

# **SR 52 PD&E STUDY REEVALUATION**

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Florida Department of Transportation  
Project Development and Environment (PD&E) Study Reevaluation

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## **FINAL Noise Study Technical Memorandum**

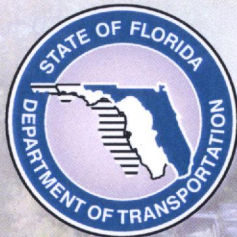
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### **SR 52 PD&E STUDY REEVALUATION**

**From Moon Lake Road to US 41 (SR 45)  
Pasco County, Florida**

W.P.I. Segment No.: 256243 1  
F.A.P. No.: 1851-108

**Florida Department  
of Transportation  
District Seven  
Tampa, Florida**



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January 2002



**DRAFT**  
**NOISE STUDY TECHNICAL MEMORANDUM**

**SR 52 Project Development &  
Environment Study Reevaluation**

FROM MOON LAKE ROAD TO US 41 (SR 45)  
PASCO COUNTY, FLORIDA

W.P.I. Segment Number: 256243 1

F.A.P. Number: 1851-108

The proposed action includes widening SR 52 from the existing two-lane rural cross-section to a six-lane urban divided roadway. The study limits extend approximately 5.7 miles, from Moon Lake Road to US 41 (SR 45) in Pasco County, Florida.

**Florida Department of Transportation**  
**District Seven**  
Tampa, Florida

Prepared By:  
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Tampa, Florida

**JANUARY 2002**



## EXECUTIVE SUMMARY

The Florida Department of Transportation (FDOT) is conducting a Project Development and Environment (PD&E) Study reevaluation of a previously approved study of the SR 52 project corridor from Moon Lake Road to US 41 (SR 45) in Pasco County. The reevaluation assesses the engineering and environmental effects associated with the widening of the existing two-lane rural cross section to a six-lane divided urban cross section for the segment of SR 52 from Moon Lake Road to US 41 (SR 45), approximately 5.7 miles. Stormwater ponds and floodplain compensation areas were considered during the reevaluation study. The locations of the ponds may change as the design phase progresses.

In July 1988, the FHWA approved the Environmental Assessment/Finding of No Significant Impact for the SR 52 PD&E Study from US 19 to I-75. The 1988 study proposed widening SR 52 to a multilane divided highway for approximately 23.3 miles. A six-lane divided urban cross section was proposed from US 19 to Moon Lake Road, and a four-lane rural cross section was proposed from Moon Lake Road to I-75.

This Noise Study Technical Memorandum has been prepared according to the methodology established in Title 23 Code of Federal Regulation (CFR), Part 772<sup>1</sup> and Part 2, Chapter 17 of the FDOT PD&E Manual<sup>2</sup>. The objectives of the noise study are to identify noise sensitive sites adjacent to the project corridor, compare and evaluate traffic noise levels at these sites with and without the proposed project, and evaluate the need for, and the effectiveness of noise abatement measures.

The design year (2025) Build alternative noise levels are predicted to approach or exceed the FHWA Noise Abatement Criteria (NAC) at 18 residences adjacent to the segment of SR 52 from Kent Grove Drive to US 41 (SR 45). The noise levels at these affected sites range from 66.1 to 71.1 dBA. Ten of the 18 residences affected by the Build alternative are also predicted to approach or exceed the NAC in the existing condition and 2025 No-Build alternative.

Five noise barriers were modeled along the proposed right-of-way line and within the property boundaries for each of the 18 affected residences adjacent to SR 52 from Kent Grove Drive to US 41 (SR 45). At 14 of the 18 affected residences, a 5-dBA reduction could not be achieved because of limitation in barrier length to accommodate property boundaries and private driveways. Noise barriers are not feasible at these locations. The remaining four residences are isolated therefore, noise barriers do not meet the cost criteria and are not reasonable at these locations.

A copy of the Final Noise Study Technical Memorandum will be provided to local officials to assist them in the planning of compatible land uses for future development.



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## 1.0 INTRODUCTION

In July 1988, the Federal Highway Administration (FHWA) approved the Environmental Assessment/Finding of No Significant Impact (EA/FONSI) for the SR 52 Project Development and Environment (PD&E) Study from US 19 to I-75. The 1988 study proposed widening SR 52 to a multilane divided highway for approximately 23.3 miles, and replacing a low level bridge over Bear Creek, located approximately 1.5 miles east of US 19. A six-lane divided urban cross section was proposed from US 19 to Moon Lake Road, and a four-lane rural cross section was proposed from Moon Lake Road to I-75. Stormwater ponds and floodplain compensation areas were considered during the reevaluation study. The locations of the ponds may change as the design phase progresses. The design year for the approved study is 2010.

The Florida Department of Transportation (FDOT) is conducting a reevaluation of the previously approved PD&E Study for the segment of SR 52 from Moon Lake Road to US 41 (SR 45) in Pasco County, Florida. The purpose of the reevaluation is to examine changes in the engineering and environmental effects between the originally selected alternative and the proposed design changes.

### 1.1 Project Description

The FDOT is proposing improvements to SR 52 from Moon Lake Road to US 41 (SR 45) in Pasco County, Florida, a distance of approximately 5.7 miles. The proposed improvements consist of widening the existing two-lane rural roadway to a six-lane divided urban highway to accommodate present and future traffic demands.

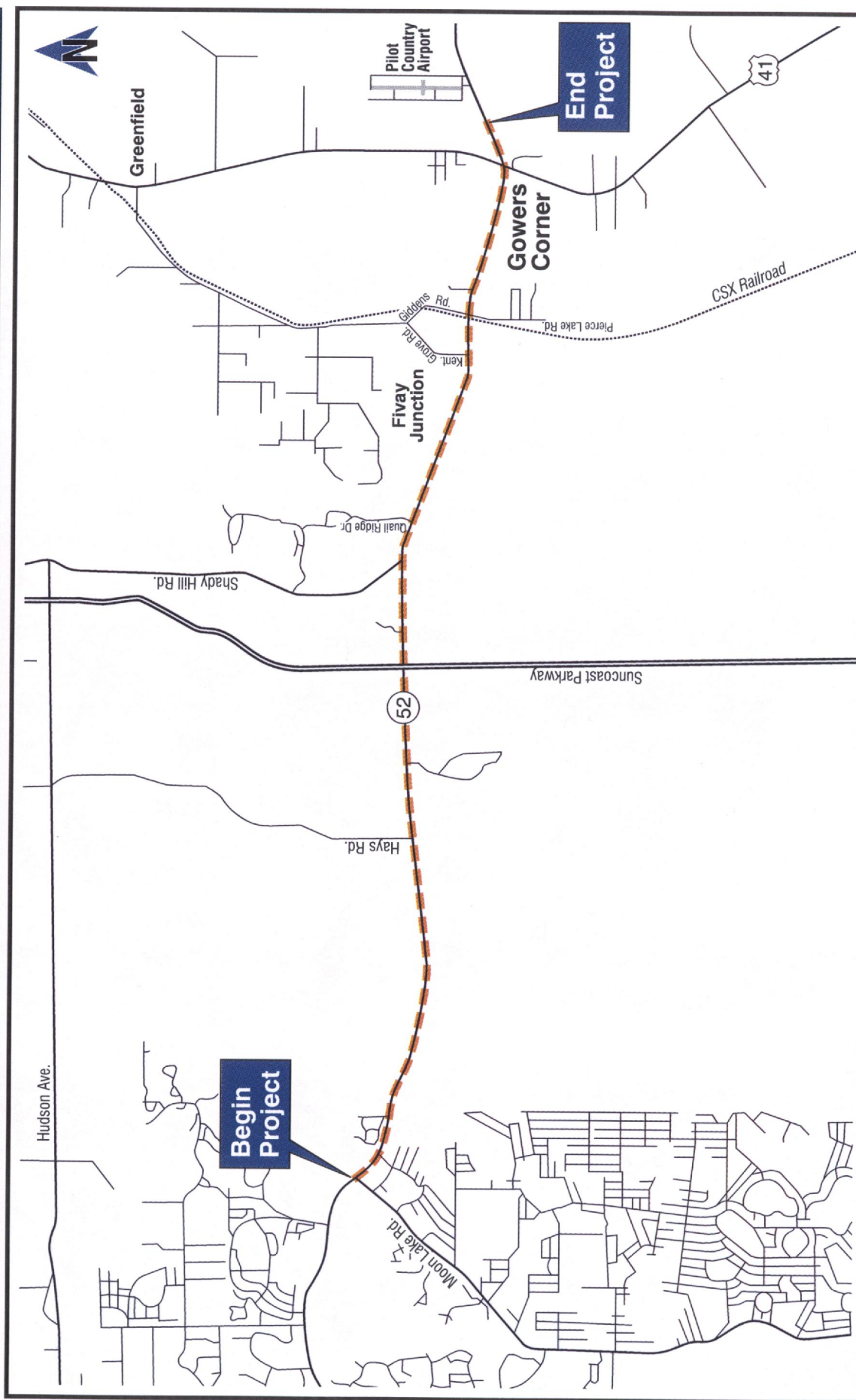
SR 52 is an east-west arterial highway in Pasco County beginning at US 19 and terminating at the US 98 Dade City Bypass. The existing SR 52 roadway is a two-lane rural roadway throughout the project area. Turn lanes have been added at certain intersections. The existing right-of-way varies in width with a minimum of 100 feet. The project location is shown in Figure 1.

### 1.2 Existing Facility

The existing roadway is typically a two-lane rural facility with one 12-foot lane in each direction and 12-foot shoulders (4 feet paved). The roadway cross section varies throughout the length of the project. The existing roadway typical section for SR 52 is shown in Figure 2.



**S.R. 52 PD&E Reevaluation Study**



From Moon Lake Road  
to SR 45 (US 41)  
W.P.I. Segment No. 256243 1

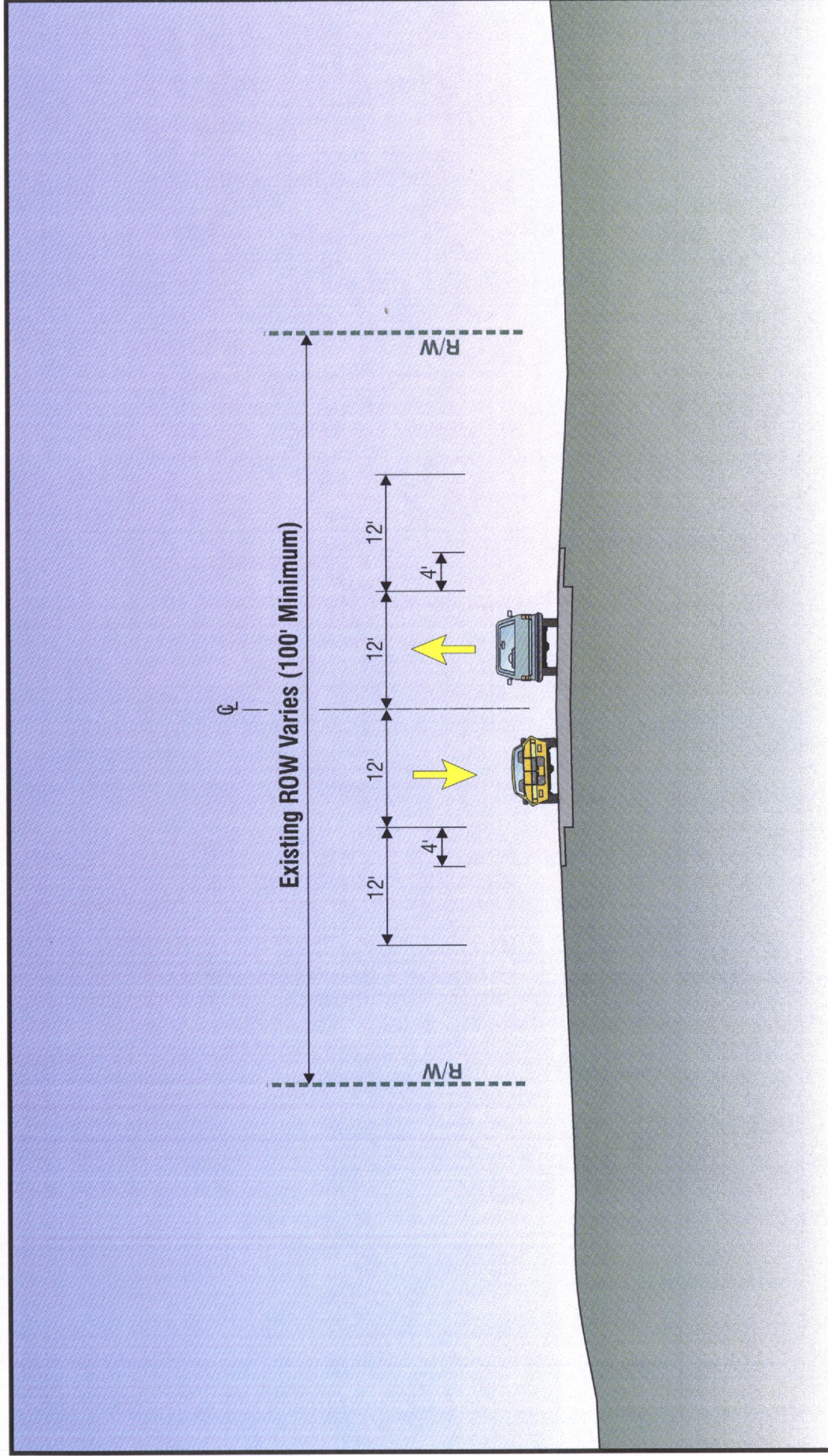


**PROJECT LOCATION MAP**

FIGURE  
1



**S.R. 52 PD&E Reevaluation Study**



From Moon Lake Road  
to SR 45 (US 41)  
W.P.I. Segment No. 256243 1



**EXISTING TYPICAL SECTION**

FIGURE  
2



## **1.3 Proposed Improvements**

### **1.3.1 Proposed Typical Section**

The proposed improvement to SR 52 is a six-lane urban divided typical section. This typical section would contain a 22-foot wide raised median, six 12-foot lanes (three in each direction), 4-foot bike lanes in each direction, and 12-foot borders (containing a 2-foot curb and gutter, a 3-foot utility strip, a 5-foot sidewalk, and a minimum 2-foot back-of-sidewalk buffer) in both directions. This typical section would require a minimum width of 156 feet. Left turn lanes would be added within the median. The proposed six-lane typical section is shown in Figure 3.

### **1.3.2 Recommended Alignment**

The recommended alignment for the SR 52 project corridor was evaluated and compared to the 1988 PD&E Study alignment. Subsequent to the previous study, the current recommended alignment for the segment from Moon Lake Road to US 41 (SR 45) was adjusted or shifted to the north for a portion of the project to avoid the gas transmission easement, located south of SR 52.

## **2.0 PD&E STUDY NOISE ANALYSIS (1988)**

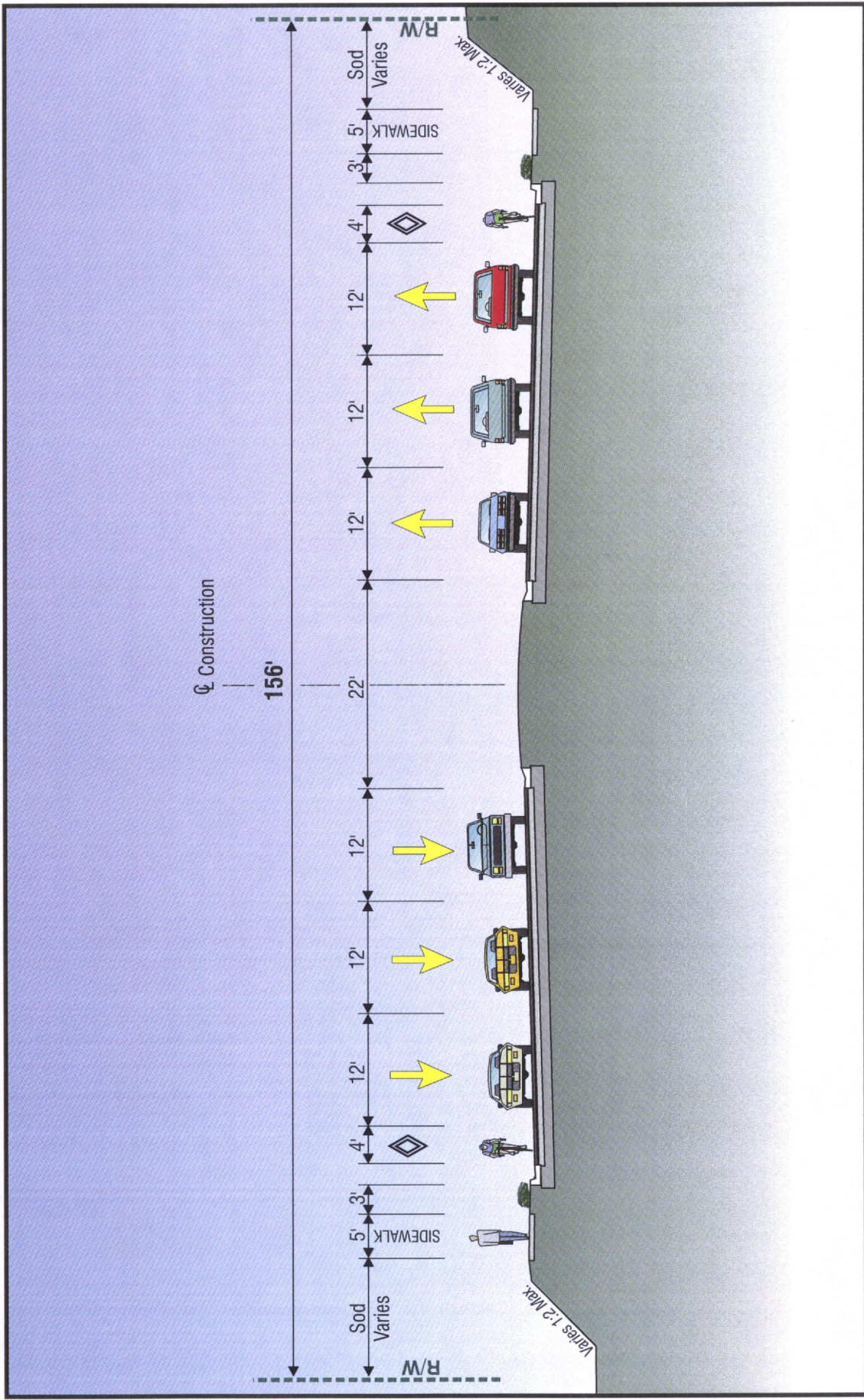
In July 1988, the FHWA approved the EA/FONSI for the SR 52 PD&E Study from US 19 to I-75 in Pasco County. A four-lane rural cross section was proposed from Moon Lake Road to US 41 (SR 45).

### **2.1 PD&E Study Methodology**

A noise study was conducted in support of the proposed project. The 1988 Noise Impact Analysis Report presented the traffic noise levels associated with the then existing conditions (1985) and design year (2010) No-Build and Build alternatives. The land uses adjacent to SR 52, between Moon Lake Road and US 41 (SR 45), were designated for agriculture, with smaller pockets of residential, commercial, and light industrial. According to the Future Land Use Element of the 1982 Pasco County Comprehensive Plan, residential developments were planned for parcels near the intersections of SR 52 with Moon Lake Road and US 41 (SR 45).



**S.R. 52 PD&E Reevaluation Study**



From Moon Lake Road  
to SR 45 (US 41)  
W.P.I. Segment No. 256243 1



**PROPOSED ROADWAY TYPICAL SECTION**

FIGURE  
3



2.2 PD&E Study Results

During the 1988 study, only one cluster of residences was evaluated for the segment of SR 52 between Moon Lake Road and US 41 (SR 45). Noise Receiver 8 represented 15 single-family residences located south of SR 52 across from Coon Hide Road. The location of Receiver 8 is shown in Figure 4.

The existing condition and design year noise levels presented in the 1988 study were calculated using the FLAMOD noise prediction model and expressed as L10 in dBA. L10 is the noise level that is exceeded 10 percent of the time under consideration. The results from the 1988 Noise Impact Analysis Report for Receiver 8 are shown in Table 1.

Table 1  
Predicted L10 Noise Levels (dBA)

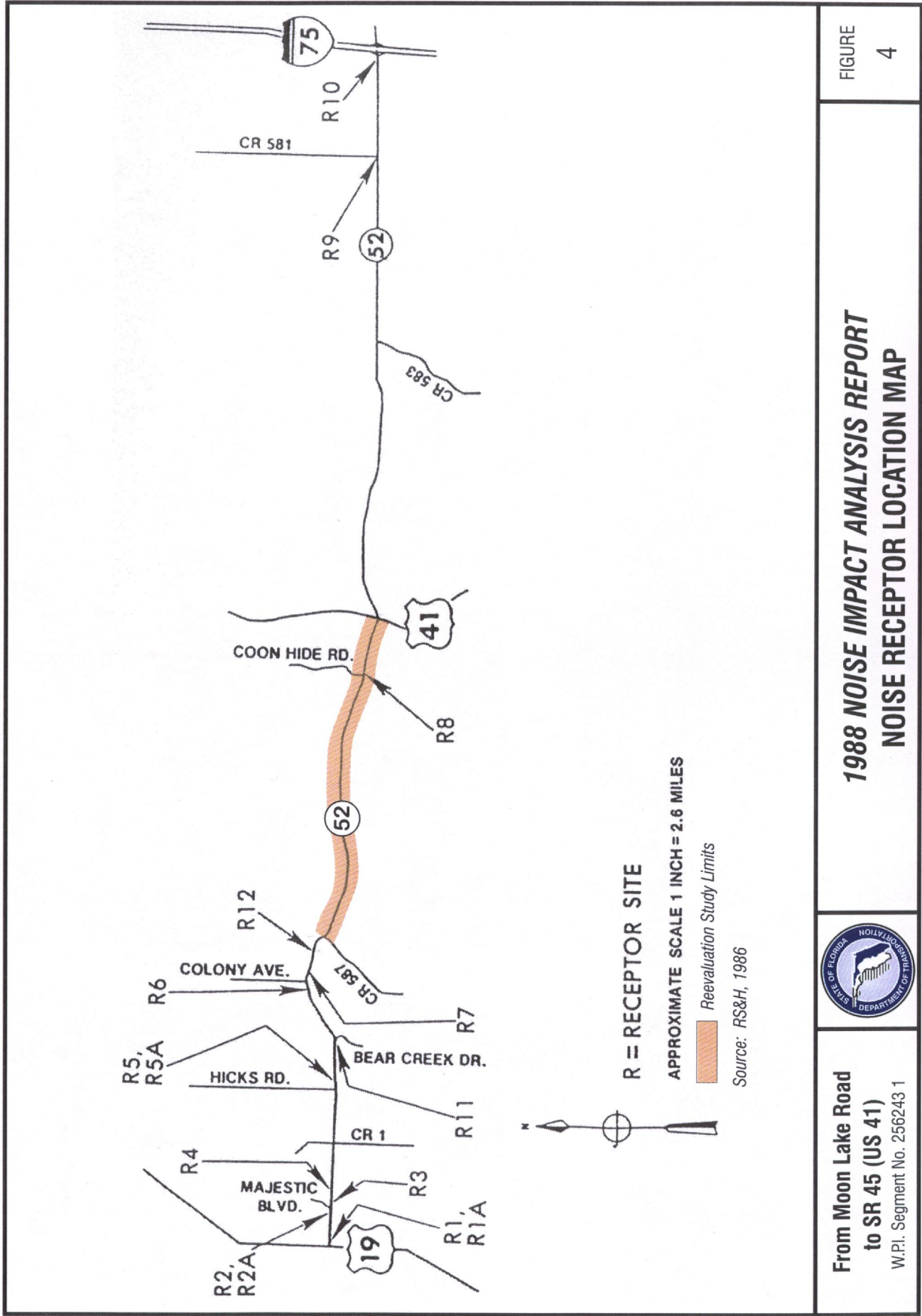
Receiver Number	Number of Residences	1985 Existing Condition	2010 No-Build Alternative	2010 Build Alternative	FHWA NAC Category B
8	15	68	69	69	70

Source: RS&H, 1988.

The noise levels were compared to the FHWA Noise Abatement Criteria (NAC) for Activity Category B (70 dBA). A detailed discussion of the NAC is presented in Section 3.3. Activity Category B includes sites such as recreation areas, residences, schools, and churches. The noise sensitive sites along this section of SR 52 were described as single-family residences. Noise abatement measures are considered when future traffic noise levels are predicted to approach or exceed the NAC. Prior to January 2000, the term “approach” meant within 2 dBA of the NAC. The results for Receiver 8 indicate that the noise levels for all study alternatives approach the NAC for Activity Category B. Since the 2010 noise levels are predicted to exceed the NAC by less than 3 dBA and the homes are widely dispersed, the 1988 Noise Impact Analysis Report concluded that abatement measures were not reasonable.



S.R. 52 PD&E Reevaluation Study





### **3.0 REEVALUATION NOISE STUDY (2001)**

This Noise Study Technical Memorandum has been prepared according to the methodology established in Title 23 CFR, Part 772<sup>1</sup> and the FDOT PD&E Manual, Part 2, Chapter 17<sup>2</sup>. All noise levels described in this reevaluation study are expressed in A-weighted decibels (dBA) in terms of one-hour equivalent continuous noise level – LAeq1h. All predicted noise levels were produced using the FHWA traffic noise model, STAMINA 2.0 (Florida version STAMINA 2.1).

#### **3.1 Study Objectives**

The objectives of the noise study are to identify noise sensitive sites adjacent to the project corridor, compare and evaluate traffic noise levels at these sites with and without the proposed project, and evaluate the need for, and the effectiveness of noise abatement measures. Predicted isopleths for future noise levels are also included. The isopleths will assist local officials in establishing setback requirements for future noise sensitive land uses.

#### **3.2 Noise Sensitive Sites**

Noise sensitive sites are any property (owner occupied, rented, or leased) where frequent exterior human use occurs and where a lowered noise level would be of benefit. These sites are often referred to as receivers. Noise sensitive sites within the project corridor consist of single-family and multi-family residences. Noise sensitive land uses listed from west to east are described below. All referenced street names and receiver numbers can be found on the aerials at the end of this memorandum.

##### Pine Ridge Community from Moon Lake Road to Hays Road

The Pine Ridge Community consists of duplex homes constructed and occupied in 1987. The closest home (receiver 11) is located approximately 100 feet north of SR 52. These homes are represented by receivers 1 through 15. A 6-foot tall wooden privacy fence extends along the community's southern boundary.

Two single-family homes, located more than 250 feet south of SR 52, are also included in this area. These two homes are represented by receivers 16 and 17. Neither the Pine Ridge Community nor the two single-family homes south of SR 52 were evaluated in the noise analysis for 1988 PD&E Study.



#### Single-family residences from Hays Road to Murcott Way

This area includes four single-family residences located north and south of SR 52 from Hays Road to Murcott Way. Receiver 18 represents two single-family residences located east of Hays Road, approximately 300 feet north of SR 52. Receivers 19 and 20 represent two single-family homes west of Murcott Way and are more than 300 feet south of SR 52. According to records from the Pasco County Property Appraiser Office, the two homes north of SR 52 were built and occupied in 1990 and 1999. The two homes south of SR 52 were built and occupied in 1997.

#### Quail Ridge Community at Quail Ridge Drive

The Quail Ridge Community, represented by receivers 21 through 24, consists of single-family estate homes north of SR 52 at Quail Ridge Drive. The closest home (receiver 23) is located more than 200 feet north of the existing alignment. A six-foot tall brick privacy wall extends along the community, 160 feet north of SR 52. According to records from the Pasco County Property Appraiser Office, the homes in this community were built from 1988 to 1999, after the 1988 study was approved.

#### Single-family residences from Kent Grove Drive to US 41 (SR 45)

This area includes 28 single-family residences located north and south of SR 52 from Kent Grove Drive to US 41 (SR 45). Receivers 25, 26, 27, 35, and 36 are west of the Seaboard Coast Line railroad. Receivers 28 through 34 are east of the railroad. The closest home, (receiver 26) is approximately 75 feet south of SR 52. This cluster of homes was included in the noise analysis for 1988 PD&E Study, as described in Section 2.2.

### **3.3 Noise Abatement Criteria**

The FHWA has established noise levels at which noise abatement must be considered. Known as the Noise Abatement Criteria (NAC), these criteria vary according to a property's land use category. Table 2 presents the NAC for both LAeq1h and L10.

According to 23 CFR 772<sup>1</sup>, noise abatement measures must be considered when future predicted traffic noise levels approach or exceed the NAC or when predicted traffic noise levels substantially exceed the existing condition noise levels. In Part 2, Chapter 17 of the FDOT PD&E Manual<sup>2</sup> the term "approach" is defined to mean within 1 dBA of the NAC. For Activity Category B, which applies to most of the noise sensitive land uses adjacent to SR 52, this translates to 66 dBA. The FDOT has also defined a substantial increase in traffic noise levels to be 15 dBA or more above the existing noise levels. Since SR 52 is an existing facility, an increase of 15 dBA or more is not anticipated.



**Table 2**  
**Noise Abatement Criteria (dBA)**

Activity Category	L <sub>Aeq1h</sub>	L <sub>10</sub>	Description of Activity Category
A	57 (exterior)	60 (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)	70 (exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72	75	Developed lands, properties, or activities not included in Categories A or B above.
D	–	–	Undeveloped lands.
E	52 (interior)	55 (interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

Source: Title 23 of the Code of Federal Regulations, Part 772 (23 CFR 772), April 2001.

### 3.4 Measured Noise Levels

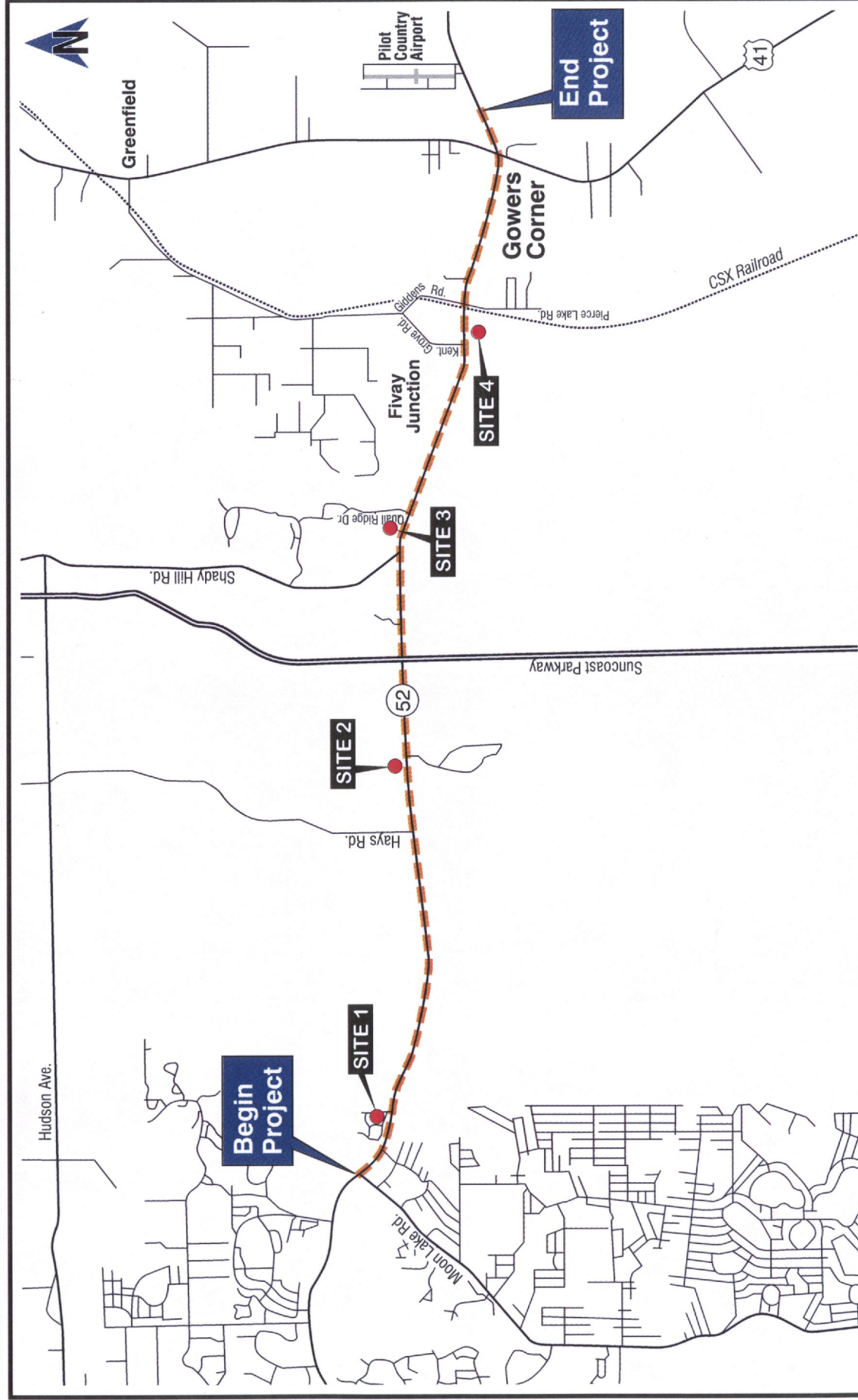
Prior to using STAMINA 2.1 to predict traffic noise levels, the accuracy of the model must be verified, or validated. Existing traffic noise levels were measured in the field and compared against levels predicted in STAMINA 2.1. Field measurements were collected at four sites along the project corridor in three repetitions of 10 minutes each. The noise measurements were conducted according to procedures described in Measurement of Highway-Related Noise (Report No. FHWA-PD-96-046, May 1996).

The ambient noise levels were measured with a calibrated Quest Technologies Sound Level Meter 2900 fitted with a condenser microphone and windshield. The sites selected are representative of typical noise sensitive land uses within the study limits. The locations of the noise measurement sites are shown in Figure 5. Vehicle counts, classifications, and speeds were observed concurrent to the measurements.

The noise level prediction model is approved for use if measured and predicted noise levels are within the FDOT tolerance standard of 3 dBA. As shown in Table 3, the ability of STAMINA 2.1 to accurately predict noise levels for this project was validated, as the levels are within the FDOT tolerance standard.



**S.R. 52 PD&E Reevaluation Study**



From Moon Lake Road  
to SR 45 (US 41)  
W.P.I. Segment No. 256243 1



**NOISE MEASUREMENT AND VALIDATION SITES**

FIGURE  
5



**Table 3  
Noise Model Validation Results**

Site	Description	Date	Time	Field Measurement (dBA)	STAMINA 2.1 Prediction (dBA)	Difference (dBA)
1	Pine Ridge Community at Ridgedale Drive	1/3/01	10:35 – 11:05	67.4	69.7	2.3
2	Safety Town entrance at Alric Pottberg Road	1/3/01	11:30 – 12:00	62.4	64.6	2.2
3	Quail Ridge Community at Quail Ridge Drive	1/3/01	12:20 – 12:50	63.2	63.5	0.3
4	former Trail Blazer mobile home park, west of RR	1/3/01	1:05 – 1:35	62.2	64.9	2.7

### 3.5 Traffic Parameters

Input parameters necessary to run STAMINA 2.1 include detailed roadway geometry, receiver locations, propagation characteristics, shielding, and traffic data. The propagation path along SR 52 is primarily soft (i.e., vegetated cover). Projected existing conditions and design year (2025) average daily traffic (ADT) volumes, vehicle classifications, and speeds for each segment were provided by FDOT District Seven in "Traffic for Air and Noise Studies" memorandum dated January 9, 2001. The design-hour traffic volumes are 10.28 percent of the ADT. Design-hour traffic volumes were divided by vehicle classifications of 96 percent cars, 2 percent medium trucks, and 2 percent heavy trucks. The traffic data used are summarized in Table 4.

Noise level predictions are made for the traffic characteristics that yield the worst hourly traffic noise on a regular basis. Generally, the worst hourly traffic volume is the peak-hour level of service (LOS) C or demand LOS, whichever is less. Since LOC C traffic volumes for the existing two-lane rural facility were used for both the existing condition and 2025 No-Build alternative, the predicted noise levels are expected to be same.



**Table 4  
Traffic Data for Noise Study**

Segment of SR 52	Study Alternative	Average Daily Traffic	Design-Hour Traffic Volumes			Posted Speed
			Cars	Medium Trucks	Heavy Trucks	
Moon Lake Road to Hays Road	Existing Condition	14,400 <sup>1</sup>	1,420	30	30	55
	2025 No-Build	14,400 <sup>1</sup>	1,420	30	30	55
	2025 Build	34,900 <sup>2</sup>	3,444	72	72	45
Hays Road to Suncoast Pkwy	Existing Condition	14,400 <sup>1</sup>	1,420	30	30	55
	2025 No-Build	14,400 <sup>1</sup>	1,420	30	30	55
	2025 Build	40,200 <sup>2</sup>	3,967	83	83	45
Suncoast Pkwy to Shady Hills Road	Existing Condition	14,400 <sup>1</sup>	1,420	30	30	55
	2025 No-Build	14,400 <sup>1</sup>	1,420	30	30	55
	2025 Build	35,200 <sup>2</sup>	3,475	72	72	45
Shady Hills Road to US 41 (SR 45)	Existing Condition	14,400 <sup>1</sup>	1,420	30	30	55
	2025 No-Build	14,400 <sup>1</sup>	1,420	30	30	55
	2025 Build	46,000 <sup>1</sup>	4,539	95	95	45

<sup>1</sup> LOS C

<sup>2</sup> Demand LOS

### 3.6 Predicted Noise Levels

Noise level isopleths associated with the design year alternatives were estimated using STAMINA 2.1. Isopleths, or points of equal noise levels were estimated for the 66-dBA noise level to identify those areas that may approach or exceed the NAC for Activity Category B. The isopleth distances measured from the existing and proposed centerline of SR 52 are provided in Table 5. The isopleths for the Build Alternative are shown on aerials at the end of this memorandum.



Table 5  
66-dBA Noise Level Isopleths for Design Year (2025) Alternatives

Segment of SR 52	No-Build Alternative	Build Alternatives
Moon Lake Road to Hays Road	120 ft	152 ft
Hays Road to the Suncoast Parkway	120 ft	175 ft
The Suncoast Parkway to Shady Hills Road	120 ft	152 ft
Shady Hills Road to US 41 (SR 45)	120 ft	190 ft

The isopleths listed above do not consider any shielding of noise by structures between the receiver and roadway.

3.7 Noise Analysis Results

Existing conditions and future traffic noise levels were predicted for 38 receivers, representing 65 single-family and multi-family residences along the SR 52 project corridor from Moon Lake Road to US 41 (SR 45). The noise levels were predicted for exterior areas where frequent human activity occurs. The predicted existing and future noise levels are presented in Table 6. The locations of the receivers modeled are provided at the end of this report.

Table 6  
Predicted Existing and Future Noise Levels (dBA)

Receiver Number	Number of Residences	Predicted Noise Levels (dBA)			Difference Existing vs. Build	Approaches or Exceeds NAC
		Existing Condition	2025 No-Build	2025 Build		
Pine Ridge Community from Moon Lake Road to Hays Road						
1	2	63.8	63.8	64.6	0.8	NO
2	2	64.1	64.1	64.6	0.5	NO
3	2	64.3	64.3	64.7	0.4	NO
4	2	64.1	64.1	64.5	0.4	NO
5	2	63.6	63.6	64.2	0.6	NO
6	2	61.7	61.7	62.8	1.1	NO
7	2	60.5	60.5	61.9	1.4	NO
8	2	60.6	60.6	62.2	1.6	NO
9	2	62.5	62.5	64.2	1.7	NO
10	2	63.6	63.6	65.3	1.7	NO
11	2	64.1	64.1	65.9	1.8	NO
12	2	59.2	59.2	61.1	1.9	NO
13	2	59.4	59.4	61.3	1.9	NO
14	2	58.8	58.8	60.3	1.5	NO
15	2	59.3	59.3	60.7	1.4	NO
16	1	59.6	59.6	63.6	4.0	NO



**Table 6**  
**Predicted Existing and Future Noise Levels (dBA)**

Receiver Number	Number of Residences	Predicted Noise Levels (dBA)			Difference Existing vs. Build	Approaches or Exceeds NAC
		Existing Condition	2025 No-Build	2025 Build		
17	1	57.2	57.2	60.1	2.9	NO
<i>Single-family Residences from Hays Road to Murcott Way</i>						
18	2	58.8	58.8	62.6	3.8	NO
19	1	59.0	59.0	61.8	2.8	NO
20	1	57.4	57.4	60.2	2.8	NO
<i>Quail Ridge Community at Quail Ridge Drive</i>						
21	1	57.4	57.4	61.4	4.0	NO
22	1	57.2	57.2	61.1	3.9	NO
23	1	60.0	60.0	64.1	4.1	NO
24	1	57.6	57.6	61.5	3.9	NO
<i>Single-family Residences from Kent Grove Drive to US 41 (SR 45)</i>						
25	2	62.8	62.8	65.5	2.7	NO
26	2	68.4	68.4	70.4	2.0	YES
27	2	66.6	66.6	69.0	2.4	YES
28	5	66.2	66.2	68.7	2.5	YES
29	1	63.4	63.4	66.2	2.8	YES
30	4	63.1	63.1	66.1	3.0	YES
31	1	61.7	61.7	65.6	3.9	NO
32	2	61.4	61.4	65.9	4.5	NO
33	1	65.6	65.6	71.1	5.5	YES
34	1	62.6	62.6	67.3	4.7	YES
35	1	60.1	60.1	64.6	4.5	NO
36	1	58.1	58.1	62.3	4.2	NO
37	1	67.0	67.0	68.4	1.4	YES
38	1	65.6	65.6	68.1	2.5	YES

As shown in Table 6, nine receivers, representing 18 residences, are predicted to experience noise levels that approach or exceed the NAC. These residences are located adjacent to the section of SR 52 from Kent Grove Drive to US 41 (SR 45) and include:

**Receivers 26 and 27** – represent four residences located approximately 75 feet south of SR 52, between Kent Grove Drive and the Seaboard Coast Line railroad. The predicted Build alternative noise levels range from 69.0 to 70.4 dBA.

**Receivers 28, 29, and 30** – represent 10 residences located approximately 120 feet south of SR 52, east of the Seaboard Coast Line railroad. The predicted Build alternative noise levels range from 66.1 to 68.7 dBA.

**Receivers 33 and 34** – represent two single-family residences located approximately 30 feet north of SR 52, east of Davis Lane. The predicted Build alternative noise levels range from 67.3 to 71.1 dBA.



**Receivers 37 and 38** – represent two residences located approximately 90 feet north of SR 52, west of US 41 (SR 45). The predicted Build alternative noise levels range from 68.1 to 68.4 dBA.

The range in increase in predicted noise levels from the existing condition to the Build alternative is 0.4 to 5.5 dBA. None of the noise sensitive sites are predicted to experience a “substantial increase” of 15 dBA or more above the existing condition noise levels.

## **4.0 EVALUATION OF ABATEMENT ALTERNATIVES**

The FHWA requires that noise abatement measures be considered if noise levels at a noise sensitive site approaches or exceeds the NAC. Therefore, abatement was evaluated for the 18 noise sensitive sites predicted to be affected by traffic noise. As outlined in 23 CFR Part 772, these measures may include traffic systems management, alignment modifications, property acquisition, land use controls, and noise barriers.

### **4.1 Traffic Systems Management**

Traffic system management measures, which limit motor vehicle speeds and reduce traffic volumes, can be effective noise mitigation measures. However, these measures also negate a roadway's ability to accommodate forecasted traffic volumes. For example, if speeds on SR 52 are reduced, the capacity of the roadway to handle motor vehicle traffic would also be reduced. Therefore, reducing traffic speeds and/or volumes is inconsistent with the goal of improving the capacity of the roadway.

Measures that prohibit truck traffic on roadways can also be effective noise mitigation measures. However, SR 52 is a regional facility, providing access along the corridor. Prohibiting trucks on the roadway would put an unreasonable hardship on the existing land uses adjacent to SR 52 that require truck access. Therefore, traffic management measures are not considered a reasonable or feasible abatement option for this project.

### **4.2 Alignment Modifications**

Alignment modifications generally involve orienting and/or shifting the roadway at sufficient distances from noise sensitive areas to minimize the noise impacts. Alignment alternatives to the north and south of the existing alignment were evaluated during the 1988 PD&E Study and again during the reevaluation study.

The current recommended alignment for the segment from Moon Lake Road to US 41 (SR 45) was adjusted or shifted to the north for a portion of the project to avoid the gas transmission easement, which is located south of SR 52. The proposed alignment was



developed in an effort to minimize potential engineering and environmental effects, including noise levels.

### **4.3 Land Use Controls**

Land use controls can be used to minimize noise sensitive sites that may be affected by traffic noise. Within the project corridor, land uses adjacent to SR 52 are primarily undeveloped. Future growth and residential development are projected for this area. Local planning and permitting officials can use the noise isopleths provided in Table 5 to assist in promoting compatible land use development adjacent to SR 52.

### **4.4 Noise Barriers**

Noise barriers reduce noise levels by blocking the propagation path between the roadway and noise sensitive sites. To be effective in reducing traffic noise levels, a noise barrier must be relatively long, continuous (with no intermittent openings for driveways), and sufficiently high enough to provide the necessary reduction in noise levels.

In order for a barrier to be considered reasonable, it must meet the following minimum conditions:

- Provide an average minimum insertion loss (IL) (noise reduction) of 5 dBA with a design goal of 10 dBA; and
- Barrier construction costs are not to exceed \$30,000 per benefited receiver unless a higher level of expenditure can be justified by other circumstances. The current unit cost used to evaluate economic reasonableness is \$25 per square foot.

Other important factors such as community desires, adjacent land uses, safety, and barrier constructability and maintenance also play important roles in determining feasibility and reasonableness.

Noise barriers were modeled along the proposed right-of-way line and within the property boundaries for each of the affected 18 residences adjacent to SR 52 from Kent Grove Drive to US 41 (SR 45). Openings were provided in the barriers to accommodate private driveways. A line-of-sight review was also conducted to ensure that safety requirements are maintained. Since the proposed right-of-way is expected to be greater than 25 feet from the edge-of-pavement, barriers placed along the right-of-way would not obstruct a driver's line-of-sight. Modeled noise barrier locations are shown on the aerials provided in the Technical Appendices. A discussion for each of the modeled noise barriers is provided below:



**Receiver 26 – Two single-family residences (Barrier 1)** - Two residences represented by receiver 26 are predicted to experience noise levels that approach or exceed the NAC. Receiver 26 is located 75 feet south of SR 52, across from the intersection of Kent Grove Drive. Openings were provided in the modeled noise barrier (referred to as Barrier 1) to accommodate private driveways. A barrier placed along the right-of-way at this location would not obstruct a driver's line-of-sight. Heights of 8 to 20 feet were evaluated for a 220-foot long barrier. Even at a height of 20 feet, an insertion loss of 5 dBA could not be achieved. Therefore, a noise barrier at this location was determined not to be a feasible abatement measure.

**Receiver 27 – Two single-family residences (Barrier 2)** - Two residences represented by receiver 27 are predicted to experience noise levels that approach or exceed the NAC. Receiver 27 is located 75 feet south of SR 52, east of Kent Grove Drive. Openings were provided in the modeled noise barrier (referred to as Barrier 2) to accommodate private driveways. A barrier placed along the right-of-way at this location would not obstruct a driver's line-of-sight. Heights of 8 to 20 feet were evaluated for a 248-foot long barrier. Even at height of 20 feet, an insertion loss of 5 dBA could not be achieved. Therefore, a noise barrier at this location was determined not to be a feasible abatement measure.

**Receivers 28 & 29 – Six single-family residences (Barrier 3)** - Six residences are predicted to experience noise levels that approach or exceed the NAC. Receivers 28 and 29 are located 120 feet south of SR 52, east of the Seaboard Coast Line railroad. Openings were provided in the modeled noise barrier (referred to as Barrier 3) to accommodate private driveways. A barrier placed along the right-of-way at this location would not obstruct a driver's line-of-sight. Heights of 8 to 20 feet were evaluated for a 682-foot long barrier. The results of the noise barrier evaluation are provided in Table 7.

**Table 7**  
**Noise Barrier 3 Evaluation for Receivers 28 & 29**

Wall Height	#/Rec 5 dBA	#/Rec 6 dBA	#/Rec 7 dBA	#/Rec 8 dBA	#/Rec 9 dBA	#/Rec 10 dBA	Avg IL	Total Cost	Total Benefited Rec	Cost/Rec
8 feet	-	-	-	-	-	-	<5	\$136,400	0	N/A
10 feet	-	-	-	-	-	-	<5	\$170,500	0	N/A
12 feet	-	-	-	-	-	-	<5	\$204,600	0	N/A
14 feet	-	-	-	-	-	-	<5	\$238,700	0	N/A
16 feet	2	-	-	-	-	-	5.4	\$272,800	2	\$136,400
18 feet	2	-	-	-	-	-	5.7	\$306,900	2	\$153,450
20 feet	2	-	-	-	-	-	5.9	\$341,000	2	\$170,500

\* Cost is calculated based on \$25.00 per square foot.

\*\* Receivers included in cost analysis are those receiving at least a 5-dBA insertion loss (IL).



The evaluation determined that a noise barrier could provide an insertion loss of at least 5 dBA at Receiver 28 for barrier heights of 16 feet or higher. However, the cost greatly exceeds the reasonableness criteria of \$30,000 per benefited receiver. Receiver 29 will not achieve an insertion loss of 5 dBA or greater as a result of a noise barrier along the right-of-way. Therefore, a noise barrier at this location was determined not to be a feasible abatement measure.

**Receiver 30 – Four single-family residences (Barrier 4)** - Four residences represented by receiver 30 are predicted to experience noise levels that approach or exceed the NAC. Receiver 30 is located 120 feet south of SR 52, east of the Seaboard Coast Line railroad. Openings were provided in the modeled noise barrier (referred to as Barrier 4) to accommodate private driveways. A barrier placed along the right-of-way at this location would not obstruct a driver's line-of-sight. Heights of 8 to 20 feet were evaluated for a 684-foot long barrier. The results of the noise barrier evaluation are provided in Table 8.

**Table 8**  
**Noise Barrier 4 Evaluation for Receiver 30**

Wall Height	#/Rec 5 dBA	#/Rec 6 dBA	#/Rec 7 dBA	#/Rec 8 dBA	#/Rec 9 dBA	#/Rec 10 dBA	Avg IL	Total Cost	Total Benefited Rec	Cost/Rec
8 feet	-	-	-	-	-	-	<5	\$136,800	0	N/A
10 feet	-	-	-	-	-	-	<5	\$171,000	0	N/A
12 feet	-	-	-	-	-	-	<5	\$205,200	0	N/A
14 feet	-	-	-	-	-	-	<5	\$239,400	0	N/A
16 feet	2	-	-	-	-	-	5.1	\$273,600	2	\$136,800
18 feet	2	-	-	-	-	-	5.4	\$307,800	2	\$153,900
20 feet	2	-	-	-	-	-	5.7	\$342,000	2	\$171,000

\* Cost is calculated based on \$25.00 per square foot.

\*\* Receivers included in cost analysis are those receiving at least a 5-dBA insertion loss (IL).

The evaluation determined that a noise barrier could provide an average insertion loss of at least 5 dBA for barrier heights of 16 feet or higher. However, the cost exceeds the reasonableness criteria of \$30,000 per benefited receiver. Therefore, a noise barrier at this location was determined not to be a feasible abatement measure.

**Receivers 33 and 34 – Two single-family residences** – Two residences represented by receivers 33 and 34 are predicted to experience noise levels that approach or exceed the NAC. Receiver 33 is approximately 30 feet north of SR 52, east of Davis Lane. Receiver 34 is located 120 feet north of SR 52, east of Davis Lane. Due to limitations in barrier length to accommodate property boundaries and Davis Lane, a noise barrier would not be effective in reducing the predicted noise levels by 5 dBA. Therefore, a noise barrier is not feasible at this location.



**Receivers 37 and 38 – Two single-family residences (Barrier 5)** – Two single-family residences are predicted to experience noise levels that approach or exceed the NAC. Receivers 37 and 38 are located 90 feet north of SR 52, west of US 41 (SR 45). Breaks were provided in the modeled noise barrier (referred to as Barrier 5) to accommodate private driveways. A barrier placed along the right-of-way at this location would not obstruct a driver's line-of-sight. Heights of 8 to 20 feet were evaluated for a 265-foot long barrier. Even at a height of 20 feet, an insertion loss of 5 dBA could not be achieved. Therefore, a noise barrier at this location was determined not to be a feasible abatement measure.

## **5.0 PUBLIC COORDINATION**

Continued coordination with the public, agencies, and local officials has been conducted during the development of this study. A copy of the Final Noise Study Technical Memorandum will be available for review. The Public Hearing for the PD&E Study reevaluation was held on December 11, 2001, at the Mission Outreach Church.



## REFERENCES

1. 23 CFR Part 772, "Procedures for Abatement of Highway Traffic Noise and Construction Noise"; April 2001. Available from US Department of Transportation, Washington DC.
2. Florida Department of Transportation Project Development and Environment (PD&E) Manual, Part 2, Chapter 17; January 2001. Available from FDOT, Tallahassee, Florida.
3. Federal Highway Administration Report Number FHWA-PD-96-046, "Measurement of Highway-Related Noise"; Cynthia S.Y. Lee and Gregg Fleming; May 1996; 206 pages. Available from National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, VA 22161.
4. Federal Highway Administration Report Number FHWA-DP-58-1, "Noise Barrier Cost Reduction Procedure STAMINA 2.0 / OPTIMA: User's Manual", March 1983; 102 pages. Available from National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, VA 22161.
5. Florida Department of Transportation "Standard Specifications for Road and Bridge Construction"; 2000. Available from FDOT, Tallahassee, Florida.



**NOISE SENSITIVE SITES  
AND  
66-dBA ISOPLETHS**



BEGIN  
PROJECT

D = 2° 52' 49"  
L = 1534.92'  
V = 50 MPH  
• = RC

EXIST R/W

ELEVEN  
(CITGO GAS)

WINN  
DIXIE  
MARKETPLACE

PINE RIDGE  
AT  
SUGAR CREEK

S.R. 52

EXIST R/W

PROP R/W

LEGEND

PROPOSED ROADWAY  
PROPOSED BUILD 66 dBA CONTOUR  
RECEIVER NUMBER  
RECEIVER LOCATION



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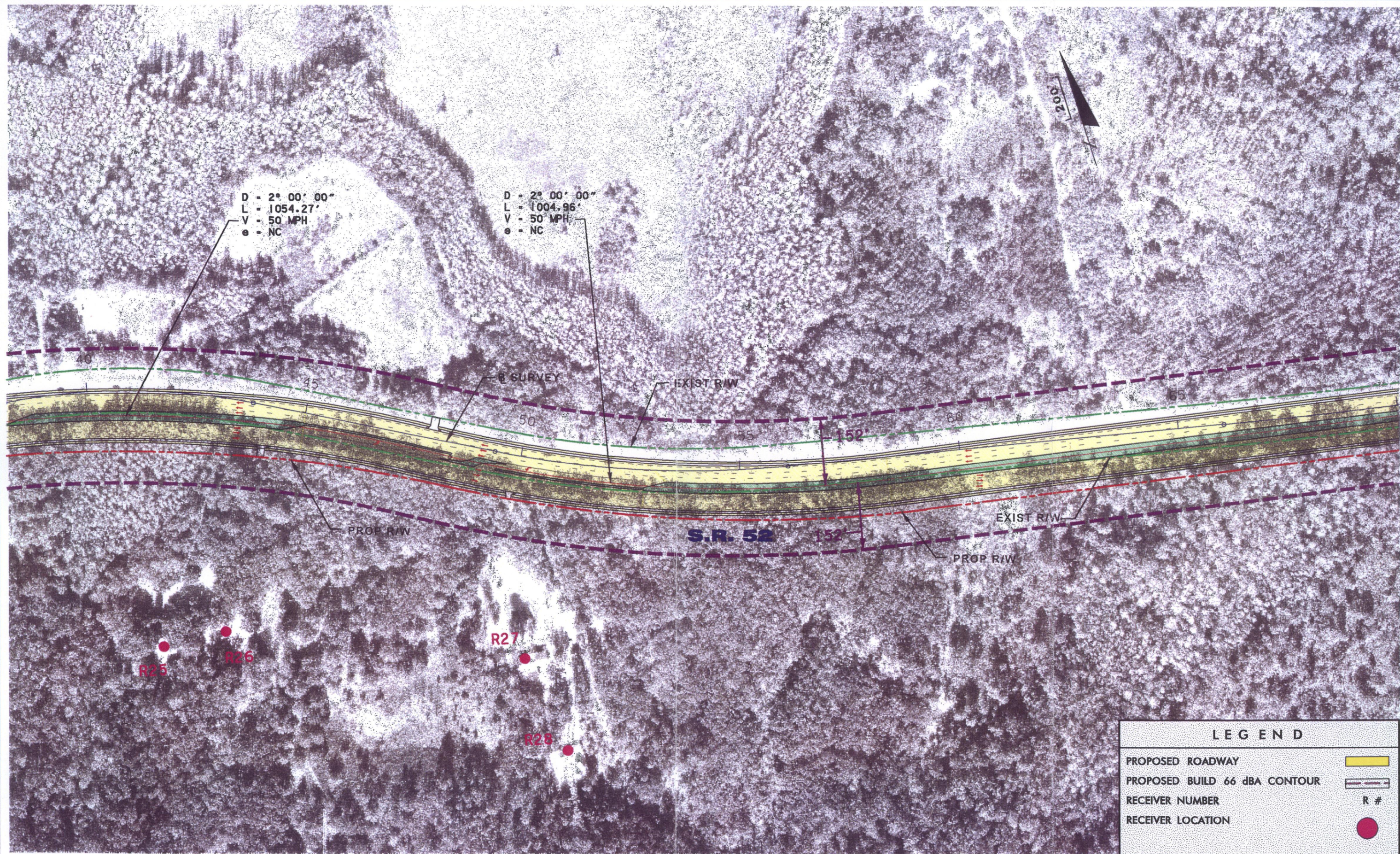
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NOISE SENSITIVE AREAS  
S.R. 52 PD&E REEVALUATION  
(Moon Lake Road to U.S. 41)

SHEET  
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1



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RECEIVER NUMBER	R #
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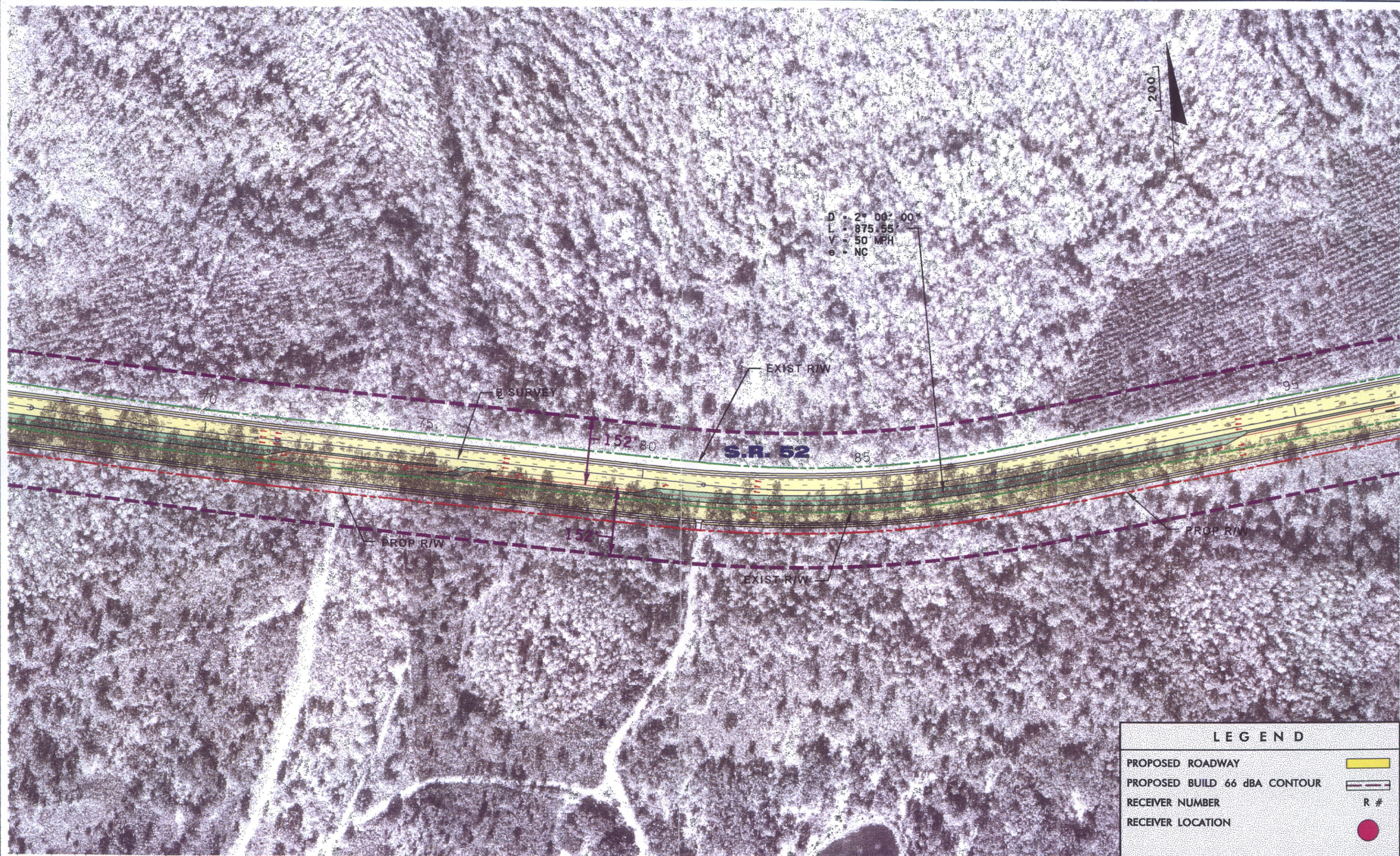
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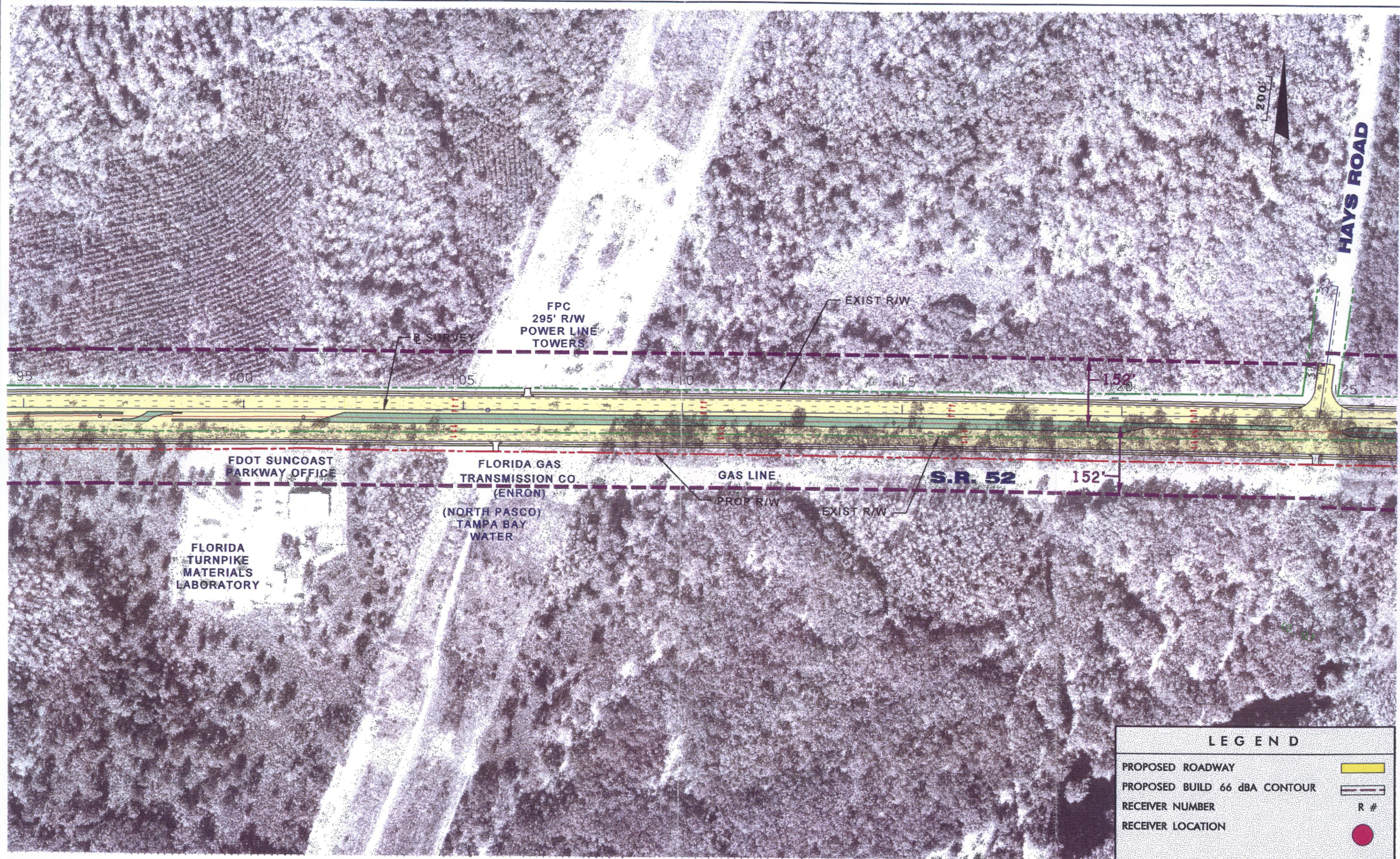
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PROPOSED BUILD 66 dBA CONTOUR	
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RECEIVER LOCATION	

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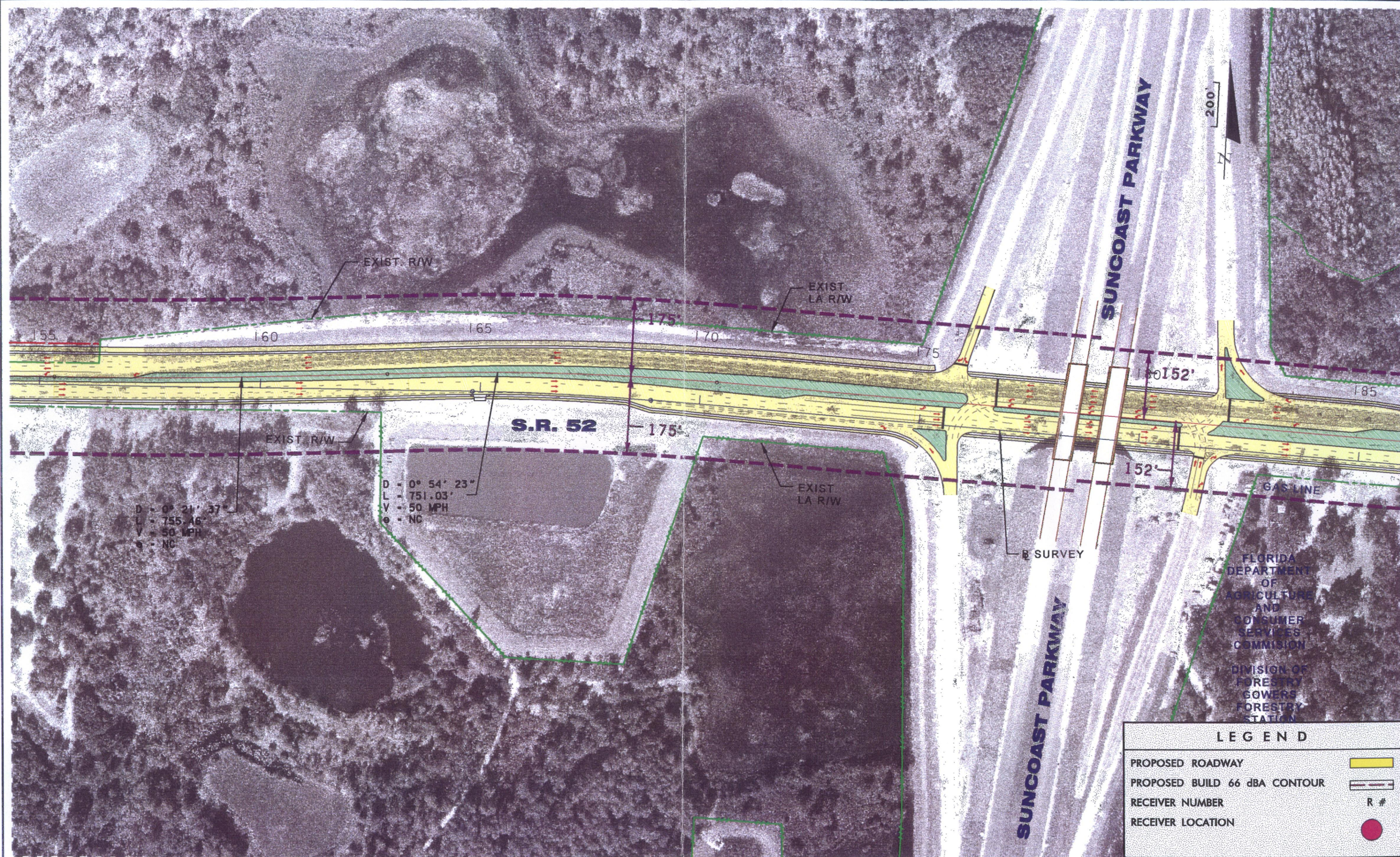


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- PROPOSED ROADWAY
- PROPOSED BUILD 66 dBA CONTOUR
- RECEIVER NUMBER
- RECEIVER LOCATION

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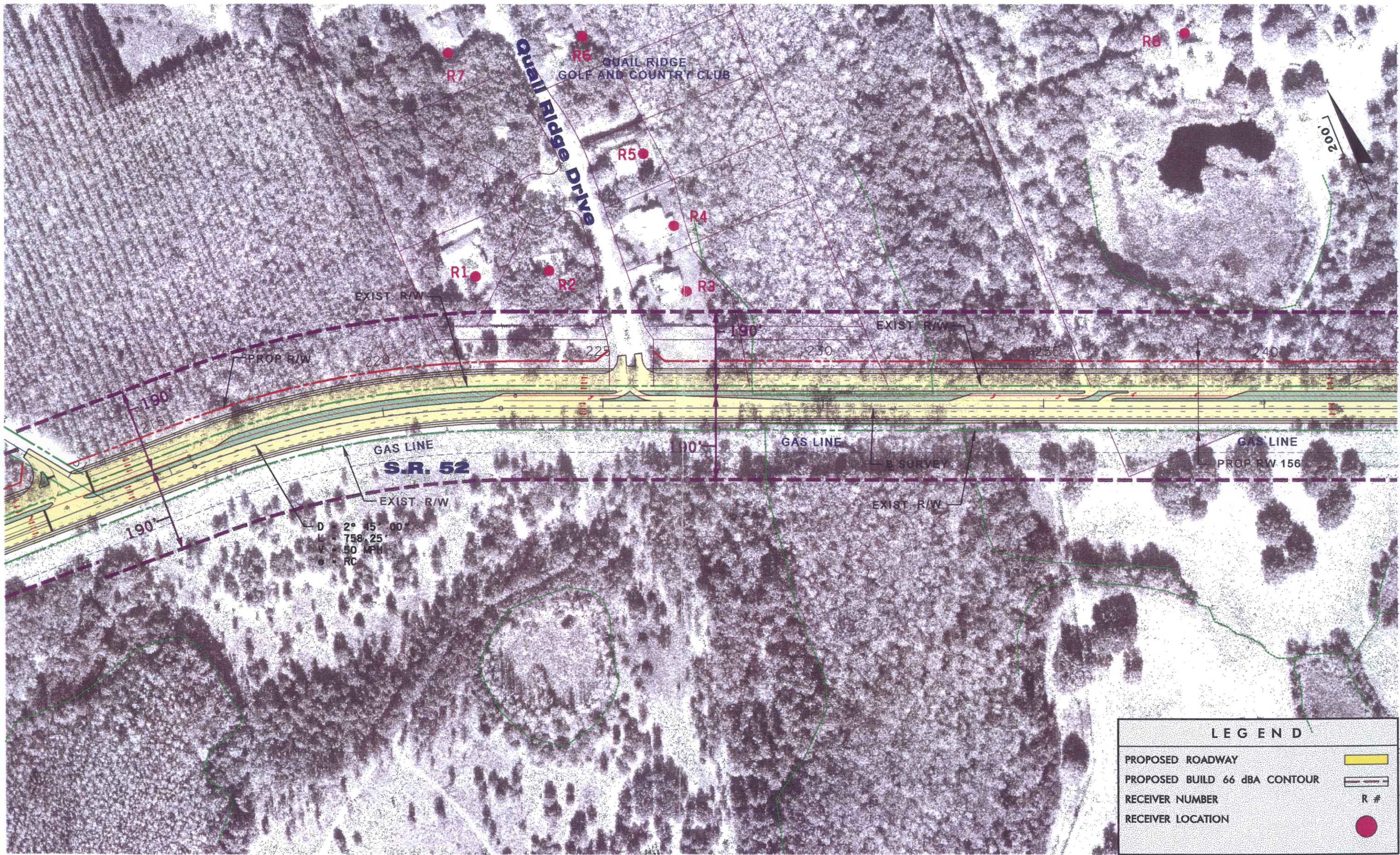
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SHEET NO.
7





D = 2° 45' 00"  
L = 758.25'  
V = 50 MPH  
RC

LEGEND

PROPOSED ROADWAY

PROPOSED BUILD 66 dBA CONTOUR

RECEIVER NUMBER

RECEIVER LOCATION

R #

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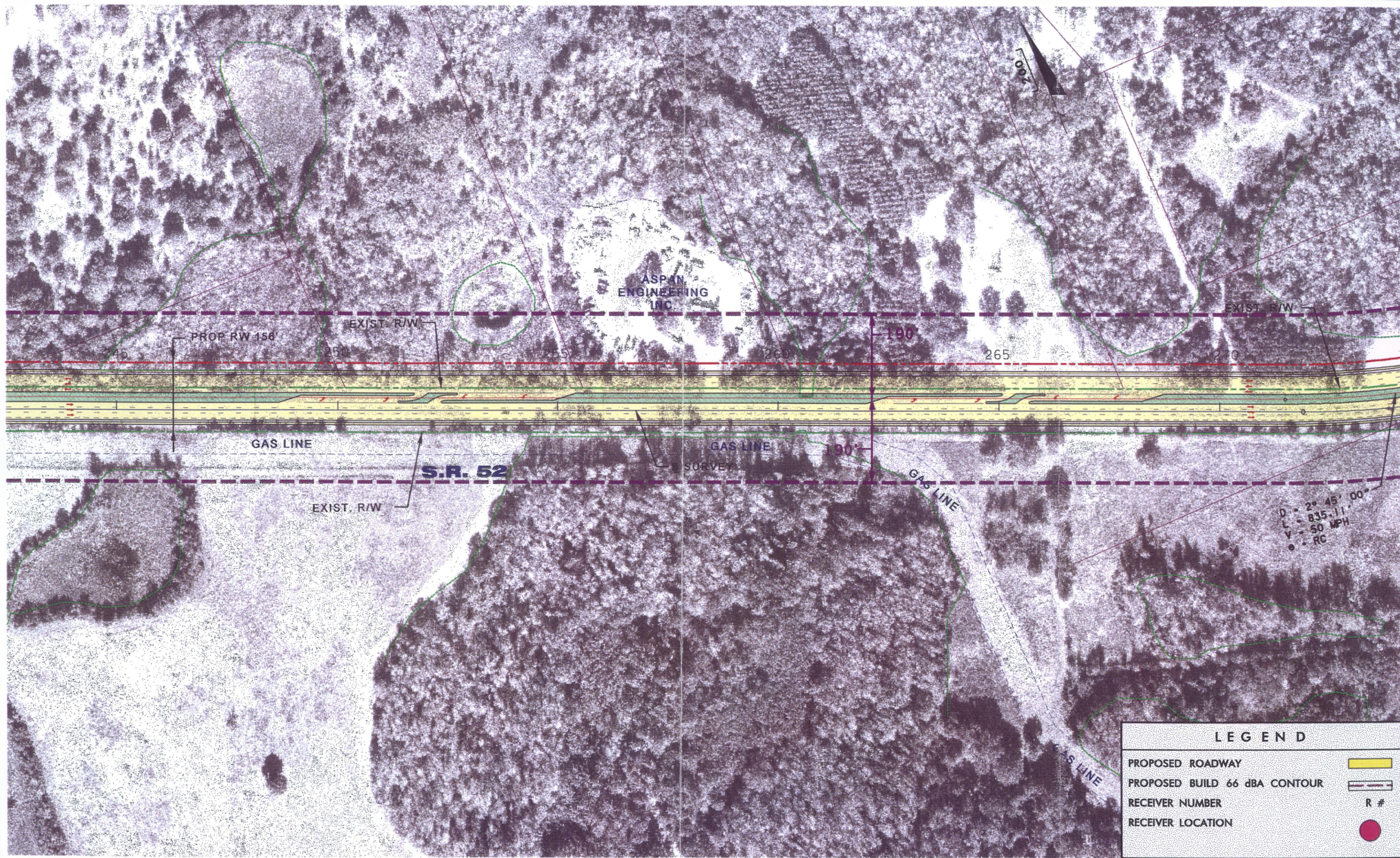
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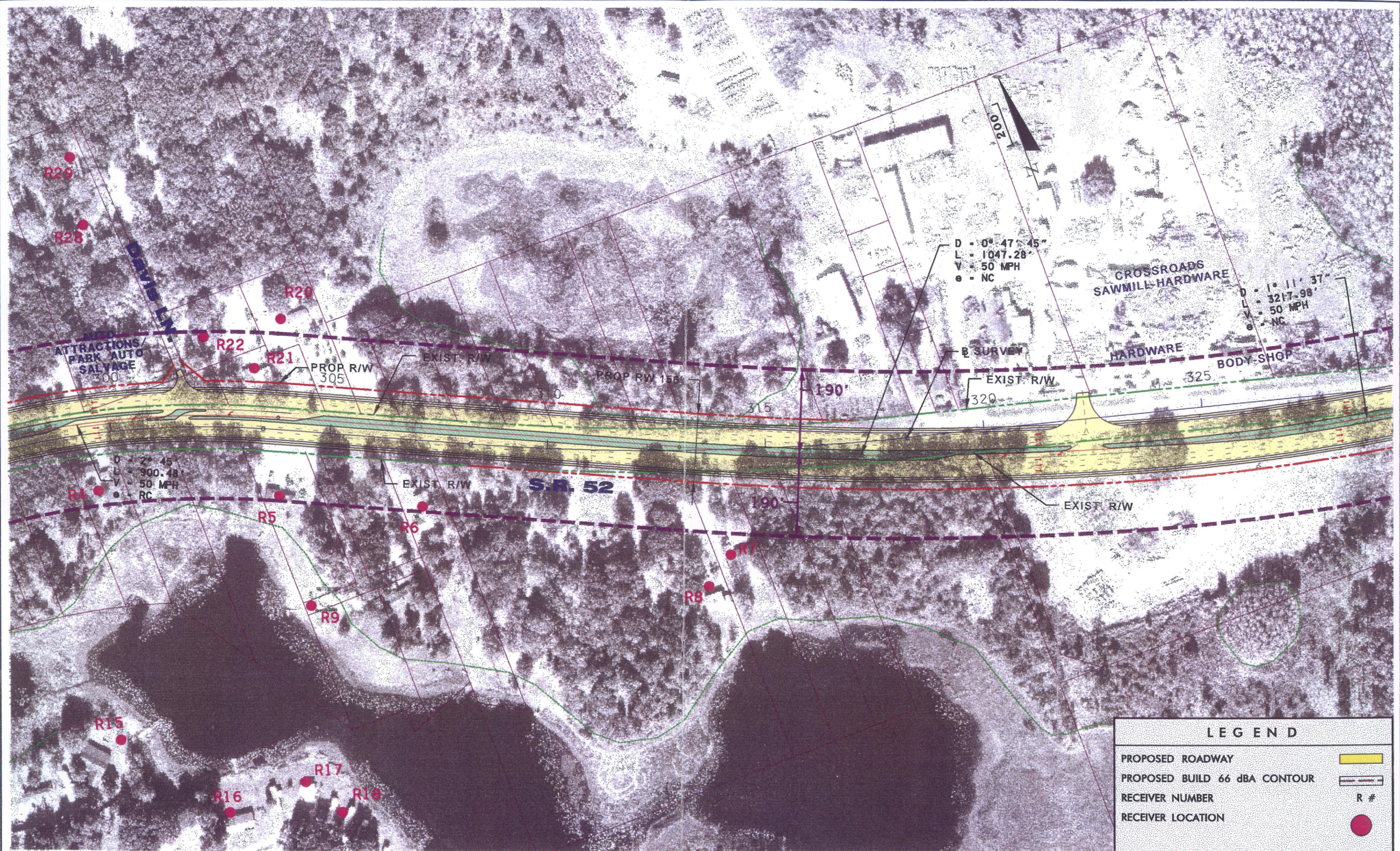
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PROPOSED ROADWAY

PROPOSED BUILD 66 dBA CONTOUR

RECEIVER NUMBER

RECEIVER LOCATION

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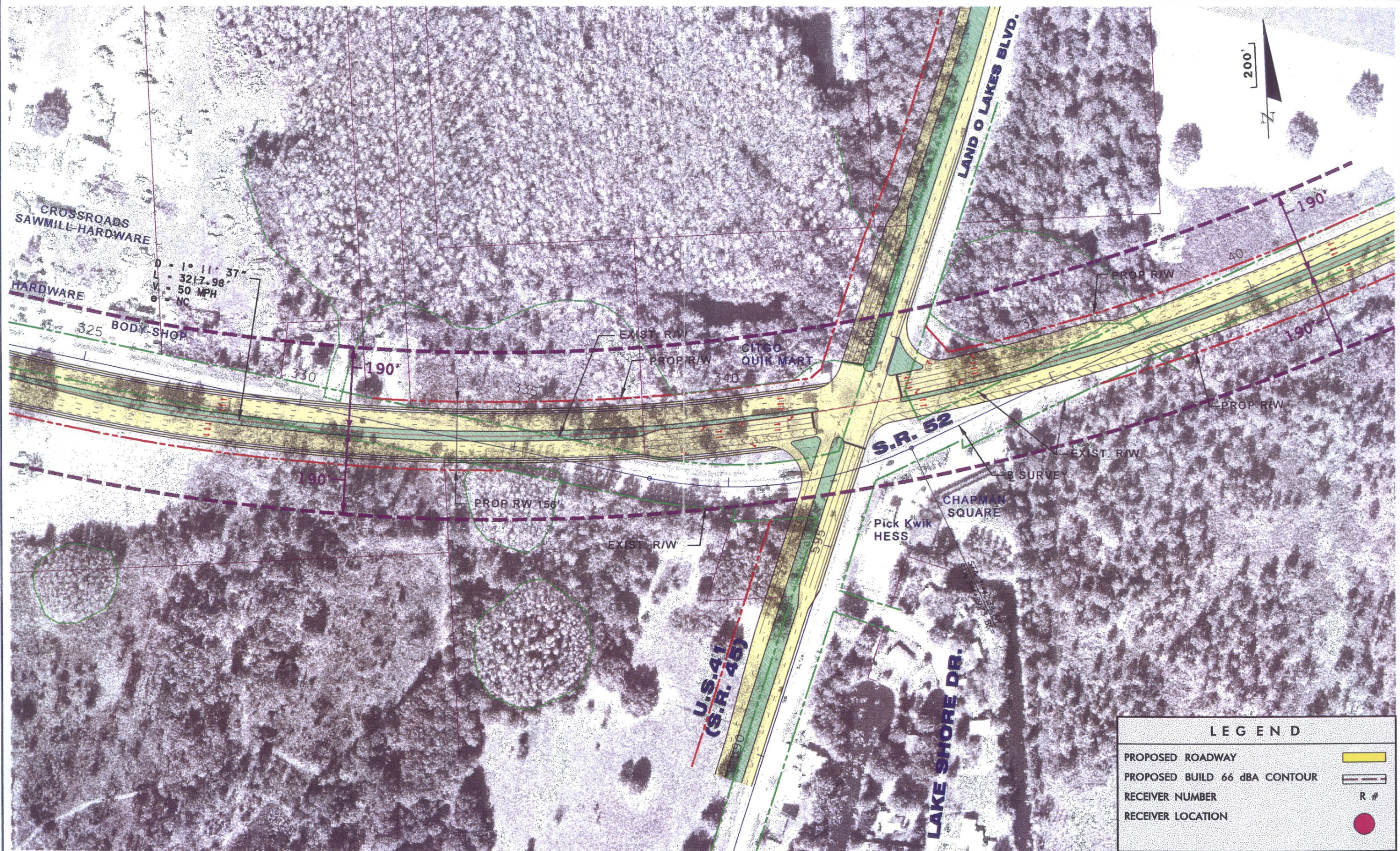
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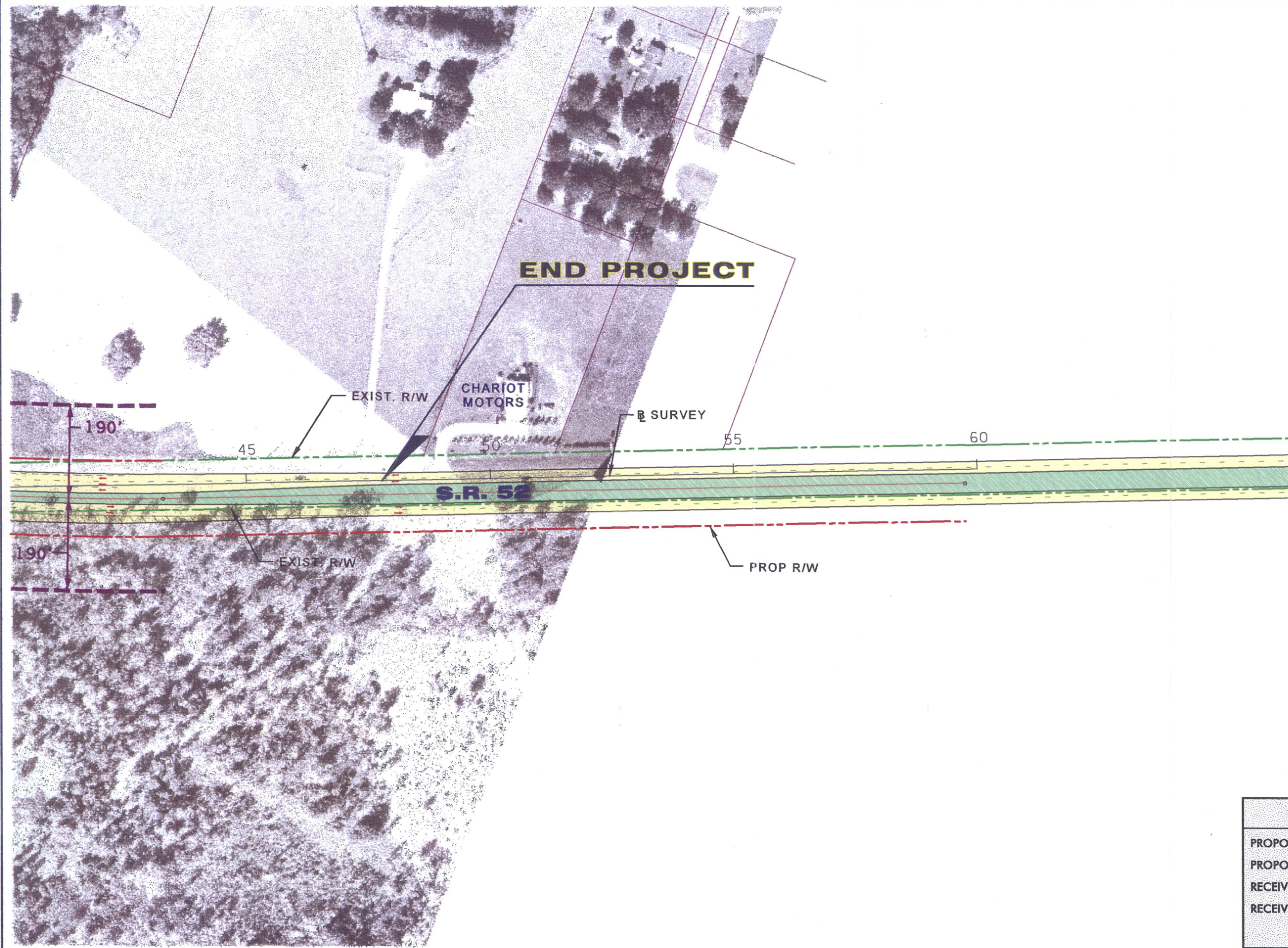
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