Appendix I: Noise Impact Assessment

NOISE IMPACT ASSESSMENT

I-26 Widening MM 187 – 194

Berkeley County,

South Carolina

Prepared For:

Mead and Hunt, Inc.

878 South Lake Drive,

Lexington SC 29072

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Cayce, SC 29033

August 2019

EXECUTIVE SUMMARY

The following noise assessment has been prepared in compliance with Title 23 of the Code of Federal Regulations, Part 772 (23 CFR Part 772), and will be provided by South Carolina Department of Transportation (SCDOT) to local officials in an attempt to prevent future impacts from traffic noise.

The proposed project is located in Berkeley County, South Carolina. The project consists of widening Interstate 26 (I-26) for approximately 6.6 miles from MM 187 – MM 194. The improvements involve adding a travel lane in each direction of I-26 toward the existing median, median clearing and cable guardrail installation, improving the Exit 187 interchange and ramps, replacing the I-26 mainline dual bridges over Cypress Swamp, potential replacement of Cypress Campground Road bridge over I-26, and drainage improvements.

The TNM 2.5 Noise Model was used to analyze the existing condition (2018) and the 2043 design year No-build and a Build Alternative based on preliminary design. Field measurements were performed to establish a sound level baseline for which to compare possible sound level increases that may result from the proposed action. Traffic data was derived from the traffic study entitled "Traffic Data," prepared by Stantec in June 2019.

Berkeley County was contacted to obtain approved building permits within the noise study area. The Berkeley County Planning & Zoning Department provided no approved building permits for new structures within the noise study area. It has been noted that a building permit has been submitted and a site plan approval is pending for a church adjacent to I-26 and Cypress Campground Road. Although a site plan is not available, a noise contour was used to create an area within the approximate property boundary that would potentially exceed 66dBA. This approximate area will be provided to Berkeley County for their consideration.

The modeling results indicated that fourteen (14) residential receivers would have noise levels that approach or exceed the NAC criteria for its respective land use for Build Alternatives 1 and 3. Alternative 2 would have fifteen (15) residential receivers that would have noise levels that approach or exceed the NAC criteria for its respective land use. Alternative 1 would potentially require the relocation of one (1) residential receiver, while Alternative 2 would potentially require the relocation of two (2) residential receivers. Noise abatement was therefore considered for the proposed project. As a result of the mitigation analysis, there were no feasible and reasonable solutions to mitigate for the noise according to the SCDOT Traffic Noise Abatement Policy.

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I. INTRODUCTION AND PROJECT DESCRIPTION

The following noise assessment has been prepared in compliance with Title 23 of the Code of Federal Regulations, Part 772 (23 CFR Part 772), and will be provided by South Carolina Department of Transportation (SCDOT) to local officials in an attempt to prevent future impacts from traffic noise. The current SCDOT Traffic Noise Abatement Policy, dated September 2014, was followed to analyze the potential noise impacts and mitigation as necessary.

A. Proposed Project Description and Existing Facility

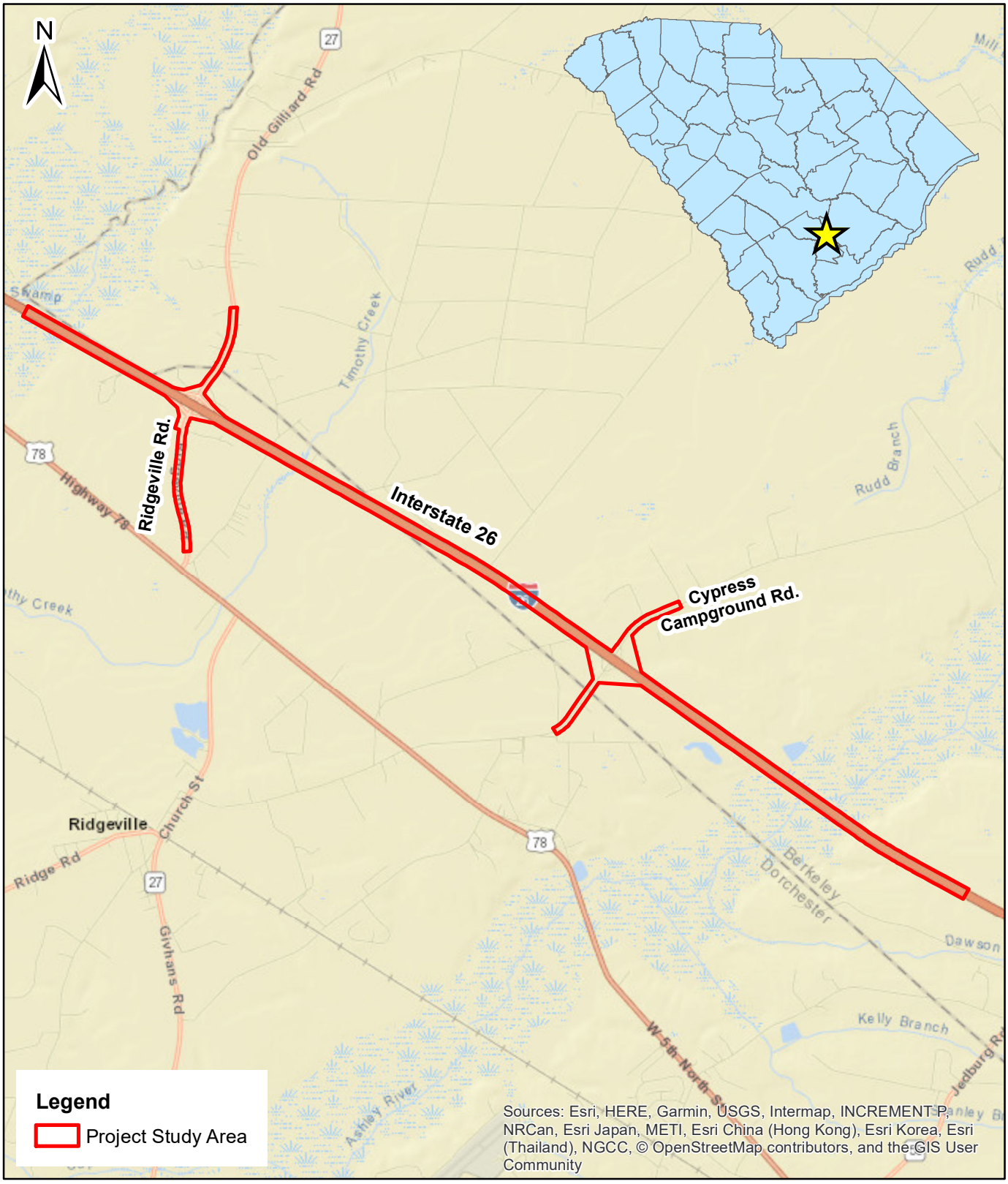
This project consists of widening Interstate 26 (I-26) for approximately 6.6 miles from MM 187 – MM 194, refer to Figure 1. The improvements involve adding a travel lane in each direction of I-26 toward the existing median, median clearing and cable guardrail installation, improving the Exit 187 interchange and ramps, replacing the I-26 mainline dual bridges over Cypress Swamp, replacing Cypress Campground Road bridge over I-26, and drainage improvements (Figure 2). There are three (3) proposed Build Alternatives for improvements to the Exit 187 interchange and ramps. Designs for Alternatives 1 – 3 are a rural diamond interchange, a partial cloverleaf interchange, or a diamond round about, respectively. Based on preliminary evaluation Alternative 3 is the preferred alternative.

B. Existing Land Uses

Land use adjacent to I-26 is mostly comprised of undeveloped land with some residential housing. Land use along Ridgeville Road North of I-26 is a mixture of residential and commercial, while South of I-26 is mostly undeveloped land with minimal residential housing. Cypress Campground Road is mostly undeveloped land with a few residential housings.

The proposed project is located within Berkeley County, South Carolina. The Berkeley County Planning & Zoning Department provided no approved building permits for new structures within the noise study area.

It has been noted that a building permit has been submitted and a site plan approval is pending for a church adjacent to I-26 and Cypress Campground Road. Although a site plan is not available, a noise contour was used to create an area within the approximate property boundary that would potentially exceed 66dBA. This approximate area will be provided to Berkeley County for their consideration. (Figure 3).



THREE OAKS ENGINEERING

Prepared For: SCDOT

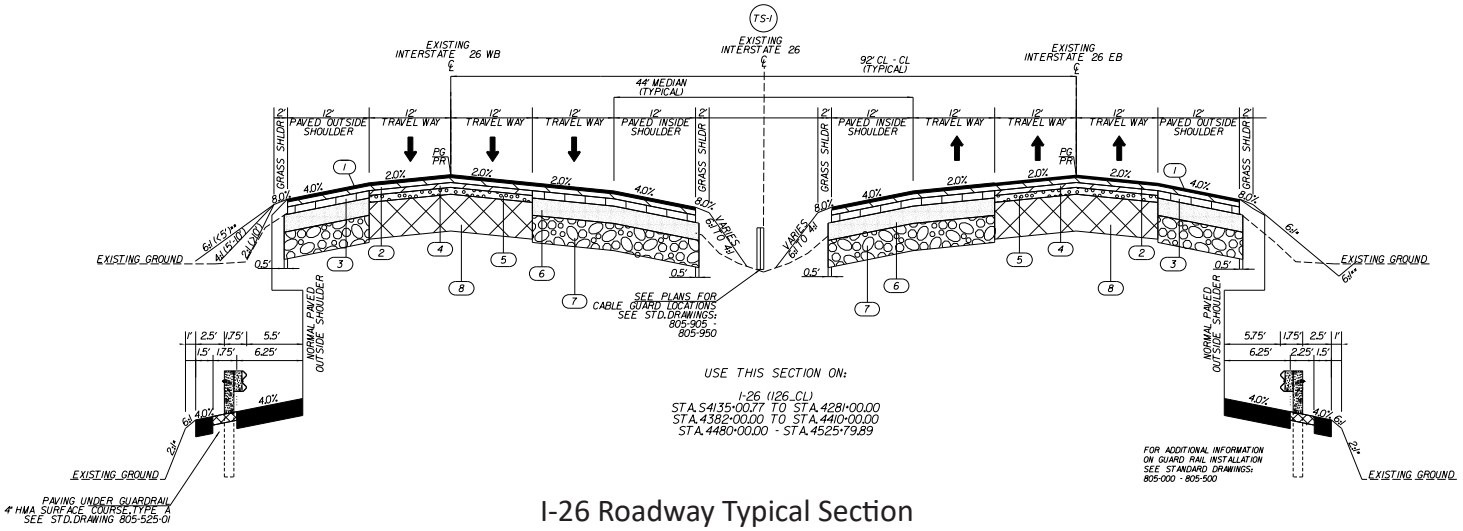
I-26 Widening MM 187-194
Project Location Map
Berkeley County, SC

0 0.25 0.5 1 Miles

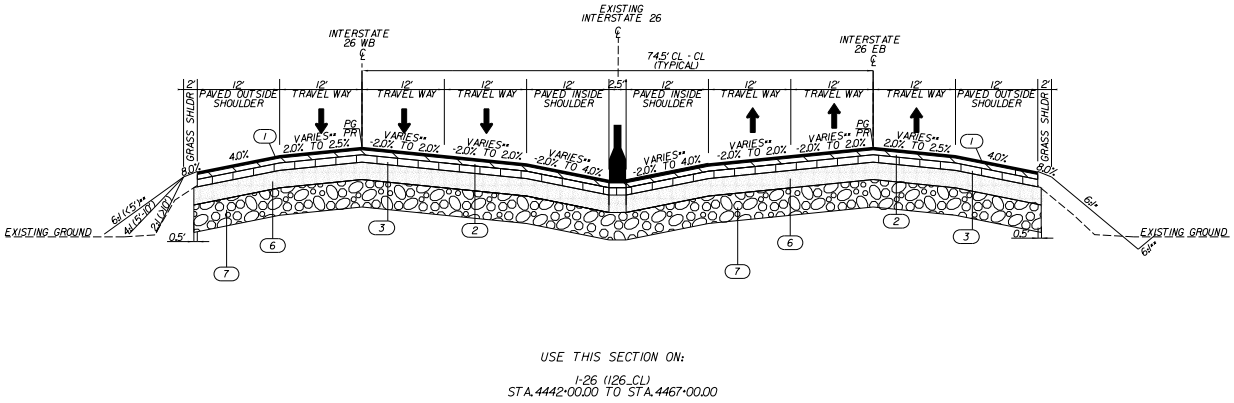
Date:	July 2019
Scale:	1 in = 1 miles
Job No.:	18-016
Drawn By:	SMM
Checked By:	HMR

Figure
1

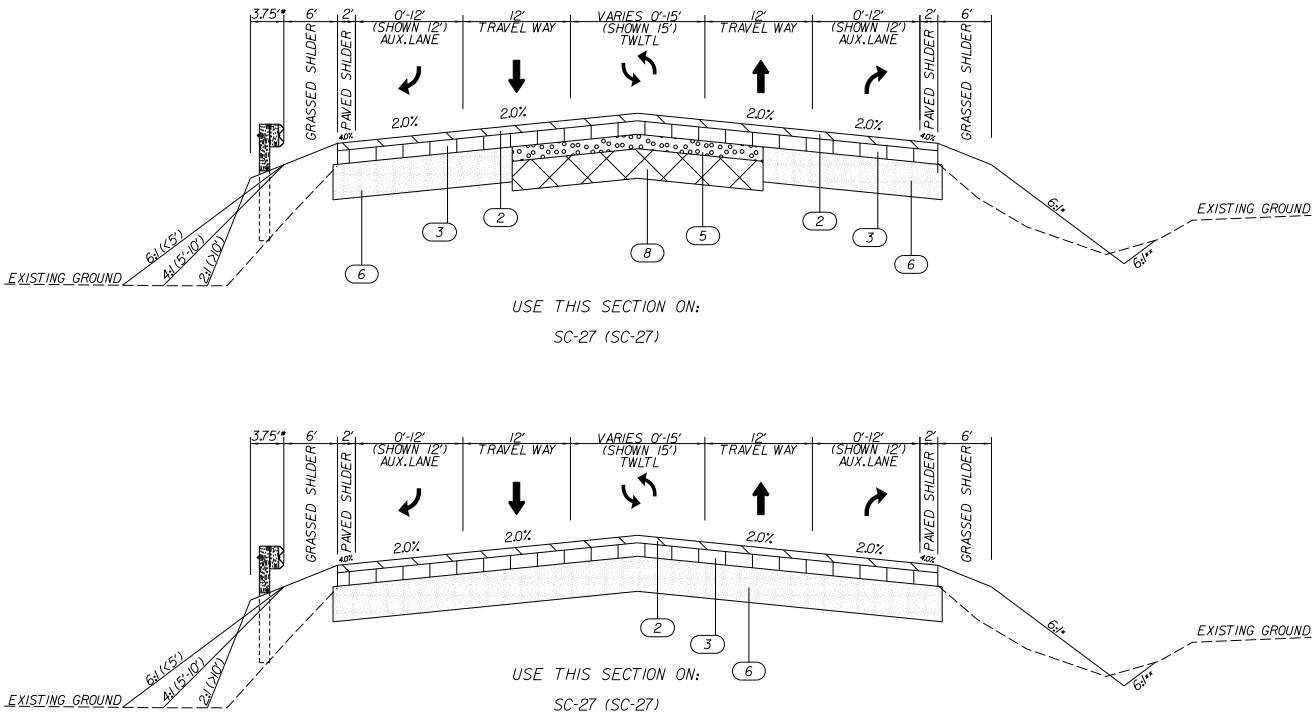
Figure 2: Typical Section



I-26 Roadway Typical Section



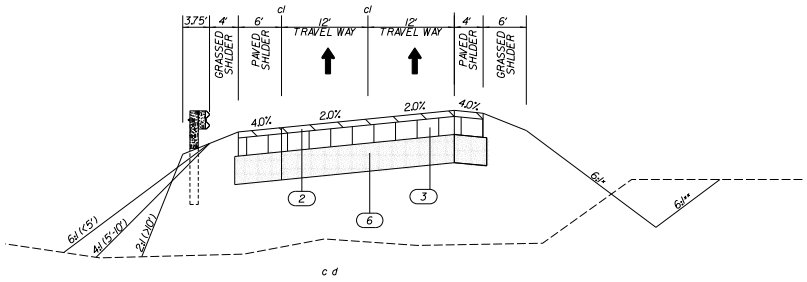
I-26 Bridge Typical Section



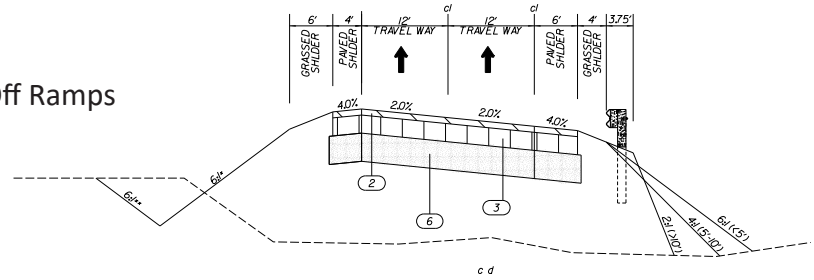
Ridgeville Road Typical Section

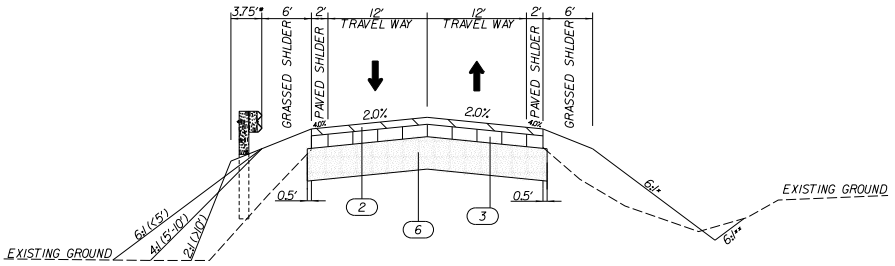
Figure 2: Typical Section

I-26 Westbound On-Off Ramps

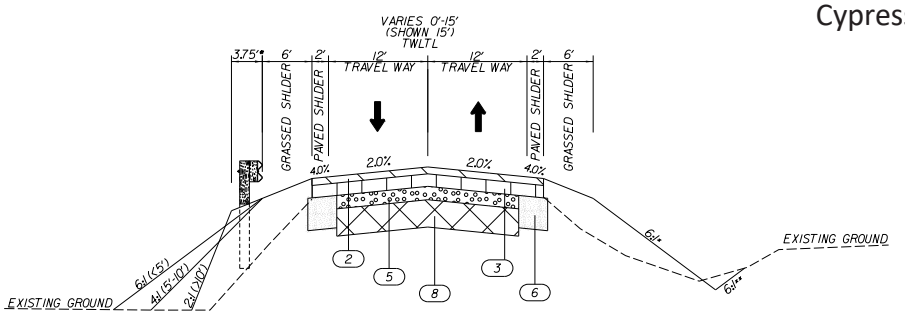


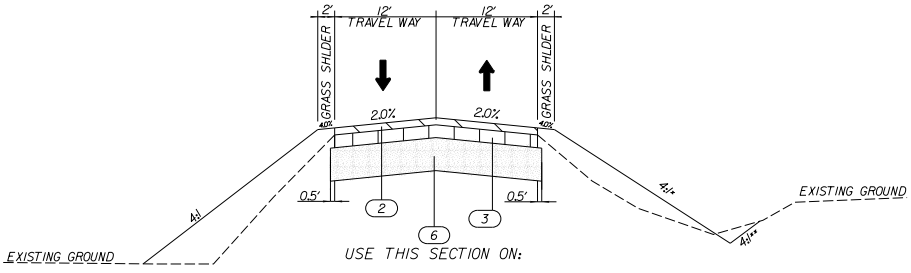
I-26 Eastbound On-Off Ramps





Cypress Campground Road





USE THIS SECTION ON:

STABLE LANE (SL_RR)
STA.68+59.82 TO STA.75+87.67

RUDD ROAD (SL_RR)
STA.76+71.67 TO STA.85+30.82

FIVEL LANE (FIVEL)
STA.76+33.01 TO STA.85+04.64

STABLE LANE EXTENSION
(STABLE_EXT)
STA.40+18.41 TO 41+37.02

Stable Lane, Rudd Road, Fivel Lane and Stable Lane Extension

Three Oaks Engineering

Prepared For: SCDOT

Noise Analysis
I-26 Widening MM 187-194
Berkeley County, SC

0 250 500 1,000 Feet

Date:	July 2019
Scale:	1 in = 1,000 feet
Job No.:	18-016
Drawn By:	SMM
Checked By:	HMR

Figure 3

II. ANALYSIS METHODOLOGY

A. Model Used and Assumptions

Federal Highway Administration (FHWA) Traffic Noise Model (TNM 2.5) was used to derive existing and future noise levels. Applicable model features, such as shoulders were added to the analysis to provide accurate sound level results.

B. Traffic Data

Traffic data (and design files) for the proposed project were provided by Stantec. The traffic report included the estimated Average Annual Daily Traffic (AADT) for the existing year (2018) and the design year (2043) that included fleet mix percentages, directional splits, and peak hour. A speed limit of 70 miles per hour (mph) was used for I-26. Ridgeville Road was modeled at 45 and the ramps were modeled at 35 mph. The Volvo interchange was modeled at 45 mph and Cypress Campground Road was modeled at 55 mph. (Appendix A).

C. Receiver Locations

Sensitive receivers and/or land use types were first identified using aerial photography and street level views from http://maps.google.com, then field verified. Receivers were modeled in areas of frequent human use. Exterior usage receiver categories that are potentially impacted by the proposed project include FHWA-developed Noise Abatement Criteria (NAC) categories B, C, and E (refer to Table 1). Figure 3 shows all the receptors evaluated for this project.

D. Field Measurements

Ambient noise field measurements were taken at three (3) different locations along I-26, shown in Figure 3. Noise measurements were taken on Thursday, July 19, 2018 during AM peak traffic and Thursday, July 26, 2018 during PM peak traffic. These were performed in accordance with the FHWA publication "Measurement of Highway-related Noise."

Vehicles were counted and the type of vehicles were noted during the field measurements. Meteorological conditions and local features were noted for each site. Table 2 summarizes the information for the ambient noise field measurements and Appendix B contains the field measurement data sheets. At Site 3 the eastbound traffic was not visible during measurements due to dense tree coverage in the I-26 median. Several different locations were evaluated for a third noise measurement site, but no other areas were identified as a suitable substitute with visible eastbound traffic. Based on the vehicle counts for the westbound traffic being higher than the eastbound traffic on Site 1 and Site 2, the westbound traffic counts were used for both directions at Site 3 to be conservative.

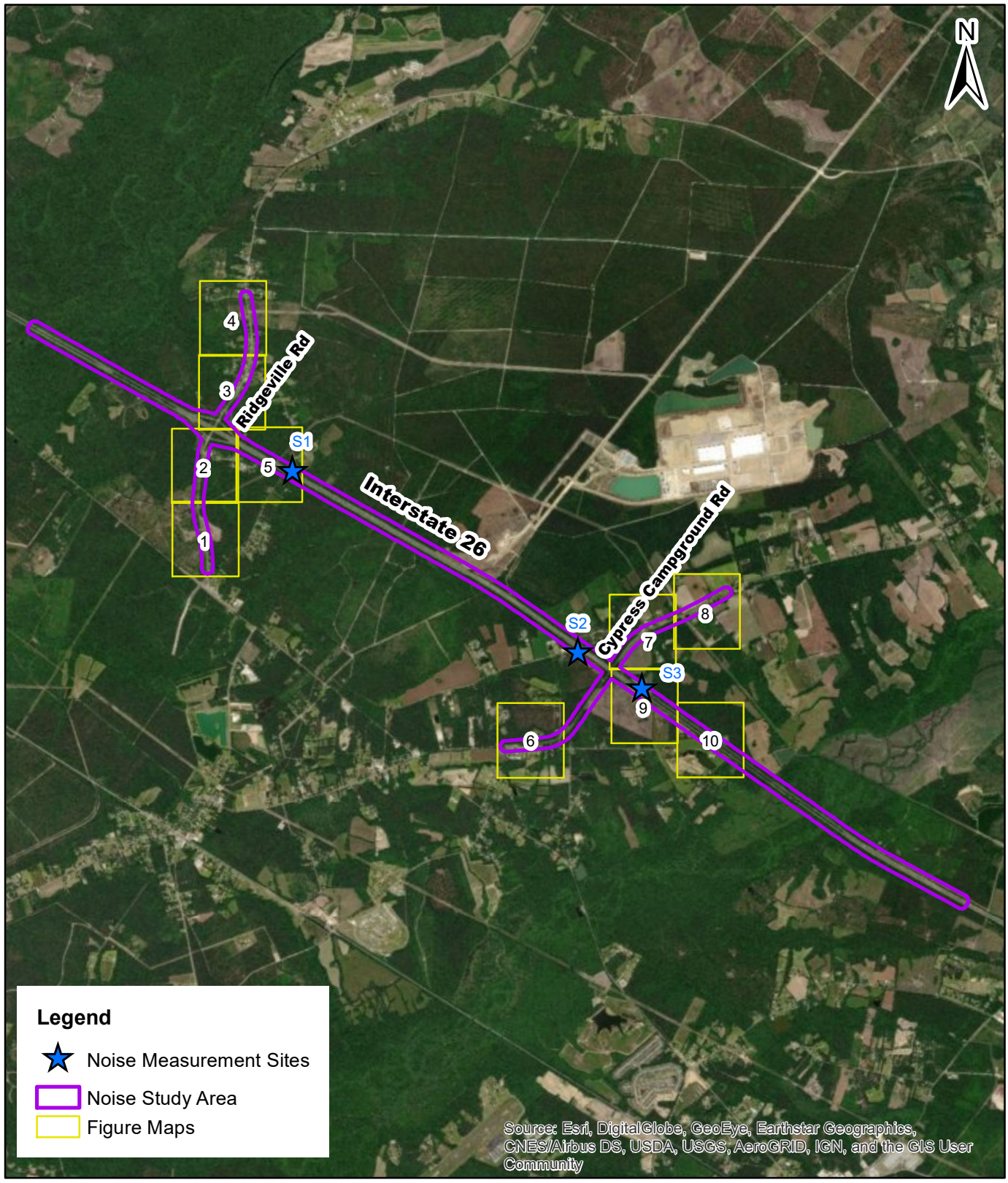
Table 1: 23 CFR Part 772, Table 1 Noise Abatement Criteria (NAC) Hourly A Weighted Sound Level in Decibels (dB(A))				
Activity Category	**Leq (h)\1,2**	**L10 (h) \1,2**	**Evaluation Location**	**Description of Activity Category**
A	57	60	Exterior	Lands on which serenity and quiet are of extraordinary 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	70	Exterior	Residential.
C\3\	67	70	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	55	Interior	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E \3\	72	75	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.
SOURCE: 23 CFR Part 772 \1\ Either Leq(h) or L10(h) (but not both) may be used on a project. \2\ The Leq(h) and L10(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.				

Table 2: Field Data Count and Classification Summary												
Location	Date	Time Period (min)	Traffic Counts Data									
			Eastbound					Westbound				
			HT	MT	Auto	Bus	MC	HT	MT	Auto	Bus	MC
Site #1	7/19/2018	7:35 AM – 7:50 AM	63	23	293	0	0	70	29	301	0	4
Site #1	7/26/2018	5:17 PM – 5:32 PM	36	9	413	2	0	48	13	436	2	0
Site #2	7/19/2018	8:17 AM – 8:32 AM	91	11	286	0	0	68	12	397	0	0
Site #2	7/26/2018	4:20 PM – 4:35 PM	48	10	388	1	0	58	8	390	0	0
Site #3	7/19/2018	8:49 AM – 9:04 AM	-	-	-	-	-	95	22	329	0	0
Site #3	7/26/2018	4:45 PM – 5:00 PM	-	-	-	-	-	55	11	365	0	0
Notes: MT - Medium Trucks HT - Heavy Trucks MC – Motorcycles ***Eastbound traffic was not visible during site #3 measurements due to dense tree coverage in the I-26 median (Appendix B).*												

E. Model Validation

Using the ambient noise field measurements shown in Table 2, the TNM2.5 model was validated per the requirements in 23 CFR §772.11(d)(2). Leq is defined as the equivalent steady-state sound level which, in a stated period of time contains the same acoustic energy as the time-varying sound level during the same time period, with Leq(h) being the hourly value of Leq. Table 3 compares the measured Leq versus modeled Leq for the sites during the measurement period. Based on SCDOT Policy, if the measured and modeled Leq are within 3 dBA, the model is validated. Table 3 shows that the difference between the modeled and measured Leq, where applicable, was ≤ 3.0 dBA at the sites; therefore, the model is validated.

Table 3: Comparison of Measured Leq to TNM 2.5 Modeled Leq			
Location	Measured Leq	Modeled Leq	Difference
Site #1 AM	74.4	76.0	+1.6
Site #1 PM	74	75.4	+1.4
Site #2 AM	73.1	75.4	+2.3
Site #2 PM	72.3	74.4	+2.1
Site #3 AM	72.3	75.2	+2.9
Site #3 PM	72.3	74.3	+2.0



THREE OAKS ENGINEERING · THREE OAKS ENGINEERING

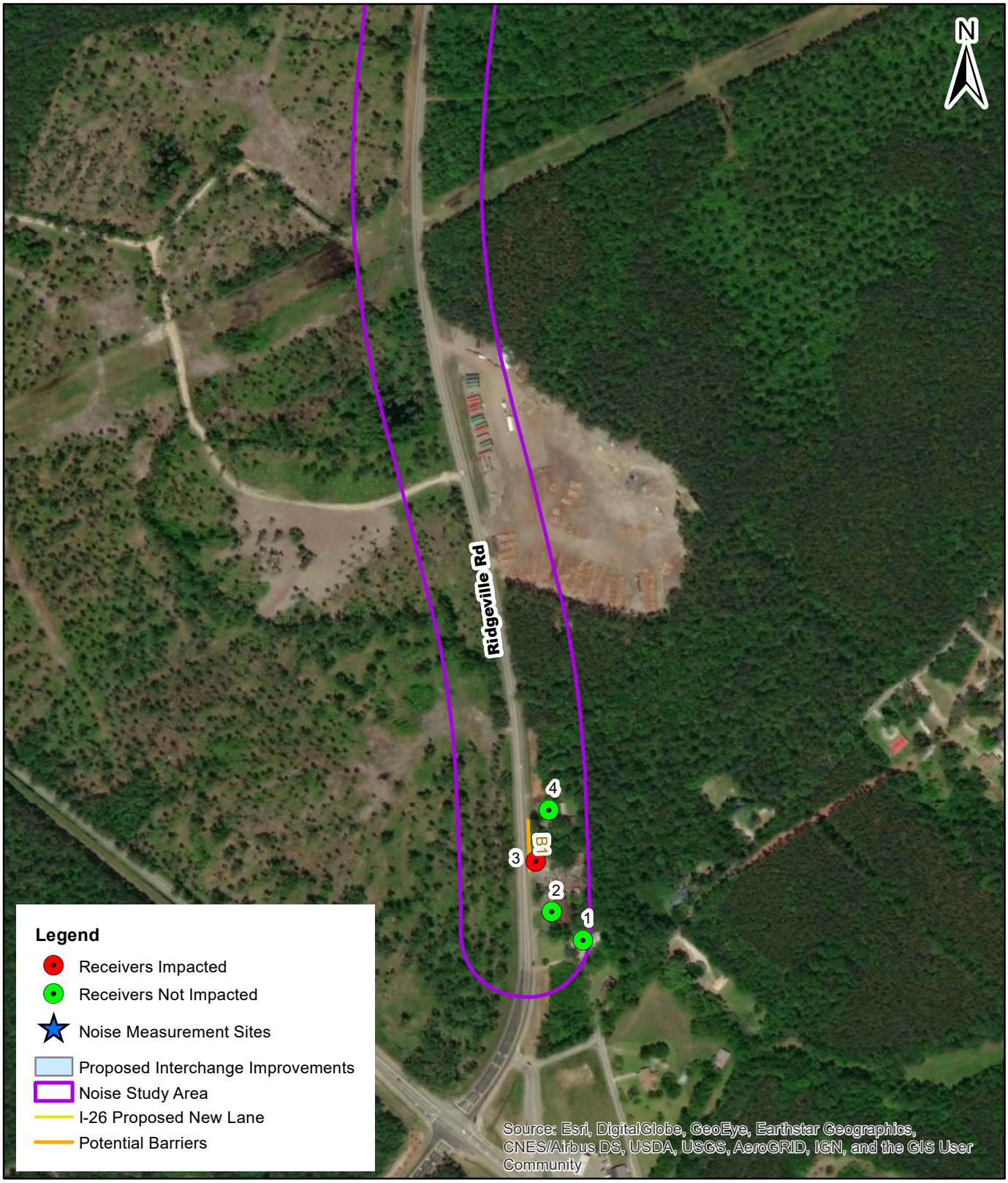
Prepared For: SCDOT

I-26 Widening MM 187-194
Berkeley County, SC

0 0.375 0.75 1.5 Miles

Date:	July 2019
Scale:	1 in = 1 miles
Job No.:	18-016
Drawn By:	SMM
Checked By:	HMR

Figure
4-0



THREE OAKS ENGINEERING · THREE OAKS ENGINEERING ·

Prepared For: SCDOT

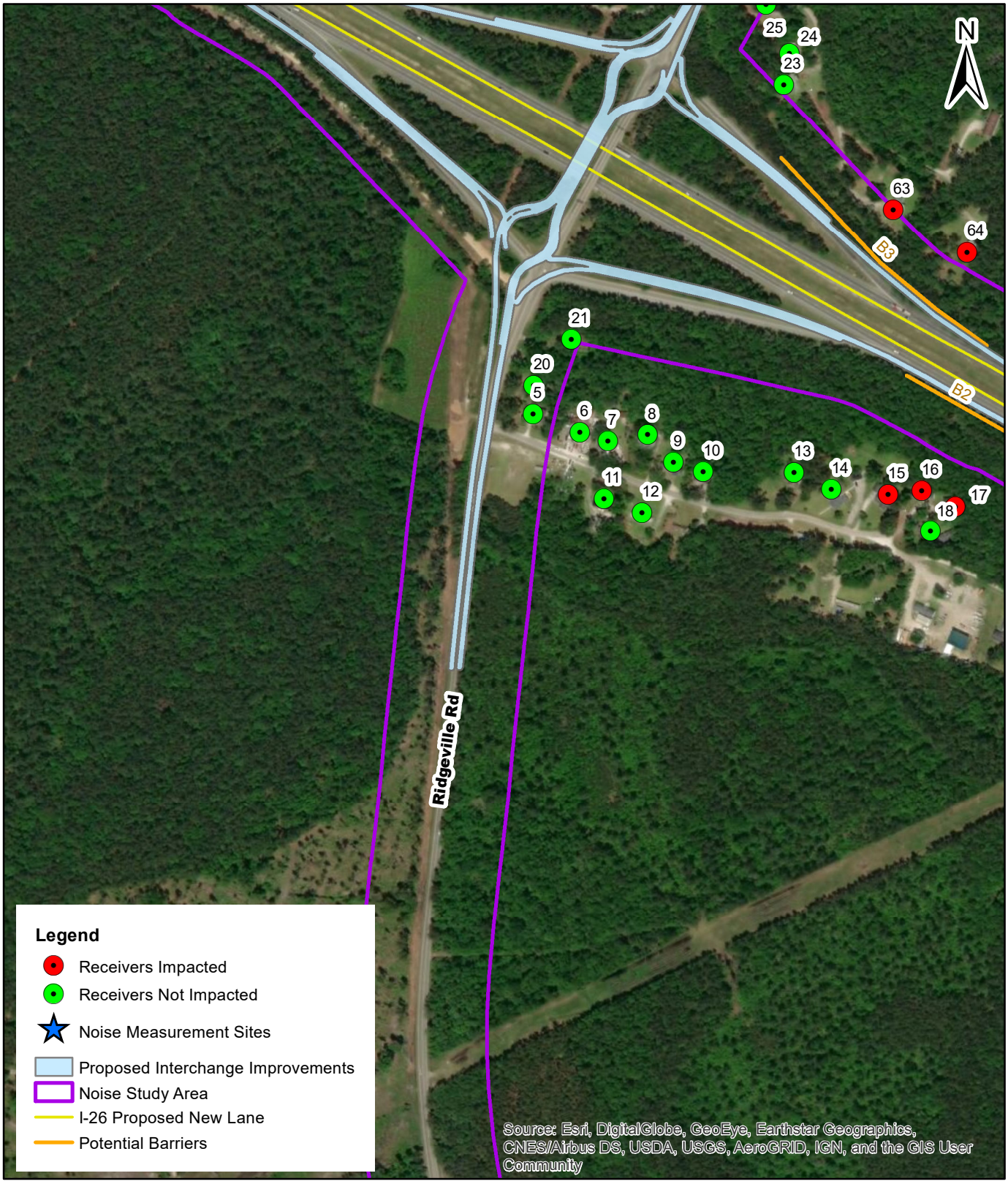
Noise Analysis
I-26 Widening MM 187-194

Berkeley County, SC

0 75150 300 450 Feet

Date:	July 2019
Scale:	1 in = 450 feet
Job No.:	18-016
Drawn By:	SMM
Checked By:	HMR

Figure
4-1



THREE OAKS ENGINEERING

Prepared For: SCDOT

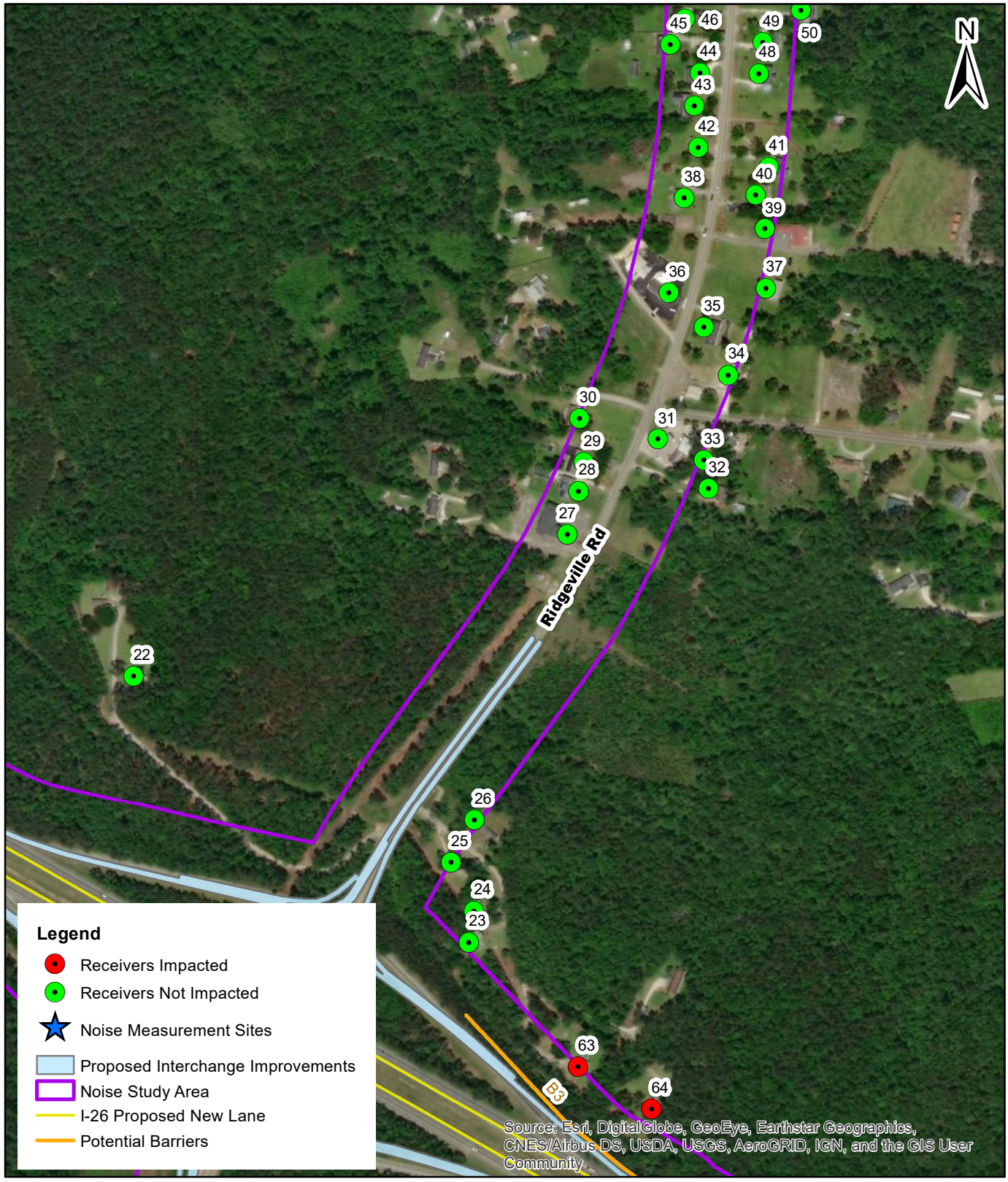
Noise Analysis
I-26 Widening MM 187-194

Berkeley County, SC

0 75150 300 450 Feet

Date:	July 2019
Scale:	1 in = 450 feet
Job No.:	18-016
Drawn By:	SMM
Checked By:	HMR

Figure
4-2



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Noise Analysis
I-26 Widening MM 187-194

Berkeley County, SC

0 75150 300 450 Feet

Date:	July 2019
Scale:	1 in = 450 feet
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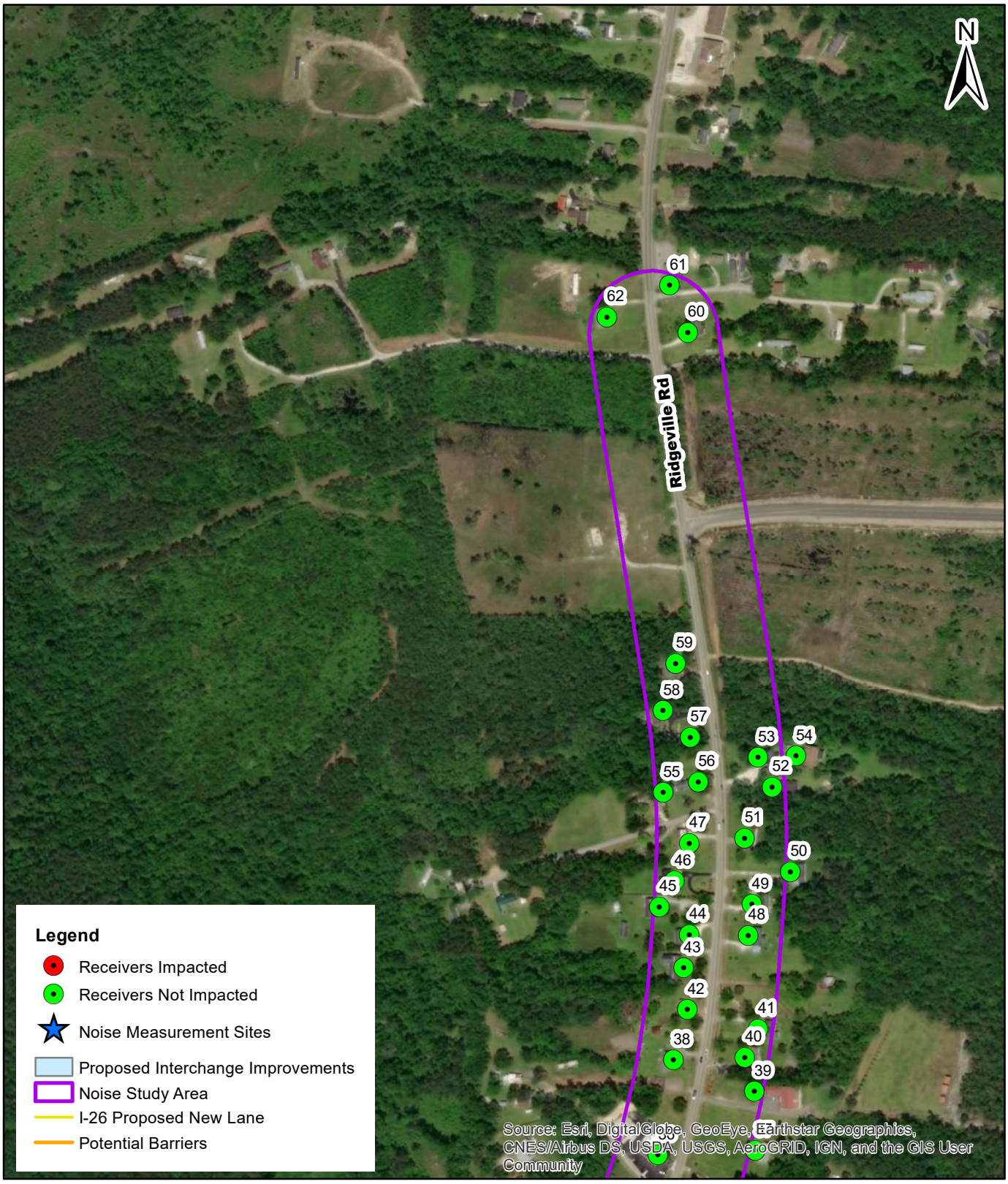
Drawn By:	SMM
Checked By:	HMR

Figure
4-3



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Prepared For: SCDOT

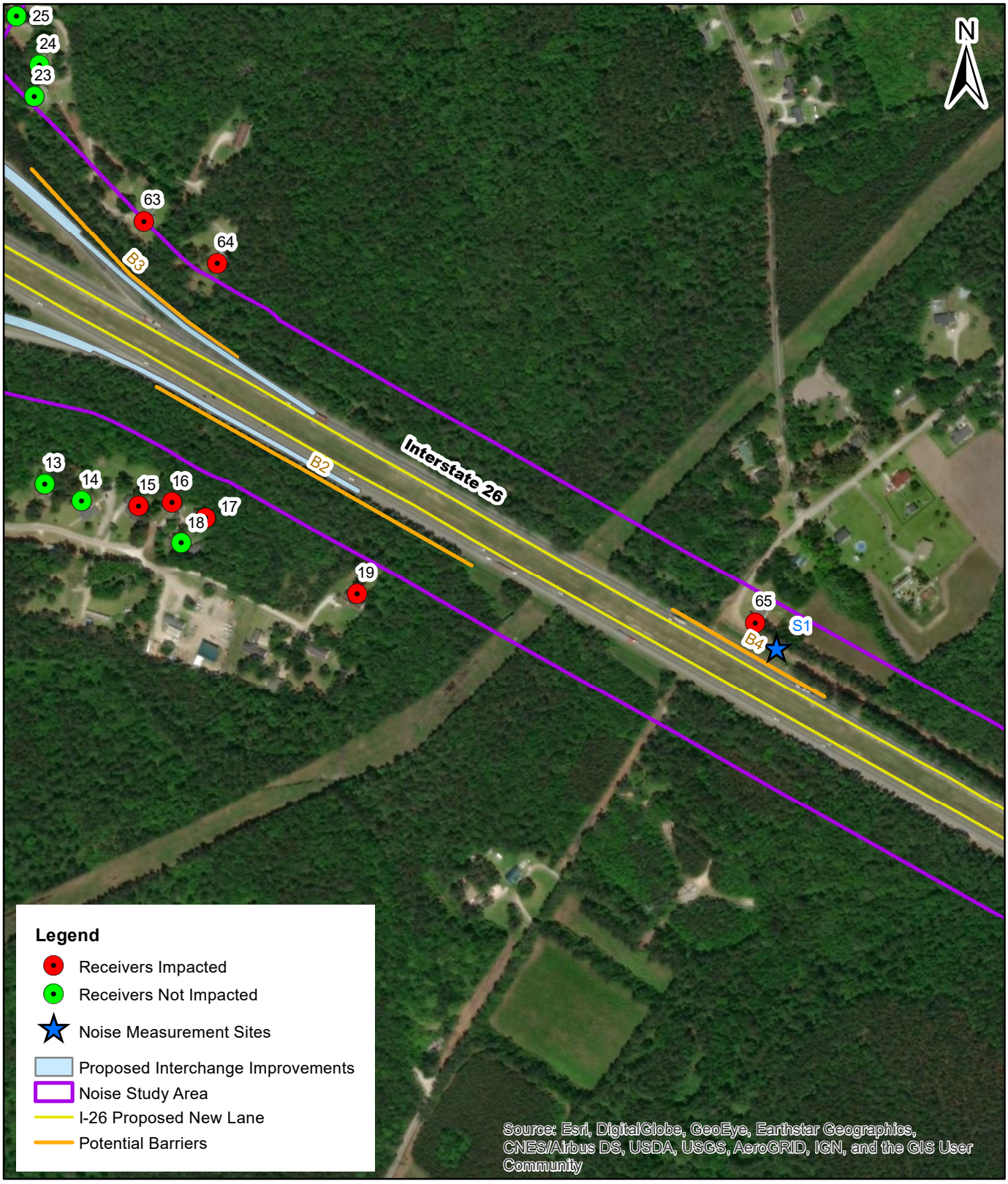
Noise Analysis
I-26 Widening MM 187-194

Berkeley County, SC

0 75150 300 450 Feet

Date:	July 2019
Scale:	1 in = 450 feet
Job No.:	18-016
Drawn By:	SMM
Checked By:	HMR

Figure
4-4



THREE OAKS ENGINEERING

Prepared For: SCDOT

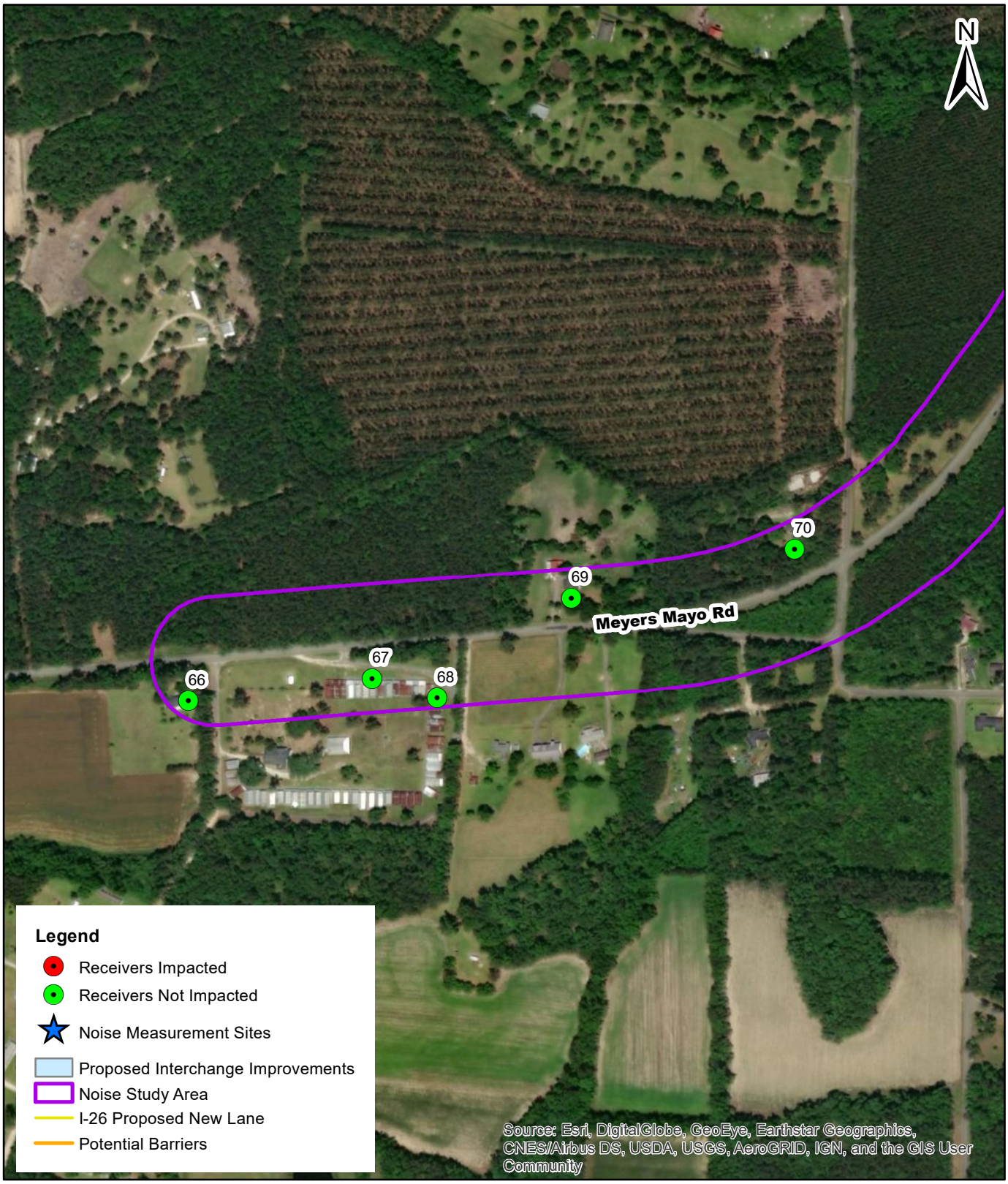
Noise Analysis
I-26 Widening MM 187-194

Berkeley County, SC

0 75150 300 450 Feet

Date: July 2019
Scale: 1 in = 450 feet
Job No.: 18-016
Drawn By: SMM
Checked By: HMR

Figure
4-5



THREE OAKS ENGINEERING

Prepared For: SCDOT

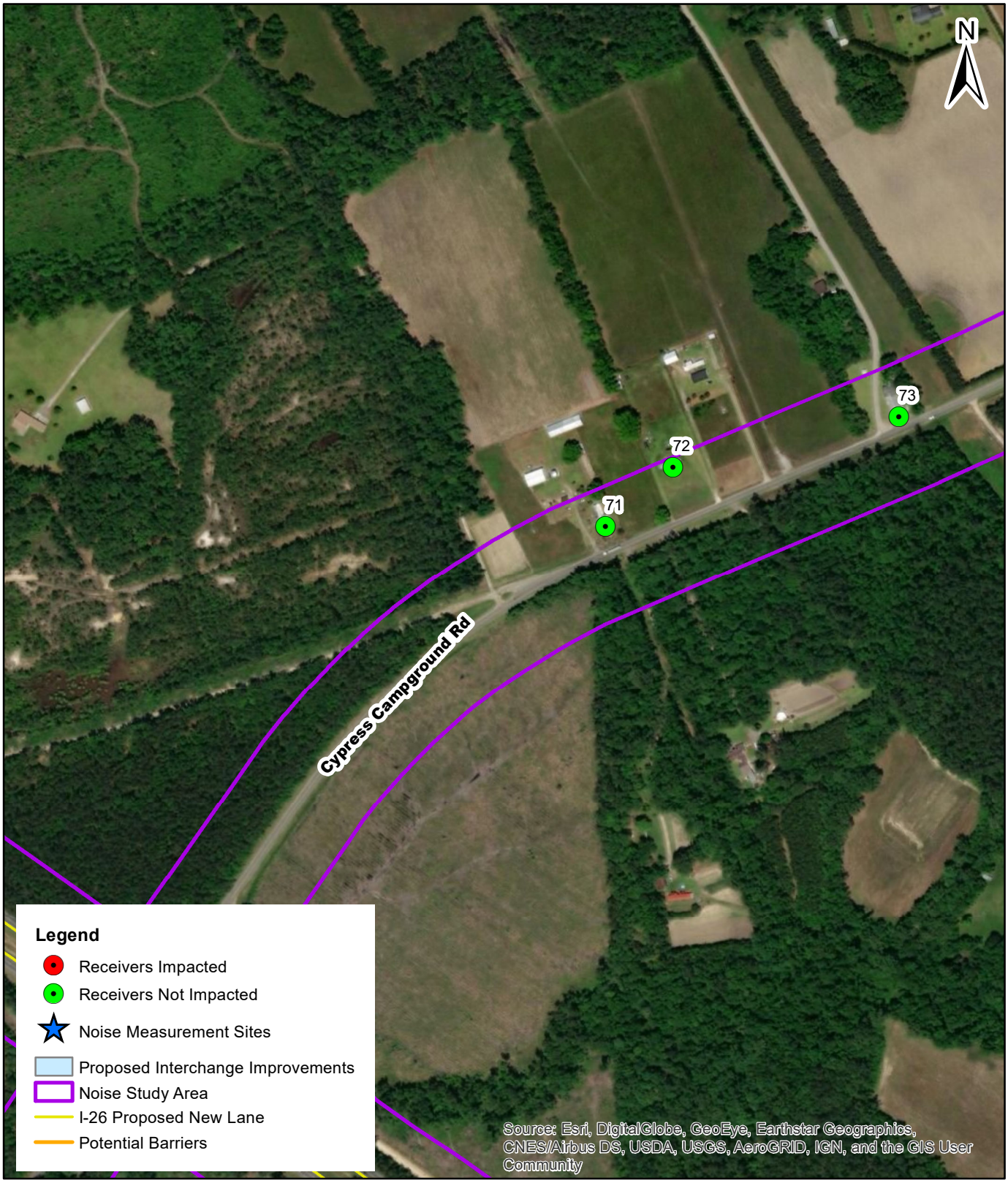
Noise Analysis
I-26 Widening MM 187-194

Berkeley County, SC

0 75150 300 450 Feet

Date:	July 2019
Scale:	1 in = 450 feet
Job No.:	18-016
Drawn By:	SMM
Checked By:	HMR

Figure
4-6



THREE OAKS ENGINEERING

Prepared For: SCDOT

Noise Analysis
I-26 Widening MM 187-194

Berkeley County, SC

0 75150 300 450 Feet

Date:	July 2019
Scale:	1 in = 450 feet
Job No.:	18-016
Drawn By:	SMM
Checked By:	HMR

Figure
4-7

THREE OAKS ENGINEERING

Prepared For: SCDOT

Noise Analysis
I-26 Widening MM 187-194

Berkeley County, SC

0 75150 300 450 Feet

Date:	July 2019
Scale:	1 in = 450 feet
Job No.:	18-016
Drawn By:	SMM
Checked By:	HMR

Figure
4-8

THREE OAKS ENGINEERING

Prepared For: SCDOT

Noise Analysis
I-26 Widening MM 187-194

Berkeley County, SC

0 75150 300 450 Feet

Date:	July 2019
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Job No.:	18-016
Drawn By:	SMM
Checked By:	HMR

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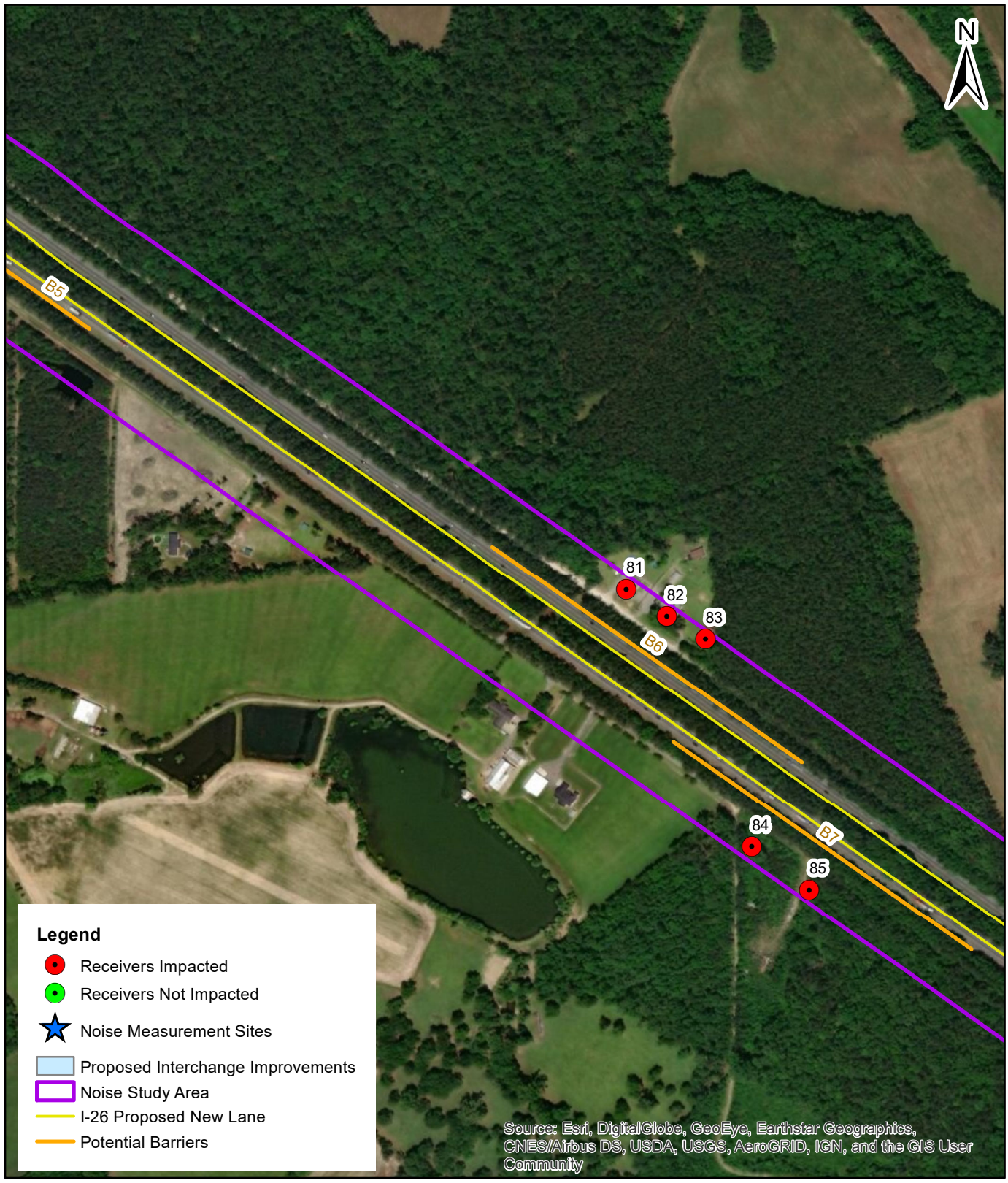
4-9



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Noise Analysis
I-26 Widening MM 187-194

Berkeley County, SC

0 75150 300 450 Feet

Date:	July 2019
Scale:	1 in = 450 feet
Job No.:	18-016
Drawn By:	SMM
Checked By:	HMR

Figure
4-10

III. TRAFFIC NOISE IMPACTS

FHWA has developed noise abatement criteria and procedures in 23 CFR Part 772, as shown in Table 1, that states that traffic noise impacts occur when either:

1) The predicted traffic noise levels approach (within 1 dBA) or exceed the FHWA NAC for the applicable activity category shown in Table 1; or,
2) The predicted traffic noise levels substantially exceed the existing noise levels by ≥ 15 dBA.

The TNM 2.5 model results for the existing condition, and the 2043 design year No-Build and three (3) Build Alternatives can be found in Table 4. No receivers would have a substantial increase impact for the 2043 Build Alternatives.

A. Modeled and/or Measured Existing Year Noise Levels
In the existing condition (2018), there are thirteen (13) residential receivers that have noise levels that approach or exceed the NAC criterion for its respective land use.

B. Modeled Design Year (2043) No-Build Alternative Noise Levels
There are fifteen (15) residential receivers that would have noise levels that approach or exceed the NAC criterion for its respective land use.

C. Modeled Design Year (2043) Build Alternative 1 Noise Levels
There are fourteen (14) residential receivers that would have noise levels that approach or exceed the NAC criterion for its respective land use. This alternative would also potentially require the relocation of one (1) residence.

D. Modeled Design Year (2043) Build Alternative 2 Noise Levels
There are fifteen (15) residential receivers that would have noise levels that approach or exceed the NAC criterion for its respective land use. This alternative would also potentially require the relocation of two (2) residences.

E. Modeled Design Year (2043) Build Alternative 3 Noise Levels
There are fourteen (14) residential receivers that would have noise levels that approach or exceed the NAC criterion for its respective land use.

Table 4: Existing and Design Year Sound Levels											
Receptor Number	Existing	2040 No-Build	Alt 1 2040 Build	Alt 1 Increase over Existing	Alt 2 2040 Build	Alt 2 Increase over Existing	Alt 3 2040 Build	Alt 3 Increase over Existing	NAC Impact?	NAC	Land Use
1	54.2	55.8	55.6	1.4	55.6	1.4	56	1.8	N	66	B
2	61.3	63.1	63.1	1.8	63.1	1.8	63.1	1.8	N	66	B
3	67.9	69.7	69.7	1.8	69.7	1.8	69.7	1.8	Y	66	B
4	61.8	63.6	64	2.2	64	2.2	64	2.2	N	66	B
5	62.2	63.9	63.9	1.7	63.9	1.7	62.9	0.7	N	66	B
6	61.2	63	62.4	1.2	62.7	1.5	61.9	0.7	N	66	B
7	60.4	62.2	62.1	1.7	62.4	2	61.9	1.5	N	66	B
8	61.6	63.4	63.1	1.5	63.5	1.9	62.8	1.2	N	66	B
9	61.2	63	62.7	1.5	62.9	1.7	62.3	1.1	N	66	B
10	61.4	63.2	63	1.6	63	1.6	62.6	1.2	N	66	B
11	59	60.7	60.6	1.6	60.6	1.6	60.4	1.4	N	66	B
12	59.2	60.9	60.5	1.3	60.6	1.4	60.4	1.2	N	66	B
13	63.7	65.6	65.3	1.6	65.1	1.4	64.6	0.9	N	66	B
14	63.9	65.8	65.4	1.5	65.1	1.2	64.9	1.0	N	66	B
15	65.3	67.3	66.9	1.6	66.4	1.1	66.3	1.0	Y	66	B
16	66.7	68.7	68.1	1.4	67.7	1	67.6	0.9	Y	66	B
17	66.7	68.9	68.2	1.5	67.9	1.2	67.8	1.1	Y	66	B
18	64.3	66.3	65.7	1.4	65.5	1.2	65.4	1.1	N	66	B
19	67	69.1	69.2	2.2	68.6	1.6	68.4	1.4	Y	66	B
20	63.2	64.9	65.2	2	Relocation	-	63.7	0.5	N	66	B
21	62.9	64.7	Relocation	-	Relocation	-	64.2	1.3	N	66	B
22	61	62.4	60.9	-0.1	61.2	0.2	63.3	2.3	N	66	B
23	63.9	65.3	65.3	1.4	66	2.1	65.7	1.8	N	66	B
24	63.1	64.6	64.4	1.3	65.1	2	64.7	1.6	N	66	B
25	62.6	64.2	64.2	1.6	64.5	1.9	63.8	1.2	N	66	B
26	61.9	63.5	62.9	1	63.1	1.2	62.7	0.8	N	66	B
27	62.8	64.4	64.8	2	64.7	1.9	64.3	1.5	N	66	C
28	61.2	62.7	63.1	1.9	63	1.8	62.8	1.6	N	66	B
29	60	61.5	61.9	1.9	61.7	1.7	61.5	1.5	N	66	B
30	57.4	59	59.3	1.9	59	1.6	63.9	6.5	N	66	B
31	64.6	66.2	66.2	1.6	66.2	1.6	66	1.4	N	71	E
32	55.4	56.9	56.7	1.3	57.1	1.7	64.8	9.4	N	66	B
33	56.4	57.9	58	1.6	58.3	1.9	63.2	6.8	N	66	B
34	57	58.6	58.6	1.6	58.6	1.6	61.4	4.4	N	66	B
35	63.6	65.2	65.5	1.9	65.5	1.9	65	1.4	N	66	B
36	62.8	64.3	64.9	2.1	64.9	2.1	64.6	1.8	N	71	E
37	55.6	57.1	57.1	1.5	57.2	1.6	61.2	5.6	N	66	B
38	61.6	63.2	63.7	2.1	63.7	2.1	63.5	1.9	N	66	B
39	56.9	58.4	58.5	1.6	58.6	1.7	59.4	2.5	N	66	C
40	59.2	60.7	60.9	1.7	60.9	1.7	60.8	1.6	N	66	B

Table 4: Existing and Design Year Sound Levels											
Receptor Number	Existing	2040 No-Build	Alt 1 2040 Build	Alt 1 Increase over Existing	Alt 2 2040 Build	Alt 2 Increase over Existing	Alt 3 2040 Build	Alt 3 Increase over Existing	NAC Impact?	NAC	Land Use
41	57.9	59.5	59.4	1.5	59.5	1.6	59.4	1.5	N	66	B
42	63.4	65	65.4	2	65.4	2	65	1.6	N	66	B
43	61.3	62.9	63.2	1.9	63.3	2	63.2	1.9	N	66	B
44	62.1	63.6	64	1.9	64	1.9	64.1	2.0	N	66	B
45	56.9	58.3	58.6	1.7	58.5	1.6	59.8	2.9	N	66	B
46	59	60.5	60.7	1.7	60.6	1.6	60.6	1.6	N	66	B
47	61	62.6	63	2	63	2	62.9	1.9	N	66	B
48	60.7	62.2	62.6	1.9	62.6	1.9	62.6	1.9	N	66	B
49	60.5	62	62.3	1.8	62.4	1.9	62.3	1.8	N	66	B
50	55.3	56.8	56.7	1.4	56.8	1.5	57.9	2.6	N	66	B
51	62.8	64.4	64.6	1.8	64.6	1.8	64.8	2.0	N	66	B
52	57.4	58.9	58.9	1.5	58.9	1.5	59	1.6	N	66	B
53	59	60.5	60.7	1.7	60.7	1.7	60.7	1.7	N	66	B
54	54.4	55.8	55.7	1.3	55.7	1.3	57.3	2.9	N	66	B
55	57.1	58.6	58.8	1.7	58.7	1.6	58.6	1.5	N	66	B
56	63.4	65	65.1	1.7	65.1	1.7	65.2	1.8	N	66	B
57	62.1	63.6	64.2	2.1	64.2	2.1	63.7	1.6	N	66	B
58	58.2	59.7	59.7	1.5	59.7	1.5	59.6	1.4	N	66	B
59	61.1	62.7	63.2	2.1	63.2	2.1	63.1	2.0	N	66	B
60	57.7	59.2	59.4	1.7	59.4	1.7	59.5	1.8	N	66	B
61	54.1	55.5	55.2	1.1	55.2	1.1	55.6	1.5	N	66	B
62	54.4	55.9	55.6	1.2	55.6	1.2	55.8	1.4	N	66	B
63	70.1	71.6	70	-0.1	70.4	0.3	70.2	0.1	Y	66	B
64	70	71.1	70.2	0.2	70.2	0.2	70.2	0.2	Y	66	B
65	74.5	75.6	74.6	0.1	74.6	0.1	74.6	0.1	Y	66	B
66	49.1	50.5	49.9	0.8	49.9	0.8	49.9	0.8	N	66	B
67	53.2	54.8	54.9	1.7	54.9	1.7	54.9	1.7	N	66	C
68	50.4	51.9	51.6	1.2	51.6	1.2	51.6	1.2	N	66	C
69	53.2	54.6	55.2	2	55.2	2	55.2	2.0	N	66	B
70	53.2	54.7	54.8	1.6	54.8	1.6	54.8	1.6	N	66	B
71	56	57.5	56.8	0.8	56.8	0.8	56.8	0.8	N	66	B
72	52.5	54	53.7	1.2	53.7	1.2	53.7	1.2	N	66	B
73	59.6	61.1	61	1.4	61	1.4	61	1.4	N	66	C
74	51.5	53	53.3	1.8	53.3	1.8	53.3	1.8	N	66	B
75	53.7	55.1	55.8	2.1	55.8	2.1	55.8	2.1	N	66	B
76	50.4	51.8	51.8	1.4	51.8	1.4	51.8	1.4	N	66	B
77	54.5	56	56.9	2.4	56.9	2.4	56.9	2.4	N	66	B
78	51.3	52.7	53.6	2.3	53.6	2.3	53.6	2.3	N	66	B
79	54.8	56.3	57.2	2.4	57.2	2.4	57.2	2.4	N	66	B
80	69.2	71.5	70.8	1.6	70.8	1.6	70.8	1.6	Y	66	B

Table 4: Existing and Design Year Sound Levels											
Receptor Number	Existing	2040 No-Build	Alt 1 2040 Build	Alt 1 Increase over Existing	Alt 2 2040 Build	Alt 2 Increase over Existing	Alt 3 2040 Build	Alt 3 Increase over Existing	NAC Impact?	NAC	Land Use
81	71.6	72.7	71.4	-0.2	71.4	-0.2	71.4	-0.2	Y	66	B
82	71.6	72.7	71.5	-0.1	71.5	-0.1	71.5	-0.1	Y	66	B
83	71.5	72.7	71.1	-0.4	71.1	-0.4	71.1	-0.4	Y	66	B
84	73.2	75.5	73.4	0.2	73.4	0.2	73.4	0.2	Y	66	B
85	72.7	74.8	72	-0.7	72	-0.7	72	-0.7	Y	66	B

IV. FEASIBLE AND RESONABLE CONSIDERATION OF ABATEMENT

Since there are receivers that would be impacted by the noise from the 2043 Design Year Build Alternative, abatement measures were considered for the proposed project.

When considering noise abatement measures, primary consideration shall be given to exterior areas where frequent human use occurs. Since South Carolina is not part of the FHWA-approved Quiet Pavement Pilot Program, the use of quieter pavements was not considered as an abatement measure for the proposed project. In addition, the planting of vegetation or landscaping was not considered as a potential abatement measure since it is not an acceptable Federal-aid noise abatement measure due to the fact that only dense stands of evergreen vegetation planted 100 feet deep will reduce noise levels. In accordance with 23 CFR §772.13(c), the following measures were considered and evaluated as a means to reduce or eliminate the traffic noise impacts:

A. Acquisition of Right-of-Way - The acquisition of rights-of-way to mitigate the noise levels at the affected site would result in disruptive relocations.
B. Traffic Management - Measures such as exclusive lane designations and signing for prohibition of certain vehicle type would prevent the project from serving its intended purpose, such as moving people, goods and services.
C. Alteration of Horizontal and Vertical Alignments - Alignment modifications as a means of noise abatement would result in disruptive relocations for this project and would not be cost effective.
D. Acquisition of real property or interests therein (predominately unimproved property) to serve as a buffer zone to preempt development - Adequate property is not available to create an effective buffer zone between the proposed roadway and the impacted receivers.
E. Noise insulation of public use or nonprofit institutional structures – There are no facilities within the study area that would benefit from noise insulation.
F. Noise Barriers - Among the most common noise barriers are earthen berms and freestanding walls. The optimum situation for the use of free-standing noise barriers is when a dense concentration of impacted receivers lies directly adjacent to and parallel

with the highway right-of-way. In these instances, one barrier can protect many people at a relatively low cost per impacted site.

When considering abatement, the SCDOT Noise Policy Guidelines state that noise abatement measures must be both feasible and reasonable. The feasibility and reasonableness of a noise barrier is determined by the following factors for Feasibility and Reasonableness.

1. Feasibility:

There are two mandatory feasibility factors that must be met for a noise abatement measure to be considered reasonable. The two mandatory factors must collectively be achieved in order for a noise abatement measure to be deemed reasonable. Failure to achieve any one of the factors will result in the noise abatement measure being deemed not feasible.

a. Acoustic Feasibility - It is SCDOT's policy that a noise reduction of at least 5 dBA must be achieved for at least 75 percent of impacted receivers for the noise abatement measure to be acoustically feasible. If this goal is not met, then abatement is determined not to be feasible and no further analysis is required.

b. Engineering Feasibility - Feasibility also includes engineering considerations. The ability to achieve noise reduction may be limited by engineering considerations such as the topographical features of the area, safety, drainage, utilities, maintenance and access. In addition, due to constructability constraints, the height of the noise abatement measure cannot exceed 25 feet.

2. Reasonableness:

There are three mandatory reasonable factors that must be met for a noise abatement measure to be considered reasonable. The three mandatory reasonable factors must collectively be achieved in order for a noise abatement measure to be deemed reasonable. Failure to achieve any one of the reasonable factors will result in the noise abatement measure being deemed not reasonable.

a. Noise Reduction Design Goal - It is SCDOT's policy that a noise reduction of at least 8 dBA must be achieved for 80% of those receivers determined to be in the first two building rows and considered benefited. Please note that the first two building rows will only be applicable if they are within 500 feet from the edge of pavement noise source. If the design goal is not met, then abatement is determined not to be reasonable and no further analysis is required.

b. Cost Effectiveness - The allowable cost of the abatement will be based on $35.00 per square foot. This allowable cost is based on actual construction costs on recent SCDOT projects. This construction cost will be divided by the number of benefited receivers. If the cost per benefited receiver is less than $30,000 then the barrier is determined to be cost effective.

c. Viewpoints of the Property Owners and Residents of the Benefited Receivers – If the noise reduction design goal and cost-effective criteria are met, SCDOT shall solicit the viewpoints of all of the benefited receivers and document a decision on either desiring or not desiring the noise abatement measure. The viewpoints will be solicited as part of the public involvement process through a voting procedure if a barrier is proposed. The voting ballot will explain that the noise abatement shall be constructed unless a majority (greater than 50% of the benefited receivers) of votes not desiring noise abatement is received. For non-owner occupied benefited receivers, both the property owner and the renter may vote on whether the noise abatement is desired.

For this noise analysis, the mitigation analysis determined that all the barriers either did not meet the design goal or the cost effectiveness criteria. Therefore, the voting process of the benefited property owners is not applicable.

3. Noise Barrier Evaluation:

Barriers 1, 4, and 5 were modeled to abate noise impacts to three (3) isolated impacted residences (Receptors 3, 64, and 80, respectively). The addition of a noise barrier would provide a 5 dBA reduction for the impacted receivers, and therefore were determined feasible. However, the receivers do not meet the noise reduction goal of 8 dBA, and therefore, the barriers were determined not reasonable.

Barrier 2 was modeled to abate noise impacts to residences (Receptors 15, 16, 17, and 19) along Jared Lane. The addition of a noise barrier would provide a 5 dBA reduction for the impacted receiver, and therefore was determined feasible. However, the receiver does not meet the noise reduction goal of 8 dBA, and therefore, this barrier was determined not reasonable.

Barrier 3 was modeled to abate noise impacts to residences (Receptors 63 and 64) along Emma Lane. The addition of a noise barrier would provide a 5 dBA reduction for the impacted receiver, and therefore was determined feasible. However, the receiver does not meet the noise reduction goal of 8 dBA, and therefore, this barrier was determined not reasonable.

Barrier 6 was modeled to abate noise impacts to residences along Fivel Lane (Receptors 81 – 83). The addition of a noise barrier would provide a 5 dBA reduction for the impacted receiver, and therefore was determined feasible. The noise barrier would provide an 8 dBA reduction for the impacted receivers, which meets the noise reduction design goal. Based on SCDOT policy for estimating barrier costs at $35/ square foot, the total cost of this barrier would be $976,920 or $325,640 per benefitted receiver. This cost per benefitted receiver exceeds the SCDOT allowable cost of $30,000 and therefore, is not reasonable.

Barrier 7 was modeled to abate noise impacts to residences (Receptors 84 – 85) along Rudd Road. The addition of a noise barrier would provide a 5 dBA reduction for the impacted receiver, and therefore was determined feasible. The noise barrier would provide an 8 dBA reduction for the impacted receivers, which meets the noise reduction design goal. Based on SCDOT policy for estimating barrier costs at $35/ square foot, the total cost of this barrier would be $997,955 or $498,977.50 per benefitted receiver. This cost per benefitted receiver exceeds the SCDOT allowable cost of $30,000 and therefore, is not reasonable.

Barrier descriptions are shown in Table 5 (below). Table 6 includes a summary of the barrier evaluations. The SCDOT Feasible and Reasonable Worksheets are located in Appendix C. Overall, as a result of the mitigation analysis, there were no feasible and reasonable solutions to mitigate for the predicted noise impacts according to the SCDOT Traffic Noise Abatement Policy. Therefore, there are no noise barriers proposed to be carried forward to the construction phase.

Table 5: Barrier Descriptions

Name	Type	Heights along Barrier			Length (ft)	Area (sq ft)
		Min (ft)	Avg (ft)	Max (ft)		
Barrier 1	W	25	25	25	159	3,982
Barrier 2	W	25	25	25	1,172	2,9293
Barrier 3	W	25	25	25	905	22,629
Barrier 4	W	25	25	25	554	13,839
Barrier 5	W	25	25	25	762	19,038
Barrier 6	W	20	22.49	23	1,241	27,912
Barrier 7	W	23	24.44	25	1,167	28,513

Table 6: Barrier Evaluation Summary

Barrier	Receiver Number	Acoustically Feasible? (Y/N)	Engineering Feasibility? (Y/N)	Overall Feasible? (Y/N)	Meets Noise Reduction Goal? (Y/N)	Is Barrier Cost Effectiveness? (Y/N)	Overall Reasonable? (Y/N)	Conclusion
B1	3	Y	Y	Y	N	N	N	Feasible, but not reasonable
B2	15, 16, 17, 19	Y	Y	Y	N	N	N	Feasible, but not reasonable
B3	63, 65	Y	Y	Y	N	N	N	Feasible, but not reasonable
B4	64	Y	Y	Y	N	N	N	Feasible, but not reasonable
B5	80	Y	Y	Y	N	N	N	Feasible, but not reasonable
B6	81, 82, 83	Y	Y	Y	Y	N	N	Feasible, but not reasonable
B7	84, 85	Y	Y	Y	Y	N	N	Feasible, but not reasonable

V. FINDINGS AND RECOMMENDATIONS

Overall, there were 14-15 receivers impacted, depending on the alternative, in the noise study area for the 2043 design year Build Alternative condition. As a result, mitigation analysis was warranted according to the SCDOT Traffic Noise Abatement Policy. None of the barrier analyses results met both of the feasible and reasonable criteria as per the SCDOT Traffic Noise Abatement Policy.

VI. CONSTRUCTION NOISE

If the build alternative is chosen, temporary increases in noise levels would occur during the time period that construction takes place. Noise levels due to construction, although temporary, can impact areas adjacent to the project. The major noise sources from construction would be the heavy equipment operated at the site. However, other construction site noise sources would include hand tools and trucks supplying and removing materials

Typical noise levels generated by different types of construction equipment are presented in Table 6. Construction operations are typically broken down into several phases including clearing and grubbing, earthwork, erection, paving and finishing. Although these phases can overlap, each has their own noise characteristics and objective.

SCDOT's "2007 Standard Specifications for Highway Construction" includes various references to construction noise, including Sections 107.6-paragraph 3, 606.3.1.6.3-paragraph 1, 607.3.1.6.3-paragraph 1, 607.3.2.6.3-paragraph 1, and 702.4.15-paragraph 3. The SCDOT specifications cited above are generalized for nuisance noise avoidance. Detailed specifications suggested for consideration for inclusion in the proposed project's construction documents may consist of the following:

- Construction equipment powered by an internal combustion engine shall be equipped with a properly maintained muffler.
- Air compressors shall meet current USEPA noise emission exhaust standards.
- Air powered equipment shall be fitted with pneumatic exhaust silencers.
- Stationary equipment powered by an internal combustion engine shall not be operated within 150 feet of noise sensitive areas without portable noise barriers placed between the equipment and noise sensitive sites. Noise sensitive sites include residential buildings, motels, hotels, schools, churches, hospitals, nursing homes, libraries and public recreation areas.
- Portable noise barriers shall be constructed of plywood or tongue and groove boards with a noise absorbent treatment on the interior surface (facing the equipment).
- Powered construction equipment shall not be operated during the traditional evening and/or sleeping hours within 150 feet of a noise sensitive site, to be decided either by local ordinances and/or agreement with the SCDOT.

Table 7: Leq Noise Level (dBA) at 50 Feet for Construction Equipment	
Equipment	**dBA Leq @ 50 feet**
Earth Moving:	
Front Loader	79
Back Hoe	85
Dozer	80
Tractor	80
Scraper	88
Grader	85
Truck	91
Paver	89
Materials Handling:	
Concrete Mixer	85
Concrete Pump	82
Crane	83
Derrick	88
Stationary:	
Pump	76
Generator	78
Compressor	81
Impact:	
Pile Driver	100
Jackhammer	88
Rock Drill	98
Other:	
Saw	78
Vibrator	76
SOURCE: Grant, Charles A. and Reagan, Jerry, A., *Highway Construction Noise: Measurement, Prediction and Mitigation*	

VII. COORDINATION WITH LOCAL OFFICIALS

SCDOT has no authority over local land use planning and development. SCDOT can only encourage local officials and developers to consider highway traffic noise in the planning, zoning and development of property near existing and proposed highway corridors. The lack of consideration of highway traffic noise in land use planning at the local level has added to the highway traffic noise problem which will continue to grow as development continues adjacent to major highway long after these highways were proposed and/or constructed.

In order to help local officials and developers consider highway traffic noise in the vicinity of proposed Type I project, SCDOT will inform them of the predicted future noise levels

and the required distance from such projects needed to ensure that noise levels remain below the NAC for each type of land use per 23 CFR §772.17. The contour distances to the 66 and 71 dBA sound levels are shown in Table 8. Please note that the values in the table do not represent predicted levels at every location at a particular distance back from the roadway. Sound levels will vary with changes in terrain and will be affected by the shielding of objects such as buildings.

Table 8: Contour Distances (dBA)

NAC Land Use	Impact Contour	Worst-Case Approximate Distance from Edge of Nearest Travel Lane
Category B & C (Residential, outdoor recreation facilities, churches, schools, hospitals, etc.	66 dBA	410 Feet
Category E (Hotels, motels, offices, restaurants/bars, and other developments/activities not included in the other NAC's)	71 dBA	230 Feet
SOURCE: Three Oaks Engineering, August, 2019		

APPENDIX A

Traffic Data

Traffic Data

Existing Traffic 2018								
	I-26 Mainline		Ridgeville Road North of I-26		Ridgeville Road South of I-26		Cypress Campground Road	
Speed	70 mph		45 mph		45 mph		55mph	
Lane Width	4 lanes at 12 feet		2 lanes at 12 feet		2 lanes at 12 feet		2 lanes at 12 feet	
Directional Split	By Traffic Count		By Traffic Count		By Traffic Count		By Traffic Count	
Vehicle Mix	81% Autos + 3% Medium Trucks + 16% Heavy Trucks		98% Autos + 2% Heavy Trucks		98% Autos + 2% Heavy Trucks		98% Autos + 2% Heavy Trucks	
	Eastbound	Westbound	Northbound	Southbound	Northbound	Southbound	Northbound	Southbound
Peak	2470	2439	382	347	487	334	30	30
Autos (per lane)	1,000	988	374	340	477	327	29	29
Medium Trucks (per lane)	37	37	0	0	0	0	0	0
Heavy Trucks (per lane)	198	195	8	7	10	7	1	1
Source: Traffic Report by Stantec 2019								

Existing Traffic 2018 - Ramps & Exits				
	I-26 WB to Ridgeville	Ridgeville to I-26 WB	I-26 EB to Ridgeville	Ridgeville to I-26 EB
Speed	35 mph	35 mph	35 mph	35 mph
Lane Width	1 lane at 12 feet	1 lane at 12 feet	1 lane at 12 feet	1 lane at 12 feet
Directional Split	By Traffic Count	By Traffic Count	By Traffic Count	By Traffic Count
Vehicle Mix	98% Autos + 2% Heavy Trucks	98% Autos + 2% Heavy Trucks	98% Autos + 2% Heavy Trucks	98% Autos + 2% Heavy Trucks
	I-26 WB Exit Ramp	I-26 WB On Ramp	I-26 EB Exit Ramp	I-26 EB On Ramp
Peak	467	143	124	477
Autos (per lane)	458	140	122	467
Medium Trucks (per lane)	0	0	0	0
Heavy Trucks (per lane)	9	3	2	10
Source: Traffic Report by Stantec 2019				

No-Build Design Year 2043 Traffic								
	I-26 Mainline		Ridgeville Road North of I-26		Ridgeville Road South of I-26		Cypress Campground Road	
Speed	70 mph		45 mph		45 mph		55mph	
Lane Width	4 lanes at 12 feet		2 lanes at 12 feet		2 lanes at 12 feet		2 lanes at 12 feet	
Directional Split	By Traffic Count		By Traffic Count		By Traffic Count		By Traffic Count	
Vehicle Mix	81% Autos + 3% Medium Trucks + 16% Heavy Trucks		98% Autos + 2% Heavy Trucks		98% Autos + 2% Heavy Trucks		98% Autos + 2% Heavy Trucks	
	Eastbound	Westbound	Northbound	Southbound	Northbound	Southbound	Northbound	Southbound
AM Peak	2774	2914	549	500	731	511	46	46
Autos	1,123	1,180	538	490	716	501	45	45
Medium Trucks	42	44	0	0	0	0	0	0
Heavy Trucks	222	233	11	10	15	10	1	1
Source: Traffic Report by Stantec 2019								

No-Build Design Year 2043 Traffic - Ramps & Exits				
	I-26 WB to Ridgeville	Ridgeville to I-26 WB	I-26 EB to Ridgeville	Ridgeville to I-26 EB
Speed	35 mph	35 mph	35 mph	35 mph
Lane Width	1 lane at 12 feet	1 lane at 12 feet	1 lane at 12 feet	1 lane at 12 feet
Directional Split	By Traffic Count	By Traffic Count	By Traffic Count	By Traffic Count
Vehicle Mix	98% Autos + 2% Heavy Trucks	98% Autos + 2% Heavy Trucks	98% Autos + 2% Heavy Trucks	98% Autos + 2% Heavy Trucks
	I-26 WB Exit Ramp	I-26 WB On Ramp	I-26 EB Exit Ramp	I-26 EB On Ramp
Peak	497	167	191	687
Autos (per lane)	487	164	187	673
Medium Trucks (per lane)	0	0	0	0
Heavy Trucks (per lane)	10	3	4	14
Source: Traffic Report by Stantec 2019				

Build Design Year 2043 Traffic								
	I-26 Mainline		Ridgeville Road North of I-26		Ridgeville Road South of I-26		Cypress Campground Road	
Speed	70 mph		45 mph		45 mph		55mph	
Lane Width	6 lanes at 12 feet		4 lanes at 12 feet		4 lanes at 12 feet		2 lanes at 12 feet	
Directional Split	By Traffic Count		By Traffic Count		By Traffic Count		By Traffic Count	
Vehicle Mix	81% Autos + 3% Medium Trucks + 16% Heavy Trucks		98% Autos + 2% Heavy Trucks		98% Autos + 2% Heavy Trucks		98% Autos + 2% Heavy Trucks	
	Eastbound	Westbound	Northbound	Southbound	Northbound	Southbound	Northbound	Southbound
AM Peak	2774	2914	549	500	731	511	46	46
Autos	749	787	269	245	358	250	45	45
Medium Trucks	28	29	0	0	0	0	0	0
Heavy Trucks	148	155	5	5	7	5	1	1
Source: Traffic Report by Stantec 2019								

Build Design Year 2043 Traffic - Ramps & Exits				
	I-26 WB to Ridgeville	Ridgeville to I-26 WB	I-26 EB to Ridgeville	Ridgeville to I-26 EB
Speed	35 mph	35 mph	35 mph	35 mph
Lane Width	2 lane at 12 feet	2 lane at 12 feet	2 lane at 12 feet	2 lane at 12 feet
Directional Split	By Traffic Count	By Traffic Count	By Traffic Count	By Traffic Count
Vehicle Mix	98% Autos + 2% Heavy Trucks	98% Autos + 2% Heavy Trucks	98% Autos + 2% Heavy Trucks	98% Autos + 2% Heavy Trucks
	I-26 WB Exit Ramp	I-26 WB On Ramp	I-26 EB Exit Ramp	I-26 EB On Ramp
Peak	497	167	191	687
Autos (per lane)	244	82	94	337
Medium Trucks (per lane)	0	0	0	0
Heavy Trucks (per lane)	5	2	2	7
Source: Traffic Report by Stantec 2019				

2043 Traffic - Volvo Ramps & Exits				
	I-26 WB to Volvo - Ramp 2	Volvo to I-26 WB - Ramp 3	I-26 EB to Volvo - Ramp 1	Volvo to I-26 EB - Ramp 4
Speed	45 mph	45 mph	45 mph	45 mph
Lane Width	2 lanes at 12 feet	1 lane at 16 feet	1 lane at 16 feet	2 lanes at 12 feet
Directional Split	By Traffic Count	By Traffic Count	By Traffic Count	By Traffic Count
Vehicle Mix	80% Autos + 6% Heavy Trucks	80% Autos + 6% Heavy Trucks +	80% Autos + 6% Heavy Trucks +	80% Autos + 6% Heavy Trucks + 14%
	I-26 WB Exit Ramp	I-26 WB On Ramp	I-26 EB Exit Ramp	I-26 EB On Ramp
Peak	743	125	186	623
Autos (per lane)	297	100	149	249
Medium Trucks (per lane)	52	18	26	44
Heavy Trucks (per lane)	22	8	11	19
Source: Traffic Report by Stantec 2019				

APPENDIX B

Field Measurement Data Sheets

NOISE SURVEY SHEET

EQUIPMENT: METER NL-52 CALIBRATOR NC-74

CALIBRATION: START 93.7 dB END 93.6 dB

RESPONSE: FAST ✓ SLOW _____ A-WEIGHTING ✓ BATTERY CHECK ✓

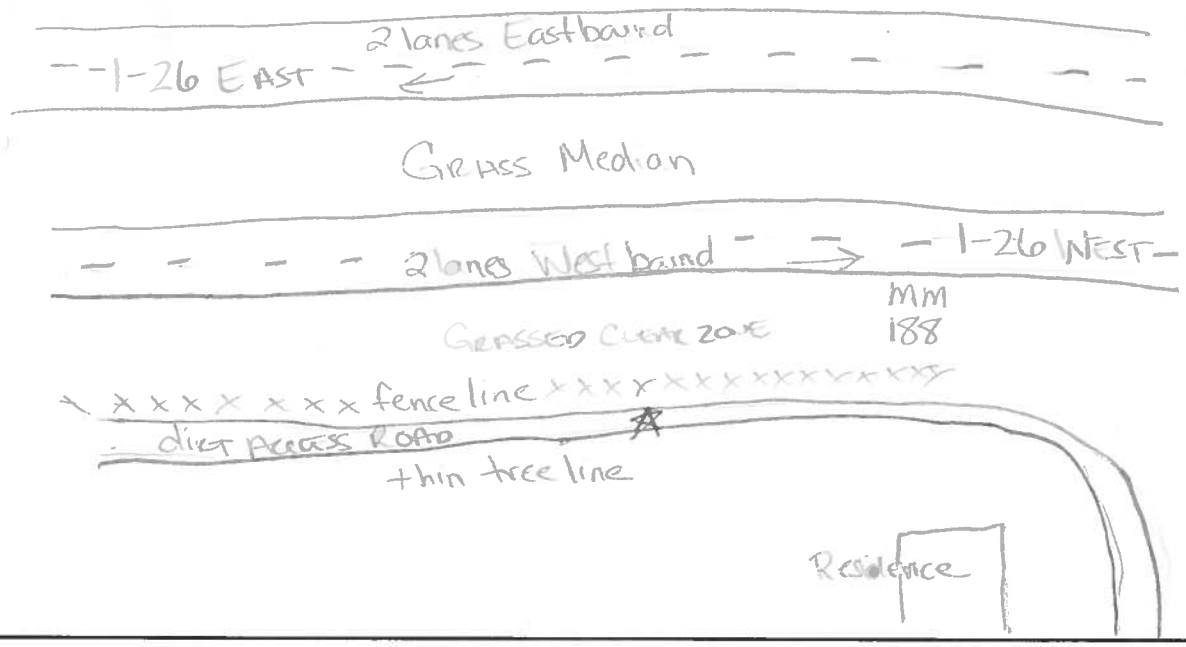
WEATHER DATA: Clear, but Cloudy, 72°

Site	Time Period	Hourly Traffic Based on Concurrent Traffic Counts										Measured Leq
		Eastbound Lanes					*Westbound Lanes*					
		Autos	MT	HT	Bus	MC	Autos	MT	HT	Bus	MC	
#1	7:35 AM 7:50 AM	293	23	03	0	0	301	29	70	0	4	74.4

MT = Medium Trucks | HT = Heavy Trucks | MC = Motorcycles

NOTES: Speed Limit 70 MPH

SITE SKETCH



BACKGROUND NOISE: Insects, Birds

MAJOR SOURCES: I-26

UNUSUAL EVENTS:

OTHER NOTES: Video of Traffic to make Accurate Counts

NOISE SURVEY SHEET

EQUIPMENT: METER NL-52 CALIBRATOR NC-74

CALIBRATION: START 93.7 dB END 93.7 dB

RESPONSE: FAST ✓ SLOW ____ A-WEIGHTING ✓ BATTERY CHECK ✓

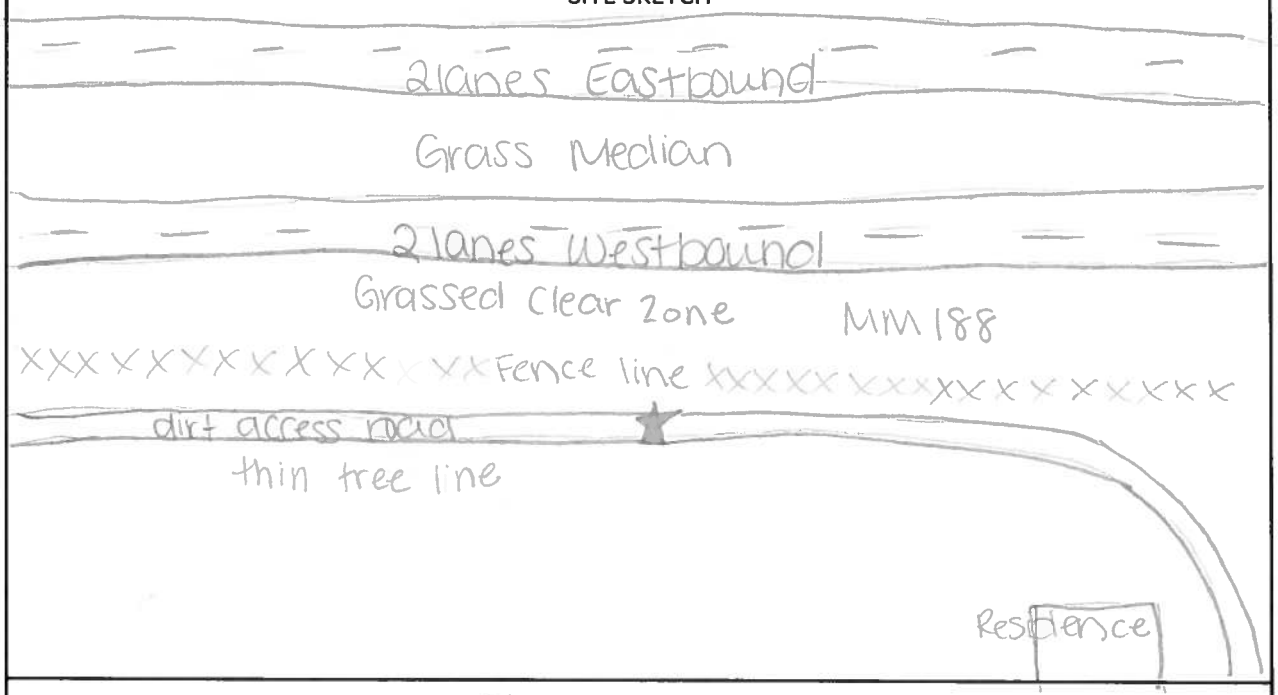
WEATHER DATA: 73° F, 90% humidity, Mostly cloudy, light thunder

Site	Time Period	Hourly Traffic Based on Concurrent Traffic Counts										Measured Leq
		Eastbound Lanes					*Westbound Lanes*					
		Autos	MT	HT	Bus	MC	Autos	MT	HT	Bus	MC	
#1	5:17 5:32pm	413	9	30	2	0	430	13	48	2	0	74.0

MT = Medium Trucks | HT = Heavy Trucks | MC = Motorcycles

NOTES: Speed limit 70 MPH

SITE SKETCH



BACKGROUND NOISE: insects, light thunder

MAJOR SOURCES: I-216

UNUSUAL EVENTS:

OTHER NOTES:

THREE OAKS ENGINEERING

NOISE SURVEY SHEET

EQUIPMENT: METER NL-52 CALIBRATOR NC-74

CALIBRATION: START 93.7 dB END 93.7 dB

RESPONSE: FAST ✓ SLOW _____ A-WEIGHTING ✓ BATTERY CHECK ✓

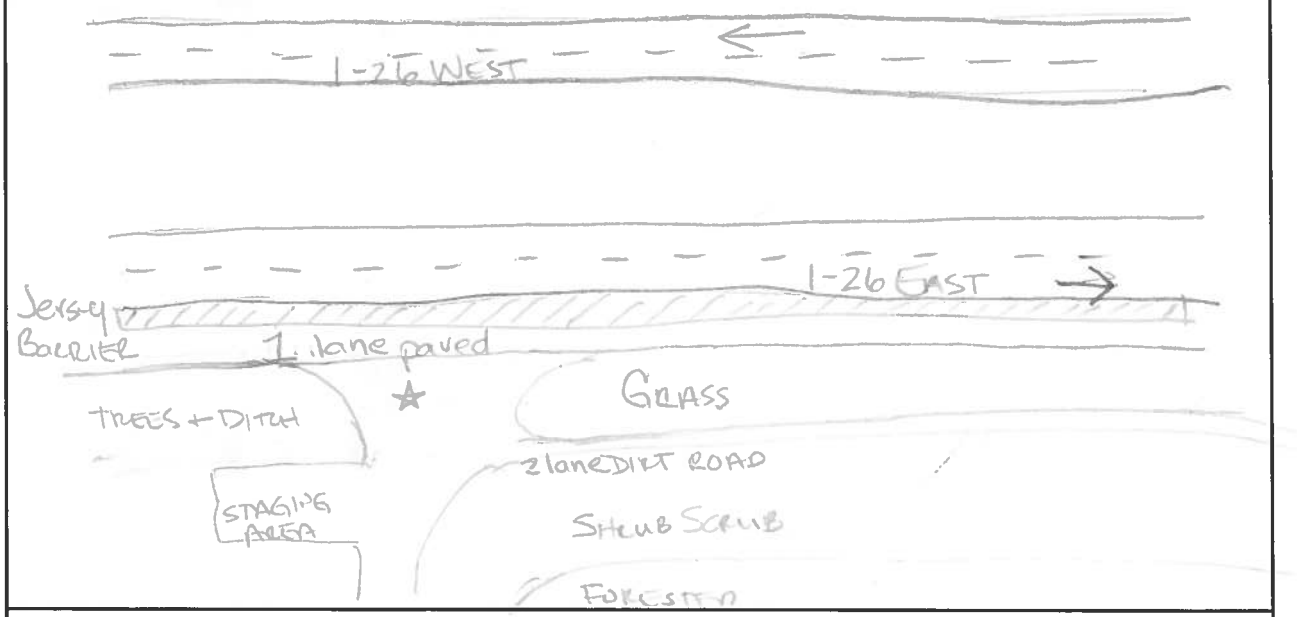
WEATHER DATA: 75° Mostly Cloudy

Site	Time Period	Hourly Traffic Based on Concurrent Traffic Counts										Measured Leq
		Eastbound Lanes					*Westbound Lanes*					
		Autos	MT	HT	Bus	MC	Autos	MT	HT	Bus	MC	
#2	8:17AM-8:32AM	280	11	91	0	0	397	12	68	0	0	73.1

MT = Medium Trucks | HT = Heavy Trucks | MC = Motorcycles

NOTES: Speed limit 70mph

SITE SKETCH



BACKGROUND NOISE: Insects

MAJOR SOURCES: I-26

UNUSUAL EVENTS: car horn @ 8:22AM

OTHER NOTES: VIDEO OF TRAFFIC FOR ACCURACY

THREE OAKS ENGINEERING

NOISE SURVEY SHEET

EQUIPMENT: METER NL-52 CALIBRATOR NC-74

CALIBRATION: START 93.7 dB END 93.7 dB

RESPONSE: FAST ✓ SLOW _____ A-WEIGHTING ✓ BATTERY CHECK ✓

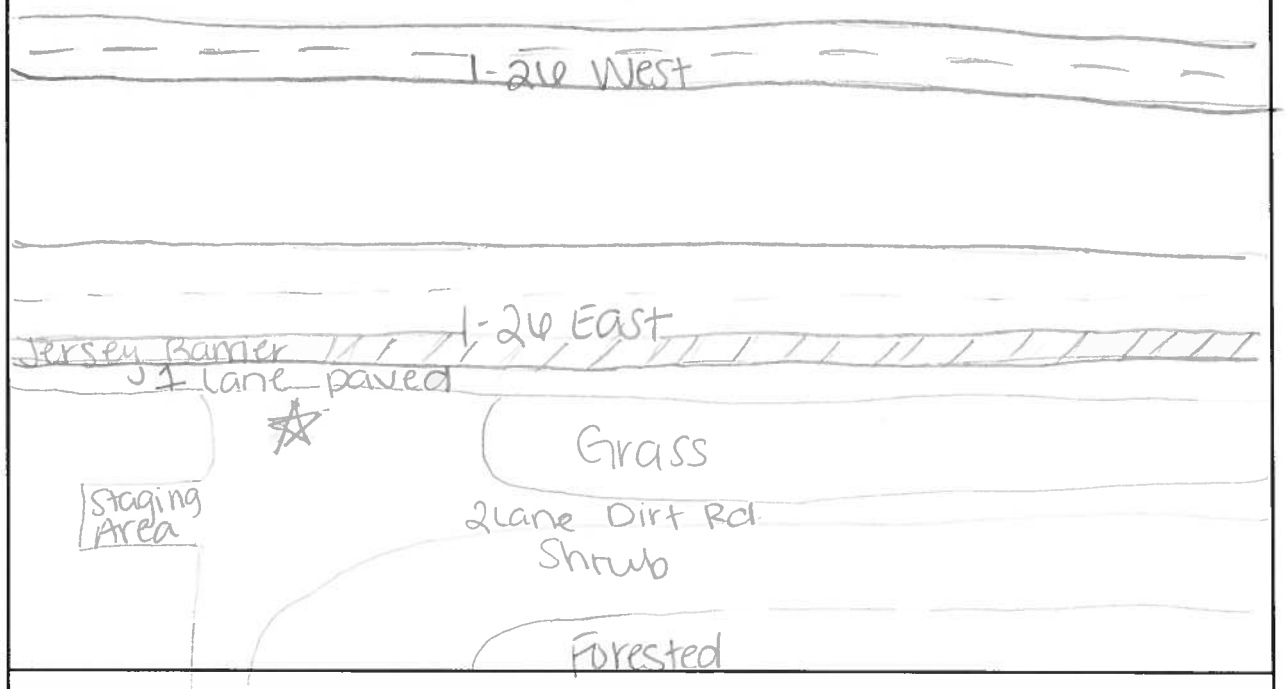
WEATHER DATA: 73°F, mostly cloudy

Site	Time Period	Hourly Traffic Based on Concurrent Traffic Counts										Measured Leq
		Eastbound Lanes					*Westbound Lanes*					
		Autos	MT	HT	Bus	MC	Autos	MT	HT	Bus	MC	
#2	4:20-4:35pm	388	10	48	1	0	390	8	58	0	0	72.3

MT = Medium Trucks | HT = Heavy Trucks | MC = Motorcycles

NOTES: Speed limit 70 mph

SITE SKETCH



BACKGROUND NOISE: Insects

MAJOR SOURCES: I-26

UNUSUAL EVENTS:

OTHER NOTES:

THREE OAKS ENGINEERING

NOISE SURVEY SHEET

EQUIPMENT: METER NL-52 CALIBRATOR NC-74

CALIBRATION: START 93.7 dB END 93.7 dB

RESPONSE: FAST ✓ SLOW _____ A-WEIGHTING ✓ BATTERY CHECK ✓

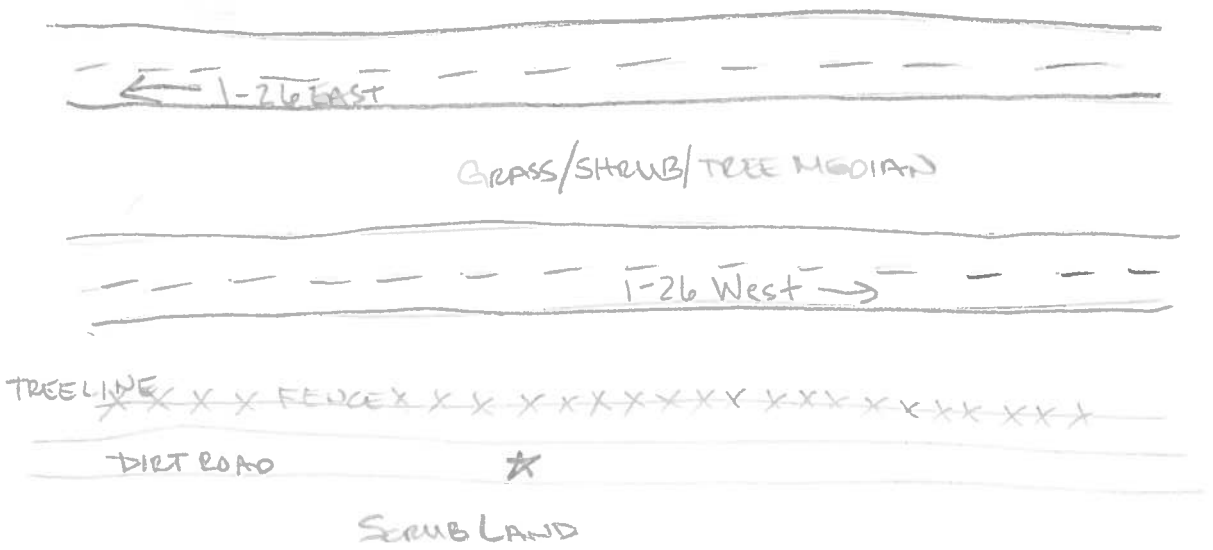
WEATHER DATA: Sunny + Cloudy 76°

Site	Time Period	Hourly Traffic Based on Concurrent Traffic Counts										Measured Leq
		Eastbound Lanes					*Westbound Lanes*					
		Autos	MT	HT	Bus	MC	Autos	MT	HT	Bus	MC	
#3	8:49AM-9:04AM	–	–	–	–	–	329	22	95	0	0	72.3

MT = Medium Trucks | HT = Heavy Trucks | MC = Motorcycles

NOTES: East bound lanes obstructed view from tree median
speed limit 70 mph

SITE SKETCH



BACKGROUND NOISE: Insects

MAJOR SOURCES: I-26

UNUSUAL EVENTS:

OTHER NOTES: Video of Traffic to make accurate counts

THREE OAKS ENGINEERING

NOISE SURVEY SHEET

EQUIPMENT: METER NL-52 CALIBRATOR NC-74

CALIBRATION: START 93.7 dB END 93.7 dB

RESPONSE: FAST ✓ SLOW ____ A-WEIGHTING ✓ BATTERY CHECK ✓

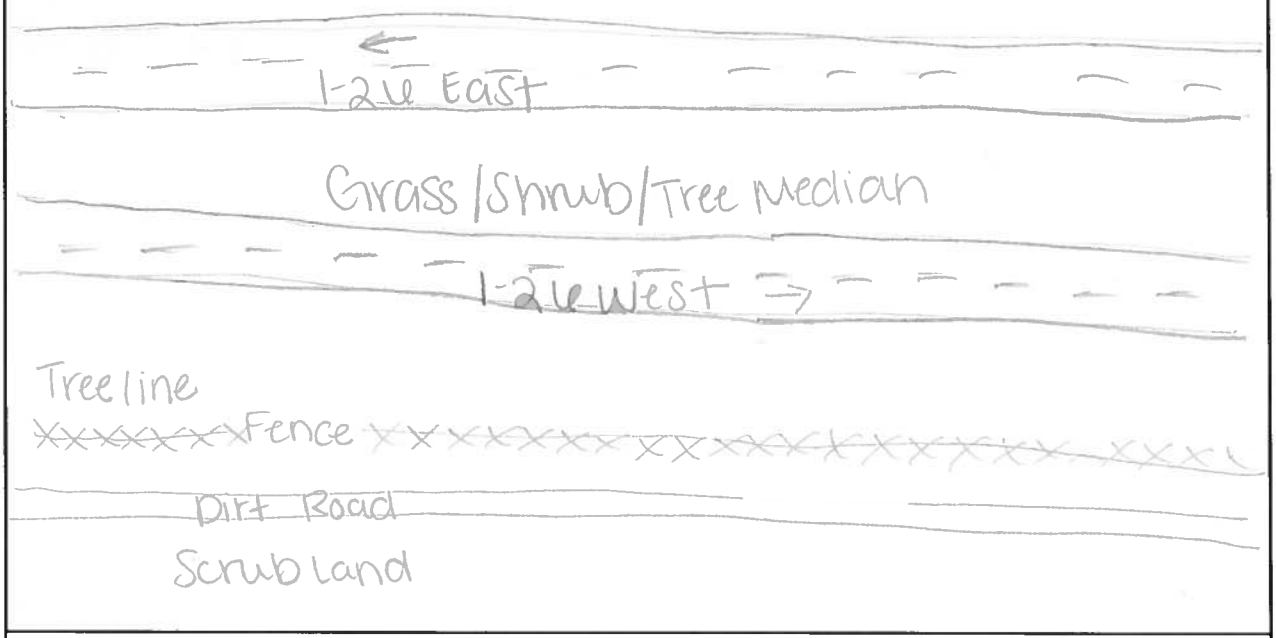
WEATHER DATA: 73°F, mostly cloudy

Site	Time Period	Hourly Traffic Based on Concurrent Traffic Counts										Measured Leq
		Eastbound Lanes					*Westbound Lanes*					
		Autos	MT	HT	Bus	MC	Autos	MT	HT	Bus	MC	
#3	4:45-5:00pm	-	-	-	-	-	365	11	55	0	0	72.3

MT = Medium Trucks | HT = Heavy Trucks | MC = Motorcycles

NOTES: Eastbound lanes obstructed from view
Speed limit 70 mph

SITE SKETCH



BACKGROUND NOISE: Insects

MAJOR SOURCES: I-26

UNUSUAL EVENTS:

OTHER NOTES:

THREE OAKS ENGINEERING

APPENDIX C

Feasible and Reasonable Worksheets

SCDOT Feasibility and Reasonableness Worksheet

Date: June 2019

Project Name I-26 Widening MM 187 - 194 Berkeley County

Highway Traffic Noise Abatement Measure Barrier 1 - Receiver 3

Feasibility

Number of Impacted Receivers: 1

Number of Benefited Receivers: 1

Percentage of Impacted Receivers that would achieve a 5 dBA reduction from the proposed noise abatement measure: 100

Is the proposed noise abatement measure acoustically feasible?
NOTE:SCDOT Policy indicates that 75% of the impacted receivers must achieve at least a 5 dBA reduction for it to be acoustically feasible.

☒ Yes ☐ No

Would any of the following issues limit the ability of the abatement measure to achieve the noise reduction goal?

Topography	☐ Yes	☒ No
Safety	☐ Yes	☒ No
Drainage	☐ Yes	☒ No
Utilities	☐ Yes	☒ No
Maintenance	☐ Yes	☒ No
Access	☒ Yes	☐ No
Exposed Height of Wall	☐ Yes	☒ No

If "Yes" was marked for any of the questions above, please explain below.

Current access inhibits extending the barrier any further.

Reasonableness

According to 23 CFR 772.13(d)(2)(iv) the abatement measure must collectively achieve each of these criteria to be reasonable. Therefore if any of the three mandatory reasonable factors are not achieved, then the abatement measure is determined NOT to be reasonable. When completing the form it is not necessary to detail each of the criteria if one was determined not to be reasonable.

#1: Noise Reduction Design Goal

Number of Benefited Receivers: 1

Number of Benefited Receivers that achieve at least an 8 dBA reduction: 0

Percentage of Benefited Receivers in the first two building rows that would achieve at least a 8 dBA reduction from the proposed noise abatement measure. NOTE: SCDOT Policy indicates that 80% of the benefited receivers in the first two building rows must achieve at least a 8 dBA reduction for it to be reasonable.: 0

Does the proposed noise abatement measure meet the noise reduction design goal? ☐ Yes ☒ No

If "Yes" is marked, continue to #2. If "No" is marked, then abatement is determined NOT to be reasonable.

#2: Cost Effectiveness

Estimated cost per square foot for noise abatement measure:

Estimated construction cost for noise abatement measure:

Estimated cost per Benefited Receiver:

Based on the SCDOT policy of $30,000 per Benefited Receiver, would the abatement measure be reasonable? NOTE: SCDOT Policy states that the preliminary noise analysis is based on $35.00 per square foot and a more project-specific construction cost should be applied at a cost per square foot basis during the detailed noise abatement evaluation. ☐ Yes ☐ No

If "Yes" is marked, continue to #3. If "No" is marked, then abatement is determined NOT to be reasonable.

#3: Viewpoints of the property owners and residents of the benefitted receivers

Number of Benefited Receivers (same as above):

Number of Benefited Receivers in **support** of noise abatement measure:

Percentage of Benefited Receivers in **support** of noise abatement measure:

Number of Benefited Receivers **opposed** to noise abatement measure:

Percentage of Benefited Receivers **opposed** to noise abatement measure:

Number of Benefited Receivers **that did not respond** to solicitation on noise abatement measure:

Percentage of Benefited Receivers **that did not respond** to solicitation on noise abatement measure:

Based on the viewpoints of the property owners and residents of the Benefited Receivers, would the abatement measure be reasonable? NOTE: SCDOT Policy indicates that the noise abatement shall be constructed unless greater than 50% of the benefited receptors are opposed to noise abatement. ☐ Yes ☐ No

Final Determination for Noise Abatement Measure
Feasible, but not reasonable.

SCDOT Feasibility and Reasonableness Worksheet

Date: June 2019

Project Name I-26 Widening MM 187 - 194 Berkeley County

Highway Traffic Noise Abatement Measure Barrier 2 - Receiver 15, 16, 17, & 19

Feasibility

Number of Impacted Receivers: 4

Number of Benefited Receivers: 3

Percentage of Impacted Receivers that would achieve a 5 dBA reduction from the proposed noise abatement measure: 75

Is the proposed noise abatement measure acoustically feasible?
NOTE:SCDOT Policy indicates that 75% of the impacted receivers must achieve at least a 5 dBA reduction for it to be acoustically feasible. ☒ Yes ☐ No

Would any of the following issues limit the ability of the abatement measure to achieve the noise reduction goal?

Topography	☐ Yes	☒ No
Safety	☐ Yes	☒ No
Drainage	☐ Yes	☒ No
Utilities	☐ Yes	☒ No
Maintenance	☐ Yes	☒ No
Access	☐ Yes	☒ No
Exposed Height of Wall	☐ Yes	☒ No

If "Yes" was marked for any of the questions above, please explain below.

Detailed Description

Reasonableness

According to 23 CFR 772.13(d)(2)(iv) the abatement measure must collectively achieve each of these criteria to be reasonable. Therefore if any of the three mandatory reasonable factors are not achieved, then the abatement measure is determined NOT to be reasonable. When completing the form it is not necessary to detail each of the criteria if one was determined not to be reasonable.

#1: Noise Reduction Design Goal

Number of Benefited Receivers: 3

Number of Benefited Receivers that achieve at least an 8 dBA reduction: 2

Percentage of Benefited Receivers in the first two building rows that would achieve at least a 8 dBA reduction from the proposed noise abatement measure. NOTE: SCDOT Policy indicates that 80% of the benefited receivers in the first two building rows must achieve at least a 8 dBA reduction for it to be reasonable.: 67

Does the proposed noise abatement measure meet the noise reduction design goal? ☐ Yes ☒ No

If "Yes" is marked, continue to #2. If "No" is marked, then abatement is determined NOT to be reasonable.

#2: Cost Effectiveness

Estimated cost per square foot for noise abatement measure:

Estimated construction cost for noise abatement measure:

Estimated cost per Benefited Receiver:

Based on the SCDOT policy of $30,000 per Benefited Receiver, would the abatement measure be reasonable? NOTE: SCDOT Policy states that the preliminary noise analysis is based on $35.00 per square foot and a more project-specific construction cost should be applied at a cost per square foot basis during the detailed noise abatement evaluation. ☐ Yes ☐ No

If "Yes" is marked, continue to #3. If "No" is marked, then abatement is determined NOT to be reasonable.

#3: Viewpoints of the property owners and residents of the benefitted receivers

Number of Benefited Receivers (same as above):

Number of Benefited Receivers in **support** of noise abatement measure:

Percentage of Benefited Receivers in **support** of noise abatement measure:

Number of Benefited Receivers **opposed** to noise abatement measure:

Percentage of Benefited Receivers **opposed** to noise abatement measure:

Number of Benefited Receivers **that did not respond** to solicitation on noise abatement measure:

Percentage of Benefited Receivers **that did not respond** to solicitation on noise abatement measure:

Based on the viewpoints of the property owners and residents of the Benefited Receivers, would the abatement measure be reasonable? NOTE: SCDOT Policy indicates that the noise abatement shall be constructed unless greater than 50% of the benefited receptors are opposed to noise abatement. ☐ Yes ☐ No

Final Determination for Noise Abatement Measure
Feasible, but not reasonable.

SCDOT Feasibility and Reasonableness Worksheet

Date: June 2019

Project Name I-26 Widening MM 187 - 194 Berkeley County

Highway Traffic Noise Abatement Measure Barrier 3 - Receiver 63 & 65

Feasibility

Number of Impacted Receivers: 2

Number of Benefited Receivers: 2

Percentage of Impacted Receivers that would achieve a 5 dBA reduction from the proposed noise abatement measure: 100

Is the proposed noise abatement measure acoustically feasible?
NOTE:SCDOT Policy indicates that 75% of the impacted receivers must achieve at least a 5 dBA reduction for it to be acoustically feasible.

☒ Yes ☐ No

Would any of the following issues limit the ability of the abatement measure to achieve the noise reduction goal?

Topography	☐ Yes	☒ No
Safety	☐ Yes	☒ No
Drainage	☐ Yes	☒ No
Utilities	☐ Yes	☒ No
Maintenance	☐ Yes	☒ No
Access	☐ Yes	☒ No
Exposed Height of Wall	☐ Yes	☒ No

If "Yes" was marked for any of the questions above, please explain below.

Detailed Description

Reasonableness

According to 23 CFR 772.13(d)(2)(iv) the abatement measure must collectively achieve each of these criteria to be reasonable. Therefore if any of the three mandatory reasonable factors are not achieved, then the abatement measure is determined NOT to be reasonable. When completing the form it is not necessary to detail each of the criteria if one was determined not to be reasonable.

#1: Noise Reduction Design Goal

Number of Benefited Receivers: 2

Number of Benefited Receivers that achieve at least an 8 dBA reduction: 0

Percentage of Benefited Receivers in the first two building rows that would achieve at least a 8 dBA reduction from the proposed noise abatement measure. NOTE: SCDOT Policy indicates that 80% of the benefited receivers in the first two building rows must achieve at least a 8 dBA reduction for it to be reasonable.: 0

Does the proposed noise abatement measure meet the noise reduction design goal? ☐ Yes ☒ No

If "Yes" is marked, continue to #2. If "No" is marked, then abatement is determined NOT to be reasonable.

#2: Cost Effectiveness

Estimated cost per square foot for noise abatement measure:

Estimated construction cost for noise abatement measure:

Estimated cost per Benefited Receiver:

Based on the SCDOT policy of $30,000 per Benefited Receiver, would the abatement measure be reasonable? NOTE: SCDOT Policy states that the preliminary noise analysis is based on $35.00 per square foot and a more project-specific construction cost should be applied at a cost per square foot basis during the detailed noise abatement evaluation. ☐ Yes ☐ No

If "Yes" is marked, continue to #3. If "No" is marked, then abatement is determined NOT to be reasonable.

#3: Viewpoints of the property owners and residents of the benefitted receivers

Number of Benefited Receivers (same as above):

Number of Benefited Receivers **in support** of noise abatement measure:

Percentage of Benefited Receivers in **support** of noise abatement measure:

Number of Benefited Receivers **opposed** to noise abatement measure:

Percentage of Benefited Receivers **opposed** to noise abatement measure:

Number of Benefited Receivers **that did not respond** to solicitation on noise abatement measure:

Percentage of Benefited Receivers **that did not respond** to solicitation on noise abatement measure:

Based on the viewpoints of the property owners and residents of the Benefited Receivers, would the abatement measure be reasonable? NOTE: SCDOT Policy indicates that the noise abatement shall be constructed unless greater than 50% of the benefited receptors are opposed to noise abatement. ☐ Yes ☐ No

Final Determination for Noise Abatement Measure
Feasible, but not reasonable.

SCDOT Feasibility and Reasonableness Worksheet

Date: June 2019

Project Name I-26 Widening MM 187 - 194 Berkeley County

Highway Traffic Noise Abatement Measure Barrier 4 - Receiver 64

Feasibility

Number of Impacted Receivers: 1

Number of Benefited Receivers: 1

Percentage of Impacted Receivers that would achieve a 5 dBA reduction from the proposed noise abatement measure: 100

Is the proposed noise abatement measure acoustically feasible?
NOTE:SCDOT Policy indicates that 75% of the impacted receivers must achieve at least a 5 dBA reduction for it to be acoustically feasible.

☒ Yes ☐ No

Would any of the following issues limit the ability of the abatement measure to achieve the noise reduction goal?

Topography	☐ Yes	☒ No
Safety	☐ Yes	☒ No
Drainage	☐ Yes	☒ No
Utilities	☐ Yes	☒ No
Maintenance	☐ Yes	☒ No
Access	☐ Yes	☒ No
Exposed Height of Wall	☐ Yes	☒ No

If "Yes" was marked for any of the questions above, please explain below.

Detailed Description

Reasonableness

According to 23 CFR 772.13(d)(2)(iv) the abatement measure must collectively achieve each of these criteria to be reasonable. Therefore if any of the three mandatory reasonable factors are not achieved, then the abatement measure is determined NOT to be reasonable. When completing the form it is not necessary to detail each of the criteria if one was determined not to be reasonable.

#1: Noise Reduction Design Goal

Number of Benefited Receivers: 1

Number of Benefited Receivers that achieve at least an 8 dBA reduction: 0

Percentage of Benefited Receivers in the first two building rows that would achieve at least a 8 dBA reduction from the proposed noise abatement measure. NOTE: SCDOT Policy indicates that 80% of the benefited receivers in the first two building rows must achieve at least a 8 dBA reduction for it to be reasonable.: 0

Does the proposed noise abatement measure meet the noise reduction design goal? ☐ Yes ☒ No

If "Yes" is marked, continue to #2. If "No" is marked, then abatement is determined NOT to be reasonable.

#2: Cost Effectiveness

Estimated cost per square foot for noise abatement measure:

Estimated construction cost for noise abatement measure:

Estimated cost per Benefited Receiver:

Based on the SCDOT policy of $30,000 per Benefited Receiver, would the abatement measure be reasonable? NOTE: SCDOT Policy states that the preliminary noise analysis is based on $35.00 per square foot and a more project-specific construction cost should be applied at a cost per square foot basis during the detailed noise abatement evaluation. ☐ Yes ☐ No

If "Yes" is marked, continue to #3. If "No" is marked, then abatement is determined NOT to be reasonable.

#3: Viewpoints of the property owners and residents of the benefitted receivers

Number of Benefited Receivers (same as above):

Number of Benefited Receivers in **support** of noise abatement measure:

Percentage of Benefited Receivers in **support** of noise abatement measure:

Number of Benefited Receivers **opposed** to noise abatement measure:

Percentage of Benefited Receivers **opposed** to noise abatement measure:

Number of Benefited Receivers **that did not respond** to solicitation on noise abatement measure:

Percentage of Benefited Receivers **that did not respond** to solicitation on noise abatement measure:

Based on the viewpoints of the property owners and residents of the Benefited Receivers, would the abatement measure be reasonable? NOTE: SCDOT Policy indicates that the noise abatement shall be constructed unless greater than 50% of the benefited receptors are opposed to noise abatement. ☐ Yes ☐ No

Final Determination for Noise Abatement Measure
Feasible, but not reasonable.

SCDOT Feasibility and Reasonableness Worksheet

Date: June 2019

Project Name I-26 Widening MM 187 - 194 Berkeley County

Highway Traffic Noise Abatement Measure Barrier 5 - Receiver 80

Feasibility

Number of Impacted Receivers: 1

Number of Benefited Receivers: 1

Percentage of Impacted Receivers that would achieve a 5 dBA reduction from the proposed noise abatement measure: 100

Is the proposed noise abatement measure acoustically feasible?
NOTE:SCDOT Policy indicates that 75% of the impacted receivers must achieve at least a 5 dBA reduction for it to be acoustically feasible.

☒ Yes ☐ No

Would any of the following issues limit the ability of the abatement measure to achieve the noise reduction goal?

Topography	☐ Yes	☒ No
Safety	☐ Yes	☒ No
Drainage	☐ Yes	☒ No
Utilities	☐ Yes	☒ No
Maintenance	☐ Yes	☒ No
Access	☐ Yes	☒ No
Exposed Height of Wall	☐ Yes	☒ No

If "Yes" was marked for any of the questions above, please explain below.

Detailed Description

Reasonableness

According to 23 CFR 772.13(d)(2)(iv) the abatement measure must collectively achieve each of these criteria to be reasonable. Therefore if any of the three mandatory reasonable factors are not achieved, then the abatement measure is determined NOT to be reasonable. When completing the form it is not necessary to detail each of the criteria if one was determined not to be reasonable.

#1: Noise Reduction Design Goal

Number of Benefited Receivers: 1

Number of Benefited Receivers that achieve at least an 8 dBA reduction: 0

Percentage of Benefited Receivers in the first two building rows that would achieve at least a 8 dBA reduction from the proposed noise abatement measure. NOTE: SCDOT Policy indicates that 80% of the benefited receivers in the first two building rows must achieve at least a 8 dBA reduction for it to be reasonable.: 0

Does the proposed noise abatement measure meet the noise reduction design goal? ☐ Yes ☒ No

If "Yes" is marked, continue to #2. If "No" is marked, then abatement is determined NOT to be reasonable.

#2: Cost Effectiveness

Estimated cost per square foot for noise abatement measure:

Estimated construction cost for noise abatement measure:

Estimated cost per Benefited Receiver:

Based on the SCDOT policy of $30,000 per Benefited Receiver, would the abatement measure be reasonable? NOTE: SCDOT Policy states that the preliminary noise analysis is based on $35.00 per square foot and a more project-specific construction cost should be applied at a cost per square foot basis during the detailed noise abatement evaluation. ☐ Yes ☐ No

If "Yes" is marked, continue to #3. If "No" is marked, then abatement is determined NOT to be reasonable.

#3: Viewpoints of the property owners and residents of the benefitted receivers

Number of Benefited Receivers (same as above):

Number of Benefited Receivers **in support** of noise abatement measure:

Percentage of Benefited Receivers **in support** of noise abatement measure:

Number of Benefited Receivers **opposed** to noise abatement measure:

Percentage of Benefited Receivers **opposed** to noise abatement measure:

Number of Benefited Receivers **that did not respond** to solicitation on noise abatement measure:

Percentage of Benefited Receivers **that did not respond** to solicitation on noise abatement measure:

Based on the viewpoints of the property owners and residents of the Benefited Receivers, would the abatement measure be reasonable? NOTE: SCDOT Policy indicates that the noise abatement shall be constructed unless greater than 50% of the benefited receptors are opposed to noise abatement. ☐ Yes ☐ No

Final Determination for Noise Abatement Measure
Feasible, but not reasonable.

SCDOT Feasibility and Reasonableness Worksheet

Date: June 2019

Project Name I-26 Widening MM 187 - 194 Berkeley County

Highway Traffic Noise Abatement Measure Barrier 6 - Receiver 81-83

Feasibility

Number of Impacted Receivers: 3

Number of Benefited Receivers: 3

Percentage of Impacted Receivers that would achieve a 5 dBA reduction from the proposed noise abatement measure: 100

Is the proposed noise abatement measure acoustically feasible?
NOTE:SCDOT Policy indicates that 75% of the impacted receivers must achieve at least a 5 dBA reduction for it to be acoustically feasible.

☒ Yes ☐ No

Would any of the following issues limit the ability of the abatement measure to achieve the noise reduction goal?

Topography	☐ Yes	☒ No
Safety	☐ Yes	☒ No
Drainage	☐ Yes	☒ No
Utilities	☐ Yes	☒ No
Maintenance	☐ Yes	☒ No
Access	☐ Yes	☒ No
Exposed Height of Wall	☐ Yes	☒ No

If "Yes" was marked for any of the questions above, please explain below.

Detailed Description

Reasonableness

According to 23 CFR 772.13(d)(2)(iv) the abatement measure must collectively achieve each of these criteria to be reasonable. Therefore if any of the three mandatory reasonable factors are not achieved, then the abatement measure is determined NOT to be reasonable. When completing the form it is not necessary to detail each of the criteria if one was determined not to be reasonable.

#1: Noise Reduction Design Goal

Number of Benefited Receivers: 3

Number of Benefited Receivers that achieve at least an 8 dBA reduction: 3

Percentage of Benefited Receivers in the first two building rows that would achieve at least a 8 dBA reduction from the proposed noise abatement measure. NOTE: SCDOT Policy indicates that 80% of the benefited receivers in the first two building rows must achieve at least a 8 dBA reduction for it to be reasonable.: 100

Does the proposed noise abatement measure meet the noise reduction design goal? ☒ Yes ☐ No

If "Yes" is marked, continue to #2. If "No" is marked, then abatement is determined NOT to be reasonable.

#2: Cost Effectiveness

Estimated cost per square foot for noise abatement measure: 35

Estimated construction cost for noise abatement measure: 976,920

Estimated cost per Benefited Receiver: 325,640

Based on the SCDOT policy of $30,000 per Benefited Receiver, would the abatement measure be reasonable? NOTE: SCDOT Policy states that the preliminary noise analysis is based on $35.00 per square foot and a more project-specific construction cost should be applied at a cost per square foot basis during the detailed noise abatement evaluation. ☐ Yes ☒ No

If "Yes" is marked, continue to #3. If "No" is marked, then abatement is determined NOT to be reasonable.

#3: Viewpoints of the property owners and residents of the benefitted receivers

Number of Benefited Receivers (same as above):

Number of Benefited Receivers **in support** of noise abatement measure:

Percentage of Benefited Receivers **in support** of noise abatement measure:

Number of Benefited Receivers **opposed** to noise abatement measure:

Percentage of Benefited Receivers **opposed** to noise abatement measure:

Number of Benefited Receivers **that did not respond** to solicitation on noise abatement measure:

Percentage of Benefited Receivers **that did not respond** to solicitation on noise abatement measure:

Based on the viewpoints of the property owners and residents of the Benefited Receivers, would the abatement measure be reasonable? NOTE: SCDOT Policy indicates that the noise abatement shall be constructed unless greater than 50% of the benefited receptors are opposed to noise abatement. ☐ Yes ☐ No

Final Determination for Noise Abatement Measure
Feasible, but not reasonable.

SCDOT Feasibility and Reasonableness Worksheet

Date: June 2019

Project Name I-26 Widening MM 187 - 194 Berkeley County

Highway Traffic Noise Abatement Measure Barrier 7 - Receiver 84-85

Feasibility

Number of Impacted Receivers: 2

Number of Benefited Receivers: 2

Percentage of Impacted Receivers that would achieve a 5 dBA reduction from the proposed noise abatement measure: 100

Is the proposed noise abatement measure acoustically feasible?
NOTE:SCDOT Policy indicates that 75% of the impacted receivers must achieve at least a 5 dBA reduction for it to be acoustically feasible.

☒ Yes ☐ No

Would any of the following issues limit the ability of the abatement measure to achieve the noise reduction goal?

Topography	☐ Yes	☒ No
Safety	☐ Yes	☒ No
Drainage	☐ Yes	☒ No
Utilities	☐ Yes	☒ No
Maintenance	☐ Yes	☒ No
Access	☐ Yes	☒ No
Exposed Height of Wall	☐ Yes	☒ No

If "Yes" was marked for any of the questions above, please explain below.

Detailed Description

Reasonableness

According to 23 CFR 772.13(d)(2)(iv) the abatement measure must collectively achieve each of these criteria to be reasonable. Therefore if any of the three mandatory reasonable factors are not achieved, then the abatement measure is determined NOT to be reasonable. When completing the form it is not necessary to detail each of the criteria if one was determined not to be reasonable.

#1: Noise Reduction Design Goal

Number of Benefited Receivers: 2

Number of Benefited Receivers that achieve at least an 8 dBA reduction: 2

Percentage of Benefited Receivers in the first two building rows that would achieve at least a 8 dBA reduction from the proposed noise abatement measure. NOTE: SCDOT Policy indicates that 80% of the benefited receivers in the first two building rows must achieve at least a 8 dBA reduction for it to be reasonable.: 100

Does the proposed noise abatement measure meet the noise reduction design goal? ☒ Yes ☐ No

If "Yes" is marked, continue to #2. If "No" is marked, then abatement is determined NOT to be reasonable.

#2: Cost Effectiveness

Estimated cost per square foot for noise abatement measure: 35

Estimated construction cost for noise abatement measure: 997,955

Estimated cost per Benefited Receiver: 498,977.5

Based on the SCDOT policy of $30,000 per Benefited Receiver, would the abatement measure be reasonable? NOTE: SCDOT Policy states that the preliminary noise analysis is based on $35.00 per square foot and a more project-specific construction cost should be applied at a cost per square foot basis during the detailed noise abatement evaluation. ☐ Yes ☒ No

If "Yes" is marked, continue to #3. If "No" is marked, then abatement is determined NOT to be reasonable.

#3: Viewpoints of the property owners and residents of the benefitted receivers

Number of Benefited Receivers (same as above):

Number of Benefited Receivers in **support** of noise abatement measure:

Percentage of Benefited Receivers in **support** of noise abatement measure:

Number of Benefited Receivers **opposed** to noise abatement measure:

Percentage of Benefited Receivers **opposed** to noise abatement measure:

Number of Benefited Receivers **that did not respond** to solicitation on noise abatement measure:

Percentage of Benefited Receivers **that did not respond** to solicitation on noise abatement measure:

Based on the viewpoints of the property owners and residents of the Benefited Receivers, would the abatement measure be reasonable? NOTE: SCDOT Policy indicates that the noise abatement shall be constructed unless greater than 50% of the benefited receptors are opposed to noise abatement. ☐ Yes ☐ No

Final Determination for Noise Abatement Measure
Feasible, but not reasonable.