

CHAPTER II

Purpose and Need

The goal or purpose of the overall program of I-70 improvements is to provide a safe, efficient, environmentally sound and cost-effective transportation facility that responds to corridor needs as well as expectations of a national interstate. This Final Environmental Assessment (FEA) addresses the area designated as SIU 2. SIU 2 encompasses 60 miles (100 kilometers) of I-70 in Missouri, generally between Route 131 (not including the interchange) in Odessa to Route 5 (not including the interchange) near Boonville.

The overall purpose and need for the proposed improvements to SIU 2 has several components, including:

- Addressing improvements needed to conform to current highway design standards;
- Improving safety for the traveling public;
- Improving efficiency of the transportation system: capacity and travel time;
- Addressing economic development and related transportation requirements: truck/goods movement and seasonal recreation traffic;
- Meeting national needs for a strategic highway corridor network

The primary proposed improvements within SIU 2 would include the mainline (through lanes), bridges, frontage roads and interchanges associated with I-70.

A. Roadway Design Features

Corridor Design Criteria

MoDOT, in coordination with FHWA, has established overall corridor-level design criteria and guidance for the Second Tier preliminary engineering studies of the I-70 improvements. These design criteria are generally based on the MoDOT "Project Development Manual" and the AASHTO "Policy on Geometric Design of Highways and Streets, 2001", Fourth Edition. These criteria represent current engineering standards for the design of freeways of this type; as such it is considered a good practice not to deviate from these standards unless it is unusually difficult to construct a facility meeting the desired criteria.

Some selected criteria for the design of the Interstate are as follows:

- Design Year: 2030;
- Number of lanes (Basic): 6;
- Design speed: 75 miles per hour (120 kilometers per hour);
- Lane width: 12 feet (3.7 meters);
- Median Width: 120 to 130 feet (37 to 40 meters);
- Shoulder width: 12 feet (3.7 meters);
- Safety Clear Zone: 32 feet (9.75 meters)*;
- Maximum Horizontal Curve: 1 degree and 30 minutes;
- Vertical clearance over I-70: 19 feet (5.8 meters);
- Grade: 3 %;
- Crest Vertical Curve K-value: 312;
- Sag Vertical Curve K-value: 206.

*Note: The actual clear zone will vary somewhat based on other geometric conditions and design considerations. Some objects that are protected may be located within the clear zone.

For more detail of design criteria, the Technical Memorandum titled “Median Area Study Design Criteria and Cost Estimating Guide” is available upon request.

B. Traffic Safety

Crash statistics and safety data summarized or presented in this section are protected under federal law (see Appendix D of the DEA).

Results of the traffic analysis for SIU 2 are discussed in detail in Chapter II of the DEA. A summary of crash statistics from 1995 through 2001 shows that there were 2,349 total crashes, 53 of which were fatalities, in SIU 2. Twelve crashes resulted in fatalities during the last year that data are available. The fatal rate in SIU 2 is slightly higher, 1.42 fatalities per 100 million vehicle miles traveled, than the fatal rate of the I-70 corridor, 1.37 fatalities per 100 million vehicles miles traveled.

Improving travel safety is a primary goal for transportation agencies. Based on estimations, unless I-70 is improved, there could be an additional 111 fatalities in SIU 2 by the year 2030 (DEA, Table I-4). These crash and fatality rates and the anticipated trend toward more crashes and fatalities characterize the primary purpose and need of the Preferred Alternative. Crash data collected during 2002 and 2003 was evaluated against the six-year crash data from 1995 to 2001. This new data was considered to be consistent with six-year crash data.

C. Transportation System Efficiency

Traffic trends indicate that congestion levels and travel times on I-70 outside of and within SIU 2 would increase in the future. Although transportation system efficiency degradation on the mainline of I-70 and at the interchanges within SIU 2 would be less severe than in some of the other SIUs, the changes would be substantial by 2030 in SIU 2. Over time, the levels of congestion, frequency that congestion is a problem and the duration of congested periods would all increase as volumes increase unless capacity improvements are made.

Using the base year (2000) and forecasted (2020 and 2030) traffic volumes along I-70, operational analyses were completed to determine the ability of the existing I-70 facility to serve the corridor’s travel demands. The analysis was performed using the basic freeway subsection methodologies from the *Highway Capacity Manual* (HCM). The analysis calculates a level of service (LOS) for freeway sections based upon hourly volumes, percent of heavy vehicles in the vehicle mix and the freeway subsection attributes.

The quality of traffic flow is measured by comparing existing traffic flow to established levels of traffic service. These levels of service are defined in the HCM. The HCM defines LOS as a quality measure describing operational conditions within a traffic stream, generally in terms of such service measures as speed and travel time, freedom to maneuver, traffic interruptions and comfort and convenience (HCM, 2000). The LOS ranges from the most desirable, LOS A, to the least desirable flow, LOS E. Non-flowing conditions are referred to as LOS F.

Mainline Level of Service

The results of the roadway LOS analysis for mainline sections indicates that in 2020, five of the 14 subsections in SIU 2 would have insufficient capacity (i.e., number of lanes) to adequately serve the daily traffic demand according to MoDOT's desired service standards – LOS C in more rural areas and LOS D in more urban areas. In 2030, this analysis indicates that all of the subsections within SIU 2 would operate below LOS C (Table II-9, DEA). These subsections of I-70 would be near conditions of unstable flow, lowered operating speeds, congested stop-and-go travel and traffic volumes that exceed the capacity of the roadway.

Interchange Level of Service

The four I-70 ramps at each interchange connect to the north/south crossroads. The north/south crossroads distribute I-70 traffic onto and off of the local road network. Based on an analysis of the traffic volumes on the north/south crossroad and the traffic volumes on I-70, LOS for the ramps-merge and diverge lanes and the overall intersection at each interchange were calculated. Ramp interchange LOS B conditions in the year 2000 would fall to LOS D conditions or below (I-70/Route 13, Westbound-LOS F) at every interchange in SIU 2 except those with low crossroad volumes (DEA, Table I-6).

While LOS D is tolerable for interchanges, according to transportation planning policy, the corridor wide changes to LOS D from LOS B represent a substantial degradation in system efficiency and would represent a substantial statewide problem if other SIU improvements are made and interchange improvements in SIU 2 lag or are not implemented in a timely manner.

D. Address Economic Development and Related Transportation Requirements

Interstate 70 serves a vital economic role within Missouri and the nation and serves a wide range of economic development interests along the way. More specifically, many communities along I-70 in SIU 2 and elsewhere have oriented their commercial and industrial development approvals and other planning decisions around existing interchanges. These communities depend on the services I-70 offers motorists (commuters, other drivers and truck drivers) and the corresponding tax revenue generated by businesses linked to travelers on I-70. This dependency, especially in relation to the economies and fiscal health of the relatively small communities within SIU 2 makes them highly vulnerable to I-70 conditions. Inadequate access management at interchanges may lead to congestion that limits economic development. Across SIU 2, the dependencies to I-70 vary, but overall, they represent a substantial need to maintain and improve access conditions in the future.

Another key element of economic health in Missouri is tourism. SIU 2 through its connections with U.S. 65 and Route 13 provides access to the scenic Ozarks region, which includes statewide attractions such as Lake of the Ozarks, Harry S. Truman Reservoir and Branson. Routes 23 and 131 and U.S. 65 provide primary north-south connections to these tourism destinations and others both north and south of I-70. Adequate mainline and interchange access to and from I-70 is important to maintain and enhance tourism across Missouri.

The need to provide state and regional access is MoDOT's goal and adequate access for commerce would become increasingly unreliable in the future as travel efficiencies degrade. In summary, future improvements to I-70 are needed to maintain appropriate service for interstate

commerce, adequate access for maintaining economic and fiscal health of communities within SIU 2 and to serve and sustain tourism in Missouri.

E. National Security

The need to have efficient, convenient and expeditious movement of large quantities of people and goods requires that transportation systems must have a high degree of access. In cases such as the highway system, access is almost unlimited. Along with the open access, most of the transportation infrastructure was designed and constructed long before concerns about national security and terrorism had arisen. Although the highway system has many of the same vulnerabilities as other surface transportation modal systems, the highway system provides an additional system if other transportation systems are impaired. To provide the necessary transportation system, the individual corridors must have the ability to meet the demands if other links are impacted. The other key to taking advantage of duplication in the system is the ability to provide systems status information. Current planning related to the highway system security is focusing on:

- Protecting critical mobility assets;
- Enhancing traffic management capabilities; and
- Improving state department of transportations emergency response capabilities.

The American Association of State Highway and Transportation Officials' (AASHTO) Transportation Security Task Force identified that investment in these three security initiatives will yield other general mobility benefits. The reverse is also true. Investments in general highway system enhancements, such as improving the I-70 corridor, will yield security benefits. Additional available capacity along the I-70 corridor would increase the ability of the corridor to handle diversion from other highway links should some type of disaster occur. The increased available capacity also enhances the ability to handle emergency responses.

The I-70 corridor is part of the Strategic Highway Network (STRAHNET) and two interchanges within SIU 2 (Route 13 and U.S. 65) provide connections to STRAHNET. The STRAHNET is designed to facilitate the movement of personnel and equipment for deployment and emergency response. Proposed intelligent transportation system (ITS) implementation along the corridor would assist in protecting critical assets and would enhance traffic management capabilities. Closed-circuit television cameras could be used for surveillance of critical assets such as major bridges. Alarm systems can also be facilitated by the ITS communication network. The physical protection of assets would be considered as part of the design process. An example may be designing a barrier system to eliminate the ability of vehicles to park under critical bridges.

During the final design process, a risk assessment based approach would be used to determine the appropriate investment in security. One approach to the issue of transportation security is the concept of a layered security system, where multiple security features are connected and provide backup for one another. This approach offers the advantage that perfection from each element of the system is not required, as other elements can compensate for any deficiencies. At the same time, enhancements to one layer of the system could boost the performance of the system as a whole. Improving I-70 can help to increase transportation system security in Missouri and across the nation as a whole.