Exhibit E

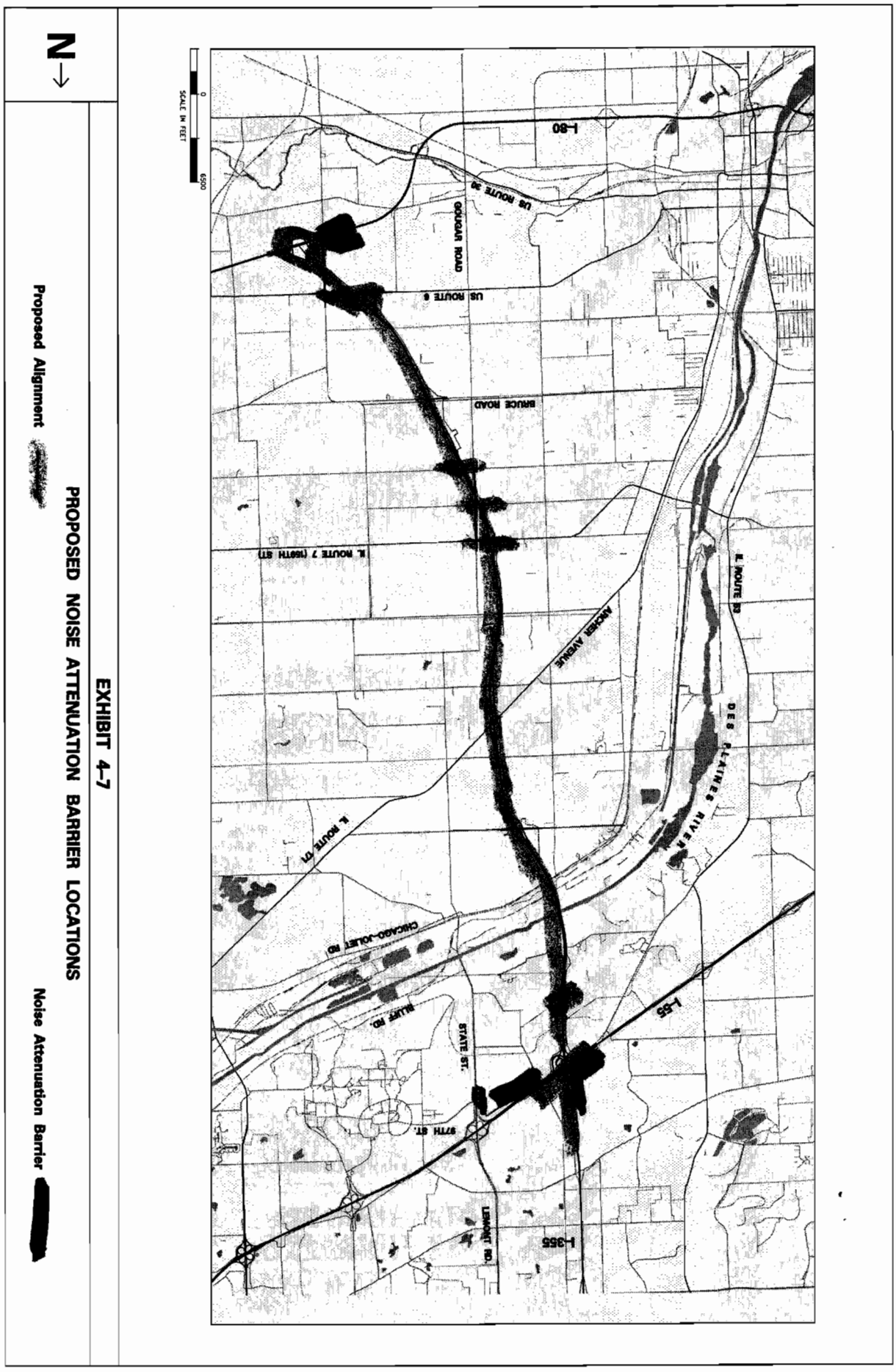
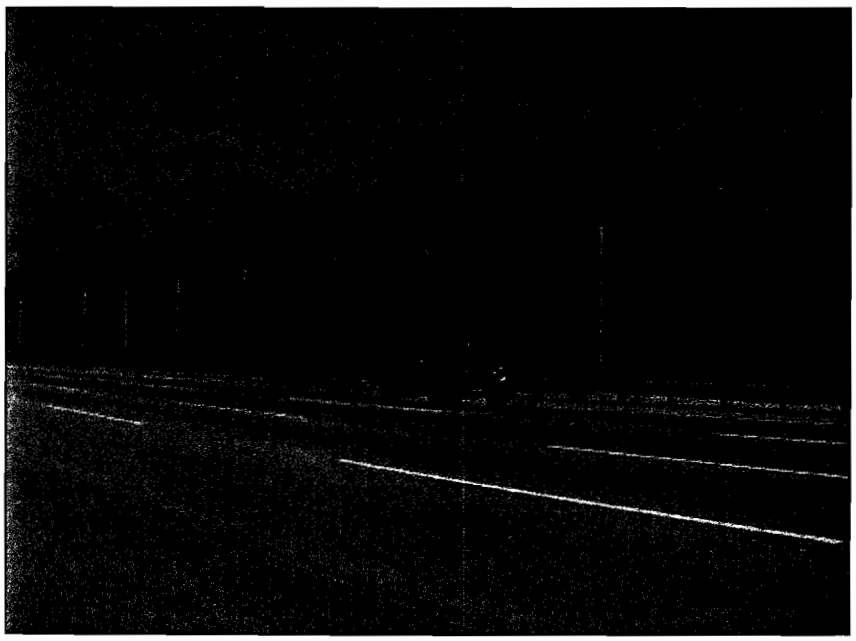

N
SCALE IN FEET
0
6500
I-80
US ROUTE 30
COUGAR ROAD
US ROUTE 6
BRUCE ROAD
IL ROUTE 7 (159TH ST)
ARCHER AVENUE
IL ROUTE 83
DES PLAINES RIVER
IL ROUTE 171
CHICAGO-JOLIET RD
BLUFF RD.
STATE ST.
I-55
97TH ST.
LEMONT RD.
I-355
EXHIBIT 4-7
PROPOSED NOISE ATTENUATION BARRIER LOCATIONS
Proposed Alignment
Noise Attenuation Barrier

 Exhibit F

I-355 South Extension (FAP 340)
Traffic Noise Analysis Reevaluation
Technical Report



August 10, 2005

Illinois Tollway
Open Roads for a Faster Future

HDR

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I. INTRODUCTION

The Interstate Route 355 (I-355) South Extension project includes 12 miles of expressway on new alignment in Cook, DuPage, and Will Counties. Exhibit A shows a project location map. The project is a divided interstate highway, which will extend the existing I-355 south from Interstate Route 55 (I-55) to Interstate Route 80 (I-80). The project includes the construction of one toll plaza (located between 167th Street and Bruce Road) and six interchanges (I-55, 127th Street, Archer Avenue to 143rd Street, 159th Street (Illinois Route 7), U.S. Route 6, and I-80).

A traffic noise analysis was conducted for the I-355 South Extension project during the Environmental Impact Statement (EIS) process. The original studies were initiated for the Final Environmental Impact Statement (FEIS) in 1993 and the Supplemental Final Environmental Impact Statement (SFEIS) in 1999. The results of these studies recommended six noise barriers along the proposed I-355 South Extension Corridor[1]. The total cost of these walls is approximately $5,649,000 (based on $25/sq-ft).

Subsequent changes in the design and traffic have made it necessary to reevaluate the recommended mitigation measures[2]. The purpose of the reevaluation is to incorporate the necessary changes, verify the mitigation committed to in the previous studies, and make minor adjustments to the design of the proposed noise walls (wall height, length, and placement along right-of-way) if necessary.

In addition to design and traffic volume changes, land use changes have occurred within the project area. Although land use changes that occurred after the publication of the SFEIS Notice of Intent (plats recorded with the County after April 1999) do not qualify for mitigation measures, the Tollway modeled the sensitive receptors to provide an understanding of their future noise levels. There are four new developments that would benefit from noise abatement. The Tollway is not responsible for the construction of traffic noise abatement walls for the new developments.

The reevaluation included the following tasks:

- Identify noise sensitive land use
- Model Future (2020) No-Action, Future (2020) Build, Future (2020) Build, and Future (2030) Build scenarios
- Determine traffic noise impacts on noise sensitive land uses
- Evaluate noise abatement measures (for those areas platted prior to April 1999)
- Develop recommendations

[1] Record of Decision (ROD), FHWA-IL-EIS-93-03-FS/4(f), February 25, 2002; Section V. Mitigation and Commitments, Noise (page10); as was identified in Draft SEIS, Section 4.13.

[2] *Ibid.* Section VI. Comments on the Final SEIS, Response to Will County Land Use Department, page 16.

II. CHANGES INCORPORATED IN THE TRAFFIC NOISE MODELS

Since the publication of previous noise studies for the I-355 South Extension project, changes in the design and traffic volumes have made it necessary to reevaluate the proposed mitigation measures. The changes are as follows:

- *Four-lane/six-lane cross-section.* Previous studies modeled six lanes of traffic along the South Extension. For the reevaluation, in addition to the six-lane configuration, a four-lane/six-lane configuration was modeled. The four-lane section was between I-80 and 127th Street, with the remaining corridor modeled as six lanes. This configuration reflexes the opening day of the South Extension.
- *Toll plaza.* The traffic noise models used in previous studies did not include a toll plaza. A toll plaza was included in the updated models. It was placed between 167th Street and Bruce Road. The toll plaza design included the Open Road Tolling (ORT) (three express I-PASS lanes and two manual lanes in each direction). Since traffic volumes were not available for the open road tolling design, it was assumed that 25-percent of the traffic would exit to use the manual lanes and that 75-percent of the traffic would remain on the mainline and use the express I-PASS lanes.
- *2030 Traffic volumes.* The traffic noise models of the FEIS used 2010 peak hour traffic volumes and those of the SFEIS used 2020 peak hour traffic volumes. Since the completion of these studies, projected 2030 traffic volumes have been provided by the Chicago Area Transportation Study (CATS). Based on a comparison, these volumes are generally lower than the 2020 peak hour traffic volumes. Because of this difference, both sets of traffic data were modeled so the worst-case scenario for the traffic noise would be addressed.

In addition, land use changes have occurred.

- *Land use.* Land use changes from what was evaluated in the EIS process were identified. These changes involved the conversion of land from open space to residential development. Although not qualified for noise mitigation measures (such as walls or berms), these locations were included in the future noise level modeling process.

III. METHODOLOGY

A. Identifying Noise Sensitive Land Use

Noise sensitive land use includes residential development, commercial development, churches, parks, and recreational facilities. These land uses were identified as part of the SFEIS. Noise sensitive land use changes were identified as part of the reevaluation. Although these new developments were platted after April 1999, identified in Table 1, they do not qualify for mitigation measures, their future noise levels were predicted based on available data. Table 1 summarizes the additional noise sensitive not qualifying land uses that are within 500 feet of the I-355 alignment and their respective new receptor ID. A complimentary technical memo August 10, 2005, Traffic Noise Analysis Summary for New Developments along I-355 South Extension, was prepared to aid municipalities and developers in their planning of noise abatement.

Table 1 - Summary of Land Use Changes from the SFEIS

	Location	Land Use Type	New Receptors ID
1	NE Quadrant of I-355 and I-55	Residential Development (Farmingdale Village/Vicente)	1-12
2	NW Quadrant of I-355 and I-55	Residential Development (Bolingbrook subdivision)	16
3	SE Quadrant of I-355 and 127th Street	Old Quarry Middle School	36
4	SE Quadrant of I-355 and 127th Street	Residential Development (South Pointe)	37
5	SW Quadrant of I-355 and 127th Street	Residential Development (Mayfair Estates)	31-35
6	NW Quadrant of I-355 and 127th Street	Residential Development (Briarcliffe Estates)	22, 23, 25-30
7	SW Quadrant of I-355 and 167th Street between I-355 and Gougar Road	Residential Development (Parker Ridge Estates)	59-72
8	South of proposed I-355 and I-80 Interchange	Liberty Junior High School & Residential Development (Walker Country Estates)	80, 85-91
9	NE Quadrant of I-355 and 163rd Street	Currently residential as modeled in the SFEIS; however, Lockport is considering changing the land use to commercial	57, 58 (existing receptors from SFEIS)

B. Determining Traffic Noise Impacts

Traffic noise levels were predicted using the Federal Highway Administration (FHWA) - approved highway prediction computer program Traffic Noise Model (TNM) Version 2.5 (an updated version of the TNM model used in the SFEIS). The TNM noise model accounts for such factors as soft and hard ground attenuation, shielding from local terrain and structures, traffic control devices, hourly traffic volumes, vehicle classification, vehicle speeds, and steep-grade adjustments.

1) Existing Noise Levels

Existing traffic noise levels were obtained for all receptors in 1995 (FEIS), 2000 (SFEIS), or 2005 (new developments). The noise levels were taken at representative locations. Table 2 summarizes existing traffic noise levels for receptors along the I-355 South Extension that were taken during the FEIS/SFEIS analysis. Additional information on the existing traffic noise levels is located in the FEIS and SFEIS.

Table 2 - Existing (1995/2000) Traffic Noise Levels

Receptors	Land Use Type	Existing Traffic Noise Levels
13-17	Residential	64 dBA
18-21	Recreational	45 dBA
22-24	Residential	73 dBA
31	Residential	58 dBA
37	Residential	62 dBA
38-41	Residential	41 dBA
42	Residential	51 dBA
43-51	Residential and Commercial	62 dBA
52	Residential	49 dBA
53-56	Residential	64 dBA
57-58	Residential	50 dBA
73-75	Residential and Commercial	65 dBA
76-84	Residential	68 dBA

Table 3 summarizes the existing (2005) traffic noise levels for several areas of new development. Existing (2005) measurements could not be taken at new receptors 16, 37, or 80 due to construction noise that would have interfered with the readings. Existing measurements for those receptors were estimated from 2000 existing readings of receptors representing existing developments located close to the new developments.

Table 3 - Existing (2005) Traffic Noise Levels

Receptors	Land Use Type	Existing (2005) Traffic Noise Levels
1-12	Residential	67 dBA
36	School	52 dBA
32-35	Residential	49 dBA
25-30	Residential	51 dBA
59-72	Residential	48 dBA
85-91	Residential	64 dBA

Existing noise levels taken in 2005 were measured during peak hour periods (7:00 a.m. to 9:00 a.m. and 4:00 p.m. to 6:30 p.m.) to coincide with the expected highest traffic noise levels. These periods provide the best opportunity to monitor the highest existing noise level, since they have the highest volume of traffic traveling at free flow speeds. Tuesday through Thursday were selected to take the noise measurements because peak hour traffic volumes on these days represent the typical weekday traffic conditions. Air humidity, surface characteristics, and wind speeds have an effect on noise levels. Measurements were not taken during certain weather conditions, such as windy and rainy days to avoid inaccurate measurements of traffic noise.

A Bruel & Kjaer Model 2236 digital noise meter, set at approximately five feet above the ground, was used to measure the existing noise level at the representative receptors. The noise meter was calibrated before every reading with a Bruel & Kjaer Model 4231 calibrator. Refer to Exhibit B in the appendix for a summary of the specifications of the noise meter and calibrator. At each location, sound measurements were taken for a minimum of ten minutes. Traffic data (such as volume, speed, classification) were collected simultaneously with the noise level measurement. Special events, such as airplanes passing or dogs barking in the proximity, were documented to assist with the calibration process.

2) Modeling Traffic Noise Levels

Traffic Noise Receptors

All noise sensitive receptors within the project limits were evaluated for potential traffic noise impacts; although only those platted before April 1999 qualify for mitigation. Noise sensitive receptors are residential and outdoor recreational properties within 500 feet from the proposed edge of travel lane. A total of 91 traffic noise receptor locations (representing 277 residences, two schools, two commercial units, and three recreation areas [Forest Preserves] were evaluated for this study. All of the traffic noise receptors were modeled at five feet above ground elevation, and measured from a location of the residence where frequent human activities occur closest to the proposed roadway alignment.

Roadway

The TNM program predicts the noise energy reaching a receptor from a roadway section. The roadway is divided into segments representing different traffic volumes, speeds, grades, and sections of a curve. The variables of traffic volumes, traffic speed, and roadway grade account for the different traffic noise levels reaching a receptor.

The I-355 South Extension is designed as a six-lane divided highway from I-55 to approximately 127th Street and a four-lane divided highway from approximately 127th Street to I-80. Since the ultimate configuration of the South Extension is six lanes along the entire corridor, both scenarios were modeled.

Access is fully controlled and provided at six interchange locations: I-55, I-80, 127th Street, IL Route 171/Archer Avenue, 159th Street (IL Route 7), and U.S. Route 6. I-55 is a six-lane, access-controlled facility that is designed to intersect with I-355 as a directional interchange. I-80 is a six-lane, access-controlled facility that is designed to intersect with I-355 as a directional interchange. 127th Street is designed to intersect I-355 with a diamond interchange. IL Route 171/Archer Ave is designed to be a split diamond interchange with I-355. 159th Street (IL Route 7) is designed to intersect I-355 with a diamond interchange. U.S. Route 6 is designed to be a partial clover-leaf interchange with I-355 with all ramps to the north of U.S. Route 6.

Depressed roadway sections are proposed as part of the design of I-355 that will help to reduce traffic noise. In addition, there is a toll plaza proposed between 167th Street and Bruce Road. The facility is proposed as an ORT facility with express I-PASS lanes and exit ramps to manual lanes. See Exhibit C for the proposed roadway improvements.

Traffic Characteristics

Two sets of traffic volumes were used for this noise reevaluation: 2020 PM Peak hour volumes and 2030 PM peak hour traffic volumes (Refer to Exhibit D for the peak hour traffic volumes). Both sets of traffic volumes were developed by CATS. The original traffic noise study completed for the FEIS used 2010 traffic volumes while the traffic noise study for the SFEIS used 2020 traffic volumes. It was the initial intent of this study to update the SFEIS traffic study with 2030 traffic volumes only. However, a comparison of 2020 and 2030 traffic volumes showed a decrease in the projected traffic volumes from 2020 to 2030. In order to obtain traffic noise results for the worst-case scenario, both sets of volumes (2020 and 2030) were modeled in the reevaluation. Traffic noise abatement measures were only modeled using the highest traffic volumes (2020).

At the toll plaza, it was assumed that the traffic split of vehicles using the I-PASS Express Lanes and vehicles using the manual lanes is 75 percent/25 percent.

Traffic noise levels are affected by the speed of the vehicles. The faster a vehicle travels, the more traffic noise is produced. The traffic speeds used in the traffic noise model are shown in Table 4.

The traffic noise levels produced are also dependent upon the types of vehicles using the roadway. A heavy truck produces more traffic noise than an automobile. With 2020 traffic volumes, trucks percentages represented ten-percent of the total vehicles predicted to travel along I-355. Within this ten-percent truck volume, heavy trucks represented the majority of the truck percentage (approximately seven-percent). With 2030 traffic

volumes, trucks percentages represented between three-percent and four-percent of the total vehicles predicted to travel along I-355. Within this three-percent, truck volume, heavy trucks represented the majority of the truck percentage (approximately two-percent).

Noise Barriers

Noise barriers, earthen berms, forests, and buildings will in varying degrees reduce the traffic noise reaching the receptors from the roadway. The TNM 2.5 program allows for the input of terrain lines, buildings, tree zones, and noise barriers to calculate their influence on traffic noise reduction.

Within I-355 South Extension project area there is one existing earthen berm (varying 3.5 feet to 6.5 feet high) that is located in the southeast quadrant of I-355 and I-80. See Exhibit C for the location of the earthern berm.

In addition, sections of the roadway are proposed to be depressed, which generally functions as a berm reducing traffic noise levels. The sections along I-355 that were modeled as depressed include areas just south of the Des Plaines River Bridge to north of 135th Street, just south of 135th Street to just south of 143rd Street, just south of 159th Street (short distance), and just south of Bruce Road to just north of Spring Creek. See Exhibit C for the approximate locations of the depressed roadway.

Table 4 - Traffic Speeds

Roadway	Speed Limit
I-355	55 mph
I-55	55 mph
Davey Road	35 mph
Bluff Road	35 mph
New Avenue	40 mph
127th Street	35 mph
135th Street	45 mph
IL Route 171 (Archer Avenue)	50 mph
139th Street	35 mph
143rd Street/IL Route 171 Frontage Road	35 mph
143rd Street	45 mph
147th Street	35 mph
151st Street	35 mph
159th Street (IL Route 7)	45 mph
163rd Street	50 mph
Gougar Road	40 mph
167th Street	50 mph
Toll Plaza manual lanes	35 mph
Bruce Road	45 mph
U.S. Route 6	45 mph
Cedar Road	45 mph
I-80	55 mph

C. Evaluating Noise Abatement Measures

The FHWA has established guidelines defining impact, noise abatement criteria (NAC), as shown in Table 5. These NAC are set forth in the Code of Federal Regulations Title 23 Part 772 (23 CFR 772). The NAC are not attenuation criteria or targets. Accordingly noise abatement measures are considered if the receptor(s) meet one of the following:

- The design year predicted noise levels approach or exceed the NAC
- The design year predicted noise levels substantially exceed the existing noise levels

FHWA allows the State Highway Authority (SHA) to establish the definition of approach and substantially exceed. The Illinois Tollway defines noise levels within 1 dBA of the FHWA's NAC as approaching (66 dBA for residential use and 71 dBA for commercial use) and a level 14 dBA greater than exiting noise levels as a substantial increase where mitigation measures must be considered. The goal of noise abatement measures is to achieve a substantial reduction in future noise levels. These definitions are taken from the Illinois Tollway's *Traffic Noise Study and Abatement Policy* that was last updated in April 2005.

The Notice of Intent for the I-355 South Extension SFEIS was published in the Federal Register in April 1999. Any development platted (recorded with the County) before April 1999 and located within 500 feet of the edge of travel lane must be evaluated for traffic noise impacts and adhere to the guidelines/policies of the FHWA and Illinois Tollway. Developments platted after April 1999 are responsible for conducting their own traffic noise studies and providing their own traffic noise abatement as may be deemed needed.

All of the new developments identified in Table 1 were platted after April 1999. Although not qualified for Illinois Tollway funded mitigation, they are included in the traffic noise model to aid local agencies and developers in the planning and consideration of noise abatement for their communities. A technical memorandum dated August 10, 2005, *Traffic Noise Analysis Summary for New Developments along I-355 South Extension,* contains the results of the traffic noise modeling for the new developments.

Noise barriers are constructed only if they are effective in reducing traffic noise and are cost-effective:

- *Effectiveness in Traffic Noise Reduction:* An effective noise barrier must reduce the traffic noise level by at least 5 dBA (preferably 8 dBA) at one location.
- *Cost-Effectiveness:* Total cost of the noise barrier should be reasonable taking the number of benefited receptors (residences) into consideration. In general, a residence is considered benefited if traffic noise levels are reduced by 3 dBA to 5 dBA or more as a result of a noise barrier (this may include second row receptors).

Table 5 - FHWA Noise Abatement Criteria (NAC)

Land Use Category	Leq(h)* (dBA)	Description of Land Use 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, and hospitals.
C	72 (Exterior)	Developed lands, properties, or activities not included in Categories A or B above.
D	--	Undeveloped Lands.
E**	52 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

Source: 23 CFR 772-Procedures for Abatement of Highway Traffic Noise and Construction Noise.

Notes:

* *"Leq(h)" – The hourly value of Leq. Leq is the equivalent steady-state sound level, which in a stated period of time contains the same acoustic energy as the time-varying sound level during the same period. For purposes of measuring or predicting noise levels, a receptor is assumed to be at ear height, located five feet above ground surface.*

** *Use of interior noise levels shall be limited to situations where exterior noise levels are not applicable, i.e., where there are no exterior activities to be affected by traffic noise, or where exterior activities are far from or physically shielded from the roadway in a manner that prevents an impact on exterior activities.*

The NAC are noise impact thresholds for considering abatement. (Abatement must be considered when predicted traffic noise levels for the design year approach [i.e., are within 1 decibel of] or exceed the noise abatement criteria, or when the predicted traffic noise levels are substantially higher [i.e., are more than 14 decibels greater] than the existing noise level.) The NAC are not attenuation design criteria or targets. The goal of noise abatement measures is to achieve a substantial reduction in future noise level. The reductions may or may not result in future noise levels at or below the NAC.

In addition, feasible and reasonable factors are considered. Some of the criteria used include:

- *Feasibility and Reasonableness*[3] *Factors*
  - Constructability: noise barriers can be built given the topography of the location.
  - Maintainability: noise barriers should not inhibit or complicate proper maintenance.
  - Safety: noise barriers must not pose a threat to safety, interfere with normal access to the property, hinder maintenance, or disrupt drainage.
  - Adverse Impacts: noise barriers should not have substantial adverse environmental and social-economic impact.
  - Drainage: noise barriers should not impact drainage.

[3] Criteria of "feasibility and reasonableness" of noise abatement were adapted from *Traffic Noise Study and Abatement Policy, Illinois State Toll Highway Authority, April 2005*

- Public Support: noise barriers are wanted by most impacted residents.
- Land Use Stability: the existing and proposed land use should accommodate traffic noise abatement.
- Local Controls: the local governing or jurisdictional body should control noise sensitive land uses from being located adjacent to the roadway.
- Local Official: the local representative authorities should support noise abatement.
- Noise Level Changes from Future Build and No-Action: noise abatement measures are more practical if noise levels between the build alternative and No-Action alternative are 5 dBA or greater.
- Antiquity: noise abatement measures are more practical if the development was constructed before the Tollway facility.
- Aesthetic: noise barriers should be able to blend in with its surroundings.
- Right-of-way (ROW) Needs: noise barriers should be constructed within Illinois Tollway ROW, if ROW is required; it is preferable for it to be donated.

IV. RESULTS

A. Existing Conditions

Under existing conditions, a total of 22 receptors (representing 47 residences and one school) approach or exceed the NAC. Table 6 shows the existing traffic noise levels. As shown in the table, the existing traffic noise levels at receptors located adjacent to I-355 range between 41.0 dBA and 73.0 dBA. Receptors 1 to 15 are located adjacent to I-55 and not I-355. These receptors (1 to 15) are included in the analysis because of ramp improvements required for the interchange of I-355 with I-55. An exception is Receptor 1. The improvements do not extend to this development (Vicente subdivision); the development is included in the analysis because the community has expressed concerns about traffic noise related to the I-355 South Extension. Receptors 76 to 91 are located adjacent to I-80 and not I-355. These receptors (76 to 91) are included in the analysis because of the ramp required for the interchange of I-355 with I-80.

Table 6 - Summary of Existing Readings and 2005 Predicted Traffic Noise Levels

Receptor ID #	Type of Receptor (number representing)	Receptor adjacent to depressed roadway?	Traffic Noise Level (dBA)					Consideration of Abatement Warranted?***
			Existing Reading	2020 No-Action	2020 6-lane	2020 4/6-lane	2030 6-lane	
1*	Residences (2)	No	67**	70.5	70.0	70.0	69.0	Yes [a]
2*	Single Residence	No	67**	68.5	69.5	69.5	67.0	Yes [a]
3*	Residences (2)	No	67**	69.5	70.5	70.5	68.0	Yes [a]
4*	Single Residence	No	67**	69.5	70.5	70.5	68.0	Yes [a]
5*	Residences (3)	No	67**	68.0	69.5	69.5	67.0	Yes [a]
6*	Residences (2)	No	67**	66.5	68.0	68.0	65.5	Yes [a]
7*	Residences (2)	No	67**	67.5	68.5	68.5	66.0	Yes [a]
8*	Residences (2)	No	67**	67.0	68.5	68.5	65.5	Yes [a]
9*	Single Residence	No	67**	67.5	69.0	69.0	66.0	Yes [a]
10*	Single Residence	No	67**	66.0	68.0	68.0	64.5	Yes [a]
11*	Residences (2)	No	67**	66.0	68.0	68.0	65.0	Yes [a]
12*	Residences (2)	No	67**	65.0	67.0	67.0	64.0	Yes [a]
13	Residences (10)	No	64	68.0	65.5	65.5	64.5	Yes [c]
14	Residences (9)	No	64	71.5	72.0	72.0	70.0	Yes [a, c]
15	Residences (9)	No	64	70.0	71.0	71.0	68.5	Yes [a]
16*	Residences (10)	No	64	62.0	57.0	57.0	54.5	No
17	Residences (30)	No	64	66.0	71.5	71.5	69.5	Yes [a, c]
18	Forest Preserve/Park	No	45	55.0	**65.0**	**65.0**	**63.0**	Yes [b]
19	Forest Preserve/Park	No	45	31.0	**68.0**	**68.0**	**69.0**	Yes [a, b]

Table 6 - Summary of Existing Readings and 2005 Predicted Traffic Noise Levels

Receptor ID #	Type of Receptor (number representing)	Receptor adjacent to depressed roadway?	Traffic Noise Level (dBA)					Consideration of Abatement Warranted?***
			Existing Reading	2020 No-Action	2020 6-lane	2020 4/6-lane	2030 6-lane	
20	Forest Preserve/Park	No	45	32.5	**73.0**	**73.0**	**66.0**	Yes [a, b]
21	Forest Preserve/Park	No	45	64.0	**68.0**	**68.0**	**68.0**	Yes [a, b]
22*	Single Residence	Yes	51**	55.0	**66.5**	**66.5**	63.5	Yes [a, b]
23*	Single Residence	Yes	51**	48.0	64.0	64.0	61.5	No
24	Single Residence	Yes	73	58.5	63.5	63.5	61.0	No
25*	Residences (2)	Yes	51**	44.0	**65.5**	**65.5**	63.0	Yes [b]
26*	Residences (2)	Yes	51**	41.5	**65.5**	**65.5**	61.0	Yes [b]
27*	Residences (2)	Yes	51**	40.5	**66.0**	**66.0**	60.0	Yes [a, b]
28*	Residences (2)	Yes	51**	39.5	**67.0**	**67.0**	60.5	Yes [a, b]
29*	Residences (2)	Yes	51**	39.0	64.5	64.5	59.5	No
30*	Residences (2)	Yes	51**	39.5	56.5	56.5	54.5	No
31	Residences (5)	Yes	58	46.5	59.5	59.5	52.5	No
32*	Residences (3)	Yes	49**	42.5	59.5	59.5	53.0	No
33*	Residences (2)	Yes	49**	42.0	59.0	59.0	53.5	No
34*	Residences (2)	Yes	49**	40.0	**66.0**	**66.0**	61.5	Yes [a, b]
35*	Residences (2)	Yes	49**	38.0	**64.5**	**64.5**	61.5	Yes [b]
36*	School - Old Quarry Middle School	Yes	52**	44.5	61.5	61.5	58.0	No
37*	Residences (4)	No	62	39.0	60.5	60.5	55.5	No
38	Residences (3)	Yes	41	37.5	**63.0**	**63.0**	**60.5**	Yes [b, d]
39	Residences (2)	Yes	41	38.5	**64.5**	**64.5**	**62.0**	Yes [b, d]
40	Residences (5)	No	41	41.5	**64.5**	**64.5**	**61.5**	Yes [b, d]
41	Residences (4)	No	41	45.5	**61.5**	**61.5**	**59.5**	Yes [b, d]
42	Single Residence	No	51	56.0	**65.5**	**65.5**	62.0	Yes [b, d]
43	Single Residence	No	62	54.5	65.0	65.0	63.0	No
44	Single Residence	Yes	62	45.0	61.0	61.0	59.0	No
45	Residences (4)	Yes	62	55.0	58.0	57.5	57.0	No
46	Residences (4)	No	62	58.5	57.5	57.0	56.5	No
47	Residences (5)	Yes	62	55.0	59.5	59.5	57.0	No

Table 6 - Summary of Existing Readings and 2005 Predicted Traffic Noise Levels

Receptor ID #	Type of Receptor (number representing)	Receptor adjacent to depressed roadway?	Traffic Noise Level (dBA)					Consideration of Abatement Warranted?***
			Existing Reading	2020 No-Action	2020 6-lane	2020 4/6-lane	2030 6-lane	
48	Single Residence	Yes	62	47.0	58.0	58.0	56.0	No
49	Commercial - Fire House	Yes	62	65.0	68.5	68.5	66.0	No, does not meet the 71 dBA NAC
50	Single Residence	Yes	62	62.0	65.0	65.0	63.0	No
51	Single Residence	Yes	62	58.0	61.5	61.5	59.5	No
52	Residences (4)	Yes	49	51.5	**66.5**	**65.5**	**64.0**	Yes [a, b]
53	Single Residence	No	64	60.5	63.0	63.0	62.5	No
54	Single Residence	No	64	60.5	61.5	61.5	61.0	No
55	Residences (4)	No	64	48.5	54.0	54.0	53.0	No
56	Single Residence	No	64	59.0	60.5	60.5	60.0	No
57	Residences (4)	No	50	60.5	**64.0**	63.5	62.5	Yes [b, d]
58	Residences (4)	No	50	61.5	**65.0**	**64.5**	63.5	Yes [b, d]
59*	Single Residence	No	48**	55.0	61.0	60.5	59.0	No
60*	Single Residence	No	48**	54.5	**62.5**	**62.0**	60.0	Yes [b]
61*	Residences (2)	No	48**	53.0	**64.5**	**63.5**	61.5	Yes [b]
62*	Residences (2)	No	48**	52.5	**67.0**	**65.5**	**63.5**	Yes [a, b]
63*	Residences (2)	No	48**	49.5	**69.5**	**69.0**	**67.0**	Yes [a, b]
64*	Residences (2)	No	48**	45.5	**68.5**	**67.5**	**65.0**	Yes [a, b]
65*	Residences (2)	No	48**	42.5	**68.0**	**66.5**	**64.0**	Yes [a, b]
66*	Residences (2)	No	48**	53.5	**63.0**	**62.0**	59.5	Yes [b]
67*	Single Residence	No	48**	41.0	59.5	59.5	57.0	No
68*	Single Residence	No	48**	39.5	60.0	59.0	57.5	No
69*	Single Residence	No	48**	39.0	60.5	59.5	58.0	No
70*	Residences (2)	No	48**	39.0	60.0	59.0	57.5	No
71*	Residences (2)	No	48**	38.5	59.0	58.5	57.0	No
72*	Single Residence	No	48**	38.0	58.0	57.5	56.0	No
73	Commercial - Landscape Business	No	65	44.0	59.0	58.5	56.0	No
74	Single Residence	No	65	53.0	55.5	55.0	53.5	No
75	Single Residence	No	65	63.0	64.0	63.5	62.5	No

Table 6 - Summary of Existing Readings and 2005 Predicted Traffic Noise Levels

Receptor ID #	Type of Receptor (number representing)	Receptor adjacent to depressed roadway?	Traffic Noise Level (dBA)					Consideration of Abatement Warranted?***
			Existing Reading	2020 No-Action	2020 6-lane	2020 4/6-lane	2030 6-lane	
76	Residences (5)	No	68	72.0	73.0	72.0	67.0	Yes [a, c]
77	Residences (5)	No	68	70.5	70.5	70.0	65.5	Yes [a, c]
78	Residences (5)	No	68	67.5	70.0	69.5	65.0	Yes [a, c]
79	Residences (4)	No	68	64.0	64.5	64.5	62.5	No
80*	School - Liberty Junior High	No	68	58.0	59.5	59.5	54.5	No
81	Single Residence	No	68	56.0	58.0	58.0	53.0	No
82	Single Residence	No	68	55.0	57.5	57.5	53.0	No
83	Residences (2)	No	68	53.0	57.0	57.0	51.5	No
84	Residences (2)	No	68	53.0	56.0	56.0	50.5	No
85*	Residences (6)	No	64**	52.5	56.5	56.5	51.0	No
86*	Residences (6)	No	64**	55.0	58.5	58.5	52.5	No
87*	Residences (6)	No	64**	59.5	62.0	62.0	55.0	No
88*	Residences (6)	No	64**	60.0	62.0	62.0	55.5	No
89*	Residences (6)	No	64**	60.5	62.5	62.5	55.5	No
90*	Residences (5)	No	64**	60.5	62.0	62.0	55.0	No
91*	Residences (5)	No	64**	61.5	63.0	63.0	55.5	No

Notes: *A highlighted noise level indicates that the receptor either approaches or exceeds the NAC for the indicated scenario.*

An underlined **bold** *predicted noise level indicates that the receptor substantially exceed the existing noise levels for the indicated scenario.*

* *Receptor represents a new development that was platted after April 1999.*

** *Receptor's existing noise level was identified in 2005 (If receptor is not double asterisked, the existing noise level was taken from the FEIS or the SFEIS)*

*** *The Illinois Tollway defines noise impact when traffic noise levels for the design year approach within 1 dBA of the FHWA's NAC (66 dBA for residential use) or when the predicted traffic noise levels substantially higher (more than 14 dBA greater) than the existing noise level. Noise barriers are constructed only if they are effective in reducing traffic noise, cost-effective, and feasible and reasonable.*

a. *These values represent noise levels for the proposed condition that exceed the impact criteria of 66 dBA. The corresponding noise levels are bolded.*

b. *These values represent noise levels for the proposed condition that are greater than 14 dBA over the existing noise level.*

c. *Consideration of abatement warranted and noise wall recommended in the SFEIS for this receptor. This reevaluation will analyze the recommended wall height and length only.*

d. *Consideration of abatement warranted and noise wall recommended in the FEIS for this receptor. This reevaluation will analyze the recommended wall height and length only.*

B. 2020 No-Action Alternative

The 2020 No-Action Alternative represents the future conditions if the I-355 South Extension is not constructed. Under the No-Action Alternative a total of 18 receptors (representing 92 residences) will approach or exceed the NAC. Table 6 shows the predicted No-Action traffic noise levels. As shown in the Table 6, the No-Action traffic noise levels at receptors located adjacent to I-355 are predicted to range between 31.0 dBA and 72.0 dBA.

C. Build Alternatives

Three alternatives were considered for the future build condition in this traffic noise reevaluation: 2020 4/6-Lane Alternative, 2020 6-Lane Alternative, and a 2030 6-Lane Alternative. The 4/6-Lane Alternative will be constructed with the accommodations for six lanes throughout. The worst-case scenario is the 2020 6-Lane Alternative as the traffic volumes are predicted to be the highest and the travel lanes are located closest to receptors.

1) 2020 4/6-Lane Alternative

The 2020 4/6-Lane Alternative includes a six-lane divided highway from I-55 to approximately 127th Street and a four-lane divided highway from approximately 127th Street to I-80. Access is fully controlled and provided at six recommended interchange locations: I-55, 127th Street, IL Route 171/Archer Avenue, 159th Street (IL Route 7), U.S. Route 6, and I-80.

Under the 2020 4/6-Lane Alternative, a total of 28 receptors (representing 97 residences and the forest preserve areas north of the Des Plaines River) will approach or exceed the NAC. A total of 25 receptors (representing 49 residences and the forest preserve areas north of the Des Plaines River) substantially exceed the existing noise levels. Many of the impacted receptors represent new developments platted after April 1999, and therefore, are not considered for noise abatement. Table 6 shows the predicted Build traffic noise levels. As shown in the table for this alternative, the traffic noise levels at receptors located adjacent to the I-355 south extension are predicted to range between 54.0 dBA and 73.0 dBA. The noise levels with this alternative are on average approximately 10 dBA higher than the No-Action Alternative.

2) 2020 6-Lane Alternative

The 2020 6-Lane Alternative is the worst-case alternative. This alternative includes a six-lane divided highway from I-55 to I-80. Access is fully controlled and provided at six recommended interchange locations: I-55, I-80, 127th Street, IL Route 171/Archer Avenue, 159th Street (IL Route 7), and U.S. Route 6.

Under the 2020 6-Lane Build Alternative a total of 30 receptors (representing 103 residences and the forest preserve areas north of the Des Plaines River) will approach or exceed the NAC. A total of 26 receptors (representing 53 residences and the forest preserve areas north of the Des Plaines River) substantially exceed the existing noise levels. Many of the impacted receptors represent new developments platted after April 1999, and therefore, are not considered for noise abatement. Table 6 shows the predicted Build traffic noise levels. As shown in the table for this alternative, the traffic noise levels at receptors located adjacent to the I-355 South Extension are predicted to range between 54.0 dBA and 73.0 dBA. The noise levels with this alternative are on average approximately 10 dBA higher than the No-Action Alternative.

3) 2030 6-Lane Alternative

The 2030 6-Lane Alternative includes a six-lane divided highway from I-55 to I-80. Access is fully controlled and provided at six recommended interchange locations: I-55, 127th Street, IL Route 171/Archer Avenue, 159th Street (IL Route 7), U.S. Route 6, and I-80.

Under the 2030 6-Lane Alternative a total of 15 receptors (representing 67 residences and the forest preserve areas north of the Des Plaines River) will approach or exceed the NAC. A total of 13 receptors (representing 26 residences and the forest preserve areas north of the Des Plaines River) substantially exceed the existing noise levels. Many of the impacted receptors represent new developments platted after April 1999, and therefore, are not considered for noise abatement. Table 6 shows the predicted Build traffic noise levels. As shown in the table for this alternative, the traffic noise levels at receptors located adjacent to the I-355 South Extension are predicted to range between 50.5 dBA and 70.0 dBA. The noise levels with this alternative are on average approximately 7 dBA higher than the No-Action Alternative.

V. NOISE ABATEMENT MEASURES

Noise abatement measures were considered as part of the traffic noise studies conducted for the FEIS and the SFEIS. As part of this reevaluation the traffic noise wall heights and lengths recommended in the FEIS and SFEIS were reanalyzed for final design. In addition, impacted receptors representing development platted prior to April 1999 were considered for traffic noise abatement. This section presents results of the traffic noise abatement analysis.

A. EIS Traffic Noise Barriers

A total of six traffic noise barriers were recommended in the FEIS for mitigating traffic noise at noise impacted locations within the study area. Of the six traffic noise barriers, two extend along I-55 (SFEIS-1 and SFEIS-2), two extend along I-80 (SFEIS-3 and SFEIS-4), and the remaining two barriers along I-355 (FEIS-1 and FEIS-2). The traffic noise barriers that extend along I-55 and I-80 were also recommended in the SFEIS. Each noise barrier length extends parallel to the alignment a distance of approximately four times the perpendicular distance of the last protected receptor to the noise barrier. Parallel barriers (barriers that run adjacent to a roadway on both sides of the roadway) are avoided where possible. Where parallel barriers cannot be avoided the width-to-height ratio of the roadway section to the barriers should be at least 10:1. The width being the distance between the barriers, and the height is the average height of the barriers involved above the roadway.[4] Table 7 summarizes the revised dimensions and locations of the EIS recommended noise barriers. Exhibit C illustrates the locations of these noise barriers.

Table 7 - FEIS and SFEIS Noise Barriers based on 2005 Modeling

Noise Barrier	Height (feet)	Length (feet)	Location
FEIS-1	14	2,450	Northeast quadrant of I-355 and 135th Street
FEIS-2	14	990	Northeast quadrant of I-355 and 163rd Street
SFEIS-1	14	5,400	Southeast quadrant of I-355 and I-55 between Murphy Road and Lemont Road
SFEIS-2	17	4,060	Northwest quadrant of I-355 and I-55 adjacent to both interstate facilities
SFEIS-3	14	1,350	Northwest quadrant of I-355 and I-80 adjacent to I-80
SFEIS-4	14	1,020	Southwest quadrant of I-355 and I-80 adjacent to I-80

Note: The noise barrier heights and lengths were revised in 2005 using TNM 2.5 with the worst-case scenario, the 2020 6-Lane Alternative. The height of the wall may be greater than the stated height, but not less than.

[4] Federal Highway Administration, "Keeping the Noise Down: Highway Traffic Noise Barriers"; Publication No: FHWA-EP-01-004, HEPN/2-01(10M)E and at http://www.fhwa.dot.gov/environment

B. Impacted Receptors Not Qualifying for Detailed Abatement Measure Evaluation

Five receptors representing developments platted prior to April 1999 are impacted by the proposed improvements that do not qualify for detailed abatement and evaluation. These receptors (18, 19, 20, 21, and 52) represent four residences and the forest preserve property located north of the Des Plaines River. After an analysis and consideration of the receptors were conducted, it was determined that noise abatement would not be warranted for these receptors.

Receptors 18 to 21 represent the Keepataw Forest Preserve and the Black Partridge Woods and Nature Preserve. These receptors are generally located approximately seventy-feet below the I-355 South Extension bridge structure that spans the Des Plaines River Valley. These forest preserves attract a minimal number of passive recreational visitors per day throughout the year. The cost of a noise barrier placed on top of the bridge structure and redesign of the bridge would not be justified based on the sparse number of undocumented visitors potentially benefited. A noise abatement wall was not evaluated at these locations.

Receptor 52 represents four residences in the southeast quadrant of 151st Street and I-355. These residences face 151st Street. Due to their close proximity to 151st Street a noise barrier of reasonable height could not effectively reduce the noise at these locations. The barrier would need to start several feet south of 151st Street in order to avoid creating a sight-distance hazard. Based on the predicted noise levels, the wall would need to be at least 21 feet high and approximately 1,000 feet long.

C. Effectiveness in Traffic Noise Reduction

According to Illinois Tollway policy, a noise barrier is considered effective if it reduces the traffic noise level by 5 dBA or more at least at one location. A traffic noise receptor is considered benefited, if the traffic noise level is reduced by 3 dBA to 5 dBA or more as a result of a noise barrier. All receptors within 500 feet of the edge of proposed travel lane are considered in the noise wall evaluation. Table 8 shows the predicted traffic noise levels with potential noise barriers based on 2005 analysis.

Field studies have shown traffic noise levels are not substantially increased by construction of a noise barrier on the opposite side of a highway from a receiver. If both the direct noise levels and the reflected noise levels are not abated by natural or artificial terrain features, the noise level increase is theoretically limited to 3 dBA, due to a doubling of energy from the noise source. In practice, however, not all of the acoustical energy is reflected back to the receiver due to diffraction, reflection, longer path length the sound must travel, blocked, and absorbed sound energy. Measurements made to quantify this reflective increase have never shown an increase of greater than 1 – 2 dBA, which is not perceptible to the average human ear.[5]

Of the six traffic noise barriers reevaluated, five (FEIS-1 and SFEIS-1 to SFEIS-4) are determined effective in traffic noise reduction. Noise wall FEIS-2 was not effective at reducing traffic noise.

[5] *Ibid*, Federal Highway Administration

Table 8 - Effectiveness of Noise Barriers in Traffic Noise Reduction

Potential Barrier	Shielded Receptors	No. of Residences Represented	Noise Abatement Criteria (dBA)	Traffic Noise Level (dBA)		Insertion Loss (dBA)	Receptors Benefited? (Yes/No)	Barrier Effective? (Yes/No)
				Without Barrier	With Barrier			
FEIS-1	38	3	66	63.0	59.0	4.0	Yes	Yes[a]
	39	2	66	64.5	59.5	5.0	Yes	
	40	5	66	64.5	62.5	2.0	No	
	41	4	66	61.5	56.5	5.0	Yes	
	42	1	66	65.5	62.5	3.0	Yes	
FEIS-2	57	4	66	64.0	62.0	2.0	No	No[b]
	58	4	66	65.0	62.5	2.5	No	
SFEIS-1	13	10	66	65.5	63.0	2.5	No	Yes
	14	9	66	72.0	63.5	8.5	Yes	
	15	9	66	71.0	64.0	7.0	Yes	
SFEIS-2	17	30	66	71.5	63.5	8.0	Yes	Yes
SFEIS-3	76	5	66	73.0	67.5	5.5	Yes	Yes
	77	5	66	70.5	62.0	8.5	Yes	
SFEIS-4	78	5	66	70.0	64.5	5.5	Yes	Yes

Note:

a. This wall was modeled because it was recommended in the 1996 FEIS. The predicted noise levels no longer warrant consideration of a noise wall; however, the wall is still effective for reduction of traffic noise levels.

b. This wall was modeled because it was recommended in the 1996 FEIS. The predicted noise levels no longer warrant consideration of a noise wall and the noise wall is no longer effective for reduction of traffic noise levels.

D. Cost-Effectiveness

In addition to being effective in traffic noise level reduction, barriers must be cost-effective. A cost-effective barrier should be reasonable based on the number of sensitive receptors benefited. A receptor is considered benefited if traffic noise levels are reduced by at least 3 dBA to 5 dBA as a result of a noise barrier. Secondary receptors should also be considered while calculating cost-effectiveness. Secondary receptors are those that are not directly adjacent to the roadway but are within 500 feet; typically these receptors are somewhat shielded from the primary (first row) receptors. Exhibit C presents the 500-foot buffer location map. The cost-effectiveness of a barrier is based on the per benefited receptor costs. A unit cost of $25 per square-foot is assumed for the barrier cost calculation.

All six barriers (FEIS-1, FEIS-2, and SFEIS-1 to SFEIS-4) were evaluated for cost-effectiveness. Table 9 presents the cost-effectiveness analysis. If the cost per benefited receptor is reasonable, other reasonableness factors were considered prior to the recommendations. All six barriers were determined to be cost-effective based on the cost per number of residences within 500 feet of the edge of pavement.

Table 9. Cost-Effectiveness of Noise Barrier

Noise Barrier	Barrier Height (ft)	Length (ft)	Total Cost[a]	Number of Benefited Residences[b]	Number of Residences within 500'	Cost per Benefited Residence	Cost per Residence Within 500'
FEIS-1	14	2,450	$857,500	10	25	$85,800	$34,300
FEIS-2	14	990	$346,500	0	10	N/A	$34,700
SFEIS-1	14	5,400	$1,890,000	18	56	$105,000	$33,800
SFEIS-2	17	4,060	$1,725,500	30	60	$57,500	$28,800
SFEIS-3	14	1,350	$472,500	10	20	$47,300	$23,600
SFEIS-4	14	1,020	$357,000	5	11	$71,400	$32,500

a. Costs based on $25/sq foot

b. Benefited Receptors are those where the noise levels are reduced by the barrier by at least 3 to 5 dBA – modeled for first row receptors only.

Table 10 presents a comparison of traffic noise abatement recommendations between the previous studies completed for the I-355 South Extension. Many of the final costs are comparable between barriers. All design barrier heights have been reduced from the heights previously recommended based on updated elevation data. Recommendations for two of the traffic noise walls, SFEIS-1 and SFEIS-2, are considerably different between the 2005 analysis and the recommendations presented in the previous documents. For SFEIS-1, the 2005 analysis resembles closely to the FEIS findings, and not the SFEIS findings. The difference in recommendations is not exactly known and may be a result of varying interchange designs, aerial coverage, elevation data, an oversight or a combination of factors.

Also as shown in Table 10, Barrier FEIS-1 and Barrier FEIS-2 were recommended in the FEIS and not the SFEIS. Two primary factors may have contributed to this finding. First, the noise walls recommended in the FEIS were modeled using STAMINA 2.0 and 2010 traffic volumes. The noise walls modeled for the SFEIS and the 2005 traffic noise reevaluation used TNM and 2020 traffic volumes. STAMINA 2.0 is known to over-predict modeled traffic noise levels by 2-4 dBA where TNM is much closer in predicting actual future conditions.

The second factor has to do with IDOT cost per benefited receptor criteria. According to the IDOT traffic noise criteria used in the SFEIS analysis, a barrier is only recommended if a traffic noise reduction of 8 dBA is attained for the shielded receptor. In addition the total cost of the traffic noise barrier could not exceed $24,000 per benefited residence (a residence is considered benefited if it would experience a traffic noise reduction of 5 dBA or more). The IDOT traffic noise criteria used in the FEIS were less stringent. Due to the differences between the FEIS and SFEIS traffic noise analyses, the Illinois Tollway committed to constructing all noise abatement recommended in the FEIS and SFEIS.

Table 10 - Comparison of Traffic Noise Abatement Recommendations

Barrier ID	FEIS Barriers*		SFEIS Barriers*		2005 Barriers	
	Dimensions (ft x ft)	Cost	Dimensions (ft x ft)	Cost	Dimensions (ft x ft)	Cost
FEIS-1	2,240 x 25	$1,400,000	NR	NR	2,450 x 14	$857,500
FEIS-2	1,000 x 25	$625,000	NR	NR	990 x 14	$346,500
SFEIS-1	5,000 x 15	$1,875,000	1,556 x 25	$972,600	5,400 x 14	$1,890,000
SFEIS-2	1,400 x 25	$875,000	1,394 x 19	$662,175	4,060 x 17	$1,725,500
SFEIS-3	1,200 x 15	$450,000	1,211 x 15	$454,050	1,350 x 14	$472,500
SFEIS-4	1,000 x 15	$375,000	982 x 15	$368,275	1,020 x 14	$357,000

NR = Traffic noise barrier not recommended in study

** Information obtained from the I-355 South Extension Final Environmental Impact Statement (FEIS) and Supplemental Final Environmental Impact Statement (SFEIS)*

E. Feasibility and Reasonableness

All of the previously committed noise barriers were evaluated for feasibility and reasonableness.

Constructability

All six noise barriers are proposed to be constructed along the back of roadway/ramp shoulders. Drastic change in topography is not anticipated at any of the proposed noise barrier locations. Topography will not pose a problem for construction of the noise barriers. Based on constructability, the proposed noise barriers are feasible and reasonable.

Safety

The noise barriers will not interfere with the access to I-355, I-55, I-80, or other access points for Tollway maintenance and public safety. Coordination with municipalities will continue during the design phase to ensure that the barriers do not hinder their maintenance or interfere with the normal roadway drainage patterns. Based on public safety, the proposed noise barriers are feasible and reasonable.

Adverse Impacts

Due to the proximity of the evaluated noise barriers to the proposed roadway/ramp shoulders, the potential noise barriers are not anticipated to induce adverse impact on the environment (*i.e.* natural resources, wetlands, floodplains, water quality). Based on the impact evaluations from the EIS process and documentation of adverse impacts, the proposed noise barriers are feasible and reasonable.

Public Support

Noise barriers are generally favored by residents immediately adjacent to highways, because noise barriers could improve their living quality by reducing the traffic noise levels normal outside human activity areas. However, local residents may have concerns about unsightliness, shortened daylight, shadows, reduced property safety, and changes in air circulation patterns due to the noise barriers. To ensure that most influenced residents want

the noise barriers, community meetings or surveys are recommended. The Illinois Tollway has developed a local advisory committee that is composed of community leaders and citizens of the communities located adjacent to the I-355 alignment. The committee meets monthly and is open to the general public. The focus of the committee is to address local issues related to construction activities such as noise, aesthetics, landscaping, property access, protection and use, surface water drainage, and public utilities. Since December 2004, two of the meetings have focused specifically on traffic noise. Results of the meeting indicate that noise walls are desired along the I-355 alignment. Based on public support, the proposed noise barriers are deemed feasible and reasonable.

Other reasonableness factors should include land use stability, local controls, community desires, views of local officials, noise level changes from Build and No-Action conditions, antiquity, aesthetics, right-of-way (ROW) or property acquisition needs, and other environmental and social issues. Table 11 addresses the reasonableness factors for barriers FEIS-1, FEIS-2, and SFEIS-1 to SFEIS-4. All six noise barriers reevaluated for feasibility and reasonableness are effective. They include Barrier FEIS-1, Barrier FEIS-2, Barrier SFEIS-1, Barrier SFEIS-2, Barrier SFEIS-3, and Barrier SFEIS-4.

Table 11 - Reasonableness of Noise Barriers

Noise Barrier	Land Use Stability	Local Controls	Community Desires	Views of Local Officials	Noise Level difference between Build & No-Action (dBA)	Antiquity	Aesthetic	ROW	Other Env. Issues
FEIS-1	No change expected	No controls used	Supported by community	Barrier Supported	3.8	Homes were constructed first	Pleasing	None Anticipated	None
FEIS-2	Potential change	No controls used	Supported by community	Barrier Supported	2.25	Homes were constructed first	Pleasing	None Anticipated	None
SFEIS-1	No change expected	No controls used	Supported by community	Barrier Supported	6.0	Homes were constructed first	Pleasing	None Anticipated	None
SFEIS-2	No change expected	No controls used	Supported by community	Barrier Supported	8.0	Homes were constructed first	Pleasing	None Anticipated	None
SFEIS-3	No change expected	No controls used	Supported by community	Barrier Supported	7.0	Homes were constructed first	Pleasing	None Anticipated	None
SFEIS-4	No change expected	No controls used	Supported by community	Barrier Supported	5.5	Homes were constructed first	Pleasing	None Anticipated	None

F. Recommendation

Based on the reevaluation analysis of the effectiveness in traffic noise level reduction, cost-effectiveness, feasibility and reasonableness, and prior FEIS/SFEIS abatement recommendations, a total of six traffic noise barriers are recommended.

Barrier FEIS-1 (14-foot by 2,450-foot) is recommended for the residences in the northeast quadrant of 135th Street and I-355. A total of 25 residences will benefit from Barrier FEIS-1. A barrier was modeled in this location because there will be a substantial increase between existing traffic noise levels and predicted traffic noise levels warranting consideration of noise abatement. Barrier FEIS-1 reduces traffic noise levels by at least 5 dBA at 2 noise receptor locations (39 and 41; representing 6 residences). In addition, several residences are located within 500 feet of the travel lane that should experience a noise level reduction with the proposed barrier. The estimated cost of Barrier FEIS-1 is $857,500. This is equivalent to approximately $85,800 per benefited receptor (considering first row receptors only) or $34,300 per receptor within 500 feet of travel lane. *Barrier FEIS-1 is recommended for construction based on the substantial increase from the existing noise levels to future noise levels, effective and substantial predicted traffic noise reduction, reasonable cost, the reasonableness factors and previous recommendations in the FEIS.*

Barrier FEIS-2 (14-foot by 990-foot) is recommended for the ten residences in the northeast quadrant of 163rd Street and I-355. A barrier was modeled in this location because there will be a substantial increase between existing traffic noise levels and predicted traffic noise levels warranting consideration of noise abatement. Barrier FEIS-2 does not reduce traffic noise levels by 5 dBA at either of the traffic noise receptor locations (57 or 58). The estimated cost of Barrier FEIS-2 is $346,500. This is equivalent to $34,700 per receptor within 500 feet of travel lane. Coordination with Lockport has resulted in additional land use information. Lockport is considering rezoning this area from residential to industrial. Industrial land use is associated with different noise abatement criteria for identifying impact than that of residential land use. It is not likely that this area would warrant consideration of noise abatement if the land was rezoned industrial. *Barrier FEIS-2 is however recommended for construction based on the substantial increase from the existing noise levels to future noise levels and previous in the FEIS.*

Barrier SFEIS-1 (14-foot by 5,400-foot) is recommended for the residences in the southeast quadrant of I-55 and I-355. A total of 56 residences will benefit from Barrier SFEIS-1. A barrier was modeled in this location because predicted traffic noise levels exceed the NAC warranting consideration of noise abatement. Barrier SFEIS-1 reduces traffic noise levels by at least 5 dBA at two traffic noise receptor locations (14 and 15; representing 18 residences). In addition, several residences are located within 500 feet of the travel lane that should experience a noise level reduction with the proposed barrier. The estimated cost of Barrier SFEIS-1 is $1,890,000. This is equivalent to approximately $105,000 per benefited receptor (considering first row receptors only) or $33,800 per receptor within 500 feet of travel lane. *Barrier SFEIS-1 is recommended for construction based on effective and substantial predicted traffic noise reduction, reasonable cost, the reasonableness factors and previous recommendations in the FEIS/SFEIS.*

Barrier SFEIS-2 (17-foot by 4,060-foot) is recommended for the residences in the northwest quadrant of I-55 and I-355. A total of 60 residences will benefit from Barrier SFEIS-2. A barrier was modeled in this location because predicted traffic noise levels exceed the NAC warranting consideration of noise abatement. Barrier SFEIS-2 reduces traffic noise levels by

at least 5 dBA at traffic noise receptor 17 (representing 30 residences). In addition, several residences are located within 500 feet of the travel lane that should experience a noise level reduction with the proposed barrier. The estimated cost of Barrier SFEIS-2 is $1,725,500. This is equivalent to approximately $57,500 per benefited receptor (considering first row receptors only) or $28,800 per receptor within 500 feet of travel lane. *Barrier SFEIS-2 is recommended for construction based on effective and substantial predicted traffic noise reduction, reasonable cost, the reasonableness factors and previous recommendations in the FEIS/SFEIS.*

Barrier SFEIS-3 (14-foot by 1,350-foot) is recommended for the residences in the northwest quadrant of I-80 and I-355. A total of 20 residences will benefit from Barrier SFEIS-3. A barrier was modeled in this location because predicted traffic noise levels exceed the NAC warranting consideration of noise abatement. Barrier SFEIS-3 reduces traffic noise levels by at least 5 dBA at two traffic noise receptor locations (76 and 77; representing 10 residences). In addition, several residences are located within 500 feet of the travel lane that should experience a noise level reduction with the proposed barrier. The estimated cost of Barrier SFEIS-3 is $472,500. This is equivalent to approximately $47,300 per benefited receptor (considering first row receptors only) or $23,600 per receptor within 500 feet of travel lane. *Barrier SFEIS-3 is recommended for construction based on effective and substantial predicted traffic noise reduction, reasonable cost, the reasonableness factors and previous recommendations in the FEIS/SFEIS.*

Barrier SFEIS-4 (14-foot by 1,020-foot) is recommended for the residences in the southwest quadrant of I-80 and I-355. A total of 11 residences will benefit from Barrier SFEIS-4. A barrier was modeled in this location because predicted traffic noise levels exceed the NAC warranting consideration of noise abatement. Barrier SFEIS-4 reduces traffic noise levels by at least 5 dBA at traffic noise receptor 78 (representing 5 residences). In addition, several residences are located within 500 feet of the travel lane that should experience a noise level reduction with the proposed barrier. The estimated cost of Barrier SFEIS-4 is $357,000. This is equivalent to approximately $71,400 per benefited receptor (considering first row receptors only) or $32,500 per receptor within 500 feet of travel lane. *Barrier SFEIS-4 is recommended for construction based on effective and substantial predicted traffic noise reduction, reasonable cost, the reasonableness factors and previous recommendations in the FEIS/SFEIS.*

VI. SUMMARY

The results of the traffic noise reevaluation of the recommended mitigation measures conducted for the I-355 South Extension Project include:

- Residential development, educational facilities, commercial development, and recreational facilities are identified within the project area.
- There are 28 receptors (representing 97 residences and the forest preserve areas north of the Des Plaines River) and 30 receptors (representing 103 residences and the forest preserve areas south of the Des Plaines River) that have traffic noise levels approaching (66 dBA) or exceeding (67 dBA) the NAC in 2020 with proposed improvements.
- A total of 15 receptors (representing 67 residences and the forest preserve areas north of the Des Plaines River) will have traffic noise levels exceeding the NAC (67 dBA in 2030 with proposed improvements.
- Eight new developments that were platted after April 1999 were identified within the project area. Of the eight new developments, four are identified as impacted they will have traffic noise levels exceeding the NAC. Noise abatement was not considered by the Illinois Tollway for these impacts since the areas were platted after April 1999. The applicability of traffic noise abatement is the responsibility of the representative jurisdictional communities/developer. However, a technical memorandum dated August 10, 2005, *Traffic Noise Analysis Summary for New Developments along I-355 South Extension,* was prepared that contains the results of the traffic noise modeling for the new developments. The memo can be referenced by communities/developers for their abatement planning.
- Six traffic noise barriers were recommended for construction through the EIS process.
- The construction of the six previous recommended noise barriers (Barrier FEIS-1, Barrier FEIS-2, Barrier SFEIS-1, Barrier SFEIS-2, Barrier SFEIS-3, and Barrier SFEIS-4) are recommended for construction.

VII. CONCLUSION

A traffic noise analysis and reevaluation of the previous recommended six noise barriers was conducted for the I-355 South Extension Project to address the results of previous EIS traffic noise studies, identify traffic noise impacts associated with developments platted after April 1999, and to determine feasibility and reasonableness of potential noise abatement committed throughout the project area.

In the worst-case scenario, with the 2020 6-Lane Alternative, a total of 30 receptors (representing 103 residences and the forest preserve areas north of the Des Plaines River) will have traffic noise levels exceeding the NAC with proposed improvements. To reduce potential traffic noise impacts six previous committed traffic noise barriers (Barrier FEIS-1, Barrier FEIS-2, Barrier SFEIS-1, Barrier SFEIS-2, Barrier SFEIS-3, and Barrier SFEIS-4) are recommended for construction.

LIST OF EXHIBITS:

Exhibit A: Project Location Map

Exhibit B: Specifications of the Noise Meter and Calibrator Used in the Field Measurement

Exhibit C: I-355 South Extension Traffic Noise Receptors and Proposed Noise Walls

Exhibit D: 2020 and 2030 Peak Hour Traffic Volumes

Exhibit A: Project Location Map

Exhibit B: Specifications of the Noise Meter and Calibrator Used in the Field Measurement

Table B-1: Major Specifications of Bruel & Kjaer Model 2236 Sound Level Meter

	Specifications
Conforms to	– IEC 651 (1979) and 804 (1985) Type 1 – ANSI S1.4 (1983) and Draft S1.43, 6th September, 1992 Types 1
Noise floor	– Typically: 18 dB(A) – Maximum: 20 dB(A) RMS
Measuring range	– Highest range: 140 dB – Lowest range: 10 dB – Measurement range: 80 dB
Frequency weighting	*RMS:* – A, C according to IEC 651 Type 1 – L: flat from 10 Hz to 20 kHz (±2 dB) with Type 1 tolerances *Peak:* – C according to IEC 651 Type 1 – L: flat from 10 Hz to 20 kHz (±2 dB) with Type 1 tolerances
Microphone	Type 4188 prepolarized free-field 1/2" condenser microphone – Sensitivity: -30 dB re 1V/Pa ± 2 dB – Frequency range: 8 Hz to 12.5 kHz (±2 dB) – Capacitance: 12 pF
Memory	40 records of overall results

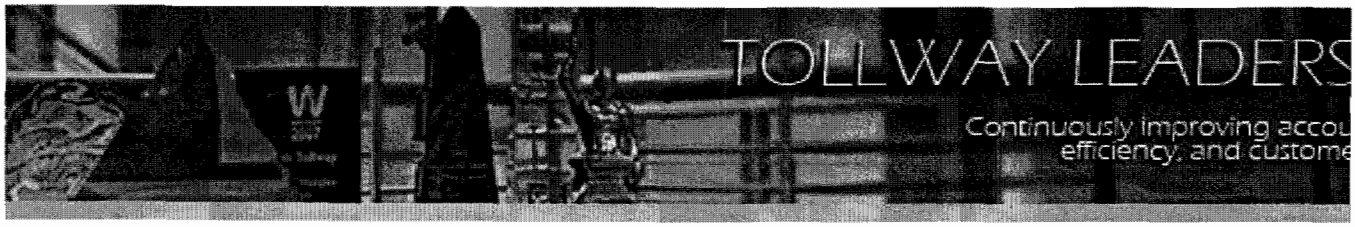
Source: Bruel & Kjaer website, 2003

Table B-2: Major Specifications of Bruel & Kjaer Model 4231 Sound Level Calibrator

	Specifications
Conforms to	– IEC 942 (1988) Class I – ANSI S1.40 (1984) (R 1997)
Calibration accuracy	±0.2 dB
Calibration frequency	1kHz
Calibration sound level	94 dB or 114 dB
Fitting microphones	Fits Brüel &Kjær 1" and 1/2" microphones (1/4" and 1/8" microphones with adaptor)

Source: Bruel & Kjaer website, 2003

Exhibit G



Soundwalls

Traffic Noise Study & Abatement Policy
Illinois Tollway

1.0 PURPOSE AND OVERVIEW

In 2004, the Congestion-Relief Program – *Open Roads for a Faster Future* was app 2005, the Illinois Tollway launched the $6.3 billion program. The Tollway's Traffic and Abatement Policy update provides an opportunity to evaluate traffic noise thro implementation of the CRP.

The Tollway's current policy addresses guidelines and procedures for initiating traf studies and considering traffic noise abatement. The policy first establishes the eli requirements for a Traffic Noise Study. The policy then establishes the requiremer considering the construction of traffic noise abatement structures when they are fe reasonable.

The traffic noise analysis guidance provided in this policy is based largely on the re material that is found in Title 23 Code of Federal Regulations Part 772 (23 CFR Par entitled "Procedures for Abatement of Highway Traffic Noise and Construction Nois

The initial traffic noise impact assessment for all projects will be a cursory review. assessment would determine if noise sensitive receptors are within the project lim noise impacts are already present, if future traffic noise levels are likely to increas future traffic noise impacts will occur. This review would include assessment of exi proposed land use plans, review of aerial photography, a review of prior studies, a representative number of short-term 15-minute Leq traffic noise measurements.

If initial traffic noise impact assessments indicate the possibility of future traffic no then a Traffic Noise Study will be performed. A detailed technical memorandum wi prepared to document the assumptions, data, procedures, results and traffic noise considerations and recommendations from the Traffic Noise Study.

2.0 DEFINITIONS

Illinois Tollway

ILLINOIS STATE TOLL HIGHWAY AUTHORITY

TO: **Illinois Tollway Board of Directors** **DATE: January 27, 2009**

FROM: **Rocco J. Zucchero**
Deputy Chief of Engineering for Planning

SUBJECT: **Interstate 355 Post-Construction Noise Report**

The following summary and attachments were prepared in response to a resident concern expressed at the Tollway's December 18, 2008 Board Meeting.

Overview and History

Interstate 355 has been considered by the Chicagoland Metropolitan Region since the early 1960's. The roadway centerline was recorded in 1968 and the State of Illinois (both Illinois Department of Transportation and Illinois Tollway) began studying the South Extension of Interstate 355, from I-55 to I-80 in the mid 1980's. The Federal Highway Administration required that an Environmental Impact Statement (EIS) be prepared for this project to ensure compliance with the National Environmental Protection Act (NEPA). NEPA is the applicable law that is invoked when federal activities such as highway construction is proposed and establishes a broad national framework for protecting our environment. NEPA's basic policy is to assure that all branches of government give proper consideration to the environment prior to undertaking any major federal action that significantly affects the environment.

An EIS identifies the purpose and need for a project, as well as discloses the potential impacts. The EIS provides the basis for project development and impact mitigation, including noise impacts. The Tollway's Noise Policy is consistent with the federal guidelines, 23CFR772, which provides the foundation for noise abatement recommendations along Interstate 355. Federal guidelines identify noise impact thresholds for considering abatement when the traffic noise levels approach 67dBA, or have a substantial noise increase over existing noise levels. Noise abatement recommendations are applied consistently across all Tollway projects, which have a goal to achieve an 8dBA noise reduction for the first-floor receptors. However, the minimum acceptable noise reduction is 5dBA.

EIS Noise Abatement Recommendations

IDOT's 1996 EIS recommended noise abatement at six locations associated with the construction of Interstate 355. Two locations along I-55, two locations along I-80, north of 163rd Street and north of 135th Street (see attached). A lawsuit in 1997 delayed the project and required an update to the EIS. The Supplemental EIS prepared by IDOT in 2000/01 revised the noise abatement recommendations to reflect analysis changes based on the newly released Traffic Noise Model (TNM) adopted by FHWA and as such reduced the amount of recommended abatement from six locations to four locations (see attached). Noise abatement was removed due to changes in both the federal model and IDOT Policy.

The updated EIS recommended the removal of noise abatement at 135th Street and 163rd Street because the walls were no longer considered reasonable or feasible due to IDOT cost and noise reduction policy.

Tollway Noise Abatement Re-evaluation

In 2004 the Tollway updated the traffic noise study and noise abatement recommendations to reflect 2030 traffic and a continuous six-lane corridor from I-55 to I-80. The final recommendation reinstituted all of the original noise abatement recommendations as outlined in the 1996 EIS. Noise abatement at both the 135th Street and 163rd Street locations was added back into the roadway design. Several public meetings were held throughout the final phases of design and early stages of construction. The Tollway hosted monthly Local Advisory Committee meetings starting in November 2004, with two meetings specifically designated to discuss noise abatement recommendations. In addition, a significant public outreach effort including the development and dissemination of project fact sheets continued throughout construction to reaffirm noise abatement recommendations, as well as provide information regarding the basis for these recommendations (attached).

1[redacted]t

The following statistics represent information presented in the EIS, actual contract documents, and change orders approved by the Tollway Board:

- Modeled noise levels Pre I-355: 41dBA
- Predicted noise levels without wall: 61-65dBA
- Predicted noise levels with wall: 56-63dBA
- [redacted]: 2,450' of noise wall, 14.0' avg. ht.
- [redacted]: 2,560' of noise wall, 15.8' avg. ht.
- [redacted]: 72' of additional wall – 2,632' total
  2' additional height over southern 300'
- [redacted]: 240', of additional wall, 10.0 avg. ht.
- [redacted]: 2,872' (422' of additional noise wall)

Post-Construction Noise Measurements:

On January 20th and 22nd, 2009 Tollway staff and traffic noise consultant, Huff and Huff, measured noise along I-355 in the vicinity of 135th Street. Graphs and tables summarizing the field measurements are attached for reference. Post-construction noise measurements north of 135th Street range from 56-62dBA, below the federal noise abatement impact criteria of 67dBA.

Conclusion

Tollway staff conducted a review of the historical records for the I-355 project to assess compliance with 23CFR772, the federal guideline concerning traffic noise, as well as Illinois Department of Transportation and Illinois Tollway Policies concerning traffic noise studies and abatement recommendations. After reviewing these documents it is reasonable to conclude that the Tollway's construction of I-355 is consistent with both the federal and state criteria and exceeds the recommendations outlined in the Federal Highway Administration approved Environmental Impact Statement. The noise wall constructed in the vicinity of I-355 and 135th Street is 422' longer and nearly 2' taller than that documented in the EIS and required to demonstrate compliance with NEPA. Post-construction field measurements of traffic noise reaffirmed the noise modeling results included in the EIS and confirmed the overall effectiveness of noise abatement in this area.

Exhibit I

Gilman, Ilya

From: LaPorte, Angela
Sent: Tuesday, July 14, 2009 4:14 PM
To: Gilman, Ilya
Cc: Zucchero, Rocco
Subject: Cost Information for Noise Wall Change- Contract 7713

Attachments: 135th Noise Wall.pdf

Ilya:

Per your discussion, in May of 2007 the pre-cast concrete noise abatement wall (included in Contract 7713) on the east side of I-355 just north of the 135th street bridge was modified as noted in the attached document. The modification included 72 feet of additional wall length at a height of 15.8 feet for a total of 1137.6 square feet. The modification also included an additional 2 feet in height for approximately 300 feet in length totaling 600 square feet of additional noise wall. Combined (1137.6+600) 1737.6 additional square footage of noise wall at $33.31 per square foot equals $57,879.46 of additional noise wall costs incurred at this location.

The Tollway then included a wooden noise wall extension in contract 7728. This noise wall extension included 240 feet of additional wall length with an average height of 10 feet which cost $69,280. The noise wall extension was studied with the overall intention of decreasing sounds levels behind the wall for 2 homes by 2 decibels.

I hope this helps answer the questions you asked earlier, let me know if there is anything else that needs clarification.

Angela

135th Noise Wall.pdf (3 MB)

Angela La Porte
Environmental Planner
Illinois Tollway
Downers Grove, IL 60515
Office Phone: (630) 241-6800 Ext. 3963
Fax: (630) 241-6105

Exhibit J

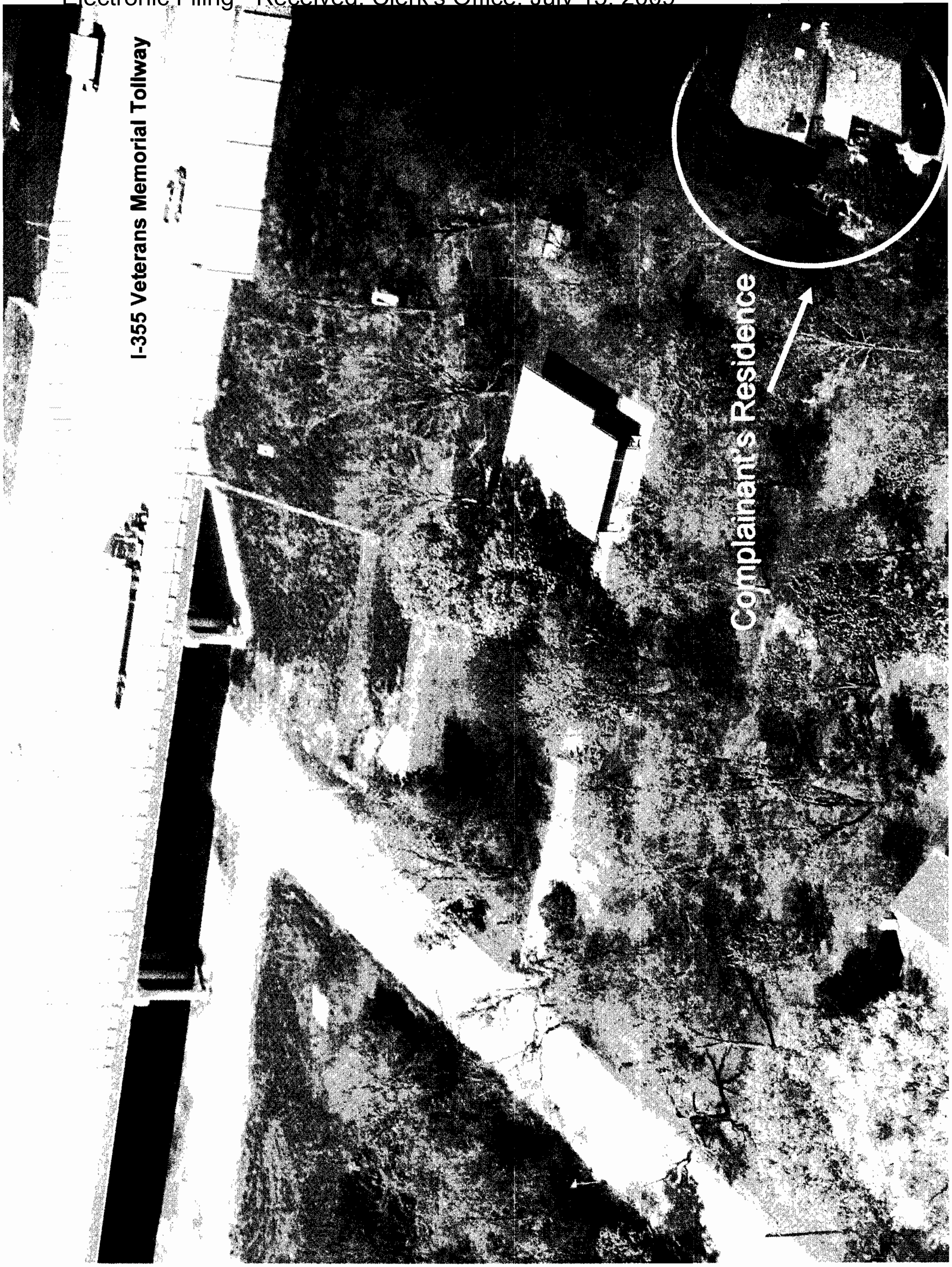


 Exhibit K

U.S. Department of Transportation
Federal Highway Administration

Illinois Division

3250 Executive Park Dr.
Springfield, IL 62703

February 19, 2009

Refer To: HDA-IL

Mr. Peter Arendovich
1388 Gordon Drive
Lemont, IL 60439

Subject: I-355 South Extension Supplemental Environmental Impact Statement

Dear Mr. Arendovich:

We have received your January 23, 2009, letter to our office concerning the I-355 South Extension and the traffic noise generated from that facility. We signed the Record of Decision (ROD) for this facility on February 25, 2002. The ROD contained the commitment to construct noise walls where determined to be economically reasonable and feasible, at locations identified in the Supplemental Environmental Impact Statement.

We have concluded the Illinois State Toll Highway Authority (Tollway) has appropriately fulfilled the commitments relating to noise abatement that were stipulated in the ROD. The Federal Highway Administration's (FHWA) legal authority regarding the Tollway is limited. Because the Tollway implemented the noise abatement measures stipulated in the ROD, FHWA's responsibility in this project concerning traffic noise has been completed. The FHWA has no legal authority for any further action.

Any further inquiries should be directed to the Tollway at:

Illinois State Toll Highway Authority
2700 Ogden Avenue
Downers Grove, IL 60515
Phone: (630) 241-6800
www.illinoistollway.com

Sincerely,

Norman R. Stoner, P.E.
Division Administrator

MOVING THE AMERICAN ECONOMY

Interstate 355
Post Construction Noise Abatment Evaluation
Archer Avenue to north of 135th Street

	1/20/2008	1/22/2008	1/22/2008
Site 1			
Time of Measurement	8:16am		
Average Leq dBA	59dBA		
Site 2			
Time of Measurement	8:48am		
Average Leq dBA	69dBA		
Site 3			
Time of Measurement	9:22am	5:53am	5:00pm
Average Leq dBA	58dBA	62dBA	62dBA
Site 4			
Time of Measurement	9:49am	6:09am	5:20pm
Average Leq dBA	56dBA	60dBA	61dBA

Table 1 to Part 772—Noise Abatement Criteria

[Hourly A-Weighted Sound Level—decibels (dBA)[1]]

Activity Category	Leq(h)	L_{10}(h)	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 (Exterior)	75 (Exterior)	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.

[1]Either L_{10}(h) or Leq(h) (but not both) may be used on a project.

CERTIFICATE OF SERVICE

The undersigned, being first duly sworn upon oath, deposes and states that a copy of this Notice of Filing and Motion to Dismiss Frivolous Complaint were served upon PETER ARENDROVICH at the United States mail chute located at 2700 Ogden Avenue, Downers Grove, Illinois 60515 on the 15th day of July with proper postage prepaid. I, Robert T. Lane, hereby certify to the foregoing subject to penalty for perjury in accordance with Section I-109 of the Illinois Civil Practice Act.

ROBERT T. LANE