Appendix E
Traffic Noise Analysis for I-94 East-West Corridor Project

Traffic Noise Analysis for I-94 East-West Corridor Project

(70th Street to 16th Street)

Submitted to

Wisconsin Department of Transportation

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Acronyms and Abbreviations

Ambient Noise Level: The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.

A-Scale: A weighting system which best approximates the frequency response of the average human ear.

A-Weighted Sound Level [dBA]: The sound-pressure level in decibels as measured on a sound-level meter using the A weighted filter network. The A-weighted filter deemphasizes very low- and very high-frequency components of sound, in a manner similar to the frequency response of the human ear, and correlates well with subjective reactions to noise. All sound levels in this report are A-weighted.

Approach: Means one (1) decibel less than the levels in the Noise Level Criteria for Considering Barriers.

ATC: American Transmission Company - American Transmission Co. is a Wisconsin-based company that owns and operates the high-voltage electric transmission system that powers communities in portions of the Upper Midwest.

Benefited Receptor: A receptor or common use area receiving a minimum eight (8) decibels reduction in sound level as a result of the proposed abatement measure. A receptor does not need to be impacted to be benefitted.

CFR: Code of Federal Regulation

Common Noise Environment: A group of receptors within the same Land Use Category listed in the Noise Level Criteria For Considering Barriers, that are exposed to similar noise sources and levels; traffic volumes, traffic mix, and speed; and topographic features. Generally, common noise environments occur between two secondary noise sources such as interchanges, intersections and cross-roads.

Common Use Area: An outdoor place in a multi-unit residential complex where frequent human use by all complex residents occurs and a lowered noise level would be of benefit.

Decibel (dB): The unit of measure of sound intensity. The decibel scale audible to humans spans approximately 140 dB.

Design Year: Means 20 years after the completion of construction of the highway facility. 2050 for the I-94 E-W Project

EIS: Environmental Impact Statement

Equivalent Noise Level (Leq): The average A-weighted noise level during the measurement period.

Existing Noise Level: The highest hourly traffic noise level caused by existing conditions in a particular area.

Feasibility: The combination of acoustical and engineering factors considered in the evaluation of a noise abatement measure.

FHWA: Federal Highway Administration

Future Noise Level: The highest hourly traffic noise level based on estimated design year (2050) traffic volumes.

HOT: High-occupancy toll

HOV: High-occupancy vehicle

Impacted Receptor: The recipient that has a traffic noise impact.

Intrusive: Noise that intrudes over and above the ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content, as well as the prevailing ambient noise level.

Leq: The equivalent steady-state noise level, as measured in decibels on the A-weighted scale (dBA), which in a stated period of time contains the same acoustic energy as the time-varying noise level during the same period.

Leq(h): The hourly value of Leq

Mph: Miles per hour

NAC: FHWA Noise Abatement Criteria

NLC: WisDOT Noise Level Criteria

Noise: Unwanted sound

Noise Barrier: A physical obstruction that is constructed between the highway noise source and the noise sensitive receptor(s) that lowers the noise level, including stand-alone noise walls, noise berms (earth or other materials), and combination berm/wall systems.

Noise Level: The sound level obtained through use of A-weighting characteristics. The unit of measure is the decibel (dB), commonly referred to as dBA when A-weighting is used.

Noise Reduction Design Goal: The department's criteria of a nine (9) decibel sound level reduction required at one (1) receptor or common use area as a result of the proposed abatement measure before a reasonableness determination can be made.

Permitted: A definite commitment to develop land with an approved specific design of land use activities as evidenced by the issuance of a building permit.

Property Owner: An individual or group of individuals that holds a title, deed or other legal documentation of ownership of a property or residence.

Reasonableness: The combination of social, economic, and environmental factors considered in the evaluation of a noise abatement measure.

Representative Receptor: A discrete or representative location of a noise sensitive area(s) for any of the land uses listed in **Table 2-2** where frequent human use occurs and a lowered noise level would be of benefit.

Residence: The official location of a household.

SEWRPC: Southeastern Wisconsin Regional Planning Commission

Substantial Noise Increase: An increase of 15 dBA or more in the design year over the existing noise level.

TNM: Traffic Noise Model

Traffic Noise Impacts: Design year build conditions that approach or exceed the Noise Level Criteria for Considering Barriers for the applicable Land Use Category or a substantial noise increase in the design year over the existing noise level.

23 CFR 772: Title 23, Section 772 of the Code of Federal Regulations

SECTION 1

Introduction

The I-94 East-West Project improvements will reconstruct Interstate 94 (I-94) between 70th Street and 16th Street, a distance of about 3.5 miles, and extend Washington Street on new alignment (approximately 0.6 mile south of I-94 between 70th Street and Hawley Road) in Milwaukee, Wisconsin (see **Exhibit 1-1**). The scope of the proposed action is to rebuild the freeway and bridges, modify interchange access to improve safety and traffic flow, and reconstruct local streets affected by the freeway reconstruction.

This traffic noise study has been prepared to evaluate traffic noise related to these roadway improvements and is an update to the 2016 Final EIS noise analysis. This updated study considers new traffic projections, the 6-lane with both half-Hawley and full-Hawley Interchange alternative and the DDI at the Stadium Interchange. The noise study area, shown in **Exhibit 1-2** (including a 500-foot buffer), is in the City of Milwaukee, Milwaukee County, Wisconsin.

This analysis will document existing and predicted future noise conditions in the project corridor. The existing land use adjacent to the road is a mixture of residential, commercial/industrial, and cemeteries.

This report presents the federal and state noise regulations (Section 2), field noise monitoring (Section 3), a description of the noise analysis method (Section 4), traffic noise model results (Section 5), the noise abatement analysis (Section 6), a description of additional analysis to assess noise impacts and abatement to all populations (Section 7), the likelihood statement (Section 8), construction noise (Section 9), coordination with local officials for undeveloped lands (Section 10), and the noise analysis conclusion (Section 11).

SECTION 2

Noise Background and Regulations

2.1 Noise Background

Sound is a form of vibration that causes pressure variations in elastic media such as air and water. Noise is unwanted and disruptive sound. The ear is sensitive to pressure variation and perceives it as sound. The intensity of these pressure variations causes the ear to detect different levels of loudness. These pressure differences are most commonly measured in decibels.

The decibel (dB) is the unit of measurement for sound. The decibel scale audible to humans spans approximately 140 dB. A level of zero dB corresponds to the lower limit of audibility, while 140 dB produces a sensation more like pain than sound. The decibel scale is a logarithmic representation of the actual sound pressure variations. Therefore, a 26 percent change in the energy level only changes the sound level 1 dB. The human ear would not detect this change except in a controlled environment. Doubling the energy level would result in a 3-dB increase, which would be barely perceptible in the natural environment. Tripling the energy sound level would result in a clearly noticeable change of 5 dB in the sound level.

A change of 10 times the energy level would result in a 10 dB change in the sound level. This would be perceived as a doubling (or halving) of the apparent loudness.

The human ear has a non-linear sensitivity to noise. To account for this in noise measurements, electronic weighting scales are used to define the relative loudness of different frequencies. The “A” weighting scale is widely used in environmental work because it closely resembles the non-linearity of human hearing. Therefore, the unit of measurement for a decibel A-weighted noise level is dBA.

Traffic noise is not constant. It varies as each vehicle passes a point. The time-varying characteristics of environmental noise are analyzed statistically to determine the duration and intensity of noise exposure. In an urban environment, noise is made up of two distinct parts. One is ambient, or background noise. Wind noise and distant traffic noise make up the acoustical environment surrounding the project. These sounds are not readily recognized but combine to produce a non-irritating ambient sound level. This background sound level varies throughout the day, being lowest at night and highest during the day. The other component of urban noise is intermittent and louder than the background noise. Transportation noise and local industrial noise are examples of this type of noise. It is for these reasons that environmental noise is analyzed statistically.

The statistical descriptor used for traffic noise is Leq. Leq is the constant, average sound level that, over a period of time, contains the same amount of sound energy as the varying levels of the traffic noise. The Leq correlates reasonably well the effects of noise on people. It is also easily measurable with integrating sound level meters. The time period for traffic noise is 1 hour. Therefore, the unit of measure for traffic noise is Leq(1h) dBA.

Highway noise sources have been divided into the five types:

- Automobiles—All vehicles with two axles and four tires, includes passenger vehicles and light trucks, less than 10,000 pounds.
- Medium trucks—All vehicles having two axles and six tires, vehicle weight between 10,000 and 26,000 pounds.
- Heavy trucks—All vehicles having three or more axles, vehicle weight greater than 26,000 pounds.
- Buses—All vehicles designed to carry more than nine passengers.

- Motorcycles—All vehicles with two or three tires and an open-air driver/passenger compartment.

Noise levels produced by highway vehicles can be attributed to three major categories:

- Running gear and accessories (tires, drive train, fan, and other auxiliary equipment)
- Engine (intake and exhaust noise, radiation from engine casing)
- Aerodynamic and body noise

Tires are the dominant noise source at speeds greater than 20 to 30 mph for cars and 50 mph for trucks.[1] Tire sound levels increase with vehicle speed but also depend upon road surface, vehicle weight, tread design and wear. Change in any of these can vary noise levels. At lower speeds, especially in trucks and buses, the dominant noise source is the engine and related accessories.

Technical noise terms used in this report are defined in the **Acronyms, Abbreviations and Definitions, Pages iv and v.**

The effects of noise on people can be listed in three general categories:

- Subjective effects of annoyance, nuisance, and dissatisfaction
- Interference with activities such as speech, sleep, and learning
- Physiological effects such as startling and hearing loss

In most cases, environmental noise produces effects in the subjective and interference categories only. Workers in industrial plants, however, typically experience noise effects in the physiological category. No completely satisfactory way exists to measure the subjective effects of noise, or to measure the corresponding reactions of annoyance and dissatisfaction. This lack of a standard is primarily because of the wide variation in individual thresholds of annoyance and habituation to noise. Thus, an important way of determining a person's subjective reaction to a new noise is to compare it to the existing or "ambient" environment to which that person has adapted. In general, the more a new noise exceeds the previously ambient noise level, the less acceptable the new noise will be judged by listeners. **Table 2-1** shows typical noise levels of transportation sources and general subjective responses.

[1] https://www.fhwa.dot.gov/pavement/sustainability/articles/tire_noise.cfm

TABLE 2-1
Typical Noise Levels

Transportation Sources	Noise Level (dBA)	Other Sources	Description
	130	Gunshot (5 ft)	Painfully Loud
	125		
Jet Takeoff (200 ft)	120		
Car Horn (3 ft)	115		Maximum Vocal Effort
	110		
	105		
	100	Shout (1.5 ft)	
	95		Very Annoying
Heavy Truck (50 ft)	90	Jackhammer (50 ft)	
Train on a Structure (50 ft)	85	Home Shop Tools (3 ft) Backhoe (50 ft)	
	80	Bulldozer(50 ft)	Annoying
Train (50 feet)	75	Vacuum Cleaner (3 ft) Blender (3 ft)	
City Bus at Stop (50 ft) Freeway Traffic (50 ft)	70	Lawn Mower (50 ft)	
Train in Station (50 ft)	65	Large Office Washing Machine (3 ft)	Intrusive
	60	TV (10 ft)	
	55	Talking (10 ft)	
Light Traffic (50 ft)	50		Quiet
Light Traffic (100 ft)	45	Refrigerator (3 ft)	
	40	Bedroom Library	
	35		
	30	Soft Whisper (15 ft)	Very Quiet

Regarding increases in A-weighted noise level, consider the following relationships:

- Except in carefully controlled laboratory experiments, a change of 1 to 2 dB cannot be perceived by humans.
- Outside the laboratory, a 3-dB change is just perceivable.
- A change in level of at least 5 dB is required before any noticeable change in community response would be expected.
- A 10-dB increase is heard subjectively as an approximate doubling in loudness and may cause an adverse community response.

2.2 Federal Regulations

Traffic noise analyses are required for all projects considered a Type I project. Federal regulations (23 Code of Federal Regulations [CFR 772], 2010) 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 between the existing condition to the build condition

  – 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 a through-traffic lane(s). This includes the addition of a through-traffic lane that functions as a high-occupancy vehicle (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 lane or an auxiliary lane
- The addition of a new or substantial alteration of a weigh station, rest stop, ride-share lot or toll plaza.

The proposed improvements to I-94 would be characterized as a Type I noise project as they may include the addition of through-traffic lane(s) and will include substantial horizontal and vertical alterations and new auxiliary lanes in many parts of the corridor.

The federal criteria for evaluating noise impacts used in this report are contained in "Procedures for Abatement of Highway Traffic Noise and Construction Noise" (23 CFR 772, 2010). The Categories B and C criteria in that document apply to residences, cemeteries, churches, schools, recreation areas, and similar land uses. They represent an hourly sound level that approaches, meets, or exceeds 67 dBA Leq. Other developed land, such as commercial or industrial uses, is included in Category E, for which an hourly sound-level criterion that approaches, meets, or exceeds 72 dBA Leq has been established. There are no criteria for undeveloped lands that are not permitted or for industrial land uses. The sound levels are described in more detail in **Table 2-2** and are measured at the exterior of structures during peak-hour noise conditions.

TABLE 2-2
Noise Level Criteria (NLC)[1] for Considering Barriers

Land Use Category	Leq(h) (dBA) (Evaluation Location)	Description of Land Use Category
A	57 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need, and where the preservation of those qualities is essential if the area is to continue to serve their intended purpose.
B*	67 (Exterior)	Residential.
C*	67 (Exterior)	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, daycare 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, daycare 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 through D or F.

TABLE 2-2
Noise Level Criteria (NLC)[1] for Considering Barriers

Land Use Category	Leq(h) (dBA) (Evaluation Location)	Description of Land Use Category
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.

Source: 23 CFR Part 772, Procedures for Abatement of Highway Traffic Noise and Construction Noise (2010)

[1]WisDOT has substituted the term "Noise Abatement Criteria" used in 23 CFR 772 with "Noise Level Criteria" throughout Chapter 23 (Noise) of the Facilities Development Manual (November 15, 2023) and in supporting documents. Further, Table 1 in 23 CFR 772 is the Noise Abatement Criteria for various land uses. WisDOT has adopted the land use categories, impact levels and evaluation locations in 23 CFR 772, Table 1, but refers to this table as "Noise Level Criteria for Considering Barriers" in this Section. The word "Level" is used instead of "Abatement" because the department believes the use of the term "Noise Abatement Criteria" means that the noise impact levels indicated in the table require that abatement be provided. The term "Noise Level Criteria" accurately reflects the intent of the table which is to identify a sound level at which a noise impact occurs, thus requiring a determination of whether or not abatement is feasible, reasonable, and likely to be incorporated into the project.

* Includes undeveloped lands permitted for this activity category or publicly-owned recreation lands formally designated in a public agency's Master Plan.

In addition to the criterion sound levels, the Federal Highway Administration (FHWA) considers a traffic noise impact to occur if predicted sound levels result in a substantial increase above existing noise levels. FHWA guidance does not specifically define what constitutes a substantial increase, but instead gives state highway agencies flexibility in establishing their own definitions.

2.3 WisDOT Policy

The WisDOT Noise Policy, consistent with 23 CFR 772, is presented in Chapter 23 of WisDOT's *Facilities Development Manual* (November 15, 2023).

To fulfill the detailed analysis requirements for Type I projects, existing sound levels must be determined by measurement and/or by computer modeling. Future sound levels are predicted by implementing the FHWA model. Noise impacts are then determined from the existing and future sound levels.

Traffic volumes and geometric data are obtained within the project limits. For the complete analysis, the worst-case traffic condition for the existing year (2019) and the design year (2050) should be used. The vehicle mix for both years must be compiled into a minimum of three categories: automobiles, medium trucks, and heavy trucks (buses and motorcycles will also be categorized if the numbers are substantial). Receptors must be located at representative sites in the project area. Once the existing and future sound levels are established, the impact of the sound upon the receptors and the criteria for which mitigation should be considered must be determined. If it is determined there is a noise impact, abatement should be evaluated.

WisDOT's noise policy has established the following criteria to define traffic noise impacts for Type 1 projects:

- The predicted equivalent design year traffic sound levels at a receptor or common use area approach or exceed the NLC For Considering Barriers for any Land Use Category listed in **Table 2-2** applicable in the study area,
- Or, when predicted future sound levels exceed existing levels by 15 dB or more.

"Approach" is defined as 1 dBA less than the NLC for the applicable Land Use Category. As a result, WisDOT's Facilities Development Manual (2023) considers traffic noise impacts to occur if predicted design year traffic noise levels approach 66 dBA for Categories B and C; 71 dBA for Category E; approach or exceed the noise level criteria in **Table 2-2**; or if build noise levels increase above existing levels by 15 dBA or greater.

SECTION 3
Field Noise Level Measurements

3.1 Field Noise Level Measurement Methodology

Actual noise level measurements (noise monitoring) provide a "snapshot" of existing site conditions. The traffic volumes and conditions during the actual noise level measurements need to be considered when evaluating field measurements as typical for the area.

Traffic noise levels measured during monitoring events are representative of the traffic characteristics (volume, speed, and composition) for the period measured. Traffic was moving under free-flow conditions during the monitoring period. This may or may not be the peak-period noise condition at the location being measured. Noise levels are also influenced by noise sources in the area other than the traffic noise and the characteristics of the location, such as shielding afforded by existing berms or structures. Consequently, comparison of the noise levels between locations needs to also consider the variations in site characteristics in addition to varying traffic conditions. The noise meter was set in a location where human activity typically occurs or in a location representative of that location. **Tables 3-2** and **3-3** present the measured existing noise levels collected at the six sites. The locations of the field sites are shown on **Exhibit 1-2**.

The following methods were used to collect noise level measurements.

3.1.1 Traffic Volumes

Traffic volumes along roadways adjacent to receptors were counted during field monitoring. The number of cars, trucks, motorcycles, and buses were recorded separately along with any other noise sources observed during monitoring. The traffic volumes were counted as a total for each direction during the 15-minute noise monitoring periods and extrapolated to hourly volumes by multiplying the volumes by 4, to estimate the hourly traffic. This procedure is accepted by the FHWA as a representative noise monitoring method.

3.1.2 Traffic Composition

Five types of vehicles were counted: cars, medium trucks, heavy trucks, buses, and motorcycles. The percentage of automobiles counted on I-94 was approximately 93% of all vehicles. Medium trucks accounted for 2.3% of all vehicles, with heavy trucks accounting for 4% of traffic volume at each receptor where noise was monitored. Buses and motorcycles accounted for less than 1% of all vehicles counted. These percentages are consistent with the 2019 weekday length-based classification data for I-94 mainline sites.

3.1.3 Speed Conditions

The existing posted speed limit is 50 miles per hour (mph) at Field Sites 1 and 2 and 55 mph at sites 3 – 6 for I-94. Clybourn Street speed limit is 30 mph. Noise measurements were taken during free-flow conditions with all vehicles traveling at or above the posted speed limit.

3.1.4 Time and Day for Measurements

Noise-level measurements and concurrent traffic counts were conducted on September 29, 2021, between 8:00 a.m. and 2:00 p.m. The noise-monitoring locations were selected based on a review of aerials to determine the locations of noise-sensitive land uses in the project area.

3.1.5 Weather Conditions

Weather conditions have some effect on the noise-measurement readings. Noise measurements should not be taken if the wind speed exceeds 12 miles per hour (mph). A wind screen was used at all measurements to reduce wind noise. The conditions during the monitoring are summarized in **Table 3-1.**

TABLE 3-1
Weather Conditions During Noise Monitoring

Condition	Required	Actual
Pavement	Dry	Dry
Humidity	Less than 90%	50-88%
Temperature	14 to 112 degrees Fahrenheit	53-75 degrees Fahrenheit
Wind Speed	Less than 12 mph	0-9 mph

The weather conditions during the noise monitoring were within the recommended ranges for all parameters listed above.

3.1.6 Instrumentation

The measurements were made in accordance with FHWA guidelines using an integrating sound level analyzer meeting American National Standards Institute and International Electrical Commission Type 1 specifications. A Sound Level MeterSoundPro DL sound-level meter was used to monitor the actual noise level. The Leq was recorded for the "A"-weighted scale. The instrument was calibrated prior to use. The instrument was set up approximately 5 feet from the ground, and the measurement was conducted for 15 minutes.

3.2 Field Noise Monitoring Results

Noise monitoring was conducted at seven noise sensitive sites representative of the entire project area. **Table 3-2** describes the selected field sites and the measured existing noise levels.

TABLE 3-2
Measured Existing Noise Levels

Field Site	Site Description and Distance from Road	Noise Level dBA Leq (1h)
1	Residence, 125 feet from westbound I-94 centerline and five feet west of 63rd Street	60.2
2	Spring Hill Cemetery, 123 feet from eastbound I-94 centerline and 73 feet southeast of the mausoleum	69.2
3	Bike Path, 145 feet west of Yount Drive and 82 feet from westbound I-94 centerline	72.7
4	Open Space/Indian Hill Sled Run, 249 feet from westbound I-94 centerline and 302 feet from intersection of N 41st Street and W. Mt. Vernon Avenue	57.4
5	Residence, corner of W. Park Hill Ave and N. 31st Street; 79 feet from westbound I-94 centerline	71.4
6	Sav-On Foods parking lot, Clybourn Street; 215 feet from WB I-94 centerline	67.0
7	807 S 60th St West Allis (for the Washington Street extension)	60.9

3.2.1 Comparison of Field Data Versus Modeled Noise Levels

Traffic data counted during the field noise measurements was used to model the noise level from six field measurement locations using the FHWA Traffic Noise Model (TNM) Version 2.5.[2] The FHWA

[2] Traffic counts were not taken at Washington Street because it currently does not connect between 70th Street and Hawley Road.

TNM is a computer program used for predicting noise impacts in the vicinity of highways. TNM 2.5 is a nationally accepted model that is required by FHWA to be used on all federal-aid highway projects.[3]

The purpose of the field noise measurements was to validate the accuracy of FHWA's TNM 2.5 for predicting traffic noise exposure within the study area (FHWA 2004). The project area was inspected to gather input data that would allow accurate modeling of roadway and receptor locations. The locations of the measurement sites, and existing roadway geometry, vehicle counts, and estimated speeds obtained during the noise measurement periods, were input into TNM 2.5.

Field measurements were then compared to the output from TNM to confirm the applicability of the computer model to the specific conditions in the I-94 study area. The traffic data from the six sites were used in the TNM to model the field data. The modeled noise levels at the six sites with concurrent traffic counts all compared within ±3 dB of the field measured levels. This represents reasonable correlation because the human ear can barely distinguish a 3 dB change in the Leq(1h) noise level in the urban environment.

Table 3-3 summarizes the noise monitoring results and compares noise levels obtained during the traffic noise measurements with the levels predicted by the noise model. Measured noise levels ranged from 57 to 73 dBA. Agreement between the noise levels measured in the field and noise levels calculated by the noise model serves to validate the model, as represented in the "Difference" column in **Table 3-3.** A positive difference indicates that noise levels measured in the field are lower than those predicted by the computer model. A negative difference shows that measured noise levels are greater than predicted noise levels.

As shown in **Table 3-3**, all the receptors are within 3 dBA of those measured. Such differences show agreement between measured and modeled/calculated noise levels and indicate that the TNM 2.5 may be used to accurately calculate noise exposure in the corridor. Since the TNM 2.5 modeled field data were within +/- 3 dB of the measured noise levels, the model is assumed to be valid for this study. At this point in the environmental analysis, the field measurements and the modeled noise levels using the traffic counts taken during the field noise measurements are set aside for the remainder of the noise analysis.

TABLE 3-3
Comparison of Measured and Modeled Noise Levels

Field Site	Noise Level, dBA $_{Leq}$		Difference in Noise Level, dBA $_{Leq}$ Modeled Noise Level Minus Measured Noise Level
	Measured	Modeled	
1	60.2	62.6	2.4
2	69.2	71.5	2.3
3	72.7	74.8	2.1
4	57.4	59	1.6
5	71.4	74.3	2.9
6	67	67.1	0.1

[3] In continuation with the previous noise analyses used for the 2014 Draft EIS, 2016 Final EIS, and 2022 Supplemental Draft EIS, WisDOT used TNM 2.5 for noise modeling. As noted in FHWA's December 2023 Frequently Asked Questions Traffic Noise Model 3.2, TNM 3.2 is not required on noise analyses until FHWA updates the noise regulations at 23 CFR 772 (FHWA 2023).

SECTION 4
Noise Analysis Methodology

FHWA's TNM 2.5 was used to model existing (2019) and future (2050) noise levels for each of the alternatives under consideration. Noise levels were calculated based on traffic volumes in Southeastern Wisconsin Regional Planning Commission's (SEWRPC) traffic model. SEWRPC's traffic model is used because it averages traffic counts from throughout the year. FHWA's TNM 2.5 model is based upon reference energy emission levels for automobiles, medium trucks (two axles), and heavy trucks (three or more axles) with consideration given to vehicle volume, speed, roadway configuration, distance to the receptor, terrain features, atmospheric conditions, and the acoustical characteristics of the site. Refer to **Exhibit 4-1** in **Appendix A** for representative receptor locations.

Prediction of noise levels is one step in assessing potential traffic noise impacts and abatement strategies. Noise impacts were measured by calculating the difference between the modeled existing condition and the modeled future condition during the design hour. The design hour is the hour before or after the morning or afternoon peak periods, when traffic is generally at its loudest. The TNM 2.5 output for the existing noise level is used instead of the field noise level measurement because the TNM 2.5 noise level is a more accurate representation of the average noise level at a specific location at the loudest hour of the day. During the field measurement, several factors could influence the noise measurement that are not present daily. Noises that are extraneous from traffic (birds, people, machinery, etc.) could influence the noise measurement reading during the 15-minute period. Additionally, the field measurement is not necessarily taken during the loudest time of the day. However, the study team needs to know the noise level during the loudest time of the day to determine if the predicted noise levels exceed or approach the noise level criteria for considering noise barriers.

The following parameters were used in FHWA's TNM 2.5 model to calculate an hourly L_{eq}(1h) at a specific receptor location:

- Distance between roadway and receptor
- Relative elevations of roadway and receptor (all receptors are assumed to be 5 feet off the ground)
- Hourly traffic volume in light-duty (two axles, four tires), medium-duty (two axles, six tires), and heavy-duty (three or more axles) vehicles
- Vehicle speed
- Roadway grade
- Topographic features, including retaining walls and berms
- Noise source height of vehicles

Exhibits 4-1, 4-2, and 4-4 show 175 representative receptor locations numbered R1 to R9, N1 through N123, and NR1 through NR26, plus the noise measurement locations FS-1 through FS-17. **Exhibit 4-3** shows two additional representative receptors, NR27 and NR28, totaling 177 representative receptors.[4] Representative receptors are sites typical of the applicable land use category near the existing or proposed highway route that may be used to represent the sound levels at similar land uses along the route. These receptors were selected to model the representative noise impacts at outdoor areas of frequent human use at 158 residential receptors representing 670 residences (including apartments),

[4] NR27 and NR28 were added in this Supplemental Final EIS for the 8-lane diverging diamond alternative (preferred alternative) only. These receptors were added to model the representative noise impacts at Menomonee Valley Community Park.

one active sports area, one recreation facility, one educational facility, four cemeteries (nine representative receptors total), one day care center, two parks (Valley Park and Menomonee Valley Community Park; three representative receptors total)[5], one restaurant, one dentist, and one hospital.

Information sources used in the TNM 2.5 analysis are briefly described in the following subsections.

4.1 Traffic Volumes

Traffic noise levels for the receptor sites for existing (2019) conditions, as well as no-build and build (both 2050) conditions for each of the alternatives under consideration, were predicted using existing (2019) and build (2050) peak hour traffic volumes provided by SEWRPC. The peak-hour traffic was used as a worst-case noise scenario as traffic is the dominant noise source for a majority of receptors.

4.2 Traffic Composition

Five types of vehicles, including cars, medium trucks (two axles), heavy trucks (three or more axles), buses, and motorcycles were input into TNM. Truck composition for project area roads was determined based on the traffic data provided by SEWRPC. The percentage of automobiles was 92.5% of all vehicles, medium trucks 2.8%, heavy trucks 2.4%, motorcycles 1.6%, and buses 0.7% of all vehicles.

4.3 Speed Conditions

The average speed during free flow traffic conditions was used for the noise analysis and was input into the model as the posted speed limit. The existing speed limit ranges from 50 – 55 mph for I-94 and is not expected to change with the proposed action. Speeds ranged from 20 – 35 mph on local roads and ramps.

4.4 Receptor Distance/Elevation

Most noise-sensitive locations in the analysis area are immediately adjacent to I-94. Front row receptors are primarily residential to the north and south of the mainline. There are several cemeteries and parks in the analysis area. There are residences adjacent to eastern half the Washington Street extension, south of the proposed roadway. There are also residences adjacent to the south side of National Avenue, west of Brewers Boulevard. The selected representative receptors include residential land and apartments, a day care center, an educational facility, various cemeteries, parks, a dentist, a hospital and recreational and sports facilities. The distance and elevation of each receptor directly affects the predicted traffic noise level. Typically, receptors within 500 feet of the proposed roadway edge of pavement are studied for potential traffic noise impacts, as noise impacts typically do not occur at distances greater than 500 feet. The receptors studied for potential traffic noise impacts range from 18 – 671 feet from the I-94 centerline. **Table 4-1** lists the distances from each receptor to the centerline of the nearest lane.

[5] Representative noise impacts at Menomonee Valley Community Park were modeled for the preferred alternative only (representative receptors NR27 and NR28). The 8-lane alternative with hybrid interchange at the Stadium Interchange and 6-lane alternatives include a representative receptor for only one park (Valley Park).

TABLE 4-1
Distances from each Receptor to the Centerline of Near Lane

Receptor	Distance from centerline of near lane to receptor in feet	Receptor	Distance from centerline of near lane to receptor in feet	Receptor	Distance from centerline of near lane to receptor in feet	Receptor	Distance from centerline of near lane to receptor in feet	Receptor	Distance from centerline of near lane to receptor in feet
R1	157	N30	116	N68	182	N106	210	NR4	64
R2	177	N31	227	N69	118	N107	209	NR5	99
R3	182	N32	106	N70	87	N108	209	NR6	29
R4	128	N33	250	N71	270	N109	213	NR7	48
R5	143	N34	68	N72	380	N110	213	NR8	40
R6	210	N35	163	N73	202	N111	187	NR9	148
R7	340	N36	94	N74	281	N112	45	NR10	205
R8	210	N37	190	N75	262	N113	69	NR11	252
R9	301	N38	169	N76	184	N114	347	NR12	235
N1	436	N39	133	N77	504	N115	85	NR13	190
N2	400	N40	207	N78	352	N116	34	NR14	188
N3	384	N41	309	N79	385	N117	24	NR15	155
N4	262	N42	159	N80	301	N118	31	NR16	190
N5	257	N43	225	N81	168	N119	34	NR17	194
N6	235	N44	303	N82	250	N120	18	NR18	188
N7	227	N45	208	N83	181	N121	288	NR19	184
N8	212	N46	160	N84	243	N122	234	NR20	187
N9	420	N47	309	N85	181	N123	239	NR21	439
N10	190	N48	492	N86	164	FS-1	113	NR22	450
N11	190	N49	276	N87	236	FS-2	195	NR23	393
N12	212	N50	75	N88	152	FS-3	467	NR24	390
N13	206	N51	97	N89	391	FS-4	475	NR25	356
N14	227	N52	309	N90	186	FS-5	289	NR26	274
N15	207	N53	547	N91	232	FS-6	150	NR27	488
N16	359	N54	671	N92	555	FS-7	184	NR28	485
N17	188	N55	518	N93	239	FS-8	495		
N18	267	N56	312	N94	382	FS-9	427		
N19	111	N57	369	N95	153	FS-10	117		
N20	540	N58	193	N96	197	FS-11	126		
N21	485	N59	434	N97	389	FS-12	517		
N22	583	N60	182	N98	255	FS-13	487		
N23	254	N61	249	N99	111	FS-14	110		
N24	463	N62	299	N100	183	FS-15	147		
N25	224	N63	289	N101	186	FS-16	440		
N26	355	N64	295	N102	160	FS-17	188		
N27	254	N65	296	N103	112	NR1	331		
N28	151	N66	329	N104	105	NR2	63		
N29	338	N67	369	N105	172	NR3	53		

SECTION 5

Traffic Noise Model (TNM) Results

The noise analysis presents the modeled existing and future noise levels at various locations in the study area. The determination of noise abatement measures and locations is within the framework of WisDOT's *Facilities Development Manual, Chapter 23, Noise*, effective November 15, 2023, which is WisDOT's FHWA-approved noise policy pursuant to 23 CFR Part 772. **Table 2-2** presents the noise level criteria for considering barriers abutting various land uses. The noise level descriptor used is the equivalent sound level, L_{eq}(1h), defined as the steady state sound level, which in a stated time period (usually 1 hour) contains the same sound energy as the actual time-varying sound.

Noise abatement measures will be considered when the predicted noise levels approach or exceed those values identified for the appropriate activity category in **Table 2-2**, or when the predicted traffic noise levels substantially exceed the existing noise levels. "Approach" is defined as being within 1 dBA less than the noise levels shown in **Table 2-2**. WisDOT has defined an increase over existing noise levels of 15 decibels or more as being a noise impact.

5.1 Existing Noise Levels

Existing peak-hour traffic noise levels range from 26 dBA at NR1 to 77 dBA at N34 and N50. **Table 5-1** summarizes calculated peak-hour noise levels at the selected representative receptor locations.

TABLE 5-1
Peak Hour Noise Levels at Selected Representative Receptor Locations

Receptor	Existing Sound Level (dBA)	Receptor	Existing Sound Level (dBA)	Receptor	Existing Sound Level (dBA)	Receptor	Existing Sound Level (dBA)	Receptor	Existing Sound Level (dBA)
R1	61	N30	72	N68	67	N106	65	NR4	63
R2	65	N31	69	N69	69	N107	64	NR5	61
R3	67	N32	73	N70	69	N108	64	NR6	68
R4	64	N33	69	N71	64	N109	65	NR7	40
R5	65	N34	77	N72	61	N110	60	NR8	66
R6	66	N	73	N73	66	N111	62	NR9	64
R7	66	N36	70	N74	64	N112	62	NR10	62
R8	46	N37	67	N75	63	N113	60	NR11	60
R9	42	N38	67	N76	62	N114	40	NR12	58
N1	63	N39	74	N77	56	N115	62	NR13	58
N2	62	N40	70	N78	61	N116	65	NR14	58
N3	63	N41	64	N79	57	N117	66	NR15	60
N4	63	N42	68	N80	59	N118	66	NR16	56
N5	63	N43	65	N81	66	N119	65	NR17	56
N6	62	N44	63	N82	60	N120	66	NR18	56
N7	62	N	66	N83	66	N121	41	NR19	56
N8	62	N46	70	N84	63	N122	44	NR20	56
N9	64	N47	64	N85	67	N123	53	NR21	59
N10	65	N48	65	N86	68	FS-1	69	NR22	49
N11	64	N49	69	N87	66	FS-2	64	NR23	53
N12	65	N50	77	N88	71	FS-3	61	NR24	53
N13	71	N51	68	N89	63	FS-4	61	NR25	57
N14	72	N52	64	N90	68	FS-5	68	NR26	59
N15	65	N53	64	N91	68	FS-6	72	NR27	55
N16	62	N54	62	N92	61	FS-7	67	NR28	54
N17	67	N	64	N93	69	FS-8	62		
N18	63	N56	68	N94	65	FS-9	60		
N19	67	N57	66	N95	68	FS-10	69		
N20	66	N58	69	N96	70	FS-11	74		
N21	68	N59	63	N97	62	FS-12	59		
N22	65	N60	66	N98	67	FS-13	62		
N23	68	N61	66	N99	74	FS-14	74		
N24	67	N62	65	N100	65	FS-15	41		
N25	68	N63	64	N101	60	FS-16	38		
N26	67	N64	63	N102	65	FS-17	50		
N27	68	N	62	N103	75	NR1	26		
N28	70	N66	61	N104	62	NR2	64		
N29	67	N67	62	N105	73	NR3	65		

5.2 No-Build Noise Levels

No-build (2050) peak-hour traffic noise levels range from 26 dBA at NR1 to 78 dBA at N34. **Tables 5-2** and **5-3** summarize calculated peak-hour noise levels at the selected representative receptor locations. Generally, noise levels stay the same or increase 1 dBA from the existing scenario to the no-build scenario. Any increases in traffic noise levels from the existing to the no-build scenarios are due to an increase in traffic volumes. 71 representative receptors would be impacted under the No-build alternative.

5.3 Build Noise Levels

The following alternatives retained for detailed study in the Draft Supplemental Environmental Impact Statement (EIS) were modeled to determine future (2050) noise levels:

- 8-lane Hybrid Stadium Interchange (Hybrid Interchange)
- 8-lane Diverging Diamond Stadium Interchange (DDI)
- 6-lane Hybrid Interchange with Half-Hawley
- 6-lane Hybrid Interchange with Full-Hawley
- 6-lane DDI with Half-Hawley
- 6-lane DDI with Full-Hawley
- Washington Street Extension

5.3.1 8-lane Hybrid Interchange Alternative

The results of the noise analysis indicate that peak-period noise levels at exterior activity areas under the 8-lane hybrid interchange 2050 build condition range from 43 dBA at R9 to 78 dBA at N50. The difference between build noise levels and existing noise levels ranges from a reduction of 4 dBA to a 4 dBA increase. Such increases are below WisDOT's definition of substantial increase of 15 dBA. **Table 5-2** lists the calculated peak-hour traffic noise levels. 72 representative receptors would be impacted under the 8-lane hybrid interchange alternative, which means they approach, meet, or exceed the WisDOT Noise Level Criteria (NLC). They are identified in bold in **Table 5-2**. In comparison, there would be 71 representative receptors impacted under the No-build alternative. Traffic noise levels varied, depending on the receptor's proximity to the proposed 8-lane hybrid interchange alternative. Most traffic noise level changes from the existing condition to the build scenario are due to predicted future traffic volume increases.

TABLE 5-2
Noise Impact Summary – TNM Modeling Results for the 8-lane Hybrid Interchange Alternative

Receptor	NLC (dBA)	Existing (dBA)	No build (dBA)	8-lane alternative (dBA)	Build (8 lane) increase above existing (dBA)	Build (8 lane) increase above No Build (dBA)	Build (8 lane) increase above NLC (dBA)
R1	67	61	61	61	0	0	-6
R2	67	65	65	65	0	0	-2
R3	**67**	**67**	**67**	**67**	**0**	**0**	**0**
R4	67	64	64	65	1	1	-2
R5	67	65	65	65	0	0	-2
R6	**67**	**66**	**67**	**67**	**1**	**0**	**0**

TABLE 5-2
Noise Impact Summary – TNM Modeling Results for the 8-lane Hybrid Interchange Alternative

Receptor	NLC (dBA)	Existing (dBA)	No build (dBA)	8-lane alternative (dBA)	Build (8 lane) increase above existing (dBA)	Build (8 lane) increase above No Build (dBA)	Build (8 lane) increase above NLC (dBA)
R7	**67**	**66**	**66**	**67**	**1**	**1**	**0**
R8	52	46	46	46	0	0	-6
R9	52	42	43	43	1	0	-9
N1	67	63	63	65	2	2	-2
N2	67	62	63	65	3	2	-2
N3	67	63	64	65	2	1	-2
N4	**67**	**63**	**64**	**67**	**4**	**3**	**0**
N5	**67**	**63**	**63**	**66**	**3**	**3**	**-1**
N6	**67**	**62**	**63**	**66**	**4**	**3**	**-1**
N7	67	62	62	65	3	3	-2
N8	67	62	62	64	2	2	-3
N9	**67**	**64**	**64**	**66**	**2**	**2**	**-1**
N10	**67**	**65**	**65**	**67**	**2**	**2**	**0**
N11	**67**	**64**	**65**	**67**	**3**	**2**	**0**
N12	**67**	**65**	**65**	**68**	**3**	**3**	**1**
N13	**67**	**71**	**72**	**74**	**3**	**2**	**7**
N14	**67**	**72**	**72**	**73**	**1**	**1**	**6**
N15	**67**	**65**	**65**	**68**	**3**	**3**	**1**
N16	67	62	62	65	3	3	-2
N17	**67**	**67**	**67**	**70**	**3**	**3**	**3**
N18	**67**	**63**	**64**	**66**	**3**	**2**	**-1**
N19	**67**	**67**	**68**	**69**	**2**	**1**	**2**
N20	**67**	**66**	**66**	**68**	**2**	**2**	**1**
N21	**67**	**68**	**68**	**69**	**1**	**1**	**2**
N22	**67**	**65**	**66**	**67**	**2**	**1**	**0**
N23	**67**	**68**	**69**	**69**	**1**	**0**	**2**
N24	**67**	**67**	**67**	**67**	**0**	**0**	**0**
N25	**67**	**68**	**69**	**69**	**1**	**0**	**2**
N26	**67**	**67**	**68**	**68**	**1**	**0**	**1**
N27	**67**	**68**	**68**	**68**	**0**	**0**	**1**
N28	**67**	**70**	**70**	**70**	**0**	**0**	**3**
N29	**67**	**67**	**67**	**68**	**1**	**1**	**1**
N30	**67**	**72**	**72**	**71**	**-1**	**-1**	**4**
N31	**67**	**69**	**69**	**68**	**-1**	**-1**	**1**
N32	**67**	**73**	**74**	**72**	**-1**	**-2**	**5**
N33	**67**	**69**	**70**	**67**	**-2**	**-3**	**0**
N34	**67**	**77**	**78**	**77**	**0**	**-1**	**10**
N35	**67**	**73**	**74**	**73**	**0**	**-1**	**6**
N36	**67**	**70**	**70**	**69**	**-1**	**-1**	**2**

TABLE 5-2
Noise Impact Summary – TNM Modeling Results for the 8-lane Hybrid Interchange Alternative

Receptor	NLC (dBA)	Existing (dBA)	No build (dBA)	8-lane alternative (dBA)	Build (8 lane) increase above existing (dBA)	Build (8 lane) increase above No Build (dBA)	Build (8 lane) increase above NLC (dBA)
N37	**67**	**67**	**68**	**68**	**1**	**0**	**1**
N38	**67**	**67**	**68**	**68**	**1**	**0**	**1**
N39	**67**	**74**	**74**	**73**	**-1**	**-1**	**6**
N40	**67**	**70**	**71**	**69**	**-1**	**-2**	**2**
N41	67	64	64	64	0	0	-3
N42	**67**	**68**	**69**	**67**	**-1**	**-2**	**0**
N43	67	65	65	65	0	0	-2
N44	67	63	63	64	1	1	-3
N45	67	66	67	65	-1	-2	-2
N46	**67**	**70**	**71**	**70**	**0**	**-1**	**3**
N47	**67**	**64**	**65**	**66**	**2**	**1**	**-1**
N48	67	65	65	65	0	0	-2
N49	**67**	**69**	**69**	**70**	**1**	**1**	**3**
N50	**67**	**77**	**77**	**78**	**1**	**1**	**11**
N51	**67**	**68**	**68**	**69**	**1**	**1**	**2**
N52	67	64	64	65	1	1	-2
N53	67	64	64	64	0	0	-3
N54	67	62	63	62	0	-1	-5
N55	67	64	64	64	0	0	-3
N56	**67**	**68**	**69**	**68**	**0**	**-1**	**1**
N57	**67**	**66**	**66**	**66**	**0**	**0**	**-1**
N58	**67**	**69**	**70**	**69**	**0**	**-1**	**2**
N59	67	63	63	64	1	1	-3
N60	**67**	**66**	**67**	**68**	**2**	**1**	**1**
N61	**67**	**66**	**66**	**67**	**1**	**1**	**0**
N62	**67**	**65**	**65**	**66**	**1**	**1**	**-1**
N63	67	64	64	64	0	0	-3
N64	67	63	64	64	1	0	-3
N65	67	62	62	63	1	1	-4
N66	67	61	62	62	1	0	-5
N67	67	58	58	58	0	0	-9
N68	67	62	62	62	0	0	-5
N69	67	65	65	65	0	0	-2
N70	**67**	**69**	**69**	**68**	**-1**	**-1**	**1**
N71	67	59	59	60	1	1	-7
N72	67	58	59	59	1	0	-8
N73	67	64	65	64	0	-1	-3
N74	67	63	63	62	-1	-1	-5
N75	67	63	63	62	-1	-1	-5

TABLE 5-2
Noise Impact Summary – TNM Modeling Results for the 8-lane Hybrid Interchange Alternative

Receptor	NLC (dBA)	Existing (dBA)	No build (dBA)	8-lane alternative (dBA)	Build (8 lane) increase above existing (dBA)	Build (8 lane) increase above No Build (dBA)	Build (8 lane) increase above NLC (dBA)
N76	67	62	63	58	-4	-5	-9
N77	67	56	57	56	0	-1	-11
N78	67	61	62	61	0	-1	-6
N79	67	57	57	57	0	0	-10
N80	67	59	59	61	2	2	-6
N81	**67**	**66**	**67**	**69**	**3**	**2**	**2**
N82	67	60	61	61	1	0	-6
N83	67	66	66	65	-1	-1	-2
N84	67	63	63	62	-1	-1	-5
N85	67	67	67	63	-4	-4	-4
N86	67	68	68	65	-3	-3	-2
N87	**67**	**66**	**66**	**67**	**1**	**1**	**0**
N88	**67**	**71**	**71**	**69**	**-2**	**-2**	**2**
N89	67	63	63	64	1	1	-3
N90	**67**	**68**	**68**	**69**	**1**	**1**	**2**
N91	**67**	**68**	**68**	**69**	**1**	**1**	**2**
N92	67	61	61	62	1	1	-5
N93	**67**	**69**	**69**	**69**	**0**	**0**	**2**
N94	**67**	**65**	**65**	**66**	**1**	**1**	**-1**
N95	**67**	**68**	**69**	**68**	**0**	**-1**	**1**
N96	**67**	**70**	**70**	**70**	**0**	**0**	**3**
N97	67	62	62	63	1	1	-4
N98	**67**	**67**	**67**	**67**	**0**	**0**	**0**
N99	**67**	**74**	**74**	**72**	**-2**	**-2**	**5**
N100	**67**	**65**	**65**	**66**	**1**	**1**	**-1**
N101	67	60	61	61	1	0	-6
N102	67	65	66	65	0	-1	-2
N103	**67**	**75**	**75**	**72**	**-3**	**-3**	**5**
N104	67	62	63	64	2	1	-3
N105	**67**	**73**	**73**	**72**	**-1**	**-1**	**5**
N106	67	65	65	63	-2	-2	-4
N107	67	64	64	62	-2	-2	-5
N108	67	64	64	63	-1	-1	-4
N109	67	65	66	64	-1	-2	-3
N110	**67**	**69**	**69**	**69**	**0**	**0**	**2**
N111	72	62	62	62	0	0	-10
FS-1	**67**	**69**	**69**	**68**	**-1**	**-1**	**1**
FS-2	**67**	**64**	**65**	**67**	**3**	**2**	**0**
FS-3	67	61	61	63	2	2	-4

TABLE 5-2
Noise Impact Summary – TNM Modeling Results for the 8-lane Hybrid Interchange Alternative

Receptor	NLC (dBA)	Existing (dBA)	No build (dBA)	8-lane alternative (dBA)	Build (8 lane) increase above existing (dBA)	Build (8 lane) increase above No Build (dBA)	Build (8 lane) increase above NLC (dBA)
FS-4	67	61	61	63	2	2	-4
FS-5	**67**	**68**	**69**	**68**	**0**	**-1**	**1**
FS-6	**67**	**72**	**72**	**71**	**-1**	**-1**	**4**
FS-7	**67**	**67**	**68**	**69**	**2**	**1**	**2**
FS-8	67	62	62	63	1	1	-4
FS-9	67	60	60	61	1	1	-6
FS-10	67	66	66	65	-1	-1	-2
FS-11	**67**	**74**	**75**	**73**	**-1**	**-2**	**6**
FS-12	67	59	59	58	-1	-1	-9
FS-13	67	62	62	63	1	1	-4
FS-14	**67**	**74**	**74**	**73**	**-1**	**-1**	**6**

5.3.2 8-lane DDI Alternative

The results of the noise analysis indicate that peak-period noise levels at exterior activity areas under the 8-lane diverging diamond 2050 build condition range from 26 dBA at NR1 to 78 dBA at N50. The difference between build noise levels and existing noise levels ranges from a reduction of 3 dBA to a 12 dBA increase. Such increases are below WisDOT's definition of substantial increase of 15 dBA. **Table 5-3** lists the calculated peak-hour traffic noise levels. 80 representative receptors would be impacted under the 8-lane diverging diamond alternative, which means they approach, meet, or exceed the WisDOT NLC. They are identified in bold in **Table 5-3**. In comparison, there would be 71 representative receptors impacted under the No-build alternative. Traffic noise levels varied, depending on the receptor's proximity to the proposed 8-lane diverging diamond alternative. Most traffic noise level changes from the existing condition to the build scenario are due to predicted future traffic volume increases.

TABLE 5-3
Noise Impact Summary – TNM Modeling Results for the 8-lane DDI Alternative

Receptor	NLC (dBA)	Existing (dBA)	No build (dBA)	8-lane alternative (dBA)	Build (8 lane) increase above existing (dBA)	Build (8 lane) increase above No Build (dBA)	Build (8 lane) increase above NLC (dBA)
R1	67	61	61	61	0	0	-6
R2	67	65	65	65	0	0	-2
R3	**67**	**67**	**67**	**67**	**0**	**0**	**0**
R4	67	64	64	65	1	1	-2
R5	67	65	65	65	0	0	-2
R6	**67**	**66**	**67**	**67**	**1**	**0**	**0**
R7	**67**	**66**	**66**	**67**	**1**	**1**	**0**
R8	52	46	46	46	0	0	-6

TABLE 5-3
Noise Impact Summary – TNM Modeling Results for the 8-lane DDI Alternative

Receptor	NLC (dBA)	Existing (dBA)	No build (dBA)	8-lane alternative (dBA)	Build (8 lane) increase above existing (dBA)	Build (8 lane) increase above No Build (dBA)	Build (8 lane) increase above NLC (dBA)
R9	52	42	43	43	1	0	-9
N1	67	63	63	65	2	2	-2
N2	67	62	63	65	3	2	-2
N3	67	63	64	65	2	1	-2
N4	**67**	**63**	**64**	**67**	**4**	**3**	**0**
N5	**67**	**63**	**63**	**66**	**3**	**3**	**-1**
N6	**67**	**62**	**63**	**66**	**4**	**3**	**-1**
N7	67	62	62	65	3	3	-2
N8	67	62	62	64	2	2	-3
N9	**67**	**64**	**64**	**66**	**2**	**2**	**-1**
N10	**67**	**65**	**65**	**67**	**2**	**2**	**0**
N11	**67**	**64**	**65**	**67**	**3**	**2**	**0**
N12	**67**	**65**	**65**	**68**	**3**	**3**	**1**
N13	**67**	**71**	**72**	**74**	**3**	**2**	**7**
N14	**67**	**72**	**72**	**73**	**1**	**1**	**6**
N15	**67**	**65**	**65**	**68**	**3**	**3**	**1**
N16	67	62	62	65	3	3	-2
N17	**67**	**67**	**67**	**70**	**3**	**3**	**3**
N18	**67**	**63**	**64**	**66**	**3**	**2**	**-1**
N19	**67**	**67**	**68**	**69**	**2**	**1**	**2**
N20	**67**	**66**	**66**	**68**	**2**	**2**	**1**
N21	**67**	**68**	**68**	**69**	**1**	**1**	**2**
N22	**67**	**65**	**66**	**67**	**2**	**1**	**0**
N23	**67**	**68**	**69**	**69**	**1**	**0**	**2**
N24	**67**	**67**	**67**	**67**	**0**	**0**	**0**
N25	**67**	**68**	**69**	**69**	**1**	**0**	**2**
N26	**67**	**67**	**68**	**67**	**0**	**-1**	**0**
N27	**67**	**68**	**68**	**68**	**0**	**0**	**1**
N28	**67**	**70**	**70**	**70**	**0**	**0**	**3**
N29	**67**	**67**	**67**	**68**	**1**	**1**	**1**
N30	**67**	**72**	**72**	**71**	**-1**	**-1**	**4**
N31	**67**	**69**	**69**	**68**	**-1**	**-1**	**1**
N32	**67**	**73**	**74**	**72**	**-1**	**-2**	**5**
N33	**67**	**69**	**70**	**67**	**-2**	**-3**	**0**
N34	**67**	**77**	**78**	**77**	**0**	**-1**	**10**
N35	**67**	**73**	**74**	**73**	**0**	**-1**	**6**
N36	**67**	**70**	**70**	**69**	**-1**	**-1**	**2**
N37	**67**	**67**	**68**	**68**	**1**	**0**	**1**
N38	**67**	**67**	**68**	**68**	**1**	**0**	**1**

TABLE 5-3
Noise Impact Summary – TNM Modeling Results for the 8-lane DDI Alternative

Receptor	NLC (dBA)	Existing (dBA)	No build (dBA)	8-lane alternative (dBA)	Build (8 lane) increase above existing (dBA)	Build (8 lane) increase above No Build (dBA)	Build (8 lane) increase above NLC (dBA)
N39	**67**	**74**	**74**	**73**	**-1**	**-1**	**6**
N40	**67**	**70**	**71**	**69**	**-1**	**-2**	**2**
N41	67	64	64	64	0	0	-3
N42	**67**	**68**	**69**	**67**	**-1**	**-2**	**0**
N43	67	65	65	65	0	0	-2
N44	67	63	63	64	1	1	-3
N45	67	66	67	65	-1	-2	-2
N46	**67**	**70**	**71**	**70**	**0**	**-1**	**3**
N47	**67**	**64**	**65**	**66**	**2**	**1**	**-1**
N48	**67**	**65**	**65**	**66**	**1**	**1**	**-1**
N49	**67**	**69**	**69**	**70**	**1**	**1**	**3**
N50	**67**	**77**	**77**	**78**	**1**	**1**	**11**
N51	**67**	**68**	**68**	**69**	**1**	**1**	**2**
N52	67	64	64	65	1	1	-2
N53	67	64	64	64	0	0	-3
N54	67	62	63	63	1	0	-4
N55	67	64	64	65	1	1	-2
N56	**67**	**68**	**69**	**68**	**0**	**-1**	**1**
N57	**67**	**66**	**66**	**66**	**0**	**0**	**-1**
N58	**67**	**69**	**70**	**70**	**1**	**0**	**3**
N59	67	63	63	65	2	2	-2
N60	**67**	**66**	**67**	**70**	**4**	**3**	**3**
N61	**67**	**66**	**66**	**69**	**3**	**3**	**2**
N62	**67**	**65**	**65**	**67**	**2**	**2**	**0**
N63	**67**	**64**	**64**	**66**	**2**	**2**	**-1**
N64	67	63	64	65	2	1	-2
N65	67	62	62	65	3	3	-2
N66	67	61	62	64	3	2	-3
N67	67	58	58	60	2	2	-7
N68	67	62	62	63	1	1	-4
N69	67	65	65	65	0	0	-2
N70	**67**	**69**	**69**	**70**	**1**	**1**	**3**
N71	67	59	59	60	1	1	-7
N72	67	58	59	60	2	1	-7
N73	67	64	65	65	1	0	-2
N74	67	63	63	64	1	1	-3
N75	67	63	63	64	1	1	-3
N76	67	62	63	62	0	-1	-5
N77	67	56	57	59	3	2	-8

TABLE 5-3

Noise Impact Summary – TNM Modeling Results for the 8-lane DDI Alternative

Receptor	NLC (dBA)	Existing (dBA)	No build (dBA)	8-lane alternative (dBA)	Build (8 lane) increase above existing (dBA)	Build (8 lane) increase above No Build (dBA)	Build (8 lane) increase above NLC (dBA)
N78	67	61	62	62	1	0	-5
N79	67	57	57	57	0	0	-10
N80	67	59	59	61	2	2	-6
N81	**67**	**66**	**67**	**69**	**3**	**2**	**2**
N82	67	60	61	61	1	0	-6
N83	**67**	**66**	**66**	**67**	**1**	**1**	**0**
N84	67	63	63	63	0	0	-4
N85	**67**	**67**	**67**	**66**	**-1**	**-1**	**-1**
N86	**67**	**68**	**68**	**67**	**-1**	**-1**	**0**
N87	**67**	**66**	**66**	**68**	**2**	**2**	**1**
N88	**67**	**71**	**71**	**70**	**-1**	**-1**	**3**
N89	67	63	63	65	2	2	-2
N90	**67**	**68**	**68**	**70**	**2**	**2**	**3**
N91	**67**	**68**	**68**	**70**	**2**	**2**	**3**
N92	67	61	61	63	2	2	-4
N93	**67**	**69**	**69**	**69**	**0**	**0**	**2**
N94	**67**	**65**	**65**	**66**	**1**	**1**	**-1**
N95	**67**	**68**	**69**	**68**	**0**	**-1**	**1**
N96	**67**	**70**	**70**	**70**	**0**	**0**	**3**
N97	67	62	62	63	1	1	-4
N98	**67**	**67**	**67**	**67**	**0**	**0**	**0**
N99	**67**	**74**	**74**	**72**	**-2**	**-2**	**5**
N100	**67**	**65**	**65**	**66**	**1**	**1**	**-1**
N101	67	60	61	61	1	0	-6
N102	67	65	66	64	-1	-2	-3
N103	**67**	**75**	**75**	**72**	**-3**	**-3**	**5**
N104	67	62	63	64	2	1	-3
N105	**67**	**73**	**73**	**72**	**-1**	**-1**	**5**
N106	67	65	65	63	-2	-2	-4
N107	67	64	64	62	-2	-2	-5
N108	67	64	64	63	-1	-1	-4
N109	67	65	66	64	-1	-2	-3
N110	**67**	**69**	**69**	**69**	**0**	**0**	**2**
N111	72	62	62	62	0	0	-10
FS-1	**67**	**69**	**69**	**68**	**-1**	**-1**	**1**
FS-2	**67**	**64**	**65**	**67**	**3**	**2**	**0**
FS-3	67	61	61	62	1	1	-5
FS-4	67	61	61	63	2	2	-4
FS-5	**67**	**68**	**69**	**69**	**1**	**0**	**2**

TABLE 5-3
Noise Impact Summary – TNM Modeling Results for the 8-lane DDI Alternative

Receptor	NLC (dBA)	Existing (dBA)	No build (dBA)	8-lane alternative (dBA)	Build (8 lane) increase above existing (dBA)	Build (8 lane) increase above No Build (dBA)	Build (8 lane) increase above NLC (dBA)
FS-6	**67**	**72**	**72**	**72**	**0**	**0**	**5**
FS-7	**67**	**67**	**68**	**70**	**3**	**2**	**3**
FS-8	67	62	62	64	2	2	-3
FS-9	67	60	60	62	2	2	-5
FS-10	**67**	**66**	**66**	**66**	**0**	**0**	**-1**
FS-11	**67**	**74**	**75**	**73**	**-1**	**-2**	**6**
FS-12	67	59	59	59	0	0	-8
FS-13	67	62	62	63	1	1	-4
FS-14	67	74	74	73	-1	-1	6
NR1	52	26	26	26	0	0	-26
NR2	67	64	64	64	0	0	-3
NR3	67	65	65	65	0	0	-2
NR4	67	64	64	63	-1	-1	-4
NR5	67	61	62	61	0	-1	-6
NR6	**67**	**68**	**68**	**68**	**0**	**0**	**1**
NR7	52	40	41	40	0	-1	-12
NR8	**67**	**66**	**66**	**66**	**0**	**0**	**-1**
NR9	67	65	65	64	-1	-1	-3
NR10	67	62	62	62	0	0	-5
NR11	67	60	61	60	0	-1	-7
NR12	67	59	59	58	-1	-1	-9
NR13	67	58	58	58	0	0	-9
NR14	67	58	58	58	0	0	-9
NR15	67	60	60	60	0	0	-7
NR16	67	56	56	56	0	0	-11
NR17	67	56	56	56	0	0	-11
NR18	67	56	56	56	0	0	-11
NR19	67	56	56	56	0	0	-11
NR20	67	55	56	56	1	0	-11
NR21	67	49	49	49	0	0	-18
NR22	67	49	49	49	0	0	-18
NR23	67	52	53	53	1	0	-14
NR24	67	54	54	53	-1	-1	-14
NR25	67	57	57	57	0	0	-10
NR26	67	59	59	59	0	0	-8
NR 27	67	55	55	61	6	6	-6
NR 28	67	54	55	61	7	6	-6

5.3.3 6-lane Hybrid Interchange with Half-Hawley Alternative

The results of the noise analysis indicate that peak-hour noise levels at exterior activity areas under the 2050 build condition range from 43 dBA at R9 to 77 dBA at N34 and N50. The difference between the 6-lane with Half-Hawley Interchange build noise levels and existing noise levels range from a reduction of 4 dBA to a 3 dBA increase. Such increases are below WisDOT's definition of substantial increase of 15 dBA. **Table 5-4** lists the calculated peak-hour traffic noise levels. 66 representative receptors would be impacted under the 6-lane hybrid interchange with Half-Hawley alternative, which means they approach, meet, or exceed the WisDOT NLC. They are identified in bold in **Table 5-4**. In comparison, there would be 71 representative receptors impacted under the No-build alternative. Traffic noise levels varied, depending on the receptor's proximity to the proposed 6-lane alternative. Most traffic noise level changes from the existing condition to the 6-lane hybrid interchange with Half-Hawley build alternative scenario are due to predicted future traffic volume increases.

TABLE 5-4
Noise Impact Summary – TNM Modeling Results for the 6-lane Hybrid Interchange with Half-Hawley Alternative

Receptor	NLC (dBA)	Existing (dBA)	No build (dBA)	6-lane alternative (dBA)	Build (6 lane) increase above existing	Build (6 lane) increase above No Build (dBA)	Build (6 lane) increase above NLC (dBA)
R1	67	61	61	61	0	0	-6
R2	67	65	65	65	0	0	-2
R3	**67**	**67**	**67**	**67**	**0**	**0**	**0**
R4	67	64	64	65	1	1	-2
R5	67	65	65	65	0	0	-2
R6	**67**	**66**	**67**	**67**	**1**	**0**	**0**
R7	**67**	**66**	**66**	**66**	**0**	**0**	**-1**
R8	52	46	46	46	0	0	-6
R9	52	42	43	43	1	0	-9
N1	67	63	63	64	1	1	-3
N2	67	62	63	64	2	1	-3
N3	67	63	64	64	1	0	-3
N4	**67**	**63**	**64**	**66**	**3**	**2**	**-1**
N5	**67**	**63**	**63**	**66**	**3**	**3**	**-1**
N6	67	62	63	65	3	2	-2
N7	67	62	62	64	2	2	-3
N9	67	64	64	65	1	1	-2
N8	67	62	62	64	2	2	-3
N10	**67**	**65**	**65**	**66**	**1**	**1**	**-1**
N11	**67**	**64**	**65**	**66**	**2**	**1**	**-1**
N12	**67**	**65**	**65**	**68**	**3**	**3**	**1**
N13	**67**	**71**	**72**	**73**	**2**	**1**	**6**
N14	**67**	**72**	**72**	**73**	**1**	**1**	**6**
N15	**67**	**65**	**65**	**67**	**2**	**2**	**0**
N16	67	62	62	65	3	3	-2
N17	**67**	**67**	**67**	**70**	**3**	**3**	**3**

TABLE 5-4
Noise Impact Summary – TNM Modeling Results for the 6-lane Hybrid Interchange with Half-Hawley Alternative

Receptor	NLC (dBA)	Existing (dBA)	No build (dBA)	6-lane alternative (dBA)	Build (6 lane) increase above existing	Build (6 lane) increase above No Build (dBA)	Build (6 lane) increase above NLC (dBA)
N18	67	63	64	65	2	1	-2
N19	**67**	**67**	**68**	**69**	**2**	**1**	**2**
N20	**67**	**66**	**66**	**67**	**1**	**1**	**0**
N21	**67**	**68**	**68**	**69**	**1**	**1**	**2**
N22	**67**	**65**	**66**	**67**	**2**	**1**	**0**
N23	**67**	**68**	**69**	**69**	**1**	**0**	**2**
N24	**67**	**67**	**67**	**66**	**-1**	**-1**	**-1**
N25	**67**	**68**	**69**	**69**	**1**	**0**	**2**
N26	**67**	**67**	**68**	**67**	**0**	**-1**	**0**
N27	**67**	**68**	**68**	**68**	**0**	**0**	**1**
N28	**67**	**70**	**70**	**70**	**0**	**0**	**3**
N29	**67**	**67**	**67**	**67**	**0**	**0**	**0**
N30	**67**	**72**	**72**	**71**	**-1**	**-1**	**4**
N31	**67**	**69**	**69**	**68**	**-1**	**-1**	**1**
N32	**67**	**73**	**74**	**72**	**-1**	**-2**	**5**
N33	**67**	**69**	**70**	**67**	**-2**	**-3**	**0**
N34	**67**	**77**	**78**	**77**	**0**	**-1**	**10**
N35	**67**	**73**	**74**	**73**	**0**	**-1**	**6**
N36	**67**	**70**	**70**	**69**	**-1**	**-1**	**2**
N37	**67**	**67**	**68**	**67**	**0**	**-1**	**0**
N38	**67**	**67**	**68**	**68**	**1**	**0**	**1**
N39	**67**	**74**	**74**	**73**	**-1**	**-1**	**6**
N40	**67**	**70**	**71**	**69**	**-1**	**-2**	**2**
N41	67	64	64	64	0	0	-3
N42	**67**	**68**	**69**	**67**	**-1**	**-2**	**0**
N43	67	65	65	64	-1	-1	-3
N44	67	63	63	63	0	0	-4
N45	**67**	**66**	**67**	**66**	**0**	**-1**	**-1**
N46	**67**	**70**	**71**	**70**	**0**	**-1**	**3**
N47	67	64	65	65	1	0	-2
N48	67	65	65	65	0	0	-2
N49	**67**	**69**	**69**	**69**	**0**	**0**	**2**
N50	**67**	**77**	**77**	**77**	**0**	**0**	**10**
N51	**67**	**68**	**68**	**68**	**0**	**0**	**1**
N52	67	64	64	65	1	1	-2
N53	67	64	64	63	-1	-1	-4
N54	67	62	63	62	0	-1	-5
N55	67	64	64	64	0	0	-3

TABLE 5-4

Noise Impact Summary – TNM Modeling Results for the 6-lane Hybrid Interchange with Half-Hawley Alternative

Receptor	NLC (dBA)	Existing (dBA)	No build (dBA)	6-lane alternative (dBA)	Build (6 lane) increase above existing	Build (6 lane) increase above No Build (dBA)	Build (6 lane) increase above NLC (dBA)
N56	**67**	**68**	**69**	**67**	**-1**	**-2**	**0**
N57	**67**	**66**	**66**	**66**	**0**	**0**	**-1**
N58	**67**	**69**	**70**	**69**	**0**	**-1**	**2**
N59	67	63	63	64	1	1	-3
N60	**67**	**66**	**67**	**68**	**2**	**1**	**1**
N61	**67**	**66**	**66**	**67**	**1**	**1**	**0**
N62	67	65	65	65	0	0	-2
N63	67	64	64	64	0	0	-3
N64	67	63	64	63	0	-1	-4
N65	67	62	62	62	0	0	-5
N66	67	61	62	62	1	0	-5
N67	67	58	58	58	0	0	-9
N68	67	62	62	62	0	0	-5
N69	67	65	65	64	-1	-1	-3
N70	**67**	**69**	**69**	**68**	**-1**	**-1**	**1**
N71	67	59	59	59	0	0	-8
N72	67	58	59	58	0	-1	-9
N73	67	64	65	64	0	-1	-3
N74	67	63	63	62	-1	-1	-5
N75	67	63	63	62	-1	-1	-5
N76	67	62	63	58	-4	-5	-9
N77	67	56	57	56	0	-1	-11
N78	67	61	62	60	-1	-2	-7
N79	67	57	57	57	0	0	-10
N80	67	59	59	61	2	2	-6
N81	**67**	**66**	**67**	**69**	**3**	**2**	**2**
N82	67	60	61	61	1	0	-6
N83	67	66	66	65	-1	-1	-2
N84	67	63	63	62	-1	-1	-5
N85	67	67	67	63	-4	-4	-4
N86	67	68	68	65	-3	-3	-2
N87	**67**	**66**	**66**	**66**	**0**	**0**	**-1**
N88	**67**	**71**	**71**	**69**	**-2**	**-2**	**2**
N89	67	63	63	64	1	1	-3
N90	**67**	**68**	**68**	**69**	**1**	**1**	**2**
N91	**67**	**68**	**68**	**69**	**1**	**1**	**2**
N92	67	61	61	62	1	1	-5
N93	**67**	**69**	**69**	**68**	**-1**	**-1**	**1**

TABLE 5-4
Noise Impact Summary – TNM Modeling Results for the 6-lane Hybrid Interchange with Half-Hawley Alternative

Receptor	NLC (dBA)	Existing (dBA)	No build (dBA)	6-lane alternative (dBA)	Build (6 lane) increase above existing	Build (6 lane) increase above No Build (dBA)	Build (6 lane) increase above NLC (dBA)
N94	67	65	65	65	0	0	-2
N95	**67**	**68**	**69**	**67**	**-1**	**-2**	**0**
N96	**67**	**70**	**70**	**69**	**-1**	**-1**	**2**
N97	67	62	62	63	1	1	-4
N98	**67**	**67**	**67**	**67**	**0**	**0**	**0**
N99	**67**	**74**	**74**	**72**	**-2**	**-2**	**5**
N100	67	65	65	65	0	0	-2
N101	67	60	61	61	1	0	-6
N102	67	65	66	65	0	-1	-2
N103	**67**	**75**	**75**	**72**	**-3**	**-3**	**5**
N104	67	62	63	64	2	1	-3
N105	**67**	**73**	**73**	**71**	**-2**	**-2**	**4**
N106	67	65	65	63	-2	-2	-4
N107	67	64	64	62	-2	-2	-5
N108	67	64	64	62	-2	-2	-5
N109	67	65	66	64	-1	-2	-3
N110	**67**	**69**	**69**	**69**	**0**	**0**	**2**
N111	72	62	62	62	0	0	-10
FS-1	**67**	**69**	**69**	**69**	**0**	**0**	**2**
FS-2	**67**	**64**	**65**	**66**	**2**	**1**	**-1**
FS-3	67	61	61	62	1	1	-5
FS-4	67	61	61	63	2	2	-4
FS-5	**67**	**68**	**69**	**68**	**0**	**-1**	**1**
FS-6	**67**	**72**	**72**	**71**	**-1**	**-1**	**4**
FS-7	**67**	**67**	**68**	**68**	**1**	**0**	**1**
FS-8	67	62	62	62	0	0	-5
FS-9	67	60	60	61	1	1	-6
FS-10	67	66	66	65	-1	-1	-2
FS-11	**67**	**74**	**75**	**73**	**-1**	**-2**	**6**
FS-12	67	59	59	58	-1	-1	-9
FS-13	67	62	62	63	1	1	-4
FS-14	**67**	**74**	**74**	**72**	**-2**	**-2**	**5**

5.3.4 6-lane Hybrid Interchange with Full-Hawley Alternative

The results of the noise analysis indicate that peak-hour noise levels at exterior activity areas under the 2050 build condition range from 43 dBA at R9 to 77 dBA at N50. The difference between the 6—lane hybrid interchange with Full-Hawley alternative build noise levels and existing noise levels range from a reduction of 4 dBA to a 3 dBA increase. Such increases are below WisDOT's definition of substantial increase of 15 dBA. **Table 5-5** lists the calculated peak-hour traffic noise levels. 65 representative receptors would be impacted under the 6-lane hybrid interchange with Full-Hawley alternative, which means they approach, meet, or exceed the WisDOT NLC. They are identified in bold in **Table 5-5**. In comparison, there would be 71 representative receptors impacted under the No-build alternative. Traffic noise levels varied, depending on the receptor's proximity to the proposed 6-lane alternative. Most traffic noise level changes from the existing condition to the 6-lane hybrid interchange with Full-Hawley build alternative scenario are due to predicted future traffic volume increases.

TABLE 5-5

Noise Impact Summary – TNM Modeling Results for the 6-lane Hybrid Interchange with Full-Hawley Alternative

Receptor	NLC (dBA)	Existing (dBA)	No build (dBA)	6-lane alternative (dBA)	Build (6 lane) increase above existing	Build (6 lane) increase above No Build (dBA)	Build (6 lane) increase above NLC (dBA)
R1	67	61	61	61	0	0	-6
R2	67	65	65	65	0	0	-2
R3	**67**	**67**	**67**	**67**	**0**	**0**	**0**
R4	67	64	64	65	1	1	-2
R5	67	65	65	65	0	0	-2
R6	**67**	**66**	**67**	**67**	**1**	**0**	**0**
R7	**67**	**66**	**66**	**66**	**0**	**0**	**-1**
R8	52	46	46	46	0	0	-6
R9	52	42	43	43	1	0	-9
N1	67	63	63	64	1	1	-3
N2	67	62	63	64	2	1	-3
N3	67	63	64	64	1	0	-3
N4	**67**	**63**	**64**	**66**	**3**	**2**	**-1**
N5	67	63	63	65	2	2	-2
N6	67	62	63	65	3	2	-2
N7	67	62	62	64	2	2	-3
N9	67	62	62	64	2	2	-3
N8	67	64	64	65	1	1	-2
N10	**67**	**65**	**65**	**66**	**1**	**1**	**-1**
N11	**67**	**64**	**65**	**66**	**2**	**1**	**-1**
N12	**67**	**65**	**65**	**68**	**3**	**3**	**1**
N13	**67**	**71**	**72**	**73**	**2**	**1**	**6**
N14	**67**	**72**	**72**	**73**	**1**	**1**	**6**
N15	**67**	**65**	**65**	**67**	**2**	**2**	**0**
N16	67	62	62	65	3	3	-2
N17	**67**	**67**	**67**	**70**	**3**	**3**	**3**
N18	67	63	64	65	2	1	-2
N19	**67**	**67**	**68**	**69**	**2**	**1**	**2**
N20	**67**	**66**	**66**	**67**	**1**	**1**	**0**
N21	**67**	**68**	**68**	**69**	**1**	**1**	**2**
N22	**67**	**65**	**66**	**67**	**2**	**1**	**0**
N23	**67**	**68**	**69**	**69**	**1**	**0**	**2**

TABLE 5-5

Noise Impact Summary – TNM Modeling Results for the 6-lane Hybrid Interchange with Full-Hawley Alternative

Receptor	NLC (dBA)	Existing (dBA)	No build (dBA)	6-lane alternative (dBA)	Build (6 lane) increase above existing	Build (6 lane) increase above No Build (dBA)	Build (6 lane) increase above NLC (dBA)
N24	**67**	**67**	**67**	**66**	**-1**	**-1**	**-1**
N25	**67**	**68**	**69**	**68**	**0**	**-1**	**1**
N26	**67**	**67**	**68**	**67**	**0**	**-1**	**0**
N27	**67**	**68**	**68**	**68**	**0**	**0**	**1**
N28	**67**	**70**	**70**	**69**	**-1**	**-1**	**2**
N29	**67**	**67**	**67**	**67**	**0**	**0**	**0**
N30	**67**	**72**	**72**	**71**	**-1**	**-1**	**4**
N31	**67**	**69**	**69**	**68**	**-1**	**-1**	**1**
N32	**67**	**73**	**74**	**71**	**-2**	**-3**	**4**
N33	**67**	**69**	**70**	**67**	**-2**	**-3**	**0**
N34	**67**	**77**	**78**	**76**	**-1**	**-2**	**9**
N35	**67**	**73**	**74**	**73**	**0**	**-1**	**6**
N36	**67**	**70**	**70**	**69**	**-1**	**-1**	**2**
N37	**67**	**67**	**68**	**67**	**0**	**-1**	**0**
N38	**67**	**67**	**68**	**67**	**0**	**-1**	**0**
N39	**67**	**74**	**74**	**72**	**-2**	**-2**	**5**
N40	**67**	**70**	**71**	**69**	**-1**	**-2**	**2**
N41	67	64	64	64	0	0	-3
N42	**67**	**68**	**69**	**67**	**-1**	**-2**	**0**
N43	67	65	65	64	-1	-1	-3
N44	67	63	63	63	0	0	-4
N45	**67**	**66**	**67**	**66**	**0**	**-1**	**-1**
N46	**67**	**70**	**71**	**70**	**0**	**-1**	**3**
N47	67	64	65	65	1	0	-2
N48	67	65	65	65	0	0	-2
N49	**67**	**69**	**69**	**70**	**1**	**1**	**3**
N50	**67**	**77**	**77**	**77**	**0**	**0**	**10**
N51	**67**	**68**	**68**	**68**	**0**	**0**	**1**
N52	67	64	64	65	1	1	-2
N53	67	64	64	63	-1	-1	-4
N54	67	62	63	62	0	-1	-5
N55	67	64	64	64	0	0	-3
N56	**67**	**68**	**69**	**67**	**-1**	**-2**	**0**
N57	**67**	**66**	**66**	**66**	**0**	**0**	**-1**
N58	**67**	**69**	**70**	**69**	**0**	**-1**	**2**
N59	67	63	63	64	1	1	-3
N60	**67**	**66**	**67**	**68**	**2**	**1**	**1**
N61	**67**	**66**	**66**	**67**	**1**	**1**	**0**

TABLE 5-5
Noise Impact Summary – TNM Modeling Results for the 6-lane Hybrid Interchange with Full-Hawley Alternative

Receptor	NLC (dBA)	Existing (dBA)	No build (dBA)	6-lane alternative (dBA)	Build (6 lane) increase above existing	Build (6 lane) increase above No Build (dBA)	Build (6 lane) increase above NLC (dBA)
N62	67	65	65	65	0	0	-2
N63	67	64	64	64	0	0	-3
N64	67	63	64	63	0	-1	-4
N65	67	62	62	62	0	0	-5
N66	67	61	62	62	1	0	-5
N67	67	58	58	58	0	0	-9
N68	67	62	62	62	0	0	-5
N69	67	65	65	64	-1	-1	-3
N70	**67**	**69**	**69**	**68**	**-1**	**-1**	**1**
N71	67	59	59	59	0	0	-8
N72	67	58	59	58	0	-1	-9
N73	67	64	65	64	0	-1	-3
N74	67	63	63	62	-1	-1	-5
N75	67	63	63	62	-1	-1	-5
N76	67	62	63	58	-4	-5	-9
N77	67	56	57	56	0	-1	-11
N78	67	61	62	60	-1	-2	-7
N79	67	57	57	57	0	0	-10
N80	67	59	59	61	2	2	-6
N81	**67**	**66**	**67**	**69**	**3**	**2**	**2**
N82	67	60	61	61	1	0	-6
N83	67	66	66	65	-1	-1	-2
N84	67	63	63	62	-1	-1	-5
N85	67	67	67	63	-4	-4	-4
N86	67	68	68	65	-3	-3	-2
N87	**67**	**66**	**66**	**66**	**0**	**0**	**-1**
N88	**67**	**71**	**71**	**69**	**-2**	**-2**	**2**
N89	67	63	63	64	1	1	-3
N90	**67**	**68**	**68**	**69**	**1**	**1**	**2**
N91	**67**	**68**	**68**	**69**	**1**	**1**	**2**
N92	67	61	61	62	1	1	-5
N93	**67**	**69**	**69**	**68**	**-1**	**-1**	**1**
N94	67	65	65	65	0	0	-2
N95	**67**	**68**	**69**	**67**	**-1**	**-2**	**0**
N96	**67**	**70**	**70**	**69**	**-1**	**-1**	**2**
N97	67	62	62	63	1	1	-4
N98	**67**	**67**	**67**	**67**	**0**	**0**	**0**
N99	**67**	**74**	**74**	**72**	**-2**	**-2**	**5**

TABLE 5-5
Noise Impact Summary – TNM Modeling Results for the 6-lane Hybrid Interchange with Full-Hawley Alternative

Receptor	NLC (dBA)	Existing (dBA)	No build (dBA)	6-lane alternative (dBA)	Build (6 lane) increase above existing	Build (6 lane) increase above No Build (dBA)	Build (6 lane) increase above NLC (dBA)
N100	67	65	65	65	0	0	-2
N101	67	60	61	61	1	0	-6
N102	67	65	66	65	0	-1	-2
N103	**67**	**75**	**75**	**72**	**-3**	**-3**	**5**
N104	67	62	63	64	2	1	-3
N105	**67**	**73**	**73**	**71**	**-2**	**-2**	**4**
N106	67	65	65	63	-2	-2	-4
N107	67	64	64	62	-2	-2	-5
N108	67	64	64	63	-1	-1	-4
N109	67	65	66	64	-1	-2	-3
N110	**67**	**69**	**69**	**69**	**0**	**0**	**2**
N111	72	62	62	62	0	0	-10
FS-1	**67**	**69**	**69**	**69**	**0**	**0**	**2**
FS-2	**67**	**64**	**65**	**66**	**2**	**1**	**-1**
FS-3	67	61	61	62	1	1	-5
FS-4	67	61	61	63	2	2	-4
FS-5	**67**	**68**	**69**	**68**	**0**	**-1**	**1**
FS-6	**67**	**72**	**72**	**71**	**-1**	**-1**	**4**
FS-7	**67**	**67**	**68**	**68**	**1**	**0**	**1**
FS-8	67	62	62	62	0	0	-5
FS-9	67	60	60	61	1	1	-6
FS-10	67	66	66	65	-1	-1	-2
FS-11	**67**	**74**	**75**	**73**	**-1**	**-2**	**6**
FS-12	67	59	59	58	-1	-1	-9
FS-13	67	62	62	63	1	1	-4
FS-14	**67**	**74**	**74**	**72**	**-2**	**-2**	**5**

5.3.5 6-lane DDI with Half-Hawley Alternative

The results of the noise analysis indicate that peak-hour noise levels at exterior activity areas under the 2050 build condition range from 43 dBA at R9 to 77 dBA at N50. The difference between the 6-lane DDI with half-Hawley alternative build noise levels and existing noise levels range from a reduction of 4 dBA to a 3 dBA increase. Such increases are below WisDOT's definition of substantial increase of 15 dBA. **Table 5-6** lists the calculated peak-hour traffic noise levels. 72 representative receptors would be impacted under the 6-lane DDI with half-Hawley alternative, which means they approach, meet, or exceed the WisDOT NLC. They are identified in bold in **Table 5-6**. In comparison, there would be 71 representative receptors impacted under the No-build alternative. Traffic noise levels varied, depending on the receptor's proximity to the proposed 6-lane alternative. Most traffic noise level changes from the existing condition to the 6-lane DDI with half-Hawley build alternative scenario are due to predicted future traffic volume increases.

TABLE 5-6
Noise Impact Summary – TNM Modeling Results for the 6-lane DDI with Half-Hawley Alternative

Receptor	NLC (dBA)	Existing (dBA)	No build (dBA)	6-lane alternative (dBA)	Build (6 lane) increase above existing	Build (6 lane) increase above No Build (dBA)	Build (6 lane) increase above NLC (dBA)
R1	67	61	61	61	0	0	-6
R2	67	65	65	65	0	0	-2
R3	**67**	**67**	**67**	**67**	**0**	**0**	**0**
R4	67	64	64	65	1	1	-2
R5	67	65	65	65	0	0	-2
R6	**67**	**66**	**67**	**67**	**1**	**0**	**0**
R7	**67**	**66**	**66**	**66**	**0**	**0**	**-1**
R8	52	46	46	46	0	0	-6
R9	52	42	43	43	1	0	-9
N1	67	63	63	64	1	1	-3
N2	67	62	63	64	2	1	-3
N3	67	63	64	64	1	0	-3
N4	**67**	**63**	**64**	**66**	**3**	**2**	**-1**
N5	67	63	63	65	2	2	-2
N6	67	62	63	65	3	2	-2
N7	67	62	62	64	2	2	-3
N8	67	62	62	64	2	2	-3
N9	67	64	64	65	1	1	-2
N10	**67**	**65**	**65**	**66**	**1**	**1**	**-1**
N11	**67**	**64**	**65**	**66**	**2**	**1**	**-1**
N12	**67**	**65**	**65**	**68**	**3**	**3**	**1**
N13	**67**	**71**	**72**	**73**	**2**	**1**	**6**
N14	**67**	**72**	**72**	**73**	**1**	**1**	**6**
N15	**67**	**65**	**65**	**67**	**2**	**2**	**0**
N16	67	62	62	65	3	3	-2
N17	**67**	**67**	**67**	**70**	**3**	**3**	**3**
N18	67	63	64	65	2	1	-2
N19	**67**	**67**	**68**	**68**	**1**	**0**	**1**
N20	**67**	**66**	**66**	**67**	**1**	**1**	**0**
N21	**67**	**68**	**68**	**69**	**1**	**1**	**2**
N22	**67**	**65**	**66**	**67**	**2**	**1**	**0**
N23	**67**	**68**	**69**	**69**	**1**	**0**	**2**
N24	**67**	**67**	**67**	**66**	**-1**	**-1**	**-1**
N25	**67**	**68**	**69**	**69**	**1**	**0**	**2**
N26	**67**	**67**	**68**	**67**	**0**	**-1**	**0**
N27	**67**	**68**	**68**	**68**	**0**	**0**	**1**
N28	**67**	**70**	**70**	**70**	**0**	**0**	**3**
N29	**67**	**67**	**67**	**67**	**0**	**0**	**0**
N30	**67**	**72**	**72**	**71**	**-1**	**-1**	**4**

TABLE 5-6
Noise Impact Summary – TNM Modeling Results for the 6-lane DDI with Half-Hawley Alternative

Receptor	NLC (dBA)	Existing (dBA)	No build (dBA)	6-lane alternative (dBA)	Build (6 lane) increase above existing	Build (6 lane) increase above No Build (dBA)	Build (6 lane) increase above NLC (dBA)
N31	**67**	**69**	**69**	**68**	**-1**	**-1**	**1**
N32	**67**	**73**	**74**	**72**	**-1**	**-2**	**5**
N33	**67**	**69**	**70**	**67**	**-2**	**-3**	**0**
N34	**67**	**77**	**78**	**77**	**0**	**-1**	**10**
N35	**67**	**73**	**74**	**73**	**0**	**-1**	**6**
N36	**67**	**70**	**70**	**69**	**-1**	**-1**	**2**
N37	**67**	**67**	**68**	**67**	**0**	**-1**	**0**
N38	**67**	**67**	**68**	**68**	**1**	**0**	**1**
N39	**67**	**74**	**74**	**73**	**-1**	**-1**	**6**
N40	**67**	**70**	**71**	**69**	**-1**	**-2**	**2**
N41	67	64	64	64	0	0	-3
N42	**67**	**68**	**69**	**67**	**-1**	**-2**	**0**
N43	67	65	65	64	-1	-1	-3
N44	67	63	63	63	0	0	-4
N45	**67**	**66**	**67**	**66**	**0**	**-1**	**-1**
N46	**67**	**70**	**71**	**70**	**0**	**-1**	**3**
N47	67	64	65	65	1	0	-2
N48	67	65	65	65	0	0	-2
N49	**67**	**69**	**69**	**70**	**1**	**1**	**3**
N50	**67**	**77**	**77**	**77**	**0**	**0**	**10**
N51	**67**	**68**	**68**	**68**	**0**	**0**	**1**
N52	67	64	64	65	1	1	-2
N53	67	64	64	63	-1	-1	-4
N54	67	62	63	62	0	-1	-5
N55	67	64	64	64	0	0	-3
N56	**67**	**68**	**69**	**67**	**-1**	**-2**	**0**
N57	**67**	**66**	**66**	**66**	**0**	**0**	**-1**
N58	**67**	**69**	**70**	**70**	**1**	**0**	**3**
N59	67	63	63	65	2	2	-2
N60	**67**	**66**	**67**	**69**	**3**	**2**	**2**
N61	**67**	**66**	**66**	**68**	**2**	**2**	**1**
N62	**67**	**65**	**65**	**67**	**2**	**2**	**0**
N63	**67**	**64**	**64**	**66**	**2**	**2**	**-1**
N64	67	63	64	65	2	1	-2
N65	67	62	62	64	2	2	-3
N66	67	61	62	63	2	1	-4
N67	67	58	58	59	1	1	-8
N68	67	62	62	62	0	0	-5
N69	67	65	65	65	0	0	-2

TABLE 5-6
Noise Impact Summary – TNM Modeling Results for the 6-lane DDI with Half-Hawley Alternative

Receptor	NLC (dBA)	Existing (dBA)	No build (dBA)	6-lane alternative (dBA)	Build (6 lane) increase above existing	Build (6 lane) increase above No Build (dBA)	Build (6 lane) increase above NLC (dBA)
N70	**67**	**69**	**69**	**70**	**1**	**1**	**3**
N71	67	59	59	60	1	1	-7
N72	67	58	59	60	2	1	-7
N73	67	64	65	65	1	0	-2
N74	67	63	63	64	1	1	-3
N75	67	63	63	64	1	1	-3
N76	67	62	63	63	1	0	-4
N77	67	56	57	58	2	1	-9
N78	67	61	62	62	1	0	-5
N79	67	57	57	56	-1	-1	-11
N80	67	59	59	61	2	2	-6
N81	**67**	**66**	**67**	**69**	**3**	**2**	**2**
N82	67	60	61	61	1	0	-6
N83	**67**	**66**	**66**	**67**	**1**	**1**	**0**
N84	67	63	63	63	0	0	-4
N85	**67**	**67**	**67**	**66**	**-1**	**-1**	**-1**
N86	**67**	**68**	**68**	**67**	**-1**	**-1**	**0**
N87	**67**	**66**	**66**	**67**	**1**	**1**	**0**
N88	**67**	**71**	**71**	**70**	**-1**	**-1**	**3**
N89	67	63	63	64	1	1	-3
N90	**67**	**68**	**68**	**70**	**2**	**2**	**3**
N91	**67**	**68**	**68**	**69**	**1**	**1**	**2**
N92	67	61	61	62	1	1	-5
N93	**67**	**69**	**69**	**69**	**0**	**0**	**2**
N94	**67**	**65**	**65**	**66**	**1**	**1**	**-1**
N95	**67**	**68**	**69**	**67**	**-1**	**-2**	**0**
N96	**67**	**70**	**70**	**69**	**-1**	**-1**	**2**
N97	67	62	62	62	0	0	-5
N98	**67**	**67**	**67**	**66**	**-1**	**-1**	**-1**
N99	**67**	**74**	**74**	**71**	**-3**	**-3**	**4**
N100	67	65	65	64	-1	-1	-3
N101	67	60	61	61	1	0	-6
N102	67	65	66	64	-1	-2	-3
N103	**67**	**75**	**75**	**71**	**-4**	**-4**	**4**
N104	67	62	63	64	2	1	-3
N105	**67**	**73**	**73**	**71**	**-2**	**-2**	**4**
N106	67	65	65	63	-2	-2	-4
N107	67	64	64	62	-2	-2	-5
N108	67	64	64	62	-2	-2	-5

TABLE 5-6
Noise Impact Summary – TNM Modeling Results for the 6-lane DDI with Half-Hawley Alternative

Receptor	NLC (dBA)	Existing (dBA)	No build (dBA)	6-lane alternative (dBA)	Build (6 lane) increase above existing	Build (6 lane) increase above No Build (dBA)	Build (6 lane) increase above NLC (dBA)
N109	67	65	66	64	-1	-2	-3
N110	**67**	**69**	**69**	**69**	**0**	**0**	**2**
N111	72	62	62	62	0	0	-10
FS-1	**67**	**69**	**69**	**69**	**0**	**0**	**2**
FS-2	**67**	**64**	**65**	**66**	**2**	**1**	**-1**
FS-3	67	61	61	62	1	1	-5
FS-4	67	61	61	63	2	2	-4
FS-5	**67**	**68**	**69**	**68**	**0**	**-1**	**1**
FS-6	**67**	**72**	**72**	**71**	**-1**	**-1**	**4**
FS-7	**67**	**67**	**68**	**69**	**2**	**1**	**2**
FS-8	67	62	62	64	2	2	-3
FS-9	67	60	60	62	2	2	-5
FS-10	**67**	**66**	**66**	**66**	**0**	**0**	**-1**
FS-11	**67**	**74**	**75**	**73**	**-1**	**-2**	**6**
FS-12	67	59	59	58	-1	-1	-9
FS-13	67	62	62	63	1	1	-4
FS-14	**67**	**74**	**74**	**72**	**-2**	**-2**	**5**

5.3.6 6-lane DDI with Full-Hawley Alternative

The results of the noise analysis indicate that peak-hour noise levels at exterior activity areas under the 2050 build condition range from 43 dBA at R9 to 77 dBA at N50. The difference between the 6-lane DDI with Full-Hawley alternative build noise levels and existing noise levels range from a reduction of 4 dBA to a 3 dBA increase. Such increases are below WisDOT's definition of substantial increase of 15 dBA. **Table 5-7** lists the calculated peak-hour traffic noise levels. 72 representative receptors would be impacted under the 6-lane DDI with Full-Hawley alternative, which means they approach, meet, or exceed the WisDOT NLC. They are identified in bold in **Table 5-7**. In comparison, there would be 71 representative receptors impacted under the No-build alternative. Traffic noise levels varied, depending on the receptor's proximity to the proposed 6-lane alternative. Most traffic noise level changes from the existing condition to the 6-lane DDI with Full-Hawley build alternative scenario are due to predicted future traffic volume increases.

TABLE 5-7
Noise Impact Summary – TNM Modeling Results for the 6-lane DDI with Full-Hawley Alternative

Receptor	NLC (dBA)	Existing (dBA)	No build (dBA)	6-lane alternative (dBA)	Build (6 lane) increase above existing	Build (6 lane) increase above No Build (dBA)	Build (6 lane) increase above NLC (dBA)
R1	67	61	61	61	0	0	-6
R2	67	65	65	65	0	0	-2
R3	**67**	**67**	**67**	**67**	**0**	**0**	**0**

TABLE 5-7
Noise Impact Summary – TNM Modeling Results for the 6-lane DDI with Full-Hawley Alternative

Receptor	NLC (dBA)	Existing (dBA)	No build (dBA)	6-lane alternative (dBA)	Build (6 lane) increase above existing	Build (6 lane) increase above No Build (dBA)	Build (6 lane) increase above NLC (dBA)
R4	67	65	64	64	1	1	-2
R5	67	65	65	65	0	0	-2
R6	**67**	**67**	**66**	**67**	**1**	**0**	**0**
R7	**67**	**66**	**66**	**66**	**0**	**0**	**-1**
R8	52	46	46	46	0	0	-6
R9	52	43	42	43	1	0	-9
FS-1	**67**	**69**	**69**	**69**	**0**	**0**	**2**
FS-2	**67**	**66**	**64**	**65**	**2**	**1**	**-1**
FS-3	67	62	61	61	1	1	-5
FS-4	67	63	61	61	2	2	-4
FS-5	**67**	**69**	**68**	**69**	**1**	**0**	**2**
FS-6	**67**	**71**	**72**	**72**	**-1**	**-1**	**4**
FS-7	**67**	**69**	**67**	**68**	**2**	**1**	**2**
FS-8	67	64	62	62	2	2	-3
FS-9	67	62	60	60	2	2	-5
FS-10	**67**	**66**	**66**	**66**	**0**	**0**	**-1**
FS-11	**67**	**73**	**74**	**75**	**-1**	**-2**	**6**
FS-12	67	58	59	59	-1	-1	-9
FS-13	67	63	62	62	1	1	-4
FS-14	**67**	**72**	**74**	**74**	**-2**	**-2**	**5**
N1	67	64	63	63	1	1	-3
N2	67	64	62	63	2	1	-3
N3	67	64	63	64	1	0	-3
N4	**67**	**66**	**63**	**64**	**3**	**2**	**-1**
N5	67	65	63	63	2	2	-2
N6	67	65	62	63	3	2	-2
N7	67	64	62	62	2	2	-3
N8	67	64	62	62	2	2	-3
N9	67	65	64	64	1	1	-2
N10	**67**	**66**	**65**	**65**	**1**	**1**	**-1**
N11	**67**	**66**	**64**	**65**	**2**	**1**	**-1**
N12	**67**	**67**	**65**	**65**	**2**	**2**	**0**
N13	**67**	**73**	**71**	**72**	**2**	**1**	**6**
N14	**67**	**73**	**72**	**72**	**1**	**1**	**6**
N15	**67**	**67**	**65**	**65**	**2**	**2**	**0**
N16	67	65	62	62	3	3	-2
N17	**67**	**70**	**67**	**67**	**3**	**3**	**3**
N18	67	65	63	64	2	1	-2
N19	**67**	**69**	**67**	**68**	**2**	**1**	**2**

TABLE 5-7

Noise Impact Summary – TNM Modeling Results for the 6-lane DDI with Full-Hawley Alternative

Receptor	NLC (dBA)	Existing (dBA)	No build (dBA)	6-lane alternative (dBA)	Build (6 lane) increase above existing	Build (6 lane) increase above No Build (dBA)	Build (6 lane) increase above NLC (dBA)
N20	**67**	**67**	**66**	**66**	**1**	**1**	**0**
N21	**67**	**69**	**68**	**68**	**1**	**1**	**2**
N22	**67**	**67**	**65**	**66**	**2**	**1**	**0**
N23	**67**	**69**	**68**	**69**	**1**	**0**	**2**
N24	**67**	**66**	**67**	**67**	**-1**	**-1**	**-1**
N25	**67**	**68**	**68**	**69**	**0**	**-1**	**1**
N26	**67**	**67**	**67**	**68**	**0**	**-1**	**0**
N27	**67**	**68**	**68**	**68**	**0**	**0**	**1**
N28	**67**	**69**	**70**	**70**	**-1**	**-1**	**2**
N29	**67**	**67**	**67**	**67**	**0**	**0**	**0**
N30	**67**	**71**	**72**	**72**	**-1**	**-1**	**4**
N31	**67**	**68**	**69**	**69**	**-1**	**-1**	**1**
N32	**67**	**71**	**73**	**74**	**-2**	**-3**	**4**
N33	**67**	**67**	**69**	**70**	**-2**	**-3**	**0**
N34	**67**	**76**	**77**	**78**	**-1**	**-2**	**9**
N35	**67**	**73**	**73**	**74**	**0**	**-1**	**6**
N36	**67**	**69**	**70**	**70**	**-1**	**-1**	**2**
N37	**67**	**67**	**67**	**68**	**0**	**-1**	**0**
N38	**67**	**67**	**67**	**68**	**0**	**-1**	**0**
N39	**67**	**72**	**74**	**74**	**-2**	**-2**	**5**
N40	**67**	**69**	**70**	**71**	**-1**	**-2**	**2**
N41	67	64	64	64	0	0	-3
N42	**67**	**66**	**68**	**69**	**-2**	**-3**	**-1**
N43	67	64	65	65	-1	-1	-3
N44	67	63	63	63	0	0	-4
N45	**67**	**66**	**66**	**67**	**0**	**-1**	**-1**
N46	**67**	**70**	**70**	**71**	**0**	**-1**	**3**
N47	67	65	64	65	1	0	-2
N48	67	65	65	65	0	0	-2
N49	**67**	**70**	**69**	**69**	**1**	**1**	**3**
N50	**67**	**77**	**77**	**77**	**0**	**0**	**10**
N51	**67**	**68**	**68**	**68**	**0**	**0**	**1**
N52	67	65	64	64	1	1	-2
N53	67	63	64	64	-1	-1	-4
N54	67	62	62	63	0	-1	-5
N55	67	64	64	64	0	0	-3
N56	**67**	**67**	**68**	**69**	**-1**	**-2**	**0**
N57	**67**	**66**	**66**	**66**	**0**	**0**	**-1**
N58	**67**	**70**	**69**	**70**	**1**	**0**	**3**

TABLE 5-7

Noise Impact Summary – TNM Modeling Results for the 6-lane DDI with Full-Hawley Alternative

Receptor	NLC (dBA)	Existing (dBA)	No build (dBA)	6-lane alternative (dBA)	Build (6 lane) increase above existing	Build (6 lane) increase above No Build (dBA)	Build (6 lane) increase above NLC (dBA)
N59	67	65	63	63	2	2	-2
N60	**67**	**69**	**66**	**67**	**3**	**2**	**2**
N61	**67**	**68**	**66**	**66**	**2**	**2**	**1**
N62	**67**	**67**	**65**	**65**	**2**	**2**	**0**
N63	**67**	**66**	**64**	**64**	**2**	**2**	**-1**
N64	67	65	63	64	2	1	-2
N65	67	64	62	62	2	2	-3
N66	67	64	61	62	3	2	-3
N67	67	59	58	58	1	1	-8
N68	67	62	62	62	0	0	-5
N69	67	65	65	65	0	0	-2
N70	**67**	**70**	**69**	**69**	**1**	**1**	**3**
N71	67	60	59	59	1	1	-7
N72	67	60	58	59	2	1	-7
N73	67	65	64	65	1	0	-2
N74	67	64	63	63	1	1	-3
N75	67	64	63	63	1	1	-3
N76	67	63	62	63	1	0	-4
N77	67	58	56	57	2	1	-9
N78	67	62	61	62	1	0	-5
N79	67	56	57	57	-1	-1	-11
N80	67	61	59	59	2	2	-6
N81	**67**	**69**	**66**	**67**	**3**	**2**	**2**
N82	67	61	60	61	1	0	-6
N83	**67**	**67**	**66**	**66**	**1**	**1**	**0**
N84	67	63	63	63	0	0	-4
N85	**67**	**66**	**67**	**67**	**-1**	**-1**	**-1**
N86	**67**	**67**	**68**	**68**	**-1**	**-1**	**0**
N87	**67**	**67**	**66**	**66**	**1**	**1**	**0**
N88	**67**	**70**	**71**	**71**	**-1**	**-1**	**3**
N89	67	64	63	63	1	1	-3
N90	**67**	**70**	**68**	**68**	**2**	**2**	**3**
N91	**67**	**69**	**68**	**68**	**1**	**1**	**2**
N92	67	63	61	61	2	2	-4
N93	**67**	**69**	**69**	**69**	**0**	**0**	**2**
N94	**67**	**66**	**65**	**65**	**1**	**1**	**-1**
N95	**67**	**67**	**68**	**69**	**-1**	**-2**	**0**
N96	**67**	**69**	**70**	**70**	**-1**	**-1**	**2**
N97	67	62	62	62	0	0	-5

TABLE 5-7
Noise Impact Summary – TNM Modeling Results for the 6-lane DDI with Full-Hawley Alternative

Receptor	NLC (dBA)	Existing (dBA)	No build (dBA)	6-lane alternative (dBA)	Build (6 lane) increase above existing	Build (6 lane) increase above No Build (dBA)	Build (6 lane) increase above NLC (dBA)
N98	**67**	**66**	**67**	**67**	**-1**	**-1**	**-1**
N99	**67**	**72**	**74**	**74**	**-2**	**-2**	**5**
N100	67	64	65	65	-1	-1	-3
N101	67	61	60	61	1	0	-6
N102	67	64	65	66	-1	-2	-3
N103	**67**	**71**	**75**	**75**	**-4**	**-4**	**4**
N104	67	64	62	63	2	1	-3
N105	**67**	**71**	**73**	**73**	**-2**	**-2**	**4**
N106	67	63	65	65	-2	-2	-4
N107	67	62	64	64	-2	-2	-5
N108	67	62	64	64	-2	-2	-5
N109	67	64	65	66	-1	-2	-3
N110	**67**	**69**	**69**	**69**	**0**	**0**	**2**
N111	72	62	62	62	0	0	-10

5.3.7 Washington Street Extension

An additional noise level field measurement was taken for the Washington Street Extension see Exhibit 1-2. It showed existing noise of 60 dBA. Traffic counts were not taken at this location since the field measurement was to determine existing conditions. There is currently no traffic on the Washington Street Extension since the extension would be a new roadway.

The results of the noise analysis indicate that peak-hour noise levels at exterior activity areas under the 2050 build condition for the Washington Street Extension range from 43 dBA at N121 to 65 dBA at N117 to N120. The difference between build noise levels and existing noise levels ranges from a reduction of 1 dBA to a 12 dBA increase. Such increases are below WisDOT's definition of substantial increase of 15 dBA. **Table 5-8** lists the calculated peak-hour traffic noise levels. None of the 15 representative receptors approach or exceed the WisDOT NLC for the Washington Street Extension. Traffic noise levels varied, depending on the receptor's proximity to the proposed Washington Street Extension. The largest change takes place at FS-15, since there is a new road introduced in an area where there is currently no road.

None of the 15 representative receptor locations would be impacted.

TABLE 5-8
Noise Impact Summary – TNM Modelling Results for the Washington Street Extension

Receptor	NLC (dBA)	Existing (dBA)	No build (dBA)	Washington Street Extension (dBA)	Build (Washington Street Extension) increase above existing (dBA)	Build (Washington Street Extension) increase above No Build (dBA)	Build (Washington Street Extension) increase above NLC (dBA)
N112	67	62	62	63	1	1	-4

TABLE 5-8
Noise Impact Summary – TNM Modelling Results for the Washington Street Extension

Receptor	NLC (dBA)	Existing (dBA)	No build (dBA)	Washington Street Extension (dBA)	Build (Washington Street Extension) increase above existing (dBA)	Build (Washington Street Extension) increase above No Build (dBA)	Build (Washington Street Extension) increase above NLC (dBA)
N113	67	60	60	61	1	1	-6
N114	67	40	41	48	8	7	-19
N115	67	62	62	61	-1	-1	-6
N116	67	65	66	64	-1	-2	-3
N117	67	66	67	65	-1	-2	-2
N118	67	66	66	65	-1	-1	-2
N119	67	65	65	64	-1	-1	-3
N120	67	66	66	65	-1	-1	-2
N121	67	41	41	43	2	2	-24
N122	67	44	44	46	2	2	-21
N123	67	53	53	55	2	2	-12
FS-15	67	41	41	53	12	12	-14
FS-16	67	38	38	46	8	8	-21
FS-17	67	50	50	54	4	4	-13

5.3.8 Noise Impacts Summary

The results of the computer modeling by alternative are presented in **Appendix B, Traffic Noise Impact Summary**. The noise levels for each alternative are independent of the Washington Extension noise levels. Therefore, the data presented in **Appendix B** are appropriate for any alternative combined with the Washington Street Extension.

The noise levels in **Appendix B** are the modeled noise levels based on SEWRPC's existing and future design year traffic model and existing I-94 geometric conditions and the proposed geometrics of the build alternatives. Noise impacts are determined based on the findings of the SEWRPC traffic model. SEWRPC's traffic model uses traffic counts from throughout the year and averages them, producing more accurate results than one 15-minute traffic count at a specific point in time. Refer to **Section 3.2.1** for more information on the comparison of field data and modeled noise levels.

The projected changes in the study area are summarized by alternative in **Table 5-9**. Note that projected noise levels would differ in the other segments due to different traffic volumes as a result of the design through the cemetery area. The projected number of properties that would be exposed to design-year noise levels that approach or exceed the levels in **Table 2-2** are presented in **Table 6-1**.

TABLE 5-9
Change in Design Hour Noise Levels by Alternative

Alternative	Change in Noise Level, dBA Leq
8-lane hybrid interchange alternative	-4 to +4
8-lane DDI alternative	-3 to +7
6-lane Hybrid Interchange with Half-Hawley alternative	-4 to +3
6-lane Hybrid Interchange with Full-Hawley alternative	-4 to +3
6-lane DDI with Half-Hawley alternative	-4 to +3
6-lane DDI with Full-Hawley alternative	-4 to +3
Washington Street Extension	-1 to +12

In addition to the I-94 improvements, spot improvements are being proposed near three intersections: National Avenue/Miller Park Way/General Mitchell Boulevard, National Avenue/Greenfield Avenue/62nd Street, and Greenfield Avenue/70th Street. The proposed improvements include restriping of existing pavement to add turn lanes or increase the lengths of existing turn lanes, and the addition of a proposed right-turn lane to improve access to the Milwaukee VA Medical Center. All the proposed improvements are designed to improve traffic operations. Traffic noise impacts are associated with National Avenue/Brewers Boulevard intersection improvements for the 8-lane alternative with diverging diamond interchange (refer to representative receptors NR6 and NR8 in Section 5.3.2).[6]

[6] Traffic noise impacts of the National Avenue/Brewers Boulevard intersection improvements were only analyzed for the 8-lane alternative with diverging diamond interchange (preferred alternative).

Noise Abatement Analysis

Based upon the requirements of *23 CFR 772* and within the framework of *Facilities Development Manual 23, Noise*, various methods were reviewed to mitigate the noise impact of the proposed improvements. Among those considered were restricting truck traffic to specific times of the day, prohibiting trucks, altering horizontal and vertical alignments, property acquisition for construction of noise barriers or berms, property acquisition to create buffer zones to prevent development that could be adversely impacted, soundproofing (Land Use Activity Category D only), berms, and sound barriers.

Restricting or prohibiting trucks is counter to the project's purpose and need. Design criteria and recommended termini for the proposed project preclude substantial horizontal and vertical alignment shifts that would produce noticeable changes in the projected acoustical environment. Due to right-of-way limitation, the construction of noise berms is neither feasible nor reasonable. Soundproofing was not considered as the applicable federal regulations and WisDOT policy were not met.[7] Therefore, only the construction of noise barriers was reviewed.

There is a day care north of I-94 at the east end of the project area, which was evaluated as a Land Use Category C receptor. According to *Facilities Development Manua*l *23, Noise*, "Land Use Category D is only used as the basis for noise impact determination in situations where no exterior activities are to be affected by the traffic noise, or where the exterior activities are far from or physically shielded from the roadway in a manner that prevents an impact on exterior activities." This means that because there are exterior activities at the day care that could be affected by the noise (outdoor play areas) and there is no shielding that would prevent an impact on exterior activities, Land Use Category D is not used as a basis for noise impact determination. Therefore, per WisDOT's federally-approved noise policy, the day care in this case is evaluated as a Land Use Category C receptor. Noise abatement in the form of a noise barrier adjacent to the day care was determined to not be reasonable.

The projected number of properties that would be exposed to design-year noise levels that approach or exceed the levels in **Table 2-2**, prior to mitigation, are presented in **Table 6-1**.[8]

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[7] Refer to 23 CFR 772.11(c)(2)(iv) and *Facilities Development Manual* 23-30-5.4.

[8] Note the number of impacted representative receptors in **Table 6-1** does not match the number of impacted receptors for each barrier in **Appendix C**. **Table 6-1** shows the number of impacted *representative* receptors. A representative receptor is a discrete or representative location of a noise sensitive area(s) for any of the land uses listed in **Table 2-2** where frequent human use occurs and a lowered noise level would be of benefit. Any impacted representative receptor underwent a barrier analysis for all receptors within 500 feet of that impacted representative receptor. The total receptors studied, impacted receptors, and benefited receptors shown in **Appendix C** for each barrier reflect all receptors studied for the barrier analysis.

TABLE 6-1
Impacted Noise Receptors Summary for Representative Receptors Prior to Mitigation

	No build Alternative	8-lane Hybrid Interchange Alternative	8-lane DDI Interchange Alternative	6-lane Hybrid Interchange with Half Hawley Alternative	6-lane Hybrid with Interchange Full Hawley Alternative	6-lane DDI with Half Hawley Alternative	6-lane DDI with Full Hawley Alternative
Residences	65 (245)*	66 (227)	73 (250)	60 (208)	59 (202)	66 (220)	66 (220)
Active sports areas	0	0	0	0	0	0	0
Recreation facilities	0	0	0	0	0	0	0
Educational facilities	0	0	0	0	0	0	0
Cemeteries	5 (4)	5 (4)	6 (4)	5 (4)	5 (4)	5 (4)	5 (4)
Day care center	1	1	1	1	1	1	1
Park	0	0	0	0	0	0	0
Restaurant	0	0	0	0	0	0	0
Total Impacted Representative Receptors	71	72	**80**	66	65	72	72

*(#) indicates the number of unique properties represented by the representative receptors
Note: No representative receptors would be impacted by the Washington Street extension.

6.1 Abatement Alternatives

Future traffic noise levels in the analysis area will approach, meet, or exceed the NLC at 72 locations for the 8-lane hybrid interchange alternative, 80 locations for the 8-lane DDI alternative, 65 or 66 locations for the 6-lane hybrid interchange alternatives, 72 locations for the 6-lane DDI alternatives, and no locations for the Washington Street Extension. The locations that approach, meet, or exceed the NLC will require noise abatement consideration. Traffic noise abatement strategies considered for mitigating roadway noise as identified in *WisDOT's Facilities Development Manual (2023)* include the following:

- Traffic control measures
- Acquisition of undeveloped land for buffer zones
- Constructing noise barriers
- Soundproofing (only for activity Category D)

Typically, the most effective noise abatement strategy is the implementation of noise barriers. It should be noted that noise barriers can have their own negative impacts. Barriers may interfere with the passage of air, interrupt scenic views, or create objectionable shadows and visual impacts, especially in a rural setting. They could also create maintenance access problems, make it difficult to maintain landscaping, create drainage problems, or provide pockets for wind-borne trash and garbage to accumulate.

6.2 Wisconsin Noise Abatement Guidelines

Determining feasibility and reasonableness of noise abatement involves professional judgment to balance overall benefits against any adverse social, economic, and environmental impacts of noise abatement. The factors include the following: amount of noise reduction expected, number of benefited receptors, cost of noise abatement, opinions of affected receptors, absolute noise levels, change in noise levels, timing of development adjacent to the highway versus the time of initial highway construction, and differences between the existing, no-build, and build noise levels.

WisDOT's *Facilities Development Manual Chapter 23, Noise*, establishes criteria for determining feasibility and reasonableness of noise barriers, as described in Sections 6.2.1 and 6.2.2.

6.2.1 Feasibility

The feasibility decision should be based on whether the measures proposed are compatible with the project purpose and need, meet design criteria and guidance, or result in other impacts that would offset noise reduction benefits.

Other factors that must be considered based on the various noise abatement measures being evaluated include safety, barrier height, topography, drainage, utilities, maintenance of the abatement measure, maintenance access to adjacent properties, and access to adjacent properties.

For a noise abatement measure to be feasible, a minimum of one impacted receptor or common use area shall achieve a 5 dBA noise reduction.

6.2.2 Reasonableness

If the noise barrier cost per benefited receptor is equal to or less than $50,000, the noise barrier is considered reasonable and a determination of whether or not the barrier will be incorporated into the project is made. WisDOT may annually adjust this $50,000 maximum figure up or down based on the last 3 years of available noise barrier construction cost data. This review will take place on an annual basis.

If the noise barrier cost per benefited receptor is greater than $50,000, the noise barrier is considered not reasonable, and the process ends with inclusion of this finding in the environmental document.

If a common noise environment exists within the project termini, cost-averaging of multiple barriers within the common noise environment may occur as part of the reasonableness determination on all noise barriers costing less than $100,000 per receptor.[9]

Noise barriers exceeding $100,000 per benefited receptor cannot be included in the cost averaging. The order of cost averaging of eligible multiple barriers will start with the most cost-effective noise barrier increasing to the second most cost-effective barrier to the third, etc., until the average cost approaches or equals but does not exceed $50,000 per benefited receptor. The noise barriers included in the cost averaging may be carried forward for a determination of whether they will be incorporated into the project. WisDOT must receive a vote of support for the barrier from a simple majority of all votes cast by the owners or residents of the benefited receptors in order for the barrier to be constructed.

To make a reasonableness determination, a noise barrier will be designed (horizontal and vertical location) such that a minimum of one receptor or common use area achieves WisDOT's noise reduction design goal of 9 dBA.

A noise barrier shall reduce noise levels by a minimum of 8 dBA for a receptor or common use area to be considered as benefited for the purposes of determining reasonableness.

6.3 Noise Abatement Evaluation

Noise abatement measures, specifically noise barriers, were considered as part of the analysis. The area surrounding the I-94 E-W project corridor is primarily residential, with cemeteries and commercial/industrial facilities mixed in.

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[9] A common noise environment is a group of receptors within the same Land Use Category listed in FDM 23-30 Table 2.1 (Noise Level Criteria For Considering Barriers), that are exposed to similar noise sources and levels, traffic volumes, traffic mix, traffic speed, and topographic features. Generally, common noise environments occur between two secondary noise sources, such as interchanges, intersections, and cross-roads. See FDM 25-35-15 for more information.

- Seventy-two (72) representative receptors are predicted to be impacted by the 8-lane hybrid interchange alternative.
- Eighty (80) representative receptors are predicted to be impacted by the 8-lane DDI alternative.
- Sixty-six (66) representative receptors are predicted to be impacted by the 6-lane hybrid interchange with Half-Hawley alternative.
- Sixty-five (65) representative receptors are predicted to be impacted by the 6-lane hybrid interchange with Full-Hawley alternative.
- Seventy-two (72) representative receptors are predicted to be impacted by the 6-lane DDI with Half-Hawley alternative.
- Seventy-two (72) representative receptors are predicted to be impacted by the 6-lane DDI with Full-Hawley alternative.
- No impacts were predicted for the Washington Street Extension.

A total of 15 noise barriers were analyzed for eight residential areas and three cemeteries abutting the corridor that would be exposed to noise levels that approach or exceed the noise level criteria for considering barriers for both the 8-lane alternatives and all four of the 6-lane alternatives. **Table 6-2** presents a summary of the noise barrier analysis for each alternative.

6.3.1 ATC Powerline Avoidance Options

Options to avoid impacts to overhead powerlines and other utilities located north of I-94 between 68th Street and Hawley Road that would result with Barrier 4 were evaluated. These options included shifting I-94 roadway south, locating the noise barrier north of the ATC towers, or reducing the height of the barrier to avoid impacts to the overheard utilities. Shifting the roadway to the south or moving the barrier to the north of the ATC towers were eliminated as options from consideration due to right-of-way impacts and additional costs. Barrier 4A, a reduced height barrier, was found to be reasonable and feasible with its reduced height that avoids the additional cost of relocating ATC towers that would be required by Barrier 4 for both the 8-lane alternatives and all four 6-lane alternatives.

6.3.2 8-lane Hybrid Interchange Alternative

A total of 12 noise barriers were analyzed for areas abutting the corridor that would be exposed to noise levels that approach, meet, or exceed the NLC for considering barriers for the 8-lane hybrid interchange alternative. See **Exhibit 4-1, Proposed Noise Barriers 8-Lane Hybrid Interchange Alternative.** Five of these barriers were considered both reasonable and feasible independent of cost averaging (Barriers 1, 3, 4A, 7, and 10). Cost averaging for the 8-lane hybrid interchange alternative provided cost reasonableness for one additional barrier (Barrier 9) for a total of six barriers. A summary of the noise barrier analysis for the 8-lane hybrid interchange alternative is presented in **Table 6-3**.

6.3.3 8-lane DDI Alternative

A total of 15 noise barriers were analyzed for areas abutting the corridor that would be exposed to noise levels that approach, meet, or exceed the NLC for considering barriers for the 8-lane DDI alternative. See **Exhibit 4-2, Proposed Noise Barriers 8-Lane DDI Alternative.** Five of these barriers were considered both reasonable and feasible independent of cost averaging (Barriers 1, 3, 4A, 7, and 10). Cost averaging for the 8-lane DDI alternative provided cost reasonableness for one additional barrier (Barrier 9) for a total of six barriers. A summary of the noise barrier analysis for the 8-lane DDI alternative is presented in **Table 6-4**. Analyses for each barrier are presented in **Appendix C**. Individual barrier analyses are presented only for the 8-lane DDI alternative because the 8-lane DDI alternative was identified as the preferred alternative in the Supplemental Draft EIS.

6.3.4 6-lane Hybrid Interchange with Half-Hawley Alternative

For the 6-lane with half-Hawley Interchange alternative, a total of 12 noise barriers were analyzed for areas abutting the corridor that would be exposed to noise levels that approach, meet, or exceed the NLC for barrier consideration. See **Exhibit 4-3, Proposed Noise Barriers 6-Lane Hybrid Interchange Alternatives.** Five of these barriers were considered both reasonable and feasible independent of cost averaging (Barriers 1, 3, 4A, 7, and 10). Cost averaging for the 6-lane hybrid interchange with Half-Hawley alternative provided cost reasonableness for one additional barrier (Barrier 9) for a total of six barriers. A summary of the noise barrier analysis for the 6-lane alternative is presented in **Table 6-5**.

6.3.5 6-lane Hybrid Interchange with Full-Hawley Alternative

For the 6-lane with full-Hawley Interchange alternative, a total of 12 noise barriers were analyzed for areas abutting the corridor that would be exposed to noise levels that approach, meet, or exceed the NLC for barrier consideration. See **Exhibit 4-3, Proposed Noise Barriers 6-Lane Hybrid Interchange Alternatives** Five of these barriers were considered both reasonable and feasible independent of cost averaging (Barriers 1, 3, 4A, 7, and 10). Cost averaging for the 6-lane hybrid interchange with Full-Hawley alternative provided cost reasonableness for one additional barrier (Barrier 9) for a total of six barriers. A summary of the noise barrier analysis for the 6-lane alternative is presented in **Table 6-6.**

6.3.6 6-lane DDI with Half-Hawley Alternative

For the 6-lane DDI with half-Hawley alternative, a total of 13 noise barriers were analyzed for areas abutting the corridor that would be exposed to noise levels that approach, meet, or exceed the NLC for barrier consideration. See **Exhibit 4-4, Proposed Noise Barriers 6-Lane DDI Alternatives.** Five of these barriers were considered both reasonable and feasible independent of cost averaging (Barriers 1, 3, 4A, 7, and 10). Cost averaging for the 6-lane DDI with Half-Hawley alternative provided cost reasonableness for one additional barrier (Barrier 9) for a total of six barriers. A summary of the noise barrier analysis for the 6-lane hybrid interchange alternative with half-Hawley is presented in **Table 6-7**.

6.3.7 6-lane DDI with Full-Hawley Alternative

For the 6-lane DDI with full-Hawley alternative, a total of 13 noise barriers were analyzed for areas abutting the corridor that would be exposed to noise levels that approach, meet, or exceed the NLC for barrier consideration. See **Exhibit 4-4, Proposed Noise Barriers 6-Lane DDI Alternative.** Four of these barriers were considered both reasonable and feasible independent of cost averaging (Barriers 1, 3, 4A, and 7). Cost averaging for the 6-lane DDI with Full-Hawley alternative provided cost reasonableness for two additional barriers (Barriers 9 and 10) for a total of six barriers. A summary of the noise barrier analysis for the 6-lane DDI with full-Hawley alternative is presented in **Table 6-8**.

TABLE 6-2

Acoustical Mitigation – Summary of Feasible and Reasonable Noise Barriers

Barrier #	Location	As Modeled in Draft Supplemental EIS					
		8-Lane Hybrid Interchange Alternative	8-Lane DDI Alternative	6-Lane Hybrid Interchange with Half Hawley Alternative	6-Lane Hybrid Interchange with Full Hawley Alternative	6-Lane DDI with Half Hawley Interchange Alternative	6-Lane DDI with Full Hawley Interchange Alternative
1	EB I-94 From N 72nd to 68th	Yes	Yes	Yes	Yes	Yes	Yes
2	WB I-94 From N 68th to 72nd	No	No	No	No	No	No
3	EB I-94 From N 68th to Hawley	Yes	Yes	Yes	Yes	Yes	Yes
4	WB I-94 From Hawley to 68th	No	No	No	No	No	No
4A		Yes	Yes	Yes	Yes	Yes	Yes
5	EB I-94 From Hawley to Zablocki	No	No	No	No	No	No
6	WB I-94 From Zablocki to Hawley	No	No	No	No	No	No
7	WB I-94 From Yount to General Mitchell	Yes	Yes	Yes	Yes	Yes	Yes
8	SB 175 From Bluemound to Parkway	NA	No	NA	NA	No	No
8A	NB 175 From Parkway to Bluemound	No	No	No	No	No	No
9	WB Park Hill from 35th to End	Yes (with Cost Averaging)	Yes (with Cost Averaging)	Yes (with Cost Averaging)	Yes (with Cost Averaging)	Yes (with Cost Averaging)	Yes (with Cost Averaging)
10	WB Park Hill from 29th to 35th	Yes	Yes	Yes	Yes	Yes	Yes (with Cost Averaging)
11	WB Clybourn From 25th to 26th	No	No	No	No	No	No
12	WB Clybourn From 17th to 22nd	No	No	No	No	No	No
13	EB National Ave from S. 48th East 27'	NA	No	NA	NA	NA	NA
14	EB National Ave from 50' east of S. 47th 48'	NA	No	NA	NA	NA	NA
	Number of Feasible and Reasonable Noise Barriers	**5**	**5**	**5**	**5**	**5**	**4**
	Number of Cost Averaged Feasible and Reasonable Noise Barriers	**1**	**1**	**1**	**1**	**1**	**2**
	Total Number of Feasible and Reasonable Noise Barriers	**6**	**6**	**6**	**6**	**6**	**6**

TABLE 6-3

Summary of Noise Barrier Analysis for the 8-lane Hybrid Interchange Alternative

Barrier #	Location	Existing Noise Levels (dBA)	Range of 2050 Future Leq Noise levels (dBA)		Noise Reduction (dBA)	Barrier Characteristics		Estimated Barrier Cost[a]	Total Benefited Units[b]	Estimated Barrier Cost per Benefited Unit	Feasible and Reasonable
			Without Barrier	With Barrier		Height (feet)	Total Length (feet)				
1	EB I-94 From N 72nd to 68th	64-70	67-74	63-68	1-9	20	1229	$737,010	22	$33,500	**Yes**
2	WB I-94 From N 68th to 72nd	61-67	65-70	60-65	1-5	30	1223	$1,100,700	0	N/A	No
3	EB I-94 From N 68th to Hawley	63-77	62-77	57-63	4-18	12,22,22	3256	$1,994,910	42	$47,498	**Yes**
4	WB I-94 From Hawley to 68th	61-72	64-74	57-65	2-12	16 to 26	3513	$14,253,480[c]	65	$219,284	No
4A	WB I-94 From Hawley to 68th	61-72	64-74	57-65	2-12	12 to 20	2842	$1,297,260	48	$27,026	**Yes**
5	EB I-94 From Hawley to Zablocki	62-68	63-76	62-66	1-10	12	1060	$381,600	1	$381,600	No
6	WB I-94 From Zablocki to Hawley	65-77	65-78	60-65	5-13	18	1349	$728,460	2	$364,230	No
7	WB I-94 From Yount to General Mitchell	61-69	62-70	54-65	2-11	20	1041	$624,600	15	$41,640	**Yes**
8	NB 175 From Parkway to Bluemound	58-69	59-69	59-64	0-8	18	331	$178,740	1	$178,740	No
9	WB Park Hill from 35th to End	57-74	57-73	56-65	0-13	20	1519	$911,400	16	$56,963	**Yes**[d]
10	WB Park Hill from 29th to 35th	61-75	62-73	55-63	3-16	20	2082	$1,249,200	40	$31,230	**Yes**
11	WB Clybourn From 25th to 26th	73	70	66	4	30	330	$297,000	0	N/A	No
12	WB Clybourn From 17th to 22nd	64-69	62-70	55-68	0-11	30	2052	$1,846,800	5	$369,360	No

[a] Based on $30.00 per square foot; [b] For the purposes of this Supplemental EIS, a unit is a discrete residence or business; [c] Costs include expense of relocating approximately 12 ATC towers.; [d] Based on cost averaging of multiple barriers within the common noise environment for the 8-lane Hybrid Interchange Alternative; refer to **Section 6.2.2, Reasonableness** for a description of how costs are averaged.

TABLE 6-4

Summary of Noise Barrier Analysis for the 8-lane DDI Alternative

Barrier #	Location	Existing Noise Levels (dBA)	Range of 2050 Future Leq Noise levels (dBA)		Noise Reduction (dBA)	Barrier Characteristics		Estimated Barrier Cost[a]	Total Benefited Units[b]	Estimated Barrier Cost per Benefited Unit	Feasible and Reasonable
			Without Barrier	With Barrier		Height (feet)	Total Length (feet)				
1	EB I-94 From N 72nd to 68th	64-70	67-74	63-68	1-10	20	1229	$737,400	22	$33,518	**Yes**
2	WB I-94 From N 68th to 72nd	61-67	65-70	60-65	2-6	30	1223	$1,100,700	0	N/A	No
3	EB I-94 From N 68th to Hawley	63-77	62-77	57-65	1-18	12,22,22	3256	$1,994,910	43	$46,393	**Yes**
4	WB I-94 From Hawley to 68th	61-72	64-74	57-65	1-13	16 to 26	3535	$14,253,480[c]	69	$206,572	No
4A	WB I-94 From Hawley to 68th	61-72	64-74	58-65	0-13	12,18,20	2842	$1,308,870	49	$26,712	**Yes**
5	EB I-94 From Hawley to Zablocki	62-68	63-76	62-66	1-11	12	1060	$381,600	1	$381,600	No
6	WB I-94 From Zablocki to Hawley	65-77	66-78	60-64	5-14	18	1349	$728,460	2	$364,230	No
7	WB I-94 From Yount to General Mitchell	61-69	64-70	58-65	1-11	20	1041	$624,600	16	$39,038	**Yes**
8	SB 175 From Bluemound to Parkway	58-66	60-70	60-65	0-7	30	359	$323,100	0	N/A	No
8A	NB 175 From Parkway to Bluemound	58-69	60-70	60-65	0-9	20	331	$198,600	1	$198,600	No
9	WB Park Hill from 35th to End	57-74	58-73	58-68	0-12	20	1519	$911,400	15	$60,760	**Yes**[d]
10	WB Park Hill from 29th to 35th	61-75	61-73	57-64	0-15	20	2082	$1,249,200	32	$39,038	**Yes**
11	WB Clybourn From 25th to 26th	73	70	68	0-2	30	330	$297,000	0	N/A	No
12	WB Clybourn From 17th to 22nd	64-69	62-70	55-68	0-12	30	2052	$1,846,800	5	$369,360	No
13	EB National Ave from S. 48th East 27 feet	66	67	63	5	30	27	$24,300	0	N/A	No
14	EB National Ave from 50 feet east of S. 47th 48 feet	66	66	60	6	30	48	$43,200	0	N/A	No

[a] Based on $30.00 per square foot; [b] For the purposes of this Supplemental Final EIS, a unit is a discrete residence or business; [c] Costs include expense of relocating approximately 12 ATC towers; [d] Based on cost averaging of multiple barriers within the common noise environment for the 8-lane DDI Alternative; refer to **Section 6.2.2, Reasonableness** for a description of how costs are averaged.

TABLE 6-5

Summary of Noise Barrier Analysis for the 6-lane Hybrid Interchange with Half-Hawley Alternative

Barrier #	Location	Existing Noise Levels (dBA)	Range of 2050 Future Leq Noise levels (dBA)		Noise Reduction (dBA)	Barrier Characteristics		Estimated Barrier Cost[a]	Total Benefited Units[b]	Estimated Barrier Cost per Benefited Unit	Feasible and Reasonable
			Without Barrier	With Barrier		Height (feet)	Total Length (feet)				
1	EB I-94 From N 72nd to 68th	64-70	67-74	62-67	3-9	16	1235	$592,800	21	$28,229	**Yes**
2	WB I-94 From N 68th to 72nd	61-67	64-69	60-65	1-5	30	1223	$1,100,700	0	N/A	No
3	EB I-94 From N 68th to Hawley	63-77	62-77	57-65	2-15	12,22,22	3236	$1,982,160	48	$41,295	**Yes**
4	WB I-94 From Hawley to 68th	61-72	63-73	57-64	2-12	18 to 26	3514	$14,283,810[c]	60	$283,063	No
4A	WB I-94 From Hawley to 68th	61-72	63-73	57-64	2-12	12,18,20	2843	$1,391,880	30	$46,396	**Yes**
5	EB I-94 From Hawley to Zablocki	62-68	63-76	62-65	1-10	12	1060	$381,600	1	$381,600	No
6	WB I-94 From Zablocki to Hawley	65-77	65-77	60-65	4-12	16	1349	$647,520	2	$323,760	No
7	WB I-94 From Yount to General Mitchell	61-69	62-69	57-64	2-11	20	1041	$624,600	14	$44,614	**Yes**
8	NB 175 From Parkway to Bluemound	58-69	60-69	59-64	0-8	14	331	$139,020	1	$139,020	No
9	WB Park Hill from 35th to End	57-74	56-72	56-65	0-11	20	1519	$911,400	13	$70,108	**Yes**[d]
10	WB Park Hill from 29th to 35th	61-75	63-72	54-63	1-16	20	2082	$1,249,200	25	$49,968	**Yes**
11	WB Clybourn From 25th to 26th	73	70	65	5	30	320	$288,000	0	N/A	No
12	WB Clybourn From 17th to 22nd	64-69	62-70	55-68	0-11	30	2052	$1,846,800	7	$263,829	No

[a] Based on $30.00 per square foot; [b] For the purposes of this Supplemental Final EIS, a unit is a discrete residence or business; [c] Costs include expense of relocating approximately 12 ATC towers; [d] Based on cost averaging of multiple barriers within the common noise environment for the 6-Lane Hybrid Interchange with Half-Hawley Alternative; refer to **Section 6.2.2, Reasonableness** for a description of how costs are averaged.

TABLE 6-6

Summary of Noise Barrier Analysis for the 6-lane Hybrid Interchange with Full-Hawley Alternative

Barrier #	Location	Existing Noise Levels (dBA)	Range of 2050 Future Leq Noise levels (dBA)		Noise Reduction (dBA)	Barrier Characteristics		Estimated Barrier Cost[a]	Total Benefited Units[b]	Estimated Barrier Cost per Benefited Unit	Feasible and Reasonable
			Without Barrier	With Barrier		Height (feet)	Total Length (feet)				
1	EB I-94 From N 72nd to 68th	64-70	67-74	62-66	3-10	20	1235	$741,000	23	$32,217	**Yes**
2	WB I-94 From N 68th to 72nd	61-67	64-69	59-65	1-5	30	1223	$1,100,700	0	N/A	No
3	EB I-94 From N 68th to Hawley	63-77	62-73	56-63	3-16	12,22,22	3236	$1,982,160	50	$39,643	**Yes**
4	WB I-94 From Hawley to 68th	61-72	64-73	56-68	2-13	18 to 26	3514	$14,317,500[c]	66	$216,932	No
4A	WB I-94 From Hawley to 68th	61-72	63-73	57-64	2-12	12,18,20	2875	$1,411,410	47	$30,030	**Yes**
5	EB I-94 From Hawley to Zablocki	62-68	63-67	62-65	1-10	12	1060	$381,600	1	$381,600	No
6	WB I-94 From Zablocki to Hawley	65-77	65-77	60-65	4-12	16	1349	$647,520	2	$323,760	No
7	WB I-94 From Yount to General Mitchell	61-69	62-69	57-64	2-11	20	1041	$624,600	14	$44,614	**Yes**
8	NB 175 From Parkway to Bluemound	58-69	60-69	59-64	0-8	14	331	$139,020	1	$139,020	No
9	WB Park Hill from 35th to End	57-74	56-73	56-65	0-11	20	1519	$911,400	15	$60,760	**Yes**[d]
10	WB Park Hill from 29th to 35th	61-75	61-72	57-62	1-16	20	2082	$1,249,200	26	$48,046	**Yes**
11	WB Clybourn From 25th to 26th	73	70	65	5	30	320	$288,000	0	N/A	No
12	WB Clybourn From 17th to 22nd	64-69	62-70	55-68	0-11	30	2052	$1,846,800	7	$263,829	No

[a] Based on $30.00 per square foot; [b] For the purposes of this Supplemental Final EIS, a unit is a discrete residence or business; [c] Costs include expense of relocating approximately 12 ATC towers; [d] Based on cost averaging of multiple barriers within the common noise environment for the 6-Lane Hybrid Interchange with Full-Hawley Alternative; refer to **Section 6.2.2, Reasonableness** for a description of how costs are averaged.

TABLE 6-7

Summary of Noise Barrier Analysis for the 6-lane DDI with Half-Hawley Alternative

Barrier #	Location	Existing Noise Levels (dBA)	Range of 2050 Future Leq Noise levels (dBA)		Noise Reduction (dBA)	Barrier Characteristics		Estimated Barrier Cost[a]	Total Benefited Units[b]	Estimated Barrier Cost per Benefited Unit	Feasible and Reasonable
			Without Barrier	With Barrier		Height (feet)	Total Length (feet)				
1	EB I-94 From N 72nd to 68th	64-70	67-74	62-67	3-9	16	1235	$592,800	16	$28,229	**Yes**
2	WB I-94 From N 68th to 72nd	61-67	64-67	59-60	1-8	30	1223	$1,100,700	5	$220,140	No
3	EB I-94 From N 68th to Hawley	63-77	62-77	57-64	1-16	12,22,22	3236	$1,982,160	48	$41,295	**Yes**
4	WB I-94 From Hawley to 68th	61-72	64-73	56-68	1-13	18 to 26	3514	$14,283,570[c]	61	$234,157	No
4A	WB I-94 From Hawley to 68th	61-72	64-73	57-68	1-12	12,18 to 26	2843	$1,391,880	37	$37,618	**Yes**
5	EB I-94 From Hawley to Zablocki	62-68	63-76	62-65	1-10	12	1060	$381,600	1	$381,600	No
6	WB I-94 From Zablocki to Hawley	65-77	65-77	61-65	4-12	16	1349	$647,520	2	$323,760	No
7	WB I-94 From Yount to General Mitchell	61-69	63-70	57-64	0-12	20	1041	$624,600	16	$39,038	**Yes**
8	SB 175 From Bluemound to Parkway	58-66	61-66	58-61	0-8	30	359	$323,100	1	$323,100	No
8A	NB 175 From Parkway to Bluemound	58-69	60-70	60-65	0-9	14	331	$139,020	1	$139,020	No
9	WB Park Hill from 35th to End	57-74	58-73	58-67	0-12	20	1519	$911,400	15	$60,760	**Yes**[d]
10	WB Park Hill from 29th to 35th	61-75	62-72	58-63	1-15	20	2082	$1,249,200	31	$40,297	**Yes**
11	WB Clybourn From 25th to 26th	73	70	67	3	30	330	$297,000	0	N/A	No
12	WB Clybourn From 17th to 22nd	64-69	62-70	55-68	0-11	30	2052	$1,846,800	7	$263,829	No

[a] Based on $30.00 per square foot; [b] For the purposes of this Supplemental EIS, a unit is a discrete residence or business; [c] Costs include expense of relocating approximately 12 ATC towers; [d] Based on cost averaging of multiple barriers within the common noise environment for the 6-lane DDI with Half-Hawley Interchange Alternative; refer to **Section 6.2.2, Reasonableness** for a description of how costs are averaged.

TABLE 6-8

Summary of Noise Barrier Analysis for the 6-lane DDI with Full-Hawley Alternative

Barrier #	Location	Existing Noise Levels (dBA)	Range of 2050 Future Leq Noise levels (dBA) Without Barrier	With Barrier	Noise Reduction (dBA)	Barrier Characteristics Height (feet)	Total Length (feet)	Estimated Barrier Cost[a]	Total Benefited Units[b]	Estimated Barrier Cost per Benefited Unit	Feasible and Reasonable
1	EB I-94 From N 72nd to 68th	64-70	67-74	62-66	3-9	16	1235	$592,800	22	$26,945	**Yes**
2	WB I-94 From N 68th to 72nd	61-67	64-67	59-60	1-8	30	1223	$1,100,700	5	$220,140	No
3	EB I-94 From N 68th to Hawley	63-77	62-76	57-63	1-16	12,22,22	3236	$1,982,160	52	$38,118	**Yes**
4	WB I-94 From Hawley to 68th	61-72	64-73	56-68	1-12	18 to 26	3546	$14,302,770[c]	66	$216,709	No
4A	WB I-94 From Hawley to 68th	61-72	64-73	57-68	1-12	12,18 to 26	2875	$1,411,410	41	$34,425	**Yes**
5	EB I-94 From Hawley to Zablocki	62-68	63-76	62-65	1-10	12	1060	$381,600	1	$381,600	No
6	WB I-94 From Zablocki to Hawley	65-77	65-77	61-65	4-12	16	1349	$647,520	2	$323,760	No
7	WB I-94 From Yount to General Mitchell	61-69	64-70	57-64	0-12	20	1041	$624,600	16	$39,038	**Yes**
8	SB 175 From Bluemound to Parkway	58-66	61-66	58-61	0-8	30	359	$323,100	1	$323,100	No
8A	NB 175 From Parkway to Bluemound	58-69	60-70	60-65	0-8	18	331	$178,740	1	$178,740	No
9	WB Park Hill from 35th to End	57-74	58-73	58-67	0-10	20	1519	$911,400	15	$60,760	**Yes**[d]
10	WB Park Hill from 29th to 35th	61-75	62-72	58-63	1-15	20	2082	$1,249,200	19	$65,747	**Yes**[d]
11	WB Clybourn From 25th to 26th	73	70	67	3	30	330	$297,000	0	N/A	No
12	WB Clybourn From 17th to 22nd	64-69	62-70	55-68	0-11	30	2052	$1,846,800	1	$1,846,800	No

[a] Based on $30.00 per square foot; [b] For the purposes of this Supplemental Final EIS, a unit is a discrete residence or business; [c] Costs include expense of relocating approximately 12 ATC towers; [d] Based on cost averaging of multiple barriers within the common noise environment for the 6-Lane DDI with Full-Hawley Interchange Alternative; refer to **Section 6.2.2, Reasonableness** for a description of how costs are averaged.

SECTION 7

Additional Analysis to Assess Noise Impacts to All Populations

Traffic noise is a primary source of noise within 500 feet of the freeway. For comparative purposes, WisDOT and FHWA assessed sociodemographic information (race and low-income) of the census block groups within 1,000 feet of I-94. Overall, the minority and low-income population of those living within 1,000 feet of the corridor have a minority population lower than the City of Milwaukee. Based on the U.S. Census Bureau's 2017-2021 American Community Survey 5-year estimate data, the City of Milwaukee is 67 percent minority and 24.1 percent lives in poverty (U.S. Census Bureau 2021). Those census block groups that exceeded either or both of the City of Milwaukee's minority or poverty levels were identified as environmental justice areas for the purposes of this additional noise analysis. Those that had lower percentages were identified as non-environmental justice areas for the purposes of this additional analysis.[10] This methodology is representative of the "meaningfully greater analysis" method described in the 2019 *Community Guide to Environmental Justice and NEPA Methods* developed by the Federal Interagency Working Group on Environmental Justice & NEPA Committee.

Barriers 3, 4A, 5, 9, 11, and 12 were determined to be in environmental justice areas; barriers 1, 2, 6, 7, 8, 8A, 13 and 14 were determined to be in non-environmental justice areas. There are 718 receptors with 215 (30 percent) impacted receptors in environmental justice areas. There are 278 receptors with 110 (40 percent) impacted receptors in non-environmental justice areas. In total, there are 996 receptors studied collectively between the environmental justice areas and non-environmental justice areas. Of those 996 receptors, 325 (33 percent) are impacted. The totals reflect information obtained from Appendix C of this technical memorandum, specifically the number of receptors studied, impacted, and benefited by each barrier.

Consistent with WisDOT's federally-approved noise policy, WisDOT determined noise barriers 1, 3, 4A, 7, 9, and 10 were reasonable and feasible for noise abatement. WisDOT policy requires a benefited receptor to receive a minimum 8 dBA reduction with noise barriers. Federal noise regulations, 23 CFR 772, allow a state to consider as low as a 5 dBA noise as a benefit. This analysis looks at benefited receptors receiving at least an 8 dBA reduction as well as receptors that receive a 5-7 dBA reduction.

There are a total of 651 receptors, 207 of them impacted, included in the analysis of environmental justice area barriers 3, 4A, 9, and 10. Of the 651 receptors, 93 were determined to meet the WisDOT definition of a benefited receptor. If a majority of the benefited receptors identified with each of these four noise walls vote in agreement with the noise wall, the noise wall will be constructed. After reviewing the appropriate barriers in Appendix C and tallying the number of receptors that would receive a noise reduction of 5-7 dBA, it was determined that an additional 179 receptors would receive a 5-7 dBA reduction with the construction of the four noise barriers. These 179 receptors are not included in the vote. In sum, while there are 215 receptors impacted within the larger environmental justice areas (including barriers not determined reasonable and feasible), 272 receptors would receive at least a 5 dBA noise reduction should barriers 3, 4A, 9, and 10 be constructed. Looking at it based on percentages, while 30 percent of the receptors in environmental justice areas are impacted, 38 percent (272/718) will receive at least a 5 dBA noise reduction should barriers 3, 4A, 9, and 10 be constructed.

There are a total of 184 receptors, 87 of them impacted, included in the non-environmental justice area barriers 1 and 7. While noise barrier 2 was not reasonable and feasible, the existing portion will be

10 This analysis does not reflect a change to the federally-approved WisDOT noise policy. It was conducted as part of the NEPA process. For future NEPA documents, the analysis will be reviewed to determine its applicability. It may be refined as needed.

reconstructed as part of the I-94 East-West Corridor project. The receptors associated with the reconstructed barrier 2 were not included in this analysis. Of the 184 receptors, 32 were determined to meet the WisDOT definition of a benefited receptor. If a majority of the benefited receptors identified with each of these two noise walls vote in agreement with the noise wall, the noise wall will be constructed. After reviewing the appropriate barriers in Appendix C, it was determined that an additional 27 receptors would receive a 5-7 dBA reduction with the construction of the four noise barriers. These 27 receptors are not included in the vote. In sum, while there are 110 receptors impacted within the larger non-environmental justice areas (including barriers not determined reasonable and feasible), 59 receptors would receive at least a 5 dBA reduction in noise should barriers 1, and 7 be constructed. Looking at it based on percentages, while 40 percent of the receptors in non-environmental justice areas are impacted, only 21 percent (59/278) will receive at least a 5 dBA noise reduction should barriers 1 and 7 be constructed.

While there are more receptors in environmental justice areas impacted (215) than in non-environmental justice areas (110), more receptors in environmental justice areas (272) would receive at least a 5 dBA reduction in noise than in non-environmental justice areas (59) with the construction of noise barriers 1, 3, 4a, 7, 9 and 10. With the consideration of mitigation, there are not disproportionate high and adverse noise impacts to environmental justice populations.

SECTION 8

Likelihood Statement

Noise barriers 1, 3, 4A, 7, 9, and 10 were determined to meet the feasibility and reasonableness criteria for all alternatives. If the project's final design characteristics are different from the preliminary design, WisDOT 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 has progressed to a point where barrier siting can be confidently determined and until the public involvement process is complete. The public involvement process will solicit the viewpoints of residents and property owners who benefit by the construction of the feasible and reasonable noise barriers to determine whether noise abatement will be likely to be incorporated into the project.

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. Measurement of construction noise is not required for highway projects. However, **Table 9-1** presents the distance from a construction site and the range of noise levels expected based on a range of construction equipment noise levels.

TABLE 9-1
Construction Noise/Distance Relationships

Distance from Construction Site (feet)	Range of Typical Noise Levels (dBA)[1]
25	82 - 102
50	75 - 95
100	69 - 89
200	63 - 83
300	59 - 79
400	57 - 77
500	55 - 75
1000	49 – 69

[1] Point sources = 6 dBA reduction per doubling of distance
(Source: EPA and WisDOT)

To minimize or eliminate the effect of construction noise on these receptors, *WisDOT Standard Specifications 107.8(6) and 108.7.1* regarding timing of work will apply.

SECTION 10

Coordination with Local Officials for Undeveloped Land

Documenting future noise levels is helpful to local agencies and the public to aid in future land-use planning. 23 CFR 772.17 requires that certain information be provided to local officials related to future traffic noise impacts on currently undeveloped lands. The intent is to have the transportation agency work with the planning or zoning agency to prevent incompatibility arising from future traffic sound levels and future development.

For all Type I projects where undeveloped lands that are not permitted are located adjacent to the roadway and for which a detailed traffic noise analysis was prepared, local officials should be provided future traffic sound level information. There is no undeveloped land in the project area.

SECTION 11

Conclusions

As a result of this traffic noise analysis, the following conclusions can be made:

- Noise levels under the existing condition range from 26 dBA to 77 dBA. Under existing conditions, 23% of the representative receptors exceed the WisDOT NLC.
- Noise levels under the no-build condition range from 26 dBA to 78 dBA and exceed WisDOT NLC at 26% of the representative receptors.
- Under the 8-lane hybrid interchange alternative, noise levels range from 43 –78 dBA, with 37% of representative receptors exceeding the NLC.
- Under the 8-lane DDI alternative (preferred alternative), noise levels range from 26-78 dBA, with 29% of representative receptors exceeding the NLC.
- Noise levels for the 6-lane hybrid interchange with Half-Hawley alternative range from 43 –77 dBA; with 31% exceeding the NLC.
- Noise levels for the 6-lane with hybrid interchange with Full-Hawley alternative range from 43 –77 dBA; with 41% of representative receptors exceeding the NLC.
- Noise levels for the 6-lane DDI with Half-Hawley alternative range from 43 –77 dBA; with 32% of representative receptors exceeding the NLC.
- Noise levels for the 6-lane DDI with Full-Hawley alternative range from 43 –77 dBA; with 32% of representative receptors exceeding the NLC.
- No noise levels exceed the NLC for the Washington Street Extension.
- Noise levels for the National Avenue/Brewers Boulevard intersection improvements range from 67 –68 dBA; with 50% of representative receptors exceeding the NLC.
- Six noise barriers, 1, 3, 4A, 7, 9, and 10, were determined to meet the feasibility and reasonableness criteria in the noise study area for the 8 and 6-lane alternatives. See Barriers 1, 3, 4A, 7, 9, and 10 on **Exhibits 4-1 through 4-4**.
- There are no barriers recommended in the Washington Street Extension area.
- There are no barriers recommended along National Avenue.

A final decision on the installation of noise abatement measures will be made upon completion of the project's final design, and through the public involvement process, which will solicit the viewpoints of residents and property owners benefited by the construction of the feasible and reasonable noise barriers.

SECTION 12

References

Code of Federal Regulations (CFR). 2010. "Procedures for Abatement of Highway Traffic Noise and Construction Noise". Title 23, Chapter I, Subchapter H, Part 772. July. Available at: http://www.ecfr.gov/cgi-bin/text-idx?c=ecfr;sid=0342effde9eee877884a54f81c87dafc;rgn=div5;view=text;node=23%3A1.0.1.8.44;idno=23;cc=ecfr.

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Appendix A
Exhibits

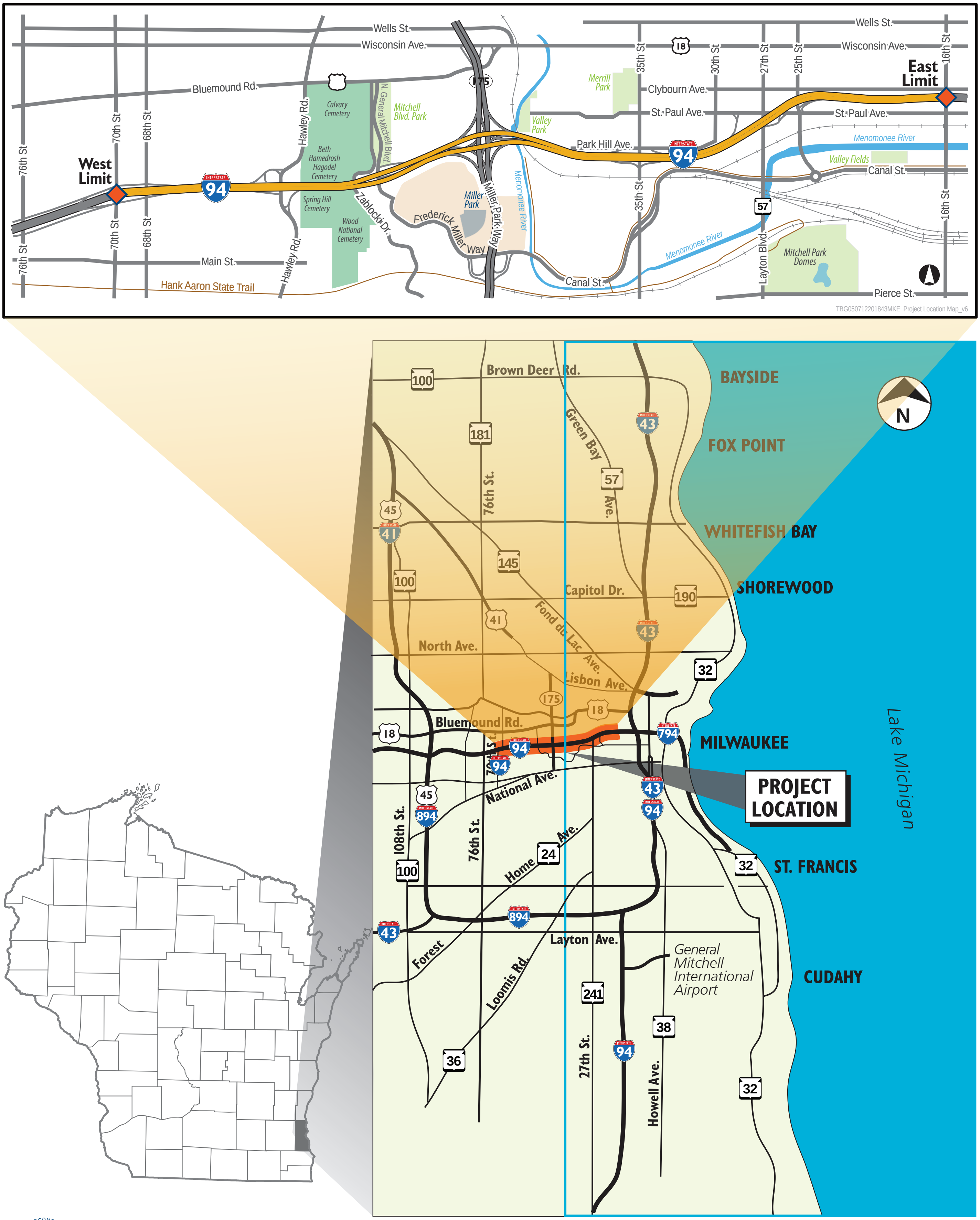
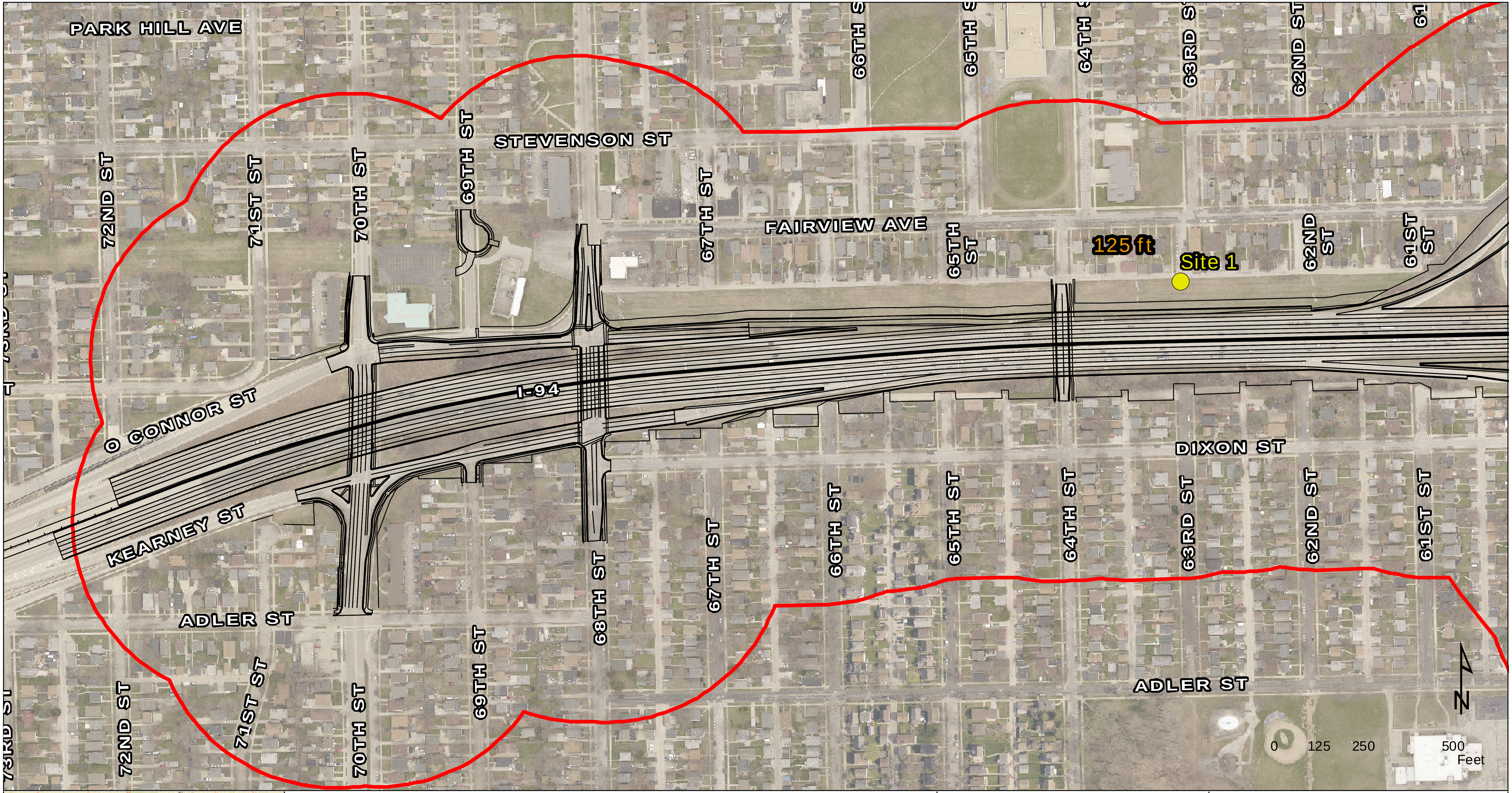


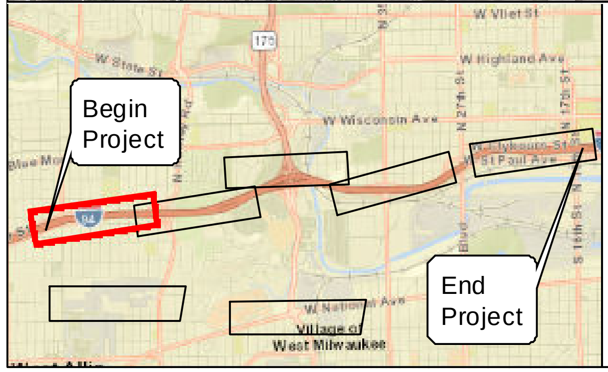
Exhibit 1-1

Project Location Map

U.S. Department of Transportation
Federal Highway Administration

Wisconsin Department of Transportation





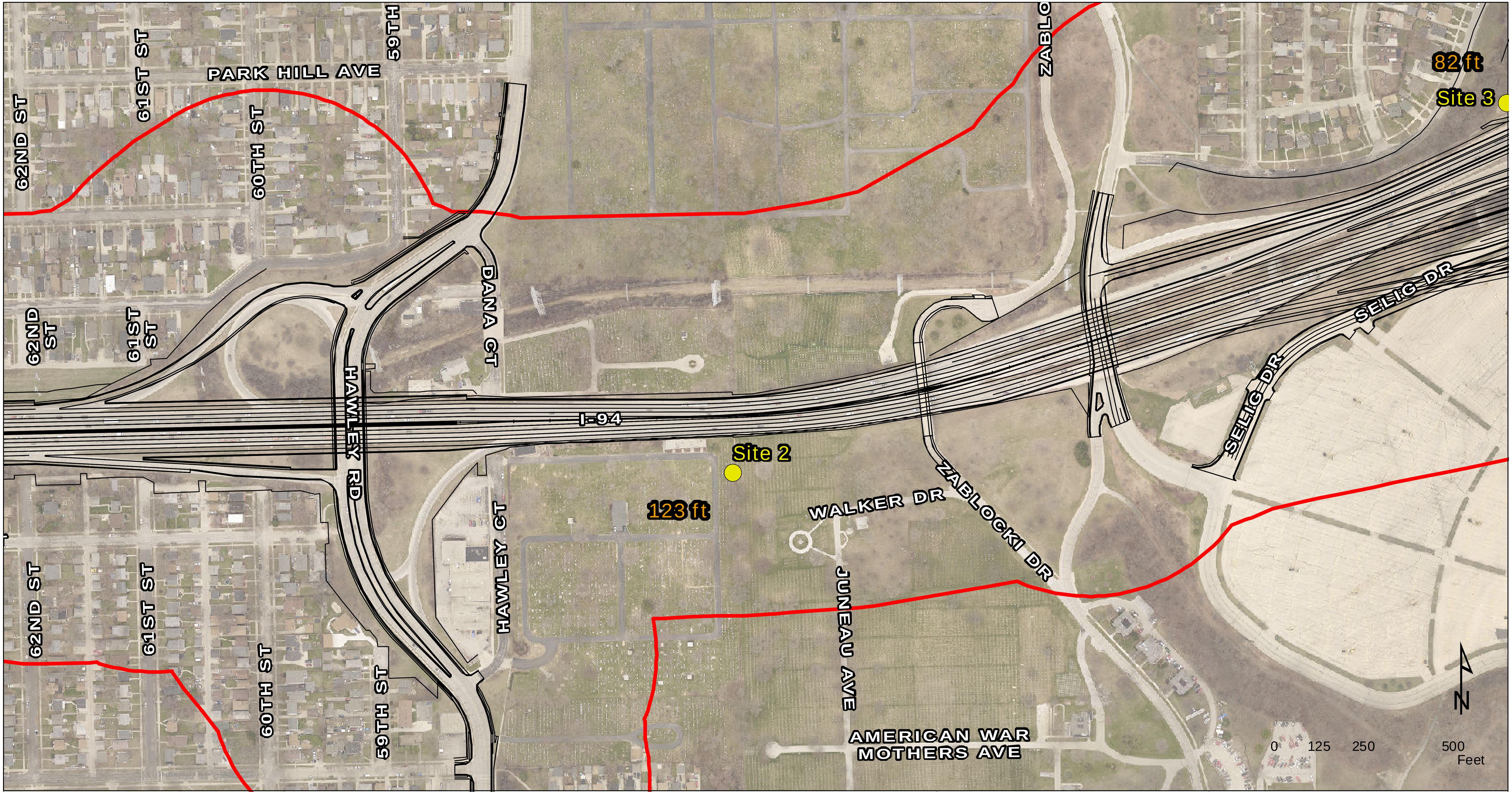
Legend

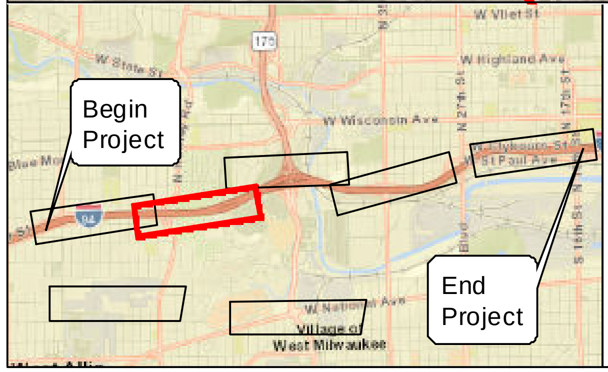
- Validation Site
- Field Reading Site
- XX ft Distance from Centerline
- 500 ft Buffer
- Proposed Design

Locations on the map identified and labeled receptor may be utilized as individual receptor locations or may be receiver locations representative of multiple receptors with the exception of properties protected by Section 4(f).

I-94
Milwaukee County, WI

Exhibit 1-2
Field Site (Validation)
Location Map





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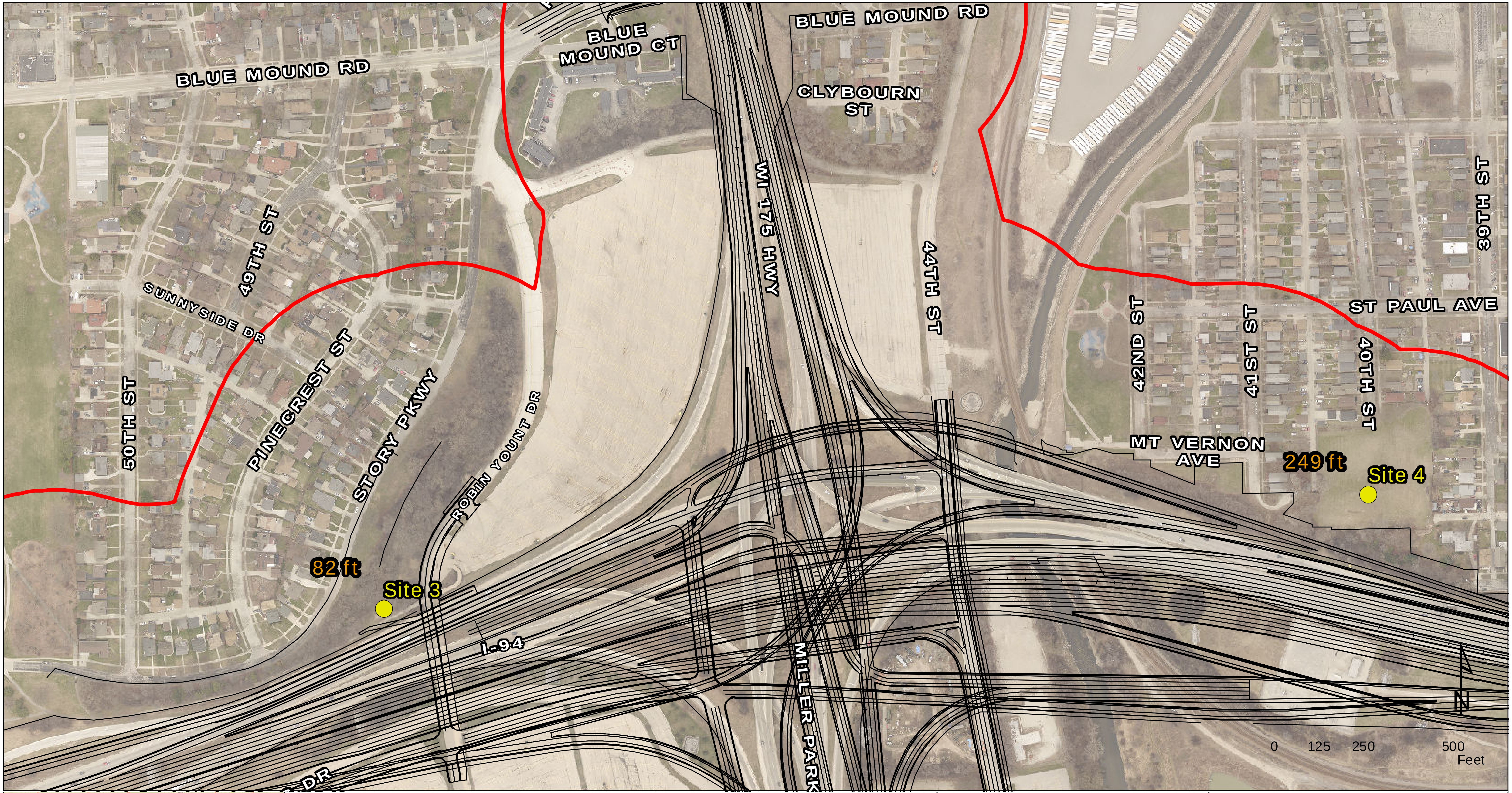

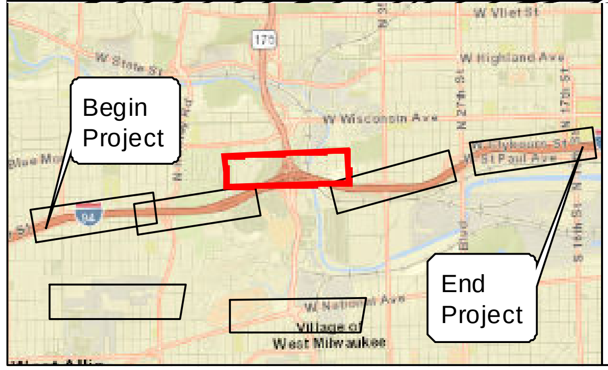

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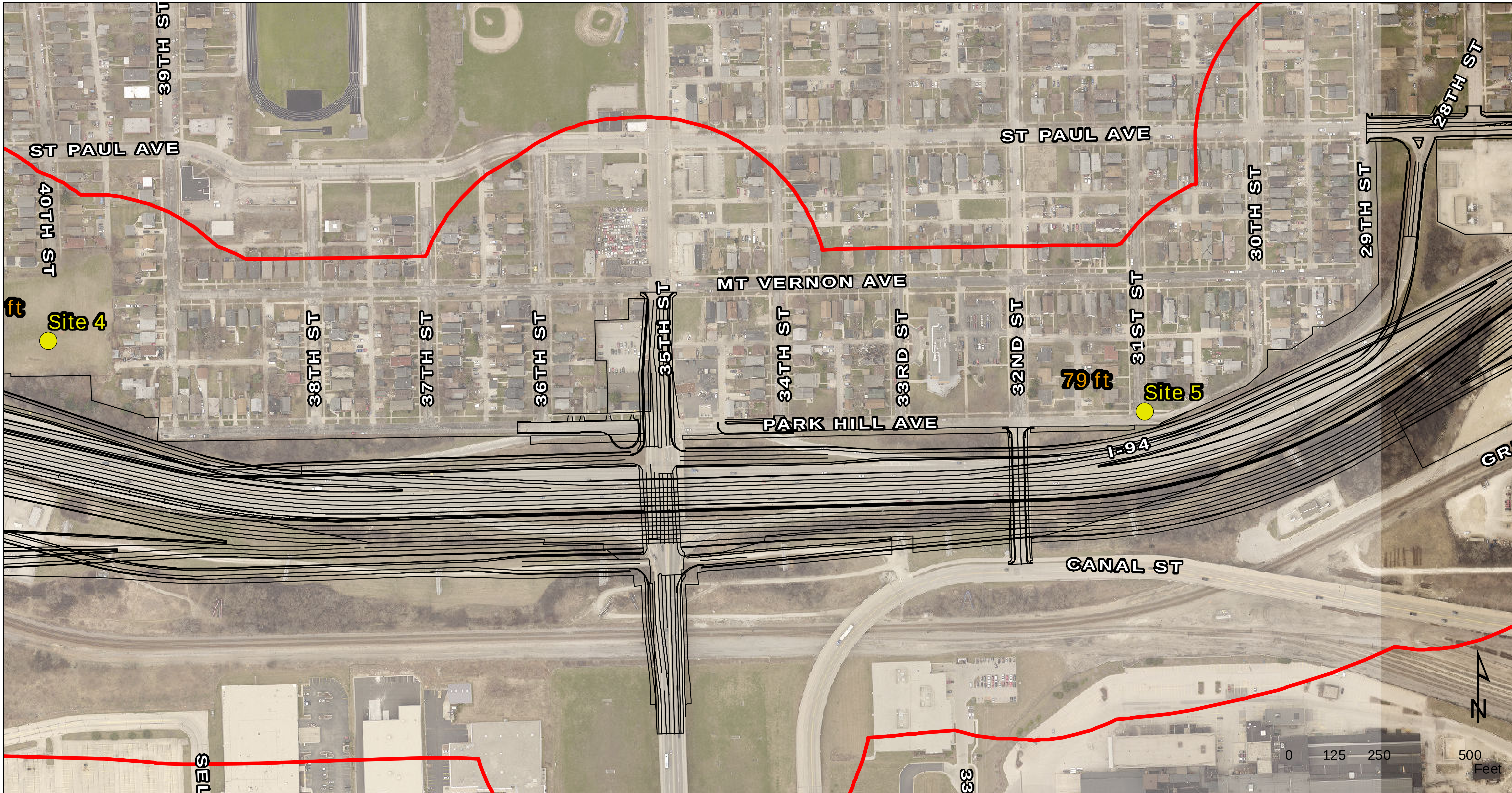

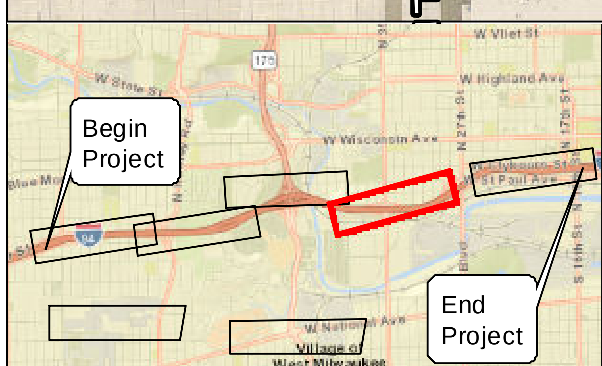

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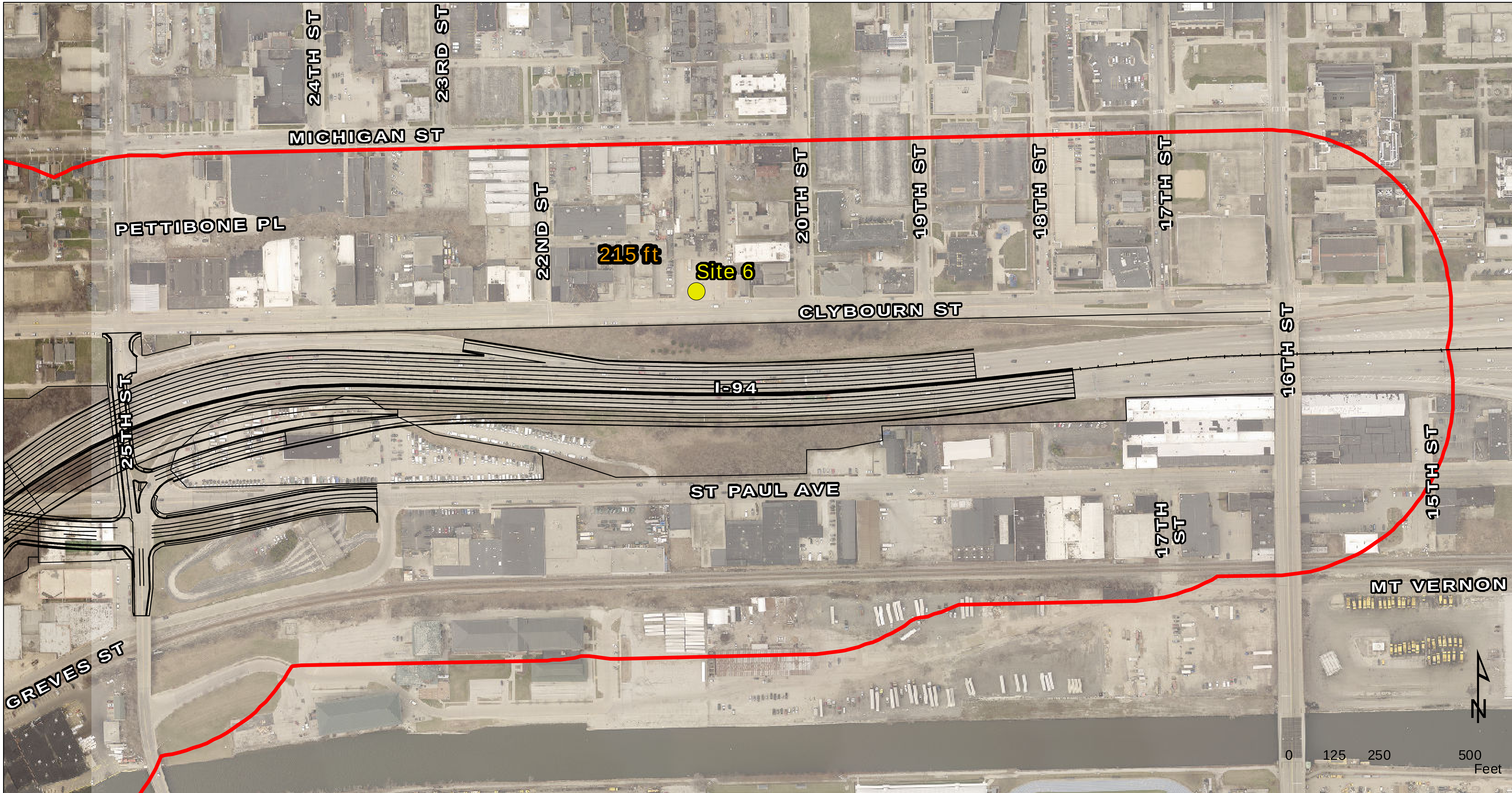

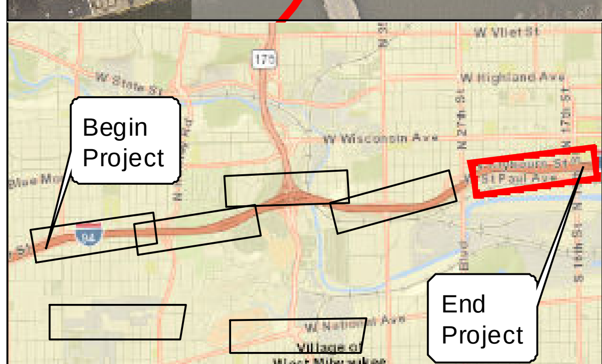

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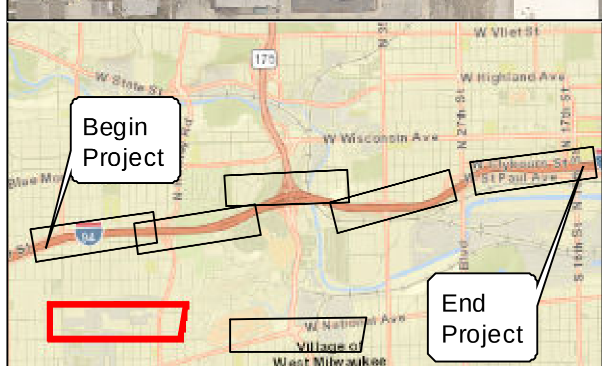

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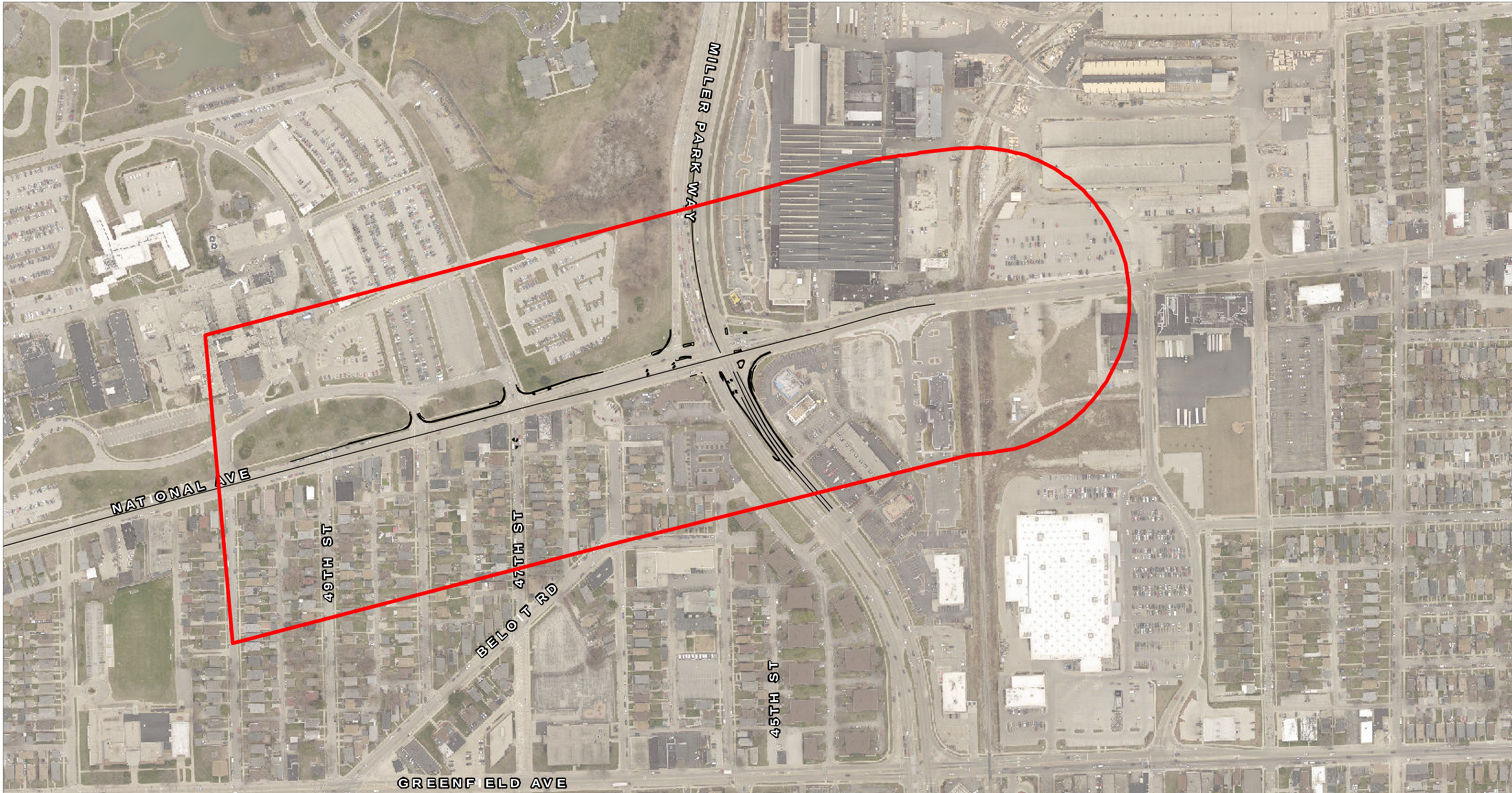

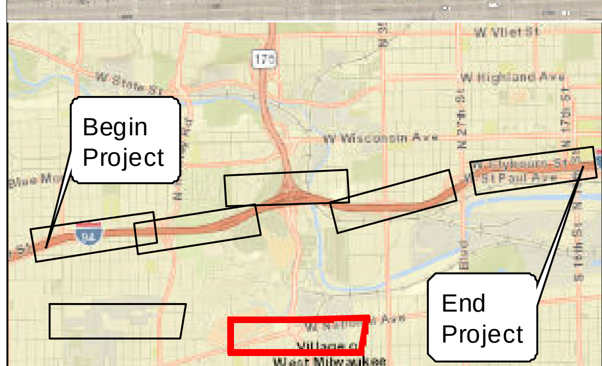

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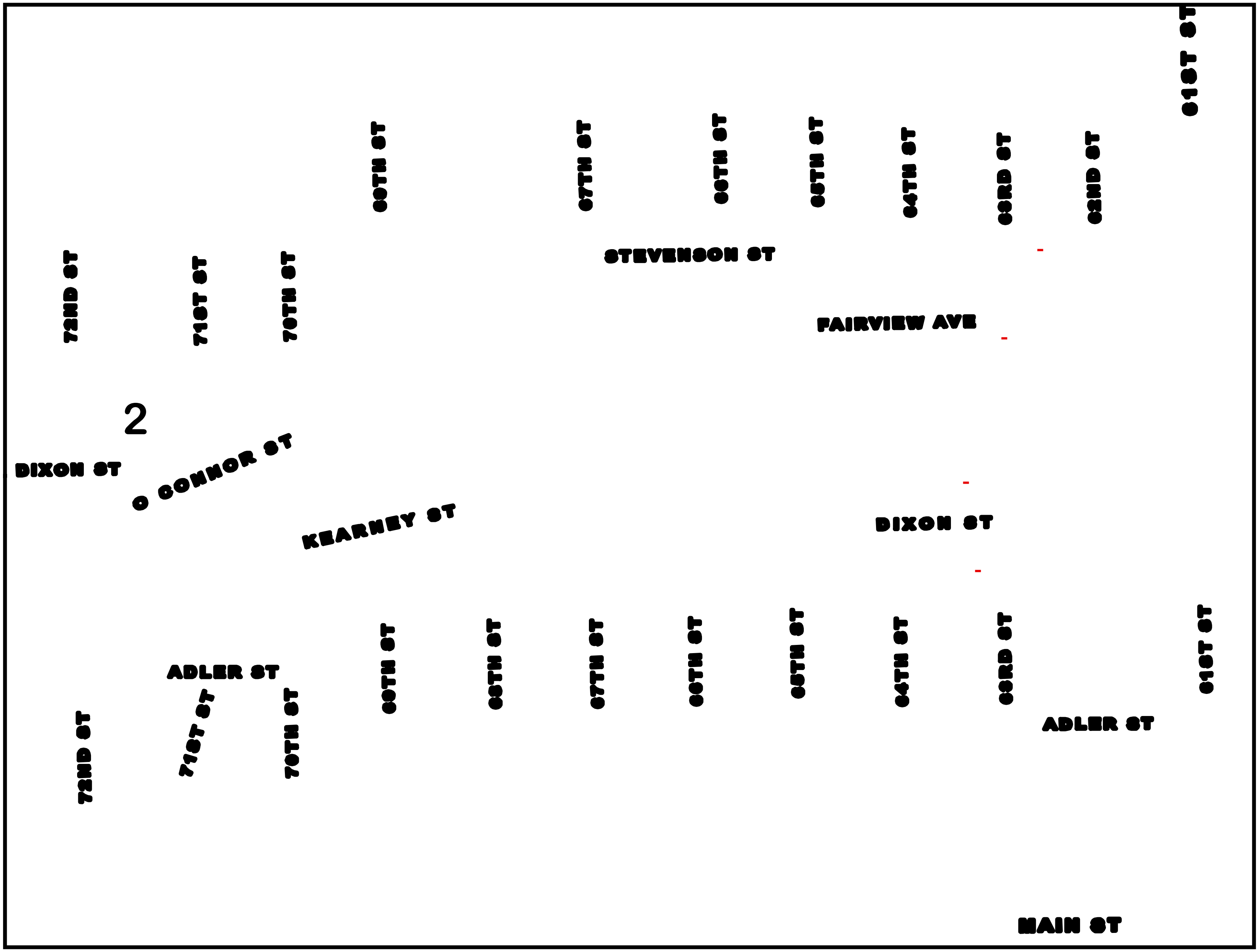
Location Map



North

LEGEND

- N2 Noise Receptors
- Existing Noise Barrier
- Potential Noise Barrier
- Barrier Did Not Meet Reasonableness Criteria
- Proposed Design
- Noise Barrier Number

Note: Proposed Noise Barriers are color coded to match the Noise Barrier Number

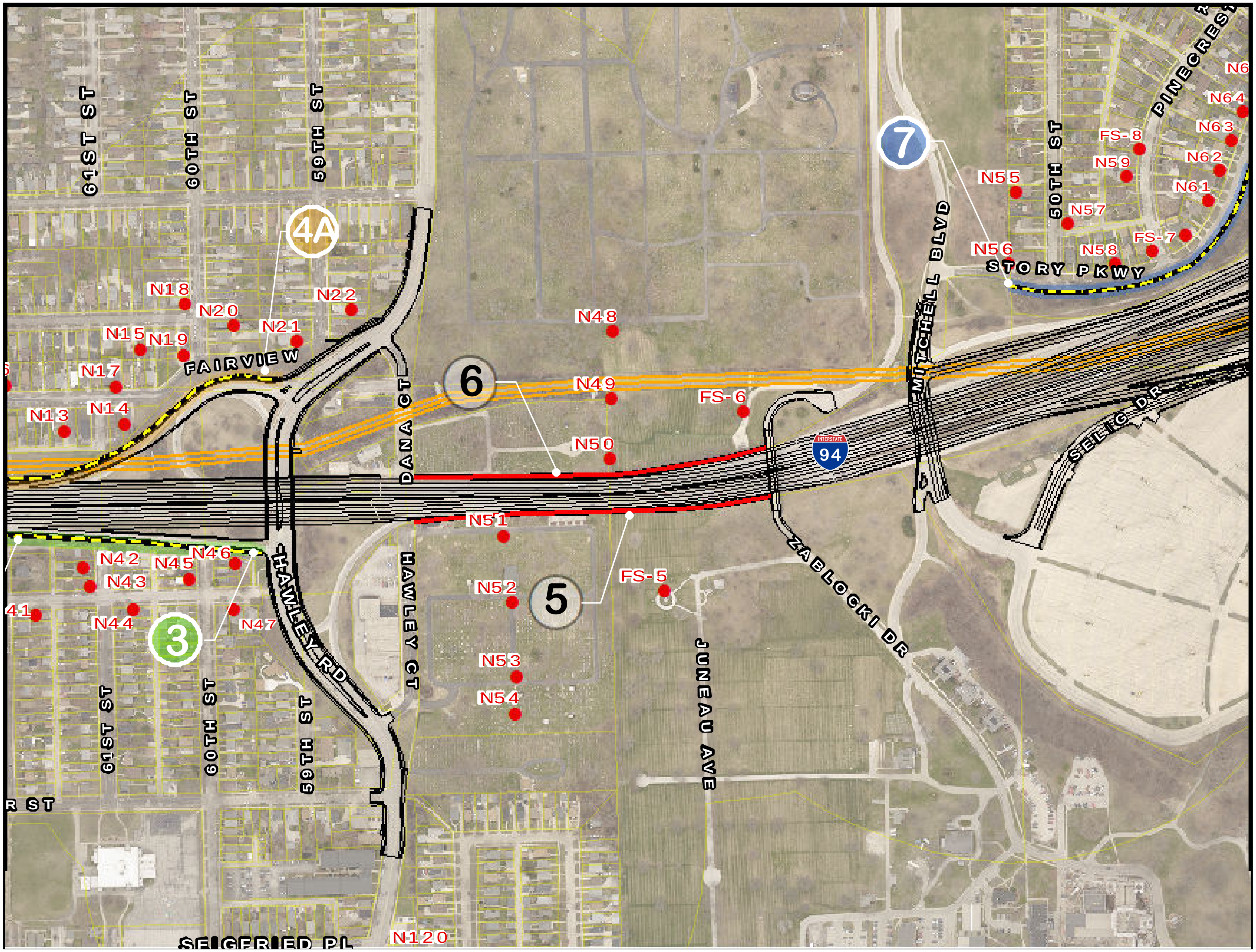
*Barrier locations are approximate

- Electric Power Transmission Lines

U.S. Department of Transportation Federal Highway Administration

Exhibit 4-1

Proposed Noise Barriers Eight-Lane Hybrid Interchange Alternative



North

LEGEND

- Noise Receptors
- Existing Noise Barrier
- Potential Noise Barrier
- Barrier Did Not Meet Reasonableness Criteria
- Proposed Design
- Noise Barrier Number

Note: Proposed Noise Barriers are color coded to match the Noise Barrier Number

*Barrier locations are approximate

- Electric Power Transmission Lines

U.S. Department of Transportation Federal Highway Administration

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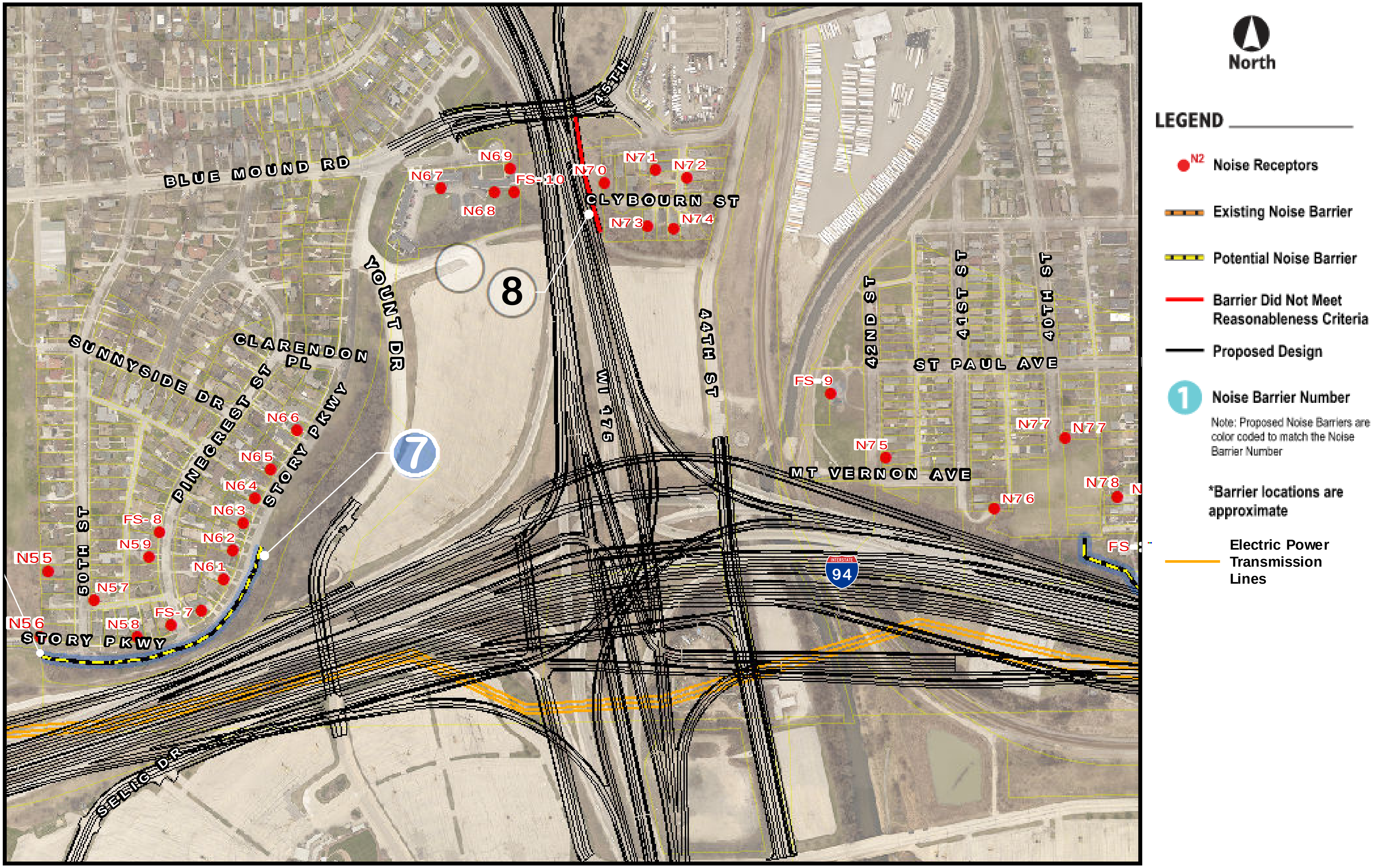
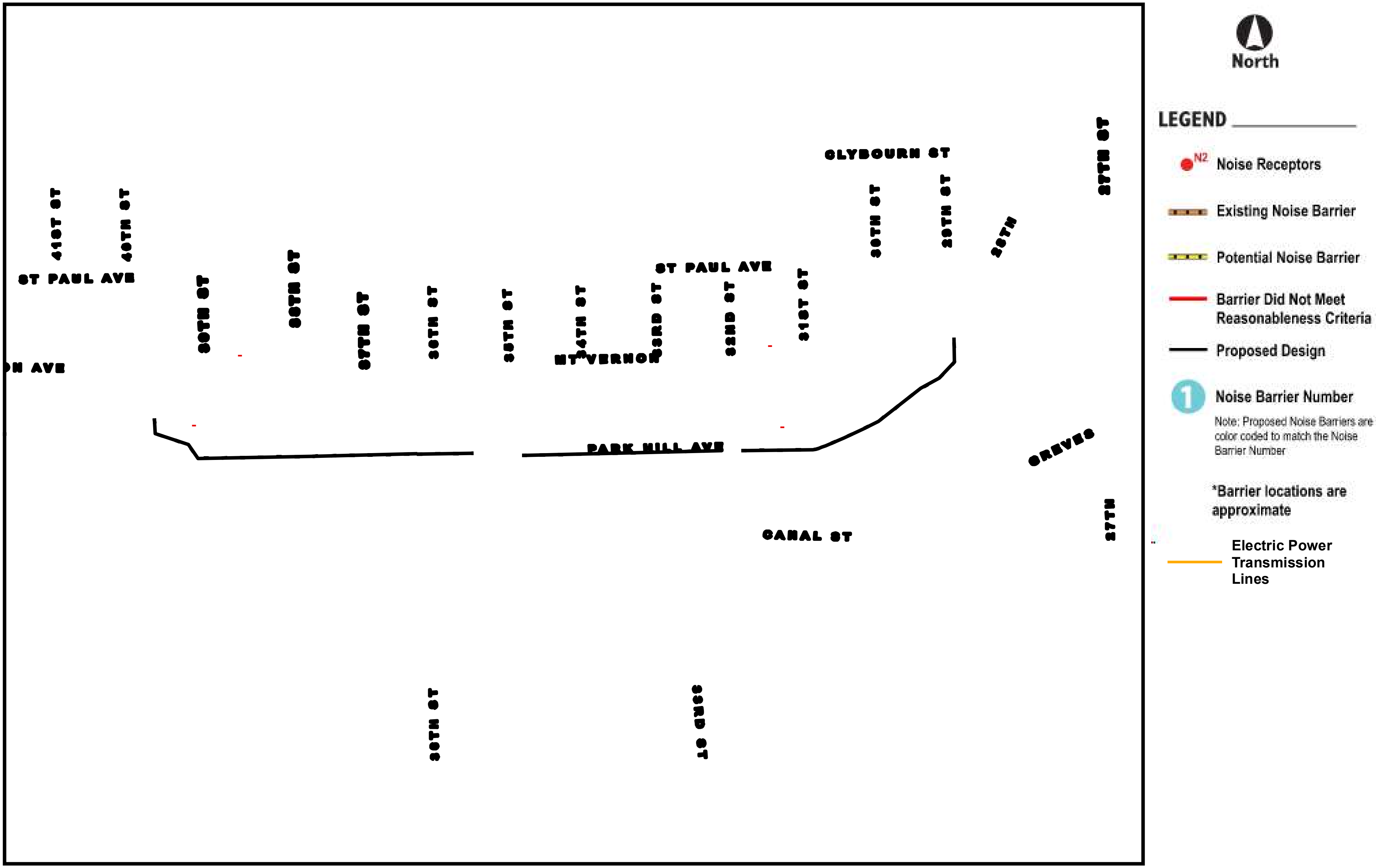


U.S. Department of Transportation
Federal Highway Administration

Exhibit 4-1

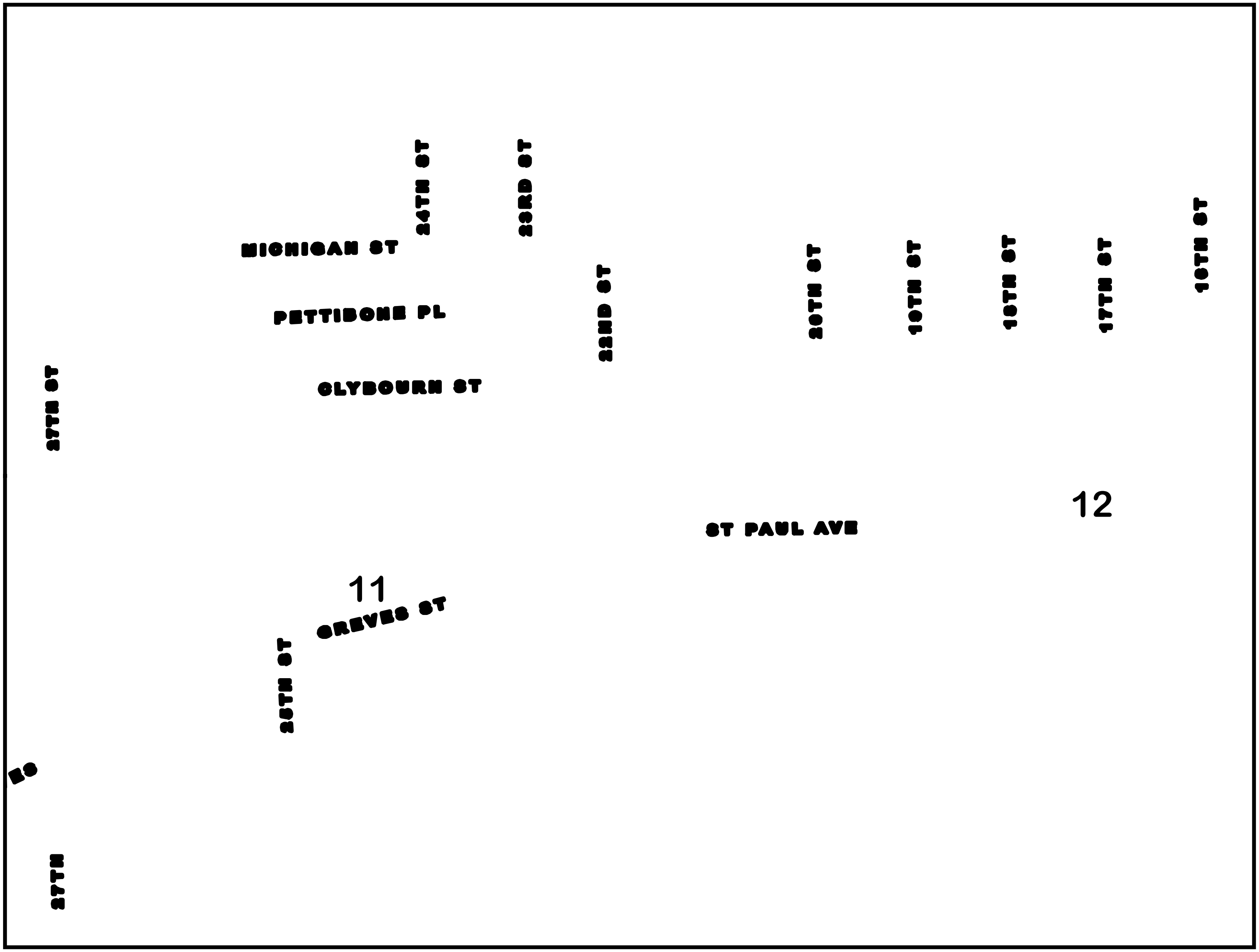
Proposed Noise Barriers **8**-Lane Hybrid Interchange Alternative



U.S. Department of Transportation
Federal Highway Administration

Exhibit 4-1

Proposed Noise Barriers Eight-Lane Hybrid Interchange Alternative



North

LEGEND

- Noise Receptors (N2)
- Existing Noise Barrier
- Potential Noise Barrier
- Barrier Did Not Meet Reasonableness Criteria
- Proposed Design
- Noise Barrier Number

Note: Proposed Noise Barriers are color coded to match the Noise Barrier Number

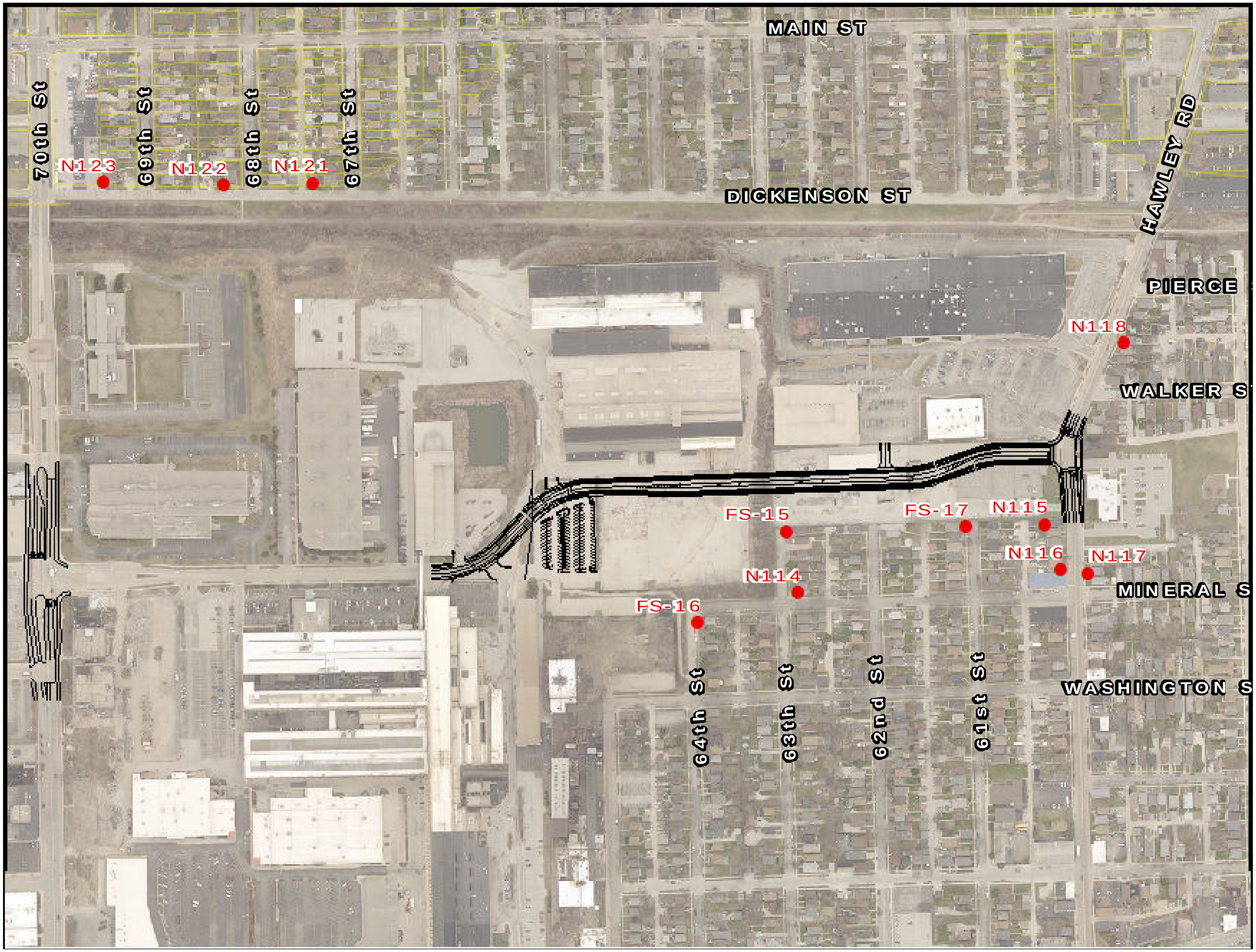
*Barrier locations are approximate

- Electric Power Transmission Lines

U.S. Department of Transportation
Federal Highway Administration

Exhibit 4-1

Proposed Noise Barriers Eight-Lane Hybrid Interchange Alternative



LEGEND

- N2 Noise Receptors
- Existing Noise Barrier
- Potential Noise Barrier
- Barrier Did Not Meet Reasonableness Criteria
- Proposed Design
- 1 Noise Barrier Number

Note: Proposed Noise Barriers are color coded to match the Noise Barrier Number

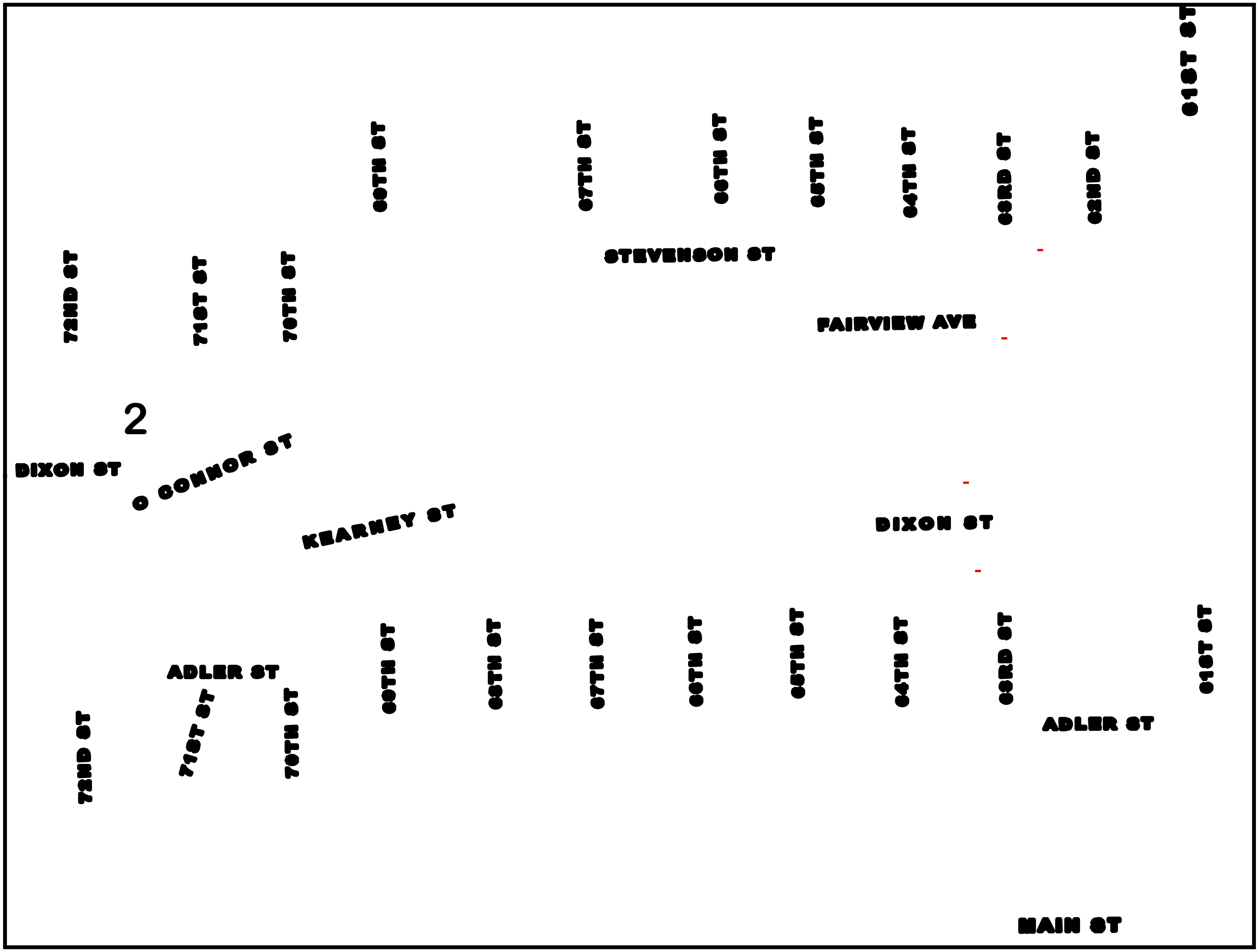
*Barrier locations are approximate

- Electric Power Transmission Lines

U.S. Department of Transportation
Federal Highway Administration

Exhibit 4-1

Proposed Noise Barriers **8-**Lane Hybrid Interchange Alternative



North

LEGEND

- Noise Receptors (N2)
- Existing Noise Barrier
- Potential Noise Barrier
- Barrier Did Not Meet Reasonableness Criteria
- Proposed Design
- Noise Barrier Number (1)

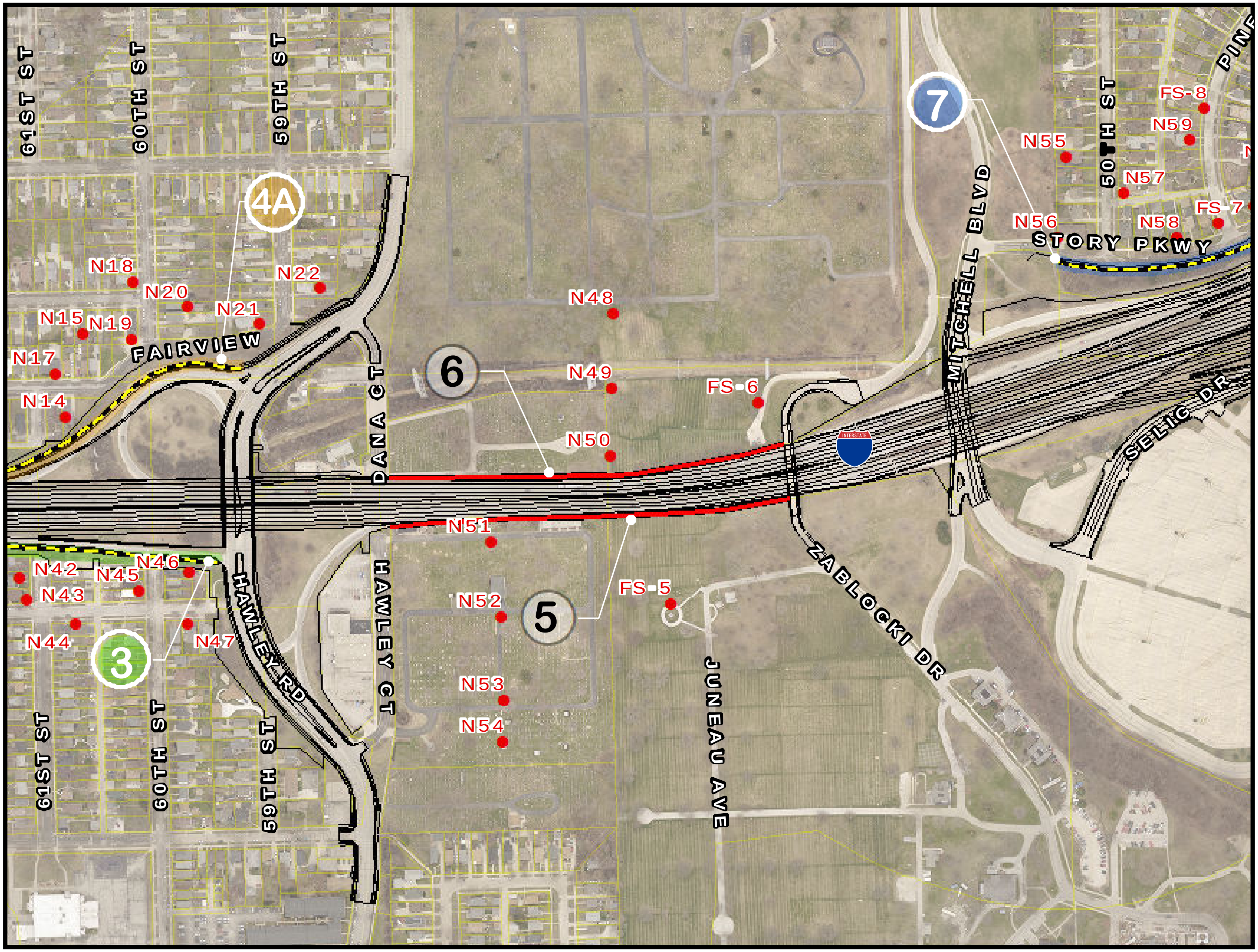
Note: Proposed Noise Barriers are color coded to match the Noise Barrier Number

*Barrier locations are approximate

U.S. Department of Transportation
Federal Highway Administration

Exhibit 4-2

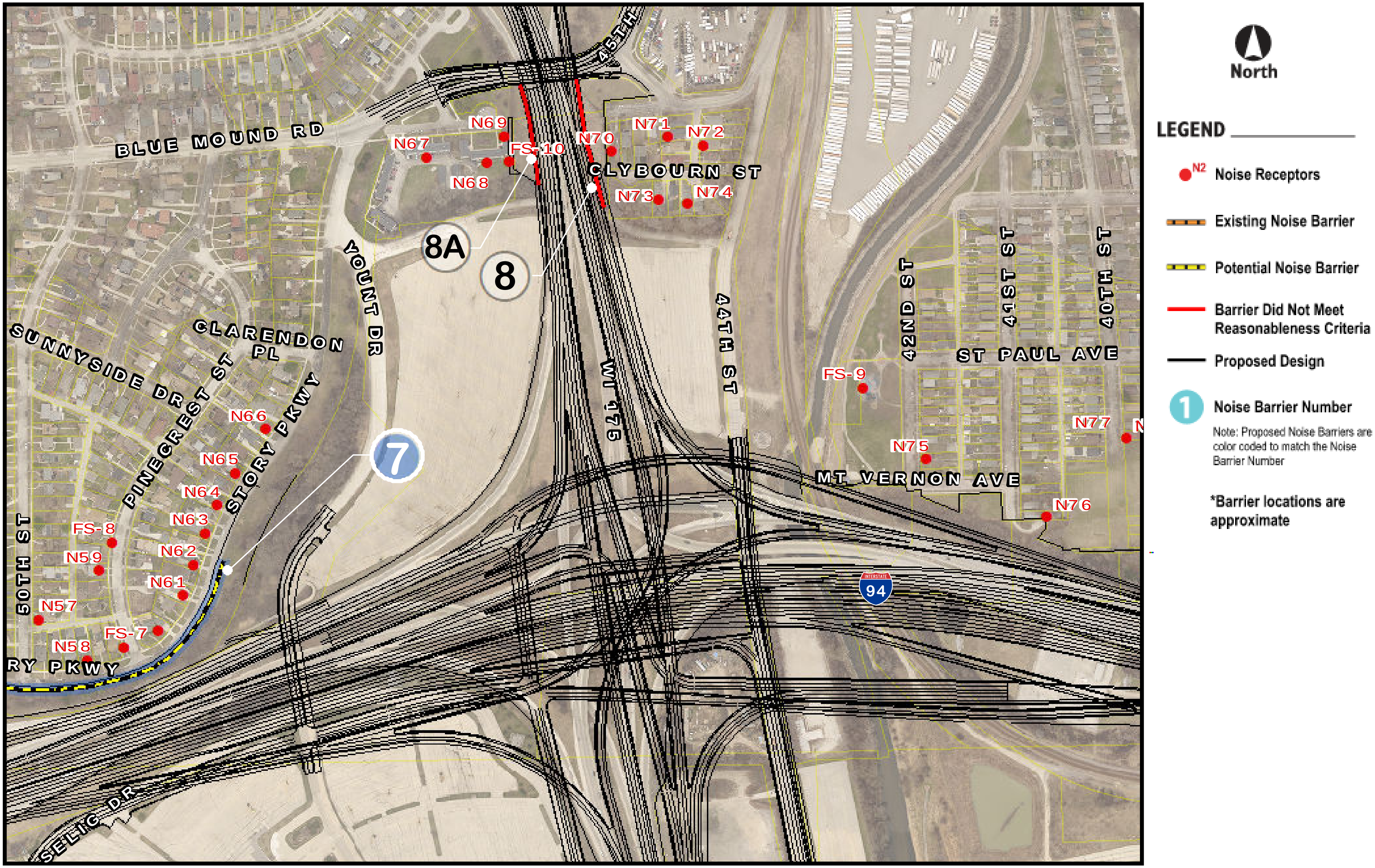
Proposed Noise Barriers Eight-Lane DDI Alternative



U.S. Department of Transportation
Federal Highway Administration

Exhibit 4-2

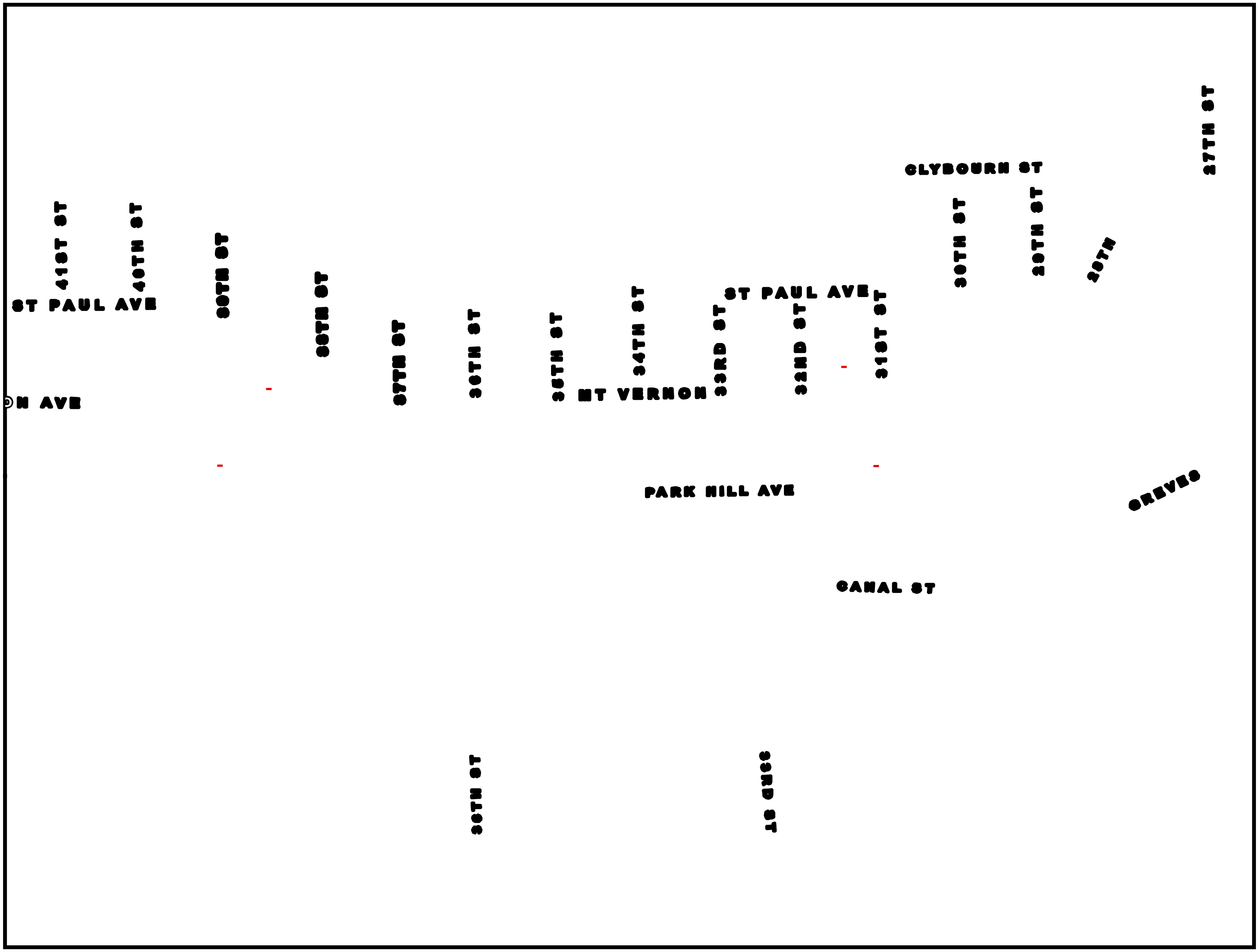
Proposed Noise Barriers 8-Lane DDI Alternative



U.S. Department of Transportation
Federal Highway Administration

Exhibit 4-2

Proposed Noise Barriers 8-Lane DDI Alternative



North

LEGEND

- N2 Noise Receptors
- Existing Noise Barrier
- Potential Noise Barrier
- Barrier Did Not Meet Reasonableness Criteria
- Proposed Design
- 1 Noise Barrier Number

Note: Proposed Noise Barriers are color coded to match the Noise Barrier Number

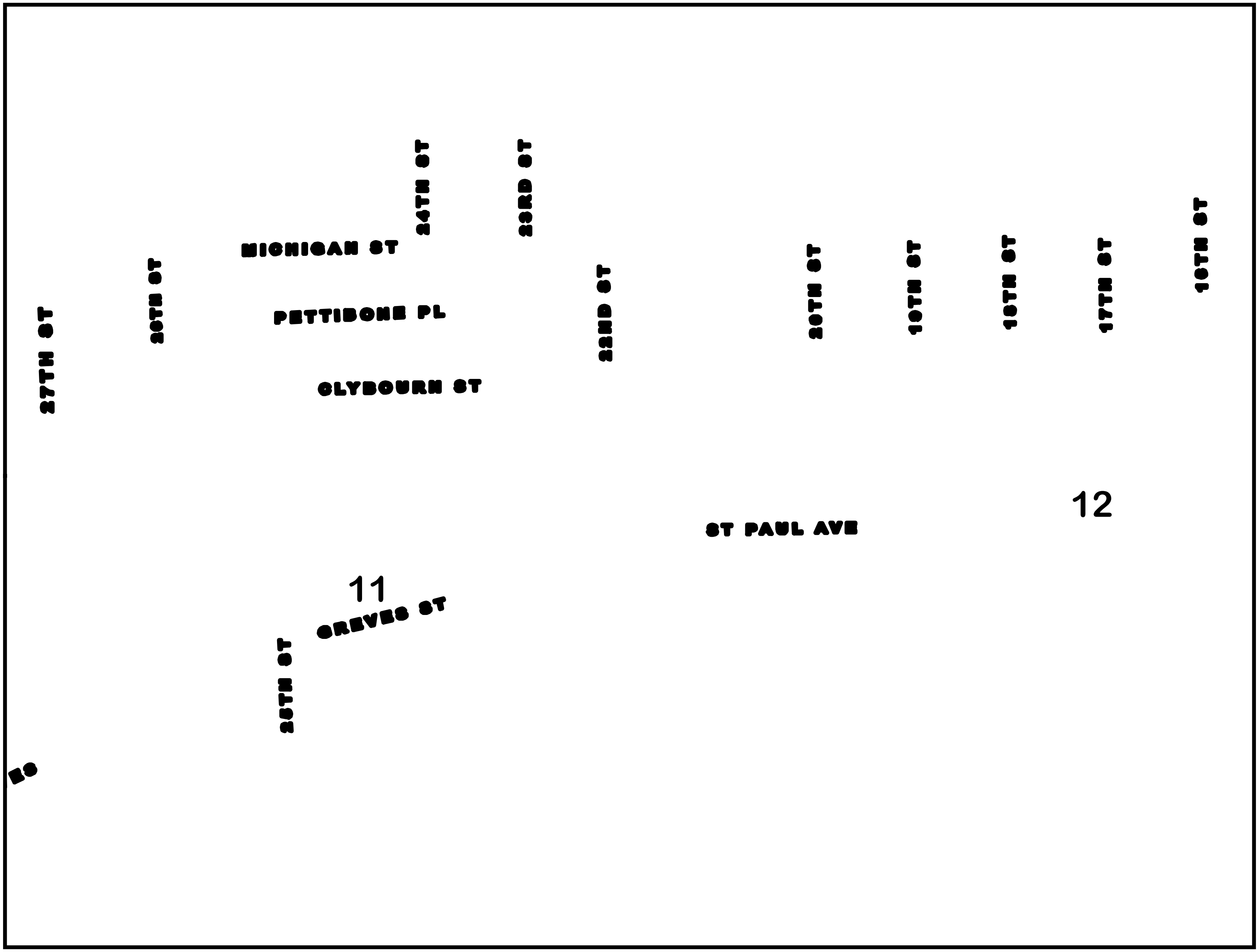
*Barrier locations are approximate

WISCONSIN DEPARTMENT OF TRANSPORTATION

U.S. Department of Transportation Federal Highway Administration

Exhibit 4-2

Proposed Noise Barriers Eight-Lane DDI Alternative



North

LEGEND

- Noise Receptors (N2)
- Existing Noise Barrier
- Potential Noise Barrier
- Barrier Did Not Meet Reasonableness Criteria
- Proposed Design
- Noise Barrier Number (1)

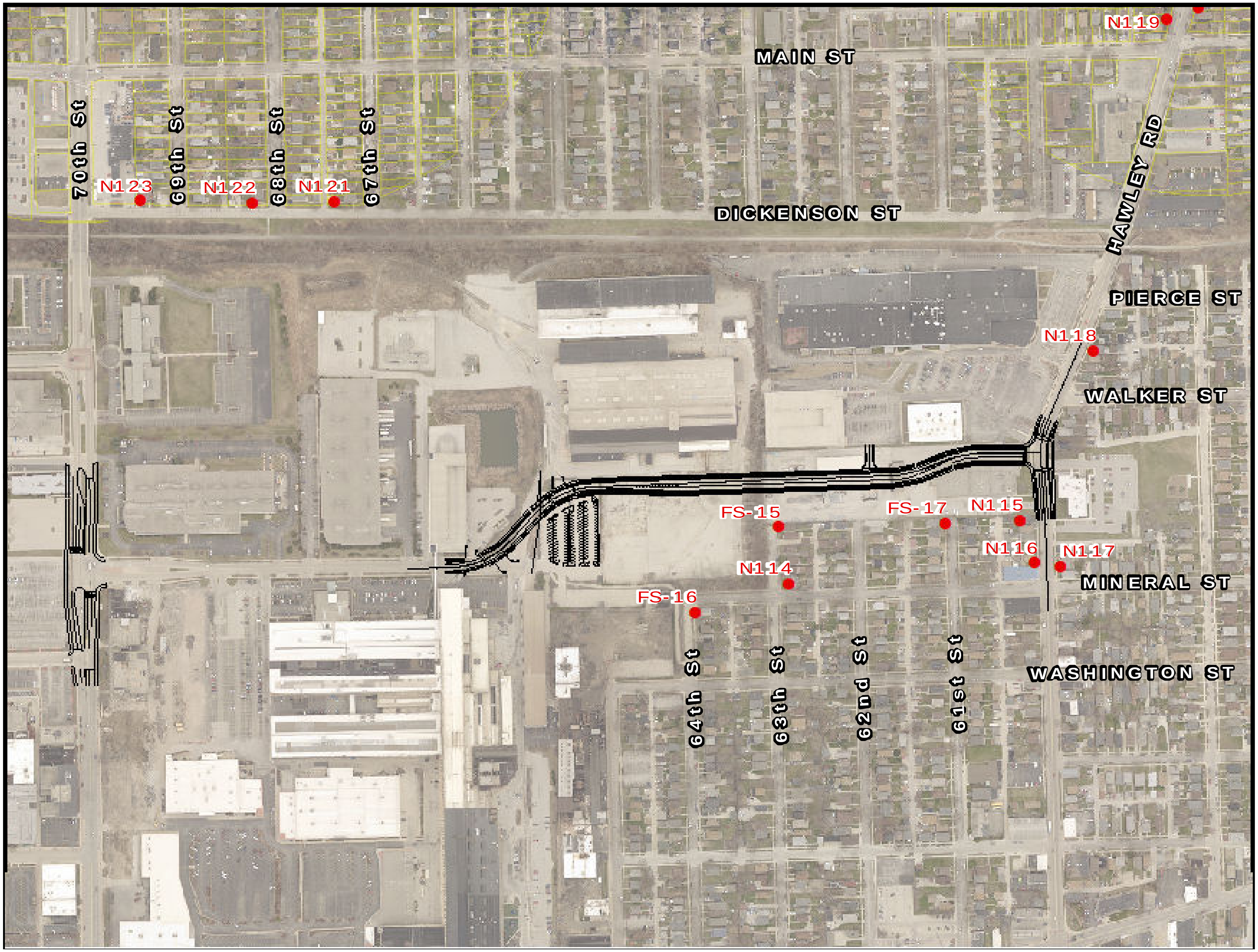
Note: Proposed Noise Barriers are color coded to match the Noise Barrier Number

*Barrier locations are approximate

U.S. Department of Transportation
Federal Highway Administration

Exhibit 4-2

Proposed Noise Barriers Eight-Lane DDI Alternative



North

LEGEND

- Noise Receptors
- Existing Noise Barrier
- Potential Noise Barrier
- Barrier Did Not Meet Reasonableness Criteria
- Proposed Design
- Noise Barrier Number

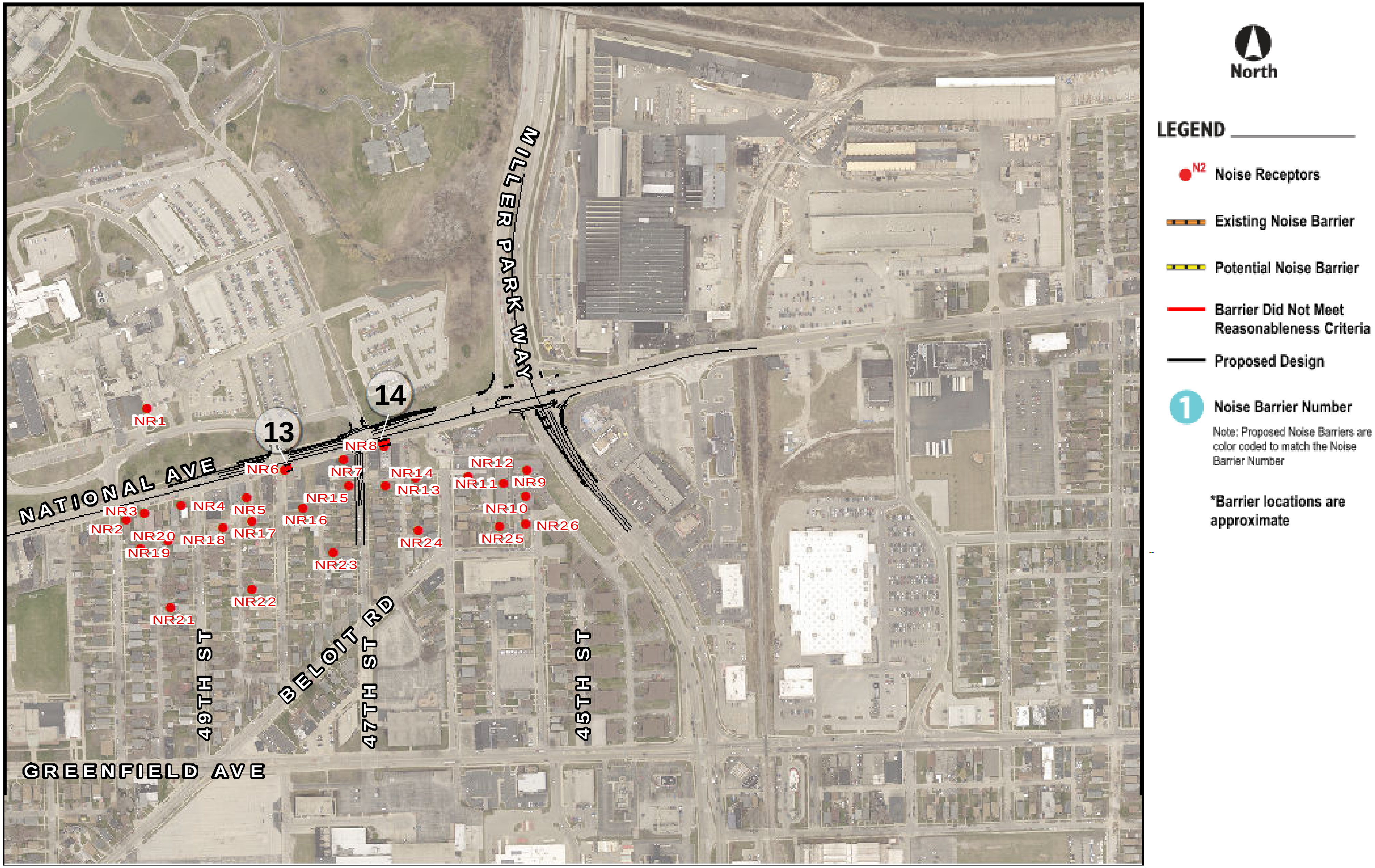
Note: Proposed Noise Barriers are color coded to match the Noise Barrier Number

*Barrier locations are approximate

U.S. Department of Transportation
Federal Highway Administration

Exhibit 4-2

Proposed Noise Barriers 8-Lane DDI Alternative

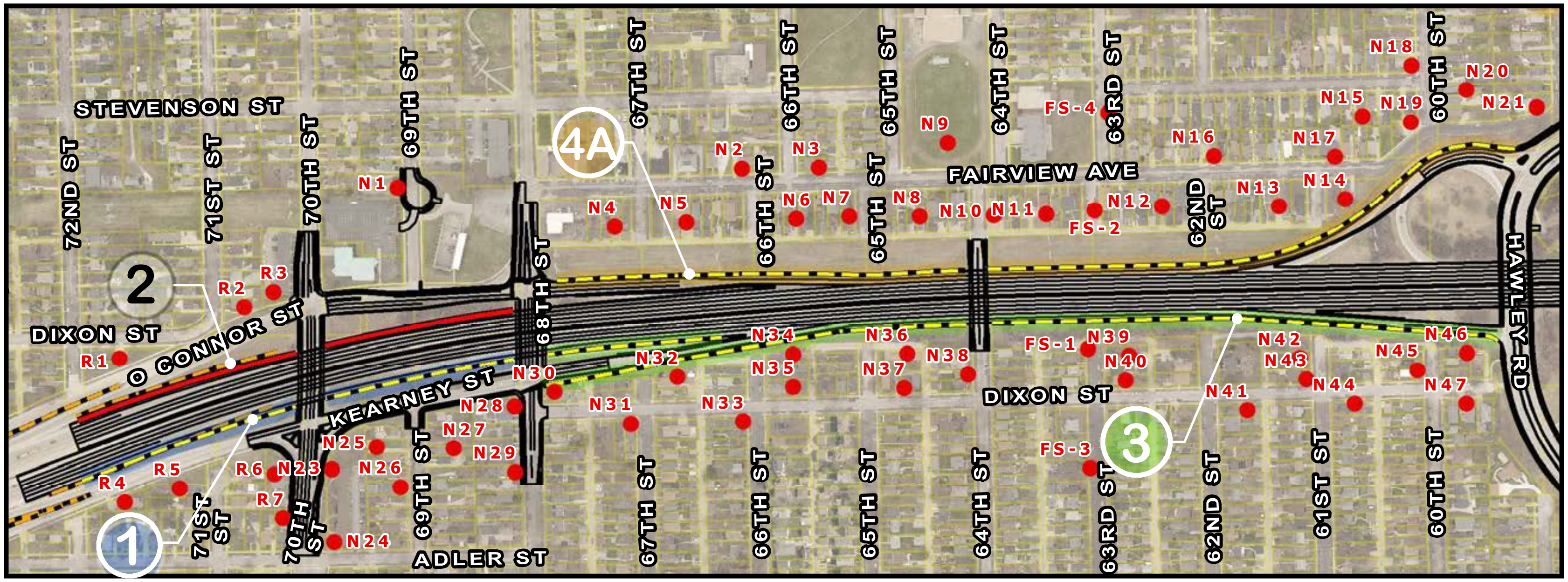


U.S. Department of Transportation
Federal Highway Administration

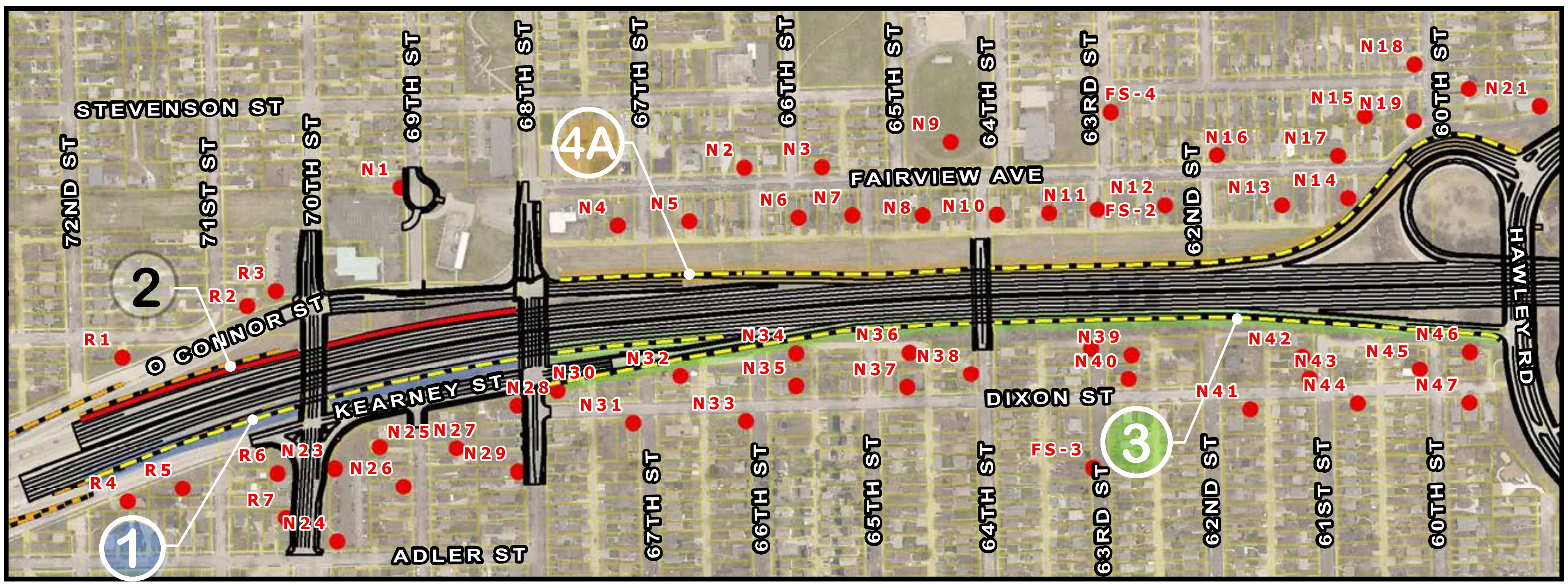
Exhibit 4-2

Proposed Noise Barriers 8-Lane DDI Alternative

6 LANE



6 LANE (FULL HAWLEY)



North

LEGEND

- N2 Noise Receptors
- Existing Noise Barrier
- Potential Noise Barrier
- Barrier Did Not Meet Reasonableness Criteria
- Proposed Design
- 1 Noise Barrier Number

Note: Proposed Noise Barriers are color coded to match the Noise Barrier Number

*Barrier locations are approximate

Wisconsin Department of Transportation

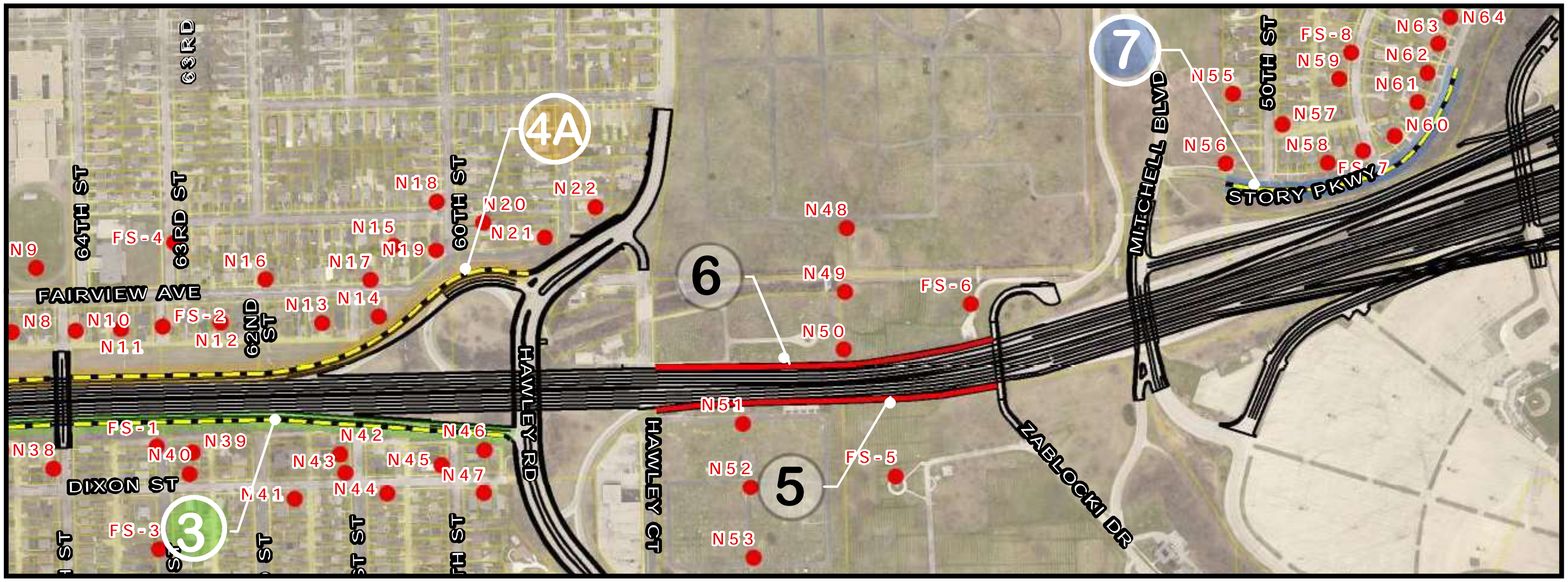
U.S. Department of Transportation Federal Highway Administration

Exhibit 4-3

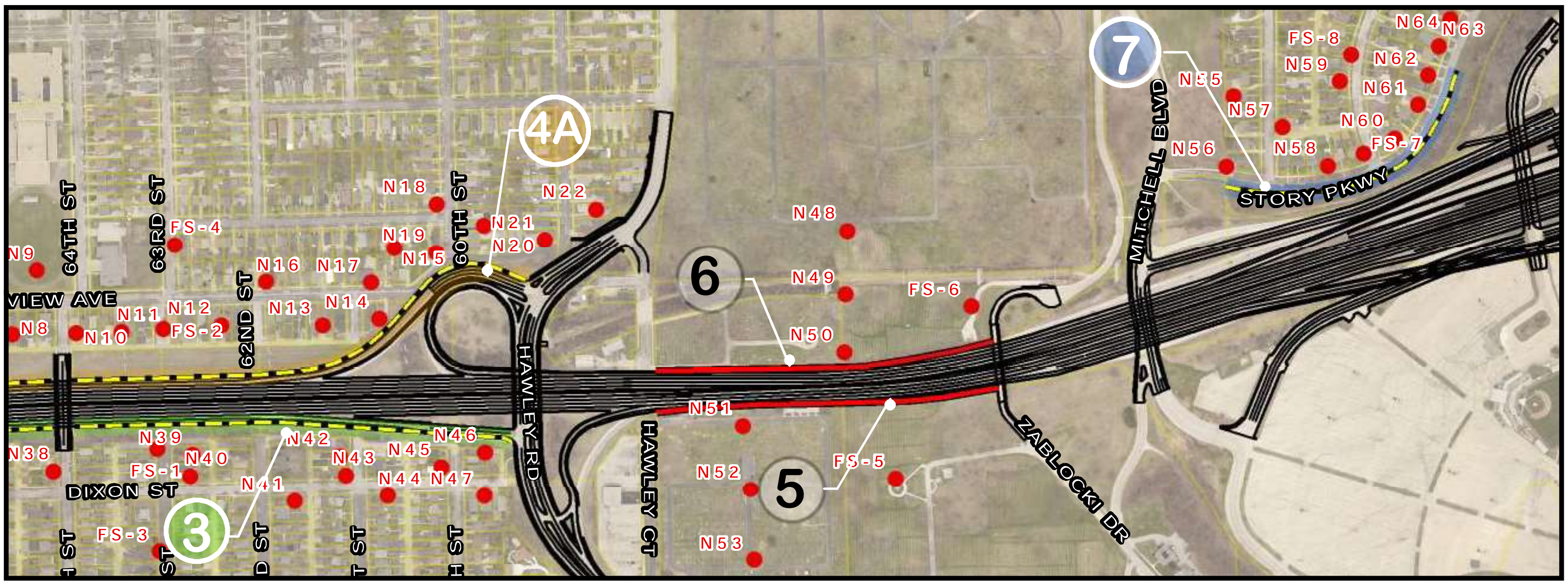
Page 1

Proposed Noise Barriers Six-Lane Hybrid Interchange Alternatives

6 LANE



6 LANE (FULL HAWLEY)



North

LEGEND

- Noise Receptors
- Existing Noise Barrier
- Potential Noise Barrier
- Barrier Did Not Meet Reasonableness Criteria
- Proposed Design
- 1 Noise Barrier Number

Note: Proposed Noise Barriers are color coded to match the Noise Barrier Number

*Barrier locations are approximate

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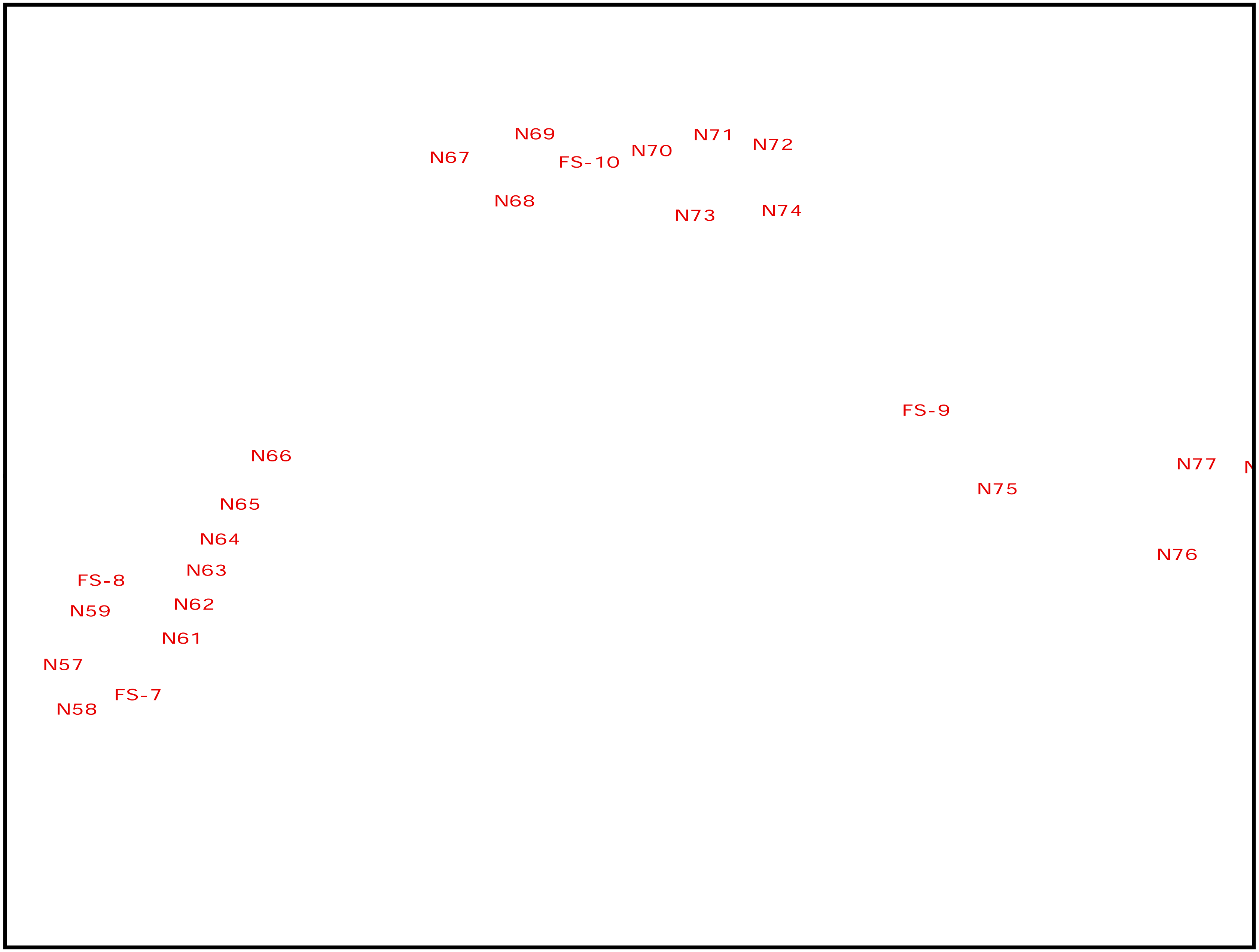

North

LEGEND

- Noise Receptors
- Existing Noise Barrier
- Potential Noise Barrier
- Barrier Did Not Meet Reasonableness Criteria
- Proposed Design
- 1 Noise Barrier Number

Note: Proposed Noise Barriers are color coded to match the Noise Barrier Number

***Barrier locations are approximate**

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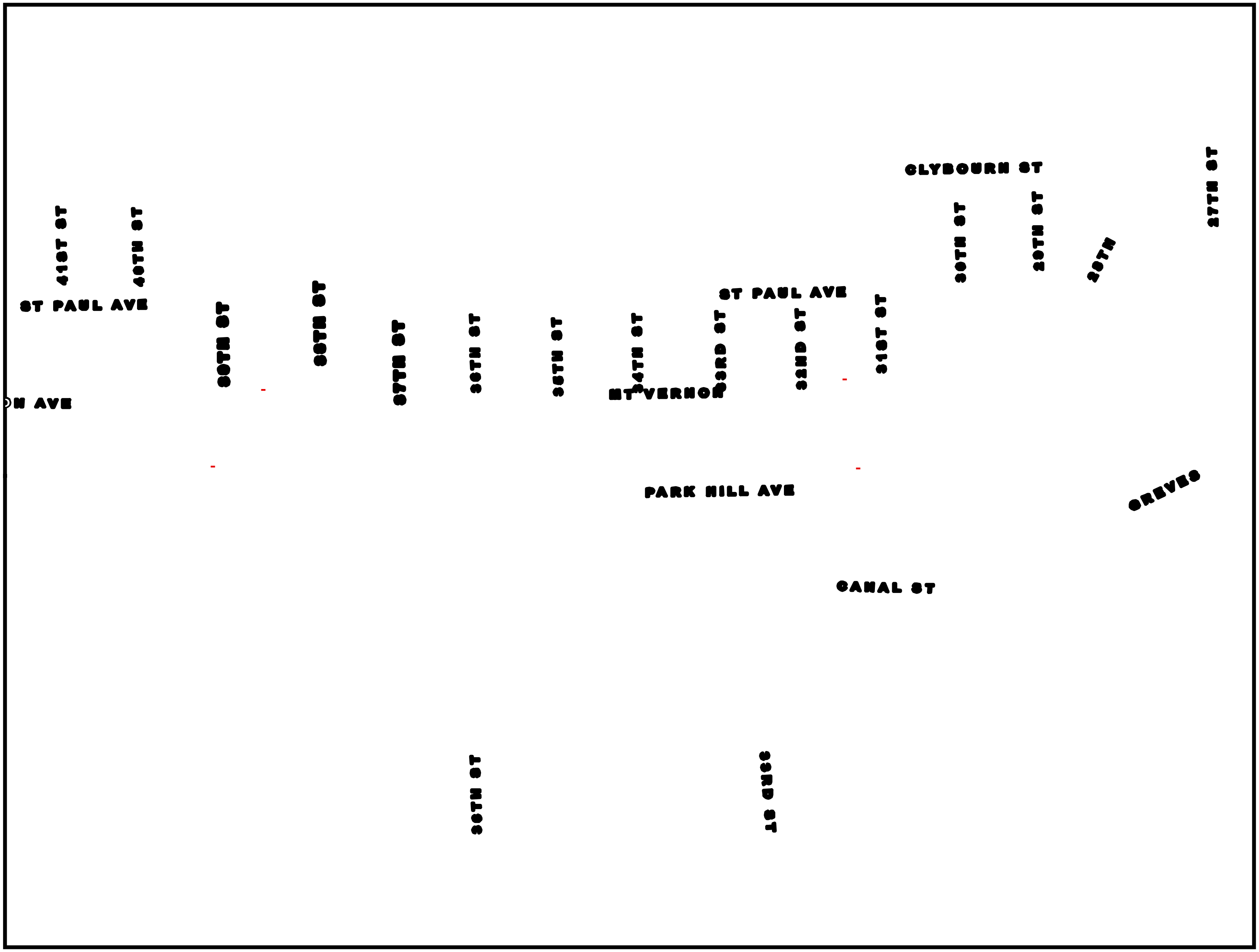
Exhibit 4-3

Proposed Noise Barriers 6-Lane Hybrid Interchange Alternatives



North

LEGEND

- N2 Noise Receptors
- Existing Noise Barrier
- Potential Noise Barrier
- Barrier Did Not Meet Reasonableness Criteria
- Proposed Design
- 1 Noise Barrier Number

Note: Proposed Noise Barriers are color coded to match the Noise Barrier Number

*Barrier locations are approximate

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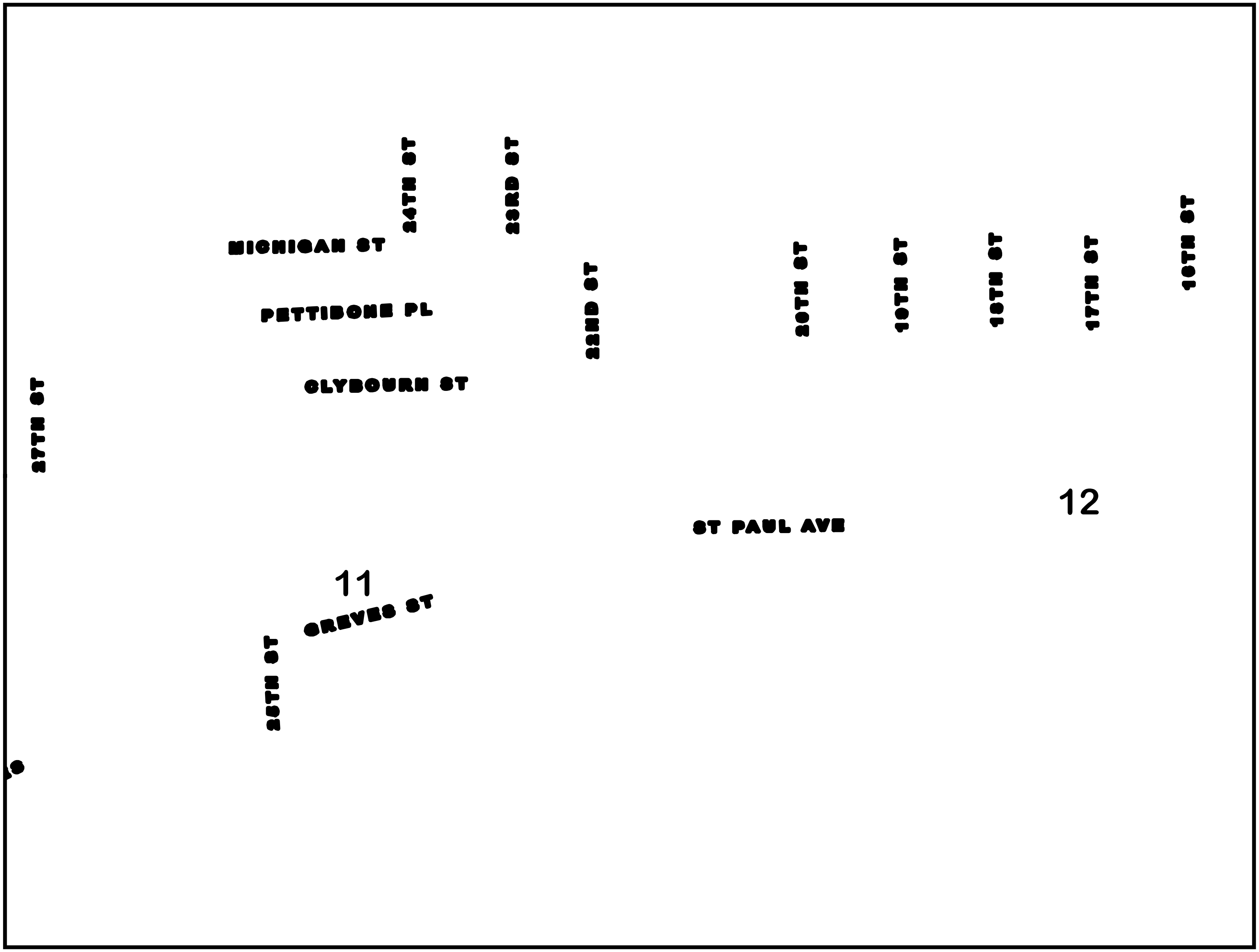
Exhibit 4-3

Proposed Noise Barriers Six-Lane Hybrid Interchange Alternatives



North

LEGEND

- Noise Receptors
- Existing Noise Barrier
- Potential Noise Barrier
- Barrier Did Not Meet Reasonableness Criteria
- Proposed Design
- Noise Barrier Number

Note: Proposed Noise Barriers are color coded to match the Noise Barrier Number

*Barrier locations are approximate

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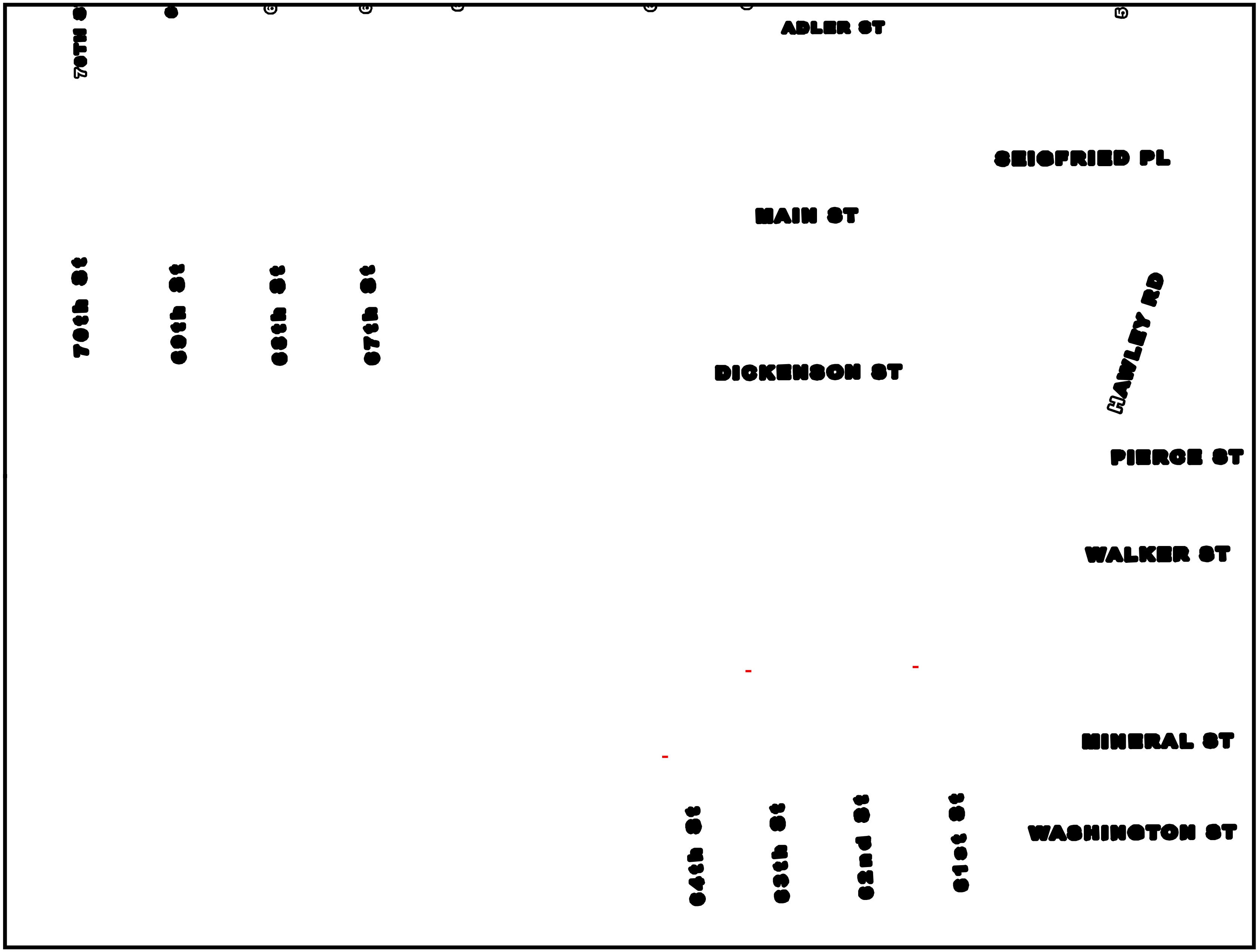
Exhibit 4-3

Proposed Noise Barriers Six-Lane Hybrid Interchange Alternatives



North

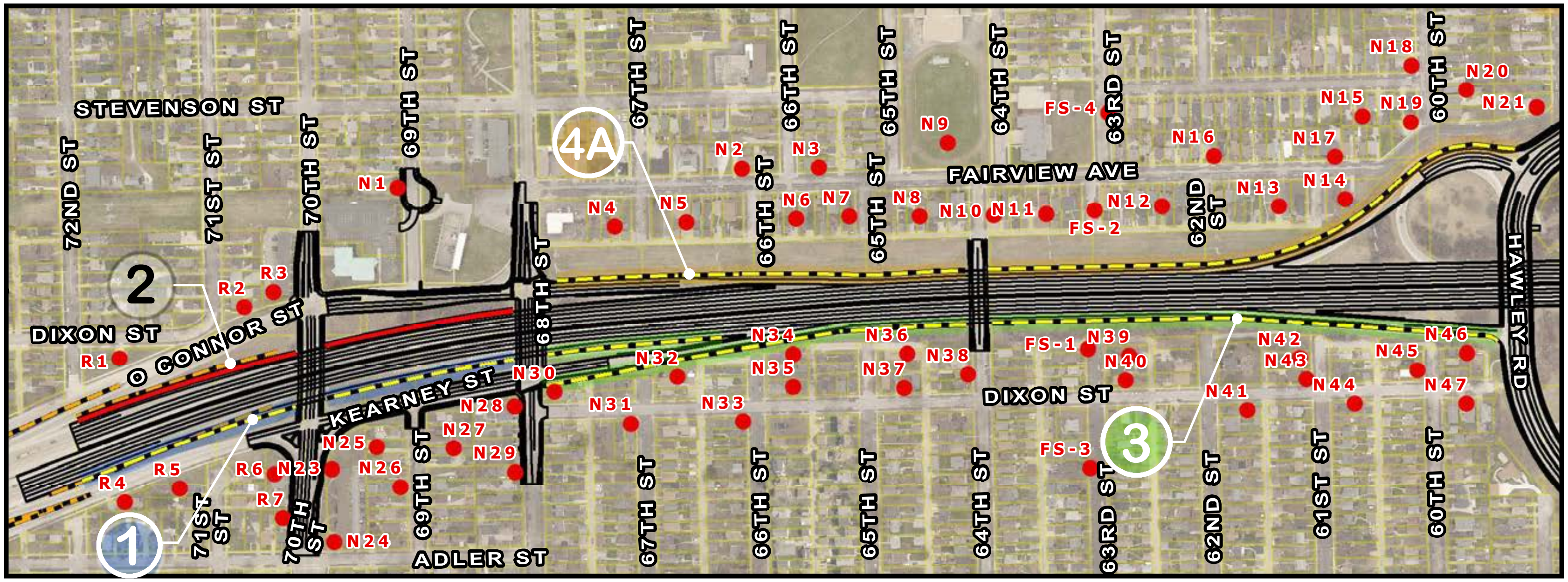
LEGEND

- Noise Receptors
- Existing Noise Barrier
- Potential Noise Barrier
- Barrier Did Not Meet Reasonableness Criteria
- Proposed Design
- Noise Barrier Number

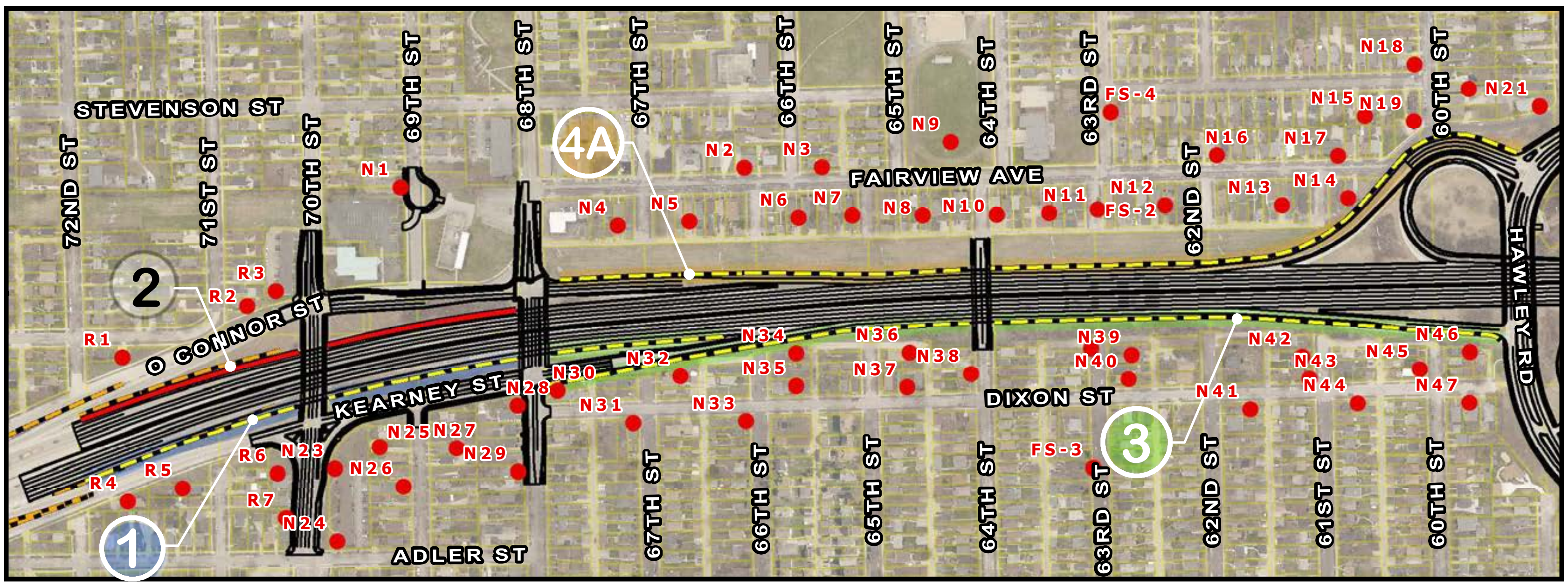
Note: Proposed Noise Barriers are color coded to match the Noise Barrier Number

*Barrier locations are approximate

6 LANE



6 LANE (FULL HAWLEY)



North

LEGEND

- N2 Noise Receptors
- Existing Noise Barrier
- Potential Noise Barrier
- Barrier Did Not Meet Reasonableness Criteria
- Proposed Design
- 1 Noise Barrier Number

Note: Proposed Noise Barriers are color coded to match the Noise Barrier Number

*Barrier locations are approximate

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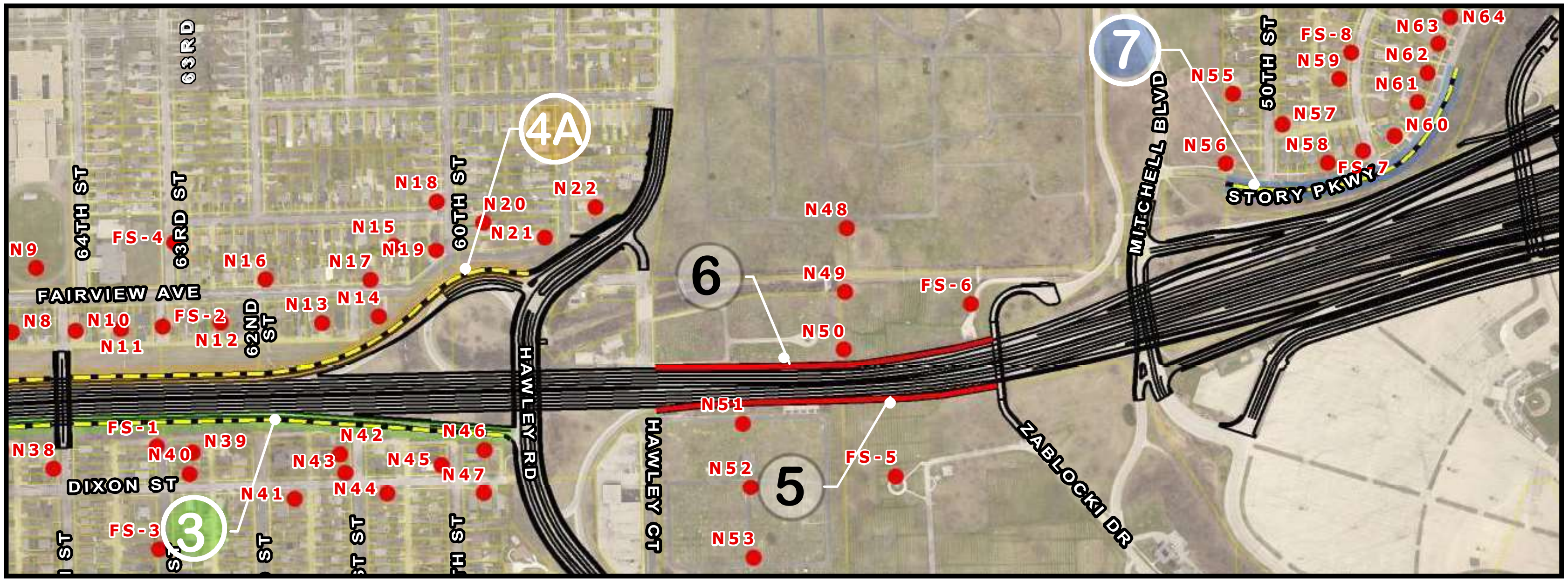
Exhibit 4-4

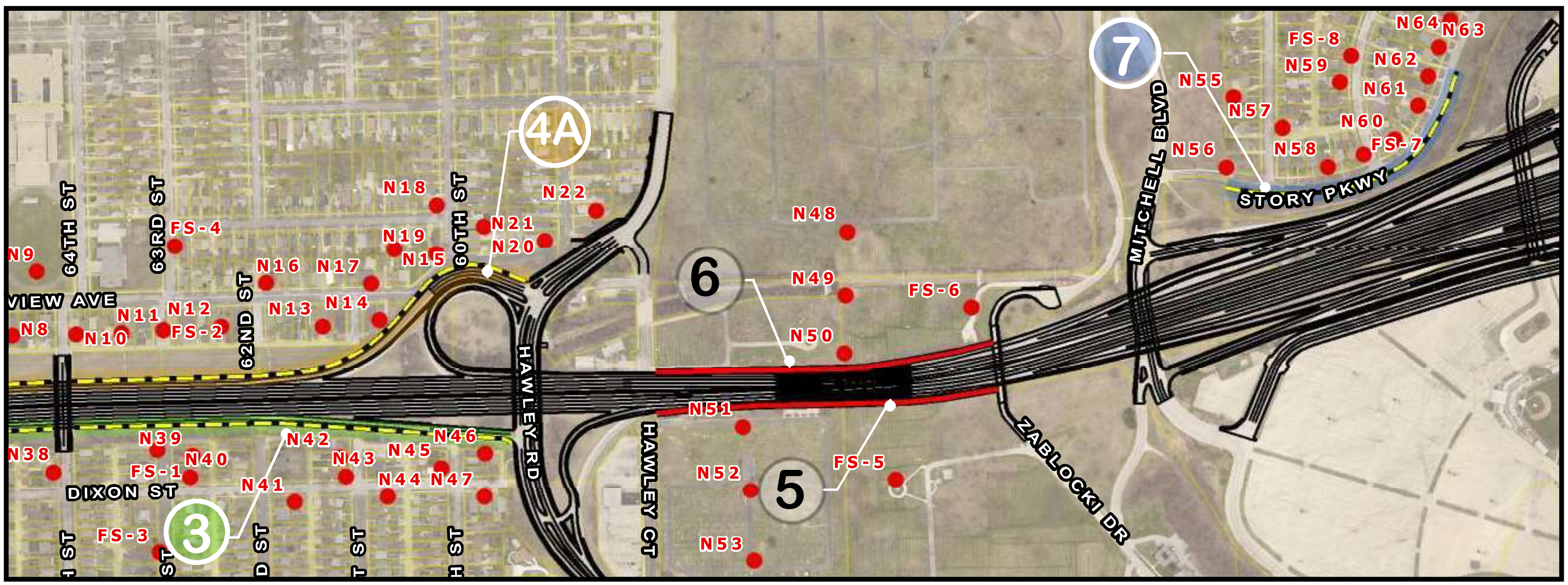
Page 1

Proposed Noise Barriers Six-Lane DDI Alternatives

6 LANE



6 LANE (FULL HAWLEY)



North

LEGEND

- Noise Receptors
- Existing Noise Barrier
- Potential Noise Barrier
- Barrier Did Not Meet Reasonableness Criteria
- Proposed Design
- 1 Noise Barrier Number

Note: Proposed Noise Barriers are color coded to match the Noise Barrier Number

*Barrier locations are approximate

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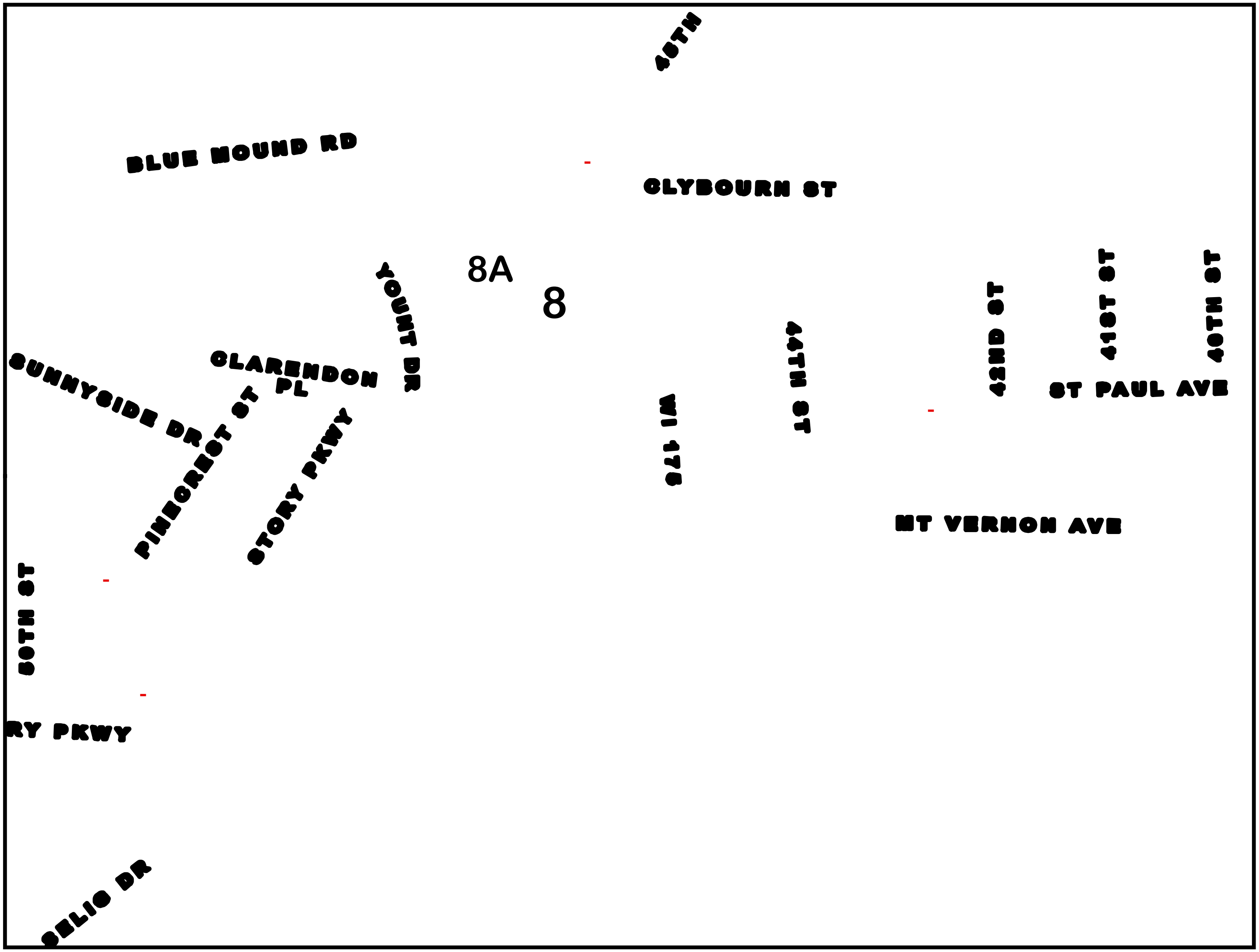
Exhibit 4-4

Page 2

Proposed Noise Barriers 6-Lane DDI Alternatives



North

LEGEND

- Noise Receptors
- Existing Noise Barrier
- Potential Noise Barrier
- Barrier Did Not Meet Reasonableness Criteria
- Proposed Design
- 1 Noise Barrier Number

Note: Proposed Noise Barriers are color coded to match the Noise Barrier Number

*Barrier locations are approximate

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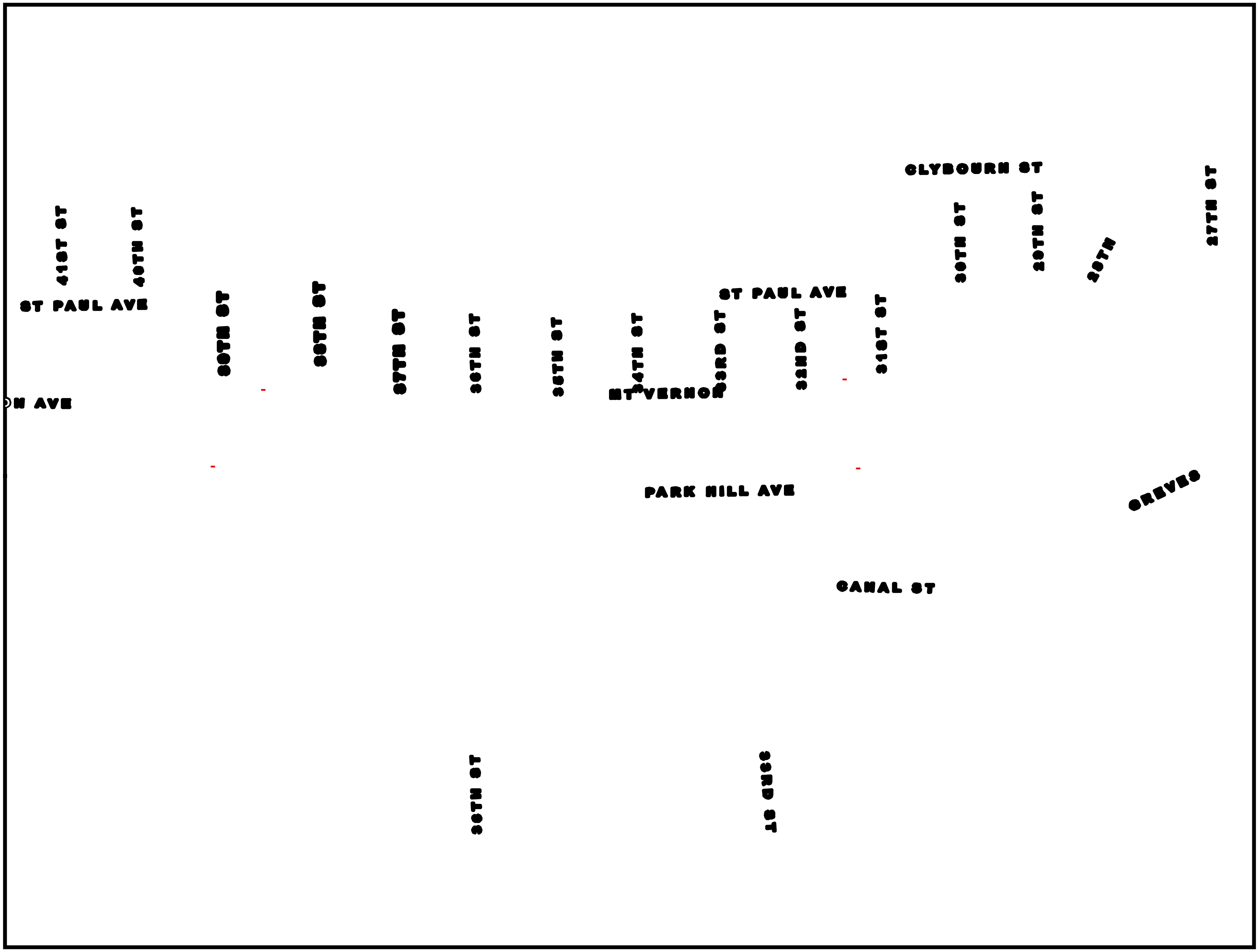
Exhibit 4-4

Proposed Noise Barriers 6-Lane DDI Alternatives



North

LEGEND

N2 Noise Receptors

Existing Noise Barrier

Potential Noise Barrier

Barrier Did Not Meet Reasonableness Criteria

Proposed Design

Noise Barrier Number

Note: Proposed Noise Barriers are color coded to match the Noise Barrier Number

*Barrier locations are approximate

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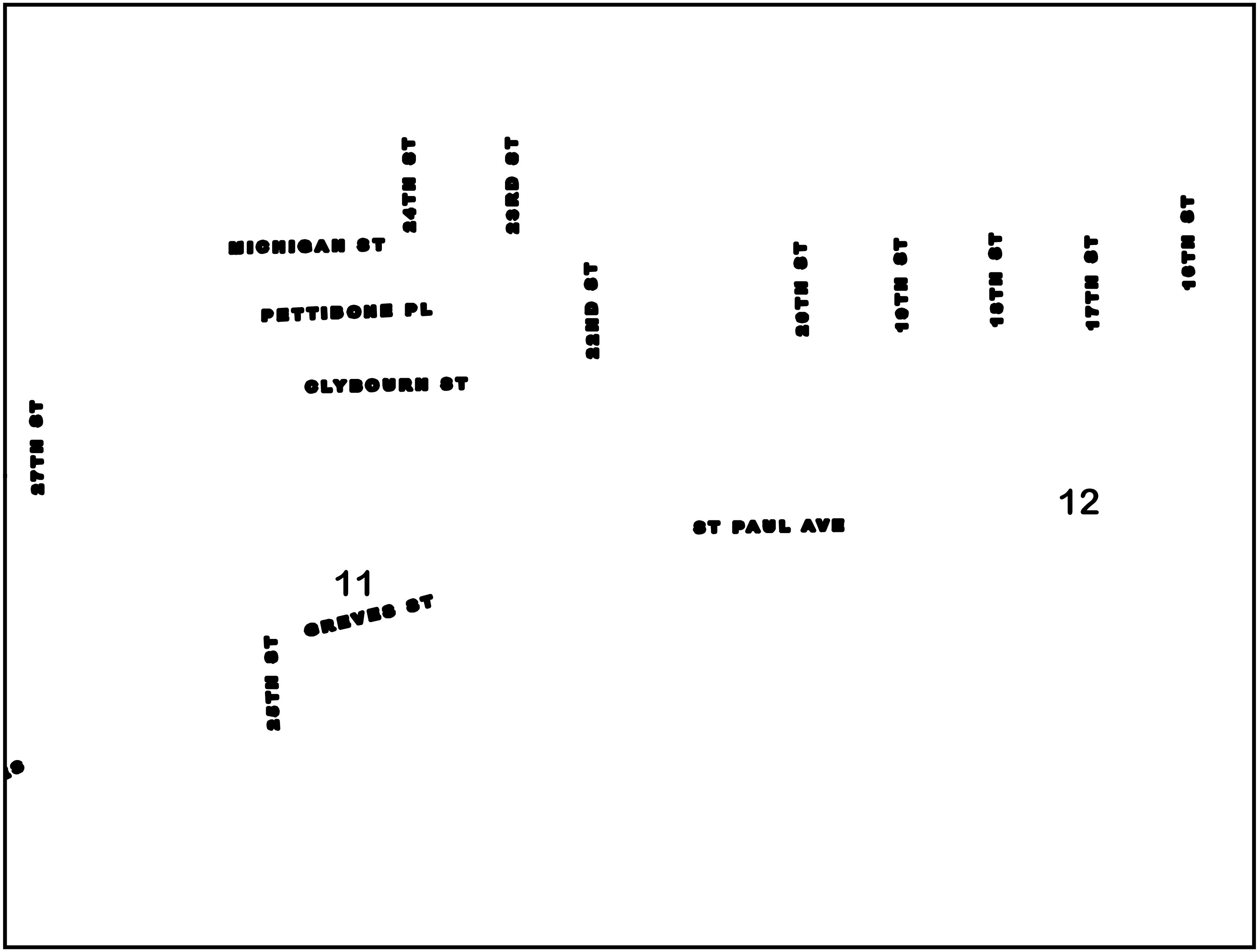
Exhibit 4-4

Proposed Noise Barriers Six-Lane DDI Alternatives



North

LEGEND

- N2 Noise Receptors
- Existing Noise Barrier
- Potential Noise Barrier
- Barrier Did Not Meet Reasonableness Criteria
- Proposed Design
- 1 Noise Barrier Number

Note: Proposed Noise Barriers are color coded to match the Noise Barrier Number

*Barrier locations are approximate

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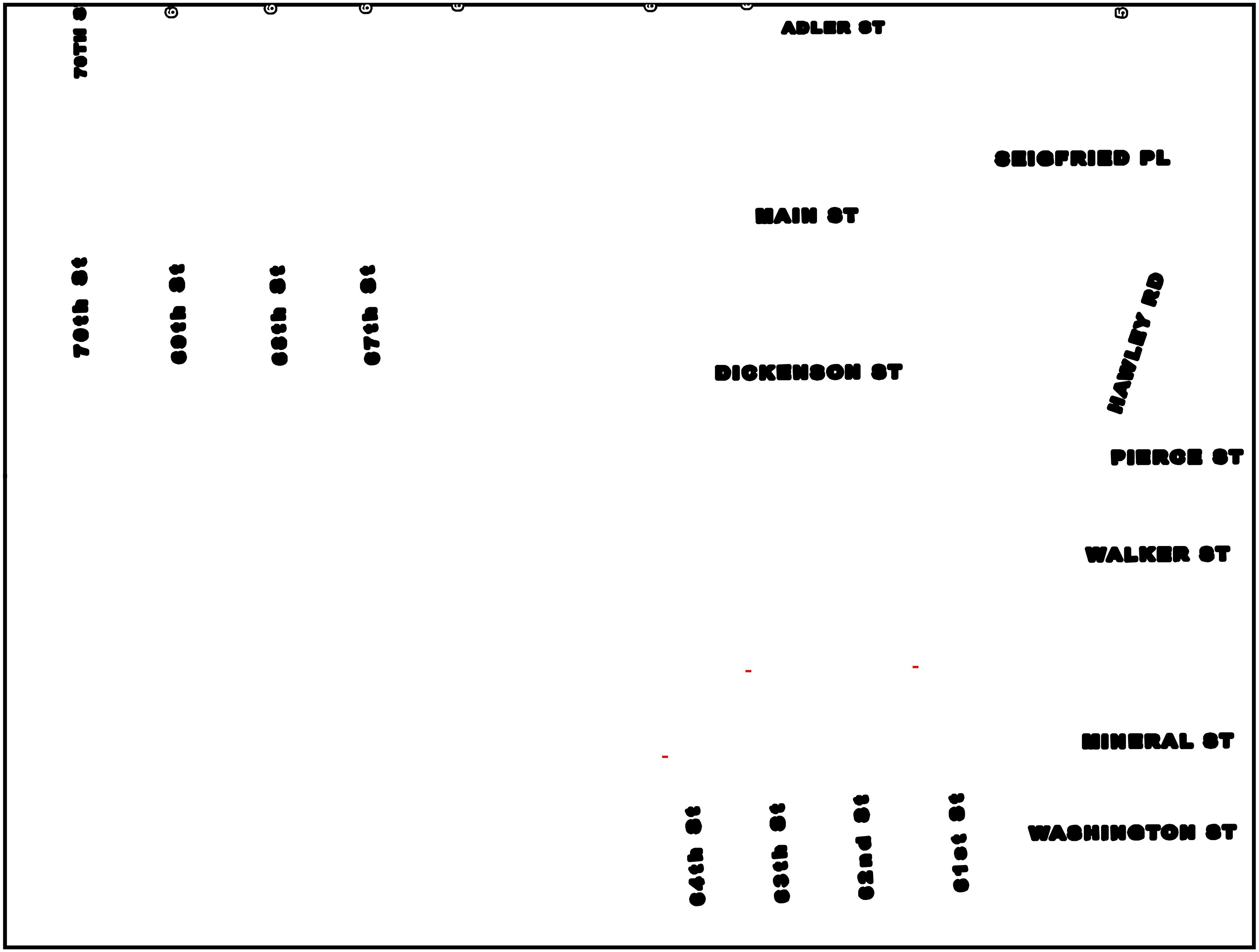
Exhibit 4-4

Proposed Noise Barriers Six-Lane DDI Alternatives



North

LEGEND

- Noise Receptors
- Existing Noise Barrier
- Potential Noise Barrier
- Barrier Did Not Meet Reasonableness Criteria
- Proposed Design
- Noise Barrier Number

Note: Proposed Noise Barriers are color coded to match the Noise Barrier Number

*Barrier locations are approximate

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Exhibit 4-4

Proposed Noise Barriers 6-Lane DDI Alternatives

Appendix B
Traffic Noise Impact Summary

APPENDIX B-1

Traffic Noise Impact Summary – 8-lane Hybrid Interchange Alternative

A. Receptor Location	B. Distance from centerline of near lane to receptor in feet	C. Number of families or people typical of this receptor site	D. Noise Level Criteria (NLC) (dBA)	E. 2050 Future Sound Level (dBA)	F. 2021 Existing sound level (dBA)	G. Difference in Future and Existing Sound Levels (dBA) (E minus F)	H. Difference in Future Sound Levels and Noise Level Criteria (dBA) (E minus D)	Impact (I) or No Impact (N) (dBA)
R1	157	Single Family	67	61	61	0	-6	N
R2	177	Single Family	67	65	65	0	-2	N
R3	182	Multi Family (3)	67	67	67	0	0	I
R4	128	Single Family	67	65	64	1	-2	N
R5	143	Single Family	67	65	65	0	-2	N
R6	210	Multi Family (2)	67	67	66	1	0	I
R7	340	Single Family	67	67	66	1	0	I
R8	210	Educational Facility	52	46	46	0	-6	N
R9	301	Recreation Facility	52	43	42	1	-9	N
N1	436	Residence (4)	67	65	63	2	-2	N
N2	400	Residence (7)	67	65	62	3	-2	N
N3	384	Residence (2)	67	65	63	2	-2	N
N4	262	Residence (4)	67	67	63	4	0	I
N5	257	Residence (6)	67	66	63	3	-1	I
N6	235	Residence (2)	67	66	62	4	-1	I
N7	227	Residence (6)	67	65	62	3	-2	N
N8	212	Active Sports Area	67	64	62	2	-3	N
N9	420	Residence (6)	67	66	64	2	-1	I
N10	190	Residence (4)	67	67	65	2	0	I
N11	190	Residence (3)	67	67	64	3	0	I
N12	212	Residence (6)	67	68	65	3	1	I
N13	206	Residence (7)	67	74	71	3	7	I
N14	227	Residence (1)	67	73	72	1	6	I
N15	207	Residence (10)	67	68	65	3	1	I
N16	359	Residence (15)	67	65	62	3	-2	N
N17	188	Residence (5)	67	70	67	3	3	I
N18	267	Residence (2)	67	66	63	3	-1	I
N19	111	Residence (3)	67	69	67	2	2	I
N20	540	Residence (2)	67	68	66	2	1	I

APPENDIX B-1

Traffic Noise Impact Summary – 8-lane Hybrid Interchange Alternative

A. Receptor Location	B. Distance from centerline of near lane to receptor in feet	C. Number of families or people typical of this receptor site	D. Noise Level Criteria (NLC) (dBA)	E. 2050 Future Sound Level (dBA)	F. 2021 Existing sound level (dBA)	G. Difference in Future and Existing Sound Levels (dBA) (E minus F)	H. Difference in Future Sound Levels and Noise Level Criteria (dBA) (E minus D)	Impact (I) or No Impact (N) (dBA)
N21	485	Residence (2)	67	69	68	1	2	I
N22	583	Residence (3)	67	67	65	2	0	I
N23	254	Residence (4)	67	69	68	1	2	I
N24	463	Residence (4)	67	67	67	0	0	I
N25	224	Residence (3)	67	69	68	1	2	I
N26	355	Residence (2)	67	68	67	1	1	I
N27	254	Residence (2)	67	68	68	0	1	I
N28	151	Residence (3)	67	70	70	0	3	I
N29	338	Residence (4)	67	68	67	1	1	I
N30	116	Residence (1)	67	71	72	-1	4	I
N31	227	Residence (9)	67	68	69	-1	1	I
N32	106	Residence (3)	67	72	73	-1	5	I
N33	250	Residence (1)	67	67	69	-2	0	I
N34	68	Residence (1)	67	77	77	0	10	I
N35	163	Residence (2)	67	73	73	0	6	I
N36	94	Residence (5)	67	69	70	-1	2	I
N37	190	Residence (3)	67	68	67	1	1	I
N38	169	Residence (6)	67	68	67	1	1	I
N39	133	Residence (1)	67	73	74	-1	6	I
N40	207	Residence (5)	67	69	70	-1	2	I
N41	309	Residence (4)	67	64	64	0	-3	N
N42	159	Residence (3)	67	67	68	-1	0	I
N43	225	Residence (2)	67	65	65	0	-2	N
N44	303	Residence (1)	67	64	63	1	-3	N
N45	208	Residence (5)	67	65	66	-1	-2	N
N46	160	Residence (1)	67	70	70	0	3	I
N47	309	Residence (4)	67	66	64	2	-1	I
N48	492	Cemetery	67	65	65	0	-2	N

APPENDIX B-1

Traffic Noise Impact Summary – 8-lane Hybrid Interchange Alternative

A. Receptor Location	B. Distance from centerline of near lane to receptor in feet	C. Number of families or people typical of this receptor site	D. Noise Level Criteria (NLC) (dBA)	E. 2050 Future Sound Level (dBA)	F. 2021 Existing sound level (dBA)	G. Difference in Future and Existing Sound Levels (dBA) (E minus F)	H. Difference in Future Sound Levels and Noise Level Criteria (dBA) (E minus D)	Impact (I) or No Impact (N) (dBA)
N49	276	Cemetery	67	70	69	1	3	I
N50	75	Cemetery	67	78	77	1	11	I
N51	97	Cemetery	67	69	68	1	2	I
N52	309	Cemetery	67	65	64	1	-2	N
N53	547	Cemetery	67	64	64	0	-3	N
N54	671	Cemetery	67	62	62	0	-5	N
N55	518	Residence (4)	67	64	64	0	-3	N
N56	312	Residence (1)	67	68	68	0	1	I
N57	369	Residence (7)	67	66	66	0	-1	I
N58	193	Residence (5)	67	69	69	0	2	I
N59	434	Residence (6)	67	64	63	1	-3	N
N60	182	Residence (2)	67	68	66	2	1	I
N61	249	Residence (2)	67	67	66	1	0	I
N62	299	Residence (2)	67	66	65	1	-1	I
N63	289	Residence (2)	67	64	64	0	-3	N
N64	295	Residence (3)	67	64	63	1	-3	N
N65	296	Residence (3)	67	63	62	1	-4	N
N66	329	Residence (4)	67	62	61	1	-5	N
N67	369	Residence (18)	67	62	62	0	-5	N
N68	182	Residence (1)	67	67	67	0	0	I
N69	118	Residence (2)	67	69	69	0	2	I
N70	87	Residence (1)	67	69	69	0	2	I
N71	270	Residence (6)	67	63	64	-1	-4	N
N72	380	Residence (6)	67	61	61	0	-6	N
N73	202	Residence (1)	67	65	66	-1	-2	N
N74	281	Residence (4)	67	63	64	-1	-4	N
N75	262	Residence (3)	67	62	63	-1	-5	N
N76	184	Residence (3)	67	58	62	-4	-9	N
N77	504	Residence (4)	67	56	56	0	-11	N

APPENDIX B-1

Traffic Noise Impact Summary – 8-lane Hybrid Interchange Alternative

A. Receptor Location	B. Distance from centerline of near lane to receptor in feet	C. Number of families or people typical of this receptor site	D. Noise Level Criteria (NLC) (dBA)	E. 2050 Future Sound Level (dBA)	F. 2021 Existing sound level (dBA)	G. Difference in Future and Existing Sound Levels (dBA) (E minus F)	H. Difference in Future Sound Levels and Noise Level Criteria (dBA) (E minus D)	Impact (I) or No Impact (N) (dBA)
N78	352	Residence (5)	67	61	61	0	-6	N
N79	385	Residence (6)	67	57	57	0	-10	N
N80	301	Residence (6)	67	61	59	2	-6	N
N81	168	Residence (8)	67	69	66	3	2	I
N82	250	Residence (5)	67	61	60	1	-6	N
N83	181	Residence (3)	67	65	66	-1	-2	N
N84	243	Residence (8)	67	62	63	-1	-5	N
N85	181	Residence (1)	67	63	67	-4	-4	N
N86	164	Residence (3)	67	65	68	-3	-2	N
N87	236	Residence (3)	67	67	66	1	0	I
N88	152	Residence (1)	67	69	71	-2	2	I
N89	391	Residence (12)	67	64	63	1	-3	N
N90	186	Residence (2)	67	69	68	1	2	I
N91	232	Residence (5)	67	69	68	1	2	I
N92	555	Residence (10)	67	62	61	1	-5	N
N93	239	Merrill Park Apt. (6)	67	69	69	0	2	I
N94	382	Residence (5)	67	66	65	1	-1	I
N95	153	Residence (3)	67	68	68	0	1	I
N96	197	Residence (10)	67	70	70	0	3	I
N97	389	Residence (7)	67	63	62	1	-4	N
N98	255	Residence (3)	67	67	67	0	0	I
N99	111	Residence (3)	67	72	74	-2	5	I
N100	183	Residence (3)	67	66	65	1	-1	I
N101	186	Residence (14)	67	61	60	1	-6	N
N102	160	Residence (6)	67	65	65	0	-2	N
N103	112	Residence (5)	67	72	75	-3	5	I
N104	105	Residence (5)	67	64	62	2	-3	N
N105	172	Residence (3)	67	72	73	-1	5	I

APPENDIX B-1

Traffic Noise Impact Summary – 8-lane Hybrid Interchange Alternative

A. Receptor Location	B. Distance from centerline of near lane to receptor in feet	C. Number of families or people typical of this receptor site	D. Noise Level Criteria (NLC) (dBA)	E. 2050 Future Sound Level (dBA)	F. 2021 Existing sound level (dBA)	G. Difference in Future and Existing Sound Levels (dBA) (E minus F)	H. Difference in Future Sound Levels and Noise Level Criteria (dBA) (E minus D)	Impact (I) or No Impact (N) (dBA)
N106	210	Residence (2)	67	63	65	-2	-4	N
N107	209	Residence (2)	67	62	64	-2	-5	N
N108	209	Residence (8)	67	63	64	-1	-4	N
N109	213	Residence (12)	67	64	65	-1	-3	N
N110	213	Day Care Center (1)	67	69	69	0	2	I
N111	187	Restaurant (1)	72	62	62	0	-10	N
FS-1	113	Residence (1)	67	68	69	-1	1	I
FS-2	195	Residence (1)	67	67	64	3	0	I
FS-3	467	Residence (1)	67	63	61	2	-4	N
FS-4	475	Residence (9)	67	63	61	2	-4	N
FS-5	289	Cemetery	67	68	68	0	1	I
FS-6	150	Cemetery	67	71	72	-1	4	I
FS-7	184	Residence (1)	67	69	67	2	2	I
FS-8	495	Residence (1)	67	63	62	1	-4	N
FS-9	427	Park	67	61	60	1	-6	N
FS-10	117	Residence (2)	67	69	69	0	2	I
FS-11	126	Residence (4)	67	73	74	-1	6	I
FS-12	517	Residence (9)	67	58	59	-1	-9	N
FS-13	487	Residence (5)	67	63	62	1	-4	N
FS-14	110	Residence (1)	67	73	74	-1	6	I

APPENDIX B-2

Traffic Noise Impact Summary – 8-lane DDI Alternative

A. Receptor Location	B. Distance from centerline of near lane to receptor in feet	C. Number of families or people typical of this receptor site	D. Noise Level Criteria (NLC) (dBA)	E. 2050 Future Sound Level (dBA)	F. 2021 Existing sound level (dBA)	G. Difference in Future and Existing Sound Levels (dBA) (E minus F)	H. Difference in Future Sound Levels and Noise Level Criteria (dBA) (E minus D)	Impact (I) or No Impact (N) (dBA)
R1	157	Single Family	67	61	61	0	-6	N
R2	177	Single Family	67	65	65	0	-2	N
R3	182	Multi Family (3)	67	67	67	0	0	I
R4	128	Single Family	67	65	64	1	-2	N
R5	143	Single Family	67	65	65	0	-2	N
R6	210	Multi Family (2)	67	67	66	1	0	I
R7	340	Single Family	67	67	66	1	0	I
R8	210	Educational Facility	52	46	46	0	-6	N
R9	301	Recreation Facility	52	43	42	1	-9	N
N1	436	Residence (4)	67	65	63	2	-2	N
N2	400	Residence (7)	67	65	62	3	-2	N
N3	384	Residence (2)	67	65	63	2	-2	N
N4	262	Residence (4)	67	67	63	4	0	I
N5	257	Residence (6)	67	66	63	3	-1	I
N6	235	Residence (2)	67	66	62	4	-1	I
N7	227	Residence (6)	67	65	62	3	-2	N
N8	212	Active Sports Area	67	64	62	2	-3	N
N9	420	Residence (6)	67	66	64	2	-1	I
N10	190	Residence (4)	67	67	65	2	0	I
N11	190	Residence (3)	67	67	64	3	0	I
N12	212	Residence (6)	67	68	65	3	1	I
N13	206	Residence (7)	67	74	71	3	7	I
N14	227	Residence (1)	67	73	72	1	6	I
N15	207	Residence (10)	67	68	65	3	1	I
N16	359	Residence (15)	67	65	62	3	-2	N
N17	188	Residence (5)	67	70	67	3	3	I
N18	267	Residence (2)	67	66	63	3	-1	I
N19	111	Residence (3)	67	69	67	2	2	I

APPENDIX B-2

Traffic Noise Impact Summary – 8-lane DDI Alternative

A. Receptor Location	B. Distance from centerline of near lane to receptor in feet	C. Number of families or people typical of this receptor site	D. Noise Level Criteria (NLC) (dBA)	E. 2050 Future Sound Level (dBA)	F. 2021 Existing sound level (dBA)	G. Difference in Future and Existing Sound Levels (dBA) (E minus F)	H. Difference in Future Sound Levels and Noise Level Criteria (dBA) (E minus D)	Impact (I) or No Impact (N) (dBA)
N20	540	Residence (2)	67	68	66	2	1	I
N21	485	Residence (2)	67	69	68	1	2	I
N22	583	Residence (3)	67	67	65	2	0	I
N23	254	Residence (4)	67	69	68	1	2	I
N24	463	Residence (4)	67	67	67	0	0	I
N25	224	Residence (3)	67	69	68	1	2	I
N26	355	Residence (2)	67	67	67	0	0	I
N27	254	Residence (2)	67	68	68	0	1	I
N28	151	Residence (3)	67	70	70	0	3	I
N29	338	Residence (4)	67	68	67	1	1	I
N30	116	Residence (1)	67	71	72	-1	4	I
N31	227	Residence (9)	67	68	69	-1	1	I
N32	106	Residence (3)	67	72	73	-1	5	I
N33	250	Residence (1)	67	67	69	-2	0	I
N34	68	Residence (1)	67	77	77	0	10	I
N35	163	Residence (2)	67	73	73	0	6	I
N36	94	Residence (5)	67	69	70	-1	2	I
N37	190	Residence (3)	67	68	67	1	1	I
N38	169	Residence (6)	67	68	67	1	1	I
N39	133	Residence (1)	67	73	74	-1	6	I
N40	207	Residence (5)	67	69	70	-1	2	I
N41	309	Residence (4)	67	64	64	0	-3	N
N42	159	Residence (3)	67	67	68	-1	0	I
N43	225	Residence (2)	67	65	65	0	-2	N
N44	303	Residence (1)	67	64	63	1	-3	N
N45	208	Residence (5)	67	65	66	-1	-2	N
N46	160	Residence (1)	67	70	70	0	3	I
N47	309	Residence (4)	67	66	64	2	-1	I
N48	492	Cemetery	67	66	65	1	-1	I

APPENDIX B-2

Traffic Noise Impact Summary – 8-lane DDI Alternative

A. Receptor Location	B. Distance from centerline of near lane to receptor in feet	C. Number of families or people typical of this receptor site	D. Noise Level Criteria (NLC) (dBA)	E. 2050 Future Sound Level (dBA)	F. 2021 Existing sound level (dBA)	G. Difference in Future and Existing Sound Levels (dBA) (E minus F)	H. Difference in Future Sound Levels and Noise Level Criteria (dBA) (E minus D)	Impact (I) or No Impact (N) (dBA)
N49	276	Cemetery	67	70	69	1	3	I
N50	75	Cemetery	67	78	77	1	11	I
N51	97	Cemetery	67	69	68	1	2	I
N52	309	Cemetery	67	65	64	1	-2	N
N53	547	Cemetery	67	64	64	0	-3	N
N54	671	Cemetery	67	63	62	1	-4	N
N55	518	Residence (4)	67	65	64	1	-2	N
N56	312	Residence (1)	67	68	68	0	1	I
N57	369	Residence (7)	67	66	66	0	-1	I
N58	193	Residence (5)	67	70	69	1	3	I
N59	434	Residence (6)	67	65	63	2	-2	N
N60	182	Residence (2)	67	70	66	4	3	I
N61	249	Residence (2)	67	69	66	3	2	I
N62	299	Residence (2)	67	67	65	2	0	I
N63	289	Residence (2)	67	66	64	2	-1	I
N64	295	Residence (3)	67	65	63	2	-2	N
N65	296	Residence (3)	67	65	62	3	-2	N
N66	329	Residence (4)	67	64	61	3	-3	N
N67	369	Residence (18)	67	60	58	2	-7	N
N68	182	Residence (1)	67	63	62	1	-4	N
N69	118	Residence (2)	67	65	65	0	-2	N
N70	87	Residence (1)	67	70	69	1	3	I
N71	270	Residence (6)	67	60	59	1	-7	N
N72	380	Residence (6)	67	60	58	2	-7	N
N73	202	Residence (1)	67	65	64	1	-2	N
N74	281	Residence (4)	67	64	63	1	-3	N
N75	262	Residence (3)	67	64	63	1	-3	N
N76	184	Residence (3)	67	62	62	0	-5	N

APPENDIX B-2

Traffic Noise Impact Summary – 8-lane DDI Alternative

A. Receptor Location	B. Distance from centerline of near lane to receptor in feet	C. Number of families or people typical of this receptor site	D. Noise Level Criteria (NLC) (dBA)	E. 2050 Future Sound Level (dBA)	F. 2021 Existing sound level (dBA)	G. Difference in Future and Existing Sound Levels (dBA) (E minus F)	H. Difference in Future Sound Levels and Noise Level Criteria (dBA) (E minus D)	Impact (I) or No Impact (N) (dBA)
N77	504	Residence (4)	67	59	56	3	-8	N
N78	352	Residence (5)	67	62	61	1	-5	N
N79	385	Residence (6)	67	57	57	0	-10	N
N80	301	Residence (6)	67	61	59	2	-6	N
N81	168	Residence (8)	67	69	66	3	2	I
N82	250	Residence (5)	67	61	60	1	-6	N
N83	181	Residence (3)	67	67	66	1	0	I
N84	243	Residence (8)	67	63	63	0	-4	N
N85	181	Residence (1)	67	66	67	-1	-1	I
N86	164	Residence (3)	67	67	68	-1	0	I
N87	236	Residence (3)	67	68	66	2	1	I
N88	152	Residence (1)	67	70	71	-1	3	I
N89	391	Residence (12)	67	65	63	2	-2	N
N90	186	Residence (2)	67	70	68	2	3	I
N91	232	Residence (5)	67	70	68	2	3	I
N92	555	Residence (10)	67	63	61	2	-4	N
N93	239	Merrill Park Apt. (6)	67	69	69	0	2	I
N94	382	Residence (5)	67	66	65	1	-1	I
N95	153	Residence (3)	67	68	68	0	1	I
N96	197	Residence (10)	67	70	70	0	3	I
N97	389	Residence (7)	67	63	62	1	-4	N
N98	255	Residence (3)	67	67	67	0	0	I
N99	111	Residence (3)	67	72	74	-2	5	I
N100	183	Residence (3)	67	66	65	1	-1	I
N101	186	Residence (14)	67	61	60	1	-6	N
N102	160	Residence (6)	67	64	65	-1	-3	N
N103	112	Residence (5)	67	72	75	-3	5	I
N104	105	Residence (5)	67	64	62	2	-3	N
N105	172	Residence (3)	67	72	73	-1	5	I

APPENDIX B-2

Traffic Noise Impact Summary – 8-lane DDI Alternative

A. Receptor Location	B. Distance from centerline of near lane to receptor in feet	C. Number of families or people typical of this receptor site	D. Noise Level Criteria (NLC) (dBA)	E. 2050 Future Sound Level (dBA)	F. 2021 Existing sound level (dBA)	G. Difference in Future and Existing Sound Levels (dBA) (E minus F)	H. Difference in Future Sound Levels and Noise Level Criteria (dBA) (E minus D)	Impact (I) or No Impact (N) (dBA)
N106	210	Residence (2)	67	63	65	-2	-4	N
N107	209	Residence (2)	67	62	64	-2	-5	N
N108	209	Residence (8)	67	63	64	-1	-4	N
N109	213	Residence (12)	67	64	65	-1	-3	N
N110	213	Day Care Center (1)	67	69	69	0	2	I
N111	187	Restaurant (1)	72	62	62	0	-10	N
FS-1	113	Residence (1)	67	68	69	-1	1	I
FS-2	195	Residence (1)	67	67	64	3	0	I
FS-3	467	Residence (1)	67	62	61	1	-5	N
FS-4	475	Residence (9)	67	63	61	2	-4	N
FS-5	289	Cemetery	67	69	68	1	2	I
FS-6	150	Cemetery	67	72	72	0	5	I
FS-7	184	Residence (1)	67	70	67	3	3	I
FS-8	495	Residence (1)	67	64	62	2	-3	N
FS-9	427	Park	67	62	60	2	-5	N
FS-10	117	Residence (2)	67	66	66	0	-1	I
FS-11	126	Residence (4)	67	73	74	-1	6	I
FS-12	517	Residence (9)	67	59	59	0	-8	N
FS-13	487	Residence (5)	67	63	62	1	-4	N
FS-14	110	Residence (1)	67	73	74	-1	6	I
NR1	331	Hospital	52	26	26	0	-26	N
NR2	63	Residence (1)	67	64	64	0	-3	N
NR3	53	Residence (6)	67	65	65	0	-2	N
NR4	64	Residence (1)	67	63	64	-1	-4	N
NR5	99	Residence (1)	67	61	61	0	-6	N
NR6	29	Residence (4)	67	68	68	0	1	I
NR7	48	Dentist	52	40	40	0	-12	N
NR8	40	Residence (8)	67	66	66	0	-1	I

APPENDIX B-2

Traffic Noise Impact Summary – 8-lane DDI Alternative

A. Receptor Location	B. Distance from centerline of near lane to receptor in feet	C. Number of families or people typical of this receptor site	D. Noise Level Criteria (NLC) (dBA)	E. 2050 Future Sound Level (dBA)	F. 2021 Existing sound level (dBA)	G. Difference in Future and Existing Sound Levels (dBA) (E minus F)	H. Difference in Future Sound Levels and Noise Level Criteria (dBA) (E minus D)	Impact (I) or No Impact (N) (dBA)
NR9	148	Residence (6)	67	64	65	-1	-3	N
NR10	205	Residence (3)	67	62	62	0	-5	N
NR11	252	Residence (10)	67	60	60	0	-7	N
NR12	235	Residence (1)	67	58	59	-1	-9	N
NR13	190	Residence (1)	67	58	58	0	-9	N
NR14	188	Residence (1)	67	58	58	0	-9	N
NR15	155	Residence (2)	67	60	60	0	-7	N
NR16	190	Residence (4)	67	56	56	0	-11	N
NR17	194	Residence (1)	67	56	56	0	-11	N
NR18	188	Residence (1)	67	56	56	0	-11	N
NR19	184	Residence (1)	67	56	56	0	-11	N
NR20	187	Residence (1)	67	56	55	1	-11	N
NR21	439	Residence (1)	67	49	49	0	-18	N
NR22	450	Residence (2)	67	49	49	0	-18	N
NR23	393	Residence (2)	67	53	52	1	-14	N
NR27	488	Park	67	61	55	6	-6	N
NR28	485	Park	67	61	54	7	-6	N

APPENDIX B-3

Traffic Noise Impact Summary—6-lane Hybrid Interchange with Half-Hawley Alternative

A. Receptor Location	B. Distance from centerline of near lane to receptor in feet	C. Number of families or people typical of this receptor site	D. Noise Level Criteria (NLC) (dBA)	E. 2050 Future Sound Level (dBA)	F. 2021 Existing sound level (dBA)	G. Difference in Future and Existing Sound Levels (dBA) (E minus F)	H. Difference in Future Sound Levels and Noise Level Criteria (dBA) (E minus D)	Impact (I) or No Impact (N) (dBA)
R1	157	Single Family	67	61	61	0	-6	N
R2	177	Single Family	67	65	65	0	-2	N
R3	182	Multi Family (3)	67	67	67	0	0	I
R4	128	Single Family	67	65	64	1	-2	N
R5	143	Single Family	67	65	65	0	-2	N
R6	210	Multi Family (2)	67	67	66	1	0	I
R7	340	Single Family	67	66	66	0	-1	I
R8	210	Educational Facility	52	46	46	0	-6	N
R9	301	Recreation Facility	52	43	42	1	-9	N
N1	436	Residence (4)	67	64	63	1	-3	N
N2	400	Residence (7)	67	64	62	2	-3	N
N3	384	Residence (2)	67	64	63	1	-3	N
N4	262	Residence (4)	67	66	63	3	-1	I
N5	257	Residence (6)	67	66	63	3	-1	I
N6	235	Residence (2)	67	65	62	3	-2	N
N7	227	Residence (6)	67	64	62	2	-3	N
N8	212	Active Sports Area	67	64	62	2	-3	N
N9	420	Residence (6)	67	65	64	1	-2	N
N10	190	Residence (4)	67	66	65	1	-1	I
N11	190	Residence (3)	67	66	64	2	-1	I
N12	212	Residence (6)	67	68	65	3	1	I
N13	206	Residence (7)	67	73	71	2	6	I
N14	227	Residence (1)	67	73	72	1	6	I
N15	207	Residence (10)	67	67	65	2	0	I
N16	359	Residence (15)	67	65	62	3	-2	N
N17	188	Residence (5)	67	70	67	3	3	I
N18	267	Residence (2)	67	65	63	2	-2	N

APPENDIX B-3

Traffic Noise Impact Summary—6-lane Hybrid Interchange with Half-Hawley Alternative

A. Receptor Location	B. Distance from centerline of near lane to receptor in feet	C. Number of families or people typical of this receptor site	D. Noise Level Criteria (NLC) (dBA)	E. 2050 Future Sound Level (dBA)	F. 2021 Existing sound level (dBA)	G. Difference in Future and Existing Sound Levels (dBA) (E minus F)	H. Difference in Future Sound Levels and Noise Level Criteria (dBA) (E minus D)	Impact (I) or No Impact (N) (dBA)
N19	111	Residence (3)	67	69	67	2	2	I
N20	540	Residence (2)	67	67	66	1	0	I
N21	485	Residence (2)	67	69	68	1	2	I
N22	583	Residence (3)	67	67	65	2	0	I
N23	254	Residence (4)	67	69	68	1	2	I
N24	463	Residence (4)	67	66	67	-1	-1	I
N25	224	Residence (3)	67	69	68	1	2	I
N26	355	Residence (2)	67	67	67	0	0	I
N27	254	Residence (2)	67	68	68	0	1	I
N28	151	Residence (3)	67	70	70	0	3	I
N29	338	Residence (4)	67	67	67	0	0	I
N30	116	Residence (1)	67	71	72	-1	4	I
N31	227	Residence (9)	67	68	69	-1	1	I
N32	106	Residence (3)	67	72	73	-1	5	I
N33	250	Residence (1)	67	67	69	-2	0	I
N34	68	Residence (1)	67	77	77	0	10	I
N35	163	Residence (2)	67	73	73	0	6	I
N36	94	Residence (5)	67	69	70	-1	2	I
N37	190	Residence (3)	67	67	67	0	0	I
N38	169	Residence (6)	67	68	67	1	1	I
N39	133	Residence (1)	67	73	74	-1	6	I
N40	207	Residence (5)	67	69	70	-1	2	I
N41	309	Residence (4)	67	64	64	0	-3	N
N42	159	Residence (3)	67	67	68	-1	0	I
N43	225	Residence (2)	67	64	65	-1	-3	N
N44	303	Residence (1)	67	63	63	0	-4	N
N45	208	Residence (5)	67	66	66	0	-1	I
N46	160	Residence (1)	67	70	70	0	3	I

APPENDIX B-3

Traffic Noise Impact Summary—6-lane Hybrid Interchange with Half-Hawley Alternative

A. Receptor Location	B. Distance from centerline of near lane to receptor in feet	C. Number of families or people typical of this receptor site	D. Noise Level Criteria (NLC) (dBA)	E. 2050 Future Sound Level (dBA)	F. 2021 Existing sound level (dBA)	G. Difference in Future and Existing Sound Levels (dBA) (E minus F)	H. Difference in Future Sound Levels and Noise Level Criteria (dBA) (E minus D)	Impact (I) or No Impact (N) (dBA)
N47	309	Residence (4)	67	65	64	1	-2	N
N48	492	Cemetery	67	65	65	0	-2	N
N49	276	Cemetery	67	69	69	0	2	I
N50	75	Cemetery	67	77	77	0	10	I
N51	97	Cemetery	67	68	68	0	1	I
N52	309	Cemetery	67	65	64	1	-2	N
N53	547	Cemetery	67	63	64	-1	-4	N
N54	671	Cemetery	67	62	62	0	-5	N
N55	518	Residence (4)	67	64	64	0	-3	N
N56	312	Residence (1)	67	67	68	-1	0	I
N57	369	Residence (7)	67	66	66	0	-1	I
N58	193	Residence (5)	67	69	69	0	2	I
N59	434	Residence (6)	67	64	63	1	-3	N
N60	182	Residence (2)	67	68	66	2	1	I
N61	249	Residence (2)	67	67	66	1	0	I
N62	299	Residence (2)	67	65	65	0	-2	N
N63	289	Residence (2)	67	64	64	0	-3	N
N64	295	Residence (3)	67	63	63	0	-4	N
N65	296	Residence (3)	67	62	62	0	-5	N
N66	329	Residence (4)	67	62	61	1	-5	N
N67	369	Residence (18)	67	61	62	-1	-6	N
N68	182	Residence (1)	67	67	67	0	0	I
N69	118	Residence (2)	67	69	69	0	2	I
N70	87	Residence (1)	67	69	69	0	2	I
N71	270	Residence (6)	67	63	64	-1	-4	N
N72	380	Residence (6)	67	61	61	0	-6	N
N73	202	Residence (1)	67	65	66	-1	-2	N

APPENDIX B-3

Traffic Noise Impact Summary—6-lane Hybrid Interchange with Half-Hawley Alternative

A. Receptor Location	B. Distance from centerline of near lane to receptor in feet	C. Number of families or people typical of this receptor site	D. Noise Level Criteria (NLC) (dBA)	E. 2050 Future Sound Level (dBA)	F. 2021 Existing sound level (dBA)	G. Difference in Future and Existing Sound Levels (dBA) (E minus F)	H. Difference in Future Sound Levels and Noise Level Criteria (dBA) (E minus D)	Impact (I) or No Impact (N) (dBA)
N74	281	Residence (4)	67	63	64	-1	-4	N
N75	262	Residence (3)	67	62	63	-1	-5	N
N76	184	Residence (3)	67	58	62	-4	-9	N
N77	504	Residence (4)	67	56	56	0	-11	N
N78	352	Residence (5)	67	60	61	-1	-7	N
N79	385	Residence (6)	67	57	57	0	-10	N
N80	301	Residence (6)	67	61	59	2	-6	N
N81	168	Residence (8)	67	69	66	3	2	I
N82	250	Residence (5)	67	61	60	1	-6	N
N83	181	Residence (3)	67	65	66	-1	-2	N
N84	243	Residence (8)	67	62	63	-1	-5	N
N85	181	Residence (1)	67	63	67	-4	-4	N
N86	164	Residence (3)	67	65	68	-3	-2	N
N87	236	Residence (3)	67	66	66	0	-1	I
N88	152	Residence (1)	67	69	71	-2	2	I
N89	391	Residence (12)	67	64	63	1	-3	N
N90	186	Residence (2)	67	69	68	1	2	I
N91	232	Residence (5)	67	69	68	1	2	I
N92	555	Residence (10)	67	62	61	1	-5	N
N93	239	Merrill Park Apt. (6)	67	68	69	-1	1	I
N94	382	Residence (5)	67	65	65	0	-2	N
N95	153	Residence (3)	67	67	68	-1	0	I
N96	197	Residence (10)	67	69	70	-1	2	I
N97	389	Residence (7)	67	63	62	1	-4	N
N98	255	Residence (3)	67	67	67	0	0	I
N99	111	Residence (3)	67	72	74	-2	5	I
N100	183	Residence (3)	67	65	65	0	-2	N
N101	186	Residence (14)	67	61	60	1	-6	N

APPENDIX B-3

Traffic Noise Impact Summary—6-lane Hybrid Interchange with Half-Hawley Alternative

A. Receptor Location	B. Distance from centerline of near lane to receptor in feet	C. Number of families or people typical of this receptor site	D. Noise Level Criteria (NLC) (dBA)	E. 2050 Future Sound Level (dBA)	F. 2021 Existing sound level (dBA)	G. Difference in Future and Existing Sound Levels (dBA) (E minus F)	H. Difference in Future Sound Levels and Noise Level Criteria (dBA) (E minus D)	Impact (I) or No Impact (N) (dBA)
N102	160	Residence (6)	67	65	65	0	-2	N
N103	112	Residence (5)	67	72	75	-3	5	I
N104	105	Residence (5)	67	64	62	2	-3	N
N105	172	Residence (3)	67	71	73	-2	4	I
N106	210	Residence (2)	67	63	65	-2	-4	N
N107	209	Residence (2)	67	62	64	-2	-5	N
N108	209	Residence (8)	67	62	64	-2	-5	N
N109	213	Residence (12)	67	64	65	-1	-3	N
N110	213	Day Care Center (1)	67	69	69	0	2	I
N111	187	Restaurant (1)	72	62	62	0	-10	N
FS-1	113	Residence (1)	67	69	69	0	2	I
FS-2	195	Residence (1)	67	66	64	2	-1	I
FS-3	467	Residence (1)	67	62	61	1	-5	N
FS-4	475	Residence (9)	67	63	61	2	-4	N
FS-5	289	Cemetery	67	68	68	0	1	I
FS-6	150	Cemetery	67	71	72	-1	4	I
FS-7	184	Residence (1)	67	68	67	1	1	I
FS-8	495	Residence (1)	67	62	62	0	-5	N
FS-9	427	Park	67	61	60	1	-6	N
FS-10	117	Residence (2)	67	69	69	0	2	I
FS-11	126	Residence (4)	67	73	74	-1	6	I
FS-12	517	Residence (9)	67	58	59	-1	-9	N
FS-13	487	Residence (5)	67	63	62	1	-4	N
FS-14	110	Residence (1)	67	72	74	-2	5	I

APPENDIX B-4

Traffic Noise Impact Summary—6-lane Hybrid Interchange with Full-Hawley Alternative

A. Receptor Location	B. Distance from centerline of near lane to receptor in feet	C. Number of families or people typical of this receptor site	D. Noise Level Criteria (NLC) (dBA)	E. 2050 Future Sound Level (dBA)	F. 2021 Existing sound level (dBA)	G. Difference in Future and Existing Sound Levels (dBA) (E minus F)	H. Difference in Future Sound Levels and Noise Level Criteria (dBA) (E minus D)	Impact (I) or No Impact (N) (dBA)
R1	157	Single Family	67	61	61	0	-6	N
R2	177	Single Family	67	65	65	0	-2	N
R3	182	Multi Family (3)	67	67	67	0	0	I
R4	128	Single Family	67	65	64	1	-2	N
R5	143	Single Family	67	65	65	0	-2	N
R6	210	Multi Family (2)	67	67	66	1	0	I
R7	340	Single Family	67	66	66	0	-1	I
R8	210	Educational Facility	52	46	46	0	-6	N
R9	301	Recreation Facility	52	43	42	1	-9	N
N1	436	Residence (4)	67	64	63	1	-3	N
N2	400	Residence (7)	67	64	62	2	-3	N
N3	384	Residence (2)	67	64	63	1	-3	N
N4	262	Residence (4)	67	66	63	3	-1	I
N5	257	Residence (6)	67	65	63	2	-2	N
N6	235	Residence (2)	67	65	62	3	-2	N
N7	227	Residence (6)	67	64	62	2	-3	N
N8	212	Active Sports Area	67	64	62	2	-3	N
N9	420	Residence (6)	67	65	64	1	-2	N
N10	190	Residence (4)	67	66	65	1	-1	I
N11	190	Residence (3)	67	66	64	2	-1	I
N12	212	Residence (6)	67	68	65	3	1	I
N13	206	Residence (7)	67	73	71	2	6	I
N14	227	Residence (1)	67	73	72	1	6	I
N15	207	Residence (10)	67	67	65	2	0	I
N16	359	Residence (15)	67	65	62	3	-2	N
N17	188	Residence (5)	67	70	67	3	3	I
N18	267	Residence (2)	67	65	63	2	-2	N
N19	111	Residence (3)	67	69	67	2	2	I

APPENDIX B-4

Traffic Noise Impact Summary—6-lane Hybrid Interchange with Full-Hawley Alternative

A. Receptor Location	B. Distance from centerline of near lane to receptor in feet	C. Number of families or people typical of this receptor site	D. Noise Level Criteria (NLC) (dBA)	E. 2050 Future Sound Level (dBA)	F. 2021 Existing sound level (dBA)	G. Difference in Future and Existing Sound Levels (dBA) (E minus F)	H. Difference in Future Sound Levels and Noise Level Criteria (dBA) (E minus D)	Impact (I) or No Impact (N) (dBA)
N20	540	Residence (2)	67	67	66	1	0	I
N21	485	Residence (2)	67	69	68	1	2	I
N22	583	Residence (3)	67	67	65	2	0	I
N23	254	Residence (4)	67	69	68	1	2	I
N24	463	Residence (4)	67	66	67	-1	-1	I
N25	224	Residence (3)	67	68	68	0	1	I
N26	355	Residence (2)	67	67	67	0	0	I
N27	254	Residence (2)	67	68	68	0	1	I
N28	151	Residence (3)	67	69	70	-1	2	I
N29	338	Residence (4)	67	67	67	0	0	I
N30	116	Residence (1)	67	71	72	-1	4	I
N31	227	Residence (9)	67	68	69	-1	1	I
N32	106	Residence (3)	67	71	73	-2	4	I
N33	250	Residence (1)	67	67	69	-2	0	I
N34	68	Residence (1)	67	76	77	-1	9	I
N35	163	Residence (2)	67	73	73	0	6	I
N36	94	Residence (5)	67	69	70	-1	2	I
N37	190	Residence (3)	67	67	67	0	0	I
N38	169	Residence (6)	67	67	67	0	0	I
N39	133	Residence (1)	67	72	74	-2	5	I
N40	207	Residence (5)	67	69	70	-1	2	I
N41	309	Residence (4)	67	64	64	0	-3	N
N42	159	Residence (3)	67	67	68	-1	0	I
N43	225	Residence (2)	67	64	65	-1	-3	N
N44	303	Residence (1)	67	63	63	0	-4	N
N45	208	Residence (5)	67	66	66	0	-1	I
N46	160	Residence (1)	67	70	70	0	3	I

APPENDIX B-4

Traffic Noise Impact Summary—6-lane Hybrid Interchange with Full-Hawley Alternative

A. Receptor Location	B. Distance from centerline of near lane to receptor in feet	C. Number of families or people typical of this receptor site	D. Noise Level Criteria (NLC) (dBA)	E. 2050 Future Sound Level (dBA)	F. 2021 Existing sound level (dBA)	G. Difference in Future and Existing Sound Levels (dBA) (E minus F)	H. Difference in Future Sound Levels and Noise Level Criteria (dBA) (E minus D)	Impact (I) or No Impact (N) (dBA)
N47	309	Residence (4)	67	65	64	1	-2	N
N48	492	Cemetery	67	65	65	0	-2	N
N49	276	Cemetery	67	70	69	1	3	I
N50	75	Cemetery	67	77	77	0	10	I
N51	97	Cemetery	67	68	68	0	1	I
N52	309	Cemetery	67	65	64	1	-2	N
N53	547	Cemetery	67	63	64	-1	-4	N
N54	671	Cemetery	67	62	62	0	-5	N
N55	518	Residence (4)	67	64	64	0	-3	N
N56	312	Residence (1)	67	67	68	-1	0	I
N57	369	Residence (7)	67	66	66	0	-1	I
N58	193	Residence (5)	67	69	69	0	2	I
N59	434	Residence (6)	67	64	63	1	-3	N
N60	182	Residence (2)	67	68	66	2	1	I
N61	249	Residence (2)	67	67	66	1	0	I
N62	299	Residence (2)	67	65	65	0	-2	N
N63	289	Residence (2)	67	64	64	0	-3	N
N64	295	Residence (3)	67	63	63	0	-4	N
N65	296	Residence (3)	67	62	62	0	-5	N
N66	329	Residence (4)	67	62	61	1	-5	N
N67	369	Residence (18)	67	58	58	0	-9	N
N68	182	Residence (1)	67	62	62	0	-5	N
N69	118	Residence (2)	67	64	65	-1	-3	N
N70	87	Residence (1)	67	68	69	-1	1	I
N71	270	Residence (6)	67	59	59	0	-8	N
N72	380	Residence (6)	67	58	58	0	-9	N
N73	202	Residence (1)	67	64	64	0	-3	N
N74	281	Residence (4)	67	62	63	-1	-5	N

APPENDIX B-4

Traffic Noise Impact Summary—6-lane Hybrid Interchange with Full-Hawley Alternative

A. Receptor Location	B. Distance from centerline of near lane to receptor in feet	C. Number of families or people typical of this receptor site	D. Noise Level Criteria (NLC) (dBA)	E. 2050 Future Sound Level (dBA)	F. 2021 Existing sound level (dBA)	G. Difference in Future and Existing Sound Levels (dBA) (E minus F)	H. Difference in Future Sound Levels and Noise Level Criteria (dBA) (E minus D)	Impact (I) or No Impact (N) (dBA)
N75	262	Residence (3)	67	62	63	-1	-5	N
N76	184	Residence (3)	67	58	62	-4	-9	N
N77	504	Residence (4)	67	56	56	0	-11	N
N78	352	Residence (5)	67	60	61	-1	-7	N
N79	385	Residence (6)	67	57	57	0	-10	N
N80	301	Residence (6)	67	61	59	2	-6	N
N81	168	Residence (8)	67	69	66	3	2	I
N82	250	Residence (5)	67	61	60	1	-6	N
N83	181	Residence (3)	67	65	66	-1	-2	N
N84	243	Residence (8)	67	62	63	-1	-5	N
N85	181	Residence (1)	67	63	67	-4	-4	N
N86	164	Residence (3)	67	65	68	-3	-2	N
N87	236	Residence (3)	67	66	66	0	-1	I
N88	152	Residence (1)	67	69	71	-2	2	I
N89	391	Residence (12)	67	64	63	1	-3	N
N90	186	Residence (2)	67	69	68	1	2	I
N91	232	Residence (5)	67	69	68	1	2	I
N92	555	Residence (10)	67	62	61	1	-5	N
N93	239	Merrill Park Apt. (6)	67	68	69	-1	1	I
N94	382	Residence (5)	67	65	65	0	-2	N
N95	153	Residence (3)	67	67	68	-1	0	I
N96	197	Residence (10)	67	69	70	-1	2	I
N97	389	Residence (7)	67	63	62	1	-4	N
N98	255	Residence (3)	67	67	67	0	0	I
N99	111	Residence (3)	67	72	74	-2	5	I
N100	183	Residence (3)	67	65	65	0	-2	N
N101	186	Residence (14)	67	61	60	1	-6	N

APPENDIX B-4

Traffic Noise Impact Summary—6-lane Hybrid Interchange with Full-Hawley Alternative

A. Receptor Location	B. Distance from centerline of near lane to receptor in feet	C. Number of families or people typical of this receptor site	D. Noise Level Criteria (NLC) (dBA)	E. 2050 Future Sound Level (dBA)	F. 2021 Existing sound level (dBA)	G. Difference in Future and Existing Sound Levels (dBA) (E minus F)	H. Difference in Future Sound Levels and Noise Level Criteria (dBA) (E minus D)	Impact (I) or No Impact (N) (dBA)
N102	160	Residence (6)	67	65	65	0	-2	N
N103	112	Residence (5)	67	72	75	-3	5	I
N104	105	Residence (5)	67	64	62	2	-3	N
N105	172	Residence (3)	67	71	73	-2	4	I
N106	210	Residence (2)	67	63	65	-2	-4	N
N107	209	Residence (2)	67	62	64	-2	-5	N
N108	209	Residence (8)	67	63	64	-1	-4	N
N109	213	Residence (12)	67	64	65	-1	-3	N
N110	213	Day Care Center (1)	67	69	69	0	2	I
N111	187	Restaurant (1)	72	62	62	0	-10	N
FS-1	113	Residence (1)	67	69	69	0	2	I
FS-2	195	Residence (1)	67	66	64	2	-1	I
FS-3	467	Residence (1)	67	62	61	1	-5	N
FS-4	475	Residence (9)	67	63	61	2	-4	N
FS-5	289	Cemetery	67	68	68	0	1	I
FS-6	150	Cemetery	67	71	72	-1	4	I
FS-7	184	Residence (1)	67	68	67	1	1	I
FS-8	495	Residence (1)	67	62	62	0	-5	N
FS-9	427	Park	67	61	60	1	-6	N
FS-10	117	Residence (2)	67	65	66	-1	-2	N
FS-11	126	Residence (4)	67	73	74	-1	6	I
FS-12	517	Residence (9)	67	58	59	-1	-9	N
FS-13	487	Residence (5)	67	63	62	1	-4	N
FS-14	110	Residence (1)	67	72	74	-2	5	I

APPENDIX B-5

Traffic Noise Impact Summary—6-lane DDI with Half-Hawley Alternative

A. Receptor Location	B. Distance from centerline of near lane to receptor in feet	C. Number of families or people typical of this receptor site	D. Noise Level Criteria (NLC) (dBA)	E. 2050 Future Sound Level (dBA)	F. 2021 Existing sound level (dBA)	G. Difference in Future and Existing Sound Levels (dBA) (E minus F)	H. Difference in Future Sound Levels and Noise Level Criteria (dBA) (E minus D)	Impact (I) or No Impact (N) (dBA)
R1	157	Single Family	67	61	61	0	-6	N
R2	177	Single Family	67	65	65	0	-2	N
R3	182	Multi Family (3)	67	67	67	0	0	I
R4	128	Single Family	67	65	64	1	-2	N
R5	143	Single Family	67	65	65	0	-2	N
R6	210	Multi Family (2)	67	67	66	1	0	I
R7	340	Single Family	67	66	66	0	-1	I
R8	210	Educational Facility	52	46	46	0	-6	N
R9	301	Recreation Facility	52	43	42	1	-9	N
N1	436	Residence (4)	67	64	63	1	-3	N
N2	400	Residence (7)	67	64	62	2	-3	N
N3	384	Residence (2)	67	64	63	1	-3	N
N4	262	Residence (4)	67	66	63	3	-1	I
N5	257	Residence (6)	67	65	63	2	-2	N
N6	235	Residence (2)	67	65	62	3	-2	N
N7	227	Residence (6)	67	64	62	2	-3	N
N8	212	Active Sports Area	67	64	62	2	-3	N
N9	420	Residence (6)	67	65	64	1	-2	N
N10	190	Residence (4)	67	66	65	1	-1	I
N11	190	Residence (3)	67	66	64	2	-1	I
N12	212	Residence (6)	67	68	65	3	1	I
N13	206	Residence (7)	67	73	71	2	6	I
N14	227	Residence (1)	67	73	72	1	6	I
N15	207	Residence (10)	67	67	65	2	0	I
N16	359	Residence (15)	67	65	62	3	-2	N
N17	188	Residence (5)	67	70	67	3	3	I
N18	267	Residence (2)	67	65	63	2	-2	N
N19	111	Residence (3)	67	68	67	1	1	I

APPENDIX B-5

Traffic Noise Impact Summary—6-lane DDI with Half-Hawley Alternative

A. Receptor Location	B. Distance from centerline of near lane to receptor in feet	C. Number of families or people typical of this receptor site	D. Noise Level Criteria (NLC) (dBA)	E. 2050 Future Sound Level (dBA)	F. 2021 Existing sound level (dBA)	G. Difference in Future and Existing Sound Levels (dBA) (E minus F)	H. Difference in Future Sound Levels and Noise Level Criteria (dBA) (E minus D)	Impact (I) or No Impact (N) (dBA)
N20	540	Residence (2)	67	67	66	1	0	I
N21	485	Residence (2)	67	69	68	1	2	I
N22	583	Residence (3)	67	67	65	2	0	I
N23	254	Residence (4)	67	69	68	1	2	I
N24	463	Residence (4)	67	66	67	-1	-1	I
N25	224	Residence (3)	67	69	68	1	2	I
N26	355	Residence (2)	67	67	67	0	0	I
N27	254	Residence (2)	67	68	68	0	1	I
N28	151	Residence (3)	67	70	70	0	3	I
N29	338	Residence (4)	67	67	67	0	0	I
N30	116	Residence (1)	67	71	72	-1	4	I
N31	227	Residence (9)	67	68	69	-1	1	I
N32	106	Residence (3)	67	72	73	-1	5	I
N33	250	Residence (1)	67	67	69	-2	0	I
N34	68	Residence (1)	67	77	77	0	10	I
N35	163	Residence (2)	67	73	73	0	6	I
N36	94	Residence (5)	67	69	70	-1	2	I
N37	190	Residence (3)	67	67	67	0	0	I
N38	169	Residence (6)	67	68	67	1	1	I
N39	133	Residence (1)	67	73	74	-1	6	I
N40	207	Residence (5)	67	69	70	-1	2	I
N41	309	Residence (4)	67	64	64	0	-3	N
N42	159	Residence (3)	67	67	68	-1	0	I
N43	225	Residence (2)	67	64	65	-1	-3	N
N44	303	Residence (1)	67	63	63	0	-4	N
N45	208	Residence (5)	67	66	66	0	-1	I
N46	160	Residence (1)	67	70	70	0	3	I
N47	309	Residence (4)	67	65	64	1	-2	N

APPENDIX B-5

Traffic Noise Impact Summary—6-lane DDI with Half-Hawley Alternative

A. Receptor Location	B. Distance from centerline of near lane to receptor in feet	C. Number of families or people typical of this receptor site	D. Noise Level Criteria (NLC) (dBA)	E. 2050 Future Sound Level (dBA)	F. 2021 Existing sound level (dBA)	G. Difference in Future and Existing Sound Levels (dBA) (E minus F)	H. Difference in Future Sound Levels and Noise Level Criteria (dBA) (E minus D)	Impact (I) or No Impact (N) (dBA)
N48	492	Cemetery	67	65	65	0	-2	N
N49	276	Cemetery	67	70	69	1	3	I
N50	75	Cemetery	67	77	77	0	10	I
N51	97	Cemetery	67	68	68	0	1	I
N52	309	Cemetery	67	65	64	1	-2	N
N53	547	Cemetery	67	63	64	-1	-4	N
N54	671	Cemetery	67	62	62	0	-5	N
N55	518	Residence (4)	67	64	64	0	-3	N
N56	312	Residence (1)	67	67	68	-1	0	I
N57	369	Residence (7)	67	66	66	0	-1	I
N58	193	Residence (5)	67	70	69	1	3	I
N59	434	Residence (6)	67	65	63	2	-2	N
N60	182	Residence (2)	67	69	66	3	2	I
N61	249	Residence (2)	67	68	66	2	1	I
N62	299	Residence (2)	67	67	65	2	0	I
N63	289	Residence (2)	67	66	64	2	-1	I
N64	295	Residence (3)	67	65	63	2	-2	N
N65	296	Residence (3)	67	64	62	2	-3	N
N66	329	Residence (4)	67	63	61	2	-4	N
N67	369	Residence (18)	67	59	58	1	-8	N
N68	182	Residence (1)	67	62	62	0	-5	N
N69	118	Residence (2)	67	65	65	0	-2	N
N70	87	Residence (1)	67	70	69	1	3	I
N71	270	Residence (6)	67	60	59	1	-7	N
N72	380	Residence (6)	67	60	58	2	-7	N
N73	202	Residence (1)	67	65	64	1	-2	N
N74	281	Residence (4)	67	64	63	1	-3	N

APPENDIX B-5

Traffic Noise Impact Summary—6-lane DDI with Half-Hawley Alternative

A. Receptor Location	B. Distance from centerline of near lane to receptor in feet	C. Number of families or people typical of this receptor site	D. Noise Level Criteria (NLC) (dBA)	E. 2050 Future Sound Level (dBA)	F. 2021 Existing sound level (dBA)	G. Difference in Future and Existing Sound Levels (dBA) (E minus F)	H. Difference in Future Sound Levels and Noise Level Criteria (dBA) (E minus D)	Impact (I) or No Impact (N) (dBA)
N75	262	Residence (3)	67	64	63	1	-3	N
N76	184	Residence (3)	67	63	62	1	-4	N
N77	504	Residence (4)	67	58	56	2	-9	N
N78	352	Residence (5)	67	62	61	1	-5	N
N79	385	Residence (6)	67	56	57	-1	-11	N
N80	301	Residence (6)	67	61	59	2	-6	N
N81	168	Residence (8)	67	69	66	3	2	I
N82	250	Residence (5)	67	61	60	1	-6	N
N83	181	Residence (3)	67	67	66	1	0	I
N84	243	Residence (8)	67	63	63	0	-4	N
N85	181	Residence (1)	67	66	67	-1	-1	I
N86	164	Residence (3)	67	67	68	-1	0	I
N87	236	Residence (3)	67	67	66	1	0	I
N88	152	Residence (1)	67	70	71	-1	3	I
N89	391	Residence (12)	67	64	63	1	-3	N
N90	186	Residence (2)	67	70	68	2	3	I
N91	232	Residence (5)	67	69	68	1	2	I
N92	555	Residence (10)	67	62	61	1	-5	N
N93	239	Merrill Park Apt. (6)	67	69	69	0	2	I
N94	382	Residence (5)	67	66	65	1	-1	I
N95	153	Residence (3)	67	67	68	-1	0	I
N96	197	Residence (10)	67	69	70	-1	2	I
N97	389	Residence (7)	67	62	62	0	-5	N
N98	255	Residence (3)	67	66	67	-1	-1	I
N99	111	Residence (3)	67	71	74	-3	4	I
N100	183	Residence (3)	67	64	65	-1	-3	N
N101	186	Residence (14)	67	61	60	1	-6	N
N102	160	Residence (6)	67	64	65	-1	-3	N

APPENDIX B-5

Traffic Noise Impact Summary—6-lane DDI with Half-Hawley Alternative

A. Receptor Location	B. Distance from centerline of near lane to receptor in feet	C. Number of families or people typical of this receptor site	D. Noise Level Criteria (NLC) (dBA)	E. 2050 Future Sound Level (dBA)	F. 2021 Existing sound level (dBA)	G. Difference in Future and Existing Sound Levels (dBA) (E minus F)	H. Difference in Future Sound Levels and Noise Level Criteria (dBA) (E minus D)	Impact (I) or No Impact (N) (dBA)
N103	112	Residence (5)	67	71	75	-4	4	I
N104	105	Residence (5)	67	64	62	2	-3	N
N105	172	Residence (3)	67	71	73	-2	4	I
N106	210	Residence (2)	67	63	65	-2	-4	N
N107	209	Residence (2)	67	62	64	-2	-5	N
N108	209	Residence (8)	67	62	64	-2	-5	N
N109	213	Residence (12)	67	64	65	-1	-3	N
N110	213	Day Care Center (1)	67	69	69	0	2	I
N111	187	Restaurant (1)	72	62	62	0	-10	N
FS-1	113	Residence (1)	67	69	69	0	2	I
FS-2	195	Residence (1)	67	66	64	2	-1	I
FS-3	467	Residence (1)	67	62	61	1	-5	N
FS-4	475	Residence (9)	67	63	61	2	-4	N
FS-5	289	Cemetery	67	68	68	0	1	I
FS-6	150	Cemetery	67	71	72	-1	4	I
FS-7	184	Residence (1)	67	69	67	2	2	I
FS-8	495	Residence (1)	67	64	62	2	-3	N
FS-9	427	Park	67	62	60	2	-5	N
FS-10	117	Residence (2)	67	66	66	0	-1	I
FS-11	126	Residence (4)	67	73	74	-1	6	I
FS-12	517	Residence (9)	67	58	59	-1	-9	N
FS-13	487	Residence (5)	67	63	62	1	-4	N
FS-14	110	Residence (1)	67	72	74	-2	5	I

APPENDIX B-6

Traffic Noise Impact Summary—6-lane DDI with Full-Hawley Alternative

A. Receptor Location	B. Distance from centerline of near lane to receptor in feet	C. Number of families or people typical of this receptor site	D. Noise Level Criteria (NLC) (dBA)	E. 2050 Future Sound Level (dBA)	F. 2021 Existing sound level (dBA)	G. Difference in Future and Existing Sound Levels (dBA) (E minus F)	H. Difference in Future Sound Levels and Noise Level Criteria (dBA) (E minus D)	Impact (I) or No Impact (N) (dBA)
R1	157	Single Family	67	61	61	0	-6	N
R2	177	Single Family	67	65	65	0	-2	N
R3	182	Multi Family (3)	67	67	67	0	0	I
R4	128	Single Family	67	65	64	1	-2	N
R5	143	Single Family	67	65	65	0	-2	N
R6	210	Multi Family (2)	67	67	66	1	0	I
R7	340	Single Family	67	66	66	0	-1	I
R8	210	Educational Facility	52	46	46	0	-6	N
R9	301	Recreation Facility	52	43	42	1	-9	N
N1	436	Residence (4)	67	64	63	1	-3	N
N2	400	Residence (7)	67	64	62	2	-3	N
N3	384	Residence (2)	67	64	63	1	-3	N
N4	262	Residence (4)	67	66	63	3	-1	I
N5	257	Residence (6)	67	65	63	2	-2	N
N6	235	Residence (2)	67	65	62	3	-2	N
N7	227	Residence (6)	67	64	62	2	-3	N
N8	212	Active Sports Area	67	64	62	2	-3	N
N9	420	Residence (6)	67	65	64	1	-2	N
N10	190	Residence (4)	67	66	65	1	-1	I
N11	190	Residence (3)	67	66	64	2	-1	I
N12	212	Residence (6)	67	67	65	2	0	I
N13	206	Residence (7)	67	73	71	2	6	I
N14	227	Residence (1)	67	73	72	1	6	I
N15	207	Residence (10)	67	67	65	2	0	I
N16	359	Residence (15)	67	65	62	3	-2	N
N17	188	Residence (5)	67	70	67	3	3	I
N18	267	Residence (2)	67	65	63	2	-2	N
N19	111	Residence (3)	67	69	67	2	2	I

APPENDIX B-6

Traffic Noise Impact Summary—6-lane DDI with Full-Hawley Alternative

A. Receptor Location	B. Distance from centerline of near lane to receptor in feet	C. Number of families or people typical of this receptor site	D. Noise Level Criteria (NLC) (dBA)	E. 2050 Future Sound Level (dBA)	F. 2021 Existing sound level (dBA)	G. Difference in Future and Existing Sound Levels (dBA) (E minus F)	H. Difference in Future Sound Levels and Noise Level Criteria (dBA) (E minus D)	Impact (I) or No Impact (N) (dBA)
N20	540	Residence (2)	67	67	66	1	0	I
N21	485	Residence (2)	67	69	68	1	2	I
N22	583	Residence (3)	67	67	65	2	0	I
N23	254	Residence (4)	67	69	68	1	2	I
N24	463	Residence (4)	67	66	67	-1	-1	I
N25	224	Residence (3)	67	68	68	0	1	I
N26	355	Residence (2)	67	67	67	0	0	I
N27	254	Residence (2)	67	68	68	0	1	I
N28	151	Residence (3)	67	69	70	-1	2	I
N29	338	Residence (4)	67	67	67	0	0	I
N30	116	Residence (1)	67	71	72	-1	4	I
N31	227	Residence (9)	67	68	69	-1	1	I
N32	106	Residence (3)	67	71	73	-2	4	I
N33	250	Residence (1)	67	67	69	-2	0	I
N34	68	Residence (1)	67	76	77	-1	9	I
N35	163	Residence (2)	67	73	73	0	6	I
N36	94	Residence (5)	67	69	70	-1	2	I
N37	190	Residence (3)	67	67	67	0	0	I
N38	169	Residence (6)	67	67	67	0	0	I
N39	133	Residence (1)	67	72	74	-2	5	I
N40	207	Residence (5)	67	69	70	-1	2	I
N41	309	Residence (4)	67	64	64	0	-3	N
N42	159	Residence (3)	67	66	68	-2	-1	I
N43	225	Residence (2)	67	64	65	-1	-3	N
N44	303	Residence (1)	67	63	63	0	-4	N
N45	208	Residence (5)	67	66	66	0	-1	I
N46	160	Residence (1)	67	70	70	0	3	I

APPENDIX B-6

Traffic Noise Impact Summary—6-lane DDI with Full-Hawley Alternative

A. Receptor Location	B. Distance from centerline of near lane to receptor in feet	C. Number of families or people typical of this receptor site	D. Noise Level Criteria (NLC) (dBA)	E. 2050 Future Sound Level (dBA)	F. 2021 Existing sound level (dBA)	G. Difference in Future and Existing Sound Levels (dBA) (E minus F)	H. Difference in Future Sound Levels and Noise Level Criteria (dBA) (E minus D)	Impact (I) or No Impact (N) (dBA)
N47	309	Residence (4)	67	65	64	1	-2	N
N48	492	Cemetery	67	65	65	0	-2	N
N49	276	Cemetery	67	70	69	1	3	I
N50	75	Cemetery	67	77	77	0	10	I
N51	97	Cemetery	67	68	68	0	1	I
N52	309	Cemetery	67	65	64	1	-2	N
N53	547	Cemetery	67	63	64	-1	-4	N
N54	671	Cemetery	67	62	62	0	-5	N
N55	518	Residence (4)	67	64	64	0	-3	N
N56	312	Residence (1)	67	67	68	-1	0	I
N57	369	Residence (7)	67	66	66	0	-1	I
N58	193	Residence (5)	67	70	69	1	3	I
N59	434	Residence (6)	67	65	63	2	-2	N
N60	182	Residence (2)	67	69	66	3	2	I
N61	249	Residence (2)	67	68	66	2	1	I
N62	299	Residence (2)	67	67	65	2	0	I
N63	289	Residence (2)	67	66	64	2	-1	I
N64	295	Residence (3)	67	65	63	2	-2	N
N65	296	Residence (3)	67	64	62	2	-3	N
N66	329	Residence (4)	67	64	61	3	-3	N
N67	369	Residence (18)	67	59	58	1	-8	N
N68	182	Residence (1)	67	62	62	0	-5	N
N69	118	Residence (2)	67	65	65	0	-2	N
N70	87	Residence (1)	67	70	69	1	3	I
N71	270	Residence (6)	67	60	59	1	-7	N
N72	380	Residence (6)	67	60	58	2	-7	N
N73	202	Residence (1)	67	65	64	1	-2	N
N74	281	Residence (4)	67	64	63	1	-3	N

APPENDIX B-6

Traffic Noise Impact Summary—6-lane DDI with Full-Hawley Alternative

A. Receptor Location	B. Distance from centerline of near lane to receptor in feet	C. Number of families or people typical of this receptor site	D. Noise Level Criteria (NLC) (dBA)	E. 2050 Future Sound Level (dBA)	F. 2021 Existing sound level (dBA)	G. Difference in Future and Existing Sound Levels (dBA) (E minus F)	H. Difference in Future Sound Levels and Noise Level Criteria (dBA) (E minus D)	Impact (I) or No Impact (N) (dBA)
N75	262	Residence (3)	67	64	63	1	-3	N
N76	184	Residence (3)	67	63	62	1	-4	N
N77	504	Residence (4)	67	58	56	2	-9	N
N78	352	Residence (5)	67	62	61	1	-5	N
N79	385	Residence (6)	67	56	57	-1	-11	N
N80	301	Residence (6)	67	61	59	2	-6	N
N81	168	Residence (8)	67	69	66	3	2	I
N82	250	Residence (5)	67	61	60	1	-6	N
N83	181	Residence (3)	67	67	66	1	0	I
N84	243	Residence (8)	67	63	63	0	-4	N
N85	181	Residence (1)	67	66	67	-1	-1	I
N86	164	Residence (3)	67	67	68	-1	0	I
N87	236	Residence (3)	67	67	66	1	0	I
N88	152	Residence (1)	67	70	71	-1	3	I
N89	391	Residence (12)	67	64	63	1	-3	N
N90	186	Residence (2)	67	70	68	2	3	I
N91	232	Residence (5)	67	69	68	1	2	I
N92	555	Residence (10)	67	63	61	2	-4	N
N93	239	Merrill Park Apt. (6)	67	69	69	0	2	I
N94	382	Residence (5)	67	66	65	1	-1	I
N95	153	Residence (3)	67	67	68	-1	0	I
N96	197	Residence (10)	67	69	70	-1	2	I
N97	389	Residence (7)	67	62	62	0	-5	N
N98	255	Residence (3)	67	66	67	-1	-1	I
N99	111	Residence (3)	67	72	74	-2	5	I
N100	183	Residence (3)	67	64	65	-1	-3	N
N101	186	Residence (14)	67	61	60	1	-6	N

APPENDIX B-6

Traffic Noise Impact Summary—6-lane DDI with Full-Hawley Alternative

A. Receptor Location	B. Distance from centerline of near lane to receptor in feet	C. Number of families or people typical of this receptor site	D. Noise Level Criteria (NLC) (dBA)	E. 2050 Future Sound Level (dBA)	F. 2021 Existing sound level (dBA)	G. Difference in Future and Existing Sound Levels (dBA) (E minus F)	H. Difference in Future Sound Levels and Noise Level Criteria (dBA) (E minus D)	Impact (I) or No Impact (N) (dBA)
N102	160	Residence (6)	67	64	65	-1	-3	N
N103	112	Residence (5)	67	71	75	-4	4	I
N104	105	Residence (5)	67	64	62	2	-3	N
N105	172	Residence (3)	67	71	73	-2	4	I
N106	210	Residence (2)	67	63	65	-2	-4	N
N107	209	Residence (2)	67	62	64	-2	-5	N
N108	209	Residence (8)	67	62	64	-2	-5	N
N109	213	Residence (12)	67	64	65	-1	-3	N
N110	213	Day Care Center (1)	67	69	69	0	2	I
N111	187	Restaurant (1)	72	62	62	0	-10	N
FS-1	113	Residence (1)	67	69	69	0	2	I
FS-2	195	Residence (1)	67	66	64	2	-1	I
FS-3	467	Residence (1)	67	62	61	1	-5	N
FS-4	475	Residence (9)	67	63	61	2	-4	N
FS-5	289	Cemetery	67	69	68	1	2	I
FS-6	150	Cemetery	67	71	72	-1	4	I
FS-7	184	Residence (1)	67	69	67	2	2	I
FS-8	495	Residence (1)	67	64	62	2	-3	N
FS-9	427	Park	67	62	60	2	-5	N
FS-10	117	Residence (2)	67	66	66	0	-1	I
FS-11	126	Residence (4)	67	73	74	-1	6	I
FS-12	517	Residence (9)	67	58	59	-1	-9	N
FS-13	487	Residence (5)	67	63	62	1	-4	N
FS-14	110	Residence (1)	67	72	74	-2	5	I

APPENDIX B-7

Traffic Noise Impact Summary – Washington Street Extension

A. Receptor Location (see Exhibit 4-1)	B. Distance from centerline of near lane to receptor in feet	C. Number of families or people typical of this receptor site	D. Noise Level Criteria (NLC) (dBA)	E. 2050 Future Sound Level (dBA)	F. 2021 Existing sound level (dBA)	G. Difference in Future and Existing Sound Levels (dBA) (E minus F)	H. Difference in Future Sound Levels and Noise Level Criteria (dBA) (E minus D)	Impact (I) or No Impact (N) (dBA)
N112	45	Residence (16)	67	63	62	1	-4	N
N113	69	Residence (26)	67	61	60	1	-6	N
N114	347	Residence (3)	67	48	40	8	-19	N
N115	85	Residence (1)	67	61	62	-1	-6	N
N116	34	Residence (8)	67	64	65	-1	-3	N
N117	24	Residence (8)	67	65	66	-1	-2	N
N118	31	Residence (14)	67	65	66	-1	-2	N
N119	34	Residence (11)	67	64	65	-1	-3	N
N120	18	Residence (14)	67	65	66	-1	-2	N
N121	288	Residence (4)	67	43	41	2	-24	N
N122	234	Residence (4)	67	46	44	2	-21	N
N123	239	Residence (1)	67	55	53	2	-12	N
FS-15	147	Residence (3)	67	53	41	12	-14	N
FS-16	440	Residence (3)	67	46	38	8	-21	N
FS-17	188	Residence (4)	67	54	50	4	-13	N

Appendix C
8-Lane DDI Alternative Barrier Analyses

Abatement Analysis

Before any abatement measure can be proposed for incorporation into the project, it must be both feasible and reasonable. Feasibility and reasonableness considerations include constructability, the predicted acoustic reductions provided by an abatement measure, a cost allowance, and whether the adjacent receptors desire abatement. Receptors associated with an abatement measure that achieve a noise reduction of 8 dBA or greater are called benefited receptors.

Based on FHWA's *Highway Traffic Noise Analysis and Abatement Guidance*, WisDOT identified representative receptors potentially affected by traffic sound (schools, libraries, churches, hospitals, residences, resources protected by Section 4(f), etc.) within 500 feet of the proposed design right-of-way. Sensitive receptors beyond 500 feet were not considered for noise analysis or mitigation. Any impacted representative receptor underwent a barrier analysis for all receptors within 500 feet of that impacted representative receptor.

WisDOT's *Facilities Development Manual Chapter 23, Noise*, establishes criteria for determining reasonableness of noise barriers, as follows:

- The total cost of the barrier may not exceed $50,000 per benefited receptor. In addition, an individual barrier within a common noise environment may not be considered for cost averaging if the barrier cost exceeds $100,000 per benefited receptor.
- A noise barrier will be designed (horizontal and vertical location) such that a minimum of one receptor or common use area achieves WisDOT's noise reduction design goal of 9 dBA.
- A noise barrier shall reduce noise levels by a minimum of 8 dBA for a receptor or common use area to be considered as benefited for the purposes of determining reasonableness.

Per WisDOT's *Facilities Development Manual* 23-35-15.2:

- Each individual residence benefited is counted as one (1) benefited receiver.
- Each dwelling unit benefited in a multi-family dwelling is counted as one (1) benefited receiver.
- Each dwelling unit in the multi-family complex eligible to use the benefited common use area is counted as one (1) benefited receiver.

A total of 15 noise barriers were analyzed for areas abutting the corridor that would be exposed to noise levels that approach, meet, or exceed the NLC for considering barriers for the 8-lane DDI alternative. Five barriers were considered both reasonable and feasible independent of cost averaging (Barriers 1, 3, 4A, 7, and 10). Cost averaging for the 8-lane DDI alternative provided cost reasonableness for one additional barrier (Barrier 9) for a total of six barriers.

Barrier 1

R4, R5, R6, R7, N23, N24, N25, N26, N27, N28, and N29 are the representative receptors along eastbound I-94 from 72nd Street to 68th Street, and represent 106 total receptors studied for barrier 1. Barrier 1 would achieve the minimum feasible 8 dBA noise reduction for 17 benefited receptors (22 benefited units). With an estimated barrier cost of $33,518 per benefited unit, the barrier would also be reasonable. **Table C-1** summarizes the barrier 1 analysis and **Table C-2** presents the barrier 1 analysis for each receptor studied. **Figure C-1** shows the barrier 1 analysis results. Although the receptors between 70th Street and 68th Street would not be benefitted (would not receive an 8 dbA or more noise reduction), they would still receive some reduction in noise level from the proposed barrier, as shown in **Table C-2**.

For the purposes of the Barrier 1 analysis, WisDOT analyzed the barriers east and west of 70th Street in combination to determine if it was reasonable. The analysis of the combination barrier was determined reasonable. The existing noise barrier along I-94 eastbound from 72nd Street to 70th Street will be reconstructed as part of this project.

Table C-1
Barrier 1 Analysis Summary

Location	Representative Receptors	Total Receptors in Study*	Number of Receptors Impacted	Total Benefited Receptors	Total Benefited Units**	Estimated Barrier Cost	Estimated Barrier Cost per Benefited Unit	Result of Analysis
EB I-94 From N 72nd to 68th	R4, R5, R6, R7, N23, N24, N25, N26, N27, N28, N29	106	63	17	22	$737,400	$33,518	Reasonable and Feasible

*For the purposes of this Supplemental EIS, receptors are considered individual buildings.
** A unit is a discrete residence or business.

Table C-2
Barrier 1 Analysis for Receptors Studied

Receptor	No Barrier dBA	With Barrier dBA	Noise Reduction dBA	Minimum Benefited Goal dBA	Units Per Benefited Receptor*	Noise Impact (I) Impact (N) Non Impact
12	70	60	10	8	2	I
13	70	60	10	8	2	I
14	69	60	9	8	1	I
15	69	60	9	8	1	I
16	70	61	9	8	1	I
17	71	62	9	8	2	I
18	71	62	9	8	1	I
20	73	64	9	8	2	I
27	66	57	9	8	2	N
R4	75	67	8	8	1	I
R5	73	65	8	8	1	I

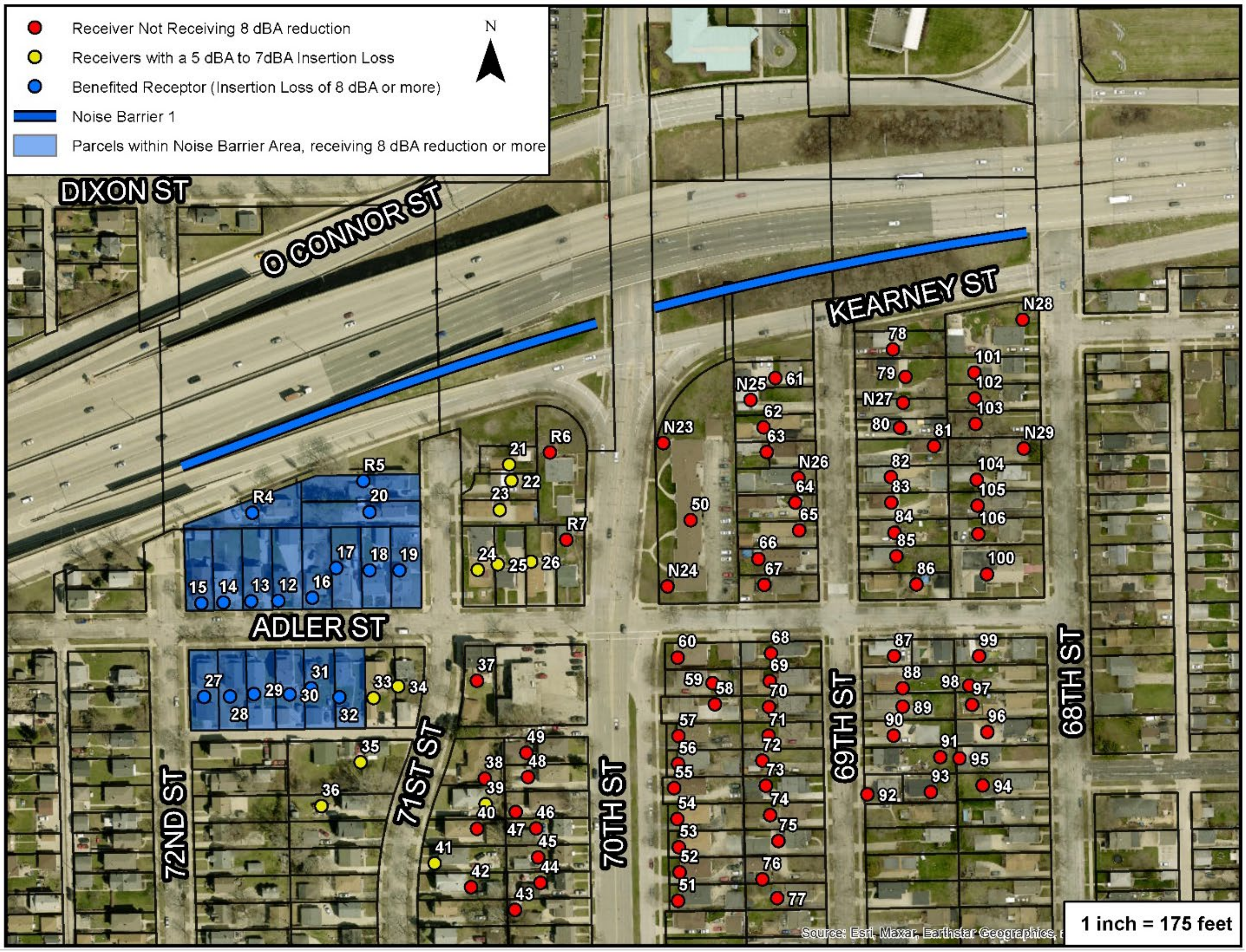
Receptor	No Barrier dBA	With Barrier dBA	Noise Reduction dBA	Minimum Benefited Goal dBA	Units Per Benefited Receptor*	Noise Impact (I) Impact (N) Non Impact
19	70	62	8	8	1	I
28	66	58	8	8	1	I
29	66	58	8	8	1	I
30	66	58	8	8	1	I
31	66	58	8	8	1	I
32	66	58	8	8	1	N
33	66	59	7	8	-	N
34	66	59	7	8	-	I
36	63	56	7	8	-	N
24	68	62	6	8	-	I
25	68	62	6	8	-	I
35	64	58	6	8	-	N
21	69	64	5	8	-	I
22	69	64	5	8	-	I
23	69	64	5	8	-	I
26	68	63	5	8	-	I
39	64	59	5	8	-	N
41	62	57	5	8	-	N
R7	69	65	4	8	-	I
N26	68	64	4	8	-	I
37	64	60	4	8	-	N
38	63	59	4	8	-	N
40	63	59	4	8	-	N
42	62	58	4	8	-	N
43	64	60	4	8	-	N
47	65	61	4	8	-	N
48	66	62	4	8	-	N
49	66	62	4	8	-	N
58	67	63	4	8	-	I
59	67	63	4	8	-	I
60	68	64	4	8	-	I
61	69	65	4	8	-	I
62	69	65	4	8	-	I
63	69	65	4	8	-	I
64	68	64	4	8	-	I

Receptor	No Barrier dBA	With Barrier dBA	Noise Reduction dBA	Minimum Benefited Goal dBA	Units Per Benefited Receptor*	Noise Impact (I) Impact (N) Non Impact
65	67	63	4	8	-	I
66	67	63	4	8	-	I
67	67	63	4	8	-	I
69	66	62	4	8	-	I
70	66	62	4	8	-	I
73	65	61	4	8	-	N
78	69	65	4	8	-	I
79	69	65	4	8	-	I
80	68	64	4	8	-	I
82	68	64	4	8	-	I
83	68	64	4	8	-	I
N23	70	67	3	8	-	I
R6	69	66	3	8	-	I
N24	68	65	3	8	-	I
N25	69	66	3	8	-	I
N27	68	65	3	8	-	I
44	65	62	3	8	-	N
45	65	62	3	8	-	N
46	65	62	3	8	-	N
50	68	65	3	8	-	I
54	66	63	3	8	-	N
57	67	64	3	8	-	I
68	66	63	3	8	-	I
71	65	62	3	8	-	N
72	65	62	3	8	-	N
74	64	61	3	8	-	N
75	64	61	3	8	-	N
76	63	60	3	8	-	N
77	63	60	3	8	-	N
81	68	65	3	8	-	I
84	67	64	3	8	-	I
85	67	64	3	8	-	I
86	67	64	3	8	-	I
88	65	62	3	8	-	N
89	65	62	3	8	-	N

Receptor	No Barrier dBA	With Barrier dBA	Noise Reduction dBA	Minimum Benefited Goal dBA	Units Per Benefited Receptor*	Noise Impact (I) Impact (N) Non Impact
90	65	62	3	8	-	N
92	64	61	3	8	-	N
100	66	63	3	8	-	N
101	69	66	3	8	-	I
103	68	65	3	8	-	I
104	67	64	3	8	-	I
105	67	64	3	8	-	I
N29	68	66	2	8	-	I
51	65	63	2	8	-	N
52	65	63	2	8	-	N
53	65	63	2	8	-	N
55	66	64	2	8	-	I
56	66	64	2	8	-	I
87	65	63	2	8	-	N
91	64	62	2	8	-	N
93	63	61	2	8	-	N
94	63	61	2	8	-	N
95	64	62	2	8	-	N
97	64	62	2	8	-	N
98	64	62	2	8	-	N
99	64	62	2	8	-	N
102	68	66	2	8	-	I
106	66	64	2	8	-	I
N28	70	69	1	8	-	I
96	63	62	1	8	-	N

*Units per benefited receptor were only determined for receptors receiving an 8 dBA or more reduction. For the purposes of this Supplemental EIS, receptors are considered individual buildings. A unit is a discrete residence or business.

Figure C-1. Barrier 1 Analysis



Barrier 2

R1, R2, R3, and N1 are the representative receptors along westbound I-94 from 68th Street to 72nd Street, and represent 62 total receptors studied for barrier 2. Barrier 2 would not achieve the goal of 8 dBA reduction. **Table C-3** summarizes the barrier 2 analysis and **Table C-4** presents the barrier 2 analysis for each receptor studied. **Figure C-2** shows the barrier 2 analysis results.

For the purposes of the Barrier 2 analysis, WisDOT analyzed the barriers east and west of 70th Street in combination to determine if it was reasonable. The combination barrier was determined not reasonable. However, the existing noise barrier along I-94 westbound from 70th Street to 72nd Street will be reconstructed as part of this project, providing noise abatement.

Table C-3
Barrier 2 Analysis Summary

Location	Representative Receptors	Total Receptors in Study*	Number of Receptors Impacted	Total Benefited Receptors	Total Benefited Units**	Estimated Barrier Cost	Estimated Barrier Cost per Benefited Unit	Result of Analysis
WB I-94 From N 68th to 72nd	R1, R2, R3, N1	62	16	0	0	$1,134,900	$0	Not Reasonable or Feasible

*For the purposes of this Supplemental EIS, receptors are considered individual buildings.
** A unit is a discrete residence or business.

Table C-4
Barrier 2 Analysis for Receptors Studied

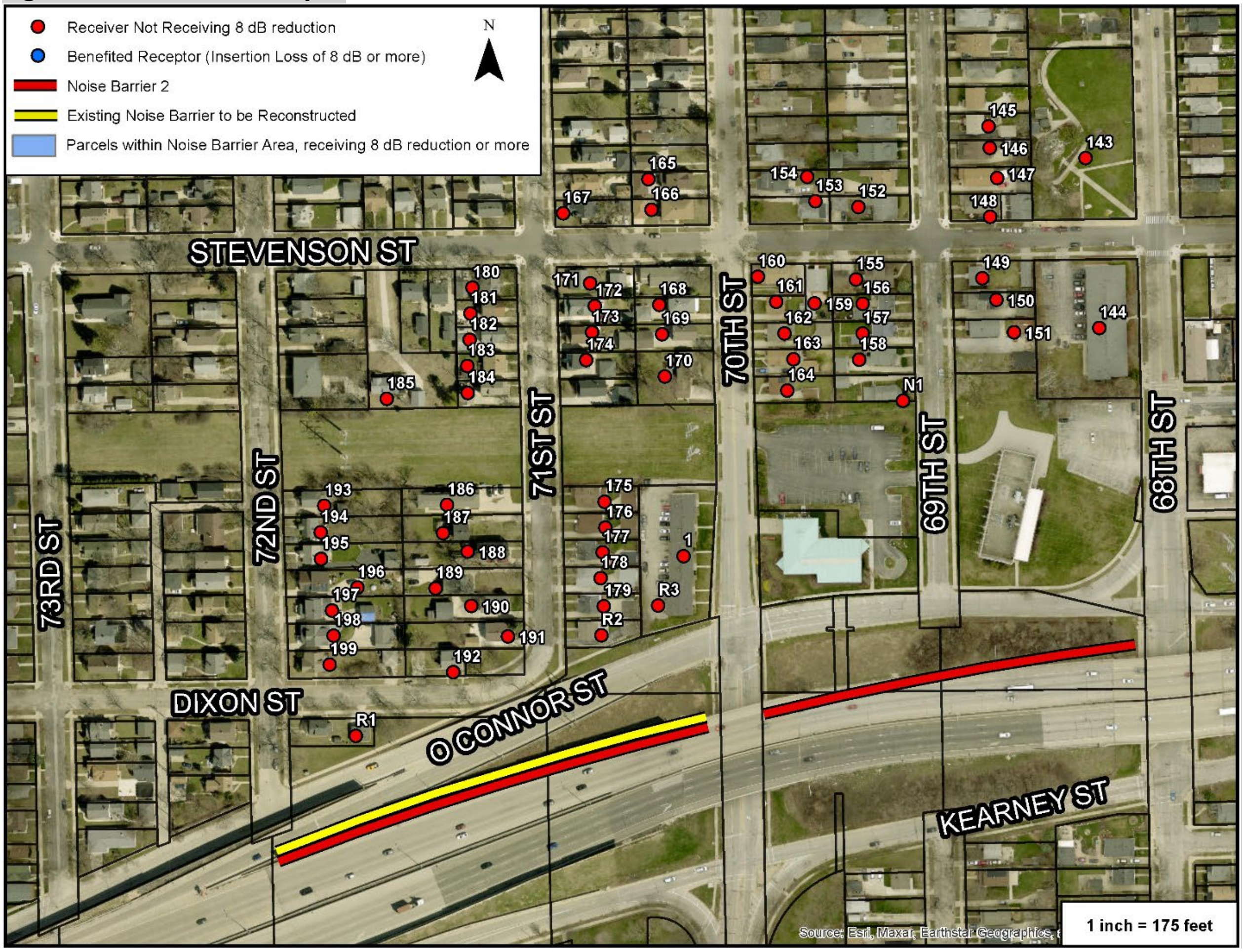
Receptor	No Barrier dBA	With Barrier dBA	Noise Reduction dBA	Minimum Benefited Goal dBA	Units Per Benefited Receptor*	Noise Impact (I) Impact (N) Non Impact
189	67	61	6	8	-	I
R1	70	65	5	8	-	I
177	66	61	5	8	-	I
190	67	62	5	8	-	I
191	67	62	5	8	-	I
192	68	63	5	8	-	I
196	67	62	5	8	-	I
198	68	63	5	8	-	I
199	69	64	5	8	-	I
169	64	59	5	8	-	N
176	66	61	5	8	-	N
181	63	58	5	8	-	N
182	63	58	5	8	-	N
184	64	59	5	8	-	N

Receptor	No Barrier dBA	With Barrier dBA	Noise Reduction dBA	Minimum Benefited Goal dBA	Units Per Benefited Receptor*	Noise Impact (I) Impact (N) Non Impact
185	64	59	5	8	-	N
186	65	60	5	8	-	N
187	65	60	5	8	-	N
188	66	61	5	8	-	N
193	65	60	5	8	-	N
R2	67	63	4	8	-	I
178	66	62	4	8	-	I
179	67	63	4	8	-	I
195	66	62	4	8	-	I
197	67	63	4	8	-	I
N1	65	61	4	8	-	N
152	62	58	4	8	-	N
153	62	58	4	8	-	N
154	62	58	4	8	-	N
155	63	59	4	8	-	N
156	63	59	4	8	-	N
157	64	60	4	8	-	N
158	64	60	4	8	-	N
159	63	59	4	8	-	N
162	64	60	4	8	-	N
163	64	60	4	8	-	N
164	65	61	4	8	-	N
165	62	58	4	8	-	N
166	62	58	4	8	-	N
167	62	58	4	8	-	N
168	63	59	4	8	-	N
170	64	60	4	8	-	N
171	63	59	4	8	-	N
172	63	59	4	8	-	N
173	63	59	4	8	-	N
174	63	59	4	8	-	N

Receptor	No Barrier dBA	With Barrier dBA	Noise Reduction dBA	Minimum Benefited Goal dBA	Units Per Benefited Receptor*	Noise Impact (I) Impact (N) Non Impact
175	65	61	4	8	-	N
180	62	58	4	8	-	N
183	63	59	4	8	-	N
194	65	61	4	8	-	N
R3	68	65	3	8	-	I
1	67	64	3	8	-	I
145	61	58	3	8	-	N
147	62	59	3	8	-	N
148	62	59	3	8	-	N
149	63	60	3	8	-	N
150	63	60	3	8	-	N
151	64	61	3	8	-	N
160	63	60	3	8	-	N
161	63	60	3	8	-	N
143	61	59	2	8	-	N
144	65	63	2	8	-	N
146	61	59	2	8	-	N

*Units per benefited receptor were only determined for receptors receiving an 8 dBA or more reduction. For the purposes of this Supplemental EIS, receptors are considered individual buildings. A unit is a discrete residence or business.

Figure C-2. Barrier 2 Analysis



Barrier 3

N30, N31, N32, N33, N34, N35, N36, N37, N38, N39, N40, N41, N42, N43, N44, N45, N46, N47, FS-1, and FS-3 are the representative receptors along eastbound I-94 from 68th Street to Hawley Road, and represent 236 total receptors studied for barrier 3. Barrier 3 would achieve the minimum feasible 8 dBA noise reduction for 36 benefited receptors (43 benefited units). With an estimated barrier cost of $46,393 per benefited unit, the barrier would also be reasonable. **Table C-5** summarizes the barrier 3 analysis and **Table C-6** presents the barrier 3 analysis for each receptor studied. **Figure C-3** shows the barrier 3 analysis results.

Table C-5
Barrier 3 Analysis Summary

Location	Representative Receptors	Total Receptors in Study*	Number of Receptors Impacted	Total Benefited Receptors	Total Benefited Units**	Estimated Barrier Cost	Estimated Barrier Cost per Benefited Unit	Result of Analysis
EB I-94 From N 68th to Hawley	N30, N31, N32, N33, N34, N35, N36, N37, N38, N39, N40, N41, N42, N43, N44, N45, N46, N47, FS-1, FS-3	236	69	36	43	$1,994,910	$46,393	Reasonable and Feasible

*For the purposes of this Supplemental EIS, receptors are considered individual buildings.
** A unit is a discrete residence or business.

Table C-6
Barrier 3 Analysis for Receptors Studied

Receptor	No Barrier dBA	With Barrier dBA	Noise Reduction dBA	Minimum Benefited Goal dBA	Units Per Benefited Receptor*	Noise Impact (I) Impact (N) Non Impact
N34	78	60	18	8	1	I
159	75	61	14	8	1	I
222	75	61	14	8	1	I
N32	73	59	14	8	1	I
128	72	59	13	8	1	I
129	71	59	12	8	1	I
151	72	60	12	8	1	I
210	72	60	12	8	1	I
N35	73	61	12	8	2	I
N39	73	61	12	8	1	I
170	71	60	11	8	1	I
223	72	61	11	8	1	I
127	71	61	10	8	1	I
158	69	59	10	8	1	I

Receptor	No Barrier dBA	With Barrier dBA	Noise Reduction dBA	Minimum Benefited Goal dBA	Units Per Benefited Receptor*	Noise Impact (I) Impact (N) Non Impact
168	70	60	10	8	1	I
169	70	60	10	8	2	I
171	70	60	10	8	1	I
221	69	59	10	8	1	I
N40	70	60	10	8	1	I
172	69	60	9	8	1	I
252	69	60	9	8	1	I
N33	68	59	9	8	2	I
4	68	60	8	8	1	I
110	71	63	8	8	2	I
150	67	59	8	8	1	I
157	67	59	8	8	4	I
161	67	59	8	8	1	I
167	66	58	8	8	1	N
209	69	61	8	8	1	I
220	66	58	8	8	1	N
251	67	59	8	8	1	I
308	68	60	8	8	1	I
FS-1	68	60	8	8	1	I
N31	69	61	8	8	1	I
N36	68	60	8	8	1	I
N37	68	60	8	8	1	I
141	67	60	7	8	-	I
149	66	59	7	8	-	I
156	66	59	7	8	-	N
160	66	59	7	8	-	I
177	66	59	7	8	-	N
204	66	59	7	8	-	N
207	68	61	7	8	-	I
208	68	61	7	8	-	I
218	66	59	7	8	-	N

Receptor	No Barrier dBA	With Barrier dBA	Noise Reduction dBA	Minimum Benefited Goal dBA	Units Per Benefited Receptor*	Noise Impact (I) Impact (N) Non Impact
219	66	59				I
230	65	58				N
231	65	58				N
250	66	59				I
N43	65	58				N
125	68	62				I
126	68	62				I
138	65	59				N
139	65	59				N
140	66	60				N
146	64	58				N
147	64	58				N
148	65	59				N
155	64	58				N
166	64	58				N
174	64	58				N
175	64	58				N
176	65	59				N
184	65	59				N
185	66	60				N
186	66	60				I
187	68	62				I
201	67	61				I
205	66	60				I
206	66	60				I
216	64	58				N
217	65	59				N
265	66	60				N
268	66	60				I
N46	70	64				I
2	64	59	5	8	-	N
5	62	57	5	8	-	N

Receptor	No Barrier dBA	With Barrier dBA	Noise Reduction dBA	Minimum Benefited Goal dBA	Units Per Benefited Receptor*	Noise Impact (I) Impact (N) Non Impact
6	63	58	5	8	-	N
123	66	61	5	8	-	N
136	64	59	5	8	-	N
137	64	59	5	8	-	N
145	63	58	5	8	-	N
152	62	57	5	8	-	N
153	62	57	5	8	-	N
154	63	58	5	8	-	N
163	62	57	5	8	-	N
164	62	57	5	8	-	N
165	63	58	5	8	-	N
173	63	58	5	8	-	N
178	64	59	5	8	-	N
179	67	62	5	8	-	I
181	63	58	5	8	-	N
182	63	58	5	8	-	N
183	64	59	5	8	-	N
188	67	62	5	8	-	I
189	68	63	5	8	-	I
190	68	63	5	8	-	I
196	64	59	5	8	-	N
197	65	60	5	8	-	N
198	65	60	5	8	-	N
199	66	61	5	8	-	N
200	66	61	5	8	-	I
215	63	58	5	8	-	N
225	61	56	5	8	-	N
227	62	57	5	8	-	N
229	63	58	5	8	-	N
235	62	57	5	8	-	N
236	62	57	5	8	-	N

Receptor	No Barrier dBA	With Barrier dBA	Noise Reduction dBA	Minimum Benefited Goal dBA	Units Per Benefited Receptor*	Noise Impact (I) Impact (N) Non Impact
237	63	58	5	8	-	N
240	64	59	5	8	-	N
246	62	57	5	8	-	N
248	63	58	5	8	-	N
249	63	58	5	8	-	N
257	63	58	5	8	-	N
259	64	59	5	8	-	N
260	64	59	5	8	-	N
261	65	60	5	8	-	N
264	65	60	5	8	-	N
284	65	60	5	8	-	N
297	69	64	5	8	-	I
N41	64	59	5	8	-	N
N44	64	59	5	8	-	N
N45	66	61	5	8	-	N
107	68	64	4	8	-	I
109	69	65	4	8	-	I
121	65	61	4	8	-	N
122	65	61	4	8	-	N
130	63	59	4	8	-	N
131	63	59	4	8	-	N
133	63	59	4	8	-	N
134	63	59	4	8	-	N
135	63	59	4	8	-	N
142	62	58	4	8	-	N
143	62	58	4	8	-	N
144	62	58	4	8	-	N
162	61	57	4	8	-	N
180	62	58	4	8	-	N
191	67	63	4	8	-	I
192	67	63	4	8	-	I
193	64	60	4	8	-	N

Receptor	No Barrier dBA	With Barrier dBA	Noise Reduction dBA	Minimum Benefited Goal dBA	Units Per Benefited Receptor*	Noise Impact (I) Impact (N) Non Impact
194	62	58	4	8	-	N
195	63	59	4	8	-	N
202	61	57	4	8	-	N
203	62	58	4	8	-	N
211	60	56	4	8	-	N
212	60	56	4	8	-	N
213	61	57	4	8	-	N
214	61	57	4	8	-	N
224	60	56	4	8	-	N
226	61	57	4	8	-	N
228	62	58	4	8	-	N
232	60	56	4	8	-	N
234	61	57	4	8	-	N
238	62	58	4	8	-	N
239	62	58	4	8	-	N
244	61	57	4	8	-	N
245	61	57	4	8	-	N
247	62	58	4	8	-	N
256	62	58	4	8	-	N
258	63	59	4	8	-	N
267	69	65	4	8	-	I
281	64	60	4	8	-	N
282	64	60	4	8	-	N
283	64	60	4	8	-	N
296	68	64	4	8	-	I
FS-3	62	58	4	8	-	N
N38	68	64	4	8	-	I
1	63	60	3	8	-	N
3	60	57	3	8	-	N
11	65	62	3	8	-	N
103	66	63	3	8	-	I

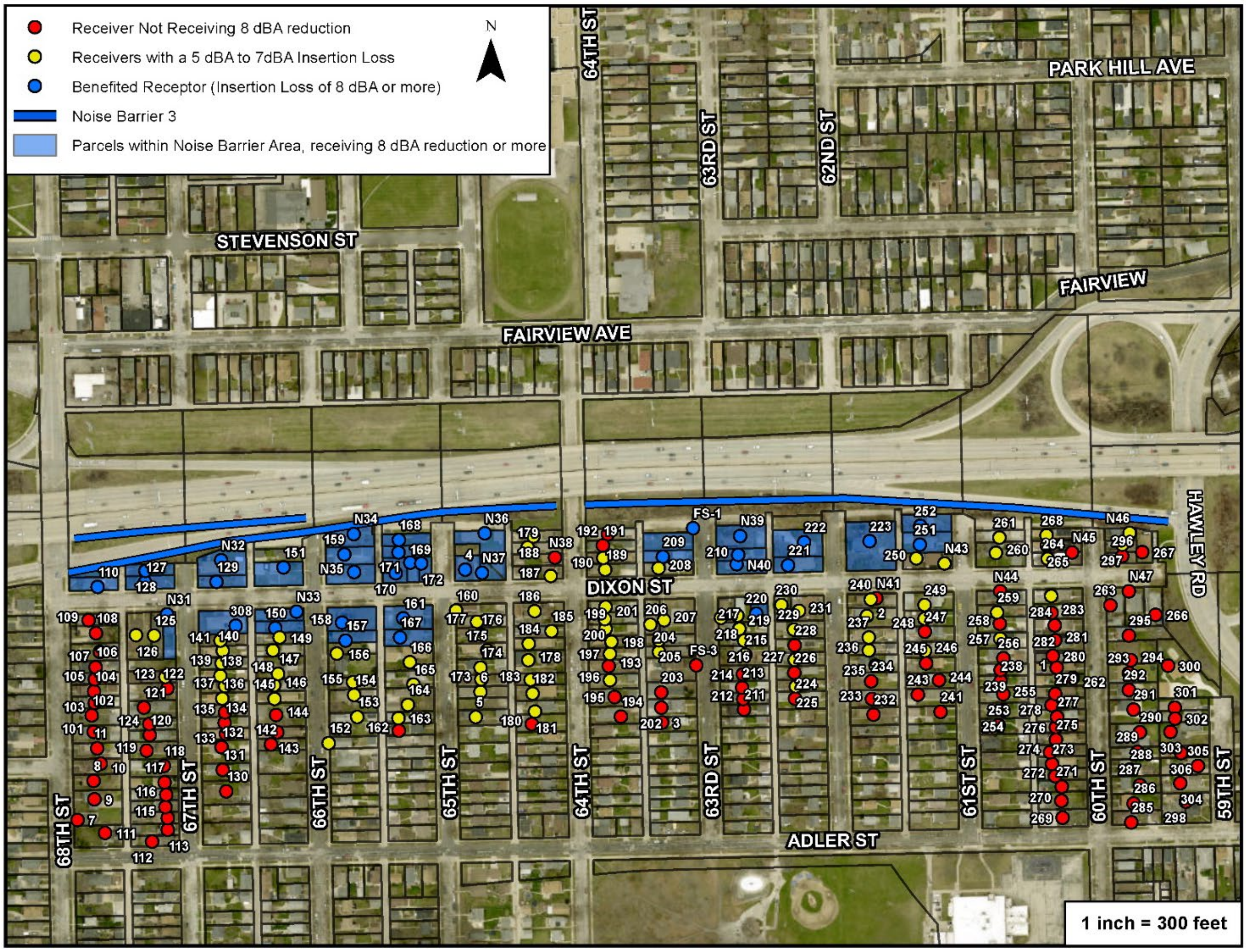
Receptor	No Barrier dBA	With Barrier dBA	Noise Reduction dBA	Minimum Benefited Goal dBA	Units Per Benefited Receptor*	Noise Impact (I) Impact (N) Non Impact
105	67	64	3	8	-	I
106	67	64	3	8	-	I
108	68	65	3	8	-	I
112	62	59	3	8	-	N
113	62	59	3	8	-	N
114	62	59	3	8	-	N
115	62	59	3	8	-	N
116	62	59	3	8	-	N
117	63	60	3	8	-	N
118	63	60	3	8	-	N
119	63	60	3	8	-	N
120	64	61	3	8	-	N
124	64	61	3	8	-	N
132	62	59	3	8	-	N
233	60	57	3	8	-	N
241	60	57	3	8	-	N
243	60	57	3	8	-	N
253	60	57	3	8	-	N
254	61	58	3	8	-	N
255	61	58	3	8	-	N
263	65	62	3	8	-	N
274	60	57	3	8	-	N
279	62	59	3	8	-	N
280	63	60	3	8	-	N
295	64	61	3	8	-	N
N47	66	63	3	8	-	I
8	64	62	2	8	-	N
9	63	61	2	8	-	N
10	64	62	2	8	-	N
101	65	63	2	8	-	N
102	66	64	2	8	-	N
104	66	64	2	8	-	I

Receptor	No Barrier dBA	With Barrier dBA	Noise Reduction dBA	Minimum Benefited Goal dBA	Units Per Benefited Receptor*	Noise Impact (I) Impact (N) Non Impact
111	62	60	2	8	-	N
262	62	60	2	8	-	N
266	66	64	2	8	-	N
269	58	56	2	8	-	N
271	59	57	2	8	-	N
272	59	57	2	8	-	N
273	59	57	2	8	-	N
275	60	58	2	8	-	N
276	60	58	2	8	-	N
277	61	59	2	8	-	N
278	61	59	2	8	-	N
292	62	60	2	8	-	N
293	63	61	2	8	-	N
294	63	61	2	8	-	N
7	63	62	1	8	-	N
270	58	57	1	8	-	N
285	58	57	1	8	-	N
286	58	57	1	8	-	N
287	59	58	1	8	-	N
288	59	58	1	8	-	N
289	60	59	1	8	-	N
290	60	59	1	8	-	N
291	61	60	1	8	-	N
298	59	58	1	8	-	N
300	63	62	1	8	-	N
301	61	60	1	8	-	N
302	61	60	1	8	-	N
303	60	59	1	8	-	N
304	60	59	1	8	-	N
305	60	59	1	8	-	N
306	60	59	1	8	-	N

Receptor	No Barrier dBA	With Barrier dBA	Noise Reduction dBA	Minimum Benefited Goal dBA	Units Per Benefited Receptor*	Noise Impact (I) Impact (N) Non Impact
299	60	60	0	8	-	N
307	61	61	0	8	-	N

*Units per benefited receptor were only determined for receptors receiving an 8 dBA or more reduction. For the purposes of this Supplemental EIS, receptors are considered individual buildings. A unit is a discrete residence or business.

Figure C-3. Barrier 3 Analysis



Barrier 4

N2, N3, N4, N5, N6, N7, N8, N9, N10, N11, N12, N13, N14, N15, N16, N17, N18, N19, N20, N21, N22, FS-2, and FS-4 are the representative receptors along westbound I-94 from Hawley Road to 68th Street, and represent 163 total receptors studied for barrier 4. Barrier 4 would achieve the minimum feasible 8 dBA noise reduction for 45 benefited receptors (69 benefited units). With an estimated barrier cost of $206,572 per benefited unit, the barrier would not be reasonable. **Table C-7** summarizes the barrier 4 analysis and **Table C-8** presents the barrier 4 analysis for each receptor studied. **Figure C-4** shows the barrier 4 analysis results.

Table C-7
Barrier 4 Analysis Summary

Location	Representative Receptors	Total Receptors in Study*	Number of Receptors Impacted	Total Benefited Receptors	Total Benefited Units**	Estimated Barrier Cost	Estimated Barrier Cost per Benefited Unit	Result of Analysis
WB I-94 From Hawley to 68th	N2, N3, N4, N5, N6, N7, N8, N9, N10, N11, N12, N13, N14, N15, N16, N17, N18, N19, N20, N21, N22, FS-2, FS-4	163	81	45	69	$14,253,480	$206,572	Feasible not Reasonable

*For the purposes of this Supplemental EIS, receptors are considered individual buildings.
** A unit is a discrete residence or business.

Table C-8
Barrier 4 Analysis for Receptors Studied

Receptor	No Barrier dBA	With Barrier dBA	Noise Reduction dBA	Minimum Benefited Goal dBA	Units Per Benefited Receptor*	Noise Impact (I) Impact (N) Non Impact
21	75	62	13	8	1	I
N13	74	62	12	8	1	I
N14	74	62	12	8	1	I
20	72	60	12	8	2	I
22	74	62	12	8	2	I
80	71	60	11	8	1	I
97	72	61	11	8	1	I
98	71	60	11	8	1	I
99	71	60	11	8	1	I
N6	67	57	10	8	1	I
3	67	57	10	8	2	I
121	67	57	10	8	2	I
78	71	61	10	8	1	I

Receptor	No Barrier dBA	With Barrier dBA	Noise Reduction dBA	Minimum Benefited Goal dBA	Units Per Benefited Receptor*	Noise Impact (I) Impact (N) Non Impact
79	71	61	10	8	1	I
81	70	60	10	8	4	I
100	71	61	10	8	1	I
124	66	56	10	8	2	N
4	67	58	9	8	1	I
5	67	58	9	8	2	I
122	66	57	9	8	1	I
N15	69	60	9	8	1	I
14	69	60	9	8	6	I
17	70	61	9	8	1	I
18	70	61	9	8	1	I
19	69	60	9	8	4	I
60	69	60	9	8	1	I
62	68	59	9	8	2	I
82	68	59	9	8	1	I
83	68	59	9	8	1	I
85	68	59	9	8	1	I
86	68	59	9	8	1	I
119	66	57	9	8	2	N
120	66	57	9	8	1	N
123	66	57	9	8	1	N
N5	66	58	8	8	1	I
6	67	59	8	8	1	I
7	66	58	8	8	1	I
N12	69	61	8	8	1	I
N19	70	62	8	8	6	I
58	69	61	8	8	1	I
59	69	61	8	8	1	I
61	68	60	8	8	1	I
84	67	59	8	8	1	I
N3	66	58	8	8	1	N
12	66	58	8	8	1	N

Receptor	No Barrier dBA	With Barrier dBA	Noise Reduction dBA	Minimum Benefited Goal dBA	Units Per Benefited Receptor*	Noise Impact (I) Impact (N) Non Impact
FS-2	68	61	7	8	-	I
15	68	61	7	8	-	I
23	69	62	7	8	-	I
52	66	59	7	8	-	I
77	67	60	7	8	-	I
87	66	59	7	8	-	I
92	66	59	7	8	-	I
101	69	62	7	8	-	I
102	69	62	7	8	-	I
N2	66	59	7	8	-	N
N7	66	59	7	8	-	N
11	66	59	7	8	-	N
111	65	58	7	8	-	N
114	65	58	7	8	-	N
115	65	58	7	8	-	N
117	66	59	7	8	-	N
118	65	58	7	8	-	N
N16	66	59	7	8	-	N
54	66	59	7	8	-	N
55	65	58	7	8	-	N
57	64	57	7	8	-	N
63	66	59	7	8	-	N
66	65	58	7	8	-	N
67	64	57	7	8	-	N
71	65	58	7	8	-	N
89	66	59	7	8	-	N
90	66	59	7	8	-	N
91	66	59	7	8	-	N
93	66	59	7	8	-	N
N4	67	61	6	8	-	I
N9	66	60	6	8	-	I

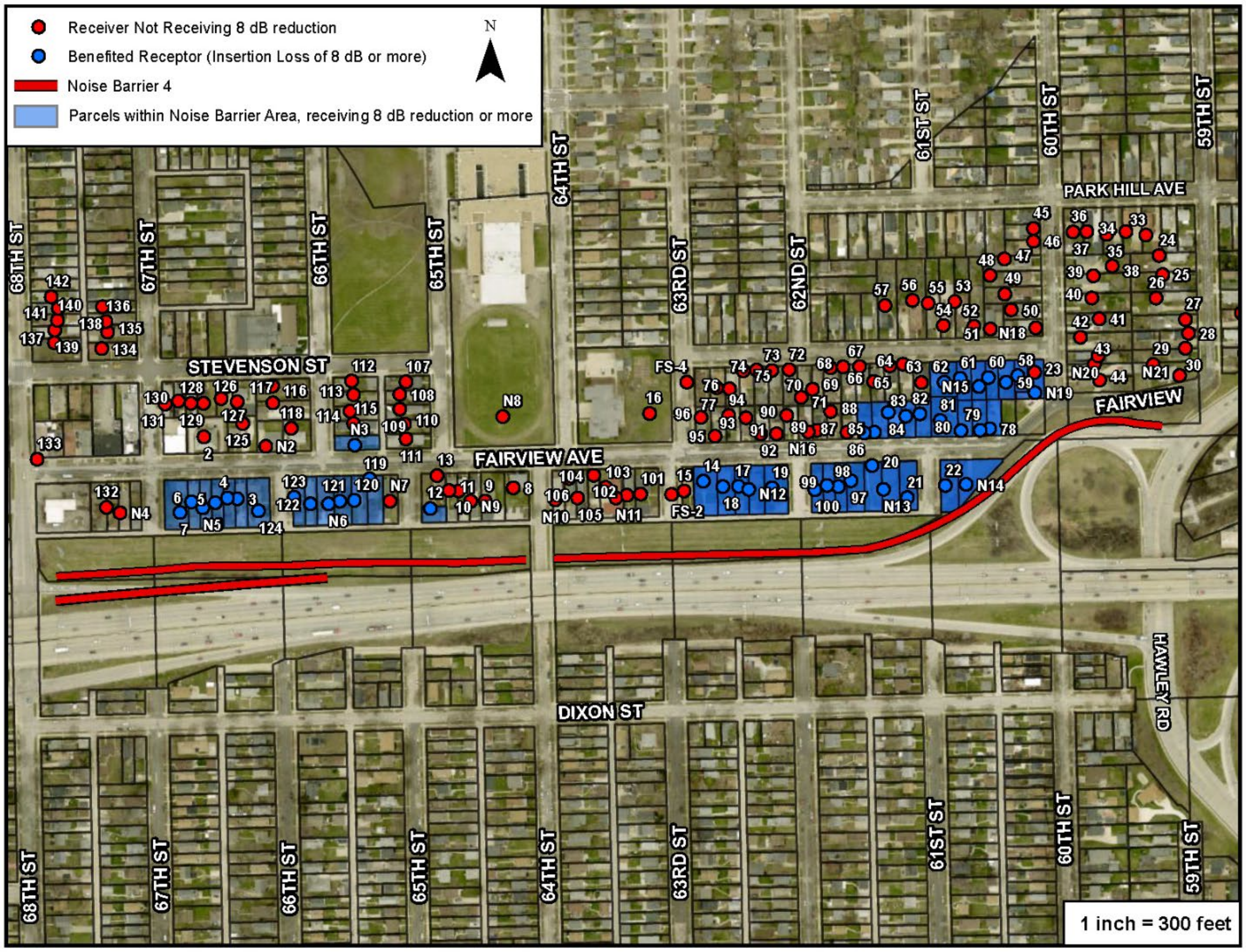
Receptor	No Barrier dBA	With Barrier dBA	Noise Reduction dBA	Minimum Benefited Goal dBA	Units Per Benefited Receptor*	Noise Impact (I) Impact (N) Non Impact
10	66	60	6	8	-	I
132	68	62	6	8	-	I
N11	68	62	6	8	-	I
N18	67	61	6	8	-	I
51	66	60	6	8	-	I
76	67	61	6	8	-	I
94	66	60	6	8	-	I
104	69	63	6	8	-	I
N8	65	59	6	8	-	N
2	66	60	6	8	-	N
13	65	59	6	8	-	N
107	63	57	6	8	-	N
109	64	58	6	8	-	N
110	64	58	6	8	-	N
112	63	57	6	8	-	N
113	64	58	6	8	-	N
116	65	59	6	8	-	N
125	65	59	6	8	-	N
126	65	59	6	8	-	N
127	65	59	6	8	-	N
50	66	60	6	8	-	N
53	65	59	6	8	-	N
56	64	58	6	8	-	N
64	64	58	6	8	-	N
65	64	58	6	8	-	N
69	63	57	6	8	-	N
70	64	58	6	8	-	N
74	65	59	6	8	-	N
75	65	59	6	8	-	N
88	65	59	6	8	-	N
95	66	60	6	8	-	N
96	66	60	6	8	-	N

Receptor	No Barrier dBA	With Barrier dBA	Noise Reduction dBA	Minimum Benefited Goal dBA	Units Per Benefited Receptor*	Noise Impact (I) Impact (N) Non Impact
8	67	62	5	8	-	I
9	66	61	5	8	-	I
16	67	62	5	8	-	I
103	68	63	5	8	-	I
108	63	58	5	8	-	N
128	65	60	5	8	-	N
129	65	60	5	8	-	N
130	65	60	5	8	-	N
FS-4	65	60	5	8	-	N
47	64	59	5	8	-	N
48	64	59	5	8	-	N
49	65	60	5	8	-	N
68	63	58	5	8	-	N
72	63	58	5	8	-	N
73	63	58	5	8	-	N
42	68	64	4	8	-	I
105	68	64	4	8	-	I
106	68	64	4	8	-	I
131	64	60	4	8	-	N
35	64	60	4	8	-	N
37	63	59	4	8	-	N
45	63	59	4	8	-	N
46	63	59	4	8	-	N
N10	68	65	3	8	-	I
43	69	66	3	8	-	I
134	62	59	3	8	-	N
34	64	61	3	8	-	N
36	63	60	3	8	-	N
39	66	63	3	8	-	N
N20	68	66	2	8	-	I
40	67	65	2	8	-	I

Receptor	No Barrier dBA	With Barrier dBA	Noise Reduction dBA	Minimum Benefited Goal dBA	Units Per Benefited Receptor*	Noise Impact (I) Impact (N) Non Impact
41	67	65	2	8	-	I
44	70	68	2	8	-	I
135	61	59	2	8	-	N
136	61	59	2	8	-	N
137	62	60	2	8	-	N
138	60	58	2	8	-	N
139	61	59	2	8	-	N
140	61	59	2	8	-	N
141	61	59	2	8	-	N
142	60	58	2	8	-	N
24	65	63	2	8	-	N
25	66	64	2	8	-	N
33	64	62	2	8	-	N
38	65	63	2	8	-	N
133	67	66	1	8	-	I
N21	70	69	1	8	-	I
N22	68	67	1	8	-	I
26	66	65	1	8	-	I
27	67	66	1	8	-	I
28	68	67	1	8	-	I
29	69	68	1	8	-	I
30	69	68	1	8	-	I
31	69	68	1	8	-	I
32	67	66	1	8	-	I

*Units per benefited receptor were only determined for receptors receiving an 8 dBA or more reduction. For the purposes of this Supplemental EIS, receptors are considered individual buildings. A unit is a discrete residence or business.

Figure C-4. Barrier 4 Analysis



Barrier 4A

N2, N3, N4, N5, N6, N7, N8, N9, N10, N11, N12, N13, N14, N15, N16, N17, N18, N19, N20, N21, N22, FS-2, and FS-4 are the representative receptors along westbound I-94 from Hawley Road to 68th Street, and represent 163 total receptors studied for barrier 4A. Barrier 4A would achieve the minimum feasible 8 dBA noise reduction for 30 benefited receptors (49 benefited units). With an estimated barrier cost of $26,712 per benefited unit, the barrier would also be reasonable. Barrier 4A is in the same location as barrier 4, but is shorter in height to avoid the additional cost of relocating ATC towers that would be required by Barrier 4. **Table C-9** summarizes the barrier 4A analysis and **Table C-10** presents the barrier 4A analysis for each receptor studied. **Figure C-5** shows the barrier 4A analysis results. Even if a receptor is not be benefitted (would not receive an 8 dbA or more noise reduction), it would still receive some reduction in noise level from the proposed barrier, as shown in Table C-10.

Table C-9
Barrier 4A Analysis Summary

Location	Representative Receptors	Total Receptors in Study*	Number of Receptors Impacted	Total Benefited Receptors	Total Benefited Units**	Estimated Barrier Cost	Estimated Barrier Cost per Benefited Unit	Result of Analysis
WB I-94 From Hawley to 64th	N2, N3, N4, N5, N6, N7, N8, N9, N10, N11, N12, N13, N14, N15, N16, N17, N18, N19, N20, N21, N22, FS-2, FS-4	163	81	30	49	$1,308,870	$26,712	Reasonable and Feasible

*For the purposes of this Supplemental EIS, receptors are considered individual buildings.
** A unit is a discrete residence or business.

Table C-10
Barrier 4A Analysis for Receptors Studied

Receptor	No Barrier dBA	With Barrier dBA	Noise Reduction dBA	Minimum Benefited Goal dBA	Units Per Benefited Receptor*	Noise Impact (I) Impact (N) Non Impact
21	75	62	13	8	1	I
N13	74	62	12	8	1	I
N14	74	62	12	8	1	I
22	74	62	12	8	2	I
20	72	61	11	8	2	I
97	72	61	11	8	1	I
78	71	61	10	8	1	I
79	71	61	10	8	1	I
80	71	61	10	8	1	I
98	71	61	10	8	1	I
99	71	61	10	8	1	I
100	71	61	10	8	1	I

Receptor	No Barrier dBA	With Barrier dBA	Noise Reduction dBA	Minimum Benefited Goal dBA	Units Per Benefited Receptor*	Noise Impact (I) Impact (N) Non Impact
N15	69	60	9	8	1	I
17	70	61	9	8	1	I
60	69	60	9	8	1	I
81	70	61	9	8	4	I
N12	69	61	8	8	1	I
N19	70	62	8	8	6	I
14	69	61	8	8	6	I
18	70	62	8	8	1	I
19	69	61	8	8	4	I
58	69	61	8	8	1	I
59	69	61	8	8	1	I
61	68	60	8	8	1	I
62	68	60	8	8	2	I
82	68	60	8	8	1	I
83	68	60	8	8	1	I
84	67	59	8	8	1	I
85	68	60	8	8	1	I
86	68	60	8	8	1	I
FS-2	68	61	7	8	-	I
15	68	61	7	8	-	I
23	69	62	7	8	-	I
87	66	59	7	8	-	I
54	66	59	7	8	-	N
55	65	58	7	8	-	N
63	66	59	7	8	-	N
64	65	58	7	8	-	N
66	65	58	7	8	-	N
90	66	59	7	8	-	N
N18	67	61	6	8	-	I
51	66	60	6	8	-	I
52	66	60	6	8	-	I

Receptor	No Barrier dBA	With Barrier dBA	Noise Reduction dBA	Minimum Benefited Goal dBA	Units Per Benefited Receptor*	Noise Impact (I) Impact (N) Non Impact
76	67	61	6	8	-	I
77	67	61	6	8	-	I
92	66	60	6	8	-	I
94	66	60	6	8	-	I
101	69	63	6	8	-	I
102	69	63	6	8	-	I
104	69	63	6	8	-	I
N16	66	60	6	8	-	N
50	66	60	6	8	-	N
53	65	59	6	8	-	N
56	64	58	6	8	-	N
57	64	58	6	8	-	N
65	64	58	6	8	-	N
67	64	58	6	8	-	N
70	64	58	6	8	-	N
71	65	59	6	8	-	N
74	65	59	6	8	-	N
88	65	59	6	8	-	N
89	66	60	6	8	-	N
91	66	60	6	8	-	N
93	66	60	6	8	-	N
95	66	60	6	8	-	N
96	66	60	6	8	-	N
121	67	62	5	8	-	I
N11	68	63	5	8	-	I
16	67	62	5	8	-	I
103	68	63	5	8	-	I
12	66	61	5	8	-	N
FS-4	65	60	5	8	-	N
47	64	59	5	8	-	N
48	64	59	5	8	-	N
49	65	60	5	8	-	N

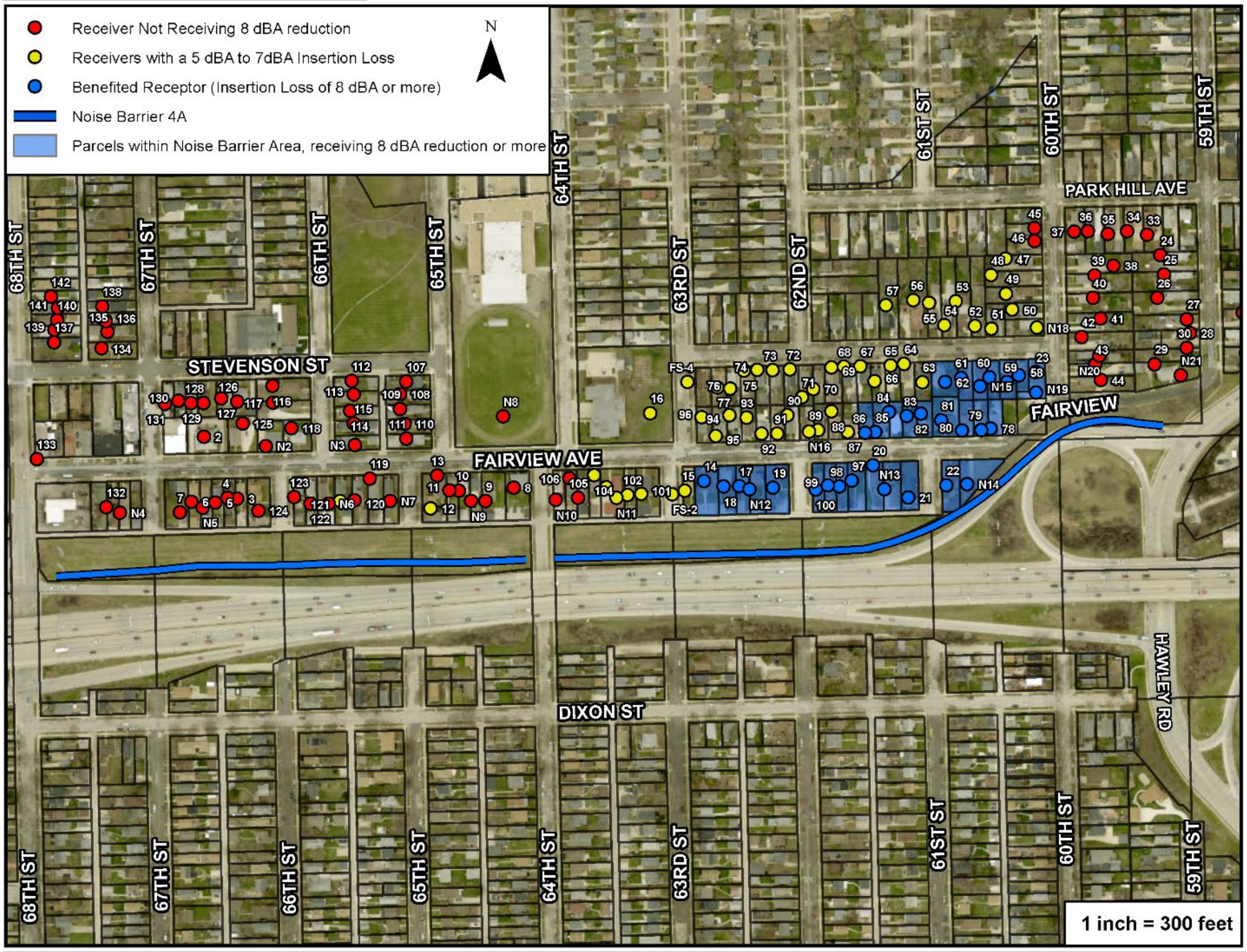
Receptor	No Barrier dBA	With Barrier dBA	Noise Reduction dBA	Minimum Benefited Goal dBA	Units Per Benefited Receptor*	Noise Impact (I) Impact (N) Non Impact
68	63	58	5	8	-	N
69	63	58	5	8	-	N
72	63	58	5	8	-	N
73	63	58	5	8	-	N
75	65	60	5	8	-	N
N6	67	63	4	8	-	I
N9	66	62	4	8	-	I
8	67	63	4	8	-	I
9	66	62	4	8	-	I
10	66	62	4	8	-	I
42	68	64	4	8	-	I
105	68	64	4	8	-	I
106	68	64	4	8	-	I
N3	66	62	4	8	-	N
N7	66	62	4	8	-	N
N8	65	61	4	8	-	N
11	66	62	4	8	-	N
13	65	61	4	8	-	N
111	65	61	4	8	-	N
119	66	62	4	8	-	N
120	66	62	4	8	-	N
45	63	59	4	8	-	N
46	63	59	4	8	-	N
3	67	64	3	8	-	I
122	66	63	3	8	-	I
N10	68	65	3	8	-	I
43	69	66	3	8	-	I
107	63	60	3	8	-	N
108	63	60	3	8	-	N
109	64	61	3	8	-	N
110	64	61	3	8	-	N

Receptor	No Barrier dBA	With Barrier dBA		Minimum Benefited Goal dBA	Units Per Benefited Receptor*	Noise Impact (I) Impact (N) Non Impact
113	64	61	3	8	-	N
114	65	62	3	8	-	N
115	65	62	3	8	-	N
117	66	63	3	8	-	N
123	66	63	3	8	-	N
124	66	63	3	8	-	N
35	64	61	3	8	-	N
36	63	60	3	8	-	N
37	63	60	3	8	-	N
39	66	63	3	8	-	N
4	67	65	2	8	-	I
5	67	65	2	8	-	I
N20	68	66	2	8	-	I
40	67	65	2	8	-	I
41	67	65	2	8	-	I
44	70	68	2	8	-	I
N2	66	64	2	8	-	N
2	66	64	2	8	-	N
112	63	61	2	8	-	N
116	65	63	2	8	-	N
118	65	63	2	8	-	N
126	65	63	2	8	-	N
127	65	63	2	8	-	N
24	65	63	2	8	-	N
25	66	64	2	8	-	N
33	64	62	2	8	-	N
34	64	62	2	8	-	N
38	65	63	2	8	-	N
N5	66	65	1	8	-	I
6	67	66	1	8	-	I
7	66	65	1	8	-	I
132	68	67	1	8	-	I

Receptor	No Barrier dBA	With Barrier dBA	Noise Reduction dBA	Minimum Benefited Goal dBA	Units Per Benefited Receptor*	Noise Impact (I) Impact (N) Non Impact
N21	70	69	1	8	-	I
N22	68	67	1	8	-	I
26	66	65	1	8	-	I
27	67	66	1	8	-	I
28	68	67	1	8	-	I
29	69	68	1	8	-	I
30	68	67	1	8	-	I
31	69	68	1	8	-	I
125	65	64	1	8	-	N
128	65	64	1	8	-	N
129	65	64	1	8	-	N
130	65	64	1	8	-	N
131	64	63	1	8	-	N
137	62	61	1	8	-	N
141	61	60	1	8	-	N
N4	67	67	0	8	-	I
133	67	67	0	8	-	I
32	66	66	0	8	-	I
134	62	62	0	8	-	N
135	61	61	0	8	-	N
136	61	61	0	8	-	N
138	60	60	0	8	-	N
139	61	61	0	8	-	N
140	61	61	0	8	-	N
142	60	60	0	8	-	N

*Units per benefited receptor were only determined for receptors receiving an 8 dBA or more reduction. For the purposes of this Supplemental EIS, receptors are considered individual buildings. A unit is a discrete residence or business.

Figure C-5. Barrier 4A Analysis



Barrier 5

N51, N52, N53, N54, and FS-5 are the representative receptors along eastbound I-94 from Hawley Road to Zablocki Drive, and represent five total receptors studied for barrier 5. Barrier 5 would achieve the minimum feasible 8 dBA noise reduction for 1 benefited receptor (1 benefited unit). However, with an estimated barrier cost of $381,600 per benefited unit, it would not be reasonable. **Table C-11** summarizes the barrier 5 analysis and **Table C-12** presents the barrier 5 analysis for each receptor studied. **Figure C-6** shows the barrier 5 analysis results.

Table C-11
Barrier 5 Analysis Summary

Location	Representative Receptors	Total Receptors in Study*	Number of Receptors Impacted	Total Benefited Receptors	Total Benefited Units**	Estimated Barrier Cost	Estimated Barrier Cost per Benefited Unit	Result of Analysis
EB I-94 From Hawley to Zablocki	N51, N52, N53, N54, FS-5	5	3	1	1	$381,600	$381,600	Feasible, not Reasonable

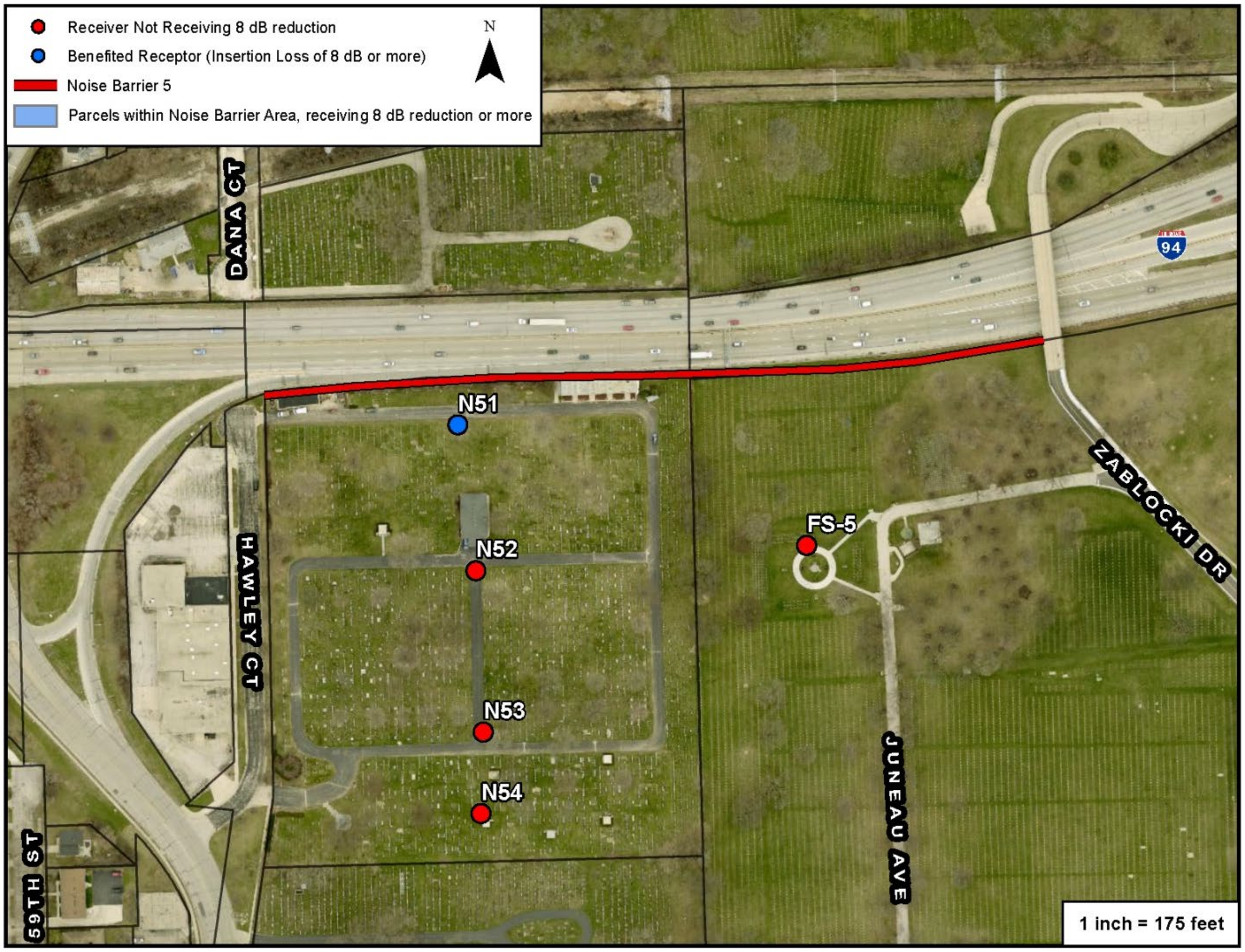
*For the purposes of this Supplemental EIS, receptors are considered individual buildings.
** A unit is a discrete residence or business.

Table C-12
Barrier 5 Analysis for Receptors Studied

Receptor	No Barrier dBA	With Barrier dBA	Noise Reduction dBA	Minimum Benefited Goal dBA	Units Per Benefited Receptor*	Noise Impact (I) Impact (N) Non Impact
N51	77	66	11	8	1	I
N52	68	64	4	8	-	I
N53	65	63	2	8	-	N
N54	64	63	1	8	-	N
FS-5	69	65	4	8	-	I

*Units per benefited receptor were only determined for receptors receiving an 8 dBA or more reduction. For the purposes of this Supplemental EIS, receptors are considered individual buildings. A unit is a discrete residence or business.

Figure C-6. Barrier 5 Analysis



Barrier 6

N48, N49, N50, and FS-6 are the representative receptors along westbound I-94 from Zablocki Drive to Hawley Road, and represent four total receptors studied for barrier 6. Barrier 6 would achieve the minimum feasible 8 dBA noise reduction for 2 benefited receptors (2 benefited units). However, with an estimated barrier cost of $364,230 per benefited unit, it would not be reasonable. **Table C-13** summarizes the barrier 6 analysis and **Table C-14** presents the barrier 6 analysis for each receptor studied. **Figure C-7** shows the barrier 6 analysis results.

Table C-13
Barrier 6 Analysis Summary

Location	Representative Receptors	Total Receptors in Study*	Number of Receptors Impacted	Total Benefited Receptors	Total Benefited Units**	Estimated Barrier Cost	Estimated Barrier Cost per Benefited Unit	Result of Analysis
WB I-94 From Zablocki to Hawley	N48, N49, N50, FS-6	4	4	2	2	$728,460	$364,230	Feasible, not Reasonable

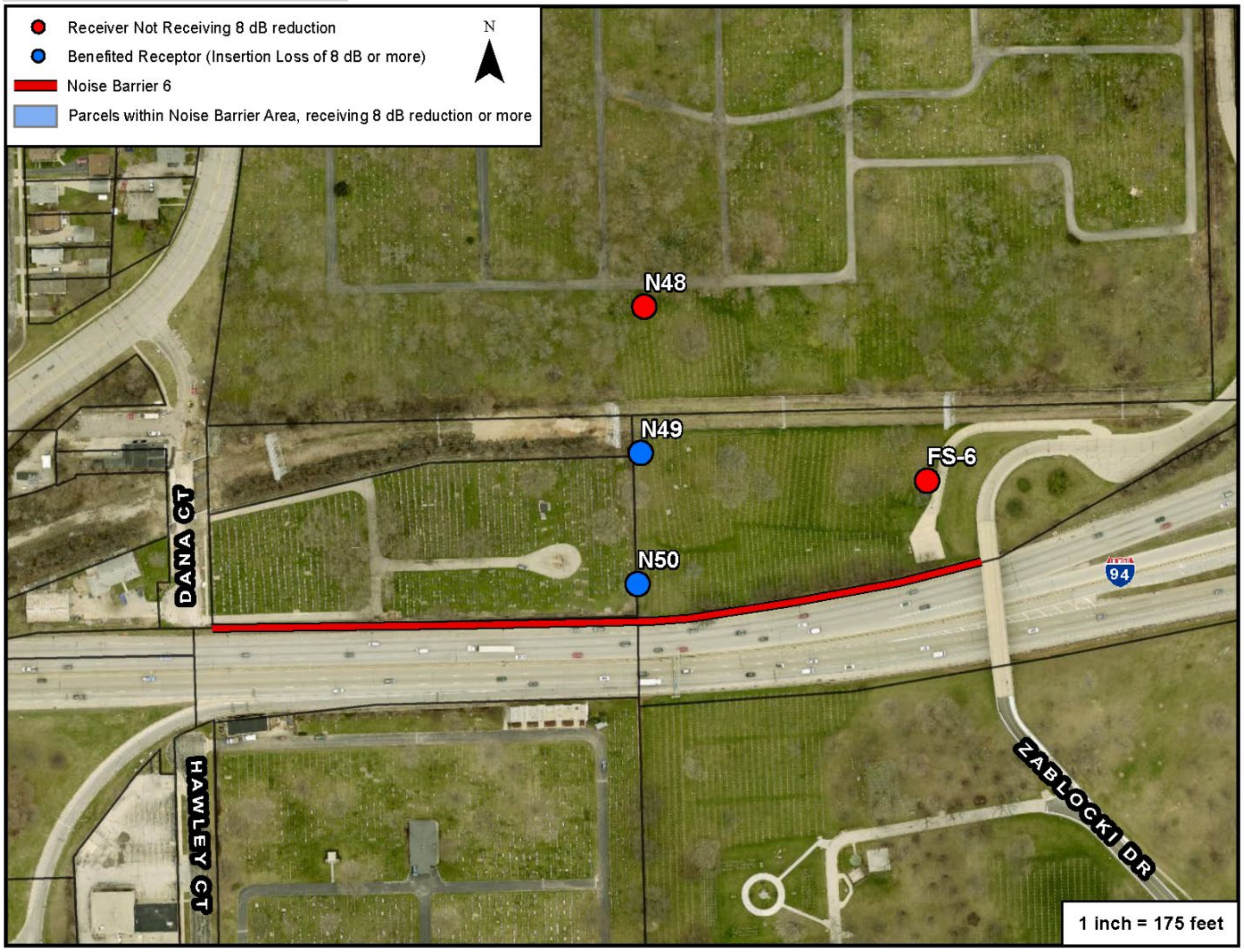
*For the purposes of this Supplemental EIS, receptors are considered individual buildings.
** A unit is a discrete residence or business.

Table C-14
Barrier 6 Analysis for Receptors Studied

Receptor	No Barrier dBA	With Barrier dBA	Noise Reduction dBA	Minimum Benefited Goal dBA	Units Per Benefited Receptor*	Noise Impact (I) Impact (N) Non Impact
N50	78	64	14	8	1	I
N49	70	62	8	8	1	I
FS-6	72	66	6	8	-	I
N48	66	61	5	8	-	I

*Units per benefited receptor were only determined for receptors receiving an 8 dBA or more reduction. For the purposes of this Supplemental EIS, receptors are considered individual buildings. A unit is a discrete residence or business.

Figure C-7. Barrier 6 Analysis



Barrier 7

N55, N56, N57, N58, N59, N60, N61, N62, N63, N64, N65, N66, FS-7, and FS-8 are the representative receptors along westbound I-94 from Yount Drive to General Mitchell Boulevard, and represent 78 total receptors studied for barrier 7. Barrier 7 would achieve the minimum feasible 8 dBA noise reduction for 15 benefited receptors (16 benefited units). With an estimated barrier cost of $39,038 per benefited unit, it would also be reasonable. **Table C-15** summarizes the barrier 7 analysis and **Table C-16** presents the barrier 7 analysis for each receptor studied. **Figure C-8** shows the barrier 7 analysis results.

Table C-15
Barrier 7 Analysis Summary

Location	Representative Receptors	Total Receptors in Study*	Number of Receptors Impacted	Total Benefited Receptors	Total Benefited Units**	Estimated Barrier Cost	Estimated Barrier Cost per Benefited Unit	Result of Analysis
WB I-94 From Yount to General Mitchell	N55, N56, N57, N58, N59, N60, N61, N62, N63, N64, N65, N66, FS-7, FS-8	78	24	15	16	$624,600	$39,038	Reasonable and Feasible

*For the purposes of this Supplemental EIS, receptors are considered individual buildings.
** A unit is a discrete residence or business.

Table C-16
Barrier 7 Analysis for Receptors Studied

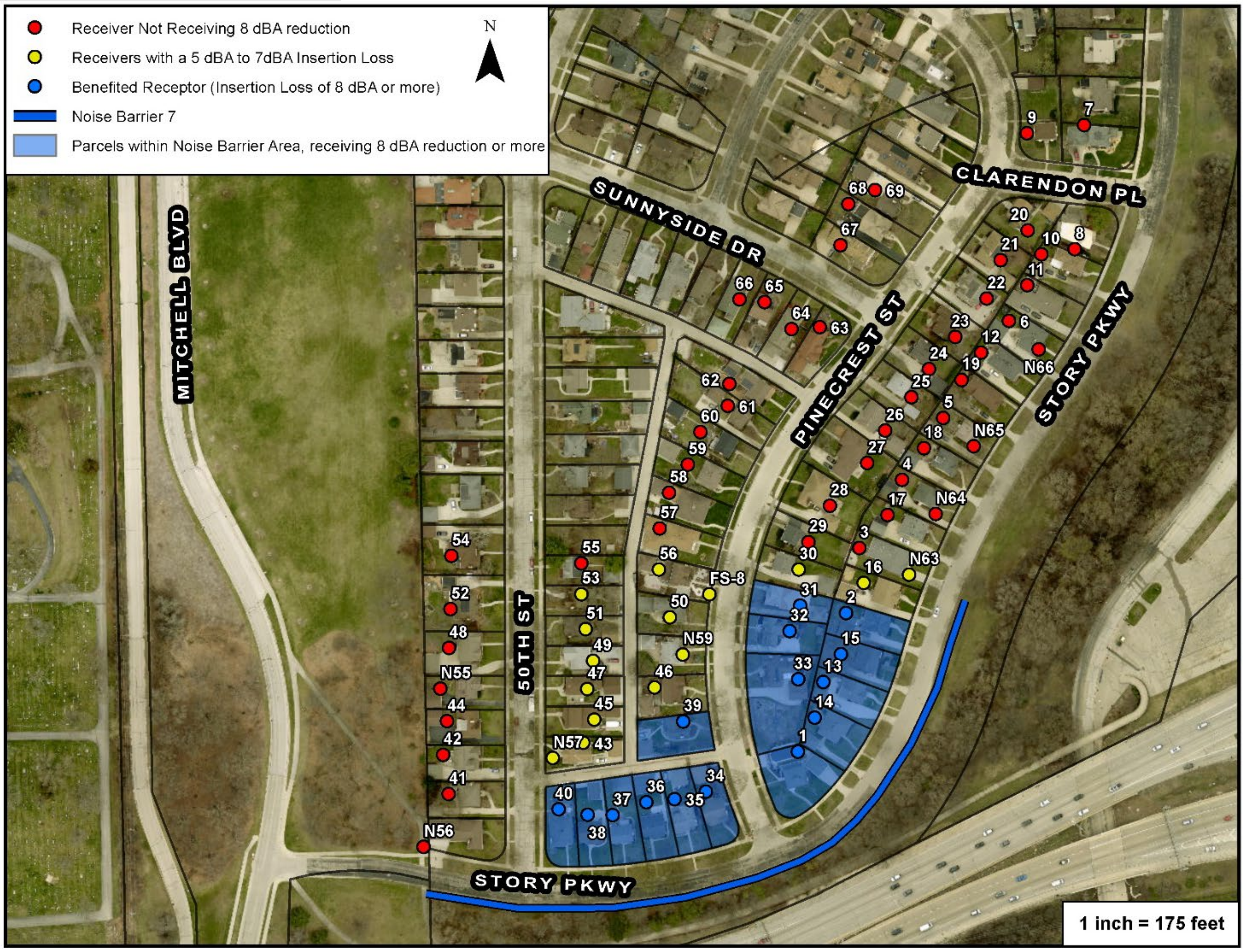
Receptor	No Barrier dBA	With Barrier dBA	Noise Reduction dBA	Minimum Benefited Goal dBA	Units Per Benefited Receptor*	Noise Impact (I) Impact (N) Non Impact
34	69	58	11	8	1	I
35	69	58	11	8	1	I
36	69	58	11	8	1	I
37	69	58	11	8	1	I
38	69	58	11	8	1	I
1	68	58	10	8	1	I
14	68	58	10	8	2	I
15	67	57	10	8	1	I
2	66	57	9	8	1	I
13	67	58	9	8	1	I
33	67	58	9	8	1	I
40	68	59	9	8	1	I
32	66	58	8	8	1	I
39	67	59	8	8	1	I
31	66	58	8	8	1	N

Receptor	No Barrier dBA	With Barrier dBA	Noise Reduction dBA	Minimum Benefited Goal dBA	Units Per Benefited Receptor*	Noise Impact (I) Impact (N) Non Impact
N57	67	60	7	8	-	I
43	67	60	7	8	-	I
45	67	60	7	8	-	I
46	66	59	7	8	-	I
N59	66	59	7	8	-	N
16	66	60	6	8	-	I
47	66	60	6	8	-	I
FS-8	64	58	6	8	-	N
30	65	59	6	8	-	N
50	65	59	6	8	-	N
N63	66	61	5	8	-	I
49	65	60	5	8	-	N
51	65	60	5	8	-	N
53	64	59	5	8	-	N
56	64	59	5	8	-	N
41	67	63	4	8	-	I
3	65	61	4	8	-	N
29	64	60	4	8	-	N
44	66	62	4	8	-	N
48	65	61	4	8	-	N
55	64	60	4	8	-	N
N56	68	65	3	8	-	I
42	66	63	3	8	-	I
N55	65	62	3	8	-	N
28	64	61	3	8	-	N
52	64	61	3	8	-	N
54	63	60	3	8	-	N
57	63	60	3	8	-	N
58	63	60	3	8	-	N
N64	66	64	2	8	-	N
4	65	63	2	8	-	N
17	65	63	2	8	-	N

Receptor	No Barrier dBA	With Barrier dBA	Noise Reduction dBA	Minimum Benefited Goal dBA	Units Per Benefited Receptor*	Noise Impact (I) Impact (N) Non Impact
27	64	62	2	8	-	N
59	62	60	2	8	-	N
60	62	60	2	8	-	N
61	62	60	2	8	-	N
62	62	60	2	8	-	N
6	64	63	1	8	-	N
7	62	61	1	8	-	N
12	64	63	1	8	-	N
19	64	63	1	8	-	N
21	63	62	1	8	-	N
26	64	63	1	8	-	N
63	61	60	1	8	-	N
64	61	60	1	8	-	N
65	61	60	1	8	-	N
66	60	59	1	8	-	N
N65	65	65	0	8	-	N
N66	64	64	0	8	-	N
5	64	64	0	8	-	N
8	63	63	0	8	-	N
9	61	61	0	8	-	N
10	63	63	0	8	-	N
11	63	63	0	8	-	N
18	64	64	0	8	-	N
20	62	62	0	8	-	N
22	63	63	0	8	-	N
23	62	62	0	8	-	N
24	63	63	0	8	-	N
25	63	63	0	8	-	N
67	60	60	0	8	-	N
68	60	60	0	8	-	N
69	60	60	0	8	-	N

*Units per benefited receptor were only determined for receptors receiving an 8 dBA or more reduction. For the purposes of this Supplemental EIS, receptors are considered individual buildings. A unit is a discrete residence or business.

Figure C-8. Barrier 7 Analysis



Barrier 8

N67, N68, N69, and FS-10 are the representative receptors along southbound WIS 175 from Bluemound Road to Parkway Drive, and represent seven total receptors studied for barrier 8. Barrier 8 would not achieve the goal of 8 dBA reduction. **Table C-17** summarizes the barrier 8 analysis and **Table C-18** presents the barrier 8 analysis for each receptor studied. **Figure C-9** shows the barrier 8 analysis results.

Table C-17
Barrier 8 Analysis Summary

Location	Representative Receptors	Total Receptors in Study*	Number of Receptors Impacted	Total Benefited Receptors	Total Benefited Units**	Estimated Barrier Cost	Estimated Barrier Cost per Benefited Unit	Result of Analysis
SB 175 From Bluemound to Parkway	N67, N68, N69, FS-10***	7	0	0	0	$323,100	$0	Not Reasonable or Feasible

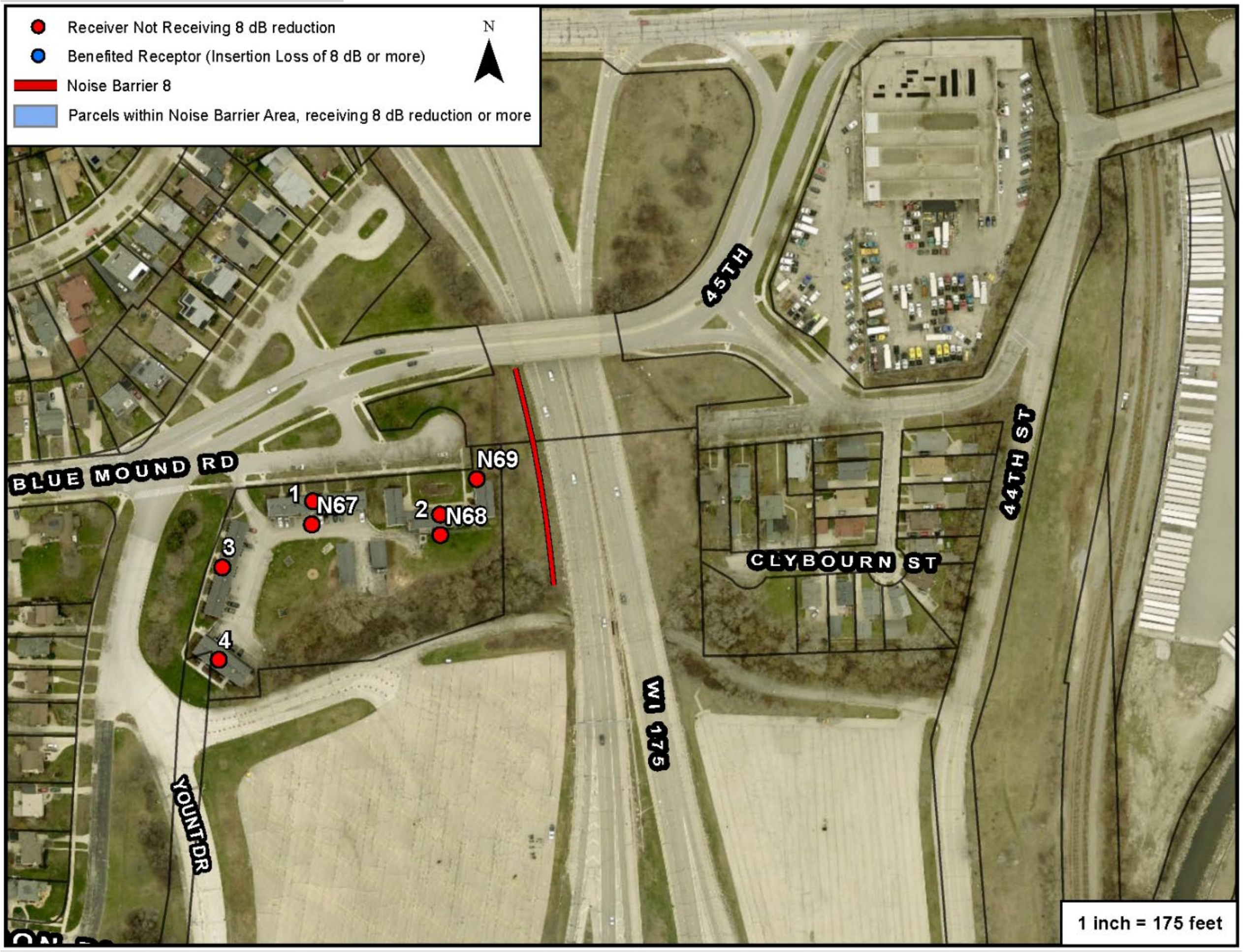
*For the purposes of this Supplemental EIS, receptors are considered individual buildings.
** A unit is a discrete residence or business.
*** FS-10 is a field measurement receptor and representative receptor for the proposed model (refer to Section 4). It was the lone impact and therefore a barrier analysis was conducted for the area. However, FS-10 is vacant land with no activity adjacent to an apartment complex and is not included in the barrier analysis.

Table C-18
Barrier 8 Analysis for Receptors Studied

Receptor	No Barrier dBA	With Barrier dBA	Noise Reduction dBA	Minimum Benefited Goal dBA	Units Per Benefited Receptor*	Noise Impact (I) Impact (N) Non Impact
N69	66	59	7	8	-	N
N68	64	62	2	8	-	N
2	63	61	2	8	-	N
N67	62	61	1	8	-	N
1	62	61	1	8	-	N
3	61	61	0	8	-	N
4	62	62	0	8	-	N

*Units per benefited receptor were only determined for receptors receiving an 8 dBA or more reduction. For the purposes of this Supplemental EIS, receptors are considered individual buildings. A unit is a discrete residence or business.

Figure C-9. Barrier 8 Analysis



Barrier 8A

N70, N71, N72, N73, and N74 are the representative receptors along northbound WIS 175 from Parkway Drive to Bluemound Road, and represent 19 total receptors studied for barrier 8A. Barrier 8A would achieve the minimum feasible 8 dBA noise reduction for 1 benefited receptor (1 benefited unit). However, with an estimated barrier cost of $198,600 per benefited unit, it would not be reasonable. **Table C-19** summarizes the barrier 8A analysis and **Table C-20** presents the barrier 8A analysis for each receptor studied. **Figure C-10** shows the barrier 8A analysis results.

Table C-19
Barrier 8A Analysis Summary

Location	Representative Receptors	Total Receptors in Study*	Number of Receptors Impacted	Total Benefited Receptors	Total Benefited Units**	Estimated Barrier Cost	Estimated Barrier Cost per Benefited Unit	Result of Analysis
NB 175 From Parkway to Bluemound	N70, N71, N72, N73, N74	19	1	1	1	$198,600	$198,600	Not Reasonable or Feasible

*For the purposes of this Supplemental EIS, receptors are considered individual buildings.
** A unit is a discrete residence or business.

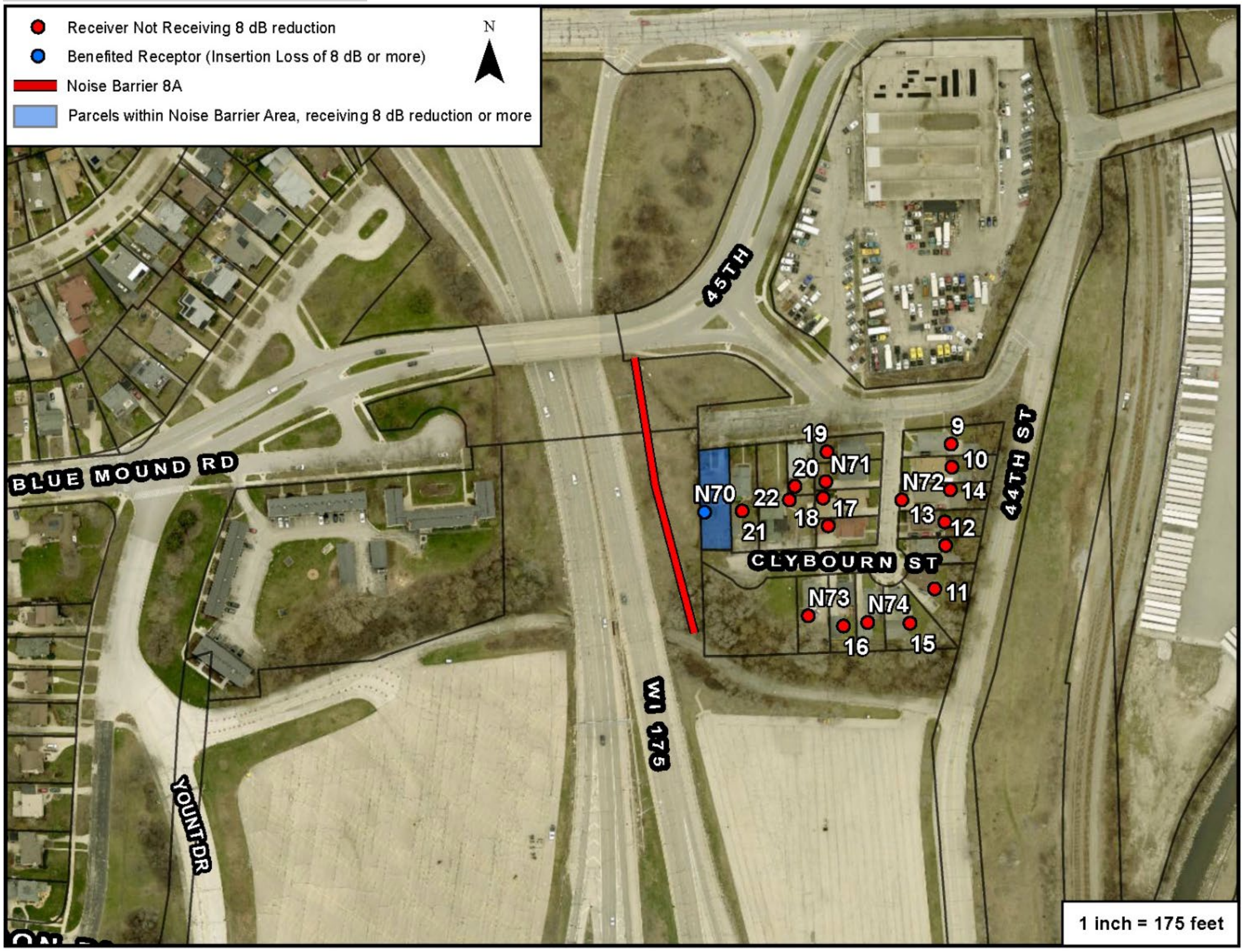
Table C-20
Barrier 8A Analysis for Receptors Studied

Receptor	No Barrier dBA	With Barrier dBA	Noise Reduction dBA	Minimum Benefited Goal dBA	Units Per Benefited Receptor*	Noise Impact (I) Impact (N) Non Impact
N70	71	62	9	8	1	I
20	62	61	1	8	-	N
N71	61	61	0	8	-	N
N72	61	61	0	8	-	N
N73	66	66	0	8	-	N
N74	64	64	0	8	-	N
9	60	60	0	8	-	N
10	60	60	0	8	-	N
11	62	62	0	8	-	N
12	61	61	0	8	-	N
13	61	61	0	8	-	N
14	61	61	0	8	-	N
15	63	63	0	8	-	N
16	65	65	0	8	-	N
17	61	61	0	8	-	N
18	61	61	0	8	-	N

Receptor	No Barrier dBA	With Barrier dBA	Noise Reduction dBA	Minimum Benefited Goal dBA	Units Per Benefited Receptor*	Noise Impact (I) Impact (N) Non Impact
19	61	61	0	8	-	N
21	63	63	0	8	-	N
22	62	62	0	8	-	N

*Units per benefited receptor were only determined for receptors receiving an 8 dBA or more reduction. For the purposes of this Supplemental EIS, receptors are considered individual buildings. A unit is a discrete residence or business.

Figure C-10. Barrier 8A Analysis



Barrier 9

N78, N79, N80, N81, N82, N83, N84, N85, N86, and FS-12 are the representative receptors along westbound Park Hill Avenue from approximately 35th Street to 39th Street, and represent 118 total receptors studied for barrier 9. Barrier 9 would achieve the minimum feasible 8 dBA noise reduction for 11 benefited receptors (15 benefited units). With an estimated barrier cost of $60,760 per benefited unit, it would also be reasonable through cost-averaging. **Table C-21** summarizes the barrier 9 analysis and **Table C-22** presents the barrier 9 analysis for each receptor studied. **Figure C-11** shows the barrier 9 analysis results.

Table C-21
Barrier 9 Analysis Summary

Location	Representative Receptors	Total Receptors in Study*	Number of Receptors Impacted	Total Benefited Receptors	Total Benefited Units**	Estimated Barrier Cost	Estimated Barrier Cost per Benefited Unit	Result of Analysis
WB Park Hill from 35th to End	N78, N79, N80, N81, N82, N83, N84, N85, N86, FS-11***, FS-12	118	13	11	15	$911,400	$60,760	Reasonable and Feasible with Cost Averaging

*For the purposes of this Supplemental EIS, receptors are considered individual buildings.
** A unit is a discrete residence or business.
*** FS-11 was not used for the barrier analysis shown in Table C-22 because it is captured by receptors 94 and 95.

Table C-22
Barrier 9 Analysis for Receptors Studied

Receptor	No Barrier dBA	With Barrier dBA	Noise Reduction dBA	Minimum Benefited Goal dBA	Units Per Benefited Receptor*	Noise Impact (I) Impact (N) Non Impact
N81	70	58	12	8	1	I
102	70	58	12	8	1	I
94	70	59	11	8	2	I
95	70	59	11	8	2	I
96	69	58	11	8	1	I
97	68	58	10	8	1	I
N83	68	59	9	8	1	I
98	67	58	9	8	1	I
51	67	59	8	8	2	I
99	66	58	8	8	1	N
101	66	58	8	8	2	N
32	67	60	7	8	-	I
70	65	58	7	8	-	N
71	65	58	7	8	-	N
72	65	58	7	8	-	N

Receptor	No Barrier dBA	With Barrier dBA	Noise Reduction dBA	Minimum Benefited Goal dBA	Units Per Benefited Receptor*	Noise Impact (I) Impact (N) Non Impact
100	65	58	7	8	-	N
N85	67	61	6	8	-	I
62	64	58	6	8	-	N
69	63	58	5	8	-	N
73	62	57	5	8	-	N
N80	67	63	4	8	-	N
3	62	58	4	8	-	N
6	61	57	4	8	-	N
22	62	58	4	8	-	I
30	64	60	4	8	-	N
52	64	60	4	8	-	N
68	62	58	4	8	-	N
N82	68	65	3	8	-	N
N86	62	59	3	8	-	I
23	66	63	3	8	-	N
31	63	60	3	8	-	N
54	63	60	3	8	-	N
55	62	59	3	8	-	N
61	61	58	3	8	-	N
63	61	58	3	8	-	N
66	61	58	3	8	-	N
67	61	58	3	8	-	N
74	61	58	3	8	-	N
N84	63	61	2	8	-	N
7	66	64	2	8	-	N
24	65	63	2	8	-	N
25	64	62	2	8	-	N
29	66	64	2	8	-	N
33	62	60	2	8	-	N
34	62	60	2	8	-	N
35	61	59	2	8	-	N
36	61	59	2	8	-	N

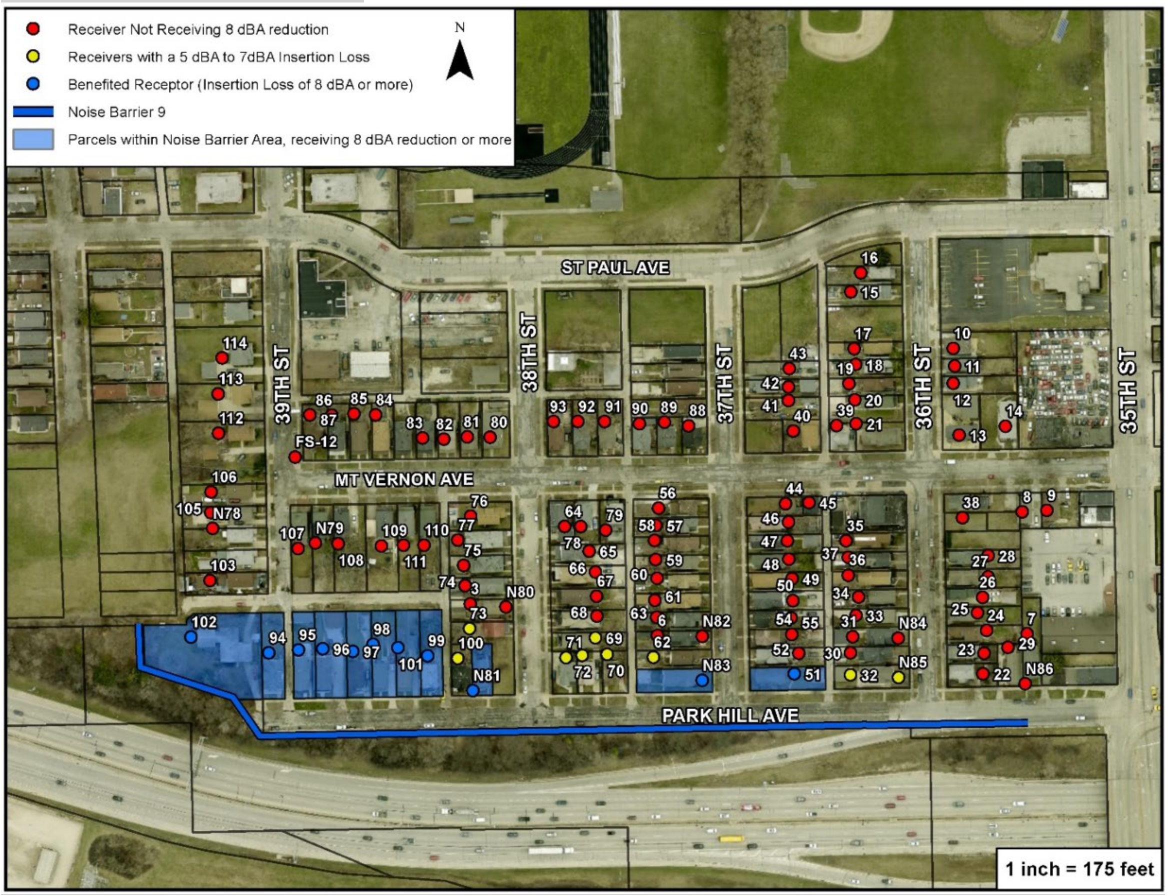
Receptor	No Barrier dBA	With Barrier dBA	Noise Reduction dBA	Minimum Benefited Goal dBA	Units Per Benefited Receptor*	Noise Impact (I) Impact (N) Non Impact
37	61	59	2	8	-	N
46	60	58	2	8	-	N
49	61	59	2	8	-	N
50	61	59	2	8	-	N
59	60	58	2	8	-	N
60	60	58	2	8	-	N
64	60	58	2	8	-	N
65	60	58	2	8	-	N
75	61	59	2	8	-	N
77	61	59	2	8	-	N
78	60	58	2	8	-	N
8	63	62	1	8	-	N
20	59	58	1	8	-	N
21	59	58	1	8	-	N
26	63	62	1	8	-	N
27	63	62	1	8	-	N
39	59	58	1	8	-	N
42	58	57	1	8	-	N
43	58	57	1	8	-	N
44	59	58	1	8	-	N
45	59	58	1	8	-	N
47	60	59	1	8	-	N
48	60	59	1	8	-	N
56	59	58	1	8	-	N
57	59	58	1	8	-	N
58	59	58	1	8	-	N
76	60	59	1	8	-	N
79	59	58	1	8	-	N
87	59	58	1	8	-	N
88	58	57	1	8	-	N
89	58	57	1	8	-	N

Receptor	No Barrier dBA	With Barrier dBA		Minimum Benefited Goal dBA	Units Per Benefited Receptor*	Noise Impact (I) Impact (N) Non Impact
90	58	57	1	8	-	N
103	64	63	1	8	-	N
107	61	60	1	8	-	N
109	60	59	1	8	-	N
110	60	59	1	8	-	N
111	60	59	1	8	-	N
N78	63	63	0	8	-	N
N79	60	60	0	8	-	N
FS-12	59	59	0	8	-	N
9	64	64	0	8	-	N
10	59	59	0	8	-	N
11	60	60	0	8	-	N
12	60	60	0	8	-	N
13	60	60	0	8	-	N
14	61	61	0	8	-	N
15	57	57	0	8	-	N
16	57	57	0	8	-	N
17	58	58	0	8	-	N
18	58	58	0	8	-	N
19	58	58	0	8	-	N
28	62	62	0	8	-	N
38	61	61	0	8	-	N
40	58	58	0	8	-	N
41	58	58	0	8	-	N
80	59	59	0	8	-	N
81	59	59	0	8	-	N
82	59	59	0	8	-	N
83	59	59	0	8	-	N
84	59	59	0	8	-	N
85	59	59	0	8	-	N
86	59	59	0	8	-	N
91	58	58	0	8	-	N

Receptor	No Barrier dBA	With Barrier dBA	Noise Reduction dBA	Minimum Benefited Goal dBA	Units Per Benefited Receptor*	Noise Impact (I) Impact (N) Non Impact
92	58	58	0	8	-	N
93	58	58	0	8	-	N
105	63	63	0	8	-	N
106	62	62	0	8	-	N
108	60	60	0	8	-	N
112	60	60	0	8	-	N
113	59	59	0	8	-	N
114	58	58	0	8	-	N

*Units per benefited receptor were only determined for receptors receiving an 8 dBA or more reduction. For the purposes of this Supplemental EIS, receptors are considered individual buildings. A unit is a discrete residence or business.

Figure C-11. Barrier 9 Analysis



Barrier 10

N87, N88, N89, N90, N91, N92, N93, N94, N95, N96, N97, N98, N99, N100, N101, N102, N103, FS-13, and FS-14 are the representative receptors along westbound Park Hill Avenue from 29th Street to 35th Street, and represent 134 total receptors studied for barrier 10. Barrier 10 would achieve the minimum feasible 8 dBA noise reduction for 16 benefited receptors (32 benefited units). With an estimated barrier cost of $39,038 per benefited unit, it would also be reasonable. **Table C-23** summarizes the barrier 10 analysis and **Table C-24** presents the barrier 10 analysis for each receptor studied. **Figure C-12** shows the barrier 10 analysis results.

Table C-23
Barrier 10 Analysis Summary

Location	Representative Receptors	Total Receptors in Study*	Number of Receptors Impacted	Total Benefited Receptors	Total Benefited Units**	Estimated Barrier Cost	Estimated Barrier Cost per Benefited Unit	Result of Analysis
WB Park Hill from 29th to 35th	N87, N88, N89, N90, N91, N92, N93, N94, N95, N96, N97, N98, N99, N100, N101, N102, N103, FS-13, FS-14	134	44	16	32	$1,249,200	$39,038	Reasonable and Feasible

*For the purposes of this Supplemental EIS, receptors are considered individual buildings.
** A unit is a discrete residence or business.

Table C-24
Barrier 10 Analysis for Receptors Studied

Receptor	No Barrier dBA	With Barrier dBA	Noise Reduction dBA	Minimum Benefited Goal dBA	Units Per Benefited Receptor*	Noise Impact (I) Impact (N) Non Impact
N103	72	57	15	8	4	I
23	72	61	11	8	2	I
83	71	60	11	8	2	I
N99	73	62	11	8	2	I
99	72	62	10	8	2	I
N88	71	61	10	8	2	I
N90	71	61	10	8	1	I
22	71	62	9	8	1	I
24	70	61	9	8	2	I
82	69	60	9	8	4	I
97	69	60	9	8	2	I
100	71	62	9	8	1	I
101	72	63	9	8	1	I
67	67	59	8	8	2	I

Receptor	No Barrier dBA	With Barrier dBA	Noise Reduction dBA	Minimum Benefited Goal dBA	Units Per Benefited Receptor*	Noise Impact (I) Impact (N) Non Impact
81	67	59	8	8	2	I
N96	70	62	8	8	2	I
25	69	62	7	8	-	I
27	69	62	7	8	-	I
29	68	61	7	8	-	I
32	69	62	7	8	-	I
98	69	62	7	8	-	I
102	71	64	7	8	-	I
N93	70	63	7	8	-	I
N98	67	60	7	8	-	I
1	68	62	6	8	-	I
28	67	61	6	8	-	I
45	69	63	6	8	-	I
68	64	58	6	8	-	N
69	65	59	6	8	-	N
84	66	60	6	8	-	N
85	66	60	6	8	-	I
86	66	60	6	8	-	I
95	67	61	6	8	-	I
103	69	63	6	8	-	I
N100	65	59	6	8	-	N
N87	68	62	6	8	-	I
13	65	60	5	8	-	N
15	65	60	5	8	-	N
30	65	60	5	8	-	N
31	65	60	5	8	-	N
33	67	62	5	8	-	I
34	66	61	5	8	-	I
35	66	61	5	8	-	N
47	64	59	5	8	-	N
62	64	59	5	8	-	N

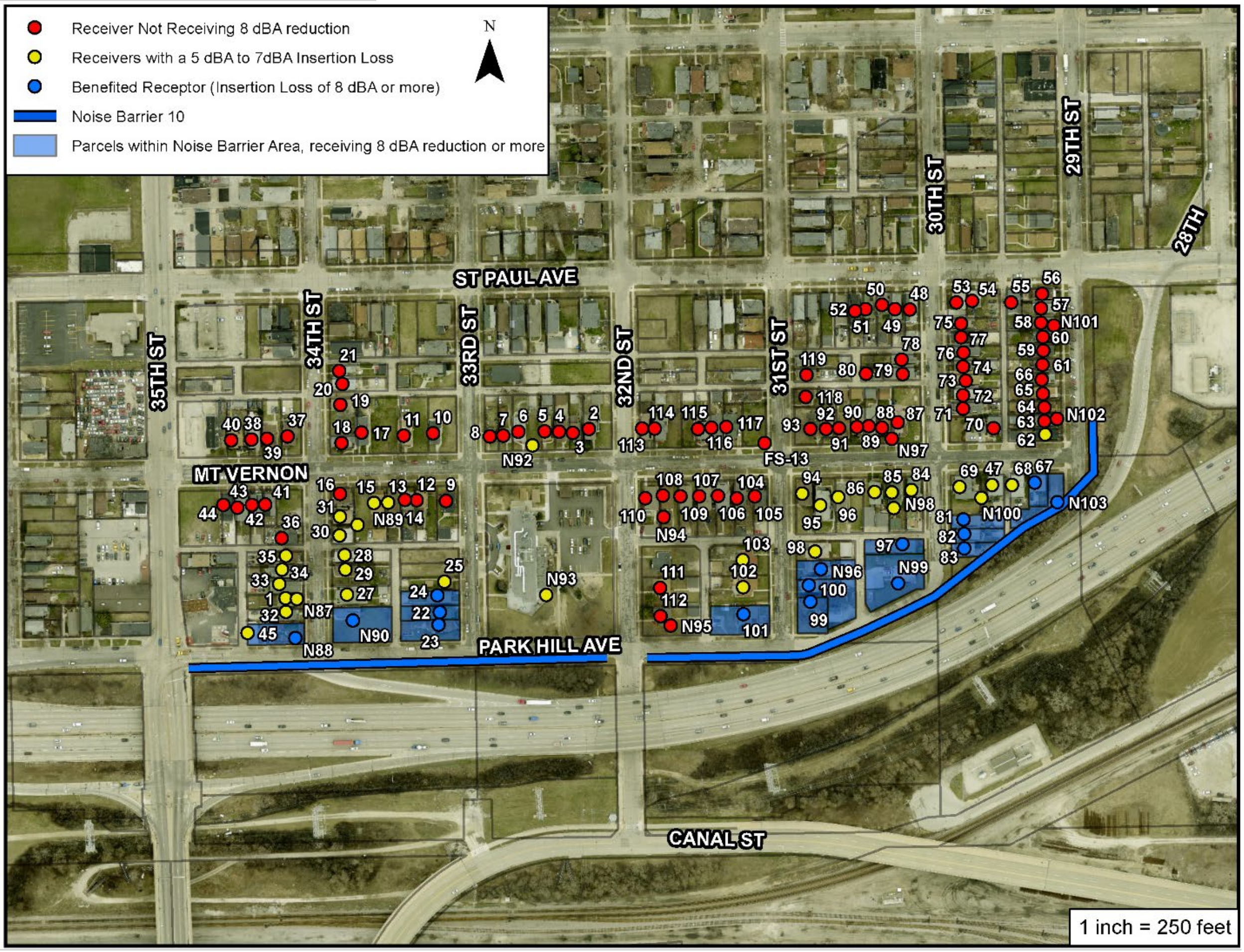
Receptor	No Barrier dBA	With Barrier dBA	Noise Reduction dBA	Minimum Benefited Goal dBA	Units Per Benefited Receptor*	Noise Impact (I) Impact (N) Non Impact
94	66	61	5	8	-	I
96	66	61	5	8	-	I
N89	66	61	5	8	-	N
N92	64	59	5	8	-	N
2	63	59	4	8	-	N
3	63	59	4	8	-	N
4	63	59	4	8	-	N
5	63	59	4	8	-	N
6	63	59	4	8	-	N
7	63	59	4	8	-	N
8	63	59	4	8	-	N
9	65	61	4	8	-	N
10	63	59	4	8	-	N
11	63	59	4	8	-	N
12	65	61	4	8	-	N
14	65	61	4	8	-	N
16	64	60	4	8	-	N
17	62	58	4	8	-	N
36	65	61	4	8	-	N
71	62	58	4	8	-	N
79	61	57	4	8	-	N
80	61	57	4	8	-	N
88	63	59	4	8	-	N
89	63	59	4	8	-	N
90	63	59	4	8	-	N
91	63	59	4	8	-	N
92	63	59	4	8	-	N
104	66	62	4	8	-	I
105	66	62	4	8	-	I
106	66	62	4	8	-	I
FS-13	64	60	4	8	-	N
N102	65	61	4	8	-	N

Receptor	No Barrier dBA	With Barrier dBA	Noise Reduction dBA	Minimum Benefited Goal dBA	Units Per Benefited Receptor*	Noise Impact (I) Impact (N) Non Impact
N97	63	59	4	8	-	N
18	62	59	3	8	-	N
19	61	58	3	8	-	N
20	61	58	3	8	-	N
41	64	61	3	8	-	N
42	64	61	3	8	-	N
70	62	59	3	8	-	N
72	61	58	3	8	-	N
78	60	57	3	8	-	N
87	62	59	3	8	-	N
93	63	60	3	8	-	N
107	66	63	3	8	-	I
108	66	63	3	8	-	N
109	66	63	3	8	-	N
110	66	63	3	8	-	N
115	63	60	3	8	-	N
116	63	60	3	8	-	N
117	63	60	3	8	-	N
118	62	59	3	8	-	N
119	61	58	3	8	-	N
N94	67	64	3	8	-	I
N95	68	65	3	8	-	I
21	60	58	2	8	-	N
37	62	60	2	8	-	N
38	63	61	2	8	-	N
39	62	60	2	8	-	N
43	64	62	2	8	-	N
44	65	63	2	8	-	N
48	59	57	2	8	-	N
49	59	57	2	8	-	N
50	59	57	2	8	-	N

Receptor	No Barrier dBA	With Barrier dBA	Noise Reduction dBA	Minimum Benefited Goal dBA	Units Per Benefited Receptor*	Noise Impact (I) Impact (N) Non Impact
51	59	57	2	8	-	N
52	59	57	2	8	-	N
53	59	57	2	8	-	N
54	59	57	2	8	-	N
63	63	61	2	8	-	N
64	63	61	2	8	-	N
65	63	61	2	8	-	N
73	60	58	2	8	-	N
74	60	58	2	8	-	N
75	59	57	2	8	-	N
76	60	58	2	8	-	N
77	59	57	2	8	-	N
111	67	65	2	8	-	I
112	67	65	2	8	-	I
113	63	61	2	8	-	N
114	63	61	2	8	-	N
40	63	62	1	8	-	N
55	59	58	1	8	-	N
56	60	59	1	8	-	N
57	60	59	1	8	-	N
58	61	60	1	8	-	N
59	61	60	1	8	-	N
60	61	60	1	8	-	N
61	62	61	1	8	-	N
66	62	61	1	8	-	N
N101	61	61	0	8	-	N

*Units per benefited receptor were only determined for receptors receiving an 8 dBA or more reduction. For the purposes of this Supplemental EIS, receptors are considered individual buildings. A unit is a discrete residence or business.

Figure C-12. Barrier 10 Analysis



Barrier 11

N105 is the representative receptor along westbound Clybourn Street from 25th to 26th streets, and represents 40 total receptors studied for barrier 11. Barrier 11 would not achieve the goal of 8 dBA reduction. **Table C-25** summarizes the barrier 11 analysis and **Table C-26** presents the barrier 11 analysis for each receptor studied. **Figure C-13** shows the barrier 11 analysis results.

Table C-25
Barrier 11 Analysis Summary

Location	Representative Receptors	Total Receptors in Study*	Number of Receptors Impacted	Total Benefited Receptors	Total Benefited Units**	Estimated Barrier Cost	Estimated Barrier Cost per Benefited Unit	Result of Analysis
WB Clybourn From 25th to 26th	N105	40	3	0	0	$297,000	$0	Not Reasonable or Feasible

*For the purposes of this Supplemental EIS, receptors are considered individual buildings.
** A unit is a discrete residence or business.

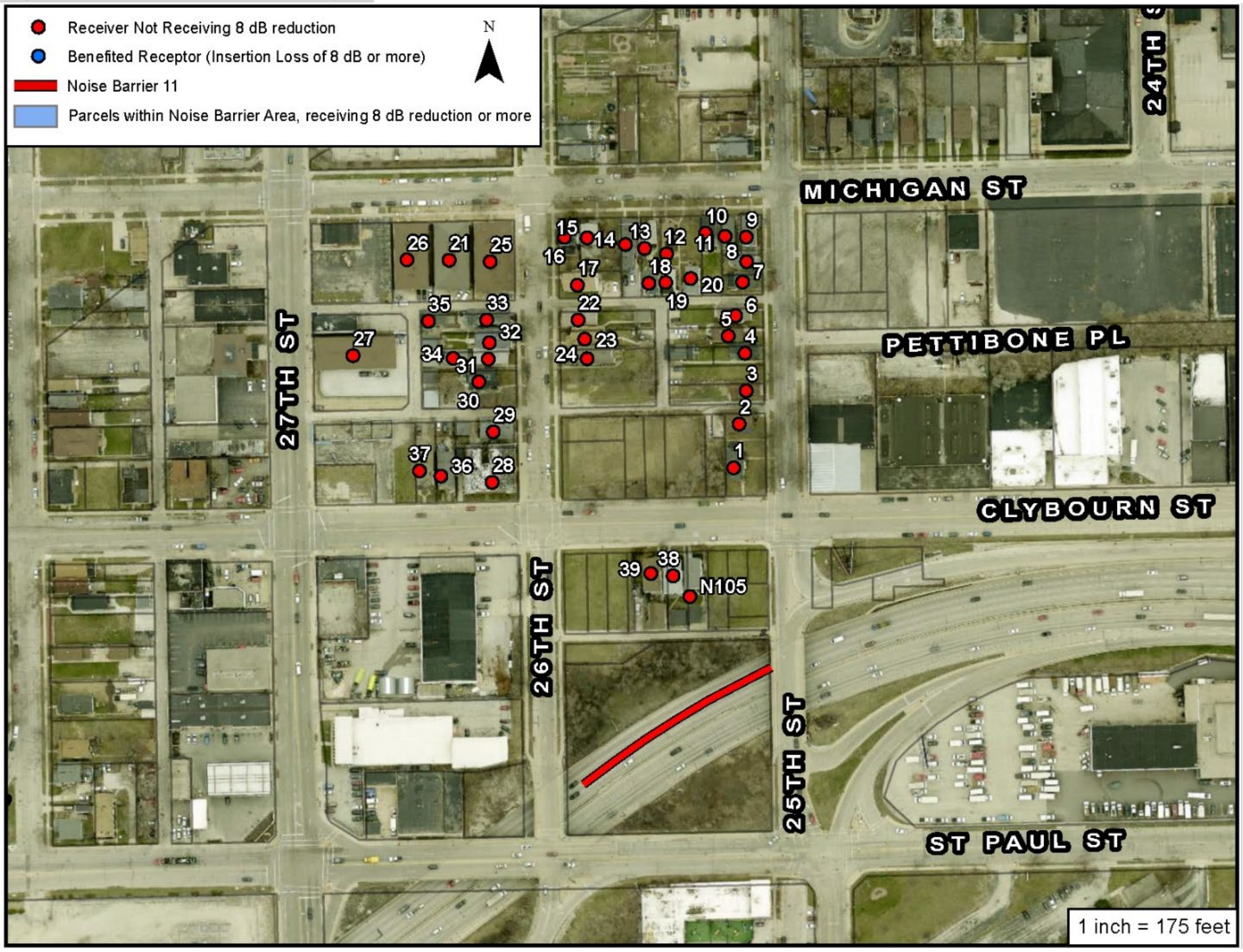
Table C-26
Barrier 11 Analysis for Receptors Studied

Receptor	No Barrier dBA	With Barrier dBA	Noise Reduction dBA	Minimum Benefited Goal dBA	Units Per Benefited Receptor*	Noise Impact (I) Impact (N) Non Impact
N105	70	68	2	8	-	I
10	59	58	1	8	-	N
12	59	58	1	8	-	N
17	60	59	1	8	-	N
33	61	60	1	8	-	N
38	68	67	1	8	-	I
1	65	65	0	8	-	N
2	63	63	0	8	-	N
3	63	63	0	8	-	N
4	62	62	0	8	-	N
5	61	61	0	8	-	N
6	61	61	0	8	-	N
7	60	60	0	8	-	N
8	59	59	0	8	-	N
9	59	59	0	8	-	N
11	59	59	0	8	-	N

Receptor	No Barrier dBA	With Barrier dBA	Noise Reduction dBA	Minimum Benefited Goal dBA	Units Per Benefited Receptor*	Noise Impact (I) Impact (N) Non Impact
13	58	58	0	8	-	N
14	58	58	0	8	-	N
15	58	58	0	8	-	N
16	58	58	0	8	-	N
18	59	59	0	8	-	N
19	59	59	0	8	-	N
20	59	59	0	8	-	N
21	59	59	0	8	-	N
22	61	61	0	8	-	N
23	61	61	0	8	-	N
24	62	62	0	8	-	N
	59	59	0	8	-	N
26	59	59	0	8	-	N
27	60	60	0	8	-	N
28	64	64	0	8	-	N
29	63	63	0	8	-	N
30	62	62	0	8	-	N
31	61	61	0	8	-	N
32	61	61	0	8	-	N
34	61	61	0	8	-	N
35	60	60	0	8	-	N
36	63	63	0	8	-	N
37	63	63	0	8	-	N
39	66	66	0	8	-	I

*Units per benefited receptor were only determined for receptors receiving an 8 dBA or more reduction. For the purposes of this Supplemental EIS, receptors are considered individual buildings. A unit is a discrete residence or business.

Figure C-13. Barrier 11 Analysis



Barrier 12

R8, R9, N106, N107, N108, N109, and N110 are the representative receptors along westbound Clybourn Street from 17th to 19th streets, and represent 22 total receptors studied for barrier 12. Barrier 12 would achieve the minimum feasible 8 dBA noise reduction for 3 benefited receptors (5 benefited units). However, with an estimated barrier cost of $369,360 per benefited unit, it would not be reasonable. **Table C-27** summarizes the barrier 12 analysis and **Table C-28** presents the barrier 12 analysis for each receptor studied. **Figure C-14** shows the barrier 12 analysis results.

Table C-27
Barrier 12 Analysis Summary

Location	Representative Receptors	Total Receptors in Study*	Number of Receptors Impacted	Total Benefited Receptors	Total Benefited Units**	Estimated Barrier Cost	Estimated Barrier Cost per Benefited Unit	Result of Analysis
WB Clybourn From 17th to 19th	R8, R9, N106, N107, N108, N109, N110	22	2	3	5	$1,846,800	$369,360	Not Reasonable or Feasible

*For the purposes of this Supplemental EIS, receptors are considered individual buildings.
** A unit is a discrete residence or business.

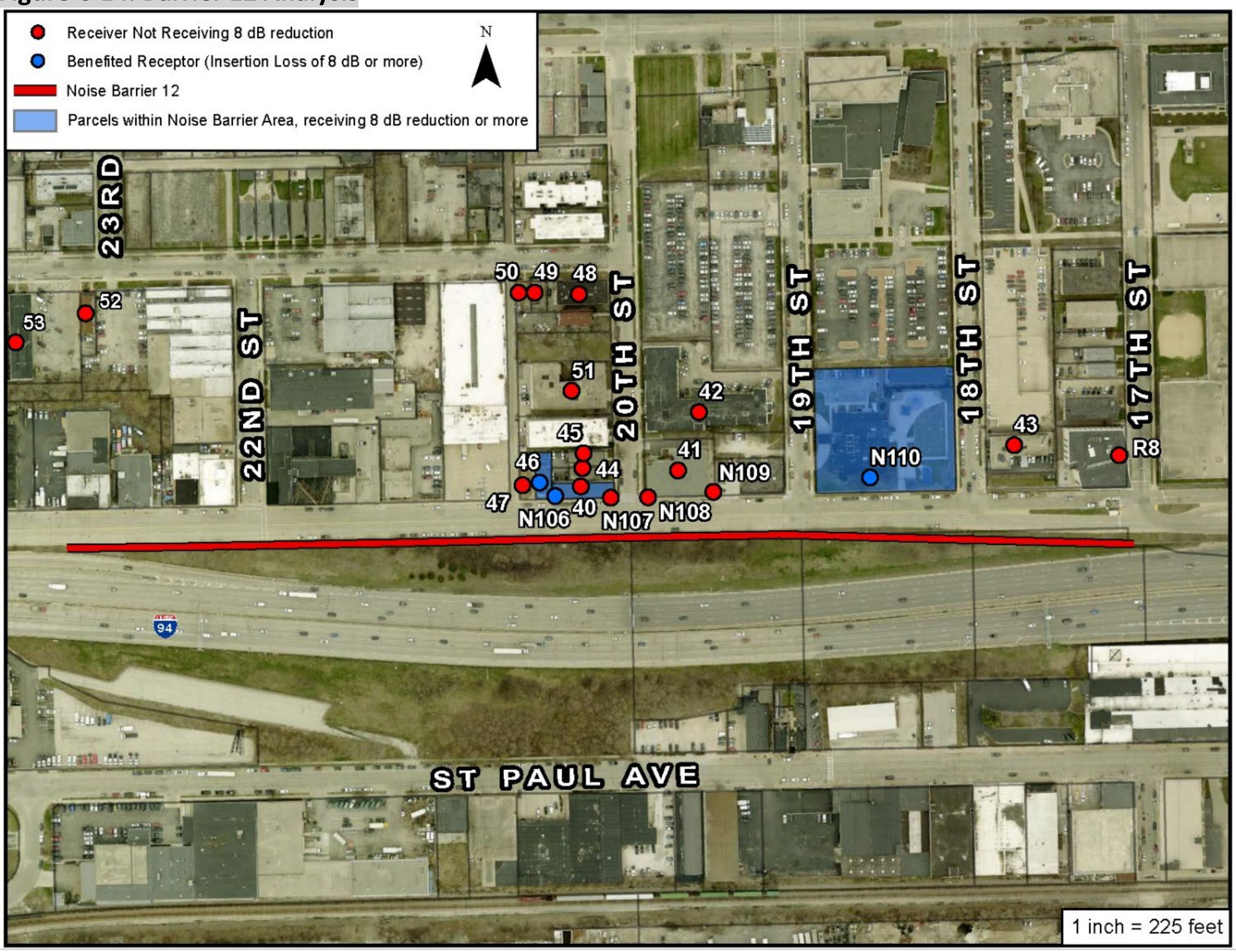
Table C-28
Barrier 12 Analysis for Receptors Studied

Receptor	No Barrier dBA	With Barrier dBA	Noise Reduction dBA	Minimum Benefited Goal dBA	Units Per Benefited Receptor*	Noise Impact (I) Impact (N) Non Impact
N110	71	59	12	8	1	I
N106	64	56	8	8	2	N
46	64	56	8	8	2	N
N107	63	56	7	8	-	N
N108	63	56	7	8	-	N
N109	64	57	7	8	-	N
40	63	56	7	8	-	N
41	64	57	7	8	-	N
44	62	56	6	8	-	N
47	62	56	6	8	-	N
42	61	56	5	8	-	N
43	69	64	5	8	-	I
45	61	56	5	8	-	N
51	59	55	4	8	-	N
R8	46	44	2	8	-	N
R9	46	44	2	8	-	N

Receptor	No Barrier dBA	With Barrier dBA	Noise Reduction dBA	Minimum Benefited Goal dBA	Units Per Benefited Receptor*	Noise Impact (I) Impact (N) Non Impact
48	57	55	2	8	-	N
49	57	55	2	8	-	N
50	57	55	2	8	-	N
52	60	59	1	8	-	N
53	63	62	1	8	-	N
54	62	62	0	8	-	N

*Units per benefited receptor were only determined for receptors receiving an 8 dBA or more reduction. For the purposes of this Supplemental EIS, receptors are considered individual buildings. A unit is a discrete residence or business.

Figure C-14. Barrier 12 Analysis



Barrier 13

NR6 is the representative receptor along eastbound National Avenue from 48th Street east about 27 feet, and represents one total receptor studied for barrier 13. Barrier 13 would not achieve the goal of 8 dBA reduction. **Table C-29** summarizes the barrier 13 analysis and **Table C-30** presents the barrier 13 analysis for each receptor studied. **Figure C-15** shows the barrier 13 analysis results.

Table C-27
Barrier 13 Analysis Summary

Location	Representative Receptors	Total Receptors in Study*	Number of Receptors Impacted	Total Benefited Receptors	Total Benefited Units**	Estimated Barrier Cost	Estimated Barrier Cost per Benefited Unit	Result of Analysis
EB National Ave From S 48th east 27 feet	NR6	1	1	0	0	$24,300	$0	Not Reasonable or Feasible

*For the purposes of this Supplemental EIS, receptors are considered individual buildings.
** A unit is a discrete residence or business.

Table C-28
Barrier 13 Analysis for Receptors Studied

Receptor	No Barrier dBA	With Barrier dBA	Noise Reduction dBA	Minimum Benefited Goal dBA	Units Per Benefited Receptor*	Noise Impact (I) Impact (N) Non Impact
NR6	68	63	5	8	-	I

*Units per benefited receptor were only determined for receptors receiving an 8 dBA or more reduction. For the purposes of this Supplemental EIS, receptors are considered individual buildings. A unit is a discrete residence or business.

Figure C-15. Barrier 13 Analysis

Barrier 14

NR8 is the representative receptor along eastbound National Avenue from east of 47th Street east about 48 feet, and represents one total receptor studied for barrier 14. Barrier 14 would not achieve the goal of 8 dBA reduction. **Table C-29** summarizes the barrier 14 analysis and **Table C-30** presents the barrier 14 analysis for each receptor studied. **Figure C-16** shows the barrier 14 analysis results.

Table C-29
Barrier 14 Analysis Summary

Location	Representative Receptors	Total Receptors in Study*	Number of Receptors Impacted	Total Benefited Receptors	Total Benefited Units**	Estimated Barrier Cost	Estimated Barrier Cost per Benefited Unit	Result of Analysis
EB National Ave from 50 feet east of S 47th 48 feet	NR8	1	1	0	0	$43,200	$0	Not Reasonable or Feasible

*For the purposes of this Supplemental EIS, receptors are considered individual buildings.
** A unit is a discrete residence or business.

Table C-30
Barrier 14 Analysis for Receptors Studied

Receptor	No Barrier dBA	With Barrier dBA	Noise Reduction dBA	Minimum Benefited Goal dBA	Units Per Benefited Receptor*	Noise Impact (I) Impact (N) Non Impact
NR8	67	61	6	8	-	I

*Units per benefited receptor were only determined for receptors receiving an 8 dBA or more reduction. For the purposes of this Supplemental EIS, receptors are considered individual buildings. A unit is a discrete residence or business.

Figure C-16. Barrier 14 Analysis