I-290

Phase I Study

West of US 45 (Mannheim Road) to Racine Avenue

Draft Traffic Noise Analysis Volume 2

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Draft Technical Memorandum

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Section One: Introduction

This traffic noise analysis has been prepared to evaluate traffic noise for the Eisenhower Expressway (I-290) Reconstruction Project. The recommended improvement includes widening the I-290 mainline to four lanes in each direction; all of the mainline improvements will fit within the existing right-of-way (ROW) with some minor ROW needs occurring at some interchanges. The noise study area, shown in Figure 1, is in within the Villages of Hillside, Westchester, Bellwood, Broadview, Maywood, Forest Park, Oak Park, and the City of Chicago in Cook County, Illinois. The project's four Alternatives Carried Forward were studied as part of the project's Volume 1 of the traffic noise analysis. A modification of the HOT 3+ alternative was selected as the Preliminary Preferred Alternative for the I-290 Reconstruction Project.

IDOT and FHWA require a noise abatement analysis for the Preferred Alternative. However, given the level of stakeholder interest in traffic noise, the project team also developed a traffic noise sensitivity analysis that compares the year 2040 traffic noise levels of the four build alternatives advanced for further evaluation.

Volume 1 of the traffic noise analysis for this project presented the Federal and state noise regulations, a discussion of noise sensitive receptors, field noise monitoring, a description of the noise analysis methodology, and the analysis of the existing and future No Build noise levels. This document, Volume 2 of the traffic noise analysis, will present the traffic noise impacts of the four Build alternatives carried forward (Section 2), the traffic noise impacts of the Preliminary Preferred Alternative (Section 3), an analysis of traffic noise abatement for the impacted receptors identified for the Preliminary Preferred Alternative (Section 4), and an analysis of currently undeveloped lands within the Preliminary Preferred Alternative noise study area (Section 5). A preliminary discussion of construction noise considerations for the Preliminary Preferred Alternative is in Section 6, and conclusions are noted in Section 7. This report represents Oak Park results as a subset from the full Volume 2 noise report; the full Volume 2 report will additionally include the results of the viewpoints solicitation analysis and a listing of the noise barriers recommended for construction as part of the I-290 project.

Section 2: Build Alternatives Carried Forward Sensitivity Analysis

Build Alternatives Carried Forward Identification

The four I-290 Build alternatives carried forward share the same design; each alternative would add a mainline travel lane in each direction between 25th Avenue and Austin Boulevard resulting in four travel lanes in each direction, and would modify interchange designs between 25th Avenue and IL 50/Cicero Avenue. No additional through lanes are proposed from Central Avenue to Racine Avenue. The variation in alternatives along the entire corridor is related to how each alternative manages the lanes; the alternatives each propose a different use for the inside lane in each travel direction, as described below:

- General Purpose Add-Lane (GP Add Lane) (The additional lane in each direction would be a typical highway lane with no use restrictions)
- High Occupancy Vehicle Lane (HOV 2+)
- High Occupancy Toll Lane (HOT 3+)
- High Occupancy Toll Lane, plus Toll all remaining lanes (HOT 3+ Toll)

For the 2040 conditions, mainline traffic composition data were obtained from the lead Phase 1 consultant. In the 2040 conditions for the Oak Park area, the average percentage of automobiles on the I-290 mainline is estimated to be 94 percent of total traffic, with medium and heavy trucks combined accounting for 6 percent of total traffic.

Posted speed limits were used for speed data inputs for the noise analysis to assume traffic will travel at free flow speeds. Using posted speed limits for the analysis is a conservative approach, as current I-290 traffic has been observed to travel at lower speeds than posted speed limits due to traffic delay. Using the posted speed would yield higher noise level results during peak travel periods than using travel speeds of delayed traffic. The existing speed and proposed speed limit for I-290 is 55 mph. All existing speed limits on other roads were projected to remain the same in the future condition.

Noise Shielding from Potential Design Elements

The Eisenhower Expressway Preferred Alternative includes horizontal structures that provide a degree of noise shielding, such as the proposed Harlem Avenue interchange design, which covers a portion of mainline I-290. These design elements shield a portion of expressway noise from adjacent areas. However, TNM 2.5 does not have the capability to analyze noise shielding provided by horizontal structures. The future condition noise levels discussed in Section 6 are considered worst-case, and do not include any benefits from horizontal shielding from potential design elements.

Build Alternatives Carried Forward Sensitivity Analysis Findings

A traffic noise receptor is a discrete or representative location of a Common Noise Environment (CNE), which is an area of similar land use and noise characteristics. A representative receptor is location within a CNE that represents the worst-case noise level 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 (- 1 dB(A)), meet, or exceed the NAC presented in Table 1.

Table 1 presents the existing, No Build, and Build alternatives carried forward noise levels for the receptor sites in Oak Park, as well as the anticipated difference in noise levels for these two periods. Representative receptors indicating a noise impact are identified in Table 1 with boldface text.[1] Figure 2 shows the analyzed representative receptors in the study area.

[1] Traffic noise impacts are defined only for the Build condition, per IDOT policy, and include all receptors that would have noise levels that approach (+/- I dB(A)), meet, or exceed the NAC presented in Table 1.

The Existing noise levels range from 59 dB(A) at R110 and R123 to 78 dB(A) at R100 and R119. The projected No Build 2040 traffic noise levels range from 60 dB(A) at R110 and R123 to 79 dB(A) at R119. Areas with higher noise levels are typically located closer to I-290 than other receptors. Generally, noise levels either remain the same or increase by 1 dB(A) from the Existing scenario to the No Build scenario. Any change in traffic noise levels are mainly due to a change in traffic volumes and varying traffic patterns.

The projected Build 2040 traffic noise levels for the four Build alternatives are typically within the same range at each representative receptor. The four Build alternatives share the same design, but have different traffic volumes due to of the effects of managed lanes and tolling. The traffic volume differences influenced the slight differences in noise levels among the Build alternatives. The collective Build 2040 traffic noise levels range from 58 dB(A) at R123 to 79 dB(A) at R119. The collective projected Build 2040 noise levels vary between -1 dB(A) and 4 dB(A) from the existing condition.

TABLE 1
NOISE LEVELS SUMMARY – TNM MODELING RESULTS[2]

Representative Receptor Number	Activity Category/ NAC (dB(A))	Existing Noise Level, dB(A)	No-Build 2040 Noise Level, dB(A)	GP Add Lane 2040 Noise Level, dB(A)	HOV 2+ 2040 Noise Level, dB(A)	HOT 3+ 2040 Noise Level, dB(A)	HOT 3+ Toll 2040 Noise Level, dB(A
R77	C / 67	69	70	**72**	**72**	**72**	**71**
R78	C / 67	72	73	**74**	**73**	**73**	**73**
R79	C / 67	75	76	**76**	**75**	**75**	**74**
R79A	B / 67	75	76	**77**	**77**	**77**	**76**
R80	C / 67	72	73	**74**	**73**	**73**	**73**
R81	C / 67	72	73	**74**	**73**	**73**	**73**
R82	B / 67	75	75	**77**	**76**	**76**	**76**
R83	B / 67	76	76	**77**	**76**	**77**	**76**
R84	B / 67	76	76	**77**	**77**	**77**	**76**
R85	B / 67	76	76	**77**	**77**	**77**	**76**
R86	B / 67	77	77	**78**	**78**	**78**	**77**
R87	E / 72	70	71	**71**	70	**71**	70
R88	B / 67	67	68	**67**	**67**	**67**	**67**
R89	E / 72	77	78	**78**	**77**	**78**	**77**
R90	E / 72	69	70	69	69	69	70
R91	B / 67	67	68	**67**	**67**	**67**	**68**
R92	B / 67	75	75	**76**	**76**	**76**	**75**
R93	C / 67	75	76	**77**	**76**	**76**	**76**
R94	B / 67	77	77	**78**	**77**	**77**	**77**
R95	C / 67	63	63	65	65	64	64

[2]In this version of the report, results are shown for receptors within the Village of Oak Park only.

Representative Receptor Number	Activity Category/ NAC (dB(A))	Existing Noise Level, dB(A)	No-Build 2040 Noise Level, dB(A)	GP Add Lane 2040 Noise Level, dB(A)	HOV 2+ 2040 Noise Level, dB(A)	HOT 3+ 2040 Noise Level, dB(A)	HOT 3+ Toll 2040 Noise Level, dB(A
R96	C / 67	69	69	**70**	**69**	**70**	**69**
R96A	C / 67	74	74	**75**	**74**	**75**	**74**
R97	B / 67	63	64	65	64	64	63
R98	C / 67	75	75	**76**	**76**	**76**	**75**
R99	B / 67	75	75	**76**	**76**	**76**	**75**
R100	B / 67	78	78	**79**	**78**	**78**	**78**
R101	C / 67	77	78	**79**	**78**	**78**	**78**
R102	B / 67	72	73	**73**	**73**	**73**	**73**
R103	C / 67	69	69	**70**	**69**	**70**	**70**
R104	B / 67	73	73	**77**	**76**	**76**	**76**
R105	B / 67	67	67	**68**	**67**	**67**	**68**
R107	C / 67	66	66	**67**	**67**	**67**	**67**
R108	C / 67	62	62	64	63	63	63
R109	E / 72	60	61	62	61	61	61
R110	E / 72	59	60	61	60	60	60
R111	B / 67	75	75	**76**	**75**	**76**	**75**
R112	E / 72	62	62	63	63	63	62
R113	B / 67	66	66	**66**	**66**	**66**	**66**
R114	C / 67	61	62	62	62	62	62
R115	B / 67	66	67	**67**	**67**	**67**	**67**
R116	E / 72	65	65	65	65	65	65
R117	C / 67	75	75	**76**	**76**	**76**	**76**
R118	C / 67	62	62	63	63	63	62
R119	B / 67	78	79	**79**	**78**	**79**	**78**
R120	C / 67	68	68	**69**	**69**	**69**	**68**
R121	C / 67	61	62	62	62	62	61
R122	B / 67	73	73	**73**	**72**	**73**	**72**
R123	C / 67	59	60	59	58	58	58

Boldface indicates the noise levels approach (- 1 dB(A)), meet, or exceed the NAC in the *future build condition*, constituting a *noise impact*.

Observations and Conclusions

As noted in Table 1, there are no significant differences in noise levels for the four Build alternatives carried forward. Table 2 summarizes the number of representative receptors that would exceed the NAC for each alternative.

TABLE 2
TRAFFIC NOISE IMPACTS SUMMARY BY BUILD ALTERNATIVE (OAK PARK ONLY)

	GP Add Lane (2040) Alternative	HOV 2+ (2040) Alternative	HOT 3+ (2040) Alternative	HOT 3+ Toll (2040) Alternative
Receptors with Traffic Noise Impacts	36	35	36	35

Table 3 further illustrates there are no significant differences among traffic noise levels for the 2040 No Build and the four build alternatives in Oak Park. The relative noise level changes from the 2040 No Build Condition to the 2040 Build Condition are reported in Table 3 both by the change in decibels and 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 3
RECEPTORS WITH PERCEPTABLE NOISE CHANGE
NO BUILD TO BUILD CONDITIONS (OAK PARK ONLY)

Noise Level Perception	dB(A)	GP Add Lane	HOV 2+	HOT 3+	HOT 3+ Toll
Readily Perceptible	**>= +5**	0	0	0	0
Barely Perceptible	**>= +3**	1	1	1	1
Less than Barely Perceptible	**2 to -2**	47	47	47	47
Barely Perceptible	**<= -3**	0	0	0	0
Readily Perceptible	**<= -5**	0	0	0	0
	Total	48	48	48	48

The table indicates that for the Oak Park representative receptors, noise levels for the year 2040 Build alternatives would generally be perceived by the human ear similarly to those of the year 2040 No Build alternative. The Build alternatives would minimally influence noise levels compared to the No Build condition, with 98% of the representative receptors experiencing either no change or a change that is considered imperceptible (less than barely perceptible) to the human ear. Furthermore, none of the four Build alternatives would result in any changes to the noise

environment from the No Build condition that would be considered a readily perceptible change of five decibels or greater.

The analysis indicates that a majority of the corridor, regardless of the Build alternative, would experience noise levels greater than the NAC, and would require a noise abatement analysis.

Section 3: Traffic Noise Impacts of the Preliminary Preferred Alternative

Preliminary Preferred Alternative Identification

The Preliminary Preferred Alternative for the I-290 Reconstruction Project is the HOT 3+ alternative, one of the Alternatives Carried Forward. The Preliminary Preferred Alternative has been refined to reflect continuous access to the proposed managed lane, updated traffic forecasts, and corresponding updated traffic volumes.

Preliminary Preferred Alternative Traffic Noise Impacts

Existing, 2040 No Build, and 2040 Build traffic noise levels for the Oak Park representative receptors associated with the Preliminary Preferred Alternative are shown in Table 4 below.

TABLE 4
PRELIMINARY PREFERRED ALTERNATIVE NOISE IMPACT SUMMARY

Receptor Number	Activity Category/ NAC (dB(A))	Existing Noise Level, dB(A)	No Build 2040 Noise Level, dB(A)	Preliminary Preferred Alternative 2040 Noise Level, dB(A)
R77	C / 67	69	70	**72**
R78	C / 67	72	73	**73**
R79	C / 67	75	76	**75**
R79A	B / 67	75	76	**77**
R80	C / 67	72	73	**74**
R81	C / 67	72	73	**73**
R82	B / 67	75	75	**76**
R83	B / 67	76	76	**77**
R84	B / 67	76	76	**77**
R85	B / 67	76	76	**77**
R86	B / 67	77	77	**78**
R87	E / 72	70	71	69
R88	B / 67	67	68	**67**
R89	E / 72	77	78	**78**
R90	E / 72	69	70	70
R91	B / 67	67	68	**68**
R92	B / 67	75	75	**76**
R93	C / 67	75	76	**77**

Receptor Number	Activity Category/ NAC (dB(A))	Existing Noise Level, dB(A)	No Build 2040 Noise Level, dB(A)	Preliminary Preferred Alternative 2040 Noise Level, dB(A)
R94	B / 67	77	77	**77**
R95	C / 67	63	63	63
R96	C / 67	69	69	**70**
R96A	C / 67	74	74	**75**
R97	B / 67	63	64	64
R98	C / 67	75	75	**76**
R99	B / 67	75	75	**76**
R100	B / 67	78	78	**78**
R101	C / 67	77	78	**78**
R102	B / 67	72	73	**73**
R103	C / 67	69	69	**70**
R104	B / 67	73	73	**76**
R105	B / 67	67	67	**68**
R107	C / 67	66	66	**67**
R108	C / 67	62	62	63
R109	E / 72	60	61	62
R110	E / 72	59	60	61
R111	B / 67	75	75	**76**
R112	E / 72	62	62	63
R113	B / 67	66	66	**66**
R114	C / 67	61	62	62
R115	B / 67	66	67	**67**
R116	E / 72	65	65	65
R117	C / 67	75	75	**76**
R118	C / 67	62	62	64
R119	B / 67	78	79	**79**
R120	C / 67	68	68	**67**
R121	C / 67	61	62	62
R122	B / 67	73	73	**73**
R123	C / 67	59	60	59

Boldface indicates the noise levels approach (- 1 dB(A)), meet, or exceed the NAC in the *future build condition*, constituting a *noise impact*.

Observations and Conclusions

The 2040 traffic noise levels for the Preliminary Preferred Alternative as predicted by TNM range from 59 dB(A) at R123 to 79 dB(A) at R119. Noise level change from No Build to Build ranges from -2 to 3 dB(A). Several representative receptors experienced noise decreases from the No

Build to the Build condition; this occurs due to roadway geometry changes, including shielding of the mainline from the proposed ramps, I-290 lane shifts, and elevation modifications.

The elevation of I-290 relative to the representative receptors influenced noise levels; areas in a "trench" (such as in Oak Park) where I-290 is at a lower elevation than the surrounding land uses typically had lower noise levels than areas at nearly the same elevation as I-290. The "trench" provides some noise shielding to the surrounding representative receptors. In the Build condition, much of I-290 through Oak Park will be at a lower elevation than in existing conditions, which contributes to lower noise levels in some areas. Due to the proposed lower I-290 mainline elevation through Oak Park in combination with the proposed Harlem Avenue and Austin Boulevard interchange designs, additional shielding will be provided to representative receptors along the north side of I-290 through Oak Park, such as R79 (Wenonah Tot Lot, Oak Park, north side of I-290).

For the 2040 Preliminary Preferred Alternative, 35 of the 48 (73 percent) representative receptor locations approach, meet, or exceed the FHWA NAC, and therefore warrant a noise abatement analysis. None of the receptors are considered impacted due to a substantial increase (greater than 14 dB(A) increase) in traffic noise levels.

Section 4: Abatement Analysis

Abatement Alternatives

Traffic noise abatement measures were considered for the impacted representative receptors that approach, meet, or exceed the appropriate FHWA NAC, as shown in Table 1. The most feasible approach to abating noise impacts in these areas would be to construct a noise barrier, which may include a noise wall, an earth berm, or a combination of both. Noise barriers placed adjacent to the roadway would attenuate traffic-related noise and are the most practical measure for this project. Noise abatement analysis is completed for all represented receptors within each CNE with an impacted representative (worst-case noise condition) receptor.[3] An effective noise barrier must be tall enough to break the line-of-sight between the receptor and source and typically extends beyond the last receptor four times the distance between the receptor and noise barrier. Noise barriers have a zone of effectiveness, or shadow zone, which is generally within 200 feet of the noise barrier; therefore, less noise reduction is achieved as the distance between the receptor and the noise barrier increases.

TNM was used to perform the noise barrier feasibility and reasonability evaluation for the impacted representative receptors. When determining if an abatement measure is feasible and reasonable, the noise reductions achieved, number of represented receptors benefited, total cost, and total cost per represented receptor benefited are considered.

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

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 receptors. In order for a noise abatement measure to be constructed, it must meet both the feasibility and reasonability criteria, 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) traffic noise reduction at an impacted represented receptor. Factors including but not limited to safety, barrier height, topography, drainage, utilities, maintenance, and access issues are also considered.

Reasonableness

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

- cost effectiveness of the highway traffic noise abatement measure;
- achievement of IDOT's noise reduction design goal; and,
- consideration of the viewpoints of the benefited receptors (property owners and residents) results in a majority desiring the abatement.

A noise abatement measure is considered cost-effective to construct if the noise wall 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. The FHWA regulations allow each State Highway Authority to establish cost criteria for determining cost effectiveness.

IDOT policy establishes the actual cost per benefited receptor shall be based on a noise wall cost of $25 per square foot, which includes engineering, materials, and construction. The base value allowable cost is $24,000 per benefited receptor, which can be increased based on three factors as summarized below:

- the absolute noise level of the benefited receptors in the design year build scenario before noise abatement;
- the incremental increase in noise level between the existing noise level at the benefited receptor and the predicted build noise level before noise abatement; and
- the date of development compared to the construction date of the highway. These factors are considered for all benefited receptors.

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)	$2,000
80 dB(A) or greater	$4,000

Source: IDOT Highway Traffic Noise Assessment Manual

Increase in Noise Level Consideration

Incremental Increase in Noise Level Between the Existing Noise Level and the Predicted Build Noise Level 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)	$2,000
15 dB(A) or greater	$4,000

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

Note: No single optional reasonableness factor shall be used to determine that a noise abatement measure is unreasonable.
Source: IDOT Highway Traffic Noise Assessment Manual

The IDOT noise reduction design goal is to achieve an 8 dB(A) traffic noise reduction at a minimum of one benefited receptor. If a noise abatement measure is feasible, achieves the cost-effective criterion, and achieves the IDOT noise reduction design goal, then the viewpoints of benefited receptors are solicited, so they may vote regarding construction of the noise wall.

Noise Wall Analysis

TNM was used to perform the noise wall feasibility and reasonability check for the represented receptors in CNEs with a representative receptor impacted by the Preliminary Preferred Alternative. When determining if an abatement measure is feasible and reasonable, the noise reductions achieved, number of residences benefited, total barrier cost, total cost per residence benefited, and viewpoints of the benefited receptors are considered.

The noise barriers studied in the abatement analysis are shown in the Analyzed Noise Wall Location Map, Figure 2, found at the conclusion of the report.

Oak Park (Proposed New Noise Barriers, Proposed I-290 Reconstruction)

The project corridor within the village of Oak Park could receive new noise barriers as a result of this noise abatement analysis. This section of the project corridor is proposed for complete I-290 reconstruction.

Twelve noise walls were evaluated for the impacted representative receptors within the village of Oak Park. All of the noise walls were found to be feasible, meaning they could achieve at least a 5 dB(A) reduction at an impacted receptor.

Eleven of the twelve feasible noise barriers would be considered acoustically reasonable, as they achieve the IDOT noise reduction design goal of at least an 8 dB(A) traffic noise reduction at one or more benefited receptors. Noise wall B36 would not achieve the noise reduction design goal, and is not considered acoustically reasonable. This wall does not achieve the IDOT noise reduction design goal because the barrier must be located adjacent to the proposed edge-of-pavement rather than at the proposed right-of-way due to the presence of buildings south of Harrison Street, limiting the effectiveness of the barrier shadow zone.

The eleven feasible noise walls that also achieve the noise reduction design goal were then evaluated for cost-effectiveness. Table 5 summarizes the results of the adjusted allowable cost per benefited receptor determination. Each benefited receptor received a base allowable barrier cost of $24,000, which could be increased based upon absolute noise level considerations, increase in noise level considerations, and new alignment/construction data considerations. The range of these cost adjustment considerations per barrier is summarized as “Adjustment Factor Range” in Table 5. Table 6 summarizes the results of the noise abatement evaluation.

TABLE 5
ADJUSTED ALLOWABLE COST PER BENEFITED RECEPTOR
I-290 ANAYLZED NEW BARRIERS: OAK PARK

Barrier	Benefited Receptors	Adjustment Factor Range	Adjusted Allowable Cost per Benefited Receptors
B30	23	$2,000 to $7,000	$29,696
B31	24	$1,000 to $7,000	$29,125
B32	78	$5,000 to $7,000	$29,692
B33	79	$5,000 to $7,000	$30,443
B34	114	$5,000 to $7,000	$29,404
B35	90	$5,000 to $7,000	$30,567
B36	Does not meet IDOT Noise Reduction Design Goal		
B37	40	$0 to $7,000	$29,750
B38	31	$6,000 to $7,000	$30,032
B39	22	$1,000 to $7,000	$28,773
B40	156	$5,000 to $6,000	$29,083
B41	82	$0 to $7,000	$29,634

TABLE 6
NOISE ABATEMENT ANALYSIS SUMMARY
I-290 ANALYZED NEW BARRIERS: OAK PARK

Barrier	Location of Barrier	Barrier Length (ft) [1]	Average Barrier Height (ft) [1]	Barrier Construction Cost ($) [2]	Total Allowable Barrier Cost ($)[3]	Benefitted Receptors [4]	Adjusted Allowable Cost per Benefitted Receptor ($)	Actual Cost per Benefitted Receptor ($)	Ratio [5]	Finding
B30	South of I-290, Harlem Ave. to Home Ave.	1,008	15	$378,000	$683,000	23	$29,696	$16,435	0.55	Cost-Effective
B31	North of I-290, Harlem Ave. to Home Ave.	1,456	15	$546,000	$699,000	24	$29,125	$22,750	0.78	Cost-Effective
B32	North of I-290, Home Ave. to Oak Park Ave.	1,237	15	$463,875	$2,316,000	78	$29,692	$5,947	0.20	Cost-Effective
B33	South of I-290, Home Ave. to Oak Park Ave.	1,224	15	$459,000	$2,405,000	79	$30,443	$5,810	0.19	Cost-Effective
B34	North of I-290, Oak Park Ave. to East Ave.	1,303	17	$553,775	$3,352,000	114	$29,404	$4,858	0.17	Cost-Effective
B35	South of I-290, Oak Park Ave. to East Ave.	1,305	13	$424,125	$2,751,000	90	$30,567	$4,713	0.15	Cost-Effective
B36	North of I-290, NE quadrant of 1st Ave. interchange	Does not meet IDOT Noise Reduction Design Goal							n/a	Not reasonable
B37	South of I-290, East Ave. to Ridgeland Ave.	1,312	15	$492,000	$1,190,000	40	$29,750	$12,300	0.41	Cost-Effective
B38	North of I-290, Ridgeland Ave. to Lombard Ave.	1,302	13	$423,150	$931,000	31	$30,032	$13,650	0.45	Cost-Effective
B39	South of I-290, Ridgeland Ave. to Lombard Ave.	1,302	17	$553,350	$633,000	22	$28,773	$25,152	0.87	Cost-Effective
B40	North of I-290, Lombard Ave. to Austin Blvd.	1,303	17	$553,775	$4,537,000	156	$29,083	$3,550	0.12	Cost-Effective
B41	South of I-290, Lombard Ave. to Austin Blvd.	1,278	17	$543,150	$2,430,000	82	$29,634	$6,624	0.22	Cost-Effective

[1] Barrier length and height are not listed for barriers that are not reasonable and feasible.
[2] Based on the IDOT policy value of $25 per square foot
[3] per IDOT traffic noise policy and the reasonability analysis
[4] Any receptor receiving at least a 5 dB(A) reduction due to the proposed barrier
[5] Ratio of actual build cost of a barrier per benefitted receptor to the adjusted allowable cost per benefitted receptor. This is used to determine if a barrier can be found cost effective through cost averaging. For a single noise abatement measure 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 allowable noise abatement cost per benefitted receptor).

In summary, twelve barrier locations were studied within the Oak Park section of I-290. Of the twelve barriers, all were found to be feasible, and eleven were found to be reasonable. The one barrier (B36) found to be not reasonable did not meet the IDOT noise reduction criterion. The eleven remaining noise barriers were found to be feasible and reasonable as stand-alone noise barriers.

Cost Averaging

After the noise barrier locations were considered reasonable or feasible as stand-alone barriers, the noise wall costs were then considered cumulatively, across the corridor and across Common Noise Environments, to determine if any barrier found to be not cost effective standing alone could be cost effective cumulatively. No additional noise barriers in Oak Park were recommended through the cost averaging analysis, as the one barrier in Oak Park that was not recommended did not meet the IDOT noise reduction design goal and was not eligible for cost averaging. The cost averaging analysis for the entire I-290 is included in the full version of the Volume 2 noise analysis report.

Viewpoints Solicitation

The third component of reasonableness is obtaining the viewpoints of those who would be benefitted by a feasible and cost-effective noise barrier that meets the IDOT noise reduction design goal. Viewpoints solicitation packages, including an informational letter, voting form, and maps of the proposed wall, will be sent to property owners and tenants at receptors that would benefit from the proposed wall. The received votes will be tallied by noise wall per IDOT policy. If greater than fifty percent of a wall's votes are in support of wall construction, the wall will recommended for construction and will likely be included in final design plans for the project. Conversely, walls that do not receive greater than fifty percent of the votes in favor of the wall will not be recommended for construction as part of the project.

The results of the viewpoints solicitation will be included in the full version of the Volume 2 noise analysis report.

SECTION 5: Coordination With Local Officials For Undeveloped Lands

No areas of undeveloped land were identified within the Village of Oak Park's noise study area.

SECTION 6: 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 areas, mitigation measures have been incorporated into the Illinois Department of Transportation's Standard Specifications for Road and Bridge Construction as Article 107.35.

Construction noise and effects will be further investigated with stakeholders separately from this analysis, which is intended to address traffic noise.

SECTION 7: Conclusion

This traffic noise study has been coordinated to evaluate traffic noise impacts for the proposed roadway. Traffic noise was evaluated at forty-eight receptor locations in Oak Park. The Existing noise levels range from 59 dB(A) at R110 and R123 to 78 dB(A) at R100 and R119. The projected No Build 2040 traffic noise levels range from 60 dB(A) at R110 and R123 to 79 dB(A) at R119. Generally, noise levels either remain the same or increase by 1 dB(A) from the Existing scenario to the No Build scenario.

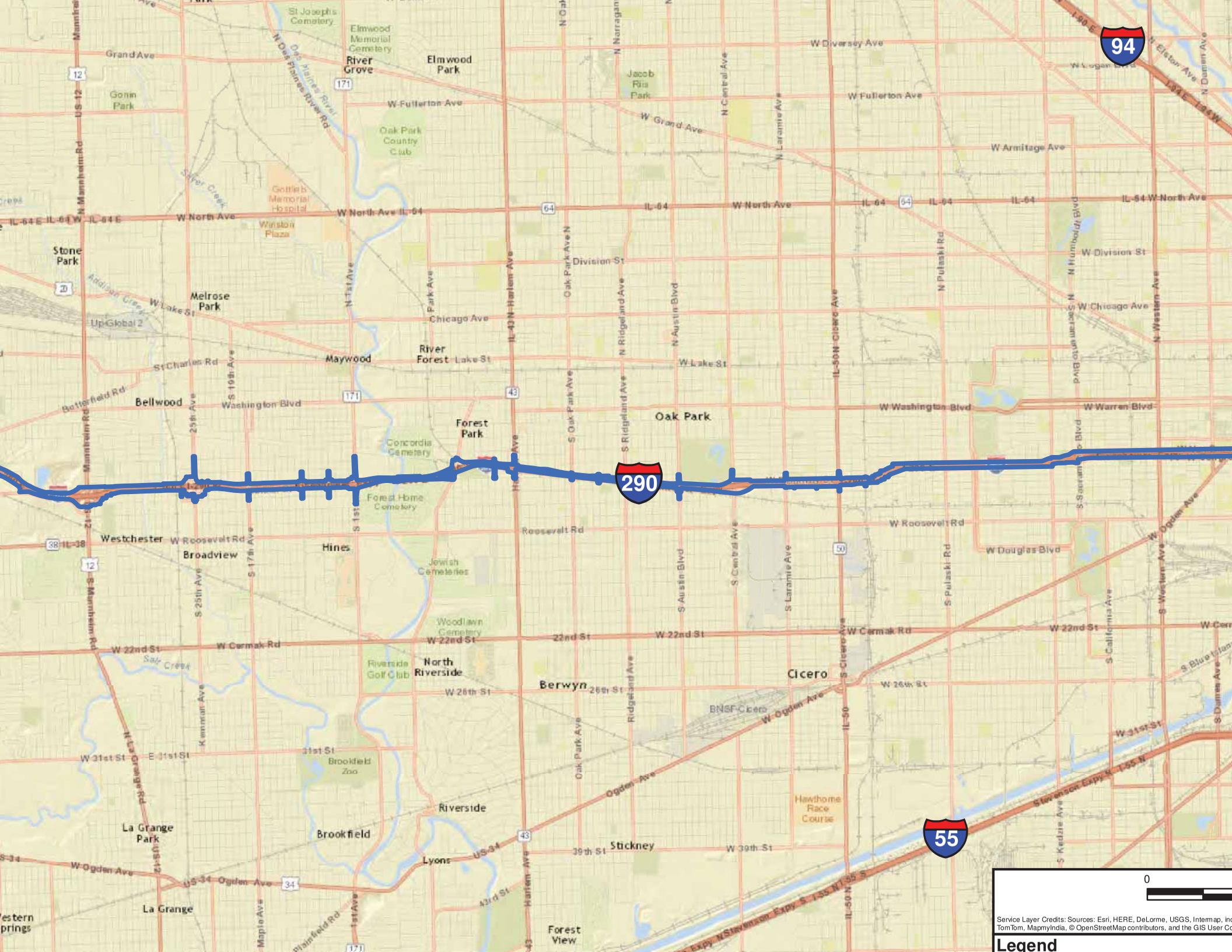
The 2040 traffic noise levels for the Preliminary Preferred Alternative as predicted by TNM range from 59 dB(A) at R123 to 79 dB(A) at R119. Noise level change from No Build to Build ranges from -2 to 3 dB(A). For the 2040 Preliminary Preferred Alternative, 35 of the 48 (73 percent) representative receptor locations approach, meet, or exceed the FHWA NAC, and therefore warrant a noise abatement analysis. None of the receptors are considered impacted due to a substantial increase (greater than 14 dB(A) increase) in traffic noise levels.

Twelve noise walls were evaluated for the impacted representative receptors within the village of Oak Park. All of the noise walls were found to be feasible, meaning they could achieve at least a 5 dB(A) reduction at an impacted receptor. Eleven of the twelve feasible noise barriers would be considered acoustically reasonable, as they achieve the IDOT noise reduction design goal of at least an 8 dB(A) traffic noise reduction at one or more benefited receptors. Noise wall B36 would not achieve the noise reduction design goal, and is not considered acoustically reasonable. The remaining eleven walls achieved the IDOT noise reduction design goal of at least an 8 dB(A) traffic noise reduction for at least one benefitted receptor. The eleven walls were checked for economic reasonability, and all were found to be economically reasonable, as the actual wall cost per benefitted receptor did not exceed the adjusted allowable cost per benefitted receptor.

The noise barriers determined to meet the feasible and reasonable criteria (before the viewpoints solicitation) are identified in Table 6. The full version of the Volume 2 noise report will contain results of the viewpoints solicitations as well as a list of noise walls receiving more than fifty percent of their possible votes; these walls will be recommended for construction.

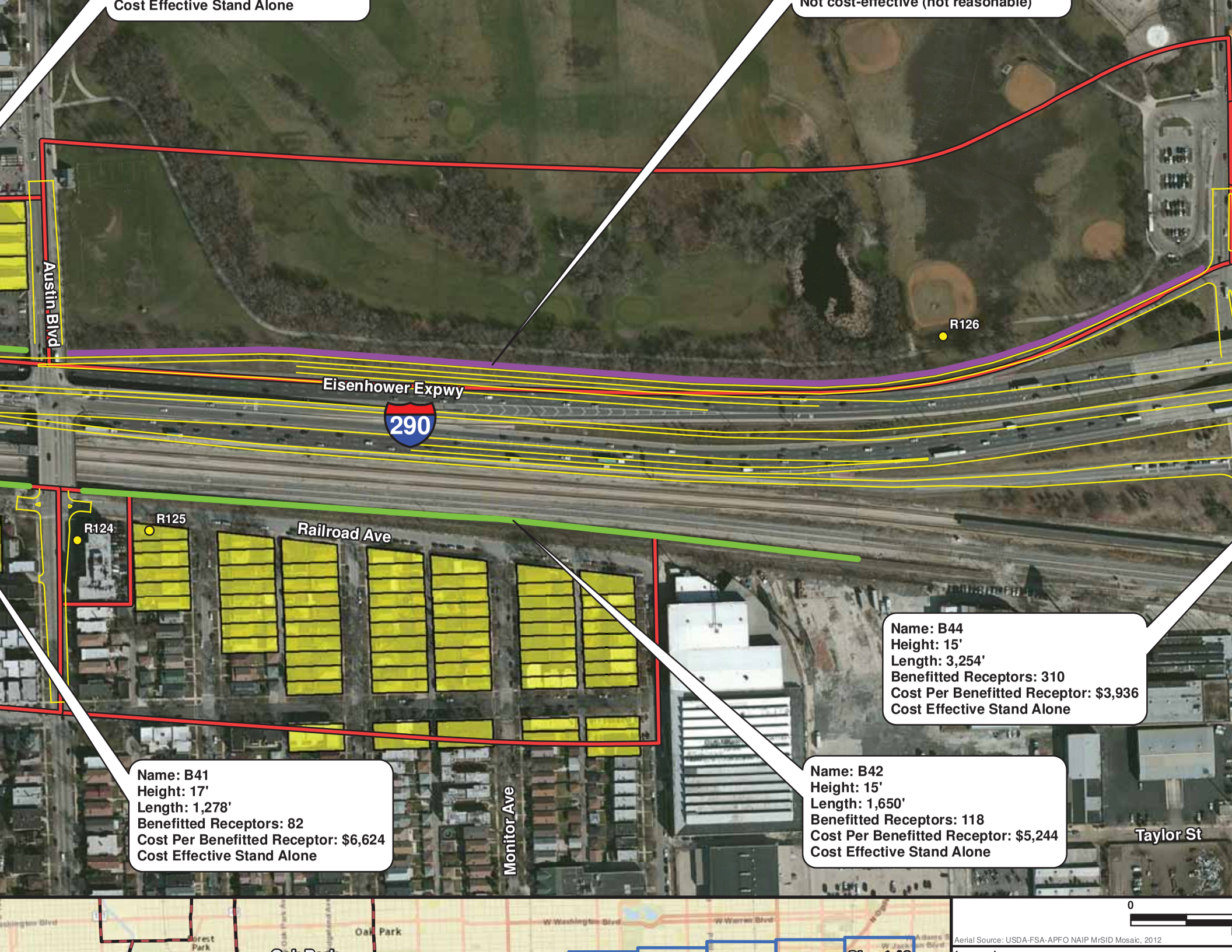
If it subsequently develops during final design that constraints not foreseen in the preliminary design occur, or public input substantially changes reasonableness, the abatement measure may need to be modified or removed from the project plans. A final decision on the installation of abatement measures will be made during the project's final design phase, which includes additional, public involvement, and aesthetics coordination.

APPENDIX A


94
290
55
Oak Park
Forest Park
Maywood
River Forest
Bellwood
Melrose Park
Stone Park
River Grove
Elmwood Park
Hines
Broadview
Westchester
North Riverside
Berwyn
Cicero
Riverside
Brookfield
La Grange Park
La Grange
Stickney
Forest View
Lake St
Chicago Ave
Division St
North Ave
Washington Blvd
Roosevelt Rd
Cermak Rd
22nd St
Ogden Ave
31st St
39th St
Fullerton Ave
Grand Ave
Armitage Ave
Diversey Ave
Irving Park Rd
Addison Creek
Salt Creek
Silver Creek
Des Plaines River
Brookfield Zoo
Hawthorne Race Course
Riverside Golf Club
Concordia Cemetery
Forest Home Cemetery
Woodlawn Cemetery
Jewish Cemeteries
Elmwood Memorial Cemetery
St Joseph's Cemetery
Oak Park Country Club
Jacob Ries Park
Gottlieb Memorial Hospital
Winston Plaza
UpGlobal 2
BNSF Cicero
Stevenson Expy
0
Service Layer Credits: Sources: Esri, HERE, DeLorme, USGS, Intermap, inc
TomTom, MapmyIndia, © OpenStreetMap contributors, and the GIS User Co
Legend


Cost Effective Stand Alone
Cost Effective Stand Alone
Cost Effective Stand
Name: B34
Height: 17'
Length: 1,303'
Benefitted Receptors
Cost Per Benefitted R
Cost Effective Stand
Maple Ave
Harrison St
Eisenhower Expwy
290
Home Ave
Clinton Ave
Harlem Ave
R79
R79A
R77
R78
R80
R81
R82
R83
Garfield St
Grove Ave
Wenonah
Name: B29
Not Feasible
Does Not Meet Feasibility Criterion
Name: B30
Height: 15'
Length: 1,008'
Benefitted Receptors: 23
Cost Per Benefitted Receptor: $16,435
Cost Effective Stand Alone
Name: B33
Height: 15'
Length: 1,224'
Benefitted Receptors: 79
Cost Per Benefitted Receptor: $5,810
Cost Effective Stand Alone
Name: B35
Height: 13'
Length: 1,305'
Benefitted Receptors: 90
Cost Per Benefitted Receptor: $4,713
Cost Effective Stand Alone
Oak Park
W Washington Blvd
W Warren Blvd
0
Aerial Source: USDA-FSA-APFO NAIP MrSID Mosaic, 2012


Cost Effective Stand Alone
Name: B36
Does Not Achieve NRDG,
Is Not Acoustically Reasonable
Name: B38
Height: 13'
Length: 1,302'
Benefitted Receptors: 3
Cost Per Benefitted Rec
Cost Effective Stand Alo
R95
Scoville Ave
Gunderson Ave
R98
R102
R103
R105
R107
R112
R113
R109
R108
R110
R104
R100
R101
East Ave
290
Eisenhower Expwy
Flournoy St
R93
R96A
R99
R96
R111
Harvey Ave
R97
Name: B35
Height: 13'
Length: 1,305'
Benefitted Receptors: 90
Cost Per Benefitted Receptor: $4,713
Cost Effective Stand Alone
Name: B37
Height: 15'
Length: 1,312'
Benefitted Receptors: 40
Cost Per Benefitted Receptor: $12,300
Cost Effective Stand Alone
Name: B39
Height: 17'
Length: 1,302'
Benefitted Receptors: 22
Cost Per Benefitted Receptor: $25,152
Cost Effective Stand Alone
Name: B41
Height: 17'
Length: 1,278'
Benefitted Receptors: 82
Cost Per Benefitted Receptor: $6,62
Cost Effective Stand Alone
Harvard St
Oak Park
0
Aerial Source: USDA-FSA-APFO NAIP MrSID Mosaic, 2012


Cost Effective Stand Alone
Not cost-effective (not reasonable)
Austin Blvd
R126
Eisenhower Expwy
290
R124
R125
Railroad Ave
Name: B44
Height: 15'
Length: 3,254'
Benefitted Receptors: 310
Cost Per Benefitted Receptor: $3,936
Cost Effective Stand Alone
Name: B41
Height: 17'
Length: 1,278'
Benefitted Receptors: 82
Cost Per Benefitted Receptor: $6,624
Cost Effective Stand Alone
Monitor Ave
Name: B42
Height: 15'
Length: 1,650'
Benefitted Receptors: 118
Cost Per Benefitted Receptor: $5,244
Cost Effective Stand Alone
Taylor St
Oak Park
W Washington Blvd
W Warren Blvd
0
Aerial Source: USDA-FSA-APFO NAIP MrSID Mosaic, 2012