	1	0					
L-147	B	55.0	49.8	**5.2**	1	1	0					
L-148	B	57.9	51.3	**6.6**	1	1	0					
L-149	B	56.4	49.1	**7.3**	1	1	1					
L-150	B	67.0	58.4	**8.6**	1	1	1					
L-151	B	56.6	50.1	**6.5**	1	1	0					
L-152	B	61.9	53.5	**8.4**	1	1	1					
L-153	B	58.4	51.5	**6.9**	1	1	0					
L-154	B	54.3	49.0	**5.3**	1	1	0					
L-155	B	66.9	58.6	**8.3**	1	1	1					
L-156	B	61.0	52.7	**8.3**	1	1	1					
L-157	B	62.7	53.9	**8.8**	1	1	1	7.2	3,765	75,030	$2,701,080	$28,735
L-158	B	65.5	57.6	**7.9**	1	1	1					
L-159	B	64.8	56.8	**8.0**	1	1	1					
L-160	E	66.7	58.4	**8.3**	1	1	1					
L-161	E*	77.0	61.4	**15.6**	1	1	1					
L-162	B	62.3	54.4	**7.9**	1	1	1					
L-163	E*	76.6	62.6	**14.0**	1	1	1					
L-164	B	63.8	55.5	**8.3**	1	1	1					
L-165	B	64.0	55.7	**8.3**	1	1	1					
L-166	B	68.1	58.3	**9.8**	1	1	1					
L-167	C	71.6	60.9	**10.7**	1	1	1					
L-168	B	64.0	55.7	**8.3**	1	1	1					

20 Foot Barrier

NB12 (650 feet south of Weaver Lake Road to existing barrier at Wedgewood Way N)

Receptors	Activity Category	Preferred Alternative Leq Noise Levels (dBA)		Reduction (in dBA)(2)	Number of Units	Number of Benefited Receptors	Number of Receptors Meeting Design Goal Reduction(3)	Average Decibel Reduction	Length of barrier (feet)	Barrier Area (SF) (4)	Total cost of barrier $36/sq. ft(5)	Cost / benefited receptor(6)
		2040 (No Barrier) (1)	2040 (With Barrier) (1)									
L-169	B	69.6	59.3	**10.3**	1	1	1					
L-170	B	68.5	60.1	**8.4**	1	1	1					
L-171	B	65.3	56.9	**8.4**	1	1	1					
L-172	B	58.6	52.0	**6.6**	1	1	0					
L-173	B	59.2	52.6	**6.6**	1	1	0					
L-174	B	67.7	58.1	**9.6**	1	1	1					
L-175	B	65.1	56.1	**9.0**	1	1	1					
L-176	B	63.6	55.5	**8.1**	1	1	1					
L-177	B	52.6	49.9	2.7	1	0	0					
L-178	B	62.5	56.7	**5.8**	1	1	0					
L-179	B	56.4	51.3	**5.1**	1	1	0					
L-180	B	69.1	59.5	**9.6**	1	1	1	7.2	3,765	75,030	$2,701,080	$28,735
L-181	B	60.5	54.6	**5.9**	1	1	0					
L-182	B	55.8	55.3	0.5	1	0	0					
L-183	B	55.1	51.2	3.9	1	0	0					
L-184	B	56.0	53.7	2.3	1	0	0					
L-185	B	71.5	61.1	**10.4**	1	1	1					
L-186	B	61.2	54.2	**7.0**	1	1	1					
L-187	B	65.2	56.1	**9.1**	1	1	1					
L-188	B	52.8	52.0	0.8	1	0	0					
L-189	B	68.7	58.3	**10.4**	1	1	1					
L-190	B	72.6	62.1	**10.5**	1	1	1					
L-191	B	66.9	57.5	**9.4**	1	1	1					

20 Foot Barrier

NB12 (650 feet south of Weaver Lake Road to existing barrier at Wedgewood Way N)

Receptors	Activity Category	Preferred Alternative Leq Noise Levels (dBA)		Reduction (in dBA)(2)	Number of Units	Number of Benefited Receptors	Number of Receptors Meeting Design Goal Reduction(3)	Average Decibel Reduction	Length of barrier (feet)	Barrier Area (SF) (4)	Total cost of barrier $36/sq. ft(5)	Cost / benefited receptor(6)
		2040 (No Barrier) (1)	2040 (With Barrier) (1)									
L-192	B	61.1	53.1	**8.0**	1	1	1					
L-193	B	57.8	54.5	3.3	1	0	0					
L-194	B	61.0	58.6	2.4	1	0	0					
L-195	B	59.5	54.0	**5.5**	1	1	0					
L-196	B	64.6	56.0	**8.6**	1	1	1					
L-197	B	69.4	59.5	**9.9**	1	1	1					
L-198	B	57.8	54.0	3.8	1	0	0					
L-199	B	68.2	59.8	**8.4**	1	1	1					
L-200	B	72.9	62.6	**10.3**	1	1	1					
L-201	B	69.1	59.7	**9.4**	1	1	1					
L-202	B	71.6	61.1	**10.5**	1	1	1					
L-203	B	67.3	62.5	4.8	1	0	0	7.2	3,765	75,030	$2,701,080	$28,735
L-204	B	67.3	63.1	4.2	1	0	0					
L-205	B	63.1	60.7	2.4	1	0	0					
L-206	B	64.2	62.9	1.3	1	0	0					
L-207	E*	73.9	65.2	**8.7**	1	1	1					
L-208	B	65.5	64.3	1.2	1	0	0					
L-209	B	67.3	66.5	0.8	1	0	0					
L-210	B	68.2	67.3	0.9	1	0	0					
L-215	C	62.8	55.0	**7.8**	1	1	1					
L-216	C	64.0	55.6	**8.4**	1	1	1					
L-217	C	67.2	58.5	**8.7**	1	1	1					
L-218	C	71.0	60.6	**10.4**	1	1	1					

20 Foot Barrier

NB12 (650 feet south of Weaver Lake Road to existing barrier at Wedgewood Way N)

Receptors	Activity Category	Preferred Alternative Leq Noise Levels (dBA)		Reduction (in dBA)(2)	Number of Units	Number of Benefited Receptors	Number of Receptors Meeting Design Goal Reduction(3)	Average Decibel Reduction	Length of barrier (feet)	Barrier Area (SF) (4)	Total cost of barrier $36/sq. ft(5)	Cost / benefited receptor(6)
		2040 (No Barrier) (1)	2040 (With Barrier) (1)									
L-219	C	74.9	63.0	**11.9**	1	1	1	7.2	3,765	75,030	$2,701,080	$28,735
L-220	C	74.9	62.3	**12.6**	1	1	1					
L-221	C	67.5	63.3	4.2	1	0	0					
L-222	C	62.1	61.0	1.1	1	0	0					
L-223	C	74.9	63.9	**11.0**	1	1	1					
L-224	C	75.0	70.8	4.2	1	0	0					

* Receptor does not have an outdoor use area and is therefore not considered impacted for this analysis.

(1) Underlined numbers represent any value approaching or exceeding the Federal Noise Abatement Criteria
(2) **Bold** Numbers represent benefited receptors (5 decibel reduction or greater)
(3) For the barrier to be reasonable, the design goal is to achieve at least 7 dBA reduction for at least one receptor.
(4) Barrier area incorporates barrier taper at north end for the proposed barrier.
(5) The cost for a barrier is $36/sqft. Cost includes the addition of 2300 ft. guardrail at a cost of $15 per ft.
(6) The maximum cost/benefited receptor is $78,500 for a barrier to be considered reasonable.

17 Foot Barrier

NB12 (650 feet south of Weaver Lake Road to existing barrier at Wedgewood Way N)

Receptors	Activity Category	Preferred Alternative Leq Noise Levels (dBA)		Reduction (in dBA)(2)	Number of Units	Number of Benefited Receptors	Number of Receptors Meeting Design Goal Reduction(3)	Average Decibel Reduction	Length of barrier (feet)	Barrier Area (SF)	Total cost of barrier $36/sq. ft(5)	Cost / benefited receptor(6)
		2040 (No Barrier) (1)	2040 (With Barrier) (1)									
L-101	C	60.7	54.6	**6.1**	1	1	0					
L-102	C	65.8	57.0	**8.8**	1	1	1					
L-103	B	62.2	54.6	**7.6**	1	1	1					
L-104	B	60.4	53.5	**6.9**	1	1	0					
L-105	B	67.1	57.3	**9.8**	1	1	1					
L-106	B	67.9	58.2	**9.7**	1	1	1					
L-107	B	61.1	54.2	**6.9**	1	1	0					
L-108	B	60.3	52.6	**7.7**	1	1	1					
L-109	B	56.6	50.7	**5.9**	1	1	0					
L-110	B	59.9	51.6	**8.3**	1	1	1					
L-111	C	61.4	54.1	**7.3**	1	1	1					
L-112	B	55.4	50.1	**5.3**	1	1	0	6.3	3,770	64,110	$2,342,460	$26,619
L-113	B	64.1	54.5	**9.6**	1	1	1					
L-114	B	62.4	55.6	**6.8**	1	1	0					
L-115	B	62.1	55.4	**6.7**	1	1	0					
L-116	B	64.0	55.6	**8.4**	1	1	1					
L-117	B	57.9	52.7	**5.2**	1	1	0					
L-118	B	54.5	50.6	3.9	1	0	0					
L-119	B	67.2	58.8	**8.4**	1	1	1					
L-120	B	50.8	47.2	3.6	1	0	0					
L-121	B	60.6	53.4	**7.2**	1	1	1					
L-122	B	65.7	58.1	**7.6**	1	1	1					
L-123	B	61.2	55.1	**6.1**	1	1	0					

17 Foot Barrier

NB12 (650 feet south of Weaver Lake Road to existing barrier at Wedgewood Way N)

Receptors	Activity Category	Preferred Alternative Leq Noise Levels (dBA)		Reduction (in dBA)(2)	Number of Units	Number of Benefited Receptors	Number of Receptors Meeting Design Goal Reduction(3)	Average Decibel Reduction	Length of barrier (feet)	Barrier Area (SF)	Total cost of barrier $36/sq. ft(5)	Cost / benefited receptor(6)
		2040 (No Barrier) (1)	2040 (With Barrier) (1)									
L-124	B	55.9	51.2	4.7	1	0	0	6.3	3,770	64,110	$2,342,460	$26,619
L-125	B	60.9	54.8	**6.1**	1	1	0					
L-126	B	64.2	58.0	**6.2**	1	1	0					
L-127	B	54.8	50.9	3.9	1	0	0					
L-128	B	58.7	52.5	**6.2**	1	1	0					
L-129	B	63.5	58.1	**5.4**	1	1	0					
L-130	B	50.9	47.1	3.8	1	0	0					
L-131	B	53.7	49.9	3.8	1	0	0					
L-132	B	60.7	54.5	**6.2**	1	1	0					
L-133	B	64.6	58.6	**6.0**	1	1	0					
L-134	B	60.8	54.5	**6.3**	1	1	0					
L-135	B	51.2	47.6	3.6	1	0	0					
L-136	B	64.1	58.5	**5.6**	1	1	0					
L-137	B	50.0	46.8	3.2	1	0	0					
L-138	B	60.8	53.4	**7.4**	1	1	1					
L-139	B	60.2	54.5	**5.7**	1	1	0					
L-140	B	52.6	48.7	3.9	1	0	0					
L-141	B	60.1	54.3	**5.8**	1	1	0					
L-142	B	65.8	59.0	**6.8**	1	1	0					
L-143	B	65.9	59.0	**6.9**	1	1	0					
L-144	B	60.5	53.1	**7.4**	1	1	1					
L-145	B	58.6	52.8	**5.8**	1	1	0					
L-146	B	54.5	48.9	**5.6**	1	1	0					

17 Foot Barrier

NB12 (650 feet south of Weaver Lake Road to existing barrier at Wedgewood Way N)

Receptors	Activity Category	Preferred Alternative Leq Noise Levels (dBA)		Reduction (in dBA)(2)	Number of Units	Number of Benefited Receptors	Number of Receptors Meeting Design Goal Reduction(3)	Average Decibel Reduction	Length of barrier (feet)	Barrier Area (SF)	Total cost of barrier $36/sq. ft(5)	Cost / benefited receptor(6)
		2040 (No Barrier) (1)	2040 (With Barrier) (1)									
L-147	B	55.0	50.6	4.4	1	0	0					
L-148	B	57.9	52.2	**5.7**	1	1	0					
L-149	B	56.4	50.3	**6.1**	1	1	0					
L-150	B	67.0	59.6	**7.4**	1	1	1					
L-151	B	56.6	51.0	**5.6**	1	1	0					
L-152	B	61.9	54.6	**7.3**	1	1	1					
L-153	B	58.4	52.5	**5.9**	1	1	0					
L-154	B	54.3	50.2	4.1	1	0	0					
L-155	B	66.9	59.7	**7.2**	1	1	1					
L-156	B	61.0	53.9	**7.1**	1	1	1					
L-157	B	62.7	55.2	**7.5**	1	1	1					
L-158	B	65.5	58.7	**6.8**	1	1	0	6.3	3,770	64,110	$2,342,460	$26,619
L-159	B	64.8	58.0	**6.8**	1	1	0					
L-160	E	66.7	59.4	**7.3**	1	1	1					
L-161	E*	77.0	62.6	**14.4**	1	1	1					
L-162	B	62.3	54.9	**7.4**	1	1	1					
L-163	E*	76.6	63.8	**12.8**	1	1	1					
L-164	B	63.8	56.2	**7.6**	1	1	1					
L-165	B	64.0	56.7	**7.3**	1	1	1					
L-166	B	68.1	59.6	**8.5**	1	1	1					
L-167	C	71.6	62.0	**9.6**	1	1	1					
L-168	B	64.0	56.7	**7.3**	1	1	1					
L-169	B	69.6	60.7	**8.9**	1	1	1					

17 Foot Barrier

NB12 (650 feet south of Weaver Lake Road to existing barrier at Wedgewood Way N)

Receptors	Activity Category	Preferred Alternative Leq Noise Levels (dBA)		Reduction (in dBA)(2)	Number of Units	Number of Benefited Receptors	Number of Receptors Meeting Design Goal Reduction(3)	Average Decibel Reduction	Length of barrier (feet)	Barrier Area (SF)	Total cost of barrier $36/sq. ft(5)	Cost / benefited receptor(6)
		2040 (No Barrier) (1)	2040 (With Barrier) (1)									
L-170	B	68.5	61.3	**7.2**	1	1	1	6.3	3,770	64,110	$2,342,460	$26,619
L-171	B	65.3	58.1	**7.2**	1	1	1					
L-172	B	58.6	52.8	**5.8**	1	1	0					
L-173	B	59.2	53.4	**5.8**	1	1	0					
L-174	B	67.7	59.5	**8.2**	1	1	1					
L-175	B	65.1	57.5	**7.6**	1	1	1					
L-176	B	63.6	56.8	**6.8**	1	1	0					
L-177	B	52.6	50.7	1.9	1	0	0					
L-178	B	62.5	57.4	**5.1**	1	1	0					
L-179	B	56.4	52.2	4.2	1	0	0					
L-180	B	69.1	60.9	**8.2**	1	1	1					
L-181	B	60.5	55.6	4.9	1	0	0					
L-182	B	55.8	55.5	0.3	1	0	0					
L-183	B	55.1	51.9	3.2	1	0	0					
L-184	B	56.0	54.2	1.8	1	0	0					
L-185	B	71.5	62.2	**9.3**	1	1	1					
L-186	B	61.2	55.2	**6.0**	1	1	0					
L-187	B	65.2	57.4	**7.8**	1	1	1					
L-188	B	52.8	52.3	0.5	1	0	0					
L-189	B	68.7	59.6	**9.1**	1	1	1					
L-190	B	72.6	63.2	**9.4**	1	1	1					
L-191	B	66.9	58.7	**8.2**	1	1	1					
L-192	B	61.1	54.2	**6.9**	1	1	0					

17 Foot Barrier

NB12 (650 feet south of Weaver Lake Road to existing barrier at Wedgewood Way N)

Receptors	Activity Category	Preferred Alternative Leq Noise Levels (dBA)		Reduction (in dBA)(2)	Number of Units	Number of Benefited Receptors	Number of Receptors Meeting Design Goal Reduction(3)	Average Decibel Reduction	Length of barrier (feet)	Barrier Area (SF)	Total cost of barrier $36/sq. ft(5)	Cost / benefited receptor(6)
		2040 (No Barrier) (1)	2040 (With Barrier) (1)									
L-193	B	57.8	55.0	2.8	1	0	0					
L-194	B	61.0	59.0	2.0	1	0	0					
L-195	B	59.5	55.0	4.5	1	0	0					
L-196	B	64.6	57.2	**7.4**	1	1	1					
L-197	B	69.4	60.7	**8.7**	1	1	1					
L-198	B	57.8	54.5	3.3	1	0	0					
L-199	B	68.2	60.8	**7.4**	1	1	1					
L-200	B	72.9	63.6	**9.3**	1	1	1					
L-201	B	69.1	60.9	**8.2**	1	1	1					
L-202	B	71.6	62.2	**9.4**	1	1	1					
L-203	B	67.3	62.8	4.5	1	0	0					
L-204	B	67.3	63.3	4.0	1	0	0	6.3	3,770	64,110	$2,342,460	$26,619
L-205	B	63.1	60.7	2.4	1	0	0					
L-206	B	64.2	62.9	1.3	1	0	0					
L-207	E*	73.9	65.7	**8.2**	1	1	1					
L-208	B	65.5	64.3	1.2	1	0	0					
L-209	B	67.3	66.5	0.8	1	0	0					
L-210	B	68.2	67.2	1.0	1	0	0					
L-215	C	62.8	55.6	**7.2**	1	1	1					
L-216	C	64.0	56.3	**7.7**	1	1	1					
L-217	C	67.2	59.1	**8.1**	1	1	1					
L-218	C	71.0	61.6	**9.4**	1	1	1					
L-219	C	74.9	64.0	**10.9**	1	1	1					

17 Foot Barrier

NB12 (650 feet south of Weaver Lake Road to existing barrier at Wedgewood Way N)

Receptors	Activity Category	Preferred Alternative Leq Noise Levels (dBA)		Reduction (in dBA)(2)	Number of Units	Number of Benefited Receptors	Number of Receptors Meeting Design Goal Reduction(3)	Average Decibel Reduction	Length of barrier (feet)	Barrier Area (SF)	Total cost of barrier $36/sq. ft(5)	Cost / benefited receptor(6)
		2040 (No Barrier) (1)	2040 (With Barrier) (1)									
L-220	C	74.9	63.4	**11.5**	1	1	1	6.3	3,770	64,110	$2,342,460	$26,619
L-221	C	67.5	63.5	4.0	1	0	0					
L-222	C	62.1	60.9	1.2	1	0	0					
L-223	C	74.9	64.5	**10.4**	1	1	1					
L-224	C	75.0	70.5	4.5	1	0	0					

* Receptor does not have an outdoor use area and is therefore not considered impacted for this analysis.

(1) Underlined numbers represent any value approaching or exceeding the Federal Noise Abatement Criteria
(2) **Bold** Numbers represent benefited receptors (5 decibel reduction or greater)
(3) For the barrier to be reasonable, the design goal is to achieve at least 7 dBA reduction for at least one receptor.
(4) The cost for a barrier is $36/sqft. Cost includes the addition of 2300 ft. guardrail at a cost of $15 per ft.
(5) The maximum cost/benefited receptor is $78,500 for a barrier to be considered reasonable.

14 Foot Barrier

NB12 (650 feet south of Weaver Lake Road to existing barrier at Wedgewood Way N)

Receptors	Activity Category	Preferred Alternative Leq Noise Levels (dBA)		Reduction (in dBA)(2)	Number of Units	Number of Benefited Receptors	Number of Receptors Meeting Design Goal Reduction(3)	Average Decibel Reduction	Length of barrier (feet)	Barrier Area (SF)	Total cost of barrier $36/sq. ft(5)	Cost / benefited receptor(6)
		2040 (No Barrier) (1)	2040 (With Barrier) (1)									
L-101	C	60.7	55.7	**5.0**	1	1	0					
L-102	C	65.8	58.1	**7.7**	1	1	1					
L-103	B	62.2	56.2	**6.0**	1	1	0					
L-104	B	60.4	55.1	**5.3**	1	1	0					
L-105	B	67.1	58.9	**8.2**	1	1	1					
L-106	B	67.9	59.7	**8.2**	1	1	1					
L-107	B	61.1	55.6	**5.5**	1	1	0					
L-108	B	60.3	53.9	**6.4**	1	1	0					
L-109	B	56.6	51.9	4.7	1	0	0					
L-110	B	59.9	52.9	**7.0**	1	1	1					
L-111	C	61.4	55.5	**5.9**	1	1	0					
L-112	B	55.4	51.0	4.4	1	0	0	5.2	3,770	52,780	$1,934,580	$27,637
L-113	B	64.1	56.0	**8.1**	1	1	1					
L-114	B	62.4	57.0	**5.4**	1	1	0					
L-115	B	62.1	56.8	**5.3**	1	1	0					
L-116	B	64.0	57.1	**6.9**	1	1	0					
L-117	B	57.9	53.9	4.0	1	0	0					
L-118	B	54.5	51.4	3.1	1	0	0					
L-119	B	67.2	59.7	**7.5**	1	1	1					
L-120	B	50.8	48.0	2.8	1	0	0					
L-121	B	60.6	54.7	**5.9**	1	1	0					
L-122	B	65.7	58.9	**6.8**	1	1	0					
L-123	B	61.2	56.0	**5.2**	1	1	0					

14 Foot Barrier

NB12 (650 feet south of Weaver Lake Road to existing barrier at Wedgewood Way N)

Receptors	Activity Category	Preferred Alternative Leq Noise Levels (dBA)		Reduction (in dBA)(2)	Number of Units	Number of Benefited Receptors	Number of Receptors Meeting Design Goal Reduction(3)	Average Decibel Reduction	Length of barrier (feet)	Barrier Area (SF)	Total cost of barrier $36/sq. ft(5)	Cost / benefited receptor(6)
		2040 (No Barrier) (1)	2040 (With Barrier) (1)									
L-124	B	55.9	52.3	3.6	1	0	0					
L-125	B	60.9	55.6	**5.3**	1	1	0					
L-126	B	64.2	58.4	**5.8**	1	1	0					
L-127	B	54.8	51.7	3.1	1	0	0					
L-128	B	58.7	53.7	**5.0**	1	1	0					
L-129	B	63.5	58.4	**5.1**	1	1	0					
L-130	B	50.9	48.1	2.8	1	0	0					
L-131	B	53.7	50.8	2.9	1	0	0					
L-132	B	60.7	55.7	**5.0**	1	1	0					
L-133	B	64.6	59.9	4.7	1	0	0					
L-134	B	60.8	55.8	**5.0**	1	1	0					
L-135	B	51.2	48.4	2.8	1	0	0	5.2	3,770	52,780	$1,934,580	$27,637
L-136	B	64.1	59.7	4.4	1	0	0					
L-137	B	50.0	47.5	2.5	1	0	0					
L-138	B	60.8	54.9	**5.9**	1	1	0					
L-139	B	60.2	55.6	4.6	1	0	0					
L-140	B	52.6	49.5	3.1	1	0	0					
L-141	B	60.1	55.4	4.7	1	0	0					
L-142	B	65.8	60.4	**5.4**	1	1	0					
L-143	B	65.9	60.4	**5.5**	1	1	0					
L-144	B	60.5	54.6	**5.9**	1	1	0					
L-145	B	58.6	54.0	4.6	1	0	0					
L-146	B	54.5	50.0	4.5	1	0	0					

14 Foot Barrier

NB12 (650 feet south of Weaver Lake Road to existing barrier at Wedgewood Way N)

Receptors	Activity Category	Preferred Alternative Leq Noise Levels (dBA)		Reduction (in dBA)(2)	Number of Units	Number of Benefited Receptors	Number of Receptors Meeting Design Goal Reduction(3)	Average Decibel Reduction	Length of barrier (feet)	Barrier Area (SF)	Total cost of barrier $36/sq. ft(5)	Cost / benefited receptor(6)
		2040 (No Barrier) (1)	2040 (With Barrier) (1)									
L-147	B	55.0	51.3	3.7	1	0	0					
L-148	B	57.9	53.3	4.6	1	0	0					
L-149	B	56.4	51.6	4.8	1	0	0					
L-150	B	67.0	61.1	**5.9**	1	1	0					
L-151	B	56.6	52.1	4.5	1	0	0					
L-152	B	61.9	56.0	**5.9**	1	1	0					
L-153	B	58.4	53.7	4.7	1	0	0					
L-154	B	54.3	51.5	2.8	1	0	0					
L-155	B	66.9	61.1	**5.8**	1	1	0					
L-156	B	61.0	55.3	**5.7**	1	1	0					
L-157	B	62.7	56.8	**5.9**	1	1	0					
L-158	B	65.5	60.0	**5.5**	1	1	0	5.2	3,770	52,780	$1,934,580	$27,637
L-159	B	64.8	59.3	**5.5**	1	1	0					
L-160	E	66.7	60.8	**5.9**	1	1	0					
L-161	E*	77.0	64.1	**12.9**	1	1	1					
L-162	B	62.3	55.9	**6.4**	1	1	0					
L-163	E*	76.6	65.1	**11.5**	1	1	1					
L-164	B	63.8	57.4	**6.4**	1	1	0					
L-165	B	64.0	58.7	**5.3**	1	1	0					
L-166	B	68.1	61.4	**6.7**	1	1	0					
L-167	C	71.6	63.1	**8.5**	1	1	1					
L-168	B	64.0	58.6	**5.4**	1	1	0					
L-169	B	69.6	62.8	**6.8**	1	1	0					

14 Foot Barrier

NB12 (650 feet south of Weaver Lake Road to existing barrier at Wedgewood Way N)

Receptors	Activity Category	Preferred Alternative Leq Noise Levels (dBA)		Reduction (in dBA)(2)	Number of Units	Number of Benefited Receptors	Number of Receptors Meeting Design Goal Reduction(3)	Average Decibel Reduction	Length of barrier (feet)	Barrier Area (SF)	Total cost of barrier $36/sq. ft(5)	Cost / benefited receptor(6)
		2040 (No Barrier) (1)	2040 (With Barrier) (1)									
L-170	B	68.5	63.1	**5.4**	1	1	0					
L-171	B	65.3	60.3	**5.0**	1	1	0					
L-172	B	58.6	54.4	4.2	1	0	0					
L-173	B	59.2	55.1	4.1	1	0	0					
L-174	B	67.7	61.8	**5.9**	1	1	0					
L-175	B	65.1	60.0	**5.1**	1	1	0					
L-176	B	63.6	59.1	4.5	1	0	0					
L-177	B	52.6	51.5	1.1	1	0	0					
L-178	B	62.5	59.0	3.5	1	0	0					
L-179	B	56.4	53.1	3.3	1	0	0					
L-180	B	69.1	62.8	**6.3**	1	1	0					
L-181	B	60.5	56.5	4.0	1	0	0	5.2	3,770	52,780	$1,934,580	$27,637
L-182	B	55.8	55.6	0.2	1	0	0					
L-183	B	55.1	52.9	2.2	1	0	0					
L-184	B	56.0	54.6	1.4	1	0	0					
L-185	B	71.5	63.8	**7.7**	1	1	1					
L-186	B	61.2	56.3	4.9	1	0	0					
L-187	B	65.2	58.7	**6.5**	1	1	0					
L-188	B	52.8	52.5	0.3	1	0	0					
L-189	B	68.7	61.0	**7.7**	1	1	1					
L-190	B	72.6	64.7	**7.9**	1	1	1					
L-191	B	66.9	60.1	**6.8**	1	1	0					
L-192	B	61.1	55.3	**5.8**	1	1	0					

14 Foot Barrier

NB12 (650 feet south of Weaver Lake Road to existing barrier at Wedgewood Way N)

Receptors	Activity Category	Preferred Alternative Leq Noise Levels (dBA)		Reduction (in dBA)(2)	Number of Units	Number of Benefited Receptors	Number of Receptors Meeting Design Goal Reduction(3)	Average Decibel Reduction	Length of barrier (feet)	Barrier Area (SF)	Total cost of barrier $36/sq. ft(5)	Cost / benefited receptor(6)
		2040 (No Barrier) (1)	2040 (With Barrier) (1)									
L-193	B	57.8	55.4	2.4	1	0	0					
L-194	B	61.0	59.4	1.6	1	0	0					
L-195	B	59.5	56.1	3.4	1	0	0					
L-196	B	64.6	58.7	**5.9**	1	1	0					
L-197	B	69.4	62.0	**7.4**	1	1	1					
L-198	B	57.8	55.3	2.5	1	0	0					
L-199	B	68.2	62.0	**6.2**	1	1	0					
L-200	B	72.9	65.2	**7.7**	1	1	1					
L-201	B	69.1	62.4	**6.7**	1	1	0					
L-202	B	71.6	63.8	**7.8**	1	1	1					
L-203	B	67.3	63.6	3.7	1	0	0					
L-204	B	67.3	64.1	3.2	1	0	0	5.2	3,770	52,780	$1,934,580	$27,637
L-205	B	63.1	60.8	2.3	1	0	0					
L-206	B	64.2	62.9	1.3	1	0	0					
L-207	E*	73.9	67.1	**6.8**	1	1	0					
L-208	B	65.5	64.4	1.1	1	0	0					
L-209	B	67.3	66.5	0.8	1	0	0					
L-210	B	68.2	67.2	1.0	1	0	0					
L-215	C	62.8	57.0	**5.8**	1	1	0					
L-216	C	64.0	57.3	**6.7**	1	1	0					
L-217	C	67.2	60.2	**7.0**	1	1	1					
L-218	C	71.0	62.9	**8.1**	1	1	1					
L-219	C	74.9	65.2	**9.7**	1	1	1					

14 Foot Barrier

NB12 (650 feet south of Weaver Lake Road to existing barrier at Wedgewood Way N)

Receptors	Activity Category	Preferred Alternative Leq Noise Levels (dBA)		Reduction (in dBA)(2)	Number of Units	Number of Benefited Receptors	Number of Receptors Meeting Design Goal Reduction(3)	Average Decibel Reduction	Length of barrier (feet)	Barrier Area (SF)	Total cost of barrier $36/sq. ft(5)	Cost / benefited receptor(6)
		2040 (No Barrier) (1)	2040 (With Barrier) (1)									
L-220	C	74.9	64.9	**10.0**	1	1	1	5.2	3,770	52,780	$1,934,580	$27,637
L-221	C	67.5	64.1	3.4	1	0	0					
L-222	C	62.1	61.1	1.0	1	0	0					
L-223	C	74.9	65.7	**9.2**	1	1	1					
L-224	C	75.0	70.7	4.3	1	0	0					

* Receptor does not have an outdoor use area and is therefore not considered impacted for this analysis.

(1) Underlined numbers represent any value approaching or exceeding the Federal Noise Abatement Criteria
(2) **Bold** Numbers represent benefited receptors (5 decibel reduction or greater)
(3) For the barrier to be reasonable, the design goal is to achieve at least 7 dBA reduction for at least one receptor.
(4) The cost for a barrier is $36/sqft. Cost includes the addition of 2300 ft. guardrail at a cost of $15 per ft.
(5) The maximum cost/benefited receptor is $78,500 for a barrier to be considered reasonable.

Table 19: Noise Mitigation Cost Effectiveness Results – NB13

20 Foot Barrier

NB13 (At Vinewood Lane N, between Wedgewood Way N and 73rd Avenue N)

Receptors	Activity Category	Preferred Alternative Leq Noise Levels (dBA)		Reduction (in dBA)(2)	Number of Units	Number of Benefited Receptors	Number of Receptors Meeting Design Goal Reduction(3)	Average Decibel Reduction	Length of barrier (feet)	Barrier Area (SF)	Total cost of barrier $36/sq. ft(4)	Cost / benefited receptor(5)
		2040 (No Barrier) (1)	2040 (With Barrier) (1)									
L-1	B	62.8	56.9	**5.9**	2	2	0	7.4	1,190	23,800	$870,300	$29,010
L-2	B	65.6	57.6	**8.0**	2	2	2					
L-3	B	62.3	56.6	**5.7**	2	2	0					
L-4	B	61.1	55.3	**5.8**	4	4	0					
L-5	B	71.2	60.1	**11.1**	2	2	2					
L-6	B	66.5	58.1	**8.4**	2	2	2					
L-7	B	70.5	59.3	**11.2**	2	2	2					
L-8	B	70.6	59.2	**11.4**	2	2	2					
L-9	B	69.3	58.1	**11.2**	2	2	2					
L-10	B	70.2	58.5	**11.7**	2	2	2					
L-11	B	60.2	54.6	**5.6**	4	4	0					
L-12	B	61.9	56.4	**5.5**	2	2	0					
L-13	B	61.0	55.7	**5.3**	2	2	0					
L-14	B	60.3	55.5	4.8	2	0	0					
L-15	B	56.9	53.6	3.3	2	0	0					
L-16	B	59.5	55.3	4.2	2	0	0					

(1) Underlined numbers represent any value approaching or exceeding the Federal Noise Abatement Criteria
(2) **Bold** Numbers represent benefited receptors (5 decibel reduction or greater)
(3) For the barrier to be reasonable, the design goal is to achieve at least 7 dBA reduction for at least one receptor.
(4) The cost for a barrier is $36/sqft. Cost includes the addition of 900 ft. guardrail at a cost of $15 per ft.
(5) The maximum cost/benefited receptor is $78,500 for a barrier to be considered reasonable.

17 Foot Barrier

NB13 (At Vinewood Lane N, between Wedgewood Way N and 73rd Avenue N)

Receptors	Activity Category	Preferred Alternative Leq Noise Levels (dBA)		Reduction (in dBA)(2)	Number of Units	Number of Benefited Receptors	Number of Receptors Meeting Design Goal Reduction(3)	Average Decibel Reduction	Length of barrier (feet)	Barrier Area (SF)	Total cost of barrier $36/sq. ft(4)	Cost / benefited receptor(5)
		2040 (No Barrier) (1)	2040 (With Barrier) (1)									
L-1	B	62.8	57.8	**5.0**	2	2	0	6.5	1,190	20,230	$741,780	$30,908
L-2	B	65.6	58.6	**7.0**	2	2	2					
L-3	B	62.3	57.4	4.9	2	0	0					
L-4	B	61.1	56.1	**5.0**	4	4	0					
L-5	B	71.2	61.7	**9.5**	2	2	2					
L-6	B	66.5	59.2	**7.3**	2	2	2					
L-7	B	70.5	60.6	**9.9**	2	2	2					
L-8	B	70.6	60.5	**10.1**	2	2	2					
L-9	B	69.3	59.2	**10.1**	2	2	2					
L-10	B	70.2	59.5	**10.7**	2	2	2					
L-11	B	60.2	55.1	**5.1**	4	4	0					
L-12	B	61.9	57.2	4.7	2	0	0					
L-13	B	61.0	56.5	4.5	2	0	0					
L-14	B	60.3	56.2	4.1	2	0	0					
L-15	B	56.9	53.9	3.0	2	0	0					
L-16	B	59.5	55.7	3.8	2	0	0					

(1) Underlined numbers represent any value approaching or exceeding the Federal Noise Abatement Criteria
(2) **Bold** Numbers represent benefited receptors (5 decibel reduction or greater)
(3) For the barrier to be reasonable, the design goal is to achieve at least 7 dBA reduction for at least one receptor.
(4) The cost for a barrier is $36/sqft. Cost includes the addition of 900 ft. guardrail at a cost of $15 per ft.
(5) The maximum cost/benefited receptor is $78,500 for a barrier to be considered reasonable.

14 Foot Barrier

NB13 (At Vinewood Lane N, between Wedgewood Way N and 73rd Avenue N)

Receptors	Activity Category	Preferred Alternative Leq Noise Levels (dBA)		Reduction (in dBA)(2)	Number of Units	Number of Benefited Receptors	Number of Receptors Meeting Design Goal Reduction(3)	Average Decibel Reduction	Length of barrier (feet)	Barrier Area (SF)	Total cost of barrier $36/sq. ft(4)	Cost / benefited receptor(5)
		2040 (No Barrier) (1)	2040 (With Barrier) (1)									
L-1	B	62.8	59.4	3.4	2	0	0	4.9	1,190	16,660	$599,760	$49,980
L-2	B	65.6	60.7	4.9	2	0	0					
L-3	B	62.3	58.9	3.4	2	0	0					
L-4	B	61.1	58.2	2.9	4	0	0					
L-5	B	71.2	64.8	**6.4**	2	2	0					
L-6	B	66.5	61.5	**5.0**	2	2	0					
L-7	B	70.5	63.6	**6.9**	2	2	0					
L-8	B	70.6	63.1	**7.5**	2	2	2					
L-9	B	69.3	60.4	**8.9**	2	2	2					
L-10	B	70.2	60.9	**9.3**	2	2	2					
L-11	B	60.2	56.3	3.9	4	0	0					
L-12	B	61.9	58.4	3.5	2	0	0					
L-13	B	61.0	57.6	3.4	2	0	0					
L-14	B	60.3	57.1	3.2	2	0	0					
L-15	B	56.9	54.8	2.1	2	0	0					
L-16	B	59.5	56.5	3.0	2	0	0					

(1) Underlined numbers represent any value approaching or exceeding the Federal Noise Abatement Criteria
(2) **Bold** Numbers represent benefited receptors (5 decibel reduction or greater)
(3) For the barrier to be reasonable, the design goal is to achieve at least 7 dBA reduction for at least one receptor.
(4) The cost for a barrier is $36/sqft. Cost includes the addition of 900 ft. guardrail at a cost of $15 per ft.
(5) The maximum cost/benefited receptor is $78,500 for a barrier to be considered reasonable.

Other Noise Mitigation Techniques

Noise abatement measures other than noise barriers were considered for the proposed project. These measures are summarized below.

- Traffic Management Measures: These measures include such items as prohibition of certain vehicle types and time-use restrictions for certain vehicle types. These traffic management measures are not reasonable for I-94 because this would be inconsistent with the need for the proposed project and the functional classification of these roadways, which is to provide flexibility to travelers and increase highway capacity.
- Modified Speed Limits: Reducing speed limits would reduce noise levels adjacent to project area roadways. A general rule of thumb is that a decrease in speed of approximately 20 miles per hour is necessary for a noticeable decrease in noise levels. Reduced speed limits are not reasonable because this would be inconsistent with the need of the proposed project and the functional classification of these roadways. In addition, reductions of speed limits, although acoustically beneficial, are seldom practical unless the design speed of the proposed improvement is also reduced.
- Vertical and Horizontal Alignment: The proposed improvement project will take place within the existing right of way closely following the existing horizontal and vertical alignments. Changes in the horizontal and vertical alignment are not feasible without substantial impacts to adjacent properties and resources.
- Landscaping/Natural Noise Screening: The use of vegetation as a noise screen can be effective only if at least 75 to 100 feet of dense, evergreen vegetation (evergreen vegetation maintains its foliage year around) is provided between the source and receptor. It is not feasible to plant enough vegetation within the right of way to achieve substantial noise level reductions. As such, vegetation is not a reasonable noise mitigation measure.
- Exclusive Land Use Designations: Buffer zones are undeveloped, open spaces adjacent to a highway corridor. Acquisition of property to serve as a buffer zone between the roadway and adjacent lands is not feasible because it would require the purchase of additional right of way.
- Noise Insulation of Activity Category D Land Use: There are no impacts to Category D facilities within the project area.

5.0 CONSTRUCTION NOISE

The construction activities associated with implementation of the Preferred Alternative may result in increased noise levels relative to existing conditions. These impacts will primarily be associated with construction equipment and pile driving.

Table 20 shows peak noise levels monitored at 50 feet from various types of construction equipment. This equipment is primarily associated with site grading, site preparation and roadway construction and is associated with the higher noise levels due to construction.

Table 20: Typical Construction Equipment Noise Levels at 50 Feet

Equipment Type	Manufacturers Sampled	Total Number of Models in Sample	Peak Noise Level (dBA)	
			Range	Average
Backhoes	5	6	74-92	83
Front Loaders	5	30	75-96	85
Dozers	8	41	65-95	85
Graders	3	15	72-92	84
Scrapers	2	27	76-98	87
Pile Drivers	NA	NA	95-105	101

Source: United States Environmental Protection Agency and Federal Highway Administration

Mitigation

Increased noise levels are to a degree unavoidable for this type of project. MnDOT will require that construction equipment be properly muffled and in proper working order. While MnDOT and its contractor(s) are exempt from local noise ordinances, it is the practice to require that the contractor(s) comply with applicable local noise restrictions to the extent possible. Notice will be provided to affected communities for any abnormally loud construction activities. It is anticipated that nighttime construction may sometimes be required to minimize traffic impacts and improve safety. However, construction will be limited to daytime hours as much as possible. This project is anticipated to be under construction in 2020. Any proposed noise barriers will be constructed as early as the construction staging allows. Any associated high-impact equipment noise such as pile driving, pavement sawing, or jack hammering will be unavoidable with construction of the Preferred Alternative. Pile driving noise is associated with any sheet piling necessary for any retaining wall construction. The use of pile drivers, pavement sawing and jack-hammering equipment will be prohibited during nighttime hours.

6.0 CONCLUSIONS AND RECOMMENDATIONS

Traffic noise levels were modeled at 715 representative receptor locations along the I-94 project corridor. Traffic noise levels were modeled for existing (2017) conditions, the future (2040) No Build condition, and the future (2040) Build condition. A summary of the impacted noise receptors is provided in **Table 21**.

Table 21: Summary of Impacted Noise Receptors

Modeled Year	Existing (2017)	Future No Build (2040)	Future Build Alternative (2040)
Receptors Exceed FHWA Noise Abatement Criteria	148	162	171
L_{eq} Modeled Noise Level Ranges (low/high)	46.1 to 81.3 dBA	46.7 to 81.8 dBA	46.9 to 82.1 dBA

In general, the proposed improvements would result in minor changes without noise barriers in traffic noise levels compared to existing conditions. The analysis shows that under the Future No Build alternative, L_{eq} modeled traffic noise levels vary 0.1 dBA to 1.9 dBA over existing conditions. Modeled L_{eq} noise levels under the Build Alternative vary 0 dBA to 4.7 dBA from existing (2017) conditions.

Thirteen noise barriers were analyzed along the I-94 project corridor. Barrier NB10 did not achieve 5 dBA at any receptors to be considered feasible and was eliminated from further consideration. Eight barriers were able to achieve the MnDOT noise reduction design goal of at least 7 dBA for at least one benefited receptor, but the cost per benefited receptor exceeded MnDOT's cost effectiveness reasonableness threshold of $78,500 per receptor. These barriers were not considered reasonable and were eliminated from further consideration. Four barriers were found to meet MnDOT's cost effectiveness reasonableness threshold and noise reduction design goal. Therefore, these barriers are proposed for the project and will move forward to collect the viewpoints of benefited receptors. A brief summary of each proposed barrier can be found below:

- Barrier NB1 has a preliminary cost per benefited receptor of $77,976. There is a total of 21 benefited receptors, and the barrier is proposed at 20 feet high with a length of 2,255 feet.
- Barrier NB3 has a preliminary cost per benefited receptor of $44,311. There is a total of 53 benefited receptors, and the barrier is proposed at 20 feet high with a length of 3,255 feet.
- Barrier NB12 has a preliminary cost per benefited receptor of $28,735. There is a total of 94 benefited receptors, and the barrier is proposed at 20 feet high with a length of 3,765 feet.
- Barrier NB13 has a preliminary cost per benefited receptor of $29,010. There is a total of 30 benefited receptors, and the barrier is proposed at 20 feet high with a length of 1,190 feet.

Viewpoints of the residents and owners of the benefited receptors will be collected in early 2019.

Statement of Likelihood

The traffic noise analysis for the proposed noise barriers described above is based upon preliminary design studies completed to date. Final mitigation decisions will be subject to final design considerations and the viewpoint of benefited residents and property owners. If it subsequently develops during final design that conditions have substantially changed, noise abatement measures may not be provided. Affected benefited receptors and local officials would be notified of plans to eliminate or substantially modify a noise abatement measure prior to the completion of the final design process. This notification would explain changes in site conditions (if any), additional site information, any design changes implemented during the final design process, and an explanation of noise barrier feasibility and reasonableness. A final decision regarding installation of the proposed abatement measure will be made upon completion of the project's final design and the public involvement process.

7.0 REFERENCES

FHWA Noise Standard, 23 CFR 772 – Procedures for Abatement of Highway Traffic Noise and Construction Noise (http://www.dot.state.mn.us/environment/noise/pdf/guidance/fhwa-noise-procedures.pdf).

MnDOT Noise Requirements for MnDOT and other Type I Federal-aid Projects, Minnesota Department of Transportation, effective date: July 10, 2017.

U.S. Department of Transportation, Federal Highway Administration. Measurement of Highway-Related Noise. FHWA Report Number FHWA-PD-96-046. May 1996.

U.S. Department of Transportation, Federal Highway Administration. Highway Traffic Noise: Analysis and Abatement Guidance. FHWA Report Number FHWA-HEP-10-025. December 2011.

APPENDIX A

Figure 2 through 16 – Noise Receptor Maps

DEPARTMENT OF TRANSPORTATION

Figure 2 - Traffic Noise Study
I-94 UBOL Resurfacing Maple Grove to Rogers and Brockton Interchange

S.P. 2780-97
MnDOT and City of Dayton, Minnesota

HNTB WSB

Date: 1/2/2019
Author: Jennifer Rybarczyk, HNTB Corporation
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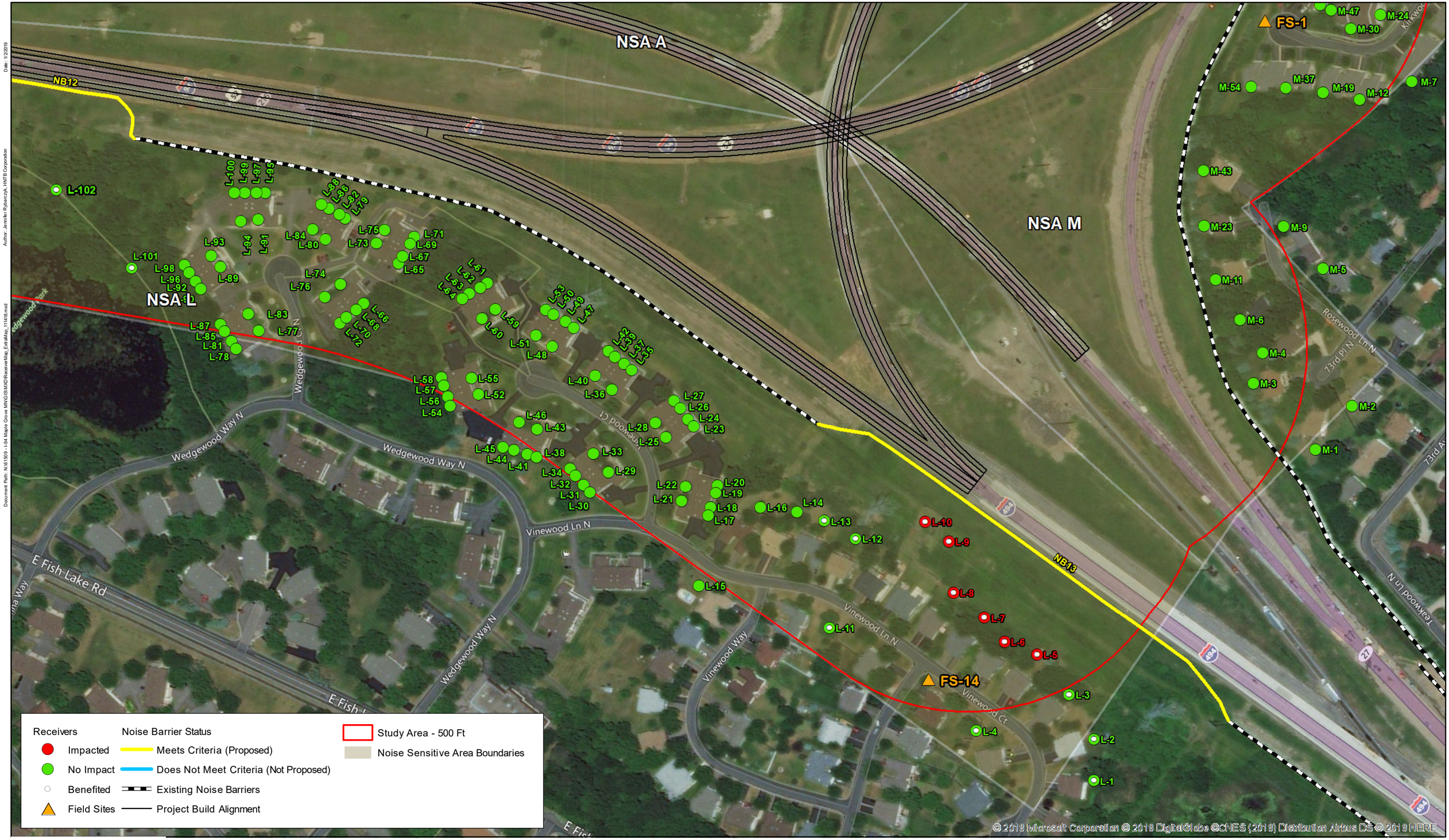

DEPARTMENT OF TRANSPORTATION

Figure 3 - Traffic Noise Study
I-94 UBOL Resurfacing Maple Grove to Rogers and Brockton Interchange

S.P. 2780-97
MnDOT and City of Dayton, Minnesota

N

0 400 Feet

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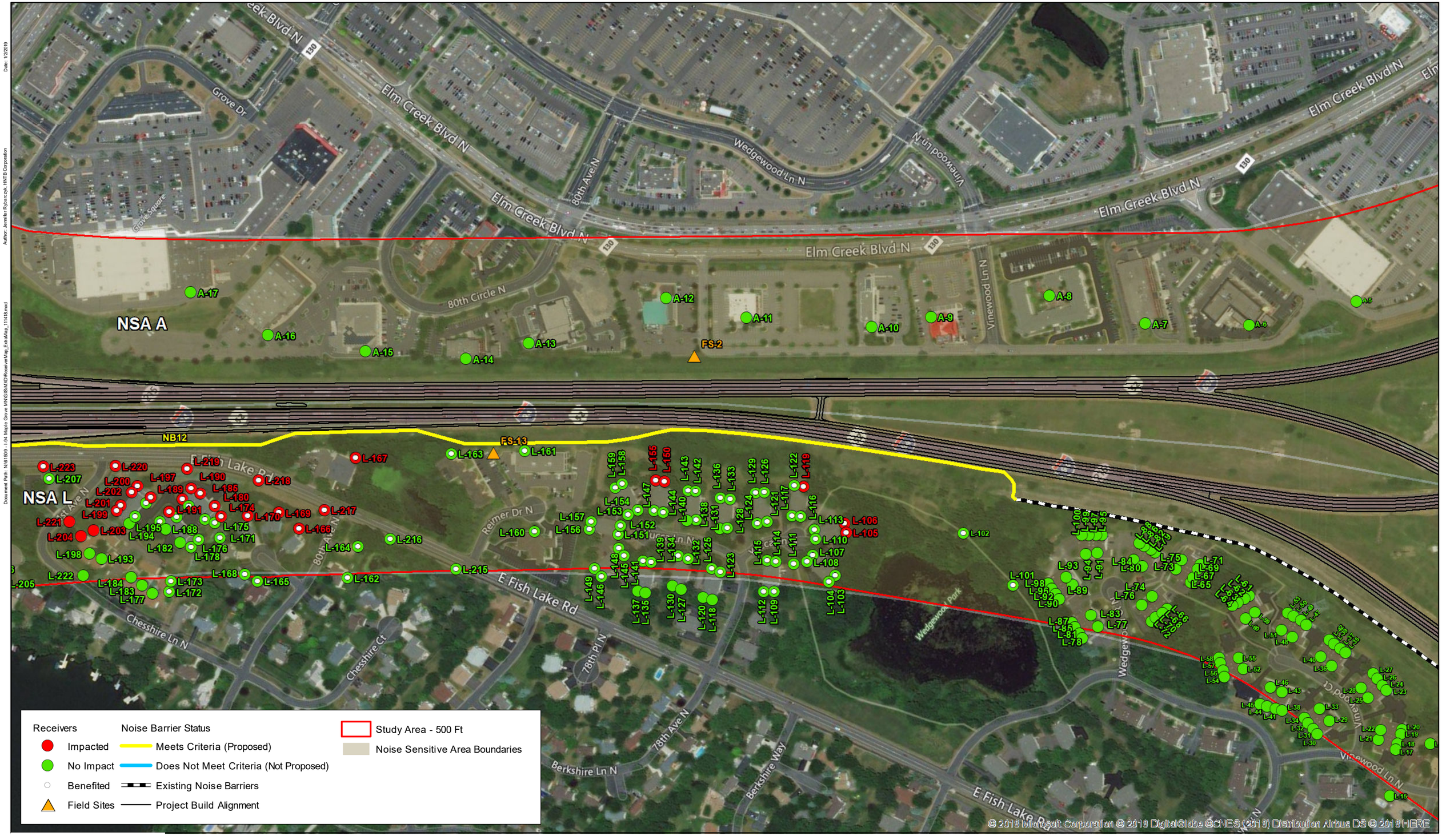

DEPARTMENT OF TRANSPORTATION

Figure 4 - Traffic Noise Study
I-94 UBOL Resurfacing Maple Grove to Rogers and Brockton Interchange

S.P. 2780-97
MnDOT and City of Dayton, Minnesota

N

0 400 Feet

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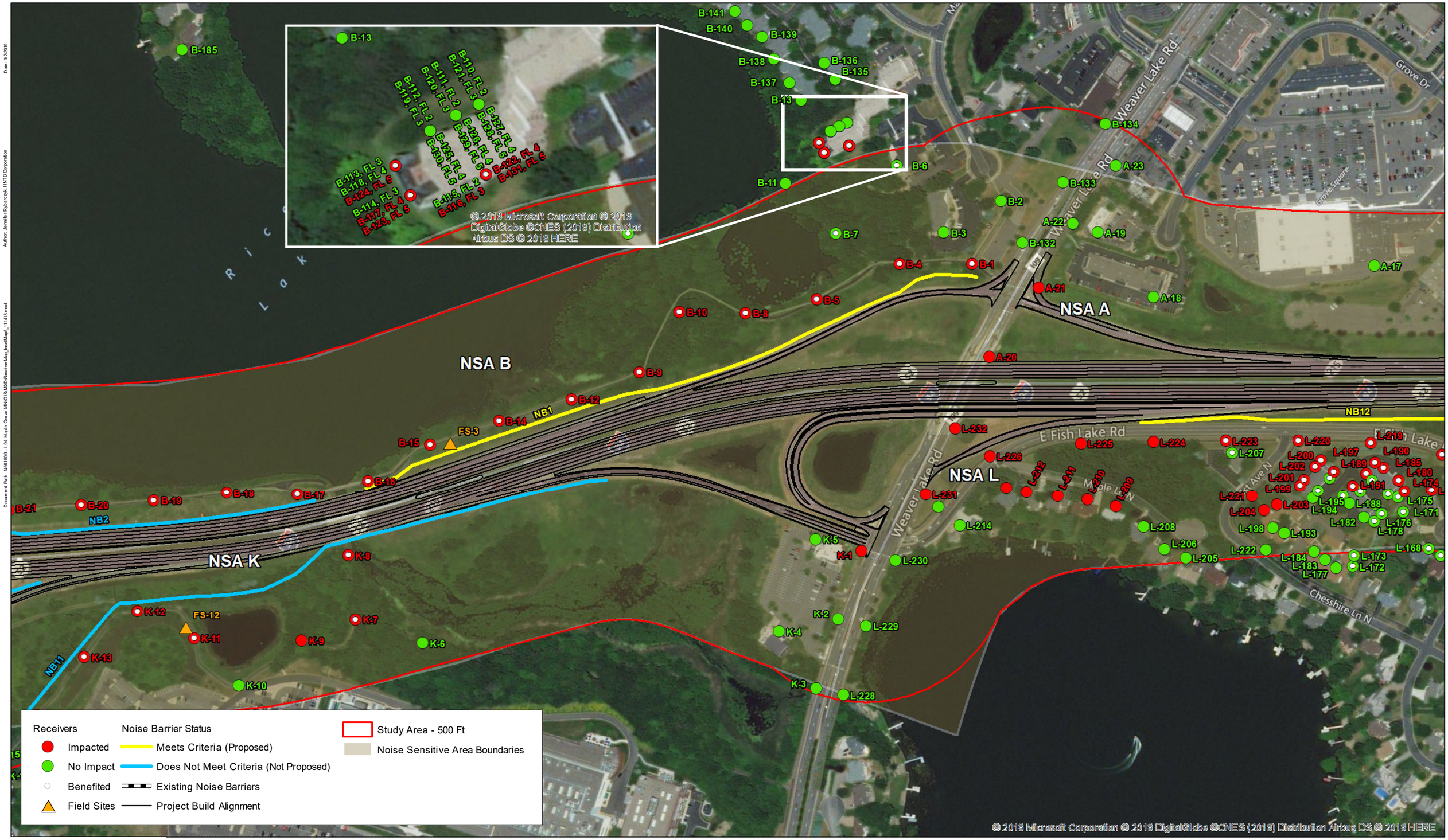

DEPARTMENT OF TRANSPORTATION

Figure 5 - Traffic Noise Study
I-94 UBOL Resurfacing Maple Grove to Rogers and Brockton Interchange

S.P. 2780-97
MnDOT and City of Dayton, Minnesota

N

0 400 Feet

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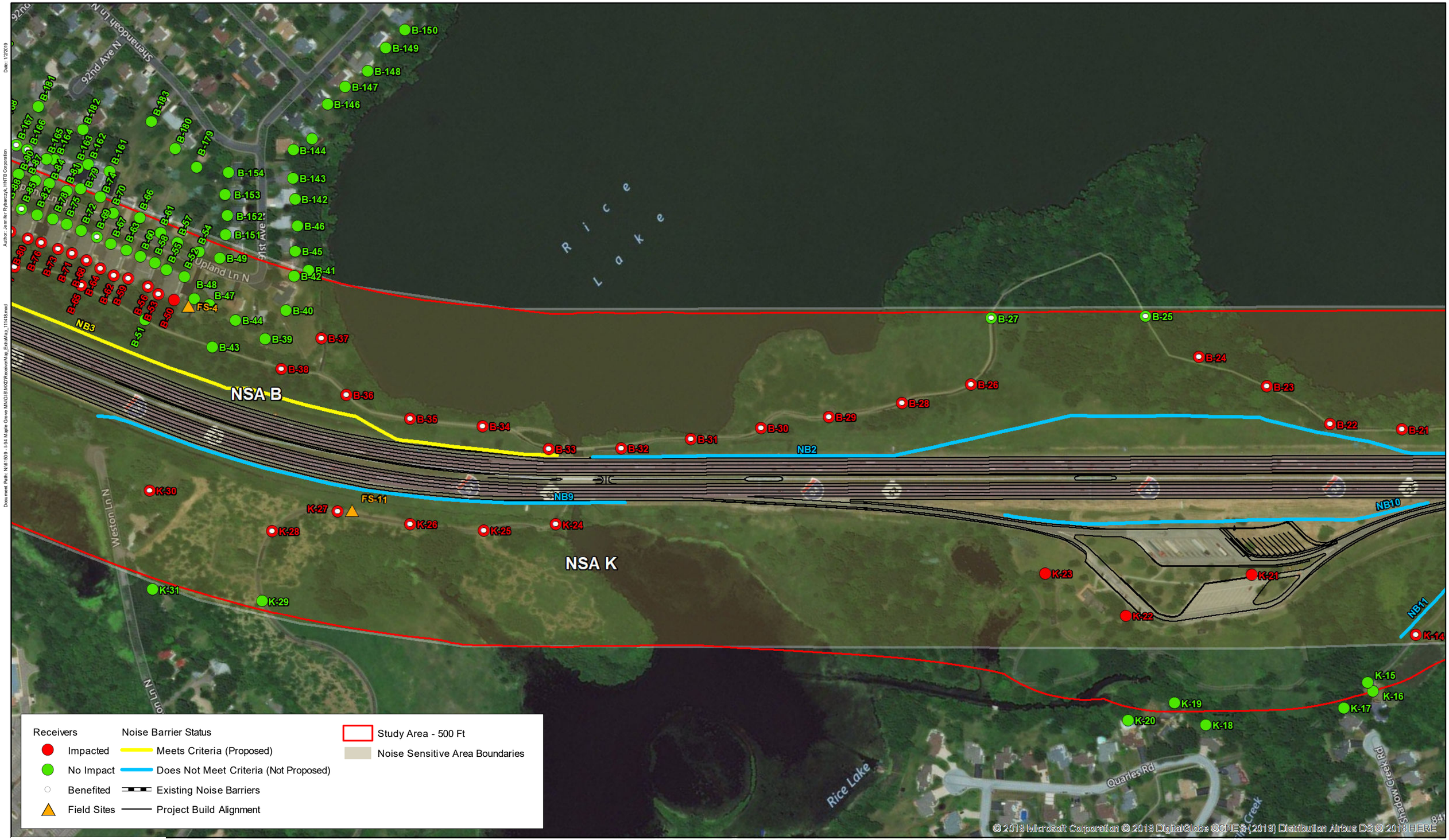

Figure 6 - Traffic Noise Study
I-94 UBOL Resurfacing Maple Grove to Rogers and Brockton Interchange

S.P. 2780-97
MnDOT and City of Dayton, Minnesota

N

0 400 Feet

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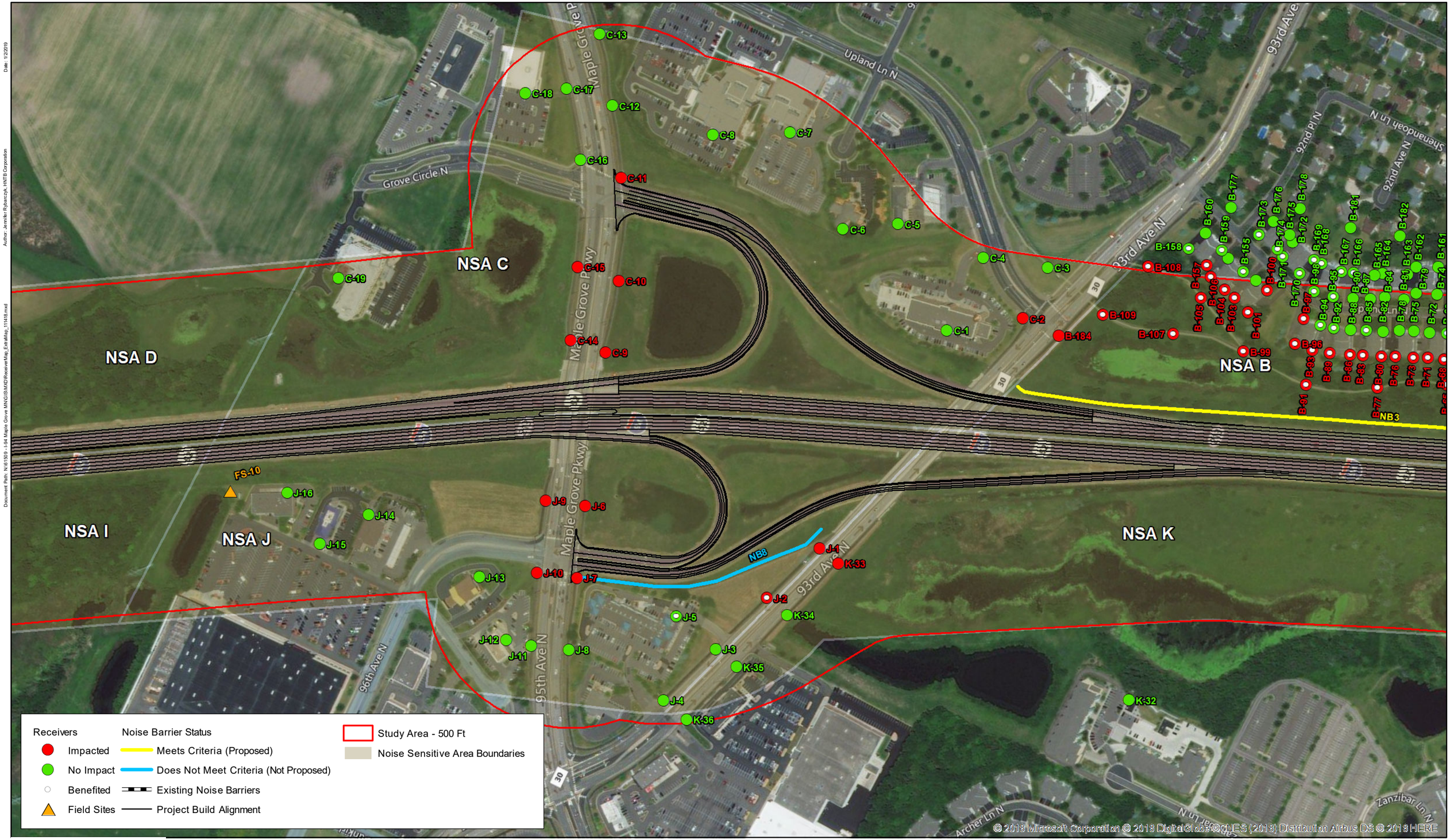

DEPARTMENT OF TRANSPORTATION

Figure 7 - Traffic Noise Study
I-94 UBOL Resurfacing Maple Grove to Rogers and Brockton Interchange

S.P. 2780-97
MnDOT and City of Dayton, Minnesota

N

0 400 Feet

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Date: 1/2/2019

Author: Jennifer Rybarczyk, HNTB Corporation

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DEPARTMENT OF TRANSPORTATION

Figure 8 - Traffic Noise Study
I-94 UBOL Resurfacing Maple Grove to Rogers and Brockton Interchange

S.P. 2780-97
MnDOT and City of Dayton, Minnesota

N

0 400 Feet

HNTB WSB

DEPARTMENT OF TRANSPORTATION

Figure 9 - Traffic Noise Study
I-94 UBOL Resurfacing Maple Grove to Rogers and Brockton Interchange

S.P. 2780-97
MnDOT and City of Dayton, Minnesota

N

0 400 Feet

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Date: 1/2/2019

Author: Jennifer Rybarczyk, HNTB Corporation

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DEPARTMENT OF TRANSPORTATION

Figure 10 - Traffic Noise Study
I-94 UBOL Resurfacing Maple Grove to Rogers and Brockton Interchange

S.P. 2780-97
MnDOT and City of Dayton, Minnesota

N

0 400 Feet

HNTB WSB

DEPARTMENT OF TRANSPORTATION

Figure 11 - Traffic Noise Study
I-94 UBOL Resurfacing Maple Grove to Rogers and Brockton Interchange

S.P. 2780-97
MnDOT and City of Dayton, Minnesota

N

0 400 Feet

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DEPARTMENT OF TRANSPORTATION

Figure 12 - Traffic Noise Study
I-94 UBOL Resurfacing Maple Grove to Rogers and Brockton Interchange

S.P. 2780-97
MnDOT and City of Dayton, Minnesota

N

0 400 Feet

HNTB WSB

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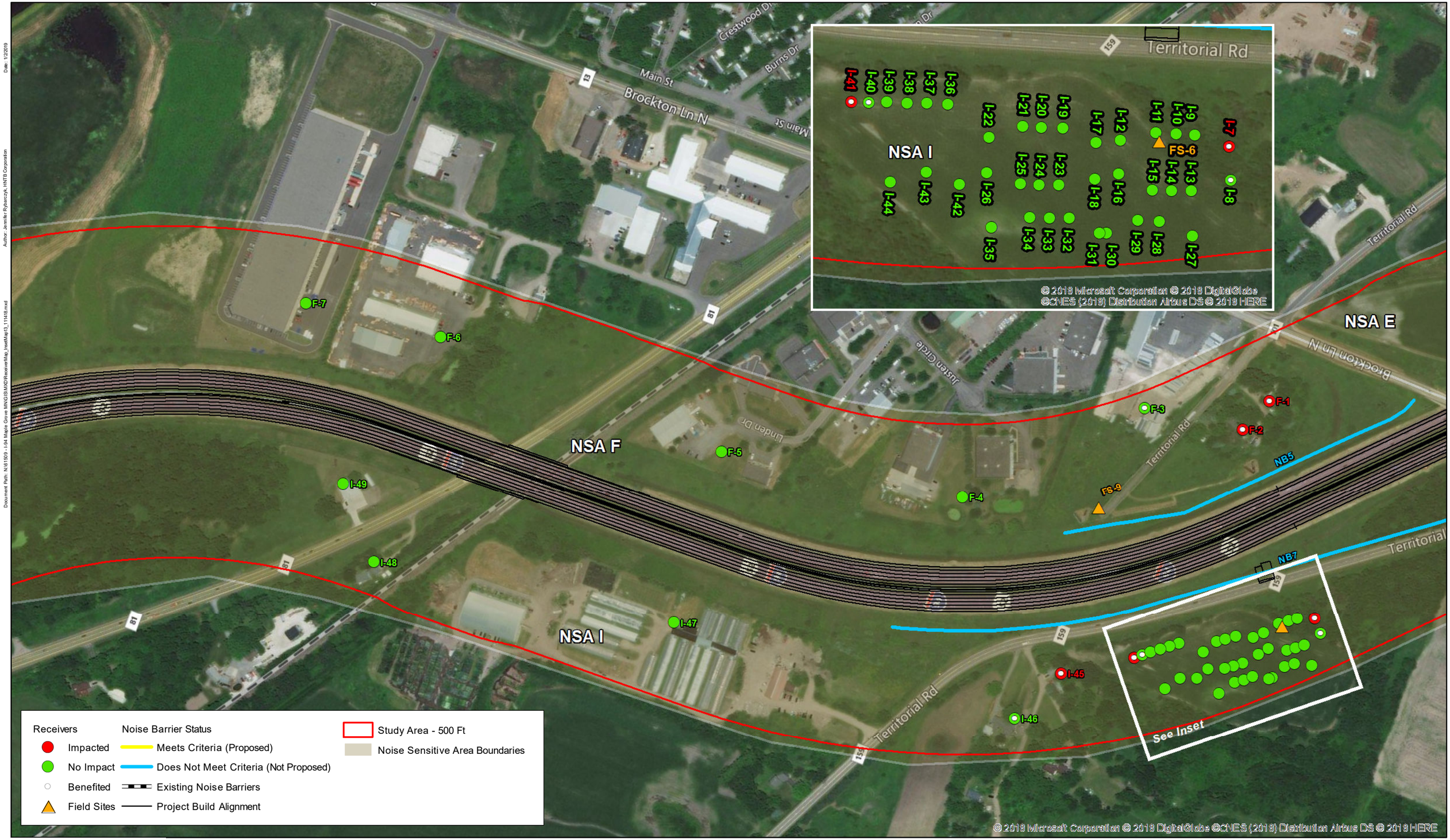

DEPARTMENT OF TRANSPORTATION

Figure 13 - Traffic Noise Study
I-94 UBOL Resurfacing Maple Grove to Rogers and Brockton Interchange

S.P. 2780-97
MnDOT and City of Dayton, Minnesota

HNTB WSB

Date: 1/2/2019
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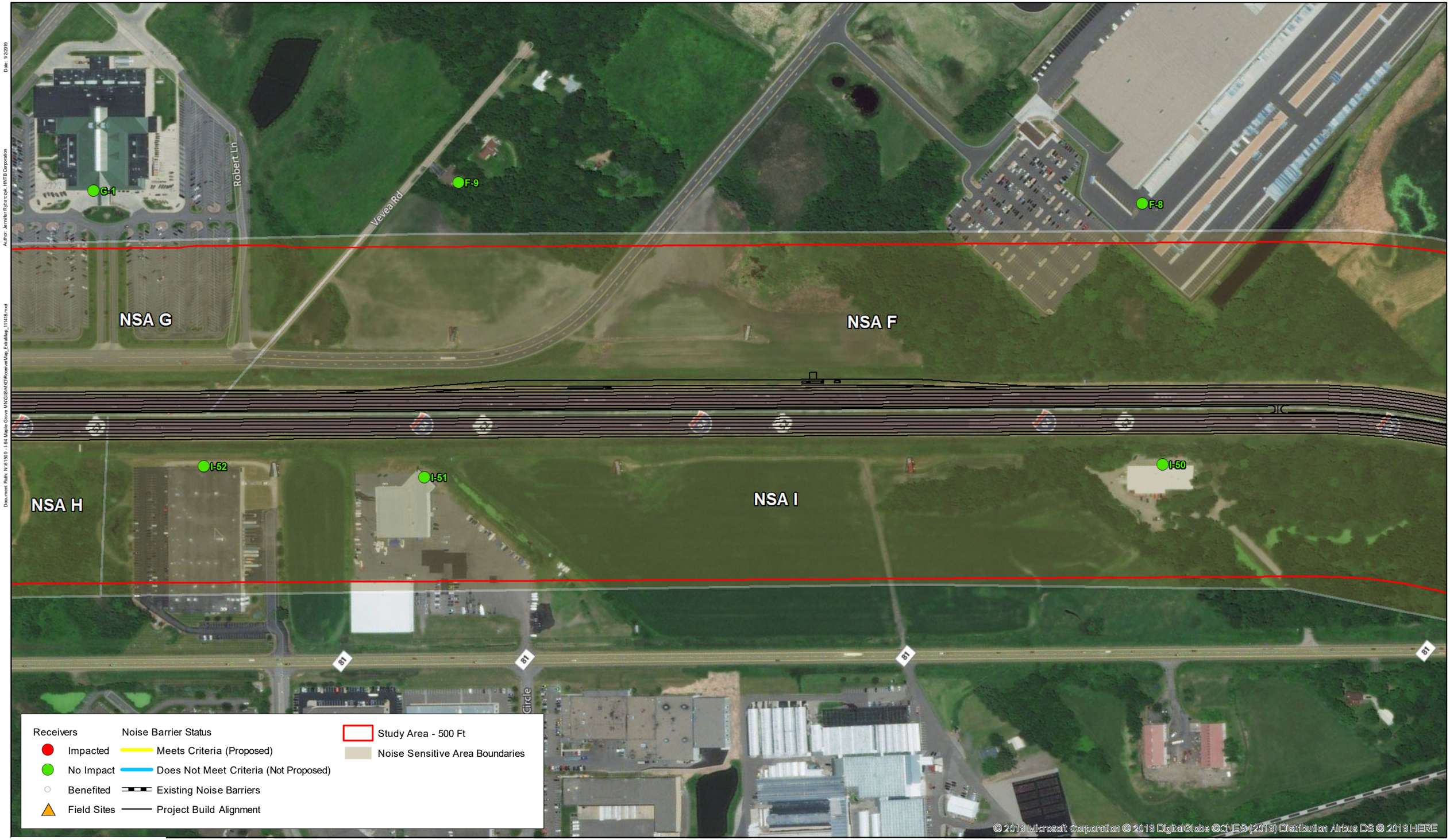

Date: 1/2/2019

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DEPARTMENT OF TRANSPORTATION

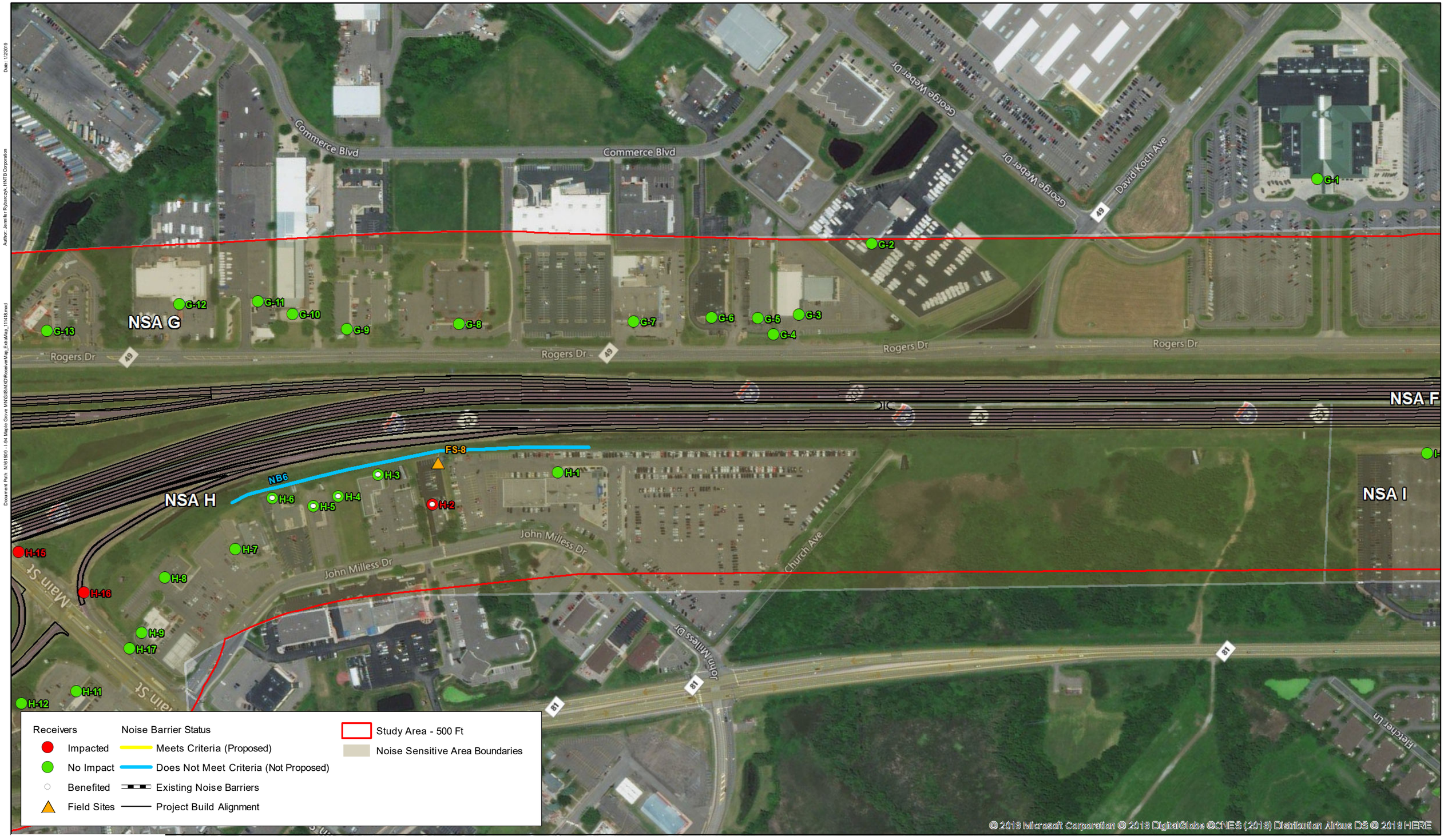
Figure 14 - Traffic Noise Study
I-94 UBOL Resurfacing Maple Grove to Rogers and Brockton Interchange

S.P. 2780-97
MnDOT and City of Dayton, Minnesota

N

0 400 Feet

HNTB WSB



DEPARTMENT OF TRANSPORTATION

Figure 15 - Traffic Noise Study
I-94 UBOL Resurfacing Maple Grove to Rogers and Brockton Interchange

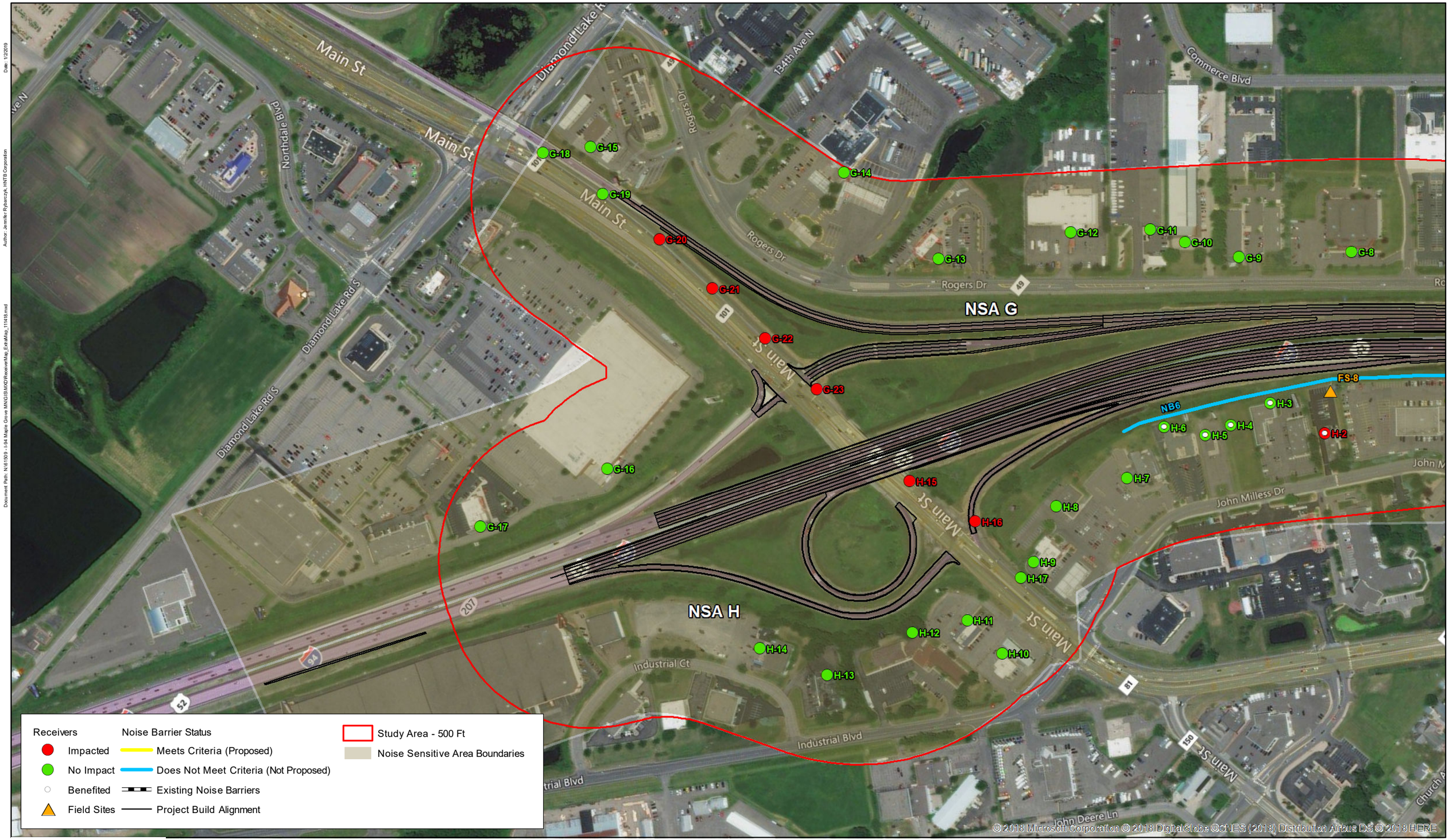
S.P. 2780-97
MnDOT and City of Dayton, Minnesota

N

0 400 Feet

HNTB WSB

Date: 1/2/2019
Author: Jennifer Rybarczyk, HNTB Corporation
Document Path: N:\61509 - I-94 Maple Grove MN\GIS\MXD\ReceiverMap_ExtraMap_111418.mxd



DEPARTMENT OF TRANSPORTATION

Figure 16 - Traffic Noise Study
I-94 UBOL Resurfacing Maple Grove to Rogers and Brockton Interchange

S.P. 2780-97
MnDOT and City of Dayton, Minnesota

N

0 400 Feet

HNTB WSB

Date: 1/2/2019
Author: Jennifer Rybarczyk, HNTB Corporation
Document Path: N:\61509 - I-94 Maple Grove MN\GIS\MXD\ReceiverMap_ExtraMap_111418.mxd

APPENDIX B

Field Data Measurement Sheets

HNTB

NOISE MEASUREMENT DATA SHEET

PROJECT: I-94 (Maple Grove, MN) BY: MFZ

SITE: FS-1 DATE: 6/5/18 TIME: 9:07

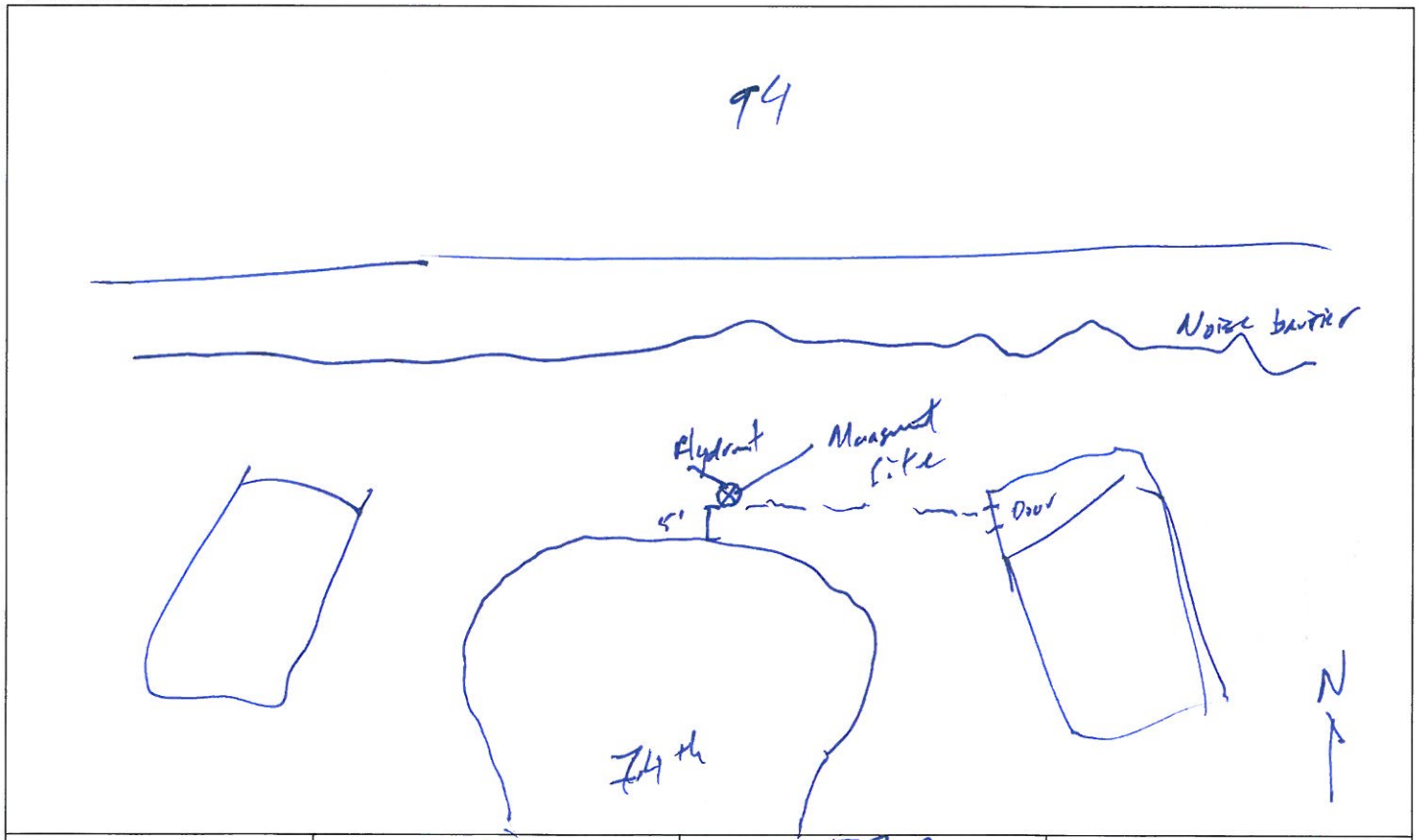
CALIBRATION: 113.8 at 1k Hz dB.

RESPONSE: FAST / SLOW WEIGHTING: A / C / LIN.

TRAFFIC DATA		
ROAD (Name/Dir)		
AUTOS		
MED TRKS		
HVY TRKS		
BUS		
MOTORCYCLE		
SPEED		

EQUIPMENT	
INSTRUMENT	
SLM MANUFACTURER	Norsonic
SLM MODEL	Type 118
SLM	S / N 31483
PREAMPLIFIER – Type 1206	S / N 30522
MICROPHONE – Type 1225	S / N 52318
CALIBRATOR – Type 1251	S / N 30825

SITE SKETCH



MEASUREMENT DATA	Duration 30 min	Leq 57.9	

WEATHER DATA WIND SPEED (MPH) 2-5 DIR S/W TEMP. 77 HUMIDITY CLOUD COVER CLR

BACKGROUND NOISE Birds

MAJOR SOURCES I-94

UNUSUAL EVENTS

OTHER NOTES

L10	L50
59.6	57.6

HNTB

NOISE MEASUREMENT DATA SHEET

PROJECT: I-94 (Maple Grove, MN) BY: MFZ

SITE: FS-2 DATE: 6/5/18 TIME: 9:47AM

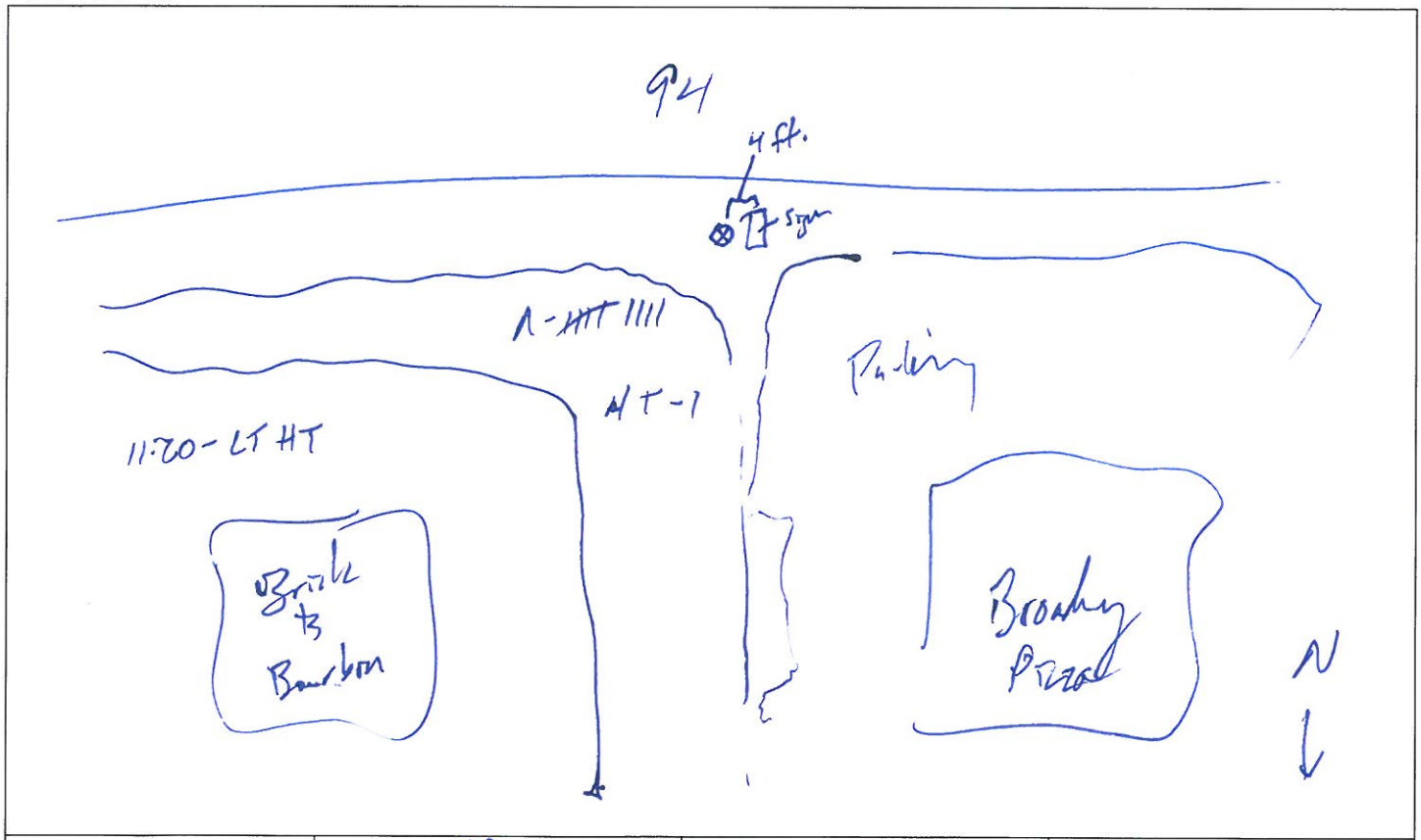
CALIBRATION: 113.8 at 1k Hz dB.

RESPONSE: FAST / SLOW WEIGHTING: A / C / LIN.

TRAFFIC DATA		
ROAD (Name/Dir)		
AUTOS		
MED TRKS		
HVY TRKS		
BUS		
MOTORCYCLE		
SPEED		

EQUIPMENT	
INSTRUMENT	
SLM MANUFACTURER	Norsonic
SLM MODEL	Type 118
SLM	S / N 31483
PREAMPLIFIER – Type 1206	S / N 30522
MICROPHONE – Type 1225	S / N 52318
CALIBRATOR – Type 1251	S / N 30825

SITE SKETCH



MEASUREMENT DATA	Duration 30 min	Leq 75.1	

WEATHER DATA WIND SPEED (MPH) 2-5 DIR. N TEMP. 78 HUMIDITY CLOUD COVER CLR

BACKGROUND NOISE

MAJOR SOURCES I-94

UNUSUAL EVENTS

OTHER NOTES

L10	L50
77.9	74.3

HNTB

NOISE MEASUREMENT DATA SHEET

PROJECT: I-94 (Maple Grove, MN) BY: MFZ

SITE: FS-3 DATE: 6/5/18 TIME: 10:41 AM

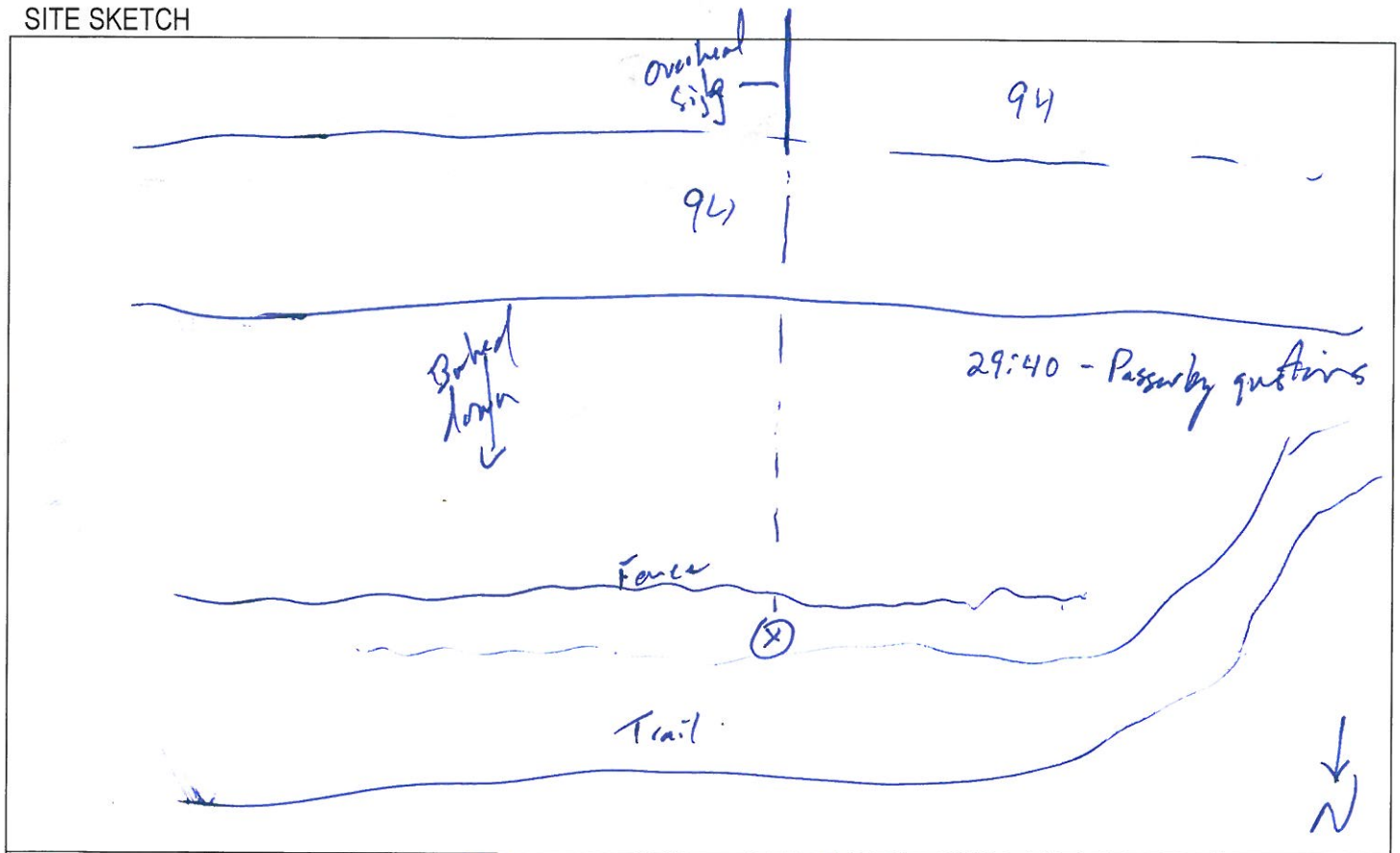
CALIBRATION: 113.8 at 1k Hz dB.

RESPONSE: FAST / SLOW WEIGHTING: A / C / LIN.

TRAFFIC DATA		
ROAD (Name/Dir)		
AUTOS		
MED TRKS		
HVY TRKS		
BUS		
MOTORCYCLE		
SPEED		

EQUIPMENT	
INSTRUMENT	
SLM MANUFACTURER	Norsonic
SLM MODEL	Type 118
SLM	S / N 31483
PREAMPLIFIER – Type 1206	S / N 30522
MICROPHONE – Type 1225	S / N 52318
CALIBRATOR – Type 1251	S / N 30825

SITE SKETCH



MEASUREMENT DATA	Duration 30 min	Leq 69.9	

WEATHER DATA WIND SPEED (MPH) 0-3 DIR. N TEMP. 79 HUMIDITY CLOUD COVER CLR

BACKGROUND NOISE

MAJOR SOURCES I-94

UNUSUAL EVENTS

OTHER NOTES

L10	L50
73.2	68.4

HNTB

NOISE MEASUREMENT DATA SHEET

PROJECT: I-94 (Maple Grove, MN) BY: MFZ

SITE: FS-4 DATE: 6/5/18 TIME: 11:37

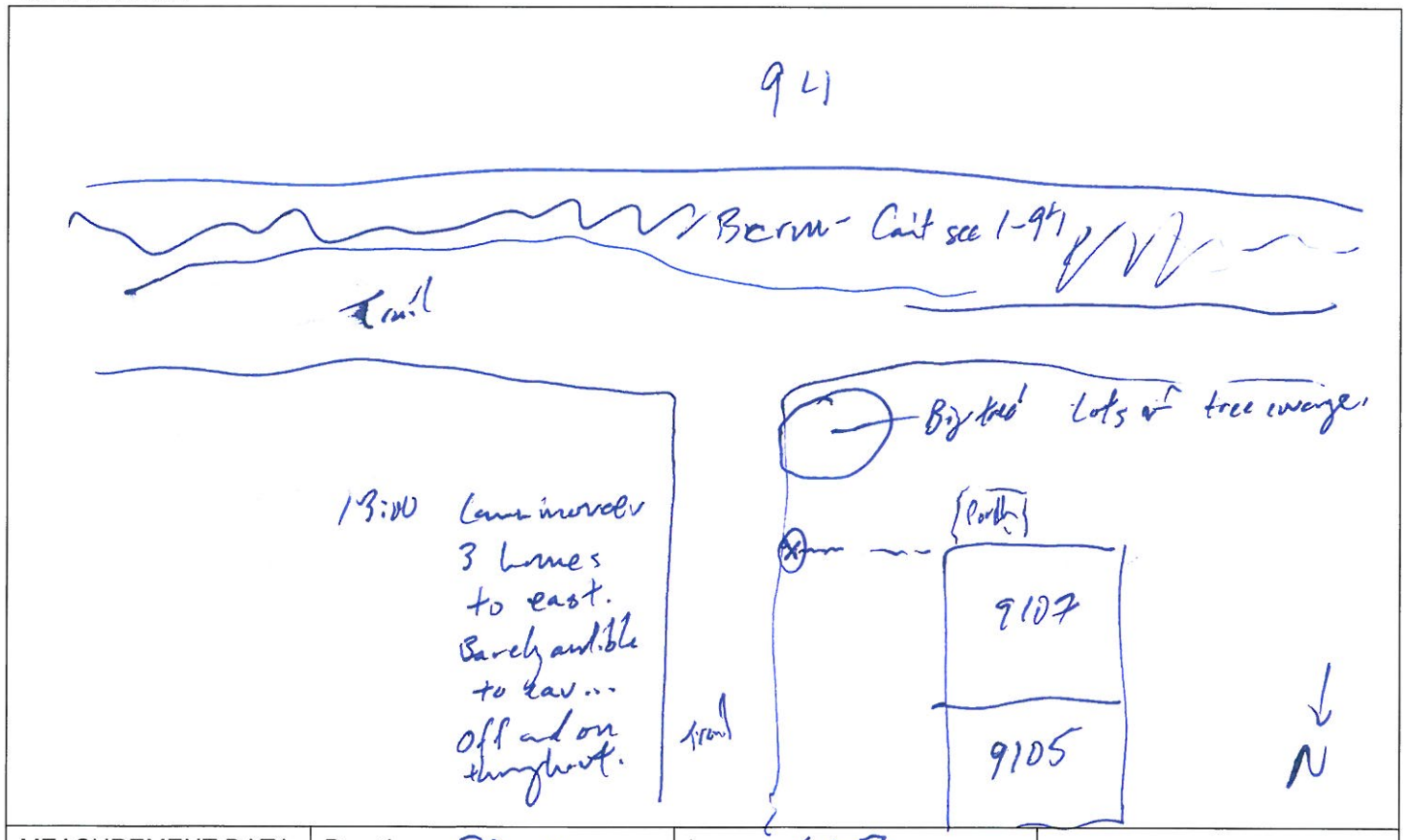
CALIBRATION: 113.8 at 1k Hz dB.

RESPONSE: [FAST] / SLOW WEIGHTING: [A] / C / LIN.

TRAFFIC DATA		
ROAD (Name/Dir)		
AUTOS		
MED TRKS		
HVY TRKS		
BUS		
MOTORCYCLE		
SPEED		

EQUIPMENT	
INSTRUMENT	
SLM MANUFACTURER	Norsonic
SLM MODEL	Type 118
SLM	S / N 31483
PREAMPLIFIER – Type 1206	S / N 30522
MICROPHONE – Type 1225	S / N 52318
CALIBRATOR – Type 1251	S / N 30825

SITE SKETCH



MEASUREMENT DATA	Duration 30 min	Leq 61.7	

WEATHER DATA WIND SPEED (MPH) 0-1 DIR. N TEMP. 81 HUMIDITY CLOUD COVER CLR

BACKGROUND NOISE Wind in trees, birds.

MAJOR SOURCES I-94

UNUSUAL EVENTS

OTHER NOTES

L10	L50
63.1	61.5

HNTB

NOISE MEASUREMENT DATA SHEET

PROJECT: I-94 (Maple Grove, MN) BY: M GJERSVIK

SITE: ~~M7~~ M6 DATE: 6/5/18 TIME: 1:39 - 2:09

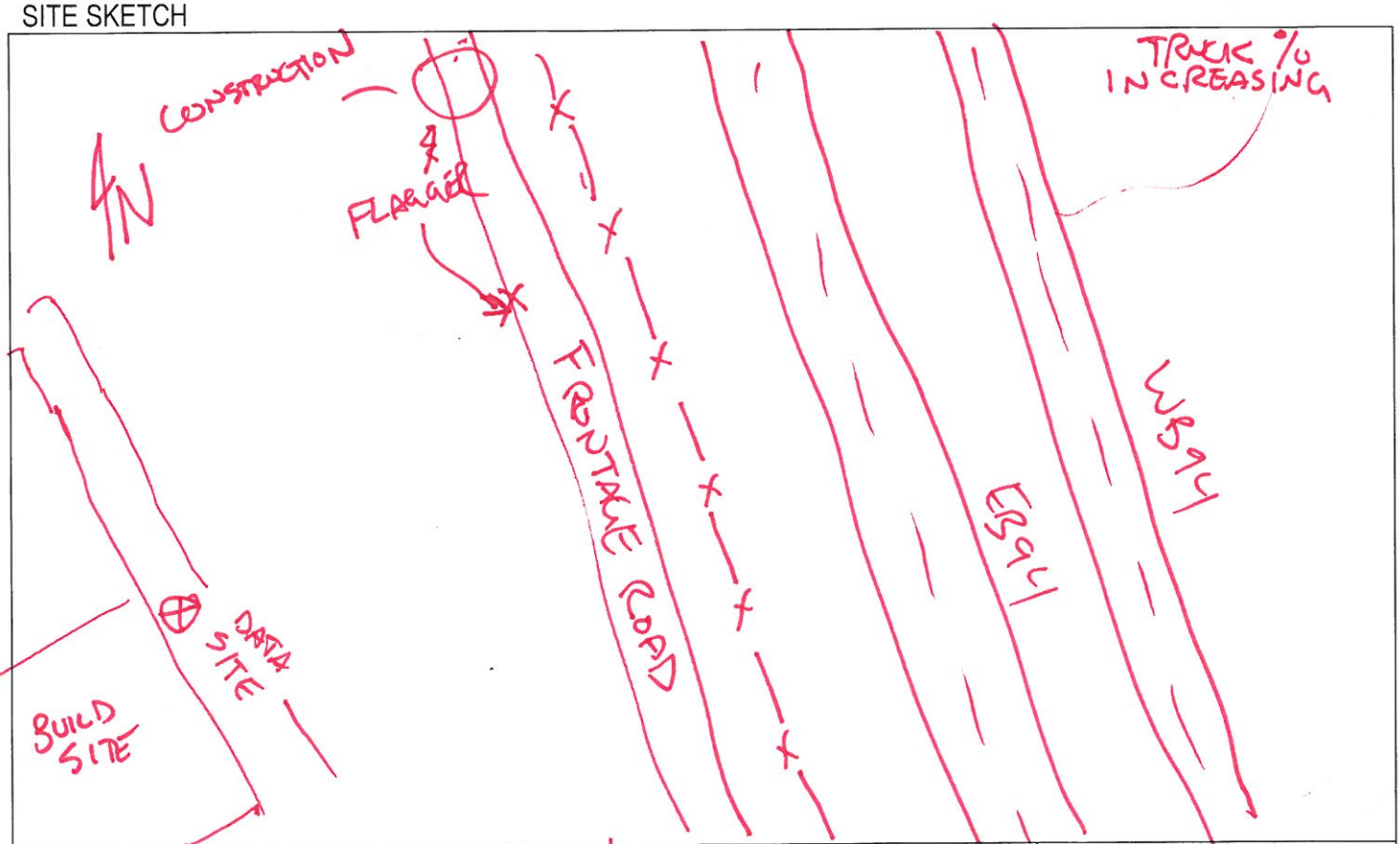
CALIBRATION: 113.8 at 1k Hz dB.

RESPONSE: FAST / SLOW WEIGHTING: A / C / LIN.

TRAFFIC DATA		
ROAD (Name/Dir)		
AUTOS		
MED TRKS		
HVY TRKS		
BUS		
MOTORCYCLE		
SPEED		

EQUIPMENT	
INSTRUMENT	
SLM MANUFACTURER	Norsonic
SLM MODEL	Type 118
SLM	S / N 31361
PREAMPLIFIER – Type 1206	S / N 30396
MICROPHONE – Type 1225	S / N 48094
CALIBRATOR – Type 1251	S / N 30825

SITE SKETCH



MEASUREMENT DATA	Duration 30 MIN	Leq 70.3	

WEATHER DATA WIND SPEED (MPH) 10+ DIR. SSE TEMP. 75° HUMIDITY 50% CLOUD COVER CLEAR

BACKGROUND NOISE CARPENTRY ON NEW HOUSES / CONST. ON FRONTAGE ROAD

MAJOR SOURCES I-94

UNUSUAL EVENTS

OTHER NOTES CARPENTRY CAN BARELY BE HEARD OVER 94 NOISE

L10	L50
72.3	70.1

HNTB

NOISE MEASUREMENT DATA SHEET

PROJECT: I-94 (Maple Grove, MN) BY: M GJERSVIK

SITE: M8 DATE: 6/5/18 TIME: 2:25 PM

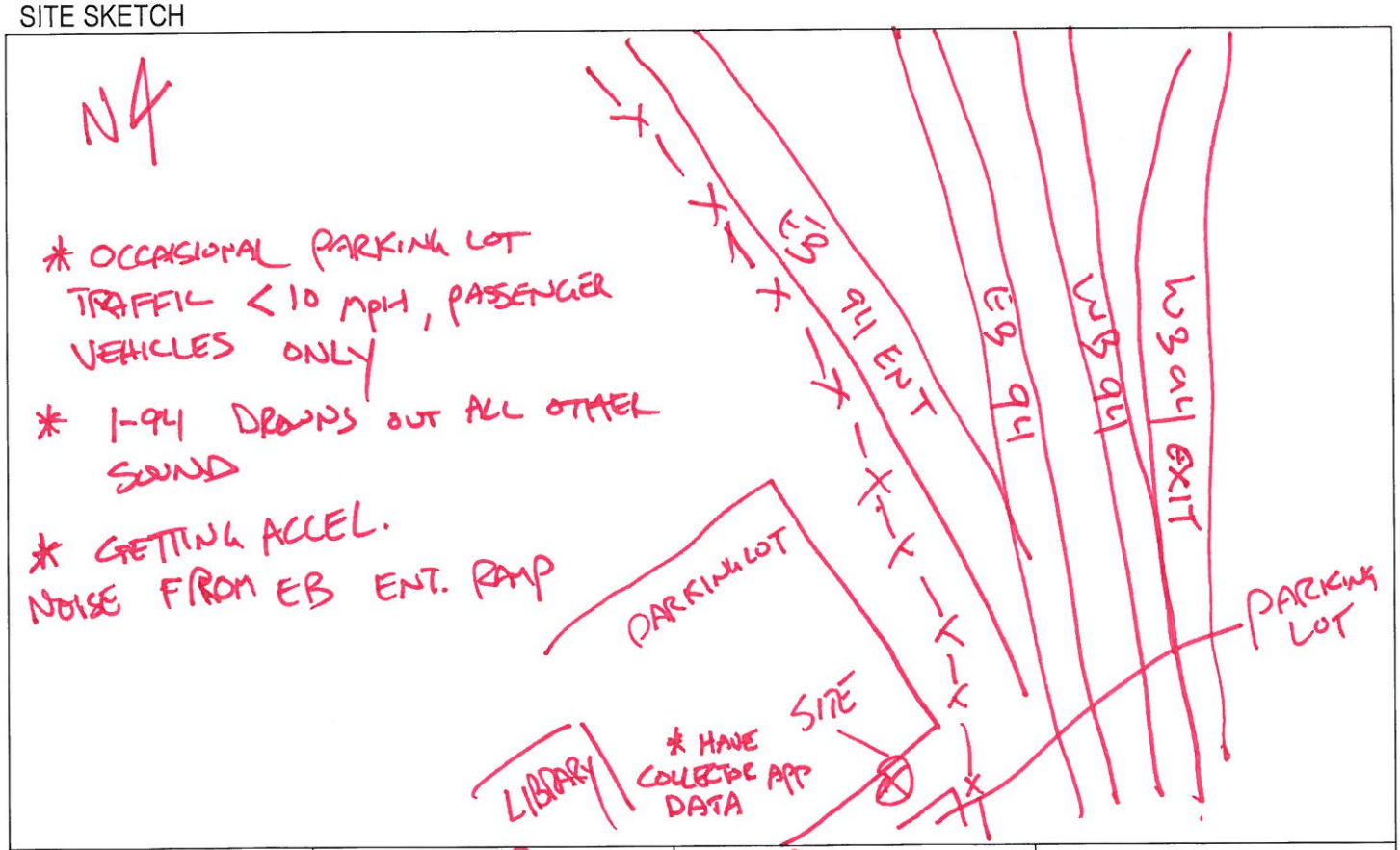
CALIBRATION: 113.8 at 1k Hz dB.

RESPONSE: FAST / SLOW WEIGHTING: A / C / LIN.

TRAFFIC DATA		
ROAD (Name/Dir)		
AUTOS		
MED TRKS		
HVY TRKS		
BUS		
MOTORCYCLE		
SPEED		

EQUIPMENT	
INSTRUMENT	
SLM MANUFACTURER	Norsonic
SLM MODEL	Type 118
SLM	S / N 31361
PREAMPLIFIER – Type 1206	S / N 30396
MICROPHONE – Type 1225	S / N 48094
CALIBRATOR – Type 1251	S / N 30825

SITE SKETCH



MEASUREMENT DATA	Duration 30	Leq 74.1 dBA	

WEATHER DATA WIND SPEED (MPH) 5-10 DIR. SSE TEMP. 78 HUMIDITY 50% CLOUD COVER CLEAR

BACKGROUND NOISE SOME CAR DOORS ~~[illegible]~~ SLAMMING, MOSTLY HIGHWAY

MAJOR SOURCES I-94 AND RAMPS

UNUSUAL EVENTS

OTHER NOTES

L10	L50
76.4	73.4

HNTB

NOISE MEASUREMENT DATA SHEET

PROJECT: I-94 (Maple Grove, MN) BY: MFZ

SITE: FS-B DATE: 6/5/18 TIME: 1:39 PM

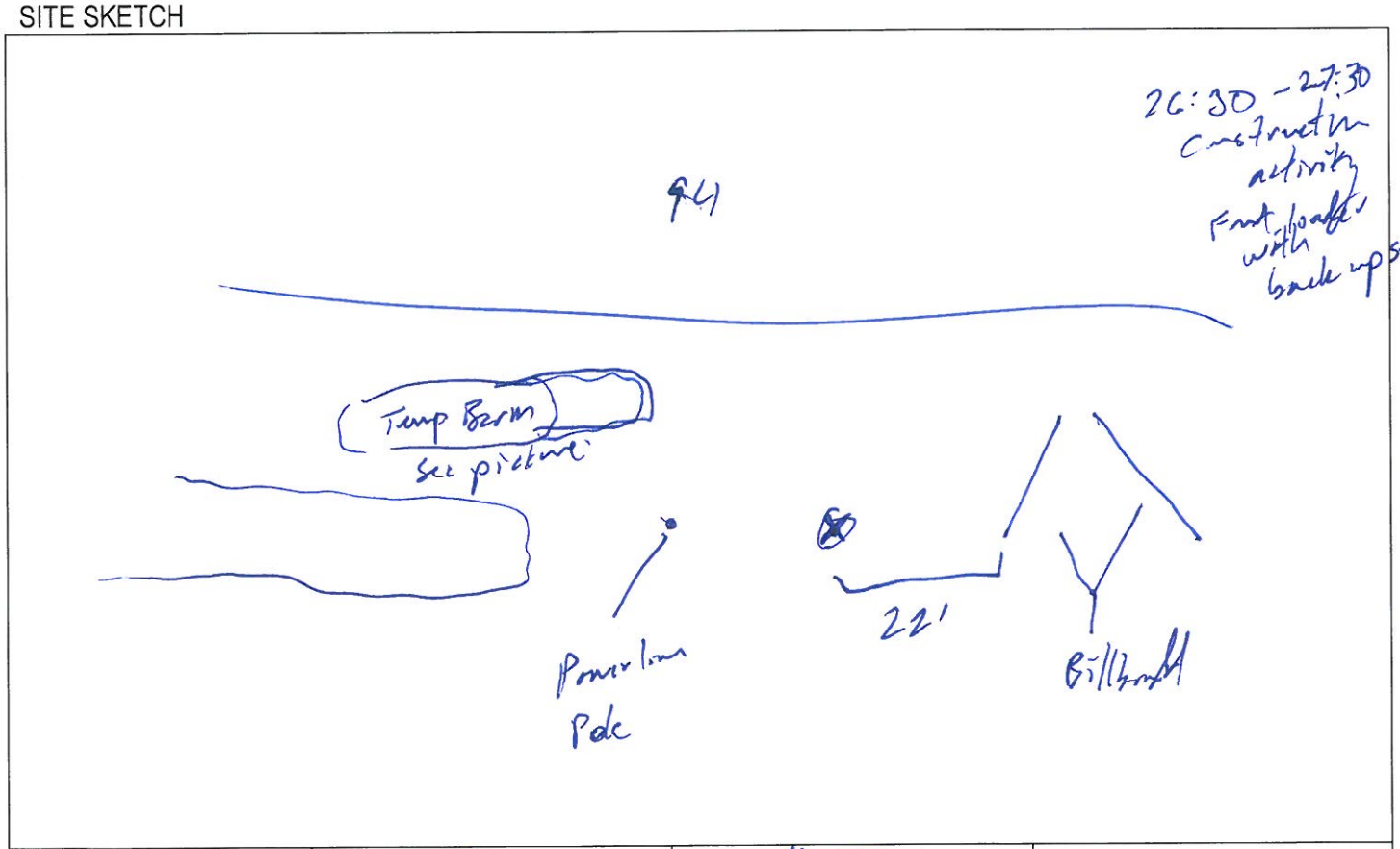
CALIBRATION: 113.8 at 1k Hz dB.

RESPONSE: FAST / SLOW WEIGHTING: A / C / LIN.

TRAFFIC DATA		
ROAD (Name/Dir)		
AUTOS		
MED TRKS		
HVY TRKS		
BUS		
MOTORCYCLE		
SPEED		

EQUIPMENT	
INSTRUMENT	
SLM MANUFACTURER	Norsonic
SLM MODEL	Type 118
SLM	S / N 31483
PREAMPLIFIER – Type 1206	S / N 30522
MICROPHONE – Type 1225	S / N 52318
CALIBRATOR – Type 1251	S / N 30825

SITE SKETCH



MEASUREMENT DATA	Duration 30 min	Leq 70.1	

WEATHER DATA WIND SPEED (MPH) 4-8 DIR. N TEMP. 84 HUMIDITY CLOUD COVER CLR

BACKGROUND NOISE

MAJOR SOURCES I-94

UNUSUAL EVENTS

OTHER NOTES

L10	L50
72.4	69.6

HNTB

NOISE MEASUREMENT DATA SHEET

PROJECT: I-94 (Maple Grove, MN) BY: M GUSERSVIK

SITE: M10 DATE: 6/5/18 TIME: 12:32

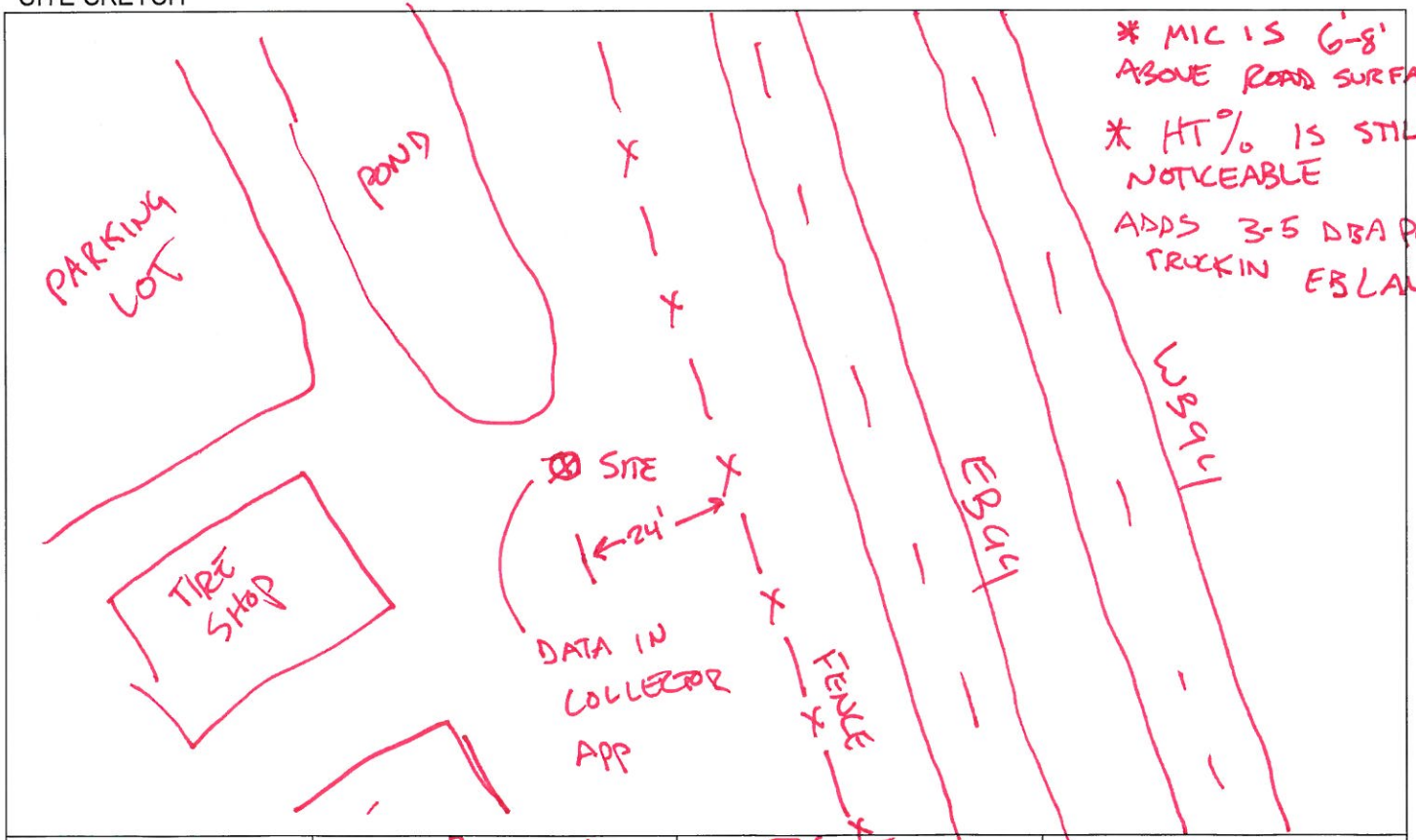
CALIBRATION: 113.8 at 1k Hz dB.

RESPONSE: FAST / SLOW WEIGHTING: A / C / LIN.

TRAFFIC DATA		
ROAD (Name/Dir)		
AUTOS		
MED TRKS		
HVY TRKS		
BUS		
MOTORCYCLE		
SPEED		

EQUIPMENT	
INSTRUMENT	
SLM MANUFACTURER	Norsonic
SLM MODEL	Type 118
SLM	S / N 31361
PREAMPLIFIER – Type 1206	S / N 30396
MICROPHONE – Type 1225	S / N 48094
CALIBRATOR – Type 1251	S / N 30825

SITE SKETCH



MEASUREMENT DATA	Duration 30 MIN	Leq 76.5	

WEATHER DATA WIND SPEED (MPH) 7-10 DIR. SSE TEMP. 74° HUMIDITY 50% CLOUD COVER CLEAR

BACKGROUND NOISE ROADWAY I-94

MAJOR SOURCES I-94

UNUSUAL EVENTS

OTHER NOTES LOUDEST SITE YET

L10	L50
79.0	75.9

* NO ADDITIONAL PASSENGER VEHICLE NOISE FROM PARKING LOT
* SOME BIRDSONG, BUT DROWNED OUT BY TRAFFIC

HNTB

NOISE MEASUREMENT DATA SHEET

PROJECT: I-94 (Maple Grove, MN) BY: M GJERSVIK

SITE: M11 DATE: 6/5/18 TIME: 11:37 – 12:07

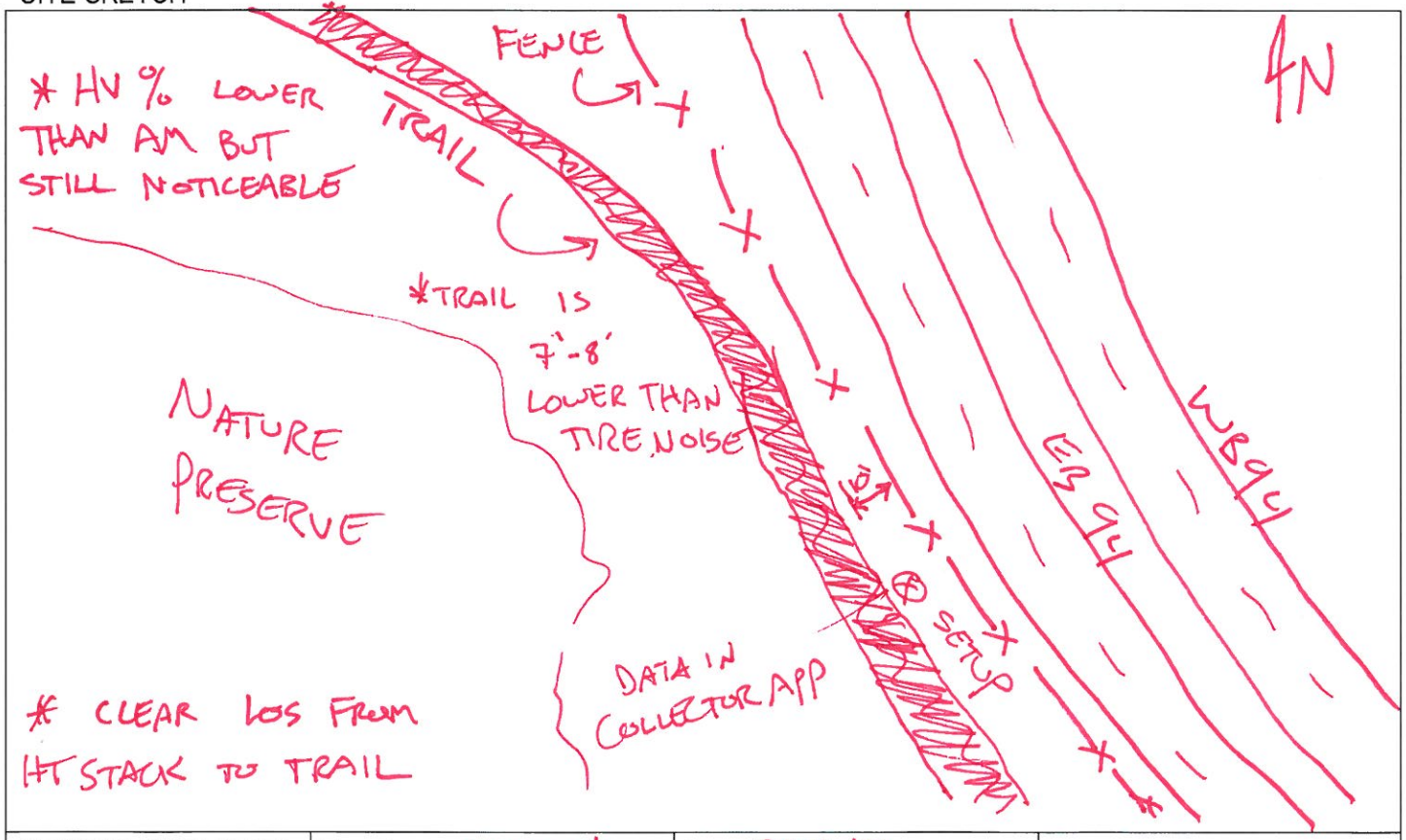
CALIBRATION: 113.8 at 1k Hz dB.

RESPONSE: FAST / SLOW WEIGHTING: A / C / LIN.

TRAFFIC DATA		
ROAD (Name/Dir)		
AUTOS		
MED TRKS		
HVY TRKS		
BUS		
MOTORCYCLE		
SPEED		

EQUIPMENT	
INSTRUMENT	
SLM MANUFACTURER	Norsonic
SLM MODEL	Type 118
SLM	S / N 31361
PREAMPLIFIER – Type 1206	S / N 30396
MICROPHONE – Type 1225	S / N 48094
CALIBRATOR – Type 1251	S / N 30825

SITE SKETCH



MEASUREMENT DATA	Duration 30 MIN	Leq 72.8 dBA	

WEATHER DATA WIND SPEED (MPH) 5-10 DIR SSE TEMP. 75° HUMIDITY 60% CLOUD COVER CLEAR

BACKGROUND NOISE I-94

MAJOR SOURCES I-94, SOME BIRDSONG

UNUSUAL EVENTS NONE

OTHER NOTES LOTS OF CYCLISTS

L10	L50
74.7	72.5

HNTB

NOISE MEASUREMENT DATA SHEET

PROJECT: I-94 (Maple Grove, MN) BY: M GJERSVIK

SITE: M12 DATE: 6/5/18 TIME: 10:41 - 11:11

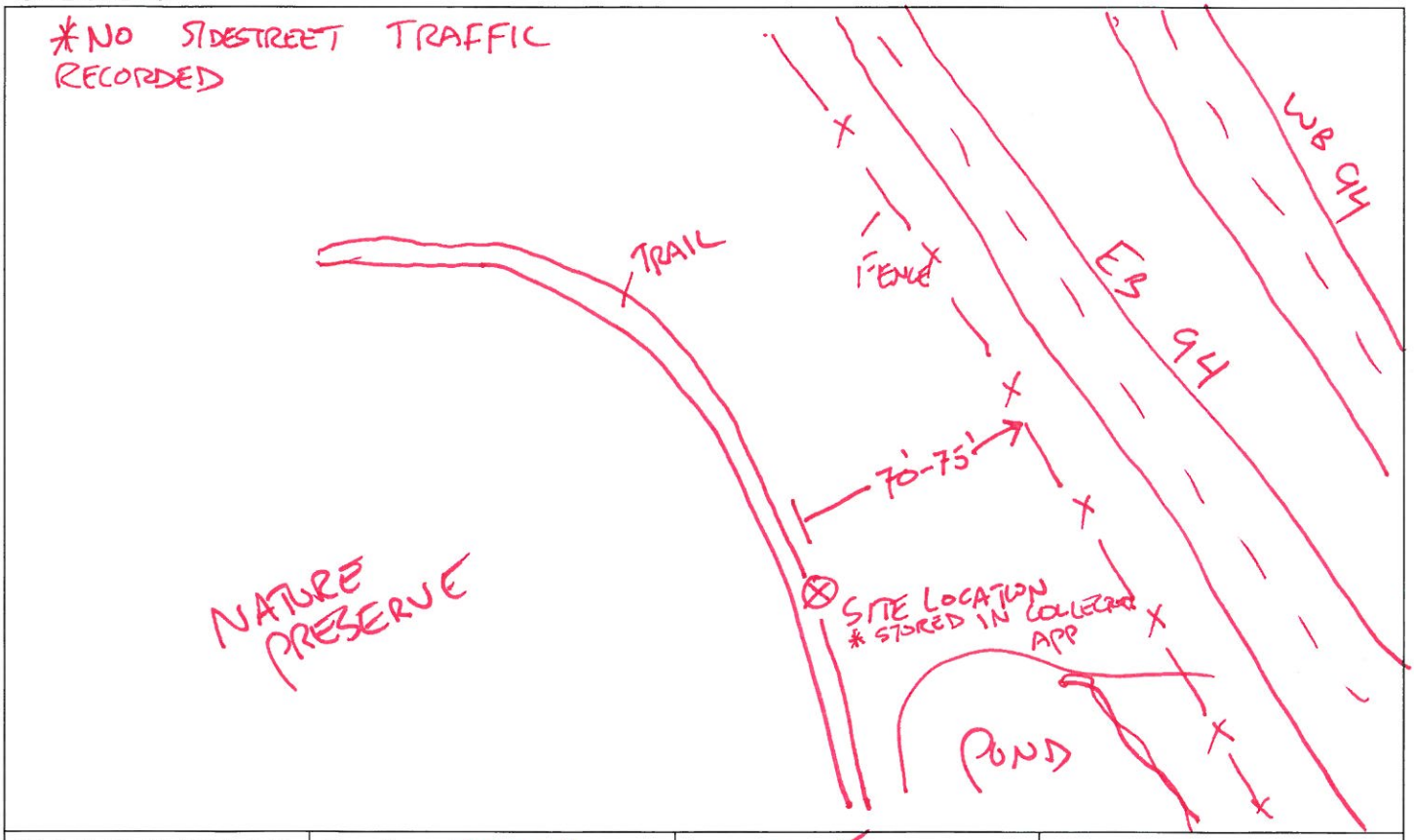
CALIBRATION: 113.8 at 1k Hz dB.

RESPONSE: FAST / SLOW WEIGHTING: A / C / LIN.

TRAFFIC DATA		
ROAD (Name/Dir)		
AUTOS		
MED TRKS		
HVY TRKS		
BUS		
MOTORCYCLE		
SPEED		

EQUIPMENT	
INSTRUMENT	
SLM MANUFACTURER	Norsonic
SLM MODEL	Type 118
SLM	S / N 31361
PREAMPLIFIER – Type 1206	S / N 30396
MICROPHONE – Type 1225	S / N 48094
CALIBRATOR – Type 1251	S / N 30825

SITE SKETCH



MEASUREMENT DATA	Duration 30 MIN	Leq 66.5	

WEATHER DATA WIND SPEED (MPH) 5-7 DIR. SSE TEMP. 73° HUMIDITY 50% CLOUD COVER CLEAR

BACKGROUND NOISE I-94

MAJOR SOURCES I-94 / BIRDS

UNUSUAL EVENTS NONE

OTHER NOTES CONSISTENT BIRDSONG

L10	L50
68.1	66.3

HNTB

NOISE MEASUREMENT DATA SHEET

PROJECT: I-94 (Maple Grove, MN) BY: M GJERSVIK

SITE: M13 DATE: 6/5/18 TIME: 9:48 – 10:18

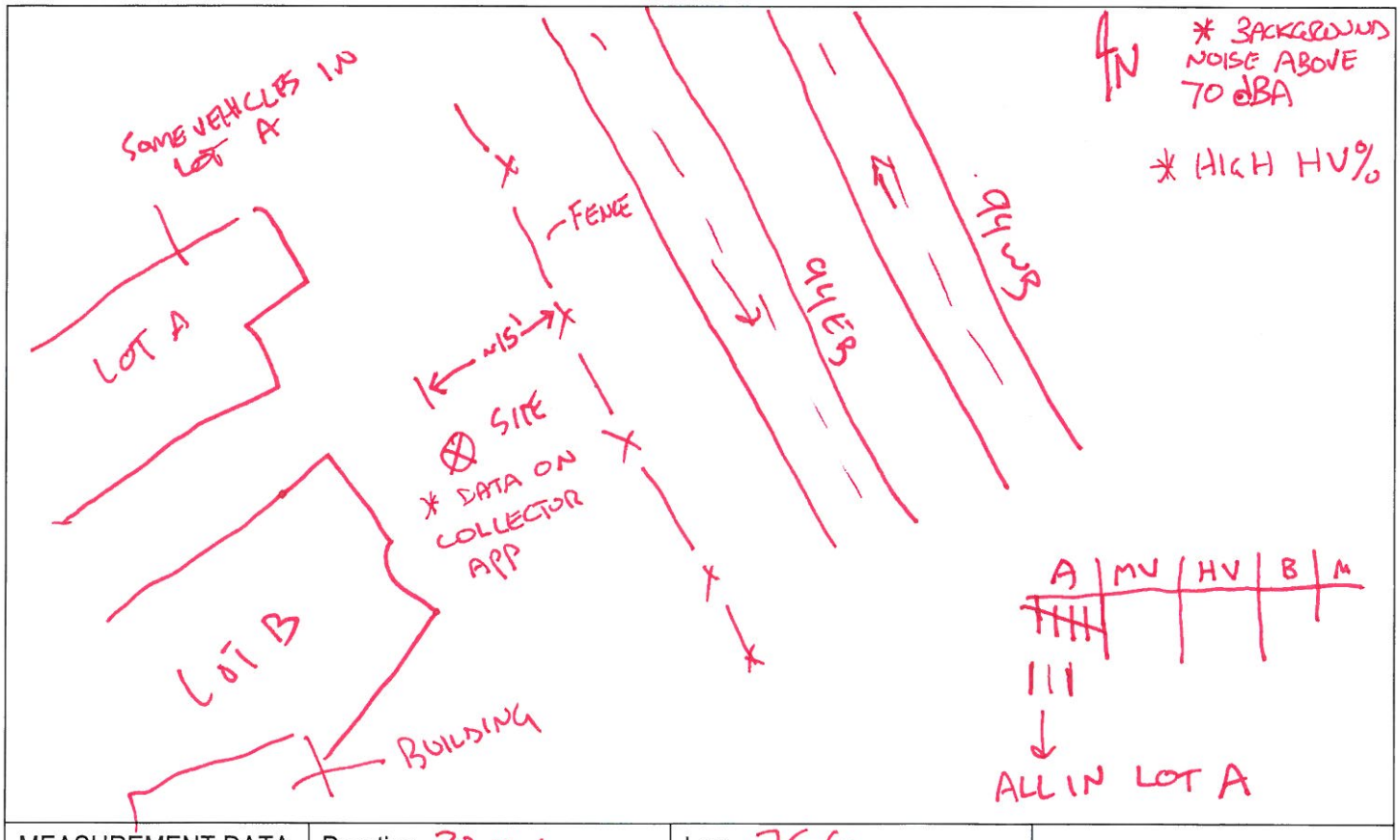
CALIBRATION: 113.8 at 1k Hz dB.

RESPONSE: FAST / SLOW WEIGHTING: A / C / LIN.

TRAFFIC DATA		
ROAD (Name/Dir)		
AUTOS		
MED TRKS		
HVY TRKS		
BUS		
MOTORCYCLE		
SPEED		

EQUIPMENT	
INSTRUMENT	
SLM MANUFACTURER	Norsonic
SLM MODEL	Type 118
SLM	S / N 31361
PREAMPLIFIER – Type 1206	S / N 30396
MICROPHONE – Type 1225	S / N 48094
CALIBRATOR – Type 1251	S / N 30825

SITE SKETCH



MEASUREMENT DATA	Duration 30 MIN	Leq 75.6	

WEATHER DATA WIND SPEED (MPH) 5-10 DIR. SSE TEMP. 68° HUMIDITY LOW CLOUD COVER CLEAR

BACKGROUND NOISE I-94

MAJOR SOURCES I-94

UNUSUAL EVENTS NONE

OTHER NOTES VERY CLOSE PROXIMITY TO I-94

L10	L50
77.6	75.3

HNTB

NOISE MEASUREMENT DATA SHEET

PROJECT: I-94 (Maple Grove, MN) BY: M GJERSVIK

SITE: M 14 DATE: 6/5/18 TIME: 9:07

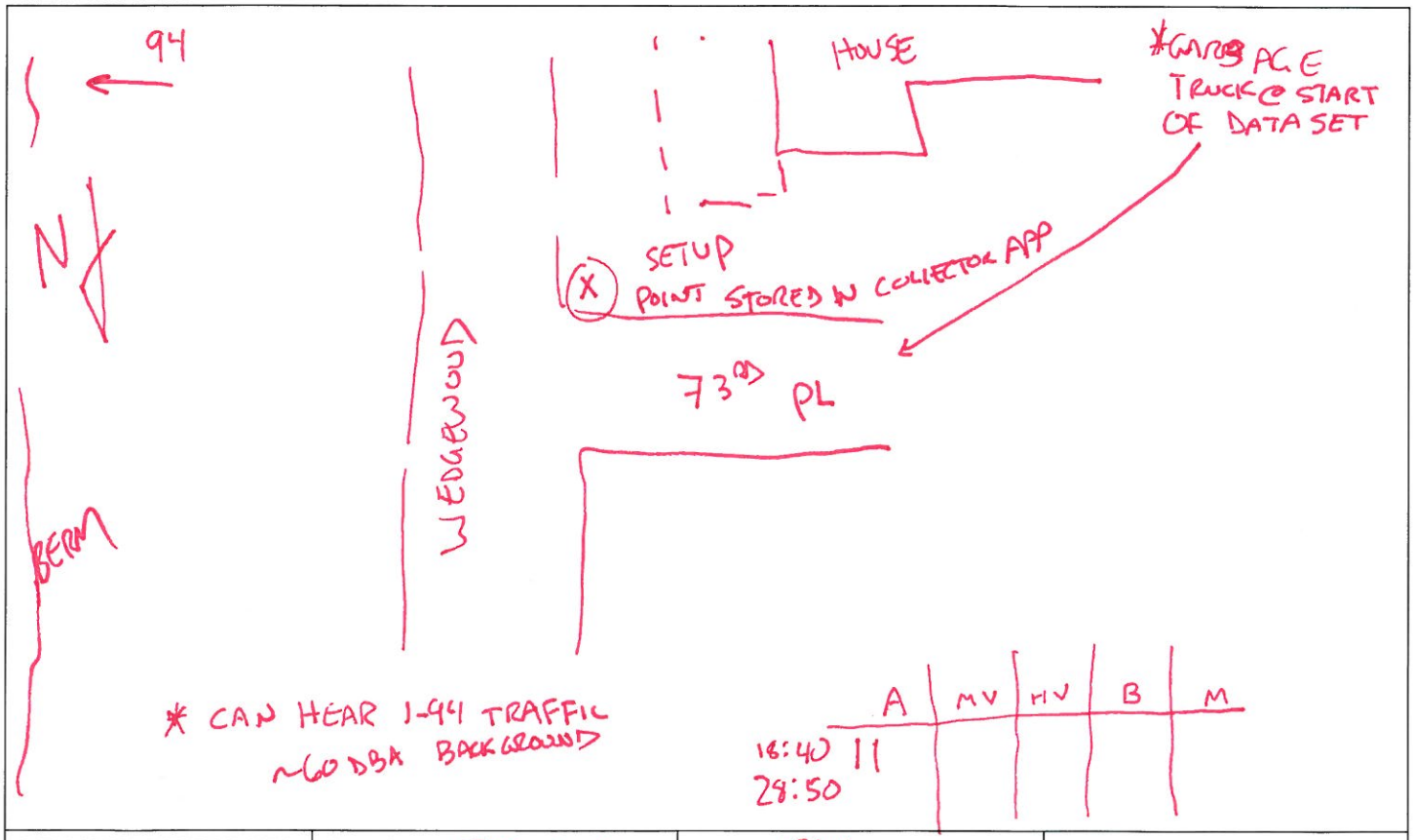
CALIBRATION: 113.8 at 1k Hz dB.

RESPONSE: [FAST] / SLOW WEIGHTING: [A] / C / LIN.

TRAFFIC DATA		
ROAD (Name/Dir)		
AUTOS		
MED TRKS		
HVY TRKS		
BUS		
MOTORCYCLE		
SPEED		

EQUIPMENT	
INSTRUMENT	
SLM MANUFACTURER	Norsonic
SLM MODEL	Type 118
SLM	S / N 31361
PREAMPLIFIER – Type 1206	S / N 30396
MICROPHONE – Type 1225	S / N 48094
CALIBRATOR – Type 1251	S / N 30825

SITE SKETCH



MEASUREMENT DATA	Duration 30 MIN	Leq 59.6	

WEATHER DATA WIND SPEED (MPH) <5 DIR. S/SE TEMP. 66° HUMIDITY LOW CLOUD COVER NONE

BACKGROUND NOISE ROAD NOISE FROM I-94 TO THE EAST

MAJOR SOURCES I-94

UNUSUAL EVENTS GARBAGE TRUCK @ START OF DATA SET

OTHER NOTES * MINOR BUT CONSISTENT BIRDSONG

L10	L50
60.9	59.4