SR 54 Project Development and Environment (PD&E) Study

From CR 577 (Curley Road)
to CR 579/CR 54 (Morris Bridge Road)

Final Noise Study Report

WPI Segment No: 416561-1
Pasco County

Prepared by the

Florida Department of Transportation
District Seven

October 2008

EXECUTIVE SUMMARY

The Florida Department of Transportation (FDOT) conducted a Project Development and Environment (PD&E) Study to evaluate the improvements to SR 54 from Curley Road to east of Morris Bridge Road in Pasco County, Florida. The length of the study area along SR 54 is approximately 4.5 miles.

The objectives of this Noise Study Report (NSR) are to identify noise-sensitive sites adjacent to the project corridor, to evaluate the significance of existing and future traffic noise levels at the sites with the 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 level "contours" adjacent to the corridor.

The 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 prediction of future traffic noise levels with the proposed roadway improvements was performed using the Federal Highway Administration's (FHWA's) Traffic Noise Model (TNM Version 2.5). The TNM propagates sound energy, in one-third octave bands, between highways and nearby receivers, taking into account the intervening ground's acoustical characteristics and topography, and rows of buildings.

The results of the analysis indicate that existing (2006) and no-build (2030) exterior traffic noise levels are predicted to range from 52.0 to 65.4 dBA at the 116 noise-sensitive sites evaluated, with traffic noise levels predicted to be below the FHWA's Noise Abatement Criteria (NAC) at all of the sites. In the future (2030), with the proposed improvements to SR 54, exterior traffic noise levels are predicted to range from 54.5 to 69.3 dBA, with levels predicted to approach, meet, or exceed the NAC at 30 of the 116 sites. The 30 noise-sensitive sites are all single-family residences.

When compared to the existing/no-build condition, exterior traffic noise levels are predicted to increase 0.1 to 6.4 dBA with the improvements to SR 54. As such, none of the sites are predicted to experience a substantial increase (15 dBA or more) in traffic noise as a result of the project.

Noise abatement measures were evaluated for the noise sensitive areas predicted to be affected by the proposed improvements to SR 54. The measures were traffic management, alignment modifications, property acquisition, land use controls, and noise barriers. Although feasible, traffic management, alignment modifications, property acquisitions, and land use controls were determined to be unreasonable methods to reduce the predicted traffic noise impacts for the affected sites.

Based on the results of the analysis, the construction of three noise barriers along SR 54 appears to be a feasible and cost-reasonable method of reducing predicted traffic noise impacts for some of the affected noise-sensitive sites. Those locations are: the residences along White Bay Circle, River Haven Mobile Homes, and Ralph's Trailer Park.

It should be noted that the noise barriers identified as feasible and cost-reasonable are still subject to an engineering feasibility review. The purpose of the review is to ensure that the noise barrier could be built as planned. It will take into consideration items such as drainage, utilities (both existing and planned), safety, constructability, maintainability, right-of-way needs, and any other construction or engineering issues that may preclude providing the noise barriers that have been identified.

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SECTION 1.0 – INTRODUCTION

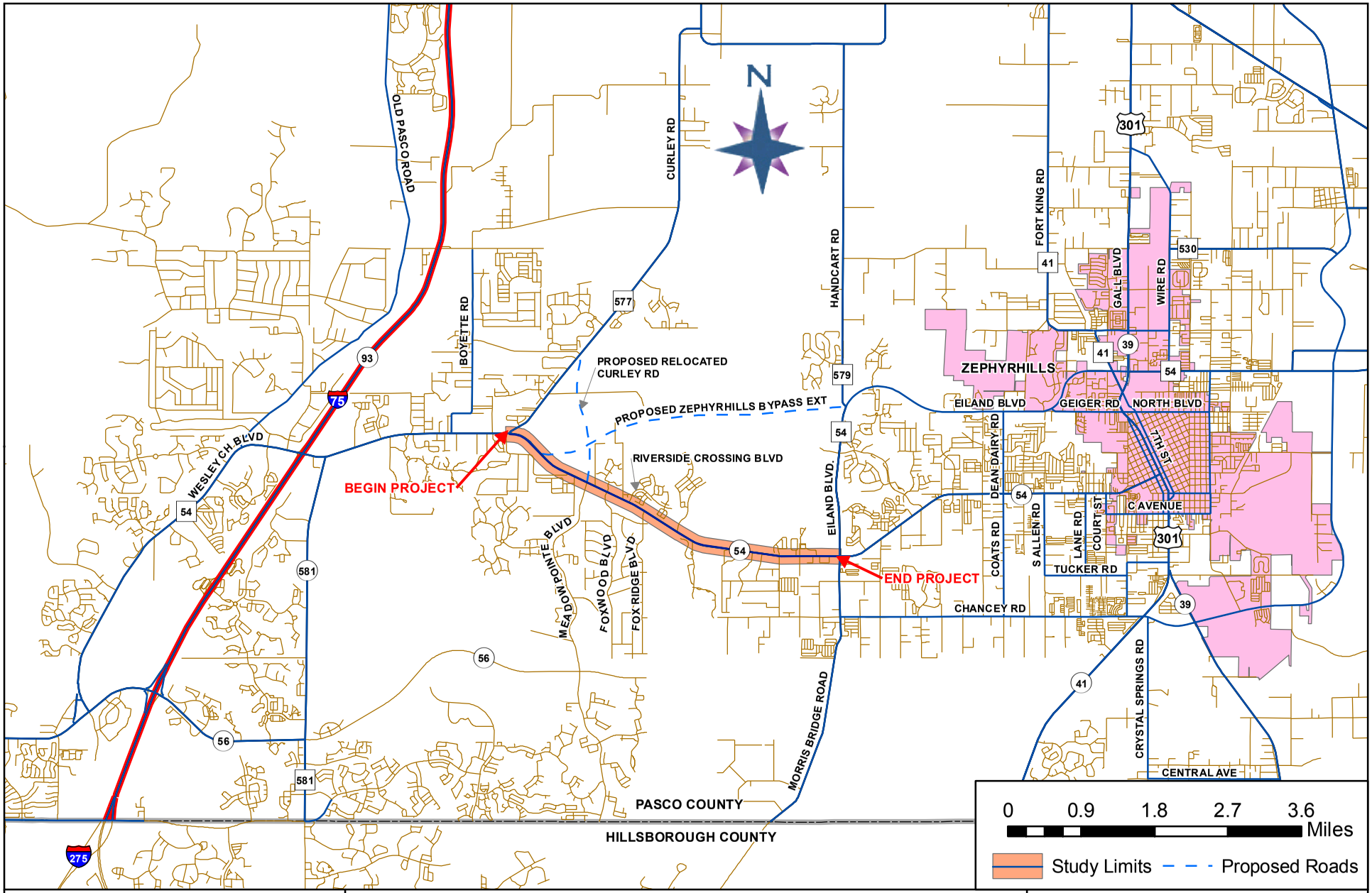
1.1 PROJECT LOCATION AND LIMITS

The Florida Department of Transportation (FDOT) conducted a Project Development and Environment (PD&E) Study to evaluate alternative improvements along State Road (SR) 54, from CR 577 (Curley Road) to CR 579/CR 54 (Morris Bridge Road), in southeast Pasco County (**Figure 1-1**). A Study Area map is shown in **Figure 1-2**.

The west end of the study area is located in Wesley Chapel, an unincorporated census-designated place. The project is located within Sections 9, 10, 13, 14, & 15, Township 26 S, and Range 20 E and Section 18, Township 26 S, Range 21 E. The total length of the proposed project limits is approximately 4.5 miles. The segment of SR 54 to the west, from I-75 to east of Curley Road (CR 577), is currently programmed by Pasco County for widening to six lanes. That project also includes a connection to the planned Zephyrhills West Bypass Extension.

The purpose of the proposed project is to provide a higher capacity and safer facility to better meet future transportation demand in this rapidly developing area of Pasco County. SR 54 is one of the primary east-west facilities within Pasco County, effectively connecting the eastern and western sides of the county. This corridor is also designated as an emergency evacuation route. The PD&E Study also included the consideration of a No-Build Alternative.

A *Programming Screen Summary Report* was published on August 17, 2006 as part of the Department's Efficient Transportation Decision Making (ETDM) process. The project is designated as #6651 in ETDM. The Federal Highway Administration has determined that the project qualifies as a Type 2 Categorical Exclusion.

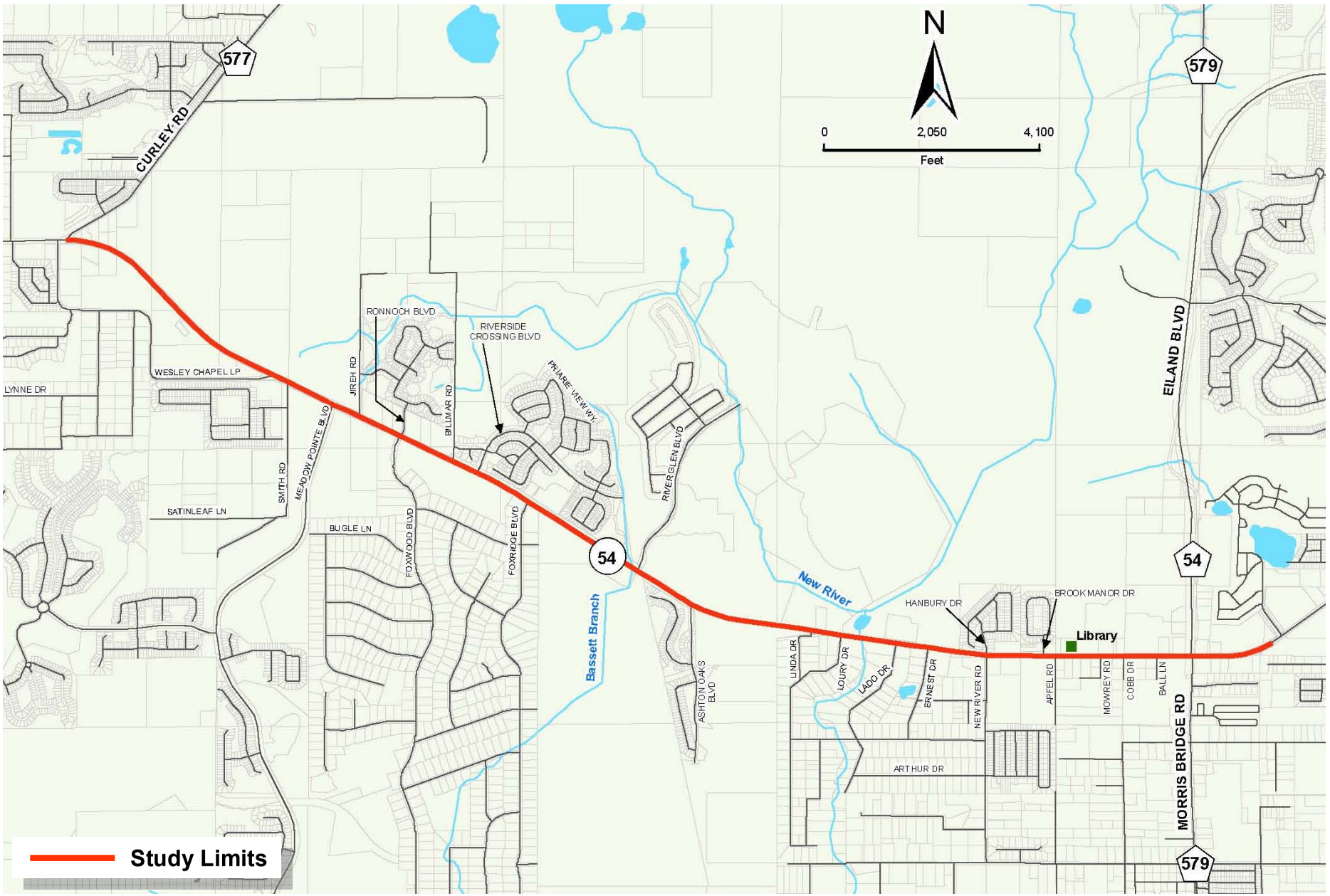


SR 54 PD&E Study
From Curley Road to Morris Bridge Road
Pasco County, FL
WPI Segment No. 416561-1

SR 54 PD&E STUDY AREA MAP

Rev. 11/19/08

FIGURE 1-1



SR 54 PD&E Study
From Curley Road to Morris Bridge Road
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SR 54 PD&E STUDY AREA MAP

Rev. 10/8/07

FIGURE 1-2

1.2 REPORT PURPOSE

The objectives of the Noise Study Report (NSR) are:

- To identify noise-sensitive sites adjacent to the project corridor;
- To evaluate the significance of existing and future traffic noise levels at the sites with the improvements to SR 54; and
- To evaluate the need for and effectiveness of noise abatement measures.

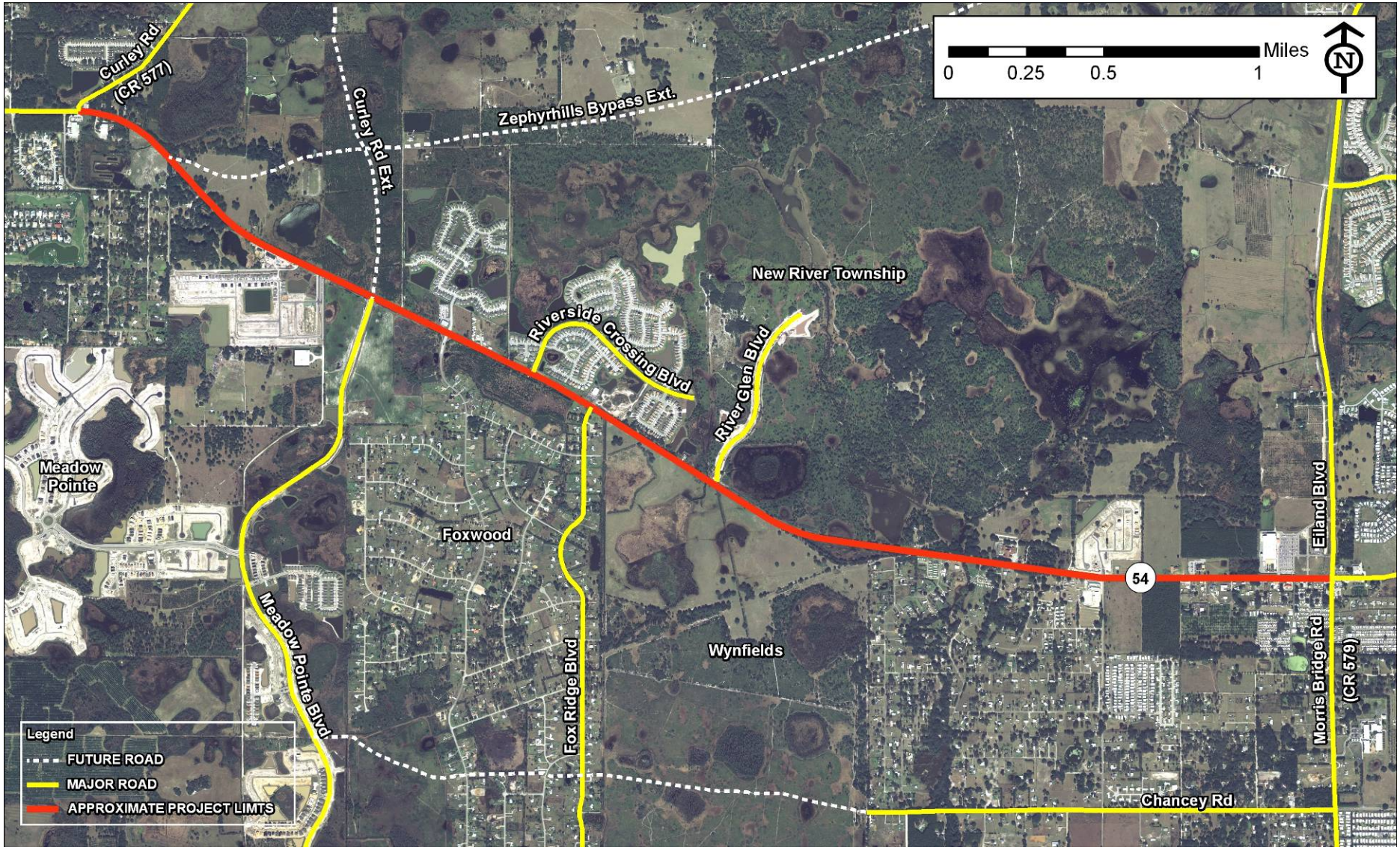
Additional objectives include the evaluation of construction noise impacts and the identification of noise "contours" adjacent to the corridor. An Aerial Photograph of the Study Area is shown in **Figure 1-3**.

1.3 EXISTING FACILITY AND PROPOSED IMPROVEMENTS

The existing SR 54 facility is functionally classified by FDOT as:

- "Urban Principal Arterial Other" from west of the project limits to Smith Rd
- "Rural Principal Arterial Other" from Smith Rd to west of New River
- "Urban Principal Arterial Other" from west of New River to east of the project limits

The existing roadway is a two-lane rural facility with 12-ft travel lanes and 5-ft paved shoulders (**Figure 1-4**). Several areas have been widened to provide left-turn and right-turn lanes. From west to east, the posted speed limit varies from 55 miles per hour (mph) to 45 mph. Traffic signals currently exist (or will be in operation) at Curley Road, Meadow Pointe Boulevard, River Glen Boulevard/Wyndfields Boulevard, and Morris Bridge Road. The existing right-of-way typically varies between 80 ft and 100 ft. In addition, the County has obtained (or will obtain) "reserved" right-of-way which is being donated by developers as a stipulation of development orders and rezoning conditions. The existing highway is classified by FDOT as Access Management Class 3.



February 2007 Aerial Photos

SR 54 PD&E Study
From Curley Road to Morris Bridge Road
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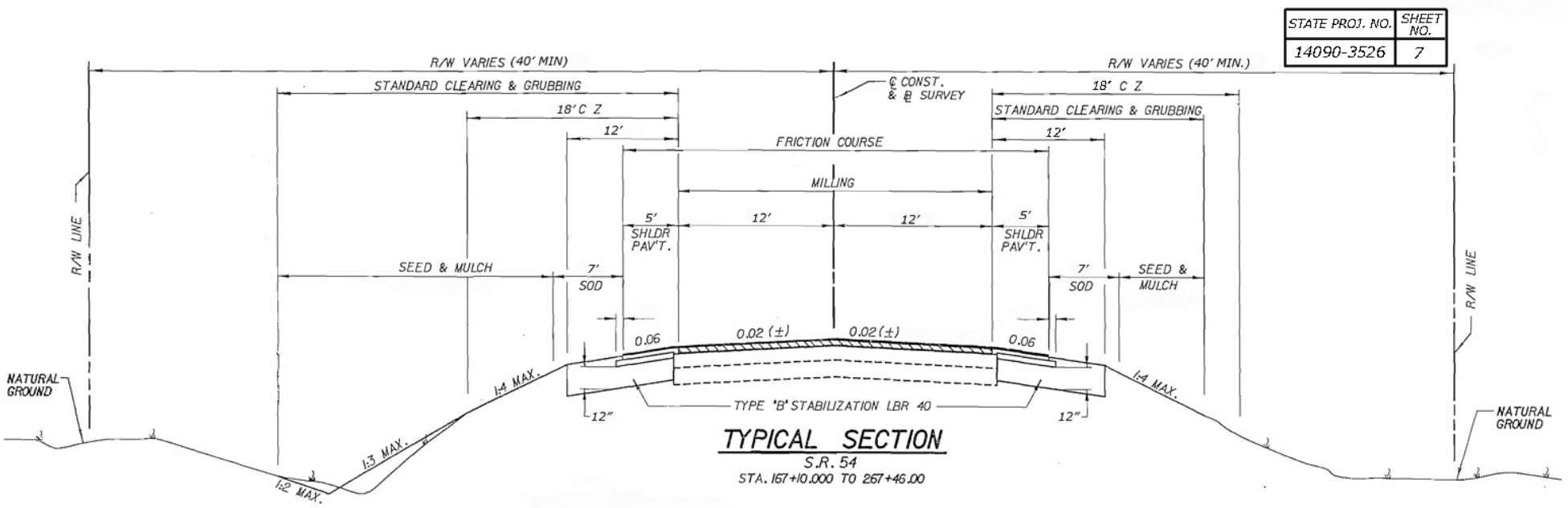
SR 54 PD&E STUDY AREA AERIAL PHOTOGRAPH

FIGURE 1-3



TYPICAL SECTION

S.R. 54

STA. 167+10.000 TO 267+46.00

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EXISTING TYPICAL SECTION

FIGURE 1-4

Class 3 standards require a minimum traffic signal spacing of 0.5 miles, which the existing facility meets, and minimum spacing for median openings as follows:

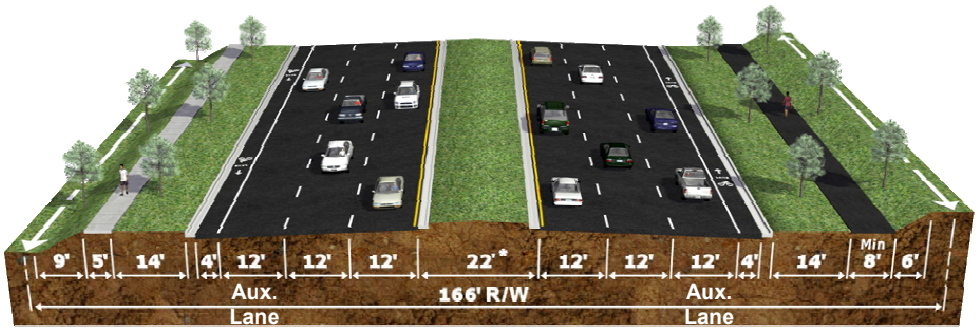
- 0.5 mile for full median openings
- 0.25 mile for directional median openings

The existing facility is mostly two-lane undivided and two-lane divided without raised medians, so the median opening spacing standards don't apply yet.

The Preferred Alternative includes the widening or reconstruction of the existing highway to a four-lane divided arterial with auxiliary lanes west of Meadow Point Boulevard (including the intersection) and a four-lane divided arterial east of Meadow Point Boulevard. Two different types of typical sections are proposed: an urban typical section and a suburban typical section **(Figure 1-4)**. The proposed typical sections include 12-ft travel lanes, sidewalks and "trails", and either 5-ft paved shoulders or 4-ft bicycle lanes, with a closed drainage system, extension or replacement of cross drains, and associated storm water management facilities for water quality treatment and discharge attenuation.

The proposed project is included in the Pasco County Metropolitan Planning Organization's (MPO) Year 2025 Cost Affordable Long-Range Transportation Plan for the period from 2016 to 2025, as a four-lane divided facility.

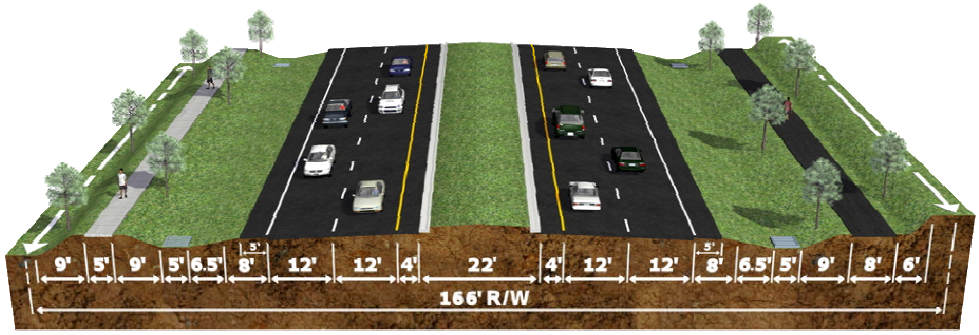
(Looking east for all sections)



Four-Lane Divided with Auxiliary Lanes Urban Typical Section

From Curley Road to Foxwood Blvd

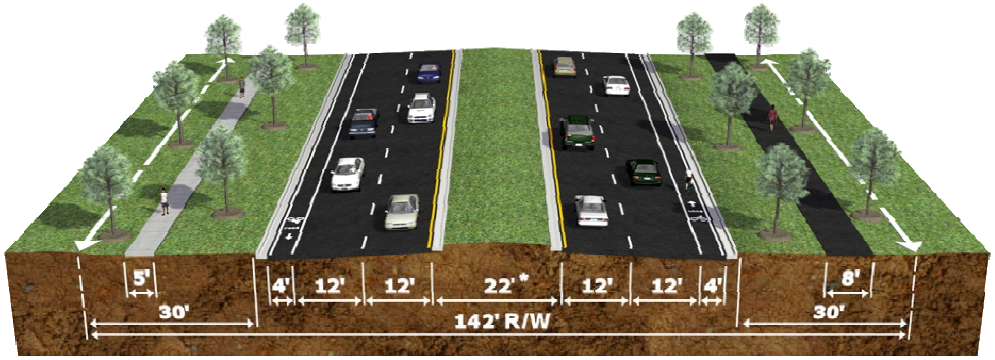
Design Speed = 45 mph



Four-Lane Divided Suburban Typical Section

From Foxwood Blvd to Linda Drive

Design Speed = 55 mph



Four-Lane Divided Urban Typical Section

From Linda Drive to Morris Bridge Road

Design Speed = 45 mph

*For the few areas where a 30' median would be required for dual left turn lanes at signalized intersections, the outside border areas would be reduced by 4' on each side to provide the extra median width required.

Rev. 5/13/08

SR 54 PD&E Study From Curley Road to Morris Bridge Road Pasco County, Florida WPI Segment No. 416561-1	**SR 54 Proposed Typical Sections (Looking East)**	**FIGURE 1-5**

SECTION 2.0 – METHODOLOGY

2.1 NOISE METHODOLOGY

The SR 54 noise analysis was performed following FDOT procedures (*Project Development and Environment Manual*: Part II, Chapter 17: April 14, 2007). The FDOT procedures comply with Title 23 Code of Federal Regulations (CFR) Part 772 (*Procedures for Abatement of Highway Traffic Noise and Construction Noise*).

The prediction of future traffic noise levels with the roadway improvements was performed using the Federal Highway Administration's (FHWA) computer model for highway traffic noise prediction and analysis – the Traffic Noise Model (TNM – Version 2.5). The TNM propagates sound energy, in one-third octave bands, between highways and nearby receivers taking into account the intervening ground's acoustical characteristics and topography, and rows of buildings.

The noise levels presented in this report are expressed in decibels (dB) on the A-weighted scale (dBA). This scale most closely approximates the response characteristics of the human ear to low level sound. All noise levels are reported as equivalent level (LA_{eq1h}), values which theoretically contain the same amount of acoustic energy as an actual time-varying A-weighted sound level over a period of 1 hour.

The existing/no-build (2006) and forecast future year (2030) traffic data used in the TNM for the SR 54 project are presented in **Appendix A**. All traffic data came from the project's *Traffic Technical Memorandum, May 2008*, prepared by American Consulting Engineers of Florida.

2.2 MODEL ASSUMPTIONS

The following are details and assumptions used to develop the noise model for the SR 54 PD&E Study:

- Speed limits in the model were assumed at the posted speed limit along SR 54.
- The library, churches and child care facilities were modeled as Activity Category "E" with the abatement criterion set at 51 dBA. A conservative approach of a 20 dBA reduction (based on a light frame building type with closed windows) of the exterior noise levels was used in the analysis.
- All receptor heights were set at 5 feet.

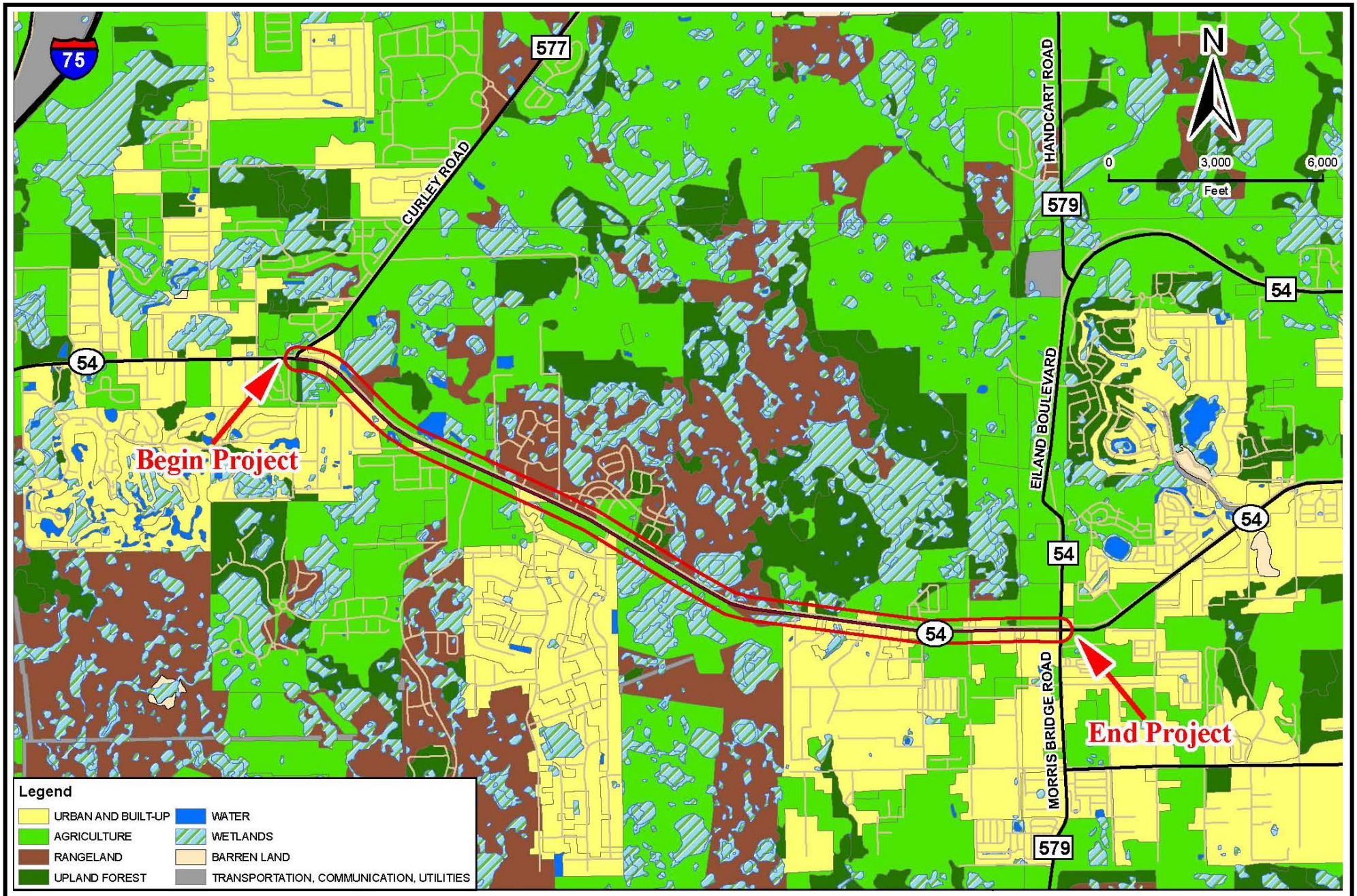
SECTION 3.0 – LAND USE

3.1 EXISTING LAND USE

The study corridor, located in portions of Wesley Chapel and Zephyrhills, is mostly rural in nature but is being developed at a rapid pace. The Florida Land Use, Cover and Forms Classification System (FLUCFCS) from the Southwest Florida Water Management District (SWFWMD), together with aerial photographs and wetland data from the National Wetland Inventory, were utilized to determine current land use and habitat types within the corridor. These land uses and habitat types were subsequently groundtruthed for verification during field visits. **Figure 3-1** shows the existing land use within the corridor. The majority of the landscape has been converted from native habitat to other land uses such as pastureland (210), planted pine (246), shrub and brushland (320) and residential areas (120, 130) with the exception of a few parcels that have been unaltered or are comprised almost entirely of jurisdictional wetlands. From Curley Road to New River Road, the land use predominantly consists of residential and agricultural lands. There are several residential subdivisions as well as the Wesley Chapel Nursery and Landscape Supply located along this segment. From New River Road to Morris Bridge Road, the land use predominately consists of commercial and office/retail. The Home Depot anchors the commercial development in this area with other locally owned establishments dotting the segment.

3.2 FUTURE LAND USE

According to the Pasco County Future Land Use Map (2015), the entire project corridor is transitioning from a rural area to a residential area with small, scattered office/retail developments located immediately adjacent to SR 54 (**Figure 3-2**). These transformations are currently taking place as many of the existing agricultural areas along this stretch of SR 54 are being converted to residential subdivisions and retail/office development.



SR 54 PD&E Study
From Curley Road to Morris Bridge Road
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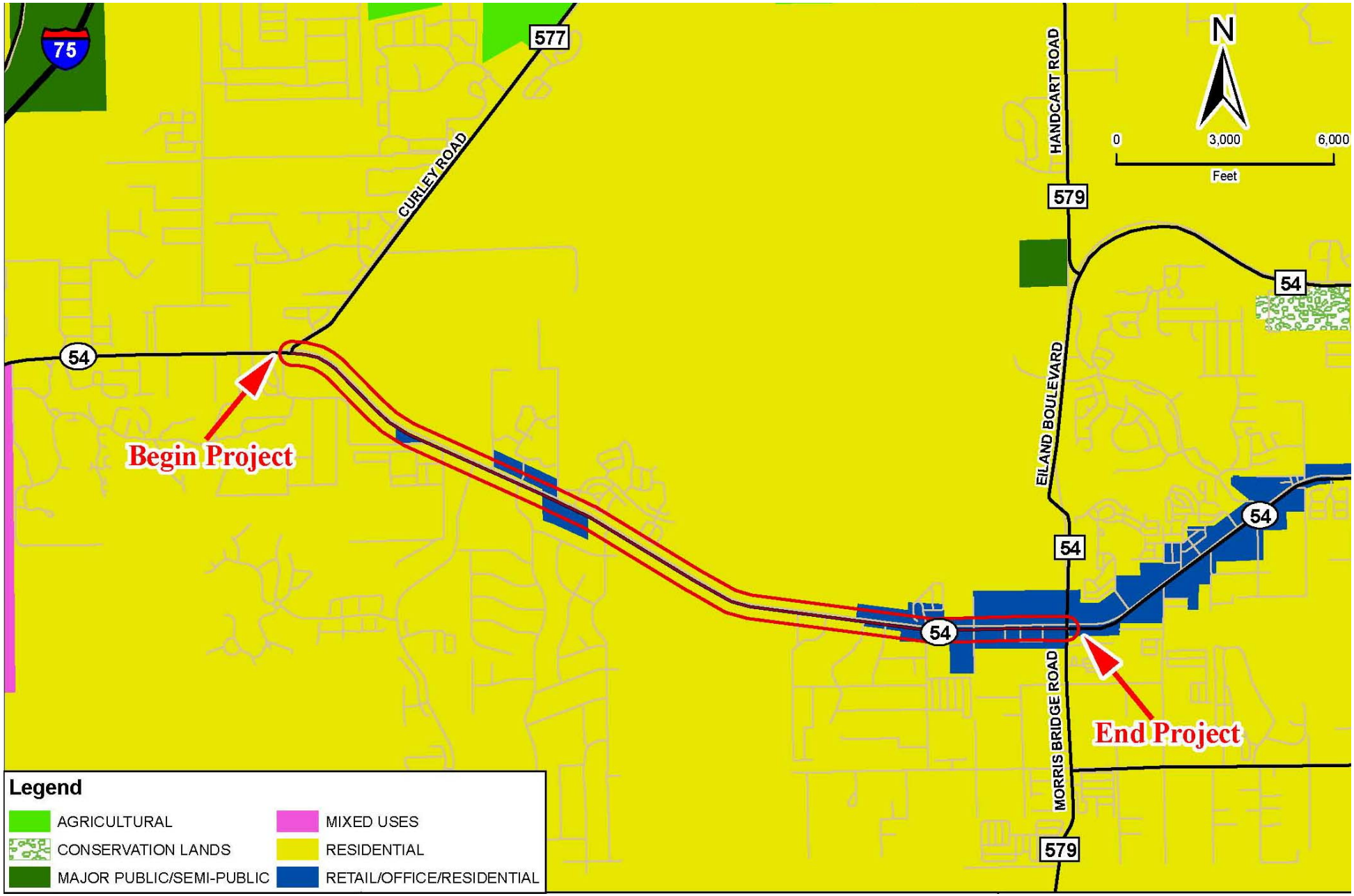
Existing Land Use

Figure 3-1



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Future Land Use

Figure 3-2

SECTION 4.0 – NOISE ANALYSIS

4.1 NOISE-SENSITIVE SITES

Noise-sensitive sites are defined as properties where frequent human use occurs and where a lowered noise level would be of benefit. To evaluate traffic noise, the FHWA established Noise Abatement Criteria (NAC). As shown in **Table 4-1**, the criteria vary according to a property's activity category.

Table 4-1 – FHWA Noise Abatement Criteria

Activity Category	Abatement Level (in L_{Aeq})	Description of activity category
A	57 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, RV parks, day care centers, hospitals.
C	72 (Exterior)	Developed lands, properties, or activities not included in Categories A and B above.
D		Undeveloped lands.
E	52 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, auditoriums.

When predicted noise levels "approach" or exceed the NAC or, when predicted noise levels increase substantially, the FHWA requires that noise abatement measures be considered. The FDOT defines the word "approach" to mean within 1 dBA of the NAC and considers that a substantial increase will occur if traffic noise levels are predicted to increase by 15 or more dBA as a direct result of a transportation improvement project. Increases of 15 dBA or more are not likely adjacent to the project corridor as increases of this magnitude typically occur at sites where no roadway existed previously.

One hundred and sixteen (116) noise-sensitive sites were identified along the project corridor. One hundred and seven (107) sites are single-family (SF) residences and are represented by 63 receptors within TNM. Areas of frequent human use, usually the edge of the dwelling unit closest to SR 54, were used in the TNM. Interior noise levels were predicted for 9 noise sensitive sites and are represented by 9 receptors within TNM. These sites include 6 churches, 2 child care facilities, and 1 library. The location of each of the noise-sensitive sites is shown on **Figure 4-1**. The 107 residential sites were considered Activity Category "B" as shown in **Table 4-1**. As such, exterior noise levels will be evaluated for these sites, and noise abatement measures will be considered if the predicted exterior traffic noise level is 66.0 dBA or more, or if levels are predicted to increase by 15 dBA or more as a result of the proposed improvements. The other 9 sites were considered Activity Category "E" as shown in **Table 4-1**. As such, interior noise levels will be evaluated for these sites, and noise abatement measures will be considered if the predicted interior traffic noise level is 51.0 dBA or more, or if levels are predicted to increase by 15 dBA or more as a result of the proposed improvements.

Various factors affect the "transmittal" of sound from a source to a receiver. These factors include vegetation, intervening structures, elevation of the source and/or the receiver, surrounding topography and the type of ground surface between the source and the receiver. The attenuation (reduction) of sound levels due to intervening structures occurs when a receiver's view (line-of-sight) is obstructed or partially obstructed by dense objects (e.g. rows of buildings, or other barriers). The attenuation provided by a row of buildings (houses) depends on the actual density and length of the row occupied by the buildings.

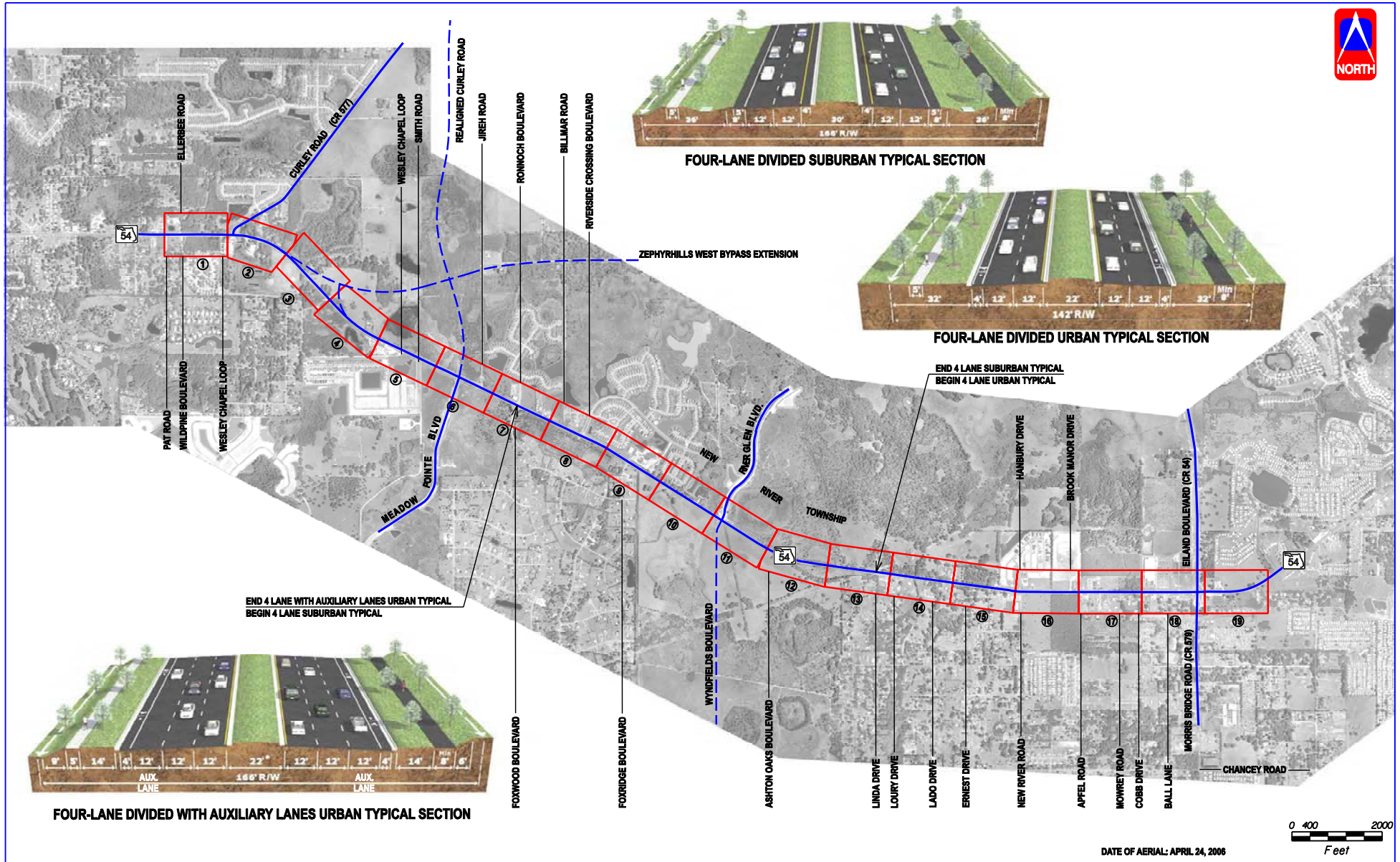

Figure 4-1 Noise Sensitive Sites and Proposed Noise Barriers

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STATE OF FLORIDA
DEPARTMENT OF TRANSPORTATION

ROAD NO.	COUNTY	FINANCIAL PROJECT ID
SR 54	PASCO	41656I-1-22-01

SR 54 PD&E STUDY

SHEET INDEX

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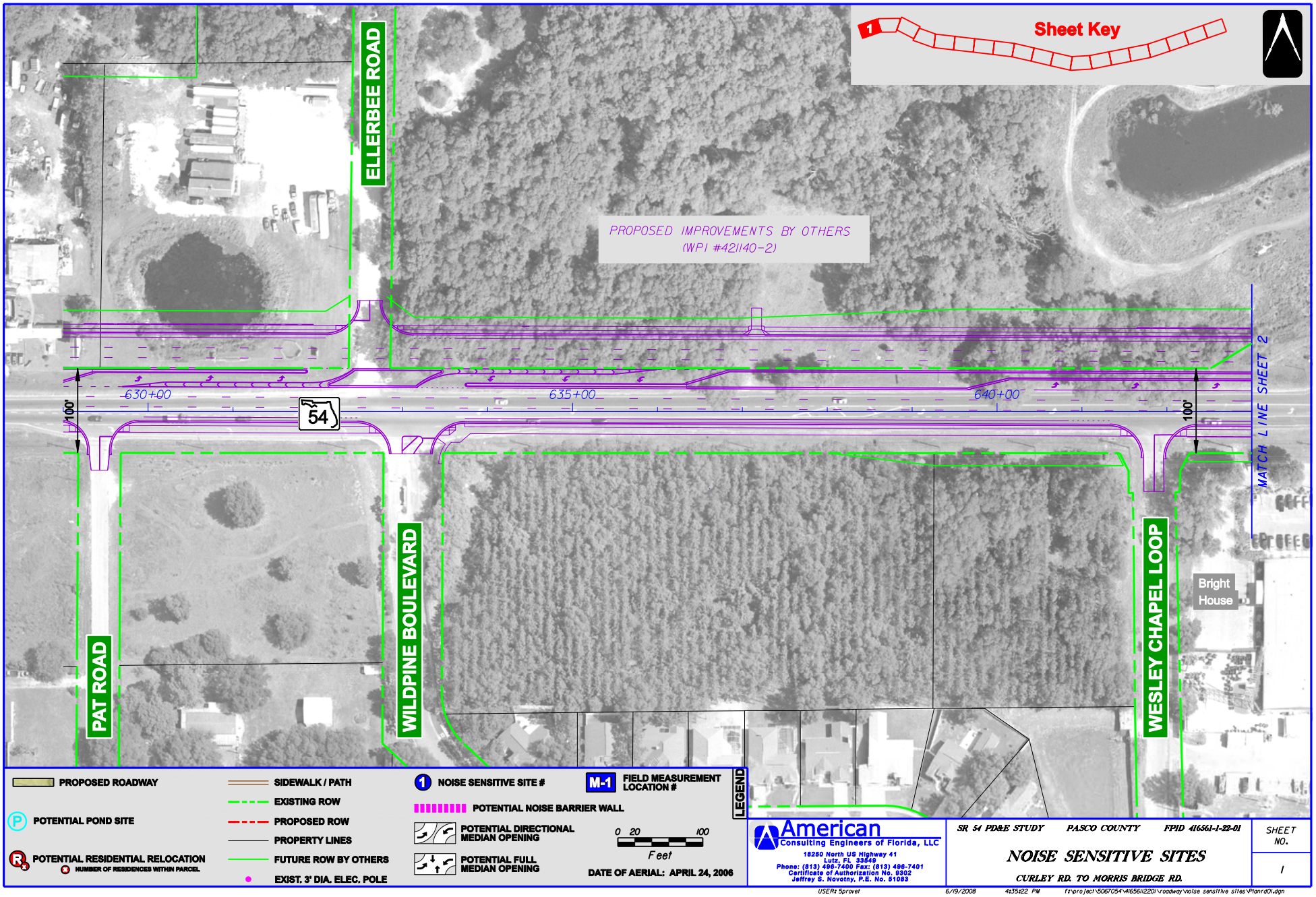

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SR 54 PD&E STUDY PASCO COUNTY FPID 416561-1-22-01

NOISE SENSITIVE SITES

CURLEY RD. TO MORRIS BRIDGE RD.

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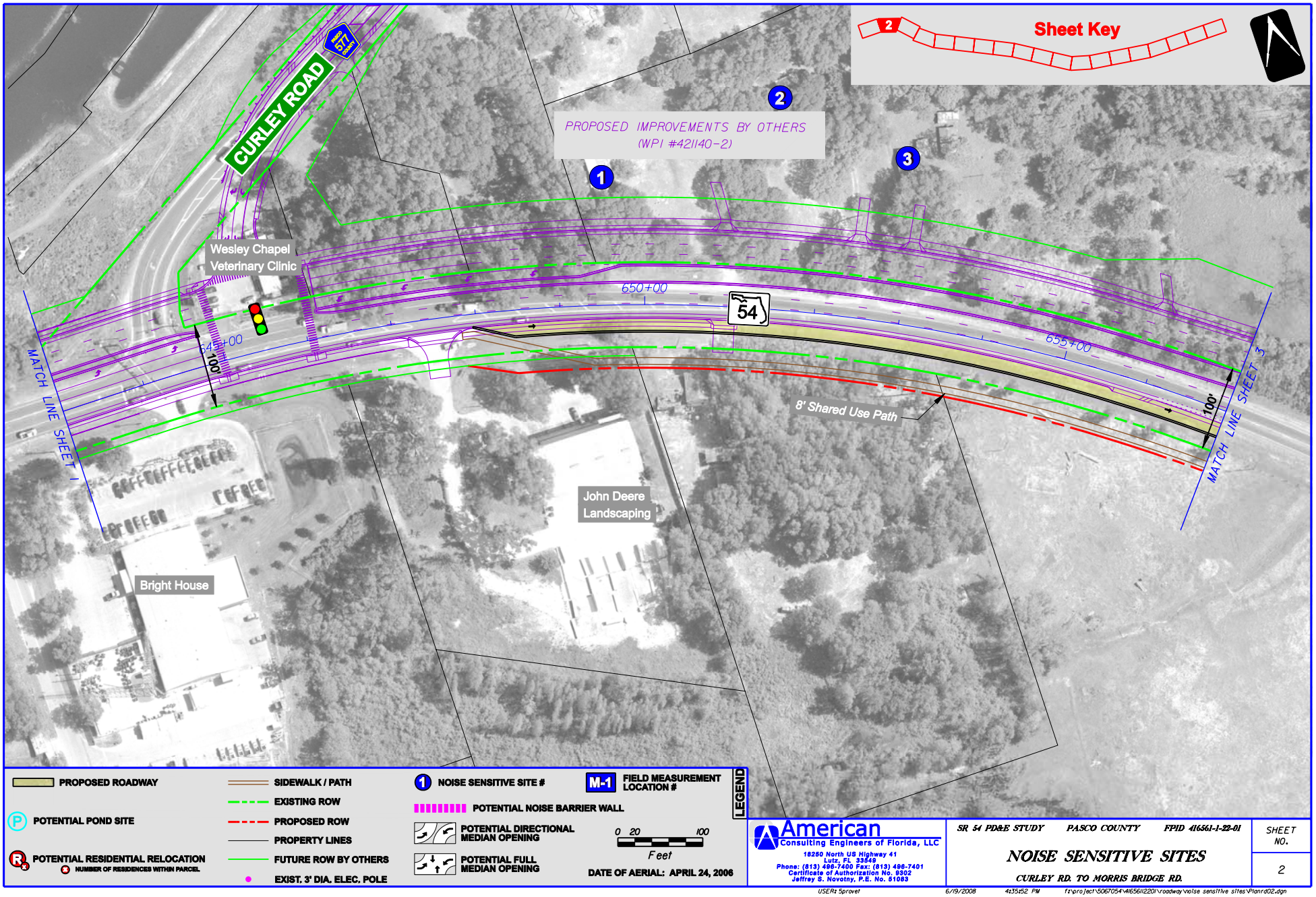

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NOISE SENSITIVE SITES

CURLEY RD. TO MORRIS BRIDGE RD.

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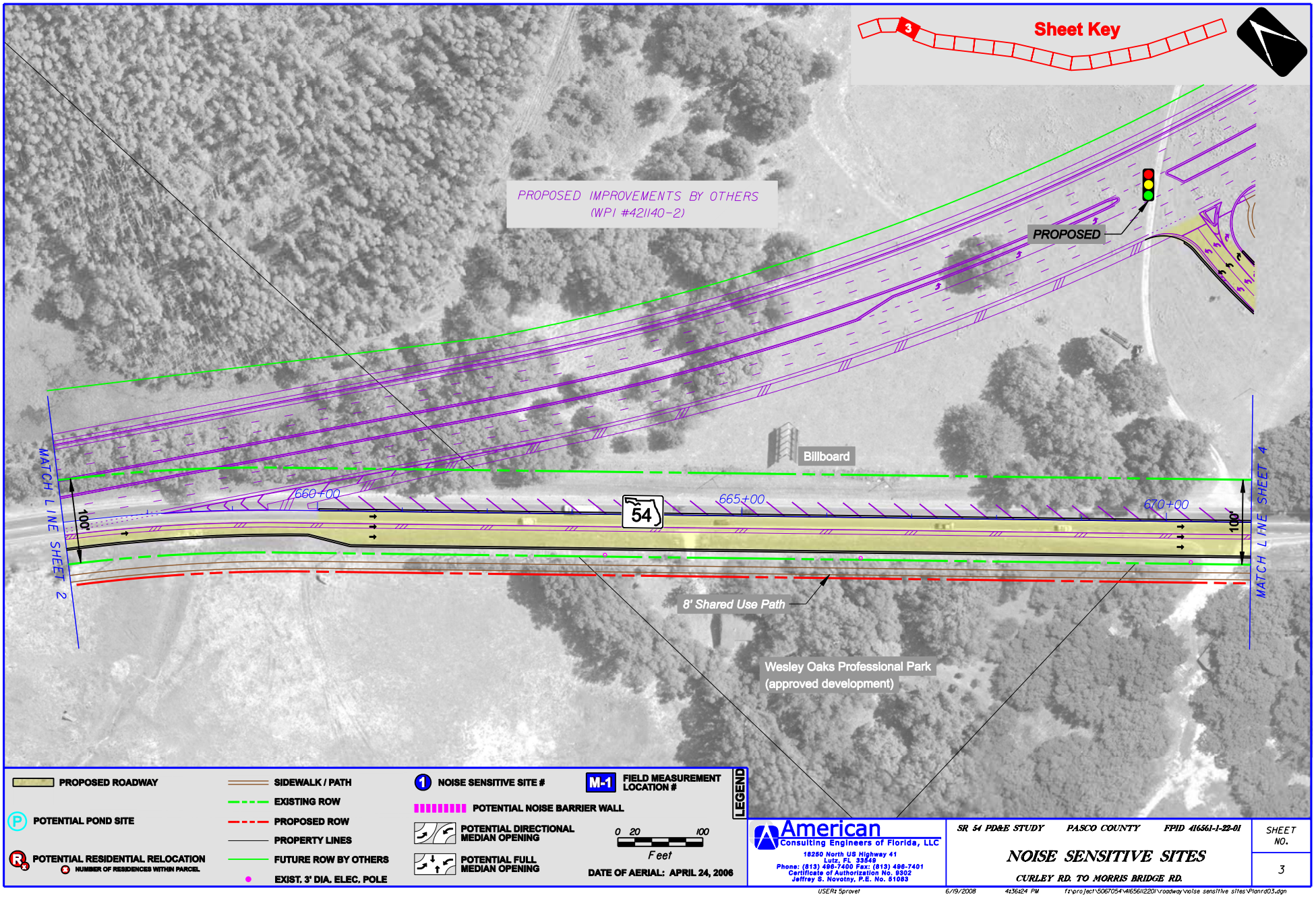

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NOISE SENSITIVE SITES

CURLEY RD. TO MORRIS BRIDGE RD.

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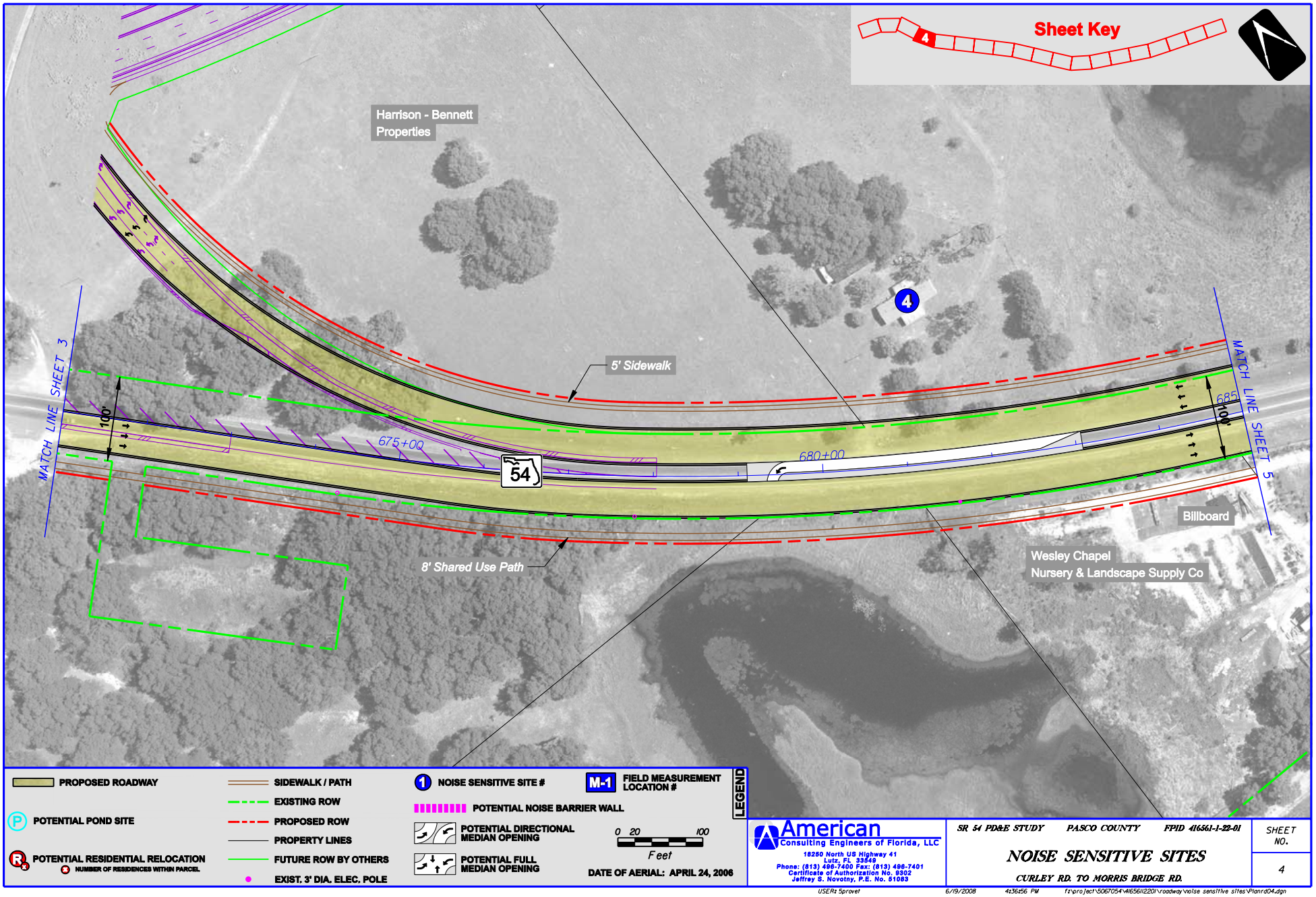

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NOISE SENSITIVE SITES

CURLEY RD. TO MORRIS BRIDGE RD.

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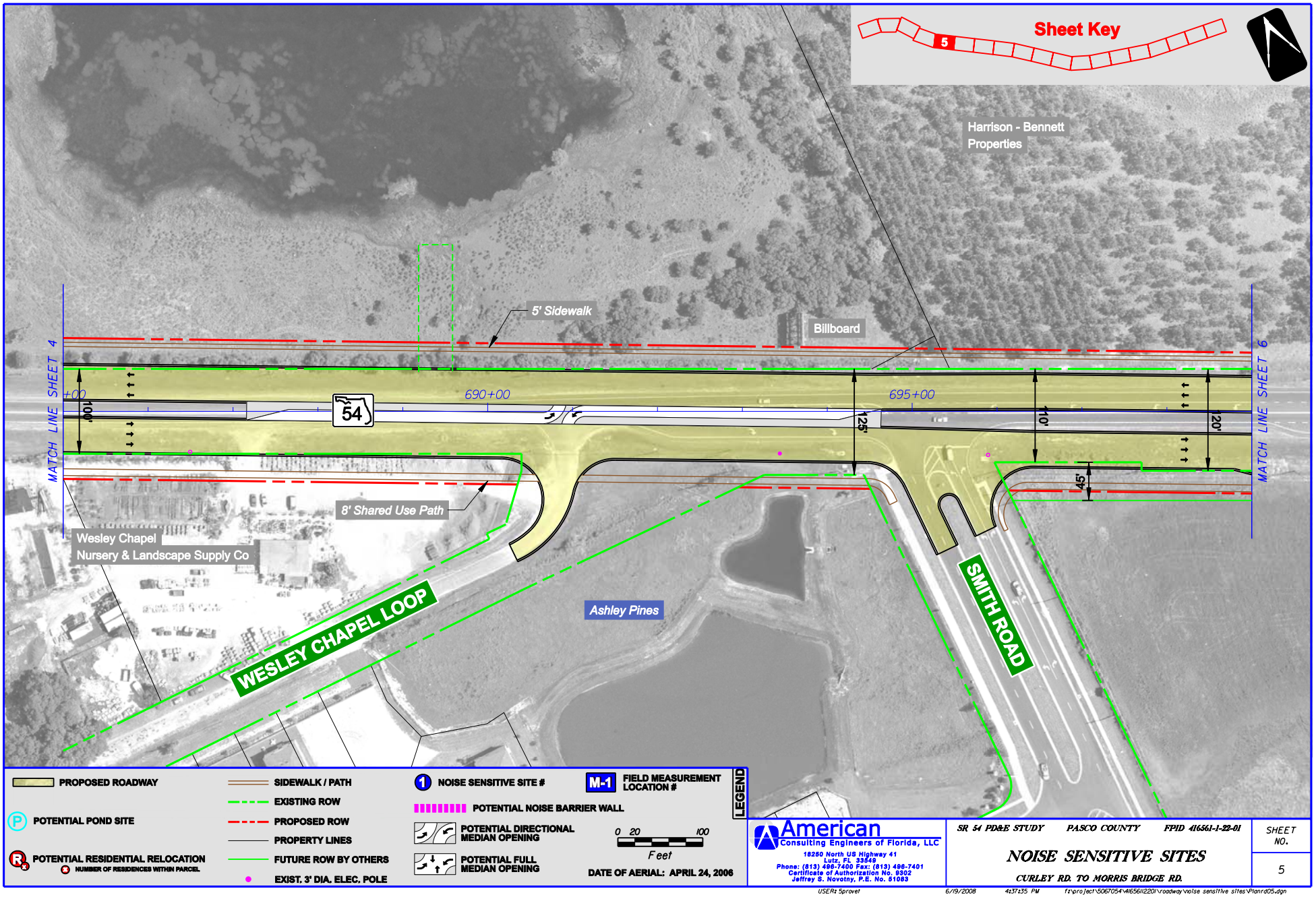

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NOISE SENSITIVE SITES

CURLEY RD. TO MORRIS BRIDGE RD.

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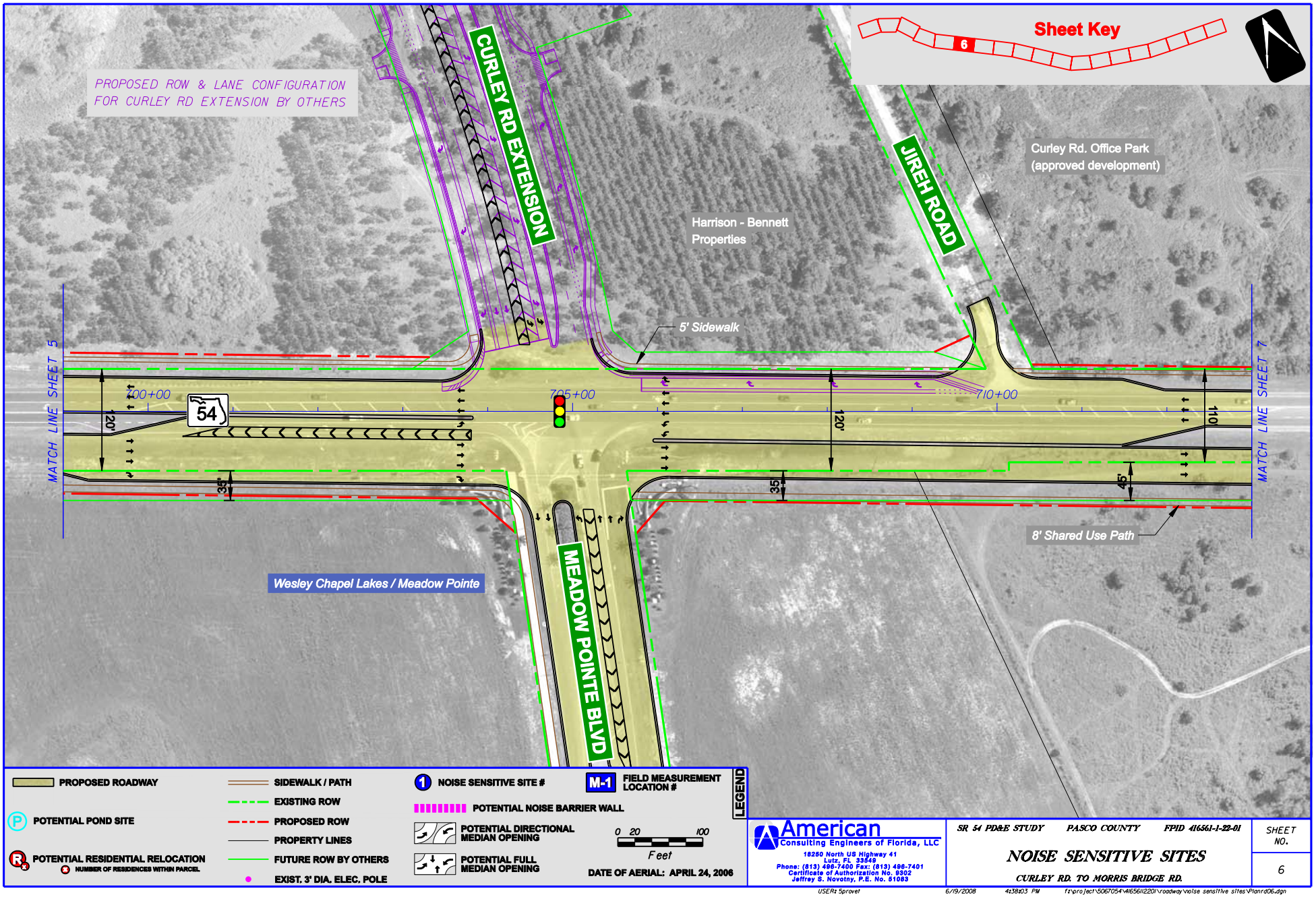

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NOISE SENSITIVE SITES

CURLEY RD. TO MORRIS BRIDGE RD.

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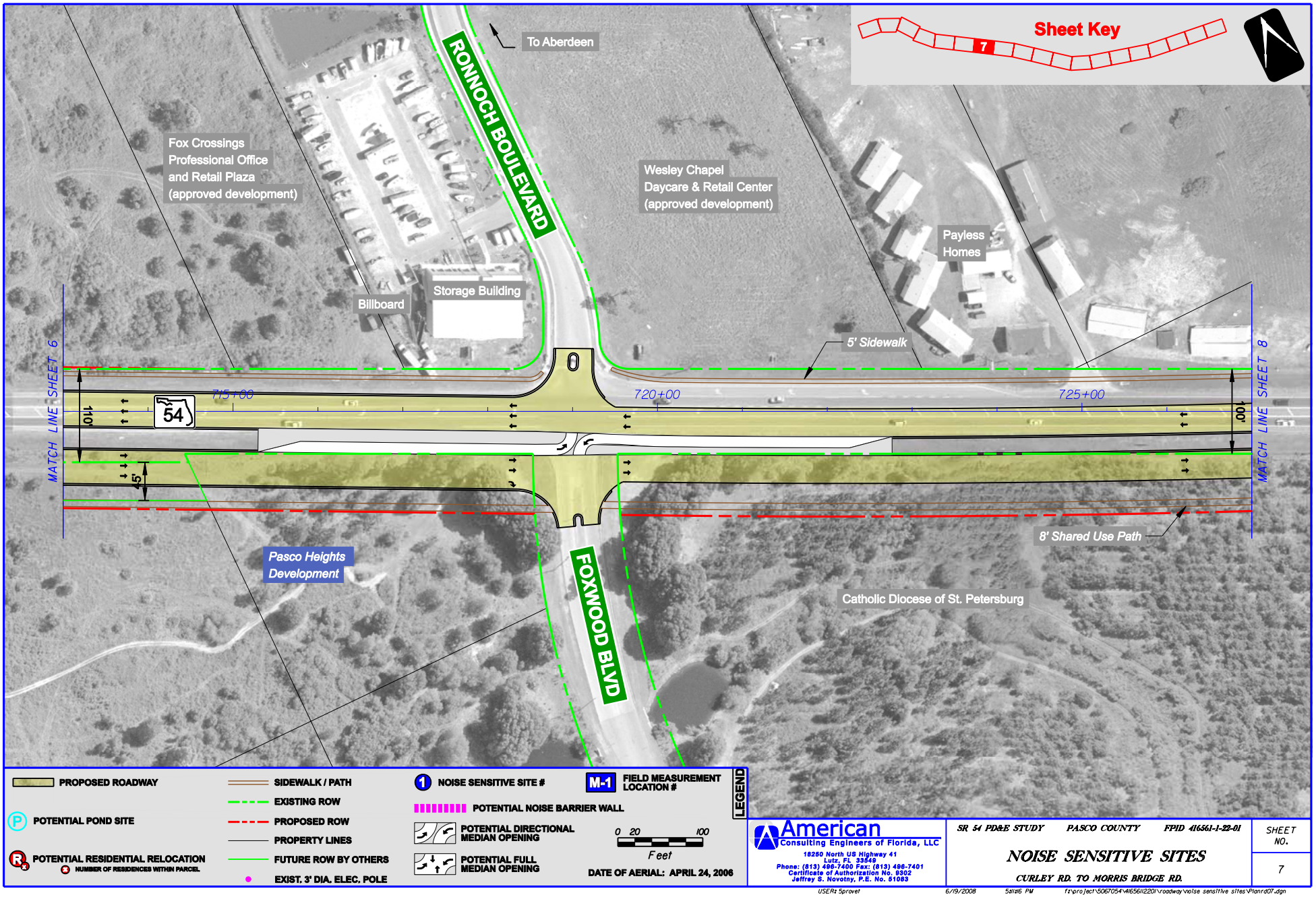

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NOISE SENSITIVE SITES

CURLEY RD. TO MORRIS BRIDGE RD.

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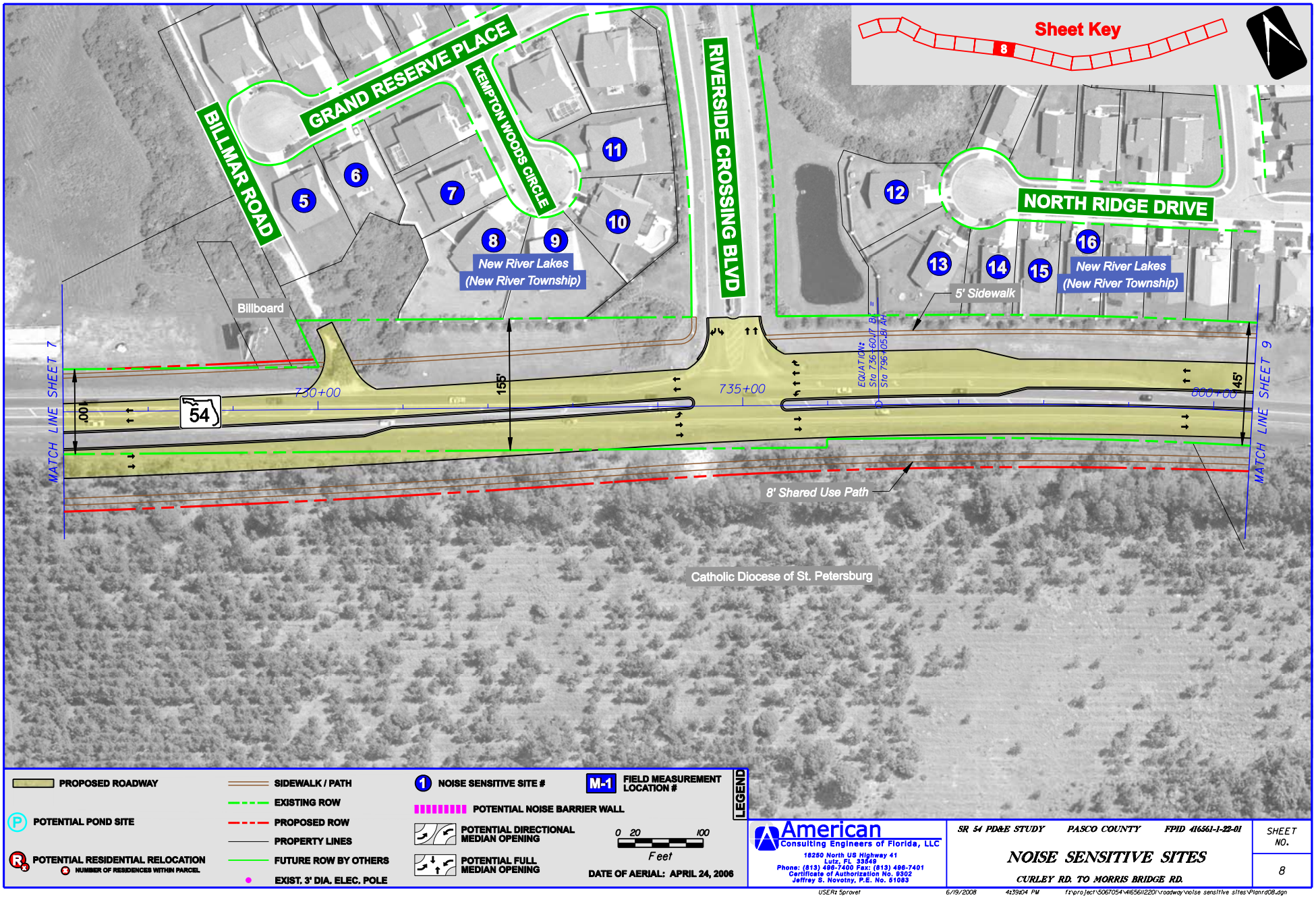

LEGEND

- PROPOSED ROADWAY
- POTENTIAL POND SITE
- POTENTIAL RESIDENTIAL RELOCATION — NUMBER OF RESIDENCES WITHIN PARCEL
- SIDEWALK / PATH
- EXISTING ROW
- PROPOSED ROW
- PROPERTY LINES
- FUTURE ROW BY OTHERS
- EXIST. 3' DIA. ELEC. POLE
- NOISE SENSITIVE SITE #
- POTENTIAL NOISE BARRIER WALL
- POTENTIAL DIRECTIONAL MEDIAN OPENING
- POTENTIAL FULL MEDIAN OPENING
- M-1 FIELD MEASUREMENT LOCATION #

0 20 100
Feet

DATE OF AERIAL: APRIL 24, 2006

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SR 54 PD&E STUDY PASCO COUNTY FPID 416561-1-22-01

NOISE SENSITIVE SITES

CURLEY RD. TO MORRIS BRIDGE RD.

SHEET NO. 8

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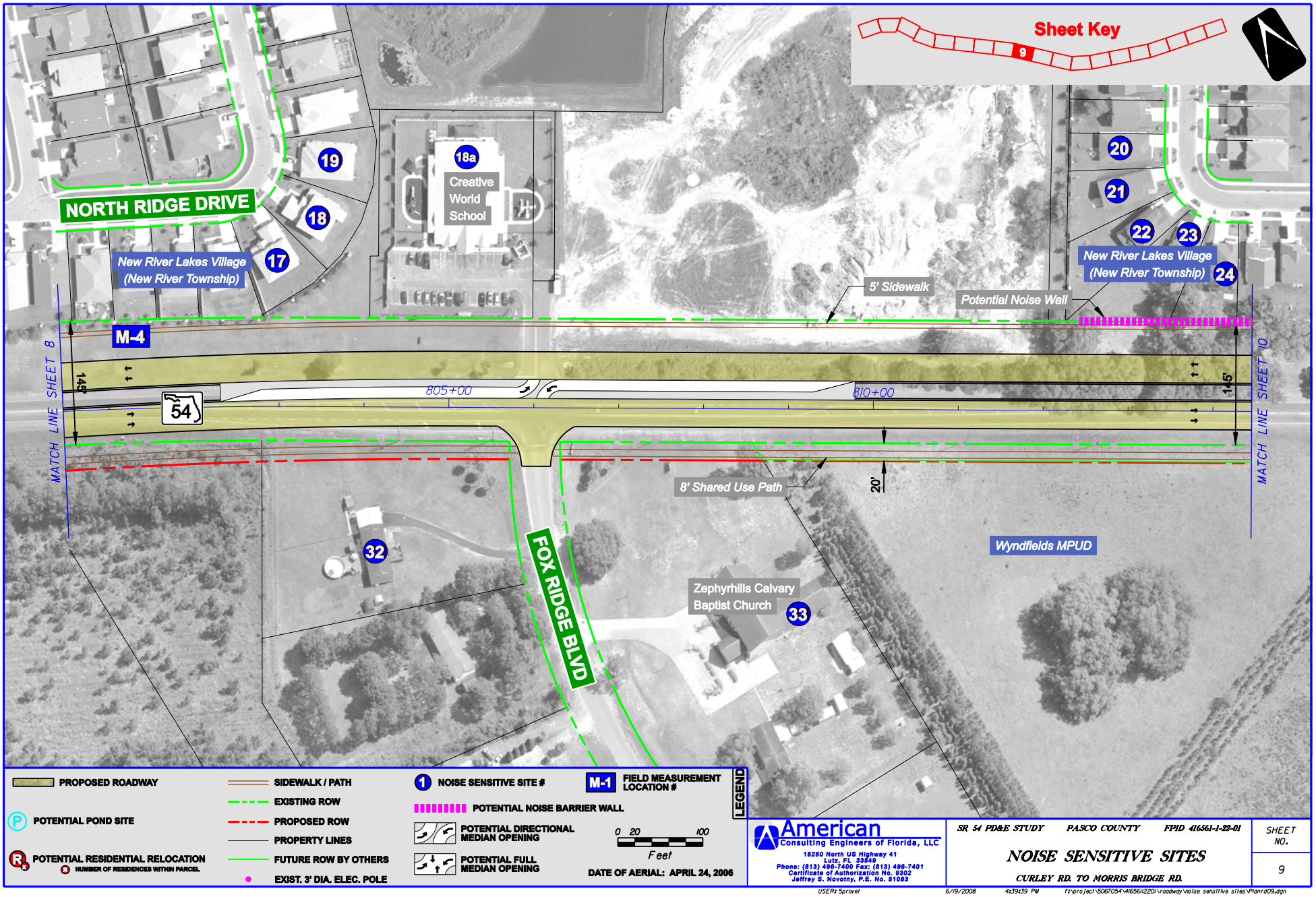

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NOISE SENSITIVE SITES

CURLEY RD. TO MORRIS BRIDGE RD.

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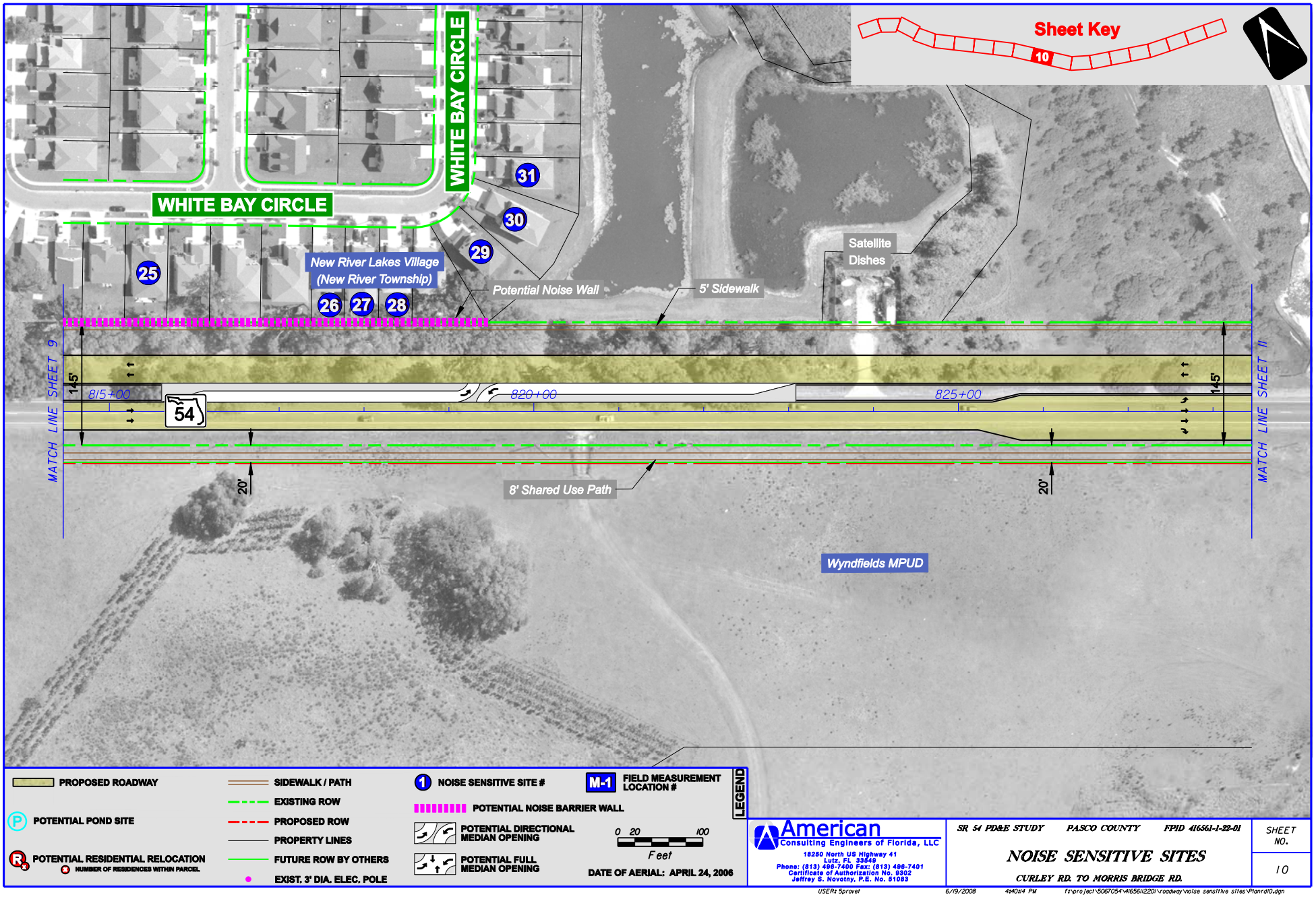

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NOISE SENSITIVE SITES

CURLEY RD. TO MORRIS BRIDGE RD.

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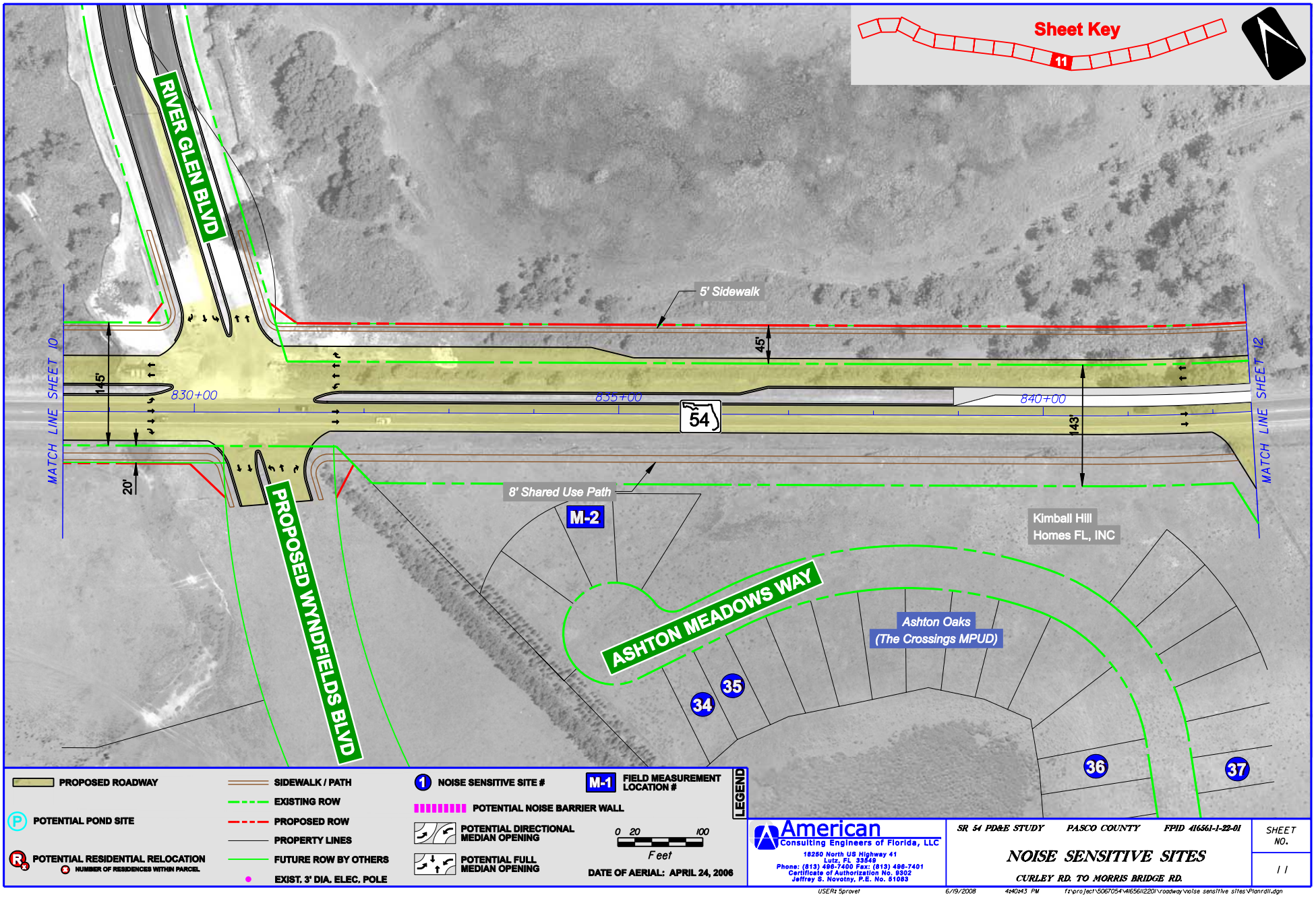

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NOISE SENSITIVE SITES

CURLEY RD. TO MORRIS BRIDGE RD.

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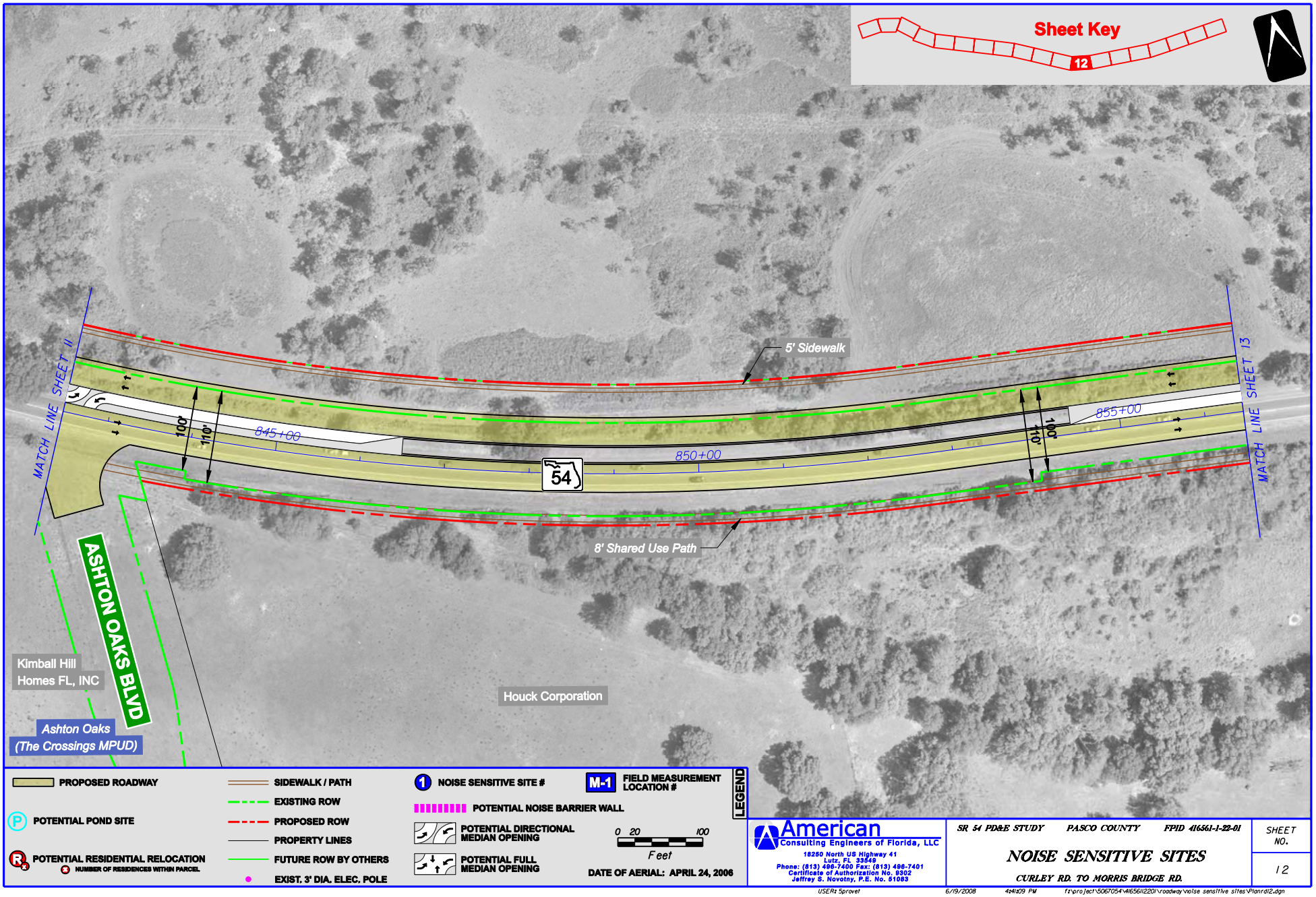

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NOISE SENSITIVE SITES

CURLEY RD. TO MORRIS BRIDGE RD.

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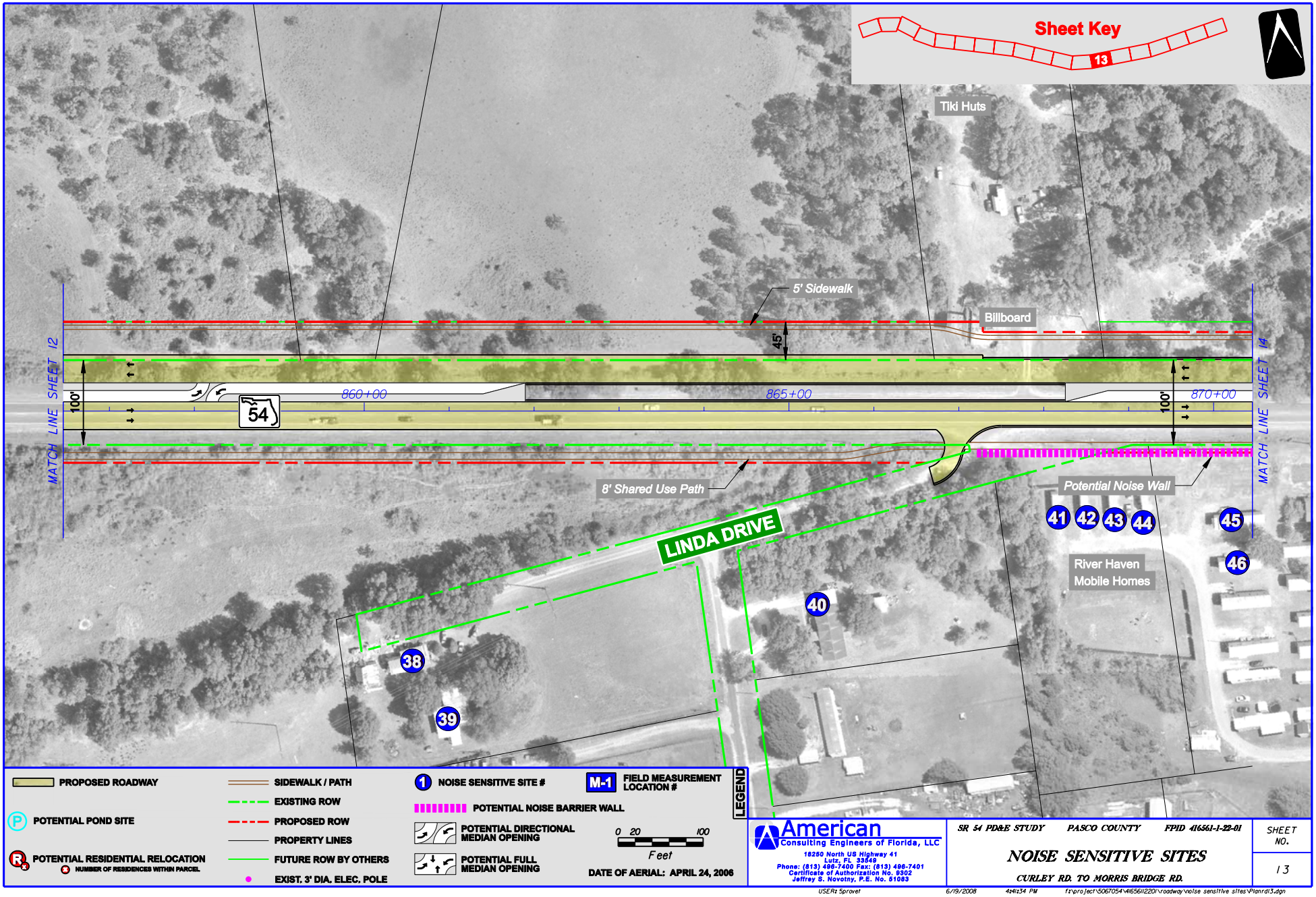

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NOISE SENSITIVE SITES

CURLEY RD. TO MORRIS BRIDGE RD.

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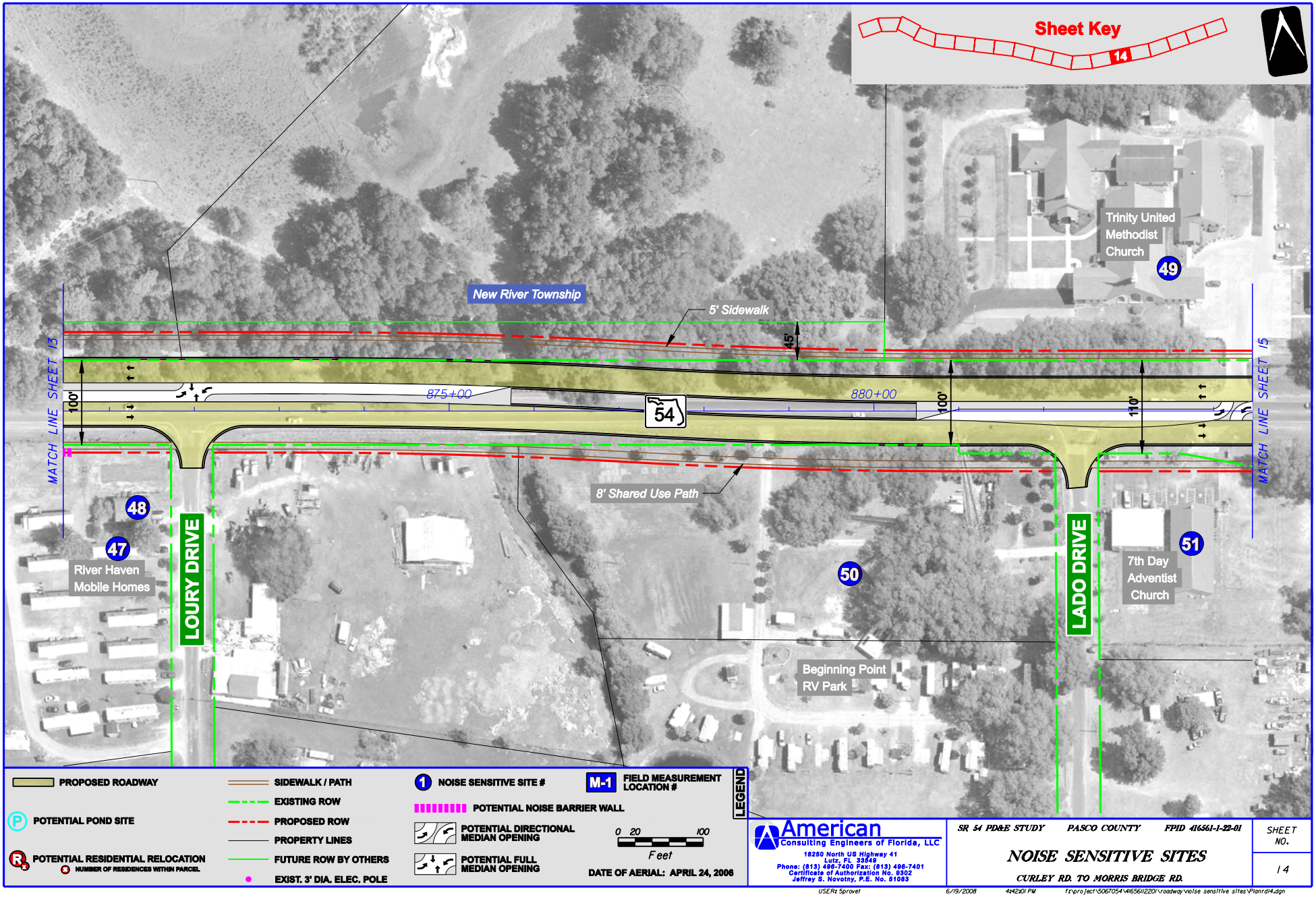

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NOISE SENSITIVE SITES

CURLEY RD. TO MORRIS BRIDGE RD.

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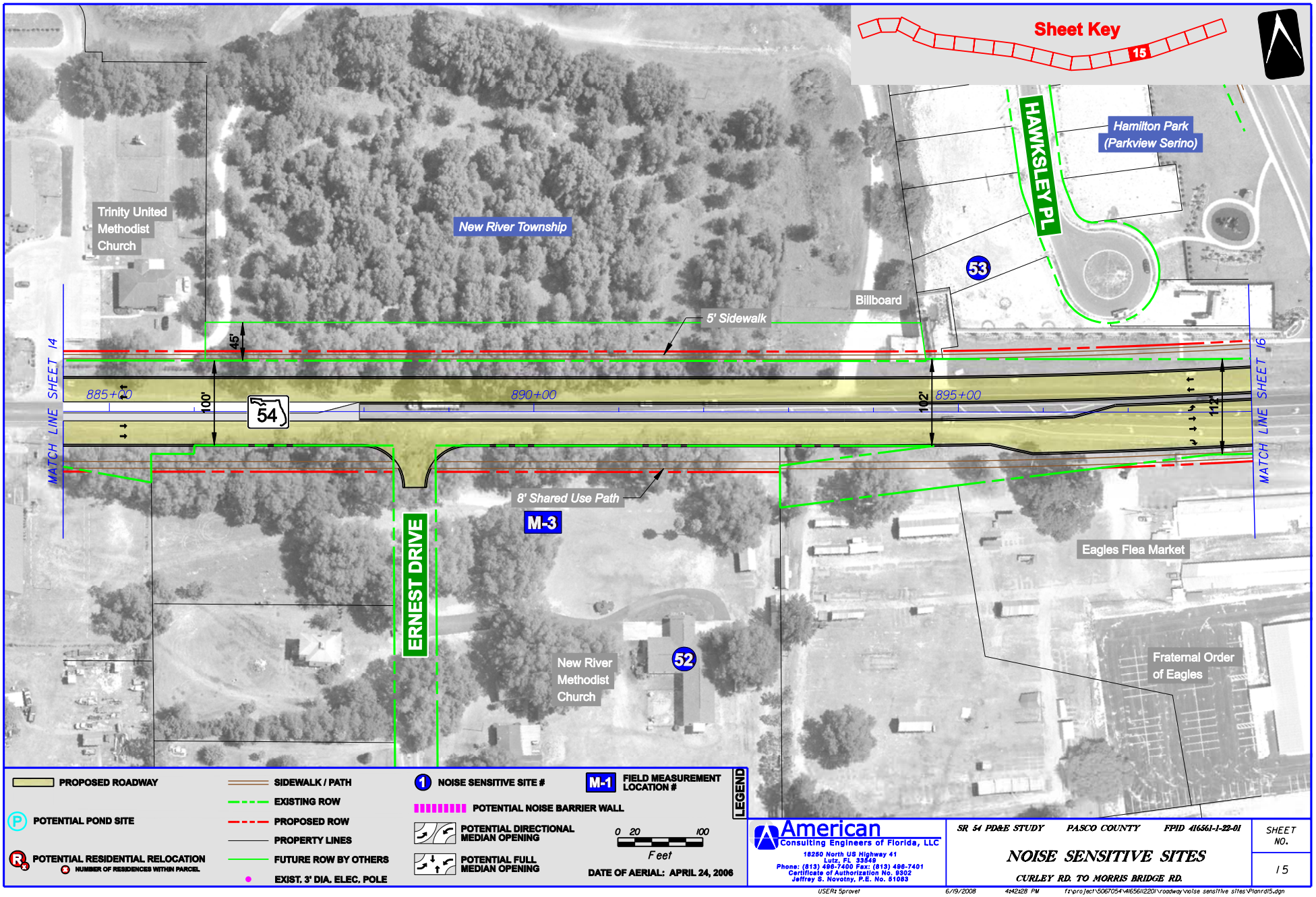

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NOISE SENSITIVE SITES

CURLEY RD. TO MORRIS BRIDGE RD.

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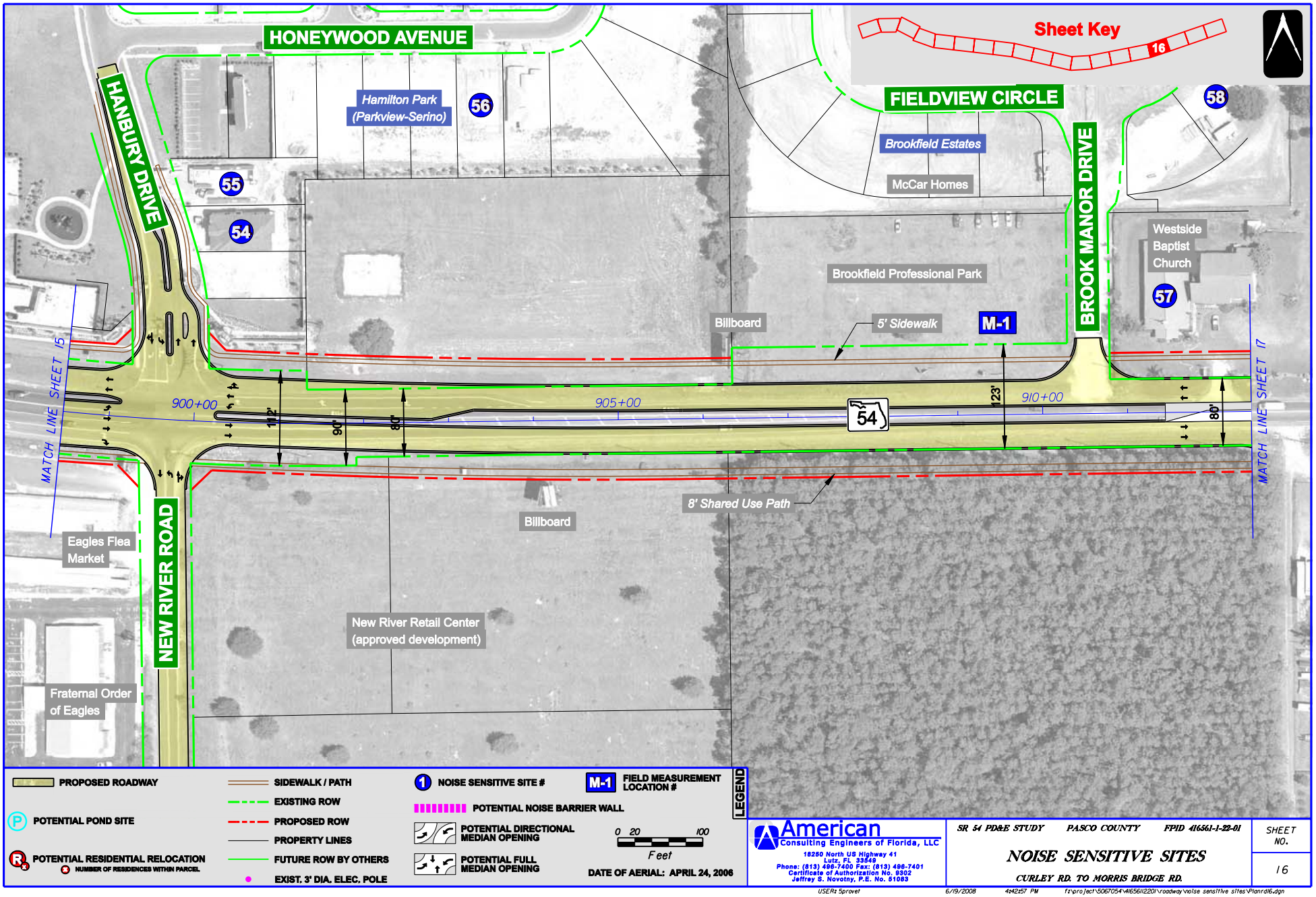

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NOISE SENSITIVE SITES

CURLEY RD. TO MORRIS BRIDGE RD.

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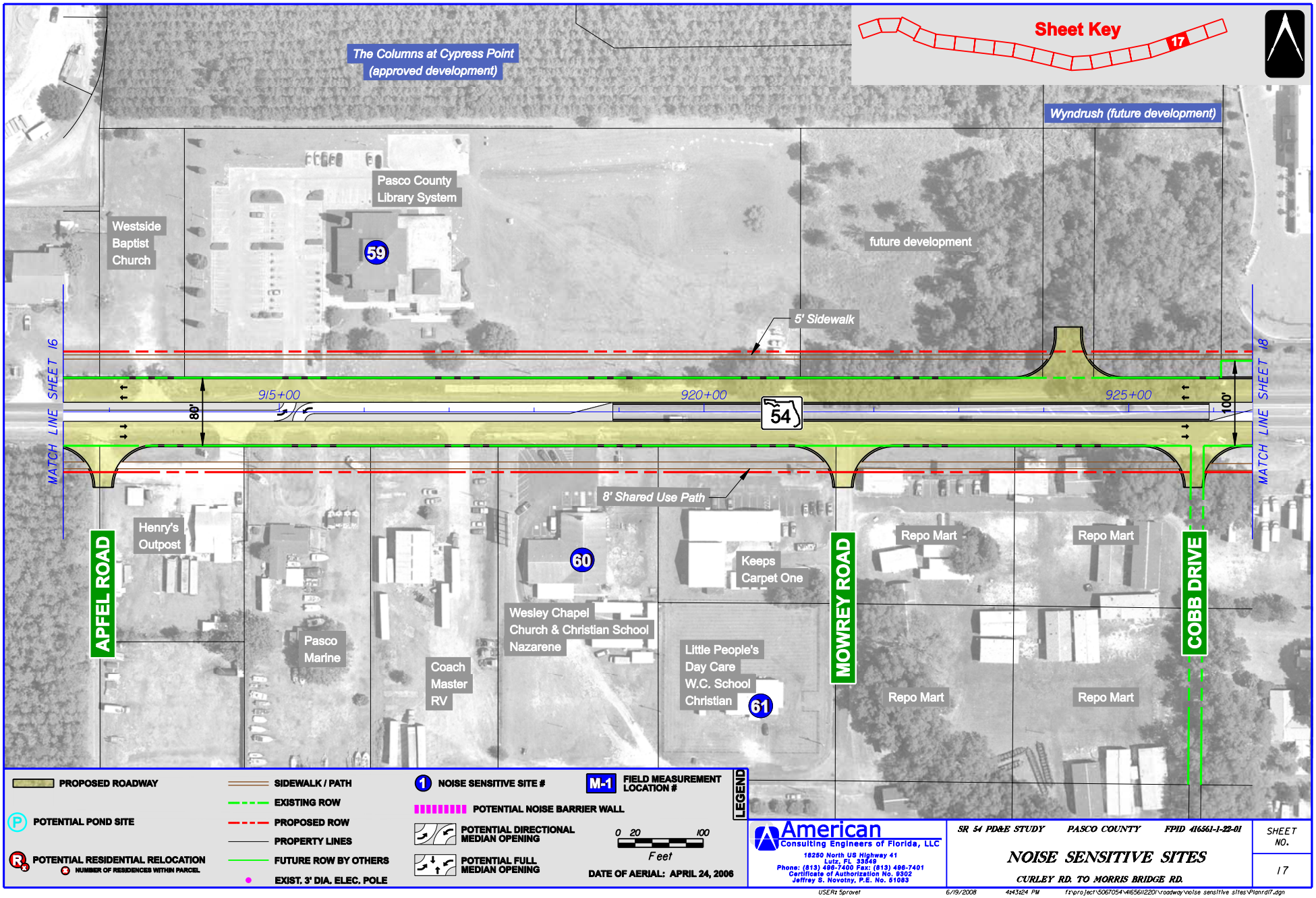
Sheet Key
17
The Columns at Cypress Point
(approved development)
Wyndrush (future development)
Pasco County
Library System
Westside
Baptist
Church
59
future development
5' Sidewalk
MATCH LINE SHEET 16
MATCH LINE SHEET 18
915+00
920+00
925+00
80'
100'
54
8' Shared Use Path
Henry's
Outpost
APFEL ROAD
60
Keeps
Carpet One
MOWREY ROAD
Repo Mart
Repo Mart
COBB DRIVE
Pasco
Marine
Wesley Chapel
Church & Christian School
Nazarene
Coach
Master
RV
Little People's
Day Care
W.C. School
Christian
61
Repo Mart
Repo Mart
LEGEND
PROPOSED ROADWAY
POTENTIAL POND SITE
POTENTIAL RESIDENTIAL RELOCATION
NUMBER OF RESIDENCES WITHIN PARCEL
SIDEWALK / PATH
EXISTING ROW
PROPOSED ROW
PROPERTY LINES
FUTURE ROW BY OTHERS
EXIST. 3' DIA. ELEC. POLE
1 NOISE SENSITIVE SITE #
M-1 FIELD MEASUREMENT LOCATION #
POTENTIAL NOISE BARRIER WALL
POTENTIAL DIRECTIONAL MEDIAN OPENING
POTENTIAL FULL MEDIAN OPENING
0 20 100
Feet
DATE OF AERIAL: APRIL 24, 2006
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PASCO COUNTY
FPID 416561-1-22-01
NOISE SENSITIVE SITES
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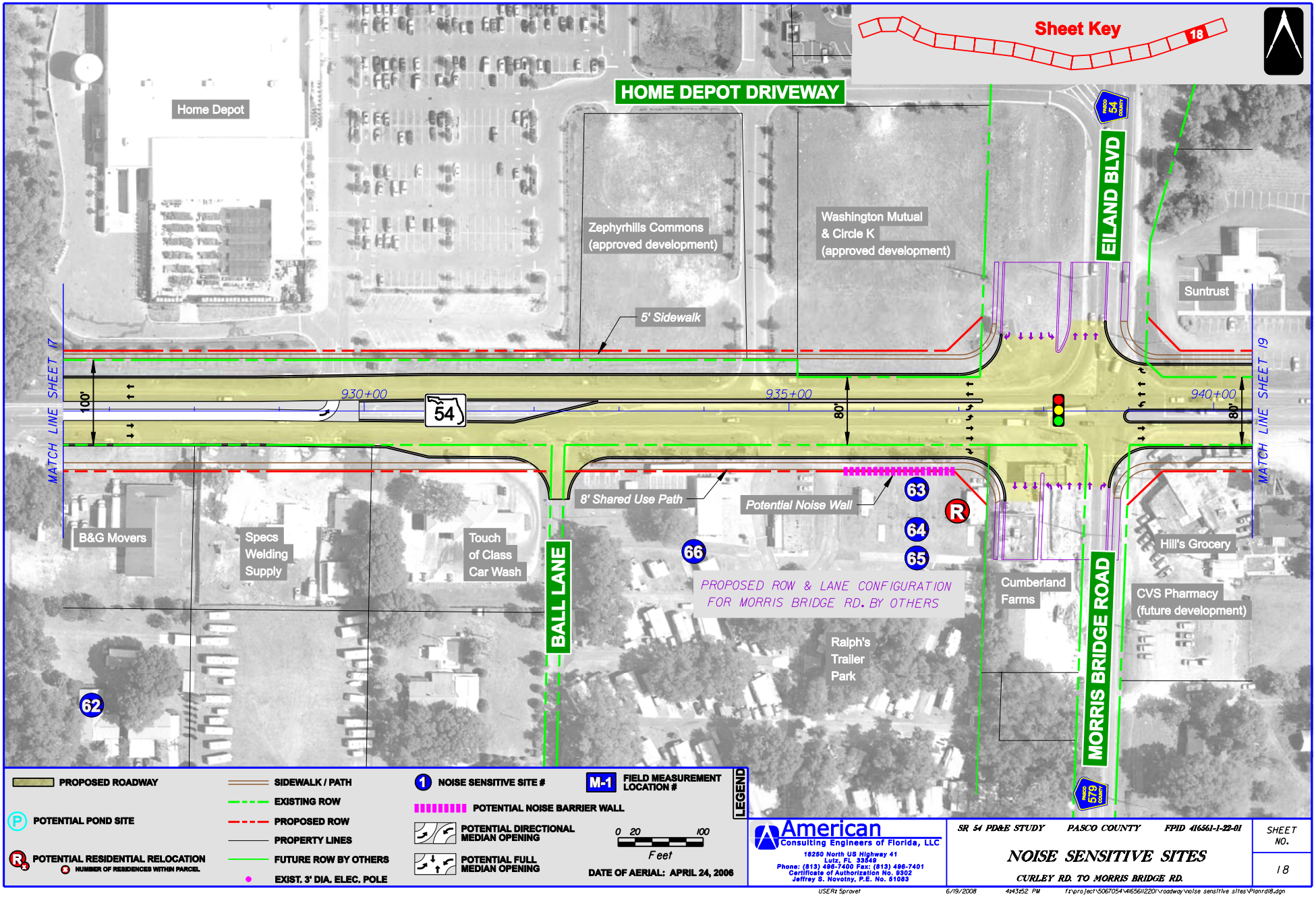

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NOISE SENSITIVE SITES

CURLEY RD. TO MORRIS BRIDGE RD.

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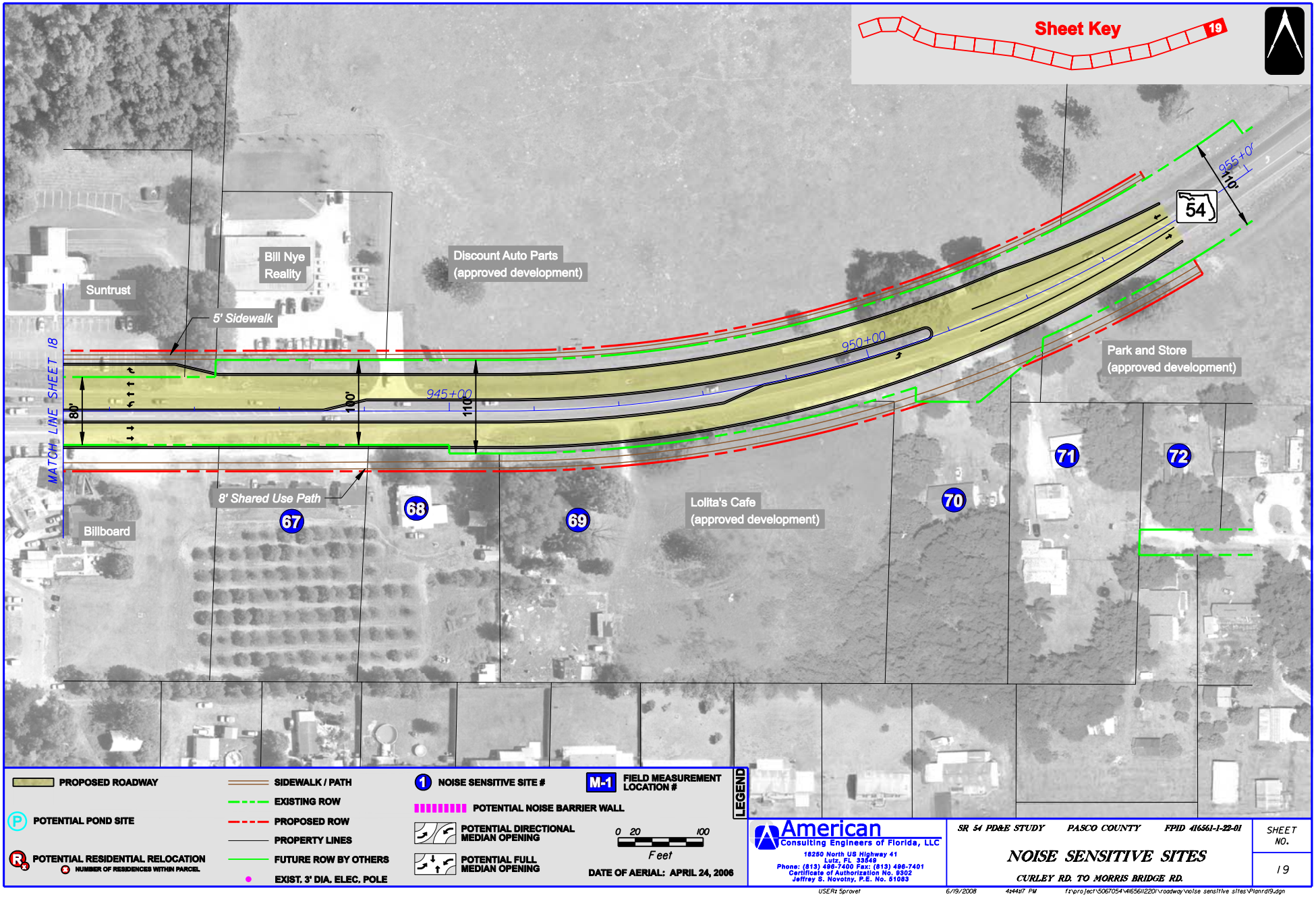

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NOISE SENSITIVE SITES

CURLEY RD. TO MORRIS BRIDGE RD.

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4.2 MEASURED NOISE LEVELS

As previously stated, future noise levels with the proposed improvements were modeled using the TNM. To insure that these predictions are as accurate as possible, the computer model was validated using measured noise levels at locations adjacent to the project corridor. Traffic and meteorological data, including traffic volumes, vehicle speeds, and atmospheric conditions were recorded during each measurement period.

The field measurements for SR 54 were conducted in accordance the FHWA's *Measurement of Highway Related Noise*. Each field measurement was obtained using a Casella CEL-593 Type 1 Sound Level Meter. The meter was calibrated before and after each monitoring period with a Casella CEL-284 Type 1 Sound Level Calibrator.

The measured field data were used as input for the TNM to determine if, given the topography and actual site conditions of the area, the computer model could "re-create" the measured noise levels with the existing roadway. Following FDOT guidelines, a noise prediction model is considered valid for the use of predicting traffic noise levels if the measured and predicted noise levels are within a tolerance standard of 3 dBA. Initial field measurements were taken on April 17, 2008 on SR 54 at four locations. The locations at which the measurements were taken can be seen in **Figure 4-1.** The sound level meter was placed approximately 100 feet from the centerline of the roadway at a height of 5 feet above ground. Sets of 10-minute measurements were taken for both eastbound and westbound traffic. Data collected in the field can be found in **Appendix B**.

Table 4-2 presents the field measurements and the computer validation results for SR 54. As shown, the ability of the model to accurately predict noise levels for the project was confirmed. Notably, the computer-modeled levels are all higher than the measured values. Documentation in support of the validation is provided in **Appendix B** of this report.

Table 4-2 – Validation Data

Location	Measurement Period	Modeled	Measured	Difference
M-1 NB side of SR 54 west of Curley Rd	10:45 am - 10:55 am	63.2	65.0	1.8
M-2 Ashton Oaks	1:30 pm - 1:40 pm	64.4	66.0	1.6
M-3 New River Methodist Church	1:55 pm - 2:05 pm	64.6	65.1	0.5
M-4 New River Township	2:40 pm - 2:50 pm	66.5	65.6	0.9
Measurements were obtained on April 17, 2008.				

4.3 RESULTS OF THE NOISE ANALYSIS

Table 4-3 presents the calculated existing (2006) and future year (2030) traffic noise levels for noise-sensitive sites adjacent to SR 54. Documentation in support of the analysis is provided in **Appendix C**, which is published separately as a Technical Appendix.

As shown in **Table 4-3**, the results of the analysis indicate that existing (2006) and no-build (2030) exterior traffic noise levels range from 52.0 to 65.4 dBA at the residential sites, with traffic noise levels predicted to approach, meet, or exceed the NAC at none of the sites. In the future (2030), with the proposed improvements to SR 54, traffic noise levels are predicted to range from 54.5 to 69.3 dBA, with levels predicted to approach, meet, or exceed the NAC at 30 of the sites.

The difference in noise levels at the 116 noise-sensitive sites between the existing/no-build and build alternative ranges from 0.1 and 6.4 dBA. As such, none of the sites are predicted to experience a substantial increase (15 dBA or more) in traffic noise levels as a result of the proposed improvements. Noise abatement measures were evaluated for the 30 noise-sensitive sites predicted to be affected by the proposed improvements to SR 54. The results of the evaluation are presented in **Section 5.0** of this report.

Table 4-3 – Predicted Traffic Noise Levels

Site ID#	# of Units	Land Use*	L_{Aeq1h} (dBA)					Approaches, Meets, or Exceeds NAC?
			Existing (2006)*	No Build (2030)*	Build (2030)	Difference between Build and Existing	Difference between Build and No-Build	
1	1	SF	62.9	62.9	69.3	6.4	6.4	Yes
2	1	SF	58.1	58.1	61.0	2.9	2.9	No
3	1	SF	61.4	61.4	64.9	3.5	3.5	No
4	1	SF	61.1	61.1	62.9	1.8	1.8	No
5	1	SF	56.9	56.9	59.4	2.5	2.5	No
6	1	SF	54.7	54.7	57.3	2.6	2.6	No
7	1	SF	55.7	55.7	58.2	2.5	2.5	No
8	1	SF	57.6	57.6	60.0	2.4	2.4	No
9	1	SF	57.4	57.4	59.9	2.5	2.5	No
10	1	SF	55.8	55.8	58.2	2.4	2.4	No
11	1	SF	53.0	53.0	55.5	2.5	2.5	No
12	1	SF	55.1	55.1	57.7	2.6	2.6	No
13	1	SF	58.7	58.7	61.7	3.0	3.0	No
14	1	SF	59.2	59.2	62.4	3.2	3.2	No
15	1	SF	58.7	58.7	62.0	3.3	3.3	No
16	8	SF	59.2	59.2	62.6	3.4	3.4	No
17	1	SF	58.2	58.2	61.7	3.5	3.5	No
18	1	SF	56.7	56.7	59.3	2.6	2.6	No
18a	1	CC	39.6	39.6	40.7	1.1	1.1	No
19	1	SF	56.1	56.1	58.2	2.1	2.1	No
20	1	SF	56.3	56.3	58.1	1.8	1.8	No
21	1	SF	58.9	58.9	60.5	1.6	1.6	No
22	1	SF	61.1	61.1	62.3	1.2	1.2	No
23	1	SF	62.6	62.6	65.0	2.4	2.4	No
24	3	SF	62.6	62.6	66.7	4.1	4.1	Yes
25	4	SF	63.5	63.5	66.9	3.4	3.4	Yes
26	1	SF	63.0	63.0	66.6	3.6	3.6	Yes
27	1	SF	63.5	63.5	67.1	3.6	3.6	Yes
28	2	SF	63.0	63.0	66.7	3.7	3.7	Yes
29	1	SF	62.1	62.1	65.6	3.5	3.5	No
30	1	SF	61.1	61.1	62.7	1.6	1.6	No
31	1	SF	58.2	58.2	59.7	1.5	1.5	No

*SF = Single Family Residential, CC = Child Care Facility, RF = Religious Facility, LIB = Library
**The Existing and No-Build Conditions do not include future improvements to SR 54.

Predicted Interior Noise Levels

Site ID#	# of Units	Land Use*	LAeq1h (dBA)					Approaches, Meets, or Exceeds NAC?
			Existing (2006)*	No Build (2030)*	Build (2030)	Difference between Build and Existing	Difference between Build and No-Build	
32	1	SF	61.8	61.8	64.5	2.7	2.7	No
33	1	RF	39.0	39.0	40.1	1.1	1.1	No
34	1	SF	53.3	53.3	55.2	1.9	1.9	No
35	1	SF	54.1	54.1	55.8	1.7	1.7	No
36	1	SF	52.0	52.0	54.5	2.5	2.5	No
37	1	SF	52.3	52.3	54.5	2.2	2.2	No
38	1	SF	56.6	56.6	57.4	0.8	0.8	No
39	1	SF	54.8	54.8	56.3	1.5	1.5	No
40	1	SF	59.8	59.8	59.9	0.1	0.1	No
41	1	SF	64.5	64.5	66.0	1.5	1.5	Yes
42	1	SF	64.6	64.6	66.2	1.6	1.6	Yes
43	1	SF	65.0	65.0	66.5	1.5	1.5	Yes
44	1	SF	65.4	65.4	66.8	1.4	1.4	Yes
45	1	SF	62.8	62.8	64.0	1.2	1.2	No
46	1	SF	60.1	60.1	61.1	1.0	1.0	No
47	1	SF	59.8	59.8	62.0	2.2	2.2	No
48	1	SF	63.7	63.7	65.3	1.6	1.6	No
49	1	RF	36.9	36.9	39.1	2.2	2.2	No
50	1	SF	58.6	58.6	59.6	1.0	1.0	No
51	1	RF	39.6	39.6	41.4	1.8	1.8	No
52	1	RF	33.7	33.7	36.5	2.8	2.8	No
53	1	SF	60.4	60.4	62.2	1.8	1.8	No
54	1	SF	57.4	57.4	60.8	3.4	3.4	No
55	1	SF	55.3	55.3	57.2	1.9	1.9	No
56	2	SF	53.4	53.4	55.7	2.3	2.3	No
57	1	RF	40.4	40.4	42.7	2.3	2.3	No
58	1	SF	52.5	52.5	54.9	2.4	2.4	No
59	1	LIB	37.9	37.9	41.4	3.5	3.5	No
60	1	RF	40.8	40.8	41.1	0.3	0.3	No
61	1	CC	33.8	33.8	35.9	2.1	2.1	No
62	1	SF	52.5	52.5	55.6	3.1	3.1	No
63	9	SF	65.2	65.2	68.1	2.9	2.9	Yes
64	7	SF	62.9	62.9	64.3	1.4	1.4	No
65	6	SF	58.2	58.2	61.2	3.0	3.0	No

*SF = Single Family Residential, CC = Child Care Facility, RF = Religious Facility, LIB = Library
**The Existing and No-Build Conditions do not include future improvements to SR 54.

Predicted Interior Noise Levels

Site ID#	# of Units	Land Use*	L_{Aeq1h} (dBA)					Approaches, Meets, or Exceeds NAC?
			Existing (2006)*	No Build (2030)*	Build (2030)	Difference between Build and Existing	Difference between Build and No-Build	
66	8	SF	60.2	60.2	61.0	0.8	0.8	No
67	4	SF	63.9	63.9	68.3	4.4	4.4	Yes
68	1	SF	64.1	64.1	68.1	4.0	4.0	Yes
69	1	SF	61.9	61.9	65.2	3.3	3.3	No
70	1	SF	58.8	58.8	61.4	2.6	2.6	No
71	1	SF	58.4	58.4	60.9	2.5	2.5	No
72	1	SF	53.8	53.8	57.0	3.2	3.2	No
*SF = Single Family Residential, CC = Child Care Facility, RF = Religious Facility, LIB = Library **The Existing and No-Build Conditions do not include future improvements to SR 54.								
	Predicted Interior Noise Levels							

SECTION 5.0 – EVALUATION OF ABATEMENT ALTERNATIVES

The FDOT considers abatement alternatives when predicted traffic noise levels approach, meet, or exceed the NAC. The measures considered for SR 54 were traffic management, alternative roadway alignment, property acquisition, and noise barriers. The following discusses the feasibility (engineering considerations) and reasonableness (amount of noise reduction provided, number of noise-sensitive sites benefited, absolute noise levels, cost, etc.) of the measures.

5.1 TRAFFIC MANAGEMENT MEASURES

The improvements to SR 54 are meant to help alleviate future traffic congestion and aid in regional connectivity. Traffic management measures that limit motor vehicle speeds and reduce volumes can be effective noise mitigation measures. However, these measures can also negate a project's ability to accommodate forecast traffic volumes.

For example, if the posted speed limit on SR 54 were reduced, the capacity of the roadway to handle the forecast traffic demand would also be reduced. Therefore, reducing traffic speeds and/or traffic volumes is inconsistent with the goal of improving the ability of the roadway to handle the forecast volumes. As such, although feasible, traffic management measures are not considered a reasonable noise mitigation measure for the project.

5.2 ALIGNMENT MODIFICATION

The proposed alignment seeks to minimize the need for additional right-of-way (ROW) within the project corridor. A shift in the roadway alignment would result in the need for additional ROW. As such, an alternative roadway alignment is not considered a reasonable noise mitigation measure for the project.

5.3 PROPERTY ACQUISITION

The acquisition of property to provide noise buffers is not feasible due to the high cost and/or the unavailability of vacant land in proximity to noise-sensitive sites.

5.4 LAND USE CONTROLS

Land use controls can be used to minimize traffic noise in future developments or areas where redevelopment occurs. Land uses such as residences, motels, schools, churches, recreation areas and parks are considered incompatible with highway noise levels above 66 dBA. In order to reduce the possibility of additional noise related impacts, noise level contours were developed for the future improved roadway. These noise contours delineate the minimum distance from the improved roadway's edge of pavement where the FHWA Activity Category B land use should occur in 2030. Local planning officials can use the noise contour information to avoid development of noise sensitive land uses.

As shown in **Table 5-1,** the extent of the 66 dBA noise level on SR 54 ranges from 74 to 104 feet from the roadway's edge of pavement.

Table 5-1 – Noise Contour for SR 54

Roadway Segment	Distance to 66 dBA Isopleth from Edge-of-Pavement
Curley Rd to Foxwood Blvd	104 feet
Foxwood Blvd to Linda Ave	89 feet
Linda Ave to east of Morris Bridge Rd	74 feet
[a] Distances do not reflect any reduction in noise levels that would result from existing structures (shielding) and should be used for planning purposes only.	

5.5 NOISE BARRIER ANALYSIS

Noise barriers reduce noise levels by blocking the sound path between the source and the receiver. In order to effectively reduce traffic noise, a noise barrier must be relatively long, continuous (without intermittent openings), and sufficiently tall to provide a reduction in noise levels. Following FDOT procedures, the minimum requirements for a noise barrier to be considered both feasible and economically reasonable are:

- The barrier must provide at least a 5 dBA reduction at the noise sensitive sites with the greatest reductions with a design goal of 10 dBA or more is desired.

- The barrier should not cost more than $42,000 per benefited receiver (a benefited receiver is a site that receives at least a 5 dBA reduction in noise from the barrier), unless a higher level of expenditure can be justified by other circumstances. The current estimated cost to construct a noise barrier (materials and labor) is $30.00 per square foot.

Other factors considered when evaluating noise barriers as a potential noise abatement measure address both the feasibility of the barriers (given site-specific details, can a barrier actually be constructed) and the reasonableness of the barriers.

Feasibility factors that relate to noise barriers include driver/pedestrian sight distance (safety), ingress and egress requirements to and from affected properties, ROW requirements including access rights and easements for construction and/or maintenance, impacts on existing/planned utilities, and drainage.

Reasonableness factors include:

- The relationship of the predicted future noise levels to the NAC (do the predicted levels approach, meet, or far surpass the NAC);

- Land use stability (are the noise-sensitive land uses likely to remain for an indefinite period of time);
- Antiquity (the amount of development that has occurred before and after the initial construction of a roadway);
- The desires of the affected property owners to have a noise barrier adjacent to their property; and
- Aesthetics

As previously stated, in year 2030, with the proposed improvements to SR 54, noise levels are predicted to approach, meet, or exceed the NAC at 30 noise-sensitive sites along the project corridor. The following section discusses the feasibility and reasonableness of providing noise barriers as an abatement measure for the affected sites. Documentation in support of the noise barrier analysis is provided in **Appendix D**, which is published separately as a Technical Appendix.

TNM accounts for the shielding effect of a noise barrier, the diffraction of sound over a noise barrier, and the effects of the ground between a barrier and a receiver (i.e. sound absorption). The net effect of the barrier shielding is referred to as "insertion loss". In other words, insertion loss is the difference in sound level before and after the installation of the barrier.

RESIDENCE WEST OF CURLEY ROAD

A residence on the north side of SR 54 west of Curley Road (site 1) was predicted to be affected by traffic noise. This site was predicted to experience a future traffic noise level of 69.3 dBA with the proposed SR 54 improvements. A noise barrier for this single residence would not meet the minimum 5 dBA noise reduction and still be within the Department's cost criteria. Therefore, a noise barrier in this area is not considered cost feasible and a barrier is not recommended for further consideration.

RESIDENCES ALONG WHITE BAY CIRCLE

Fourteen (14) residences on the north side of SR54 (represented by sites 24 through 28) are predicted to be affected by traffic noise. These sites are predicted to experience future traffic noise levels ranging from 66.6 to 67.1 dBA with the proposed improvements to SR 54.

The length of the barrier evaluated was 650 feet, beginning at approximately station 812+40 and ending at approximately station 817+40. The height of the barrier was evaluated in 2-foot increments from 8 to 16 feet. The location of the barrier was placed 5 feet within the FDOT right-of-way.

The results of the evaluation are provided in **Table 5-2**. As shown, noise levels could be reduced by 5 dBA or more at 11 of the affected residences with all barrier heights analyzed. At the evaluated length of 650 feet and at heights ranging from 8 to 16 feet, the total estimated cost to construct the barrier is approximately between $156,000 and $312,000. A cost-per-benefited receiver is approximately between $14,182 and $28,364, a cost that is below the cost reasonable guideline.

Table 5-2 – Barrier 1 – White Bay Circle Barrier Parameters

Barrier Height (ft)	Affected Receivers With Insertion Loss of (dBA)						Number of Benefited Receivers			Total Estimated Cost	Cost Per Benefited Receiver	Cost Reasonable Yes/No
	5	6	7	8	9	10	Affected	* Other	Total			
8	5	5	1	0	0	0	11	0	11	$156,000	$14,182	Yes
10	0	1	5	5	0	0	11	0	11	$195,000	$17,727	Yes
12	0	0	1	5	5	0	11	0	11	$234,000	$21,273	Yes
14	0	0	1	0	5	5	11	0	11	$273,000	$24,818	Yes
16	0	0	1	0	4	6	11	0	11	$312,000	$28,364	Yes

* Other = Receivers to be unaffected by the project (traffic noise levels less than 66 dBA) but benefited by the noise barrier.

Based on the results of the analysis, Barrier 1 appears to be a feasible noise abatement measure because the barrier is predicted to reduce traffic noise levels at the 11 affected sites at least 5 dBA or more. Additionally, because the cost to construct the barrier at a height between 8 to 16 feet is below the cost reasonable guideline, the barrier is also considered a potentially reasonable abatement measure. As such, the barrier was evaluated further. The results of the evaluation are provided in **Table 5-3.**

Table 5-3 – Additional Considerations: Barrier 1 – White Bay Circle Barrier

Abatement Consideration	Comment
Relationship of future levels to the abatement criterion	Traffic noise levels are predicted to approach/exceed the NAC at 11 residences.
Insertion Loss	At heights between 8 to 16 feet, all of the affected residences would receive a benefit from the barrier.
Safety	Engineering Feasibility Review to be performed.
Community Desires	Public Involvement to be performed.
Accessibility	Engineering Feasibility Review to be performed
Land Use Stability	It is anticipated that these residential land uses will remain in the future.
Views of Officials With Jurisdiction in the Area	To be determined during the public involvement phase of the project.
Noise level increase from existing to future Build conditions	Traffic noise levels are predicted to increase 3.4 to 3.7 dBA from the existing to the future build condition at the affected residences.
Noise level increase from No-Build to future Build conditions	Same as above.
Antiquity	No antiquity issues appear to be associated with the barrier.
Constructability	Engineering Feasibility Review to be performed.
Maintainability	Engineering Feasibility Review to be performed.
Aesthetics	To be determined during the public involvement phase of the project.
Right-of-way needs including access rights (air, light, view, ingress/egress), easements for construction, and/or maintenance, and additional land	Engineering Feasibility Review to be performed.
Cost	At a length of 650 feet and height between 8 and 16 feet, the estimated cost to construct the barrier is between $156,000 and $312,000. The cost per benefitted receiver ranges between $14,182 and $28,364, a cost that is below the FDOT's cost reasonable guideline.
Utilities	Engineering Feasibility Review to be performed.
Drainage	Engineering Feasibility Review to be performed.
Special land use considerations	The noise-sensitive sites are not considered special land uses.
Other environmental impacts	There do not appear to be any other environmental impacts associated with the barrier.
Additional Considerations	None.

As shown is **Table 5-3**, Barrier 1 appears to be a feasible and reasonable noise abatement measure because:

- Traffic noise levels are predicted to approach or exceed the NAC at 11 residences.
- At heights between 8 and 16 feet and a length of 650 feet, the barrier would provide at least the minimum required reduction in traffic noise at a cost below the cost-reasonable guideline.
- The land use is expected to remain noise-sensitive.

Riverhaven Mobile Home Park

Four (4) residences on the south side of SR54 (represented by sites 41 through 44) are predicted to be affected by traffic noise. These sites are predicted to experience future traffic noise levels ranging from 66.0 to 66.8 dBA with the proposed improvements to SR 54.

The length of the barrier evaluated was 300 feet, beginning at approximately station 867+20 and ending at approximately station 870+20. The height of the barrier was evaluated in 2-foot increments from 8 to 16 feet. The location of the barrier was placed 5 feet within the FDOT right-of-way.

The results of the evaluation are provided in **Table 5-4**. As shown, noise levels could be reduced by 5 dBA or more at the 4 affected residences with all barrier heights analyzed. At the evaluated length of 300 feet and at heights ranging from 8 to 16 feet, the total estimated cost to construct the barrier is approximately between $72,000 and $144,000. A cost-per-benefited receiver is approximately between $18,000 and $36,000, a cost that is below the cost reasonable guideline.

Table 5-4 – Barrier 2 – Riverhaven Mobile Home Park Barrier Parameters

Barrier Height (ft)	Affected Receivers With Insertion Loss of (dBA)						Number of Benefited Receivers			Total Estimated Cost	Cost Per Benefited Receiver	Cost Reasonable Yes/No
	5	6	7	8	9	10	Affected	* Other	Total			
8	3	1	1	0	0	0	4	0	4	$72,000	$18,000	Yes
10	0	2	2	0	0	0	4	0	4	$90,000	$22,500	Yes
12	0	1	2	1	0	0	4	0	4	$108,000	$27,000	Yes
14	0	0	1	0	5	5	4	0	4	$126,000	$31,500	Yes
16	0	0	1	0	4	6	4	0	4	$144,000	$36,000	Yes
* Other = Receivers to be unaffected by the project (traffic noise levels less than 66 dBA) but benefited by the noise barrier.												

Based on the results of the analysis, Barrier 2 appears to be a feasible noise abatement measure because the barrier is predicted to reduce traffic noise levels at the 4 affected sites at least 5 dBA or more. Additionally, because the cost to construct the barrier at a height between 8 to 16 feet is below the cost reasonable guideline, the barrier is also considered a potentially reasonable abatement measure. As such, the barrier was evaluated further. The results of the evaluation are provided in **Table 5-5.**

Table 5-5 – Additional Considerations: Barrier 2 – River Haven Mobile Home Park

Abatement Consideration	Comment
Relationship of future levels to the abatement criterion	Traffic noise levels are predicted to approach/exceed the NAC at 4 residences.
Insertion Loss	At heights between 8 to 16 feet, all of the affected residences would receive a benefit from the barrier.
Safety	Engineering Feasibility Review to be performed.
Community Desires	Public Involvement to be performed.
Accessibility	Engineering Feasibility Review to be performed
Land Use Stability	It is anticipated that these residential land uses will remain in the future.
Views of Officials With Jurisdiction in the Area	To be determined during the public involvement phase of the project.
Noise level increase from existing to future Build conditions	Traffic noise levels are predicted to increase 1.4 to 1.6 dBA from the existing to the future build condition at the affected residences.
Noise level increase from No-Build to future Build conditions	Same as above.
Antiquity	No antiquity issues appear to be associated with the barrier.
Constructability	Engineering Feasibility Review to be performed.
Maintainability	Engineering Feasibility Review to be performed.
Aesthetics	To be determined during the public involvement phase of the project.
Right-of-way needs including access rights (air, light, view, ingress/egress), easements for construction, and/or maintenance, and additional land	Engineering Feasibility Review to be performed.
Cost	At a length of 300 feet and height between 8 and 16 feet, the estimated cost to construct the barrier is between $72,000 and $144,000. The cost per benefitted receiver ranges between $18,000 and $36,000, a cost that is below the FDOT's cost reasonable guideline.
Utilities	Engineering Feasibility Review to be performed.
Drainage	Engineering Feasibility Review to be performed.
Special land use considerations	The noise-sensitive sites are not considered special land uses.
Other environmental impacts	There do not appear to be any other environmental impacts associated with the barrier.
Additional Considerations	None.

As shown is **Table 5-5**, Barrier 2 appears to be a feasible and reasonable noise abatement measure because:

- Traffic noise levels are predicted to approach or exceed the NAC at 4 residences.
- At heights between 8 and 16 feet and a length of 300 feet, the barrier would provide at least the minimum required reduction in traffic noise at a cost below the cost-reasonable guideline.
- The land use is expected to remain noise-sensitive.

Ralph's Trailer Park

Eight (8) residences on the south side of SR54 (represented by site 63) are predicted to be affected by traffic noise. These sites are predicted to experience future traffic noise level of 68.1 dBA with the proposed improvements to SR 54.

The length of the barrier evaluated was 130 feet, beginning at approximately station 935+70 and ending at approximately station 937+00. The height of the barrier was evaluated in 2-foot increments from 8 to 16 feet. The location of the barrier was placed 5 feet within the FDOT right-of-way.

The results of the evaluation are provided in **Table 5-6**. As shown, noise levels could be reduced by 5 dBA or more at the 6 of the 8 affected residences with all barrier heights analyzed. At the evaluated length of 130 feet and at heights ranging from 8 to 16 feet, the total estimated cost to construct the barrier is approximately between $31,200 and $62,400. A cost-per-benefited receiver is approximately between $5,200 and $10,400, a cost that is below the cost reasonable guideline.

Table 5-6 – Barrier 3 – Ralph's Trailer Park Barrier Parameters

Barrier Height (ft)	Affected Receivers With Insertion Loss of (dBA)						Number of Benefited Receivers			Total Estimated Cost	Cost Per Benefited Receiver	Cost Reasonable Yes/No
	5	6	7	8	9	10	Affected	* Other	Total			
8	1	5	0	0	0	0	6	0	6	$31,200	$5,200	Yes
10	0	1	5	0	0	0	6	0	6	$39,000	$6,500	Yes
12	0	1	0	5	0	0	6	0	6	$46,800	$7,800	Yes
14	0	1	0	5	0	0	6	0	6	$54,600	$9,100	Yes
16	0	0	1	5	0	0	6	0	6	$62,400	$10,400	Yes
* Other = Receivers to be unaffected by the project (traffic noise levels less than 66 dBA) but benefited by the noise barrier.												

Based on the results of the analysis, Barrier 3 appears to be a feasible noise abatement measure because the barrier is predicted to reduce traffic noise levels at the 6 of the 8 affected sites at least 5 dBA or more. Additionally, because the cost to construct the barrier at a height between 8 to 16 feet is below the cost reasonable guideline, the barrier is also considered a potentially reasonable abatement measure. As such, the barrier was evaluated further. The results of the evaluation are provided in **Table 5-7.**

Table 5-7 – Additional Considerations: Barrier 2 – River Haven Mobile Home Park

Abatement Consideration	Comment
Relationship of future levels to the abatement criterion	Traffic noise levels are predicted to approach/exceed the NAC at 8 residences.
Insertion Loss	At heights between 8 to 16 feet, 6 of the 8 affected residences would receive a benefit from the barrier.
Safety	Engineering Feasibility Review to be performed.
Community Desires	Public Involvement to be performed.
Accessibility	Engineering Feasibility Review to be performed
Land Use Stability	It is anticipated that these residential land uses will remain in the future.
Views of Officials With Jurisdiction in the Area	To be determined during the public involvement phase of the project.
Noise level increase from existing to future Build conditions	Traffic noise levels are predicted to increase 2.9 dBA from the existing to the future build condition at the affected residences.
Noise level increase from No-Build to future Build conditions	Same as above.
Antiquity	No antiquity issues appear to be associated with the barrier.
Constructability	Engineering Feasibility Review to be performed.
Maintainability	Engineering Feasibility Review to be performed.
Aesthetics	To be determined during the public involvement phase of the project.
Right-of-way needs including access rights (air, light, view, ingress/egress), easements for construction, and/or maintenance, and additional land	Engineering Feasibility Review to be performed.
Cost	At a length of 130 feet and height between 8 and 16 feet, the estimated cost to construct the barrier is between $31,200 and $62,400. The cost per benefitted receiver ranges between $5,200 and $10,400, a cost that is below the FDOT's cost reasonable guideline.
Utilities	Engineering Feasibility Review to be performed.
Drainage	Engineering Feasibility Review to be performed.
Special land use considerations	The noise-sensitive sites are not considered special land uses.
Other environmental impacts	There do not appear to be any other environmental impacts associated with the barrier.
Additional Considerations	None.

As shown is **Table 5-7**, Barrier 3 appears to be a feasible and reasonable noise abatement measure because:

- Traffic noise levels are predicted to approach or exceed the NAC at 8 residences.
- At heights between 8 and 16 feet and a length of 130 feet, the barrier would provide at least the minimum required reduction in traffic noise at a cost below the cost-reasonable guideline for 6 of the 8 affected residences.
- The land use is expected to remain noise-sensitive.

Residences East of Morris Bridge Road

Four (4) residences on the south side of SR 54 east of Morris Bridge Road (represented by sites 67 and 68) were predicted to be affected by traffic noise. These sites were predicted to experience a future traffic noise level of 68.1 and 68.3 dBA with the proposed SR 54 improvements. Due to the multiple driveways, a noise barrier could not be designed of sufficient length to meet the minimum 5 dBA noise reduction. Therefore, a noise barrier is not recommended for further consideration.

5.6 SUMMARY

Noise abatement measures were evaluated for the noise-sensitive sites predicted to be affected by the proposed improvements to SR 54. The measures were traffic management, alignment modifications, property acquisition, land use controls and noise barriers. Although feasible, traffic management, alignment modification, land use controls, and property acquisition were determined to be unreasonable methods to reduce the predicted traffic noise levels for the affected sites.

Based on the results of the analysis, it appears that the construction of three noise barriers along SR 54 may be a feasible and cost-reasonable method of reducing predicted traffic noise levels for both affected noise-sensitive sites.

At the future public hearing, the noise study results will be presented and the community will be allowed to discuss and respond to the findings. After the public hearing and once the Location and Design Concept Acceptance occurs, copies of this final NSR will be furnished to the local government and planning officials to assist them in establishing compatible land uses for future development.

It should be noted that the noise barriers that have been identified as feasible and cost reasonable are still subject to an engineering feasibility review. The purpose of the review is to ensure that the noise barriers could be built as planned. It will take into consideration items such as drainage, utilities (both existing and planned), safety, constructability, maintainability, ROW needs, and any other construction or engineering issues that may preclude providing the noise barriers that have been identified.

SECTION 6.0 – CONSTRUCTION NOISE AND VIBRATION

During the construction phase of the proposed project, short-term noise may be generated by stationary and mobile construction equipment. Construction of roadway improvements will have a temporary impact on noise-sensitive sites adjacent to the project corridor. Construction noise will be controlled by the adherence to the most recent edition of the FDOT's Standard Specifications for Road and Bridge Construction.

Using FDOT's listing of vibration sensitive sites, residences were identified as potentially sensitive to vibration caused during construction. If during final design it is determined that provisions to control vibration are necessary, the project's construction provisions can include the necessary provisions as needed.

SECTION 7.0 – NOISE CONTOURS

As previously stated, land uses such as residences, motels, schools, churches, recreation areas and parks are considered *incompatible* with highway noise levels above 66dBA. In order to reduce the possibility of additional noise sensitive sites being located within an area with traffic noise of this level, a noise contour was developed for the future improved roadway facility. This noise contour delineates the distance from the improved roadway's edge of pavement where the FHWA's NAC would be approached (within 1 dBA of the NAC). Based on the results of the analysis, a level of 66dBA would extend between 74 and 104 feet from the closest travel lane. Local officials should not approve construction of any new noise sensitive sites (e.g., residences, parks, churches, etc.) within this area unless noise abatement is considered as part of the planned structures.

SECTION 8.0 – REFERENCES

Federal Highway Administration, Traffic Noise Model, Version 2.5, February 2004.

Federal Highway Administration, Title 23 CFR, Part 772, Procedures for Abatement of Highway Traffic Noise and Construction Noise, April 1, 1992 Edition.

Florida Department of Transportation, Project Development and Environment Manual, Chapter 17 (Noise), April 18, 2007.

Florida Department of Transportation, Standard Specifications for Road and Bridge Construction, 2007.

Federal Highway Administration, Measurement of Highway-Related Noise: Final Report, October 2003.

American Consulting Engineers of Florida, Traffic Technical Memorandum, May 2008.

APPENDIX A

FDOT Traffic Data Sheets

DISTRICT 7
TRAFFIC DATA FOR NOISE STUDIES

DATE: __5/5/08__
PREPARED BY:
L.Weatherby, ACE-FLA

Work Program Item Segment No(s): 416561-1

Federal Aid Number(s): 7810-028-S

Project Description: SR 54, from Curley Road to Morris Bridge Road

Segment Description: **1. Curley Road to Foxwood Blvd. (proposed 4 LD + aux lanes urban)**
(Data sheets are to be filled out for every segment having a change in traffic parameters such as volumes, posted speeds, typical section, etc.)

NOTE: ADT is the LOS (C) volume referenced in the FDOT LOS tables or Demand, whichever is less.

Existing Facility	No-Build (design year)	Build (design year)
Year : _2006_____	Year : _2030___	Year : _2030___
ADT : *LOS(C) __15,750 VPD___	ADT : *LOS(C) __15,750 VPD_	ADT : LOS(C) 52,100 (6 LD)__
Demand __24,200_____	Demand __27,700_____	Demand __ 27,700____
Posted Speed: _55 mph _88 kmh	Posted Speed: _55 mph _88_kmh	Posted Speed: _45_mph _72_kmh
K= _9.5_%	K= _9.5_%	K= _9.5_%
D= _57__%	D= _57__%	D= _57__%
T= _7.2_% for 24 hrs.	T= _7.2_% for 24 hrs.	T= _7.2_% for 24 hrs.
T= _3.6 % Design hr.	T= _3.6 % Design hr.	T= _3.6 % Design hr.
0.9 % Heavy Trucks DHV	0.9 % Heavy Trucks DHV	0.9 % Heavy Trucks DHV
2.7_% Medium Trucks DHV	2.7_% Medium Trucks DHV	2.7_% Medium Trucks DHV
_0_ % Buses DHV	_0_ % Buses DHV	_0_ % Buses DHV
_0__% Motorcycles DHV	_0__% Motorcycles DHV	_0__% Motorcycles DHV

Traffic Data Source: (1) Draft Traffic Technical Memorandum for SR 54, May 2008
(2) 2005 vehicle class history data report for count station 14-5116 (SR 54 west of Morris Bridge Road)
(3) LOS Table 4-1 used for LOS C AADTs.
*based on 2-lane uninterrupted flow: 15,000 VPD + 5% for divided = 15,750

Revised 12/30/02

DISTRICT 7
TRAFFIC DATA FOR NOISE STUDIES

DATE: __5/5/08__
PREPARED BY:
L.Weatherby, ACE-FLA

Work Program Item Segment No(s): 416561-1

Federal Aid Number(s): 7810-028-S

Project Description: SR 54, from Curley Road to Morris Bridge Road

Segment Description: **2. Foxwood Blvd. To Linda Drive (proposed 4 LD suburban)**
(Data sheets are to be filled out for every segment having a change in traffic parameters such as volumes, posted speeds, typical section, etc.)

NOTE: ADT is the LOS (C) volume referenced in the FDOT LOS tables or Demand, whichever is less.

Existing Facility	No-Build (design year)	Build (design year)
Year : _2006_____	Year : _2030___	Year : _2030___
ADT : *LOS(C) _15,750 VPD____	ADT : *LOS(C) __15,750 VPD_	ADT : LOS(C) __34,700 (4 LD)
Demand __22,500____	Demand ___35,500___	Demand ____35,500___
Posted Speed: _55 mph _88_kmh	Posted Speed: _55_mph _88_kmh	Posted Speed: __50_mph __80_kmh
K= _9.5_%	K= _9.5_%	K= _9.5_%
D= _57__%	D= _57__%	D= _57__%
T= _7.2_% for 24 hrs.	T= _7.2_% for 24 hrs.	T= _7.2_% for 24 hrs.
T= _3.6 % Design hr.	T= _3.6 % Design hr.	T= _3.6 % Design hr.
0.9 % Heavy Trucks DHV	0.9 % Heavy Trucks DHV	0.9 % Heavy Trucks DHV
2.7_% Medium Trucks DHV	2.7_% Medium Trucks DHV	2.7_% Medium Trucks DHV
_0_ % Buses DHV	_0_ % Buses DHV	_0_ % Buses DHV
_0__% Motorcycles DHV	_0__% Motorcycles DHV	_0__% Motorcycles DHV

Traffic Data Source: (1) Draft Traffic Technical Memorandum for SR 54, May 2008
(2) 2005 vehicle class history data report for count station 14-5116 (SR 54 west of Morris Bridge Road)
(3) LOS Table 4-1 used for LOS C AADTs.
*based on 2-lane uninterrupted flow: 15,000 VPD + 5% for divided = 15,750 Revised 12/30/02

DISTRICT 7
TRAFFIC DATA FOR NOISE STUDIES

DATE: __5/5/08__
PREPARED BY:
L.Weatherby, ACE-FLA

Work Program Item Segment No(s): 416561-1

Federal Aid Number(s): 7810-028-S

Project Description: SR 54, from Curley Road to Morris Bridge Road

Segment Description: **3. Linda Drive to East of Morris Bridge Rd (proposed 4 LD urban)**
(Data sheets are to be filled out for every segment having a change in traffic parameters such as volumes, posted speeds, typical section, etc.)

NOTE: ADT is the LOS (C) volume referenced in the FDOT LOS tables or Demand, whichever is less.

Existing Facility	No-Build (design year)	Build (design year)
Year : _2006_____	Year : _2030___	Year : _2030___
ADT : *LOS(C) __15,750 VPD__	ADT : *LOS(C) __15,750 VPD__	ADT : LOS(C) _34,700 (4 LD)_
Demand ___21,900___	Demand __32,100____	Demand ___32,100____
Posted Speed: _50_mph _80_kmh	Posted Speed: _50_mph _80_kmh	Posted Speed: _45_mph _72_kmh
K= _9.5_%	K= _9.5_%	K= _9.5_%
D= _57__%	D= _57__%	D= _57__%
T= _7.2_% for 24 hrs.	T= _7.2_% for 24 hrs.	T= _7.2_% for 24 hrs.
T= _3.6 % Design hr.	T= _3.6 % Design hr.	T= _3.6 % Design hr.
0.9 % Heavy Trucks DHV	0.9 % Heavy Trucks DHV	0.9 % Heavy Trucks DHV
2.7_% Medium Trucks DHV	2.7_% Medium Trucks DHV	2.7_% Medium Trucks DHV
_0_ % Buses DHV	_0_ % Buses DHV	_0_ % Buses DHV
_0__% Motorcycles DHV	_0__% Motorcycles DHV	_0__% Motorcycles DHV

Traffic Data Source: (1) Draft Traffic Technical Memorandum for SR 54, May 2008
(2) 2005 vehicle class history data report for count station 14-5116 (SR 54 west of Morris Bridge Road)
(3) LOS Table 4-1 used for LOS C AADTs.
*based on 2-lane uninterrupted flow: 15,000 VPD + 5% for divided = 15,750

Revised 12/30/02

APPENDIX B

Validation Documentation

NOISE DATA
FIELD VALIDATION

Date 4/17/08

Project SR54
WPI 416561-1
Location NB side of SR54 west of Morris Bridge Rd

Distance from Center of Near Travel Lane 106 ft.
Width of Roadway/Lanes 12 ft. 12 ft. # lanes 2
Barrier/Buffer _____
Terrain grass Grade _____
Height of Meter Microphone 5 ft. Length of Run 10 min. Time 10:45 (am) (pm)

Traffic:	**Counted:**		**Hourly Conversion:**	**Radar Gun Reading:**		**Posted speed**
Cars =	97	x6	582	47	avg. mph	45 mph
	109	x6	654		avg. mph	
MT =	3	x6	18		avg. mph	
	9	x6	54		avg. mph	
HT =	5	x6	30		avg. mph	
	9	x6	54		avg. mph	
MC =	4	x6	24		avg. mph	
	0	x6			avg. mph	
Buses =	0	x6			avg. mph	
	0	x6			avg. mph	

Unusual Events:
1-3 mph w/ 10mph gusts from the east.

Results:

Lav (Leq) 65 dB
Lpk (peak) 113.4 dB
Computer 63.2 dB

Field Staff:

Robin Rhinesmith
Dan DeForge

FDOT
rmr

21 April 2008
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: SR 54 w of Morris Brdg 10:45-10:55
RUN: 416561
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	No Barrier LAeq1h Crit'n	Increase over existing Calculated	Increase over existing Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	With Barrier Noise Reduction Calculated	With Barrier Noise Reduction Goal	With Barrier Noise Reduction Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Receiver1	1	1	0.0	63.2	66	63.2	10	----	63.2	0.0	8	-8.0

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

FDOT 21 April 2008
rmr TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: SR 54 w of Morris Brdg 10:45-10:55
RUN: 416561

Roadway	Points											
Name	Name	No.	Segment									
			Autos		MTrucks		HTrucks		Buses		Motorcycles	
			V	S	V	S	V	S	V	S	V	S
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
WB	point2	2	654	47	48	47	36	47	0	0	0	0
	point1	1										
EB	point3	3	582	47	18	47	30	47	0	0	0	0
	point4	4										

FDOT
rmr

21 April 2008
TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: SR 54 w of Morris Brdg 10:45-10:55
RUN: 416561

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

Roadway		Points									
Name	Width	Name	No.	Coordinates (pavement)			Flow Control			Segment	
				X	Y	Z	Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
WB	12.0	point2	2	1,000.0	100.0	0.00				Average	
		point1	1	-1,000.0	100.0	0.00					
EB	12.0	point3	3	-1,000.0	88.0	0.00				Average	
		point4	4	1,000.0	88.0	0.00					

FDOT
rmr

21 April 2008
TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: SR 54 w of Morris Brdg 10:45-10:55
RUN: 416561

Receiver

Name	No.	#DUs	Coordinates (ground)			Height above Ground	Input Sound Levels and Criteria				Active in Calc.
			X	Y	Z		Existing LAeq1h	Impact Criteria LAeq1h	Impact Criteria Sub'l	NR Goal	
			ft	ft	ft	ft	dBA	dBA	dB	dB	
Receiver1	1	1	0.0	206.0	0.00	5.00	0.00	66	10.0	8.0	Y

NOISE DATA
FIELD VALIDATION

Date 4/17/08

Project SR54
WPI 416561-1
Location Ashton Oaks - empty lot

Distance from Center of Near Travel Lane 96 ft.

Width of Roadway/Lanes 12 ft. 12 ft. # lanes 2

Barrier/Buffer _____

Terrain _____ Grade _____

Height of Meter Microphone 5 ft. Length of Run 10 min. Time 1:30 (am) (pm)

Traffic:	**Counted:**		**Hourly Conversion:**	**Radar Gun Reading:**	
Cars =	88	x6	528	49	avg. mph
	93	x6	558		avg. mph
MT =	6	x6	36		avg. mph
	6	x6	36		avg. mph
HT =	4	x6	24		avg. mph
	1	x6	6		avg. mph
MC =	1	x6	6		avg. mph
	0	x6			avg. mph
Buses =	2	x6	12		avg. mph
	3	x6	18		avg. mph

Posted speed 45 mph

Unusual Events: Sandhill cranes calling, fountain.

Results:

Lav (Leq) 66 dB
Lpk (peak) 113.7 dB
Computer 64.4 dB

Field Staff:

Robin Rhinesmith
Dan DeForge

FDOT
rmr

21 April 2008
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: SR 54 Ashton Oak 1:55 - 2:05
RUN: 416561
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	No Barrier LAeq1h Crit'n	Increase over existing Calculated	Increase over existing Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Receiver1	1	1	0.0	64.4	66	64.4	10	----	64.4	0.0	8	-8.0

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

FDOT
rmr

21 April 2008
TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: SR 54 Ashton Oak 1:55 - 2:05
RUN: 416561

Roadway	Points											
Name	Name	No.	Segment									
			Autos		MTrucks		HTrucks		Buses		Motorcycles	
			V	S	V	S	V	S	V	S	V	S
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
WB	point2	2	558	49	36	49	6	49	18	49	0	0
	point1	1										
EB	point3	3	528	49	36	49	24	49	12	49	6	49
	point4	4										

FDOT
rmr

21 April 2008
TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: SR 54 Ashton Oak 1:55 - 2:05
RUN: 416561

Receiver

Name	No.	#DUs	Coordinates (ground)			Height above Ground	Input Sound Levels and Criteria				Active in Calc.
			X	Y	Z		Existing LAeq1h	Impact Criteria LAeq1h	Impact Criteria Sub'l	NR Goal	
			ft	ft	ft	ft	dBA	dBA	dB	dB	
Receiver1	1	1	0.0	196.0	0.00	5.00	0.00	66	10.0	8.0	Y

FDOT
rmr

21 April 2008
TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: SR 54 Ashton Oak 1:55 - 2:05
RUN: 416561

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

Roadway		Points									
Name	Width	Name	No.	Coordinates (pavement)			Flow Control			Segment	
				X	Y	Z	Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
WB	12.0	point2	2	1,000.0	100.0	0.00				Average	
		point1	1	-1,000.0	100.0	0.00					
EB	12.0	point3	3	-1,000.0	88.0	0.00				Average	
		point4	4	1,000.0	88.0	0.00					

NOISE DATA
FIELD VALIDATION

Date 4/17/08

Project SR54
WPI 4165611-1
Location New River Methodist Church

Distance from Center of Near Travel Lane 100 ft.
Width of Roadway/Lanes 12 ft. 12 ft. # lanes 2
Barrier/Buffer _____
Terrain _____ Grade _____
Height of Meter Microphone 5 ft. Length of Run 10 min. Time 1:55 (am) (pm)

Traffic:	**Counted:**	**Hourly Conversion:**	**Radar Gun Reading:**	
Cars =	97 x6	582	47 avg. mph	Posted speed
	110 x6	660	____ avg. mph	45 mph
MT =	6 x6	36	____ avg. mph	
	7 x6	42	____ avg. mph	
HT =	4 x6	24	____ avg. mph	
	2 x6	12	____ avg. mph	
MC =	2 x6	12	____ avg. mph	
	2 x6	12	____ avg. mph	
Buses =	1 x6	6	____ avg. mph	
	2 x6	12	____ avg. mph	

Unusual Events:
Wind gusts of 2-4 mph

Results:

Lav (Leq) 65.1 dB
Lpk (peak) 100.8 dB
Computer 64.6 dB

Field Staff:

Robin Rhinesmith
Dan DeForge

FDOT
rmr

21 April 2008
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: SR 54 Ashton Oak 1:55 - 2:05
RUN: 416561
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	No Barrier LAeq1h Crit'n	Increase over existing Calculated	Increase over existing Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Receiver1	1	1	0.0	64.6	66	64.6	10	----	64.6	0.0	8	-8.0

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

FDOT 21 April 2008
rmr TNM 2.5

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: SR 54 Ashton Oak 1:55 - 2:05
RUN: 416561

Roadway	Points											
Name	Name	No.	Segment									
			Autos		MTrucks		HTrucks		Buses		Motorcycles	
			V	S	V	S	V	S	V	S	V	S
			veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph	veh/hr	mph
WB	point2	2	660	47	42	47	12	47	12	47	12	47
	point1	1										
EB	point3	3	582	47	36	47	24	47	6	47	12	47
	point4	4										

FDOT
rmr

21 April 2008
TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: SR 54 Ashton Oak 1:55 - 2:05
RUN: 416561

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

Roadway		Points									
Name	Width	Name	No.	Coordinates (pavement)			Flow Control			Segment	
				X	Y	Z	Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
WB	12.0	point2	2	1,000.0	100.0	0.00				Average	
		point1	1	-1,000.0	100.0	0.00					
EB	12.0	point3	3	-1,000.0	88.0	0.00				Average	
		point4	4	1,000.0	88.0	0.00					

FDOT
rmr

21 April 2008
TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: SR 54 Ashton Oak 1:55 - 2:05
RUN: 416561

Receiver

Name	No.	#DUs	Coordinates (ground)			Height above Ground	Input Sound Levels and Criteria				Active in Calc.
			X	Y	Z		Existing LAeq1h	Impact Criteria LAeq1h	Impact Criteria Sub'l	NR Goal	
			ft	ft	ft	ft	dBA	dBA	dB	dB	
Receiver1	1	1	0.0	196.0	0.00	5.00	0.00	66	10.0	8.0	Y

NOISE DATA
FIELD VALIDATION

Date 4/17/08

Project SR54
WPI 416561-1
Location New River Township

Distance from Center of Near Travel Lane 80 ft.
Width of Roadway/Lanes 12 ft. 12 ft. # lanes 2
Barrier/Buffer 5'6" Wall
Terrain grass Grade
Height of Meter Microphone 5 ft. Length of Run 10 min. Time 2:40 (am) (pm)

Traffic:	**Counted:**		**Hourly Conversion:**	**Radar Gun Reading:**		
Cars =	124	x6	744	47	avg. mph	Posted speed
	104	x6	624		avg. mph	45 mph
MT =	5	x6	30		avg. mph	
	5	x6	30		avg. mph	
HT =	3	x6	36		avg. mph	
	3	x6	36		avg. mph	
MC =	0	x6			avg. mph	
	0	x6			avg. mph	
Buses =	3	x6	18		avg. mph	
	4	x6	24		avg. mph	

Unusual Events:
Wind at 3mph

Results:

Lav (Leq) 65.6 dB
Lpk (peak) 113.4 dB
Computer 66.5 dB

Field Staff:

Robin Rhinesmith
Dan DeForge

FDOT
rmr

21 April 2008
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: SR 54 New River Twnsp 2:40-2:50
RUN: 416561
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

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

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier					With Barrier			
				LAeq1h		Increase over existing		Type Impact	Calculated LAeq1h	Noise Reduction		
				Calculated	Crit'n	Calculated	Crit'n Sub'l Inc			Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Receiver1	1	1	0.0	66.5	66	66.5	10	Snd Lvl	66.5	0.0	8	-8.0

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

FDOT
rmr

21 April 2008
TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: SR 54 New River Twnsp 2:40-2:50
RUN: 416561

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

Roadway		Points									
Name	Width	Name	No.	Coordinates (pavement)			Flow Control			Segment	
				X	Y	Z	Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?
	ft			ft	ft	ft		mph	%		
WB	12.0	point2	2	1,000.0	100.0	0.00				Average	
		point1	1	-1,000.0	100.0	0.00					
EB	12.0	point3	3	-1,000.0	88.0	0.00				Average	
		point4	4	1,000.0	88.0	0.00					

FDOT 21 April 2008
rmr TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: SR 54 New River Twnsp 2:40-2:50
RUN: 416561

Receiver

Name	No.	#DUs	Coordinates (ground)			Height above Ground	Input Sound Levels and Criteria				Active in Calc.
			X	Y	Z		Existing LAeq1h	Impact Criteria LAeq1h	Impact Criteria Sub'l	NR Goal	
			ft	ft	ft	ft	dBA	dBA	dB	dB	
Receiver1	1	1	0.0	180.0	0.00	5.00	0.00	66	10.0	8.0	Y

APPENDIX C

TNM Input/Output

Published Separately

APPENDIX D

TNM Barrier Analysis

Published Separately