

Chapter 2: Alternatives Analysis

This chapter of the US 231 Relocation Study Environmental Document presents the alternatives considered for the completion of the original Proposed Relocation of US 231 between State Route (SR) 26 and US 52 in Tippecanoe County, Indiana and identifies those alternatives carried forward for detailed study in Chapter 3 (Existing Environment & Environmental Consequences) of this Environmental Document. The following information is provided in this chapter:

- History of alternatives considered;
- Range of alternatives considered;
- Screening of alternatives considered;
- Alternatives eliminated from detailed study;
- Alternatives carried forward for detailed study; and
- Final screening of alternatives.

2.1 HISTORY OF ALTERNATIVES CONSIDERED

The Proposed Relocation of US 231 and Wabash River Crossing has been described and discussed in three previous documents that involved the evaluation of alternatives that met the approved purpose and need for the overall project. Each document contains a complete discussion of alternatives developed, considered, and eliminated from or carried forward for detailed study. An annotated list of these documents is as follows:

- **1987 Draft Environmental Impact Statement for the Proposed Relocation of US 231 and Wabash River Crossing in Tippecanoe County (DEIS):** The DEIS studied three alternatives including the No-Build Alternative, Transportation System Management (TSM) plan, and a Build Alternative. The Build Alternative featured six alignments. Of the six alignments, three were southern routes to Harrison Bridge and three were northern routes from South River Road to US 52. Of the three northern routes (Lines 1, 2, and 3), Line 3 was dismissed from further consideration. Lines 1 and 2 were carried forward for detailed study.
- **1992 Final Environmental Impact Statement for the Proposed Relocation of US 231 and Wabash River Crossing in Tippecanoe County (FEIS):** The FEIS further evaluated the alternatives carried forward in the DEIS. For the southern portion of the project, Line A (and its Wabash River crossing) was identified as the preferred alternative. For the northern portion of the project, Line 1 was identified as the preferred alternative. The FEIS reaffirmed the DEIS's finding that the No-Build Alternative and the TSM plan did not meet the purpose and need of the project.

- **1992 US 231 Relocation and Wabash River Crossing - Tippecanoe County-Record of Decision (ROD):** The ROD approved the preferred alternative identified in the FEIS for the entire relocation of US 231 and Wabash River crossing in Tippecanoe County, Indiana. The ROD also discussed the rationale for the selection of the preferred alternative.

2.2 RANGE OF ALTERNATIVES CONSIDERED

Federal Highway Administration (FHWA) and Indiana Department of Transportation (INDOT) have evaluated a range of alternatives for the portion of the Proposed Relocation of US 231 project between SR 26 and US 52. This range includes the No-Build Alternative, and a Build Alternative featuring three alignments previously considered and seven newly developed alignments. Although the No-Build Alternative was dismissed in previous studies as not meeting the purpose and need of the project, the Council on Environmental Quality (CEQ) regulations governing all federal agencies specifically require analysis of a No Action (i.e., No-Build) Alternative. Therefore, while the No-Build Alternative does not achieve the purpose and need for the project, it has been defined and carried forward for comparison purposes with the Build Alternative. The project's location and definition of the Project Study Area (study area) are included in Chapter 1 of this Environmental Document.

A list of all alternatives considered is provided in Table 2-1. The cost of each alternative is preliminary and is not considered for this alternative analysis.

**Table 2-1
Alternatives Considered**

Alternative Considered	Length (miles)	Preliminary Cost Estimate¹ (In millions of dollars)
No-Build Alternative	0	NA
Build Alternative Alignments		
Original Preferred Alternative- Line 1	3.1	12.6
Line 2	2.7	10.0
Line 3	3.3	12.2
Line 4	4.3	13.0
Line 5	5.0	18.1
Line 6	6.7	24.8
Line 7	3.2	11.5
Line 8	4.2	15.2
Line 9	3.4	12.2
Line 10	4.2	12.6

Source: Michael Baker Jr., Inc. 2002.

¹ Preliminary cost estimates are based on \$960 per linear foot of roadway; approximately \$3.7 million a mile, current average construction costs and do not include ROW or utility relocations.

NA = Not Applicable

2.2.1 Development and Consideration of Environmental Constraints

Environmental constraints within the study area were initially developed from secondary data sources (e.g., aerial photography, wetlands mapping, Federal Emergency Management Agency [FEMA] Q-3 data), existing information obtained from state and local agencies, and previous environmental documents associated with the project. Detailed field studies were performed, including wetland identification, wetland delineation, stream evaluation, and other field studies associated with National Environmental Policy Act (NEPA) documentation, on the Build Alternative alignments carried forward for detailed study in this Environmental Document. Details concerning methodologies and results of field studies are found in Chapter 3 of this Environmental Document. Environmental constraints and sensitive resources presented at the January 17, 2002 Public Kick-off Meeting included:

- Residences/businesses/community facilities (existing and proposed development),
- National Wetland Inventory (NWI) wetlands,
- 100-year floodplains,
- Streams, and
- Recreational resources (trails, parks, golf courses, etc.).

Environmental resource "inventories" were compiled in a geographic information system (GIS) and laid over US Geological Survey (USGS) Digital Topographic Quadrangle mapping (1"=2000') and 1997 and 2000 digital aerial photography. These sources were incorporated to create base mapping for the development of additional Build Alternative alignments and for use in preliminary field reconnaissance. Additional information was obtained during preliminary field reconnaissance, Community Impact Assessment (CIA) development, and public involvement activities.

2.2.2 Section 4(f) of the United States Department of Transportation (USDOT) Act of 1966

Section 4(f) of the USDOT Act of 1966 includes the use (or potential use) of Section 4(f)-protected resources within the study area. Section 4(f) protected resources include public park and recreation lands, wildlife and waterfowl refuges, and historic sites. Early identification of Section 4(f) and Section 6(f) resources allows these resources to be considered, along with Natural and Community resources, as constraints to be considered during project and alignment development. Table 2-2 shows the Section 4(f) Resources located in the Project Study Area.

**Table 2-2
Section 4(f) Resources**

Name	Location	Details	Section 4(f) Resource?
Ackerman Hill Golf Course	Boilermaker Golf Complex	18-hole course	Yes
Celery Bog Nature Preserve and Lilly Nature Center	Existing Nature Park	6(f) Environmental Education, also a Section 6(f) resource	Yes
Purdue Horticulture Park	Existing Nature Park	Environmental Education	Yes
Kampen Golf Course	Birk Boilermaker Golf Complex	18-Hole golf course	Yes
Klondike Elementary and Middle Schools (recreation areas)	East side of Klondike, south of US 52	Baseball, Softball, Football, Basketball, and Playgrounds	Yes
Cattail Trail	Celery Bog Nature Area – Existing Trail along the river.	Both hike and bike	Yes
Number 10 Grange Hall	Lindberg Road	Eligible Historic Resource	Yes
Montmorenci Evangelical United Brethern Church	Main Street	Eligible Historic Resource	Yes
Montmorenci High School	650 W. Road	Eligible Historic Resource	Yes

Source: Michael Baker Jr., Inc.

Further consideration of Section 4(f) Resources as applied to the Alternative Screening Process is provided later in this Chapter.

2.2.3 Development and Consideration of Engineering Constraints

The proposed action for the US 231 Relocation Study, a four-lane divided multi-lane arterial, is being developed as a limited access urban arterial between SR 26 and US 52 in Tippecanoe County, Indiana. The required design standards used for the design of the southern portion of the project (south of SR 26) were prescribed in the 1994 and/or 2000 editions of American Association of State Highway and Transportation Officials’ (AASHTO’s) *A Policy of Geometric Design of Highways and Streets* and various INDOT design directives. Consistent with the standards of the INDOT Design Manual, additional alignments have been developed to meet the standards 4R for functional classification of roadway being urban other principle arterial at a design speed of 55 miles per hour (MPH).

The final typical sections and engineering parameters for the preferred alternative will be provided in the Engineer’s Report.

2.2.4 Additional Build Alternative Alignment Development

Three major conditions controlled the location of additional Build Alternative alignments developed:

- Avoidance or minimization, where practicable, of adverse effects to environmental resources as provided by the environmental constraint mapping; particularly residential displacements, sensitive resources such as Celery Bog, wetlands, historic properties, and cemeteries;
- Avoid or minimize use of potential Section 4(f) and Section 6(f) resources; and
- Provision for functional access, and consideration of access from existing collector roads (e.g. SR 26, Lindberg Road, US 52) to the main line of the alignment.

Reasonable alternatives to the proposed action that were considered include the No-Build Alternative, and a Build Alternative featuring 10 alignments, two of which involve upgrades to existing roadways.

2.2.5 No-Build Alternative

The No-Build Alternative for 2025 includes all of the projects within Tippecanoe County's *Transportation Plan for 2025 – Greater Lafayette Area Transportation and Development Study* (2025 Transportation Plan), with the exception of the north section of US 231 from SR 26 to US 52. The No-Build Alternative also includes the section of US 231 between South River Road and SR 26 that is undergoing final engineering design. Funds for this section of US 231 are programmed by INDOT. The probability is extremely high that this section will be constructed; therefore, it is included as part of the No-Build Alternative. Other planned improvements to the roadway network between 1999 and 2025 within the study area include:

- Widening of River Road from US 231 to SR 26 to four lanes,
- Widening of SR 26 between relocated US 231 and McCormick Road to four lanes,
- Widening of County Road (CR) 200N (Lindberg Road) between Northwestern Avenue and CR 300W (Klondike Road) to four lanes,
- Widening CR 300W (Klondike Road) from CR 200N to US 52, and
- Extending Cumberland Avenue to CR 300W (Klondike Road).

2.2.6 Build Alternative

For the Build Alternative, 10 alignments were considered (Exhibit 2-1). Of these, three correspond to alignments carried forward from the DEIS and/or FEIS. Descriptions of the alignments are as follows:

Line 1: Corresponds to Line 1 from the DEIS, which was selected as the preferred alternative for the FEIS. Beginning at SR 26, approximately 1,050 feet east of the Kankakee, Beaverville and Southern Railroad (KBS Railroad), Line 1 heads due north for approximately 800 feet turning in a northwest direction with a radius of 1,312 feet intersecting with SR 126 (Cherry Lane) extended. Access will be provided to SR 126 by means of a four-leg at-grade intersection in the vicinity of the future planned Purdue Athletic Facility. Turning north with a radius of 9,842 feet, Line 1 intersects with CR 200N (Lindberg Road) at McCormick Road. A four-leg at-grade intersection will provide access to CR 200N. Additional roadway improvements to McCormick Road will be necessary to tie McCormick Road to CR 200N. This will require two at-grade three-leg intersections approximately 400 feet to either side of the centerline of Line 1. Continuing northward for approximately one mile, Line 1 then turns east with a 1,968-foot radius, bridging the Cumberland Avenue extension and terminating at existing US 231/52 in line with Cumberland Avenue. A four-leg at-grade intersection will provide the access. The total length of Line 1 is 16,530 linear feet (approximately 3.1 miles). A 150-foot right-of-way (ROW) from the centerline with a 50-foot depressed grass median and four 12-foot travel lanes was assumed on this alignment.

Line 2: Corresponds to Line 2 from the DEIS. The southern terminus of this alignment was proposed to connect with the northern terminus of Line B (as described in the DEIS) at SR 26 and SR 526 (Airport Road). From there it heads due north, parallel and to the east of the SR 526 ROW, turns northeast with a 4,101-foot radius at 3rd Street Drive to a four-leg at-grade intersection with SR 126 (Cherry Lane) extended in the vicinity of the future planned Purdue Athletic Facility. It then heads northwest with a radius of 13,123 feet crossing CR 200N (Lindberg Road) approximately 1,570 feet east of the McCormick Road intersection. Access to CR 200N will be provided by means of a four-leg at-grade intersection. Turning with a radius of 2,624 feet, Line 2 then heads northeasterly to its termination perpendicular with existing US 231/52 at a four-leg at-grade intersection at the Cumberland Avenue intersection. The total length of Line 2 is 14,353 linear feet (approximately 2.7 miles). A 150-foot ROW from the centerline with a 50-foot depressed grass median and four 12-foot travel lanes was assumed on this alignment.

Line 3: Beginning at SR 26, approximately 800 feet east of the KBS Railroad, Line 3 heads northwest along the east side ROW of the KBS Railroad for approximately two miles, passing the SR 126 (Cherry Lane) extension and providing access by means of a three-leg at-grade intersection. Line 3 continues northeast to where it crosses CR 200N (Lindberg Road). Access to CR 200N will be provided with a four-leg at-grade intersection at the southwest corner of Wake Robin neighborhood. From there it heads north along the west edge of Wake Robin for approximately 0.5 miles where it crosses the Cumberland Avenue extension. Access is provided via four-leg at-grade intersection. It then travels due north terminating at existing US 52 between Klondike Elementary School and Brindon Woods. The total length of Line 3 is 17,368 linear feet (approximately 3.3 miles). A 150-foot ROW from the centerline with a 50-foot depressed grass median and four 12-foot travel lanes was assumed on this alignment.

Line 4: Beginning at SR 26, approximately 1,050 feet east of the KBS Railroad, Line 4 heads due north then turns northwest with a 1,640-foot radius paralleling the KBS Railroad. Access is provided to the SR 126 (Cherry Lane) extension by a three-leg intersection. Line 4 continues paralleling the KBS Railroad to where it bridges the KBS Railroad tracks and CR 200N approximately 1,160 feet east of the CR 200N and CR 300W existing intersection. Line 4 provides a dogleg connection to CR 200N near the Wake Robin and Sherwood Forest neighborhoods. It continues northwest along the western side of the KBS Railroad ROW bridging CR 300W and CR 250N. Line 4 bridges the KBS Railroad tracks once again and continues northwest crossing and providing access to CR 400W. Line 4 terminates at US 52 across from the Purdue University Agronomy Farm with a four-leg at-grade intersection. The total length of Line 4 is 22,479 linear feet (approximately 4.3 miles). A 150-foot ROW from the centerline with a 50-foot depressed grass median and four 12-foot travel lanes was assumed on this alignment.

Line 5: Beginning at SR 26, approximately 1,050 feet east of the KBS Railroad, Line 5 heads due north then turns northwest with a 1,148-foot radius bridging the KBS Railroad tracks to where it ties to the centerline of SR 26, upgrading SR 26 from a two lane facility to a four lane divided facility with a 30-foot raised grass median. Existing SR 26 will be terminated with a cul-de-sac just south of where Line 5 ties into SR 26. Line 5 continues along existing SR 26, providing access to CR 250W and CR 300W. The neighborhoods of Huntington Farms, Green Meadows, and Pine Meadows will gain access by means of CR 300W. Direct access is provided to the neighborhoods of Deer Ridge and Appleridge at the Orchards. Continuing northwest, Line 5 bridges both CR

400W and CR 200N. Access is provided with a dogleg to CR 400W. Continuing on, Line 5 passes CR 475W providing access with a four-leg at-grade intersection and improving the radii of three existing horizontal curves before turning northeast approximately 0.6 miles past the intersection of CR 475W. Line 5 then crosses CR 350N and terminates with a three-leg at-grade intersection at US 52. The total length of Line 5 is 26,453 linear feet (approximately 5.0 miles). A 75-foot ROW from the centerline with a 30-foot raised grass median and four 12-foot travel lanes was assumed on this alignment. Lines 5 and 8 utilize all or a portion of existing roadway (SR 26/Jackson Highway). The development of these two alignments uses reduced ROW to allow for the creation of access/frontage roads related to existing and proposed developments such as Huntington Farms, Green Meadows, Pine Meadows and Appleridge at the Orchards.

Line 6: Beginning at SR 26, approximately 800 feet east of the KBS Railroad, Line 6 heads northwest crossing the KBS Railroad. It then turns in a westerly direction crossing CR 250W at-grade and running along the northern edge of the Purdue University Horticulture Farm. It then crosses CR 350W at-grade, turns and heads northward for approximately 0.5 miles where it turns northwest, bridging CR 400W and crossing CR 200N at-grade. It then continues in a northwesterly direction for approximately 1.4 miles. Prior to crossing CR 600W, Line 6 turns north, crossing Jackson Highway at-grade, bridging CR 350N and Hoover Road and crossing US 52 at-grade. It then turns west and terminates at SR 53/US 231 at a three-leg intersection approximately 1,550 feet north of US 52. Access along Line 6 will be provided at four-leg intersections at SR 26, CR 250W, CR 350W, CR 200N, Jackson Highway and US 52. The total length of Line 6 is 35,389 linear feet (approximately 6.7 miles). A 150-foot ROW from the centerline with a 50-foot depressed grass median and four 12-foot travel lanes was assumed on this alignment.

Line 7: Line 7 is the alignment described in the 2025 Transportation Plan. Beginning at SR 26, approximately 1,050 feet east of the KBS Railroad, Line 7 heads in a northwesterly direction after a 1,640-foot radius for 5,500 feet (1.04 miles). Line 7 provides access to the SR 126 (Cherry Lane) extension with a three-leg at-grade intersection. Just beyond SR 126 (Cherry Lane), Line 7 turns northeast with a 1,640-foot radius and continues on for 2,500 feet (0.47 miles), at which point it turns due north with a 1,640-foot radius, crossing CR 200N (Lindberg Road) and providing access with a four-leg at-grade intersection. Line 7 then continues for 2,000 feet (0.38 miles) and ties into existing McCormick Road just northwest of the intersection with Lindberg Road. Line 7 follows McCormick Road providing access to the Cumberland Avenue extension with a four-leg at-grade intersection. Line 7 continues north terminating with

a three-leg at-grade intersection at US 52 between the neighborhoods of Brindon Woods and Pineview, providing access to both neighborhoods via frontage roads. The total length of Line 7 is 17,139 linear feet (approximately 3.2 miles). A 150-foot ROW from the centerline with a 50-foot depressed grass median and four 12-foot travel lanes was assumed on this alignment.

Line 8: Beginning at SR 26, approximately 1,050 feet east of the KBS Railroad, Line 8 heads due north turning northwest with a 1,148-foot radius. Line 8 heads northwest, bridges the KBS Railroad tracks, and ties into the centerline of SR 26, upgrading SR 26 from a two-lane facility to a four-lane divided facility with a 30-foot raised grass median. Line 8 continues along existing SR 26 for approximately 2 miles. Existing SR 26 will be terminated with a cul-de-sac just south of where Line 8 ties to SR 26. Line 8 continues along existing SR 26, providing access at CR 250W and CR 300W at three-leg intersections. The neighborhoods of Huntington Farms, Green Meadows, and Pine Meadows will gain access by means of CR 300W. Direct access is provided to the neighborhoods of Deer Ridge and Appleridge at the Orchards. CR 325W will be terminated with a cul-de-sac. Line 8 then turns northeast with a 2,952-foot radius and bridges CR 200N and CR 250N. Access will be provided to CR 250N by means of a dogleg with a T-intersection with Line 8. Line 8 then bridges the KBS Railroad and terminates at US 52 with an at-grade three-leg intersection 1,750 feet west of CR 300W. The total length of Line 8 is 21,996 linear feet (approximately 4.2 miles). A 75-foot ROW from the centerline with a 30-foot raised grass median and four 12-foot travel lanes was assumed on this alignment. Lines 5 and 8 utilize all or a portion of existing roadway (SR 26/Jackson Highway). The development of these two alignments uses reduced ROW to allow for the creation of access/frontage roads related to existing and proposed developments such as Huntington Farms, Green Meadows, Pine Meadows and Appleridge at the Orchards.

Line 9: Beginning at SR 26, approximately 1,050 feet east of the KBS Railroad, Line 9 heads due north turning northwest with a 1,640-foot radius and heads along the eastside right-of-way of the KBS Railroad for approximately two miles to where it bridges CR 200N. Access to CR 200N will be provided by means of a jug handle connection. Access will be provided to SR 126 (Cherry Lane) extension with an at-grade three-leg intersection. Line 9 then turns northeast with a 1,640-foot radius crossing the Cumberland Avenue extension. Access will be provided to the Cumberland Avenue extension with a four-leg at-grade intersection. Line 9 continues north terminating with a three-leg at-grade intersection at US 52 between the neighborhoods of Brindon

Woods and Pineview, providing access to both neighborhoods via frontage roads. The total length of Line 9 is 17,965 linear feet (approximately 3.4 miles). A 150-foot ROW from the centerline with a 50 foot depressed grass median and four 12-foot travel lanes was assumed on this alignment.

Line 10: Beginning at SR 26, approximately 1,050 feet east of the KBS Railroad, Line 10 heads northwest, parallel to and east of the KBS Railroad. Line 10 continues to parallel the tracks for approximately 17,000 feet (3.2 miles) bridging CR 200N, CR 300W, CR 250N, and CR 400W. Line 10 provides access to SR 126 (Cherry Lane) extension at a three-leg intersection. Access to CR 200N and CR 300W is provided by means of dogleg connections to at-grade intersections. Line 10 then turns and heads due north terminating with US 52 across from the Purdue University Agronomy Farm with a four-leg at-grade intersection. The total length of Line 10 is 22,362 linear feet (approximately 4.2 miles). A 150-foot ROW from the centerline with a 50 foot depressed grass median and four 12-foot travel lanes was assumed on this alignment.

2.3 SCREENING OF ALTERNATIVES CONSIDERED

The No-build Alternative and the Build Alternative alignment Line 1 were automatically carried forward for detailed study, without regard to the screening criteria. The No-build Alternative was carried forward as required by federal regulations (40 CFR §1502.14), and used as a baseline for environmental analysis. Line 1 is carried forward as a basis for comparison because it is the original preferred alternative in the ROD.

All 10 Build Alternative alignments were evaluated by a screening process to determine whether they warranted detailed study. The elimination of alternatives from detailed study is consistent with FHWA regulations (23 CFR §771.123).

A consistent set of screening criteria was applied to all of the alternatives under consideration. If an alternative does not meet purpose and need, or if it has a Section 4(f) impact, such as an unavoidable impact to a Section 4(f) resource, it will not be considered for further study (except for Build Alternative alignment Line 1 and the No-Build Alternative).

The alternative screening process resulted in the elimination of Build Alternative alignments Lines 2, 3, 5, 6, and 8. Five of the Build Alternative alignments (Line 1, 4, 7, 9, and 10) along with the No-build Alternative were carried forward for detailed study. Environmental consequences of the No-Build Alternative and the

Build Alternative alignments carried forward for detailed study are presented in Chapter 3 of this Environmental Document.

2.3.1 Purpose and Need Requirements

Chapter 1 describes the proposed action and the purpose and need for the project. As discussed in Chapter 1, four elements of purpose and need were identified in the DEIS:

- Conformity to existing transportation plans,
- Existing traffic and crash characteristics,
- Future land use developments, and
- Future traffic assignments.

A screening criterion was developed for each element to determine whether the alternative meets the purpose and need for the project. The criteria are as follows:

Conformity to existing transportation plans

Each alternative was evaluated to determine if it is consistent with four local transportation and land use plans.

- 1) Indiana Department of Transportation Draft 2000-2025 Long-Range Plan (INDOT LRP): An alternative was considered consistent with the INDOT LRP if it is a limited access roadway and begins at SR 26 and ends at US 52.
- 2) Transportation Plan for 2025 – Greater Lafayette Area Transportation and Development Study (2025 Transportation Plan): An alternative was considered consistent with the 2025 Transportation Plan if it includes relocating US 231 from Northwestern Avenue and allows for the completion of other planned roadways within the study area. These roadways included the Cumberland Avenue Extension and the Cherry Lane Extension (see Chapter 1, Section 1.4.3 for description of additional improvements).
- 3) Purdue University Transportation and Parking Plan (Purdue Transportation Plan): An alternative was considered consistent with the Purdue Transportation Plan if it does not substantially disrupt the land use plans of Purdue University and allows for the extension of campus access roads to relocated US 231 (such as Cherry Lane).
- 4) Land Use Plans: An alternative was considered consistent with the *Comprehensive Plan for Tippecanoe County* (Tippecanoe Comprehensive Plan) and *Focus on the Future of Unincorporated Wabash Township, an Action Plan* (Focus on the Future Plan) if it does not encourage development outside of the urbanized or urbanizing areas (i.e., Shelby Township) or provide new access and/or higher traffic levels to the large tracts of farmland in western Wabash Township.

Accommodate existing and projected traffic volumes and address safety concerns

A Build Alternative alignment was considered to meet purpose and need elements concerning traffic and safety if both the northern and southern half of the US 231 (divided by CR 200N):

- are projected to carry at least 10,000 Average Annual Daily Traffic (AADT), and
- to carry no less than 50 percent of the traffic volume of the highest overall volume alignment (Line 7).

The traffic analysis indicates that traffic that is carried by each alignment is predominately traffic that is removed from congested roadways in the study area such as existing US 231, McCormick Road, and CR 300W (Klondike Road). Removing traffic volumes from the existing roadways will potentially reduce the number of crashes at intersections along these routes.

Year 2025 forecast Average Annual Daily Traffic (AADT) for each Build Alternative alignment was obtained from the TCAPC forecasting model and are shown in Table 2-3. Traffic volumes are shown for the section of US 231 south of CR 200N, and the section north of CR 200N because there was a distinct change in volume at this location for many of the Build Alternative alignments. Line 7 is projected to carry the highest overall traffic volume (17,700 AADT and 19,300 AADT on the northern and southern sections respectively). The percent difference in traffic volumes as compared to Line 7 is shown in Table 2-3 for each Build Alternative alignment.

**Table 2-3
2025 AADTs for the Build Alternative Alignments**

Build Alternative Alignment	From	To	2025 AADT	% Difference vs. Highest Volume Alignment (Line 7)
Line 1	SR 26	CR 200N	9,500	- 46%
	CR 200N	US 52	10,700	- 45%
Line 3	SR 26	CR 200N	16,400	- 7%
	CR 200N	US 52	12,200	- 37%
Line 4	SR 26	CR 200N	18,000	2%
	CR 200N	US 52	11,700	-39%
Line 5	SR 26	CR 200N	20,700	+ 17%
	CR 200N	US 52	8,200	- 58%
Line 6	SR 26	CR 200N	11,800	- 33%
	CR 200N	US 52	9,100	- 53%

Build Alternative Alignment	From	To	2025 AADT	% Difference vs. Highest Volume Alignment (Line 7)
Line 7	SR 26	CR 200N	17,700	0%
	CR 200N	US 52	19,300	0%
Line 8	SR 26	CR 200N	18,700	+ 6%
	CR 200N	US 52	7,500	- 61%
Line 9	SR 26	CR 200N	18,500	+ 5%
	CR 200N	US 52	14,700	- 24%
Line 10	SR 26	CR 200N	19,800	+ 12%
	CR 200N	US 52	11,400	- 41%

Source: Michael Baker Jr., Inc. 2002 and TCAPC traffic forecast model.

Line 2 directly affects Celery Bog - a Section 4(f) and 6(f) resource. Due to this Section 4(f) impact and substantial impacts, Line 2 was eliminated from further consideration and traffic model output was not obtained. It is expected that Line 2 would have traffic volumes similar to Line 1.

2.3.2 Consideration of Section 4(f) Resources

Each alternative was evaluated to determine whether it possessed any Section 4(f) impacts. Section 4(f) of the USDOT Act of 1966 includes the use (or potential use) of Section 4(f)-protected resources within the study area. Section 4(f) protected resources include public park and recreation lands, wildlife and waterfowl refuges, and historic sites. Any alternative that impacts Section 4(f) resources cannot be selected if a feasible and prudent alternative avoids Section 4(f) resources.

Any alternative that does not meet the objectives of the Screening of Alternatives Considered criteria has been eliminated from detailed study (except the No-Build alternative and Build Alternative alignment Line 1) (Table 2-4).

**Table 2-4
Screening of Alternatives Considered**

Screening Criteria	No-Build Alternative	Build Alternative Alignments									
		Line 1 (Original Preferred Alternative)	Line 2	Line 3	Line 4	Line 5	Line 6	Line 7	Line 8	Line 9	Line 10
Purpose and Need Requirements:											
1. Consistency with Local Plans											
INDOT LRP	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
2025 Transportation Plan	No	Yes	Yes	Yes	Yes	No	No	Yes	No	Yes	Yes
Purdue Transportation Plan	No	No	No	Yes	Yes	No	No	Yes	No	Yes	Yes
Land Use Plans ²	No	Yes	Yes	Yes	Yes	No	No	Yes	No	Yes	Yes
2. Accommodate existing and projected traffic volumes and address safety concerns											
Carries at least 10,000 AADT on both sections	No	No	NA	Yes	Yes	No	No	Yes	No	Yes	Yes
Carries at least 50% of the AADT of the highest volume alignment (Line 7)	NA	Yes	NA	Yes	Yes	No	No	Yes	No	Yes	Yes
Section 4(f) impacts:											
Potential involvement with Section 4(f) resources?	NA	No	Yes	Yes	No	Yes	Yes	No	Yes	No	No
Carried forward for detailed study?	Yes¹	Yes	No	No	Yes	No	No	Yes	No	Yes	Yes

Source: Michael Baker Jr., Inc. 2002.

¹To be carried forward (per CEQ regulations)

²Land Use plans include the Tippecanoe Comprehensive Plan, the Focus on the Future plan, and the Purdue Transportation Plan.

The alignments that have been eliminated from detailed study are shaded.

NA=Not applicable

2.4 ALTERNATIVES ELIMINATED FROM DETAILED STUDY

The criteria for the Screening of Alternatives Considered was described in the previous section. The following discussion of each alignment eliminated (from further consideration and thus detailed study) explains how the alignment failed to meet project purpose and need. If the alignment did meet project purpose and need, the discussion explains how the alignment failed the screening due to potential involvement with a Section 4(f) resource. Refer to Table 2-4 (Screening of Alternatives Considered) for supporting data.

Line 2: Line 2 was considered and dismissed in the prior DEIS and FEIS based on residential displacements and wetland impacts. Although Line 2 meets the overall purpose and need for the project, it continues to have high residential and business displacements (the highest projected displacements of all Build Alternative alignments). Moreover, Line 2 directly impacts Celery Bog - a Section 4(f) and 6(f) resource. Due to this Section 4(f) resource impact, Line 2 was eliminated from further consideration and thus detailed study.

Line 3: Line 3 was considered and dismissed in the DEIS and FEIS based on residential displacements, concerns regarding impacts to Klondike Elementary and Middle Schools, and lack of community support. Although Line 3 meets the overall purpose and need for the project, it presents potential impacts to Klondike Elementary and Middle Schools, which are considered Section 4(f) resources. Due to this Section 4(f) resource impact, Line 3 was eliminated from further consideration and thus detailed study.

Line 5: Line 5 was developed as an improved roadway alignment to be considered in this Environmental Document. Line 5 does not meet the traffic element of purpose and need because it is projected at less than 10,000 AADT, and would carry less than 50 percent of the traffic volume of the highest overall volume alignment (Line 7), on the northern half of the roadway. In addition, Line 5 is inconsistent with the 2025 Transportation Plan and the Purdue Transportation Plan because it does not allow for extensions to connect with Cumberland Avenue or Cherry Lane. Line 5 is also inconsistent with the Tippecanoe Comprehensive Plan goal of maintaining the rural character of the areas west of CR 500W in Shelby Township. Finally, Line 5 is inconsistent with future land use goals contained in the Focus on the Future Plan, which call for preservation of the rural character of the area by preserving farmland and encouraging low-density development. Thus, Line

5 does not adequately meet the purpose and need for the proposed action and, therefore, was eliminated from further consideration and thus detailed study.

Line 6: Line 6 was developed as an additional alignment to be considered in this Environmental Document. Line 6 is the western-most alignment considered, with a US 52 tie-in near Montmorenci. Line 6 does not meet the traffic element of purpose and need because it is projected at less than 10,000 AADT, and would carry less than 50 percent of the traffic volume of the highest volume alignment (Line 7), on the northern half of the roadway. In addition, Line 6 is inconsistent with the 2025 Transportation Plan and the Purdue Transportation Plan because it does not allow for extensions to connect with Cumberland Avenue or Cherry Lane. Line 6 also is inconsistent with the Tippecanoe Comprehensive Plan goal of maintaining the rural character of the areas west of CR 500W. Finally, Line 6 is inconsistent with future land use goals contained in the Focus on the Future Plan which call for preservation of the rural character of the area by preserving farmland and encouraging low-density development. Thus, Line 6 does not adequately meet the purpose and need for the proposed action and, therefore, was eliminated from further consideration and thus detailed study.

Line 8: Line 8 was developed as an additional alignment to be considered in this Environmental Document. Line 8 does not meet the traffic element of purpose and need because it is projected at less than 10,000 AADT, and would carry less than 50 percent of the traffic volume of the highest volume alignment (Line 7), on the northern half of the roadway. In addition, Line 8 is inconsistent with the 2025 Transportation Plan and the Purdue Transportation Plan because it does not allow for extensions to connect with Cumberland Avenue or Cherry Lane. Line 8 also is inconsistent with future land use goals contained in the Focus on the Future Plan, which call for preservation of the rural character of the area by preserving farmland and encouraging low-density development. Thus, Line 8 does not adequately meet the purpose and need for the proposed action and, therefore, was eliminated from further consideration and thus detailed study.

In sum, Build Alternative alignments Lines 2, 3, 5, 6, and 8, have been considered and eliminated from further consideration and thus detailed study in this Environmental Document (Table 2-5). These alignments lack consistency with local transportation and land use plans or, as is the case with Lines 2 and 3, result in impacts to Section 4(f) resources. Although the No-Build Alternative was considered and dismissed in previous environmental documents for the project and continues

to inadequately address purpose and need, it will be carried forward for detailed study in this Environmental Document, consistent with FHWA and CEQ regulations.

**Table 2-5
Screening of Alternatives Considered Results**

Alternative Considered	Eliminated from further consideration and detailed study?	Carried forward for detailed study in Chapter 3 of this Environmental Document?
No-Build Alternative ¹	No	Yes
Build Alternative Alignments		
Original Preferred Alternative- Line 1	No	Yes
Line 2	Yes	No
Line 3	Yes	No
Line 4	No	Yes
Line 5	Yes	No
Line 6	Yes	No
Line 7	No	Yes
Line 8	Yes	No
Line 9	No	Yes
Line 10	No	Yes

Source: Michael Baker Jr., Inc. 2002.
Alignments eliminated from further consideration and thus detailed study are shaded.

2.5 ALTERNATIVES CARRIED FORWARD FOR DETAILED STUDY

The No-Build Alternative, and Build Alternative alignments, Line 1 (original Preferred Alternative) and Lines 4, 7, 9, and 10 (Table 2-5), will be carried forward for detailed study in Chapter 3 of this Environmental Document. The alternatives carried forward for detailed study are shown in Exhibit 2-2.

2.6 FINAL SCREENING OF ALTERNATIVES

The No-Build Alternative, and Build Alternative alignments Line 1 (the original Preferred Alternative), 4, 7, 9, and 10 have been carried forward for detailed study based on the screening of alternatives considered. These alternatives were fully evaluated for potential environmental consequences. Detailed environmental

consequences of the No-Build Alternative and the Build Alternative alignments carried forward for detailed study are presented in Chapter 3 of this Environmental Document. Table 2-6 is a Summary Matrix for Environmental Impacts.

**Table 2-6
Summary Matrix for Environmental Impacts**

Environmental Impacts	No-Build Alternative	Build Alternative Alignments				
		Line 1	Line 4	Line 7	Line 9	Line 10
SOCIO-ECONOMIC ENVIRONMENT						
Land Use - Direct (acres)						
Agriculture/Undeveloped	0	96.8	147.1	117.4	132.2	145.7
Community	0	0	1.5	4.1	4.1	1.5
Multi-family	0	19.8	0	2.5	2.7	0.5
Office and Industrial	0	3.3	4.2	0	0	3.5
Parks and Recreation	0	0.6	5.3	0	0	5.3
Retail	0	3.2	5.0	0	0	0.4
Single-family	0	0.2	1.7	5.8	6.6	7.3
TOTAL ACRES	0	120.8	164.8	129.8	145.7	164.2
Farmland Soils (prime and state-wide in acres)	0	91	124	52	117	122
Consistency with local plans ¹	2	4	2	8	8	2
Displacements (#)						
Residential (units)	0	335	124	18	109	36
Businesses	0	3	4	0	0	2
Community Facility	0	0	1	1	1	1
Environmental Justice Disproportionate Impacts (yes or no)	No	No	No	No	No	No
NATURAL ENVIRONMENT						
Stream Impacts (# of crossings/Length of impact in ft)	0/0	2/694	4/1412	2/636	3/1022	4/1356
Floodplain Impacts (acres)	0	0	3.8	0	0	3.0
Wetland Impacts ² (acres)						
PAB	0	0	0	0	0	0
PEM	0	0	1.0	0.5	1.2	2.0
PSS	0	0	0.8	0	0	0
PFO	0	0	1.0	1.2	1.0	1.0
TOTAL ACRES	0	0	2.8	1.7	2.2	3.0
Land cover (total acres of conversion)	0	139.0	165.0	129.9	145.7	164.1
PHYSICAL ENVIRONMENT						
Hazardous Waste Site Impacts (#)	0	0	1	0	0	0
OTHER ENVIRONMENT						
Noise Impacts (#)	6	3	0	3	5	2

Source: Michael Baker Jr., Inc.

¹ Eight plans were reviewed and consistency with these plans is discussed in Chapter 3.

² Initial wetland impacts for all Build Alternative alignments were calculated based on verified NWI wetlands within the study area.

In many cases, the environmental impacts associated with each Build Alternative alignment carried forward are similar. The recommendation of a preferred alternative requires consideration of the impacts as a whole, the purpose and need

of the proposed action, the purpose of the study, and previous documentation. While the summary of environmental impacts and the brief discussion of the final screening that follows focus on quantitative impacts, Chapter 3 details many qualitative impacts of the No-Build Alternative and the Build Alternative alignments that were also considered. These impacts generally supported the quantitative findings, so they are not detailed here for the sake of simplicity. These impacts are important, and they will be particularly important as considerations in project design and mitigation.

The following paragraphs discuss each alternative with a synopsis of environmental consequences (based on detailed analysis in Chapter 3) associated with its elimination.

No-Build Alternative: The No-Build Alternative has the least amount of overall environmental impacts; however, this alternative has been eliminated as the preferred alternative because it does not meet purpose and need of the project, and is the least consistent with local planning objectives.

Line 1: Although Line 1 meets the overall purpose and need of the project, it has been reevaluated for environmental impacts and used in comparison to other alignments carried forward for detailed study. Line 1 has been eliminated from further consideration as the preferred alternative based on environmental consequences presented in Chapter 3. In sum, Line 1 would result in a substantial number of residential displacements (335 units) and three businesses (resulting in the highest economic impacts of any alignment carried forward). Additionally, Line 1 has the least desirable connection to US 52 and would prohibit a direct extension of US 231 to I-65 in the future.

Line 4: Line 4 has been eliminated from further consideration as the preferred alternative based on environmental consequences presented in Chapter 3. In sum, Line 4 would have the greatest acreage of direct land use impacts, would convert the highest acreage of prime farmland soils to transportation use, would result in the loss of four local businesses (resulting in the second highest economic impacts of any alignment carried forward), and would have the greatest impact on the natural environment (streams, floodplains, wetlands, and land cover). With the exception of residential displacements, the environmental consequences associated with Line 4 are greater than those associated with Line 1.

Line 10: Line 10 has been eliminated from further consideration as the preferred alternative based on environmental consequences presented in Chapter 3. In sum, Line 10 would have the second greatest acreage of direct land use impacts, would convert the second greatest amount of prime farmland soils to transportation use, would result in the loss of two businesses (economic impacts), would have the second greatest impact on the natural environment (streams, floodplains, wetlands, and land cover).

Line 7 and Line 9: These alignments have similar environmental impacts and stand out as the most desirable in such terms; however, there are subtle but important differences between the two alignments.

Line 9 would have approximately 15 additional acres of direct land use impacts and would convert approximately twice the acreage of prime farmland soils to transportation use as Line 7. In terms of natural resource impacts, Line 9 would result in an additional stream crossing, approximately 400 feet of additional stream length impacts, 0.5 additional acres of wetland encroachments and approximately 15 more acres of land cover impacts than Line 7.

Line 7 would produce a substantially lower number of residential displacements (18) compared to Line 9 (109). Neither Line 7 nor Line 9 directly impact local businesses. Noise impacts of Lines 7 and 9 are similar.

Both Lines are consistent with local planning, although Line 7 is the preferred route of the TCAPC in its planning documents. Line 7 will not impact future development, while Line 9 will reduce the number of units for the Copper Beech Townhouses development.

A community focal point affected by Lines 7 and 9 is the Lindberg Road Soccer Fields. Either alignment will require residents of some neighborhoods to cross the proposed highway in order to access the soccer fields. Only Line 7, however, will keep the West Lafayette-bound traffic that uses Lindberg Road from the new highway to the east of the soccer fields. Line 9 (as well as Lines 4 and 10) would cause this traffic to pass by the soccer fields, making access to the soccer fields more challenging for motorists, bicyclists, and pedestrians

Line 9: Line 9 has been eliminated from further consideration as the preferred alternative based on environmental consequences presented in Chapter 3. Although

Line 9 has environmental consequences similar to Line 7, these impacts, as a whole, result in greater overall environmental impacts.

Based on the detailed analysis provided in Chapter 3, the No-Build Alternative, Line 1, Line 9 and Line 10 have been eliminated from further consideration as the preferred alternative.

2.7 RECOMMENDED PREFERRED ALTERNATIVE

Based upon the intent of the proposed action, purpose and need of the project, and overall environmental consequences to the study area, Line 7 has been identified as the recommended preferred alternative to complete the US 231 Relocation Study from SR 26 to US 52. Chapter 4 discusses the recommended preferred alternative in detail and outlines potential mitigation measures.

Chapter 2: Alternatives Analysis Exhibits

Exhibit 2-1 Alignments Considered

Exhibit 2-2 Alignments Carried Forward for Detailed Analysis