

DRAFT NOISE STUDY REPORT

Florida Department of Transportation

District 1

DeSoto Bridge (Bridge #1300530) Replacement Project Development and Environment Study

Limits of Project: State Road 64 (Manatee Avenue East) to Haben Boulevard

Manatee County, Florida

Financial Management Number: 442630-1-22-01

ETDM Number: 14510

Date: March 18, 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 U.S.C. § 327 and a Memorandum of Understanding dated May 26, 2022 and executed by the Federal Highway Administration and FDOT.

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Executive Summary

The Florida Department of Transportation (FDOT), District One, is conducting a Project Development and Environment (PD&E) Study for the replacement of the DeSoto Bridge (Bridge # 130053) from State Road (SR) 64 (Manatee Avenue East) to Haben Boulevard in Manatee County, Florida. The purpose of this project is to address the structural degradation and substandard design elements of the existing DeSoto Bridge. The Preferred Build Alternative (East Alternative) will result in a substantial horizontal alteration of the roadway alignment and qualifies as a “Type I” project for which a traffic noise study is required.

The objectives of this Noise Study Report (NSR) are to identify noise sensitive land uses within the project limits, evaluate existing and future traffic noise levels at noise sensitive land uses with and without the proposed improvements, and to evaluate the need for and effectiveness of noise abatement measures. Additional objectives include the evaluation of construction noise impacts and the identification of noise impact contours adjacent to the corridor.

The traffic noise analysis was performed following FDOT procedures that comply with Title 23 Code of Federal Regulations (CFR), Part 772 “Procedures for Abatement of Highway Traffic Noise and Construction Noise.” The evaluation follows the FDOT’s traffic noise policy documented in the FDOT PD&E Manual. The prediction of future traffic noise levels with the roadway improvements was performed using Version 2.5 of the Federal Highway Administration’s (FHWA’s) Traffic Noise Model (TNM).

Within the project limits, 134 TNM receptors representing the various noise sensitive sites were modeled to represent 135 residences, six recreation uses, one hospital, one office outdoor use area, and one restaurant outdoor seating area.

Existing (2023) and future no-build (2050) exterior traffic noise levels are predicted to range from 52.4 to 73.8 dB(A) at the residences and recreation areas (Activity Categories B and C, respectively) and from 60.6 to 64.2 dB(A) at the two outdoor use areas considered Activity Category E. Interior traffic noise levels at Manatee Memorial Hospital are predicted to range from 45.7 to 47.2 dB(A).

Design year (2050) exterior traffic noise levels with the project (future build with the East Alignment) are predicted to range from 53.1 to 74.2 dB(A) at the residences, with traffic noise levels predicted to approach, meet, or exceed the Noise Abatement Criteria (NAC) for Activity Category B at 32 residential balconies located in the Aria at Bradenton Apartments. Traffic noise levels at the various recreation uses are predicted to range from 62.0 to 72.2 dB(A), and are predicted to approach, meet, or exceed the NAC for Activity Category C at portions of the walking trail located in Palmetto Estuary Preserve. Traffic noise levels are not predicted to approach, meet, or exceed the NAC at either of the Activity Category E uses evaluated or at the single Activity Category D use. None of the evaluated noise sensitive land uses are predicted to experience a substantial increase (15 dB(A) or more) in traffic noise resulting from the proposed project.

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Traffic management and alternative roadway alignments were determined to be unreasonable noise abatement measures. When used in conjunction with compatible land use planning, noise buffer zones can be an effective abatement measure. Noise contours, which are used to establish noise buffer zones, have been prepared for the future improved roadway facility and are discussed in this report.

A noise barrier was not evaluated for the Palmetto Estuary Preserve trail. The trail is considered an “isolated use” and according to FDOT’s methodology for evaluating noise abatement at non-residential land uses, would not have enough daily person-hours of use to warrant a detailed noise barrier analysis.

The results of the analysis indicate that a noise barrier is a potentially feasible and cost reasonable measure for up to 15 impacted residences within the Aria at Bradenton Apartments. There does not appear to be any other method of reducing the predicted traffic noise impacts at the remaining impacted residential receptors.

The FDOT is committed to the construction of the potentially feasible and cost reasonable noise abatement measure identified for the Aria at Bradenton Apartments, contingent upon the following conditions:

1. Final recommendations on the construction of the abatement measure are 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;
3. Cost analysis indicates that the cost of the noise barrier will not exceed the cost reasonable criterion;
4. Community input supporting types, heights, and locations of the noise barrier is provided to the District Office; and
5. Safety and engineering aspects related to the roadway user and the adjacent property owner have been reviewed and any conflicts or issues resolved.

Residences, hospitals, and parks are located within the project limits and are identified in the FDOT’s listing of noise and vibration-sensitive sites. It is anticipated that the application of the FDOT “Standard Specifications for Road and Bridge Construction” will minimize or eliminate potential construction noise and vibration impacts.

Both in-person and virtual Alternatives Public Workshops were conducted in October 2023. Various presentation materials were available showing both project build alternatives under consideration at the time. Members of the FDOT and project consultant team were available to answer questions and address concerns from stakeholders and the public. One general traffic noise inquiry was voiced during the in-person meeting, and no additional traffic noise-related concerns were received during the comment period that followed. The Public Hearing for the project is anticipated in spring 2024.

1.0 Introduction

1.1 Project Description

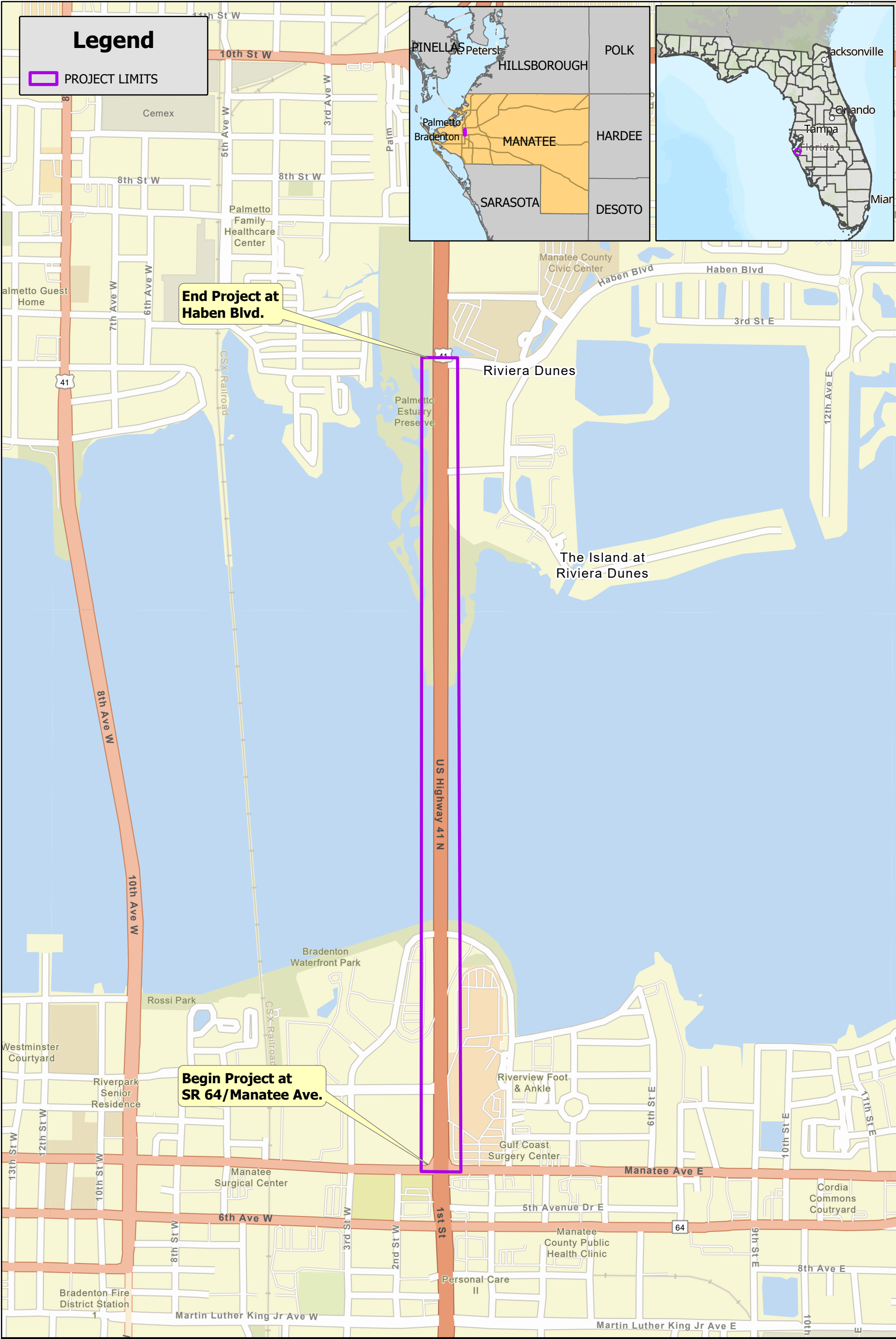
This project involves the potential in-kind replacement of the Hernando DeSoto Bridge (DeSoto Bridge), which carries US 301/US 41/SR 55 across the Manatee River between the cities of Bradenton and Palmetto within Manatee County (**Figure 1-1**). To bring the bridge up to current FDOT design standards, the inclusion of paved shoulders as well as bicycle and pedestrian facilities will be considered as part of the project.

As the Manatee River divides the western half of Manatee County, separating the Cities of Bradenton and Palmetto, the DeSoto Bridge is one of three north-south crossings of the river that connects the two communities. The current bridge structure is a mid-level fixed structure consisting of two 12-foot travel lanes in each direction (four lanes total) separated by concrete traffic barriers in the middle. It is 62 feet wide, 2,225 feet long, and consists of 30 concrete approach spans and three steel main spans. No shoulders or bicycle/pedestrian facilities are present on the bridge.

The landside segments of the roadway include two 12-foot travel lanes in each direction separated by a raised concrete and/or grass median with intermittent left and right turn lanes. Short sidewalk segments exist on the far southern and northern ends of the landside portions of the project corridor. While no transit service operates north-south on the project corridor, Manatee County Area Transit (MCAT) Route 3-Manatee Avenue operates along SR 64, crossing the project corridor twice.

The DeSoto Bridge was originally constructed in 1957 and is one of four bridges in Manatee County (along with Anna Maria Bridge, Cortez Bridge, and Longboat Pass Bridge) that requires replacement. Each has surpassed its 50-year life expectancy and is experiencing similar advanced corrosion issues; therefore, rehabilitation is no longer feasible. To avoid having all four bridges become structurally deficient at the same time, which would create challenging mobility issues for the traveling public and an unacceptable schedule of work in the geographic area, the FDOT District One has staggered the replacement of the bridges through a controlled schedule across several years. The DeSoto Bridge has been recommended for replacement within 5 to 10 years as it is expected to be classified as structurally deficient by the year 2027.

Existing right-of-way (ROW) along the project corridor ranges from 65 feet to 160 feet, narrower at the northern bridge approach and wider at the intersections with SR 64 and Haben Boulevard. Less than 1 acre of additional ROW is needed to provide the proposed typical section with sidewalk and shared use path connectivity.



Legend

 PROJECT LIMITS

End Project at Haben Blvd.

Begin Project at SR 64/Manatee Ave.

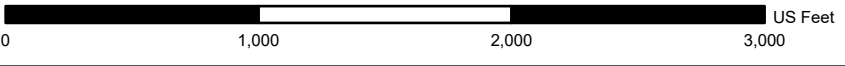
Figure 1-1 Study Area Location

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 From Manatee Avenue East (SR 64) to Haben Blvd.
 Manatee County, Florida

Data Source: ESA, ESRI



All data within this map are supplied as is, without warranty. This product has not been prepared for legal, engineering, or survey purposes. Users of this information should review or consult the primary data sources to ascertain the usability of the information.



1.2 Purpose and Need

The purpose of this project is to address the structural degradation and substandard design elements of the existing DeSoto Bridge located between SR 64 and Haben Boulevard within the cities of Bradenton and Palmetto in Manatee County. Other goals of the project are to 1) maintain a critical link for regional travel and 2) accommodate multimodal activity within the area. The primary need for the project is based on structural degradation and substandard design elements.

The bridge has exceeded its design life of 50 years. The bridge superstructure is composed of 1950s pre-American Association of State Highway and Transportation Officials (AASHTO) standards post-tensioned (PT) concrete beams reinforced with steel post-tensioning (PT) bars. These beams have a long history of problems in Florida and are of concern due to their tendency to excessively deteriorate and possibly fail. Although corrosion has not seriously impacted the anchorage of the bridge beams to date, corrosion has been identified on the beam end anchorage zones. The substructure is also rapidly deteriorating; gunite repairs previously performed on the footers are now failing on 93% of the footers. In addition, as revealed through an assessment of the bridge conducted by FDOT District One in March 2019 (which included corrosion testing of the concrete bridge material and rate of future corrosion progression), DeSoto Bridge falls on the low end of the fair condition per National Bridge Inspection ratings (with poor, fair, and good serving as the ratings). The substructure elements that were tested exceed the threshold levels (at levels two to three times higher) for chloride intrusion and for corrosion potential concentrations. There is evidence that the high chloride contamination levels in the existing concrete are causing recent concrete repairs to fail prematurely; the pier columns and footings have reached a point where repairing concrete materials is no longer an option to provide long-term corrosion control.

The existing DeSoto Bridge does not meet current FDOT design standards as it lacks both inside and outside shoulders as well as bicycle and pedestrian facilities. According to the 2023 FDOT Design Manual, the typical section for this type of bridge should feature 12-foot lanes, 10-foot outside shoulders, and 6-foot inside shoulders. Sidewalks and/or bicycle facilities should also be considered to allow for the safe movement of pedestrians and bicyclists along the bridge. The lack of inside and outside shoulders on the bridge restricts the ability of drivers to avoid hazards or react to changing driving conditions within the directional travel lanes without causing direct impacts. In addition, due to the current configuration of the bridge, there is limited space for an emergency service vehicle to pass to respond to a situation during periods of congestion or to accommodate a maintenance vehicle or disabled vehicle to prevent it from obstructing traffic flow.

The project is anticipated to address the systemic deterioration of the existing bridge structure as well as the design deficiencies of the bridge.

1.3 Alternatives Analysis

The DeSoto Bridge is scheduled for an in-kind replacement in fiscal year (FY) 2027 since it is considered structurally deficient. Two (2) build alternatives were analyzed for the DeSoto Bridge (East and West Alternatives) and are described in more detail in the Preliminary Engineering Report.

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Based on engineering and environmental analysis, the East Alternative was determined to be the Preferred Alternative.

- The Preferred (East) Alternative would provide a new 4-lane bridge. The new bridge would have an alignment shifted to the east of the existing bridge.

The Preferred Alternative provides a new bridge over the Manatee River. The proposed construction includes the removal of the existing bridge and bringing the new bridge crossing up to current FDOT design standards.

1.3.1 Build Typical Section

The current bridge has 12-foot lanes, 2-foot outside shoulders, and a 4-foot inside shoulder. There are no sidewalks or bike lanes for pedestrians along the bridge. The total width of the bridge is 62 feet, 1 inch (**Figure 1-2**).

The typical section for the proposed bridge features 12-foot lanes, 12-foot outside shoulders, and 10-foot inside shoulders. A 12-foot shared use path is proposed on the northbound and southbound sides of the bridge, allowing for the safe movement of pedestrians and bicyclists along the bridge. The total proposed width of the new bridge is 123 feet, which nearly doubles the width of the existing bridge (**Figure 1-3**).

Modifications to US 41/US 301/SR 55 north of the bridge include two 12-foot wide throughway lanes with up to two turn lanes of varying widths up to 12-feet wide. The southbound direction has two turn lanes (right and left), while the northbound direction has one right turn lane option. There is a 5-foot sodded shoulder on each side of the roadway, followed by a drainage swale on the southbound side. Combining the 7-foot traffic separator in the center of the roadway and the northbound left turn lane will give the roadway a 22-foot median. A 12-foot shared use path for pedestrians and bicyclists on the northbound and southbound sides will be included north of the bridge. These paths will continue south and continue over the new DeSoto Bridge (**Figure 1-4**).

Modifications to US 41/US 301/SR 55 south of the bridge include two 12-foot wide throughway lanes with one 12-foot wide turn lane. There is a 5-foot sod shoulder on each side of the roadway followed by a drainage swale on the southbound side. Two 10-foot shoulders are proposed in the center of the roadway for a 22-foot median. One 12-foot shared use path on the southbound side and one sidewalk, up to 8 feet wide, on the northbound side, for pedestrians and bicyclists will be included south of the bridge (**Figure 1-5**).

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Figure 1-2: Typical Section – Existing Bridge

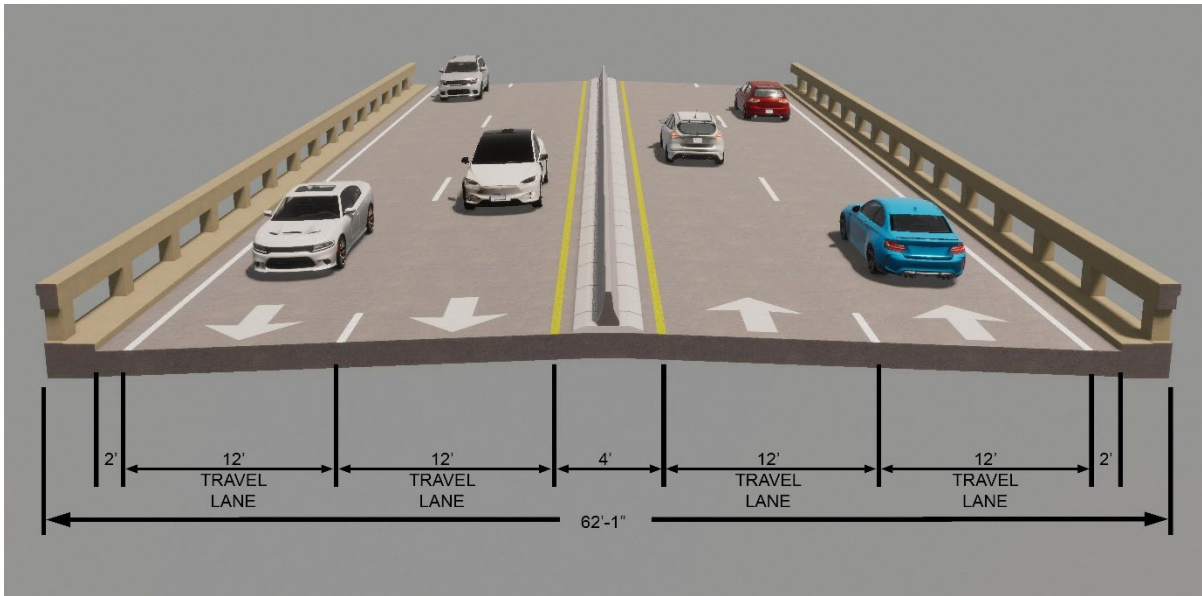
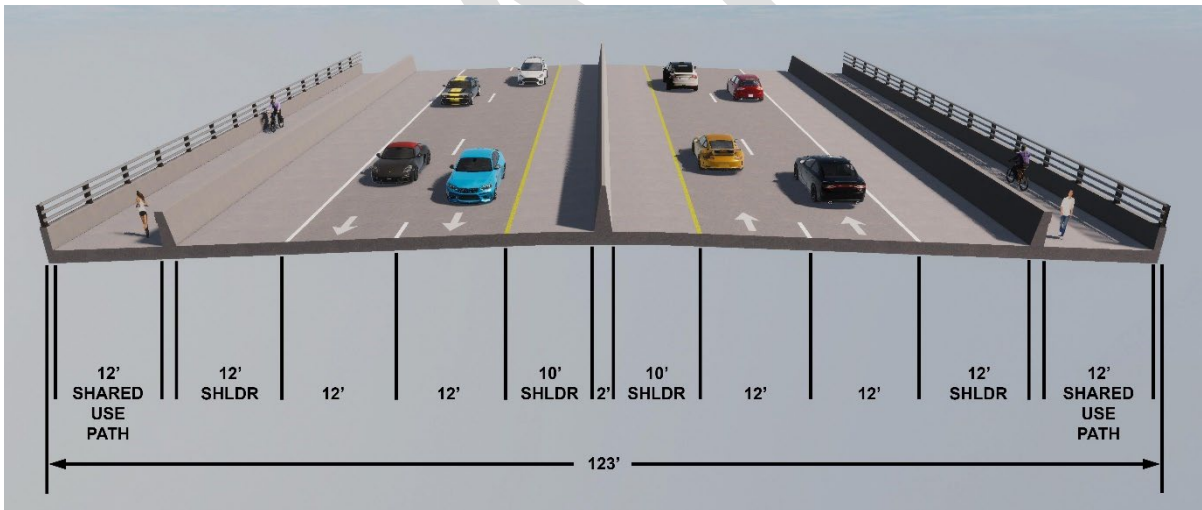


Figure 1-3: Typical Section – Proposed Bridge



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Figure 1-4: Typical Section – Roadway North

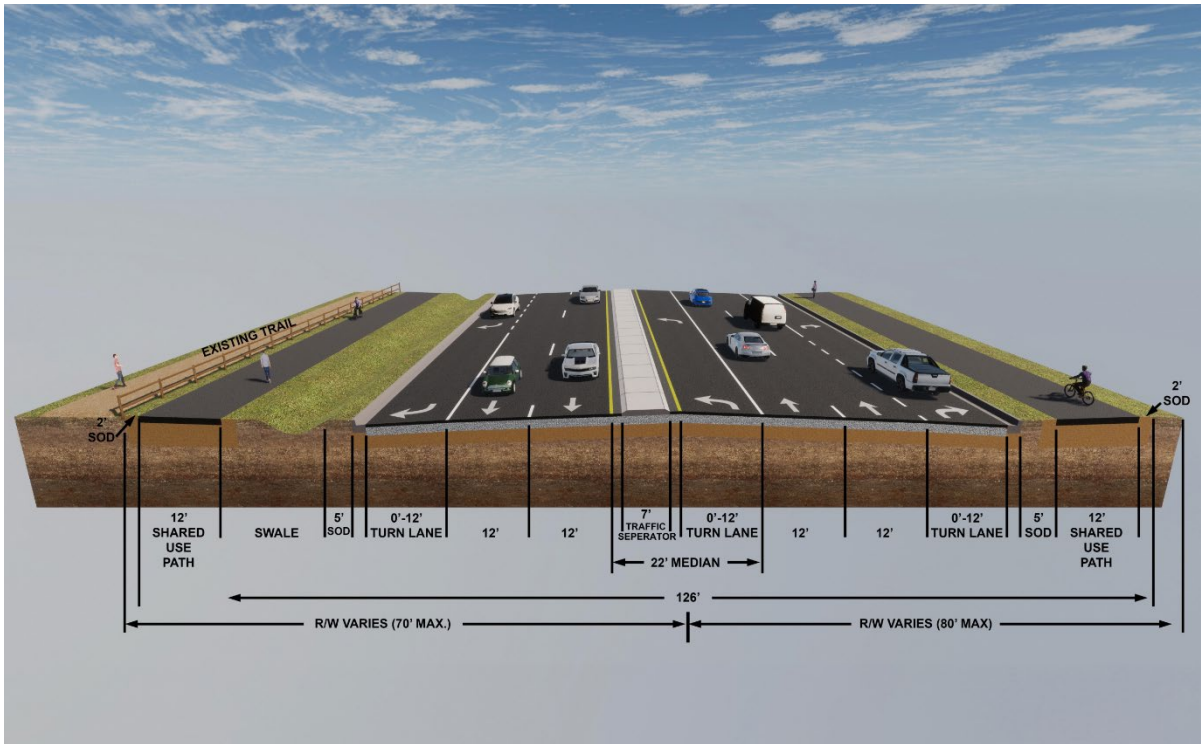
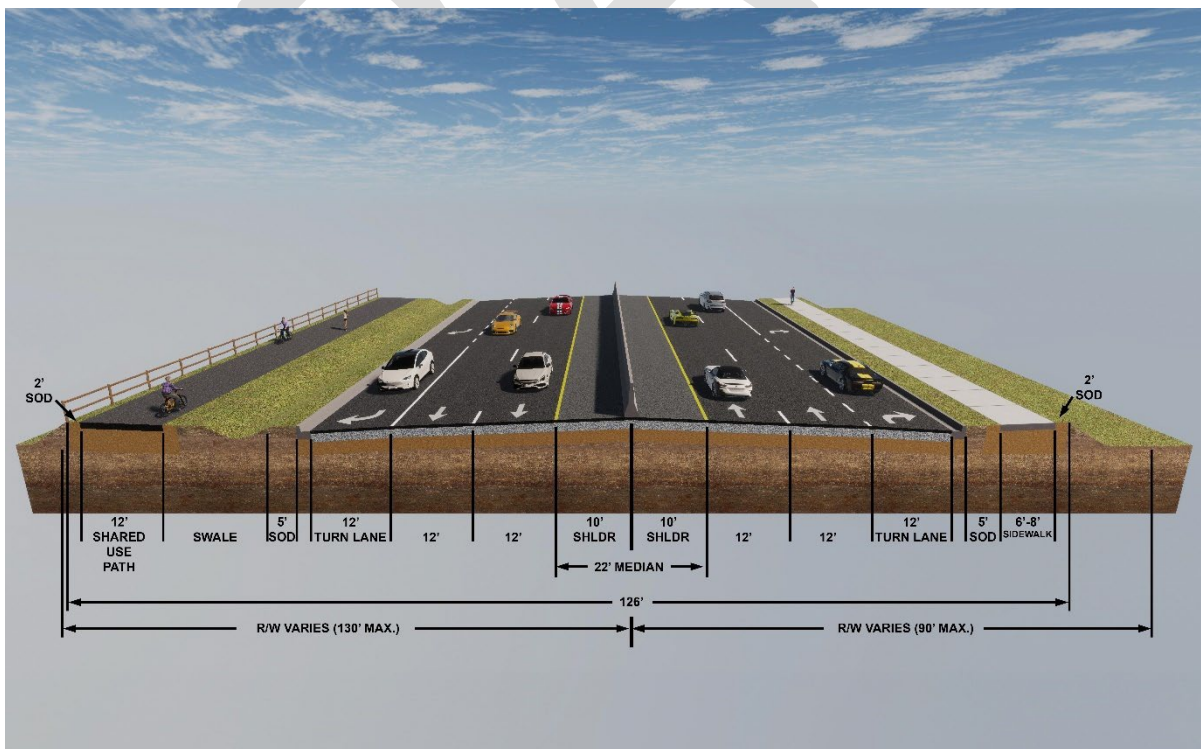


Figure 1-5: Typical Section – Roadway South



1.3.2 No-Build Alternative

The No-Build Alternative would maintain the DeSoto Bridge as it currently exists. Maintenance costs would continue to escalate with shorter durations between repairs. With rehabilitation no longer being a feasible option, structural deficiency is inevitable under the No-Build Alternative.

1.3.3 Preferred Build Alternative – East Alternative

The northbound half of the new bridge will begin construction independently of the existing bridge, with a centerline shift of approximately 41 feet to the east. This will allow for a spacing of about 10 feet between the new and old bridges, maintaining all traffic as normal on the existing bridge and roadway while the construction of the new bridge proceeds without interference. After the completion of the northbound half of the new bridge, temporary striping will provide four lanes, with two lanes in each direction, for all traffic to be shifted onto the new bridge. The old DeSoto Bridge will then be removed, and the southbound half of the new bridge will be constructed and joined with the northbound structure. This new bridge includes 12-foot protected shared-use paths on both sides, 12-foot outside shoulders, and 10-foot inside shoulders, along with two 12-foot travel lanes, barrier-separated, in both directions. The new bridge will be approximately 2,225 feet in length and have grades of $\pm 3.2\%$. It will have a vertical channel clearance of 40 feet above the mean water level and 75 feet of horizontal clearance. The new bridge will meet all current FDOT design standards and could be widened in the future.

Traffic patterns on the landside will not change, as the through lanes will remain consistent with existing conditions. The roadway will have to be slightly adjusted and will begin to skew eastward approximately 490 feet from the project's start at Manatee Avenue East. A new sidewalk that will transition into the shared-use path is proposed closer to the Manatee Memorial Hospital parking lot, but this infrastructure will be constructed within the existing right-of-way. While most of the improvements are located within the existing right-of-way, additional ROW will need to be purchased throughout the corridor in areas to accommodate additional new sidewalks and the shared-use paths. Shared-use paths on both the northern and southern ends will be implemented to accommodate the new paths on the bridge.

1.4 Noise Study Report

The objectives of this Noise Study Report (NSR) are to identify noise sensitive land uses within the project limits, to evaluate existing and future traffic noise levels at the sites with and without the proposed improvements, and to evaluate the need for and effectiveness of noise abatement measures. Additional objectives include the evaluation of construction noise impacts and the identification of noise impact contours adjacent to the corridor.

2.0 Methodology

This traffic noise study was prepared in accordance with Title 23 Code of Federal Regulations (CFR) Part 772, “Procedures for Abatement of Highway Traffic Noise and Construction Noise.”¹ The evaluation uses methodology established by the FDOT Traffic Noise Policy documented in the “Highway Traffic Noise” chapter of the PD&E Manual.² Additional guidance was obtained from the FDOT document “Traffic Noise Modeling and Analysis Practitioners Handbook”.³

In accordance with 23 CFR Part 772 and the FDOT Traffic Noise Policy, this project will result in the substantial horizontal alteration of the roadway alignment and qualifies as a “Type I” project for which a traffic noise study is required.

The prediction of existing and future traffic noise levels, with and without the roadway improvements, was performed using the Federal Highway Administration’s (FHWA’s) computer model for highway traffic noise prediction and analysis – the Traffic Noise Model (TNM-Version 2.5). The TNM predicts sound energy, in one-third octave bands, between highways and nearby receptors taking the intervening ground’s acoustical characteristics, topography, and rows of buildings into account.

The predicted noise levels presented in this report are expressed in decibels (dB) on the A-weighted scale dB(A). This scale most closely approximates the response characteristics of the human ear to traffic noise. All noise levels are reported as hourly equivalent level $Leq(h)$ values, which is the equivalent steady-state sound level for a one-hour period that contains the same acoustic energy as the time-varying sound level during the same time period. The use of the Leq metric and dB(A) as the unit of measurement is specified by 23 CFR Part 772.

2.1 Traffic Data

The traffic data approved for use in the analysis is provided in **Appendix A**. Level of Service “C” (LOS C) or demand volumes, whichever is less, were used for modeled roadway segments within the project limits. The lesser of the two volumes is used since traffic noise is a combination of volume and speed, not necessarily one or the other. If the traffic analysis shows that demand volumes exceed roadway capacity (i.e., LOS C volumes), there would be a decrease in speed and as a result, a decrease in predicted traffic noise levels. Conversely, if demand traffic volumes are predicted to be less than LOS C/roadway capacity, it’s determined that maximum capacity volumes would not be achieved, and the demand volumes are appropriate for use. This approach ensures that the worst-case traffic noise levels are predicted at noise sensitive land uses. LOS C volumes were used in the analysis of the existing, future no-build, and future build conditions.

Vehicle speeds are based on the posted speed limit for the existing and future no-build conditions, and the proposed posted speed limits for the future build condition. The speed limit used for US 41/US 301/SR 55 was 50 miles per hour (mph) for the existing, future no-build, and future build conditions.

2.2 Measured Sound Levels and Computer Model Validation

As discussed, existing and future traffic noise levels were modeled using the TNM. To ensure that these predictions are as accurate as possible, the computer model was validated using sound levels measured at locations adjacent to the project corridor. Traffic data including motor vehicle volumes, vehicle mix, vehicle speeds (obtained using a handheld radar gun), and meteorological conditions were observed and recorded during each measurement period. The model validation was conducted in accordance with 23 CFR Part 772 and the FDOT's traffic noise policy.

The field measurements for this project were conducted in accordance with the FHWA's "Noise Measurement Handbook".⁴ Each field measurement was obtained using a Larson Davis Model 720 Sound Level Meter (SLM). The SLM was calibrated before and after each monitoring period with a Larson Davis Model CAL150 Sound-Level Calibrator. Measurements were conducted at two locations within the project limits; one south and one north of the Manatee River, and are shown on the figures in **Appendix B**.

The vehicle data (volumes, fleet mix, and speeds) observed and recorded during each monitoring period were used as input for the TNM to determine if, along with the existing roadway geometry and area site conditions, the computer model could "re-create" the measured levels with the existing roadway. Consistent with the FDOT's traffic noise policy, a traffic noise prediction model is considered within the accepted level of accuracy if the measured and predicted noise levels are within a tolerance standard of plus or minus three dB(A). Each measurement period lasted for a duration of 10 minutes, with three 10-minute periods occurring at each location. Observed traffic data for each 10-minute period was multiplied by six to determine hourly volumes for input to the TNM. Vehicle speeds were averaged for each of the five vehicle classifications observed and recorded during each measurement period.

Table 2-1 presents the field measurements and the validation results for the project. As shown, the ability of the model to predict noise levels within the acceptable range of plus or minus three dB(A) for the project was confirmed. At Site 1, measured levels were lower than those predicted by TNM, which may be due to a combination of the roadway elevation being higher than the ground elevation at the measurement site and shielding caused by roadway edge diffraction. For the measurement periods at the second site when measured levels were higher than those predicted by the TNM, the difference is likely due to being downwind from US 41/US 301/SR 55. Documentation in support of the model validation measurements is provided in **Appendix C** of this report.

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Table 2-1 Model Validation Results

Validation Monitoring Site ID/Location ¹	Measurement Period	Leq(h) – dB(A)		
		Measured	Modeled	Difference ²
1: Open/Grassy Area near Bradenton Riverwalk adjacent to DeSoto Bridge approach	1	66.7	68.3	-1.6
	2	67.0	67.5	-0.5
	3	65.3	67.3	-2.0
2: Palmetto Estuary Preserve	1	69.6	69.0	0.6
	2	70.6	68.7	1.9
	3	69.6	68.7	0.9

¹ Measurements were obtained on February 9, 2024. Measurement locations are provided on the Figures in Appendix B.

² A negative “Difference” value indicates computer modeled noise levels are higher than those measured in the field.

2.3 Noise Abatement Criteria

To evaluate traffic noise, the FHWA established Noise Abatement Criteria (NAC). As shown in **Table 2-2**, the criteria vary according to a property’s activity category.

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Table 2-2 Noise Abatement Criteria

Activity Category	Activity Leq(h) ¹		Evaluation Location	Description of 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 ²	67	66	Exterior	Residential.
C ²	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, recreational 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 ²	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.

(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.

Note: FDOT defines that a substantial noise increase occurs when the existing noise level is predicted to be exceeded by 15 decibels or more as a result of the transportation improvement project. When this occurs, the requirement for abatement consideration will be followed.

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When predicted traffic noise levels “approach” or exceed the NAC, or when predicted future noise levels increase substantially from existing levels, FDOT policy requires the consideration of noise abatement measures. The FDOT defines the word “approach” to mean within one dB(A) of the NAC and states that a substantial increase will occur if traffic noise levels are predicted to increase 15 dB(A) or more when compared to existing noise levels as a direct result of a transportation improvement project.

Within the project limits, 134 TNM receptors (i.e., a discrete or representative location of a noise sensitive area(s)) representing the various noise sensitive sites were modeled to represent 144 noise sensitive uses. The following provides a description of those evaluated within each Activity Category present within the project limits:

- Activity Category B (Residences): 93 receptors were modeled to represent 135 residences within the project limits. This includes single-family (SF) residences, and residences within multi-family (MF) apartment and condominium buildings. Residential receptor points were located at the edge of the structure closest to US 41/US 301/SR 55 for SF homes and at the balcony/patio for the residences within the MF buildings. South of the Manatee River, 68 residential balconies were evaluated within the Aria at Bradenton Apartments. North of the Manatee River, SF residences were evaluated within the Pegel Point and Jet mobile home cooperative (co-op) communities, as well as both SF homes and balconies/patios at condominium buildings within the Riviera Dunes community. In some cases, a single receptor point was used in TNM to represent more than one residence.
- Activity Category C (Recreation Uses): 37 receptors were modeled within six Activity Category C uses, including the Blue Star Memorial, Bradenton Skatepark, Bradenton Riverwalk, Palmetto Estuary Preserve trail, playground, and picnic tables, and picnic tables next to a primitive boat ramp. Multiple receptors were used to predict the extent of traffic noise levels within each of these uses.
- Activity Category D (Medical Facilities): Two receptors were used to evaluate interior traffic noise levels at Manatee Memorial Hospital.
- Activity Category E (Offices and Restaurant Outdoor Seating): Two receptors were used to represent the outdoor seating areas at the Mattison’s Riverwalk Grille restaurant and Riverwalk Professional Park offices.

All receptor heights were assumed to be five feet above ground level for first floor residential units, recreation uses, medical facilities and outdoor seating areas. Additional residential receptors above the ground floor in the apartment and condominium buildings were assumed to be an additional 10 feet above ground for each subsequent level (i.e., a second-floor residence is 15 feet above ground, 3rd floor residence is 25 feet above ground, etc.). The letters A, B, and C, D, etc. following a receptor ID (i.e., 1A, 1B, 1C, 1D) denote first, second, third, and fourth, floor receptors, respectively.

Exterior traffic noise levels were predicted for the residences, recreation uses, and outdoor seating areas at the office and restaurant. Interior traffic noise levels were predicted at Manatee Memorial

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Hospital. Interior traffic noise levels were determined by applying a building reduction factor to the predicted exterior traffic noise level at the face of the building structure closest to US 41/US 301/SR 55. Field reviews as well as information available from the Manatee County Property Appraiser confirmed the hospital is built of concrete block/masonry construction, which warranted a 25 dB(A) reduction factor consistent with guidance found in the FHWA publication “Highway Traffic Noise: Analysis and Abatement Guidance”.⁵

The modeled receptor locations are provided on the figures in **Appendix B**. Noise sensitive land uses were verified during field reviews of the project area conducted in June 2023 and February 2024 and based on property records available online from the Manatee County Property Appraiser.

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3.0 Results of the Noise Analysis

Table 3-1 provides a summary of predicted traffic noise levels for the existing/future no-build conditions, as well as the future build condition with the Preferred East Alternative. A complete list of predicted traffic noise levels for all evaluated noise sensitive land uses is provided in **Appendix D**. The TNM files have been provided electronically as **Appendix E**.

As shown in **Table 3-1**, existing (2023) and future no build (2050) exterior traffic noise levels are predicted to range from 52.4 to 73.8 dB(A) at the residences (Activity Category B), 61.1 to 71.8 dB(A) at the recreation uses (Activity Category C), and from 60.6 to 64.2 dB(A) at the two outdoor use areas considered Activity Category E. Interior traffic noise levels at Manatee Memorial Hospital are predicted to range from 45.7 to 47.2 dB(A).

Design year (2050) exterior traffic noise levels with the project (future build with the Preferred East Alternative) are predicted to range from 53.1 to 74.2 dB(A) residences, with traffic noise levels predicted to approach, meet, or exceed the NAC for Activity Category B at 32 residential balconies located in the Aria at Bradenton Apartments. Traffic noise levels at the various recreation uses are predicted to range from 62.0 to 72.2 dB(A). Traffic noise levels are predicted to approach, meet, or exceed the NAC for Activity Category C at portions of the walking trail located in Palmetto Estuary Preserve. Traffic noise levels are not predicted to approach, meet, or exceed the NAC for either of the Activity Category E uses evaluated, ranging from 60.2 to 63.0 dB(A). Finally, interior traffic noise levels at Manatee Memorial Hospital are predicted to range from 45.9 to 47.4 dB(A), levels that do not approach, meet, or exceed the NAC for Activity Category D.

When compared to existing traffic noise levels, the largest increase with the proposed project is predicted to be 2.4 dB(A). None of the evaluated noise sensitive land uses are predicted to experience a substantial increase (15 dB(A) or more) in traffic noise resulting from the proposed project. The increase in predicted traffic noise levels can be attributed to the roadway and bridge alignment shifting to the east. Some locations are also predicted to experience a decrease in traffic noise levels in the future when compared to the existing condition, which can be attributed to a combination of the roadway/bridge alignment shift to the east as well as the wider roadway typical section that creates shielding due to roadway edge diffraction.

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Table 3-1 Summary of Predicted Traffic Noise Levels¹

Site ID's	Sheet ²	Number & Type of Sites Represented	NAC Activity Category	Range of Predicted Traffic Noise Levels - Leq (dB(A))			Number of Impacted Sites with Preferred Alternative Future Build	Barrier #
				Existing/Future No-Build (2023/2050)	Preferred Alternative Future Build (2050)	Change from Existing		
1-10	1	Aria at Bradenton Apartments – 68 residential balconies	B	59.7 to 73.8	60.9 to 74.2	-0.5 to 2.3	32	1
48-50	6	Pegel Point – 4 residences		53.9 to 54.0	54.3 to 54.4	0.4 to 0.5	0	N/A
51-57	6	Jet Mobile Home Co-Op – 7 residences		53.8 to 55.2	53.1 to 54.1	0.7 to 1.2	0	N/A
62-64	7	Island at Riviera Dunes – 3 residences		52.4 to 53.6	53.1 to 54.1	0.5 to 0.7	0	N/A
65-66	7	Laguna at Riviera Dunes Condominiums – 28 residences		55.6 to 62.5	56.8 to 62.6	0.1 to 1.2	0	N/A
67-68	7	Bel Mare at Riviera Dunes Condominiums – 28 residences		53.5 to 60.4	55.4 to 60.5	0.0 to 2.1	0	N/A
15	2	Outdoor Memorial	C	62.0	62.0	0.0	0	N/A
16-30	3	Bradenton Skatepark		63.2 to 69.3	62.5 to 65.6	-4.2 to -0.3	0	N/A
31-35	3	Bradenton Riverwalk		63.8 to 68.3	62.9 to 65.0	-3.3 to -0.6	0	N/A
36-45	4-7	Palmetto Estuary Preserve Trail		64.5 to 71.8	62.6 to 72.2	-3.7 to 0.6	1	N/A ³
46-47	6-7	Palmetto Estuary Preserve Picnic Tables		61.1 to 62.2	62.0 to 62.9	0.7 to 0.9	0	N/A

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Site ID's	Sheet ²	Number & Type of Sites Represented	NAC Activity Category	Range of Predicted Traffic Noise Levels - Leq (dB(A))			Number of Impacted Sites with Preferred Alternative Future Build	Barrier #
				Existing/Future No-Build (2023/2050)	Preferred Alternative Future Build (2050)	Change from Existing		
58-61	5	Outdoor Tables at Boat Ramp	C	64.3 to 65.1	63.9 to 64.5	-0.4 to -0.6	0	N/A
13-14	1-2	Manatee Memorial Hospital	D (Interior)	45.7 to 47.2	45.9 to 47.4	0.2	0	N/A
11	2	Office Outdoor Use Area	E	60.6	63.0	2.4	0	N/A
12	2	Restaurant Outdoor Seating	E	64.2	60.2	-4.0	0	N/A

¹ A full list of Predicted Traffic Noise Levels is provided in Appendix D.

² Please refer to the Figures in Appendix B.

³ Abatement not evaluated since minimum usage requirements cannot be achieved. See Section 4.4 for further information.

4.0 Evaluation of Abatement Alternatives

The FDOT is required to consider traffic noise abatement measures when design year future build traffic noise levels approach, meet, or exceed the NAC for a given activity category or when levels increase substantially (15 dB(A) or more) compared to existing levels. The abatement measures considered for the Activity Category B and C land uses predicted to be impacted by traffic noise from the proposed project include traffic management, roadway alignment modifications, buffer zones, and noise barriers. The following subsections discuss the feasibility (e.g., amount of noise reduction and engineering considerations) and cost reasonableness of each of the abatement measures.

4.1 Traffic Management

Traffic management measures that limit motor vehicle speeds and/or reduce traffic volumes can be effective mitigation measures. However, they also negate the ability of the project to accommodate the forecast future travel demand. For example, if the posted speed were reduced, the ability of US 41/US 301/SR 55 and the DeSoto Bridge to accommodate the forecast motor vehicle demand would also be reduced. The posted speed for US 41/US 301/SR 55 will remain 50 mph (as it currently exists) with the replacement of the DeSoto Bridge, and a reduction to the posted speed limit would reduce the ability of the roadway to handle the future motor vehicle traffic demand. As a result, traffic management measures are not considered a reasonable noise abatement measure for this project.

4.2 Alignment Modifications

Except for the noted shifts to the east to construct the proposed bridge replacement while maintaining traffic patterns on the existing bridge, the alignment for the proposed project generally follows the existing bridge alignment and seeks to minimize the need for additional ROW within the project limits beyond that proposed for acquisition. Shifting the bridge alignment further would result in additional ROW acquisition costs and may not provide a positive benefit since noise sensitive land uses are located on both the east and west sides of US 41/US 301/SR 55 and the DeSoto Bridge. As such, an alternative roadway alignment is not considered a reasonable noise abatement measure.

4.3 Buffer Zones

Land uses such as residences, hotels, schools, churches, and recreation areas are considered incompatible with highway traffic noise levels that exceed the NAC for their respective Activity Category as detailed previously in Table 2-2. To reduce the possibility of noise related impacts to future development, noise level contours were developed for the future improved roadway facility. These noise contours predict the distance from the outside edge of the nearest travel lane for the

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Future Build to the location where the NAC for each Activity Category (A through E) is expected to be approached (i.e. within one dB(A) of the NAC) in the design year (2050). Upon completion of this report, copies will be provided to Manatee County to promote compatibility between the proposed project and additional development that may occur in the future. Noise contour distances are provided in **Table 4-1** and shown in **Figure 4-1**.

Table 4-1 Noise Contours

US 41/US 301/SR 55 Roadway Segment	Activity Category (NAC)	Distance to Approach (within 1 dB(A)) of NAC for Activity Category (feet) ¹
Project Limits: SR 64 (Manatee Avenue East) to Haben Boulevard	A (57 dB(A))	525
	B/C (67 dB(A))	110
	D ² (52 dB(A))	40
	E (72 dB(A))	40

¹ Distances are measured from the outside edge of the nearest travel lane for the improved roadway, do not account for any reduction in noise levels that may occur from shielding and/or terrain, and should be used for planning purposes only.

² The distance to the interior impact criteria for Activity Category D is based on a conservative reduction factor of 20 dB(A) due to the building envelope that is applied to the predicted exterior traffic noise level.

4.4 Noise Barriers

Noise barriers reduce noise levels by altering the sound propagation path between the noise source and the receptor. To effectively reduce traffic noise, a noise barrier must be relatively long, continuous (without intermittent openings), and sufficiently tall to provide a discernable reduction in noise levels. Consistent with FDOT's traffic noise policy, the minimum requirements for a noise barrier to be considered acoustically feasible and reasonable, and economically reasonable are:

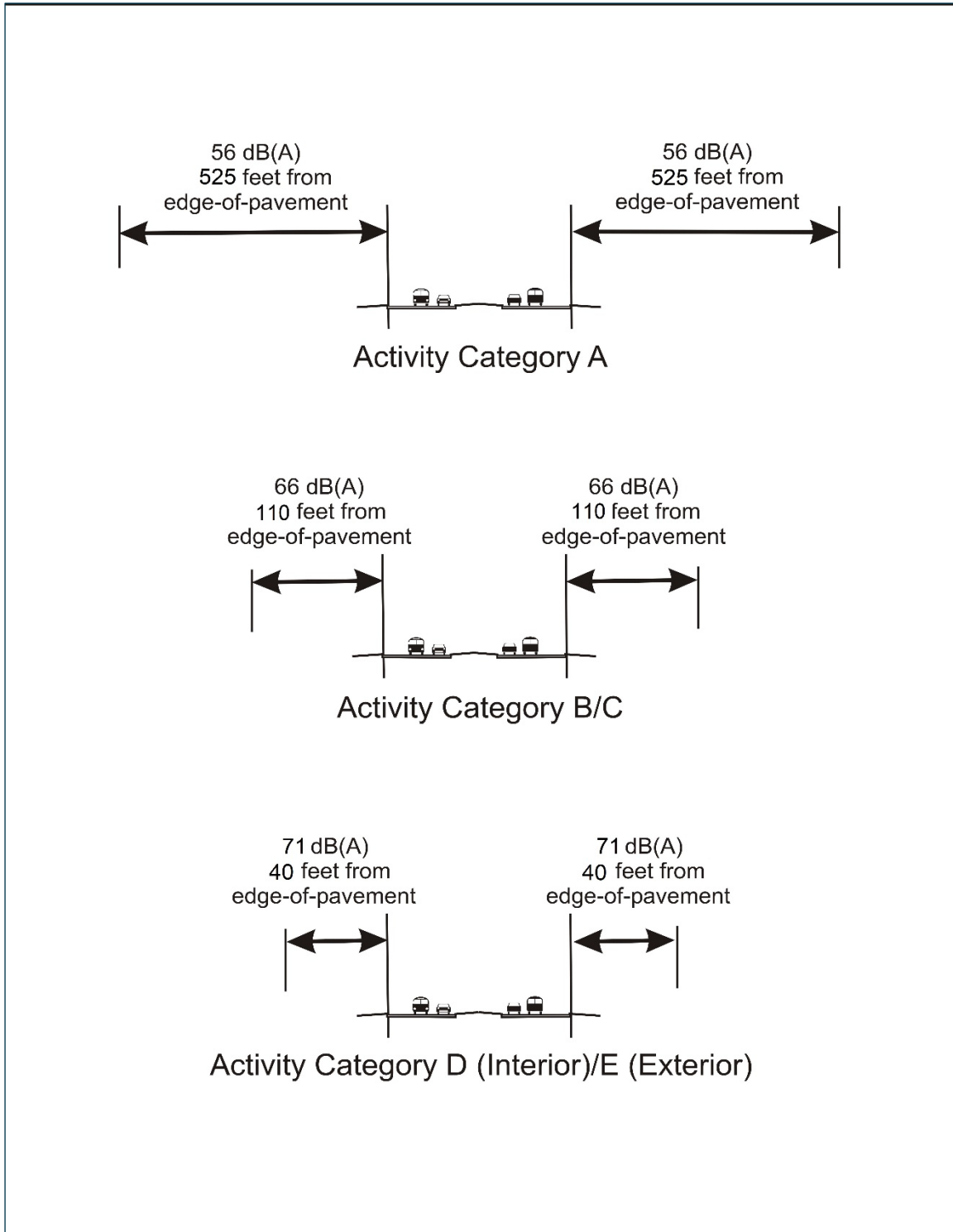
- A noise barrier must provide at least a five dB(A) reduction in traffic noise for at least two impacted noise sensitive receptors to be considered an acoustically feasible abatement measure. A receptor that meets the minimum five dB(A) noise reduction requirement is considered "benefited",
- To be considered acoustically reasonable, a noise barrier must provide at least a seven dB(A) reduction (i.e., the FDOT's noise reduction design goal) for at least one benefited receptor and,
- A noise barrier should not cost more than \$42,000 per benefited noise sensitive receptor. The current statewide cost estimate for noise barrier construction, which includes materials and labor, is \$30 per square foot (ft²).

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Figure 4-1 Noise Contours



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After considering the amount of reduction that may be provided and the cost effectiveness, additional factors must also be considered when evaluating a noise barrier. These additional factors address the feasibility and reasonableness of providing a noise barrier as an abatement measure. Additional feasibility factors include factors that relate to design and construction (i.e., site-specific constructability), safety, access to and from adjacent properties, ROW requirements, maintenance, and impacts on utilities and drainage. In addition to the cost and noise reduction design goal requirement, the only other reasonableness factor considered is the viewpoint of the benefited property owners and residents, if applicable, who may, or may not, desire a noise barrier as an abatement measure. The desires of the benefited property owners and residents are typically solicited during the project's design phase if feasible and cost reasonable abatement is being recommended for construction.

The evaluation of noise abatement at non-residential land uses (parks, recreation areas, etc.) follows methodology developed by FDOT and documented in the publication "Methodology to Evaluate Traffic Noise at Special Land Uses"⁶. Contained within the methodology is a provision for an "optional preliminary screening" for isolated (single use) facilities to determine if the facility would have a minimum of 45,026 person-hours of use per year within the area potentially benefited by a noise barrier to meet minimum feasibility requirements. Palmetto Estuary Preserve is open seven days a week, 52 weeks per year. Assuming the average visit to the preserve would be one hour, a minimum of 124 persons per day would need to occupy the area potentially benefitted by a noise barrier. Since the potentially benefited area would be smaller than the total size of the facility it is not reasonable to assume this level of usage would occur, and minimum feasibility requirements cannot be achieved. As such, a noise barrier is not a feasible abatement measure for the impacted portions of the trail within Palmetto Estuary Preserve. The preliminary screening worksheet is provided in **Appendix F**.

The TNM was used to evaluate the effectiveness of a noise barrier as a potential abatement measure for the remaining impacted residential receptors located in the Aria at Bradenton Apartments. Noise barrier lengths are optimized at each height evaluated to maintain at least the minimum noise reduction requirements while minimizing excess barrier length (thus reducing cost) at the ends.

4.4.1 Noise Barrier Analysis

Noise Barrier 1: Aria at Bradenton Apartments

Noise Barrier 1 was evaluated for 32 impacted residential receptors (Receptor ID's 1-4, and 7-10) that are predicted to experience future traffic noise levels exceeding the NAC for Activity Category B, ranging from 66.0 to 74.2 dB(A) with the proposed project. The impacted receptors are located on the first, second, third, and fourth floors of the apartment buildings, located in the northwest quadrant of the US 41/US 301/SR 55 and SR 64 (Manatee Avenue East) intersection.

The noise barrier was evaluated near the back edge of the sidewalk approximately five feet or less within the FDOT ROW and in three segments to maintain sidewalk connections from the adjacent

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properties to the sidewalk that parallels US 41/US 301/SR 55. The height of the barrier was evaluated from eight to 22 feet in two-foot increments.

The results of the analysis are provided in **Table 4-2**. As shown, the noise reduction design goal could be achieved at all heights evaluated, and up to 15 of the impacted residences could achieve a reduction in traffic noise of at least five dB(A). The total estimated cost to construct the barrier ranges from \$121,440 to \$276,540. The cost per benefited receptor ranges from \$7,560 to \$20,240, costs that are below the cost reasonableness criteria. Further analysis was performed since the barrier is predicted to achieve noise reduction requirements at a cost below the reasonableness criteria, the results of which are provided in **Table 4-3**. As discussed, there are potential conflicts with underground utilities and street lighting in addition to extremely limited ROW available for the construction and placement of a noise barrier at this location. These items, among others, will be evaluated in greater detail during the design phase of the project.

Table 4-2 Noise Barrier 1: Aria at Bradenton Apartments

Barrier Height / Length (ft.)	Impacted Receptors With Insertion Loss of (dB(A))			Number of Benefited Receptors			Avg ²	Total Estimated Cost	Cost Per Benefited Receptor	Cost Reasonable?
	5-5.9	6-6.9	> 7	Impacted	Other ¹	Total				
8/506	2	1	1	4	2	6	6.0	\$121,440	\$20,240	Yes
10/459	2	1	2	5	4	9	6.3	\$137,700	\$15,300	Yes
12/379	1	2	2	5	4	9	6.6	\$136,440	\$15,160	Yes
14/576	3	1	6	10	22	32	8.0	\$241,920	\$7,560	Yes
16/419	5	5	3	13	4	17	6.5	\$201,120	\$11,831	Yes
18/379	6	4	3	13	4	17	6.6	\$204,660	\$12,039	Yes
20/379	3	5	5	13	4	17	6.9	\$227,400	\$13,377	Yes
22/419	3	5	7	15	4	19	7.1	\$276,540	\$14,555	Yes

¹ Other = Receptors determined to not be impacted by the project (traffic noise levels less than 66 dB(A)) but benefited by the noise barrier.

² Avg = Average noise reduction applies only to “impacted” receptors that would receive at least a five dB(A) benefit from the noise barrier

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Table 4-3 Additional Considerations – Noise Barrier 1: Aria at Bradenton Apartments

Evaluation Criteria	Comment
1. Relationship of future levels to the abatement criteria	The 32 impacted receptors are predicted to experience future traffic noise levels ranging from 66.0 to 74.2 dB(A) with the proposed project. These levels approach and exceed the NAC for Activity Category B land uses.
2. Amount of noise reduction	Up to 15 impacted receptors may be provided with a reduction in traffic noise of at least five dB(A), and the noise reduction design goal could be achieved at up to seven receptors.
3. Safety	To be evaluated during the design phase of the project.
4. Community desires	Community desires for reasonable and feasible abatement measures will be solicited during the project design phase.
5. Accessibility	To be evaluated during the design phase of the project.
6. Local controls	Manatee County does not have an active noise control program.
7. Views of local officials with jurisdiction	The views of local officials with jurisdiction related to reasonable and feasible abatement measures will be solicited during the project design phase.
8. Constructability	There is limited ROW available for the construction and placement of the potential noise barrier. This item will be evaluated in greater detail during the project design phase.
9. Maintainability	To be evaluated during the design phase of the project.
10. Aesthetics	Aesthetic options for reasonable and feasible abatement measures will be solicited during the project design phase.
11. ROW needs including access rights, easements for construction and/or maintenance, and additional land	There is limited ROW available for the construction and placement of the potential noise barrier. This item will be evaluated in greater detail during the project design phase.
12. Cost	Determined to be potentially cost reasonable.
13. Utilities	Underground utilities and street lighting exist within the vicinity of the potential noise barrier. This item will be evaluated in greater detail during the project design phase.
14. Drainage	To be evaluated during the design phase of the project.
15. Special land use considerations	The adjacent properties are not considered special land uses.
16. Other environmental considerations	To be evaluated during the design phase of the project.

4.5 Summary

During the design year (2050) with the improvements to the US 41/US 310/SR 55 and the replacement of the DeSoto Bridge with the Preferred East Alternative, traffic noise levels are predicted to approach, meet, or exceed the NAC for Activity Category B at 32 residences, and approach, meet or exceed the NAC for Activity Category C at the Palmetto Estuary Preserve trail.

A noise barrier was not evaluated for the Palmetto Estuary Preserve trail. The trail is considered an “isolated” use and according to FDOT’s methodology for evaluating noise abatement at non-residential land uses, would not have enough daily person-hours of use to warrant a detailed noise barrier analysis.

A noise barrier was evaluated as a potential abatement measure for the impacted residential receptors. The results of the analysis indicate that a noise barrier is a potentially feasible and cost reasonable measure for up to 15 impacted residences within the Aria at Bradenton Apartments. There does not appear to be any other method of reducing the predicted traffic noise impacts at the remaining impacted residential receptors.

4.5.1 Statement of Likelihood

The FDOT is committed to the construction of the potentially feasible and cost reasonable noise abatement measure identified for the Aria at Bradenton Apartments, contingent upon the following conditions:

1. Final recommendations on the construction of the abatement measure are 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;
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 District Office; and
5. Safety and engineering aspects related to the roadway user and the adjacent property owner have been reviewed and any conflicts or issues resolved.

5.0 Construction Noise and Vibration

Land uses within the project limits are identified in the FDOT listing of noise and vibration-sensitive sites (e.g., residences, hospitals, and parks). Construction of the proposed roadway improvements is not expected to have any significant noise or vibration impact. If additional sensitive land uses are developed 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”⁷ 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 District Noise Specialist and the Contractor, will investigate additional methods of controlling these impacts.

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6.0 Community Coordination

Community Coordination and public involvement has been an integral component since the beginning of the PD&E Study to ensure local residents and stakeholders have the opportunity to provide input to the project development process.

An in-person Alternatives Public Workshop was held on Tuesday October 17, 2023, from 5:00 pm to 7:00 pm at the Manatee Performing Arts Center located at 502 3rd Avenue West, Bradenton, FL 34205. Various display boards were available showing both project build alternatives under consideration at the time. A video presentation was also played on a continuous loop throughout the duration of the meeting. Members of the FDOT and project consultant team were available to answer questions and address concerns from stakeholders and the public. One general traffic noise inquiry was received during the meeting, and no additional traffic noise-related concerns were received during the comment period that followed.

A virtual Alternatives Public Workshop was conducted online on Thursday October 19, 2023, at 6:00 pm. The virtual meeting consisted of a presentation with various project information that was also available via display boards provided at the in-person meeting two days before. The virtual meeting concluded with a question-and-answer session. No traffic noise concerns were received during the virtual meeting, and the materials used in the meeting were posted to the project website located at: <https://www.swflroads.com/project/442630-1>.

The Public Hearing for the project is anticipated in spring 2024.

7.0 References

1. 23 Code of Federal Regulations, Part 772: “Procedures for Abatement of Highway Traffic Noise and Construction Noise.” Federal Highway Administration; July 13, 2010.
2. Project Development and Environment Manual, Part 2, Chapter 18. Florida Department of Transportation. July 1, 2023.
3. Traffic Noise Modeling and Analysis Practitioners Handbook. Florida Department of Transportation. December 31, 2018.
4. Noise Measurement Handbook. Federal Highway Administration. FHWA- HEP-18-065. June 2018.
5. Highway Traffic Noise: Analysis and Abatement Guidance. Federal Highway Administration. FHWA-HEP-10-025. December 2011.
6. Methodology to Evaluate Highway Traffic Noise at Special Land Uses. Florida Department of Transportation Office of Environmental Management. December 2023.
7. Florida Department of Transportation Standard Specifications for Road and Bridge Construction. January 2024.

APPENDIX A

Noise Study Traffic Data

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**TRAFFIC DATA FOR NOISE STUDIES - SUMMARY OUTPUT
FDOT DISTRICT 1**

Federal Aid Number(s):	0
FPID Number(s):	442630-1
State/Federal Route No.:	SR 55/US 41/301
Road Name:	SR 55/US 41/301/1ST ST (DeSoto Bridge)
Project Description:	442630-1 DeSoto Bridge PD&E
Segment Description:	SR 55/US 41/301/1ST ST from SR 64 to Haben Boulevard
Section Number:	0
Mile Post To/From:	0

Existing Facility:		D =	55.00%	%
Year:	2023	T24 =	7.12%	% of 24 Hour Volume
LOS C Peak Hour Directional Volume:	1520	Tpeak =	3.21%	% of Design Hour Volume
Demand Peak Hour Volume:	3069	MT =	1.65%	% of Design Hour Volume
Posted Speed:	50	HT =	1.56%	% of Design Hour Volume
		B =	0.29%	% of Design Hour Volume
		MC =	0.27%	% of Design Hour Volume


No Build Alternative (Design Year):		D =	55.00%	%
Year:	2050	T24 =	7.12%	% of 24 Hour Volume
LOS C Peak Hour Directional Volume:	1520	Tpeak =	3.21%	% of Design Hour Volume
Demand Peak Hour Volume:	4212	MT =	1.65%	% of Design Hour Volume
Posted Speed:	50	HT =	1.56%	% of Design Hour Volume
		B =	0.29%	% of Design Hour Volume
		MC =	0.27%	% of Design Hour Volume

Build Alternative (Design Year):		D =	55.00%	%
Year:	2050	T24 =	7.12%	% of 24 Hour Volume
LOS C Peak Hour Directional Volume:	1520	Tpeak =	3.21%	% of Design Hour Volume
Demand Peak Hour Volume:	4212	MT =	1.65%	% of Design Hour Volume
Posted Speed:	50	HT =	1.56%	% of Design Hour Volume
		B =	0.29%	% of Design Hour Volume
		MC =	0.27%	% of Design Hour Volume

I certify that the above information is accurate and appropriate for use with the traffic noise analysis

Prepared By: Jerry Graham, PE, AICP  Date: 9/14/2023
 Print Name Signature

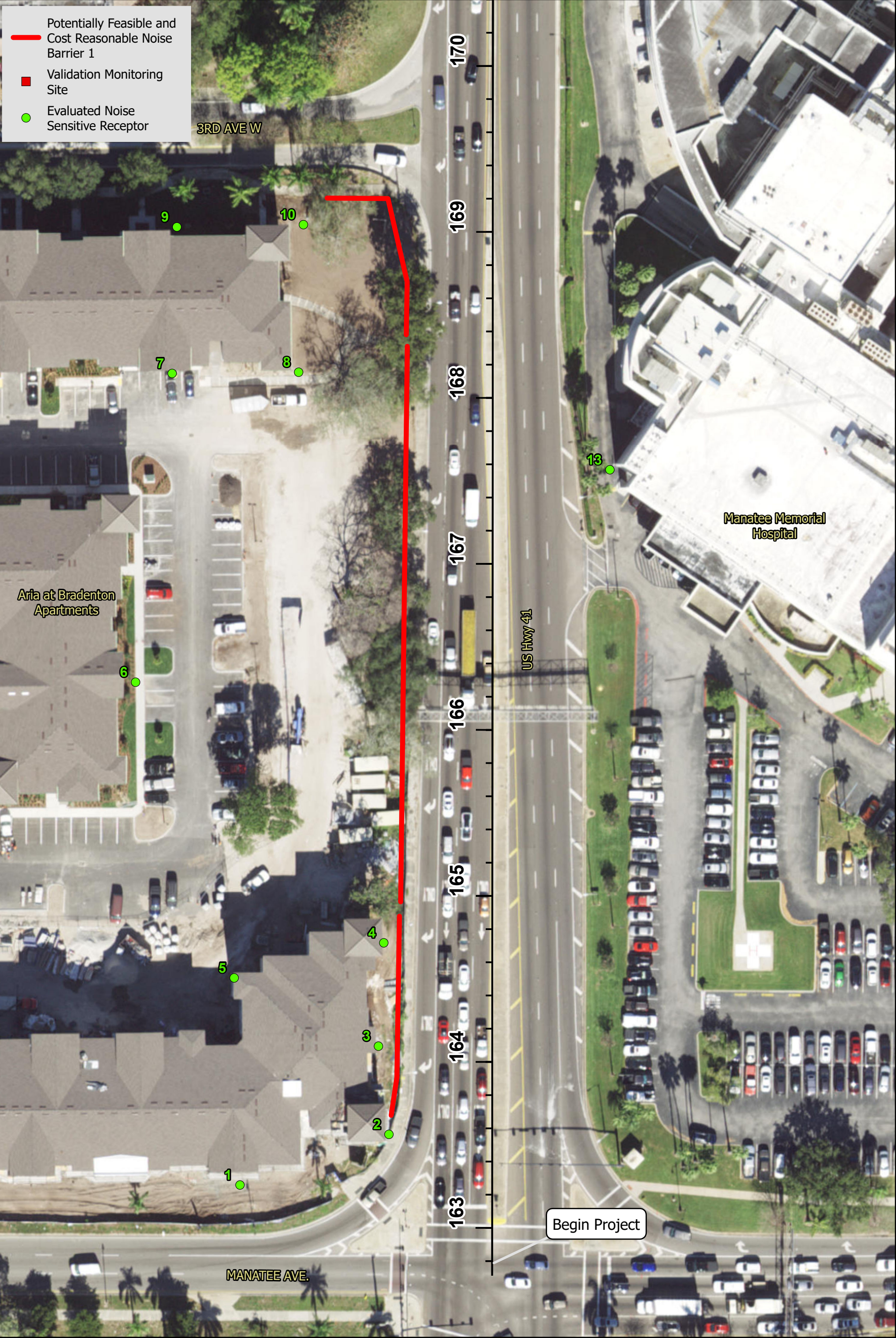
I have reviewed and concur that the above information is appropriate for use with the traffic noise analysis

FDOT Reviewer: Brittany Nichols  Date: 09/20/2023 | 10:29 AM EDT
 Print Name Signature

APPENDIX B

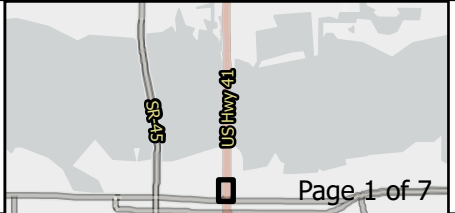
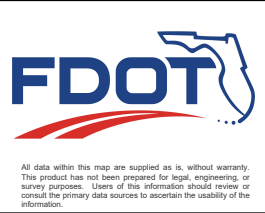
Project Aerials

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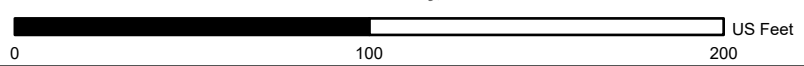
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- Validation Monitoring Site
- Evaluated Noise Sensitive Receptor

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Appendix B - Project Aerials

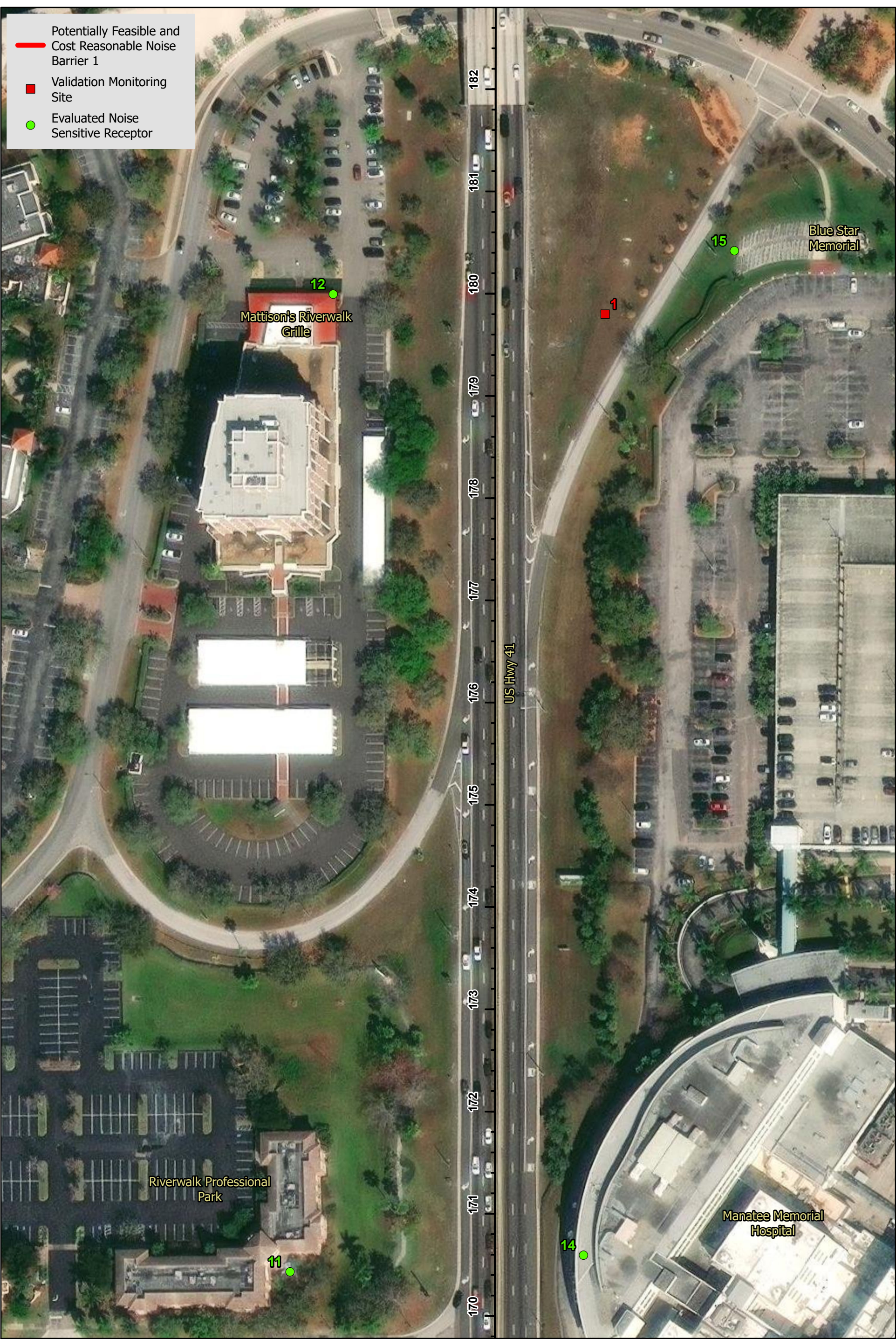
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 DeSoto Bridge Replacement PD&E
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 Manatee County, Florida



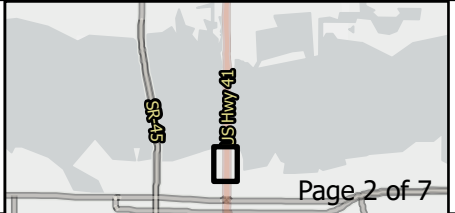
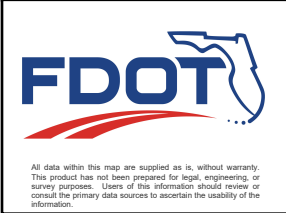
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- Potentially Feasible and Cost Reasonable Noise Barrier 1
- Validation Monitoring Site
- Evaluated Noise Sensitive Receptor

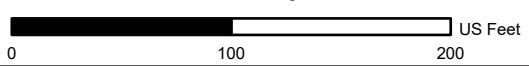


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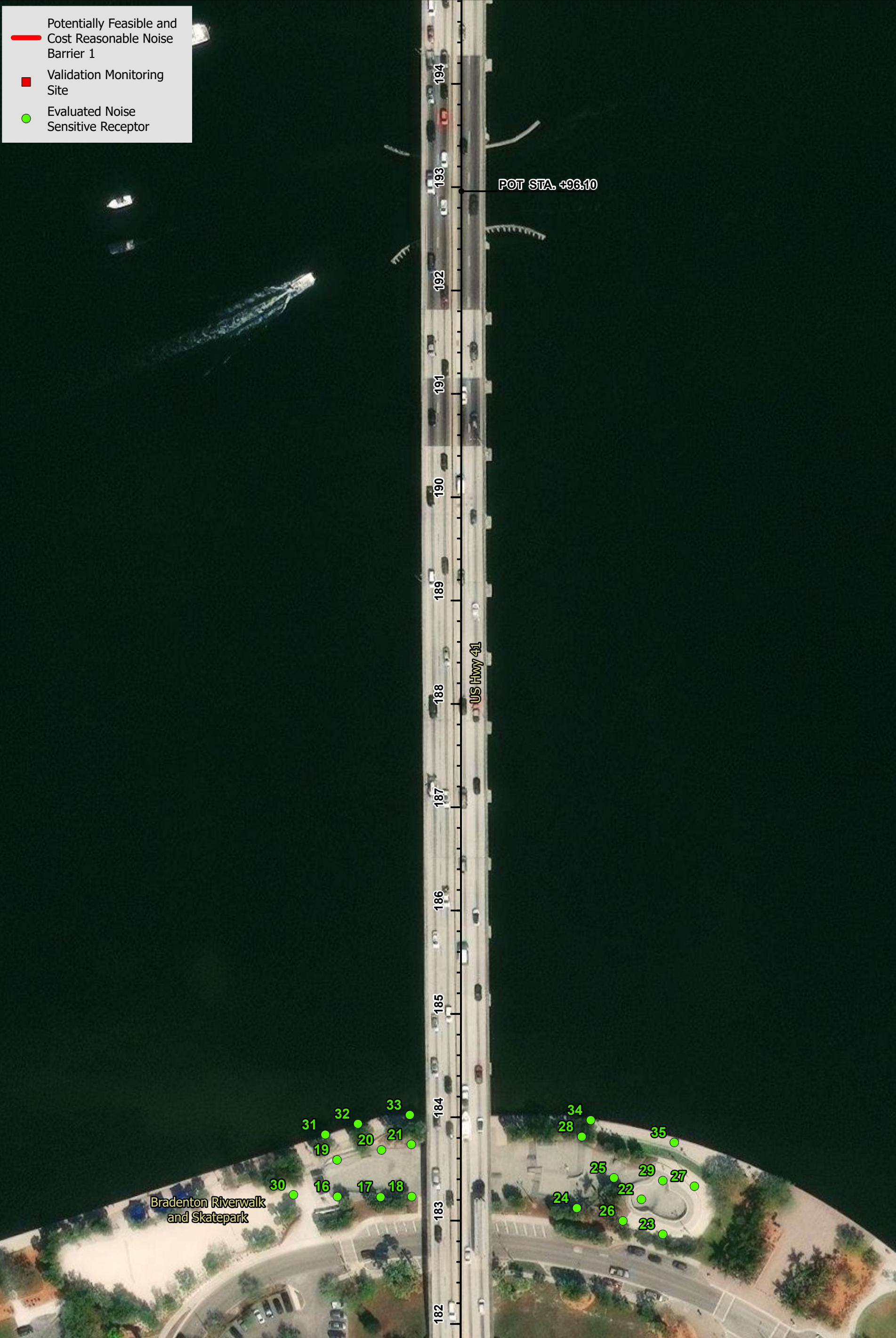
Appendix B - Project Aerials

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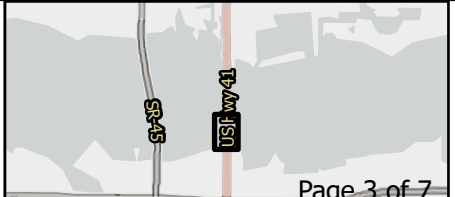


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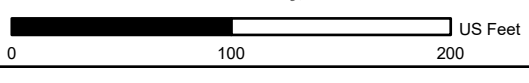


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Appendix B - Project Aerials

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 DeSoto Bridge Replacement PD&E
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Data Source: ESA, ESRI



- Potentially Feasible and Cost Reasonable Noise Barrier 1
- Validation Monitoring Site
- Evaluated Noise Sensitive Receptor

Palmetto Estuary Preserve Trail

36

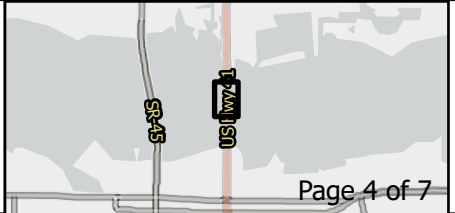


US Hwy 41

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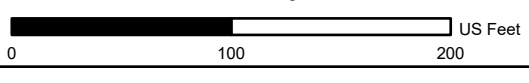


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Appendix B - Project Aerials

FPID #: 442630-1-22-01
 DeSoto Bridge Replacement PD&E
 Page 4 of 7
 Manatee County, Florida



Data Source: ESA, ESRI



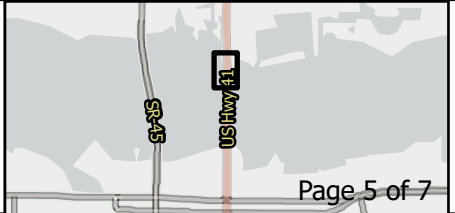


- Potentially Feasible and Cost Reasonable Noise Barrier 1
- Validation Monitoring Site
- Evaluated Noise Sensitive Receptor

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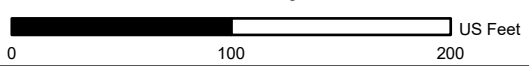


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Appendix B - Project Aerials

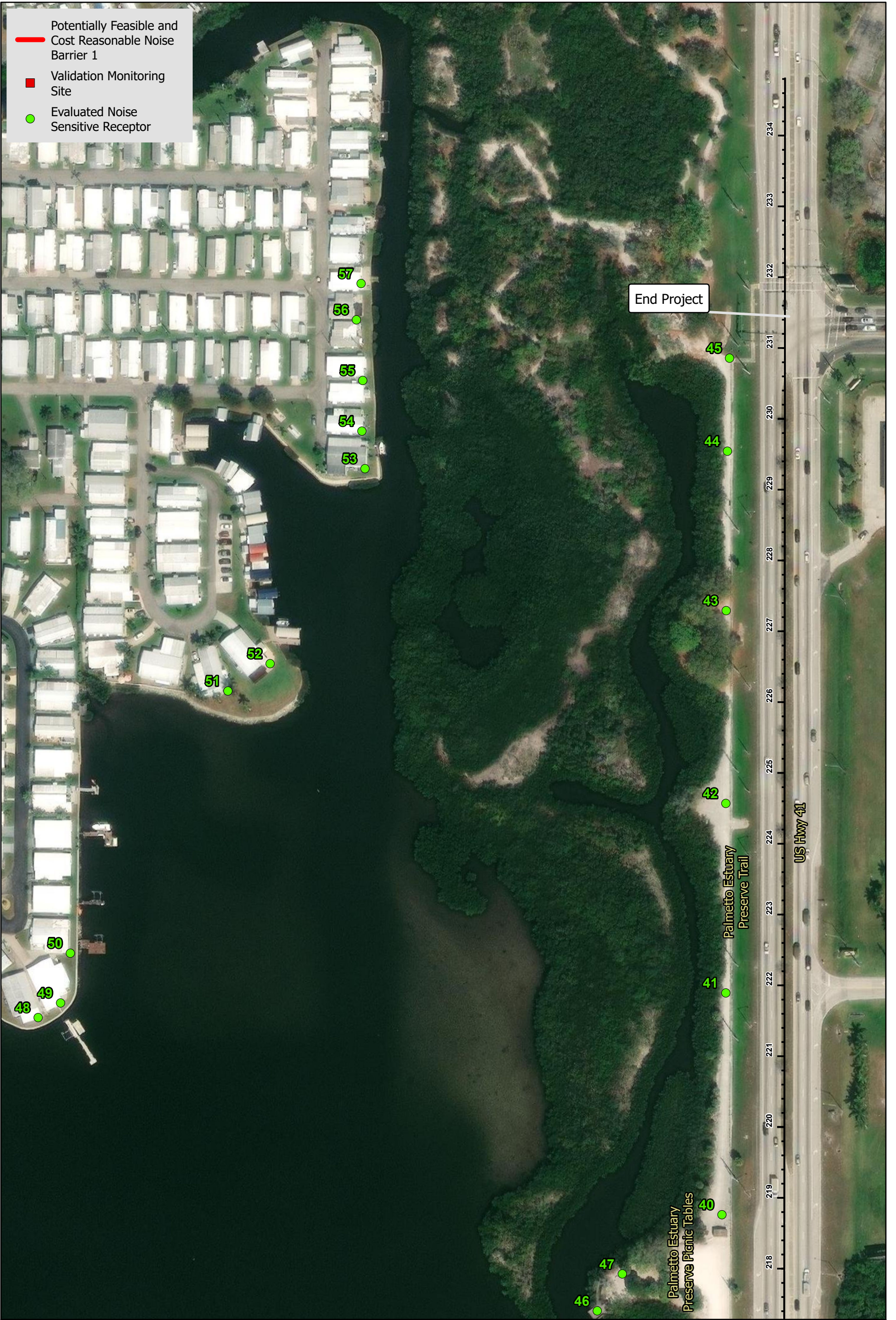
FPID #: 442630-1-22-01
 DeSoto Bridge Replacement PD&E
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 Manatee County, Florida



Data Source: ESA, ESRI



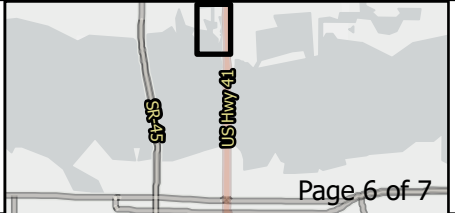
- Potentially Feasible and Cost Reasonable Noise Barrier 1
- Validation Monitoring Site
- Evaluated Noise Sensitive Receptor



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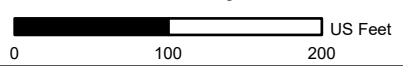


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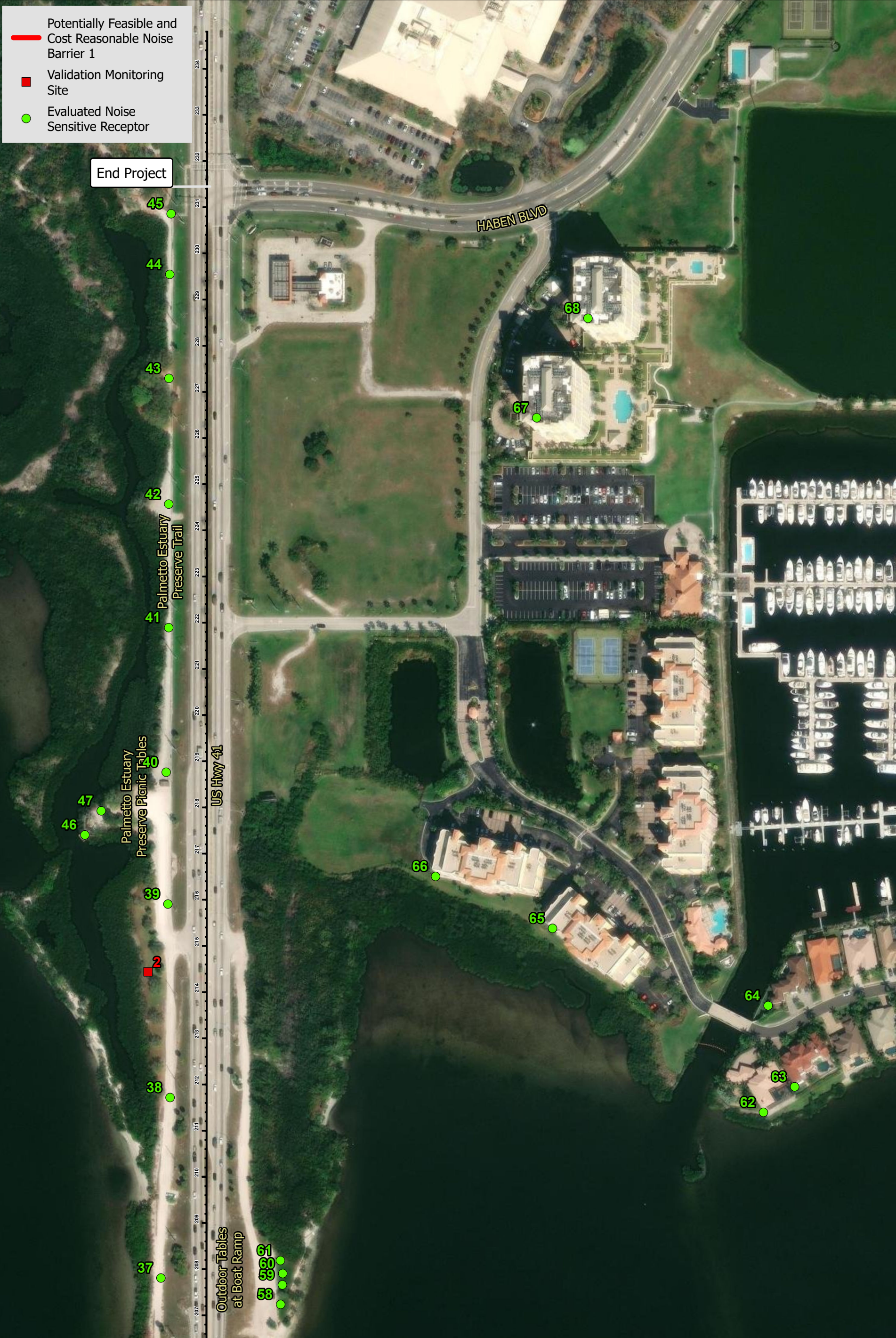
Appendix B - Project Aerials

FPID #: 442630-1-22-01
 DeSoto Bridge Replacement PD&E
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 Manatee County, Florida



Data Source: ESA, ESRI





- Potentially Feasible and Cost Reasonable Noise Barrier 1
- Validation Monitoring Site
- Evaluated Noise Sensitive Receptor

End Project

HABEN BLVD

Palmetto Estuary Preserve Trail

Palmetto Estuary Preserve Picnic Tables

US Hwy 41

Outdoor Tables at Boat Ramp

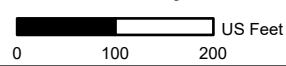


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Appendix B - Project Aerials

FPID #: 442630-1-22-01
 DeSoto Bridge Replacement PD&E
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Data Source: ESA, ESRI



APPENDIX C

Validation Measurement Documentation

DRAFT

Validation Monitoring Measurement Data Sheet

Date: 2/9/2024

Measurement Taken By: MSM/SNT/GI

Project: 442630-1 / DeSoto Bridge Replacement PD&E Study

Site ID: 1: Open/Grassy Area near Bradenton Riverwalk adjacent to DeSoto Bridge Approach

Weather Conditions: Clear: Partly Cloudy: X Cloudy: Other:

Temperature: Start: 66 End: 76 (°F)

Wind Direction: Start: E End: E

Wind Speed (Start): Min: 0.1 Max: 2 Average: 0.8 (mph)

Wind Speed (End): Min: 2.6 Max: 4.8 Average: 2.1 (mph)

Humidity: Start: 74 End: 55 (%)

Equipment Data

Sound Level Meter: Larson Davis 720 SLM Serial Number: 0409

Date of Last Traceable Calibration: 11/6/2023

Calibration: Start: 114.0 End: 114.0

Battery: Start: 86.0 End: 80.0

Weighting Scale: A Response: Slow

Calibrator: Larson Davis CAL 150 Serial Number: 2282

Run 1: 10:20 - 10:30am	Run 2: 10:34 - 10:44am	Run 3: 10:50 - 11:00am
Results: Leq: 66.7 dB(A)	Results: Leq: 67.0 dB(A)	Results: Leq: 65.3 dB(A)

Major Noise Sources: Motor vehicle traffic on US 41/US 301/SR 55

Background Noise Sources: activity in skatepark, vehicles on park entrance road (4-5 per monitoring period)

Other Notes/Observations: Siren/horns at 10:34am, some congestion on southbound roadway

Observed Traffic Data: Site 1

Run 1

Vehicle Types	Northbound US /41/US 301/SR 55		Southbound US /41/US 301/SR 55	
	Volume	Speed	Volume	Speed
Auto	246	45	251	45
Medium Truck	26	43	11	43
Heavy Truck	22	44	9	44
Bus	0	0	0	0
Motorcycle	0	0	0	0

Run 2

Vehicle Types	Northbound US /41/US 301/SR 55		Southbound US /41/US 301/SR 55	
	Volume	Speed	Volume	Speed
Auto	287	44	272	44
Medium Truck	15	47	10	47
Heavy Truck	12	42	10	42
Bus	0	0	0	0
Motorcycle	2	54	1	54

Run 3

Vehicle Types	Northbound US /41/US 301/SR 55		Southbound US /41/US 301/SR 55	
	Volume	Speed	Volume	Speed
Auto	300	46	288	46
Medium Truck	15	43	7	43
Heavy Truck	10	44	6	44
Bus	0	0	0	0
Motorcycle	1	54	0	0

Site 1 Photos



Validation Monitoring Measurement Data Sheet

Date: 2/9/2024

Measurement Taken By: MSM/SNT/GI

Project: 442630-1 / DeSoto Bridge Replacement PD&E Study

Site ID: 2: Palmetto Estuary Preserve

Weather Conditions: Clear: _____ Partly Cloudy: X Cloudy: _____ Other: _____

Temperature: Start: 77 End: 77 (°F)

Wind Direction: Start: E End: E

Wind Speed (Start): Min: 0.2 Max: 3.5 Average: 1.5 (mph)

Wind Speed (End): Min: 1.8 Max: 6.1 Average: 3.1 (mph)

Humidity: Start: 52 End: 48 (%)

Equipment Data

Sound Level Meter: Larson Davis 720 SLM Serial Number: 0409

Date of Last Traceable Calibration: 11/6/2023

Calibration: Start: 114.0 End: 114.0

Battery: Start: 84.0 End: 78.0

Weighting Scale: A Response: Slow

Calibrator: Larson Davis CAL 150 Serial Number: 2282

Run 1: 11:29 - 11:39am	Run 2: 11:43 - 11:53	Run 3: 11:57am - 12:07pm
Results: Leq: 69.6 dB(A)	Leq: 70.6 dB(A)	Leq: 65.3 dB(A)

Major Noise Sources: Motor vehicle traffic on US 41/US 301/SR 55

Background Noise Sources: _____

Other Notes/Observations: train horn at 12:05pm, light breeze from East

Observed Traffic Data: Site 2

Run 1

Vehicle Types	Northbound US /41/US 301/SR 55		Southbound US /41/US 301/SR 55	
	Volume	Speed	Volume	Speed
Auto	365	46	312	46
Medium Truck	17	41	10	41
Heavy Truck	20	44	13	44
Bus	1	44	0	0
Motorcycle	2	42	2	42

Run 2

Vehicle Types	Northbound US /41/US 301/SR 55		Southbound US /41/US 301/SR 55	
	Volume	Speed	Volume	Speed
Auto	332	46	255	46
Medium Truck	9	44	13	44
Heavy Truck	16	47	13	47
Bus	0	0	0	0
Motorcycle	0	0	1	46

Run 3

Vehicle Types	Northbound US /41/US 301/SR 55		Southbound US /41/US 301/SR 55	
	Volume	Speed	Volume	Speed
Auto	400	44	314	44
Medium Truck	14	42	20	42
Heavy Truck	14	42	11	42
Bus	0	0	0	0
Motorcycle	2	46	3	46

Site 2 Photos



APPENDIX D

Predicted Traffic Noise Levels

DRAFT

DeSoto Bridge Replacement PD&E Study
 SR 64 (Manatee Avenue East) to Haben Boulevard, Manatee County
 442630-1

Appendix D: Predicted Traffic Noise Levels

Site ID ¹	# of Units	Land Use / Activity	NAC Activity Category	Leq(h) - dB(A)			Approaches, Meets, or Exceeds NAC?
				Existing/Future No Build	Future Build	Increase From Existing	
1A	2	Residential	B	66.4	65.9	-0.5	No
1B	2	Residential	B	68.6	68.4	-0.2	Yes
1C	2	Residential	B	68.9	68.6	-0.3	Yes
1D	2	Residential	B	68.7	68.5	-0.2	Yes
2A	1	Residential	B	73.7	74.2	0.5	Yes
2B	1	Residential	B	73.8	74.0	0.2	Yes
2C	1	Residential	B	73.5	73.8	0.3	Yes
2D	1	Residential	B	73.4	73.6	0.2	Yes
3A	1	Residential	B	72.4	72.9	0.5	Yes
3B	1	Residential	B	72.7	72.8	0.1	Yes
3C	1	Residential	B	72.5	72.6	0.1	Yes
3D	1	Residential	B	72.2	72.5	0.3	Yes
4A	1	Residential	B	72.5	73.0	0.5	Yes
4B	1	Residential	B	72.6	72.8	0.2	Yes
4C	1	Residential	B	72.4	72.6	0.2	Yes
4D	1	Residential	B	72.2	72.5	0.3	Yes
5A	1	Residential	B	59.7	60.9	1.2	No
5B	1	Residential	B	63.1	63.5	0.4	No
5C	1	Residential	B	63.6	63.8	0.2	No
5D	1	Residential	B	63.8	63.9	0.1	No
6A	5	Residential	B	61.0	62.1	1.1	No
6B	5	Residential	B	64.3	64.9	0.6	No
6C	5	Residential	B	65.6	65.8	0.2	No
6D	5	Residential	B	65.7	65.9	0.2	No
7A	2	Residential	B	61.2	62.6	1.4	No
7B	2	Residential	B	64.8	65.4	0.6	No
7C	2	Residential	B	65.8	65.9	0.1	No
7D	2	Residential	B	65.9	66.0	0.1	Yes
8A	1	Residential	B	66.7	68.4	1.7	Yes
8B	1	Residential	B	69.7	70.1	0.4	Yes
8C	1	Residential	B	69.7	70.0	0.3	Yes
8D	1	Residential	B	69.6	69.9	0.3	Yes
9A	2	Residential	B	60.5	62.8	2.3	No
9B	2	Residential	B	64.5	65.6	1.1	No
9C	2	Residential	B	65.7	66.2	0.5	Yes
9D	2	Residential	B	65.9	66.4	0.5	Yes
10A	1	Residential	B	66.7	68.7	2.0	Yes
10B	1	Residential	B	69.8	70.3	0.5	Yes
10C	1	Residential	B	69.8	70.2	0.4	Yes
10D	1	Residential	B	69.8	70.0	0.2	Yes
11	1	Office Outdoor Use Area	E	60.6	63.0	2.4	No
12	1	Restaurant Outdoor Seating	E	64.2	60.2	-4.0	No
13	1	Manatee Memorial Hospital	D (Interior)	47.2	47.4	0.2	No
14				45.7	45.9	0.2	No
15	1	Blue Star Memorial	C	62.0	62.0	0.0	No
16	1	Bradenton Skatepark	C	66.2	63.1	-3.1	No
17				68.0	64.1	-3.9	No
18				69.3	65.1	-4.2	No
19				66.3	63.4	-2.9	No
20				68.1	64.4	-3.7	No
21				69.2	65.4	-3.8	No
22				64.8	63.9	-0.9	No
23				63.9	63.3	-0.6	No

DeSoto Bridge Replacement PD&E Study
 SR 64 (Manatee Avenue East) to Haben Boulevard, Manatee County
 442630-1

Appendix D: Predicted Traffic Noise Levels

Site ID ¹	# of Units	Land Use / Activity	NAC Activity Category	Leq(h) - dB(A)			Approaches, Meets, or Exceeds NAC?
				Existing/Future No Build	Future Build	Increase From Existing	
24	1	Bradenton Skatepark	C	66.6	65.2	-1.4	No
25				65.4	64.7	-0.7	No
26				65.3	63.9	-1.4	No
27				63.2	62.9	-0.3	No
28				66.5	65.6	-0.9	No
29				64.1	63.4	-0.7	No
30				65.0	62.5	-2.5	No
31	1	Bradenton Riverwalk	C	65.7	62.9	-2.8	No
32				67.0	63.7	-3.3	No
33				68.3	65.0	-3.3	No
34				66.1	64.9	-1.2	No
35				63.8	63.2	-0.6	No
36	1	Palmetto Estuary Preserve Trail	C	64.5	62.6	-1.9	No
37				68.5	64.8	-3.7	No
38				71.6	69.3	-2.3	Yes
39				70.9	70.2	-0.7	Yes
40				69.9	70.5	0.6	Yes
41				70.6	70.5	-0.1	Yes
42				70.8	70.6	-0.2	Yes
43				70.2	69.9	-0.3	Yes
44				70.5	70.6	0.1	Yes
45				71.8	72.2	0.4	Yes
46	1	Palmetto Estuary Preserve Picnic Tables	C	61.1	62.0	0.9	No
47				62.2	62.9	0.7	No
48	1	Residential	B	53.9	54.3	0.4	No
49	1	Residential	B	54.0	54.4	0.4	No
50	1	Residential	B	53.9	54.4	0.5	No
51	1	Residential	B	53.8	54.5	0.7	No
52	1	Residential	B	54.1	55.0	0.9	No
53	1	Residential	B	55.0	55.9	0.9	No
54	1	Residential	B	55.2	56.4	1.2	No
55	1	Residential	B	55.2	56.3	1.1	No
56	1	Residential	B	55.0	56.1	1.1	No
57	1	Residential	B	55.1	56.1	1.0	No
58	1	Outdoor Tables at Boat Ramp	C	64.3	63.9	-0.4	No
59				64.6	64.1	-0.5	No
60				64.7	64.2	-0.5	No
61				65.1	64.5	-0.6	No
62	1	Residential	B	53.6	54.1	0.5	No
63	1	Residential	B	52.7	53.3	0.6	No
64	1	Residential	B	52.4	53.1	0.7	No
65B	2	Residential	B	55.6	56.8	1.2	No
65C	2	Residential	B	57.0	57.6	0.6	No
65D	2	Residential	B	57.8	58.1	0.3	No
65E	2	Residential	B	58.4	58.6	0.2	No
65F	2	Residential	B	58.9	59.1	0.2	No
65G	2	Residential	B	59.4	59.6	0.2	No
65H	2	Residential	B	59.8	59.9	0.1	No
66B	2	Residential	B	58.9	59.9	1.0	No
66C	2	Residential	B	60.3	60.7	0.4	No
66D	2	Residential	B	61.1	61.4	0.3	No
66E	2	Residential	B	61.8	62.0	0.2	No
66F	2	Residential	B	62.3	62.4	0.1	No

Appendix D: Predicted Traffic Noise Levels

Site ID ¹	# of Units	Land Use / Activity	NAC Activity Category	Leq(h) - dB(A)			Approaches, Meets, or Exceeds NAC?
				Existing/Future No Build	Future Build	Increase From Existing	
66G	2	Residential	B	62.4	62.5	0.1	No
66H	2	Residential	B	62.5	62.6	0.1	No
67B	1	Residential	B	54.7	56.8	2.1	No
67C	1	Residential	B	56.8	58.0	1.2	No
67D	1	Residential	B	57.7	58.6	0.9	No
67E	1	Residential	B	58.4	59.0	0.6	No
67F	1	Residential	B	59.0	59.4	0.4	No
67G	1	Residential	B	59.6	59.8	0.2	No
67H	1	Residential	B	60.1	60.1	0.0	No
67I	1	Residential	B	60.2	60.2	0.0	No
67J	1	Residential	B	60.3	60.3	0.0	No
67K	1	Residential	B	60.3	60.4	0.1	No
67L	1	Residential	B	60.4	60.5	0.1	No
67M	1	Residential	B	60.4	60.5	0.1	No
67N	1	Residential	B	60.4	60.5	0.1	No
68B	1	Residential	B	53.5	55.4	1.9	No
68C	1	Residential	B	55.1	56.4	1.3	No
68D	1	Residential	B	56.3	57.3	1.0	No
68E	1	Residential	B	57.1	57.7	0.6	No
68F	1	Residential	B	57.7	58.1	0.4	No
68G	1	Residential	B	58.2	58.5	0.3	No
68H	1	Residential	B	58.7	58.8	0.1	No
68I	1	Residential	B	59.1	59.1	0.0	No
68J	1	Residential	B	59.3	59.3	0.0	No
68K	1	Residential	B	59.4	59.4	0.0	No
68L	1	Residential	B	59.4	59.4	0.0	No
68M	1	Residential	B	59.5	59.5	0.0	No
68N	1	Residential	B	59.5	59.6	0.1	No

¹The letters "A", "B", "C", "D" following a Site ID refer to first, second, third, fourth and subsequent additional floors, respectively for residences located in multi-family apartment/condominium buildings.

APPENDIX E

TNM Files (Provided Electronically)

DRAFT

APPENDIX F

Special Land Use Preliminary Screening Worksheet for Palmetto Estuary Preserve Trail

DRAFT

Usage Screening - To be used for ISOLATED SLUS ONLY

An isolated SLU must have enough person-hour usage to equate to at least 2 residences to satisfy the FDOT requirement that 2 residences must be provided a benefit for a noise barrier to be found feasible.

Palmetto Estuary Preserve Trail

Average Single-Family Residence in Florida - Person Hours per Year	
Average number of people in a single-family residence in Florida (US CENSUS, 2017-2021 data)	2.57
Hours a single-family residence is available for use (24 hours x 365 days)	8,760
Residential Person-Hours per Year Available for Use	22,513
Isolated SLU Person-Hours per Year	
Average number of users per day at the SLU	124
Approximate daily hourly usage by each person at the SLU	1
Number of Days per week the SLU is operational	7
Number of weeks per year the SLU is operational	52
Person-Hours per Year SLU is available for use	45,136
Equivalent Residence (ER)	2.00
Isolated SLU Eligible for Noise Barrier Evaluation?	ELIGIBLE