PART C

NOISE ANALYSIS REPORT

The Technology Group

May 6, 2005

Noise Analysis Report

Southside Drive Improvements: New Cut Road to Strawberry Lane

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Noise Report
Southside Drive Improvements

This report addresses the effects of traffic-generated noise which can be expected to occur due to the widening of Southside Drive from its intersection with New Cut Road northward to its intersection with Strawberry Lane/Thalia Lane. The analysis contained herein was performed in compliance with 23 USC Section 109(h) and (i), the Federal Highway Administration (FHWA) guidelines for the assessment of highway traffic-generated noise. These guidelines, published as Part 772 of Title 23 of the Code of Federal Regulations, provide procedures to be followed in conducting noise analyses that will protect the public health and welfare. In addition, the analysis was performed in accordance with the Kentucky Transportation Cabinet (KYTC) Highway Traffic Noise Policy.

Both 23 CFR 772 and the KYTC policy require the use of the equivalent sound level, Leq, as the descriptor for highway noise. Leq is an energy average level, and is similar to an average value. It is measured in A-weighted decibels, dBA. The following sections address each specific requirement of both FHWA and KYTC policies.

1. Identification of Existing Activities or Land Uses Which May Be Affected By Noise From the Highway

Land use in the corridor was determined by field investigation on May 4, 2005, and review of aerial mapping. Currently, land use along the project corridor is predominantly commercial on the northern portion of the corridor, with the exception of the Epiphany United Methodist Church. South and west of the intersection with National Turnpike, land use becomes predominantly residential, with a number of single and multi-family residences abutting Southside Drive. Also located in the

project corridor are the following specific noise sensitive sites: Epiphany United Methodist Church; Southside Christian Child Care; St. Mark's Lutheran Church; First Vietnamese Baptist Church; Auburndale Park; Seventh Day Adventist Church; and Our Lady of Mt. Carmel Catholic Church.

2. Determination of Ambient Sound Levels for Existing Activities or Developed Land Uses

Existing sound levels adjacent to the project are dominated by traffic from the existing Southside Drive. Therefore, in accordance with 23 CFR 772, existing sound levels at sensitive receptors were determined by modeling the existing roadway geometry and traffic configuration. The FHWA Highway Traffic Noise Model, TNM 2.5, was used for this purpose. Input to the model includes existing roadway geometry, traffic volumes, vehicle speed, and truck percentage.

Existing traffic volumes are consistent from New Cut Road to National Turnpike, at which point they increase substantially. Therefore the corridor was divided into two sections, one from New Cut Road to National Turnpike, and the other from National Turnpike to Strawberry Lane/Thalia Lane.

Because all sensitive receptors are located at different distances from the roadway centerline, modeled sound levels were plotted on a log-normal graph, and can be used to determine the sound levels at any distance. Existing sound levels for Section 1 and Section 2 are contained in Table 1, and illustrated in Figure 1 and Figure 2, respectively.

Table 1 shows that existing Leq values in Section 1 range from 53 to 63 dBA, and 62 to 67 dBA in Section 2. These numbers are typical of those found in an urban area which has extensive commercial development in the vicinity. It should

be noted that there are only six residential structures in Section 2 that abut Southside Drive.

Location/Description	Leq (dBA)
Section 1	
Mt. Carmel Catholic Church	63
Seventh Day Adventist Church	53
First Vietnamese Baptist Church	59
Auburndale Park (tennis court)	62
St. Mark's Lutheran Church	61
Southside Christian Child Care	62
Single family residences (60-110 ft. from centerline)	60-63
Multi-family residences (50-70 ft. from centerline)	61-64
Section 2	
Epiphany United Methodist Church	62
Single family residences (50-70 ft. from centerline)	65-67

Table 1: Existing Sound Levels

3. Prediction of Future Traffic Noise Levels

Traffic-generated noise levels under the future build condition along the study corridor were also calculated using the FHWA Highway Traffic Noise Model, TNM 2.5, for the design year (2029). Input to the model includes future roadway geometry, traffic volumes, vehicle speed, and truck percentage.

Future traffic volumes are also consistent from New Cut Road to National Turnpike, at which point they increase substantially. Therefore the same sections as used for the existing condition are used here (one from New Cut Road to National Turnpike, and the other from National Turnpike to Strawberry Lane/Thalia Lane).

Widening of the existing Southside Drive is assumed to be symmetrical about the existing centerline. Again, all sensitive receptors will be located at different distances from the roadway centerline. Therefore, modeled sound levels were

plotted on a log-normal graph, which can be used to determine the sound levels at any distance. Future sound levels for Section 1 and Section 2 are contained in Table 2, and illustrated in Figure 1 and Figure 2, respectively.

4. Comparison of Predicted Traffic Noise Levels with Existing Noise Levels and with Noise Abatement Criteria

Two methods are used for determining a noise impact. The first is a comparison of predicted noise levels with the Noise Abatement Criteria (NAC) established by 23 CFR Part 772. A 67 dBA Leq criterion has been established for schools, libraries, residences, churches, playgrounds and recreational areas. Any predicted noise level that "approaches or exceeds" the applicable NAC is considered an impact. The KYTC policy defines "approach" as one dBA below the appropriate NAC, or 66 dBA for the noise sensitive land use in this corridor.

At sites where no significant exterior activity occurs, the interior NAC is applied (52 dBA Leq). In this case, an exterior to interior reduction in noise levels of 25 decibels would be assumed, resulting in an exterior noise level of 76 dBA Leq (one dBA below the NAC of 52 dBA) being required to produce an impact. This situation would apply, for example, to school buildings.

The second method of predicting noise impacts involves comparing existing noise levels in the project corridor with predicted levels for the future build condition. According to 23 CFR 772, an impact results if a "substantial increase" over existing levels occurs. The KYTC policy defines "substantial increase" as 10 dBA or more. Therefore, any receivers experiencing an increase of 10 dBA or more would be considered impacted.

Table 2 shows that future Leq values for Section 1 range from 56 to 65 dBA.

Figure 1 demonstrates that a sound level of 66 dBA would occur at less than 50 feet from the centerline of the proposed facility. In addition, Table 2 demonstrates that future sound levels can be expected to increase from 1 to 3dBA. Therefore, no noise sensitive receptors in Section 1 will be impacted.

Table 2 also shows that future sound levels for Section 2 range from 65 to 69 dBA. Examination of the project corridor shows that six single family residences, located northwest of Southside Drive, will experience sound levels that approach or exceed the NAC of 67 dBA in the design year of 2029. In addition, Table 2 also shows that sound levels can be expected to increase by 1 to 3 dBA throughout the project for the build condition, and 0 to 2 dBA for the no-build condition.

Location	Existing Sound Level (dBA)	Future Sound Level (dBA)		Change	
		Build	No-Build	Build	No-Build
Section 1					
Mt. Carmel Catholic Church	63	64	64	+1	+1
Seventh Day Adventist Church	53	56	54	+3	+1
First Vietnamese Baptist Church	59	60	59	+1	0
Auburndale Park (tennis court)	62	63	63	+1	+1
St. Mark's Lutheran Church	61	62	62	+1	+1
Southside Christian Child Care	62	63	63	+1	+1
Single family residences (60-110 ft. from centerline)	60-63	61-64	60-64	+1	+1
Multi-family residences (50-70 ft. from centerline)	61-64	62-65	61-65	+1	+1
Section 2					
Epiphany United Methodist Church	62	65	64	+3	+2
Single family residences (50-70 ft. from centerline)	65-67	67-69	66-69	+2	+(1-2)

Table 2: Comparison of Future to Existing Sound Levels

5. Examination and Evaluation of Alternative Noise Abatement Measures

In accordance with 23 CFR Part 772, alternative noise abatement measures for reducing or eliminating noise impacts along the proposed corridor were evaluated for all noise sensitive sites which were determined to be impacted. Among the types of abatement considered were the following:

a. Abatement Barriers - Among the most common are earth berms and free-standing walls. These kinds of abatement measures would not be feasible for this project because there would not be full control of access. Openings required for points of access (e.g. driveways, cross streets) would render a barrier ineffective.

b. Acquisition of Rights-of-Way - The acquisition of rights-of-way to create buffer zones would result in disruptive relocations.

c. Traffic Management - Measures such as traffic control devices and signing for prohibition of certain vehicle types, time-use restrictions for certain vehicle types, and modified speed limits would prevent the project from serving its intended purpose. Exclusive lane designations would be inappropriate for a project of this scope and would not reduce traffic noise levels.

d. Alteration of Horizontal and Vertical Alignments Alignment modifications as a means of noise abatement would be infeasible for this project.

6. Construction Noise

Although temporary in nature, construction noise can, at times, interfere with day-to-day activities. Construction equipment should be required to have factory-installed mufflers or their equivalents in good working order during the life of

the construction contracts, and construction, where feasible, should take place primarily during the less noise sensitive daylight hours to avoid impacts during the hours associated with sleep.

7. Summary

The construction of this project would result in a 1 to 3 decibel increase in traffic generated noise throughout the corridor. (It should be noted that increases of 3 dBA or less are not considered to be perceptible by humans.) There would be six single family residences impacted under the build condition northwest of Southside Drive between National Turnpike and Strawberry Lane. Noise abatement for the impacted sites was considered. However, no feasible and reasonable abatement measures were identified for the impacted sites.

Figure 1: Noise-Distance Graph
New Cut to National Turnpike

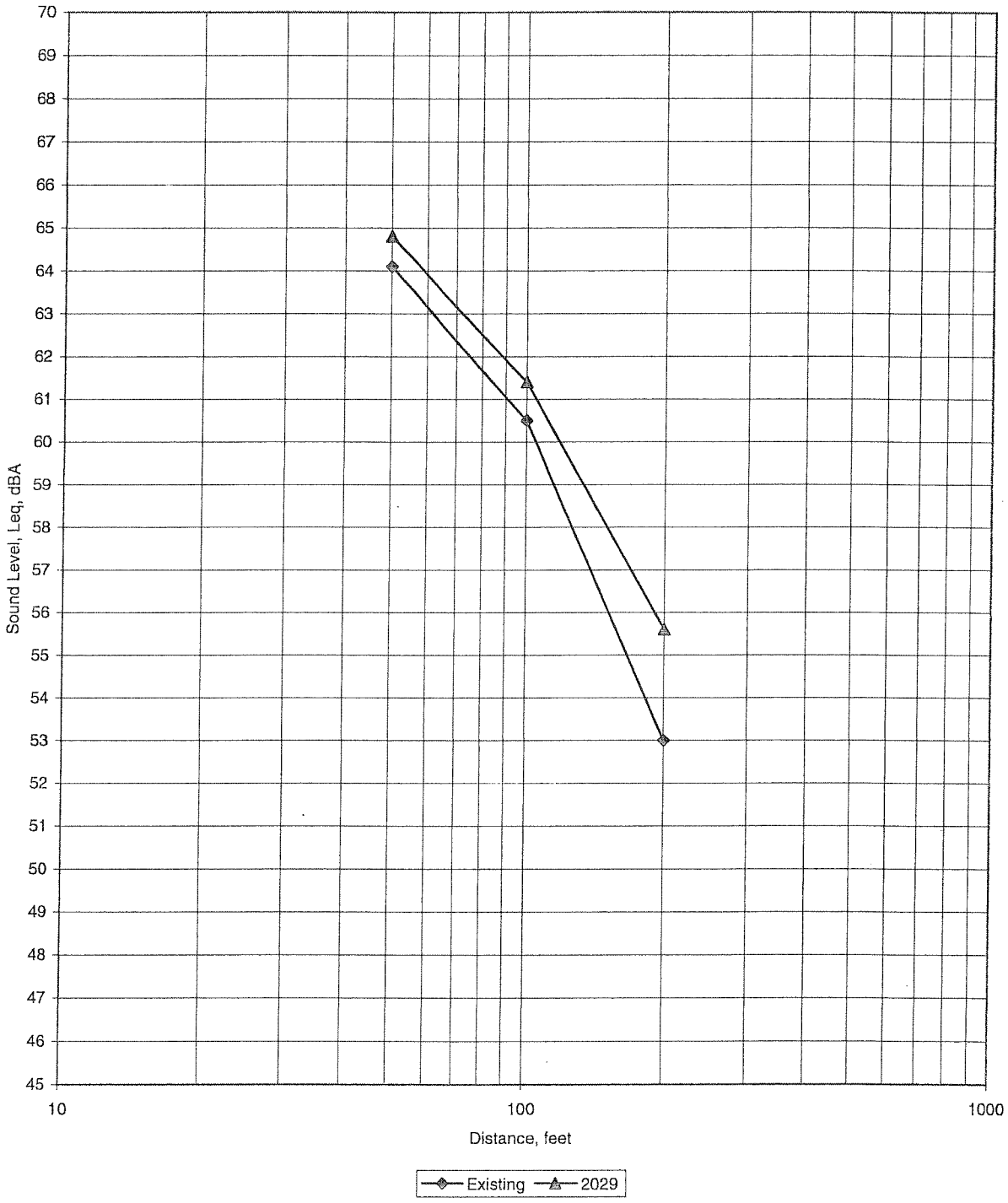

Figure 2: Noise-Distance Graph
National Turnpike to Strawberry Lane