

Purpose and Need

A. Project Overview

This chapter of the Environmental Impact Statement (EIS) provides a description of the transportation-related problems addressed by the proposed improvements, the purpose and need for the project, and the proposed action.

The Missouri Department of Transportation (MoDOT) and the Federal Highway Administration (FHWA) are proposing to make modifications to existing portions of the US 50/63 (Rex Whitton Expressway, also known as Whitton) facility in Cole County, Missouri. The Rex Whitton Expressway is located within Jefferson City and unincorporated Cole County, in Central Missouri (See Figure 1). Whitton is the officially designated portion of US 50 from the Tri-Level to Jackson Street within Cole County and Jefferson City. The portion of Whitton under study in this EIS process is located entirely within Jefferson City. In its entirety, Whitton consists of various roadway elements and types through the limits of the study area. This EIS examines capacity and operational improvements for Whitton; it describes existing problems in the corridor, discusses development of alternatives, examines potential impacts of the alternatives considered and identifies a preferred alternative.

Figure 1 – Regional Map



1. Project Termini

The proposed action is a continuation of the work begun with the 2006 Problem Definition Study. For the proposed action, the defined Whitton study corridor, as displayed in Figure 2, consists of a western terminus located at Bolivar Street with an eastern terminus of the study corridor at the Eastland Drive interchange and from 300 feet south of Whitton to McCarty Street on the north. Access to the Missouri State Penitentiary (MSP) Redevelopment site, which is located north of McCarty Street, will also be examined. The study corridor encompasses those areas that most directly affect downtown Jefferson City and the MSP site.

Figure 2 – Study Area



The study team will examine this portion of US 50 due to its transitions in roadway types from freeway to urban arterial and back to freeway. These transitions lead to traffic operation deficiencies involving unsatisfactory handling of high traffic volumes and the associated traffic congestion, especially during peak periods.

The study limits extend 300 feet south of Whitton to McCarty Street. This area will encompass potential access changes, including such as ramps for a new interchange should one be required. The study area extends to the Missouri River in order to include the MSP Redevelopment project.

2. Project Background

At the western termini of the study corridor the roadway transitions from the rural high-speed section to an urban arterial section. Whitton operates at a 45 mph speed limit, with curbs, raised medians, and signalized control of the at-grade intersections with the local city streets. As the route exits the eastern edge of the downtown area, it again becomes a controlled access facility with the 55 mph posted speeds and arterial type roadway characteristics on the outside and a raised median. This intermediate type section continues eastward from the downtown through the interchange with Clark Avenue. East of Clark Avenue and to the study limit, the expressway again becomes a 65 mph freeway type facility with full shoulders, as well as a wide, depressed median.

The City of Jefferson, Cole County and MoDOT completed a Problem Definition Study in April 2006. The study identified transportation deficiencies of the existing Whitton facility across the downtown section and the Central East Side section of Jefferson City, ending just east of the Eastland Drive interchange. That study looked at a number of improvement concepts for each of these areas and took a high-level look at environmental issues. The study did not draw conclusions nor make recommendations under the assumption that the National Environmental Policy Act (NEPA) process would be the next step. During the course of the project, the study team held a public meeting and two stakeholder meetings to obtain input into the identification of existing and potential deficiencies.

3. Major Attractions/Destinations in the Corridor

The Missouri State Capitol and a number of state and federal office buildings are important destinations in downtown Jefferson City. Located immediately east of the downtown government complex, the MSP Redevelopment Project is spurring change at the central east end of Jefferson City. The MSP (later named Jefferson City Correctional Center or JCCC), the first prison built west of the Mississippi River, opened in 1836. Today the entire site covers approximately 142 acres of river bluff land, seven blocks east of the State Capitol. The MSP has been decommissioned and the site, largely due to its size and proximity to the Capitol has provided an opportunity for redevelopment.

B. Purpose and Need for the Project

The purpose of the proposed project is to add capacity and improve safety consistent with best design practices along this three-mile (4.8 kilometers) section of Whitton. The proposed action will address several needs including:

- Roadway capacity and traffic operations
- Traffic safety
- Address structural and roadway needs
- Access to major activity centers and redevelopment areas

1. Provide Sufficient Roadway Capacity and Improve Traffic Operations

The Problem Definition Study identified the primary existing deficiency of Whitton as the unsatisfactory handling of the high traffic volumes and the associated traffic congestion, especially during the peak periods. There are multiple factors that affect capacity and traffic operations within the study corridor.

Three major routes, US 50/54/63 converge at the Tri-level interchange, with two of the routes going through downtown Jefferson City along Whitton. The lack of alternative routes for highway traffic forces all of the through highway traffic onto Whitton. The freeway section from

Jackson Street eastward through the Clark Avenue Interchange to the end of the study corridor is operating with good levels of service.

The downtown section of Whitton from Missouri Boulevard to Monroe Street is currently an arterial section with traffic signals at every intersection. The downtown-signalized section is operating near capacity today and some movements experience poor levels of service during the peak periods. The signalized intersections are the most critical capacity constraints for the downtown section, due to the close proximity to one another and the high traffic volumes that the signals are serving.

**Table I-1
Existing (2005*) and Forecasted (2035)
Daily Two-Way Traffic Demand**

Location	Existing	2035 No-Build
Bolivar to Jackson	33,779	75,000
Jackson to Clark	30,140	70,000
Clark to Eastland	--**	--**

* 2006 daily traffic volume data not available

** no daily traffic volume data available

**Table I-2
Year 2006 Two-Way Peak Hour Traffic Demand and Directional Distribution**

Location	No. of Lanes	Year 2006 AM Peak Hour Volume	Year 2006 PM Peak Hour Volume	AM Peak Hour Directional Distribution	PM Peak Hour Directional
Bolivar to Missouri Blvd	6	3272	3765	58.2%	64.7%
Missouri Blvd to Broadway	6	3192	3745	50.1%	58.5%
Broadway to Jefferson	4	2922	3764	56.7%	53.8%
Jefferson to Madison	4	2935	3720	54.0%	50.6%
Madison to Monroe	4	2881	3598	57.1%	53.6%
Monroe to Jackson	4	3078	3401	65.5%	52.2%
Jackson to Clark *	4	3065	3124	60.8%	55.6%
Clark to Eastland *	4	2988	2608	68.7%	62.0%

* 2005 traffic volumes used for these locations; 2006 data unavailable

**Table I-3
US 50 Current (2006) Peak Hour LOS
(AM and PM Peak Hour)**

Location	Facility/ Analysis type	Westbound No. of Lanes	Eastbound No. of Lanes	AM Peak Hour LOS	PM Peak Hour LOS
Mainline				WB/EB	WB/EB
Bolivar to Jackson	Arterial	2-3	2-3	C / D	*
Jackson to Clark	Freeway	2	2	C / B **	B / B **
Clark to Eastland	Freeway	2	2	B / A **	A / B **
Intersections/Interchanges				WB/EB	WB/EB
Missouri Blvd.	Signalized Int.			D	*
Broadway St.	Signalized Int.			B	*
Jefferson St.	Signalized Int.			B	*
Madison St.	Signalized Int.			B	*
Monroe St.	Signalized Int.			C	*
Clark Ave.	Unsignalized Int.			C / C **	B / E **
Eastland Dr.	Signalized Int.			B / B	B / B

* Results pending existing signal timing information

** Results based on 2005 traffic volume data; 2006 data unavailable

**Table I-4
US 50 Forecasted (2035) No-Build Peak Hour Mainline LOS
(PM Peak Hour)**

Location	PM Volume	PM Peak Hour LOS
Mainline		WB/EB
Bolivar to Jackson	2616-3847 / 2094-2554	F / F
Jackson to Clark	2616 / 2527	D / D
Clark to Eastland	1527 / 2771	B / C
Intersections/Interchanges		WB/EB
Missouri Blvd.		F
Broadway St.		E
Jefferson St.		F
Madison St.		F
Monroe St.		F
Clark Ave.		B / B
Eastland Dr.		*

* 2035 traffic volume data unavailable for this interchange

2. Improve Traffic Safety

The Problem Definition Study conducted a detailed review of crash data along the corridor to determine if there were any safety concerns or identified crash patterns attributable to deficiencies to the current roadway design or configuration. Previous analysis determined that the freeway sections of Whitton had many crashes, especially during wet or snow conditions. To address the situation, MoDOT completed a pavement-grooving project in 2001. A post study of the construction project determined that the grooving reduced the overall number of crashes by approximately 15 percent along the freeway sections.

Despite the completion of the grooving project, the corridor as a whole has crash rates that are higher than would be anticipated for this type of facility under normal traffic conditions. As detailed in Table I-5, the freeway section of Whitton east of Jackson Street, including the Clark Avenue interchange, has higher crash rates than the statewide average for similar freeway facilities.

**Table I-5
Rex Whitton Expressway Section Crash Rate Information**

Location	Total Crashes		Injury Crashes		Fatal Crashes	
	Project Rate	Statewide Rate	Project Rate	Statewide Rate	Project Rate	Statewide Rate
Bolivar to Jackson	899.65*	176.36 (1)	200.29*	49.23	1.67*	1.28
Jackson to Clark	221.45*	121.08 (2)	58.28*	31.04	5.83*	0.86
Clark to Eastland	179.96*	121.08 (2)	48.81*	31.04	2.22*	0.86

Note: Rates calculated per hundred million vehicle miles.
* Indicates rates higher than the comparable statewide rate
(1) Based on 1999-2003 5-year average for expressways
(2) Based on 1999-2003 5-year average for freeway sections

The crash history did not identify any specific locations, patterns or deficiencies that appeared to be substantial contributors or causes of the crashes along the corridor. The crashes within the freeway sections occurred throughout the corridor and did not appear to have any definitive patterns.

Table I-5 also shows that the most significant deviation from the statewide rate occurs in the section of the corridor between Bolivar Street and Jackson Street. Along this section of the corridor, the current crash rate is over 5 times higher than the rate for similar expressway facilities across the state. This is the most urban-like section of the expressway and commonly referred to as the triplets due to the at-grade intersections with Madison, Monroe, and Jefferson streets. Signals control each of the three at grade intersections.

The Problem Definition Study included a detailed review of the intersection crash history that further investigated the factors related to the high crash rates of the downtown section. Table I-6 provides details on the crash rates for five at-grade signalized intersections in the downtown area.

**Table I-6
Rex Whitton Expressway Intersection Crash Rate Information**

Location	Number of Crashes	Overall Crash Rate	Injury Crash Rate
Missouri Boulevard	113	1.21	0.27
Broadway Street	70	0.93	0.16
Jefferson Street	65	0.87	0.24
Madison Street	97	1.32	0.33
Monroe Street	95	1.39	0.29

Note: Rates are calculated per million entering vehicles. Intersection crash rates not tabulated by MoDOT.

Of these five signalized intersections, the intersection of Whitton and Missouri Boulevard experiences the highest number of crashes with 113 crashes. The intersection of Whitton and Monroe Street experienced the highest crash rate during the five-year study period, with 1.39

crashes per million entering vehicles. The majority of the crashes at each of these locations are of the rear-end variety which can be attributed to the congested conditions that exist through this portion of the corridor. This is very common along a congested, signalized corridor.

3. Address Structural and Roadway Needs

The Problem Definition Study discussed minor geometric deficiencies. In each of the distinct roadway sections, different design criteria and operational constraints exist. The freeway sections are a high-speed facility with wide medians and extensive clear zones. Through the downtown portion of the corridor, the roadway has a lower design speed and signalized at-grade intersections to provide local access. The transitional sections between the freeway portions and the downtown section have a mixture of both types of roadway elements that work to match the terrain and surrounding land use constraints.

The study looked at the following sections for geometric deficiencies:

a. Jackson Street Bridge and Rock Cut Section

The Jackson Street Bridge and associated roadway cut limits the width of the expressway and encroach within the required clear zone facility. The deficiency is technical in nature and a review of the crash rates did not identify this as a contributing factor or the cause of any crashes.

b. Jackson Street through Clark Avenue Interchange

The existing constructed fill slopes for this section of Whitton range between 55 percent and 70 percent slopes. Typically, slope embankments are between 33 percent and 50 percent. These steep fill slopes begin downward within a few feet of the back of curb. With no significant shoulders, the steepness of these slopes does not provide vehicles that leave the pavement sufficient opportunity for recovery until reaching the toe of the slopes. Review of the crash history as related to the embankment slopes did not identify any incidents attributable to the steepness of the slopes.

The existing expressway through the transitional section immediately east of Monroe has a mix of both high speed and low speed elements. The vertical and horizontal design is adequate for the 55 mph posted speed limit but there are no provisions for shoulders that typically would be present on roadways posted at this speed. In addition, the raised portion of the median is only two feet in width and provides only for a total separation of eight feet between opposing traffic, which is a low speed design element. The crash history indicated that some serious head-on injury accidents occurred within this section of the study corridor. MoDOT recently completed a project to construct a raised median barrier from Monroe Street eastward to where the freeway section begins west of the Eastland interchange to provide separation between the traffic and thus reduce the potential for head-on crashes.

c. Clark Avenue to Eastland Road

Within this high speed, freeway section of the study corridor, analysis revealed two locations with minor clear zone limitations that technically do not meet current design criteria.

As constructed, none of the existing bridge structures would allow widening of the expressway and very few can accommodate a widening without replacement. The three overpasses at Jackson Street, Chestnut Street and Clark Avenue are concrete rigid frames that have only 80 feet of horizontal clearance, making it difficult to widen to three lanes in each direction. Vertical clearance at the Jackson Street overpass is limited to 15'-8".

Most of the bridges are in good condition even though all but two are 43 to 48 years old. There is one bridge where the current condition is poor and will therefore affect all strategies. The

existing box culvert that runs under Miller Street is 1,300 feet long and is in need of repair or replacement prior to any widening of the roadway.

4. Improve Access to Major Activity Centers and Encourage Development

The Whitton study corridor continues to develop and redevelop with residential and commercial possibilities. The downtown section has the greatest potential for social and economic impacts given the proximity of neighborhoods and businesses. With the location of the State Capitol complex, as well as other government buildings in the downtown area, safe and efficient access to this part of the city is vital.

As mentioned above, the prison was decommissioned and the site, largely due to its size and proximity to the Capitol, provided an opportunity for redevelopment. In 2000, the State of Missouri commissioned an authority to plan the prison's redevelopment. The framework plan anticipates that the project will include the MSP Historic Area, Public Service Campus, Public Assembly Campus, Office Campus and Natural Resources Area. The plan identifies Lafayette and Chestnut streets as the main access points into the development from the local street network. There is some desire to create an additional interchange from Whitton with the one of the local streets in this area. This EIS will look at a corridor in this area for the possibility of additional access from Whitton to the MSP Redevelopment site.

C. Related Plans or Studies

1. County-Wide Thoroughfare Study

A report titled *County-Wide Thoroughfare Study for Cole County, Missouri & Jefferson City, Missouri – Final Report* was prepared in September of 2003 to assist Cole County and Jefferson City in determining the expected future impacts of development in relation to the roadway infrastructure improvements that would be necessary in order to provide the roadway capacity necessary to support approved land use master plans. The *Thoroughfare Study* included the results of analyses that utilized both existing traffic volumes recorded along major routes, and projected traffic volumes based on planned future development to identify capacity deficient intersections and corridors within the County and City. Recommendations involving Whitton included the following traffic control or geometric improvements:

- Traffic signal timing / phasing optimization at Broadway Street, Monroe Street, and the Eastland Drive interchange.
- Geometric modifications utilizing dual eastbound left-turn lanes at Missouri Boulevard.
- Traffic control improvements at the Clark Avenue interchange.

In addition, committed improvements programmed by MoDOT are included in the traffic model to account for anticipated and projected roadway and traffic control improvements including the addition of lanes between Broadway and Monroe, and modification of signalized intersections as required. The Thoroughfare Study also indicated that, by the year 2021, several intersections would potentially have capacity constraints and should be reviewed in detail to determine if improvements would be required. Those intersections along Whitton occur at Missouri Boulevard, Broadway Street, Jefferson Street, Madison Street, and Monroe Street. The study also stated that the Tri-level Interchange would still operate at poor levels of service due primarily to geometric layout and spacing between individual intersections, and no geometric improvements were recommended.

2. Central East Side Neighborhood Plan

The *Central East Side Neighborhood Plan* (CESN Plan) was prepared in August of 2005 and included recommendations and guidelines for land use and transportation/street improvements for the area east/southeast of the downtown area, to “foster economic development, promote historic preservation, and enhance the quality of life consistent with the comprehensive plan of the City of Jefferson”. The CESN Plan stated that the traffic capacity and operational concerns of Whitton be addressed in a separate study as these impact traffic operations throughout the neighborhood.

Some preliminary improvement alternative concepts that were presented in the CESN Plan included new interchanges at Lafayette Street and/or Chestnut Street with Whitton, and intersection modifications. These potential improvements are expected to not only satisfy the demands of neighborhood traffic, but also to manage the traffic volumes associated with the proposed MSP Redevelopment Project located adjacent to the northeast side of the Central East Side Neighborhood. The MSP project will consist of uses such as offices, restaurants, retail shops, museums, interpretive centers, a performing arts center, and a natural resource area. It is expected to become a major office park and visitor destination over the next decade, and will most likely bring new residents for the neighborhood and customers for local businesses. A comprehensive study of the MSP project is included in a report prepared in October of 2003 titled *The MSP Redevelopment Project: Framework Plan*.

3. Problem Definition Study – Rex Whitton Expressway

In April of 2006, a report titled *Problem Definition Study – Rex Whitton Expressway, Jefferson City, Cole County, Route 50/63: Final Report* was prepared “to identify the existing and potential future traffic operational and safety concerns that are occurring, or could occur, along the Whitton study corridor between Route 179 and the Eastland Street Interchange”. The study defined issues and recommended several types of improvements that may be required to satisfy the future traffic demands. Those related to the project corridor included the following:

- The existing freeway section east of Clark Avenue is expected to be able to handle the anticipated growth.
- The public desires additional access for the Central East Side (CES) Neighborhood and for the MSP redevelopment.
- A CES interchange should not be constructed without addressing the downtown congestion.
- Multiple access points to the local street system from the CES interchange are desirable for future traffic conditions.
- Clark Avenue ramp terminal intersections could be modified to roundabouts to enhance access for ramps and local streets.
- Local access through the downtown section is critical to local businesses.
- The downtown segment requires either 3 or 4 through lanes, plus multiple left and right turn lanes to satisfy traffic demands if all downtown intersections are to be maintained as at-grade signalized facilities. Alternatives to the widening of the existing facility were developed and include the separation of through traffic from local traffic and the creation of a separate elevated facility for these traffic flows.
- Socio-economic impacts (access, change of traffic distribution, displacements) in the downtown area will be a primary issue during the subsequent NEPA study and design. Continued public involvement and context sensitive solutions to neighborhood and business impacts will be important elements of that study.

4. Jefferson City Area Greenway Master Plan

Improvements to Whitton will also have to take into consideration existing and future non-vehicular means of transportation, including multi-use trails and greenways. The Jefferson City Area Greenway Master Plan, prepared in April of 2007, stated that there is a "...need for improved non-motorized connectivity across Highway 50..." (Whitton) because it "...acts as a major access barrier to non-motorized modes, as crossings are widely spaced and primarily devoted to automobile movement...".

The master plan document discussed several segments of trails/greenways within the City that are proposed or planned for the future. The East Branch Greenway Extension (East Elm Street to McCarty Street) is a proposed segment that will extend from the existing Wears Creek Bicycle/Pedestrian Path at East Elm Street, paralleling the East Branch of Wears Creek as it travels under Whitton to McCarty Street. The plan calls for another future segment of this trail planned to follow parallel to the north side of Whitton from Monroe Street to Missouri Boulevard. Other future segments include a trail paralleling Bolivar Street that travels over the Expressway, and a trail paralleling W. McCarty Street that travels under the Tri-Level Interchange. The plan noted Clark Avenue as a desirable location for a trail crossing, which would improve access across the Expressway to neighborhoods, existing greenways and parks, and the downtown area.

D. Planned System Improvements

The City of Jefferson has a project that connects to the section of Whitton under study in this EIS. The project is located at Eastland Drive at McCarty Street for a signal and roadway modification for extension of McCarty to the US 50/63 interchange. The lead agency on the project is the City of Jefferson. The project will be in design and construction in 2007.



Purpose and Need Technical Memorandum: Addendum

The Whitton Expressway EIS has worked through the process of developing a Purpose and Need and conducting an initial screening of alternatives in preparation of submitting a Draft EIS. During that process, resource and local agencies, along with the Citizen's Advisory group and the public have been involved and provided comments. These comments led to revisions in the Purpose and Need statement and the alternatives that are considered reasonable.

The study began with the following description of the needs to be addressed by the proposed action:

- Roadway capacity and traffic operations – the ability to handle high traffic volumes and congestion especially during peak periods;
- Traffic safety – reduce the number and severity of crashes on Whitton Expressway;
- Address structural and roadway needs – using engineering to reduce the opportunities for head-on crashes and add room for recovery or avoidance of obstacles;
- Access to major activity centers and redevelopment areas – provide access to the existing government center and areas that are currently redeveloping at the MSP site.

During the discussions with the community stakeholders and agencies one comment that has been made many times is that access to Lincoln University and Jefferson City High School is equally as important as access to the MSP site. The study team took these comments and revised the fourth bullet under needs and included a fifth bullet. This was done to highlight the importance of providing direct access to redevelopment areas to the north of Whitton as well as providing access to the south and existing activity centers. It is unclear exactly how and when the MSP site will fully develop. Lincoln University and Jefferson City High School already exist. By separating the two access issues, the screening process becomes more effective in identifying reasonable alternatives to be carried forward.

The Access to major activity centers and redevelopment areas bullet has now become:

- Improve access to the Missouri State Penitentiary and encourage development.
- Improve access to Lincoln University and Jefferson City High School.