



Chapter 2: Purpose and Need

A Purpose and Need Statement for the US 31 Improvement from Plymouth to South Bend in Marshall and St. Joseph counties, Indiana, was drafted in March of 2003. It was presented at a Community Advisory Committee (CAC) and at a Public Information Meeting on April 10, 2003, and at an Interagency Review Meeting on May 15, 2003. The Purpose and Need Statement was subsequently revised with data for the year 2030 along with comments received. The following information reflects these revisions.

2.1 Traffic Congestion

The majority of the US 31 Corridor is presently experiencing high levels of congestion with unacceptable operating conditions (based on INDOT roadway design standards on level-of-service). As growth of the South Bend metropolitan area and Indiana fuels increasing traffic volumes, traffic flow conditions will further deteriorate to an unacceptable level from the Michigan Road intersection (north of Plymouth) to the US 20 Bypass.

Traffic operating conditions are typically described through a level-of-service (LOS) rating of six levels from “A” through “F”. The LOS rating scale is a qualitative method for describing traffic conditions. The scale ranges from LOS “A”, which corresponds to free-flowing traffic and minimal delays at intersections, to LOS “F”, which corresponds to a complete breakdown in traffic flow. Based on INDOT reconstruction (4R) standards outlined in the Indiana Design Manual, an LOS “C” is the minimum acceptable LOS for rural and suburban areas, and LOS “B” is desirable. In urban intermediate and built-up areas, an LOS “D” is the minimum acceptable LOS, and LOS “C” is desirable. Except for the segment from Miller Road (about three miles south of the US 20 Bypass) to the US 20 Bypass, the US 31 corridor is considered rural where a level of service falling below “C” is unacceptable.

The methods for calculating LOS are given in the Transportation Research Board’s (TRB) Highway Capacity Manual (HCM), recently revised in the year 2000. US 31 and its major intersections were analyzed in accordance with this method to determine their LOS. Between Plymouth and South Bend, US 31 was analyzed in eight segments on the basis of traffic counts conducted in the year 2000, and an LOS was determined for each segment. An LOS was calculated for all four signalized intersections and six notable two-way stop-controlled intersections (stop control for the crossroad approaches) based on traffic counts conducted in the year 2002. Table 2.1.1 shows the base (year 2000) and future (year 2030) LOS of the US 31 segments. Table 2.1.2 shows the base (year 2002) and future (year 2030) LOS at major intersections. Figure 2.1.1 shows segments and intersections failing to meet INDOT minimum design standards for LOS for the base and future years.

Termini	Area Type	2000 Base Year				2030 Future Year			
		AADT*	Daily Vehicle Capacity	V/C Ratio	LOS	AADT	Daily Vehicle Capacity	V/C Ratio	LOS
US 30 - Michigan Rd.	Rural	16,989	39,800	0.43	B	23,500	39,800	0.59	C
Michigan Rd. – US 6	Rural	24,232	39,800	0.61	C	35,200	39,800	0.88	E
US 6 – Tyler Rd.	Rural	19,845	22,300	0.89	E	28,200	22,300	1.26	F
Tyler Rd. – Lake Trail	Rural	21,400	39,800	0.54	C	29,300	39,800	0.74	D
Lake Trail – SR 4	Rural	27,217	22,300	1.22	F	40,300	22,300	1.81	F

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Table 2.1.1 Continued: Base and Future Years' Levels-Of-Service of US 31 Segments

Termini	Area Type	2000 Base Year				2030 Future Year			
		AADT*	Daily Vehicle Capacity	V/C Ratio	LOS	AADT	Daily Vehicle Capacity	V/C Ratio	LOS
SR 4 – Miller Rd.	Rural	24,240	27,700	0.89	E	34,400	27,700	1.24	F
Miller Rd. - Roosevelt Rd.	Urban	26,419	27,700	0.95	E	37,500	27,700	1.35	F
Roosevelt Rd. - US 20	Urban	31,526	27,700	1.14	F	46,000	27,700	1.66	F

Note: Shading denotes failure to meet INDOT minimum design standards for LOS of C in rural areas and D in urban areas.
 * AADT is average annual daily traffic.

Table 2.1.2: Base and Future Years' Levels-of-Service for US 31 Intersections

	Area Type	2002 Base Year		2030 Future Year	
		AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
Signalized Intersections					
US 6	Rural	E	F	F	F
SR 4	Rural	B	B	D	E
Kern Road	Urban	E	D	F	F
Johnson Road	Urban	E	D	F	F
Major Unsignalized Intersections (two-way stop-controlled)					
Plymouth-Goshen Trail	Rural	C	C	D	E
W 5A Road	Rural	B	C	C	C
Tyler Road	Rural	E	D	F	F
New Road	Rural	E	F	F	F
Madison Road	Urban	C	C	F	F
Roosevelt Road	Urban	D	D	F	F

Note: Shading denotes failure to meet INDOT minimum design standards for LOS of C in rural areas and D in urban areas.

Base LOS conditions are unacceptable for the following:

- The year 2002, three out of four signalized intersections operate at an LOS E or F during the AM and/or PM peak hours
- The year 2002, three out of six major unsignalized intersections operate at an LOS D, E, or F during the AM and/or PM peak hours
- The year 2000, five out of eight US 31 segments operate at an unacceptable LOS. US 31, from US 6 through La Paz to Tyler Road, operates at an LOS E. US 31, from Lake Trail south of Lakeville to US 20, operates at an LOS E or F

Future (year 2030) LOS conditions are unacceptable for the following:

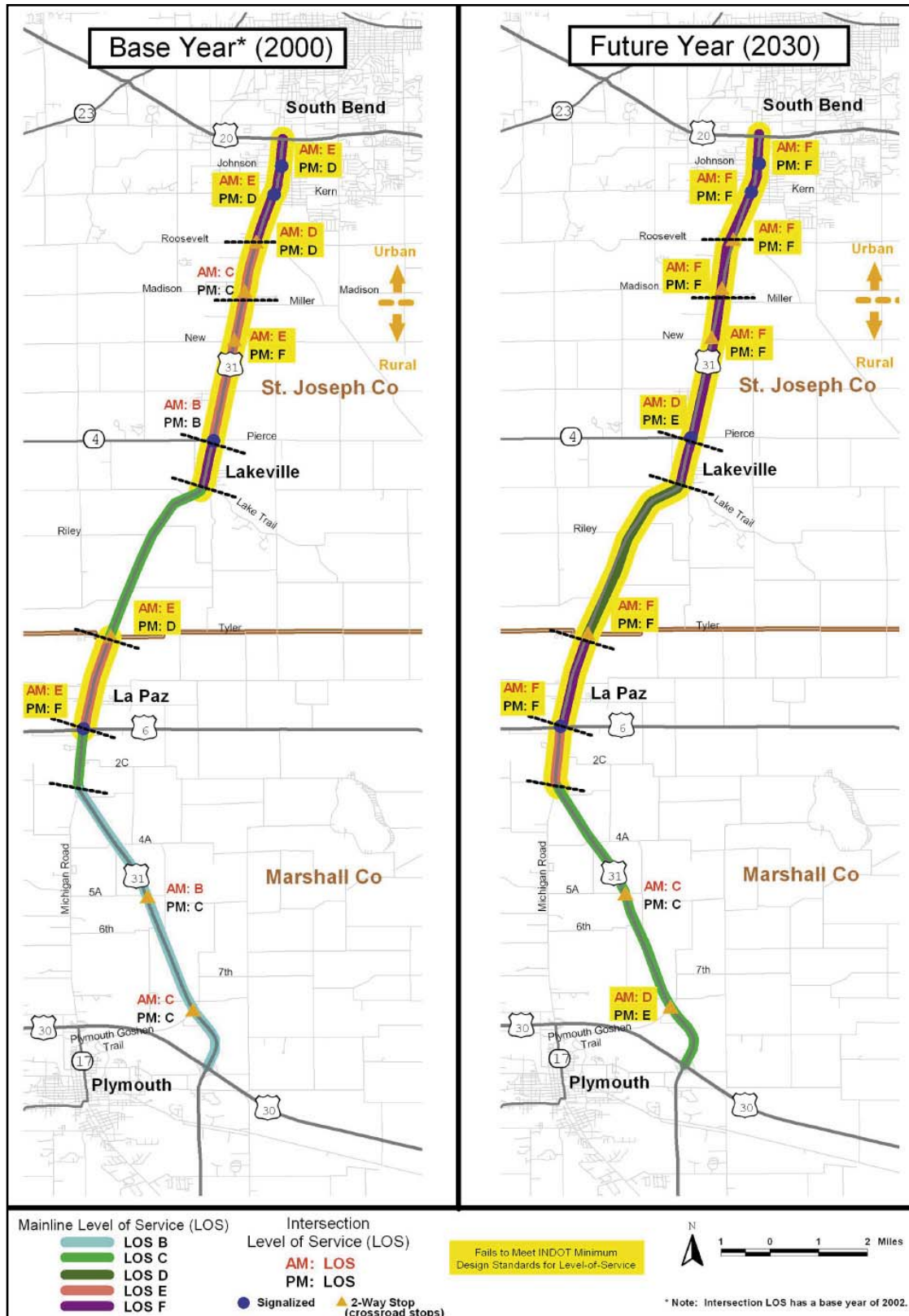


Figure 2.1.1: US 31 Segments and Intersections Failing to Meet INDOT Minimum Design Standards for Level-of-Service (LOS) (assuming no improvements to US 31)



- The year 2030, four out of four signalized intersections operate at an LOS D, E, or F during the AM and/or PM peak hours
- The year 2030, five out of six major unsignalized intersections operate at an LOS D, E, or F during the AM and/or PM peak hours
- The year 2030, all US 31 segments operate at an unacceptable LOS, except the most southern one from US 30 to Michigan Road

2.2 Safety

Base and future crash rates on segments of US 31 were compared to the average statewide crash rates for rural principal arterials (the primary functional classification for US 31). Traffic crash (accident) statistics for the three-year period from 1997 to 1999 for US 31 between Plymouth and South Bend were analyzed and compared to Indiana statewide average crash rates for rural principal arterial roadways. The analysis found that US 31 through the corridor has accident rates above Indiana statewide averages for both injury accidents and fatal accidents. These findings reveal that crash rates on US 31 exceed those of comparable facilities throughout the state. Table 2.2.3 below shows the contrast between crash rates for US 31 and the average rates for rural principal arterials in Indiana and nationwide.

Table 2.2.3: Crash Rate Comparison of US 31 from US 30 to US 20

Route	Injury Crashes (1997-1999)	Injury Crash Rate*	Fatal Crashes (1997-1999)	Fatal Crash Rate*
US 31 Plymouth-South Bend	204	50.39	9	2.22
Indiana Rural Principal Arterials	8,485	47.15	353	1.96
U.S. Rural Principal Arterials ¹	349,047	50.87	15,128	2.12

Notes: * Per 100 million annual vehicle-miles of travel; the crashes used in this chart are investigated crashes only.
 Source: For US 31, Bernardin, Lochmueller & Associates, Inc. analysis of INDOT Division of Program Development Crash Location-report for St. Joseph and Marshall counties; for Indiana and U.S. Rural Principal Arterials, INDOT Division of Program Development Indiana Motor Vehicle Fatalities and Injuries, 1997-1999. Averages were revised 1/22/02.

Crash rates are equal to fatal and personal injury crashes plus property damage only (PDO) crashes per 100 million annual vehicle-miles of travel. The statewide average crash rate for rural principal arterials is 186.57 accidents per 100 million annual vehicle miles of travel. Base and future total crash rates on US 31 exceed the statewide average from US 6 through La Paz, through Lakeville, and from Lakeville to US 20 as shown in Table 2.2.4. Figure 2.2.2 shows the areas of US 31 where crash rates exceed the statewide rates for the years 1997-99 and are projected for the year 2030.

2.3 Consistency with Transportation Plans

US 31 is designated a Commerce Corridor and a Statewide Mobility Corridor in the INDOT 2000-2025 Long Range Transportation Plan. The Indiana General Assembly in 1991 passed legislation directing INDOT to establish Commerce Corridors. A Commerce Corridor connects major population concentrations to the National Highway System, and provides good connectivity to major manufacturing and trade service concentrations. It also improves access to tourism and recreation areas, economic concentrations, and those areas with demonstrated and anticipated potential

¹ National injury crash data estimated based on 1997 data alone, as 1998 and 1999 data is unavailable.



Table 2.2.4: Crash Rate Comparison of US 31 Segments ²								
Segments	Injury Crashes	Injury Crash Rate*	Fatal Crashes	Fatal Crash Rate*	PDO Crashes	PDO Crash Rate*	Total Crashes	Total Crash Rate*
Existing Conditions Annual Average for Years 1997 to 1999								
US 30 to LaPaz	8	17.33	0.7	1.51	33	75.34	42	94.17
through LaPaz	1	45.60	0.3	11.40	6	193.81	7	250.82
LaPaz to Lakeville	2	8.76	0.0	0.00	10	36.28	12	45.04
through Lakeville	11	120.60	0.0	0.00	30	335.43	41	456.04
Lakeville to US 20	46	86.69	2.0	3.77	79	149.52	127	239.98
Rural Principal Arterials	2,828	47.15	118	1.96	8,244	137.45	11,190	186.57
Future Conditions in Year 2030**								
US 30 to LaPaz	12	17.33	1.1	1.51	50	75.34	64	94.17
through LaPaz	1	45.60	0.4	11.40	9	193.81	11	250.82
LaPaz to Lakeville	3	8.76	0.0	0.00	15	36.28	18	45.04
through Lakeville	17	120.60	0.0	0.00	47	335.43	64	456.04
Lakeville N to US 20	70	86.69	3.1	3.77	121	149.52	194	239.98
Rural Principal Arterials	3,791	47.15	158	1.96	11,052	137.45	15,002	186.57
Notes: * Per 100 million annual vehicle-miles of travel; the crashes used in this chart are investigated crashes only. Shading denotes rates exceeding Indiana statewide average for rural principal arterials. **Future crashes were projected by the application of existing rates to projected vehicle-miles of travel. Source: For US 31, Bernardin, Lochmueller & Associates, Inc. analysis of INDOT Division of Program Development Crash Location Report for St. Joseph and Marshall counties; for Indiana Rural Principal Arterials, INDOT Division of Program Development Indiana Motor Vehicle Fatalities and Injuries, 1997-1999 Averages, revised 1/22/02.								

growth. The Commerce Corridor designation is more restrictive than the Statewide Mobility Corridor designation. This designation consists of Interstates plus select arterials with full or partial access control that are identified as having significant importance to statewide and national transportation. When compared to other Commerce Corridors, US 31 lacks good connectivity without even partial access control along most of the corridor, and provides poor mobility due to congestion.

A Statewide Mobility Corridor is the highest tier of INDOT’s three-tiered planning-level corridors. Such corridors have upper level design standards, high-speeds, minimal travel delay, free-flowing conditions, and no less than partial access control. Attainment of these minimum characteristics for US 31 requires reduced congestion, increased speeds, reduced travel times, and establishment of at least partial access control. Other characteristics typically associated with a Statewide Mobility Corridor include: serves long-distance trips, large through traffic volumes of traffic, and heavy commercial vehicle flows; carries longer distance commuter traffic; is generally multi-lane divided, full access control desirable, railroad and highway grade separation desirable, and desirable to bypass congested areas; has no non-motorized/pedestrian interaction; and has major river crossings.³

² All crash rates are given per 100 million annual vehicle miles of travel. Crash totals and rates reflect investigated crashes only. US 31 is classified as a rural principal arterial on all of the segments except from north of Miller Road to the US 20 Bypass, where US 31 is classified as an urban principal arterial.

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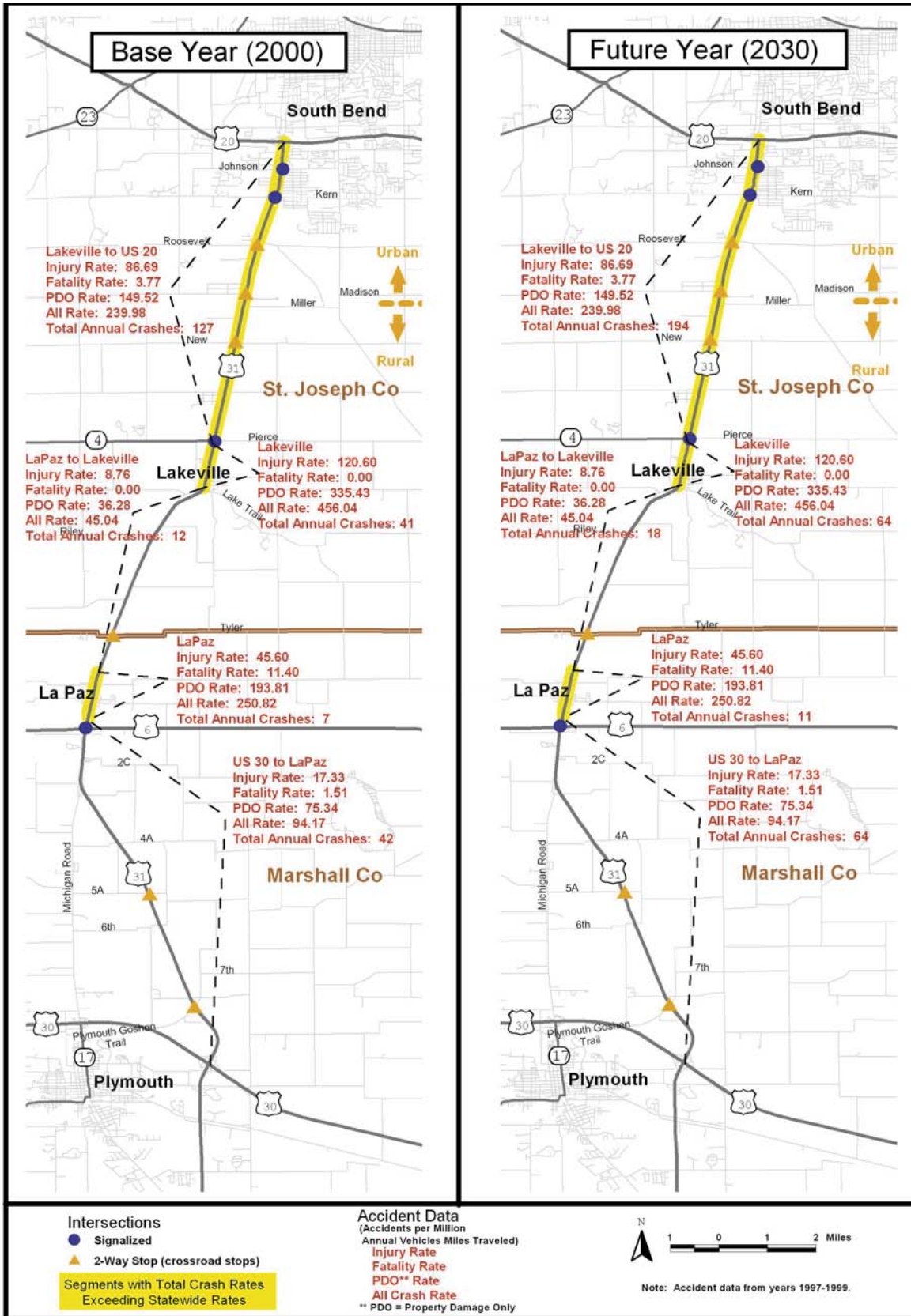


Figure 2.2.2: US 31 Segments with Crash Rates Exceeding Statewide Rates (Assuming no improvements to US 31)



The Michiana Area Council of Governments (MACOG, South Bend Area Metropolitan Planning Organization, MPO) Transportation Plan identified the need to improve existing US 31. The 2025 Transportation Plan published by MACOG for the South Bend Metropolitan Area also called specifically for the improvement of US 31 as a result of traffic operational failures identified in the level-of-service analysis of the plan. Failures were identified along segments of US 31 from US 20 to Kern Road and New Road to Pierce Road in years 2005 through 2025. Therefore, the MPO's plan proposed that US 31 should be improved to "a new limited access road with interchanges at several locations and would continue south from US 20 in St. Joseph County to US 30 in Marshall County."⁴ This recommendation to improve US 31 from US 20 to US 30 was reiterated in March of 2002, in MACOG's 2025 Transportation Plan Update.⁵ Therefore, it is desirable that alternatives to improve US 31 be consistent with the improvements called for in the MPO's 2025 Transportation Plan for the South Bend Metropolitan Area.

2.4 Project Purpose and Need Statement

2.4.1 Project Need Statement

Transportation improvements to US 31 between US 30 and the US 20 Bypass are needed for the following reasons:

Reduce Traffic Congestion

- For the year 2002, three out of the four signalized intersections operate at an LOS E or F during the AM and/or PM peak hours (where LOS C is minimally acceptable for rural areas and LOS D is minimally acceptable for urban areas based on INDOT's current standards)
- In the year 2030, all currently signalized intersections will operate at an unacceptable LOS
- For the year 2000, five out of eight segments of US 31 operate at an unacceptable LOS
- In the year 2030, all segments of US 31 will operate at an unacceptable LOS, with the one exception being the segment between US 30 and Michigan Road

Improve Safety

- Base and future total crash rates on US 31 exceed the statewide average for about half the length of the 20-mile corridor, including segments from US 6 through LaPaz, through Lakeville, and from Lakeville to US 20
- Base and projected future injury crash rates or fatal crash rates on US 31 exceed the statewide average for 40% of the corridor length

Consistency with Transportation Plans

- Existing US 31 lacks even partial access control for 15 miles from Michigan Road to the US 20 Bypass, where about 480 private driveways exist

³ INDOT *Statewide 2000-2025 Long Range Transportation Plan (2001 Update)*, pages 82 and 83.

⁴ *2025 Transportation Plan for South Bend/Elkhart/Goshen Transportation Management Area*; Michiana Area Council of Governments (MACOG); April 1999; pages 45-49 and 98.

⁵ *2025 Transportation Plan Update*; Michiana Area Council of Governments (MACOG); March 18, 2002; page 39.



- Existing US 31 also lacks adequate median width for left-turns through LaPaz and through Lakeville to the US 20 Bypass

2.4.2 Project Purpose Statement

Based on the identified transportation needs, three overall project purposes (goals) have been established for the US 31 Improvement Project:

- 1) Purpose 1 (Congestion): Reduce congestion on US 31 by providing the capacity to meet the forecasted travel demand for 2030 at an acceptable LOS
- 2) Purpose 2 (Safety): Improve safety on US 31 between US 30 and US 20
- 3) Purpose 3 (Consistency with Transportation Plans): Determine consistency with statewide (INDOT) and regional (MACOG) transportation plans

Project Alternatives will not be required to meet the third criterion in order to satisfy purpose and need. As previously discussed, US 31 has been designated a Statewide Mobility Corridor by INDOT's 2000-2025 Long Range Transportation Plan, is part of the NHS, 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.

2.4.3 Evaluation Criteria for Meeting Purpose and Need

Specific objectives and performance measures have been developed for each of the three identified purposes. The three purposes of the project and the performance measures for each are listed below.

Purpose 1 (Congestion): Reduce congestion on US 31 by providing the capacity to meet the forecasted travel demand for 2030 at an acceptable level-of-service (LOS).

Performance Measures:

- Achievement of an LOS in rural and suburban areas of C (B is preferable) and in urban intermediate/built-up areas of no less than D (C is preferable) on US 31 between US 30 and US 20
- Reduction in the amount of congested vehicle-miles of travel and congested vehicle-hours of travel in the South Bend metropolitan area

Purpose 2 (Safety): Improve safety on US 31 between US 30 and US 20.

Performance Measures:

- Reduction in the risk of fatal, injury, and property damage only (PDO) crashes to crash rate levels at or below statewide averages for this type of facility associated with travel on US 31 between US 30 and US 20
- Reduction in fatal, injury, and PDO crashes to crash rate levels at or below statewide averages for this type of facility in the South Bend metropolitan area



Purpose 3 (Consistency with Transportation Plans): Determine consistency with the statewide (INDOT) and regional (MACOG) transportation plans.

Performance Measures:

- Determine consistency with the INDOT 2000-2025 Long Range Transportation Plan for Statewide Mobility Corridors and consistency with the MACOG Transportation Plan. Project alternatives will not be required to meet this criterion in order to satisfy purpose and need

The screening process involves testing each alternative to determine to what degree each meets the Purpose and Need Statement with respect to its associated objectives and performance measures.



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