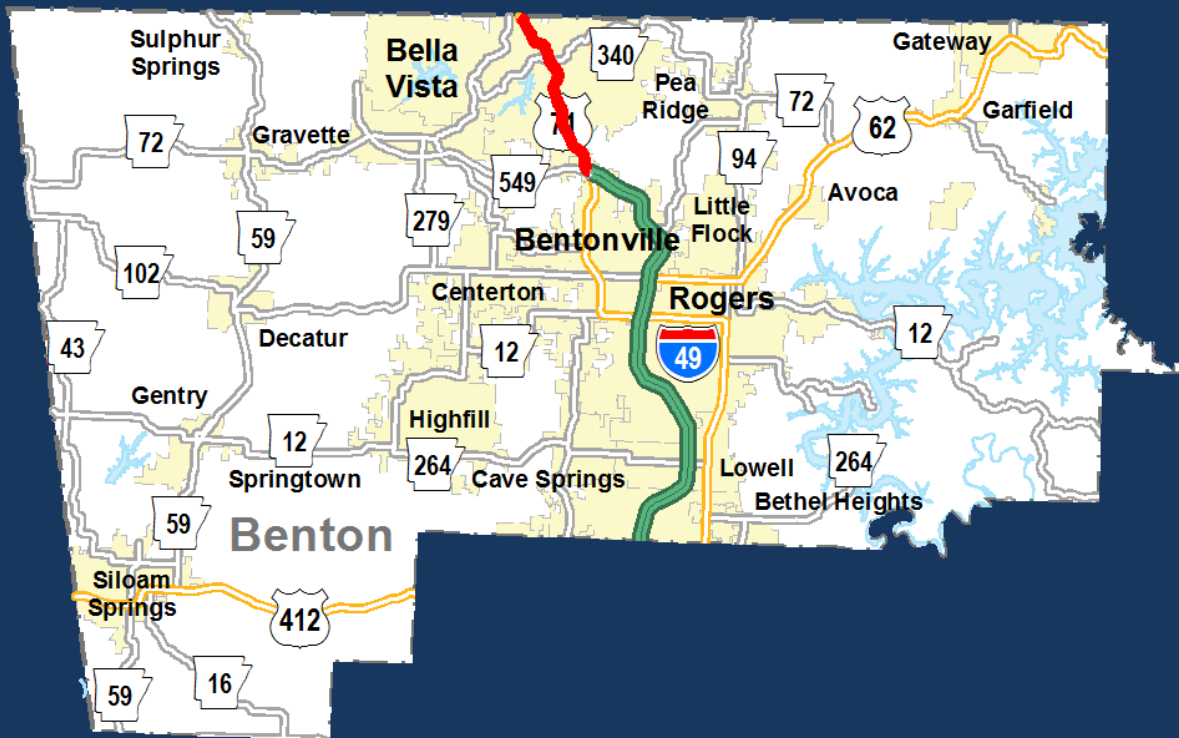


HIGHWAY 71 CORRIDOR IMPROVEMENT STUDY

BELLA VISTA BYPASS – MISSOURI STATE LINE BENTON COUNTY



Highway 71 Corridor Improvement Study

Bella Vista Bypass to Missouri State Line BENTON COUNTY

EXECUTIVE SUMMARY



Prepared by the Transportation Planning and Policy Division
Arkansas Department of Transportation
In cooperation with the Federal Highway Administration

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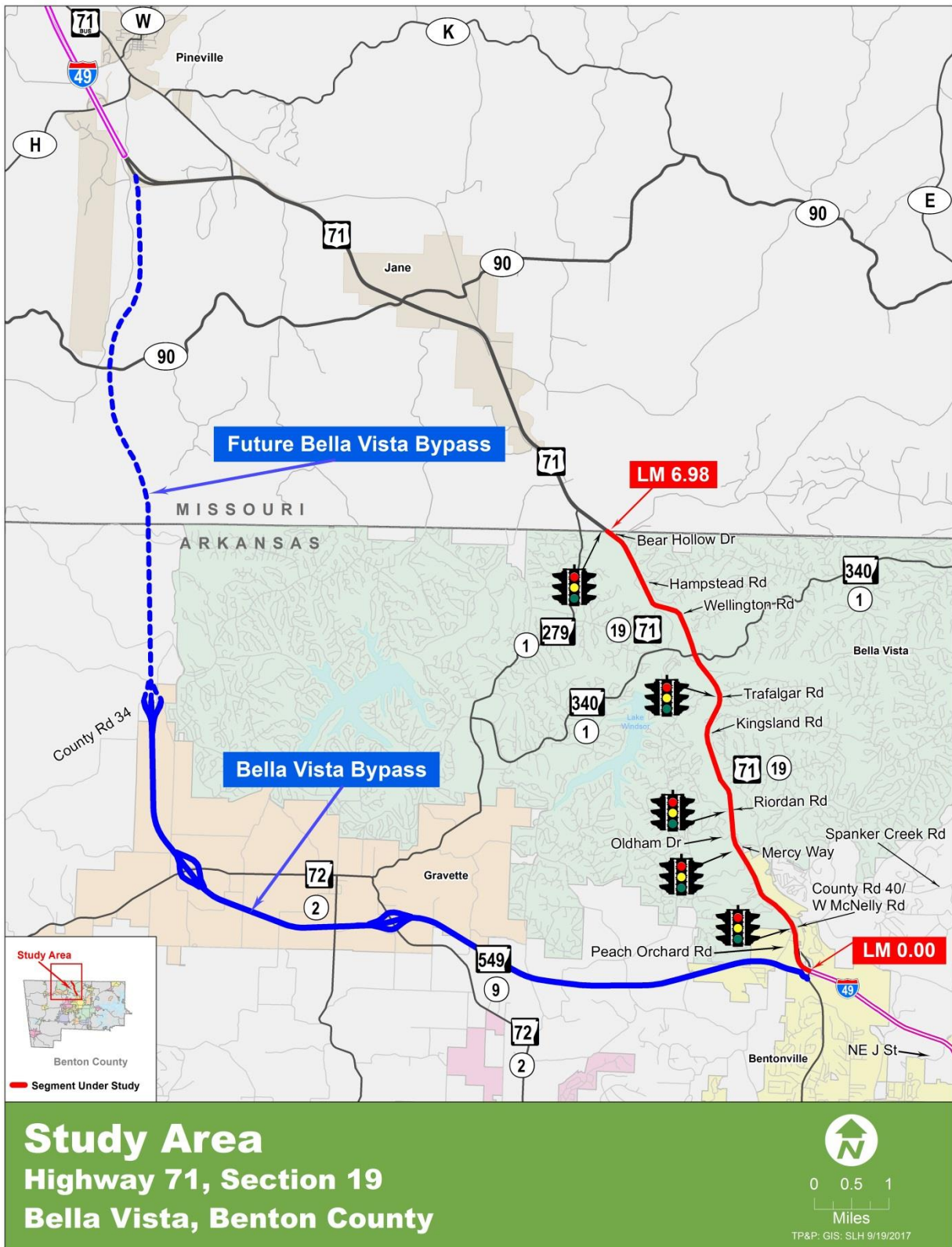
INTRODUCTION

Highway 71 is a north-south principal arterial that serves western Arkansas from the Louisiana State Line to the Missouri State Line. In Bella Vista, Highway 71 connects citizens to schools and employment in Bentonville and other areas to the south. Over 80 percent of workers in Bella Vista commute to Bentonville, Rogers, and other cities in Northwest Arkansas. Furthermore, most of Bella Vista is within the Bentonville School District. These factors result in commuting patterns that are highly directional. Highway 71 is the only direct route between Bella Vista and employment centers in the region, and this route additionally serves through traffic from or to Missouri including numerous trucks.

Future Interstate 49, locally referred to as the Bella Vista Bypass (Bypass), will provide a fully controlled access route between Pineville, Missouri and Bella Vista, Arkansas, which will ultimately connect Kansas City, Missouri with New Orleans, Louisiana. This planned interstate facility will provide an alternate route between western Bella Vista and the cities to the south. However, Highway 71 will remain as the most direct route between most of Bella Vista and Bentonville, with anticipated heavy traffic demands.

Because of the congestion due to the rapid growth in the region as well as the uncertain timing for completion of Interstate 49, local officials requested a study to evaluate the need for intersection improvements along this corridor to enhance safety and improve traffic flow. As a result, the Arkansas State Highway Commission adopted Minute Order 2014-050 (see Appendix A), authorizing this study to identify needed improvements to Highway 71 between the Interstate 49 interchange and the Missouri State Line. The study area is shown in Figure ES-1.

Figure ES-1 - Study Area



PURPOSE AND NEED

This study examines the need for and feasibility of improvements to Highway 71 between the Interstate 49 interchange and the Missouri State Line.

EXISTING CONDITIONS

The area known as Bella Vista has changed over the years. It was first established as a summer resort town in the early 20th Century. Due to its natural beauty, Bella Vista became known for its retirement community beginning in the 1960s. In recent years, not only has Bella Vista been incorporated into a city, it has become a popular place to live for young families due to its close proximity to rapidly growing cities like Bentonville.

Due to the overall population growth and increased north-south traffic along the Interstate 49 corridor between Missouri and Arkansas, traffic demand on Highway 71 in the study area has increased significantly. In May 2017, a portion of the Bypass (temporarily signed as Highway 549) was open to traffic. A field traffic count taken in August 2017 indicated approximately 6,300 vehicles have started using the Bypass. Although the recently opened portion of the Bypass provides residents on the western portion of Bella Vista with another option to connect to Interstate 49 in Bentonville, Highway 71 remains the only direct north-south route in Bella Vista. This is largely due to the terrain and how the city was developed as a retirement community.

Within the study area, Highway 71 is a four-lane, principal arterial with a raised median (12-foot width) and partial access control. The corridor has 12-foot travel lanes and 6-foot shoulders. Traffic volumes range from 20,000 vehicles per day (vpd) near the Missouri State Line to 39,000 vpd near County Road 40. The speed limit ranges from 45

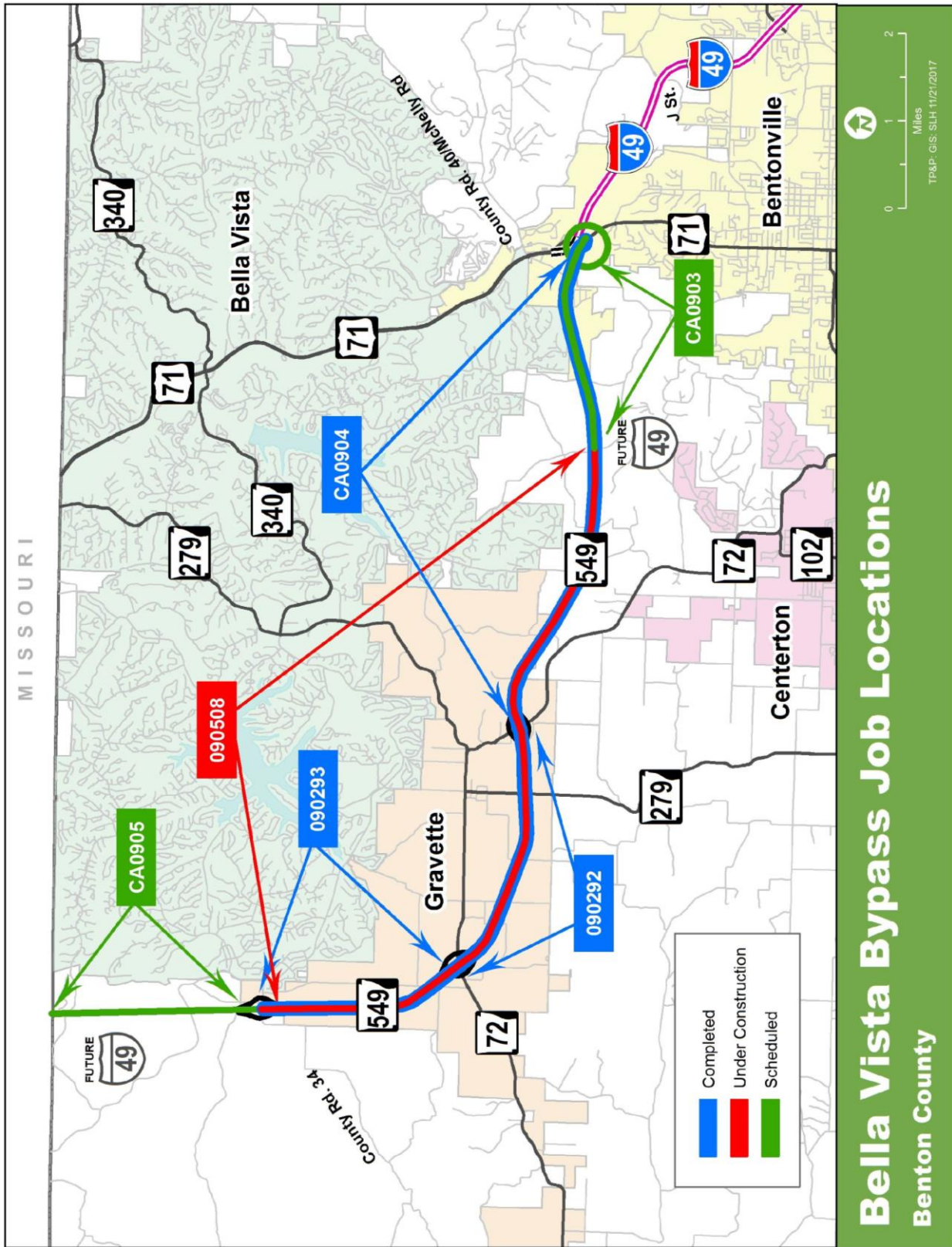
miles per hour (mph) to 55 mph for the length of the study area. The highway generally follows the Sugar Creek valley, passing through an area of rolling terrain adjacent to parks, golf courses, and some commercial development. The City of Bella Vista is primarily residential outside of the Highway 71 corridor.

CURRENT TRANSPORTATION PLANS

Other than the future Bypass, there are no other plans to enhance north-south connectivity in Bella Vista. Rather, the 2040 Northwest Arkansas Metropolitan Transportation Plan (MTP) identifies funding for smaller improvements in the area, including preliminary work towards widening Mercy Way to a five lane section. This job is included in the 2016-2020 Northwest Arkansas Regional Transportation Study (NARTS) Transportation Improvement Program (TIP) and the 2016-2020 Statewide Transportation Improvement Program (STIP). The MTP also mentions potential funding for an additional Interstate 49 interchange at J Street to enhance connectivity from Bentonville to Interstate 49.

Although Highway 71 is currently the only direct north-south route in Bella Vista, the planned completion of the Bypass will divert Interstate 49 through traffic, leaving the existing highway to be used primarily by local residents. The Bypass is a high priority route, and numerous efforts have been implemented into the planning, funding, and construction of the facility over the past two decades. To date, approximately \$114 million has been invested to construct the Bypass. Another \$60 million is scheduled to complete the remaining Arkansas portion of the Bypass. However, completion of the entire Bypass is contingent upon the Missouri Department of Transportation fully funding their portion of the Bypass.

Figure ES-2 - Bella Vista Bypass Jobs



TRAFFIC OPERATIONS ANALYSIS

Existing and forecast traffic operations were analyzed on Highway 71 both with and without the partial Bypass for 2018 and with the full Bypass for 2040. The partial Bypass consists of a two-lane facility connecting Interstate 49 to County Road 34, and the full Bypass will provide a four-lane, divided facility connecting Interstate 49 in Bella Vista to Interstate 49 in Pineville, MO. The projected volumes under these scenarios are shown in Figure ES-3. The operational analysis included a review of the signalized intersections as well as the Highway 340 grade-separated intersection.

The results of the operational analysis indicate that eventual construction of the full Bypass would relieve much of the congestion along the Highway 71 corridor. However, not enough traffic would be diverted to fully relieve congestion between Mercy Way and Interstate 49.

Method for Traffic Forecasting
Traffic volumes were developed using traffic station data and field counts. Multiple tools were consulted to estimate growth and diversion, including the regional Travel Demand Model (TDM) developed by the Northwest Arkansas Regional Planning Commission, the metropolitan planning organization for the area. Other tools include linear trend projections of historic daily volumes, county growth rates, and census data.

In particular, the County Road 40 intersection would continue to operate above capacity, both in the current year (with the partial Bypass) and in the future year (with the full Bypass). This is primarily due to the lack of north-south travel options for Bella Vista residents who live east of Highway 71.

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TRAFFIC SAFETY ANALYSIS

Crash data from 2011 to 2015 were analyzed to determine the historical safety performance of Highway 71. This analysis included a determination of crash rates and a review of crash types for patterns.

Table ES-1 shows the 5-year annual average crash rates. The average crash rates on Highway 71 were well below the statewide average for similar facilities. However, the KA crash rate was higher than the statewide average south of Riordan Road.

Figure ES-4 illustrates locations with a high crash frequency. Crashes occurred more frequently at Mercy Way and County Road 40, which are the most congested intersections on the corridor with frequent stop-and-go conditions. When considering fatal (K) and serious injury (A) crashes, as shown in Figure ES-5, the highest concentration is located between Oldham Drive and Mercy Way. A closer examination revealed a number of these KA crashes occurred due to a northbound vehicle attempting to turn left at Mercy Way in the inside through lane (because a turn bay wasn't present) and getting rear-ended by another vehicle. The City of Bella Vista has recently constructed a left-turn bay at this location that will mitigate this situation.

The safety analysis also revealed a relatively high number of crashes at several intersections at the minor street approach turning right onto Highway 71. A closer inspection shows that these high crash locations occur where there is a low skew angle and yield control. Many crashes occur due to a following driver incorrectly assuming that the proceeding vehicle will utilize the additional pavement width as acceleration lanes. These high crash locations are at the County Road 40, Mercy Way, Oldham Drive, and Hampstead Road intersections.

Table ES-1 - Annual Average Crash Rates (2011 - 2015)

Route	Log Miles	Weighted ADT ¹	All Crashes			KA Crashes		
			Number of Crashes	Crash Rate (per MVM) ³	Statewide Average ² (per MVM) ³	Number of Crashes	Crash Rate (per 100 MVM) ⁴	Statewide Average ² (per 100 MVM) ⁴
Highway 71 (Interstate 49 interchange to Riordan Road)	0.00 to 2.61	40,500	67.60	1.76	2.13	3.40	8.85	6.53
Highway 71 (Riordan Road to Highway 340 Interchange)	2.62 to 4.86	34,000	12.00	0.43	2.13	1.40	5.05	6.53
Highway 71 (Highway 340 Interchange to State Line)	4.87 to 6.99	20,500	6.80	0.43	2.13	0.60	3.82	6.53

1 - Average daily traffic

2 - Statewide average crash rate for 4-lane divided urban highways with partial access control

3 - Crash rates reported in crashes per million vehicle miles (MVM)

4 - KA crash rates reported in crashes per 100 million vehicle miles (MVM)

Figure ES-4 - Highway 71 Safety Review (All Crashes)

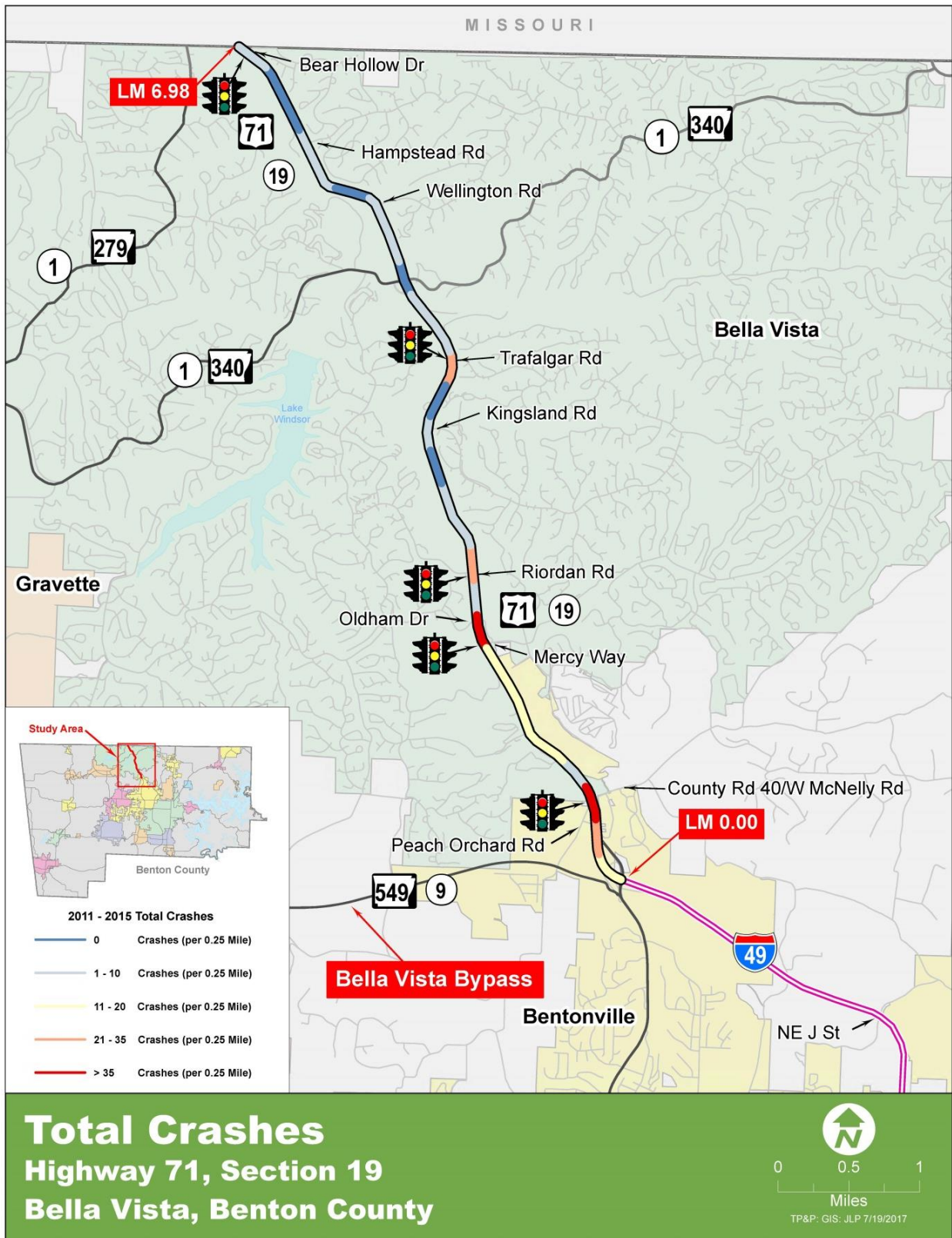
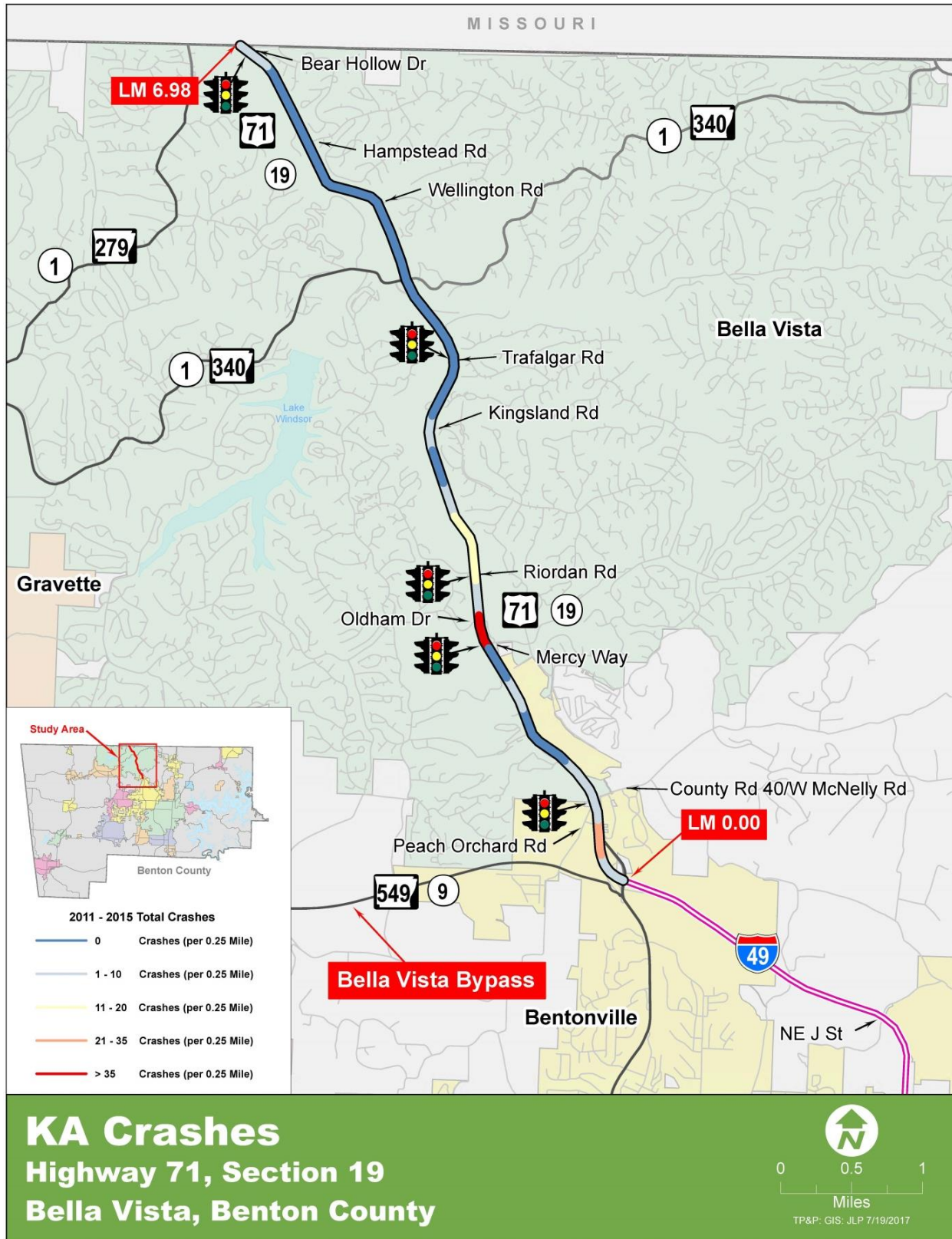


Figure ES-5 - Highway 71 Safety Review (KA Crashes)



INFRASTRUCTURE CONDITIONS

A review of the pavement and bridge conditions was conducted for Highway 71. The pavement condition on Highway 71 in the study area is generally fair, and therefore does not qualify for rehabilitation according to the Department’s Preventative Maintenance Plan. However, Highway 71 meets the requirements for a surface treatment between Interstate 49 and Mercy Way. None of the bridges on the corridor qualify for replacement.

MULTIMODAL CONSIDERATIONS

Bicyclists and Pedestrians

Although the corridor currently has 6-foot shoulders, Highway 71 is not a designated bicycle route. Currently, the Bella Vista Trails and Greenway Master Plan (Greenway Master Plan) indicates the city’s desire to improve bicycle and pedestrian transportation within the study area. Several existing and proposed trails, parks, and recreational areas are located on both sides of Highway 71. Thus, improved east-west trail connectivity is considered a valuable goal in the Greenway Master Plan.

Freight

Completion of the Bypass will likely reduce the Highway 71 truck volume significantly. However, freight access will continue to be needed for the existing and future commercial development on Highway 71. Additionally, Highway 71 will serve as a relief route for the Bypass.

Plans to Improve Pedestrian and Bicycle Facilities

Existing grade-separated facilities such as the Sugar Creek Bridge underpass (just north of Riordan Road) and the Highway 340 overpass were identified by the Greenway Master Plan as opportunities for local agencies to improve trail east-west connectivity without disrupting Highway 71 traffic. The Greenway Master Plan also discusses extending the Razorback Greenway to the Missouri border.

Transit

Fixed-route transit is presently not provided anywhere in the study area.

ACCESS MANAGEMENT

Currently, Highway 71 is divided by a raised median through the study area with median breaks at the major intersections. Access management is critical to the safety and efficiency of a corridor. An important component of access management is ensuring all properties can be accessed with only minimal indirection. Without reasonable accommodations, drivers may make illegal maneuvers to access these properties, such as those seen at Mercy Way, which was recently addressed by the City by providing a northbound left-turn lane to improve access. The study corridor was screened for properties that could not be reasonably accessed. Based on the review, U-turn accommodations are recommended at Kingsland Road and Trafalgar Road.

PURPOSE AND NEED SUMMARY

Shifting demographics indicate a growing population that desires to access employment and schools south of Bella Vista. The lack of adequate north-south connectivity leaves Highway 71 carrying most of the burden with an increasing population. Based on the analyses of Highway 71, several issues have been identified. One primary issue is the bottleneck at County Road 40, which is induced by the heavy volumes. There are also safety issues related to driver behavior and expectation that could be addressed through infrastructure improvements on Highway 71. Completion of the partial and full Bypass will alleviate some of the issues, but not completely.

ENVIRONMENTAL CONSIDERATIONS

A cursory review was conducted to identify any environmental constraints or conditions that warrant consideration in the planning or design process.

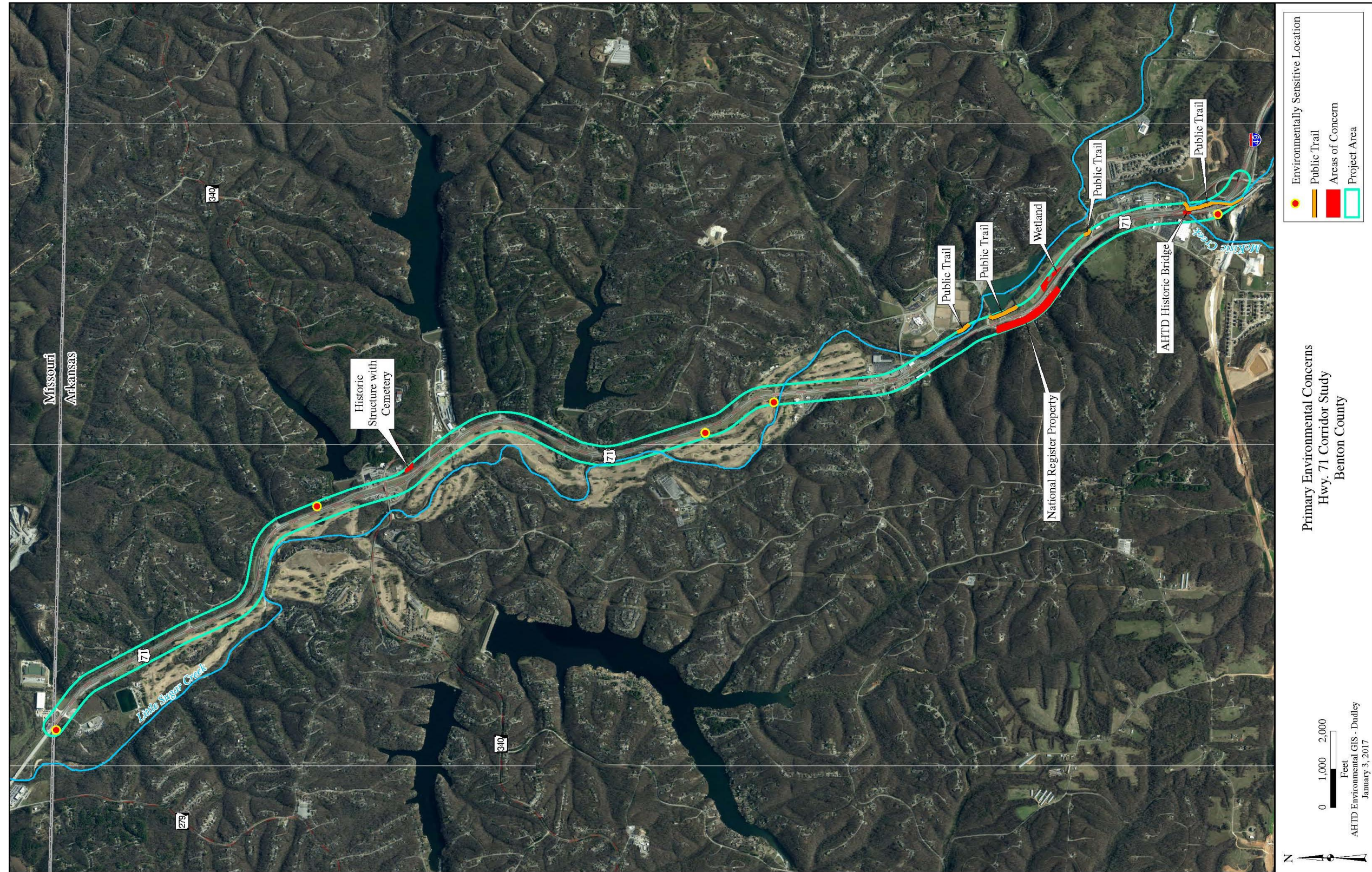
The cursory review indicated numerous environmental constraints and areas of concern near the Highway 71 corridor including the following:

- Longitudinal stream encroachments
- 1 historic bridge (BR 02196)
- 1 area with 8 cabins on the National Register of Historic Places
- 1 historic cemetery (Dug Hill) and associated properties
- 4 fuel stations with underground storage tanks
- 4 crossings of the Razorback Greenway
- Potential for 6 endangered species in the area

Many of the constraints are close in proximity to Highway 71, which makes widening in certain areas difficult. Impacts to the constraints should be avoided or minimized. The constraints are shown in Figure ES-6.

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Figure ES-6 - Environmental Constraints



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ALTERNATIVES

Based on an evaluation of the existing conditions as well as current and future transportation needs even with assumed eventual completion of the full Bypass, several improvement alternatives for Highway 71 were identified. Due to the relatively high cost and potential impacts that traditional widening of existing Highway 71 would have, non-traditional improvement alternatives were identified and closely evaluated. The improvement alternatives generally fall into the following categories.

- Innovative operational strategies on Highway 71
- Operational enhancements of the existing Highway 71 traffic signals
- Safety enhancements at select intersections along Highway 71
- Improved local connectivity to relieve pressure from Highway 71
- Construction of auxiliary lanes on Highway 71 to improve operations while minimizing cost and impact

Innovative operational strategies such as hard shoulder running, reversible lanes, and enhanced carpooling were initially reviewed but were removed from further consideration due to the lack of adequate pavement structure, safety concerns, and low benefit versus cost. Other innovative strategies such as continuous flow intersections were also ruled out due to the low benefit versus cost.

The remaining improvement concepts were evaluated in closer detail and combined into stand-alone alternatives for further consideration.

DESCRIPTION OF ALTERNATIVES

Existing and future traffic operations were reviewed under build conditions and were compared to those under no-build conditions. All build conditions assume completion of the full Bypass for 2040. The following build alternatives are shown on Figure ES-7.

No-Build Alternative

No modifications to the transportation system would occur other than continued maintenance.

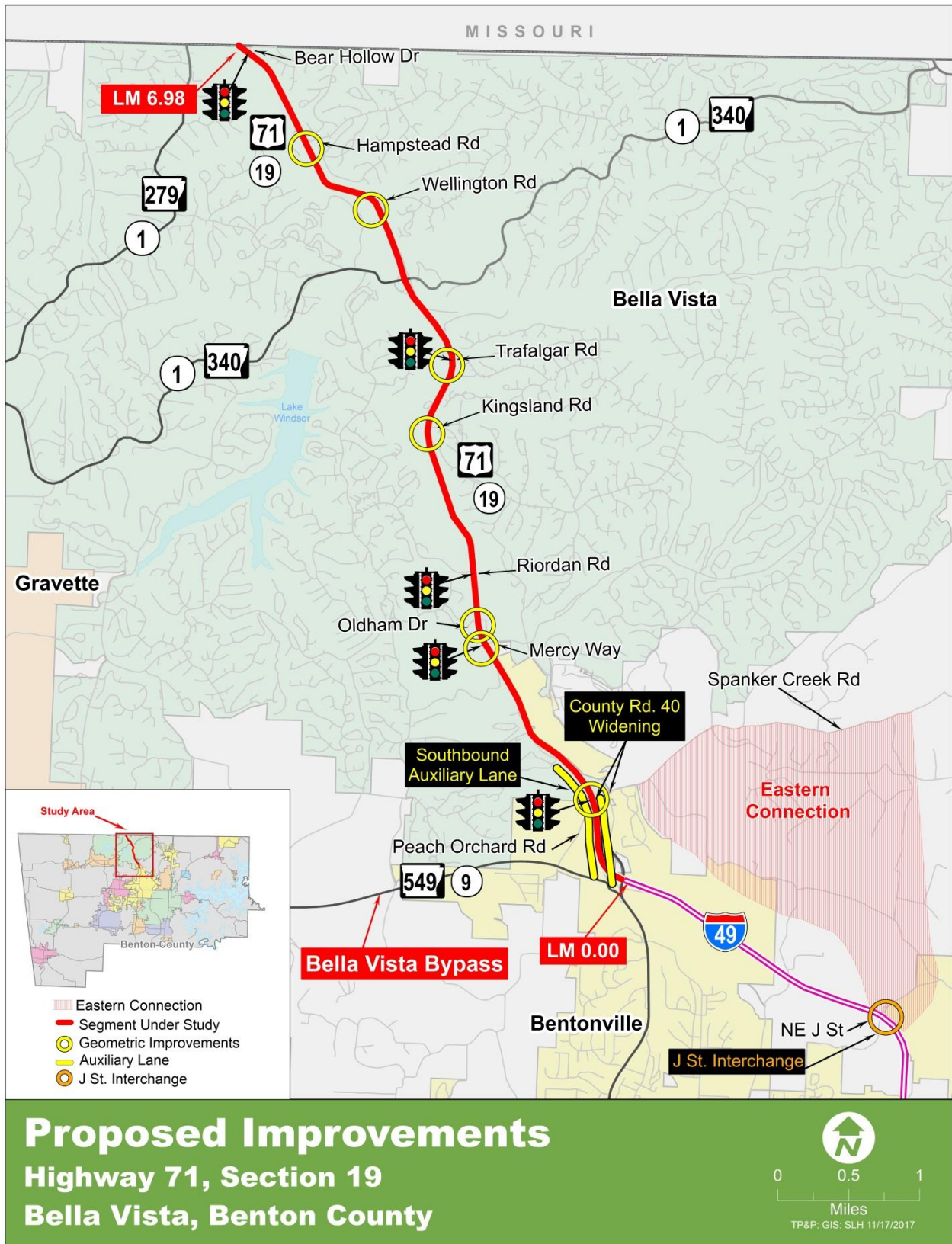
Alternative 1 - Safety and Operational Improvements

Safety improvements would be implemented at select intersections: County Road 40, Mercy Way, Oldham Drive, Kingsland Road, Trafalgar Road, Wellington Road, and Hampstead Road. These improvements would involve realigning the minor street right-turn approaches to provide shorter, more perpendicular channelized turns, as well as U-turn accommodations at Kingsland Road and Trafalgar Road.

Basic operational improvements, such as signal timing and coordination improvements, would be implemented. Although it was determined that the signal timings are well coordinated, and because the City recently hired a traffic engineering firm to maintain optimization of the Highway 71 signals, the timings should be continuously monitored to account for traffic fluctuations and other factors.

The total estimated cost of Alternative 1 is \$1.4 million (2018 dollars), of which \$1.0 million is the construction cost.

Figure ES-7 - Build Alternatives



Alternative 2 - Safety Improvements and Eastern Connection

The safety improvements identified in Alternative 1 would be implemented. Connecting roadway infrastructure (see Figure ES-7) would be constructed to enhance north-south mobility for the eastern portion of Bella Vista. A new interchange would also be constructed on Interstate 49 at the NE J Street grade separation, as mentioned in the local MTP. For the purposes of the study, it was assumed that this route would connect NE J Street at I-49 with Spanker Creek Road, which is essentially an extension of County Road 40. The total estimated cost is \$32.0 million (2018 dollars), of which \$25.7 million is the construction cost. Further study would be required to develop a more refined cost for this alternative.

Alternative 3 - Safety Improvements and Auxiliary Lanes

The safety improvements identified in Alternative 1 would be implemented. A southbound auxiliary lane on Highway 71 would be constructed beginning approximately 1,500 feet north of the County Road 40 intersection and dropping at the Highway 71B southbound ramp, a total of 0.70 mile. A northbound auxiliary lane would also be needed between Interstate 49 and County Road 40. The total estimated cost is \$4.2 million (2018 dollars), of which \$3.1 million is the construction cost.

Alternative 4 - Safety Improvements, Eastern Connection, and Auxiliary Lanes

Alternative 4 would encompass all the improvements of the other three alternatives. Intersection safety improvements, an eastern connection with a new interchange at NE J Street (Alternative 2), and auxiliary lanes on Highway 71 (Alternative 3) would all be constructed. The total estimated cost is \$34.8 million (2018 dollars), of which \$27.8 million is the construction cost.

ANALYSIS OF ALTERNATIVES

Based on an operational analysis of the study corridor, it was determined that Alternative 1 would provide very little benefit. Alternatives 2 and 3 would notably improve traffic operations on Highway 71, although congestion would still be expected to exceed acceptable levels in 2040 during peak periods. Only Alternative 4 is expected to fully reduce long-term congestion to acceptable levels. A detailed description is shown below.

- The **No-Build Alternative** does not address the purpose and need. Traffic operational issues would continue through the study period, even with the completion of the Bypass. Safety conflicts will continue to be an issue at several intersections on the corridor.
- **Alternative 1** only provided marginal improvement over the No-Build Alternative in regard to traffic operations. The Mercy Way and County Road 40 intersections already operate at capacity, limiting the benefits of improved signal timings and coordination. However, improving select intersections would enhance the safety performance of the corridor.
- **Alternatives 2 and 3** would significantly improve operations along the Highway 71 corridor. Queue lengths would drop to more manageable levels and delay could be reduced by as much as 30 percent at County Road 40 for Alternative 2, and 60 percent for Alternative 3. These alternatives would not improve traffic operations to acceptable levels (LOS D or better) for the morning peak. However, the duration of congestion would be reduced.
- **Alternative 4** would provide acceptable operations through the study period for the Highway 71 corridor. Traffic diversions to the Bypass and to enhanced local street connectivity to the east, in combination with the proposed operational and safety improvements, allow for adequate capacity on Highway 71.

CONCLUSIONS

Bella Vista has experienced rapid change over the years since evolving from a resort town into a retirement community and then an incorporated city. Shifting demographics have shown younger families moving into the area to take advantage of the close proximity to recreational parks and employment in Bentonville. As Bella Vista continues to grow, local traffic needs will continue to increase along Highway 71 even as the eventual completion of the Bypass will remove much of the through traffic.

The proposed build alternatives will improve the operations and safety of the Highway 71 corridor both now and in the future. Alternatives 1, 2, and 3 improve conditions over the No-Build Alternative but do not improve operations to acceptable levels (LOS D or better). Alternative 4 improves safety and provides acceptable traffic operations through the study period while limiting impacts to the current land use and environment on Highway 71.

Construction of auxiliary lanes between County Road 40 and Interstate 49, as shown in Alternatives 3 and 4, could be considered either as part of Job CA0903 or as a future separate project.

Cost estimates and summarized conclusions for each alternative are shown in Tables ES-2 and ES-3.

Table ES-2 – Cost Estimates of Alternatives

Improvement	Description	Construction (in 2018 dollars)	Total Cost (in 2018 dollars)
Alternative 1	Safety Improvements	\$1.0 million	\$1.4 million
	Operational	Minimal	Minimal
	Total	\$1.0 million	\$1.4 million
Alternative 2	Safety Improvements	\$1.0 million	\$1.4 million
	Eastern Connection	\$24.7 million	\$30.6 million
	Total	\$25.7 million	\$32.0 million
Alternative 3	Safety Improvements	\$1.0 million	\$1.4 million
	Auxiliary Lane	\$2.1 million	\$2.8 million
	Total	\$3.1 million	\$4.2 million
Alternative 4	Safety Improvements	\$1.0 million	\$1.4 million
	Eastern Connection	\$24.7 million	\$30.6 million
	Auxiliary Lane	\$2.1 million	\$2.8 million
	Total	\$27.8 million	\$34.8 million
<p>Note: Further study would be required to obtain a refined cost for the Eastern Connection.</p>			

In addition to the improvement alternatives, access management with the existing median was evaluated. It was determined that providing U-turns at Kingsland Road and Trafalgar Road would benefit certain access points that are not currently accommodated without significant indirection. The improved traffic operations would minimize vehicular conflicts and reduce risky driving behavior. Access management strategies should continue to be implemented with the improvement alternatives.

Due to the high cost associated with roadway improvements, cost sharing with local jurisdictions should be explored. After completion of the full Bypass, much of the remaining traffic along Highway 71 will be local traffic. At a minimum, possible removal of highways from the State Highway System should be considered.

Table ES-3 - Summary of Alternatives

Alternative	Description	Advantages	Disadvantages
No-Build	No capital improvements	<ul style="list-style-type: none"> • No Capital Costs • No environmental or community impacts 	<ul style="list-style-type: none"> • Safety issues are not addressed • Travel through the region is not improved
Alternative 1	Safety and Operational Improvements	<ul style="list-style-type: none"> • Safety issues are addressed <ul style="list-style-type: none"> • Relatively low costs • Fewer environmental or community impacts 	<ul style="list-style-type: none"> • Operations are not improved much over existing conditions
Alternative 2	Safety Improvements and Eastern Connection	<ul style="list-style-type: none"> • Safety issues are addressed • Traffic operations are improved 	<ul style="list-style-type: none"> • Operations are improved, but not to target levels • Additional costs and impacts due to new location roadway
Alternative 3	Safety Improvements and Auxiliary Lane	<ul style="list-style-type: none"> • Safety issues are addressed • Traffic operations are improved 	<ul style="list-style-type: none"> • Operations are improved, but not to target levels
Alternative 4	Safety Improvements, Eastern Connection, and Auxiliary Lane	<ul style="list-style-type: none"> • Safety issues are addressed • Provides acceptable levels of service 	<ul style="list-style-type: none"> • Additional costs and impacts due to new location roadway



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