Appendix II-A Design Criteria



## **APPENDIX II-A** Improve I-70 Program Design Criteria

Design Consideration	Interstate Rural & Bypass	Interstate Urban	U.S. Route Principal Arterial	State Route – Numbered & Principal Arterial	State Route - Lettered & Local Route	Ramp	Frontage Road
Functional Classification	Interstate	Interstate	Principal Arterial	Principal Arterial	Minor Arterial	-	-
Traffic Service Volume (Design Year)	All (over 15,000 ADT)	All (over 15,000 ADT)	All (over 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) <sup>2</sup>	6	6	4	4 or 2	2	1	2
Design Speed	75 mph	70 mph	70 mph	60 mph	50 mph	Gore = 50 mph Loop = 30 mph	50 mph Desirable 35 mph Minimum
Lane Width	12'	12'	12'	12'	12' Desirable 11' Minimum.	18'	12' Desirable.
Median Width	124'	26' w/Barrier	60' <sup>9</sup>	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Outside Shoulder Width	12'	12'	10'	10'	8'	8'	8'
Inside Shoulder Width	12'	12'	4'	4' (Divided) or Not Applicable	Not Applicable	4'	Not Applicable
Safety Clear Zone	32'	32'	30'	30'	See Note 1	See Note 1	See Note 1
Slopes (H:V): Foreslope In Clear Zone Foreslope Out of Clear Zone Backslope	6:1 4:1 3:1	6:1 4:1 3:1	6:1 4:1 3:1	6:1 4:1 Des./3:1 Min. 3:1	6:1 4:1 Des./3:1 Min. 3:1	6:1 4:1 3:1	4:1 3:1 3:1
Maximum Horizontal Curve <sup>3</sup> (Based on 0.08'/'SE)	1 <sup>0</sup> 30'	1 <sup>°</sup> 30'	3 <sup>0</sup> 00'	4 <sup>0</sup> 45'	6 <sup>0</sup> 00'	6 <sup>0</sup> at Gore 7 <sup>0</sup> 30' Max. on Ramp	6 <sup>0</sup> 00' Des. 13 <sup>0</sup> 30' Min.
Vertical Clearance: Over Railroad	23'-6"	23'-6"	23'-6"	23'-6"	23'-6"	23'-6"	23'-6"
Over I-70	19'0"	19'-0"	19'-0"	19'-0"	19'-0"	19'-0"	Not Applicable
Over Crossroad	16'-6"	16'-6"	16'-6"	16'-6"	15'-6"	16'-6"	15'-6"
Grade	3%	3%	4%	4%	5%	5%	7%
Crest Vertical Curve <sup>4</sup>	K = 312	K = 247	K = 247	K = 151	K = 84	K = 84	K = 84 Desirable
Sag Vertical Curve <sup>5</sup>	K = 206	K = 181	K = 181	K = 136	K = 96	K = 96	K = 96 Desirable K = 49 Minimum
Passing Sight Distance <sup>6</sup>	Not Applicable	Not Applicable	2,480'	2,135'	1,835'	-	1,835' Desirable 1,280' Minimum
Superelevation <sup>7</sup> (Based on 0.08'/'Maximum)	0.08 Feet/Foot	0.08 Feet/Foot	0.08 Feet/Foot	0.08 Feet/Foot	0.08 Feet/Foot	0.08 Feet/Foot	0.04 Feet/Foot
Pavement Cross Slope	2%	2%	2%	2%	2%	2%	2%
Ditch Depth (Desirable)	4'	4'	4'	4'	2'	2'	2'

Notes: 2.

Refer to AASHTO "Roadside Design Guide". Laneage is depended on design year traffic forecasts. Spiral curves required on all curves meeting these conditions: ADT> 400 vpd, Design Speed> 50 MPH and Degree of Curve > 2<sup>0</sup>00'. Exhibit 3-76 - 2001 Policy on Geometric Design - AASHTO. Exhibit 3-79 - 2001 Policy on Geometric Design - AASHTO. З.

4.

5.

Disclaimer for Improve I-70 Design Criteria: The design criteria presented above is the goal for the Improve I-70 Program. At the time of design, a decision will be made whether the presented design criteria will be followed or the current MoDOT standard will be used. This decision will be based on the available funding at the time of design.

Exhibit 3-77 - 2001 Policy on Geometric Design - AASHTO. If superelevation is used on crossroad in Urban Area, use 0.04 '/' as maximum superelevation. Rural standards apply from MO-J/O to U.S. 40, and urban from U.S. 40 to MO-Z.

Median Width may be subject to exceptions.

7.

8.

Appendix II-B Construction Staging and Typical Cross Sections IMPROVE

# APPENDIX II-B Construction Staging

## **A.** Potential Construction Phasing

The focus, goals and priorities for construction of the corridor have yet to be determined. Assuming funding was not an issue, the entire corridor (MO-J/O to MO-Z) might take seven to 10 years, end to end, full buildout. Most of this time would be spent within the City of Columbia and assuming full funding for the Columbia section. However, MoDOT has stated that the construction would be phased in over the next 30 years as the needs arise at particular locations and as funding is available. One approach would be to develop a corridor construction program for delivery over that time by identifying and prioritizing a number of individual projects. If MoDOT receives only partial funding, the highest priority project would proceed. The first priority might be the MO-740 interchange or the US 63/Business 63 interchange, or additional lanes on I-70. The decision would be made based on need at the time the funding becomes available, as well as how much money is available.

A great deal of energy, time and thought go into the development of order of projects in a program, as well as the staging plans (in what order do all of the pieces of an individual project get built). An extremely important consideration in the development of the staging is the impact on the traveling public both during and after construction, including delay and safety. Not all locations, i.e. all interchanges, would be under construction at the same time. Projects would be staggered and sequential. MoDOT is committed to keep four lanes of traffic moving on I-70, and to keep access to businesses open during construction.

## **B.** Construction Staging Approaches

In the development of an EIS, it is too early to determine the exact plan that a contractor would follow during the construction of a project. Plans must be flexible and are determined on a project-by-project basis. Each plan has a focus on safety requiring careful planning and execution. The goal is to construct the project while safely maintaining traffic flow. Impacts to traffic operations must be kept as close to normal while providing positive protection of the drivers from the work area and adequate room for the contractor to perform work safely and efficiently.

A number of methods to manage the traffic flow would be employed during the construction activities. These include temporary pavement, construction of crossroad bridges next to existing bridges, temporary roadway connections between old and new facilities, temporary lane and ramp closures, shifting of traffic lanes, narrow shoulder widths and temporary traffic barriers. In addition, construction contractor working hours may include nights and weekends. Finally, warning signs with appropriate legends and regulatory signs, such as speed reduction signing, changeable message signs, lighting and other warning devices, would be positioned to give the driver sufficient time to respond to the conditions.

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## C. Potential Staging for the Reconstruction of I-70

The corridor contains five distinct sections with differing conditions of construction, depending on the relationship of the existing median location in relation to the new roadway. In general, construction could be accomplished by one of several methods. In one approach, new construction could take place on the outside of the existing facility, traffic shifted to the new lanes, and the area in between completed. In another method, temporary pavement could be constructed adjoining existing pavement in one direction of travel, and traffic shifted to the temporary lanes. Construction of new lanes would occur after the abandoned pavement is removed. Traffic would be shifted over to the new lanes and the temporary lanes removed and reconstructed. A third possibility would be for temporary pavement to be constructed in the median of the existing facility, and traffic shifted to this location. Construction of the new lanes would occur on the outside of the temporary pavement. Traffic would then be shifted to the new lanes and the area in between completed.

There are many different potential approaches that could be used to sequence the construction staging. The staging approach shown below was chosen because it appears to minimize the number of traffic shifts and amount of temporary pavement. This staging approach may or may not be the approach ultimately used during construction.

## 1. MO-J/O to U.S. 40

This section of I-70 has an existing 40-foot (12.2-m) median. The proposed median is 124 feet (37.8 m) wide with widening taking place to the south of the existing eastbound (EB) lanes. The approach would be to first build the new EB lanes offset to the south. EB traffic would be shifted to the new EB lanes. Westbound (WB) traffic would be shifted to the existing old EB lanes. The existing WB lanes would be demolished. New WB lanes would be constructed where the existing old WB lanes were. WB traffic would be shifted to the new WB lanes. The remaining pavement would be demolished.

## 2. U.S. 40 to MO-740, and Paris Road to MO-Z

These two sections of I-70 have an existing 40-foot (12.2-m) median. The proposed median treatment leaves 50 feet (15.2 m) (26 feet [7.92 m], plus two 12-foot [3.7-m] shoulders) between eastbound and westbound lanes, separated by a barrier. Widening takes place symmetrically about the existing centerline. The approach would be to first build temporary pavement in the median between the existing lanes. Traffic would be shifted to the temporary pavement. The new outside EB and WB lanes would be constructed, and traffic shifted to the new lanes. The temporary pavement and existing old lanes would be demolished, and the new lanes constructed and opened to traffic.

## 3. MO-740 to Business Loop West

This section of I-70 has an existing 12-foot (3.7-m) median. The proposed median treatment leaves 50 feet (15.2 m) (26 feet [7.92 m], plus two 12-foot [3.7-m] shoulders) between eastbound and westbound lanes, separated by a barrier. Widening takes place to the north of the existing freeway. The approach would be to first build the new EB and WB lanes north of the existing lanes. Traffic would be shifted to the new lanes and the existing old pavement removed.

## 4. Business Loop West to MO-163

This section of I-70 has an existing 12-foot (3.7-m) median. The proposed median treatment leaves 50 feet (15.2 m) (26 feet [7.92 m], plus two 12-foot [3.7-m] shoulders) between eastbound and westbound lanes, separated by a barrier. Widening takes place slightly south of the existing centerline. The approach would be to first build the new outside EB lanes and bridges. EB traffic would be shifted to the new EB lanes. WB traffic would be shifted to the existing old EB lanes. The existing old WB lanes and bridges would be removed. The new WB lanes and bridges would then be built, and WB traffic shifted to the new lanes and bridges. The remaining old pavement and bridges would be removed. The remaining EB and WB lanes and bridges would be constructed and the new lanes opened to traffic.

## 5. E. MO-163 163 to Paris Road

This section of I-70 has an existing 12-foot (3.7-m) median. The proposed median treatment leaves 50 feet (15.2 m) (26 feet [7.92 m], plus two 12-foot (3.7-m) shoulders) between eastbound and westbound lanes, separated by a barrier. Widening takes place symmetrically about the existing centerline. The approach would be to first build the new outside EB and WB lanes and bridges. Traffic would be shifted to the new EB and WB lanes, and the existing old lanes removed. The remaining new lanes and bridges would be constructed and opened to traffic.

# D. Potential Construction Staging for Bridges over I-70

The corridor contains a number of cross road bridges above I-70, and one railroad bridge for the Columbia Terminal Railroad (COLT). Construction of new bridges could occur using two general approaches. First, the bridge could be closed, reconstructed and then opened again to traffic while traffic is diverted to nearby crossings. For example, Paris Road could be connected to Business Loop, the Business Loop East crossing constructed, then MO-163 or MO-763 could be closed and reconstructed one at a time.

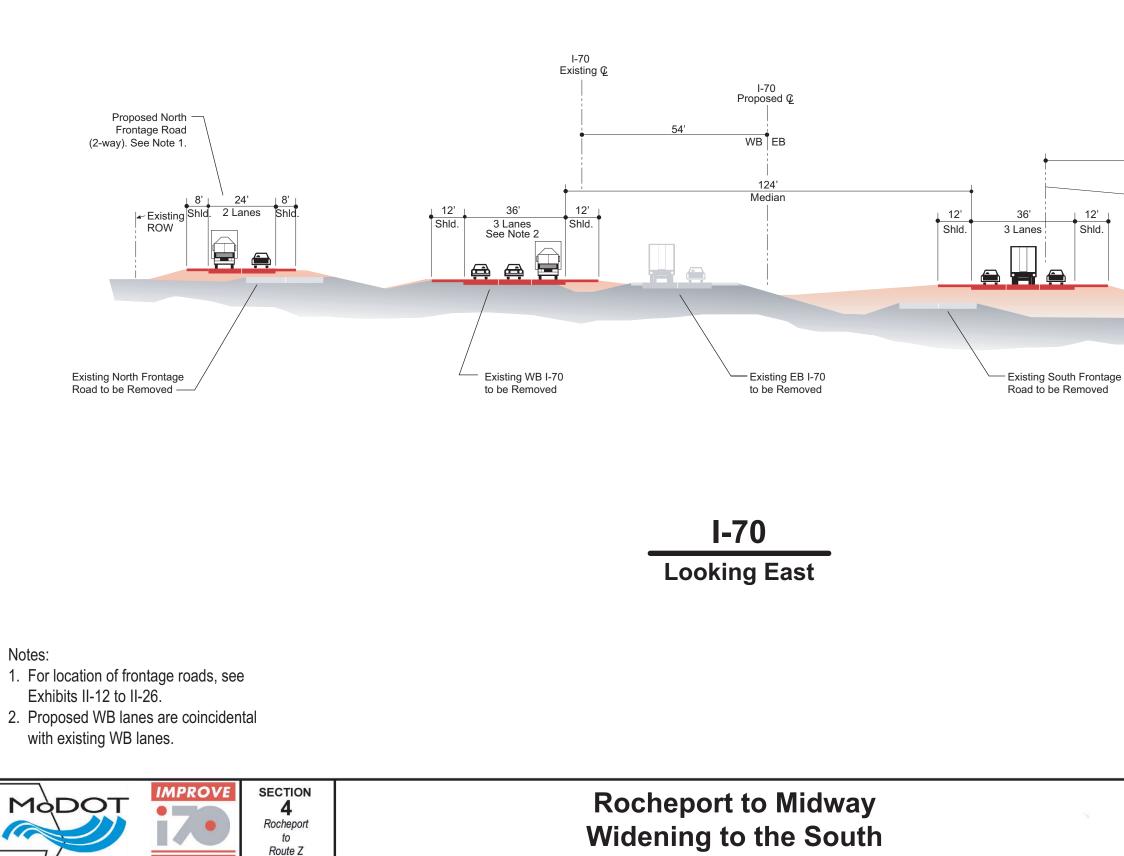
Bridges such as MO-740 and Business 63 would need to be constructed under traffic. This would mean building part of the new structure adjacent to the existing, diverting traffic to the partially constructed bridge, demolishing the old bridge and completing the new bridge. This same offset approach could be used on other structures if the decision was to keep traffic open at all times.

The COLT railroad bridge over I-70 must be replaced as part of any widening of the freeway. Vertical clearances do not meet corridor criteria, nor are the spans long enough to accommodate the future lanes. In a September 22, 2003 memo COLT officials noted that a "new bridge just west of the existing bridge would probably be the easiest from a construction and operations point of view. Closing down and replacing the bridge on the existing alignment would be more difficult both in terms in construction and short term railroad operations, however, it would be preferable in the long run in order to keep from adding any reverse curves to the railroad alignment." This memorandum also notes that the railroad serves only two customers south of I-70, including the Power Plant and Boone County Lumber. The Power Plant suspends coal deliveries from the first week in December to the first week in March, leaving a

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three-month window to shut down the railroad and reconstruct the bridge. Review by several structural engineers familiar with the requirements of railroad grade separations determined that this window would be adequate for demolition and reconstruction. The closure option was selected and used in the evaluation of costs, property and environmental impacts.



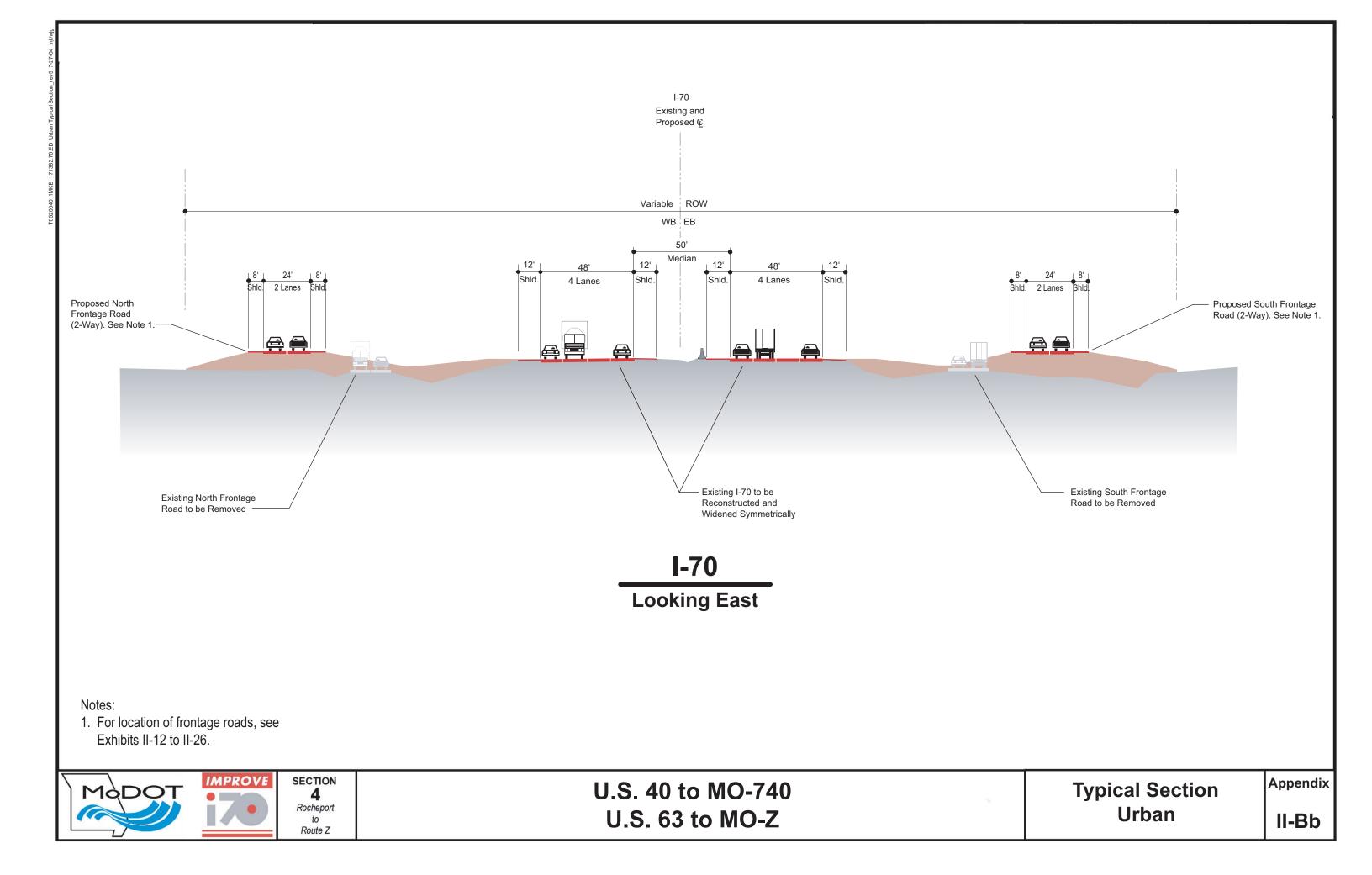


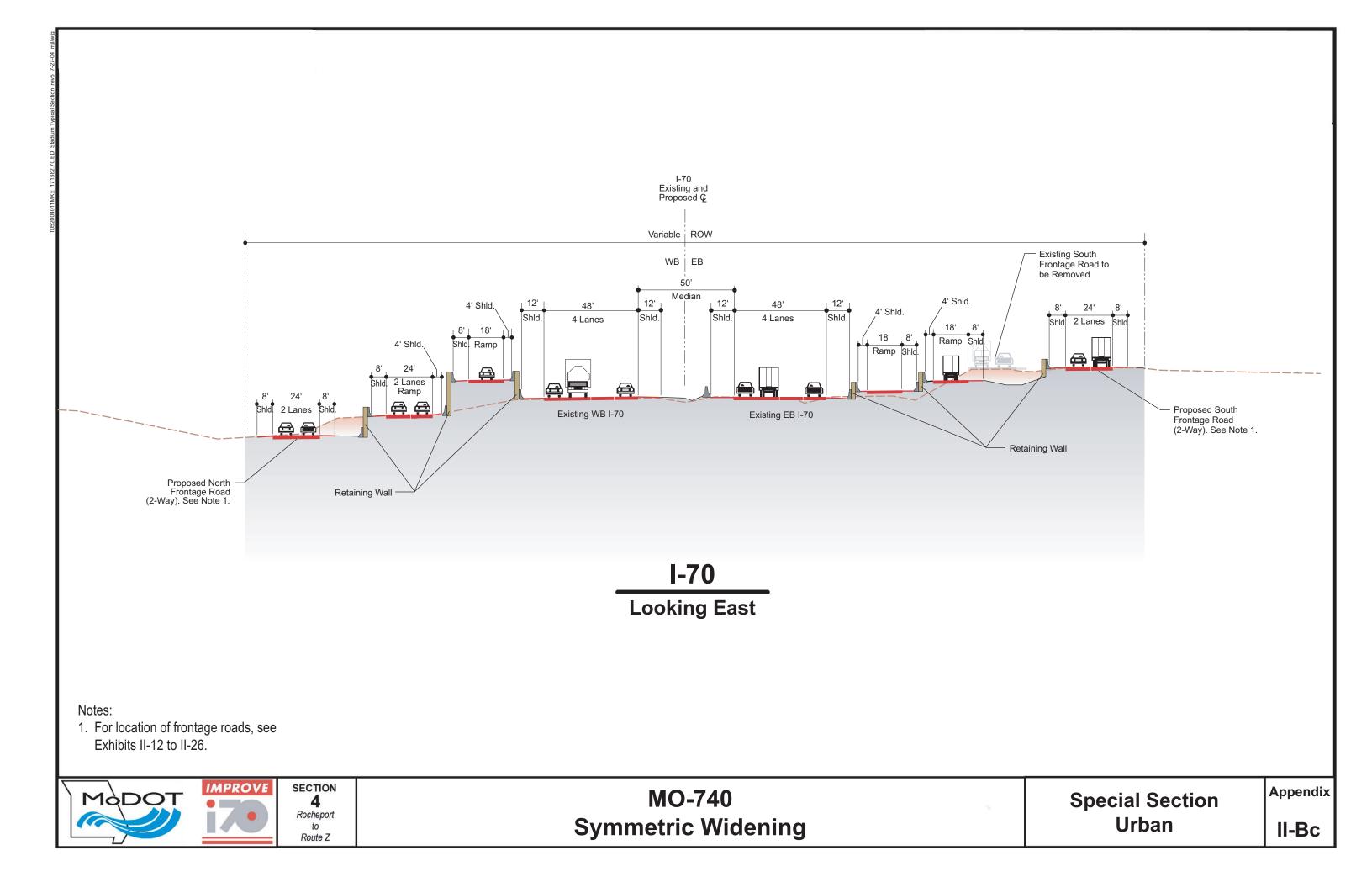
Additional ROW A	As Needed
Existing ROW	Proposed South Frontage Road (2-way). See Note 1.
•	8' 24' 8' hld 2 Lanes Shld.
	<b>₽</b>

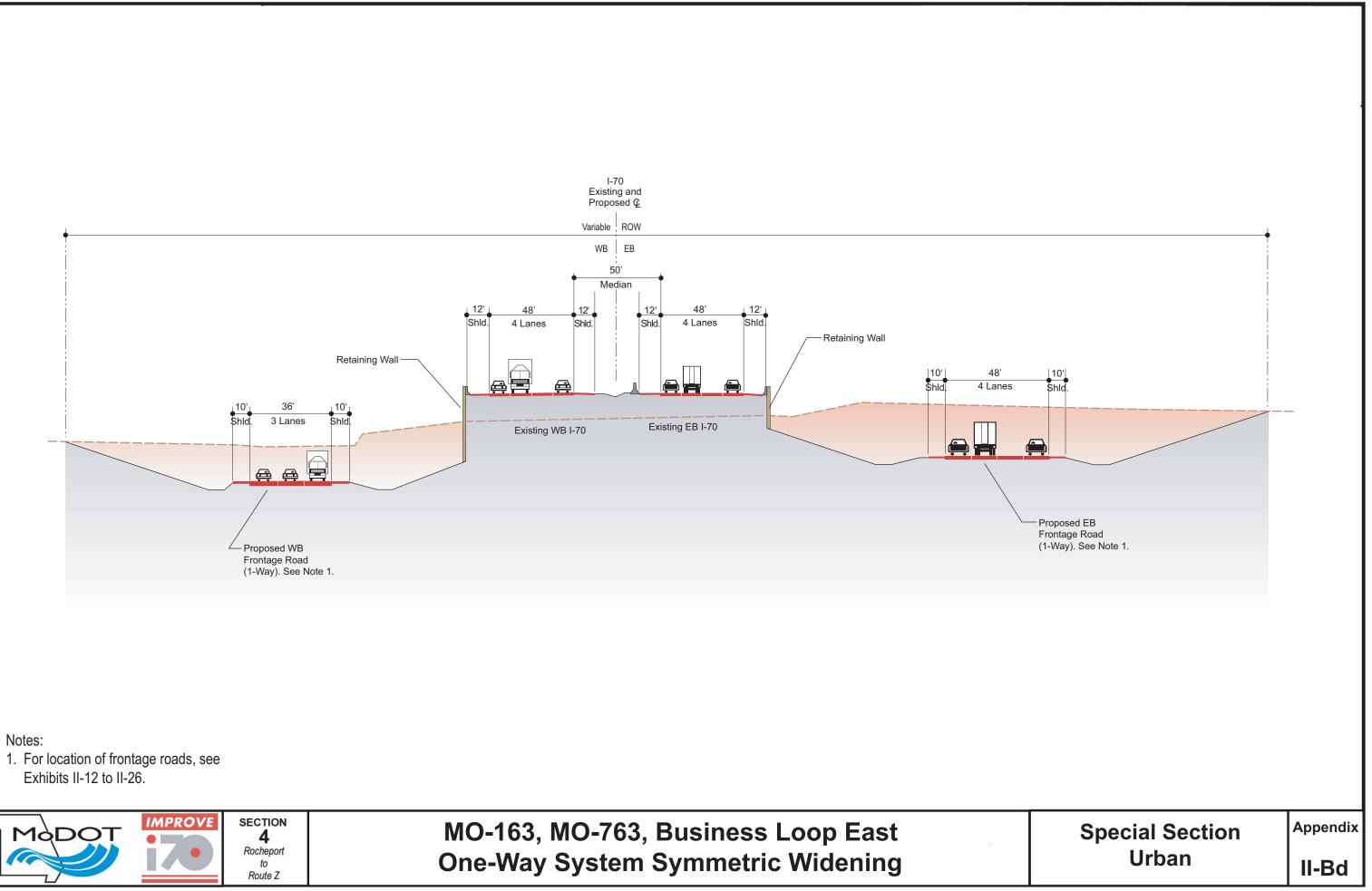
**Typical Section Rural** 

Appendix

II-Ba







Appendix II-C Preliminary Concept Evaluation Summary



## PRELIMINARY EVALUATION MATRIX SUMMARY

Improve I-70: Columbia Area (SIU #4)



			Concept			
	1	2	3	4	5	
	Basic	One-Way	Two-Way	Collector-	Stacked	
EVALUATION FACTORS/PRELIMINARY CONCEPTS	Widening	Frontage Road	Frontage Road	Distributor Road	Highway	
URPOSE AND NEED						
1. Accommodate existing an future traffic volumes on I-70						
-Increase capacity to 6-lanes in rural/8-lanes in urban areas	+	+	+	+	0	
-Meet highway Level of Service guidelines (volume/capacity)	+	+	+	+	+	
-Flexibility for future expansion in the corridor	0	0	+	+	-	
2. Improve existing I-70 design deficiencies						
-Uncorrectable design elements associated with Concept	0	+	+	+	0	
3. Accommodate all users of I-70						
-Make provisions for all major I-70 traffic streams	-	0	+	+	+	
-Implement interchange designs with acceptable Level of Service	+	+	+	+	0	
-Maintain Columbia-area access points	-	0	+	+	0	
4. Improve user safety					-	
-Comply with MoDOT Access Management guidelines		+	+	+	-	
-Effectively manage truck traffic		0	0	+	0	
-Reduce conflicting traffic movements at on/off ramps	0	0	+	+	0	
		Ŭ,				
NVIRONMENTAL IMPACTS						
Avoid Section 4(f) sites like Cosmo Park, other parks, historic sites	_	_	_	_		
Total expected Phase I Environmental Site Assessments	0	0	0	0	0	
Avoid prime farmland parcels	0	0	0	0	0	
Avoid impacts to the "waters of the United States"	0					
Avoid impacts to threatened and endangered species	-	0	0	0	0	
Avoid noise impacts						
•	0	0	0	0	-	
Avoid cultural resource impacts (e.g. sites on Historic Register)	0	0	0	0	0	
AND USE IMPACTS						
Business displacements	+	+	-	-	0	
Access to businesses from I-70	0	+	+	0	-	
Access to businesses from local roadways	-	-	+	+	-	
Residential displacements	+	+	-	-	0	
Residential access impacts	=	0	+	+	-	
Secondary impacts	0	0	0	0	0	
Expected travel pattern disruptions - overall	-	0	+	0	-	
Expected travel pattern disruptions - during construction	-	0	0	+	-	
Visual impacts	0	0	0	0	-	
Potential for Environmental Justice issues	0	+	+	+	0	
Potential for community service disruptions (EMS, fire, police)	-	0	+	+	-	
NGINEERING						
Estimated construction cost	+	0	0	0	-	
Total estimated Right-of-Way (ROW)	+	+	-	-	0	
Constructibility	0	0	0	+	-	
Maintenance of traffic	0	0	0	+	-	
Other engineering-related constraints	0	0	0	0	-	

Legend/Footnotes								
Positive Impact - Important Decision-Making Factor	+	7	10	15	17	2		
Neutral/Unclear/Contradictory Impact	0	15	20	13	11	15		
Negative Impact - Important Decision-Making Factor	-	11	3	5	5	16		

E۷	AL	UAT	ION	MAT	RIX

#### Concept 1 - Basic Widening

#### Improve I-70: Columbia Area (SIU #4)

PURPOSE AND NEED  1. Accommodate existing and future traffic volumes on I-70 -Increase capacity to 6-lanes in rural/8-lanes in urban areas		
-Increase capacity to 6-lanes in rural/8-lanes in urban areas		
	+	Additional lane capacity along existing I-70 incorporated
-Meet highway Level of Service guidelines (volume/capacity)	+	No apparent impediment to meeting threshold Level of Service
-Flexibility for future expansion in the corridor	0	No impediment to I-70 expansion, but maintenance of the existing discontinuous frontage road system is limiting
2. Improve existing I-70 design deficiencies	-	
-Uncorrectable design elements associated with Concept	0	Basic widening limits ability to correct existing design deficiences
3. Implement a better strategy for accommodating all users of I-70	-	
-Make provisions for all major I-70 traffic streams	-	No accommodations made to differentiate competing traffic streams
-Implement interchange designs with acceptable Level of Service	+	No apparent impediment to meeting threshold Level of Service
-Maintain Columbia-area access points	-	No improvements to cross I-70 operations proposed
4. Improve user safety		
-Comply with MoDOT Access Management guidelines	-	Basic widening limits ability to implement Access Management guidelines
-Effectively manage truck traffic	-	No accommodations made to differentiate competing traffic streams
-Eliminate identified crash precursors	0	Concept allows some design flexibility to address crash precursors
•	•	
ENVIRONMENTAL IMPACTS		
Avoid Section 4(f) sites like Cosmo Park, other parks, historic sites	_	Redesign of the Stadium interchange may not be feasible/prudent without minor encroachments to Cosmo Park
Total expected Phase I Environmental Site Assessments		Relatively minor encroachments
Avoid prime farmland parcels	-	No apparent impediment to avoiding encroachments
Avoid impacts to the "waters of the United States"	0	Impacts can be characterized as increases to existing encroachments (such as culvert lengthening)
Avoid impacts to threatened and endangered species	-	Likely impact to bristled cyperus located within the existing ROW
Avoid noise impacts	0	Potential for localized noise impacts, but overall concept is benign
Avoid cultural resource impacts (e.g. sites on Historic Register)	-	Strict adherence to engineering standards may result in encroachment on known NRHP resources
	•	
LAND USE IMPACTS		
Business displacements	+	Business displacements/partial takes are likely; however, overall concept is benign
Access to businesses from I-70		Existing pathways maintained in their sub-optimum condition
Access to businesses from local roadways	-	Discontinuous frontage road system is limiting and will not adequately service expected needs
Residential displacements		Minimizes overall project footprint and, therefore, residential displacements
Residential access impacts	-	Discontinuous frontage road system is limiting and will not adequately service expected needs
Secondary impacts		Basic widening fails to address many existing land use problems
	~	
SOCIO-ECONOMIC/COMMUNITY IMPACTS		
Expected travel pattern disruptions - overall	-	Discontinuous frontage road system is limiting and will not adequately service expected needs
Expected travel pattern disruptions - during construction	-	In-place reconstruction will provide few opportunities to reroute traffic (closure/detour onto local network will be required)
Visual impacts	0	Visual environment encroachments are likely; however, overall concept is benign
Potential for Environmental Justice issues	-	Discontinuous frontage road is limiting and fails to address many issues; however, project footprint is minimized
Potential for community service disruptions (EMS, fire, police)	-	Discontinuous frontage road system will not adequately service access needs
ENGINEERING		
Estimated construction cost	+	Least expensive build alternative
Total estimated Right-of-Way (ROW)		Minimizes overall project footprint
Constructibility	-	No extraordinary construction measures necessary
Maintenance of traffic	-	No extraordinary MOT measures necessary
Other engineering-related constraints	•	Standard maintenance procedures apply to this concept
	,	

Legend	
Positive Impact - Important Decision-Making Factor	+
Neutral/Unclear/Contradictory Impact	0
Negative Impact - Important Decision-Making Factor	-

EVALUATION MATRIX
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Concept 2 - One-Way Frontage Road

Improve I-70: Columbia Area (SIU #4)

EVALUATION FACTORS	RATING	DECISION-MAKING FACTORS
PURPOSE AND NEED		
1. Accommodate existing and future traffic volumes on I-70		
-Increase capacity to 6-lanes in rural/8-lanes in urban areas	+	Additional lane capacity along existing I-70 incorporated
-Meet highway Level of Service guidelines (volume/capacity)	+	No apparent impediment to meeting threshold Level of Service
-Flexibility for future expansion in the corridor	0	No structural impediment to I-70 expansion, one-way frontage roads may be difficult to expand
2. Improve existing I-70 deficiencies		
-Uncorrectable design elements associated with Concept	+	One way frontage road system allows for correction of most major design deficiencies
3. Implement a better strategy for accommodating all users of I-70		
-Make provisions for all major I-70 traffic streams	0	Continuous one-way system fundementally alters local traffic pattern and is counter to most driver expectations
-Implement interchange designs with acceptable Level of Service	+	No apparent impediment to meeting threshold Level of Service
-Maintain Columbia-area access points	0	Maintains existing interchanges and adds 2-3 over/underpasses. One-way access to frontage road may be controversial
4. Improve user safety	_	
-Comply with MoDOT Access Management guidelines	+	Concept allows for improving interchanges to achieve many of the MoDOT Access Management Guidelines
-Effectively manage truck traffic	0	Local truck traffic may find the frontage road system to be an attractive alternative to I-70
-Eliminate identified crash precursors	0	Concept allows enough design flexibility to address crash precursors. One-way roads may have negative impacts
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ENVIRONMENTAL IMPACTS		
Avoid Section 4(f) sites like Cosmo Park, other parks, historic sites	-	Redesign of the Stadium interchange may not be feasible/prudent without minor encroachments to Cosmo Park
Total expected Phase I Environmental Site Assessments	0	Relatively minor encroachments
Avoid prime farmland parcels	0	No apparent impediment to avoiding encroachments
Avoid impacts to the "waters of the United States"	0	Impacts can be characterized as increases to existing encroachments (such as culvert lengthening)
Avoid impacts to threatened and endangered species	-	Likely impact to bristled cyperus located within the existing ROW
Avoid noise impacts		Potential for localized noise impacts, but overall concept is benign
Avoid uliural resource impacts (e.g. sites on Historic Register)	0	Strict adherence to engineering standards may result in encroachment on known NRHP resources
Avoid cultural resource impacts (e.g. siles on historic negister)	0	Sunct adherence to engineering standards may result in encloactiment on known NKHP resources
LAND USE IMPACTS		
		Minimizer annual mariant factorizet and the sefere devices displacements
Business displacements	+	Minimizes overall project footprint and, therefore, business displacements
Access to businesses from I-70	+	Existing I-70 to Columbia pathways maintained
Access to businesses from local roadways	-	One-way frontage road system alters existing access pathways (no right turns)
Residential displacements	+	Minimizes overall project footprint and, therefore, residential displacements
Residential access impacts	0	One-way frontage road system alters existing access pathways
Secondary impacts	0	One-way frontage road system alters existing access pathways
SOCIO-ECONOMIC/COMMUNITY IMPACTS		
Expected travel pattern disruptions - overall	0	One-way frontage road system alters existing access pathways, but the enhanced operations may be a net positive
Expected travel pattern disruptions - during construction	0	Narrow footprint may be limiting, but opportunities for partial implementation may be possible
Visual impacts	0	Visual environment encroachments are likely, however, overall concept is benign
Potential for Environmental Justice issues	+	Positive EJ aspects include new overpasses, incorporation of pedestrian/bike needs and continuous frontage roads
Potential for community service disruptions (EMS, fire, police)	0	Impacts expected, however, overall concept is benign (one-way system will alter existing access pathways)
ENGINEERING		
Estimated construction cost	0	Comparable to other emerging alternatives that utilize a simple continuous parallel roadway system
Total estimated Right-of-Way (ROW)	+	Minimizes overall project footprint
Constructibility	0	No extraordinary construction measures necessary
Maintenance of traffic	0	No extraordinary MOT measures necessary

Legend	
Positive Impact - Important Decision-Making Factor	+
Neutral/Unclear/Contradictory Impact	0
Negative Impact - Important Decision-Making Factor	-

EVALUATION MATRIX							
Concept 3 - Two-Way Frontage Road							
Improve I-70: Columbia Area (SIU #4)							
		volvement Meeting - December 11, 2003					
EVALUATION FACTORS	RATING	DECISION-MAKING FACTORS					
PURPOSE AND NEED							
1. Accommodate existing and future traffic volumes on I-70							
-Increase capacity to 6-lanes in rural/8-lanes in urban areas	+	Additional lane capacity along existing I-70 incorporated					
-Meet highway Level of Service guidelines (volume/capacity)	+	No apparent impediment to meeting threshold Level of Service					
-Flexibility for future expansion in the corridor	+	No structural impediment to expansion					
2. Improve existing I-70 deficiencies							
-Uncorrectable design elements associated with Concept	+	Two way frontage road system allows for correction of most major design deficiencies					
3. Implement a better strategy for accommodating all users of I-70							
-Make provisions for all major I-70 traffic streams	+	Continuous two-way system is the most flexible local roadway system and conforms to most driver expectations					
-Implement interchange designs with acceptable Level of Service	+	No apparent impediment to meeting threshold Level of Service					
-Maintain Columbia-area access points	+	Maintains existing interchanges, adds 2-3 over/underpasses and maintains two-way access to frontage road properties					
4. Improve user safety							
-Comply with MoDOT Access Management guidelines	+	Concept allows for improving interchanges to achieve many of the MoDOT Access Management Guidelines					
-Effectively manage truck traffic	0	Local truck traffic may find the frontage road system to be an attractive alternative to I-70					
-Eliminate identified crash precursors	+	Concept allows enough design flexibility to address crash precursors					
ENVIRONMENTAL IMPACTS							
Avoid Section 4(f) sites like Cosmo Park, other parks, historic sites	-	Redesign of the Stadium interchange may not be feasible/prudent without minor encroachments to Cosmo Park					
Total expected Phase I Environmental Site Assessments	0	Relatively minor encroachments					
Avoid prime farmland parcels	0	No apparent impediment to avoiding encroachments					
Avoid impacts to the "waters of the United States"	0	Impacts can be characterized as increases to existing encroachments (such as culvert lengthening)					
Avoid impacts to threatened and endangered species	-	Likely impact to bristled cyperus located within the existing ROW					
Avoid noise impacts	0	Potential for localized noise impacts, but overall concept is benign					
Avoid cultural resource impacts (e.g. sites on Historic Register)	0	Strict adherence to engineering standards may result in encroachment on known NRHP resources					
LAND USE IMPACTS							
Business displacements	-	Business displacements/partial takes are likely due to wider footprint for improvements					
Access to businesses from I-70	+	Existing I-70 to Columbia pathways maintained					
Access to businesses from local roadways	+	Use of existing two-way frontage road system will maintain existing local access pathways					
Residential displacements	-	Residential displacements/partial takes are likely due to wider footprint for improvements					
Residential access impacts	+	Two-way frontage road system will maintain expected access pathways					
Secondary impacts	0	Two-way frontage road system will maintain expected access pathways					
SOCIO-ECONOMIC/COMMUNITY IMPACTS							
Expected travel pattern disruptions - overall	+	Two-way frontage road system will maintain expected access pathways					
Expected travel pattern disruptions - during construction	0	Larger footprint and maintenance of existing frontage road pathways make construction straight-forward but not necessarily problem-					
Visual impacts	0	Visual environment encroachments are likely; however, overall concept is benign					
Potential for Environmental Justice issues	+	Positive EJ aspects include new overpasses, incorporation of pedestrian/bike needs and continuous frontage roads					
Potential for community service disruptions (EMS, fire, police)	+	Impacts expected; however, overall concept is benign (two-way system will maintain expected access pathways)					
ENGINEERING	-						
Estimated construction cost	0	Comparable to other emerging alternatives that utilize a simple continuous parallel roadway system					
Total estimated Right-of-Way (ROW)	-	Encroachments/impacts expected					
Constructibility	0	No extraordinary construction measures necessary					
Maintenance of traffic	0	No extraordinary MOT measures necessary (two-way system will maintain expected access pathways)					
Other engineering-related constraints	0	Standard maintenance procedures apply to this concept					

Legend	
Positive Impact - Important Decision-Making Factor	+
Neutral/Unclear/Contradictory Impact	0
Negative Impact - Important Decision-Making Factor	-

Display         Display <t< th=""><th></th><th></th><th>EVALUATION MATRIX</th></t<>			EVALUATION MATRIX
Display         Display         Display           EXALLATION FACTORS         RATINO         DECEMONATION FACTORS           EXPOSE AND NEED         In         In           1. Accommode weighting and future traffic volumes on 1/70         In         In           1. Accommode weighting and future traffic volumes on 1/70         In         In           1. Accommode weighting and future traffic volumes on 1/70         In         In         In           1. Accommode weighting and future traffic volumes on 1/70         In         In<		Con	cept 4 - Collector/Distributor System
Public Number Num Number Number Number Number Number Number Number Num			
Process Answer         Process Answer         Process Answer           PURPOSE AND UNDER STATUS         4           Answer According to share in numb lower by The numb lower by The Answer			
PUPDESCEND         V           1. Accommodate explanting and future solvenes on 1-70         V           Accommodate explanting and future solvenes on 1-70         V           Meets tripheny Level of Service guidalines (colume/applicit)         No apported impediment to immedia dimensional column           2. Improve existing 1-76 definitions         Existing for definitional column         Existing for definitional column           3. Improve existing 1-76 definitions         C         Optimization for an import 778 traffic streams         Existing for definitional column           3. Improve existing 1-76 definitions         C         Optimization for an import 778 traffic streams         Existing for accommodate column         Existing for accommodate column           4. Incorrect state streams         Hint 2-79         C         Optimization for an import 778 traffic streams         Existing for accommodate column           4. Incorrect state streams         Hint 2-70         Compare transmission for an import 778 traffic streams         Martares setting intercharge, state 2-70 eventrotherpases and manifables throw any access to forting code programm           4. Incorrect state streams         Hint 2-70 codes programm         Martares setting intercharges state streams         Hint 2-70           4. Concept streams         Hint 2-70 codes programm         Concept streams         Hint 2-70           4. Incorrect streamstresthin 2-70         Condept streamstres throm			······································
PUPDESCEND         V           1. Accommodate explanting and future solvenes on 1-70         V           Accommodate explanting and future solvenes on 1-70         V           Meets tripheny Level of Service guidalines (colume/applicit)         No apported impediment to immedia dimensional column           2. Improve existing 1-76 definitions         Existing for definitional column         Existing for definitional column           3. Improve existing 1-76 definitions         C         Optimization for an import 778 traffic streams         Existing for definitional column           3. Improve existing 1-76 definitions         C         Optimization for an import 778 traffic streams         Existing for accommodate column         Existing for accommodate column           4. Incorrect state streams         Hint 2-79         C         Optimization for an import 778 traffic streams         Existing for accommodate column           4. Incorrect state streams         Hint 2-70         Compare transmission for an import 778 traffic streams         Martares setting intercharge, state 2-70 eventrotherpases and manifables throw any access to forting code programm           4. Incorrect state streams         Hint 2-70 codes programm         Martares setting intercharges state streams         Hint 2-70           4. Concept streams         Hint 2-70 codes programm         Concept streams         Hint 2-70           4. Incorrect streamstresthin 2-70         Condept streamstres throm			
	EVALUATION FACTORS	RATING	DECISION-MAKING FACTORS
Increase capacity for Johnese in mathemases         +         Additional lane capacity and galaxies of Johnese quadrational (volume Appacity)           Anset highway Level of Service         +         No signature trapediment to metricing Preclosed Level of Service           Interview existing 170 differences         +         No signature trapediment to metricing Preclosed Level of Service           1. Importe existing 170 differences         +         C D System allows for commodating all users of 170           Make provides for all model 701 Head for anno         +         C D System allows for commodified galaxies           - Allower existing Teleformation or all matchine secting interchanges. doi: 2.0 certification or allow the way access to forminge and properties         +           - Allower existing         +         Company with MoOT Access Management guidelines         +           - Company with MoOT Access Management guidelines         +         Company with MoOT Access Management guidelines         +           - Company with MoOT Access Management guidelines         +         Company with MoOT Access Management guidelines         +           - Relevand Montania counting Interchanges. do allow on runnerving interchanges may role. Insultable interchanges and maintains two-way access. In formation access management guidelines         -           - Relevand Montanin countinalis ancoverance         -         Relev	PURPOSE AND NEED		
Meta topbergy Land of Service guidelines (volume/capacity)         Pho Sparmel Impediation to Decision         Pho Sparmel Impediation to Exercision           Jensory excittability for future separation in the continer         Pho Sparmel Impediation for the continer         Pho Sparmel Impediation for the continer           Jensory excittability for future separation in the continer         Pho Sparmel Impediation for a most made design deficiencies           Jumpionent Internation of the continer         Pho Sparmel Impediation for anothing of the service of the continent internation of the continent internatin internation of the continent internation of the cont	1. Accommodate existing and future traffic volumes on I-70		
-Philoithy for future regretation in the corridor         +         No structural impediment to expansion           2. Improve existing 170 deficiencies         -         C D System allows for correction of most major design deficiencies           3. Implement a before strategy for accommodating all users of 170         -         C D System allows for correction of most major design deficiencies           3. Implement interchange designs with acceptable Level of Service         +         No structural implement interchange designs with acceptable Level of Service           4. Improve user and/ty         -         C D system is the most deficitive solution to segarating the correction dimitation to way access to formage road properties           4. Improve user and/ty         -         Concept allows for improving interchanges, adds 2:3 overfundinguesse and maintains to way access to formage road properties           4. Improve user and/ty         -         Concept allows for improving interchanges to address can procursors           4. Element means that strate         -         Redesign of the Statian interchanges, address can procursors           5. Or addraw proper accentance         -         Redesign of the Statian interchanges, address can procursors           5. Or addraw proper accentance         -         Redesign of the Statian interchanges (address can procursors           5. Or addraw proper accentance         -         Redesign of the Statian interchanges (address can procursors)           7. Deficit	-Increase capacity to 6-lanes in rural/8-lanes in urban areas	+	Additional lane capacity along existing I-70 incorporated
Improve setsing 1-79 deficiencies     Improve setsing 1-79 deficiencies     Improvement a better strategy for accommodating all users of 1-70     Improvement a better strategy for accommodating all users of 1-70     Improvement and party 1-70 tarlie streams     Improvement functionage staggins with acceptable user of 2-70     Improvement access points     Improvement access     Improvement     Improvement ac	-Meet highway Level of Service guidelines (volume/capacity)	+	No apparent impediment to meeting threshold Level of Service
Juncorrectable design elements essociated with Concept     Autor process of an apper 12 mile arterum     the Co System allows for correction of most major design deficiencies     Autor process of an apper 12 mile arterum     the Co D system allows for correction to segarating the conflicting taffic streams within SU 4     Autor theorem and the content of an apper 12 mile arterum     Autor process of an apper 12 mile arterum     the Co D system is the most effective solution to segarating the conflicting taffic streams within SU 4     Autor and theorem and the content of an appendix and the content of a appendix and the appendix and th	-Flexibility for future expansion in the corridor	+	No structural impediment to expansion
Implement a better strategy for accommodating all users of 170     Alex provideors for all major 170 raffer streams     H     C-2 system is the most effective solution to separating the conflicting traffic streams within SUU 4     Huntrians (account of the solution to most of the solution to esparating the conflicting traffic streams within SUU 4     Huntrians (account of the solution to most of the solution to separating the conflicting traffic streams within SUU 4     Huntrians (account of the solution to most of the solution to separating the conflicting traffic streams within SUU 4     Huntrians (account of the solution to separating the conflicting traffic streams within SUU 4     Huntrians (account of the solution to separating the conflicting traffic streams within SU 4     Huntrians (account of the solution to separating the conflicting traffic streams within SU 4     Huntrians (account of the solution to separating the conflicting traffic streams within SU 4     Huntrians (account of the solution to separating the conflicting traffic streams within SU 4     Huntrians (account of the solution to separating the conflicting traffic streams within SU 4     Huntrians (account of the solution to separating the conflicting traffic streams within SU 4     Huntrians (account of the solution to separating the conflicting traffic streams within SU 4     Huntrians (account of the solution to separating the conflicting traffic streams within SU 4     Huntrians (account of the solution streams) (b design fileshibly to address crash precursors     Havid profile     Huntrians (account of the solution streams) (b design fileshibly to address crash precursors     Havid profile transmitter of the United States*     Huntrians (account of the United Sta	2. Improve existing I-70 deficiencies		
• Able provisions for all major F7 torffic streams         +         -O system is the most effective solution to separating the conficting toffic streams within SU 4           • Implement interchange designs with acceptable Level of Service         +         No apparent impediations in the most effective solution to separating the conficting toffic streams within SU 4           • Improve user safety         +         No apparent impediations in the most effective solution to separating the conficting toffic streams within SU 4           • Concept within Sear access and paratimation to major toffic streams within SU 4         +         Concept within Sear access and maintain two-way access to fortage road properties           • Concept allows for improving interchange, add 2-3 overlundepasses and maintain two-way access to fortage road properties         +         Concept allows for improving interchange add 2-3 overlundepasses           • Concept allows for improving interchange, add 2-3 overlundepasses         +         Concept allows for improving interchange, add 2-3 overlundepasses           • Concept allows for improving interchange, add 2-3 overlundepasses         +         Concept allows for improving interchange, add 2-3 overlundepasses           • Concept allows for improving interchange, add 2-3 overlundepasses         +         Concept allows for improving interchange, add 2-3 overlundepasses           • Concept allows for improving interchange, add 2-3 overlundepasses         +         Relatively improve interchange add 2-3 overlundepasses           • Concept allows for improvements	-Uncorrectable design elements associated with Concept	+	C-D System allows for correction of most major design deficiencies
-implement Interchange designs with acceptable Level of Service <ul></ul>	3. Implement a better strategy for accommodating all users of I-70		
Haintain Columbia area access points         +         Maintain existing interchanges, adds 2-3 overlundepasses and maintains two-way access to fontage road properties           4. Improve user safety         -         Compary with MoOT Access Management guidelines           -Compary with MoOT Access Management guidelines         +         Concept allows for improving interchanges to achieve many of the MoOT Access Management Guidelines           -Effectively manage truck traffic         +         Concept allows enough design flexibility to address crash precursors           -Effectively manage truck traffic         +         Concept allows enough design flexibility to address crash precursors           -         Redestion 4(f) isses like Concept Allows Acteber parks. Natoric alles         -           Avoid Staction and the sale for information of the Staction interchange may not be flexible/pudent without minor encreachments to Conno Park           Avoid practs to threatend and endangered species         -         Redestign of the Staction interchange in any not be flexible/pudent without minor encreachments (such as culvent lengthering)           Avoid ingest to threatend and endangered species         -         Leke impact to bried copens koated within the existing NOW           Avoid ingest to threatend and endangered species         -         Leke impact         Devide addican instructures           Avoid ingest to threatend and endangered species         -         Leke impact         Devide addicant metrichange impacts	-Make provisions for all major I-70 traffic streams	+	C-D system is the most effective solution to separating the conflicting traffic streams within SIU 4
4. Improve user safely       Improve user safely       Improve user safely         -Compty with MbDD Access Management guidelines       +       Concept allows for improving interchanges to achieve many of the MbDDT Access Management Guidelines         -Effective manage truck truth       +       Concept allows for improving interchanges to achieve many of the MbDDT Access Management Guidelines         -Effective manage truck truth       +       Concept allows enough design flexibility to address crash precursors         ENVIRONMENTAL IMPACTS       -       Redesign of the Stadum Interchange many to be flexible/prudent without minor encreachments to Coamo Park.         Avoid Section 4(f) sites ill bits Coamo Park, other parks, historic alles       -       Redesign of the Stadum Interchange many not be flexible/prudent without minor encreachments to Coamo Park.         Avoid impacts to the "water of the United States"       O       Inagets can be characterized as increases to existing encreachments (such as cubert lengthening)         Avoid moise impacts       O       Potential to isolated noise impacts, but overall concept to bening         Avoid moise impacts (a.g. sites on Historic Register)       O       Site: adherina to any interchange many mouter to thore additional floxibility         Business displacements       -       Business displacements/partial takes are likely due to wider footprint for improvements         Access to businesses from 1-70       O       Localthrough lane configuration may limit some movement between 1-70	-Implement interchange designs with acceptable Level of Service	+	No apparent impediment to meeting threshold Level of Service
-Comply with MoDOT Access Management guidelines         +         Concept allows for improving interchanges to achieve many of the MaDOT Access Management Guidelines           -Effectively manage truck traffic         +         C-D madway represents the most effective solution to separating the conflicting traffic streams within SU 4           -Effectively manage truck traffic         +         Concept allows enough design flexibility to addess crash precursors           ENVIRONMENTAL IMPACTS         +         Concept allows enough design flexibility on addess crash precursors           Avoid Section (0) sites like Cosmo Park, other parks, historic alles         -         Redesign of the Stadum interchange may not be flexable/pudent without minor encrachments to Cosmo Park.           Total aspected Phase I Environmental Site Assessments         0         No apparent impediant to avoiding encrachments (such as cubert lengthening)           Avoid impacts to the water of the United State*         0         No apparent impediant to avoiding encrachments (such as cubert lengthening)           Avoid impacts to the water of the United State*         0         Patential for localized noise impacts, but oreal is beingn           Avoid impacts to the water of the United State*         0         Patential for localized noise impacts, but oreals is beingn           Avoid impacts to the states of additional flexibility         0         Descrit adherence to engineering standards may result in encreachment to known NRHP resources           EAND USE IMPACTS         <	-Maintain Columbia-area access points	+	Maintains existing interchanges, adds 2-3 over/underpasses and maintains two-way access to frontage road properties
-Effectively manage truck traffic         +         C-D roadway represents the most effective solution to separating the conflicting traffic atreams within SIU 4           -Eliminate identified crash precursors         +         Concept allows enough design flexibility to address crash precursors           ENVIRONMENTAL IMPACTS         -         Redesign of the Stadium interchange may not be feasible/prudent without minor encroachments to Cosmo Park.           Avoid Section 4(f) sites like Cosmo Park, other parks, historic sites         0         Redesign of the Stadium interchange may not be feasible/prudent without minor encroachments to Cosmo Park.           Avoid prime farmiand parcels         0         No appertnt impédiment to avoiding encroachments           Avoid inpacts to the values of the United States*         0         Impacts can be characterized as increases to oxising encroachments (such as outvert lengthening)           Avoid inpacts to threatened and endangered species         -         Likely impact to bristed cypeus located within the existing ROW           Avoid cultural resource Impacts (e.g. alles on Historic Register)         0         Strict adherence to engineering standards may result in encreachments (such as outvert lengthening)           Access to businesses from Load roadways         +         Two-way frontage road system will be maintained. C-D road will provide additional flockbilly           Residential displacements         -         Residential displacements         Peterlistor condinulis provide additional flockbilly      <	4. Improve user safety		
-Eliminate identified crash precursors         +         Concept allows enough design flexibility to address crash precursors           ENVRONMENTAL IMPACTS         -         Redesign of the Stadium interchange may not be feasible/pudent without minor encreachments to Cosmo Park.           Avoid Section 4(f) sites like Cosmo Park, other parks, historic sites         -         Redesign of the Stadium interchange may not be feasible/pudent without minor encreachments to Cosmo Park.           Avoid prime frammind parcels         0         Notapprints incodent on cosking encreachments           Avoid inpacts to the "waters of the United States"         0         Impacts can be characterized as increases to existing encreachments (such as cultert lengthening)           Avoid inpacts to threatened and endangered species         -         Leky impacts to breatled operus located within the existing ROW           Avoid notes impacts.         0         Potential for locatiar donaise impacts. Un overall compet to known NRHP resources           LINU USE IMPACTS         0         Existence to engineering standards may result in encreachments (such as culter to the improvements           Access to businesses from IrO         0         Local/through hate configuration may inter them environed techneon IrO and Columbia (signing/engineering will limit thei).           Access to businesses from IrO         0         Local/through hate configuration may inter takes are likely due to wider foolprint for improvements           Residential displacements         -	-Comply with MoDOT Access Management guidelines	+	Concept allows for improving interchanges to achieve many of the MoDOT Access Management Guidelines
EXVIRONMENTAL IMPACTS         Redesign of the Stadum interchange may not be feasible/pudent without minor encreachments to Cosmo Park, Avoid Sector Phase I Environmental Site Assessments         Redesign of the Stadum interchange may not be feasible/pudent without minor encreachments to Cosmo Park           Avoid Sector Phase I Environmental Site Assessments         0         Relatively minor encreachments           Avoid Inpacts to the "waters of the United States"         0         Inpacts can be characterized as increases to existing encodments (such as culvent lengthening)           Avoid Inpacts to threatend and endargered species         -         Likely impact to briefdo operus located within the existing ROW           Avoid Inpacts to threatend and endargered species         0         Potential for locatized noise impacts, but overall concept is benign           Avoid Inpacts to threatend and endargered species         0         Potential for locatized noise impacts, but overall concept is benign           Avoid Inpacts to threatenes         0         Potential for locatized noise impacts, but overall concept is benign           Avoid Inpacts         0         Strict adherence to engineering standards may result in encreachments           Access to businesses from local readways         +         Two-way frontage read system will be maintained, C-D read will provide additional flexibility           Residential displacements         -         Residential displacements         Potential for Dotynit for improvements           Secondary impacts	-Effectively manage truck traffic	+	C-D roadway represents the most effective solution to separating the conflicting traffic streams within SIU 4
Avoid Section 4(f) sites like Cosmo Park, other parks, historic sites       -       Redesign of the Staduum interchange may not be feasible/prodent without minor encroachments to Cosmo Park         Total expected Phase I Environmental Site Assessments       O       No apparent impedment to avoiding encroachments         Avoid impacts to the "waters of the United States"       O       No apparent impedment to avoiding encroachments         Avoid impacts to the "waters of the United States"       O       Impacts can be divatedired as increases to existing encroachments (such as culver lengthening)         Avoid impacts to the "waters of the United States"       O       Potential for localized noise impacts, but overall concept is benign         Avoid impacts to threatened and endangered species       -       Likely impact to bristed coperus located within the existing ROW         Avoid outpact is displacements       O       Potential for localized noise impacts, but overall concept is benign         Access to businesses from I>70       D       Local/through lane configuration may limit some movement between I>70 and Columbia (signing/engineering will limit this)         Access to businesses from I>70       D       Local/through lane configuration may limit some rowerents         Residential displacements       -       Residential displacements/sparall takes are likely due to wider footprint for improvemants         Residential displacements       -       Residential dadisplacements/sparali takes are likely due to wider footprint dor	-Eliminate identified crash precursors	+	Concept allows enough design flexibility to address crash precursors
Avoid Section 4(f) sites like Cosmo Park, other parks, historic sites       -       Redesign of the Staduum interchange may not be feasible/prodent without minor encroachments to Cosmo Park         Total expected Phase I Environmental Site Assessments       O       No apparent impedment to avoiding encroachments         Avoid impacts to the "waters of the United States"       O       No apparent impedment to avoiding encroachments         Avoid impacts to the "waters of the United States"       O       Impacts can be divatedired as increases to existing encroachments (such as culver lengthening)         Avoid impacts to the "waters of the United States"       O       Potential for localized noise impacts, but overall concept is benign         Avoid impacts to threatened and endangered species       -       Likely impact to bristed coperus located within the existing ROW         Avoid outpact is displacements       O       Potential for localized noise impacts, but overall concept is benign         Access to businesses from I>70       D       Local/through lane configuration may limit some movement between I>70 and Columbia (signing/engineering will limit this)         Access to businesses from I>70       D       Local/through lane configuration may limit some rowerents         Residential displacements       -       Residential displacements/sparall takes are likely due to wider footprint for improvemants         Residential displacements       -       Residential dadisplacements/sparali takes are likely due to wider footprint dor			
Total expected Phase I Environmental Site Assessments         Q         Relatively minor encroachments           Avoid prime farmiand parceis         Q         Impacts can be characterized as increases to existing encroachments (such as culvert lengthening)           Avoid impacts to the "waters of the United States"         Q         Impacts can be characterized as increases to existing encroachments (such as culvert lengthening)           Avoid impacts to threstened and endangered species         -         Likely impact to bristed coprens located within the existing ROW           Avoid inpacts to the "waters of the United States"         Q         Potential for localized noise impacts, but overall concept is benign           Avoid mode ultural resource impacts (e.g. sites on Historic Register)         Q         Strict adherence to engineering standards may result in encroachment on known NRHP resources           LAND USE IMPACTS         Business displacements         -         Business displacements           Access to businesses from I-70         Q         Local/through lane configuration may limit some movement between I-70 and Columbia (signing/engineering will limit this)           Residential displacements         -         Residential displacements         -           Residential displacements         -         Residential displacements         -           Residential displacements         -         Residential displacements         -           Residential displacements<	ENVIRONMENTAL IMPACTS		
Avoid prime farmland parcels       O       No apparent impediment to avoiding encroachments         Avoid impacts to the "waters of the United States"       O       Impacts can be characterized as increases to existing encroachments (such as culvert lengthening)         Avoid onice impacts       O       Potential for localized noise impacts, but overall concept is benign         Avoid cultural resource impacts (e.g. sites on Historic Register)       O       Static adherence to engineering standards may result in encroachment on known NRHP resources         LAND USE IMPACTS       D       Estimates displacements       -         Access to businesses from Iocal roadways       +       Two-way frontage road system will be maintained, C-D road will provide additional flexibility         Residential displacements       -       Residential displacements       -         Residential displacements       -       Residential displacements       -         Residential displacements       -       Residential displacements       -         Secondary impacts       O       Separation of conflicting traffic streams should have positive ramifications         SOCIO-ECONMIC/COMMUNTY IMPACTS       Impacts       -         Expected travel pattern disruptions - overall       O       Yow way frontage road system will be maintained, C-D road will provide additional flexibility         SociO-ECONMIC/COMMUNTY IMPACTS       -       -	Avoid Section 4(f) sites like Cosmo Park, other parks, historic sites	-	Redesign of the Stadium interchange may not be feasible/prudent without minor encroachments to Cosmo Park
Avoid impacts to the "waters of the United States" <ul> <li>Impacts can be characterized as increases to existing encroachments (such as culvert lengthening)</li> </ul> Avoid impacts to threatened and endangered species <ul> <li>Likely impact to bristled cyperus located within the existing ROW</li> </ul> Avoid oniose impacts <ul> <li>Detertial for localized noise impacts, but overall concept is beingin</li> <li>Avoid cultural resource impacts (e.g. sites on Historic Register)</li> <li>Strict adherence to engineering standards may result in encroachment on known NRHP resources</li> <li>EAND USE IMPACTS</li></ul>	Total expected Phase I Environmental Site Assessments	0	Relatively minor encroachments
Avoid impacts to threatened and endangered species       -       Likely impact to bristled cyperus located within the existing ROW         Avoid outbur al resource impacts (e.g. sites on Historic Register)       O       Potential for localized noise impacts, but overall concept is benign         Avoid cultural resource impacts (e.g. sites on Historic Register)       O       Stitt adherence to engineering standards may result in encreachment on known NRHP resources         LAND USE IMPACTS       E         Business displacements       -       Business displacements/partial takes are likely due to wider footprint for improvements         Access to businesses from I-70       O       Local/through late configuration may limit some movement tetween I-70 and Columbia (signing/engineering will limit this)         Access to businesses from local roadways       +       Two-way frontage road system will be maintained, C-D road will provide additional flexibility         Residential displacements       -       Residential displacements/partial takes are likely due to wider footprint for improvements         Residential displacements       -       Residential displacements/partial takes are likely due to wider tooptint for improvements         Residential access impacts       +       Two-way frontage road system will be maintained, C-D road will provide additional flexibility         SociOi-ECONMMC/COMMUNITY IMPACTS       E       E         Expected travel pattern disruptions - overall       O       Two-way fro	Avoid prime farmland parcels	0	No apparent impediment to avoiding encroachments
Avoid noise impacts       0       Potential for localized noise impacts, but overall concept is benign.         Avoid cultural resource impacts (e.g. sites on Historic Register)       0       Strict adherence to engineering standards may result in encroachment on known NRHP resources         LAND USE IMPACTS       -       -       -         Business displacements       -       -       -         Access to businesses from 1-70       0       Local/through lane configuration may limit some movement between 1-70 and Columbia (signing/engineering will limit this)         Access to businesses from local roadways       +       Two-way frontage road system will be maintained, C-D road will provide additional flexibility         Residential access inpacts       -       Residential displacements/partial takes are likely due to wider tootprint for improvements         Residential access inpacts       +       Two-way frontage road system will be maintained, C-D road will provide additional flexibility         Secondary impacts       0       Separation of conflicting traffic streams should have positive ramifications         SOCIO-ECONOMIC/COMMUNITY IMPACTS       -       -         Expected travel pattern disruptions - overall       0       Two-way frontage road system will maintain expected access pathways/CD operations may be confusing         Expected travel pattern disruptions - overall       0       Two-way fontage road system will maintain expected access pathways/CD operations ma	Avoid impacts to the "waters of the United States"	0	Impacts can be characterized as increases to existing encroachments (such as culvert lengthening)
Avoid cultural resource impacts (e.g. sites on Historic Register)       O       Strict adherence to engineering standards may result in encroachment on known NRHP resources         LAND USE IMPACTS       Image: Comparison of the compa	Avoid impacts to threatened and endangered species	-	Likely impact to bristled cyperus located within the existing ROW
LAND USE IMPACTS         Business displacements         Access to businesses from I-70         Access to businesses from Iocal roadways         +         Two-way fontage road system will be maintained, C-D road will provide additional flexibility         Residential displacements         Residential displacements         Residential displacements         Residential displacements         Residential access impacts         +       Two-way frontage road system will be maintained, C-D road will provide additional flexibility         Secondary impacts       O         SOCIO-ECONOMIC/COMMUNITY IMPACTS         Expected travel pattern disruptions - overall       O         Two-way frontage road system will maintain expected access pathways/CD operations may be confusing         Expected travel pattern disruptions - overall       O         Visual environment encroachments are likely, however, overall concept is benign         Potential for Environmental Justice issues       +         Positive EJ aspects include new overpasses, incorporation of pedestrian/bike needs and continuous frontage roads         Potential for community service disruptions (EMS, fire, police)       +         Impacts expected, however, overall concept is benign         Potential for community service disruptions (EMS, fire, police)       +         Impacts expected, howev	Avoid noise impacts	0	Potential for localized noise impacts, but overall concept is benign
Business displacements       -       Business displacements/partial takes are likely due to wider footprint for improvements         Access to businesses from local roadways       +       Two-way frontage road system will be maintained, C-D road will provide additional flexibility         Residential displacements       -       Residential displacements/partial takes are likely due to wider footprint for improvements         Residential access impacts       +       Two-way frontage road system will be maintained, C-D road will provide additional flexibility         Secondary impacts       0       Separation of conflicting traffic streams should have positive ramifications         SOCIO-ECONOMIC/COMMUNITY IMPACTS       -         Expected travel pattern disruptions - overall       0       Two-way frontage road system will maintain expected access pathways/CD operations may be confusing         Visual impacts       0       Visual environment encroachments are likely, however, overall concept is benign         Potential for Environmental Justice issues       +       Positive EJ aspects include new overpasses, incorporation of pedestrian/bike needs and continuous frontage roads         Estimated construction cost       0       Comparable to other emerging alternatives that utilize a simple continuous parallel roadway system         Total estimated Right-of-Way (ROW)       -       Encroachments/mantse expected         Constructibility       +       Offers most flexibility in reconstruction of mainline 1	Avoid cultural resource impacts (e.g. sites on Historic Register)	0	Strict adherence to engineering standards may result in encroachment on known NRHP resources
Business displacements       -       Business displacements/partial takes are likely due to wider footprint for improvements         Access to businesses from local roadways       +       Two-way frontage road system will be maintained, C-D road will provide additional flexibility         Residential displacements       -       Residential displacements/partial takes are likely due to wider footprint for improvements         Residential access impacts       +       Two-way frontage road system will be maintained, C-D road will provide additional flexibility         Secondary impacts       0       Separation of conflicting traffic streams should have positive ramifications         SOCIO-ECONOMIC/COMMUNITY IMPACTS       -         Expected travel pattern disruptions - overall       0       Two-way frontage road system will maintain expected access pathways/CD operations may be confusing         Visual impacts       0       Visual environment encroachments are likely, however, overall concept is benign         Potential for Environmental Justice issues       +       Positive EJ aspects include new overpasses, incorporation of pedestrian/bike needs and continuous frontage roads         Estimated construction cost       0       Comparable to other emerging alternatives that utilize a simple continuous parallel roadway system         Total estimated Right-of-Way (ROW)       -       Encroachments/mantse expected         Constructibility       +       Offers most flexibility in reconstruction of mainline 1			
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Total estimated Right-of-Way (ROW)     -     Encroachments/impacts expected       Constructibility     +     Offers most flexibility in reconstruction of mainline I-70       Maintenance of traffic     +     Offers most flexibility in reconstruction of mainline I-70	Estimated construction cost	0	Comparable to other emerging alternatives that utilize a simple continuous parallel roadway system
Maintenance of traffic         +         Offers most flexibility in reconstruction of mainline I-70	Total estimated Right-of-Way (ROW)	_	Encroachments/impacts expected
Maintenance of traffic + Offers most flexibility in reconstruction of mainline I-70	Constructibility	+	Offers most flexibility in reconstruction of mainline I-70
	Maintenance of traffic		
	<u> </u>		

Legend	
Positive Impact - Important Decision-Making Factor	+
Neutral/Unclear/Contradictory Impact	0
Negative Impact - Important Decision-Making Factor	-

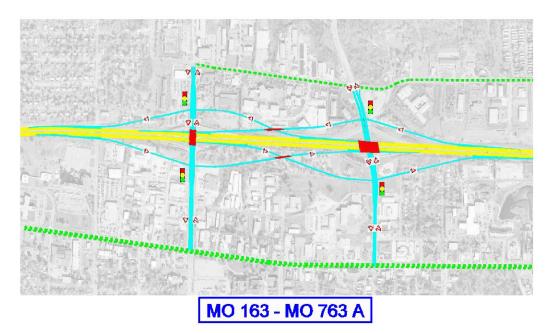
#### Concept 5 - Stacked Highway

#### Improve I-70: Columbia Area (SIU #4)

EVALUATION FACTORS	RATING	DECISION-MAKING FACTORS
PURPOSE AND NEED		
1. Accommodate existing an future traffic volumes on I-70		
-Increase capacity to 6-lanes in rural/8-lanes in urban areas	0	"Stacking" does not reduce the need for additional lane capacity
-Meet highway Level of Service guidelines (volume/capacity)	+	No apparent impediment to meeting threshold Level of Service
-Flexibility for future expansion in the corridor	-	The bridge viaduct columns will inhibit expansion of the mainline I-70 lanes in the future
2. Improve existing I-70 design deficiencies		
-Uncorrectable design elements associated with Concept	0	Design impacts expected to vary based on configuration of service roads & other improvements
3. Accommodate all users of I-70		
-Make provisions for all major I-70 traffic streams	+	Through traffic can be completely segregated from local traffic by "stacking"
-Implement interchange designs with acceptable Level of Service	0	Engineering requirements of "Stacked" design expected to reduce flexibility of interchange design
-Maintain Columbia-area access points	0	Engineering requirements of "Stacked" may lead to reductions in the number of access points
4. Improve user safety		
-Comply with MoDOT Access Management guidelines	-	Constraints associated with "Stacked" expected to negatively impact compliance
-Effectively manage truck traffic	0	Through traffic completely segregated but not all trucks are on through trips
-Reduce conflicting traffic movements at on/off ramps	0	"Stacked" highways may be counter to driver expectations, thus be a crash precursor itself
ENVIRONMENTAL IMPACTS		
Avoid Section 4(f) sites like Cosmo Park, other parks, historic sites	-	Engineering requirements of "Stacked" design expected to reduce flexibility of interchange design
Total expected Phase I Environmental Site Assessments	0	Footprint under "Stacked" isonly lower if no service roads or other improvements are included
Avoid prime farmland parcels	0	No apparent impediment to avoiding encroachment
Avoid impacts to the "waters of the United States"	0	Footprint under "Stacked" isonly lower if no service roads or other improvements are included
Avoid impacts to threatened and endangered species	-	Likely impact to bristled cyperus located within the existing ROW
Avoid noise impacts	-	Elevating the roadway will increase the noise profile of the project
Avoid cultural resource impacts (e.g. sites on Historic Register)	0	Strict adherence to engineering standards may result in encroachment on known NRHP resources
LAND USE IMPACTS		
Business displacements	0	Footprint under "Stacked" isonly lower if no service roads or other improvements are included
Access to businesses from I-70	-	Travelers on through portion of "Stacked Section" will be unable to access local businesses
Access to businesses from local roadways	-	Design constraints expected to further limit operation of existing frontage road system
Residential displacements	0	Footprint under "Stacked" isonly lower if no service roads or other improvements are included
Residential access impacts	-	Engineering requirements of "Stacked" will reduce flexibility in design of local connections
Secondary impacts	0	Potential impacts expected to vary based on configuration of service roads & other improvements
SOCIO-ECONOMIC/COMMUNITY IMPACTS		
Expected travel pattern disruptions - overall	-	Reduced design flexibility expected to reduce ability to accommodate some traffic movements
Expected travel pattern disruptions - during construction	-	Reduced design flexibility expected to reduce ability to accommodate some traffic movements
Visual impacts	-	Elevating the roadway will increase the visual profile of the project
Potential for Environmental Justice issues	0	Impacts expected to vary based on configuration of service roads and other improvements
Potential for community service disruptions (EMS, fire, police)	-	Impacts expected to vary based on configuration of service roads and other improvements
ENGINEERING		
Estimated construction cost	-	Highest construction and maintenance costs
Total estimated Right-of-Way (ROW)	0	ROW acquisition lower under "Stacking" <u>only</u> if no service roads or other improvements included
Constructibility	-	Requires construction of new highway over existing, operating roadways
Maintenance of traffic	-	After completion, no emergency access to "Stacked Sections"
Other engineering-related constraints	-	Because of "Stacking", general maintenance is more difficult/expensive
	-	

Legend	
Positive Impact - Important Decision-Making Factor	+
Neutral/Unclear/Contradictory Impact	0
Negative Impact - Important Decision-Making Factor	-

Appendix II-D Alternatives Investigated and Rejected



This alternative utilized braided ramps between MO 163 and MO 763. This alternative was eliminated because it created substantial impacts north and south of I-70, and it did not function well with the upstream and downstream interchanges at Business Loop 70 West and Business Loop 70 East.



## **US HWY 63 A**

This alternative was the same as the US 63 interchange shown on Exhibit II-8B with the exception that it utilized a Single Point Urban Interchange at Business 63. This alternative was eliminated because the operational benefits of the SPUI were minimal compared with the additional structure costs and increased construction issues.

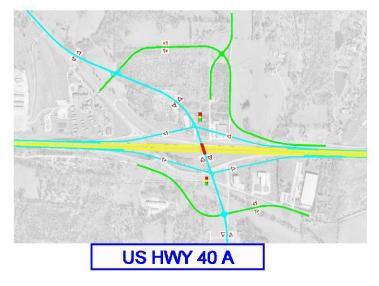




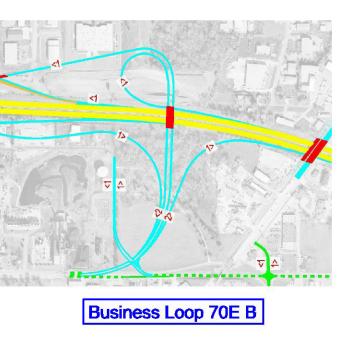
Business Loop 70E A

This alternative consisted of a loop in the northwest quadrant of the interchange. This alternative was eliminated because it was not necessary for acceptable operations and would have created substantial impacts in the commercial area north of I-70 and to the Bowling property south of I-70.

This alternative consisted of a loop in the northwest quadrant of the interchange. This alternative was eliminated because it was not necessary for acceptable operations and would have created substantial impacts in the commercial area north of I-70 and to the Bowling property south of I-70.



This alternative consisted of a standard diamond interchange with reconfigured frontage roads. This alternative was eliminated because of the impacts created by the north frontage road configuration.



Other Alternatives Investigated and Rejected



