# Traffic Noise Analysis

## I-55 Phase I Engineering Study

Veterans Memorial Tollway (I-355) to Dan Ryan Expressway (I-90/94)

Prepared for:

Illinois Department of Transportation

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I-55 MANAGED LANE PROJECT

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## *SECTION 1: INTRODUCTION*

Interstate 55 (I-55), commonly referred to as the Stevenson Expressway in Cook County, provides the primary southwest-northeast roadway access to the Chicago central business district. It serves Cook County, DuPage County and Will County in the Chicago Metropolitan area. The project limits, shown in Figure 1 (see Appendix A), connect the Veterans Memorial Tollway (I-355, the metropolitan area's outer regional circumferential route) at the southern terminus, the Tri-State Tollway (I-294, the metropolitan area's inner circumferential route) and I-90/94 (Dan Ryan Expressway) to the north.

Previously, an Environmental Assessment (EA)/Finding of No Significant Impact (FONSI)identified a Preferred Alternative of adding one managed lane - an Express Toll Lane (ETL) - in each direction of I-55 on the inside shoulder from I-355 to I-90/94. The FONSI was issued July 20, 2016. As part of that EA/FONSI, a noise study was done to determine noise impacts and to identify feasible and reasonable abatement, which included solicitating viewpoints of benefited receptors (see Section 10: VIEWPOINT SOLICITATION SUMMARY). Fiscal constraints and adjacent community impacts eliminated the further consideration of reconstructing the existing facility. A second study was initiated in Spring 2017 to further improve the operations and reliability of I-55. This new study is evaluating the addition of a second managed lane within the median from east of Interstate 294 (I-294) to Interstate 90/94 (I-90/94), which is the most congested portion of the previous study. The portion from Interstate 355 to I-294 would remain as one ETL in each direction. The existing general-purpose lanes are in good condition and will not be rehabilitated as part of the improvement. Except for proposed geometric modifications of the northbound I-55 mainline and exit ramp to Harlem Avenue, no interchanges or crossing roadways will be reconstructed or improved as part of this project, and no change in roadway elevation is proposed. The new managed toll lane(s) will utilize congestion pricing strategies to maintain reliable service, even during congested morning and evening peak hours.

This traffic noise analysis has been prepared to evaluate traffic noise for the new I-55 Managed Lane Study. The noise study area is within the communities of Woodridge, Darien, Lemont, Willowbrook, Burr Ridge, Indian Head Park, Countryside, McCook, Hodgkins, Summit, Forest View, Stickney and Chicago. The noise study evaluates existing and anticipated future traffic noise conditions and will evaluate potential noise abatement measures if appropriate.

## *SECTION 2: NOISE BACKGROUND AND REGULATIONS*

### Noise Background

Sound is a pressure fluctuation in air, transmitting mechanical energy caused by vibration. Noise is *unwanted* sound. Loudness is measured on a logarithmic scale using units of decibels (dB). Sound is composed of a wide range of frequencies; however, the human ear is not uniformly sensitive to all frequencies. Therefore, an "A"-weighted scale was devised to correspond with range of human hearing, screening out frequencies that cannot be heard. The A-weighted scale is used because:

1) It is easily measured.
2) It approximates the sensitivity of the human ear to sounds of different frequencies.
3) It matches attitudinal surveys of noise annoyance better than other noise measurements.
4) It has been adopted as the basic unit of environmental noise by many agencies around the world for community noise issues.

The equivalent sound level ($L_{eq}$) is the steady-state, A-weighted sound level that contains the same amount of acoustic energy as the actual time-varying, A-weighted sound level over a specified period. If the period is 1 hour, the descriptor is the hourly equivalent sound level or $L_{eq}(h)$, which is widely used by state highway agencies as a descriptor of traffic noise. It is generally the equivalent level of sound (in dB(A)) that represents the level of sound, held constant over a specified period, that denotes the same amount of energy as the actual fluctuating noise over that period. $L_{eq}$ is based on the energy average, not a noise level average.

## Federal Regulations

Traffic noise analyses are required for all projects considered a Type I project. Federal regulations define Type I projects as any of the following:

- The construction of a highway on new location
- The physical alteration of an existing highway where there is either:
  - Substantial Horizontal Alteration - a project that halves the distance between the traffic noise source and the closest receptor from the existing condition to the future build condition, or
  - Substantial Vertical Alteration - a project that removes shielding therefore, exposing the line-of-sight between the receptor and the traffic noise source (this is done by either altering the vertical alignment of the highway or by altering the topography between the highway traffic noise source and the receptor)
- The addition of through-traffic lane(s), which may include the addition of an HOV lane, High-Occupancy Toll [HOT] lane, bus lane, or truck climbing lane
- The addition of an auxiliary lane, except for when the auxiliary lane is a turn lane
- The addition or relocation of interchange lanes or ramps added to a quadrant to complete an existing partial interchange
- Restriping existing pavement for the purpose of adding a through-traffic or auxiliary lane
- The addition of a new or substantial alteration of a weigh station, rest stop, rideshare lot or toll plaza

This proposed improvement to I-55 meets the characteristics of a Type I noise project as it proposes the addition of through-traffic lanes within the existing median of the roadway.

Federal regulations define noise abatement criteria for various land use types. Five separate noise abatement criteria (NAC) are used by the Federal Highway Administration (FHWA) to assess potential noise impacts. A traffic noise impact occurs when noise levels approach (within 1 dB(A)), meet, or exceed the NAC listed in Table 1.[1] In determining the applicable noise activity category for the study area, existing land use was reviewed. The applicable NAC for all residential noise receptors evaluated is 67 dB(A).

**TABLE 1**

**FHWA NOISE ABATEMENT CRITERIA - HOURLY WEIGHTED SOUND LEVEL**

| Activity Category | Activity Criteria dB(A) Leq(h) | Description of Activity Category |
|---|---|---|
| A | 57 (Exterior) | Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue its intended purpose |
| B | 67 (Exterior) | Residential |
| C | 67 (Exterior) | Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings |
| D | 52 (Interior) | Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios |
| E | 72 (Exterior) | Hotels, motels, offices, restaurants/bars, and other developed lands; properties or activities not included in A-D or F |
| F | — | Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing |
| G | — | Undeveloped lands that are not permitted |
| *Activity Categories B, C, and E include permitted undeveloped lands, as applicable* | | |

[1] Based on 23 Code of Federal Regulations Part 772, Procedures for Abatement of Highway Traffic Noise and Construction Noise (adopted 2010).

**IDOT Policy**

Based on the FHWA regulations, State Highway Authorities are allowed to define the noise impacts as 1) the build noise level determined to approach the NAC and 2) the increase in build noise levels determined to be a substantial increase from existing levels. The Illinois Department of Transportation (IDOT) defines noise impacts as follows:

- Design-year traffic noise levels approach, meet or exceed the NAC, with approach defined as 66 dB(A) for the residential NAC of 67 dB(A)
- Design-year traffic noise levels constitute a substantial increase over existing traffic-generated noise levels, defined as an increase of 15 dB(A) or greater

## *SECTION 3: NOISE RECEPTOR SELECTION*

A traffic noise receptor is a discrete or representative location within a Common Noise Environment (CNE); a CNE is a group of receptors with the same Activity Category designation (as detailed in Table 1, above) and which share similar topographical characteristics and a similar level of exposure to noise sources. A "representative" receptor is a location within a CNE that represents the worst-case noise level (often determined by proximity to the dominant noise source, which for this analysis is the I-55 facility) for all other individual represented receptors within that CNE. Traffic noise impacts are defined only for the Build condition, per IDOT policy, and include all representative receptors that would have noise levels that approach (within 1 dBA), meet, or exceed the NAC presented in Table 1 above.

Receptor locations are selected to assess changes in traffic noise levels throughout the project corridor that occur as a result of variations in traffic volume, speed, vehicle mix, roadway alignment (horizontal and vertical), number of lanes, shielding, and ground cover. Proximity to I-55 was the primary factor used to select receptors for modeling and analysis with use of the FHWA Traffic Noise Model (TNM) 2.5. Receptors within 500 feet of proposed improvements were considered for selection, per guidance provided in the *IDOT Highway Traffic Noise Assessment Manual* (2017). This guidance is based upon FHWA's 2010 performance evaluation of TNM, which found that highway traffic noise typically does not cause impacts at distances greater than 500 feet for heavily-traveled freeways. The evaluation also found that TNM under-predicted sound levels for "soft" ground types (turf) and over-predicted sound levels for "hard" ground types (pavement) for receptors farther than 500 feet from the roadway[2].

Table 2 lists the location, type, and the approximate distance to the existing I-55 edge of pavement for each of the representative receptors selected for this analysis. Figure 3 (in Appendix A) depicts aerial photographs of each representative receptor and its corresponding CNE. Land uses identified within the project limit of study (approximately 500 feet from proposed edge of pavement) include residences (Activity Category B); active sport areas, playgrounds/recreation areas, cemeteries, daycare centers, parks, and trails (Activity Category C); hotels, offices, and restaurants (Activity Category E); agricultural lands, industrial uses, maintenance facilities, manufacturing, rail yards, retail facilities, utilities, and warehousing (Activity Category F); and undeveloped lands (Activity Category G). Activity Categories B and C have a NAC of 67 dB(A). Activity Category E has an NAC of 72 dB(A), and Activity Categories F and G have no NAC level. The activity categories for the land uses identified within approximately 500 feet of proposed I-55 edges of pavement in the project area are presented in Figure 2 (Appendix A).

FHWA regulation and IDOT policy stipulate that when determining traffic noise impacts, primary consideration shall be given to exterior areas within Activity Category A, B, C and E land uses where frequent human use occurs. Examples include (but are not limited to) the following:

- Single-family Residences: yards, decks, patios
- Multi-family Residences: patios, decks, balconies; building entrances
- Nursing Homes: patios, decks, balconies; common areas (benches or main entrance)
- Parks: pavilion areas, gazebos, picnic tables, play equipment

[2] U.S. Department of Transportation Research and Innovative Technology Administration. "Ground and Pavement Effects using FHWA's Traffic Noise Model 2.5." April 2010.

- Sports Fields and Golf Courses: playing field, benches, bleachers, tee boxes, etc.
- Permitted (but not yet constructed) residential developments

Undeveloped lands identified within 500 feet of project improvements were investigated for permitted development of noise-sensitive land use. Two areas of permitted residential development were identified. Receptor R3 represents permitted residential lots in the Farmingdale Village subdivision, located along Gloucester Road in the Village of Woodridge. Receptor R42 represents permitted residential development located along Bridewell Drive between Burr Ridge Parkway and Commonwealth Avenue in the Village of Burr Ridge. Both permitted developments were analyzed per the Activity Category B NAC of 67 dB(A).

Potential traffic noise impacts for receptors within Activity Category D land uses are investigated for interior areas, but only if the building(s) are located within 500 feet of the proposed edge of pavement and if the location has no outdoor areas of frequent human use (i.e., no outdoor noise receptors). Since outdoor areas of frequent human use were identified at each potential Activity Category D land use, no interior analysis was conducted for this study. In some cases, an identified CNE contains Activity Category E land uses which have no apparent areas of frequent outdoor use; in such cases, no representative receptor has been selected.

One hundred (100) receptors have been selected to represent noise-sensitive land uses in the project area. Each receptor represents a CNE. Table 2, below, lists each representative receptor, a description of the land use represented, its activity category and associated NAC, the approximate distance to the nearest I-55 through-lane proposed edge of pavement, and its affiliated community or jurisdiction. Representative receptors and respective CNEs are shown on Figure 3 (in Appendix A).

**TABLE 2**
**REPRESENTATIVE RECEPTORS**

| Receptor | Land Use Description | Activity Category (NAC dBA) | Distance (Feet) to I-55 Proposed Edge of Pavement | Geographic Area |
|---|---|---|---|---|
| **R1** | Single-Family Residence | B (67) | 280 | Woodridge |
| **R2** | Permitted Residential Development | B (67) | 210 | Woodridge |
| **R3** | Single-Family Residence | B (67) | 120 | Lemont |
| **R4** | Single-Family Residence | B (67) | 150 | Darien |
| **R5** | Single-Family Residence | B (67) | 110 | Darien |
| **R6** | Active Sport Area (Golf Course) | C (67) | 170 | Darien |
| **R7** | Multi-Family Residence | B (67) | 130 | Darien |
| **R8** | Single-Family Residence | B (67) | 85 | Darien |
| **R9** | Active Sport Area (Golf Course) | C (67) | 360 | Darien |
| **R10** | Single-Family Residence | B (67) | 175 | Darien |
| **R11** | Place of Worship (Playground) | C (67) | 80 | Darien |
| **R12** | Single-Family Residence | B (67) | 455 | Darien |
| **R13** | Single-Family Residence | B (67) | 285 | Darien |
| **R14** | Church (Entrance) | C (67) | 290 | Darien |
| **R15** | Hotel (Exterior Common Area) | E (72) | 295 | Woodridge |
| **R16** | Playground | C (67) | 215 | Darien |
| **R17** | Multi-Family Residence (Condominium) | B (67) | 140 | Darien |
| **R18** | Single-Family Residence | B (67) | 125 | Darien |
| **R19** | Single-Family Residence | B (67) | 100 | Darien |
| **R20** | Single-Family Residence | B (67) | 150 | Darien |
| **R21** | Single-Family Residence | B (67) | 355 | Darien |
| **R22** | Single-Family Residence | B (67) | 195 | Darien |
| **R23** | Hotel (Exterior Common Area) | E (72) | 160 | Darien |
| **R24** | Multi-Family Residence | B (67) | 115 | Willowbrook |
| **R25** | Single-Family Residence | B (67) | 110 | Willowbrook |
| **R26** | Single-Family Residence | B (67) | 145 | Willowbrook |
| **R27** | Playground | C (67) | 235 | Willowbrook |

| Receptor | Land Use Description | Activity Category (NAC dBA) | Distance (Feet) to I-55 Proposed Edge of Pavement | Geographic Area |
|---|---|---|---|---|
| **R28** | Single-Family Residence | B (67) | 125 | Willowbrook |
| **R29** | Single-Family Residence | B (67) | 100 | Darien |
| **R30** | Single-Family Residence | B (67) | 125 | Willowbrook |
| **R31** | Single-Family Residence | B (67) | 145 | Burr Ridge |
| **R32** | Single-Family Residence | B (67) | 400 | Willowbrook |
| **R33** | Hotel (Exterior Common Area) | E (72) | 270 | Willowbrook |
| **R34** | Single-Family Residence | B (67) | 150 | Willowbrook |
| **R35** | Restaurant (Outdoor Dining) | E (72) | 350 | Willowbrook |
| **R36** | Single-Family Residence | B (67) | 230 | Burr Ridge |
| **R37** | Park/Active Sports Area | C (67) | 340 | Burr Ridge |
| **R38** | Multi-Family Residence | B (67) | 355 | Burr Ridge |
| **R39** | Hotel (Exterior Common Area) | E (72) | 170 | Burr Ridge |
| **R40** | Nursing Home (Main Entrance) | C (67) | 455 | Burr Ridge |
| **R41** | Hotel (Exterior Common Area) | E (72) | 460 | Burr Ridge |
| **R42** | Permitted Residential Development | B (67) | 185 | Burr Ridge |
| **R43** | Single-Family Residence | B (67) | 170 | Burr Ridge |
| **R44** | Single-Family Residence | B (67) | 125 | Burr Ridge |
| **R45** | Single-Family Residence | B (67) | 190 | Indian Head Park |
| **R46** | Multi-Family Residence | B (67) | 295 | Indian Head Park |
| **R47** | Single-Family Residence | B (67) | 200 | Countryside |
| **R48** | Park/Active Sports Area | C (67) | 200 | Countryside |
| **R49** | Single-Family Residence | B (67) | 80 | Countryside |
| **R50** | Single-Family Residence | B (67) | 70 | Countryside |
| **R51** | Restaurant/Bar (Outdoor Dining) | E (72) | 455 | Countryside |
| **R52** | Playground | C (67) | 210 | Countryside |
| **R53** | Single-Family Residence | B (67) | 100 | Countryside |
| **R54** | Single-Family Residence | B (67) | 175 | Countryside |
| **R55** | Single-Family Residence | B (67) | 390 | Hodgkins |
| **R56** | Park/Active Sports Area | C (67) | 405 | Summit |
| **R57** | Single-Family Residence | B (67) | 210 | Summit |
| **R58** | Single-Family Residence | B (67) | 165 | Chicago |
| **R59** | Park | C (67) | 195 | Chicago |
| **R60** | Single-Family Residence | B (67) | 245 | Chicago |
| **R61** | Park/Active Sports Area | C (67) | 220 | Chicago |
| **R62** | Single-Family Residence | B (67) | 445 | Chicago |
| **R63** | Park Bench | C (67) | 425 | Chicago |
| **R64** | Park/Active Sports Area | C (67) | 435 | Chicago |
| **R65** | Single-Family Residence | B (67) | 440 | Chicago |
| **R66** | Multi-Family Residence (Apartment Balcony) | B (67) | 85 | Chicago |
| **R67** | Single-Family Residence | B (67) | 415 | Chicago |
| **R68** | Single-Family Residence | B (67) | 375 | Chicago |
| **R69** | Mixed-Use Residential | B (67) | 260 | Chicago |
| **R70** | Mixed-Use Residential | B (67) | 180 | Chicago |
| **R71** | Park (Playground) | C (67) | 445 | Chicago |
| **R72** | Single-Family Residence | B (67) | 221 | Chicago |
| **R73** | Single-Family Residence | B (67) | 185 | Chicago |
| **R74** | Single-Family Residence | B (67) | 180 | Chicago |
| **R75** | Single-Family Residence | B (67) | 220 | Chicago |
| **R76** | Single-Family Residence | B (67) | 244 | Chicago |
| **R77** | Mixed-Use Residential | B (67) | 45 | Chicago |
| **R78** | Single-Family Residence (Balcony) | B (67) | 230 | Chicago |

| Receptor | Land Use Description | Activity Category (NAC dBA) | Distance (Feet) to I-55 Proposed Edge of Pavement | Geographic Area |
|---|---|---|---|---|
| **R79** | Single-Family Residence | B (67) | 110 | Chicago |
| **R80** | Mixed-Use Residential | B (67) | 15 | Chicago |
| **R81** | Mixed-Use Residential | B (67) | 40 | Chicago |
| **R82** | Mixed-Use Residential | B (67) | 30 | Chicago |
| **R83** | Day Care Playground Area | C (67) | 70 | Chicago |
| **R84** | Multi-Family Residence | B (67) | 70 | Chicago |
| **R85** | Nursing Home (Building Entrance) | C (67) | 95 | Chicago |
| **R86** | Multi-Family Residence (Balcony) | B (67) | 80 | Chicago |
| **R87** | Multi-Family Residence | B (67) | 70 | Chicago |
| **R88** | Mixed-Use Residential | B (67) | 165 | Chicago |
| **R89** | Restaurant (Outdoor Dining) | E (72) | 210 | Chicago |
| **R90** | Mixed-Use Residential | B (67) | 215 | Chicago |
| **R91** | Mixed-Use Residential | B (67) | 230 | Chicago |
| **R92** | Mixed-Use Residential | B (67) | 230 | Chicago |
| **R93** | Mixed-Use Residential | B (67) | 205 | Chicago |
| **R94** | Mixed-Use Residential | B (67) | 155 | Chicago |
| **R95** | Multi-Family Residence | B (67) | 200 | Chicago |
| **R96** | Multi-Family Residence | B (67) | 300 | Chicago |
| **R97** | Park | C (67) | 450 | Chicago |
| **R98** | Single-Family Residence (Balcony) | B (67) | 265 | Chicago |
| **R99** | Multi-Family Residence | B (67) | 225 | Chicago |
| **R100** | Multi-Family Residence | B (67) | 140 | Chicago |

## ***SECTION 4: NOISE MONITORING***

Noise monitoring provides a "snapshot" of existing site conditions. Field measurements and the data collected during monitoring are used to validate FHWA's approved traffic noise prediction model (TNM) to ensure it accurately predicts each area's noise environment. Traffic noise levels measured during monitoring events are representative of the traffic characteristics (volume, speed, and composition) for the period measured, and the period measured may or may not be the peak-hour traffic condition. The monitored noise levels may be influenced by noise sources in the area other than traffic noise, and by site features that provide shielding (such as existing berms or structures). While certain features that provide shielding (such as barriers, terrain, and buildings) can be adequately represented in TNM, non-traffic noise sources cannot.

Noise monitoring in the I-55 project corridor was conducted at 25 receptor locations, representing noise-sensitive land uses and noise environments present in the corridor. The selection of these locations was reviewed and approved by IDOT and FHWA.

### Traffic Volumes

Traffic volumes on I-55 adjacent to receptors were counted during each fifteen-minute noise monitoring period. The number of cars and trucks were recorded separately along with any other noise sources observed during monitoring. The traffic volumes counted were extrapolated to hourly volumes for TNM input. This procedure is accepted by FHWA as a representative noise monitoring method, detailed in the IDOT Highway Traffic Noise Assessment Manual (2017).

### Time of Day for Measurements

Noise monitoring is typically conducted during the period representing the worst hourly noise level. This may or may not be during the peak hour traffic volumes, as traffic may be operating under stop-and-go conditions or at a reduced travel speed during the peak hour. Monitoring typically occurred during the midday off-peak period of travel when free-flow conditions were present on I-55, which generates higher sound levels as compared to congested peak hour conditions. Noise monitoring was conducted on November 10 and 11 and December 3, 9, and 10 of 2015.

## Weather Conditions

Weather conditions affect noise measurement readings. Measurements cannot be taken if wind speed exceeds 12 mph. A wind screen was used at all times during monitoring to reduce wind noise. The weather conditions observed during the noise monitoring were within the recommended ranges for all parameters:

**TABLE 3**

**WEATHER CONDITIONS DURING I-55 TRAFFIC NOISE MONITORING**

| Date | Pavement | Humidity | Temperature | Wind Speed |
|---|---|---|---|---|
| November 10, 2015 | Dry | 36%-38% | 54°-55° F | 3-8 mph |
| November 11, 2015 | Dry | 52%-76% | 40°-63° F | Calm-10 mph |
| December 3, 2015 | Dry | 73%-79% | 35°-37° F | 8-10 mph |
| December 9, 2015 | Dry | 79%-82% | 43°-47° F | 6-10 mph |
| December10, 2015 | Dry | 58%-78% | 46°-53° F | 5-10 mph |
| *Required Condition* | *Dry* | *Less than 90%* | *14° to 112° F* | *12 mph or less* |

*Source: National Weather Service*

## Instrumentation

Measurements were performed using a Larson Davis Model 820 sound level meter, Model CAL200 calibrator, and Model PRM828 preamp with a PCB Piezotronics Model 377B02 free-field microphone. For each measurement, the calibrated meter was placed five feet above ground level in an outdoor location where human activity typically occurs. Monitoring was conducted using the A-weighted scale.

**TABLE 4**

**NOISE MONITORING AND VALIDATION RESULTS (Leq)**

| Receptor | Monitored dB(A) | Modeled dB(A)* | Difference |
|---|---|---|---|
| R1 | 71 | 68 | 3 |
| R5 | 80 | 77 | 3 |
| R6 | 71 | 72 | -1 |
| R11 | 77 | 77 | 0 |
| R16 | 68 | 68 | 0 |
| R19 | 77 | 76 | 1 |
| R24 | 79 | 76 | 3 |
| R26 | 75 | 72 | 3 |
| R30 | 72 | 73 | -1 |
| R34 | 73 | 72 | 1 |
| R36 | 71 | 72 | -1 |
| R38 | 63 | 66 | -3 |
| R52 | 63 | 65 | -2 |
| R54 | 68 | 70 | -2 |
| R55 | 71 | 69 | 2 |
| R56 | 66 | 66 | 0 |
| R59 | 67 | 66 | 1 |
| R61 | 68 | 66 | 2 |
| R63 | 60 | 59 | 1 |
| R64 | 64 | 65 | -1 |
| R72 | 70 | 70 | 0 |
| R75 | 69 | 68 | 0 |
| R76 | 65 | 64 | 1 |
| R86 | 66 | 67 | -1 |
| R89 | 70 | 68 | 2 |

** Represents modeled noise levels using existing-condition inputs and traffic volumes observed in the field for each monitoring event. Traffic volumes observed during noise monitoring vary from the peak-hour traffic volumes used for project development. For this reason, the modeled noise levels presented in Table 3 vary from those presented in Table 4.*

### Field Noise Monitoring Results and Model Validation

To validate the noise model for a given receptor location, traffic volumes and mix observed during the field monitoring for that location are used as model input; the model results (sound level output) is then compared to the field-monitored level. Modeled noise levels must be within 3 dB of the monitored noise levels for the model to be validated.

The noise levels measured at the 25 monitoring sites range from 60 dB(A) to 80 dB(A). The difference between modeled and monitored noise levels provides an indication of noise model validity; for this analysis, modeled noise levels are within 3 dB of the monitored levels (see Table 4), which, per IDOT traffic noise policy, validates the TNM 2.5 modeling.

## *SECTION 5: NOISE ANALYSIS METHODOLOGY*

The Preferred Alternative for the I-55 Managed Lane Study is an Express Toll Lane (ETL) with either a continuous-access operation or a controlled-access operation, and involves the construction of one express toll lane within the I-55 median (both directions) from I-355 to east of La Grange Road and two express toll lanes within the median (both directions) from east of La Grange Road to I-90/I-94. For the purposes of this noise analysis, traffic volumes for *continuous-access operation* were utilized. This is considered to be a conservative approach to the evaluation, as continuous-access operation will tend to result in slightly higher traffic volumes.

Prediction of noise levels is one step in assessing potential noise impacts and abatement strategies. Traffic noise levels were predicted using existing and future (2040) traffic volumes. TNM inputs are described in the following sections, and include traffic volume, traffic mix (cars, heavy trucks, and medium trucks), traffic controls, receptor distance, elevation, and average speeds during free-flowing conditions.

### Traffic Volumes

Study area traffic volumes (daily and peak hour) utilized project traffic for the most recent year available (considered to be the existing condition), the No Build (2040) condition, and the proposed Build (2040) condition. Upon review of existing and 2040 No Build and Build project traffic data, it was determined that the AM peak represents the highest-volume peak condition ("worst case") traffic scenario. Therefore, the AM peak volumes were used for the FHWA TNM traffic input for the sound level modeling of existing, no build, and build scenarios for this analysis.

### Traffic Composition and Speed Conditions

TNM traffic volume and composition input for the project area included passenger vehicles, single-unit (medium) trucks, and multi-unit (heavy) trucks. Traffic mix observed during project noise monitoring activities indicate that heavy truck volumes ranged from 77% to 92% of total truck traffic throughout the corridor. For existing conditions, the percentage of truck traffic for the I-55 mainline is estimated to range from 5% to 16% for northbound I-55 travel lanes, and from 8% to 28% for southbound I-55. Under No Build (2040) and Build (2040) conditions, truck traffic is estimated to range from 3% to 17% for northbound I-55 and from 7% to 26% for southbound lanes. Under all scenarios, automobiles (passenger vehicles) account for the balance of the total traffic composition.

Free-flow conditions were assumed for the modeling of existing and future-condition noise levels; therefore, the posted speed limit (55 mph) was used for I-55 traffic speed TNM input.

### Receptor Distance/Elevation

The distance and elevation of each receptor influences the predicted traffic noise level. As listed in Table 2, distances between representative receptors and nearest I-55 through-lane proposed edge of pavement range from 15 feet (Receptor 80) to 460 feet (Receptor R41). The specific location of the receptor is based upon the location where outdoor activity is observed or anticipated to occur, verified via aerial photography and field reviews.

## *SECTION 6: TNM RESULTS AND TRAFFIC NOISE IMPACTS*

Existing, No Build (2040), and Build-condition (2040) traffic noise levels were predicted for 100 representative receptors using approved noise modeling software (FHWA TNM 2.5). Receptor locations are illustrated on Figure 3 (see Appendix A). Table 5 presents the modeled noise levels, as well as the anticipated difference in noise levels between Existing and Build-condition scenarios:

**TABLE 5**
**TRAFFIC NOISE LEVEL SUMMARY: TNM RESULTS**

| Receptor Number | Activity Category (NAC dBA) | Existing dB(A) | No Build (2040) dB(A) | Build (2040) dB(A) | Difference: Existing to Build | Community |
|---|---|---|---|---|---|---|
| R1 | B (67) | 68 | 69 | 69 | 1 | Woodridge |
| R2 | B (67) | 69 | 70 | 70 | 1 | Woodridge |
| R3 | B (67) | 61 | 63 | 62 | 1 | Lemont |
| R4 | B (67) | 73 | 74 | 74 | 1 | Darien |
| R5 | B (67) | 76 | 76 | 77 | 1 | Darien |
| R6 | C (67) | 72 | 72 | 73 | 1 | Darien |
| R7 | B (67) | 73 | 74 | 75 | 2 | Darien |
| R8 | B (67) | 76 | 77 | 77 | 1 | Darien |
| R9 | C (67) | 66 | 67 | 70 | 4 | Darien |
| R10 | B (67) | 71 | 72 | 74 | 3 | Darien |
| R11 | C (67) | 77 | 77 | 78 | 1 | Darien |
| R12 | B (67) | 65 | 65 | 68 | 3 | Darien |
| R13 | B (67) | 69 | 69 | 71 | 2 | Darien |
| R14 | B (67) | 65 | 66 | 68 | 3 | Darien |
| R15 | E (72) | 68 | 69 | 70 | 2 | Woodridge |
| R16 | C (67) | 68 | 69 | 69 | 1 | Darien |
| R17 | B (67) | 73 | 73 | 74 | 1 | Darien |
| R18 | B (67) | 71 | 72 | 72 | 1 | Darien |
| R19 | B (67) | 75 | 76 | 77 | 2 | Darien |
| R20 | B (67) | 73 | 73 | 74 | 1 | Darien |
| R21 | B (67) | 65 | 65 | 67 | 2 | Darien |
| R22 | B (67) | 71 | 71 | 72 | 1 | Darien |
| R23 | E (72) | 72 | 73 | 74 | 2 | Darien |
| R24 | B (67) | 76 | 76 | 77 | 1 | Willowbrook |
| R25 | B (67) | 65 | 65 | 66 | 1 | Willowbrook |
| R26 | B (67) | 72 | 73 | 73 | 1 | Willowbrook |
| R27 | C (67) | 67 | 68 | 67 | 0 | Willowbrook |
| R28 | B (67) | 72 | 72 | 72 | 0 | Willowbrook |
| R29 | B (67) | 73 | 73 | 74 | 1 | Darien |
| R30 | B (67) | 73 | 73 | 75 | 2 | Willowbrook |
| R31 | B (67) | 71 | 72 | 72 | 1 | Burr Ridge |
| R32 | B (67) | 64 | 64 | 65 | 1 | Willowbrook |
| R33 | E (72) | 69 | 69 | 70 | 1 | Willowbrook |
| R34 | B (67) | 71 | 72 | 72 | 1 | Willowbrook |
| R35 | E (72) | 62 | 63 | 63 | 1 | Willowbrook |
| R36 | B (67) | 72 | 72 | 73 | 1 | Burr Ridge |
| R37 | C (67) | 67 | 68 | 68 | 1 | Burr Ridge |
| R38 | B (67) | 66 | 66 | 69 | 3 | Burr Ridge |
| R39 | E (72) | 72 | 73 | 74 | 2 | Burr Ridge |
| R40 | C (67) | 64 | 64 | 66 | 2 | Burr Ridge |
| R41 | E (72) | 65 | 65 | 67 | 2 | Burr Ridge |
| R42 | B (67) | 71 | 72 | 72 | 1 | Burr Ridge |

| Receptor Number | Activity Category (NAC dBA) | Existing dB(A) | No Build (2040) dB(A) | Build (2040) dB(A) | Difference: Existing to Build | Community |
|---|---|---|---|---|---|---|
| R43 | B (67) | 62 | 63 | 62 | 0 | Burr Ridge |
| R44 | B (67) | 63 | 64 | 64 | 1 | Burr Ridge |
| R45 | B (67) | 70 | 70 | 70 | 0 | Indian Head Park |
| R46 | B (67) | 71 | 72 | 73 | 2 | Indian Head Park |
| R47 | B (67) | 63 | 64 | 64 | 1 | Countryside |
| R48 | C (67) | 60 | 61 | 61 | 1 | Countryside |
| R49 | B (67) | 64 | 64 | 65 | 1 | Countryside |
| R50 | B (67) | 77 | 78 | 79 | 2 | Countryside |
| R51 | E (72) | 71 | 71 | 72 | 1 | Countryside |
| R52 | C (67) | 64 | 65 | 65 | 1 | Countryside |
| R53 | B (67) | 72 | 72 | 73 | 1 | Countryside |
| R54 | B (67) | 69 | 70 | 70 | 1 | Countryside |
| R55 | B (67) | 68 | 69 | 70 | 2 | Hodgkins |
| R56 | C (67) | 64 | 66 | 66 | 2 | Summit |
| R57 | B (67) | 66 | 67 | 68 | 2 | Summit |
| R58 | B (67) | 60 | 61 | 62 | 2 | Chicago |
| R59 | C (67) | 61 | 62 | 63 | 2 | Chicago |
| R60 | B (67) | 62 | 63 | 64 | 2 | Chicago |
| R61 | C (67) | 64 | 65 | 66 | 2 | Chicago |
| R62 | B (67) | 60 | 61 | 62 | 2 | Chicago |
| R63 | C (67) | 58 | 59 | 59 | 1 | Chicago |
| R64 | C (67) | 64 | 64 | 65 | 1 | Chicago |
| R65 | B (67) | 64 | 65 | 65 | 1 | Chicago |
| R66 | B (67) | 66 | 67 | 66 | 0 | Chicago |
| R67 | B (67) | 59 | 59 | 59 | 0 | Chicago |
| R68 | B (67) | 62 | 63 | 63 | 1 | Chicago |
| R69 | B (67) | 61 | 61 | 63 | 2 | Chicago |
| R70 | B (67) | 62 | 63 | 65 | 3 | Chicago |
| R71 | C (67) | 55 | 55 | 57 | 2 | Chicago |
| R72 | B (67) | 68 | 68 | 68 | 0 | Chicago |
| R73 | B (67) | 67 | 67 | 67 | 0 | Chicago |
| R74 | B (67) | 64 | 65 | 64 | 0 | Chicago |
| R75 | B (67) | 67 | 67 | 67 | 0 | Chicago |
| R76 | B (67) | 63 | 63 | 63 | 0 | Chicago |
| R77 | B (67) | 67 | 67 | 67 | 0 | Chicago |
| R78 | B (67) | 68 | 68 | 69 | 1 | Chicago |
| R79 | B (67) | 68 | 68 | 69 | 1 | Chicago |
| R80 | B (67) | 64 | 65 | 66 | 2 | Chicago |
| R81 | B (67) | 77 | 78 | 79 | 2 | Chicago |
| R82 | B (67) | 66 | 67 | 70 | 4 | Chicago |
| R83 | C (67) | 67 | 67 | 68 | 1 | Chicago |
| R84 | B (67) | 69 | 69 | 71 | 2 | Chicago |
| R85 | B (67) | 64 | 64 | 65 | 1 | Chicago |
| R86 | B (67) | 74 | 74 | 75 | 1 | Chicago |
| R87 | B (67) | 65 | 66 | 66 | 1 | Chicago |
| R88 | B (67) | 67 | 68 | 69 | 2 | Chicago |
| R89 | E (72) | 61 | 61 | 61 | 1 | Chicago |
| R90 | B (67) | 62 | 63 | 63 | 1 | Chicago |
| R91 | B (67) | 61 | 61 | 62 | 1 | Chicago |
| R92 | B (67) | 65 | 65 | 65 | 0 | Chicago |

| Receptor Number | Activity Category (NAC dBA) | Existing dB(A) | No Build (2040) dB(A) | Build (2040) dB(A) | Difference: Existing to Build | Community |
|---|---|---|---|---|---|---|
| R93 | B (67) | 67 | 68 | 68 | 1 | Chicago |
| R94 | B (67) | 64 | 65 | 65 | 1 | Chicago |
| R95 | B (67) | 61 | 62 | 62 | 1 | Chicago |
| R96 | B (67) | 62 | 62 | 63 | 1 | Chicago |
| R97 | C (67) | 61 | 62 | 62 | 1 | Chicago |
| R98 | B (67) | 64 | 64 | 65 | 1 | Chicago |
| R99 | B (67) | 60 | 60 | 61 | 1 | Chicago |
| R100 | B (67) | 70 | 70 | 70 | 0 | Chicago |

*Build-condition (2040) noise levels that approach (within 1 dBA), meet, or exceed the applicable Activity Category Noise Abatement Criteria (NAC) constitute a* **noise impact.**

## Observations and Conclusions

As shown in Table 5, existing noise levels at the 100 representative receptors analyzed range from 55 dB(A) to 77 dB(A). Predicted No Build (2040) noise levels range from 55 dB(A) to 78 dB(A). Most representative receptors show no increase to a 1 dB(A) increase from Existing to No Build (2040) conditions, with select receptors experiencing a 2 dB(A) increase.

TNM-predicted Build (2040) condition traffic noise levels range from 57 dB(A) to 79 dB(A) and range from no increase to a 4 dB(A) increase over Existing levels. Most receptors experience a 1 dB(A) to 2 dB(A) Build-condition increase over Existing levels. With respect to No Build levels, the Build condition levels range from a 1 dB(A) *decrease* to a 3 dB(A) increase.

Across all 100 representative receptors, the average overall sound level change from the No Build condition to the Build condition is less than 1 dB(A). Under Build (2040) conditions, 63 of the 100 (63%) representative receptor locations approach, meet, or exceed the FHWA NAC, and therefore warrant noise abatement analysis. None of the representative receptors are predicted to experience a substantial increase-type impact (15 dB or greater increase in traffic noise levels from the Existing condition to the future Build condition). Representative receptors with a predicted noise impact are identified in Table 5.

Table 6 further summarizes the relative noise level differences between No Build (2040) levels and Build (2040) levels, reporting the change in dB(A) and providing a description of how the human ear would perceive that level of noise change. Commonly accepted principles regarding perception of noise level changes, as cited in the IDOT Highway Traffic Noise Assessment Manual, include:

- ± 10 dB(A) a doubling or halving of perceived noise level
- ± 5 dB(A) readily perceptible change
- ± 3 dB(A) barely perceptible change
- ± 1 dB(A) less than barely perceptible change

Table 6 indicates that differences between No Build (2040) noise levels and Build (2040) levels would be less than barely perceptible to barely perceptible:

**TABLE 6**

**NOISE CHANGE FROM NO BUILD (2040) TO BUILD (2040) CONDITIONS**

| Noise Level Perception | dB(A) Change | Instances Among Representative Receptors Analyzed |
|---|---|---|
| Readily Perceptible | +5 or Greater | 0 |
| Barely Perceptible | +3 to +4 | 3 |
| Less than Barely Perceptible | +2 to -2 | 97 |
| Barely Perceptible | -3 to -4 | 0 |
| Readily Perceptible | -5 or Greater | 0 |
| | Total | 100 |

## *SECTION 7: ABATEMENT ANALYSIS*

### Abatement Alternatives

Traffic noise abatement measures were considered for impacted representative receptors (those with future Build-condition noise levels that approach, meet, or exceed the applicable FHWA NAC. The most feasible approach to abating noise impacts in these areas is to construct a noise barrier, which may include a noise wall, an earthen berm, or a combination of both. Noise walls are the most practical measure for this project, as most potential abatement locations require placement on elevated roadway structure or in locations where existing constraints (such as local roadways) do not accommodate the wider footprint associated with earthen berms. Noise abatement analysis is conducted for all receptors represented within each CNE containing an impacted representative receptor.[3]

The FHWA's TNM 2.5 software was used to perform the noise barrier feasibility and reasonability evaluation for impacted receptors. When determining if an abatement measure is feasible and reasonable, the criteria considered include: the noise reduction achieved, the number of receptors benefited, the total cost, and cost per benefited receptor.

### Feasibility and Reasonableness

An analysis of noise abatement measures (noise barriers) was conducted in conformance with FHWA requirements contained in Title 23 Code of Federal Regulations Part 772 for each of the impacted representative receptors. In order for a noise abatement measure to be constructed, it must meet both the feasibility and reasonableness criteria, as described below:

Feasibility

The feasibility evaluation is a combination of acoustical and engineering factors considered in the evaluation of a noise abatement measure. The acoustical portion of the IDOT policy, as required by FHWA regulations, considers noise abatement to be feasible if it achieves at least a 5 dB(A) noise reduction for at least two impacted receptors. Factors including (but not limited to) safety, barrier height, topography, drainage, utilities, maintenance, and access issues are also considered.

Reasonableness

As per FHWA regulations, a noise abatement measure is determined to be reasonable when all three of the following reasonableness evaluation factors are met:

- the abatement measure achieves IDOT's noise reduction design goal
- the abatement measure is determined to be cost-effective
- the consideration of the viewpoints of benefited receptors (property owners and residents) results in a majority desiring the abatement

The IDOT noise reduction design goal is to achieve an 8 dB(A) traffic noise reduction for at least one benefited receptor. A noise abatement measure is considered cost-effective if the noise barrier construction cost per benefited receptor is less than the allowable cost per benefited receptor. A benefited receptor is any receptor that is afforded at least a 5 dB(A) traffic noise reduction from the proposed noise abatement measure.

FHWA regulations allow each State Highway Authority to establish cost criteria for determining cost-effectiveness. IDOT policy establishes that the actual cost per benefited receptor shall be based on a noise barrier cost of $30 per square foot, which includes engineering, materials, and construction. The base value allowable cost is $30,000 per benefited receptor, which per IDOT policy, can be increased based on three factors (these factors are considered for all benefited receptors):

[3] In the abatement analysis section of the report, all instances of "receptor," unless otherwise noted, are represented receptors.

- the absolute noise level of the benefited receptor in the design year build scenario before noise abatement
- the predicted incremental increase in design year build scenario noise level (before noise abatement) compared to the existing level at the benefited receptor
- the date of development of the benefited receptor property compared to the construction date of the highway

**Absolute Noise Level Consideration**

| Predicted Build Noise Level (Before Noise Abatement) | Dollars Added to Base Value Cost Per Benefited Represented Receptor |
|---|---|
| Less than 70 dB(A) | $0 |
| 70 to 74 dB(A) | $1,000 |
| 75 to 79 dB(A) | $2,500 |
| 80 dB(A) or greater | $5,000 |

*Source: IDOT Highway Traffic Noise Assessment Manual*

**Increase in Noise Level Consideration**

| Predicted Increase in Noise Level from Existing to Build Condition (Before Noise Abatement) | Dollars Added to Base Value Cost Per Benefited Represented Receptor |
|---|---|
| Less than 5 dB(A) | $0 |
| 5 to 9 dB(A) | $1,000 |
| 10 to 14 dB(A) | $2,500 |
| 15 dB(A) or greater | $5,000 |

*Source: IDOT Highway Traffic Noise Assessment Manual*

**New Alignment / Construction Date Consideration**

| Project is on New Alignment OR the Receptor Existed Prior to the Original Construction of the Highway | Dollars Added to Base Value Cost Per Benefited Represented Receptor |
|---|---|
| NO for both | $0 |
| YES for either | $5,000 |

*Source: IDOT Highway Traffic Noise Assessment Manual*

If a noise abatement measure is feasible, achieves the cost-effectiveness criterion, and achieves the IDOT noise reduction design goal, the viewpoints of benefited receptors are then solicited regarding construction of the noise barrier.

## Noise Barrier Analysis

TNM was used to perform the noise barrier feasibility and reasonableness check for CNEs with at least two impacted receptors. When determining if an abatement measure is feasible and reasonable, the noise reductions achieved, number of residences benefited, total barrier cost, and total cost per residence benefited are considered. Noise barriers are displayed on Figure 3 (Appendix A).

### Existing Noise Barriers

The project corridor contains three existing noise barriers (B2, B11, and B14) constructed along I-55 in the project corridor (within the villages of Lemont, Burr Ridge, Countryside), and one (B13) constructed along I-294 near its I-55 overpass (located in the Village of Countryside). Six representative receptors situated in the shadow zones of B2, B11, and B14 (R3, R43, R44, R47, R48, and R49) were selected for inclusion in the TNM analysis for this study (along with the barriers themselves). None of these six receptors were predicted to experience traffic noise impacts.

New Noise Barriers Evaluated

Eighteen noise barriers were evaluated for the abatement of predicted noise impacts (see Table 5 in Section 6 for predicted impacts). All eighteen barriers were found to be feasible (meaning they could achieve at least a 5 dB(A) reduction for at least two impacted receptors). Due to constructability and maintenance issues related to Barrier B22 on the existing ramp from southbound I-90/I-94 to southbound I-55, the east terminus of B22 has been modified, shortening the proposed barrier length by approximately 643 feet. The existing ramp structure to the east of the modified B22 terminus was not originally designed to support noise barriers (see picture showing limits of existing structural support for noise barriers); this modification allows B22 to be a constructible noise barrier.

Southbound I-90/I-94 to Southbound I-55 Ramp, facing northeast
Structural supports circled in red

All eighteen barriers were found to meet the first reasonableness criterion (i.e., achieve the IDOT noise reduction design goal of at least an 8 dB(A) traffic noise reduction for at least one benefited receptor). The eighteen barriers were then evaluated for cost-effectiveness. Table 7 summarizes the results of the adjusted allowable cost per benefited receptor (AACBR) determinations for each barrier (adjustment criteria are detailed above in the "Feasibility and Reasonableness" subsection). Table 8 summarizes the results of the noise abatement evaluation:

**TABLE 7**
**ADJUSTED ALLOWABLE COST PER BENEFITED RECEPTOR (AACBR)**

| Barrier ID | Corresponding Representative Receptors | Number of Benefited Receptors | Average* Adjustment for Receptors Pre-Dating I-55 | Average* Adjustment for Absolute Noise Level | Average* Adjustment for Noise Increase | Cumulative Adjustment Factor | AACBR |
|---|---|---|---|---|---|---|---|
| B1 | R1-R2 | 112 | $0 | $0 | $0 | $0 | $30,000 |
| B3 | R4-R14 | 271 | $387 | $312 | $0 | $699 | $30,699 |
| B4 | R15-R20 | 270 | $296 | $485 | $0 | $781 | $30,781 |
| B5 | R21-R23 | 129 | $78 | $977 | $0 | $1,054 | $31,054 |
| B6 | R24-R27 | 241 | $166 | $396 | $0 | $562 | $30,562 |
| B7 | R28-R34 | 119 | $924 | $559 | $0 | $1,483 | $31,483 |
| B8 | R36-R37 | 34 | $3,676 | $118 | $0 | $3,794 | $33,794 |
| B9 | R38-R41 | 320 | $219 | $375 | $0 | $594 | $30,594 |
| B10 | R42 | 29 | $0 | $345 | $0 | $345 | $30,345 |
| B12 | R46 | 27 | $0 | $0 | $0 | $0 | $30,000 |
| B15-B16 | R50-R53 | 20 | $750 | $875 | $0 | $1,625 | $31,625 |
| B17 | R54 | 8 | $625 | $250 | $0 | $875 | $30,875 |
| B18 | R55 | 151 | $0 | $0 | $0 | $0 | $30,000 |
| B19 | R56-R57 | 229 | $3,821 | $0 | $0 | $3,821 | $33,821 |
| B20 | R61-R62 | 13 | $1,538 | $0 | $0 | $1,538 | $31,538 |
| B21 | R66 | 63 | $0 | $0 | $0 | $0 | $30,000 |
| B22 | R72-R79 | 349 | $2,407 | $57 | $0 | $2,464 | $32,464 |
| B23 | R80-R100 | 431 | $3,817 | $325 | $0 | $4,142 | $34,142 |

** Averaged among the benefited receptors for each barrier. The Cumulative Adjustment Factor may not equal the exact sum of the individual adjustment factors due to rounding.*

## TABLE 8
### NOISE ABATEMENT ANALYSIS SUMMARY

| Barrier | Location of Barrier Along I-55 | Barrier Height (ft) | Barrier Length (ft) | Barrier Cost (1) | Allowable Barrier Cost (2) | Benefitted Receptors (3) | AACBR (4) | Actual CBR (5) | Ratio (6) | Finding |
|---|---|---|---|---|---|---|---|---|---|---|
| B1 | North Side between I-355 & Lemont | 16 | 5,250 | $2,520,000 | $3,360,000 | 112 | $30,000 | $22,500 | 0.75 | Cost-Effective |
| B3 | North Side between Lemont & S. Cass | 15-20 | 9,850 | $5,266,200 | $8,319,500 | 271 | $30,699 | $19,432 | 0.63 | Cost-Effective |
| B4 | South Side between Lemont & S. Cass | 15-18 | 7,250 | $3,439,380 | $8,311,000 | 270 | $30,781 | $12,738 | 0.41 | Cost-Effective |
| B5 | North Side along Ramp to Northbound Lemont | 14 | 1,700 | $714,000 | $4,006,000 | 129 | $31,054 | $5,535 | 0.18 | Cost-Effective |
| B6 | North Side between S. Cass & Kingery | 16-18 | 5,450 | $2,824,620 | $7,365,442 | 241 | $30,562 | $11,720 | 0.38 | Cost-Effective |
| B7 | South Side between S. Cass & Kingery | 15-19 | 6,450 | $3,373,230 | $3,746,500 | 119 | $31,483 | $28,346 | 0.90 | Cost-Effective |
| B8 | North Side between Kingery and County Line | 16 | 2,350 | $1,128,000 | $1,149,000 | 34 | $33,794 | $33,176 | 0.98 | Cost-Effective |
| B9 | South Side between S. Cass & County Line | 21 | 3,450 | $2,173,500 | $9,790,000 | 320 | $30,594 | $6,792 | 0.22 | Cost-Effective |
| B10 | South Side between County Line & I-294 | 20 | 1,400 | $840,000 | $880,000 | 29 | $30,345 | $28,966 | 0.95 | Cost-Effective |
| B12 | Along Northbound Exit Ramp to I-294 South | 23 | 1,500 | $1,035,000 | $810,000 | 27 | $30,000 | $38,333 | 1.28 | Not Cost-Effective (Not Reasonable) |
| B15/B16 | South Side at Willow Springs (B15)<br>Along Ramp from NB I-294 to NB I-55 (B16) | 10 (B15)<br>12-17 (B16) | 1,650 (B15)<br>1,650 (B16) | $1,242,150 | $632,500 | 20 | $31,625 | $62,108 | 1.96 | Not Cost-Effective (Not Reasonable) |
| B17 | South Side just West of La Grange | 14-20 | 1,750 | $844,500 | $247,000 | 8 | $30,875 | $105,563 | 3.42 | Not Cost-Effective (Not Reasonable) |
| B18 | Along Southbound Exit Ramp to La Grange | 13-18 | 2,150 | $1,021,170 | $4,530,000 | 151 | $30,000 | $6,763 | 0.23 | Cost-Effective |
| B19 | Along Northbound Exit Ramp to S. Harlem | 14-18 | 2,250 | $1,069,230 | $7,745,000 | 229 | $33,821 | $4,669 | 0.14 | Cost-Effective |
| B20 | South Side between S. Central and Cicero | 20 | 2,150 | $1,290,000 | $410,000 | 13 | $31,538 | $99,231 | 3.15 | Not Cost-Effective (Not Reasonable) |
| B21 | South Side at S. Western Ave/S. Western Blvd. | 14 | 900 | $378,000 | $1,890,000 | 63 | $30,000 | $6,000 | 0.20 | Cost-Effective |
| B22 | North Side just West of I-90/94 | 12 | 6,307 | $2,270,520 | $11,329,936 | 349 | $32,464 | $6,506 | 0.20 | Cost-Effective |
| B23 | South Side just West of I-90/94 | 13 | 6,800 | $2,652,000 | $14,715,202 | 431 | $34,142 | $6,153 | 0.18 | Cost-Effective |

(1) ***Barrier Cost*** *is based on the IDOT policy value of $30 per square foot*
(2) ***Allowable Barrier Cost*** *is based on a figure of $30,000 per benefited receptor + adjustment factors (as detailed in Section 4 of the IDOT Highway Traffic Noise Assessment Manual)*
(3) *A* ***Benefited Receptor*** *is any receptor receiving at least a 5 dB(A) reduction in future Build-condition noise level due to the proposed barrier*
(4) ***Adjusted Allowable Cost Per Benefited Receptor –*** *these values are calculated in Table 7*
(5) ***Actual Cost Per Benefited Receptor*** *– the Barrier Cost divided by the number of Benefited Receptors*
(6) ***Ratio of Actual CBR to the AACBR*** *(used to determine if a barrier can be found cost effective through cost averaging): for an individual barrier to be considered as part of a cost averaging solution, this Ratio must not exceed 2.0 (the cost of noise abatement per benefitted receptor may not exceed two times the adjusted noise abatement cost per benefitted receptor)*

Eighteen feasible noise barriers were evaluated for cost-effectiveness; four barriers were found to be not cost-effective (B12, B15/B16, B17, and B20). The other fourteen barriers (B1, B3, B4, B5, B6, B7, B8, B9, B10, B18, B19, B21, B22, and B23) were found to be reasonable (cost-effective) as stand-alone barriers.

**Cost Averaging**

After the evaluated noise barriers were considered for reasonableness and feasibility as stand-alone barriers, noise barrier costs were then considered cumulatively, across CNEs, to determine if any barrier found to be not cost-effective standing alone could be cost-effective on a cumulative basis. As shown in Table 9 (below), the cost averaging analysis places analyzed barriers in order of increasing cost-effective ratio (ratio between the actual cost per benefited receptor and the adjusted allowable cost per benefited receptor). Noise abatement measures achieve the cost reasonableness criterion cumulatively if the cumulative estimated noise barrier cost per benefited receptor is less than the cumulative adjusted allowable cost per benefited receptor (when considering all barriers that are feasible and meet the noise reduction design goal).

As shown in Table 9, two additional noise barriers (B12 and B15/B16) would be considered cost-effective on a cumulative basis:

**TABLE 9**
**COST AVERAGING ANALYSIS SUMMARY**

| Barrier | Benefited Receptors | Barrier Cost | Actual CBR | AACBR | Ratio of CBR to AACBR | Cumulative CBR | Cumulative AACBR | Cost-Effectiveness Status |
|---|---|---|---|---|---|---|---|---|
| B19 | 229 | $1,069,230 | $4,669 | $33,821 | 0.14 | $4,669 | $33,821 | Cost Effective Stand Alone |
| B05 | 129 | $714,000 | $5,535 | $31,054 | 0.18 | $4,981 | $32,824 | Cost Effective Stand Alone |
| B23 | 431 | $2,652,000 | $6,153 | $34,142 | 0.18 | $5,621 | $33,544 | Cost Effective Stand Alone |
| B21 | 63 | $378,000 | $6,000 | $30,000 | 0.20 | $5,649 | $33,282 | Cost Effective Stand Alone |
| B22 | 349 | $2,270,520 | $6,506 | $32,464 | 0.20 | $5,898 | $33,044 | Cost Effective Stand Alone |
| B09 | 320 | $2,173,500 | $6,792 | $30,594 | 0.22 | $6,086 | $32,529 | Cost Effective Stand Alone |
| B18 | 151 | $1,021,170 | $6,763 | $30,000 | 0.23 | $6,147 | $32,300 | Cost Effective Stand Alone |
| B06 | 241 | $2,824,620 | $11,720 | $30,562 | 0.38 | $6,849 | $32,081 | Cost Effective Stand Alone |
| B04 | 270 | $3,439,380 | $12,738 | $30,781 | 0.41 | $7,578 | $31,921 | Cost Effective Stand Alone |
| B03 | 271 | $5,266,200 | $19,432 | $30,699 | 0.63 | $8,887 | $31,786 | Cost Effective Stand Alone |
| B01 | 112 | $2,520,000 | $22,500 | $30,000 | 0.75 | $9,481 | $31,708 | Cost Effective Stand Alone |
| B07 | 119 | $3,373,230 | $28,346 | $31,483 | 0.90 | $10,317 | $31,698 | Cost Effective Stand Alone |
| B10 | 29 | $840,000 | $28,966 | $30,345 | 0.95 | $10,517 | $31,683 | Cost Effective Stand Alone |
| B08 | 34 | $1,128,000 | $33,176 | $33,794 | 0.98 | $10,797 | $31,709 | Cost Effective Stand Alone |
| B12 | 27 | $1,035,000 | $38,333 | $30,000 | 1.28 | $11,065 | $31,693 | Cost Effective Cumulatively |
| B15/16 | 20 | $1,242,150 | $62,108 | $31,625 | 1.96 | $11,430 | $31,692 | Cost Effective Cumulatively |
| ~~B20~~ | ~~13~~ | ~~$1,290,000~~ | ~~$99,231~~ | ~~$31,538~~ | ~~3.15~~ | *Not included in evaluation; estimated cost is greater than two times the adjusted allowed cost* | | |
| ~~B17~~ | ~~8~~ | ~~$844,500~~ | ~~$105,563~~ | ~~$30,875~~ | ~~3.42~~ | | | |

A barrier at the location of B12 has been included in the Illinois State Toll Highway Authority (Tollway) Master Plan due to its proximity to I-294. TNM analysis indicates that no noise impacts from I-55 traffic would occur at this location should the Tollway Master Plan barrier (18-feet in height) be constructed. As such, the Tollway will assume responsibility for the implementation of this noise abatement measure. If any change prompts the removal of this barrier from the Tollway Master Plan, Barrier B12 should be reevaluated in Phase II of this project.

## *SECTION 8: COORDINATION WITH LOCAL OFFICIALS FOR UNDEVELOPED LANDS*

Undeveloped parcels occur along I-55 in the project corridor (located in the communities of Woodridge, Darien, Willowbrook, Burr Ridge, Indian Head Park, Hodgkins, Chicago, and unincorporated areas of DuPage County). For local agency planning and development purposes, TNM analysis of Build-condition traffic noise was conducted for these parcels. Table 10 lists the approximate distance (from I-55 mainline edge of pavement) where predicted 2040 Build-condition traffic noise impacts would occur for potential Activity Category B/C and Activity Category E land use at these parcels. The impact range is provided for Build conditions (with and without feasible/reasonable noise barrier insertion as applicable; see Section 7):

**TABLE 10**
**SUMMARY OF BUILD (2040) SOUND LEVELS FOR UNDEVELOPED PARCELS**

| Parcel or Parcel Group | Range of Build (2040) Noise Impact for Activity Category B/C \| NAC of 67 dB(A) (Measured from I-55 Edge of Pavement) | | Range of Build (2040) Noise Impact for Activity Category E \| NAC of 72 dB(A) (Measured from I-55 Edge of Pavement) | |
|---|---|---|---|---|
| | No Barrier | With Barrier | No Barrier | With Barrier |
| Woodridge (A) | Entire Parcel | No Impact to Parcel | Within 225 Feet | No Impact to Parcel |
| Woodridge (B) | Within 500 feet | No Impact to Parcel | Within 225 Feet | No Impact to Parcel |
| DuPage County (A) | Within 375 feet | No Impact to Parcel | Within 175 feet | No Impact to Parcel |
| DuPage County (B) | Within 500 feet | No Impact to Parcels | Within 275 feet | No Impact to Parcels |
| DuPage County (C) | Within 250 feet | Within 175 feet | Within 125 feet | No Impact to Parcels |
| DuPage County (D) | Within 500 feet | No Impact to Parcels | Within 375 feet | No Impact to Parcels |
| DuPage County (E) | Entire Parcel | No Impact to Parcel | Entire Parcel | No Impact to Parcel |
| Darien (A) | Within 450 feet | No Impact to Parcel | Within 200 feet | No Impact to Parcel |
| Darien (B) | Entire Parcel | No Impact to Parcel | Entire Parcel | No Impact to Parcel |
| Darien (C) | Entire Parcel | No Impact to Parcel | Entire Parcel | No Impact to Parcel |
| Darien (D) | No Impact to Parcel | No Impact to Parcel | No Impact to Parcel | No Impact to Parcel |
| Darien (E) | Within 375 feet | No Impact to Parcel | Within 125 feet | No Impact to Parcel |
| Darien (F) | Within 425 feet | No Impact to Parcel | No Impact to Parcel | No Impact to Parcel |
| Darien (G) | Within 400 feet | No Impact to Parcel | Within 275 feet | No Impact to Parcel |
| Willowbrook | Entire Parcel | No Barrier Proposed | Within 175 feet | No Barrier Proposed |
| Burr Ridge (A) | Within 500 feet | No Barrier Proposed | Within 450 feet | No Barrier Proposed |
| Burr Ridge (B) | Entire Parcels | No Impact to Parcels | Entire Parcels | No Impact to Parcels |
| Burr Ridge (C) | Within 300 feet | No Barrier Proposed | Within 175 feet | No Barrier Proposed |
| Indian Head Park | Entire Parcel | No Impact to Parcel | Within 225 feet | No Impact to Parcel |
| Hodgkins | Within 350 feet | No Barrier Proposed | No Impact to Parcel | No Barrier Proposed |
| Chicago (A) | No Impact to Parcels | No Barrier Proposed | No Impact to Parcels | No Barrier Proposed |
| Chicago (B) | Within 300 feet | No Barrier Proposed | Within 250 feet | No Barrier Proposed |
| Chicago (C) | Within 200 feet | No Impact to Parcel | Within 175 feet | No Impact to Parcel |
| Chicago (D) | Within 200 feet | No Impact to Parcel | No Impact to Parcel | No Impact to Parcel |
| Chicago (E) | Entire Parcel | No Impact to Parcel | Within 75 feet | No Impact to Parcel |
| Chicago (F) | Within 275 feet | No Impact to Parcel | Within 225 Feet | No Impact to Parcel |
| Chicago (G) | Within 250 feet | No Impact to Parcel | Within 200 feet | No Impact to Parcel |
| Chicago (H) | Within 200 feet | No Impact to Parcel | Within 175 feet | No Impact to Parcel |
| Chicago (I) | Within 175 feet | No Impact to Parcels | No Impact to Parcels | No Impact to Parcels |
| Chicago (J) | Within 200 feet | No Impact to Parcels | No Impact to Parcels | No Impact to Parcels |
| Chicago (K) | No Impact to Parcels | No Impact to Parcels | No Impact to Parcels | No Impact to Parcels |
| Chicago (L) | Entire Parcels | No Impact to Parcels | No Impact to Parcels | No Impact to Parcels |

Appendix B includes letters that were previously sent to local officials during the initial Phase I study, having jurisdiction over these adjacent undeveloped lands. Two updated letters were sent to the Village of Burr Ridge and the City of Chicago because the current study has identified two additional noise barriers in these locations. Each letter is accompanied by a map of the affected parcel(s) which lists approximate range of Activity Category B/C and E impact as listed in Table 10, above.

## ***SECTION 9: CONSTRUCTION NOISE***

Trucks and machinery used for construction produce noise that may affect some land uses and activities during the construction period. Residents along the alignment will at some time experience perceptible construction noise from implementation of the project. To minimize or eliminate the effect of construction noise on these receptors, mitigation measures have been incorporated into the Illinois Department of Transportation's Standard Specifications for Road and Bridge Construction as Article 107.35.

## ***SECTION 10: VIEWPOINT SOLICITATION SUMMARY***

As stated in Section 1, an EA/FONSI identified a Preferred Alternative of adding one managed lane, an Express Toll Lane (ETL), in each direction of I-55 on the inside shoulder from I-355 to I-90/94. The FONSI was issued July 20, 2016. As part of that EA/FONSI, a noise study was done to determine noise impacts and to identify feasible and reasonable abatement, which included soliciting viewpoints of benefited receptors regarding the potential implementation of identified noise barriers. The process, as described below, was conducted in a manner consistent with IDOT policies and incorporated an extensive community outreach and education plan to support the voting process. This viewpoint solicitation took approximately 6 months and included 4 noise forums, 2 viewpoint voting solicitations by mail, and included over 2,000 benefitted receptors of which approximately half participated in the viewpoint voting process.

Subsequent to the previous study, IDOT has analyzed the impacts of providing not only one managed lane in both directions on the inside shoulder of I-55 from I-355 to I-294, but also adding two managed lanes in each direction from I-294 to I-90/94. These geometric impacts had little effect on the proposed noise wall locations or on benefitted receptors.

### Agency Coordination

Meetings were conducted with municipal leaders, DuPage County and the Forest Preserve District of DuPage County to identify the location of potential noise walls and describe the viewpoint solicitation process. A summary of these meetings can be found in Appendix C.

### Noise Forums

Noise Forums were conducted at three locations along the project corridor where potential noise wall locations were identified, and additional project information was presented. They were held on April 5, 6, and 7, 2016 in Chicago, Burr Ridge, and Woodridge. A fourth noise forum was held in Chicago with the assistance of Alderman Thompson – Ward 11 that provided interpreters for Spanish and Mandarin speaking people. Postcard invitations were mailed to benefited receptors. At these forums, the viewpoint solicitation process was presented and project staff was available to answer questions. A summary of forums can be found in Appendix C.

### Viewpoint Solicitation

The first viewpoint solicitation was mailed to benefited receptors on May 4, 2016. Solicitations for Barriers B22 and B23 were sent to each benefited receptor in English, Spanish and Chinese in order to maximize the outreach to local communities at these locations. A copy of the viewpoint solicitation letter and Ballot can be found in Appendix C.

Three barriers (B5, B22 and B23) required a second solicitation, which was mailed on June 6, 2016. As a result of the Phase I viewpoint solicitation process, 12 barriers (B1, B3, B4, B5, B6, B7, B8, B15/B16, B18, B19, B22 and B23) were approved. One barrier (B9) was rejected, due to a hotel and nursing home voting against the abatement measure. Copies of returned ballots are included in Appendix C.

Viewpoint Solicitation Comments

As part of the viewpoint solicitation process, a number of ballots were returned with comments. These comments were included in the EA errata, and are a part of the previously-approved FONSI (July 20, 2016). Copies of the comments are also included in Appendix C of this document.

Viewpoint Solicitation Notification

At the completion of the final viewpoint solicitation process, all benefited receptors were notified of the results for their specific barrier via USPS. Information is included in Appendix C.

Viewpoint Solicitation Update

Since the Phase I viewpoint solicitation was conducted, the IDOT *Highway Traffic Noise Assessment Manual* was updated (2017). Among the manual's policy updates is a modification of the classification of "front row" receptors (votes from owners and tenants of front row units are given more weight in the consideration of proposed noise barriers). Previous policy identified front-row receptors as "receptors sharing a property line with the highway right-of-way". The updated manual defines front row receptors as "*receptors or properties adjacent to a proposed barrier*", and includes language stating that front row status will be reviewed on a case-by-case basis. This study has been updated to apply this new criterion.

The updated manual also states that viewpoint solicitation may occur in either Phase I or Phase II. Per FHWA, the solicitation of viewpoints should occur following approval of the final noise abatement design, which would mean voting would best occur in Phase II.

Subsequent study updates were applied to the project's sound level modeling and analysis based on modifications to traffic projections, proposed geometry, and noise barrier heights. Due to these updates, the number and array of benefited receptors at each barrier location was affected.

A highly-conservative approach was applied to the viewpoint solicitation process with regard to the identification of new benefitted receptors. To determine if additional viewpoint solicitation would be required in Phase II of the project, a sensitivity analysis was applied to evaluate whether such action would affect the results of the previous solicitation. Each previously-approved barrier location was analyzed with the assumption that any new benefited receptor be tallied as a "no" vote toward the barrier if it were to participate in the viewpoint solicitation process. Likewise, each new benefitted receptor at a previously-rejected barrier was presumed to be a "yes" vote if included in the solicitation process.

The application of this conservative approach resulted in no change to initial study results for each noise barrier, with the exception of Barrier B19. This barrier was significantly impacted by modifications to the Harlem Avenue interchange. Though B19 was approved in 2016, revised interchange geometry now forces this barrier closer to adjacent receptors, prompting design modifications which add a significant number of benefitted receptors and possible votes. It is therefore recommended that the voting process for Barrier B19 be conducted again during Phase II of the project to re-assess public sentiment. Viewpoint solicitation will also be conducted during Phase II for newly-added Barrier B10 and Barrier B21.

As stated in Section 7 above, Barrier 12 is included in the Tollway Master Plan and is currently under Tollway authority. If any change prompts the removal of this barrier from the Tollway Master Plan, Barrier B12 should be reevaluated in Phase II of this project and undergo viewpoint solicitation, as appropriate.

## TABLE 11
### VIEWPOINT SOLICITATION SUMMARY

**PREVIOUS VIEWPOINT SOLICITATION SUMMARY**

| Barrier ID | Proposed Wall Height (Feet) | Benefited Receptors | Possible Votes | Forms Returned | Respond Rate | Total Votes Cast | Support Barrier | Against Barrier |
|---|---|---|---|---|---|---|---|---|
| B1 | 14 | 92 | 92 | 78 | 85% | 78 | 76 | 2 |
| B3 | 16 | 197 | 203 | 151 | 77% | 152 | 147 | 5 |
| B4 | 13 | 218 | 218 | 79 | 36% | 79 | 73 | 6 |
| B5 | 14 | 127 | 254 | 2 | 2% | 4 | 4 | 0 |
| B6 | 14 | 151 | 163 | 81 | 54% | 82 | 78 | 4 |
| B7 | 14-16 | 82 | 94 | 28 | 34% | 35 | 33 | 2 |
| B8 | 12-16 | 30 | 31 | 15 | 50% | 15 | 14 | 1 |
| B9 | 21 | 318 | 332 | 125 | 39% | 127 | 8 | 119 |
| B15/B16 | 11-14 | 19 | 29 | 11 | 58% | 17 | 17 | 0 |
| B18 | 13 | 113 | 226 | 60 | 53% | 60 | 57 | 3 |
| B19 | 14 | 82 | 82 | 30 | 37% | 30 | 24 | 6 |
| B22 | 10 | 335 | 395 | 131 | 39% | 131 | 109 | 22 |
| B23 | 10 | 396 | 623 | 189 | 48% | 228 | 134 | 94 |
| **Total** | | **2,160** | **2,742** | **980** | **45%** | **1,038** | **774** | **264** |

**UPDATED VIEWPOINT SOLICITATION SUMMARY**

| Barrier ID | Proposed Wall Height (Feet) | Benefited Receptors | Possible Votes | Forms Returned | Respond Rate | Total Votes Cast | Support Barrier | Against Barrier |
|---|---|---|---|---|---|---|---|---|
| B1 | 16 | 112 | 324 | 78 | 85% | 78 | 228 | 46 |
| B3 | 15-20 | 271 | 664 | 151 | 77% | 152 | 380 | 160 |
| B4 | 15-18 | 270 | 824 | 79 | 36% | 79 | 186 | 134 |
| B5 | 14 | 129 | 254 | 2 | 2% | 4 | 4 | 0 |
| B6 | 16-18 | 241 | 633 | 81 | 54% | 82 | 237 | 190 |
| B7 | 15-19 | 119 | 350 | 28 | 34% | 35 | 80 | 80 |
| B8 | 12-16 | 34 | 66 | 15 | 50% | 15 | 27 | 10 |
| B9 | 21 | 320 | 668 | 125 | 39% | 127 | 20 | 238 |
| B10 | 20 | 29 | 94 | | *Viewpoint Solicitation to be Conducted in Phase II* | | | |
| B12 | 23 | 27 | 76 | | *Included in Tollway Master Plan* | | | |
| B15/B16 | 10-17 | 20 | 60 | 11 | 58% | 17 | 34 | 2 |
| B18 | 13-16 | 151 | 980 | 60 | 53% | 60 | 228 | 88 |
| B19 | 14-18 | 229 | 750 | 30 | 37% | 30 | 130* | 364* |
| B21 | 14 | 63 | 162 | | *Viewpoint Solicitation to be Conducted in Phase II* | | | |
| B22 | 12 | 349 | 812 | 131 | 39% | 131 | 224 | 113 |
| B23 | 13 | 431 | 876 | 189 | 48% | 228 | 187 | 184 |
| **Total** | | **2,831** | **7,679** | **980** | **45%** | **1,038** | **1,977** | **1,609** |

** Proposed modification of the Harlem Avenue interchange (and Barrier B19) add a significant number of benefitted receptors and possible votes. It is therefore recommended that viewpoint solicitation for Barrier B19 be conducted again during Phase II to re-assess public sentiment.*

## Likelihood Statement

Noise Barriers B1, B3, B4, B5, B6, B7, B8, B15/B16, B18, B22 and B23 were determined to meet the feasibility and reasonableness criteria. If the project's final design characteristics are different from the preliminary design, IDOT will determine if revisions to the traffic noise analysis are necessary. A final decision on noise abatement will not be made until the project's final design is approved and the public involvement process is complete.

Noise Barriers B10, B19, and B21 were determined to meet the feasibility criteria, the noise reduction design goal, and the cost effectiveness criteria as identified in Table 9. In order to determine if these barriers will be implemented, viewpoint solicitation still needs to occur. Viewpoint solicitation will occur after the project's final design is approved. If the project's final design is different from the preliminary design, IDOT will determine if revisions to the traffic noise analysis are necessary. A final decision on noise abatement will not be made until the project's final design is approved and the public involvement process is complete.

## ***SECTION 11: CONCLUSION***

This traffic noise study has been coordinated to evaluate traffic noise impacts for the proposed improvements to I-55 (Stevenson Expressway) from I-355 (Veterans Memorial Tollway) to I-90/I-94 (Dan Ryan Expressway). Traffic noise was evaluated at 100 representative receptor locations.

Existing noise levels range from 55 dB(A) to 77 dB(A); predicted No Build (2040) noise levels range from 55 dB(A) to 78 dB(A). Most receptors show no increase to a 1 dB(A) increase from Existing to No Build (2040) conditions, with select receptors experiencing a 2 dB(A) increase.

Build (2040) condition traffic noise levels range from 57 dB(A) to 79 dB(A), ranging from no increase to a 4 dB(A) increase over Existing levels (most receptors experience a 1 dB(A) to 2 dB(A) increase over Existing). Build condition levels range from a 1 dB(A) *decrease* to a 3 dB(A) increase over No Build (2040) levels.

A total of 63 of 100 (63%) representative receptors approach, meet, or exceed the FHWA NAC under project Build conditions, and therefore warrant a noise abatement analysis. No impacts are due to a substantial increase in noise level.

Eighteen noise barriers were evaluated for the abatement of impacts predicted for representative receptors under project Build conditions. All 18 barriers met IDOT's feasibility criterion and achieved IDOT's noise reduction design goal of at least an 8 dB(A) traffic noise reduction at one or more benefited receptors. These 18 barriers were then evaluated for economic reasonableness, and 14 of the 18 met this criterion. A subsequent cost-averaging analysis resulted in the cumulative inclusion of 2 additional barriers which were not found to be cost-effective on a standalone basis.

The 16 cost-effective noise barriers are identified in Table 9 and shown on Figure 3. One of these 16 barriers (Barrier B12) is included in the Illinois State Toll Highway Authority Master Plan due to its proximity to I-294. The Tollway will therefore assume responsibility for the implementation of Barrier B12. If any change prompts the removal of this barrier from the Tollway Master Plan, Barrier B12 should be reevaluated in Phase II of this project and undergo viewpoint solicitation, as appropriate.

Viewpoint solicitation conducted as part of the project FONSI (2016) resulted in the approval of 12 barriers and rejection of 1 barrier by benefited receptors. Further viewpoint solicitation will be conducted in Phase II of the project for newly-introduced Barrier B10 and Barrier B21, and to re-assess public sentiment for Barrier B19 (which has undergone significant modification as a result of revised interchange geometrics).

Should unforeseen constraints occur during final design, or should public input substantially change reasonableness, an abatement measure may need to be modified or removed from the project plans. A final decision on noise abatement will not be made until the project's final design is approved and the public involvement process is complete.