



## Chapter 2: Purpose and Need

A draft Purpose and Need Statement for the US 31 Improvement Project from Plymouth to South Bend in Marshall and St. Joseph counties, Indiana, was completed in March 2003. It was presented at a Community Advisory Committee (CAC) and a Public Information Meeting on April 10, 2003, and at an Interagency Review Meeting on May 15, 2003. The draft 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 Project Purpose and Need Statement

#### 2.1.1 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 unacceptable levels (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 new construction/reconstruction design 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 on comparable facilities for about half the length of the 20-mile corridor, including sections from US 6 through LaPaz, through Lakeville, and from Lakeville to US 20.
- Base and 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.
- Existing US 31 also lacks adequate median width for left-turns through LaPaz and through Lakeville to the US 20 Bypass



## 2.1.2 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 item 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.

## 2.1.3 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 a LOS in rural and suburban areas of C (B more desirable) and in urban intermediate/built-up areas of no less than D (C is more desirable) 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 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 item 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.



## 2.2 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 along US 31 to an unacceptable level from the Michigan Road interchange (Old US 31, north of Plymouth) to the US 20 Bypass.

In order to be able to predict future traffic volumes within the study area for this project, a travel demand model was developed. The travel demand model developed for this project, the US 31 Corridor Travel Demand Model, began with the Indiana Statewide Travel Demand Model (INSTDM) that is utilized by INDOT to predict future traffic volumes on a statewide basis.

During the initial development of the INSTDM in 1998, the state was subdivided into travel analysis zones and origin-destination (OD) studies were performed. At that time, the INSTDM included only the State of Indiana and the abutting Chicago, Cincinnati, and Louisville metropolitan areas, with a base year of 1998, a future year of 2025, and included only the roadway system maintained by the state. For the I-69 Evansville to Indianapolis Tier 1 Environmental Impact Statement (EIS), the geographic area of the ISTDM was expanded to include major portions of surrounding states (I-57 in Illinois, Western Parkway and I-71 in Kentucky, I-94 in Michigan, and I-75 in Ohio). The modeled roadway network was also expanded in the 26 counties in southwest Indiana associated with the I-69 Tier 1 EIS to include all roadways classified as Rural Major Collectors or higher, regardless of maintenance responsibility. The I-69 version of ISTDM was validated in February 2001 and is documented in Appendix V of the I-69 Evansville to Indianapolis Tier 1 FEIS (December, 2003). The I-69 version of the ISTDM was next updated to include the results of the year 2000 Census while maintaining the modeled roadway network, the travel analysis zone structure, and the future year of 2025.

The US 31 Corridor Travel Demand Model expanded the INSTDM by:

- Adding to the INSTDM roadway network to include all roadway network contained in the MACOG metropolitan model for St. Joseph County and all roadways classified as Rural Minor Collectors or higher in Marshall County,
- Extrapolating the travel analysis zone forecasts from the year 2025 to the year 2030,
- Disaggregating the ISTDM travel analysis zones to:
  - Reflect the MACOG metropolitan zonal system north of the US 20 Bypass,
  - Create smaller zones than the MACOG zonal system south of the US 20 Bypass in St. Joseph County (approximating that of the previous US 31 St. Joseph/Marshall County Major Investment Study (MIS) traffic model), and
  - Create a new zonal system in Marshall County approximating Census Block Groups.

Modeling more roadway network with a higher number of smaller travel analysis zones generally results in a more accurate travel demand model that can provide data on a much smaller scale. This expanded travel demand model was developed to provide more detailed information within St. Joseph and Marshall counties while maintaining the



balance of the INSTDM outside of these two counties. The performance and accuracy of the US 31 Corridor Travel Demand Model was checked against actual traffic counts within the US 31 study area and its accuracy was validated when it was found to replicate those traffic volumes within 5%.

Following the development of a US 31 Corridor Travel Demand Model that accurately models the existing travel patterns, future population and employment data by travel analysis zone was inserted to predict future traffic conditions within the study area. The development of the future (Year 2030) traffic conditions utilized population growth and employment growth trends to establish county-wide control totals; then, the 30-year increment in growth by county was allocated to travel analysis zones based on development activity. Development activity information included population and employment change patterns from the MACOG Travel Demand Model, current land use and zoning, future land use patterns of local comprehensive plans, and marketing information on industrial, commercial and residential developments. The long range transportation plans and transportation improvement programs for MACOG and INDOT were reviewed to identify both the major roadway improvement projects completed since the year 2000 as well as those projects currently programmed for future completion. The addition of both the major roadway improvement projects completed since the Year 2000 as well as those projects currently programmed for future completion to the roadway network of the Year 2000 creates the existing-plus-committed roadway network. This existing-plus-committed roadway network represents the No Build Alternative for the future year 2030 that has served as the baseline when comparing the effectiveness and potential impacts of other alternatives throughout the study.

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 new construction/reconstruction (4R) design standards outlined in the Indiana Design Manual, a LOS “C” is the minimum acceptable for rural and suburban areas, and LOS “B” is more desirable. In urban intermediate and built-up areas, a LOS “D” is the minimum acceptable, and LOS “C” is more desirable.

The United States Census Bureau has established a definition of urban and rural that is used uniformly through the nation and has been utilized for this project. An Urbanized Area (UA) or Urban Cluster (UC) consists of core Census Block Groups or Census Blocks with at least 1,000 persons per square mile and surrounding Census Blocks that have an overall density of at least 500 persons per square mile. All territory located outside UAs or UCs is classified as rural. This definition may be found on the US Census Bureau website under “Census 2000 Urban and Rural Classification”. 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 LOS “C” is the minimum acceptable and any level below that is unacceptable.

The methods for calculating LOS are given in the Transportation Research Board’s (TRB) Highway Capacity Manual (HCM), and were revised in 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 a LOS was determined for each segment. A 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 2.2.1 shows the base (year 2000) and future (Year 2030) LOS of the US 31 segments. Table 2.2.2 shows the base (year 2002) and future (year 2030) LOS at major intersections. Figure 2.2.1 shows segments and intersections failing to meet INDOT minimum design standards for LOS for the base and future years.