

CHAPTER II: ALTERNATIVES

This chapter describes the process used to develop and evaluate the range of alternatives developed during the EC-EIS to correct the existing and future problems identified in **Chapter I**. The development and evaluation of alternatives were based on engineering evaluations, agency coordination, consideration of social, economic and environmental impacts and public input. The alternatives retained for detailed analysis are described in this chapter. The justifications for eliminating alternatives from further consideration are also discussed. This chapter concludes by describing the Preferred Alternative and the justification for its identification.

A. Overview of the Alternatives Development Process

The process to identify the Preferred Alternative was based on a screening process that began by identifying a wide range of initial alternatives that could potentially address the transportation needs established by the project. These initial alternatives were called **Conceptual Alternatives**. The conceptual alternatives were established using engineering judgment, existing planning goals, public involvement, and potential environmental impacts. The primary screening tool used to evaluate the conceptual alternatives was an analysis of how well they could satisfy the project's purpose and need. Those that were determined to minimally satisfy the project's purpose and need were advanced for further consideration.

Starting with the conceptual alternatives, engineering evaluations (tempered by agency coordination; social, economic, and environmental constraints; and public input) were conducted to develop configurations that were suitable for implementation. These alternatives were called the **Reasonable Alternatives**. The reasonable alternatives were developed to conform to appropriate design standards allowing for the establishment of preliminary project footprints. This allowed for detailed impact assessments, cost estimates and traffic evaluations.

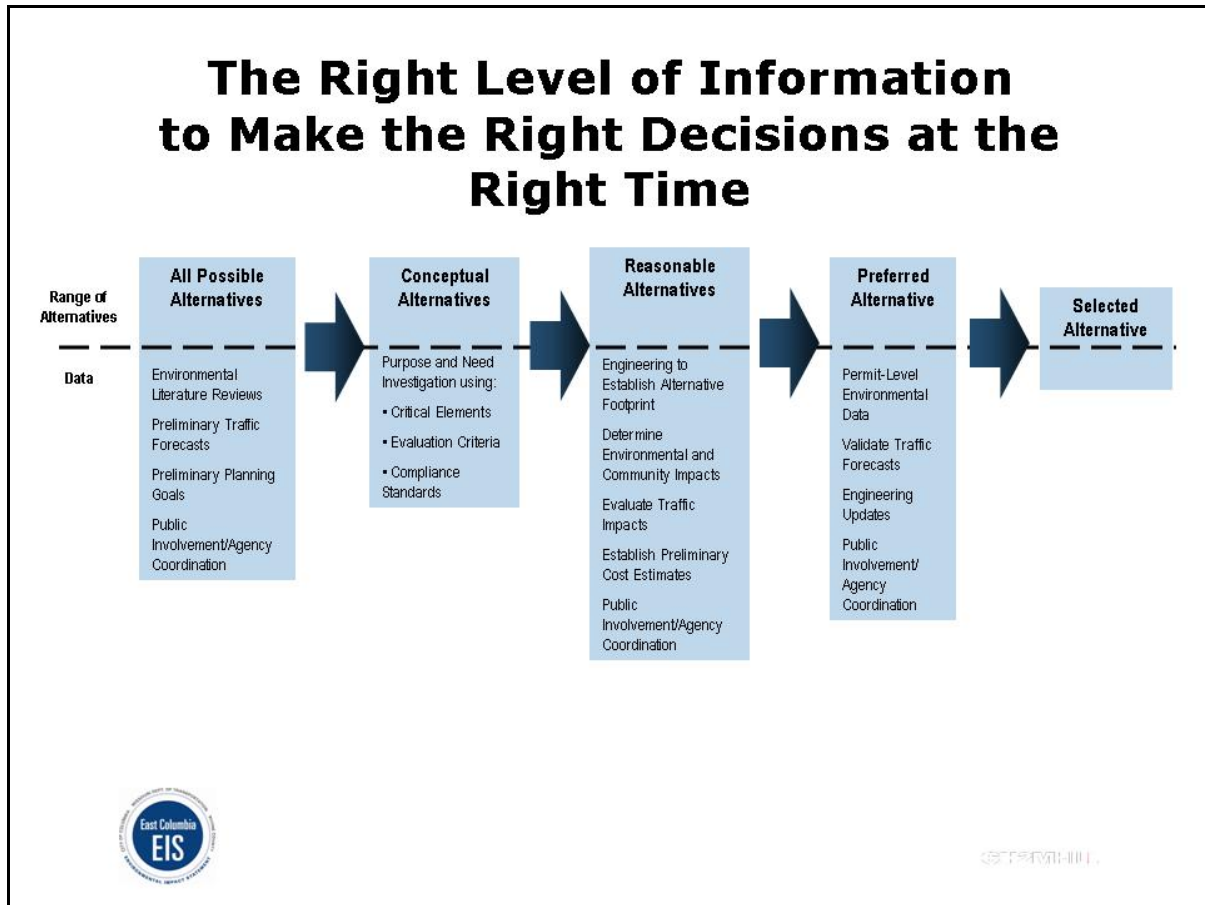
The alternative that best accomplishes the purpose and need for the proposed action, while avoiding, minimizing or mitigating the impacts to the social and natural environment was identified as the **Preferred Alternative**. The Preferred Alternative is discussed throughout this DEIS document and represents its endpoint.

Pursuant to the circulation, coordination and evaluation of this DEIS, the Preferred Alternative may be accepted, refined or rejected or replaced. This alternative will be identified as the **Selected Alternative**. Upon completion of the DEIS and public comment period, the selected alternative will be identified. Final evaluations (such as for archaeology field studies and wetland delineations) will be completed and the results presented in a FEIS. The FEIS will be subject to circulation, coordination and evaluation. The NEPA process will conclude with a ROD that concisely outlines the selected alternative, its impacts and the mitigation, monitoring and enforcement provisions associated with the selected alternative.



Figure II-1 depicts the overall process of alternative development and evaluation.

FIGURE II-1
 Process of Alternative Development and Evaluation



B. Development and Evaluation of Conceptual Alternatives

1. Background: History of East Columbia Projects

Improvements to the transportation network in eastern Columbia have been under consideration for many years. For example, CATSO 2025 Transportation Plan states that the extension of Stadium Boulevard (Route 740), "...has been in the CATSO Major Thoroughfare Plan for several decades." The most salient elements of the background leading to the EC-EIS project will be discussed below.

In addition to the extension of Stadium Boulevard, numerous other transportation projects affecting eastern Columbia are included in the CATSO 2025 Transportation Plan. Among these projects are the widening of East Broadway (Route WW) and the extension of Ballenger Lane. The CATSO major roadway plan (MRP) identifies Route WW as a major

arterial west of the Route 740 extension and a minor arterial east of the Route 740 extension. It is currently configured as a two-lane rural roadway. In addition to relieving congestion, the 2025 Transportation Plan identifies concerns regarding pedestrian access and greenway impacts. The extension of Ballenger Lane (over I-70 to Clark Lane/Route PP) was added to the major roadway plan in 1997. The intent was generally defined as to relieve congestion.

In addition to the major projects identified in the CATSO MRP, several minor projects are also under development. These are the products of public and private partnerships. All of the analysis for the EC-EIS project has assumed that these projects, including the "Rolling Hills Road Extension" and the "Gans Road Project," will be completed by others as currently planned. Other smaller public/private partnerships include the "Lemone Industrial Boulevard Extension" and the "Cinnamon Hill Realignment." **Figure I-1** shows the location of these projects. **Exhibit I-1** depicts the general study area established for the EC-EIS project.

The most heavily traveled roadway feature in Boone County is the I-70/US-63 interchange. In the late 1990s, MoDOT completed a major investment study (MIS) for the I-70/US-63 interchange. Very broadly speaking, the I-70/ US-63 interchange MIS supports the need for improvements within eastern Columbia.

The majority of I-70 across Missouri has been subject to evaluation. The *Improve I-70* project developed a Tier 1 EIS for the entirety of I-70 with the exception of the St. Louis and Kansas City urban areas. The Tier 1 EIS identified purpose and need elements that applied generally to I-70 and established sections of independent utility (SIUs). Boone County was contained within SIU 4. The selected alternative for SIU 4 proposes the improvement of I-70 along its existing alignment. Improvements include increasing the number of through lanes on I-70 from four to six, west of the US-40 interchange and east of the Route Z interchange, and from four to eight from US-40 interchange to the Route Z interchange. In addition, the Preferred Alternative would include the reconstruction/reconfiguration of the existing interchanges. The ROD for the selected alternative was dated April 27, 2006. Information about the *Improve I-70* project is available at <http://www.improvei70.org>.

In 2008, MoDOT initiated the Supplemental I-70 EIS (SEIS). The intent is to investigate newly developed strategies for accommodating truck traffic. These strategies were not considered during the original EIS and potentially offer cost-effective benefits. Details about the SEIS are also available at <http://www.improvei70.org>.

Regarding the improvement of the transportation system in east Columbia, the FHWA published a notice of intent (NOI) to prepare an EIS, as required by Council of Environmental Quality (CEQ) regulations 40 CFR 1501.7. The NOI was published in the Federal Register on February 27, 2006. The goals listed in the NOI include 1) improve safety, 2) decrease congestion and 3) support community regional development.

Acknowledging the comprehensive/regional nature of the EC-EIS project, the City of Columbia, Boone County and MoDOT entered into a partnering agreement, to cooperatively undertake the EC-EIS. This agreement formalized the decision-making process that would be followed during the NEPA elements of the project. At its heart was a commitment to consensus decision-making. A copy of the partnering agreement is included in **Appendix C**.

2. Process Used to Develop Conceptual Alternatives

The process used to develop the conceptual alternatives considered:

1. Existing Traffic Conditions
2. Technical Feasibility Balanced with Impacts to Known Resources
3. Public Input

A comprehensive traffic analysis was conducted to assess future traffic conditions in the study area (design year 2030). The traffic analysis considered projects programmed and committed for construction. These projects composed the background conditions for the no-build condition. Current deficiencies, locations of congestion and crash rates within the study area are expected to worsen. Traffic volumes are projected to exceed their capacity (especially on Route WW in the vicinity of the El Chaparral subdivision).

Intersections are expected to operate poorly (especially at the Route WW intersections with Keene Street, Daniel Boone Road and Rolling Hills Road). Crashes are also expected to increase with an increase in traffic volumes and more congested roadways. The conceptual alternatives were developed to address the conditions identified in the traffic analysis.

Major Elements of the EC-EIS Purpose & Need

- Address traffic congestion and safety concerns
- Connect the major highway linkages between Eastern Boone County and Columbia
- Provide access to East Columbia



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The development of conceptual alternatives also considered technical feasibility and impacts to the human and natural environment. Technical feasibility utilized the project's design criteria within the context of general alignments (200-foot corridors). Preliminary project costs were also considered. Additionally, to be technically feasible the concept needed to minimally improve safety, decrease congestion and support community regional development. Each concept was also evaluated at a broad qualitative level for environmental, social and economic impacts.

A public information meeting was conducted on September 19, 2006 following the completion of the traffic analysis. Information relating to existing and future land uses, housing characteristics, trip patterns, traffic volumes, crash history and traffic-service levels was presented in an open-house workshop setting. In addition to opportunities to discuss the project with members of the study team, attendees were provided maps of the study area. The extension of Stadium Drive to I-70 (to either the Lake of the Woods or the Route Z interchange) was discussed. There were several suggestions to improve/extend Route WW. Others recommended that New Haven Road be improved as a circumferential facility from US-63 on the south and west up to Route Z on the north and east. The inclusion of bicycle/trail facilities and the preservation of the natural environment were also common themes.

3. The Conceptual and No-Build Alternatives

The process above identified nine conceptual alternatives. These are described below and shown graphically in **Exhibit II-1**. Originally, the nine conceptual alternatives were referred to as Alternatives A through G. To provide a more intuitive naming structure for the conceptual alternatives, the alternatives were re-named prior to the October 24, 2007 public information meeting to better reflect the corridor they utilize. The original names of the nine conceptual corridors are noted in parentheses after the revised alternative names listed below:

Alternative WW-1 (formerly Alternative A):

Widen and realign Route WW from US-63 to the east limits of the July 2005 annexation to provide turn lanes and signalized control at critical intersections.

Alternative WW-2 (formerly Alternative B):

Improve Route WW and extend Stadium Boulevard on new alignment from US-63 to a new intersection with realigned and improved Route WW.

Alternative SC-1 (formerly Alternative C):

Improve Route WW and extend Stadium Boulevard to I-70 interchange (Lake of the Woods interchange).

Alternative SC-2 (formerly Alternative F1):

Improve Route WW; extend Stadium Boulevard to I-70 (Lake of the Woods interchange) and extend Ballenger Lane.

Alternative RR-1 (formerly Alternative D):

Improve Route WW and extend Stadium Boulevard generally along the location of Richland Road to the I-70 interchange with Route Z.

Alternative RR-2 (formerly Alternative F2):

Improve Route WW; extend Stadium Boulevard generally along the location of Richland Road to the I-70 interchange with Route Z and extend Ballenger Lane.

Alternative RR-3 (Alternative G):

Improve Route WW; extend Stadium Boulevard to I-70 along Richland Road and then to a new interchange with I-70 between St. Charles Road (Lake of the Woods) and Route Z.

Alternative NH-1 (formerly Alternative E1):

Improve Route WW; build an improved facility generally along the location of New Haven Road and Rangeline Road to the I-70 interchange with Route Z.

Alternative NH-2 (formerly Alternative E2):

Improve Route WW; build an improved facility generally along the location of New Haven Road and Rangeline Road and extend Stadium Boulevard to Route WW.

The no-build alternative for EC-EIS would consist of maintaining the current roadways in essentially their current condition. Routine maintenance would continue to be conducted, and occasional minor safety upgrades would be implemented. No capacity additions or major improvements would be made. Overall, the no-build alternative does nothing to meet the project purpose and need. It is described in this document in order to provide a baseline condition against which the changes associated with the other alternatives may be evaluated.

4. Evaluation of Conceptual Alternatives

The evaluation of the conceptual alternatives focused primarily on how well they could satisfy the project's purpose and need. Only those conceptual alternatives that were determined to minimally satisfy the project's purpose and need were advanced for further consideration. The discussion below will focus on the methodology used to evaluate the conceptual alternatives.

To minimally address the project's purpose and need, a conceptual alternative should satisfy a majority of the evaluation criteria for each of the three elements. **Exhibit II-2** is the tabular summary of the purpose and need evaluation.

a. Address Traffic Congestion and Safety Concerns within the Existing Roadway Network

The evaluation criteria used to determine how well the conceptual alternatives addressed traffic congestion and safety included the following:

1. Is congestion on the existing roadway network improved as compared to existing conditions?

Standard: The Level of Service (LOS) for study area roadways was determined for year 2005 and year 2030. To minimally achieve the project's purpose and need, an alternative should improve the LOS over the conditions predicted for the no-build alternative.

Findings: Under 2030 no-build conditions, the LOS is expected to be LOS D or worse by 2030 on all but one roadway segment.

Conclusions: All of the Conceptual Alternatives could improve the LOS of the existing roadway network.

2. Are identified crash hotspots addressed?

Standard: Based on an examination of the 2003 – 2007 crash record, those areas which displayed a disproportionate crash rate or a high crash severity were identified as crash hotspots. To minimally achieve the project's purpose and need, an alternative should address each of the hotspots within its footprint.

Findings: All provide an equal opportunity to improve the factors associated the crash hotspots along Route WW.

Alternatives RR-1, RR-2 and RR-3 use a northeastern loop and do not make explicit provisions for the improvement of the St. Charles/Richland intersection. This may exacerbate conditions at this location.

Alternatives WW-1 and WW-2 are so limited in scope that they only provide improvements along Route WW.

Conclusions: Alternatives RR-1, RR-2 and RR-3 fail to explicitly allow for improvements to the St. Charles/Richland intersection while also using a northwestern loop. Alternatives WW-1 and WW-2 are so limited in scope that they provide improvements only along Route WW.

3. Are the design year LOS at the secondary roadway intersections adequate?

Standard: Under existing conditions, by the year 2030, it is expected that 15 of the 36 intersections within the study area will operate at LOS F during both the AM and PM peak hours. To minimally achieve the project's purpose and need, a conceptual alternative should achieve a 2030 LOS no lower than LOS E at intersections that fall within its footprint and in addition should lower the overall study area's number of double LOS F intersections (LOS F in both the AM and PM).

Findings: Under the 2005 no-build conditions, very few evaluated intersections were predicted to operate at LOS F.

Under the 2030 no-build conditions, 10 intersections are predicted to operate at LOS F in both the AM and the PM peak hours.

After reviewing the draft intersection models, it was concluded that all intersections could be improved to operate at acceptable LOSs – regardless of alternative.

Conclusions: For the EC-EIS project, intersection operation is more a function of the individual intersection's configuration than the configuration of the overall roadway network. Consequently, it has been concluded that all alternatives can satisfy this criteria.

4. Are emergency service response times hindered by traffic bottlenecks?

Standard: As intersection operation becomes less efficient, emergency service runs will become increasingly affected. To minimally achieve the project's purpose and need, an alternative should have adequate pathways to the existing EMS stations.

Findings: All alternatives will improve Route WW. Hospital and police resources use this route regularly.

Alternative RR-3 provides a new I-70 interchange in the immediate vicinity of the Lake of the Woods Fire Station.

The extension of Stadium Boulevard materially extends access into the study area. Only Alternatives WW-1 and NH-1 fail to provide any extension of Stadium Boulevard.

An extension of Ballenger Lane across I-70 (Alternatives SC-2 and RR-2) provides an additional crossing point to/from the north.

Conclusions: Because alternatives WW-1 and NH-1 do not provide any Stadium Boulevard extensions, these alternatives do not minimally satisfy this element.

b. Complete the Major Highway Linkages between Eastern Boone County and Columbia

The evaluation criteria used to determine how well conceptual alternatives complete the major highway linkages between eastern Boone County and Columbia include:

1. Is the proposed roadway network consistent with the MRP?

Standard: Within the study area, the MRP identifies three major north/south roadways and four major east/west roadways. To minimally achieve the project's purpose and need, an alternative must maintain the number of each of the roadway types.

Findings: Alternatives WW-1, WW-2, NH-1 and NH-2 fail to make provisions for an extension of Route 740 to I-70.

Only alternative RR-3 provides an opportunity for connecting Route 740 to a new location along I-70.

All of the alternatives will provide a minimum of three north/south roadways.

The only differences regarding north/south roadways are alternatives SC-2/RR-2 (with a Ballenger Extension) and alternative NH-1/NH-2 (with a possible improvement to Rangeline Road).

Conclusions: Alternatives WW-1, WW-2, NH-1 and NH-2 fail to make provisions for an extension of Route 740 to I-70.

2. Does the proposed roadway system provide adequate connections to Routes 70, 63 and 740?

Standard: Within the study area, there are three interchanges along US-63 and two interchanges along I-70. To minimally achieve the project's purpose and need, an alternative should provide connections to a majority of the interchanges (3 of 5).

Findings: Alternative WW-1 provides an improved connection only at the US-63/Route WW interchange.

Alternative WW-2 provides an improved connection only at the US-63/Route WW and US-63/Route 740 interchanges.

The remaining alternatives provide improved connections at 3 or 4 of the interchanges in the study area.

Alternative RR-3 maintains the total number of interchanges; moving the I-70/St. Charles interchange approximately 1.2 miles to the east.

Conclusions: Alternatives WW-1 and WW-2 are so limited in scope that they only provide improved connections at Route WW.

3. Is the alternative consistent with the roadway type identified in CATSO's major roadway plan (MRP)?

Standard: The CATSO MRP identifies the roadway types for the roadways included in the MRP. To minimally achieve the project's purpose and need, an alternative should be consistent with the roadway type identified in the MRP.

Findings: The MRP depicts the connection between US-63 and I-70 as an expressway.

An expressway is described as a controlled access facility with a right-of-way of 250 feet.

Conclusions: Without substantial mitigation, the conversion of existing roadways into an expressway between US-63 and I-70 is incompatible with the design criteria for the repurposed roads.

c. Provide Adequate Transportation Infrastructure for Access to Eastern Columbia

The evaluation criteria used to determine how well the conceptual alternatives provide adequate infrastructure include:

1. Does the alternative create a discernable community gateway?

Standard: A successful community gateway has the following attributes: it is identifiable and visible, it projects the community's image, it enhances uses and activities, and it provides important access and linkages. To minimally achieve the project's purpose and need, an alternative should reasonably address each of the attributes of a successful gateway.

Findings: Relative to projecting the community's image and providing for essential linkages, all of the alternatives are minimally adequate in projecting a unique community image.

Relative to being identifiable, alternatives NH-1 and NH-2 divide access between Route WW and New Haven Rd.

Relative to enhancement, alternative WW-1 fails to provide any additional access opportunities within the study area.

Conclusions: A key factor to creating a successful gateway is identifiability. Alternatives NH-1 and NH-2 fail to meet this standard because they

do not create a single identifiable access point. Another factor for a successful gateway is improving access patterns. Alternative WW-1 fails to enhance the existing access pattern.

2. Can the alternative allow for the accommodation of adequate pedestrian/bicycle facilities?

Standard: While the creation of pedestrian/bicycle facilities is not an explicit purpose for the project, an effective Eastern Gateway will allow accommodations for pedestrians and bicyclist. To minimally achieve the project's purpose and need, an alternative should 1) have no obvious hindrance to constructing bridges that would accommodate all existing and proposed trails and 2) have no clear right-of-way constraints that would prevent the roadway from being designed as a "Green Route."

Findings: Alternatives SC-2, RR-2 and RR-3 consist of multiple river crossings, with several that appear to pose engineering difficulties due to substantially skewed intersections.

Using the forecasted 2030 traffic projections, alternatives SC-1, RR-1, RR-2 and RR-3 alter the circulation pattern (increase volumes) to the extent that substantial improvements could be required to maintain them as "Green Routes."

Conclusions: Alternatives RR-2 and RR-3 fail to meet either standard. Alternatives SC-2, RR-2 and RR-3 propose multiple river crossings, some that would result in large portions of the river meandering through the work area, which would hinder the eventual establishment of a streamside trail. Using forecasted 2030 traffic projections, alternatives SC-1, RR-1, RR-2 and RR-3 increase volumes on local roads to the extent that substantial improvements could be required to maintain them as a route for average riders.

3. Will the alternative accomplish the area's growth/development goals?

Standard: The determination of how well an alternative accomplishes the area's development goals will be the result of stakeholder involvement. At each step of the project development process, each alternative will be classified by Columbia, CATSO and Boone County as one of the following: 1) the alternative achieves all community goals, 2) the alternative will achieve the essential community goals, or 3) the alternative is inconsistent with the community's essential goals. To minimally achieve the project's purpose and need, an alternative should not be classified as inconsistent with essential community goals by Columbia, CATSO or Boone County.

Conclusions: Based on coordination with the City of Columbia, Boone County and CATSO, alternatives WW-1, WW-2, NH-1 and RR-3 are not in accordance with the community's essential goals.

5. Conceptual Alternatives Recommended for Further Consideration

To minimally address the project's purpose and need, a conceptual alternative should satisfy a majority of the evaluation criteria for each of the three purpose and need elements. Key findings of the conceptual alternative evaluation include:

- Alternative WW-1 fails to satisfy a majority of any of the three elements.
- Alternatives WW-2, RR-3, NH-1 and NH-2 fail to satisfy at least one of the three elements.
- Only SC-1, SC-2, RR-1 and RR-2 satisfy a majority of each of the three elements.
- Conceptual alternatives SC-1 and SC-2 satisfy 9 of the 10 evaluation criteria.
- Conceptual alternative RR-1 satisfies 8 of the 10 evaluation criteria.
- Conceptual alternatives RR-2 and RR-3 satisfy 7 of the 10 evaluation criteria.
- Conceptual alternatives NH-1 and WW-1 satisfy fewer than 6 of the 10 evaluation criteria.

Only conceptual alternatives SC-1, SC-2, RR-1 and RR-2 satisfy a majority of the evaluation criteria that define each of the three purpose and need critical elements. These four alternatives were advanced for further consideration as the project's reasonable alternatives. All of the other conceptual alternatives failed to satisfy at least one of the three purpose and need critical elements. To satisfy a critical element, a majority of the evaluation criteria need to be achieved.



Conceptual alternatives SC-1, SC-2, RR-1 and RR-2 satisfy a majority of each of the three purpose and need critical elements. These four alternatives were advanced for further consideration as the project's reasonable alternatives.

C. Development of the Reasonable Alternatives

The development of reasonable alternatives started with the corridors associated with the conceptual alternatives. Consistent with the conceptual alternatives and the project's purpose and need, the following elements would be investigated during the reasonable alternatives stage of the project:

- Extension of Stadium Boulevard (Route 740) from US-63 to I-70
- Improvement of Broadway (Route WW) from US-63 to Olivet Road

In addition to the two elements noted above, this study also investigated the extension of Ballenger Lane from Clark Lane (Route PP) to the new Route 740. The Ballenger Lane extension was an element included in all of the conceptual alternatives; and while it was ultimately deemed not to be essential for any of the reasonable alternatives to meet the project's purpose and need, it is being cleared under NEPA as part of the EC-EIS. This was due in large part to following through on the collaborative process employed on the EC-EIS

by MoDOT and their local planning partners, the City of Columbia and Boone County. The local planning partners stated strong support for clearing the Ballenger Lane extension under NEPA citing the positive impact the extension would have on the eastern Columbia roadway network, their presumed benefits to operations at the I-70/US-63 interchange, creating a complete roadway system in eastern Columbia and because the Ballenger Lane extension has been identified as a key element of CATSO's Roadway Plan for many years.

In order to develop comprehensive engineering layouts that were detailed enough to include a direct impact footprint, CATSO's Roadway Type Criteria, MoDOT's Engineering Policy Guide and the principles of Practical Design were used as the engineering design criteria. This was supplemented by environmental data collection and analysis sufficient to develop impact summaries (and more importantly) to guide the development of alternatives in order to minimize impacts. The environmental data collection effort involved reviews of existing literature, local stakeholder and official input, appropriate onsite surveys and GIS analysis.

Using the data, the following reasonable alternatives were developed:

1. Extension of Stadium Boulevard from US-63 to I-70

Five possible alignments for the extension of Stadium Boulevard (Route 740) were developed. All of these are compatible with the other components necessary to create a complete project. Each configures Stadium Boulevard as an expressway (a controlled access highway). For the purposes of alternative development and impact quantification, the expressway is assumed to be a four-lane divided highway. The actual design configuration of the roadway is subject to modification based on future funding constraints and/or practical design considerations.

SC-2A – Route 740 extension uses a new alignment north of the North Fork Grindstone Creek to the St. Charles interchange on I-70.

SC-2B – Route 740 extension uses a new alignment south of the North Fork Grindstone Creek to the St. Charles interchange on I-70.

SC-2C – Route 740 extension uses a new alignment to the north of the North Fork Grindstone Creek and then adjacent to the existing St. Charles Road corridor to the St. Charles interchange on I-70.

RR-2A – Route 740 extension uses the existing Richland Road corridor to the Route Z interchange on I-70.

RR-2B – Route 740 extension uses a new alignment to the Route Z interchange on I-70.

Exhibits II-3A to II-3F are graphic depictions of the reasonable alternatives.

Exhibit II-3G shows a conceptual depiction of the cross-section for Route 740 and the other roadway types associated with this project.

2. Improvement of Broadway (Route WW)

Three possible alignments for the improvement of Route WW were developed. All of the reasonable alternatives are compatible with the extensions of Route 740. Each configures Route WW as a major arterial west of the Route 740 extension and a minor arterial east of

the Route 740 extension. In some places the footprint may be as wide as 300 feet (see **Exhibit II-3G**).

Alignments WWA, WWB and WWC are identical, except in the vicinity of the Boone County Fire Protection District Station 12 (980 El Chaparral Avenue) and the Lighthouse Community Church (4275 Route WW).

WWA – Route WW improved along the existing alignment. It is not possible to avoid some relocations in the vicinity of the fire station.

WWB – Route WW routed north of the fire station and the Lighthouse Community Church. The configuration requires connections between the new and existing routes.

WWC – Route WW is routed between the fire station and the Lighthouse Community Church. The configuration also requires connections between the new and existing routes.

Exhibit II-3F is a graphic depiction of alignments WWA, WWB and WWC.

3. Possibility of a Ballenger Lane Extension

The appropriateness of a Ballenger Lane extension has been investigated throughout the development of the EC-EIS. All of the reasonable alternatives are compatible with a Ballenger Lane extension.

Each of the reasonable alternative exhibits (**Exhibits II-3A to II-3E**) depicts the Ballenger extension appropriate with the corresponding Stadium Boulevard extension. Each version of a Ballenger extension follows the same basic alignment, although the length and roadway connections vary. Other basic alignments were eliminated from consideration due to the limitations associated with the extension's termini and the distribution of the resources that the extension would impact. For planning purposes, the Ballenger extension is depicted as a major arterial, whose footprint may be as wide as 300 feet (see **Exhibit II-3G**). The alignment used minimizes relocations, facilitates desired roadway connectivity, advantageously crosses the Hominy Branch and maximizes the possibility for an at-grade intersection connecting the Ballenger extension to the existing I-70 Drive Southwest.

The reasonable alternatives underwent an evaluation using existing traffic modeling data. This data was used to determine improvements in study area roadway Levels of Service over the No-Build scenario and were incorporated into Synchro to focus on the operations at the I-70 interchanges. The interchange configuration used was based loosely on the recommended interchange configurations in the I-70 EIS. Regardless of reasonable



Ballenger Lane Extension

The Ballenger Lane extension would be processed and financed as a local project.

Ultimately, the financing for the Ballenger Lane extension may include federal funding obtained by the local partners. Should federal funding be involved in the Ballenger Lane extension financing, this document would clear the project under NEPA and would mandate that the project be in accordance with the environmental commitments in this document.

alternative, the configuration of the interchanges may need to differ from those depicted in the I-70 EIS.

One of the findings was that the inclusion of a Ballenger Lane extension would have only a minor benefit on the operation of the I-70 interchanges. This finding was contrary to the prevailing public sentiment that its close proximity to the US-63 interchange and the St. Charles interchange would serve to aid operations at the interchanges by maximizing flexibility.

Because the Ballenger extension would not benefit the extension of Stadium Boulevard from US-63 to I-70, it was determined to not be essential to the EC-EIS. However, following through on the collaborative process employed on the EC-EIS by MoDOT and their local planning partners, the City of Columbia and Boone County, it is being cleared under NEPA as part of the EC-EIS for the local benefits it provides. Local planning partners stated strong support for clearing the Ballenger Lane extension under NEPA citing the positive impact the extension would have on the eastern Columbia roadway network, presumed benefits to operations at the I-70/US-63 interchange, creating a complete roadway system in eastern Columbia and because the Ballenger Lane extension has been identified as a key element of the region's CATSO's Roadway Plan for many years. This local benefit led to the agreement that if a Ballenger extension was included in the project's Preferred Alternative it would be processed and financed solely as a local project. Ultimately, the financing for the Ballenger Lane extension may include federal funding obtained by the local partners. Should federal funding be involved in the Ballenger Lane extension financing, this document would clear the project under NEPA and would mandate that the Ballenger Extension project be in accordance with the environmental commitments in this document. These are listed in the summary section of this document.

4. Other Permutations Considered during the Evaluation of Reasonable Alternatives

As the benefits, costs and impacts of the reasonable alternatives were considered, other permutations were evaluated. These modifications were generally the result of project team (Columbia/MoDOT/Boone County) discussions, agency coordination or stakeholder/public involvement. In some cases, these modifications were incorporated directly into the reasonable alternatives. In other cases, these permutations were considered and found impractical or unsuitable for further consideration. The project's technical files and administrative record will contain the materials generated pursuant to this matter. Some of the primary permutations considered are discussed below.

Since the project team is composed of three very distinct organizations (with different mandates), reaching agreement required close and frequent collaboration and coordination. At one stage of the collaborative effort, there was some disagreement on the best connection between US-63 and I-70. This led to consideration of what was called the "Hybrid." It combined both a connection to the St. Charles interchange and the Route Z interchange. While it provided maximum utility, it was ultimately considered impractical. Not only would costs and environmental impacts be substantial, it required agreements on schedules that merely delayed agreement on near future improvements.

In addition, as the reasonable alternatives were evaluated, discussions with stakeholders and property owners led to consideration of what became known as the “WW modifications.” This focused on improving Route WW in a manner that would make a new extension of Stadium Boulevard unnecessary. These permutations were similar to the conceptual alternative WW-1 and WW-2. They were driven by private landowner interests. Ultimately, they were considered impractical and unsuitable.

D. Evaluation of the Reasonable Alternatives

The reasonable alternatives represent those improvements that satisfy the project's purpose and need, meet the established traffic-related threshold levels, meet engineering requirements and minimize impacts to the human and natural environment.

The reasonable alternatives emerged from the information that was developed during the concept phase of the project and validated by supplemental investigations. **Chapters III and IV** present the details of the various resource specific investigations conducted for the reasonable alternatives. The evaluation process will also be summarized here.

The following components represent the EC-EIS reasonable alternatives. They are interchangeable and create a comprehensive transportation network designed to accomplish the purpose and need of this project.

- WWA – Route WW improved along the existing alignment. It is not possible to avoid some relocations in the vicinity of the fire station.
- WWB – Route WW routed north of the fire station and the Lighthouse Community Church. The configuration requires connections between the new and existing routes.
- WWC – Route WW is routed between the fire station and the Lighthouse Community Church. The configuration also requires connections between the new and existing routes.
- SC-2A – Route 740 extension uses a new alignment north of the North Fork Grindstone Creek to the St. Charles interchange on I-70.
- SC-2B – Route 740 extension uses a new alignment south of the North Fork Grindstone Creek to the St. Charles interchange on I-70.
- SC-2C – Route 740 extension uses a new alignment along north of the North Fork Grindstone Creek and then along the existing St. Charles Road corridor to the St. Charles interchange on I-70.
- RR-2A – Route 740 extension uses the existing Richland Road corridor to the Route Z interchange on I-70.
- RR-2B – Route 740 extension uses a new alignment to the Route Z interchange on I-70.
- Ballenger Extension – Configuration of an appropriate connection between Route 740 extension and Clark Lane.

1. Reasonable Alternative Traffic Evaluation

Using existing CATSO traffic modeling data, traffic projections were developed to determine how much traffic would use the new expressway as well as determining what reduction in volumes would be expected from the study area roadways.

Traffic modeling results show that in 2030, the Route 740 extension under alternatives RR-2A and RR-2B would carry up to 39,000 vehicles per day while under alternatives SC-2A, SC-2B and SC-2C it would carry up to 41,000 vehicles per day. Under all of the reasonable alternatives, the local roadway system (including Keene Street, Richland Road, Olivet Road, and Rangeline Road) would experience a 10 percent to 45 percent decrease in ADT in 2030 versus the No-Build. The highest decrease would occur on Olivet Road under alternatives RR-2A and RR-2B.

This decrease in volume on study area roads will improve the expected Levels of Service on the roadways and will improve the expected safety of the roadways (fewer vehicles and fewer potential conflicts with other vehicles). These issues address the first element of the project purpose and need – improve Level of Service on study area roads versus the No-Build and address crash hot-spots.

In addition, a Synchro analysis of operations of the I-70 interchanges was conducted. The intent was to investigate if there were any critical interchange operational issues associated with any of the reasonable alternatives. The assumptions used included:

- Peak Hour Factor (PHF) = 0.92
- Design Hour Truck Percentage = 15 percent
- Right-turns on red were permitted
- Yellow and All Red = 4.0 seconds
- No pedestrian phases
- All intersections were analyzed as signalized

The interchange configurations used were based loosely on the recommended interchange configurations as contained in the I-70 EIS. This configuration includes two through lanes in each direction, an exclusive left turn lane from the intersecting street to the mainline on-ramp, and a shared right-turn movement from the intersecting street to the main-line on-ramp.

The following general trends emerged from the interchange traffic analysis:

- The RR alternatives seem to better balance traffic volumes expected for the St. Charles and Route Z interchanges. Volumes at the 2 interchanges are roughly equivalent under the RR alternatives.
- Regardless of alternative, the configuration of the interchanges may need to differ from those depicted in the I-70 EIS. The intersection LOS at the St Charles interchange is particularly poor under the SC alternatives. The following configuration achieved acceptable operations:
 - Three through lanes northbound
 - Two through lanes southbound
 - Dual left-turn lanes at westbound on-ramp and eastbound off-ramp
- A higher overall level of usage is expected under the St. Charles alternatives. They may also be attracting vehicles that would have otherwise used the I-70/US-63 interchange.

- The inclusion of a Ballenger Lane extension has a negligible impact on the operation of the interchange intersections but does seem to moderate volume levels on Clark Lane.
- This analysis suggests that under any scenario the ramp intersections at the Route Z interchange will operate at LOS C or better under the basic analysis configuration.
- The RR alternatives appear to have a lesser overall impact to the St. Charles and Route Z interchanges. Under either scenario, it is likely that some work would still be required at St. Charles, but it is likely that the scope of the work will be less extensive.
- On Route WW, the RR alternatives (as compared to the SC alternatives) seem to result in higher volumes in the vicinity of the Route WW/Route 740 intersection and lower volumes in the vicinity of the Route WW/Olivet intersection. This seems to indicate a shifting of trips away from traveling through the southwest quadrant of the study area.

Based on this analysis it was concluded that no major traffic-related issues existed.

2. Reasonable Alternative Construction Cost Evaluation

Cost estimates were developed for each reasonable alternative. The construction and engineering costs are in January 2008 dollars. Right-of-way costs that are presented are based on assessor data provided in the GIS database for property and buildings. **Tables II-1** through **II-3** summarize the total cost for each reasonable alternative.

TABLE II-1
Summary of Costs Associated with Route 740 Extensions

Reasonable Alternative	Construction Cost	Engineering Cost	R/W Cost	Total Cost
SC-2A	\$ 28,500,000	\$ 5,200,000	\$ 6,100,000	\$ 39,800,000
SC-2B	\$ 39,000,000	\$ 7,100,000	\$ 6,100,000	\$ 52,200,000
SC-2C	\$ 32,700,000	\$ 5,900,000	\$ 10,400,000	\$ 49,000,000
RR-2A	\$ 72,300,000	\$ 13,100,000	\$ 11,100,000	\$ 96,500,000
RR-2B	\$ 55,700,000	\$ 10,100,000	\$ 7,000,000	\$ 72,800,000

TABLE II-2
Summary of Costs Associated with Ballenger Lane Extensions

Reasonable Alternative	Construction Cost	Engineering Cost	R/W Cost	Total Cost
Ballenger for SC-2A	\$ 27,100,000	\$ 4,900,000	\$ 2,000,000	\$ 34,000,000
Ballenger for SC-2B	\$ 26,400,000	\$ 4,800,000	\$ 2,100,000	\$ 33,300,000
Ballenger for SC-2C	\$ 21,300,000	\$ 3,900,000	\$ 1,600,000	\$ 26,800,000
Ballenger for RR-2A	\$ 26,600,000	\$ 4,900,000	\$ 1,800,000	\$ 33,300,000
Ballenger for RR-2B	\$ 31,900,000	\$ 5,800,000	\$ 1,900,000	\$ 39,600,000

TABLE II-3
 Summary of Costs Associated with Route WW Improvements

Emerging Alignment	Construction Cost	Engineering Cost	R/W Cost	Total Cost
WWA	\$ 14,500,000	\$ 2,700,000	\$ 4,800,000	\$ 22,000,000
WWB	\$ 15,600,000	\$ 2,900,000	\$ 3,700,000	\$ 22,200,000
WWC	\$ 15,300,000	\$ 2,800,000	\$ 4,800,000	\$ 22,900,000

This opinion of cost follows the practices set forth by the Association for the Advancement of Cost Estimating International Recommended Practice No. 17R-97 for Class 4 at a 5 percent design level. A Class 4 estimate is for concept or feasibility studies. The level-of-accuracy range for this class and design level is plus 90 percent to minus 45 percent of the actual construction cost. The actual cost may be up to 90 percent higher or 45 percent lower than the estimate. The “plus” value is usually assigned as the contingency percentage for the project. The cost estimate numbers presented above reflect the application of “plus 90 percent” on the project’s cost estimate.

3. Reasonable Alternative Impact Summary

The environmental consequences of the reasonable alternatives were evaluated using available environmental literature data supplemented by field reviews. Field reviews included historic architecture surveys, environmental site assessments, habitat categorizations and wetland determinations. Ultimately, the analysis concluded that, from an environmental standpoint, the alternatives varied primarily based upon the configuration of stream crossings and the overall project footprint. **Chapters III** and **IV** present the details of the various resource specific investigations conducted for the reasonable alternatives. Some of the impacts are summarized below:

- Expected Wetland Impacts
 - Encroachments vary between 0.9 acres (SC-2B) and 5.2 acres (RR-2A).
 - Open water and unconsolidated (PUB) wetlands constitute a large portion of affected wetlands.
- Cultural Resources
 - No affected architectural resources are eligible for the NRHP.
 - No known NRHP-eligible archaeological resources are affected.
- Sites of Concern (potential regulated material sites)
 - Numerous (>10) sites located at Route Z interchange.
 - Four sites located at intersection of Ballenger Ext. and I-70 outer road.
- Terrestrial Habitat Impacts
 - Alternative SC-2C has the smallest footprint.



- Alternative RR-2A has the largest footprint.
- Alternatives RR-2B and SC-2B have higher forest encroachments.
- None of the alternatives exceed 20 acres of cropland encroachment.
- Aquatic Habitat Impacts
 - Ballenger extension has a Hominy Branch crossing.
 - SC-2B has two *new* North Fork crossings.
 - RR-2B has two *new* North Fork and one *new* South Fork crossings.
 - All of the alternatives will require work at existing locations along the Grindstone Creeks.
- Relocations
 - *Total structure* relocations vary from 32 (SC-2B) to 56 (SC-2C).
 - *Residential* relocations vary from 14 (SC-2B) to 23 (SC-2C).
 - Business relocations vary from 5 (RR-2A/RR-2B) to 9 (SC-2A/2B/2C).
- Park Impacts
 - No direct park impacts are expected, except by RR-2A (Lake of the Woods South Park)
- Public Service Impacts
 - The improvement of Route WW under WWA and WWC will require the relocations of Boone County Fire Station 12.
 - No direct impacts to the Cedar Ridge Elementary School are expected.
- Expected Right-of-Way Requirements
 - RR alternatives require roughly one-third more right-of-way than St. Charles alternatives.
 - Alternatives RR-2B, SC-2A and SC-2B have new alignments components.
- Other Neighborhood/Community Impacts
 - Existing large subdivisions: RR-2A has few direct impacts but places a major roadway in close proximity.
 - Existing Connectivity: RR-2B will require the least alteration to the existing local roadway system.
 - WWB: Found to be inferior relative to maintaining appropriate traffic patterns on Route WW. It would add two awkward intersections between existing and new Route WW, increase right-of-way acquisitions, enlarge the footprint at the North Fork of the Grindstone Creek crossing and require additional private property

relocations. To date, the fire protection district has not commented regarding this relocation.

E. Preferred Alternative

Based on all of the work conducted, a Preferred Alternative has been identified. The project team believes that 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 Preferred Alternative and examine the key data associated with its identification.

Notwithstanding the identification of a Preferred Alternative, all reasonable alternatives presented would remain under consideration through the public hearing and DEIS review and comment period. The Missouri Department of Transportation would officially identify the preferred course of action (in the FEIS) after evaluating all comments received from the public hearing following the availability of the DEIS for public and agency review.

The Preferred Alternative consists of the following elements:

- The extension of Route 740 using a new alignment to the St. Charles interchange (SC-2A)
- The improvement of Broadway (Route WW) from US-63 to Olivet Road utilizing the existing alignment (WWA)
- The possible extension of Ballenger Lane as a locally sponsored project

A complete depiction of the Preferred Alternative is contained in **Exhibits II-4A to 4G**.

The process that led to the selection of the Preferred Alternative included evaluations of impacts (see **Chapter III**). The impact analysis included right-of-way impacts, environmental impacts, community impacts, relocation impacts and engineering impacts along with an examination of the compatibility with CATSO priorities.

The remainder of this section outlines some of the key design elements of the Preferred Alternative as well as important decision-making elements that led to the identification of the Preferred Alternative.



The Preferred Alternative includes:

The extension of Route 740 using a new alignment to the St. Charles Road interchange (SC-2A)

The improvement of Broadway (Route WW) from US-63 to Olivet Road utilizing the existing alignment (WWA)

The possible extension of Ballenger Lane as a locally sponsored project

A large scale depiction of the Preferred Alternative is contained in **Exhibit S-2**. A more detailed depiction is contained in **Exhibits II-4A to II-4G**.

1. Key Elements Associated with the Preferred Alternative

a. The extension of Route 740 (Stadium Boulevard)—SC-2A

- The Preferred Alternative uses a new alignment from the existing US-63 interchange to the St. Charles interchange at I-70.
- The Route 740 extension is planned to be an expressway.
- Overpasses will be investigated at the Lemone Industrial Boulevard (proposed) and Rustic Road.
- At-grade intersections will be required at Route WW, Richland Road/Ballenger Lane and Grace Lane/St. Charles Road (existing). The intersection of Richland Road and Ballenger Lane with Route 740 is at a common location.

b. The improvement of Broadway (Route WW)—WWA

- The improvements will extend from US-63 to Olivet Road. The improvement will utilize the existing alignment; the footprint will be widened to the side that minimizes impacts to existing resources.
- Route WW is planned to be a major arterial west of the Route 740 extension and a minor arterial east of the Route 740 extension.
- All existing intersections on Route WW will be maintained.
- The crossing of the Grindstone Creek (North Fork) will involve the realignment of Route WW. This will eliminate a tight curve. This will also facilitate the proposed intersection with the extension of Route 740.

c. The probable extension of Ballenger Lane

- This element will be processed as a locally sponsored project.
- The Ballenger Lane extension is planned to be a major arterial.
- The Ballenger Lane extension is expected to include an at-grade intersection with existing I-70 Southeast (outer road).
- The intersection of Richland Road and Ballenger Lane with Route 740 is at a common location (a modification from the reasonable alternatives).

2. Important Decision-Making Elements that Led to the Preferred Alternative

- SC-2A achieves the project's purpose and need.
- SC-2A closely conforms with the CATSO major roadway plan.
- SC-2A avoids new major stream crossings.
- SC-2A minimizes residential relocations.
- SC-2A minimizes total construction costs.

- SC-2A minimizes project footprint.
- SC-2A connects to the St. Charles interchange.
- The SC alternatives maximize the usage expected at the I-70 interchanges.
- The SC alternatives maximize the potential for attracting vehicles that might otherwise use I-70/US-63.
- The SC alternatives minimize the amount of diversion of Columbia-bound traffic via a Route Z/WW pathway.
- WWA best maintains appropriate traffic patterns on Route WW. It would also minimize right-of-way acquisitions, minimize the footprint at the North Fork of the Grindstone Creek crossing and require fewer private property relocations.