

Appendix H

Air Quality

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I-465 Reconfiguration Project (1802075)

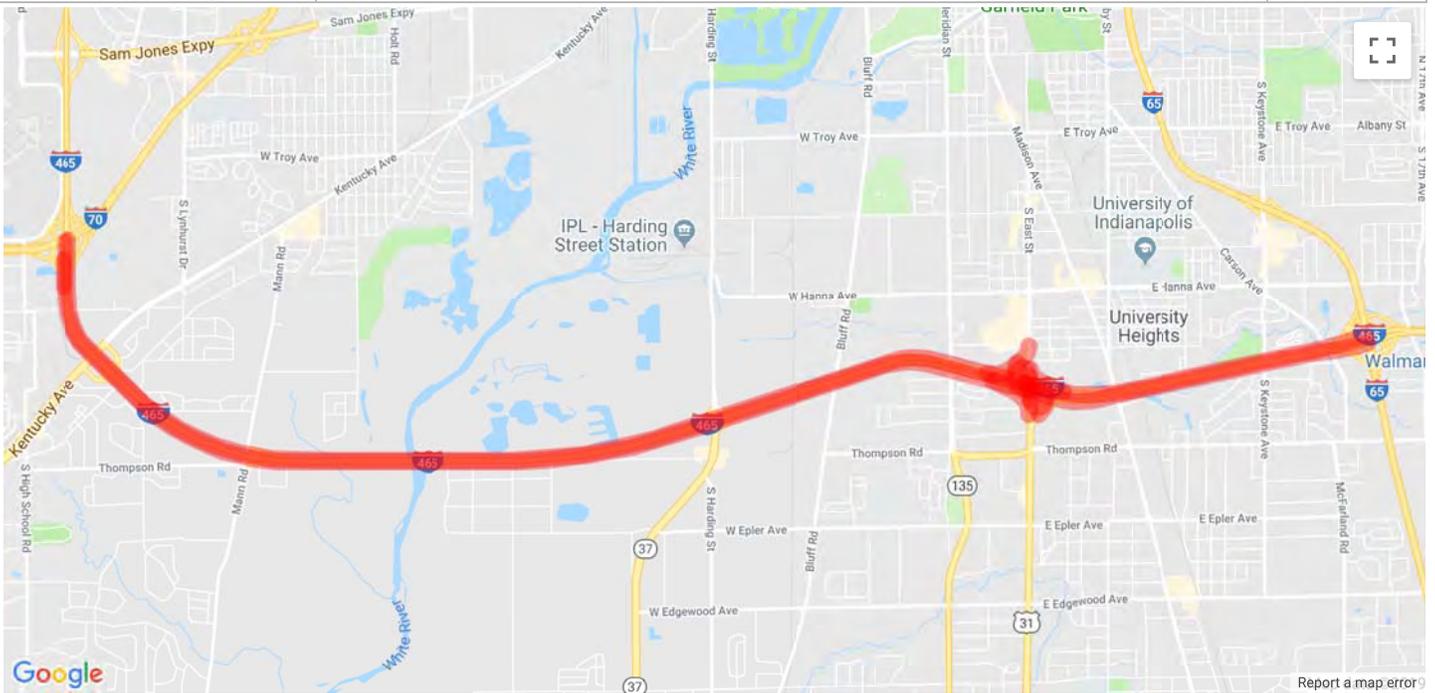
<i>Des Number</i>	1802075	<i>Amendment</i>	20-00 IRTIP	<i>Exempt Category</i>	Non-Exempt	<i>Est Total Project Cost</i>	\$73,900,000
<i>Lead Agency</i>	INDOT	<i>Contact (ERC)</i>	Jim Earl 3172332072	<i>INDOT District</i>	Greenfield	<i>County</i>	Marion Marion Co.
<i>Project Type</i>	Added Travel Lanes	<i>Letting Date</i>	MAR/2020	<i>Functional Classification</i>	Interstate	<i>Bike/Ped Component(s)</i>	No

Title I-465 Reconfiguration Project

Limits From 0.1 to 9.05 of Distance (mile) 8.95 Milepost begins at .1 ends at 9.05

Description Add travel lanes and auxiliary lanes from I-70 to I-65 on I-465 southwest segment; Interchange modification at US31 and I-465 south.

Phase	Fund Source	Prior SFY	SFY2020	SFY2021	SFY2022	SFY2023	SFY2024	Future SFY	Total
PE	FEDERAL - NHS	\$3,600,000	-	-	-	-	-	-	\$3,600,000
PE	STATE - Other	\$400,000	-	-	-	-	-	-	\$400,000
<i>Total Preliminary Engineering</i>		\$4,000,000	-	-	-	-	-	-	\$4,000,000
CN	FEDERAL - NHS	-	\$57,510,000	-	-	-	-	-	\$57,510,000
CN	STATE - Other	-	\$6,390,000	-	-	-	-	-	\$6,390,000
<i>Total Construction</i>		-	\$63,900,000	-	-	-	-	-	\$63,900,000
CE	FEDERAL - NHS	-	\$5,400,000	-	-	-	-	-	\$5,400,000
CE	STATE - Other	-	\$600,000	-	-	-	-	-	\$600,000
<i>Total Construction Engineering</i>		-	\$6,000,000	-	-	-	-	-	\$6,000,000
Total Programmed		\$4,000,000	\$69,900,000	-	-	-	-	-	\$73,900,000





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District Bridge Project (Replacement) (1701345)

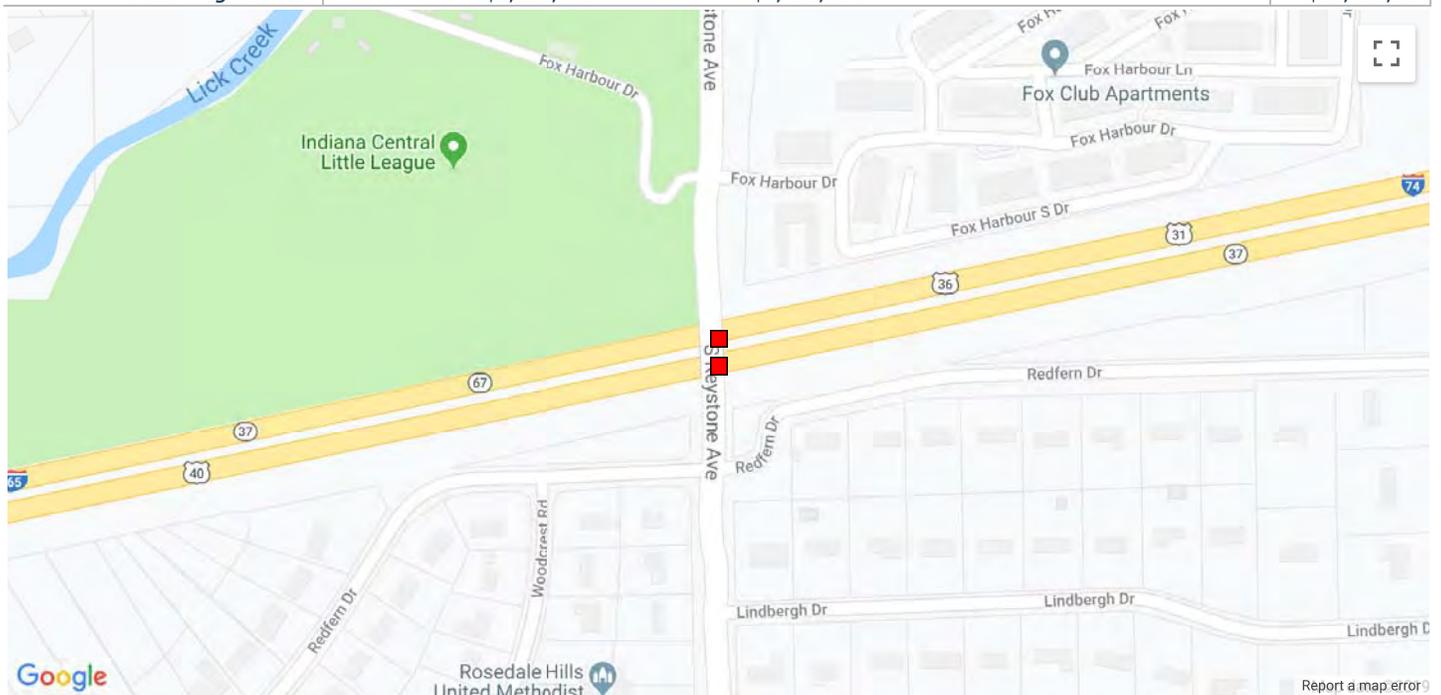
<i>Des Number</i>	1701345	<i>Amendment</i>	20-00 IRTIP	<i>Exempt Category</i>	Exempt	<i>Est Total Project Cost</i>	\$10,699,854
<i>Lead Agency</i>	INDOT	<i>Contact (ERC)</i>		<i>INDOT District</i>	Greenfield	<i>County</i>	Marion Marion Co.
<i>Project Type</i>	Bridge - Other	<i>Letting Date</i>	JAN/2022	<i>Functional Classification</i>	Interstate	<i>Bike/Ped Component(s)</i>	No

Title District Bridge Project (Replacement)

Limits Bridge #: 51210

Description Keystone Ave. over I-465, 0.67 mi. W of I-65

Phase	Fund Source	Prior SFY	SFY2020	SFY2021	SFY2022	SFY2023	SFY2024	Future SFY	Total
PE	FEDERAL - NHPP	-	\$1,080,000	-	-	-	-	-	\$1,080,000
PE	STATE - Other	-	\$120,000	-	-	-	-	-	\$120,000
<i>Total Preliminary Engineering</i>		-	\$1,200,000	-	-	-	-	-	\$1,200,000
CN	FEDERAL - NHPP	-	-	-	\$8,549,869	-	-	-	\$8,549,869
CN	STATE - Other	-	-	-	\$949,985	-	-	-	\$949,985
<i>Total Construction</i>		-	-	-	\$9,499,854	-	-	-	\$9,499,854
Total Programmed		-	\$1,200,000	-	\$9,499,854	-	-	-	\$10,699,854



Indiana Department of Transportation (INDOT)
 State Preservation and Local Initiated Projects FY 2020 - 2024

SPONSOR	CONTR ACT # / LEAD DES	STIP NAME	ROUTE	WORK TYPE	LOCATION	DISTRICT	MILES	FEDERAL CATEGORY	Estimated Cost left to Complete Project*	PROGRAM	PHASE	FEDERAL	MATCH	2020	2021	2022	2023	2024
Indianapolis	41393 / 1801448	Init.	ST 1028	Added Travel Lanes	Emerson Avenue Widening from County Line Road to Stop 11	Greenfield	0	STPBG		Indianapolis MPO	CN	\$10,142,500.00	\$0.00				\$10,142,500.00	
										Local Funds	CN	\$0.00	\$2,535,625.00				\$2,535,625.00	
										Local Funds	RW	\$0.00	\$600,000.00	\$300,000.00	\$300,000.00			
Indiana Department of Transportation	41512 / 1702921	Init.	I 465	Bridge Replacement, Other Construction	ARLINGTON AVENUE OVER I-465, 02.05 miles W of I-74(E. Jct.)	Greenfield	0	NHPP		Bridge ROW	RW	\$18,000.00	\$2,000.00		\$20,000.00			
										Bridge Consulting	PE	\$386,100.00	\$42,900.00	\$429,000.00				
										Bridge Construction	CN	\$3,857,344.20	\$428,593.80				\$4,285,938.00	
Indiana Department of Transportation	41759 / 1800875	Init.	I 74	ITS Communications Systems	Fiber from SR 267 to I-465 (West Leg) at CDP-N7	Greenfield	3.152	NHPP		Statewide Consulting	PE	\$27,000.00	\$3,000.00			\$30,000.00		
										Statewide Construction	CN	\$333,000.00	\$37,000.00				\$370,000.00	
Indiana Department of Transportation	41781 / 1800035	Init.	US 36	Added Travel Lanes	From 3 miles west of I-465 to 1.65 miles west of I-465.	Greenfield	1.403	NHPP		Mobility ROW	RW	\$9,040,000.00	\$2,260,000.00		\$11,300,000.00			
										Mobility Construction	CN	\$14,595,762.40	\$3,648,940.60		\$1,516,000.00		\$16,728,703.00	
										Bridge Construction	CN	\$702,488.00	\$175,622.00				\$878,110.00	
Indiana Department of Transportation	41781 / 1800035	A 01	US 36	Added Travel Lanes	From 3 miles west of I-465 to 1.65 miles west of I-465.	Greenfield	1.403	NHPP	\$32,394,813.00	Mobility Consulting	PE	\$1,577,600.00	\$394,400.00	\$1,972,000.00				
Comments:Adding PE Phase. IMPO 20-00																		
Indiana Department of Transportation	41787 / 1802075	Init.	I 465	Added Travel Lanes	Reconfiguration from I-70 to Mann Rd. & from US-31 to I-65	Greenfield	8.98	NHPP		Road Consulting	PE	\$4,851,000.00	\$539,000.00	\$5,390,000.00				
										Bridge ROW	RW	\$0.00	\$0.00		\$0.00			
										Bridge Consulting	PE	\$551,583.00	\$61,287.00	\$612,870.00				
										Bridge Construction	CN	\$5,066,588.70	\$562,954.30	\$0.00	\$0.00	\$5,629,543.00	\$0.00	
Indiana Department of Transportation	41789 / 1600854	Init.	I 465	Added Travel Lanes	from 1.33 mi S of I-865 (86th Street) to US 421	Greenfield	3.495	NHPP		Road ROW	RW	\$2,250,000.00	\$250,000.00		\$2,500,000.00			
										Road Consulting	PE	\$15,210,000.00	\$1,690,000.00	\$16,900,000.00				

*Estimated Costs left to Complete Project column is for costs that may extend beyond the four years of a STIP. This column is not fiscally constrained and is for information purposes.

Appendix I

Noise

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Excerpts

Traffic Noise Impact Analysis

I-465 Reconfiguration Project

Des. 1802105



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December 2019 Updated Draft

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LIST OF ABBREVIATIONS

- CFR – Code of Federal Regulations
- CNE – Common Noise Environment
- dB – Decibels
- dB(A) – Decibels using the “A” weighting scale
- EA – Environmental Assessment
- EB – Eastbound
- FHWA – Federal Highway Administration
- $L_{eq}(h)$ – Hourly Equivalent Sound Level
- INDOT – Indiana Department of Transportation
- LOS – Level of Service
- MPH – Miles Per Hour
- NEPA – National Environmental Policy Act
- NAC – Noise Abatement Criteria
- NB – Northbound
- SB – Southbound
- TNM – Traffic Noise Model
- WB - Westbound

Executive Summary

A Traffic Noise Impact Analysis was conducted for the I-465 Reconfiguration Project in Indianapolis, Marion County, Indiana. The project includes improvements to I-465 in two sections: between I-70 and Mann Road (Section C) and between the US 31 interchange and the I-65 interchange (Section A/B).

The Federal Highway Administration (FHWA) Traffic Noise Model (TNM) Version 2.5 was used to predict existing and future design year noise levels. Because design year noise levels are predicted to approach or exceed the FHWA Noise Abatement Criteria (NAC), the project has been found to have traffic noise impacts. Based on the Indiana Department of Transportation (INDOT) Traffic Noise Analysis Procedure (2017), the feasibility and reasonableness of noise barriers were considered at all locations in the project area where noise impacts were identified under the future build alternative. Based on this evaluation, 10 feasible and reasonable barriers were identified for this project. These barriers were updated based on consideration of the views of residents and property owners that have been obtained per the INDOT Traffic Analysis Procedure. These locations are summarized in Table ES-1:

Table ES-1: Feasible and Reasonable Noise Barriers

NOISE BARRIER	LOCATION	LENGTH (FEET)	NUMBER OF BENEFITED RECEPTORS
1+3	Section C: north side of I-465 between Kentucky Avenue and Mann Road	3825	97
2+4	Section C: south side of I-465 between Kentucky Avenue and Mann Road	3500	118
6	Section A/B: south side of I-465 between East Street and Madison Avenue	2500	59
7	Section A/B: north side of I-465 between Madison Avenue and the Louisville & Indiana Railroad	600	38
8+10	Section A/B: south side of I-465 between Madison Avenue and Keystone Avenue	5100	169
9	Section A/B: north side of I-465 between Louisville & Indiana Railroad and Keystone Avenue	2660	75
11	Section A/B: north side of I-465 east of Keystone Avenue	1175	103

1.0 Project History and Background Information

1.1 PURPOSE OF THE TRAFFIC NOISE IMPACT ANALYSIS

The purpose of this Traffic Noise Impact Analysis is to evaluate noise impacts and abatement under the requirements of Title 23, Part 772 of the Code of Federal Regulations (23 CFR 772) “Procedures for Abatement of Highway Traffic Noise” for the I-465 Reconfiguration Project. The project involves adding travel lanes on the I-465 mainline and reconfiguring the I-465 eastbound to US 31 northbound exit ramp. The added travel lanes make this a Type I project in accordance with 23 CFR 772. This regulation provides procedures for preparing operational and construction noise studies and evaluating noise abatement considered for federal and federal-aid highway projects. According to 23 CFR 772.3, all highway projects that are developed in conformance with this regulation are deemed to be in conformance with FHWA noise standards.

The INDOT Traffic Noise Analysis Procedure (2017) establishes INDOT policy for implementing 23 CFR 772 in Indiana. The INDOT Traffic Noise Analysis Procedure outlines the requirements for analyzing highway traffic noise. Noise impacts associated with this project will be included in the project’s Categorical Exclusion (CE), in compliance with the National Environmental Policy Act (NEPA).

1.2 PROJECT DESCRIPTION

The I-465 Reconfiguration Project is located in Indianapolis, Marion County, Indiana. The project involves an added travel lane on I-465.

The project is divided into two sections along I-465: Section C and Section A/B. Section C begins at the south end of the I-465/I-70 interchange and ends just west of the interchange with Mann Road. The proposed work for Section C includes added travel lanes along I-465, full depth pavement replacement at the shoulders, and replacement of the Mooresville Road Bypass bridge. Section A/B begins approximately 0.30 miles west of the I-465/US 31 interchange and ends at the I-465/I-65 interchange. The proposed work for Section A/B includes building auxiliary lanes on eastbound and westbound I-465 with retaining walls, reconfiguring eastbound I-465 to northbound US 31 exit ramp, extending the southbound US 31 to eastbound I-465 merge area, and extending the entrance lane from southbound US 31 to eastbound I-465. The proposed work for Section A/B also includes the replacement of the Madison Avenue, Keystone Avenue, and Carson Avenue bridges. The noise study area defined for these projects is shown in Figures 1 and 2.

During construction, traffic will be maintained along I-465 with shoulder and lane closures. All ramps within the interchanges will primarily remain open during construction, except temporary night time closures over a few weekends are anticipated. Local roads will experience closures while the Madison Avenue, Keystone Avenue, Carson Avenue, and Mooresville Road Bypass bridges are replaced, and detours will be provided.



Figure 1: I-465 Reconfiguration Section C Noise Study Area

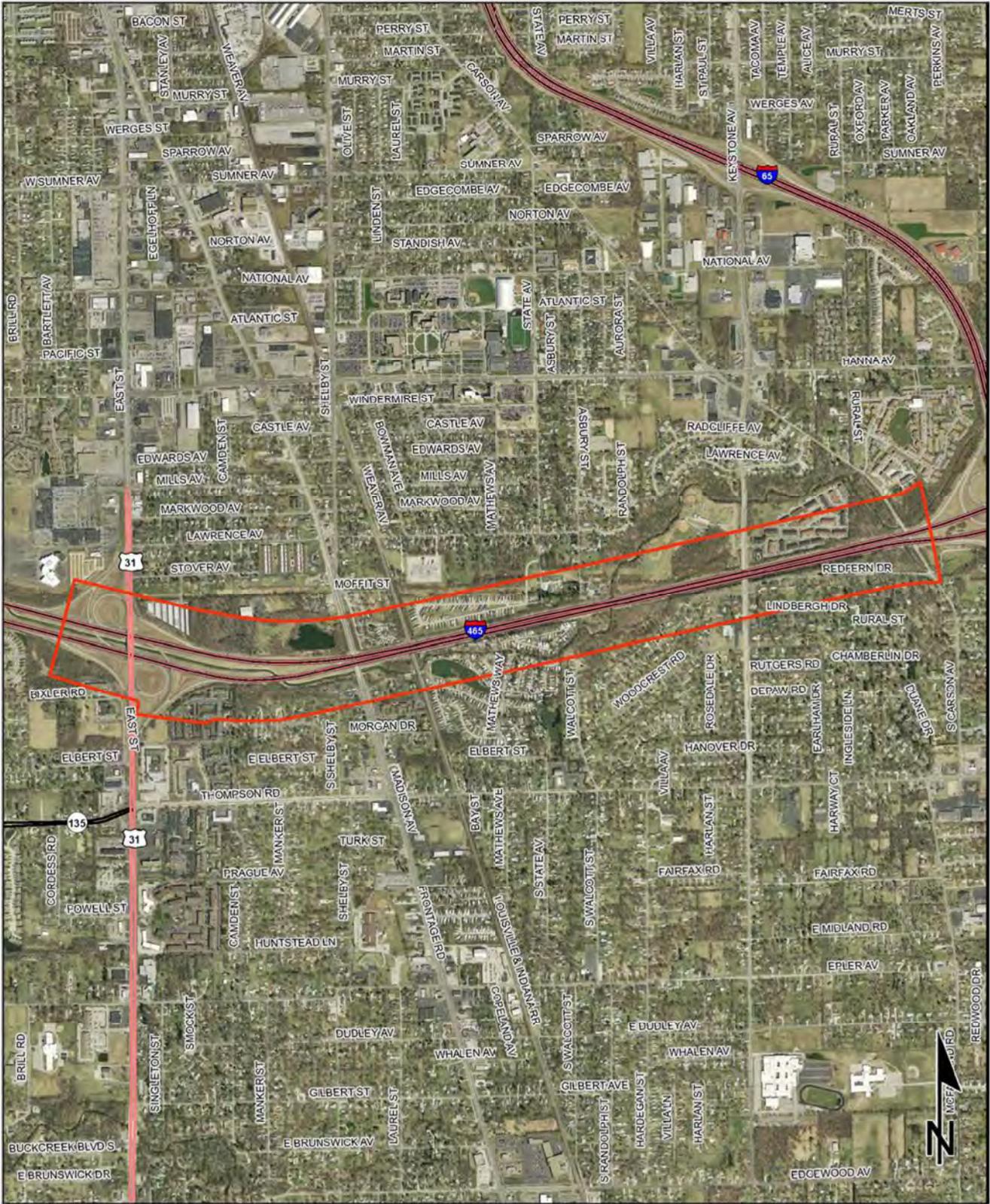


Figure 2: I-465 Reconfiguration Section A/B Noise Study Area

2.0 Methodology

2.1 FUNDAMENTALS OF TRAFFIC NOISE

The human ear perceives noise as a form of vibration that causes pressure variations. The ear is sensitive to this variation and perceives it as sound. The intensity of these pressure variations causes the ear to discern different levels of loudness. These pressure differences are commonly measured in decibels (dB).

The dB scale that is audible to the human ear spans about 140 dB. A dB level of zero is barely audible to the human ear while 140 dB is an unrecognizable sound which is painful to the listener. The decibel scale is a logarithmic representation of the actual sound pressure variation. This means that a 26 percent change in energy level only changes the sound level 1 dB. It would be possible for the human ear to detect this difference only in a laboratory. Increasing the energy level 100 percent would result in a 3 dB increase, which would be barely perceptible outdoors. A tripling in sound energy level would result in a clearly noticeable change of 5 dB in the sound level. An increase of ten times the energy level would result in a 10 dB increase in the sound level, which would be perceived as a doubling of the sound level.

The human ear has a non-linear sensitivity to noise. To account for this in noise measurement, electronic weighting scales are used to define the relative loudness of different frequencies. The "A" weighting scale, expressed as dB(A), is widely used in environmental work because it most nearly matches the nonlinear nature of human hearing.

The measurement that is most commonly used to express dB(A) levels for traffic noise is the Hourly Equivalent Sound Level [$L_{eq}(h)$]. The $L_{eq}(h)$ describes a noise sensitive receptor's cumulative exposure from all noise-producing events over a 1-hour period.

Traffic noise studies for road projects in Indiana are performed in accordance with 23 CFR 772 and INDOT's Traffic Noise Analysis Procedure. There are five main steps comprising traffic noise studies:

1. Identify noise sensitive receptors,
2. Determine existing ambient peak noise levels,
3. Predict future peak noise levels,
4. Identify traffic noise impacts, and
5. Evaluate mitigation measures for sensitive receptors where traffic noise impacts occur.

Noise levels were predicted for the outdoor human activity areas at each sensitive receptor using the worst traffic conditions likely to occur on a regular basis during the design year. Future noise levels predicted for the project area are included on Table C in Appendix C.

2.2 METHODS FOR IDENTIFYING LAND USES AND SELECTING NOISE MEASUREMENT AND MODELING LOCATIONS

A field investigation was conducted to identify land uses that could be subject to traffic and construction noise impacts from the proposed project. Land uses in the project area were categorized by land use type, Activity Category as defined in Table 1, and the extent of frequent human use. Although all developed land uses are considered in this analysis, the focus is on locations of frequent human use that would benefit from a lowered noise level. Accordingly, this impact analysis focuses on locations with defined outdoor activity areas, such as residential backyards and common use areas at recreational facilities.

Table 1: Noise Abatement Criteria in 23 CFR 772

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

Source: 23 CFR 772

2.3 TRAFFIC NOISE LEVEL PREDICTION METHODS

Traffic noise levels were predicted using FHWA TNM 2.5. Traffic noise was evaluated under design year conditions for the Build alternative. The loudest hour traffic volumes, vehicle classification percentages, and traffic speeds under design-year (2045) conditions were developed for input into the traffic noise model. The loudest hour is generally characterized by free-flowing traffic at the highway design speed (i.e., Level of Service [LOS] C or better). Since most of the project area is projected to operate at LOS C or worse, LOS C traffic was predominantly used in the TNM modeling for this project (Appendix F). Year 2045 projected traffic volumes for this project were provided by INDOT.

2.4 METHODS FOR IDENTIFYING TRAFFIC NOISE IMPACTS

According to the INDOT Traffic Noise Analysis Procedure, a traffic noise impact occurs when either of the following conditions results at a sensitive receptor:

- The future predicted $L_{eq}(h)$ noise level either approaches (is within 1 dB(A)) or exceeds the Noise Abatement Criteria (NAC) shown in Table 1.
- The future predicted $L_{eq}(h)$ noise level substantially exceeds (by 15 or more dB(A)) the existing $L_{eq}(h)$ noise level. Traffic-generated noise level increases of 15 dB(A) or more are typically associated with roadway improvements on a new alignment.

Where traffic noise impacts are identified, noise abatement must be considered for reasonableness and feasibility as required by 23 CFR 772 and the INDOT Traffic Noise Analysis Procedure. Details of this evaluation are provided in Section 4.2.

3.0 Existing Noise Environment

3.1 EXISTING LAND USES

Field investigations were conducted on April 30 and May 1, 2019 to identify land uses that could be subject to traffic and construction noise impacts from the proposed project. Single-family residences, apartments, and assisted living facilities were identified as Activity Category B. Places of worship and active sports areas were identified as Activity Category C. Hotels were identified as Activity Category E, and light industrial and undeveloped lands were identified as Activity Categories F and G, respectively.

Noise levels were predicted at all Activity Category B, C, and E land uses. Areas of frequent outdoor human activity were identified for the Activity Category B, C, and E uses, and noise levels were predicted at these areas. For the majority of this project, one receiver was modeled for a single corresponding dwelling unit or area of frequent outdoor use. At apartment complexes, mobile home parks, and assisted living facilities, one receiver typically represents several dwelling units. At the two hotels in the project area, one receiver was modeled to represent the outdoor seating area as one receptor. For the other non-residential land uses, the number of receptors assigned was determined by using the FHWA lot-sized based methodology. Under this methodology, the number of receptors was calculated by dividing the size of the parcel within the 500-foot noise study area by the average single-family lot size in the project area. The following summarizes the number of receptors assigned to these non-residential land uses:

This document uses the terms “receptor” and “receiver” that are similar but distinct. Receptors represent noise-sensitive locations, such as a backyard or an outdoor seating area at a hotel or restaurant. Receivers are discreet TNM modeling points that represent receptors. A TNM receiver can represent a single receptor or a group of receptors, such as using one TNM receiver to represent a group of residences with similar sound levels.

LAND USE	PROJECT SECTION	PARCEL SIZE WITHIN NOISE STUDY AREA	AVERAGE SINGLE-FAMILY LOT SIZE	NUMBER OF RECEPTORS
Southwest Church of the Nazarene	C	334,900	27,500	13
Cross Church	A/B	609,100	33,700	19
Madison Park Village Apartments Swimming Pool	A/B	8,300	33,700	1
Indiana Central Little League Fields	A/B	460,800	33,700	14

3.2 COMMON NOISE ENVIRONMENT (CNE) DESCRIPTIONS

Land uses in the project area have been grouped into a series of numbered Common Noise Environments (CNE) that are identified on exhibits provided in Appendix A.

- CNE 1 is located on the north side of I-465, west of Mooresville Road Bypass. The area consists of single-family residences (Activity Category B).
- CNE 2 is located on the south side of I-465, west of Mooresville Road Bypass. The area consists of one hotel (Activity Category E).
- CNE 3 is located on the south side of I-465, west of Mooresville Road Bypass. The area consists of single-family residences (Activity Category B).
- CNE 4 is located on the north side of I-465, between Mooresville Road Bypass and Mann Road. The area consists of single-family residences and an apartment complex (Activity Category B).
- CNE 5 is located on the south side of I-465, between Mooresville Road Bypass and Mann Road. The area consists of single-family residences and an assisted living facility (Activity Category B).
- CNE 6 is located on the south side of I-465, between Mooresville Road Bypass and Mann Road. The area consists of one church (Activity Category C).

- CNE 7 is located on the north side of I-465, between East Street and Madison Avenue. The area consists of one church (Activity Category C).
- CNE 8 is located on the north side of I-465, from just west of Madison Avenue to the Louisville & Indiana Railroad. The area consists of single-family residences (Activity Category B).
- CNE 9 is located on the south side of I-465, between East Street and Madison Avenue. The area consists of single-family residences and one apartment complex (Activity Category B).
- CNE 10 is located on the south side of I-465, between Madison Avenue and the Louisville & Indiana Railroad. The area consists of single-family residences (Activity Category B).
- CNE 11 is located on the north side of I-465, between the Louisville & Indiana Railroad and the I-465 bridge over Lick Creek. The area consists of single-family residences (Activity Category B).
- CNE 12 is located on the north side of I-465, between Lick Creek and Keystone Avenue. The area consists of active sports fields (Activity Category C).
- CNE 13 is located on the south side of I-465, between the Louisville & Indiana Railroad and Keystone Avenue. The area consists of single-family residences (Activity Category B).
- CNE 14 is located on the south side of I-465, west of east Street. The area consists of one hotel (Activity Category E).
- CNE 15 is located on the north side of I-465, east of Keystone Avenue. The area consists of one apartment complex (Activity Category B).
- CNE 16 is located on the south side of I-465, east of Keystone Avenue. The area consists of single-family residences (Activity Category B).

3.3 NOISE SENSITIVE RECEPTORS AND EXISTING NOISE CONDITIONS

Noise sensitive receptors are those locations where activities that could be affected by increased traffic noise levels occur (e.g., residences, motels/hotels, places of worship, schools, parks, and libraries). Existing noise levels are determined for the most commonly used outdoor living areas at sensitive receptors. For residences, this is typically the backyard or front porch, and for commercial areas it could be a picnic table or bench.

Over 420 receivers were evaluated to represent approximately 1,100 receptors at residential units and other noise sensitive uses in the project area for analysis as part of the noise study (Appendix A). These receptors include Activity Category B, C, and E land uses.

3.4 MEASUREMENT PROCEDURES, EQUIPMENT, AND RESULTS

Noise level measurements were taken within each CNE. The measurements were conducted using a Larson-Davis SoundExpert LxT sound meter. Measurements were taken at 18 locations, each for a 15-minute period. Calibration of the meter was checked before and after field work using a Larson-Davis Model Cal 200 calibrator. When the measurements were taken, meteorological conditions were within the manufacturer's recommended guidelines. Noise measurement field sheets that identify the noise measurement locations are included in Appendix E. The noise level measurements were taken on April 30 and May 1, 2019. Temperatures ranged from 59 to 74 degrees, wind speeds ranged from 9 to 12 mph, pavement was dry, and the skies were typically cloudy.

Table 2 summarizes the results of the existing noise measurements taken.

Traffic-generated hourly equivalent noise levels [$L_{eq}(h)$] were predicted using FHWA TNM 2.5, a highway traffic noise prediction model. The model takes into account traffic volumes, vehicle types, vehicle speeds, roadway geometry, and receiver locations to calculate traffic-generated noise levels. As shown in Table 2, comparing the modeled and measured noise levels using observed traffic counts confirms the applicability of the model to the study area. Predicted traffic noise levels using the traffic counts observed during the measurements are within +/- 3 dB(A) of the measured levels, indicating reasonable correlation. Therefore, this model is validated per 23 CFR 722.11 (d)(2), and no modifications to the model were needed.

Table 2: Comparison of Measured to Predicted Sound Levels in the TNM Model

MEASUREMENT ID	CNE	ACTIVITY CATEGORY	DURATION (MINUTES)	MEASURED $L_{eq}(h)$	PREDICTED SOUND LEVEL [dB(A)]	MEASURED MINUS PREDICTED [dB(A)]
1	1	B	15	67.6	70.5	-2.9
2	2	E (Hotel)	15	64.9	62.5	2.4
3	3	B	15	70.8	71.5	-0.7
4	5	B	15	73.2	74.4	-1.2
5	4	B	15	63.4	62.8	0.6
6	6	C (Church)	15	72.3	71.2	1.1
7	5	B (Assisted Living Facility)	15	64.6	63.9	0.7
8	4	B	15	70.8	70.2	0.6
9	9	B	15	68.6	68.3	0.3
10	7	C (Church)	15	70.1	67.3	2.8
11	8	B	15	79.8	78.7	1.1
12	10	B	15	68.6	68.0	0.6
13	11	B	15	74.6	73.3	1.3
14	12	C (Park)	15	71.2	68.2	3.0
15	13	B	15	72.3	69.7	2.6
17	16	B	15	73.9	73.8	0.1
18	15	B	15	67.7	65.1	2.6

4.0 Future Noise Environment, Impacts, and Abatement

4.1 FUTURE NOISE ENVIRONMENT AND IMPACTS

Table C in Appendix C summarizes the traffic noise modeling results for existing and design-year conditions with and without noise barriers. Results tables from TNM are provided in Appendix G. As described in Section 2.3, these predictions utilize forecasted design hour traffic conditions to ensure a conservative estimate of noise levels for the loudest noise hour. The comparison to existing conditions is included in the analysis to identify traffic noise impacts under 23 CFR 772.

Existing noise levels at the modeled receivers range from 44 to 78 dB(A). Under the build conditions, the predicted noise levels range from 45 to 80 dB(A). Noise impacts were identified in 13 of the 16 CNEs evaluated, including 194 modeled receivers that included land use Activity Categories B and C. All noise impacts are a result of the predicted noise level approaching or exceeding the NAC. Predicted noise level increases under the build conditions average approximately 2 dB(A) and range up to 4 dB(A). No predicted noise level increases exceed 15 dB(A).

The results shown in Appendix C indicate that predicted traffic noise levels for the design-year with proposed build conditions approach or exceed the NAC. Therefore, traffic noise impacts are predicted to occur within the project area, and noise abatement must be considered. A discussion of the noise abatement analysis is provided in the following section.

4.2 NOISE ABATEMENT ANALYSIS

In accordance with 23 CFR 772, noise abatement is considered where noise impacts are predicted in areas of frequent human use that would benefit from a lowered noise level. Potential noise abatement measures include the following:

- Construction of noise barriers;
- Traffic management measures including, but not limited to, traffic control devices and signing for prohibition of certain vehicle types, time-use restrictions for certain vehicle types, modified speed limits, and exclusive lane designations.
- Alteration of horizontal and vertical alignments to avoid impacts
- Acquisition of real property or interests therein (predominately unimproved property) to serve as a buffer zone to preempt development which would be adversely impacted by traffic noise.
- Noise insulation of Activity Category D land use facilities.

Noise barriers placed along roadways on state-owned right-of way can effectively shield locations from traffic-related noise. A barrier's feasibility is based on its acoustic effectiveness, which depends on the area's geometry, the barrier's configuration, and the effects of other (unblocked) noise sources. Noise barriers were evaluated, and the results are described later in this section.

Traffic management measures would not be effective for this project. Traffic management measures that could reduce sound levels include "traffic calming" actions, such as reducing volumes, especially truck volumes, or travel speeds. Such measures are not consistent with the transportation needs in the area or purpose of the project.

Major alteration of the roadway geometry that would have a substantial effect on predicted noise levels is not feasible. The preferred alternative has been developed to best meet the transportation need of the corridor while minimizing impacts to the immediate area and meeting the purpose of the project. Horizontal geometry changes significant enough to affect noise levels at receiver locations would require numerous relocations and is not a practical alternative. Similarly,

changes to the vertical geometry that would significantly affect noise levels are not practical through the project area. Thus, any changes to these alignments would be limited and have only minimal effects on sound levels.

Vacant or undeveloped property may be acquired to provide a buffer zone from noise generating facilities. However, there is no vacant land in the study area that, if acquired, would provide effective abatement as a buffer zone.

Insulation of Activity Category D land uses is not applicable for this project. The only Activity Category D building within the noise study area is the Southwest Church of the Nazarene, located along the south side of I-465 between Mooresville Road Bypass and Mann Road. As discussed below, a noise barrier is recommended in this area that would reduce noise levels at this building. Therefore, consideration of insulation is not required.

All of these abatement options have been considered. However, because of the configuration and location of the project, noise barriers are the only abatement suitable for this project.

4.2.1 FEASIBILITY OF ABATEMENT

INDOT considers engineering feasibility and acoustic feasibility when determining if noise abatement is feasible. INDOT requires noise abatement measures to be based on sound engineering practices and standards and requires that any measures be evaluated at the optimum location. For instances in which the roadway is located on fill and is at a higher location than nearby receptors, a barrier will be evaluated near the shoulder. For instances in which the roadway is located below the nearby receptors, a barrier will be evaluated near the edge of the right-of-way near the receptors. Engineering feasibility also takes into account topography, drainage, safety, barrier height, utilities, and access/maintenance needs (which may include right-of-way considerations).

In terms of acoustic feasibility, INDOT requires that noise barriers achieve a 5 dB(A) reduction at a majority (greater than 50%) of the impacted receptors. If a barrier cannot achieve this acoustic goal, abatement is considered to not be acoustically feasible.

4.2.2 REASONABLENESS OF ABATEMENT

Reasonable means that INDOT believes abatement of traffic noise impacts is prudent based on consideration of the following factors:

1. Consideration and Obtaining Views of Residents and Property Owners

The following steps will be taken to solicit public input on recommended noise barriers.

A survey will be mailed to each benefited resident. If the property owner is different from the current resident, both the resident and the property owners are surveyed. The concerns and opinions of the property owner and the unit occupants will be balanced with other considerations in determining whether a barrier is appropriate for a given location. This survey will include a pre-stamped, self-addressed return postcard, a brief project description of the project and barrier locations under consideration. It will also include a pamphlet on the basics of traffic noise. The decision-making process and pertinent information on the upcoming Noise Public Meeting will be provided. The survey can be returned via mail or returned in person at the Noise Public Meeting. All responses expressing opinions for or against barriers must be expressed in writing to INDOT, by letter, email or the response postcard. Extra surveys will be available at the hearing if any are lost or misplaced.

Consideration of noise barriers can cause conflicts in mixed-use developments, as barriers to protect residences may block line of sight to adjacent businesses. If a barrier is proposed directly adjacent to the property line of a business, the business will be solicited for input to determine whether they have any concerns about line of sight. If a mutually satisfactory compromise cannot be reached between business(es) and residences, barriers may be

terminated at the property line dividing the two areas. These conflicts can be minimized by noise-compatible planning.

2. Cost-effectiveness

To determine cost-effectiveness, the estimated cost of constructing a noise barrier (including installation and additional necessary construction such as foundations or guardrail) will be divided among the number of benefited receptors (those who would receive a reduction of at least 5 dB(A)). A cost of \$25,000 or less per benefited receptor is considered to be “cost-effective”. Development in which a majority (more than 50%) of the receptors was in place prior to initial construction of the roadway in its current state (functional classification) will receive additional consideration for noise abatement. The cost-effectiveness criteria to be used for these cases will be 20% greater (currently \$30,000 per benefited receptor).

Placing noise barriers on structures creates additional challenges, since reinforcement of the structure may be necessary to support the increased load. In these situations, other options should be assessed to determine whether cost-effective abatement can be provided without requiring complicated and expensive structural modifications. These could include lighter-weight barriers, shorter barriers, or other considerations. Any variations will be worked out in coordination between the FHWA division office and INDOT’s Offices of Structural Services, Environmental Services, and Construction Management.

3. INDOT Design Goal for Noise Abatement

INDOT’s goal for substantial noise reduction is to provide at least a 7 dB(A) reduction for benefited first row receptors in the design year. However, conflicts with adjacent lands may make it impossible to achieve substantial noise reduction at all impacted first row receptors. Therefore, the noise reduction design goal for INDOT is 7 dB(A) for a majority (greater than 50%) of the impacted first row receptors.

Twelve noise barriers were analyzed for this project prior to public involvement. Each noise barrier was evaluated for feasibility based on achievable noise reduction and engineering considerations. 11 of the 12 noise barriers were considered feasible. Reasonableness criteria were then evaluated for each of the 11 feasible noise barriers. Of the 11 feasible noise barriers analyzed along the project, 10 met both INDOT’s design goal for noise abatement and INDOT’s cost-effectiveness criterion.

The location of each of the noise barriers evaluated is summarized below:

- Noise Barrier 1: North side of I-465, west of Mooresville Road Bypass
- Noise Barrier 2: South side of I-465, west of Mooresville Road Bypass
- Noise Barrier 3: North side of I-465, between Mooresville Road Bypass and Mann Road
- Noise Barrier 4: South side of I-465, between Mooresville Road Bypass and Mann Road
- Noise Barrier 5: North side of I-465, between East Street and Madison Avenue
- Noise Barrier 6: South side of I-465, between East Street and Madison Avenue
- Noise Barrier 7: North side of I-465, between Madison Avenue and the Louisville & Indiana Railroad
- Noise Barrier 8: South side of I-465, between Madison Avenue and the Louisville & Indiana Railroad
- Noise Barrier 9: North side of I-465, between the Louisville & Indiana Railroad and Keystone Avenue
- Noise Barrier 10: South side of I-465, between the Louisville & Indiana Railroad and Keystone Avenue
- Noise Barrier 11: North side of I-465, between Keystone Avenue and Carson Avenue
- Noise Barrier 12: South side of I-465, between Keystone Avenue and Carson Avenue

Table 3 summarizes the barriers analyzed for this project as determined prior to public involvement. The feasible and cost-effective barriers and receptors are shown in detail in Appendix A. Additional information regarding the noise barrier analysis is provided in Appendix D.

Table 3: Analyzed Noise Barriers Prior to Public Involvement

NOISE BARRIER	TOTAL LENGTH (FEET)	AVERAGE HEIGHT (FEET)	ESTIMATED TOTAL COST	BENEFITED RECEPTORS	ESTIMATED COST PER BENEFITED RECEPTOR	COST-EFFECTIVENESS CRITERION PER BENEFITED RECEPTOR
1+3 ¹	4525	15.7	\$2,129,160	123	\$17,310	\$25,000
2+4 ¹	3600	14.2	\$1,535,550	119	\$12,904	\$25,000
5 ²	2050	21.9	\$1,349,040	20	\$67,452	\$25,000
6	2700	14.4	\$1,168,740	63	\$18,551	\$25,000
7	600	16.0	\$286,380	38	\$7,536	\$25,000
8+10 ¹	5100	13.9	\$2,122,020	169	\$12,556	\$25,000
9	3850	14.9	\$1,727,010	89	\$19,405	\$25,000
11	1175	19.1	\$670,800	103	\$6,513	\$25,000
12 ³	1275	30.0	---	3	---	\$25,000

Notes:

- Noise Barriers 1 and 3, Noise Barriers 2 and 4, and Noise Barriers 8 and 10 were combined for neighborhood continuity.
- Noise Barrier 5 is feasible, meets INDOT’s design goal for noise abatement, but does not meet INDOT’s cost-effectiveness criterion.
- Noise Barrier 12 is not feasible (i.e., a noise barrier could not be designed to achieve a 5 dB(A) reduction at a majority of the impacted receptors). A utility easement limits the length of the noise barrier in this area.

The rows shaded in green identify the preliminary feasible and cost-effective noise barriers. Additional results of the noise barrier analysis are provided in Appendix D.

Consideration and Obtaining Views of Residents and Property Owners

The results in Table 3 were coordinated with the benefited residents and property owners. Results of this coordination are summarized in Section 5.0

Future Design Revisions

If pertinent parameters change substantially during the continuing project design, the noise abatement decision may be changed, or the proposed barriers may be eliminated from the final project design.

5.0 Public Involvement

The public involvement process for the noise analysis consisted of a mailing, public meeting, and additional outreach activities. (See Appendix H.) The mailing was sent on August 13, 2019 to the property owners and residents that would benefit from the noise barriers found to be both feasible and cost-effective (i.e., barriers 1+3, 2+4, 6, 7, 8+10, 9, and 11). The mailing consisted of a letter informing them of the noise analysis and the public meeting along with a survey postcard. The postcard was used to survey the current resident/property owner to determine if they were in favor or opposed to the proposed noise barrier. A total of 513 letters and surveys were sent in August 2019 to benefited residents and adjacent property owners.

A public meeting was conducted on August 29, 2019 to discuss the results of the Traffic Noise Impact Analysis and potential noise barriers. At the meeting, INDOT’s noise mitigation process and the proposed noise barrier locations were presented. Attendees were provided copies of the survey postcard.

In addition to the public meeting, additional outreach activities were conducted in communities where noise barriers are proposed. The purpose of these activities was to provide project information and to encourage benefited residents to submit a noise survey response. The outreach events are summarized in Table 4.

Table 4. Outreach Activities

COMMUNITY	DATE	EVENT TYPE
Fox Club Apartments ¹	September 3, 2019	Outdoor booth- distributed project information, collected noise surveys and project comments.
Decatur Township Center	September 3, 2019	Met with nursing home staff, left project information and noise surveys
Madison Mobile Home Community	September 4, 2019	Outdoor booth- distributed project information, collected noise surveys and project comments.
Village of North Acre	September 4, 2019	Outdoor booth- distributed project information, collected noise surveys and project comments.
Single family homes along Tincher Rd, Norcroft Dr, Gambell Rd, and Biltmore Ave.	September 5, 2019	Door-to-door, distributed project information and noise surveys.
Horizons Apartments	September 6, 2019	Outdoor booth at neighborhood community day and pool party. Distributed project information, collected noise surveys and project comments.
Yorktown Homes South Cooperative	September 9, 2019	Community clubhouse pizza party. Distributed project information, collected noise surveys and project comments.
Fox Club Apartments	September 10, 2019	Door-to-door, distributed project information and noise survey (including Spanish language ¹).
Single family homes along Redfern Dr. and Morgan Dr.	September 10, 2019	Door-to-door, distributed project information and noise survey.
Long Acre mobile home community	September 14, 2019	Door-to-door, distributed project information and noise survey.

¹ Spanish language was requested at the first visit to this community.

A request for translation to Chin language was requested at the public open house on July 10, 2019. Additionally, requests for Spanish language were received at community outreach events. Parsons worked with INDOT Public Involvement to provide the requested project documents in Chin and Spanish language.

Business owners that did not respond to the initial mailing were also contacted directly to encourage them to submit a noise survey response. Overall, 139 responses were received from the noise-impacted property owners benefited by the noise barriers. Of the responses received, 133 were in support of the noise barriers being constructed. A summary of the survey results is provided in Table 5 by noise barrier. For each noise barrier, a clear majority of respondents are in favor of the proposed noise abatement.

Table 5. Survey Response Summary by Barrier

NOISE BARRIER	SURVEYS SENT	SURVEY RESPONSE	
		YES – I WANT THE NOISE BARRIER CONSTRUCTED	NO – I DO NOT WANT THE NOISE BARRIER CONSTRUCTED
1 + 3	125	22	2
2 + 4	21	9	0
6	61	46	2
7	71	19	0
8 + 10	104	20	1
9	27	6	0
11	104	11	1

To address concerns from some adjacent business owners regarding the loss of visibility to their property from I-465, the length of some walls was shortened. The following summarizes the changes to the noise barrier locations based on input from adjacent property owners.

- Noise Barrier 2: Barrier 2 was shortened on the west end to maintain visibility to Country Inn and Suites.
- Noise Barrier 3: Barrier 3 was shortened on the east end to maintain visibility to Storage Express and the amenities at Horizons Apartments.
- Noise Barrier 6: Barrier 6 was shortened on the west end to maintain visibility Storage Express.
- Noise Barrier 9: Barrier 9 was shortened on the east end, and the eastern terminus of this noise barrier is now located west of the I-465 bridge over Lick Creek. The only benefited receptor east of the Lick Creek bridge was Indiana Central Little League Fields. However, upon further review, this receptor is not impacted. Therefore, providing noise mitigation for the Indiana Central Little League Fields is not required. The height through some of the remaining section of Barrier 9 was increased so that all of the impacted receptors remain benefited.

Table 6 summarizes the analysis for these revised noise barriers. The revised proposed barriers are presented on the figures in Appendix A.

Table 6: Analysis for Revised Noise Barriers

NOISE BARRIER	TOTAL LENGTH (FEET)	AVERAGE HEIGHT (FEET)	ESTIMATED TOTAL COST	BENEFITED RECEPTORS	ESTIMATED COST PER BENEFITED RECEPTOR	COST-EFFECTIVENESS CRITERION PER BENEFITED RECEPTOR
1+3	3825	15.7	\$1,805,280	97	\$18,611	\$25,000
2+4	3500	14.2	\$1,487,850	118	\$12,609	\$25,000
6	2500	14.5	\$1,084,860	59	\$18,387	\$25,000
9	2660	16.2	\$1,295,040	75	\$17,267	\$25,000

6.0 Construction Noise

During construction of the project, noise from construction activities may intermittently dominate the noise environment in the immediate area of construction.

Table 7 summarizes noise levels produced by construction equipment that is commonly used on roadway construction projects. Construction equipment is expected to generate noise levels ranging from 70 to 90 dB(A) at a distance of 50 feet, and noise produced by construction equipment would be reduced over distance at a rate of approximately 6 dB(A) per doubling of distance.

Table 7: Construction Equipment Noise

EQUIPMENT	MAXIMUM NOISE LEVEL (DB(A) AT 50 FEET)
Scrapers	89
Bulldozers	85
Heavy Trucks	88
Backhoe	80
Pneumatic Tools	85
Concrete Pump	82

Source: U.S. Environmental Protection Agency 1971.

No adverse noise impacts from construction are anticipated because construction noise would be short-term and intermittent. Measures to minimize the temporary impacts will include requiring equipment to have sound-control devices that are no less effective than those provided on the original equipment and requiring all equipment to be muffled.

7.0 Conclusions and Recommendations

Based on the noise impact analysis completed for this project, 10 feasible and reasonable barriers were identified for this project. These locations are summarized in Table 8.

Table 8: Feasible and Reasonable Noise Barriers

NOISE BARRIER	LOCATION	LENGTH (FEET)	NUMBER OF IMPACTED RECEPTORS	NUMBER OF BENEFITED RECEPTORS
1+3	Section C: north side of I-465 between Kentucky Avenue and Mann Road	3825	95	97
2+4	Section C: south side of I-465 between Kentucky Avenue and Mann Road	3500	122	118
6	Section A/B: south side of I-465 between East Street and Madison Avenue	2500	35	59
7	Section A/B: north side of I-465 between Madison Avenue and the Louisville & Indiana Railroad	600	44	38
8+10	Section A/B: south side of I-465 between Madison Avenue and Keystone Avenue	5100	163	169
9	Section A/B: north side of I-465 between Louisville & Indiana Railroad and Keystone Avenue	2660	75	75
11	Section A/B: north side of I-465 east of Keystone Avenue	1175	47	103

7.1 STATEMENT OF LIKELIHOOD

Based on the studies completed to date, INDOT has identified 602 impacted receptors within the noise study area for this project. INDOT has also determined that noise abatement is likely, but not guaranteed, at 10 locations where 581 of the 602 impacted receptors are located. Noise abatement at these locations is based upon preliminary design costs and design criteria. Noise abatement in these locations at this time has been estimated to cost approximately \$8.8 million and will reduce the noise level by a minimum of 5 dB(A) at a majority of the identified impacted receptors. A re-evaluation of the noise analysis will occur during final design. If during final design it has been determined that conditions have changed such that noise abatement is not feasible and reasonable, the abatement measures might not be provided. The final decision on the installation of any abatement measure(s) will be made upon the completion of the project's final design and the public involvement processes.

The viewpoints of the benefited residents and property owners was obtained and considered to assist in determining the reasonableness of highway traffic noise abatement measures for this project. INDOT will incorporate highway traffic noise consideration in on-going activities for public involvement in the highway program.

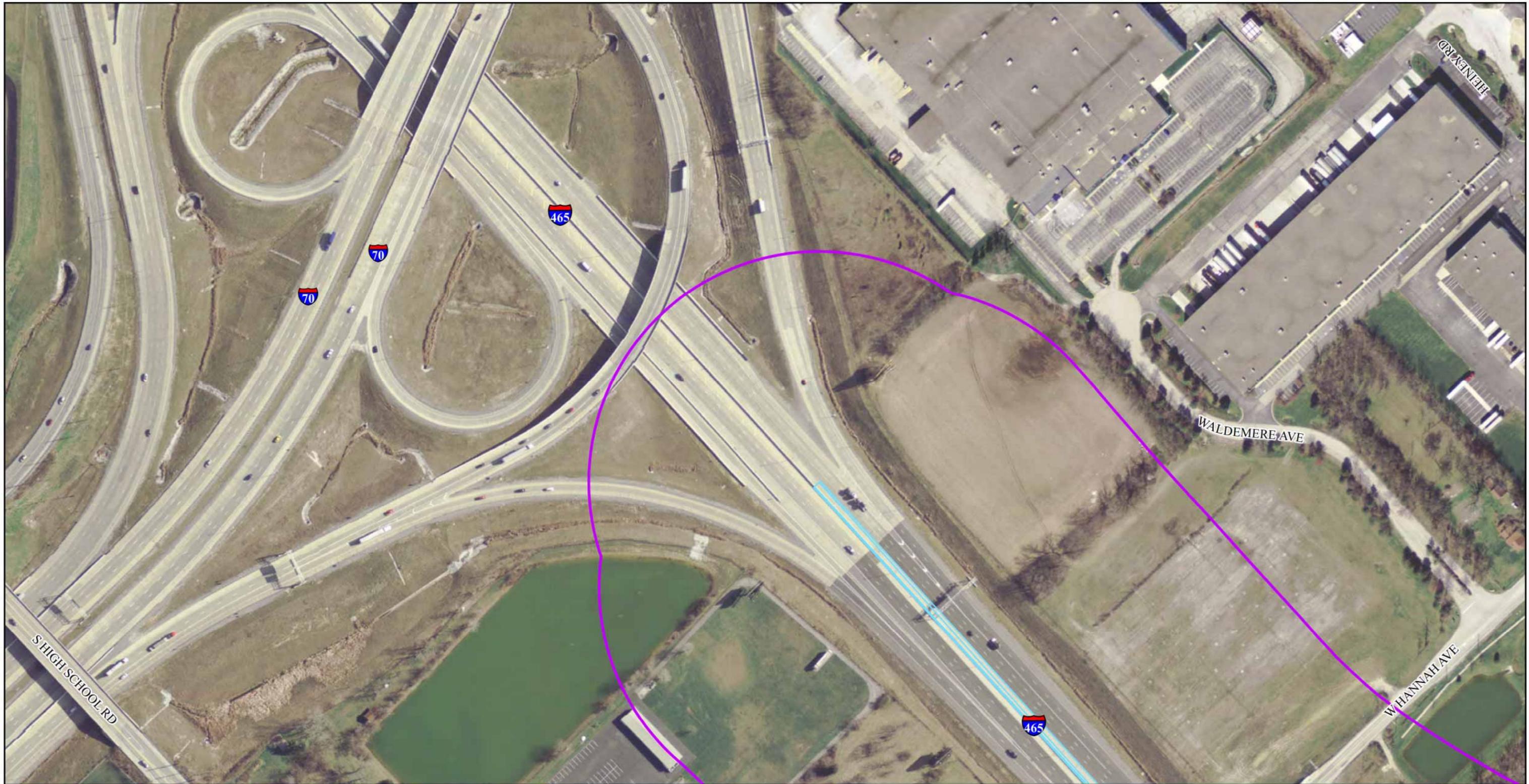
8.0 References

23 CFR 772 (2011). "Procedures for Abatement of Highway Traffic Noise and Construction Noise." Accessed May 30, 2019. <https://www.fhwa.dot.gov/legsregs/directives/fapg/cfr0772.htm>

INDOT 2017. "Indiana Department of Transportation Traffic Noise Analysis Procedure," Office of Environmental Services. <https://www.in.gov/indot/files/2017%20INDOT%20Noise%20Policy.pdf>

U.S. Environmental Protection Agency, "Noise from Construction Equipment and Operations, Building Equipment and Home Appliances," NTID300.1, December 31, 1971. <https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockkey=9101NN3I.PDF>

Appendix A – Noise Receptor and Noise Barrier Locations

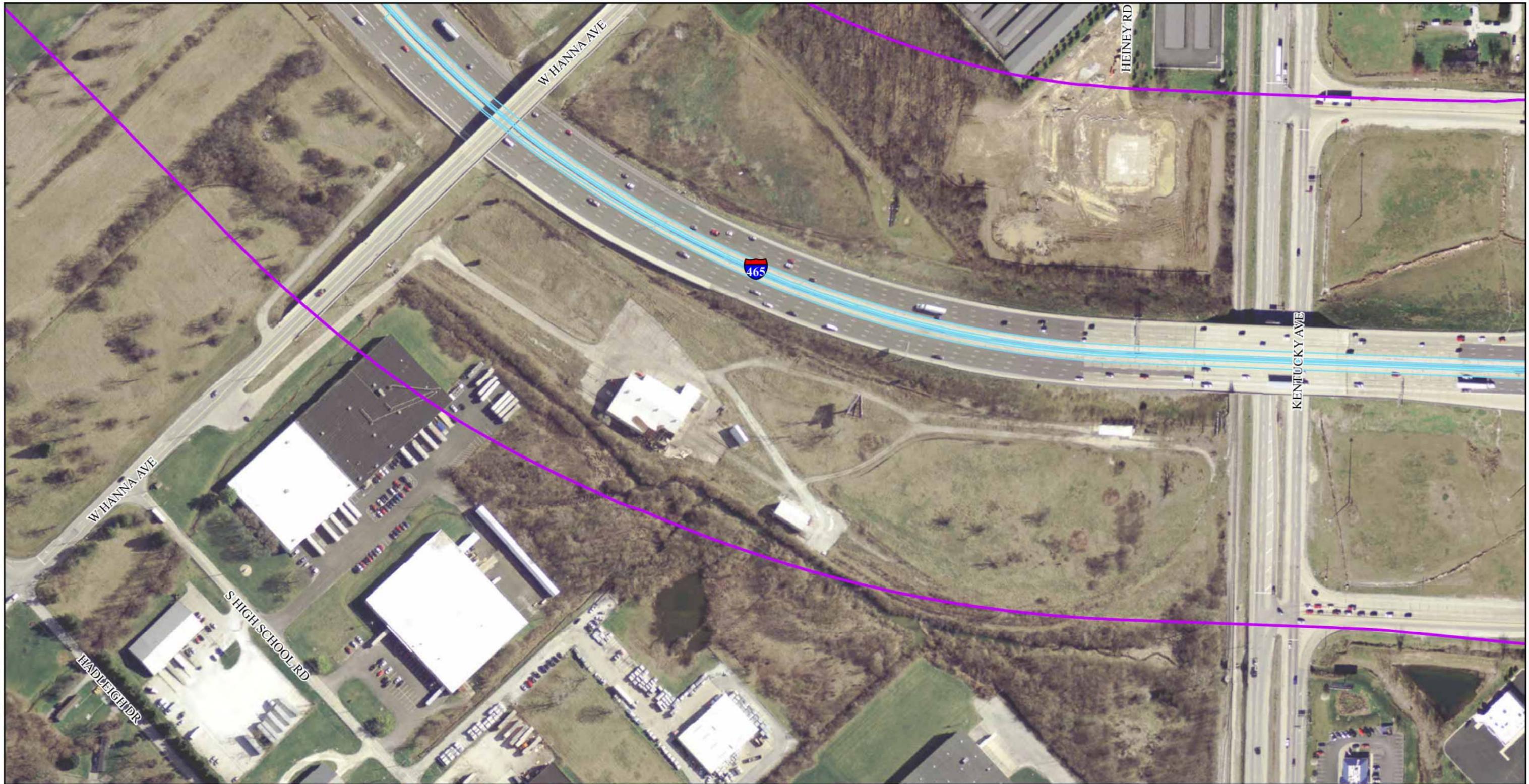


Feasible and Reasonable Noise Barrier	Noise Study Area
Noise Barrier Evaluated, Not Recommended	Common Noise Environment
Impacted - Benefited	Proposed Roadway Improvements
Impacted - Not Benefited	Duke Energy Easement
Not Impacted - Benefited	
Not Impacted - Not Benefited	
Noise Measurement Location	

Sources:
Non Orthophotography Data -
 Obtained from the State of
 Indiana Geographical
 Information Office Library
Orthophotography -
 Obtained from Indiana
 Map Framework Data
 (www.indianamap.org)

APPENDIX A
Noise Receptor and Noise Barrier Locations
 Sheet 1 of 10

Date: 11/7/2019



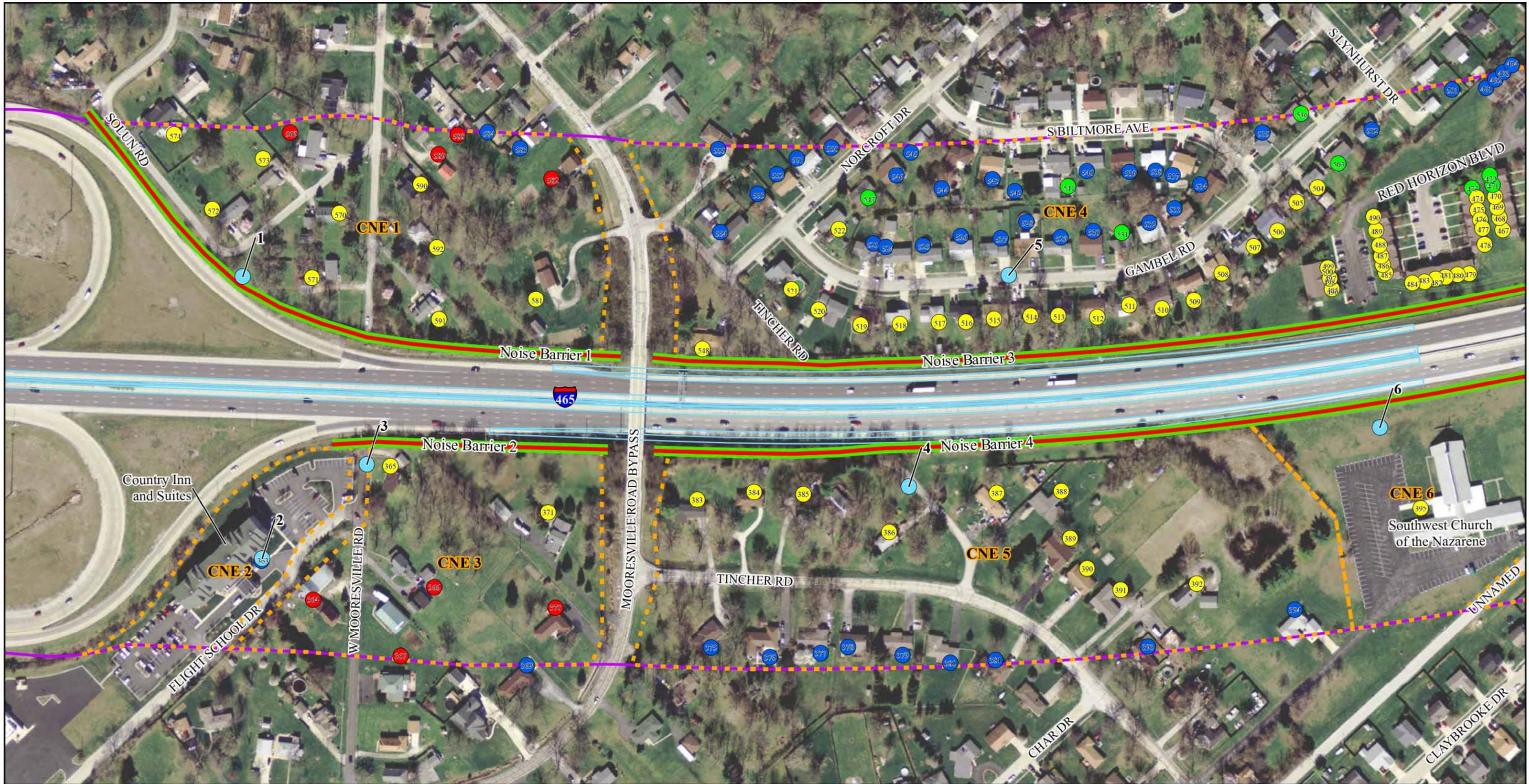
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Noise Barrier Evaluated, Not Recommended	Common Noise Environment
Impacted - Benefited	Proposed Roadway Improvements
Impacted - Not Benefited	Duke Energy Easement
Not Impacted - Benefited	
Not Impacted - Not Benefited	
Noise Measurement Location	

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APPENDIX A
Noise Receptor and Noise Barrier Locations
 Sheet 2 of 10

Date: 11/7/2019



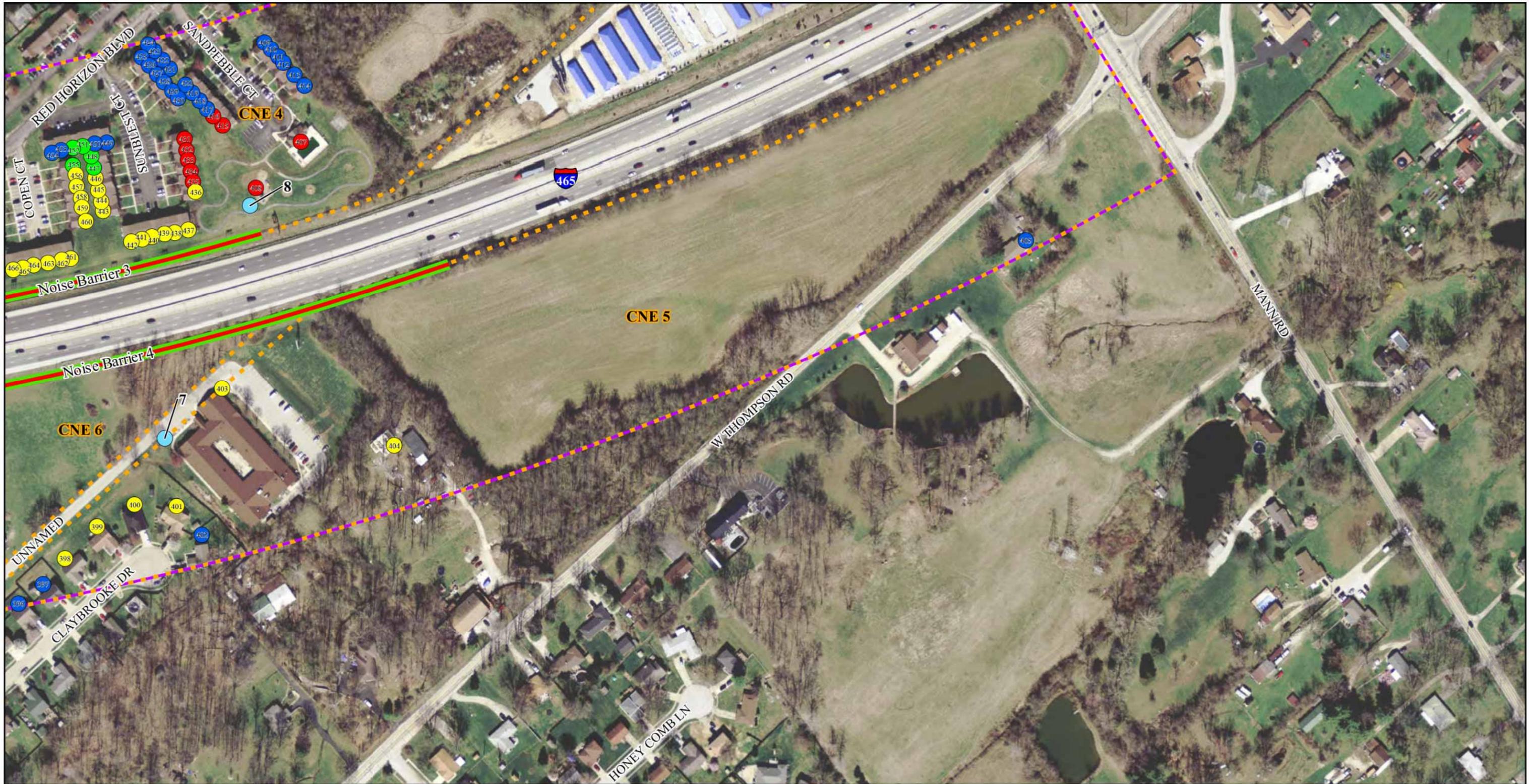
Feasible and Reasonable Noise Barrier	Common Noise Environment	Noise Study Area
Noise Barrier Evaluated, Not Recommended	Proposed Roadway Improvements	Duke Energy Easement
Impacted - Benefited		
Impacted - Not Benefited		
Not Impacted - Benefited		
Not Impacted - Not Benefited		
Noise Measurement Location		

1 Inch = 200 Feet

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APPENDIX A
Noise Receptor and Noise Barrier Locations
 Sheet 3 of 10

Date: 11/7/2019

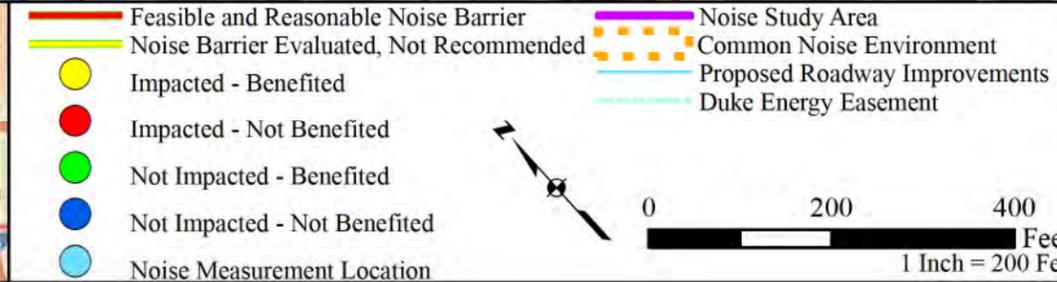


Feasible and Reasonable Noise Barrier	Noise Study Area
Noise Barrier Evaluated, Not Recommended	Common Noise Environment
Impacted - Benefited	Proposed Roadway Improvements
Impacted - Not Benefited	Duke Energy Easement
Not Impacted - Benefited	
Not Impacted - Not Benefited	
Noise Measurement Location	

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APPENDIX A
Noise Receptor and Noise Barrier Locations
 Sheet 4 of 10

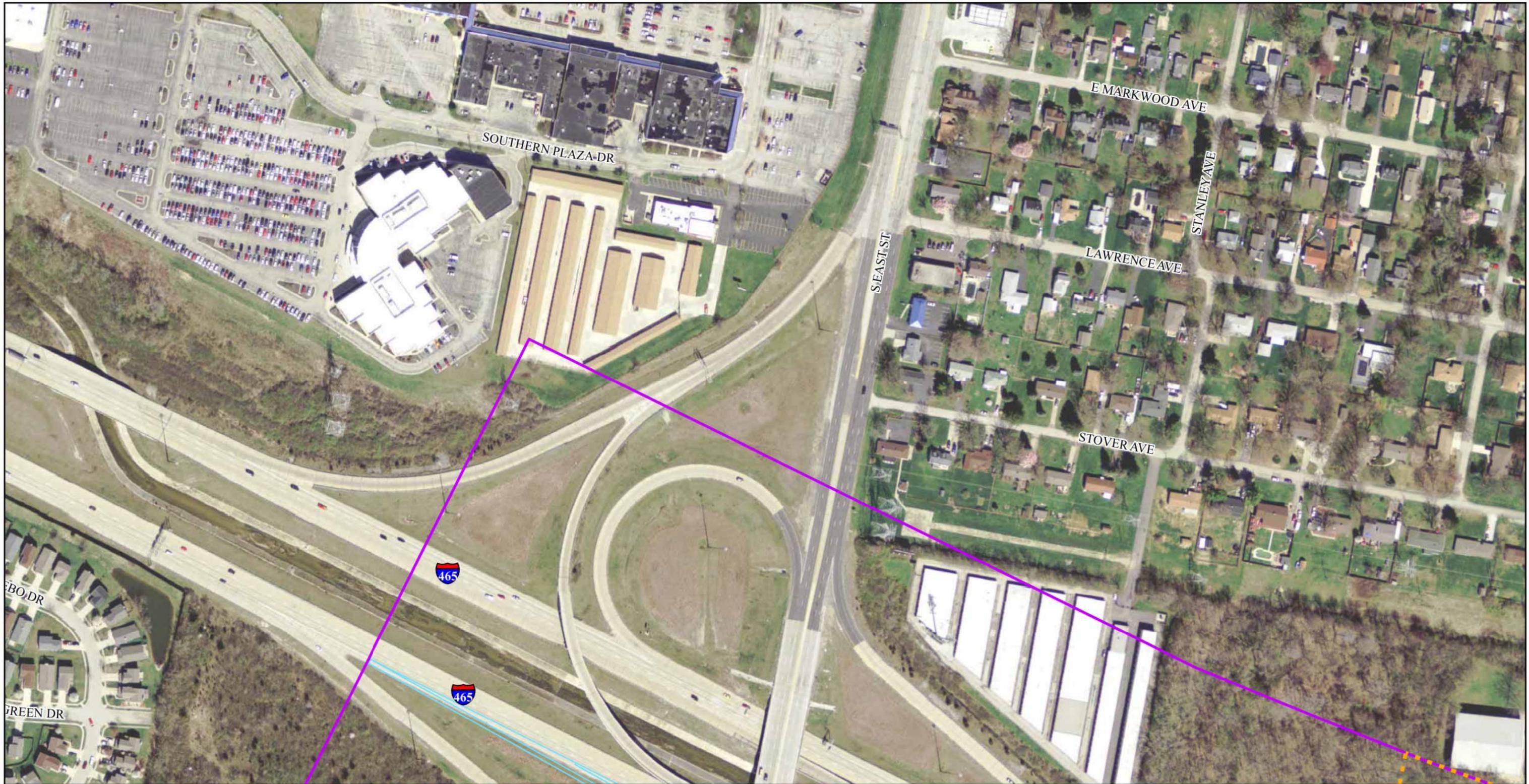
Date: 11/7/2019		PARSONS
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Sources:
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APPENDIX A
Noise Receptor and Noise Barrier Locations
 Sheet 5 of 10

Date: 11/7/2019

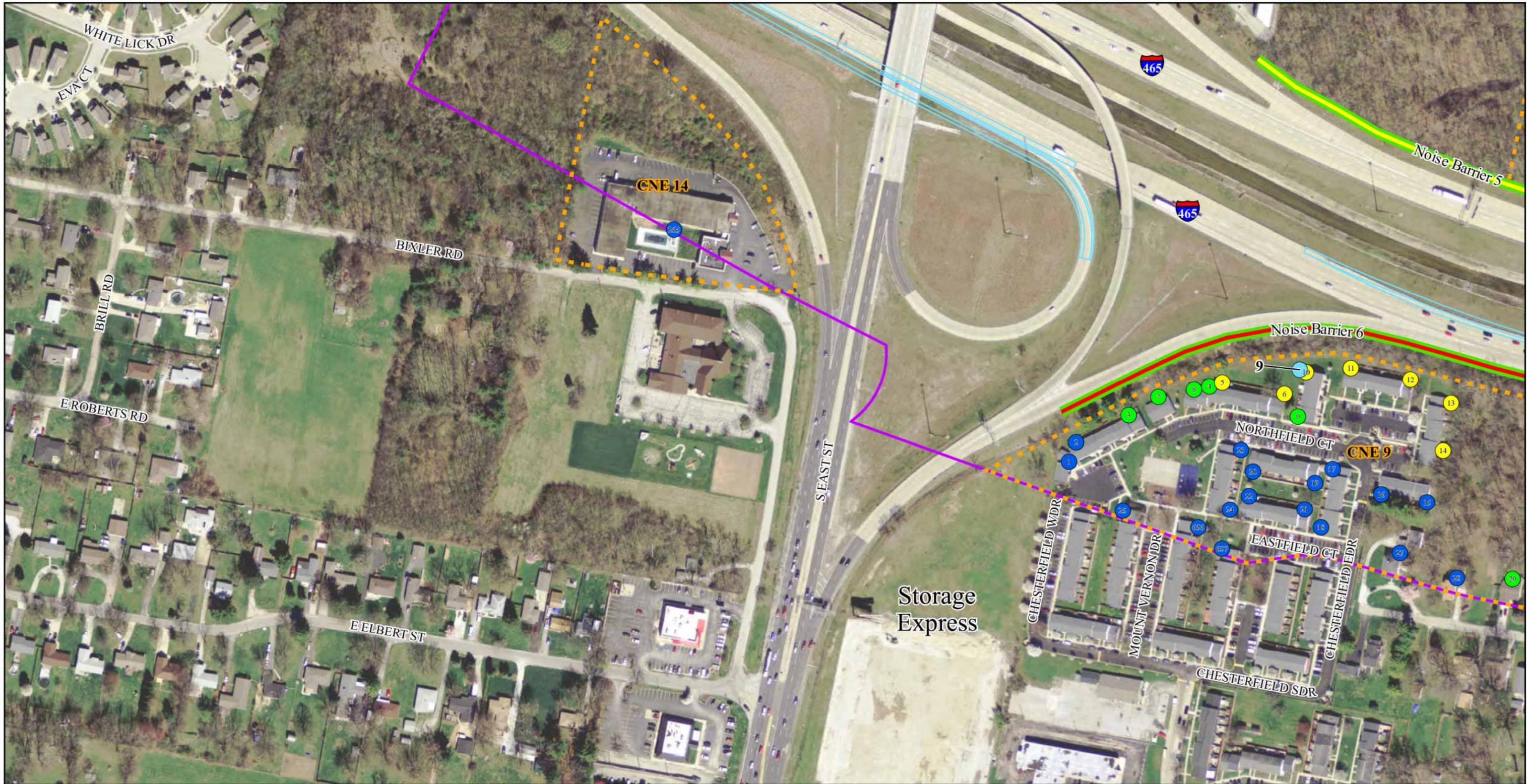


Feasible and Reasonable Noise Barrier	Noise Study Area
Noise Barrier Evaluated, Not Recommended	Common Noise Environment
Impacted - Benefited	Proposed Roadway Improvements
Impacted - Not Benefited	Duke Energy Easement
Not Impacted - Benefited	
Not Impacted - Not Benefited	
Noise Measurement Location	

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APPENDIX A
Noise Receptor and Noise Barrier Locations
 Sheet 6 of 10

Date: 11/7/2019



Feasible and Reasonable Noise Barrier	Noise Study Area
Noise Barrier Evaluated, Not Recommended	Common Noise Environment
Impacted - Benefited	Proposed Roadway Improvements
Impacted - Not Benefited	Duke Energy Easement
Not Impacted - Benefited	
Not Impacted - Not Benefited	
Noise Measurement Location	

Sources:
Non Orthophotography Data -
 Obtained from the State of
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Orthophotography -
 Obtained from Indiana
 Map Framework Data
www.indianamap.org

APPENDIX A
Noise Receptor and Noise Barrier Locations
 Sheet 7 of 10

Date: 12/4/2019	
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Feet
1 Inch = 200 Feet

Sources:
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Orthophotography -
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APPENDIX A
Noise Receptor and Noise Barrier Locations
 Sheet 8 of 10

Date: 11/7/2019

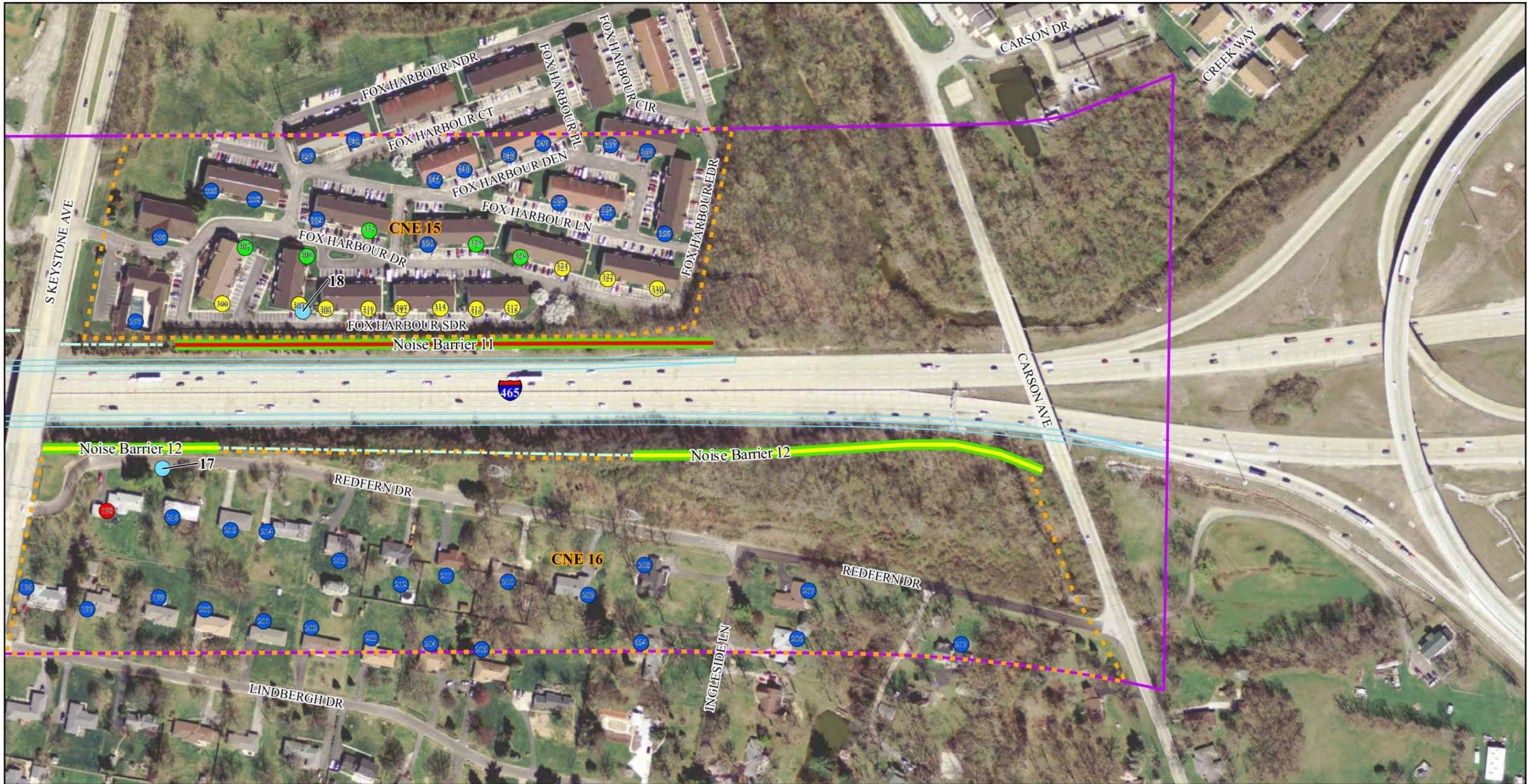


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www.indianamap.org

APPENDIX A
Noise Receptor and Noise Barrier Locations
 Sheet 9 of 10

<p>Date: 11/7/2019</p>	
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Feasible and Reasonable Noise Barrier	Noise Study Area
Noise Barrier Evaluated, Not Recommended	Common Noise Environment
Impacted - Benefited	Proposed Roadway Improvements
Impacted - Not Benefited	Duke Energy Easement
Not Impacted - Benefited	
Not Impacted - Not Benefited	
Noise Measurement Location	

Sources:
Non Orthophotography Data -
 Obtained from the State of
 Indiana Geographical
 Information Office Library
Orthophotography -
 Obtained from Indiana
 Map Framework Data
 (www.indianamap.org)

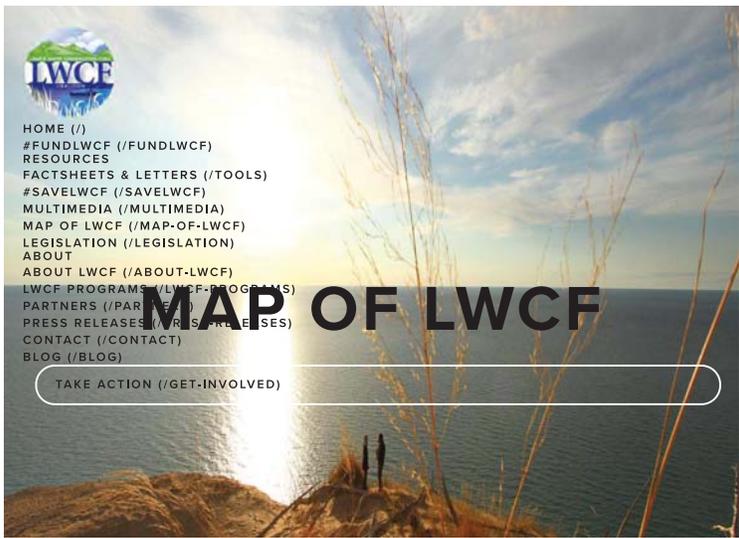
APPENDIX A
Noise Receptor and Noise Barrier Locations
 Sheet 10 of 10

Date: 11/7/2019

Appendix J

Additional Studies

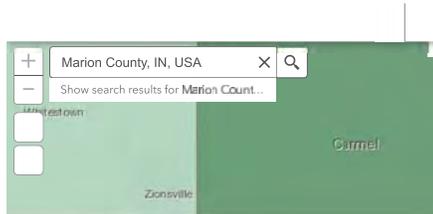
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Resources

- [FACTSHEETS & LETTERS \(/TOOLS\)](#)
- [#SAVELWCF \(/SAVELWCF\)](#)
- [MULTIMEDIA \(/MULTIMEDIA\)](#)
- [MAP OF LWCF \(/MAP-OF-LWCF\)](#)

MAP OF LWCF FUNDING THROUGH FEDERAL LAND MANAGEMENT AGENCIES AND STATE & LOCAL ASSISTANCE PROGRAM.



State	County	Grant ID Element	Type
Indiana	MARION	459	D
Indiana	MARION	88	D
Indiana	MARION	114	C
Indiana	MARION	185	D

21 records 0 selected

objectid	State	County	Grant ID	Element	Type	Grant Element Title	Grant Sponsor	Fiscal Year	Amount
47333	Indiana	MARION			48 A	EAGLE CREEK PARK	INDIANAPOLIS PARK BOARD	1968	\$ 100,000.00
47363	Indiana	MARION			167 D	EAGLE CREEK PARK-PHASE III	INDIANAPOLIS PARK BOARD	1974	\$ 70,613.59
47446	Indiana	MARION			245 D	LAWRENCE COMM PK	LAWRENCE PARK BOARD	1976	\$ 101,495.50
47490	Indiana	MARION			401 D	EAGLE CREEK FIRING RANGE/GRP PICNIC	INDIANAPOLIS PARK BOARD	1981	\$ 50,000.00
47678	Indiana	MARION			459 D	FALL CREEK CORRIDOR	INDIANAPOLIS PARK BOARD	1987	\$ 200,000.00
51308	Indiana	MARION			88 D	EAGLE CREEK DEV.	INDIANAPOLIS PARK BOARD	1971	\$ 361,624.96
51317	Indiana	MARION			114 C	EAGLE CREEK GOLF COURSES	INDIANAPOLIS PARK BOARD	1967	\$ 1,163,235.19
51333	Indiana	MARION			185 D	30TH AND GERMAN CHURCH RD PARK	INDIANAPOLIS PARK BOARD	1975	\$ 59,174.13
51359	Indiana	MARION			307 D	R-70 WASHINGTON PARK	INDIANAPOLIS PARK BOARD	1978	\$ 300,000.00
51381	Indiana	MARION			369 R	FALL CREEK PARK - PHASE II	DEPART. OF NATURAL RESOURCES	1980	\$ 60,095.01
51388	Indiana	MARION			404 D	LAKE SULLIVAN SPORTS COMPLEX	INDIANAPOLIS PARK BOARD	1981	\$ 475,000.00
51420	Indiana	MARION			541 C	SOUTHWESTWAY PARK PHASE II	INDIANAPOLIS PARK BOARD	2003	\$ 200,000.00
60716	Indiana	MARION			222 A	SOUTHWESTWAY PARK	INDIANAPOLIS PARK BOARD	1972	\$ 176,151.12
60723	Indiana	Marion			247 D	FALL CREEK PARK	DEPART. OF NATURAL RESOURCES	1976	\$ 23,485.00
60743	Indiana	MARION			330 R	RIVERSIDE PARK RENOVATION	INDIANAPOLIS PARK BOARD	1979	\$ 200,000.00
60759	Indiana	MARION			384 D	SARA BOLTON PARK	BEECH GROVE PARK BOARD	1981	\$ 19,048.78
60786	Indiana	MARION			467 C	HARTMAN FIELD	BEECH GROVE PARK BOARD	1989	\$ 90,184.00
60793	Indiana	MARION			505 C	FALL CREEK GREENWAY IMPLEMENTATIO	INDIANAPOLIS PARK BOARD	1994	\$ 79,097.50
60823	Indiana	Marion			600 R	SOUTHPORT PARK	SOUTHPORT PARK AND RECREATION BOA	2017	\$ 141,250.00
78883	Indiana	MARION			72 D	MARTIN LUTHER KING JR. MEMORIAL PAI	INDIANAPOLIS PARK BOARD	1971	\$ 290,000.00
78977	Indiana	MARION			478 C	D/VETERANS MEMORIAL PARK	LAWRENCE PARK BOARD	1992	\$ 100,000.00

Source: <https://www.lwcfcoalition.com/map-of-lwcf>
September 7, 2019

ENVIRONMENTAL JUSTICE (EJ) ANALYSIS

I-465 Reconfiguration
 Des. No. 1802075
 Indianapolis, Marion County
 August 8, 2019

Under FHWA Order 6640.23A, the Federal Highway Administration (FHWA) and the Indiana Department of Transportation (INDOT), as a recipient of funding from FHWA, are responsible to ensure that their programs, policies, and activities do not have a disproportionately high and adverse effect on minority or low-income populations. Per the current INDOT Categorical Exclusion (CE) Manual, an Environmental Justice (EJ) Analysis is required for any project that has two or more relocations or 0.5 acre of additional permanent right-of-way. The project will require no right-of-way and no relocations. However, since this project is a Type 1 project requiring noise analysis and a CE, Level 4 (CE-4), it was decided that EJ analysis is required. The purpose of this preliminary analysis is to identify any potential EJ populations and to plan public involvement activities.

Potential EJ impacts are detected by locating minority and low-income populations relative to a reference population to determine if populations of EJ concern exists and whether there could be disproportionately high and adverse impacts to them. The reference population may be a county, city or town and is called the community of comparison (COC). In this project, the COC is Marion County. The community that overlaps the project limits is called the affected community (AC). In this project, the ACs are eight census tract block groups (CTBGs) in Section A/B, AC-A through AC-H, and six CTBGs in Section C, AC-I to AC-N.

An AC has a population of concern for EJ if the population is more than 50% minority or low-income or if the low-income or minority population is 125% of the COC. Data from the U.S. Census Bureau’s 2013-2017 American Community Survey five-year estimate was obtained from the US Census Bureau Website <https://factfinder.census.gov/> on July 2019 by Parsons. The data collected for minority and low-income populations within the ACs for Sections A/B and Section C are summarized below in Tables 1 and 2.

Table 1. Section A/B I-465 Reconfiguration Minority and Low Income Data (ACS 2017)

	COC	AC-A	AC-B	AC-C	AC-D	AC-E	AC-F	AC-G	AC-H
	Marion County, Indiana	Block Group 3, Census Tract 3804.02	Block Group 1, Census Tract 3804.04	Block Group 1, Census Tract 3805.01	Block Group 2, Census Tract 3805.01	Block Group 1, Census Tract 3805.02	Block Group 3, Census Tract 3805.02	Block Group 1, Census Tract 3806	Block Group 3, Census Tract 3806
Minority									
Percent Minority	43.3	27.1	43.1	6.9	20.1	35.8	24.5	35.8	22.2
125% of COC	54.1	AC<125% COC	AC<125% COC	AC<125% COC					
EJ Population of Concern	N/A	No	No	No	No	No	No	No	No
Low-Income									
Percent Low-Income	19.8	43.5	33.9	18.0	29.3	28.5	10.3	18.4	24.6
125% of COC	24.7	AC>125% COC	AC>125% COC	AC<125% COC	AC>125% COC	AC>125% COC	AC<125% COC	AC<125% COC	AC<125% COC
EJ Population of Concern	N/A	Yes	Yes	No	Yes	Yes	No	No	No

Data source: www.census.gov, American Community Survey (ACS) 5-Year Estimates 2013-2017

AC-A, Block Group 3, Census Tract 3804.02 has a percent minority of 27.1 percent, which is below 50% and is below the 125% COC threshold. AC-B, Block Group 1, Census Tract 3804.04 has a percent minority of 43.1 percent, which is below 50% and is below the 125% COC threshold. AC-C, Block Group 1, Census Tract 3805.01 has a percent minority of 6.9 which is below 50% and is below the 125% COC threshold. AC-D, Block Group 2, Census Tract 3805.01 has a percent minority of 20.1 percent which is below 50% and is below the 125% COC threshold. AC-E, Block Group 1, Census Tract 3805.01 has a percent minority of 35.8 percent which is below 50% and is below the 125% COC threshold. AC-F, Block Group 3, Census Tract 3805.02 has a percent minority of 24.5 percent which is below 50% and is below the 125% COC threshold. AC-G, Block Group 1, Census Tract 3806 has a percent minority of 35.8 percent which is below 50% and is below the 125% COC threshold. AC-H, Block Group 3, Census Tract 3806 has a percent minority of 22.2 percent which is below 50% and is below the 125% COC threshold. Therefore, the eight ACs within Section A/B do not contain minority populations of EJ concern.

AC-A has a percent low-income of 43.5, which is below 50% but is above the 125% COC threshold. AC-B has a percent low-income of 33.9, which is below 50% but is above the 125% COC threshold. AC-C has a percent low-income of 18.0, which is below 50% and is below the 125% COC threshold. AC-D has a percent low-income of 29.3 percent which is below 50% but is above the 125% COC threshold. AC-E has a percent low-income of 28.5 percent which is below 50% but is above the 125% COC threshold. AC-F has a percent low-income of 10.3 percent which is below 50% and is below the 125% COC threshold. AC-G has a percent low-income of 18.4 percent which is below 50% and is below the 125% COC threshold. AC-H has a percent low-income of 24.6 percent which is below 50% and is below the 125% COC threshold. Therefore, of the eight ACs within Section A/B, four are low-income populations of EJ concern, specifically AC-A, AC-B, AC-D, and AC-E.

Table 2. Section C I-465 Reconfiguration Minority and Low-Income Data (ACS 2017)

	COC	AC-I	AC-J	AC-K	AC-L	AC-M	AC-N
	Marion County, Indiana	Block Group 1, Census Tract 3702.01	Block Group 2, Census Tract 3702.01	Block Group 3, Census Tract 3702.01	Block Group 4, Census Tract 3702.01	Block Group 3, Census Tract 3702.02	Block Group 1, Census Tract 3703.02
Minority							
Percent Minority	43.3	3.6	8.0	10.6	7.6	4.7	14.9
125% of COC	54.1	AC<125% COC					
EJ Population of Concern	N/A	No	No	No	No	No	No
Low-Income							
Percent Low-Income	19.8	10.0	1.5	37.3	17.8	8.8	21.4
125% of COC	24.7	AC<125% COC	AC<125% COC	AC>125% COC	AC<125% COC	AC<125% COC	AC<125% COC
EJ Population of Concern	N/A	No	No	Yes	No	No	No

Data source: www.census.gov, American Community Survey (ACS) 5-Year Estimates 2013-2017

AC-I, Block Group 1, Census Tract 3702.01 has a percent minority of 3.6 which is below 50% and is below the 125% COC threshold. AC-J, Block Group 2, Census Tract 3702.01 has a percent minority of 8.0 percent which is below 50% and is below the 125% COC threshold. AC-K, Block Group 3, Census Tract 3702.01 has a percent minority of 10.6 percent which is below 50% and is below the 125% COC threshold. AC-L, Block Group 4, Census Tract 3702.01 has a percent minority of 7.6 percent which is below 50% and is below the 125% COC threshold. AC-M, Block Group 3, Census Tract 3702.02 has a percent minority of 4.7 percent which is below 50% and is below the 125% COC threshold. AC-N, Block Group 1, Census Tract 3703.02 has a percent minority of 14.9 percent which is below 50% and is below the 125% COC threshold. Therefore, the six ACs within Section C are not minority populations of EJ concern.

AC-I has a percent low-income of 10.0 which is below 50% and is below the 125% COC threshold. AC-J has a percent low-income of 1.5 percent which is below 50% and is below the 125% COC threshold. AC-K has a percent low-income of 37.3 percent which is below 50% but is above the 125% COC threshold. AC-L has a percent low-income of 17.8 which is below 50% and is below the 125% COC threshold. AC-M has a percent low-income of 8.8 percent which is below 50% and is below the 125% COC threshold. AC-N has a percent low-income of 21.4 which is below 50% and is below the 125% COC threshold. Therefore, of the six ACs adjacent to Section C, five ACs are not minority populations of EJ concern. AC-K is a low-income population of EJ concern.

Maps showing the COC and AC boundaries (Attachments, pages 1 and 2), summary tables (Attachments, pages 3 and 4), and data obtained from Census.gov (Attachments, pages 5 to 18) are provided.

SPECIFIC COMMUNITIES

Specific communities along the alignment were researched to help identify potential EJ populations. Additionally, the U.S. Department of Housing and Urban Development (HUD) mapper tool was used to identify potential low-income communities. <https://resources.hud.gov/>. The results are summarized below. These neighborhoods are shown on the Maps of Specific Communities (Attachments, pages 20 and 21).

- Hanna Village Apartments, at 4020 Hanna Village Drive, is located 0.4 mile north of Section A/B. This apartment complex is listed under the HUD low-income housing tax credit program.
- Valley Forge Apartments, at 4350 Madison Avenue, is 0.1 mile north of Section A/B along Madison Avenue. This apartment complex is listed under the HUD low-income housing tax credit program.
- Madison Mobile Home Community, at 4403 Madison Avenue, is adjacent to Section A/B at the northeast of I-465 and Madison Avenue.
- Village of North Acre, at 1507 E Little Piney Way, is a mobile home community located adjacent to Section A/B.
- Longacre Mobile Home Park, at 4701 Madison Avenue, is located adjacent to Section A/B, southwest of I-465 and Madison Avenue. This mobile home community is located within AC-D, which is a low-income population of EJ concern.
- Madison Park Village, at 4725 Madison Avenue, is an apartment complex located adjacent to Section A/B and south of I-465. This complex is located within AC-A, which is a low-income population of EJ concern.
- Fox Club Apartments at 4401 S Keystone Ave is located adjacent to Section A/B, north of I-465 and east of Keystone Avenue. This complex is located within AC-B, which is a low-income population of EJ concern.
- Stone Lake Apartments and Carson at the Crossing, at 2913 E Hanna Ave, are located 0.1 mile northwest of Section A/B. These apartment complexes are located within AC-E, which is a low-income population of EJ concern.
- Decatur Township Center, 4851 Tincher Road, is a nursing home facility that abuts Section C of the project.
- Abbey Apartments, at 4012 Mann Road, is located 0.6 mile north of Section C. It is identified as a low income, elderly, and special needs housing by HUD.
- Two community organizations that appear to represent ethnic groups were identified near the project area: Burmese American Community Institute and Chin Community of Indiana-Chin Center (Southeast Asian ethnic group).

Representatives from these communities and organizations were invited to the July 10, 2019 public open house. A request for translation to Chin language was requested at the public open house. Parsons is working with INDOT Public Involvement to translate and post project documents in Chin language.

CONCLUSION

Of the 14 ACs adjacent to the project area, five ACs (AC-A, AC-B, AC-D, AC-E, and AC-K) were identified in the preliminary analysis to be low-income populations of EJ concern. Additionally, there are multiple adjacent and nearby communities that likely contain EJ populations. This project has no relocations and will require no new or temporary right-of-way. Impacts are being minimized through stakeholder coordination. Therefore, the I-465 Reconfiguration Project should not have a disproportionately high and adverse impact on EJ populations.

Potential impacts to the community will be minimized through stakeholder coordination. This includes noise analysis/noise meetings, a community advisory committee (CAC) meeting, the July 10, 2019 public open house, coordination with City of Indianapolis Department of Public Works (DPW), Mayor’s Office neighborhood liaisons, and local transit (IndyGo and Commuter Connect), multiple public outreach activities such as a neighborhood “night-out”, homeowner association meetings, and a public hearing. Public documents should be translated into Chin language. To solicit responses to noise barrier surveys, in-person visits (e.g., door-to-door) should be considered at specific communities. Where possible, the traffic management plan should minimize impacts to EJ communities, such as prohibiting the closure of consecutive crossings (e.g., Keystone Avenue and Madison Avenue). At this time, no further environmental justice analysis is warranted.

Attachments

	<u>Page(s)</u>
Overview Map – Community of Comparison (COC)	1
Map of Affected Communities (ACs).....	2
Table 3. Section A/B Data Calculations	3
Table 4. Section C Data Calculations.....	4
U.S. Census Data (Race)	5
U.S. Census Data (Poverty)	11
Section A/B – Map of Specific Communities	20
Section C – Map of Specific Communities.....	21

Maps intentionally omitted. Refer to Appendix B.

Table 3. I-465 Reconfiguration Section A/B Calculations

Minority and Low-Income Data (2017 ACS)									
Des. 1802075									
Section A/B I-465 Reconfiguration									
	COC	AC-A	AC-B	AC-C	AC-D	AC-E	AC-F	AC-G	AC-H
	Marion County, Indiana	Block Group 3, Census Tract 3804.02	Block Group 1, Census Tract 3804.04	Block Group 1, Census Tract 3805.01	Block Group 2, Census Tract 3805.01	Block Group 1, Census Tract 3805.02	Block Group 3, Census Tract 3805.02	Block Group 1, Census Tract 3806	Block Group 3, Census Tract 3806
Minority									
Total Population (TP)	939,964	1,940	1,425	1,266	1,344	1,092	1,521	1,847	1,992
TP: White Alone	532,896	1,414	811	1,179	1,074	701	1,149	1,186	1,550
Number Non-White/Minority	407,068	526	614	87	270	391	372	661	442
Percent Minority	43.3	27.1	43.1	6.9	20.1	35.8	24.5	35.8	22.2
125% of COC	54.1	AC<125% COC	AC<125% COC	AC<125% COC					
EJ Population of Concern	N/A	No	No	No	No	No	No	No	No
Low-Income									
TP	920,904	1,940	1,348	1,246	1,344	1,068	1,494	1,847	1,975
Income in the Past 12 months Below Poverty Level	182,317	844	457	224	394	304	154	339	485
Percent Low-Income	19.8	43.5	33.9	18.0	29.3	28.5	10.3	18.4	24.6
125% of COC	24.7	AC>125% COC	AC>125% COC	AC<125% COC	AC>125% COC	AC>125% COC	AC<125% COC	AC<125% COC	AC<125% COC
EJ Population of Concern	N/A	Yes	Yes	No	Yes	Yes	No	No	No

Table 4. I-465 Reconfiguration Section C Calculations

Minority and Low-Income Data (2017 ACS)							
Des. 1802075							
Section C I-465 Reconfiguration							
	COC	AC-I	AC-J	AC-K	AC-L	AC-M	AC-N
	Marion County, Indiana	Block Group 1, Census Tract 3702.01	Block Group 2, Census Tract 3702.01	Block Group 3, Census Tract 3702.01	Block Group 4, Census Tract 3702.01	Block Group 3, Census Tract 3702.02	Block Group 1, Census Tract 3703.02
Minority							
Total Population (TP)	939,964	1,004	677	142	2,340	1,604	3,773
TP: White Alone	532,896	968	623	127	2,162	1,529	3,210
Number Non-White/Minority	407,068	36	54	15	178	75	563
Percent Minority	43.3	3.6	8.0	10.6	7.6	4.7	14.9
125% of COC	54.1	AC<125% COC					
EJ Population of Concern?	N/A	No	No	No	No	No	No
Low-Income							
TP	920,904	910	677	142	2,210	1,604	3,740
Income in the Past 12 months Below Poverty Level	182,317	91	10	53	393	141	802
Percent Low-Income	19.8	10.0	1.5	37.3	17.8	8.8	21.4
125% of COC	24.7	AC<125% COC	AC<125% COC	AC>125% COC	AC<125% COC	AC<125% COC	AC<125% COC
EJ Population of Concern?	N/A	No	No	Yes	No	No	No



B03002

HISPANIC OR LATINO ORIGIN BY RACE
 Universe: Total population
 2013-2017 American Community Survey 5-Year Estimates

Supporting documentation on code lists, subject definitions, data accuracy, and statistical testing can be found on the American Community Survey website in the Technical Documentation section.

Sample size and data quality measures (including coverage rates, allocation rates, and response rates) can be found on the American Community Survey website in the Methodology section.

Although the American Community Survey (ACS) produces population, demographic and housing unit estimates, it is the Census Bureau's Population Estimates Program that produces and disseminates the official estimates of the population for the nation, states, counties, cities, and towns and estimates of housing units for states and counties.

AC-J

	Marion County, Indiana COC		Block Group 1, Census Tract 3702.01, Marion County, Indiana AC-I		Block Group 2, Census Tract 3702.01, Marion County, Indiana AC-J
	Estimate	Margin of Error	Estimate	Margin of Error	Estimate
Total:	939,964	*****	1,004	+/-364	677
Not Hispanic or Latino:	845,355	*****	1,004	+/-364	623
White alone	532,896	+/-400	968	+/-361	623
Black or African American alone	255,912	+/-1,711	25	+/-20	0
American Indian and Alaska Native alone	1,758	+/-394	0	+/-11	0
Asian alone	26,970	+/-490	0	+/-11	0
Native Hawaiian and Other Pacific Islander alone	221	+/-88	0	+/-11	0
Some other race alone	2,751	+/-623	0	+/-11	0
Two or more races:	24,847	+/-1,769	11	+/-19	0
Two races including Some other race	523	+/-153	0	+/-11	0
Two races excluding Some other race, and three or more races	24,324	+/-1,785	11	+/-19	0
Hispanic or Latino:	94,609	*****	0	+/-11	54
White alone	56,073	+/-2,061	0	+/-11	54
Black or African American alone	1,824	+/-412	0	+/-11	0
American Indian and Alaska Native alone	648	+/-386	0	+/-11	0
Asian alone	203	+/-148	0	+/-11	0
Native Hawaiian and Other Pacific Islander alone	204	+/-215	0	+/-11	0
Some other race alone	31,645	+/-2,223	0	+/-11	0
Two or more races:	4,012	+/-719	0	+/-11	0
Two races including Some other race	2,155	+/-552	0	+/-11	0
Two races excluding Some other race, and three or more races	1,857	+/-511	0	+/-11	0

	Block Group 2, Census Tract 3702.01, Marion County, Indiana	Block Group 3, Census Tract 3702.01, Marion County, Indiana AC-K		Block Group 4, Census Tract 3702.01, Marion County, Indiana AC-L	
	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error
Total:	+/-212	142	+/-125	2,340	+/-434
Not Hispanic or Latino:	+/-196	127	+/-120	2,310	+/-437
White alone	+/-196	127	+/-120	2,162	+/-455
Black or African American alone	+/-11	0	+/-11	109	+/-101
American Indian and Alaska Native alone	+/-11	0	+/-11	39	+/-56
Asian alone	+/-11	0	+/-11	0	+/-11
Native Hawaiian and Other Pacific Islander alone	+/-11	0	+/-11	0	+/-11
Some other race alone	+/-11	0	+/-11	0	+/-11
Two or more races:	+/-11	0	+/-11	0	+/-11
Two races including Some other race	+/-11	0	+/-11	0	+/-11
Two races excluding Some other race, and three or more races	+/-11	0	+/-11	0	+/-11
Hispanic or Latino:	+/-86	15	+/-25	30	+/-28
White alone	+/-86	7	+/-12	22	+/-25
Black or African American alone	+/-11	0	+/-11	0	+/-11
American Indian and Alaska Native alone	+/-11	8	+/-13	0	+/-11
Asian alone	+/-11	0	+/-11	0	+/-11
Native Hawaiian and Other Pacific Islander alone	+/-11	0	+/-11	0	+/-11
Some other race alone	+/-11	0	+/-11	8	+/-14
Two or more races:	+/-11	0	+/-11	0	+/-11
Two races including Some other race	+/-11	0	+/-11	0	+/-11
Two races excluding Some other race, and three or more races	+/-11	0	+/-11	0	+/-11

	Block Group 3, Census Tract 3702.02, Marion County, Indiana AC-M		Block Group 1, Census Tract 3703.02, Marion County, Indiana AC-N		Block Group 3, Census Tract 3804.02, Marion County, Indiana AC-A
	Estimate	Margin of Error	Estimate	Margin of Error	Estimate
Total:	1,604	+/-434	3,773	+/-707	1,940
Not Hispanic or Latino:	1,542	+/-434	3,541	+/-691	1,778
White alone	1,529	+/-436	3,210	+/-677	1,414
Black or African American alone	0	+/-11	331	+/-262	54
American Indian and Alaska Native alone	0	+/-11	0	+/-11	0
Asian alone	0	+/-11	0	+/-11	253
Native Hawaiian and Other Pacific Islander alone	0	+/-11	0	+/-11	0
Some other race alone	0	+/-11	0	+/-11	0
Two or more races:	13	+/-18	0	+/-11	57
Two races including Some other race	0	+/-11	0	+/-11	0
Two races excluding Some other race, and three or more races	13	+/-18	0	+/-11	57
Hispanic or Latino:	62	+/-66	232	+/-186	162
White alone	15	+/-27	45	+/-84	130
Black or African American alone	0	+/-11	0	+/-11	0
American Indian and Alaska Native alone	0	+/-11	0	+/-11	12
Asian alone	0	+/-11	0	+/-11	0
Native Hawaiian and Other Pacific Islander alone	0	+/-11	0	+/-11	0
Some other race alone	34	+/-55	187	+/-200	20
Two or more races:	13	+/-22	0	+/-11	0
Two races including Some other race	0	+/-11	0	+/-11	0
Two races excluding Some other race, and three or more races	13	+/-22	0	+/-11	0

	Block Group 3, Census Tract 3804.02, Marion County, Indiana	Block Group 1, Census Tract 3804.04, Marion County, Indiana		Block Group 1, Census Tract 3805.01, Marion County, Indiana	
	Margin of Error	AC-B Estimate	Margin of Error	AC-C Estimate	Margin of Error
Total:	+/-389	1,425	+/-358	1,266	+/-291
Not Hispanic or Latino:	+/-344	1,237	+/-321	1,208	+/-277
White alone	+/-345	811	+/-209	1,179	+/-275
Black or African American alone	+/-69	376	+/-223	26	+/-41
American Indian and Alaska Native alone	+/-11	0	+/-11	0	+/-11
Asian alone	+/-211	0	+/-11	0	+/-11
Native Hawaiian and Other Pacific Islander alone	+/-11	0	+/-11	0	+/-11
Some other race alone	+/-11	0	+/-11	3	+/-6
Two or more races:	+/-89	50	+/-77	0	+/-11
Two races including Some other race	+/-11	0	+/-11	0	+/-11
Two races excluding Some other race, and three or more races	+/-89	50	+/-77	0	+/-11
Hispanic or Latino:	+/-127	188	+/-250	58	+/-95
White alone	+/-114	188	+/-250	58	+/-95
Black or African American alone	+/-11	0	+/-11	0	+/-11
American Indian and Alaska Native alone	+/-19	0	+/-11	0	+/-11
Asian alone	+/-11	0	+/-11	0	+/-11
Native Hawaiian and Other Pacific Islander alone	+/-11	0	+/-11	0	+/-11
Some other race alone	+/-22	0	+/-11	0	+/-11
Two or more races:	+/-11	0	+/-11	0	+/-11
Two races including Some other race	+/-11	0	+/-11	0	+/-11
Two races excluding Some other race, and three or more races	+/-11	0	+/-11	0	+/-11

	Block Group 2, Census Tract 3805.01, Marion County, Indiana AC-D		Block Group 1, Census Tract 3805.02, Marion County, Indiana AC-E		Block Group 3, Census Tract 3805.02, Marion County, Indiana E AC-F
	Estimate	Margin of Error	Estimate	Margin of Error	Estimate
Total:	1,344	+/-322	1,092	+/-289	1,521
Not Hispanic or Latino:	1,096	+/-278	931	+/-295	1,377
White alone	1,074	+/-275	701	+/-267	1,149
Black or African American alone	0	+/-11	122	+/-90	209
American Indian and Alaska Native alone	0	+/-11	0	+/-11	0
Asian alone	0	+/-11	54	+/-54	0
Native Hawaiian and Other Pacific Islander alone	0	+/-11	0	+/-11	0
Some other race alone	0	+/-11	0	+/-11	0
Two or more races:	22	+/-24	54	+/-50	19
Two races including Some other race	0	+/-11	0	+/-11	0
Two races excluding Some other race, and three or more races	22	+/-24	54	+/-50	19
Hispanic or Latino:	248	+/-204	161	+/-114	144
White alone	248	+/-204	114	+/-95	144
Black or African American alone	0	+/-11	0	+/-11	0
American Indian and Alaska Native alone	0	+/-11	0	+/-11	0
Asian alone	0	+/-11	26	+/-42	0
Native Hawaiian and Other Pacific Islander alone	0	+/-11	0	+/-11	0
Some other race alone	0	+/-11	21	+/-25	0
Two or more races:	0	+/-11	0	+/-11	0
Two races including Some other race	0	+/-11	0	+/-11	0
Two races excluding Some other race, and three or more races	0	+/-11	0	+/-11	0

	Block Group 3, Census Tract 3805.02, Marion County, Indiana	Block Group 1, Census Tract 3806, Marion County, Indiana AC-G		Block Group 3, Census Tract 3806, Marion County, Indiana AC-H	
	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error
Total:	+/-283	1,847	+/-529	1,992	+/-535
Not Hispanic or Latino:	+/-267	1,740	+/-521	1,648	+/-482
White alone	+/-244	1,186	+/-361	1,550	+/-459
Black or African American alone	+/-124	481	+/-358	61	+/-92
American Indian and Alaska Native alone	+/-11	0	+/-11	0	+/-11
Asian alone	+/-11	23	+/-37	0	+/-11
Native Hawaiian and Other Pacific Islander alone	+/-11	0	+/-11	0	+/-11
Some other race alone	+/-11	0	+/-11	0	+/-11
Two or more races:	+/-19	50	+/-63	37	+/-59
Two races including Some other race	+/-11	0	+/-11	0	+/-11
Two races excluding Some other race, and three or more races	+/-19	50	+/-63	37	+/-59
Hispanic or Latino:	+/-149	107	+/-126	344	+/-223
White alone	+/-149	52	+/-95	344	+/-223
Black or African American alone	+/-11	37	+/-43	0	+/-11
American Indian and Alaska Native alone	+/-11	0	+/-11	0	+/-11
Asian alone	+/-11	0	+/-11	0	+/-11
Native Hawaiian and Other Pacific Islander alone	+/-11	0	+/-11	0	+/-11
Some other race alone	+/-11	18	+/-30	0	+/-11
Two or more races:	+/-11	0	+/-11	0	+/-11
Two races including Some other race	+/-11	0	+/-11	0	+/-11
Two races excluding Some other race, and three or more races	+/-11	0	+/-11	0	+/-11

Data are based on a sample and are subject to sampling variability. The degree of uncertainty for an estimate arising from sampling variability is represented through the use of a margin of error. The value shown here is the 90 percent margin of error. The margin of error can be interpreted roughly as providing a 90 percent probability that the interval defined by the estimate minus the margin of error and the estimate plus the margin of error (the lower and upper confidence bounds) contains the true value. In addition to sampling variability, the ACS estimates are subject to nonsampling error (for a discussion of nonsampling variability, see Accuracy of the Data). The effect of nonsampling error is not represented in these tables.

While the 2013-2017 American Community Survey (ACS) data generally reflect the February 2013 Office of Management and Budget (OMB) definitions of metropolitan and micropolitan statistical areas; in certain instances the names, codes, and boundaries of the principal cities shown in ACS tables may differ from the OMB definitions due to differences in the effective dates of the geographic entities.

Estimates of urban and rural populations, housing units, and characteristics reflect boundaries of urban areas defined based on Census 2010 data. As a result, data for urban and rural areas from the ACS do not necessarily reflect the results of ongoing urbanization.

Source: U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates

Explanation of Symbols:

1. An '***' entry in the margin of error column indicates that either no sample observations or too few sample observations were available to compute a standard error and thus the margin of error. A statistical test is not appropriate.
2. An '-' entry in the estimate column indicates that either no sample observations or too few sample observations were available to compute an estimate, or a ratio of medians cannot be calculated because one or both of the median estimates falls in the lowest interval or upper interval of an open-ended distribution.
3. An '-' following a median estimate means the median falls in the lowest interval of an open-ended distribution.
4. An '+' following a median estimate means the median falls in the upper interval of an open-ended distribution.
5. An '****' entry in the margin of error column indicates that the median falls in the lowest interval or upper interval of an open-ended distribution. A statistical test is not appropriate.
6. An '*****' entry in the margin of error column indicates that the estimate is controlled. A statistical test for sampling variability is not appropriate.
7. An 'N' entry in the estimate and margin of error columns indicates that data for this geographic area cannot be displayed because the number of sample cases is too small.
8. An '(X)' means that the estimate is not applicable or not available.



B17021

POVERTY STATUS OF INDIVIDUALS IN THE PAST 12 MONTHS BY LIVING ARRANGEMENT

Universe: Population for whom poverty status is determined
2013-2017 American Community Survey 5-Year Estimates

Supporting documentation on code lists, subject definitions, data accuracy, and statistical testing can be found on the American Community Survey website in the Technical Documentation section.

Sample size and data quality measures (including coverage rates, allocation rates, and response rates) can be found on the American Community Survey website in the Methodology section.

Although the American Community Survey (ACS) produces population, demographic and housing unit estimates, it is the Census Bureau's Population Estimates Program that produces and disseminates the official estimates of the population for the nation, states, counties, cities, and towns and estimates of housing units for states and counties.

COC

AC-I

AC-J

	Marion County, Indiana		Block Group 1, Census Tract 3702.01, Marion County, Indiana		Block Group 2, Census Tract 3702.01, Marion County, Indiana
	Estimate	Margin of Error	Estimate	Margin of Error	Estimate
Total:	920,904	+/-910	910	+/-357	677
Income in the past 12 months below poverty level:	182,317	+/-4,766	91	+/-82	10
In family households:	131,126	+/-4,813	0	+/-11	0
In married couple families:	38,166	+/-2,904	0	+/-11	0
All relatives	36,669	+/-2,918	0	+/-11	0
Non-relatives	1,497	+/-327	0	+/-11	0
In other families:	92,960	+/-4,379	0	+/-11	0
Male householder, no wife present:	16,944	+/-2,271	0	+/-11	0
All relatives	13,011	+/-2,018	0	+/-11	0
Non-relatives	3,933	+/-619	0	+/-11	0
Female householder, no husband present:	76,016	+/-3,942	0	+/-11	0
All relatives	71,810	+/-3,853	0	+/-11	0
Non-relatives	4,206	+/-513	0	+/-11	0
In non-family households and other living arrangement:	51,191	+/-2,029	91	+/-82	10
Householder:	33,603	+/-1,418	68	+/-52	10
Living alone	27,616	+/-1,200	22	+/-24	10
Not living alone	5,987	+/-575	46	+/-46	0
Other living arrangement	17,588	+/-1,345	23	+/-35	0
Income in the past 12 months at or above poverty level:	738,587	+/-4,754	819	+/-352	667
In family households:	582,780	+/-5,071	678	+/-340	637
In married couple families:	398,534	+/-5,427	341	+/-149	543
All relatives	396,882	+/-5,456	341	+/-149	543
Non-relatives	1,652	+/-387	0	+/-11	0
In other families:	184,246	+/-5,886	337	+/-323	94
Male householder, no wife present:	50,212	+/-3,789	18	+/-29	20
All relatives	45,851	+/-3,406	18	+/-29	20
Non-relatives	4,361	+/-712	0	+/-11	0
Female householder, no husband present:	134,034	+/-4,485	319	+/-323	74
All relatives	127,271	+/-4,435	312	+/-322	48
Non-relatives	6,763	+/-685	7	+/-11	26

	Marion County, Indiana		Block Group 1, Census Tract 3702.01, Marion County, Indiana		Block Group 2, Census Tract 3702.01, Marion County, Indiana
	Estimate	Margin of Error	Estimate	Margin of Error	Estimate
In non-family households and other living arrangement:	155,807	+/-2,650	141	+/-90	30
Householder:	127,046	+/-1,893	105	+/-61	30
Living alone	104,472	+/-1,640	80	+/-44	30
Not living alone	22,574	+/-975	25	+/-42	0
Other living arrangement	28,761	+/-1,430	36	+/-37	0

	Block Group 2, Census Tract 3702.01, Marion County, Indiana	Block Group 3, Census Tract 3702.01, Marion County, Indiana AC-K		Block Group 4, Census Tract 3702.01, Marion County, Indiana AC-L	
	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error
Total:	+/-212	142	+/-125	2,210	+/-350
Income in the past 12 months below poverty level:	+/-16	53	+/-82	393	+/-179
In family households:	+/-11	53	+/-82	291	+/-173
In married couple families:	+/-11	0	+/-11	145	+/-124
All relatives	+/-11	0	+/-11	145	+/-124
Non-relatives	+/-11	0	+/-11	0	+/-11
In other families:	+/-11	53	+/-82	146	+/-136
Male householder, no wife present:	+/-11	0	+/-11	50	+/-61
All relatives	+/-11	0	+/-11	0	+/-11
Non-relatives	+/-11	0	+/-11	50	+/-61
Female householder, no husband present:	+/-11	53	+/-82	96	+/-117
All relatives	+/-11	53	+/-82	88	+/-113
Non-relatives	+/-11	0	+/-11	8	+/-13
In non-family households and other living arrangement:	+/-16	0	+/-11	102	+/-64
Householder:	+/-16	0	+/-11	91	+/-57
Living alone	+/-16	0	+/-11	77	+/-55
Not living alone	+/-11	0	+/-11	14	+/-17
Other living arrangement	+/-11	0	+/-11	11	+/-19
Income in the past 12 months at or above poverty level:	+/-214	89	+/-91	1,817	+/-322
In family households:	+/-220	89	+/-91	1,554	+/-343
In married couple families:	+/-220	89	+/-91	1,181	+/-340
All relatives	+/-220	89	+/-91	1,181	+/-340
Non-relatives	+/-11	0	+/-11	0	+/-11
In other families:	+/-85	0	+/-11	373	+/-183
Male householder, no wife present:	+/-31	0	+/-11	122	+/-124
All relatives	+/-31	0	+/-11	122	+/-124
Non-relatives	+/-11	0	+/-11	0	+/-11
Female householder, no husband present:	+/-91	0	+/-11	251	+/-146
All relatives	+/-57	0	+/-11	229	+/-143
Non-relatives	+/-43	0	+/-11	22	+/-33
In non-family households and other living arrangement:	+/-22	0	+/-11	263	+/-108
Householder:	+/-22	0	+/-11	195	+/-81
Living alone	+/-22	0	+/-11	150	+/-69
Not living alone	+/-11	0	+/-11	45	+/-33
Other living arrangement	+/-11	0	+/-11	68	+/-45

	Block Group 3, Census Tract 3702.02, Marion County, Indiana AC-M		Block Group 1, Census Tract 3703.02, Marion County, Indiana AC-N		Block Group 3, Census Tract 3804.02, Marion County, Indiana Es AC-A
	Estimate	Margin of Error	Estimate	Margin of Error	Estimate
Total:	1,604	+/-434	3,740	+/-705	1,940
Income in the past 12 months below poverty level:	141	+/-93	802	+/-325	844
In family households:	66	+/-72	727	+/-314	671
In married couple families:	13	+/-22	379	+/-322	384
All relatives	0	+/-11	309	+/-315	359
Non-relatives	13	+/-22	70	+/-82	25
In other families:	53	+/-66	348	+/-264	287
Male householder, no wife present:	35	+/-60	17	+/-29	0
All relatives	35	+/-60	0	+/-11	0
Non-relatives	0	+/-11	17	+/-29	0
Female householder, no husband present:	18	+/-30	331	+/-262	287
All relatives	0	+/-11	331	+/-262	270
Non-relatives	18	+/-30	0	+/-11	17
In non-family households and other living arrangement:	75	+/-59	75	+/-71	173
Householder:	33	+/-39	17	+/-28	61
Living alone	19	+/-31	17	+/-28	32
Not living alone	14	+/-26	0	+/-11	29
Other living arrangement	42	+/-42	58	+/-66	112
Income in the past 12 months at or above poverty level:	1,463	+/-453	2,938	+/-699	1,096
In family households:	1,090	+/-477	2,485	+/-729	829
In married couple families:	686	+/-451	1,525	+/-568	385
All relatives	686	+/-451	1,525	+/-568	385
Non-relatives	0	+/-11	0	+/-11	0
In other families:	404	+/-288	960	+/-567	444
Male householder, no wife present:	0	+/-11	280	+/-206	93
All relatives	0	+/-11	254	+/-192	93
Non-relatives	0	+/-11	26	+/-30	0
Female householder, no husband present:	404	+/-288	680	+/-528	351
All relatives	374	+/-268	604	+/-511	326
Non-relatives	30	+/-38	76	+/-78	25
In non-family households and other living arrangement:	373	+/-107	453	+/-182	267
Householder:	358	+/-105	357	+/-133	198
Living alone	320	+/-109	239	+/-124	131
Not living alone	38	+/-36	118	+/-75	67
Other living arrangement	15	+/-27	96	+/-91	69

	Block Group 3, Census Tract 3804.02, Marion County, Indiana	Block Group 1, Census Tract 3804.04, Marion County, Indiana AC-B		Block Group 1, Census Tract 3805.01, Marion County, Indiana AC-C	
	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error
Total:	+/-389	1,348	+/-356	1,246	+/-282
Income in the past 12 months below poverty level:	+/-337	457	+/-336	224	+/-178
In family households:	+/-317	410	+/-334	166	+/-181
In married couple families:	+/-291	29	+/-42	0	+/-11
All relatives	+/-268	0	+/-11	0	+/-11
Non-relatives	+/-39	29	+/-42	0	+/-11
In other families:	+/-175	381	+/-338	166	+/-181
Male householder, no wife present:	+/-11	0	+/-11	67	+/-79
All relatives	+/-11	0	+/-11	22	+/-35
Non-relatives	+/-11	0	+/-11	45	+/-72
Female householder, no husband present:	+/-175	381	+/-338	99	+/-166
All relatives	+/-177	381	+/-338	81	+/-136
Non-relatives	+/-26	0	+/-11	18	+/-30
In non-family households and other living arrangement:	+/-129	47	+/-38	58	+/-56
Householder:	+/-44	29	+/-27	45	+/-47
Living alone	+/-37	20	+/-23	38	+/-44
Not living alone	+/-23	9	+/-13	7	+/-12
Other living arrangement	+/-105	18	+/-20	13	+/-20
Income in the past 12 months at or above poverty level:	+/-280	891	+/-224	1,022	+/-223
In family households:	+/-285	637	+/-235	786	+/-231
In married couple families:	+/-224	366	+/-175	491	+/-213
All relatives	+/-224	366	+/-175	491	+/-213
Non-relatives	+/-11	0	+/-11	0	+/-11
In other families:	+/-222	271	+/-204	295	+/-147
Male householder, no wife present:	+/-110	70	+/-92	218	+/-130
All relatives	+/-110	70	+/-92	199	+/-117
Non-relatives	+/-11	0	+/-11	19	+/-27
Female householder, no husband present:	+/-190	201	+/-172	77	+/-70
All relatives	+/-187	154	+/-165	77	+/-70
Non-relatives	+/-38	47	+/-69	0	+/-11
In non-family households and other living arrangement:	+/-128	254	+/-99	236	+/-147
Householder:	+/-90	243	+/-95	178	+/-80
Living alone	+/-65	224	+/-94	141	+/-62
Not living alone	+/-56	19	+/-22	37	+/-53
Other living arrangement	+/-54	11	+/-18	58	+/-83

	Block Group 2, Census Tract 3805.01, Marion County, Indiana AC-D		Block Group 1, Census Tract 3805.02, Marion County, Indiana AC-E		Block Group 2, Census Tract 3805.02, Marion County, Indiana not adjacent
	Estimate	Margin of Error	Estimate	Margin of Error	
Total:	1,344	+/-322	1,068	+/-287	842
Income in the past 12 months below poverty level:	394	+/-223	304	+/-151	209
In family households:	258	+/-184	113	+/-109	12
In married couple families:	180	+/-191	0	+/-11	0
All relatives	180	+/-191	0	+/-11	0
Non-relatives	0	+/-11	0	+/-11	0
In other families:	78	+/-63	113	+/-109	12
Male householder, no wife present:	28	+/-43	36	+/-59	0
All relatives	0	+/-11	36	+/-59	0
Non-relatives	28	+/-43	0	+/-11	0
Female householder, no husband present:	50	+/-50	77	+/-123	12
All relatives	50	+/-50	77	+/-123	0
Non-relatives	0	+/-11	0	+/-11	12
In non-family households and other living arrangement:	136	+/-153	191	+/-112	197
Householder:	35	+/-29	87	+/-54	46
Living alone	35	+/-29	54	+/-45	18
Not living alone	0	+/-11	33	+/-32	28
Other living arrangement	101	+/-152	104	+/-78	151
Income in the past 12 months at or above poverty level:	950	+/-236	764	+/-220	633
In family households:	691	+/-216	454	+/-217	463
In married couple families:	480	+/-207	113	+/-92	320
All relatives	480	+/-207	113	+/-92	320
Non-relatives	0	+/-11	0	+/-11	0
In other families:	211	+/-120	341	+/-189	143
Male householder, no wife present:	61	+/-53	170	+/-156	47
All relatives	61	+/-53	114	+/-109	47
Non-relatives	0	+/-11	56	+/-61	0
Female householder, no husband present:	150	+/-117	171	+/-136	96
All relatives	150	+/-117	160	+/-125	96
Non-relatives	0	+/-11	11	+/-17	0
In non-family households and other living arrangement:	259	+/-134	310	+/-129	170
Householder:	181	+/-76	250	+/-86	155
Living alone	88	+/-48	210	+/-88	134
Not living alone	93	+/-74	40	+/-39	21
Other living arrangement	78	+/-77	60	+/-93	15

	Block Group 2, Census Tract 3805.02, Marion County, Indiana	Block Group 3, Census Tract 3805.02, Marion County, Indiana		Block Group 1, Census Tract 3806, Marion County, Indiana	
		AC-F		AC-G	
	Margin of Error	Estimate	Margin of Error	Estimate	Margin of Error
Total:	+/-230	1,494	+/-270	1,847	+/-529
Income in the past 12 months below poverty level:	+/-165	154	+/-96	339	+/-198
In family households:	+/-21	41	+/-39	266	+/-197
In married couple families:	+/-11	13	+/-20	65	+/-118
All relatives	+/-11	0	+/-11	65	+/-118
Non-relatives	+/-11	13	+/-20	0	+/-11
In other families:	+/-21	28	+/-33	201	+/-165
Male householder, no wife present:	+/-11	0	+/-11	36	+/-45
All relatives	+/-11	0	+/-11	0	+/-11
Non-relatives	+/-11	0	+/-11	36	+/-45
Female householder, no husband present:	+/-21	28	+/-33	165	+/-170
All relatives	+/-11	19	+/-27	165	+/-170
Non-relatives	+/-21	9	+/-17	0	+/-11
In non-family households and other living arrangement:	+/-165	113	+/-87	73	+/-59
Householder:	+/-35	77	+/-58	51	+/-48
Living alone	+/-20	77	+/-58	51	+/-48
Not living alone	+/-29	0	+/-11	0	+/-11
Other living arrangement	+/-139	36	+/-51	22	+/-36
Income in the past 12 months at or above poverty level:	+/-190	1,340	+/-270	1,508	+/-466
In family households:	+/-205	1,077	+/-281	1,162	+/-481
In married couple families:	+/-198	632	+/-233	719	+/-384
All relatives	+/-198	632	+/-233	719	+/-384
Non-relatives	+/-11	0	+/-11	0	+/-11
In other families:	+/-92	445	+/-198	443	+/-288
Male householder, no wife present:	+/-54	250	+/-152	252	+/-263
All relatives	+/-54	228	+/-143	252	+/-263
Non-relatives	+/-11	22	+/-36	0	+/-11
Female householder, no husband present:	+/-78	195	+/-138	191	+/-161
All relatives	+/-78	188	+/-139	148	+/-145
Non-relatives	+/-11	7	+/-11	43	+/-67
In non-family households and other living arrangement:	+/-60	263	+/-86	346	+/-132
Householder:	+/-52	229	+/-71	318	+/-123
Living alone	+/-54	180	+/-68	270	+/-124
Not living alone	+/-20	49	+/-40	48	+/-39
Other living arrangement	+/-24	34	+/-33	28	+/-36

	Block Group 3, Census Tract 3806, Marion County, Indiana	
	Estimate	Margin of Error
Total:	1,975	+/-525
Income in the past 12 months below poverty level:	485	+/-388
In family households:	343	+/-386
In married couple families:	86	+/-140
All relatives	86	+/-140
Non-relatives	0	+/-11
In other families:	257	+/-332
Male householder, no wife present:	0	+/-11
All relatives	0	+/-11
Non-relatives	0	+/-11
Female householder, no husband present:	257	+/-332
All relatives	257	+/-332
Non-relatives	0	+/-11
In non-family households and other living arrangement:	142	+/-100
Householder:	17	+/-27
Living alone	17	+/-27
Not living alone	0	+/-11
Other living arrangement	125	+/-97
Income in the past 12 months at or above poverty level:	1,490	+/-458
In family households:	717	+/-291
In married couple families:	379	+/-226
All relatives	379	+/-226
Non-relatives	0	+/-11
In other families:	338	+/-235
Male householder, no wife present:	60	+/-76
All relatives	60	+/-76
Non-relatives	0	+/-11
Female householder, no husband present:	278	+/-216
All relatives	262	+/-205
Non-relatives	16	+/-29
In non-family households and other living arrangement:	773	+/-371
Householder:	491	+/-181
Living alone	296	+/-153
Not living alone	195	+/-131
Other living arrangement	282	+/-253

AC-H

Data are based on a sample and are subject to sampling variability. The degree of uncertainty for an estimate arising from sampling variability is represented through the use of a margin of error. The value shown here is the 90 percent margin of error. The margin of error can be interpreted roughly as providing a 90 percent probability that the interval defined by the estimate minus the margin of error and the estimate plus the margin of error (the lower and upper confidence bounds) contains the true value. In addition to sampling variability, the ACS estimates are subject to nonsampling error (for a discussion of nonsampling variability, see Accuracy of the Data). The effect of nonsampling error is not represented in these tables.

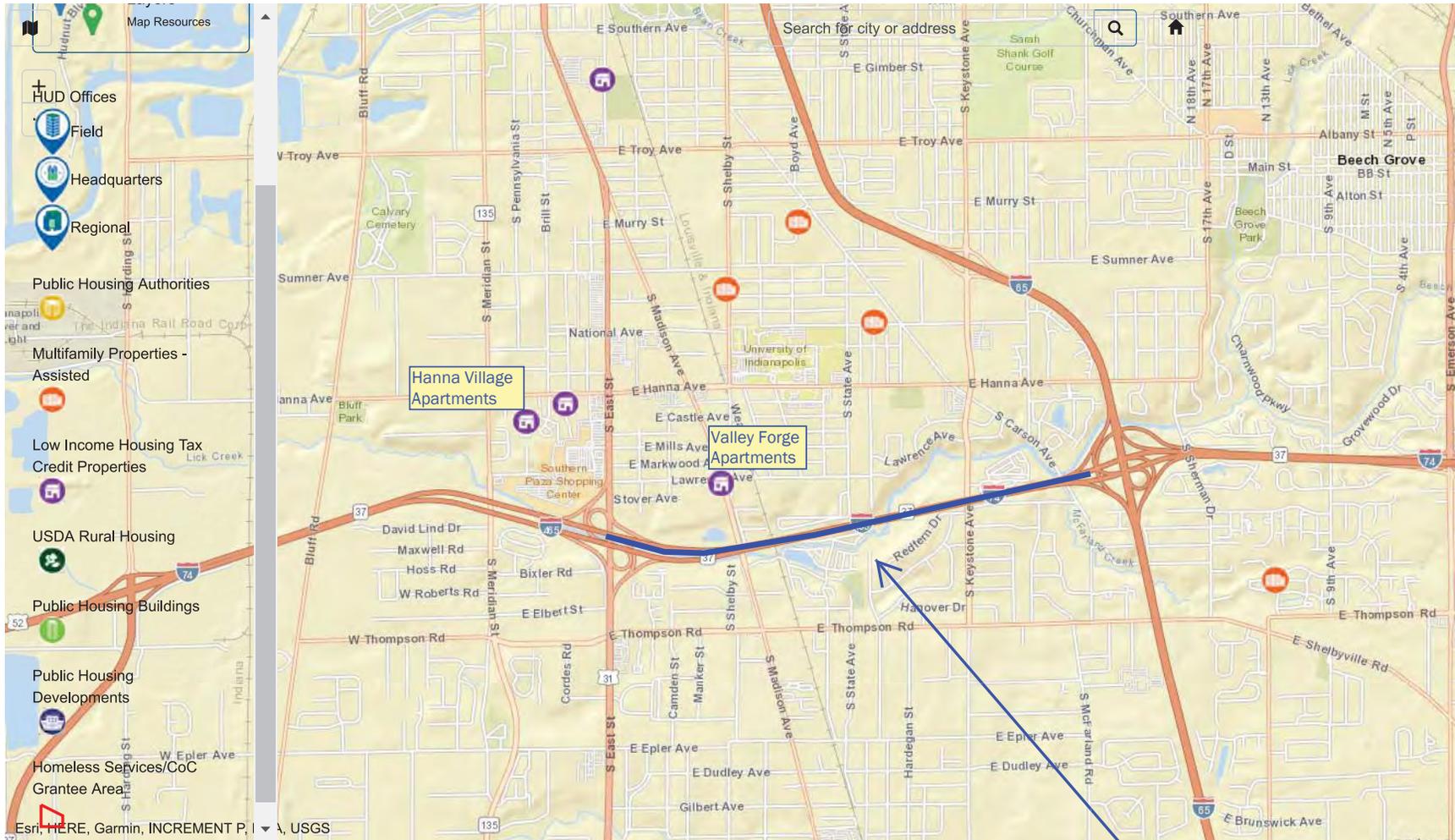
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Estimates of urban and rural populations, housing units, and characteristics reflect boundaries of urban areas defined based on Census 2010 data. As a result, data for urban and rural areas from the ACS do not necessarily reflect the results of ongoing urbanization.

Source: U.S. Census Bureau, 2013-2017 American Community Survey 5-Year Estimates

Explanation of Symbols:

1. An **** entry in the margin of error column indicates that either no sample observations or too few sample observations were available to compute a standard error and thus the margin of error. A statistical test is not appropriate.
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I-465 Reconfiguration
Project Area, Section A/B

The map interface includes a search bar at the top with the text "Search for city or address". On the left, a vertical menu lists various HUD resources: HUD Offices (Field, Headquarters, Regional), Public Housing Authorities, Multifamily Properties - Assisted, Low Income Housing Tax Credit Properties, USDA Rural Housing, Public Housing Buildings, Public Housing Developments, and Homeless Services/CoC Grantee Area. The map itself shows a network of roads including I-75, I-465, I-52, and I-67. A blue line highlights a section of I-465, with a callout box pointing to it that reads "I-465 Reconfiguration Project Area, Section C". A red circle on the map is labeled "Abbey Apartments". Other landmarks like "Buller Park Golf Course" and "Indianapolis Power and Light" are also visible.

I-465
Reconfiguration
Project Area,
Section C

Memorandum

To: Brian Shattuck, INDOT Central Office

Date: July 23, 2019

From: Dan Miller, Parsons

Des. No. 1802075

Subject: **Draft Purpose and Need Statement**
I-465 Reconfiguration Project
Marion County

The purpose of this memorandum is to present an initial draft purpose and need statement for the I-465 Reconfiguration Project to support early environmental analysis and public involvement activities. The final purpose and need statement will be part of the environmental document (Level 4 Categorical Exclusion).

BRIEF PROJECT DESCRIPTION

The Indiana Department of Transportation (INDOT) proposes an added travel lanes project on Interstate 465 (I-465) in Marion County, Indiana. The project consists of two sections: Section A/B and Section C. A Project Area Map is attached.

Section A/B begins approximately 0.3 mile west of the I-465/United States (US) 31 interchange and ends at the I-465/I-65 interchange. The proposed work for Section A/B includes building auxiliary lanes on eastbound and westbound I-465 with retaining walls, reconfiguring the eastbound I-465 to the northbound US 31 exit ramp, extending the southbound US 31 to eastbound I-465 merge area, and extending the entrance lane from southbound US 31 to eastbound I-465. The proposed work for Section A/B also includes the replacement of the Madison Avenue, Keystone Avenue, and Carson Avenue bridges. Section A/B addresses current safety and capacity issues between the I-465/US-31 interchange and terminates at the I-465/I-65 interchange, therefore it has independent utility with logical termini. **Table 3** summarizes the bridges and culverts within the project area.

Section C begins at the south end of the I-465/I-70 interchange and ends just west of the interchange with Mann Road. The proposed work for Section C includes added travel lanes along I-465, full depth pavement replacement at the shoulders, and replacement of the Mooresville Road Bypass bridge. The added travel lanes will address existing safety and capacity issues along I-465; therefore, Section C has independent utility with logical termini between the I-465/I-70 interchange and I-465/Mann Road interchange. Currently, the eastern terminus is proposed to match-up with the western terminus of the I-69 Section 6 project. However, even if Section 6 of I-69 becomes delayed or cancelled, Section C would be needed to address the existing safety and capacity issues (described below).

All work will occur within existing right-of-way. Less than one acre of temporary right-of-way may be required.

During construction, traffic will be maintained along I-465 with shoulder and lane closures. All ramps within the interchanges will primarily remain open during construction. Local roads will experience closures while the Madison Avenue, Keystone Avenue, Carson Avenue, and Mooresville Road Bypass bridges are replaced, and detours will be provided.

DRAFT PURPOSE AND NEED STATEMENT

The needs for this project are due to insufficient capacity along I-465 and safety issues that result in a high rate of crashes. Safety issues include interchange ramp lengths that do not meet current *Indiana Design Manual 2013* (revised

2019) standards. Within Section A/B, there are back-ups and accidents at the I-465 to northbound US 31 ramps, the southbound US 31 to I-465 ramp, and the southbound US 31 to eastbound I-465 entrance lane. Within Section C, there are back-ups and accidents where the eastbound I-70 to eastbound I-465 entrance lane drops, at the eastbound I-465 to State Road (SR) 67 entrance ramp, at the westbound I-465 to eastbound I-70 exit ramp, and at the westbound I-465 to SR 67 on-ramp.

Existing crash data from 2015 to 2017 within these sections of I-465 is summarized below in **Table 1**.

TABLE 1 SUMMARY OF EXISTING CRASH DATA 2015 TO 2017

SECTION	MANNER OF COLLISION				TOTAL NO. OF CRASHES	NO. OF INJURIES	NO. OF FATALITIES
	REAR END	RAN OFF ROAD	SAME DIRECTION SIDE SWIPE	OTHER			
Section A/B	92	28	59	37	216	35	2
Section C	72	19	81	26	198	21	0

Safety is evaluated using the Road Hazard Analysis Tool (RoadHAT) software. RoadHAT provides results in an Index of Crash Frequency (ICF) and Index of Crash Cost (ICC), which illustrate how the facility is performing. Per the *INDOT Design Manual 2013*, an ICF and ICC of zero or less represents average or below-average crash frequency. The results of the RoadHAT analysis provided an ICF of 1.47 and an ICC of 1.57 on Section A and an ICF of 1.68 and an ICC of 0.31 on Section C. Therefore, the project area is experiencing a higher than expected number of crashes for this type of facility. The primary types of crashes are rear end, ran off road, and same direction sideswipe. This indicates that capacity, merging, and weaving movements likely contribute to the safety issues.

The existing ramps were compared to current *Indiana Design Manual 2013* standards, which is summarized below in **Table 2**. The substandard ramp lengths cause weaving and congestion issues that negatively impact safety within the project area.

TABLE 2 SUMMARY OF INTERCHANGE RAMP LENGTH CRITERIA

RAMP	RAMP CRITERIA	LENTGH (FEET)	
		EXISTING	DESIGN STANDARD
Eastbound I-465 to Southbound US 31	Exit Ramp Deceleration Length	180	550
Southbound US 31 to Eastbound I-465	Entrance Ramp Merge Length	300	600
Westbound I-465 to SR 67	Exit Ramp Taper Length	220	300
SR 67 to Eastbound I-465	Entrance Ramp Acceleration Length	225	1,000

Source: *Indiana Design Manual 2013* (revised 2019)

Traffic capacity was analyzed for the years 2016-2017 and 2045 in terms of Levels of Service (LOS). LOS is a performance measure that represents quality of service, measured on an A – F scale, with LOS A representing a free flow of traffic and LOS F representing a breakdown in flow (e.g., start-and-stop congestion). The project area is within an urban area, therefore the minimum criteria during peak travel hours (aka rush hour) is LOS D.

The traffic capacity analysis identified substandard levels of service within the project area. For the years 2016-2017, I-465 Section A/B from US 31 to I-65 operated at LOS E¹. Along I-465 Section C, from SR 67 to Mann Road, the facility operated at LOS D.

Traffic operational issues for the year 2025 were analyzed and shown to have unacceptable LOS². The results are summarized below.

¹ I-69 Section 6 Final Environmental Impact Statement

² Memorandum from Sarah Baty and Matt Miller, HNTB to Sarah Rubin and Jim Earl, INDOT, August 10, 2017

Section A/B LOS (2025)

- Eastbound I-465 at the US 31 interchange is LOS F during the PM peak (aka rush hour).
- Eastbound I-465 between US 31 and I-65 is LOS E.
- Westbound I-465 between I-65 and US 31 is LOS F during the AM peak.

Section C LOS (2025)

- Eastbound I-465 between the I-70 entrance ramp and SR 67 is LOS F during the PM peak.
- Eastbound I-465 from SR 67 to Mann Road is LOS F during PM peak.
- Westbound I-465 is LOS F from Mann Road to SR 67 during the AM peak.

Correcting capacity issues is also needed due to the programmed I-69 Section 6 project. The I-69 Section 6 project will construct a new interchange with I-465 and added lane capacity on I-465 from just west of Mann Road to the US 31 interchange. This is expected to increase traffic volumes and worsen existing capacity issues on I-465 within the project area, which would result in potential safety issues and major operational issues.

The purpose of the I-465 Reconfiguration Project is to improve overall traffic operation within these sections of I-465 by improving level of service to at least LOS D in the design year (2045), meeting current design standards for ramp lengths, and improving safety.

ATTACHMENTS

Table 3. I-465 Reconfiguration Bridges and Culverts
Project Area Map

Attachments
intentionally omitted
to avoid duplication.