US 31 Plymouth to South Bend FEIS
Section 404(b)(1) (LEDPA) Consistency Analysis

Introduction

In its comment letter on the DEIS, the EPA pointed out that the Section 404(b)(1) Guidelines require, in the context of Section 404 permitting, the selection of the "least environmentally damaging alternative" or "LEDPA." In particular, the Section 404(b)(1) Guidelines require the selection of the practicable alternative that causes the least harm to the "aquatic environment," which consists of wetlands and other jurisdictional waters of the United States, so long as the alternative does not have other significant adverse environmental consequences.

In response to this comment, the Federal Highway Administration (FHWA) and the Indiana Department of Transportation (INDOT) have outlined consideration of the Section 404(b)(1) Guidelines in selecting a preferred alternative. In particular, consideration was given to issues of practicability, aquatic environment impacts and other environmental impacts, in addition to meeting the other requirements of Section 404(b)(1).

Section 404 of the Clean Water Act requires approval by the U.S. Army Corps of Engineers (USACE) for discharge of dredged or fill material into waters of the United States. This approval is contingent upon the project complying with the guidelines of Section 404(b)(1) of the Clean Water Act. These guidelines are summarized as follows:

- Least Environmentally Damaging Practicable Alternative (LEDPA)-There must be no practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences.
- No Violation of Other Laws-The project must not cause or contribute to violation of State water quality standards or toxic effluent standards; must not jeopardize the continued existence of federally listed endangered and threatened species or their critical habitats (except rare circumstances involving an exemption under the Endangered Species Act); and must not violate any requirement to protect marine sanctuaries.
- No Significant Degradation-The project must not cause or contribute to significant degradation of the waters of the United States.
- Minimize and Mitigate Adverse Impacts-The project must include appropriate and practicable steps to minimize potential adverse impacts of the discharge on the aquatic ecosystem.

A Section 404 Permit will be applied for and obtained prior to construction. This analysis is to show that the screening and selection process used in the development of this NEPA document have identified the least environmentally damaging practicable alternative consistent with the Section 404(b)(1) guidelines.

Least Environmentally Damaging Practicable Alternative (LEDPA)

The Section 404(b)(1) Guidelines state "no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences." Furthermore, an alternative is considered practicable if "it is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes."

The purpose of the US 31 Plymouth to South Bend Project is to help provide an improved transportation link between Indianapolis and South Bend which will:

- Reduce traffic congestion;
- Improve safety; and
- Be consistent with statewide (INDOT) and regional (Michiana Area Council of Governments (MACOG)) transportation plans.

Project Alternatives were not required to meet the third criterion in order to satisfy purpose and need. US 31 has been designated a Statewide Mobility Corridor by INDOT's 2000-2025 Long Range Transportation Plan, is part of the National Highway System, and represents the only continuous transportation link between Indianapolis and north-central Indiana (e.g., South Bend). As such, the objectives of the US 31 corridor are to provide safe, free-flowing, high-speed connections with characteristics consistent with the Statewide Mobility Corridor designation.

This summarizes the "overall project purposes" for this US 31 project, which are detailed in Chapter 2, Purpose and Need, of this FEIS. The FEIS evaluated alternatives in a multi step process which served to eliminate alternatives that would not be considered practicable under Section 404(b)(1) guidelines, and selected the LEDPA. The evaluation steps are described below.

Scoping

Nine (9) preliminary alternatives, Alternatives A through I, were initially investigated. These preliminary alternatives were based on alternatives discussed in the 1997 US 31 Major Investment Study (MIS). The MIS was conducted in response to legislation by the Indiana General Assembly, and examined transportation improvement options in the existing US 31 corridor from Plymouth to South Bend.

On May 15, 2003, an Interagency Review meeting was held with various federal and state environmental resource agencies to review the draft *Purpose and Need Statement and Preliminary Alternatives* for the US 31 Corridor Study. A project tour was conducted for all agency representatives. This project tour provided the various agency representatives with an opportunity to see the general corridors of the nine (9) preliminary alternatives. In addition to supplemental information on environmental issues and concerns related to the preliminary alternatives, this Interagency Review Meeting and project tour generated two (2) additional preliminary alternatives (Alternatives J and K). It also resulted in a slight shift of Alternative H to follow a segment of an existing high transmission powerline corridor.

Following the identification of the eleven (11) preliminary alternatives (Alternatives A–K), environmental data, engineering data and historic and archeological resource data was collected and evaluated. The eleven (11) preliminary alternatives were each narrowed to 2,000-foot wide corridors to allow for future adjustments of alignments, and a 300 to 500-foot wide right-of-way was used for the impact analysis. The eleven (11) alternatives to be evaluated in the study include:

- Five (5) western alternatives (Alternatives A, B, C, D, E);
- Four (4) eastern alternatives (Alternatives G, H, I, and K); and
- Two (2) central alternatives (Alternatives F and J) that utilize large portions of the existing US 31 alignment.

In addition to the eleven (11) preliminary alternatives (Alternatives A-K), other potential solutions to the transportation needs in the U.S. 31 Corridor were considered. These potential solutions included:

- No-Build Alternative – represented by the existing roadway network plus programmed major roadway improvements in the South Bend Metropolitan Area. This alternative is the baseline for comparing "build" alternatives; its inclusion as an alternative is required by the National Environmental Policy Act (NEPA).
- Travel Demand Management (TDM) Alternatives – actions to spread the peak-hours of travel or to encourage the shift to alternative modes of travel to the single-occupancy vehicle (i.e. flexible workdays and road pricing (toll collection)).
- Transportation System Management (TSM) Alternatives – low-cost capital investments to reduce congestion, improve traffic flow, and measures to optimize performance of the existing transportation infrastructure (i.e. intersection improvements, signal coordination and timing, lane control (reversible lanes) and high-occupancy vehicle (HOV) lanes).
- Intelligent Transportation System (ITS) Applications – technology-based programs to actively manage the roadway system (i.e. providing travel information on roadway conditions to daily commuters via message boards, etc.).
- Mass Transit Alternatives – rail or bus service along the U.S. 31 Corridor.
- Rural Arterial (Non-Freeway) Alternative – geometric design options for upgrading existing US 31 and options involving upgrading portions of US 31 on existing and new alignments.

As was the case during the entire study, public input could be provided to INDOT and FHWA through the project web site (www.us31study.org), and by letter. All project documents mentioned in this paper were available for viewing and downloading on the web site.

Screening

In order to narrow the number of build alternatives for further analysis, screening measures were developed for use in evaluating the overall performance and impacts of each corridor alternative.

All of the preliminary alternatives developed for the US 31 Plymouth to South Bend project were evaluated to determine if they would be carried forward for evaluation in the Draft Environmental Impact Statement (DEIS). A two-phase process was used to screen each alternative. Phase 1 screened alternatives with respect to purpose and need, while Phase 2 screened alternatives with respect to potential social and environmental impacts. **If an alternative clearly did not satisfy the purpose and need, it was not advanced to Phase 2.** The screening process is detailed in the US 31 Plymouth to South Bend Preliminary Alternatives Analysis and Screening Report dated August 19, 2003.

The results of the analysis conducted in the alternatives screening process and the associated recommendations are the result of considerable coordination with INDOT, FHWA, MACOG, various state and federal resource agencies, the Community Advisory Committee (CAC), and members of the general public. These coordination efforts have been ongoing since the project's inception and will continue through the life of the project.

Based on the screening measures, four (4) alternatives were carried forward for further analysis. These four (4) alternatives were **Alternative C, Alternative E, Alternative F, and Alternative G**. In addition to the consideration of these four (4) alternatives, the No Build (No Action or Do Nothing) Alternative will continue to be an option considered throughout the life of this project. The four (4) alternatives carried forward for further analysis are shown in **Figure T-1**.

The screening process concluded that freeway alternatives A, B, D, H, I, J and K not be recommended for further study. These alternatives were eliminated due to the fact that they contained problems related to either meeting the Purpose and Need of the project, difficulties related to engineering measures or potential environmental impacts. The Travel Demand Management (TDM) Alternatives, Transportation System Management (TSM) Alternatives, Intelligent Transportation System (ITS) Applications, Mass Transit Alternative, and Rural Arterial (Non-Freeway) Alternatives also did not meet the Purpose and Need for this project. From a Section 404(b)(1) perspective, the corridors dismissed from further consideration at this screening stage were considered non-practicable alternatives. Alternatives not recommended for further study are shown in **Figure T-2**.

However, in making the decision to carry forward the four alternatives for detailed evaluation, no decisions were made about the regulatory status of the alternatives being carried forward or their practicability. Specifically, at this point, the possibility still exists that one or more of the alternatives carried forward for further study would ultimately be found to be impracticable. Also, the fact that an alternative is being carried forward at this stage does not signify that FHWA and INDOT consider that alternative to be prudent or practicable for purposes of any applicable resource-protection statutes.

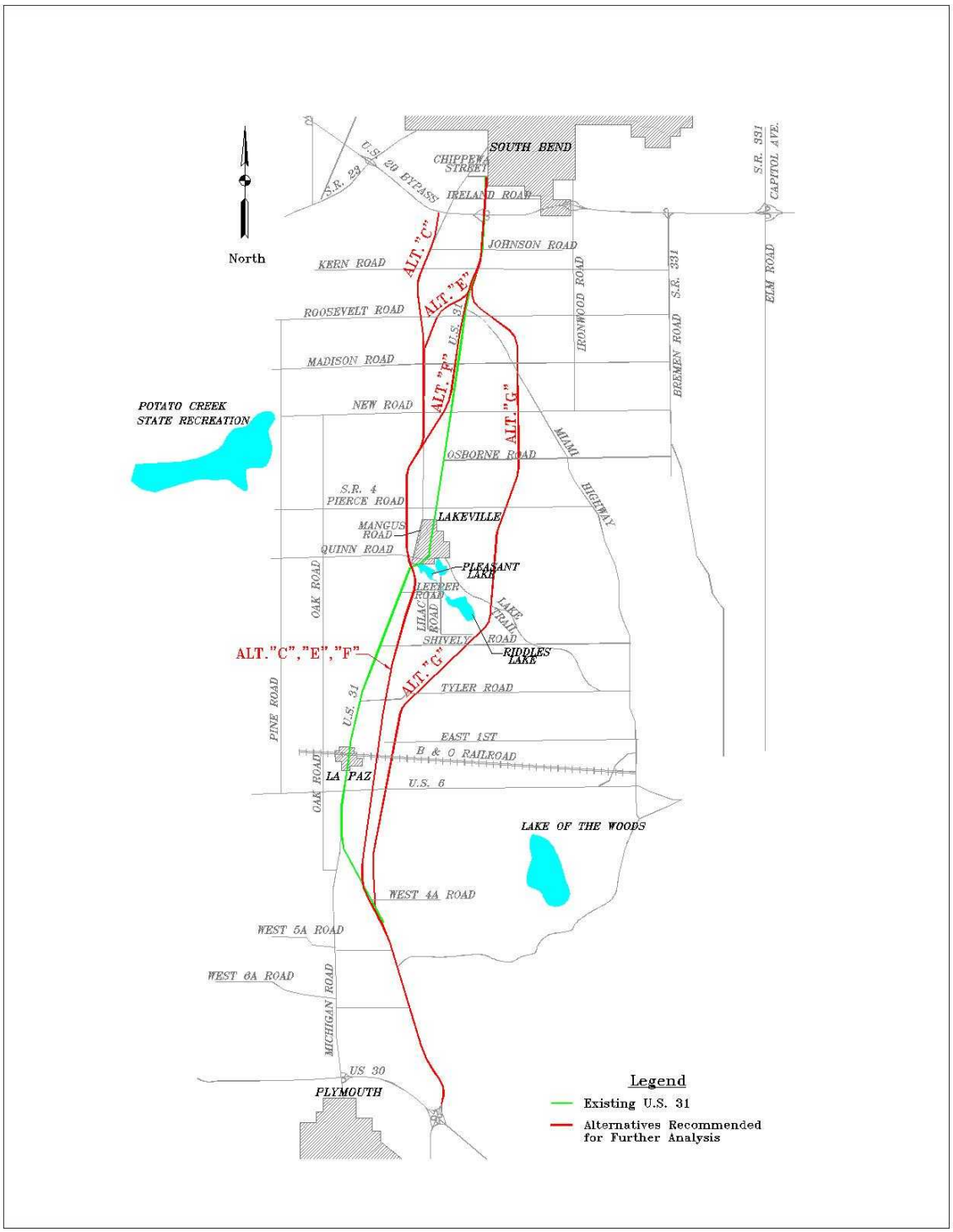

Figure T-1: US 31 Plymouth to South Bend Freeway Alternatives Recommended for Further Analysis in the DEIS (Alternatives C, E, F, and G)

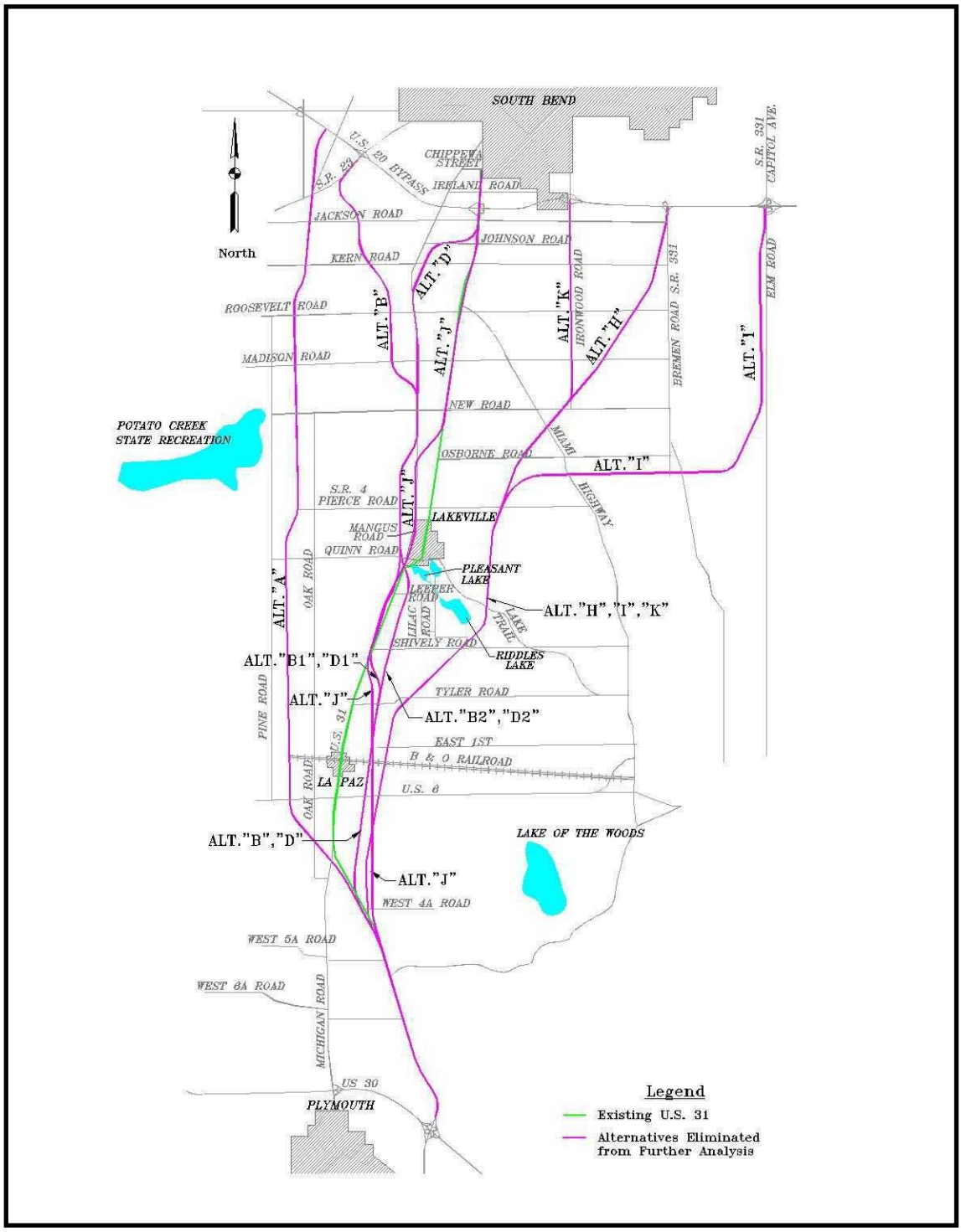

Figure T-2: US 31 Plymouth to South Bend Freeway Alternatives Eliminated From Further Consideration (Alternatives A, B, D, H, I, J, K)

Consideration of Alternative G – Ironwood Road Connection

During a resource agency meeting on July 14, 2004, and in comments received during the public comment period for the DEIS, agency comments from the USEPA and the USACE, Detroit District, requested a review of options not fully considered in the DEIS. They identified, in particular, the reevaluation of modifications to Alternative G that would terminate at the existing US 20 and Ironwood Road interchange. The US 20 and Ironwood Road interchange was the north terminus of Preliminary Alternative K that was previously eliminated from further consideration during the initial Preliminary Alternatives Analysis and Screening due to its failure to meet the purpose and need of the project. In response to these comments, INDOT and FHWA reconsidered Alternative G – Ironwood Road Connection.

After reconsideration, it was found that the Alternative G – Ironwood Road Connection, as a stand-alone alternative, fails to address the first purpose and need for the project (i.e., reduced congestion). In order for the Alternative G – Ironwood Road Connection to adequately address the purpose of reducing congestion on the existing US 31, the residual traffic on US 31 requires further major roadway investment projects, besides the cost of the alternative itself, to achieve acceptable traffic operating conditions. These improvements include the widening of existing US 31 from a four-lane to a seven-lane section from Roosevelt Road to US 20 to reach a minimum LOS D and the widening of Ironwood Road from four to seven lanes from US 20 to SR 933 (Lincolnway) to reach a minimum LOS D. A combination of these two roadway investment projects along with the alternative would provide and acceptable LOS.

In Phase 2 of the screening process, it was found that while the wetland and forest impacts associated with Alternative G – Ironwood Road Connection were slightly less than those of the alternatives to be studied further, they were still higher than the wetland and forest impacts associated with the hybrid Alternative G-Es. As discussed above, Alternative G – Ironwood Road Connection had a much higher associated total costs; higher residential relocations; higher potential historic impacts, including a Section 4(f) issue, and higher farmland impacts. **Based on these considerations, FHWA and INDOT concluded that Alternative G – Ironwood Road Connection was not a reasonable alternative and was not added to the range of reasonable alternatives to be considered in the decision-making process.** From a Section 404(b)(1) perspective, this alternative is considered non-practicable alternative.

Detailed Analysis

Modifications of Alternatives Recommended for Further Analysis

To address concerns related to impacts to both the human and natural environments, modifications in the four freeway alternatives recommended for further study in the Preliminary Alternatives Analysis and Screening Report, Alternatives C, E, F, and G, were investigated, as detailed in Sections 3.2.1, 3.2.2 and 3.2.3 of the FEIS. The goal of these modifications was to avoid and/or minimize impacts to the environment, residents, businesses, and historic properties. The socio-economic and environmental impacts of each of the modified alternatives were compared with the impacts of the original alternatives. Based on this comparison, a recommendation regarding utilization of the original alternative or modified alternative was provided. **Alternatives Cs, Es and G-C, as modified in Section 3.2 of the FEIS, were recommended for further study.**

Alternative G-C is a combination of Preliminary Alternatives C and G, consisting of the southern portion of Alternative G and the northern portion of Alternative C. It should be noted that due to the potential Section 4(f) issues associated with Alternatives F, G and Gs and the two historically significant structures discussed in Section 3.2.1 of the FEIS, and the presence of prudent and feasible alternatives without potential Section 4(f) issues, Alternatives F, G and Gs were eliminated from further consideration.

Evaluation of Hybrid Alternatives

During resource agency meetings and in comments received during the comment period on the DEIS, the USACE and the U.S. Fish and Wildlife Service (USFWS) requested a review of modifications to alternatives that would maximize the use of the existing US 31 corridor. Additionally, the Indiana Department of Natural Resources (IDNR) requested a review of potential modifications to Alternative G-C north of Roosevelt Road to avoid impacts to natural resources. Public comments also requested the investigation of the combination of Alternatives Es and G-C north of Roosevelt Road. In response to these comments, a "hybrid" alternative, Alternative G-E was developed.

Alternative G-E is a hybrid alternative consisting of a combination of the southern portion of Preliminary Alternative G-C and the northern portion of Preliminary Alternative Es. **Table T-1** compares the socio-economic and environmental impacts associated with the alternative to those alternatives recommended for further study (Alternatives Cs, Es and G-C). The US 31 Improvement Project has been a dynamic process. Similar information previously or later presented is from the data and conceptual design parameters available at a particular stage in the progress of the study. Additional information is collected and design is developed further in the progress of the study, and the numbers contained in previous or later tables in the FEIS may be slightly different.

Additional analysis, as detailed in **Table T-1**, indicated that the hybrid alternative resulted in a reduction of wetland impacts and avoidance of many high quality wetland complexes located west of existing US 31, a reduction in forest impacts, was a good traffic performer, was an alternative that utilized more of the existing US 31 corridor, and had relocation impacts and cost estimates that were consistent with the other alternatives being studied further. **Therefore, the range of reasonable alternatives in the decision-making process was expanded to include Alternative G-E, along with the No-Build Alternative and Alternatives Cs, Es and G-C.**

Table T-1: Comparison of Alternatives G-E with Cs, Es & G-C				
Socio-Economic/Environmental Measure	Alternative			
	Cs	Es	G-C	G-E
Engineering Costs (Total) (Mil. Of $)	204.1 to 224.0	269.8 to 289.2	206.0 to 226.5	242.1 to 262.0
NWI Wetlands	54 Acres	38 Acres	42 Acres	33 Acres
Traffic Performance				
Meets Purpose and Need	Yes	Yes	Yes	Yes
Performance (Compared to other Alternatives, 1 is Best Performer)	3	1	4	2
Relocations				
Residences Acquired	49	110	58	107
Businesses Acquired (Includes Large Farming Operations)	8	34	5	36
Businesses Damaged	5	5	4	5
Churches Acquired	1	1	1	1
Historic Properties (Compared to other Alts.)				
Visual Impacts	Medium	Low	High	High
Noise Impacts	Medium	Low	High	High
Potential Section 4(f) Issues	0	0	0	0
Forests	189 Acres	133 Acres	135 Acres	107 Acres
Farmland (Row Crop)	390 Acres	394 Acres	471 Acres	462 Acres

Modifications to Alternatives G-C and G-E

As the study continued to progress, the study team continually investigated potential modifications to the alternatives that would avoid and/or minimize impacts to both the natural and human environment. During one of many field investigations aimed at collecting additional data for Alternatives Cs, Es, G-C and G-E, a team of environmental scientists identified a very high quality wetland complex that was being impacted by Alternatives G-C and G-E. This wetland complex was located between Pierce Road (SR 4) and Miller Road, just south of New Road. The team of environmental scientists coordinated with a team of engineers to investigate potential modifications in the form of shifts in the alignment of Alternatives G-C and G-E to the east, called G-Cs and G-Es. Again, the goal of these modifications was avoidance and/or minimization of impacts to the natural and human environment.

Table T-2 compares the socio-economic and environmental impacts associated with Alternatives G-C, G-E, G-Cs and G-Es.

Table T-2: Comparison of Preliminary Alternatives G-C, G-Cs, G-E and G-Es				
SOCIO-ECONOMIC/ENVIRONMENTAL MEASURE	**ALTERNATIVE**			
	G-C	**G-Cs**	**G-E**	**G-Es**
ENGINEERING (TOTAL) COST (Mil. Of $)	**206.0 to 226.5**	**205.5 to 226.1**	**242.1 to 262.0**	**241.6 to 261.6**
CONSTRUCTION COSTS (Mil. Of $)	146.2 to 165.9	146.4 to 166.1	160.2 to 179.4	160.4 to 179.6
RIGHT-OF-WAY COSTS (Mil. Of $)	48.2	47.6	67.5	66.9
DESIGN FEES (Mil. Of $)	11.6 to 12.4	11.5 to 12.4	14.4 to 15.1	14.3 to 15.1
RELOCATIONS				
RESIDENCES ACQUIRED	58	54	107	103
* BUSINESSES ACQUIRED	5	6	36	37
BUSINESSES DAMAGED	4	4	5	5
CHURCHES ACQUIRED	1	1	1	1
NWI WETLANDS	**42 Ac.**	**33 Ac.**	**33 Ac.**	**24 Ac.**
FORESTS	**135 Ac.**	**124 Ac.**	**107 Ac.**	**96 Ac.**
FARMLAND (ROW CROPS)	**471 Ac.**	**494 Ac.**	**462 Ac.**	**485 Ac.**

Note: Information previously presented was from the data and conceptual design parameters available at a particular stage in the progress of the study. Additional information is collected and design is developed further in the progress of the study, and the numbers contained in previous tables in this report and the FEIS may be slightly different.

As shown in **Table T-2**, the modifications or shifts to Alternatives G-C and G-E, called G-Cs and G-Es, provided positive results as impacts to both the human and natural environments were further reduced. This included a slight reduction in residential relocations and further reductions to wetlands and forests. This particular avoidance/minimization measure also provided an opportunity to avoid the high quality wetland complex associated with both of the alternatives. **Due to the positive results related to impact reductions seen by this shift in the alignments, Alternatives G-C and G-E were eliminated from further consideration and Alternatives G-Cs and G-Es were added to the range of reasonable alternatives in the decision-making process, that includes the No-Build Alternative and Alternatives Cs, Es, G-Cs and G-Es.**

Identification of Preferred Alternative

The Preferred Alternative was selected through a multi-stage process that involved extensive analysis of traffic performance, environmental impacts and costs, as well as consideration of input from resource agencies, local elected and appointed officials and the public.

Even though the No-Build Alternative would not address the purpose and need for this project, it was carried forward for evaluation throughout the development of the FEIS and served as a baseline when comparing the effectiveness and potential impacts of other alternatives; however, it is not considered the Preferred Alternative.

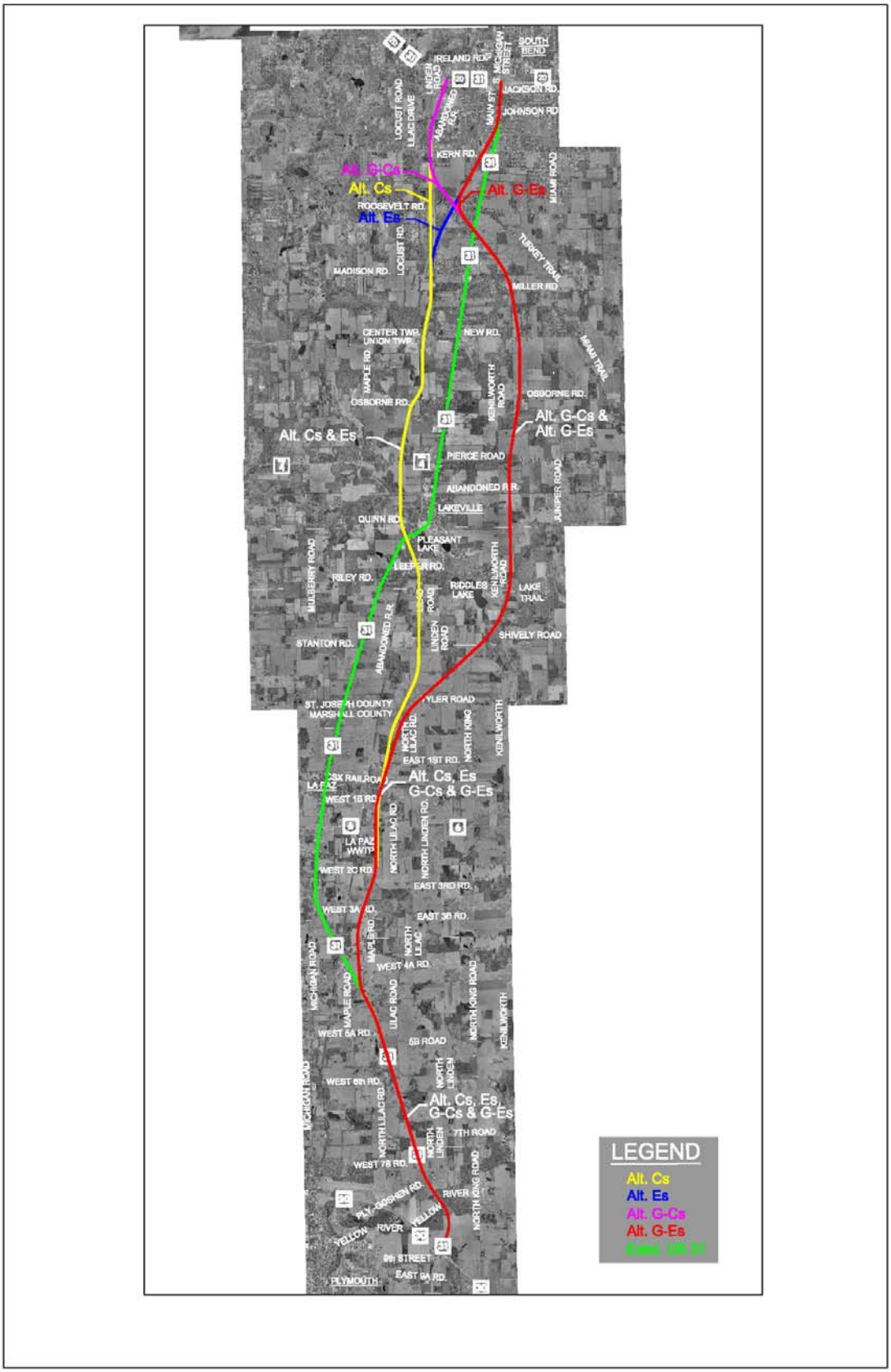

Figure T-3: US 31 Plymouth to South Bend Alternatives Considered for Detailed Analysis (Alternatives Cs, Es, G-Cs, G-Es)

A comparison of the remaining freeway alternatives, Alternatives Cs, Es, G-Cs and G-Es (shown in **Figure T-3** and **Table T-3**) identified different types of impacts related to each alternative. Following the identification of Alternative G-Es as the Preferred Alternative, additional, in-depth studies were performed on the alternative. These additional studies included, but were not limited to, refinement of local access plan and proposed right-of-way requirements, wetland delineations, Phase 1a Archaeological Review, etc. Therefore, the table shows Alternative G-Es and the best available data used to compare it to the other remaining alternatives, as well as the Preferred Alternative G-Es and impacts developed through more detailed studies and refinements.

Some generalizations related to the impacts of the alternatives included:

- The alternatives that were west of existing US 31 (Alternatives Cs, Es and the northern most portion of G-Cs) exhibited higher impacts to the natural environment, particularly wetlands and forests
- The alternatives that were east of existing US 31 (Alternatives G-Cs and G-Es) exhibited higher farmland impacts but had lower wetland and forest impacts
- The alternatives that utilized more of the existing US 31 corridor (Alternatives Es and G-Es) exhibited higher impacts to the human environment, particularly residential and business relocations
- The alternatives that utilized more of the existing US 31 corridor (Alternatives Es and G-Es) generally exhibited higher total costs than those that were largely new terrain corridors
- The alternatives that utilized more of the existing US 31 corridor (Alternatives Es and G-Es) were generally better traffic performers; however, all remaining freeway alternatives meet the projects purpose and need and the associated performance measures

Alternative Cs

A comparative evaluation of the data contained in **Table T-3** above resulted in the identification of Alternative Cs as a Non-Preferred Alternative. The data contained in **Table T-3** indicated that the impacts associated with Alternatives Cs and G-Cs were very similar with respect to both social and environmental impacts, particularly costs, relocations and land use. A comparison of Alternatives Cs and G-Cs revealed that Alternative Cs had a slightly lower associated engineering (total) cost, slightly lower residential impacts and significantly lower agricultural (row crops) impacts. However, its associated business impacts were slightly higher and environmental impacts to wetlands and forests (woodland) were significantly higher than those associated with Alternative G-Cs. In fact, the impacts to wetlands and forests associated with Alternative Cs were the highest among the remaining freeway alternatives. **Alternative Cs was considered a Non-Preferred Alternative due to its higher relative environmental impacts to wetlands and forests while exhibiting similar impacts to residences and businesses.**

Table T-3: Comparison of Preliminary Alternatives Cs, Es, G-Cs and G-Es					
Socio-Economic/Environmental Measure	**ALTERNATIVE**				
	Cs	**Es**	**G-Cs**	**G-Es**	**Final Pref. Alt. G-Es[1]**
COSTS (Total) (Mil. Of $) (year 2005 dollars)	**324.7 to 327.9**	**362.3 to 365.9**	**332.2 to 339.7**	**366.9 to 374.4**	**371.0 to 378.3**
Length (Miles)	19.5	19.9	20.3	20.5	20.5
No. of New Interchanges (Total Interchanges)	5 (7)	5 (6)	5 (7)	5 (6)	5 (6)
No. of Grade Separations (Overpass/Underpass)	16	16	16	16	16
No. of Grade Separations (Railroad Crossings)	2	1	2	1	1
CONSTRUCTION COSTS (Mil. of $)	208.6 to 211.8	218.2 to 221.3	213.4 to 220.9	221.7 to 228.7	223.2 to 203.2
RECONSTRUCTION of US 20 (Mil. of $)	29.6	21.1	29.6	21.1	21.1
LOCAL ROAD IMPROVEMENT PROJECTS (Mil. Of $)	3.6	11.5	5.8	13.7	13.6
RIGHT-OF-WAY COSTS (Mil. of $)	44.7	70.7	47.1	70.9	72.5
ENGINEERING COSTS (Mil. of $)	13.7	18.1	13.9	18.3	18.3
UTILITY RELOCATION COSTS (Mil. of $)	17.2	17.2	17.2	17.2	17.2
MITIGATION COSTS (Mil. of $)	7.3	5.5 to 6.0	5.2	4.0 to 4.5	5.1 to 5.4
TRAFFIC PERFORMANCE					
Meet Purpose and Need	Yes	Yes	Yes	Yes	Yes
Performance (Compared to Other Alternatives, 1 is Best Performer)	3	1	4	2	2
LAND USE	**961 Ac.**	**968 Ac.**	**1,012 Ac.**	**1,011 Ac.**	**1,061 Ac.**
Agricultural (row crop)	390 Ac.	395 Ac.	504 Ac.	503 Ac.	537 Ac.
Commercial	15 Ac.	23 Ac.	16 Ac.	23 Ac.	23 Ac.
Church/Religious	2 Ac.	2 Ac.	2 Ac.	2 Ac.	2 Ac.
Herbaceous Cover	51 Ac.	48 Ac.	68 Ac.	52 Ac.	53 Ac.
Open Water	<1 Ac.	<1 Ac.	<1 Ac.	<1 Ac.	<1 Ac.
Pasture	14 Ac.	12 Ac.	3 Ac.	4 Ac.	4 Ac.
Transportation	213 Ac.	220 Ac.	217 Ac.	222 Ac.	226 Ac.
Residential	51 Ac.	86 Ac.	55Ac.	77 Ac.	82 Ac.
Scrub/Shrub	38 Ac.	46 Ac.	31 Ac.	36 Ac.	37 Ac.
Woodland (Wetland & Non-Wetland) (Forests)	186 Ac.	135 Ac.	115 Ac.	91 Ac.	96 Ac.
RELOCATIONS					
Residences Acquired	50	128	59	124	131
Businesses Acquired[2]	7	40	5	39	39
Businesses Damaged	5	13	5	13	13
Churches Acquired	1	1	1	1	1
HISTORIC PROPERTIES (Listed or Eligible)					
SECTION 4(f) PROPERTIES	0	0	0	0	0
PROPERTIES WITHIN A.P.E.	5	4	9	8	8
PROPERTIES ADVERSELY AFFECTED BUT NO SUBSTANTIAL LOSS OF INTEGRITY	0	0	1	1	1
ARCHAEOLOGICAL SITES					
Within Alignment	2	3	2	3	3
TOTAL WETLANDS (NWI + FARMED)	**51.6 Ac.**	**35.6 Ac.**	**30.7 Ac.**	**23.9 Ac.**	**29.93[3]**
WETLANDS (From NWI Maps)	**49.6 Ac.**	**33.7 Ac.**	**27.8 Ac.**	**21.1 Ac.**	**-**
Forested	21.8 Ac.	17.8 Ac.	17.7 Ac.	14.8 Ac.	13.21
Scrub/Shrub	3.0 Ac.	1.6 Ac.	1.4 Ac.	0.0 Ac.	1.45
Emergent	24.0 Ac.	13.6 Ac.	8.7 Ac.	6.3 Ac.	15.27
Aquatic Bed	0.8 Ac.	0.7 Ac.	0.0 Ac.	0.0 Ac.	0.0
ESTIMATED FARMED WETLANDS	2.0 Ac.	1.9 Ac.	2.9 Ac.	2.8 Ac.	0.44[4]
STREAM IMPACTS (No. of Impact Locations) (USGS)	18	19	18	17	17

Table T-3: Comparison of Preliminary Alternatives Cs, Es, G-Cs and G-Es					
Socio-Economic/Environmental Measure	**ALTERNATIVE**				
	Cs	**Es**	**G-Cs**	**G-Es**	**Final Pref. Alt. G-Es[1]**
WILDLIFE HABITAT AREAS					
Potato Creek State Park & Swamp Rose Nature Preserve	0	0	0	0	0
Notable Wildlife Habitat (IDNR)	2	1	0	0	0
Classified Wildlife Habitat (IDNR)	4	3	0	0	0
Classified Forest (IDNR)	2-3	2-3	1-2	1-2	1-2
Conservation Reserve Program (CRP) (NRCS)	1	2	2	1	1
Wetland Reserve Program (WRP) (NRCS)	1	1	0	0	0
Partners for Fish and Wildlife Program (USFWS)	2	1	0	0	0
INDIRECT IMPACTS					
Farmland	115 Ac.	50 Ac.	105 Ac.	45 Ac.	45 Ac.
Wetland	3 Ac.	3 Ac.	3 Ac.	3 Ac.	3 Ac.
Forests	30 Ac.	25 Ac.	10 Ac.	10 Ac.	10 Ac.

Notes: The final impacts associated with Preferred Alternative G-Es are shaded.

1 Following the identification of Alternative G-Es as the Preferred Alternative, additional, in-depth studies were performed on the alternative. These additional studies included, but were not limited to, refinement of local access plan and proposed right-of-way requirements, wetland delineations, Phase 1a Archaeological Review, etc.

2 Businesses Acquired include large farming operations.

3 Wetland delineations resulted in 29.93 acres of wetlands impacted, of which, 25.51 acres were federal jurisdictional and 4.42 acres were isolated

4 One farmed wetland was identified. This area met the three US Army Corps of Engineers wetland criteria and was considered an emergent wetland. This farmed wetland was included in the emergent wetland total.

Alternative Es

A comparative evaluation of the data contained in **Table T-3** above also resulted in the identification of Alternative Es as a Non-Preferred Alternative. The data contained in **Table T-3** indicated that the impacts associated with Alternatives Es and G-Es were very similar with respect to both social and environmental impacts, particularly costs, relocations and land use. A comparison of Alternatives Es and G-Es revealed that Alternative Es had slightly lower engineering (total) cost and significantly lower agricultural (row crops) impacts; however, its residential and business impacts were slightly higher and environmental impacts to wetlands and forests were significantly higher than those associated with Alternative G-Es. **Alternative Es is considered a Non-Preferred Alternative due to its higher relative environmental impacts to wetlands and forests while exhibiting similar impacts to residences and businesses.**

Following the initial comparative evaluation of the data contained in **Table T-3**, Alternatives Cs and Es were identified as Non-Preferred Alternatives. Alternatives G-Cs and G-Es remained as alternatives to be further evaluated. These alternatives follow the same alignment from US 30 northward to near Roosevelt Road. From this point northward, Alternative G-Cs assumes a northwesterly direction and terminates approximately 1-mile west of the existing US 31 and US 20 interchange while Alternative G-Es assumes a northeasterly direction and terminates at the existing US 31 and US 20 interchange. Alternative G-Cs exhibited lower engineering (total) costs, relatively lower residential and business relocations, relatively higher environmental impacts to wetlands and forests, and utilized very little of the existing US 31 alignment,

making it a poorer traffic performer than Alternative G-Es. Alternative G-Es exhibited the lowest environmental impacts related to wetlands and forests, it utilized more of the existing US 31 alignment, making it a better traffic performer, and its engineering (total) costs and residential and business relocations were relatively higher.

As the process of identifying a single preferred alternative continued, the FHWA and the INDOT agreed that additional field data should be collected and analyzed, roadway engineering and associated costs should be refined and further developed and the human and natural environmental impacts should be re-assessed. Since Alternatives G-Cs and G-Es follow the same alignment from US 30 to near Roosevelt Road, FHWA and INDOT agreed that the additional studies in this area were not necessary at this time in the decision-making process, as impacts would be the same for each of the alternatives. Instead, the additional analysis focused on the area in which Alternatives G-Cs and G-Es did not follow a common alignment, essentially from Roosevelt Road northward to US 20. Some of the additional items included in the additional analysis of Alternatives G-Cs and G-Es from Roosevelt Road to US 20 included:

- Delineation and quality evaluation of wetland complexes and refinement of wetland impacts
- Refinement of forest and farmland impacts
- Further conceptual design and cost update for the US 31 and US 20 interchange associated with each of the alternatives including reconstruction of US 20 within the interchange limits
- Further conceptual design and cost update of local access issues, particularly related to Alternative G-Es from Kern Road to US 20 and northward to Ireland Road
- Refinement of residential and business relocations and the associated costs
- Determination of potential mitigation measures and estimation of associated mitigation costs
  - Wetland Mitigation and bridging of wetlands
  - Context Sensitive Solutions
  - Noise Mitigation

Table T-4 contains the results of the additional analysis that focused on the area in which Alternatives G-Cs and G-Es did not follow a common alignment, essentially from Roosevelt Road northward to US 20.

A comparative evaluation of the data contained in Table T-4 resulted in the identification of Alternatives G-Cs as a Non-Preferred Alternative and Alternative G-Es as the Preferred Alternative. Alternative G-Cs had lower associated total project cost and lower residential and business impacts than those associated with Preferred Alternative G-Es. While residential and business impacts associated with Preferred Alternative G-Es are higher than those for Alternative G-Cs, the DEIS indicates that it appears that there is sufficient availability of comparable housing to accommodate the expected number of residential relocations. The DEIS also indicates that the availability of commercial real estate is most prevalent in the South Bend area at the north end of the corridor (near the US 20 Bypass) and that there appears to be adequate availability of commercial property. It is anticipated that there will be opportunities for many of the

relocated businesses to rebuild in the same general vicinity with little or no loss in business in the long-term.

The traffic performance of Alternative G-Cs was not as good as Preferred Alternative G-Es. Alternative G-Cs utilized very little of existing US 31, although it did meet the purpose and need of the project and the associated performance measures. As a more detailed conceptual design of the interchange of Alternative G-Cs with US 20 developed, engineers expressed concerns with operational problems associated with the interchanges proximity to the existing US 31 and US 20 interchange. The operation problems associated with the interchange configuration focused on insufficient traffic weaving lengths for several traffic movements. Traffic weaving lengths are essentially a distance that a driver has to weave through other lanes of traffic in order to get to an appropriate lane that allows the traffic movement that a driver desires. Inadequate weaving lengths or lengths near minimum allowable values tend to lead to traffic congestion and generally less safe driving conditions as driver actions become less predictable. The proposed interchange at US 20 for Alternative G-Es consists of the reconstruction of the existing interchange and did not exhibit operational problems.

The associated environmental impacts to wetlands and forests for Alternative G-Cs were higher than those for Preferred Alternative G-Es. Alternative G-Cs had severe impacts on several high quality wetland complexes located north of Roosevelt Road, south of US 20 and west of existing US 31. Wetlands in this portion of the study area are among the highest quality wetland complexes within the entire study area. Impacts to these wetland complexes would be very difficult to mitigate as they are in many cases forested wetlands that cannot be reconstructed and take many years to develop. Bridging of these wetlands as a mitigation measure was evaluated but this method of mitigation is relatively expensive and often still results in the destruction of considerable amounts of forested wetlands. By utilizing the existing US 31 alignment north of Kern Road, Preferred Alternative G-Es does not impact these high quality wetland complexes. In comments received during the DEIS Public Comment Period, the USEPA emphasized the importance of selecting a preferred alternative in accordance with the wetlands permitting requirements under Section 404 of the Clean Water Act.

Alternatives G-Cs and G-Es have their own unique impacts. The No-Build Alternative has no impacts but does not address the needs of the project. Alternative G-Cs had the lowest associated total project cost and the lower residential and business impacts. It was generally a poorer traffic performer, had operational problems associated with its interchange at US 20 and had high environmental impacts to wetlands and forests. Due to this, Alternative G-Cs is considered a Non-Preferred Alternative. While Preferred Alternative G-Es had a higher associated total project cost and higher residential and business impacts, it was a better traffic performer and did not exhibit operational problems associated with its interchange at US 20. Preferred Alternative G-Es also has lower environmental impacts to wetlands and forests and meets the Section 404(b)(1) Guidelines that require selection of the "least environmentally damaging practicable alternative."

Table T-4: Comparison of Preliminary Alternatives G-Cs and G-Es		
SOCIO-ECONOMIC/ENVIRONMENTAL MEASURE	**ALTERNATIVE**	
	G-Cs	**G-Es**
COST (Without Mitigation) (Mil. Of $)	**309.8 to 317.3**	**345.7 to 352.7**
CONSTRUCTION COSTS (Mil. Of $)	213.4 to 220.9	221.7 to 228.7
RECONSTRUCTION OF US 20 (Mil. Of $)	29.6	21.1
LOCAL ROAD IMPROVEMENT PROJECTS (Mil. Of $)	5.8	13.7
RIGHT-OF-WAY COSTS (Mil. Of $)	47.1	70.9
ENGINEERING (DESIGN) FEES (Mil. Of $)	13.9	18.3
*** MITIGATION COST (Mil. Of $)**	**32.8 to 36.2**	**21.0 to 24.0**
WETLAND MITIGATION (Mil. Of $)	3.6 to 4.1	2.0 to 2.5
BRIDGING OF WETLANDS (Mil. Of $)	10.7	0.0
CONTEXT SENSITIVE SOLUTIONS (Mil. Of $)	16.8 to 19.7	17.5 to 20.0
NOISE MITIGATION (Mil. Of $)	1.7	1.5
TOTAL PROJECT COSTS (Mil. Of $)	**342.6 to 353.5**	**366.7 to 376.7**
TRAFFIC PERFORMANCE		
MEET PURPOSE AND NEED	Yes	Yes
TRAFFIC OPERATIONAL PROBLEMS WITH US 31 AND US 20 INTERCHANGE	Yes	No
RELOCATIONS		
RESIDENCES ACQUIRED	58	124
** BUSINESSES ACQUIRED	5	39
BUSINESSES DAMAGED	5	13
CHURCHES ACQUIRED	1	1
***** WETLANDS (NWI + FARMED)**	**30.7 Ac.**	**23.9 Ac.**
FORESTS	**115 Ac.**	**91 Ac.**
FARMLAND (ROW CROPS)	**504 Ac.**	**503 Ac.**

NOTES:

*** Wetland Mitigation Ratios are based off of the INDOT MOU signed January 28, 1991, and investigators professional judgment on quality. Costs estimates associated with Mitigation for Bridging Wetlands only include those areas north of Roosevelt Road.**

**** Businesses Acquired Includes Large Farming Operations.**

***** Wetland Impacts are from NWI Maps and estimated Farmed Wetlands are calculated as 2% of all Hydric Soils on agricultural land. The percentage is an estimate based on coordination with the Natural Resources Conservation Service (NRCS).**

Water Resources Discussion

All aquatic environments (wetlands, streams and open water bodies) have been identified using GIS data and field reviews. Wetland and open water impacts for each alternative were identified using USFWS National Wetland Inventory (NWI) digital data. This data was confirmed during field reviews. Wetland categories include Palustrine Forested (PFO), Palustrine Scrub/Shrub (PSS), and Palustrine Emergent (PEM), as well as Farmed Wetland. Farmed wetlands were estimated as 2% of the total hydric soils on agricultural land, excluding NWI wetlands. These wetland types are discussed in more detail in Section 5.12 of the FEIS. Wetland delineations were later preformed for the Preferred Alternative, but were not used in wetland comparison of the alternatives because they were only conducted for the Preferred.

Open water as used in the FEIS can be described as any impoundment of water due to natural or man-made activities that has an insufficient amount of vegetation within the water body to make it an emergent wetland, excluding streams and rivers. Open water impacts are limited for the alternatives. No large natural lakes within the project area will be directly impacted. The open water areas were generally small, excavated ponds with a wetland fringe.

Stream locations were identified for any feature displaying an Ordinary High Water Mark (OHWM) during field reviews. Stream crossings were divided into three categories, perennial, intermittent and ephemeral, based on field identified conditions as well as mapping designations. Jurisdictional determinations and exact impacts on these aquatic sites will be finalized during the permitting phase. The estimates provided in the FEIS are based on field identified conditions at the time of the study.

Table T-5 summarizes NWI and estimated farmed wetland, as well as open water impacts for the final four (4) alternatives carried forward for detailed analysis.

Table T-5: US 31 NWI Wetland Acres Impacted by Alternatives

Wetland Type	Alternative Cs	Alternative Es	Alternative G-Cs	Alternative G-Es
Aquatic Bed	0.8 acres	0.7 acres	0 acres	0 acres
Emergent	24.0 acres	13.6 acres	8.7 acres	6.3 acres
Scrub/Shrub	3.0 acres	1.6 acres	1.4 acres	0 acres
Forested	21.8 acres	17.8 acres	17.7 acres	14.8 acres
Totals	**49.6 acres**	**33.7 acres**	**27.8 acres**	**21.1 acres**
Farmed (Estimate)	2.0 acres	1.9 acres	2.9 acres	2.8 acres
Total Wetlands	**51.6 acres**	**35.6 acres**	**30.7 acres**	**23.9 acres**
Unconsolidated Bottom (Open Water)	0.4 acres	0.3 acres	0.7 acres	0.5 acres

The Preferred Alternative G-Es has the lowest total estimated wetland impacts of the four alternatives with 23.9 acres. This is less than half of the estimated total wetland impacts for Alternative Cs. It is important to note that estimated wetland impacts for those alternatives recommended for further study in the *Preliminary Alternatives Analysis and Screening Report* ranged from 43 to 85 acres. Through modification of alternatives and the selection of a hybrid alternative as the preferred, wetland impacts have been significantly reduced.

The open water impacts were comparable for all four alternatives. All were under 1 acre and consisted primarily of small, excavated ponds.

Table T-6: U.S. 31 Summary of Stream Impacts

Stream Type	Alternative Cs	Alternative Es	Alternative G-Cs	Alternative G-Es
Perennial	10	9	11	11
Intermittent	7	9	2	1
Ephemeral	1	1	5	5
Stream Total	**18**	**19**	**18**	**17**
Totals Length (feet)	**10,111**	**8,966**	**7,321**	**7,668**
Total Area (sq feet)	**86,170**	**86,589**	**71,813**	**81,655**

Table T-6 summarizes the stream impacts for the final four (4) alternatives carried forward for detailed analysis. The Preferred Alternative G-Es has the least total stream impacts and has the second lowest total length and total area of stream impacts.

The wetland and stream impact numbers show that the Preferred Alternative G-Es is the practicable alternative with the least impacts to the aquatic ecosystem, which does not have significant adverse environmental consequences. Alternative G-Es has been selected as the single preferred alternative, and is considered the least environmentally damaging practicable alternative based on Section 404(b)(1) guidelines.

Preferred Alternative G-Es had the lowest NWI wetland impacts (23.9 acres) of the four alternatives carried forward for detailed analysis. Preferred Alternative G-Es is a hybrid alternative developed, in part, to avoid wetland impacts. Alignment shifts were made throughout this study in order to avoid and minimize wetland impacts. A detailed wetland delineation was conducted for the Preferred Alternative G-Es footprint during July – October 2004. Wetland determinations and delineations were performed in accordance with the *Corps of Engineers Wetland Delineation Manual (1987)* and all subsequent Corps of Engineers guidance releases. The wetland delineation found that a total of 29.93 acres of wetlands at 39 separate impact locations are within the proposed US 31 footprint and are expected to be impacted at this time. Of this, 15.27 acres are emergent, 13.21 acres are forested, and 1.45 acres are scrub/shrub. The proposed alternative crosses two 8-digit watersheds, the Kankakee (07120001) and the St. Joseph (04050001). Of the total wetland impacts, 24.75 acres are within the Kankakee watershed and 5.18 acres are within the St. Joseph.

Representatives from the USACE Detroit District and IDEM reviewed proposed wetland impacts during a field review on November 4 – 6 2004. In a jurisdictional determination letter dated February 24, 2005 (Appendix C), the USACE identifies which impact sites are considered "waters of the United States," thus falling under federal jurisdiction. Of the total wetland acreage impacted, 25.51 acres fall under federal jurisdiction. The remaining 4.42 acres are considered isolated, and will likely fall under state jurisdiction under the IDEM Isolated Wetlands Regulatory Program.

No Violation of Other Laws

The Section 404(b)(1) Guidelines also identify that the project must not cause or contribute to violation of State water quality standards or toxic effluent standards; must not jeopardize the continued existence of federally listed endangered and threatened species or their critical habitats (except rare circumstances involving an exemption under the Endangered Species Act); and must not violate any requirement to protect marine sanctuaries. To ensure that Preferred Alternative G-Es conforms to this requirement, additional evaluations have been completed subsequent to publication of the DEIS including wetland delineations and a conceptual mitigation plan. Wetland delineations and potential stream impacts are described in a report entitled "Waters of the U.S." Verification Report US 31 Improvement Project Plymouth to South Bend in Marshall and St. Joseph Counties, Indiana dated May 2, 2005. A Conceptual Wetland Mitigation Plan is included in the FEIS as Appendix N.

State Water Quality and Toxic Effluents

Conformity with State water quality standards are reviewed by the Indiana Department of Environmental Management (IDEM) and final approval of the project will be granted via a 401 Water Quality Certification in conjunction with the 404 permit. The Section 401 State Water Quality Certification will be applied for and obtained prior to construction. This review focuses on modifications to waters of the State that have the potential to affect water quality as well as stormwater runoff of contaminants into waters of the State which have the potential to affect water quality. Based on the EIS evaluation, the project would not contribute to any violation of State water quality standards. Continued coordination with IDEM through the project development process will ensure compliance with State water quality standards. Additionally, no toxic effluent standards would be violated by Alternative G-Es.

Federally Listed Endangered and Threatened Species

Based on the evaluation of threatened and endangered species performed under the EIS and reported in section 5.9.5, the FEIS has concluded that Alternative G-Es is not likely to adversely effect species listed as endangered or threatened. Continued coordination with the USFWS during project development process will ensure that these species and their habitat will be protected.

Marine Sanctuaries

No marine sanctuaries exist within the project study area. Thus Alternative G-Es will not violate any requirement to protect marine sanctuaries.

No Significant Degradation

The third requirement of the Section 404(b)(1) Guidelines prohibits any discharge which will cause or contribute to the significant degradation of the waters of the United States.

In evaluating significant degradation, several criteria may be considered individually or collectively including:

- Impacts on human health or welfare, including but not limited to effects on municipal water supplies, plankton, fish, shellfish, wildlife, and special aquatic sites;
- Impacts on life stages of aquatic life and other wildlife dependent on aquatic ecosystems, including the transfer, concentration, and spread of pollutants or their byproducts outside of the disposal site through biological, physical, and chemical processes;
- Impacts on aquatic ecosystem diversity, productivity, and stability, may include, but are not limited to, loss of fish and wildlife habitat or loss of the capacity of a wetland to assimilate nutrients, purify water, or reduce wave energy; or
- Impacts on recreational, aesthetic, and economic values.

The estimated aquatic impacts of Alternative G-Es based on the FEIS are summarized in **Tables T-5** and **T-6**. These impacts include: 23.9 acres of fill within wetlands; 11 new perennial stream crossings; 1 new intermittent stream crossings; and 5 new ephemeral stream crossings. Based on the analysis of these impacts, the selected Alternative G-Es, will not cause or contribute to the significant degradation of waters of the United States. No significant impact to human health or welfare will occur from the proposed impacts to waters of the United States. No significant impact to aquatic ecosystem diversity, productivity and stability, or aquatic ecosystem-dependent wildlife populations will occur from the proposed impacts. In addition, there will be no significant impact to recreational, aesthetic, and economic values of waters of the United States based on the proposed impacts. Additional coordination with environmental review agencies during permitting will ensure that no significant degradation will occur from the development of the selected alternative.

Minimize and Mitigate Adverse Impacts

The fourth requirement of the Section 404(b)(1) Guidelines require that any impacts caused by the project be minimized prior to the issuance of a permit. Throughout the development of Alternative G-Es, multiple refinements of the alignment have been made to minimize the impacts to aquatic habitats including wetlands. These efforts included the development of the hybrid alternative and shifts in the alignment to avoid and minimize wetland impacts.

In addition, a Conceptual Wetland Mitigation Plan has been developed, including compensatory wetland mitigation, to offset unavoidable impacts. This proposed mitigation will be consistent with the 404(b)(1) Guidelines under the Memorandum of Agreement between the Environmental Protection Agency and the Department of the Army concerning the determination of mitigation. Mitigation sites will be restricted from other uses to ensure they remain in a natural condition in perpetuity. Replacement of wetlands at proposed mitigation sites will provide wildlife functions, water quality improvements and human values. The final mitigation plan will be inclusive of all plans to ensure no significant degradation and will be included in the conditions of the Section 404 permits that will be required for the project.

Conclusion

This analysis shows that the detailed evaluation completed in the EIS identified four (practicable) alternatives (Cs, Es, G-Cs and G-Es) to be considered for detailed evaluation. Of the four remaining (practicable) alternatives, Alternative G-Es is the least environmentally damaging. Additionally, the development of Alternative G-Es will cause no violation of other laws and will not cause or contribute to significant degradation of waters of the United States. Finally, preliminary plans have been developed to minimize and mitigate unavoidable impacts caused by Alternative G-Es. These factors show that the selected Alternative G-Es is the LEDPA and meets all Section 404(b)(1) guidelines for the selection of an alternative.