

66th Street Multi-Laning Project  
Noise Study Report  
Pinellas County, Florida

State Project Number 15060-1517  
W.P.I. Number 7117063  
F.A.P. Number M-1427(11)

Prepared For: Florida Department of Transportation  
District Seven  
4950 West Kennedy Boulevard  
Tampa, Florida 33609

June, 1992

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June, 1992

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## **I. INTRODUCTION**

### **A. Purpose of Report**

This report has been prepared to describe the noise analysis conducted in conjunction with the 66th Street (S.R. 693) multi-laning project in Pinellas County. The 66th Street improvement project, as adopted in the Pinellas County Long Range Highway Plan, will modify the existing four-lane, rural cross section which will not sufficiently meet future traffic demands.

Measures required to minimize noise impacts, where necessary or appropriate, have been investigated and are documented in this report. This document also contains computer-generated noise-level isopleth lines to assist local governments in making decisions related to land development along 66th Street. The format and content of this report are based on the procedures established in 23 CFR 772.

### **B. Project Description**

The 1.6 mile project corridor extends south from Ulmerton Road to Bryan Dairy Road. The project is located in the Cities of Largo and Pinellas Park in Pinellas County, Florida (See Figure 1, Project Location Map).

The existing 66th Street four-lane, rural cross section, divided facility will be upgraded to a six-lane, urban cross section, divided facility. The upgrading of the existing facility will be accommodated within the existing 182 feet to 200 feet right-of-way.

Figure 2 shows the project typical section under consideration.

## **II. NOISE STUDY**

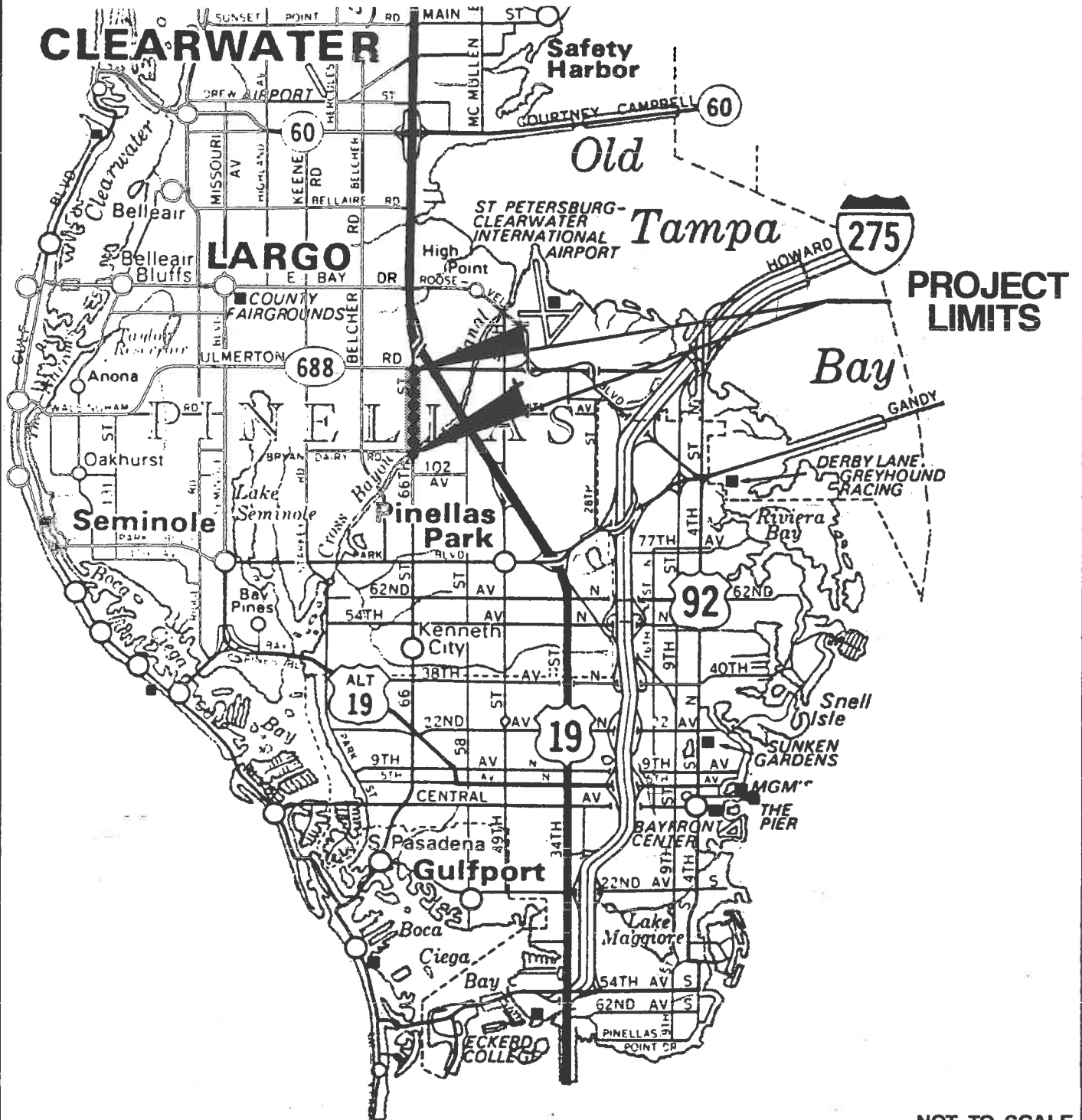
### **A. Land Use**

Land use adjacent to 66th Street, from Ulmerton Road to Bryan Dairy Road is predominantly community commercial and light industrial. Two mobile home parks, a recreational vehicle park and an apartment complex are adjacent to 66th Street, between 118th Street and 126th Street.

### **B. Noise Sensitive Sites**

An analysis was conducted to estimate the impact the proposed project would have on the noise environment. First, sensitive noise receptor sites along the project corridor were identified from field reviews and aerial photography

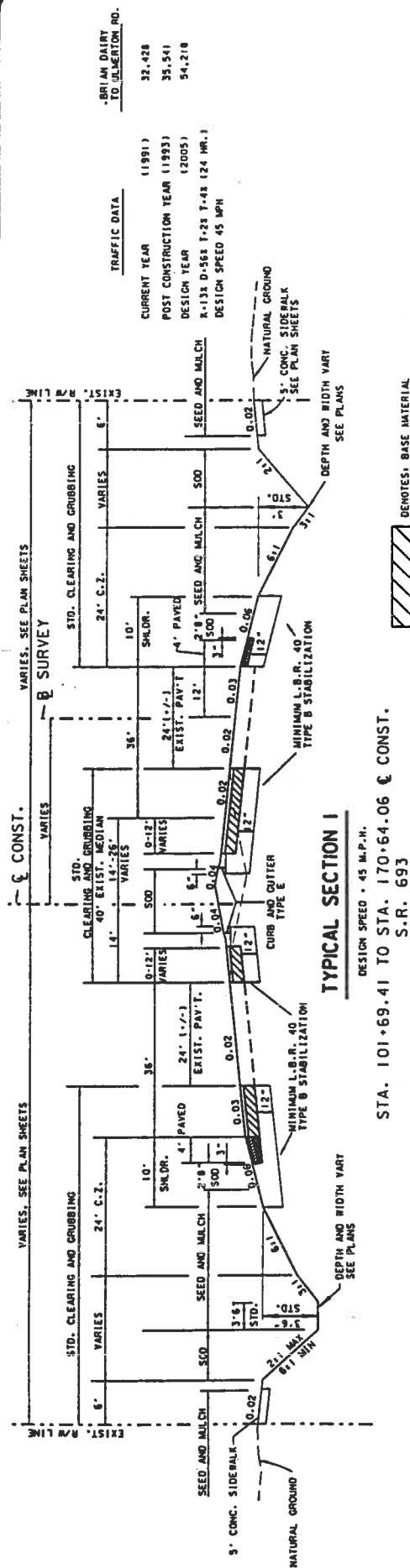
F.A.P. No. M-1427(11)  
State Project No. 15060-1517  
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**PINELLAS COUNTY**  
**66TH STREET (ALTERNATE 19A)**



POST, BUCKLEY, SCHUH & JERNIGAN, INC.

**PROJECT LOCATION MAP**

**FIGURE 1**



**DENOTES: BASE MATERIAL**

SEE NOTE 6

## TYPICAL SECTION I

DESIGN SPEED • 45 M.P.H.  
STA. 101+69.41 TO STA. 170+64.06 € CONST.  
S.R. 693

## MILLING

MILL EXISTING ASPHALTIC PAVEMENT (1.5" AVERAGE DEPTH)

## RESURFACING

TYPE S STRUCTURAL COURSE (100 LBS/SY) AND FRICTION COURSE FC-1 OR FC-4 (1")

## WIDENING

OPTIONAL BASE GROUP 9 (FOR THICKNESS SEE BELOW) WITH TYPE S STRUCTURAL COURSE (300 LBS/SY) AND FRICTION COURSE FC-1 OR FC-4 (1")

| <u>OPTIONAL BASE COURSES PERMITTED</u> | <u>OPTIONAL CODES</u> |
|--|-----------------------|
| 10" LIMEROCK (LBR 100)                 | 990                   |
| 6" ABC-3 (MIN MARSHALL STAB. 1000)     | 327                   |

## SHOULDER PAVEMENT

OPTIONAL BASE GROUP 16 (FOR THICKNESS SEE BELOW) WITH TYPE S STRUCTURAL (100 LBS/SY) AND FRICTION COURSE FC-1 OR FC-4 (1")

| <u>OPTIONAL BASE COURSES PERMITTED</u> | <u>OPTION CODES</u> |
|--|---------------------|
| 4" LINEROCK (LER 100)                  | 981                 |
| 3" ABC-3 (MIN. MARSHALL STAB. 1000)    | 606                 |
| 5" RAP BASE                            | 631                 |

STANDARD NOTES.....

1. ALL GRASS AREAS ARE TO RECEIVE A 6" TOPSOIL TREATMENT.
2. NONE OF THE EXISTING LINEROCK BASE THAT IS REMOVED IS TO BE USED IN THE CONSTRUCTION OF THE NEW LINEROCK BASE.
3. ALL OF THE EXISTING LINEROCK BASE THAT IS REMOVED IS TO BE INCORPORATED IN THE STABILIZED PORTION OF THE SURGRADE.
4. ONLY ONE DENSE GRADED FRICTION COURSE (FC-1 OR FC-4) IS TO BE USED THROUGHOUT THE LIMITS OF THE PROJECT.
5. ACTUAL WIDTH OF BASE WIDENING MAY VARY DUE TO ACTUAL EXISTING PAVEMENT WIDTH. CONTRACTOR MAY ELECT TO PLACE UNIFORM WIDTH BASE WIDENING STRIP AT NO ADDITIONAL COST.
6. LINEROCK SHOULDERS AT THE CONTRACTOR'S OPTION. THIS AREA MAY BE CONSTRUCTED OF BASE MATERIAL AT NO ADDITIONAL COMPENSATION.
7. TRANSVERSE SLOPE CONTROL SHALL BE USED ON THE OVERBUILD COURSE AND THE STRUCTURAL COURSE.
8. THE CONTRACTION SHALL PLACE 500 ON ALL SLOPES GREATER THAN 3:1.
9. THE CONTRACTOR IS ALERTED TO THE FACT THAT THE USE OF PREMIED STABILIZATION MAY BE NECESSARY ON THIS PROJECT.



evaluations. Sensitive receptors may include residential sites and parks, schools, hospitals and other land uses where quiet is important for normal activities. These land use categories are shown as Category B on Table 2. Where more than one sensitive receptor site was clustered together, a sample site closest to the noise source was made representative of the group.

Next, the project corridor was analyzed in three separate sections according to existing and future differences in vehicle traffic demand and the resulting noise levels:

1. Ulmerton Road to 126th Avenue.
2. 126th Avenue to 118th Avenue.
3. 118th Avenue to Bryan Dairy Road.

Four sensitive receptor sites were located between 118th Avenue and 126th Avenue, each representing a number of dwelling units. No other sensitive receptors were located within the project corridor. A description of the selected receptors and their locations are provided in Table 1. Figure 3 illustrates the receptor locations in the project corridor.

**TABLE 1**  
**REPRESENTATIVE NOISE RECEPTORS**

| <u>NOISE<br/>RECEPTOR<br/>SITE</u> | <u>LAND<br/>USE</u>                              | <u>DESCRIPTION</u>  |
|------------------------------------|--|---|
| 1                                  | Dwelling Units<br>(Recreational<br>Vehicle Park) | Between 118th Street and 126th Street. East side of 66th Street. 40 feet from existing/proposed right-of-way. |
| 2                                  | Dwelling Units<br>(Apt. Complex)                 | Between 118th Street and 126th Street. West side of 66th Street. 40 feet from existing/proposed right-of-way. |
| 3                                  | Dwelling Units<br>(Apt. Complex)                 | Between 118th Street and 126th Street. West side of 66th Street. 40 feet from existing/proposed right-of-way. |
| 4                                  | Dwelling Units<br>(Mobile Home<br>Park)          | Between 118th Street and 126th Street. West side of 66th Street. 10 feet from existing/proposed right-of-way. |

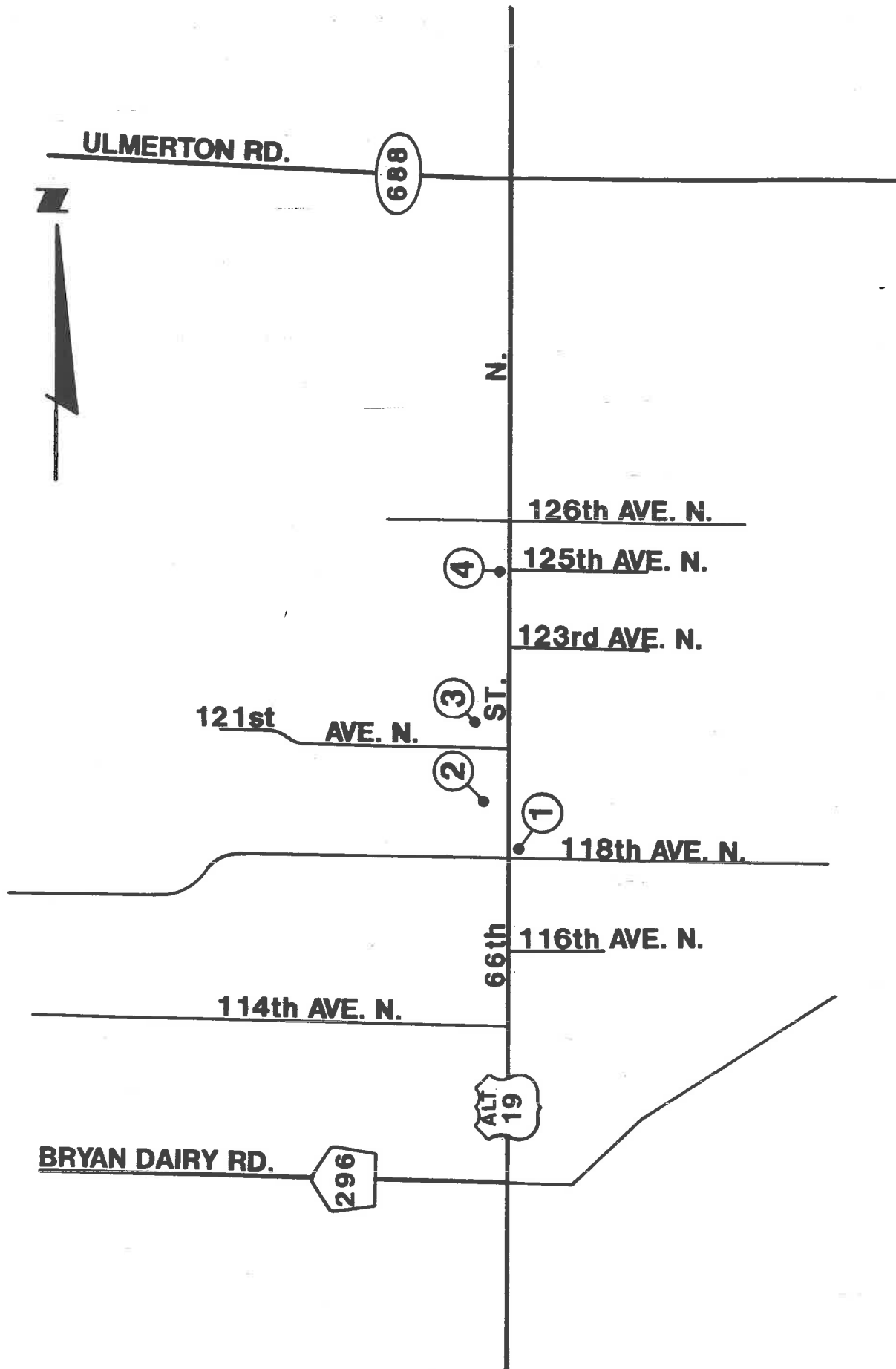


FIGURE  
3

66th STREET  
NOISE RECEIVER LOCATIONS

### C. Prediction Methods

Future noise levels along the project corridor were calculated using the STAMINA 2.0 computer model. The computer model was used to predict noise levels for the Existing, 2010 No-Build and 2010 Build project alternatives.

Existing noise level measurements were recorded along the project corridor in accordance with FHWA guidelines contained in Report No. DP-45-1R, "Sound Procedures for Measuring Highway Noise: Final Report." Existing noise levels were measured in the field using a Metrosonics db-308 sound level dosimeter/analyzer, and then compared against STAMINA 2.0 model predictions to validate the accuracy of the computer model. The STAMINA 2.0 model was found to accurately reflect the actual noise measurements, within 3 dBA, along the project corridor and was, therefore, considered valid for future projections.

All noise levels are expressed in decibels on the "A" scale. This scale most closely approximates the response characteristics of the human ear for low-level sound. All noise levels are reported as Leq (h) values which theoretically contain the same amount of acoustic energy as the actual time varying, A-weighted sound level over a period of one hour. Table 2 describes the design noise level and activity category relationships referenced in 23 CFR 772. The sensitive receptors used in the analysis are shown as land use Category B in Table 2.

Abatement criteria were determined by examining the language of 23 CFR Part 773. It states that abatement must be considered when noise levels are projected to approach (within 2 dBA) or exceed 67 dBA for land use category B, or when receivers are projected to experience a substantial increase over existing noise levels. A substantial increase was defined through the development of Figure 4. As seen in Figure 4, a substantial increase in noise levels is indicated when existing and predicted noise levels differ by 10 to 15 dBA. However, an increase is not considered substantial unless the predicted future noise level is at least 57 dBA.

**TABLE 2**

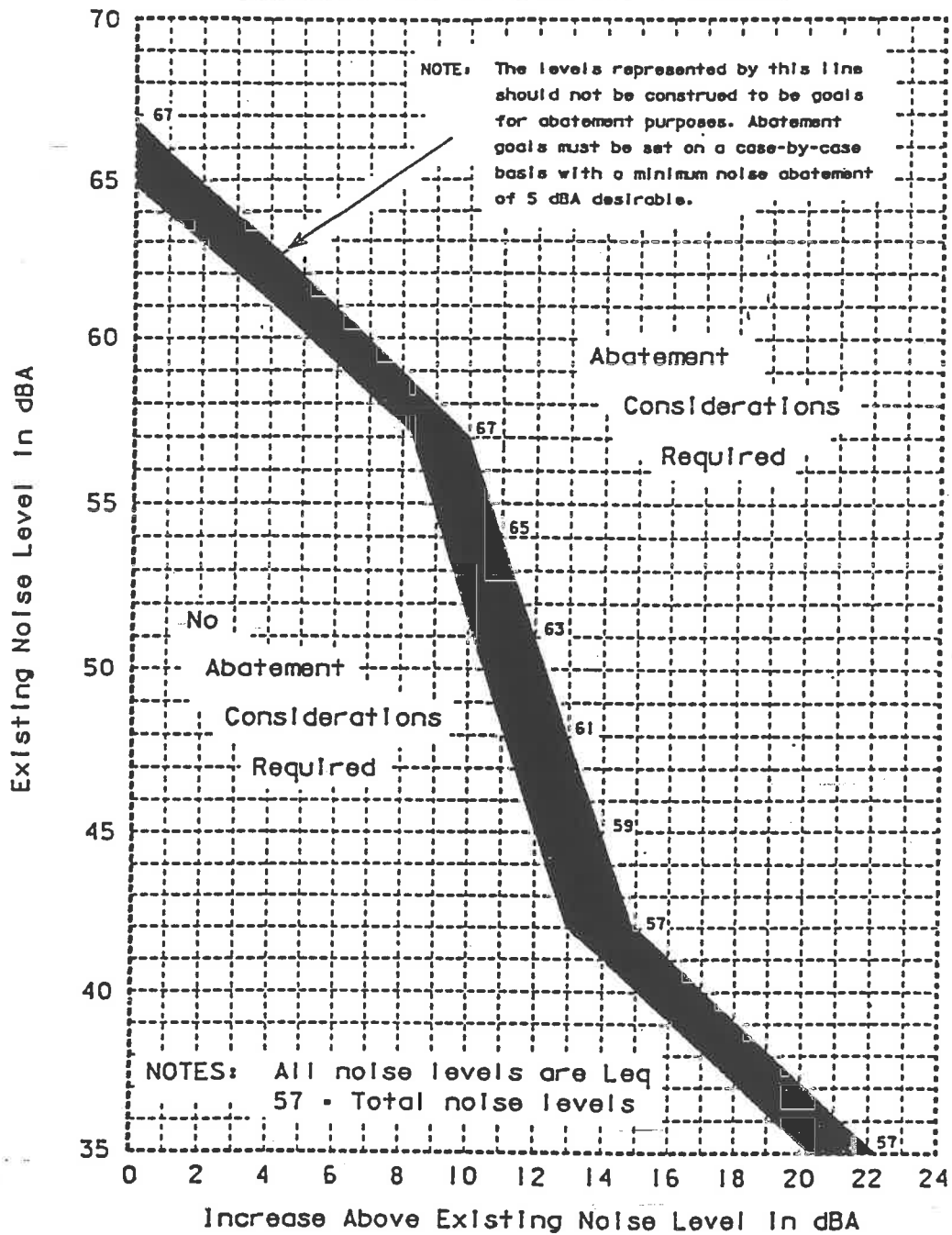
**DESIGN NOISE LEVEL/ACTIVITY CATEGORY RELATIONSHIPS**

**Hourly A-Weighted Sound Level in Decibels**

| <u>Category</u> | <u>Leq(h)</u> | <u>Description of Activity</u>   |
|-----------------|---------------|--|
| 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 purposes. |
| B               | 67 Exterior   | Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.  |
| C               | 72 Exterior   | Developed lands, properties, or activities not included in Categories A or B.  |
| D               | —             | Undeveloped lands.   |
| E               | 52            | Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.  |

SOURCE: 23 CFR 772

# ABATEMENT CRITERIA ACTIVITY CATEGORY B




 - Approaching Abatement Criteria  
 (abatement considerations normally required)

**66th STREET  
NOISE ABATEMENT CRITERIA**

**FIGURE 4**

#### **D. Traffic Data**

Vehicle traffic data input to the STAMINA 2.0 model to predict existing and future traffic noise levels were provided by FDOT. The traffic data represent the project demand peak-hour volume, or the highest LOS C peak-hour service volume, whichever is less. Vehicle speeds were calculated based on 1985 Highway Capacity Manual (HCM) procedures. The traffic data represent the varying conditions between the primary intersections in the corridor. The traffic volumes input to the STAMINA 2.0 models are presented in the Appendices. The peak-hour, peak-directional traffic volumes are input to STAMINA 2.0 so that the highest traffic volumes (worst case) are located on the same side of the road as the sensitive noise receivers.

#### **E. Noise Level Isopleths**

The STAMINA 2.0 model was used to estimate the distance from the project roadway at which 65 dBA and 67 dBA occur. The noise-level distances were then plotted as contours (isopleths), reflecting varying traffic and noise levels along the project corridor. The receptors which were within the contour lines were considered for noise abatement.

From Ulmerton Road to Bryan Dairy Road, for the build scenario, the 65 dBA contour line is 20 feet outside of the existing/proposed right-of-way. The 67 dBA contour line is 10 feet inside the existing/proposed right-of-way. Appendix 9 contains the aerial graphic depicting the noise level contours.

#### **F. STAMINA Noise Analysis**

Noise levels throughout the project corridor were calculated using the STAMINA 2.0 model for Existing, No-Build, and Build scenarios. Under the Existing and No-Build scenarios, noise levels will not approach (within 2 dBA) the FHWA 67 dBA criteria for abatement. Under the Build scenario, Receiver 1, a recreation vehicle park north of 118th Avenue, and Receiver 4, the mobile home park south of 126th Avenue, approach the FHWA criteria for abatement at 65 dBA, but will not exceed 67 dBA. A barrier analysis was therefore necessary for Receivers 1 and 4.

The results of the STAMINA 2.0 analysis are shown on Table 3 below. The STAMINA 2.0 computer worksheets are provided in the Technical Appendix.

**TABLE 3**

**STAMINA 2.0 ANALYSIS**

| <u>SCENARIO</u>   | <u>RECEIVER</u> | <u>LEQ</u> |
|-------------------|-----------------|------------|
| Existing/No-Build | R1              | 62 dBA     |
|                   | R2              | 62 dBA     |
|                   | R3              | 62 dBA     |
|                   | R4              | 64 dBA     |
| Build             | R1              | 65 dBA     |
|                   | R2              | 64 dBA     |
|                   | R3              | 64 dBA     |
|                   | R4              | 65 dBA     |

**G. Barrier Analysis**

A barrier analysis was conducted for Receivers 1 and 4 using the OPTIMA barrier optimization computer program. The Technical Appendix contains the OPTIMA computer worksheets for review.

The barrier analysis for Receiver 1 indicates an adequate insertion loss (IL) of at least 5 dBA is not feasible. An IL of only .6 is obtained from a 12 foot barrier wall at Receiver 1.

The barrier analysis for Receiver 4 indicates that an insertion loss of at least 5 dBA is obtainable. The results of the barrier analysis for Receiver 4 is shown below. Receiver 4 represents 4 dwelling units.

**TABLE 4**

**ANALYSIS OPTIMA BARRIER**

**RECEIVER 4**

|                       |          |          |          |          |          |
|-----------------------|----------|----------|----------|----------|----------|
| Barrier Heights (Ft.) | 6        | 8        | 10       | 12       | 14       |
| Insertion Loss (IL)   | 2.8      | 4.6      | 5.9      | 6.5      | 6.8      |
| Cost                  | \$12,600 | \$16,800 | \$21,000 | \$25,200 | \$29,400 |
| Cost/Receiver         | \$ 3,150 | \$ 4,200 | \$ 5,250 | \$ 6,300 | \$ 7,350 |

## **H. Noise Analysis Conclusions**

The Florida Department of Transportation is committed to the construction of feasible noise abatement measures at the noise-impacted location identified as Receiver 4 and contingent upon the following conditions:

- Detailed noise analyses during the final design process supports the need for abatement;
- Reasonable cost analyses indicates that the economic cost of the barrier(s) will not exceed the guidelines found below;
- Community input regarding desires, types, heights, and locations of barriers has been solicited by the District;
- Preferences regarding compatibility with adjacent land uses, particularly as addressed by officials having jurisdiction over such land uses has been noted;
- Safety and engineering aspects as related to the roadway user and the adjacent property owner have been reviewed; and
- Any other mitigating circumstances have been analyzed.

Based on the noise analyses performed to date, there appears to be no apparent solutions available to mitigate the noise impacts at the location identified as Receiver 1. If, during the final design phase, any of the contingency conditions listed above cause abatement to be considered reasonable or feasible for a given location(s), such determination(s) will be made prior to requesting approval for construction advertisement. Commitments regarding the exact abatement measure locations, heights, and type (on approved alternatives) will be made before the construction advertisement is approved.

During the final design phase, exact barrier locations, heights, and types will be determined. Abatement commitments will be documented in the re-evaluation prior to construction advertisement.

## **III. CONSTRUCTION NOISE**

During the construction phase of the proposed project, short-term noise impacts, related to both stationary and mobile construction equipment, may occur. These impacts will be temporary at any one location.

Construction noise will be controlled on this project by adherence to the controls listed in the 1991 edition of the Florida Department of Transportation's "Standard Specifications for Road and Bridge Construction."



The FDOT Standard Specifications contain the following requirements for construction noise control:

- The contractor shall operate only factory-recommended exhaust mufflers on internal combustion engines.
- Adequate equipment maintenance procedures will be used to ensure the elimination of unnecessary noise on all construction equipment caused by loose body parts.
- Excessive tailgate banging by haul trucks will be prohibited.
- All stationary equipment shall be screened from noise sensitive receivers if that equipment is to operate beyond normal working hours. If it is feasible, this equipment shall be screened during normal working hours to reduce noise impacts.
- The contractor shall establish haul routes which will direct vehicles away from developed areas when feasible, and ensure that noise from hauling operations is kept to a minimum.

Specific noise impact problems that may arise during construction of the project will be addressed by the FDOT Construction Engineer in cooperation with the appropriate District Environmental Specialist.

#### **IV. COORDINATION WITH LOCAL OFFICIALS**

In accordance with 23 CFR 772, FDOT will take measures that are prudent and feasible to assure that the location and design of highways are compatible with existing and planned land uses. To accomplish this goal, FDOT will cooperate with local officials by furnishing appropriate generalized future noise levels for both developed and undeveloped lands or properties in the immediate vicinity of the project.

**APPENDIX I**  
**FLAMOD CONTOURS**

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