

# **Project Development and Environment NOISE STUDY REPORT**

**WIDENING FLORIDA'S TURNPIKE  
FROM KISSIMMEE PARK ROAD TO US 192 (MP 238.5 TO MP 242.5)  
Osceola County, Florida**

**Financial Project ID No.: 441224-1**

Prepared for:



**Florida's Turnpike Enterprise**

**October 2020**

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Prepared by:

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**October 2020**

# Executive Summary

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The Florida Department of Transportation (FDOT), Florida's Turnpike Enterprise (FTE) is currently undertaking a Project Development and Environment (PD&E) Study for improvements to the Northern Coin System of Florida's Turnpike beginning at approximately Mile Post (MP) 238.5, approximately 2 miles north of the Three Lakes Toll Plaza. This segment of the Turnpike Mainline (SR 91) is currently 4 lanes. The project improvements include widening of the Turnpike Mainline (SR 91), from south of Kissimmee Park Road (MP 238.5) to US 192 (MP 242.5), construction of new ramps to and from the south at the Kissimmee Park Road interchange (MP 240), widening of the existing ramps to and from the north at the Kissimmee Park Road interchange, and construction of a new southbound on-ramp at the US 192 interchange (MP 242.5). The project will also include improvements to Kissimmee Park Road and Old Canoe Creek Road to accommodate future traffic volumes since they influence the operations of the interchange. The total project length is approximately 4 miles of mainline improvements and 3.35 miles of local road improvements, making a total of 7.35 miles of improvements.

This PD&E phase noise study includes a traffic noise analysis for residential and special land use areas (i.e., non-residential) along the Preferred Alternative (i.e., the Nolte Road Interchange). The traffic noise study is completed in accordance with Title 23, Code of Federal Regulations, Part 772 (23 CFR 772), *Procedures for Abatement of Highway Traffic Noise and Construction Noise* following methodology and procedures established by the FDOT in the *PD&E Manual*, Part 2, Chapter 18. The purpose of this noise study is to identify noise sensitive sites that would be impacted by the Nolte Road Interchange alternative, evaluate abatement measures at impacted noise sensitive sites and determine where noise abatement (i.e., noise barriers) needs to be included in the Design plans.

Noise levels are predicted at 229 receptor points representing 338 residences and ten special land uses (Neptune Middle School [basketball court], Villas of Emerald Lake Condo Association [basketball court], Origin Hospitality/Assisted Living Facility [outdoor pavilion], Journey Bible Fellowship Church [basketball court], Teka Village [recreational shuffleboard court], Anthem Park, Sunset Park, Neptune Elementary School [playground], Partin Triangle Park, and City of Life Christian School [baseball field, basketball courts, and a playground]). For Design Year (2045) conditions of the Nolte Road Interchange alternative, noise levels at the residences are predicted to approach, meet, or exceed the Noise Abatement Criteria (NAC) at 198 residences and eight special land uses. In addition, compared to existing monitored conditions, noise levels for Design Year 2045 conditions of the Nolte Road Interchange alternative are not predicted to substantially increase at any residence or special land use. These 198 impacted residences and eight special land uses were further evaluated to determine the feasibility and reasonableness of providing noise barriers to reduce traffic noise.

The noise barrier evaluation identified that noise barriers are a reasonable and feasible form of abatement and could potentially provide at least a 5 dB(A) reduction at up to 125 of the 198 impacted residences (residences in Teka Village and residences along Betsy Ross Ln. and Kettle Creek Dr.), and at one of the eight impacted special land uses (Neptune Elementary School) at a cost below the reasonable limit. A noise barrier at a second special land use, Neptune Middle School, was found to be potentially feasible

but its reasonableness could not be conclusively determined at this writing.<sup>1</sup> Noise barriers cannot provide at least a 5 dB(A) reduction to 73 impacted residences and six impacted special land uses because they do not meet the criteria of reasonableness and/or feasibility to warrant the construction of a noise barrier.

A combination ROW (up to 22 ft.) and shoulder (8 ft.) noise barrier system was found to be potentially reasonable and feasible for Teka Village. A combination ROW (up to 22 ft.) and shoulder (14 ft. and 8 ft.) noise barrier system was found to be potentially reasonable and feasible for residents along Betsy Ross Ln. and Kettle Creek Dr. Barriers ranging between 10 ft. and a 22 ft. were found to be potentially reasonable and feasible for Neptune Elementary School. Barriers ranging between 14 and 16 feet were presumed to be potentially reasonable and feasible at Neptune Middle School, pending a determination of site usage as described in this report, which will be resolved during the Design phase.

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<sup>1</sup> The percentage of the student population that uses the field and basketball courts was unable to be determined due to school closures associated with COVID19 (April 2020). Therefore, the usage of the field and basketball courts of Neptune Middle School will be confirmed in the Design phase Noise Study Report Addendum to determine if a noise barrier is cost reasonable.

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# ***ACRONYMS***

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CFR	Code of Federal Regulations
CBD	Central Business District
CNE	Common Noise Environment
dB	Decibels
dB(A)	A-weighted decibels
FDOT	Florida Department of Transportation
FHWA	Federal Highway Administration
Ft	Feet
FTE	Florida's Turnpike Enterprise
LOS	Level of Service
MP	Mile Post
NAC	Noise Abatement Criteria
NEPA	National Environmental Policy Act
PD&E	Project Development and Environment
ROW	Right-of-way
SR	State Road
TIP	Transportation Improvement Program
TNM	Traffic Noise Model



# Section 1

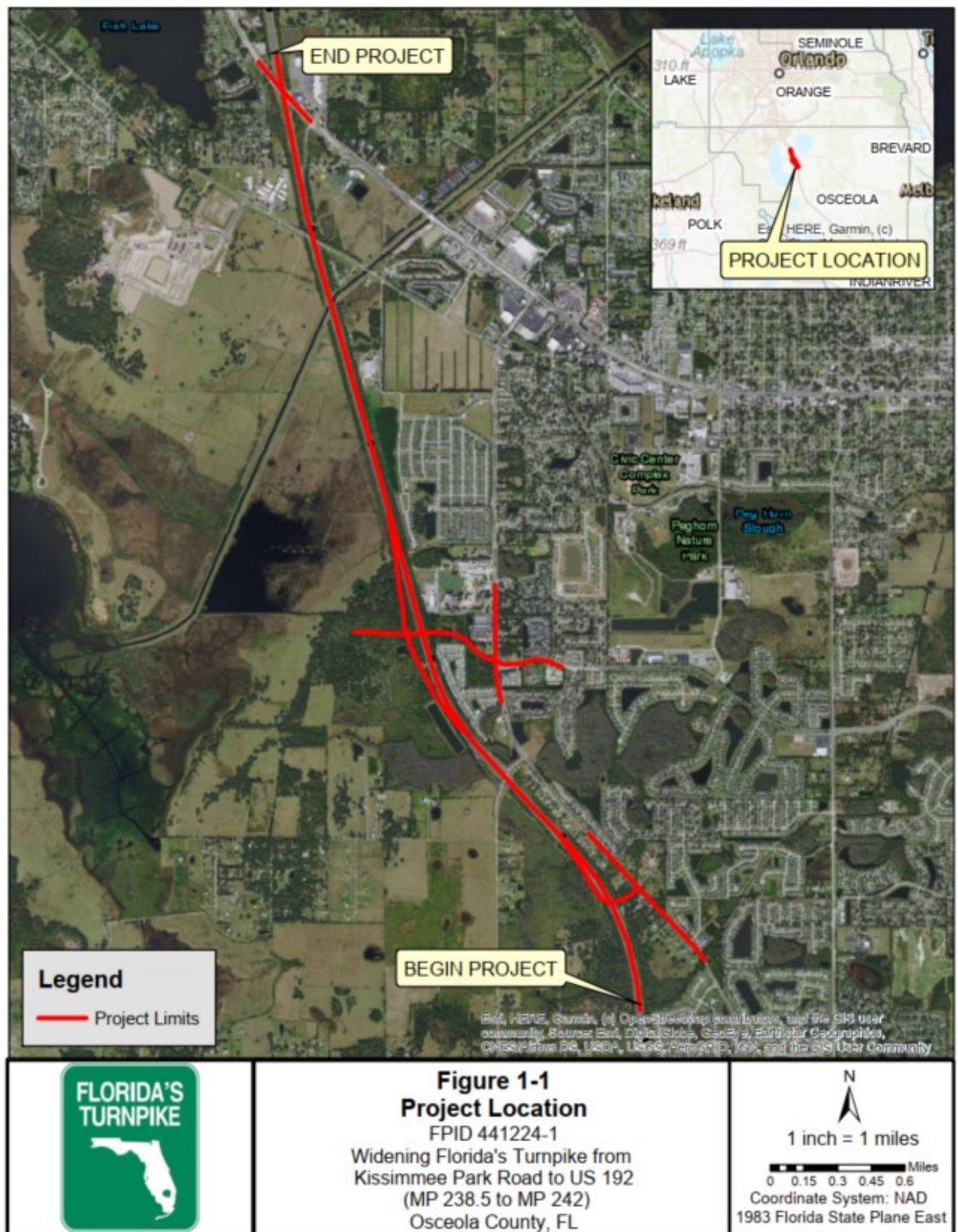
## ***Introduction***

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### **1.1 PROJECT DESCRIPTION**

The Florida Department of Transportation (FDOT), Florida's Turnpike Enterprise (FTE) is currently undertaking a Project Development and Environment (PD&E) Study for improvements to the Northern Coin System of Florida's Turnpike beginning at approximately Mile Post (MP) 238.5, approximately two miles north of the Three Lakes Toll Plaza. This segment of the Turnpike Mainline (SR 91) is currently four lanes wide. The project improvements include widening of the Turnpike Mainline (SR 91), from south of Kissimmee Park Road (MP 238.5) to US 192 (MP 242.5), construction of new ramps to and from the south at the Kissimmee Park Road interchange (MP 240), widening of the existing ramps to and from the north at the Kissimmee Park Road interchange, and construction of a new southbound on-ramp at the US 192 interchange (MP 242.5). The project will also include improvements to Kissimmee Park Road, and Old Canoe Creek Road to accommodate future traffic volumes since they influence the operations of the interchange. The total project length is approximately 7.35 miles, including local road improvements, and is shown in **Figure 1-1**.

This PD&E phase noise study includes a traffic noise analysis for residential and special land use areas (i.e., non-residential) along the Preferred Alternative (i.e., the Nolte Road Interchange alternative). The traffic noise study is completed in accordance with Title 23, Code of Federal Regulations, Part 772 (23 CFR 772), *Procedures for Abatement of Highway Traffic Noise and Construction Noise* following methodology and procedures established by the FDOT in the *PD&E Manual*, Part 2, Chapter 18. The purpose of this noise study is to identify noise sensitive sites that would be impacted by the Nolte Road Interchange alternative, evaluate abatement measures at impacted noise sensitive sites and determine where noise abatement (i.e., noise barriers) needs to be included in the Design plans.



**Figure 1-1 Project Location Map**

## Section 2

# Methodology

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This traffic noise study was performed in accordance with 23 CFR 772, *Procedures for Abatement of Highway Traffic Noise and Construction Noise* using methodology established in the FDOT *PD&E Manual*, Part 2, Chapter 18 (*Highway Traffic Noise*) (FDOT, January 2019). Predicted noise levels were produced using the Federal Highway Administration (FHWA) Traffic Noise Model (TNM), version 2.5.

### 2.1 NOISE METRICS

Noise levels developed for this analysis are expressed in decibels (dB) using an “A”-scale [dB(A)] weighting. This scale most closely approximates the response characteristics of the human ear to typical traffic noise levels. All reported noise levels are hourly equivalent noise levels [Leq(h)]. The Leq(h) is defined as the equivalent steady-state sound level that, in an hourly period, contains the same acoustic energy as the time-varying sound level for the same hourly period. Use of these metrics is consistent with the requirements of 23 CFR 772.

### 2.2 TRAFFIC DATA

Among other factors, traffic noise is heavily dependent on both traffic speed and traffic volume with the amount of noise generated by traffic increasing as the vehicle speed and number of vehicles increases. The traffic conditions that result in the highest noise levels for roadways are the hourly traffic volumes that represent Level of Service (LOS) C traffic conditions because they represent maximized traffic volumes that continue to travel at free flow speed.

Traffic data was reviewed to determine maximum traffic volumes that would allow traffic to flow at speeds consistent with established speed limits. Traffic data for the 2045 Build condition was provided by FTE and reviewed to identify forecasted traffic volumes that would allow vehicles to travel at speeds consistent with established speed limits. For roadway segments where the predicted hourly Design year traffic volumes equaled or exceeded LOS C, LOS C hourly traffic was utilized. For roadway segments where the predicted hourly traffic demand was less than LOS C traffic volumes, the predicted hourly demand volumes were utilized. For ramp volumes, hourly traffic demand volumes were utilized. Traffic volumes and speeds used in the analysis are provided in **Appendix A**. In addition, the total vehicle volume is divided between five classifications: cars, medium trucks, heavy trucks, buses, and motorcycles. Traffic vehicle percentages used in the analysis are provided in **Appendix A**.

### 2.3 NOISE ABATEMENT CRITERIA

Noise sensitive sites are any property where frequent human use occurs and a lowered noise level would be of benefit. FHWA has established noise levels at which abatement is considered for various types of noise sensitive sites. These levels, which are used by the FTE for the purpose of evaluating traffic noise, are referred to as the Noise Abatement Criteria (NAC). As shown in **Table 2-1**, NAC vary by activity category (i.e., land use). Noise abatement measures are considered when predicted traffic noise levels for the Design year (2045) approach, meet, or exceed the NAC.

**Table 2-1  
FHWA Noise Abatement Criteria**

Activity Category	Activity Leq(h)		Evaluation Location	Description of Land Use Activity Category
	FHWA	FDOT		
A	57	56	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	67	66	Exterior	Residential.
C	67	66	Exterior	Active sports 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	51	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	72	71	Exterior	Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A – D or F.
F	-----	-----	-----	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing.
G	-----	-----	-----	Undeveloped lands that are not permitted.

Source: 23 CFR Part 772, *Procedures for Abatement of Highway Traffic Noise and Construction Noise*, FHWA, 2010

**Table 2-2  
Typical Noise Levels**

Common Outdoor Activities	Noise Level dB(A)	Common Indoor Activities
Jet Fly-over at 1000 ft	---110---	Rock Band
Gas Lawn Mower at 3 ft	---100---	
Diesel Truck at 50 ft, at 50 mph	---90---	Food Blender at 3 ft
Noise Urban Area (Daytime)	---80---	Garbage Disposal at 3 ft
Gas Lawn Mower at 100 ft	---70---	Vacuum Cleaner at 10 ft
Commercial Area	---60---	Normal Speech at 3 ft
Heavy Traffic at 300 ft	---50---	Large Business Office
Quiet Urban Daytime	---40---	Dishwasher Next Room
Quiet Urban Nighttime	---30---	Theater, Large Conference Room (Background)
Quiet Suburban Nighttime	---20---	Library
Quiet Rural Nighttime	---10---	Bedroom at Night, Concert Hall (Background)
Lowest Threshold of Human Hearing	---0---	Lowest Threshold of Human Hearing

Source: California Dept. of Transportation Technical Noise Supplement, Oct. 1998, Page 18.

FDOT defines “approach” as within 1 dB(A) of FHWA criteria. For perspective, **Table 2-2** provides typical noise levels of common indoor and outdoor activities.

Noise abatement measures must also be considered when a substantial increase in traffic noise will occur as a direct result of the transportation project. FDOT defines a substantial increase as 15 or more decibels above existing conditions. A substantial increase typically occurs in areas where traffic noise is a minor component of the existing noise environment but would become a major component after the project is constructed (e.g., new alignment project).

Common Noise Environments (CNEs) are studied separately. A CNE is a group of receptors of the same NAC that are exposed to noise in a similar way. These noise exposures are due to traffic mix, volume, speed and topographic features, and typically occur between two secondary noise sources such as interchanges, intersections, and cross roads.

## **2.4 NOISE ABATEMENT MEASURES**

Noise abatement is considered at all noise sensitive sites predicted to approach/exceed the NAC as stipulated by 23 CFR 772. Abatement measures considered include traffic management, alignment modifications, noise buffer zones through application of land use controls and noise barriers.

### **2.4.1 TRAFFIC MANAGEMENT**

Traffic management techniques that limit motor vehicle speeds or reduce truck traffic can be used to abate traffic noise. A substantial speed reduction on Florida's Turnpike would lower traffic noise levels. However, the capacity of the roadway to service traffic would also be reduced. Therefore, speed reduction is not a reasonable abatement measure. Florida's Turnpike serves as a north/south route for the movement of freight. Limiting truck operations would affect the movement of materials and goods over an extensive area. Therefore, prohibiting or limiting truck traffic on Florida's Turnpike is not a reasonable abatement measure.

### **2.4.2 ALIGNMENT MODIFICATIONS**

The existing alignment of Florida's Turnpike dictates the proposed horizontal and vertical alignment of the Nolte Road Interchange Alternative. Project costs and detrimental effects on land use are minimized by making use of the existing corridor. An alignment modification that could provide a substantial noise reduction is, therefore, not a feasible or reasonable abatement measure.

### **2.4.3 BUFFER ZONES**

As properties in the vicinity of a highway are developed, providing a buffer between a highway and future noise sensitive development can minimize or eliminate noise impacts. This abatement measure can be implemented through local land use planning. The distances between the proposed highway and location where traffic noise levels approach the NAC for Activity Categories A, B, C and E are determined to facilitate future land use planning that is compatible with the traffic noise environment. For the proposed conceptual Design, the distance between the nearest through lane of Florida's Turnpike and the location where traffic noise levels would approach a particular NAC is provided in **Table 2-3**. The distances do not account for any reduction in noise levels that may be provided by berms, privacy walls or intervening structures in the noise propagation path. The noise contours also do not account for any increase in noise resulting from increased highway elevation (e.g., overpasses) or elevated noise sensitive sites (e.g., second floor patios). For any new development occurring in the future, local officials can use the noise contour information to establish buffer zones thereby minimizing or avoiding noise impacts at sensitive land uses.

**Table 2-3  
Noise Abatement Criteria Contours**

Segment of Florida's Turnpike	Distance <sup>1</sup>		
	Activity Category A [56 dB(A)]	Activity Category B & C [66 dB(A)]	Activity Category E [71 dB(A)]
South of Old Canoe Creek Road	980	305	173
From Old Canoe Creek Road to New Nolte Road	1330	505	247
From New Nolte Road to U.S. 192 North Southbound On-Ramp	1790	665	350
North of U.S. 192 North Southbound On-Ramp	1780	720	360

<sup>1</sup>Distance referenced to the edge of the nearest proposed through lane. Distance does not account for any reduction in noise levels that may be provided by berms, privacy walls or intervening structures.

#### 2.4.4 NOISE BARRIERS

Noise barriers reduce noise levels by blocking the sound path between a highway and noise sensitive site. To effectively reduce traffic noise, a barrier must be relatively long, continuous (with no intermittent openings), and of sufficient height. For a noise barrier to be considered feasible and cost reasonable, the following minimum conditions should be met:

- At least two impacted receptors must be provided a noise reduction of 5 dB(A) or more to be considered feasible.
- A noise barrier must also attain the Noise Reduction Design Goal (NRDG), which states that a minimum noise reduction of 7 dB(A) for at least one benefited receptor must be achieved. Of importance, this receptor may also have been previously identified as meeting the feasibility requirement of receiving a 5 dB(A) reduction (first bullet).
- The cost of the noise barriers should not exceed \$42,000 per benefited receptor. This is the upper cost limit established by FDOT. A benefited receptor is defined as a recipient of an abatement measure that experiences at least a 5 dB(A) reduction as a result of providing a noise barrier. The current unit cost used to evaluate cost reasonableness is \$30 per square foot (sq. ft.).

Within the project limits, noise barrier locations are evaluated as follows:

- Right-of-Way noise barriers located outside the clear recovery zone, but within the right-of-way, are initially considered at heights ranging from 8 ft. to 22 ft. in 2-ft. increments. According to the *FDOT Design Manual*, noise barriers outside the clear zone shall not exceed a maximum height of 22 ft.
- If a right-of-way barrier cannot provide at least a 5 dB(A) reduction to an impacted receptor or the barrier is not feasible due to construction limitations, then a shoulder barrier is evaluated. According to the *FDOT Design Manual*, shoulder barriers shall not exceed 14 ft. in height when on embankment and 8 ft. in height when on structure.

The length and height of the noise barriers are optimized based on the benefit provided to noise sensitive sites with predicted noise levels that approach, meet, or exceed the NAC.

#### **2.4.4.1 Special Land Uses**

It should be noted that the methodology used to evaluate noise barriers for special land uses (i.e., non-residential) is different than for residential receptors. Noise barriers for special land use were evaluated following procedures documented in *A Method to Determine Reasonableness and Feasibility of Noise Abatement at Special Use Locations* (FDOT 2009). This methodology accounts for the threshold of \$42,000 per benefitted receptor and translates it to apply to a non-residential receptor based on person-hours-of-use in the following equation:

$$\frac{\$42k}{\text{residence}} \times \frac{\text{residence}}{2.46 \text{ persons}} \times \frac{\text{usage}}{24 \text{ hours}} \times (14ft. \times 100ft.) = \$995,935/\text{person hour}/ft^2$$

The cost of abatement is considered reasonable if the calculated “abatement cost factor” is below the “criteria abatement cost factor” of the above equation (\$995,935/person-hour/ft<sup>2</sup>).



## Section 3

# Traffic Noise Analysis

### 3.1 MODEL VALIDATION

To validate the accuracy of the computer noise model for the project area, field measurements were taken following procedures documented in FHWA's *Noise Measurement Handbook* (June 2018). Noise monitoring was performed on January 30, 2020 using a Quest Technologies Q-300 noise monitor. All monitoring events were ten minutes in duration consistent with FDOT procedures. Prior to taking noise measurements, the noise monitor was calibrated using a QC-10 calibrator.

The validation sites were located along the ROW of the existing highway. Traffic volumes by vehicle classification were noted during each monitoring event. Field notes for each monitoring event are provided in **Appendix B**. Locations of monitoring sites are depicted in aerials provided in **Appendix C**.

The results for each monitoring event are provided in **Table 3-1**. The variance between measured and predicted noise levels was less than 3 dB(A). Therefore, the noise model is predicting within the level of accuracy specified in FDOT's *Project Development and Environment Manual*, Part 2, Chapter 18.

**Table 3-1**  
**Florida's Turnpike Noise Model Validation**

Location	Trial #	Date	Start Time	Field Measured Level dB(A)	Computer Predicted Level dB(A)	Decibel Difference dB(A)
Monitoring Site #1 ~20' from Edge of Pavement (-81.328237, 28.245998)	1	January 30, 2020	9:45 AM	76.5	78.4	1.9
	2		9:55 AM	76.8	77.9	1.1
	3		10:07 AM	76.7	77.7	1.0
Monitoring Site #2 ~13' from Edge of Pavement (-81.323690, 28.233056)	1	January 30, 2020	11:07 AM	76.3	78.4	2.1
	2		11:19 AM	75.4	78.0	2.6
	3		11:30 AM	76.4	77.9	1.5

### 3.2 PREDICTED NOISE LEVELS AND ABATEMENT ANALYSIS

Within the project limits, noise sensitive land uses adjacent to Florida's Turnpike include residential areas, places of worship, schools, parks, recreational areas (basketball courts, tennis courts, etc.), and playgrounds. Residential communities are in Activity Category B of the NAC while the remaining noise

sensitive land uses fall under Activity Category C, D or E. Noise levels are predicted at 229 receptor points representing 338 residences and ten nonresidential (i.e., special land uses<sup>2</sup>), affected by traffic noise.

The location of the receptor points representing the noise sensitive sites are in accordance with the *FDOT Project Development & Environment Manual*, Part 2, Chapter 18 as follows:

- Residential receptor points are located at the edge of the building closest to the major traffic noise source.
- Where residences are clustered together, single receptor points are analyzed as representative of a group of noise sensitive sites with similar characteristics (i.e., common noise environment area).
- Ground floor receptor points are assumed to be 5 feet (ft) above the ground elevation. Second, third, and fourth floor receptor points are assumed to be 15, 25, and 35 ft, respectively, above the ground elevation.

Predicted noise levels for these sites are provided in **Appendix D**. The locations of the receptor points are depicted on the aerials found in **Appendix C**. The alphanumeric identification for each receptor point (e.g., RE4, RW13A) associated with a noise sensitive site is formulated as follows:

- A “W” or “E” following the “R” denotes which side of Florida’s Turnpike the receptor is located (e.g., RE4). A “W” indicates that the receptor is located along the southbound lanes (i.e., west of Florida’s Turnpike) while an “E” indicates that the receptor is located along the northbound lanes (i.e., east of Florida’s Turnpike).
- The numbers identify a specific receptor point and generally increase from south to north.
- Where noise sensitive sites occur on multiple floors, an additional suffix letter is added to the receptor identification name (e.g., RE192A and RE192B) identifying the receptor as being located on the first floor (denoted by “A”) or the second floor (denoted by “B”). Additionally, the symbol depicted on the aerials found in **Appendix D** have increasingly smaller symbols to depict each floor, with higher floors being a smaller circle.

For the year 2045 Build condition, noise levels are predicted to approach or exceed the NAC at 121 receptors representing 201 residences and eight special land uses. These noise sensitive sites are further evaluated to determine the feasibility and cost reasonableness of providing barriers to reduce traffic noise. Additionally, a substantial increase is not predicted to occur at any residence (shown in **Appendix C**).

### 3.2.1 NOISE SENSITIVE SITES - EAST OF FLORIDA’S TURNPIKE

Predicted noise levels approach or exceed the NAC for 2045 Build condition at 174 residences and six special land uses: Origin Hospitality/Assisted Living Facility, Journey Bible Fellowship Church, Anthem Park, Sunset Park, Neptune Elementary School, Partin Triangle Park, and City of Life Christian School, along the east side of Florida’s Turnpike. All impacted noise sensitive sites are evaluated to determine the feasibility and reasonableness of providing barriers to reduce traffic noise. The discussions that follow analyze residential communities and special land uses along northbound lanes of Florida’s Turnpike from south to north.

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<sup>2</sup> Special land uses as defined by *A Method to Determine Reasonableness and Feasibility of Noise Abatement at Special Use Locations*; Florida Department of Transportation; July 2009.

### **3.2.1.1 Residences along Old Canoe Creek Rd. and Settlers Ct.**

Residences along Old Canoe Creek Rd. and Settlers Ct. (**Appendix D**, Aerial Sheets 1 - 3) are represented by 35 receptor points representing 53 residences (RE55 through RE60, RE62 through RE84 and RE86 through RE91). While none of the residences would have a substantial increase of 15 dB(A) over existing conditions, exterior traffic noise levels are predicted to range from 59.9 to 75.0 dB(A) for the Design year Build condition and approaches, meets or exceeds the NAC at 47 residences. Therefore, a noise barrier for the residences along Old Canoe Creek Rd. and Settlers Ct. was evaluated.

A ROW noise barrier was evaluated at heights ranging from 8 – 22 ft. The ROW noise barrier evaluation, shown in **Table 3-2**, found that although ROW noise barriers ranging from 8-22 feet in height would provide a benefit to at least two impacted receptors and meets the NRDG, it was not cost reasonable. Additionally, a shoulder noise barrier ranging in height from 8-14 ft. was evaluated, shown in **Table 3-3**, and was found to also be not cost reasonable. In both cases (i.e., the ROW barrier and the shoulder barrier), only a maximum of 18 of the 47 impacted residences could receive a 5 dB(A) benefit because the barrier would not address traffic noise along Old Canoe Creek Road. Therefore, a noise barrier for the residences along Old Canoe Creek Rd. and Settlers Ct. is not recommended.

### **3.2.1.2 Origin Hospitality/Assisted Living Facility**

Origin Hospitality/Assisted Living Facility (**Appendix D**, Aerial Sheet 2) is located along Old Canoe Creek Rd. and has an outdoor use area (pavilion and trail). This outdoor use area was evaluated for traffic noise impacts as an Activity Category C and was represented by one receptor (RE61). The predicted exterior traffic noise levels is 65.8 dB(A) for the Design year Build condition and does not approach, meet, or exceed the NAC. Furthermore, the facility would not have a substantial increase of 15 dB(A) over existing conditions. Therefore, a noise barrier for the Origin Hospitality/Assisted Living Facility was not considered.

### **3.2.1.3 Journey Bible Fellowship Church**

The Journey Bible Fellowship Church (**Appendix D**, Aerial Sheet 3) is located along Old Canoe Creek Rd. This place of worship has an outdoor use area (basketball court) that was evaluated for traffic noise impacts as an Activity Category C and was represented by one receptor (RE85). While the receptor would not have a substantial increase of 15 dB(A) over existing conditions, the predicted exterior traffic noise levels is 73.5 dB(A) for the Design year Build condition and exceeds the NAC. Therefore, a noise barrier for Journey Bible Fellowship Church was evaluated.

A noise barrier was evaluated following the FDOT Special Land Use procedures outlined in **Section 2.4.4.1**. A ROW noise barrier was evaluated at heights ranging from 8 – 22 ft. and is shown in **Table 3-4**. The noise barrier evaluation found that a ROW noise barrier at heights ranging from 8-22 ft. would provide a benefit to all of the impacted area. However, only barriers 12 ft. or greater would meet the NRDG. For a 12 ft. ROW noise barrier to be cost reasonable, 203 people need to use the basketball court per day for one hour. Considering the Journey Bible Fellowship Church has 20 parking spaces, it is not anticipated that the basketball count at the place of worship would meet the person-hours of required use for the noise barrier to be found cost reasonable. Therefore, a noise barrier for Journey Bible Fellowship Church was not considered.

**Table 3-2**  
**Noise Barrier Analysis (ROW) – Residences Along Old Canoe Creek Rd. and Settlers Ct.**

Barrier Height (feet)	Barrier Length <sup>1,2</sup> (feet)	Barrier Location	Number of Impacted Residences	Number of Impacted Residences Within a Noise Reduction Range			Number of Benefited Residences				Total Estimated Cost <sup>5</sup>	Cost Per Benefited Residence	Cost Reasonable?
				5-5.9 dB(A)	6-6.9 dB(A)	≥ 7 dB(A)	Impacted <sup>3</sup>	Other <sup>4</sup>	Total	Average Reduction dB(A)			
8	3,686	ROW	47	11	3	1	15	0	15	6.0	\$884,640	\$58,976	No
10	3,678	ROW		1	4	13	18	0	18	7.4	\$1,103,400	\$61,300	No
12	3,578	ROW		1	1	16	18	0	18	8.4	\$1,288,080	\$71,560	No
14	3,578	ROW		1	1	16	18	0	18	9.2	\$1,502,760	\$83,487	No
16	3,578	ROW		1	0	17	18	0	18	9.8	\$1,717,440	\$95,413	No
18	3,578	ROW		1	0	17	18	0	18	10.4	\$1,932,120	\$107,340	No
20	3,578	ROW		1	0	17	18	0	18	10.7	\$2,146,800	\$119,267	No
22	3,578	ROW		0	1	17	18	0	18	11.1	\$2,361,480	\$131,193	No

<sup>1</sup> Full height is for the length indicated. If a shoulder noise barrier location is indicated, the length of vertical height tapers at the shoulder barrier's terminus (See FDOT Standard Plans) would be in addition to the length indicated.

<sup>2</sup> Variation in the barrier length is a result of optimizing the length for a particular height.

<sup>3</sup> Benefited residences with a predicted noise level that approaches or exceeds the NAC.

<sup>4</sup> Benefited residences with a predicted noise level that does not approach the NAC.

<sup>5</sup> Unit cost of \$30 per square foot of noise barrier.

**Table 3-3**  
**Noise Barrier Analysis (Shoulder) – Residences Along Old Canoe Creek Rd. and Settlers Ct.**

Barrier Height (feet)	Barrier Length <sup>1,2</sup> (feet)	Barrier Location	Number of Impacted Residences	Number of Impacted Residences Within a Noise Reduction Range			Number of Benefited Residences				Total Estimated Cost <sup>5</sup>	Cost Per Benefited Residence	Cost Reasonable?
				5-5.9 dB(A)	6-6.9 dB(A)	≥ 7 dB(A)	Impacted <sup>3</sup>	Other <sup>4</sup>	Total	Average Reduction dB(A)			
8	NA	Shoulder	47	10	1	0	NA <sup>6</sup>						
10	NA	Shoulder		10	1	0	NA <sup>6</sup>						
12	2,853	Shoulder		2	3	6	11	0	11	7.0	\$1,027,080	\$93,371	No
14	3,797	Shoulder		4	3	10	17	0	17	7.5	\$1,594,740	\$93,808	No

<sup>1</sup> Full height is for the length indicated. If a shoulder noise barrier location is indicated, the length of vertical height tapers at the shoulder barrier's terminus (See FDOT Standard Plans) would be in addition to the length indicated.

<sup>2</sup> Variation in the barrier length is a result of optimizing the length for a particular height.

<sup>3</sup> Benefited residences with a predicted noise level that approaches or exceeds the NAC.

<sup>4</sup> Benefited residences with a predicted noise level that does not approach the NAC.

<sup>5</sup> Unit cost of \$30 per square foot of noise barrier.

<sup>6</sup> NRDG not met.

**Table 3-4**  
**Noise Barrier Analysis –Journey Bible Fellowship Church**

Barrier Height (feet)	Total Barrier Length (feet) <sup>1</sup>	Barrier Location	Total Cost <sup>2</sup>	Benefited Acreage within 0.02 Acre Impact Area	Percentage of Impacted Area Benefited	Average Reduction in Benefited Area [(dB(A)]	Required Person-Hours of Daily Use Within Benefited Area <sup>3</sup>	Possible for Person-Hours of Daily Use Within Entire Facility to be met?
8	800	ROW	\$192,000	0.02	100	6.6	270	No
10	400	ROW	\$120,000	0.02	100	6.4	169	No
12	400	ROW	\$144,600	0.02	100	7.0	203	No
14	400	ROW	\$168,400	0.02	100	7.4	237	No
16	400	ROW	\$192,000	0.02	100	7.7	270	No
18	400	ROW	\$216,000	0.02	100	7.9	304	No
20	400	ROW	\$240,000	0.02	100	8.1	338	No
22	400	ROW	\$264,000	0.02	100	8.2	372	No

<sup>1</sup> Full height is for the length indicated. If a shoulder noise barrier location is indicated, the length of vertical height tapers at the shoulder barrier's terminus (See FDOT Standard Plans) would be in addition to the length indicated.

<sup>2</sup> Unit cost of \$30 per sq. f.t of noise barrier.

<sup>3</sup> Based on \$995,935/person-hour/ft<sup>2</sup> of barrier as the limit for cost reasonableness.

#### **3.2.1.4 Teka Village**

Residences within Teka Village (**Appendix D**, Aerial Sheets 4 and 5) are located between Old Canoe Creek Rd. and Florida's Turnpike and are represented by 82 receptor points representing 112 residences (RE92 through RE99, RE101 through RE160 and RE237 through RE250). While none of the residences would have a substantial increase of 15 dB(A) over existing conditions, exterior traffic noise levels are predicted to range from 58.1 to 76.1 dB(A) for the Design year Build condition and approaches, meets or exceeds the NAC at 37 residences. Therefore, a noise barrier for the residences in Teka Village was evaluated.

A ROW and shoulder noise barrier system was evaluated at heights ranging from 8 – 22 ft. The noise barrier evaluation, shown in **Table 3-5**, found that a ROW and shoulder noise barrier system ranging in heights from 8-22 ft. at the ROW and limited to 8 ft. on the shoulder would provide a benefit to at least two impacted receptors, meet the NRDG and is cost reasonable. The 22 ft. ROW noise barrier in conjunction with the 8 ft. shoulder noise barrier provides the most benefit to impacted residences and is shown in aerial sheet 4 and 5 in **Appendix D**. Therefore, a noise barrier for Teka Village residents is recommended and will be evaluated further in the Design phase.

#### **3.2.1.5 Teka Village's Shuffleboard Court**

The Teka Village mobile home park (**Appendix D**, Aerial Sheet 4) is located along Old Canoe Creek Rd. and has an outdoor use area (shuffleboard court). This outdoor use area was evaluated for traffic noise impacts as an Activity Category C and was represented by one receptor (R100). The predicted exterior traffic noise level is 60.2 dB(A) for the Design year Build condition and does not approach, meet or exceed the NAC. Furthermore, the receptor is not predicted to have a substantial increase of 15 dB(A) over existing conditions. Therefore, a noise barrier for Teka Village's shuffleboard court was not evaluated, although this area would be shielded by the Teka Village noise barrier described above.

#### **3.2.1.6 Residences along Betsy Ross Ln. and Kettle Creek Dr.**

Residences along Betsy Ross Ln. and Kettle Creek Dr. (**Appendix D**, Aerial Sheets 6 and 7) are represented by 56 receptor points representing 135 residences (RE161 through RE197, RE200 through RE212 and RE215 through RE220). While none of the residences would have a substantial increase of 15 dB(A) over existing conditions, exterior traffic noise levels are predicted to range from 60.0 to 75.6 dB(A) for the Design year Build condition and approaches, meets or exceeds the NAC at 88 residences. Therefore, a noise barrier for the residences along Betsy Ross Ln. and Kettle Creek Dr. was evaluated.

A ROW and shoulder noise barrier system was evaluated at heights ranging from 8 – 22 ft.<sup>3</sup> The noise barrier evaluation, shown in **Table 3-6**, found that a ROW and shoulder noise barrier system ranging in heights from 8-22 ft. at the ROW, limited to 8 ft. on structure, and limited to 14 ft. on the shoulder would provide a benefit to at least two impacted receptors, meet the NRDG and is cost reasonable. The 22 ft. ROW noise barrier in conjunction with the 8 ft. and 14 ft. shoulder noise barrier provides the most benefit to impacted residences and is shown in aerial sheet 4 and 5 in **Appendix D**. Therefore, a noise barrier for the residences along Betsy Ross Ln. and Kettle Creek Dr. is recommended and will be evaluated further in the Design phase.

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<sup>3</sup> A cattle crossing prevented the ROW noise barrier from extending further south. Therefore, a shoulder barrier in combination with the ROW noise barrier was evaluated.

**Table 3-5**  
**Noise Barrier Analysis (ROW) – Residences in Tekka Village**

Barrier Height (feet)	Barrier Length <sup>1</sup> (Feet)	Barrier Type	Number of Impacted Residences	Number of Impacted Residences Within a Noise Reduction Range			Number of Benefited Residences				Total Estimated Cost <sup>4</sup>	Cost Per Benefited Residence	Cost Reasonable?
				5-5.9 dB(A)	6-6.9 dB(A)	≥ 7 dB(A)	Impacted <sup>2</sup>	Other <sup>3</sup>	Total	Average Reduction dB(A)			
8	2,302	ROW	37	6	2	25	33	0	33	7.6	\$716,640	\$21,716	Yes
8	684	Shoulder											
10	2,102	ROW		4	2	31	37	2	39	9.1	\$842,760	\$21,609	Yes
8	884	Shoulder											
12	2,102	ROW		4	0	33	37	12	49	12.0	\$874,800	\$17,853	Yes
8	492	Shoulder											
14	2,102	ROW		2	2	33	37	17	54	9.5	\$1,000,920	\$18,536	Yes
8	492	Shoulder											
16	2,102	ROW		2	2	33	37	6	43	11.4	\$1,127,040	\$26,210	Yes
8	492	Shoulder											
18	2,102	ROW		2	2	33	37	0	37	13.1	\$1,253,160	\$33,869	Yes
8	492	Shoulder											
20	2,102	ROW		2	2	33	37	4	41	12.7	\$1,462,320	\$35,666	Yes
8	838	Shoulder											
22	2,102	ROW		2	2	33	37	5	42	12.9	\$1,551,480	\$36,940	Yes
8	684	Shoulder											

<sup>1</sup> Full height is for the length indicated. If a shoulder noise barrier location is indicated, the length of vertical height tapers at the shoulder barrier's terminus (See FDOT Standard Plans) would be in addition to the length indicated.

<sup>2</sup> Variation in the barrier length is a result of optimizing the length for a particular height.

<sup>3</sup> Benefited residences with a predicted noise level that approaches or exceeds the NAC.

<sup>4</sup> Benefited residences with a predicted noise level that does not approach the NAC.

<sup>5</sup> Unit cost of \$30 per square foot of noise barrier.



**Table 3-6**  
**Noise Barrier Analysis (ROW) – Residences Along Betsy Ross Ln. and Kettle Creek Dr.**

Barrier Height (feet)	Barrier Length <sup>1</sup> (Feet)	Barrier Type	Number of Impacted Residences	Number of Impacted Residences Within a Noise Reduction Range			Number of Benefited Residences				Total Estimated Cost <sup>4</sup>	Cost Per Benefited Residence	Cost Reasonable?
				5-5.9 dB(A)	6-6.9 dB(A)	≥ 7 dB(A)	Impacted <sup>2</sup>	Other <sup>3</sup>	Total	Average Reduction dB(A)			
8	300	ROW	88	14	9	36	59	0	59	7.5	\$609,840	\$10,336	Yes
8	50	Shoulder											
14	1,252												
10	2,200	ROW		12	8	51	71	3	74	6.9	\$1,282,260	\$17,328	Yes
8	50	Shoulder											
14	1,453												
12	3,800	ROW		8	13	58	79	16	95	7.1	\$1,990,260	\$20,950	Yes
8	50	Shoulder											
14	1,453												
14	3,600	ROW		21	15	52	88	11	99	7.4	\$1,754,160	\$17,719	Yes
8	50	Shoulder											
14	548												
16	3,400	ROW		4	15	69	88	21	109	7.8	\$1,875,840	\$17,210	Yes
8	50	Shoulder											
14	552												
18	3,300	ROW		6	7	75	88	34	122	8.0	\$1,941,420	\$15,913	Yes
8	50	Shoulder											
14	351												
20	3,350	ROW		8	2	78	88	38	126	8.3	\$2,127,000	\$16,881	Yes
8	50	Shoulder											
14	250												
22	3,300	ROW		4	6	78	88	39	127	8.6	\$2,295,000	\$18,071	Yes
8	50	Shoulder											
14	250												

<sup>1</sup> Full height is for the length indicated. If a shoulder noise barrier location is indicated, the length of vertical height tapers at the shoulder barrier's terminus (See FDOT Standard Plans) would be in addition to the length indicated.

<sup>2</sup> Variation in the barrier length is a result of optimizing the length for a particular height.

<sup>3</sup> Benefited residences with a predicted noise level that approaches or exceeds the NAC.

<sup>4</sup> Benefited residences with a predicted noise level that does not approach the NAC.

<sup>5</sup> Unit cost of \$30 per square foot of noise barrier.

### **3.2.1.7 Anthem Park**

Anthem Park (**Appendix D**, Aerial Sheets 6 and 7) is located along Betsy Ross Ln. This park has outdoor use areas (two volleyball courts and two tennis courts) that were evaluated for traffic noise impacts as an Activity Category C. These outdoor use areas were represented by two receptors (RE198 and RE 199). While neither receptor would have a substantial increase of 15 dB(A) over existing conditions, the predicted exterior traffic noise levels range from 66.5 to 68.1 dB(A) for the Design year Build condition and approaches, meets or exceeds the NAC. However, a noise barrier was found to be reasonable and feasible for the residences along Betsy Ross Ln. and Kettle Creek Dr. (see **Section 3.2.1.6**). Anthem Park would benefit from this noise barrier.

### **3.2.1.8 Sunset Park**

Sunset Park (**Appendix D**, Aerial Sheet 7) is located along Betsy Ross Ln. This park has outdoor use areas (a waterfront park and a dog park) that were evaluated for traffic noise impacts as an Activity Category C. These outdoor use areas were represented by two receptors (RE213 and RE 214). While neither receptor would have a substantial increase of 15 dB(A) over existing conditions, the predicted exterior traffic noise levels range from 68.9 to 72.2 dB(A) for the Design year Build condition and exceed the NAC. However, a noise barrier was found to be reasonable and feasible for the residences along Betsy Ross Ln. and Kettle Creek Dr. (see **Section 3.2.1.6**). Sunset Park would benefit from this noise barrier.

### **3.2.1.9 Neptune Elementary School**

Neptune Elementary School (**Appendix D**, Aerial Sheet 7) is located along Betsy Ross Ln. and has an outdoor use area (a playground). This outdoor use area was evaluated for traffic noise impacts as an Activity Category C and was represented by one receptor (RE221). While the school would not have a substantial increase of 15 dB(A) over existing conditions, the predicted exterior traffic noise level is 74.9 dB(A) for the Design year Build condition and exceeds the NAC. Therefore, a noise barrier for Neptune Elementary School was evaluated.

A noise barrier was evaluated following FDOT Special Land Use procedures outlined in **Section 2.4.4.1**. A ROW noise barrier was evaluated at heights ranging from 8 – 22 ft. and is shown in **Table 3-7**. The noise barrier evaluation found that a ROW noise barrier at heights ranging from 8-22 ft. would provide a benefit to all of the impacted area and meet the NRDG. For a 12 ft. ROW noise barrier to be cost reasonable, 183 people need to use the facility per day for one hour. The student population of Neptune Elementary School is 1,025 and the staff population is 120 making a total of 1,145 people who could use the exterior use areas for one hour per day for recess and/or physical education classes. Considering the total population of Neptune Elementary School, it is possible for the person-hours requirement to be met at every noise barrier height. The noise barrier with a height of 12 ft. provides as much of a benefit as a 22 ft. barrier (100% of the impacted area) and is recommended for further analysis in the Design Phase of the project. This 12 ft. noise barrier is shown on aerial sheets 7 and 8 found in **Appendix D**.

**Table 3-7**  
**Noise Barrier Analysis – Neptune Elementary School**

Barrier Height (feet)	Total Barrier Length (feet) <sup>1</sup>	Barrier Location	Total Cost <sup>2</sup>	Benefited Acreage within 0.05 Acre Impact Area	Percentage of Impacted Area Benefited	Average Reduction in Benefited Area [(dB(A)]	Required Person-Hours of Daily Use Within Entire Facility	Required Person-Hours of Daily Use Within Benefited Area <sup>3</sup>	Possible for Person-Hours of Daily Use Within Entire Facility to be met?
8	NA	ROW	NA <sup>4</sup>						
10	500	ROW	\$150,000	0.05	100	7.1	211	211	Yes
12	360	ROW	\$129,600	0.05	100	7.5	183	183	Yes
14	320	ROW	\$134,400	0.05	100	7.8	189	189	Yes
16	300	ROW	\$144,000	0.05	100	8.1	203	203	Yes
18	280	ROW	\$151,200	0.05	100	8.1	213	213	Yes
20	280	ROW	\$168,000	0.05	100	8.3	237	237	Yes
22	280	ROW	\$184,800	0.05	100	8.5	260	260	Yes

<sup>1</sup> Full height is for the length indicated. If a shoulder noise barrier location is indicated, the length of vertical height tapers at the shoulder barrier's terminus (See FDOT Standard Plans) would be in addition to the length indicated.

<sup>2</sup> Unit cost of \$30 per sq. f.t of noise barrier.

<sup>3</sup> Based on \$995,935/person-hour/ft<sup>2</sup> of barrier as the limit for cost reasonableness.

<sup>4</sup> NRDG not met.

### **3.2.1.10 Partin Triangle Park**

Partin Triangle Park (**Appendix D**, Aerial Sheet 9) is located along Neptune Rd. This park has several outdoor use areas (boat rentals, a dog park, tennis courts, a playground, and a racquetball court) that were evaluated for traffic noise impacts as an Activity Category C. These outdoor use areas were represented by five receptors (RE223 and RE225 through RE228). While the receptors would not have a substantial increase of 15 dB(A) over existing conditions, the predicted exterior traffic noise levels range from 67.0 to 75.9 dB(A) for the Design year Build condition and exceed the NAC. Therefore, a noise barrier for Partin Triangle Park was evaluated.

A noise barrier was evaluated following FDOT Special Land Use procedures outlined in **Section 2.4.4.1**. A ROW noise barrier was evaluated at heights ranging from 8 – 22 ft. and is shown in **Table 3-8**. The noise barrier evaluation found that a ROW noise barrier at heights ranging from 10-22 ft. would provide a benefit to all of the impacted area of the park and meet the NRDG. For a 10 ft. ROW noise barrier to be cost reasonable, 850 people need to use the facility per day for one hour. Considering that Partin Triangle Park has 41 parking spaces, it is not anticipated that the park would meet the required person-hours of use for the noise barrier to be considered cost reasonable. Therefore, a noise barrier for Partin Triangle Park was not considered.

### **3.2.1.11 City of Life Christian School and Church**

The City of Life Christian School and Church (**Appendix D**, Aerial Sheets 9 and 10) is located along City of Life Way. This school/church has several outdoor use areas (a baseball field, basketball courts, and a playground) that were evaluated for traffic noise impacts as an Activity Category C. These outdoor use areas were represented by three receptors (RE229 through RE 231). While the receptors would not have a substantial increase of 15 dB(A) over existing conditions, the predicted exterior traffic noise levels range from 64.1 to 66.6 dB(A) for the Design year Build condition and approaches the NAC. Therefore, a noise barrier for the City of Life Christian School was evaluated.

A noise barrier was evaluated following FDOT Special Land Use procedures outlined in **Section 2.4.4.1**. A ROW noise barrier was evaluated at heights ranging from 8 – 22 ft. and is shown in **Table 3-9**. The noise barrier evaluation found that a ROW noise barrier at heights ranging from 20-22 ft. would provide a benefit to greater than 90% of the impacted area and meet the NRDG. For a 14 ft. ROW noise barrier to be cost reasonable, 1,617 people need to use the school's exterior use per day for one hour. The student population of City of Life Christian School is 450 and the staff population is 42, making a total of 492 people who could use the exterior use areas for one hour per day for recess and/or physical education classes. Considering the total population of City of Life Christian School (534 people), it is not possible for the person-hours requirement to be met, making the ROW noise barrier not cost reasonable. Therefore, this noise barrier is not recommended.

Additionally, the population of the City of Life Church was evaluated. On an average Sunday, anywhere from 1,600-2,200 people attend the service. However, not all attendees are assumed to use the exterior facilities. Therefore, the noise barrier was found to be not cost reasonable for the exterior activities that take place at the City of Life Church.

**Table 3-8**  
**Noise Barrier Analysis – Partin Triangle Park**

Barrier Height (feet)	Total Barrier Length (feet) <sup>1</sup>	Barrier Location	Total Cost <sup>2</sup>	Benefited Acreage within 7.37 Acre Impact Area	Percentage of Impacted Area Benefited	Average Reduction in Benefited Area [(dB(A)]	Required Person-Hours of Daily Use Within Benefited Area <sup>3</sup>	Required Person-Hours of Daily Use Within Entire Facility	Possible for Person-Hours of Daily Use Within Entire Facility to be met?
8	1,104	ROW	\$264,960	2.19	29.71	8.8	373	1,255	No
10	1,104	ROW	\$331,200	4.04	54.81	9.0	466	850	No
12	1,104	ROW	\$397,440	4.73	64.17	9.5	559	871	No
14	1,104	ROW	\$463,680	4.73	64.17	10.3	652	1,016	No
16	1,104	ROW	\$529,920	4.73	64.17	11.0	745	1,161	No
18	1,104	ROW	\$596,160	4.73	64.17	11.6	839	1,307	No
20	1,104	ROW	\$662,400	4.73	64.17	12.0	932	1,452	No
22	1,104	ROW	\$728,640	4.73	64.17	12.5	1,025	1,597	No

<sup>1</sup> Full height is for the length indicated. If a shoulder noise barrier location is indicated, the length of vertical height tapers at the shoulder barrier's terminus (See FDOT Standard Plans) would be in addition to the length indicated.

<sup>2</sup> Unit cost of \$30 per sq. ft. of noise barrier.

<sup>3</sup> Based on \$995,935/person-hour/ft<sup>2</sup> of barrier as the limit for cost reasonableness.

**Table 3-9**  
**Noise Barrier Analysis – City of Life Christian School**

Barrier Height (feet)	Total Barrier Length (feet) <sup>1</sup>	Barrier Location	Total Cost <sup>2</sup>	Benefited Acreage within 2.34 Acre Impact Area	Percentage of Impacted Area Benefited	Average Reduction in Benefited Area [(dB(A))]	Required Person-Hours of Daily Use Within Benefited Area <sup>3</sup>	Required Person-Hours of Daily Use Within Entire Facility	Possible for Person-Hours of Daily Use Within Entire Facility to be met?
8	NA	ROW	NA <sup>4</sup>						
10		ROW							
12		ROW							
14	2,469	ROW	\$1,036,980	2.11	90.17	6.0	1,458	1,617	No
16	2,309	ROW	\$1,108,320	2.11	90.17	6.4	1,558	1,728	No
18	2,109	ROW	\$1,138,860	2.11	90.17	6.6	1,601	1,776	No
20	1,909	ROW	\$1,145,400	2.11	90.17	7.4	1,611	1,787	No
22	2,569	ROW	\$1,695,540	2.34	100	7.3	2,384	2,384	No

<sup>1</sup> Full height is for the length indicated. If a shoulder noise barrier location is indicated, the length of vertical height tapers at the shoulder barrier's terminus (See FDOT Standard Plans) would be in addition to the length indicated.

<sup>2</sup> Unit cost of \$30 per sq. f.t of noise barrier.

<sup>3</sup> Based on \$995,935/person-hour/ft<sup>2</sup> of barrier as the limit for cost reasonableness.

<sup>4</sup> NRDG not met.

### **3.2.1.12 Residences Along City of Life Way**

Residences along City of Life Way (**Appendix D**, Aerial Sheet 10) are represented by three receptor points representing three residences (RE232 through RE234). While none of the residences would have a substantial increase of 15 dB(A) over existing conditions, exterior traffic noise levels are predicted to range from 65.0 to 72.0 dB(A) for the Design year Build condition and approaches, meets or exceeds the NAC at two residences. Therefore, a noise barrier for the residences along City of Life Way was evaluated.

The noise barrier evaluation, shown in **Table 3-10**, found that although ROW noise barriers ranging from 8-22 feet in height would provide a benefit to at least two impacted receptors and meets the NRDG, it was not cost reasonable. Additionally, a shoulder barrier was evaluated, shown in **Table 3-11**. However, a shoulder barrier was also found to not be cost reasonable. Therefore, a noise barrier for the residences along City of Life Way is not recommended.

### **3.2.1.13 Isolated Residence along Simmons Rd.**

One residence exists along Simmons Rd. (**Appendix D**, Aerial Sheet 11) and is represented by one receptor point (RE235). The exterior traffic noise levels are predicted to be 65.8 dB(A) for the Design year Build condition and does not approach, meet, or exceed the NAC. Furthermore, the residence is not expected to experience a substantial increase of 15 dB(A). Therefore, a noise barrier for the residence along Simmons Rd. was not considered.

**Table 3-10**  
**Noise Barrier Analysis (ROW) – Residences Along City of Life Way**

Barrier Height (feet)	Barrier Length <sup>1,2</sup> (feet)	Barrier Location	Number of Impacted Residences	Number of Impacted Residences Within a Noise Reduction Range			Number of Benefited Residences				Total Estimated Cost <sup>5</sup>	Cost Per Benefited Residence	Cost Reasonable?
				5-5.9 dB(A)	6-6.9 dB(A)	≥ 7 dB(A)	Impacted <sup>3</sup>	Other <sup>4</sup>	Total	Average Reduction dB(A)			
8	NA	ROW	2	1	0	0	0	0	0	NA <sup>6</sup>			
10	1,909	ROW		1	0	1	2	0	2	6.9	\$572,700	\$286,350	No
12	615	ROW		1	0	1	2	0	2	7.0	\$221,400	\$110,700	No
14	515	ROW		1	0	1	2	0	2	7.5	\$216,300	\$108,150	No
16	515	ROW		1	0	1	2	0	2	7.9	\$247,200	\$123,600	No
18	515	ROW		1	0	1	2	0	2	8.2	\$278,100	\$139,050	No
20	415	ROW		1	0	1	2	0	2	8.1	\$249,000	\$124,500	No
22	415	ROW		1	0	1	2	0	2	8.3	\$273,900	\$136,950	No

<sup>1</sup> Full height is for the length indicated. If a shoulder noise barrier location is indicated, the length of vertical height tapers at the shoulder barrier's terminus (See FDOT Standard Plans) would be in addition to the length indicated.

<sup>2</sup> Variation in the barrier length is a result of optimizing the length for a particular height.

<sup>3</sup> Benefited residences with a predicted noise level that approaches or exceeds the NAC.

<sup>4</sup> Benefited residences with a predicted noise level that does not approach the NAC.

<sup>5</sup> Unit cost of \$30 per square foot of noise barrier.

<sup>6</sup> NRDG not achieved. Additionally, two impacted receptors do not receive a benefit.



**Table 3-11**  
**Noise Barrier Analysis (Shoulder) – Residences Along City of Life Way**

Barrier Height (feet)	Barrier Length <sup>1,2</sup> (feet)	Barrier Location	Number of Impacted Residences	Number of Impacted Residences Within a Noise Reduction Range			Number of Benefited Residences				Total Estimated Cost <sup>5</sup>	Cost Per Benefited Residence	Cost Reasonable?
				5-5.9 dB(A)	6-6.9 dB(A)	≥ 7 dB(A)	Impacted <sup>3</sup>	Other <sup>4</sup>	Total	Average Reduction dB(A)			
8	1,166	Shoulder	2	1	0	1	2	0	2	6.2	\$629,760	\$314,880	No
	1,458	Shoulder											
10	1,166	Shoulder		1	0	1	2	0	2	6.5	\$587,400	\$293,700	No
	792	Shoulder											
12	1,166	Shoulder		1	0	1	2	0	2	6.6	\$635,400	\$317,700	No
	599	Shoulder											
14	1,368	Shoulder		1	0	1	2	0	2	6.0	\$700,560	\$350,280	No
	300	Shoulder											

<sup>1</sup> Full height is for the length indicated. If a shoulder noise barrier location is indicated, the length of vertical height tapers at the shoulder barrier's terminus (See FDOT Standard Plans) would be in addition to the length indicated.

<sup>2</sup> Variation in the barrier length is a result of optimizing the length for a particular height.

<sup>3</sup> Benefited residences with a predicted noise level that approaches or exceeds the NAC.

<sup>4</sup> Benefited residences with a predicted noise level that does not approach the NAC.

<sup>5</sup> Unit cost of \$30 per square foot of noise barrier.

### 3.2.2 NOISE SENSITIVE SITES - WEST OF FLORIDA'S TURNPIKE

Predicted noise levels approach or exceed the NAC for 2045 Build condition at 24 residences and two special land uses (Neptune Middle School and a basketball court associated with the Villas of Emerald Lake Condo Association, receptors W2 and W28, respectively), along the west side of Florida's Turnpike. All impacted noise sensitive sites are evaluated to determine the feasibility and reasonableness of providing barriers to reduce traffic noise. The discussions that follow analyze residential communities and special land uses along southbound lanes of Florida's Turnpike from south to north.

#### 3.2.2.1 Neptune Middle School

Neptune Middle School (**Appendix D**, Aerial Sheet 10) is located along Neptune Rd. and has two outdoor use areas: a multi-use field and six basketball courts. These outdoor use areas were evaluated for traffic noise impacts as an Activity Category C and was represented by one receptor (RW2). While the school would not have a substantial increase of 15 dB(A) over existing conditions, the predicted exterior traffic noise levels is 76.5 dB(A) for the Design year and exceeds the NAC. Therefore, a noise barrier for Neptune Middle School was evaluated.

A noise barrier was evaluated following FDOT Special Land Use procedures outlined in **Section 2.4.4.1**. A ROW noise barrier was evaluated at heights ranging from 8 – 22 ft. and is shown in **Table 3-12**. The noise barrier evaluation found that a ROW noise barrier at heights ranging from 12-22 ft. would provide a benefit to greater than 50% of the impacted area. For a 14 ft. ROW noise barrier to be cost reasonable, 558 people need to use the facility per day for one hour. The student population of Neptune Middle School is 1,100. The usage of the fields and basketball court could not be determined as of this writing.<sup>4</sup> In the absence of usage data, assuming approximately half of these students could use the exterior use areas for one hour per day for recess and/or physical education classes, it is possible for the person-hours requirement to be met at barrier heights of 14 and 16 ft. The noise barrier with a height of 14 ft. provides as much of a benefit as a 16 ft. barrier (57.03% of the impacted area) and is the least expensive option. Therefore, although the 14 ft. noise barrier was found to be a potentially reasonable and feasible abatement measure, the reasonableness of the barrier and the person-hour usage of the field and the basketball courts will be confirmed in the Design Phase of the project. The 14 ft. noise barrier is shown on aerial sheet 10 found in **Appendix D**.

#### 3.2.2.2 Residences Along Patricia St., Ames Haven Rd. and Villas of Emerald Lake Condo Association

Residences along Patricia St., Ames Haven Rd. and Villas of Emerald Lake Condo Association (**Appendix D**, Aerial Sheets 10 and 11) are represented by 34 receptor points representing 34 residences (RW3 through RW27 and RW 29 through RW37). While none of the residences would have a substantial increase of 15 dB(A) over existing conditions, exterior traffic noise levels are predicted to range from 62.8 to 73.9 dB(A) for the Design year and approaches, meets or exceeds the NAC at 24 residences. Therefore, a noise barrier for the residences along Patricia St., Ames Haven Rd. and Villas of Emerald Lake Condo Association was evaluated.

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<sup>4</sup> The percentage of the student population that uses the field and basketball courts was unable to be determined due to school closures associated with COVID19 (April 2020). Therefore, the usage of the field and basketball courts of Neptune Middle School will be confirmed in the Design phase Noise Study Report Addendum to determine if a noise barrier is cost reasonable.

**Table 3-12**  
**Noise Barrier Analysis – Neptune Middle School**

<b>Barrier Height (feet)</b>	<b>Total Barrier Length (feet)<sup>1</sup></b>	<b>Barrier Location</b>	<b>Total Cost<sup>2</sup></b>	<b>Benefited Acreage within 1.35 Acre Impact Area</b>	<b>Percentage of Impacted Area Benefited</b>	<b>Average Reduction in Benefited Area [(dB(A)]</b>	<b>Required Person-Hours of Daily Use Within Benefited Area<sup>3</sup></b>	<b>Required Person-Hours of Daily Use Within Entire Facility</b>	<b>Possible for Person-Hours of Daily Use Within Entire Facility to be met?</b>
8	857	ROW	\$205,680	0.21	15.56	6.7	290	1,864	No
10	957	ROW	\$287,100	0.34	25.19	6.7	404	1,604	No
12	657	ROW	\$236,520	0.34	25.19	6.9	333	1,322	No
14	537	ROW	\$225,540	0.77	57.03	6.4	318	558	Yes
16	497	ROW	\$238,560	0.77	57.03	6.4	336	589	Yes
18	477	ROW	\$257,580	0.77	57.03	6.4	363	637	No
20	477	ROW	\$286,200	0.77	57.03	6.5	403	707	No
22	477	ROW	\$314,820	0.77	57.03	6.6	443	777	No

<sup>1</sup> Full height is for the length indicated. If a shoulder noise barrier location is indicated, the length of vertical height tapers at the shoulder barrier's terminus (See FDOT Standard Plans) would be in addition to the length indicated.

<sup>2</sup> Unit cost of \$30 per sq. ft of noise barrier.

<sup>3</sup> Based on \$995,935/person-hour/ft<sup>2</sup> of barrier as the limit for cost reasonableness.

A ROW noise barrier was evaluated at heights ranging from 8 – 22 ft. and is shown in **Table 3-13**. The noise barrier evaluation found that although ROW noise barriers ranging from 10-22 feet in height would provide a benefit to at least two impacted receptors and meets the NRDG, it was not cost reasonable. Additionally, a shoulder noise barrier was evaluated at heights ranging from 8-14 ft. The shoulder noise barrier evaluation, shown in **Table 3-14**, found that a shoulder noise barrier is not cost reasonable. Therefore, a noise barrier for the residences along Patricia St., Ames Haven Rd., and the Villas of Emerald Lake Condo Association is not recommended.

### **3.2.2.3 Villas of Emerald Lake Condo Association's Community Basketball Court**

The Villas of Emerald Lake Condo Association's Community basketball court (**Appendix D**, Aerial Sheet 10 and 11) is located along Patricia St. This outdoor use area was evaluated for traffic noise impacts as an Activity Category C and was represented by one receptor (RW28). While the receptor would not have a substantial increase of 15 dB(A) over existing conditions, the predicted exterior traffic noise levels is 76.5 dB(A) for the Design year and exceed the NAC. Therefore, a noise barrier for the basketball court at Villas of Emerald Lake Condos was evaluated.

A noise barrier was evaluated following FDOT Special Land Use procedures outlined in **Section 2.4.4.1**. A ROW noise barrier was evaluated at heights ranging from 8 – 22 ft. However, the noise barrier evaluation found that a noise barrier could not provide a 7 dB(A) reduction to meet the NRDG at any height. Therefore, a noise barrier for the basketball court at the Villas of Emerald Lake Condo Association is not recommended.

**Table 3-13**

**Noise Barrier Analysis (ROW) – Residences Along Patricia St., Ames Haven Rd. and Villas of Emerald Lake Condo Association**

Barrier Height (feet)	Barrier Length <sup>1,2</sup> (feet)	Barrier Location	Number of Impacted Residences	Number of Impacted Residences Within a Noise Reduction Range			Number of Benefited Residences				Total Estimated Cost <sup>5</sup>	Cost Per Benefited Residence	Cost Reasonable?
				5-5.9 dB(A)	6-6.9 dB(A)	≥ 7 dB(A)	Impacted <sup>3</sup>	Other <sup>4</sup>	Total	Average Reduction dB(A)			
8	NA	ROW	24	1	0	0	NA <sup>6</sup>						
10	2,983	ROW		4	0	1	5	0	5	5.6	\$894,900	\$178,980	No
12	2,612	ROW		5	6	1	12	0	12	6.1	\$940,320	\$78,360	No
14	2,043	ROW		3	7	5	15	0	15	6.6	\$858,060	\$57,204	No
16	2,043	ROW		4	4	10	18	0	18	6.8	\$980,640	\$54,480	No
18	2,043	ROW		2	5	12	19	2	21	7.0	\$1,103,220	\$52,534	No
20	2,283	ROW		1	4	15	20	2	22	7.7	\$1,369,800	\$62,264	No
22	2,283	ROW		2	2	17	21	2	23	8.1	\$1,506,780	\$65,512	No

<sup>1</sup> Full height is for the length indicated. If a shoulder noise barrier location is indicated, the length of vertical height tapers at the shoulder barrier's terminus (See FDOT Standard Plans) would be in addition to the length indicated.

<sup>2</sup> Variation in the barrier length is a result of optimizing the length for a particular height.

<sup>3</sup> Benefited residences with a predicted noise level that approaches or exceeds the NAC.

<sup>4</sup> Benefited residences with a predicted noise level that does not approach the NAC.

<sup>5</sup> Unit cost of \$30 per square foot of noise barrier.

<sup>6</sup> NRDG not met.

**Table 3-14**

**Noise Barrier Analysis (Shoulder) – Residences Along Patricia St., Ames Haven Rd. and Villas of Emerald Lake Condo Association**

Barrier Height (feet)	Barrier Length <sup>1, 2</sup> (feet)	Barrier Location	Number of Impacted Residences	Number of Impacted Residences Within a Noise Reduction Range			Number of Benefited Residences				Total Estimated Cost <sup>5</sup>	Cost Per Benefited Residence	Cost Reasonable?
				5-5.9 dB(A)	6-6.9 dB(A)	≥ 7 dB(A)	Impacted <sup>3</sup>	Other <sup>4</sup>	Total	Average Reduction dB(A)			
8	NA	Shoulder	24	0	0	0	NA <sup>6</sup>						
10	NA	Shoulder		2	0	0	NA <sup>6</sup>						
12	2622	Shoulder		17	3	2	22	0	22	5.6	\$2,232,600	\$101,482	No
12	1426	Shoulder											
8	517	Shoulder											
12	1809	Shoulder											
14	3243	Shoulder											
14	1426	Shoulder		14	4	6	24	4	28	6.0	\$2,634,840	\$94,101	No
8	517	Shoulder											
14	1309	Shoulder											

<sup>1</sup> Full height is for the length indicated. If a shoulder noise barrier location is indicated, the length of vertical height tapers at the shoulder barrier's terminus (See FDOT Standard Plans) would be in addition to the length indicated.

<sup>2</sup> Variation in the barrier length is a result of optimizing the length for a particular height.

<sup>3</sup> Benefited residences with a predicted noise level that approaches or exceeds the NAC.

<sup>4</sup> Benefited residences with a predicted noise level that does not approach the NAC.

<sup>5</sup> Unit cost of \$30 per square foot of noise barrier.

<sup>6</sup> NRDG not met.

## Section 4

# Conclusions

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### 4.1 TRAFFIC NOISE IMPACTS

Noise levels were predicted at 229 receptor points representing 338 residences and ten special land uses. For the year 2045 Build condition, noise levels are predicted to approach, meet, or exceed the NAC at 202 residences and eight special land uses within the project limits. These impacted noise sensitive sites were evaluated to determine the feasibility and cost reasonableness of providing barriers to reduce traffic noise. Additionally, a substantial increase of 15 dB(A) is not predicted to occur at any residence or special land use (shown in **Appendix C**).

The noise barrier evaluation identified that noise barriers are a reasonable and feasible form of abatement and could potentially provide at least a 5 dB(A) reduction at up to 125 of the 198 impacted residences (residences in Teka Village and residences along Betsy Ross Ln. and Kettle Creek Dr.), and at one of the eight impacted special land uses (Neptune Elementary School) at a cost below the reasonable limit. A noise barrier at a second special land use, Neptune Middle School, was found to be potentially feasible but its reasonableness could not be conclusively determined at this writing.<sup>5</sup> These potentially reasonable and feasible noise barriers are listed in **Table 4-1**. Noise barriers cannot provide at least a 5 dB(A) reduction to 73 impacted residences and six impacted special land uses because they do not meet the criteria of reasonableness and/or feasibility to warrant the construction of a noise barrier.

A combination ROW (up to 22 ft.) and shoulder (8 ft.) noise barrier system was found to be potentially reasonable and feasible for Teka Village. A combination ROW (up to 22 ft.) and shoulder (14 ft. and 8 ft.) noise barrier system was found to be potentially reasonable and feasible for residents along Betsy Ross Ln. and Kettle Creek Dr. Barriers ranging between 10 ft. and 22 ft. were also found to be reasonable and feasible for Neptune Elementary School. Barriers ranging between 14 and 16 ft. were presumed to be potentially reasonable and feasible at Neptune Middle School, pending a determination of site usage as described above, which will be resolved during the Design phase.

### 4.2 STATEMENT OF LIKELIHOOD

The total cost of the noise barriers summarized in **Table 4-1** ranges from \$1,131,180 to \$4,460,940. These noise barriers benefit 125 residences and two schools with predicted noise levels that approach or exceed the NAC. The noise barriers summarized in **Table 4-1** are both feasible (i.e., at least a 5 dB(A) reduction would be provided for most impacted residents) and cost reasonable.

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<sup>5</sup> The percentage of the student population that uses the field and basketball courts was unable to be determined due to school closures associated with COVID19 (April 2020). Therefore, the usage of the field and basketball courts of Neptune Middle School will be confirmed in the Design phase Noise Study Report Addendum to determine if a noise barrier is cost reasonable.

The FTE is committed to the construction of feasible and reasonable noise abatement measures at the noise-impacted locations identified in **Table 4-1** contingent upon the following conditions during future Design phases:

1. Final recommendations on the construction of abatement measures is determined during the project's final Design and through the public involvement process;
2. Detailed noise analyses during the final Design process support the need, feasibility and reasonableness of providing abatement; At Neptune Middle School, determining reasonableness will require confirmation about usage of outdoor recreational facilities that were not able to be determined during the PD&E process because the school was closed at the time of the noise study
3. Cost analysis indicates that the cost of the noise barrier(s) will not exceed the cost reasonable criterion;
4. Community input supporting types, heights, and locations of the noise barrier(s) is provided to the FTE; and
5. Safety and engineering aspects as related to the roadway user and the adjacent property owner have been reviewed and any conflicts or issues resolved.



**Table 4-1**  
**Summary of Potentially Feasible and Cost Reasonable Noise Barriers**

Common Noise Environment	Barrier Location	Barrier Approx. Begin & End Stations		Optimized Preliminary Barrier Height (feet)	Optimized Preliminary Barrier Length <sup>a</sup> (feet)	Optimized Preliminary Barrier Cost <sup>b</sup>	Number of Impacted Residences	Benefited Residences		Cost per Benefited Residence
		Min	Max					Impacted and Benefited	Total Benefited <sup>c</sup>	
Residences in Teka Village	ROW	4530	3060	8 – 22	2,102 – 2,302	\$716,640 - \$1,551,480	37	33-37	33-54	\$18,536 - \$36,940
	Shoulder			8	492 - 838					
Residences Along Betsy Ross Ln. and Kettle Creek Dr.	ROW	6078	4625	8 – 22	50 – 3,800	\$609,840 - \$2,295,000	88	59-88	59-127	\$10,336- \$20,950
	Shoulder			8 – 14	300 – 1,503					
Neptune Elementary School	ROW	4618	4623	10 – 22	280-500	\$129,600 – \$184,800	N/A			
Neptune Middle School <sup>d</sup>	ROW	4666	4675	14 – 16	497-537	\$225,540 – \$238,560	N/A			
Totals		-----		-----	-----	\$1,131,180 - \$4,460,940	125	92 – 125	92 -181	\$10,336 - \$36,940

<sup>a</sup> Full height is for the length indicated. The length of any required taper in height at a shoulder noise barrier termination would be in addition to the length indicated.

<sup>b</sup> Unit cost of \$30/ft.<sup>2</sup> for all barriers.

<sup>c</sup> Total Benefited includes impacted/benefited residences and additional residences with predicted noise levels that do not approach 66 dB(A) but are incidentally benefited.

<sup>d</sup> The usage of the field and basketball courts of Neptune Middle School will be confirmed in the Design Phase. The percentage of the student population that uses the field and basketball courts was unable to be determined due to school closures associated with COVID19 (April 2020).

## Section 5

# ***Construction Noise and Vibration***

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Land use adjacent to Florida's Turnpike is identified on the FDOT listing of construction noise and vibration sensitive sites (i.e., residences, medical facilities, schools, churches, parks, and businesses with outdoor use). Any noise or vibration generated during construction of the proposed highway improvements is expected to be short-term and temporary at any location. If additional sensitive land uses develop adjacent to the roadway prior to construction, increased potential for noise or vibration impacts could result. It is anticipated that the application of the *FDOT Standard Specifications for Road and Bridge Construction*<sup>6</sup> will minimize or eliminate potential construction noise and vibration impacts. However, should unanticipated noise or vibration issues arise during the construction process, the Project Engineer, in coordination with the FTE Noise Specialist and the Contractor, will investigate additional methods of controlling these impacts.

## Section 6

# ***Community Coordination***

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Coordination with local agencies, officials and the general public is ongoing and the public has had the opportunity to comment on the proposed project at public meetings and other outreach efforts:

- A Public Information Meeting was held on August 6, 2019 and the public expressed concerns about traffic noise and requested noise mitigation, particularly at the Teka Village community.
- An outreach meeting was held for Teka Village on November 14, 2019 to discuss potentially feasible and reasonable noise abatement and take comments and concerns.
- A second outreach meeting was held for Teka Village on October 15, 2020 to discuss refinements to the Nolte Road interchange concept and note where impacts were identified and noise abatement was found to be potentially feasible and reasonable. Resident questions about noise abatement were answered.

The FTE is responsible for taking measures that are prudent and feasible to minimize conflicts with existing land uses and for promoting compatibility with future development. This report provides information that can be used by local officials to prevent future land development from becoming incompatible with anticipated traffic noise levels. A draft copy of this noise study report will be available for public review at the next Public Hearing presently scheduled for November 10, 2020. Where possible, comments from the Public Hearing will be incorporated into the final noise study report.

## Section 7

# References

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23 CFR Part 772, "Procedures for Abatement of Highway Traffic Noise and Construction Noise", Federal Register, Vol. 75, No. 133, Tuesday, July 13, 2010; pages 39834-39839.

Florida Department of Transportation, "A Method to Determine Reasonableness and Feasibility of Noise Abatement at Special Use Locations", July 2009. 64 pages.

Florida Department of Transportation. "Noise Analysis", Part 2, Chapter 18. Project Development and Environment Manual, Florida Department of Transportation, Tallahassee, January 14, 2019.

Florida Department of Transportation Design Manual Volume 1, Chapter 264, "Noise Walls and Perimeter Walls", January 2019

Florida Department of Transportation "Standard Specifications for Road and Bridge Construction", January 2019.

Florida Department of Transportation, "2012 FDOT Quality/Level of Service Handbook"; Tallahassee, Florida; 2012.

Florida Department of Transportation, "FDOT Design Manual", Tallahassee, Florida; 2019.

Federal Highway Administration Report FHWA-HEP-10-025, "Highway Traffic Noise: Analysis and Abatement Guidance", June 2010 (revised December 2010); 76 pages.

Federal Highway Administration Report FHWA-PD-96-009, "FHWA Traffic Noise Model, Version 1.0 User's Guide", January 1998; 192 pages + supplements.

FHWA. Report Number FHWA-HEP-065, "Noise Measurement Handbook". June 1, 2018.  
<https://www.fhwa.dot.gov/environment/noise/measurement/handbook.cfm>

Federal Highway Administration Report FHWA-HEP-06-015, "FHWA Highway Construction Noise Handbook: Final Report". August 2006; 185 pages.

## ***APPENDICES***

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***Appendix A    Traffic Data***

***Appendix B    Noise Measurement Field Sheets***

***Appendix C    Predicted Noise Levels***

***Appendix D    Aerials***

***Appendix E    TNM Modeling Files (Provided in  
Project Files)***

## ***APPENDIX A***

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### ***TRAFFIC DATA***

Traffic Data - Florida's Turnpike from Kissimmee Park Rd to US 192  
Existing 2018 Conditions

Florida's Turnpike Mainline													
Mainline Segment	Number of Lanes	AADT	LOS C AADT	Peak Hour Peak Direction	LOS C Peak Hour Peak Direction	Design Hr. % Trucks	Design Hr. % MT	Design Hr. % HT	Design Hr. % Buses	Design Hr. % Motorcycles	Standard K-factor	D-factor	Posted Speed (mph)
South of Kissimmee Park Road (MP 240)	4	32,300	49,000	1,728	2,760	8.28%	1.99%	6.09%	0.20%	0.10%	10.5%	53.7%	70
From Kissimmee Park Road (MP 240) to U.S. 192 (MP 242)	4	48,000	51,400	2,212	2,900	8.28%	1.99%	6.09%	0.20%	0.10%	10.5%	53.7%	70
From U.S. 192 South (MP 242) to U.S. 192 North Southbound On-ramp (MP 244)	4	46,100	51,400	2,212	2,900	8.28%	1.99%	6.09%	0.20%	0.10%	10.5%	53.7%	70
North of U.S. 192 North Southbound On-Ramp (MP 244)	4	44,600	51,400	2,114	2,900	8.28%	1.99%	6.09%	0.20%	0.10%	10.5%	53.7%	70
Ramps													
Interchange Ramp	Number of Lanes	One-Way AADT	One-Way LOS C AADT	Peak Hour Peak Direction	LOS C Peak Hour Peak Direction	Design Hr. % Trucks	Design Hr. % MT	Design Hr. % HT	Design Hr. % Buses	Design Hr. % Motorcycles	K-factor	D-factor	Posted Speed (mph)
<b>Kissimmee Park Road (MP 240)</b>													
Southbound Off-Ramp	1	7,700	8,600	1,241	1,310	4.04%	1.41%	2.30%	0.34%	0.07%	11.5%	66.2%	45
Northbound On-Ramp	1	8,000	8,600	1,431	1,310	4.04%	1.41%	2.30%	0.34%	0.07%	11.5%	66.2%	45
<b>U.S. 192 South (MP 242)</b>													
Northbound Off-Ramp	1	1,900	11,300	171	1,310	4.04%	1.41%	2.30%	0.34%	0.07%	10.2%	57.0%	45
<b>U.S. 192 North (MP 244)</b>													
Southbound On-Ramp	1	1,500	11,200	97	1,300	4.04%	1.41%	2.30%	0.34%	0.07%	10.2%	57.0%	35
Arterials													
Arterial Segment	Number of Lanes	AADT	LOS C AADT	Peak Hour Peak Direction	LOS C Peak Hour Peak Direction	Design Hr. % Trucks	Design Hr. % MT	Design Hr. % HT	Design Hr. % Buses	Design Hr. % Motorcycles	K-factor	D-factor	Posted Speed (mph)
<b>Kissimmee Park Road</b>													
East of Florida's Turnpike	2	21,700	7,000	1,418	370	4.04%	1.41%	2.30%	0.34%	0.07%	9.0%	58.8%	35
West of Florida's Turnpike	2	2,400	7,000	151	370	4.04%	1.41%	2.30%	0.34%	0.07%	9.0%	58.8%	35
<b>Old Canoe Creek Road</b>													
South of Kissimmee Park Road	2	21,900	14,500	1,442	840	2.68%	0.82%	1.52%	0.34%	0.05%	9.0%	64.4%	45
From Kissimmee Park Road to New Nolte Road	4	24,700	37,600	1,127	1,930	2.68%	0.82%	1.52%	0.34%	0.05%	9.0%	57.0%	45
North of New Nolte Road	4	24,200	37,600	1,242	1,930	2.68%	0.82%	1.52%	0.34%	0.05%	9.0%	57.0%	45
<b>New Nolte Road</b>													
East of Old Canoe Creek Road	4	19,600	13,900	1,063	740	1.53%	0.33%	0.87%	0.34%	0.03%	9.0%	59.2%	35
<b>U.S. 192</b>													
East of Florida's Turnpike	4	28,300	40,900	1,537	2,110	4.34%	1.54%	2.47%	0.34%	0.08%	9.0%	57.3%	50
West of Florida's Turnpike	4	28,900	40,900	1,600	2,110	4.34%	1.54%	2.47%	0.34%	0.08%	9.0%	57.3%	50

AADT: Annual Average Daily Traffic; MT: Medium Trucks; HT: Heavy Trucks

(1) Number of lanes were obtained from the aerial maps and design layouts.

(2) Traffic data was obtained from the PD&E study Project Traffic Forecast Memorandum.

(3) Peak hour demand and LOS C Peak Hour maximum service volumes are provided directionally.

(4) LOS C targets were based on the 2012 FDOT Quality and LOS Handbook, and adjusted for local conditions.

(5) LOS C AADTs were estimated using K and D factors and the design hour peak direction LOS C maximum service volumes.

(6) Florida's Turnpike mainline and tolled ramps design hour truck percentages are based on toll data. Truck percentages for non-tolled ramps are based on applicable adjacent toll data. Truck percentages for arterials were estimated from counts and distributed based on class data from the Florida Traffic Online Application. The medium vehicle classifications listed here make a distinction between medium trucks and buses.

(7)Posted speed data was obtained from field observations

Traffic Data – Florida’s Turnpike from Kissimmee Park Rd to US 192  
No-Build 2045 Conditions

Florida's Turnpike Mainline													
Mainline Segment	Number of Lanes	AADT	LOS C AADT	Peak Hour Peak Direction	LOS C Peak Hour Peak Direction	Design Hr. % Trucks	Design Hr. % MT	Design Hr. % HT	Design Hr. % Buses	Design Hr. % Motorcycles	Standard K-factor	D-factor	Posted Speed (mph)
South of Kissimmee Park Road (MP 240)	4	53,200	51,400	2,860	2,900	8.28%	1.99%	6.09%	0.20%	0.10%	10.5%	53.7%	70
From Kissimmee Park Road (MP 240) to U.S. 192 South (MP 242)	4	94,900	51,400	5,220	2,900	8.28%	1.99%	6.09%	0.20%	0.10%	10.5%	53.7%	70
From U.S. 192 South (MP 242) to U.S. 192 North Southbound On-ramp (MP 244)	8	113,100	102,900	6,790	5,800	8.28%	1.99%	6.09%	0.20%	0.10%	10.5%	53.7%	70
North of U.S. 192 North Southbound On-Ramp (MP 244)	8	107,400	102,900	6,200	5,800	8.28%	1.99%	6.09%	0.20%	0.10%	10.5%	53.7%	70
Ramps													
Interchange Ramp	Number of Lanes	One-Way AADT	One-Way LOS C AADT	Peak Hour Peak Direction	LOS C Peak Hour Peak Direction	Design Hr. % Trucks	Design Hr. % MT	Design Hr. % HT	Design Hr. % Buses	Design Hr. % Motorcycles	K-factor	D-factor	Posted Speed (mph)
<b>Kissimmee Park Road (MP 240)</b>													
Southbound Off-Ramp	1	20,900	8,600	3,180	1,310	4.04%	1.41%	2.30%	0.34%	0.07%	11.5%	66.2%	45
Northbound On-Ramp	1	20,900	8,600	3,180	1,310	4.04%	1.41%	2.30%	0.34%	0.07%	11.5%	66.2%	45
<b>U.S. 192 (MP 242)</b>													
Southbound Off-Ramp	1	12,000	9,600	1,570	1,310	4.04%	1.41%	2.30%	0.34%	0.07%	9.8%	69.9%	45
Northbound On-Ramp	1	12,000	10,000	1,570	1,310	4.04%	1.41%	2.30%	0.34%	0.07%	9.5%	69.0%	45
Northbound Off-Ramp	1	5,700	11,300	590	1,310	4.04%	1.41%	2.30%	0.34%	0.07%	10.2%	57.0%	45
<b>U.S. 192 North</b>													
Southbound On-Ramp	1	5,700	11,200	590	1,300	4.04%	1.41%	2.30%	0.34%	0.07%	10.2%	57.0%	35
Arterials													
Arterial Segment	Number of Lanes	AADT	LOS C AADT	Peak Hour Peak Direction	LOS C Peak Hour Peak Direction	Design Hr. % Trucks	Design Hr. % MT	Design Hr. % HT	Design Hr. % Buses	Design Hr. % Motorcycles	K-factor	D-factor	Posted Speed (mph)
<b>Kissimmee Park Road</b>													
East of Florida's Turnpike	2	47,000	7,000	2,700	370	4.04%	1.41%	2.30%	0.34%	0.07%	9.0%	58.8%	35
West of Florida's Turnpike	2	33,200	7,000	1,680	370	4.04%	1.41%	2.30%	0.34%	0.07%	9.0%	58.8%	35
<b>Old Canoe Creek Road</b>													
South of Kissimmee Park Road	2	54,700	14,500	3,130	840	2.68%	0.82%	1.52%	0.34%	0.05%	9.0%	64.4%	45
From Kissimmee Park Road to New Nolte Road	4	51,700	37,600	2,410	1,930	2.68%	0.82%	1.52%	0.34%	0.05%	9.0%	57.0%	45
North of New Nolte Road	4	46,900	37,600	2,460	1,930	2.68%	0.82%	1.52%	0.34%	0.05%	9.0%	57.0%	45
<b>New Nolte Road</b>													
East of Old Canoe Creek Road	4	37,400	13,900	2,080	740	1.53%	0.33%	0.87%	0.34%	0.03%	9.0%	59.2%	35
<b>U.S. 192</b>													
East of Florida's Turnpike	6	51,400	63,000	2,580	3,250	4.34%	1.54%	2.47%	0.34%	0.08%	9.0%	57.3%	45
West of Florida's Turnpike	6	37,900	63,000	1,940	3,250	4.34%	1.54%	2.47%	0.34%	0.08%	9.0%	57.3%	45

AADT: Annual Average Daily Traffic; MT: Medium Trucks; HT: Heavy Trucks

(1) Number of lanes were obtained from the aerial maps and design layouts.

(2) Traffic data was obtained from the PD&E study Project Traffic Forecast Memorandum.

(3) Peak hour demand and LOS C Peak Hour maximum service volumes are provided directionally.

(4) LOS C targets were based on the 2012 FDOT Quality and LOS Handbook, and adjusted for local conditions.

(5) LOS C AADTs were estimated using K and D factors and the design hour peak direction LOS C maximum service volumes.

(6) Florida's Turnpike mainline and tolled ramps design hour truck percentages are based on toll data. Truck percentages for non-tolled ramps are based on applicable adjacent toll data. Truck percentages for arterials were estimated from counts and distributed based on class data from the Florida Traffic Online Application. The medium vehicle classifications listed here make a distinction between medium trucks and buses.

(7)Posted speed data was obtained from field observations.



**Traffic Data – Florida’s Turnpike from Kissimmee Park Rd to US 192  
Build 2045 Alternative**

Florida's Turnpike Mainline													
Mainline Segment	Number of Lanes	AADT	LOS C AADT	Peak Hour Peak Direction	LOS C Peak Hour Peak Direction	Design Hr. % Trucks	Design Hr. % MT	Design Hr. % HT	Design Hr. % Buses	Design Hr. % Motorcycles	Standard K-factor	D-factor	Posted Speed (mph)
South of Old Canoe Creek Road (MP 239)	8	55,200	102,900	3,090	5,800	8.33%	2.00%	6.12%	0.20%	0.08%	10.5%	53.7%	70
From Old Canoe Creek Road (MP 239) to New Nolte Road (MP 241)	8	71,000	102,900	3,560	5,800	8.33%	2.00%	6.12%	0.20%	0.08%	10.5%	53.7%	70
From New Nolte Road (MP 241) to U.S. 192 South (MP 242)	8	95,400	102,900	5,240	5,800	8.33%	2.00%	6.12%	0.20%	0.08%	10.5%	53.7%	70
From U.S. 192 South (MP 242) to U.S. 192 North Southbound On-ramp (MP 244)	8	109,700	102,900	6,450	5,800	8.33%	2.00%	6.12%	0.20%	0.08%	10.5%	53.7%	70
North of U.S. 192 North Southbound On-Ramp (MP 244)	8	106,600	102,900	6,110	5,800	8.33%	2.00%	6.12%	0.20%	0.08%	10.5%	53.7%	70
Polk Parkway Ramps													
Interchange Ramp	Number of Lanes	One-Way AADT	One-Way LOS C AADT	Peak Hour Peak Direction	LOS C Peak Hour Peak Direction	Design Hr. % Trucks	Design Hr. % MT	Design Hr. % HT	Design Hr. % Buses	Design Hr. % Motorcycles	K-factor	D-factor	Posted Speed (mph)
<b>Old Canoe Creek Road (Supplementary Ramps)</b>													
Southbound Off-Ramp	1	7,900	8,600	1,180	1,310	4.04%	1.41%	2.30%	0.34%	0.07%	11.5%	66.2%	45
Northbound On-Ramp	2	7,900	17,200	1,230	2,620	4.04%	1.41%	2.30%	0.34%	0.07%	11.5%	66.2%	45
<b>New Nolte Road</b>													
Southbound Off-Ramp	2	15,200	17,200	2,330	2,620	4.04%	1.41%	2.30%	0.34%	0.07%	11.5%	66.2%	45
Northbound On-Ramp	2	15,200	17,200	2,280	2,620	4.04%	1.41%	2.30%	0.34%	0.07%	11.5%	66.2%	45
Southbound On-Ramp	1	3,000	9,100	430	1,310	4.04%	1.41%	2.30%	0.34%	0.07%	13.2%	54.4%	45
Northbound Off-Ramp	1	3,000	9,100	430	1,310	4.04%	1.41%	2.30%	0.34%	0.07%	13.2%	54.4%	45
<b>U.S. 192 South</b>													
Southbound Off-Ramp	1	10,500	9,600	1,440	1,310	4.04%	1.41%	2.30%	0.34%	0.07%	9.8%	69.9%	45
Northbound On-Ramp	1	10,500	9,600	1,440	1,310	4.04%	1.41%	2.30%	0.34%	0.07%	9.8%	69.9%	45
Southbound On-Ramp	1	3,400	11,300	230	1,310	4.04%	1.41%	2.30%	0.34%	0.07%	10.2%	57.0%	45
Northbound Off-Ramp	1	3,400	11,300	570	1,310	4.04%	1.41%	2.30%	0.34%	0.07%	10.2%	57.0%	45
<b>U.S. 192 North</b>													
Southbound On-Ramp	1	3,100	11,200	340	1,300	4.04%	1.41%	2.30%	0.34%	0.07%	10.2%	57.0%	35
Arterials													
Arterial Segment	Number of Lanes	AADT	LOS C AADT	Peak Hour Peak Direction	LOS C Peak Hour Peak Direction	Design Hr. % Trucks	Design Hr. % MT	Design Hr. % HT	Design Hr. % Buses	Design Hr. % Motorcycles	K-factor	D-factor	Posted Speed (mph)
<b>Kissimmee Park Road</b>													
East of Florida's Turnpike	2	9,400	7,000	500	370	4.04%	1.41%	2.30%	0.34%	0.07%	9.0%	58.8%	35
West of Florida's Turnpike	2	9,400	7,000	500	370	4.04%	1.41%	2.30%	0.34%	0.07%	9.0%	58.8%	35
<b>Old Canoe Creek Road</b>													
South of Florida's Turnpike Ramps	2	59,000	14,500	3,420	840	2.68%	0.82%	1.52%	0.34%	0.05%	9.0%	64.4%	45
From Florida's Turnpike Ramps to Kissimmee Park Road	4	50,400	33,300	2,680	1,930	2.68%	0.82%	1.52%	0.34%	0.05%	9.0%	64.4%	45
From Florida's Turnpike Ramps to Kissimmee Park Road	2	50,400	14,500	2,680	840	2.68%	0.82%	1.52%	0.34%	0.05%	9.0%	64.4%	45
From Kissimmee Park Road to New Nolte Road	4	50,400	37,600	2,590	1,930	2.68%	0.82%	1.52%	0.34%	0.05%	9.0%	57.0%	45
North of New Nolte Road	4	54,100	37,600	2,730	1,930	2.68%	0.82%	1.52%	0.34%	0.05%	9.0%	57.0%	45
<b>New Nolte Road</b>													
East of Old Canoe Creek Road	4	35,900	15,300	2,140	740	1.53%	0.33%	0.87%	0.34%	0.03%	9.0%	53.6%	35
From Old Canoe Creek Road to Florida's Turnpike North Ramps	4	24,700	15,300	1,360	740	1.53%	0.33%	0.87%	0.34%	0.03%	9.0%	53.6%	35
West of Florida's Turnpike South Ramps	4	26,700	15,300	1,420	740	1.53%	0.33%	0.87%	0.34%	0.03%	9.0%	53.6%	35
<b>U.S. 192</b>													
East of Florida's Turnpike	6	56,800	63,000	2,930	3,250	4.34%	1.54%	2.47%	0.34%	0.08%	9.0%	57.3%	45
West of Florida's Turnpike	6	40,800	63,000	2,000	3,250	4.34%	1.54%	2.47%	0.34%	0.08%	9.0%	57.3%	45

AADT: Annual Average Daily Traffic; MT: Medium Trucks; HT: Heavy Trucks

(1) Number of lanes were obtained from the aerial maps and design layouts.

(2) Traffic data was obtained from the PD&E study Project Traffic Forecast Memorandum.

(3) Peak hour demand and LOS C Peak Hour maximum service volumes are provided directionally.

(4) LOS C targets were based on the 2012 FDOT Quality and LOS Handbook, and adjusted for local conditions.

(5) LOS C AADTs were estimated using K and D factors and the design hour peak direction LOS C maximum service volumes.

(6) Florida's Turnpike mainline and tolled ramps design hour truck percentages are based on toll data. Truck percentages for non-tolled ramps are based on applicable adjacent toll data. Truck percentages for arterials were estimated from counts and distributed based on class data from the Florida Traffic Online Application. The medium vehicle classifications listed here make a distinction between medium trucks and buses.

(7) Posted speed data was obtained from field observations

## ***APPENDIX B***

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### ***Noise Measurement Field Sheets***

# TRAFFIC SOUND LEVEL DATA FOR VALIDATION OF NOISE MODEL

Date: 1/30/20

Wind: Steel / Sic 2  
7-8 mph / 7-8 mph

Project: Kissimmee Park Rd to US 192

Temperature: 59°F / 68°F

Humidity: 79% / 68%

Location #1: 28.2459984, -81.3282379

repetition # and start time	roadway direction	cars	medium trucks	heavy trucks	speed	sound level
9:45	SB	153	10	35	70	76.5
	NB	185	5	27	70	

4 Buses

9:55	SB	169	14	27	70	76.8
	NB	180	4	13	70	

3 Buses

10:07	SB	160	14	24	70	76.7
	NB	156	4	20	70	

4 Buses  
1 Bus

Location #2: 28.2330567, -81.3236908

11:07	SB	202	7	31	70	76.3
	NB	165	13	36	70	

5 Buses

11:19	SB	251	9	27	70	75.4
	NB	168	14	28	70	

2 Buses  
1 Bus

11:30	SB	241	5	22	70	76.4
	NB	163	12	30	70	

1 Bus

## ***APPENDIX C***

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### ***PREDICTED NOISE LEVELS***

Appendix B

Predicted Noise Levels

Noise Sensitive Area	Aerial Sheet Number	Receptor ID	Activity Category	Property Type	Number of Residents Represented	Predicted Noise Level			Difference between Build and Existing dB(A)	Substantial Noise Increase?	NAC Approached or Exceeded?
						Existing 2018 Condition dB(A)	2045 No Build Condition dB(A)	2045 Build Condition dB(A)			
Neptune Middle School	9 & 10	RW2	C	School - Exterior	0	70.1	70.8	76.5	6.4	NO	YES
Residences along Patricia St., Ames Haven Rd. and Villas of Emerald Lake Condo Association	10	RW3	B	Residential	1	65.8	66.6	73.9	8.1	NO	YES
	10	RW4	B	Residential	1	64.4	65.1	72.4	8.0	NO	YES
	10	RW5	B	Residential	1	61.7	62.3	68.9	7.2	NO	YES
	10	RW6	B	Residential	1	61.5	62.1	68.8	7.3	NO	YES
	10	RW7	B	Residential	1	62.6	63.2	70.2	7.6	NO	YES
	10	RW8	B	Residential	1	62.4	63.0	70.4	8.0	NO	YES
	10	RW9	B	Residential	1	62.4	62.9	70.8	8.4	NO	YES
	10	RW10	B	Residential	1	63.0	63.5	69.9	6.9	NO	YES
	10	RW11	B	Residential	1	61.7	62.2	67.3	5.6	NO	YES
	10	RW12	B	Residential	1	62.9	63.5	68.9	6.0	NO	YES
	10	RW13	B	Residential	1	59.5	60.0	66.1	6.6	NO	YES
	10	RW14	B	Residential	1	60.0	60.6	65.5	5.5	NO	NO
	10	RW15	B	Residential	1	61.5	62.1	66.9	5.4	NO	YES
	10	RW16	B	Residential	1	62.4	62.9	67.3	4.9	NO	YES
	10	RW17	B	Residential	1	59.2	59.8	64.2	5.0	NO	NO
	10	RW18	B	Residential	1	63.0	63.5	67.5	4.5	NO	YES
	10	RW19	B	Residential	1	61.0	61.6	65.1	4.1	NO	NO
	10 & 11	RW20	B	Residential	1	58.6	59.1	63.3	4.7	NO	NO
	10 & 11	RW21	B	Residential	1	63.7	64.2	67.6	3.9	NO	YES
	10 & 11	RW22	B	Residential	1	63.9	64.4	67.9	4.0	NO	YES
	10 & 11	RW23	B	Residential	1	64.6	65.2	68.4	3.8	NO	YES
	10 & 11	RW24	B	Residential	1	64.8	65.3	68.5	3.7	NO	YES
	10 & 11	RW25	B	Residential	1	64.8	65.3	68.3	3.5	NO	YES
	10 & 11	RW26	B	Residential	1	64.5	64.9	67.9	3.4	NO	YES
	10 & 11	RW27	B	Residential	1	64.0	64.5	67.3	3.3	NO	YES
Villas of Emerald Lake Condo Association	10 & 11	RW28	C	Community Basketball Court	0	63.9	64.3	66.9	3.0	NO	YES
Residences along Patricia St., Ames Haven Rd. and Villas of Emerald Lake Condo Association	10 & 11	RW29B	B	Residential	1	64.1	64.5	67.9	3.8	NO	YES
	10 & 11	RW29A	B	Residential	1	60.6	61.1	63.9	3.3	NO	NO
	10 & 11	RW31B	B	Residential	1	63.3	63.8	67.4	4.1	NO	YES

Noise Sensitive Area	Aerial Sheet Number	Receptor ID	Activity Category	Property Type	Number of Residents Represented	Predicted Noise Level			Difference between Build and Existing dB(A)	Substantial Noise Increase?	NAC Approached or Exceeded?
						Existing 2018 Condition dB(A)	2045 No Build Condition dB(A)	2045 Build Condition dB(A)			
	10 & 11	RW31A	B	Residential	1	60.0	60.5	63.2	3.2	NO	NO
	10 & 11	RW33B	B	Residential	1	63.0	63.4	67.0	4.0	NO	YES
	10 & 11	RW33A	B	Residential	1	59.7	60.2	62.8	3.1	NO	NO
	11	RW35	B	Residential	1	62.6	62.9	65.1	2.5	NO	NO
	11	RW36	B	Residential	1	61.8	62.2	64.4	2.6	NO	NO
	11	RW37	B	Residential	1	61.6	62.0	64.7	3.1	NO	NO
Residences on old Canoe Creek Rd and Settlers Ct.	1	RE55	B	Residential	1	58.3	59.2	59.9	1.6	NO	NO
	1	RE56	B	Residential	1	58.9	60.0	61.0	2.1	NO	NO
	1 & 2	RE57	B	Residential	1	60.1	61.7	62.9	2.8	NO	NO
	2	RE58	B	Residential	1	60.5	61.7	63.0	2.5	NO	NO
	2	RE59	B	Residential	1	61.4	62.0	63.3	1.9	NO	NO
	2	RE60	B	Residential	1	61.7	63.5	65.1	3.4	NO	NO
Origin Hospitality/Assisted Living Facility	2	RE61	C	Medical Facility	0	62.1	63.6	65.8	3.7	NO	NO
Residences on old Canoe Creek Rd and Settlers Ct.	2	RE62	B	Residential	1	65.4	67.4	70.1	4.7	NO	YES
	2	RE63	B	Residential	1	66.0	67.9	70.7	4.7	NO	YES
	2	RE64	B	Residential	1	70.6	72.7	75.0	4.4	NO	YES
	2	RE65	B	Residential	1	66.0	65.3	67.0	1.0	NO	YES
	2 & 3	RE66	B	Residential	1	66.6	68.6	72.0	5.4	NO	YES
	2	RE67	B	Residential	3	66.5	65.9	67.5	1.0	NO	YES
	2 & 3	RE68	B	Residential	1	66.6	68.5	71.9	5.3	NO	YES
	2 & 3	RE69	B	Residential	3	66.4	65.8	67.3	0.9	NO	YES
	2 & 3	RE70	B	Residential	1	65.6	67.5	71.0	5.4	NO	YES
	2 & 3	RE71	B	Residential	3	66.0	65.3	66.7	0.7	NO	YES
	2 & 3	RE72	B	Residential	1	65.6	67.5	71.0	5.4	NO	YES
	3	RE73	B	Residential	1	65.5	67.3	70.6	5.1	NO	YES
	3	RE74	B	Residential	3	66.2	65.4	66.4	0.2	NO	YES
	3	RE75	B	Residential	1	67.3	69.2	72.5	5.2	NO	YES
	3	RE76	B	Residential	3	67.6	66.7	67.7	0.1	NO	YES
	3	RE77	B	Residential	1	66.6	68.5	71.8	5.2	NO	YES
	3	RE78	B	Residential	1	67.8	69.8	72.5	4.7	NO	YES
	3	RE79	B	Residential	3	67.0	66.2	67.5	0.5	NO	YES
	3	RE80	B	Residential	1	67.6	69.5	72.4	4.8	NO	YES
	3	RE81	B	Residential	3	67.6	66.7	67.8	0.2	NO	YES
	3	RE82	B	Residential	1	68.8	70.8	73.6	4.8	NO	YES

Noise Sensitive Area	Aerial Sheet Number	Receptor ID	Activity Category	Property Type	Number of Residents Represented	Predicted Noise Level			Difference between Build and Existing dB(A)	Substantial Noise Increase?	NAC Approached or Exceeded?
						Existing 2018 Condition dB(A)	2045 No Build Condition dB(A)	2045 Build Condition dB(A)			
	3	RE83	B	Residential	1	68.9	70.9	73.5	4.6	NO	YES
	3	RE84	B	Residential	3	67.2	66.3	67.6	0.4	NO	YES
Journey Bible Fellowship Church	3	RE85	C	Place of Worship - Basketball Court	0	68.7	70.6	73.5	4.8	NO	YES
Residences on old Canoe Creek Rd and Settlers Ct.	3	RE86	B	Residential	3	68.5	67.5	69.1	0.6	NO	YES
	3	RE87	B	Residential	1	66.8	68.6	71.6	4.8	NO	YES
	3	RE88	B	Residential	1	69.1	68.1	69.7	0.6	NO	YES
	3 & 4	RE89	B	Residential	1	67.0	68.8	71.8	4.8	NO	YES
	3 & 4	RE90	B	Residential	1	67.6	69.5	72.3	4.7	NO	YES
	3 & 4	RE91	B	Residential	1	67.5	69.5	71.3	3.8	NO	YES
Teka Village	4	RE92	B	Residential	2	73.4	75.5	74.8	1.4	NO	YES
	4	RE93	B	Residential	2	73.0	74.9	74.4	1.4	NO	YES
	4	RE94	B	Residential	2	74.9	76.9	76.1	1.2	NO	YES
	4	RE95	B	Residential	2	74.4	76.4	75.8	1.4	NO	YES
	4	RE96	B	Residential	2	63.8	65.5	65.4	1.6	NO	NO
	4	RE97	B	Residential	2	73.9	75.9	75.6	1.7	NO	YES
	4	RE98	B	Residential	2	73.7	75.7	75.8	2.1	NO	YES
	4	RE99	B	Residential	2	62.8	64.4	64.1	1.3	NO	NO
Teka Village Shuffleboard Court	4	RE100	C	Recreational (Shuffleboard)	0	58.2	59.7	60.1	1.9	NO	NO
Teka Village	4	RE101	B	Residential	2	72.8	74.7	75.2	2.4	NO	YES
	4	RE102	B	Residential	2	62.6	64.0	63.9	1.3	NO	NO
	4 & 5	RE103	B	Residential	2	73.2	75.0	75.5	2.3	NO	YES
	4 & 5	RE104	B	Residential	2	62.5	63.9	64.0	1.5	NO	NO
	4 & 5	RE105	B	Residential	2	73.7	75.4	75.8	2.1	NO	YES
	4 & 5	RE106	B	Residential	2	63.0	64.3	64.9	1.9	NO	NO
	4 & 5	RE107	B	Residential	2	73.2	74.9	75.2	2.0	NO	YES
	4 & 5	RE108	B	Residential	1	57.7	58.9	59.0	1.3	NO	NO
	4 & 5	RE109	B	Residential	1	60.4	61.7	61.6	1.2	NO	NO
	4 & 5	RE110	B	Residential	1	62.6	63.9	64.6	2.0	NO	NO
	4 & 5	RE111	B	Residential	1	60.7	61.9	62.8	2.1	NO	NO
	4 & 5	RE112	B	Residential	2	73.4	75.1	75.4	2.0	NO	YES
	4 & 5	RE113	B	Residential	1	58.0	59.2	59.6	1.6	NO	NO
	4 & 5	RE114	B	Residential	1	59.8	61.0	61.1	1.3	NO	NO
	4 & 5	RE115	B	Residential	1	61.9	63.1	63.4	1.5	NO	NO



Noise Sensitive Area	Aerial Sheet Number	Receptor ID	Activity Category	Property Type	Number of Residents Represented	Predicted Noise Level			Difference between Build and Existing dB(A)	Substantial Noise Increase?	NAC Approached or Exceeded?
						Existing 2018 Condition dB(A)	2045 No Build Condition dB(A)	2045 Build Condition dB(A)			
	4 & 5	RE116	B	Residential	1	73.0	74.5	75.4	2.4	NO	YES
	4 & 5	RE117	B	Residential	2	72.3	73.7	74.8	2.5	NO	YES
	4 & 5	RE118	B	Residential	1	58.4	59.6	60.3	1.9	NO	NO
	4 & 5	RE119	B	Residential	1	61.8	62.9	63.3	1.5	NO	NO
	4 & 5	RE120	B	Residential	1	59.7	60.9	61.3	1.6	NO	NO
	4 & 5	RE121	B	Residential	2	71.9	73.0	74.6	2.7	NO	YES
	4 & 5	RE122	B	Residential	2	61.1	62.0	62.6	1.5	NO	NO
	4 & 5	RE123	B	Residential	1	57.4	58.4	59.2	1.8	NO	NO
	5	RE124	B	Residential	2	71.8	72.5	74.0	2.2	NO	YES
	5	RE125	B	Residential	2	61.2	62.0	62.4	1.2	NO	NO
	5	RE126	B	Residential	1	57.1	58.1	59.1	2.0	NO	NO
	5	RE127	B	Residential	1	57.1	57.9	59.0	1.9	NO	NO
	5	RE128	B	Residential	2	72.2	72.7	72.7	0.5	NO	YES
	5	RE129	B	Residential	2	61.7	62.4	62.6	0.9	NO	NO
	5	RE130	B	Residential	1	56.7	57.6	58.9	2.2	NO	NO
	5	RE131	B	Residential	2	72.5	72.9	69.8	-2.7	NO	YES
	5	RE132	B	Residential	1	56.4	57.3	58.7	2.3	NO	NO
	5	RE133	B	Residential	2	61.8	62.4	61.6	-0.2	NO	NO
	5	RE134	B	Residential	1	56.2	57.0	58.6	2.4	NO	NO
	5	RE135	B	Residential	2	72.2	72.6	67.2	-5.0	NO	YES
	5	RE136	B	Residential	1	55.9	56.7	58.6	2.7	NO	NO
	5	RE137	B	Residential	2	61.8	62.3	61.5	-0.3	NO	NO
	5	RE138	B	Residential	2	55.7	56.4	58.5	2.8	NO	NO
	5	RE139	B	Residential	2	72.1	72.5	66.0	-6.1	NO	YES
	5	RE140	B	Residential	1	56.4	57.0	58.4	2.0	NO	NO
	5	RE141	B	Residential	1	56.9	57.5	58.3	1.4	NO	NO
	5	RE142	B	Residential	1	56.0	56.8	58.5	2.5	NO	NO
	5	RE143	B	Residential	1	61.4	61.9	60.8	-0.6	NO	NO
	5	RE144	B	Residential	2	72.4	72.7	65.0	-7.4	NO	NO
	5	RE145	B	Residential	1	56.1	56.8	58.4	2.3	NO	NO
	5	RE146	B	Residential	1	57.5	58.0	58.5	1.0	NO	NO
	5	RE147	B	Residential	1	59.1	59.6	59.3	0.2	NO	NO
	5	RE148	B	Residential	1	61.4	61.9	60.5	-0.9	NO	NO
	5	RE149	B	Residential	1	56.7	57.3	58.4	1.7	NO	NO



Noise Sensitive Area	Aerial Sheet Number	Receptor ID	Activity Category	Property Type	Number of Residents Represented	Predicted Noise Level			Difference between Build and Existing dB(A)	Substantial Noise Increase?	NAC Approached or Exceeded?
						Existing 2018 Condition dB(A)	2045 No Build Condition dB(A)	2045 Build Condition dB(A)			
Teka Village (continued)	5	RE150	B	Residential	1	55.9	56.5	58.1	2.2	NO	NO
	5	RE151	B	Residential	1	56.4	57.1	58.6	2.2	NO	NO
	5	RE152	B	Residential	1	61.5	61.9	60.3	-1.2	NO	NO
	5	RE153	B	Residential	1	55.8	56.4	58.6	2.8	NO	NO
	5	RE154	B	Residential	1	72.7	73.0	64.1	-8.6	NO	NO
	5	RE155	B	Residential	1	55.7	56.3	59.1	3.4	NO	NO
	5	RE156	B	Residential	1	55.8	56.3	58.6	2.8	NO	NO
	5	RE157	B	Residential	1	62.7	63.1	60.3	-2.4	NO	NO
	5	RE158	B	Residential	1	56.9	57.5	59.0	2.1	NO	NO
	5	RE159	B	Residential	1	71.4	71.7	62.9	-8.5	NO	NO
	5	RE160	B	Residential	1	66.2	66.6	61.3	-4.9	NO	NO
	5	RE237	B	Residential	1	55.5	56.3	58.3	2.8	NO	NO
	5	RE238	B	Residential	1	55.2	56.1	58.5	3.3	NO	NO
	5	RE239	B	Residential	1	55.3	56.2	58.8	3.5	NO	NO
	5	RE240	B	Residential	1	55.4	56.2	59.4	4.0	NO	NO
	5	RE241	B	Residential	1	55.5	56.3	60.1	4.6	NO	NO
	5	RE242	B	Residential	1	55.5	56.2	61.2	5.7	NO	NO
	5	RE243	B	Residential	1	55.6	56.3	62.4	6.8	NO	NO
	5	RE244	B	Residential	1	56.1	56.7	64.3	8.2	NO	NO
	5	RE245	B	Residential	1	56.7	57.3	62.8	6.1	NO	NO
	5	RE246	B	Residential	1	57.6	58.1	61.5	3.9	NO	NO
	5	RE247	B	Residential	1	58.2	58.6	60.8	2.6	NO	NO
	5	RE248	B	Residential	1	55.8	56.5	59.2	3.4	NO	NO
	5	RE249	B	Residential	1	56.1	56.7	60.0	3.9	NO	NO
	5	RE250	B	Residential	1	56.4	57.0	59.6	3.2	NO	NO
Residences on Betsy Ross Ln. and Kettle Creek Dr.	6	RE161	B	Residential	15	70.3	70.6	73.9	3.6	NO	YES
	6	RE162B	B	Residential	2	67.1	67.4	70.3	3.2	NO	YES
	6	RE162A	B	Residential	4	62.6	62.9	67.0	4.4	NO	YES
	6	RE164B	B	Residential	2	64.4	64.7	67.6	3.2	NO	YES
	6	RE164A	B	Residential	4	60.5	60.8	63.4	2.9	NO	NO
	6	RE166B	B	Residential	2	60.5	60.8	63.8	3.3	NO	NO
	6	RE166A	B	Residential	4	57.2	57.6	60.9	3.7	NO	NO
	6	RE168	B	Residential	9	70.4	70.7	75.6	5.2	NO	YES
	6	RE169B	B	Residential	1	59.2	59.5	62.9	3.7	NO	NO

Noise Sensitive Area	Aerial Sheet Number	Receptor ID	Activity Category	Property Type	Number of Residents Represented	Predicted Noise Level			Difference between Build and Existing dB(A)	Substantial Noise Increase?	NAC Approached or Exceeded?
						Existing 2018 Condition dB(A)	2045 No Build Condition dB(A)	2045 Build Condition dB(A)			
	6	RE169A	B	Residential	2	56.4	56.7	60.2	3.8	NO	NO
	6	RE171	B	Residential	3	69.8	70.1	75.3	5.5	NO	YES
	6	RE172B	B	Residential	1	58.8	59.2	62.8	4.0	NO	NO
	6	RE172A	B	Residential	2	56.3	56.7	60.4	4.1	NO	NO
	6	RE174	B	Residential	3	69.6	69.9	74.9	5.3	NO	YES
	6	RE175B	B	Residential	1	58.9	59.2	62.8	3.9	NO	NO
	6	RE175A	B	Residential	2	56.4	56.8	60.7	4.3	NO	NO
	6	RE177	B	Residential	3	68.7	69.0	74.3	5.6	NO	YES
	6	RE178B	B	Residential	1	60.0	60.3	64.0	4.0	NO	NO
	6	RE178A	B	Residential	2	57.2	57.5	61.7	4.5	NO	NO
	6	RE180	B	Residential	6	70.1	70.4	75.4	5.3	NO	YES
	6	RE181B	B	Residential	1	60.6	60.9	65.0	4.4	NO	NO
	6	RE181A	B	Residential	2	57.9	58.2	62.8	4.9	NO	NO
	6	RE183B	B	Residential	1	61.0	61.3	65.5	4.5	NO	NO
	6	RE183A	B	Residential	2	58.3	58.6	63.5	5.2	NO	NO
	6	RE185	B	Residential	6	70.0	70.3	75.5	5.5	NO	YES
	6	RE186B	B	Residential	1	61.1	61.4	65.7	4.6	NO	NO
	6	RE186A	B	Residential	2	58.4	58.7	63.8	5.4	NO	NO
	6	RE188B	B	Residential	1	61.2	61.5	66.0	4.8	NO	YES
	6 & 7	RE188A	B	Residential	2	58.5	58.9	64.0	5.5	NO	NO
	6 & 7	RE190A	B	Residential	6	70.2	70.5	75.2	5.0	NO	YES
	6 & 7	RE190B	B	Residential	1	61.7	62.0	66.4	4.7	NO	YES
	6 & 7	RE192B	B	Residential	1	62.4	62.8	66.8	4.4	NO	YES
	6 & 7	RE192A	B	Residential	2	59.3	59.6	64.6	5.3	NO	NO
	6 & 7	RE194B	B	Residential	1	62.0	62.4	66.2	4.2	NO	YES
	6 & 7	RE194A	B	Residential	2	58.9	59.3	63.6	4.7	NO	NO
	6 & 7	RE196B	B	Residential	1	64.9	65.2	69.3	4.4	NO	YES
	6 & 7	RE196A	B	Residential	2	62.0	62.3	67.1	5.1	NO	YES
Anthem Park	6 & 7	RE198	C	Volleyball Court	0	62.9	63.2	68.1	5.2	NO	YES
	6 & 7	RE199	C	Tennis court	0	61.3	61.6	66.5	5.2	NO	YES
Residences on Betsy Ross Ln. and Kettle Creek Dr.	7	RE200	B	Residential	1	60.3	60.6	65.8	5.5	NO	NO
	7	RE201	B	Residential	1	58.6	58.9	63.9	5.3	NO	NO
	7	RE202	B	Residential	1	62.1	62.4	67.7	5.6	NO	YES
	7	RE203	B	Residential	1	64.0	64.3	69.4	5.4	NO	YES

Noise Sensitive Area	Aerial Sheet Number	Receptor ID	Activity Category	Property Type	Number of Residents Represented	Predicted Noise Level			Difference between Build and Existing dB(A)	Substantial Noise Increase?	NAC Approached or Exceeded?
						Existing 2018 Condition dB(A)	2045 No Build Condition dB(A)	2045 Build Condition dB(A)			
	7	RE204	B	Residential	2	64.1	64.4	69.5	5.4	NO	YES
	7	RE205	B	Residential	1	56.3	56.6	61.2	4.9	NO	NO
	7	RE206	B	Residential	2	56.4	56.7	61.2	4.8	NO	NO
	7	RE207	B	Residential	2	64.0	64.3	69.5	5.5	NO	YES
	7	RE208	B	Residential	2	55.3	55.6	60.0	4.7	NO	NO
	7	RE209	B	Residential	2	64.0	64.3	69.4	5.4	NO	YES
	7	RE210	B	Residential	2	55.9	56.3	60.5	4.6	NO	NO
	7	RE211	B	Residential	2	63.7	64.0	69.2	5.5	NO	YES
	7	RE212	B	Residential	1	58.9	59.2	63.2	4.3	NO	NO
Sunset Park	7	RE213	C	Park	0	66.4	66.7	72.2	5.8	NO	YES
	7	RE214	C	Park (Dog Park)	0	63.8	64.0	68.9	5.1	NO	YES
Residences on Betsy Ross Ln. and Kettle Creek Dr.	7	RE215	B	Residential	2	63.7	64.0	68.5	4.8	NO	YES
	7	RE216	B	Residential	2	63.6	63.9	68.2	4.6	NO	YES
	7	RE217	B	Residential	2	63.4	63.7	67.7	4.3	NO	YES
	7	RE218	B	Residential	2	63.2	63.5	67.3	4.1	NO	YES
	7	RE219	B	Residential	2	62.8	63.1	66.7	3.9	NO	YES
	7	RE220	B	Residential	2	62.3	62.6	66.0	3.7	NO	YES
Neptune Elementary School	7 & 8	RE221	C	School - Playground	0	70.9	71.2	74.9	4.0	NO	YES
Partin Triangle Park	9	RE223	C	Park - Boat rentals	0	66.8	67.2	71.4	4.6	NO	YES
	9	RE225	C	Park - Dog Park	0	71.8	72.2	75.9	4.1	NO	YES
	9	RE226	C	Park - Tennis Courts	0	63.7	64.2	68.4	4.7	NO	YES
	9	RE227	C	Park - Playground	0	62.5	62.9	67.0	4.5	NO	YES
	9	RE228	C	Park - Raquetball Court	0	65.9	66.3	70.8	4.9	NO	YES
City of Life Christian School	9 & 10	RE229	C	School - Baseball field	0	63.1	64.1	66.6	3.5	NO	YES
	10	RE230	C	School - Basketball Courts	0	63.5	64.6	66.6	3.1	NO	YES
	10	RE231	C	School - Playground	0	60.8	61.6	64.1	3.3	NO	NO
Residences along City of Life Way	10	RE232	B	Residential	1	65.6	67.0	68.1	2.5	NO	YES
	10	RE233	B	Residential	1	69.6	71.1	72.0	2.4	NO	YES
	10	RE234	B	Residential	1	60.8	62.0	65.0	4.2	NO	NO
Isolated residence on Simmons Rd.	11	RE235	B	Residential	1	60.1	60.8	65.8	5.7	NO	NO

## ***APPENDIX D***

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### ***AERIALS***









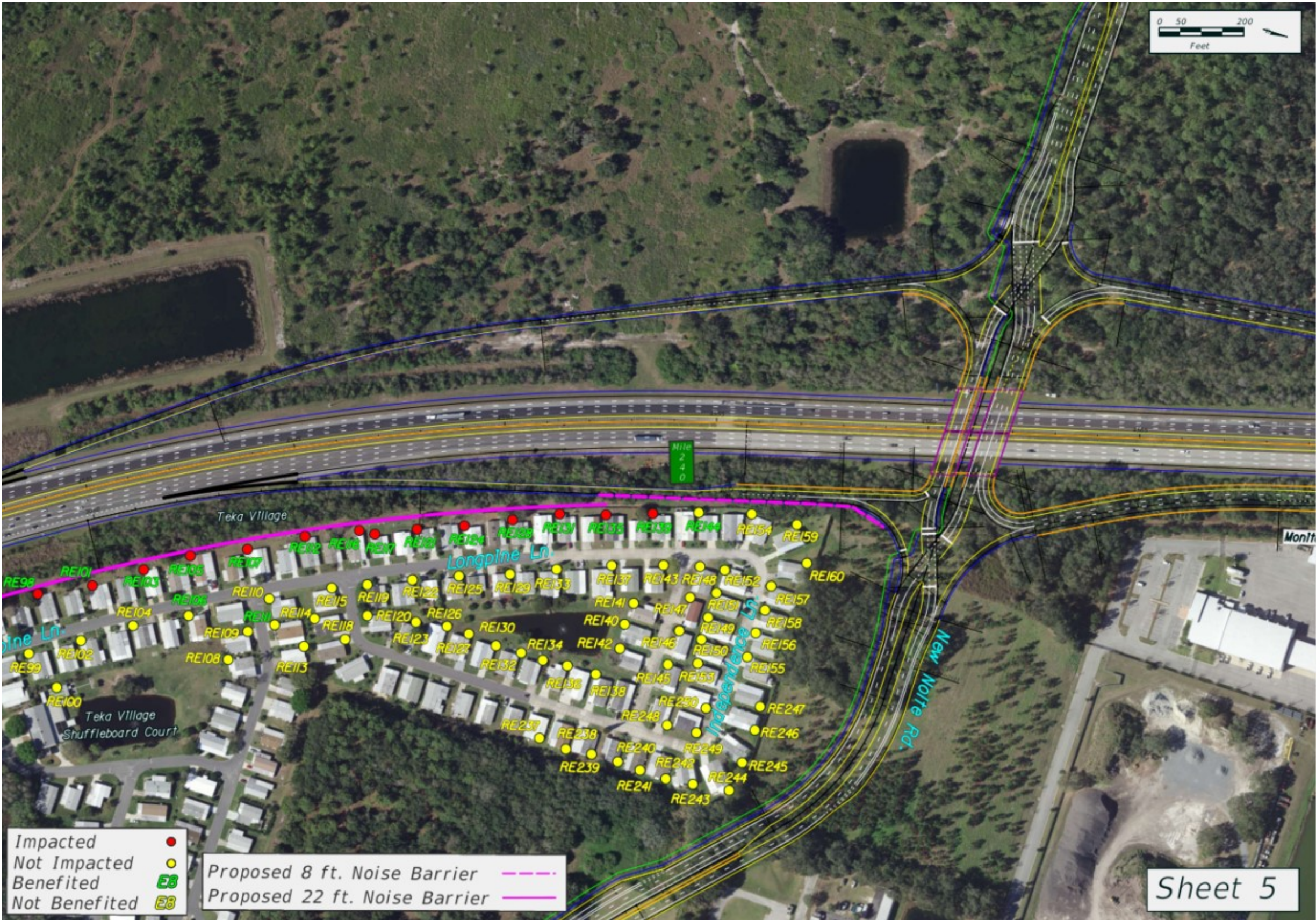








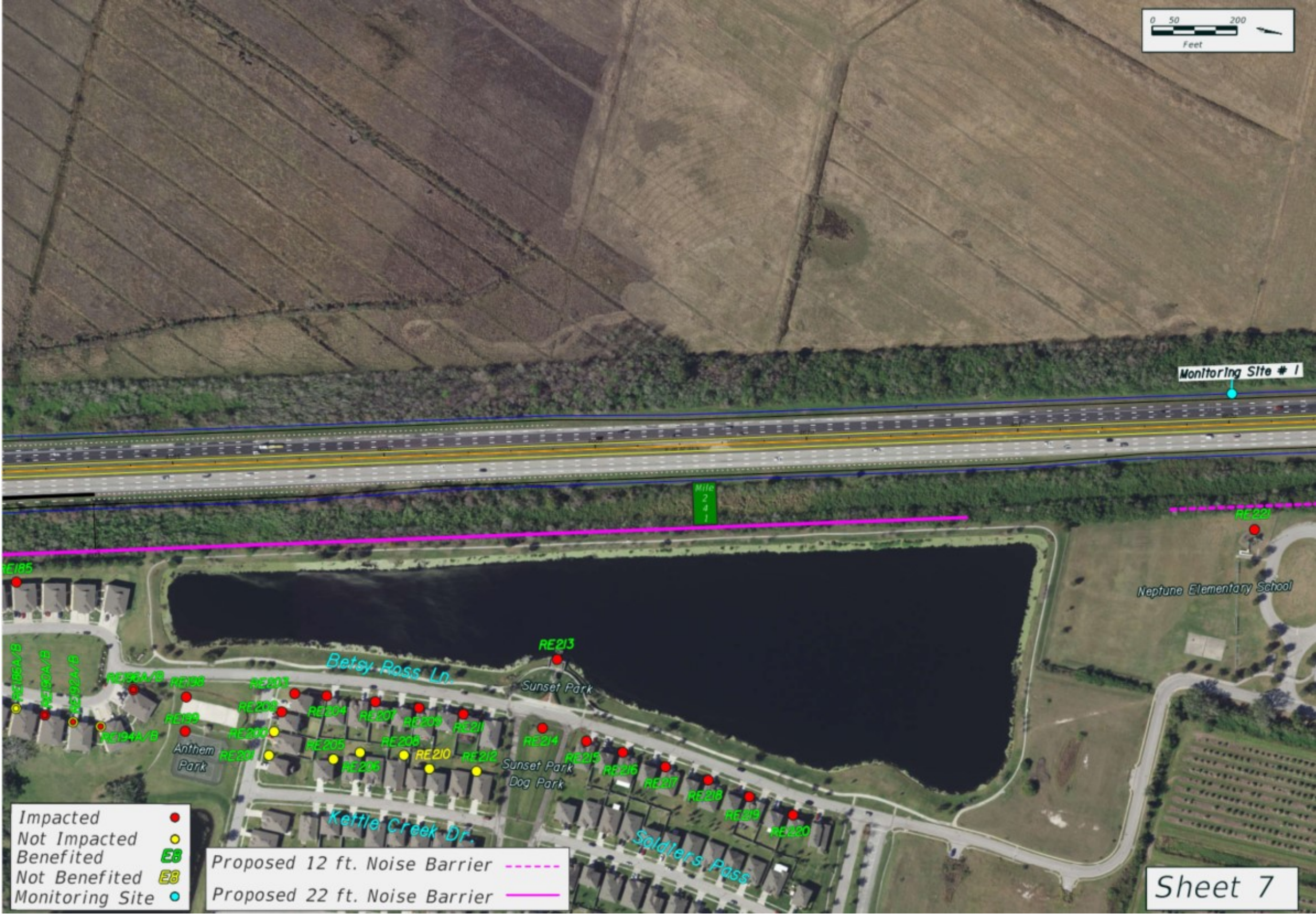






























## ***APPENDIX E***

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### ***TNM Files***



TNM Files provided in Project Files.