APPENDIX J. *BISHOPVILLE TRUCK ROUTE PROJECT TRAFFIC NOISE ANALYSIS*

FINAL BISHOPVILLE TRUCK ROUTE PROJECT (S-69-08)

TRAFFIC NOISE ANALYSIS

Prepared for:

Federal Highway Administration

&

South Carolina Department of Transportation

December 2021

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ACRONYMS AND ABBREVIATIONS

AADT	Average Annual Daily Traffic
CFR	Code of Federal Regulations
CNE	Common Noise Environment
dB	decibel
dBA	A-weighted sound levels in decibels
EA	Environmental Assessment
EIS	Environmental Impact Statement
FHWA	Federal Highway Administration
Hz	hertz
L_{eq}	equivalent sound pressure level
NAC	noise abatement criteria
NEPA	National Environmental Policy Act
ROD	Record of Decision
SCDOT	South Carolina Department of Transportation
SPL	sound pressure level
TNM	traffic noise model
TNM 2.5	FHWA Traffic Noise Model Version 2.5

1. SUMMARY

The South Carolina Department of Transportation (SCDOT) is evaluating the traffic noise impacts associated with the proposed Bishopville Truck Route project. Twelve alternatives are being proposed. These alternatives generally span from the U.S. 15/Bethune Highway area north of the City of Bishopville and loop to the east of the city and connect back to U.S. 15 south of the city.

Federal funding is being utilized for the design and construction of the project, and Federal Highway Administration (FHWA) approval will be required. An Environmental Impact Statement (EIS) is being prepared for this project. This project is identified as a "Type I" project, per FHWA Procedures for Abatement of Highway Noise (23 CFR 772.5(2)) and the *2014 South Carolina Department of Transportation Traffic Noise Abatement Policy*.

A preliminary noise analysis was completed using TNM 2.5 to establish the Base Year 2015, predicted No Build scenario, and the 12 reasonable alternatives for the year 2045.

Noise-sensitive sites (residences, restaurants, churches, schools, medical facilities, and sporting areas) within 550 feet of the proposed alternatives were analyzed for noise impacts. A total of 119 receivers were analyzed in the model. All sites along the proposed segments are categorized as Activity Category B, C, D, or E, according to FHWA Noise Abatement Criteria (NAC).

There are no traffic noise impacts for Alternatives 1 through 12.

The Date of Public Knowledge will be the approval date of the Record of Decision (ROD). After this date, federal and state governments are no longer responsible for providing noise abatement measures for new development within the noise impact area of the proposed project.

2. INTRODUCTION

2.1 PROJECT BACKGROUND

The environmental review process, under the National Environmental Policy Act (NEPA) for the Proposed Bishopville Truck Route Project, began in 2010 with an Environmental Assessment (EA), which was completed in the fall of 2012. The EA identified seven alternatives to provide alternate routes for large trucks traveling through downtown Bishopville on U.S. 15/Main Street. A number of individuals opposed the project at the November 2012 public hearing and, subsequently, the City of Bishopville and Lee County could not agree on a preferred alternative. In February 2015, a public information meeting was held to update the public on the project status and present options for moving forward. Because of anticipated strong public opinion associated with the project, FHWA directed SCDOT to reinitiate the environmental planning process and prepare an Environmental Impact Statement (EIS).

Twelve reasonable alternatives are being studied for the project. These 12 alternatives are based on combining four unique alignments for the proposed Bishopville Truck Route project south of S.C. 341 with three unique alignments north of S.C. 341. Alternatives 5 through 12 are the same as the corresponding segments of Alternatives 1 through 4. Since the alignments and traffic volumes are the same for the segments of Alternatives 5 through 12 as the corresponding segments of Alternatives 1 through 4, traffic noise analyses were only run for Alternatives 1 through 4. These four analyses are sufficient to determine impacts for all 12 alternatives. **Table 1** below presents the combinations of segments of Alternatives 1 through 4 that make up Alternatives 5 through 12.

Figure 1 shows Alternatives 1 through 4**.**

Table 1: Segments of the 12 Alternatives

Alternative	Alternative Segment South of S.C. 341	Alternative Segment North of S.C. 341
5	Alternative 1	Alternative 2
6	Alternative 1	Alternative 3
7	Alternative 2	Alternative 1
8	Alternative 2	Alternative 3
9	Alternative 3	Alternative 1
10	Alternative 3	Alternative 2
11	Alternative 4	Alternative 1
12	Alternative 4	Alternative 2

2.2 PURPOSE AND NEED

On average, over 700 large commercial trucks travel U.S. 15 (N. Main Street) through downtown Bishopville daily. The proposed project is considered necessary to reduce existing and future truck congestion downtown. The primary purpose of the Bishopville Truck Route Project is to address truck traffic traveling through downtown Bishopville. The secondary purpose is to enhance the economic development of the area.

2.3 COMMON NOISE ENVIRONMENT

A common noise environment (CNE), as defined for this study, is a group of receivers within the same Activity Category that are exposed to similar noise sources, levels, and topographic features. Seven CNEs were identified for the ambient receiver locations where traffic noise is not the predominant source. Each CNE is a distinct geographic location in the study area containing noise-sensitive land uses that can be considered similar in the acoustical environment. The CNEs in the study area are shown in

Figure 2. A discussion of the existing conditions for each CNE is provided below.

Several analyzed receivers representing noise sensitive land uses within 550 feet of the build alternatives were not included in CNEs because their land uses were different than nearby CNEs. If the receiver was close and had a similar land use to other receivers in the CNE, it was included in the nearby CNE.

RECs 1 through 7 and 120 are receivers along U.S. 15 near the intersection of Wilkinson Road that represent a mix of land uses including residential and office land uses.

REC-34 is a residential property on St. Charles Road, it is on the western side of St. Charles Road opposite CNE-C.

REC-41 is a residence on St. Charles Road that is in the middle of farmland. The receiver would not have a similar acoustical environment as the other receivers in CNE-C.

RECs 46 through 59 are properties adjacent to Wisacky Highway. Because of its proximity to the highway, it would not have a similar acoustical environment as the other receivers in CNE-E.

RECs 81, 83, 88, 104, 105, 107, 108, 109, 111, 112 and 115 are properties adjacent to U.S. 15 and because traffic noise is the predominant noise source, these receivers do not have a similar acoustical environment as the other receivers in CNE-G.

RECs 116, 118 and 119 are properties on Bethune Highway where traffic noise is the predominant noise source. For this reason, these receivers were not included in CNE-G.

2.3.1 CNE-A

CNE-A encompasses the Edgefield Drive neighborhood south of U.S. 15. It spans from the western end of Edgefield Drive to Wilkinson Road. The area is comprised of residential uses and is surrounded by farmland and other undeveloped lands.

2.3.2 CNE-B

CNE-B comprises the Lee County Council on Aging and surrounding undeveloped land. It is between Wilkinson Road and S.C. 154 (St. Charles Road), spanning from the back of CSC Community Pharmacy Pediatrics to Edgefield Drive.

2.3.3 CNE-C

CNE-C comprises the Magnolia Drive neighborhood east of S.C. 154 (St. Charles Road). The area spans from S.C. 154 (St. Charles Road) to Magnolia Drive and encompasses the houses within this area, in addition to the first row of apartments north of South Lee Street. This area is predominantly residential and is surrounded by farmland.

2.3.4 CNE-D

CNE-D encompasses the area around Liberty Hill Baptist Church. The area spans approximately from the intersection of S.C. 154 (St. Charles Road) and Dove Lane southward to Woodside Road. The area contains the Liberty Hill Baptist Church, residential uses, and farmland.

2.3.5 CNE-E

CNE-E comprises the Wags Drive and Azalea Drive neighborhoods. The area spans from the northernmost point of Dogwood Drive to about 200 feet north of S.C. 341 (Wisacky Highway). The area contains predominantly residential uses and farmland.

2.3.6 CNE-F

CNE-F encompasses the area around Robert E. Lee Academy (Cousar Street). The area spans from the western tree line across from South Atlantic Canners to the eastern boundary of Robert E. Lee Academy next to the football field. The area comprises Robert E. Lee Academy and its sporting fields, a vacant lot, and a truck parking lot.

2.3.7 CNE-G

CNE-G comprises the agricultural and residential area from the east of U.S. 15 to the northeast of Bishopville city limits. This area encompasses Park at the Bay Warehouse, LLC, Tabernacle of Champions Church, and Lynches River Apartments. The area extends from east of U.S. 15 to the railroad tracks and from south of Academy Road to south of Mixon Drive. The area is a mix of residential, religious centers, warehousing, and undeveloped land.

Figure 1: Study Area Map

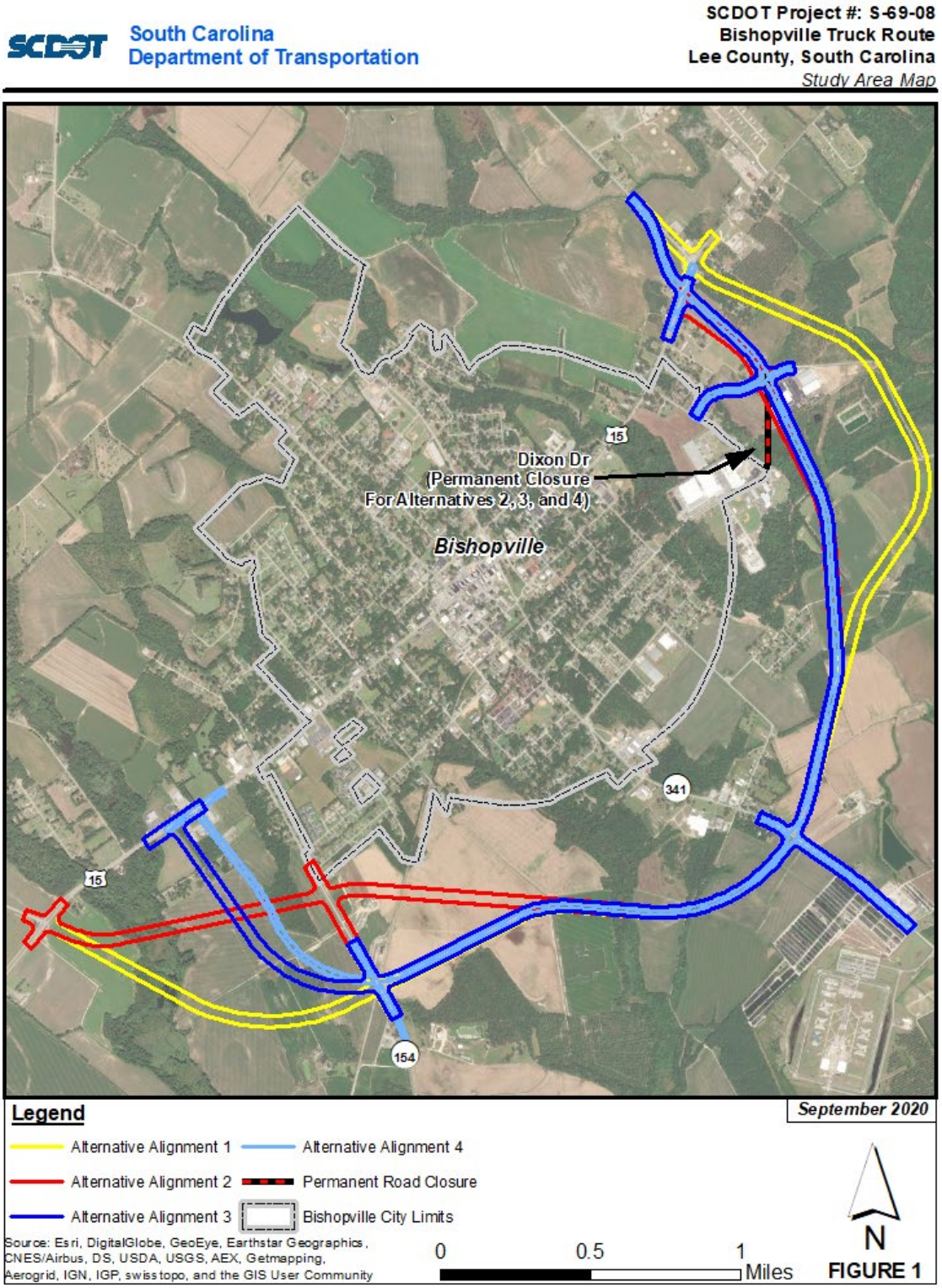
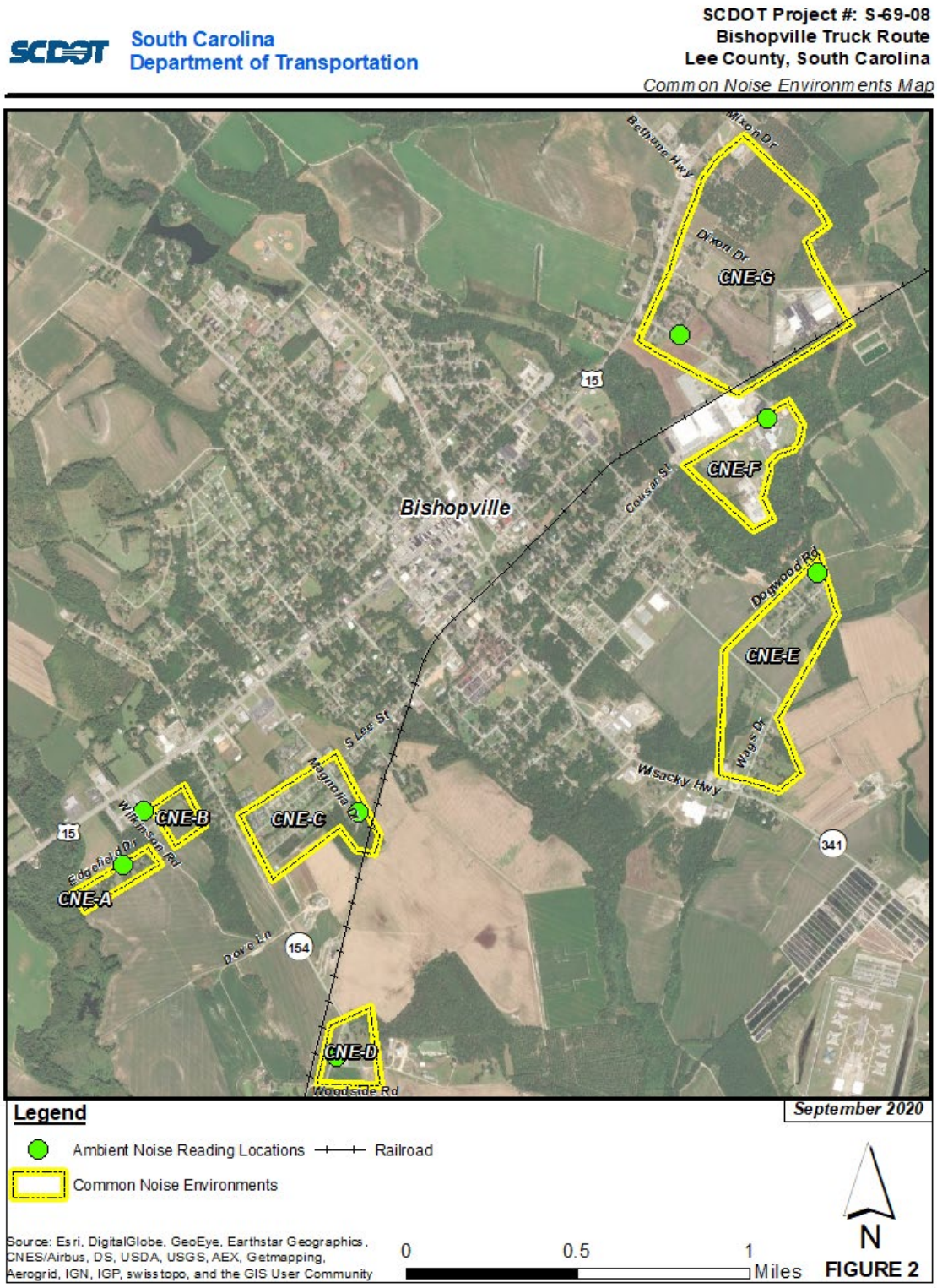


Figure 2: Common Noise Environments



2.4 PROCEDURES

This noise analysis identifies potential impacts associated with conceptual designs for the Bishopville Truck Route reasonable alternatives. This analysis has been prepared in accordance with the FHWA's 23 CFR 772 and the *South Carolina Department of Transportation Traffic Noise Abatement Policy, August 2014*.

The analysis was completed using TNM 2.5 to establish the Base Year 2015, predicted No-Build scenario, and the four reasonable Build alternative alignments for the year 2045. The model used peak hourly traffic volumes for 2015 and 2045, as provided by the 2020 Traffic Analysis Study (see **Appendix A**).

Noise-sensitive land uses in the study area, which are surrounded by agricultural and undeveloped land, include residential, restaurants, places of worship, a medical facility, a school, an adult daycare, and a sports complex. A calibrated Type II sound level meter was used to collect ambient and traffic noise measurements in the field on November 6 and 8, 2019.

The data collected in the field was used in the existing scenario TNM models to establish the baseline conditions and model validations. These models were used in the development of the six scenario models: Existing (2015), No-Build (2045), Build Alternative 1 (2045), Build Alternative 2 (2045), Build Alternative 3 (2045), and Build Alternative 4 (2045). As stated above, current conceptual designs for the four reasonable Build alternative alignments of the 12 reasonable alternatives were used for the build scenario models.

Peak hourly volumes were entered into the models. Because the Bishopville Truck Route project is on new location, noise levels predicted by the 2015 model were lower than noise levels observed in the field. Noise levels were recorded for each CNE. For receivers whose noise levels were below their respective baseline CNE level, their CNE level was used as the baseline noise level in the Build alternatives models.

The receivers that had low sound level predictions outside of CNEs are RECs 1, 6, 34, 41, 46, 50, 55, and 120. The existing noise levels for these receivers were adjusted to the lowest ambient noise reading of 55.6 dBA.

REC-1 is a residence on U.S. 15. The receiver has a low sound level prediction because the property is set back approximately 400 feet from the edge of pavement.

REC-6 is behind the CSC Community Pharmacy Pediatrics on Wilkinson Road. The receiver has a low sound level prediction because Wilkinson Road is a local road with low traffic volumes and low speeds.

REC-34 is a residence on St. Charles Road. The receiver has a low sound level prediction because St. Charles Road has low traffic volumes.

REC-41 is a residence on St. Charles Road surrounded by agricultural land.The receiver is approximately 600 feet away from the edge of pavement of St. Charles Road. This, coupled with low traffic volumes is why the receiver has a low sound level prediction.

REC-46 is a residence on Wisacky Highway. The lot is long and has more space in the backyard where the outdoor activity area is located. The receiver has a low sound level prediction because the outdoor activity areas are further away from the road.

REC-50 is a residence on Wisacky Highway. The lot is long and the house is set back approximately 215 feet from the edge of pavement. The receiver has a low sound level prediction because of its distance from the road.

REC-55 is a residence located behind REC-50 on Wisacky Highway. The location of this receiver is approximately 500 feet from the edge of pavement. The receiver has a low sound level prediction because of its distance from the road is why it has a low sound level prediction.

REC-120 is a bar located on Wilkinson Road. The receiver has a low sound level prediction because Wilkinson Road is a local road with low traffic volumes and low speeds.

2.5 STATEMENT OF COMPLIANCE

Federal funding is being used for the design and construction of the project. FHWA approval will be required. An Environmental Impact Statement (EIS) is being prepared for this project.

This study will follow FHWA 23 CFR 772, *Procedures for Abatement of Highway Traffic Noise and Construction Noise,* and *South Carolina Department of Transportation Traffic Noise Abatement Policy, August 2014*.

According to FHWA and SCDOT, there are three types of projects:

- **Type I Project** – a proposed federal or federal-aid highway project for the construction of a highway on new location or the physical alteration of an existing highway which significantly changes either the horizontal or vertical alignment or increases the number of through-traffic lanes.
- **Type II Project** – a proposed federal or federal-aid highway project for noise abatement on an existing highway.
- **Type III Project** – a federal or federal-aid highway project that does not meet the classifications of a Type I or Type II project. Type III projects do not require a noise analysis.

The Proposed Bishopville Truck Route project is a Type I project, as designated in FHWA 23 CFR 772, because the project proposes the construction of a highway on a new location.

3. FUNDAMENTALS OF NOISE

3.1 FUNDAMENTALS OF NOISE

Noise can be defined as unwanted sound. Noise can be disruptive to normal activities when it reaches certain levels and when it is louder than the ambient noise environment. **Table 2** illustrates common noise sources and their sound levels. Sound is usually measured in decibels and is expressed as dB.

Table 2: Common Sound and Noise Levels

Outdoor Noise	dBA	Indoor Noise
	110	Rock band at 16.5 feet
Jet flyover at 990 feet		
Pneumatic hammer	100	Subway train
Gas lawn mower at 3.3 feet		
	90	Food blender at 3.3 feet
Downtown area (large city)	80	Garbage disposal at 3.3 feet
		Shouting at 3.3 feet
Lawnmower at 99 feet	70	Vacuum cleaner at 9.9 feet
Commercial area		Normal speech at 3.3 feet
Air-conditioning unit	60	Clothes dryer at 3.0 feet
Babbling brook		Large business office
Quiet urban (daytime)	50	Dishwasher (next room)
Quiet urban (nighttime)	40	Library
	30	
	20	
	10	
		Threshold of hearing
	0	

Source: FHWA

Sound pressure is the magnitude of noise or deviation from the ambient noise level. The magnitude of the noise is the ratio of the sound pressure to a reference sound pressure, which is normally 20 micro-Pascals. Logarithmic scales are used to relate sound pressure to a common reference pressure, which generates a sound pressure level (SPL). SPL is measured in dimensionless units of decibels (dB) and is adjusted by the frequency response of human hearing or weighting. For detecting sound, the limits of human hearing range from 0 dB, the threshold of hearing, to 140 dB, the pain threshold. Sound frequencies are

measured in hertz (Hz), the number of vibrations per second of a tone. Sound occurs over a wide range of frequencies.

Three weightings measure sound pressure: A, B, and C. The accepted audible frequency for humans ranges from 20 to 20,000 Hz. Human hearing is sensitive to frequencies between 1,000 and 6,000 Hz. The A-weighted scale is adjusted to the frequencies most sensitive to human ears. Because some frequencies are undetectable to the human ear, an adjustment is made for the high and low frequencies to estimate how an average person hears sounds. This adjustment is called A-weighting and is expressed as dBA. All noise levels in this analysis are expressed as dBA.

One factor that is important in evaluating potential noise impacts is the perceived effect of incremental increases in existing noise levels. The relationship between fluctuations in sound levels, loudness, and acoustic energy is shown in **Table 3.**

The degree of annoyance of unwanted sound depends on three factors:

- Amount and type of intruding noise
- Relationship between the ambient noise and intruding noise
- Activity occurring when the intruding noise is heard

Table 3: Relationships Between Changes in Sound Levels, Loudness, and Acoustic Energy

Sound Level Change (dBA)	Change in Loudness[1,2]	Relative Change in Acoustic Energy[3]
+30	Eight Times as Loud	1,000
+20	Four Times as Loud	100
+10	Twice as Loud	10
+5	Readily Perceptible	~3
+3	Barely Perceptible	2
0	No Change	0
–3	Barely Perceptible	1 / 2
–5	Readily Perceptible	~1 / 3
–10	Half as Loud	1 / 10
–20	One-Fourth as Loud	1 / 100
–30	One-Eighth as Loud	1 / 1,000

Source: FHWA 2011

Notes:

[1]Loudness pertains only to the perceived magnitude of a sound or sounds. Loudness does not describe the tonal qualities of one or more sounds. Two sounds can have the same sound level magnitudes, and can sound "just as loud," and be distinguishable because of differing tones (frequencies).

[2]Relative to the loudness of an initial sound level (e.g., the loudness of a 63 dBA sound would be barely perceptible from the loudness of a 60 dBA sound. An 80 dBA sound would generally be perceived as four times as loud as a 60 dBA sound).

[3]Relative to the acoustic energy of an initial sound level (e.g., a sound level of 63 dBA has twice the acoustic energy as an initial sound level of 60 dBA. A sound level of 80 dBA has 100 times the acoustic energy as 60 dBA).

Individuals have different hearing sensitivities to noise. Loud noises bother some people more than others, and some people become irritated when there is a persistent unwanted

noise. The time of day and the patterns at which noise occurs can affect someone's judgment of whether a noise is objectionable.

People judge the annoyance of unwanted sounds based on its relationship to noise from other sources (ambient noise). For example, a car horn blowing at night when ambient noise levels are about 45 dBA would be more objectionable than a car horn blowing in the afternoon when ambient noise levels are approximately 55 dBA.

Over time, people tend to accept the noises that intrude into their daily lives, particularly if the noises occur at consistent and expected intervals. Certain techniques regulate noises from sources such as airplanes, factories, railroad, and highway traffic noise.

Noise levels in this analysis are based on the equivalent sound level (L_{eq}), which is the steady-state (constant sound) A-weighted sound level with the same acoustic energy as the actual time-varying sound levels during the same time period. The varying sound levels of traffic over the course of a day are represented based on a constant noise level with the same energy content.

3.2 TRAFFIC NOISE AND PROPAGATION

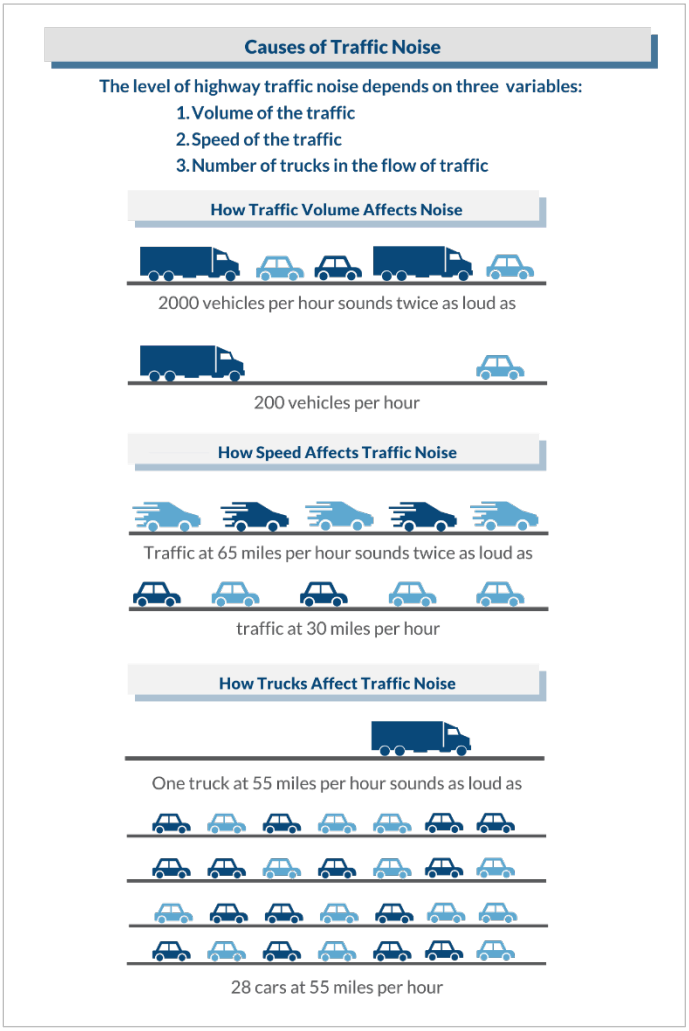
Vehicular traffic noise is created from a vehicle's tires, engine, and exhaust. It can be exacerbated by defective or faulty equipment on vehicles. Roadway geometry (e.g., steep inclines) can cause increased labor on vehicles, which will also increase traffic noise levels.

Most people consider vehicular traffic noise to be objectionable and undesirable. The level of highway traffic noise depends on three factors:

1. Volume of traffic
2. Speed of traffic
3. Number of trucks in the flow of traffic

Traffic noise is never constant and, as a result, noise levels are always fluctuating based on the volume, speed, and vehicle type mix. **Figure 3** illustrates how increased traffic volumes, speeds, and trucks influence traffic noise.

Figure 3: Effect of Traffic Volumes, Speeds, and Trucks on Noise Levels

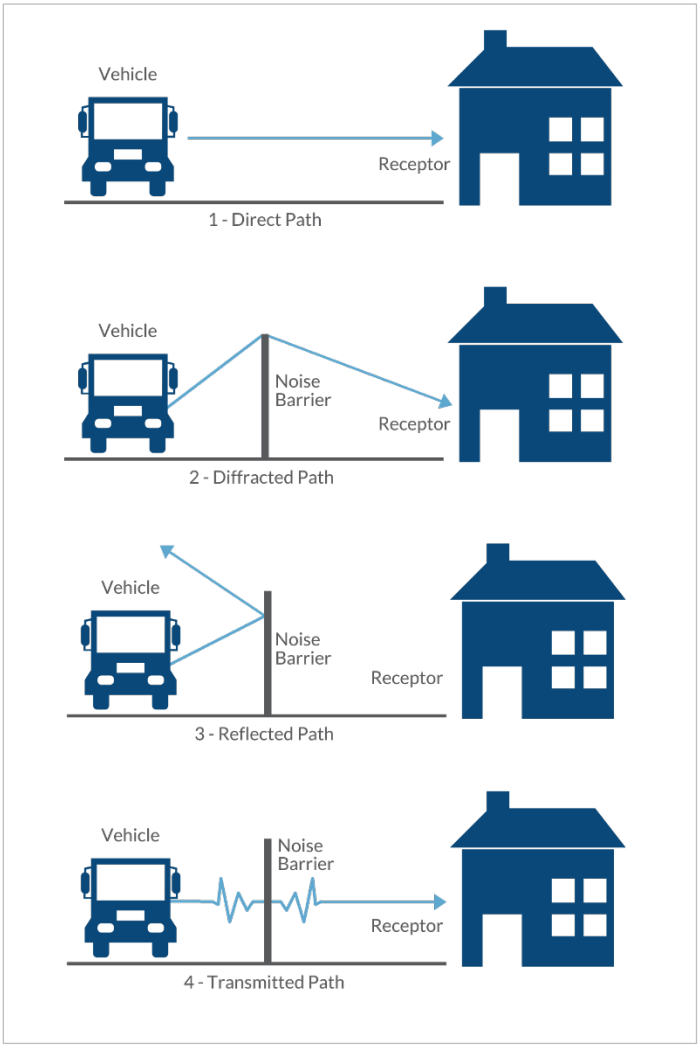


Source: FHWA

Traffic noise levels are reduced by a variety of factors, including an individual's distance from a highway, terrain, vegetation, and natural and manmade obstacles. Noise from a roadway can follow four paths to reach nearby receivers (as shown in **Figure 4**):

1. Direct path—the noise follows a straight path from the source to the receiver.
2. Diffracted path—the noise follows a path from the source to the top of a barrier and then bends down toward the receiver.
3. Reflected path—the noise is bounced off a barrier and directed toward a receiver on the opposite side of the roadway from the barrier.
4. Transmitted path—the noise is transmitted directly through the barrier.

Figure 4: Different Paths Followed by Noise



Source: FHWA

A wall, building, earth berm, hill, or another type of solid structure or terrain can act as a sound barrier and, therefore, can provide reduction to receivers in the “shadow zone” created by the barrier. Breaking the line of sight between the noise source and the receiver produces the maximum reduction in noise.

In some instances, refracted traffic noise can be more irritating than direct transmission because of the inconsistent occurrence and because it introduces exposure to sounds that are different than the noise source. The refraction is usually caused by wind and temperature gradients and can influence noise levels locally.

3.3 TRAFFIC NOISE REGULATIONS

FHWA has established noise abatement criteria (NAC), listed in **Table 4,** for various land use activities. These criteria determine at what point a traffic noise impact would occur. As shown in the *South Carolina Department of Transportation Traffic Noise Abatement Policy, August 2014*, SCDOT adopted these federal NACs as the standard in South Carolina.

Table 4: FHWA Noise Abatement Criteria

Activity Criteria	$L_{eq(h)}$	Evaluation Location	Activity Description
A	57	Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose
B[3]	67	Exterior	Residential
C[3]	67	Exterior	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, daycare centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings
D	52	Interior	Auditoriums, daycare 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	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

[3] Includes undeveloped lands permitted for this activity category

A receiver is a discrete or representative location of a noise-sensitive area for any of the land uses listed in **Table 4.** The receiver is considered impacted if noise levels approach (within one dBA) or exceed the NAC, as defined in the *South Carolina Department of Transportation Traffic Noise Abatement Policy, August 2014* or create a substantial increase over existing noise levels. SCDOT uses a substantial increase criterion of 15 dBA or greater to define noise increases from the existing noise level.

3.4 NOISE ABATEMENT MEASURES

When a receiver is impacted by traffic noise, noise abatement measures must be considered. A noise abatement measure is any positive action that reduces the impact of traffic noise on an activity area. This can include traffic management, alignment alterations, acquisition of property to create a buffer zone, providing noise insulation and/or air conditioning of public-use or nonprofit buildings, and construction of a noise barrier.

Prior to the recommendation of noise abatement measures, the feasibility and reasonableness of the abatement measures must be determined per Section 5.1 and 5.2 of the *South Carolina Department of Transportation Traffic Noise Abatement Policy, August 2014*. Feasibility of noise abatement measures is based on acoustic feasibility, where a noise reduction of at least 5 dBA must be achieved for at least 75 percent of the receivers that are determined to be impacted. The noise abatement measure must also have engineering feasibility where factors that include topography, safety, drainage, utilities, maintenance, access, and height of the noise abatement measure would not limit the ability to achieve noise reduction goals.

SCDOT also established Three Mandatory Reasonable Factors that must be met for a noise abatement measure to be considered reasonable. The three factors are: (1) the viewpoints

of the property owners and residents of the benefitted receivers, (2) cost-effectiveness, and (3) the noise reduction design goal.

The following reasonableness factors, according to 23 CFR 772, must be achieved for noise barriers to be deemed reasonable:

- Construction of a noise barrier is not reasonable unless a majority of residents and property owners of the benefitted receivers (denoted by a noise reduction of 5 dBA or more from the noise barrier) want a noise barrier, even if all other criteria indicate a noise barrier is reasonable.

- Construction of a noise barrier is not reasonable if the cost is more than $30,000 per benefitted receiver. The barrier cost includes the cost of construction (material and labor), the cost of additional right-of-way, the additional cost of relocating utilities, and other costs associated with the barrier. The estimated cost of construction will be $35 per square foot. The allowable cost per benefitted receiver and the cost of construction shall be reanalyzed every five years. All receivers with noise reductions of 5 dBA or more will be counted. Each house or apartment unit will be counted as one receiver. Active sports areas are equivalent to one impacted residence. For nonresidential uses, such as schools, places of worship, community centers, and auditoriums, the following equation will be used to determine the equivalent number of residents:

  Equivalent # Residents = # Occupants/(# People/Residence) * Usage

  The Equivalent # Residents formula is used to determine the equivalent number of impacted residents for non-residential uses and retirement homes.

  The # People/Residence is the average number of people per residence as defined by the 2000 U.S. Census for the particular project area.

  Usage is the number of hours the facility is used per day/24 hours per day.

- A noise reduction of at least 8 dBA must be achieved for at least 80 percent of those receivers determined to be in the first two building rows and considered benefitted.

4. EXISTING CONDITIONS

Existing noise level measurements were collected (November 6 and 8, 2019) to determine existing noise levels in the environment, to validate the TNM 2.5 measurements, and to define baseline conditions in noise-sensitive areas where traffic is not a dominant noise source. Noise measurement locations consisted of 12 locations, five near the existing roadway network (where the dominant noise source is traffic), and seven noise-sensitive areas where roadway traffic is not a major noise source. Following the SCDOT policy, noise measurements were taken approximately 30 meters (100 feet) from the centerline of the existing roadway, if possible, and in areas of human/recreational activity for areas where roadway traffic is not a dominant source. The noise meters were placed 5 feet above the ground level, and the equivalent steady-state (L_{eq}) was collected for each site logged in one-minute intervals. One-minute data logging is important to determine aberrant noise events at each site. Noise measurement sites were identified as specified in the following:

Locations where traffic noise is the dominant noise source (see list below). A calibrated Type II sound level meter was used to collect noise measurements during the heaviest traffic periods (free-flow traffic conditions) during the morning and afternoon peak traffic hours[1]. Readings were taken in 15-minute intervals, and corresponding manual traffic counts were conducted for the various vehicle classification types at the following locations:

- Site #1: Bishopville Kingdom Hall of Jehovah's Witnesses on S.C. 341 (Bethune Highway)
- Site #2: Bishopville next to the Head Start Early Head Start Center on U.S. 15
- Site #6: S.C. 341 (Wisacky Highway) east of Wags Drive
- Site #8: S.C. 154 (St. Charles Road) south of Maple Drive
- Site #12: Piedmont Cemetery on U.S. 15

Noise measurements taken where traffic is not a dominant noise source are listed below. A calibrated Type II sound level meter was used to collect noise measurements. Readings were taken in 30-minute intervals.

- Site #3: Lynches River Apartments
- Site #4: Robert E. Lee Academy
- Site #5: Azalea Drive in the Dogwood Road neighborhood
- Site #7: Magnolia Drive in the Maple Drive neighborhood
- Site #9: Liberty Hill Baptist Church on Dove Lane
- Site #10: Edgefield Drive in the Edgefield Drive neighborhood
- Site #11: Wilkinson Road behind CSC Community Pharmacy Pediatrics

Measured noise levels ranged from 55.6 to 67.5 dBA. Observed traffic counts during the 15-minute noise measurements were converted to hourly volumes. Summary of the noise meter output and traffic counts for short-term monitoring locations are available in **Appendix B.**

[1] Readings were taken when traffic conditions were heavy but still flowing at or near the posted speed to capture worst-case noise levels in the field.

4.1 NOISE MODEL VALIDATION

Noise levels were modeled for the existing conditions using traffic volumes observed during field noise monitoring. Traffic volumes were counted at the five locations identified above, where traffic noise was the dominant source.

Traffic counted during field monitoring was used in the TNM validation model for the existing roadways. The noise monitoring sites were used as the receivers in the model to verify the results of the TNM validation.

The modeled noise levels were compared to the noise monitoring results to verify the accuracy of the model setup. FHWA and SCDOT accept modeled noise levels that are within ±3.0 dBA. All sites were found to be within FHWA and SCDOT's tolerance, and a third party review confirmed that the model was valid. The results of the TNM validation can be found in **Appendix B.**

4.2 AMBIENT READINGS

Seven ambient readings (where traffic noise is not the dominant source) were taken to establish baseline noise conditions for areas that would be near the Bishopville Truck Route. The ambient readings were not included in the TNM validation. However, they provided baseline noise levels for the seven CNE areas.

4.2.1 CNE-A

CNE-A (Site #10) Noise monitoring occurred on a vacant lot on Edgefield Drive west of Wilkinson Road. An ambient noise level of 56.2 dBA was measured, representative of the noise levels in this CNE. The major noise sources at this location are daily human activity and the sounds of the natural environment.

4.2.2 CNE-B

CNE-B (Site #11) Noise monitoring occurred on undeveloped land between CSC Community Pharmacy Pediatrics and the Lee County Council on Aging. An ambient noise level of 56.5 dBA was measured, representative of the noise levels in this CNE. The major noise sources in this area are daily human activity and the sounds of the natural environment.

4.2.3 CNE-C

CNE-C (Site #7) Noise monitoring occurred on a vacant lot at the end of Magnolia Drive. An ambient noise level of 56.0 dBA was measured, representative of noise levels in this CNE. The major noise sources in this area are daily human activity and the sounds of the natural environment.

4.2.4 CNE-D

CNE-D (Site #9) An ambient noise level of 55.9 dBA was measured in front of the Liberty Hill Baptist Church on Dove Lane, representative of the noise levels within this CNE. The major noise sources in this area are sounds of the natural environment.

4.2.5 CNE-E

CNE-E (Site #5) An ambient noise level of 55.6 dBA was measured at at Azalea Drive in the Dogwood Road neighborhood, representative of the noise levels in this CNE. The major noise sources in this area are daily human activity and the sounds of the natural environment.

4.2.6 CNE-F

CNE-F (Site #4) An ambient noise level of 62.5 dBA was measured at Robert E. Lee Academy. Manufacturing noise from the Ardagh Metal Beverage facility is the dominant noise source in this area.

4.2.7 CNE-G

CNE-G (Site #3) An ambient noise level of 56.0 dBA was measured at Lynches River Apartments. The predominant noise sources in this area are daily human activities, but manufacturing noises could be heard from the noise monitoring location.

The ambient readings taken in the field were used to adjust sites where traffic noise is not the dominant source. When TNM predicted noise levels lower than the lowest measurement of 55.6 dBA (Site #3), the noise level was adjusted using the appropriate ambient reading associated with that location. In areas outside of a CNE boundary, the lowest field measurement of 55.6 dBA was used.

5. NOISE IMPACT ANALYSIS

5.1 NOISE ANALYSIS PROCEDURE

FHWA's TNM 2.5 traffic noise prediction and analysis software is capable of predicting highway traffic noise. TNM 2.5, released in April 2004 as the latest version currently available, is the required noise analysis software on all federal-aid highway projects. The software was used to predict noise levels at receiver locations based on the volume of vehicles, speed, types of vehicles, distance to the receiver, and terrain.

The traffic noise scenarios in this analysis include:

- Existing (2015) loudest-hour noise levels
- No-Build (2045) loudest-hour noise levels
- Build Alternative 1 (2045) loudest-hour noise levels (also Alternatives 5 and 6 south of S.C. 341 and Alternatives 7, 9, and 11 north of S.C. 341)
- Build Alternative 2 (2045) loudest-hour noise levels (also Alternatives 7 and 8 south of S.C. 341 and Alternatives 5, 10 and 12 north of S.C. 341)
- Build Alternative 3 (2045) loudest-hour noise levels (also Alternatives 9 and 10 south of S.C. 341 and Alternatives 6 and 8 north of S.C. 341)
- Build Alternative 4 (2045) loudest-hour noise levels (also Alternatives 11 and 12 south of S.C. 341)

Traffic volumes for major streets in the study area in 2015 and forecast year of 2045 were obtained from the 2020 Traffic Analysis Study. A summary of the traffic volumes used in this analysis is shown in Section 5.2.1.

Receiver locations were placed at exterior locations on structures or land uses with an Activity Category of B, C, D, and E within 550 feet of the reasonable alternatives. No Category A land uses were identified within the buffer area. In the model, receivers were placed at all residential, institutional, and commercial properties within the study area. A total of 119 receivers were modeled. Receiver locations and relocated receivers are shown in **Appendix E.**

5.2 TRAFFIC DATA FOR NOISE PREDICTION

5.2.1 MODELED ROADWAYS AND VOLUMES

The Lee County subarea traffic model was developed for the base year of 2015 and a forecast year of 2045. Traffic volumes for each of the existing modeled roadways and the reasonable alternatives were provided as Average Annual Daily Traffic (AADT).

Traffic volumes for the TNM scenarios were calculated as Design Hourly Volumes (DHVs). DHVs are calculated by multiplying the existing and projected AADT volumes by the K Factor established for the study area. The DHVs were split 50/50 for each roadway direction (e.g., northbound/southbound).

The DHVs for each direction were then grouped by vehicle classification (automobiles, medium trucks, and heavy trucks) for both the existing and future conditions. This was done by multiplying the DHVs by the percentage of each vehicle classification. (Each segment

has a unique vehicle classification percentage.) The DHVs were then divided per number of travel lanes for each direction and assigned to the appropriate TNM roadway segment.

The speed limits for the roadways in the model are listed below:

- 40 mph for northern part of St. Charles Road and U.S. 15 north of the City of Bishopville
- 45 mph for U.S. 15 south of the City of Bishopville and Wisacky Highway
- 55 mph for southern part of St. Charles Road, Bethune Highway and the reasonable alternatives

A breakdown of traffic calculations is displayed in **Appendix C.**

5.3 NOISE IMPACT SUMMARY

Noise levels were predicted for Existing (2015), No-Build (2045), Build Alternative Alignment 1 (2045), Build Alternative Alignment 2 (2045), Build Alternative Alignment 3 (2045), and Build Alternative Alignment 4 (2045) loudest-hour traffic volumes at receiver locations that represent 120 receivers in existing land uses. The number and type of predicted traffic noise impacts for the build scenarios are displayed in **Table 5.** The magnitude of the predicted noise levels and their increase over existing levels determine if a noise impact occurs and the type of impact. Types of impacts can include receivers exceeding FHWA NAC or substantial increase criteria.

Table 5: Traffic Noise Impact Summary

Scenario	Approximate # of Impacted Receivers Approaching or Exceeding the NAC					Substantial Noise Level Increase	Impacts Caused by both Criteria	Total Impacts per 23 CFR 772
	A	B	C	D	E			
Alternatives 1-12	0	0	0	0	0	0	0	0

If the Bishopville Truck Route is not built, noise levels are projected to be between 35.9 and 71.4 dBA by 2045. One residential receiver's (REC-88) noise levels would approach or exceed the NAC as a result of traffic growth from 2015 to 2045. One business receiver's (REC-104) noise levels would approach or exceed the NAC as a result of traffic growth from 2015 to 2045.

The estimated noise level range of the Build Alternatives (2045) is 38.2 and 71.8 dBA. No receivers would have noise levels approach or exceed the NAC (66 dBA for residences, medical offices, churches, and adult day cares and 71 dBA for businesses or other commercial properties). Reference **Appendix D** for more information on receiver noise levels compared to the NAC.

The proposed designs for the Bishopville Truck Route were overlaid on top of existing receivers.**Table 6** below shows which receivers would be relocated in each alternative.

Table 6: Relocated Receivers in Each Alternative

Alternative	Relocated Receivers
Alternative 1	RECs 104, 108, and 112
Alternative 2	None
Alternative 3	RECs 4, 7, 12, and 13
Alternative 4	RECs 4, 7, 9, and 10
Alternative 5	None
Alternative 6	None
Alternative 7	RECs 104, 108, and 112
Alternative 8	None
Alternative 9	RECs 4, 7, 12, 13, 104, 108, and 112
Alternative 10	RECs 4, 7, 12, and 13
Alternative 11	RECs 4, 7, 9, 10, 104, 108, and 112
Alternative 12	RECs 4, 7, 9, and 10

Appendix D shows the TNM results for each model.

5.4 INTERIOR CONSIDERATIONS FOR CATEGORY D

Activity Category D is the interior impact criterion for certain types of facilities listed in Activity Category C that have interior uses. An indoor analysis should be completed when a determination is made that exterior noise abatement measures are not reasonable or feasible. Where no exterior activities are affected by traffic noise, or where exterior activities are far from or shielded from the roadway in a manner that prevents any impact on exterior activities, Activity Category D should be used as the basis for determining noise impacts.

Interior noise analysis can use structural noise reduction factors to estimate noise reduction, as opposed to obtaining the factors from the detailed acoustical analysis. One receiver, Bishopville Kingdom Hall of Jehovah's Witnesses (REC-116), was identified as Activity Category D because no outside activity areas were observed during the field visits. From the 2045 analysis, the exterior noise level was predicted to be 67.5 dBA. Since the Bishopville Kingdom Hall of Jehovah's Witnesses has a masonry structure and fixed closed windows on the building, a noise reduction of 25 dBA was assumed, as shown in **Table 7.** The interior

noise level was calculated by subtracting the noise reduction factors from the predicted exterior levels for the Kingdom Hall. The interior noise level for Bishopville Kingdom Hall of Jehovah's Witnesses (REC-116) is 42.5 dBA, which is below the 52 dBA criterion for Activity Category D.

Table 7: Structural Noise Reduction Factors

Building Type	Window Condition	Noise Reduction owing to Exterior of the Structure
All	Open*	10 dB
Light Frame	Ordinary sash (closed)	20 dB
–	Storm windows	25 dB
Masonry	Single-glazed	25 dB
–	Double-glazed	35 dB

**The windows shall be considered open unless there is firm knowledge that the windows are, in fact, kept closed almost every day of the year.*

6. MITIGATION ALTERNATIVES AND CONSIDERATION

6.1 ACCEPTABLE NOISE ABATEMENT MEASURES

Noise abatement measures are considered when noise levels at receivers approach or exceed the FHWA NAC or when predicted noise levels substantially exceed existing noise levels. Noise abatement measures are intended to reflect or absorb highway traffic noise and reduce it to acceptable levels. Examples of noise abatement measures consist of noise walls, earthen berms, and depressed roadway segments. SCDOT's traffic noise policy discusses several abatement measures that can be used as a means for reducing or eliminating traffic noise impacts. The results of this analysis found that there would be no traffic noise impacts as a result of the proposed Bishopville Truck Route project. However, possible examples of abatement measures are described in the following sections.

6.1.1 Traffic Management Measures

Traffic management includes five measures for abating traffic noise, including (1) traffic control devices, (2) signing for the prohibition of certain vehicle types, (3) time-use restrictions for certain vehicle types, (4) modified speed limits, and (5) exclusive lane designations.

6.1.2 Alteration of Horizontal and Vertical Alignments

Altering the horizontal and vertical alignments of the highway can reduce noise levels for noise-sensitive receivers. Lowering the highway's vertical alignment can create a natural berm between the highway and the receivers. Shifting the highway's horizontal alignment away from noise-sensitive receivers and towards less sensitive receptors is another possible method.

6.1.3 Acquisition of Property Rights For Construction of Noise Barriers

The acquisition of property rights can be used for the construction of noise barriers. The cost of the property should be included in the reasonableness determination for the barrier. The property rights can be acquired either fee simple or through a lesser interest.

6.1.4 Acquisition of Property Rights to Create a Buffer Zone

Buffer zones are undeveloped open spaces that border a highway. Real property or other property interests may be acquired to serve as a buffer zone. This can be used to preempt development that may be adversely impacted by traffic noise. The use of buffer zones applies to predominantly unimproved property, not to purchase homes or other developed properties to create a noise buffer zone.

6.1.5 Noise Insulation of Public Use or Nonprofit Institutional Structures

Insulating buildings can reduce traffic noise. Sometimes this requires installing sound-absorbing material in the walls of the structure during construction. This method can be expensive because it requires air-conditioning to be installed once windows are sealed. Noise insulation can only be used for public use or nonprofit institutional structures. This would constitute places of worship, schools, hospitals, libraries, etc. Noise insulation can

only be used for interior traffic noise impacts, and since there are no predicted interior traffic noise impacts, noise insulation is not recommended.

6.1.6 Construction of Noise Barriers

Noise barriers are the most common type of noise abatement and are the only form of noise abatement required for consideration on federal or federal-aid projects, in accordance with 772.13(c)(1). Noise barriers are solid obstructions built between the highway and the receivers along the highway. The construction of noise barriers can be built either within or outside of the highway right-of-way. The noise barriers can include landscaping for aesthetic purposes.

Noise barriers must be high enough and long enough to shield a receiver from significant sections of the highway to provide adequate noise reduction. Access openings in the barrier reduce the effectiveness provided by the barrier. Economically, it is unreasonable to construct a barrier that will yield a small noise reduction. Another concern is that access openings (e.g., driveways and street crossings) are a safety hazard because of limited sight distance.

To provide sufficient noise reduction, a barrier's length would normally be eight times the distance from the barrier to the receiver. For example, a receiver located 50 feet (15 meters) from the barrier would require a barrier 400 feet (120 meters) long. An access opening of 40 feet (10 percent of the area) would limit its noise reduction to approximately 4 dBA.

6.2 NOISE ABATEMENT MEASURES RECOMMENDATIONS

Noise abatement measures were not recommended as there were not any impacted receivers under the Build Alternatives (see Section 5.3 and Table 5).

6.3 STATEMENT OF LIKELIHOOD

Abatement for traffic noise impacts as a result of the proposed SCDOT S-69-09 project is considered not feasible and is not likely.

7. CONSTRUCTION NOISE

The major construction activities for this project are expected to be earth removal, hauling, grading, and paving. Temporary and localized construction noise impacts will likely occur as a result of these activities. Temporary speech interference for passers-by and individuals living or working near the project can be expected. Noise levels in the study area will be increased during construction. The sound levels resulting from construction activities at nearby noise-sensitive receptors will be a function of the types of equipment utilized, the duration of the activities, and the distances between construction activities and nearby land use. Default sound levels from construction equipment used in FHWA's Roadway Construction Noise Model (RCNM) are shown in **Table 8.**

Pile-drivers and impact-hammers will cause temporary, sporadic, and acute construction noise impacts. Other equipment, such as paving equipment, produces more steady noise levels and, if operated at night, may interfere with sleep. Sporadic noise emissions from backup alarms and liftgate closures will be perceived as distinctly louder than the steady noise levels of construction equipment and will likely cause impacts to noise-sensitive receptors (residences).

Low-cost and easily implemented construction noise control measures should be incorporated into the project plans and specifications to the extent possible. These measures include but are not limited to, work-hour limits, equipment exhaust muffler requirements, haul-road locations, elimination of "tailgate banging," ambient-sensitive backup alarms, construction noise complaint mechanisms, and consistent and transparent community communication.

Earth removal, paving, grading, hauling, and pile-driving should be limited during evening/nighttime hours as well as on weekends and/or holidays. If meeting the project schedule requires that earth removal, grading, hauling, and/or paving must occur during the evening, nighttime, and/or weekend hours in the vicinity of residences, the contractor shall notify SCDOT as soon as possible. In such instances, all reasonable attempts shall be made to notify and to make appropriate arrangements for the mitigation of the predicted construction noise impacts upon the affected property owners and/or residents. Discrete construction noise abatement measures, including but not limited to portable noise barriers and other equipment-quieting devices, shall be considered.

Table 8: FHWA RCNM Default Noise Emission Reference Levels and Usage Factors

Equipment Description	Impact Device?	Acoustical Use Factor (%)	Spec 721.560 Lmax @ 50 ft (dBA, slow)	Actual Measured Lmax @ 50 ft (dBA, slow)
Auger Drill Rig	No	20	85	84
Backhoe	No	40	80	78
Boring Jack Power Unit	No	50	80	83
Chain Saw	No	20	85	84
Clam Shovel (dropping)	Yes	20	93	87
Compactor (ground)	No	20	80	83
Compressor (air)	No	40	80	78
Concrete Mixer Truck	No	40	85	79
Concrete Pump Truck	No	20	82	81
Concrete Saw	No	20	90	90
Crane	No	16	85	81
Dozer	No	40	85	82
Drill Rig Truck	No	20	84	79
Drum Mixer	No	50	80	80
Dump Truck	No	40	84	76
Excavator	No	40	85	81
Flatbed Truck	No	40	84	74
Front-End Loader	No	40	80	79
Generator	No	50	82	81
Generator (<25KVA, VMS signs)	No	50	70	73
Gradall®	No	40	85	83
Grader	No	40	85	N/A
Grapple (on backhoe)	No	40	85	87
Horizontal Boring Hydr. Jack	No	25	80	82
Hydra Break Ram	Yes	10	90	N/A
Impact Pile Driver	Yes	20	95	101
Jackhammer	Yes	20	85	89
Man Lift	No	20	85	75
Mounted Impact Hammer (hoe ram)	Yes	20	90	90
Pavement Scarifier	No	20	85	90
Paver	No	50	85	77
Pickup Truck	No	40	55	75
Pneumatic Tools	No	50	85	85
Pumps	No	50	77	81
Rock Drill	No	20	85	81
Roller	No	20	85	80
Scraper	No	40	85	84
Shears (on backhoe)	No	40	85	96
Tractor	No	40	84	N/A
Vibratory Concrete Mixer	No	20	80	80
Vibratory Pile Driver	No	20	95	101
Warning Horn	No	5	85	83
Welder/Torch	No	40	73	74

Source: United States Department of Transportation 2006

8. CONCLUSION

A total of 119 receivers were analyzed in the model. All sites along the proposed segments were categorized as either Activity Category B, C, D, or E of the FHWA NAC. The analysis did not find any traffic noise impacts.

There are no traffic noise impacts for Alternatives 1 through 12.

9. REFERENCES

Final Report on Project 25-34 Supplemental Guidance on the Application of FHWA's Traffic Noise Model (TNM) Appendix B Signalized Interchanges, Intersections, and Roundabouts. NCHRP. March 2014

Procedures for Abatement of Highway Traffic Noise and Construction Noise, FHWA Regulation 23 CFR 772. https://www.ecfr.gov/cgi-bin/text-idx?c=ecfr;sid=1253e5cedf4b79ecfc5150fe9d7d00e7;rgn=div5;view=text;node=23%3A1.0.1.8.44;idno=23;cc=ecfr. Accessed February 18, 2020

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SCDOT Traffic Noise Abatement Policy, South Carolina Department of Transportation (SCDOT). September 1, 2014

Techniques for Reviewing Noise Analyses and Associated Noise Reports, FHWA. https://www.fhwa.dot.gov/environment/noise/resources/reviewing_noise_analysis/#toc494123461. August 7, 2018.

BISHOPVILLE TRUCK ROUTE PROJECT (S-69-08)

TRAFFIC NOISE ANALYSIS

APPENDICES

Prepared for:

Federal Highway Administration

&

South Carolina Department of Transportation

July 20212020

BISHOPVILLE TRUCK ROUTE PROJECT (S-69-08)

TRAFFIC NOISE ANALYSIS

APPENDICES

APPENDIX A
TRAFFIC MEMORANDUM

Technical Memorandum

To: *Bishopville Noise Project File*

From: *CDM Smith Traffic Team*

Date: *May 20, 2020*

Subject: *Traffic Volumes Used in the Noise Model*

Introduction

This technical memorandum was created to provide detailed clarifications to the source of the traffic volumes used by the noise model. The South Carolina Statewide Model Version 4 (SCSWMv4) was used as a starting point from which a Lee County Subarea model was developed and validated using existing 2015 counts. All traffic volumes were generated from the Lee County Subarea Travel Demand Model. To make the analysis more area specific, a Bishopville Study Area Model, which included downtown Bishopville was developed from the Lee County Subarea model and was validated using 2015 ground counts.

The limits of the noise model overlap the data collection areas for St. Charles Highway, which showed higher volumes in the south and lower volumes in the north adjacent to U.S. 15. The volume used in the noise model is an estimated volume between the north and south volumes intended to capture the shift in volume.

Specifically, the noise model used traffic volumes from five scenarios – Existing Year (2015), Future Year (2045) No-Build, Future Year (2045) Build Alternative 1, Future Year (2045) Build Alternative 2, Future Year (2045) Build Alternative 3 and Future Year (2045) Build Alternative 4. The process of obtaining the traffic volumes for each scenario can be summarized into two categories:

1. Existing Year (2015)

Three sources of AADT and ADT information were evaluated to accurately depict existing traffic in Bishopville: 2015 SCDOT AADT volume estimations, 48-hour mechanical counts, and 2015 volume estimations from the Travel Demand Model. By comparing these three sources, estimated 2015 AADTs were determined for the roadway segments needed for the noise model: U.S. 15, Bethune Highway, S.C. 341 and St. Charles Highway.

2. Future Year (2045)

A conservative estimate of traffic growth was desired for this study in order to ensure that the physical elements of the proposed roadway and its intersections with U.S. 15 are adequate. The Travel Demand Model showed variation in growth across the study area, so the growth factors for each individual segment were averaged, resulting in a growth factor of 1.75. This value was

considered appropriate and was applied directly to the 2015 volumes to determine Future Year (2045) No-Build volumes. These volumes were rounded to the nearest 100.

Volumes for the alternatives were also determined using the Travel Demand Model. The ratio of Travel Demand Model Build Alternative volumes to Travel Demand Model No Build volumes was calculated for each alternative scenario and applied to the Future Year (2045) No-Build volumes for the existing segments.

To determine volumes for the different halves of the alternative, this calculation varied slightly. The southeastern alternative segment between U.S. 15 and S.C. 341 was compared to its parallel segment of U.S. 15 south of S.C. 341 in the Travel Demand Model and this ratio was applied to the same segment in the Future Year (2045) No-Build to get a volume for the alternative. To determine the ratio for volumes on the northern alternative segment between S.C. 341 and U.S. 15, the Travel Demand Model volume on U.S. 15 north of downtown and the volume on S.C. 341 east of downtown was used, assuming that the alternative volume was composed of traffic from these two locations. This was done because it appears that, based on existing travel routes, S.C. 341 volumes would make up a higher proportion of volumes traveling on the northeastern alternative segment.

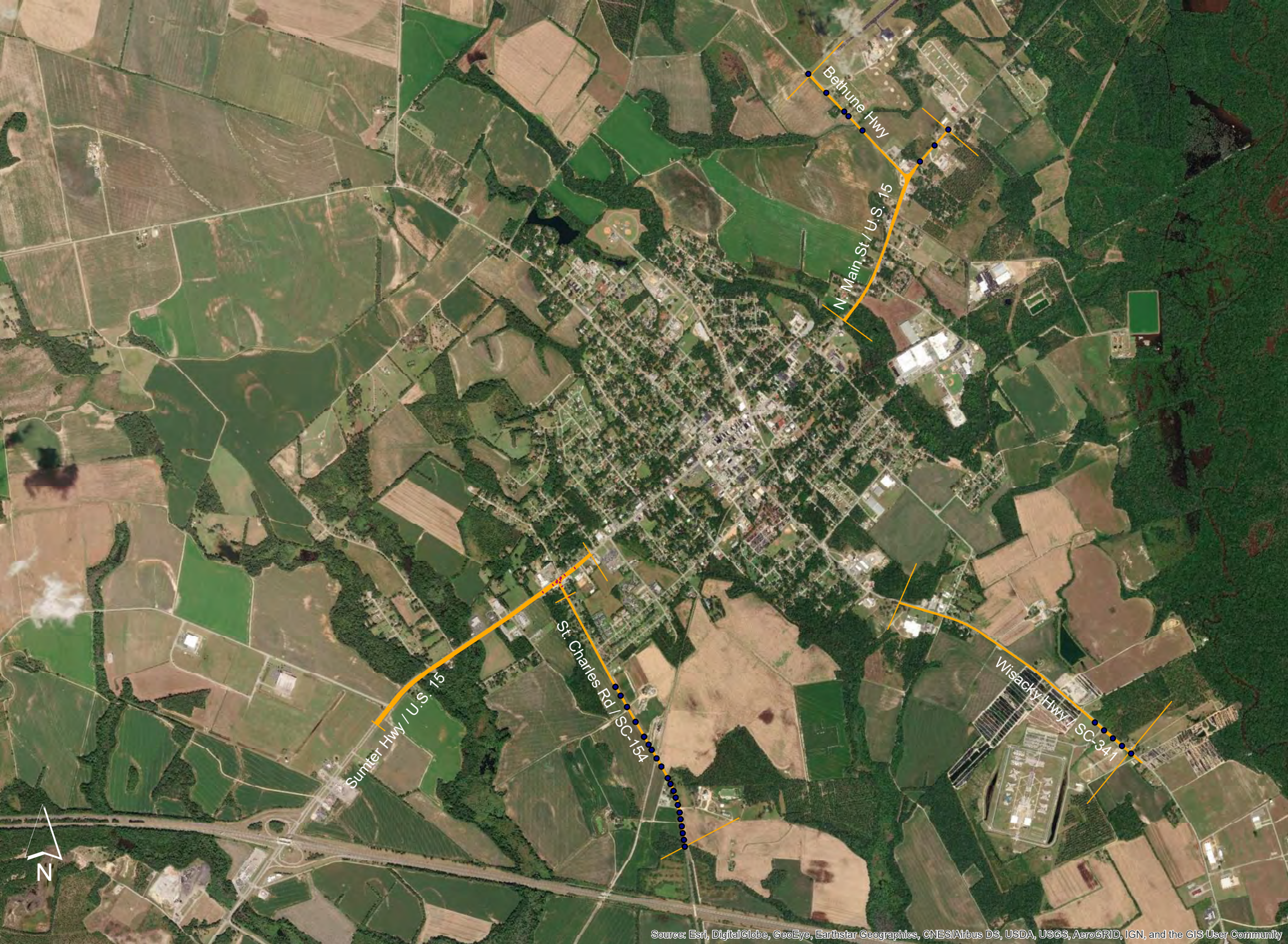
Attached are the maps of traffic volumes used for each of the five scenarios of the noise model.

The K Factor (Existing 2015 and Future Year 2045)

The K factor is the percentage of AADT occurring in the peak hour. For this study, K factors were determined for primary routes in the study area using mechanical counts collected over a 48-hour period in September of 2015. For each respective location, the highest hourly volume was determined for each day and the sum of these volumes was divided by the total 48-hour volume. It was assumed that the peak characteristics would be similar in the future and that the K factors for the new alternative routes would mirror their parallel U.S. 15 routes. Therefore the K factor for U.S. 15 between Browntown Road and Church Street was applied to the segment of the alternative between Browntown Road and S.C. 341, and the K factor for U.S. 15 between Church Street and Bethune Highway was applied to the segment of the alternative between S.C. 341 and Bethune Highway.

Vehicle Classification

Vehicle classification was determined for the roadway segments needed for the noise model by examining the collected 2015 48-hour mechanical counts during the same periods identified by the k factors. The class breakdowns shown in these counts were used to identify automobiles (FHWA class 1-3), single unit trucks also known as medium trucks (FHWA class 4-7), and heavy vehicles also known as heavy trucks (FHWA class 8-13). The classification was assumed to remain constant across periods, and vehicle classification on the new alternative routes was expected to be the same as their parallel U.S. 15 segment north or south of S.C. 341.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N. Main St / U.S. 15
Sumter Hwy / U.S. 15
St. Charles Rd / SC-154
Wisacky Hwy / SC-341
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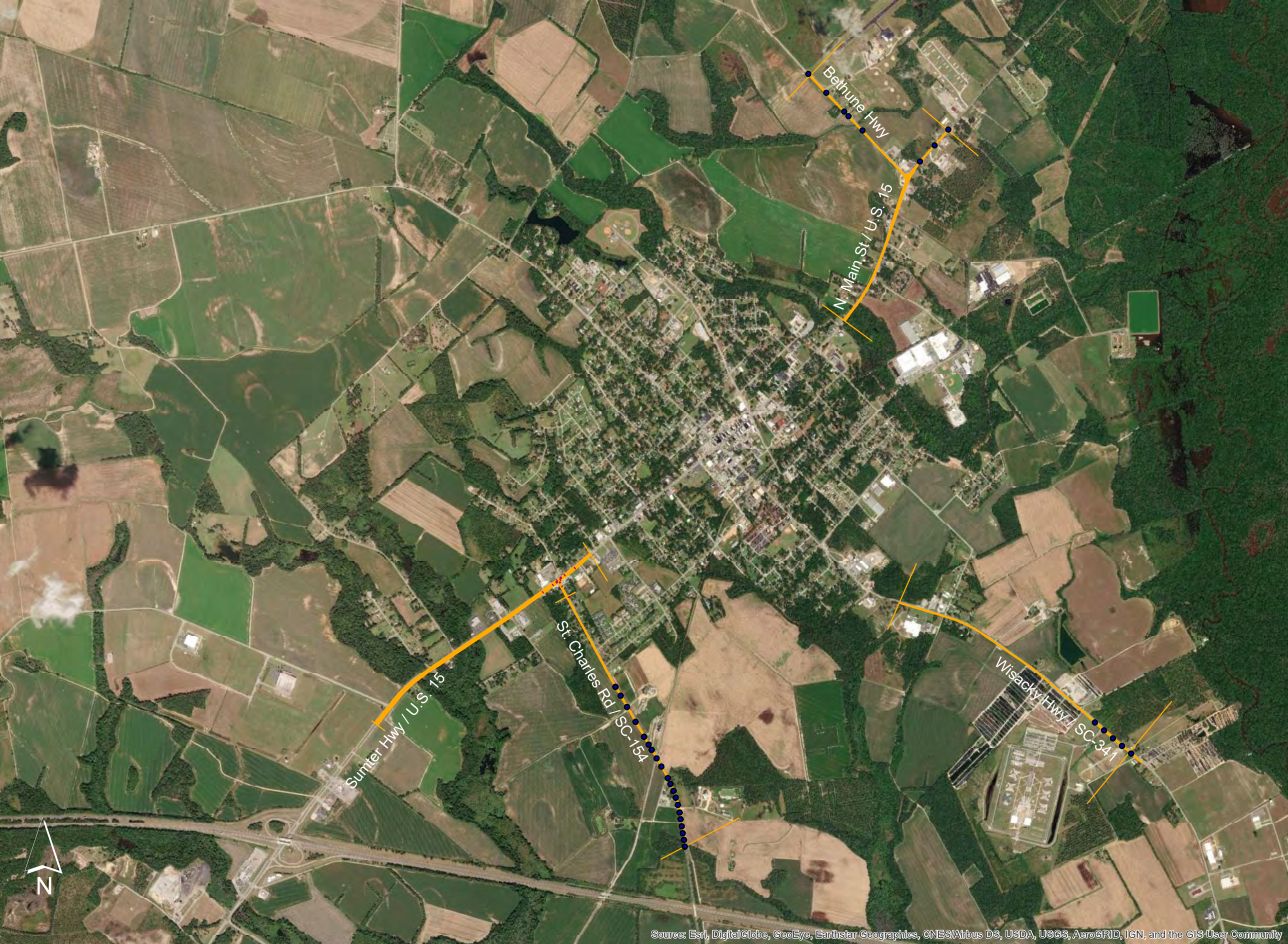
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community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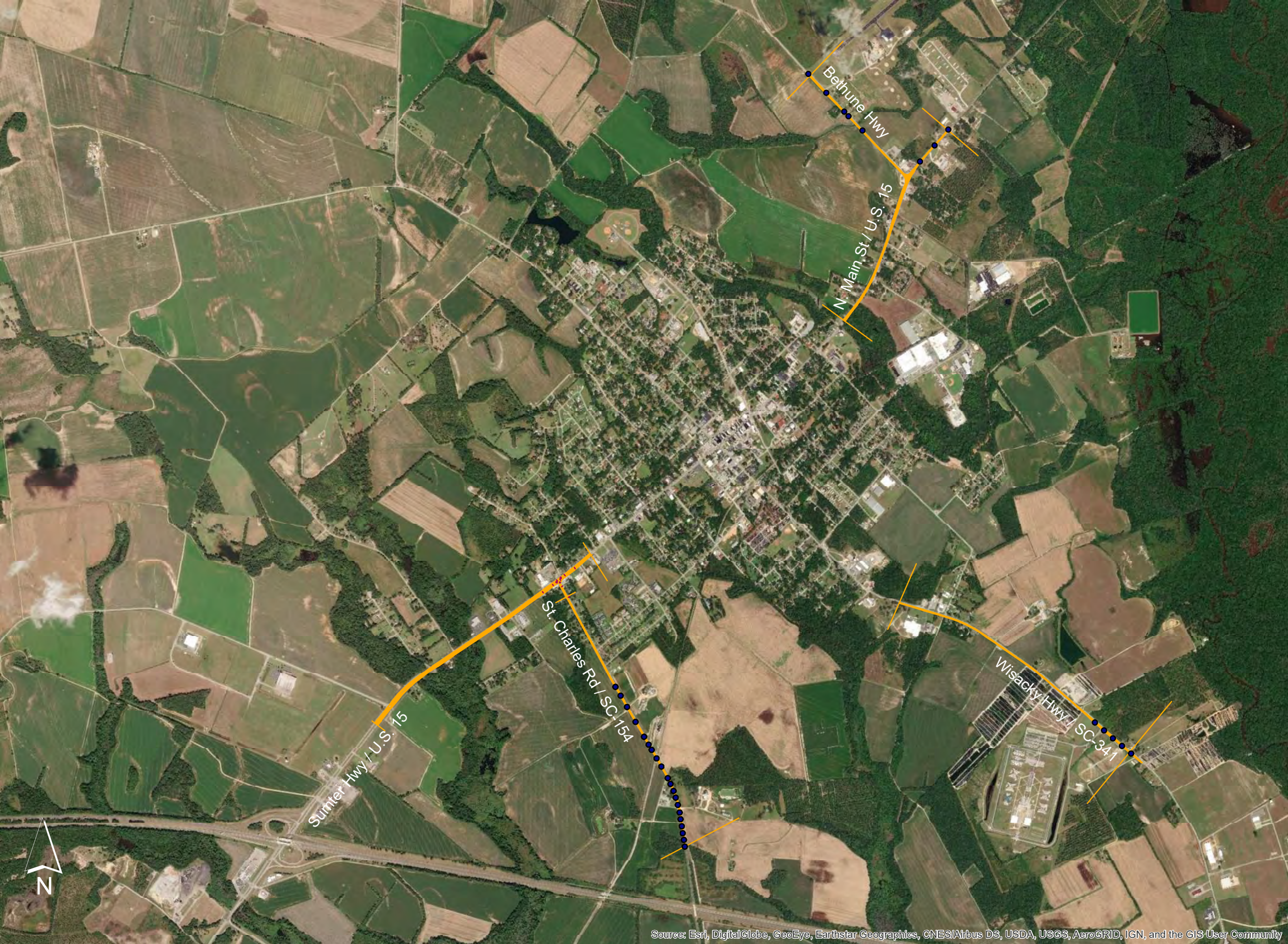
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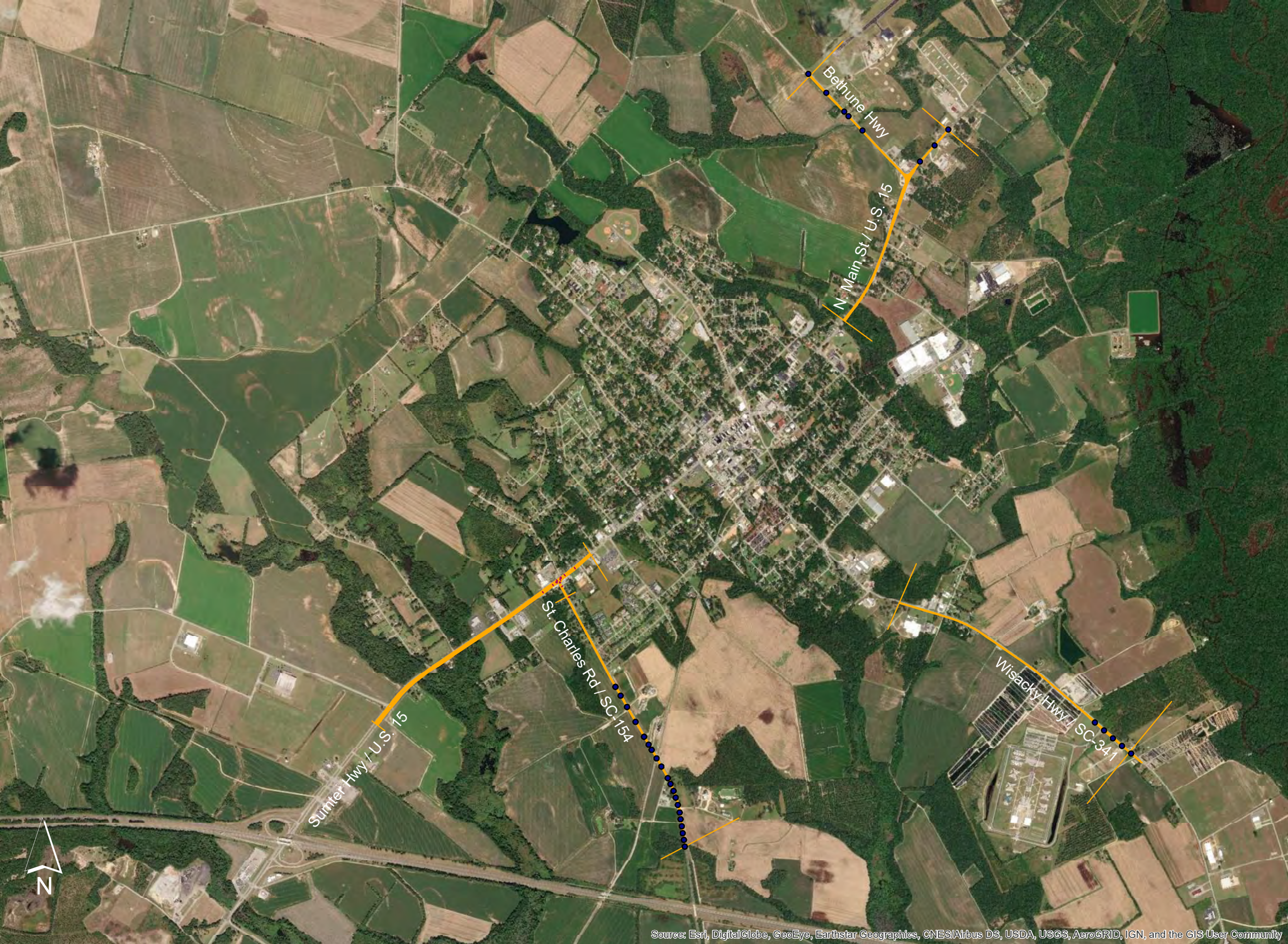
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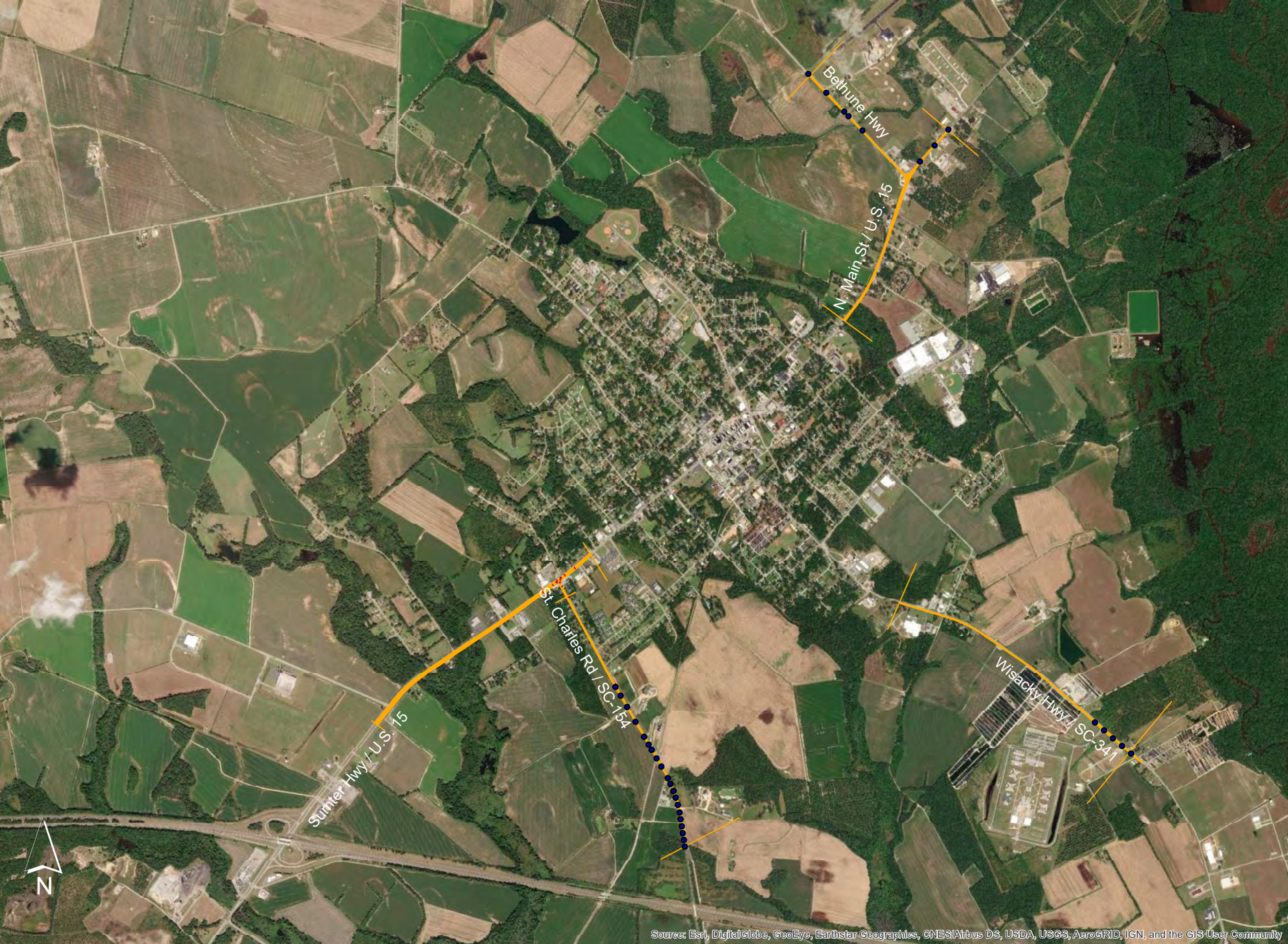
Bethune Hwy
N. Main St / U.S. 15
St. Charles Rd / SC-154
Sumter Hwy / U.S. 15
Wisacky Hwy / SC-341
N
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

BISHOPVILLE TRUCK ROUTE PROJECT (S-69-08)

TRAFFIC NOISE ANALYSIS

APPENDICES

APPENDIX B
NOISE MODEL VALIDATION AND ASSUMPTIONS

BISHOPVILLE TRUCK ROUTE PROJECT (S-69-08) NOISE MODEL VALIDATION AND ASSUMPTIONS

Prepared for:

Federal Highway Administration

&

South Carolina Department of Transportation

January 2020

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1. INTRODUCTION

1.1 PROJECT BACKGROUND

The environmental review process under the National Environmental Policy Act (NEPA) for the Proposed Bishopville Truck Route Project began in 2010 with an Environmental Assessment (EA), which was completed in the fall of 2012. The EA identified seven alternatives to provide alternate routes for large trucks traveling through downtown Bishopville on U.S. 15/Main Street. A number of individuals opposed the project at the November 2012 Public Hearing and subsequently, the City of Bishopville and Lee County could not agree on a preferred alternative. In February of 2015, a Public Information Meeting was held to update the public on the project status and present options for moving forward. Because of anticipated strong public opinion associated with the project, FHWA directed SCDOT to reinitiate the environmental planning process and prepare an Environmental Impact Statement (EIS).

1.2 PURPOSE & NEED

The purpose of the Bishopville Truck Route Project (S-69-08) is to reduce the volume of truck traffic traveling along U.S. 15/Main Street through downtown Bishopville and enhance the economic development within the designated area in Bishopville, South Carolina.

1.3 STATEMENT OF COMPLIANCE

This study will follow the Federal Highway Administration's (FHWA) 23 CFR 772, *Procedures for Abatement of Highway Traffic Noise and Construction Noise* and the *South Carolina Department of Transportation Traffic Noise Abatement Policy, August 2014*.

According to FHWA and SCDOT, there are three types of projects:

- ***Type I Project***- a proposed Federal or Federal-aid highway project for the construction of a highway on new location or the physical alteration of an existing highway which significantly changes either the horizontal or vertical alignment or increases the number of through-traffic lanes.
- ***Type II Project***- a proposed Federal or Federal-aid highway project for noise abatement on an existing highway.
- ***Type III Project***- a Federal or Federal-aid highway project that does not meet the classifications of a Type I or Type II project. Type III projects do not require a noise analysis.

The Proposed Bishopville Truck Route project is a Type I project as designated in FHWA 23 CFR 772, based on the project proposing the construction of a highway on a new location.

2. BASELINE CONDITIONS

2.1 FIELD MEASUREMENTS

Noise measurements were collected on November 6 and 8, 2019 to determine existing noise levels, validate the FHWA Traffic Noise Model (TNM) version 2.5, and to define baseline conditions in noise sensitive areas where traffic is not a dominant noise source. Noise measurement locations consisted of twelve locations, five near the existing roadway network (where the dominant noise source is traffic) and seven noise sensitive areas where roadway traffic is not a major noise source. Following SCDOT policy, noise measurements were taken approximately 30 meters (100 feet) from the centerline of the existing roadway if possible, and in areas of human/recreational activity for areas where roadway traffic is not a dominant source. The following identifies the noise measurement sites.

Locations where traffic noise is the dominant noise source are listed below. A calibrated Type II sound level meter was used to collect noise measurements during the heaviest traffic periods (free flow traffic conditions) during the morning and afternoon peak traffic hours[1]. Readings were taken in 15-minute intervals and corresponding manual traffic counts were conducted for the various vehicle classification types at the following locations:

- Site #1: Bishopville Kingdom Hall of Jehovah's Witnesses on S.C. 341 (Bethune Highway)
- Site #2: Bishopville next to the Head Start Early Head Start Center on U.S. 15
- Site #6: S.C. 341 (Wisacky Highway) east of Wags Drive
- Site #8: S.C. 154 (St. Charles Road) south of Maple Drive
- Site #12: Piedmont Cemetery on U.S. 15

Noise measurements taken where traffic is not a dominant noise source are listed below. A calibrated Type II sound level meter was used to collect noise measurements. Readings were taken for 30-minute intervals.

- Site #3: Lynches River Apartments
- Site #4: Robert E. Lee Academy
- Site #5: Azalea Drive in the Dogwood Road neighborhood
- Site #7: Magnolia Drive in the Maple Drive neighborhood
- Site #9: Liberty Hill Baptist Church on Dove Lane
- Site #10: Edgefield Drive in the Edgefield Drive neighborhood
- Site #11: Wilkinson Road behind CSC Community Pharmacy Pediatrics

1 Readings were taken when traffic conditions were heavy but still flowing at or near the posted speed to capture worst-case noise levels in the field.

Weather data was collected from the local weather station. Weather conditions during all noise measurements were within acceptable parameters as identified in *FHWA's Noise Measurement Handbook* (2018).

2.2 FIELD MONITORING RESULTS

The first step in a noise analysis is measuring ambient noise levels at various locations in the study area. Noise from natural and mechanical sources in addition to human activity typically constitutes the ambient noise in an area. Ambient noise level measurements quantify the existing acoustic environment and provide a baseline for assessing the impact of future noise levels to the receptors in the vicinity of the proposed action resulting from increased traffic and the new roadway alignment. Field measurements assist in evaluating the level of noise reduction that may be provided by existing elements such as fences and scattered vegetation that cannot be precisely modeled by the computer. This information will be an important consideration in determining noise impacts and the evaluation of related noise abatement measures for the project.

Noise levels were measured at 12 locations, as shown in **FIGURE 1**. Traffic volumes were counted during noise measurements at five of these locations. The sites are: Sites # 1, 2, 6, 8, and 12. Traffic volumes and speeds were not counted at Sites # 3, 4, 5, 7, 9, 10, and 11 because these sites represent neighborhood and park space where traffic noise is not the major noise source. As a result, these sites were not used as part of the TNM validation. However, the noise readings were used to determine the ambient noise levels within those Common Noise Environment (CNE) areas (see section 3.2).

Outdoor measurements were taken using a Type II SoundPro DL sound level meter on November 6 and 8, 2019. The noise meters were placed five feet above the ground level. Noise levels were measured for 30 minutes at each ambient location and 15 minutes for each model location where traffic data was collected. The equivalent steady-state sound level (L_{eq}) was collected for each site logged in one-minute intervals. One-minute data logging helps to determine any aberrant noise events at each site. The traffic counts at Sites # 1, 2, 6, 8, and 12 were categorized into automobiles, medium trucks, and heavy trucks. Associated documents for the ambient and model noise measurements are provided in **Appendix C**. No interior noise level measurements were performed.

A summary of measured noise levels is provided in **Table 1**. Measured noise levels ranged from 55.6 dBA to 67.5 dBA. A summary of output from the noise meter at each location is included in **Appendix B**.

Figure 1: Noise Measurement Locations

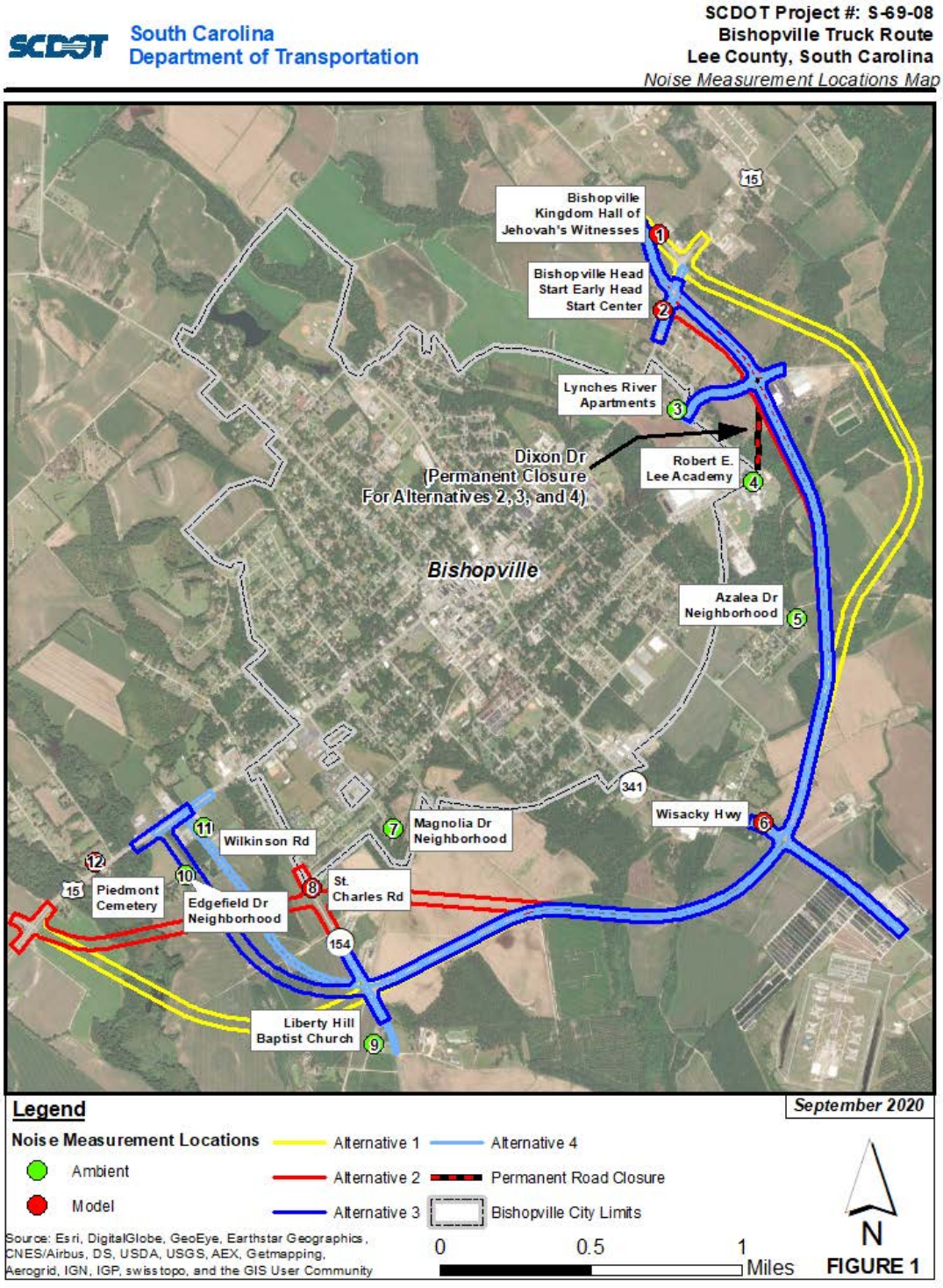


Table 1: Measured Noise Levels

Monitoring Location	Monitored Period	Location	Land Use	Leq (dBA)
1	11/6/19 8:48 AM-9:03 AM	Bishopville Kingdom Hall of Jehovah's Witnesses- S.C. 341 (Bethune Highway)	Church	65.8
2	11/6/19 8:25 AM-8:41 AM	Next to Bishopville Head Start Early Head Start Center- U.S. 15	Agriculture/School	66.0
3	11/8/19 9:13 AM-9:42 AM	Lynches River Apartments Academy Road	Residential, Agriculture, Manufacturing	56.0
4	11/8/19 9:53 AM-10:23 AM	Robert E. Lee Academy Cousar Street	School, Manufacturing	62.5
5	11/8/19 10:51 AM-11:21 AM	Azalea Drive	Residential, Agriculture	55.6
6	11/8/19 12:55 PM-1:10 PM	S.C. 341 (Wisacky Highway)	Residential, Agriculture	62.4
7	11/6/19 11:19 AM-11:49 AM	Magnolia Drive	Residential	56.0
8	11/6/19 7:52 AM-8:07 AM	S.C. 154 (St. Charles Road)	Residential	62.1
9	11/6/19 11:57 AM-12:27 PM	Liberty Hill Baptist Church S.C. 154 (St. Charles Road)	Church	55.9
10	11/6/19 10:04 AM-10:34 AM	Edgefield Drive	Residential	56.2
11	11/8/19 12:05 PM-12:35 PM	Wilkinson Road	Agriculture, Residential, Medical, Daycare	56.5
12	11/6/19 7:24 AM-7:39 AM	Piedmont Cemetery U.S. 15 (Main Street)	Cemetery	67.5

3. MODEL VALIDATION

3.1 NOISE MODEL VALIDATION

Traffic counts and equivalent hourly volumes were recorded during the 15-minute noise measurements and are summarized in **Table 2**.

Table 2: Traffic Volume Collected During Noise Monitoring

Monitoring Location	Road Name	Speed (mph)	Direction	Equivalent Hourly Traffic Volume				
				A	MT	HT	B	MC
1	S.C. 341 (Bethune Highway)	55	EB	64	-	8	-	-
			WB	128	-	32	-	-
2	U.S. 15- Bishopville Head Start	40	NB	192	-	32	-	-
			SB	196	4	32	-	-
6	S.C. 341 (Wisacky Highway)	45	NW	120	4	8	-	-
			SW	112	8	8	-	-
8	S.C. 154 (St. Charles Road)	40	WB	44	-	4	-	-
			EB	36	-	4	-	-
12	U.S. 15- Piedmont Cemetery	45	NB	432	20	28	12	-
			SB	320	4	24	4	-

Key: EB = eastbound, WB = westbound, A = automobiles, MT = medium truck, HT = heavy truck, B= buses, MC = motorcycles

Noise levels were modeled for the existing conditions using traffic volumes collected during noise monitoring. The modeled noise levels were compared against the monitored noise levels to evaluate the accuracy of the model setup. The measured and modeled noise levels are shown in **Table 3**. The FHWA and SCDOT accept modeled noise levels that are within +/- 3.0 dBA. All locations are within FHWA and SCDOT's tolerance.

Table 3: Measured and Modeled Noise Levels

Monitoring Location	Time Period	Measured Leq (dBA)	Modeled Leq (dBA)	Difference (dBA)
1	8:48 AM-9:03 AM	65.8	66.3	0.5
2	8:25 AM-8:41 AM	66.0	64.9	-1.1
6	12:55 PM-1:10 PM	62.4	61.3	-1.1
8	7:52 AM-8:07 AM	62.1	61.1	-1.0
12	7:24 AM-7:39 AM	67.5	65.2	-2.3

Difference = Measured Leq minus Modeled Leq

3.2 COMMON NOISE ENVIRONMENT DETERMINATION

A common noise environment (CNE) as defined for this study is a group of receptors within the same Activity Category that are exposed to similar noise sources, levels, and topographic features. Six CNE's were identified for the ambient receiver locations where traffic noise is not the predominant source. These six locations are distinct geographic areas in the study area containing noise-sensitive land uses that can be considered similar in acoustical environment. The CNE's in the study area are shown in **Figure 2** below.

A discussion of existing conditions for each CNE is provided below.

3.2.1 CNE-A

CNE-A (Site # 10) encompasses the Edgefield Drive neighborhood south of U.S. 15. It spans from the western end of Edgefield Drive to Wilkinson Road. The area is comprised of residential uses and is surrounded by farmland and other undeveloped land. Noise monitoring occurred on a vacant lot on Edgefield Drive west of Wilkinson Road where an ambient noise level of 56.2 dBA was measured, which is representative of the noise levels within this CNE. The major noise sources at this location are daily human activity and the sounds of the natural environment.

3.2.2 CNE-B

CNE-B (Site # 11) is the area surrounding the Lee County Council on Aging. It is between Wilkinson Road and S.C. 154 (St. Charles Road) spanning from the back of CSC Community Pharmacy Pediatrics to Edgefield Drive. The area is comprised of the Lee County Council on Aging, and undeveloped land. Noise monitoring occurred on undeveloped land between CSC Community Pharmacy Pediatrics and the Lee County Council on Aging. An ambient noise level of 56.5 dBA was measured, which represents the noise levels in this CNE. The major noise sources in this area are daily human activity and

the sounds of the natural environment.

3.2.3 CNE-C

CNE-C (Site # 7) comprises the Magnolia Drive neighborhood east of S.C. 154 (St. Charles Road). The area spans from S.C. 154 (St. Charles Road) to Magnolia Drive and encompasses the houses within this area in addition to the first row of apartments north of South Lee Street. This area is predominantly residential and is surrounded by farmland. Noise monitoring occurred on a vacant lot at the end of Magnolia Drive. An ambient noise level of 56.0 dBA was measured, which is representative of noise levels in this CNE. The major noise sources in this area are daily human activity and sounds of the natural environment. A rail line is located within the CNE. Although the rail line is active, no train traffic was observed during the field visit. According to the U.S. DOT Crossing Inventory Form for crossing number 623917P, the rail crossing in this area has 2 total day through trains and 2 total night through trains.

3.2.4 CNE-D

CNE-D (Site # 9) encompasses the area around Liberty Hill Baptist Church. The area spans approximately from the intersection of S.C. 154 (St. Charles Road) and Dove Lane southward to Woodside Road. The area contains the Liberty Hill Baptist Church, residential uses, and farmland. An ambient noise level of 55.9 dBA was measured at this location, which is representative of the noise levels within this CNE. The major noise sources in this area are sounds of the natural environment.

3.2.5 CNE-E

CNE-E (site #5) comprises the Wags Drive and Azalea Drive neighborhoods. The area spans from the northernmost point of Dogwood Drive to about 200 feet north of S.C. 341 (Wisacky Highway). The area predominately contains residential uses and farmland. An ambient noise level of 55.6 dBA was measured at this location, which represents the noise levels in this CNE. The major noise sources in this area are daily human activity and the sounds of the natural environment.

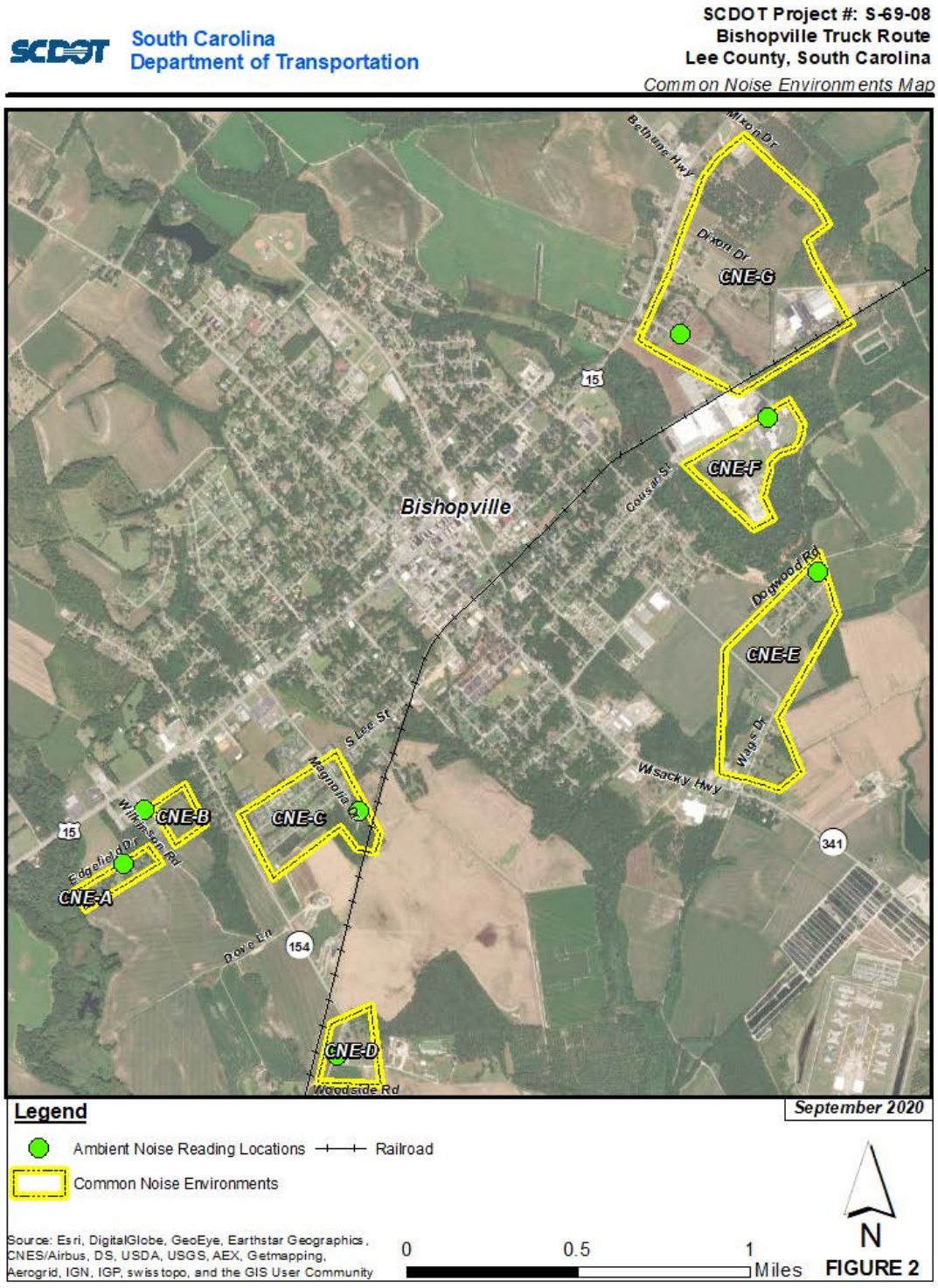
3.2.6 CNE-F

CNE-F (Site # 4) encompasses the area around Robert E. Lee Academy (Cousar Street). The area spans from the western tree line across from South Atlantic Canners to the eastern boundary of Robert E. Lee Academy next to the football field. The area comprises Robert E. Lee Academy and its sporting fields, a vacant lot, and a truck parking lot. An ambient noise level of 62.5 dBA was measured at this location. It is important to note that manufacturing noise from the Ardagh Metal Beverage facility is the dominant noise source in this area. A rail line is located within the CNE. Although the rail line is active, no train traffic was observed during the field visit. According to the U.S. DOT Crossing Inventory Form for crossing number 632902A, the rail crossing in this area has 2 total day through trains and 2 total night through trains.

3.2.7 CNE-G

CNE-G (Site # 3) comprises the agricultural and residential area to the east of U.S. 15 to the northeast of Bishopville city limits. This area encompasses Park at the Bay Warehouse, LLC, Tabernacle of Champions church and Lynches River Apartments. The area spans south of Dixon Drive to Mixon Drive to the north. The area is located to the east of U.S. 15 to the back of Park at the Bay Warehouse, LLC. The area has a mix of residential, religious centers, warehousing, and undeveloped land. An ambient noise reading was taken at Lynches River Apartments where a noise level of 56.0 dBA was measured. The predominant noise sources in this area are daily human activities, but manufacturing noises could be heard from the noise monitoring location.

Figure 2: Common Noise Environments



4. MODEL INPUTS

4.1 MODEL INPUTS

The section below describes the TNM input parameters, including the roadways, structures, and terrain features. Although SCDOT's noise policy was updated in October of 2019, the parameters below will follow SCDOT's previous *Traffic Noise Abatement Policy*, August 25, 2014. Since the project was started under the previous noise policy FHWA determined that this project would continue under 2014 policy. A preliminary noise model will be developed for each of the reasonable alternatives, and a design model developed for the preferred alternative only. It is anticipated the design model will include design features that are associated with 30% design plans.

4.1.1 ROADWAYS TO BE MODELED

The following roadways and their respective number of lanes will be modeled in the existing and build models:

- U.S. 15 will be modeled as a 4 lane road south of the City of Bishopville and 2 to 3 lane road north of the City of Bishopville
- S.C. 341 (Wisacky Highway) will be modeled as a 2 lane road
- S.C. 154 (St. Charles Road) will be modeled as a 2 lane road
- S.C. 341 (Bethune Highway) will be modeled as a 2 lane road
- Proposed Bishopville Truck Route (Reasonable Alternatives) will be modeled as a 2 lane road

The horizontal and vertical coordinates and elevations for each travel lane and/or turn lanes based on existing conditions and roadway configurations will be included in the model. Existing posted speeds will be used in the model for the roadways listed above. The proposed truck route will be modeled at 55 mph.

4.1.2 SHOULDERS

Roadway shoulders will be modeled in TNM 2.5 as a separate TNM roadway with no traffic within the build design model for the reasonable alternatives only.

4.1.3 MEDIANS

Only paved medians will be included in the TNM. The paved medians will be modeled in TNM 2.5 as a separate roadway with no traffic assigned to them.

4.1.4 GROUND ZONES

Ground zones will be added (if required) where the non-default ground type is between the roadway and receiver only in the build design model for the preferred alternative.

4.1.5 TERRAIN LINES

Terrain lines will only be included where there are changes in elevation greater than 5 feet. A terrain line was added at the Piedmont Cemetery adjacent to U.S. 15. Terrain lines will be added in the model in any roadway sections that will be on structure.

4.1.6 STRUCTURES

Building rows will be included in the build design model for the preferred alternative in locations where the percentage of buildings is greater than 20 percent. No more than two building rows in depth will be included in the model. Heights will be estimated per structure type and pictures will be included in the report.

4.1.7 TNM RECEIVERS

Receiver locations will be placed in exterior locations at structures or land uses with an Activity Category of B, C, D, and E within 550 feet of the Reasonable Alternatives. No Category A land uses were identified within the buffer area. **Figure 3** shows the proposed TNM receiver locations to be used in the existing and build models. **Figure 4** is an inset map of proposed TNM receiver locations 1 through 44. **Figure 5** shows an inset map of proposed TNM receiver locations 45 through 73. **Figure 6** is an inset map showing proposed TNM receiver locations 74 through 123.

Figure 3: Proposed TNM Receiver Locations

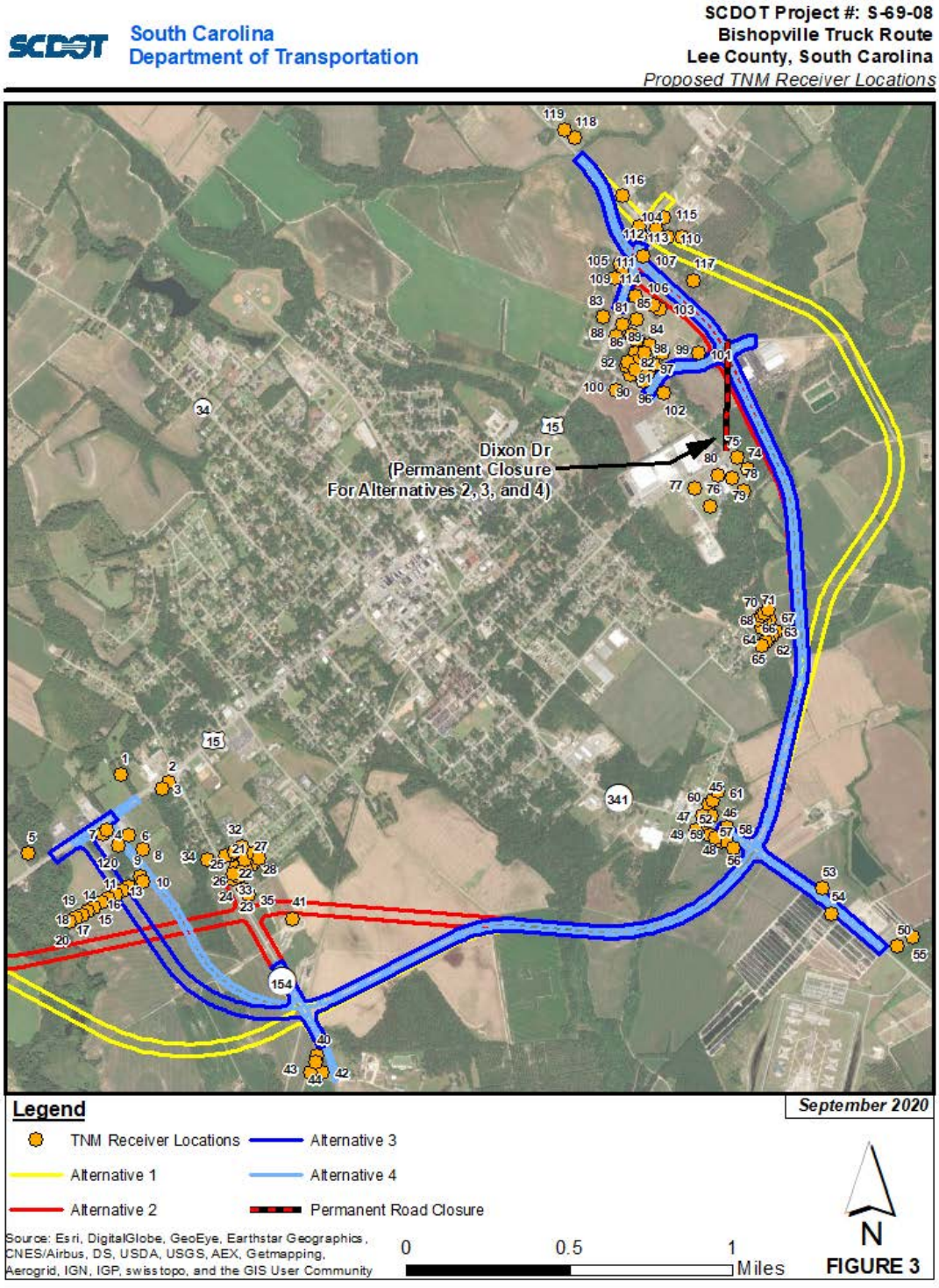


Figure 4: Proposed TNM Receiver Locations Inset Map 1

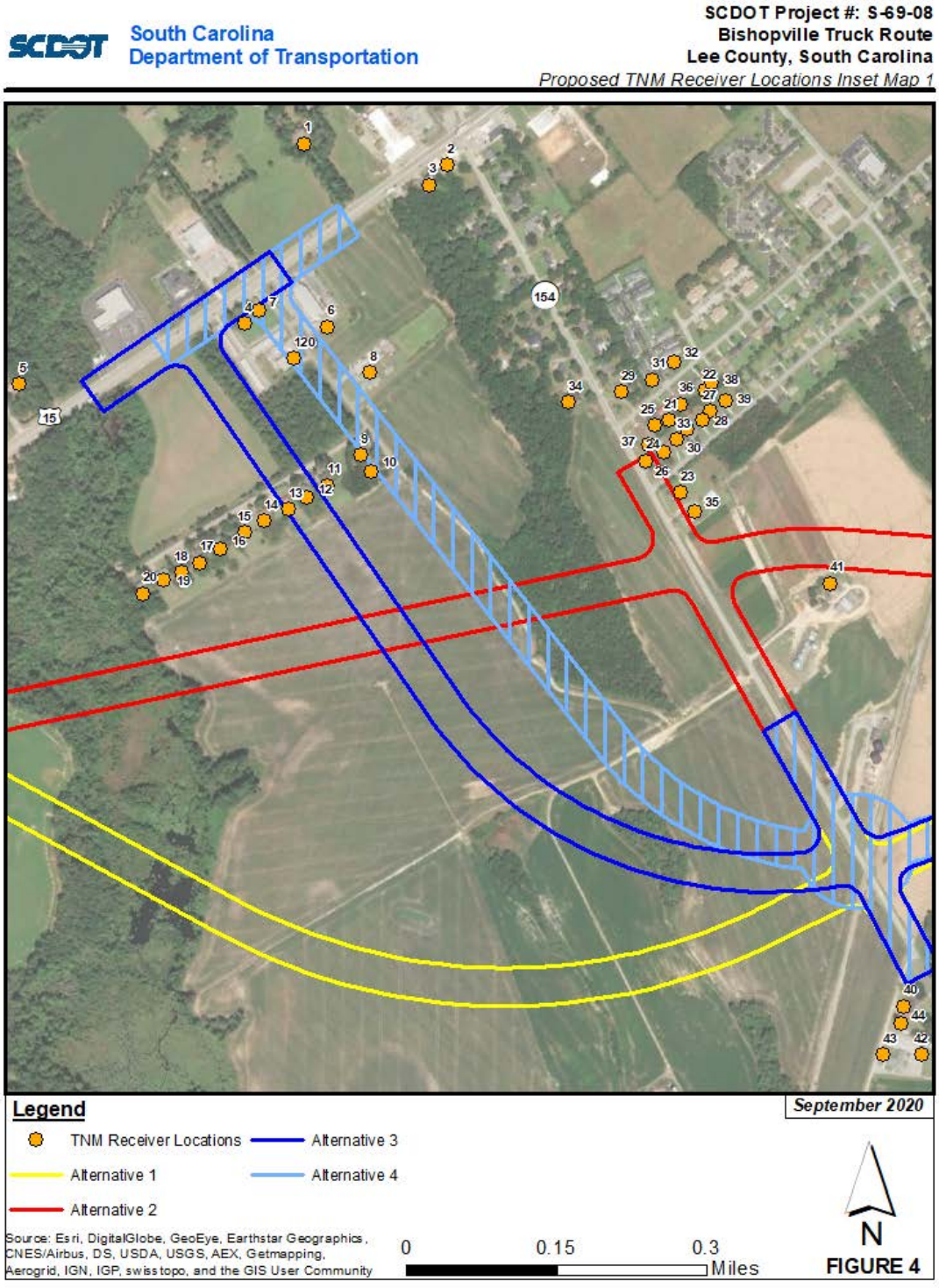


Figure 5: Proposed TNM Receiver Locations Inset Map 2

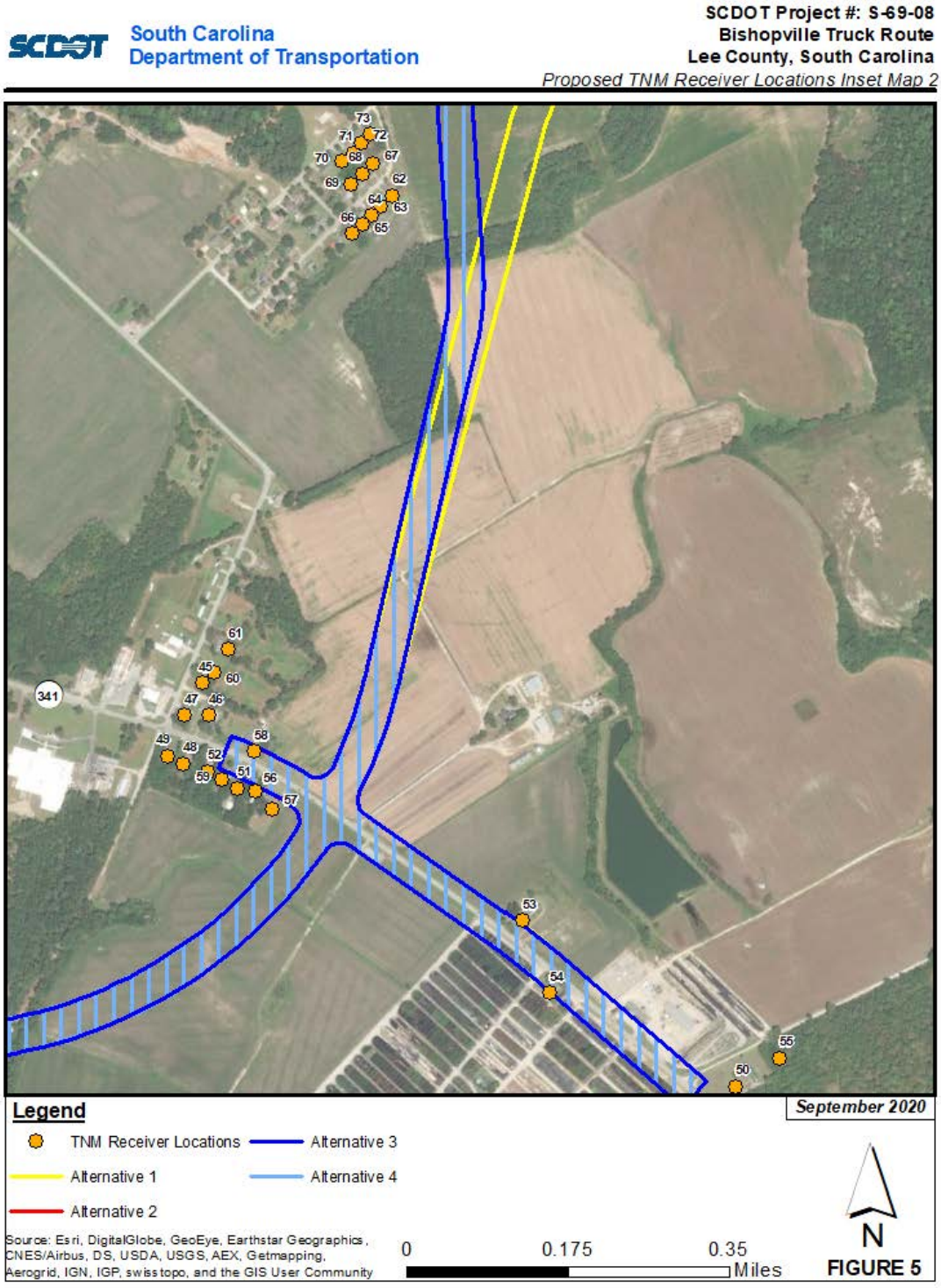
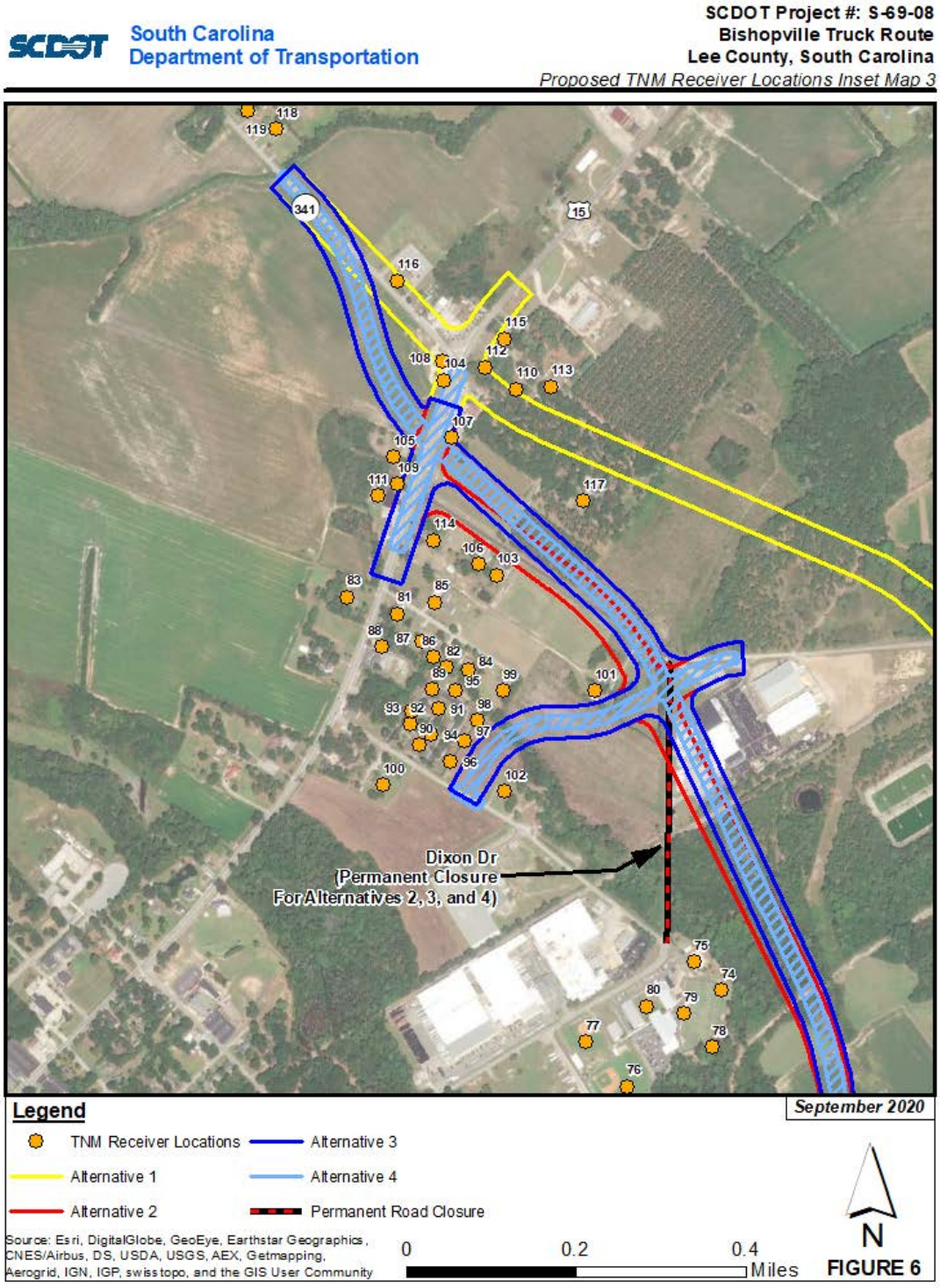


Figure 6: Proposed TNM Receiver Locations Inset Map 3



4.2 TRAFFIC VOLUMES

4.2.1 TNM ROADWAY VOLUMES

The Lee County Subarea traffic model was developed for a base year of 2015 and a forecast year of 2045. Traffic volumes for each of the existing modeled roadways and the reasonable alternatives have been provided as Average Annual Daily Traffic (AADT).

Traffic volumes for the TNM scenarios will calculated as Design Hourly Volume (DHV). DHV is calculated by multiplying the existing and projected AADT volumes by the K Factor established for the study area. The DHVs will be split 50/50 for each roadway direction (e.g., northbound/southbound).

The DHV for each direction will then be broken down further for each of the vehicle classifications (automobiles, medium trucks, and heavy trucks) for both the existing and future conditions. This is done by multiplying the DHVs by the percentage of each vehicle classification. The DHV will then be divided per number of travel lanes for each direction and assigned to the appropriate TNM roadway segment.

4.2.2 TRAFFIC NOISE LEVEL PREDICTIONS

The interior and exterior noise levels will be predicted based on modeled noise results from both the 2015 (Existing) and 2045 (Design-Year) scenarios. The predicted design year noise levels will be compared to the existing noise levels, the FHWA Noise Abatement Criteria (NAC), and SCDOT's 2014 Traffic Noise Abatement Policy. Traffic noise impacts will be determined for each existing noise sensitive receptor and its associated land use type by comparing the predicted noise levels with the FHWA NAC (as shown in **Table 4**). Receptors are considered impacted if the predicted noise levels approach the NAC (are within 1 dBA), exceed the NAC, or if the design year noise level substantially exceeds the existing noise level (15 dBA).

Table 4: FHWA Noise Abatement Criteria

Activity Criteria	$L_{eq(h)}$	Evaluation Location	Activity Description
A	57	Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose
B[3]	67	Exterior	Residential
C[3]	67	Exterior	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings
D	52	Interior	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios
E[3]	72	Exterior	Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A–D or F
F	-	-	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing
G	-	-	Undeveloped lands that are not permitted

[3] Includes undeveloped lands permitted for this activity category

4.2.3 ABATEMENT MEASURES AND EVALUATION

As a part of the analysis, noise abatement will be considered and evaluated for identified traffic noise impacts. Noise abatement will be evaluated for feasibility and reasonableness based on SCDOT's 2014 Traffic Noise Abatement Policy. For purposes of determining reasonableness, the allowable cost of the abatement will be based on $35 per square foot and $30,000 per benefitted receptor.

If a NAC "C" land use is determined to be impacted and noise mitigation is not reasonable or feasible, then NAC "D" will be used to determine noise impacts, and an internal noise level will be calculated. The internal noise level will be computed by subtracting the building noise reduction factors (shown in **Table 5**) from the modeled exterior noise level.

Table 5: Building Noise Reduction Factors

Building Type Structures	Window Condition	Noise Reduction due to Composition of Exterior of the Structures (or "Structure Type")
All	Open	10 dB
Light Frame	Ordinary Sash (closed)	20 dB
	Storm Windows	25 dB
Masonry	Single Glazed	25 dB
	Double Glazed	35 dB

*The window shall be considered open unless there is knowledge that the windows are in fact kept closed almost every day of the year.

BISHOPVILLE TRUCK ROUTE PROJECT (S-69-08) NOISE MODEL VALIDATION AND ASSUMPTIONS APPENDICES

Prepared for:

Federal Highway Administration

&

South Carolina Department of Transportation

Januay 2020

A. TNM MODEL OUTPUT FILE

CDM Smith
MLB

27 January 2020
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: Bishopville Truck Route
RUN: Bishopville Baseline
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	No Barrier LAeq1h Crit'n	Increase over existing Calculated	Increase over existing Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	With Barrier Noise Reduction Calculated	With Barrier Noise Reduction Goal	With Barrier Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Site#12	1	1	67.5	65.2	66	-2.3	10	----	65.2	0.0	8	-8.0
Site#8	3	1	62.1	61.1	66	-1.0	10	----	61.1	0.0	8	-8.0
Site#2	5	1	66.0	64.9	66	-1.1	10	----	64.9	0.0	8	-8.0
Site#1	6	1	65.8	66.3	66	0.5	10	Snd Lvl	66.3	0.0	8	-8.0
Site#6	7	1	62.4	61.3	66	-1.1	10	----	61.3	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Noise Reduction Avg	Noise Reduction Max
		dB	dB	dB
All Selected	5	0.0	0.0	0.0
All Impacted	1	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

B. NOISE METER OUTPUT SESSION REPORTS

Session Report

11/7/2019

Information Panel

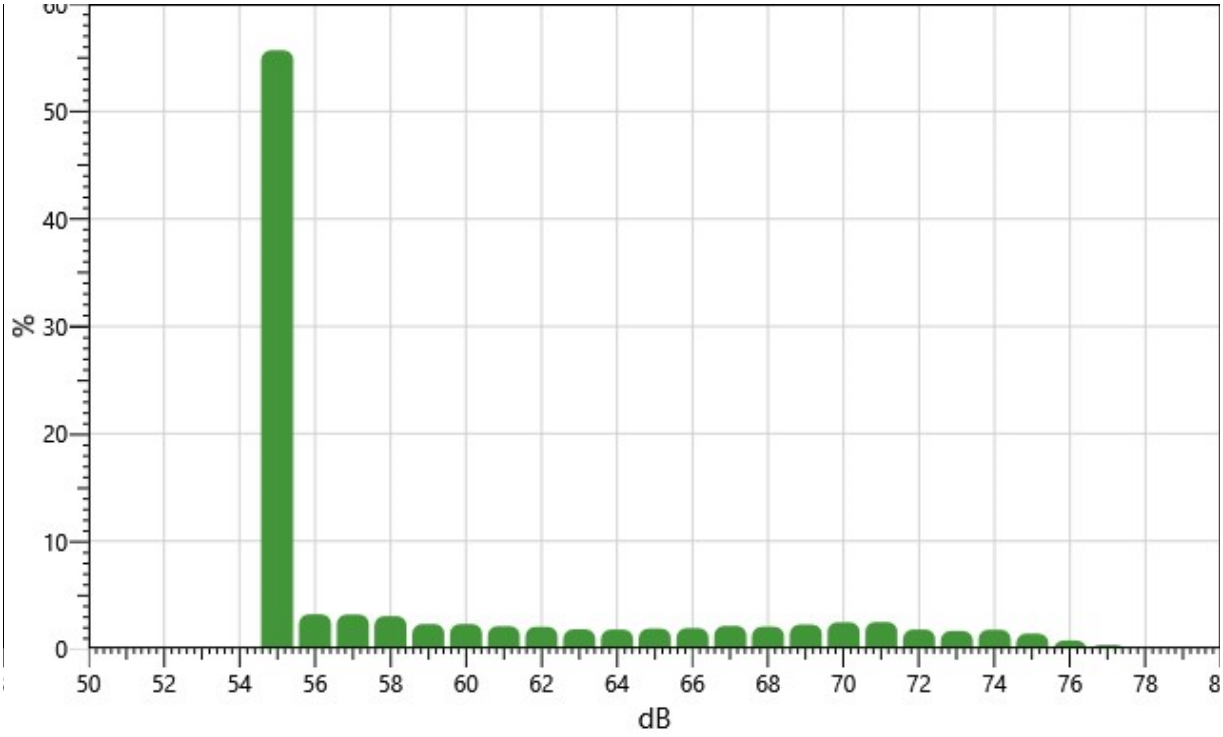
Name	S173
Start Time	11/6/2019 8:47:52 AM
Stop Time	11/6/2019 9:03:04 AM
Device Name	BIJ080016
Model Type	SoundPro DL
Device Firmware Rev	R.13H
Comments	Site #1 Bishopville Kingdom Hall of Jehovah's Witnesses on Bethune Highway
Run Time	00:15:12

Summary Data Panel

Description	Meter	Value	Description	Meter	Value
Leq	1	65.8 dB			
Exchange Rate	1	3 dB	Weighting	1	A
Response	1	SLOW	Bandwidth	1	1/3
Exchange Rate	2	3 dB	Weighting	2	C
Response	2	SLOW			

Statistics Chart

S173: Statistics Chart



Session Report

11/7/2019

Information Panel

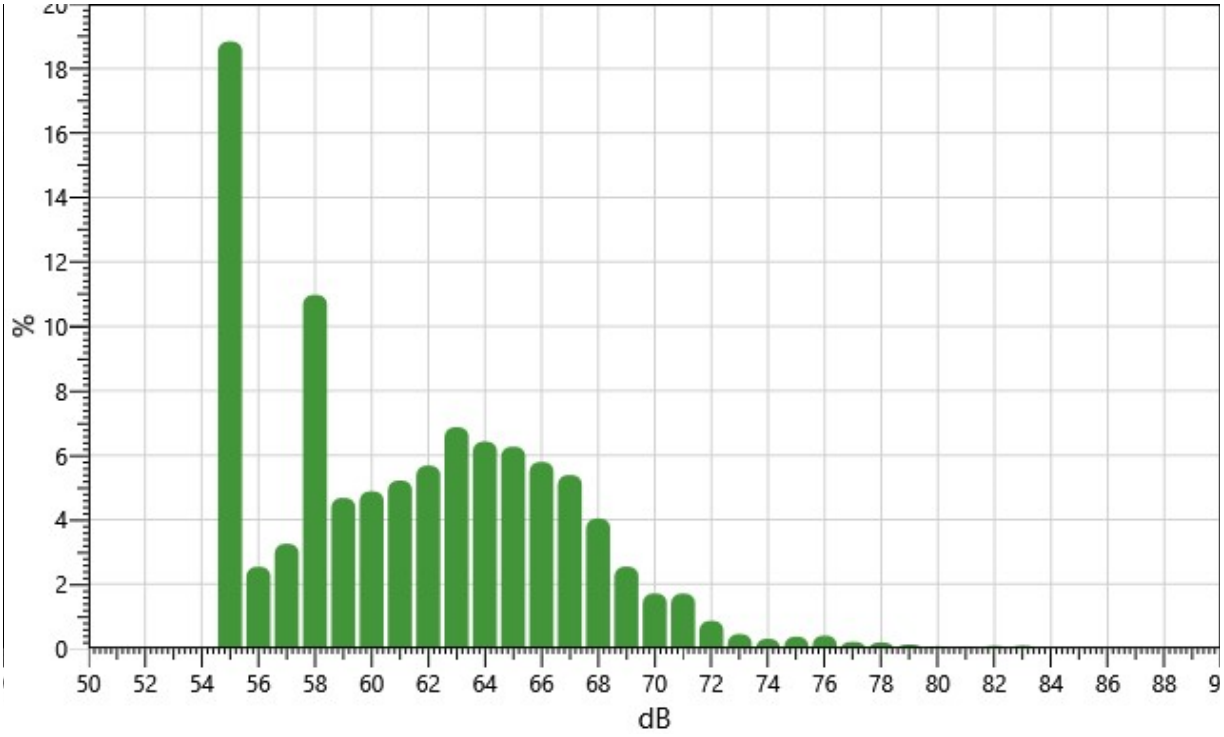
Name	S172
Start Time	11/6/2019 8:25:19 AM
Stop Time	11/6/2019 8:40:20 AM
Device Name	BIJ080016
Model Type	SoundPro DL
Device Firmware Rev	R.13H
Comments	Site #2 Bishopville Head Start Early Head Start Center on U.S. 15
Run Time	00:15:01

Summary Data Panel

Description	Meter	Value	Description	Meter	Value
Leq	1	66 dB			
Exchange Rate	1	3 dB	Weighting	1	A
Response	1	SLOW	Bandwidth	1	1/3
Exchange Rate	2	3 dB	Weighting	2	C
Response	2	SLOW			

Statistics Chart

S172: Statistics Chart



Session Report

11/20/2019

Information Panel

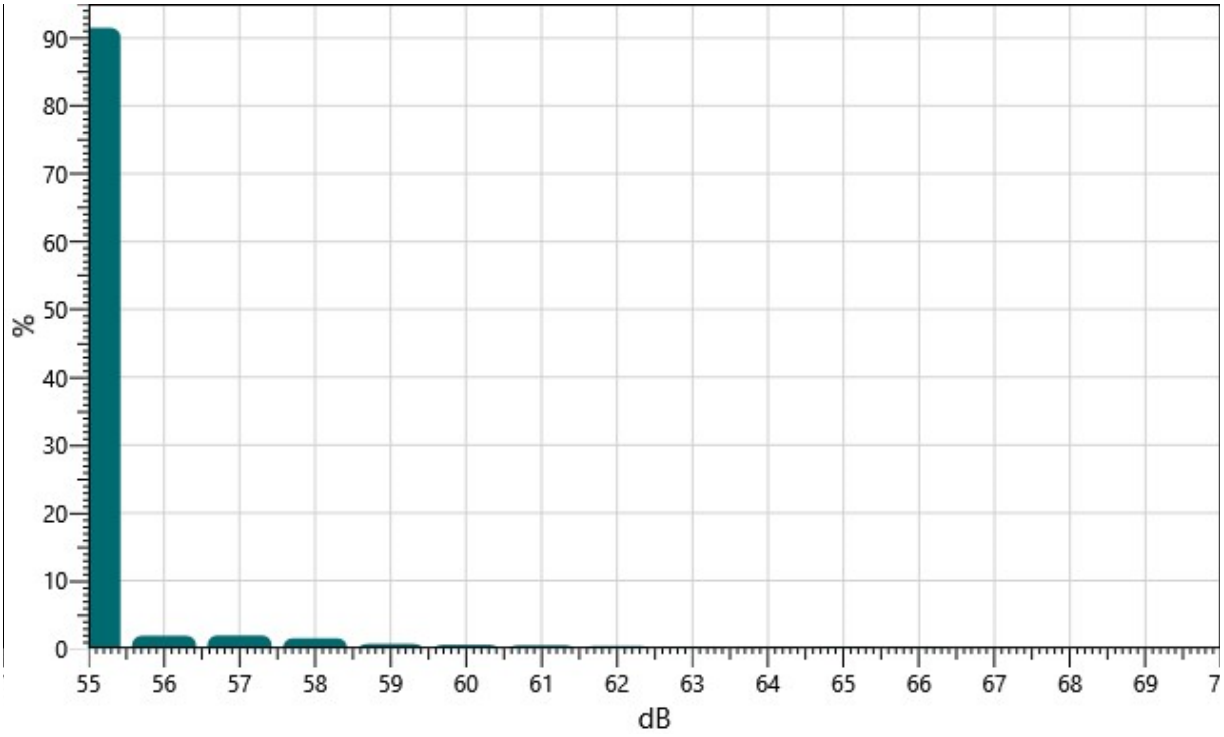
Name	S181
Start Time	11/8/2019 9:12:27 AM
Stop Time	11/8/2019 9:42:29 AM
Device Name	BIJ080016
Model Type	SoundPro DL
Device Firmware Rev	R.13H
Comments	Site #3 Lynches River Apartments
Run Time	00:30:02

Summary Data Panel

Description	Meter	Value	Description	Meter	Value
Leq	1	56 dB			
Exchange Rate	1	3 dB	Weighting	1	A
Response	1	SLOW	Bandwidth	1	1/3
Exchange Rate	2	3 dB	Weighting	2	C
Response	2	SLOW			

Statistics Chart

S181: Statistics Chart



Session Report

11/20/2019

Information Panel

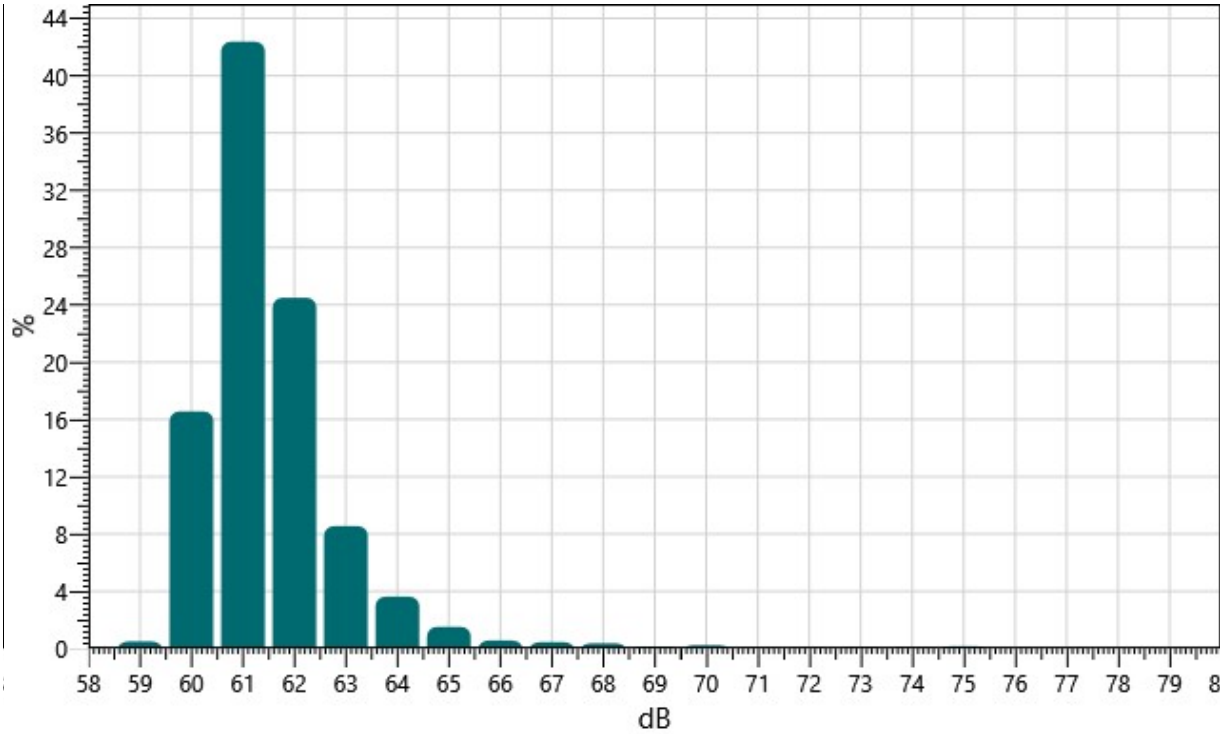
Name	S182
Start Time	11/8/2019 9:53:26 AM
Stop Time	11/8/2019 10:23:28 AM
Device Name	BIJ080016
Model Type	SoundPro DL
Device Firmware Rev	R.13H
Comments	Site #4 Robert E. Lee Academy
Run Time	00:30:02

Summary Data Panel

Description	Meter	Value	Description	Meter	Value
Leq	1	62.5 dB			
Exchange Rate	1	3 dB	Weighting	1	A
Response	1	SLOW	Bandwidth	1	1/3
Exchange Rate	2	3 dB	Weighting	2	C
Response	2	SLOW			

Statistics Chart

S182: Statistics Chart



Session Report

11/20/2019

Information Panel

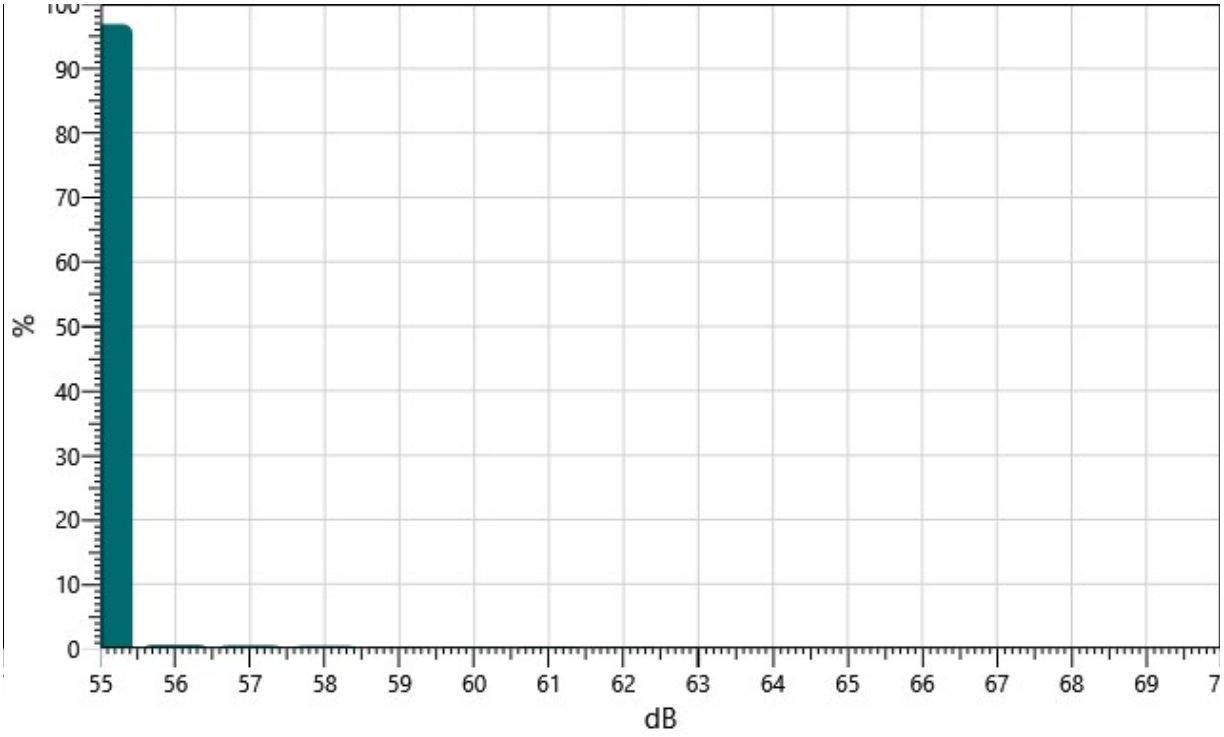
Name	S183
Start Time	11/8/2019 10:50:31 AM
Stop Time	11/8/2019 11:20:33 AM
Device Name	BIJ080016
Model Type	SoundPro DL
Device Firmware Rev	R.13H
Comments	Site #5 Azalea Drive in the Dogwood Road neighborhood
Run Time	00:30:02

Summary Data Panel

Description	Meter	Value	Description	Meter	Value
Leq	1	55.6 dB			
Exchange Rate	1	3 dB	Weighting	1	A
Response	1	SLOW	Bandwidth	1	1/3
Exchange Rate	2	3 dB	Weighting	2	C
Response	2	SLOW			

Statistics Chart

S183: Statistics Chart



Session Report

11/20/2019

Information Panel

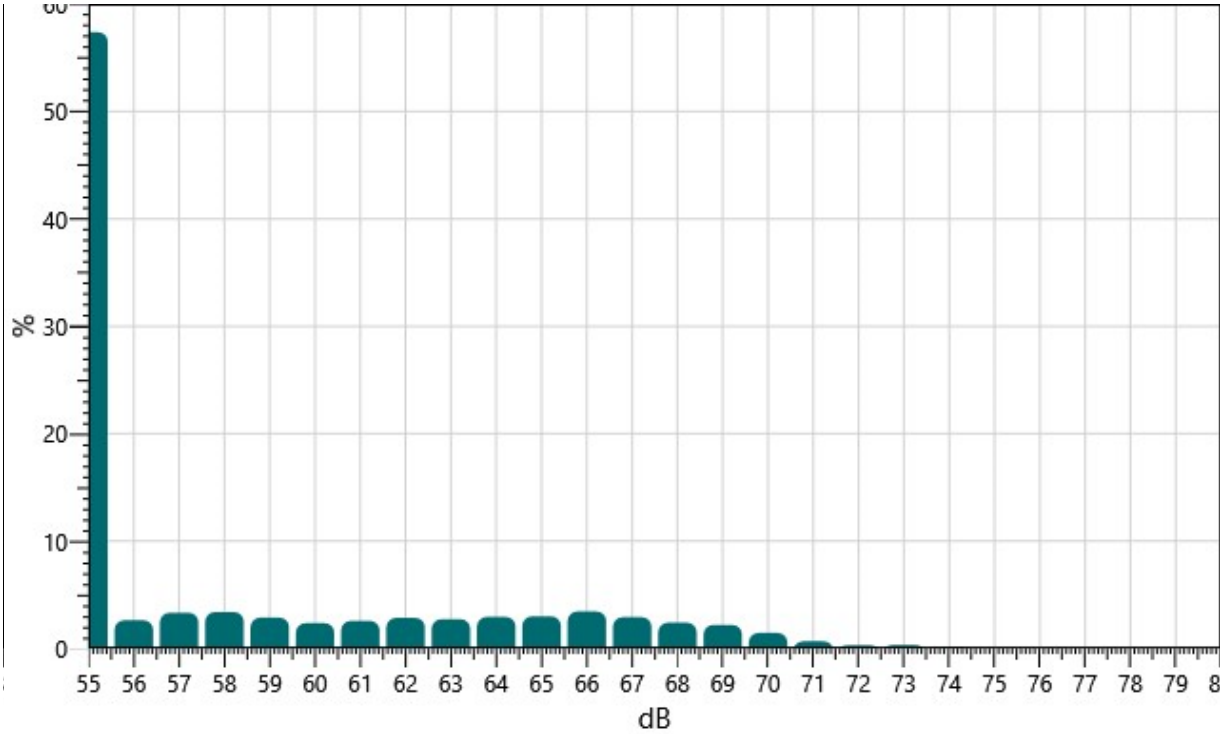
Name	S186
Start Time	11/8/2019 12:54:27 PM
Stop Time	11/8/2019 1:09:37 PM
Device Name	BIJ080016
Model Type	SoundPro DL
Device Firmware Rev	R.13H
Comments	Site #6 Wisacky Highway east of Wags Drive
Run Time	00:15:10

Summary Data Panel

Description	Meter	Value	Description	Meter	Value
Leq	1	62.4 dB			
Exchange Rate	1	3 dB	Weighting	1	A
Response	1	SLOW	Bandwidth	1	1/3
Exchange Rate	2	3 dB	Weighting	2	C
Response	2	SLOW			

Statistics Chart

S186: Statistics Chart



Session Report

11/7/2019

Information Panel

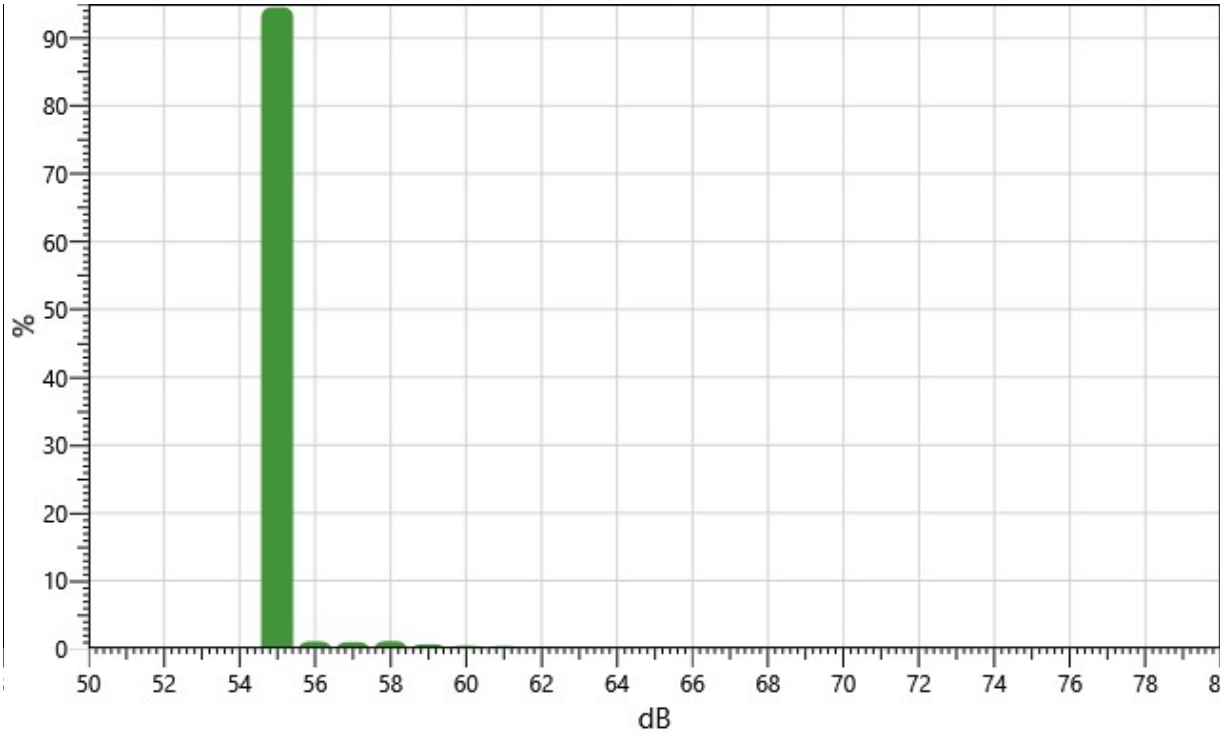
Name	S177
Start Time	11/6/2019 11:18:22 AM
Stop Time	11/6/2019 11:48:24 AM
Device Name	BIJ080016
Model Type	SoundPro DL
Device Firmware Rev	R.13H
Comments	Site #7 Magnolia Drive in the Maple Drive neighborhood
Run Time	00:30:02

Summary Data Panel

Description	Meter	Value	Description	Meter	Value
Leq	1	56 dB			
Exchange Rate	1	3 dB	Weighting	1	A
Response	1	SLOW	Bandwidth	1	1/3
Exchange Rate	2	3 dB	Weighting	2	C
Response	2	SLOW			

Statistics Chart

S177: Statistics Chart



Session Report

11/7/2019

Information Panel

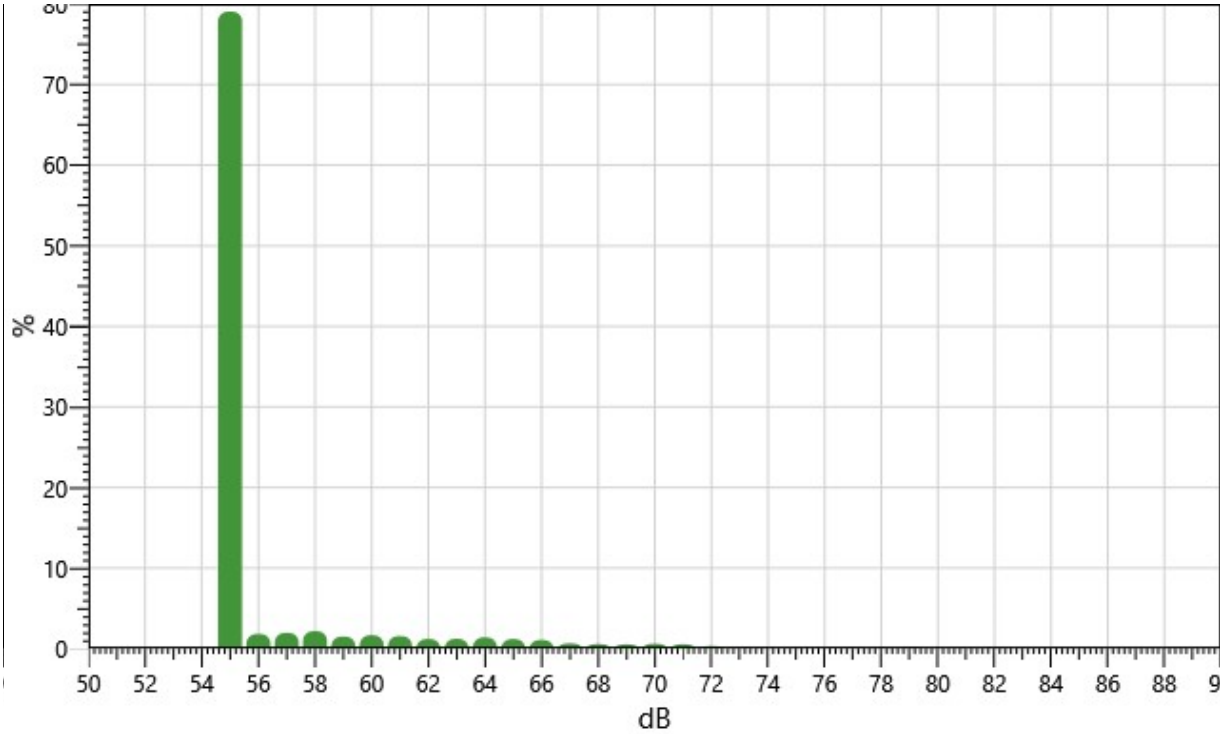
Name	S171
Start Time	11/6/2019 7:51:55 AM
Stop Time	11/6/2019 8:06:56 AM
Device Name	BIJ080016
Model Type	SoundPro DL
Device Firmware Rev	R.13H
Comments	Site #8 St. Charles Road south of Maple Drive
Run Time	00:15:01

Summary Data Panel

Description	Meter	Value	Description	Meter	Value
Leq	1	62.1 dB			
Exchange Rate	1	3 dB	Weighting	1	A
Response	1	SLOW	Bandwidth	1	1/3
Exchange Rate	2	3 dB	Weighting	2	C
Response	2	SLOW			

Statistics Chart

S171: Statistics Chart



Session Report

11/7/2019

Information Panel

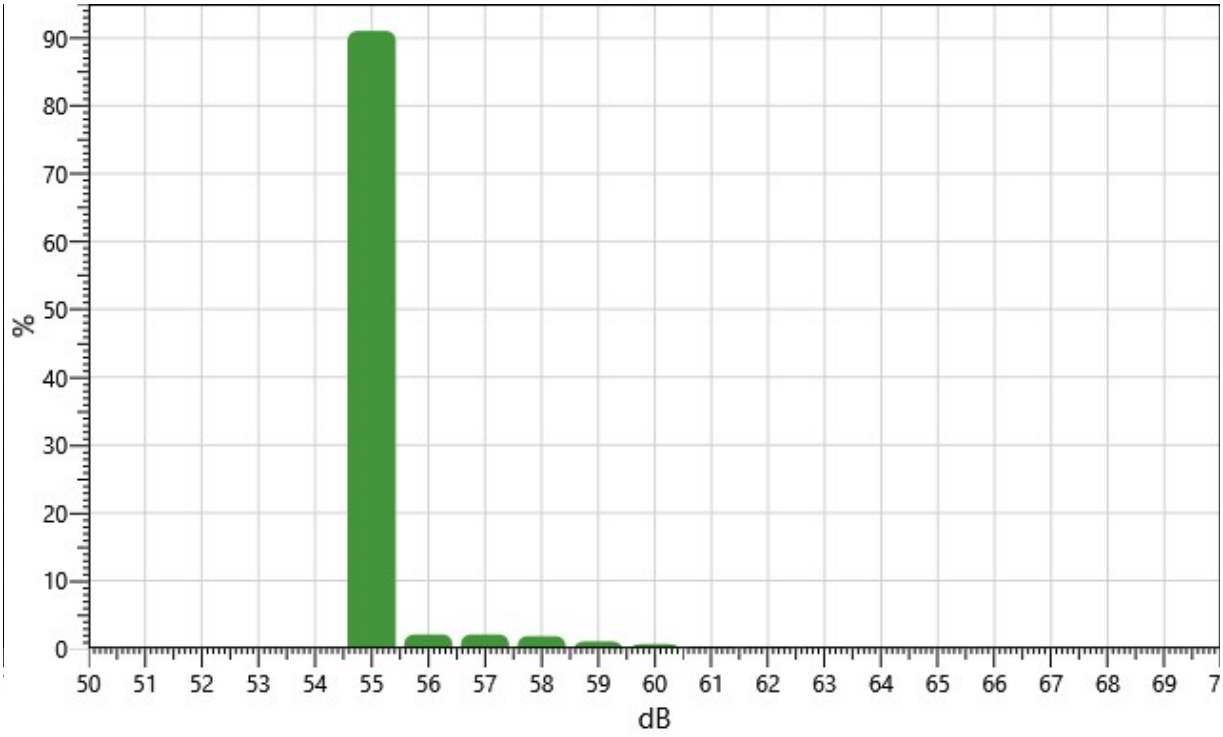
Name	S178
Start Time	11/6/2019 11:56:27 AM
Stop Time	11/6/2019 12:27:01 PM
Device Name	BIJ080016
Model Type	SoundPro DL
Device Firmware Rev	R.13H
Comments	Site #9 Liberty Hill Baptist Church
Run Time	00:30:34

Summary Data Panel

Description	Meter	Value	Description	Meter	Value
Leq	1	55.9 dB			
Exchange Rate	1	3 dB	Weighting	1	A
Response	1	SLOW	Bandwidth	1	1/3
Exchange Rate	2	3 dB	Weighting	2	C
Response	2	SLOW			

Statistics Chart

S178: Statistics Chart



Session Report

11/7/2019

Information Panel

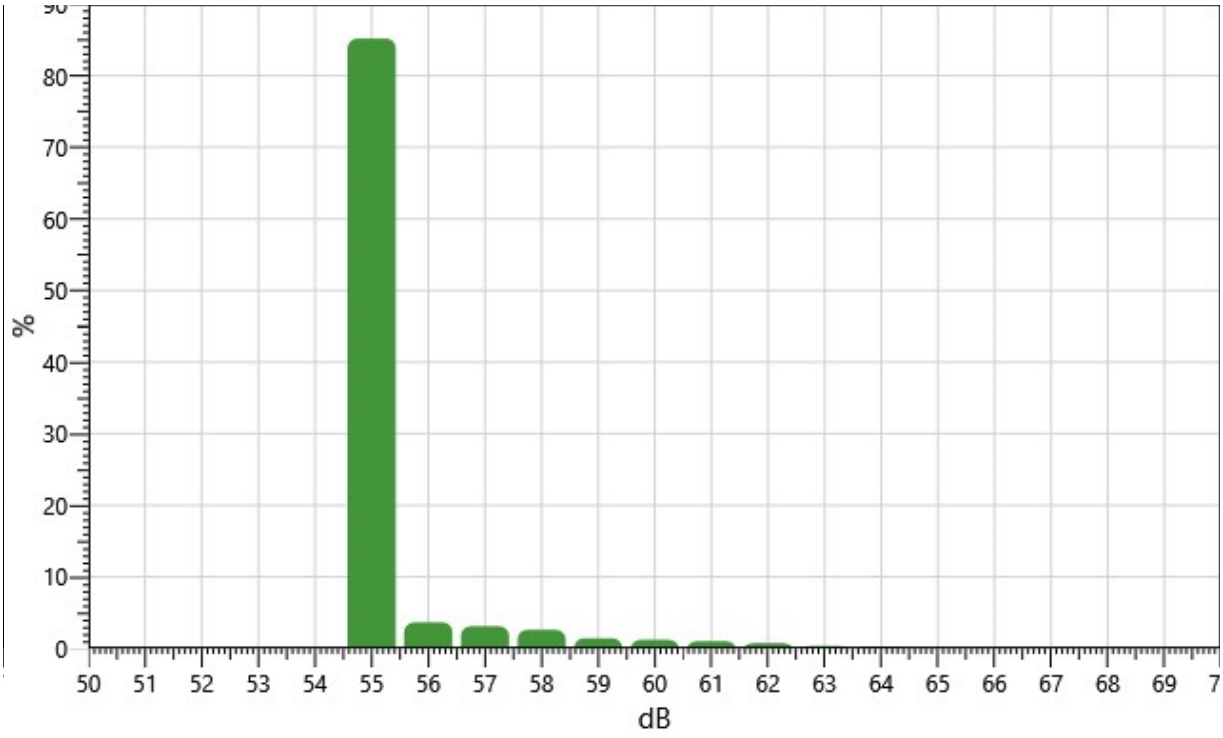
Name	S175
Start Time	11/6/2019 10:03:37 AM
Stop Time	11/6/2019 10:33:45 AM
Device Name	BIJ080016
Model Type	SoundPro DL
Device Firmware Rev	R.13H
Comments	Site #10 Edgefield Drive in the Edgefield Drive neighborhood
Run Time	00:30:07

Summary Data Panel

Description	Meter	Value	Description	Meter	Value
Leq	1	56.2 dB			
Exchange Rate	1	3 dB	Weighting	1	A
Response	1	SLOW	Bandwidth	1	1/3
Exchange Rate	2	3 dB	Weighting	2	C
Response	2	SLOW			

Statistics Chart

S175: Statistics Chart



Session Report

11/20/2019

Information Panel

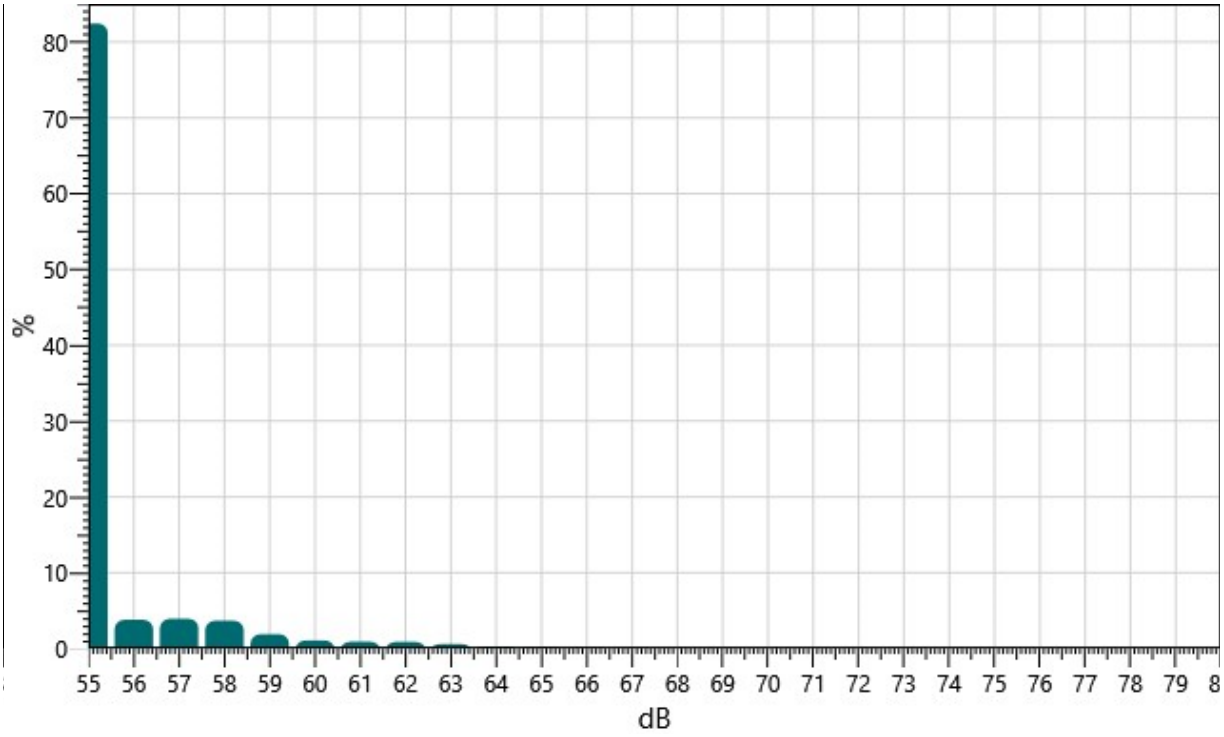
Name	S185
Start Time	11/8/2019 12:04:31 PM
Stop Time	11/8/2019 12:34:46 PM
Device Name	BIJ080016
Model Type	SoundPro DL
Device Firmware Rev	R.13H
Comments	Site #11 Wilkinson Road behind CSC Community Pharmacy Pediatrics
Run Time	00:30:15

Summary Data Panel

Description	Meter	Value	Description	Meter	Value
Leq	1	56.5 dB			
Exchange Rate	1	3 dB	Weighting	1	A
Response	1	SLOW	Bandwidth	1	1/3
Exchange Rate	2	3 dB	Weighting	2	C
Response	2	SLOW			

Statistics Chart

S185: Statistics Chart



Session Report

11/7/2019

Information Panel

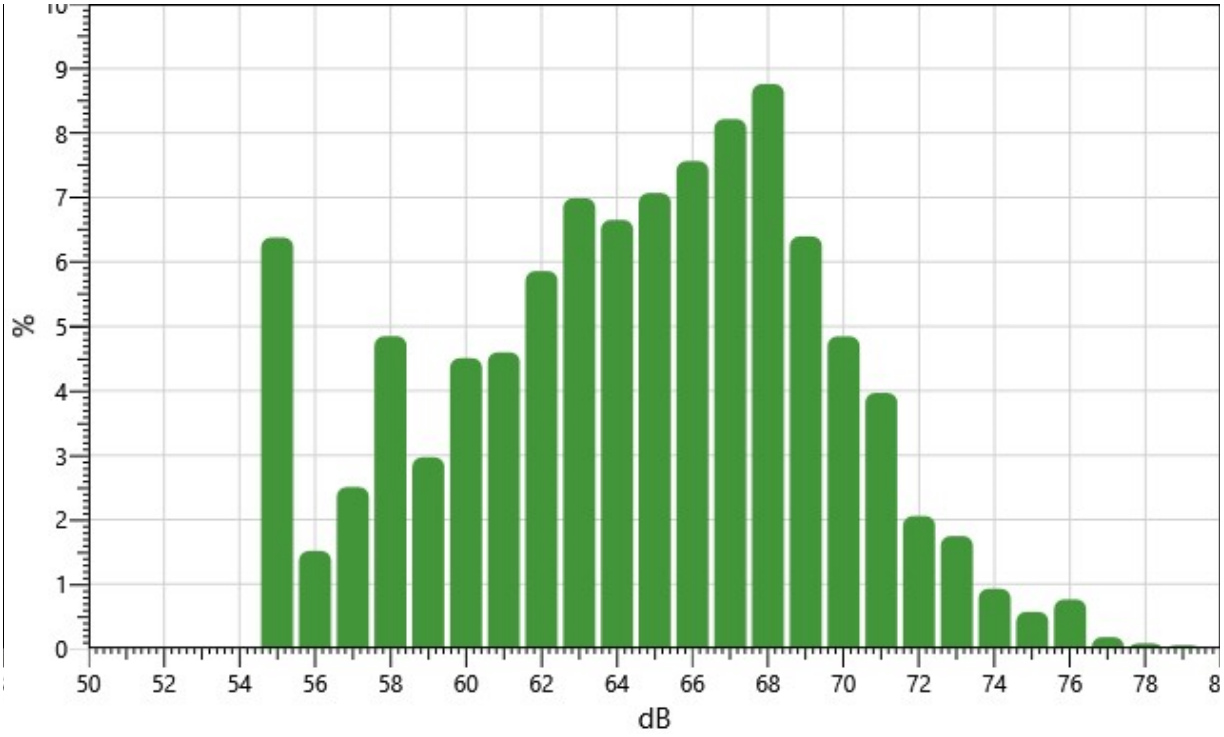
Name	S170
Start Time	11/6/2019 7:23:48 AM
Stop Time	11/6/2019 7:38:49 AM
Device Name	BIJ080016
Model Type	SoundPro DL
Device Firmware Rev	R.13H
Comments	Site #12 Piedmont Cemetery on U.S. 15
Run Time	00:15:01

Summary Data Panel

Description	Meter	Value	Description	Meter	Value
Leq	1	67.5 dB			
Exchange Rate	1	3 dB	Weighting	1	A
Response	1	SLOW	Bandwidth	1	1/3
Exchange Rate	2	3 dB	Weighting	2	C
Response	2	SLOW			

Statistics Chart

S170: Statistics Chart



C. NOISE MONITORING FIELD SHEETS

Project #: S-69-08
County: Lee
Division:

Observer's Name Gio

Date 11/6/19 Monitor Site # 1 Bishopville Kingdom Hall of Jehovah's Witnesses on Bethune Highway

travel lanes 2 Direction of Lanes E/W

Speed limit 55 Surface Conditions Dry

Grade - Wind Speed 10 mph Humidity 55%

Surrounding Land uses Church

Time monitoring began 8:48 AM Time monitoring ended 9:03 AM

Traffic # (15 min)	EB Lane			WB Lane		
Cars	16	# 64	VPH	32	# 128	VPH
Medium Truck		#	VPH		#	VPH
Heavy Truck	2	# 8	VPH	8	# 32	VPH
Bus		#	VPH		#	VPH
Motorcycle		#	VPH		#	VPH
Total	18	# 72	VPH	40	# 160	VPH

VPH (volume per hour) Multiply by 4 to get hourly volumes

Leq Noise Level L(avg) 65.8 dB

Distance from Travel Lane 50 ft

Height above roadway 0 ft

Height above Ground 5 ft

Site Sketch if needed

Background Noise

Major Noise Source Traffic

Unusual Events

Comments

Project #:
County:
Division:

Project #: S-69-08
County: Lee
Division:

Observer's Name Gio

Date 11/6/19 Monitor Site # 2 Bishopville Head Start Early Head Start Center on U.S. 15

travel lanes 4 Direction of Lanes N/S

Speed limit 40 Surface Conditions Dry

Grade - Wind Speed 10 mph Humidity 59%

Surrounding Land uses Agriculture

Time monitoring began 8:25 AM Time monitoring ended 8:41 AM

Traffic # (15 min)	SB Lane			NB Lane		
Cars	49	# 196	VPH	48	# 192	VPH
Medium Truck	1	# 4	VPH		#	VPH
Heavy Truck	8	# 32	VPH	8	# 32	VPH
Bus		#	VPH		#	VPH
Motorcycle		#	VPH		#	VPH
Total	58	# 232	VPH	56	# 224	VPH

VPH (volume per hour) Multiply by 4 to get hourly volumes

Leq Noise Level L(avg) 66 dB

Distance from Travel Lane 50 ft

Height above roadway 0 ft

Height above Ground 5 ft

Site Sketch if needed

Background Noise

Major Noise Source Traffic

Unusual Events

Comments

Project #: S-69-08
County: Lee
Division:

Observer's Name Christian/Ariel

Date 11/8/19 Monitor Site # 3 Lynches River Apartments

travel lanes _____ Direction of Lanes _____

Speed limit _____ Surface Conditions Damp

Grade - Wind Speed 10 mph Humidity 71%

Surrounding Land uses Residential, farmland, manufacturing

Time monitoring began 9:13 AM Time monitoring ended 9:42 AM

Traffic # (15 min)	Lane	Lane
Cars	#_____VPH	#_____VPH
Medium Truck	#_____VPH	#_____VPH
Heavy Truck	#_____VPH	#_____VPH
Bus	#_____VPH	#_____VPH
Motorcycle	#_____VPH	#_____VPH
Total	#_____VPH	#_____VPH

VPH (volume per hour) Multiply by 4 to get hourly volumes

Leq Noise Level L(avg) 56 dB

Distance from Travel Lane 50 ft

Height above roadway _____ ft

Height above Ground 5 ft

Site Sketch if needed

Background Noise Truck, manufacturing noises from Coca Cola Factory

Major Noise Source _____

Unusual Events Train horn

Comments _____

Project #:
County:
Division:

Project #: S-69-08
County: Lee
Division:

Observer's Name Christian/Ariel

Date 11/8/19 Monitor Site # 4 Robert E. Lee Academy

travel lanes _____ Direction of Lanes _____

Speed limit _____ Surface Conditions Dry

Grade - Wind Speed 5 mph Humidity 63%

Surrounding Land uses School, manufacturing

Time monitoring began 9:53 AM Time monitoring ended 10:23 AM

Traffic # (15 min)	_____ Lane	_____ Lane
Cars	_____ # _____ VPH	_____ # _____ VPH
Medium Truck	_____ # _____ VPH	_____ # _____ VPH
Heavy Truck	_____ # _____ VPH	_____ # _____ VPH
Bus	_____ # _____ VPH	_____ # _____ VPH
Motorcycle	_____ # _____ VPH	_____ # _____ VPH
Total	_____ # _____ VPH	_____ # _____ VPH

VPH (volume per hour) Multiply by 4 to get hourly volumes

Leq Noise Level L(avg) 62.5 dB

Distance from Travel Lane _____ ft

Height above roadway _____ ft

Height above Ground 5 ft

Site Sketch if needed

Background Noise Manufacturing noises from Ardagh Group

Major Noise Source _____

Unusual Events _____

Comments _____

Project #:
County:
Division:

Project #: S-69-08
County: Lee
Division:

Observer's Name Christian/Ariel

Date 11/8/19 Monitor Site # 5 Azalea Drive in the Dogwood Road neighborhood

travel lanes _____ Direction of Lanes _____

Speed limit _____ Surface Conditions Dry

Grade - Wind Speed 7 mph Humidity 57%

Surrounding Land uses Residential, farmland

Time monitoring began 10:51 AM Time monitoring ended 11:21 AM

Traffic # (15 min)	Lane	Lane
Cars	#_____VPH	#_____VPH
Medium Truck	#_____VPH	#_____VPH
Heavy Truck	#_____VPH	#_____VPH
Bus	#_____VPH	#_____VPH
Motorcycle	#_____VPH	#_____VPH
Total	#_____VPH	#_____VPH

VPH (volume per hour) Multiply by 4 to get hourly volumes

Leq Noise Level L(avg) 55.6 dB

Distance from Travel Lane _____ ft

Height above roadway _____ ft

Height above Ground 5 ft

Site Sketch if needed

Background Noise _____

Major Noise Source _____

Unusual Events Train horn

Comments _____

Project #:
County:
Division:

Project #: S-69-08
County: Lee
Division:

Observer's Name Christian/Ariel

Date 11/8/19 Monitor Site # 6 Wisacky Hwy east of Wags Drive

travel lanes 2 Direction of Lanes NW/SW

Speed limit 45 Surface Conditions Dry

Grade - Wind Speed 3 mph Humidity 37%

Surrounding Land uses Residential, farmland

Time monitoring began 12:55 PM Time monitoring ended 1:10 PM

Traffic # (15 min)	NW Lane			SW Lane		
Cars	30	# 120	VPH	28	# 112	VPH
Medium Truck	1	# 4	VPH	2	# 8	VPH
Heavy Truck	2	# 8	VPH	2	# 8	VPH
Bus		#	VPH		#	VPH
Motorcycle		#	VPH		#	VPH
Total	33	# 132	VPH	32	# 128	VPH

VPH (volume per hour) Multiply by 4 to get hourly volumes

Leq Noise Level L(avg) 62.4 dB

Distance from Travel Lane 50 ft

Height above roadway 5 ft

Height above Ground 5 ft

Site Sketch if needed

Background Noise

Major Noise Source

Unusual Events

Comments

Project #:
County:
Division:

Project #: S-69-08
County: Lee
Division:

Observer's Name Gio

Date 11/6/19 Monitor Site # 7 Magnolia Drive in the Maple Drive neighborhood

travel lanes _____ Direction of Lanes _____

Speed limit _____ Surface Conditions Dry

Grade - Wind Speed 10 mph Humidity 40%

Surrounding Land uses Residential

Time monitoring began 11:19 AM Time monitoring ended 11:49 AM

Traffic # (15 min)	_____ Lane	_____ Lane
Cars	_____#_____VPH	_____#_____VPH
Medium Truck	_____#_____VPH	_____#_____VPH
Heavy Truck	_____#_____VPH	_____#_____VPH
Bus	_____#_____VPH	_____#_____VPH
Motorcycle	_____#_____VPH	_____#_____VPH
Total	_____#_____VPH	_____#_____VPH

VPH (volume per hour) Multiply by 4 to get hourly volumes

Leq Noise Level L(avg) 56 dB

Distance from Travel Lane _____ ft

Height above roadway _____ ft

Height above Ground 5 ft

Site Sketch if needed

Background Noise _____

Major Noise Source Traffic

Unusual Events _____

Comments _____

Project #:
County:
Division:

Project #: S-69-08
County: Lee
Division:

Observer's Name Gio

Date 11/6/19 Monitor Site # 8 St. Charles Road south of Maple Drive

travel lanes 2 Direction of Lanes E/W

Speed limit 40 Surface Conditions Dry

Grade - Wind Speed 10 mph Humidity 65%

Surrounding Land uses Residential

Time monitoring began 7:52 AM Time monitoring ended 8:07 AM

Traffic # (15 min)	W Lane		E Lane	
Cars	11	# 44 VPH	9	# 36 VPH
Medium Truck		# VPH		# VPH
Heavy Truck	1	# 4 VPH	1	# 4 VPH
Bus		# VPH		# VPH
Motorcycle		# VPH		# VPH
Total	12	# 48 VPH	10	# 40 VPH

VPH (volume per hour) Multiply by 4 to get hourly volumes

Leq Noise Level L(avg) 62.1 dB

Distance from Travel Lane 50 ft

Height above roadway 0 ft

Height above Ground 5 ft

Site Sketch if needed

Background Noise

Major Noise Source Traffic

Unusual Events

Comments

Project #: S-69-08
County: Lee
Division:

Observer's Name Gio

Date 11/6/19 Monitor Site # 8 Maple Dr (traffic counted concurrently with St. Charles Rd)

travel lanes 2 Direction of Lanes N/S

Speed limit 10 Surface Conditions Dry

Grade - Wind Speed 10 mph Humidity 65%

Surrounding Land uses Residential

Time monitoring began 7:52 AM Time monitoring ended 8:07 AM

Traffic # (15 min)	N Lane		S Lane	
Cars	4	# 12 VPH	0	# 0 VPH
Medium Truck		# VPH		# VPH
Heavy Truck	0	# 0 VPH	0	# 0 VPH
Bus		# VPH		# VPH
Motorcycle		# VPH		# VPH
Total	4	# 12 VPH	0	# 0 VPH

VPH (volume per hour) Multiply by 4 to get hourly volumes

Leq Noise Level L(avg) 62.1 dB

Distance from Travel Lane 50 ft

Height above roadway 0 ft

Height above Ground 5 ft

Site Sketch if needed

Background Noise

Major Noise Source Traffic

Unusual Events

Comments

Project #:
County:
Division:

Project #: S-69-08
County: Lee
Division:

Observer's Name Gio

Date 11/6/19 Monitor Site # 9 Liberty Hill Baptist Church on Dove Lane

travel lanes _____ Direction of Lanes _____

Speed limit _____ Surface Conditions Dry

Grade - Wind Speed 10 mph Humidity 38%

Surrounding Land uses Church

Time monitoring began 11:57 AM Time monitoring ended 12:27 PM

Traffic # (15 min)	_____ Lane	_____ Lane
Cars	_____ # _____ VPH	_____ # _____ VPH
Medium Truck	_____ # _____ VPH	_____ # _____ VPH
Heavy Truck	_____ # _____ VPH	_____ # _____ VPH
Bus	_____ # _____ VPH	_____ # _____ VPH
Motorcycle	_____ # _____ VPH	_____ # _____ VPH
Total	_____ # _____ VPH	_____ # _____ VPH

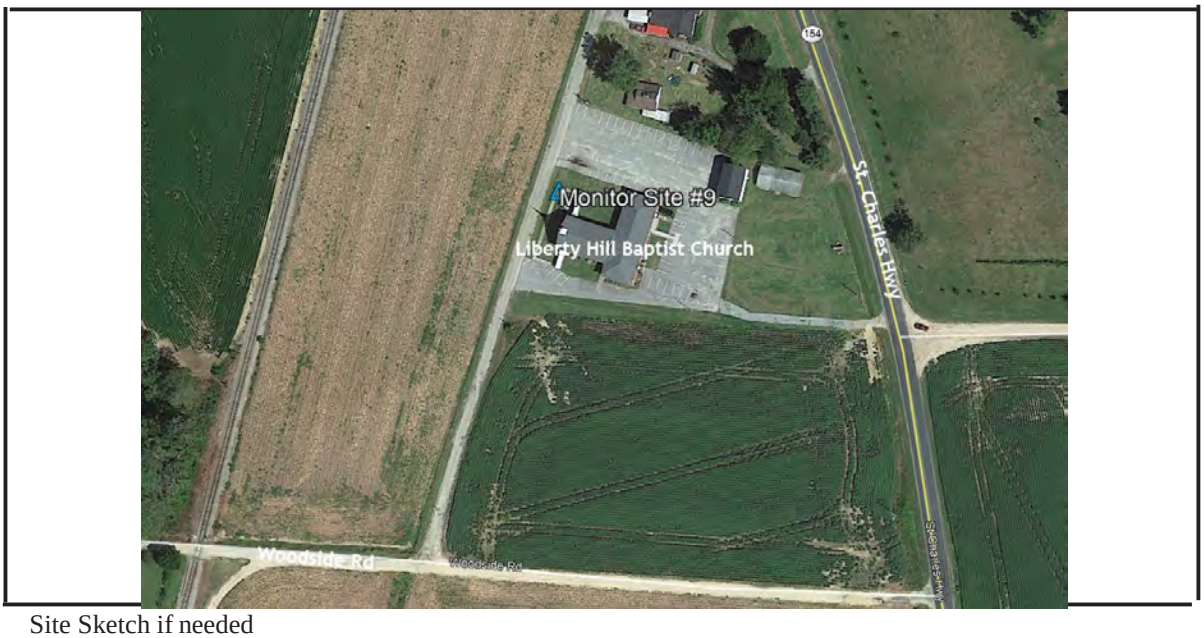
VPH (volume per hour) Multiply by 4 to get hourly volumes

Leq Noise Level L(avg) 55.9 dB

Distance from Travel Lane _____ ft

Height above roadway _____ ft

Height above Ground 5 ft



Site Sketch if needed

Background Noise _____

Major Noise Source _____

Unusual Events _____

Comments _____

Project #:
County:
Division:

Project #: S-69-08
County: Lee
Division:

Observer's Name Gio

Date 11/6/19 Monitor Site # 10 Edgefield Drive in the Edgefield Drive neighborhood

travel lanes _____ Direction of Lanes _____

Speed limit _____ Surface Conditions Dry

Grade - Wind Speed 10 mph Humidity 46%

Surrounding Land uses Residential

Time monitoring began 10:04 AM Time monitoring ended 10:34 AM

Traffic # (15 min)	_____ Lane	_____ Lane
Cars	_____#_____VPH	_____#_____VPH
Medium Truck	_____#_____VPH	_____#_____VPH
Heavy Truck	_____#_____VPH	_____#_____VPH
Bus	_____#_____VPH	_____#_____VPH
Motorcycle	_____#_____VPH	_____#_____VPH
Total	_____#_____VPH	_____#_____VPH

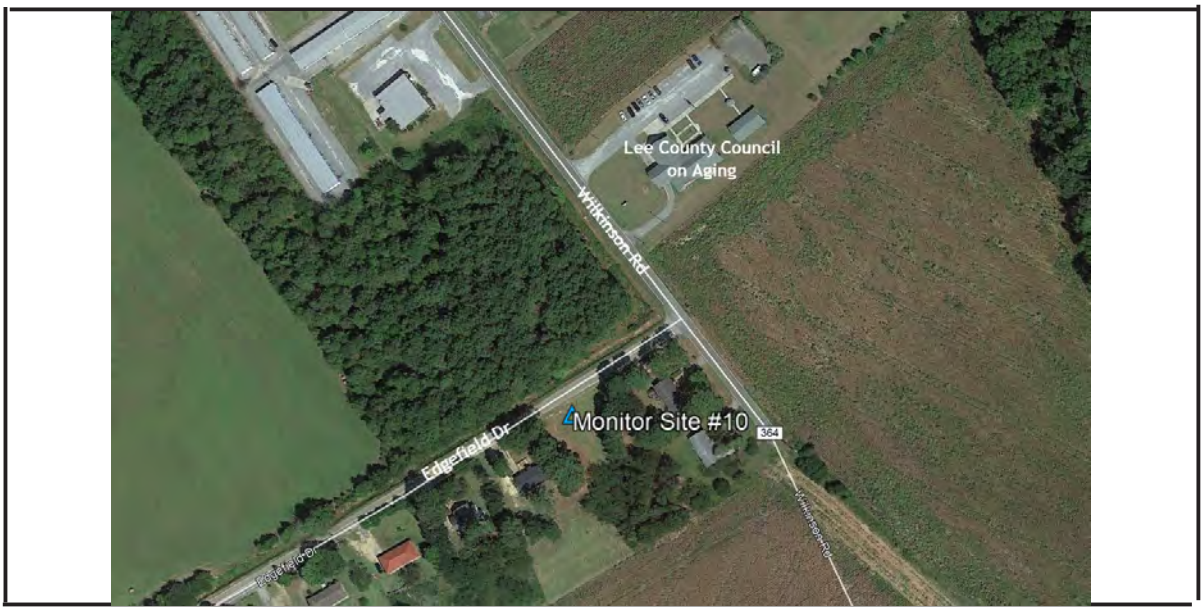
VPH (volume per hour) Multiply by 4 to get hourly volumes

Leq Noise Level L(avg) 56.2 dB

Distance from Travel Lane _____ ft

Height above roadway _____ ft

Height above Ground 5 ft



Site Sketch if needed

Background Noise _____

Major Noise Source Traffic

Unusual Events _____

Comments _____

Project #:
County:
Division:

Project #: S-69-08
County: Lee
Division:

Observer's Name Christian/Ariel

Date 11/8/19 Monitor Site # 11 Wilkinson Road behind CSC Community Pharmacy Pediatrics

travel lanes _____ Direction of Lanes _____

Speed limit _____ Surface Conditions Dry

Grade - Wind Speed 10 mph Humidity 42%

Surrounding Land uses Agricultural, residential, medical, daycare

Time monitoring began 12:05 PM Time monitoring ended 12:35 PM

Traffic # (15 min)	_____ Lane	_____ Lane
Cars	_____#_____VPH	_____#_____VPH
Medium Truck	_____#_____VPH	_____#_____VPH
Heavy Truck	_____#_____VPH	_____#_____VPH
Bus	_____#_____VPH	_____#_____VPH
Motorcycle	_____#_____VPH	_____#_____VPH
Total	_____#_____VPH	_____#_____VPH

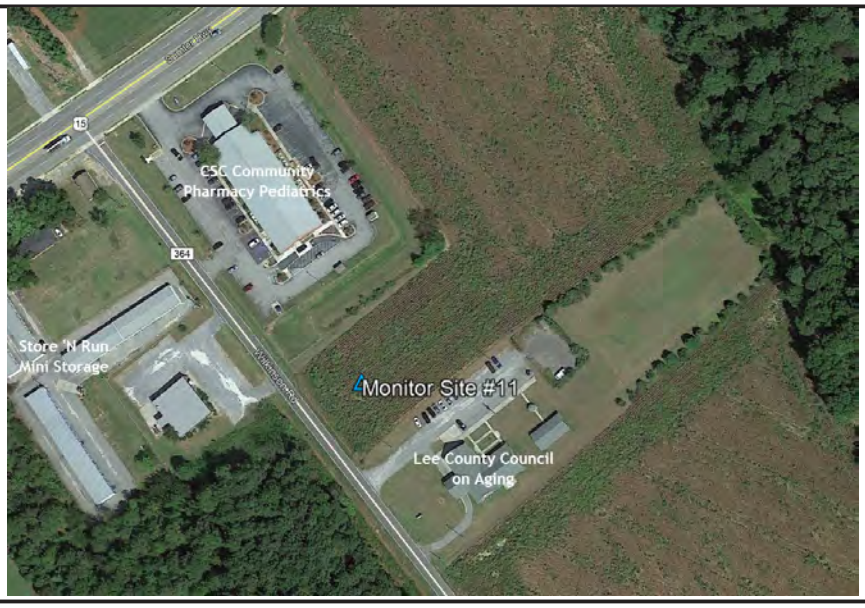
VPH (volume per hour) Multiply by 4 to get hourly volumes

Leq Noise Level L(avg) 56.5 dB

Distance from Travel Lane _____ ft

Height above roadway _____ ft

Height above Ground 5 ft



Site Sketch if needed

Background Noise _____

Major Noise Source _____

Unusual Events _____

Comments _____

Project #:
County:
Division:

Project #: S-69-08
County: Lee
Division:

Observer's Name Gio

Date 11/6/19 Monitor Site # 12 Piedmont Cemetery

travel lanes 4 Direction of Lanes N/S

Speed limit 45 Surface Conditions Dry

Grade - Wind Speed 9 mph Humidity 69%

Surrounding Land uses Cemetery

Time monitoring began 7:24 AM Time monitoring ended 7:39 AM

Traffic # (15 min)	SB Lane			NB Lane		
Cars	80	# 320	VPH	108	# 432	VPH
Medium Truck	1	# 4	VPH	5	# 20	VPH
Heavy Truck	6	# 24	VPH	7	# 28	VPH
Bus	1	# 4	VPH	3	# 12	VPH
Motorcycle		#	VPH		#	VPH
Total	88	# 352	VPH	123	# 492	VPH

VPH (volume per hour) Multiply by 4 to get hourly volumes

Leq Noise Level L(avg) 67.5 dB

Distance from Travel Lane 50 ft

Height above roadway 10 ft

Height above Ground 5 ft

Site Sketch if needed

Background Noise

Major Noise Source Traffic

Unusual Events

Comments

Project #:
County:
Division:

D. NOISE METER CALIBRATION CERTIFICATES

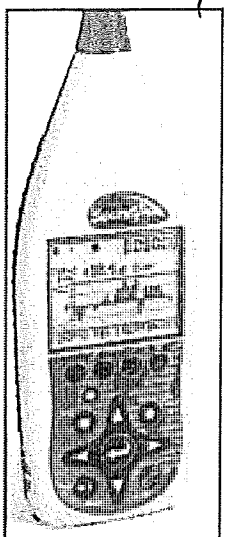
QC'd by: [illegible]

QC date: 11/4

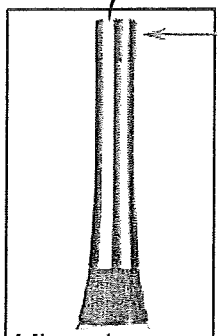
PREMIER SAFETY

NOTE: Inspect unit and accessories, if you have any questions call 800-332-0435
Items missing upon return will be charged to your order

Included with the SoundPro



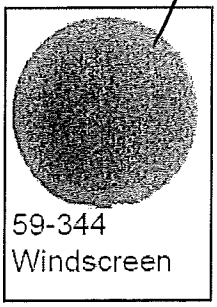
SoundPro



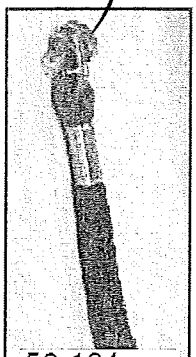
Microphone

Note: Do not remove Preamp from base

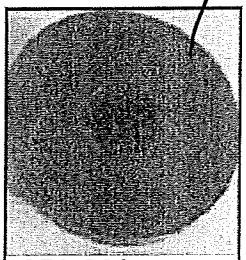
3M DMS USB
W/ WIN 10 SOFTWARE
AND INSTRUMENT
MANUALS



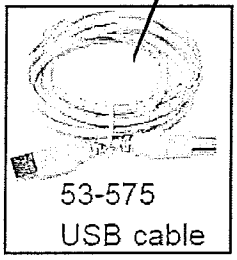
59-344
Windscreen



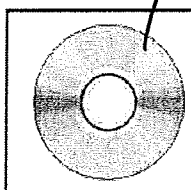
56-164
Strap



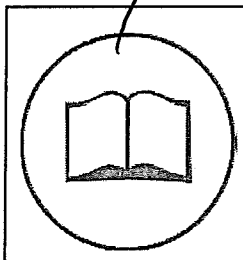
056-990
Cal Adapter



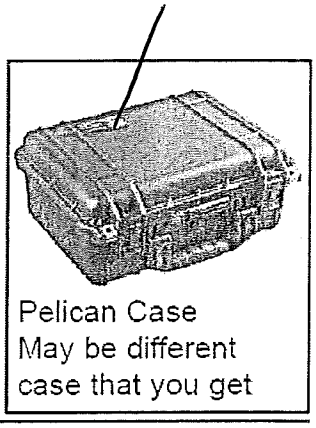
53-575
USB cable



Detection
Management
Software



Manual



Pelican Case
May be different
case that you get

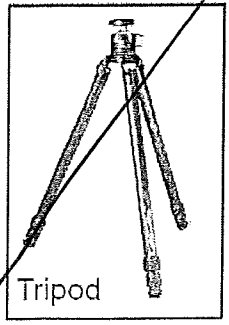
Listed below are the OPTIONAL kits for the Soundpro

494-0018

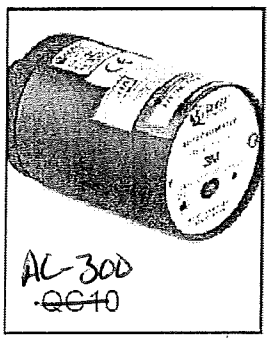
~~415-1012~~ 415-1013

Several Versions

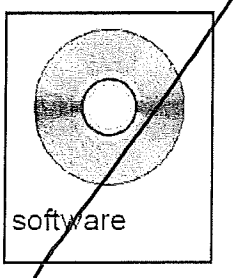
415-0005



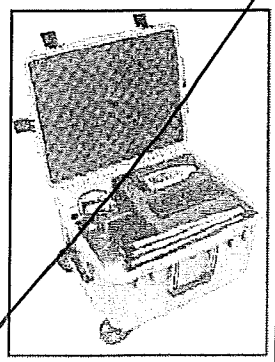
Tripod



AL-300
~~QC10~~



software



FR. 415-2024 PLEASE RETURN THIS SHEET Nov 1, 2013

PREMIER SAFETY
CALIBRATION LABORATORY

Calibration Certificate 0008876

114 (1KHZ)

Instrument: Acoustical **Calibrator**
Model: AC-300
Manufacturer: 3M
Serial number: AC300008921
Class (IEC 60942): 1
Barometer type:
Barometer s/n:

Date Calibrated: **8/1/2019** *Cal Due:* **8/01/2020**

Status:	Received	Sent
In tolerance:	X	X
Out of tolerance:		
See comments:		

Contains non-accredited tests: __Yes _X_ No

Customer:
Tel/Fax: /

Address:

Tested in accordance with the following procedures and standards:
Calibration of Noise Dosimeters, Sound Meters, and Calibratos., Rev. Chf 04

Instrumentation used for calibration: Nor-1504 Norsonic Test System:

Instrument - Manufacturer	Description	S/N	Cal. Date	Traceability evidence Cal. Lab / Accreditation	Cal. Due
483B-Norsonic	SME Cal Unit	31079	May 09, 2019	Norsonic SA	May 09, 2021
DS-360-SRS	Function Generator	123268	May 10, 2019	SRS	May 10, 2020
34401A-Agilent Technologies	Digital Voltmeter	MY53003818	May 15, 2018	Agilent Provider #93107	May 15, 2021
SD700-Extech	Meteo Station	Q769118	May 06, 2019	INNOCAL	May 06, 2021
140-Norsonic	Real Time Analyzer	1405966	May 09, 2019	Norsonic SA	May 09, 2021
PC Program 1018 Norsonic	Calibration software	v.6.1T	Validated Nov 2014	Scantek, Inc.	-
40AG-GRAS	Microphone	173539	May 16, 2019	Scantek, Inc. / NVLAP	May 16, 2020
NN1203-Norsonic	Preamplifier	138531	May 16, 2019	Norsonic SA	May 16, 2020

Instrumentation and test results are traceable to SI (International System of Units) through standards maintained by NIST (USA) and NPL (UK)

Calibrated by:	Steven Boertmann	**Authorized signatory:**	Eric Ford
Signature	Steven Boertmann	Signature	Eric Ford
Date	8-1-19	Date	8-1-19

Document stored as: C:\Nor1504\Cal\2014\3M-AC300_AC300008921_M3.doc

Results summary: Device was tested and complies with following clauses of mentioned specifications:

CLAUSES[1] FROM STANDARDS REFERENCED IN PROCEDURES:	MET[2]	NOT MET	COMMENTS
Manufacturer specifications			
Manufacturer specifications: Sound pressure level	X		
Manufacturer specifications: Frequency	X		
Manufacturer specifications: Total harmonic distortion	X		
Current standards			
ANSI S1.40:2006 B.3 / IEC 60942: 2003 B.2 - Preliminary inspection	X		Unit older than the standard
ANSI S1.40:2006 B.4.4 / IEC 60942: 2003 B.3.4 - Sound pressure level	X		Unit older than the standard
ANSI S1.40:2006 A.5.4 / IEC 60942: 2003 A.4.4 - Sound pressure level stability	-	-	Unit older than the standard
ANSI S1.40:2006 B.4.5 / IEC 60942: 2003 B.3.5 - Frequency	X		Unit older than the standard
ANSI S1.40:2006 B.4.6 / IEC 60942: 2003 B.3.6 - Total harmonic distortion	X		Unit older than the standard
Older standards (obsolete)			
IEC 60942: 1997 B.2 - Preliminary inspection	X		
IEC 60942: 1997 B.3.3 - Sound pressure level	X		
IEC 60942: 1997 B.3.4 - Sound pressure level stability	X		
IEC 60942: 1997 B.3.5 - Frequency	X		
IEC 60942: 1997 B.3.6 - Total harmonic distortion	X		
ANSI S1.40: 1984 (R1997) 4.4.2 Sound pressure level in the coupler	X		Not applicable
ANSI S1.40: 1984 (R1997) 4.4 Frequency sound in the coupler	X		Not applicable
ANSI S1.40: 1984 (R1997) 4.10 Total harmonic distortion	X		Not applicable

[1] The results of this calibration apply only to the instrument type with serial number identified in this report.

[2]

Main measured parameters [3]:

Measured[4]/Acceptable[5] Tone frequency (Hz):	Measured[4]/Acceptable[5] Total Harmonic Distortion (%):	Measured [4]/Acceptable Level[5] (dB):
1000.06 ± 1.0/1000.0 ± 10.0	0.20 ± 0.10/ < 3	114.26 ± 0.00/114.0 ± 0.4

[3] The stated level is valid at measurement conditions.

[4] The above expanded uncertainties for frequency and distortion are calculated with a coverage factor k=2; for level k=2.00

[5] Acceptable parameters values are from the current standards

Barometer indication	Nominal indication

Environmental conditions:

Temperature (°C)	Barometric pressure (kPa)	Relative Humidity (%)
22.0 ± 1.0	100.00 ± 0.001	42.0 ± 2.0

Tests made with following attachments to instrument:

Calibrator ½" Adaptor Type:
Other:

Adjustments: Unit was not adjusted.
Comments: C:\Nor1504\Cal\2014\3M-AC300_AC300008921_M3.doc

Note: The instrument was tested for the parameters listed in the table above, using the test methods described in the listed standards. All tests were performed around the reference conditions. The test results were compared with the manufacturer's or with the standard's specifications, whichever are larger.
Compliance with any standard cannot be claimed based solely on the periodic tests.

Place of Calibration: Premier Safety
46410 Continental Dr.
Chesterfield, MI 48047

Ph/Fax: 586-840-3220/ -3221
www.premiersafety.com

PREMIER SAFETY
CALIBRATION LABORATORY

Calibration Certificate No.

Instrument: Sound Level Meter
Model: SoundPro SE_DL1
Manufacturer: Quest
Serial number: BJJ080002
Tested with: Microphone QE7052 s/n 34139
Preamplifier n/a s/n 0614 9841
Type (class): 1
Customer:
Tel/Fax: /

Date Calibrated: **8/19/2019** *Cal Due:* **8/19/2020**

	Received	Sent
Status:		
In tolerance:	X	X
Out of tolerance:		
See comments:		

Contains non-accredited tests: __Yes X No
Calibration service: __ Basic X Standard
Address:

Tested in accordance with the following procedures and standards:
Calibration of Sound Level Meters, Scantek Inc., Rev. 6/22/2012
SLM & Dosimeters – Acoustical Tests, Scantek Inc., Rev. 7/6/2011

Instrumentation used for calibration: Nor-1504 Norsonic Test System:

Instrument - Manufacturer	Description	S/N	Cal. Date	Traceability evidence Cal. Lab / Accreditation	Cal. Due
4831 Norsonic	SME Cal Unit	31079	May 09, 2019	Norsonic SA	May 09, 2021
DS-360 SRS	Function Generator	123268	May 10, 2019	SRS	May 10, 2020
34401A-Agilent Technologies	Digital Voltmeter	MY53003818	May 15, 2018	Agilent Provider #93107	May 15, 2021
SD700-Extech	Meteo Station	Q769118	May 06, 2019	INNOCAL	May 06, 2021
PC Program 1019 Norsonic	Calibration software	v.6.1T	Validated Nov 2014	Scantek, Inc.	-
1251 Norsonic	Calibrator	34103	May 16, 2019	Scantek, Inc./ NVLAP	May 16, 2020

Instrumentation and test results are traceable to SI (International System of Units) through standards maintained by NIST (USA) and NPL (UK).

Environmental conditions:

Temperature (°C)	Barometric pressure (kPa)	Relative Humidity (%)
22.0	100.00	42.0

Calibrated by:	Steven Boertmann	Authorized signatory:	Eric Ford
Signature	Steven Boertmann	Signature	Eric Ford
Date	8-19-19	Date	8-19-19

Document stored C:\Nor1504\SLM\2014\QSproSE2_BIJ080016_M2.doc

Results summary: Device complies with following clauses of mentioned specifications:

CLAUSES FROM IEC/ANSI STANDARDS REFERENCED IN PROCEDURES:	RESULT[2,3]	EXPANDED UNCERTAINTY (coverage factor 2) [dB]
INDICATION AT THE CALIBRATION CHECK FREQUENCY - ANSI S1.4 CLAUSE 3.2	Passed	0.20.15
FREQUENCY WEIGHTINGS: A NETWORK - IEC 61672-3 ED.1 CLAUSE 12	Passed	0.2
FREQUENCY WEIGHTINGS: C NETWORK - IEC 61672-3 ED.1 CLAUSE 12	Passed	0.2
FREQUENCY WEIGHTINGS: Z NETWORK - IEC 61672-3 ED.1 CLAUSE 12	Passed	0.2
FREQUENCY AND TIME WEIGHTINGS AT 1 KHZ IEC 61672-3 ED.1 CLAUSE 13	Passed	0.2
LEVEL LINEARITY ON THE REFERENCE LEVEL RANGE - IEC 61672-3 ED.1 CLAUSE 14	Passed	0.3
LEVEL LINEARITY INCLUDING THE LEVEL RANGE CONTROL - IEC 61672-3 ED.1 CLAUSE 15	Passed	0.3
TONEBURST RESPONSE - IEC 61672-3 ED.1 CLAUSE 16	Passed	0.3
PEAK C SOUND LEVEL - IEC 61672-3 ED.1 CLAUSE 17	Passed	0.35

1 The results of this calibration apply only to the instrument type with serial number identified in this report.

2 Parameters are certified at actual environmental conditions.

3

Comments:

Note: The instrument was tested for the parameters listed in the table above, using the test methods described in the listed standards. All tests were performed around the reference conditions. The test results were compared with the manufacturer's or with the standard's specifications, whichever are larger.
Compliance with any standard cannot be claimed based solely on the periodic tests.

Tests made with the following attachments to the instrument:

Microphone: Quest QE7052 s/n 34139 for acoustical test
Preamplifier: Quest n/a s/n 0614 9841 for all tests
Other: line adaptor ADP005 (18pF) for electrical tests and 1448 (18pF) for noise test
Accompanying acoustical calibrator: 3M AC-300 s/n AC300008921
Windscreen: none

Measured Data: in Test Report # of ... pages.

Place of Calibration: Premier Safety
46410 Continental Dr.
Chesterfield, MI 48047
Ph/Fax: 586-840-3220/ -3221
www.premier safety.com

SoundPro SE_DL1 s/n: BJJ080002 ID:
Date: 8/19/2019 By: SB
Due: 8/19/2020

BISHOPVILLE TRUCK ROUTE PROJECT (S-69-08)

TRAFFIC NOISE ANALYSIS

APPENDICES

APPENDIX C
TRAFFIC CALCULATIONS

TRAFFIC CALCULATIONS

EXISTING (2015) TRAFFIC

Segment Name	AADT	K	DHV	Cars Total	Medium Trucks Total	Heavy Trucks Total
U.S. 15 South of Browntown Road to North of St. Charles Road	12,000	0.08	960	895	32	34
St. Charles Road/S.C. 154	1,500	0.088	132	123	5	5
Wisacky Highway/S.C. 341	5,000	0.089	445	409	7	30
U.S. 15 from North of College Street to Bethune Highway	9,000	0.095	855	683	24	149
U.S. 15 from Bethune Highway to Mixon Drive	6,800	0.095	646	532	67	49
Bethune Highway	3,300	0.093	306.9	265	8	35

Notes:
Each segment has unique vehicle classification percentages

NO BUILD (2045) TRAFFIC

Segment Name	AADT	K	DHV	Cars Total	Medium Trucks Total	Heavy Trucks Total
U.S. 15 South of Browntown Road to North of St. Charles Road	21,000	0.08	1,680	1,566	55	59
St. Charles Road/S.C. 154	1,500	0.088	132	122	4	5
Wisacky Highway/S.C. 341	8,800	0.089	784	720	12	52
U.S. 15 from North of College Street to Bethune Highway	15,800	0.095	1,501	1,198	43	262
U.S. 15 from Bethune Highway to Mixon Drive	11,900	0.095	1,130.5	930	117	85
Bethune Highway	5,800	0.093	539.4	464	14	61

Notes:
Each segment has unique vehicle classification percentages

ALTERNATIVE 1 (2045) TRAFFIC

Segment Name	AADT	K	DHV	Cars Total	Medium Trucks Total	Heavy Trucks Total
U.S. 15 South of Browntown Road	25,600	0.08	2,048	1,909	68	72
U.S. 15 from Browntown Road to North of St. Charles Road	14,000	0.08	1,120	1,044	37	39
St. Charles Road/S.C. 154	2,800	0.088	246.4	229	8	9
Alternative 1 from Browntown Road to S.C. 341*	8,700	0.08	696	649	23	24
Wisacky Highway/S.C. 341	8,300	0.087	722.1	640	58	25
Alternative 1 from S.C. 341 to Bethune Highway*	4,500	0.095	427.5	341	12	74
U.S. 15 from North of College Street to Bethune Highway	13,200	0.095	1,254	1,001	35	218
U.S. 15 from Bethune Highway to Mixon Drive	12,800	0.095	1,216	1,000	125	91
Bethune Highway	6,000	0.093	558	480	15	63

Notes:

- *Each segment has unique vehicle classification percentages*
- *Traffic in this table is applicable to Alternatives 5 and 6 south of S.C. 341 and Alternatives 7, 9, and 11 north of S.C. 341*
- **The highest traffic volume for the segment was used*

ALTERNATIVE 2 (2045) TRAFFIC

Segment Name	AADT	K	DHV	Cars Total	Medium Trucks Total	Heavy Trucks Total
U.S. 15 South of Browntown Road	24,800	0.08	1,984	1,849	65	69
U.S. 15 from Browntown Road to North of St. Charles Road	14,200	0.08	1,136	1,059	37	40
St. Charles Road/S.C. 154	2,300	0.088	202.4	188	7	8
Alternative 2 from Browntown Road to S.C. 341*	8,500	0.08	680	634	22	24
Wisacky Highway/S.C. 341	8,900	0.087	774.3	686	62	26
Alternative 2 from S.C. 341 to Bethune Highway*	5,900	0.095	560.5	447	16	98
U.S. 15 from North of College Street to Bethune Highway	12,500	0.095	1,187.5	948	33	207
U.S. 15 from Bethune Highway to Mixon Drive	12,700	0.095	1,206.5	992	124	90
Bethune Highway	5,900	0.093	548.7	472	14	62
Alt 2 Extension to Academy Road**	1,100	0.127	139.7	128	3	9

Notes:

- *Each segment has unique vehicle classification percentages*
- *Traffic in this table is applicable to Alternatives 7 and 8 south of S.C. 341 and Alternatives 5, 10, and 12 north of S.C. 341*
- **The highest traffic volume for the segment was used*
- ***The AADTs for these segments was calculated using the K Factors from the 2015 tube data applied to the peak hour volume from the traffic model*

ALTERNATIVE 3 (2045) TRAFFIC

Segment Name	AADT	K	DHV	Cars Total	Medium Trucks Total	Heavy Trucks Total
U.S. 15 from Browntown Road to North of St. Charles Road	15,500	0.08	1,240	1,156	41	43
St. Charles Road/S.C. 154	2,000	0.088	176	164	6	7
Alternative 3 from Browntown Road to S.C. 341*	6,600	0.08	528	492	17	18
Wisacky Highway/S.C. 341	8,000	0.087	696	617	56	24
Alternative 3 from S.C. 341 to Bethune Highway*	5,600	0.095	532	425	15	93
U.S. 15 from North of College Street to Bethune Highway	12,600	0.095	1,197	956	34	209
U.S. 15 from Bethune Highway to Mixon Drive	12,700	0.095	1,206.5	992	125	91
Bethune Highway	6,100	0.093	567.3	488	15	64
Alt 3 Extension to Academy Road**	1,100	0.127	139.7	128	3	9

Notes:

- *Each segment has unique vehicle classification percentages*
- *Traffic in this table is applicable to Alternatives 9 and 10 south of S.C. 341 and Alternatives 6 and 8 north of S.C. 341*
- **The highest traffic volume for the segment was used*
- ***The AADTs for these segments was calculated using the K Factors from the 2015 tube data applied to the peak hour volume from the traffic model*

ALTERNATIVE 4 (2045) TRAFFIC

Segment Name	AADT	K	DHV	Cars Total	Medium Trucks Total	Heavy Trucks Total
U.S. 15 from Browntown Road to North of St. Charles Road	15,500	0.08	1,240	1,156	41	43
St. Charles Road/S.C. 154	2,000	0.088	176	163	6	7
Alternative 4 from Browntown Road to S.C. 341*	6,600	0.08	528	492	17	18
Wisacky Highway/S.C. 341	8,000	0.087	696	617	56	24
Alternative 4 from S.C. 341 to Bethune Highway*	5,600	0.095	532	425	15	93
U.S. 15 from North of College Street to Bethune Highway	12,600	0.095	1,197	956	34	209
U.S. 15 from Bethune Highway to Mixon Drive	12,700	0.095	1,206.5	992	125	91
Bethune Highway	6,100	0.093	567.3	488	15	64
Alt 4 Extension to Academy Road**	1,100	0.127	139.7	128	3	9

Notes:

- *Each segment has unique vehicle classification percentages*
- *Traffic in this table is applicable to Alternatives 11 and 12 south of S.C. 341*
- **The highest traffic volume for the segment was used*
- ***The AADTs for these segments was calculated using the K Factors from the 2015 tube data applied to the peak hour volume from the traffic model*

BISHOPVILLE TRUCK ROUTE PROJECT (S-69-08)

TRAFFIC NOISE ANALYSIS

APPENDICES

APPENDIX D
RECEIVER NOISE LEVEL IMPACTS

RECEIVER NOISE LEVEL IMPACTS SOUTH OF S.C. 341/WISACKY HIGHWAY

CNE	Receiver	Land Use (NAC)	Units	NAC (dBA)	Existing (2015) Noise Level (dBA)	Existing (2015) Adjusted Noise Level (dBA)	No Build (2045) Noise Level (dBA)	No Build (2045) Change (dBA)	Alt 1, 5, 6 (2045) Noise Level (dBA)	Alt 1, 5, 6 (2045) Change (dBA)	Alt 2, 7, 8 (2045) Noise Level (dBA)	Alt 2, 7, 8 (2045) Change (dBA)	Alt 3, 9, 10 (2045) Noise Level (dBA)	Alt 3, 9, 10 (2045) Change (dBA)	Alt 4, 11, 12 (2045) Noise Level (dBA)	Alt 4, 11, 12 (2045) Change (dBA)
	REC-1	Residential- U.S. 15 (B)	1	66	51.2	55.6*	53.5	2.3	38.2	-17.4	39.3	-16.3	52.2	-3.4	52.6	-3.0
	REC-2	Oriental Quick Stop- U.S. 15 (E)	1	71	64	64.0	66.3	2.3	38.2	-25.8	40.0	-24.0	65.2	1.2	65	1.0
	REC-3	Residential- U.S. 15 (B)	1	66	61.8	61.8	64.1	2.3	38.4	-23.4	40.0	-21.8	62.9	1.1	62.8	1.0
	REC-4	Residential- U.S. 15 (B)	1	66	61.2	61.2	63.5	2.3	40.7	-20.5	41.5	-19.7	RELOCATION		RELOCATION	
	REC-5	Residential- U.S. 15 (B)	1	66	56.3	56.3	58.6	2.3	46.9	-9.4	45.5	-10.8	57.3	1.0	56.8	0.5
	REC-6	Medical Office- U.S.15 (C)	1	66	52.8	55.6*	55.2	2.4	39.6	-16.0	41.6	-14.0	54.1	-1.5	60.7	5.1
	REC-7	Residential- U.S. 15 (B)	1	66	62.3	62.3	64.7	2.4	40.3	-22.0	41.4	-20.9	RELOCATION		RELOCATION	
B	REC-8	Adult Day Care- Wilkinson Rd (C)	1	66	46.6	56.5*	48.9	2.3	39.4	-17.1	42.7	-13.8	50.0	-6.5	59.6	3.1
A	REC-9	Residential- Wilkinson Rd (B)	1	66	43.1	56.2*	45.3	2.2	40.1	-16.1	45.5	-10.7	53.0	-3.2	RELOCATION	
A	REC-10	Residential- Wilkinson Rd (B)	1	66	42.4	56.2*	44.5	2.1	40.2	-16.0	46.3	-9.9	53.0	-3.2	RELOCATION	
A	REC-11	Residential- Edgefield Dr (B)	1	66	42.9	56.2*	45.1	2.2	40.6	-15.6	46.4	-9.8	60.6	4.4	53.9	-2.3
A	REC-12	Residential- Edgefield Dr (B)	1	66	43	56.2*	45.2	2.2	40.8	-15.4	46.8	-9.4	RELOCATION		51.0	-5.2
A	REC-13	Residential- Edgefield Dr (B)	1	66	43	56.2*	45.2	2.2	41.0	-15.2	47.4	-8.8	RELOCATION		49.2	-7.0
A	REC-14	Residential- Edgefield Dr (B)	1	66	43.1	56.2*	45.4	2.3	41.3	-14.9	47.8	-8.4	58.2	2.0	47.7	-8.5
A	REC-15	Residential- Edgefield Dr (B)	1	66	43.1	56.2*	45.4	2.3	41.6	-14.6	48.3	-7.9	54.3	-1.9	46.7	-9.5
A	REC-16	Residential- Edgefield Dr (B)	1	66	43.1	56.2*	45.4	2.3	42.1	-14.1	49.3	-6.9	51.0	-5.2	45.8	-10.4
A	REC-17	Residential- Edgefield Dr (B)	1	66	43.2	56.2*	45.5	2.3	43.0	-13.2	50.2	-6.0	49.4	-6.8	45.3	-10.9
A	REC-18	Residential- Edgefield Dr (B)	1	66	43.3	56.2*	45.6	2.3	43.7	-12.5	50.8	-5.4	48.6	-7.6	45.1	-11.1
A	REC-19	Residential- Edgefield Dr (B)	1	66	43.5	56.2*	45.8	2.3	44.0	-12.2	51.3	-4.9	48.0	-8.2	45.0	-11.2
A	REC-20	Residential- Edgefield Dr (B)	1	66	43.6	56.2*	45.9	2.3	44.6	-11.6	52.1	-4.1	47.3	-8.9	44.6	-11.6
C	REC-21	Residential- S. Lee St (B)	1	66	45.3	56.0*	45.8	0.5	41.3	-14.7	49.5	-6.5	47.2	-8.8	43.8	-12.2
C	REC-22	Residential- S. Lee St (B)	1	66	41.7	56.0*	42.8	1.1	40.1	-15.9	46.6	-9.4	44.4	-11.6	42.7	-13.3
C	REC-23	Residential- St. Charles Rd (B)	1	66	49.8	56.0*	50.0	0.2	45.9	-10.1	56.5	0.5	51.3	-4.7	46.9	-9.1
C	REC-24	Residential- St. Charles Rd (B)	1	66	56.8	56.8	56.8	0.0	45.3	-11.5	60.2	3.4	57.8	1.0	46.5	-10.3
C	REC-25	Residential- S. Lee St (B)	1	66	47.6	56.0*	47.9	0.3	41.7	-14.3	51.1	-4.9	49.2	-6.8	44.2	-11.8
C	REC-26	Residential- Maple Dr (B)	1	66	48.5	56.0*	48.8	0.3	43.0	-13.0	52.7	-3.3	50.0	-6.0	44.8	-11.2

CNE	Receiver	Land Use (NAC)	Units	NAC (dBA)	Existing (2015) Noise Level (dBA)	Existing (2015) Adjusted Noise Level (dBA)	No Build (2045) Noise Level (dBA)	No Build (2045) Change (dBA)	Alt 1, 5, 6 (2045) Noise Level (dBA)	Alt 1, 5, 6 (2045) Change (dBA)	Alt 2, 7, 8 (2045) Noise Level (dBA)	Alt 2, 7, 8 (2045) Change (dBA)	Alt 3, 9, 10 (2045) Noise Level (dBA)	Alt 3, 9, 10 (2045) Change (dBA)	Alt 4, 11, 12 (2045) Noise Level (dBA)	Alt 4, 11, 12 (2045) Change (dBA)
C	REC-27	Residential- Maple Dr (B)	1	66	42.0	56.0*	43.0	1.0	40.6	-15.4	47.8	-8.2	44.7	-11.3	42.8	-13.2
C	REC-28	Residential- Maple Dr (B)	1	66	42.6	56.0*	43.5	0.9	40.8	-15.2	48.4	-7.6	45.2	-10.8	43.2	-12.8
C	REC-29	Residential- St. Charles Rd (B)	1	66	51.0	56.0*	51.2	0.2	41.0	-15.0	53.1	-2.9	52.2	-3.8	44.3	-11.7
C	REC-30	Residential- Maple Dr (B)	1	66	43.9	56.0*	44.6	0.7	41.3	-14.7	49.4	-6.6	46.2	-9.8	43.6	-12.4
C	REC-31	Ivy Terrace Apartments (B)	4	66	44.8	56.0*	45.6	0.8	40.0	-16.0	47.7	-8.3	46.7	-9.3	43.3	-12.7
C	REC-32	Ivy Terrace Apartments (B)	6	66	42.8	56.0*	43.9	1.1	39.6	-16.4	46.0	-10.0	45.0	-11	42.8	-13.2
C	REC-33	Residential- Maple Dr (B)	1	66	45.5	56.0*	46.0	0.5	42.0	-14	50.6	-5.4	47.5	-8.5	44.0	-12.0
	REC-34	Residential- St. Charles Rd (B)	1	66	50.2	55.6*	50.5	0.3	41.0	-14.6	51.5	-4.1	51.6	-4.0	45.8	-9.8
C	REC-35	Residential- St. Charles Rd (B)	1	66	49.2	56.0*	49.4	0.2	48.4	-7.6	58.9	2.9	50.8	-5.2	48.6	-7.4
C	REC-36	Residential- S. Lee St (B)	1	66	43.4	56.0*	44.2	0.8	40.5	-15.5	47.9	-8.1	45.7	-10.3	43.2	-12.8
C	REC-37	Residential- St. Charles Rd (B)	1	66	51.7	56.0*	51.8	0.1	43.2	-12.8	54.7	-1.3	52.9	-3.1	45.2	-10.8
C	REC-38	Residential- S. Lee St (B)	1	66	41.2	56.0*	42.5	1.3	39.9	-16.1	46.2	-9.8	44.1	-11.9	42.5	-13.5
C	REC-39	Residential- Maple Dr (B)	1	66	41	56.0*	42.2	1.2	40.3	-15.7	47.1	-8.9	44.0	-12.0	42.5	-13.5
D	REC-40	Residential- Dove Ln (B)	1	66	52.1	55.9*	52.1	0.0	54.9	-1.0	40.2	-15.7	53.2	-2.7	53.2	-2.7
	REC-41	Residential- St. Charles Rd (B)	1	66	40.9	55.6*	41.6	0.7	44.8	-10.8	60.5	4.9	45.1	-10.5	44.9	-10.7
D	REC-42	Church- Liberty Hill Baptist (C)	1	66	52.1	55.9*	52.1	0.0	54.2	-1.7	39.1	-16.8	52.7	-3.2	52.7	-3.2
D	REC-43	Church- Liberty Hill Baptist (C)	1	66	45.1	55.9*	45.2	0.1	49.5	-6.4	38.9	-17	47.5	-8.4	47.5	-8.4
	REC-48	Residential- Wisacky Hwy (B)	1	66	57.0	57.0	59.4	2.4	58.8	1.8	59.0	2.0	58.6	1.6	58.7	1.7
	REC-49	Residential- Wisacky Hwy (B)	1	66	57.9	57.9	60.3	2.4	59.8	1.9	60.0	2.1	59.6	1.7	59.6	1.7
	REC-51	Residential- Wisacky Hwy (B)	1	66	56.3	56.3	58.7	2.4	58.2	1.9	58.7	2.4	58.0	1.7	58.1	1.8
	REC-52	Residential- Wisacky Hwy (B)	1	66	57.4	57.4	59.8	2.4	59.0	1.6	59.2	1.8	58.8	1.4	58.8	1.4
	REC-54	Residential- Wisacky Hwy (B)	1	66	60.8	60.8	63.2	2.4	61.3	0.5	61.5	0.7	61.1	0.3	61.1	0.3
	REC-56	Residential- Wisacky Hwy (B)	1	66	58.4	58.4	60.8	2.4	60.0	1.6	60.7	2.3	59.9	1.5	60.0	1.6
	REC-57	Residential- Wisacky Hwy (B)	1	66	55.8	55.8	58.2	2.4	60.0	4.2	60.8	5.0	59.9	4.1	59.9	4.1
	REC-59	Residential- Wisacky Hwy (B)	1	66	57.0	57.0	59.3	2.3	58.6	1.6	58.8	1.8	58.4	1.4	58.4	1.4
	REC-120	Palmetto Moon- Wilkinson Rd (E)	1	71	52.0	55.6*	54.3	2.3	40.2	-15.4	42.1	-13.5	55.0	-0.6	65.2	9.6

*Existing adjusted noise level was used in the Build alternatives analyses

Notes:

- The No Build (2045) Change column is the difference between the existing unadjusted dBA's and No Build dBA's

RECEIVER NOISE LEVEL IMPACTS NORTH OF S.C. 341/WISACKY HIGHWAY

CNE	Receiver	Land Use (NAC)	Units	NAC (dBA)	Existing (2015) Noise Level (dBA)	Existing (2015) Adjusted Noise Level (dBA)	No Build (2045) Noise Level (dBA)	No Build (2045) Change (dBA)	Alt 1, 7, 9, 11 (2045) Noise Level (dBA)	Alt 1, 7, 9, 11 (2045) Change (dBA)	Alt 2, 5, 10, 12 (2045) Noise Level (dBA)	Alt 2, 5, 10, 12 (2045) Change (dBA)	Alt 3, 6, 8 (2045) Noise Level (dBA)	Alt 3, 6, 8 (2045) Change (dBA)	Alt 4 (2045) Noise Level (dBA)	Alt 4 (2045) Change (dBA)
E	REC-45	Residential- Wags Dr (B)	1	66	49.3	55.6*	51.7	2.4	52.0	-3.6	52.5	-3.1	52.0	-3.6	52.0	-3.6
	REC-46	Residential- Wisacky Hwy (B)	1	66	54.6	55.6*	57.0	2.4	56.9	1.3	57.2	1.6	56.8	1.2	56.8	1.2
	REC-47	Residential- Wags Dr (B)	1	66	56.9	56.9	59.3	2.4	58.8	1.9	59.1	2.2	58.7	1.8	58.7	1.8
	REC-50	Residential- Wisacky Hwy (B)	1	66	53.8	55.6*	56.2	2.4	55.9	0.3	55.5	-0.1	55.3	-0.3	55.8	0.2
	REC-53	Residential- Wisacky Hwy (B)	1	66	57.0	57.0	59.4	2.4	59.6	2.6	59.8	2.8	59.4	2.4	59.4	2.4
	REC-55	Residential- Wisacky Hwy (B)	1	66	46.6	55.6*	49.0	2.4	48.6	-7.0	48.4	-7.2	48.5	-7.1	48.0	-7.6
	REC-58	Residential- Wisacky Hwy (B)	1	66	60.9	60.9	63.3	2.4	65.0	4.1	65.3	4.4	64.8	3.9	64.8	3.9
E	REC-60	Residential- Wags Dr (B)	1	66	47.6	55.6*	50.0	2.4	50.9	-4.7	51.5	-4.1	51.0	-4.6	51.1	-4.5
E	REC-61	Residential- Wags Dr (B)	1	66	45.0	55.6*	47.4	2.4	49.6	-6.0	50.3	-5.3	49.9	-5.7	49.9	-5.7
E	REC-62	Residential- James St (B)	1	66	34.3	55.6*	36.6	2.3	50.6	-5.0	56.5	0.9	56.3	0.7	56.3	0.7
E	REC-63	Residential- James St (B)	1	66	34.3	55.6*	36.7	2.4	49.8	-5.8	55.0	-0.6	54.8	-0.8	54.8	-0.8
E	REC-64	Residential- James St (B)	1	66	34.3	55.6*	36.7	2.4	49.3	-6.3	53.8	-1.8	53.6	-2.0	53.6	-2.0
E	REC-65	Residential- James St (B)	1	66	34.4	55.6*	36.8	2.4	48.8	-6.8	52.9	-2.7	52.7	-2.9	52.7	-2.9
E	REC-66	Residential- James St (B)	1	66	34.5	55.6*	36.8	2.3	48.3	-7.3	52.0	-3.6	51.8	-3.8	51.8	-3.8
E	REC-67	Residential- James St (B)	1	66	34.3	55.6*	36.7	2.4	48.4	-7.2	54.4	-1.2	54.2	-1.4	54.2	-1.4
E	REC-68	Residential- James St (B)	1	66	34.3	55.6*	36.7	2.4	47.9	-7.7	53.2	-2.4	53.0	-2.6	53.0	-2.6
E	REC-69	Residential- James St (B)	1	66	34.4	55.6*	36.8	2.4	47.4	-8.2	52.0	-3.6	51.8	-3.8	51.8	-3.8
E	REC-70	Residential- Dogwood Rd (B)	1	66	34.4	55.6*	36.8	2.4	46.6	-9.0	51.3	-4.3	51.1	-4.5	51.1	-4.5
E	REC-71	Residential- Dogwood Rd (B)	1	66	34.4	55.6*	36.7	2.3	47.1	-8.5	52.4	-3.2	52.2	-3.4	52.2	-3.4
E	REC-72	Residential- Dogwood Rd (B)	1	66	34.4	55.6*	36.7	2.3	47.3	-8.3	53.2	-2.4	53.1	-2.5	53.1	-2.5
E	REC-73	Residential- Dogwood Rd (B)	1	66	34.3	55.6*	36.7	2.4	47.7	-7.9	54.3	-1.3	54.1	-1.5	54.1	-1.5
F	REC-74	Robert E Lee Academy- Track (C)	1	66	36.8	62.5*	39.2	2.4	43.6	-18.9	56.2	-6.3	55.4	-7.1	55.4	-7.1
F	REC-75	Robert E Lee Academy- Playground (C)	1	66	37.5	62.5*	39.9	2.4	43.6	-18.9	57.6	-4.9	57.6	-4.9	57.6	-4.9
F	REC-76	Robert E Lee Academy- Baseball field (C)	1	66	36.7	62.5*	39.0	2.3	42.5	-20.0	47.2	-15.3	46.9	-15.6	47.0	-15.5
F	REC-77	Robert E Lee Academy- Softball field (C)	1	66	37.5	62.5*	39.9	2.4	42.6	-19.9	46.7	-15.8	46.6	-15.9	46.6	-15.9

CNE	Receiver	Land Use (NAC)	Units	NAC (dBA)	Existing (2015) Noise Level (dBA)	Existing (2015) Adjusted Noise Level (dBA)	No Build (2045) Noise Level (dBA)	No Build (2045) Change (dBA)	Alt 1, 7, 9, 11 (2045) Noise Level (dBA)	Alt 1, 7, 9, 11 (2045) Change (dBA)	Alt 2, 5, 10, 12 (2045) Noise Level (dBA)	Alt 2, 5, 10, 12 (2045) Change (dBA)	Alt 3, 6, 8 (2045) Noise Level (dBA)	Alt 3, 6, 8 (2045) Change (dBA)	Alt 4 (2045) Noise Level (dBA)	Alt 4 (2045) Change (dBA)
F	REC-78	Robert E Lee Academy-Track (C)	1	66	36.5	62.5*	38.9	2.4	43.5	-19.0	52.8	-9.7	52.2	-10.3	52.2	-10.3
F	REC-79	Robert E Lee Academy- Football stands (C)	1	66	37.1	62.5*	39.5	2.4	43.2	-19.3	52.8	-9.7	52.3	-10.2	52.2	-10.3
F	REC-80	Robert E Lee Academy- Common space (C)	1	66	37.5	62.5*	39.8	2.3	43.1	-19.4	51.2	-11.3	51.1	-11.4	51	-11.5
	REC-81	Residential- Mendy Ln (B)	1	66	63.1	63.1	65.5	2.4	64.8	1.7	64.2	1.1	64.6	1.5	64.6	1.5
G	REC-82	Residential- Mendy Ln (B)	1	66	51.6	56.0*	54.0	2.4	53.7	-2.3	55.0	-1.0	54.5	-1.5	54.6	-1.4
	REC-83	Residential- U.S. 15 (B)	1	66	60.2	60.2	62.7	2.5	61.9	1.7	61.9	1.7	61.8	1.6	61.8	1.6
G	REC-84	Residential- Mendy Ln (B)	1	66	49.6	56.0*	52.0	2.4	52.0	-4.0	54.0	-2.0	53.6	-2.4	53.8	-2.2
G	REC-85	Church- Tabernacle of Champions (C)	1	66	55.7	56.0*	58.1	2.4	57.8	1.8	59.2	3.2	58.1	2.1	58.2	2.2
G	REC-86	Residential- Mendy Ln (B)	1	66	53.2	56.0*	55.6	2.4	55.2	-0.8	56	0.0	55.7	-0.3	55.8	-0.2
G	REC-87	Residential- Mendy Ln (B)	1	66	55.3	56.0*	57.8	2.5	57.3	1.3	58.0	2.0	57.5	1.5	57.5	1.5
	REC-88	Residential- U.S. 15 (B)	1	66	63.9	63.9	66.3	2.4	65.6	1.7	65.1	1.2	65.4	1.5	65.4	1.5
G	REC-89	Lynches River Apartment (B)	4	66	52.1	56.0*	54.5	2.4	54.1	-1.9	54.7	-1.3	54.5	-1.5	54.5	-1.5
G	REC-90	Lynches River Apartment (B)	4	66	51.0	56.0*	53.5	2.5	53.0	-3.0	53.3	-2.7	53.2	-2.8	53.2	-2.8
G	REC-91	Lynches River Apartment (B)	4	66	50.7	56.0*	53.1	2.4	52.9	-3.1	53.4	-2.6	53.2	-2.8	53.2	-2.8
G	REC-92	Lynches River Apartment (B)	4	66	52.8	56.0*	55.2	2.4	54.7	-1.3	54.9	-1.1	54.8	-1.2	54.8	-1.2
G	REC-93	Lynches River Apartment (B)	4	66	53.2	56.0*	55.6	2.4	55.1	-0.9	55.3	-0.7	55.1	-0.9	55.1	-0.9
G	REC-94	Lynches River Apartment (B)	4	66	50.4	56.0*	52.8	2.4	52.4	-3.6	52.9	-3.1	52.7	-3.3	52.8	-3.2
G	REC-95	Lynches River Apartment- Playground (B)	4	66	50.0	56.0*	52.4	2.4	52.3	-3.7	53.4	-2.6	53.2	-2.8	53.2	-2.8
G	REC-96	Lynches River Apartment (B)	4	66	47.8	56.0*	50.2	2.4	43.7	-12.3	49.8	-6.2	50.3	-5.7	50.3	-5.7
G	REC-97	Lynches River Apartment (B)	4	66	47.5	56.0*	49.9	2.4	43.7	-12.3	50.6	-5.4	50.9	-5.1	50.9	-5.1
G	REC-98	Lynches River Apartment (B)	4	66	47.3	56.0*	49.7	2.4	44.4	-11.6	50.6	-5.4	50.7	-5.3	50.7	-5.3
G	REC-99	Residential- Mendy Ln (B)	1	66	46.5	56.0*	48.9	2.4	49.4	-6.6	53.1	-2.9	52.5	-3.5	52.6	-3.4
G	REC-100	Residential- Academy Rd (B)	1	66	52.5	56.0*	54.9	2.4	54.4	-1.6	54.4	-1.6	54.4	-1.6	54.4	-1.6
G	REC-101	Residential- Edmund Ave (B)	1	66	42.5	56.0*	44.9	2.4	47.3	-8.7	59.3	3.3	57.4	1.4	57.5	1.5
G	REC-102	Residential- Academy Rd (B)	1	66	43.9	56.0*	46.3	2.4	46.7	-9.3	50.8	-5.2	50.6	-5.4	50.6	-5.4
G	REC-103	Residential- Dixon Dr (B)	1	66	50.1	56.0*	52.5	2.4	53.4	-2.6	63.3	7.3	58.5	2.5	58.7	2.7
	REC-104	Grill- U.S. 15 (E)	1	71	69.0	69.0	71.4	2.4	RELOCATION		70.4	1.4	68.8	-0.2	70.0	1.0
	REC-105	Residential- U.S. 15 (B)	1	66	60.9	60.9	63.3	2.4	61.9	1.0	63.5	2.6	64.0	3.1	64.2	3.3

CNE	Receiver	Land Use (NAC)	Units	NAC (dBA)	Existing (2015) Noise Level (dBA)	Existing (2015) Adjusted Noise Level (dBA)	No Build (2045) Noise Level (dBA)	No Build (2045) Change (dBA)	Alt 1, 7, 9, 11 (2045) Noise Level (dBA)	Alt 1, 7, 9, 11 (2045) Change (dBA)	Alt 2, 5, 10, 12 (2045) Noise Level (dBA)	Alt 2, 5, 10, 12 (2045) Change (dBA)	Alt 3, 6, 8 (2045) Noise Level (dBA)	Alt 3, 6, 8 (2045) Change (dBA)	Alt 4 (2045) Noise Level (dBA)	Alt 4 (2045) Change (dBA)
G	REC-106	Residential- Dixon Dr (B)	1	66	52.0	56.0*	54.4	2.4	54.8	-1.2	63.4	7.4	58.4	2.4	58.7	2.7
	REC-107	Happy China- U.S. 15 (E)	1	71	64.6	64.6	67.0	2.4	66.0	1.4	65.6	1.0	69.1	4.5	69.5	4.9
	REC-108	Bar- U.S. 15 (E)	1	71	67.5	67.5	69.9	2.4	RELOCATION		68.8	1.3	64.6	-2.9	64.9	-2.6
	REC-109	Office- U.S. 15 (E)	1	71	64.6	64.6	67.0	2.4	65.3	0.7	68.3	3.7	65.4	0.8	65.6	1.0
G	REC-110	Residential- U.S. 15 (B)	1	66	54.7	56.0*	57.0	2.3	65.8	9.8	56.9	0.9	57.2	1.2	57.5	1.5
	REC-111	Head Start (School)- U.S. 15 (C)	1	66	60.1	60.1	62.5	2.4	61.4	1.3	63.4	3.3	61.6	1.5	61.7	1.6
	REC-112	Residential- U.S. 15 (B)	1	66	62.2	62.2	64.5	2.3	RELOCATION		63.5	1.3	63.0	0.8	63.3	1.1
G	REC-113	Residential- U.S. 15 (B)	1	66	50.7	56.0*	53.1	2.4	60.8	4.8	53.5	-2.5	54.1	-1.9	54.2	-1.8
G	REC-114	Residential- Dixon Dr (B)	1	66	60.0	60.0	62.4	2.4	61.6	1.6	64.6	4.6	62.2	2.2	62.3	2.3
	REC-115	Residential- U.S. 15 (B)	1	66	60.2	60.2	62.5	2.3	64.4	4.2	62.4	2.2	62.3	2.1	62.4	2.2
	REC-116	Church (JW)- Bethune Hwy (C)	1	52	62.4	62.4	64.8	2.4	42.5**	5.1	64.8	2.4	58.5	-3.9	58.8	-3.6
G	REC-117	Residential- U.S. 15 (B)	1	66	46.2	56.0*	48.6	2.4	57.5	1.5	54.7	-1.3	57.5	1.5	57.6	1.6
	REC-118	Residential- Bethune Hwy (B)	1	66	55.8	55.8	58.2	2.4	59.3	3.5	58.2	2.4	59.3	3.5	59.2	3.4
	REC-119	Residential- Bethune Hwy (B)	1	66	58.4	58.4	60.8	2.4	61.2	2.8	60.8	2.4	61.3	2.9	61.2	2.8

*Existing adjusted noise level was used in the Build alternatives analyses
**An interior analysis was performed for REC-116.

Notes:

- The No Build (2045) Change column is the difference between the existing unadjusted dBA's and No Build dBA's
- Red text with red cell color indicates impacted receivers

BISHOPVILLE TRUCK ROUTE PROJECT

(S-69-08)

TRAFFIC NOISE ANALYSIS

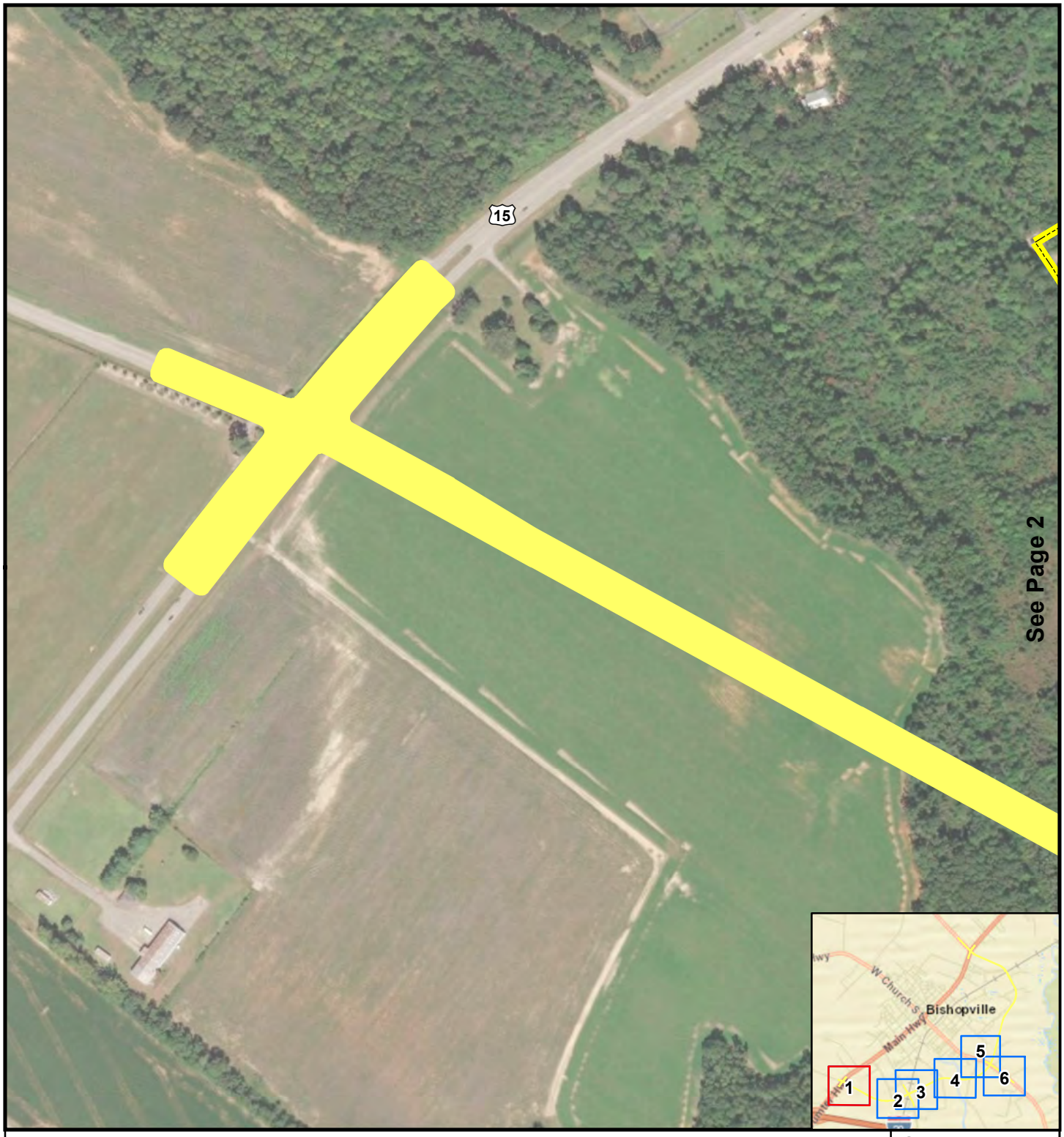
APPENDICES

APPENDIX E
SCENARIO IMPACT RECEIVER MAPBOOKS

BUILD ALTERNATIVE 1 NORTH AND SOUTH RECEIVER MAPBOOKS

South Carolina Department of Transportation

SCDOT Project #: S-69-08
Bishopville Truck Route
Lee County, South Carolina
Alternatives 1, 5, 6 South Noise Impacts



Legend

- No Impact
- Common Noise Environments
- Alternatives 1, 5, 6 South

September 2020

N

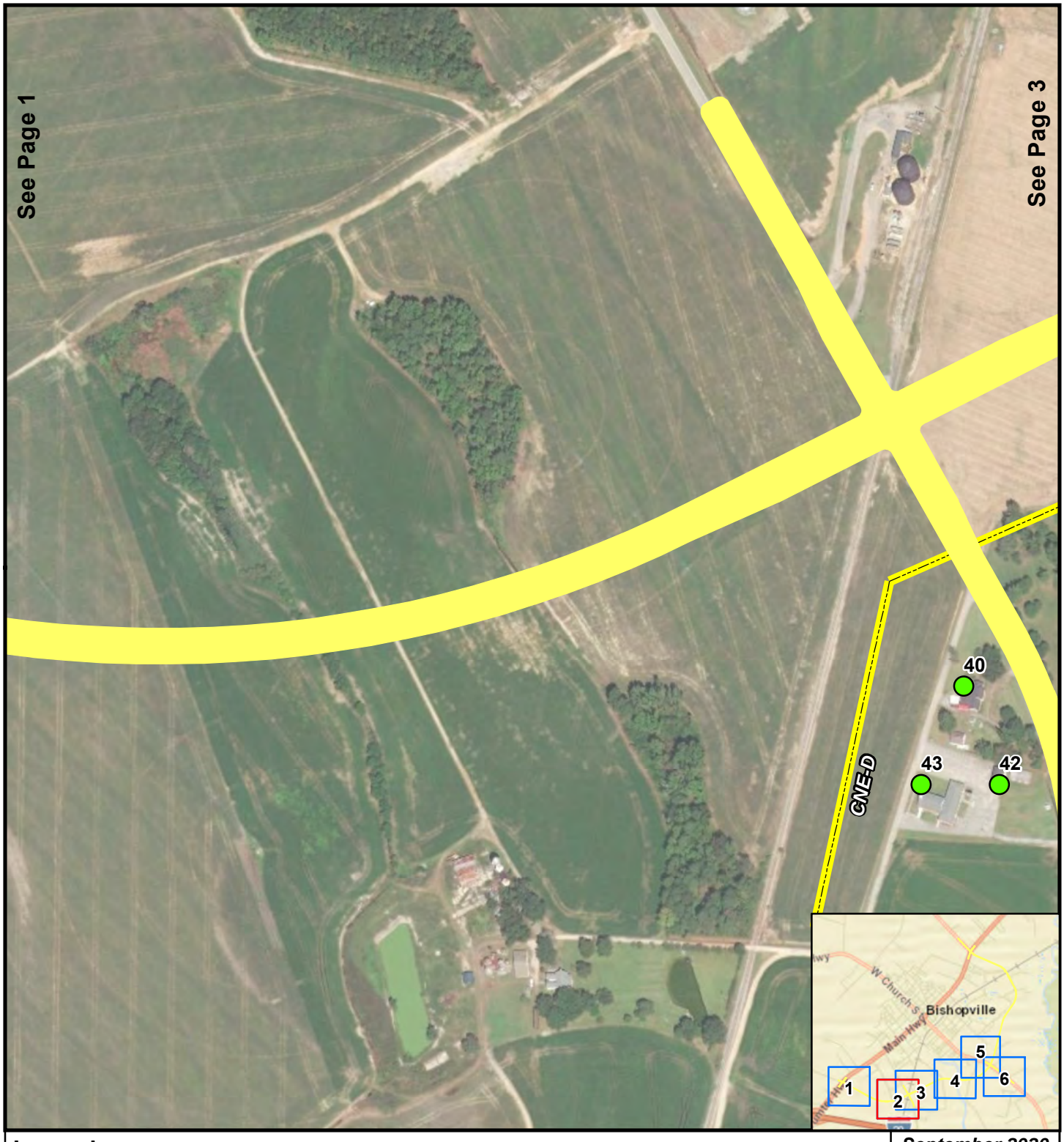
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus, DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

0 0.075 0.15 Miles

FIGURE 1 OF 6

South Carolina Department of Transportation

SCDOT Project #: S-69-08
Bishopville Truck Route
Lee County, South Carolina
Alternatives 1, 5, 6 South Noise Impacts



Legend

- No Impact
- Common Noise Environments
- Alternatives 1, 5, 6 South

September 2020

N

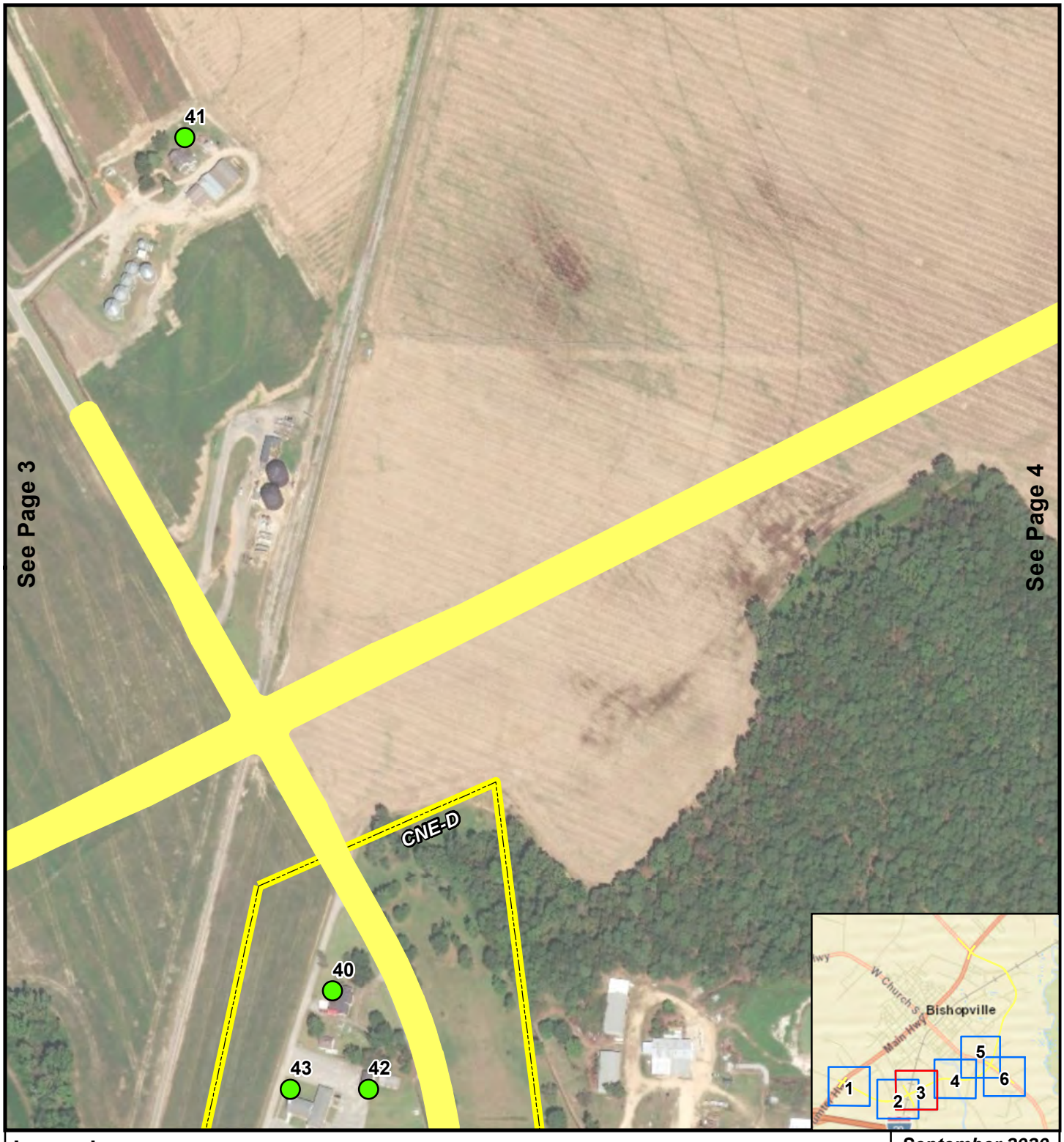
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus, DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

0 0.075 0.15 Miles

FIGURE 2 OF 6

South Carolina Department of Transportation

SCDOT Project #: S-69-08
Bishopville Truck Route
Lee County, South Carolina
Alternatives 1, 5, 6 South Noise Impacts



Legend

- No Impact
- Common Noise Environments
- Alternatives 1, 5, 6 South

September 2020

N

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus, DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

0 0.075 0.15 Miles

FIGURE 3 OF 6

South Carolina Department of Transportation

SCDOT Project #: S-69-08
Bishopville Truck Route
Lee County, South Carolina
Alternatives 1, 5, 6 South Noise Impacts

Legend

- No Impact
- Common Noise Environments
- Alternatives 1, 5, 6 South

September 2020

N

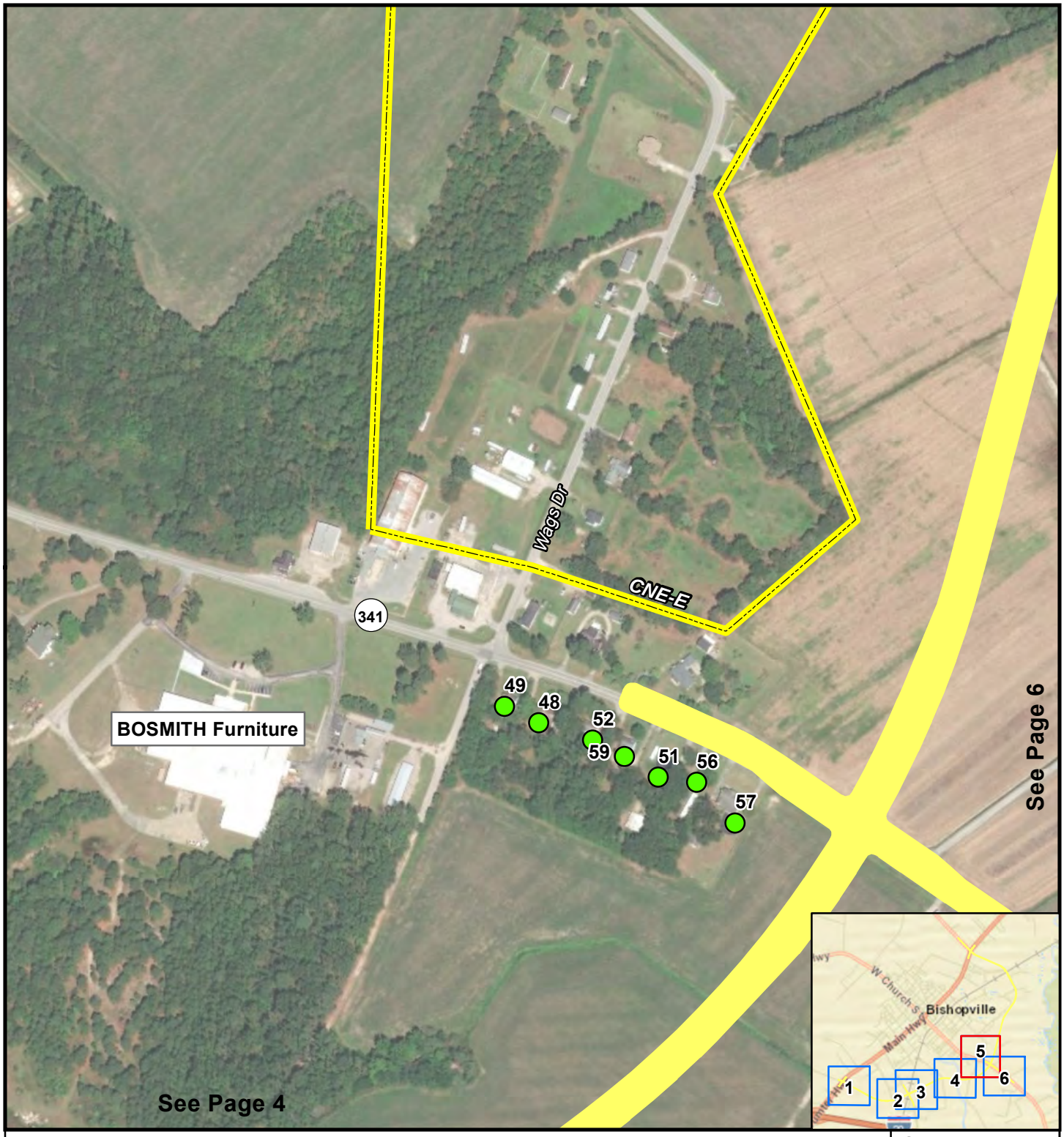
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus, DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

0 0.075 0.15 Miles

FIGURE 4 OF 6

South Carolina Department of Transportation

SCDOT Project #: S-69-08
Bishopville Truck Route
Lee County, South Carolina
Alternatives 1, 5, 6 South Noise Impacts



Legend

- No Impact
- Common Noise Environments
- Alternatives 1, 5, 6 South

September 2020

N

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus, DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

0 0.075 0.15 Miles

FIGURE 5 OF 6

South Carolina Department of Transportation

SCDOT Project #: S-69-08
Bishopville Truck Route
Lee County, South Carolina
Alternatives 1, 5, 6 South Noise Impacts

Legend

- No Impact
- Common Noise Environments
- Alternatives 1, 5, 6 South

September 2020

N

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus, DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

0 0.075 0.15 Miles

FIGURE 6 OF 6

South Carolina Department of Transportation

SCDOT Project #: S-69-08
Bishopville Truck Route
Lee County, South Carolina
Alternatives 1, 7, 9, 11 North Noise Impacts

Legend

- No Impact
- Relocated Receiver
- Alternatives 1, 7, 9, 11 North
- Relocations
- Common Noise Environments

September 2020

N

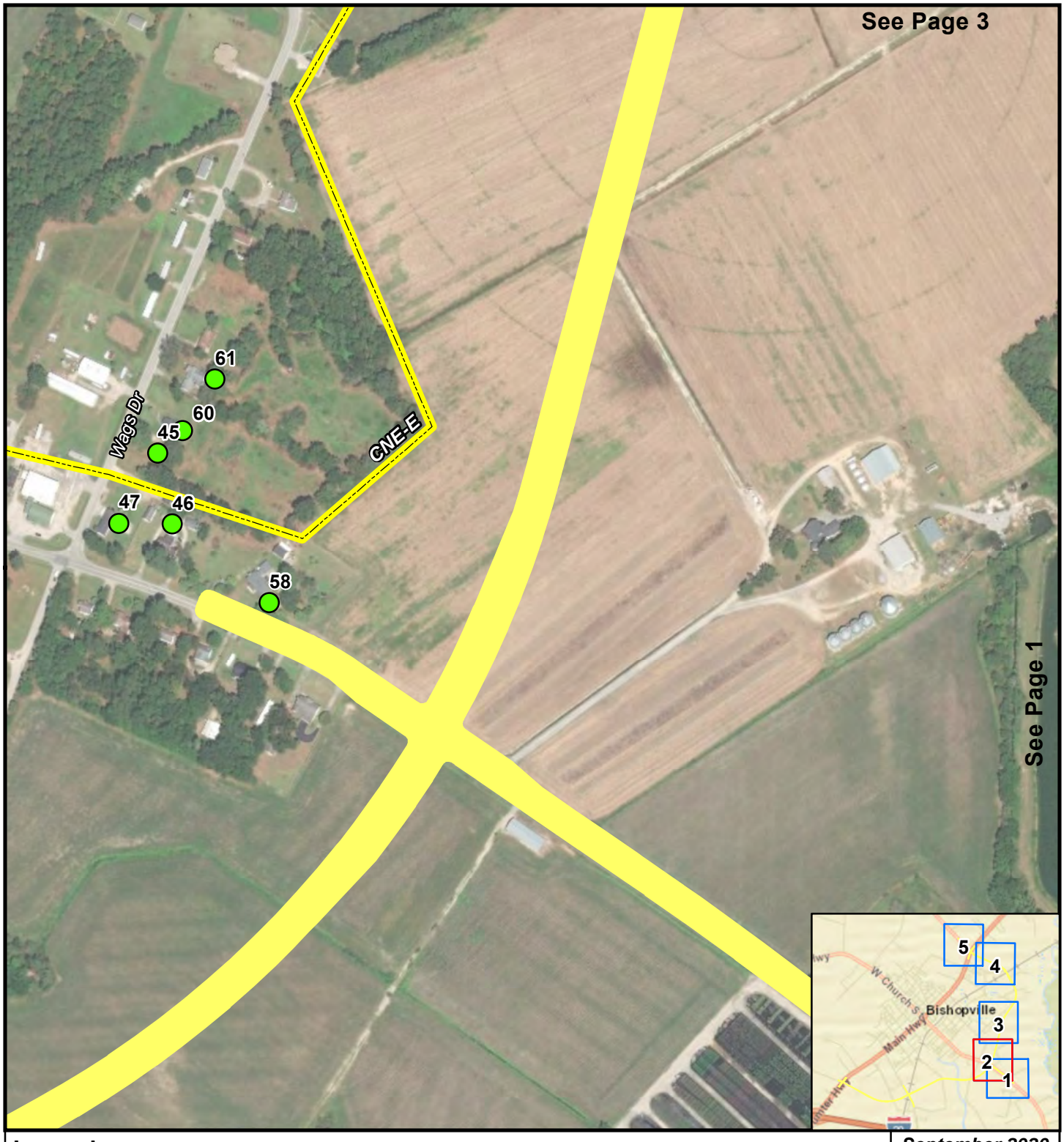
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus, DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

0 0.075 0.15 Miles

FIGURE 1 OF 5

South Carolina Department of Transportation

SCDOT Project #: S-69-08
Bishopville Truck Route
Lee County, South Carolina
Alternatives 1, 7, 9, 11 North Noise Impacts



Legend

- No Impact
- Relocated Receiver
- Alternatives 1, 7, 9, 11 North
- Relocations
- Common Noise Environments

September 2020

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus, DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

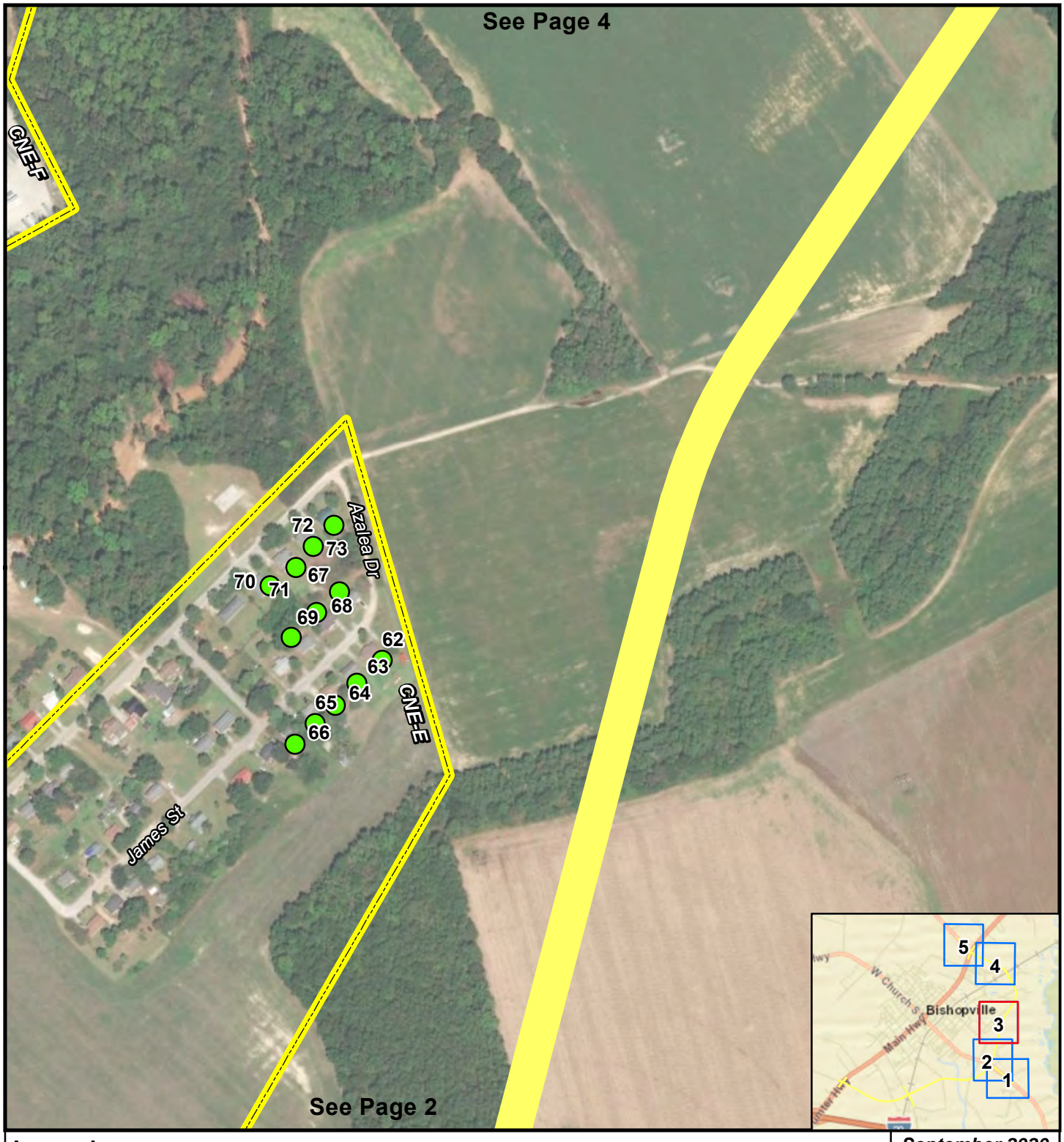
0 0.075 0.15 Miles

N

FIGURE 2 OF 5

South Carolina
Department of Transportation

SCDOT Project #: S-69-08
Bishopville Truck Route
Lee County, South Carolina
Alternatives 1, 7, 9, 11 North Noise Impacts



Legend

- No Impact
- Relocated Receiver
- Alternatives 1, 7, 9, 11 North
- Relocations
- Common Noise Environments

September 2020

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus, DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

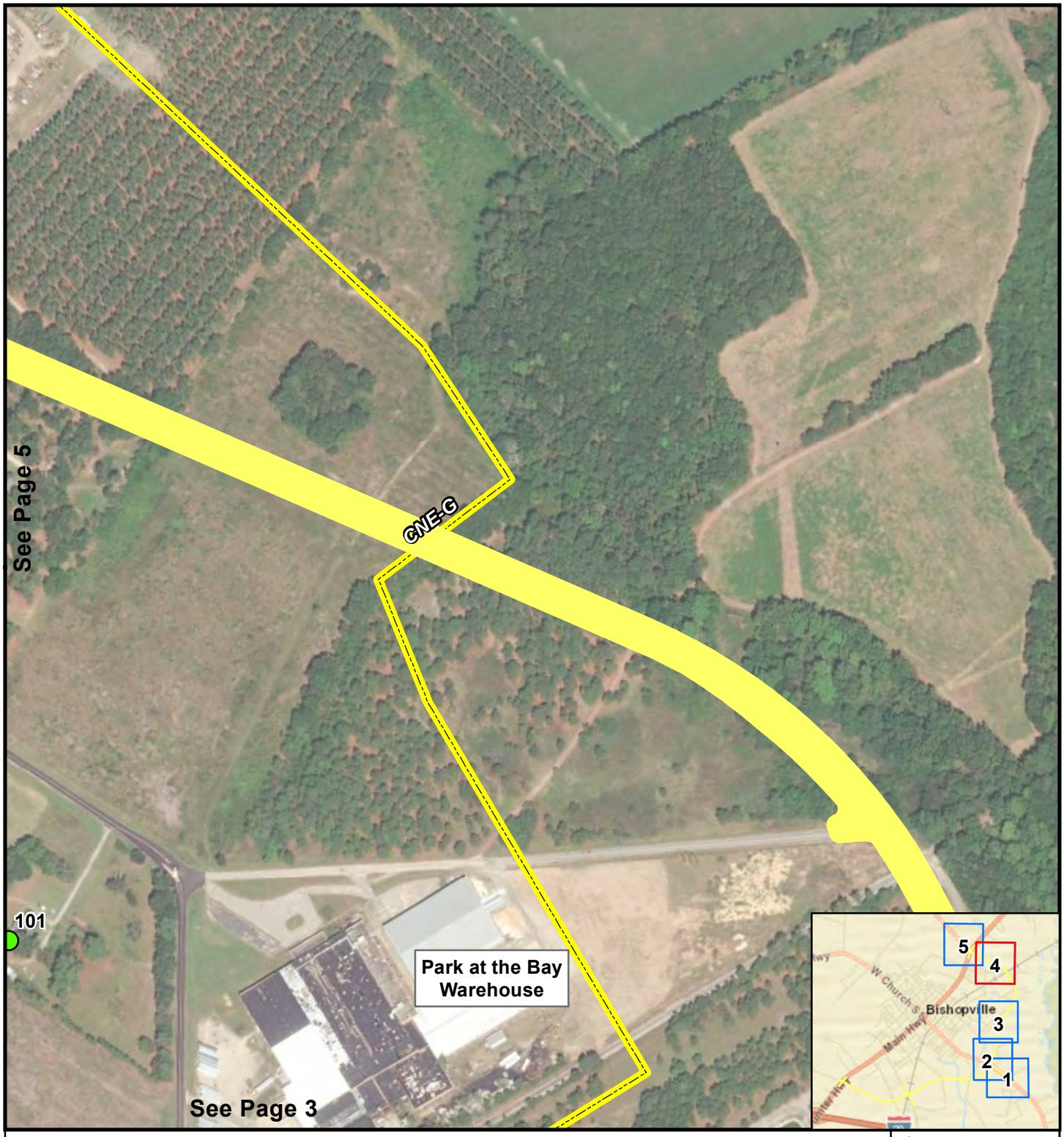
0 0.075 0.15 Miles

N

FIGURE 3 OF 5

South Carolina Department of Transportation

SCDOT Project #: S-69-08
Bishopville Truck Route
Lee County, South Carolina
Alternatives 1, 7, 9, 11 North Noise Impacts



Legend

- No Impact
- Relocated Receiver
- Alternatives 1, 7, 9, 11 North
- Relocations
- Common Noise Environments

September 2020

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus, DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

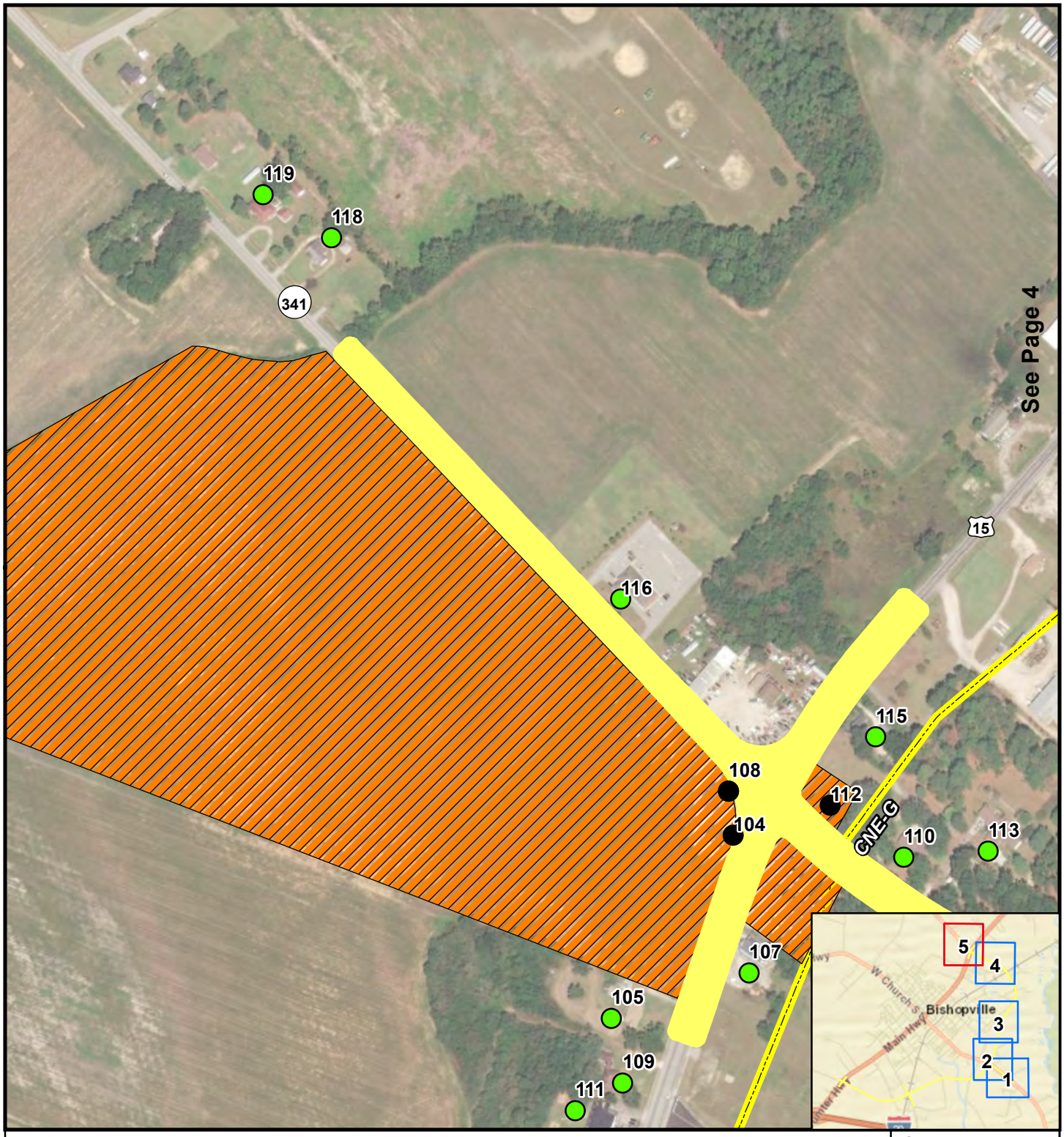
0 0.075 0.15 Miles

N

FIGURE 4 OF 5

South Carolina Department of Transportation

SCDOT Project #: S-69-08
Bishopville Truck Route
Lee County, South Carolina
Alternatives 1, 7, 9, 11 North Noise Impacts



Legend

- No Impact
- Relocated Receiver
- Alternatives 1, 7, 9, 11 North
- Relocations
- Common Noise Environments

September 2020

N

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus, DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

0 0.075 0.15 Miles

FIGURE 5 OF 5

BUILD ALTERNATIVE 2 NORTH AND SOUTH RECEIVER MAPBOOKS

South Carolina Department of Transportation

SCDOT Project #: S-69-08
Bishopville Truck Route
Lee County, South Carolina
Alternatives 2, 7, 8 South Noise Impacts

Legend

- No Impact
- Common Noise Environments
- Alternative 2, 7, 8 South

September 2020

N

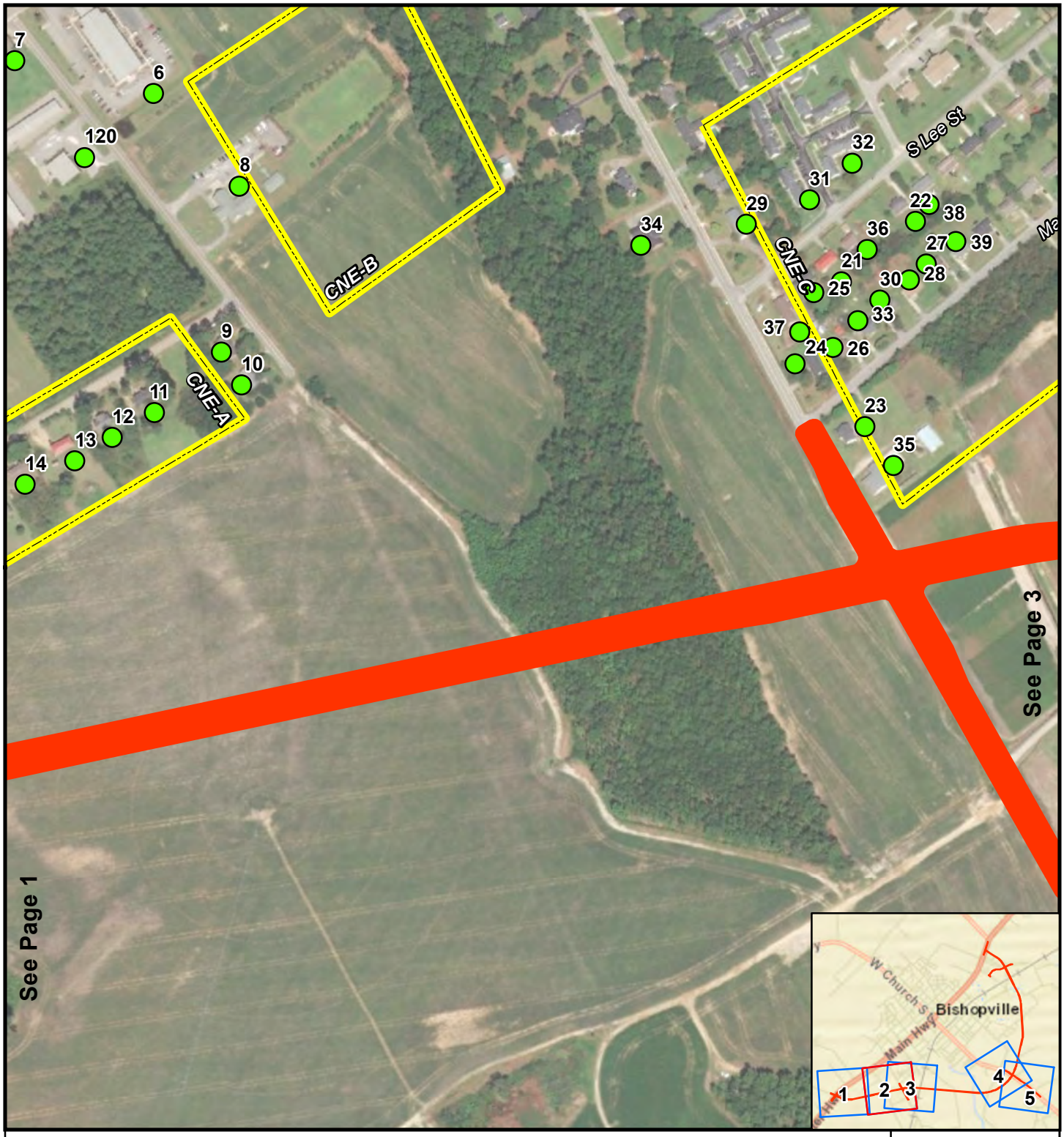
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus, DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

0 0.075 0.15 Miles

FIGURE 1 OF 5

South Carolina Department of Transportation

SCDOT Project #: S-69-08
Bishopville Truck Route
Lee County, South Carolina
Alternatives 2, 7, 8 South Noise Impacts



Legend

- No Impact
- Common Noise Environments
- Alternative 2, 7, 8 South

September 2020

N

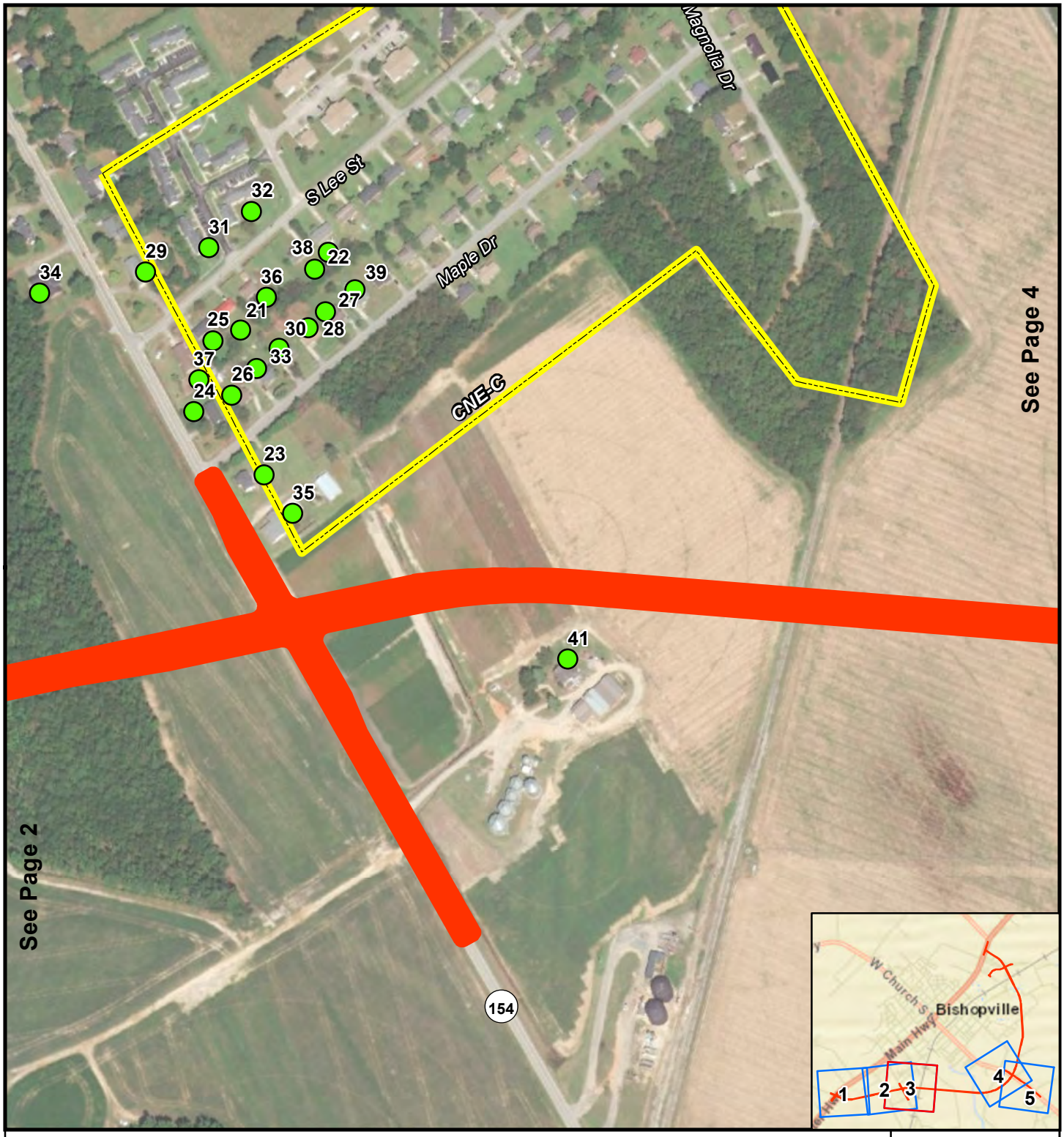
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus, DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

0 0.075 0.15 Miles

FIGURE 2 OF 5

South Carolina Department of Transportation

SCDOT Project #: S-69-08
Bishopville Truck Route
Lee County, South Carolina
Alternatives 2, 7, 8 South Noise Impacts



Legend

- No Impact
- Common Noise Environments
- Alternative 2, 7, 8 South

September 2020

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus, DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

0 0.075 0.15 Miles

N

FIGURE 3 OF 5

South Carolina Department of Transportation

SCDOT Project #: S-69-08
Bishopville Truck Route
Lee County, South Carolina
Alternatives 2, 7, 8 South Noise Impacts

Legend

- No Impact
- Common Noise Environments
- Alternative 2, 7, 8 South

September 2020

N

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus, DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

0 0.075 0.15 Miles

FIGURE 4 OF 5

South Carolina Department of Transportation

SCDOT Project #: S-69-08
Bishopville Truck Route
Lee County, South Carolina
Alternatives 2, 7, 8 South Noise Impacts

Legend

- No Impact
- Common Noise Environments
- Alternative 2, 7, 8 South

September 2020

N

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus, DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

0 0.075 0.15 Miles

FIGURE 5 OF 5

South Carolina Department of Transportation

SCDOT Project #: S-69-08
Bishopville Truck Route
Lee County, South Carolina
Alternatives 2, 5, 10, 12 North Noise Impacts

Legend

- No Impact
- Common Noise Environments
- Alternatives 2, 5, 10, 12 North
- Permanent Road Closure

September 2020

N

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus, DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

0 0.075 0.15 Miles

FIGURE 1 OF 5

South Carolina Department of Transportation

SCDOT Project #: S-69-08
Bishopville Truck Route
Lee County, South Carolina
Alternatives 2, 5, 10, 12 North Noise Impacts

Legend

- No Impact
- Common Noise Environments
- Alternatives 2, 5, 10, 12 North
- Permanent Road Closure

September 2020

N

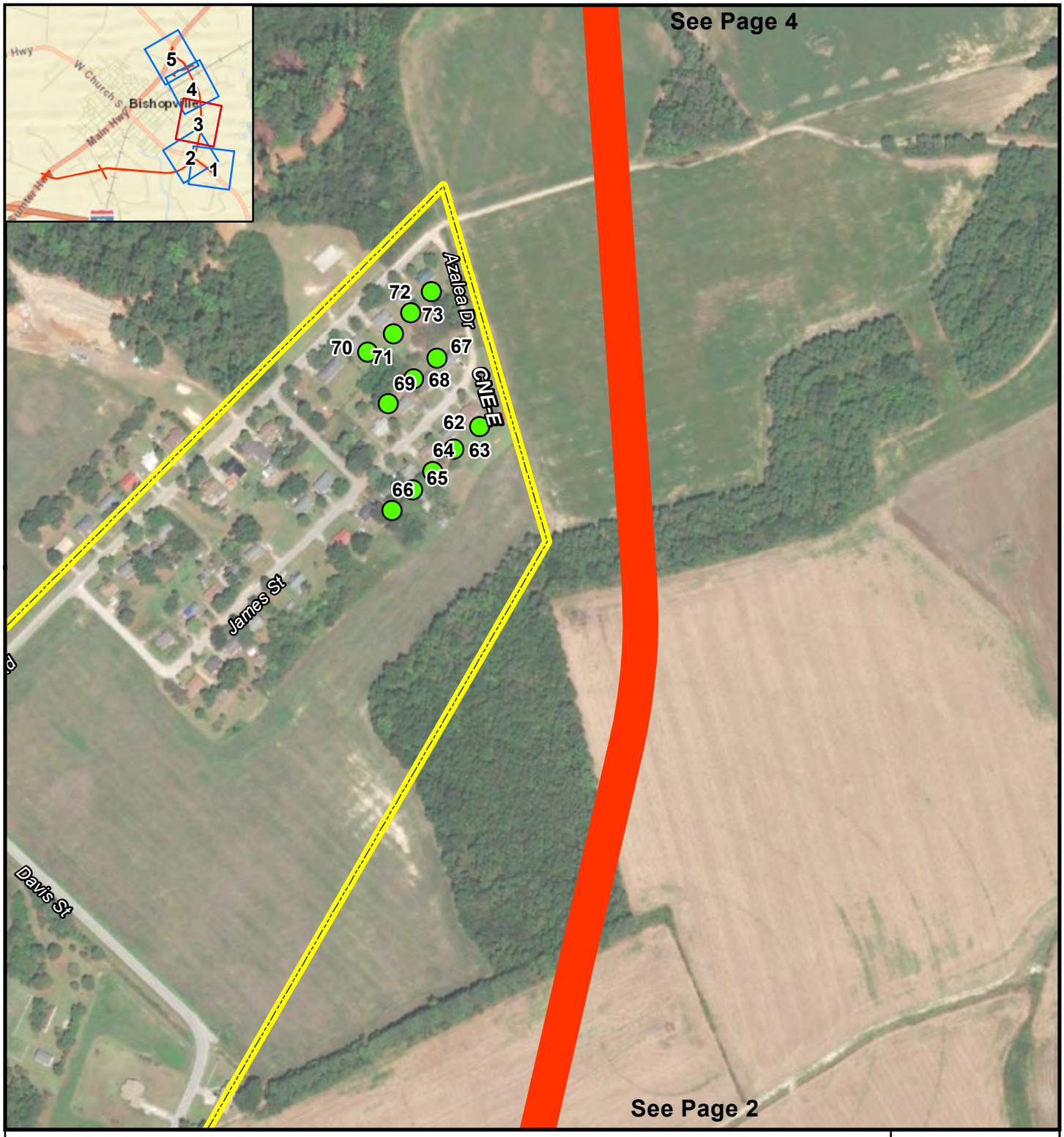
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus, DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

0 0.075 0.15 Miles

FIGURE 2 OF 5

South Carolina Department of Transportation

SCDOT Project #: S-69-08
Bishopville Truck Route
Lee County, South Carolina
Alternatives 2, 5, 10, 12 North Noise Impacts



Legend

- No Impact
- Common Noise Environments
- Alternatives 2, 5, 10, 12 North
- Permanent Road Closure

September 2020

N

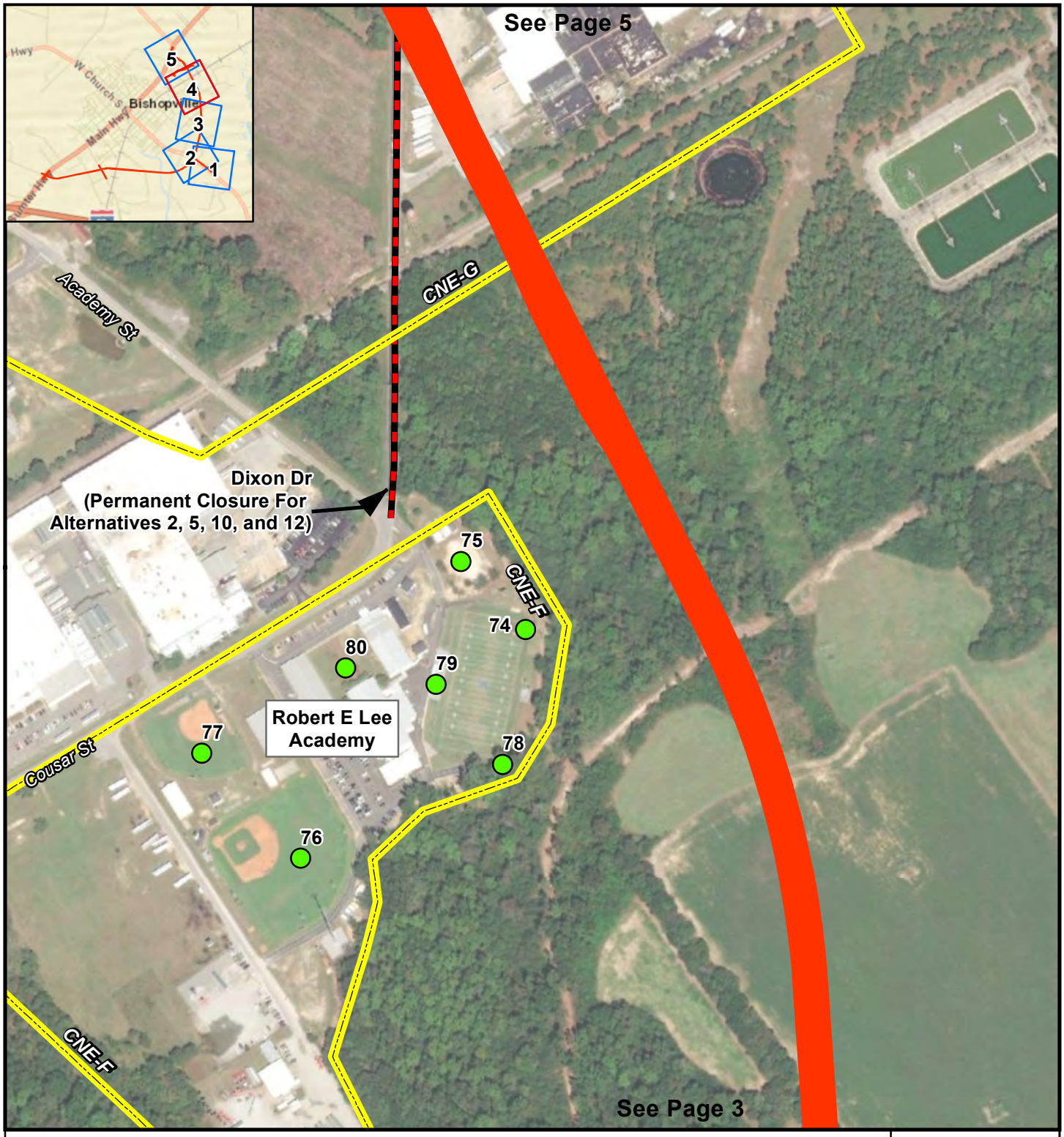
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus, DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

0 0.075 0.15 Miles

FIGURE 3 OF 5

South Carolina Department of Transportation

SCDOT Project #: S-69-08
Bishopville Truck Route
Lee County, South Carolina
Alternatives 2, 5, 10, 12 North Noise Impacts



Legend

- No Impact
- Common Noise Environments
- Alternatives 2, 5, 10, 12 North
- Permanent Road Closure

September 2020

N

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus, DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

0 0.075 0.15 Miles

FIGURE 4 OF 5

South Carolina Department of Transportation

SCDOT Project #: S-69-08
Bishopville Truck Route
Lee County, South Carolina
Alternatives 2, 5, 10, 12 North Noise Impacts

Legend

- No Impact
- Common Noise Environments
- Alternatives 2, 5, 10, 12 North
- Permanent Road Closure

September 2020

N

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus, DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

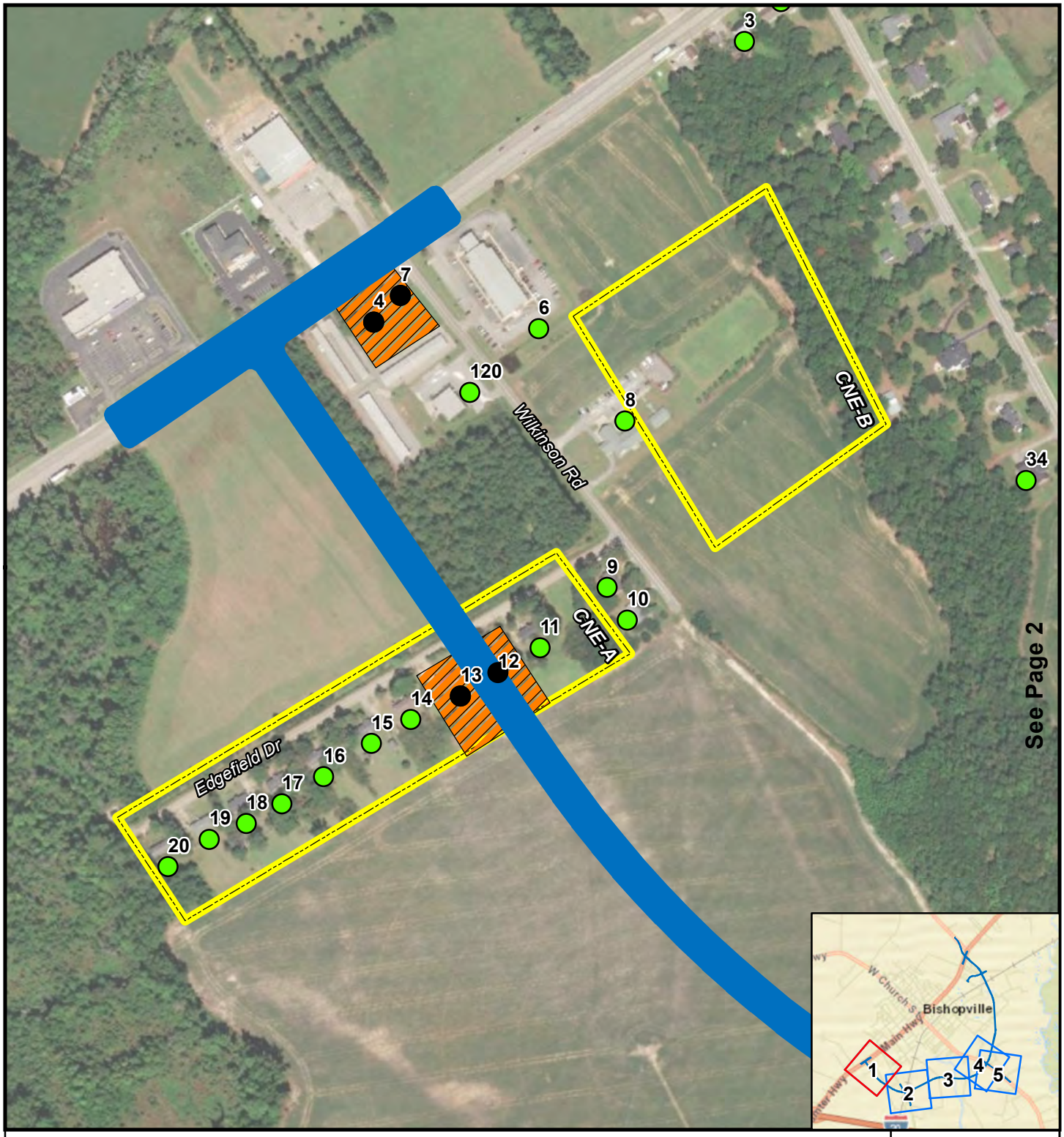
0 0.075 0.15 Miles

FIGURE 5 OF 5

BUILD ALTERNATIVE 3 NORTH AND SOUTH RECEIVER MAPBOOKS

South Carolina Department of Transportation

SCDOT Project #: S-69-08
Bishopville Truck Route
Lee County, South Carolina
Alternative 3, 9, 10 South Noise Impacts



Legend

- No Impact
- Relocated Receiver
- Alternative 3, 9, 10 South
- Relocations
- Common Noise Environments

September 2020

N

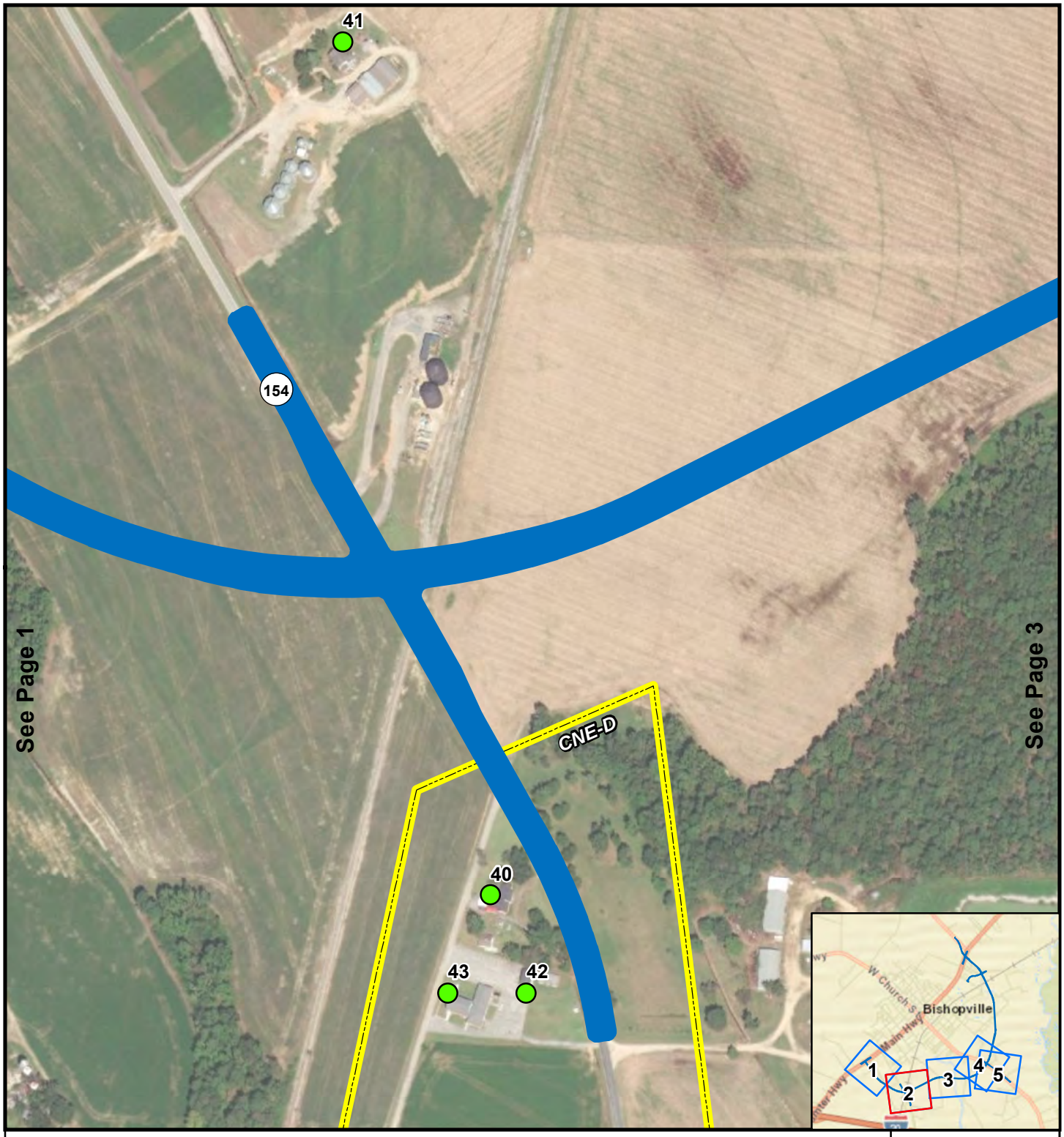
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus, DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

0 0.075 0.15 Miles

FIGURE 1 OF 5

South Carolina Department of Transportation

SCDOT Project #: S-69-08
Bishopville Truck Route
Lee County, South Carolina
Alternative 3, 9, 10 South Noise Impacts



Legend

- No Impact
- Relocated Receiver
- Alternative 3, 9, 10 South
- Relocations
- Common Noise Environments

September 2020

N

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus, DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

0 0.075 0.15 Miles

FIGURE 2 OF 5

South Carolina Department of Transportation

SCDOT Project #: S-69-08
Bishopville Truck Route
Lee County, South Carolina
Alternative 3, 9, 10 South Noise Impacts

Legend

- No Impact
- Relocated Receiver
- Alternative 3, 9, 10 South
- Relocations
- Common Noise Environments

September 2020

N

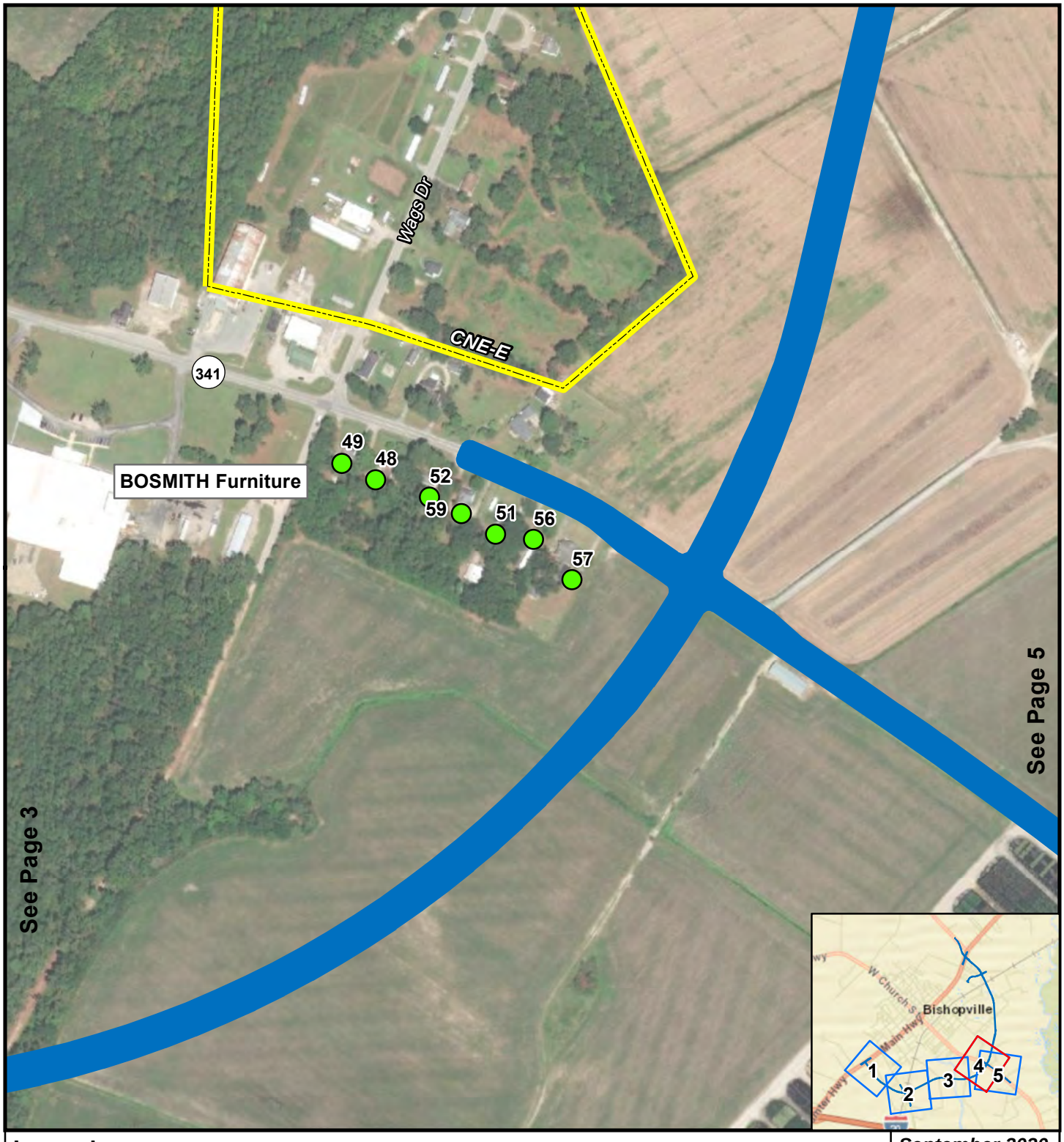
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus, DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

0 0.075 0.15 Miles

FIGURE 3 OF 5

South Carolina Department of Transportation

SCDOT Project #: S-69-08
Bishopville Truck Route
Lee County, South Carolina
Alternative 3, 9, 10 South Noise Impacts



Legend

- No Impact
- Relocated Receiver
- Alternative 3, 9, 10 South
- Relocations
- Common Noise Environments

September 2020

N

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus, DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

0 0.075 0.15 Miles

FIGURE 4 OF 5

South Carolina Department of Transportation

SCDOT Project #: S-69-08
Bishopville Truck Route
Lee County, South Carolina
Alternative 3, 9, 10 South Noise Impacts

Legend

- No Impact
- Relocated Receiver
- Alternative 3, 9, 10 South
- Relocations
- Common Noise Environments

September 2020

N

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus, DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

0 0.075 0.15 Miles

FIGURE 5 OF 5

South Carolina Department of Transportation

SCDOT Project #: S-69-08
Bishopville Truck Route
Lee County, South Carolina
Alternative 3, 6, 8 North Noise Impacts

Legend

- No Impact
- Alternatives 3, 6, 8 North
- Common Noise Environments
- Permanent Road Closure

September 2020

N

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus, DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

0 0.075 0.15 Miles

FIGURE 1 OF 5

South Carolina Department of Transportation

SCDOT Project #: S-69-08
Bishopville Truck Route
Lee County, South Carolina
Alternative 3, 6, 8 North Noise Impacts

Legend

- No Impact
- Common Noise Environments
- Alternatives 3, 6, 8 North
- Permanent Road Closure

September 2020

N

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus, DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

0 0.075 0.15 Miles

FIGURE 2 OF 5

South Carolina Department of Transportation

SCDOT Project #: S-69-08
Bishopville Truck Route
Lee County, South Carolina
Alternative 3, 6, 8 North Noise Impacts

Legend

- No Impact
- Common Noise Environments
- Alternatives 3, 6, 8 North
- Permanent Road Closure

September 2020

N

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus, DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

0 0.075 0.15 Miles

FIGURE 3 OF 5

South Carolina Department of Transportation

SCDOT Project #: S-69-08
Bishopville Truck Route
Lee County, South Carolina
Alternative 3, 6, 8 North Noise Impacts

Legend

- No Impact
- Common Noise Environments
- Alternatives 3, 6, 8 North
- Permanent Road Closure

September 2020

N

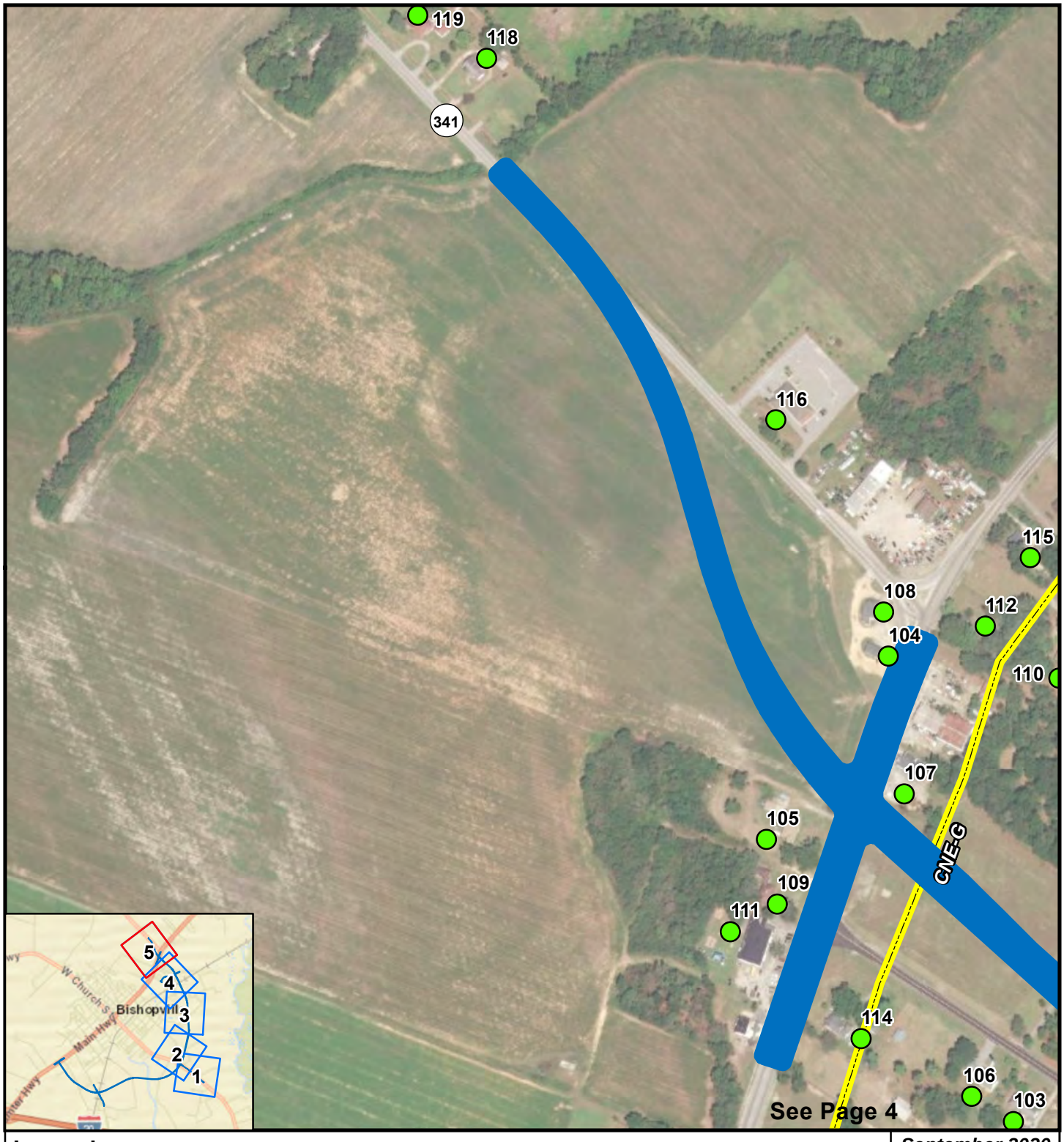
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus, DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

0 0.075 0.15 Miles

FIGURE 4 OF 5

South Carolina Department of Transportation

SCDOT Project #: S-69-08
Bishopville Truck Route
Lee County, South Carolina
Alternative 3, 6, 8 North Noise Impacts



Legend

- No Impact
- Common Noise Environments
- Alternatives 3, 6, 8 North
- Permanent Road Closure

September 2020

N

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus, DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

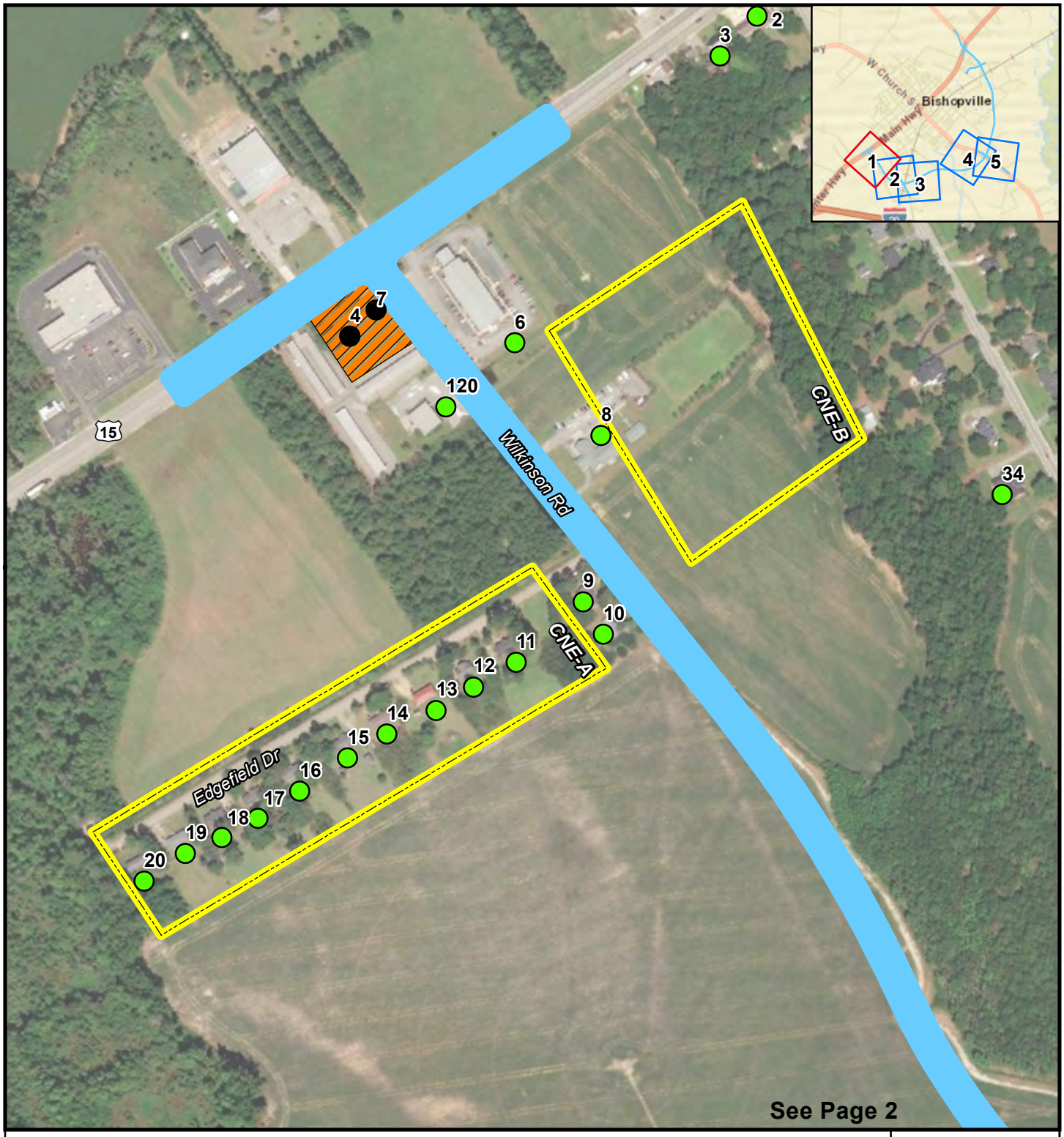
0 0.075 0.15 Miles

FIGURE 5 OF 5

BUILD ALTERNATIVE 4 NORTH AND SOUTH RECEIVER MAPBOOKS

South Carolina Department of Transportation

SCDOT Project #: S-69-08
Bishopville Truck Route
Lee County, South Carolina
Alternative 4, 11, 12 South Noise Impacts



See Page 2

Legend

- No Impact
- Relocated Receiver
- Alternatives 4, 11, 12
- Relocations
- Common Noise Environments

September 2020

N

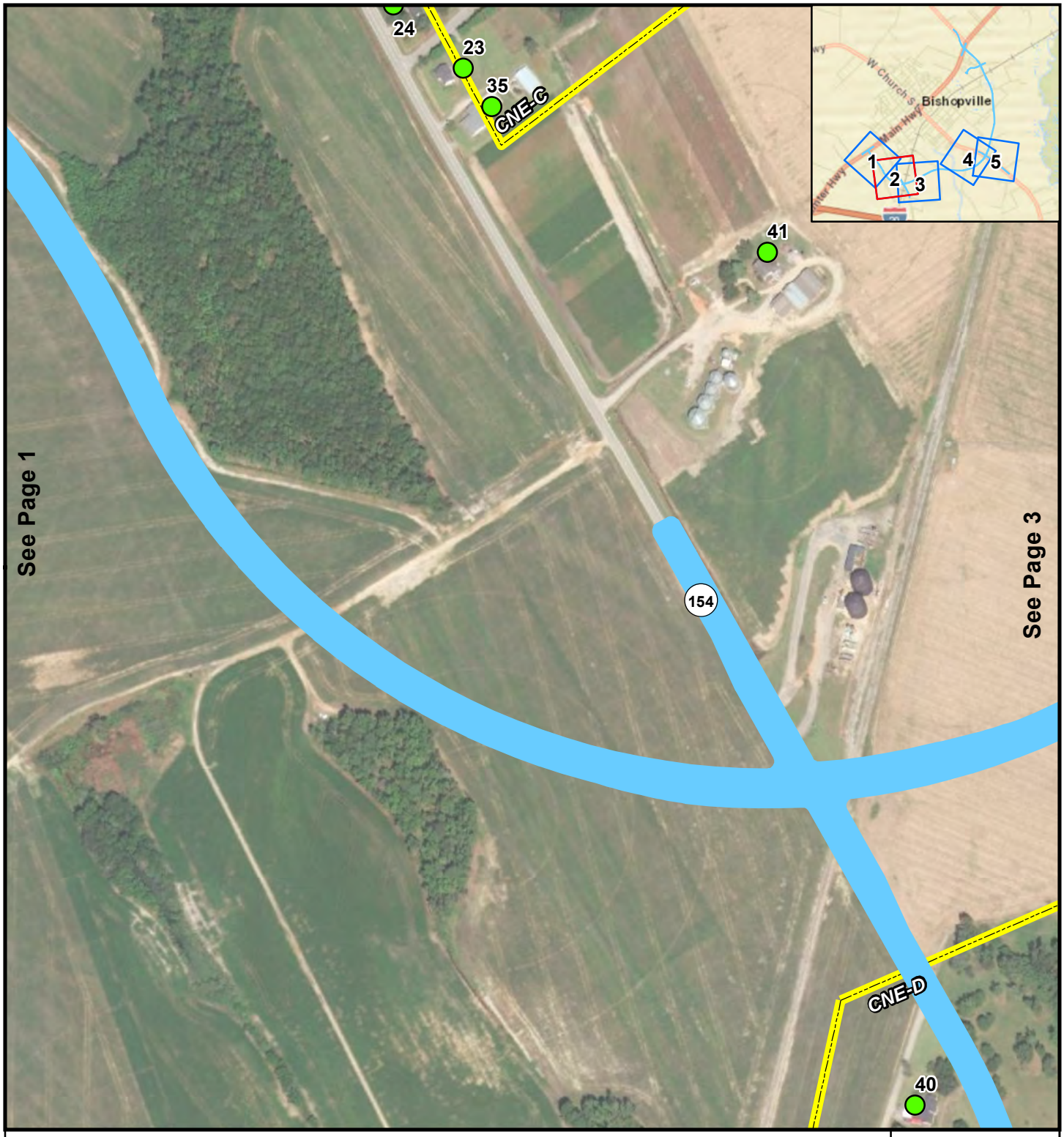
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus, DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

0 0.075 0.15 Miles

FIGURE 1 OF 5

South Carolina Department of Transportation

SCDOT Project #: S-69-08
Bishopville Truck Route
Lee County, South Carolina
Alternative 4, 11, 12 South Noise Impacts



Legend

- No Impact
- Relocated Receiver
- Alternatives 4, 11, 12
- Relocations
- Common Noise Environments

September 2020

N

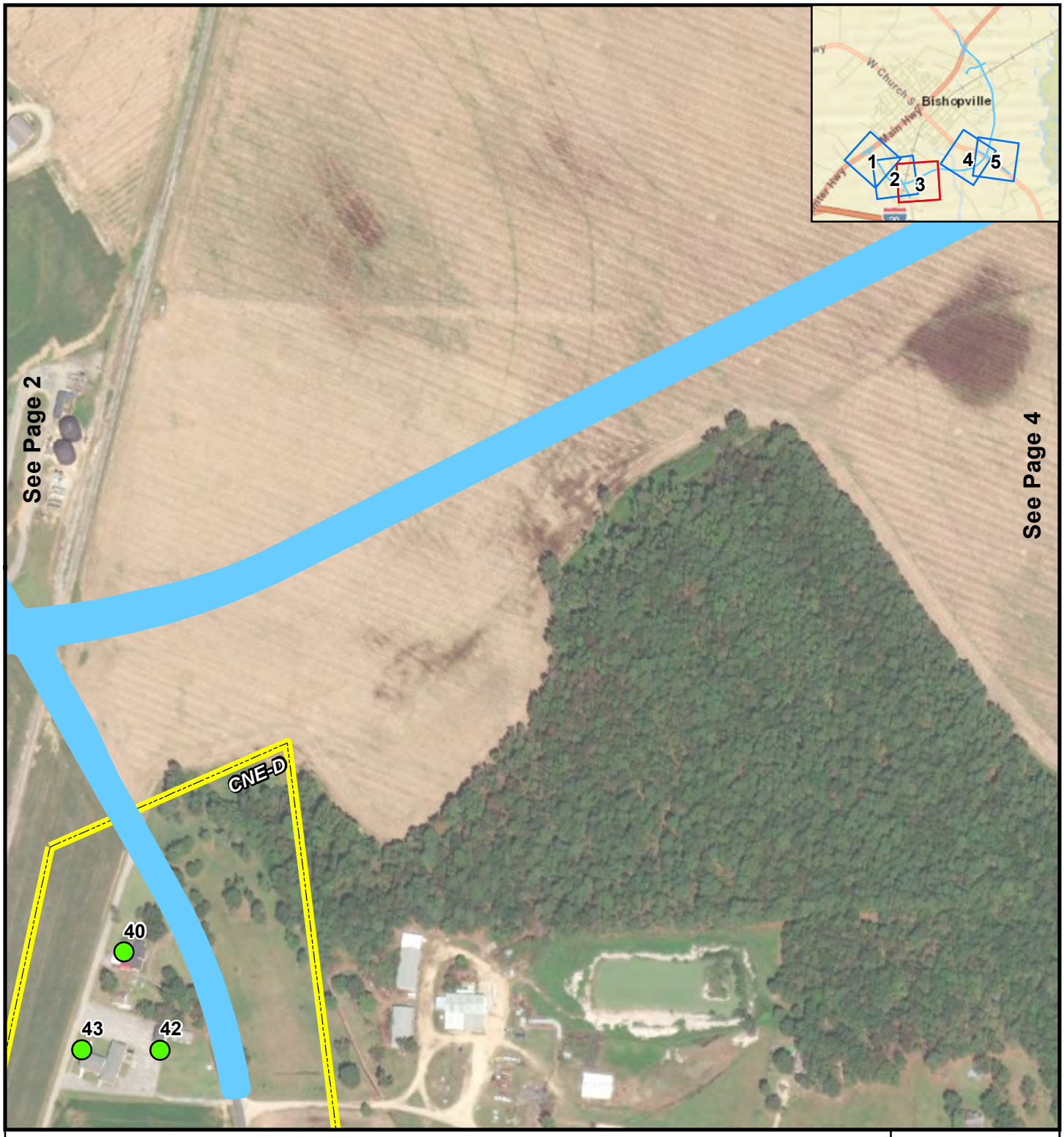
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus, DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

0 0.075 0.15 Miles

FIGURE 2 OF 5

South Carolina Department of Transportation

SCDOT Project #: S-69-08
Bishopville Truck Route
Lee County, South Carolina
Alternative 4, 11, 12 South Noise Impacts



Legend

- No Impact
- Relocated Receiver
- Alternatives 4, 11, 12
- Relocations
- Common Noise Environments

September 2020

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0 0.075 0.15 Miles

FIGURE 3 OF 5

South Carolina Department of Transportation

SCDOT Project #: S-69-08
Bishopville Truck Route
Lee County, South Carolina
Alternative 4, 11, 12 South Noise Impacts

Legend

- No Impact
- Relocated Receiver
- Alternatives 4, 11, 12
- Relocations
- Common Noise Environments

September 2020

N

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus, DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

0 0.075 0.15 Miles

FIGURE 4 OF 5

South Carolina Department of Transportation

SCDOT Project #: S-69-08
Bishopville Truck Route
Lee County, South Carolina
Alternative 4, 11, 12 South Noise Impacts

Legend

- No Impact
- Relocated Receiver
- Alternatives 4, 11, 12
- Relocations
- Common Noise Environments

September 2020

N

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus, DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

0 0.075 0.15 Miles

FIGURE 5 OF 5

South Carolina Department of Transportation

SCDOT Project #: S-69-08
Bishopville Truck Route
Lee County, South Carolina
Alternative 4 North Noise Impacts

Legend

- No Impact
- Common Noise Environments
- Alternative 4
- Permanent Road Closure

September 2020

N

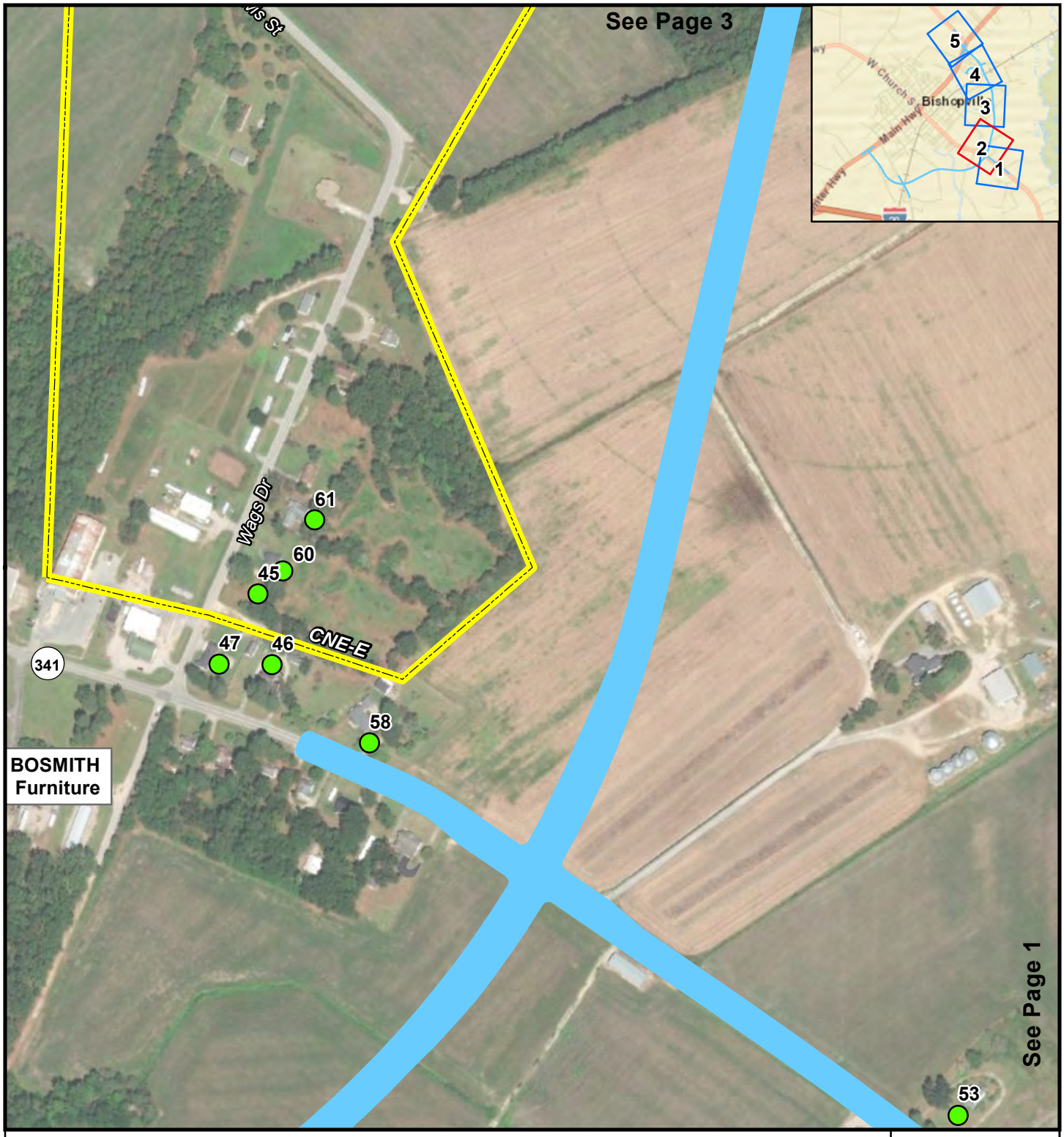
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus, DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

0 0.075 0.15 Miles

FIGURE 1 OF 5

South Carolina Department of Transportation

SCDOT Project #: S-69-08
Bishopville Truck Route
Lee County, South Carolina
Alternative 4 North Noise Impacts



Legend

- No Impact
- Common Noise Environments
- Alternative 4
- Permanent Road Closure

September 2020

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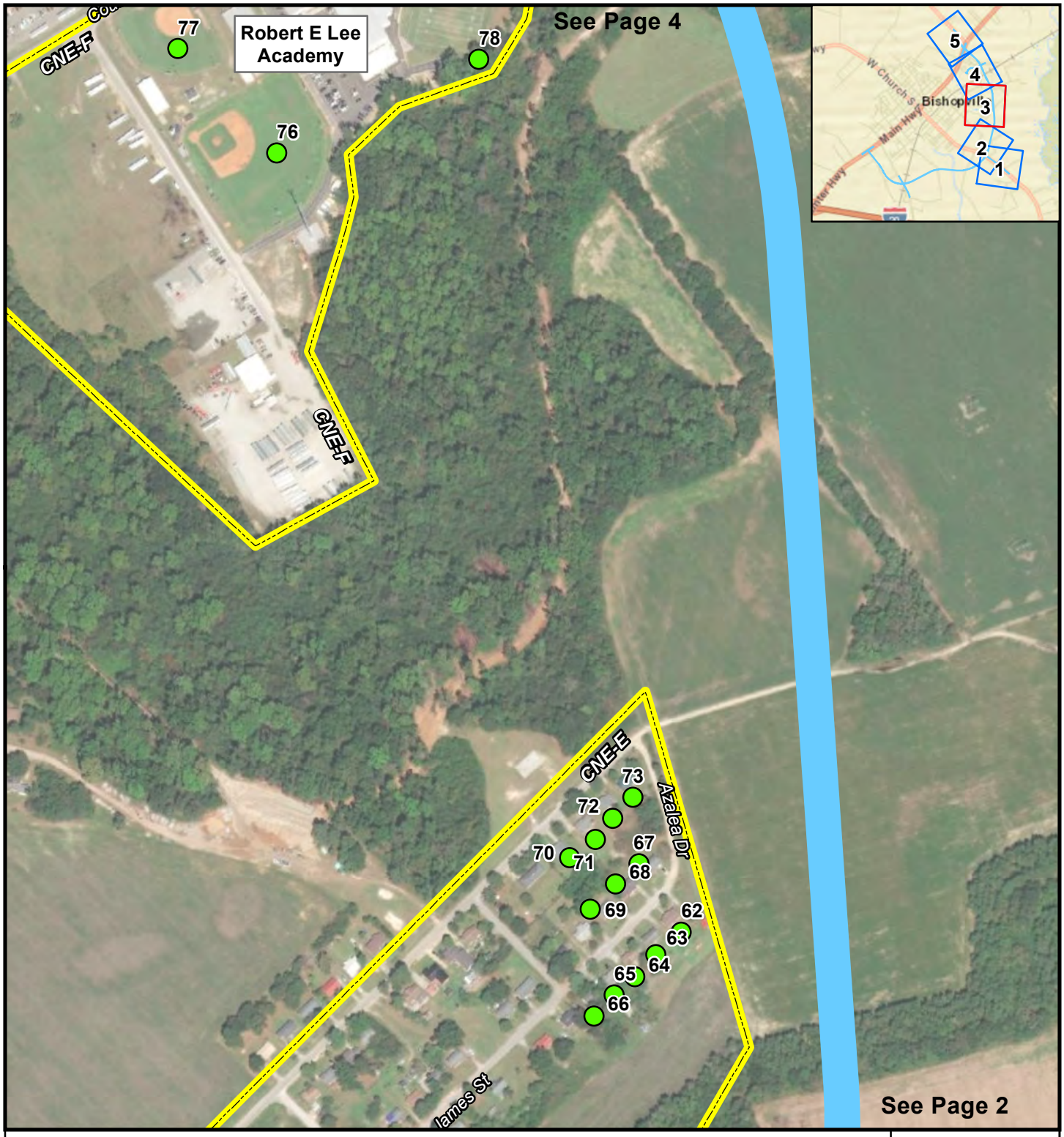
0 0.075 0.15 Miles

FIGURE 2 OF 5

South Carolina Department of Transportation

SCDOT Project #: S-69-08
Bishopville Truck Route
Lee County, South Carolina
Alternative 4 North Noise Impacts



Legend

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- Common Noise Environments
- Alternative 4
- Permanent Road Closure

September 2020

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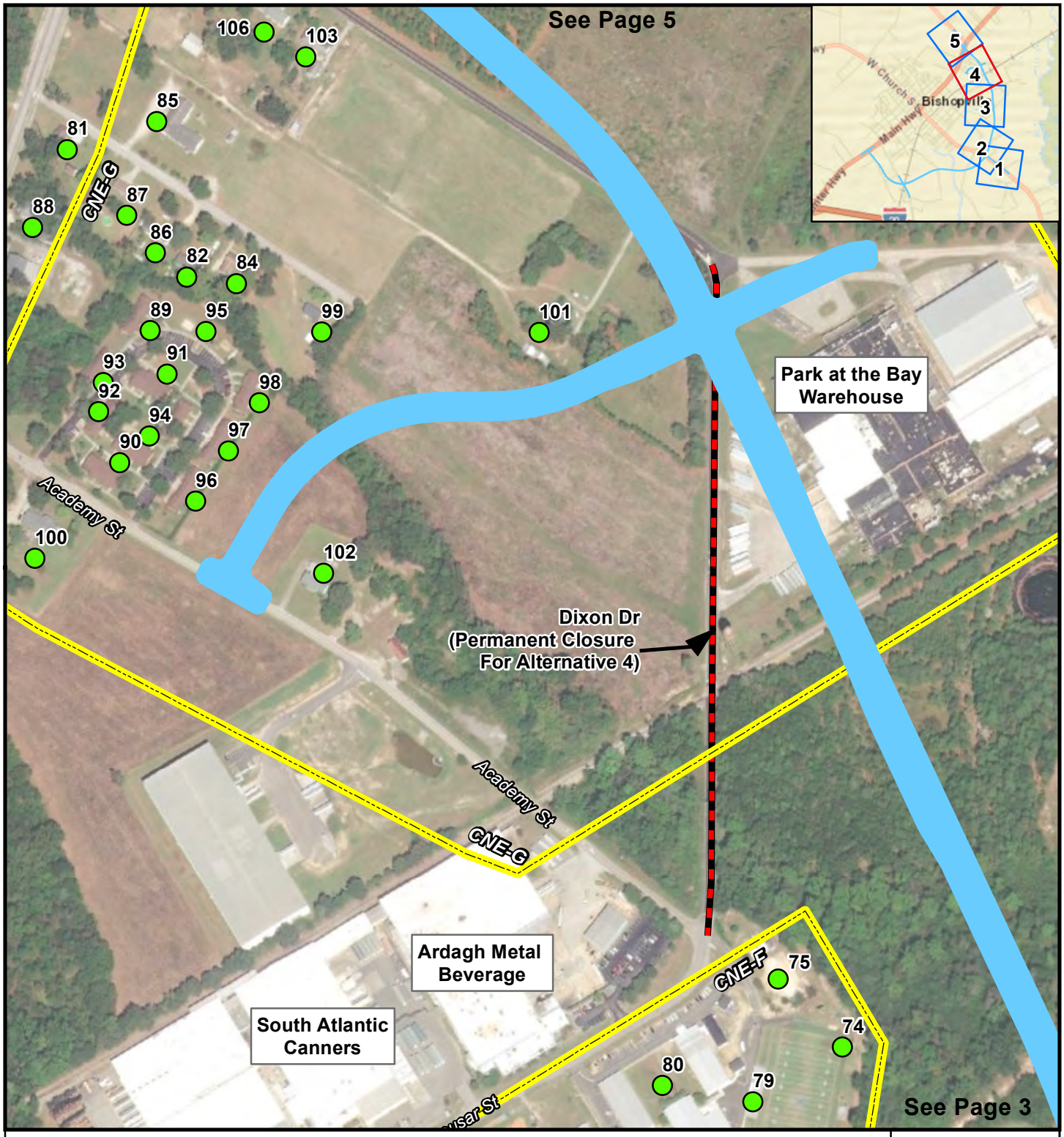
0 0.075 0.15 Miles

FIGURE 3 OF 5

South Carolina Department of Transportation

SCDOT Project #: S-69-08
Bishopville Truck Route
Lee County, South Carolina
Alternative 4 North Noise Impacts



Legend

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- Common Noise Environments
- Alternative 4
- Permanent Road Closure

September 2020

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0 0.075 0.15 Miles

FIGURE 4 OF 5

South Carolina Department of Transportation

SCDOT Project #: S-69-08
Bishopville Truck Route
Lee County, South Carolina
Alternative 4 North Noise Impacts

See Page 4

Legend

- No Impact
- Common Noise Environments
- Alternative 4
- Permanent Road Closure

September 2020

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0 0.075 0.15 Miles

FIGURE 5 OF 5