

CHAPTER II

Alternatives

A. Introduction

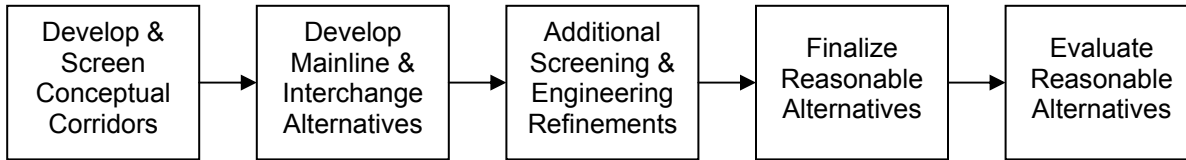
This chapter describes the process used to develop and evaluate potential improvements within SIU 7 that address the project's purpose and need. This process began at the completion of the First Tier EIS and included a number of improvement concepts. The initial I-70 SIU 7 improvement concepts included a variety of options for I-70, from the possibility of making modest improvements to the existing highway to constructing a new freeway in a new location. In addition, alternatives were explored at each interchange to meet anticipated development and projected traffic and travel demands.

Ultimately, a reasonable set of alternatives was developed for both the mainline and at each interchange within the project corridor. Each alternative was evaluated for its ability to meet the purpose and need requirements for this project. In accordance with the Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500 - 1508), only those reasonable alternatives that passed the screening process were selected for detailed evaluation. Those alternatives that did not meet the purpose and need requirements of this project are also described in this section.

B. Screening and Development of Alternatives

The study process consisted of a broad screening phase, a preliminary alternative development stage and a detailed study stage. The initial screening phase considered recommendations carried forward from the First Tier EIS and an evaluation of generalized north-south widening recommendations, also from the First Tier EIS. The preliminary stage identified a broad range of interchange and localized mainline alternatives and identified those that met the purpose and need requirements for this project, meriting further study. Although the proposed solutions address the entire project corridor, localized alternatives were developed along the mainline where localized conditions mandated and at each interchange. The detailed study stage was a thorough evaluation of those alternatives.

The initial I-70 SIU 7 improvement concepts included the possibility of constructing a new freeway in a new location and making modest improvements to the parallel portion of the existing highway, along with other alternative concepts that involved major improvements only to the existing facility. These initial concepts were first evaluated at the conceptual screening level. In the second step of the process, interchanges options were explored and mainline alternatives developed that addressed the project purpose. As engineering review and refinements were completed, the alternatives were refined or eliminated from further consideration. These were further refined in light of environmental constraints. In the third analysis phase, a set of reasonable project alternatives was evaluated in greater detail. This process is illustrated in Figure II-1 and described in detail in the following sections of this chapter.

Figure II-1: Alternatives Development Process

1. Scoping Process

This process of screening the initial strategies through a testing of the purpose and need, followed by a more detailed evaluation of the reasonable alternatives was coordinated with the public and agency coordination program. Through a collaboration involving the public and a number of state and federal agencies, a general consensus of the potentially affected public and review agencies was developed.

2. Methodology

A range of alternatives was developed for the I-70 SIU 7 project corridor. Each of these alternatives was evaluated for its ability to meet the purpose and need requirements of this project. In accordance with the Council on Environmental Quality (CEQ) regulations, only those reasonable alternatives that passed the screening process were selected for detailed evaluation in this Draft EIS.

Those alternatives that did not meet the purpose and need requirements of this project are also described in this section. Although the proposed solutions address the entire project corridor, localized alternatives were developed as conditions required. The remainder of this section focuses on the process of screening the conceptual corridor alternatives. Section C focuses on the process used to develop and screen the mainline and interchange alternatives. It discusses the scoping and screening processes, stages in the alternative development process, and environmental and other geographical features that influence decision-making within each section of the project study area.

The study process consisted of a preliminary alternative development stage and a detailed study stage. The detailed study stage was a thorough evaluation of those alternatives. Subsequent sections focus on the range of alternatives considered and on the alternatives retained for detailed study. The impacts of each alternative are presented and compared, consistent with the level of detail used for the analysis at each stage of the development process.

In the preliminary stage, an aerial photo base map showing environmental and other geographic features of concern was developed for the study corridor. Mapped information included known wetlands; rivers, streams, and lakes; property lines; corporate boundaries; roadway names and boundaries; parks, cemeteries, and churches; and other cultural features. Additional major constraints were mapped as they were identified including cultural resources, wetlands and other water resources, and the locations of homes and businesses.

3. Screening Process

The purpose of the project is to provide a safe and efficient I-70 transportation corridor having national, state, regional and local importance while minimizing adverse environmental disturbances. The initial screening process involved consideration of whether a specific alternative would meet the identified purpose and need requirements for this project. The primary requirements are that the alternative must:

- Provide a roadway consistent with Missouri statewide planning efforts and the intended highway function as a route of national, state, regional and local importance.
- Provide capacity and an adequate Level of Service (LOS) for current and projected traffic volumes through 2030.
- Reduce congestion and travel time.
- Improve the safety of the highway by reducing traffic conflicts and the potential for crashes.
- Provide appropriate system linkages to other travel modes.
- Attempt to meet MoDOT's Access Management Guidelines.
- Fit within national, regional and local national defense and homeland security plans.

The alternative must also:

- Avoid or minimize adverse environmental impacts, including impacts to wetlands and other natural resources, and cultural resources such as historical and archaeological features.
- Support local community needs and interests, and be consistent with local development patterns.
- Minimize impacts due to right of way acquisition and relocation.

Only the alternatives that meet the purpose and need requirements of this project were selected for detailed evaluation in this Draft EIS.

No-Build Alternatives are also evaluated in detail, as required by 40 CFR 1502.14 of the CEQ regulations, and because it serves as a baseline to evaluate the improvement alternatives.

As documented in the Record of Decision from the FTEIS, the Federal Highway Administration has approved the selection of the Widen Existing I-70 Strategy for the I-70 corridor. The selected strategy is environmentally preferred and involves the improvement and total reconstruction of the existing I-70 roadway. In the Columbia and Warrenton / Wright City / Wentzville areas, further consideration of a number of conceptual corridor options was also part of the selected strategy. Future 2030 travel demands suggest that six lanes would be required in the rural areas, with six lanes (ultimately eight lanes) through Columbia and in the areas of Kansas City and St. Louis. In the St. Louis area, six lanes would be required in the short-term, ultimately with eight lanes provided from Warrenton to the east, into the St. Louis metropolitan area.

Within SIU 7, a series of reports were prepared to further evaluate and screen the assumptions and conclusions developed in the First Tier EIS. These documents are available upon request and include:

- A Conceptual Corridor Reevaluation Report to consider options carried forward from the First Tier EIS for developing alternative I-70 corridors on new alignment in the more densely developed eastern portion of the study corridor.
- A Rural Reevaluation Technical Memorandum to examine and confirm the north or south widening recommendations in the rural portion of the study area to the west.

- An Interchange Screening Technical Memorandum and addendum to evaluate the preliminary interchange concept plans developed for each SIU 7 interchange and to narrow the range of interchange alternatives.

a. Conceptual Corridor Reevaluation Report

The *Conceptual Corridor Reevaluation Report* (submitted April 2003) was one element in a series of major steps undertaken to study the I-70 corridor and recommend a series of improvement strategies. This report was designed to reflect a community-based planning approach used to determine if the corridors identified in the First Tier EIS most efficiently met the project's purpose and need and merit advancement for additional study. For the purpose of screening the conceptual corridors, this report reassessed only the portion of the study area that would be affected by the corridors in the eastern portion of the study area near Warrenton, Wright City and Wentzville.

Four conceptual corridors were located in the central and eastern sections of the SIU 7 study corridor (refer to Exhibit II-1, Conceptual Corridors, for a map of the conceptual corridor locations). Each conceptual corridor met current AASHTO and MoDOT roadway design standards for freeways. In addition to existing I-70, three conceptual corridors on new alignment were considered:

- **South Conceptual Corridor** – this conceptual corridor was located south of the existing interstate. It began east of the I-70 interchange at Route A/B in Warren County, traveled to the south of Warrenton, stayed to the north of the Village of Innsbrook, and tied into the future Page Avenue extension at U.S. 40/61 in St. Charles County.
- **Near North Conceptual Corridor** – this conceptual corridor was located just to the north of the existing interstate. It began west of the Route A/B interchange with I-70 in Warren County and traveled to the east. It skirted the northern reaches of Warrenton, Wright City and Wentzville and reconnected with I-70 between exit 212 (Route A) and exit 214 (Lake St. Louis Boulevard).
- **Far North Conceptual Corridor** – this conceptual corridor began at Jonesburg and traveled due east, following the Warren/Lincoln county line, running north of Incline Village. It reconnected with existing I-70 between exit 212 (Route A in St. Charles County) and exit 214 (Lake St. Louis Boulevard).

There was substantial variability in the terminal locations for the conceptual corridors on new alignment in the study area. For the western terminus, these three conceptual corridors all tie into existing I-70, but at different locations. The connection options for the eastern terminus are conceptually different as well, with potentially differing implications on the St. Louis metropolitan area's highway network. The two northern conceptual corridors would tie into existing I-70 near Lake St. Louis, while the South conceptual corridor would join the future Page Avenue extension at its interchange with U.S. 40/61.

Construction of any of the conceptual corridors on new alignment would have also included improvements to existing I-70. West of the beginning of any of the conceptual corridors on new alignment, I-70 would have been reconstructed to meet current standards and widened to six through lanes. When running in parallel with the conceptual corridors on new alignment, existing I-70 would improve interchanges and maintain or reconstruct the existing four through lanes west of Route Z in St. Charles County and widen to six through lanes east of that interchange. The South conceptual corridor would then provide eight through lanes between Route 40/61 and the eastern end of the section. At the eastern terminus of the Far North and Near North conceptual corridors, existing I-70 would be reconstructed to provide eight through

lanes from the junction of the new alignment and existing corridors to the eastern end of the section at Lake St. Louis Boulevard. The Improve Existing I-70 conceptual corridor would carry six lanes from its western terminus to two miles (3.2 km) west of Route 47, where it would be widened to eight lanes through the eastern end of the section at Lake St. Louis Boulevard.

The following five criteria were used to evaluate the four conceptual corridors. Also included is a summary of the screening results:

- **Compatibility with Planning Goals** – The land under consideration for this study is situated in one of the fastest growing regions of the St. Louis metropolitan area. Many of the communities in the study corridor have developed a comprehensive planning process to accommodate and direct this anticipated growth. Each of the cities and counties within the study area is actively pursuing the implementation of their plans, without consideration of any potential I-70 conceptual corridors; and in many cases, *with* regard to the presence of I-70 in its current location. Further, citing important concerns about specific regional impacts, such as access management, the area’s Metropolitan Planning Organizations (MPOs) indicated a preference for the Improve Existing I-70 conceptual corridor over the other conceptual corridors on new alignment.
- **Local and Regional Economic Impacts** – If a conceptual corridor on new alignment were to be selected, the new highway location, its associated interchanges, and potentially upgraded highway sections that link the new route to the established communities along existing I-70 would have been the most likely routes to attract new economic activities. Existing I-70 sections that would have no longer been part of the primary route but would continue to function as important thoroughfares in the region are also potential locations for development. Although it is likely that the study area would neither be positively nor negatively impacted at an economic level from the selection of a conceptual corridor on new alignment, localized direct and secondary and cumulative impacts would have to be considered and mitigated.
- **Natural Resources Impacts** – Because it would follow the existing alignment, the Improve Existing I-70 conceptual corridor would have the least overall effect on natural resources. Of the three conceptual corridors on new alignment, the Near North and South conceptual corridors would result in fewer impacts than would the Far North conceptual corridor. Impacts to air quality, noise, prime farmland, water quality, floodplains, wetlands and visual quality are all expected to be more severe under a conceptual corridor on new alignment. While wetlands and prime farmland would be most affected by the South conceptual corridor, all of the other natural resources impacts are comparable. However, along the Improve Existing I-70 conceptual corridor, there are a number of cultural resources that would have needed to be avoided or mitigated. Finally, opportunities were identified to improve the visual aesthetics of the corridor through burying of overhead utilities lines, innovative bridge and overpass design, and judicious use of landscaping.
- **Preliminary Estimated Construction and Maintenance Costs** – The Improve Existing I-70 conceptual corridor would have the lowest overall life cycle estimated costs – some 26 percent lower than the second least expensive conceptual corridor. The Far North conceptual corridor would have the highest estimated overall costs.
- **Transportation Impacts** – Only the Improve Existing I-70 and the South conceptual corridors improved traffic operations sufficiently to achieve the desired service standard in all subsections of the corridor within SIU 7. The No-Build option resulted in the most severe levels of congestion in the year 2030. Neither the Near North conceptual corridor nor the Far North conceptual corridor attracted sufficient traffic from existing I-70 to

adequately reduce congestion in the corridor and meet desired LOS standards. Any of the build conceptual corridors would have provided substantial increases in traffic safety over what would be expected if no major improvements were made. There would have been no discernible difference in safety among the build options.

Based on the analysis presented in the *Conceptual Corridor Reevaluation Report*, the Improve Existing I-70 conceptual corridor was the sole conceptual corridor carried forward for further study. Each of the factors considered in the analysis contributed to this conclusion. Taken together, these impacts clearly indicate that the Improve Existing I-70 conceptual corridor is the appropriate option. Traffic impacts alone were sufficient to remove the Near North and Far North conceptual corridors from further consideration. The substantial negative impacts to land use and an estimated total project life cycle cost that is approximately \$230 million higher than the estimated project costs for the Improve Existing I-70 option supply sufficient additional rationale to not advance the South conceptual corridor for additional study.

The process of evaluating the conceptual corridors and selecting a preferred conceptual corridor involved a balance of the benefits and impacts with regard to social and environmental considerations, capacity and safety issues, and engineering constraints. It also must serve the State of Missouri's goals of preserving the existing transportation network, while reducing construction and maintenance costs. The preferred conceptual alternative – to widen and improve the existing I-70 corridor in SIU 7 – is the conceptual corridor that best met projected travel and safety needs in the corridor, while giving careful consideration to socioeconomic and environmental issues. Further, the preferred conceptual corridor is the one that most fully met the purpose and need as stated in the First Tier EIS.

b. Rural Areas Alternative Screening Technical Memorandum

The First Tier EIS concluded that I-70 should be reconstructed and improved along its existing alignment. As discussed in the previous section, options were developed for conceptual corridors on new alignment in the eastern suburban portions of the study corridor in the Warrenton, Wright City and Wentzville areas, and the decision was made to improve I-70 along the existing alignment. This highway section would be developed with an urban typical section since it is located in the growing eastern portion of the study corridor that is already heavily developed. Conditions in the rural section of SIU 7, located from milepost (MP) 174 to approximately 0.6 mile (1.0 km) east of Route A/B (just west of Warrenton in Warren County), are summarized and evaluated in the *Rural Areas Alternative Screening Technical Memorandum* (submitted August 2003). This report details the general widening options to be carried forward for further analysis in the STEIS for SIU 7. Exhibit II-2: Rural Study Area highlights the location of this study.

In the *Rural Reevaluation Technical Memorandum*, the rural area along the western portion of SIU 7 (west of Warrenton) was investigated to determine the preferred location for widening – to the north or to the south. The locations of these subsections are shown in Exhibit II-3: Rural Recommendations for Widening. This assessment was based on an evaluation of impacts to resources adjacent to the existing right of way. Consideration was given to the number of displacements, cultural resources, utility relocations, impacts to wetlands and floodplains and crossover considerations. For those areas where these impacts were substantially the same, the widening configuration was based primarily on engineering judgments. These considerations included construction costs, the extent of necessary grading, the need for relocations of existing frontage roads, and potential displacements of existing structures.

Based on the evaluation presented in the technical memorandum, the recommendation was to widen to the south side of I-70 in a rural typical section from the western terminus of the SIU 7

study corridor (MP 174), transition to widening to the north side at the existing curve east of High Hill near MP 180, and stay on the north side through the transition to an urban typical section at a point approximately 0.6 mile (1.0 km) east of Route A/B (near MP 189) in Warren County.

c. Interchange Screening Technical Memorandum

The purpose of the Interchange Screening Technical Memorandum and addendum was to evaluate the preliminary interchange concept plans developed for each of the interchanges within SIU 7 and to narrow the range of interchange alternatives prior to detailed engineering, environmental and socioeconomic evaluations. The memorandum sought to determine if any or all of the conceptual interchange plans met the project's purpose and need as determined in the first tier studies, and within the more localized context as determined by the screening criteria presented. These screening criteria included engineering, traffic, social, economic and environmental impacts. The conclusions drawn from the memorandum are carried forward into the detailed STEIS evaluations.

Each of the preliminary interchange concept plans was screened against engineering, traffic, social and economic and environmental criteria to select Reasonable Alternatives at each location for further study and evaluation.

C. Refinement of Alternatives

This section describes the range of alternatives considered for SIU 7. For purposes of study and analysis, the alternatives have been divided into mainline alternatives and interchange alternatives. Note that this section provides an overview of each alternative considered. For detailed information about each of the preliminary interchange concepts and alternatives considered, refer to the Interchange Screening Technical Memorandum and Addendum.

1. Mainline Alternatives

a. General Description of the Mainline Alternative

Existing I-70 in SIU 7 begins at MP 174, just west of the Route 19 interchange. Through Wentzville Parkway, existing I-70 consists of two through lanes in each direction with a median that is generally 40 feet in width, much of it now with cable barrier to reduce crossover crashes. Four-foot (1.2 m) inside shoulders and eight-foot (2.4 m) outside shoulders are typical of this area. East of Wentzville Parkway the center median is replaced by guardrail or a concrete median barrier. East of the U.S. 40/61 interchange, three through lanes will be provided in each direction following completion of a current MoDOT construction project in 2004 that is adding one lane in each direction and a center concrete median barrier between U.S. 40/61 and Lake St. Louis Boulevard. SIU 7 ends just east of Lake St. Louis Boulevard.

All of the mainline alternatives are planned with the intent of providing an acceptable Level of Service on I-70 through the design year of 2030. (An acceptable Level of Service is considered to be C in rural areas of the corridor and D in the urban areas.) To provide sufficient through-lane capacity for the projected 2030 traffic volumes, any of the Build Alternatives considered will provide:

- Three through lanes in each direction from the western terminus of SIU 7 at MP 174 in Montgomery County to the interchange at Routes A/B at MP 188 in Warren County.
- Four through lanes from Route A/B eastward to Wentzville Parkway (MP 208) in St. Charles County
- Five through lanes and one auxiliary lane in each direction east of Wentzville Parkway to the U.S. 40/61 interchange
- Three through lanes and one auxiliary lane westbound and four through lanes and one auxiliary lane eastbound from the U.S. 40/61 interchange to the Route A interchange at MP 212 in St. Charles County
- Three through lanes and one auxiliary lane from the Route A interchange through the eastern terminus of SIU 7 just east of the Lake St. Louis Blvd. interchange.

Table II-1 summarizes the number of existing, committed and proposed lanes throughout the length of SIU 7. (“Committed” lanes are those included in future projects that have been funded and are included in the current five-year Transportation Improvement Plan. “Proposed” lanes are those proposed as part of the Improve I-70 project addressed in this EIS.)

Table II-1: Number of Existing, Committed and Proposed Lanes

Location	Exit #	# Existing Lanes				# Committed Lanes				# Proposed Lanes			
		EB		WB		EB		WB		EB		WB	
		Thru Lanes	Aux. Lanes	Thru Lanes	Aux. Lanes	Thru Lanes	Aux. Lanes	Thru Lanes	Aux. Lanes	Thru Lanes	Aux. Lanes	Thru Lanes	Aux. Lanes
Route 19	175	2		2		2		2		3		3	
Route F (High Hill)	179	2		2		2		2		3		3	
Route E/Y	183	2		2		2		2		3		3	
Route A/B	188	2		2		2		2		3		3	
Route 47 (Warrenton)	193	2		2		2		2		4		4	
Route H (WCW)	199	2		2		2		2		4		4	
Route J/F (WCE)	200	2		2		2		2		4		4	
Route W/T (Foristell)	203	2		2		2		2		4		4	
Wentzville Parkway	208	2		2		2		2		4		4	
Route Z	209	2		2		2		2		5	1	5	1
US 40/61	210	2		2	1	3		3		5	1	5	
Route A	212	2		2		3		3		4	1	3	1
Lake St. Louis Blvd.	214	2		2		3		3		3	1	3	1
		3		2	1	3		3		3	1	3	1

b. Design Criteria

MoDOT, in coordination with FHWA, established overall program-level design criteria and guidance for the Second Tier preliminary engineering studies of the I-70 improvements. These guidelines were established based on MoDOT's *Policy Procedure and Design Manual* and AASHTO's *Policy on Geometric Design of Highways and Streets*. However, recognizing that the investments in I-70 will be long term, more conservative design criteria were defined for this project to ensure that the future corridor is more likely to be capable of accommodating future transportation needs and ever-evolving design parameters. For example, current Interstate highway design criteria allow a maximum degree of curvature for horizontal curves of 3 degrees. For this study, however, horizontal curves were limited to a maximum degree of curve of only 1.5 degrees. Furthermore, using a more conservative design criterion for this analysis results in an estimate of impacts of the project that are a worst-case impact assessment scenario, thus ensuring that impacts were not understated in the environmental documentation.

In an additional example, the minimum vertical clearance at bridges is greater than what would be required per currently adopted standards. This allowed the improvements to accept future changes in vertical clearance requirements. In the future and for all such instances, MoDOT will assess the program's overall design criteria and standards during subsequent design to ensure the program strikes the right balance between meeting the needs of tomorrow and the additional costs and impacts of the more stringent design. MoDOT is committed to adhering, at a minimum, to the appropriate currently adopted criteria and design standards. The goal will be to provide a consistent standard throughout the corridor. However, MoDOT recognizes that constraints in some areas, such as the urban areas, may affect the ability to reasonably accomplish the more stringent criteria. If necessary, the rural areas may provide a more stringent design criterion while the urban areas, due to tighter constraints, may hold to the minimum design criteria.

The project design criteria are outlined in MoDOT's "Median Area Study, Design Criteria and Cost Estimating Guide, I-70 Second Tier Environmental Studies, Kansas City to St. Louis" (January 2003). The design criteria table (Exhibit II-4: Improve I-70 Program Design Criteria) contains some design criteria that exceed current interstate highway design standards so to facilitate consideration of future transportation uses in the median in the rural sections, and to allow for future changes that will permit a reconstructed I-70 to function acceptably through 2030 and beyond.

Significant differences from typical interstate highway design criteria include the following:

- Twelve-foot (3.6 m) inside and outside shoulders that could be used as traffic lanes during future expansion of the highway. They also assist in maintenance of traffic during roadway repair and maintenance operations and during traffic incidents by providing an additional temporary driving lane.
- Seventy-five mph (120 kph) design speed.
- 1.5-degree maximum horizontal curves.
- Nineteen-foot (5.8 m) minimum vertical clearance on all lanes.
- 3 percent maximum grades

Review of the existing alignments have highlighted three significant locations that do not meet proposed design criteria or that experience higher than normal crash rates that warrant consideration during alternatives development.

- Railroad grade separation east of High Hill – At this location I-70 crosses from the south to the north side of the Norfolk Southern Railway by passing under the railroad through

very tight openings. The curves on either side of the grade separation are three degree curves which are at the generally accepted upper limit for interstate highways, and significantly sharper than the proposed one and one-half degree maximum curve requirement being proposed for future I-70 construction. A concrete median barrier with a narrow inside shoulder also replaces the open grass median in this area.

- Horizontal alignment at Wright City between MP 199.5 and 201 – At this location the center median consists of a concrete median barrier with one-foot inside shoulders. The curves at this location are two-degree curves with only a 325-foot (99 m) tangent between them. The curves do not meet the proposed 1.5-degree maximum curve requirement being proposed for future I-70 construction.
- Railroad grade separation east of Wentzville Parkway between MP 208.5 and 209.5 – At this location I-70 crosses from the north to the south side of the Norfolk Southern Railway by passing under the railroad through very tight openings. The three degree and two degree eighteen minute curves at this location do not meet the proposed 1.5-degree maximum curve requirement for future I-70 construction.

c. Mainline Alternatives Development Process

Following completion of the Conceptual Corridor Reevaluation Report previously described, the following steps were taken to develop the alternatives:

- Brainstorming/Sketching – Study team members discussed each segment of the mainline and brainstormed to devise alternatives. Prominent criteria used in developing these alternatives included geometric design criteria, constructibility, and impacts to adjacent property owners; however, all the evaluation criteria were considered as work progressed. A wide range of options for the location of the roadway was considered, including a number of methods to widen the highway. Sketches were made by hand on plots of aerial photographs, or in CADD files with an aerial photo background.
- Team Development/Review – Team members went through an iterative process of developing, reviewing, discussing and revising alternatives. Some alternatives were discarded due to the inability to meet geometric design criteria. Others were discarded due to potentially severe impacts to either the local community or to property owners that were excessive compared to other alternatives being considered.
- Public Comment – In September 2003, public meetings were held in Wentzville and Warrenton to share more fully developed plans of alternatives carried forward for detailed engineering and environmental evaluation.
- Post-Screening Additions – Following public comment, additional study including traffic analysis of the recommended alternatives, identification of historic properties or architecturally significant structures, and input from the public and MoDOT identified the need for several additional alternatives. These were developed and presented to the public at a drop-in center held in Warrenton in November 2003.

d. Detailed Description of the Mainline Alternatives

In general, mainline I-70 has been divided into a rural portion that runs from the west end of SIU 7 at MP 174 in Montgomery County to a point about 0.6 miles (1 km) east of the Route A/B interchange at about MP 189 in Warren County. An urban typical section has been identified from that point to the eastern termini of the project, at Lake St. Louis Boulevard in St. Charles

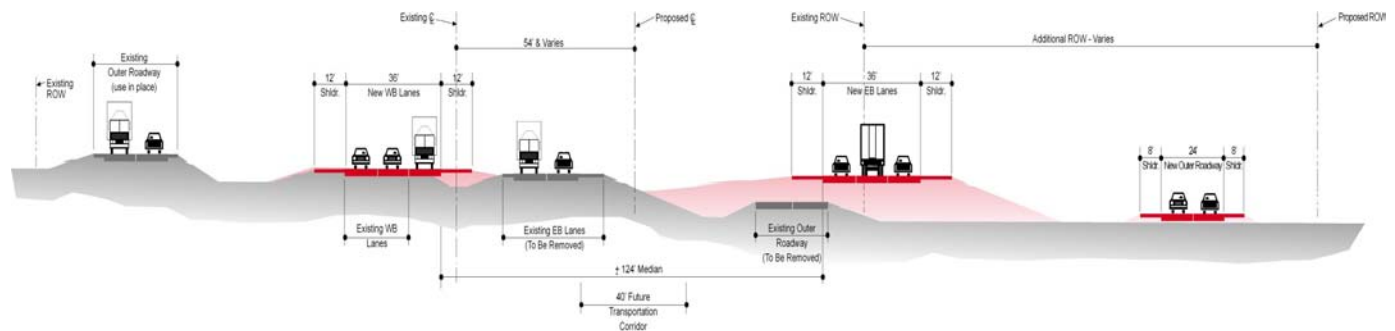
County. The transition to an urban typical section is required because the outer roadways in the urban portion of the project are much more heavily developed and impacts to adjoining properties can be minimized by eliminating the wide median used in a rural typical section.

Rural Typical Section

Maintenance of traffic during the reconstruction of I-70 is of prime importance since closure of lanes on I-70 for any reason results in significant traffic backups, long delays, increased crashes, additional fuel consumption and increased air pollution. To facilitate a uniform approach towards the definition of a highway cross section that will minimize the impacts of construction to existing traffic on I-70, MoDOT prepared *Widen Existing I-70 Strategy – Comparison of Improvement Options* (October 2003) that compares nine separate options for roadway cross sections and their location relative to existing I-70. The result of the comparison was that a rural typical section utilizing a 124-foot (38 m) median and holding the outside edge of pavement between the proposed and existing lanes on one side provides the most benefit in maintaining traffic and eliminates the need for large amounts of temporary pavement and the need to run traffic head-to-head with small or non-existent inside shoulders and a concrete median barrier separating traffic traveling in opposite directions. A detailed discussion and figures defining basic construction staging can be found in Section D.1.c of this chapter.

This typical section (Figure II-2), applied only to the rural portion of SIU 7, will consist of three through lanes in each direction separated by a 124-foot (38 m) median that provides a wide median that reduces the potential for crossover crashes.

Figure II-2: Rural Typical Section



The First Tier EIS stated the long-term goal of providing continuous frontage roads for the purposes of incident management – frontage roads could provide an alternative route should an incident occur on I-70. MoDOT is currently in the process of developing a statewide incident management plan, including a plan for I-70 across the state, to respond quickly and efficiently to incidents. Providing continuous frontage roads along the corridor, on at least one side or the other, would provide redundancy within the system and would fully complement and further amplify the benefits of incident management. In the event of an incident, traffic can be efficiently rerouted to the adjacent frontage road system, as necessary, to maintain traffic flow in the corridor.

Though continuous frontage roads are a long-term goal and are included as part of the proposed action for environmental planning purposes, continuous frontage roads are not a high priority. Including continuous frontage roads as part of the proposed action provides a long-term master plan for the corridor, but MoDOT is not committed to building continuous frontage roads in the near term. MoDOT is committed to construct frontage roads for the purposes of maintaining existing local service connections and maintaining existing access to adjacent properties. Each frontage road will be assessed on an individual basis as to whether or not any existing

discontinuities will be addressed as part of the initial construction. Elimination of existing discontinuities will depend on the availability of construction funding and relative priorities.

For the purposes of this environmental document, since it is reasonably anticipated that full build-out of the frontage road system will occur at some point in the future, continuous frontage roads have been considered in the impact assessments as direct impacts. As such, the analysis of the improvement alternatives has fully considered the implications of the future continuous frontage system on the layout and configuration of the initial I-70 improvements (i.e., proposed action). Recommendations for the improvements have been based on the anticipated full build-out of the corridor.

Within SIU 7, parallel frontage roads already exist through much of the section, and a new frontage road is proposed as part of this project in only one limited location. At the railroad grade separation east of High Hill, approximately 2,000 feet of new frontage road is proposed on the south side of I-70. This new frontage road will be developed in conjunction with the re-use of approximately 2,000 additional feet of the existing eastbound lanes of I-70 where it crosses beneath the railroad, to create a continuous frontage road along the south side of the highway. This improvement is considered part of the initial I-70 improvements and all costs and impacts from this part of the project are included in the present evaluation.

Widening of I-70 in the rural area will typically occur entirely on one side or the other of the highway, so the existing outer roadway on one side of the highway will be used in place while the outer roadway on the side being widened will be reconstructed. Decisions about which side to widen are documented in the *Rural Areas Screening Technical Memorandum* (August 2003). In most cases the outside edge of pavement on the side not being widened is held from the existing to the reconstructed highway.

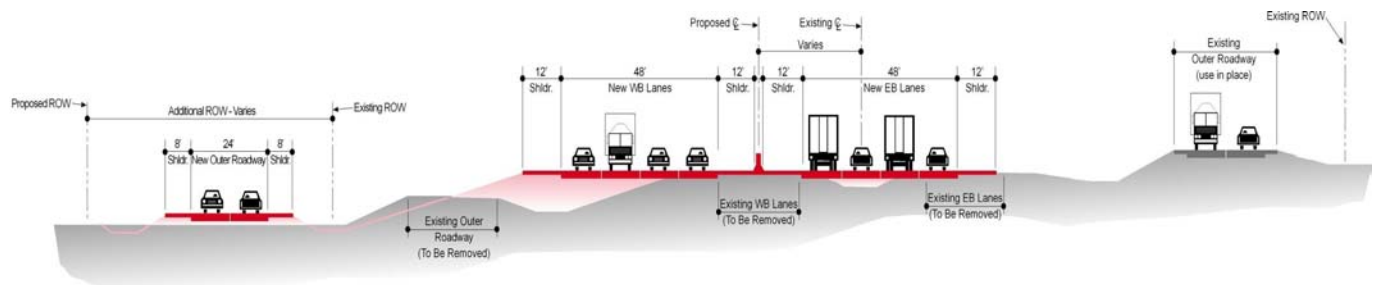
Urban Typical Section

Because of projected future traffic volumes, the urban portion will be constructed with four through lanes in each direction with 12-foot inside and outside shoulders with opposing directions of traffic separated by a concrete median barrier. Room for an additional fifth lane in each direction is provided to the outside of the other lanes for future expansion. Outer roadways are offset from the highway where practical, but in some cases are constructed immediately adjacent to the mainline pavement with a concrete median barrier located between them.

Several different typical sections used in the urban areas of SIU 7 are illustrated below with specific examples. Note that north is to the left in all of these figures.

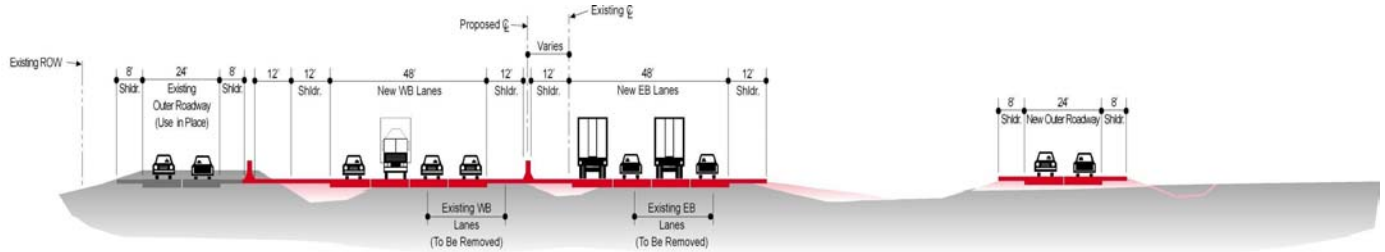
- MP 192 – At this location west of the Route 47 interchange the existing south outer roadway would be used in place, the highway would be widened to the north, and a new north outer roadway would be constructed (Figure II-3).

Figure II-3: Urban Typical Section (MP 192)



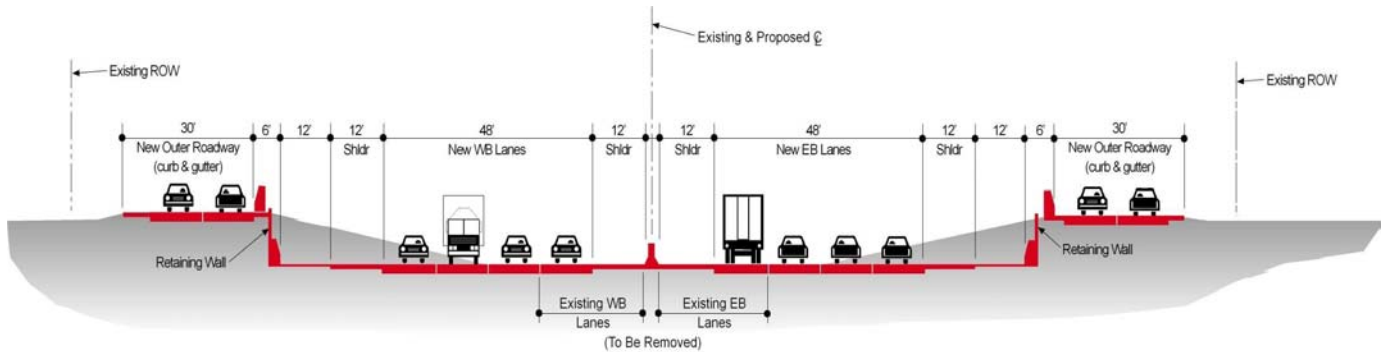
- MP 194 – At this location east of the Route 47 interchange the north outer roadway would be reconstructed to be immediately adjacent to the highway with a median barrier separating it from the I-70 through lanes. The highway would be widened to both the north and south and a new south outer roadway would be constructed (Figure II-4).

Figure II-4: Urban Typical Section (MP 194)



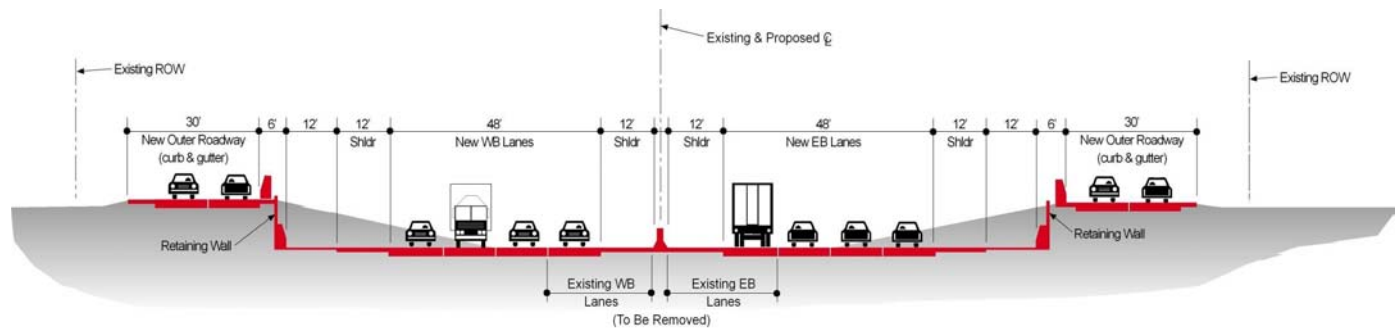
- MP 200 – At this location at Wright City the highway is squeezed between development on both the north and south of the highway. To eliminate impacts on the north side of I-70, the north outer roadway utilizes a curb-and-gutter section roadway 30-feet (9.1 m) wide. To the south the outer roadway is moved south to existing 2nd Street and only a connector from existing Route F to Hedeman Road would be provided along the existing outer roadway alignment. This would also be a curb-and-gutter typical section. The outer road and connector would be separated from the highway by median barriers, and would require retaining walls to compensate for required differences in grade (Figure II-5).

Figure II-5: Urban Typical Section (MP 200)



- MP 208 – At this location just west of the Wentzville Parkway interchange, the outer roadways on both the north and south side of I-70 would be built immediately adjacent to the mainline highway with concrete median barriers to separate them (Figure II-6).

Figure II-6: Urban Typical Section (MP 208)



These urban configurations will require construction to be completed in more stages, with more shifts in traffic and the probability of delays and backups. But by widening entirely to one side of the existing highway, it is reasonable to expect to be able to maintain the same numbers of lanes of traffic through construction though it will likely require the use of temporary pavement, narrow shoulders, and head-to-head traffic in a manner consistent with other urban highway reconstruction projects.

As a result of the process described above, one full-length mainline I-70 alternative (M1) has been developed. In addition, three additional localized mainline alternatives (identified as LM, followed by the nearest exit number, e.g. LM175) for specific locations along the mainline have been developed. These alternatives are discussed in the following four sections and each is carried forward for further evaluation.

Alternative M1

Alternative M1 is a full-length alternative for improvement to I-70 in SIU 7, extending from Milepost 174 in Montgomery County on the west through the Lake St. Louis Boulevard interchange at Milepost 214 in St. Charles County on the east. Details of Alternative M1 are shown by milepost in Table II-2. Starting at the west end at MP 174, the typical rural section will be used with all widening being to the south side of existing I-70 to match SIU 6, to miss portions of the development at Route 19, and to miss historic properties on the north side of I-70 in the city of High Hill.

East of High Hill, the highway will be relocated between MPs 180.5 and 182 to allow for less severe horizontal curves and a change in the vertical alignment to take I-70 over the Norfolk Southern Railway. This alignment change was made to eliminate the three-degree curves and narrow center medians on the existing alignment that do not meet the design criteria and have contributed to safety problems in the area.

East of MP 182, the alignment will be shifted so that the widening is to the north side of existing I-70. Between MP 182 and 184, the inside edge of pavement on the existing eastbound lanes of I-70 are retained in their current location, rather than the outside edge of pavement, to minimize encroachment on the guy wires of the radio antenna at MP 182.2. This also minimizes impacts to properties adjacent to the existing highway at the Jonesburg interchange.

From Jonesburg through the end of the rural portion at about MP 189.4, the outside edge of pavement on the south side of existing I-70 is retained in its current location and the highway is widened entirely to the north side.

Through the curve starting at MP 189.4, the highway transitions from a rural to an urban typical section. The location of the proposed I-70 centerline relative to the existing I-70 centerline varies along the entire length of the urban section. Typically the highway is widened to one side or the other to facilitate construction and limit impacts to only one side of the highway. There

are some sections though where the highway is widened to both sides to minimize impacts to adjacent properties and reduce right of way costs.

Included in the urban sections is a small realignment of I-70 just east of Wright City that will increase curve radii and provide additional tangent between curves that will, in conjunction with wider shoulders, increase safety. Likewise, I-70 is relocated in the area of the crossing of the Norfolk Southern Railway at Wentzville to increase curve radii and improve safety in this location, though strict adherence to the criteria to use one and one-half degree curves could not be met without unacceptable impacts to adjacent property owners. The flatter curves and improved sight distance will improve safety in this area. Details of the eastern portions of Alternative M1 are shown in Table II-2.

Alternative LM175

This localized mainline alternative starts at approximately MP 175.5 and extends through MP 179 in Montgomery County. This alternative provides for widening on the north side of existing I-70 rather than on the south side of existing I-70 just east of the Route 19 interchange. It attempts to minimize impacts to properties that are potentially eligible for the NRHP and preserves two large-diameter water wells associated with the tree farm on the south side of the highway (parcels 1182 and 1184). The highway widening shifts back to the south side of the highway at the east end.

Alternative LM189

This localized mainline alternative starts at approximately MP 189.0 (just east of the Route A/B interchange in Warren County) and extends through MP 195.4. Differences from alternative M1 include:

- The rural typical section is carried farther east to approximately MP 191.
- The alignment is shifted north at MP 191 to allow for the elimination of a curve at about MP 191.5.
- From MP 191.5 to approximately MP 183.5 at Route 47, the highway is widened to the south rather than the north of existing I-70 with a portion of the south outer roadway being constructed immediately adjacent to the mainline highway to minimize impacts to adjacent businesses.
- Starting at MP 194.2, the highway is shifted further north to provide appropriate separation from the existing south outer roadway before matching back to Alternative M1 at about MP 195.5.

Alternative LM196

In this alternative, the mainline highway and south outer roadway remain in the same positions as alternative M1, but the north outer roadway is realigned to miss properties that are potentially eligible for the NRHP. These properties include parcel 695 where the house may be architecturally significant and parcel 701 where the landscape may be historic. The alignment of the north outer roadway leaves the existing alignment at about MP 196.3 and turns north. It goes around the north side of a lake on parcel 705 and turns east to intersect North Strack Church Road about 1,900 feet (579 m) north of the centerline of I-70. It continues east, tying into the existing north outer roadway at about MP 198.3.

e. Offset from Existing I-70 Centerline

The principal distinguishing characteristic of the mainline alternatives is how they relate to the location of existing I-70. For all alternatives considered, the improved highway is either widened to one side or the other, with a shift of the centerline in the direction of the widening, or it is widened symmetrically about the existing centerline. Table II-2 shows the relationship of the proposed new centerline for improved I-70 to the existing centerline of I-70.

Table II-2: Offset of the Proposed Centerline

Begin MP	End MP	Type of Section	Offset from Existing Centerline	Offset Direction
Alternative M1				
174.0	180.5	Rural	54'	South
180.5	182	Rural	Varies	Transition
182	184	Rural	32'	North
184	185	Rural	Varies	North
185	189	Rural	54'	North
189	190	Varies	Varies	North
190	191	Urban	29'	North
191	192	Urban	58'	North
192	193.5	Urban	43'	North
193.5	194.25	Urban	Varies	Transition
194.25	194.75	Urban	0'	No Offset
194.75	195.25	Urban	Varies	Transition
195.25	196.5	Urban	46'	South
196.5	197	Urban	Varies	Transition
197	198	Urban	70'	North
198	198.5	Urban	Varies	North
198	199	Urban	13'	North
199	201	Urban	Varies	Varies
201	203	Urban	44'	North
203	204	Urban	Varies	North
204	207	Urban	30'	North
207	207.5	Urban	Varies	Transition
207.5	208.5	Urban	0'	No Offset
208.5	209.5	Urban	Varies	South
209.5	214	Urban	0'	No Offset
Alternative I M 175				
174	175.5	Rural	54'	South
175.5	176	Rural	Varies	Transition
176	178.5	Rural	54'	North
178.5	179	Rural	Varies	Transition
179	179.5	Rural	Varies	South
Alternative I M 189				
189	190	Rural	Varies	North
190	190.75	Rural	Varies	North
190.75	191	Varies	Varies	North
191	191.5	Urban	Varies	North
191.5	193	Urban	Varies	South
193	194.25	Urban	Varies	Transition
194.25	194.75	Urban	78'	North
194.75	195.25	Urban	Varies	Transition
Alternative I M 196				
196.5	197	Urban	Varies	Transition
197	198	Urban	20'	North
198	199	Urban	Varies	North
199	200	Urban	Varies	Varies

2. Interchange Alternatives

Because of reconstruction and widening of mainline I-70, nearly all of the 13 interchanges in SIU 7 will require complete reconstruction; the Wentzville Parkway and Route A interchanges will need only minor improvements. This will provide the opportunity to improve interchange geometrics and access management to safely facilitate projected increased volumes. Section 2b discusses interchange design criteria followed and section 2c discusses access management guidelines considered during the layout of the reconstructed interchanges.

a. Interchange Alternatives Development Process

During the FTEIS, a single interchange conceptual alternative was developed for each interchange location in SIU 7. Using these conceptual alternatives as a starting point, work proceeded in this STEIS to develop a full range of interchange alternatives at each interchange location. The following steps have been taken in developing the alternatives presented here.

- Brainstorming/Sketching – Study team members discussed each interchange location and brainstormed to devise alternatives for each location. Prominent criteria used in developing these alternatives included geometric design criteria, access management guidelines, and constructibility; however, all the evaluation criteria (refer to Section 2d) were considered as work progressed. Different interchange types (Figure II-7) were considered to see which types might fit the specific site under consideration. A wide range of options for the location of each interchange was considered, including movement of the interchange away from its current location. Sketches were made by hand on plots of aerial photographs, or in CADD files with an aerial photo background.
- Team Development/Review – Team members went through an iterative process of developing, reviewing, discussing and revising alternatives. During the process, some alternatives were discarded due to the inability to meet geometric design criteria. Others were discarded because of unusual interchange layouts that provided poor driver expectation, adverse effects on through traffic movements, or impacts to the local community that appeared excessive compared to other alternatives being considered.
- Interchange Workshops – To gain a better understanding of local issues and the impacts the interchange alternatives would have on them, a series of Interchange Workshops was held. These were small group meetings attended by the study team, MoDOT staff and a small group of local city, county and regional officials and staff, and select local property owners who had expressed an interest in participating. The following meetings were held:
 - High Hill – May 14, 2003 - Discussed the interchanges at the following Montgomery County locations:
 - Exit 175 – Route 19 – Hermann/New Florence
 - Exit 179 – Route F – High Hill
 - Exit 183 – Route E/Y – Jonesburg
 - Warrenton – May 15, 2003 - Discussed the interchanges at the following Warren County locations:
 - Exit 188 – Route A/B – Truxton
 - Exit 193 – Route 47 – Warrenton

- Exit 199 – Wright City
- Exit 200 – Route F/J – Wright City
- Wentzville – May 13, 2003 - Discussed the interchanges at the following St. Charles County locations:
 - Exit 203 – Route T/W – Foristell
 - Exit 208 – Wentzville Parkway – Wentzville
 - Exit 209 – Route Z – Wentzville
 - Exit 210 – U.S. 40/61 – Wentzville
 - Exit 212 – Route A – Wentzville/Lake St. Louis
 - Exit 214 – Lake St. Louis Boulevard – O’Fallon/Lake St. Louis

Following these meetings, adjustments were made to some interchange alternatives based on the group input, and new ideas originating during the workshops were developed in greater detail. The study team then held follow-up meetings with representatives from Warrenton, Wright City and Lake St. Louis to discuss the additional alternatives and/or highly modified alternatives at these specific locations and received additional input.

The alternatives developed through this process were then analyzed to assess the strengths and weaknesses of each and to recommend alternatives to be carried forward into detailed engineering, environmental and socioeconomic evaluations. The results of this analysis were presented in an Interchange Screening Technical Memorandum in July 2003.

In September 2003, public meetings were held in Wentzville and Warrenton to share more fully developed plans of alternatives carried forward for detailed engineering and environmental evaluation.

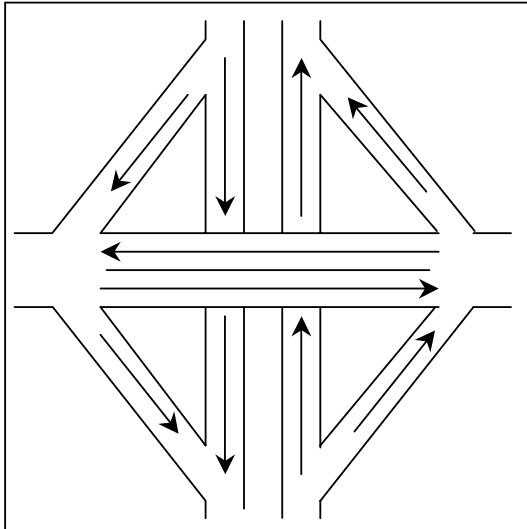
Following initial screening, additional study was undertaken including traffic analysis of the recommended alternatives, identification of historic properties or architecturally significant structures, and input from the public. This further refinement identified four additional interchange alternatives. A second evaluation was conducted taking the additional alternatives into account and the results were presented in an addendum to the Interchange Screening Technical Memorandum in December 2003.

The interchange alternatives that were carried forward are presented in the following sections, and are identified by an “I”, indicating it is an Interchange alternative, followed by the interchange number and the sequential number of the alternative (e.g. I188-2). Note too that an alternative may appear to be numbered out of sequence. This occurs when a previously developed alternative was dropped from further consideration, but the numbering was preserved in order to maintain consistency throughout the reporting process.

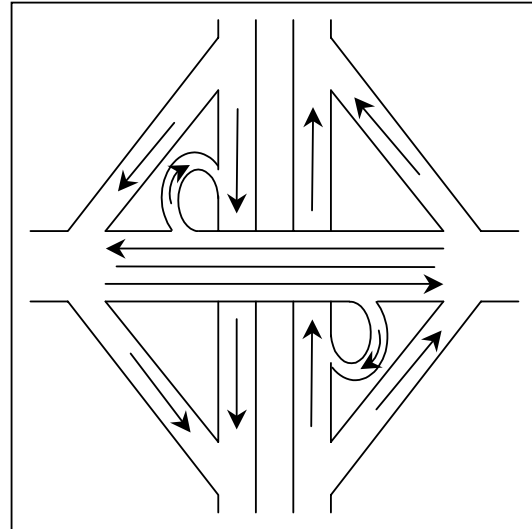
b. Design Criteria

As with the mainline alternatives, MoDOT, in coordination with FHWA, has established overall program-level design criteria and guidance for the preliminary engineering of the Second Tier interchange alternatives that goes beyond current design standards to ensure a safe facility and one that will provide a greater flexibility to address future requirements and standards. (See Section C.1.b.)

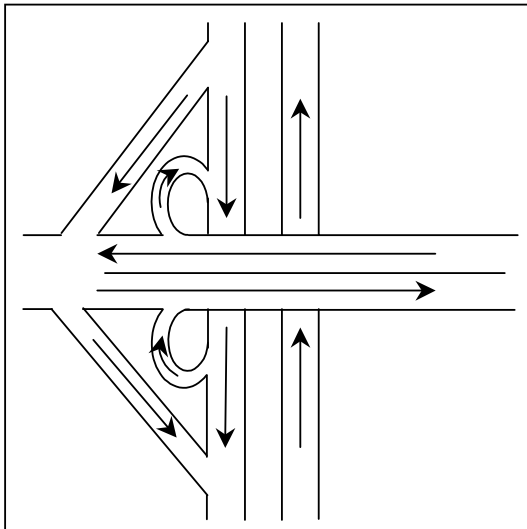
Figure II-7: Interchange Types



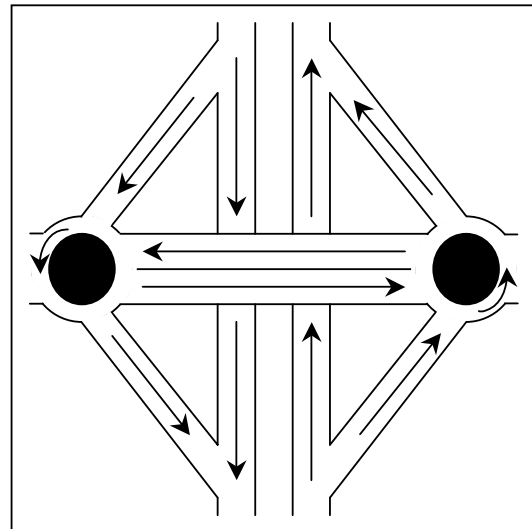
Diamond Interchange



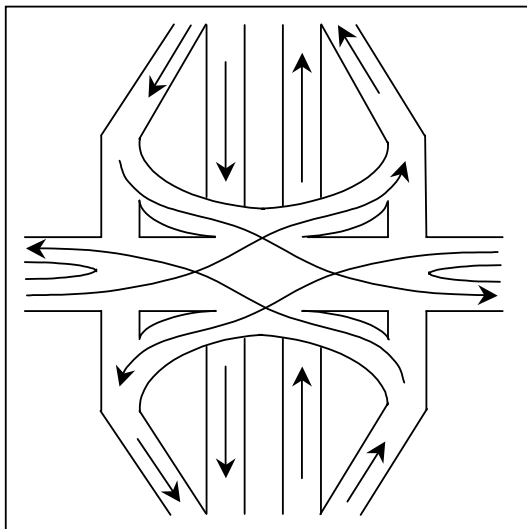
Partial Cloverleaf Interchange



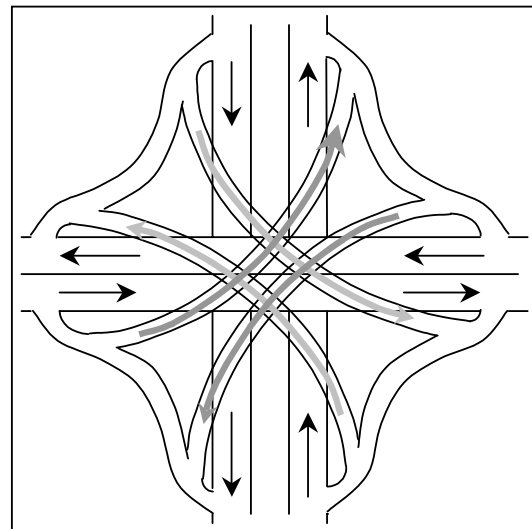
Folded Diamond Interchange



Roundabout Interchange



Single Point Interchange



Directional Interchange

Crossroads

The design guidelines for crossroads along I-70 are based on the type of road. In SIU 7, crossroads include numbered U.S. routes, numbered state routes, lettered state routes, and local roads. At the U.S. 40/61 interchange, plans call for the south side of the U.S. 40/61 interchange to be upgraded to become I-64. Horizontal alignments have been designed to meet the required guidelines, and are generally shifted from the existing location to facilitate staged construction. Vertical alignments have been developed that provide a minimum of 19 feet (5.8 m) of vertical clearance over I-70 to better accommodate large loads.

Diamond Interchange

The diamond interchange is the most common interchange type considered in the study (Figure II-7). The normal MoDOT ramp terminal separation distance of 700 feet (213 m) has been increased to 800 feet (244 m) in the rural areas to compensate for the wider median on mainline I-70, provide sufficient distance for adequate left turn storage, and to provide additional sight distance for stop sign controlled ramp approaches. Entrance and exit ramps have an operating speed of 50 mph (80 kph) at the freeway/ramp nose area. Based on a 15-degree departure angle and the 800-foot (244 m) separation of ramp terminals, minimum ramp lengths of about 1000 feet (305 m) have been utilized. Additional length was added if possible at those locations with high ramp volumes to provide greater length for deceleration and storage. Ramp terminal intersections have been designed to provide for turning of large trucks in accordance with MoDOT standard practices.

In some locations, ramp terminals may be designed to utilize a roundabout rather than the traditional signalized or stop sign controlled intersection. A roundabout is a small diameter circular section of roadway to which all legs of an intersection are connected. Entering traffic on all legs of the roundabout yields to traffic already in the roundabout. Up to two ramps, two outer roadways, and two cross road connections can be tied into a single roundabout resulting in a very compact design that fits more easily in a confined right of way situation.

Single Point Diamond Interchange

The single point diamond interchange, also known as the single point urban interchange (Figure II-7), is a variation of the regular diamond interchange that consolidates the two ramp terminal intersections into a single intersection at the center of the crossroad. This type of interchange is more expensive than the diamond interchange because of the large bridge structures required to provide for the single ramp terminal intersection directly above or below the mainline highway and the need for retaining walls between the highway and ramps. Their use is generally restricted to situations where there are large opposing left turn volumes requiring multiple turn lanes, and where development adjacent to the interchange makes the cost for right of way acquisition for a regular diamond interchange excessive. The same design criteria for entrance and exit lanes and ramp lengths defined for the regular diamond interchange also applies to this interchange type.

Directional Interchange

Directional interchanges (Figure II-7), are warranted where design year peak hour traffic demands on ramps are expected to be in excess of 1,200 vph. If ramp volumes are in excess of 1,800 vph, provisions for a two-lane directional ramp are considered. Directional interchanges are typically used for system-to-system interchanges, such as the interchange of I-70 with U.S. 40/61 at Wentzville, where full access control is required on both of the crossing roadways. Directional ramps should be designed to provide a minimum design speed of 50 mph.

Loop Ramps

The use of loop ramps is not generally encouraged but can be used in some cases where expensive right of way or other impacts can be avoided and the ramp volume is relatively low (800 to 1,200 vph). (Loop ramps are shown in the upper left and lower right quadrants of the Partial Cloverleaf Interchange in Figure II-7). A minimum radius of 230 feet (30 mph (50 kph) design speed) (70 m) was utilized, with the use of compounded curves of larger radii to meet the required 50 mph (80 kph) design speed at the ramp nose.

c. Access Management

Roads serve both the mobility and access needs of the traveling public. Maximizing mobility usually means limiting access, and vice-versa. By defining how access can be provided to each type of roadway, a balance of mobility and access can be reached that is appropriate for the situation.

The Missouri State Constitution (Article IV, Section 29) gives the Highway and Transportation Commission the authority to manage highway access:

“The highways and transportation commission shall have authority over all state transportation programs and facilities as provided by law, including but not limited to, bridges, highways, aviation, railroads, mass transportation, ports, and waterborne commerce, and shall have authority to limit access to, from, and across state highways where the public interest and safety may require.”

MoDOT has implemented comprehensive *Access Management Guidelines* (September 12, 2003) that offer the following benefits when appropriately implemented:

- Improved safety – Properly located driveways and streets reduce the number of potential conflicts that can lead to congestion, traffic and crashes.
- Decreased travel time and congestion – Limiting the number of driveways reduces the number of conflict points between through traffic, leading to less driver confusion and smoother, more efficient traffic flow.
- Increased roadway capacity – More vehicles can use a roadway when travel times and congestion are decreased.
- Increased property access – Fewer driveways means less driver confusion about where to turn, making access to businesses easier.
- Increased economic growth – More drivers will use a roadway and the businesses along it when the road offers increased traffic flow, fewer traffic delays, less congestion, and improved safety.
- Improved air quality – Reduced congestion and improved fuel economy lead to fewer air pollutants and less environmental harm.

Access management considers many issues, but those of primary concern to the development of I-70 interchanges include the following:

- Distance between interchanges – Spacing of interchanges is needed to preserve smooth traffic flow and to allow for safe and efficient weaving of traffic entering and exiting the highway. In rural areas, a distance of five miles (8.0 km) should be maintained between interchanges. In urban areas, the distance can be reduced to two miles (3.2 km).
- Clearance of functional areas of interchanges – The functional area of an interchange is the area in which merging and diverging of traffic takes place. Drivers must travel along the road, find acceptable gaps, change lanes (weave), and merge within this distance. In

order to provide a safe distance for this activity to occur, a spacing of about 1,320 feet (402 m) needs to be provided from the end of the ramp to the first private driveway on the left-hand side, median opening or intersection with a public road. When only right turns into or out of driveways or public roads are involved, a shorter clearance of 750 feet (229 m) may be used.

- Raised medians – Raised medians are an effective means of access management on high volume urban routes and are 25 or more percent safer than multi-lane undivided sections and 16 percent safer than two-way left-turn lane (TWLTL) cross-sections in high traffic situations. The use of raised medians on crossroads is recommended when projected traffic volume exceeds 28,000 average annual daily traffic (AADT) or where there is a desire to restrict left turns on lower volume roadways close to highway interchanges.
- Two-way left-turn lanes (“five lane” facilities) – TWLTL may be an effective access management tool when used in conjunction with other techniques such as driveway consolidation and corner clearance. This method works best when traffic volumes are relatively low, the proportion of left-turning vehicles is relatively high and the density of driveways is relatively low. They should not be used where the commercial driveway density is over 24 per mile (12 per mile in each direction) due to the likelihood of a considerable increase in crash rates. TWLTL configurations should also not be used on roadways with traffic volumes exceeding 28,000 AADT or on facilities with more than four through lanes.
- Three-lane cross sections – Three-lane cross sections (two through lanes with a TWLTL in the center) are an acceptable access management tool if traffic volumes are projected to remain below 17,500 AADT and there are no more than 24 commercial driveways per mile (12 per mile in each direction).
- Frontage and backage roads – Frontage and backage roads provide alternative access to property and help remove turning traffic from the through traffic on a roadway. Both types of roads should be placed a minimum of 300 feet (91 m) from the road for which they provide alternative access.
- Driveway spacing – The guidelines require providing a minimum spacing of 220 feet (67 m) for collector roads, 330 feet (101 m) for minor arterial roads, and 440 feet to 660 feet (134 to 201 m) for principal arterial roads. To preserve spacing, direct access should be moved to local streets (not arterials and collectors) where possible. Access can often be accomplished on major streets through use of frontage and backage roads, joint access, cross access and shared driveways.
- Driveway corner clearance – Corner clearance represents the distance between the corner of the intersection of two public roadways and the first private driveway. It is important to provide enough distance between the public road intersection corner and the first driveway to separate conflict points and allow drivers time to make safe maneuvers. Inadequate corner clearance can result in delays, traffic congestion and increased crash rates. The guidelines require a minimum spacing of 220 feet (67 m) for collector roads, 330 feet (101 m) for minor arterial roads, and 440 feet to 660 feet (134 to 201 m) for principal arterial roads.

The implementation of the full-range of access management policies during the reconstruction of existing interchanges in SIU 7 is often not possible, particularly in heavily developed interchange locations. Alternatives have been developed that attempt to maximize the application of the guidelines without having unreasonable adverse impacts to existing landowners and businesses.

d. Interchange Screening Criteria

Each of the preliminary interchange concept plans has been screened against engineering, traffic, social and economic and environmental criteria to select all reasonable alternatives at each location for further study and evaluation. These criteria include the following:

Engineering Criteria

Design criteria for I-70, cross roads, ramps and outer roadways as outlined in *Median Area Study, Design Criteria, and Cost Estimating Guide, I-70 Second Tier Environmental Studies, Kansas City to St. Louis* (January 2003) were used in the development of the interchange alternatives. Since each interchange alternative follows the design criteria guidelines with only a few very minor exceptions, an alternative's ability to meet the design criteria guidelines was not considered in the screening.

The engineering issues utilized in the screening of the alternatives included the following:

- Construction cost – Construction costs were not specifically developed for each alternative, but by utilizing the size and number of bridges and the lengths of roadway involved, alternatives were compared to determine the relative cost differences.
- Constructibility – The relative ease of construction for each alternative was evaluated. Reconstruction of a crossroad in its exact current location presents difficulties in staging construction and maintaining traffic during construction. A shift in alignments that allows for crossroads to be constructed in their entirety before closure of the existing crossroad bridge simplifies these issues.
- Major utility conflicts – Impacts to major utilities, including but not limited to high-voltage power lines, electric substations and sewage lagoons were considered during the evaluation.

Traffic Criteria

The traffic issues utilized in the screening of the alternatives included, in no particular order of importance, the following:

- Traffic operations – Based on existing traffic volumes, land use, and projected growth in the surrounding area, interchange alternatives were screened for their ability to handle traffic. This was done using knowledge of the location and basic traffic information without performing specific calculations. Detailed traffic operations analysis will be performed on the Reasonable Alternatives carried forward.
- Pedestrians/Bicycles – Each alternative in the urban areas was evaluated as to its ability to safely accommodate pedestrian and bicycle traffic through the interchange. In general, diamond interchanges require the crossing of two ramps to cross the highway and present the safest condition. A single point diamond interchange typically requires the crossing of four ramps since the left and right turn movements are normally split close to the crossroad, resulting in an increased safety risk to pedestrian and bicycle traffic.
- Transit/Park and Ride – There is currently no public transportation in the communities along I-70 in SIU 7. Park and Ride lots are located at most interchanges and the interchange alternatives were screened to determine whether existing lots could remain in service or if new lots would have to be created.
- Access management – During the development of interchange alternatives, MoDOT's Draft Access Management Guidelines were applied to the extent possible given the constraints inherent in reconstructing existing interchanges that may be surrounded by development. During the screening process alternatives were compared to determine

which ones did the best job of implementing the guidelines including ramp terminal separation, ramp terminal to outer roadway separation, location of business and residential driveways, and others.

- Safety – Improvements to the geometrics and access management in the vicinity of an interchange should lead to a decrease in crashes and result in a safer facility. The alternatives were reviewed to see if changes in safety would result, either positive or negative, from the proposed interchange geometry.
- Driver expectations – Meeting driver expectations with regard to interchange configuration and crossroad business access results in a safer roadway that carries more traffic at higher speeds. The alternatives were screened to compare one to the other in relation to driver expectation. In general, a diamond interchange is more familiar than a folded diamond or a single-point diamond. Diamond interchanges with roundabouts at the ramp terminal are unfamiliar to most drivers and do not meet the drivers expectation of a stop sign or traffic signal controlled ramp terminal intersection.

Social and Economic Criteria

The social and economic issues considered in the screening of the interchange alternatives included the following:

- Land Use Compatibility – Interchange alternatives were screened to determine their compatibility with local land uses.
- Community Cohesion – Construction or widening of a roadway has the potential to form a barrier between different areas in a community. Interchange alternatives were screened to identify those alternatives with negative impacts on community cohesion.
- Displacements – Interchange alternatives were screened to determine the number of residential, business and other relocations required to construct the alternative.
- Environmental Justice – Interchange alternatives were screened to determine if there was a potential for a disproportionate impact to minority or economically disadvantaged populations.

Environmental Criteria

For many of the interchange locations, the difference in the impact to the environment between the various alternatives is negligible. During the screening process, the alternatives were reviewed to determine if any alternative had a disproportionately larger impact in one of the following areas. Some of these impacts will be difficult to evaluate until detailed investigation and calculations are made of the selected alternatives.

- Air Quality
- Noise
- Parklands/Recreational Areas
- Prime Farmland
- Floodplains
- Wetlands
- Historic and Archaeological Resources
- Hazardous Waste Sites
- Visual Quality

e. Description of Interchange Alternatives

A summary of the interchange alternatives follows these descriptions. Note that the interchange alternatives described in this section represent just one step in the process of developing the final alternatives carried forward. Exhibits illustrating this interim process are shown in Appendix J. Exhibits depicting the final alternatives carried forward are shown in Appendix B.

Route 19 (Exit 175) – Hermann/New Florence

The existing interchange at this location consists of a diamond interchange with stop sign controlled ramp terminals with Route 19 passing over I-70. Development has occurred adjacent to the interchange predominately along the north outer roadway and consists primarily of traveler-oriented businesses including restaurants, gas stations and hotels. The south side of the interchange includes a local racetrack and a campground. Route 19 provides access to New Florence to the north and to Hermann to the south.

Though several alternatives were brainstormed during initial interchange development, only one proposed interchange configuration was advanced for detailed analysis. The rural nature of this location, the ability to site a standard diamond interchange, and the ease of implementation of access management guidelines made it unnecessary to consider other interchange types or interchange locations.

ALTERNATIVE I175-1

Alternative I175-1 utilizes a diamond interchange configuration with an 800-foot (244 m) spacing between ramp terminals. The alignment of Route 19 would be shifted slightly to the west to facilitate the construction of the new bridge over I-70, while traffic continues to utilize the old roadway. Ramps will be lengthened slightly from their current configuration and their geometrics changed to reduce skew angles at the ramp terminals. The south outer roadway connection would be moved to a location about 1,320 feet (402 m) south of the ramp terminal, allowing for full implementation of access control along the south leg of Route 19. The north outer roadway would be moved to a location about 1,550 feet (472 m) north of the ramp terminal to line up with a proposed roadway planned by the City of New Florence for that location. Access to most north outer roadway businesses will be moved from the front to the back of the business with the loss of only one business in the northwest quadrant of the interchange.

This alternative provides a design that meets both geometric requirements and driver expectations. Good access management can be implemented with a minimum amount of impact to local business operations, and there are no apparent significant environmental impacts. This alternative was advanced for further study.

Route F (Exit 179) – High Hill

The existing interchange at this location consists of a diamond interchange with stop sign controlled ramp terminals with Route F passing over I-70. The south outer roadway is located only 100 feet (30 m) from the south ramp terminal. The crossroad curves to the west leaving the north side of the interchange. Existing commercial development along the north outer roadway in the immediate vicinity of the interchange is currently abandoned. Development along the south outer roadway includes two hotels and some residential development. Route F/North Outer Roadway provides access to the City of High Hill just northwest of the interchange.

There are two proposed interchange alternatives at this location.

ALTERNATIVE I179-1

Alternative I179-1 utilizes a diamond interchange configuration with an 800-foot (244 m) spacing between ramp terminals. The crossroad alignment would be shifted about 180 feet (55 m) east to facilitate the construction of the new bridge over I-70 while traffic continues to utilize the

existing roadway and to avoid a subdivision on the south side of the interchange. Ramps will be lengthened from their current configuration and their geometrics set to provide acceptable skew angles at the ramp terminals. The south outer roadway connection would be moved to a location about 1,320 feet (402 m) south of the ramp terminal, allowing for full implementation of access control along the south leg of the crossroad. The north side of the interchange would be reconfigured to provide for continuity of the outer roadway. The tee intersection where the crossroad intersects the north outer roadway would be pushed as far north as allowed by the railroad, resulting in a 500-foot (152 m) distance between the north ramp terminal and the outer roadway. Access to properties on the south side of the interchange is modified due to the relocation of the outer roadway.

Positive features of this interchange alternative include its ability to meet geometric requirements, ability to meet driver expectations, and lack of known significant environmental impacts. On the negative side, the proximity to the railroad on the north does not allow for full application of access management guidelines. This alternative also surrounds an existing subdivision with the highway, crossroad and outer road. This alternative was advanced for further study.

ALTERNATIVE I179-2

Alternative 179-2 utilizes a diamond interchange configuration with an 800-foot (244 m) spacing between roundabout ramp terminals. The crossroad alignment would be shifted slightly west to facilitate the construction of the new bridge over I-70 while traffic continues to utilize the old roadway. Ramps have been lengthened from their current configuration and their geometrics set to provide acceptable entrance into the roundabout ramp terminals. The outer roadways on both the north and south side of the interchange will be tied into the roundabouts.

The positive features of this alternative include its ability to meet geometric requirements, its ability to meet access management guidelines, a construction cost that would be less than Alternative I179-1, and there are no known significant environmental impacts. On the negative side, roundabout ramp terminals, particularly in a rural setting, would not meet current driver expectations. This alternative was advanced for further study.

Route E/Y (Exit 183) – Jonesburg

The existing interchange at this location consists of a diamond interchange with stop sign controlled ramp terminals with Route E/Y passing over I-70. The City of Jonesburg is located on the south side of the interchange, with a large number of driveways along Route Y as it passes through the town. The south outer roadway (old U.S. 40) is located about 1,800 feet (549 m) from the south ramp terminal in the middle of downtown Jonesburg. To the west, this roadway does not currently connect to the next interchange at High Hill. To the east it intersects mainline I-70 east of Jonesburg and is parallel to I-70 to the next interchange at Route A/B. The north outer roadway is located about 850 feet (259 m) north of the existing north ramp terminal and provides access to several residences and a park and ride lot in the immediate vicinity of the interchange. This outer roadway does connect to the adjacent interchanges east and west of Jonesburg.

There were originally two proposed interchange alternatives at this location that were taken through the development process to the screening stage. When it was determined that a farm property in the northeast quadrant of the interchange was potentially eligible for the NRHP, a third alternative was added to reduce impacts to the farm.

ALTERNATIVE I183-1

Alternative I183-1 utilizes a diamond interchange configuration with an 800-foot (244 m) spacing between ramp terminals created by pushing the existing north ramp terminal further to the north. The crossroad alignment would be shifted to the west to facilitate the construction of the new

bridge over I-70 while traffic continues to utilize the old roadway. Ramps will be lengthened from their current configuration and their geometrics set to provide acceptable skew angles at the ramp terminals. Route Y (south of I-70) would be improved to provide a two-lane curb and gutter roadway with sidewalks on both sides to assist pedestrian movement. Access would be restricted for the first 300 feet (91 m) to improve interchange operations and safety, resulting in the elimination of left turns into the gas station and out of the church in this area. Other changes to driveways are envisioned to improve access management along this 1,400-foot (427 m) stretch, and can be detailed during the detailed design phase. The north outer roadway would be moved to a location about 1,320 feet (402 m) north of the ramp terminals to a location that allows for construction of the north outer roadway along a property line. The east leg of the north outer roadway is projected due east to tie to an existing county road. An access road is provided in the northeast quadrant of the interchange to provide access to two residences cut off by the outer roadway relocation.

The positive features of this alternative include its ability to meet geometric requirements and lack of known significant environmental impacts. On the negative side, an access road is required to service residences in the northeast quadrant and access management cannot be fully implemented south of the interchange. This alternative was not advanced for further study.

ALTERNATIVE I183-2

Alternative I183-2 utilizes the same diamond interchange configuration as Alternative I183-1. Route Y south of the interchange is also unchanged from Alternative I183-1. The only difference in this alternative is a change in the alignment of the east leg of the north outer roadway to come further south before proceeding eastward. This allows for access to the existing residences from the backside of their properties.

The positive features of this alternative include its ability to meet geometric requirements, provides better access to residences in the northeast quadrant, provides better opportunity for business development along the north outer roadway and lack of known significant environmental impacts. On the negative side, access management cannot be fully implemented south of the interchange. This alternative was advanced for further study.

ALTERNATIVE I183-3

Alternative I183-3 was created to avoid impacts to parcel 1055, which may be eligible for the NRHP. It utilizes the same diamond interchange configuration as Alternative I183-1, and Route Y south of the interchange is also unchanged. On the north side of the interchange, the crossroad is realigned to a location west of the existing crossroad and the outer roadway in the northeast quadrant is shown north of parcel 1055, running eastward to tie into an existing county road. The existing crossroad would be utilized to provide access to residences in the northeast quadrant of the interchange.

The positive features of this alternative include its ability to meet geometric requirements, it provides acceptable access to residences in the northeast quadrant, eliminates impacts to a potential NRHP eligible property, and has no other known significant environmental impacts. This alternative was advanced for further study.

Route A/B (Exit 188) – Truxton/Pendleton

The existing interchange at this location consists of a diamond interchange with stop sign controlled ramp terminals with Route A/B passing over I-70 on a very narrow two-lane bridge. The only major development that has occurred adjacent to the interchange is a truck stop and hotel off the west leg of the south outer roadway. Route A provides access to Truxton to the north and to Pendleton to the south.

Though several alternatives were brainstormed during initial interchange development work, only one proposed interchange configuration completed the process to the screening point. The

rural nature of this location, the ability to site a standard diamond interchange, and the ease of implementation of access management guidelines eliminated consideration of other interchange types or interchange locations.

ALTERNATIVE I188-1

Alternative I188-1 utilizes a diamond interchange configuration with an 800-foot (244 m) spacing between ramp terminals. Because an existing county road is located about 1,800 feet (549 m) north, this alternative utilizes that road and extends it to the west to come back adjacent to mainline I-70. On the east side the north outer roadway will run due east from Route A about a quarter mile along the existing county road and then run due south along a property line to rejoin the highway. This configuration minimizes the splitting of the farmland in the area and allows for implementation of access management guidelines. The south outer roadway intersection would be moved 1,320 feet (402 m) south of the ramp terminal to meet access management guidelines. On either side of Route B it curves back to the north to reconnect with mainline I-70.

Positive features of this interchange alternative include its ability to meet geometric requirements, driver expectations and access management guidelines. Also, there are no known significant environmental impacts. There are no significant negative features. This alternative was advanced for further study.

Route 47 (Exit 193) – Warrenton

The existing interchange at this location consists of a tight diamond interchange with signalized ramp terminals spaced only 400 feet (122 m) apart. The north outer roadway ties into Route 47 a mere 100 feet (30 m) north of the north ramp terminal at a signalized intersection. The south outer roadway (old Highway 40) is located about 1,050 feet (320 m) south of the south ramp terminal, also at a signalized intersection. Route 47 on the north side of the interchange is a four-lane road with a TWLTL that narrows to a two-lane rural highway section about 1,000 feet (305 m) north of the interchange. On the south side, Route 47 is a four-lane road with a TWLTL between the interchange and outer roadway. This stretch includes a large number of retail business driveway entrances servicing fast food restaurants, gas stations, a hotel and other businesses. South of the south outer roadway Route 47 was widened in 2003 to a five-lane section south to Route M.

Because of high traffic volumes, large number of conflict points (driveways) and extremely limited opportunities to improve access management along existing Route 47, two of the four alternatives defined for this location include the relocation of Route 47 west of existing Route 47. This relocation would allow for fuller implementation of access management guidelines to improve safety and traffic operations as traffic volumes grow.

ALTERNATIVE I193-1

This alternative keeps Route 47 at its current location with only a very slight shift in alignment to enhance the constructibility of the bridge over I-70. The interchange would be a single point diamond interchange. Route 47 both north and south of the interchange would be a four-lane facility with a center median to prevent any left turns until reaching the outer roadway. The north outer roadway would be moved north to a location about 1,000 feet (305 m) north of the centerline of I-70 (just north of Waffle House restaurant). In the northwest quadrant, the outer roadway would wrap around the north and west sides of the newly constructed Wal-Mart store. An access road would be built between the existing Route 47 businesses and Wal-mart to provide back access to the Route 47 businesses. In the northeast quadrant, the outer roadway would curve to the south and adjacent to I-70, again providing back access to the Route 47 businesses. On the south side of I-70, access roads behind the Route 47 businesses would be constructed to provide back access.

Positive features of this alternative include its ability to meet geometric requirements, its reuse of existing right of way along Route 47 and the elimination of left turns along Route 47 that will improve traffic operations. On the negative side, this alternative could prove to be very difficult to construct and access to businesses is severely modified. While left turns are restricted, little can be done to consolidate driveways and meet access management guidelines for right-in, right-out movements. This option also requires the construction of more outer roadway/access road than other alternatives. This alternative was not advanced for further study.

ALTERNATIVE I193-2

This alternative shifts the entire Route 47 interchange about 600 feet (183 m) west along I-70 and would remove the existing bridge. A single point diamond interchange with Route 47 passing over I-70 is utilized in this alternative that would restrict the impacts to adjacent businesses and handle large left turn volumes coming off westbound I-70. (Taking Route 47 under I-70 was also investigated, but was found to be more of a problem.) Route 47 would extend to the south to tie back into existing Route 47 at the current outer roadway location. The existing outer roadway would be used in the southwest quadrant. In the southeast quadrant, existing Route 47 would become part of the outer roadway, which would be extended to the east alongside I-70. This configuration allows access into and out of businesses along existing Route 47 to remain unchanged, and prohibits access to Route 47 between the I-70 and the south outer roadway. On the north side Route 47 would curve back to the east between Wal-Mart and McDonald's to tie back into Route 47 about 1,600 feet (488 m) north of I-70. The outer roadway would run around Wal-Mart in the northwest quadrant and would utilize existing Route 47 and the existing outer roadway in the northeast quadrant.

Positive features of this alternative include its ability to better meet access management guidelines than alternative I193-1, and the use of existing Route 47 as part of the outer roadway system. Businesses access is not negatively impacted in this alternative. The single point diamond configuration is well suited to handling the large left turn movements from westbound I-70 to southbound Route 47. On the negative side, a single-point diamond interchange is expensive to construct, and additional right of way would be required to relocate Route 47 to the west. Differences in grades on the north and south of I-70 could also mean additional costs for excavation or embankment to get Route 47 over I-70. This alternative was advanced for further study.

ALTERNATIVE I193-3

This alternative is the same as Alternative I193-2 except that a tight diamond interchange would be constructed at I-70 with Route 47 going over I-70. The outer roadway configurations would be the same.

Positive and negative features of this alternative are the same as those for Alternative 193-2, except that the cost would be lower due to the interchange type and the tight diamond configuration may not be able to handle the large left turn volumes as efficiently as the single point diamond configuration in Alternative 193-2. This alternative was advanced for further study.

ALTERNATIVE I193-4

This alternative is similar to Alternative I193-1 except a tight diamond interchange would be used and the outer roadway connection on the north side would be moved further to the north. In the northwest quadrant, the outer roadway would pass east of Wal-Mart.

This alternative would have more significant negative noise impacts to residential areas on the north side of the area and provide much longer routes for back access into and out of businesses on the north side of I-70 than compared with Alternative I193-1. This alternative was not advanced for further study.

Wright City West (Exit 199) – Wright City

The existing interchange at this location consists of a diamond interchange with stop sign controlled ramp terminals with the cross road passing over I-70 on a two-lane bridge. Located at the west edge of Wright City, it currently serves as the only access point to Wright City for eastbound motorists. The outer roadways in this area are very close to the ramp terminals. The south side is constrained by the close proximity of the Norfolk Southern Railway tracks. The north side has a McDonald's and Shell station adjacent to the north outer roadway.

There are two proposed interchange alternatives at this location.

ALTERNATIVE I199-1

This alternative provides a diamond interchange with roundabouts at the ramp terminals. The crossroad is shifted to the east of the existing location to facilitate construction. The north side roundabout provides for the junction of the crossroad, two ramp terminals and two outer roadway connections. The outer roadway in the northwest quadrant would be aligned to utilize the street that would be constructed on the north side of McDonald's and Shell. The south side roundabout provides the same connections as on the north side, but would allow room on the roundabout for the future addition of a sixth leg to go south over the railroad.

The greatest positive feature of this alternative is the use of roundabouts at the ramp terminals since these provide an excellent way to connect both the ramps and the outer roadways to the crossroad without any impacts or additional costs associated with traffic having to cross the railroad. This alternative also has very little impact on existing businesses in the area, provides the ability to implement good access management and would be the least expensive to construct. The biggest negative feature of this alternative is that drivers are not familiar with roundabouts. This alternative was advanced for further study.

ALTERNATIVE I199-2

This alternative provides a standard diamond interchange with the crossroad shifted west to facilitate construction. On the south side the crossroad would extend south over both the outer roadway and the railroad to connect with a county road on the south side of the railroad. A connection would provide access back to the outer roadway along the existing county road, but with a grade separation at the railroad required by the additional traffic that would be introduced at the crossing. On the north side, the outer roadway is pushed as far north as possible without requiring right of way acquisition from residential neighborhoods.

This alternative does a better job at meeting driver expectations, but requires the construction of two grade separation structures over the railroad. It also brings outer roadway traffic closer to residential neighborhoods with the potential for increased noise impacts. This alternative was advanced for further study.

Route F/J (Exit 200) – Wright City

The existing interchange at this location is a half-diamond with less than 300 feet (91 m) between stop sign controlled ramp terminals. Two-way outer roadways tie into the ramp terminals on the west side of the crossroad. The westbound I-70 off-ramp has extremely poor sight distance at the ramp terminal, and the curve for the outer roadway in the northeast quadrant is substandard and presents sight distance problems for traffic coming off I-70. The half diamond configuration at this location presents problems for westbound motorists unfamiliar with the interchange who get off the highway seeking services and then do not understand that they need to go one mile (1.6 km) west to get back onto westbound I-70.

There are two proposed interchange alternatives at this location.

ALTERNATIVE I200-1

This alternative shifts the exit about one-half mile (0.8 km) east and provides a direct connect to and from 2nd Street on the south side of I-70 to the highway. It also provides direct access to the outer roadway on the north side. The same movements provided for in the existing half-diamond interchange are provided for in this configuration. The south outer roadway would tie to 1st Street and the north outer roadway would be shifted north to facilitate the off ramp from westbound I-70. The terrain on the north side of I-70 is very hilly in this area and could provide difficulty and/or additional costs to construct the north outer roadway. A new bridge at the existing interchange location would also have to be provided to facilitate access for Route J traffic across I-70.

This option provides a more direct access into and out of Wright City, but still only provides two directions of movement. I-70 eastbound traffic exiting at Wright City would have to continue to utilize Exit 199, as would Wright City traffic wishing to go westbound on I-70. The use of directional ramps at this location also promotes the introduction of higher speed traffic onto 2nd Street. Tying the south outer road to 1st Street may not be possible because 1st Street is believed to be on railroad right of way. This alternative was not advanced for further study.

ALTERNATIVE I200-2

This alternative also shifts the exit about one-half mile east, but provides a full diamond interchange with roundabout ramp terminals. The outer roadways on both the north and south side of the interchange are tied into the roundabouts, along with all four ramps.

Providing a full interchange at this location will not meet the MoDOT access management guidelines that call for two full miles between interchanges in urban areas. The spacing is only about one-third mile (0.5 km) short of the guideline and traffic volumes on the west legs of the interchange are not expected to be heavy, and traffic operations analysis predicts desirable operating conditions.

This alternative provides for much less outer roadway and bridge construction than alternative I200-1. The use of roundabouts also allows for a full diamond interchange configuration to be located close to the railroad, and eliminates the worry of high-speed traffic exiting the highway on to 2nd Street. This alternative was advanced for further study.

Route T/W (Exit 203) – Foristell

The existing interchange at this location is a tight diamond interchange with about 475 feet (145 m) between stop sign controlled ramp terminals. Outer roadways are located 200 to 250 feet (61 to 76 m) from the ramp terminals on either side. Route W goes north and Route T goes south from the interchange to serve rural areas of St. Charles and Warren Counties. Route T is not a direct connection, but requires a 200-foot (61 m) jog along the south outer roadway. Route T also crosses the Norfolk Southern Railway at-grade only 200 feet (61 m) from the outer roadway. Development on the north side of the interchange includes two truck stops, a hotel and several retail stores. The only business on the south side near the interchange is a truck stop. The City of Foristell is located south and west of the interchange along the south outer roadway, the railroad and Route T.

There are three proposed interchange alternatives at this location.

ALTERNATIVE I203-1

This alternative provides a new diamond interchange about 600 feet (183 m) west of the existing location. This lines up the crossroad with Route T on the south side and takes Route W behind the truck stop on the north side. The north outer roadway is pushed as far north as possible without getting into two large ponds. The south outer roadway would cross under the crossroad, and a grade-separated connection from Route T to the outer roadway would be

provided in the southeast quadrant. Construction of this alternative along existing Route T would require the use of retaining walls to minimize impacts to adjacent homes and businesses because Route T would have to be raised 30 feet (9 m) or more at the railroad tracks to provide a grade separation.

This alternative would provide a standard diamond interchange, good implementation of access management guidelines, and increased safety through the elimination of an at-grade railroad crossing. It would, however, result in a 30- to 40-foot (9 to 12 m) embankment for Route T on the south side of the interchange to cross the railroad, which would require expensive retaining walls and be difficult to construct under existing traffic. Community cohesion would also be impacted by the introduction of such a tall embankment. This alternative also makes it difficult to provide good access to the Wentzville Fire Protection District station located off Route T just south of the railroad. This alternative was not advanced for further study.

ALTERNATIVE I203-2

This alternative provides for a new diamond interchange located several hundred feet east of the existing location. This lines up the crossroad with Route W on the north side and takes Route T behind existing businesses on the south side. The north outer roadway is pushed as far north as possible without impacting two large ponds, and moves the access for all businesses to the rear side. The south outer roadway would cross under the crossroad, and a grade-separated connection from Route T to the outer roadway would be provided in the southeast quadrant. The grade separation on this connection is shown about 1,500 feet (457 m) east of relocated Route T to provide a crossing location where roadway grades will work, and to follow property lines to avoid property splits. The large area between Route T, the outer roadway connection and the railroad provides the side benefit of creating a highly developable area because of the new access. The existing at-grade crossing at Route T would remain for local use only.

Positive features of this alternative include the use of a standard diamond interchange, good implementation of access management guidelines, and increased safety through the elimination of most traffic at the Route T at-grade railroad crossing. This alternative does require more outer roadway construction in order to tie the north outer roadway into Route W at the maximum available distance from the ramp terminals. It also would require the construction of more access roads and driveways to provide back access to existing businesses. This alternative was advanced for further study.

ALTERNATIVE I203-3

This alternative is the same as Alternative I203-2 except for the following:

- The interchange type is a single point diamond.
- The north outer roadway intersection with Route W would be moved closer to I-70.

This alternative provides for good implementation of access management guidelines and increased safety through the elimination of most traffic at the Route T at-grade railroad crossing. The north outer roadway is closer to existing businesses, making access to them easier. The cost of the interchange will be higher than alternative 203-2, but the construction cost of the outer roadways should be lower due to their shorter length. This alternative was advanced for further study.

Wentzville Parkway (Exit 208) – Wentzville

The existing interchange at Wentzville Parkway is a diamond interchange. In 2003, MoDOT completed the reconstruction of the bridge over I-70 and improvements to ramps and the south outer roadway. The north outer roadway (Pearce Boulevard) connection is about 750 feet

(229 m) north of the north ramp terminal. The south outer roadway is immediately adjacent to the south ramp terminal.

There were originally two proposed interchange alternatives at this location that completed the development process to the screening stage. A third alternative was added based on traffic studies of the current interchange that indicate that it will function at an adequate LOS in the future with only minor modifications.

ALTERNATIVE I208-1

In this alternative, all proposed changes are to Wentzville Parkway and outer roadways. No changes to the interchange ramps or the new bridge over I-70 are included. On the north side, the addition of a raised center median is recommended to separate traffic and eliminate left turns onto and off this segment of Wentzville Parkway to QuickTrip and the other connected businesses. On the south side, Wentzville Parkway would be extended to the south as far as the proposed Interstate Drive, with a grade separation at the Norfolk Southern Railway. The south outer roadway would be disconnected from Wentzville Parkway. In the southeast quadrant, the existing railroad crossing would serve properties in the area bounded by I-70, the railroad and Wentzville Parkway. In the southwest quadrant, a new connection from Interstate Drive to the south outer roadway would be constructed including a grade separation at the railroad. Disconnecting the south outer roadway from Wentzville Parkway, which improves access management, should not be detrimental to the continuous outer roadway concept if Interstate Drive is completed to Route T in Foristell.

The alternative provides for good implementation of access management guidelines, incorporates the City of Wentzville's proposed extension of Wentzville Parkway and would be less expensive to construct than alternative I208-2. On the negative side, it requires traffic to cross the railroad twice, once at grade, to access the properties between the highway and the railroad in the southeast quadrant. Outer roadway traffic in the southwest quadrant would also have to take multiple turns to connect with Wentzville Parkway and I-70. This alternative was not advanced for further study.

ALTERNATIVE I208-2

In this alternative, all proposed changes are to Wentzville Parkway and outer roadways. No changes to the interchange ramps or the new bridge over I-70 are included. On the north side, the same changes made in Alternative I208-1 are proposed. On the south side, Wentzville Parkway would be extended to the south as far as the proposed Interstate Drive, with a grade separation at the Norfolk Southern Railway. The south outer roadway would pass under Wentzville Parkway. In the southeast quadrant, the existing railroad crossing would remain to connect the south outer roadway with Interstate Drive. In the southwest quadrant, a new connection from Wentzville Parkway to the south outer roadway would be constructed.

This alternative provides a fair implementation of the access management guidelines. The introduction of an additional intersection between the highway and the railroad does not allow for meeting the goal of 1,320 feet (402 m) between the ramp terminal and the first left turn location, but since it is on new alignment, all access between the highway and Interstate Drive can be restricted, which should make this an acceptable situation. The extension of Wentzville Parkway is part of the City of Wentzville's plan for future development, the property between the highway and the railroad is more easily accessed and it does not require a connection with a grade separation like alternative I208-1. It will though require a grade separation of Wentzville Parkway with the south outer roadway, which will increase the cost and make construction staging more difficult. This alternative was not advanced for further study.

ALTERNATIVE I208-3

The alternative utilizes the existing interchange with the addition of a second right turn lane from the westbound I-70 off ramp to northbound Wentzville Parkway and the continuation of that lane as an auxiliary lane from the ramp terminal to Pearce Boulevard. There would be no changes to the outer roadways, though the south outer roadway should be relocated further away from the ramp terminals if Wentzville Parkway is ever extended to the south as envisioned in the City of Wentzville Comprehensive Plan.

This alternative utilizes all of the existing interchange as reconstructed in 2003 with only a minor and relatively inexpensive addition. This alternative was advanced for further study.

Route Z (Exit 209) – Wentzville

The Route Z interchange is currently a half-diamond configuration, though a project currently under construction will add the ramps on the west side of Route Z to complete a full diamond configuration. Completion is expected in late 2004. There is an access roadway in the northwest quadrant that serves a nursing home. There is an access roadway in the southeast quadrant that serves a cemetery and several homes. The only development in the southwest quadrant is a church, whose driveway will be modified during the upcoming planned interchange construction. North of the interchange Route Z (Church Street) is lined by residential and church properties. The City of Wentzville anticipates extensive growth south of I-70 that should increase traffic volumes at this location in the future.

There is one proposed interchange alternative at this location.

ALTERNATIVE I209-1

This alternative reconstructs the diamond interchange to provide more distance between ramp terminals. The westbound I-70 off ramp would be moved east and braided with the ramps coming from U.S. 40/61 to westbound I-70. Traffic coming to I-70 from either direction on U.S. 40/61 would not have access to Route Z. The access road in the northwest quadrant to the nursing home would be eliminated, with access being provided by a new city street to the west. Interstate Drive is being planned for extension in the southeast quadrant, and a new access road off Interstate Drive to serve the cemetery and residences is proposed. Route Z north of the interchange would see minor improvements made to driveway accesses.

The positive features of this alternative are the use of a full diamond interchange with adequate ramp terminal spacing and the ability to implement good access management to the south. Negative features include the need to take the church in the southwest quadrant of the interchange and the minimal ability to implement access management improvements north of the interchange. The opportunity for northbound U.S. 40/61 traffic to exit to westbound I-70 and then immediately exit onto Route Z will be eliminated by the reconstruction of the U.S. 40/61 interchange with I-70. Exit ramps will be provided for eastbound and westbound I-70 traffic only. The current outer roadway in the northwest quadrant would also have to be eliminated to provide adequate ramp separation, so access to the nursing home would have to be changed to come from a new city street that would connect the north and south sides of the railroad by crossing under the existing railroad bridge just west of this intersection. This alternative was advanced for further study.

U.S. 40/61 and I-70 System-to-System Interchange (Exit 210)

The U.S. 40/61 interchange is presently a semi-directional interchange that includes many design features that are not consistent with today's design criteria, such as left-hand exits, multiple on-and/or off-ramps in the same direction and a non-directional, diamond interchange type, stop-controlled intersection for westbound I-70 to southbound U.S. 40/61. The U.S. 61/Pitman Road interchange (a half-diamond) sits so close on the north side that any

reconfiguration of the I-70 and U.S. 40/61 interchange must also include the reconfiguration of the Pitman Road interchange. The geometrics of this interchange also affect the configuration of the I-70 and Route Z interchange just to the west. There are no outer roadways at this location, though Pitman Road provides access to Lake St. Louis Boulevard four miles (6.4 km) to the east. There is an existing access road in the southwest quadrant that serves a county park, and may someday become part of Interstate Drive.

There are two proposed interchange alternatives at this location.

ALTERNATIVE I210-1

This alternative provides a standard three-level directional interchange. I-70 would be at the bottom level with U.S. 61 going over it. Above that would be the flyover ramps from northbound U.S. 40/61 to westbound I-70 and from southbound U.S. 61 to eastbound I-70. Traffic volumes for eastbound I-70 to northbound Route 61 and westbound I-70 to southbound U.S. 40/61 are projected to be relatively low, and the movements are proposed to be provided by loop ramps. The U.S. 61 and Pitman Road interchange would be reconfigured to provide an off-ramp from U.S. 61 and an on ramp to southbound U.S. 40/61 only.

Eastbound, but not westbound, I-70 traffic would have access to Pitman Road, but Pitman Road traffic would have no access to I-70 under this design. This alternative makes good use of existing right of way and has minimal direct impacts to adjacent, property owners. It also does not encroach on the adjacent St. Charles County park property in the southwest quadrant. Constructibility of this alternative, in particular the flyover ramp bridges that cross I-70 at a high skew angle, would be difficult. This alternative was not advanced for further study.

ALTERNATIVE I210-2

This alternative provides directional or loop ramps for all movements, but in a different configuration than Alternative I210-1. I-70 would be at the bottom of the interchange, with U.S. 61 going over I-70. Northbound U.S. 40/61 to westbound I-70 would be the only flyover ramp, crossing on a third level above I-70 and U.S. 61. Southbound U.S. 61 to eastbound I-70 follows the same basic geometry as it does in the existing interchange. Access to and from Pitman Road is similar to Alternative I210-1 except that access to eastbound I-70 is also provided.

Because of the more spread out nature of this alternative, it should be easier to construct, and it should cost less than the other alternative because of the reduced area of roadway that must be carried on bridges. Like alternative I210-1, this alternative makes good use of existing right of way, minimizes impacts to local businesses and stays off of county park property. This alternative was advanced for further study.

Route A (Exit 212) – Wentzville/Lake St. Louis

The existing interchange at this location is a diamond configuration with stop-controlled ramp terminals that are about 600 feet (183 m) apart. The south outer roadway is about 250 feet (76 m) from the south ramp terminal. There is no north outer roadway. Route A passes over Pitman Road and the Norfolk Southern railroad to the north of the interchange. To the south of the interchange are a City of Lake St. Louis park and residential properties.

There was originally one proposed interchange alternative at this location that completed the development process to the screening stage. A second alternative was added based on public input that suggested an alternative that would eliminate all left turns at the intersection of Route A with the Pitman Road connectors.

ALTERNATIVE I212-1

No changes to the ramps or the south outer roadway are planned in this alternative. Moving the outer roadway connection away from I-70 to the 1,320 feet (402 m) recommended without major

impacts to residential and park development is not possible. A connector road between Route A and Pitman road is the only major improvement included in this alternative. On Route A this connection is closer to the interchange ramp terminals than desired according to access management guidelines, but it would be pushed as far north as it can go without impact to a residence along Pitman Road.

Access from Route A to Pitman Road provides an additional point of access to I-70 for properties between I-70 and Pitman Road. The existing interchange comes close to meeting geometric requirements and does not warrant reconstruction. Access to Route A from the south outer roadway north to the railroad can be restricted to maintain appropriate access control. Construction would require a large volume of fill material to be brought to the site because Route A is higher than Pitman Road in this area. This alternative was advanced for further study.

ALTERNATIVE I212-2

At one of the public meetings in September 2003, a citizen living in the vicinity of this interchange commented that the addition of the connector road between Route A and Pitman Road raised safety issues over the presence of a crest curve over the railroad and Pitman Road. This curve could cause sight distance problems with the Route A/Connector intersection. He suggested that we build a connector on each side of Route A to eliminate the need for left turns.

As a result of the recommendation, this alternative would be developed to add a connector to both the east and the west sides of Route A. This configuration improves compliance with access management guidelines by providing only right-in, right-out connections with Route A at a location that is too close to the interchange ramp terminals for a full intersection. This alternative was advanced for further study.

Lake St. Louis Boulevard (Exit 214) – O'Fallon/Lake St. Louis

The interchange at this location is a tight diamond with about 425 feet (130 m) between ramp terminals. Both the north and south outer roadways tie into Lake St. Louis Boulevard within about 100 feet (30 m) of the ramp terminals. The south outer road/Lake St. Louis Boulevard intersection is the only one currently signalized. To the south, Lake St. Louis Boulevard curves back to the east, serving a variety of retail and commercial businesses in the vicinity of the interchange, and residential areas once the Lake St. Louis lake dam is crossed. To the north, Mexico Road connects with the north outer roadway about 575 feet (175 m) west of Lake St. Louis Boulevard and crosses the Norfolk Southern Railroad to proceed northwest into rural St. Charles County.

Three issues influenced the design of this interchange:

- A MoDOT construction contract widened I-70 to six lanes by filling the median from Lake St. Louis Boulevard west to U.S. 40/61 in 2003 and 2004. As part of that project, the Lake St. Louis Boulevard bridge was removed and replaced with a new six-lane structure that required modifications to ramp terminals and outer roadway connections.
- The property between the railroad and north outer roadway at the interchange is being developed. MoDOT and the City of O'Fallon are working to negotiate a change in the configuration of the outer roadway to move it several hundred feet away from I-70. While this design does not fully meet the new access management guidelines, it is an improvement over what existed previously.
- On the north side of the railroad at this location, a residential developer is working to plat a new subdivision. MoDOT, the City of O'Fallon and St. Charles County have worked with the developer to define where the northward extension of Lake St. Louis Boulevard will be located. All parties involved agreed that the extension must be grade-separated over the railroad. The geometry for this proposed extension is shown on the study plans

based on recommendations for this extension as of May 2004. The extension is not a part of the Improve I-70 program.

Three alternatives were originally proposed for interchange alternatives at this location in this screening stage. Ultimately a fourth and fifth alternative were added based on traffic studies of the first three alternatives that indicated that each would not provide an adequate LOS for projected future 2030 traffic volumes. Each of the alternatives is discussed below.

ALTERNATIVE I214-1

This alternative includes a diamond interchange with the northeast ramp folded over to the northwest quadrant. The north outer roadway would extend to the east from the ramp terminal. The north outer roadway to the west ties into extended Lake St. Louis Boulevard north of the railroad. On the south side, the existing outer roadway connection is too close to the ramp terminals and will likely cause significant delays as traffic volumes increase. This intersection must serve ambulances coming to the hospital just west of the interchange on the south service road. This plan constructs a roundabout as far south of the interchange as possible without spilling over the slope into the lake. The west leg of the south outer roadway would be curved around to the south to tie into the roundabout. The third leg of the roundabout would be Lake St. Louis Boulevard extending to the east. The east leg of the south outer roadway would tie into Lake St. Louis Boulevard east of the roundabout, which requires an additional intersection. The roundabout would provide a bypass lane for traffic coming from the highway wishing to go west on the outer roadway.

By relocating the outer roadway, additional distance is added between the south ramp terminal and the next intersection, which is expected to improve traffic flow. The roundabout design provides for continuous traffic flow, and can act as a focal point for the entrance to the City that commands a sweeping view of the lake. This alternative, and each of the others, has major impacts to adjacent businesses that would be relocated to allow for the realignment. It also does not provide for continuous flow of outer roadway traffic, with the south outer roadway east of the interchange tying to Lake St. Louis Boulevard east of the roundabout. This alternative was not advanced for further study.

ALTERNATIVE I214-2

This alternative utilizes the existing diamond. On the north side, the outer roadway is moved several hundred feet north to the approximate location being discussed by MoDOT, the City of O'Fallon, St. Charles County and various developers. On the south side, the outer roadway intersection with Lake St. Louis Boulevard is moved about 300 feet (91 m) south of its current location and the outer roadways are reconfigured to tie into it. This intersection would be a regular signalized at-grade intersection.

This alternative benefits traffic flow by moving the outer roadway intersection away from the ramp terminals, though it is not as far away as access management guidelines suggest. It also provides for continuous movement along the south outer roadway. One negative to this plan is the need to acquire several businesses to obtain right of way for construction. This alternative was not advanced for further study.

ALTERNATIVE I214-3

This alternative has the same general configuration as Alternative I214-2, but the standard signalized intersection of the south outer roadway with Lake St. Louis Boulevard would be replaced by a roundabout.

This alternative benefits traffic flow by moving the outer roadway intersection away from the ramp terminals, though it is not as far away as access management guidelines recommend. It provides for continuous movement along the south outer roadway and the roundabout could

serve as a focal point for the entrance to the City of Lake St. Louis. One negative to this plan is the need to acquire several businesses to obtain right of way for construction. This alternative was not advanced for further study.

ALTERNATIVE I214-4

This alternative replaces the existing diamond interchange with a single point diamond interchange and makes improvements to the south outer roadway that do not require significant additional right of way.

This alternative would include no improvements north of the westbound interchange ramps, but would use the new configuration of the north outer roadway exactly as proposed by the City of O'Fallon based on agreements with MoDOT District 6, St. Charles County and various developers.

This alternative benefits traffic flow by reducing the number of intersections from four to three, and increasing the distance from the ramp terminals to the south outer roadway intersection. No improvements to the north outer roadway are proposed. Dual left-turn lanes are provided on the mainline exit ramps and on some legs of the outer roadway intersections to handle the projected high volume of turning movements. Because of the short weaving distance from the interchange to the north outer roadway intersection, this interchange is projected to operate at LOS E in the year 2030. This alternative was not advanced for further study.

ALTERNATIVE I214-5

This alternative does not substantially impact the diamond interchange constructed in 2004 and accommodates the known development in the interchange area as best as possible without major impacts. The only changes from current conditions are proposed for the south outer roadway - the same improvements proposed in alternative I214-4, which do not require significant additional right of way.

This alternative utilizes the interchange constructed in 2004 at Exit 214, including the new configuration of the north outer roadway discussed in alternative I214-4. The analysis additionally included an extension of Lake St. Louis Boulevard to the north that is currently listed in St. Charles County's Long Range Plan. It is assumed that this configuration will be in place by the analysis year 2030 and no additional modifications were considered for the north outer road.

The land adjacent to Exit 214 is fully developed to the south and in the beginning phases of development to the north. The magnitude and type of development north of the interchange is still undetermined at this time, but will certainly have a great impact on future traffic volumes through the interchange. At this time, this alternative is estimated to operate at a LOS E in the year 2030, but the location should be monitored in the future. This alternative was advanced for further study.

f. Summary of Interchange Alternatives

The following table summarizes and combines the interchanges studied in the *Rural Reevaluation Technical Memorandum* and the *Interchange Screening Technical Memorandum Addendum*.

Table II-3: Interchange Alternatives Summary

Alternative	Interchange Description	Positive Features	Negative Features	Recommendation ✓ = advance ✗ = remove
175-1 Route 19 Hermann / New Florence	Diamond Interchange with 800-foot ramp terminal spacing	<ul style="list-style-type: none"> • Meets geometric requirements • Meets driver expectation • Good access management implementation • Minimum business impacts • No significant known environmental impacts 	<ul style="list-style-type: none"> • No significant negative remarks 	✓
179-1 Route F High Hill	Diamond Interchange with 800-foot ramp terminal spacing	<ul style="list-style-type: none"> • Meets geometric requirements • Meets driver expectation • No significant known environmental impacts 	<ul style="list-style-type: none"> • Cannot meet desired 1,320' from ramp terminal to north outer road due to RR • Noise and community cohesion impacts in SW quadrant where subdivision now surrounded by highway, crossroad and south outer roadway 	✓
179-2 Route F High Hill	Diamond Interchange with 800-foot ramp terminal spacing	<ul style="list-style-type: none"> • Meets geometric requirements • Good access management implementation • No significant known environmental impacts 	<ul style="list-style-type: none"> • Roundabouts do not meet driver expectation, especially in rural setting • Ability to carry future traffic volumes not determined 	✓
183-1 Route E/Y Jonesburg	Diamond Interchange with 800-foot ramp terminal spacing	<ul style="list-style-type: none"> • Meets geometric requirements • No significant known environmental impacts 	<ul style="list-style-type: none"> • Inability to fully implement access management on south • Need for 1,000' access road in NE quadrant 	✗
183-2 Route E/Y Jonesburg	Diamond Interchange with 800-foot ramp terminal spacing	<ul style="list-style-type: none"> • Meets geometric requirements 	<ul style="list-style-type: none"> • Inability to fully implement access management on south • Possible impact to parcel that may be historically significant 	✓
183-3 Route E/Y Jonesburg	Diamond Interchange with 800-foot ramp terminal spacing	<ul style="list-style-type: none"> • Meets geometric requirements • No significant known environmental impacts 	<ul style="list-style-type: none"> • Inability to fully implement access management on south 	✓
188-1 Route A/B Truxton / Pendleton	Diamond Interchange with 800-foot ramp terminal spacing	<ul style="list-style-type: none"> • Meets geometric requirements • Meets driver expectations • Meets access management guidelines • No significant known environmental impacts 	<ul style="list-style-type: none"> • None 	✓

Alternative	Interchange Description	Positive Features	Negative Features	Recommendation ✓ = advance ✗ = remove
193-1 Route 47 Warrenton	Single-point diamond interchange at existing location	<ul style="list-style-type: none"> • Eliminates left turns between the outer roadways and interchange • Utilizes existing right of way for Route 47 • Meets geometric requirements 	<ul style="list-style-type: none"> • Construction would be difficult due to location on existing alignment • Changes in business access to front and back entrances • Inability to do much driveway consolidation • Cost of north outer roadway, access road, and single-point interchange 	✗
193-2 Route 47 Warrenton	Single-point diamond interchange 600 feet west of existing location	<ul style="list-style-type: none"> • Better implementation of access management than possible with no Route 47 relocation • Maintains business access at fronts of properties and does not favor north or south-side businesses 	<ul style="list-style-type: none"> • Cost of single-point diamond interchange construction • Need for additional right of way • Earthwork to put Route 47 over I-70 	✓
193-3 Route 47 Warrenton	Tight diamond interchange west of existing location	<ul style="list-style-type: none"> • Better implementation of access management than possible with no Route 47 relocation • Maintains business access at fronts of properties and does not favor north or south-side businesses • Less expensive to construct than single-point diamond interchange 	<ul style="list-style-type: none"> • Need for additional right of way • Earthwork to put Route 47 over I-70 	✓
193-4 Route 47 Warrenton	Tight diamond interchange at existing location	<ul style="list-style-type: none"> • Eliminates left turns between the outer roadways and interchange • Utilizes existing right of way for Route 47 • Meets geometric requirements 	<ul style="list-style-type: none"> • Construction would be difficult due to location on existing alignment • Changes in business access to combination front & back entrances • Location of north outer roadway/Route 47 requires change in access to residential area • Noise impacts to north side residential areas • Cost of north outer roadway and access road construction 	✗

Alternative	Interchange Description	Positive Features	Negative Features	Recommendation ✓ = advance ✗ = remove
199-1 Wright City West	Diamond interchange with roundabout ramp terminals	<ul style="list-style-type: none"> • Allows for connection of outer roadways with minimum right of way • Eliminates short distance between ramp terminal and south outer roadway • Allows for future expansion over RR • Does not require traffic going into town (SE quadrant) to cross RR • Minimal impacts to existing businesses • Excellent ability to meet access management guidelines 	<ul style="list-style-type: none"> • Roundabout ramp terminals do not meet driver expectation • Ability to carry interchange traffic is unclear until additional traffic studies can be completed 	✓
199-2 Wright City West	Diamond Interchange	<ul style="list-style-type: none"> • Meets driver expectations • Grade separates traffic from RR on south side • Improves access to area south of the RR • Fairly good ability to meet access management guidelines 	<ul style="list-style-type: none"> • Requires an outer roadway connection that is grade separated with the RR • Outer roadway and its noise are closer to residential areas on north side of interchange • More expensive to construct 	✓
200-1 Route F/J Wright City	Directional Interchange (two movements only)	<ul style="list-style-type: none"> • Maintains existing movements 	<ul style="list-style-type: none"> • Does not provide full level of movements • Directional ramp promotes introduction of higher speed traffic onto 2nd Street • Tying outer roadway to 1st Street may not be possible due to RR ownership of 1st Street 	✗
200-2 Route F/J Wright City	Full Diamond Interchange with roundabout ramp terminals	<ul style="list-style-type: none"> • Less outer roadway and bridge construction and associated costs and impacts • Good way to handle outer roadway connections in area confined by RR • Roundabouts slow traffic entering city 	<ul style="list-style-type: none"> • Roundabout ramp terminals do not meet driver expectation • Ability to carry interchange traffic is unclear until additional traffic studies can be completed 	✓
203-1 Route T/W Foristell	Full Diamond Interchange west of existing location	<ul style="list-style-type: none"> • Standard diamond interchange meets driver expectations • Ability to implement access management guidelines • Increased safety through elimination of at-grade RR crossing 	<ul style="list-style-type: none"> • 30'-40' tall embankment for Route T will divide city, reducing community cohesion • Embankment would require extensive, and expensive, retaining wall construction • Difficult access for Wentzville Fire Protection District 	✗

Alternative	Interchange Description	Positive Features	Negative Features	Recommendation ✓ = advance ✗ = remove
203-2 Route T/W Foristell	Full Diamond Interchange east of existing location	<ul style="list-style-type: none"> • Standard diamond interchange meets driver expectations • Ability to implement access management guidelines • Increased safety through reduction of traffic at existing at-grade RR crossing 	<ul style="list-style-type: none"> • More outer roadway construction and costs than Alternative 203-3 • More access and driveway construction 	✓
203-3 Route T/W Foristell	Single Point Diamond Interchange east of existing location	<ul style="list-style-type: none"> • Ability to implement access management guidelines • Increased safety through reduction of traffic at existing at-grade RR crossing • Reduced outer roadway and access road construction than Alternative 203-2 	<ul style="list-style-type: none"> • Single point diamond interchange more expensive to construct 	✓
208-1 Wentzville Parkway Wentzville	Existing Diamond interchange with outer roadway disconnected	<ul style="list-style-type: none"> • Good implementation of access management guidelines • Incorporates planned extension of Wentzville Parkway 	<ul style="list-style-type: none"> • Access to property between highway and RR impacted • At grade RR crossing in SE quadrant • Outer roadway would not directly connect to Wentzville Pkwy • Grade separation over RR between south outer roadway and Interstate Drive • Expensive to construct 	✗
208-2 Wentzville Parkway Wentzville	Existing diamond interchange with outer roadway connection	<ul style="list-style-type: none"> • Fair implementation of access management guidelines • Incorporates planned extension of Wentzville Pkwy • Better access to property between highway and RR • Eliminates need for grade separation over RR between south outer roadway and Interstate Drive 	<ul style="list-style-type: none"> • Requires grade separation with outer roadway • Indirect connection to outer roadway • Expensive to construct 	✗
208-3 Wentzville Parkway Wentzville	Existing diamond interchange with additional WB exit ramp right turn lane	<ul style="list-style-type: none"> • Utilizes all interchange reconstruction completed in 2003 • Provides adequate LOS at future volumes with only minimal construction and expense 	<ul style="list-style-type: none"> • Requires grade separation with outer roadway • Does not improve south outer roadway separation from interchange ramps 	✓

Alternative	Interchange Description	Positive Features	Negative Features	Recommendation ✓ = advance ✗ = remove
209-1 Route Z Wentzville	Diamond interchange. No north outer roadway. Use Interstate Drive as south outer roadway	<ul style="list-style-type: none"> • Full diamond interchange can be developed • Good implementation of access management south of interchange 	<ul style="list-style-type: none"> • Requires right of way taking of church in SW quadrant • Requires elimination of north outer roadway to west of Route Z • Nursing home access will be moved to new city street passing under existing highway underpass • Minimal ability to improve access management north of interchange • Access from NB U.S. 40/61 is eliminated 	✓
210-1 U.S. 40/61 and I-70 System-to-System Interchange	Semi-directional interchange with direct ramps for all movements except EB I-70 to NB U.S. 61 and WB I-70 to SB U.S. 40/61	<ul style="list-style-type: none"> • Good use of existing right of way • Eliminates existing geometric problems • Meets driver expectation for directional interchange • Minimal impacts to adjacent businesses • Misses county park property 	<ul style="list-style-type: none"> • Eliminates access to Pitman Road from WB I-70 traffic that first exits onto U.S. 61 NB • Pitman Road traffic entering SB U.S. 40/61 cannot then exit to I-70 in either direction • Constructibility of this alternative would likely be very difficult • Skew at 3-level stack would make flyover ramp bridge spans long 	✗
210-2 U.S. 40/61 and I-70 System-to-System Interchange	Semi-directional interchange of a different layout from Alternative 210-1 that includes direct ramps for all movements except EB I-70 to NB U.S. 61 and WB I-70 to SB U.S. 40/61	<ul style="list-style-type: none"> • Good use of existing right of way • Eliminates existing geometric problems • Meets driver expectation for directional interchange • Minimal impacts to adjacent businesses • Misses county park property • Adds access from Pitman Road to EB I-70 • Constructibility would be easier than Alternative 210-1 • Less bridge construction than Alternative 210-1 	<ul style="list-style-type: none"> • Eliminates access to Pitman Road from WB I-70 traffic that first exits onto U.S. 61 NB • Pitman Road traffic can enter only SB U.S. 40/61 and EB I-70 • Difficult construction sequencing 	✓
212-1 Route A Wentzville/Lake St. Louis	Use existing interchange with addition of Route A to Pitman Rd connection	<ul style="list-style-type: none"> • Provides additional point of access to I-70 for properties between I-70 and Pitman Rd • Existing interchange comes close to meeting requirements and will not be rebuilt 	<ul style="list-style-type: none"> • Large volume of fill material would have to be brought to site 	✓

Alternative	Interchange Description	Positive Features	Negative Features	Recommendation ✓ = advance ✗ = remove
212-2 Route A Wentzville/Lake St. Louis	Use existing interchange with addition of two Route A to Pitman Road connections	<ul style="list-style-type: none"> • Provides additional point of access to I-70 for properties between I-70 and Pitman Rd • Existing interchange comes close to meeting requirements and will not be rebuilt • Better application of access management 	<ul style="list-style-type: none"> • Large volume of fill material would have to be brought to site 	✓
214-1 Lake St. Louis Boulevard O'Fallon/Lake St. Louis	Existing diamond interchange with modifications to Lake St. Louis Blvd. and south outer roadway	<ul style="list-style-type: none"> • Moves outer roadway intersection away from ramp terminals • Roundabout a focal point for entrance to city of Lake St. Louis 	<ul style="list-style-type: none"> • Acquisition of several businesses would be required to construct • Does not provide continuous flow on outer roadway • Roundabout possibly still too close to ramp terminal 	✗
214-2 Lake St. Louis Boulevard O'Fallon/Lake St. Louis	Existing diamond interchange with modifications to Lake St. Louis Blvd. and south outer roadway	<ul style="list-style-type: none"> • Moves outer roadway intersection away from ramp terminals • Provides continuous flow on outer roadway 	<ul style="list-style-type: none"> • Acquisition of several businesses would be required to construct • Intersection possibly still too close to ramp terminal 	✗
214-3 Lake St. Louis Boulevard O'Fallon/Lake St. Louis	Existing diamond interchange with modifications to Lake St. Louis Blvd. and south outer roadway	<ul style="list-style-type: none"> • Moves outer roadway intersection away from ramp terminals • Roundabout a focal point for entrance to Lake St. Louis • Provides continuous flow on outer roadway 	<ul style="list-style-type: none"> • Acquisition of several businesses would be required to construct • Roundabout possibly still too close to ramp terminal 	✗
214-4 Lake St. Louis Boulevard O'Fallon/Lake St. Louis	New single point diamond interchange with modifications to Lake St. Louis Blvd. and south outer roadway	<ul style="list-style-type: none"> • Eliminates one intersection • Increases distance from ramp terminals to south outer roadway intersection • No acquisition of businesses required for construction 	<ul style="list-style-type: none"> • Cost of reconstruction to single point diamond interchange • SPUI projected to operate at LOS E in 2030 	✗
214-5 Lake St. Louis Boulevard O'Fallon/Lake St. Louis	Existing diamond interchange with modifications to south outer roadway	<ul style="list-style-type: none"> • Moves south outer roadway intersection away from ramp terminals • No acquisition of businesses required for construction • Lowest cost option 	<ul style="list-style-type: none"> • Diamond projected to operate at LOS E in 2030 • Does not meet access management guidelines 	✓

3. Weigh Stations

SIU 7 has one pair of weigh station facilities located about one-third of a mile (0.54 km) east of the entrance and exit ramps for the Route TW interchange at Foristell (Exit 203). At this location, the distance across the highway between the eastbound and westbound weigh stations is not sufficient to allow for the 10 lanes that will eventually be required at this location with the Preferred Alternative. For this reason, at least one of the two facilities would have to be reconstructed further back to provide the necessary room for the widening of the I-70 mainline. But considering that weigh stations function in the same manner as a busy interchange for evaluation of access

management, the existing weigh station location fails to meet current guidelines for limiting highway access points to a minimum of two-mile (3.2 km) intervals in urban areas.

In order to keep the weigh stations at their current locations along I-70, ramps on the west side of the weigh stations would have to be braided with the Foristell interchange ramps, introducing significant construction costs. One of the two weigh station facilities would still also have to be reconstructed to move it away from the highway to allow for up to 10 lanes of highway.

Alternative locations for the weigh stations were considered because of the high construction costs associated with changes to the ramps that would be necessary to provide the proper separation from the interchange ramp entrances. Locations for a relocated weigh station had to provide enough room for construction of the facility without major impacts to adjacent properties and be located at least two miles (3.2 km) from adjacent interchanges.

Because of the tight spacing of existing interchanges, there are no sites east of the current weigh station location that would be suitable. To the west of the existing location, the first location that meets the desired spacing criteria is between Warrenton and Wright City near the Strack Church Road grade separation near MP 197. A westbound facility could be constructed just east of the overpass, with an eastbound facility located about one mile (1.6 km) west of the overpass. This location would eliminate the possible use of Strack Church Road or Franklin Road as locations for a future interchange. Though no interchange is currently planned or under study at these locations now, local planners have identified this area as a potential interchange site to provide a second access point for the City of Warrenton. Further, there is concern that Route M, which parallels I-70 on the south, would be an easy route for overloaded trucks attempting to bypass the weigh station scales. For these reasons, this location was dropped from further consideration.

The second location identified as a potential weigh station location is at MP 178 in Montgomery County between the Route 19 and High Hill interchanges. This location is relatively flat and can be constructed with little impact to adjacent properties. It provides two miles (3.2 km) of spacing to adjacent interchanges, and there are no short routes around the location for vehicles wanting to avoid passing through the weigh station scales. This weigh station location is therefore being included in mainline alternatives M1 and LM175.

4. Rest Areas/Welcome Centers

In order to provide a consistent corridor-wide approach to locating rest areas/welcome centers along I-70, MoDOT completed the *I-70 Rest Area/Welcome Center Study* (August 2003). This study recommended that a new rest area/welcome center be constructed in SIU 7 between the Route 19 interchange at MP 179 and the Wright City West interchange at MP 199. The study further recommended that the existing rest area/welcome center be closed and removed following completion of the new rest area/welcome center facilities.

The study recommends the use of sidesaddle rest areas/welcome centers providing separate facilities for eastbound and westbound traffic, but across from one another so that sewage treatment facilities can be shared. This type of rest area/welcome center provides right-off, right-on movements, which are safer than the left-off, left-on movements typical of a median rest area. It also provides greater opportunities for possible enhancements and recreation opportunities as the improvements are not confined to the space between the travel lanes or the resources within a median rest area/welcome center.

The study identified a need for a minimum of 65 parking spaces per facility (side) for commercial trucks and a minimum of 30 parking spaces for cars, buses and RV's.

Locations for a new rest area/welcome center within the limits provided by the MoDOT I-70 Rest Area/Welcome Center Study were sought that would attempt to meet the access management guidelines to provide five miles (8.0 km) between access points on an interstate highway in rural areas. Because there are no locations where existing interchanges are located more than ten miles (16 km) apart, the guidelines for providing at least two miles (3.2 km) between interchanges in urban areas was applied. Much of I-70 between MP 179 and 199 is parallel to the Norfolk Southern Railway and provides little or no room for development of a rest area/welcome center and other areas are more highly developed, making them expensive to acquire and develop.

The only reasonable location identified is at MP 187 in Warren County, just east of the Montgomery County line. This is about three miles (4.8 km) east of the Route E/Y interchange at Jonesburg and two miles (3.2 km) west of the Route A/B interchange at Truxton/Pendleton. Its location at a small crest in the highway provides some assistance in slowing down exiting traffic and speeding up entering traffic. Land use in this area is generally agricultural and no structures would have to be acquired to place the rest area/welcome center at this location. Utilities could be obtained from the City of Jonesburg, approximately two-and-a-half miles away. This alternative has been added to mainline alternative M1. The existing facility will be removed.

5. Intelligent Transportation Systems Evaluation

The implementation of Intelligent Transportation Systems (ITS) along the I-70 Corridor will improve the operating efficiency of the corridor under both the No-Build and Build alternatives. The movement of people and goods along the corridor will be safer, faster and more reliable. ITS improves safety by identifying hazards and providing information on those hazards to drivers and system operators. Efficiently identifying and managing incidents in the I-70 corridor will reduce the occurrences of congestion, which reduces average travel time, improves travel time reliability and provides environmental benefits. ITS improvements complement the benefits of other safety and capacity improvements, thus they are proposed as part of the overall improvement strategy for the corridor. Implementing ITS along I-70 will maximize the return on the investment being made on the critical I-70 corridor.

ITS recommendations for deployment along the I-70 corridor include:

- Commercial Vehicle Operations (CVO) – A Commercial Vehicle Electronic Clearance System, such as the PrePass system currently operating at the weigh stations on I-70.
- Parking Management – An accurate inventory of the availability of public truck parking spaces in rest areas/welcome centers is necessary to assist truck drivers in making informed decisions on where to stop. In addition it can reduce maintenance costs caused by trucks that choose to park along interchange ramps, damaging shoulders.
- Road Weather Information System (RWIS) – This system will collect roadway and weather condition data on and adjacent to the roadway. The data are used to provide motorists driving condition information and in planning of maintenance activities.
- Incident Detection and Management - The more intense deployment of ITS components will be focused around existing high-incident locations and the most congested subsections within the corridor, particularly in the eastern portion of SIU 7. Traffic detection equipment will include permanent detection stations installed to provide full coverage of these subsections. Using the data from these stations, incidents can be detected. Video surveillance equipment could be installed to provide full coverage of the subsections.

- Traffic and Travel Information – The statewide traveler information system will provide traffic and traveler information through a Web site, a traveler information phone number (511), radio stations and other news media. The system will also include the deployment of dynamic message signs (DMS) and highway advisory radio (HAR) at strategic route diversionary points where travelers can choose to take an alternative route if weather or an incident precludes the use of the interstate. Within SIU 7, these diversionary points are proposed at Route 19 and Route 47.
- Smart Work Zone Management – The key to flexible and cost effective work zone management is the communication network. The wireless communication network proposed for the I-70 corridor is expected to provide the flexibility needed for work zone management prior to the beginning of major construction.

Within SIU 7, the following ITS components are operating or will be in place in the near future:

- A commercial vehicle electronic clearance system (PrePass) is operating at the permanent weigh stations located on I-70 at Foristell, east of Exit 203.
- An extension of Gateway Guide¹ on I-70 to the Route W interchange (MP 203) is under design by MoDOT District 6 and should be in place prior to implementing I-70 widening. As part of this project the reference markers will be extended to Route W.

Within SIU 7, the following ITS components are planned:

- Relocation of commercial vehicle electronic clearance system (PrePass) components to accommodate widening at the permanent weigh station located on I-70 at Foristell, east of Exit 203.
- Parking management system for the new rest area/welcome center to provide information on the number of available truck parking spaces.
- As part of the 12-station RWIS network along I-70, two RWIS stations will be implemented within SIU 7. Actual locations will be determined through further studies.
- On the eastern end of SIU 7, the Gateway Guide vehicle detection and surveillance system will be extended from Route W interchange to the Route 47 interchange. This is a 10-mile deployment with one-third mile vehicle detection, 100 percent video surveillance capabilities and appropriate DMSs.
- On the western end of SIU 7, one traffic flow/count station is proposed.
- DMSs and HAR transmitters are proposed both eastbound and westbound approaching the Route 19 interchange to disseminate traveler information.
- To provide the wireless communication network, three radio transmitters must be deployed in SIU 7.
- To extend the fiber optic backbone along the I-70 corridor, 19 miles of fiber optic cable and conduit are required along with pull boxes and communication hardware within SIU 7.
- Two-tenth mile markers, *55 signs² and 511 signs³ for SIU 7 from the western end to Route W.

¹ MoDOT's program to improve roadway efficiency and safety in the St. Louis area through the reduction of traffic congestion.

The capital cost for implementing ITS in SIU 7 is estimated at \$7,200,000 with an estimated annual operation and maintenance cost of \$720,000. These costs reflect the extension of the Gateway Guide system to the Route 47 interchange area, but do not include the cost for developing and operating an I-70 corridor traffic operations center.

D. Alternatives Carried Forward for Further Study

Up to this point, the potential corridors have been screened, the alternatives initially developed and modified based on the criteria and inputs mentioned previously, and finalized into a set of alternatives to be carried forward for further study. This section describes the alternatives that are carried forward and presents the organizational schema by which they will be analyzed in subsequent chapters.

1. Build Alternatives

Following definition and screening of the alternatives, additional engineering work was done to more clearly define the various alignments and determine the areas that would be impacted if they were constructed.

For each alignment the horizontal and vertical geometry was refined taking into account the design criteria, access management guidelines, known physical, cultural, and environmental obstacles and other factors. Using roadway design software, cross sections were prepared for the proposed alignments to establish rough construction limits. Right of way limits required for construction were then defined.

a. Alternatives

To facilitate the evaluation of the environmental impacts of each alternative, the corridor has been divided into 17 subsections with each subsection containing one to four alternatives. Table II-4 provides the limits of the alternative subsections and the corresponding preliminary mainline and interchange alternatives from the previous section that make up the definition of the proposed alternatives. Within each of the subsections, each alternative has been developed to provide essentially the same level of capacity, safety and access management improvements. It is therefore expected that there would be no substantive difference among the alternatives with regard to the level of transportation improvements provided. Maps of the alternatives are provided in Appendix B. Note that the right of way lines shown on the maps are approximate and subject to change during final design.

² Instructing motorists to call *55 on a cellular phone to summon the Motorist Assist and Emergency Response program.

³ U.S. Department of Transportation (USDOT)-sponsored program to designate a nationwide three-digit telephone number for traveler information

Table II-4: Summary of Alternatives Carried Forward

Alternative	Begin MP	End MP	Length in Miles (km)	Preliminary Mainline Alternative	Preliminary Interchange Alternative	Description
1	174.0	175.5	1.5 (2.4)	M1	I175-1	Route 19 Diamond interchange
2A	175.5	179.0	3.5 (5.6)	M1	None	East of Route 19 to west side of High Hill – South widening with south outer road immediately adjacent to I-70
2B	175.5	179.0	3.5 (5.6)	LM175	None	East of Route 19 to west side of High Hill – North widening
2C	175.5	179.0	3.5 (5.6)	M1 with modified south outer road	None	East of Route 19 to west side of High Hill – South widening with south outer road passing south of MoDOT maintenance facility
3A	179.0	180.5	1.5 (2.4)	M1	I179-1	Route F diamond interchange
3B	179.0	180.5	1.5 (2.4)	M1	I179-2	Route F diamond interchange with roundabout ramp terminals
4	180.5	183.0	2.5 (4.0)	M1	None	High Hill to Jonesburg including RR crossing realignment
5A	183.0	185.0	2.0 (3.2)	M1	I183-2	Route E/Y diamond interchange – Jonesburg
5B	183.0	185.0	2.0 (3.2)	M1	I183-3	Route E/Y diamond interchange – Jonesburg – alternative alignments
6	185.0	189.0	4.0 (6.4)	M1	I188-1	Jonesburg to east of Route A/B including Route A/B diamond interchange
7A	189.0	193.0	4.0 (6.4)	M1	None	East of Route A/B to Warrenton
7B	189.0	193.0	4.0 (6.4)	LM189	None	East of Route A/B to Warrenton – alternative widening
8A	193.0	194.0	1.0 (1.6)	M1	I193-2	Route 47 single point diamond interchange
8B	193.0	194.0	1.0 (1.6)	LM189	I193-2	Route 47 single point diamond interchange with alternative widening
8C	193.0	194.0	1.0 (1.6)	M1	I193-3	Route 47 diamond interchange
8D	193.0	194.0	1.0 (1.6)	LM189	I193-3	Route 47 diamond interchange with alternative widening
9A	194.0	196.0	2.0 (3.2)	M1	None	East of Route 47 to MP 196
9B	194.0	196.0	2.0 (3.2)	LM189	None	East of Route 47 to MP 196 alternative widening
10A	196.0	198.5	2.5 (4.0)	M1	None	MP 196 to Wright City
10B	196.0	198.5	2.5 (4.0)	LM196	None	MP 196 to Wright City alternative north outer road alignment
10C	196.0	198.5	2.5 (4.0)	LM196 with revised north outer roadway	None	MP 196 to Wright City with different north outer road alternative
11A	198.5	200.0	1.5 (2.4)	M1	I199-1	Wright City West diamond interchange with roundabouts
11B	198.5	200.0	1.5 (2.4)	M1	I199-2	Wright City West diamond interchange
12	200.0	203.0	3.0 (4.8)	M1	I200-2	Route F/J diamond interchange with roundabouts
13A	203.0	205.0	2.0 (3.2)	M1	I203-2	Route T/W diamond interchange
13B	203.0	205.0	2.0 (3.2)	M1	I203-3	Route T/W single point diamond interchange
13C	203.0	205.0	2.0 (3.2)	M1	None	Route T/W tight diamond interchange
14	205.0	209.0	4.0 (6.4)	M1	I208-3	Wentzville Parkway diamond interchange
15	209.0	211.5	2.5 (4.0)	M1	I210-2	U.S. 40/61 and Route Z interchanges
16A	211.5	213.0	1.5 (2.4)	M1	I212-2	Route A – double connector
16B	211.5	213.0	1.5 (2.4)	M1	I212-1	Route A – single connector
17	213.0	214.0	1.0 (1.6)	M1	I214-5	Lake St. Louis Boulevard existing diamond interchange

Preferred alternative indicated by shading

b. Design Criteria

The application of the design criteria to the project is important to the development of a roadway so that driver expectations are met and the facility is as safe as practicable. During the process of further refining the design of I-70 and the interchanges, several locations listed in the following table were identified where the more-stringent design criteria goals for the Improved I-70 project (see Section II.C.1.b) could not be met, but where existing MoDOT design criteria for Interstate highways was still achieved. The only location where current standards would not be met is in the eastern three miles of the corridor where a current (2003-2004) construction project has added additional lanes to the median of I-70 that include shoulder widths that are slightly less than current criteria. The proposed improvements do not include modifications to increase the shoulder width because of the severity of impacts such widening would entail.

Table II-5: Mainline *Improve I-70* Design Criteria Deviations

Type of Data	Existing	Study Criteria	MoDOT Criteria	Proposed	Location	Reason for Design Exception
Horizontal Alignment Radius		3819.72 ft. (1164.25 m)	1910 ft. (582 m)	2864.79 ft. (873.19 m)	3 curves MP 208 to 210	Necessary to minimize the impact to existing Wentzville Parkway and surrounding properties.
Grade %	3.4%	3.0%	4%	3.4%	MP 212	Match existing condition to avoid replacing entire structure over Route A.
Inside Shoulder Width	7 ft. (2.13 m)	12 ft. (3.66 m)	12 ft. (3.66 m)	7 ft. (2.13 m)	MP 211 to 214	7 ft. inside shoulders and median barrier completed in 2004. Change would require complete reconstruction of I-70 rather than just widening to side

c. Constructibility

The ability to actually construct the alternatives while maintaining the existing highway, outer roadway and cross road traffic is important since facilities may be closed to traffic for construction. During the final definition of alignments, care was taken to ensure that horizontal alignments and vertical grades were set to allow for the phased construction that will be necessary.

Construction of mainline improvements in the rural portion of SIU 7 where there is a 54-foot offset from the existing highway centerline to the new highway centerline can be done using a four-stage approach as illustrated in Figure II-8

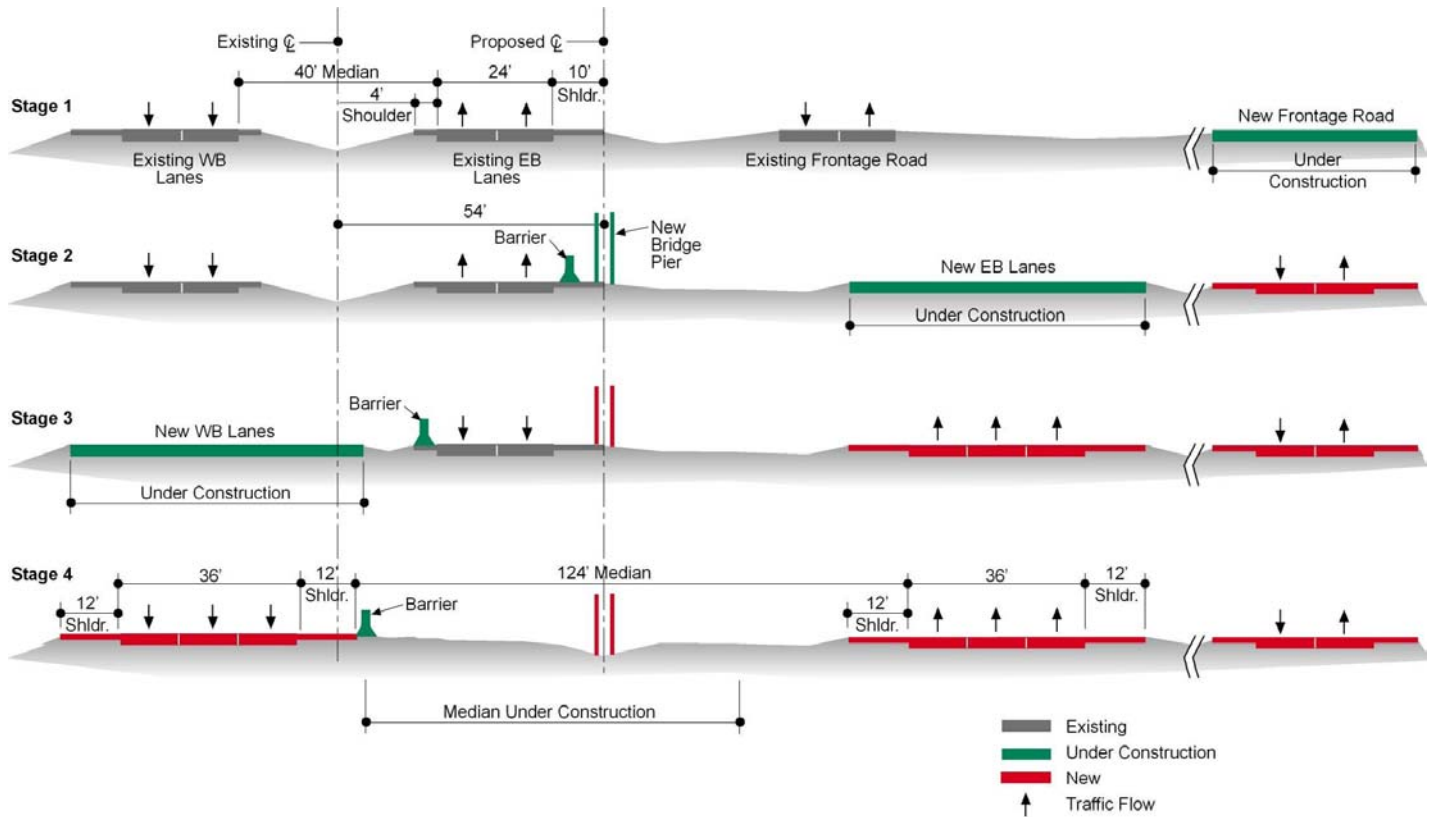
In Stage 1, reconstruction of the outer roadway on the widening side is completed in order to clear the area of the existing outer roadway for construction of new mainline pavement. The contractor will have to perform construction across driveways and other public roads that connect to it, and will have to provide access across construction in a manner determined on a case-by-case basis.

In Stage 2, one direction of the new mainline pavement will be constructed between the existing highway and the new outer roadway while traffic continues to use existing I-70. Construction of bridges over I-70 must be completed in this stage to allow for a shift of traffic in one direction onto the new mainline pavement at the end of the stage. Concrete barrier, and possibly pavement widening, will be necessary in the area of bridge center pier construction to provide a safe work zone for construction workers.

During Stage 3, one direction of I-70 traffic is on new pavement while the other direction is shifted onto the other half of the existing I-70 pavement. The remaining portions of mainline pavement can then be constructed utilizing, at least in part, the existing roadbed. A concrete median barrier will be required adjacent to construction of the new lanes because construction will encroach on the required clear zone.

In Stage 4, traffic is now utilizing all six lanes of the new pavement. Construction consists of the removal of the remaining existing I-70 pavement, the grading of the median, and the completion of median drainage structures. A concrete median barrier will be required adjacent to the median in one direction because the pavement demolition and grading work will be occurring within the required clear zone.

Figure II-8: Construction Staging



Between MP 181.8 and 184.0, a centerline offset of only 30 feet is proposed to eliminate an impact to a radio/communications tower. Construction sequencing will be similar to that described above, except that temporary pavement in the area of center pier construction for two bridges will be required to maintain traffic through construction.

Mainline construction through the urban portion of SIU 7 will be much less standard and will require the use of multiple construction staging schemes in order to complete construction while maintaining traffic.

Generally, construction in these areas would begin with any necessary reconstruction of outer roadways in order to provide room for mainline construction. In many locations through this urban portion of I-70, widening is to be accomplished by expanding to one side of the existing highway. Construction of at least one lane, if not two, and a shoulder would be completed while leaving traffic on the existing pavement. Following completion of this portion, one direction of

traffic could be shifted onto the new pavement. A second phase would likely complete construction of the lanes in one direction which would then allow all traffic to be shifted to new pavement while the remaining portion of the highway is completed in a third phase. Each of these phases will require the use of concrete median barrier to separate the motorists from the construction areas. Narrow lanes and temporary pavement will also be necessary to complete construction. Because of the multitude of possibilities, no construction staging diagrams are included for urban mainline construction.

Consideration should be given during preparation of construction plans and specifications to using alternative bidding scenarios including A+B bidding, where both cost and time are considered, and lane rentals. These methods of bidding should help in completing construction as quickly as possible and minimizing travel delays to users.

To illustrate the phased construction approach at interchanges, a possible sequence of construction for the Route 19 interchange and the U.S. 40/61 interchange is defined below.

Route 19 Interchange Construction Phasing

A possible sequence of construction for the Route 19 interchange is described here and illustrated in an exhibit in Appendix C. This general approach of staging construction would also be undertaken at each of the other diamond and single point diamond interchanges in the subsection.

STAGE 1

Construct the new north and south outer roadways, start construction of new Route 19 bridge over I-70, and construct the portions of Route 19 outside of the existing outer roadways.

STAGE 2

Construct the new I-70 eastbound lanes outside of the existing south side ramps, the new south side ramps and a portion of the westbound I-70 off ramp and westbound I-70 on ramp. Complete bridge construction and Route 19 on south side of I-70.

STAGE 3

Construct remainder of new I-70 eastbound lanes through interchange. Complete westbound I-70 on ramp and Route 19 north of I-70. Route 19 will be built one half at a time using a temporary connection to existing Route 19 while building the west half, and then shifting traffic onto the new west half to construct the east half.

STAGE 4

Construct westbound I-70 lanes and complete westbound I-70 off ramp. Remove any temporary detours and open the entire interchange to traffic.

U.S. 40/61 Interchange Construction Phasing

The reconstruction of the U.S. 40/61 interchange with I-70 presents many challenges. The following sequence of construction provides a general outline of a scheme that would allow construction to occur while maintaining traffic. This scheme involves construction of some portions under traffic using temporary pavement widening and temporary detours. See Appendix C for drawings that depict this staging.

STAGE 1

During this stage, Route Z would be reconstructed along with the westbound on ramp and a portion of the westbound off ramp. Four of the six bridges carrying ramps and U.S. 61 over I-70 would be constructed along with the bridge on the southbound U.S. 61 to westbound I-70 ramp. Portions of ramps would be constructed including southbound U.S. 61 to westbound I-70, eastbound I-70 to southbound U.S. 40/61, and southbound U.S. 61 to eastbound I-70. The outer roadway in the northeast quadrant of the interchange would also be relocated.

STAGE 2

In Stage 2, portions of northbound and southbound U.S. 61 would be constructed along with a portion of the ramp carrying U.S. 40/61 traffic onto westbound I-70. The northbound U.S. 40/61 ramp to eastbound I-70 would also be constructed.

STAGE 3

In this stage, construction of northbound U.S. 61 would be completed including the widening of the bridge over Pitman Road, along with the ramp from northbound U.S. 40/61 to westbound I-70. The southbound U.S. 61 to westbound I-70 ramp would be also be completed using a temporary detour to handle traffic. Ramps from eastbound I-70 to northbound U.S. 61, westbound I-70 to northbound U.S. 61, and northbound U.S. 61 to Pitman road would also be constructed. Several temporary detours would be necessary to maintain northbound U.S. 61 traffic.

STAGE 4

Several ramps would be completed including westbound I-70 to Route Z, westbound I-70 to southbound U.S. 40/61, and Pitman Road to southbound U.S. 40/61. The ramp from Pitman Road and southbound U.S. 61 to eastbound I-70 would be completed except for the bridge over I-70.

STAGE 5

The bridge on the Pitman Road and southbound U.S. 61 ramp to I-70 over I-70 would be completed, along with the remaining portion of southbound U.S. 61.

STAGE 6

Any remaining temporary detours would be removed and the interchange would be fully opened to traffic in all directions.

d. Right of Way and Construction Costs

Construction costs for each alternative have been calculated based on information in the “Median Area Study, Design Criteria, and Cost Estimating Guide, I-70 Second Tier Environmental Studies, Kansas City to St. Louis” (January 2003), provided by MoDOT. Costs have been evaluated in the following categories. In Table II-6, right of way acquisition has been further subdivided into costs for the purchase of land, structure costs and relocation and acquisition expenses. The remaining items are summed to a single number identified as design and construction costs.

1. Right of Way Acquisition

Right of way acquisition includes the cost to buy needed land and structures and relocate existing residences and business, including all costs for appraisals, negotiations, condemnations, structure removal, etc. It also includes fencing of the new right of way and the acquisition and removal costs for outdoor advertising signs impacted by the proposed construction. It is assumed that billboards will be paid for based on the actual cost to replace the billboards in kind. In some cases, existing billboards along I-70 do not conform to MoDOT guidelines, and there may be additional cost implications in order to bring them into compliance. These potential costs are subjective based on each individual occurrence and therefore have not been included in the estimate.

2. Utility Relocations

The cost for moving electric, gas, water, telephone, fiber optic, pipelines and sewers is calculated using an average rate of \$250,000 per mile. This average rate can be adjusted up or down in any particular area based on the concentration of utilities that would be impacted.

Major utility items such as electric substations, high-voltage electric transmission lines, and gas or petroleum transmission pipelines were estimated on a case-by-case basis.

3. *Grading and Drainage*

This category includes clearing and grubbing of areas that currently contain vegetation, the excavation, hauling and placement of dirt and rock, and the placement of drainage pipes and culverts.

Earthwork volumes and costs were calculated using cross sections for mainline I-70 and crossroads. Outer roadway earthwork costs are calculated using an average rate of \$300,000 per-mile. Drainage structure costs are also calculated on a per mile basis based on the type of roadway. Costs for large box culvert drainage structures are calculated separately using a cost per square foot of opening.

4. *Pavement and Base*

The cost for removing existing pavement and base and constructing new pavement and base is included in this category. Costs are calculated based on the area, in square yards, of pavement removed or constructed. Costs are included for light, medium, and heavy-duty pavements and concrete median barriers, where required, are included at a cost of \$40 per linear foot.

5. *Interchanges*

Interchange costs include those costs associated with the construction of the ramps and collector-distributor roads associated with an interchange, but not the cross road or bridges on the crossroad. Costs are lump sum values based on the type of interchange.

6. *Rest Areas/Welcome Centers and Weigh Stations*

Included in this category are the costs for all earthwork, drainage, paving, buildings, sanitary systems and weighing equipment to construct rest areas/welcome centers and weigh stations. Costs are lump sum values of \$4,800,000 per side for rest areas/welcome centers and \$4,000,000 per side for weigh stations.

7. *Bridges*

Costs for the removal and construction of bridges are based on a square foot cost for different types of structures.

8. *Miscellaneous*

This category includes costs for engineering design, contractor mobilization, traffic control, maintenance of traffic, construction inspection and contingency. All are calculated as a percentage of construction costs.

Table II-6 presents a summary of these costs in 2005 dollars. As the construction timeline is extended, costs are subject to change due to inflation.

Table II-6: Summary of Year 2005 Costs by Alternative

Alternative	Begin Mile Post	End Mile Post	Right of Way Costs			Design and Construction Costs (Millions)	Total Costs (Millions)
			Land (Millions)	Structures (Millions)	Relocation Expenses (Millions)		
1	174.0	175.5	\$16.52	\$0.78	\$0.20	\$31.4	\$48.9
2A	175.5	179.0	\$2.93	\$0.60	\$0.15	\$46.9	\$50.6
2B	175.5	179.0	\$2.73	\$0.36	\$0.09	\$46.3	\$49.5
2C	175.5	179.0	\$2.89	\$0.60	\$0.15	\$46.9	\$50.5
3A	179.0	180.5	\$9.69	\$1.44	\$0.36	\$29.4	\$40.9
3B	179.0	180.5	\$10.05	\$1.64	\$0.41	\$24.6	\$36.7
4	180.5	183.0	\$1.53	\$0.05	\$0.01	\$45.7	\$47.3
5A	183.0	185.0	\$3.08	\$0.95	\$0.24	\$32.3	\$36.6
5B	183.0	185.0	\$2.72	\$0.95	\$0.24	\$32.4	\$36.3
6	185.0	189.0	\$4.54	\$1.55	\$0.39	\$71.8	\$78.3
7A	189.0	193.0	\$2.51	\$1.24	\$0.31	\$45.2	\$49.3
7B	189.0	193.0	\$2.71	\$1.34	\$0.33	\$42.7	\$47.1
8A	193.0	194.0	\$6.23	\$1.03	\$0.26	\$33.8	\$41.3
8B	193.0	194.0	\$6.60	\$1.23	\$0.31	\$34.1	\$42.2
8C	193.0	194.0	\$6.36	\$1.03	\$0.26	\$30.0	\$37.7
8D	193.0	194.0	\$6.58	\$1.23	\$0.31	\$30.3	\$38.4
9A	194.0	196.0	\$1.60	\$1.09	\$0.27	\$22.6	\$25.6
9B	194.0	196.0	\$1.53	\$1.43	\$0.36	\$22.4	\$25.7
10A	196.0	198.5	\$0.57	\$0.20	\$0.05	\$25.8	\$26.6
10B	196.0	198.5	\$0.72	\$0.60	\$0.15	\$27.8	\$29.3
10C	196.0	198.5	\$0.34	-	-	\$25.1	\$25.4
11A	198.5	200.0	\$6.77	\$0.26	\$0.06	\$27.0	\$34.1
11B	198.5	200.0	\$13.99	\$0.95	\$0.24	\$39.1	\$54.3
12	200.0	203.0	\$2.66	\$1.77	\$0.44	\$43.0	\$47.9
13A	203.0	205.0	\$9.54	\$1.71	\$0.43	\$42.2	\$53.9
13B	203.0	205.0	\$10.26	\$1.71	\$0.43	\$47.8	\$60.2
13C	203.0	205.0	\$10.38	\$1.71	\$0.43	\$43.3	\$55.8
14	205.0	209.0	\$2.86	\$2.82	\$0.70	\$47.7	\$54.1
15	209.0	211.5	\$10.29	\$0.60	\$0.15	\$110.3	\$121.3
16A	211.5	213.0	\$0.72	-	-	\$17.0	\$17.7
16B	211.5	213.0	\$0.28	-	-	\$17.0	\$17.3
17	213.0	214.0	\$0.51	-	\$0.20	\$8.4	\$9.1

*In year 2005 dollars
Preferred alternative indicated by shading*

Based on these numbers, different combinations of alternatives will provide the following minimum and maximum right of way, construction, and total costs.

Table II-7: Minimum and Maximum Costs

	2005 Right of Way Costs (Millions)	2005 Construction Costs (Millions)	Total Costs (Millions)
Minimum Cost	\$101.2	\$667.9	\$769.1
Maximum Cost	\$112.0	\$710.4	\$823.7

In year 2005 dollars

Costs for the construction, operation and maintenance of I-70 have been evaluated for the build and No-Build scenarios. (See Table II-7 and Table II-9) Multiple options for the build scenario are not included because the numbers are based on miles of interstate highway and the different combinations of Build Alternatives would produce essentially the same result.

The build scenario envisions the resurfacing of 64 lane miles of highway in years 2005 and 2006 and the reconstruction of I-70 starting with four miles of six-lane highway in 2010, five miles of eight-lane highway each year from 2011 to 2015, four miles of six-lane highway in 2016 and 2017, and the final three miles of six-lane highway in 2018. The reconstruction affects the amount of operations and maintenance costs in any year because of the increase from four to six or eight lanes during each year of construction.

2. No-Build Alternative

For purposes of this document, the No-Build Alternative is defined as continuing MoDOT’s ongoing construction program with no additional extraordinary projects. MoDOT’s Statewide Transportation Improvement Program (2004-2008) lists the projects that the Department is likely to construct over the next several years. The plan includes highway reconstruction, bridge maintenance projects, interchange improvements and localized widenings of the interstate. Table II-8 lists the major highway reconstruction projects within SIU 7. This program of potential improvements would be carried out regardless of whether or not a separate construction project arises from this EIS.

Projects in the plan are not as extensive as those envisioned for the Build alternatives. Major highway reconstruction and interchange improvements as outlined in Table II-8 include only the addition of a third lane in each direction from Route Z to Lake St. Louis Blvd., the addition of two ramps to the Route Z interchange, and changes in the configuration of two ramps at the US-40/61 interchange. Other projects are generally limited to rehabilitation / reconstruction of the roadway as it currently exists. Although the scope of improvements for each location in the STIP has not been developed, they do not include characteristics such as widening the entire corridor, or the addition of shoulders, or a coordinated effort to improve each interchange. The No-Build Alternative will not add any additional capacity to I-70 in SIU 7 beyond the improvements listed in Table II-8.

Table II-8: MoDOT STIP Projects within SIU 7

MoDOT Job	Location	County	Cost (000)	Award	Length	Description
3I0685	I-70	Montgomery	\$1,673	July - Sept. 2003	21	Install guard cable and upgrade guardrail end sections to fill gaps from Jonesburg to Wright City.
3I0702	I-70	Montgomery	\$1,681	2005	14.8	Install guard cable and upgrade guardrail end sections to fill gaps from west of Danville to Jonesburg.
3I0701	I-70	Montgomery/ Warren	\$2,937	2005	35.4	Resurface eastbound and westbound lanes from Callaway County line to Route F.
6I0736D	I-70	St Charles	\$16,588	Oct. - Dec. 2003	1.1	Grading, paving, bridges, and retaining walls from west of Rte. Z to east of Route 40/61. Involves adding median lanes on I-70 and bridges L-6242 and A-5406. Relates to 6I0736 and 6I0736C.
6I1598	I-70	St Charles	\$2,840	2005	0.3	Replace bridge at I-70 SOR east of Lake St. Louis at Perouque Creek. Project involves bridge R-93.
6I1626	I-70	St Charles	\$3,796	2005	0.4	Add eastbound off ramp and westbound on ramp and widen Rte. Z on I-70 at Route Z. MoDOT's commitment is \$25,000.
6I1668	I-70	St Charles	\$303	Jan. - March 2004	3	Resurfacing on I-70 south outer road from west of Lake St. Louis to Callahan Road.
6S1600	RT A	St Charles	\$6,137	2006	0.2	Rehab deck, bridge widening, roadway widening, signals and signing at Route 61. Project involves bridge A-2766.
6S1706	RT Z	St Charles	\$261	Jan. - March 2004	0.2	Add left turn lane for Interstate Drive 0.25 mile south of I-70.
3I0699	I-70	Warren	\$3,981	2005	7.1	Coldmill and resurface eastbound lane from Montgomery County line to Route 47.

In calculating the costs of the No-Build scenario, it is assumed that over time the pavement of I-70 will be replaced in the same configuration as currently exists and that all bridges will be re-decked. The No-Build scenario includes the total reconstruction of 20 lane miles of pavement each year starting in 2005 and ending in 2012 (Table II-9). One bridge would be re-decked annually starting in 2005 and ending in 2023. Resurfacing of the reconstructed pavement would start in 2025 with 20 lane miles per year being resurfaced. Operations and maintenance would be consistently applied to 40 miles of four-lane highway.

Table II-9 provides the sum of the rehabilitation and operations and maintenance costs for each scenario for the 26-year period from 2005 to 2030. The costs have then been calculated as a present value using a 6 percent discount rate and as an equivalent uniform annual cost.

Table II-9: Rehabilitation and O&M Costs

	Sum of 24 years of Rehabilitation and O&M	Present Value of Annual Costs at 6% Rate	Equivalent Uniform Annual Cost
Build	\$44,705,000	\$16,790,000	\$1,220,000
No-Build	\$133,760,000	\$83,505,000	\$6,425,000

In year 2005 dollars

The No-Build Alternative would not meet the purpose and need requirements of this project. It is carried forward as a detailed study alternative to serve as a baseline for comparison of Build Alternatives and for evaluation of their environmental impacts.

E. Preferred Alternative

Based on the work conducted within SIU 7, a recommended preferred alternative has been identified. The preferred alternative description in this DEIS is the course of action that has been preliminarily determined to be most desirable in terms of a balance of functional efficiency as well as environmental, social and economic effects. This alternative satisfies the project’s purpose and need, minimizes negative environmental impacts (eliminates all avoidable significant negative impacts) and, overall, best balances the costs and benefits of project development. This section will describe the recommended preferred alternative and examine the key data associated with its identification. The environmental analysis of the alternatives carried forward is located in Chapter IV.

This identification of a preferred alternative in the DEIS is considered preliminary and subject to revision. The final evaluation and selection of a preferred alternative will be based on a project public hearing, public and agency comments on the DEIS, and other relevant information that may become available. Comments and information that would assist in such an evaluation are invited.

1. Description of the Preferred Alternative

The preferred alternative for SIU 7 is defined by selecting the one preferred alternative from each of the 17 subsections. Table II-10 lists the preferred alternatives within each of the subsections. These alternatives are shown in the exhibits contained in Appendix B, with the exhibit number matching the number of the alternative.

Table II-10: Preferred Alternative

Alternative	Begin Mile Post	End Mile Post	Right of Way Costs (Millions)	Design and Construction Costs (Millions)	Total Costs (Millions)	Description and Rationale for Recommendation
1	174.0	175.5	\$17.5	\$31.4	\$48.9	<ul style="list-style-type: none"> ▪ Six lanes, rural section ▪ Widen to South ▪ Reconfigured Route 19 diamond interchange ▪ Recommended by Rural Reevaluation Report
2C	175.5	179.0	\$3.6	\$46.9	\$50.5	<ul style="list-style-type: none"> ▪ Six lanes, rural section ▪ Widen to South ▪ New weigh station ▪ Avoids adverse impacts to NRHP-eligible properties
3B	179.0	180.5	\$12.1	\$24.6	\$36.7	<ul style="list-style-type: none"> ▪ Six lanes, rural section ▪ Widen to South ▪ Reconfigured Route F diamond interchange with roundabout ramp terminals ▪ Lower stream impacts ▪ Avoids communications tower ▪ Lower overall cost
4	180.5	183.0	\$1.6	\$45.7	\$47.3	<ul style="list-style-type: none"> ▪ Six lanes, rural section ▪ Transition widening South to North ▪ New alignment to cross over Railroad ▪ Recommended by Rural Reevaluation Report
5A	183.0	185.0	\$4.3	\$32.3	\$36.6	<ul style="list-style-type: none"> ▪ Six lanes, rural section ▪ Widen to North ▪ Reconfigured Route E/Y diamond interchange ▪ Lower floodplain impacts ▪ Requires less new R/W

Alternative	Begin Mile Post	End Mile Post	Right of Way Costs (Millions)	Design and Construction Costs (Millions)	Total Costs (Millions)	Description and Rationale for Recommendation
6	185.0	189.0	\$6.5	\$71.8	\$78.3	<ul style="list-style-type: none"> ▪ Six lanes, increased to eight lanes east of Routes A/B interchange, MP 188, rural section ▪ Widen to North ▪ Reconfigured Route A/B diamond interchange ▪ New rest area/welcome center ▪ Recommended by Rural Reevaluation Report
7A	189.0	193.0	\$4.1	\$45.2	\$49.3	<ul style="list-style-type: none"> ▪ Eight lanes, transition to urban section ▪ Avoids communications tower ▪ Lower floodplain, stream and wetlands impacts
8C	193.0	194.0	\$7.7	\$30.0	\$37.7	<ul style="list-style-type: none"> ▪ Eight lanes, urban section ▪ Reconfigured Route 47 tight diamond interchange ▪ Lowest commercial & residential structure impacts ▪ Second lowest wetlands impact ▪ Lowest cost
9A	194.0	196.0	\$3.0	\$22.6	\$25.6	<ul style="list-style-type: none"> ▪ Eight lanes, urban section ▪ Greatly lower residential relocations ▪ Lower stream impacts
10C	196.0	198.5	\$0.3	\$25.1	\$25.4	<ul style="list-style-type: none"> ▪ Eight lanes, urban section ▪ Avoids adverse impacts to NRHP-eligible property ▪ Lowest residential relocations ▪ Avoids extensive new frontage road construction ▪ Lowest overall cost
11A	198.5	200.0	\$7.1	\$27.0	\$34.1	<ul style="list-style-type: none"> ▪ Eight lanes, urban section ▪ Reconfigured Wright City West diamond interchange with roundabout ramp terminals ▪ Fewer residential and commercial structures impacted ▪ Lesser impacts to floodplains, floodways, rivers and streams ▪ Considerably lower overall costs
12	200.0	203.0	\$4.9	\$43.0	\$47.9	<ul style="list-style-type: none"> ▪ Eight lanes, urban section ▪ Reconfigured Route F/J diamond interchange with roundabout ramp terminals ▪ Roundabouts better accommodate local streets ▪ Lower construction cost than alternative
13A	203.0	205.0	\$11.7	\$42.2	\$53.9	<ul style="list-style-type: none"> ▪ Eight lanes, urban section ▪ Route T/W standard diamond interchange ▪ Best access management ▪ Lowest wetland impacts ▪ Lowest overall cost
14	205.0	209.0	\$6.4	\$47.7	\$54.1	<ul style="list-style-type: none"> ▪ Eight lanes ▪ Widens to north side ▪ Uses recently-reconstructed interchange with Wentzville Parkway ▪ Provides adequate future LOS at least cost ▪ Improved alignment for RR crossing
15	209.0	211.5	\$11.0	\$110.3	\$121.3	<ul style="list-style-type: none"> ▪ New directional 3-level system interchange with US 40/61 ▪ Provides access from Pitman Rd. to EB I-70 ▪ Constructibility better than other alternatives ▪ Improved interchange with Route Z
16A	211.5	213.0	\$0.7	\$17.0	\$17.7	<ul style="list-style-type: none"> ▪ Provides connector roads on both sides of Rt. A ▪ Improves access management and safety ▪ Provides better access to Pitman Ave.
17	213.0	214.0	\$.7	\$8.4	\$9.1	<ul style="list-style-type: none"> ▪ Uses current improvements to interchange and north outer road ▪ Improvements to South Outer Roadway cause least impacts

In year 2005 dollars

Total overall cost for the Preferred Alternative is estimated to be approximately \$774 million in Year 2005 dollars. This overall cost includes estimated right of way costs of \$103 million and design and construction costs of \$671 million.

a. Rest Areas/Welcome Centers

The “I-70 Rest Area/Welcome Center Study (Kansas City to St. Louis) – Second Tier Environmental Studies” prepared by MoDOT for the entire I-70 corridor indicates, “the Wright City facilities are limited” and that “truck parking at this location is inadequate and fills beyond capacity in the evenings.” Based on truck parking requirements, proximity to urban areas, system functionality (spacing), and utility availability, the study recommends the consolidation of the Wright City and Mineola rest areas/welcome centers into a single rest area/welcome center located somewhere between exits 179 and 199 in SIU 7. Separate eastbound and westbound facilities would be constructed including at least 65 truck parking spaces in each direction, restrooms, vending, picnic areas and shelters, playground, pet walk areas, information kiosks, waste receptacles, news stands, a recycling station, and walkways and trails.

While the existing rest area/welcome center falls within the desired limits the study identified for new rest areas/welcome center, its location just west of the Wright City West interchange violates the guidelines for interchange spacing and will likely result in weaving problems under higher highway volumes. After consideration of possible alternative locations, the existing rest area/welcome center located just west of Wright City would be moved to a location about two miles west of Route A/B at the west edge of Warren County under each of the Build Alternatives. This change will result in the rest area/welcome center being further away from the adjacent service interchanges, which should result in smoother flowing mainline I-70 traffic.

The new rest area/welcome center would also be larger than the existing facility and would provide the additional parking recommended in the I-70 Rest Area/Welcome Center Study, especially for large trucks. The existing rest areas/welcome centers are overcrowded, particularly at night, when large numbers of trucks try to park for extended periods of time. Refer to Appendix B, Exhibits 6.2 – 6.3 for the locations of the proposed new rest areas/welcome centers.

The No-Build Alternative would leave the rest area/welcome center at its current location, which is too close to the western Wright City interchange according to the current MoDOT Access Management Guidelines.

b. Weigh Stations

Under the No-Build Alternative, the existing weigh station east of Foristell would continue to be utilized. Increased volumes on I-70 could impact traffic speeds due to weaving of weigh station and Foristell interchange traffic and spacing of less than one mile. There is also the potential for a new interchange currently being planned by the city of Wentzville only one mile to the east of the weigh station that would present the same potential for weaving problems on that side.

The existing weigh station location does not meet the MoDOT Access Management Guidelines for interchange spacing on an interstate highway that defines the desired distance between interchanges in rural areas as being five miles and in urban areas as being two miles. Due to this the weigh stations would be moved to a location in Montgomery County approximately half way between Route 19 and High Hill under any of the Build Alternatives. This location provides for a two-mile spacing to adjacent interchanges and should improve traffic flow on I-70 when compared to the existing location.

Truckers whose trucks are overweight will sometimes try to avoid being caught by utilizing state, county and local roads to bypass a weigh station. At the existing location it is possible for trucks to bypass the weigh station with a detour of as little as three miles. At the proposed location, alternative routes following numbered or lettered routes would require a detour of at least 16

miles on at least three different roads making it less likely that truck traffic would attempt to bypass the weigh station. Refer to Appendix B, Exhibits 2A.3 – 2A.4, 2B.3 – 2B.4 and 2C.3 – 2C.4, for the locations of the proposed new weigh stations.

It is possible that the development of new truck weighing technologies in the future may render the need for weigh stations, as we know them today, obsolete. An evaluation of the need for weigh stations should take place at the time of design for appropriate subsections of I-70. For purposes of this study, the area impact and costs for new weigh stations are included in the evaluation.

c. Park and Ride Lots

There are currently four park and ride lots serving I-70 within SIU 7 (Table II-11). They range in size from 0.45 to 0.80 acres (0.18 to 0.32 ha), with an average of approximately 0.56 acres (0.23 ha). The lots are located at interchanges 183, 193, 199, 203, and 214. All of the lots are gravel, and none have any developed facilities.

Table II-11: Park and Ride Lot Impacts

Lot Location (Interchange) <i>Alternative</i>	Lot Size (ac/ha)	Impact	Action Recommended
Jonesburg (Exit 183) <i>Alternative 5</i>	0.45 / 0.18	Impacted	None – Abandon Lot
Warrenton (Exit 193) <i>Alternative 8</i>	0.80 / 0.32	Impacted	Relocate lot (provide same number of parking spaces)
Wright City (Exit 199) <i>Alternative 11</i>	0.45 / 0.18	Impacted	None – abandon lot
Foristell (Exit 203) <i>Alternative 13A</i>	0.66 / 0.27	Not impacted	None
Foristell (Exit 203) <i>Alternatives 13B & 13C</i>	0.66 / 0.27	Impacted	Lot to stay the same but reduce size to 0.60 ac / 0.24 ha
Lake St. Louis Boulevard (Exit 214) <i>Alternative 17</i>	0.45 / 0.18	Not impacted	None

2. Rationale for Recommendation

All of the alternatives considered in each subsection were designed to meet the same criteria and to provide the same basic transportation improvements within the existing I-70 corridor. For this reason, differences among the alternatives considered in each subsection and the impacts of those alternatives were not great. Table II-10 above summarizes the principal factors upon which the recommendation of one alternative over another was based. In the instances of alternatives 2C and 10C, these were recommended as the only alternatives that avoided adverse impacts to historic properties determined eligible for listing on the NRHP.

3. Transportation Effects of the Preferred Alternative

a. Level of Service/Congestion

Highway LOS is a qualitative rating of the speed and traffic density conditions on a particular roadway. Generally, MoDOT’s goal is to provide a minimum LOS C in rural areas and a minimum LOS D in more heavily traveled urban areas in the design year.

For this analysis, mainline levels of service were determined using the Highway Capacity Software (HCS). This software is designed to accurately replicate the methodologies published by the Transportation Research Board in their Highway Capacity Manual (HCM). These procedures were originally published in 1950 and last updated in 2000 and are considered the standard for estimating capacity and determining LOS for highway facilities. VISSIM, advanced traffic simulation software for microscopic traffic flow simulation, was also used for analysis. VISSIM offers the capability to replicate SIU 7 as a system (in this case, by county) composed of the individual mainline segments, interchanges and crossroads.

Table II-12 presents the levels of service on the I-70 mainline that are expected to occur during the peak hour under three scenarios – current conditions, the year 2030 if no major improvements are made (No-Build), and the year 2030 if the proposed Build Alternatives are implemented. As the table shows, the proposed Build Alternatives will improve the LOS in the rural areas to B and C levels, and to B and C levels in the more urbanized areas all the way to the U.S. 40/61 interchange. East of the U.S. 40/61 interchange, projected volumes are substantially higher, and LOS D conditions are expected.

Table II-12: Existing and Projected Mainline Traffic Levels of Service

Link	Description	Exit		Year 2000			Year 2030		
				Length	Existing		No-Build	Proposed	Build
		From	To	(miles)	Lanes	LOS	LOS	Lanes	LOS
45	MO-19 to MO-F	175	179	4.8	4	A	C	6	B
46	MO-F to MO-E/MO-Y	179	183	4	4	A	C	6	B
47	MO-E/MO-Y to MO-A/MO-B	183	188	4.7	4	A	E	6	C
48	MO-A/MO-B to MO-47	188	193	5	4	B	F	8	B
49	MO H to Route H	193	199	5.5	4	B	F	8	C
50	MO H to MO-J/MO-F	199	200	1	4	B	F	8	C
51	MO-J/MO-F to MO-W/MO-T	200	203	3.8	4	B	F	8	C
52	MO-W/MO-T to Wentzville Parkway	203	208	4.5	4	C	F	8	B
53	Wentzville Parkway to MO-Z	208	209	1.2	4	C	F	8	C
54	MO-Z to U.S. 61	209	210	0.9	4	D	F	8	C
55	U.S. 61 to MO-A	210	212	1.6	4	E	F	8	D
56	MO-A to Lake St. Louis Blvd.	212	214	2	4	F	F	8	D

SYNCHRO intersection capacity analysis software, as well as VISSIM software, was used to estimate the levels of service that would be expected at the various interchanges along I-70 within SIU 7. Analysis of existing conditions indicates that all interchanges within SIU 7 are currently operating at LOS B or better with the exception of the interchanges at Route 47 (Exit 193) and Wentzville Parkway (Exit 208), which currently operate at a LOS C, and Lake St. Louis Boulevard (Exit 214), operating at LOS D.

If no major capital improvements are made to increase the capacity and operational efficiency of these interchanges (the No-Build Alternative), the LOS at the above-mentioned three

interchanges, as well as the interchange at Route A (Exit 212), is anticipated to deteriorate to LOS F by the year 2030. Levels of service at the remaining interchanges would be expected to still be within the acceptable range through the design year 2030 with the No-Build Alternative.

With the Build Alternatives, all of the interchanges, with the exception noted below, would be expected to operate at acceptable levels of service through the 2030 design year. The Route 47 interchange in Warrenton and the Pearce Boulevard interchange in Wentzville would be expected to operate at LOS D in 2030, and all other interchanges within SIU 7 would operate at LOS B or better.

The Lake St. Louis Boulevard interchange is expected to operate at LOS E in the design year of 2030 unless geometric upgrades are made to incorporate access management guidelines. Alternatives at Lake St. Louis Boulevard are constrained by the current reconstruction of the interchange and north outer road, as well as committed plans by St. Charles County to extend Lake St. Louis Boulevard north of the north outer road. Although effective in the near-term, this design is not expected to accommodate 2030 traffic volumes, which are expected to increase substantially with the major development proposed north of the Lake St. Louis intersection, along the future Lake St. Louis Boulevard. The size and type of development in this area is presently being defined. Without major impacts to adjacent properties, various geometric improvements analyzed for the Lake St. Louis interchange cannot obtain the desired project standard of LOS D. Therefore, due to the densely developed land and the relative uncertainty of future traffic volumes, the selected alternative for this interchange includes only minor upgrades to the south outer road and monitoring of conditions to identify additional changes warranted as future growth proceeds.

b. Average Travel Speeds

Field observations indicate that current travel speeds in SIU 7 are at or near the speed limit in the subsections west of the U.S. 40/61 interchange. Higher traffic volumes at the east end of the corridor lead to average speeds less than 55 mph in the peak hour. Average travel speeds on the I-70 mainline in 2030 and under the No-Build conditions would be at or near the speed limit only in the extreme western portion of SIU 7. In all those areas where LOS F is expected, average travel speeds in the peak hours would be less than 45 mph, and less than 30 mph from Wright City eastward. With the Build Alternatives, average peak hour travel speeds would be at 65 mph or above on all subsections west of the U.S. 40/61 interchange, and above 60 mph east of that interchange to Lake St. Louis Boulevard.

c. Safety

A crucial component of the proposed project's purpose and need is to improve safety for traffic in the I-70 corridor.⁴ All of the Build Alternatives have been designed to incorporate features to significantly upgrade the safety of the highway over the existing conditions.

Principal design features that will contribute to increased safety are: providing a wider median in the rural areas to separate the opposing lanes, adding additional lanes to reduce the density of traffic, and implementing a variety of geometric improvements. These geometric features include: improved horizontal and vertical alignments, improved guardrail design, increased width of clear zones, and grooved shoulders.

⁴ Crash statistics and safety data summarized or presented in this section are protected under federal law (Appendix F).

In order to estimate the change in traffic safety that could be expected to occur with implementation of the preferred alternative, future crash rates along the I-70 mainline were predicted for the No-Build and Build Alternatives, and the resulting number of crashes with each scenario were compared. To estimate the future crash rate for the No-Build Alternative, it was simply assumed that the current crash rate, based on the past six years of crash data, would remain constant for each of the three principal categories of crashes – property damage only, injury, and fatal. These crash rates were computed for each of the subsections of the existing highway in SIU 7. Although this crash rate was assumed to remain constant over the duration of the analysis period for the No-Build scenario, the projected number of crashes would be expected to increase each year with the expected growth in traffic volumes.

The existing I-70 facility was designed many years ago, and advances in highway design over the succeeding years have resulted in safer design standards, which would be implemented on the improved I-70. To estimate the crash rate that would be expected to apply on the Build Alternative, it was recognized that the entire new facility would be designed to meet the improved current safety standards.

The incorporation of the design enhancements that are a part of the Build alternatives are expected to reduce the number of crashes from the number that would be expected if no improvements are made. In order to estimate the degree of improvement in crash rates that might be expected, MoDOT and the GEC conducted a thorough review of recent literature and analyses of prior safety improvements. This analysis indicated that the complete package of safety and geometric improvements summarized above could be expected to reduce property damage crashes by approximately 16 percent, injury crashes by approximately 18 percent and fatal crashes by approximately 33 percent. These “improved” crash rates have been applied to the projected traffic volumes expected on the upgraded facility with the Build alternative to generate projections of anticipated crashes on improved I-70 in the Year 2030, see Table II-13.

Table II-13: Summary of Projected Study Corridor Crashes (Year 2030)

Alternative	Number of Crashes			Total Crashes
	Property Damage	Injury	Fatal	
No-Build in 2030	769	322	16	1,107
Build Alternative in 2030	654	265	11	930
Improvement	115	57	5	177

Crash savings for the Build Alternative were computed simply as the difference in the number of each type of crash between the Build Alternative and the No-Build option. For a hypothetical scenario where the entire project would be complete and operational by 2010, the proposed improvements could be expected to prevent over 2,700 total crashes, including approximately 850 injury crashes and over 90 fatal crashes in the 20 years of operation through the year 2030. Cost savings to the public resulting from this reduced number of crashes, in Year 2000 dollars, are estimated at over \$350 million over the 20-year analysis period. Table II-14 presents details of the expected reduction in crashes within each subsection of the I-70 mainline in SIU 7.

Table II-14: Projected Year 2030 Crash Savings Through Interstate Improvements

Description	2030 Crash Projections			2030 Improved I-70 Projections			2030 Annual Average Crash Savings		
	PDO	Injury	Fatal	PDO	Injury	Fatal	PDO	Injury	Fatal
From MO-19 to MO-F	46	33	1.5	39	27	1.1	7	6	0.5
From MO-F to MO-E/Y	90	58	1.2	77	48	0.8	13	10	0.4
From MO-E/Y to MO-A/B	80	36	2.7	67	29	1.8	13	7	0.9
From MO-A/B to MO-47	89	41	2.8	74	33	1.9	15	8	0.9
From Mo-47 to Exit 199	100	37	1.8	84	31	1.2	16	6	0.6
From Exit 199 to MO-J/F	45	18	1.2	37	14	0.8	8	4	0.4
From MO-J/F to MO-W/T	80	27	0.8	68	22	0.6	12	5	0.2
From MO-W/T to Exit 208	83	23	0.9	70	19	0.6	13	4	0.3
From Exit 208 to MO-Z	53	20	0.8	51	19	0.6	2	1	0.2
From MO-Z to U.S. 40/61	31	9	0.0	26	7	0.0	5	2	0.0
From U.S. 40/61 to MO-A	34	9	1.3	29	7	0.9	5	2	0.4
From MO-A to Lake St. Louis Blvd.	38	11	1.6	32	9	1.1	6	2	0.5
Total:	769	322	16.59	654	265	11.29	115	57	5.3

The above analysis addresses only the expected safety benefits along the I-70 mainline following completion of construction. There would be short-term safety impacts during construction that would occur at a relatively similar level for either the Build scenario or for the reconstruction of the existing facility that would be required with the No-Build scenario. Each of the interchanges in SIU 7 will also be improved to meet current design standards, which should result in additional reductions in the anticipated crash rates. Safety benefits will also result from the implementation of MoDOT's access management guidelines, which should greatly reduce congestion and conflicts at all of the interchanges. Because travel speeds are generally much lower in the interchange areas, there are fewer fatal crashes under either the Build or No-Build scenarios, and therefore most of the crashes avoided at interchanges would be of the property damage only type.

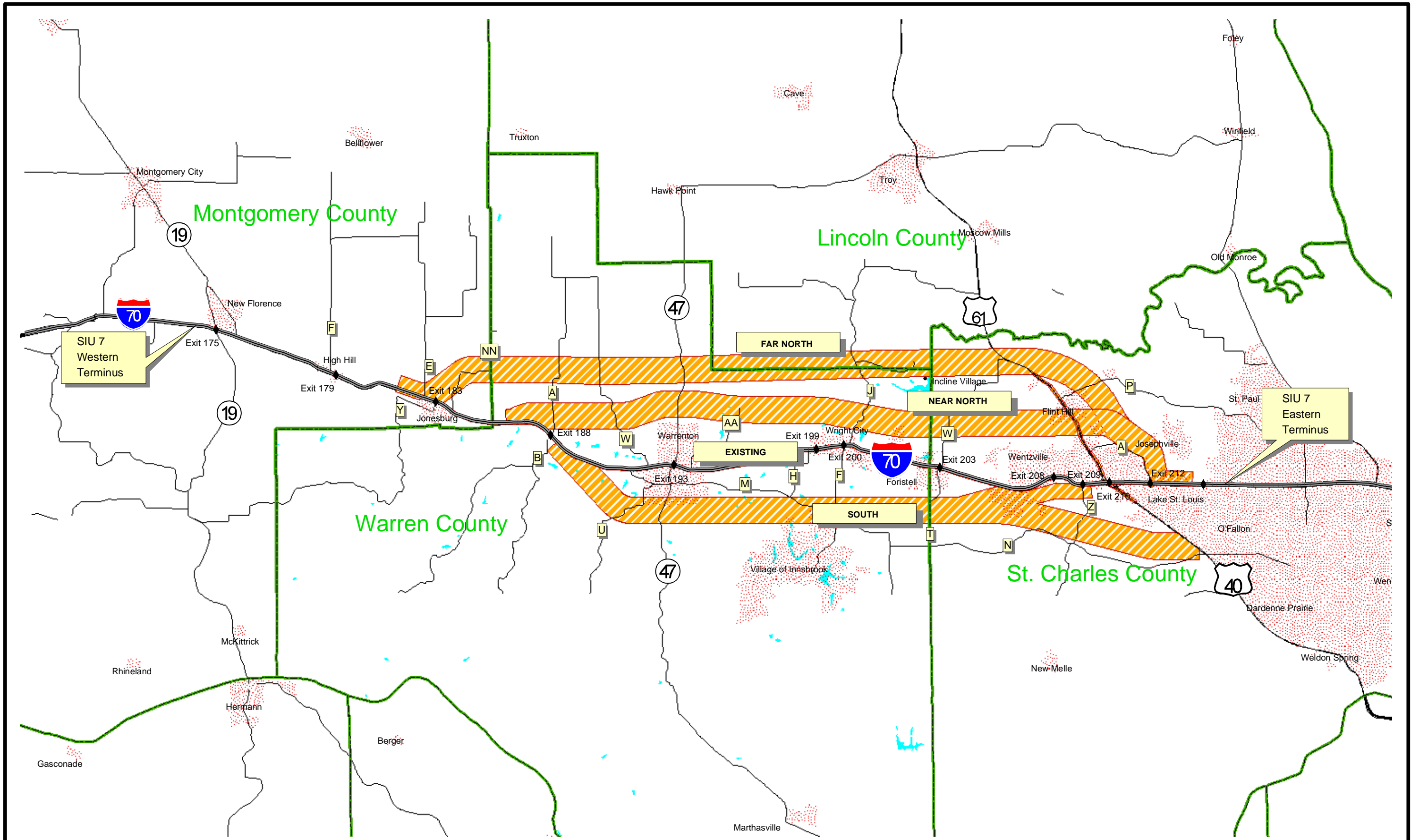
d. Access Management

The Build Alternatives have each been designed to meet, or come as close as possible to meeting, MoDOT's Access Management Guidelines. This plan, adopted in September 2003, was designed to increase safety, improve traffic operations, protect the taxpayers' investment and provide better operating conditions for non-auto modes of transportation. The Access Management Guidelines consider many issues, but those of primary concern for SIU 7 are the distance along the mainline between interchanges, clearance of functional areas of interchanges, raised medians, TWLTLs, three-lane cross sections, frontage and backage roads, driveway spacing and driveway corner clearance.

At most interchanges, the intersections of the outer roadways with the crossroads on either side of the interchange have been moved up to 1,320 feet away from the interchange ramp terminals. All left turns onto or off of the crossroad roadway in this area have been eliminated, typically through the use of concrete median strips. Right turns in and out of adjoining properties along the crossroad have also been restricted and are typically not closer than 750 feet from the interchange ramp terminals. Because of these changes, outer roadways typically have been relocated to pass behind existing businesses located along the crossroad and existing outer roadways at the interchanges. While these changes do improve safety and traffic operations, it does require patrons of highway oriented businesses to typically travel a further distance to reach those businesses located within a quarter-mile of the interchange, and they must now enter from the backside of the business rather than the front side.

In general though, changes to access management to more closely meet the current MoDOT Access Management Guidelines will result in improved traffic flows and a reduction in crashes at an interchange, particularly as traffic volumes increase due to local population growth or the addition of businesses that generate large traffic volumes.

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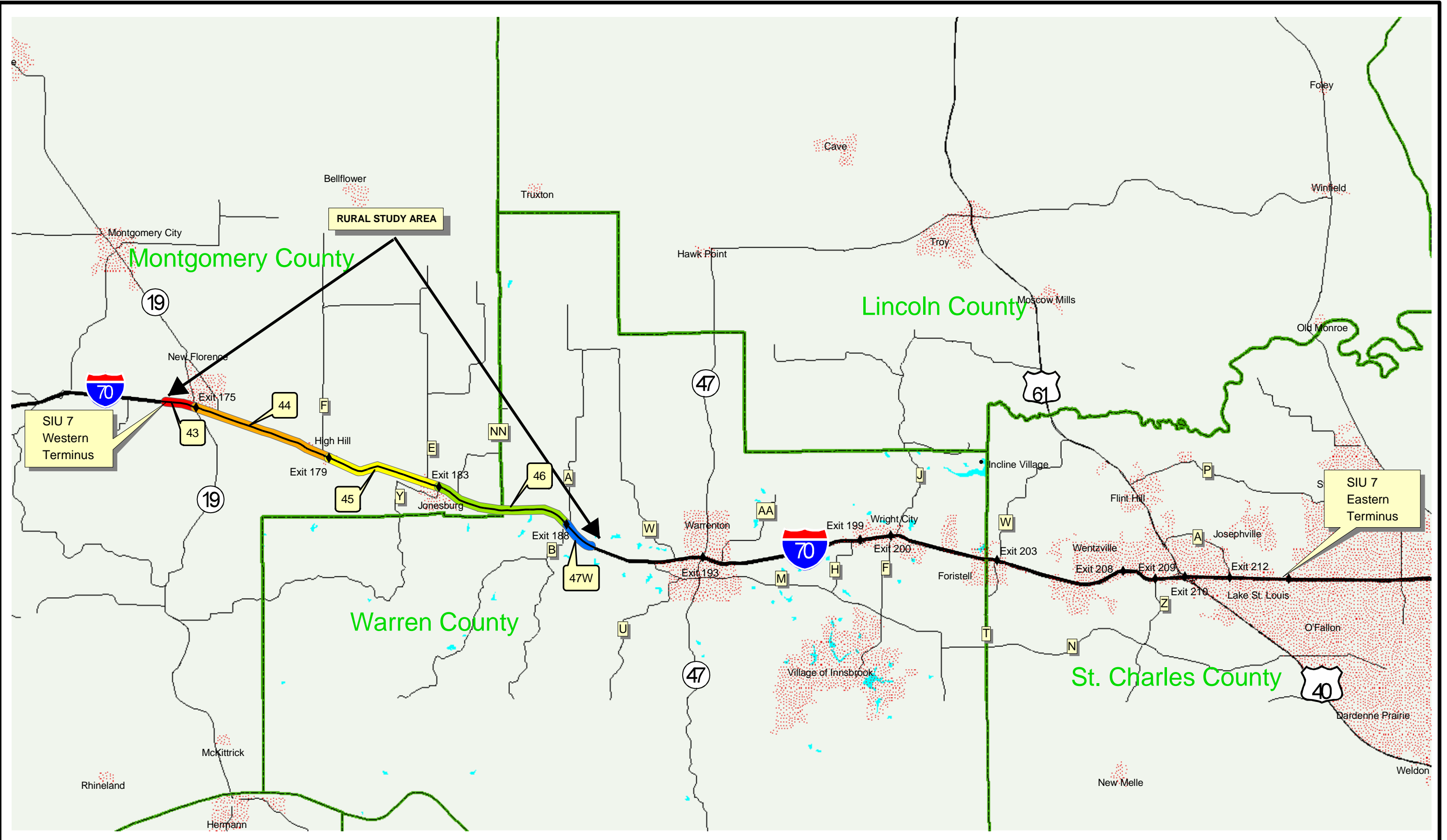
SIU 7
Route 19
to
Lake St. Louis

- ◆ Interchanges
- ▬ County Boundaries
- ▬ I-70
- ▬ City Limits
- ▨ Conceptual Corridor
- ▬ MO/US Route



Conceptual Corridors

EXHIBIT
II-1

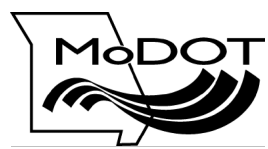
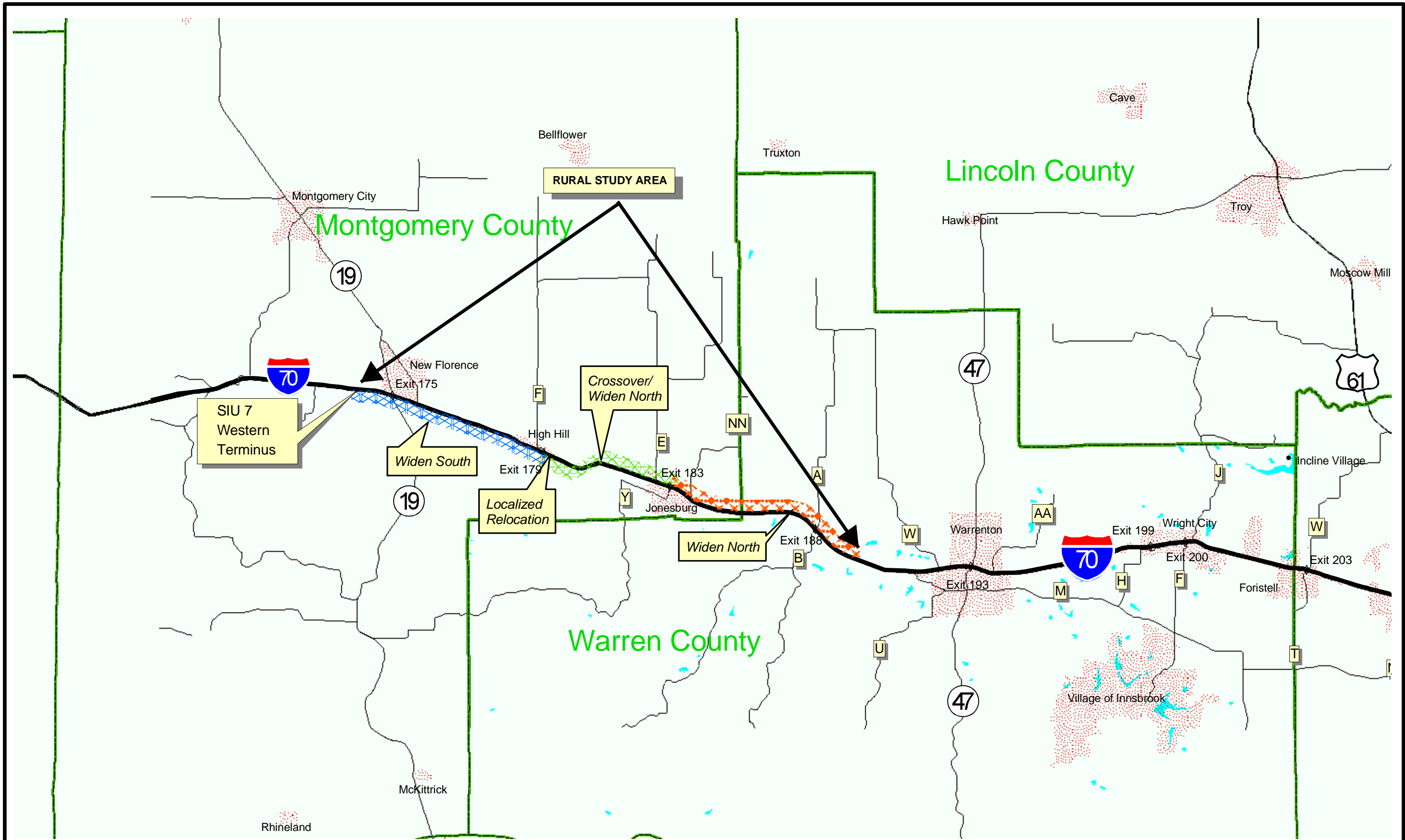


SIU
7
Route 19
to
Lake St. Louis

- ◆ Interchanges
- ◆ City Limits
- I-70
- MO/US Route
- County Boundaries
- Lakes

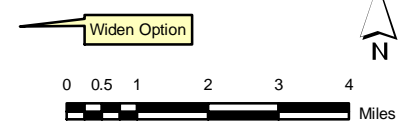


Rural Study Area



SIU 7
Route 19
to
Lake St. Louis

- ◊ Interchanges
- ◌ City Limits
- County Boundaries
- Lakes
- I-70
- MO/US Route



**Rural Recommendations
for Widening**

**EXHIBIT
II-3**

Exhibit II-4: Improve I-70 Program Design Criteria

Design Consideration	Unit	Interstate - Rural & Bypass	Interstate - Urban	U.S. Route - Principal Arterial	State Route - Numbered & Prin. Arterial	State Route - Lettered & Local Route	Ramp	Frontage Road
Functional Classification and Roadway Section		Interstate Figure B1	Interstate Figure B2	Principal Arterial Figure B3 MoDOT Std. D-61	Principal Arterial Figure B3 MoDOT Std. D-61 or Figure B4 MoDOT Std. D-63	Minor Arterial Figure B5 MoDOT Std. D-62 Collector Figure B6 MoDOT Std. D-65 Local Figure B7 MoDOT Std. D-69	Figure B8 MoDOT Std. D-50	Figure B9
Design Year		2030	2030	2030	2030	2030	2030	2030
Traffic Service Volume (Design Year)		All (> 15,000 ADT)	All (> 15,000 ADT)	All (> 15,000 ADT)	4-Lane > 10,000 ADT 2-Lane < 10,000 ADT	< 5,000 ADT	One Lane < 1500 VPH	All
Number of Lanes (Basic)²	#	6 ¹¹	6	4	4 or 2	2	1	2
Design Speed	MPH	75	70	70	60	50	Gore = 50 Loop = 30	50 Desirable 35 Minimum
Lane Width	Feet	12	12	12	12	12 Des./11 Min.	18	12 Des.
Median Width	Feet	124	26 w/Barrier	60 ⁹	60/Varies/NA	N/A	N/A	N/A
Outside Shoulder Width	Feet	12	12	10	10	8	8	8 Paved ⁸
Inside Shoulder Width	Feet	12	12	4	4 (Divided) or N/A	N/A	4	N/A
Safety Clear Zone (minimum)	Feet	32	32	30	30	See Note 1	See Note 1	See Note 1
Slopes (H:V)								
Foreslope In Clear Zone		6:1	6:1	6:1	6:1	6:1	6:1	4:1
Foreslope Out of Clear Zone		4:1	4:1	4:1	4:1 Des./3:1 Min.	4:1 Des./3:1 Min.	4:1	3:1
Backslope		3:1	3:1	3:1	3:1	3:1	3:1	3:1
Maximum Horizontal Curve³ (Based on 0.08 '/ SE or High-speed rail requirements)	Degree	1°30'	1°30'	3°00'	4°45'	6°00'	6° at Gore 7°30' Max. on Ramp	6°00' Des. 13°30' Min.
Vertical Clearance								
- Over Railroad	Feet	23'-6"	23'-6"	23'-6"	23'-6"	23'-6"	23'-6"	23'-6"
- Over I-70 ¹⁰	Feet	19'0"	19'-0"	19'-0"	19'-0"	19'-0"	19'-0"	N.A.
- Over Crossroad	Feet	16'-6"	16'-6"	16'-6"	16'-6"	15'-6"	16'-6"	15'-6"
Maximum Grade	%	3	3	4	4	5	5	7
Crest Vertical Curve	K-Value ⁴	312	247	247	151	84	84	84 Des.
Sag Vertical Curve	K-Value ⁵	206	181	181	136	96	96	96 Des. 49 Min.
Passing Sight Distance⁶	Feet	N.A.	N.A.	2480	2135	1835	-	1835 Des. 1280 Min.
Superelevation⁷ (Based on 0.08 '/ Max.)	Feet/Foot	0.08	0.08	0.08	0.08	0.08	0.08	0.04
Pavement Cross Slope	%	2	2	2	2	2	2	2
Ditch Depth (Desirable)	Feet	4	4	4	4	2	2	2

Notes:

1. Refer to AASHTO "Roadside Design Guide."
2. Laneage is dependent on design year traffic forecasts.
3. Spiral curves required on all curves meeting these conditions: ADT > 400 vpd, Design Speed > 50 MPH and Degree of Curve > 2°00'.
4. Exhibit 3-76 - 2001 Policy on Geometric Design - AASHTO.
5. Exhibit 3-79 - 2001 Policy on Geometric Design - AASHTO.
6. Exhibit 3-77 - 2001 Policy on Geometric Design - AASHTO.
7. If superelevation is used on crossroad in Urban Area, use 0.04 '/' as maximum superelevation.
8. See Figure 6-03.4 of MoDOT Design Manual
9. Median Width may be subject to exceptions.
10. See Typical Section for further information on critical clearance points.
11. Four lanes only on bypass.