

S South Lawrence Trafficway

APPENDIX E: Alternatives Screening Technical Memorandum

MAY, 2021







Technical Memorandum

To: Cooperating Agencies, Participating Agencies and Other Interested Stakeholders	Date: April 19, 2019 Updated: August 10, 2020
From: South Lawrence Trafficway SEIS Study Team	
Subject: SLT SEIS Alternatives Screening Technical Memorandum	

South Lawrence Trafficway Supplemental Environmental Impact Statement Proposed Alternatives Screening Criteria

1.0 Introduction and Background History

The purpose of this technical memorandum is to describe the alternatives for screening, proposed screening criteria, and to document the results of the initial and reasonable alternatives screening process for the South Lawrence Trafficway (SLT) Supplemental Environmental Impact Statement (SEIS). This Technical Memorandum is one of several interim reports to be prepared for the SLT SEIS for review and concurrence by Cooperating and Participating Agencies for the project.

SLT EIS

A previous Environmental Impact Statement (EIS) was prepared in 1990 for the SLT study area. The Purpose and Need stated in that EIS was to relieve congestion on existing 23rd Street and Iowa Street by diverting through and local traffic from these two existing streets and Clinton Parkway, thereby achieving an improved level of traffic service on the local street network. As an outcome of the approved 1990 EIS, two expressway lanes of the West Section were constructed and opened to traffic in 1996. The East Section was not constructed and a subsequent SEIS with a "No Build" decision was approved in 2000. A subsequent EIS, in conjunction with a USACE 404 Permit, was completed in 2002 and adopted and approved by FHWA in November 2007. The FHWA then issued a Record of Decision (ROD) in May 2008. Since the completion of the ROD, the East Section four-lane freeway was constructed and opened to traffic in 2016.

K-10 West Leg Concept Study

The *K-10 West Leg Concept Study*, conducted from 2014-2016 by the Kansas Department of Transportation, investigated the current and future needs and functions in the K-10/SLT West Section. This study considered alternatives for the future widening and upgrade of the corridor, which modified the current 2-lane expressway design to a 4-lane freeway design with limited access (with consideration for a 6-lane facility), and either closed existing at-grade intersections or upgraded them to grade separated interchanges. During the concept study, proposed conceptual alternatives went through a screening process to evaluate qualitative and quantitative impacts of the alternatives for the West Section improvements. The concept study and its alternatives screening process will be used as a baseline and reference document for the SLT SEIS for developing and screening the initial alternatives.

2.0 Overview of SLT SEIS Alternatives Development Process

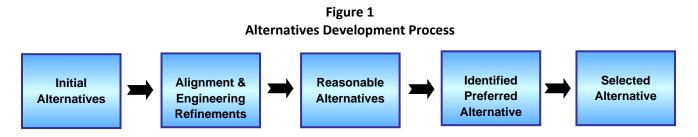
A Supplemental Environmental Impact Statement (SEIS) will be prepared for the proposed project. Within the SEIS, the alternatives development process identifies alternatives for the proposed project that are reasonable and feasible from a technical, environmental and economic standpoint. Initial Alternatives for the project were developed using the SLT 1990 EIS and the K-10 West Section Concept Study as a baseline for the proposed build alternatives.

The current SEIS, as a supplement to the original 1990 EIS, evaluated a 'No Action' alternative as well as a combination of proposed Build Alternatives for the entire SLT study area, designated as the *Initial Alternatives*. Roadway configuration options were evaluated, including upgrading of the West Section as a multi-lane freeway, with controlled access and interchanges at West 6th Street/U.S. 40, Bob Billings Parkway, Clinton Parkway, an interchange between Wakarusa Drive and Kasold Drive, and at U.S. 59/Iowa Street. Also, interchange alternatives at I-70/East 600 Road/Lecompton Road and K-10/I-70/North 1800 Road were considered. A range of funding options will also be evaluated for the proposed alternatives.

The East Section of the SLT is included in this study because it was a part of the study area for the original 1990 EIS, and because funding options, such as tolled and toll-free options, were evaluated for the project. Therefore, the entire SLT corridor was evaluated to assess potential impacts of the funding options and their ability to provide sustainable funds for operation, maintenance and future SLT improvements. It is not anticipated that there will be any physical roadway improvements or modifications that require additional right-of-way on the East Section as a result of the funding options.

The screening process entailed a screening of the alternatives to determine which alternatives warranted further consideration for the project. Based on the screening of the Initial Alternatives, the alternatives development process defined and evaluated a range of No Action and Build Alternatives in sufficient detail to identify the feasible and prudent alternatives (i.e., *Reasonable Alternatives*). The Reasonable Alternatives were carried forward and evaluated with regard to the acceptability of the environmental and social impacts, as presented within the Affected Environmental and Environmental Consequences section of the SEIS. The more detailed evaluation of the Reasonable Alternatives identified the alternative that best accomplished the purpose and need for the proposed project while providing acceptable impacts to both the natural and man-made environment. This alternative is designated as the *Identified Preferred Alternative*. The Identified Preferred Alternative is presented within the Draft SEIS and at the Public Hearing for agency and public review and comment. After the comments on the Public Hearing and Draft SEIS have been received and addressed, the Identified Preferred Alternative is approved by FHWA as the *Selected Alternative* for the project and a Final SEIS and Record of Decision will be prepared. The screening process is displayed on Figure 1.

The process of alternatives screening and ascending level of detailed evaluation assures decision-makers of the fulfillment of the improvement's goals, while developing informed consent with the reviewing agencies, stakeholders and the general public. This screening process was performed in collaboration with the public and agency coordination plan as defined in the Project Coordination Plan.



3.0 Detailed Descriptions of Initial Alternatives

As previously discussed, Initial Alternatives for the project were developed using the SLT 1990 EIS and the K-10 West Section Concept Study as a baseline for the proposed build alternatives. The Initial Alternatives for the project include the following:

No Action Alternative

The No Action Alternative makes no capacity improvements on the existing West Section of the SLT beyond improvements that are directly related to ongoing rehabilitation and maintenance of the facility or projects that are already committed or programmed in the State Transportation Improvement Program (STIP) or the Lawrence - Douglas County Metropolitan Planning Organization (MPO) Long Range Transportation Plan (LRTP), designated as *Transportation 2040 (T2040)*. The No Action Alternative is not a no cost alternative. Currently, there are several committed or programmed roadway or bridge projects identified that have been included in the No Action Alternative. Those projects include:

- **6**th **Street/K-10 Interchange** KDOT has developed preliminary plans to reconfigure the existing 6th Street (US-40)/K-10 Diamond Interchange to a Diverging Diamond Interchange. Further development of the plans has been suspended during the SLT SEIS and will be progressed as traffic conditions warrant.
- E 1200 Road (Kasold Drive)/K-10 Intersection closure KDOT identified this intersection for closure in December 2018 after more than 28 crashes have occurred at the intersection since 2016. The expressway experienced a substantial increase of traffic with the opening of the eastern leg of the South Lawrence Trafficway. This project was completed after the initial draft of the Purpose and Need for the project was distributed to agencies and the public.
- I-70 Acceleration/Deceleration Lane Improvements The Kansas Turnpike Authority is planning and constructing improvements to the acceleration and deceleration lanes at the Lecompton Interchange ramps where they enter and exit the I-70 Turnpike. These improvements were constructed in 2019.
- Interim Safety Improvements KDOT has identified several interim safety improvements for SLT which include a queue warning system and intersection geometric improvements. Due to deteriorating safety conditions in the SLT corridor, KDOT implemented several interim safety improvements such as queue detection warnings in 2020. Other improvements would be

planned and constructed as interim improvements until a preferred alternative to improve the SLT corridor is selected and funded.

The No Action Alternative also includes planned or programmed multimodal projects such as transit and bicycle and pedestrian facilities. Identified planned roadway facilities within the SLT right-of-way include potential crossings at:

- N 1750 Road;
- 6th Street;
- N 1800 Road at Lecompton Road/E 600 Road;
- Along US 40; and
- Wakarusa Drive south of W 27th Street.

While several existing Lawrence or RideKC transit routes are located in close proximity to the SLT corridor, no routes currently cross, or are planned to cross, SLT.

Exhibit 1 in **Appendix A: Initial Alternatives Exhibits** shows the programmed and committed projects included with the No Action Alternative. The No Action Alternative is used as a baseline for comparison to the other alternatives proposed for the project.

Transportation System Management (TSM)/Transportation Demand Management (TDM) Alternative

The Transportation System Management/Transportation Demand Management (TSM/TDM) Alternative is designed to maximize the efficiency of the existing transportation system by improving capacity and reducing the effects of bottlenecks and chokepoints. These strategies are relatively low-cost, low-impact strategies geared toward enhancing mobility on the SLT without adding new travel lanes or upgrading the facility to a freeway. TSM improvements may include a wide range of strategies, including: coordinated signal timings, intelligent transportation systems (ITS), ramp metering, queue warning systems or minor intersection improvements. TDM strategies typically attempt to modify travel behaviors to benefit capacity, such as carpooling, staggered work shifts, telecommuting, and promoting transit use.

The following TSM/TDM strategies were considered appropriate for implementation in the SLT corridor and are considered the primary elements of the TSM/TDM initial alternative for the SLT SEIS. Those strategies include:

- Installation of ITS elements throughout the SLT corridor including driver information systems that convey travel times, weather advisory data, incident avoidance information, and other pertinent congestion reduction and incident management information. The KC Scout ITS system (or similar system) elements are considered the model for system implementation in the SLT corridor. K-10 Highway near the Kansas City metro area has KC Scout elements deployed and the SLT corridor will propose similar ITS elements.
- Construction of minor intersection improvements to improve safety and traffic circulation. Modifications may include adding right and left turn bays at intersections, lengthening existing turn bays, adaptive signal timings, increasing lane widths at intersections, widening shoulders, adding rumble strips, or enhanced bicycle/pedestrian crossings. In addition, minor safety and geometric improvements could be made to alternate routes such as U.S. 40 to improve overall

operations on the roadway network, such as improving vertical curves, intersection sight distance or roadside grading and slopes.

• While it is difficult to implement or mandate specific TDM strategies for the proposed project, the SLT study team promotes the integration of these strategies where possible for affected commuters and businesses to help alleviate peak period congestion and improve safety and mobility within the study area.

Exhibit 2 in Appendix A shows the TSM/TDM strategies proposed for the SLT project and study area.

Multimodal Alternative

The Multimodal Alternative includes reasonable measures to enhance crossing of the corridor for nonmotorized travel and freight and increases the effectiveness of transit options in the corridor. Elements of this alternative allows for the existing transit agencies in the state or Lawrence region to increase transit routes or enhance transit service by providing roadway improvements that allow for more efficient local and regional transit connections. Transit elements such as Bus-on-Shoulder that enhance the reliability and reduce congestion of the corridor are also included in this alternative. Bus-onshoulder improvements may include pavement improvements and minor widening of existing shoulders on the SLT corridor to accommodate bus-on-shoulder operations. This concept would be similar to the bus-on-shoulder provided by Kansas City Area Transportation Authority (KCATA), designated as RideKC, for the I-35 corridor in the Kansas City metro area. At the current time, no existing transit agencies have transit routes on or crossing the SLT corridor. A bus-on-shoulder concept would only be implemented if a transit agency committed to deploying transit on the SLT corridor.

Similarly, this alternative aims to preserve existing bicycle and pedestrian connections and crossings of the SLT corridor by shared-use trails and paths while also accommodating future planned shared path and trail connections. This alternative will also enhance freight service bottlenecks through intersection improvements such as increased turning radii, elongated turn bays, wider shoulders, wider lanes at intersections, improving merge distances, and optimizing signal timings.

Exhibit 3 in **Appendix A** shows the proposed multimodal improvements programmed or committed for the study area, as well as other multimodal improvements that could be accommodated by the SLT corridor, such as bus-on-shoulder, if desired in the future by existing transit agencies.

Build Alternative – Add Capacity Expressway (West Section)

This alternative would upgrade the existing two-lane undivided West Section of the SLT to a median divided expressway facility with four lanes. It will also include the reconstruction of the existing two lanes. This alternative was the approved preferred alternative from the 1990 EIS. Existing interchanges at West 6th Street/U.S. 40, Bob Billings Parkway, Clinton Parkway, and U.S. 59/Iowa Street will remain interchanges with ramp modifications to accommodate additional expressway travel lanes.

Under an expressway concept, existing at-grade intersections located along the SLT West Section, such as the West 27th Street/Wakarusa Drive signalized intersection and the I-70 interchange ramp terminals would remain in-place, but would have various intersection improvements to enhance safety and

mobility. In a separate project, E 1050 Road (Wakarusa Drive) will be extended to provide connection between N 1200 Road (County Road 458) and the future SLT improvements.

Exhibit 4 in Appendix A shows the proposed Add Capacity Expressway Alternative.

Build Alternative – Add Capacity Freeway (West Section)

This alternative would upgrade the existing two-lane undivided West Section of the SLT to a median divided fully access-controlled freeway facility with either four or six lanes, as predicated on future need. The freeway section would be consistent with the SLT East Section to provide system continuity for travelers. Existing interchanges at West 6th Street/US-40, Bob Billings Parkway, Clinton Parkway, and US-59/Iowa Street would remain interchanges with modifications to accommodate additional freeway travel lanes.

Under a freeway concept, existing at-grade intersections located along the SLT West Section, such as the West 27th Street/Wakarusa Drive signalized intersection, would no longer remain in-place. These atgrade intersections would be improved to new grade-separated access, to enhance safety and mobility along and across the SLT corridor. Alternatives for a new system interchange with I-70 were considered; some of these alternatives include new service interchanges at I-70/East 600 Road/Lecompton Road and K-10/I-70/North 1800 Road to provide local access. In a separate project, N 1200 Road (County Road 458) would be connected to the future SLT improvements at the selected access point.

In addition, this alternative includes the consideration of tolling infrastructure to connect to the existing toll system with the I-70 Turnpike. This alternative would not include tolling the SLT West or East Section freeway.

Exhibit 5 in Appendix A shows the proposed Add Capacity Freeway Alternative.

Build Alternative – Add Capacity Tolled Highway (East & West Sections)

This alternative is similar to the previous 'add capacity' Build Alternative, however it includes the ability to collect tolls along the SLT highway through all-electronic tolling (AET). The tolled highway section would be consistent with the SLT East Section to provide system continuity for travelers.

The alternative upgrades the existing two-lane undivided West Section of the SLT to a divided four or six lane fully access-controlled freeway facility. Existing interchanges at West 6th Street/US-40, Bob Billings Parkway, Clinton Parkway, and US-59/Iowa Street remain interchanges with ramp modifications to accommodate the median divided freeway.

Under a tolled highway concept, existing at-grade intersections located along the SLT West Section, such as the West 27th Street/Wakarusa Drive signalized intersection, would no longer remain in-place. These at-grade intersections would be improved to new grade-separated access, to enhance safety and mobility along and across the SLT corridor. Alternatives for a new system interchange with I-70 were considered; some of these alternatives consider new interchanges at I-70/East 600 Road/Lecompton Road and K-10/I-70/North 1800 Road to provide local access. In a separate project, N 1200 Road (County Road 458) would be connected to the future SLT improvements at the selected access point.

Under AET, no physical toll plazas to stop and pay tolls with cash would be constructed along the SLT corridor. Rather, overhead gantries would be constructed at various points throughout the corridor to

collect tolls through the AET method. Tolling concepts, such as express toll lanes, were considered as a method of tolling for the project. This includes consideration of tolling only the new, additional lanes constructed along the SLT; one lane in each direction of travel will continue to be toll-free.

The East Section of the SLT is included in this alternative because tolling the entire facility is being evaluated as part of the project. Therefore, the entire SLT corridor was evaluated to assess potential impacts of the funding options and their ability to provide sustainable funds for operation, maintenance of future SLT improvements. It is not anticipated that there would be any physical roadway improvements or modifications that require additional right-of-way on the East Section as a result of the funding options.

In addition, this alternative includes the consideration of tolling infrastructure to connect to the existing toll system with the I-70 Turnpike.

Exhibit 6 in **Appendix A** shows the proposed Add Capacity Tolled Highway Alternative and how proposed AET gantries would look and function along the SLT corridor.

4.0 Screening Criteria

The Initial Alternatives previously described were screened against the purpose and need goals for the project. Natural and human environmental impacts, as well as engineering issues and associated relative costs, were also evaluated at a high-level for the Initial Alternatives. An Initial Alternatives Screening Matrix was then be prepared to screen the alternatives based on the screening criteria developed. Public and stakeholder input was a component of the screening criteria for the Initial Alternatives.

Purpose and Need Criteria

The purpose of the South Lawrence Trafficway is to provide the traveling public with an efficient and cost-effective transportation facility for users of K-10 Highway and the surrounding state highway system. In addition, the purpose and need established in the 1990 EIS was carried forward for the SEIS, which is to relieve congestion on the local street network within the city of Lawrence.

The proposed project is needed to:

- Reduce congestion and improve the traffic capacity to meet existing and future travel demands,
- Enhance safety to help address high crash locations within the study area,
- **Promote a multimodal transportation system** by ensuring the project accommodates the needs of other transportation modes, and
- **Support local and regional growth** by providing and coordinating transportation connections to be consistent with planned and proposed community land use and development.

The screening criteria to evaluate meeting the purpose and need criteria are defined as:

• **Reduce Congestion** – This screening criteria evaluates the extent to which an alternative includes measures that increase the capacity of the SLT West Section and/or increase transit service and

use that would be sufficient to reduce congestion to level of service (LOS) D during the peak periods.

- Level of Service on K-10 and on major urban arterials This screening measure is rated using LOS reporting, with the scale encompassing LOS A (best) through LOS F (worst). An alternative that improves LOS conditions to LOS D or better during peak periods will receive a higher relative rating.
- Decreases in Travel Time- This screening measure is rated using the Harvey balls/ideograms type system. This screening measure is used for evaluating decreases in travel time and will quantify the change in travel distances and/or travel times and speeds over existing conditions.
- Enhance Safety The screening criteria evaluates the extent to which an alternative addresses safety of the SLT West Section over existing conditions.
 - Reduction in Number and Severity of Crashes This screening measure is rated using the Harvey balls/ideograms type system and evaluates the extent to which an alternative includes improvements to address locations with critical crash rates above the statewide average. The focus is on a reduction in number and severity of crashes as a result of an alternative improvements. Evaluation could also include investigation of countermeasures (i.e., additional driving lanes, installation of grade-separated interchanges, traffic signals or median barriers) on the SLT West Section mainline that result in an expected reduction in crashes using the FHWA Crash Modification Factors Clearinghouse as a basis of analysis.
- Promote a Multimodal Transportation System This screening criteria evaluates the extent to which an alternative provides measures to enhance crossing of the corridor for non-motorized travel and freight and increases the effectiveness of transit options in the corridor.
 - Potential for Crossing Improvements This screening measure is rated using the Harvey balls/ideograms type system. Alternatives that allows for potential crossing improvements of SLT at new locations will receive a higher relative rating.
 - Increased Accommodation of Bus Transit Routes This screening measure will include the potential increase in the number of bus transit routes that may facilitate improved transit access within the community. This will be measured by an increase/decrease in the number of potential transit route crossings of the SLT that could link with nearby existing transit routes.
 - Provides Connection to Pedestrian, Bike or Trail Facility This screening measure is rated using the Harvey balls/ideograms type system. Alternative will be evaluated on the ability to preserve existing bike or trail systems and accommodate future planned connections.
 - Potential to Eliminate Freight Bottlenecks This screening measure is rated using the Harvey balls/ideograms type system. This screening measure will evaluate improvements that may be beneficial to freight movement (i.e. increased turning radii, access points) or improvements that may reduce or eliminate freight bottlenecks on areas of the SLT corridor (i.e., the number of signalized intersections potentially eliminated that cause backups and

queues along SLT, adding traffic capacity with additional lanes, improving traffic merge distances, etc.) that can impact goods movement.

- **Support Local and Regional Growth** This screening criteria evaluates the extent to which an alternative accommodates planned population, land use and other growth and development plans in the region.
 - Compatibility with Local Planning This screening measure is rated using the Harvey balls/ideograms type system. This screening measure will evaluate an alternative's compatibility and consistency with city plans for future growth and development.
 - Compatibility with Regional Planning This screening measure is rated using the Harvey balls/ideograms type system. This screening measure will evaluate an alternative's compatibility and consistency with regional MPO plans for future growth and development.

Environmental Criteria

The study team performed a cursory evaluation of the potential natural and human environmental impacts for each initial alternative. The natural environmental impacts relate to the anticipated effect on natural sites. The human environmental impacts include any community, neighborhood, or business resources that may be affected by the alternatives.

- Environmental Fatal Flaws This screening measure is a simple yes or no evaluation to determine if the alternative has any environmental fatal flaws. Environmental fatal flaws are defined as unavoidable impacts for which mitigation is not considered an acceptable remedy. Examples (though not all-inclusive) include impacts to critical habitat for threatened and endangered species, impacts to sensitive Native American cultural and burial sites, or substantial impacts to Section 4(f)/6(f) resources that require the development of an avoidance alternative.
- **Potential Parks Impacted** This screening measure includes the number of parks potentially impacted by each alternative.
- **Potential Community Facilities Impacted** This screening measure includes the number of community facilities potentially impacted by each alternative.
- Potential for Changes to Land Use This screening measure is rated using the Harvey balls/ideograms type system. The alternatives that will require more right of way have more potential to change the surrounding land use. This screening measure does not determine whether the change is positive or negative as this is often subjective.
- **Potential for Environmental Justice Impacts** This screening measure is rated using the Harvey balls/ideograms type system. The direct impact on environmental justice areas are from relocations as related to the need for right-of-way and range of funding options being considered for the project.
- **Potential for Noise Impacts** This screening measure is rated using the Harvey balls/ideograms type system. The impact of noise is typically related to the need for right of way and proximity to

sensitive noise receptors. Once the reasonable alternatives are identified, the evaluation will consider the number of noise receptors affected.

- **Potential for Natural Environmental Resources Impacts** This screening measure is rated using the Harvey balls/ideograms type system. The potential for adversely impacting natural resource areas such as wetlands, floodplains, critical habitat, and threatened or endangered species will be measured.
- **Potential for Hazardous Materials and Contaminated Sites Impacts** This screening measure will include the number of hazardous materials and contaminated sites potentially impacted by each alternative.
- Stakeholder and Public Support Positive support, neutral support, and negative reactions from stakeholders and the public will be indicated and rated by the Harvey balls/ideograms type system.

Engineering Criteria

The study team performed an evaluation of potential engineering issues including fatal flaws, right of way impacts, and construction phasing for the initial alternatives. The engineering criteria incorporate the major elements used within the K-10 West Leg Concept Study as a baseline.

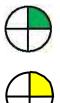
- Engineering Fatal Flaws This screening measure is a simple yes or no evaluation to determine if the alternative has any engineering fatal flaws.
- **Right of Way Impacts** This screening measure is rated using the Harvey balls/ideograms type system. The evaluation will be high level, at this stage, assessment of the right of way needs from private property for each alternative. A more detailed assessment of needs will be made as the study proceeds.
- Allows for Project Phasing This screening measure is a simple yes or no evaluation to determine if the alternative allows for construction to be phased over time.
- Maintenance of Traffic and Constructability This screening measure is rated using the Harvey balls/ideograms type system. The evaluation is high level at this stage and measures complexity of staging and anticipated road closures.

5.0 Initial Alternatives Screening Ratings System

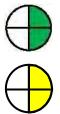
A Harvey balls/ideograms rating system was established as part of the screening process and used in the screening matrix when screening the Initial Alternatives. An example rating system is shown below.



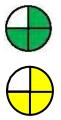
No Achievement/No Impact: For the purpose and need goals this symbol relates to the extent of achieving a goal; for environmental and engineering/cost criteria, it relates to the level of potential impacts (the greater the impact, the more slices in the circle are highlighted). This rating denotes that this criterion is not met at all (or very negligible) and there are no (or negligible) environmental and engineering/cost impacts. It should be noted that impacts can have either a positive or negative connotation depending on what criteria is being evaluated.



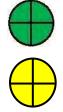
Some Achievement/Some Impact (approximately 25 percent): For the purpose and need goals this symbol relates to the extent of achieving a goal in green; for environmental and engineering/cost criteria in yellow, it relates to the level of potential impacts (the greater the impact, the more slices in the circle are highlighted). This rating indicates that approximately a quarter of the purpose and need goals are met and there are approximately 25 percent impacts for environmental and engineering/cost criteria. It should be noted that impacts can have either a positive or negative connotation depending on what criteria is being evaluated.



Half Achievement/Moderate Impact (approximately 50 percent): For the purpose and need goals this symbol relates to the extent of achieving a goal in green; for environmental and engineering/cost criteria in yellow, it relates to the level of potential impacts (the greater the impact, the more slices in the circle are highlighted). This rating indicates approximately half of the purpose and need goals are met and there are approximately 50 percent impacts for environmental and engineering/cost criteria. It should be noted that impacts can have either a positive or negative connotation depending on what criteria is being evaluated.



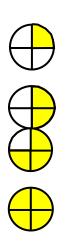
Substantial Achievement/Substantial Impact (approximately 75 percent): For the purpose and need goals this symbol relates to the extent of achieving a goal in green; for environmental and engineering/cost criteria in yellow, it relates to the level of potential impacts (the greater the impact, the more slices in the circle are highlighted). This rating indicates approximately three-quarters of the purpose and need goals are met and there are approximately 75 percent impacts for environmental and engineering/cost criteria. It should be noted that impacts can have either a positive or negative connotation depending on what criteria is being evaluated.



Complete Achievement/High Impact (approximately 100 percent): For the purpose and need goals this symbol relates to the extent of achieving a goal in green; for environmental and engineering/cost criteria in yellow, it relates to the level of potential impacts (the greater the impact, the more slices in the circle are highlighted). This rating indicates all or the vast majority of the purpose and need goals are met and there are approximately 100 percent impacts for environmental and engineering/cost criteria. It should be noted that impacts can have either a positive or negative connotation depending on what criteria is being evaluated.

Project Cost Criteria

In addition, the final evaluation criterion was the relative costs of each alternative. The alternatives were given one of the ratings below:



Alternative would have low or minimal additional cost beyond what is anticipated for long-term maintenance (i.e. maintaining the existing facility – No Action).

Alternative would have moderate to average costs related to other alternatives proposed.

Alternative would have substantial costs related to other alternatives proposed.

Alternative would have a cost that is orders of magnitude higher than other alternatives.

6.0 Screening of Initial Alternatives

In March 2019, the Purpose and Need Statement for the project was reviewed, commented upon, and agreed upon with Cooperating and Participating agencies, resulting in concurrence on the Purpose and Need Statement for the project. The Initial Alternatives screening criteria based upon the Purpose and Need described in this document are now considered finalized and were used by the SLT SEIS Study Team to screen the alternatives. The results of this screening may be viewed in **Appendix A** and are summarized below.

Initial Alternatives dismissed from further consideration

TSM/TDM Alternative – This Initial Alternative was eliminated from consideration as a stand-alone alternative due to its relatively low ability to reduce congestion and enhance safety in comparison to the other build alternatives. Although this alternative is eliminated from consideration as a stand-alone solution to congestion and safety in the SLT corridor, individual elements of the alternative may be incorporated into the build alternatives that have been retained for further development.

Multimodal Alternative – Similar to the TSM/TDM Alternative, the Multimodal Alternative was eliminated as a stand-alone alternative due to its lack of ability to meet the purpose and need of the project through reducing congestion and enhancing safety in comparison to build alternatives that add capacity. Likewise, individual elements of this alternative, in combination with elements of the TSM/TDM Alternative, may be incorporated into the build alternatives retained for further development to maximize alternative performance.

Build Alternative – Add Capacity Expressway (West Section) – This Initial Alternative was eliminated from further consideration primarily due to its inability to enhance safety in comparison to the Build - Add Capacity Freeway and Build- Add Capacity Tolled Highway alternatives. The primary difference between these alternatives is the retainage of at-grade intersections in the Expressway alternative, while all at-grade intersections are converted to limited access full interchanges in the Freeway and Tolled Highway alternatives. At-grade intersections within the existing corridor are locations with high frequencies of crashes and those intersection configurations perform poorly in safety evaluations in comparison to limited access interchanges.

Initial Alternatives retained for further development

No Action Alternative – As previously described, the No Action Alternative makes no capacity improvements on the existing West Section of the SLT beyond improvements that are directly related to ongoing rehabilitation and maintenance of the facility or projects that are already committed or programmed by local or State funding programs. The alternative does not meet several elements of the purpose and need established for the project. However, this alternative is retained throughout the NEPA evaluation process and its potential impacts are disclosed to provide a basis of comparison for other Build Alternatives.

Build Alternative – Add Capacity Freeway (West Section) – This Initial Alternative was carried forward for further development due to its substantial ability to enhance safety and reduce congestion in comparison to all other alternatives. This alternative eliminates all at-grade intersections and converts them to limited access full interchanges while also adding capacity in the form of additional travel lanes. By removing at-grade intersections, this alternative addresses the issue of locations with high frequencies of crashes while also increasing capacity and improving levels of service. In addition, various elements of the Multimodal and TSM/TDM alternatives may be incorporated into this Build Alternative.

Build Alternative – Add Capacity Tolled Highway (East and West Sections) - This alternative is similar to the previous 'Add Capacity Freeway' build alternative and was carried forward for additional development and analysis. However, this alternative includes the ability to collect tolls through allelectronic tolling (AET) to fund the construction of the facility. The tolled highway section would be consistent with the SLT East Section to provide system continuity for travelers. Like the freeway build alternative, this alternative will add capacity to reduce congestion, and will eliminate at-grade intersections thereby enhancing safety in comparison to other alternatives. Various elements of the Multimodal and TSM/TDM alternatives may be incorporated into this Build Alternative. The Build Alternative – Add Capacity Tolled Highway originally contemplated tolling all lanes of traffic on the SLT. In the Spring of 2019, the Kansas Legislature passed new legislation governing new toll roads in the state of Kansas. The legislation contained several provisions that directed how new tolling projects could be implemented in the state. The following is a brief summary of those provisions that pertain most significantly to the SLT:

- Existing lanes of capacity on any state highway system cannot be tolled.
- Only new lanes of capacity can be tolled.
- Any tolling revenue collected on a facility, such as the SLT, would need to be spent for ongoing construction or maintenance of that facility.
- To implement a new tolling project, the local government(s) in which the project exists must request the study of tolling feasibility in order for the project to proceed.
- The local communities must determine the level of public support for tolling, including a minimum of one public meeting.

As an outcome of the enabling toll legislation, the SLT study team developed a new tolling concept that utilized Express Toll Lanes so that the Tolled Highway Alternative was consistent with Kansas statute. Express Toll Lanes include concepts for only tolling new, additional lanes along SLT and existing lanes would remain toll-free. This revised tolling concept is described in additional detail in the Reasonable Alternatives section.

7.0 Reasonable Alternatives

As described in Section 6, three alternatives were carried forward for additional detailed development and analysis. These Alternatives are the No-Action Alternative, the Build Alternative – Add Capacity Freeway (West Section), and the Build Alternative – Add Capacity Tolled Highway (East and West Sections). The two Build Alternatives were carried forward for their ability to satisfy the Purpose and Need criteria for the proposed project and safety reasons, while the No-Action Alternative was carried forward as a basis of comparison for the two alternatives. Although the No-Action Alternative did not satisfy the Purpose and Need screening criteria, it is considered a Reasonable Alternative.

Development of Reasonable Build Alternatives

When developing roadway, bridge, and other geometric details for the Build Alternatives, several design elements and principles were considered essential in order to meet the Purpose and Need and to respond to previous public input on the proposed project:

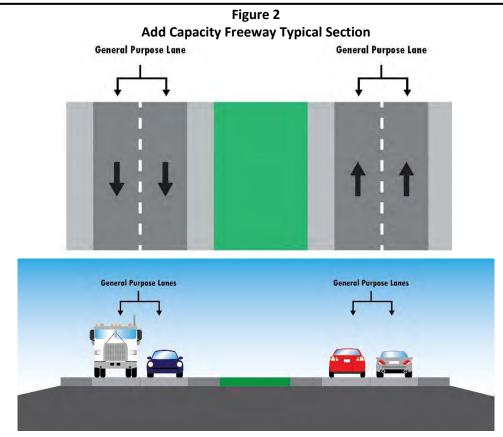
- Elimination of all at-grade intersections within the corridor to create a fully access-controlled facility to improve safety conditions;
- Addition of vehicle capacity in the form of additional lanes to improve future traffic operations and reduce congestion;
- Provide reasonable access for residential, commercial, and industrial roadway system users to and from N 1800 Road (Farmer's Turnpike) and I-70 and SLT;
- Accommodation of multimodal, TSM/TDM, or other ITS elements; and
- Provide flexibility in the corridor for future facility widening and "future proofing."

The two Build Alternatives were further developed through the course of the Reasonable Alternatives evaluation process. Each alternative was developed to meet KDOT roadway and bridge design criteria.

Build Alternative – Add Capacity Freeway (West Section)– The Add Capacity Freeway Alternative would rebuild the existing two-lane expressway, expanding it to a four-lane divided freeway by realigning the existing SLT West Section with two eastbound and two westbound lanes. In addition to the added capacity this alternative includes:

- Re-alignment of the SLT West Section through Clinton Parkway area (south of Bob Billings Parkway to north of Wakarusa Drive/27th Street) to remediate the existing curve geometry.
- Reconfiguration of the SLT/US-59 interchange to accommodate proposed future development plans in the vicinity of the existing interchange.
- Removal of the at-grade Wakarusa/27th Street intersection and replacement with a gradeseparated access-controlled service interchange at a location at or near the existing grade separated intersection (exact location to be determined in the future).
- Aligning the new, grade-separated Wakarusa interchange to connect to new Wakarusa Drive extension to County Road 458 (Wakarusa Drive extension to be constructed by others).
- Accommodation of multimodal, TSM/TDM and ITS technologies as part of SLT corridor-wide improvements.
- Potential to widen the corridor from four lanes to six lanes in the future when traffic demand warrants, and flexibility in future tolling and alternative approaches to lane congestion management in the median of the freeway when traffic demand warrants as well as the opportunity to implement new or emerging transportation technologies.

The full improvements contemplated with this alternative can be seen in **Exhibit 7**. A conceptual typical section of the divided freeway concept is depicted in **Figure 2**.

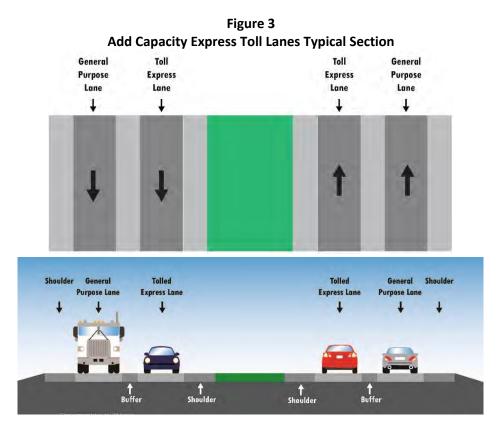


Build Alternative – Add Capacity Express Toll Lanes (East and West Sections)– As mentioned previously, 2019 Kansas Legislation directed that the Add Capacity Toll Highway Alternative be adjusted to continue as a viable alternative since it prohibits tolling existing capacity without some form of legislative exception. The new tolling alternative developed was an Express Toll Lane (ETL) concept.

The ETL alternative is compatible with the existing East Section of SLT, which is currently two freeway travel lanes in each direction. Those existing travel lanes are considered existing capacity and cannot be tolled under current Kansas law. However, the existing configuration allows for additional capacity to be added to the median, which accommodates one ETL in each direction. This would correspond with and provide continuity with the proposed ETL concept on the West Section of the SLT and would provide travelers the option of using the existing non-tolled four lanes of capacity, or using the tolled ETL.

The West Section ETL alternative would rebuild the existing two-lane expressway, expanding it to a fourlane divided highway, as with the Add Capacity Freeway Alternative, providing two eastbound and two westbound lanes. In the ETL Alternative one lane in each direction of travel would remain a toll-free lane (matching the existing lane capacity), the additional lane added in each direction would be an ETL. The ETL alternative would offer travelers the ability to choose to pay a toll to drive in the ETL or to select a toll-free trip in the general-purpose lane. The ETL would provide travel service focused primarily on through trips and would provide a more reliable, congestion-free trip. The ETL and the general-purpose lane in each direction would be separated by either a barrier or buffer area separation. At designated access points along the corridor access would be provided so that travelers could make a choice to move between the ETLs and general-purpose lanes. All travelers would have the ability to access the interchange ramps along the corridor via the general-purpose lanes.

A conceptual typical section of the divided freeway concept for ETLs is depicted in Figure 3.



The SLT study team did not make decisions about the exact number or location of access points between the ETLs and general-purpose lanes or the type of separation that would be implemented with this alternative. It was determined that reasonable assumptions could be made for the analysis and environmental impact assessment of this alternative and that these decisions could be made during the design phase if the alternative was selected as the Preferred Alternative for the project.

The Add Capacity Express Toll Alternative contains the same system-wide improvements implemented with the Add Capacity Freeway Alternative, including:

- Re-alignment of the SLT West Section through Clinton Parkway area (south of Bob Billings Parkway to north of Wakarusa Drive/27th Street) to remediate the existing curve geometry;
- Reconfiguration of the SLT/US-59 interchange to accommodate proposed future development plans in the vicinity of the existing interchange;

- Removal of the at-grade Wakarusa/27th Street intersection and replacement with a gradeseparated access-controlled service interchange at a location at or near the existing gradeseparated intersection (exact location to be determined in the future);
- Aligning the new, grade-separated Wakarusa interchange to connect to new Wakarusa Drive extension to County Road 458 (Wakarusa Drive extension to be constructed by others);
- Accommodation of multimodal and ITS technologies as part of SLT corridor-wide improvements; and
- Potential to widen the corridor to six lanes in the future when traffic demand warrants, and flexibility in future tolling and alternative approaches to lane congestion management in the median of the freeway when traffic demand warrants, as well as the opportunity to implement new or emerging transportation technologies.

The full improvements contemplated with this alternative can be seen in **Exhibit 8**.

Development of Build Alternatives for the K-10 and I-70 Interchange

During the previously completed SLT Concept Study, the I-70 and SLT interchange was identified as a segment of the SLT corridor that may need additional study to identify solutions that provide reasonable access from Farmer's Turnpike to SLT and I-70. Previous public input during the SLT Concept Study had identified this issue as a hurdle to overcome, so the study team developed three alternatives to address the needed improvements at the K-10 and I-70 interchange. The following describes the three alternatives that were developed and screened. It should be noted that these three interchange alternatives were compatible with both the Build Freeway Reasonable Alternative and the Build Tolled Highway Reasonable Alternative.

Alternative 1: **Relocated Farmers Turnpike Access** – This alternative utilized a new system to system interchange at K-10 and I-70 that only provides access between those two systems, while relocating Farmer's Turnpike access to/from K-10 and/or I-70 to a new interchange with I-70 at Lecompton Road. Alternative 1 is displayed on **Exhibit 9**. Direct access from Farmer's Turnpike to K-10 or I-70 at the existing K-10/I-70 system interchange would be removed, with new access to I-70 provided via the new interchange at Lecompton Road. Farmer's Turnpike access to K-10 would be provided via I-70 or an improved US-40 route. This alternative would result in increased out-of-distance travel for Farmer's Turnpike users attempting to reach either I-70 or K-10 due to the removal of direct access at the existing K-10/I-70 system interchange. Additionally, due to expected increased traffic volumes on US-40 with this configuration, safety enhancements would be constructed on US-40 between the new I-70/Lecompton Road interchange and K-10.

Alternative 2: Partially Relocated Farmers Turnpike Access – Similar to Alternative 1, this alternative utilizes a new system to system interchange at K-10 and I-70 to provide access between those two systems. Alternative 2 also constructs a new interchange at I-70 and Lecompton Road. However, this alternative does provide direct access from Farmer's Turnpike to/from K-10 at the K-10/I-70 interchange. With this alternative direct access from Farmer's Turnpike to I-70 is not provided at the K-10/I-70 interchange, rather this access is relocated west to the new I-70/Lecompton Road interchange. Alternative 2 can be viewed on **Exhibit 10**. Since direct access from Farmer's Turnpike to K-10 is

provided at the K-10/I-70 interchange, it is not anticipated that this alternative will lead to the diversion of additional traffic onto US-40 and upgrades to US-40 are not included in this alternative.

Alternative 3: Non- Relocated Farmers Turnpike Access – Alternative 3 would provide a new system to system interchange at K-10 and I-70 with full access to/from I-70, K-10 and Farmer's Turnpike, with free-flow movement for all ramps. This alternative also removes all at-grade intersections at the I-70/K-10 system interchange that were necessary to provide access to and from Farmer's Turnpike and SLT in Alternatives 1 and 2. To accomplish full access for Farmer's Turnpike to/from I-70 and K-10, this alternative utilizes combined access points for K-10 and Farmer's Turnpike to/from I-70. Alternative 3 can be viewed on **Exhibit 11.**

Development of Alternatives for other SLT corridor interchanges

The SLT West Section Concept Study process, completed in 2018, addressed configurations for existing interchanges in the SLT West Section. Specifically, the concept study determined geometric layouts for the existing interchanges at 6th Street, Bob Billings Parkway, Clinton Parkway, and US 59. Geometric layouts of the interchanges were developed to accommodate expansion of the SLT West Section from two to four lanes and have been adopted by both the Non-Tolled Freeway Alternative and the Tolled Expressway Alternative. These interchange configurations can be viewed on **Exhibits 7** or **8**.

The existing at-grade Wakarusa Road and 27th Street intersection will be converted to a full accesscontrolled service interchange with both the Non-Tolled Freeway and Tolled Expressway Build Alternatives. The exact location of this interchange and interchange geometrics are currently under evaluation. When the evaluation process is completed, this section will be updated and will include the evaluation results and preferred interchange configuration.

8.0 Reasonable Alternatives Screening and Ratings System

The Reasonable Alternatives were screened in a similar fashion as the Initial Alternatives. Screening the Reasonable Build Alternatives and the No-Action Alternative utilized both the Harvey Balls rating system and detailed, quantifiable engineering and social, natural, and physical environmental data. The Reasonable Alternatives were further refined through the course of the evaluation process and as such slight refinements were made to the screening criteria to best compare the alternatives.

Purpose and Need Criteria

The study team also performed an evaluation of how well the Reasonable Alternatives met the purpose and need criteria established for the project. The screening criteria to evaluate meeting the purpose and need criteria are previously defined in Section 4 and were refined as described:

 Traffic Operations (Reduce Congestion) – This screening criteria evaluates the extent to which an alternative includes measures that increase the capacity of the SLT West Section and/or increase transit service and use that would be sufficient to reduce congestion to level of service (LOS) D during the peak periods. To determine Level of Service on K-10 and on major urban arterials, detailed LOS was evaluated for each Reasonable Alternative for each segment of K-10 and the adjacent urban arterials. This analysis captured both congestion and reduction in travel times through the corridor. The full results of this analysis are presented in the Traffic and Safety Appendix Report. The screening measure is rated using Harvey balls/ideograms type system to condense the hundreds of LOS results. An alternative that improves LOS conditions to LOS D or better during peak periods will receive a higher relative rating.

- Enhance Safety The screening criteria evaluates the extent to which an alternative addresses safety of the SLT West Section over existing conditions by reduction in number and severity of crashes. This screening measure is rated using the Harvey balls/ideograms type system and evaluates the extent to which an alternative includes improvements to address locations with critical crash rates above the statewide average. The focus is on a reduction in number and severity of crashes as a result of an alternative improvements. Evaluation could also include investigation of countermeasures (i.e., additional driving lanes, installation of grade-separated interchanges, traffic signals or median barriers) on the SLT West Leg mainline that result in an expected reduction in crashes using the FHWA Crash Modification Factors Clearinghouse as a basis of analysis.
- **Promote a Multimodal Transportation System** This screening criteria evaluates the extent to which an alternative provides measures to enhance crossing of the corridor for non-motorized travel and freight and increases the effectiveness of transit options in the corridor.
 - Potential for Crossing Improvements This screening measure is rated using the Harvey balls/ideograms type system. Alternatives that allows for potential crossing improvements of SLT at new locations will receive a higher relative rating.
 - Increased Accommodation of Bus Transit Routes This screening measure will include the potential increase in the number of bus transit routes that may facilitate improved transit access within the community. This will be measured by an increase/decrease in the number of potential transit route crossings of the SLT that could link with nearby existing transit routes.
 - Provides Connection to Pedestrian, Bike or Trail Facility This screening measure is rated using the Harvey balls/ideograms type system. Alternative will be evaluated on the ability to preserve existing bike or trail systems and accommodate future planned connections.
 - Potential to Eliminate Freight Bottlenecks This screening measure is rated using the Harvey balls/ideograms type system. This screening measure will evaluate improvements that may be beneficial to freight movement (i.e. increased turning radii, access points) or improvements that may reduce or eliminate freight bottlenecks on areas of the SLT corridor (i.e., the number of signalized intersections potentially eliminated that cause backups and queues along SLT, adding traffic capacity with additional lanes, improving traffic merge distances, etc.) that can impact goods movement.
 - Support Local and Regional Growth This screening criteria evaluates the extent to which an alternative accommodates planned population, land use and other growth and development plans in the region through the measurement of potential land use impacts and is rated using the Harvey balls/ideograms type system. This screening measure will

evaluate an alternative's compatibility and consistency with city plans for future growth and development, as well as with regional metropolitan planning organization (MPO) plans for future growth and development.

Environmental Criteria

The study team also performed an evaluation of the potential natural and human environmental impacts for each initial alternative. The natural environmental impacts relate to the anticipated effect on natural sites. The human environmental impacts include any community, neighborhood, or business resources that may be affected by the alternatives.

- **Potential Park Impacts** This screening measure will include the area (acres) of parks potentially impacted by each alternative.
- **Potential Trail Impacts** This screening measure will include the length of shared-use-path or trails potentially impacted by each alternative.
- **Potential Right-of-Way Impacts** This screening measure is rated using the Harvey balls/ideograms type system. The alternatives that will require more right of way have more potential to change the surrounding land use. This screening measure does not determine whether the change is positive or negative as this is often subjective.
- **Potential for Property Displacements** The screening measure assesses the anticipated number of properties that would be displaced as a result of each alternative.
- **Potential for Environmental Justice Impacts** This screening measure is rated using the Harvey balls/ideograms type system. The direct impact on environmental justice areas are from relocations as related to the need for right of way and range of funding options being considered for the project.
- **Potential for Wetland Impacts** This screening measure is the area (acres) of anticipated impacts to wetlands of each alternative.
- **Potential for Pond Impacts** This screening measure is the area (acres) of anticipated impacts to ponds of each alternative.
- **Potential for Floodplain Impacts** This screening measure is the area (acres) of anticipated impacts to the 100-year and 500-year recurrence interval floodplains with each alternative.
- **Potential for Stream Impacts** This screening measure is the length (feed) of anticipated impacts to streams with each alternative.
- **Potential for Threatened and Endangered Species Impacts** This screening measure is the area (acres) of anticipated impacts to habitats of threatened and endangered species of each alternative.
- **Potential for Farmland Impacts** This screening measure is the area (acres) of anticipated impacts to farmland with each alternative.
- **Potential for Historic/Archaeological Impacts** This screening measure is the area (acres) of anticipated impacts to historic or archaeological properties with each alternative.
- **Potential for Noise Impacts** This screening measure is rated using the Harvey balls/ideograms type system. The impact of noise is typically related to the need for right of way and proximity to sensitive noise receptors. Once the reasonable alternatives are identified, the evaluation will consider the number of noise receptors affected.

- **Potential for Air Quality Impacts** This screening measure is rated using the Harvey balls/ideograms type system. Impacts to air quality are associated with higher levels of congestion and stop-and-go traffic that result in higher vehicle emissions.
- Potential for Hazardous Materials and Contaminated Sites Impacts This screening measure will include the number of hazardous materials and contaminated sites potentially impacted by each alternative.
- Stakeholder and Public Support This screening measure is rated using the Harvey balls/ideograms type system and takes into account the feedback received from the public and stakeholders through the course of the public involvement process.

Engineering Criteria

The study team also performed an evaluation of potential engineering issues including impacts on longterm maintenance, right of way impacts, and construction phasing for the reasonable alternatives. The engineering criteria incorporate the major elements used within the K-10 West Leg Concept Study as a baseline.

- Long-Term Maintenance This screening measure is rated using the Harvey balls/ideograms type system. The screening consisted of an assessment of impacts on maintenance needs for both the proposed and remaining existing facilities.
- Maintenance of Traffic and Constructability This screening measure is rated using the Harvey balls/ideograms type system. The screening consisted of an assessment of the ease of construction and ease of maintaining traffic during construction of each alternative.
- Estimated Cost These screening measures evaluate the anticipated Construction Cost of implementing each alternative and Life-Cycle Costs of maintaining each alternative after construction.

Reasonable Alternatives Screening Ratings System

Similar to the initial alternatives screening process, a Harvey balls/ideograms rating system was established and used in the screening matrix when screening the Reasonable Alternatives. An example rating system is shown below.



High Impact/No/or Low Achievement: This symbol relates to the extent of achieving a goal or the level of potential impacts. This rating denotes that this goal is not met at all (or very negligible) and there are high environmental and engineering/cost impacts. It should be noted that impacts can have either a positive or negative connotation depending on what criteria is being evaluated.



Substantial Impact/Slight Achievement (approximately 25%): This symbol relates to the extent of achieving a goal and the level of potential impacts. This rating indicates that approximately a quarter of the purpose and need goals are met and there are approximately 75% impacts for environmental and engineering/cost criteria. It should be noted that impacts can have either a positive or negative connotation depending on what criteria is being evaluated.

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Moderate Impact/Moderate Achievement (approximately 50%): This symbol relates to the extent of achieving a goal and the level of potential impacts (the greater the impact, the more slices in the circle are highlighted). This rating indicates approximately half of the purpose and need goals are met and there are approximately 50% impacts for environmental and engineering/cost criteria. It should be noted that impacts can have either a positive or negative connotation depending on what criteria is being evaluated.



Slight Impact/Substantial Achievement (approximately 75%): This symbol relates to the extent of achieving a goal and the level of potential impacts. This rating indicates approximately three-quarters of the purpose and need goals are met and there are approximately 25% impacts for environmental and engineering/cost criteria. It should be noted that impacts can have either a positive or negative connotation depending on what criteria is being evaluated.



No or Low Impact/High Achievement (approximately 100%): This symbol relates to the extent of achieving a goal and the level of potential impacts. This rating indicates all or the vast majority of the purpose and need goals are met and there are approximately zero or very low impacts for environmental and engineering/cost criteria. It should be noted that impacts can have either a positive or negative connotation depending on what criteria is being evaluated.

9.0 Screening of Reasonable Alternatives

As described in Section 8, screening the Reasonable Build Alternatives and the No-Action Alternative utilized both the Harvey Balls rating system and detailed, quantifiable engineering and social, natural, and physical environmental data. The toll-free and tolled Build Alternatives were developed and vetted with the same levels of engineering, traffic, safety, and environmental impact analysis. In general, the screening process revealed that engineering, traffic, safety and natural and physical environmental impacts were similar between the tolled and toll-free Build Alternatives. The comparative screening process also demonstrated similar achievement and impacts between the toll-free and tolled alternatives including similar levels of traffic operations and safety achievement.

In addition, for the Tolled Build Alternative, a high-level assessment of anticipated traffic in ETLs was evaluated. The goal of this analysis was to understand the potential traffic volume and revenue that might be generated by the ETLs. This high-level assessment indicated a lower traffic demand for the ETLs in the initial opening years of the project, meaning that the majority of travelers would be expected to choose a trip in the general-purpose lane rather than the ETL for the initial years after implementation and until such time that traffic in the corridor grew enough to cause a critical level of congestion in the non-tolled general-purpose lane. For a more detailed explanation of the traffic analysis and results see the Traffic and Safety Appendix Report.

Further evaluation of the tolled Build Alternative demonstrate that performed slightly worse than the non-tolled Build Alternative in a few areas:

- The tolled alternative required additional infrastructure and long-term maintenance investment, leading to lower ratings in the Long-Term Maintenance rating and higher costs overall. However, toll revenues may offset some or all of the anticipated additional costs.
- The tolled alternative had higher anticipated social environment impacts due to potential environmental justice concerns related to toll charges and the presence of low-income populations near the corridor.
- The public engagement conducted through the course of the study process revealed concern from the public over the Tolled Alternative and a strong preference towards the Add Capacity Freeway Alternative. This feedback resulted in the lower rating in the Public Input criteria.

The potential impacts of the tolled and non-tolled options were compared and can viewed on **Exhibit 12**.

Screening of Build Alternatives for the K-10 and I-70 Interchange

The screening process revealed that construction of a new interchange at I-70 and Lecompton Road to relocate or partially relocate access for Farmer's Turnpike (Alternatives 1 and 2) created more environmental impacts than reconstruction I-70/K-10 system interchange to provide full access to and from Farmer's Turnpike (Alternative 3). A new interchange at I-70/Lecompton Road resulted in greater farmland, wetland, pond, and floodplain impacts, but lesser stream impacts. The screening matrix developed for comparing the engineering and environmental impacts of the three K-10 and I-70 Interchange Alternatives is shown in **Exhibit 13**.

During the screening process of the K-10 and I-70 interchange alternatives, it was noted that Alternative 3 created substantially greater impacts to potential threatened and endangered species habitat. This was primarily due to greater amounts of contiguous forested property impacts created by the expanded constructed footprint of Alternative 3. For the purposes of this screening, forested property was considered as a proxy for potential habitat for the Federally endangered Northern Long-eared Bat. The presence or absence of this endangered species has not been confirmed on any of the identified forested property. Mitigation for potential impacts to Northern Long-eared Bat habitat is related to identification of potential roost trees and timing of tree clearing to avoid seasonal roosting and presence of the bats. For these reasons, impacts to potential bat habitat was not considered an environmental red flag.

Additionally, identified populations of Mead's Milkweed, a protected plant on the Federally Threatened and Endangered species list, were identified within the project area during previous environmental surveys. One area of known population was identified within the proposed construction footprint for the new I-70/Lecompton interchange. This area was identified as an environmental red flag and potential impacts to the populations should be avoided. To avoid impacts to this area, the project study team evaluated additional roadway alignment options and determined that avoidance of the known populations was either not feasible from an engineering perspective, or that the resulting additional environmental impacts created by avoidance were undesirable. As a result, Alternatives 1 and 2, which both included a proposed new interchange and I-70 and Lecompton Road and involved unavoidable impacts to known populations of Mead's Milkweed, were eliminated from further consideration.

Selection of the SLT and I-70 Interchange Alternative

Alternative 3 - Non-relocated Farmer's Turnpike Access, was selected as KDOT's Identified Preferred Alternative for the project SLT/I-70. Alternative 3 was selected due to its ability to meet the Purpose and Need for the project, its ability to maintain Farmer's Turnpike access to and from I-70 and SLT, and its avoidance of impacts to known populations of Mead's Milkweed.

While all three SLT/I-70 interchange Build Alternatives met the Purpose and Need for the project, as previously mentioned Alternatives 1 and 2 were eliminated from further consideration due to their impact to critical habitat of a Federally threatened plant, negative public reaction to these alternatives, public concerns with US 40 as a connecting route from I-70 to SLT, and inability to provide full access to/from Farmer's Turnpike and K-10/I-70 at a single location.

Selection of the Identified Preferred Alternative

The Add Capacity Freeway Build Alternative was recommended by the SLT study team as the Identified Preferred Alternative, including the recommendation of the K-10 and I-70 Alternative 3 Interchange, for the proposed project. The Add Capacity Freeway was selected due to its ability to meet the Purpose and Need for the project, provide acceptable levels of traffic operations through, and beyond, the design year, limit environmental impacts, and achieve the lowest cost solution.

The Add Capacity Freeway Build Alternative met the Purpose and Need for the project by:

- Reducing congestion In the 2045 AM peak travel period, 77 of 78 segments (99 percent) were in the acceptable level of service range, while the PM peak travel period saw 76 of 78 segments fall within the acceptable level of service range. In comparison, the No-Action alternative saw only 62 percent in the AM peak period and 54 percent of segments in the PM peak period fall within the acceptable level of service range.
- Enhancing safety The implementation of full access control (upgrading the Wakarusa/SLT and I-70/K-10 intersections to grade-separated interchanges), addressing horizontal deficiencies in the existing SLT alignment (through the Clinton Parkway area), and upgrading the facility from a two-lane undivided facility to a four-lane divided facility will enhance safety within the SLT corridor.
- Promoting a multimodal transportation system The Add Capacity Freeway Build Alternative
 accommodates opportunities for enhancing the pedestrian and bicycling environment by
 maintaining existing trail connections across the SLT facility and providing opportunities for
 additional trail connections across SLT at the new Wakarusa Drive interchange. Transit, freight,
 and other mobility services will see benefits through reduced future congestion in the corridor
 and improvements that enhance user safety.
- Supporting local and regional growth An upgraded SLT with additional capacity, improved operations, reduced delay, and enhanced safety design elements supports both local and regional growth through overall improved mobility.

The Add Capacity Tolled Highway generated substantial public comments in opposition to tolling the facility and failed to attract enough traffic to the ETLs in the initial opening years of the project to make

this option a viable alternative. Environment justice issues with toll charges and the presence of lowincome populations also created concerns with this alternative, although the environmental justice concerns could potentially be mitigated through availability of non-tolled general-purpose freeway lanes. Should traffic conditions and levels of congestion change, the Identified Preferred Alternative retains flexibility in the median to integrate ETLs or other congestion management solutions in the future when warranted.

The No-Action Alternative, while a Reasonable Alternative, was primarily carried forward for evaluation as a point of comparison against the Build Alternatives. The No-Action Alternative did not meet the Purpose and Need for the project and was not selected as the Identified Preferred Alternative due the presence of a constructible, fundable, and viable Build Alternative that met the Purpose and Need for the project.

10.0 The Identified Preferred Alternative

SLT Identified Preferred Alternative Description

The SLT Identified Preferred Alternative is the Add Capacity Freeway Alternative. This alternative provides a four-lane freeway facility and a full system to system interchange with access to/from I-70, SLT and Farmer's Turnpike, with free-flow movement for all ramps (I-70 and K-10 Alternative 3). The elements of the Preferred Alternative can viewed on **Exhibit 14**.

The Preferred Alternative is a 128-foot wide facility that includes two 12-foot travel lanes in each direction, six-foot inside and 10-foot outside shoulders, and a 60-foot undeveloped median. The median is reserved for implementation of additional travel lanes in the future if and when warranted by traffic demand.

The SLT Identified Preferred Alternative includes the following design and construction elements:

- Construction of a fully access controlled four-lane freeway by realigning and widening the existing SLT West Section with two eastbound lanes and two westbound lanes;
- Re-alignment of the SLT West Section through Clinton Parkway area (south of Bob Billings Parkway to north of Wakarusa Drive/27th Street) to remediate the existing curve geometry;
- Reconfiguration of the SLT/US-59 interchange to accommodate proposed future development plans in the vicinity of the existing interchange;
- Removal of the at-grade Wakarusa/27th Street intersection and replacement with a gradeseparated access-controlled service interchange at a location at or near the existing gradeseparated intersection (exact location to be determined in the future);
- Aligning the new, grade-separated Wakarusa interchange to connect to new Wakarusa Drive extension to County Road 458 (Wakarusa Drive extension to be constructed by others);
- Accommodation of multimodal, TSM/TDM and ITS technologies as part of SLT corridor-wide improvements;
- Potential to widen the corridor to six lanes in the future when traffic demand warrants, and flexibility in future tolling and alternative approaches to lane congestion management in the

median of the freeway when traffic demand warrants, as well as the opportunity to implement new or emerging transportation technologies; and

Integration of a future six-lane SLT West Section with a future SLT East Section, as both Sections
include undeveloped medians that are reserved for construction of future tolled or non-tolled
capacity. This will create a continuous and consistent SLT expressway treatment from I-70 east
to East 23rd Street (east Lawrence) as future traffic conditions warrant.

Identified Preferred Alternative "Future Proofing" and Tolling

The SLT study team recognizes the emerging and evolving technological environment that currently exists with respect to congestion management, intelligent transportation systems, and vehicular safety measures. In order to preserve flexibility to "future proof" the SLT for the long-term, the study team recommended preserving a right-of-way footprint in the SLT corridor to accommodate and allow the ability to implement future transportation and technology solutions. The 128-foot right-of-way footprint being cleared through this study and SEIS will provide that flexibility.

Ultimately, the 128-foot wide typical section utilized for the Preferred Alternative provides the flexibility to widen and improve the SLT Corridor to an ultimate six lanes beyond the design year 2045. While only four lanes are needed to meet traffic demand through the design year, this footprint leaves flexibility to widen to six lanes when warranted in the future. This footprint is consistent with the configuration of the median area for the SLT East Section from the US-59/Iowa Street interchange to the 23rd Street/SLT interchange.

Tolling the SLT corridor was evaluated as a means to provide funding for construction of the project, however the study team determined that the future forecasted traffic demand does not warrant the construction of ETLs by the anticipated 2025 opening day of the SLT Corridor improvements. However, a future transportation improvement area was reserved in the median of the four-lane freeway so that ETLs could be evaluated and potentially constructed when warranted. This leaves flexibility to "future proof" the corridor for the long-term by implementing ETLs or other forms of lane management strategies. This same strategy could be applied to the median of the SLT East Section so that a future ETL in each direction in the median could span both the East and West Section, as well as potentially connect to a future ETL if/when warranted from Lawrence to the Kansas City metro area.

Phasing of the SLT Identified Preferred Alternative

Based on future projected traffic demand and the current available funding, the Identified Preferred Alternative could be constructed in phases. Opening year for the SLT corridor improvements was assumed to be 2025 and the design year to be 2045. Some proposed corridor improvements may not be warranted by future projected traffic demand until closer to the design year 2045.

An exact approach to phasing the improvements was not determined as part of the SEIS. KDOT and the study partners will continue to evaluate approaches along with options for funding the improvements as design of the project progresses. The phasing approaches will not change the ultimate improvements comprising the Identified Preferred Alternative, once fully implemented.

Identified Preferred Alternative Cost and Funding

The Identified Preferred Alternative was estimated to cost \$175 million in 2020 dollars. Estimated yearly life-cycle cost to maintain the proposed improvements between 2025 and 2045 is \$8 million.

APPENDIX A: ALTERNATIVES EXHIBITS

South Lawrence Trafficway

Programmed and Committed Projects – No Action



Legend

 South Lawrence Trafficway (includes maintenance and rehabilitation of existing lanes)

 Geometric improvements

 Bike Route with Paved Shoulder

 Bike Lane

 Shared Use Path

South Lawrence Trafficway Supplemental Environmental Impact Statement KDOT # 10-23-KA-3634-01

Exhibit 1





U.S. Department of Transportation Federal Highway Administration



Proposed TSM/TDM Strategies



Legend

O Construction of intersection improvements to improve safety and traffic circulation. Improvements may include:

· Adding right and left turn bays at intersections

- Lengthening existing turn bays
- Adaptive signal timings
- Increasing lane widths at intersections Widening shoulders

 Adding rumble strips Enhanced bicycle/pedestrian crossings •ITS improvements including ramp metering, queue detection and advance warning for roadway transitions.

South Lawrence Trafficway Supplemental Environmental Impact Statement

South Lawrence Trafficway - - - US 40 safety improvements

Exhibit 2

KDOT # 10-23-KA-3634-01



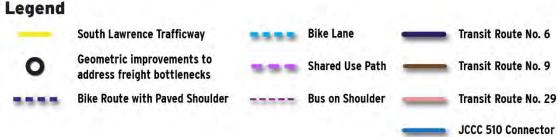


U.S. Department of Transportation Federal Highway

Suth Lawrence Trafficway

Programmed or Committed Multimodal Improvements





South Lawrence Trafficway Supplemental Environmental Impact Statement KDOT # 10-23-KA-3634-01

Exhibit 3





U.S. Department of Transportation Federal Highway Administration

SLT South Lawrence Trafficway

Legend

Add Capacity Expressway Alternative

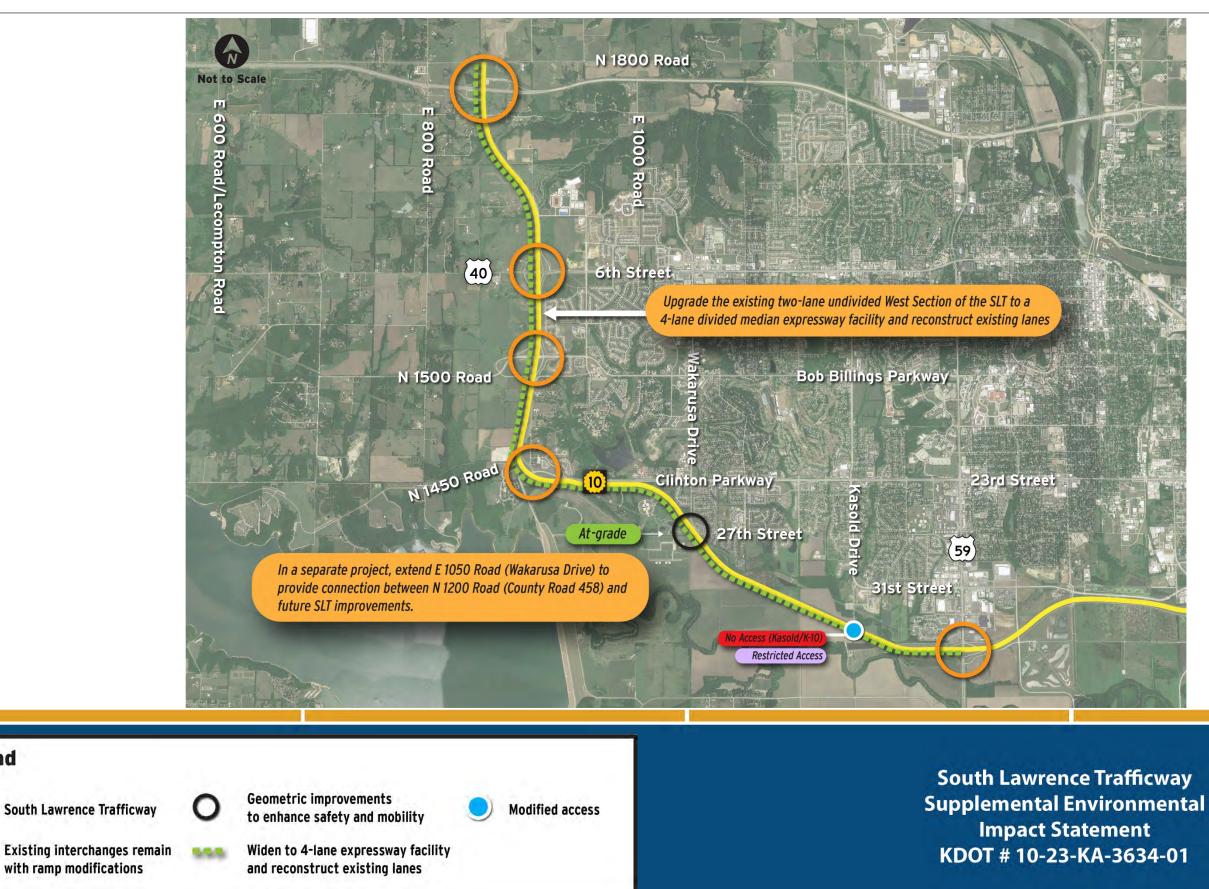


Exhibit 4



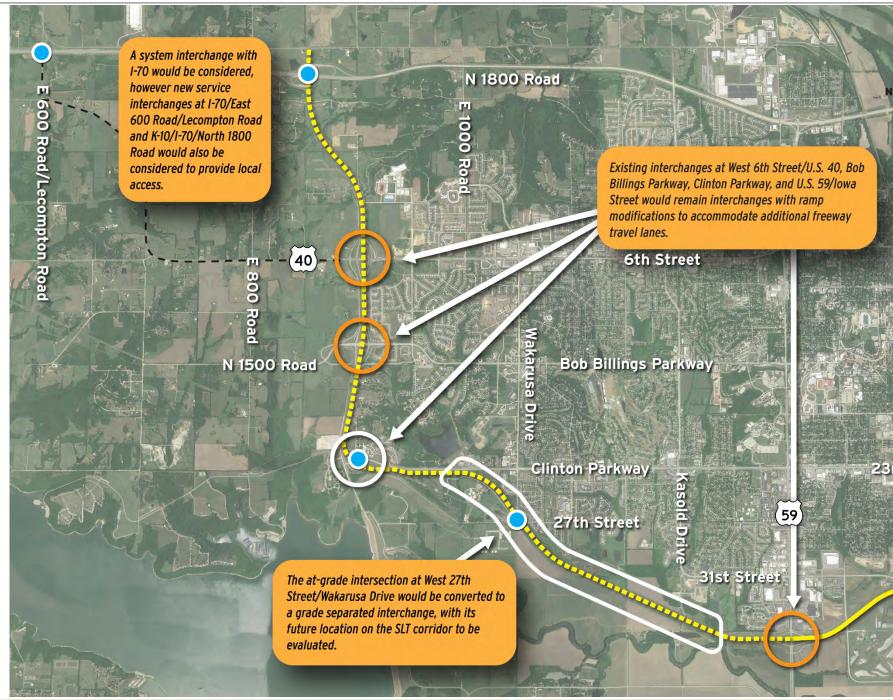




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SLT South Lawrence Trafficway

Add Capacity Freeway Alternative



Legend

Potential US 40 safety improvements ---



Potential new interchanges or modified access



Existing interchanges remain with ramp modifications

SLT with future expansion to 4 or 6 lane freeway

South Lawrence Trafficway Supplemental Environmental Impact Statement KDOT # 10-23-KA-3634-01

Exhibit 5







U.S. Department of Transportation ederal Highway



Add Capacity Tolled Highway Alternative

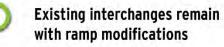


Legend





Potential new interchanges or modified access



140

SLT with future expansion to 4 or 6 lane freeway

Existing SLT



General Access points from tolled lanes to non-tolled lane & local street network South Lawrence Trafficway Supplemental Environmental Impact Statement KDOT # 10-23-KA-3634-01


Exhibit 6






J.S. Department of Transportation Federal Highway Administration

South Lawrence Trafficway

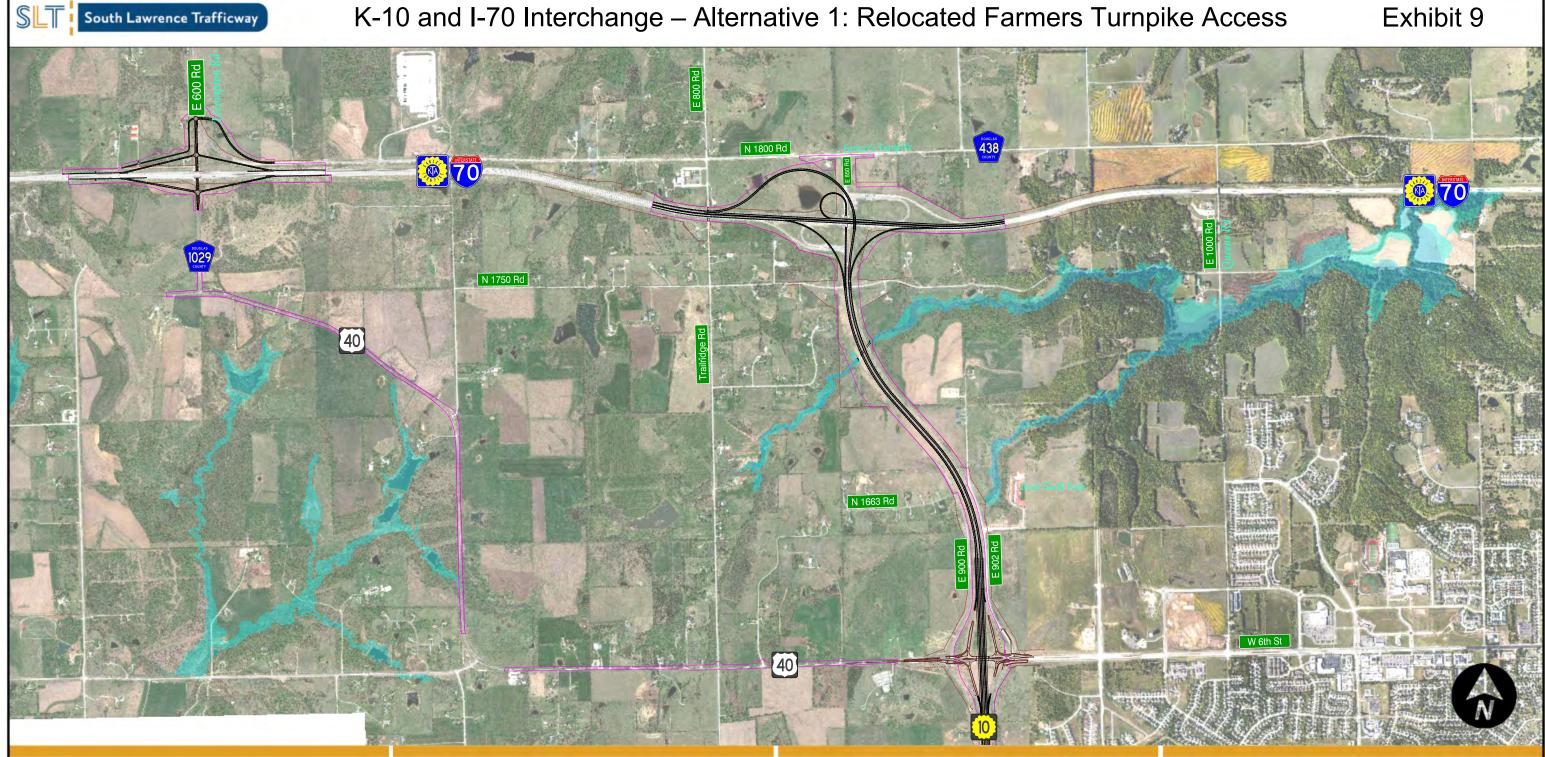


South Lawrence Trafficway







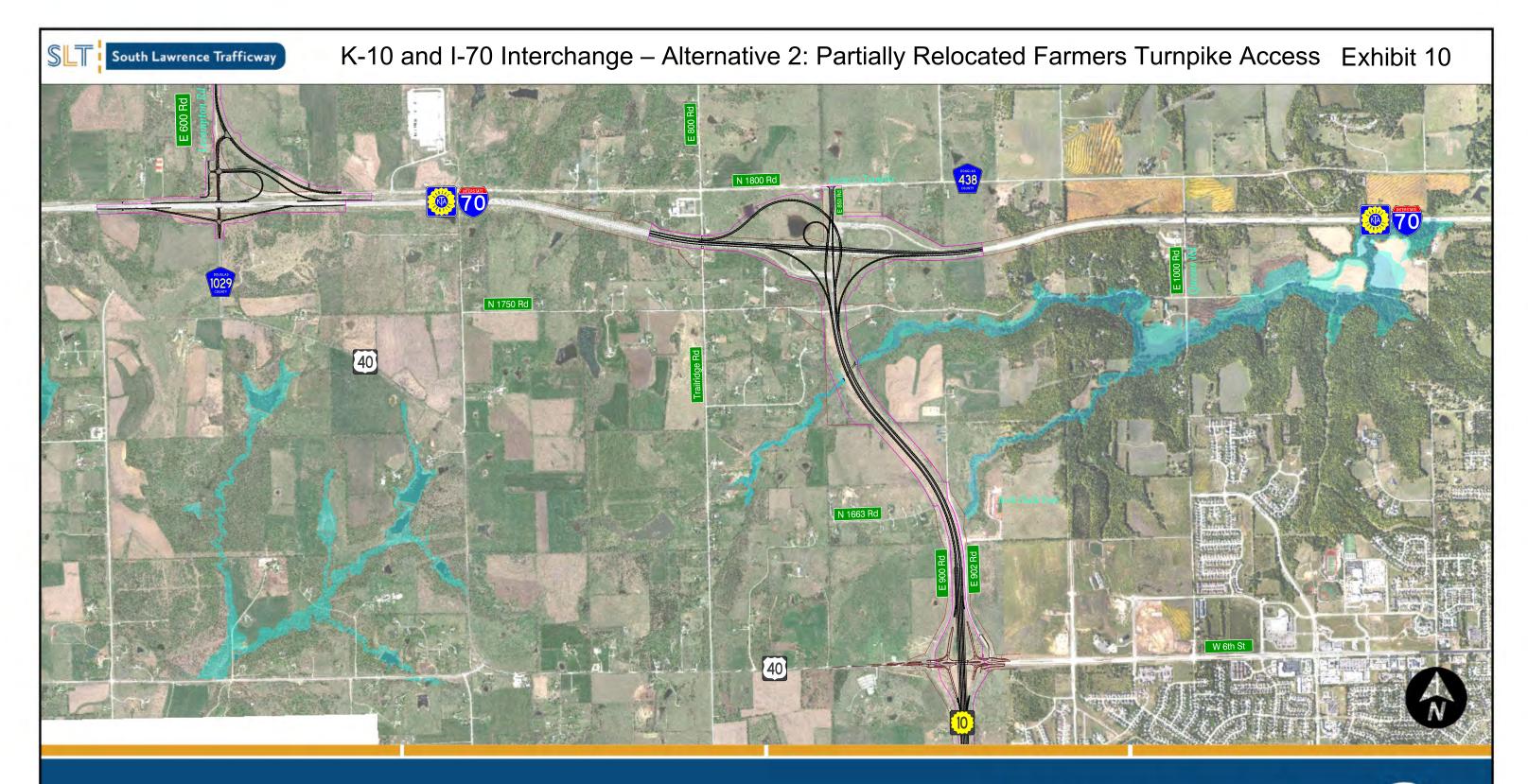


South Lawrence Trafficway Supplemental Environmental Impact Statement KDOT # 10-23-KA-3634-01





ederal Highway

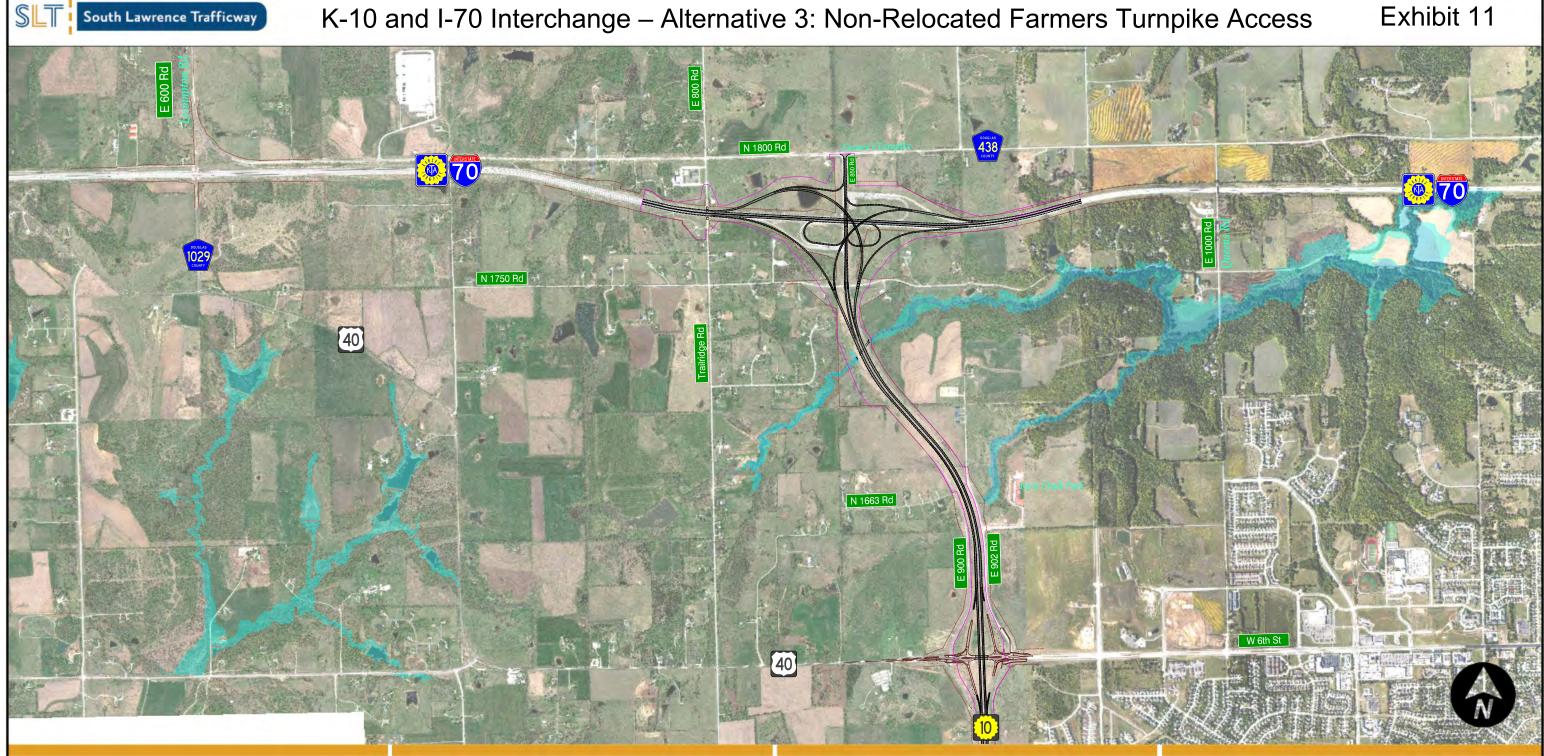


South Lawrence Trafficway Supplemental Environmental Impact Statement KDOT # 10-23-KA-3634-01





J.S. Department of Transportation Federal Highway Administration



South Lawrence Trafficway Supplemental Environmental **Impact Statement** KDOT # 10-23-KA-3634-01





ederal Highway

									S	outh La	wrence 1	rafficwa	ıy - West L	.eg													
										F	Reasonab	e Alterna	tives														
			Ratings																Estimat	ted Cost							
Alternate Configuration		2	045 Traffic Operations									Environmental Screening													j –		
	Description	I-70	K-10 Local Street Safety Network	MOT & Constructability	Long-Term Maintenance	Public Input	Access	Right of Way/Utilities	Land Use Impac	ts Environmenta Justice	Displacements	NWI Wetland Impacts (Acres)	d NWI Pond Impa (Acres)	Floodplain acts Impacts 100 & 50 Yr (Acres)	00- NHD Stream Impacts (Feet)	Potential T&E Species Habitat Impacts (Acres)	labitat Farmland Impacts (Acres)	Historic/Arch- aeological Property Impact (Acres)	Park Impacts	Trail Impacts (Feet)	Noise Impacts	Air Quality Impacts	Hazardous Materials Impacts (Sites)	Construction Cost (2020 Dollars)	t Life-Cycle Costs (2025-2045)		
		Achievement	Achievement	Achievement	Achievement	Impact	Impact	Achievement	Impact	Impact	Impact	Impact				(******,		()		()						<u> </u>	<u> </u>
No-Build	 -Includes only maintenance activities to keep the facility open to traffic and operating. 	-	•	•	•	•	•	-	•	•	•	•	-	-	-	-	-	-	-	-	-	-	TBD	TBD	0	\$0	\$13M
Non-Tolled Freeway Alternative	-Four-Lane Freeway with grade separations at all intersections. -Freeway can be expanded to a 6-lane section in the future. -Includes Alternative 3 at K-10 & I-70 interchange.	\oplus	•	•	•	Ð	Ð	•	Ð	•	•	•	4	74.43	6.78	209.03	12,441.78	34.47	148.53	0.00	26.57	28,734.95	TBD	TBD	1	\$175M	\$8M
Express Toll Lane Freeway Alternative (Range of Tolled Solution)	-Express Toll-Lane w/ one Toll-Lane and One General Purpose lane in each direction. Includes an evaluation of range of solutions for typical section from High-Tend to Low-EndRanges indicate the impact/cost range from High-End to Low-End Tolled Alternative -Includes Alternative 3 at K-10 & I-70 interchange.		•	•	Ð	•	•	Ð	Ð	•	•	•	4	74.43 - 77.7	5 6.78	209.03 - 212.58	12,441.78 - 13,698.77	34.47 - 35.83	148.53 - 154.2	. 0.00	26.57 - 28.84	28,734.95 - 33,466.24	TBD	TBD	1	\$195-237M	\$3M*
High Impact/No or Low Achievement Substantial Impact/Slight Achieveme Moderate Impact/Moderate Achievem Slight Impact/Substantial Achievement No or Low Impact/High Achievement	nt nent	Safety: High-lew MOT & Constru Long-Term Mai Public Input: Su Access: Include Right of Way/Ut Land Use Impac	alitative assessment of an citability: Assessm ntenance: Impact ummary of feedbac es assessment of im tilities: Impacts to cts: Considers ho Justice: Considers	chievement based nent of ease of ma on future mainten k received from p npacts on ease of surrounding prop w improvements v	I on anticipated se aintaining traffic du ance for both pro ublic through vario access between I erties or challenge vill facilitate land u	afety; includes ass uring construction posed and remain ous stakeholder e I-70/K-10 System as staying within R ise consistent with	essment of numb and overall ease hing existing facilit ngagement activit s and local netwo t/W; impacts to ut a Long-Range Pla	er of weaving mo of construction ies ies rk illities in	vements, entrano		at-grade intersection	ns, and number c	f access points					·				<u>.</u>				*Note: Assumed opp maintenance costs o partially offset by tolli	of ETL Freeway are

Exhibit 12

South Lawrence Trafficway **Supplemental Environmental** Impact Statement KDOT # 10-23-KA-3634-01





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										South	h Lawrei	nce Traff	icway - W	est Leg														
										North	Interchar	nge Altern	ate Config	urations														
			Ratings																	ted Cost								
		2045 Traffic Operations											Environmental Screening														1	
Alternate Configuration Description	I-70	K-10	Farmer's Turnpike/K-10 Inter.	Lecompton Inter.	Safety		Long-Term ity Maintenance	Public Input	Access	Right of Way/Utilities	Land Use Impac	ts Environmental Justice	Displacements	NWI Wetland Impacts (Acres)	NWI Pond Impacts In (Acres)	Floodplain npacts 100 & 500- Yr (Acres)	NHD Stream Impacts (Feet)	Potential T&E Species Habitat Impacts (Acres)	Farmland Impac (Acres)	Historic/Arch- aeological Property Impacts (Acres)	Park Impacts (Acres)	Trail Impacts (Feet)	Noise Impacts	Air Quality Impacts	Hazardous Materials Impacts (Sites)	Construction Cost (2020 Dollars)		
		Achievement	Achievement	Achievement	Achievement	Impact	Impact	Achievement	Impact	Impact	Impact	Impact															<u> </u>	
No-Build	-Includes normal operations and maintenance to maintain facility condition.	+	•	•	NA	+	•	•	•	\oplus	•	•	•	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	N/A	0	\$0	N/A
Alt. 1 Relocated Farmers Tumpike	-K-10 & I-70 Interchange provides system-system access only -New interchange provided at I-70 and Lecompton Road for I-70 to Farmer's Turmpike access. -Farmer's Turmpike access. -Includes US-40 safety enhancements to address increase in traffic due to altered Farmer's Turmpike Access.	Ð	•	NA	•	-	•	Ð	•	•	•	•	•	2	3.63	7.06	1.47	2,468.01	15.45	81.63	0.82	0.00	4,396.18	TBD	TBD	0	\$46M	N/A
Alt. 2 Partial Relocated Farmers Tumpike	-K-10 & I-70 Interchange provides system-sytem access and K-10-Farmer's Tumpike access. -New interchange provided at I-70 and Lecompton Road for I-70-Farmer's Tumpike access.		•	•	•	\oplus	\oplus	\oplus	•	•	•	•	•	1	3.63	7.06	1.47	2,594.52	14.33	89.21	0.00	0.00	4,397.64	TBD	TBD	0	\$55M	N/A
Alt. 3 Non-Relocated Farmers Tumpike	K-10 & I-70 Interchange provides system-system access, K-10-Farmer's Tumpike access, and I-70-Farmer's Tumpike access. Provides fine-flow movements for all ramps. -No al-gradie intersections. -Utilizes combined access points for K-10/Farmer's Turnpike access to/from I-70.	\oplus	•	•	NA	Ð	\oplus	•	Ð	•	Ð	•	•	3	3.14	6.54	1.42	2,993.59	19.20	58.85	0.00	0.00	4,263.65	TBD	TBD	1	\$58M	N/A
High Impact/No or Low Achievement Substantial Impact/Slight Achievement Moderate Impact/Moderate Achieveme		Safety: High-leve MOT & Construe Long-Term Mair Public Input: Su	el assessment of a ctability: Assessn ntenance: Impact mmary of feedbac	achievement based nent of ease of ma on future maintena k received from pu		ety; includes asse ng construction a sed and remainin s stakeholder enç	essment of numb and overall ease on ng existing facilitie gagement activitie	es			ade intersections,	and number of ac	cess points			· · ·												

Access: includes assessment of mactor arease of access between 170(k-10 Systems and locat network Access: includes assessment of impacts on ease of access between 170(k-10 Systems and locat network Right of Wayl/Utilities: Inpacts to surrounding properties or challenges staying within RWv; impacts to utilities Land Use Impacts: Considers the degree to which improvements may have differential impacts on demographic groups.

No or Low Impact/High Ad

Slight li

South Lawrence Trafficway Supplemental Environmental Impact Statement KDOT # 10-23-KA-3634-01


Exhibit 13





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South Lawrence Trafficway SLI







Preferred Alternative

Exhibit 14