



**MID-STATES  
CORRIDOR**

# APPENDIX JJ – NOISE IMPACTS

## Mid-States Corridor Tier 1 Environmental Impact Statement

Prepared for  
Indiana Department of Transportation  
Mid-States Corridor Regional Development Authority

DECEMBER 9, 2021

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Prepared by  
Mid-States Corridor Project Consultant





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# NOISE IMPACTS

## Introduction

The following substantive changes have been made to this (section/chapter/appendix) since the Draft Environmental Impact Statement (DEIS) was published:

- During the Screening of Alternatives, preliminary **Alternative R** was evaluated before being removed from further consideration. **Alternative R** consists of upgrading US 231 from I-64 to I-69. Many comments on the DEIS requested further consideration of an upgrade of US 231 in addition to the five alternatives presented in the DEIS. In response to these comments, this FEIS further evaluates the costs, impacts and benefits of **Alternative R**. See **Section 2.5.1** for details about **Alternative R**.
- Multiple comments were received from local officials in Loogootee and Martin County about the alignment of **Alternative P** in Martin County, in particular in the vicinity of Loogootee. The DEIS showed **Alternative P** with an alignment west of Loogootee. Portions of this alignment are in Daviess County. These comments requested modifications to **Alternative P** to bring it through or to the east of Loogootee.

In response to these comments, three additional variations of **Alternative P** have been added in Martin County. All variations of **Alternative P** are within Section of Independent Utility (SIU) 4. See **Section 2.7** for a discussion of Tier 2 sections for all alternatives. **Alternative P** with these variations has been designated as **Refined Alternative P (RPA P)**. It is evaluated separately from any alternative considered in the DEIS. A single variation of **RPA P** will be selected in Tier 2 studies for SIU 4. See **Section 2.5.2** for details about the variations of **RPA P** near Loogootee.

- Potential noise impacts for the Refined Preferred Alternative P (RPA P) variations were evaluated and summarized.
- Potential noise impacts for Alternative R along US 231 were evaluated and summarized.
- Revisions have been included to correct receptors identified incorrectly.

The Mid-States Corridor project will include construction of a combination of new/upgraded multi-county transportation facility from the Ohio River north to I-69. The construction of a new facility, whether on new alignment or utilizing an upgrade of an existing facility will include changes in access and impacts to local communities. A facility of this type will alter the existing travel patterns and increase/decrease travel times.

Transportation related noise impacts are a growing concern. The transportation system within the State of Indiana continues to grow and expand to meet the economic and social needs of the State. As the population grows and economic development continues, the transportation system expands and the traffic volumes increase. The communities adjacent to these facilities will continue to be subjected to higher levels of highway-related noise. The increase in levels of highway-related noise is an environmental concern, especially in high density urban



settings and outlying urban/suburban areas where large numbers of residential properties along high volume Interstates and highways are routinely affected.

The Indiana Department of Transportation (INDOT) Traffic Noise Analysis Procedure (October 12, 2022) (“Procedure”) was utilized for the noise analysis. The analysis addresses the intents of this policy, as appropriate for a Tier 1 Environmental Impact Statement (EIS). The Procedure is INDOT’s application of Federal Highway Administration (FHWA) highway traffic and construction noise regulations. The Procedure incorporates application of FHWA standards under 23 CFR Part 772 “Procedures for Abatement of Highway Traffic Noise and Construction Noise.” FHWA recognizes the potential for such adverse off-site effects associated with Type I projects. The Mid-States Corridor qualifies as a Type I project because it: (1) proposes to either construct a highway on a new location or (2) significantly changes the vertical or horizontal alignment and/or number of through-traffic lanes of an existing highway. The INDOT/FHWA policy analyzes noise impacts, as well as reasonable and feasible mitigation, for projects with a defined location and right-of-way. INDOT has not chosen to implement a Type II program to construct noise barriers independently of added-capacity projects.

## Methodology

Typically, a highway noise study is designed to quantitatively analyze specific areas for noise impacts along one or more proposed alternatives, each of which possess a clearly defined alignment with known horizontal and vertical geometry and the occupied areas adjacent to the proposed roadway. The goal of the Tier 1 EIS study is to select a corridor to move forward to a Tier 2 EIS study. This noise analysis has been undertaken at a level appropriate to compare working alignments within alternative corridors. The Tier 2 NEPA noise analyses will further evaluate noise impacts by specifically identifying noise receptors of potential noise mitigation.

A Technical Memorandum (Memo) was provided to INDOT recommending the parameters used for the evaluation of noise impacts and comparison of those impacts by alternative for a Tier 1 level study for the Mid-States Corridor project. The Memo is shown at the conclusion of this Methodology section. It describes how the intent of the Procedure is addressed without incorporating all details required in a formal noise analysis. This comparison of alternative noise impacts is appropriate for a Tier 1 EIS. The goal is to develop noise impact analysis that is consistent with the INDOT Traffic Noise Analysis Procedure (2022) and is both accurate and at the level needed to meet the object of the noise evaluation, without all the significant details typically required in a formal noise analysis.

The purpose of the Tier 1 EIS noise impact analysis is to provide data to inform alternative selection, as such noise analyses have been undertaken at a level appropriate to compare alternatives. The analysis will be accurate and can be used for comparison of noise impacts between alternatives but will not satisfy requirements of typical INDOT noise analysis. The subsequent Tier 2 NEPA study will have an approved alignment and implement INDOT’s noise policy with regards to site-specific impacts in more detail.

The Tier 1 Level noise analysis was performed using the FHWA Traffic Noise Model (TNM) Version 2.5 software to predict noise impacts in the vicinity of highways. The noise analysis included a straight line TNM 2.5 model for every alignment disregarding horizontal curvature, the vertical component of the roadway, and terrain and utilize traffic volumes and truck percentages. Available traffic data and ADT truck percentages were used to obtain hourly heavy and medium truck volumes.



The model had no terrain lines, ground zones, tree zones, or building rows. It used simple speed, traffic volume, traffic distance, and GIS points for receptors. Receptor classification was limited to Category B and C NAC sites. Peak hourly volumes and daily traffic volumes from the traffic model was split by cars and trucks. Since a straight-line typical section was used, this type of model ignores terrain lines, tree and ground zones. The receptors were placed at-grade with the road to determine where the 66 dB(A) threshold was. That provides locations that may not be impacted due to cut and fill; but should highlight the worst-case potential for impacts.

The model was constructed to represent the typical section of the proposed roadway and utilized receptors placed at 25-foot intervals perpendicular to the roadway. The results of the model were then used to identify the distance from the edge of pavement where the model predicts future sound levels of 66 dB(A) Leq. Once the distance to the 66 dB(A) level was found for each segment along the working alignment, an ArcGIS shapefile was created demonstrating this buffer around the working alignment. All properties within that limit were then identified as potential impacts for the alternative.

Impacts were evaluated on the number of impacted receptors along each alignment. Focus was placed on the areas with concentrated impacts instead of isolated and small clusters. Noise abatement assessment for a Tier 1 type of analysis evaluated the potential of working alignment alternatives to require potential abatement using professional judgment, topography and aerial photos to identify residential areas where noise abatement might be warranted. Subsequent detailed Tier 2 studies may conclude that some of these areas do not meet the feasible and reasonableness criteria for noise barrier wall abatement and/or may reveal other areas not identified that do meet the requirements.

The noise analysis identifies locations where the proposed roadway is an intrusion adjacent to developed areas. There are five activity categories established to classify land use for the purposes of assessing noise impact and potential noise abatement. **Table 1** describes each of these categories; **Table 2** provides a listing of receptors where highway noise impacts would potentially occur near the alternatives evaluated in the DEIS. **Table 2A** provides a listing of receptors for the Refined Preferred Alternative P and Alternative R. **Table 3** provides noise impacts by alternative in each county evaluated in the DEIS. **Table 3A** provides noise impacts for the Refined Preferred Alternative P and Alternative R. **Table 4** provides noise impacts by each local improvement. **Table 5** provides noise impacts for the local improvements evaluated for the DEIS alternatives. **Table 5A** provides local improvements noise impacts for the Refined Preferred Alternative P. **Table 1** is provided as a reference in this document. It also is provided in **Section 3.10** as **Table 3.10-1**.



Attachment 1



## TECHNICAL MEMO

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**To:** Michael Grovak  
**From:** Brian Shaw – Beam, Longest and Neff, LLC  
**Cc:** Jason DuPont, David Goffinet, Kirsten Lewis  
**Date:** July 1, 2020  
**Subject:** Impact Calculations and DEIS Preparation

This technical memorandum is presented to provide recommended parameters for the evaluation of noise impacts and comparison of those impacts by alternative for a Tier I level study for the Mid-States Corridor project. The goal is to develop noise impact analysis that is consistent with the INDOT Traffic Noise Analysis Procedure (2017) and is both accurate and good enough to meet the object of the noise evaluation, without all the significant details typically required in a formal noise analysis.

### Introduction

The Mid-States corridor project will include construction of a combination of new/upgraded multi-county transportation facility from the Ohio River north to I-69. The construction of a new facility, whether on new alignment or utilizing an existing facility will include changes in access and impacts to local communities. A facility of this type will alter the existing travel patterns and increase/decrease travel times.

Transportation related noise impacts have become a growing environmental concern, especially in high density urban settings and outlying urban/suburban areas where large numbers of residential properties along high volume roadways are routinely affected. Transportation related noise related impacts are anticipated along the project corridor. The impacts are expected to be greater in the more urbanized areas within the project footprint including the cities of Bloomington, Bedford, Loogootee, Huntingburg, and Jasper.

### Agency Guidance

The Indiana Department of Transportation (INDOT) Traffic Noise Analysis Procedure (July 1, 2017) will be utilized for the noise analysis. The analysis will address the intents of this policy, as appropriate for a Tier 1 level EIS. The INDOT Traffic Noise Analysis Procedure incorporates the application of the Federal Highway Administration (FHWA) standards under 23 Code of Federal Regulations (CFR) Part 772 Procedures for Abatement of Highway Traffic Noise and Construction Noise. The FHWA recognizes the potential for impacts associated with Type I projects. The Mid States corridor qualifies as a Type I project because it: (1) proposes to either construct a highway on a new location or (2) significantly changes the vertical or horizontal alignment and/or number of through-traffic lanes of an existing highway. The INDOT/FHWA policy analyzes noise impacts, as well as reasonable and feasible mitigation, for projects with a defined location and right-of-way. The subsequent Tier 2 NEPA study will implement INDOT's noise policy with site-specific impacts.





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INDOT's 2017 INDOT Traffic Noise Analysis Procedure was developed to implement the requirements of 23 CFR 772 Part 772 Procedures for Abatement of Highway Traffic Noise and Construction Noise and the noise-related requirements of the National Environmental Policy Act of 1969 and focuses on seven principal elements:

- Definition of Impact Criteria and Identification of Noise-Sensitive Land Uses
- Determination of Existing Noise Levels
- Prediction of Future Traffic Noise Levels
- Identification of Traffic Noise Impacts
- Identification and Consideration of Abatement
- Construction Noise Analysis
- Coordination with Local Government Officials

The Tier 1 EIS assessment addresses each of the above elements at a high-level evaluation that is accurate and allows comparison of relative noise impacts of alternatives to the extent appropriate at a Tier 1 EIS level. The subsequent Tier 2 NEPA study will implement INDOT's noise policy with site specific impacts. The intent of the 2017 INDOT Traffic Noise Procedure is addressed without all the significant details typically required in a formal noise analysis.

#### **Methodology**

The goal of the Tier 1 EIS noise impact analysis is to provide data to inform alternative selection, as such noise analyses have been undertaken at a level appropriate to compare alternatives. The analysis will be accurate and can be used for comparison of noise impacts between alternatives but will not satisfy requirements of typical INDOT noise analysis. The subsequent Tier 2 NEPA study will have an approved alignment and implement INDOT's noise policy with regards to site-specific impacts in more detail.

The Mid-States Tier 1 Noise Evaluation process will construct a straight line TNM 2.5 model for every alignment disregarding the vertical component of the roadway and terrain and utilize traffic volumes and truck percentages. Available traffic data will be used and anticipate using ADT truck percentages to obtain hourly heavy and medium truck volumes.

- No terrain lines, ground zones, tree zones, or building rows,
- Simple distance speed, traffic volume, traffic distance
- Use GIS points for homes and businesses.
- Limit receptor classification to Category B and C NAC sites.
- Peak hour & daily from traffic model split by cars and truck
- Conduct random sampling of appropriate locations for ambient readings. Determine an average and apply to all rural areas for baseline number. Suburban areas may require a separate ambient background reading.

The model will be constructed to represent the typical section of the proposed roadway and will utilize receptors placed perpendicular to the roadway and then refined to identify the distance from the edge of



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pavement where the model predicts future sound levels of 66 dB(A) Leq. Once the distance to 66 dB(A), is found for each segment along the corridor, an ArcGIS shapefile will be created demonstrating this buffer around the corridor. All properties within that limit will then be identified and reported as potential impacts for the corridor.

Impacts will be evaluated on how many receptors are impacted per alignment and the number of anticipated impacted receptors along each alignment. Focus will be on the areas with concentrated impacts instead of isolated and small clusters. Potential mitigation for a Tier 1 type of analysis will compare relative potential of alternatives to require potential abatement. These locations are confined to residential areas and a table will be included that summarizes a review using professional judgment, area contours and aerial photos to identify residential areas where noise abatement potentially would be needed. Subsequent detailed Tier 2 studies may conclude that some of these areas do not meet the feasibility and reasonableness criteria for noise barrier wall abatement and/or may reveal other areas not identified that do meet the requirements.

The analysis will also include a general statement on potential noise impacts to wildlife regarding foraging and mating for an alternative that passes through a natural area has higher potential for impacts.

#### **Limitations**

The proposed Tier 1 noise analysis procedures will be sufficient for alternative comparison but not be conducted at a level of detail typically required of INDOT noise analyses. Subsequent detailed Tier 2 studies may result in conclusions dissimilar to the findings of this Tier 1 assessment. Variability in the Tier 2 analysis is possible if the alignments change to avoid significant resources such as Section 106 resources and wildlife.





**TABLE 1: FHWA NOISE ABATEMENT CRITERIA**

Activity Category	NAC Leq(h)	Activity Description
A	57 dBA (exterior)	Land 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 dBA (exterior)	Residential including single and multi-family residences (duplexes, apartments, condominiums), mobile home communities and facilities that provide long-term residential stays.
C	67 dBA (exterior)	Active sport areas, amphitheatres, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings
D	52 dBA (interior)	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios
E	72 dBA (exterior)	Hotels, motels, offices, restaurants/bars and other developed lands, properties or activities not included in Category A to D.

**TABLE 2: POTENTIALLY IMPACTED RECEPTORS BY ALTERNATIVE**

ID	USE	COUNTY	Potentially Impacted Receptors by Alternative											
			Alternative B		Alternative C		Alternative M		Alternative O		Alternative P Ew		Alternative P Ee	
			Express	Super 2	Express	Super 2	Express	Super 2	Express	Super 2	Express	Super 2	Express	Super 2
1	Residential	Dubois			X	X	X	X	X	X	X	X	X	X
2	Residential	Dubois			X	X	X	X	X	X	X	X	X	X
3	Residential	Dubois			X	X	X	X	X	X	X	X	X	X
4	Residential	Dubois	X	X										
5	Residential	Dubois			X	X	X	X	X	X	X	X	X	X
6	Residential	Dubois			X	X	X	X	X	X	X	X	X	X
7	Residential	Dubois			X	X	X	X	X	X	X	X	X	X
8	Residential	Dubois			X	X	X	X	X	X	X	X	X	X
9	Residential	Dubois			X	X	X	X	X	X	X	X	X	X
10	Residential	Dubois			X	X	X	X	X	X	X	X	X	X
11	Residential	Dubois			X	X	X	X	X	X	X	X	X	X
12	Residential	Dubois			X	X	X	X	X	X	X	X	X	X
13	Residential	Dubois			X	X	X	X	X	X	X	X	X	X
14	Residential	Dubois			X	X	X	X	X	X	X	X	X	X



ID	USE	COUNTY	Potentially Impacted Receptors by Alternative											
			Alternative B		Alternative C		Alternative M		Alternative O		Alternative P Ew		Alternative P Ee	
			Express	Super 2	Express	Super 2	Express	Super 2	Express	Super 2	Express	Super 2	Express	Super 2
15	Residential	Dubois			X	X	X	X	X	X	X	X	X	X
16	Residential	Dubois			X	X	X	X	X	X	X	X	X	X
17	Residential	Dubois			X	X	X	X	X	X	X	X	X	X
18	Residential	Dubois			X	X	X	X	X	X	X	X	X	X
19	Residential	Dubois			X	X	X	X	X	X	X	X	X	X
20	Residential	Dubois			X	X	X	X	X	X	X	X	X	X
21	Residential	Dubois			X	X	X	X	X	X	X	X	X	X
22	Residential	Dubois			X	X	X	X	X	X	X	X	X	X
23	Residential	Dubois			X	X	X	X	X	X	X	X	X	X
24	Residential	Dubois			X	X	X	X	X	X	X	X	X	X
25	Residential	Dubois			X	X	X	X	X	X	X	X	X	X
26	Residential	Dubois			X	X	X	X	X	X	X	X	X	X
27	Residential	Dubois			X	X	X	X	X	X	X	X	X	X
28	Residential	Dubois			X	X	X	X	X	X	X	X	X	X
29	Residential	Dubois			X	X	X	X	X	X	X	X	X	X
30	Residential	Dubois			X	X	X	X	X	X	X	X	X	X
31	Residential	Dubois			X	X	X	X	X	X	X	X	X	X
32	Residential	Dubois			X	X	X	X	X	X	X	X	X	X
33	Residential	Dubois			X	X	X	X	X	X	X	X	X	X
34	Residential	Dubois			X	X	X	X			X	X	X	X
35	Residential	Dubois			X	X	X	X			X	X	X	X
36	Residential	Dubois			X	X	X	X			X	X	X	X
37	Residential	Dubois			X	X	X	X			X	X	X	X
38	Residential	Dubois			X	X	X	X			X	X	X	X
58	Residential	Dubois	X	X										
59	Residential	Dubois	X	X										
60	Residential	Dubois	X	X										
61	Residential	Dubois	X	X										
62	Residential	Dubois	X	X										
63	Residential	Dubois	X	X										
64	Residential)	Dubois	X	X										
65	Residential	Dubois	X	X										
66	Residential	Dubois	X	X										



ID	USE	COUNTY	Potentially Impacted Receptors by Alternative											
			Alternative B		Alternative C		Alternative M		Alternative O		Alternative P Ew		Alternative P Ee	
			Express	Super 2	Express	Super 2	Express	Super 2	Express	Super 2	Express	Super 2	Express	Super 2
67	Residential	Dubois	X	X										
68	Residential	Dubois	X	X										
69	Residential	Dubois	X	X										
70	Residential	Dubois	X	X										
71	Residential	Dubois	X	X										
72	Residential	Dubois	X	X										
73	Residential	Dubois	X	X										
74	Residential	Dubois	X	X										
75	Residential	Dubois	X	X										
76	Residential)	Dubois	X	X										
81	Residential	Dubois	X	X										
82	Residential	Dubois	X	X										
83	Residential	Dubois	X	X										
84	Residential	Dubois	X	X										
92	Residential	Dubois							X	X				
93	Residential	Dubois							X	X				
94	Residential	Dubois							X	X				
95	Residential	Dubois							X	X				
96	Residential	Dubois							X	X				
97	Residential	Dubois							X	X				
98	Residential	Dubois							X	X				
99	Residential	Dubois							X	X				
100	Residential	Dubois							X	X				
439	Residential	Dubois			X	X	X	X	X	X	X	X	X	X
47	Residential	Daviess									X	X		
52	Residential	Daviess									X	X		
56	Residential	Daviess									X		X	
57	Residential	Daviess									X	X	X	X
77	Residential	Daviess	X	X										
78	Residential	Daviess	X											
79	Residential	Daviess	X	X										
80	Residential	Daviess	X											
85	Residential	Daviess			X									



ID	USE	COUNTY	Potentially Impacted Receptors by Alternative											
			Alternative B		Alternative C		Alternative M		Alternative O		Alternative P Ew		Alternative P Ee	
			Express	Super 2	Express	Super 2	Express	Super 2	Express	Super 2	Express	Super 2	Express	Super 2
86	Residential	Daviess			X	X								
87	Residential	Daviess			X	X								
88	Residential	Daviess			X									
89	Residential	Daviess			X	X								
90	Residential	Daviess			X	X								
91	Residential	Daviess			X	X								
39	Residential	Martin					X	X			X	X	X	X
40	Residential	Martin					X	X			X	X	X	X
41	Residential	Martin									X	X		
42	Residential	Martin									X	X		
43	Residential	Martin									X	X		
44	Residential	Martin									X	X		
45	Residential	Martin					X						X	X
46	Residential	Martin					X						X	X
48	Residential	Martin											X	X
51	Residential	Martin											X	X
53	Residential	Martin									X			
54	Residential	Martin									X	X		
55	Residential	Martin									X		X	
114	Residential	Martin					X							
121	Residential	Martin					X	X						
122	Residential	Martin					X	X						
123	Residential	Martin					X	X						
124	Residential	Martin					X	X						
690	Residential	Martin											X	
404	Hotel	Greene									X		X	
407	Residential	Greene									X		X	
101	Residential	Orange							X					
102	Residential	Orange							X	X				
103	Residential	Orange							X	X				
104	Residential	Orange							X	X				
105	Residential	Orange							X	X				
106	Residential	Orange							X	X				



ID	USE	COUNTY	Potentially Impacted Receptors by Alternative											
			Alternative B		Alternative C		Alternative M		Alternative O		Alternative P Ew		Alternative P Ee	
			Express	Super 2	Express	Super 2	Express	Super 2	Express	Super 2	Express	Super 2	Express	Super 2
107	Residential	Orange							X	X				
108	Residential	Orange							X	X				
109	Residential	Orange							X	X				
110	Residential	Orange							X	X				
111	Residential	Orange							X	X				
112	Residential	Orange							X	X				
113	Residential	Lawrence							X	X				
115	Residential	Lawrence					X	X						
116	Residential	Lawrence					X	X						
117	Residential	Lawrence					X	X						
118	Residential	Lawrence					X	X						
119	Residential	Lawrence					X							
120	Residential	Lawrence					X							

NOTE: All residential sites are single family/dwelling.

**TABLE 3: POTENTIALLY IMPACTED RECEPTORS FOR REFINED PREFERRED ALTERNATIVE P AND ALTERNATIVE R**

ID	USE	COUNTY	Alternatives							
			RPA P1		RPA P2	RPA P3		RPA P4		Alternative R
			Express	Super 2	Super 2	Express	Super 2	Express	Super 2	Super 2
1	Residential	Dubois	X	X	X	X	X	X	X	X
2	Residential	Dubois	X	X	X	X	X	X	X	X
3	Residential	Dubois	X	X	X	X	X	X	X	
5	Residential	Dubois	X	X	X	X	X	X	X	X
6	Residential	Dubois	X	X	X	X	X	X	X	X
7	Residential	Dubois	X	X	X	X	X	X	X	X
8	Residential	Dubois	X	X	X	X	X	X	X	X
9	Residential	Dubois	X	X	X	X	X	X	X	X
10	Residential	Dubois	X	X	X	X	X	X	X	X
11	Residential	Dubois	X	X	X	X	X	X	X	X
12	Residential	Dubois	X	X	X	X	X	X	X	X
13	Residential	Dubois	X	X	X	X	X	X	X	
14	Residential	Dubois	X	X	X	X	X	X	X	
15	Residential	Dubois	X	X	X	X	X	X	X	X



ID	USE	COUNTY	Alternatives							
			RPA P1		RPA P2	RPA P3		RPA P4		Alternative R
			Express	Super 2	Super 2	Express	Super 2	Express	Super 2	Super 2
16	Residential	Dubois	X	X	X	X	X	X	X	
17	Residential	Dubois	X	X	X	X	X	X	X	
18	Residential	Dubois	X	X	X	X	X	X	X	
19	Residential	Dubois	X	X	X	X	X	X	X	
20	Residential	Dubois	X	X	X	X	X	X	X	
21	Residential	Dubois	X	X	X	X	X	X	X	
22	Residential	Dubois	X	X	X	X	X	X	X	
23	Residential	Dubois	X	X	X	X	X	X	X	
24	Residential	Dubois	X	X	X	X	X	X	X	
25	Residential	Dubois	X	X	X	X	X	X	X	
26	Residential	Dubois	X	X	X	X	X	X	X	
27	Residential	Dubois	X	X	X	X	X	X	X	
28	Residential	Dubois	X	X	X	X	X	X	X	
29	Residential	Dubois	X	X	X	X	X	X	X	
30	Residential	Dubois	X	X	X	X	X	X	X	
31	Residential	Dubois	X	X	X	X	X	X	X	
32	Residential	Dubois	X	X	X	X	X	X	X	
33	Residential	Dubois	X	X	X	X	X	X	X	
34	Residential	Dubois	X	X	X	X	X	X	X	
35	Residential	Dubois	X	X	X	X	X	X	X	
36	Residential	Dubois	X	X	X	X	X	X	X	
37	Residential	Dubois	X			X		X		
38	Residential	Dubois	X	X	X	X	X	X	X	
268	Residential	Dubois								X
269	Residential	Dubois								X
270	Residential	Dubois								X
274	Residential	Dubois								X
277	Residential	Dubois								X
278	Residential	Dubois								X
279	Residential	Dubois								X
280	Residential	Dubois								X
281	Residential	Dubois								X
282	Residential	Dubois								X
283	Residential	Dubois								X



ID	USE	COUNTY	Alternatives							
			RPA P1		RPA P2	RPA P3		RPA P4		Alternative R
			Express	Super 2	Super 2	Express	Super 2	Express	Super 2	Super 2
284	Residential	Dubois								X
285	Residential	Dubois								X
286	Residential	Dubois								X
287	Residential	Dubois								X
288	Residential	Dubois								X
289	Residential	Dubois								X
290	Residential	Dubois								X
291	Residential	Dubois								X
292	Residential	Dubois								X
293	Residential	Dubois								X
294	Residential	Dubois								X
295	Residential	Dubois								X
296	Residential	Dubois								X
297	Residential	Dubois								X
298	Residential	Dubois								X
299	Residential	Dubois								X
300	Residential	Dubois								X
301	Residential	Dubois								X
302	Residential	Dubois								X
303	Residential	Dubois								X
304	Residential	Dubois								X
305	Residential	Dubois								X
306	Residential	Dubois								X
307	Residential	Dubois								X
308	Residential	Dubois								X
309	Residential	Dubois								X
310	Residential	Dubois								X
311	Residential	Dubois								X
312	Residential	Dubois								X
313	Residential	Dubois								X
314	Residential	Dubois								X
315	Residential	Dubois								X
317	Residential	Dubois								X
318	Residential	Dubois								X



ID	USE	COUNTY	Alternatives							
			RPA P1		RPA P2	RPA P3		RPA P4		Alternative R
			Express	Super 2	Super 2	Express	Super 2	Express	Super 2	Super 2
319	Residential	Dubois								X
320	Residential	Dubois								X
323	Residential	Dubois								X
324	Residential	Dubois								X
325	Residential	Dubois								X
326	Residential	Dubois								X
327	Residential	Dubois								X
328	Residential	Dubois								X
329	Residential	Dubois								X
330	Residential	Dubois								X
331	Residential	Dubois								X
332	Residential	Dubois								X
334	Residential	Dubois								X
335	Residential	Dubois								X
337	Residential	Dubois								X
338	Residential	Dubois								X
339	Residential	Dubois								X
340	Residential	Dubois								X
341	Residential	Dubois								X
342	Residential	Dubois								X
343	Residential	Dubois								X
344	Residential	Dubois								X
345	Residential	Dubois								X
346	Residential	Dubois								X
347	Residential	Dubois								X
348	Residential	Dubois								X
349	Residential	Dubois								X
350	Residential	Dubois								X
351	Residential	Dubois								X
352	Residential	Dubois								X
353	Residential	Dubois								X
354	Residential	Dubois								X
355	Residential	Dubois								X
356	Residential	Dubois								X





ID	USE	COUNTY	Alternatives							
			RPA P1		RPA P2	RPA P3		RPA P4		Alternative R
			Express	Super 2	Super 2	Express	Super 2	Express	Super 2	Super 2
357	Residential	Dubois								X
358	Residential	Dubois								X
359	Residential	Dubois								X
360	Residential	Dubois								X
361	Residential	Dubois								X
362	Residential	Dubois								X
363	Residential	Dubois								X
364	Residential	Dubois								X
365	Residential	Dubois								X
366	Residential	Dubois								X
367	Residential	Dubois								X
368	Residential	Dubois								X
369	Residential	Dubois								X
370	Residential	Dubois								X
371	Residential	Dubois								X
372	Residential	Dubois								X
373	Residential	Dubois								X
374	Residential	Dubois								X
375	Residential	Dubois								X
376	Residential	Dubois								X
377	Residential	Dubois								X
378	Residential	Dubois								X
379	Residential	Dubois								X
380	Residential	Dubois								X
381	Residential	Dubois								X
382	Residential	Dubois								X
383	Residential	Dubois								X
384	Residential	Dubois								X
385	Residential	Dubois								X
386	Residential	Dubois								X
387	Residential	Dubois								X
388	Residential	Dubois								X
389	Residential	Dubois								X
390	Residential	Dubois								X



ID	USE	COUNTY	Alternatives							
			RPA P1		RPA P2	RPA P3		RPA P4		Alternative R
			Express	Super 2	Super 2	Express	Super 2	Express	Super 2	Super 2
391	Religious Institution	Dubois								X
392	Residential	Dubois								X
393	Residential	Dubois								X
394	Residential	Dubois								X
395	Residential	Dubois								X
396	Residential	Dubois								X
397	Residential	Dubois								X
398	Residential	Dubois								X
399	Residential	Dubois								X
400	Residential	Dubois								X
439	Residential	Dubois	X	X	X	X	X	X	X	X
440	Residential	Dubois								X
441	Residential	Dubois								X
442	Residential	Dubois								X
443	Residential	Dubois								X
444	Residential	Dubois								X
445	Residential	Dubois								X
446	Residential	Dubois								X
447	Residential	Dubois								X
448	Residential	Dubois								X
449	Residential	Dubois								X
450	Residential	Dubois								X
460	Residential	Dubois								X
461	Residential	Dubois								X
462	Residential	Dubois								X
463	Residential	Dubois								X
464	Residential	Dubois								X
465	Residential	Dubois								X
466	Residential	Dubois								X
467	Residential	Dubois								X
468	Residential	Dubois								X
469	Residential	Dubois								X
470	Cemetery	Dubois								X



ID	USE	COUNTY	Alternatives							
			RPA P1		RPA P2	RPA P3		RPA P4		Alternative R
			Express	Super 2	Super 2	Express	Super 2	Express	Super 2	Super 2
471	Residential	Dubois								X
472	Residential	Dubois								X
473	Residential	Dubois								X
474	Residential	Dubois								X
475	Residential	Dubois								X
476	Residential	Dubois								X
477	Residential	Dubois								X
478	Residential	Dubois								X
479	Residential	Dubois								X
480	Residential	Dubois								X
481	Residential	Dubois								X
482	Residential	Dubois								X
483	Residential	Dubois								X
484	Residential	Dubois								X
485	Residential	Dubois								X
487	Residential	Dubois								X
488	Residential	Dubois								X
489	Residential	Dubois								X
490	Residential	Dubois								X
491	Residential	Dubois								X
492	Residential	Dubois								X
493	Residential	Dubois								X
494	Residential	Dubois								X
495	Residential	Dubois								X
496	Residential	Dubois								X
497	Residential	Dubois								X
498	Residential	Dubois								X
499	Residential	Dubois								X
500	Residential	Dubois								X
501	Residential	Dubois								X
502	Residential	Dubois								X
503	Residential	Dubois								X
504	Residential	Dubois								X
505	Residential	Dubois								X



ID	USE	COUNTY	Alternatives							
			RPA P1		RPA P2	RPA P3		RPA P4		Alternative R
			Express	Super 2	Super 2	Express	Super 2	Express	Super 2	Super 2
506	Residential	Dubois								X
507	Residential	Dubois								X
508	Residential	Dubois								X
509	Residential	Dubois								X
510	Residential	Dubois								X
511	Residential	Dubois								X
512	Residential	Dubois								X
513	Residential	Dubois								X
514	Residential	Dubois								X
515	Residential	Dubois								X
516	Residential	Dubois								X
517	Religious Institution	Dubois								X
518	Residential	Dubois								X
519	Residential	Dubois								X
520	Residential	Dubois								X
521	Residential	Dubois								X
522	Residential	Dubois								X
523	Residential	Dubois								X
524	Religious Institution	Dubois								X
525	Residential	Dubois								X
526	Residential	Dubois								X
527	Residential	Dubois								X
528	Residential	Dubois								X
529	Residential	Dubois								X
530	Residential	Dubois								X
531	Residential	Dubois								X
532	Residential	Dubois								X
533	Residential	Dubois								X
534	Residential	Dubois								X
535	Residential	Dubois								X
536	Residential	Dubois								X
537	Residential	Dubois								X
538	Residential	Dubois								X



ID	USE	COUNTY	Alternatives							
			RPA P1		RPA P2	RPA P3		RPA P4		Alternative R
			Express	Super 2	Super 2	Express	Super 2	Express	Super 2	Super 2
539	Residential	Dubois								X
540	Residential	Dubois								X
541	Residential	Dubois								X
542	Residential	Dubois								X
543	Residential	Dubois								X
544	Residential	Dubois								X
545	Residential	Dubois								X
546	Residential	Dubois								X
547	Residential	Dubois								X
548	Residential	Dubois								X
549	Residential	Dubois								X
550	Residential	Dubois								X
551	Park	Dubois								X
552	Residential	Dubois								X
553	Residential	Dubois								X
554	Residential	Dubois								X
555	Residential	Dubois								X
556	Residential	Dubois								X
557	Residential	Dubois								X
558	Residential	Dubois								X
559	Residential	Dubois								X
560	Residential	Dubois								X
561	Residential	Dubois								X
562	Residential	Dubois								X
563	Residential	Dubois								X
564	Residential	Dubois								X
565	Residential	Dubois								X
566	Residential	Dubois								X
567	Residential	Dubois								X
568	Residential	Dubois								X
569	Residential	Dubois								X
570	Residential	Dubois								X
571	Residential	Dubois								X
572	Residential	Dubois								X



ID	USE	COUNTY	Alternatives							
			RPA P1		RPA P2	RPA P3		RPA P4		Alternative R
			Express	Super 2	Super 2	Express	Super 2	Express	Super 2	Super 2
573	Residential	Dubois								X
574	Residential	Dubois								X
575	Residential	Dubois								X
576	Residential	Dubois								X
577	Residential	Dubois								X
578	Residential	Dubois								X
579	Residential	Dubois								X
580	Residential	Dubois								X
581	Residential	Dubois								X
582	Residential	Dubois								X
583	Residential	Dubois								X
584	Residential	Dubois								X
585	Residential	Dubois								X
586	Residential	Dubois								X
587	Residential	Dubois								X
588	Residential	Dubois								X
589	Residential	Dubois								X
590	Residential	Dubois								X
591	Residential	Dubois								X
592	Residential	Dubois								X
593	Residential	Dubois								X
594	Residential	Dubois								X
595	Residential	Dubois								X
596	Residential	Dubois								X
597	Residential	Dubois								X
598	Residential	Dubois								X
599	Residential	Dubois								X
600	Residential	Dubois								X
601	Residential	Dubois								X
602	Residential	Dubois								X
603	Residential	Dubois								X
604	Residential	Dubois								X
605	Residential	Dubois								X
606	Residential	Dubois								X



ID	USE	COUNTY	Alternatives							
			RPA P1		RPA P2	RPA P3		RPA P4		Alternative R
			Express	Super 2	Super 2	Express	Super 2	Express	Super 2	Super 2
607	Residential	Dubois								X
608	Residential	Dubois								X
609	Residential	Dubois								X
610	Residential	Dubois								X
611	Residential	Dubois								X
612	Residential	Dubois								X
613	Residential	Dubois								X
706	Funeral home	Dubois								X
707	Residential	Dubois								X
708	Residential	Dubois								X
709	Residential	Dubois								X
710	Residential	Dubois								X
711	Residential	Dubois								X
713	Residential	Dubois								X
714	Residential	Dubois								X
715	Residential	Dubois								X
716	Residential	Dubois								X
717	Residential	Dubois								X
47	Residential	Daviess	X	X						
52	Residential	Daviess	X	X						
56	Residential	Daviess	X			X		X		
57	Residential	Daviess	X	X	X	X	X	X	X	
205	Residential	Daviess								X
206	Residential	Daviess								X
207	Residential	Daviess								X
210	Residential	Daviess								X
211	Residential	Daviess								X
212	Residential	Daviess								X
214	Residential	Daviess								X
215	Residential	Daviess								X
216	Residential	Daviess								X
218	Residential	Daviess								X
220	Residential	Daviess								X



ID	USE	COUNTY	Alternatives							
			RPA P1		RPA P2	RPA P3		RPA P4		Alternative R
			Express	Super 2	Super 2	Express	Super 2	Express	Super 2	Super 2
257	Residential	Daviess								X
258	Residential	Daviess								X
259	Residential	Daviess								X
261	Residential	Daviess								X
262	Residential	Daviess								X
264	Residential	Daviess								X
267	Residential	Daviess								X
406	Residential	Daviess								X
686	Residential	Daviess								X
687	Residential	Daviess								X
39	Residential	Martin	X	X	X	X	X	X	X	
40	Residential	Martin	X	X	X	X	X	X	X	
41	Residential	Martin	X	X	X	X	X	X	X	
42	Residential	Martin	X	X	X	X	X	X	X	
43	Residential	Martin	X	X	X	X	X	X	X	
44	Residential	Martin	X	X	X	X	X	X	X	
48	Residential	Martin						X	X	
51	Residential	Martin						X	X	
53	Residential	Martin	X							
54	Residential	Martin	X	X						X
55	Residential	Martin	X			X		X		
126	Residential	Martin								X
129	Residential	Martin								X
130	Residential	Martin								X
131	Residential	Martin								X
133	Residential	Martin								X
134	Residential	Martin								X
135	Residential	Martin								X
136	Residential	Martin								X
137	Residential	Martin								X
138	Residential	Martin								X
141	Residential	Martin								X
144	Residential	Martin								X
146	Residential	Martin								X





ID	USE	COUNTY	Alternatives							
			RPA P1		RPA P2	RPA P3		RPA P4		Alternative R
			Express	Super 2	Super 2	Express	Super 2	Express	Super 2	Super 2
147	Residential	Martin								X
148	Residential	Martin								X
149	Residential	Martin								X
151	Residential	Martin								X
152	Residential	Martin								X
153	Residential	Martin								X
154	Residential	Martin								X
156	Residential	Martin								X
158	Residential	Martin								X
159	Residential	Martin								X
161	Residential	Martin								X
162	Residential	Martin								X
163	Residential	Martin								X
164	Residential	Martin								X
165	Residential	Martin								X
166	Residential	Martin								X
167	Residential	Martin								X
168	Residential	Martin								X
169	Residential	Martin								X
171	Residential	Martin								X
172	Residential	Martin								X
173	Residential	Martin								X
174	Residential	Martin								X
175	Residential	Martin								X
176	Residential	Martin								X
178	Residential	Martin								X
179	Residential	Martin								X
180	Residential	Martin								X
184	Residential	Martin								X
185	Residential	Martin								X
186	Residential	Martin								X
187	Residential	Martin								X
188	Residential	Martin								X
189	Residential	Martin								X



ID	USE	COUNTY	Alternatives							
			RPA P1		RPA P2	RPA P3		RPA P4		Alternative R
			Express	Super 2	Super 2	Express	Super 2	Express	Super 2	Super 2
190	Residential	Martin								X
191	Residential	Martin								X
192	Residential	Martin								X
193	Residential	Martin								X
194	Residential	Martin								X
195	Residential	Martin								X
196	Residential	Martin								X
197	Residential	Martin								X
198	Residential	Martin								X
201	Residential	Martin								X
202	Residential	Martin								X
203	Residential	Martin								X
221	Residential	Martin								X
222	Residential	Martin								X
223	Residential	Martin								X
225	Residential	Martin								X
227	Residential	Martin								X
228	Residential	Martin								X
230	Residential	Martin								X
231	Residential	Martin								X
238	Residential	Martin								X
239	Residential	Martin								X
240	Residential	Martin								X
241	Residential	Martin								X
244	Residential	Martin								X
245	Residential	Martin								X
246	Residential	Martin								X
247	Residential	Martin								X
248	Residential	Martin								X
250	Residential	Martin								X
251	Residential	Martin								X
252	Residential	Martin								X
253	Residential	Martin								X
254	Residential	Martin								X



ID	USE	COUNTY	Alternatives							
			RPA P1		RPA P2	RPA P3		RPA P4		Alternative R
			Express	Super 2	Super 2	Express	Super 2	Express	Super 2	Super 2
255	Residential	Martin								X
256	Residential	Martin								X
401	Residential	Martin								X
402	Residential	Martin								X
403	Residential	Martin								X
614	Residential	Martin								X
615	Residential	Martin								X
616	Residential	Martin								X
617	Residential	Martin								X
618	Residential	Martin								X
619	Residential	Martin								X
620	Residential	Martin								X
621	Residential	Martin								X
622	Residential	Martin								X
623	Residential	Martin								X
624	Residential	Martin								X
625	Residential	Martin								X
626	Residential	Martin								X
627	Residential	Martin								X
628	Residential	Martin								X
629	Residential	Martin								X
630	Residential	Martin								X
631	Residential	Martin								X
632	Residential	Martin								X
633	Residential	Martin								X
634	Residential	Martin								X
635	Residential	Martin			X					X
636	Residential	Martin			X					X
637	Religious Institution	Martin			X					X
638	Residential	Martin			X					
639	Residential	Martin			X					
640	Residential	Martin			X					X
641	Residential	Martin			X					X



ID	USE	COUNTY	Alternatives							
			RPA P1		RPA P2	RPA P3		RPA P4		Alternative R
			Express	Super 2	Super 2	Express	Super 2	Express	Super 2	Super 2
642	Residential	Martin			X					X
643	Residential	Martin			X					
644	Residential	Martin			X					
645	Residential	Martin			X					X
646	Residential	Martin			X					
647	Residential	Martin			X					
648	Residential	Martin			X					
649	Residential	Martin			X					
650	Residential	Martin			X					X
651	Residential	Martin			X					X
652	Residential	Martin			X					X
653	Residential	Martin			X					X
654	Residential	Martin			X					X
655	Residential	Martin			X					X
656	Residential	Martin			X					X
657	Residential	Martin			X					X
658	Residential	Martin			X					X
659	Residential	Martin			X					X
660	Residential	Martin			X					X
661	Residential	Martin			X					X
662	Residential	Martin			X					X
663	Residential	Martin			X					X
664	Residential	Martin			X					X
665	Residential	Martin			X					X
666	Residential	Martin			X					X
667	Residential	Martin			X					X
668	Residential	Martin			X					X
669	Residential	Martin			X					X
670	Residential	Martin			X					X
671	Residential	Martin			X					X
672	Residential	Martin			X					X
673	Residential	Martin			X					X
674	Residential	Martin			X					X
675	Residential	Martin			X					X



ID	USE	COUNTY	Alternatives								
			RPA P1		RPA P2	RPA P3		RPA P4		Alternative R	
			Express	Super 2	Super 2	Express	Super 2	Express	Super 2	Super 2	
676	Residential	Martin									X
677	Residential	Martin									X
678	Residential	Martin									X
679	Residential	Martin									X
680	Residential	Martin									X
681	Residential	Martin									X
682	Residential	Martin									X
683	Residential	Martin									X
684	Residential	Martin									X
685	Residential	Martin									X
688	Residential	Daviess						X	X		X
689	Residential	Martin						X	X		
690	Residential	Martin	X			X		X			
691	Residential	Martin				X	X				
692	Residential	Martin				X	X				
693	Residential	Martin				X	X				
694	Residential	Martin				X	X				
695	Residential	Martin				X	X				
696	Residential	Martin				X	X				
697	Residential	Martin				X	X				
698	Residential	Martin				X					
699	Residential	Martin				X	X				
700	Residential	Martin				X	X				
701	Residential	Martin				X	X				
702	Residential	Martin				X	X				
703	Residential	Martin				X	X				
704	Residential	Martin				X					
705	Residential	Martin				X	X				
712	Residential	Martin									X
718	Residential	Martin									X
719	Residential	Martin									X
404	Hotel	Greene	X			X		X			
407	Residential	Greene	X			X		X			



## Analysis

The analysis identified the number of potential receptor sites within the Category B NAC zone predicted. The Category B NAC was selected because it is routinely used to assess exterior impacts at residential properties, the most common activity category encountered. Impacts are stated as the number of potentially impacted receptors in each corridor.

To assess the relative impact of each alternative, the number of potential residential receptors within the 66 dB(A) zone was determined. For each alternative, the number of relocations identified by category is discussed. In general, the risk of noise impacts from any of the alternatives naturally increases in situations where the facility encroaches upon land in which higher densities of human occupation occur. As with most highway projects of this size and nature, single family residences will be the primary receptor class of concern with regards to NAC impact and the potential for abatement.

Because many of the alternatives involve new alignment, the location of the alignment within the corridor will be critical in determining which receptors are adversely impacted by highway noise. A simple shift in alignment of a few hundred feet or so away from a densely populated neighborhood may be all that is required to abate a potential noise impact. In other cases, it will become necessary to evaluate the cost effectiveness of noise barrier walls to attenuate noise levels at a cluster of sensitive receptors.

The 12-county study area is located in a primarily rural area of southwestern Indiana. **Table 3** summarizes the number of impacted receptors by alternative and county for Alternatives B, C, M, O, and P that were evaluated as part of the DEIS. **Table 3A** summarizes the number of impacted receptors for the Refined Preferred Alternative P (including Loogootee variations) and Alternative R along US 231. **Table 4** summarizes the number of impacted receptors by local improvement for Alternatives, B, C, M, O, and P that were evaluated as part of the DEIS. **Table 5** lists the number of impacted receptors by local improvement evaluated as part of the DEIS. **Table 5A** lists the number of impacted receptors by local improvement for the Refined Preferred Alternative P (including Loogootee variations).

**TABLE 4: POTENTIALLY IMPACTED RECEPTORS BY ALTERNATIVE**

COUNTY	Alternatives											
	B2	B3	C2	C3	M2	M3	O2	O3	P2Ew	P3Ew	P2Ee	P3Ee
Daviess	4	2	7	5	0	0	0	0	4	3	2	1
Dubois	24	24	38	38	38	38	42	42	38	38	38	38
Lawrence	0	0	0	0	6	4	1	1	0	0	0	0
Martin	0	0	0	0	9	6	0	0	9	7	8	6
Orange	0	0	0	0	0	0	12	11	0	0	0	0
Greene	0	0	0	0	0	0	0	0	2	0	2	0
<b>Total</b>	<b>28</b>	<b>26</b>	<b>45</b>	<b>43</b>	<b>53</b>	<b>48</b>	<b>55</b>	<b>54</b>	<b>53</b>	<b>48</b>	<b>50</b>	<b>45</b>



**TABLE 5: POTENTIALLY IMPACTED RECEPTORS FOR REFINED PREFERRED ALTERNATIVE P AND ALTERNATIVE R**

COUNTY	Alternative							
	RPA P1		RPA P2	RPA P3		RPA P4		R
	Express	Super 2	Super 2	Express	Super 2	Express	Super 2	Super 2
Dubois	38	37	37	38	37	38	37	310
Daviess	4	3	1	2	1	3	2	22
Martin	10	7	47	23	19	11	9	155
Greene	2	0	0	2	0	2	0	0
<b>Total</b>	<b>54</b>	<b>47</b>	<b>85</b>	<b>65</b>	<b>57</b>	<b>54</b>	<b>48</b>	<b>487</b>

**TABLE 6: NOISE IMPACTS BY LOCAL IMPROVEMENT**

Local Improvements				Potential Impact Locations
LI-#	Existing Road	Alternatives	Section	
LI-1	US 231	B, C, M, O, P, RPA P	2	4
LI-2	US 231	B, C, M, O, P, RPA P	2	6
LI-3	US 231	B, C, M, O, P, RPA P	2	0
LI-4	US 231	C, M, O, P, RPA P	2	0
LI-5	US 231	C, M, O, P, RPA P	2	14
LI-6	US 231	M, P, RPA P	3	0
LI-7	US 231	M, P, RPA P	3	4
LI-8	US 231	P, RPA P	3	0
LI-9	US 231	P, RPA P	3	5
LI-10	SR 56	B	2	9
LI-11	SR 257	B	2	5
LI-12	SR 257	B	3	8
LI-13	SR 450	M	3	2
LI-14	SR 450	M	3	2
LI-15	SR 56	O	3	2
LI-16	SR 56	O	3	1
LI-17	SR 145	O	3	1
LI-18	US 150	O	3	1



**TABLE 7: LOCAL IMPROVEMENT NOISE IMPACTS FOR ALTERNATIVE VARIATION**

Local Improvements				Receptor Information			66 dB(A) Threshold from Centerline										
LI-#*	Existing Road	Alternatives	Section	ID	Use	County	B		C		M		O		P		
							B2	B3	C2	C3	M2	M3	O2	O3	P2	P3	
LI-1	US 231	B, C, M, O, P	2	01-01	Residential	Dubois					X						
				01-02	Residential	Dubois	X	X	X	X	X	X	X	X	X	X	X
				01-03	Residential	Dubois	X	X	X	X	X	X	X	X	X	X	X
				01-04	Residential	Dubois	X	X	X	X	X	X	X				
LI-2	US 231	B, C, M, O, P	2	02-01	Residential	Dubois	X	X									
				02-02	Residential	Dubois	X	X	X	X	X	X	X	X	X	X	
				02-03	Residential	Dubois	X	X	X	X	X	X	X	X	X	X	
				02-04	Residential	Dubois	X	X	X	X	X	X	X	X	X	X	
				02-05	Residential	Dubois	X	X	X		X	X	X	X	X	X	
				02-06	Residential	Dubois	X	X	X	X	X	X	X	X	X	X	
LI-5	US 231	C, M, O, P	2	05-01	Residential	Dubois							X	X			
				05-02	Residential	Dubois			X	X	X	X	X	X	X	X	
				05-03	Residential	Dubois			X	X	X	X	X	X	X	X	
				05-04	Residential	Dubois			X	X	X	X	X	X	X	X	
				05-05	Religious Institution	Dubois								X	X		
				05-06	Residential	Dubois			X	X	X	X	X	X	X	X	
				05-07	Residential	Dubois			X	X	X	X	X	X	X	X	
				05-08	Residential	Dubois								X	X		
				05-09	Residential	Dubois			X	X	X	X	X	X	X	X	
				05-11	Residential	Dubois			X	X	X	X	X	X	X	X	
				05-12	Residential	Dubois			X	X	X	X	X	X	X	X	
				05-13	Residential	Dubois			X	X	X	X	X	X	X	X	
				05-14	Residential	Dubois								X	X		
				05-15	Residential	Dubois								X	X		
				LI-7	US 231	M, P	3	07-01	Residential	Martin						X	
07-02	Residential	Martin											X				
07-03	Residential	Martin											X				
07-04	Residential	Martin											X				
LI-9	US 231	P	3	09-01	Residential	Daviess									X	X	
				09-02	Residential	Daviess										X	X
				09-03	Residential	Daviess										X	X
				09-05	Residential	Greene										X	X
				09-06	Hotel	Greene										X	X
LI-10	SR 56	B	2	10-01	Residential	Dubois	X	X									
				10-02	Residential	Dubois	X	X									





Local Improvements				Receptor Information			66 dB(A) Threshold from Centerline									
LI-#*	Existing Road	Alternatives	Section	ID	Use	County	B		C		M		O		P	
							B2	B3	C2	C3	M2	M3	O2	O3	P2	P3
				10-03	Residential	Dubois	X	X								
				10-04	Residential	Dubois	X	X								
				10-05	Residential	Dubois	X	X								
				10-06	Residential	Dubois	X	X								
				10-07	Residential	Dubois	X	X								
				10-08	Residential	Dubois	X	X								
				10-09	Residential	Dubois	X	X								
LI-11	SR 56	B	2	11-01	Residential	Pike	X	X								
				11-02	Residential	Pike	X	X								
				11-03	Residential	Pike	X	X								
				11-04	Residential	Pike	X	X								
				11-05	Residential	Pike	X	X								
LI-12	SR 257	B	3	12-01	Residential	Daviess	X	X								
				12-02	Residential	Daviess	X	X								
				12-03	Residential	Daviess	X	X								
				12-04	Residential	Daviess	X	X								
				12-05	Residential	Daviess	X	X								
				12-06	Residential	Daviess	X	X								
				12-07	Residential	Daviess	X	X								
				12-08	Residential	Daviess	X	X								
LI-13	SR 450	M	3	13-01	Residential	Martin					X	X				
				13-02	Residential	Martin					X	X				
LI-14	SR 450	M	3	14-01	Residential	Lawrence					X	X				
				14-02	Residential	Lawrence					X	X				
LI-15	SR 56	O	3	15-01	Residential	Dubois							X	X		
				15-02	Residential	Dubois							X	X		
LI-16	SR 56	O	3	16-01	Residential	Dubois							X	X		
LI-17	SR 145	O	3	17-01	Residential	Orange							X	X		
LI-18	US 150	O	3	18-01	Residential	Orange							X	X		

\* Local Improvements 3, 4, 6 and 8 did not have any impacted receptors.



**TABLE 8: LOCAL IMPROVEMENT NOISE IMPACTS FOR REFINED PREFERRED ALTERNATIVE P VARIATIONS**

Local Improvements				Receptor Information			66 dB(A) Threshold from Centerline						
LI-#	Existing Road	Alternatives	Section	ID	Use	County	RPA P1		RPA P2	RPA P3		RPA P4	
							Express	Super 2	Super 2	Express	Super 2	Express	Super 2
LI-1	US 231	RPA P	2	01-01	Residential	Dubois							
				01-02	Residential	Dubois	X	X	X	X	X	X	X
				01-03	Residential	Dubois	X	X	X	X	X	X	X
				01-04	Residential	Dubois							
LI-2	US 231	RPA P	2	02-01	Residential	Dubois							
				02-02	Residential	Dubois	X	X	X	X	X	X	X
				02-03	Residential	Dubois	X	X	X	X	X	X	X
				02-04	Residential	Dubois	X	X	X	X	X	X	X
				02-05	Residential	Dubois	X	X	X	X	X	X	X
				02-06	Residential	Dubois	X	X	X	X	X	X	X
LI-5	US 231	RPA P	2	05-01	Residential	Dubois							
				05-02	Residential	Dubois	X	X	X	X	X	X	X
				05-03	Residential	Dubois	X	X	X	X	X	X	X
				05-04	Residential	Dubois	X	X	X	X	X	X	X
				05-05	Religious Institution	Dubois							
				05-06	Residential	Dubois	X	X	X	X	X	X	X
				05-07	Residential	Dubois	X	X	X	X	X	X	X
				05-08	Residential	Dubois							
				05-09	Residential	Dubois	X	X	X	X	X	X	X
				05-11	Residential	Dubois	X	X	X	X	X	X	X
				05-12	Residential	Dubois	X	X	X	X	X	X	X
				05-13	Residential	Dubois	X	X	X	X	X	X	X
				05-14	Residential	Dubois							
				05-15	Residential	Dubois							
LI-9	US 231	RPA P	3	09-01	Residential	Daviess	X	X	X	X	X	X	X
				09-02	Residential	Daviess	X	X	X	X	X	X	X
				09-03	Residential	Daviess	X	X	X	X	X	X	X
				09-05	Residential	Greene	X	X	X	X	X	X	X
				09-06	Hotel	Greene	X	X	X	X	X	X	X

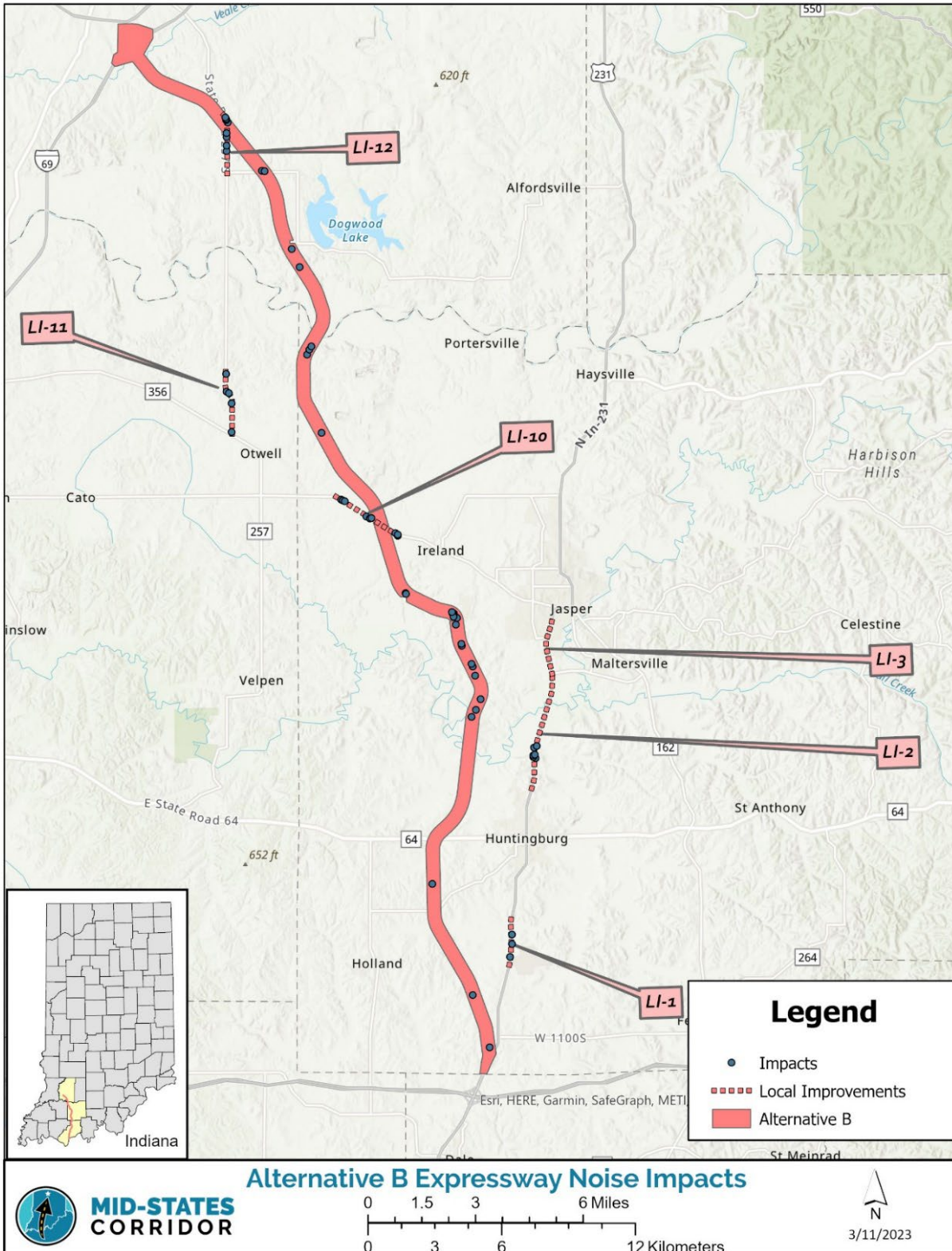


### Alternative B

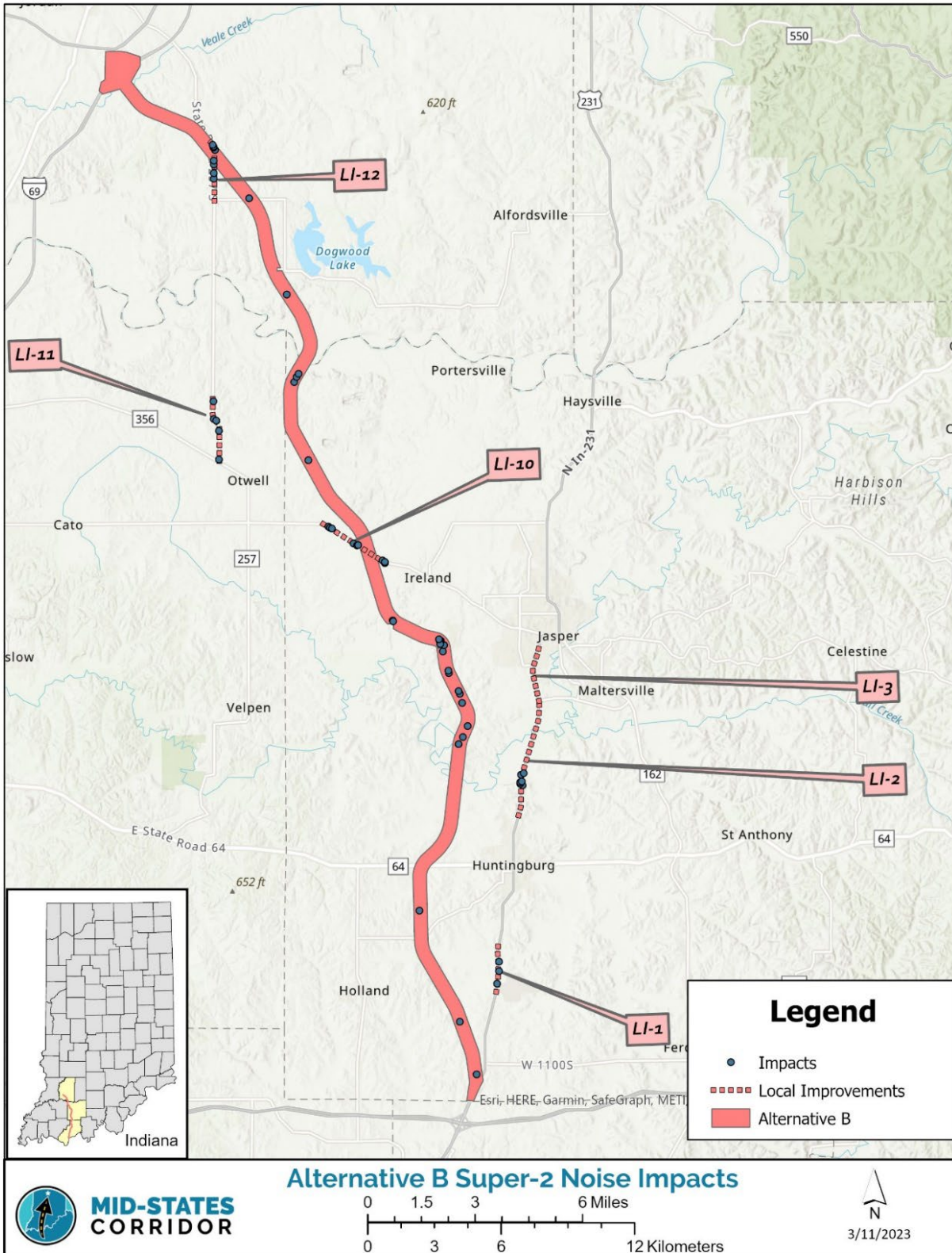
The Alternative B expressway variation, Alternative B2, splits from US 231 north of I-64 and heads northwest. Alternative B2 follows the western edge of Huntingburg and Jasper before continuing to the northwest to meet I-69 south of Washington, IN. The Super-2 variation, Alternative B3, follows the same route as Alternative B2, but it is narrower than the expressway variation. These alternatives are primarily through agricultural lands and avoid cutting through the larger communities of Jasper and Huntingburg.

Alternative B2 has a total of 28 impacted receptor locations in Dubois and Daviess Counties (**Figure 1**). Alternative B3 has a total of 26 impacted receptor locations within Dubois and Daviess Counties (**Figure 2**). There were not any significant residential high-density clusters where impacts are anticipated.

There are six different local improvements associated with the Alternative B variations. LI-1, LI-2, and LI-10 have a total of 18 impacted receptor locations within DuBois County, LI-11 has a total of five impacted receptor locations within Pike County, and LI-12 has a total of eight impacted receptor locations within Daviess County. LI-3 and LI-4 are associated with the Alternative B variations but LI-3 does not have any impacted receptors and currently LI-4 is an access management evaluation and will not impact any receptors at this time.



**FIGURE 1: ALTERNATIVE B2 NOISE IMPACTS (EXPRESSWAY)**



**FIGURE 2: ALTERNATIVE B3 NOISE IMPACTS (SUPER-2)**



### Alternative C

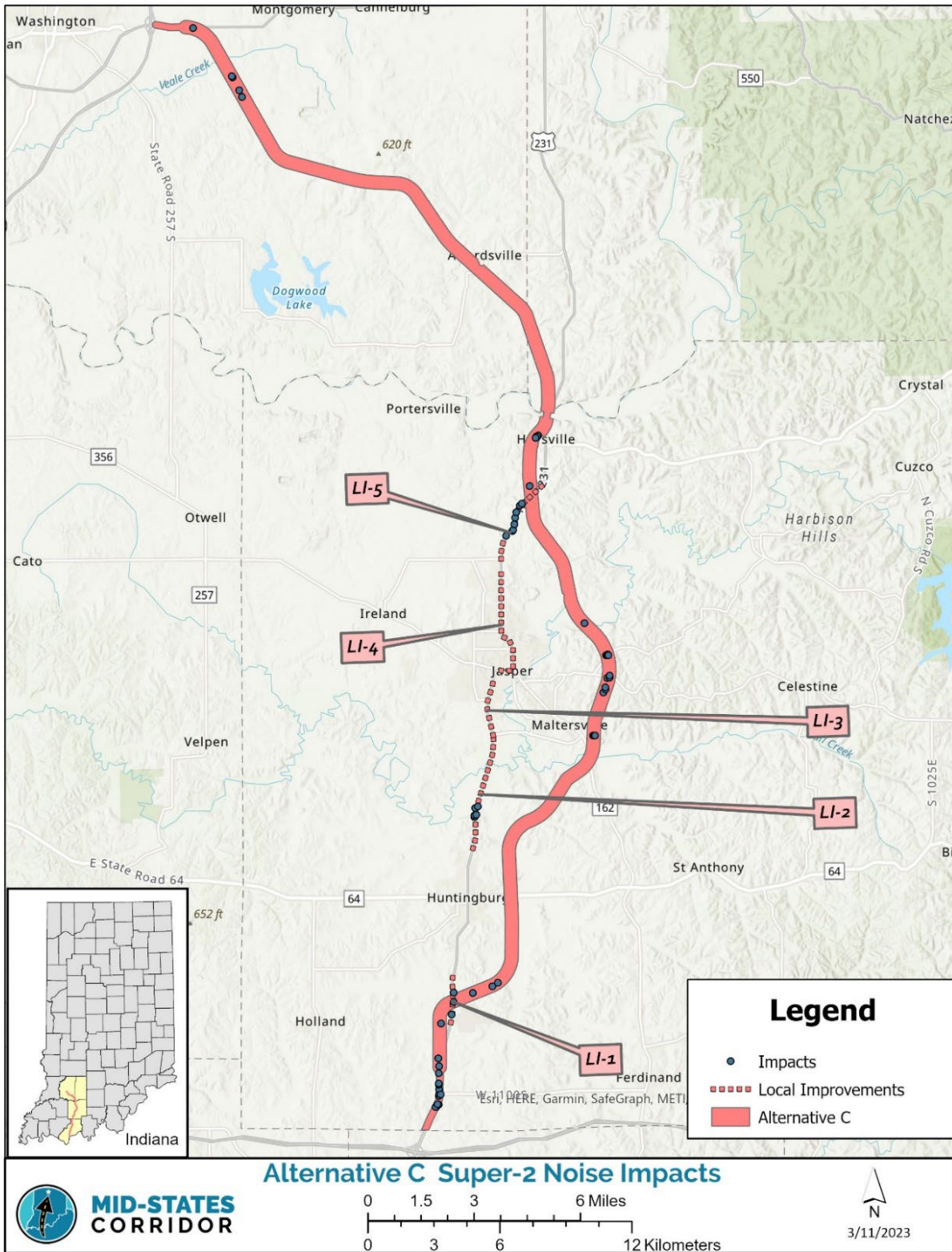
The Alternative C expressway variation, Alternative C2, begins north of I-64 along US 231 and goes east around both Huntingburg and Jasper before crossing west over US 231. After crossing US 231 and going around the western side of Haysville, Alternative C2 continues northwest, going around the southeast corner of Alfordsville and north around Corning, before ending at I-69 east of Washington, where US 150 meets I-69. The Super-2 variation, Alternative C3, follows the same route as Alternative C2, except it is narrower than the expressway variation and results in fewer possible relocations. These alternatives are primarily through agricultural and forested lands, and do not cut through larger communities in the area.

Alternative C2 has a total of 45 impacted receptor locations within Dubois and Daviess Counties (**Figure 3**). Alternative C3 has a total of 43 impacted receptor locations within Dubois and Daviess Counties (**Figure 4**). There were not any significant high density residential clusters where impacts are anticipated.

There are five different local improvements associated with the Alternative C variations. LI-1, LI-2, and LI-5 have a total of 17 impacted receptor locations within DuBois County. LI-3 and LI-4 are associated with the Alternative C variations but LI-3 does not have any impacted receptors and currently LI-4 is an access management evaluation and will not impact any receptors at this time.



**FIGURE 3: ALTERNATIVE C2 NOISE IMPACTS (EXPRESSWAY)**



**FIGURE 4: ALTERNATIVE C3 NOISE IMPACTS (SUPER-2)**



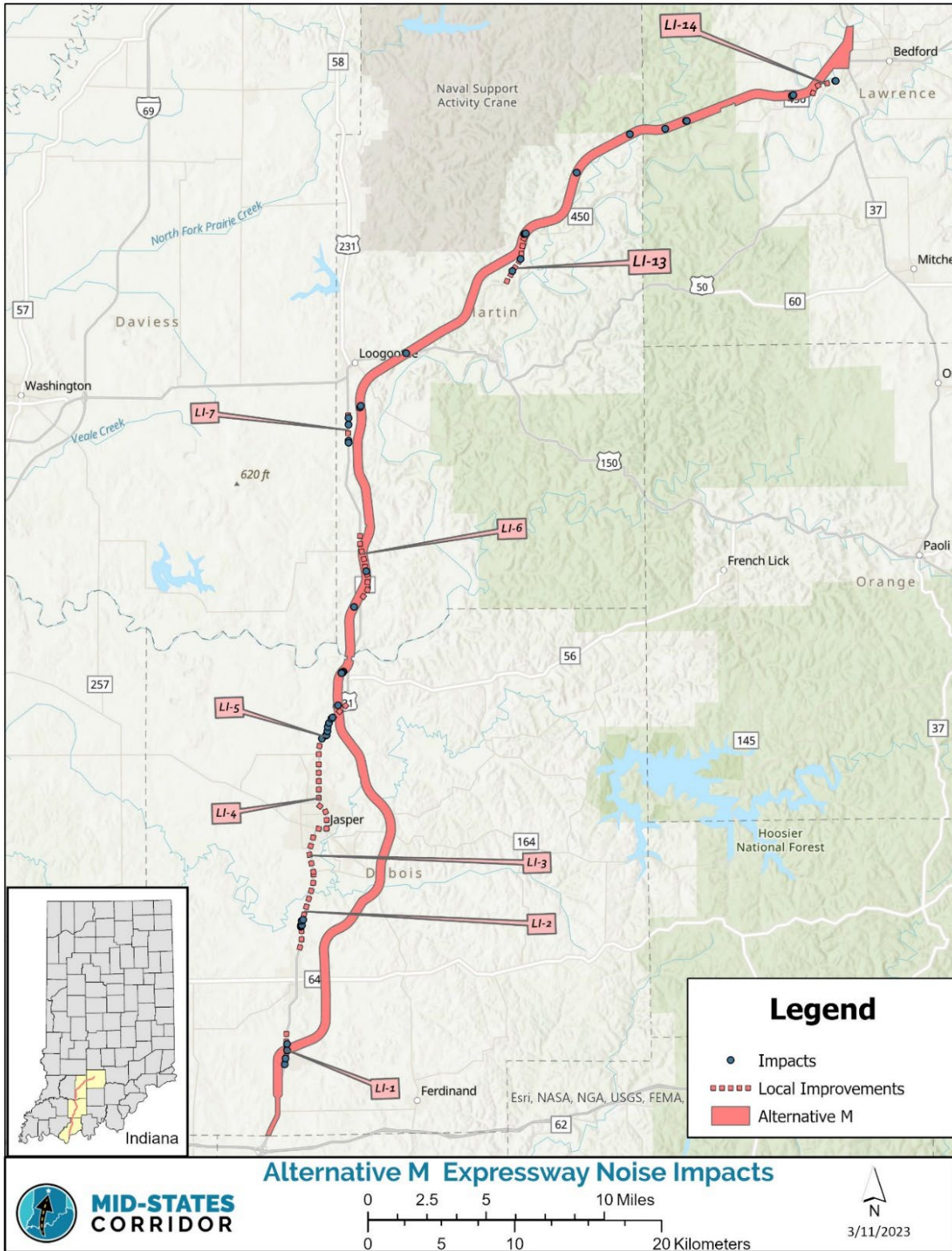


### Alternative M

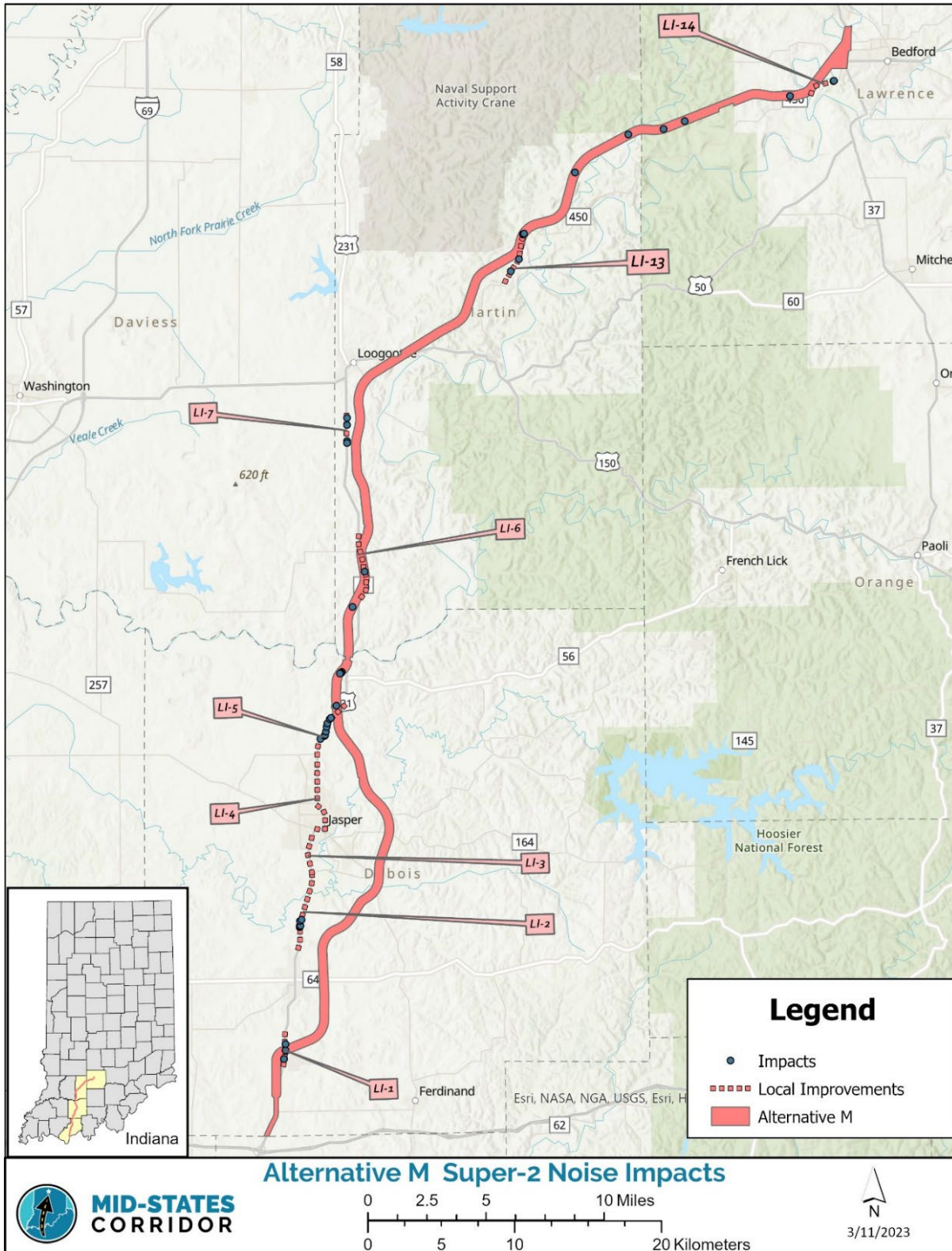
The Alternative M expressway variation, Alternative M2, begins north of I-64 along US 231 and goes east around Huntingburg and Jasper. North of Jasper, Alternative M2 crosses over US 231 and continues north, following US 231 towards Loogootee, and then heads east and parallels CR 450 before ending in Bedford. The Super-2 variation, Alternative M3, follows the same route as Alternative M2, except it is narrower than the expressway alternative and results in fewer possible relocations. Both alternatives are primarily through agricultural and forested lands, and do not cut through larger communities in the area.

Alternative M2 has a total of 53 impacted receptor locations within Dubois, Lawrence, and Martin Counties (**Figure 5**). Alternative M3 has a total of 48 impacted receptor locations within Dubois, Lawrence, and Martin counties (**Figure 6**). There were not any significant high density residential clusters where impacts are anticipated.

There are nine different local improvements associated with the Alternative M variations. L 1, LI-2, and LI-5 have a total of 18 impacted receptor locations within Dubois County. LI- 7 and LI-13 have a total of six impacted receptors within Martin County, and LI-14 has a total of two impacted receptors within Lawrence County. LI- 3, LI-4 and LI-6 are associated with the Alternative M variations but local LI-3 and LI-6 do not have any impacted receptors and currently LI-4 is an access management evaluation and will not impact any receptors at this time.



**FIGURE 5: ALTERNATIVE M2 NOISE IMPACTS (EXPRESSWAY)**



**FIGURE 6: ALTERNATIVE M3 NOISE IMPACTS (SUPER-2)**



### Alternative O

The Alternative O expressway variation, Alternative O2, begins north of I-64 along US 231 and goes east around Huntingburg and Jasper. Alternative O2 continues north and crosses SR 56 and heads east before going around the eastern edge of French Lick. After passing French Lick, this alternative heads north and ends in Mitchell. The Super-2 variation, Alternative O3, follows the same route as Alternative O2, except it is narrower than the expressway variation and results in fewer possible relocations. These alternatives are primarily through agricultural and forested lands, and do not cut through larger communities in the area.

Alternative O2 has a total of 55 impacted receptor locations within Dubois, Lawrence, and Orange Counties (**Figure 7**). Alternative O3 has a total of 53 impacted receptor locations within Dubois, Lawrence, and Orange Counties (**Figure 8**). There were not any significant high density residential clusters where impacts area anticipated.

There are nine different local improvements associated with the Alternative O variations. LI- 1, LI-2, LI-5, LI-15 and LI-16 have a total of 24 impacted receptor locations within DuBois County. LI-17 and LI-18 have a total of two impacted receptors within Orange County. LI-3 and LI-4 are associated with the Alternative M variations but LI-3 does not have any impacted receptors and currently LI-4 is an access management evaluation and will not impact any receptors at this time.

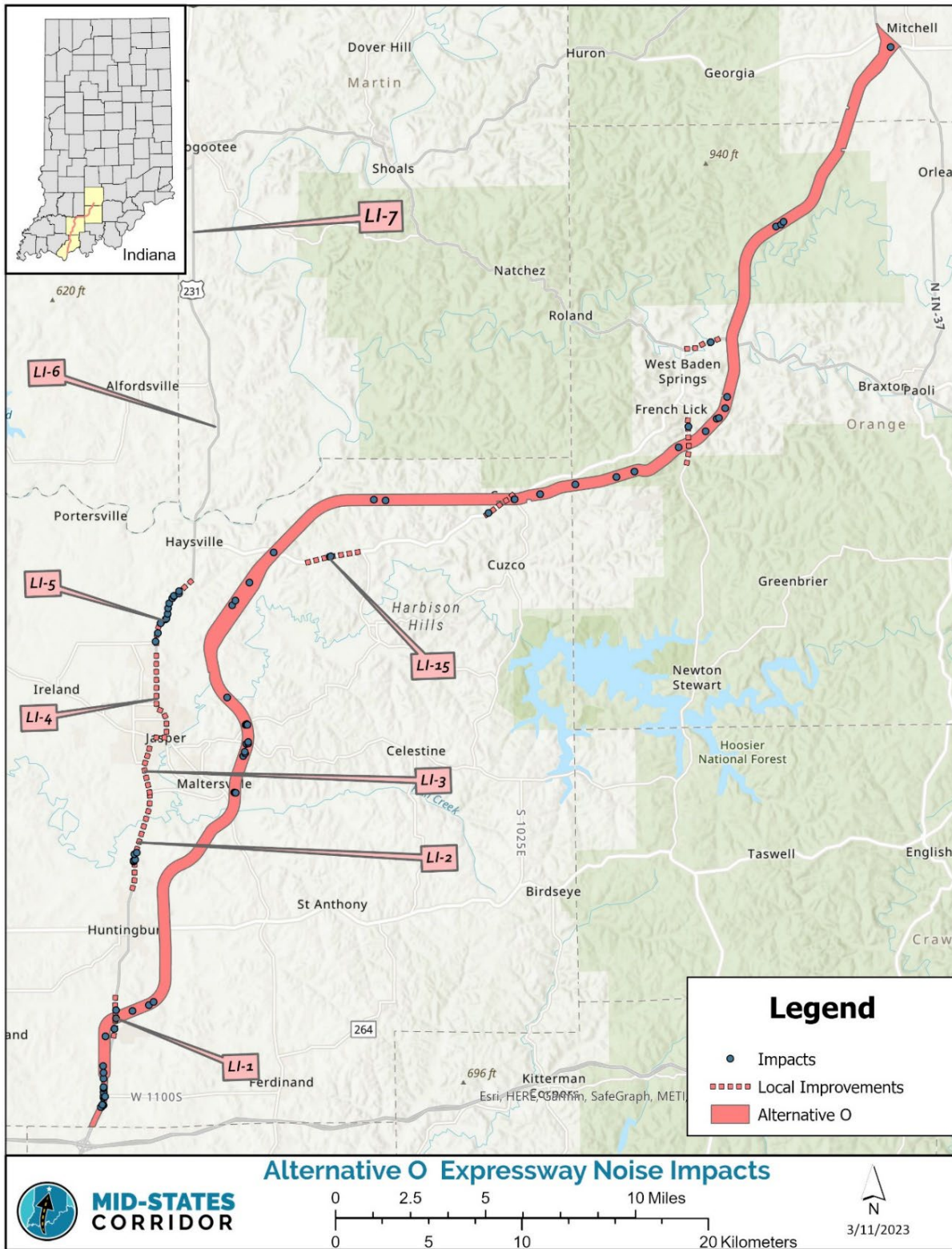
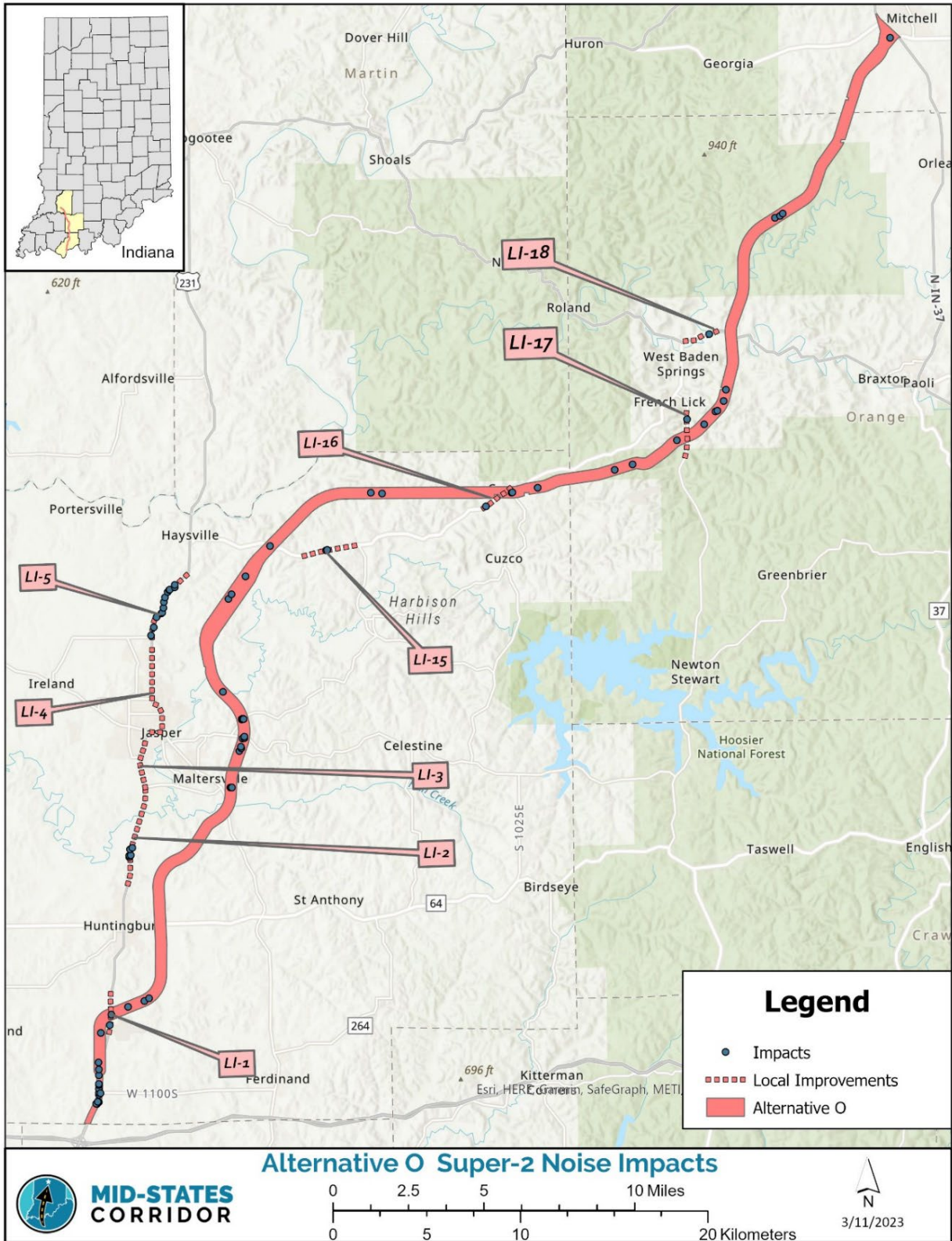


FIGURE 7: ALTERNATIVE O2 NOISE IMPACTS (EXPRESSWAY)



**FIGURE 8: ALTERNATIVE O3 NOISE IMPACTS (SUPER-2)**



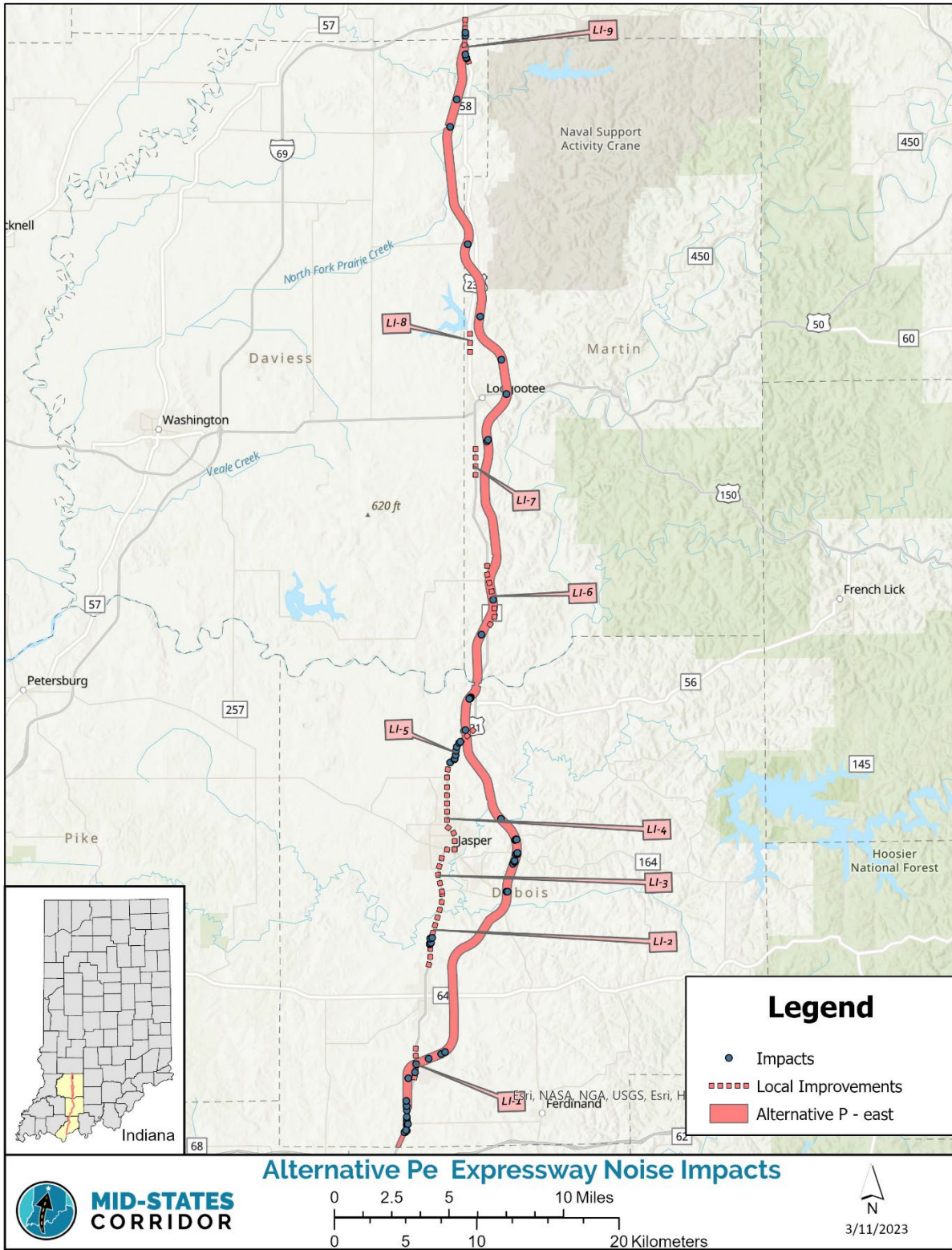
## Alternative P

Alternative P has four different alternative variations: two expressway and two Super-2. The eastern expressway and Super-2 variations, P2Ee and P3Ee respectively, begin north of I-64 along US 231, and go east around Huntingburg, Jasper, and east around Loogootee. These variations continue north, parallel to US 231, before joining with I-69 northeast of Scotland, and south of Bloomfield. The Super-2 variation, Alternative P3Ee, follows the same route as Alternative P2Ee, except it is narrower than the expressway and results in fewer possible relocations. These alternatives are primarily through agricultural and forested lands, and do not cut through larger communities in the area.

The western expressway and Super-2 variations, P2Ew and P3Ew, begin north of I-64 along US 231, and go east around Huntingburg and Jasper, but are located west around Loogootee. These variations continue north, parallel to US 231, before joining with I-69 northeast of Scotland and south of Bloomfield. The Super-2 variation follows the same route as Alternative P2Ew, except it is narrower than the expressway and results in fewer possible relocations. These alternatives are primarily through agricultural and forested lands, and do not cut through larger communities in the area.

Alternative P2Ee has a total of 50 impacted receptor locations within Daviess, Dubois, Martin, and Greene Counties (**Figure 9**). Alternative P3Ee has a total of 45 impacted receptor locations within Daviess, Dubois, and Martin Counties (**Figure 10**). Alternative P2Ew has a total of 53 impacted receptor locations within Daviess, Dubois, Martin, and Greene Counties (**Figure 11**). Alternative P3Ew has a total of 48 impacted receptor locations within Daviess, Dubois, and Martin Counties (**Figure 12**).

There are nine different local improvements associated with the Alternative P variations. LI-1, LI-2 and LI-5 have a total of 16 impacted receptor locations within DuBois County. LI-9 has a total of three impacted receptors in Daviess County and two impacted receptors in Greene County. LI-3, LI-4, LI-6, LI-7, and LI-8 are associated with the Alternative P variations but LI-3, LI-6, LI-7, and LI-8 do not have any impacted receptors and currently LI-4 is an access management evaluation and will not impact any receptors at this time.



**FIGURE 9: ALTERNATIVE P2Ee NOISE IMPACTS (EXPRESSWAY)**

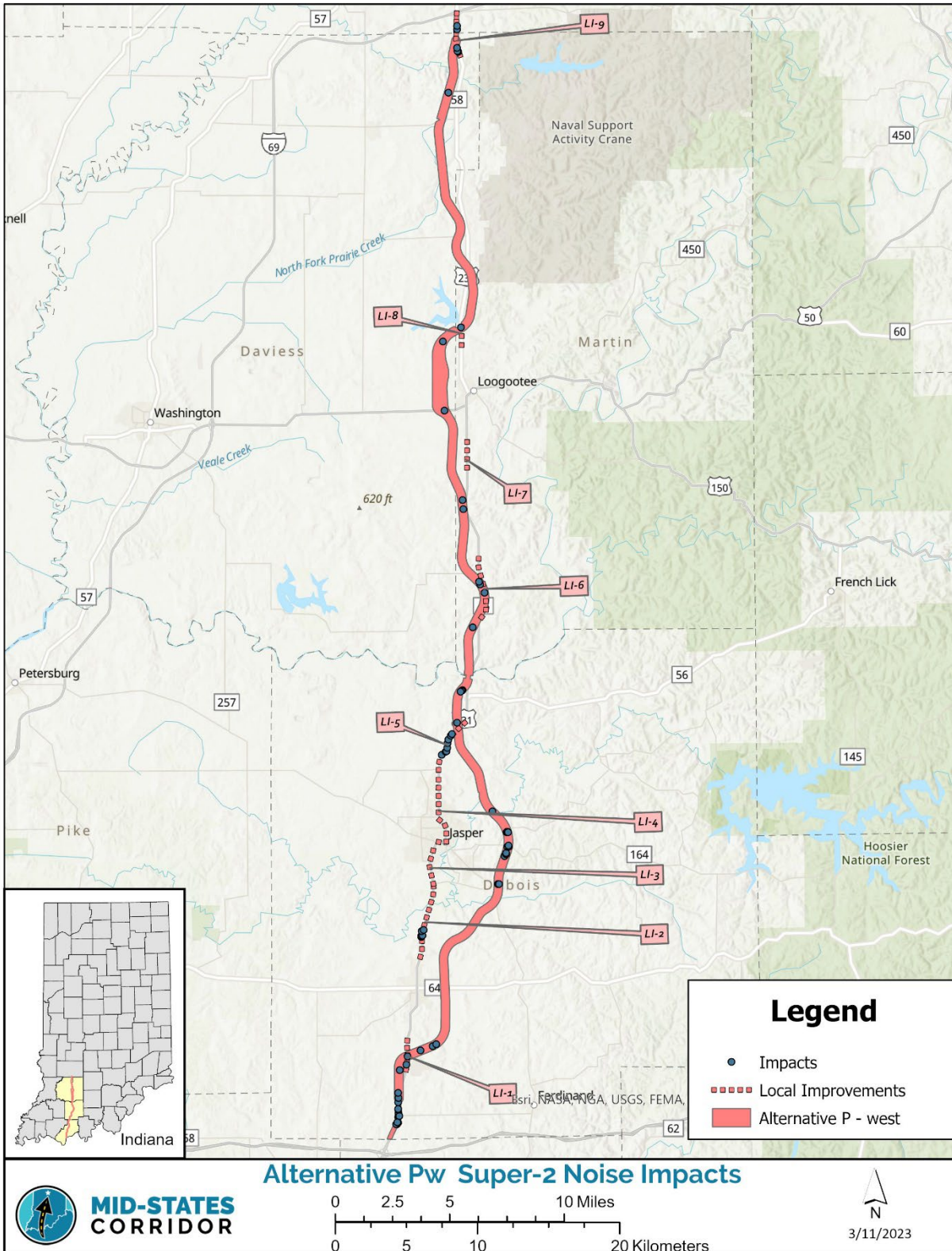




**FIGURE 10: ALTERNATIVE P3E<sub>3E</sub> NOISE IMPACTS (SUPER-2)**



**FIGURE 11: ALTERNATIVE P2EW NOISE IMPACTS (EXPRESSWAY)**



**FIGURE 12: ALTERNATIVE P3EW NOISE IMPACTS (SUPER-2)**



### Refined Preferred Alternative P

Refined Preferred Alternative P has four variations at Loogootee (RPA P1, RPA P2, RPA P3, and RPA P4). RPA P1, RPA P3, and RPA P4 each have an expressway and Super-2 facility type variation. RPA P2 through Loogootee only has the Super-2 variation. All of the Refined Preferred Alternative P alignments begin north of I-64 along US 231 and go east around Huntingburg and Jasper. At Loogootee, RPA P1 is directed to the west around the city, while RPA P3 and RPA P4 follow variations to the east, and RPA P2 follows along US 231 through Loogootee. North of Loogootee, each of these variations continue north along the same alignment parallel to US 231 before connecting to I-69 northeast of Scotland and south of Bloomfield. The Super-2 facility type has the same alignment as the expressway facility type, but the traffic data varies between the two facility types. These alternatives are primarily through agricultural and forested lands, and with the exception of RPA P2 at Loogootee, do not cut through larger communities.

RPA P1 has a total of 47 and 54 impacted receptor locations for the Super-2 and expressway facility types respectively within Dubois, Daviess, Martin, and Greene Counties (**Figures 13 and 14**). RPA P2 has a total of 85 impacted receptor locations within Dubois, Daviess, and Martin Counties (**Figure 15**). RPA P3 has a total of 57 and 65 impacted receptor locations for the Super-2 and expressway facility types respectively within Dubois, Daviess, Martin, and Greene Counties (**Figures 16 and 17**). RPA P4 has a total of 48 and 54 impacted receptor locations for the Super-2 and expressway facility types respectively within Dubois, Daviess, Martin, and Greene Counties (**Figures 18 and 19**).

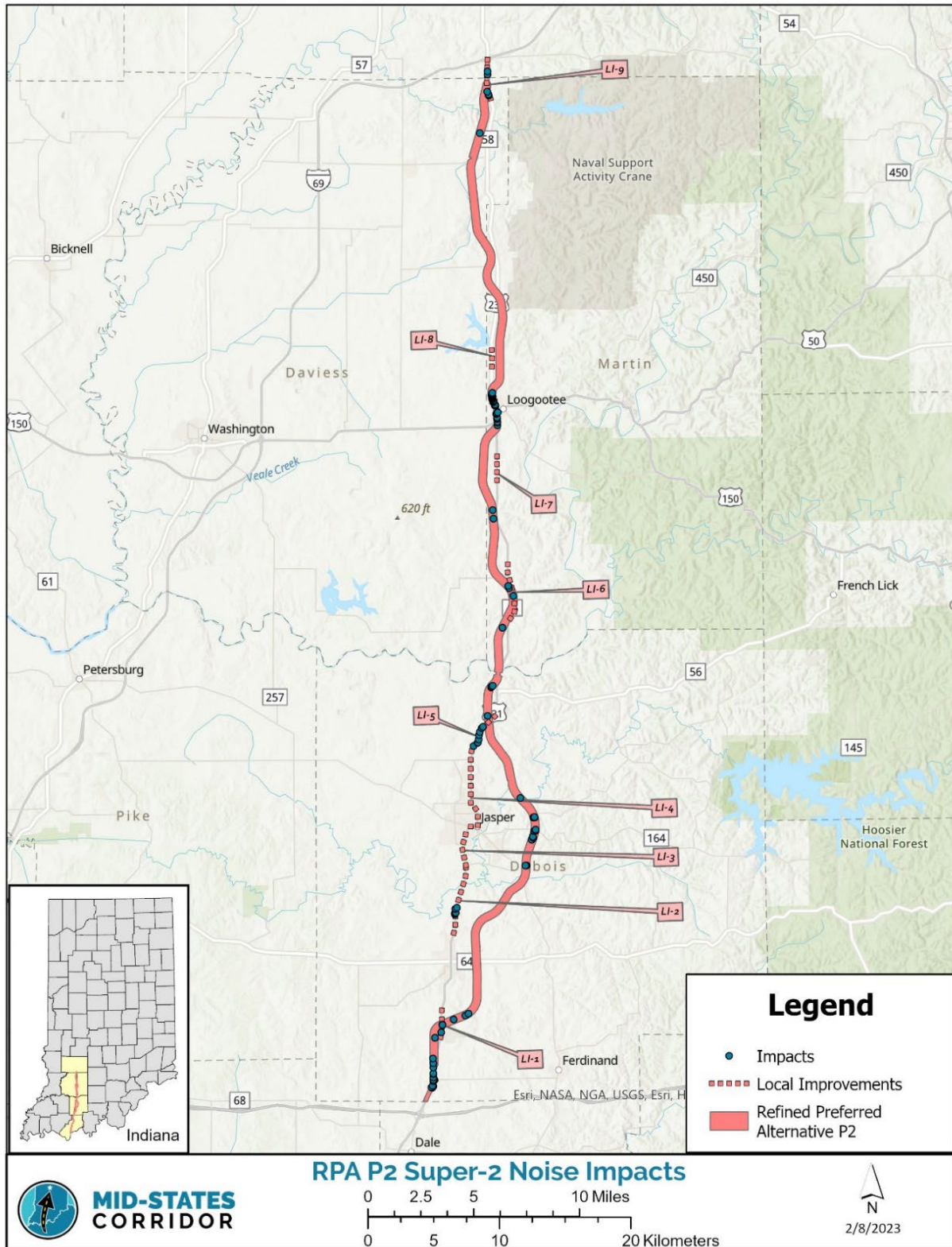
There are nine different local improvements associated with the Refined Preferred Alternative P. Noise impacts are only anticipated within LI-1, LI-2, LI-5, and LI-9. There are two impacted receptor locations for LI-1 in Dubois County. LI-2 has five impacted receptors within Dubois County. LI-5 has nine impacted receptors within Dubois County. LI-9 has five impacted receptors within Daviess and Greene Counties. One of the Greene County impacts is the Main Stay Suites/Sleepy Inn hotel along US 231 south of I-69.



**FIGURE 13 REFINED PREFERRED ALTERNATIVE P1 NOISE IMPACTS (EXPRESSWAY)**



**FIGURE 14 REFINED PREFERRED ALTERNATIVE P1 NOISE IMPACTS (SUPER-2)**

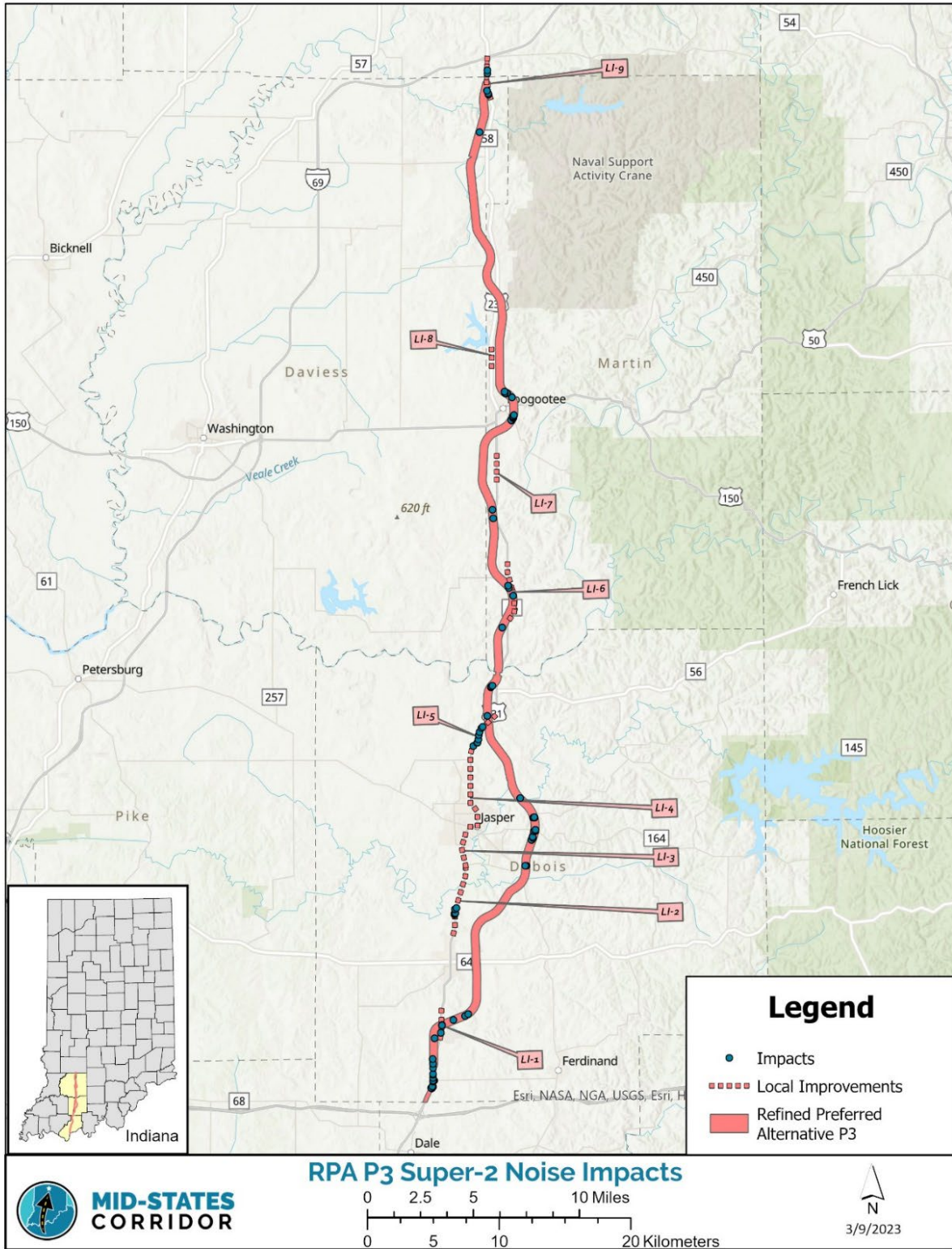


**FIGURE 15 REFINED PREFERRED ALTERNATIVE P2 NOISE IMPACTS (SUPER-2)**

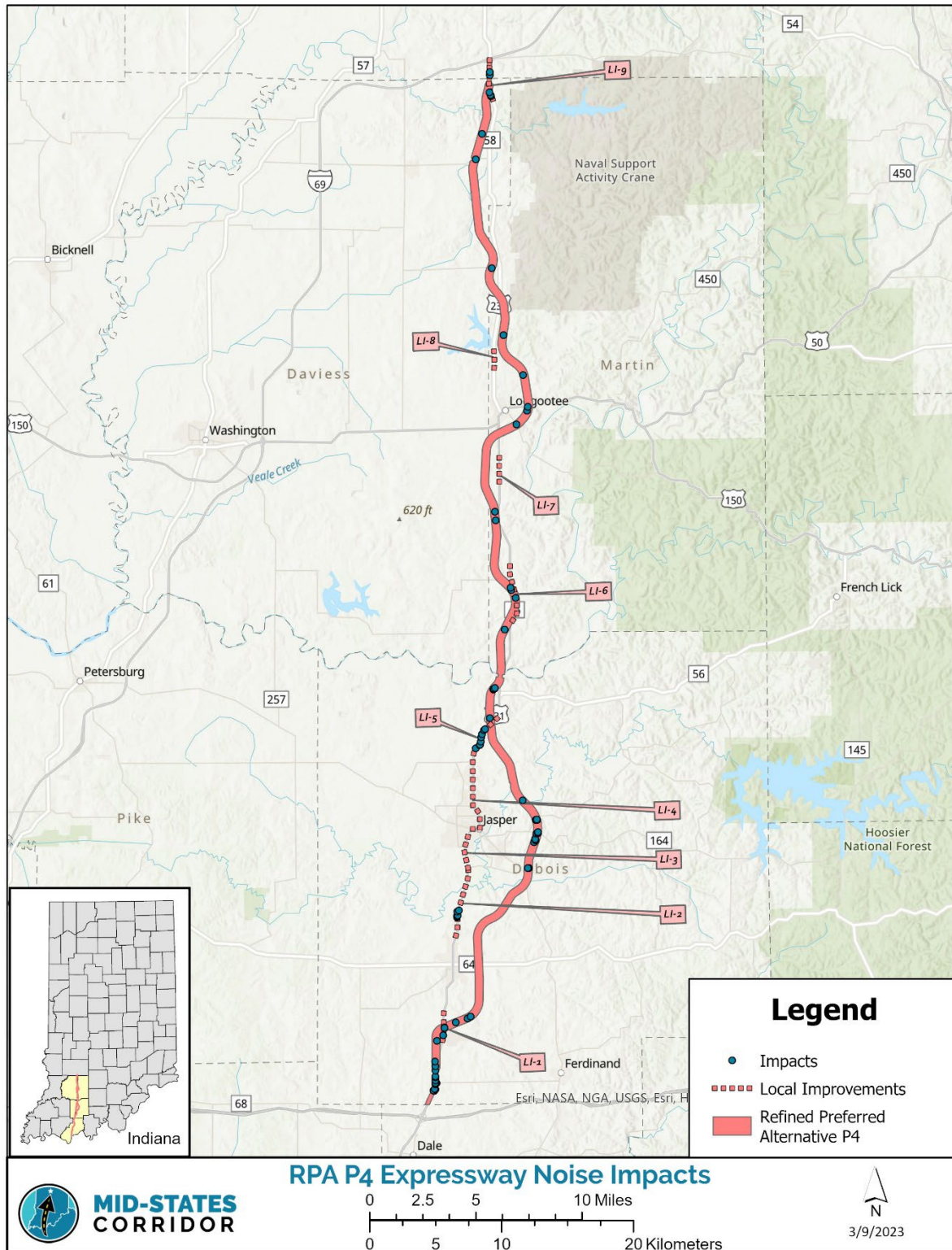


**FIGURE 16 REFINED PREFERRED ALTERNATIVE P3 NOISE IMPACTS (EXPRESSWAY)**





**FIGURE 17 REFINED PREFERRED ALTERNATIVE P3 NOISE IMPACTS (SUPER-2)**



**FIGURE 18 REFINED PREFERRED ALTERNATIVE P4 NOISE IMPACTS (EXPRESSWAY)**



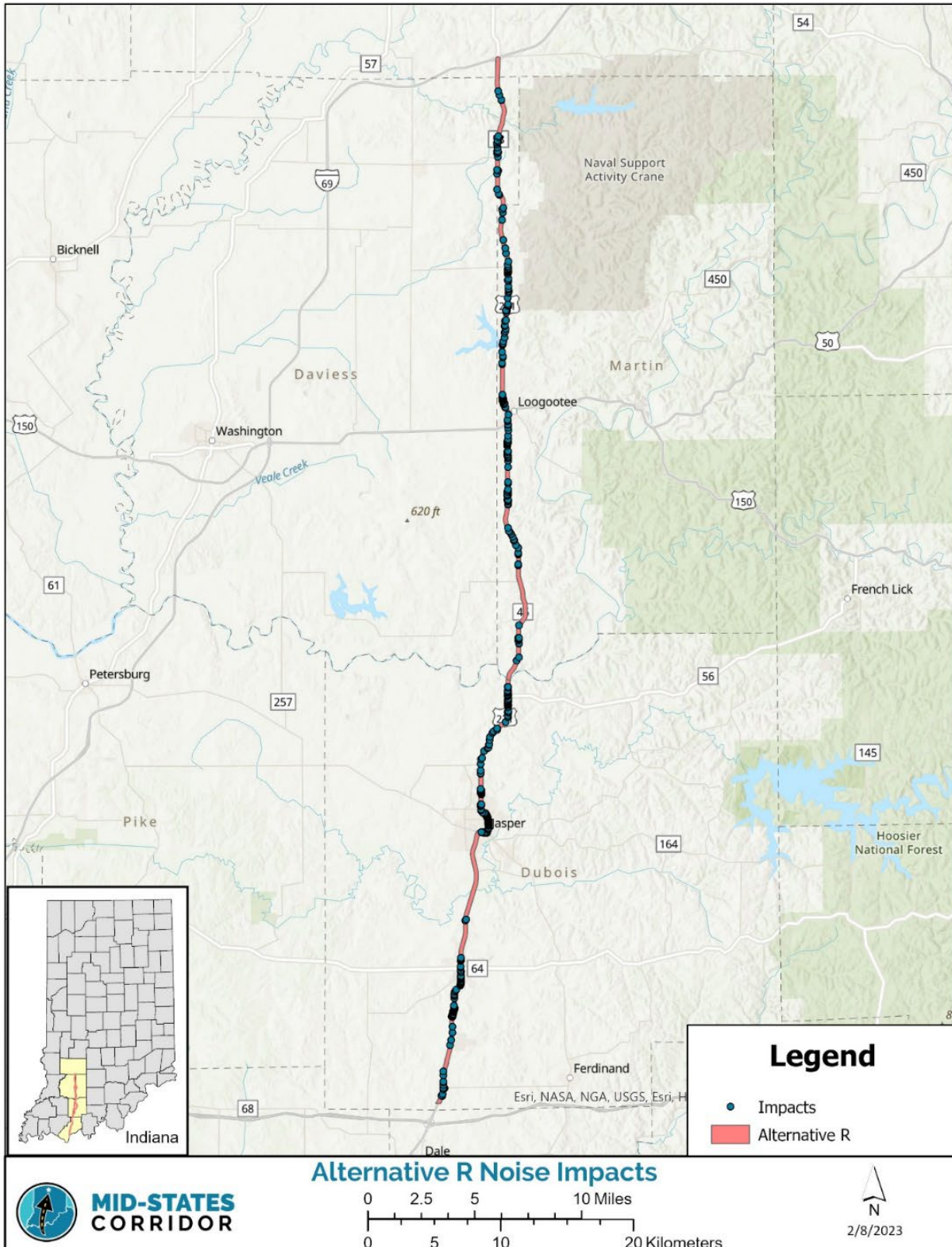
**FIGURE 19 REFINED PREFERRED ALTERNATIVE P4 NOISE IMPACTS (SUPER-2)**



## Alternative R

Alternative R follows along US 231 throughout its entire length from I-64 to I-69, including through Huntingburg, Jasper, Hayesville, and Loogootee. The Super-2 facility type is the only variation for this alternative. Due to the level of residential development along US 231 from I-64 to I-69, there would be an estimated 487 noise impacts for this alternative. The heaviest concentrations of anticipated noise impacts are within the four aforementioned cities/towns. However, smaller clusters of residences along US 231 occur throughout the rural landscape between these communities that would also be impacted.

The majority of the estimated noise impacts are in Dubois County (310 receptors), with 155 locations in Martin and 22 locations in Daviess counties (Figure 20). Since Alternative R involves upgrades to US 231 throughout its length between I-64 and I-69, there are no local improvements associated with this alternative.



**FIGURE 20 ALTERNATIVE R NOISE IMPACTS (SUPER-2)**