



Conceptual Alternatives Evaluation Report

**for Tier 2, Section 6 (Martinsville to Indianapolis)
of the I-69 Evansville to Indianapolis Project**

May 18, 2015





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1 Introduction

This technical memorandum describes the process of developing and screening Conceptual Alternatives for Section 6 of the Tier 2 I-69 Environmental Impact Statement (EIS). The I-69 Tier 1 Record of Decision (ROD) selected a corridor that follows SR 37 through nearly the entirety of Section 6, from SR 39 to just south of I-465. At least one alternative in this corridor will be carried forward throughout the Section 6 EIS process.

The Conceptual Alternatives are general I-69 alternatives that include a right-of-way footprint based on the typical impact area for a new freeway facility. Their evaluation provides a general comparison of the potential benefits and impacts of various Section 6 alternatives using existing data. This allows for a more efficient use of resources by reserving detailed data collection, engineering and evaluation efforts for the most promising alternatives. This is the first step in identifying, evaluating and refining project alternatives that will ultimately result in the selection of a preferred alternative for design and construction. The Tier 1 SR 37 alternative (Alternative C) and the Conceptual Alternatives that are selected for further analysis as Preliminary Alternatives will be developed in more detail.

An overview of the screening and evaluation process for the EIS is shown in **Figure A-1**. Twenty-six initial Conceptual Alternatives were developed and considered, 13 of which were screened out qualitatively due to environmental or engineering flaws. The remaining 13 alternatives¹ were advanced to a quantitative comparison of transportation benefits, environmental impacts and potential cost. **Figure A-2** shows the 26 initial Conceptual Alternatives. **Figure A-3** shows the remaining 13 Conceptual Alternatives, plus Alternative C, that were advanced to quantitative comparison. The best performing of these 13 Conceptual Alternatives will later be identified as Preliminary Alternatives and will undergo more detailed development and screening to ultimately determine the alternatives that will be considered in detail in the EIS along with a SR 37 alternative. Costs, impacts, and the ability to meet the project Purpose & Need are evaluated at a broad level for the Conceptual Alternatives described in this memorandum. Accordingly, these factors are considered in combination to identify Conceptual Alternatives which should be retained for further analysis.

1.1 Project Overview

The analysis described in this memorandum is being conducted as part of Section 6 of the I-69 Evansville to Indianapolis Tier 2 EIS. Section 6 begins just south of the SR 39 / SR 37 interchange in Martinsville and continues northward to I-465 in Indianapolis. This section is approximately 26 miles long. The corridor selected for Section 6 in the I-69 Tier 1 EIS is located along existing SR 37 in Morgan, Johnson, and Marion counties.

¹ There are a total of 14 alternatives at this stage, 13 Conceptual Alternatives plus the SR 37 alternative (Alternative C). A SR 37 alternative or alternatives will be carried forward for detailed study in the EIS.



1.2 Purpose & Need

The Purpose & Need of a project establishes the basis for developing a range of reasonable alternatives in a National Environmental Policy Act (NEPA) evaluation and assists with the selection of a preferred alternative. It describes the transportation and transportation-related needs which a project should address. It also provides performance measures which assess the relative ability of alternatives to address the project needs. A preferred alternative is determined by assessing the relative costs and impacts of alternatives, as well as their relative ability to satisfy the Purpose & Need.

The Draft Purpose & Need Statement for I-69 Section 6 establishes goals and performance measures to be used in evaluating alternatives for this section of I-69.² These Section 6 goals and their performance measures are summarized below in **Table 1**. Some or all of the alternatives may be similar in their ability to meet some of these goals.

Table 1. I-69 Section 6 Draft Tier 2 Goals and Performance Measures	
Project Goal	Performance Measures
Goal 1: Improve the transportation linkage between Martinsville and Indianapolis	<i>Complete Section 6 of I-69.</i> <i>Travel time between northern limits of I-69 Section 5 and I-465 in Indianapolis.</i>
Goal 2: Improve personal accessibility in the Section 6 Study Area	<i>Travel time between major travel destinations in the Section 6 Study Area.</i>
Goal 3: Reduce future traffic congestion on the highway network in the Section 6 Study Area (Morgan, Johnson, Hendricks and Marion counties)	<i>Reduction of traffic congestion on area roadways</i>
Goal 4: Improve traffic safety in the Section 6 Study Area (Morgan, Johnson, Hendricks and Marion counties)	<i>Reduction of crashes in the Section 6 Study Area.</i>
Goal 5: Support growth in economic activity in the Section 6 Study Area (Morgan, Johnson, Hendricks and Marion counties)	<i>Increases in personal income, total employment, and employment in key employment categories in the Section 6 Study Area.*</i>
Goal 6: Facilitate freight movements in the Section 6 Study Area	<i>Reductions in daily truck vehicle hours of travel (VHT) in the Section 6 Study Area.</i>

² Draft Purpose & Need Statement for Tier 2, Section 6 (Martinsville to Indianapolis) of the I-69 Evansville to Indianapolis Project, April 16, 2015



Table 1. I-69 Section 6 Draft Tier 2 Goals and Performance Measures

Project Goal	Performance Measures
Goal 7: Support intermodal connectivity to locations in the Section 6 Study Area	<i>Travel time between key entry points into the Study Area and major intermodal centers.*</i>

*Performance measure was not assessed during Conceptual Alternatives evaluation

2 Conceptual Alternatives Development

The I-69 Section 6 Conceptual Alternatives were developed to connect the northern terminus of I-69 Section 5 near Martinsville to I-465 in Indianapolis. Each Conceptual Alternative was drawn on a background of digital aerial photography and digital mapping of key environmental constraints that are discussed in Section 3.4 of the evaluation methodology. Twenty-six Conceptual Alternatives (shown in **Figure A-2**) were initially developed, which included 19 alternatives identified by the public and project team and seven unique alternatives developed in response to suggestions by the public at two public information meetings held in February 2015³. Based on public input and changed conditions in the corridor, alternatives located in part or entirely outside the SR 37 corridor are being considered as Conceptual Alternatives. In addition to the 26 Conceptual Alternatives that deviate from the SR 37 corridor, Alternative C is identified and corresponds to the SR 37 corridor selected in Tier 1. One or more versions of Alternative C will be carried forward throughout the DEIS and FEIS.

Each Conceptual Alternative was drawn with a 400-foot wide footprint to represent the potential impacts of both the I-69 mainline and local service roads. Footprints were widened where potential interchanges could be located.⁴ Each Conceptual Alternative was reviewed by engineers and environmental scientists to identify appropriate interchange locations and spacing, consider freeway design and local access requirements, and minimize impacts to environmental resources that are known or could be identified from available Geographic Information Systems (GIS) data and aerial photography. The environmental resources that were considered include wetlands, floodplains, forest, residential, and businesses properties, and managed lands. At this early stage of alternative development, no field investigations of resources were performed.

³ Public Information Meetings were held on February 23, 2015 at Center Grove High School and February 25, 2015 at Martinsville High School.

⁴ During subsequent alternative refinements, potential right-of-way widths will vary based on different typical sections representing the number of lanes and local topography, and specific local access road locations. At this stage of the NEPA process, there is not sufficient information to recommend the number of roadway lanes, interchange locations beyond intersections with other state roads, interchange configurations, or the location of local access roads and overpasses.



3 Conceptual Alternatives Evaluation Method

3.1 Step 1 – Discussion of General Advantages and Disadvantages

A list of qualitative advantages and disadvantages and maps showing environmental resources were developed for each Conceptual Alternative. A list of general advantages and disadvantages is included in **Appendix E**. Examples of potential advantages for an alternative include re-use of existing state owned right-of-way or infrastructure, lower impacts than the Tier 1 selected alternative or other Conceptual Alternatives, or better service to regional destinations, such as the Indianapolis International Airport. The study team⁵ conducted preliminary reviews of each of the 26 Conceptual Alternatives to determine if an alternative should be eliminated based on engineering or environmental flaws that cannot be avoided or because it has no advantage over other alternatives. At this stage, an alternative could be eliminated by consensus of the study team due to a single major flaw or due to an accumulation of flaws, especially if the alternative has no advantages over a similar alternative. Examples of major flaws that contributed to elimination of alternatives included direct impacts to numerous residential or commercial properties, direct impacts to protected Indiana bat habitat mitigation areas, and freeway system interchange configurations that would be cost prohibitive and/or highly impactful to construct. A list of the alternatives that were eliminated qualitatively and the major flaws associated with each is shown in **Table A-1**. Based on this qualitative screening, the number of Conceptual Alternatives was reduced to 13⁶ plus the SR 37 alternative (Alternative C).

The 13 Conceptual Alternatives were advanced for further quantitative evaluation as described in the following sections. These alternatives are indicated with a green “check mark” in **Table A-1** and are shown in **Figure A-3**. Maps of the Conceptual Alternatives, grouped by geographic location, are provided in **Appendix B**.

3.2 Step 2 – Purpose & Need Evaluation

Of the remaining 13 Conceptual Alternatives, any which do not satisfy the Purpose & Need of the I-69 Section 6 project will be eliminated from consideration. The 13 Conceptual Alternatives plus the SR 37 alternative (Alternative C) were divided into four groups based on major geographic elements they have in common. These groups include alternatives which travel west to I-70, travel west to Mann Road to I-465, remain on existing SR 37 to I-465, or travel east to I-65. Computerized travel demand modeling provided preliminary horizon year (2045) travel forecasts for each of the four alternative groups. The travel model analysis generated estimates

⁵ The study team consists of INDOT project management and engineering/environmental professionals from INDOT, FHWA, HNTB Corporation and Lochmueller Group.

⁶ Conceptual Alternatives retained for further study were A1, A2, B, D, F1, F2, G1, G2, K1, K3, K4, N and P. Alternative C uses the entire length of the Tier 1 Section 6 corridor and will be carried forward throughout the EIS process.



for four measures of traffic-related benefits for each group when compared to the No Build condition: reductions in annual crashes, travel time savings between key travel pairs, reduction in traffic congestion, and improvements in regional truck travel. The No Build forecasts assume completion of I-69 between Evansville and Martinsville, as well as other transportation improvements included in fiscally-constrained INDOT and Indianapolis Metropolitan Planning Organization (MPO) transportation improvement programs. Construction of I-69 Section 6 was not included in the No Build forecast.

Purpose & Need evaluation criteria measure how well alternatives address the needs identified for the I-69 Section 6 project. Where any of the four alternative groups shows disproportionately less benefit across the four measures than the other groups, the alternatives within that group will be discarded. At least one alternative in the SR 37 corridor selected in Tier 1 will be considered among the reasonable alternatives evaluated in detail in the Section 6 DEIS and FEIS. Key quantitative results from the Purpose & Need evaluation of the alternatives are shown in **Table A-2**. Additional detail on the travel demand modeling process, along with a summary of travel demand forecasts, is provided in **Appendix C**.

3.3 Step 3 – Relative Cost Evaluation

Preliminary project partial cost estimates for major construction items were developed for each alternative⁷. These estimates do not represent the total expected cost for the project alternatives, since too little is known at this time to develop accurate estimates. Comparison of the major cost items, however, allows the identification of alternatives that are significantly more or less expensive than others. Based on the development of partial construction and right-of-way costs, the Conceptual Alternatives were rated on a scale from 1 to 5 to compare their relative project costs. The highest cost alternative was assigned a rating of 5(\$\$\$\$\$) and the lowest cost alternative was assigned a rating of 1(\$). The cost ratings for each Conceptual Alternative are shown in **Table A-2**, and additional detail on the cost estimation methodology is provided in **Appendix D**. The Conceptual Alternatives with the highest relative cost will be eliminated unless they show other benefits such as high performance on the Purpose & Need measures or low environmental impacts.

Lane-miles added to the National Highway System beyond the existing condition were also computed for each Conceptual Alternative as a rough indication of additional future maintenance costs. This accounts for new freeway capacity and the removal of existing arterial capacity on SR 37 or SR 67 that is replaced with freeway. Capital and maintenance costs will be evaluated in more detail for alternatives carried forward.

⁷ The following items were excluded from the Conceptual Alternative costs: local access, widening of existing interstates, adjacent interchange modifications, environmental mitigation, relocation/damages to property owners, selected utility costs, and cost savings from re-use of existing infrastructure on SR 37 or SR 67.



3.4 Step 4 – Environmental Impacts Assessment Based on GIS data

Environmental impacts were assessed using existing GIS data from the IndianaMap website⁸, and GIS data provided by counties and resource agencies⁹. The following resources were considered during the evaluation process. These were selected to represent impacts that require avoidance or minimization during the Tier 2 NEPA process and / or permitting.

1. Potential Section 4(f) Resources

These resources will require analysis of avoidance alternatives. If an alternative appears completely unable to avoid a Section 4(f) resource, but other feasible alternatives do avoid the resource, this will be a strong reason for eliminating that Conceptual Alternative. If an alternative which impacts a Section 4(f) resource could be shifted to avoid the resource, this was not considered a reason for elimination. Resources regarded as Section 4(f) resources include:

- Publically-owned Managed Lands (number and approximate acreage)
- Publically-owned Recreational Facilities (number and approximate acreage)
- Trails (number and length)
- Historic and Cultural Sites & Districts Listed on the National Register¹⁰ (number)

2. Wetlands (size in acres)

The project must minimize impacts to water resources to be permitted. Within each grouping of alternatives, if a Conceptual Alternative has disproportionately higher wetland impacts than other alternatives and these impacts cannot be avoided, it has a higher likelihood of being discarded.

3. Streams (length in feet)

The project must minimize impacts that require permitting. Within a group of Conceptual Alternatives, any alternative with stream impacts much higher than other alternatives has a higher likelihood of being discarded.

⁸ <http://www.indianamap.org/>

⁹ Some GIS data provided by resource agencies, such as recorded threatened or endangered species areas and wellhead protection areas are considered “Confidential” and are not publically available.

¹⁰ Only sites and districts listed on the National Register of Historic Places were considered, based on data available from the National Register website: http://www.nps.gov/nr/research/data_downloads.htm. Sites potentially eligible for the National Register will be identified during the preliminary alternatives evaluation stage using data from the Indiana State Historic Architectural and Archaeological Research Database (SHAARD) and windshield field surveys of the alternative.



4. Forest (size in acres)

In part, this serves as a surrogate for impacts to Indiana bats and northern long-eared bats. Alternatives that would have directly used Indiana bat mitigation areas were discarded in Step 1.

5. Floodplains (size in acres)

Floodplain impacts result in additional permitting as well as construction and maintenance costs. Within a group of alternatives, substantively higher floodplain impacts compared to others in its group provides a higher likelihood for elimination.

6. Farmland (size in acres)

Within Conceptual Alternative groupings, an alternative impacting significantly greater amounts of farmland than others in the same group will have a higher likelihood of being discarded.

7. Potential Environmental Justice (EJ) populations (number of tracts with low-income status and number of blocks with minority status)

Census data have been used to identify potential populations of EJ Concern. **Figures A-4 and A-5** show the location of these populations relative to the Conceptual Alternatives. This information was not used for evaluation of Conceptual Alternatives. As the alternatives progress into the Reasonable Alternatives stage, potential EJ communities will be consulted and more detailed EJ evaluations will be completed.

8. Property acquisition by zoned land use (number of parcels and acres)

At this level of screening, individual residential, commercial or industrial structures which may be either acquired or impacted by the proposed project were not enumerated. Rather, the total number of parcels within each of these zoned land uses was quantified as a surrogate for number of structural relocations. Acreage of land by zoned land use was also utilized to determine preliminary land acquisition estimates.

9. Impacts to Wellhead Protection areas, cemeteries, and utility corridors were also assessed based on existing GIS data.

Alternatives with relatively high impacts across many of the above resources compared to other alternatives in their geographic group, especially impacts to potential Section 4(f) resources and impacts requiring permitting, will be considered for elimination. If a geographic group of Conceptual Alternatives performs worse than the other Conceptual Alternatives for one or more of the following factors: cost, environmental impacts, or the ability to satisfy the Purpose & Need, that group of alternatives will be considered for elimination.



3.5 Step 5 – Public and Resource Agency Input

The Conceptual Alternatives and evaluation results were presented to environmental resource agencies on April 30, 2015, to the Community Advisory Committee (CAC) and the Stakeholder Working Groups (SWG) on May 11 and 12, 2015, and at two public meetings on May 18 and 19, 2015 to gather input regarding which Conceptual Alternatives should be considered further. Comments will be solicited until June 2, 2015.

4 Conceptual Alternatives Evaluation Results

Results of all quantitative evaluation steps are presented in **Table A-2**. None of the 13 Conceptual Alternatives shown in the table will be eliminated from consideration until comments from agency and public meetings are reviewed in conjunction with these results.

5 Next Steps

The I-69 Section 6 study team will review comments received from the CAC, SWG, public and resource agency meetings in conjunction with the quantitative evaluation results shown in **Table A-2**. Based on this information, the 13 Conceptual Alternatives will be screened to determine which Conceptual Alternatives do not warrant being carried forward into the smaller group of Preliminary Alternatives. The remaining Preliminary Alternatives will then undergo another round of refinement and analysis, leading to a decision about which Reasonable Alternatives to carry forward for detailed study within the Section 6 Tier 2 DEIS.