NOISE STUDY REPORT

Florida Department of Transportation

District Five

SR 524 PD&E Study

Friday Road to Industry Road

Brevard County, Florida

Financial Management Number: 437983-1

ETDM Number: 14321

September 2024

The environmental review, consultation, and other actions required by applicable federal environmental laws for this project are being, or have been, carried out by the Florida Department of Transportation (FDOT) pursuant to 23 USC § 327 and a Memorandum of Understanding dated May 26, 2022, and executed by the Federal Highway Administration and FDOT.

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FDOT Office
District Five

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EXECUTIVE SUMMARY

The Florida Department of Transportation (FDOT), District Five, is conducting a Project Development and Environment (PD&E) Study to evaluate the existing deficiencies of the State Road (SR) 524 corridor in Brevard County, Florida. The PD&E study documents the potential impacts associated with the improvements along SR 524, including impacts related to traffic noise. **Figure 1** illustrates the project's location. **Appendix D** illustrates the full project layout.

Noise levels for this project were predicted using the Federal Highway Administration (FHWA) Traffic Noise Model (TNM), version 2.5. A total of 149 receptor locations representing 246 residential and seven nonresidential "special land use (SLU)" noise sensitive sites were included in the TNM. Noise levels at 63 residences are predicted to approach or exceed the Noise Abatement Criteria (NAC) for the year 2045 Build Alternative and are therefore considered "impacted."

Analyses of the impacted locations were performed to determine if noise abatement was feasible and reasonable under FDOT policy. The PD&E study phase analysis indicates that noise barriers are potentially feasible and reasonable at three locations within the project corridor. These three noise barrier systems, EB1, WB1, and WB2, could potentially provide reasonable and feasible noise abatement for 51 of the 63 impacted residences and 34 non-impacted residences.

The potentially feasible and reasonable noise barriers meet the FDOT's cost-per-benefit criteria with a preliminary cost of under the $64,000 per benefited receptor criterion. Noise barriers at these three locations will be carried forward for further consideration in this project's design phase; note that the dimensions of the noise walls are subject to change during design. The results of the noise barrier evaluations where noise abatement was determined to be feasible and reasonable are summarized in **Table 7** and illustrated in **Appendix E**.

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1.0 INTRODUCTION

1.1 PROJECT DESCRIPTION

The Florida Department of Transportation (FDOT) is conducting a Project Development and Environment (PD&E) Study for an approximately 3.15-mile portion of SR 524 between Friday Road (South) and Industry Road in Brevard County. Within the project limits, SR 524 exists as a two-lane urban minor arterial comprised of one 12-foot lane in each direction with 10-foot shoulders (4-foot paved). Intermittent sidewalks are located along the north side of SR 524 between Cox Road and Industry Road and along the south side from the CVS signalized intersection to Industry Road, while the existing paved shoulders serve as undesignated bike lanes. Stormwater flows off the roadway into roadside ditches.

The existing roadway corridor is offset from the center of a typical 200-foot right-of-way (ROW). The ROW varies through the horizontal curve located near the London Boulevard intersection and widens to 230 feet to the intersection at Industry Road.

The SR 524 corridor contains an interchange with I-95 between Friday Road (South) and Friday Road (North) and eight signalized intersections. Improvements to the existing I-95 diamond interchange and the signalized intersections are included in this PD&E Study.

The PD&E study documents the potential impacts associated with the improvements along SR 524, including impacts related to traffic noise summarized in this Noise Study Report (NSR). **Figure 1** illustrates the project's location. **Appendix D** illustrates the full project layout.

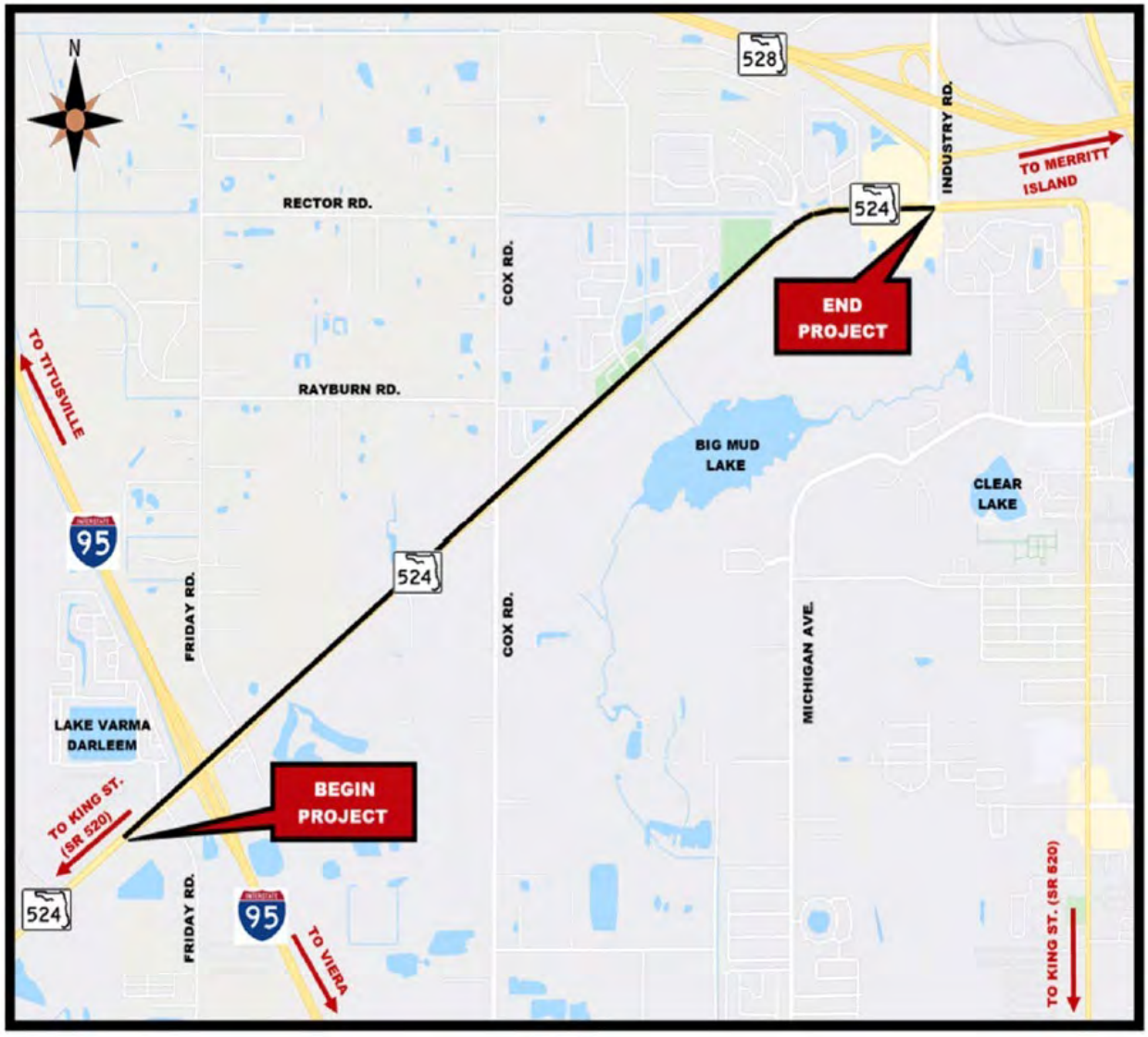
Purpose and Need

This project aims to increase capacity by widening SR 524 between Friday Road (South) and Industry Road while improving safety along the corridor for all users. This project is part of an effort to improve the current conditions, so they are projected to meet future standards of Level of Service (LOS), safety, traffic flow, and improve accessibility to large trucks and pedestrians and cyclists alike.

The PD&E study's objective is to evaluate roadway, intersection, and interchange alternatives associated with the widening of SR 524. In addition, the study will analyze and assess proposed impacts on the social, economic, cultural, natural, and physical environment to develop the location and design concept of the project in accordance with FDOT policy, procedures, and requirements.

The project need was initially identified in the previously approved 2017 Corridor Planning Study. The project focuses on responding to increasing land development demands that place additional strain on the transportation network, improving safety for vehicles and pedestrians, improving traffic flow, and providing enhanced accommodations for pedestrians and bicyclists.

Figure 1: Project Location Map



1.2 PROPOSED IMPROVEMENTS

The preferred alternative for each corridor segment is identified below based on the engineering, environmental factors, and public and agency input.

Segment 1
Segment 1 will be a four-lane divided section that runs between Friday Road (South) and Friday Road (North) with a diverging diamond interchange (DDI) at I-95. The typical section outside the DDI has 12-foot travel lanes and a varied median width (48-foot south, 53-foot north). The travel lanes widen to 14 feet within the DDI limits and include an additional 14-foot left turn lane, and the I-95 overhead bridge will require replacement.

Segment 2
Segment 2 will be a four-lane divided section that runs from Friday Road (North) to Cox Road. This typical section will have 12-foot outside lanes, 11-foot inside lanes, and a 22-foot median (17.5-foot sodded).

Segment 3
Segment 3 will be a four-lane divided section that runs from Cox Road to London Boulevard. This typical section has 11-foot travel lanes and a 22-foot median (17.5-foot sodded).

Segment 4
Segment 4 will be a four-lane divided section that runs from London Boulevard to Industry Road. This section has 11-foot travel lanes and a 22-foot median (17.5-foot sodded). The existing ROW widens on the north side, but the horizontal alignment will be at the same offset from the centerline as in segments 2 and 3 (50 feet).

All segments will include:

- Type E inside curb and gutter
- Type F outside curb and gutter
- 14-foot-wide shared-use paths on each side of SR 524
- Drainage swales with 1:4 front and back slopes

Appendix A provides the project's typical sections, and the project aerials are in **Appendix D** of this NSR. The project's Preliminary Engineering Report (PER) provides additional engineering information.

1.3 NO-BUILD ALTERNATIVE

This analysis considers an alternative that assesses what would happen to the environment in the future if this proposed project was not built. This alternative, called the No-Build Alternative, consists of the existing roadways within the study area and includes the routine maintenance improvements to these facilities. While the No-Build Alternative does not meet project needs, it provides a baseline condition to compare and measure the proposed project's effects.

2.0 METHODOLOGY

The traffic noise impact analysis conducted for this project is consistent with Title 23, *Code of Federal Regulations* (C.F.R.), § 772, Part II, Chapter 18 of the FDOT *Project Development and Environment Manual*, and Chapter 335, Section 335.17, *Florida Statutes*. This assessment also adheres to current Federal Highway Administration (FHWA) traffic noise analysis guidelines contained in *FHWA-HEP-10-025*. The FHWA Traffic Noise Model (TNM) - version 2.5 was used to predict traffic noise levels for this project following guidelines set forth in the FDOT *Traffic Noise Modeling and Analysis Practitioners Handbook*. The analysis evaluated noise levels for the 2019 Existing Condition and the 2045 No-Build and Build Alternatives.

Noise receptor coordinates used in the TNM correlate to exterior areas where frequent human use may occur, usually at the edge of the residential structure closest to the project roadways, unless the analyst's professional judgment determines otherwise.

The project design files were used to determine the location of the Build Alternative for input into TNM. Vertical elevations (existing and proposed) for SR 524, cross/side streets, and analyzed receptors were derived from the United States Geological Survey digital elevation models.

2.1 NOISE METRICS

Sound levels for this analysis are expressed in decibels (dB) using an "A"-scale weighting expressed as dB(A). This scale most closely approximates the response characteristics of the human ear to typical traffic sound levels. All reported sound levels are hourly equivalent noise levels [L_{eq}]. The L_{eq} is defined as the equivalent steady-state sound level that, in a given hourly period, contains the same acoustic energy as the time-varying sound level for the same hourly period.

2.2 TRAFFIC DATA

Traffic noise is heavily dependent on traffic volume and speed, with the amount of noise generated by traffic increasing as the vehicle speed and number of vehicles increase. Characteristics contributing to the highest traffic noise levels were used to predict project noise

levels. Worst-case noise conditions occur with the maximum traffic traveling at the posted speed and represent a LOS C operating condition. However, if the traffic analysis indicates the roadway will operate below LOS C, the project's demand peak-hour directional traffic volumes are used per Chapter 18 of the FDOT PD&E Manual. Traffic volumes and speeds used in the analysis are included in **Appendix B**.

2.3 NOISE ABATEMENT CRITERIA

Land use plays an important role in traffic noise analyses. To determine which land uses are "noise sensitive," this noise impact analysis used the FHWA Noise Abatement Criteria (NAC) shown in **Table 1.** The FDOT has established noise levels for each land use activity category at which noise abatement must be considered. In Florida, noise levels that meet or exceed 66.0 dB(A) at Activity Category B and C land uses require noise abatement consideration. A 71.0 dB(A) noise level is required for an Activity Category E land use to be considered impacted by traffic noise. Another criterion for determining when project impacts warrant abatement consideration occurs when project noise levels are below the NAC but show a substantial increase (15.0 dB(A) or more) over existing levels. 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., a new alignment project).

For comparison purposes, typical noise levels for common indoor and outdoor activities are provided in **Table 2**.

Table 1: Noise Abatement Criteria

Hourly A-Weighted Sound Level-decibels (dB(A))				Description of Activity Category
Activity Category	Activity Leq(h) [1]		Evaluation Location	
	FHWA	FDOT		
A	57.0	56.0	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[2]	67.0	66.0	Exterior	Residential.
C[2]	67.0	66.0	Exterior	Active sports areas, amphitheaters, auditoriums, campgrounds, cemeteries, daycare centers, hospitals, libraries, medical facilities, parks, picnic areas, golf courses, places of worship, playgrounds, public meeting rooms, public/nonprofit institutional structures, radio studios, recording studios, recreational areas, Section 4(f) sites, schools, television studios, trails, and trail crossings.
D	52.0	51.0	Interior	Auditoriums, daycare centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public/nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E[2]	72.0	71.0	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.

(Based on Table 1 of 23 CFR Part 772)

[1] The Leq(h) Activity Criteria values are for impact determination only and are not design standards for noise abatement measures.

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

Table 2: Comparative Sound Levels

Common Outdoor Activities	dB(A)	Common Inside Activities
Jet Flyover at 1,000 ft.	-110-	Rock Band
Gas Lawn Mower at 3 ft.	-100-	
Diesel Truck at 50 ft. (at 50 mph)	-90-	
Busy Urban Area Daytime	-80-	Food Blender at 3 ft. Garbage Disposal at 3 ft.
Gas Mower at 100 ft. Commercial Area Heavy Traffic at 300 ft.	-70- -60-	Vacuum Cleaner at 10 ft. Normal Speech at 3 ft. Large Business Office
Quiet Urban Daytime	-50-	Dishwasher Next Room
Quiet Urban Nighttime Quiet Suburban Nighttime	-40-	Theater, Large Conference Room (Background)
Quiet Rural Nighttime	-30-	Library
	-20-	
	-10-	
Lowest Threshold of Human Hearing	-0-	Lowest Threshold of Human Hearing
Source: California Dept. of Transportation Technical Noise Supplement, Oct. 1998, Page 18.		

2.4 NOISE ABATEMENT MEASURES

When traffic noise impacts are identified as part of the traffic noise analysis, noise abatement must be considered. The potential abatement alternatives considered during the PD&E included traffic management, alternative roadway alignments, buffer zones, and noise barriers.

2.4.1 Traffic Management

Traffic management measures that limit motor vehicle speeds and reduce volumes can be effective as a noise mitigation option; however, these measures may also negate a project's ability to meet the facility's needs. For example, if the posted speed on SR 524 were reduced, the capacity of the roadway to handle the forecasted motor vehicle demand would also be reduced. Therefore, reducing traffic speeds or volumes is inconsistent with improving the roadway's ability to handle the forecasted volumes.

2.4.2 Alignment Modifications

Alignment modification involves orienting or siting the roadway at sufficient distances from noise sensitive sites to minimize traffic noise. Based on the noise contours developed for this project and shown in **Section 6** of this NSR**,** any alignment shift that would avoid traffic-related noise impacts of the proposed project would introduce noise impacts to other noise sensitive sites, and no net benefit would result. Therefore, alignment modifications are not considered a reasonable noise mitigation measure.

2.4.3 Buffer Zones & Land Use Controls

Noise buffer zones that separate the roadway and noise sensitive land uses can minimize or eliminate noise impacts to areas of future development. This measure requires local land use planning not currently in place within the project corridor. Because the noise impact analysis applies to existing land uses, buffer zones are not an applicable abatement measure. However, for any new development or redevelopment occurring in the future, local officials can use the noise contour information provided in **Section 6** of this NSR to establish buffer zones, thereby minimizing or avoiding noise impacts on future sensitive land uses.

2.4.4 Noise Barriers

The most common type of noise abatement measure is constructing a noise barrier. Due to the limited ROW and proposed typical sections, noise barriers are the only measure considered for this project. The following feasibility and reasonableness factors must be evaluated when considering noise barriers for abatement.

2.4.4.1 Feasibility Factors

The FDOT PD&E Manual stipulates that a noise barrier must meet acoustic and engineering criteria to be considered feasible, as summarized below.

- Acoustic feasibility: The barrier must provide a minimum of 5.0 dB(A) reduction in traffic noise for at least two impacted receptors. Consequently, noise barriers are not evaluated for isolated and single impacted receptors.
- Engineering feasibility: The engineering review identifies whether other factors must be evaluated for the barrier to be considered feasible.
- Safety: If a noise barrier and safety conflict exist, primary consideration must be given to safety. An example of such a conflict would be the loss of a safe sight distance (line of sight) at an intersection or driveway resulting from a noise barrier placement.

- Accessibility to adjacent properties: The noise barrier placement cannot block ingress and egress on non-limited access roadways. Other access issues to be considered include access to a local sidewalk or normal travel routes. Neither applies to noise barriers on limited-access roadways.
- Right-of-way needs: Does the noise barrier require additional land, access rights, or easements for construction and maintenance?
- Maintenance: Maintenance crews must have reasonable access to both sides of the barrier for personnel and equipment using standard practices.
- Drainage: Does the barrier impact existing or planned drainage?
- Utilities: Does the barrier impact existing utilities?

2.4.4.2 Reasonableness Factors

If a noise barrier meets the feasibility criteria, the following reasonableness factors must collectively be achieved for the noise abatement measure to be deemed reasonable.

- Acoustic reasonableness: The barrier must attain the FDOT noise reduction design goal (NRDG) of 7.0 dB(A) for at least one benefited receptor. (Note: to be considered "benefited," the receptor must receive a minimum of 5.0 dB(A) in traffic noise reduction from the barrier.) Failure to achieve the NRDG results in the noise abatement measure being deemed not reasonable.
- Cost effectiveness: Using the current $40.00 per square foot statewide average, a cost of $64,000 per benefited receptor is the upper limit for a cost reasonable noise barrier.
- Benefited property owner and resident viewpoints: During project development, FDOT solicits the opinion of benefited owners and residents regarding noise abatement. Affected owners and residents are given the opportunity to provide input regarding their desires to have the proposed noise abatement measure constructed. This process aims to obtain a response for or against the noise barrier from a majority of respondents to the survey. The noise barrier is not deemed reasonable if a majority consensus is not obtained in favor of the barrier.

2.4.4 Nonresidential Barrier Analysis

The methodology used to evaluate noise barrier systems for nonresidential sites differs from those used for residential locations. The standard procedure for determining the feasibility and reasonableness of a noise barrier for a special land use (SLU) site is documented in *Methodology to Evaluate Traffic Noise at Special Land Uses* (FDOT 2023). This SLU evaluation is a multi-step process.

- If an impacted SLU receptor is not adjacent to impacted residences or other impacted SLUs such that a single noise barrier would not be a practical form of abatement for all impacted properties, it is considered isolated. It must go through a Preliminary Screening analysis to determine if it has enough person-hour usage to equate to at least two residences to be found feasible for noise abatement. To meet the feasibility requirement, the isolated SLU must have at least 45,026 person-hours of use per year in the benefited area for a noise barrier to be found as a feasible form of noise abatement.
- A noise barrier is evaluated if the Preliminary Screening results indicate that a full analysis is warranted or if the impacted SLU is adjacent to other impacted SLUs or residences.
- Once it is determined that impacted SLUs are benefited from the analyzed noise barrier, the FDOT SLU Worksheet is utilized to assess whether a noise barrier is a reasonable and feasible form of abatement. The SLU Worksheet (and therefore cost reasonable calculation) includes all residences and SLUs that would receive a benefit from the noise barrier. This methodology allows the combined evaluation of land use NAC-B, A, C, D, and E for a single noise barrier system that would potentially benefit all land use types evaluated.

This PD&E analysis determined there were no impacts to nonresidential SLU sites predicted because of the Build Alternative.

3.0 TRAFFIC NOISE ANALYSIS

3.1 MODEL VALIDATION PROCESS

Field-measured sound levels are required to validate the TNM before it can be used to predict noise levels. A series of three 10-minute measurements were taken on March 24, 2020, using an Extech Instruments Model 407780 Type 2 Integrating Sound Level Meter. The sound level meter, calibrated at 114.0 dB(A) with an Extech Instruments Model 407766 calibrator, was adjusted to the A-weighted frequency scale, which approximates the frequency sensitivity of the human ear. During each of the 10-minute measurement sessions, traffic data, including vehicle volumes and speeds by type and meteorological conditions, were recorded. The travel speed for each type of vehicle was recorded using a Bushnell Speedster hand-held radar gun.

The field validation site (VS-1), shown on **page D-6** in project aerials **Appendix D**, was selected for measurement because it presented a clear view of free-flow traffic conditions on SR 524 and is representative of the noise sensitive sites adjacent to the corridor. The weather during the monitoring session was 76° under sunny skies with a 2 to 3 mph breeze and 65% humidity. No unusual noise events occurred during the monitoring.

Validation of TNM occurs when the model-predicted noise levels are within three decibels of the field-measured levels. **Table 3** shows that TNM predicted within the 3.0-decibel acceptance range for each 10-minute session. Consequently, the model is validated and acceptable for predicting noise levels for this project.

Table 3: Field Measurement Data and TNM Validation Results

Location	Validation Session	Field Measured (dB(A))	TNM Predicted (dB(A))	Variance (dB(A))
VS-1	Session 1	69.7	70.9	1.2
	Session 2	69.1	71.2	2.1
	Session 3	70.2	71.5	1.3

3.2 IDENTIFICATION OF NOISE SENSITIVE SITES

Within the project limits, TNM receptor points representing residences are located in accordance with the FDOT PD&E Manual as follows:

- Residential receptor points are located at areas of frequent outdoor use or the corner of the residential building closest to the major traffic noise source.
- Where residences are clustered together, single receptor points are analyzed as representative of a group of residences with similar characteristics.
- Ground floor receptor points are assumed to be 5 feet above the ground elevation, and all receptors are assumed to be at ground level unless otherwise noted.
- Higher floor receptors are assumed to increase in elevation in 10-foot increments above the ground floor receptor.
- Nonresidential receptor points are located at the edge of the outdoor use area closest to the major traffic noise source.

Using **Table 2** as a guide, most noise sensitive land uses within the study corridor fall under NAC-B - Residential. The NAC-C land uses within the study corridor include religious facilities, parks, apartment complex pool, and institutional/educational. The NAC-E land uses include a hotel pool.

The remainder of the corridor is NAC G undeveloped land. A permit search of those areas was conducted to identify any active building permits for noise sensitive land uses. As of August 19, 2024, no such permits were discovered adjacent to the corridor. If a future noise sensitive land use receives a building permit before the project's Date of Public Knowledge (the date FDOT approves the project’s environmental document), they will be assessed for traffic noise impacts during the project's final design phase of development.

3.3 PREDICTED NOISE LEVELS

Traffic noise levels were predicted at 149 noise sensitive sites representing 246 residences (NAC-B), six SLU NAC-C receptors, and one SLU NAC-E receptor. Due to the number of receptors, the analysis divided the study corridor into Noise Study Areas (NSA) based on geographical dividers such as roads or environmental areas. The reporting of project noise levels was further simplified by using receptors representing similar adjacent noise sensitive sites. The grouping within a representative receptor is referred to as a Common Noise Environment (CNE). There may be several CNEs within one NSA.

Receptor points are labeled according to the NSA within which they are located. NSAs are named as follows:

- The first two letters (i.e., EB, WB) describe on which side of the SR 524 mainline the NSA is located (e.g., "EB" indicates the receptor is in an NSA on the northbound side of the mainline travel lanes).
- The number following the first two letters is a numeric sequencing number (e.g., EB4 is the 4th NSA on the eastbound side of the SR 524 mainline).
- The next set of characters are the individual receptor number relative to the broader community of receptors and are separated from the first string of characters with a dash (e.g., EB4-1 is the 1st receptor in the 4th NSA on the eastbound side of the SR 524 mainline).
    - To aid in discussing potential impacts and abatement options from an individual community/neighborhood aspect, some receptors have an additional identifier denoted with a period and sequential number (e.g., EB4-1.1 is the first sub-receptor associated with EB4-1)
- Where there are multi-family residential apartment complexes in the study corridor, the letter "a" represents ground-floor units, "b" represents 2nd-floor units, and "c" represents 3rd-floor units, etc. (e.g., EB4-1.1a).
- The letters “SLU” follow the NSA identifier for nonresidential receptors and before the numerical SLU number (e.g., EB4-SLU4-1 is the first nonresidential receptor in NSA EB4).

The 2019 existing condition, the 2045 No-Build Alternative, and the 2045 Build Alternative noise analysis results discussed in this section are also summarized in a predicted noise level comparison matrix provided in **Appendix B**. When discussing noise level increases, the general rule that applies to perception is:

- A 3 dB(A) increase is barely perceptible to most people.
- A 5 dB(A) increase is noticeable to most people.
- A 10 dB(A) increase is perceived as twice as loud and is considered a doubling of noise.

Overall, 32 residential noise receptors are currently affected by SR 524 traffic noise. Under the No-Build Alternative, noise levels are predicted to meet or exceed the FDOT NAC for 58 residential receptors and one SLU site. By comparison, predicted noise levels for the Build Alternative meet or exceed the NAC at 63 residential receptors with an average 1.0 dB(A) increase in noise levels over the existing condition. The greatest increase, 3.1 dB(A), occurs in NSA WB5 at receptor WB5-2.1. None of the project noise increases in the study corridor are considered substantial (defined as 15 dB(A) or higher).

3.3.1 NSA EB1: Begin Project to I-95

NSA EB1 is located on the south side of SR 524 between the beginning limits and I-95. As illustrated on **page D-2** in the project aerials **Appendix D**, this NSA does not contain noise sensitive sites.

3.3.2 NSA EB2: I-95 to East Friday Road

NSA EB2 is located on the south side of SR 524 between I-95 and East Friday Road. As illustrated on **page D-2** in the project aerials **Appendix D**, this NSA does not contain noise sensitive sites.

3.3.3 NSA EB3: East Friday Road to Cox Road

NSA EB3 is located on the south side of SR 524 between East Friday Road and Cox Road. As illustrated on **pages D-3 and D-4** in the project aerials **Appendix D**, this NSA does not contain noise sensitive sites.

3.3.4 NSA EB4: Cox Road to London Boulevard

NSA EB4 is located on the south side of SR 524 between Cox Road and London Boulevard. While most land uses are considered undeveloped, one multi-family residential complex (Integra Trails Apartments) has recently been constructed and is included in the analysis. The complex is comprised of five four-story buildings and one clubhouse with a pool and amenities. Eighty NAC B receptors, identified as EB4-1 through EB4-5.3, represent 104 residential noise sensitive sites. The clubhouse pool is represented by receptor EB4-SLU4-1. This NSA and its analyzed receptors are illustrated on **pages D-5 through D-7** in the project aerials **Appendix D**.

Further east along the corridor is the City of Cocoa Fire Station #3, which is not considered noise sensitive due to its lack of exterior area of use. Water management district permits have been issued for the Cocoa Landings townhomes, but as of August 19, 2024, active building permits for residential structures have not been issued. The current site plans show the townhomes will be situated well away from SR 524, behind commercial and retail uses.

The current average noise level at these sites is 62.5 dB(A), with no receptors meeting or exceeding the NAC. Under the No-Build Alternative, the average noise level is predicted to be 63.5 dB(A), with 24 3rd and 4th-floor apartment balconies exceeding the NAC. Once the project is built, the average noise level is predicted to be 63.9 dB(A), a 1.4 dB(A) increase over existing levels. Thirty-six 2nd, 3rd, and 4th-fourth-floor balconies are predicted to exceed the NAC under the Build Alternative, with the highest noise level occurring at numerous receptors (67.1 dBA).

Because the project-related noise levels exceed the NAC, noise abatement consideration is required for the 36 impacted NAC B sites and is discussed in **Section 3.3.4.1**.

3.3.4.1 Noise Barrier EB1

To determine the feasibility of providing abatement for the 36 impacted 2nd, 3rd, and 4th-floor apartment balconies in the Integra Trails complex, a two-segment noise barrier system was analyzed offset from the FDOT ROW at the back of the proposed shared-use path. Several dimension options were evaluated to determine the most effective combination. Ideally, the standard methodology is to begin and end a continuous noise barrier at a point equal to four times the perpendicular distance between the last impacted receptor and the barrier. However, limitations to providing a continuous barrier are caused by the emergency ingress/egress gate, requiring the evaluation of a two-segmented barrier system.

The analysis, summarized in **Table 4**, concluded that a two-segment barrier system meets all FDOT acoustic and cost reasonableness criteria at heights ranging from 16 to 22 feet. At heights below 16 feet, the barrier is unable to achieve the 7.0 NRDG.

As shown on **pages E-2 and E-3** in **Appendix E**, a 22-foot-tall barrier system is a potentially feasible and reasonable method to abate traffic-related noise for 24 of the 36 impacted residences and 28 non-impacted residences. Barrier EB1 is recommended for further consideration during the final design phase. The final design evaluation may change this potential barrier's height, length, or viability during the project's final design phase.

Table 4: Noise Barrier EB1 Analysis Summary

NSA EB4 Integra Trails Apartments: EB1 Analysis Summary														
Evaluated Barrier Options				Number of Impacted Sites	Number of Impacted Sites Within a Noise Reduction Range			Number of Benefited Sites *1				Total Estimated Cost *4	Cost per Benefited Receptor *5	Meets All Criteria *1 2 5
PD&E Option	Barrier Type	Height (feet)	Length (feet)		5-5.9 dB(A)	6-6.9 dB(A)	≥ 7.0 dB(A) *2	Impacted	Other *3	Total	Avg. Noise Reduction dB(A)			
Option 1	ROW	14	621	36	9	0	0	9	8	17	5.4	$ 739,200	$ 43,482	No
		14	699											
Option 2	ROW	16	621		0	11	0	11	12	23	6.3	$ 844,800	$ 36,730	Yes *6
		16	699											
Option 3	ROW	18	621		1	0	11	12	18	30	6.9	$ 950,400	$ 31,680	Yes
		18	699											
Optoin 4	ROW	20	418		7	5	11	23	22	45	6.8	$ 893,600	$ 19,858	Yes
		20	699											
Oiption 5 ***Illustrated***	ROW	22	418		1	6	17	24	28	52	7.3	$ 982,960	$ 18,903	Yes
		22	699											

*1 = Minimum of 5.0 dB(A) required to be considered benefited by noise barrier.
*2 = FDOT Noise Reduction Design Goal is 7.0 dB(A) at a minimum of 1 benefited receptor.
*3 = Refers to non-impacted noise-sensitive sites.
*4 = Based on FDOT Statewide average of $40 per square foot.
*5 = FDOT Reasonable Cost Guideline is $64,000.
*6 = FDOT Noise Reduction Deisgn Goal met at one non-impacted receptor.

3.3.5 NSA EB5: London Boulevard to Cocoa Commons

NSA EB5 is located on the south side of SR 524 between London Boulevard and the western entrance to the Cocoa Commons shopping center. As illustrated on **page D-7** in the project aerials **Appendix D**, it does not contain noise sensitive sites.

3.3.6 NSA EB6: Cocoa Commons to Industry Road

NSA EB6 is located on the south side of SR 524 and comprises the Cocoa Commons shopping center with various out parcels/buildings between its southern entrance and Industry Road. There are no noise sensitive sites within this NSA, which is illustrated on **page D-8** in the project aerials **Appendix D**. The Cheers Bar and Grill, with outdoor seating, is considered a Category E land use with a corresponding NAC of 71.0 dB(A). Because the NAC E site is located over 500 feet from the roadway, it was not included in the noise analysis.

3.3.2 NSA WB1: Begin Project to I-95

NSA WB1 is located on the north side of SR 524 from NSAEB1. The NAC E Days Inn hotel pool [receptor WB1-SLU1-1] is located near the project's beginning limits. The Lost Lakes mobile home park is not included in the analysis because of 1) its distance from the SR 524 project and 2) the type of work being proposed for the interchange's southbound ramp does not constitute a Type 1 project per the PD&E Manual – Chapter 18. NSA WB1 and its analyzed receptor are illustrated on **page D-2** in the project aerials **Appendix D**

The existing and No-Build noise levels for receptor WB1-SLU1-1 are 60.3 and 62.4 dB(A), respectively. Once the project is built, the predicted noise level for receptor WB1-SLU1-1 is 63.0 dB(A), which is an increase of 2.6 dB(A) over the existing condition. No impacts are predicted for this site; therefore, abatement consideration is not required.

3.3.4 NSA WB2: I-95 to East Friday Road

NSA WB2 is located on the north side of SR 524, across from NSA EB2. As illustrated on **page D-2** in the project aerials **Appendix D**, this NSA does not contain noise sensitive sites.

3.3.6 NSA WB3: East Friday Road to Cox Road

NSA WB3 is located on the north side of SR 524, across from NSA EB3. While most land uses are considered undeveloped, five noise sensitive sites are within this NSA. The NAC C receptors WB3-SLU3-1 and WB3-SLU3-2 are associated with the Diệu Nhân Buddhist Monastery and the Surfside Community Fellowship Church, respectively. The three other noise sensitive sites (receptors

WB3-1 through WB3-3) are considered residential NAC B. NSA WB3 and its analyzed receptors are illustrated on **pages D-3 and D-4** in the project aerials **Appendix D.**

Currently, the average noise level for NSA WB3 is 59.0 dB(A), with the highest noise level being 60.6 dB(A) at receptor WB3-1. No receptors will exceed the NAC under the No-Build Alternative. Once the project is built, the overall traffic noise will average 58.6 dB(A), a 0.4 dB(A) decrease from the existing condition. All noise levels will be decreased from existing conditions, with the greatest decrease occurring at non-impacted receptor WB3-3 [-1.4 dB(A)].

As of August 19, 2024, a water management district permit for a stormwater management system related to the Allegra Preserve Apartments had been issued. However, the local jurisdiction has not issued any active building permits for residential structures; thus, the planned Allegra Preserve Apartment complex was not included in the analysis.

There are no impacts predicted for NSA WB3; therefore, abatement consideration is not required.

3.3.8 NSA WB4: Cox Road to London Boulevard

NSA WB4 is located on the north side of SR 524, across from NSA EB4 and comprises the largest residential noise sensitive land use concentration along the corridor. This NSA is illustrated on **pages D-5 through D-7** in the project aerials **Appendix D**.

Cocoa Pines

The Cocoa Pines subdivision comprises single-family residences and has a stand-alone entrance to SR 524 (Pinyon Drive). The subdivision is bisected by Pinyon Drive, with most of the noise sensitive sites located west of the entrance. Thirty-five residences, represented by 15 receptors (WB4-1.1 through WB4-1.15), were analyzed for noise impacts. These sites' current average noise level is 61.2 dB(A). The noise levels for the 13 homes represented by receptor WB4-1.1 currently exceed the NAC at 68.1 dB(A). The WB4-1.1 sites and receptors WB4-1.3 and WB4-1.5 will exceed the NAC under the No-Build Alternative. Once the project is built, the average noise level is 61.3 dB(A), a 0.1 dB(A) increase over existing levels, with receptor WB4-1.1 predicted to exceed the NAC at 66.5 dB(A).

Because the project-related noise levels exceed the NAC, noise abatement consideration is required for the 13 impacted NAC B sites and is discussed in **Section 3.3.8.1**.

Cocoa North Unit 7

The Cocoa North Unit 7 subdivision comprises single-family residences between the Cocoa Pines subdivision and Junny Rios Martinez Park. Entrance to this subdivision is provided via

Westminster Drive. Fourteen residences, represented by eight receptors (WB4-2.1 through WB4-2.8), were analyzed for noise impacts.

Currently, the average noise level for these sites is 57.4 dB(A), and they are not predicted to meet or exceed the NAC under the No-Build and Build Alternatives. Once the project is built, the average noise level is predicted to be nearly identical to the existing condition with 57.3 dB(A). The two sites associated with receptor WB4-2.1 are predicted to have the highest noise level (61.4 dBA). There are no impacts predicted for the Cocoa North Unit 7 receptors; therefore, abatement consideration is not required.

Cocoa North Villas

The Cocoa North Villas subdivision comprises single and multi-family residences and has a stand-alone entrance to SR 524 (Lance Drive), which bisects the neighborhood. Fifty-seven residences, represented by 18 receptors (WB4-3.1 through WB4-3.18), were analyzed for noise impacts. The current average noise level for these sites is 59.8 dB(A). However, the noise levels for the 19 homes represented by receptors WB4-3.1 through WB4-3.4 currently exceed the NAC and will continue to exceed the NAC under the No-Build Alternative. Once the project is built, the average noise level is predicted to be 59.8 dB(A), a 0.1 dB(A) increase over existing levels. The 14 residences associated with receptors WB4-3.1 through WB4-3.3 are predicted to exceed the NAC, with the highest noise level occurring at receptor WB4-3.2 (67.2 dBA).

Because the project-related noise levels exceed the NAC, noise abatement consideration is required for the 14 impacted NAC B sites and is discussed in **Section 3.3.8.2**.

Junny Rios Martinez Park

Junny Rios Martinez Park, an NAC C land use, is located between the Cocoa North Unit 7 Cocoa North Villas subdivisions. Westminster Drive bisects the park, which features basketball courts, a playground, a pavilion, tables, and benches. For this study, the park was analyzed with a receptor site within each park section, with receptor WB4-SLU4-1 located in the western section and receptor WB4-SLU4-2 located in the eastern section.

Currently, the average noise level for these sites is 64.6 dB(A), and neither site meets nor exceeds the NAC. Receptor WB4-SLU4-1 is predicted to exceed the NAC under the No-Build Alternative. Once the project is built, the overall traffic noise for these sites will average 63.6 dB(A), a decrease of 1.1 dB(A) from the existing condition. At 63.7 and 63.5 dB(A), neither receptor is predicted to exceed the NAC after the project is built. There are no impacts predicted for the park receptors; therefore, abatement consideration is not required.

Eastern Florida State College – Fred Gay Golf Academy

The EFSC -Fred Gay Golf Academy, an NAC C land use, is located east of the Cocoa North Villas subdivision. For this study, the putting green nearest to SR 524 was analyzed for potential impacts.

The existing and No-Build noise levels for receptor WB4SLU4-3 are 59.8 and 60.6 dB(A), respectively. Once the project is built, the predicted noise level is 58.3 dB(A), a 1.5 dB(A) decrease from the existing condition. No impacts are predicted for this site; therefore, abatement consideration is required.

3.3.8.1 Noise Barrier WB1

To determine the feasibility of providing abatement for the 13 impacted homes in Cocoa Pines, a noise barrier was analyzed at the back of the proposed shared-use path. Several dimension options were evaluated to determine the most effective combination. Ideally, the standard methodology is to begin and end a continuous noise barrier at a point equal to four times the perpendicular distance between the last impacted receptor and the barrier. However, limitations to providing a continuous barrier are caused by the commercial driveway opening and Pinyon Drive, thus requiring the evaluation of a two-segmented barrier system.

The analysis, summarized in **Table 5**, concluded that a two-segment barrier system meets all FDOT acoustic and cost reasonableness criteria at heights ranging from 10 to 16 feet. At heights below 10 feet, the barrier does not achieve the 7.0 dB(A) NRDG. At heights above 16 feet, the barrier exceeds the cost reasonableness criterion.

As shown on **page E-1** in **Appendix E**, a 14-foot-tall barrier system is a potentially feasible and reasonable method to abate traffic-related noise for all 13 impacted residences and six non-impacted residences. Optimizing the barrier height includes considering insertion loss, cost, and community context/aesthetics. Thus, Barrier WB1 Option 5 is recommended for further consideration during the project's final design phase. The final design evaluation may change this potential barrier's height, length, or viability during the project's final design phase.

Table 5: Noise Barrier WB1 Analysis Summary

NSA WB4 Cocoa Pines: WB1 Evaluation Summary														
Evaluated Barrier Options				Number of Impacted Sites	Number of Impacted Sites Within a Noise Reduction Range			Number of Benefited Sites *1				Total Estimated Cost *4	Cost per Benefited Receptor *5	Meets All Criteria *1 2 5
PD&E Option	Barrier Type	Height (feet)	Length (feet)		5-5.9 dB(A)	6-6.9 dB(A)	≥ 7.0 dB(A) *2	Impacted	Other *3	Total	Avg. Noise Reduction dB(A)			
Option 1	ROW	8	1,360	13	11	1	0	12	0	12	5.4	$ 435,200	$ 36,267	No
Option 2	ROW	10	1,360		0	1	12	13	1	14	7.3	$ 544,000	$ 38,857	Yes
Option 3	ROW	10	1,360		0	1	12	13	4	17	6.8	$ 679,600	$ 39,976	Yes
		10	339											
Option 4	ROW	12	1,360		0	0	13	13	6	19	7.4	$ 815,520	$ 42,922	Yes
		12	339											
Option 5 ***Illustrated***	ROW	14	1,360		0	0	13	13	6	19	8.2	$ 951,440	$ 50,076	Yes
		14	339											
Option 6	ROW	16	1,360		0	0	13	13	6	19	8.9	$ 1,087,360	$ 57,229	Yes
		16	339											
Option 7	ROW	18	1,360		0	0	13	13	6	19	9.5	$ 1,223,280	$ 64,383	No
		18	339											
Option 8	ROW	20	1,360		0	0	13	13	6	19	10	$ 1,359,200	$ 71,537	No
		20	339											
Option 9	ROW	22	1,360		0	0	13	13	6	19	10.5	$ 1,495,120	$ 78,691	No
		22	339											

*1 = Minimum of 5.0 dB(A) required to be considered benefited by noise barrier.
*2 = FDOT Noise Reduction Design Goal is 7.0 dB(A) at a minimum of 1 benefited receptor.
*3 = Refers to non-impacted noise-sensitive sites.
*4 = Based on FDOT Statewide average of $40 per square foot.
*5 = FDOT Reasonable Cost Guideline is $64,000.

3.3.8.2 Noise Barrier WB2

To determine the feasibility of providing abatement for the 14 impacted homes in the Cocoa North Villas neighborhood, a two-segment noise barrier system offset from the ROW at the back of the proposed shared-use path was analyzed. Several dimension options were evaluated to determine the most effective combination.

The analysis, summarized in **Table 6**, concluded that a two-segment barrier system meets all FDOT acoustic and cost reasonableness criteria at heights between 10 and 20 feet. At heights below 10 feet, the barrier does not achieve the 7.0 dB(A) NRDG. At heights above 20 feet, the barrier exceeds the cost reasonableness criterion.

As shown on **page E-2** in **Appendix E**, a 14-foot-tall barrier system is a potentially feasible and reasonable method to abate traffic-related noise for all 14 impacted residences and five non-impacted residences. Optimizing the barrier height includes considering insertion loss, cost, and community context/aesthetics. Thus, Barrier WB2 Option 4 is recommended for further consideration during the project's final design phase. The final design evaluation may change this potential barrier's height, length, or viability during the project's final design phase.

Table 6: Noise Barrier WB2 Analysis Summary

NSA WB4 Cocoa North Villas: WB2 Evaluation Summary														
Evaluated Barrier Options				Number of Impacted Sites	Number of Impacted Sites Within a Noise Reduction Range			Number of Benefited Sites *1				Total Estimated Cost *4	Cost per Benefited Receptor *5	Meets All Criteria *1 2 5
PD&E Option	Barrier Type	Height (feet)	Length (feet)		5-5.9 dB(A)	6-6.9 dB(A)	≥ 7.0 dB(A) *2	Impacted	Other *3	Total	Avg. Noise Reduction dB(A)			
Option 1	ROW	8	919	14	9	0	0	9	0	9	5.0	$ 550,080	$ 61,120	No
		8	800											
Option 2	ROW	10	739		5	0	9	14	5	19	6.1	$ 559,600	$ 29,453	Yes
		10	660											
Option 3	ROW	12	739		1	4	9	14	5	19	7.1	$ 671,520	$ 35,343	Yes
		12	660											
Option 4 *Illustrated*	ROW	14	739		0	3	11	14	5	19	7.9	$ 783,440	$ 41,234	Yes
		14	660											
Option 5	ROW	16	739		0	1	13	14	5	19	8.5	$ 895,360	$ 47,124	Yes
		16	660											
Option 6	ROW	18	739		0	1	13	14	5	19	9.1	$ 1,007,280	$ 53,015	Yes
		18	660											
Option 7	ROW	20	739		0	0	14	14	5	19	9.6	$ 1,119,200	$ 58,905	Yes
		20	660											
Option 8	ROW	22	739		0	0	14	14	5	19	10.0	$ 1,231,120	$ 64,796	No
		22	660											

*1 = Minimum of 5.0 dB(A) required to be considered benefited by noise barrier.
*2 = FDOT Noise Reduction Design Goal is 7.0 dB(A) at a minimum of 1 benefited receptor.
*3 = Refers to non-impacted noise-sensitive sites.
*4 = Based on FDOT Statewide average of $40 per square foot.
*5 = FDOT Reasonable Cost Guideline is $64,000.

3.3.10 NSA WB5: London Boulevard to Cocoa Commons

NSA WB5 is located on the opposite side of SR 524, across from NSA EB5. Within the Coventry of Cocoa subdivision, 33 residential sites, represented by 26 receptors (WB5-1.1 through WB5-2.20), were analyzed for noise impacts. Nine sites (receptors WB5-1.1 through WB5-1.6) are located west of Coventry Road, while 24 sites (receptors WB5-2.1 through 10-2.20) are located on the east side. NSA 10 and its analyzed receptors are illustrated on **page D-7** in the project aerials **Appendix D**.

Currently, the average noise level for the analyzed sites in NSA WB5 is 56.9 dB(A), with no receptor meeting or exceeding the NAC. Similarly, no receptors will meet or exceed the NAC under the No-Build Alternative, with the average noise level being 59.3 dB(A). Once the project is built, the overall traffic noise will average 58.8 dB(A), an increase of 1.9 dB(A) from the existing condition. Though there is a slight increase over the existing condition, none of the sites are predicted to meet or exceed NAC, and the highest predicted noise level occurs at receptor WB5-2.1 (64.6 dBA). There are no impacts predicted for NSA WB5; therefore, abatement consideration is not required.

3.3.12 NSA WB6: Cocoa Commons to Industry Road

NSA WB6 is located on the opposite side of SR 524, across from NSA EB6, and comprises the unnamed shopping center with various out parcels/buildings. There are no noise sensitive sites within this NSA, which is illustrated on **page D-8** in the project aerials **Appendix D**.

4.0 CONCLUSIONS

Noise levels at 63 residences are predicted to approach or exceed the NAC for the design year 2045 Build Alternative. Three noise barrier systems were evaluated to reduce traffic noise for these impacted residential receptors in NSA EB4 (24 impacts in Integra Trails Apartments) and NSA WB4 (13 impacts in Cocoa Pines and 14 impacts in Cocoa North Villas). Based on the PD&E noise analyses performed to date, the three noise barrier systems, EB1, WB1, and WB2, could potentially provide feasible and reasonable noise abatement for 51 of the 63 impacted residences and benefit 34 non-impacted residences. The noise barrier analysis results are summarized in **Table 7** and illustrated in **Appendix E**.

Table 7: Feasible and Reasonable Noise Barrier Summary

Noise Study Area	Barrier ID	Number of Impacted Residences	Preliminary Noise Barrier Height (ft)[1]	Preliminary Noise Barrier Length (ft) [1]	Preliminary Noise Barrier Location	Total Noise Barrier System Cost [2]	Number of Residences Potentially Benefited by a Noise Barrier [3]		Total Noise Barrier System Cost Per Benefited Residence [3]
							Impacted	Total	
NOISE BARRIERS ON EASTBOUND SIDE OF SR 524									
NSA EB4	EB1	36	22	418	ROW[4]	$982,960	24	52	$18,903
			22	699	ROW[4]				
NOISE BARRIERS ON WESTBOUND SIDE OF SR 524									
NSA WB4	WB1	13	14	1,360	ROW[4]	$951,440	13	19	$50,076
			14	339	ROW[4]				
NSA WB4	WB2	14	14	739	ROW[4]	$783,440	14	19	$41,234
			14	660	ROW[4]				

[1] Full height is for length indicated.

[2] Unit cost of $40/ft^2 for all noise barriers.

[3] Total includes impacted/benefited residences and residences with a predicted noise level that does not approach or exceed the NAC, but are incidentally benefited.

[4] ROW - Noise barrier constructed offset from the FDOT right-of-way (ROW), at the back of the proposed shared-use path.

4.3 STATEMENT OF LIKELIHOOD

The FDOT is committed to the construction of the feasible and reasonable noise abatement measures identified in **Table 7** contingent upon the following conditions:

- Final recommendations on the construction of abatement measures are determined during the project's final design and through the public involvement process.
- Detailed noise analyses during the final design process support the need, feasibility, and reasonableness of providing abatement.
- Cost analysis indicates that the cost of the noise barrier will not exceed the cost-reasonable criterion.
- Community supporting the types, heights, and locations of the noise barrier(s) is provided to the District Office.
- Safety and engineering aspects related to the roadway user and the adjacent property owner have been reviewed, and any conflicts or issues have been resolved.

Noise abatement measures identified as reasonable and feasible during the PD&E phase are re-evaluated during the project's final design based on detailed design data and the public involvement process. Per the FDOT Design Manual, final determinations concerning noise abatement are based on contract plans developed during final design, thus requiring detailed, ongoing coordination between the project engineering/noise wall design team and the District Noise Specialist in the District Environmental Management Office to ensure proper analysis, public involvement, aesthetic evaluation, and determination of final noise barrier top-elevations and lengths occurs before the finalization of contract plans.

5.0 CONSTRUCTION NOISE AND VIBRATION

Based on the existing land use within the limits of this project, the construction of the proposed roadway improvements will have temporary noise and vibration impacts. Construction noise sensitive sites include all sites detailed in **Section 3** of this report. Vibration-sensitive sites on the project include residences and medical offices. Trucks, compaction equipment, earth-moving equipment, pumps, and generators are sources of construction noise and vibration. During the construction phase of the proposed project, short-term noise and vibration may be generated by stationary and mobile construction equipment. The construction noise and vibration will be temporary at any location and controlled by adherence to the most recent edition of the FDOT *Standard Specifications for Road and Bridge Construction*.

6.0 PUBLIC COORDINATION

Coordination with the public and local agencies and officials will be accomplished during the PD&E study. Local and community officials will be offered the opportunity to comment on the proposed project at the planned public hearing.

6.1 NOISE IMPACT CONTOURS

To promote compatibility between land development planning and SR 524, the point where the roadway-related noise is predicted to reach the NAC for each activity category was estimated. These estimates are referred to as noise contours and are shown in **Table 8**. These estimates provide the general distance at which the traffic noise meets or exceeds the NAC for each activity type in the 2045 Design Year. These contours do not consider topography nor any shielding of noise provided by structures or vegetation between the receptor site and the proposed travel lanes.

Table 8: Potential Noise Impact Contours

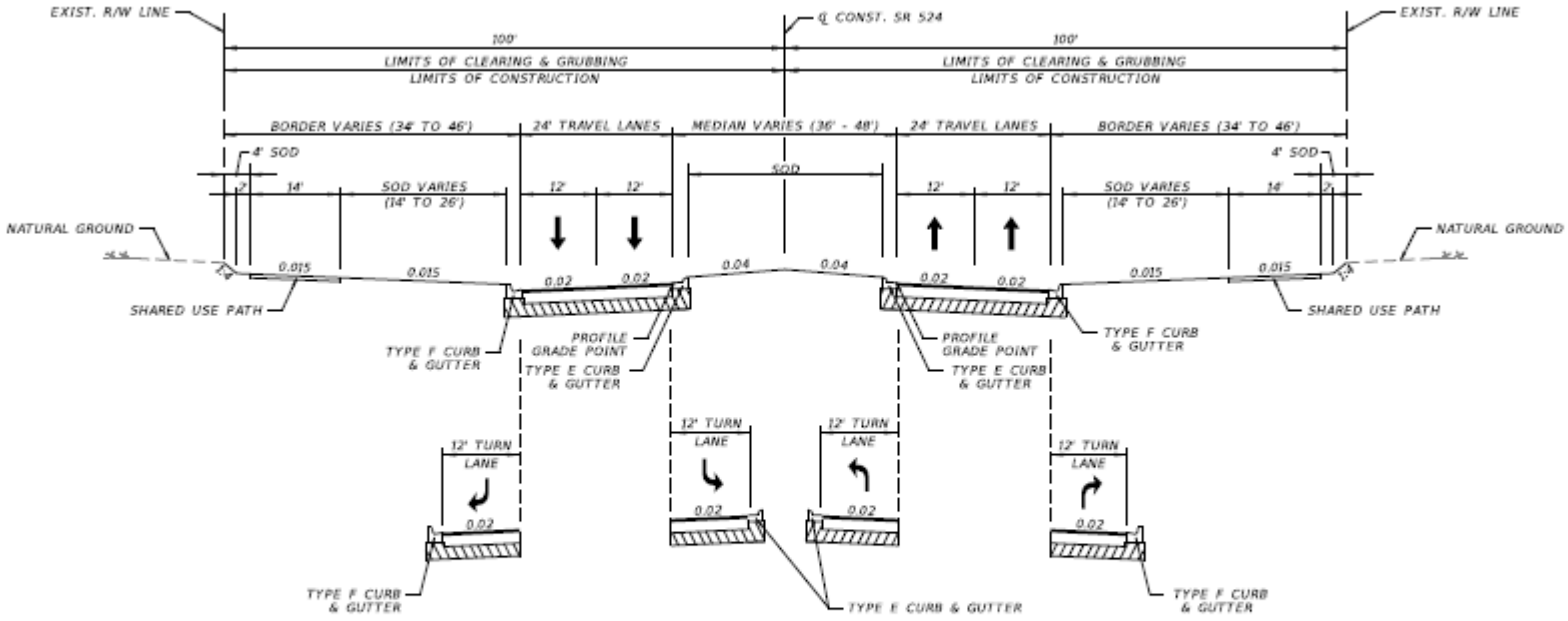
Activity Category *1	Corresponding Noise Abatement Criterion	Distance from EOP*2 (ft)					
		Friday to Cox	Cox to Westminster	Westminster to Lance	Lance to Landon	Landon to Coventry	Coventry to Industry
Category A	56 dB(A)	265	295	305	315	325	335
Category B and C	66 dB(A)	70	75	80	85	90	95
Category E	71 dB(A)	in row	in row	in row	in row	in row	in row

*1 Activity Categories as defined in 23 CFR 772.
*2 Distance from nearest edge of pavement.

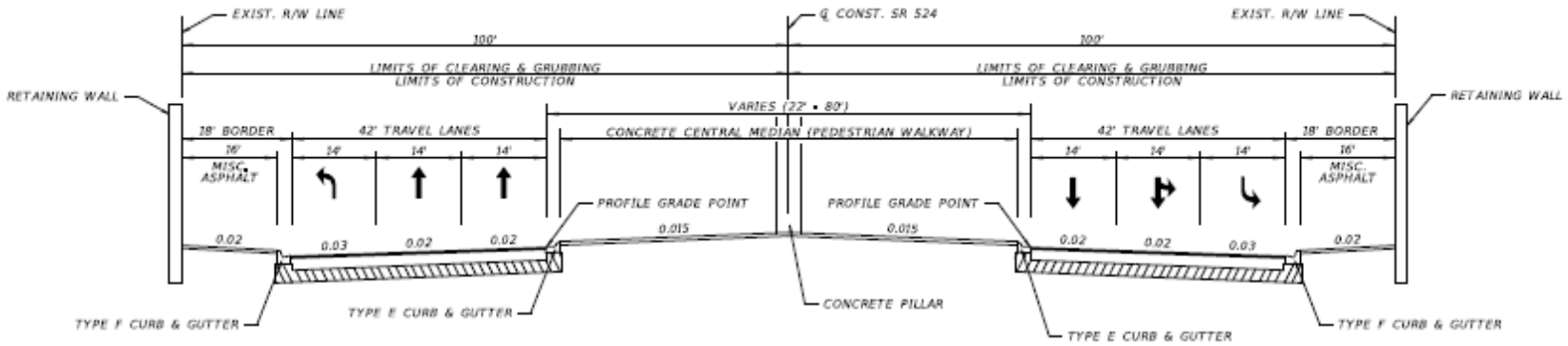
8.0 REFERENCES

1. 23 CFR Part 772, Procedures for Abatement of Highway Traffic Noise and Construction Noise Federal Register, Vol. 75, No. 133, July 2010.
2. *Project Development and Environment Manual*; FDOT. July 31, 2024.
3. Section 335.17, *Florida Statutes. State Highway Construction; Means Of Noise Abatement.* 2012.
4. *Highway Traffic Noise: Analysis and Abatement Guidance, FHWA-HEP-10-025;* FHWA. December 2011.
5. *Traffic Noise Modeling and Analysis Practitioners Handbook*; FDOT. December 2018.
6. *Methodology to Evaluate Highway Traffic Noise at Special Land Uses;* FDOT. December 2023.
7. Noise Measurement Handbook; FHWA. June 2018.
8. Standard Specifications for Road and Bridge Construction; FDOT. 2023

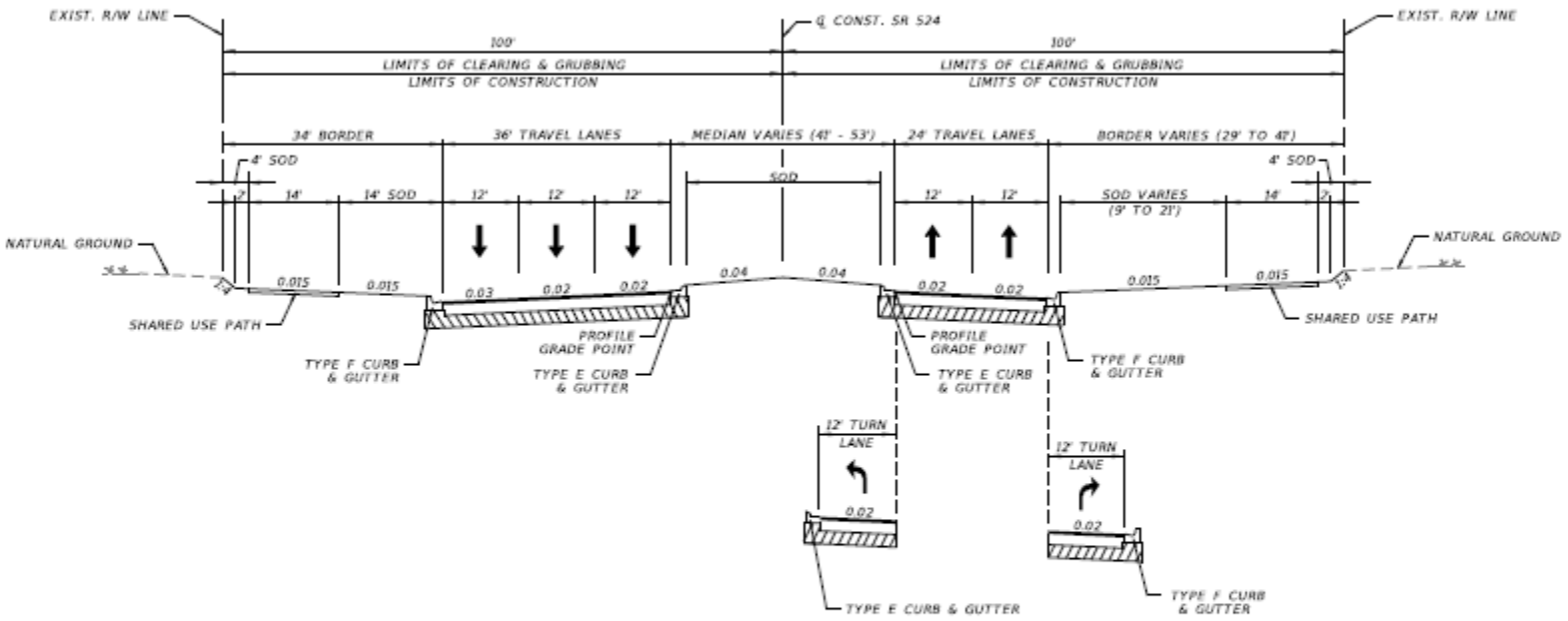
APPENDIX A – TYPICAL SECTIONS



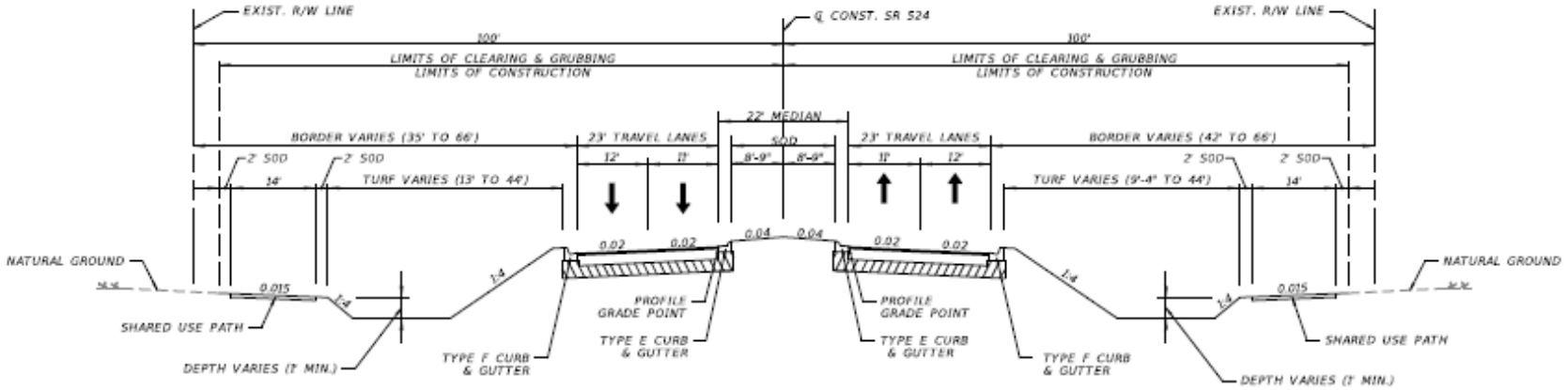
TYPICAL SECTION 01
SR 524
SEGMENT 1
FRIDAY ROAD (SOUTH) TO I-95 INTERCHANGE
MP 1.510 TO 1.605



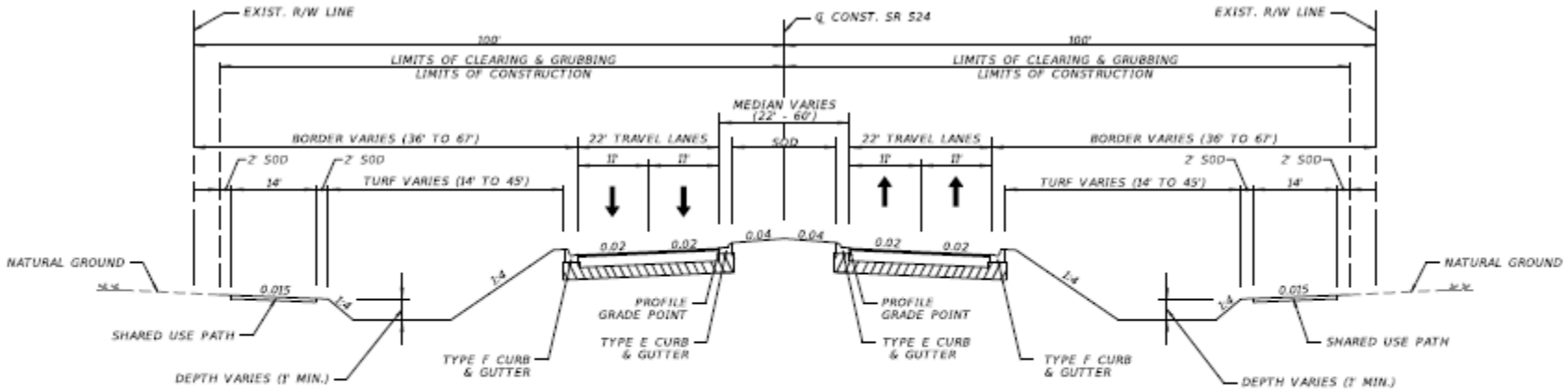
TYPICAL SECTION 02
SR 524
SEGMENT 1
I-95 INTERCHANGE
MP 1.605 TO 1.724



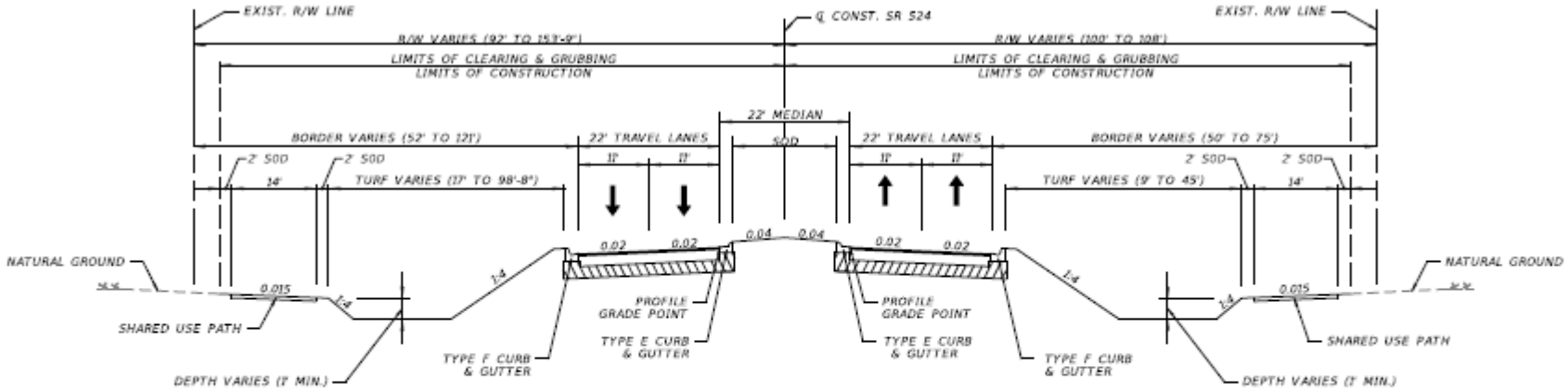
TYPICAL SECTION 03
SR 524
SEGMENT 1
I-95 INTERCHANGE TO FRIDAY ROAD (NORTH)
MP 1.724 TO 1.836



TYPICAL SECTION 04
SR 524
SEGMENT 2
FRIDAY ROAD (NORTH) TO COX ROAD
MP 1.836 - MP 2.916



TYPICAL SECTION 05
SR 524
SEGMENT 3
COX ROAD TO LONDON BOULEVARD
MP 2.916 - MP 4.194



TYPICAL SECTION 06
SR 524
SEGMENT 4
LONDON BOULEVARD TO INDUSTRY ROAD MP 4.194 - MP 4.651
(CONTEXT CLASSIFICATION C3R MP 4.194 - MP 4.305)
(CONTEXT CLASSIFICATION C3C MP 4.305 - MP 4.651)

APPENDIX B – TRAFFIC DATA

Noise Analysis Traffic Data - SR 524 PD&E from Friday Road to Industry Road
Existing (2019) Conditions

SR 524 Mainline Traffic Segment	Number of Lanes	AADT	LOS C AADT[1]	Demand Peak Hour Peak Direction	Demand Off Peak Hour Peak Direction	LOS C Peak Hour Peak Direction[1]	Design Hr. % MT	Design Hr. % HT	Design Hr. % Buses	Design Hr. % MC	K-factor	D-factor	Posted Speed (mph)
West of Precious Boulevard	2	5,600	16,800	326	200	830	5.34%	3.43%	0.23%	2.35%	8.7%	62.0%	55
Precious Boulevard to W. Friday Road	2	6,800	16,800	384	250	830	5.34%	3.43%	0.23%	2.35%	8.7%	60.6%	55
W. Friday Road to I-95 SB ramps	2	9,400	16,800	537	374	830	5.34%	3.43%	0.23%	2.35%	9.0%	58.9%	45
I-95 NB ramps to E. Friday Road	2	18,000	16,800	752	698	830	5.34%	3.43%	0.23%	2.35%	7.7%	51.9%	45
E. Friday Road to Cox Road	2	10,000	16,800	477	410	830	5.34%	3.43%	0.23%	2.35%	8.2%	53.8%	55
Cox Road to Westminster Drive	2	13,000	16,800	602	551	830	3.56%	2.29%	0.15%	2.35%	8.3%	52.2%	55
Westminster Drive to Lance Boulevard	2	14,000	16,800	666	571	830	3.56%	2.29%	0.15%	2.35%	8.4%	53.8%	55
Lance Boulevard to London Boulevard	2	15,000	16,800	748	573	830	3.56%	2.29%	0.15%	2.35%	8.4%	56.6%	55
London Boulevard to Conventry Court	2	16,000	16,800	814	645	830	3.56%	2.29%	0.15%	2.35%	8.6%	55.8%	45
Coventry Court to Industry Road	2	17,000	16,800	787	721	830	3.56%	2.29%	0.15%	2.35%	8.3%	52.2%	45
East of Industry Road	2	17,000	16,800	969	709	830	3.56%	2.29%	0.15%	2.35%	9.0%	57.7%	45
Intersecting/Side Street Traffic Segment													
I-95[2]													
North of SR 524	6	64,000	93,900	2,696	2,655	4,650	2.48%	7.44%	0.09%	0.99%	7.7%	53.0%	70
South of SR 524	6	69,000	93,900	3,296	2,988	4,650	2.48%	7.44%	0.09%	0.99%	7.8%	53.0%	70
NB off-ramp	1	5,200	n/a	524	n/a	n/a	2.52%	4.88%	0.10%	0.53%	10.6%	100.0%	35
NB on-ramp	1	2,600	n/a	195	n/a	n/a	10.36%	5.68%	0.96%	1.41%	8.1%	100.0%	45
SB off-ramp	1	2,800	n/a	231	n/a	n/a	10.29%	6.31%	0.95%	0.45%	8.7%	100.0%	35
SB on-ramp	1	5,500	n/a	565	n/a	n/a	3.15%	5.66%	0.39%	0.19%	10.8%	100.0%	45
Cox Road													
North of SR 524	2	2,500	15,120	155	86	747	3.93%	0.75%	0.27%	0.85%	9.3%	64.3%	40
South of SR 524	2	4,400	15,120	229	178	747	2.87%	1.59%	0.19%	0.82%	8.8%	56.3%	45
Industry Road[3]													
North of SR 524	4	20,000	34,110	978	907	1,719	3.56%	2.29%	0.15%	2.35%	8.6%	51.9%	45

Note: AADT, Demand Peak Hour Direction, Design Hour %'s, K and D factors obtained from the *Project Traffic Analysis Report* (July 2019).
(1) LOS C maximum service volumes obtained from the *FDOT 2020 Generalized Service Volume Tables* (Table 1 and 7)
(2) I-95 Mainline: Design Hr. %'s obtained from FDOT Vehicle Classificaiton Report - 70220000 - Site #9919
(3) Industry Road: Design Hr. %'s same as SR 524 east of Cox Rd

Prepared By (ETP): *Jason Cornell - Sr. Planner - July 8,2021*

Reviewed By (VHB):	Rajashekar Pemmanaboina, PE, PTOE	P. Rajashekar	10/1/2021
	Print Name	Signature	Date
Approved By (FDOT):		Jason P Learned	
	Print Name	Signature	Date

Noise Analysis Traffic Data - SR 524 PD&E from Friday Road to Industry Road
No-Build (2045) Conditions

SR 524 Mainline Traffic Segment	Number of Lanes	AADT	LOS C AADT[1]	Demand Peak Hour Peak Direction	Demand Off Peak Hour Peak Direction	LOS C Peak Hour Peak Direction[1]	Design Hr. % MT	Design Hr. % HT	Design Hr. % Buses	Design Hr. % MC	K-factor	D-factor	Posted Speed (mph)
West of Precious Boulevard	2	9,600	16,800	475	389	830	5.34%	3.43%	0.23%	2.35%	9.0%	55.0%	55
Precious Boulevard to W. Friday Road	2	12,000	16,800	594	486	830	5.34%	3.43%	0.23%	2.35%	9.0%	55.0%	55
W. Friday Road to I-95 SB ramps	2	16,000	16,800	792	648	830	5.34%	3.43%	0.23%	2.35%	9.0%	55.0%	45
I-95 NB ramps to E. Friday Road	2	31,000	16,800	1,535	1,256	830	5.34%	3.43%	0.23%	2.35%	9.0%	55.0%	45
E. Friday Road to Cox Road	2	17,000	16,800	842	689	830	5.34%	3.43%	0.23%	2.35%	9.0%	55.0%	55
Cox Road to Westminster Drive	2	20,000	16,800	990	810	830	3.56%	2.29%	0.15%	2.35%	9.0%	55.0%	55
Westminster Drive to Lance Boulevard	2	22,000	16,800	1,089	891	830	3.56%	2.29%	0.15%	2.35%	9.0%	55.0%	55
Lance Boulevard to London Boulevard	2	23,000	16,800	1,139	932	830	3.56%	2.29%	0.15%	2.35%	9.0%	55.0%	55
London Boulevard to Conventry Court	2	25,000	16,800	1,238	1,013	830	3.56%	2.29%	0.15%	2.35%	9.0%	55.0%	45
Coventry Court to Industry Road	2	27,000	16,800	1,337	1,094	830	3.56%	2.29%	0.15%	2.35%	9.0%	55.0%	45
East of Industry Road	2	27,000	16,800	1,337	1,094	830	3.56%	2.29%	0.15%	2.35%	9.0%	55.0%	45
Intersecting/Side Street Traffic Segment													
I-95[2]													
North of SR 524	6	97,000	93,900	4,802	3,929	4,650	2.48%	7.44%	0.09%	0.99%	9.0%	55.0%	70
South of SR 524	6	101,200	93,900	5,009	4,099	4,650	2.48%	7.44%	0.09%	0.99%	9.0%	55.0%	70
NB off-ramp	1	10,500	n/a	945	n/a	n/a	2.52%	4.88%	0.10%	0.53%	9.0%	100.0%	35
NB on-ramp	1	8,400	n/a	756	n/a	n/a	10.36%	5.68%	0.96%	1.41%	9.0%	100.0%	45
SB off-ramp	1	8,400	n/a	756	n/a	n/a	10.29%	6.31%	0.95%	0.45%	9.0%	100.0%	35
SB on-ramp	1	10,500	n/a	945	n/a	n/a	3.15%	5.66%	0.39%	0.19%	9.0%	100.0%	45
Cox Road													
North of SR 524	2	3,800	15,120	188	154	747	3.93%	0.75%	0.27%	0.85%	9.0%	55.0%	40
South of SR 524	2	8,000	15,120	396	324	747	2.87%	1.59%	0.19%	0.82%	9.0%	55.0%	45
Industry Road													
North of SR 524	4	33,000	34,110	1,634	1,337	1,719	3.56%	2.29%	0.15%	2.35%	9.0%	55.0%	45

Note: AADT, Demand Peak Hour Direction, Design Hour %'s, K and D factors obtained from the *Project Traffic Analysis Report* (July 2019).
(1) LOS C maximum service volumes obtained from the *FDOT 2020 Generalized Service Volume Tables* (Table 1 and 7)
(2) I-95 Mainline and ramps: Design Hr. %'s obtained from FDOT Vehicle Classificaiton Report - 70220000 - Site #9919
(3) Industry Road: Design Hr. %'s same as SR 524 east of Cox Rd

Prepared By (ETP): *Jason Cornell - Sr. Planner - July 8,2021*

Reviewed By (VHB): Rajashekar Pemmanaboina, PE, PTOE (Print Name) — P. Rajashekar (Signature) — 10/1/2021 (Date)

Approved By (FDOT): (Print Name) — Jason P Learned (Signature) — (Date)

Noise Analysis Traffic Data - SR 524 PD&E from Friday Road to Industry Road
Build (2045) Conditions

SR 524 Mainline Traffic Segment	Number of Lanes	AADT	LOS C AADT	Demand Peak Hour Peak Direction	Demand Off Peak Hour Peak Direction	LOS C Peak Hour Peak Direction	Design Hr. % MT	Design Hr. % HT	Design Hr. % Buses	Design Hr. % MC	Standard K-factor	D-factor	Posted Speed (mph)
West of Precious Boulevard	2	12,000	16,800	564	486	830	5.34%	3.43%	0.23%	2.35%	9.0%	55.0%	55
Precious Boulevard to W. Friday Road	2	15,000	16,800	743	608	830	5.34%	3.43%	0.23%	2.35%	9.0%	55.0%	55
W. Friday Road to I-95 SB ramps	4	20,000	37,900	990	810	1,910	5.34%	3.43%	0.23%	2.35%	9.0%	55.0%	45
I-95 NB ramps to E. Friday Road	4	39,000	37,900	1,931	1,580	1,910	5.34%	3.43%	0.23%	2.35%	9.0%	55.0%	45
E. Friday Road to Cox Road	4	22,000	37,900	1,089	891	1,910	5.34%	3.43%	0.23%	2.35%	9.0%	55.0%	55
Cox Road to Westminster Drive	4	25,000	37,900	1,238	1,013	1,910	3.56%	2.29%	0.15%	2.35%	9.0%	55.0%	55
Westminster Drive to Lance Boulevard	4	27,000	37,900	1,337	1,094	1,910	3.56%	2.29%	0.15%	2.35%	9.0%	55.0%	55
Lance Boulevard to London Boulevard	4	28,000	37,900	1,386	1,134	1,910	3.56%	2.29%	0.15%	2.35%	9.0%	55.0%	55
London Boulevard to Conventry Court	4	30,000	37,900	1,485	1,215	1,910	3.56%	2.29%	0.15%	2.35%	9.0%	55.0%	45
Coventry Court to Industry Road	4	32,000	37,900	1,584	1,296	1,910	3.56%	2.29%	0.15%	2.35%	9.0%	55.0%	45
East of Industry Road	4	32,000	37,900	1,584	1,296	1,910	3.56%	2.29%	0.15%	2.35%	9.0%	55.0%	45
Intersecting/Side Street Traffic Segment													
I-95													
North of SR 524	8	97,000	93,900	4,802	3,929	4,650	2.48%	7.44%	0.09%	0.99%	9.0%	55.0%	70
South of SR 524	8	101,200	93,900	5,009	4,099	4,650	2.48%	7.44%	0.09%	0.99%	9.0%	55.0%	70
NB off-ramp	1	10,500	n/a	945	n/a	n/a	2.52%	4.88%	0.10%	0.53%	9.0%	100.0%	35
NB on-ramp	1	8,400	n/a	756	n/a	n/a	10.36%	5.68%	0.96%	1.41%	9.0%	100.0%	45
SB off-ramp	1	8,400	n/a	756	n/a	n/a	10.29%	6.31%	0.95%	0.45%	9.0%	100.0%	35
SB on-ramp	1	10,500	n/a	945	n/a	n/a	3.15%	5.66%	0.39%	0.19%	9.0%	100.0%	45
Cox Road													
North of SR 524	2	3,800	15,120	188	154	747	3.93%	0.75%	0.27%	0.85%	9.0%	55.0%	40
South of SR 524	2	8,400	15,120	416	340	747	2.87%	1.59%	0.19%	0.82%	9.0%	55.0%	45
Industry Road													
North of SR 524	4	35,000	34,110	1,733	1,418	1,719	3.56%	2.29%	0.15%	2.35%	9.0%	55.0%	45

Note: AADT, Demand Peak Hour Direction, Design Hour %'s, K and D factors obtained from the *Project Traffic Analysis Report* (July 2019).
(1) LOS C maximum service volumes obtained from the *FDOT 2020 Generalized Service Volume Tables* (Table 1 and 7)
(2) I-95 Mainline and ramps: Design Hr. %'s obtained from FDOT Vehicle Classificaiton Report - 70220000 - Site #9919
(3) Industry Road: Design Hr. %'s same as SR 524 east of Cox Rd

Prepared By (ETP): *Jason Cornell - Sr. Planner - July 8, 2021*

Reviewed By (VHB): Rajashekar Pemmanaboina, PE, PTOE (Print Name) — P. Rajashekar (Signature) — 10/1/2021 (Date)

Approved By (FDOT): (Print Name) — Jason P Learned (Signature) — (Date)

APPENDIX C – NOISE IMPACT COMPARISON MATRIX

Noise Study Area (NSA)	Receptor Name	# Sites Represented	NAC Impact Criterion (dB(A))	Existing LAeq1h (dB(A))	2045 No Build LAeq1h (dB(A))	2045 Build LAeq1h (dB(A))	Build Change From Existing (dB(A))	Description
	Impacted Receptor							
EB4	EB4-1a	1	66.0	58.8	60.0	60.6	1.8	Integra Trails Apartments
EB4	EB4-1b	1	66.0	60.7	62.0	62.8	2.1	Integra Trails Apartments
EB4	EB4-1c	1	66.0	63.1	64.4	64.9	1.8	Integra Trails Apartments
EB4	EB4-1d	1	66.0	64.0	65.3	65.3	1.3	Integra Trails Apartments
EB4	EB4-1.1a	1	66.0	59.3	60.5	61.2	1.9	Integra Trails Apartments
EB4	EB4-1.1b	2	66.0	60.7	62.0	63.1	2.4	Integra Trails Apartments
EB4	EB4-1.1c	2	66.0	63.2	64.4	65.0	1.8	Integra Trails Apartments
EB4	EB4-1.1d	2	66.0	64.0	65.3	65.4	1.4	Integra Trails Apartments
EB4	EB4-1.2a	1	66.0	59.4	60.6	61.4	2.0	Integra Trails Apartments
EB4	EB4-1.2b	2	66.0	60.7	61.9	63.1	2.4	Integra Trails Apartments
EB4	EB4-1.2c	2	66.0	63.2	64.4	65.0	1.8	Integra Trails Apartments
EB4	EB4-1.2d	2	66.0	64.1	65.3	65.4	1.3	Integra Trails Apartments
EB4	EB4-1.3a	1	66.0	59.2	60.4	61.3	2.1	Integra Trails Apartments
EB4	EB4-1.3b	1	66.0	60.5	61.7	63.0	2.5	Integra Trails Apartments
EB4	EB4-1.3c	1	66.0	63.2	64.3	64.9	1.7	Integra Trails Apartments
EB4	EB4-1.3d	1	66.0	64.0	65.2	65.4	1.4	Integra Trails Apartments
EB4	EB4-2a	1	66.0	59.3	60.2	60.8	1.5	Integra Trails Apartments
EB4	EB4-2b	1	66.0	61.7	62.6	63.5	1.8	Integra Trails Apartments
EB4	EB4-2c	1	66.0	63.9	64.9	65.5	1.6	Integra Trails Apartments
EB4	EB4-2d	1	66.0	64.6	65.5	65.8	1.2	Integra Trails Apartments
EB4	EB4-2.1a	1	66.0	59.4	60.3	60.8	1.4	Integra Trails Apartments
EB4	EB4-2.1b	1	66.0	60.9	61.9	62.7	1.8	Integra Trails Apartments
EB4	EB4-2.1c	1	66.0	63.2	64.2	64.9	1.7	Integra Trails Apartments
EB4	EB4-2.1d	1	66.0	64.2	65.1	65.3	1.1	Integra Trails Apartments
EB4	EB4-2.2a	1	66.0	58.9	59.8	60.3	1.4	Integra Trails Apartments
EB4	EB4-2.2b	1	66.0	60.2	61.1	61.5	1.3	Integra Trails Apartments
EB4	EB4-2.2c	1	66.0	62.2	63.1	63.9	1.7	Integra Trails Apartments
EB4	EB4-2.2d	1	66.0	63.5	64.4	64.5	1.0	Integra Trails Apartments
EB4	EB4-2.3a	1	66.0	58.3	59.3	59.8	1.5	Integra Trails Apartments
EB4	EB4-2.3b	1	66.0	59.5	60.4	60.6	1.1	Integra Trails Apartments
EB4	EB4-2.3c	1	66.0	61.3	62.3	62.8	1.5	Integra Trails Apartments
EB4	EB4-2.3d	1	66.0	62.7	63.7	63.8	1.1	Integra Trails Apartments
EB4	EB4-3a	1	66.0	61.9	62.7	62.8	0.9	Integra Trails Apartments
EB4	EB4-3b	1	66.0	64.1	65.0	66.1	2.0	Integra Trails Apartments
EB4	EB4-3c	1	66.0	65.7	66.7	67.1	1.4	Integra Trails Apartments
EB4	EB4-3d	1	66.0	65.8	66.8	67.1	1.3	Integra Trails Apartments

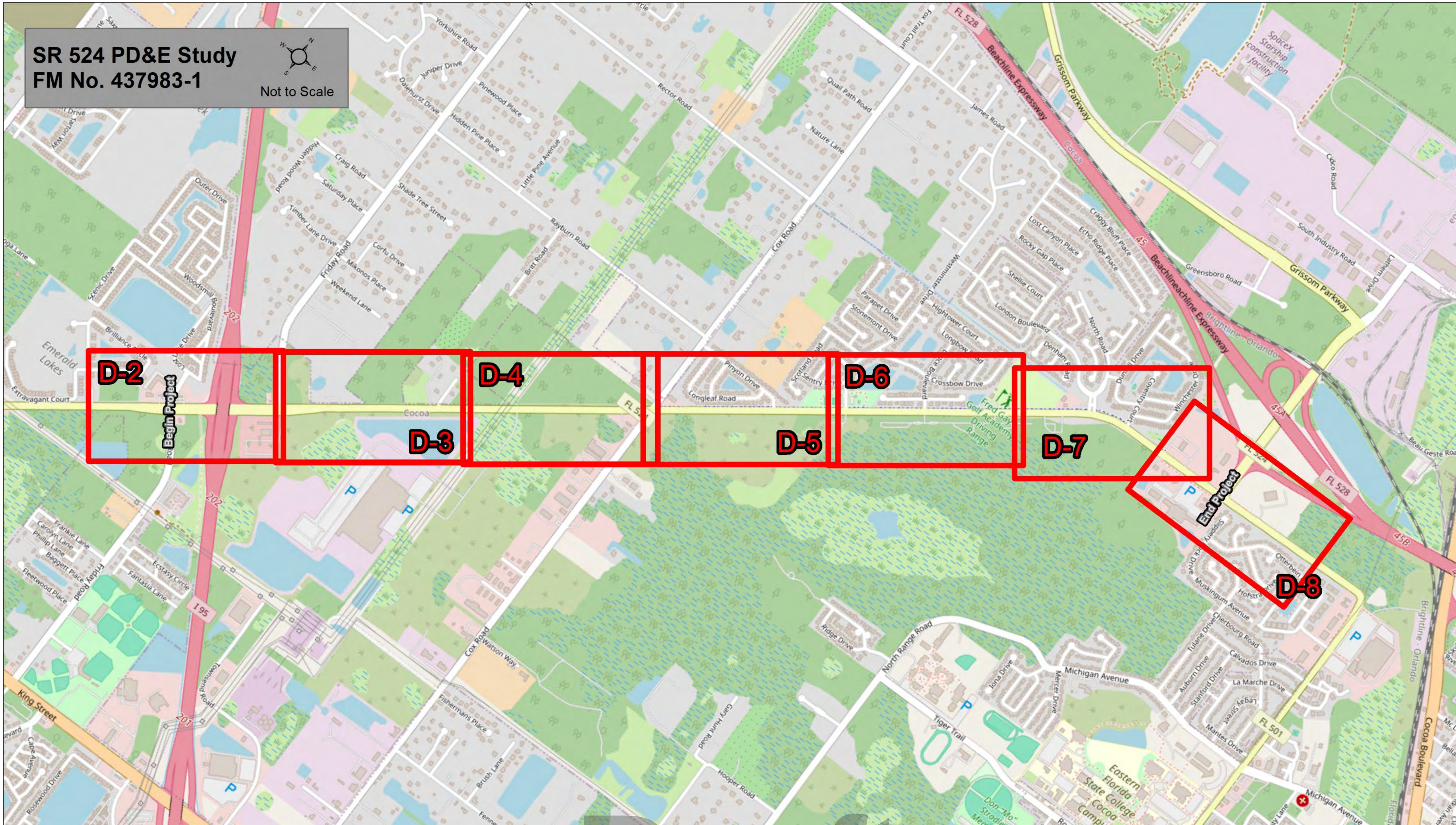
Noise Study Area (NSA)	Receptor Name	# Sites Represented	NAC Impact Criterion (dB(A))	Existing LAeq1h (dB(A))	2045 No Build LAeq1h (dB(A))	2045 Build LAeq1h (dB(A))	Build Change From Existing (dB(A))	Description
EB4	EB4-3.1a	1	66.0	61.9	62.7	62.8	0.9	Integra Trails Apartments
EB4	EB4-3.1b	2	66.0	64.2	65.1	66.2	2.0	Integra Trails Apartments
EB4	EB4-3.1c	2	66.0	65.7	66.7	67.1	1.4	Integra Trails Apartments
EB4	EB4-3.1d	2	66.0	65.8	66.8	67.1	1.3	Integra Trails Apartments
EB4	EB4-3.2a	1	66.0	61.9	62.7	62.8	0.9	Integra Trails Apartments
EB4	EB4-3.2b	2	66.0	64.3	65.2	66.2	1.9	Integra Trails Apartments
EB4	EB4-3.2c	2	66.0	65.7	66.7	67.1	1.4	Integra Trails Apartments
EB4	EB4-3.2d	2	66.0	65.8	66.8	67.1	1.3	Integra Trails Apartments
EB4	EB4-3.3a	1	66.0	61.7	62.5	62.6	0.9	Integra Trails Apartments
EB4	EB4-3.3b	1	66.0	64.2	65.2	66.0	1.8	Integra Trails Apartments
EB4	EB4-3.3c	1	66.0	65.7	66.6	67.0	1.3	Integra Trails Apartments
EB4	EB4-3.3d	1	66.0	65.8	66.7	67.0	1.2	Integra Trails Apartments
EB4	EB4-4a	1	66.0	56.9	57.8	58.1	1.2	Integra Trails Apartments
EB4	EB4-4b	1	66.0	61.7	62.6	61.5	-0.2	Integra Trails Apartments
EB4	EB4-4c	1	66.0	62.8	63.8	64.3	1.5	Integra Trails Apartments
EB4	EB4-4d	1	66.0	63.6	64.5	64.6	1.0	Integra Trails Apartments
EB4	EB4-4.1a	1	66.0	56.4	57.3	57.6	1.2	Integra Trails Apartments
EB4	EB4-4.1b	2	66.0	62.0	62.8	61.7	-0.3	Integra Trails Apartments
EB4	EB4-4.1c	2	66.0	63.1	64.1	64.7	1.6	Integra Trails Apartments
EB4	EB4-4.1d	2	66.0	63.9	64.9	65.0	1.1	Integra Trails Apartments
EB4	EB4-4.2a	1	66.0	56.7	57.5	57.8	1.1	Integra Trails Apartments
EB4	EB4-4.2b	2	66.0	62.0	62.9	61.8	-0.2	Integra Trails Apartments
EB4	EB4-4.2c	2	66.0	63.2	64.1	64.7	1.5	Integra Trails Apartments
EB4	EB4-4.2d	2	66.0	63.9	64.9	65.0	1.1	Integra Trails Apartments
EB4	EB4-4.3a	1	66.0	56.9	57.8	58.1	1.2	Integra Trails Apartments
EB4	EB4-4.3b	1	66.0	61.6	62.5	61.4	-0.2	Integra Trails Apartments
EB4	EB4-4.3c	1	66.0	62.7	63.7	64.3	1.6	Integra Trails Apartments
EB4	EB4-4.3d	1	66.0	63.6	64.5	64.6	1.0	Integra Trails Apartments
EB4	EB4-5a	1	66.0	61.8	62.6	62.5	0.7	Integra Trails Apartments
EB4	EB4-5b	1	66.0	64.2	65.2	66.1	1.9	Integra Trails Apartments
EB4	EB4-5c	1	66.0	65.7	66.7	67.0	1.3	Integra Trails Apartments
EB4	EB4-5d	1	66.0	65.8	66.8	67.0	1.2	Integra Trails Apartments
EB4	EB4-5.1a	1	66.0	61.9	62.7	62.6	0.7	Integra Trails Apartments
EB4	EB4-5.1b	2	66.0	64.2	65.2	66.1	1.9	Integra Trails Apartments
EB4	EB4-5.1c	2	66.0	65.7	66.7	67.0	1.3	Integra Trails Apartments
EB4	EB4-5.1d	2	66.0	65.8	66.8	67.0	1.2	Integra Trails Apartments
EB4	EB4-5.2a	1	66.0	61.8	62.6	62.5	0.7	Integra Trails Apartments
EB4	EB4-5.2b	2	66.0	64.2	65.2	66.1	1.9	Integra Trails Apartments
EB4	EB4-5.2c	2	66.0	65.7	66.7	67.0	1.3	Integra Trails Apartments

Noise Study Area (NSA)	Receptor Name	# Sites Represented	NAC Impact Criterion (dB(A))	Existing LAeq1h (dB(A))	2045 No Build LAeq1h (dB(A))	2045 Build LAeq1h (dB(A))	Build Change From Existing (dB(A))	Description
EB4	EB4-5.2d	2	66.0	65.8	66.8	67.0	1.2	Integra Trails Apartments
EB4	EB4-5.3a	1	66.0	61.6	62.5	62.3	0.7	Integra Trails Apartments
EB4	EB4-5.3b	1	66.0	64.1	65.1	66.0	1.9	Integra Trails Apartments
EB4	EB4-5.3c	1	66.0	65.7	66.6	66.9	1.2	Integra Trails Apartments
EB4	EB4-5.3d	1	66.0	65.8	66.8	67.0	1.2	Integra Trails Apartments
EB4	EB4-SLU4-1	1	66.0	49.6	50.8	51.8	2.2	Integra Trails Apartments
WB1	WB1-SLU1-1	1	71.0	60.3	62.4	62.9	2.6	Days Inn pool
WB3	WB3-1	1	66.0	60.6	63.2	60.2	-0.4	Single Family Residence
WB3	WB3-2	1	66.0	58.6	61.2	57.9	-0.7	Single Family Residence
WB3	WB3-3	1	66.0	60.2	62.8	58.8	-1.4	Single Family Residence
WB3	WB3-SLU3-1	1	66.0	60.1	62.6	60.8	0.7	Diệu Nhân Buddhist Monastery
WB3	WB3-SLU3-2	1	66.0	55.5	57.7	55.3	-0.2	Surfside Fellowship Church
WB4	WB4-1.1	13	66.0	68.1	69.7	66.5	-1.6	Cocoa Pines Residence
WB4	WB4-1.2	1	66.0	62.7	64.3	62.5	-0.2	Cocoa Pines Residence
WB4	WB4-1.3	1	66.0	64.4	66.0	64.9	0.5	Cocoa Pines Residence
WB4	WB4-1.4	1	66.0	63.5	65.0	64.1	0.6	Cocoa Pines Residence
WB4	WB4-1.5	1	66.0	65.4	67.0	65.8	0.4	Cocoa Pines Residence
WB4	WB4-1.6	1	66.0	62.4	64.0	63.2	0.8	Cocoa Pines Residence
WB4	WB4-1.7	1	66.0	61.9	63.5	62.3	0.4	Cocoa Pines Residence
WB4	WB4-1.8	1	66.0	60.7	62.3	60.1	-0.6	Cocoa Pines Residence
WB4	WB4-1.9	1	66.0	60.7	62.2	61.0	0.3	Cocoa Pines Residence
WB4	WB4-1.10	9	66.0	58.7	60.2	58.9	0.2	Cocoa Pines Residence
WB4	WB4-1.11	1	66.0	58.2	59.9	57.9	-0.3	Cocoa Pines Residence
WB4	WB4-1.12	1	66.0	57.5	59.2	57.9	0.4	Cocoa Pines Residence
WB4	WB4-1.13	1	66.0	57.0	58.5	57.8	0.8	Cocoa Pines Residence
WB4	WB4-1.14	1	66.0	59.0	60.5	59.0	0.0	Cocoa Pines Residence
WB4	WB4-1.15	1	66.0	57.9	59.4	58.2	0.3	Cocoa Pines Residence
WB4	WB4-2.1	2	66.0	60.9	62.5	61.4	0.5	Cocoa North Unit 7 Residence
WB4	WB4-2.2	2	66.0	58.8	60.3	58.2	-0.6	Cocoa North Unit 7 Residence
WB4	WB4-2.3	1	66.0	56.8	58.3	57.2	0.4	Cocoa North Unit 7 Residence
WB4	WB4-2.4	5	66.0	56.5	58.0	56.3	-0.2	Cocoa North Unit 7 Residence
WB4	WB4-2.5	1	66.0	56.5	57.9	56.3	-0.2	Cocoa North Unit 7 Residence
WB4	WB4-2.6	1	66.0	56.4	57.8	56.3	-0.1	Cocoa North Unit 7 Residence
WB4	WB4-2.7	1	66.0	56.8	58.1	56.5	-0.3	Cocoa North Unit 7 Residence
WB4	WB4-2.8	1	66.0	56.5	57.9	56.3	-0.2	Cocoa North Unit 7 Residence
WB4	WB4-3.1	12	66.0	66.9	68.2	67.1	0.2	Cocoa North Villas/Cocoa North Unit 5 Residence
WB4	WB4-3.2	1	66.0	66.7	67.8	67.2	0.5	Cocoa North Villas/Cocoa North Unit 5 Residence
WB4	WB4-3.3	1	66.0	66.2	67.3	66.3	0.1	Cocoa North Villas/Cocoa North Unit 5 Residence
WB4	WB4-3.4	5	66.0	66.3	67.4	65.8	-0.5	Cocoa North Villas/Cocoa North Unit 5 Residence

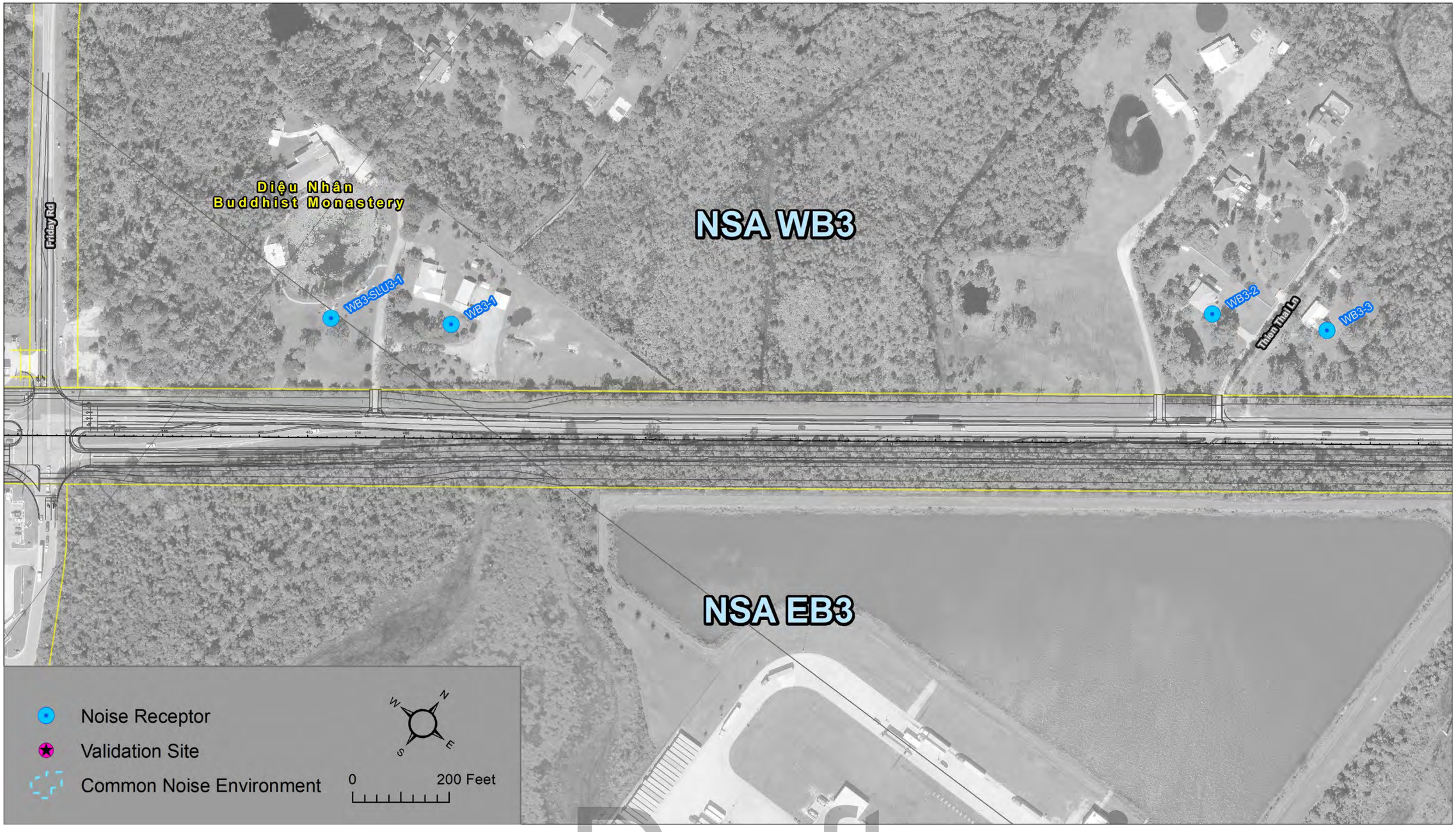
Noise Study Area (NSA)	Receptor Name	# Sites Represented	NAC Impact Criterion (dB(A))	Existing LAeq1h (dB(A))	2045 No Build LAeq1h (dB(A))	2045 Build LAeq1h (dB(A))	Build Change From Existing (dB(A))	Description
WB4	WB4-3.5	13	66.0	59.6	60.8	60.4	0.8	Cocoa North Villas/Cocoa North Unit 5 Residence
WB4	WB4-3.6	1	66.0	59.8	60.9	60.6	0.8	Cocoa North Villas/Cocoa North Unit 5 Residence
WB4	WB4-3.7	1	66.0	60.1	61.2	60.8	0.7	Cocoa North Villas/Cocoa North Unit 5 Residence
WB4	WB4-3.8	1	66.0	60.1	61.1	60.2	0.1	Cocoa North Villas/Cocoa North Unit 5 Residence
WB4	WB4-3.9	1	66.0	60.1	61.1	60.1	0.0	Cocoa North Villas/Cocoa North Unit 5 Residence
WB4	WB4-3.10	7	66.0	60.2	61.1	59.6	-0.6	Cocoa North Villas/Cocoa North Unit 5 Residence
WB4	WB4-3.11	1	66.0	56.7	57.7	56.7	0.0	Cocoa North Villas/Cocoa North Unit 5 Residence
WB4	WB4-3.12	1	66.0	56.9	58.0	56.9	0.0	Cocoa North Villas/Cocoa North Unit 5 Residence
WB4	WB4-3.13	4	66.0	56.0	57.0	55.8	-0.2	Cocoa North Villas/Cocoa North Unit 5 Residence
WB4	WB4-3.14	1	66.0	55.8	56.8	55.6	-0.2	Cocoa North Villas/Cocoa North Unit 5 Residence
WB4	WB4-3.15	1	66.0	55.9	56.8	55.8	-0.1	Cocoa North Villas/Cocoa North Unit 5 Residence
WB4	WB4-3.16	1	66.0	56.1	57.0	55.9	-0.2	Cocoa North Villas/Cocoa North Unit 5 Residence
WB4	WB4-3.17	1	66.0	56.3	57.2	56.1	-0.2	Cocoa North Villas/Cocoa North Unit 5 Residence
WB4	WB4-3.18	4	66.0	56.0	56.9	55.9	-0.1	Cocoa North Villas/Cocoa North Unit 5 Residence
WB4	WB4-SLU4-1	1	66.0	64.7	66.3	63.7	-1.0	Juny Rios Martinez Park Ballcourt
WB4	WB4-SLU4-2	1	66.0	64.4	65.8	63.5	-0.9	Juny Rios Martinez Park Pavilion
WB4	WB4-SLU4-3	1	66.0	59.8	60.6	58.3	-1.5	East Florida State College Golf Academy
WB5	WB5-1.1	2	66.0	60.3	62.6	61.0	0.7	Coventry of Cocoa Residence
WB5	WB5-1.2	3	66.0	59.2	61.5	60.1	0.9	Coventry of Cocoa Residence
WB5	WB5-1.3	1	66.0	58.4	60.7	59.5	1.1	Coventry of Cocoa Residence
WB5	WB5-1.4	1	66.0	57.9	60.3	59.2	1.3	Coventry of Cocoa Residence
WB5	WB5-1.5	1	66.0	57.9	60.2	59.2	1.3	Coventry of Cocoa Residence
WB5	WB5-1.6	1	66.0	57.4	59.7	58.9	1.5	Coventry of Cocoa Residence
WB5	WB5-2.1	1	66.0	61.5	64.2	64.6	3.1	Coventry of Cocoa Residence
WB5	WB5-2.2	1	66.0	60.6	63.1	63.2	2.6	Coventry of Cocoa Residence
WB5	WB5-2.3	1	66.0	59.9	62.4	62.2	2.3	Coventry of Cocoa Residence
WB5	WB5-2.4	3	66.0	59.2	61.7	61.2	2.0	Coventry of Cocoa Residence
WB5	WB5-2.5	1	66.0	58.2	60.7	59.8	1.6	Coventry of Cocoa Residence
WB5	WB5-2.6	1	66.0	57.3	59.7	59.0	1.7	Coventry of Cocoa Residence
WB5	WB5-2.7	2	66.0	56.8	59.2	58.7	1.9	Coventry of Cocoa Residence
WB5	WB5-2.8	1	66.0	56.1	58.4	58.2	2.1	Coventry of Cocoa Residence
WB5	WB5-2.9	1	66.0	55.6	57.9	57.9	2.3	Coventry of Cocoa Residence
WB5	WB5-2.10	1	66.0	55.2	57.4	57.5	2.3	Coventry of Cocoa Residence
WB5	WB5-2.11	1	66.0	54.8	57.1	57.3	2.5	Coventry of Cocoa Residence
WB5	WB5-2.12	1	66.0	56.8	59.2	58.3	1.5	Coventry of Cocoa Residence
WB5	WB5-2.13	1	66.0	56.3	58.6	58.0	1.7	Coventry of Cocoa Residence
WB5	WB5-2.14	1	66.0	55.8	58.0	57.6	1.8	Coventry of Cocoa Residence
WB5	WB5-2.15	2	66.0	55.1	57.4	57.2	2.1	Coventry of Cocoa Residence
WB5	WB5-2.16	1	66.0	54.6	56.8	56.7	2.1	Coventry of Cocoa Residence

Noise Study Area (NSA)	Receptor Name	# Sites Represented	NAC Impact Criterion (dB(A))	Existing LAeq1h (dB(A))	2045 No Build LAeq1h (dB(A))	2045 Build LAeq1h (dB(A))	Build Change From Existing (dB(A))	Description
WB5	WB5-2.17	1	66.0	54.2	56.3	56.4	2.2	Coventry of Cocoa Residence
WB5	WB5-2.18	1	66.0	54.0	56.2	56.1	2.1	Coventry of Cocoa Residence
WB5	WB5-2.19	1	66.0	53.8	55.9	56.0	2.2	Coventry of Cocoa Residence
WB5	WB5-2.20	1	66.0	53.5	55.6	55.7	2.2	Coventry of Cocoa Residence

APPENDIX D – PROJECT AERIALS


SR 524 PD&E Study
FM No. 437983-1
Not to Scale
D-2
D-3
D-4
D-5
D-6
D-7
D-8
Begin Project
End Project
Beachline Expressway
Grissom Parkway
Cox Road
Michigan Avenue
King Street
Eastern Florida State College Cocoa Campus
Fred Gay Golf Academy Driving Range
Spacex Starship Construction facility
Emerald Lakes
Cocoa
FL 528
FL 524
FL 501
I 95


NSA WB1
Lost Lakes
Aquarius Ter
Woodsmill Blvd
Lost Lake Dr
Lost Lake Dr
Brilliance Cir
Days Inn
WB1-SLU1-1
Friday Rd
Begin Project Limits
FM No. 437983-1
Friday Rd
NSA WB2
Friday Rd
NSA EB1
Flying J
NSA EB2
Noise Receptor
Validation Site
Common Noise Environment
N
W
E
S
0
200 Feet


Diệu Nhân
Buddhist Monastery
NSA WB3
Friday Rd
WB3-SLU3-1
WB3-1
WB3-2
Thien Thai Ln
WB3-3
NSA EB3
Noise Receptor
Validation Site
Common Noise Environment
N
W
E
S
0
200 Feet


NSA WB3
Alegra Apartments
at Cocoa
(future development)
Surfside Community
Fellowship Church
WB3-SLU3-2
NSA EB3
Cox Rd
Noise Receptor
Validation Site
Common Noise Environment
N
W
E
S
0
200 Feet


NSA WB4
Cocoa Pines
Cocoa North Unit 7
Junny Rios Martinez Park
Cocoa Landings
(future development)
NSA EB4
Cox Rd
Ponderosa St
Pinyon Dr
Longleaf Rd
Scotland Rd
Spring Cir
Sentry Dr
WB4-1.1
WB4-1.2
WB4-1.3
WB4-1.4
WB4-1.5
WB4-1.6
WB4-1.7
WB4-1.8
WB4-1.9
WB4-1.10
WB4-1.11
WB4-1.12
WB4-1.13
WB4-1.14
WB4-1.15
WB4-2.1
WB4-2.2
WB4-2.3
WB4-2.4
WB4-2.6
WB4-SLU4-1
Noise Receptor
Validation Site
Common Noise Environment
N
E
S
W
0
200 Feet


Spring Cir
Cocoa North Unit 7
Sentry Dr
Westminster Dr
WB4-2.5
WB4-2.6
WB4-2.7
WB4-2.8
WB4-SLU4-1
WB4-SLU4-2
Junny Rios Martinez Park
NSA WB4
Cocoa North Villas
Lance Blvd
WB4-3.1
WB4-3.2
WB4-3.3
WB4-3.4
WB4-3.4.1
WB4-3.4.2
WB4-3.5
WB4-3.6
WB4-3.7
WB4-3.8
WB4-3.9
WB4-3.10
WB4-3.11
WB4-3.12
WB4-3.13
WB4-3.14
WB4-3.15
WB4-3.16
WB4-3.17
WB4-3.18
Malory Ct W
Malory Ct E
Crossbow Dr
Pike Ct
Longbow Rd
EFSC Fred Gay Golf Academy
WB4-SLU4-3
VS-1
EB4-1
EB4-1.1
EB4-1.2
EB4-1.3
WB4SLU4-1
EB4-2
EB4-2.1
EB4-2.2
EB4-2.3
EB4-3
EB4-3.1
EB4-3.2
EB4-3.3
EB4-4
EB4-4.1
EB4-4.2
EB4-4.3
EB4-5
Integra Trails Apartments
NSA EB4
Noise Receptor
Validation Site
Common Noise Environment
N
W
E
S
0
200 Feet


NSA WB4
NSA WB5
Coventry of Cocoa
City of Cocoa Fire Station #3
NSA EB4
NSA EB5
Denham Rd
Colchester Rd
North Rd
Cricket Pl
Dunhill Dr
London Blvd
London Blvd
Coventry Ct
Wentworth Pl
Winchester Dr
WB5-1.1
WB5-1.2
WB5-1.3
WB5-1.4
WB5-1.5
WB5-1.6
WB5-2.1
WB5-2.2
WB5-2.3
WB5-2.4
WB5-2.5
WB5-2.6
WB5-2.7
WB5-2.8
WB5-2.9
WB5-2.10
WB5-2.11
WB5-2.12
WB5-2.13
WB5-2.14
WB5-2.15
WB5-2.16
WB5-2.17
WB5-2.18
WB5-2.19
WB5-2.20
EB4.5
EB4.5.1
EB4.5.2
EB4.5.3
Noise Receptor
Validation Site
Common Noise Environment
N
W
E
S
0
200 Feet

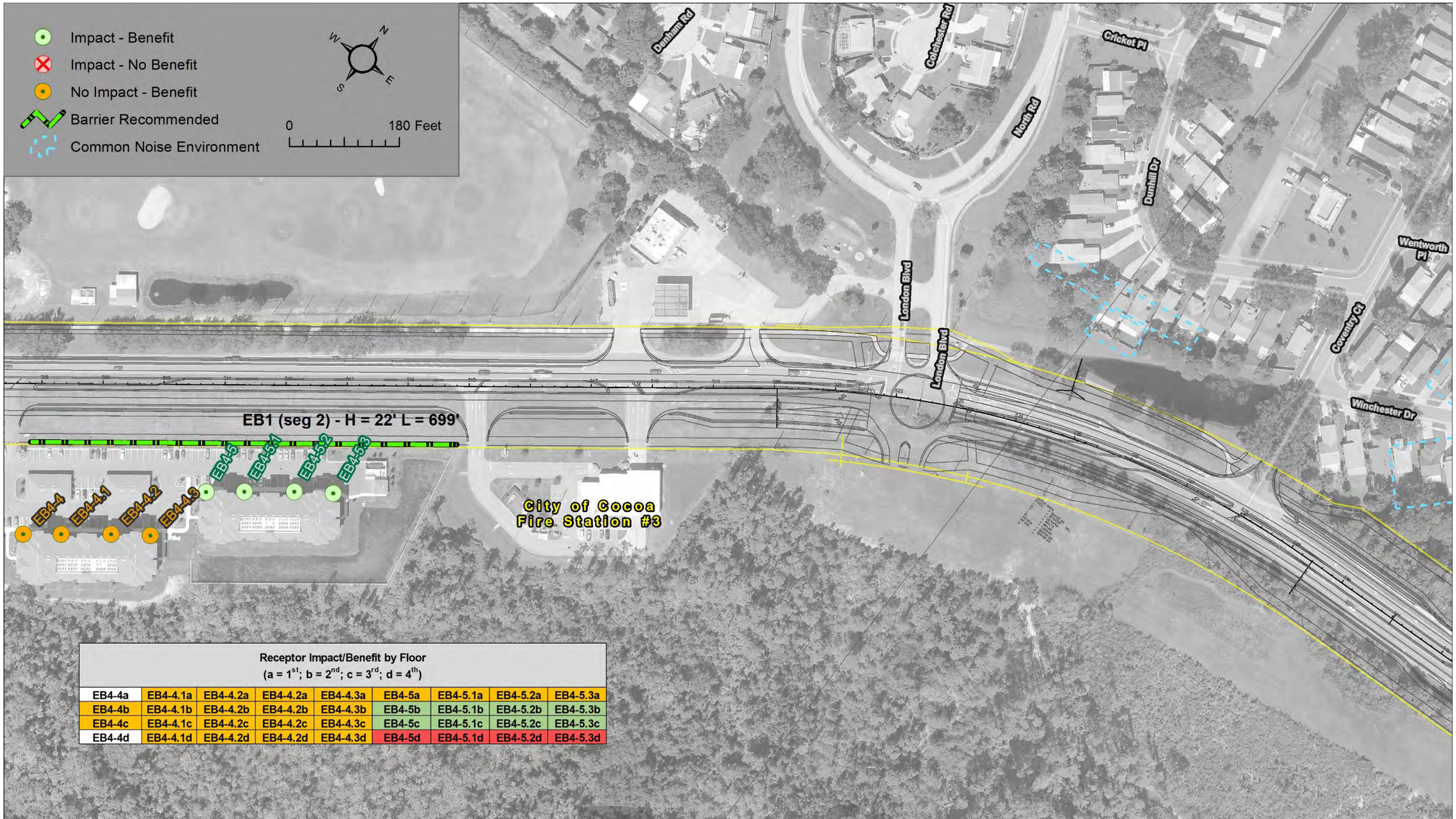

NSA WB6
NSA EB6
End Project Limits
FM No. 437983-1
Clearlake Rd
Otterbein Ave
Colby Ct
Ithaca Ct
Slippery Rock Dr
Kenyon Ave
Tulane Dr
Hedera Dr
Quail Ridge Ct
Noise Receptor
Validation Site
Common Noise Environment
N
W
E
S
0
200 Feet

APPENDIX E – Evaluated Noise Barriers


Impact - Benefit
Impact - No Benefit
No Impact - Benefit
Barrier Recommended
Common Noise Environment
N
W
E
S
0
180 Feet
NSA WB4
Cocoa Pines
Pinyon Dr
Scotland Rd
Sentry Dr
Longleaf Rd
WB4-1.2
WB4-1.1
WB4-1.3
WB4-1.7
WB4-1.4
WB4-1.6
WB4-1.5
WB1 (seg 1) - H = 14' L = 1,360'
WB1 (seg 2) - H = 14' L = 339'

Receptor Impact/Benefit by Floor
(a = 1st; b = 2nd; c = 3rd; d = 4th)

EB4-3a	EB4-3.1a	EB4-3.2a	EB4-3.3a	EB4-4a	EB4-4.1a	EB4-4.2a	EB4-4.2a	EB4-4.3a
EB4-3b	EB4-3.1b	EB4-3.2b	EB4-3.3b	EB4-4b	EB4-4.1b	EB4-4.2b	EB4-4.2b	EB4-4.3b
EB4-3c	EB4-3.1c	EB4-3.2c	EB4-3.3c	EB4-4c	EB4-4.1c	EB4-4.2c	EB4-4.2c	EB4-4.3c
EB4-3d	EB4-3.1d	EB4-3.2d	EB4-3.3d	EB4-4d	EB4-4.1d	EB4-4.2d	EB4-4.2d	EB4-4.3d



Receptor Impact/Benefit by Floor (a = 1st; b = 2nd; c = 3rd; d = 4th)								
EB4-4a	EB4-4.1a	EB4-4.2a	EB4-4.2a	EB4-4.3a	EB4-5a	EB4-5.1a	EB4-5.2a	EB4-5.3a
EB4-4b	EB4-4.1b	EB4-4.2b	EB4-4.2b	EB4-4.3b	EB4-5b	EB4-5.1b	EB4-5.2b	EB4-5.3b
EB4-4c	EB4-4.1c	EB4-4.2c	EB4-4.2c	EB4-4.3c	EB4-5c	EB4-5.1c	EB4-5.2c	EB4-5.3c
EB4-4d	EB4-4.1d	EB4-4.2d	EB4-4.2d	EB4-4.3d	EB4-5d	EB4-5.1d	EB4-5.2d	EB4-5.3d