5.8 Traffic Impacts

5.8.1 Introduction

This section addresses the traffic impacts of I-69 for both the Study Area as a whole and the major highway corridors that would be affected by the project. Detailed traffic operations studies will be undertaken during Tier 2 NEPA studies.

The discussion includes a general description of the traffic modeling methods and analytical tools used to develop the impacts described in this section. *Refer to Technical Report 3.3.3: Model Development and Validation* (available on the project web site www.i69indyevn.org) for further information on these subjects.

The section broadly addresses the issue of traffic "induced" by the national I-69 project as well as new development that would be stimulated by the highway in Indiana. A discussion is also provided of traffic diversions and congestion levels as they relate to major corridors in the region.

Since the publication of the DEIS, changes have been made to several of the alternatives, affecting their impacts, costs, and benefits. Many of these were made in response to comments from agencies and the public. Changes that affect traffic impacts include:

- ***Elimination of Mann Road Variation (affecting Alternatives 2C, 3B, 3C, 4C, and 5B)***. These alternatives now remain in the SR 37 Corridor to just south of I-465. The Mann Road variation was eliminated to decrease potential residential and wetlands impacts. See Section 6.3.4 for further discussion. The data in this section of the DEIS were based on travel model runs that assumed a Mann Road alignment for these alternatives, which were then *estimated* to reflect the alignment staying on SR 37 to just south of I-465. The new data in the FEIS are based on individual travel model runs of these alternatives remaining on SR 37 to just south of I-465. In both the DEIS and FEIS sets of model runs, an interchange was included at Southport Road.

- ***Modification of the Corridor for Alternative 3B***. Shortly before publication of the DEIS, the corridor for Alternative 3B was shifted on the north side of Bloomington to avoid sensitive resources. The effect of this change was to tie into SR 37 farther south than it had originally been laid out. The original tie-in point with SR 37 was approximately 8.57 miles north of SR 46. The revised tie in point is 1.12 miles north of SR 46. The DEIS traffic data were based on the original alignment. The FEIS traffic data are based on the revised alignment.

In addition to these changes in alternatives, in the DEIS analysis, approximately six highway links (out of over 16,000) were erroneously coded in certain model sets as being within the I-69 Study Area when, in fact, they were not (See Section 3.1, *Process Overview*). The correction of these coding errors has been to change marginally certain vehicle-miles of travel (VMT) data as reported in Section 5.8.3. These corrections do not, however, change any conclusions.

It should be noted that the selection of the far eastern variation around the City of Washington (WE2) since the publication of the DEIS did not require a change in modeling, since all forecasts in the DEIS used this far eastern variation.

Since the publication of the DEIS, this section has added traffic impact data for SR 46 west of Bloomington in response to a public comment.

5.8.2 Methodology

In the mid-1990s, INDOT undertook a significant effort to develop analytical procedures designed to assess the transportation and economic impacts of large corridor investments. This effort resulted in the *Major Corridor Investment Benefit Analysis System* (MCIBAS). MCIBAS is a suite of programs and technical procedures, which consists of the *Indiana Statewide Travel Demand Model* (ISTDM) linked by post-processors and analytical procedures to a regional econometric simulation model. ISTDM is a computer model that forecasts traffic flow throughout the highway network given a proposed change or changes to the existing system.

In the early phases of this study, significant improvements were made to both MCIBAS and ISTDM. These improvements included:

(1) the expansion of ISTDM into the four neighboring states to allow for improved testing/modeling of transportation improvements that might draw traffic from neighboring states;

(2) the addition of minor collectors and some local roads into the ISTDM transportation network to permit improved estimates of traffic flows;

(3) the ability to input traffic into the statewide network that would be generated by the completion of I-69 at the national level;

(4) the ability to output some economic and transportation data for five regions within the 26-county Study Area;[1]

(5) the development of a "feedback loop" from these regions to the starting point of ISTDM to determine the effects of the new population and employment "induced" by an improved highway corridor on the transportation network; and

(6) the conversion of new population and employment into estimates of new land development.

It should be noted that this process is the methodological source from which the indirect land use impacts reported in other sections of this document were derived.

It should also be noted that the combination of these improvements – including the national I-69 traffic, the feedback loop and land use estimates – represents a significant step beyond the usual state-of-the-practice for modeling planned transportation improvements. Typically, travel demand models will take into account only the effects of changes in destination choices and route diversions resulting from a prospective improvement to the transportation system (e.g., added speeds and capacity to an existing road and/or the construction of a new road). Most travel demand models are not integrated with an economic model, nor do they allow for the feedback of "generated" or "induced" demand resulting from new development that would occur solely because the highway is built or improved.

In preparation for this chapter, the ISTDM was run assuming two scenarios. In the first scenario, each alternative was run for the forecast year of 2025 *without* the increment of additional national I-69 or highway-induced demand.

[1] These five regions are: (1) Indianapolis including its western and southern suburbs (Hendricks, Johnson, Marion, and Morgan counties); (2) the Bloomington area (Monroe County); (3) the Terre Haute area (Vigo and Clay counties); (4) the Evansville area (Gibson, Posey, Vanderburgh and Warrick counties); and (5) Rural Southwest Indiana (Brown, Crawford, Daviess, Dubois, Greene, Knox, Lawrence, Orange, Owen, Perry, Pike, Putnam, Spencer, and Sullivan counties).

This scenario effectively assumes that I-69 would *not* be completed outside Indiana and that there would be no additional trips generated by I-69 *inside* Indiana. It was this conservative scenario that was used in the development of the Purpose and Need as well as the initial screening from 14 to 5 alternatives. As a section of independent utility (SIU), it was appropriate to exclude other SIUs and other influences for the purpose of documenting need and assessing the transportation performance of preliminary alternatives.

Under the first scenario, growth in total vehicle-miles of travel (VMT) can still occur despite the potential opportunity for a "shortcut" provided by certain alternatives. This growth is the result of changes that would occur over time in destination choices; longer trips are made within approximately the same travel time.

In the second scenario, both national I-69 and highway-induced demand (per the feedback loop) were included in a set of year 2025 tests for each alternative. Under this scenario, the incremental increases in VMT over scenario 1 are attributable to the national I-69 project and demand induced by new economic development within Indiana. The results of this scenario were utilized for purposes of documenting impacts on air quality, noise, indirect land use, and traffic in order to predict the maximum potential impacts to the Study Area upon completion of I-69 nationally.

In addition to broad, regional traffic impacts, the effects of each alternative on the key Interstates and major arterials in the region were assessed. For purposes of this analysis, the changes effected by the alternate routes on year 2025 traffic volumes (measured in terms of VMT) and levels of service were noted. Level of service (LOS) is a traffic engineering concept that relates to the relative ease of traffic flow on a highway during peak-hour conditions. LOS classifications are given ranging from "A" to "F," where "A" represents completely unhindered, free flow conditions, and "F" represents conditions in which traffic volumes are approximately equal to the physical capacity of the roadway.[2] In this discussion, all LOS values represent traffic conditions *during peak-hour conditions on a typical weekday in the forecast year, 2025.* Accordingly, these values represent the worst-case condition that a motorist would be likely to encounter under ordinary circumstances (i.e., no construction, no traffic crashes, etc.).

In the process of defining each alternative, multiple runs of the travel demand model were undertaken to determine the number of lanes that would be required for each section of the new Interstate. Lanes were successively added wherever sufficient capacity was not provided by the standard 4 lanes. This process was continued until each section of the highway generally achieved a LOS of "C." The specific number of lanes needed to achieve LOS "C" was subsequently used in the estimation of right-of-way widths and construction costs.

5.8.3 Regional and Statewide Traffic Impacts

Under the first scenario in which it is assumed that I-69 will not be completed nationally and that there will be no new trips created as a result of the new Interstate connection between Indianapolis and Evansville, Alternative 1 shows the lowest overall increase in additional vehicle-miles of travel: an increase of 637,223 vehicle-miles of travel or about 1.3% over the No Build in 2025.[3] At the other end of the spectrum, Alternative 5B would stimulate an increase in overall VMT of 1,530,689 or about 3.1%. Overall, vehicle-hours of travel (VHT) remain about the same, varying within a tight range of -0.13% and +0.85%[4].

In the second scenario, long-distance I-69 travel that passes through Indiana and additional travel induced by I-69 related economic development were added to the model tests. In this case, the same two alternatives would re-

[2] The ISTDM has time-of-day modeling capabilities. LOS estimates throughout this section represent worst-hour conditions.

[3] All percentage changes are computed on the basis of total VMT within the 26-county Study Area.

[4] A reduction in vehicle-hours can occur, despite an increase in vehicle-miles due to the increased speeds provided by an alternative.

spectively stimulate the least and the most additional travel. Alternative 1 would result in a cumulative increase of 886,312 VMT[5] or 1.8% over the No Build, while an increase of 1,848,787 VMT or 3.8% would be associated with Alternative 5A.

These model tests lead to the conclusion that the combined traffic effects of national I-69 travel and new economic development on the highway network would be minimal. By themselves, these sources of travel demand would account for between 249,089 and 318,098 VMT, a fractional increase of about 0.5% to 0.65% in total travel in the I-69 Study Area.

5.8.4 Impacts on Major Corridors

While I-69 would have a very small effect on traffic volumes throughout the region as a whole, it has the potential to impact individual corridors significantly. These impacts would both increase and decrease traffic levels depending on the specific corridor and the alternative. Table 5.8-1 summarizes the forecasted percentage changes in traffic volumes (for the year 2025) on I-465, SR 37, I-65, US 41, I-70, and SR 46. The data contained in Table 5.8-1 are based on model runs in which "induced traffic" is included; specifically, it is assumed that I-69 would be completed nationally and additional traffic from highway-induced economic development has occurred.

5.8.4.1 Impacts on I-465

All of the alternatives that make use of I-70 would have a small effect on I-465. These are: Alternatives 1, 2A, 2B, 3A, 4A, 4B, and 5A. Between the Airport Expressway and US 31 (south junction), percentage variations in VMT from the forecasted No Build condition would be negligible, except for Alternative 5A where increases in volume would be in the range of 7-8%.

On the other hand, alternatives that make use of the SR 37 corridor would all have noticeable impacts on I-465. These are Alternatives 2C, 3B, 3C, 4C, and 5B. Between the Airport Expressway and US 31 (south junction), these alternatives would increase forecasted VMT anywhere from 0 to 25% depending on the specific I-465 segment and the alternative.

As Table 5.8-1 shows, the alternatives that approach Indianapolis on SR 37 would increase traffic volumes on I-465 between the Airport Expressway and SR 67 (south junction) in the range of 0-5%. Between SR 67 and I-69 (existing SR 37), traffic would increase between 23% and 25%. East of I-69 (south junction), an increase in VMT of 19-22% on I-465 could be expected.

INDOT's Long Range Transportation Plan calls for the widening of I-465 to 10 lanes around its entire circumference.[6] A model run was conducted with 10 lanes (as opposed to its current 6-8) on I-465 between the Airport Expressway and I-65 (south junction). While these planned lane additions would increase volumes on I-465, the deterioration in levels of service created by I-69 alternatives that use SR 37 would be more than offset by the lane additions. *With I-69 and with the added lanes, I-465 would generally perform at better levels of service than would exist without I-69 and without the added lanes.* East of SR 67 (south junction) I-465 would operate during peak hours at LOS "C," which is better than accepted planning LOS standards for urban Interstates (LOS "D"). Between

[5] For major transportation improvements in rural areas, system-wide changes in VMT per se are not a meaningful performance indicator. See Appendix FF, Part III, Why Total VMT and VHT Should NOT Be Used as Performance Measures.

[6] The 10 lanes on I-465 represent the prevailing number of lanes, including through lanes. Selected segments of I-465 may have more than 10 lanes.

I-70 (west junction) and SR 67 (south junction), the forecasted peak hour LOS is "D". Without the I-465 widening, however, this segment will operate at LOS "F," even if I-69 is not built.

Table 5.8 –1: Year 2025 Percentage Change in Vehicle-Miles of Travel on Major Corridors

	1	2A	2B	2C	3A	3B	3C	4A	4B	4C	5A	5B
I-465												
Airport Express to I-70	0	1	3	1	5	2	3	1	3	0	7	3
I-70 to SR 67	1	0	-1	3	-1	5	3	0	-1	2	-8	3
SR 67 to SR 37	0	0	2	23	3	25	23	0	2	23	3	23
SR 37 to US 31	0	-1	-1	21	-1	21	20	-1	-1	22	-3	19
SR 37												
SR 46 Bloomington to SR 39 Martinsville	4	-5	-6	2	-19	57	78	-4	-7	-6	62	75
SR 39 to SR 44	-7	-3	-15	157	-24	137	147	-3	-18	153	-26	141
SR 44 to Centerton Road	-10	-2	-12	122	-25	95	113	-2	-14	121	-31	109
Centerton Road to SR 144	-5	-1	-13	208	-12	195	197	-1	-12	207	-39	191
SR 144 to Bluff Road	-3	-2	-8	194	-11	185	188	-2	-8	192	-23	183
Bluff Road to I-465	-2	-3	-11	331	-13	321	327	-2	-11	331	-24	318
I-65												
County Line Road to I-465	0	-1	-1	-3	-1	-4	-4	-1	-1	-4	-2	-4
US 41[1]												
I-64 to SR 168	65	66	67	68	-23	-22	-22	-26	-25	-25	-20	-19
SR 168 to SR 64	45	46	46	47	-15	-14	-14	-17	-17	-17	-13	-13
SR 241 to SR 441	31	35	36	38	-28	-26	-27	-31	-30	-30	-25	-24
SR 58 to New Lebanon	41	-46	-45	-46	-50	-42	-44	-56	-55	-54	-35	-34
SR 246 to SR 641 Bypass	39	-32	-32	-32	-35	-30	-31	-39	-38	-38	-26	-25
I-70												
SR 641 Bypass to SR 39	6	-12	-21	-32	-17	-24	-23	-10	-20	-30	-19	-19
SR 39 to SR 267	7	9	25	-27	33	-22	-20	10	26	-26	47	-17
SR 267 to Six Points Road	1	3	9	-12	12	-10	-10	4	10	-12	23	-9
Six Points Road to I-465	1	3	8	-11	12	-9	-9	4	9	-11	23	-8
SR 46												
East of SR 43 near Spencer	0	10	-6	-2	-15	0	-2	6	-7	-3	-2	2
East of Ellettsville (Hartstrait Rd.)	0	2	-3	-1	30	4	3	1	-3	-1	4	5
West of SR 37	0	1	-2	-1	54	3	-13	0	-3	-2	-13	-13

Source: Bernardin, Lochmueller & Associates, Inc. and Indiana Statewide Travel Demand Model

Note: Shaded areas denote sections where I-69 would make use of existing divided highways (e.g., US 41, I-70, and SR 37).

[1] The table includes representative segments of US 41 between Evansville and Terre Haute.

5.8.4.2 Impacts on SR 37

Alternatives that do not use SR 37 would divert traffic away from it to varying degrees, whereas alternatives that involve upgrading SR 37 would attract substantially more traffic to it. Alternative 1 would divert from 2-10% of forecasted traffic (depending on the specific location) away from SR 37. Alternatives 2A and 4A would function very similarly with respect to SR 37, diverting in the range of 1-5% of the traffic. Similarly, Alternatives 2B and 4B would divert from about 6-18%. Alternative 3A would reduce traffic volumes from 11-25%.

The shaded portions of Table 5.8-1 denote sections of roadway where I-69 would make use of existing divided highways. In these shaded sections of SR 37, large percentage increases in traffic would be expected due to the fact that an Interstate highway would be replacing the existing road. Alternatives 2C and 4C would result in an increase in traffic between about 120% and about 330%, depending on the alternative and the specific section of roadway.[8] Alternative 3B would attract between approximately 60% and 320% more traffic to the upgraded SR 37 corridor, affecting a longer section of the highway than Alternative 2C or 4C. Preferred Alternative 3C would attract approximately 80% to 330% more traffic to SR 37.

In the section north of Martinsville where Alternative 5A diverges from SR 37, the new highway would divert from about 20-40% of the traffic away from SR 37. From Bloomington to Martinsville, Alternative 5A would attract about 60% more traffic to the upgraded SR 37 corridor. Alternative 5B – which stays on SR 37 throughout its length – would increase traffic on this corridor from about 75% to 320%.

It is important to note that these large increases of traffic on SR 37 do not imply poor levels of service, since freeway travel lanes have the capacity to carry much higher volumes of traffic than travel lanes on divided highways with at-grade access. Moreover, in the process of scoping (i.e., defining) each alternative, multiple runs of the travel demand model were undertaken to determine the number of lanes that would be required for each section of the new Interstate. Lanes were successively added wherever sufficient capacity was not provided by the standard 4 lanes until each section of the highway generally achieved a LOS of "C." In most cases, 6 lanes would be required between Bloomington and SR 144 and 8 lanes would be needed from SR 144 to I-465. These lane requirements are reflected in both cost estimates and environmental impact calculations (see Appendix E, *Typical Cross Sections of Working Alignment*).

The alternatives that would use the SR 37 corridor would generally operate at level of service "C." The large volume of traffic that the Interstate would carry at LOS "C" would provide significant benefits to radial traffic in and out of Indianapolis from the south and southwest.

5.8.4.3 Impacts on I-65

The I-69 alternatives have very little effect on I-65 south of Marion County. From the County Line Road interchange north to I-465, the alternatives that make use of the SR 37 corridor would divert between 3-4% of the traffic on I-65. Alternatives 3A and 5A would divert 1.2% and 1.7%, respectively. The remaining alternatives would all divert less than 1%. While these percentages are small, this section of I-65 is forecasted to carry very heavy traffic loads with a correspondingly poor level of service in the No Build condition. Accordingly, even small percentage diversions in VMT can be helpful and, given the forecasted level of congestion, would have a disproportionately higher percentage reduction in travel times on the existing I-65.

5.8.4.4 Impacts on US 41

Alternative 1 would attract between 30% and 65% more traffic to US 41 between I-64 on the south and the planned SR 641 Terre Haute Bypass on the north. Due to the additional capacity that Alternative 1 would provide, levels of service would improve between Evansville and Princeton. Between SR 168 and SR 64 at Princeton, levels of service in 2025 would improve from predominantly "E" to "C." North of Princeton, the level of service would be about the same as the No Build condition.

Alternatives 2A through C would attract between 35% and 68% more traffic to the US 41 corridor between I-64 and

[8] Large percentage changes in the text are rounded to the nearest 5%.

Vincennes. They would have the same improvement on levels of service near Princeton as Alternative 1. Each of the Alternative 2 options would attract approximately comparable volumes of traffic and would improve levels of service in about the same way as Alternative 1. North of Vincennes, approximately 32% to 46% of the traffic on US 41 would be diverted to the new facility. Already good levels of service north of Vincennes would stay the same or improve.

The remaining alternatives all share a southern terminus at SR 57 and I-64. Accordingly, they would all have the effect of diverting traffic from the US 41 corridor. For Alternatives 3A through C and 4A through 4C, diversions in 2025 would range from a low of about 14% just south of Princeton to a high of 56% (Alternative 4A) between SR 58 and New Lebanon. While this is a large percentage diversion, traffic volumes are small to begin with on this relatively remote section of US 41. Consequently, the percentage change would be large. Since Alternatives 5A and 5B follow US 50 to the east at Washington rather than maintain a northeasterly direction, the impact of these alternatives on US 41 is not quite as large as Alternatives 3 and 4. They would effect diversions in the range of 13% just south of Princeton to 35% between SR 58 and New Lebanon in 2025. All of these alternatives would have the effect of improving or maintaining existing LOS along most of the length of US 41. In the relatively congested area near the Toyota Plant, Alternatives 3 through 5 (with their various options) would generally improve the level of service.

5.8.4.5 Impacts on I-70

With the exception of Alternative 1, all of the alternatives would divert traffic from I-70 between the planned SR 641 Bypass at Terre Haute and SR 39 near Monrovia in Morgan County. Alternative 1 would increase traffic by about 6%. West of SR 39, diversions for all other alternatives would range from 10% (Alternative 4A) to 32% (Alternative 2C). Since the widening of I-70 from 4 to 6 lanes has been designated as a committed project, this section of highway will operate at a LOS "B" – a condition that would remain unchanged regardless of the alternative.

Between SR 39 and SR 267, the six-lane Interstate shifts from LOS "B" to "C." In this section, all of the alternatives that merge with I-70 – 1, 2A, 2B, 3A, 4A, 4B and 5A – would attract traffic to it. Vehicle-miles of travel on this section of I-70 would increase within a range of about 7% (Alternative 1) to 47% (Alternative 5A). By contrast, all of the alternatives that approach the Indianapolis area via the SR 37 corridor – 2C, 3B, 3C, 4C and 5B –would divert traffic away from I-70. The percentage diversions range from 20% for Preferred Alternative 3C to 27% for Alternative 2C. The five alternatives that divert traffic away from I-70 would improve the LOS on this stretch of highway from "C" to "B."

Between SR 267 and I-465 (west leg), alternatives that make use of I-70 would increase traffic volumes from a low of 1% (Alternative 1) to a high of 23% (Alternative 5A). Due to added lanes, none of these alternatives would deteriorate the 2025 LOS of "D." In some cases, the LOS would improve to "C."

For the five alternatives that would divert traffic away from I-70, diversions would range between 8% and 12% between SR 267 and I-465 (west leg). All of these alternatives would improve the level of service from "D" to "C" between SR 267 and the Six Points Road interchange (under construction in 2003). Between Six Points and I-465 (west leg), the LOS would improve from "D" to "C" for Alternatives 2C and 4C.

5.8.4.6 Impacts on SR 46

Since publication of the DEIS, additional data have been provided in Table 5.8-1 regarding the impact of the alternatives on traffic volumes on SR 46. Generally, the traffic impacts of the alternatives on SR 46 would be modest. For most alternatives, the effect on SR 46 would be to reduce volumes slightly. The major exception is Alternative 3A,

which would increase traffic volumes on the SR 46 links that directly access I-69 from 30 to 54%. The levels of service on SR 46 3C would not be adversely impacted by Preferred Alternative 3C.

5.8.5 Summary

Alternatives that approach the Indianapolis area along the SR 37 (i.e., Alternatives 2C, 3B, 3C, 4C, and 5B) corridor would add a noticeable amount of traffic to the southern sections of I-465. This additional traffic, however, would be accommodated by planned lane additions to I-465.

Regarding SR 37, alternatives that approach the Indianapolis area on I-70 (i.e., Alternatives 1, 2A, 2B, 3A, 4A, 4B, and 5A) would divert traffic away from SR 37 to varying degrees, whereas alternatives that involve upgrading SR 37 would attract substantially more traffic to it. Those alternatives that would use SR 37 have the potential to draw heavy travel volumes and provide significant benefits to radial traffic to and from the south and southwest parts of the greater Indianapolis area.

Alternatives that make use of the SR 37 corridor (i.e., Alternatives 2C, 3B, 3C, 4C, and 5B) would effect a modest 3-4% reduction in VMT on I-65 in Marion County. The remaining alternatives would have a negligible effect on I-65.

Alternatives that use all or a part of US 41 (Alternatives 1, 2A, 2B, and 2C) would attract between about 30% and 68% more traffic than would occur in the No Build condition. These alternatives would relieve forecasted congestion south of Princeton generally better than alternatives that divert traffic away from US 41. Alternatives with a southern terminus at SR 57 and I-64 would divert from 13% to 56% away from the US 41 corridor. These alternatives would maintain or improve levels of service on US 41.

With the exception of Alternative 1, all of the alternatives would divert traffic from I-70 between Terre Haute and SR 39 in Morgan County. These diversions would range from 10% to 32% and maintain a LOS “B.” From SR 39 to SR 267, a level of service “C” is forecasted. The five alternatives that divert traffic away from I-70 would improve the level of service on this segment of highway from “C” to “B.”

All the I-69 alternatives would improve traffic performance on a system-wide basis, as reported in Chapter 3.