



APPENDIX G: TIER 2 SCOPING REPORTS

Kentucky Statewide Corridor Plan (Linking Kentucky)

Route: KY 4 (New Circle Road – south freeway section)
Segment ID: 4A
From: US 25 (Richmond Road)
To: KY 922 (Newtown Pike)
Counties: Fayette
Highway Districts: 7

CORRIDOR SEGMENT OVERVIEW

The 4A segment on New Circle Road begins at the New Circle Road/US 27 interchange in Fayette County and circulates clockwise around Lexington until it reaches Newtown Pike, where it becomes segment 4B. Segment 4A begins again at the Richmond Road interchange, and ends at Nicholasville Road. The corridor segment length is approximately 13 miles and currently contains multiple interchanges.

The segment is considered limited access throughout, passing through major residential and commercial corridors such as Nicholasville Road, Harrodsburg Road, Newtown Pike, Versailles Road and Georgetown Road, considered city throughout. These areas would be considered city (according to KYSTMv18 data) with clusters of homes and commercial buildings adjacent to, but not accessing, KY 4.

EXISTING FACILITY

The table below outlines the typical roadway attributes for this section of New Circle Road by sub-segment.

Typical Roadway Attributes					
Sub-segment	Functional Classification	Number & Width of Lanes	Shoulder & Width	Median Type & Width	Posted Speed Limit
From US 421 (Richmond Road) to US 60	Principal Arterial / Other Freeway & Expressway	4, 12'	4' – 10'	Depressed, 36' with cable barrier	55 mph
US 60 to US 421 (Leestown Road)	Principal Arterial / Other Freeway & Expressway	4-6, 12'	10'	Concrete barrier, 23'	55 mph
US 421 (Leestown Road) to KY 922	Principal Arterial / Other Freeway & Expressway	4, 12'	0' – 10'	Raised non-mountable, 20' and concrete barrier, 20'	55 mph

Right of Way: The existing right of way is generally 200' – 250' wide.

Pavement: The average PDI (Pavement Distress Index) for this section of KY 4 is 0.29, which indicates an overall good pavement condition according to KYTC criteria (Good: 0.00 – 0.35; Fair: 0.36 – 0.65; Poor: 0.66 – 0.99).

Intersections/Interchanges: The table below outlines the existing interchanges on the corridor. There are no at-grade intersections or railroad crossings along this segment.

Interchanges	Interchange Type
US 25 (Richmond Road)	Diamond
Alumni Drive	Diamond
KY 1974 (Tates Creek Road)	Diamond
US 27 (Nicholasville Road)	Diamond
US 68 (Harrodsburg Road)	Diverging Diamond
US 60 (Versailles Road)	Partial Cloverleaf w/ Spill-through Flyover
KY 1681 (Old Frankfort Pike)	Diamond
US 421 (Leestown Road)	Diamond
US 25 (Georgetown Road)	Diamond
KY 922 (Newtown Pike)	Partial Cloverleaf

Access Points: This segment is fully limited access, with access by permit between US 25 and KY 922.

Bridges: The tables below outline the detailed bridge information for existing bridges on or over this section of New Circle Road (KY 4).

Mainline Bridge Information										
Bridge ID	Feature Intersect	NBIS Classification	Sufficiency Rating	Substandard	Deck Rating	Superstructure Rating	Substructure Rating	Under Clearance (feet)	Horizontal Clearance (feet)	Culvert Rating
034B00022L	US 60 - VERSAILLES RD	Fair	70.4	No	6	5	6	15.92	31.33	N
034B00022R	US 60 - VERSAILLES RD	Fair	81.9	No	5	5	7	17.58	42.33	N
034B00023L	PARKERS MILL ROAD	Fair	85.3	No	5	7	5	16.33	37.5	N
034B00023R	PARKERS MILL ROAD	Fair	97.5	No	6	6	6	15.25	37.5	N
034B00024L	US 68(HARRODS BURG ROAD)	Fair	65.7	No	6	6	5	17.08	30.25	N
034B00024R	US 68(HARRODS BURG ROAD)	Fair	65.7	No	6	6	5	15.7	30.25	N
034B00025L	CLAYS MILL ROAD	Fair	78.4	No	6	6	6	17.92	31.75	N
034B00025R	CLAYS MILL ROAD	Fair	78.4	No	6	6	6	16.17	31.75	N
034B00027L	LANDSOWNE DRIVE	Fair	95.3	No	6	7	6	16.75	39.58	N
034B00027R	LANDSOWNE DRIVE	Fair	94.3	No	6	7	7	15.33	38	N
034B00028L	TATES CRK ROAD KY 1974	Fair	73.9	No	6	6	5	15.33	31.92	N
034B00028R	TATES CRK ROAD KY 1974	Fair	73.9	No	6	6	5	15.33	31.92	N
034B00029L	GREEN TREE-CHINOE RD	Fair	87.3	No	6	6	5	15.13	38.25	N
034B00029R	GREEN TREE-CHINOE RD	Fair	87.3	No	6	6	5	15.13	38.25	N
034B00031L	US 25 RICHMOND RD.	Fair	70.5	No	6	6	5	16.75	31.58	N
034B00031R	US 25 RICHMOND RD.	Fair	69.5	No	5	6	5	14.7	31.58	N
034B00037L	US 421 (LEESTOWN RD.)	Fair	62.5	No	5	5	5	16.08	30.33	N
034B00037R	US 421 (LEESTOWN RD.)	Fair	62.1	No	5	5	5	16.1	30.33	N
034B00038L	NS (CNO&TP) SYSTEM	Fair	68.8	No	6	6	5	23.58	30.33	N
034B00038R	NS (CNO&TP) SYSTEM	Fair	68.8	No	6	6	5	23.6	30.33	N

Structures Crossing Over the Corridor			
Bridge ID	Facility Carried	Under Clearance (feet)	Horizontal Clearance (feet)
034B00026N	NICHOLASVILLE ROAD	16.92	91.00
034B00030R	ALUMNI DRIVE	17.08	28.00
034B00036N	GEORGETOWN ROAD	99.99	58.33
034B00134L	ALUMNI DR NC	17.08	52.00
034B00171N	KY 1681	99.99	64.00
034B00180N	KY 922	99.99	99.00
034B00033N	NS (CNO&TP) RR	16.50	44.00

Other Noteworthy Conditions: None.

TRAFFIC & OPERATIONS

AADT & AADTT: The table below summarizes the 2015 AADT and daily truck volumes by sub-segment.

Traffic Volumes			
Sub-segment	AADT	AADTT	Truck Percentage
From US 25 (Richmond Rd) to US 421 (Leestown Rd)	53,700	3,400	6%
From US 421 (Leestown Rd) to KY 922 (Newtown Pike)	39,300	7,200	18%

Mobility: The entirety of this corridor segment is a major traffic bottleneck. (Note: bottlenecks are identified by Level of Travel Time Reliability (LOTTR) > 1.5 or volume/capacity (v/c) > 0.6.) Typical roadway attributes of the bottleneck area can be found above for the entire segment.

Existing Typical Roadway Attributes at Major Traffic Bottlenecks					
Locations	Functional Classification	Number & Width of Lanes	Median Width	Shoulder Width	2015 AADT ¹
Entire corridor	Refer to the Existing Facility section above				65,408

1) The highest traffic volume within the bottleneck based on KYSTMv18 data.

Safety: 14.7% of the corridor mileage has a Level of Safety of Service (LOSS) of 4, meaning these links have the highest potential to decrease crashes. (Note: LOSS indicates the potential for crash reduction and is broken up into four categories based on Safety Performance Functions (SPFs): LOSS 4 = high; LOSS 3 = moderate to high; LOSS 2 = low to moderate; LOSS 1 = low.) See the table under **Potential Safety Improvement** section for details of locations with LOSS =4 and potential safety improvements.

ITS Devices: Lexington-Fayette Urban County Government (LFUCG) has a fiber network surrounding the corridor with CCTV cameras throughout the corridor.

PROPOSED IMPROVEMENT CONCEPTS

The improvement options noted in this report are not intended to be all-encompassing. Other potential improvements are possible, including innovative solutions that could be cost-effective and address the reasons for improvement. Further study may be needed as part of the project development process.

Proposed Typical Section & Description of Modification: The table below describes the proposed improvement concepts for the identified bottlenecks. The proposed improvements expect to maintain an overall acceptable traffic condition through 2045 (v/c < 0.85 in urban areas and v/c < 0.7 in rural areas) and address safety issues at bottlenecks.

Proposed Improvement Concepts			
Location	Improvement Concepts ¹	Notes ²	Reason for Improvement
Clockwise from US 25 (Richmond Road) to KY 922 (Newtown Pike)	Widen to a 6-lane typical section throughout the entire segment. This already exists between Versailles Road and Leestown Road	Match typical section of widened section of New Circle Road between US 60 and KY 421, would be 3-12' lanes in each direction with 10' shoulders and concrete median barrier	The links between US 25 (Richmond Road) and US 60 (Versailles Road) are bottlenecks and do not have acceptable 2045 v/c ratio

1) The proposed roadway widening concept includes spot improvements at interchanges and major intersections as needed (see details in Interchanges for Potential Modification and Major Intersection for Potential Modification sections below).

2) Improved typical sections are based on KYTC Highway Design Manual.

Potential New Interchanges: None.

Interchanges for Potential Modification: Harrodsburg Road, Versailles Road, Old Frankfort Pike, Leestown were recently modified. Newtown Pike and Georgetown Road interchanges are currently under construction with expected completion in summer 2021, which are part of the KYTC project 7-366.00 (widen New Circle Road in Lexington from Georgetown Road to Boardwalk Avenue including interchange reconstruction at Newtown Pike).

Interchanges for Potential Modification		
Nicholasville Road	Tates Creek Road	Richmond Road

Major Intersections for Potential Modification: None.

Bridges: Bridge recommendations are based on ratings of substructure, superstructure and deck using the following methodology.

Methodology for Replacement/Rehabilitation Recommendation					
Structures	Substructure Rating	Superstructure Rating	Deck Rating	Culvert Rating	Recommendations
Bridges	<=4	Any	Any	/	Replacement
	=5	Any	Any	/	Rehabilitation
	>=6	<=5	Any	/	Rehabilitation
	>=6	Any	<=5	/	Rehabilitation
	>=6	>=6	>=6	/	None ¹
Culverts	/	/	/	<=4	Replacement
	/	/	/	5 or 6	Rehabilitation
	/	/	/	>=7	None

1) If the bridge is on a corridor with a recommendation of widening, it will be widened (considered as rehabilitation) as necessary to accommodate the additional proposed lanes.

- **Bridges for Rehab/Widening:** Rehab/widening is recommended for a total of 21 bridges along the entire corridor. Note that the bridge rehab is determined based on the "Methodology for Replacement/Rehabilitation Recommendation" table above. If the bridge has a good condition but is within a bottleneck location with recommended widening, it will be widened as necessary to accommodate the additional proposed lanes and the cost of widening is assumed to be the same as bridge rehab for the planning-level cost estimation purpose.

Bridges for Rehab/Widening	
Bridge ID	Feature Intersect
034B00022L	US 60 -VERSAILLES RD
034B00022R	US 60 -VERSAILLES RD
034B00023L	PARKERS MILL ROAD
034B00024L	US 68(HARRODSBURG ROAD)
034B00023R	PARKERS MILL ROAD
034B00024R	US 68(HARRODSBURG ROAD)
034B00028L	TATES CRK ROAD KY 1974
034B00025L	CLAYS MILL ROAD
034B00025R	CLAYS MILL ROAD
034B00027L	LANSDOWNE DRIVE
034B00027R	LANSDOWNE DRIVE
034B00028R	TATES CRK ROAD KY 1974
034B00029L	GREEN TREE-CHINOE RD
034B00029R	GREEN TREE-CHINOE RD
034B00031L	US 25 RICHMOND RD.
034B00031R	US 25 RICHMOND RD.
034B00037L	US 421 (LEESTOWN RD.)
034B00037R	US 421 (LEESTOWN RD.)
034B00038L	NS (CNO&TP) SYSTEM
034B00038R	NS (CNO&TP) SYSTEM
034B00033N	NS (CNO&TP) RR

- **Bridges for Replacement:** None.

Pavement Treatment: The overall pavement condition is good (average PDI = 0.29). Proposed additional lanes will consist of full depth asphalt pavement construction. Spot reconstruction and rehabilitation of existing asphalt pavement lanes might be needed based on more detailed evaluation of the corridor's pavement condition.

Potential Safety Improvement: The table below summarizes safety issues for the corridor and is based on KYTC safety data (LOSS value = 4), as well as a cursory review of Google Aerial imagery. The table identifies clusters of links with a LOSS value of 4 based on two categories: 1) clusters located in areas where this study already recommends corridor improvements for mobility reasons and 2) clusters not located in areas previously recommended for corridor mobility improvements. For Category 1, it is

assumed any corridor improvement based on mobility needs will be constructed to current KYTC standards and will include the necessary safety improvements. Category 2 is intended to identify corridor segments that may warrant improvement for safety reasons, even though improvement might not be needed for mobility. There may also be isolated links with LOSS value of 4 that are not included in the table. Spot improvements could be warranted for those locations but it is assumed these spot improvements do not rise to the level of a corridor improvement; therefore, these locations are not addressed in this planning study. The table further breaks the clusters down by urban and rural designation (based on KYSTMv18 data) because urban and rural roadways tend to have unique typical crash causes and countermeasures.

Potential Safety Improvements			
Category	Locations	Possible Causes	Recommendations
CAT 1: Major clusters of safety issues covered by proposed improvement concepts	KY 1974 (Tates Creek Road) to Clays Mill Road	Interchange spacing and congestion due to traffic entering and exiting at the interchanges	Widen to a 6-lane typical section throughout the entire segment. This already exists between Versailles and Leestown.
CAT 2: Other major clusters of safety issues	N/A	N/A	N/A

Proposed Phasing: Since all interchanges proposed for modification are located within the proposed corridor in Lexington, they will be completed at the same time the roadway is widened. Because the road has already been widened between Leestown Road and Versailles Road, and is currently being widened between Leestown Road and Newtown Pike, it is recommended that construction phasing begin at Versailles road and move counterclockwise to Harrodsburg Road, then Nicholasville Road, then Tates Creek Road then Alumni Drive, then Richmond Road.

PRELIMINARY ENVIRONMENTAL RED FLAG ANALYSIS

The table below summarizes the presence of critical environmental red flag concerns identified by KYTC within 1,000 ft of proposed improvement locations (Y=Yes; N=No).

Critical Red Flag Issues/Concerns	
Environmental Red Flag Features	Clockwise from US 25 (Richmond Road) to KY 922 (Newtown Pike)
Superfunds	N
Special Waters ¹	N
Forested Areas	N
NLEB Habitat Priority	Y
IB Habitat Priority Area	N
FAA Airport Runways	N
Public Hunting Areas	N
Wildlife Management Areas	N
Local Parks	Y
State/ National Parks	N
Kentucky Heritage Land Conservation Fund	N
Area Landmarks	Y
Point Landmarks	Y
National Register of Historic Places Location (Point)	N
National Register of Historic Places Location (Polygon)	Y

1) Special Waters are defined as Cold Water Aquatic Habitats, Outstanding State/National Resource Waters, Exceptional Waters, State Wild Rivers, and Federally Designated Wild / Scenic Rivers.

RIGHT OF WAY IMPACTS

The table below summarizes the potential right-of-way (ROW) needs for proposed improvement concepts.

Potential Needs of Additional Right of Way		
Location	Improvement Concepts	Potential Needs of Additional ROW
Clockwise from US 25 (Richmond Road) to KY 922 (Newtown Pike)	Widen to a 6-lane typical section throughout the entire segment.	Yes

COST ESTIMATION

Design:	34.3 (\$M)
ROW:	99.4 (\$M)
Utility:	24.2 (\$M)
Construction:	<u>223.8 (\$M)</u>
TOTAL =	381.7 (\$M)

Note:

1. The cost estimation may not include additional costs to address the potential impacts of major utilities (e.g., gas line, major water supplier, transmission line) within the proximity of the corridor, due to the lack of data when the report was prepared. Further investigation is recommended in future studies.
2. Cost estimation was based on 2020 dollars. There is a 1-3% inflation rate. Estimated cost could vary -50% to +250% of the actual number (as a rule of thumb).
3. The widening of a 2-lane facility to a 3-lane facility (with TWLTL or alternating passing lane) is considered as "Minor Widening (Undivided Road) - 2 Lane to 4 Lane".

4. The cost estimation does not include bridges outside of the bottleneck locations, as they are not assumed to rise to the level of a corridor improvement. The cost estimation only includes necessary bridge replacement/rehab/widening costs within the bottleneck locations with proposed widening improvement. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
5. Shoulder widening is not included in the cost estimation, as it is a relatively minor cost.
6. If multiple improvement concepts are recommended for the corridor, only the cost of the larger-scale improvement concept is estimated.

Kentucky Statewide Corridor Plan (Linking Kentucky)

Route: KY 4
Segment ID: 4B
From: Newtown Pike
To: US 25 (Richmond Road)
Counties: Fayette
Highway Districts: 7

CORRIDOR SEGMENT OVERVIEW

The 4B segment on New Circle Road begins as a major arterial at the New Circle Road/Newtown Pike interchange in Fayette County and circulates around the east side of Lexington until it reaches US 25 (Richmond Road), where it becomes segment 4A. The corridor segment length is approximately 6 miles and currently contains one interchange.

The segment is considered full access throughout most of the corridor, passing through major residential and commercial corridors such as Winchester Road, N Broadway Street, Bryan Avenue and Liberty Road. These areas would be considered city (according to KYSTMv18 data) with clusters of homes and commercial buildings adjacent to KY 4.

EXISTING FACILITY

The table below outlines the typical roadway attributes for this section of KY 4 by sub-segment.

Typical Roadway Attributes					
Sub-segment	Functional Classification	Number & Width of Lanes	Shoulder & Width	Median Type & Width	Posted Speed Limit
KY 922 (Newtown Pike) to Industry Rd	Principal Arterial – Other	4, 12'	Curbed (0') and Asphalt (10')	20' Raised Non-Mountable	45 mph
Industry Rd to Trade Center Dr	Principal Arterial – Other	4-6, 11' - 12'	Curbed (2') and Asphalt (2' – 10')	20' Raised Non-Mountable	45 mph
Trade Center Dr to US 25 (Richmond Rd)	Principal Arterial – Other	4, 12'	Curbed (0') and Asphalt (10')	20' Raised Non-Mountable	45 mph

Right of Way: The existing right of way is generally 130' – 160' wide.

Pavement: The average PDI (Pavement Distress Index) for this section of KY 4 is 0.19, which indicates an overall good pavement condition according to KYTC criteria (Good: 0.00 – 0.35; Fair: 0.36 – 0.65; Poor: 0.66 – 0.99).

Intersections/Interchanges: The tables below outline the existing interchanges and major intersections on the corridor.

Interchanges	Interchange Type
US 60 (Winchester Rd)	SPUI

Major Intersections ¹			
KY 353 (Russell Cave Rd)	US 68 (N Broadway)	Old Paris Road / N Limestone	KY 57 (Bryan Station Rd)
Meadow Ln	Industry Rd	Eastland Dr	KY 1927 (Liberty Rd)
Young Drive	Palumbo Dr	Woodhill Dr	

1) The table only contains intersections with Traffic Signals.

At-grade Railroad Crossings
None

Access Points: This segment is not access controlled. Throughout the corridor, there are access points for commercial and intersecting roadways.

Bridges: The tables below outline the detailed bridge information for existing bridges on or over this section of New Circle Rd (KY 4).

Mainline Bridge Information										
Bridge ID	Feature Intersect	NBIS Classification	Sufficiency Rating	Substandard	Deck Rating	Superstructure Rating	Substructure Rating	Under Clearance (feet)	Horizontal Clearance (feet)	Culvert Rating
034B00031L	US 25 RICHMOND RD.	Fair	70.50	No	6	6	5	16.75	31.58	N
034B00040N (Culvert)	CANE RUN CK.	Fair	72.50	No	N	N	N	0.00	33.00	6
034B00031R	US 25 RICHMOND RD.	Fair	69.50	No	5	6	5	14.70	31.58	N

Structures Crossing Over the Corridor			
Bridge ID	Facility Carried	Under Clearance (feet) ¹	Horizontal Clearance (feet) ¹
034B00157N	Winchester Road	16.17	99.90
034B00180N	KY-922	99.99	99.00
034B00103N	CSX RR/RJ Corman	14.9	30.00
034R00600N	CSX RR/RJ Corman	13.67	38.00

1) The data shall be updated after the next scheduled inspection is completed.

Other Noteworthy Conditions: None.

TRAFFIC & OPERATIONS

AADT & AADTT: The table below summarizes the 2015 AADT and daily truck volumes by sub-segment.

Traffic Volumes			
Sub-segment	AADT	AADTT	Truck Percentage
From US 25 (Richmond Road) to KY 1927 (Liberty Road)	39,700	3,000	8%
From KY 1927 (Liberty Road) to KY 922 (Newtown Pike)	26,200	4,000	15%

Mobility: This entire segment is a major bottleneck, with the exception of the 0.4-mile section under the US 60 overpass. (Note: bottlenecks are identified by Level of Travel Time Reliability (LOTTR) > 1.5 or volume/capacity (v/c) > 0.6.) Typical roadway attributes of the bottleneck area can be found above for the entire segment.

Existing Typical Roadway Attributes at Major Traffic Bottlenecks					
Locations	Functional Classification	Number & Width of Lanes	Median Width	Shoulder Width	2015 AADT ¹
Entire corridor	Refer to the Existing Facility section above				46,179

1) The highest traffic volume within the bottleneck based on KYSTMv18 data.

Safety: 9.6% of the corridor mileage has a Level of Safety of Service (LOSS) of 4, meaning these links have the highest potential to decrease crashes. (Note: LOSS indicates the potential for crash reduction and is broken up into four categories based on Safety Performance Functions (SPFs): LOSS 4 = high; LOSS 3 = moderate to high; LOSS 2 = low to moderate; LOSS 1 = low.) See the table under **Potential Safety Improvement** section for details of locations with LOSS =4, possible causes, and potential safety improvements.

ITS Devices: Lexington Fayette Urban County Government (LFUCG) has a fiber network surrounding the corridor with CCTV cameras throughout the corridor.

PROPOSED IMPROVEMENT CONCEPTS

The improvement options noted in this report are not intended to be all-encompassing. Other potential improvements are possible, including innovative solutions that could be cost-effective and address the reasons for improvement. Further study may be needed as part of the project development process.

Proposed Typical Section & Description of Modification: The table below describes the proposed improvement concepts for the identified bottlenecks. The proposed improvements expect to maintain an overall acceptable traffic condition through 2045 (v/c < 0.85 in urban areas and v/c < 0.7 in rural areas) and address safety issues at bottlenecks.

Proposed Improvement Concepts			
Location	Improvement Concepts ¹	Notes ²	Reason for Improvement
US 25 (Richmond Road) to KY 922 (Newtown Pike)	Widen to a 6-lane divided typical section throughout the entire segment	Urban typical section with 3-11' lanes in each direction. Concrete barrier median, curb & gutter, and sidewalk	The entire segment is a bottleneck, and 2045 v/c is at an unacceptable level through nearly the entire segment

2) The proposed roadway widening concept includes spot improvements at interchanges and major intersections as needed (see details in Interchanges for Potential Modification and Major Intersection for Potential Modification sections below).

3) Improved typical sections are based on KYTC Highway Design Manual.

Potential New Interchanges: None.

Interchanges for Potential Modification: None.

Major Intersections for Potential Modification: Improvements, such as additional turn lanes, channelization, coordinated signal timing, and innovative design should be considered at 11 major intersections within this corridor segment. The following is a list of these intersections.

Major Intersections for Potential Modification			
KY 353 (Russell Cave Rd)	US 68 (N Broadway)	Old Paris Road / N Limestone	KY 57 (Bryan Station Rd)
Meadow Ln	Industry Rd	Eastland Dr	KY 1927 (Liberty Rd)
Young Drive	Palumbo Dr	Woodhill Dr	

Bridges: Bridge recommendations are based on ratings of substructure, superstructure and deck using the following methodology.

Methodology for Replacement/Rehabilitation Recommendation					
Structures	Substructure Rating	Superstructure Rating	Deck Rating	Culvert Rating	Recommendations
Bridges	<=4	Any	Any	/	Replacement
	=5	Any	Any	/	Rehabilitation
	>=6	<=5	Any	/	Rehabilitation
	>=6	Any	<=5	/	Rehabilitation
	>=6	>=6	>=6	/	None ¹
Culverts	/	/	/	<=4	Replacement
	/	/	/	5 or 6	Rehabilitation
	/	/	/	>=7	None

1) If the bridge is on a corridor with a recommendation of widening, it will be widened (considered as rehabilitation) as necessary to accommodate the additional proposed lanes.

- **Bridges for Rehab/Widening:** Rehab/widening is recommended for a total of 5 bridges along the entire corridor. Note that the bridge rehab is determined based on the "Methodology for Replacement/Rehabilitation Recommendation" table above. If the bridge has a good condition

but is within a bottleneck location with recommended widening, it will be widened as necessary to accommodate the additional proposed lanes and the cost of widening is assumed to be the same as bridge rehab for the planning-level cost estimation purpose.

Bridges for Rehab/Widening	
Bridge ID	Feature Intersect
034B00031L	US 25 RICHMOND RD.
034B00031R	US 25 RICHMOND RD.
034B00103N	CSX RR/RJ Corman
034B00157N	Winchester Road
034R00600N	CSX RR/RJ Corman

- **Bridges for Replacement:** None.

Pavement Treatment: The overall pavement condition is good (average PDI = 0.19). Proposed additional lanes will consist of full depth asphalt pavement construction. Spot reconstruction and rehabilitation of existing asphalt pavement lanes might be needed based on more detailed evaluation of the corridor's pavement condition.

Potential Safety Improvement: The table below summarizes safety issues for the corridor and is based on KYTC safety data (LOSS value = 4), as well as a cursory review of Google Aerial imagery. The table identifies clusters of links with a LOSS value of 4 based on two categories: 1) clusters located in areas where this study already recommends corridor improvements for mobility reasons and 2) clusters not located in areas previously recommended for corridor mobility improvements. For Category 1, it is assumed any corridor improvement based on mobility needs will be constructed to current KYTC standards and will include the necessary safety improvements. Category 2 is intended to identify corridor segments that may warrant improvement for safety reasons, even though improvement might not be needed for mobility. There may also be isolated links with LOSS value of 4 that are not included in the table. Spot improvements could be warranted for those locations but it is assumed these spot improvements do not rise to the level of a corridor improvement; therefore, these locations are not addressed in this planning study. The table further breaks the clusters down by urban and rural designation (based on KYSTMv18 data) because urban and rural roadways tend to have unique typical crash causes and countermeasures.

Potential Safety Improvements			
Category	Locations	Possible Causes	Recommendations
CAT 1: Major clusters of safety issues covered by proposed improvement concepts	From Young Drive to Family Circle	Intersection spacing and congestion	Widen to a 6-lane typical section throughout the entire segment.
CAT 2: Other major clusters of safety issues	N/A	N/A	N/A

Proposed Phasing: Since all intersections proposed for spot improvements are located within the proposed corridor widening in Lexington, they will be improved at the same time the roadway is widened.

PRELIMINARY ENVIRONMENTAL RED FLAG ANALYSIS

The table below summarizes the presence of critical environmental red flag concerns identified by KYTC within 1,000 ft of proposed improvement locations (Y=Yes; N=No).

Critical Red Flag Issues/Concerns	
Environmental Red Flag Features	Counterclockwise from US 25 (Richmond Road) to KY 922 (Newtown Pike)
Superfunds	N
Special Waters ¹	N
Forested Areas	N
NLEB Habitat Priority	N
IB Habitat Priority Area	N
FAA Airport Runways	N
Public Hunting Areas	N
Wildlife Management Areas	N
Local Parks	Y
State/ National Parks	N
Kentucky Heritage Land Conservation Fund	N
Area Landmarks	Y
Point Landmarks	Y
National Register of Historic Places Location (Point)	N
National Register of Historic Places Location (Polygon)	Y

1) Special Waters are defined as Cold Water Aquatic Habitats, Outstanding State/National Resource Waters, Exceptional Waters, State Wild Rivers, and Federally Designated Wild / Scenic Rivers.

RIGHT OF WAY IMPACTS

The table below summarizes the potential right-of-way (ROW) needs for proposed improvement concepts.

Potential Needs of Additional Right of Way		
Location	Improvement Concepts	Potential Needs of Additional ROW
Counterclockwise from US 25 (Richmond Road) to KY 922 (Newtown Pike)	Widen to a 6-lane divided typical section throughout the entire segment.	Yes

COST ESTIMATION

Design: 19.1 (\$M)
 ROW: 64.0 (\$M)
 Utility: 14.8 (\$M)
 Construction: 147.7 (\$M)
TOTAL = 245.6 (\$M)

Note:

- The cost estimation may not include additional costs to address the potential impacts of major utilities (e.g., gas line, major water supplier, transmission line) within the proximity of the corridor, due to the lack of data when the report was prepared. Further investigation is recommended in future studies.
- Cost estimation was based on 2020 dollars. There is a 1-3% inflation rate. Estimated cost could vary -50% to +250% of the actual number (as a rule of thumb).
- The widening of a 2-lane facility to a 3-lane facility (with TWLTL or alternating passing lane) is considered as "Minor Widening (Undivided Road) - 2 Lane to 4 Lane".
- The cost estimation does not include bridges outside of the bottleneck locations, as they are not assumed to rise to the level of a corridor improvement. The cost estimation only includes necessary bridge replacement/rehab/widening costs within the bottleneck locations with proposed widening improvement. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
- Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
- Shoulder widening is not included in the cost estimation, as it is a relatively minor cost.
- If multiple improvement concepts are recommended for the corridor, only the cost of the larger-scale improvement concept is estimated.
- The railroad bridge widening costs are based on the following costs that are based on research of similar projects:
 RR Bridge at Broadway:
 Permanent RR Bridge: \$25K/track feet x 150 TF = \$3.75M x 2 bridges = \$7.5M
 Temporary RR Bridge: \$13K/track feet x 150 TF = \$1.95M x 2 bridges = \$3.9M
 Shoo Fly Temp. Track: \$500/track ft. x 1,000 TF = \$500K
 Permanent Track: \$500/track ft. x 1,000 TF = \$500K
 Miscellaneous (e.g., clearing/grubbing, earthwork, MOT, mobilization/demobilization, additional costs, etc.) = \$3.1M
 RR Bridge north of Young Drive:
 RR Bridge: \$25K/track feet x 120 TF = \$3M
 Retaining Walls, Temporary Shoring, Earthwork, Other: \$1.5M
 Shoo Fly Temp. Track: \$500/track ft. x 1,000 TF = \$500K
 Miscellaneous (e.g., clearing/grubbing, earthwork, MOT, mobilization/demobilization, additional costs, etc.) = \$1M

Kentucky Statewide Corridor Plan (Linking Kentucky)

Route: Man O' War Boulevard
Segment ID: 5
From: US 60 (West) in Lexington
To: I-75 in Lexington
Counties: Fayette
Highway Districts: 7

CORRIDOR SEGMENT OVERVIEW

Segment 5 on Man O' War Boulevard begins at the Man O' War Boulevard/US 60 intersection in Fayette County and extends south toward US 68 and US 27. This segment continues east along Man O' War Boulevard towards Tates Creek Road, Alumni Drive and US 25, ending at the I-75 interchange in Fayette County. The corridor segment length is approximately 16 miles and currently contains one interchange at I-75.

This segment passes through residential and commercial zones surrounding Lexington, Kentucky. These areas would be considered city (according to KYSTMv18 data) with clusters of homes and commercial buildings adjacent to Man O' War Boulevard.

EXISTING FACILITY

The table below outlines the typical roadway attributes for this section of Man O' War Boulevard by sub-segment.

Typical Roadway Attributes					
Sub-segment	Functional Classification	Number & Width of Lanes	Shoulder & Width	Median Type & Width	Posted Speed Limit
US 60 (LEX Airport) to Sir Barton Way	Principal Arterial - Other	4, 12'	Curbed (1-2'), None	Raised Non Mountable (21'), None	45-50 mph
Sir Barton Way to I-75	Principal Arterial - Other	4-6, 12'	Curbed (1-2'), Asphalt (10-13'), None	Raised Non Mountable (21'), Raised Mountable (14'), None	45 mph

Right of Way: The existing right of way is generally 120' – 140' wide.

Pavement: The average PDI (Pavement Distress Index) only exists for the KY 1425 section, between I-75 and US 60, of this segment and is 0.60, which indicates an overall fair pavement condition according to KYTC criteria (Good: 0.00 – 0.35; Fair: 0.36 – 0.65; Poor: 0.66 – 0.99).

Intersections/Interchanges: The tables below outline the existing interchanges, major intersections, and railroad crossings on the corridor.

Interchanges	Interchange Type
I-75	Diamond/Partial Cloverleaf

Major Intersections ¹			
US 60 (Versailles Rd)	KY 1968 (Parkers Mill Rd)	Beaumont Center Ln	Fort Harrods Dr
US 68 (Harrodsburg Rd)	Old Higbee Mill Rd	Clays Mill Rd	Boston Rd
Winthrop Dr	US 27 (Nicholasville Rd)	Habersham Dr	Belleau Wood Dr
Saron Dr	KY 1974 (Tates Creek Rd)	Crosby Dr	Rapid Run Dr
Trent Blvd	Armstrong Mill Rd	Bold Bidder Dr	Buckhorn Dr
Pimlico Pkwy	Alumni Dr	US 25 (Richmond Rd)	Palumbo Dr
Todds Rd/Liberty Rd	Pink Pigeon Pkwy	Sir Barton Way	

1) Only crossroads with functional classification of Minor Collector or above are included.

At-grade Railroad Crossings
None

Access Points: This segment is not access controlled. Throughout the corridor, there are intersecting roadways.

Bridges: The tables below outline the detailed bridge information for existing bridges on or over this section of Man O' War Boulevard.

Mainline Bridge Information										
Bridge ID	Feature Intersect	NBIS Classification	Sufficiency Rating	Substandard	Deck Rating	Superstructure Rating	Substructure Rating	Under Clearance (feet)	Horizontal Clearance (feet)	Culvert Rating
034B00142N	I-75	Fair	97.90	No	6	7	6	16.92	33.00	N
034C00040L	SOUTH ELKHORN CR	Fair	80.40	No	6	7	6	0.00	28.00	N
034C00040R	SOUTH ELKHORN CREEK	Fair	80.40	No	6	6	6	0.00	28.00	N
034C00041N	HICKMAN CREEK	Fair	89.20	No	7	7	6	0.00	44.00	N
034C00042N	NS (CNO&TP) SYSTEM	Fair	77.10	No	6	6	7	28.08	27.42	N

Structures Crossing Over the Corridor
None

Other Noteworthy Conditions: None.

TRAFFIC & OPERATIONS

AADT & AADTT: The table below summarizes the 2015 AADT and daily truck volumes by sub-segment.

Traffic Volumes			
Sub-segment	AADT	AADTT	Truck Percentage
From US 60 (Versailles Road) to US 68 (Harrodsburg Road)	11,100	600	6%
From US 68 (Harrodsburg Road) to Alumni Drive	20,700	700	4%
From Alumni Dr to I-75	34,600	3,900	11%

Mobility: The entirety of this corridor segment is a major traffic bottleneck. (Note: bottlenecks are identified by Level of Travel Time Reliability (LOTTR) > 1.5 or volume/capacity (v/c) > 0.6.) Typical roadway attributes of the bottleneck area can be found above for the entire segment.

Existing Typical Roadway Attributes at Major Traffic Bottlenecks					
Locations	Functional Classification	Number & Width of Lanes	Median Width	Shoulder Width	2015 AADT ¹
Entire corridor	Refer to the Existing Facility section above				39,716

1) The highest traffic volume within the bottleneck based on KYSTMv18 data.

Safety: 7.1% of the corridor mileage has a Level of Safety of Service (LOSS) of 4, meaning these links have the highest potential to decrease crashes. (Note: LOSS indicates the potential for crash reduction and is broken up into four categories based on Safety Performance Functions (SPFs): LOSS 4 = high; LOSS 3 = moderate to high; LOSS 2 = low to moderate; LOSS 1 = low.) See the table under **Potential Safety Improvement** section for details of locations with LOSS =4, possible causes, and potential safety improvements.

ITS Devices: Lexington Fayette Urban County Government (LFUCG) has a fiber network surrounding the corridor with CCTV cameras throughout the corridor.

PROPOSED IMPROVEMENT CONCEPTS

The improvement options noted in this report are not intended to be all-encompassing. Other potential improvements are possible, including innovative solutions that could be cost-effective and address the reasons for improvement. Further study may be needed as part of the project development process.

Proposed Typical Section & Description of Modification: The table below describes the proposed improvement concepts for the identified bottlenecks. The proposed improvements expect to maintain an overall acceptable traffic condition through 2045 ($v/c < 0.85$ in urban areas and $v/c < 0.7$ in rural areas) and address safety issues at bottlenecks.

Proposed Improvement Concepts			
Location	Improvement Concepts ¹	Notes ²	Reason for Improvement
Entire Corridor	Alt 1: Widen to a 6-lane typical section throughout the entire segment. Alt 2: Right-In, Right-Out at non-signalized intersections	Alt 1: Urban typical section with 3-11' lanes in each direction. Raised concrete median, curb & gutter, and sidewalk	Alt 1: will address the bottleneck situation that exists throughout most of the corridor, additionally, 2045 v/c is unacceptable between Clays Mill Road and I-75 Alt 2: will improve safety and reduce congestion through access management

1) The proposed roadway widening concept includes spot improvements at interchanges and major intersections as needed (see details in Interchanges for Potential Modification and Major Intersection for Potential Modification sections below).

2) Improved typical sections are based on KYTC Highway Design Manual.

Potential New Interchanges: None.

Interchanges for Potential Modification: Improvements are proposed for the existing interchange at I-75.

Interchanges for Potential Modification
I-75

Major Intersections for Potential Modification: Improvements, such as additional turn lanes, channelization, coordinated signal timing, and innovative design should be considered at 27 major intersections within this corridor segment. The following is a list of these intersections.

Major Intersections for Potential Modification			
US 60 (Versailles Rd)	KY 1968 (Parkers Mill Rd)	Beaumont Center Ln	Fort Harrods Dr
US 68 (Harrodsburg Rd)	Old Higbee Mill Rd	Clays Mill Rd	Boston Rd
Winthrop Dr	US 27 (Nicholasville Rd)	Habersham Dr	Belleau Wood Dr
Saron Dr	KY 1974 (Tates Creek Rd)	Crosby Dr	Rapid Run Dr
Trent Blvd	Armstrong Mill Rd	Bold Bidder Dr	Buckhorn Dr
Pimlico Pkwy	Alumni Dr	US 25 (Richmond Rd)	Palumbo Dr
Todds Rd/Liberty Rd	Pink Pigeon Pkwy	Sir Barton Way	

Bridges: Bridge recommendations are based on ratings of substructure, superstructure and deck using the following methodology.

Methodology for Replacement/Rehabilitation Recommendation					
Structures	Substructure Rating	Superstructure Rating	Deck Rating	Culvert Rating	Recommendations
Bridges	≤ 4	Any	Any	/	Replacement
	$= 5$	Any	Any	/	Rehabilitation
	≥ 6	≤ 5	Any	/	Rehabilitation
	≥ 6	Any	≤ 5	/	Rehabilitation
	≥ 6	≥ 6	≥ 6	/	None ¹
Culverts	/	/	/	≤ 4	Replacement
	/	/	/	5 or 6	Rehabilitation
	/	/	/	≥ 7	None

1) If the bridge is on a corridor with a recommendation of widening, it will be widened (considered as rehabilitation) as necessary to accommodate the additional proposed lanes.

- **Bridges for Rehab/Widening:** Rehab/widening is recommended for a total of two bridges along the entire corridor. Note that the bridge rehab is determined based on the "Methodology for Replacement/Rehabilitation Recommendation" table above. If the bridge has a good condition but is within a bottleneck location with recommended widening, it will be widened as necessary to accommodate the additional proposed lanes and the cost of widening is assumed to be the same as bridge rehab for the planning-level cost estimation purpose.

Bridges for Rehab/Widening	
Bridge ID	Feature Intersect
034C00040L	SOUTH ELKHORN CR
034C00040R	SOUTH ELKHORN CREEK

- **Bridges for Replacement:** None.

Pavement Treatment: The overall pavement condition is fair (average PDI = 0.60). Proposed additional lanes will consist of full depth asphalt pavement construction. Spot reconstruction and rehabilitation of existing asphalt pavement lanes will be needed based on more detailed evaluation of the corridor's pavement condition.

Potential Safety Improvement: The table below summarizes safety issues for the corridor and is based on KYTC safety data (LOSS value = 4), as well as a cursory review of Google Aerial imagery. The table identifies clusters of links with a LOSS value of 4 based on two categories: 1) clusters located in areas where this study already recommends corridor improvements for mobility reasons and 2) clusters not located in areas previously recommended for corridor mobility improvements. For Category 1, it is assumed any corridor improvement based on mobility needs will be constructed to current KYTC standards and will include the necessary safety improvements. Category 2 is intended to identify corridor segments that may warrant improvement for safety reasons, even though improvement might not be needed for mobility. There may also be isolated links with LOSS value of 4 that are not included in the

table. Spot improvements could be warranted for those locations but it is assumed these spot improvements do not rise to the level of a corridor improvement; therefore, these locations are not addressed in this planning study. The table further breaks the clusters down by urban and rural designation (based on KYSTMv18 data) because urban and rural roadways tend to have unique typical crash causes and countermeasures.

Potential Safety Improvements			
Category	Locations	Possible Causes	Recommendations
CAT 1: Major clusters of safety issues covered by proposed improvement concepts	US 25 (Richmond Road) to I-75 Interchange, US 27 and KY 1974	Intersection spacing and congestion	Intersection improvements and widening described above
CAT 2: Other major clusters of safety issues	N/A	N/A	N/A

Proposed Phasing: Since all intersections proposed for modification are located within the proposed corridor widening in Lexington, they will be improved at the same time the roadway is widened. Construction could be phased along the corridor: Richmond Road to I-75, another from Bates Creek Road to Richmond Road, another from Nicholasville Road to Bates Creek Road, another from Clays Mill Road to Nicholasville Road, and one phase for Versailles Road to Clays Mill Road.

PRELIMINARY ENVIRONMENTAL RED FLAG ANALYSIS

The table below summarizes the presence of critical environmental red flag concerns identified by KYTC within 1,000 ft of proposed improvement locations (Y=Yes; N=No).

Critical Red Flag Issues/Concerns	
Environmental Red Flag Features	Full Corridor
Superfunds	N
Special Waters ¹	N
Forested Areas	Y
NLEB Habitat Priority	Y
IB Habitat Priority Area	N
FAA Airport Runways	N
Public Hunting Areas	N
Wildlife Management Areas	N
Local Parks	Y
State/ National Parks	N
Kentucky Heritage Land Conservation Fund	N
Area Landmarks	Y
Point Landmarks	Y
National Register of Historic Places Location (Point)	N
National Register of Historic Places Location (Polygon)	Y

1) Special Waters are defined as Cold Water Aquatic Habitats, Outstanding State/National Resource Waters, Exceptional Waters, State Wild Rivers, and Federally Designated Wild / Scenic Rivers.

RIGHT OF WAY IMPACTS

Potential Needs of Additional Right of Way		
Location	Improvement Concepts	Potential Needs of Additional ROW
Entire Corridor	Alt 1: Widen to a 6-lane typical section throughout the entire segment.	Yes
	Alt 2: Right-In, Right-Out at non-signalized intersections.	No

COST ESTIMATION

Design:	49.2 (\$M)
ROW:	176.1 (\$M)
Utility:	40.7 (\$M)
Construction:	<u>327.5 (\$M)</u>
TOTAL =	593.5 (\$M)

Note:

1. The cost estimation may not include additional costs to address the potential impacts of major utilities (e.g., gas line, major water supplier, transmission line) within the proximity of the corridor, due to the lack of data when the report was prepared. Further investigation is recommended in future studies.
2. Cost estimation was based on 2020 dollars. There is a 1-3% inflation rate. Estimated cost could vary -50% to +250% of the actual number (as a rule of thumb).
3. The widening of a 2-lane facility to a 3-lane facility (with TWLTL or alternating passing lane) is considered as "Minor Widening (Undivided Road) - 2 Lane to 4 Lane".
4. The cost estimation does not include bridges outside of the bottleneck locations, as they are not assumed to rise to the level of a corridor improvement. The cost estimation only includes necessary bridge replacement/rehab/widening costs within the bottleneck locations with proposed widening improvement. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
5. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
6. Shoulder widening is not included in the cost estimation, as it is a relatively minor cost.
7. If multiple improvement concepts are recommended for the corridor, only the cost of the larger-scale improvement concept is estimated.

Kentucky Statewide Corridor Plan (Linking Kentucky)

Route: US 60
Segment ID: 6A
From: I-64 in Louisville
To: KY 1848 in Simpsonville
Counties: Jefferson and Shelby
Highway Districts: 5

CORRIDOR SEGMENT OVERVIEW

Segment 6A on US 60 begins at the I-64 ramps in Jefferson County and extends east to Simpsonville in Shelby County. The corridor segment length is approximately 21 miles long and currently contains two interchanges at I-264 and I-265.

This segment passes through the residential and commercial areas in one city (Louisville in Jefferson County). This area would be considered city (according to KYSTMv18 data) with clusters of homes and commercial buildings adjacent to US 60. This segment also passes through the residential and commercial areas in one town (Simpsonville in Shelby County). This area would be considered town (according to KYSTMv18 data) with clusters of homes and commercial buildings adjacent to US 60. The remainder of this segment passes through rural agricultural areas with homes interspersed along US 60.

EXISTING FACILITY

The table below outlines the typical roadway attributes for this section of US 60 by sub-segment.

Typical Roadway Attributes					
Sub-segment	Functional Classification	Number & Width of Lanes	Shoulder & Width	Median Type & Width	Posted Speed Limit
US 42 to I-265 Underpass	Principal Arterial - Other	2 to 8, 10' – 12'	Curbed (0'-2'), Stabilized (4'-10'), Asphalt (10'), Asphalt Combination (8' – 10')	None, Raised Non Mountable (4' – 32')	35-55 mph
I-265 Underpass to KY 1848	Minor Arterial	2 to 4, 11' – 12'	No shoulders or Curbs, Curbed (0'-2'), Asphalt (10'), Asphalt Combination (4' – 10')	None, Raised Non Mountable (4'), Flush (11')	35-55 mph

Right of Way: The table below outlines the general width of existing right of way within the corridor.

General Existing Right of Way Widths		
From	To	General Ex. R/W Width
I-64 in Louisville	US 60 Alt (Lexington Rd)	60' – 70'
US 60 Alt (Lexington Rd)	I-265	100' – 180'
I-265	KY 1848 in Simpsonville	60' – 100'

Pavement: The average PDI (Pavement Distress Index) for this section of US 60 is 0.27, which indicates an overall good pavement condition according to KYTC criteria (Good: 0.00 – 0.35; Fair: 0.36 – 0.65; Poor: 0.66 – 0.99).

Intersections/Interchanges: The tables below outline the existing interchanges, major intersections, and railroad crossings on the corridor.

Interchanges	Interchange Type
I-264	Cloverleaf/Flyover
I-265	Diamond

Major Intersections ¹			
Story Ave	(Mellwood Ave)	Ewing Ave	Stilz Ave
Hillcrest Ave	Cannons Ln	US 60 Alt (Lexington Rd)	KY 1932
St. Matthews Ave	Browns Ln	Hubbards Ln	KY 146 (New La Grange Rd)
Whipps Mill Rd	Lyndon Ln	KY 1747 (Hurstbourne Pwky)	Dorsey Ln
Moser Rd	KY 913 (Blankenbaker Pkwy)	Main St	Madison Ave
Evergreen Rd	Old Shelbyville Rd	N English Station	S English Station
KY 1531	Eastwood Cut Off Rd	KY 1848 (Todds Point Rd)	KY 1848 (Buck Creek Rd)

1) Only crossroads with functional classification of Minor Collector or above are included.

At-grade Railroad Crossings
US 60 Mile Point 0.7 in Jefferson County

Access Points: This segment is not access controlled. Throughout the corridor, there are residential and commercial driveways and intersecting roadways.

Bridges: The tables below outline the detailed bridge information for existing bridges on or over this section of US 60.

Mainline Bridge Information										
Bridge ID	Feature Intersect	NBIS Classification	Sufficiency Rating	Substandard	Deck Rating	Superstructure Rating	Substructure Rating	Under Clearance (feet)	Horizontal Clearance (feet)	Culvert Rating
056B00007N (Culvert)	MID FK BEARGRASS CREEK	Fair	58.50	No	N	N	N	0.00	68.33	6
056B00008N	LONG RUN CREEK	Fair	54.00	No	5	5	5	0.00	25.75	N
056B00134N	BEARGRASS CREEK	Fair	65.00	No	N	5	5	0.00	36.50	N
056B00488N	FLOYDS FORK	Good	93.70	No	7	7	7	0.00	82.00	N
106B00095N	CSX RAILROAD	Fair	78.50	No	6	8	5	21.83	44.00	N

Structures Crossing Over the Corridor			
Bridge ID	Facility Carried	Under Clearance (feet)	Horizontal Clearance (feet)
056B00141R	I-64 EB	14.92	38.00
056B00151R	I-64 EB	15.17	38.00
056B00334L	I-265 SB	16.25	40.00
056B00334R	I-265 NB	19.75	40.00
056B00447L	I-264 WB	17.17	49.31
056B00447R	I-264 EB	17.50	49.30
056B00448N	I-264 RAMP	17.08	44.00
056B00449N	I-264 RAMP	17.67	56.00
056T00938L	I-64 WB	15.17	56.92
056T00939L	I-64 WB	14.83	57.00

Other Noteworthy Conditions: None.

TRAFFIC & OPERATIONS

AADT & AADTT: The table below summarizes the 2015 AADT and daily truck volumes by sub-segment.

Traffic Volumes			
Sub-segment	AADT	AADTT	Truck Percentage
From I-64 to I-264 in Louisville	21,700	3,600	16%
From I-264 to KY 1747 (Hurstbourne Parkway) in Louisville	40,800	4,500	11%
From KY 1747 (Hurstbourne Parkway) to KY 1531 (Johnson Road) in Louisville	21,000	2,200	10%
From KY 1531 (Johnson Road) in Louisville to KY 1848 (south) in Simpsonville	5,900	500	8%

Mobility: There is one major traffic bottleneck section along this corridor segment. See the table below for details. (Note: bottlenecks are identified by Level of Travel Time Reliability (LOTTR) > 1.5 or

volume/capacity (v/c) > 0.6.) There is also one isolated traffic bottleneck at the intersection with Flat Rock Rd (3 miles east of I-265). Traffic condition is acceptable along the remainder of this segment.

Existing Typical Roadway Attributes at Major Traffic Bottlenecks					
Locations	Functional Classification	Number & Width of Lanes	Median Width	Shoulder Width	2015 AADT ¹
From I-64 in Louisville to 1.4 miles east of I-265	Principal Arterial	2-6, 10'-12'	0' or 25'	0'-10'	52,535

1) The highest traffic volume within the bottleneck based on KYSTMv18 data.

Safety: 9.1% of the corridor mileage has a Level of Safety of Service (LOSS) of 4, meaning these links have the highest potential to decrease crashes. (Note: LOSS indicates the potential for crash reduction and is broken up into four categories based on Safety Performance Functions (SPFs): LOSS 4 = high; LOSS 3 = moderate to high; LOSS 2 = low to moderate; LOSS 1 = low.) See the table under **Potential Safety Improvement** section for details of locations with LOSS =4, possible causes, and potential safety improvements.

ITS Devices: Louisville Metro fiber is in the area along with Trimarc assets around the I-264 and I-265 interchanges.

PROPOSED IMPROVEMENT CONCEPTS

The improvement options noted in this report are not intended to be all-encompassing. Other potential improvements are possible, including innovative solutions that could be cost-effective and address the reasons for improvement. Further study may be needed as part of the project development process.

Proposed Typical Section & Description of Modification: The table below describes the proposed improvement concepts for the identified bottlenecks. The proposed improvements expect to maintain an overall acceptable traffic condition through 2045 (v/c < 0.85 in urban areas and v/c < 0.7 in rural areas) and address safety issues at bottlenecks.

Proposed Improvement Concepts			
Location	Improvement Concepts ¹	Notes ²	Reason for Improvement
From I-64 in Louisville to I-265	Complete streets with enhanced transit/bike/ped and access management	Due to the urban nature of this section and the lack of right of way, widening isn't feasible	This section is a bottleneck for nearly the entire length and has an unacceptable 2045 v/c as well as spot safety issues.
From Evergreen Road to Bircham Road	Widen to 6 Lanes	Typical Section: 3-11' lanes in each direction with curb and gutter. Design for the section from Old Shelbyville Road to N English Station Road is in the KYTC's Six-Year Plan (SYP) ³ .	This section has an unacceptable 2045 v/c.
I-265 to KY 1848 in Simpsonville	Spot safety improvements	Spot safety improvements include turn lanes and upgraded shoulders	Safety issues in certain spots

1) The proposed roadway widening concept includes spot improvements at interchanges and major intersections as needed (see details in Interchanges for Potential Modification and Major Intersection for Potential Modification sections below).

2) Improved typical sections are based on KYTC Highway Design Manual.

3) Item Number: 5-80001.00, construction year 2024.

Potential New Interchanges: None.

Interchanges for Potential Modification: I-265 interchange will be upgraded as part of I-Move Project.

Interchanges for Potential Modification	
I-264	I-265

Major Intersections for Potential Modification: Improvements, such as additional turn lanes, channelization, coordinated signal timing, and innovative design should be considered at 24 major intersections within this corridor segment. The following is a list of these intersections.

Major Intersections for Potential Modification			
Story Ave	Mellwood Ave	Ewing Ave	Stilz Ave
Hillcrest Ave	Cannons Ln	US 60 Alt (Lexington Rd)	KY 1932
St. Matthews Ave	Browns Ln	Hubbards Ln	KY 146 (New La Grange Rd)
Whipps Mill Rd	Lyndon Ln	KY 1747 (Hurstbourne Pwky)	Dorsey Ln
Moser Rd	KY 913 (Blankenbaker Pkwy)	Main St	Madison Ave
Evergreen Rd	Old Shelbyville Rd	N English Station	S English Station

Bridges: Bridge recommendations are based on ratings of substructure, superstructure and deck using the following methodology.

Methodology for Replacement/Rehabilitation Recommendation					
Structures	Substructure Rating	Superstructure Rating	Deck Rating	Culvert Rating	Recommendations
Bridges	<=4	Any	Any	/	Replacement
	=5	Any	Any	/	Rehabilitation
	>=6	<=5	Any	/	Rehabilitation
	>=6	Any	<=5	/	Rehabilitation
	>=6	>=6	>=6	/	None ¹
Culverts	/	/	/	<=4	Replacement
	/	/	/	5 or 6	Rehabilitation
	/	/	/	>=7	None

1) If the bridge is on a corridor with a recommendation of widening, it will be widened (considered as rehabilitation) as necessary to accommodate the additional proposed lanes.

- **Bridges for Rehab/Widening:** Rehab/widening is recommended for a total of three bridges along the entire corridor. Note that the bridge rehab is determined based on the "Methodology for Replacement/Rehabilitation Recommendation" table above. If the bridge has a good condition but is within a bottleneck location with recommended widening, it will be widened as necessary to accommodate the additional proposed lanes and the cost of widening is assumed to be the same as bridge rehab for the planning-level cost estimation purpose.

Bridges for Rehab/Widening	
Bridge ID	Feature Intersect
056B00008N	LONG RUN CREEK
056B00134N	BEARGRASS CREEK
106B00095N	CSX RAILROAD

- **Bridges for Replacement:** None.

Pavement Treatment: The overall pavement condition is good (average PDI = 0.27). Proposed additional lanes will consist of full depth asphalt pavement construction. Spot reconstruction and rehabilitation of existing asphalt pavement lanes might be needed based on more detailed evaluation of the corridor's pavement condition.

Potential Safety Improvement: The table below summarizes safety issues for the corridor and is based on KYTC safety data (LOSS value = 4), as well as a cursory review of Google Aerial imagery. The table identifies clusters of links with a LOSS value of 4 based on two categories: 1) clusters located in areas where this study already recommends corridor improvements for mobility reasons and 2) clusters not located in areas previously recommended for corridor mobility improvements. For Category 1, it is assumed any corridor improvement based on mobility needs will be constructed to current KYTC standards and will include the necessary safety improvements. Category 2 is intended to identify corridor segments that may warrant improvement for safety reasons, even though improvement might not be needed for mobility. There may also be isolated links with LOSS value of 4 that are not included in the table. Spot improvements could be warranted for those locations but it is assumed these spot

improvements do not rise to the level of a corridor improvement; therefore, these locations are not addressed in this planning study. The table further breaks the clusters down by urban and rural designation (based on KYSTMv18 data) because urban and rural roadways tend to have unique typical crash causes and countermeasures.

Potential Safety Improvements			
Category	Locations	Possible Causes	Recommendations
CAT 1: Major clusters of safety issues covered by proposed improvement concepts	Downtown Louisville to I-265	Capacity deficiencies, signal timing, sight distance challenges, speeding, geometric deficiencies.	Intersection improvements and complete streets recommendations listed above
CAT 2: Other major clusters of safety issues	<u>RURAL</u> Webb Road to KY 1848	<u>RURAL</u> Intersection spacing and numerous access points	<u>RURAL</u> Intersection signage, advance warning signs, turn lanes

Proposed Phasing: I-265 is part of the I-Move project that is currently under construction. Between Evergreen Road and Bircham Road, since all major intersections proposed for modification are located within the proposed corridor widening in Louisville, they will be improved at the same time the roadway is widened. Likewise, spot improvements between I-265 and KY 1848 in Simpsonville can be completed at the same time. The interchange modifications at I-264 in Louisville may be more complex and require a longer project development period; therefore, it is recommended to pursue it in a separate phase.

PRELIMINARY ENVIRONMENTAL RED FLAG ANALYSIS

The table below summarizes the presence of critical environmental red flag concerns identified by KYTC within 1,000 ft of proposed improvement locations (Y=Yes; N=No).

Critical Red Flag Issues/Concerns			
Environmental Red Flag Features	From I-64 in Louisville to I-265	From Evergreen Road to Bircham Road	I-265 to KY 1848 in Simpsonville
Superfunds	N	N	N
Special Waters ¹	N	N	N
Forested Areas	N	Y	Y
NLEB Habitat Priority	N	N	N
IB Habitat Priority Area	Y	N	N
FAA Airport Runways	N	N	N
Public Hunting Areas	N	N	N
Wildlife Management Areas	N	N	N
Local Parks	Y	N	Y
State/ National Parks	N	N	N
Kentucky Heritage Land Conservation Fund	N	N	N
Area Landmarks	N	N	N
Point Landmarks	Y	Y	Y
National Register of Historic Places Location (Point)	Y	Y	Y
National Register of Historic Places Location (Polygon)	Y	N	N

1) Special Waters are defined as Cold Water Aquatic Habitats, Outstanding State/National Resource Waters, Exceptional Waters, State Wild Rivers, and Federally Designated Wild / Scenic Rivers.

RIGHT OF WAY IMPACTS

The table below summarizes the potential right-of-way (ROW) needs for proposed improvement concepts.

Potential Needs of Additional Right of Way		
Location	Improvement Concepts	Potential Needs of Additional ROW
I-64 in Louisville to I-265	Complete streets with enhanced transit/bike/ped and access management	No
From Evergreen Road to Bircham Road	Widen to 6 Lanes	Yes
I-265 to KY 1848 in Simpsonville	Spot safety improvements including turn lanes and upgraded shoulders	No
Interchange Modifications at I-264	Interchange modifications	No
Interchange Modifications at I-265	Interchange modifications	Yes

COST ESTIMATION

Design:	23.1 (\$M)
ROW:	83.0 (\$M)
Utility:	19.2 (\$M)
Construction:	<u>153.7 (\$M)</u>
TOTAL =	278.9 (\$M)

Note:

1. The cost estimation may not include additional costs to address the potential impacts of major utilities (e.g., gas line, major water supplier, transmission line) within the proximity of the corridor, due to the lack of data when the report was prepared. Further investigation is recommended in future studies.
2. Cost estimation was based on 2020 dollars. There is a 1-3% inflation rate. Estimated cost could vary -50% to +250% of the actual number (as a rule of thumb).
3. The widening of a 2-lane facility to a 3-lane facility (with TWLTL or alternating passing lane) is considered as "Minor Widening (Undivided Road) - 2 Lane to 4 Lane".
4. The cost estimation does not include bridges outside of the bottleneck locations, as they are not assumed to rise to the level of a corridor improvement. The cost estimation only includes necessary bridge replacement/rehab/widening costs within the bottleneck locations with proposed widening improvement. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
5. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
6. Shoulder widening is not included in the cost estimation, as it is a relatively minor cost.
7. If multiple improvement concepts are recommended for the corridor, only the cost of the larger-scale improvement concept is estimated.

Kentucky Statewide Corridor Plan (Linking Kentucky)

Route: US 60
Segment ID: 6B
From: KY 1848 in Simpsonville
To: US 62 in Versailles
Counties: Shelby, Franklin, Woodford
Highway Districts: 5 and 7

CORRIDOR SEGMENT OVERVIEW

The 6B segment of US 60 begins at KY 1848 in Simpsonville in Shelby County. It runs parallel to I-64 through Shelbyville and Frankfort (in Franklin County) and ends at US 62 in Versailles (in Woodford County). The corridor is approximately 41 miles long and contains two interchanges at KY 676 and I-64.

US 60 runs through the center of the city in both Shelbyville and Frankfort, with numerous access points to homes and businesses, and signalized intersections. These areas would be considered towns (according to KYSTMv18 data) with clusters of homes and commercial buildings adjacent to US 60. The remainder of this segment passes through rural agricultural areas with homes interspersed along US 60.

EXISTING FACILITY

The table below outlines the typical roadway attributes for this section of US 60 by sub-segment.

Typical Roadway Attributes					
Sub-segment	Functional Classification	Number & Width of Lanes	Shoulder & Width	Median Type & Width	Posted Speed Limit
KY 1848 (Buck Creek Road) to US 460	Minor Arterial	2 – 4, 10' – 12'	Asphalt Combination (4'), Curbed (0-2'), None	Flush (10'-18'), Raised Non-Mountable (12'-20'), None	25 – 55 mph
US 460 to Woodford County Line	Principal Arterial Other	4, 12'	Asphalt (10'), Curbed (0'-2'), None	None, Flush (12'), Raised Non-Mountable (12')	40 – 55 mph
Franklin County Line to US 62	Principal Arterial Other	4, 12'	Asphalt (0-10')	None, Raised Non-Mountable (16'), Depressed (16')	55 mph

Right of Way: The table below outlines the general width of existing right of way within the corridor.

General Existing Right of Way Widths		
From	To	General Ex. R/W Width
KY 1848 in Simpsonville	One-Way Split in Shelbyville	100' – 120'
One-Way Split in Shelbyville	KY 53/KY 55 in Shelby County	55' – 65'
KY 53/KY 55 in Shelby County	KY 1211 in Franklin County	100' – 130'
KY 1211 in Franklin County	US 421/KY 676 Interchange	60' – 80'
US 421/KY 676 Interchange	US 62 in Versailles	140' – 190'

Pavement: The average PDI (Pavement Distress Index) for this section of US 60 is 0.27, which indicates an overall good pavement condition according to KYTC criteria (Good: 0.00 – 0.35; Fair: 0.36 – 0.65; Poor: 0.66 – 0.99).

Intersections/Interchanges: The tables below outline the existing interchanges, major intersections, and railroad crossings on the corridor.

Interchanges	Interchange Type
I-64	Diamond
US 421/KY 676	SPUI

Major Intersections ¹			
KY 1848 (Buck Creek Rd)	KY 55	KY 2257	Mack Walters Rd
Smithfield Rd	10 th St	7 th St	KY 53
KY 1871	KY 714	KY 395	KY 1472
KY 151	KY 1665	Cardwell Ln	US 127
Collins Ln	Lafayette Dr	KY 1211	Bridge St
Shelby St	Main St	E Broadway St	KY 1659
Schenkel Ln/Rolling Acres Dr	US 421/US 460	Lyons Dr	KY 2821
KY 2267	KY 1681 (Duncan Rd)	KY 1681 (Old Frankfort Pike)	Steele Rd
US 62 (Midway Rd)			

1) Only crossroads with functional classification of Minor Collector or above are included.

At-grade Railroad Crossings
None

Access Points: This segment is not access controlled. Throughout the corridor, there are residential and commercial driveways and intersecting roadways.

Bridges: The tables below outline the detailed bridge information for existing bridges on or over this section of US 60.

Mainline Bridge Information										
Bridge ID	Feature Intersect	NBIS Classification	Sufficiency Rating	Substandard	Deck Rating	Superstructure Rating	Substructure Rating	Under Clearance (feet)	Horizontal Clearance (feet)	Culvert Rating
037B00008N	CSX RAILROAD	Fair	72	No	5	5	5	22.5	94	N
037B00016N	LAFAYETTE DR	Fair	64.6	No	6	5	5	24.42	40.5	N
037B00019N (Culvert)	BR OF S BENSON CREEK	Fair	84.7	No	N	N	N	0	27.75	5
037B00063N	KENTUCKY RIVER	Fair	63.5	No	5	5	5	0	30	N
037B00078N	KY 676 (E-W CONN)	Fair	85	No	6	6	6	17	116	N
037B00097N	S BENSON CREEK	Fair	87.1	No	7	6	5	0	40	N
106B00007R	CLEAR CREEK	Poor	61.8	No	4	5	4	0	36	N
106B00024N (Culvert)	DRY RUN	Fair	40.5	No	N	N	N	0	77	5
106B00025N	BULLSKIN CREEK	Fair	60.6	No	7	7	5	0	26	N
106B00076L	CLEAR CREEK	Fair	96	No	5	7	7	0	34	N
106B00085N	GUIST CREEK	Fair	95.5	No	7	7	6	0	40	N
106B00086N	BENSON CREEK	Fair	97.8	No	7	7	6	0	40	N
106B00093N	LITTLE BULLSKIN CREEK	Fair	93	No	7	7	6	0	44	N

Structures Crossing Over the Corridor			
Bridge ID	Facility Carried	Under Clearance (feet)	Horizontal Clearance (feet)
037B00053L	I-64 WB	16.58	39.25
037B00053R	I-64 EB	16.08	39.25
037X00002N	PEDESTRIAN BRIDGE	22	48

Other Noteworthy Conditions: None.

TRAFFIC & OPERATIONS

AADT & AADTT: The table below summarizes the 2015 AADT and daily truck volumes by sub-segment.

Traffic Volumes			
Sub-segment	AADT	AADTT	Truck Percentage
From KY 1848 (south) in Simpsonville to KY 55 (Freedoms Way) in Shelbyville	4,800	200	3%
From KY 55 (Freedoms Way) to KY 53(Mt Eden Rd) in Shelbyville	15,100	1,300	8%
From KY 53(Mt Eden Rd) in Shelbyville to US 127 (Lawrenceburg Rd) in Franklin	5,500	300	6%
From US 127 (Lawrenceburg Rd) in Franklin to US 62 in Versailles	13,700	1,200	9%

Mobility: There are three major traffic bottleneck sections along this corridor segment. See the table below for details. (Note: bottlenecks are identified by Level of Travel Time Reliability (LOTTR) > 1.5 or volume/capacity (v/c) > 0.6.) There is also one isolated traffic bottleneck at the intersection with US 62 in Versailles. Other than the noted traffic bottleneck sections/locations, traffic condition is acceptable along the remainder of this segment.

Existing Typical Roadway Attributes at Major Traffic Bottlenecks					
Locations	Functional Classification	Number & Width of Lanes	Median Width	Shoulder Width	2015 AADT ¹
<u>Major Bottleneck 1:</u> From KY 1848 (south) to 1 mile east of KY 1848 (south) in Simpsonville	Minor Arterial	2, 11'	0 or 11'	10'	5,883
<u>Major Bottleneck 2:</u> From Taylorsville Road to 2 mile east of KY 53/KY 55 in Shelby County	Minor Arterial	2-4, 10'-12'	0'	10'	17,027
<u>Major Bottleneck 3:</u> From KY 2817 (Cardwell Ln) to KY 1681 (Shady Ln) in Frankfort (Franklin)	Minor Arterial / Principal Arterial	2-4, 10'-12'	0-20'	0-2'	28,497

1) The highest traffic volume within the bottleneck based on KYSTMv18 data.

Safety: 5.8% of the corridor mileage has a Level of Safety of Service (LOSS) of 4, meaning these links have the highest potential to decrease crashes. (Note: LOSS indicates the potential for crash reduction and is broken up into four categories based on Safety Performance Functions (SPFs): LOSS 4 = high; LOSS 3 = moderate to high; LOSS 2 = low to moderate; LOSS 1 = low.) See the table under **Potential Safety Improvement** section for details of locations with LOSS =4, possible causes, and potential safety improvements.

ITS Devices: Approximately 1% of the corridor length will have direct access to fiber from the ongoing Kentucky Wired project.

PROPOSED IMPROVEMENT CONCEPTS

The improvement options noted in this report are not intended to be all-encompassing. Other potential improvements are possible, including innovative solutions that could be cost-effective and address the reasons for improvement. Further study may be needed as part of the project development process.

Proposed Typical Section & Description of Modification: The table below describes the proposed improvement concepts for the identified bottlenecks. The proposed improvements expect to maintain an overall acceptable traffic condition through 2045 (v/c < 0.85 in urban areas and v/c < 0.7 in rural areas) and address safety issues at bottlenecks.

Proposed Improvement Concepts			
Locations	Improvement Concepts ¹	Notes ²	Reason for Improvement
<u>Major Bottleneck 1:</u> From KY 1848 (south) to 1 mile east of KY 1848 (south) in Simpsonville	None at this time	The bottleneck at this location is likely due to this being the only signalized intersection in the area	
<u>Major Bottleneck 2:</u> From Taylorsville Road to KY 53/KY 55 in Shelby County	Spot improvements to address safety, as well as coordinated signalization, improved signage and intersections.	This section is currently a 5-lane section which turns into a one-way pair with 2 lanes in each direction through Shelbyville. Due to limited right of way and acceptable 2045 v/c through much of the section, widening is not recommended	LOTTR exceeds the established thresholds
<u>Major Bottleneck 2:</u> From KY 53/KY 55 to 2 miles east of KY 53/KY 55 in Shelby County	Widen to 5-lane section	Urban typical section with 2-11' lanes in each direction, a 15' center two-way left turn lane, curb & gutter, and sidewalk	The expected v/c in 2045 exceeds the established thresholds
<u>Major Bottleneck 3:</u> From KY 2817 (Cardwell Ln) to KY 1681 (Shady Ln) in Frankfort (Franklin)	Spot improvements to address safety as well as coordinated signalization and access management	The majority of this section has an acceptable 2045 v/c, and right of way through this area is limited, therefore spot improvements are recommended	Address safety and bottlenecks due to high LOTTR

1) The proposed roadway widening concept includes spot improvements at interchanges and major intersections as needed (see details in Interchanges for Potential Modification and Major Intersection for Potential Modification sections below).

2) Improved typical sections are based on KYTC Highway Design Manual.

Potential New Interchanges: None.

Interchanges for Potential Modification: Improvements are proposed for the existing interchange at I-64.

Interchanges for Potential Modification
I-64

Major Intersections for Potential Modification: Improvements, such as signalization and realignment should be considered at 25 major intersections within this corridor segment. The following is a list of these intersections.

Major Intersections for Potential Modification			
KY 55	KY 2257	Mack Walters Rd	Smithfield Rd
10 th St	7 th St	KY 53	US 127
Collins Ln	Lafayette Dr	KY 1211	Bridge St
Shelby St	Main St	E Broadway St	KY 1659
Schenkel Ln/Rolling Acres Dr	US 421/US 460	Lyons Dr	KY 2821
Chenault Rd	KY 1681 (Duncan Rd)	US 62 (Midway Rd)	KY 1871
Capital Ave			

Bridges: Bridge recommendations are based on ratings of substructure, superstructure and deck using the following methodology.

Methodology for Replacement/Rehabilitation Recommendation					
Structures	Substructure Rating	Superstructure Rating	Deck Rating	Culvert Rating	Recommendations
Bridges	<=4	Any	Any	/	Replacement
	=5	Any	Any	/	Rehabilitation
	>=6	<=5	Any	/	Rehabilitation
	>=6	Any	<=5	/	Rehabilitation
	>=6	>=6	>=6	/	None ¹
Culverts	/	/	/	<=4	Replacement
	/	/	/	5 or 6	Rehabilitation
	/	/	/	>=7	None

1) If the bridge is on a corridor with a recommendation of widening, it will be widened (considered as rehabilitation) as necessary to accommodate the additional proposed lanes.

- **Bridges for Rehab/Widening:** Rehab/widening is recommended for a total of seven bridges along the entire corridor. Note that the bridge rehab is determined based on the "Methodology for Replacement/Rehabilitation Recommendation" table above. If the bridge has a good condition but is within a bottleneck location with recommended widening, it will be widened as necessary to accommodate the additional proposed lanes and the cost of widening is assumed to be the same as bridge rehab for the planning-level cost estimation purpose.

Bridges for Rehab/Widening	
Bridge ID	Feature Intersect
037B00008N	CSX RAILROAD
037B00016N	LAFAYETTE DR
037B00019N	BR OF S BENSON CREEK
037B00063N	KENTUCKY RIVER
037B00097N	S BENSON CREEK
106B00025N	BULLSKIN CREEK
106B00076L	CLEAR CREEK

- **Bridges for Replacement:** Replacement is recommended for a total of one bridge along the entire corridor. Note that the bridge replacement is determined based on the "Methodology for Replacement/Rehabilitation Recommendation" table above. If the bridge needs replacement and is within a bottleneck location with recommended widening, it will be widened during the replacement to accommodate the additional proposed lanes and the cost of bridge replacement is used for the planning-level cost estimation purpose.

Bridges for Replacement	
Bridge ID	Feature Intersect
106B00007R	CLEAR CREEK

Pavement Treatment: The overall pavement condition is good (average PDI = 0.27). Proposed additional lanes will consist of full depth asphalt pavement construction. Spot reconstruction and rehabilitation of existing asphalt pavement lanes might be needed based on more detailed evaluation of the corridor's pavement condition.

Potential Safety Improvement: The table below summarizes safety issues for the corridor and is based on KYTC safety data (LOSS value = 4), as well as a cursory review of Google Aerial imagery. The table identifies clusters of links with a LOSS value of 4 based on two categories: 1) clusters located in areas where this study already recommends corridor improvements for mobility reasons and 2) clusters not located in areas previously recommended for corridor mobility improvements. For Category 1, it is assumed any corridor improvement based on mobility needs will be constructed to current KYTC standards and will include the necessary safety improvements. Category 2 is intended to identify corridor segments that may warrant improvement for safety reasons, even though improvement might not be needed for mobility. There may also be isolated links with LOSS value of 4 that are not included in the table. Spot improvements could be warranted for those locations but it is assumed these spot improvements do not rise to the level of a corridor improvement; therefore, these locations are not addressed in this planning study. The table further breaks the clusters down by urban and rural designation (based on KYSTMv18 data) because urban and rural roadways tend to have unique typical crash causes and countermeasures.

Potential Safety Improvements			
Category	Locations	Possible Causes	Recommendations
CAT 1: Major clusters of safety issues covered by proposed improvement concepts	Taylorsville Road to KY 53; KY 2817 to KY 1681	Traffic pattern change and bottleneck conditions in downtown Shelbyville; bottleneck conditions in Frankfort	Spot improvements in Shelbyville described above; spot improvements and access management described above
CAT 2: Other major clusters of safety issues	N/A	N/A	N/A

Proposed Phasing: The proposed spot improvements at major intersections could be phased geographically: one phase each for Jefferson and Shelby counties (along with widening to 5 lanes from KY 53/KY 55 to 2 miles east of KY 53/KY 55 in Shelby County), and another phase for Franklin County. Because many of the Shelby County intersections are located in Shelbyville and many of the Franklin County intersections are all located in Frankfort, they have urban and complex settings, and grouping them in a separate phase is reasonable.

PRELIMINARY ENVIRONMENTAL RED FLAG ANALYSIS

The table below summarizes the presence of critical environmental red flag concerns identified by KYTC within 1,000 ft of proposed improvement locations (Y=Yes; N=No).

Critical Red Flag Issues/Concerns			
Environmental Red Flag Features	<u>Major Bottleneck 2:</u> From Taylorsville Road to KY 53/KY 55 in Shelby County	<u>Major Bottleneck 2: From</u> KY 53/KY 55 to 2 miles east of KY 53/KY 55 in Shelby County	<u>Major Bottleneck 3:</u> From KY 2817 (Cardwell Ln) to KY 1681 (Shady Ln) in Frankfort (Franklin)
Superfunds	N	N	N
Special Waters ¹	N	N	N
Forested Areas	N	N	N
NLEB Habitat Priority	N	N	N
IB Habitat Priority Area	N	N	N
FAA Airport Runways	N	N	Y
Public Hunting Areas	N	N	N
Wildlife Management Areas	N	N	N
Local Parks	Y	N	Y
State/ National Parks	N	N	N
Kentucky Heritage Land Conservation Fund	N	N	N
Area Landmarks	Y	N	Y
Point Landmarks	Y	Y	Y
National Register of Historic Places Location (Point)	Y	Y	Y
National Register of Historic Places Location (Polygon)	Y	N	Y

1) Special Waters are defined as Cold Water Aquatic Habitats, Outstanding State/National Resource Waters, Exceptional Waters, State Wild Rivers, and Federally Designated Wild / Scenic Rivers.

RIGHT OF WAY IMPACTS

The table below summarizes the potential right-of-way (ROW) needs for proposed improvement concepts.

Potential Needs of Additional Right of Way		
Location	Improvement Concepts	Potential Needs of Additional ROW
<u>Major Bottleneck 2:</u> From KY 53/KY 55 to 2 miles east of KY 53/KY 55 in Shelby County	Widen to 5-lane section	Yes
Interchange Modifications at I-64	Interchange Modifications	Potentially
Intersection Modifications at Collins Ln, Lafayette Dr, KY 1211, Schenkel Ln/Rolling Acres Dr, Lyons Dr, and US 62 (Midway Rd)	Improvements, such as signalization and realignment	Yes
Intersection Modifications at KY 2257, Mack Walters Rd, 10th St, 7th St, Bridge St, Shelby St, Main St, E Broadway St, KY 1659, US 421/US 460, KY 2267, and KY 1681 (Duncan Rd)	Improvements, such as signalization and realignment	No
Intersection Modifications at Smithfield Rd, US 127, and KY 2821	Improvements, such as signalization and realignment	Potentially

COST ESTIMATION

Design:	21.4 (\$M)
ROW:	77.2 (\$M)
Utility:	17.8 (\$M)
Construction:	<u>142.5 (\$M)</u>
TOTAL =	258.9 (\$M)

Note:

1. The cost estimation may not include additional costs to address the potential impacts of major utilities (e.g., gas line, major water supplier, transmission line) within the proximity of the corridor, due to the lack of data when the report was prepared. Further investigation is recommended in future studies.
2. Cost estimation was based on 2020 dollars. There is a 1-3% inflation rate. Estimated cost could vary -50% to +250% of the actual number (as a rule of thumb).
3. The widening of a 2-lane facility to a 3-lane facility (with TWLTL or alternating passing lane) is considered as "Minor Widening (Undivided Road) - 2 Lane to 4 Lane".
4. The cost estimation does not include bridges outside of the bottleneck locations, as they are not assumed to rise to the level of a corridor improvement. The cost estimation only includes necessary bridge replacement/rehab/widening costs within the bottleneck locations with proposed widening improvement. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
5. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
6. Shoulder widening is not included in the cost estimation, as it is a relatively minor cost.
7. If multiple improvement concepts are recommended for the corridor, only the cost of the larger-scale improvement concept is estimated.

Kentucky Statewide Corridor Plan (Linking Kentucky)

Route: US 60
Segment ID: 6C
From: US 62 in Versailles
To: I-75 in Lexington
Counties: Woodford, Scott, and Fayette
Highway Districts: 7

CORRIDOR SEGMENT OVERVIEW

Segment 6C on US 60 begins at US 62 in Woodford County and extends southeast through Scott County and ends at the I-75 interchange in Lexington in Fayette County. The corridor segment length is approximately 19 miles long and currently contains four interchanges at the Bluegrass Parkway, New Circle Road at Versailles Road, New Circle Road at Winchester Road, and I-75.

This segment passes through the residential and commercial areas in one city (Lexington in Fayette County). This area would be considered city (according to KYSTMv18 data) with clusters of homes and commercial buildings adjacent to US 60. This segment also passes through the residential and commercial areas in one town (Versailles in Woodford County). This area would be considered town (according to KYSTMv19 data) with clusters of homes and commercial buildings adjacent to US 60. The remainder of this segment passes through rural agricultural areas with homes interspersed along US 60.

EXISTING FACILITY

The table below outlines the typical roadway attributes for this section of US 60 by sub-segment.

Typical Roadway Attributes					
Sub-segment	Functional Classification	Number & Width of Lanes	Shoulder & Width	Median Type & Width	Posted Speed Limit
US 62 to US 922 (Oliver Lewis Way)	Principal Arterial - Other	4-6, 11-12'	Curbed (0-2'), Asphalt (10')	None, Raised Non-Mountable (16'), Raised Mountable (20'), Flush (4')	35 - 55 mph
US 922 (Oliver Lewis Way) to US 25 (E Main Street)	Principal Arterial - Other	4, 11'	Curbed (0-2')	Raised Non-Mountable (20')	35 mph
US 25 (E Main Street) to I-75	Principal Arterial - Other	4-6, 10' - 12'	Curbed (0-6'), Asphalt (10'), None	None, Flush (12' – 18'), Raised Non-Mountable (14' - 15')	35 - 55 mph

Right of Way: The table below outlines the general width of existing right of way within the corridor.

General Existing Right of Way Widths		
From	To	General Ex. R/W Width
US 62 in Versailles	Versailles Road/New Circle Road Interchange	175' – 200'
Versailles Road/New Circle Road Interchange	Winchester Road/New Circle Road Interchange	80' – 100'
Winchester Road/New Circle Road Interchange	I-75 in Lexington	150' – 200'

Pavement: The average PDI (Pavement Distress Index) for this section of US 60 is 0.34, which indicates an overall good pavement condition according to KYTC criteria (Good: 0.00 – 0.35; Fair: 0.36 – 0.65; Poor: 0.66 – 0.99).

Intersections/Interchanges: The tables below outline the existing interchanges, major intersections, and railroad crossings on the corridor.

Interchanges	Interchange Type
I-64/I-75	Diamond
Winchester Road/New Circle Road	SPUI
Versailles Road/New Circle Road	Partial Cloverleaf w/ Spill-through Flyover
Bluegrass Parkway	Three Leg

Major Intersections ¹			
US 62 (Midway Rd)	US 62 (Frankfort St)	Yellow Jacket Dr	Big Sink Rd
US 60 (Lexington Rd)	Paynes Mill Rd	Huntertown Rd	KY 1967
KY 1968 (2)	KY 1969	Man O' War Blvd	Alexandria Dr
Village Dr	Mason Headley Rd	Oxford Circle (2)	Delmont Dr
Red Mile Road	Angliana Ave	Oliver Lewis Way	Jefferson Street
S Broadway / Maxwell St	High St	Vine St	W Main St
Upper St	Limestone	Martin Luther King Blvd	Rose Street
Midland Ave / E Main St	E Short St	E 3 rd St	Walton Ave
E 7 th St / Liberty Rd	E Loudon Ave	Industry Rd	Eastland Pkwy
Fortune Dr	Sir Barton Way		

1) Only crossroads with functional classification of Minor Collector or above are included.

At-grade Railroad Crossings
US 60 Mile Point 8.963 in Fayette County
US 60 Mile Point 8.544 in Woodford County
US 60 Mile Point 8.297 in Woodford County

Access Points: This segment has no limited access. Throughout the corridor, there are access points for commercial, residential, intersecting roadways.

Bridges: The tables below outline the detailed bridge information for existing bridges on or over this section of US 60.

Mainline Bridge Information										
Bridge ID	Feature Intersect	NBIS Classification	Sufficiency Rating	Substandard	Deck Rating	Superstructure Rating	Substructure Rating	Under Clearance (feet)	Horizontal Clearance (feet)	Culvert Rating
034B00012N (Culvert)	VAUGHNS BRANCH	Fair	78.1	No	N	N	N	0	76.75	6
034B00013N (Culvert)	WOLFE RUN	Fair	77	No	N	N	N	0	69	6
034B00014N (Culvert)	HARRISON BRANCH	Fair	54.4	No	N	N	N	0	68.5	6
034B00120N (Culvert)	SHANNON RUN	Fair	50.5	No	N	N	N	0	88.75	6
034B00121N (Culvert)	SOUTH ELKHORN CREEK	Fair	85	No	N	N	N	0	88.5	6
034B00122N	CSX RR & DERODE ST	Fair	86.4	No	6	7	5	37.25	68	N

Structures Crossing Over the Corridor			
Bridge ID	Facility Carried	Under Clearance (feet)	Horizontal Clearance (feet)
034B00022L	W NEW CIRCLE RD NC	15.92	31.33
034B00022R	NEW CIRCLE ROAD	17.58	42.33
034B00148L	S I-75 NC	16.17	61.5
034B00148R	N I-75	16.17	61.5
034B00157N	WINCHESTER ROAD	16.17	99.9
034B00168N	RAMP G NEW CIRCLE	16.5	25
034C00054N	S MARTIN LUTHER KI	16.85	38.17
120B00030N	BG PKWY - 9002	16.3	24
034X00001N	PEDWAY	22.92	58.67
034X00003N	RADISON PED.BRIDGE	17.5	49
034X00005N	PEDESTRIAN WALKWAY	16.33	48.3
120X00001N	PED. OVER PASS	17.50	84.00

Other Noteworthy Conditions: None.

TRAFFIC & OPERATIONS

AADT & AADTT: The table below summarizes the 2015 AADT and daily truck volumes by sub-segment.

Traffic Volumes			
Sub-segment	AADT	AADTT	Truck Percentage
From US 62 in Versailles to Bluegrass Pkwy	18,800	1,500	8% ¹
From Bluegrass Pkwy to KY 4 (New Circle Rd) in Lexington	35,800	4,500	13%
From KY 4 (New Circle Rd) to I-75 in Lexington	26,100	2,400	9%

¹ Truck percentage obtained from KYTC Traffic Count Reporting System

Mobility: There are two major traffic bottleneck sections along this corridor segment. See the table below for details. (Note: bottlenecks are identified by Level of Travel Time Reliability (LOTTR) > 1.5 or volume/capacity (v/c) > 0.6.) Traffic condition is acceptable along the remainder of this segment.

Existing Typical Roadway Attributes at Major Traffic Bottlenecks					
Locations	Functional Classification	Number & Width of Lanes	Median Width	Shoulder Width	2015 AADT ¹
<u>Major Bottleneck 1:</u> From US 62 in Versailles to 0.7 mile west of Bluegrass Pkwy	Principal Arterial	4, 12'	16'-20'	0' or 10'	24,675
<u>Major Bottleneck 2:</u> From 0.7 mile east of Bluegrass Pkwy to I-75 in Lexington	Principal Arterial	4-6, 10'-12'	0'-24'	0' or 10'	42,345

1) The highest traffic volume within the bottleneck based on KYSTMv18 data.

Safety: 5.7% of the corridor has a Level of Safety of Service (LOSS) of 4, meaning these areas have the highest potential to decrease crashes. (Note: LOSS indicates the potential for crash reduction and is broken up into four categories based on Safety Performance Functions (SPFs): LOSS 4 = high; LOSS 3 = moderate to high; LOSS 2 = low to moderate; LOSS 1 = low.) See the table under **Potential Safety Improvement** section for details of locations with LOSS =4, possible causes, and potential safety improvements.

ITS Devices: Lexington Fayette Urban County Government (LFUCG) has a fiber network surrounding the corridor with CCTV cameras throughout the corridor.

PROPOSED IMPROVEMENT CONCEPTS

The improvement options noted in this report are not intended to be all-encompassing. Other potential improvements are possible, including innovative solutions that could be cost-effective and address the reasons for improvement. Further study may be needed as part of the project development process.

Proposed Typical Section & Description of Modification: The table below describes the proposed improvement concepts for the identified bottlenecks. The proposed improvements expect to maintain an overall acceptable traffic condition through 2045 ($v/c < 0.85$ in urban areas and $v/c < 0.7$ in rural areas) and address safety issues at bottlenecks.

Proposed Improvement Concepts			
Location	Improvement Concepts ¹	Notes ²	Reason for Improvement
<u>Major Bottleneck 1:</u> From US 62 in Versailles to 0.7 mile west of Bluegrass Pkwy	Widen to 6-lane divided section and improve the US 60/Lexington Road intersection	3-12' lanes in each direction with 8' useable shoulders with concrete barrier median	This section is a bottleneck for nearly the entire length and has an unacceptable 2045 v/c
<u>Major Bottleneck 2:</u> From 0.7 mile east of Bluegrass Pkwy to New Circle Road in Lexington	Widen to 6-lane divided section	3-12' lanes in each direction with 8' useable shoulders with concrete barrier median	This section is a bottleneck for nearly the entire length and has an unacceptable 2045 v/c
<u>Major Bottleneck 2:</u> From New Circle Road to I-75 in Lexington	Complete streets with enhanced transit/bike/ped and access management	Due to right of way constraints, widening is not recommended on this section	This section is a bottleneck for nearly the entire length and has an unacceptable 2045 v/c as well as spot safety issues

1) The proposed roadway widening concept includes spot improvements at interchanges and major intersections as needed (see details in Interchanges for Potential Modification and Major Intersection for Potential Modification sections below).

2) Improved typical sections are based on KYTC Highway Design Manual.

Potential New Interchanges: None.

Interchanges for Potential Modification: Bluegrass Parkway interchange would need to be modified if the gap to I-64 is ever closed.

Interchanges for Potential Modification
Bluegrass Parkway

Major Intersections for Potential Modification: Improvements, such as additional turn lanes, channelization, coordinated signal timing and innovative design, should be considered at 37 major intersections within this corridor segment. The following is a list of these intersections.

Major Intersections for Potential Modification			
US 62 (Midway Rd)	US 60 (Frankfort St)	Big Sink Rd	US 60 (Lexington Rd)
Paynes Mill Rd	Huntertown Rd	KY 1967	KY 1968 (Parkers Mill west of Man O' War Blvd)
KY 1969	Man O' War Blvd	Alexandria Dr	Village Dr
Mason Headley Rd	Oxford Circle (2) ¹	Delmont Dr	Red Mile Road
Angliana Ave	Oliver Lewis Way	Jefferson Street	S Broadway / Maxwell St
High St	Vine St	W Main St	Upper St
Limestone	Martin Luther King Blvd	Rose Street	Midland Ave / E Main St
E Short St	E 3 rd St	Walton Ave	E 7 th St / Liberty Rd
E Loudon Ave	Industry Rd	Eastland Pkwy	Fortune Dr
Sir Barton Way			

1) The (2) indicates the second of two intersections of US 60 with Oxford Circle.

Bridges: Bridge recommendations are based on ratings of substructure, superstructure and deck using the following methodology.

Methodology for Replacement/Rehabilitation Recommendation					
Structures	Substructure Rating	Superstructure Rating	Deck Rating	Culvert Rating	Recommendations
Bridges	<=4	Any	Any	/	Replacement
	=5	Any	Any	/	Rehabilitation
	>=6	<=5	Any	/	Rehabilitation
	>=6	Any	<=5	/	Rehabilitation
	>=6	>=6	>=6	/	None ¹
Culverts	/	/	/	<=4	Replacement
	/	/	/	5 or 6	Rehabilitation
	/	/	/	>=7	None

1) If the bridge is on a corridor with a recommendation of widening, it will be widened (considered as rehabilitation) as necessary to accommodate the additional proposed lanes.

- **Bridges for Rehab/Widening:** Rehab/widening is recommended for two bridges along the entire corridor. Note that the bridge rehab is determined based on the "Methodology for Replacement/Rehabilitation Recommendation" table above. If the bridge has a good condition but is within a bottleneck location with recommended widening, it will be widened as necessary to accommodate the additional proposed lanes and the cost of widening is assumed to be the same as bridge rehab for the planning-level cost estimation purpose.

Bridges for Rehab/Widening	
Bridge ID	Feature Intersect
034B00122N	CSX RR; DERROODE ST
120X00001N	PED. OVER PASS

- **Bridges for Replacement:** None.

Pavement Treatment: The overall pavement condition is good (average PDI = 0.34). Proposed additional lanes will consist of full depth asphalt pavement construction. Spot reconstruction and rehabilitation of existing asphalt pavement lanes might be needed based on more detailed evaluation of the corridor's pavement condition.

Potential Safety Improvement: The table below summarizes safety issues for the corridor and is based on KYTC safety data (LOSS value = 4), as well as a cursory review of Google Aerial imagery. The table identifies clusters of links with a LOSS value of 4 based on two categories: 1) clusters located in areas where this study already recommends corridor improvements for mobility reasons and 2) clusters not located in areas previously recommended for corridor mobility improvements. For Category 1, it is assumed any corridor improvement based on mobility needs will be constructed to current KYTC standards and will include the necessary safety improvements. Category 2 is intended to identify corridor segments that may warrant improvement for safety reasons, even though improvement might not be needed for mobility. There may also be isolated links with LOSS value of 4 that are not included in the table. Spot improvements could be warranted for those locations but it is assumed these spot improvements do not rise to the level of a corridor improvement; therefore, these locations are not addressed in this planning study. The table further breaks the clusters down by urban and rural designation (based on KYSTMv19 data) because urban and rural roadways tend to have unique typical crash causes and countermeasures.

Potential Safety Improvements			
Category	Locations	Possible Causes	Recommendations
CAT 1: Major clusters of safety issues covered by proposed improvement concepts	S Broadway St to Short St	Bottlenecks and intersection spacing	Complete streets and access management described above
CAT 2: Other major clusters of safety issues	N/A	N/A	N/A

Proposed Phasing: The proposed new interchange at US 62 can be constructed separately and ahead of the proposed interchange modification at Bluegrass Parkway in Versailles. Intersections proposed for spot improvements outside New Circle Road are located within the proposed corridor widening in Versailles and Lexington, they will be improved at the same time the roadway is widened. The proposed spot improvements at the 28 major intersections inside New Circle Road and between New Circle Road and I-75 can be constructed at a later time.

PRELIMINARY ENVIRONMENTAL RED FLAG ANALYSIS

The table below summarizes the presence of critical environmental red flag concerns identified by KYTC within 1,000 ft of proposed improvement locations (Y=Yes; N=No).

Critical Red Flag Issues/Concerns			
Environmental Red Flag Features	<u>Major Bottleneck 1:</u> From US 62 in Versailles to 0.7 mile west of Bluegrass Pkwy	<u>Major Bottleneck 2:</u> From 0.7 mile east of Bluegrass Pkwy to New Circle Road in Lexington	<u>Major Bottleneck 2:</u> From New Circle Road to I-75 in Lexington
Superfunds	N	N	N
Special Waters ¹	N	N	N
Forested Areas	N	N	N
NLEB Habitat Priority	N	N	N
IB Habitat Priority Area	N	N	N
FAA Airport Runways	N	Y	N
Public Hunting Areas	N	N	N
Wildlife Management Areas	N	N	N
Local Parks	Y	N	Y
State/ National Parks	N	N	N
Kentucky Heritage Land Conservation Fund	N	N	N
Area Landmarks	Y	Y	Y
Point Landmarks	Y	Y	Y
National Register of Historic Places Location (Point)	N	Y	Y
National Register of Historic Places Location (Polygon)	N	Y	Y

1) Special Waters are defined as Cold Water Aquatic Habitats, Outstanding State/National Resource Waters, Exceptional Waters, State Wild Rivers, and Federally Designated Wild / Scenic Rivers.

RIGHT OF WAY IMPACTS

The table below summarizes the potential right-of-way (ROW) needs for proposed improvement concepts.

Potential Needs of Additional Right of Way		
Location	Improvement Concepts	Potential Needs of Additional ROW
<u>Major Bottleneck 1:</u> US 62 in Versailles to 0.7 mile west of Bluegrass Pkwy	Widen to 6-lane divided section and improve the US 60/Lexington Road Intersection	No
<u>Major Bottleneck 2:</u> 0.7 mile east of Bluegrass Pkwy to New Circle Road in Lexington	Widen to 6-lane divided section	No
<u>Major Bottleneck 2:</u> New Circle Road to I-75 in Lexington	Complete streets with enhanced transit/bike/ped and access management	No
New Interchange at US 62 (includes grade separated RR crossing)	New interchange	Yes

Potential Needs of Additional Right of Way		
Location	Improvement Concepts	Potential Needs of Additional ROW
Interchange Modifications at Bluegrass Parkway Extension	Interchange modifications	No
Intersection Modifications at Delmont Dr, Oliver Lewis Way, S Broadway / Maxwell St, High St, Vine St, W Main St, Upper St, Limestone, Martin Luther King Blvd, Rose Street, E Short St, E 3rd St, Walton Ave, Industry Rd	Improvements, such as additional turn lanes, channelization, coordinated signal timing and innovative design	No
Intersection Modifications at KY 1968 (Parkers Mill west of Man O' War Blvd), Alexandria Dr, Village Dr, Mason Headley Rd, Oxford Circle, Red Mile Road, Angliana Ave, Jefferson Street, Midland Ave / E Main St, E 7th St / Liberty Rd, E Loudon Ave, Eastland Pkwy, Fortune Dr, Sir Barton Way	Improvements, such as additional turn lanes, channelization, coordinated signal timing and innovative design	Potentially

COST ESTIMATION

Design:	37.0 (\$M)
ROW:	112.5 (\$M)
Utility:	25.6 (\$M)
Construction:	<u>273.9 (\$M)</u>
TOTAL =	448.9 (\$M)

Note:

1. The cost estimation may not include additional costs to address the potential impacts of major utilities (e.g., gas line, major water supplier, transmission line) within the proximity of the corridor, due to the lack of data when the report was prepared. Further investigation is recommended in future studies.
2. Cost estimation was based on 2020 dollars. There is a 1-3% inflation rate. Estimated cost could vary -50% to +250% of the actual number (as a rule of thumb).
3. The widening of a 2-lane facility to a 3-lane facility (with TWLTL or alternating passing lane) is considered as "Minor Widening (Undivided Road) - 2 Lane to 4 Lane".
4. The cost estimation does not include bridges outside of the bottleneck locations, as they are not assumed to rise to the level of a corridor improvement. The cost estimation only includes necessary bridge replacement/rehab/widening costs within the bottleneck locations with proposed widening improvement. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
5. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
6. Shoulder widening is not included in the cost estimation, as it is a relatively minor cost.
7. If multiple improvement concepts are recommended for the corridor, only the cost of the larger-scale improvement concept is estimated.

Kentucky Statewide Corridor Plan (Linking Kentucky)

Route: KY 9 (AA Highway)
Segment ID: 9
From: I-275
To: I-64 near Grayson
Counties: Bracken, Campbell, Carter, Lewis, Mason, and Pendleton
Highway Districts: 6 and 9

CORRIDOR SEGMENT OVERVIEW

Segment 9 on KY 9 begins at the I-275 interchange in Campbell County and extends southeast through Lewis, Mason, Pendleton and Bracken Counties to I-64 near Grayson in Carter County. The corridor segment length is approximately 111 miles and currently contains five interchanges.

This segment passes through the residential and commercial areas of Northern Kentucky in Campbell County, the City of Maysville in Mason County, Vanceburg in Lewis County, and near Grayson in Carter County. These areas would be considered towns (according to KYSTMv19 data) with clusters of homes and commercial buildings adjacent to KY 9. The remainder of this segment passes through rural agricultural areas with homes interspersed along KY 9.

EXISTING FACILITY

The table below outlines the typical roadway attributes for this section of KY 9 by sub-segment.

Typical Roadway Attributes					
Sub-segment	Functional Classification	Number & Width of Lanes	Shoulder & Width	Median Type & Width	Posted Speed Limit
From I-275 to Campbell County Line	Principal Arterial Other	2-6, 12'	Asphalt (3-10'), Concrete (10'), Curbed (2'), None	Concrete Barrier (9'), Flush (12'), Raised Mountable (12'-16'), Raised Non Mountable (15'), None	45-55 mph
From Campbell County Line to Mason County Line	Principal Arterial Other	2, 12'	Asphalt (10'), None	Flush (14'), None	55 mph
Only Mason County	Principal Arterial Other	2-4, 12'	Asphalt (10'), Curbed (1-2'), None	Flush (12-14'), Raised Mountable (12-15'), None	45-55 mph
From Mason County Line to I-64	Principal Arterial Other	2, 12'	Asphalt (11-12'), None	Flush (12-15'), None	55 mph

Right of Way: The existing right of way is generally 180' – 250' wide.

Pavement: The average PDI (Pavement Distress Index) for this section of KY 9 is 0.42, which indicates an overall fair pavement condition according to KYTC criteria (Good: 0.00 – 0.35; Fair: 0.36 – 0.65; Poor: 0.66 – 0.99).

Intersections/Interchanges: The tables below outline the existing interchanges and major intersections on the corridor.

Interchanges	Interchange Types
I-275	Partial Cloverleaf
KY 547	Partial Cloverleaf
US 27	Partial Cloverleaf
US 68	Partial Cloverleaf
I-64	Diamond

Major Intersections ¹			
Pooles Creek Rd	KY 159	US 62	Clarksburg Rd
Licking Pike	Foster Rd	Marketsquare Dr	KY 10
E Alexandria Pike	Lennoxburg Foster Rd	E Maple Leaf Rd	KY 59
Stonehouse Rd	Johnsville Foster Rd	KY 11	Trace
Carthage Rd	Bladeston Dr	Orangeburg Rd	KY 2
California Rd	Augusta-Chatham Rd	KY 3161	KY 7
Smith Rd	Mason Lewis Rd	Bridgeport Rd	KY 7
Ivor Rd	Germantown Rd	KY 57	KY 1959
KY 154	Parker Rd	Salt Lick Rd	Carol Malone Blvd

1) Only crossroads with function classification of Minor Collector or above are included.

At-grade Railroad Crossings
None

Access Points: This segment has limited access in the northern portions but is not access controlled throughout the rest of the corridor. Throughout the corridor, there are residential and commercial driveways and intersecting roadways.

Bridges: The tables below outline the detailed bridge information for existing bridges on or over this section of KY 9.

Mainline Bridge Information										
Bridge ID	Feature Intersect	NBIS Classification	Sufficiency Rating	Substandard	Deck Rating	Superstructure Rating	Substructure Rating	Under Clearance (feet)	Horizontal Clearance (feet)	Culvert Rating
022B00145N	BARRETT'S CREEK	Fair	97.1	No	6	7	7	0	82.02	N
022B00157N	KY 1 OVER I-64	Fair	95.7	No	6	7	6	17.5	85.96	N
012B00029N	GOOSE CREEK	Fair	75	No	6	8	7	0	43.96	N
012B00030N	LOCUST CREEK	Good	75	No	7	8	7	0	43.96	N
022B00147N	EVERMAN CREEK	Fair	87.1	No	6	7	7	0	43.96	N
022B00148N	TYGARTS CREEK	Fair	95.3	No	6	8	7	0	43.96	N
022B00149N	BUFFALO CREEK	Fair	99.3	No	6	7	7	0	43.96	N
022B00150N	GRASSY CREEK	Fair	91.2	No	6	7	7	0	44.29	N
068B00035N	SWEARINGER BRANCH	Fair	87	No	6	6	6	0	43.96	N
068B00036N (Culvert)	GRANNISON BRANCH	Good	81.4	No	N	N	N	0	44	7
068B00037N (Culvert)	BLUE SPRING BRANCH	Fair	81.4	No	N	N	N	0	44	6
068B00038N	BEN WILLEN BRANCH	Fair	83.4	No	5	6	7	0	43.96	N
068B00096N	CABIN CREEK	Fair	97	No	6	6	7	0	43.96	N
068B00097N (Culvert)	BETHEL CREEK	Good	97	No	N	N	N	0	44.29	7
068B00098N (Culvert)	LITTLE BRANCH	Good	85.5	No	N	N	N	0	48.56	7
068B00099N	SALT LICK CREEK	Fair	97	No	6	6	7	0	43.96	N
068B00100N (Culvert)	DRY RUN CREEK	Good	97.7	No	N	N	N	0	69.88	7
068B00105N	KINNICONICK CREEK	Fair	90.8	No	6	8	7	0	43.96	N
081B00057N (Culvert)	LAWRENCE CREEK	Good	80.8	No	N	N	N	0	43.96	7
081B00065N	TRANS-KY TRANS.RR	Fair	92.8	No	6	6	6	23.25	43.96	N
019B00069N	KY 547 & 4 MI CREEK	Good	96	No	7	7	7	15.94	81.69	N

Structures Crossing Over the Corridor			
Bridge ID	Facility Carried	Under Clearance (feet)	Horizontal Clearance (feet)
019B00047N	I-275	17.58	24.28

Other Noteworthy Conditions: None.

TRAFFIC & OPERATIONS

AADT & AADTT: The table below summarizes the 2015 AADT and daily truck volumes by sub-segment.

Traffic Volumes			
Sub-segment	AADT	AADTT	Truck Percentage
From I-275 to KY 547 (Four Mile Rd) in Alexandria	24,600	3,300	13%
From KY 547 (Four Mile Rd) in Alexandria to US 68 BYP in Maysville	4,700	700	14%
From US 68 BYP in Maysville to I-64	4,300	1,000	23%

Mobility: There are three major traffic bottleneck sections along this corridor segment. See the table below for details. (Note: bottlenecks are identified by Level of Travel Time Reliability (LOTTR) > 1.5 or volume/capacity (v/c) > 0.6.) There is also one isolated traffic bottleneck at the intersection with KY 10 near Vanceburg. Other than the noted traffic bottleneck sections/locations, traffic condition is acceptable along the remainder of this segment.

Existing Typical Roadway Attributes at Major Traffic Bottlenecks					
Locations	Functional Classification	Number & Width of Lanes	Median Width	Shoulder Width	2015 AADT ¹
<u>Major Bottleneck 1:</u> From I-275 to KY 547 (Four Mile Rd) in Alexandria	Principal Arterial	4, 12'	16'	2-10'	46,866
<u>Major Bottleneck 2:</u> From 1 mile west of US 62 to KY 11 in Maysville	Principal Arterial	4, 12'	0-15'	0-10'	10,991
<u>Major Bottleneck 3:</u> From KY 7/ KY 9 in Grayson to I-64	Principal Arterial	4, 12'	12'	12'	11,136

1) The highest traffic volume within the bottleneck based on KYSTMv18 data.

Safety: 2.3% of the corridor mileage has a Level of Safety of Service (LOSS) of 4, meaning these links have the highest potential to decrease crashes. (Note: LOSS indicates the potential for crash reduction and is broken up into four categories based on Safety Performance Functions (SPFs): LOSS 4 = high; LOSS 3 = moderate to high; LOSS 2 = low to moderate; LOSS 1 = low.). See the table under **Potential Safety Improvement** section for details of locations with LOSS =4, possible causes, and potential safety improvements.

ITS Devices: Approximately 4% of the corridor length has direct access to fiber through the KentuckyWired project.

PROPOSED IMPROVEMENT CONCEPTS

The improvement options noted in this report are not intended to be all-encompassing. Other potential improvements are possible, including innovative solutions that could be cost-effective and address the reasons for improvement. Further study may be needed as part of the project development process.

Proposed Typical Section & Description of Modification: The table below describes the proposed improvement concepts for the identified bottlenecks. The proposed improvements expect to maintain an overall acceptable traffic condition through 2045 ($v/c < 0.85$ in urban areas and $v/c < 0.7$ in rural areas) and address safety issues at bottlenecks.

Proposed Improvement Concepts			
Location	Improvement Concepts ¹	Notes ²	Reason for Improvement
<u>Major Bottleneck 1:</u> From I-275 to KY 547 (Four Mile Rd) in Alexandria	Widen to divided 6-lane section	3-12' lanes with 8' useable shoulders in each direction, 14' flush median	This section is a bottleneck for nearly the entire length and has an unacceptable 2045 v/c , as well as some locations with safety issues
<u>Major Bottleneck 2:</u> From 1 mile west of US 62 to KY 11 in Maysville	Access management	See the project sheet from the AA Highway Study ³	This section is a bottleneck with high LOTTR
<u>Major Bottleneck 3:</u> From KY 7/ KY 9 in Grayson to I-64	Access management		This section is a bottleneck with high LOTTR and safety issues

1) The proposed roadway widening concept includes spot improvements at interchanges and major intersections as needed (see details in Interchanges for Potential Modification and Major Intersection for Potential Modification sections below).

2) Improved typical sections are based on KYTC Highway Design Manual.

3) <https://transportation.ky.gov/Planning/Pages/Project-Details.aspx?Project=KY%209%20-AA%20Highway-%20Widening%20Study>

Potential New Interchanges: None.

Interchanges for Potential Modification: I-275 interchange to be modified in the KYTC Six-Year Plan (Item Number: 6-448). This is currently a Planning Study (as of 2020) which will evaluate the options to improve congestion and safety of KY 9 in the vicinity of the interchange with I-275.

Interchanges for Potential Modification
I-275

Major Intersections for Potential Modification: Improvements, such as additional turn lanes, channelization, and coordinated signal timing, should be considered at 12 major intersections within this corridor segment. The following is a list of these intersections.

Major Intersections for Potential Modification			
Pooles Creek Rd	E Maple Leaf Rd	Licking Pike	KY 11
E Alexandria Pike	Orangeburg Rd	Stonehouse Rd	KY 3161
Carthage Rd	Bridgeport Rd	California Rd	KY 57

Bridges: Bridge recommendations are based on ratings of substructure, superstructure and deck using the following methodology.

Methodology for Replacement/Rehabilitation Recommendation					
Structures	Substructure Rating	Superstructure Rating	Deck Rating	Culvert Rating	Recommendations
Bridges	<=4	Any	Any	/	Replacement
	=5	Any	Any	/	Rehabilitation
	>=6	<=5	Any	/	Rehabilitation
	>=6	Any	<=5	/	Rehabilitation
	>=6	>=6	>=6	/	None ¹
Culverts	/	/	/	<=4	Replacement
	/	/	/	5 or 6	Rehabilitation
	/	/	/	>=7	None

1) If the bridge is on a corridor with a recommendation of widening, it will be widened (considered as rehabilitation) as necessary to accommodate the additional proposed lanes.

- **Bridges for Rehab/Widening:** Rehab/widening is recommended for a total of one bridge along the entire corridor. Note that the bridge rehab is determined based on the "Methodology for Replacement/Rehabilitation Recommendation" table above. If the bridge has a good condition but is within a bottleneck location with recommended widening, it will be widened as necessary to accommodate the additional proposed lanes and the cost of widening is assumed to be the same as bridge rehab for the planning-level cost estimation purpose.

Bridges for Rehab/Widening	
Bridge ID	Feature Intersect
068B00038N	BEN WILLEN BRANCH

- **Bridges for Replacement:** None.

Pavement Treatment: The overall pavement condition is fair (average PDI = 0.42). Proposed additional lanes will consist of full depth asphalt pavement construction. Spot reconstruction and rehabilitation of existing asphalt pavement lanes will be needed based on more detailed evaluation of the corridor's pavement condition.

Potential Safety Improvement: The table below summarizes safety issues for the corridor and is based on KYTC safety data (LOSS value = 4), as well as a cursory review of Google Aerial imagery. The table identifies clusters of links with a LOSS value of 4 based on two categories: 1) clusters located in areas where this study already recommends corridor improvements for mobility reasons and 2) clusters not located in areas previously recommended for corridor mobility improvements. For Category 1, it is assumed any corridor improvement based on mobility needs will be constructed to current KYTC standards and will include the necessary safety improvements. Category 2 is intended to identify corridor segments that may warrant improvement for safety reasons, even though improvement might not be needed for mobility. There may also be isolated links with LOSS value of 4 that are not included in the table. Spot improvements could be warranted for those locations but it is assumed these spot improvements do not rise to the level of a corridor improvement; therefore, these locations are not addressed in this planning study. The table further breaks the clusters down by urban and rural

designation (based on KYSTMv18 data) because urban and rural roadways tend to have unique typical crash causes and countermeasures.

Potential Safety Improvements			
Category	Locations	Possible Causes	Recommendations
CAT 1: Major clusters of safety issues covered by proposed improvement concepts	I-275 to KY 1998, KY 1	Congestion	Widening and access management described above
CAT 2: Other major clusters of safety issues	<u>RURAL</u> KY 3056 to Slack Pike	<u>RURAL</u> Lack of turn lanes	<u>RURAL</u> Add turn lanes

Proposed Phasing: The intersections proposed for spot improvements within the proposed corridor widening between I-275 and KY 547 in Alexandria will be improved at the same time the roadway is widened. The proposed spot improvements at major intersections outside the corridor widening could be phased geographically from Campbell County to Mason and Lewis Counties.

PRELIMINARY ENVIRONMENTAL RED FLAG ANALYSIS

The table below summarizes the presence of critical environmental red flag concerns identified by KYTC within 1,000 ft of proposed improvement locations (Y=Yes; N=No).

Critical Red Flag Issues/Concerns			
Environmental Red Flag Features	Major Bottleneck 1: From I-275 to KY 547 (Four Mile Rd) in Alexandria	Major Bottleneck 2: From 1 mile west of US 62 to KY 11 in Maysville	Major Bottleneck 3: From KY 7/ KY 9 in Grayson to I-64
Superfunds	N	N	N
Special Waters ¹	N	N	N
Forested Areas	Y	N	N
NLEB Habitat Priority	N	Y	N
IB Habitat Priority Area	N	N	Y
FAA Airport Runways	N	N	N
Public Hunting Areas	N	N	N
Wildlife Management Areas	N	N	N
Local Parks	Y	N	N
State/ National Parks	N	N	N
Kentucky Heritage Land Conservation Fund	N	N	N
Area Landmarks	N	Y	N
Point Landmarks	Y	N	N
National Register of Historic Places Location (Point)	Y	N	N
National Register of Historic Places Location (Polygon)	N	N	N

1) Special Waters are defined as Cold Water Aquatic Habitats, Outstanding State/National Resource Waters, Exceptional Waters, State Wild Rivers, and Federally Designated Wild / Scenic Rivers.

RIGHT OF WAY IMPACTS

The table below summarizes the potential right-of-way (ROW) needs for proposed improvement concepts.

Potential Needs of Additional Right of Way		
Location	Improvement Concepts	Potential Needs of Additional ROW
<u>Major Bottleneck 1:</u> I-275 to KY 547 (Four Mile Rd) in Alexandria	Widen to divided 6-lane section.	No
<u>Major Bottleneck 2:</u> 1 mile west of US 62 to KY 11 in Maysville	Access management	No
<u>Major Bottleneck 3:</u> KY 7/ KY 9 in Grayson to I-64	Access management	No
Interchange Modifications at I-275	Interchange Modifications	Yes
Intersection Modifications at Stonehouse Rd, Carthage Rd, California Rd, E Maple Leaf Rd, KY 11 Orangeburg Rd, KY 3161, Bridgeport Rd, KY 57	Improvements, such as additional turn lanes, channelization, and coordinated signal timing.	Potentially

COST ESTIMATION

Design:	18.5 (\$M)
ROW:	49.7 (\$M)
Utility:	11.4 (\$M)
Construction:	<u>149.3 (\$M)</u>
TOTAL =	229.0 (\$M)

Note:

1. The cost estimation may not include additional costs to address the potential impacts of major utilities (e.g., gas line, major water supplier, transmission line) within the proximity of the corridor, due to the lack of data when the report was prepared. Further investigation is recommended in future studies.
2. Cost estimation was based on 2020 dollars. There is a 1-3% inflation rate. Estimated cost could vary -50% to +250% of the actual number (as a rule of thumb).
3. The widening of a 2-lane facility to a 3-lane facility (with TWLTL or alternating passing lane) is considered as "Minor Widening (Undivided Road) - 2 Lane to 4 Lane".
4. The cost estimation does not include bridges outside of the bottleneck locations, as they are not assumed to rise to the level of a corridor improvement. The cost estimation only includes necessary bridge replacement/rehab/widening costs within the bottleneck locations with proposed widening improvement. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
5. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
6. Shoulder widening is not included in the cost estimation, as it is a relatively minor cost.
7. If multiple improvement concepts are recommended for the corridor, only the cost of the larger-scale improvement concept is estimated.

Kentucky Statewide Corridor Plan (Linking Kentucky)

Route: US 79 / KY 100
Segment ID: 10
From: Tennessee State Line
To: I-65 near Franklin
Counties: Todd, Logan, and Simpson
Highway Districts: 3

CORRIDOR SEGMENT OVERVIEW

Segment 10 on US 79/KY 100 begins at the Tennessee state line on US 79 in Todd County and extends northeast through Logan County around Russellville. The corridor then turns into KY 100 in Logan County and travels southeast into Simpson County, where it becomes US 31 W traveling south ending at the I-65 Interchange. The corridor segment length is approximately 49 miles and currently contains one interchange at I-65.

This segment passes through the residential and commercial areas of Russellville in Logan County and the City of Franklin in Simpson County. These areas would be considered towns (according to KYSTMv18 data) with clusters of homes and commercial buildings adjacent to US 79/KY 100. The remainder of this segment passes through rural agricultural areas with homes interspersed along US 79/KY 100.

EXISTING FACILITY

The table below outlines the typical roadway attributes for this section of US 79/KY 100 by sub-segment.

Typical Roadway Attributes					
Sub-segment	Functional Classification	Number & Width of Lanes	Shoulder & Width	Median Type & Width	Posted Speed Limit
US 79 from Tennessee State Line to KY 100	Principal Arterial Other	2-4, 10-12'	Asphalt (8-11'), Asphalt Combination (3-10'), None	Flush (12-14'), Depressed (36'), None	35-55 mph
From KY 100 to I-65 near Franklin	Minor Arterial	2-4, 9-15'	Asphalt Combination (3'), None	Flush (12-20'), Raised Non Mountable (20'), None	25-55 mph

Right of Way: Along the Russellville Bypass, the existing right of way is generally 200' wide. Along the rest of the corridor, the existing right of way is generally 55' – 85' wide.

Pavement: The average PDI (Pavement Distress Index) for this section of US 79/KY 100 is 0.38, which indicates an overall fair pavement condition according to KYTC criteria (Good: 0.00 – 0.35; Fair: 0.36 – 0.65; Poor: 0.66 – 0.99).

Intersections/Interchanges: The tables below outline the existing interchanges, major intersections, and railroad crossings on the corridor.

Interchanges	Interchange Type
I-65	Diamond

Major Intersections ¹			
Port Royal Rd	E Old Volney Rd	Corinth Rd	E Cedar St
US 41	Watermelon Rd	Dennis Corinth Rd	W Madison St
Ewing St	US 431 Bypass	Friendship Rd	Scottsville Rd
Hadensville Rd	Orndorff Mill Rd	Middleton Rd	Harding Rd
Allensville Rd	US 431 Bypass	George Taylor Rd	Olmstead Rd
KY 100	McLendon Rd		

1) Only crossroads with functional classification of Minor Collector or above are included.

At-grade Railroad Crossings
US 79 Mile Point 9.469 in Logan County

Access Points: This segment is not access controlled. Throughout the corridor, there are residential and commercial driveways and intersecting roadways.

Bridges: The tables below outline the detailed bridge information for existing bridges on or over this section of US 79/KY 100.

Mainline Bridge Information										
Bridge ID	Feature Intersect	NBIS Classification	Sufficiency Rating	Substandard	Deck Rating	Superstructure Rating	Substructure Rating	Under Clearance (feet)	Horizontal Clearance (feet)	Culvert Rating
071B00018N	PLEASANT RUN	Fair	62.7	No	6	5	5	0	25	N
071B00019N (Culvert)	BR OF PLEASANT RUN	Good	74.3	No	N	N	N	0	21.98	7
071B00024N	DRY FORK	Fair	91.6	No	6	6	6	0	23	N
071B00025N	WHIPPOORWILL CREEK	Fair	75.5	No	6	6	6	0	22	N
071B00026N	VICKS BRANCH	Fair	63	No	5	6	5	0	22.75	N
071B00098N (Culvert)	TOWN BRANCH	Good	79.6	No	N	N	N	0	59.71	7
071B00110N (Culvert)	Town Branch	Good	64.5	No	N	N	N	99.99	99.9	8
071B00111N (Culvert)	Town Branch	Good	86.9	No	N	N	N	99.99	38	7
107B00038N	SULPHUR SPRING CREEK	Good	98.6	No	7	7	8	0	40	N
107B00054N (Culvert)	Sharps Branch	Good	100	No	N	N	N	99.99	46.75	7
110B00011N	CSX RAILROAD	Fair	62.6	No	7	5	5	21	25	N
110B00012N	ELK FORK CREEK	Fair	63.6	No	6	5	5	0	23.5	N
110B00013N (Culvert)	SPRING CREEK	Fair	99	No	N	N	N	0	19.69	6
110B00014N (Culvert)	UNNAMED STREAM	Fair	98.6	No	N	N	N	0	19.69	6

Structures Crossing Over the Corridor			
Bridge ID	Facility Carried	Under Clearance (feet)	Horizontal Clearance (feet)
107B00042N	I-65	16.44	62

Other Noteworthy Conditions: None.

TRAFFIC & OPERATIONS

AADT & AADTT: The table below summarizes the 2015 AADT and daily truck volumes by sub-segment.

Traffic Volumes			
Sub-segment	AADT	AADTT	Truck Percentage
From the TN State Line to Russellville Bypass (west) in Russellville	3,800 ¹	700	19% ²
From Russellville Bypass (west) in Russellville to KY 1008 (Bluegrass Rd) in Franklin	4,200	500	12% ³
From KY 1008 (Bluegrass Rd) in Franklin to I-65	10,000	2,300	23%

^{1,2,3} Values obtained from KYTC Traffic Count Reporting System

Mobility: There are four major traffic bottleneck sections along this section of US 79/KY 100. See the table below for details. (Note: bottlenecks are identified by Level of Travel Time Reliability (LOTTR) > 1.5 or

volume/capacity (v/c) > 0.6.) There are also a few additional isolated traffic bottlenecks along this corridor. Other than the noted traffic bottleneck sections/locations, Traffic condition is acceptable along the remainder of this segment.

Existing Typical Roadway Attributes at Major Traffic Bottlenecks					
Locations	Functional Classification	Number & Width of Lanes	Median Width	Shoulder Width	2015 AADT ¹
<u>Major Bottleneck 1:</u> From the TN state line to US 41 near Guthrie	Principal Arterial	2, 10'	0'	10'	18,361
<u>Major Bottleneck 2:</u> From 1 mile west of Russellville Bypass (west) to Russellville Bypass (west)	Principal Arterial	2, 11-12'	0-12'	0-10'	11,092
<u>Major Bottleneck 3:</u> From US 431 (Nashville Rd) to KY 100 (Franklin Rd)	Principal Arterial	2, 12'	0-14'	0-10'	7,006
<u>Major Bottleneck 4:</u> From 0.6 mile north of KY 1008 (Bluegrass Rd) to Bluegrass Rd in Franklin	Minor Arterial	2, 12'	0	0-10'	7,653

1) The highest traffic volume within the bottleneck based on KYSTMv18 data.

Safety: 3.1% of the corridor mileage has a Level of Safety of Service (LOSS) of 4, meaning these links have the highest potential to decrease crashes. (Note: LOSS indicates the potential for crash reduction and is broken up into four categories based on Safety Performance Functions (SPFs): LOSS 4 = high; LOSS 3 = moderate to high; LOSS 2 = low to moderate; LOSS 1 = low.) See the table under **Potential Safety Improvement** section for details of locations with LOSS =4, possible causes, and potential safety improvements.

ITS Devices: Less than 1% of the corridor length has direct access to fiber through the KentuckyWired project.

PROPOSED IMPROVEMENT CONCEPTS

The improvement options noted in this report are not intended to be all-encompassing. Other potential improvements are possible, including innovative solutions that could be cost-effective and address the reasons for improvement. Further study may be needed as part of the project development process.

Proposed Typical Section & Description of Modification: The table below describes the proposed improvement concepts for the identified bottlenecks. The proposed improvements expect to maintain an overall acceptable traffic condition through 2045 (v/c < 0.85 in urban areas and v/c < 0.7 in rural areas) and address safety issues at bottlenecks.

Proposed Improvement Concepts			
Location	Improvement Concepts ¹	Notes ²	Reason for Improvement
From Guthrie to Russellville	Widen to a 2+1 lane section from MP 0 to MP 3 in Todd County ³ . Improve lane width and shoulders from MP 3 in Todd County to Russellville.	Improved Typical Section: <u>2+1 lane widening:</u> 1, 12' lane in each direction with 8' shoulders. A 12' alternating passing lane. <u>Lane width and shoulder improvement:</u> 1, 12' lane in each direction with 8' shoulders.	This is a systemic safety issue
<u>Major Bottleneck 3:</u> From US 431 (Nashville Rd) to KY 100 (Franklin Rd)	Widen to a 4-lane divided section	2-12' lanes in each direction with 0'-14' flush median and 8' useable shoulders	The section from Nashville Street to KY 100 is a bottleneck and making this a 4-lane section would match the cross section of the rest of the bypass
KY 100 from US 79 to KY 1321	Improve shoulders	8' useable shoulders	This is a systemic safety issue

1) The proposed roadway widening concept includes spot improvements at interchanges and major intersections as needed (see details in Interchanges for Potential Modification and Major Intersection for Potential Modification sections below).

2) Improved typical sections are based on KYTC Highway Design Manual.

3) KYTC project Item No. 3-80001.

KYTC has a couple of bridge projects (Item No. 3-80100 and 3-80102) along the corridor that are part of a BUILD grant. Additional improvements that would help the corridor include improving KY 1008 to make it more of a bypass – control access, improve intersection control (this is not an improvement to the corridor, but an improvement to another road that would help operations along the corridor).

Potential New Interchanges: None.

Interchanges for Potential Modification: None.

Major Intersections for Potential Modification: Improvements, such as additional turn lanes, channelization, and coordinated signal timing, should be considered at seven major intersections within this corridor segment. The following is a list of these intersections.

Major Intersections for Potential modification			
US 41	E Cedar St	Ewing St	W Madison St
Hadensville Rd	Scottsville Rd	Allensville Rd	

Bridges: Bridge recommendations are based on ratings of substructure, superstructure and deck using the following methodology.

Methodology for Replacement/Rehabilitation Recommendation					
Structures	Substructure Rating	Superstructure Rating	Deck Rating	Culvert Rating	Recommendations
Bridges	<=4	Any	Any	/	Replacement
	=5	Any	Any	/	Rehabilitation
	>=6	<=5	Any	/	Rehabilitation
	>=6	Any	<=5	/	Rehabilitation
	>=6	>=6	>=6	/	None ¹
Culverts	/	/	/	<=4	Replacement
	/	/	/	5 or 6	Rehabilitation
	/	/	/	>=7	None

1) If the bridge is on a corridor with a recommendation of widening, it will be widened (considered as rehabilitation) as necessary to accommodate the additional proposed lanes.

- **Bridges for Rehab/Widening:** Rehab/widening is recommended for a total of six bridges and two culverts along the entire corridor. Note that the bridge rehab is determined based on the "Methodology for Replacement/Rehabilitation Recommendation" table above. If the bridge has a good condition but is within a bottleneck location with recommended widening, it will be widened as necessary to accommodate the additional proposed lanes and the cost of widening is assumed to be the same as bridge rehab for the planning-level cost estimation purpose.

Bridges for Rehab/Widening	
Bridge ID	Feature Intersect
071B00018N	PLEASANT RUN
071B00026N	VICKS BRANCH
110B00011N	CSX RAILROAD
110B00012N	ELK FORK CREEK
110B00013N (Culvert)	SPRING CREEK
110B00014N (Culvert)	UNNAMED STREAM
071B00019N	BR OF PLEASANT RUN
107B00038N	SULPHUR SPRING CREEK

- **Bridges for Replacement:** None.

Pavement Treatment: The overall pavement condition is fair (average PDI = 0.38). Proposed additional lanes will consist of full depth asphalt pavement construction. Spot reconstruction and rehabilitation of existing asphalt pavement lanes will be needed based on more detailed evaluation of the corridor's pavement condition.

Potential Safety Improvement: The table below summarizes safety issues for the corridor and is based on KYTC safety data (LOSS value = 4), as well as a cursory review of Google Aerial imagery. The table identifies clusters of links with a LOSS value of 4 based on two categories: 1) clusters located in areas where this study already recommends corridor improvements for mobility reasons and 2) clusters not located in areas previously recommended for corridor mobility improvements. For Category 1, it is assumed any corridor improvement based on mobility needs will be constructed to current KYTC standards and will include the necessary safety improvements. Category 2 is intended to identify corridor segments that may warrant improvement for safety reasons, even though improvement might not be needed for mobility. There may also be isolated links with LOSS value of 4 that are not included in the table. Spot improvements could be warranted for those locations but it is assumed these spot improvements do not rise to the level of a corridor improvement; therefore, these locations are not addressed in this planning study. The table further breaks the clusters down by urban and rural designation (based on KYSTMv18 data) because urban and rural roadways tend to have unique typical crash causes and countermeasures.

Potential Safety Improvements			
Category	Locations	Possible Causes	Recommendations
CAT 1: Major clusters of safety issues covered by proposed improvement concepts	N/A	N/A	N/A
CAT 2: Other major clusters of safety issues	<u>RURAL</u> John Johnson Ave to Cherry Street in Franklin, US 31W approaching I-65	<u>RURAL</u> Intersection spacing and congestion	<u>RURAL</u> Access management, improve signage

Proposed Phasing: Since all intersections proposed for spot improvements are located within the proposed corridor improvement/widening between Guthrie to Franklin, they will be improved at the same time the roadway is improved/widened.

PRELIMINARY ENVIRONMENTAL RED FLAG ANALYSIS

The table below summarizes the presence of critical environmental red flag concerns identified by KYTC within 1,000 ft of proposed improvement locations (Y=Yes; N=No).

Critical Red Flag Issues/Concerns			
Environmental Red Flag Features	From Guthrie to Russellville	Major Bottleneck 3: From US 431 (Nashville Rd) to KY 100 (Franklin Rd)	KY 100 from US 79 to KY 1321
Superfunds	N	N	N
Special Waters ¹	Y	N	Y
Forested Areas	Y	Y	Y
NLEB Habitat Priority	N	N	N
IB Habitat Priority Area	N	N	N
FAA Airport Runways	N	N	N
Public Hunting Areas	N	N	N
Wildlife Management Areas	N	N	N
Local Parks	N	N	N
State/ National Parks	N	N	N
Kentucky Heritage Land Conservation Fund	N	N	N
Area Landmarks	N	N	Y
Point Landmarks	Y	Y	Y
National Register of Historic Places Location (Point)	Y	N	Y
National Register of Historic Places Location (Polygon)	N	N	Y

1) Special Waters are defined as Cold Water Aquatic Habitats, Outstanding State/National Resource Waters, Exceptional Waters, State Wild Rivers, and Federally Designated Wild / Scenic Rivers.

RIGHT OF WAY IMPACTS

The table below summarizes the potential right-of-way (ROW) needs for proposed improvement concepts.

Potential Needs of Additional Right of Way		
Location	Improvement Concepts	Potential Needs of Additional ROW
From Guthrie to Russellville	Widen to a 2+1 lane section from MP 0 to MP 3 in Todd County and improve lane width and shoulders for the remaining section.	Potentially
Major Bottleneck 3: US 431 (Nashville Rd) to KY 100 (Franklin Rd)	Widen to a 4-lane divided section	No
KY 100 from US 79 to KY 1321	Improve shoulders	Yes
Intersection Modifications at W Madison St	Improvements, such as additional turn lanes, channelization, and coordinated signal timing	No
Intersection Modifications at US 41, E Cedar St, Ewing St, Hadensville Rd, Scottsville Rd, Allensville Rd	Improvements, such as additional turn lanes, channelization, and coordinated signal timing	Potentially

COST ESTIMATION

Design:	6.3 (\$M)
ROW:	3.8 (\$M)
Utility:	3.4 (\$M)
Construction:	<u>37.0(\$M)</u>
TOTAL =	50.5 (\$M)

Note:

1. The cost estimation may not include additional costs to address the potential impacts of major utilities (e.g., gas line, major water supplier, transmission line) within the proximity of the corridor, due to the lack of data when the report was prepared. Further investigation is recommended in future studies.
2. Cost estimation was based on 2020 dollars. There is a 1-3% inflation rate. Estimated cost could vary -50% to +250% of the actual number (as a rule of thumb).
3. The widening of a 2-lane facility to a 3-lane facility (with TWLTL or alternating passing lane) is considered as "Minor Widening (Undivided Road) - 2 Lane to 4 Lane".
4. The cost estimation does not include bridges outside of the bottleneck locations, as they are not assumed to rise to the level of a corridor improvement. The cost estimation only includes necessary bridge replacement/rehab/widening costs within the bottleneck locations with proposed widening improvement. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
5. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
6. Shoulder widening is not included in the cost estimation, as it is a relatively minor cost.
7. If multiple improvement concepts are recommended for the corridor, only the cost of the larger-scale improvement concept is estimated.

Kentucky Statewide Corridor Plan (Linking Kentucky)

Route: KY 922/US 25
Segment ID: 12
From: US 68 in Lexington
To: I-64/I-75 in Lexington
Counties: Fayette
Highway Districts: 7

CORRIDOR SEGMENT OVERVIEW

Segment 12 on KY 922/US 25 begins at US 68 in Fayette County and extends north through Lexington to the I-64/I-75 Interchange. The corridor segment length is approximately 4 miles and currently contains two interchanges: I-64/I-75 and New Circle Road.

This segment passes through the residential and commercial area of Lexington in Fayette County. This area would be considered city (according to KYSTMv19 data) with clusters of homes and commercial buildings adjacent to KY 922/US 25.

EXISTING FACILITY

The table below outlines the typical roadway attributes for this section of KY 922/ US 25 by sub-segment.

Typical Roadway Attributes					
Sub-segment	Functional Classification	Number & Width of Lanes	Shoulder & Width	Median Type & Width	Posted Speed Limit
From US 68 to US 25 (Georgetown Road)	Principal Arterial Other	4, 11-12'	Curbed (0-2'), None	Raised Non Mountable (16-20'), None	35 mph
From US 25 to I-64/I-75	Principal Arterial Other	2-6, 12'	Asphalt (3'), Curbed (0'), Asphalt Combination (7-10')	Raised Non Mountable (20-34'), Flush (16-28'), Depressed (40'), None	45-55 mph

Right of Way: The existing right of way is generally 100' – 140' wide.

Pavement: The average PDI (Pavement Distress Index) for this section of KY 922/ US 25 is 0.56, which indicates an overall fair pavement condition according to KYTC criteria (Good: 0.00 – 0.35; Fair: 0.36 – 0.65; Poor: 0.66 – 0.99).

Intersections/Interchanges: The tables below outline the existing interchanges, major intersections, and railroad crossings on the corridor.

Interchanges	Interchange Types
I-64/I-75	Partial Cloverleaf
New Circle Road	Partial Cloverleaf

Major Intersections ¹			
US 27	W Short St	Charles Ave	Citation Blvd
US 60	W Second St	US 25	Manchester St
Maryland Ave	W Loudon Ave	US 25	W Third St
Nandino Blvd			

1) Only crossroads with function classification of Minor Collector or above are included.

At-grade Railroad Crossings
US 25 Mile Point 14.95 in Fayette County

Access Points: This segment is not access controlled. Throughout the corridor, there are residential and commercial driveways and intersecting roadways.

Bridges: The tables below outline the detailed bridge information for existing bridges on or over this section of KY 922/ US 25.

Mainline Bridge Information										
Bridge ID	Feature Intersect	NBIS Classification	Sufficiency Rating	Substandard	Deck Rating	Superstructure Rating	Substructure Rating	Under Clearance (feet)	Horizontal Clearance (feet)	Culvert Rating
034B00047N (Culvert)	CANE RUN CREEK	Fair	50.5	No	N	N	N	0	84	6
034B00166N	PEDESTRIAN/BIKE PATH	Good	78.4	No	7	7	7	14.25	29	N
034B00180N	NEW CIRCLE ROAD	Good	94.1	No	9	9	9	99.99	99	N

Structures Crossing Over the Corridor			
Bridge ID	Facility Carried	Under Clearance (feet)	Horizontal Clearance (feet)
034B00089L	S 75 NC	16	62
034B00089R	I-75	16	79

Other Noteworthy Conditions: None.

TRAFFIC & OPERATIONS

AADT & AADTT: The table below summarizes the 2015 AADT and daily truck volumes by sub-segment.

Traffic Volumes			
Sub-segment	AADT	AADTT	Truck Percentage
From US 68 (Broadway) to London Ave in Lexington	20,600	1,200	6%
From London Ave to I-64/I-75 in Lexington	33,200	5,500	16%

Mobility: The entirety of this KY 922/US 25 section is a major traffic bottleneck. (Note: bottlenecks are identified by Level of Travel Time Reliability (LOTTR) > 1.5 or volume/capacity (v/c) > 0.6.) Typical roadway attributes of the bottleneck area can be found above for the entire segment.

Existing Typical Roadway Attributes at Major Traffic Bottlenecks					
Locations	Functional Classification	Number & Width of Lanes	Median Width	Shoulder Width	2015 AADT ¹
Entire corridor	Refer to the Existing Facility section				47,410

1) The highest traffic volume within the bottleneck based on KYSTMv18 data.

Safety: 3.1% of the corridor mileage has a Level of Safety of Service (LOSS) of 4, meaning these links have the highest potential to decrease crashes. (Note: LOSS indicates the potential for crash reduction and is broken up into four categories based on Safety Performance Functions (SPFs): LOSS 4 = high; LOSS 3 = moderate to high; LOSS 2 = low to moderate; LOSS 1 = low.) See the table under **Potential Safety Improvement** section for details of locations with LOSS =4, possible causes, and potential safety improvements.

ITS Devices: Lexington-Fayette Urban County Government (LFUCG) has a fiber network surrounding the corridor with CCTV cameras throughout the corridor.

PROPOSED IMPROVEMENT CONCEPTS

The improvement options noted in this report are not intended to be all-encompassing. Other potential improvements are possible, including innovative solutions that could be cost-effective and address the reasons for improvement. Further study may be needed as part of the project development process.

Proposed Typical Section & Description of Modification: The table below describes the proposed improvement concepts for the identified bottlenecks. The proposed improvements expect to maintain an overall acceptable traffic condition through 2045 (v/c < 0.85 in urban areas and v/c < 0.7 in rural areas) and address safety issues at bottlenecks. The widening in the northbound direction between New Circle Road and I-75 is included as Item No. 7-252 in the KYTC Six-Year Plan.

Proposed Improvement Concepts			
Location	Improvement Concepts ¹	Notes ²	Reason for Improvement
New Circle Road to I-75 ³	Widen to a 6-lane divided section with access management	3-12' lanes with 4' concrete barrier median and 8' useable shoulders from New Circle Road to I-75	This entire section is a bottleneck and operates at an unacceptable 2045 v/c. Additionally there are intermittent safety issues that the access management should help address.
Main Street to New Circle Road ³	Spot intersection improvement, access management		

1) The proposed roadway widening concept includes spot improvements at interchanges and major intersections as needed (see details in Interchanges for Potential Modification and Major Intersection for Potential Modification sections below).

2) Improved typical sections are based on KYTC Highway Design Manual.

3) This improvement concept was originally proposed to include the section from Main Street to New Circle Road, and its Tier 2 score reflects that. Upon further examination by the project team, it was decided that the final improvement concept to be proposed as part of Tier 2 will include widening only the section from New Circle Road to I-75, and spot intersection improvements and access management for the section from Main Street to New Circle Road.

Potential New Interchanges: None.

Interchanges for Potential Modification: KY 4 Interchange was rebuilt in 2020. I-75 Interchange may need improvements to accommodate future traffic volumes.

Interchanges for Potential Modification	
KY 4	I-75

Major Intersections for Potential Modification: Improvements, such as additional turn lanes, channelization, and coordinated signal timing, should be considered at 13 major intersections within this corridor segment. The following is a list of these intersections.

Major Intersections for Potential Modification			
US 27	W Short St	Charles Ave	Citation Blvd
US 60	W Second St	US 25	Manchester St
Maryland Ave	W Loudon Ave	US 25	W Third St
Nandino Blvd			

Bridges: Bridge recommendations are based on ratings of substructure, superstructure and deck using the following methodology.

Methodology for Replacement/Rehabilitation Recommendation					
Structures	Substructure Rating	Superstructure Rating	Deck Rating	Culvert Rating	Recommendations
Bridges	<=4	Any	Any	/	Replacement
	=5	Any	Any	/	Rehabilitation
	>=6	<=5	Any	/	Rehabilitation
	>=6	Any	<=5	/	Rehabilitation
	>=6	>=6	>=6	/	None ¹
Culverts	/	/	/	<=4	Replacement
	/	/	/	5 or 6	Rehabilitation
	/	/	/	>=7	None

1) If the bridge is on a corridor with a recommendation of widening, it will be widened (considered as rehabilitation) as necessary to accommodate the additional proposed lanes.

- **Bridges for Rehab/Widening:** Widening is recommended for one bridge along the entire corridor. Note that the bridge rehab is determined based on the "Methodology for Replacement/Rehabilitation Recommendation" table above. If the bridge has a good condition but is within a bottleneck location with recommended widening, it will be widened as necessary to accommodate the additional proposed lanes and the cost of widening is assumed to be the same as bridge rehab for the planning-level cost estimation purpose.

Bridges for Rehab/Widening	
Bridge ID	Feature Intersect
034B00180N	KY 4

- **Bridges for Replacement:** None.

Pavement Treatment: The overall pavement condition is fair (average PDI = 0.56). Proposed additional lanes will consist of full depth asphalt pavement construction. Spot reconstruction and rehabilitation of existing asphalt pavement lanes will be needed based on more detailed evaluation of the corridor's pavement condition.

Potential Safety Improvement: The table below summarizes safety issues for the corridor and is based on KYTC safety data (LOSS value = 4), as well as a cursory review of Google Aerial imagery. The table identifies clusters of links with a LOSS value of 4 based on two categories: 1) clusters located in areas where this study already recommends corridor improvements for mobility reasons and 2) clusters not located in areas previously recommended for corridor mobility improvements. For Category 1, it is assumed any corridor improvement based on mobility needs will be constructed to current KYTC standards and will include the necessary safety improvements. Category 2 is intended to identify corridor segments that may warrant improvement for safety reasons, even though improvement might not be needed for mobility. There may also be isolated links with LOSS value of 4 that are not included in the table. Spot improvements could be warranted for those locations but it is assumed these spot improvements do not rise to the level of a corridor improvement; therefore, these locations are not addressed in this planning study. The table further breaks the clusters down by urban and rural

designation (based on KYSTMv18 data) because urban and rural roadways tend to have unique typical crash causes and countermeasures.

Potential Safety Improvements			
Category	Locations	Possible Causes	Recommendations
CAT 1: Major clusters of safety issues covered by proposed improvement concepts	New Circle Road Interchange to I-64/I-75 Interchange, Georgetown Road to S Broadway Street	Interchange and intersection spacing and congestion due to traffic entering and exiting at the intersections, as well as higher speeds with multiple access points, odd angle intersection	Widening described above
CAT 2: Other major clusters of safety issues	N/A	N/A	N/A

Proposed Phasing: The intersections proposed for spot improvements within the proposed corridor widening in Lexington will be improved at the same time the roadway is widened. The other three proposed spot improvements at three major intersections can be constructed at the same time.

PRELIMINARY ENVIRONMENTAL RED FLAG ANALYSIS

The table below summarizes the presence of critical environmental red flag concerns approved by KYTC within 1,000 ft of proposed improvement locations (Y=Yes; N=No).

Critical Red Flag Issues/Concerns	
Environmental Red Flag Features	Main Street to I-75
Superfunds	N
Special Waters ¹	N
Forested Areas	N
NLEB Habitat Priority	N
IB Habitat Priority Area	N
FAA Airport Runways	N
Public Hunting Areas	N
Wildlife Management Areas	N
Local Parks	Y
State/ National Parks	N
Kentucky Heritage Land Conservation Fund	N
Area Landmarks	Y
Point Landmarks	Y
National Register of Historic Places Location (Point)	Y
National Register of Historic Places Location (Polygon)	Y

1) Special Waters are defined as Cold Water Aquatic Habitats, Outstanding State/National Resource Waters, Exceptional Waters, State Wild Rivers, and Federally Designated Wild / Scenic Rivers.

RIGHT OF WAY IMPACTS

The table below summarizes the potential right-of-way (ROW) needs for proposed improvement concepts.

Potential Needs of Additional Right of Way		
Location	Improvement Concepts	Potential Needs of Additional ROW
New Circle Road to I-75	Widen to a 6-lane divided section with access management	Yes
Interchange Modifications at KY 4 and I-75	Interchange Modifications	Potentially
Intersection Modifications at US 27, US 60	Improvements, such as additional turn lanes, channelization, and coordinated signal timing	No
Intersection Modifications at Manchester St	Improvements, such as additional turn lanes, channelization, and coordinated signal timing	Potentially

COST ESTIMATION

Design:	20.3 (\$M)
ROW:	66.2 (\$M)
Utility:	15.8 (\$M)
Construction:	<u>134.0 (\$M)</u>
TOTAL =	236.3 (\$M)

Note:

1. The cost estimation may not include additional costs to address the potential impacts of major utilities (e.g., gas line, major water supplier, transmission line) within the proximity of the corridor, due to the lack of data when the report was prepared. Further investigation is recommended in future studies.
2. Cost estimation was based on 2020 dollars. There is a 1-3% inflation rate. Estimated cost could vary -50% to +250% of the actual number (as a rule of thumb).
3. The widening of a 2-lane facility to a 3-lane facility (with TWLTL or alternating passing lane) is considered as "Minor Widening (Undivided Road) - 2 Lane to 4 Lane".
4. The cost estimation does not include bridges outside of the bottleneck locations, as they are not assumed to rise to the level of a corridor improvement. The cost estimation only includes necessary bridge replacement/rehab/widening costs within the bottleneck locations with proposed widening improvement. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
5. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
6. Shoulder widening is not included in the cost estimation, as it is a relatively minor cost.
7. If multiple improvement concepts are recommended for the corridor, only the cost of the larger-scale improvement concept is estimated.

Kentucky Statewide Corridor Plan (Linking Kentucky)

Route: KY 15, KY 7, KY 15S, KY 30
Segment ID: 15
From: Mountain Pkwy
To: US 119
Counties: Wolfe, Breathitt, Knott, Perry, and Letcher
Highway Districts: 10 and 12

CORRIDOR SEGMENT OVERVIEW

Segment 15 on KY 15 begins at the KY 15/Mountain Parkway interchange in Wolfe County and extends south through Breathitt, Knott and Perry Counties to KY 9000 in Letcher County. The corridor segment length is approximately 83 miles and currently contains four interchanges: Mountain Parkway, Hal Rogers Parkway, KY 205 and KY 550.

This segment passes through the residential and commercial areas of the City of Jackson in Breathitt County, the City of Hazard in Perry County and the City of Whitesburg in Letcher County. These areas would be considered towns (according to KYSTMv18 data) with clusters of homes and commercial buildings adjacent to KY 15. The remainder of this segment passes through rural agricultural areas with homes interspersed along KY 15.

EXISTING FACILITY

The table below outlines the typical roadway attributes for this section of KY 15 by sub-segment.

Typical Roadway Attributes					
Sub-segment	Functional Classification	Number & Width of Lanes	Shoulder & Width	Median Type & Width	Posted Speed Limit
From Mountain Parkway to Breathitt/Knott County Line	Principal Arterial Other	2-4, 11-15'	Asphalt Combination (10-12'), Asphalt (5-10'), Concrete (2-4'), None	Depressed (40-99'), Flush (12'), Raised Mountable (15'), Raised Non Mountable (14'), None	45-55 mph
From Breathitt/Knott County Line to US 119 in Whitesburg	Principal Arterial Other	2-4, 12'	Asphalt Combination (5-10), Asphalt (1-10'), Concrete (1-3'), None	Concrete Barrier (10'), Flush (6-20'), Guardrail Barrier (4'), Raised Mountable (3-12'), Raised Non Mountable (12'), None	35-55 mph

Right of Way: The existing right of way is generally 100' – 175' wide.

Pavement: The average PDI (Pavement Distress Index) for this section of KY 15 is 0.41, which indicates an overall fair pavement condition according to KYTC criteria (Good: 0.00 – 0.35; Fair: 0.36 – 0.65; Poor: 0.66 – 0.99).

Intersections/Interchanges: The tables below outline the existing interchanges, major intersections, and railroad crossings on the corridor.

Interchanges	Interchange Types
Mountain Parkway	Trumpet
Hal Rogers Parkway	Partial Loop
KY 205	Partial Loop
KY 550	Partial Cloverleaf

Major Intersections ¹			
KY 1653	KY 1812	Morton Blvd	S US 160
KY 191	KY 3068	KY 15X	KY 7
Elkins Rd	KY 30	KY 451 Conn	KY 7
KY 2491C Conn	KY 1098	KY 15X	KY 1148
KY 2028	KY 1110	Fourseam Buffalo Rd	US 160
KY 1261	KY 476	KY 451	KY 3401
KY 1812	KY 1278	KY 7	KY 931
KY 205	KY 2446	Main St	KY 15X
KY 205	KY 28	Main St Sassafrass	KY 15C
KY 30	Harveyton Rd	Big Branch Rd	US 119

1) Only crossroads with function classification of Minor Collector or above are included.

At-grade Railroad Crossings
KY 15 Mile Point 9.2 in Letcher County
KY 15 Mile Point 2.2 in Perry County
KY 15 Mile Point 2.5 in Perry County
KY 15 Mile Point 3.6 in Perry County

Access Points: This segment is not access controlled. Throughout the corridor, there are residential and commercial driveways and intersecting roadways.

Bridges: The tables below outline the detailed bridge information for existing bridges on or over this section of KY 15.

Mainline Bridge Information										
Bridge ID	Feature Intersect	NBIS Classification	Sufficiency Rating	Substandard	Deck Rating	Superstructure Rating	Substructure Rating	Under Clearance (feet)	Horizontal Clearance (feet)	Culvert Rating
013B00030N	QUICKSAND CREEK	Fair	62.4	No	6	7	5	0	29.86	N
013B00031N	TROUBLESOME CREEK	Good	81.2	No	7	7	7	0	29.86	N
013B00032N	LOST CREEK	Good	81.2	No	7	7	7	0	29.86	N
013B00033N	LOST CREEK	Fair	81.2	No	6	7	7	0	29.86	N
013B00034N	LOST CREEK	Fair	81.4	No	6	7	7	0	29.86	N
013B00035N	LOST CREEK	Fair	81.4	No	6	7	7	0	29.86	N
013B00036N (Culvert)	COCKRELL FORK	Good	98.7	No	N	N	N	0	44.95	7
013B00037N	LOST CREEK	Good	78.4	No	7	7	7	0	29.86	N
013B00082L	KY 0205 / Boone Fork	Good	95	No	8	8	8	17.55	41.66	N
013B00082R	KY 0205 / Boone Fork	Good	95	No	8	8	8	17.82	41	N
013B00083L	KY 1812 / Frozen Creek	Good	93	No	8	8	8	48.1	41.66	N
013B00083R	KY 1812 / Frozen Creek	Good	93	No	8	8	8	49.32	41.66	N
060B00056N	Carr Fork Lake	Fair	60.8	No	5	6	5	0	31.5	N
060B00057N (Culvert)	RED OAK BRANCH	Good	77	No	N	N	N	0	43.96	7
060B00058N	CARR FORK RESERVOIR	Fair	61	No	5	5	6	0	32.48	N
067B00008N	N. FK. OF KY RIVER	Fair	89.1	No	6	6	7	0	42	N
067B00009N	N. FK. OF KY RIVER	Fair	87.5	No	6	6	7	0	42	N
067B00010N	Rockhouse Creek	Fair	100	No	7	6	7	0	0	N
067B00011N (Culvert)	LITTLE COLLY CREEK	Good	96.3	No	N	N	N	0	39.7	7
067B00102N	KY 15C	Fair	93.3	No	6	7	7	16	35.76	N
067B00103N	N. FORK KY RIVER	Fair	90.5	No	6	6	7	0	43.96	N
067B00104N	N. FORK KY.RIVER	Fair	90.5	No	7	6	7	0	43.96	N
067B00105N	N Frk KY River & CS 1011	Fair	94.4	No	5	6	7	99.99	23.95	N
097B00011N	CSX RR-MAIN ST-CARR FK	Fair	97.1	No	5	7	6	16.5	43.96	N
097B00012R	CSX RR-KY 1096-BUFFALO C	Fair	78.3	No	6	7	7	24.82	29.86	N
097B00013N	CSX RAILROAD & CARR FORK	Fair	99.4	No	7	7	6	28.46	43.96	N
097B00014N	CSX RAILROAD & CARR FORK	Fair	92	No	5	6	6	23.53	43.96	N
097B00015N	CSX RAILROAD & KY 7	Fair	88.3	No	7	7	6	18.08	43.96	N
097B00017L	CSX RR & DAVIDSON BRANCH	Fair	83	No	7	7	6	38.62	29.53	N
097B00017R	CSX RR & DAVIDSON BRANCH	Fair	83	No	8	7	6	38.73	29.53	N
097B00019N	N FORK KY RIVER	Fair	88.3	No	7	6	5	33.19	43.96	N
097B00020N	CARR FORK	Fair	94.1	No	6	6	6	0	43.96	N
097B00021N	CARR FORK	Fair	95.7	No	6	6	6	0	43.96	N
097B00022N	CARR FORK	Fair	93.7	No	6	7	6	0	43.96	N
097B00055N	KY 80;N FK KY RIVER	Fair	69.3	No	6	7	7	15.25	55.77	N

Mainline Bridge Information										
Bridge ID	Feature Intersect	NBIS Classification	Sufficiency Rating	Substandard	Deck Rating	Superstructure Rating	Substructure Rating	Under Clearance (feet)	Horizontal Clearance (feet)	Culvert Rating
097B00057N (Culvert)	TEN MILE CREEK	Good	92.8	No	N	N	N	0	43.96	7
097B00104N	KY 451-MESSER BR	Fair	89.3	No	7	6	6	67	44.32	N
097B00105N	CSX RAILROAD	Good	91.4	No	7	7	7	75	85.96	N
119B00035N	HOLLY CREEK	Fair	92.3	No	7	7	6	0	43.96	N
119B00036N (Culvert)	FORK OF SWIFT CREEK	Good	87.1	No	N	N	N	0	23.95	7
119B00037N (Culvert)	HUNTING FORK CREEK	Good	92.3	No	N	N	N	0	44.95	7
119B00038N (Culvert)	HUNTING FORK CREEK	Good	92.3	No	N	N	N	0	43.96	7
119B00039N (Culvert)	HUNTING FORK CREEK	Good	85.8	No	N	N	N	0	44.62	7
119B00073N	KY 9009 MTN. PKWY.	Good	78.8	No	7	8	8	17.75	25	N
097B00012L	CSX RR-KY 1096-BUFFALO C	Fair	80.3	No	6	6	6	26.77	29.86	N

Structures Crossing Over the Corridor			
Bridge ID	Facility Carried	Under Clearance (feet)	Horizontal Clearance (feet)
097B00098N	KY-80	16.13	90.55

Other Noteworthy Conditions: None.

TRAFFIC & OPERATIONS

AADT & AADTT: The table below summarizes the 2015 AADT and daily truck volumes by sub-segment.

Traffic Volumes			
Sub-segment	AADT	AADTT	Truck Percentage
From Mountain Pkwy to KY 28 north of Hazard	4,600	400	9% ¹
From KY 28 north of Hazard to KY 7 in Perry County	8,200	800	10% ²
From KY 7 in Perry County to KY 7 (east) in Letcher County	5,100	800	15%
From KY 7 (east) in Letcher County to US 119 Whitesburg	9,300	900	10% ³

^{1, 2, 3} Truck percentage obtained from KYTC Traffic Count Reporting System

Mobility: There are two major traffic bottleneck sections along this corridor segment. See the table below for details. (Note: bottlenecks are identified by Level of Travel Time Reliability (LOTR) > 1.5 or volume/capacity (v/c) > 0.6.) There are also five isolated traffic bottlenecks along this corridor. Other than the noted traffic bottleneck sections/locations, traffic condition is acceptable along the remainder of this corridor.

Existing Typical Roadway Attributes at Major Traffic Bottlenecks					
Locations	Functional Classification	Number & Width of Lanes	Median Width	Shoulder Width	2015 AADT ¹
<u>Major Bottleneck 1:</u> From 1 mile north of KY 30 to KY 1812 (Main St) in Jackson	Principal Arterial Other	2-4, 12'	0-99'	2-12'	10,448
<u>Major Bottleneck 2:</u> From 0.5 mile west of Hal Rogers Pkwy to 0.5 mile north of KY 451 in Hazard	Principal Arterial Other	2-4, 12'	0'-12'	8-10'	13,481

1) The highest traffic volume within the bottleneck based on KYSTMv18 data.

Safety: 2.7% of the corridor mileage has a Level of Safety of Service (LOSS) of 4, meaning these links have the highest potential to decrease crashes. (Note: LOSS indicates the potential for crash reduction and is broken up into four categories based on Safety Performance Functions (SPFs): LOSS 4 = high; LOSS 3 = moderate to high; LOSS 2 = low to moderate; LOSS 1 = low.) See the table under **Potential Safety Improvement** section for details of locations with LOSS =4, possible causes, and potential safety improvements.

ITS Devices: Less than 1% of the corridor length has direct access to fiber through the KentuckyWired project.

PROPOSED IMPROVEMENT CONCEPTS

The improvement options noted in this report are not intended to be all-encompassing. Other potential improvements are possible, including innovative solutions that could be cost-effective and address the reasons for improvement. Further study may be needed as part of the project development process.

Proposed Typical Section & Description of Modification: The table below describes the proposed improvement concepts for the identified bottlenecks. The proposed improvements expect to maintain an overall acceptable traffic condition through 2045 ($v/c < 0.85$ in urban areas and $v/c < 0.7$ in rural areas) and address safety issues at bottlenecks.

Proposed Improvement Concepts			
Locations	Improvement Concepts ¹	Notes ²	Reason for Improvement
<u>Major Bottleneck 1:</u> From 1 mile north of KY 30 to KY 1812 (Main St) in Jackson	Access management	N/A	LOTTR exceeds the established thresholds

1) The proposed roadway widening concept includes spot improvements at interchanges and major intersections as needed (see details in Interchanges for Potential Modification and Major Intersection for Potential Modification sections below).

2) Improved typical sections are based on KYTC Highway Design Manual.

Potential New Interchanges: None.

Interchanges for Potential Modification: None.

Major Intersections for Potential Modification: Improvements, such as additional turn lanes, channelization, and coordinated signal timing, should be considered at eight major intersections for this corridor segment, listed below.

Major Intersections for Potential Modification			
KY 30	KY 15X	KY 1812	KY 15X
KY 3068	KY 15X	Morton Blvd	US 119

Bridges: Bridge recommendations are based on ratings of substructure, superstructure and deck using the following methodology.

Methodology for Replacement/Rehabilitation Recommendation					
Structures	Substructure Rating	Superstructure Rating	Deck Rating	Culvert Rating	Recommendations
Bridges	≤ 4	Any	Any	/	Replacement
	$= 5$	Any	Any	/	Rehabilitation
	≥ 6	≤ 5	Any	/	Rehabilitation
	≥ 6	Any	≤ 5	/	Rehabilitation
	≥ 6	≥ 6	≥ 6	/	None ¹
Culverts	/	/	/	≤ 4	Replacement
	/	/	/	5 or 6	Rehabilitation
	/	/	/	≥ 7	None

1) If the bridge is on a corridor with a recommendation of widening, it will be widened (considered as rehabilitation) as necessary to accommodate the additional proposed lanes.

- **Bridges for Rehab/Widening:** Rehab/widening is recommended for a total of seven bridges along the entire corridor. Note that the bridge rehab is determined based on the "Methodology for Replacement/Rehabilitation Recommendation" table above. If the bridge has a good condition but is within a bottleneck location with recommended widening, it will be widened as necessary to accommodate the additional proposed lanes and the cost of widening is assumed to be the same as bridge rehab for the planning-level cost estimation purpose.

Bridges for Rehab/Widening	
Bridge ID	Feature Intersect
013B00030N	QUICKSAND CREEK
060B00056N	Carr Fork Lake
060B00058N	CARR FORK RESERVOIR
067B00105N	N Frk KY River & CS 1011
097B00011N	CSX RR-MAIN ST-CARR FK
097B00014N	CSX RAILROAD & CARR FORK
097B00019N	N FORK KY RIVER

- **Bridges for Replacement:** None.

Pavement Treatment: The overall pavement condition is fair (average PDI = 0.41). Proposed additional lanes will consist of full depth asphalt pavement construction. Spot reconstruction and rehabilitation of existing asphalt pavement lanes will be needed based on more detailed evaluation of the corridor's pavement condition.

Potential Safety Improvement: The table below summarizes safety issues for the corridor and is based on KYTC safety data (LOSS value = 4), as well as a cursory review of Google Aerial imagery. The table identifies clusters of links with a LOSS value of 4 based on two categories: 1) clusters located in areas where this study already recommends corridor improvements for mobility reasons and 2) clusters not located in areas previously recommended for corridor mobility improvements. For Category 1, it is assumed any corridor improvement based on mobility needs will be constructed to current KYTC standards and will include the necessary safety improvements. Category 2 is intended to identify corridor segments that may warrant improvement for safety reasons, even though improvement might not be needed for mobility. There may also be isolated links with LOSS value of 4 that are not included in the table. Spot improvements could be warranted for those locations but it is assumed these spot improvements do not rise to the level of a corridor improvement; therefore, these locations are not addressed in this planning study. The table further breaks the clusters down by urban and rural designation (based on KYSTMv18 data) because urban and rural roadways tend to have unique typical crash causes and countermeasures.

Potential Safety Improvements			
Category	Locations	Possible Causes	Recommendations
CAT 1: Major clusters of safety issues covered by proposed improvement concepts	KY 15 at Jackson, KY 1110	Intersection spacing and bottleneck conditions	Access Management
CAT 2: Other major clusters of safety issues	N/A	N/A	N/A

Proposed Phasing: The proposed spot improvements at six major intersections can be constructed at the same time or phased geographically: one phase for Wolfe County, one phase for Jackson County, and one phase for Perry County.

PRELIMINARY ENVIRONMENTAL RED FLAG ANALYSIS

The table below summarizes the presence of critical environmental red flag concerns approved by KYTC within 1,000 ft of proposed improvement locations (Y=Yes; N=No).

Critical Red Flag Issues/Concerns	
Environmental Red Flag Features	<u>Major Bottleneck 1: From 1 mile north of KY 30 to KY 1812 (Main St) in Jackson</u>
Superfunds	N
Special Waters ¹	N
Forested Areas	Y
NLEB Habitat Priority	Y
IB Habitat Priority Area	N
FAA Airport Runways	N
Public Hunting Areas	N
Wildlife Management Areas	N
Local Parks	Y
State/ National Parks	N
Kentucky Heritage Land Conservation Fund	N
Area Landmarks	N
Point Landmarks	Y
National Register of Historic Places Location (Point)	N
National Register of Historic Places Location (Polygon)	N

1) Special Waters are defined as Cold Water Aquatic Habitats, Outstanding State/National Resource Waters, Exceptional Waters, State Wild Rivers, and Federally Designated Wild / Scenic Rivers.

RIGHT OF WAY IMPACTS

The table below summarizes the potential right-of-way (ROW) needs for proposed improvement concepts.

Potential Needs of Additional Right of Way		
Location	Improvement Concepts	Potential Needs of Additional ROW
<u>Major Bottleneck 1: From 1 mile north of KY 30 to KY 1812 (Main St) in Jackson</u>	Access management	No
Intersection Modifications at, KY 15X (Campton), KY 15X (Jackson), KY 15X (Hazard), Morton Blvd, Highway 119	Improvements, such as additional turn lanes, channelization, and coordinated signal timing	No
Intersection Modifications at KY 30, KY 1812, KY 3068	Improvements, such as additional turn lanes, channelization, and coordinated signal timing	Potentially

COST ESTIMATION

Design:	2.7 (\$M)
ROW:	3.9 (\$M)
Utility:	2.7 (\$M)
Construction:	<u>26.5 (\$M)</u>
TOTAL =	35.8 (\$M)

Note:

1. The cost estimation may not include additional costs to address the potential impacts of major utilities (e.g., gas line, major water supplier, transmission line) within the proximity of the corridor, due to the lack of data when the report was prepared. Further investigation is recommended in future studies.
2. Cost estimation was based on 2020 dollars. There is a 1-3% inflation rate. Estimated cost could vary -50% to +250% of the actual number (as a rule of thumb).
3. The widening of a 2-lane facility to a 3-lane facility (with TWLTL or alternating passing lane) is considered as "Minor Widening (Undivided Road) - 2 Lane to 4 Lane".
4. The cost estimation does not include bridges outside of the bottleneck locations, as they are not assumed to rise to the level of a corridor improvement. The cost estimation only includes necessary bridge replacement/rehab/widening costs within the bottleneck locations with proposed widening improvement. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
5. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
6. Shoulder widening is not included in the cost estimation, as it is a relatively minor cost.
7. If multiple improvement concepts are recommended for the corridor, only the cost of the larger-scale improvement concept is estimated.

Kentucky Statewide Corridor Plan (Linking Kentucky)

Route: US 31 W / KY 61
Segment ID: 18A
From: Columbia
To: I-65 near Elizabethtown
Counties: Hardin, Larue, Green, Adair
Highway Districts: 4 and 8

CORRIDOR SEGMENT OVERVIEW

Segment 18 A on US 31 W begins at the US 31 W/I-65 interchange in Hardin County and extends south through Larue and Green Counties to Columbia in Adair County as KY 61. The corridor segment length is approximately 54 miles and currently contains one interchange at I-65.

This segment passes through the residential and commercial areas of the City of Elizabethtown in Hardin County and the City of Columbia in Adair County. These areas would be considered towns (according to KYSTMv18 data) with clusters of homes and commercial buildings adjacent to KY 61. The remainder of this segment passes through rural agricultural areas with homes interspersed along KY 61.

EXISTING FACILITY

The table below outlines the typical roadway attributes for this section of US 31 W/ KY 61 by sub-segment.

Typical Roadway Attributes					
Sub-segment	Functional Classification	Number & Width of Lanes	Shoulder & Width	Median Type & Width	Posted Speed Limit
From I-65 to the Larue/Green County Line	Minor Arterial	2, 9-12'	Asphalt (6-11'), Asphalt Combination (3-12'), None	Flush (12'), None	35-55 mph
From the Larue/Green County Line to Columbia	Principal Arterial	2-4, 10-12'	Asphalt (10'), Asphalt Combination (3-6'), Curbed (4'), None	Depressed (40'), None	35-70 mph

Right of Way: The existing right of way is generally 50' – 80' wide.

Pavement: The average PDI (Pavement Distress Index) for this section of US 31 W/ KY 61 is 0.27, which indicates an overall good pavement condition according to KYTC criteria (Good: 0.00 – 0.35; Fair: 0.36 – 0.65; Poor: 0.66 – 0.99).

Intersections/Interchanges: The tables below outline the existing interchanges, major intersections, and railroad crossings on the corridor.

Interchanges	Interchange Types
I-65	Cloverleaf

Major Intersections ¹			
Columbia Bypass	W Court St	KY 566	Tanner Rd
KY 768	US 68	Mount Sherman Rd	W Main St
KY 767	KY 793	Mount Tabor Rd	Tonietville Rd
KY 487	KY 88	South L & N Turnpike Rd	Roundtop Rd
KY 565	KY 323	North L & N Turnpike Rd	E Dixie Ave
US 68	KY 569	Lincoln Farm Rd	Public Square
KY 424	South Lincoln Blvd		

1) Only crossroads with function classification of Minor Collector or above are included.

At-grade Railroad Crossings
None

Access Points: This segment is not access controlled. Throughout the corridor, there are residential and commercial driveways and intersecting roadways.

Bridges: The tables below outline the detailed bridge information for existing bridges on and over this section of US 31 W/ KY 61.

Mainline Bridge Information										
Bridge ID	Feature Intersect	NBIS Classification	Sufficiency Rating	Substandard	Deck Rating	Superstructure Rating	Substructure Rating	Under Clearance (feet)	Horizontal Clearance (feet)	Culvert Rating
001B00025N	PETTYS FORK CREEK	Fair	73.5	No	6	6	5	28	0	N
001B00026N	RUSSELL CREEK	Fair	71.3	No	5	5	5	28	0	N
044B00005N	BIG PITMAN CREEK	Fair	66.7	No	5	6	6	23.95	0	N
044B00006N	BIG BRUSH CREEK	Good	90	No	7	7	7	29.86	0	N
044B00008N	CLOVER LICK CREEK	Fair	72.3	No	6	6	6	18.7	0	N
044B00009N	CANEY FORK	Fair	61.6	No	6	5	6	18.7	0	N
044B00010N	GREEN RIVER	Fair	45.3	No	7	5	5	26.25	0	N
044B00039N (Culvert)	BRUSHY CR BRANCH	Good	96	No	N	N	N	41.99	0	7
044B00040N (Culvert)	LITTLE BRUSH CREEK	Good	80	No	N	N	N	23.95	0	7
044B00042N	BRUSH CREEK	Good	96	No	7	8	7	39.7	0	N
044B00043N (Culvert)	BRUSHY FORK CREEK	Good	96	No	N	N	N	40.68	0	7
047B00127L	I-65	Good	93.5	No	7	7	7	47.9	16.92	N
047B00127R	I-65	Good	94.3	No	7	7	7	47.9	16.92	N
047B00131L	MIDDLE CREEK RELIEF	Fair	94.4	No	6	8	7	38.39	0	N
047B00131R	MIDDLE CREEK RELIEF	Good	94.7	No	7	8	8	38.39	0	N
062B00008N	SOUTH FORK BRANCH	Good	80.1	No	8	8	7	22.5	0	N
062B00039L	NORTH FORK NOLIN RIVER	Good	99.4	No	7	7	8	43.96	0	N
062B00039R	NORTH FORK NOLIN RIVER	Good	94.7	No	7	7	8	39.7	0	N
062B00040L	MIDDLE CREEK	Good	94.4	No	7	8	8	37.73	0	N
062B00040R	MIDDLE CREEK	Good	94.7	No	7	8	8	43.96	0	N
062B00042N	SOUTH FORK-NOLIN RIVER	Good	77.2	No	7	8	7	28.22	0	N
062B00043N	SOUTH FORK-NOLIN RIVER	Good	77.6	No	7	8	7	29.53	0	N
062B00057N (Culvert)	South Fork Branch	Good	99	No	N	N	N	34	0	8

Structures Crossing Over the Corridor
None

Other Noteworthy Conditions: None.

TRAFFIC & OPERATIONS

AADT & AADTT: The table below summarizes the 2015 AADT and daily truck volumes by sub-segment.

Traffic Volumes			
Sub-segment	AADT	Truck Volume	Truck Percentage
From KY 55 (Columbia BYP) in Columbia to KY 1618 (Lincoln Pkwy) in Hodgenville	2,600	400	15%
From KY 1618 (Lincoln Pkwy) in Hodgenville to I-65	12,000	1,500	13%

Mobility: There is one major traffic bottleneck section along this corridor segment. See the table below for details. (Note: bottlenecks are identified by Level of Travel Time Reliability (LOTTR) > 1.5 or volume/capacity (v/c) > 0.6.) There is also one isolated traffic bottleneck at the intersection with KY 1618 (Lincoln Pkwy) in Hodgenville. Other than the noted traffic bottleneck sections/locations, traffic condition is acceptable along the remainder of this segment.

Existing Typical Roadway Attributes at Major Traffic Bottlenecks					
Locations	Functional Classification	Number & Width of Lanes	Median Width	Shoulder Width	2015 AADT ¹
From KY 1031(Sportsman Lake Rd) to I-65 in Elizabethtown	Principal Arterial	4, 12'	40'	6-10'	30,201

1) The highest traffic volume within the bottleneck based on KYSTMv18 data.

Safety: 3.4% of corridor mileage has a Level of Safety of Service (LOSS) of 4, meaning these links have the highest potential to decrease crashes. (Note: LOSS indicates the potential for crash reduction and is broken up into four categories based on Safety Performance Functions (SPFs): LOSS 4 = high; LOSS 3 = moderate to high; LOSS 2 = low to moderate; LOSS 1 = low.) See the table under **Potential Safety Improvement** section for details of locations with LOSS =4, possible causes, and potential safety improvements.

ITS Devices: Less than 1% of the corridor length has direct access to fiber through the KentuckyWired project.

PROPOSED IMPROVEMENT CONCEPTS

The improvement options noted in this report are not intended to be all-encompassing. Other potential improvements are possible, including innovative solutions that could be cost-effective and address the reasons for improvement. Further study may be needed as part of the project development process.

Proposed Typical Section & Description of Modification: The table below describes the proposed improvement concepts for the identified bottlenecks. The proposed improvements expect to maintain an overall acceptable traffic condition through 2045 (v/c < 0.85 in urban areas and v/c < 0.7 in rural areas) and address safety issues at bottlenecks.

Proposed Improvement Concepts			
Locations	Improvement Concepts ¹	Notes ²	Reason for Improvement
From US 31E (in Hodgenville) to KY 88 (in Greensburg)	Widen shoulders on 2-lane section	Improved Typical Section: Widen shoulders to 6 feet or more	This is a systemic safety issue.

1) The proposed roadway widening concept includes spot improvements at interchanges and major intersections as needed (see details in Interchanges for Potential Modification and Major Intersection for Potential Modification sections below).

2) Improved typical sections are based on KYTC Highway Design Manual.

Potential New Interchanges: None.

Interchanges for Potential Modification: None.

Major Intersections for Potential Modification: Improvements, such as additional turn lanes, channelization, and coordinated signal timing, should be considered at two major intersections for this corridor segment. The following is a list of these intersections.

Major Intersections for Potential Modification	
South Lincoln Blvd	E Dixie Ave

Bridges: Bridge recommendations are based on ratings of substructure, superstructure and deck using the following methodology.

Methodology for Replacement/Rehabilitation Recommendation					
Structures	Substructure Rating	Superstructure Rating	Deck Rating	Culvert Rating	Recommendations
Bridges	<=4	Any	Any	/	Replacement
	=5	Any	Any	/	Rehabilitation
	>=6	<=5	Any	/	Rehabilitation
	>=6	Any	<=5	/	Rehabilitation
	>=6	>=6	>=6	/	None ¹
Culverts	/	/	/	<=4	Replacement
	/	/	/	5 or 6	Rehabilitation
	/	/	/	>=7	None

1) If the bridge is on a corridor with a recommendation of widening, it will be widened (considered as rehabilitation) as necessary to accommodate the additional proposed lanes.

- **Bridges for Rehab/Widening:** Rehab/widening is recommended for a total of five bridges along the entire corridor. Note that the bridge rehab is determined based on the "Methodology for Replacement/Rehabilitation Recommendation" table above. If the bridge has a good condition but is within a bottleneck location with recommended widening, it will be widened as necessary to accommodate the additional proposed lanes and the cost of widening is assumed to be the same as bridge rehab for the planning-level cost estimation purpose.

Bridges for Rehab/Widening	
Bridge ID	Feature Intersect
001B00025N	PETTYS FORK CREEK
001B00026N	RUSSELL CREEK
044B00005N	BIG PITMAN CREEK
044B00009N	CANEY FORK
044B00010N	GREEN RIVER

- **Bridges for Replacement:** None.

Pavement Treatment: The overall pavement condition is good (average PDI = 0.27). Proposed additional lanes will consist of full depth asphalt pavement construction. Spot reconstruction and rehabilitation of existing asphalt pavement lanes might be needed based on more detailed evaluation of the corridor's pavement condition.

Potential Safety Improvement: The table below summarizes safety issues for the corridor and is based on KYTC safety data (LOSS value = 4), as well as a cursory review of Google Aerial imagery. The table identifies clusters of links with a LOSS value of 4 based on two categories: 1) clusters located in areas where this study already recommends corridor improvements for mobility reasons and 2) clusters not located in areas previously recommended for corridor mobility improvements. For Category 1, it is assumed any corridor improvement based on mobility needs will be constructed to current KYTC standards and will include the necessary safety improvements. Category 2 is intended to identify corridor segments that may warrant improvement for safety reasons, even though improvement might not be needed for mobility. There may also be isolated links with LOSS value of 4 that are not included in the table. Spot improvements could be warranted for those locations but it is assumed these spot improvements do not rise to the level of a corridor improvement; therefore, these locations are not addressed in this planning study. The table further breaks the clusters down by urban and rural designation (based on KYSTMv18 data) because urban and rural roadways tend to have unique typical crash causes and countermeasures.

Potential Safety Improvements			
Category	Locations	Possible Causes	Recommendations
CAT 1: Major clusters of safety issues covered by proposed improvement concepts	Campton School Road to Hedgespeth Lane near Summersville	Intersection spacing, high speeds and lack of shoulder	Widen shoulder, intersection improvements
CAT 2: Other major clusters of safety issues	N/A	N/A	N/A

Proposed Phasing: The shoulder widening on the 2-lane sections and proposed spot improvements at two major intersections can be constructed at the same time.

PRELIMINARY ENVIRONMENTAL RED FLAG ANALYSIS

The table below summarizes the presence of critical environmental red flag concerns approved by KYTC within 1,000 ft of proposed improvement locations (Y=Yes; N=No).

Critical Red Flag Issues/Concerns	
Environmental Red Flag Features	From US 31E (in Hodgenville) to KY 88 (in Greensburg)
Superfunds	N
Special Waters ¹	N
Forested Areas	Y
NLEB Habitat Priority	N
IB Habitat Priority Area	N
FAA Airport Runways	N
Public Hunting Areas	N
Wildlife Management Areas	N
Local Parks	N
State/ National Parks	N
Kentucky Heritage Land Conservation Fund	N
Area Landmarks	Y
Point Landmarks	Y
National Register of Historic Places Location (Point)	Y
National Register of Historic Places Location (Polygon)	Y

1) Special Waters are defined as Cold Water Aquatic Habitats, Outstanding State/National Resource Waters, Exceptional Waters, State Wild Rivers, and Federally Designated Wild / Scenic Rivers.

RIGHT OF WAY IMPACTS

The table below summarizes the potential right-of-way (ROW) needs for proposed improvement concepts.

Potential Needs of Additional Right of Way		
Location	Improvement Concepts	Potential Needs of Additional ROW
From US 31E (in Hodgenville) to KY 88 (in Greensburg)	Widen shoulders on 2-lane section	Yes
Intersection Modifications at South Lincoln Blvd and E Dixie Ave	Improvements, such as additional turn lanes, channelization, and coordinated signal timing	Potentially

COST ESTIMATION

Design:	0.2 (\$M)
ROW:	0.4 (\$M)
Utility:	0.6 (\$M)
Construction:	<u>8.0 (\$M)</u>
TOTAL =	9.2 (\$M)

Note:

1. The cost estimation may not include additional costs to address the potential impacts of major utilities (e.g., gas line, major water supplier, transmission line) within the proximity of the corridor, due to the lack of data when the report was prepared. Further investigation is recommended in future studies.
2. Cost estimation was based on 2020 dollars. There is a 1-3% inflation rate. Estimated cost could vary -50% to +250% of the actual number (as a rule of thumb).
3. The widening of a 2-lane facility to a 3-lane facility (with TWLTL or alternating passing lane) is considered as "Minor Widening (Undivided Road) - 2 Lane to 4 Lane".
4. The cost estimation does not include bridges outside of the bottleneck locations, as they are not assumed to rise to the level of a corridor improvement. The cost estimation only includes necessary bridge replacement/rehab/widening costs within the bottleneck locations with proposed widening improvement. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
5. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
6. Shoulder widening is not included in the cost estimation, as it is a relatively minor cost.
7. If multiple improvement concepts are recommended for the corridor, only the cost of the larger-scale improvement concept is estimated.

Kentucky Statewide Corridor Plan (Linking Kentucky)

Route: US 31 W / KY 9001
Segment ID: 18B
From: I-65
To: I-265 in Louisville
Counties: Hardin, Meade, Jefferson
Highway Districts: 4 and 5

CORRIDOR SEGMENT OVERVIEW

Segment 18B on US 31 W begins at the US 31 W/I-65 interchange in Hardin County and extends north through Meade County to I-265 in Jefferson County. The corridor segment length is approximately 29 miles and currently contains eight interchanges.

This segment passes through the residential and commercial areas of the City of Elizabethtown and Radcliff in Hardin County and the City of Louisville in Jefferson County. These areas would be considered towns (according to KYSTMv18 data) with clusters of homes and commercial buildings adjacent to US 31 W. The remainder of this segment passes through rural agricultural areas with homes interspersed along US 31 W.

EXISTING FACILITY

The table below outlines the typical roadway attributes for this section of US 31 W by sub-segment.

Typical Roadway Attributes					
Sub-segment	Functional Classification	Number & Width of Lanes	Shoulder & Width	Median Type & Width	Posted Speed Limit
From I-65 to Knox Boulevard	Principal Arterial	4-6, 12'	Asphalt (10'), Asphalt Combination (3-10'), Curbed (0-2'), None	Depressed (26-40'), Raised Non Mountable (15-26'), Flush (24-26'), Concrete Barrier (24'), None	45-70 mph
From Knox Boulevard to Jefferson County Line	Principal Arterial Other	4, 12'	Asphalt (1-10'), Asphalt Combination (3-10'), Curbed (1-8'), None	Depressed (26'), Raised Non Mountable (26'), Flush (4-26'), Concrete Barrier (6-12'), None	55 mph
From Jefferson County Line to I-265	Principal Arterial Other	4, 11-12'	Asphalt (2-11'), Asphalt Combination (10'), Curbed (1-2'), None	Flush (6-16'), Raised Non Mountable (5-20'), None	50-55 mph

Right of Way: The table below outlines the general width of existing right of way within the corridor.

General Existing Right of Way Widths		
From	To	General Ex. R/W Width
I-65	Lincoln Trail Blvd	180' – 240'
Lincoln Trail Blvd	Knox Blvd	100' – 125'
Knox Blvd	Brandenburg Road	150' – 190'
Brandenburg Road	I-265	100' – 135'

Pavement: The average PDI (Pavement Distress Index) for this section of US 31 W is 0.22, which indicates an overall good pavement condition according to KYTC criteria (Good: 0.00 – 0.35; Fair: 0.36 – 0.65; Poor: 0.66 – 0.99).

Intersections/Interchanges: The tables below outline the existing interchanges, major intersections, and railroad crossings on the corridor.

Interchanges	Interchange Types
I-65	Cloverleaf
KY 9001	Partial Cloverleaf
US 62	Partial Loop
KY 1600	SPUI
KY 1646	Cloverleaf
Chaffee Ave	Partial Diamond
Brandenburg Road	Partial Cloverleaf
I-265	Partial Cloverleaf

Major Intersections ¹			
Blevins Gap Rd	Watson Ln	KY 44	KY 1638
US 60	Knox Blvd	Hill Street	W Lincoln Trail Blvd
W Spring St	KY 144	KY 1500	Blackjack Road
KY 313	KY 434	KY 220	KY 447
Veterans Way	Towne Drive	KY 3005	Elizabethtown Bypass
KY 1357	KY 2205		

1) Only crossroads with function classification of Minor Collector or above are included.

At-grade Railroad Crossings
None

Access Points: This segment is not access controlled. Throughout the corridor, there are residential and commercial driveways and intersecting roadways.

Bridges: The tables below outline the detailed bridge information for existing bridges on and over this section of US 31 W.

Mainline Bridge Information										
Bridge ID	Feature Intersect	NBIS Classification	Sufficiency Rating	Substandard	Deck Rating	Superstructure Rating	Substructure Rating	Under Clearance (feet)	Horizontal Clearance (feet)	Culvert Rating
047B00007N	CSX RR & P&L RR	Poor	50	No	6	4	4	25	40.03	N
047B00008N (Culvert)	TIOGA CREEK	Good	78.5	No	N	N	N	0	55.77	7
047B00105N (Culvert)	FREEMAN CREEK	Good	71.3	No	N	N	N	0	95.8	7
047B00106N (Culvert)	VALLEY CREEK	Fair	50.5	No	N	N	N	0	99.9	6
047B00107L	CSX RR - P&L RR - US 62	Fair	90.2	No	7	6	7	99.99	52.49	N
047B00108L	WESTERN KENTUCKY PARKWAY	Good	91.5	No	7	7	7	15.4	49	N
047B00112N	CHAFFEE AVENUE	Good	86.4	No	7	7	7	16.33	35.76	N
047B00114N (Culvert)	DRY BRANCH	Good	68.6	No	N	N	N	0	35.76	7
047B00127L	I-65	Good	93.5	No	7	7	7	16.92	47.9	N
047B00152R	US 62 & CSX RAILROAD	Good	98.4	No	7	8	7	99.99	45	N
047B00153R	WESTERN KY PARKWAY	Good	95.4	No	7	7	8	16	44.29	N
056B00033L	P AND L RAILWAY	Fair	62.2	No	6	6	5	21.83	25.7	N
056B00033R	P AND L RAILWAY	Fair	61.2	No	6	6	5	21.83	25.75	N
056B00034N	SALT RIVER	Fair	63.8	No	6	6	6	0	47.75	N

Structures Crossing Over the Corridor			
Bridge ID	Facility Carried	Under Clearance (feet)	Horizontal Clearance (feet)
047B00109N	WOODLAND DR	18	31.5
047B00111N	KY-361 (Bullion)	16.25	35.76
047B00160N	NORTH WILSON RD	16.25	39.37
047B00172N	KY 1136	16.75	28
047B00175N	KY 361	17.1	99
056B00462L	KY 1934 SB	18.17	56
056B00462R	KY 1934 NB	19.92	44
047B00113N	P&L RAILROAD	16.25	46.26
056R00656N	CSX RAILROAD	17.33	54.83
056R00618N	P AND L RAILROAD	16.33	33.83

Other Noteworthy Conditions: None.

TRAFFIC & OPERATIONS

AADT & AADTT: The table below summarizes the 2015 AADT and daily truck volumes by sub-segment.

Traffic Volumes			
Sub-segment	AADT	Truck Volume	Truck Percentage
From I-65 to KY 1638 (Old Mill Rd) in Muldraugh	21,700	1,900	9%
From KY 1638 (Old Mill Rd) in Muldraugh to KY 841 (Gene Snyder Freeway) in Louisville	19,700	3,600	18%

Mobility: There are two major traffic bottleneck sections along this corridor segment. See the table below for details. (Note: bottlenecks are identified by Level of Travel Time Reliability (LOTTR) > 1.5 or volume/capacity (v/c) > 0.6.) Other than the noted traffic bottleneck sections/locations, traffic condition is acceptable along the remainder of this segment.

Existing Typical Roadway Attributes at Major Traffic Bottlenecks					
Locations	Functional Classification	Number & Width of Lanes	Median Width	Shoulder Width	2015 AADT ¹
<u>Major Bottleneck 1:</u> From Western Kentucky Pkwy to KY 1638 (Old Mill Rd) in Muldraugh	Principal Arterial	4-6, 12'	6-26'	0-10'	38,644
<u>Major Bottleneck 2:</u> From KY 44 (Stites Station Rd) to KY 841 (Gene Snyder Freeway) in Louisville	Principal Arterial	4, 11-12'	5-20'	2-11'	26,846

1) The highest traffic volume within the bottleneck based on KYSTMv18 data.

Safety: 11.4% of the corridor mileage has a Level of Safety of Service (LOSS) of 4, meaning these links have the highest potential to decrease crashes. (Note: LOSS indicates the potential for crash reduction and is broken up into four categories based on Safety Performance Functions (SPFs): LOSS 4 = high; LOSS 3 = moderate to high; LOSS 2 = low to moderate; LOSS 1 = low.) See the table under **Potential Safety Improvement** section for details of locations with LOSS =4, possible causes, and potential safety improvements.

ITS Devices: Approximately 1% of the corridor length has direct access to fiber through the KentuckyWired project.

PROPOSED IMPROVEMENT CONCEPTS

The improvement options noted in this report are not intended to be all-encompassing. Other potential improvements are possible, including innovative solutions that could be cost-effective and address the reasons for improvement. Further study may be needed as part of the project development process.

Proposed Typical Section & Description of Modification: The table below describes the proposed improvement concepts for the identified bottlenecks. The proposed improvements expect to maintain an overall acceptable traffic condition through 2045 ($v/c < 0.85$ in urban areas and $v/c < 0.7$ in rural areas) and address safety issues at bottlenecks.

Proposed Improvement Concepts			
Locations	Improvement Concepts ¹	Notes ²	Reason for Improvement
<u>Major Bottleneck 1:</u> From Western Kentucky Pkwy to KY 1638 (Old Mill Rd) in Muldraugh	Add Auxiliary Lane	Improved Typical Section: 3, 12-foot lanes in each direction with 8-foot shoulders. 8-foot flush median	The expected v/c in 2045 exceeds the established thresholds.
<u>Major Bottleneck 2:</u> From KY 44 (Stites Station Rd) to KY 841 (Gene Snyder Freeway) in Louisville	Widening this section to a 6-lane divided arterial on its existing alignment	Improved Typical Section: 3, 12-foot lanes in each direction with 8-foot shoulders. 8-foot flush median	The expected v/c in 2045 exceeds the established thresholds.

1) The proposed roadway widening concept includes spot improvements at interchanges and major intersections as needed (see details in Interchanges for Potential Modification and Major Intersection for Potential Modification sections below).

2) Improved typical sections are based on KYTC Highway Design Manual.

Potential New Interchanges:

Potential New Interchanges	
KY 1357	US 60

Interchanges for Potential Modification: None.

Major Intersections for Potential Modification: Improvements, such as additional turn lanes, channelization, innovative design and coordinated signal timing, should be considered at 21 major intersections for this corridor segment. The following is a list of these intersections.

Major Intersections for Potential Modification			
Blevins Gap Rd	Watson Ln	KY 1638	US 60
Knox Blvd	Hill Street	W Lincoln Trail Blvd	W Spring St
KY 144	KY 1500	Blackjack Road	KY 313
KY 434	KY 220	KY 447	Veterans Way
Towne Drive	KY 3005	Elizabethtown Bypass	KY 1357
KY 2205			

Bridges: Bridge recommendations are based on ratings of substructure, superstructure and deck using the following methodology.

Methodology for Replacement/Rehabilitation Recommendation					
Structures	Substructure Rating	Superstructure Rating	Deck Rating	Culvert Rating	Recommendations
Bridges	<=4	Any	Any	/	Replacement
	=5	Any	Any	/	Rehabilitation
	>=6	<=5	Any	/	Rehabilitation
	>=6	Any	<=5	/	Rehabilitation
	>=6	>=6	>=6	/	None ¹
Culverts	/	/	/	<=4	Replacement
	/	/	/	5 or 6	Rehabilitation
	/	/	/	>=7	None

1) If the bridge is on a corridor with a recommendation of widening, it will be widened (considered as rehabilitation) as necessary to accommodate the additional proposed lanes.

- **Bridges for Rehab/Widening:** Rehab/widening is recommended for a total of two bridges along the entire corridor. Note that the bridge rehab is determined based on the "Methodology for Replacement/Rehabilitation Recommendation" table above. If the bridge has a good condition but is within a bottleneck location with recommended widening, it will be widened as necessary to accommodate the additional proposed lanes and the cost of widening is assumed to be the same as bridge rehab for the planning-level cost estimation purpose.

Bridges for Rehab/Widening	
Bridge ID	Feature Intersect
056B00033L	P AND L RAILWAY
056B00033R	P AND L RAILWAY

- **Bridges for Replacement:** Replacement is recommended for one bridge along the entire corridor. Note that the bridge replacement is determined based on the "Methodology for Replacement/Rehabilitation Recommendation" table above. If the bridge needs replacement and is within a bottleneck location with recommended widening, it will be widened during the replacement to accommodate the additional proposed lanes and the cost of bridge replacement is used for the planning-level cost estimation purpose.

Bridges for Replacement	
Bridge ID	Feature Intersect
047B00007N	CSX RR & P&L RR

Pavement Treatment: The overall pavement condition is good (average PDI = 0.22). Proposed additional lanes will consist of full depth asphalt pavement construction. Spot reconstruction and rehabilitation of existing asphalt pavement lanes might be needed based on more detailed evaluation of the corridor's pavement condition.

Potential Safety Improvement: The table below summarizes safety issues for the corridor and is based on KYTC safety data (LOSS value = 4), as well as a cursory review of Google Aerial imagery. The table identifies clusters of links with a LOSS value of 4 based on two categories: 1) clusters located in areas where this study already recommends corridor improvements for mobility reasons and 2) clusters not located in areas previously recommended for corridor mobility improvements. For Category 1, it is assumed any corridor improvement based on mobility needs will be constructed to current KYTC standards and will include the necessary safety improvements. Category 2 is intended to identify corridor segments that may warrant improvement for safety reasons, even though improvement might not be needed for mobility. There may also be isolated links with LOSS value of 4 that are not included in the table. Spot improvements could be warranted for those locations but it is assumed these spot improvements do not rise to the level of a corridor improvement; therefore, these locations are not addressed in this planning study. The table further breaks the clusters down by urban and rural designation (based on KYSTMv18 data) because urban and rural roadways tend to have unique typical crash causes and countermeasures.

Potential Safety Improvements			
Category	Locations	Possible Causes	Recommendations
CAT 1: Major clusters of safety issues covered by proposed improvement concepts	US 31 W from Ring Road to KY 1646	Interchange and intersection spacing. Congestion due to traffic entering and existing at the interchanges/intersections	Intersection improvements; auxiliary lane
CAT 2: Other major clusters of safety issues	<u>RURAL</u> S 6 th Street (West Point) to I-265 Interchange	<u>RURAL</u> Bottlenecks, access points and high speeds	<u>RURAL</u> Access management

Proposed Phasing: Since all intersections proposed for spot improvements are located within the proposed corridor widening in Hardin/Meade Counties or Jefferson County, they will be improved at the same time the roadway is widened. The Hardin/Meade County widening can be one phase and the Jefferson County widening another phase. The proposed KY 1357 and US 60 interchanges in Elizabethtown may be more complex and require a longer project development period; therefore, it is recommended to pursue those in separate phases.

PRELIMINARY ENVIRONMENTAL RED FLAG ANALYSIS

The table below summarizes the presence of critical environmental red flag concerns approved by KYTC within 1,000 ft of proposed improvement locations (Y=Yes; N=No).

Critical Red Flag Issues/Concerns		
Environmental Red Flag Features	<u>Major Bottleneck 1:</u> From Western Kentucky Pkwy to KY 1638 (Old Mill Rd) in Muldraugh	<u>Major Bottleneck 2:</u> From KY 44 (Stites Station Rd) to KY 841 (Gene Snyder Freeway) in Louisville
Superfunds	N	N
Special Waters ¹	N	N
Forested Areas	Y	Y
NLEB Habitat Priority	N	N
IB Habitat Priority Area	N	Y
FAA Airport Runways	Y	N
Public Hunting Areas	Y	N
Wildlife Management Areas	N	N
Local Parks	Y	N
State/ National Parks	N	N
Kentucky Heritage Land Conservation Fund	N	N
Area Landmarks	Y	N
Point Landmarks	Y	Y
National Register of Historic Places Location (Point)	Y	N
National Register of Historic Places Location (Polygon)	Y	N

1) Special Waters are defined as Cold Water Aquatic Habitats, Outstanding State/National Resource Waters, Exceptional Waters, State Wild Rivers, and Federally Designated Wild / Scenic Rivers.

RIGHT OF WAY IMPACTS

The table below summarizes the potential right-of-way (ROW) needs for proposed improvement concepts.

Potential Needs of Additional Right of Way		
Location	Improvement Concepts	Potential Needs of Additional ROW
<u>Major Bottleneck 1:</u> Western Kentucky Pkwy to KY 1638 (Old Mill Rd) in Muldraugh	Add Auxiliary Lane	Yes
<u>Major Bottleneck 2:</u> KY 44 (Stites Station Rd) to KY 841 (Gene Snyder Freeway) in Louisville	Widening this section to a 6-lane divided arterial on its existing alignment	Yes
New Interchanges at KY 1357 and US 60	New Interchange	Yes

COST ESTIMATION

Design:	43.5 (\$M)
ROW:	32.6 (\$M)
Utility:	20.9 (\$M)
Construction:	<u>249.5 (\$M)</u>
TOTAL =	346.5 (\$M)

Note:

1. The cost estimation may not include additional costs to address the potential impacts of major utilities (e.g., gas line, major water supplier, transmission line) within the proximity of the corridor, due to the lack of data when the report was prepared. Further investigation is recommended in future studies.
2. Cost estimation was based on 2020 dollars. There is a 1-3% inflation rate. Estimated cost could vary -50% to +250% of the actual number (as a rule of thumb).
3. The widening of a 2-lane facility to a 3-lane facility (with TWLTL or alternating passing lane) is considered as "Minor Widening (Undivided Road) - 2 Lane to 4 Lane".
4. The cost estimation does not include bridges outside of the bottleneck locations, as they are not assumed to rise to the level of a corridor improvement. The cost estimation only includes necessary bridge replacement/rehab/widening costs within the bottleneck locations with proposed widening improvement. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
5. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
6. Shoulder widening is not included in the cost estimation, as it is a relatively minor cost.
7. If multiple improvement concepts are recommended for the corridor, only the cost of the larger-scale improvement concept is estimated.

Kentucky Statewide Corridor Plan (Linking Kentucky)

Route: US 31 W / US 150
Segment ID: 18C
From: I-265 in Louisville
To: I-64 in Louisville
Counties: Jefferson
Highway Districts: 5

CORRIDOR SEGMENT OVERVIEW

Segment 18C on US 31 W begins at the US 31 W/I-265 interchange in Jefferson County and extends north through Louisville to I-64 in Jefferson County. The corridor segment length is approximately 19 miles and currently contains three interchanges at I-64, I-264 and I-265.

This segment passes through the residential and commercial area of the City of Louisville in Jefferson County. This area would be considered suburban and urban city (according to KYSTMv18 data) with clusters of homes and commercial buildings adjacent to US 31 W. The remainder of this segment becomes two one-way pairs and passes through downtown Louisville with residential and commercial buildings along US 31 W and US 150.

EXISTING FACILITY

The table below outlines the typical roadway attributes for this section of US 31 W by sub-segment.

Typical Roadway Attributes					
Sub-segment	Functional Classification	Number & Width of Lanes	Shoulder & Width	Median Type & Width	Posted Speed Limit
From I-265 to US 31 One-Way Split	Principal Arterial Other	4-6, 10-12'	Asphalt (11'), Asphalt Combination (8'), Curbed (0-11'), None	Flush (12'), Raised Non Mountable (12-20'), Raised Mountable (4-16), None	35-50 mph
From US 31 One-Way Split to I-64 Interchange	Principal Arterial Other	2-4, 10-12'	Curbed (0'), None	Raised Non Mountable (3'), None	35 mph

Right of Way: The table below outlines the general width of existing right of way within the corridor.

General Existing Right of Way Widths		
From	To	General Ex. R/W Width
I-265	I-264	110' – 140'
I-264	US 31 One-Way Split	90' – 110'
US 31 One-Way Split	I-64	55' – 65'

Pavement: The average PDI (Pavement Distress Index) for this section of US 31 W is 0.13, which indicates an overall good pavement condition according to KYTC criteria (Good: 0.00 – 0.35; Fair: 0.36 – 0.65; Poor: 0.66 – 0.99).

Intersections/Interchanges: The tables below outline the existing interchanges, major intersections, and railroad crossings on the corridor.

Interchanges	Interchange Types
I-64	Trumpet
I-264	Partial Cloverleaf
I-265	Partial Cloverleaf

Major Intersections ¹			
Bethany Ln	Upper Hunters Trce	W Hill St	W Main St
Ashby Ln	Rockford Ln	Wilson Ave	W Market St
Valley Station Rd	Gagel Ave	Dumesnil St	W Jefferson St
Johnstown Rd	I-264	W Oak St	US 31 W
E Pages Ln	Crums Ln	N 22 nd St	US 31 W
Greenwood Rd	7 th St Rd	W Broadway	US 31 W
St Andrews Church Rd	Ralph Ave	W Chestnut St	Bank St
Lower Hunters Trce	Millers Ln	W Muhammad Ali Blvd	Portland Ave
Blanton Ln	Algonquin Pkwy	W Jefferson St	I-64

1) Only crossroads with function classification of Minor Collector or above are included.

At-grade Railroad Crossings
US 31 W Mile Point 16.2 in Jefferson County

Access Points: This segment is not access controlled. Throughout the corridor, there are residential and commercial driveways and intersecting roadways.

Bridges: The tables below outline the detailed bridge information for existing bridges on or over this section of US 31 W.

Mainline Bridge Information										
Bridge ID	Feature Intersect	NBIS Classification	Sufficiency Rating	Substandard	Deck Rating	Superstructure Rating	Substructure Rating	Under Clearance (feet)	Horizontal Clearance (feet)	Culvert Rating
056B00275N	MILL CREEK	Fair	56.8	No	N	N	N	0	28	6

Structures Crossing Over the Corridor			
Bridge ID	Facility Carried	Under Clearance (feet)	Horizontal Clearance (feet)
056B00462R	KY 1934 NB	19.92	44
056B00264N	I-264 WB	16.25	51.25
056B00266N	I-264 EB AND RAMP	15.83	95.23
056B00272N	I-264 RAMP	15.17	26
056B00274N	I-264 RAMP	15.67	40.25
056B00282N	I-64	15.58	54.33
056R00602N	NORFLK SOUTHERN RR	12.42	42.00

Other Noteworthy Conditions: None.

TRAFFIC & OPERATIONS

AADT & AADTT: The table below summarizes the 2015 AADT and daily truck volumes by sub-segment.

Traffic Volumes			
Sub-segment	AADT	AADTT	Truck Percentage
From KY 841 (Gene Snyder Freeway) to I-264 in Louisville	33,800	2,300	7%
From I-264 to I-64 in Louisville	14,900	800	5%

Mobility: The entirety of this corridor segment is a major traffic bottleneck. (Note: bottlenecks are identified by Level of Travel Time Reliability (LOTTR) > 1.5 or volume/capacity (v/c) > 0.6.) Typical roadway attributes of the bottleneck area can be found above for the entire segment.

Existing Typical Roadway Attributes at Major Traffic Bottlenecks					
Locations	Functional Classification	Number & Width of Lanes	Median Width	Shoulder Width	2015 AADT ¹
Entire corridor	Refer to the Existing Facility section above				64,790

1) The highest traffic volume within the bottleneck based on KYSTMv18 data.

Safety: 16.9% of the corridor mileage has a Level of Safety of Service (LOSS) of 4, meaning these links have the highest potential to decrease crashes. (Note: LOSS indicates the potential for crash reduction and is broken up into four categories based on Safety Performance Functions (SPFs): LOSS 4 = high; LOSS 3 = moderate to high; LOSS 2 = low to moderate; LOSS 1 = low.) See the table under **Potential Safety Improvement** section for details of locations with LOSS =4, possible causes, and potential safety improvements.

ITS Devices: Louisville Metro fiber is in the area along with TRIMARC assets around the I-264 and I-265 interchanges.

PROPOSED IMPROVEMENT CONCEPTS

The improvement options noted in this report are not intended to be all-encompassing. Other potential improvements are possible, including innovative solutions that could be cost-effective and address the reasons for improvement. Further study may be needed as part of the project development process.

Proposed Typical Section & Description of Modification: From Stonestreet to the north, follow the plan from the Louisville Metro Project, “Transforming Dixie Highway”. Bus Rapid Transit (BRT), access management and complete streets should be continued from Stonestreet south to I-265.

Potential New Interchanges: None.

Interchanges for Potential Modification: None.

Major Intersections for Potential Modification: Improvements, such as additional turn lanes, channelization, and coordinated signal timing, should be considered at 27 major intersections for this corridor segment. The following is a list of these intersections.

Major Intersections for Potential Modification			
Bethany Ln	Blanton Ln	Millers Ln	W Jefferson St
Valley Station Rd	Upper Hunters Trce	Dumesnil St	W Main St
Johnstown Rd	Gagel Ave	Rockford Ln	W Market St
E Pages Ln	I-264	N 22 nd St	Bank St
Greenwood Rd	Crums Ln	W Chestnut St	Portland Ave
St Andrews Church Rd	7 th St Rd	W Broadway	I-64
Lower Hunters Trce	Ralph Ave	W Muhammad Ali Blvd	

Bridges: Bridge recommendations are based on ratings of substructure, superstructure and deck using the following methodology.

Methodology for Replacement/Rehabilitation Recommendation					
Structures	Substructure Rating	Superstructure Rating	Deck Rating	Culvert Rating	Recommendations
Bridges	<=4	Any	Any	/	Replacement
	=5	Any	Any	/	Rehabilitation
	>=6	<=5	Any	/	Rehabilitation
	>=6	Any	<=5	/	Rehabilitation
	>=6	>=6	>=6	/	None ¹
Culverts	/	/	/	<=4	Replacement
	/	/	/	5 or 6	Rehabilitation
	/	/	/	>=7	None

1) If the bridge is on a corridor with a recommendation of widening, it will be widened (considered as rehabilitation) as necessary to accommodate the additional proposed lanes.

- **Bridges for Rehab/Widening:** None.
- **Bridges for Replacement:** None.

Pavement Treatment: The overall pavement condition is good (average PDI = 0.13). Proposed additional lanes will consist of full depth asphalt pavement construction. Spot reconstruction and rehabilitation of existing asphalt pavement lanes might be needed based on more detailed evaluation of the corridor's pavement condition.

Potential Safety Improvement: The table below summarizes safety issues for the corridor and is based on KYTC safety data (LOSS value = 4), as well as a cursory review of Google Aerial imagery. The table identifies clusters of links with a LOSS value of 4 based on two categories: 1) clusters located in areas where this study already recommends corridor improvements for mobility reasons and 2) clusters not located in areas previously recommended for corridor mobility improvements. For Category 1, it is assumed any corridor improvement based on mobility needs will be constructed to current KYTC standards and will include the necessary safety improvements. Category 2 is intended to identify corridor segments that may warrant improvement for safety reasons, even though improvement might not be needed for mobility. There may also be isolated links with LOSS value of 4 that are not included in the table. Spot improvements could be warranted for those locations but it is assumed these spot improvements do not rise to the level of a corridor improvement; therefore, these locations are not addressed in this planning study. The table further breaks the clusters down by urban and rural designation (based on KYSTMv18 data) because urban and rural roadways tend to have unique typical crash causes and countermeasures.

Potential Safety Improvements			
Category	Locations	Possible Causes	Recommendations
CAT1: Major clusters of safety issues covered by proposed improvement concepts	Full Segment	Interchange spacing and congestion due to traffic entering and exiting at the interchanges	Access Management/Complete Streets
CAT2: Other major clusters of safety issues	N/A	N/A	N/A

Proposed Phasing: The proposed spot improvements at major intersections could be phased geographically from south to north.

PRELIMINARY ENVIRONMENTAL RED FLAG ANALYSIS

The table below summarizes the presence of critical environmental red flag concerns approved by KYTC within 1,000 ft of proposed improvement locations (Y=Yes; N=No).

Critical Red Flag Issues/Concerns	
Environmental Red Flag Features	Entire Corridor
Superfunds	N
Special Waters ¹	N
Forested Areas	Y
NLEB Habitat Priority	N
IB Habitat Priority Area	N
FAA Airport Runways	N
Public Hunting Areas	N
Wildlife Management Areas	N
Local Parks	Y
State/ National Parks	N
Kentucky Heritage Land Conservation Fund	N
Area Landmarks	Y
Point Landmarks	Y
National Register of Historic Places Location (Point)	Y
National Register of Historic Places Location (Polygon)	Y

1) Special Waters are defined as Cold Water Aquatic Habitats, Outstanding State/National Resource Waters, Exceptional Waters, State Wild Rivers, and Federally Designated Wild / Scenic Rivers.

RIGHT OF WAY IMPACTS

The table below summarizes the potential right-of-way (ROW) needs for proposed improvement concepts.

Potential Needs of Additional Right of Way		
Location	Improvement Concepts	Potential Needs of Additional ROW
Intersection Modifications at Upper Hunters Trce, Ralph Ave, Millers Ln, Dumesnil St, W Chestnut St, N 22nd St, W Broadway, W Muhammad Ali Blvd, W Jefferson St, W Main St, W Market St, Portland Ave, I-64, I-264	Improvements, such as additional turn lanes, channelization, and coordinated signal timing	No
Intersection Modifications at Bethany Ln, Valley Station Rd, Johnstown Rd, E Pages Ln, Greenwood Rd, St Andrews Church Rd, Lower Hunters Trce, Blanton Ln, Rockford Ln, Gagel Ave, Crums Ln, 7th St Rd, Bank St	Improvements, such as additional turn lanes, channelization, and coordinated signal timing	Potentially

COST ESTIMATION

Design:	15.5 (\$M)
ROW:	56.9 (\$M)
Utility:	12.9 (\$M)
Construction:	<u>103.5 (\$M)</u>
TOTAL =	188.9 (\$M)

Note:

1. The cost estimation may not include additional costs to address the potential impacts of major utilities (e.g., gas line, major water supplier, transmission line) within the proximity of the corridor, due to the lack of data when the report was prepared. Further investigation is recommended in future studies.
2. Cost estimation was based on 2020 dollars. There is a 1-3% inflation rate. Estimated cost could vary -50% to +250% of the actual number (as a rule of thumb).
3. The widening of a 2-lane facility to a 3-lane facility (with TWLTL or alternating passing lane) is considered as "Minor Widening (Undivided Road) - 2 Lane to 4 Lane".
4. The cost estimation does not include bridges outside of the bottleneck locations, as they are not assumed to rise to the level of a corridor improvement. The cost estimation only includes necessary bridge replacement/rehab/widening costs within the bottleneck locations with proposed widening improvement. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
5. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
6. Shoulder widening is not included in the cost estimation, as it is a relatively minor cost.
7. If multiple improvement concepts are recommended for the corridor, only the cost of the larger-scale improvement concept is estimated.

Kentucky Statewide Corridor Plan (Linking Kentucky)

Route: US 119 / US 25 E / US 23
Segment ID: 19
From: I-75
To: West Virginia State Line
Counties: Laurel, Knox, Bell, Harlan, Letcher, Pike
Highway Districts: 11 and 12

CORRIDOR SEGMENT OVERVIEW

Segment 19 on US 25 E begins at the US 25 E/I-75 interchange in Laurel County and extends south through Knox County to US 119 in Bell County. In Bell County, the corridor extends north through Harlan County to US 23 in Letcher County. The corridor runs north until turning east and becoming US 119 again in Pike County where it eventually ends at the West Virginia state line. The corridor segment length is approximately 174 miles and currently contains seven interchanges.

This segment passes through the residential and commercial areas of the cities of Corbin, Barbourville, Pineville, Harlan, Whitesburg and Pikeville. These areas would be considered towns (according to KYSTMv18 data) with clusters of homes and commercial buildings adjacent to US 119. The remainder of this segment passes through rural agricultural areas with homes interspersed along US 119.

EXISTING FACILITY

The table below outlines the typical roadway attributes for this section of US 119 by sub-segment.

Typical Roadway Attributes					
Sub-segment	Functional Classification	Number & Width of Lanes	Shoulder & Width	Median Type & Width	Posted Speed Limit
US 25 E from I-75 to US 23 in Letcher County	Principal Arterial Other	2-4, 9-12'	Asphalt (2-16'), Asphalt Combination (2-10'), Curbed (1-2'), None	Concrete Barrier (19'), Depressed (30-40'), Flush (4-24'), Raised Mountable (16-20'), Raised Non Mountable (4-30'), None	45-55 mph
US 23 from US 119 to US 119	Principal Arterial	4, 12'	Asphalt (6-12'), Curbed (2'), None	Concrete Barrier (14-20'), Flush (12-21'), Raised Mountable (12-16'), Guardrail Barrier (14'), None	55 mph
US 119 from US 23 to West Virginia State Border	Principal Arterial Other	4, 12'	Asphalt (3-12'), Asphalt Combination (5-10'), Curbed (2'), None	Concrete Barrier (10-13'), Depressed (15-32'), Flush (12-21'), Raised Mountable (12'), Raised Non Mountable (20'), None	35-55 mph

Right of Way: The table below outlines the general width of existing right of way within the corridor.

General Existing Right of Way Widths		
From	To	General Ex. R/W Width
I-75	US 119 (Harlan Road)	150' – 200'
US 119 (Harlan Road)	US 421 (Pine Mountain Road)	70' – 100'
US 421 (Pine Mountain Road)	US 119 at Oven Fork, KY	150' – 200'
US 119 at Oven Fork, KY	KY 15 at Whitesburg, KY	50' – 100'
KY 15 at Whitesburg, KY	WV State Line	150' – 200'

Pavement: The average PDI (Pavement Distress Index) for this section of US 119 is 0.29, which indicates an overall good pavement condition according to KYTC criteria (Good: 0.00 – 0.35; Fair: 0.36 – 0.65; Poor: 0.66 – 0.99).

Intersections/Interchanges: The tables below outline the existing interchanges, major intersections, and railroad crossings on the corridor.

Interchanges	Interchange Types
US 23	Trumpet
I-75	Diamond

Major Intersections ¹			
American Greeting Card Rd	W Tennessee Ave	Highway 179	KY 122
US Highway 25 W	Highway 66	College Rd	US 460
KY 1629	US Highway 25 E	Main St	Cedar Creek Rd
Master St	Highway 987 Laurel Hill	Kingdom Come Dr	KY 3496
Lynn Camp School Rd	Highway 1344	Old Highway 119 S	KY 1460
KY 3041	Highway 987 Brownies Crk	Highway 806	KY 3495
Calvary Church Rd	Highway 987 Laurel Hill	Highway 932	US 119
N KY 233	Balkan Brownings Creek Rd	Little Shepherd Trl	Fishtrap Rd
KY 229	Highway 72	Little Cowan	KY 881
California Hollow Rd	Highway 2007	Jenkins Rd	KY 3220
KY 11	Highway 219	Old US 119	KY 3220
KY 11	Highway 840	Highway 805	KY 199
Old 25 E	Highway 840	Highway 3086	Toler Rd
KY 1304	Highway 840	KY 805	KY 292
KY 223	S US Highway 421	KY 611	KY 1506
KY 930	N US Highway 421	KY 1469	Williamson Rd
Highway 92	Highway 522	KY 2167	
Highway 2014	Highway 2010	KY 1426	

1) Only crossroads with function classification of Minor Collector or above are included.

At-grade Railroad Crossings
US 25 E Mile Point 11.9 in Knox County

Access Points: This segment is not access controlled. Throughout the corridor, there are residential and commercial driveways and intersecting roadways.

Bridges: The tables below outline the detailed Bridge information for existing bridges on or over this section of US 119.

Mainline Bridge Information										
Bridge ID	Feature Intersect	NBIS Classification	Sufficiency Rating	Substandard	Deck Rating	Superstructure Rating	Substructure Rating	Under Clearance (feet)	Horizontal Clearance (feet)	Culvert Rating
007B00002N (Culvert)	TURKEY CREEK SLOUGH	Fair	71.4	No	N	N	N	0	45.93	5
007B00130L	KY 2014, CUMBERLAND RIVER	Fair	93.7	No	5	7	7	17.8	40	N
007B00130R	CSX RR, KY 2014, CUMBERLAND	Fair	94.7	No	6	7	7	17.9	39.7	N
007B00131L	OLD 25E & CUMBERLAND RIVER	Fair	93.7	No	6	6	7	16	40	N
007B00131R	OLD 25E & CUMBERLAND RIVER	Fair	94.7	No	6	7	7	16.5	40	N
007B00144N	CUMBERLAND RIVER	Fair	69.7	No	6	6	6	0	24	N
048B00065N	KY 413 & POOR FORD CUMBERLAND RIVER	Fair	88	No	5	6	6	23	29.86	N
048B00100N	POOR FORK CUMBERLAND RIVER	Fair	95.6	No	5	7	7	0	43.96	N
048B00101N	POOR FORK CUMBERLAND RIVER	Fair	85.1	No	6	5	7	0	43.96	N
048B00107N	POOR FORK CUMBERLAND RIVER	Fair	68.2	No	6	5	7	0	43	N
048B00110N	POOR FORK CUMBERLAND RIVER	Fair	96.6	No	6	7	6	0	43.96	N
048B00111N	POOR FORK CUMBERLAND RIVER	Fair	96.6	No	6	6	7	0	43.96	N
048B00112N	POOR FORK CUMBERLAND RIVER	Fair	84.6	No	6	6	7	0	43.96	N
048B00113N	POOR FORK CUMBERLAND RIVER	Good	84.7	No	7	7	7	0	43.96	N
048B00114N	POOR FORK CUMBERLAND RIVER	Fair	96.6	No	6	7	7	0	43.96	N
048B00115N	POOR FORK CUMBERLAND RIVER	Fair	96.6	No	6	7	6	0	43.96	N
048B00116N	POOR FORK CUMBERLAND RIVER	Fair	82.3	No	5	6	7	0	43.96	N
048B00117N	POOR FORK CUMBERLAND RIVER	Fair	72.4	No	6	5	7	0	43.96	N

Mainline Bridge Information										
Bridge ID	Feature Intersect	NBIS Classification	Sufficiency Rating	Substandard	Deck Rating	Superstructure Rating	Substructure Rating	Under Clearance (feet)	Horizontal Clearance (feet)	Culvert Rating
048B00118N	POOR FK CUMBERLAN D RVR	Fair	84.2	No	6	6	7	0	43.96	N
048B00119N	POOR FK CUMBERLAN D RVR	Fair	84.2	No	6	6	7	0	43.96	N
048B00120N	POOR FK CUMBERLAN D RVR	Fair	84.6	No	6	6	6	0	43.96	N
048B00121N	POOR FK CUMBERLAN D RVR	Fair	73.6	No	7	5	6	0	43.96	N
048B00122N	POOR FK CUMBERLAN D RVR	Fair	84.7	No	6	6	6	0	43.96	N
048B00123N	POOR FORK @ MP. 33.317	Fair	85.2	No	6	6	6	0	43.96	N
048B00124N	CLOVER LICK CREEK	Good	85.8	No	7	7	7	0	43.96	N
048B00126N	-KY 160- LOONEY CR	Fair	79	No	6	6	6	23	43	N
048B00160N	POOR FORK CUMBERLAN D RIV	Fair	82.5	No	6	7	7	0	43.96	N
048B00161N	POOR FORK CUMBERLAN D RIV	Good	90.1	No	7	7	7	0	43.96	N
048B00162N	POOR FORK CUMBERLAN D RIV	Fair	97.9	No	6	7	7	0	43.96	N
048B00163N	POOR FORK CUMBERLAN D RIV	Fair	89.1	No	6	7	7	0	43.96	N
048B00164N	POOR FORK CUMBERLAN D RIV	Fair	84.6	No	6	7	7	0	43.96	N
048B00165N	POOR FORK CUMBERLAN D RIV	Good	83.8	No	7	7	7	0	43.96	N
061B00080N (Culvert)	FIGHTING CREEK	Fair	52.5	No	N	N	N	0	39.7	6
061B00081L	BIG RICHLAND CREEK	Fair	99.6	No	6	7	6	0	39.7	N
061B00081R	BIG RICHLAND CREEK	Fair	99.6	No	6	7	7	0	40.2	N
061B00082L	LITTLE RICHLAND CREEK	Fair	98.6	No	5	7	7	0	40.1	N
061B00082R	LITTLE RICHLAND CREEK	Fair	99.6	No	6	7	7	0	40.3	N
061B00089L	CUMBERLAN D RIVER	Fair	94.7	No	6	7	7	0	40	N
061B00089R	CUMBERLAN D RIVER	Fair	94.7	No	6	7	6	0	40	N
061B00090R	CSX RAILWAY	Fair	98.8	No	6	7	7	23	41.99	N
061B00091L	STINKING CREEK	Fair	99.7	No	6	7	6	0	40	N
061B00091R	STINKING CREEK	Fair	99.7	No	6	7	6	0	40	N
061B00092L	TURKEY CREEK	Fair	99.7	No	6	7	7	0	39.7	N
061B00092R	TURKEY CREEK	Fair	99.7	No	6	7	7	0	39.7	N
061B00101N	CSX RAILROAD	Good	99.9	No	7	8	8	23.2	47.8	N

Mainline Bridge Information										
Bridge ID	Feature Intersect	NBIS Classification	Sufficiency Rating	Substandard	Deck Rating	Superstructure Rating	Substructure Rating	Under Clearance (feet)	Horizontal Clearance (feet)	Culvert Rating
063B00058L	CSX RAILROAD	Fair	95.4	No	6	7	6	15.5	38.5	N
063B00058R	CSX RAILROAD	Fair	95.4	No	6	7	7	15	38.5	N
067B00027N	North Fork KY River	Fair	48.9	No	6	7	5	0	25.92	N
067B00081N	North Fork KY River	Fair	76	No	7	6	6	23.5	47.9	N
067B00082N	N.FK. OF KENTUCKY RIVER	Fair	68	No	6	7	5	0	43.96	N
067B00083N	N Frk KY River & KY 3410	Fair	99.3	No	8	6	6	99.99	62.34	N
067B00120N (Culvert)	NORTH FK KY RIVER	Fair	89.3	No	N	N	N	0	71.85	6
067B00129N (Culvert)	US 119 RAMP	Good	92.4	No	N	N	N	16.42	99.9	7
067B00130N	Elkhorn Creek & KY 805	Good	97.2	No	7	8	7	24.1	81.69	N
067B00136N	PoorFrk Cumberland River	Good	100	No	7	7	7	99.99	48.33	N
067B00137N	CUMBERLAND RIVER	Good	100	No	7	8	7	99.99	48	N
067B00138N	CUMBERLAND RIVER	Good	95	No	8	8	8	99.99	48.33	N
067B00139N	CUMBERLAND RIVER	Good	100	No	7	7	7	99.99	48	N
067B00141N	CUMBERLAND RIVER	Good	99.7	No	7	7	7	99.99	48	N
067B00142N	—	Good	92.3	No	8	8	8	99.99	48	N
067B00143N	—	Good	90.3	No	8	8	8	99.99	40	N
098B00151N	CSX RR&Tug Frk Big Sandy	Fair	93.4	No	5	7	6	57	36	N
098B00176N	KY 1460 (Old US 23)	Good	77.1	No	7	7	8	99.99	39.7	N
098B00183L	SB US 23 Ramp	Good	96	No	7	7	7	99.99	39.7	N
098B00183R	SB US 23 Ramp	Fair	96	No	6	7	6	99.99	39.7	N
098B00184N	US 23	Good	93.5	No	7	7	7	16.58	28.22	N
098B00185L	KY 3496 (Old 23)	Fair	91	No	7	7	6	99.99	51.84	N
098B00185R	KY 3496 (Old 23)	Fair	96	No	7	7	6	99.99	51.84	N
098B00201L	POND CREEK	Fair	98	No	6	7	7	0	88	N
098B00201R	POND CREEK	Fair	98	No	6	7	7	0	88	N
098B00202L	ROAD FORK	Good	98	No	7	8	8	0	44.29	N
098B00202R	ROAD FORK	Good	98	No	7	8	7	0	44.29	N
098B00205N (Culvert)	CANEY CREEK	Fair	70	No	N	N	N	0	47.9	6
098B00206N (Culvert)	CANEY CREEK	Fair	70	No	N	N	N	0	87.93	6
098B00208N	CSX RR,KY 122,Shelby Crk	Fair	93.2	No	6	6	6	23.2	81.69	N
098B00209N	Shelby Creek	Fair	83.3	No	7	7	6	0	81.69	N
098B00210N	Shelby Creek	Fair	76.4	No	6	5	6	0	81.69	N
098B00211N	CSX RR,Levisa Frk,US 460	Good	82.2	No	7	7	7	18	82	N
098B00231N (Culvert)	ROB FORK	Fair	70	No	N	N	N	0	87.93	6
098B00241N	Chloe Crk-Mine Portal	Good	80	No	7	8	7	0	76	N

Mainline Bridge Information										
Bridge ID	Feature Intersect	NBIS Classification	Sufficiency Rating	Substandard	Deck Rating	Superstructure Rating	Substructure Rating	Under Clearance (feet)	Horizontal Clearance (feet)	Culvert Rating
098B00243N	KY 610 & Shelby Crk	Good	86.7	No	7	8	7	99.99	79.72	N
098B00251N	KY 3220 & Road Fork	Good	94.4	No	7	8	8	59.3	39.3	N
098B00252N	KY 3220 & Big Creek	Good	99.4	No	7	8	8	65.5	78.41	N
098B00256L	CSXRR, KY144 1, Raccoon Crk	Good	96	No	7	7	7	0	42	N
098B00256R	CSXRR, KY144 1, Raccoon Crk	Good	95.5	No	7	7	7	0	42	N
098B00257L	Winns Branch	Good	96	No	7	8	8	0	41.5	N
098B00257R	Winns Branch	Good	96	No	8	8	7	0	41.5	N
098B00258L	CSX RR, KY 194, Johns Crk	Good	95.8	No	7	7	7	0	54	N
098B00258R	CSX RR, KY 194, Johns Crk	Good	96	No	8	7	7	0	42	N
098B00259N	US 119	Good	96	No	8	8	8	0	60	N
098B00260L	US 119 Approach	Good	96	No	8	8	7	0	42	N
098B00260R	US 119 Approach	Good	96	No	8	8	7	0	42	N
098B00261L	KY 1426 Ramp	Fair	96	No	7	7	6	99.99	50	N
098B00261R	KY 1426 Ramp	Fair	96	No	7	7	6	99.99	50	N
098B00262N (Culvert)	BENT BRANCH	Fair	85	No	N	N	N	0	52	6
098B00273N	US 23	Good	99	No	8	8	8	18	32.5	N

Structures Crossing Over the Corridor			
Bridge ID	Facility Carried	Under Clearance (feet)	Horizontal Clearance (feet)
063B00039L	I-75 NC	15.5	38.39
063B00039R	I-75	16.25	38.39
098B00164N	KY-1384	16.75	67.91
098B00253N	KY 3220	22.3	33.5
007B00140N	PED PINEVILLE Hospital	16.40	35.76
048B00125N	Pedestrian overpass	17.50	37.50
048R00600N	CSX Railroad	15.25	0.00
098R00616N	CSX Railroad	21.00	41.99

Other Noteworthy Condition: Tunnel/box culvert at US 199 and US 23 interchange at Payne Gap.

TRAFFIC & OPERATIONS

AADT & AADTT: The table below summarizes the 2015 AADT and daily truck volumes by sub-segment.

Traffic Volumes			
Sub-segment	AADT	AADTT	Truck Percentage
From I-75 to the US 25 E/US 119 intersection in Pineville	11,200	1,600	14% ¹
From the US 25 E/US 119 intersection in Pineville to KY 15 in Whitesburg	3,000	400	13%
From KY 15 in Whitesburg to the WV state line	10,900	1,300	12% ²

^{1,2} Truck percentage obtained from KYTC Traffic Count Reporting System

Mobility: There are three major traffic bottleneck sections along this corridor segment. See the table below for details. (Note: bottlenecks are identified by Level of Travel Time Reliability (LOTR) > 1.5 or volume/capacity (v/c) > 0.6.) There are also a few additional isolated traffic bottlenecks along this corridor. Other than the noted traffic bottleneck sections/locations, traffic condition is acceptable along the remainder of this segment.

Existing Typical Roadway Attributes at Major Traffic Bottlenecks					
Locations	Functional Classification	Number & Width of Lanes	Median Width	Shoulder Width	2015 AADT ¹
<u>Major Bottleneck 1:</u> From I-75 to KY 3041	Principal Arterial	4, 12'	24-40'	4-10'	19,389
<u>Major Bottleneck 2:</u> From KY 3404 (Colliers Creek Rd) to Cumberland Coal Rd east of Cumberland	Principal Arterial	2, 11'	None	10'	708
<u>Major Bottleneck 3:</u> From US 460 south of Pikeville to the US 119/US 23 intersection in north Pikeville	Principal Arterial	4, 12'	12-20'	2-12'	24,143

1) The highest traffic volume within the bottleneck based on KYSTMv18 data.

Safety: 2.5% of the corridor mileage has a Level of Safety of Service (LOSS) of 4, meaning these links have the highest potential to decrease crashes. (Note: LOSS indicates the potential for crash reduction and is broken up into four categories based on Safety Performance Functions (SPFs): LOSS 4 = high; LOSS 3 = moderate to high; LOSS 2 = low to moderate; LOSS 1 = low.) See the table under **Potential Safety Improvement** section for details of locations with LOSS =4, possible causes, and potential safety improvements.

ITS Devices: Approximately 14% of the corridor length has direct access to fiber through the KentuckyWired project.

PROPOSED IMPROVEMENT CONCEPTS

The improvement options noted in this report are not intended to be all-encompassing. Other potential improvements are possible, including innovative solutions that could be cost-effective and address the reasons for improvement. Further study may be needed as part of the project development process.

Proposed Typical Section & Description of Modification: The table below describes the proposed improvement concepts for the identified bottlenecks. The proposed improvements expect to maintain an overall acceptable traffic condition through 2045 ($v/c < 0.85$ in urban areas and $v/c < 0.7$ in rural areas) and address safety issues at bottlenecks.

Proposed Improvement Concepts			
Locations	Improvement Concepts ¹	Notes ²	Reason for Improvement
<u>Major Bottleneck 1:</u> From I-75 to KY 3041	Intersection improvements and access management	See the Major Intersections for Potential Modification section below	LOTTR exceeds the established thresholds
From US 25E (in Pineville) to KY 72 (in Harlan)	Improve shoulders and widen lanes to match the upgraded section between Harlan and Oven Fork, and spot improvements	Improved Typical Section: 2-12' lanes with 8' paved shoulders	This is a systemic safety issue
<u>Major Bottleneck 2:</u> From KY 3404 (Colliers Creek Rd) to Cumberland Coal Rd east of Cumberland	Spot improvements for intersections, access points and truck climbing lanes	Due to the topography and low v/c ratio, widening is not recommended for this section	LOTTR exceeds the established thresholds
<u>Major Bottleneck 3:</u> From US 460 south of Pikeville to the US 119/US 23 intersection in north Pikeville	Spot improvement at major intersections and access management	See the Major Intersections for Potential Modification section below	LOTTR exceeds the established thresholds

1) The proposed roadway widening concept includes spot improvements at interchanges and major intersections as needed (see details in Interchanges for Potential Modification and Major Intersection for Potential Modification sections below).

2) Improved typical sections are based on KYTC Highway Design Manual.

Potential New Interchanges: None.

Interchanges for Potential Modification: None.

Major Intersections for Potential Modification: Improvements, such as additional turn lanes, channelization, and coordinated signal timing, should be considered at 17 major intersections for this corridor segment. The following is a list of these intersections.

Major Intersections for Potential Modification			
American Greeting Card Rd	Master St	US Highway 25 W	KY 1426
KY 1629	KY 3496	KY 3041	KY 1460
Old 25 E	KY 3495	W Tennessee Ave	US 119
Highway 66	Toler Rd	US Highway 25 E	Forest Hills Rd
S US Highway 421			

Bridges: Bridge recommendations are based on ratings of substructure, superstructure and deck using the following methodology.

Methodology for Replacement/Rehabilitation Recommendation					
Structures	Substructure Rating	Superstructure Rating	Deck Rating	Culvert Rating	Recommendations
Bridges	<=4	Any	Any	/	Replacement
	=5	Any	Any	/	Rehabilitation
	>=6	<=5	Any	/	Rehabilitation
	>=6	Any	<=5	/	Rehabilitation
	>=6	>=6	>=6	/	None ¹
Culverts	/	/	/	<=4	Replacement
	/	/	/	5 or 6	Rehabilitation
	/	/	/	>=7	None

1) If the bridge is on a corridor with a recommendation of widening, it will be widened (considered as rehabilitation) as necessary to accommodate the additional proposed lanes.

- **Bridges for Rehab/Widening:** Rehab/widening is recommended for a total of 12 bridges and one culvert along the entire corridor. Note that the bridge rehab is determined based on the "Methodology for Replacement/Rehabilitation Recommendation" table above. If the bridge has a good condition but is within a bottleneck location with recommended widening, it will be widened as necessary to accommodate the additional proposed lanes and the cost of widening is assumed to be the same as bridge rehab for the planning-level cost estimation purpose.

Bridges for Rehab/Widening	
Bridge ID	Feature Intersect
007B00002N (Culvert)	TURKEY CREEK SLOUGH
007B00130L	KY 2014,CUMBERLAND RIVER
048B00065N	KY 413 & POOR FK CMBRL R
048B00100N	POOR FORK CUMBERLAND RIV
048B00101N	POOR FORK CUMBERLAND RIV
048B00107N	POOR FK CUMBERLAND RVR
048B00116N	POOR FK CUMBERLAND RVR
048B00117N	POOR FK CUMBERLAND RVR
048B00121N	POOR FK CUMBERLAND RVR
061B00082L	LITTLE RICHLAND CREEK
067B00082N	N.FK. OF KENTUCKY RIVER
098B00151N	CSX RR&Tug Frk Big Sandy
098B00210N	Shelby Creek

- **Bridges for Replacement:** None.

Pavement Treatment: The overall pavement condition is good (average PDI = 0.29). Proposed additional lanes will consist of full depth asphalt pavement construction. Spot reconstruction and rehabilitation of existing asphalt pavement lanes might be needed based on more detailed evaluation of the corridor's pavement condition.

Potential Safety Improvement: The table below summarizes safety issues for the corridor and is based on KYTC safety data (LOSS value = 4), as well as a cursory review of Google Aerial imagery. The table identifies clusters of links with a LOSS value of 4 based on two categories: 1) clusters located in areas where this study already recommends corridor improvements for mobility reasons and 2) clusters not located in areas previously recommended for corridor mobility improvements. For Category 1, it is assumed any corridor improvement based on mobility needs will be constructed to current KYTC standards and will include the necessary safety improvements. Category 2 is intended to identify corridor segments that may warrant improvement for safety reasons, even though improvement might not be needed for mobility. There may also be isolated links with LOSS value of 4 that are not included in the table. Spot improvements could be warranted for those locations but it is assumed these spot improvements do not rise to the level of a corridor improvement; therefore, these locations are not addressed in this planning study. The table further breaks the clusters down by urban and rural designation (based on KYSTMv18 data) because urban and rural roadways tend to have unique typical crash causes and countermeasures.

Potential Safety Improvements			
Category	Locations	Possible Causes	Recommendations
CAT 1: Major clusters of safety issues covered by proposed improvement concepts	Shoemaker Road to US 421 near Harlan, KY	Lane drop, high speeds, multiple access points without left turn lanes and winding road	Improve shoulders and lane widths, add signal warning flashers on high speed segments approaching signals, add turn lanes
CAT 2: Other major clusters of safety issues	N/A	N/A	N/A

Proposed Phasing: The proposed spot improvements at major intersections could be phased geographically: one phase for Laurel and Knox Counties, one phase for Bell, Harlan, and Letcher Counties, and another phase for Pike County.

PRELIMINARY ENVIRONMENTAL RED FLAG ANALYSIS

The table below summarizes the presence of critical environmental red flag concerns approved by KYTC within 1,000 ft of proposed improvement locations (Y=Yes; N=No).

Critical Red Flag Issues/Concerns				
Environmental Red Flag Features	<u>Major Bottleneck 1:</u> From I-75 to KY 3041	From US 25E (in Pineville) to KY 72 (in Harlan)	<u>Major Bottleneck 2:</u> From KY 3404 (Colliers Creek Rd) to Cumberland Coal Rd east of Cumberland	<u>Major Bottleneck 3:</u> From US 460 south of Pikeville to the US 119/US 23 intersection in north Pikeville
Superfunds	N	N	N	N
Special Waters ¹	N	N	Y	Y
Forested Areas	N	Y	Y	Y
NLEB Habitat Priority	Y	Y	Y	Y
IB Habitat Priority Area	N	Y	Y	N
FAA Airport Runways	N	Y	N	N
Public Hunting Areas	N	N	Y	N
Wildlife Management Areas	N	N	Y	N
Local Parks	N	Y	N	N
State/ National Parks	N	Y	N	N
Kentucky Heritage Land Conservation Fund	N	N	N	N
Area Landmarks	Y	Y	N	Y
Point Landmarks	Y	Y	Y	Y
National Register of Historic Places Location (Point)	N	Y	N	Y
National Register of Historic Places Location (Polygon)	N	N	N	Y

1) Special Waters are defined as Cold Water Aquatic Habitats, Outstanding State/National Resource Waters, Exceptional Waters, State Wild Rivers, and Federally Designated Wild / Scenic Rivers.

RIGHT OF WAY IMPACTS

The table below summarizes the potential right-of-way (ROW) needs for proposed improvement concepts.

Potential Needs of Additional Right of Way		
Location	Improvement Concepts	Potential Needs of Additional ROW
<u>Major Bottleneck 1:</u> I-75 to KY 3041	Intersection improvements and access management	No
From US 25E (in Pineville) to KY 72 (in Harlan)	Improve shoulders and widen lanes to match the upgraded section between Harlan and Oven Fork, and spot improvements	Yes
<u>Major Bottleneck 2:</u> KY 3404 (Colliers Creek Rd) to Cumberland Coal Rd east of Cumberland	Spot improvements for intersections, access points and truck climbing lanes	Yes
<u>Major Bottleneck 3:</u> US 460 south of Pikeville to the US 119/US 23 intersection in north Pikeville	Spot improvements at major intersections and access management	Potentially
Intersection modifications at Old 25 E, Forest Hills Rd, Toler Rd	Improvements such as additional turn lanes, channelization, and coordinated signal timing	Yes
Intersection modifications at US Highway 25 W, KY 1629, Highway 66, S US Highway 421, W Tennessee Ave, US Highway 25 E, US 119, KY 1460, KY 1426, Cedar Creek Rd, Colliers Creek Rd	Improvements such as additional turn lanes, channelization, and coordinated signal timing	No
Intersection modifications at American Greeting Card Rd, KY 3041, KY 3495, KY 3496	Improvements such as additional turn lanes, channelization, and coordinated signal timing	Potentially

COST ESTIMATION

Design:	6.0 (\$M)
ROW:	8.5 (\$M)
Utility:	6.0 (\$M)
Construction:	<u>59.5 (\$M)</u>
TOTAL =	79.9 (\$M)

Note:

1. The cost estimation may not include additional costs to address the potential impacts of major utilities (e.g., gas line, major water supplier, transmission line) within the proximity of the corridor, due to the lack of data when the report was prepared. Further investigation is recommended in future studies.
2. Cost estimation was based on 2020 dollars. There is a 1-3% inflation rate. Estimated cost could vary -50% to +250% of the actual number (as a rule of thumb).
3. The widening of a 2-lane facility to a 3-lane facility (with TWLTL or alternating passing lane) is considered as "Minor Widening (Undivided Road) - 2 Lane to 4 Lane".

4. The cost estimation does not include bridges outside of the bottleneck locations, as they are not assumed to rise to the level of a corridor improvement. The cost estimation only includes necessary bridge replacement/rehab/widening costs within the bottleneck locations with proposed widening improvement. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
5. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
6. Shoulder widening is not included in the cost estimation, as it is a relatively minor cost.
7. If multiple improvement concepts are recommended for the corridor, only the cost of the larger-scale improvement concept is estimated.

Kentucky Statewide Corridor Plan (Linking Kentucky)

Route: US 23
Segment ID: 23
From: Ohio State Line
To: US 119 near Pikeville
Counties: Greenup, Boyd, Lawrence, Johnson, Floyd, Pike
Highway Districts: 9 and 12

CORRIDOR SEGMENT OVERVIEW

Segment 23 on US 23 begins at the US 23/Ohio state line in Greenup County and extends south through Boyd, Lawrence, Johnson and Floyd Counties to US 119 in Pike County. The corridor segment length is approximately 125 miles and currently contains four interchanges.

This segment passes through the residential and commercial areas of the cities of Ashland in Boyd County, Louisa in Lawrence County, Paintsville in Johnson County and Prestonsburg in Floyd County. These areas would be considered towns (according to KYSTMv18 data) with clusters of homes and commercial buildings adjacent to US 23. The remainder of this segment passes through rural agricultural areas with homes and businesses interspersed along US 23.

EXISTING FACILITY

The table below outlines the typical roadway attributes for this section of US 23 by sub-segment.

Typical Roadway Attributes					
Sub-segment	Functional Classification	Number & Width of Lanes	Shoulder & Width	Median Type & Width	Posted Speed Limit
From the Ohio state line to the Boyd/Lawrence County Line	Principal Arterial Other	2-4, 12'	Asphalt (4-14'), Asphalt Combination (3-10'), Curbed (0-11'), None	Concrete Barrier (10-13'), Depressed (30-50'), Flush (4-18'), Guardrail Barrier (10-24'), Raised Mountable (4-30'), Raised Non Mountable (12-36'), None	35-55 mph
From the Boyd/Lawrence County Line to the Johnson/Floyd County Line	Principal Arterial Other	4-6, 12'	Asphalt (3-10'), Asphalt Combination (5'), Curbed (3'), None	Concrete Barrier (14-15'), Flush (14-20'), Depressed (14-50'), Raised Mountable (14-20'), None	45-55 mph
From the Johnson/Floyd County Line to US 119 near Pikeville	Principal Arterial	2-6, 12'	Asphalt (4-12'), Asphalt Combination (8-10'), Curbed (2'), None	Concrete Barrier (10-14'), Flush (9-38'), Raised Non Mountable (5'), Raised Mountable (14-38'), None	40-55 mph

Right of Way: The table below outlines the general width of existing right of way within the corridor.

General Existing Right of Way Widths		
From	To	General Ex. R/W Width
Ohio State Line	KY 1043	140' – 240'
KY 1043	KY 827	260' – 300'
KY 827	US 119 near Pikeville	90' – 220'

Pavement: The average PDI (Pavement Distress Index) for this section of US 23 is 0.42, which indicates an overall fair pavement condition according to KYTC criteria (Good: 0.00 – 0.35; Fair: 0.36 – 0.65; Poor: 0.66 – 0.99).

Intersections/Interchanges: The tables below outline the existing interchanges and major intersections, and railroad crossings on the corridor.

Interchanges	Interchange Type
I-64	Diamond
US 460/KY 40	Diamond
KY 114	Partial Cloverleaf
KY 80	Diamond

Major Intersections ¹			
US 119	KY 993	Center St	Kenwood Dr
Stone Coal Creek Rd	KY 3224	Blackburn Ave	Ferry St
Cowpen Rd	KY 645	Winchester Ave	Argillite Rd
KY 3218	KY 1760	29 th St	Pond Run Rd
Owsley Rd	KY 2565	22 nd St	Caroline Rd
KY 680	Cut thru to Hwy 23	15 th St	Wurtland Ave
Ivel Coal Company	KY 3	14 th St	KY Hwy 503
KY 1426	KY 3398	11 th St	Industrial Pkwy
KY 1428	KY 707	10 th St	E Main St
KY 1427	Durbin Rd	Winchester Ave	E K Rd
KY 1428	Old US Route 23	Town Center Dr	KY Hwy 2
KY 1100	Old US 23 Spur	KY Hwy 2538	Coal Br Rd
Bays Branch Rd	Whites Crk	River Hill Dr	AA Hwy
KY 1750	St Route 3	Hoods Creek Pike	Little Rocky Rd
Main St	KY 538	Bellefonte Princess Rd	Johnson Ln
OLD US 23	35 th St	Diederick Rd	KY 201
23 rd St Underpass	Ashland Dr	KY 1559	St Route 168
Bellefonte St			

1) Only crossroads with function classification of Minor Collector or above are included.

At-grade Railroad Crossings
None

Access Points: This segment is not access controlled. Throughout the corridor, there are residential and commercial driveways and intersecting roadways.

Bridges: The tables below outline the detailed Bridge information for existing bridges on or over this section of US 23.

Mainline Bridge Information										
Bridge ID	Feature Intersect	NBIS Classification	Sufficiency Rating	Substandard	Deck Rating	Superstructure Rating	Substructure Rating	Under Clearance (feet)	Horizontal Clearance (feet)	Culvert Rating
010B00001R	HOODS CREEK	Fair	83	No	7	7	6	0	29.86	N
010B00063R	CSX RAILROAD	Fair	83	No	6	7	7	20.08	29.86	N
010B00071N	I-64	Fair	72	No	6	5	5	18.17	98.5	N
036B00037L	C&O RAILROAD 184 09	Fair	91	No	6	6	6	99.99	44.95	N
036B00037R	CSX RR & CR 5070	Fair	91	No	7	6	7	99.99	44.95	N
036B00038L	LEVISA FORK	Fair	100	No	8	6	7	0	36	N
036B00038R	LEVISA FORK OF BIG SANDY	Fair	100	No	8	6	6	0	36	N
036B00039N (Culvert)	BULL CREEK	Fair	74.5	No	N	N	N	0	63.98	6
036B00113N (Culvert)	BULL CREEK	Fair	92.2	No	N	N	N	0	36.42	6
036B00115N (Culvert)	BULL CREEK	Fair	92.2	No	N	N	N	0	33.79	6
036B00130N	KY 114 @ MP 11.2	Good	80	No	7	7	7	16.92	99.9	N
036B00131N	CSX RR, MIDDLE CK, CO. ROAD	Fair	87.8	No	7	6	6	99.99	81.69	N
036B00132N	CSX RR, MIDDLE CREEK, CO. R	Fair	93.2	No	6	6	6	99.99	24.93	N
036B00133N	ABBOTT CREEK	Good	81.3	No	7	7	7	0	81.69	N
036B00134N (Culvert)	LITTLE PAINT CREEK	Good	83.5	No	N	N	N	0	84.97	7
045B00037N	LITTLE SANDY RIVER	Fair	73.1	No	6	5	5	0	43.2	N
045B00049N	TYGARTS CREEK	Fair	85	No	6	7	7	0	88.25	N
045B00052N (Culvert)	POND RUN CREEK	Good	80.6	No	N	N	N	0	71.85	7
045B00086N	OHIO RIVER	Fair	69.4	Yes	7	6	6	99.99	26	N
058B00050L	TOMS CREEK	Fair	100	No	6	6	7	0	43.96	N
058B00050R	TOMS CREEK	Fair	89	No	6	6	5	0	43.96	N
058B00069L	LICK FK-CSX RR-KY825	Good	96	No	7	7	7	99.99	37.73	N
058B00069R	LICK FK-CSX RR-KY825	Fair	96	No	7	7	6	99.99	37.73	N
058B00070L	Jennys Creek	Fair	95	No	6	7	7	0	38	N
058B00070R	Jennys Creek	Fair	95	No	6	7	7	0	38	N
058B00075L	PAINT CREEK	Fair	95	No	7	7	6	16.5	41.99	N
058B00075R	PAINT CREEK	Fair	95	No	7	7	6	16.5	41.99	N
058B00076L	KY 40	Fair	100	No	6	7	6	99.99	39.7	N
058B00076R	KY 40	Fair	100	No	6	6	6	99.99	40	N
058B00077N	Paint Creek	Fair	90.9	No	7	8	6	0	29	N
064B00007N (Culvert)	RHUBENS CREEK	Good	69	No	N	N	N	0	23.95	7
064B00008N (Culvert)	GEORGE CREEK	Good	69	No	N	N	N	0	23.95	7
064B00009N (Culvert)	GEORGE CREEK	Good	67.3	No	N	N	N	0	23.95	7
064B00010N (Culvert)	GEORGE CREEK	Fair	68	No	N	N	N	0	23.95	6

Mainline Bridge Information										
Bridge ID	Feature Intersect	NBIS Classification	Sufficiency Rating	Substandard	Deck Rating	Superstructure Rating	Substructure Rating	Under Clearance (feet)	Horizontal Clearance (feet)	Culvert Rating
064B00011N (Culvert)	GEORGES CREEK	Fair	69	No	N	N	N	0	92	6
064B00012N (Culvert)	GEORGE CREEK	Fair	69	No	N	N	N	0	23.95	6
064B00013N (Culvert)	GEORGE CREEK	Fair	69	No	N	N	N	0	23.95	6
064B00055L	BEAR CREEK @ BUCHANAN	Fair	100	No	6	6	6	0	40.68	N
064B00055R	BEAR CREEK @ BUCHANAN	Fair	100	No	6	6	6	0	40.68	N
064B00056L	BLAINE CREEK	Fair	99	No	5	6	6	0	40.03	N
064B00056R	BLAINE CREEK	Fair	99	No	5	6	6	0	40.03	N
064B00077N	KY 32	Fair	97.5	No	6	7	6	99.99	81.69	N

Structures Crossing Over the Corridor			
Bridge ID	Facility Carried	Under Clearance (feet)	Horizontal Clearance (feet)
036B00114N	KY-80	16.42	69.55
098R00604N	CSX RR	17.00	45.75

Other Noteworthy Conditions: None.

TRAFFIC & OPERATIONS

AADT & AADTT: The table below summarizes the 2015 AADT and daily truck volumes by sub-segment.

Traffic Volumes			
Sub-segment	AADT	AADTT	Truck Percentage
From US 119 in Pikeville to US 460 in Paintsville	12,700	1,900	15% ¹
From US 460 in Paintsville to I-64 south of Ashland	7,100	1,300	18% ²
From I-64 south of Ashland to KY 10 (AA Hwy) north of Greenup	14,900	1,800	12%
From KY 10 (AA Hwy) north of Greenup to the OH state line	7,600	1,000	13% ³

^{1, 2, 3} Truck percentage obtained from KYTC Traffic Count Reporting System

Mobility: There are three major traffic bottleneck sections along this corridor segment. See the table below for details. (Note: bottlenecks are identified by Level of Travel Time Reliability (LOTTR) > 1.5 or volume/capacity (v/c) > 0.6.) There are also a few additional isolated traffic bottlenecks along this corridor. Other than the noted traffic bottleneck sections/locations, traffic condition is acceptable along the remainder of this segment.

Existing Typical Roadway Attributes at Major Traffic Bottlenecks					
Locations	Functional Classification	Number & Width of Lanes	Median Width	Shoulder Width	2015 AADT ¹
<u>Major Bottleneck 1:</u> From US 119 in Pikeville to KY 680 northwest of Pikeville	Principal Arterial	4-6, 12'	5-15'	0-12'	14,736
<u>Major Bottleneck 2:</u> From KY 80 (Water Gap Rd) to 0.7 mile west of KY 80 north of Allen	Principal Arterial	4, 12'	12'	0-10'	23,183
<u>Major Bottleneck 3:</u> From Winchester Ave in Ashland to KY 207 (Argillite Rd) in Flatwoods	Principal Arterial	4, 12'	0-16'	0-10'	34,484

1) The highest traffic volume within the bottleneck based on KYSTMv18 data.

Safety: 2.7% of the corridor mileage has a Level of Safety of Service (LOSS) of 4, meaning these links have the highest potential to decrease crashes. (Note: LOSS indicates the potential for crash reduction and is broken up into four categories based on Safety Performance Functions (SPFs): LOSS 4 = high; LOSS 3 = moderate to high; LOSS 2 = low to moderate; LOSS 1 = low.) See the table under **Potential Safety Improvement** section for details of locations with LOSS =4, possible causes, and potential safety improvements.

ITS Devices: Approximately 9% of the corridor length has direct access to fiber through the KentuckyWired project.

PROPOSED IMPROVEMENT CONCEPTS

The improvement options noted in this report are not intended to be all-encompassing. Other potential improvements are possible, including innovative solutions that could be cost-effective and address the reasons for improvement. Further study may be needed as part of the project development process.

Proposed Typical Section & Description of Modification: The table below describes the proposed improvement concepts for the identified bottlenecks. The proposed improvements expect to maintain an overall acceptable traffic condition through 2045 ($v/c < 0.85$ in urban areas and $v/c < 0.7$ in rural areas) and address safety issues at bottlenecks.

Proposed Improvement Concepts			
Location	Improvement Concepts ¹	Notes ²	Reason for Improvement
<u>Major Bottleneck 1:</u> From US 119 in Pikeville to KY 680 northwest of Pikeville	Spot improvements at major intersections	See the Major Intersections for Potential Modification section below	This segment has multiple bottlenecks due to poor LOTTR
<u>Major Bottleneck 2:</u> From KY 80 (Water Gap Rd) to 0.7 mile west of KY 80 north of Allen	Spot improvements at major intersections	See the Major Intersections for Potential Modification section below	This segment has multiple bottlenecks due to poor LOTTR
<u>Major Bottleneck 3:</u> From Winchester Ave in Ashland to KY 207 (Argillite Rd) in Flatwoods	Widen to a 6-lane divided section with access management	3-12' lanes in each direction with 8' shoulders and concrete median barrier	This entire section is a bottleneck and operates at an unacceptable 2045 v/c
Downtown Ashland between the US 23X intersections	Access management	Reduce number of access points and driveways	This segment has multiple bottlenecks due to poor LOTTR which could be improved by reducing access points

1) The proposed roadway widening concept includes spot improvements at interchanges and major intersections as needed (see details in Interchanges for Potential Modification and Major Intersection for Potential Modification sections below).

2) Improved typical sections are based on KYTC Highway Design Manual.

Potential New Interchanges: None.

Interchanges for Potential Modification: None.

Major Intersections for Potential Modification: Improvements, such as additional turn lanes, channelization, and coordinated signal timing, should be considered at 31 major intersections for this corridor segment. The following is a list of these intersections

Major Intersections for Potential Modification			
US 119	KY 3	Diederick Blvd	Stone Coal Creek Rd
Cowpen Rd	Winchester Ave	Ashland Dr	Bellefonte Princess Rd
KY 3218	29 th St	Bellefonte St	KY 1559
KY 680	15 th St	Kenwood Dr	Hoods Creek Pike
KY 1428	14 th St	Ferry St	Industrial Pkwy
AA Hwy	Winchester Ave	Argillite Rd	River Hill Dr
Bays Branch Rd	Town Center Dr	Pond Run Rd	KY 1428
KY 1750	E Kentucky Rd	Wurtland Ave	

Bridges: Bridge recommendations are based on ratings of substructure, superstructure and deck using the following methodology.

Methodology for Replacement/Rehabilitation Recommendation					
Structures	Substructure Rating	Superstructure Rating	Deck Rating	Culvert Rating	Recommendations
Bridges	<=4	Any	Any	/	Replacement
	=5	Any	Any	/	Rehabilitation
	>=6	<=5	Any	/	Rehabilitation
	>=6	Any	<=5	/	Rehabilitation
	>=6	>=6	>=6	/	None ¹
Culverts	/	/	/	<=4	Replacement
	/	/	/	5 or 6	Rehabilitation
	/	/	/	>=7	None

1) If the bridge is on a corridor with a recommendation of widening, it will be widened (considered as rehabilitation) as necessary to accommodate the additional proposed lanes.

- **Bridges for Rehab/Widening:** Rehab/widening is recommended for a total of seven bridges along the entire corridor. Note that the bridge rehab is determined based on the "Methodology for Replacement/Rehabilitation Recommendation" table above. If the bridge has a good condition but is within a bottleneck location with recommended widening, it will be widened as necessary to accommodate the additional proposed lanes and the cost of widening is assumed to be the same as bridge rehab for the planning-level cost estimation purpose.

Bridges for Rehab/Widening	
Bridge ID	Feature Intersection
010B00071N	I-64
045B00037N	LITTLE SANDY RIVER
058B00050R	TOMS CREEK
064B00056L	BLAINE CREEK
064B00056R	BLAINE CREEK
010B00001R	HOODS CREEK
010B00063R	CSX RAILROAD

- **Bridges for Replacement:** None.

Pavement Treatment: The overall pavement condition is fair (average PDI = 0.42). Proposed additional lanes will consist of full depth asphalt pavement construction. Spot reconstruction and rehabilitation of existing asphalt pavement lanes will be needed based on more detailed evaluation of the corridor's pavement condition.

Potential Safety Improvement: The table below summarizes safety issues for the corridor and is based on KYTC safety data (LOSS value = 4), as well as a cursory review of Google Aerial imagery. The table identifies clusters of links with a LOSS value of 4 based on two categories: 1) clusters located in areas where this study already recommends corridor improvements for mobility reasons and 2) clusters not located in areas previously recommended for corridor mobility improvements. For Category 1, it is assumed any corridor improvement based on mobility needs will be constructed to current KYTC standards and will include the necessary safety improvements. Category 2 is intended to identify corridor segments that may warrant improvement for safety reasons, even though improvement might not be

needed for mobility. There may also be isolated links with LOSS value of 4 that are not included in the table. Spot improvements could be warranted for those locations but it is assumed these spot improvements do not rise to the level of a corridor improvement; therefore, these locations are not addressed in this planning study. The table further breaks the clusters down by urban and rural designation (based on KYSTMv18 data) because urban and rural roadways tend to have unique typical crash causes and countermeasures.

Potential Safety Improvements			
Category	Locations	Possible Causes	Recommendations
CAT 1: Major clusters of safety issues covered by proposed improvement concepts	KY 2565	Major signalized intersection and approaches with high speeds	Intersection improvements
CAT 2: Other major clusters of safety issues	<u>RURAL</u> 49 th Street to Railroad Ave (Ashland, KY)	<u>RURAL</u> Access points need a left turn lane, high speeds and railroad running next to roadway includes railroad crossings on all eastern side streets	<u>RURAL</u> Access management and added left turn lanes

Proposed Phasing: The intersections proposed for spot improvements between Winchester Avenue in Ashland and KY 207 (Argillite Rd) in Flatwoods will be improved at the same time the roadway is widened. The remaining spot improvements at major intersections could be phased geographically: one phase for Greenup County for the intersections and improvements north of Winchester Avenue in Ashland, and one phase for Boyd, Lawrence, Johnson, Floyd, and Pike Counties for the intersections and improvements south of KY 207 in Flatwoods.

PRELIMINARY ENVIRONMENTAL RED FLAG ANALYSIS

The table below summarizes the presence of critical environmental red flag concerns approved by KYTC within 1,000 ft of proposed improvement locations (Y=Yes; N=No).

Critical Red Flag Issues/Concerns			
Environmental Red Flag Features	Major Bottleneck 1: From US 119 in Pikeville to KY 680 northwest of Pikeville	Major Bottleneck 3: From Winchester Ave in Ashland to KY 207 (Argillite Rd) in Flatwoods	Downtown Ashland between the US 23X intersections
Superfunds	N	N	N
Special Waters ¹	N	N	N
Forested Areas	Y	N	Y
NLEB Habitat Priority	Y	N	N
IB Habitat Priority Area	N	N	N
FAA Airport Runways	N	N	N
Public Hunting Areas	N	N	N
Wildlife Management Areas	N	N	N
Local Parks	N	Y	Y
State/ National Parks	N	N	N
Kentucky Heritage Land Conservation Fund	N	N	N
Area Landmarks	N	N	N
Point Landmarks	Y	Y	Y
National Register of Historic Places Location (Point)	N	Y	Y
National Register of Historic Places Location (Polygon)	N	N	Y

1) Special Waters are defined as Cold Water Aquatic Habitats, Outstanding State/National Resource Waters, Exceptional Waters, State Wild Rivers, and Federally Designated Wild / Scenic Rivers.

RIGHT OF WAY IMPACTS

The table below summarizes the potential right-of-way (ROW) needs for proposed improvement concepts.

Potential Needs of Additional Right of Way		
Location	Improvement Concepts	Potential Needs of Additional ROW
Major Bottleneck 3: From Winchester Ave in Ashland to KY 207 (Argillite Rd) in Flatwoods	Widen to a 6-lane divided section with access management	Yes
Downtown Ashland between the US 23X intersections	Access management	No
Intersection Improvements at Wurtland Ave	Improvements, such as additional turn lanes, channelization, and coordinated signal timing	Yes
Intersection Improvements at AA Highway, Pond Run Rd, Industrial Pkwy, KY 680, US 119	Improvements, such as additional turn lanes, channelization, and coordinated signal timing	No
Intersection Improvements at E Kentucky Rd, KY 3, KY 1559, Bays Branch Rd, KY 1750, KY 1428 (Stonewall Road), KY 1428, KY 3218, Cowpen Rd, Stone Coal Creek Rd	Improvements, such as additional turn lanes, channelization, and coordinated signal timing	Potentially

COST ESTIMATION

Design:	14.3 (\$M)
ROW:	12.5 (\$M)
Utility:	12.4 (\$M)
Construction:	<u>149.6 (\$M)</u>
TOTAL =	188.7 (\$M)

Note:

1. The cost estimation may not include additional costs to address the potential impacts of major utilities (e.g., gas line, major water supplier, transmission line) within the proximity of the corridor, due to the lack of data when the report was prepared. Further investigation is recommended in future studies.
2. Cost estimation was based on 2020 dollars. There is a 1-3% inflation rate. Estimated cost could vary -50% to +250% of the actual number (as a rule of thumb).
3. The widening of a 2-lane facility to a 3-lane facility (with TWLTL or alternating passing lane) is considered as "Minor Widening (Undivided Road) - 2 Lane to 4 Lane".
4. The cost estimation does not include bridges outside of the bottleneck locations, as they are not assumed to rise to the level of a corridor improvement. The cost estimation only includes necessary bridge replacement/rehab/widening costs within the bottleneck locations with proposed widening improvement. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
5. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
6. Shoulder widening is not included in the cost estimation, as it is a relatively minor cost.
7. If multiple improvement concepts are recommended for the corridor, only the cost of the larger-scale improvement concept is estimated.

Kentucky Statewide Corridor Plan (Linking Kentucky)

Route: US 27
Segment ID: 27A
From: US 421 in Lexington
To: US 27/ US 68 Split in Paris
Counties: Fayette and Bourbon
Highway Districts: 7

CORRIDOR SEGMENT OVERVIEW

Segment 27A on US 27 begins at the US 27/Main Street intersection in Lexington, Fayette County and extends northeast to US 460 in Paris, Bourbon County. The corridor segment length is approximately 29 miles and currently contains one interchange at I-64/I-75.

This segment starts in the urban area of Lexington and passes through the residential and commercial areas of the City of Paris in Bourbon County. This area would be considered town (according to KYSTMv18 data) with clusters of homes and commercial buildings adjacent to US 27. The remainder of this segment passes through rural agricultural areas with homes interspersed along US 27.

EXISTING FACILITY

The table below outlines the typical roadway attributes for this section of US 27 by sub-segment.

Typical Roadway Attributes					
Sub-segment	Functional Classification	Number & Width of Lanes	Shoulder & Width	Median Type & Width	Posted Speed Limit
From Main Street (Lexington) to New Circle Road	Principal Arterial Other	4, (10-11')	Curbed (0-1'), None	Raised Non Mountable (10'), Flush (11'), None	35-45 mph
From New Circle Road to I-64/I-75 Interchange	Principal Arterial Other	4, (10-12')	Asphalt Combination (3-6'), Curbed (2')	Raised Non Mountable (14'), None	45 mph
From I-64/I-75 Interchange to US 27/US 68 split in Paris	Principal Arterial Other	4, (12')	Asphalt (11'), Asphalt Combination (4-10'), Curbed (2-3'), None	Raised Non Mountable (14-85'), Depressed (37-85'), Raised Mountable (16-37'), None	45-55 mph

Right of Way: The table below outlines the general width of existing right of way within the corridor.

General Existing Right of Way Widths		
From	To	General Ex. R/W Width
US 421 (Main Street)	KY 4 (New Circle Road)	70' – 90'
KY 4 (New Circle Road)	Paris Bypass	140' – 520'
Paris Bypass	US 27/ US 68 Split in Paris	220' – 240'

Pavement: The average PDI (Pavement Distress Index) for this section of US 27 is 0.44, which indicates an overall fair pavement condition according to KYTC criteria (Good: 0.00 – 0.35; Fair: 0.36 – 0.65; Poor: 0.66 – 0.99).

Intersections/Interchanges: The tables below outline the existing interchanges, major intersections, and railroad crossings on the corridor.

Interchanges	Interchange Types
I-64/I-75	Flopped Diamond

Major Intersections ¹			
W Main St	W Seventh St	Muir Station Rd	Georgetown Rd
W Short St	W Loudon Ave	Hutchison Rd	US 68
W Second St	W New Circle Rd	Hume Bedford Rd	
W Third St	Old Paris Rd	S Main St	
W Fourth St	Iron Works Pike	Cypress St	

1) Only crossroads with function classification of Minor Collector or above are included.

At-grade Railroad Crossings
None

Access Points: This segment is not access controlled. Throughout the corridor, there are residential and commercial driveways and intersecting roadways.

Bridges: The tables below outline the detailed Bridge information for existing bridges on or over this section of US 27.

Mainline Bridge Information										
Bridge ID	Feature Intersect	NBIS Classification	Sufficiency Rating	Substandard	Deck Rating	Superstructure Rating	Substructure Rating	Under Clearance (feet)	Horizontal Clearance (feet)	Culvert Rating
009B00048L	HOUSTON CREEK	Fair	88.6	No	6	5	5	0	44	N
009B00048R	HOUSTON CREEK	Good	99.6	No	8	8	7	0	39.25	N
009B00068L	HOUSTON CREEK	Good	80.5	No	7	7	7	0	28	N
009B00068R	HOUSTON CREEK	Good	80.5	No	7	7	7	0	28.33	N
009B00069L	BRANCH-HINKSTON CK	Good	80	No	N	N	N	0	41.17	7
009B00069R	BRANCH-HINKSTON CK	Good	80	No	N	N	N	0	40	7
034B00083R	CSX RR-N BWAY-N LIMESTON	Fair	83.3	No	6	5	6	25	63	N
034B00164L	NORTH ELKHORN CREEK	Fair	99.6	No	6	8	7	0	42	N
034B00164R	NORTH ELKHORN CREEK	Good	99.6	No	7	8	7	0	42	N

Structures Crossing Over the Corridor			
Bridge ID	Facility Carried	Under Clearance (feet)	Horizontal Clearance (feet)
034B00083L	S 75 NC	25	63
034R00602N	RJ Corman	14.67	54.00
034R00603N	RJ Corman	13.33	44.00
034X00004N	Pedway	23.67	53.67

Other Noteworthy Conditions: None.

TRAFFIC & OPERATIONS

AADT & AADTT: The table below summarizes the 2015 AADT and daily truck volumes by sub-segment.

Traffic Volumes			
Sub-segment	AADT	AADTT	Truck Percentage
From US 421 in Lexington to I-64/I-75	24,100	1,800	7%
From I-64/I-75 to US 27/US 68 split in Paris	15,600 ¹	1,600	10% ²

1, 2) Information obtained from KYTC Traffic Count Reporting System

Mobility: There are two major traffic bottleneck sections along this section of US 27. See table below for the typical roadway attributes of these bottleneck locations. (Note: traffic bottlenecks are identified by Level of Travel Time Reliability (LOTTR) > 1.5 or volume/capacity (v/c) > 0.6.) Other than the noted traffic bottleneck sections/locations, traffic condition is acceptable along the remainder of this segment.

Existing Typical Roadway Attributes at Major Traffic Bottlenecks					
Locations	Functional Classification	Number & Width of Lanes	Median Width	Shoulder Width	2015 AADT ¹
<u>Major Bottleneck 1:</u> From US 421 (Main Street) to I-64/I-75	Principal Arterial	4, 10-12'	0-14'	0-14'	33,139
<u>Major Bottleneck 2:</u> From KY 1939 (Hume Bedford Pike) to US 460 in Paris	Principal Arterial	4, 12'	0-32'	0-11'	8,744

1) The highest traffic volume within the bottleneck based on KYSTMv18 data.

Safety: 7.5% of the corridor mileage has a Level of Safety of Service (LOSS) of 4, meaning these links have the highest potential to decrease crashes. (Note: LOSS indicates the potential for crash reduction and is broken up into four categories based on Safety Performance Functions (SPFs): LOSS 4 = high; LOSS 3 = moderate to high; LOSS 2 = low to moderate; LOSS 1 = low.) See the table under **Potential Safety Improvement** section for details of locations with LOSS =4, possible causes, and potential safety improvements.

ITS Devices: Lexington Fayette Urban County Government (LFUCG) has a fiber network in the Lexington portion of the corridor with CCTV cameras.

PROPOSED IMPROVEMENT CONCEPTS

The improvement options noted in this report are not intended to be all-encompassing. Other potential improvements are possible, including innovative solutions that could be cost-effective and address the reasons for improvement. Further study may be needed as part of the project development process.

Proposed Typical Section & Description of Modification: The table below describes the proposed improvement concepts for the identified bottlenecks. The proposed improvements expect to maintain an overall acceptable traffic condition through 2045 ($v/c < 0.85$ in urban areas and $v/c < 0.7$ in rural areas) and address safety issues at bottlenecks.

Proposed Improvement Concepts			
Locations	Improvement Concepts ¹	Notes ²	Reason for Improvement
<u>Major Bottleneck 1:</u> From US 421 (Main Street) to I-64/I-75	Complete Streets; Access Management	See the Major Intersections for Potential Modification section below	LOTTR exceeds the established thresholds
<u>Major Bottleneck 2:</u> From KY 1939 (Hume Bedford Pike) to US 460 in Paris	Intersection Improvements	See the Major Intersections for Potential Modification section below	LOTTR exceeds the established thresholds

1) The proposed roadway widening concept includes spot improvements at interchanges and major intersections as needed (see details in Interchanges for Potential Modification and Major Intersection for Potential Modification sections below).

2) Improved typical sections are based on KYTC Highway Design Manual.

Potential New Interchanges: None.

Interchanges for Potential Modification: None.

Major Intersections for Potential Modification: Improvements, such as additional turn lanes, channelization, and coordinated signal timing, should be considered at 12 major intersections for this corridor segment. The following is a list of these intersections.

Major Intersections for Potential Modification			
W Main St	W Loudon Ave	W Short St	W New Circle Rd
W Second St	Old Paris Rd	W Third St	Hume Beford Rd
W Fourth St	S Main St	W Seventh St	Georgetown Rd

Bridges: Bridge recommendations are based on ratings of substructure, superstructure and deck using the following methodology.

Methodology for Replacement/Rehabilitation Recommendation					
Structures	Substructure Rating	Superstructure Rating	Deck Rating	Culvert Rating	Recommendations
Bridges	<=4	Any	Any	/	Replacement
	=5	Any	Any	/	Rehabilitation
	>=6	<=5	Any	/	Rehabilitation
	>=6	Any	<=5	/	Rehabilitation
	>=6	>=6	>=6	/	None ¹
Culverts	/	/	/	<=4	Replacement
	/	/	/	5 or 6	Rehabilitation
	/	/	/	>=7	None

1) If the bridge is on a corridor with a recommendation of widening, it will be widened (considered as rehabilitation) as necessary to accommodate the additional proposed lanes.

- **Bridges for Rehab/Widening:** Rehab/widening is recommended for a total of two bridges along the entire corridor. Note that the bridge rehab is determined based on the "Methodology for Replacement/Rehabilitation Recommendation" table above. If the bridge has a good condition but is within a bottleneck location with recommended widening, it will be widened as necessary to accommodate the additional proposed lanes and the cost of widening is assumed to be the same as bridge rehab for the planning-level cost estimation purpose.

Bridges for Rehab/Widening	
Bridge ID	Feature Intersect
009B00048L	HOUSTON CREEK
034B00083R	CSX RR-N BWAY-N LIMESTON

- **Bridges for Replacement:** None.

Pavement Treatment: The overall pavement condition is fair (average PDI = 0.44). Proposed additional lanes will consist of full depth asphalt pavement construction. Spot reconstruction and rehabilitation of existing asphalt pavement lanes will be needed based on more detailed evaluation of the corridor's pavement condition.

Potential Safety Improvement: The table below summarizes safety issues for the corridor and is based on KYTC safety data (LOSS value = 4), as well as a cursory review of Google Aerial imagery. The table identifies clusters of links with a LOSS value of 4 based on two categories: 1) clusters located in areas where this study already recommends corridor improvements for mobility reasons and 2) clusters not located in areas previously recommended for corridor mobility improvements. For Category 1, it is assumed any corridor improvement based on mobility needs will be constructed to current KYTC standards and will include the necessary safety improvements. Category 2 is intended to identify corridor segments that may warrant improvement for safety reasons, even though improvement might not be needed for mobility. There may also be isolated links with LOSS value of 4 that are not included in the table. Spot improvements could be warranted for those locations but it is assumed these spot improvements do not rise to the level of a corridor improvement; therefore, these locations are not addressed in this planning study. The table further breaks the clusters down by urban and rural designation (based on KYSTMv18 data) because urban and rural roadways tend to have unique typical crash causes and countermeasures.

Potential Safety Improvements			
Category	Locations	Possible Causes	Recommendations
CAT 2: Major clusters of safety issues covered by proposed improvement concepts	Main Street to I-64/I-75 Interchange (Lexington, KY)	Interchange spacing and congestion due to traffic entering and existing at the interchanges	Intersection Improvements; access management
CAT 1: Other major clusters of safety issues	N/A	N/A	N/A

Proposed Phasing: The proposed spot improvements at major intersections could be phased geographically: one phase for Fayette County, and another phase for Bourbon County. Because the Fayette County intersections are all located in Lexington and most have an urban and complex setting, grouping them in a separate phase is reasonable.

PRELIMINARY ENVIRONMENTAL RED FLAG ANALYSIS

The table below summarizes the presence of critical environmental red flag concerns approved by KYTC within 1,000 ft of proposed improvement locations (Y=Yes; N=No).

Critical Red Flag Issues/Concerns		
Environmental Red Flag Features	Major Bottleneck 1: From US 421 (Main Street) to I-64/I-75	Major Bottleneck 2: From KY 1939 (Hume Bedford Pike) to US 460 in Paris
Superfunds	N	N
Special Waters ¹	N	N
Forested Areas	N	N
NLEB Habitat Priority	N	Y
IB Habitat Priority Area	N	N
FAA Airport Runways	N	N
Public Hunting Areas	N	N
Wildlife Management Areas	N	N
Local Parks	Y	N
State/ National Parks	N	N
Kentucky Heritage Land Conservation Fund	N	N
Area Landmarks	Y	N
Point Landmarks	Y	N
National Register of Historic Places Location (Point)	Y	Y
National Register of Historic Places Location (Polygon)	Y	Y

1) Special Waters are defined as Cold Water Aquatic Habitats, Outstanding State/National Resource Waters, Exceptional Waters, State Wild Rivers, and Federally Designated Wild / Scenic Rivers.

RIGHT OF WAY IMPACTS

The table below summarizes the potential right-of-way (ROW) needs for proposed improvement concepts.

Potential Needs of Additional Right of Way		
Location	Improvement Concepts	Potential Needs of Additional ROW
Intersection Modification at W Main St, W Short St, W Second St, W Third St, W Fourth St, W Seventh St, Georgetown Rd (Paris)	Improvements, such as additional turn lanes, channelization, and coordinated signal timing	No
Intersection Modification at W Loudon Ave, W New Circle Rd, Old Paris Rd, Hume Bedford Rd, S Main St (Paris)	Improvements, such as additional turn lanes, channelization, and coordinated signal timing	Potentially

COST ESTIMATION

Design:	7.2 (\$M)
ROW:	26.4 (\$M)
Utility:	6.0 (\$M)
Construction:	<u>48.0 (\$M)</u>
TOTAL =	87.6 (\$M)

Note:

1. The cost estimation may not include additional costs to address the potential impacts of major utilities (e.g., gas line, major water supplier, transmission line) within the proximity of the corridor, due to the lack of data when the report was prepared. Further investigation is recommended in future studies.
2. Cost estimation was based on 2020 dollars. There is a 1-3% inflation rate. Estimated cost could vary -50% to +250% of the actual number (as a rule of thumb).
3. The widening of a 2-lane facility to a 3-lane facility (with TWLTL or alternating passing lane) is considered as "Minor Widening (Undivided Road) - 2 Lane to 4 Lane".
4. The cost estimation does not include bridges outside of the bottleneck locations, as they are not assumed to rise to the level of a corridor improvement. The cost estimation only includes necessary bridge replacement/rehab/widening costs within the bottleneck locations with proposed widening improvement. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
5. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
6. Shoulder widening is not included in the cost estimation, as it is a relatively minor cost.
7. If multiple improvement concepts are recommended for the corridor, only the cost of the larger-scale improvement concept is estimated.

Kentucky Statewide Corridor Plan (Linking Kentucky)

Route: US 27
Segment ID: 27B
From: US 27/ US 68 Split in Paris
To: KY 9 (AA Highway) in Campbell County
Counties: Bourbon, Harrison, Pendleton, Campbell
Highway Districts: 6 and 7

CORRIDOR SEGMENT OVERVIEW

Segment 27B on US 27 begins at the US 27/US 68 split in Bourbon County and extends north through Harrison and Pendleton Counties to KY 9 (AA Highway) in Campbell County. The corridor segment length is approximately 63 miles and currently contains one interchange at the AA Highway.

This segment passes through the residential and commercial areas of the City of Cynthiana in Harrison County and the City of Falmouth in Pendleton County. These areas would be considered towns (according to KYSTMv18 data) with clusters of homes and commercial buildings adjacent to US 27. The remainder of this segment passes through rural agricultural areas with homes interspersed along US 27.

EXISTING FACILITY

The table below outlines the typical roadway attributes for this section of US 27 by sub-segment.

Typical Roadway Attributes					
Sub-segment	Functional Classification	Number & Width of Lanes	Shoulder & Width	Median Type & Width	Posted Speed Limit
From US 27/ US 68 Split in Paris to Pendleton/Campbell County Line	Principal Arterial Other	2, 10-12'	Asphalt (10-11'), Asphalt Combination (4-10'), Concrete (10'), Curbed (2-14'), None	Flush (12'), Raised Mountable (17-25'), Raised Non Mountable (4-99'), None	35-55 mph
From Pendleton/Campbell County Line to KY 9 (AA Highway)	Principal Arterial Other	2-4, 12'	Asphalt (10-11'), Asphalt Combination (6'), Concrete (10'), Concrete Combination (6'), Curbed (1-4'), None	Depressed (40'), Flush (12-20'), Raised Mountable (12'), Raised Non Mountable (12'), None	40-55 mph

Right of Way: The table below outlines the general width of existing right of way within the corridor.

General Existing Right of Way Widths		
From	To	General Ex. R/W Width
US 27/ US 68 Split in Paris	Cynthiana Bypass	100' – 125'
Cynthiana Bypass		250' – 300'
Cynthiana Bypass	KY 154	75' – 125'
KY 154	KY 536	200' – 300'
KY 536	KY 709 (E Alexandria Pike)	110' - 150'
KY 709 (E Alexandria Pike)	KY 9 (AA Highway) in Campbell County	180' – 220'

Pavement: The average PDI (Pavement Distress Index) for this section of US 27 is 0.35, which indicates an overall good pavement condition according to KYTC criteria (Good: 0.00 – 0.35; Fair: 0.36 – 0.65; Poor: 0.66 – 0.99).

Intersections/Interchanges: The tables below outline the existing interchanges and major intersections, and railroad crossings on the corridor.

Interchanges	Interchange Types
KY 9 (AA Highway)	Partial Cloverleaf

Major Intersections ¹			
Martin Luther King Blvd	US 27C	KY 22	Lickert Rd
Coulthard Ln W	US Highway 62 W	Lightfoot Fork Rd	KYTC Access Rd
Clay Kiser Rd	KY Highway 1032 E	KY 17	Creektrace Rd
Mt Carmel Rd	KY Highway 1284 W	KY 177	W Main St
US Highway 27X	KY Highway 1744	Peach Grove Rd	E Alexandria Pike
KY Highway 32 W	KY 22	Kenton Station Rd	West Low Gap Rd
KY Highway 356	KY 330	Race Track Rd	

1) Only crossroads with function classification of Minor Collector or above are included.

At-grade Railroad Crossings
None

Access Points: This segment is not access controlled. Throughout the corridor, there are residential and commercial driveways and intersecting roadways.

Bridges: The tables below outline the detailed Bridge information for existing bridges on or over this section of US 27.

Mainline Bridge Information										
Bridge ID	Feature Intersect	NBIS Classification	Sufficiency Rating	Substandard	Deck Rating	Superstructure Rating	Substructure Rating	Under Clearance (feet)	Horizontal Clearance (feet)	Culvert Rating
009B00002N	TOWNSEND CREEK	Poor	47.3	No	6	6	4	0	30.25	N
009B00003N (Culvert)	COOPER CREEK SLOUGH	Fair	76.5	No	N	N	N	0	42	6
009B00004N	COOPER CREEK	Fair	65.2	No	6	6	5	0	26.17	N
019B00071N	KY 9 ("AA" HIGHWAY)	Fair	86.7	No	7	6	7	15.92	83.99	N
019B00087N	PHILLIPS CREEK	Good	100	No	7	8	8	0	106.2	N
049B00005N	TWO LICK CREEK	Fair	65.3	No	6	6	6	0	23.62	N
049B00006N	CURRY CREEK	Fair	61.3	No	5	6	6	0	23.62	N
049B00037N (Culvert)	EDGEWATER BRANCH	Fair	95.1	No	N	N	N	0	23.95	6
049B00065N	SYCAMORE CREEK	Fair	95.9	No	7	8	6	0	37.73	N
049B00068N	INDIAN CREEK	Fair	88.6	No	7	8	6	0	51.84	N
049B00069N	RICHLAND CREEK	Good	95.4	No	7	8	7	0	40.03	N
096B00002N	S FK LICKING RIVER	Fair	63	No	6	6	6	0	23.62	N
096B00008N	BLANKET CREEK NR FOUR OA	Fair	66.6	No	7	6	6	0	26.2	N
096B00018N	CSX RR-CR 5011-KENNEDY B	Fair	60.4	No	5	6	6	21.52	25.92	N
096B00019N (Culvert)	HARRIS CREEK @BOSTON	Fair	84.5	No	N	N	N	0	18.7	6
096B00020N (Culvert)	WILLOW CREEK	Fair	71	No	N	N	N	0	21.98	5
096B00021N	SO.FK. LICKING RIVER	Fair	55	No	7	6	5	0	30.18	N
096B00040N	C.S.X. RAILROAD	Good	84	No	7	8	7	23.16	39.37	N
049B00076N	GRAYS RUN CREEK	Good	95	No	8	7	8	0	44.37	N
049B00075N	KY-36	Good	100	No	8	8	8	22.24	47.17	N
049B00074N	S FORK LICKING RIV & CSX	Good	96	No	8	8	7	23.31	44	N

Structures Crossing Over the Corridor
None

Other Noteworthy Conditions: None.

TRAFFIC & OPERATIONS

AADT & AADTT: The table below summarizes the 2015 AADT and daily truck volumes by sub-segment.

Traffic Volumes			
Sub-segment	AADT	AADTT	Truck Percentage
From US 27/ US 68 Split in Paris to Main St in Falmouth	2,700	300	11%
From Main St in Falmouth to KY 9 (AA Highway) in Campbell County	8,300	900	11% ¹

¹ Truck percentage obtained from KYTC Traffic Count Reporting System

Mobility: There is one major traffic bottleneck section along this corridor segment. See the table below for details. (Note: bottlenecks are identified by Level of Travel Time Reliability (LOTTR) > 1.5 or volume/capacity (v/c) > 0.6.) There are a few additional isolated traffic bottlenecks along this corridor. Other than the noted traffic bottleneck sections/locations, traffic condition is acceptable along the remainder of this segment.

Existing Typical Roadway Attributes at Major Traffic Bottlenecks					
Locations	Functional Classification	Number & Width of Lanes	Median Width	Shoulder Width	2015 AADT ¹
From 2 miles south of KY 536 (Creektrace Rd) to KY 9 (AA Highway) near Alexandria	Principal Arterial	2-4, 12'	12-40'	2-10'	33,523

1) The highest traffic volume within the bottleneck based on KYSTMv18 data.

Safety: 6.7% of the corridor mileage has a Level of Safety of Service (LOSS) of 4, meaning these links have the highest potential to decrease crashes. (Note: LOSS indicates the potential for crash reduction and is broken up into four categories based on Safety Performance Functions (SPFs): LOSS 4 = high; LOSS 3 = moderate to high; LOSS 2 = low to moderate; LOSS 1 = low.) See the table under **Potential Safety Improvement** section for details of locations with LOSS =4, possible causes, and potential safety improvements.

ITS Devices: Less than 1% of the corridor length has direct access to fiber through the KentuckyWired project.

PROPOSED IMPROVEMENT CONCEPTS

The improvement options noted in this report are not intended to be all-encompassing. Other potential improvements are possible, including innovative solutions that could be cost-effective and address the reasons for improvement. Further study may be needed as part of the project development process.

Proposed Typical Section & Description of Modification: The table below describes the proposed improvement concepts for the identified bottlenecks. The proposed improvements expect to maintain an overall acceptable traffic condition through 2045 (v/c < 0.85 in urban areas and v/c < 0.7 in rural areas) and address safety issues at bottlenecks.

Proposed Improvement Concepts			
Locations	Improvement Concepts ¹	Notes ²	Reason for Improvement
From 0.4 mile north of KY 1893 to 0.5 mile south of US 62	Improve shoulders	Improved Typical Section: 8' useable shoulders on both sides of road	This is a systemic safety issue
From KY 10 (E. Main Street) to KY 9 (AA Highway) near Alexandria	Widening this section to a 6-lane divided arterial on its existing alignment	Improved Typical Section: 3, 12-foot lanes in each direction with 8-foot shoulders. 8-foot flush median	The expected v/c in 2045 exceeds the established thresholds

1) The proposed roadway widening concept includes spot improvements at interchanges and major intersections as needed (see details in Interchanges for Potential Modification and Major Intersection for Potential Modification sections below).

2) Improved typical sections are based on KYTC Highway Design Manual.

Potential New Interchanges: None.

Interchanges for Potential Modification: None.

Major Intersections for Potential Modification: Improvements, such as additional turn lanes, channelization, and coordinated signal timing, should be considered at seven major intersections for this corridor segment. The following is a list of these intersections.

Major Intersections for Potential Modification			
US Highway 62 W	W Main St	KY 177	E Alexandria Pike
Lickert Rd	West Low Gap Rd	Creektrace Rd	

Bridges: Bridge recommendations are based on ratings of substructure, superstructure and deck using the following methodology.

Methodology for Replacement/Rehabilitation Recommendation					
Structures	Substructure Rating	Superstructure Rating	Deck Rating	Culvert Rating	Recommendations
Bridges	<=4	Any	Any	/	Replacement
	=5	Any	Any	/	Rehabilitation
	>=6	<=5	Any	/	Rehabilitation
	>=6	Any	<=5	/	Rehabilitation
	>=6	>=6	>=6	/	None ¹
Culverts	/	/	/	<=4	Replacement
	/	/	/	5 or 6	Rehabilitation
	/	/	/	>=7	None

1) If the bridge is on a corridor with a recommendation of widening, it will be widened (considered as rehabilitation) as necessary to accommodate the additional proposed lanes.

- **Bridges for Rehab/Widening:** Rehab/widening is recommended for a total of five bridges along the entire corridor. Note that the bridge rehab is determined based on the "Methodology for Replacement/Rehabilitation Recommendation" table above. If the bridge has a good condition

but is within a bottleneck location with recommended widening, it will be widened as necessary to accommodate the additional proposed lanes and the cost of widening is assumed to be the same as bridge rehab for the planning-level cost estimation purpose.

Bridges for Rehab/Widening	
Bridge ID	Feature Intersect
009B00004N	COOPER CREEK
049B00006N	CURRY CREEK
096B00018N	CSX RR-CR 5011-KENNEDY B
096B00021N	SO.FK. LICKING RIVER
049B00037N	EDGEWATER BRANCH

- **Bridges for Replacement:** Replacement is recommended for one bridge along the corridor. Note that the bridge replacement is determined based on the "Methodology for Replacement/Rehabilitation Recommendation" table above. If the bridge needs replacement and is within a bottleneck location with recommended widening, it will be widened during the replacement to accommodate the additional proposed lanes and the cost of bridge replacement is used for the planning-level cost estimation purpose.

Bridges for Replacement	
Bridge ID	Feature Intersect
009B00002N	TOWNSEND CREEK

Pavement Treatment: The overall pavement condition is good (average PDI = 0.35). Proposed additional lanes will consist of full depth asphalt pavement construction. Spot reconstruction and rehabilitation of existing asphalt pavement lanes might be needed based on more detailed evaluation of the corridor's pavement condition.

Potential Safety Improvement: The table below summarizes safety issues for the corridor and is based on KYTC safety data (LOSS value = 4), as well as a cursory review of Google Aerial imagery. The table identifies clusters of links with a LOSS value of 4 based on two categories: 1) clusters located in areas where this study already recommends corridor improvements for mobility reasons and 2) clusters not located in areas previously recommended for corridor mobility improvements. For Category 1, it is assumed any corridor improvement based on mobility needs will be constructed to current KYTC standards and will include the necessary safety improvements. Category 2 is intended to identify corridor segments that may warrant improvement for safety reasons, even though improvement might not be needed for mobility. There may also be isolated links with LOSS value of 4 that are not included in the table. Spot improvements could be warranted for those locations but it is assumed these spot improvements do not rise to the level of a corridor improvement; therefore, these locations are not addressed in this planning study. The table further breaks the clusters down by urban and rural designation (based on KYSTMv18 data) because urban and rural roadways tend to have unique typical crash causes and countermeasures.

Potential Safety Improvements			
Category	Locations	Possible Causes	Recommendations
CAT 1: Major clusters of safety issues covered by proposed improvement concepts	N/A	N/A	N/A
CAT 2: Other major clusters of safety issues	<u>RURAL</u> KY 32 to KY 36 in Cynthiana; Main St. to KY 330; Kennedy Ridge Road to KY 17, Pendleton/Campbell County Line to KY 1936	<u>RURAL</u> Access points without left turn lanes; steep grades with no passing zones; rear end crashes; road departure crashes	<u>RURAL</u> Add turn lanes; access management; add truck climbing lane; curve warning signage

Proposed Phasing: The intersections proposed for spot improvements located within the proposed corridor widening in Alexandria will be improved at the same time the roadway is widened. The other proposed spot improvements at four major intersections can be constructed at the same time.

PRELIMINARY ENVIRONMENTAL RED FLAG ANALYSIS

The table below summarizes the presence of critical environmental red flag concerns approved by KYTC within 1,000 ft of proposed improvement locations (Y=Yes; N=No).

Critical Red Flag Issues/Concerns		
Environmental Red Flag Features	From 0.4 mile north of KY 1893 to 0.5 mile south of US 62	From KY 10 (E. Main Street) to KY 9 (AA Highway) near Alexandria
Superfunds	N	N
Special Waters ¹	N	N
Forested Areas	N	Y
NLEB Habitat Priority	N	N
IB Habitat Priority Area	N	N
FAA Airport Runways	N	N
Public Hunting Areas	N	N
Wildlife Management Areas	N	N
Local Parks	N	N
State/ National Parks	N	N
Kentucky Heritage Land Conservation Fund	N	N
Area Landmarks	N	N
Point Landmarks	Y	Y
National Register of Historic Places Location (Point)	Y	N
National Register of Historic Places Location (Polygon)	N	N

1) Special Waters are defined as Cold Water Aquatic Habitats, Outstanding State/National Resource Waters, Exceptional Waters, State Wild Rivers, and Federally Designated Wild / Scenic Rivers.

RIGHT OF WAY IMPACTS

The table below summarizes the potential right-of-way (ROW) needs for proposed improvement concepts.

Potential Needs of Additional Right of Way		
Location	Improvement Concepts	Potential Needs of Additional ROW
From 0.4 mile north of KY 1893 to 0.5 mile south of US 62	Improve shoulders	Minimal
From KY 10 (E. Main Street) to KY 9 (AA Highway) near Alexandria	Widening this section to a 6-lane divided arterial on its existing alignment	Yes
Intersection Modification at KY 177	Improvements, such as additional turn lanes, channelization, and coordinated signal timing	Yes
Intersection Modification at US Hwy 62 W, Lickert Rd, Creektrace Rd	Improvements, such as additional turn lanes, channelization, and coordinated signal timing	No

COST ESTIMATION

Design:	7.5 (\$M)
ROW:	21.2 (\$M)
Utility:	4.6 (\$M)
Construction:	62.0 (\$M)
TOTAL =	95.2 (\$M)

Note:

1. The cost estimation may not include additional costs to address the potential impacts of major utilities (e.g., gas line, major water supplier, transmission line) within the proximity of the corridor, due to the lack of data when the report was prepared. Further investigation is recommended in future studies.
2. Cost estimation was based on 2020 dollars. There is a 1-3% inflation rate. Estimated cost could vary -50% to +250% of the actual number (as a rule of thumb).
3. The widening of a 2-lane facility to a 3-lane facility (with TWLTL or alternating passing lane) is considered as "Minor Widening (Undivided Road) - 2 Lane to 4 Lane".
4. The cost estimation does not include bridges outside of the bottleneck locations, as they are not assumed to rise to the level of a corridor improvement. The cost estimation only includes necessary bridge replacement/rehab/widening costs within the bottleneck locations with proposed widening improvement. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
5. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
6. Shoulder widening is not included in the cost estimation, as it is a relatively minor cost.
7. If multiple improvement concepts are recommended for the corridor, only the cost of the larger-scale improvement concept is estimated.

Kentucky Statewide Corridor Plan (Linking Kentucky)

Route: US 27
Segment ID: 27C
From: AA Highway (KY 9)
To: Ohio State Line (Cincinnati)
Counties: Campbell
Highway Districts: 6

CORRIDOR SEGMENT OVERVIEW

Segment 27C on US 27 begins at the US 27/AA Highway interchange in Campbell County and extends north through Newport to the Ohio state line (Cincinnati). The corridor segment length is approximately 9 miles and currently contains two interchanges: AA Highway and I-471.

This segment passes through the residential and commercial area of the City of Newport in Campbell County. This area would be considered suburb (according to KYSTMv18 data) with clusters of homes and commercial buildings adjacent to US 27. The remainder of this segment passes through city with residential and commercial land use along US 27.

EXISTING FACILITY

The table below outlines the typical roadway attributes for this section of US 27 by sub-segment.

Typical Roadway Attributes					
Sub-segment	Functional Classification	Number & Width of Lanes	Shoulder & Width	Median Type & Width	Posted Speed Limit
From AA Highway to I-471	Principal Arterial Other	2-6, 10-12'	Asphalt (10'), Curbed (1-2'), Concrete (10'), None	Raised Mountable (12'), Flush (12'), None	35-45 mph
From I-471 Intersection to One-Way Split	Principal Arterial Other	2-4, 10-12'	Asphalt (10'), Asphalt Combination (3'), Curbed (0-8'), None	Raised Non Mountable (16'), None	25-35 mph
From One-Way Split to Ohio State Line	Principal Arterial Other	2-4, 10-15'	Curbed (0-2'), None	Raised Non Mountable (10'), Flush (4'), None	35-30 mph

Right of Way: The table below outlines the general width of existing right of way within the corridor.

General Existing Right of Way Widths		
From	To	General Ex. R/W Width
AA Highway (KY 9)	US 27 (Alexandria Pike)	100' – 140'
US 27 (Alexandria Pike)	Ohio State Line (Cincinnati)	60' – 70'

Pavement: The average PDI (Pavement Distress Index) for this section of US 27 is 0.33, which indicates an overall good pavement condition according to KYTC criteria (Good: 0.00 – 0.35; Fair: 0.36 – 0.65; Poor: 0.66 – 0.99).

Intersections/Interchanges: The tables below outline the existing interchanges, major intersections, and railroad crossings on the corridor.

Interchanges	Interchange Type
KY 9 (AA Parkway)	Partial Cloverleaf
I-471	Diamond

Major Intersections ¹			
E Alexandria Pike	I 471	E 11 th St	E 4 th St
Buning Ln	S Ft Thomas Ave	E 10 th St	W 5 th St
French St	Grandview Ave	W 11 th St	E 3 rd St
Industrial Rd	Mooock Rd	E 6 th St	KY 8
Martha L Collins Blvd	Highland Ave	E 5 th St	Louie B Nunn Dr
Carothers Rd	W 4 th St		

1) Only crossroads with function classification of Minor Collector or above are included.

At-grade Railroad Crossings
None

Access Points: This segment is not access controlled. Throughout the corridor, there are residential and commercial driveways and intersecting roadways.

Bridges: The tables below outline the detailed bridge information for existing bridges on or over this section of US 27.

Mainline Bridge Information										
Bridge ID	Feature Intersect	NBIS Classification	Sufficiency Rating	Substandard	Deck Rating	Superstructure Rating	Substructure Rating	Under Clearance (feet)	Horizontal Clearance (feet)	Culvert Rating
019B00037N	I 275	Fair	88	No	6	6	5	99.99	52	N
019B00071N	KY 9 ("AA" HIGHWAY)	Fair	86.7	No	7	6	7	15.92	83.99	N
019B00076N	OHIO RIVER	Good	86.1	No	7	7	7	15.75	60	N

Structures Crossing Over the Corridor			
Bridge ID	Facility Carried	Under Clearance (feet)	Horizontal Clearance (feet)
019B00049L	US 27	17.3	56
019B00049R	US 27	17.3	56
019X00001N	CSX RAILROAD	13.83	36.75

Other Noteworthy Conditions: None.

TRAFFIC & OPERATIONS

AADT & AADTT: The table below summarizes the 2015 AADT and daily truck volumes by sub-segment.

Traffic Volumes			
Sub-segment	AADT	AADTT	Truck Percentage
From AA Highway (KY 9) to Sunset Dr just south of the I-275/I-471 interchange	39,700	3,800	10%
From Sunset Dr just south of the I-275/I-471 interchange to the Ohio state line	14,200	1,800	13%

Mobility: There are two major traffic bottleneck sections along this corridor segment. See the table below for details. (Note: bottlenecks are identified by Level of Travel Time Reliability (LOTTR) > 1.5 or volume/capacity (v/c) > 0.6.) There is also one isolated traffic bottleneck at the intersection with 19th St in Newport. Other than the noted traffic bottleneck sections/locations, traffic condition is acceptable along the remainder of this segment.

Existing Typical Roadway Attributes at Major Traffic Bottlenecks					
Locations	Functional Classification	Number & Width of Lanes	Median Width	Shoulder Width	2015 AADT ¹
<u>Major Bottleneck 1:</u> From AA Highway (KY 9) to 0.4-mile northwest of the I-471/US 27 interchange	Principal Arterial	2-6, 10-12'	0-16'	0-10'	65,042
<u>Major Bottleneck 2:</u> From KY 1892 (Carothers Rd) to the Ohio State Line	Principal Arterial	4, 10-15'	0-10'	0-2'	18,098

1) The highest traffic volume within the bottleneck based on KYSTMv18 data.

Safety: 7.6% of the corridor mileage has a Level of Safety of Service (LOSS) of 4, meaning these links have the highest potential to decrease crashes. (Note: LOSS indicates the potential for crash reduction and is broken up into four categories based on Safety Performance Functions (SPFs): LOSS 4 = high; LOSS 3 = moderate to high; LOSS 2 = low to moderate; LOSS 1 = low.) See the table under **Potential Safety**

Improvement section for details of locations with LOSS =4, possible causes, and potential safety improvements.

ITS Devices: This segment does not have any fiber connections.

PROPOSED IMPROVEMENT CONCEPTS

The improvement options noted in this report are not intended to be all-encompassing. Other potential improvements are possible, including innovative solutions that could be cost-effective and address the reasons for improvement. Further study may be needed as part of the project development process.

Proposed Typical Section & Description of Modification: The table below describes the proposed improvement concepts for the identified bottlenecks. The proposed improvements expect to maintain an overall acceptable traffic condition through 2045 ($v/c < 0.85$ in urban areas and $v/c < 0.7$ in rural areas) and address safety issues at bottlenecks.

Proposed Improvement Concepts			
Locations	Improvement Concepts ¹	Notes ²	Reason for Improvement
<u>Major Bottleneck</u> 1: From AA Highway (KY 9) to just south of the I-471 interchange	Widening this section to a 6-lane divided arterial on its existing alignment; Access Management and CAV/BRT Corridor	Improved Typical Section: 3, 12-foot lanes in each direction with 8-foot shoulders. 8-foot flush median.	The expected v/c in 2045 exceeds the established thresholds.
From Highland Avenue to Carothers Street	Road Diet per the US 27 Traffic Analysis for the City of Newport, April 2020 (Gresham Smith, Integrated Engineering for the City of Newport)	Improved Typical Section: Convert existing narrow (9'-11' width) four lanes of pavement (2 in each direction) to three new lanes (equal width), one in each direction, with a two-way left-turn lane. Urban typical with curb and gutter on both sides.	There are multiple locations with safety issues, as well as areas where LOTTR exceeds the established thresholds.
From 11 th Street to Carothers Street	3-lane section with two northbound and one southbound lane per the US 27 Traffic Analysis for the City of Newport	Improved Typical Section: 3, 12-foot lanes – two westbound and one eastbound with an added eastbound left turn lane at Carothers. Westbound curb and gutter at edge of lane. Eastbound 3-foot to 4-foot shoulder between lane line and curb and gutter for multimodal use.	Addresses operational concerns at 11 th Street while narrowing cross section to meet multi-modal goals.

1) The proposed roadway widening concept includes spot improvements at interchanges and major intersections as needed (see details in Interchanges for Potential Modification and Major Intersection for Potential Modification sections below).

2) Improved typical sections are based on KYTC Highway Design Manual.

Potential New Interchanges: None.

Interchanges for Potential Modification: Improvements are proposed for the existing interchange at I-471.

Interchanges for Potential Modifications	
I-471	

Major Intersections for Potential Modification: Improvements, such as additional turn lanes, channelization, and coordinated signal timing, should be considered at 22 major intersections within this corridor segment. The following is a list of these intersections.

Major Intersections for Potential Modification			
E Alexandria Pike	I-471	E 11 th St	E 4 th St
Buning Ln	S Ft Thomas Ave	E 10 th St	W 5 th St
French St	Grandview Ave	W 11 th St	E 3 rd St
Industrial Rd	Moock Rd	E 6 th St	KY 8
Martha L Collins Blvd	Highland Ave	E 5 th St	Louie B Nunn Dr
Carothers Rd	W 4 th St		

Bridges: Bridge recommendations are based on ratings of substructure, superstructure and deck using the following methodology.

Methodology for Replacement/Rehabilitation Recommendation					
Structures	Substructure Rating	Superstructure Rating	Deck Rating	Culvert Rating	Recommendations
Bridges	<=4	Any	Any	/	Replacement
	=5	Any	Any	/	Rehabilitation
	>=6	<=5	Any	/	Rehabilitation
	>=6	Any	<=5	/	Rehabilitation
	>=6	>=6	>=6	/	None ¹
Culverts	/	/	/	<=4	Replacement
	/	/	/	5 or 6	Rehabilitation
	/	/	/	>=7	None

1) If the bridge is on a corridor with a recommendation of widening, it will be widened (considered as rehabilitation) as necessary to accommodate the additional proposed lanes.

- **Bridges for Rehab/Widening:** Rehab/widening is recommended for a total of one bridge along the entire corridor. Note that the bridge rehab is determined based on the "Methodology for Replacement/Rehabilitation Recommendation" table above. If the bridge has a good condition but is within a bottleneck location with recommended widening, it will be widened as necessary to accommodate the additional proposed lanes and the cost of widening is assumed to be the same as bridge rehab for the planning-level cost estimation purpose.

Bridges for Rehab/Widening	
Bridge ID	Feature Intersect
019B00037N	I-275

- **Bridges for Replacement:** None.

Pavement Treatment: The overall pavement condition is good (average PDI = 0.33). Proposed additional lanes will consist of full depth asphalt pavement construction. Spot reconstruction and rehabilitation of existing asphalt pavement lanes might be needed based on more detailed evaluation of the corridor's pavement condition.

Potential Safety Improvement: The table below summarizes safety issues for the corridor and is based on KYTC safety data (LOSS value = 4), as well as a cursory review of Google Aerial imagery. The table identifies clusters of links with a LOSS value of 4 based on two categories: 1) clusters located in areas where this study already recommends corridor improvements for mobility reasons and 2) clusters not located in areas previously recommended for corridor mobility improvements. For Category 1, it is assumed any corridor improvement based on mobility needs will be constructed to current KYTC standards and will include the necessary safety improvements. Category 2 is intended to identify corridor segments that may warrant improvement for safety reasons, even though improvement might not be needed for mobility. There may also be isolated links with LOSS value of 4 that are not included in the table. Spot improvements could be warranted for those locations but it is assumed these spot improvements do not rise to the level of a corridor improvement; therefore, these locations are not addressed in this planning study. The table further breaks the clusters down by urban and rural designation (based on KYSTMv18 data) because urban and rural roadways tend to have unique typical crash causes and countermeasures.

Potential Safety Improvements			
Category	Locations	Possible Causes	Recommendations
CAT 1: Major clusters of safety issues covered by proposed improvement concepts	From Highland Avenue to Monmouth Street	Conflicting turning movements	Road Diet
CAT 2: Other major clusters of safety issues	I-471 to Ohio River	Access points, congestion and bottlenecks	Access management and improved signing and striping

Proposed Phasing: The proposed improvements could be phased geographically: one phase from AA Highway to I-471, one phase from I-471 to Highland Avenue, and another from Highland Avenue to the Ohio state line. The sections have diverse characteristics that make grouping them in separate phases reasonable. Intersections proposed for spot improvements which are located within the proposed corridor widening or road diet sections will be improved at the same time the roadway is modified.

PRELIMINARY ENVIRONMENTAL RED FLAG ANALYSIS

The table below summarizes the presence of critical environmental red flag concerns identified by KYTC within 1,000 ft of proposed improvement locations (Y=Yes; N=No).

Critical Red Flag Issues/Concerns			
Environmental Red Flag Features	<u>Major Bottleneck 1: From AA Highway (KY 9) to just south of the I-471 interchange</u>	From Highland Avenue to Carothers Street	From 11 th Street to Carothers Street
Superfunds	N	N	N
Special Waters ¹	N	N	N
Forested Areas	Y	Y	N
NLEB Habitat Priority	N	N	N
IB Habitat Priority Area	N	N	N
FAA Airport Runways	N	N	N
Public Hunting Areas	N	N	N
Wildlife Management Areas	N	N	N
Local Parks	Y	N	N
State/ National Parks	N	N	N
Kentucky Heritage Land Conservation Fund	N	N	N
Area Landmarks	Y	Y	N
Point Landmarks	Y	Y	Y
National Register of Historic Places Location (Point)	N	N	N
National Register of Historic Places Location (Polygon)	N	N	Y

1) Special Waters are defined as Cold Water Aquatic Habitats, Outstanding State/National Resource Waters, Exceptional Waters, State Wild Rivers, and Federally Designated Wild / Scenic Rivers.

RIGHT OF WAY IMPACTS

The table below summarizes the potential right-of-way (ROW) needs for proposed improvement concepts.

Potential Needs of Additional Right of Way		
Location	Improvement Concepts	Potential Needs of Additional ROW
Major Bottleneck 1: From AA Highway (KY 9) to just south of the I-471 interchange	Widening this section to a 6-lane divided arterial on its existing alignment; Access Management and CAV/BRT Corridor	Yes
From Highland Avenue to Carothers Street	Road Diet per the US 27 Traffic Analysis for the City of Newport	No
From 11 th Street to Carothers Street	3-lane section with two northbound and one southbound lane per the US 27 Traffic Analysis for the City of Newport	Yes
Interchange Modifications at I-471	Improvements	Yes
Intersection Modifications at Buning Ln, French St, Industrial Rd, Martha L Collins Blvd, Louie B Nunn Dr, E 10th St, W 11th St, E 6th St, E 5th St, W 4th St, E 4th St, W 5th St, E 3rd St, KY 8	Improvements, such as additional turn lanes, channelization, and coordinated signal timing	No
Intersection Modifications at S Ft Thomas Ave, Grandview Ave, Moock Rd	Improvements, such as additional turn lanes, channelization, and coordinated signal timing	Potentially

COST ESTIMATION

Design: 20.3 (\$M)
 ROW: 73.0 (\$M)
 Utility: 16.9 (\$M)
 Construction: 135.5 (\$M)
TOTAL = 245.7 (\$M)

Note:

1. The cost estimation may not include additional costs to address the potential impacts of major utilities (e.g., gas line, major water supplier, transmission line) within the proximity of the corridor, due to the lack of data when the report was prepared. Further investigation is recommended in future studies.
2. Cost estimation was based on 2020 dollars. There is a 1-3% inflation rate. Estimated cost could vary -50% to +250% of the actual number (as a rule of thumb).
3. The widening of a 2-lane facility to a 3-lane facility (with TWLTL or alternating passing lane) is considered as "Minor Widening (Undivided Road) - 2 Lane to 4 Lane".
4. The cost estimation does not include bridges outside of the bottleneck locations, as they are not assumed to rise to the level of a corridor improvement. The cost estimation only includes necessary bridge replacement/rehab/widening costs within the bottleneck locations with proposed widening improvement. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
5. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
6. Shoulder widening is not included in the cost estimation, as it is a relatively minor cost.
7. If multiple improvement concepts are recommended for the corridor, only the cost of the larger-scale improvement concept is estimated.

Kentucky Statewide Corridor Plan (Linking Kentucky)

Route: US 68
Segment ID: 28A
From: Man O' War Blvd
To: I-64/I-75 Interchange
Counties: Fayette
Highway Districts: 7

CORRIDOR SEGMENT OVERVIEW

Segment 28A on US 68 begins at the US 68/Man O' War Blvd intersection and ends at the I-64/I-75 interchange in Fayette County. The corridor segment length is approximately 8 miles and currently contains two interchanges: New Circle Road and I-64/I-75.

This segment passes through the residential and commercial areas of the City of Lexington in Fayette County. The area would be considered urban (according to KYSTMv18 data) with clusters of homes and commercial buildings adjacent to US 68.

EXISTING FACILITY

The table below outlines the typical roadway attributes for this section of US 68 by sub-segment.

Typical Roadway Attributes					
Sub-segment	Functional Classification	Number & Width of Lanes	Shoulder & Width	Median Type & Width	Posted Speed Limit
Man O' War Blvd to Waller Ave	Principal Arterial Other	4-6, 12'	Asphalt (10'), Asphalt Combination (3-10'), Curbed (0-11'), None	Depressed (35-37'), Flush (11-24'), Raised Mountable (23-35'), Raised Non Mountable (35'), None	40-55 mph
Waller Ave to Main Street	Principal Arterial Other	4, 12'	Curbed (0-1'), None	Raised Non Mountable (23-48'), Flush (23'), Raised Mountable (23-35'), Depressed (35-37'), None	35-40 mph
Main Street to I-64/I-75	Principal Arterial Other	4, 10-12'	Asphalt Combination (3-6'), Curbed (0-3'), None	Raised Non Mountable (23'), None	35-45 mph

Right of Way: The existing right of way is generally 85' – 115' wide.

Pavement: The average PDI (Pavement Distress Index) for this section of US 68 is 0.44, which indicates an overall fair pavement condition according to KYTC criteria (Good: 0.00 – 0.35; Fair: 0.36 – 0.65; Poor: 0.66 – 0.99).

Intersections/Interchanges: The tables below outline the existing interchanges and major intersections, and railroad crossings on the corridor.

Interchanges	Interchange Type
New Circle Road	Diverging Diamond
I-64/I-75	Flopped Diamond

Major Intersections ¹			
Man O' War Blvd	Lane Allen Rd	W Maxwell St	W Third St
Wellington Way	Clays Mill Rd	W High St	W Seventh St
Ft Harrods Rd	Waller Ave	W Main St	W Loudon Ave
Arrowhead Dr	Virginia Ave	W Vine St	W Fourth St
Beaumont Centre Pkwy	Angliana Ave	W New Circle Road	Pasadena Dr
Oliver Lewis Way	W Short St		

1) Only crossroads with function classification of Minor Collector or above are included.

At-grade Railroad Crossings
None

Access Points: This segment is not access controlled. Throughout the corridor, there are residential and commercial driveways and intersecting roadways.

Bridges: The tables below outline the detailed bridge information for existing bridges on or over this section of US 68. There are no mainline bridges on this segment.

Structures Crossing Over the Corridor			
Bridge ID	Facility Carried	Under Clearance (feet)	Horizontal Clearance (feet)
034B00024L	W NEW CIRCLE RD OL	17.08	30.25
034B00024R	NEW CIRCLE ROAD-IL	15.7	30.25
034B00141N	NS (CN & TP)	69.92	16.08
034R00602N	RJ CORMAN	54	14.67
034R00603N	RJ CORMAN	44	13.33
034X00001N	PEDWAY	58.67	22.92
034X00002N	ST JOE PED BRIDGE	98.25	24.92
034X00004N	PEDWAY	53.67	23.67

Other Noteworthy Conditions: None.

TRAFFIC & OPERATIONS

AADT & AADTT: The table below summarizes the 2015 AADT and daily truck volumes by sub-segment.

Traffic Volumes			
Segment	AADT	AADTT	Truck Percentage
From Man O' War Blvd to the I-64/I-75 interchange	30,700	1,800	6%

Mobility: The entirety of this corridor segment is a major traffic bottleneck. (Note: bottlenecks are identified by Level of Travel Time Reliability (LOTTR) > 1.5 or volume/capacity (v/c) > 0.6.) Typical roadway attributes of the bottleneck area can be found above for the entire segment.

Existing Typical Roadway Attributes at Major Traffic Bottlenecks					
Locations	Functional Classification	Number & Width of Lanes	Median Width	Shoulder Width	2015 AADT ¹
Entire corridor	Refer to the Existing Facility section above				56,769

1) The highest traffic volume within the bottleneck based on KYSTMv18 data.

Safety: 29.7% of the corridor mileage has a Level of Safety of Service (LOSS) of 4, meaning these links have the highest potential to decrease crashes. (Note: LOSS indicates the potential for crash reduction and is broken up into four categories based on Safety Performance Functions (SPFs): LOSS 4 = high; LOSS 3 = moderate to high; LOSS 2 = low to moderate; LOSS 1 = low.) See the table under **Potential Safety Improvement** section for details of locations with LOSS =4, possible causes, and potential safety improvements.

ITS Devices: Lexington Fayette Urban County Government (LFUCG) has a fiber network surrounding the corridor with CCTV cameras throughout the corridor.

PROPOSED IMPROVEMENT CONCEPTS

The improvement options noted in this report are not intended to be all-encompassing. Other potential improvements are possible, including innovative solutions that could be cost-effective and address the reasons for improvement. Further study may be needed as part of the project development process.

Proposed Typical Section & Description of Modification: The table below describes the proposed improvement concepts for the identified bottlenecks. The proposed improvements expect to maintain an overall acceptable traffic condition through 2045 (v/c < 0.85 in urban areas and v/c < 0.7 in rural areas) and address safety issues at bottlenecks.

Proposed Improvement Concepts			
Locations	Improvement Concepts ¹	Notes ²	Reason for Improvement
Man O' War Boulevard to Waller Avenue	Widen to 6-lanes	Urban typical section with 3-11' lanes in each direction. Raised concrete median, curb & gutter, and sidewalk	The expected v/c in 2045 exceeds the established thresholds
Waller Avenue to Main Street	Improve Access management	Due to right of way constraints and the urban nature of this section, widening isn't feasible, therefore access management is recommended to improve traffic flow and safety	The expected v/c in 2045 exceeds the established thresholds and there are intermittent safety issues
Main Street to I-64/I-75 Interchange	Complete Streets; Access Management	See the Major Intersections for Potential Modification section below	LOTTR exceeds the established thresholds

1) The proposed roadway widening concept includes spot improvements at interchanges and major intersections as needed (see details in Interchanges for Potential Modification and Major Intersection for Potential Modification sections below).

2) Improved typical sections are based on KYTC Highway Design Manual.

Potential New Interchanges: None.

Interchanges for Potential Modification: None.

Major Intersections for Potential Modification: Improvements, such as additional turn lanes, channelization, and coordinated signal timing, should be considered at 22 major intersections for this corridor segment. The following is a list of these intersections.

Major Intersections for Potential Modification			
Man O' War Blvd	Lane Allen Rd	W Maxwell St	W Third St
Wellington Way	Clays Mill Rd	W High St	W Seventh St
Ft Harrods Rd	Waller Ave	W Main St	W Loudon Ave
Arrowhead Dr	Virginia Ave	W Vine St	W Fourth St
Beaumont Centre Pkwy	Angliana Ave	W New Circle Road	Pasadena Dr
Oliver Lewis Way	W Short St		

Bridges: Bridge recommendations are based on ratings of substructure, superstructure and deck using the following methodology.

Methodology for Replacement/Rehabilitation Recommendation					
Structures	Substructure Rating	Superstructure Rating	Deck Rating	Culvert Rating	Recommendations
Bridges	<=4	Any	Any	/	Replacement
	=5	Any	Any	/	Rehabilitation
	>=6	<=5	Any	/	Rehabilitation
	>=6	Any	<=5	/	Rehabilitation
	>=6	>=6	>=6	/	None ¹
Culverts	/	/	/	<=4	Replacement
	/	/	/	5 or 6	Rehabilitation
	/	/	/	>=7	None

1) If the bridge is on a corridor with a recommendation of widening, it will be widened (considered as rehabilitation) as necessary to accommodate the additional proposed lanes.

- **Bridges for Rehab/Widening:** Rehab/widening is recommended for a total of one bridge along the entire corridor. Note that the bridge rehab is determined based on the "Methodology for Replacement/Rehabilitation Recommendation" table above. If the bridge has a good condition but is within a bottleneck location with recommended widening, it will be widened as necessary to accommodate the additional proposed lanes and the cost of widening is assumed to be the same as bridge rehab for the planning-level cost estimation purpose.

Bridges for Rehab/Widening	
Bridge ID	Feature Intersect
034X00002N	ST JOE PED BRIDGE

- **Bridges for Replacement:** None.

Pavement Treatment: The overall pavement condition is fair (average PDI = 0.44). Proposed additional lanes will consist of full depth asphalt pavement construction. Spot reconstruction and rehabilitation of existing asphalt pavement lanes will be needed based on more detailed evaluation of the corridor's pavement condition.

Potential Safety Improvement: The table below summarizes safety issues for the corridor and is based on KYTC safety data (LOSS value = 4), as well as a cursory review of Google Aerial imagery. The table identifies clusters of links with a LOSS value of 4 based on two categories: 1) clusters located in areas where this study already recommends corridor improvements for mobility reasons and 2) clusters not located in areas previously recommended for corridor mobility improvements. For Category 1, it is assumed any corridor improvement based on mobility needs will be constructed to current KYTC standards and will include the necessary safety improvements. Category 2 is intended to identify corridor segments that may warrant improvement for safety reasons, even though improvement might not be needed for mobility. There may also be isolated links with LOSS value of 4 that are not included in the table. Spot improvements could be warranted for those locations but it is assumed these spot improvements do not rise to the level of a corridor improvement; therefore, these locations are not addressed in this planning study. The table further breaks the clusters down by urban and rural designation (based on KYSTMv18 data) because urban and rural roadways tend to have unique typical crash causes and countermeasures.

Potential Safety Improvements			
Category	Locations	Possible Causes	Recommendations
CAT 1: Major clusters of safety issues covered by proposed improvement concepts	Man O' War Boulevard to I-64/I-75 Interchange	Interchange spacing and congestion due to traffic entering and existing at the interchanges	Intersection Improvements; access management
CAT 2: Other major clusters of safety issues	N/A	N/A	N/A

Proposed Phasing: The intersections proposed for spot improvements located within the proposed corridor widening between Man O' War Boulevard and Waller Avenue will be improved at the same time the roadway is widened. The proposed spot improvements at the other intersections can be constructed at the same time.

PRELIMINARY ENVIRONMENTAL RED FLAG ANALYSIS

The table below summarizes the presence of critical environmental red flag concerns approved by KYTC within 1,000 ft of proposed improvement locations (Y=Yes; N=No).

Critical Red Flag Issues/Concerns			
Environmental Red Flag Features	Man O' War Boulevard to Waller Avenue	Waller Avenue to Main Street	Main Street to I-64/I-75 Interchange
Superfunds	N	N	N
Special Waters ¹	N	N	N
Forested Areas	N	N	N
NLEB Habitat Priority	Y	Y	N
IB Habitat Priority Area	N	N	N
FAA Airport Runways	N	N	N
Public Hunting Areas	N	N	N
Wildlife Management Areas	N	N	N
Local Parks	N	Y	Y
State/ National Parks	N	N	N
Kentucky Heritage Land Conservation Fund	N	N	N
Area Landmarks	Y	Y	Y
Point Landmarks	Y	Y	Y
National Register of Historic Places Location (Point)	N	Y	Y
National Register of Historic Places Location (Polygon)	N	Y	Y

1) Special Waters are defined as Cold Water Aquatic Habitats, Outstanding State/National Resource Waters, Exceptional Waters, State Wild Rivers, and Federally Designated Wild / Scenic Rivers.

RIGHT OF WAY IMPACTS

The table below summarizes the potential right-of-way (ROW) needs for proposed improvement concepts.

Potential Needs of Additional Right of Way		
Location	Improvement Concepts	Potential Needs of Additional ROW
Man O' War Blvd to Waller Avenue	Widen to 6-lanes	Yes
Waller Avenue to Main Street	Improve Access management	No
Intersection Modifications at Virginia Ave, Angliana Ave, Oliver Lewis Way, W Maxwell St, W High St, W Vine St, W Main St, W Short St	Improvements, such as additional turn lanes, channelization, and coordinated signal timing	No
Intersection Modifications at W Third St, W Fourth St, W Seventh St, W Loudon Ave, W New Circle Road	Improvements, such as additional turn lanes, channelization, and coordinated signal timing	Potentially

COST ESTIMATION

Design:	19.4 (\$M)
ROW:	70.5 (\$M)
Utility:	16.1 (\$M)
Construction:	<u>129.2 (\$M)</u>
TOTAL =	235.2 (\$M)

Note:

1. The cost estimation may not include additional costs to address the potential impacts of major utilities (e.g., gas line, major water supplier, transmission line) within the proximity of the corridor, due to the lack of data when the report was prepared. Further investigation is recommended in future studies.
2. Cost estimation was based on 2020 dollars. There is a 1-3% inflation rate. Estimated cost could vary -50% to +250% of the actual number (as a rule of thumb).
3. The widening of a 2-lane facility to a 3-lane facility (with TWLTL or alternating passing lane) is considered as "Minor Widening (Undivided Road) - 2 Lane to 4 Lane".
4. The cost estimation does not include bridges outside of the bottleneck locations, as they are not assumed to rise to the level of a corridor improvement. The cost estimation only includes necessary bridge replacement/rehab/widening costs within the bottleneck locations with proposed widening improvement. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
5. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
6. Shoulder widening is not included in the cost estimation, as it is a relatively minor cost.
7. If multiple improvement concepts are recommended for the corridor, only the cost of the larger-scale improvement concept is estimated.

Kentucky Statewide Corridor Plan (Linking Kentucky)

Route: US 68 / US 27
Segment ID: 28B
From: I-64/ I-75 in Fayette County
To: Ohio State Line – Mason County
Counties: Fayette, Bourbon, Nicholas, Robertson, Fleming, Mason
Highway Districts: 6, 7, 9

CORRIDOR SEGMENT OVERVIEW

Segment 28B on US 68 begins at the US 68/I-64/I-75 interchange in Fayette County and extends north through Bourbon County, Nicholas County, Robertson County and Fleming County to the Ohio state line in Mason County. The corridor segment length is approximately 63 miles and currently contains three interchanges: I-64/I-75, KY 8 and KY 9.

This segment passes through the residential and commercial areas of the City of Paris in Bourbon County and the City of Millersburg in Bourbon County. These areas would be considered towns (according to KYSTMv18 data) with clusters of homes and commercial buildings adjacent to US 68. The remainder of this segment passes through rural agricultural areas with homes interspersed along US 68.

EXISTING FACILITY

The table below outlines the typical roadway attributes for this section of US 68 by sub-segment.

Typical Roadway Attributes					
Sub-segment	Functional Classification	Number & Width of Lanes	Shoulder & Width	Median Type & Width	Posted Speed Limit
From I-64/I-75 Interchange to US 27/US 68 split in Paris	Principal Arterial Other	4, (12')	Asphalt (11'), Asphalt Combination (4-10'), Curbed (2-3'), None	Raised Non Mountable (14-85'), Depressed (37-85'), Raised Mountable (16-37'), None	45-55 mph
US 27/US 68 Split to US 68 Business	Principal Arterial Other	2-4, 11-12'	Asphalt (10'), Asphalt Combination (4-10'), Curbed (3-8'), None	Depressed (40'), Flush (12'), Raised Mountable (37'), Raised Non Mountable (37'), None	45-55 mph
US 68 Business to Ohio State Line	Principal Arterial Other	2-4, 12'	Asphalt (10'), Asphalt Combination (5-10'), None	Depressed (28'), Flush (12'), None	55 mph

Right of Way: The table below outlines the general width of existing right of way within the corridor.

General Existing Right of Way Widths		
From	To	General Ex. R/W Width
I-64/ I-75	Paris Bypass	140' – 520'
Paris Bypass	KY 1893	200' – 250'
KY 1893	From KY 36 (Concrete Rd)	60' – 80'
From KY 36 (Concrete Rd)	KY 3071	100' – 190'
KY 3071	KY 9 (AA Highway)	290' – 310'
KY 9 (AA Highway)	Ohio State Line	200' – 220'

Pavement: The average PDI (Pavement Distress Index) for this section of US 68 is 0.38, which indicates an overall fair pavement condition according to KYTC criteria (Good: 0.00 – 0.35; Fair: 0.36 – 0.65; Poor: 0.66 – 0.99).

Intersections/Interchanges: The tables below outline the existing interchanges, major intersections, and railroad crossings on the corridor.

Interchanges	Interchange Type
I-64/I-75	Flopped Diamond
KY 9	Partial Loop
KY 8	Flopped Diamond

Major Intersections ¹			
Iron Works Pike	W 2 nd St	Carpenter Rd	Suggs Rd
Muir Station Rd	Millersburg Rd	Walnut Grove Rd	Old Maysville Rd
Hutchison Rd	Ruddles Mill Rd	Concrete Rd	Blue Lick Pike
Bethlehem Rd	Jackstown Rd	E Headquarters Rd	Ewing Rd
S Main St	Old Millersburg Road XX	Barterville Rd	Helena Rd
Cypress St	Millersburg Ruddles Mill Rd	Old Paris Rd	US 68X
Georgetown Rd	Shipville Rd	Lake Rd	US 62
Cynthiana Rd	Millersburg Cynthiana Rd	Mt Mariah Rd	Germantown Rd

1) Only crossroads with functional classification of Minor Collector or above are included.

At-grade Railroad Crossings
None

Access Points: This segment is not access controlled. Throughout the corridor, there are residential and commercial driveways and intersecting roadways.

Bridges: The tables below outline the detailed bridge information for existing bridges on or over this section of US 68.

Mainline Bridge Information										
Bridge ID	Feature Intersect	NBIS Classification	Sufficiency Rating	Substandard	Deck Rating	Superstructure Rating	Substructure Rating	Under Clearance (feet)	Horizontal Clearance (feet)	Culvert Rating
009B00010N (Culvert)	BR HINKSTON CREEK	Fair	88.5	No	N	N	N	0	33.17	5
009B00011N (Culvert)	BR HINKSTON CREEK	Fair	99.6	No	N	N	N	0	33.42	6
009B00012N	HINKSTON CREEK	Fair	80.7	No	6	5	6	0	30.25	N
009B00048L	HOUSTON CREEK	Fair	88.6	No	6	5	5	0	44	N
009B00048R	HOUSTON CREEK	Good	99.6	No	8	8	7	0	39.25	N
009B00052L	STONER CREEK	Fair	88.7	No	7	7	5	0	44	N
009B00052R	STONER CREEK	Good	99.8	No	8	8	8	0	38	N
009B00068L	HOUSTON CREEK	Good	80.5	No	7	7	7	0	28	N
009B00068R	HOUSTON CREEK	Good	80.5	No	7	7	7	0	28.33	N
009B00069L (Culvert)	BRANCH-HINKSTON CK	Good	80	No	N	N	N	0	41.17	7
009B00069R (Culvert)	BRANCH-HINKSTON CK	Good	80	No	N	N	N	0	40	7
009B00073N (Culvert)	UNNAMED STREAM	Good	84.3	No	N	N	N	0	79.5	7
009B00074N (Culvert)	UNNAMED STREAM	Fair	83.2	No	N	N	N	0	39.75	6
009B00075N (Culvert)	FLAT RUN	Fair	82.9	No	N	N	N	0	34.5	6
009C00087N (Culvert)	Flat Run Creek	Fair	66.8	No	N	N	N	0	36.83	6
034B00164R	NORTH ELKHORN CREEK	Good	99.6	No	7	8	7	0	42	N
035B00069N	JOHNSON CREEK	Fair	85.9	No	6	6	5	0	45	N
081B00012N (Culvert)	LEES CREEK	Fair	95.6	No	N	N	N	0	23.95	6
081B00013N	N FK LICKING RIVER	Good	92.5	No	7	7	7	0	32	N
081B00069N	OHIO RIVER	Fair	92.9	No	6	6	6	26.67	48	N
081B00072N	OVER CR-1302	Good	93.2	No	7	8	8	24.6	40	N
081B00073N	KY 9	Good	98.1	No	7	8	7	16.79	102	N
091B00024N (Culvert)	WILBUR RUN	Fair	100	No	N	N	N	0	328.05	6
091B00025N (Culvert)	BRUSHY CREEK	Good	78	No	N	N	N	0	20.01	7
091B00026N (Culvert)	STONY CREEK	Fair	99.4	No	N	N	N	0	23.95	6
091B00027N	LUCKING RIVER	Fair	76.4	No	6	6	5	0	39.7	N
091B00061N (Culvert)	OVER BRUSHY CREEK	Good	98.2	No	N	N	N	0	47.9	8
091B00062N	OVER STONY CREEK	Good	98.2	No	7	7	7	0	47.9	N

Structures Crossing Over the Corridor			
Bridge ID	Facility Carried	Under Clearance (feet)	Horizontal Clearance (feet)
034B00083L	S 75 NC	25	63
034B00083R	I-75	25	63
081B00071N	US 62	17.75	40
009B00051N	CSX RAILROAD	16.25	51.00
101B00019N	PEDESTRIAN WALKWAY	16.23	59.71

Other Noteworthy Conditions: None.

TRAFFIC & OPERATIONS

AADT & AADTT: The table below summarizes the 2015 AADT and daily truck volumes by sub-segment.

Traffic Volumes			
Sub-segment	AADT	AADTT	Truck Percentage
From I-64/I-75 interchange in Lexington to KY 36 (Concrete Rd) west of Carlisle	6,800	1,000	15%
From KY 36 (Concrete Rd) west of Carlisle to the OH state line	2,500	400	16%

Mobility: There is one major traffic bottleneck section along this corridor segment. See the table below for details. (Note: bottlenecks are identified by Level of Travel Time Reliability (LOTTR) > 1.5 or volume/capacity (v/c) > 0.6.) There are also a few additional isolated traffic bottlenecks along this corridor. Other than the noted traffic bottleneck sections/locations, traffic condition is acceptable along the remainder of this segment.

Existing Typical Roadway Attributes at Major Traffic Bottlenecks					
Locations	Functional Classification	Number & Width of Lanes	Median Width	Shoulder Width	2015 AADT ¹
From KY 1939 (Bethlehem Rd) to US 460 (Georgetown Rd) in Paris	Principal Arterial	4, 12'	6-36'	0-11'	8,744

1) The highest traffic volume within the bottleneck based on KYSTMv18 data.

Safety: 2.0% of the corridor mileage has a Level of Safety of Service (LOSS) of 4, meaning these links have the highest potential to decrease crashes. (Note: LOSS indicates the potential for crash reduction and is broken up into four categories based on Safety Performance Functions (SPFs): LOSS 4 = high; LOSS 3 = moderate to high; LOSS 2 = low to moderate; LOSS 1 = low.) See the table under **Potential Safety Improvement** section for details of locations with LOSS=4, possible causes, and potential safety improvements.

ITS Devices: Approximately 1% of the corridor length will have direct access to fiber from the KentuckyWired project.

PROPOSED IMPROVEMENT CONCEPTS

The improvement options noted in this report are not intended to be all-encompassing. Other potential improvements are possible, including innovative solutions that could be cost-effective and address the reasons for improvement. Further study may be needed as part of the project development process.

Proposed Typical Section & Description of Modification: The table below describes the proposed improvement concepts for the identified bottlenecks. The proposed improvements expect to maintain an overall acceptable traffic condition through 2045 ($v/c < 0.85$ in urban areas and $v/c < 0.7$ in rural areas) and address safety issues at bottlenecks.

Proposed Improvement Concepts			
Locations	Improvement Concepts ¹	Notes ²	Reason for Improvement
Millersburg Bypass to KY 1244	Improve shoulders	This is part of KYTC project 7-310.30 from the Millersburg Bypass to KY 1455. This project is substantially complete as of 2020. This is a 2-lane initial, 4-lane ultimate design with 12' lanes and 10' shoulders.	This is a systemic safety issue

1) The proposed roadway widening concept includes spot improvements at interchanges and major intersections as needed (see details in Interchanges for Potential Modification and Major Intersection for Potential Modification sections below).

2) Improved typical sections are based on KYTC Highway Design Manual.

Potential New Interchanges: None.

Interchanges for Potential Modification: None.

Major Intersections for Potential Modification: Improvements, such as additional turn lanes, channelization, and coordinated signal timing, should be considered at five major intersections within this corridor segment. The following is a list of these intersections.

Major Intersections for Potential Modification			
Bethlehem Rd	Millersburg Rd	S Main St	Ruddles Mill Rd
Georgetown Rd			

Bridges: Bridge recommendations are based on ratings of substructure, superstructure and deck using the following methodology.

Methodology for Replacement/Rehabilitation Recommendation					
Structures	Substructure Rating	Superstructure Rating	Deck Rating	Culvert Rating	Recommendations
Bridges	<=4	Any	Any	/	Replacement
	=5	Any	Any	/	Rehabilitation
	>=6	<=5	Any	/	Rehabilitation
	>=6	Any	<=5	/	Rehabilitation
	>=6	>=6	>=6	/	None ¹
Culverts	/	/	/	<=4	Replacement
	/	/	/	5 or 6	Rehabilitation
	/	/	/	>=7	None

1) If the bridge is on a corridor with a recommendation of widening, it will be widened (considered as rehabilitation) as necessary to accommodate the additional proposed lanes.

- **Bridges for Rehab/Widening:** Rehab/widening is recommended for a total of five bridges and one culvert along the entire corridor. Note that the bridge rehab is determined based on the "Methodology for Replacement/Rehabilitation Recommendation" table above. If the bridge has a good condition but is within a bottleneck location with recommended widening, it will be widened as necessary to accommodate the additional proposed lanes and the cost of widening is assumed to be the same as bridge rehab for the planning-level cost estimation purpose.

Bridges for Rehab/Widening	
Bridge ID	Feature Intersect
009B00012N	HINKSTON CREEK
009B00048L	HOUSTON CREEK
009B00052L	STONER CREEK
035B00069N	JOHNSON CREEK
091B00027N	LICKING RIVER
009B00010N (Culvert)	BR HINKSTON CREEK

- **Bridges for Replacement:** None.

Pavement Treatment: The overall pavement condition is fair (average PDI = 0.38). Proposed additional lanes will consist of full depth asphalt pavement construction. Spot reconstruction and rehabilitation of existing asphalt pavement lanes will be needed based on more detailed evaluation of the corridor's pavement condition.

Potential Safety Improvement: The table below summarizes safety issues for the corridor and is based on KYTC safety data (LOSS value = 4), as well as a cursory review of Google Aerial imagery. The table identifies clusters of links with a LOSS value of 4 based on two categories: 1) clusters located in areas where this study already recommends corridor improvements for mobility reasons and 2) clusters not located in areas previously recommended for corridor mobility improvements. For Category 1, it is assumed any corridor improvement based on mobility needs will be constructed to current KYTC standards and will include the necessary safety improvements. Category 2 is intended to identify corridor segments that may warrant improvement for safety reasons, even though improvement might not be

needed for mobility. There may also be isolated links with LOSS value of 4 that are not included in the table. Spot improvements could be warranted for those locations but it is assumed these spot improvements do not rise to the level of a corridor improvement; therefore, these locations are not addressed in this planning study. The table further breaks the clusters down by urban and rural designation (based on KYSTMv18 data) because urban and rural roadways tend to have unique typical crash causes and countermeasures.

Potential Safety Improvements			
Category	Locations	Possible Causes	Recommendations
CAT 1: Major clusters of safety issues covered by proposed improvement concepts	N/A	N/A	N/A
CAT 2: Other major clusters of safety issues	N/A	N/A	N/A

Proposed Phasing: The proposed spot improvements at five major intersections can be constructed at the same time.

PRELIMINARY ENVIRONMENTAL RED FLAG ANALYSIS

The table below summarizes the presence of critical environmental red flag concerns approved by KYTC within 1,000 ft of proposed improvement locations (Y=Yes; N=No).

Critical Red Flag Issues/Concerns	
Environmental Red Flag Features	Millersburg Bypass to KY 1244
Superfunds	N
Special Waters ¹	N
Forested Areas	Y
NLEB Habitat Priority	N
IB Habitat Priority Area	N
FAA Airport Runways	N
Public Hunting Areas	N
Wildlife Management Areas	N
Local Parks	Y
State/ National Parks	N
Kentucky Heritage Land Conservation Fund	N
Area Landmarks	N
Point Landmarks	Y
National Register of Historic Places Location (Point)	Y
National Register of Historic Places Location (Polygon)	Y

1) Special Waters are defined as Cold Water Aquatic Habitats, Outstanding State/National Resource Waters, Exceptional Waters, State Wild Rivers, and Federally Designated Wild / Scenic Rivers.

RIGHT OF WAY IMPACTS

The table below summarizes the potential right-of-way (ROW) needs for proposed improvement concepts.

Potential Needs of Additional Right of Way		
Location	Improvement Concepts	Potential Needs of Additional ROW
Millersburg Bypass to KY 1244	Improve shoulders. (This KYTC project is under construction as of December 2020 and will open soon. 2-lane initial, 4-lane ultimate with 12' lanes and 10' shoulders).	No (already purchased)
Intersection Modifications at Millersburg Rd	Improvements, such as additional turn lanes, channelization, and coordinated signal timing.	Yes
Intersection Modifications at Georgetown Rd (Paris)	Improvements, such as additional turn lanes, channelization, and coordinated signal timing.	No
Intersection Modifications at Bethlehem Rd, S Main St (Paris), Ruddles Mill Rd	Improvements, such as additional turn lanes, channelization, and coordinated signal timing.	Potentially

COST ESTIMATION

Design:	3.0 (\$M)
ROW:	11.0 (\$M)
Utility:	2.5 (\$M)
Construction:	<u>20.0 (\$M)</u>
TOTAL =	36.5 (\$M)

Note:

1. The cost estimation may not include additional costs to address the potential impacts of major utilities (e.g., gas line, major water supplier, transmission line) within the proximity of the corridor, due to the lack of data when the report was prepared. Further investigation is recommended in future studies.
2. Cost estimation was based on 2020 dollars. There is a 1-3% inflation rate. Estimated cost could vary -50% to +250% of the actual number (as a rule of thumb).
3. The widening of a 2-lane facility to a 3-lane facility (with TWLTL or alternating passing lane) is considered as "Minor Widening (Undivided Road) - 2 Lane to 4 Lane".
4. The cost estimation does not include bridges outside of the bottleneck locations, as they are not assumed to rise to the level of a corridor improvement. The cost estimation only includes necessary bridge replacement/rehab/widening costs within the bottleneck locations with proposed widening improvement. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
5. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
6. Shoulder widening is not included in the cost estimation, as it is a relatively minor cost.
7. If multiple improvement concepts are recommended for the corridor, only the cost of the larger-scale improvement concept is estimated.

Kentucky Statewide Corridor Plan (Linking Kentucky)

Route: US 27
Segment ID: 30A
From: Tennessee State Line
To: US 27 Bypass near Nicholasville
Counties: McCreary, Pulaski, Lincoln, Garrard, Jessamine
Highway Districts: 7 and 8

CORRIDOR SEGMENT OVERVIEW

Segment 30A on US 27 begins at the Tennessee state line in McCreary County and extends north through Pulaski, Lincoln and Garrard Counties and ends at the US 27 Bypass in Jessamine County. The corridor segment length is approximately 103 miles and currently contains three interchanges.

This segment passes through the residential and commercial areas of the City of Somerset in Pulaski County, the City of Stanford in Lincoln County, the City of Lancaster in Garrard County and the City of Nicholasville in Jessamine County. These areas would be considered towns (according to KYSTMv18 data) with clusters of homes and commercial buildings adjacent to US 27. The remainder of this segment passes through rural agricultural areas with homes interspersed along US 27.

EXISTING FACILITY

The table below outlines the typical roadway attributes for this section of US 27 by sub-segment.

Typical Roadway Attributes					
Sub-segment	Functional Classification	Number & Width of Lanes	Shoulder & Width	Median Type & Width	Posted Speed Limit
US 27 in Jessamine County	Principal Arterial Other	4, 12'	Asphalt (6-10'), Asphalt Combination (5-10'), None	Concrete Barrier (15'), Depressed (40'), None	55 mph
US 27 in Garrard and Lincoln Counties	Principal Arterial Other	2-4, 11-15'	Asphalt (6-10'), Asphalt Combination (5-10'), Curbed (1-12'), None	Concrete Barrier (15'), Depressed (40'), Flush (12-20'), Raised Mountable (15'), Raised Non Mountable (22-27'), None	25-55 mph
US 27 in Pulaski and McCreary Counties	Principal Arterial Other	2-6, 12'	Asphalt (10'), Asphalt Combination (8'), Curbed (0-10'), None	Concrete Barrier (11'), Depressed (28-40'), Flush (12-20'), Raised Mountable (15'), Raised Non Mountable (28'), None	35-55 mph

Right of Way: The table below outlines the general width of existing right of way within the corridor.

General Existing Right of Way Widths		
From	To	General Ex. R/W Width
Tennessee State Line	KY 1247 Interchange	120' – 200'
KY 1247 Interchange	KY 70	190' – 250'
KY 70	KY 1247	115' – 155'
KY 1247	US 150	140' – 210'
US 150	KY 34	70' – 110'
KY 34	US 27 Bypass near Nicholasville	210' – 260'

Pavement: The average PDI (Pavement Distress Index) for this section of US 27 is 0.45, which indicates an overall fair pavement condition according to KYTC criteria (Good: 0.00 – 0.35; Fair: 0.36 – 0.65; Poor: 0.66 – 0.99).

Intersections/Interchanges: The tables below outline the existing interchanges, major intersections, and railroad crossings on the corridor.

Interchanges	Interchange Type
KY 29	Diamond
Louie B Nunn Cumberland Parkway	Three Leg Directional
KY 90/ KY 1247	Partial Cloverleaf

Major Intersections ¹			
Strunk - Silersville Rd	KY 1642	West Floyd Switch Estesburg Rd	Sugar Creek Rd
KY 92	KY 2292	KY 70	Kennedy Bridge Rd
KY 2792	Madison Dr	KY 501	Rogers Rd
Appletree Rd	KY 2299	KY 643	Sugar Creek Pike
KY 92	Oak Hill Rd	KY 698	Bethel Rd
Whitley City - Williamsburg Rd	KY 80X	E Main St	S Main St
KY 700	Hal Rogers Pkwy	US 150 Byp E	Shun Pike
KY 1651	KY 2227	KY 590	Edgewood Dr
Beulah Heights Rs	KY 1674	Industry Rd	Wichita Rd
The Day Ridge Rd	KY 1247	Richmond St	Etter Dr
Cumberland Falls Rd	KY 635	E Maple Ave	Keene Rd
Blue John Rd	W Todd Rd	Mt Hebron Rd	N Main St
Southeastern Byp	KY 452	KY 34	KY 1642
KY 1247	KY 753		

1) Only crossroads with functional classification of Minor Collector or above are included.

At-grade Railroad Crossings
None

Access Points: This segment is not access controlled. Throughout the corridor, there are residential and commercial driveways and intersecting roadways.

Bridges: The tables below outline the detailed Bridge information for existing bridges on or over this section of US 27.

Mainline Bridge Information										
Bridge ID	Feature Intersect	NBIS Classification	Sufficiency Rating	Substandard	Deck Rating	Superstructure Rating	Substructure Rating	Under Clearance (feet)	Horizontal Clearance (feet)	Culvert Rating
040B00028L	KENTUCKY RIVER & CO RD	Fair	86.5	Yes	6	6	7	99.99	39.5	N
040B00028R	KENTUCKY RIVER & CO	Fair	86.5	Yes	6	6	7	99.99	39.5	N
057B00018N (Culvert)	OLD US 27	Fair	66	No	N	N	N	15.83	39.7	6
057B00025L	NS (CNO&TP) SYSTEM	Good	99.3	No	7	7	7	26	40	N
057B00025R	NS (CNO&TP) SYSTEM	Fair	99.3	No	6	7	7	25.67	40	N
057B00026R	TOWN FORK	Good	99.5	No	7	7	7	0	42	N
069B00047N	DIX RIVER	Fair	61.3	No	5	5	6	0	27.89	N
069B00048N (Culvert)	LOGAN CREEK	Fair	50.3	No	N	N	N	0	56	6
069B00049N (Culvert)	NEALS CREEK	Good	84.8	No	N	N	N	0	52	7
069B00057N (Culvert)	ST. ASAPH CREEK	Fair	63.7	No	N	N	N	0	68	6
100B00024N (Culvert)	PITMAN CREEK	Fair	83.3	No	N	N	N	0	50	6
100B00032R	PITMAN CREEK	Fair	83.4	No	7	5	5	0	32	N
100B00107L	PITMAN CREEK @ CUMBERL	Fair	74.8	No	6	7	7	0	39	N
100B00108N	CUMBERLAND RIVER	Fair	80.6	No	7	7	6	14.75	39.33	N
100B00119L	NS (CNO & TP) RR	Good	100	No	7	8	7	23.01	42	N
100B00119R	NS (CNO & TP) RR	Good	100	No	7	8	7	26.03	42	N

Structures Crossing Over the Corridor			
Bridge ID	Facility Carried	Under Clearance (feet)	Horizontal Clearance (feet)
057B00024N	WILMORE ROAD	16.75	28
074B00033N	KY-3253	17.9	28
100B00115N	KY 90	20.08	94
100B00120R	LN 9008	18.02	60
057B00023N	NS (CNO&TP)SYS-NVIL	16.25	50.08
074B00017N	PEDESTRIAN OVERPASS	16.07	82
100R00600N	NS (CNO&TP) SYSTEM	16.83	36.00

Other Noteworthy Conditions: None.

TRAFFIC & OPERATIONS

AADT & AADTT: The table below summarizes the 2015 AADT and daily truck volumes by sub-segment.

Traffic Volumes			
Sub-segment	AADT	AADTT	Truck Percentage
From the TN state line to 3.7 miles south of the KY 90/KY 1247 interchange near Burnside	5,900	600	10%
From 3.7 miles south of the KY 90/KY 1247 interchange near Burnside to KY 1247 north of Somerset	13,300	1,900	14%
From KY 1247 north of Somerset to KY 34 (Chenault Bridge Rd) east of Danville	5,500	900	16%
From KY 34 (Chenault Bridge Rd) east of Danville to US 27 BUS (north) in Nicholasville	11,800	1,400	12%

Mobility: There are two major traffic bottleneck sections along this corridor segment. See the table below for details. (Note: bottlenecks are identified by Level of Travel Time Reliability (LOTTR) > 1.5 or volume/capacity (v/c) > 0.6.) There are also a few additional isolated traffic bottlenecks along this corridor. Other than the noted traffic bottleneck sections/locations, traffic condition is acceptable along the remainder of this segment.

Existing Typical Roadway Attributes at major Traffic Bottlenecks					
Locations	Functional Classification	Number & Width of Lanes	Median Width	Shoulder Width	2015 AADT ¹
<u>Major Bottleneck 1:</u> From the KY 90/KY 1247 interchange near Burnside to KY 2227/Clifty Rd in Somerset	Principal Arterial	4-6, 12'	20-40'	0-10'	24,020
<u>Major Bottleneck 2:</u> From US 27 BUS (south) to US 27 BUS (north) in Nicholasville	Principal Arterial	4, 12'	40'	6-10'	25,533

1) The highest traffic volume within the bottleneck based on KYSTMv18 data.

Safety: 14.9% of the corridor mileage has a Level of Safety of Service (LOSS) of 4, meaning these links have the highest potential to decrease crashes. (Note: LOSS indicates the potential for crash reduction and is broken up into four categories based on Safety Performance Functions (SPFs): LOSS 4 = high; LOSS 3 = moderate to high; LOSS 2 = low to moderate; LOSS 1 = low.) See the table under **Potential Safety Improvement** section for details of locations with LOSS =4, possible causes, and potential safety improvements.

ITS Devices: Approximately 7% of the corridor length will have direct access to fiber from the KentuckyWired project.

PROPOSED IMPROVEMENT CONCEPTS

The improvement options noted in this report are not intended to be all-encompassing. Other potential improvements are possible, including innovative solutions that could be cost-effective and address the reasons for improvement. Further study may be needed as part of the project development process.

Proposed Typical Section & Description of Modification: The table below describes the proposed improvement concepts for the identified bottlenecks. The proposed improvements expect to maintain an overall acceptable traffic condition through 2045 ($v/c < 0.85$ in urban areas and $v/c < 0.7$ in rural areas) and address safety issues at bottlenecks.

Proposed Improvement Concepts			
Locations	Improvement Concepts ¹	Notes ²	Reason for Improvement
<u>Major Bottleneck 1:</u> From the KY 90/KY 1247 interchange near Burnside to KY 2227/Clifty Rd in Somerset	Intersection improvements and improved signal timing	See the Major Intersections for Potential Modification section below	LOTTR exceeds the established thresholds
KY 70 (near Eubank) to KY 78 (in Stanford)	Improve shoulders	8' useable shoulders	This is a systemic safety issue
KY 590 (in Stanford) to KY 39 (in Lancaster)	Improve shoulders	8' useable shoulders	This is a systemic safety issue
Baker Street (in Lancaster) to Barker Way (in Lancaster)	Concept 1: Access management and add turn lanes Concept 2: Bypass around Lancaster	This section has safety and mobility issues, however there is not sufficient right of way for widening, therefore restricting turning movements and adding turning lanes should improve these conditions. A Lancaster bypass is a longer-term solution	Multiple safety and bottleneck locations
Hagan Court (in Lancaster) to KY 34	Improve shoulders and add turn lanes at intersections	8' useable shoulders, 12' wide turn lanes	This is a systemic safety issue
<u>Major Bottleneck 2:</u> Wichita Drive to US 27 BUS (north) in Nicholasville	Widening this section to a 6-lane divided arterial on its existing alignment with spot improvements at intersections and interchanges, and improve signal timing	3-12' lanes in each direction with 8' useable shoulders and concrete barrier median	The expected v/c in 2045 exceeds the established thresholds

1) The proposed roadway widening concept includes spot improvements at interchanges and major intersections as needed (see details in Interchanges for Potential Modification and Major Intersection for Potential Modification sections below).

2) Improved typical sections are based on KYTC Highway Design Manual.

Potential New Interchanges: None.

Interchanges for Potential Modification: None.

Major Intersections for Potential Modification: Improvements, such as additional turn lanes, channelization, and coordinated signal timing, should be considered at 22 major intersections for this corridor segment. The following is a list of these intersections.

Major Intersections for Potential Modification			
KY 2792	KY 1247	Southeastern Byp	KY 635
KY 1642	Richmond St	KY 1642	East Maple Ave
KY 2292	KY Hwy 34	Madison Dr	S Main St
KY 2299	Edgewood Dr	Oak Hill Rd	Wichita Dr
KY 80X	Etter Dr	Hal Rogers Pkwy	N Main St
KY 2227	US 150		

Bridges: Bridge recommendations are based on ratings of substructure, superstructure and deck using the following methodology.

Methodology for Replacement/Rehabilitation Recommendation					
Structures	Substructure Rating	Superstructure Rating	Deck Rating	Culvert Rating	Recommendations
Bridges	<=4	Any	Any	/	Replacement
	=5	Any	Any	/	Rehabilitation
	>=6	<=5	Any	/	Rehabilitation
	>=6	Any	<=5	/	Rehabilitation
	>=6	>=6	>=6	/	None ¹
Culverts	/	/	/	<=4	Replacement
	/	/	/	5 or 6	Rehabilitation
	/	/	/	>=7	None

1) If the bridge is on a corridor with a recommendation of widening, it will be widened (considered as rehabilitation) as necessary to accommodate the additional proposed lanes.

- **Bridges for Rehab/Widening:** Rehab/widening is recommended for a total of three bridges along the entire corridor. Note that the bridge rehab is determined based on the "Methodology for Replacement/Rehabilitation Recommendation" table above. If the bridge has a good condition but is within a bottleneck location with recommended widening, it will be widened as necessary to accommodate the additional proposed lanes and the cost of widening is assumed to be the same as bridge rehab for the planning-level cost estimation purpose.

Bridges for Rehab/Widening	
Bridge ID	Feature Intersect
069B00047N	DIX RIVER
100B00032R	PITMAN CREEK
057B00023N	NS (CNO&TP)SYS-NVIL

- **Bridges for Replacement:** None.

Pavement Treatment: The overall pavement condition is fair (average PDI = 0.45). Proposed additional lanes will consist of full depth asphalt pavement construction. Spot reconstruction and rehabilitation of existing asphalt pavement lanes will be needed based on more detailed evaluation of the corridor's pavement condition.

Potential Safety Improvement: The table below summarizes safety issues for the corridor and is based on KYTC safety data (LOSS value = 4), as well as a cursory review of Google Aerial imagery. The table identifies clusters of links with a LOSS value of 4 based on two categories: 1) clusters located in areas where this study already recommends corridor improvements for mobility reasons and 2) clusters not located in areas previously recommended for corridor mobility improvements. For Category 1, it is assumed any corridor improvement based on mobility needs will be constructed to current KYTC standards and will include the necessary safety improvements. Category 2 is intended to identify corridor segments that may warrant improvement for safety reasons, even though improvement might not be needed for mobility. There may also be isolated links with LOSS value of 4 that are not included in the table. Spot improvements could be warranted for those locations, but it is assumed these spot improvements do not rise to the level of a corridor improvement; therefore, these locations are not addressed in this planning study. The table further breaks the clusters down by urban and rural designation (based on KYSTMv18 data) because urban and rural roadways tend to have unique typical crash causes and countermeasures.

Potential Safety Improvements			
Category	Locations	Possible Causes	Recommendations
CAT 1: Major clusters of safety issues covered by proposed improvement concepts	Downtown Lancaster	Numerous access points	Access management.
CAT 2: Other major clusters of safety issues	<u>RURAL</u> Whitley City, Southfork Plaza and George Jones Road, Walmart in Stanford	<u>RURAL</u> Left turns from side streets and commercial areas	<u>RURAL</u> Access management and turn lanes

Proposed Phasing: The proposed spot improvements at major intersections could be phased geographically: one phase for McCreary and Pulaski Counties, and another phase for Lincoln, Garrard, and Jessamine Counties. Since all intersections proposed for spot improvements are located within the proposed corridor widening in Nicholasville, they will be improved at the same time the roadway is widened.

PRELIMINARY ENVIRONMENTAL RED FLAG ANALYSIS

The table below summarizes the presence of critical environmental red flag concerns identified by KYTC within 1,000 ft of proposed improvement locations (Y=Yes; N=No).

Critical Red Flag Issues/Concerns						
Environmental Red Flag Features	<u>Major Bottleneck 1: From the KY 90/KY 1247 interchange near Burnside to KY 2227/Clifty Rd in Somerset</u>	KY 70 (near Eubank) to KY 78 (in Stanford)	KY 590 (in Stanford) to KY 39 (in Lancaster)	Baker Street (in Lancaster) to Barker Way (in Lancaster)	Hagan Court (in Lancaster) to KY 34	<u>Major Bottleneck 2: Wichita Drive to US 27 BUS (north) in Nicholasville</u>
Superfunds	N	N	N	N	N	N
Special Waters ¹	N	N	N	N	N	N
Forested Areas	Y	Y	Y	N	Y	N
NLEB Habitat Priority	Y	Y	N	N	N	Y
IB Habitat Priority Area	N	N	N	N	N	N
FAA Airport Runways	Y	N	N	N	N	N
Public Hunting Areas	Y	N	N	N	N	N
Wildlife Management Areas	Y	N	N	N	N	N
Local Parks	N	N	Y	N	N	Y
State/ National Parks	N	N	N	N	N	N
Kentucky Heritage Land Conservation Fund	N	N	N	N	N	N
Area Landmarks	Y	N	Y	Y	N	N
Point Landmarks	Y	Y	Y	Y	Y	Y
National Register of Historic Places Location (Point)	N	N	Y	Y	Y	Y
National Register of Historic Places Location (Polygon)	N	Y	N	N	N	N

1) Special Waters are defined as Cold Water Aquatic Habitats, Outstanding State/National Resource Waters, Exceptional Waters, State Wild Rivers, and Federally Designated Wild / Scenic Rivers.

RIGHT OF WAY IMPACTS

The table below summarizes the potential right-of-way (ROW) needs for proposed improvement concepts.

Potential Needs of Additional Right of Way		
Location	Improvement Concepts	Potential Needs of Additional ROW
<u>Major Bottleneck 1:</u> From the KY 90/KY 1247 interchange near Burnside to KY 2227/Clifty Rd in Somerset	Intersection improvements and improved signal timing	No
KY 70 (near Eubank) to KY 78 (in Stanford)	Improve shoulders	Yes
KY 590 (in Stanford) to KY 39 (in Lancaster)	Improve shoulders	Yes
Baker Street (in Lancaster) to Barker Way (in Lancaster)	Concept 1: Access management and add turn lanes Concept 2: Bypass around Lancaster	Yes
Hagan Court (in Lancaster) to KY 34	Improve shoulders and add turn lanes at intersections	Yes – at turn lane locations. Minimal for shoulder widening.
<u>Major Bottleneck 2:</u> Wichita Drive to US 27 BUS (north) in Nicholasville	Widening this section to a 6-lane divided arterial on its existing alignment with spot improvements at intersections and interchanges, and improve signal timing	Minimal
New Interchange at US 150	New Interchange	Yes
Intersection Modifications at KY 1642 (Slate Branch Road), KY 2299, KY 1247	Improvements, such as additional turn lanes, channelization, realignment, innovative design and coordinated signal timing.	Yes
Intersection Modifications at Southeastern Bypass, Madison Drive, Oak Hill Road, Richmond St, KY 34, Edgewood Dr	Improvements, such as additional turn lanes, channelization, realignment, innovative design and coordinated signal timing.	No
Intersection Modifications at KY 2792 KY 1642 (Parkers Mill Way), KY 2292, KY 80X, Hal Rogers Parkway, KY 2227, KY 635, East Maple Ave, S Main St	Improvements, such as additional turn lanes, channelization, realignment, innovative design and coordinated signal timing.	Potentially

COST ESTIMATION

Design:	13.0 (\$M)
ROW:	40.6 (\$M)
Utility:	13.0 (\$M)
Construction:	<u>132.4 (\$M)</u>
TOTAL =	199.0 (\$M)

Note:

1. The cost estimation may not include additional costs to address the potential impacts of major utilities (e.g., gas line, major water supplier, transmission line) within the proximity of the corridor, due to the lack of data when the report was prepared. Further investigation is recommended in future studies.
2. Cost estimation was based on 2020 dollars. There is a 1-3% inflation rate. Estimated cost could vary -50% to +250% of the actual number (as a rule of thumb).
3. The widening of a 2-lane facility to a 3-lane facility (with TWLTL or alternating passing lane) is considered as "Minor Widening (Undivided Road) - 2 Lane to 4 Lane".
4. The cost estimation does not include bridges outside of the bottleneck locations, as they are not assumed to rise to the level of a corridor improvement. The cost estimation only includes necessary bridge replacement/rehab/widening costs within the bottleneck locations with proposed widening improvement. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
5. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
6. Shoulder widening is not included in the cost estimation, as it is a relatively minor cost.
7. If multiple improvement concepts are recommended for the corridor, only the cost of the larger-scale improvement concept is estimated.

Kentucky Statewide Corridor Plan (Linking Kentucky)

Route: US 27
Segment ID: 30B
From: US 27 Bypass/US 27 Business/S. Main Street in Nicholasville
To: E. Main Street/US 25 in Lexington
Counties: Fayette and Jessamine
Highway Districts: 7

CORRIDOR SEGMENT OVERVIEW

Segment 30B on US 27 begins at the US 27/Nicholasville Road Bypass in Jessamine County. The segment extends north, ending at E Main Street/US 25 in Lexington in Fayette County. The corridor segment length is approximately 11 miles and currently contains one interchange at New Circle Road.

This segment passes through the residential and commercial areas in Jessamine and Fayette Counties. These areas would be considered suburbs (according to KYSTMv18 data) with clusters of homes and commercial buildings adjacent to segment 30B. The remainder of this segment passes through urban areas through the City of Lexington. These areas would be considered city (according to KYSTMv18 data).

EXISTING FACILITY

The table below outlines the typical roadway attributes for this section of US 27 by sub-segment.

Typical Roadway Attributes					
Sub-segment	Functional Classification	Number & Width of Lanes	Shoulder & Width	Median Type & Width	Posted Speed Limit
From US 27 Bypass in Nicholasville to Jessamine/Fayette County Line	Principal Arterial Other	4-10, 9-12'	Asphalt (10'), Curbed (2'), None	Raised Mountable (28'), None	55 mph
From Jessamine/Fayette County Line to US 25 in Lexington	Principal Arterial Other	4, 12'	Asphalt (8-10'), Asphalt Combination (3-5'), Curbed (0-3'), None	Flush (12-24'), Raised Mountable (15'), Raised Non Mountable (8-24'), None	35-55 mph

Right of Way: The table below outlines the general width of existing right of way within the corridor.

General Existing Right of Way Widths		
From	To	General Ex. R/W Width
US 27 Bypass/US 27 Business/S. Main Street in Nicholasville	Southland Drive in Lexington	125' – 175'
Southland Drive in Lexington	E. Main Street/US 25 in Lexington	75' – 125'

Pavement: The average PDI (Pavement Distress Index) for this section of US 27 is 0.59, which indicates an overall fair pavement condition according to KYTC criteria (Good: 0.00 – 0.35; Fair: 0.36 – 0.65; Poor: 0.66 – 0.99).

Intersections/Interchanges: The tables below outline the existing interchanges, major intersections, and railroad crossings on the corridor.

Interchanges	Interchange Type
New Circle Road	Diamond

Major Intersections ¹			
N Main St	E Reynolds Rd	Alumni Dr	S Upper St
Ashgrove Rd	Moore Dr	Cooper Dr	Oliver Lewis Way
E Brannon Rd	Malabu Dr	Conn Ter	W Maxwell St
Southpoint Dr	Zandale Dr	Transcript Ave	W High St
Waveland Museum Ln	Southland Dr	Huguelet Dr	W Main St
Man O' War Blvd	Rosemont Garden	Avenue of Champions	Wilson Downing Rd
Arcadia Park	S Upper St		

1) Only crossroads with functional classification of Minor Collector or above are included.

At-grade Railroad Crossings
None

Access Points: This segment is not access controlled. Throughout the corridor, there are residential and commercial driveways and intersecting roadways.

Bridges: The tables below outline the detailed Bridge information for existing bridges on or over this section of US 27.

Mainline Bridge Information										
Bridge ID	Feature Intersect	NBIS Classification	Sufficiency Rating	Substandard	Deck Rating	Superstructure Rating	Substructure Rating	Under Clearance (feet)	Horizontal Clearance (feet)	Culvert Rating
034B00026N	NEW CIRCLE ROAD	Fair	80.1	No	6	6	6	16.92	91	N
057B00001N (Culvert)	MARSHALL BRANCH	Fair	50.5	No	N	N	N	0	80.71	6

Structures Crossing Over the Corridor			
Bridge ID	Facility Carried	Under Clearance (feet)	Horizontal Clearance (feet)
034X00001N	PEDWAY	22.92	58.67
034X00013N	UK PEDWAY	16.92	53.33
034X00014N	UK PEDWAY	21.08	55.50

Other Noteworthy Conditions: None.

TRAFFIC & OPERATIONS

AADT & AADTT: The table below summarizes the 2015 AADT and daily truck volumes by sub-segment.

Traffic Volumes			
Segment	AADT	AADTT	Truck Percentage
From US 27 BUS (north) in Nicholasville to US 25 (W Main St) in Lexington	42,200	4,400	10%

Mobility: The entirety of this corridor segment is a major traffic bottleneck. (Note: bottlenecks are identified by Level of Travel Time Reliability (LOTTR) > 1.5 or volume/capacity (v/c) > 0.6.) Typical roadway attributes of the bottleneck area can be found above for the entire segment.

Existing Typical Roadway Attributes at Major Traffic Bottlenecks					
Locations	Functional Classification	Number & Width of Lanes	Median Width	Shoulder Width	2015 AADT ¹
Entire corridor	Refer to the Existing Facility section above				78,460

1) The highest traffic volume within the bottleneck based on KYSTMv18 data.

Safety: 5.2% of the corridor mileage has a Level of Safety of Service (LOSS) of 4, meaning these links have the highest potential to decrease crashes. (Note: LOSS indicates the potential for crash reduction and is broken up into four categories based on Safety Performance Functions (SPFs): LOSS 4 = high; LOSS 3 = moderate to high; LOSS 2 = low to moderate; LOSS 1 = low.) See the table under **Potential Safety Improvement** section for details of locations with LOSS =4, possible causes, and potential safety improvements.

ITS Devices: Lexington Fayette Urban County Government (LFUCG) has a fiber network that provides coverage of the portion of the corridor with CCTV cameras from Man O' War Boulevard to downtown Lexington.

PROPOSED IMPROVEMENT CONCEPTS

The improvement options noted in this report are not intended to be all-encompassing. Other potential improvements are possible, including innovative solutions that could be cost-effective and address the reasons for improvement. Further study may be needed as part of the project development process.

Proposed Typical Section & Description of Modification: The southern end of the segment will be widened to 6 lanes. The US 27 and US 27 bypass intersection will be upgraded to an interchange as part of the KYTC East Nicholasville Bypass project (KYTC Item Number 7-87.30). The table below describes the proposed improvement concepts for the identified bottlenecks. The proposed improvements expect to maintain an overall acceptable traffic condition through 2045 ($v/c < 0.85$ in urban areas and $v/c < 0.7$ in rural areas) and address safety issues at bottlenecks.

Proposed Improvement Concepts			
Location	Improvement Concepts ¹	Notes ²	Reason for Improvement
KY 1980 to Man O' War Boulevard	Widen to 6-lane divided section	3-12' lanes in each direction with 8' useable shoulders and 14' concrete barrier median	This entire section is a bottleneck and most of it operates at an unacceptable 2045 v/c
Man O' War Boulevard to E. Main Street / US 25	Follow recommendations from the Lexington Fayette Urban County Government (LFUCG) US 27 Land Use and Transportation Plan in development as of December 2020	Improvements will include BRT, complete streets, and access management	This entire section is a bottleneck and most of it operates at an unacceptable 2045 v/c

1) The proposed roadway widening concept includes spot improvements at interchanges and major intersections as needed (see details in Interchanges for Potential Modification and Major Intersection for Potential Modification sections below).

2) Improved typical sections are based on KYTC Highway Design Manual.

Potential New Interchanges: A new single-point urban interchange will be constructed to the north of the existing US 27 and US 27 bypass intersection as part of the East Nicholasville Bypass project (KYTC Item Number: 7-87.30).

Interchanges for Potential Modification: Improvements are proposed for the existing interchange at KY 4.

Interchanges for Potential Modification
KY 4

Major Intersections for Potential Modification: Improvements, such as additional turn lanes, channelization, innovative intersection and coordinated signal timing, should be considered at 26 major intersections for this corridor segment. The following is a list of these intersections.

Major Intersections for Potential Modification			
N Main St	E Reynolds Rd	Alumni Dr	S Upper St
Ashgrove Rd	Moore Dr	Cooper Dr	Oliver Lewis Way
E Brannon Rd	Malabu Dr	Conn Ter	W Maxwell St
Southpoint Dr	Zandale Dr	Transcript Ave	W High St
Waveland Museum Ln	Southland Dr	Huguelet Dr	W Main St
Man O' War Blvd	Rosemont Garden	Avenue of Champions	Wilson Downing Rd
Arcadia Park	S Upper St		

Bridges: Bridge recommendations are based on ratings of substructure, superstructure and deck using the following methodology.

Methodology for Replacement/Rehabilitation Recommendation					
Structures	Substructure Rating	Superstructure Rating	Deck Rating	Culvert Rating	Recommendations
Bridges	<=4	Any	Any	/	Replacement
	=5	Any	Any	/	Rehabilitation
	>=6	<=5	Any	/	Rehabilitation
	>=6	Any	<=5	/	Rehabilitation
	>=6	>=6	>=6	/	None ¹
Culverts	/	/	/	<=4	Replacement
	/	/	/	5 or 6	Rehabilitation
	/	/	/	>=7	None

1) If the bridge is on a corridor with a recommendation of widening, it will be widened (considered as rehabilitation) as necessary to accommodate the additional proposed lanes.

- **Bridges for Rehab/Widening:** Rehab/widening is recommended for a total of 1 bridge along the entire corridor. Note that the bridge rehab is determined based on the "Methodology for Replacement/Rehabilitation Recommendation" table above. If the bridge has a good condition but is within a bottleneck location with recommended widening, it will be widened as necessary to accommodate the additional proposed lanes and the cost of widening is assumed to be the same as bridge rehab for the planning-level cost estimation purpose.

Bridges for Rehab/Widening	
Bridge ID	Feature Intersect
034B00026N	NEW CIRCLE ROAD

- **Bridges for Replacement:** None.

Pavement Treatment: The overall pavement condition is fair (average PDI = 0.59). Proposed additional lanes will consist of full depth asphalt pavement construction. Spot reconstruction and rehabilitation of existing asphalt pavement lanes will be needed based on more detailed evaluation of the corridor's pavement condition.

Potential Safety Improvement: The table below summarizes safety issues for the corridor and is based on KYTC safety data (LOSS value = 4), as well as a cursory review of Google Aerial imagery. The table identifies clusters of links with a LOSS value of 4 based on two categories: 1) clusters located in areas where this study already recommends corridor improvements for mobility reasons and 2) clusters not located in areas previously recommended for corridor mobility improvements. For Category 1, it is assumed any corridor improvement based on mobility needs will be constructed to current KYTC standards and will include the necessary safety improvements. Category 2 is intended to identify corridor segments that may warrant improvement for safety reasons, even though improvement might not be needed for mobility. There may also be isolated links with LOSS value of 4 that are not included in the table. Spot improvements could be warranted for those locations but it is assumed these spot improvements do not rise to the level of a corridor improvement; therefore, these locations are not addressed in this planning study. The table further breaks the clusters down by urban and rural designation (based on KYSTMv18 data) because urban and rural roadways tend to have unique typical crash causes and countermeasures.

Potential Safety Improvements			
Category	Locations	Possible Causes	Recommendations
CAT 1: Major clusters of safety issues covered by proposed improvement concepts	Brannon Road to Main Street in Lexington, KY	Interchange/intersection spacing and congestion due to traffic entering and existing at the interchange/intersections	Follow recommendations from the US 27 Land Use and Transportation Plan
CAT 2: Other major clusters of safety issues	<u>RURAL</u> Between Kohls Drive and Bradley Drive, KY 3375, KY 1980	<u>RURAL</u> Further investigation needed	<u>RURAL</u> Future Study or further investigation needed
	<u>URBAN</u> Man O' War Boulevard	<u>URBAN</u> Bottleneck and rear end crashes	<u>URBAN</u> Innovative intersection

Proposed Phasing: The proposed spot improvements at major intersections can be constructed at the same time. The intersections proposed for spot improvements within the proposed KY 1980 to Man O' War Boulevard corridor widening in Lexington, will be improved at the same time the roadway is widened.

PRELIMINARY ENVIRONMENTAL RED FLAG ANALYSIS

The table below summarizes the presence of critical environmental red flag concerns identified by KYTC within 1,000 ft of proposed improvement locations (Y=Yes; N=No).

Critical Red Flag Issues/Concerns		
Environmental Red Flag Features	KY 1980 to Man O' War Boulevard	Man O' War Boulevard to E. Main Street / US 25
Superfunds	N	N
Special Waters ¹	N	N
Forested Areas	N	N
NLEB Habitat Priority	Y	Y
IB Habitat Priority Area	N	N
FAA Airport Runways	N	N
Public Hunting Areas	N	N
Wildlife Management Areas	N	N
Local Parks	N	Y
State/ National Parks	Y	N
Kentucky Heritage Land Conservation Fund	N	N
Area Landmarks	N	Y
Point Landmarks	Y	Y
National Register of Historic Places Location (Point)	Y	Y
National Register of Historic Places Location (Polygon)	Y	Y

1) Special Waters are defined as Cold Water Aquatic Habitats, Outstanding State/National Resource Waters, Exceptional Waters, State Wild Rivers, and Federally Designated Wild / Scenic Rivers.

RIGHT OF WAY IMPACTS

The table below summarizes the potential right-of-way (ROW) needs for proposed improvement concepts.

Potential Needs of Additional Right of Way		
Location	Improvement Concepts	Potential Needs of Additional ROW
KY 1980 to Man O' War Boulevard	Widen to 6-lane divided section	Yes, but can be minimized.
Man O' War Boulevard to E. Main Street / US 25	Follow recommendations from the US 27 Land Use and Transportation Plan	No
Modified Interchange KY 4	Modified Interchange	Yes
Intersection Modifications at Ashgrove Rd, Wilson Downing Rd, E Reynolds Rd, Moore Dr, Malabu Dr, Zandale Dr, Southland Dr	Improvements, such as additional turn lanes, channelization, and innovative design	Yes
Intersection Modifications at Avenue of Champions, S Upper St (SB), S Upper St (NB), Oliver Lewis Way, W Maxwell St, W High St, W Main St	Improvements, such as additional turn lanes, channelization, and innovative design	No
Intersection Modifications at N Main St, Rosemont Garden, Arcadia Park, Alumni Dr, Cooper Dr, Conn Ter, Transcript Ave, Huguelet Dr	Improvements, such as additional turn lanes, channelization, and innovative design	Potentially

COST ESTIMATION

Design:	22.7 (\$M)
ROW:	76.3 (\$M)
Utility:	17.4 (\$M)
Construction:	<u>162.0 (\$M)</u>
TOTAL=	278.4 (\$M)

Note:

1. The cost estimation may not include additional costs to address the potential impacts of major utilities (e.g., gas line, major water supplier, transmission line) within the proximity of the corridor, due to the lack of data when the report was prepared. Further investigation is recommended in future studies.
2. Cost estimation was based on 2020 dollars. There is a 1-3% inflation rate. Estimated cost could vary -50% to +250% of the actual number (as a rule of thumb).
3. The widening of a 2-lane facility to a 3-lane facility (with TWLTL or alternating passing lane) is considered as "Minor Widening (Undivided Road) - 2 Lane to 4 Lane".
4. The cost estimation does not include bridges outside of the bottleneck locations, as they are not assumed to rise to the level of a corridor improvement. The cost estimation only includes necessary bridge replacement/rehab/widening costs within the bottleneck locations with proposed widening improvement. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
5. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
6. Shoulder widening is not included in the cost estimation, as it is a relatively minor cost.
7. If multiple improvement concepts are recommended for the corridor, only the cost of the larger-scale improvement concept is estimated.

Kentucky Statewide Corridor Plan (Linking Kentucky)

Route: US 31 E / US 150
Segment ID: 31A
From: Bluegrass Pkwy
To: I-265 in Louisville
Counties: Nelson, Bullitt, Spencer, Jefferson
Highway Districts: 4 and 5

CORRIDOR SEGMENT OVERVIEW

Segment 31A on US 31 E/US 150 begins at the US 31 E/Bluegrass Parkway interchange in Nelson County and extends north through Bullitt and Spencer Counties to I-265 in Jefferson County. The corridor segment is approximately 27.8 miles long and currently contains two interchanges at Bluegrass Parkway and I-265.

This segment passes through the residential and commercial areas of Mt. Washington in Bullitt County and Bardstown in Nelson County. These areas would be considered towns (according to KYSTMv18 data) with clusters of homes and commercial buildings adjacent to US 31 E/US 150. This segment transitions to the Louisville suburban area north of Mt. Washington. The remainder of this segment passes through rural agricultural areas with homes interspersed along US 31 E/US 150.

EXISTING FACILITY

The table below outlines the typical roadway attributes for this section of US 31 E/US 150 by sub-segment.

Typical Roadway Attributes					
Sub-segment	Functional Classification	Number & Width of Lanes	Shoulder & Width	Median Type & Width	Posted Speed Limit
From Bluegrass Parkway to KY 245 (John Rowan Blvd) in Bardstown	Minor Arterial	2, 11'	None or 4'	None	35 mph in Bardstown; 55 mph south of Bardstown
From KY 245 to KY 332 (Nazareth Rd) north of Bardstown	Minor Arterial	4, 12'	1' or 10'	12' flush	45 mph
From KY 332 (Nazareth Rd) north of Bardstown to KY 44 in Mt. Washington	Minor Arterial	2, 12'	10'	None	55 mph
From KY 44 in Mt. Washington to I-265	Minor Arterial	4, 12'	10'	32' depressed	55 mph

Right of Way: The existing right of way is generally 50' – 150' wide.

Pavement: The average PDI (Pavement Distress Index) for this corridor segment is 0.26, which indicates an overall good pavement condition according to KYTC criteria (Good: 0.00 – 0.35; Fair: 0.36 – 0.65; Poor: 0.66 – 0.99).

Intersections/Interchanges: The tables below outline the existing interchanges, major intersections, and railroad crossings on the corridor.

Interchanges	Interchange Type
Bluegrass Parkway	Diamond
I-265	Partial Cloverleaf

Major Intersections ¹			
Muir Ave	North Fifth St	South Fourth St	US 62
KY 1430	East Daugherty Ave	KY 245	KY 332
KY 509	KY 523 (Deatsville Rd)	KY 480	KY 523 (Old Louisville Rd)
KY 2674	S Bardstown Rd	KY 44	N Bardstown Rd
KY 660	KY 2053	Old Bardstown Rd	Cedar Creek Rd

1) Only crossroads with functional classification of Minor Collector or above are included.

At-grade Railroad Crossings
US 31 E Mile Point 14.8 in Nelson County

Access Points: This segment is not access controlled. Throughout the segment, there are residential and commercial driveways and intersecting roadways.

Bridges: The tables below outline the detailed Bridge information for existing bridges on or over this section of US 31 E/US 150.

Mainline Bridge Information										
Bridge ID	Feature Intersect	NBIS Classification	Sufficiency Rating	Substandard	Deck Rating	Superstructure Rating	Substructure Rating	Under Clearance (feet)	Horizontal Clearance (feet)	Culvert Rating
108B00043N	SALT RIVER	Fair	100	No	6	7	7	0	40	N
015B00093N (Culvert)	WHITTAKER RUN	Fair	93.2	No	N	N	N	0	46	6
015B00092N	WHITTAKER RUN	Fair	93.2	No	7	7	6	0	48.11	N
015B00094N (Culvert)	WHITTAKER RUN	Fair	93.2	No	N	N	N	0	46	6
090B00044N	BLUEGRASS PARKWAY	Fair	70.7	No	7	6	6	16.58	29.86	N
015B00087N (Culvert)	TRIB OF FLOYDS FORK	Fair	74.5	No	N	N	N	0	40	6
056B00454L	FLOYDS FORK	Fair	100	No	6	7	7	0	42	N
056B00454R	FLOYDS FORK	Fair	100	No	6	7	7	0	42	N
090B00116N	COX CREEK	Good	100	No	7	8	8	0	44	N
090B00113N	BEECH FORK RIVER	Good	89.9	No	7	8	7	0	42.98	N
090B00121N	EAST FORK OF COXES CREEK	Good	100	No	8	8	8	0	44	N
090B00120N	WHITESIDES ROAD	Good	100	No	8	8	8	16.9	44	N

Structures Crossing Over the Corridor			
Bridge ID	Facility Carried	Under Clearance (feet)	Horizontal Clearance (feet)
056B00375R	I-265 NB	16.33	52.11
056B00375L	I-265 SB	18.67	51.53

Other Noteworthy Conditions: None.

TRAFFIC & OPERATIONS

AADT & AADTT: The table below summarizes the 2015 AADT and daily truck volumes by sub-segment.

Traffic Volumes			
Sub-segment	AADT	AADTT	Truck Percentage
From Bluegrass Parkway to KY 245 (John Rowan Blvd) in Bardstown	8,600	800	10%
From KY 245 (John Rowan Blvd) in Bardstown to KY 44 in Mt. Washington	6,200	800	13%
From KY 44 in Mt. Washington to I-265	27,100	2,600	10%

Mobility: There are two major traffic bottleneck sections along this corridor segment. See the table below for details. (Note: bottlenecks are identified by Level of Travel Time Reliability (LOTTR) > 1.5 or volume/capacity (v/c) > 0.6.) Other than the noted traffic bottleneck sections/locations, traffic condition is acceptable along the remainder of this segment.

Existing Typical Roadway Attributes at Major Traffic Bottlenecks					
Locations	Functional Classification	Number & Width of Lanes	Median Width	Shoulder Width	2015 AADT ¹
<u>Major Bottleneck 1:</u> From Bluegrass Parkway to KY 332 (Nazareth Rd) north of Bardstown	Minor Arterial	2 or 4, 11' or 12'	0' or 12'	0' or 4'	14,519
<u>Major Bottleneck 2:</u> From KY 44 in Mt. Washington to I-265	Minor Arterial	4, 12'	32'	6' or 10'	42,823

1) The highest traffic volume within the bottleneck based on KYSTMv18 data.

Safety: 6.8% of the corridor mileage has a Level of Safety of Service (LOSS) of 4, meaning these areas have the highest potential to decrease crashes. (Note: LOSS indicates the potential for crash reduction and is broken up into four categories based on Safety Performance Functions (SPFs): LOSS 4 = high; LOSS 3 = moderate to high; LOSS 2 = low to moderate; LOSS 1 = low.) See the table under **Potential Safety Improvement** section for details of locations with LOSS =4, possible causes, and potential safety improvements.

ITS Devices: This corridor does not have direct access to fiber optic cable. Louisville Metro fiber is in the area at the northern end of the corridor and there are Trimarc assets around the I-265 interchange.

PROPOSED IMPROVEMENT CONCEPTS

The improvement options noted in this report are not intended to be all-encompassing. Other potential improvements are possible, including innovative solutions that could be cost-effective and address the reasons for improvement. Further study may be needed as part of the project development process.

Proposed Typical Section & Description of Modification: The table below describes the proposed improvement concepts for the identified bottlenecks. The proposed improvements expect to maintain an overall acceptable traffic condition through 2045 ($v/c < 0.85$ in urban areas and $v/c < 0.7$ in rural areas) and address safety issues at bottlenecks.

Proposed Improvement Concepts			
Locations	Improvement Concepts ¹	Notes ²	Reason for Improvement
<u>Major Bottleneck 1:</u> From Bluegrass Pkwy to US 62 in Bardstown	<p><u>Concept 1:</u> Widening this section to a 4-lane undivided arterial on its existing alignment.</p> <p><u>Concept 2:</u> Converting to a 3-lane facility on its existing alignment by adding a two-way-left-turn lane.</p>	<p>Improved Typical Section:</p> <p><u>Concept 1:</u> 2, 12-foot lanes in each direction with 8-foot shoulders. No median.</p> <p><u>Concept 2:</u> 1, 12-foot lane in each direction with 8-foot shoulders. A 14-foot flush TWLTL median.</p>	The expected v/c in 2045 exceeds the established thresholds.
<u>Major Bottleneck 1:</u> From US 62 to KY 245 (John Rowan Blvd) in Bardstown	Spot improvements at major intersections	See the Major Intersections for Potential Modification section below	LOTTR exceeds the established thresholds.
<u>Major Bottleneck 1:</u> From KY 245 (John Rowan Blvd) to KY 332 (Nazareth Rd) north of Bardstown	None at this time	This section is currently a 4-lane divided facility. No improvement is proposed at this time after considering right-of-way constraints, increased intersection safety concerns from a potential widening of a 6-lane facility, and the acceptable v/c expected in 2045. Further study is recommended.	
<u>Major Bottleneck 2:</u> From KY 44 in Mt. Washington to I-265	Widening this section to a 6-lane divided arterial on its existing alignment with spot improvements at intersections and interchanges	Improved Typical Section: 3, 12-foot lanes in each direction with 8-foot shoulders. 8-foot flush median.	The expected v/c in 2045 exceeds the established thresholds.

1) The proposed roadway widening concept includes spot improvements at interchanges and major intersections as needed (see details in Interchanges for Potential Modification and Major Intersection for Potential Modification sections below).

2) Improved typical sections are based on KYTC Highway Design Manual.

Potential New Interchanges: None.

Interchanges for Potential Modification: Improvements are proposed for the existing interchange at I-265.

Interchanges for Potential Modification
I-265

Major Intersections for Potential Modification: Improvements, such as additional turn lanes, channelization, and coordinated signal timing, should be considered at 13 major intersections within this corridor segment. The following is a list of these intersections.

Major Intersections for Potential Modification			
Muir Ave	North Fifth St	South Fourth St	US 62
KY 1430	East Daugherty Ave	KY 245	KY 332
KY 44	North Bardstown Rd	KY 2053	Old Bardstown Rd
Cedar Creek Rd			

Bridges: Bridge recommendations are based on ratings of substructure, superstructure and deck using the following methodology.

Methodology for Replacement/Rehabilitation Recommendation					
Structures	Substructure Rating	Superstructure Rating	Deck Rating	Culvert Rating	Recommendations
Bridges	<=4	Any	Any	/	Replacement
	=5	Any	Any	/	Rehabilitation
	>=6	<=5	Any	/	Rehabilitation
	>=6	Any	<=5	/	Rehabilitation
	>=6	>=6	>=6	/	None ¹
Culverts	/	/	/	<=4	Replacement
	/	/	/	5 or 6	Rehabilitation
	/	/	/	>=7	None

1) If the bridge is on a corridor with a recommendation of widening, it will be widened (considered as rehabilitation) as necessary to accommodate the additional proposed lanes.

- **Bridges for Rehab/Widening:** Rehab/widening is recommended for a total of four bridges and three culverts along the entire corridor. Note that the bridge rehab is determined based on the "Methodology for Replacement/Rehabilitation Recommendation" table above. If the bridge has a good condition but is within a bottleneck location with recommended widening, it will be widened as necessary to accommodate the additional proposed lanes and the cost of widening is assumed to be the same as bridge rehab for the planning-level cost estimation purpose.

Bridges for Rehab/Widening	
Bridge ID	Feature Intersect
090B00044N	BLUEGRASS PARKWAY
090B00113N	BEECH FORK RIVER
056B00454L	FLOYDS FORK
056B00454R	FLOYDS FORK
015B00093N (Culvert)	WHITTAKER RUN
015B00094N (Culvert)	WHITTAKER RUN
015B00087N (Culvert)	TRIB OF FLOYDS FORK

- **Bridges for Replacement:** None.

Pavement Treatment: The overall pavement condition is good (average PDI = 0.26). Proposed additional lanes will consist of full depth asphalt pavement construction. Spot reconstruction and rehabilitation of existing asphalt pavement lanes might be needed based on more detailed evaluation of the corridor's pavement condition.

Potential Safety Improvement: The table below summarizes safety issues for the corridor and is based on KYTC safety data (LOSS = 4) as well as review of Google Aerial imagery. The table identifies clusters of links with a LOSS value of 4 based on two categories: 1) clusters located in areas where this study already recommends corridor improvements for mobility reasons and 2) clusters not located in areas previously recommended for corridor mobility improvements. For Category 1, it is assumed any corridor improvement based on mobility needs will be constructed to current KYTC standards and will include the necessary safety improvements. Category 2 is intended to identify corridor segments that may warrant improvement for safety reasons, even though improvement might not be needed for mobility. There may also be isolated links with LOSS value of 4 that are not included in the table. Spot improvements could be warranted for those locations but it is assumed these spot improvements do not rise to the level of a corridor improvement; therefore, these locations are not addressed in this planning study. The table further breaks the clusters down by urban and rural designation (based on KYSTMv18 data) because urban and rural roadways tend to have unique typical crash causes and countermeasures.

Potential Safety Improvements			
Category	Locations	Possible Causes	Recommendations
CAT 1: Major clusters of safety issues covered by proposed improvement concepts	From US 62 to Flamingo Dr in Bardstown and from Mt. Washington to I-265	Intersection spacing and congestion, sight distance challenges	Intersection improvements in Bardstown and widening to a 6-lane facility from Mt. Washington to I-265 described above
CAT 2: Other major clusters of safety issues	<u>RURAL</u> From Highgrove Lane to Deerwood Drive (Highgrove, KY)	<u>RURAL</u> Sight distance challenges, geometric deficiencies, speeding	<u>RURAL</u> Sight distance improvements, intersection and signage improvements, improving geometrics.

Proposed Phasing: The proposed spot improvements at major intersections can be constructed separately and ahead of the proposed corridor widening in Bardstown and from Mt. Washington to I-265; however, since the proposed corridor widening in Bardstown is relatively short (2 miles), it may be desirable to construct it at the same time as the spot improvements.

PRELIMINARY ENVIRONMENTAL RED FLAG ANALYSIS

The table below summarizes the presence of environmental critical red flag concerns identified by KYTC within 1,000 ft of proposed improvement locations (Y=Yes; N=No).

Critical Red Flag Issues/Concerns			
Environmental Red Flag Features	<u>Major Bottleneck 1:</u> From Bluegrass Pkwy to US 62 in Bardstown	<u>Major Bottleneck 1:</u> From US 62 to KY 245 (John Rowan Blvd) in Bardstown	<u>Major Bottleneck 2:</u> From KY 44 in Mt. Washington to I-265
Superfunds	N	N	N
Special Waters ¹	N	N	N
Forested Areas	N	N	N
NLEB Habitat Priority	N	N	N
IB Habitat Priority Area	N	N	Y
FAA Airport Runways	N	N	N
Public Hunting Areas	N	N	N
Wildlife Management Areas	N	N	N
Local Parks	Y	Y	N
State/ National Parks	N	N	N
Kentucky Heritage Land Conservation Fund	N	N	N
Area Landmarks	N	N	N
Point Landmarks	Y	Y	Y
National Register of Historic Places Location (Point)	Y	Y	Y
National Register of Historic Places Location (Polygon)	N	N	N

1) Special Waters are defined as Cold Water Aquatic Habitats, Outstanding State/National Resource Waters, Exceptional Waters, State Wild Rivers, and Federally Designated Wild / Scenic Rivers.

RIGHT OF WAY IMPACTS

The table below summarizes the potential needs of additional right-of-way (ROW) for proposed improvement concepts.

Potential Needs of Additional Right of Way		
Locations	Improvement Concepts	Potential Needs of Additional ROW
<u>Major Bottleneck 1:</u> From Bluegrass Pkwy to US 62 in Bardstown	<u>Concept 1:</u> Widening this section to a 4-lane undivided arterial on its existing alignment. <u>Concept 2:</u> Converting to a 3-lane facility on its existing alignment by adding a two-way-left-turn lane.	<u>Concept 1:</u> Yes. <u>Concept 2:</u> Yes, but much would fit within the existing ROW
<u>Major Bottleneck 1:</u> From US 62 to KY 245 (John Rowan Blvd) in Bardstown	Spot improvements at major intersections	Potentially
<u>Major Bottleneck 2:</u> From KY 44 in Mt. Washington to I-265	Widening this section to a 6-lane divided arterial on its existing alignment with spot improvements at intersections and interchanges	Yes, but much would fit within the existing ROW
Interchange modifications at I-265	Interchange modifications	Potentially
Intersection modifications at KY 332	Improvements such as additional turn lanes, channelization, and coordinated signal timing.	Potentially

COST ESTIMATION

Design:	19.2 (\$M)
ROW:	40.6 (\$M)
Utility:	11.1 (\$M)
Construction:	<u>165.7 (\$M)</u>
TOTAL =	236.6 (\$M)

Note:

1. The cost estimation may not include additional costs to address the potential impacts of major utilities (e.g., gas line, major water supplier, transmission line) within the proximity of the corridor, due to the lack of data when the report was prepared. Further investigation is recommended in future studies.
2. Cost estimation was based on 2020 dollars. There is a 1-3% inflation rate. Estimated cost could vary -50% to +250% of the actual number (as a rule of thumb).
3. The widening of a 2-lane facility to a 3-lane facility (with TWLTL or alternating passing lane) is considered as "Minor Widening (Undivided Road) - 2 Lane to 4 Lane".
4. The cost estimation does not include bridges outside of the bottleneck locations, as they are not assumed to rise to the level of a corridor improvement. The cost estimation only includes necessary bridge replacement/rehab/widening costs within the bottleneck locations with proposed widening improvement.
5. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
6. Shoulder widening is not included in the cost estimation, as it is a relatively minor cost.
7. If multiple improvement concepts are recommended for the corridor, only the cost of the larger-scale improvement concept is estimated.

Kentucky Statewide Corridor Plan (Linking Kentucky)

Route: US 31 E / US 150
Segment: 31B
From: I-265 in Louisville
To: Indiana State Line
Counties: Jefferson
Highway District: 5

CORRIDOR SEGMENT OVERVIEW

Segment 31B on US 31 E/US 150 begins at the US 31 E/I-265 interchange in Jefferson County and extends northwest to the Indiana state line in Jefferson County. The corridor segment length is approximately 13.7 miles and currently contains two interchanges at I-265 and I-264.

This segment passes through residential and commercial areas of the City of Louisville in Jefferson County. These areas would be considered urban (according to KYSTMv18 data) with higher densities of homes and commercial buildings adjacent to US 31 E/US 150.

The Consultant discussed the corridor with Kentuckiana Regional Planning & Development Agency (KIPDA) staff, and developed the following observations and recommendations based on these discussions. The urbanized setting makes addressing this segment very difficult in a statewide study. General conditions are:

- Fern Creek (I-265 to the southern end of the Buechel By-pass): The area is characterized by suburban congestion that has developed over the past ten to twenty years. Many traffic signals have been added and traffic from Mt. Washington to I-265, has increased greatly, leading to major suburban congestion. Traffic engineering solutions, signal timing, spot improvements at intersections, and better access management would be more effective and palatable than additional lanes. A detailed study would be recommended.
- Buechel (Buechel By-pass and Bardstown Road south of I-264): High volume of pedestrians, driveways, and potential for redevelopment have become Downtown in this area. Solutions likely lie with access management rather than more lanes.
- Highlands (I-264 to Liberty Street): KIPDA reports likely opposition from the public to projects that add highway capacity. The removal of the lane lights and other changes are being studied and/or have been studied recently by Metro Louisville.
- Downtown (one-way couplet of Market and Main Streets, and Second Street): Any recommendations for this area would have to be coordinated with Metro Louisville. Studies have been conducted to convert the downtown one-way street system to two-way.

EXISTING FACILITY

The table below outlines the typical roadway attributes for this section of US 31 E/US 150 by sub-segment.

Typical Roadway Attributes					
Sub-segment	Functional Classification	Number & Width of Lanes	Shoulder & Width	Median Type & Width	Posted Speed Limit
From I-265 to I-264	Minor Arterial	4, 12'	2' or 4'	16' flush or 20' raised non-mountable	45 mph
From I-264 to the Indiana state line	Minor Arterial	4, 10'	None	None	35 mph

Right of Way: The existing right of way is generally 50' – 150' wide.

Pavement: The average PDI (Pavement Distress Index) for this section of US 31 E is 0.56, which indicates an overall fair pavement condition according to KYTC criteria (Good: 0.00 – 0.35; Fair: 0.36 – 0.65; Poor: 0.66 – 0.99).

Intersections/Interchanges: The tables below outline the existing interchanges, major intersections, and railroad crossings on the corridor.

Interchanges	Interchange Type
I-265	Partial Cloverleaf
I-264	Single Point

Major Intersections ¹			
KY 1065	Ferndale Rd	Fern Creek Rd	Fairground Rd
KY 1747	Watterson Trl	KY 1932	Fegenbush Ln
KY 2251	Buechel Bank Rd	Progress Blvd	Hikes Ln
Bashford Manor Ln	Meadow Dr	Goldsmith Ln	Gardiner Ln
KY 155	Douglass Blvd	US 60	KY 2860
KY 1703	US 150	E Liberty St	E Jefferson St
US 42 (E Main St)	US 42 (Story Ave)	N Shelby St	KY 61 (S Jackson St)
KY 61 (S Preston St)	S Brook St	S 1st St	KY 1020 (S 2nd St)
US 31 W			

1) Only crossroads with functional classification of Minor Collector or above are included.

At-grade Railroad Crossings
None

Access Points: This segment is not access controlled. Throughout the segment, there are residential and commercial driveways and intersecting roadways.

Bridges: The tables below outline the detailed Bridge information for existing bridges on or over this section of US 31 E.

Mainline Bridge Information										
Bridge ID	Feature Intersect	NBIS Classification	Sufficiency Rating	Substandard	Deck Rating	Superstructure Rating	Substructure Rating	Under Clearance (feet)	Horizontal Clearance (feet)	Culvert Rating
056B00137N	S FK BEARGRASS CREEK	Poor	36.2	Yes	N	4	4	0	40.42	N
056B00381N (Culvert)	BR OF CEDAR CREEK	Fair	70	No	N	N	N	0	82	6
056B00382N (Culvert)	CEDAR CREEK	Fair	70	No	N	N	N	0	82	6
056B00105N	NORFOLK SOUTHERN RR	Poor	53.3	No	4	5	4	22.5	60.1	N
056B00024N (Culvert)	S FK BEARGRASS CREEK	Fair	82	No	N	N	N	0	65	6
056B00136N	OHIO RIVER	Fair	49.4	No	6	5	5	13.58	38	N
056B00025N (Culvert)	FERN CREEK	Fair	59	No	N	N	N	0	82	5

Structures Crossing Over the Corridor			
Bridge ID	Facility Carried	Under Clearance (feet)	Horizontal Clearance (feet)
056B00437N	I-264	16.25	73.67
056B00375R	I-265 NB	16.33	52.11
056B00375L	I-265 SB	18.67	51.53
056T00906N	I-65	16.17	67.96
056R00600N	CSX RAILROAD	14.33	60

Other Noteworthy Conditions: None.

TRAFFIC & OPERATIONS

AADT & AADTT: The table below summarizes the 2015 AADT and daily truck volumes by sub-segment.

Traffic Volumes			
Sub-segment	AADT	AADTT	Truck Percentage
From I-265 to I-264	34,500	1,200	3%
From I-264 to the Indiana state line	21,000	800	4%

Mobility: The entirety of this corridor segment is a major traffic bottleneck. (Note: bottlenecks are identified by Level of Travel Time Reliability (LOTTR) > 1.5 or volume/capacity (v/c) > 0.6.) Typical roadway attributes of the bottleneck area can be found above for the entire segment.

Existing Typical Roadway Attributes at Major Traffic Bottlenecks					
Locations	Functional Classification	Number & Width of Lanes	Median Width	Shoulder Width	2015 AADT ¹
Entire corridor	Refer to the Existing Facility section above				66,813

1) The highest traffic volume within the bottleneck based on KYSTMv18 data.

Safety: 13.8% of the corridor mileage has a Level of Safety of Service (LOSS) of 4, meaning these areas have the highest potential to decrease crashes. (Note: LOSS indicates the potential for crash reduction and is broken up into four categories based on Safety Performance Functions (SPFs): LOSS 4 = high; LOSS 3 = moderate to high; LOSS 2 = low to moderate; LOSS 1 = low.) See the table under **Potential Safety Improvement** section for details of locations with LOSS =4, possible causes, and potential safety improvements.

ITS Devices: Less than 1% of the corridor length will have direct access to fiber from the KentuckyWired project. Louisville Metro fiber is in the area and there are Timarc assets around the I-264 and I-265 interchanges.

PROPOSED IMPROVEMENT CONCEPTS

The improvement options noted in this report are not intended to be all-encompassing. Other potential improvements are possible, including innovative solutions that could be cost-effective and address the reasons for improvement. Further study may be needed as part of the project development process.

Proposed Typical Section & Description of Modification: The table below describes the proposed improvement concepts for the identified bottlenecks. The proposed improvements expect to maintain an overall acceptable traffic condition through 2045 ($v/c < 0.85$ in urban areas and $v/c < 0.7$ in rural areas) and address safety issues at bottlenecks.

Proposed Improvement Concepts			
Locations	Improvement Concepts	Notes	Reason for Improvement
From I-265 in Louisville to the Indiana state line	Complete streets with enhanced transit/bike/ped and access management.	This section passes through an urbanized area with high densities of residential and commercial buildings adjacent to this corridor. Existing constraints such as right-of-way limit improvement opportunities. Further study is recommended.	Both LOTTR and the expected v/c in 2045 exceeds the established thresholds.

Potential New Interchanges: None.

Interchanges for Potential Modification: None.

Major Intersections for Potential Modification: None.

Bridges: Bridge recommendations are based on ratings of substructure, superstructure and deck using the following methodology.

Methodology for Replacement/Rehabilitation Recommendation					
Structures	Substructure Rating	Superstructure Rating	Deck Rating	Culvert Rating	Recommendations
Bridges	<=4	Any	Any	/	Replacement
	=5	Any	Any	/	Rehabilitation
	>=6	<=5	Any	/	Rehabilitation
	>=6	Any	<=5	/	Rehabilitation
	>=6	>=6	>=6	/	None ¹
Culverts	/	/	/	<=4	Replacement
	/	/	/	5 or 6	Rehabilitation
	/	/	/	>=7	None

1) If the bridge is on a corridor with a recommendation of widening, it will be widened (considered as rehabilitation) as necessary to accommodate the additional proposed lanes.

- **Bridges for Rehab/Widening:** Rehab/widening is recommended for a total of one bridge and four culverts along the entire corridor. Note that the bridge rehab is determined based on the "Methodology for Replacement/Rehabilitation Recommendation" table above. If the bridge has a good condition but is within a bottleneck location with recommended widening, it will be widened as necessary to accommodate the additional proposed lanes and the cost of widening is assumed to be the same as bridge rehab for the planning-level cost estimation purpose.

Bridges for Rehab/Widening	
Bridge ID	Feature Intersect
056B00381N (Culvert)	BR OF CEDAR CREEK
056B00382N (Culvert)	CEDAR CREEK
056B00024N (Culvert)	S FK BEARGRASS CREEK
056B00136N	OHIO RIVER
056B00025N (Culvert)	FERN CREEK

- **Bridges for Replacement:** Replacement is recommended for a total of two bridges along the entire corridor. Note that the bridge replacement is determined based on the "Methodology for Replacement/Rehabilitation Recommendation" table above. If the bridge needs replacement and is within a bottleneck location with recommended widening, it will be widened during the replacement to accommodate the additional proposed lanes and the cost of bridge replacement is used for the planning-level cost estimation purpose.

Bridges for Replacement	
Bridge ID	Feature Intersect
056B00137N	S FK BEARGRASS CREEK
056B00105N	NORFOLK SOUTHERN RR

Pavement Treatment: The overall pavement condition is fair (average PDI = 0.56). Reconstruction and rehabilitation of existing asphalt pavement lanes are needed based on more detailed evaluation of the corridor's pavement condition.

Potential Safety Improvement: The table below summarizes safety issues for the corridor and is based on KYTC safety data (LOSS = 4) as well as review of Google Aerial imagery. The table identifies clusters of links with a LOSS value of 4 based on two categories: 1) clusters located in areas where this study already recommends corridor improvements for mobility reasons and 2) clusters not located in areas previously recommended for corridor mobility improvements. For Category 1, it is assumed any corridor improvement based on mobility needs will be constructed to current KYTC standards and will include the necessary safety improvements. Category 2 is intended to identify corridor segments that may warrant improvement for safety reasons, even though improvement might not be needed for mobility. There may also be isolated links with LOSS value of 4 that are not included in the table. Spot improvements could be warranted for those locations but it is assumed these spot improvements do not rise to the level of a corridor improvement; therefore, these locations are not addressed in this planning study. The table further breaks the clusters down by urban and rural designation (based on KYSTMv18 data) because urban and rural roadways tend to have unique typical crash causes and countermeasures.

Potential Safety Improvements			
Category	Locations	Possible Causes	Recommendations
CAT 1: Major clusters of safety issues covered by proposed improvement concepts	From I-265 in Louisville to the Indiana state line	Interchange/intersection spacing and congestion	Complete streets with enhanced transit/bike/ped and access management described above
CAT 2: Other major clusters of safety issues	N/A	N/A	N/A

Proposed Phasing: Information is not available for this highly challenging corridor. Further study is needed.

PRELIMINARY ENVIRONMENTAL RED FLAG ANALYSIS

The table below summarizes the presence of environmental critical red flag concerns identified by KYTC within 1,000 ft of proposed improvement locations (Y=Yes; N=No).

Critical Red Flag Issues/Concerns	
Environmental Red Flag Features	From I-265 in Louisville to the Indiana state line
Superfunds	N
Special Waters ¹	N
Forested Areas	N
NLEB Habitat Priority	N
IB Habitat Priority Area	N
FAA Airport Runways	N
Public Hunting Areas	N
Wildlife Management Areas	N
Local Parks	Y
State/ National Parks	N
Kentucky Heritage Land Conservation Fund	N
Area Landmarks	Y
Point Landmarks	Y
National Register of Historic Places Location (Point)	Y
National Register of Historic Places Location (Polygon)	Y

1) Special Waters are defined as Cold Water Aquatic Habitats, Outstanding State/National Resource Waters, Exceptional Waters, State Wild Rivers, and Federally Designated Wild / Scenic Rivers.

RIGHT OF WAY IMPACTS

The table below summarizes the potential needs of additional right-of-way (ROW) for proposed improvement concepts.

Potential Needs of Additional Right of Way		
Locations	Improvement Concepts	Potential Needs of Additional ROW
From I-265 in Louisville to the Indiana state line	Complete streets with enhanced transit/bike/ped and access management.	No

COST ESTIMATION

N/A

Kentucky Statewide Corridor Plan (Linking Kentucky)

Route: KY 11 / KY 32 / US 460
Segment ID: 32
From: AA Highway
To: US 23 in Paintsville
Counties: Mason, Fleming, Rowan, Morgan, Magoffin, Johnson
Highway Districts: 9, 10, 12

CORRIDOR SEGMENT OVERVIEW

Segment 32 on KY 11 begins at the KY 11/KY 9 intersection in Mason County and extends south through Fleming County where it becomes KY 32. From Fleming County, KY 32 extends south to Rowan County, shifting into US 60, then KY 519 in Morehead. KY 519 extends further south to Morgan County, where it becomes KY 7. From Morgan County, KY 7 turns into US 460, where it travels through Magoffin County, eventually ending in Johnson County at US 23 near Paintsville. The corridor segment length is approximately 104 miles and currently contains two interchanges: I-64 and US 23.

This segment passes through the residential and commercial areas of the City of Flemingsburg in Fleming County, the City of Morehead in Rowan County, the City of West Liberty in Morgan County and the City of Salyersville in Magoffin County. These areas would be considered towns (according to KYSTMv18 data) with clusters of homes and commercial buildings adjacent to segment 32. The remainder of this segment passes through rural agricultural areas with homes interspersed along segment 32.

EXISTING FACILITY

The table below outlines the typical roadway attributes for this section of KY 32 by sub-segment.

Typical Roadway Attributes					
Sub-segment	Functional Classification	Number & Width of Lanes	Shoulder & Width	Median Type & Width	Posted Speed Limit
From AA Highway to US 60 in Morehead	Minor Arterial	2-4, 11-12'	Asphalt (3-11'), Asphalt Combination (3-8'), Curbed (2-3'), None	Flush (12-22'), Raised Mountable (12-14'), None	35-55 mph
From US 60 in Morehead to US 460 in Morgan County	Minor Arterial	2, 10-12'	Asphalt Combination (10'), None	Flush (12'), None	35-55 mph
From US 460 in Morgan County to US 23 near Paintsville	Minor Arterial	2-4, 9-12'	Asphalt (10-11'), Asphalt Combination (3-10'), Curbed (0-14'), None	Flush (12-20'), Raised Non Mountable (14'), None	25-55 mph

Right of Way: The table below outlines the general width of existing right of way within the corridor.

General Existing Right of Way Widths		
From	To	General Ex. R/W Width
AA Highway	KY 111	160' – 210'
KY 111	KY 377	60' – 90'
KY 377	KY 172	110' – 160'
KY 172	KY 402	45' – 90'
KY 402	US 23 in Paintsville	110' – 170'

Pavement: The average PDI (Pavement Distress Index) for this section of KY 32 is 0.34, which indicates an overall good pavement condition according to KYTC criteria (Good: 0.00 – 0.35; Fair: 0.36 – 0.65; Poor: 0.66 – 0.99).

Intersections/Interchanges: The tables below outline the existing interchanges, major intersections, and railroad crossings on the corridor.

Interchanges	Interchange Type
US 23	Diamond
I-64	Diamond

Major Intersections ¹			
E Martin Luther King Hwy	Mt Hope Rd	KY Highway 801 S	KY 30
E Maple Leaf Rd	Mueses Mill Rd	Highway 976	E Maple St
KY 419	Plummers Mill Rd	Highway 1002	Gardner Trl
KY 3170	Sharkey Rd	Highway 772	Bert T Combs - Mountain Pkwy Ext
Mt Gilead Rd	Big Brushy Rd	Highway 7	KY 1888
KY 324	Cranston Rd	US 460	KY 114
Bypass Ext	Forest Hill Dr	Highway 172	KY 2020
Helena Rd	West Second St	Highway 364	KY 825
KY 32	West Main St	KY 1081	KY 2039
KY 11	US 60 W	Highway 1000	KY 40
Smith Pk	West Wilkinson Blvd	KY 1081	KY 32X
Tile Storage Ln	KY 134	KY 111	Dry Creek Rd
KY 2019			

1) Only crossroads with functional classification of Minor Collector or above are included.

At-grade Railroad Crossings
None

Access Points: This segment is not access controlled. Throughout the corridor, there are residential and commercial driveways and intersecting roadways.

Bridges: The tables below outline the detailed bridge information for existing bridges on or over this section of KY 32.

Mainline Bridge Information										
Bridge ID	Feature Intersect	NBIS Classification	Sufficiency Rating	Substandard	Deck Rating	Superstructure Rating	Substructure Rating	Vertical Clearance (feet)	Horizontal Clearance (feet)	Culvert Rating
035B00011N (Culvert)	ALLISON CREEK	Good	98.1	No	N	N	N	0	17.72	7
035B00012N	SAND LICK CREEK	Fair	77.3	No	6	5	5	0	34.5	N
035B00013N	FOX CREEK	Fair	81.5	No	6	5	6	0	33	N
035B00014N	INDIAN CREEK	Fair	94.3	No	7	6	6	0	34	N
035B00015N	CRANE CREEK	Fair	82.6	No	7	5	6	0	34	N
035B00079N	FLEMING CREEK	Good	99.5	No	7	7	7	0	45	N
035B00089N (Culvert)	MILL CREEK	Fair	76.8	No	N	N	N	0	47.9	6
058B00058N	Paint Creek	Fair	94.3	No	6	6	6	0	44	N
058B00078N	Paint Creek	Fair	89.6	No	6	8	7	0	44.5	N
077B00006N (Culvert)	ROCKHOUSE FORK	Good	96.8	No	N	N	N	0	44.95	7
077B00061N (Culvert)	ROCKHOUSE FORK	Good	96.8	No	N	N	N	0	43.96	8
077B00081N	BURNING FORK	Good	98.6	No	7	7	7	0	36.75	N
077B00082N	STATE ROAD FORK	Good	94.4	No	7	7	7	0	39.7	N
077B00085N	Licking River	Good	98.5	No	7	8	8	0	44	N
081B00006N (Culvert)	MARSHALL BRANCH	Fair	96.5	No	N	N	N	0	51.84	6
081B00049N	CSX RR & STRODES RUN PIK	Fair	94.4	No	7	6	7	23.25	43.96	N
081B00050N	NORTH FORK LICKING RIVER	Good	92.7	No	7	7	7	0	43.96	N
081B00064N	MILL CREEK	Good	96.9	No	7	7	7	0	43.96	N
088B00018N (Culvert)	SPAWS CREEK	Fair	96.5	No	N	N	N	0	25.26	6
088B00019N (Culvert)	WAR CREEK	Fair	88.4	No	N	N	N	0	27.89	5
088B00021N	WHITE OAK CREEK	Poor	45.2	No	4	4	5	0	18.7	N
088B00022N (Culvert)	BIG SPRING BRANCH	Poor	46.3	No	N	N	N	0	23.95	4
088B00079N	PLEASANT RUN BRANCH	Fair	82.5	No	6	7	7	0	29.86	N
088B00080N	LICKING RIVER	Good	95.6	No	7	7	7	0	39.7	N
088B00090N	ELK FORK / LICKING RIVER	Good	95.9	No	8	8	8	0	45	N
103B00063N	NORTH CRANEY CREEK	Fair	77	No	7	7	6	0	26	N
103B00064N	LITTLE BRUSHY CREEK	Fair	85.2	No	6	6	6	0	34.78	N
103B00093N	NORTH FORKTRIPLETT CREEK	Good	100	No	7	8	7	0	76	N
103B00094N	MORGAN FORK	Good	99.9	No	7	8	7	0	52	N
103B00095N	TRIPLETT CREEK	Good	96.4	No	8	7	8	0	52	N
103B00096N	DRY CREEK	Good	85.8	No	7	8	8	0	52	N
103B00101N	LOWER LICK FORK	Good	86.8	No	8	8	8	0	41	N
103B00102N	LOWER LICK FORK	Good	86.8	No	8	8	8	0	41	N

Structures Crossing Over the Corridor			
Bridge ID	Facility Carried	Under Clearance (feet)	Horizontal Clearance (feet)
103B00056L	I-64 NC	16	40
103B00056R	I-64	16.17	40
103X00100N	PEDESTRIAN BRIDGE	18.60	60.00

Other Noteworthy Conditions: None.

TRAFFIC & OPERATIONS

AADT & AADTT: The table below summarizes the 2015 AADT and daily truck volumes by sub-segment.

Traffic Volumes			
Sub-segment	AADT	AADTT	Truck Percentage
From US 23 in Paintsville to KY 1167 (Dry Creek Rd) south of Morehead	2,400	200	8% ¹
From KY 1167 (Dry Creek Rd) south of Morehead to KY 377 (Cranston Rd) north of Morehead	18,100	1,000	6%
From KY 377 (Cranston Rd) north of Morehead to KY 9 (AA Hwy) in Maysville	4,200	500	11% ²

^{1, 2} Truck percentage obtained from KYTC Traffic Count Reporting System

Mobility: There is one major traffic bottleneck section along this corridor segment. See the table below for details. (Note: bottlenecks are identified by Level of Travel Time Reliability (LOTTR) > 1.5 or volume/capacity (v/c) > 0.6.) There are also a few additional isolated traffic bottlenecks along this corridor. Other than the noted traffic bottleneck sections/locations, traffic condition is acceptable along the remainder of this segment.

Existing Typical Roadway Attributes at Major Traffic Bottlenecks					
Locations	Functional Classification	Number & Width of Lanes	Median Width	Shoulder Width	2015 AADT ¹
From KY 1167 (Dry Creek Rd) south of Morehead to KY 377 (Cranston Rd) north of Morehead	Minor Arterial	2-4, 12'	0-15'	0-10'	25,321

1) The highest traffic volume within the bottleneck based on KYSTMv18 data.

Safety: 3.2% of the corridor mileage has a Level of Safety of Service (LOSS) of 4, meaning these links have the highest potential to decrease crashes. (Note: LOSS indicates the potential for crash reduction and is broken up into four categories based on Safety Performance Functions (SPFs): LOSS 4 = high; LOSS 3 = moderate to high; LOSS 2 = low to moderate; LOSS 1 = low.) See the table under **Potential Safety Improvement** section for details of locations with LOSS =4, possible causes, and potential safety improvements.

ITS Devices: Approximately 2% of the corridor length will have direct access to fiber from the KentuckyWired project.

PROPOSED IMPROVEMENT CONCEPTS

The improvement options noted in this report are not intended to be all-encompassing. Other potential improvements are possible, including innovative solutions that could be cost-effective and address the reasons for improvement. Further study may be needed as part of the project development process.

Proposed Typical Section & Description of Modification: The table below describes the proposed improvement concepts for the identified bottlenecks. The proposed improvements expect to maintain an overall acceptable traffic condition through 2045 ($v/c < 0.85$ in urban areas and $v/c < 0.7$ in rural areas) and address safety issues at bottlenecks.

Proposed Improvement Concepts			
Locations	Improvement Concepts ¹	Notes ²	Reason for Improvement
KY 32 (East of Flemingsburg Bypass) to KY 1895	Improve shoulders	Typical Section: There is an active project in the Six-Year Plan for D, R, and U for safety improvements and pavement rehab on KY 32 from east of the Flemingsburg Bypass to KY 156 (Item Number 9-8903.00)	This is a systemic safety issue
KY 1895 to KY 377	Improve shoulders and provide access management	8' useable shoulders	There are numerous safety issues throughout this section
I-64 to US 60	Widen to 6-lanes and provide access management	3-12' lanes in each direction with 8' useable shoulders and concrete barrier median	The entire section is a bottleneck with safety issues, and numerous sections have an expected v/c in 2045 that exceeds established thresholds
KY 32 to KY 519	Widen to a 4-lane divided section with turn lanes at intersections	2-12' lanes in each direction with 8' useable shoulders and flush median	The expected v/c in 2045 exceeds the established thresholds
KY 172 (in West Liberty) to US 460/KY 114 (in Salyersville)	Improve Shoulders	8' useable shoulders	This is a systemic safety issue

1) The proposed roadway widening concept includes spot improvements at interchanges and major intersections as needed (see details in Interchanges for Potential Modification and Major Intersection for Potential Modification sections below).

2) Improved typical sections are based on KYTC Highway Design Manual.

Potential New Interchanges: None.

Interchanges for Potential Modification: Improvement is proposed for the existing interchange at I-64.

Interchanges for Potential Modification
KY 32 at I-64

Major Intersections for Potential Modification: Improvements, such as additional turn lanes, channelization, and coordinated signal timing, should be considered at 13 major intersections within this corridor segment. The following is a list of these intersections.

Major Intersections for Potential Modification			
E Martin Luther King Hwy	West Main Street	Maysville Rd	US 60 W
KY 11 (Mt. Sterling Rd)	West Wilkinson Blvd	Elizaville Ave	Tile Storage Ln
Forest Hills Dr	KY 40 (Maple St)	West Second St	Bert T Combs – Mountain Pkwy Ext
US 460 (Main St)			

Bridges: Bridge recommendations are based on ratings of substructure, superstructure and deck using the following methodology.

Methodology for Replacement/Rehabilitation Recommendation					
Structures	Substructure Rating	Superstructure Rating	Deck Rating	Culvert Rating	Recommendations
Bridges	<=4	Any	Any	/	Replacement
	=5	Any	Any	/	Rehabilitation
	>=6	<=5	Any	/	Rehabilitation
	>=6	Any	<=5	/	Rehabilitation
	>=6	>=6	>=6	/	None ¹
Culverts	/	/	/	<=4	Replacement
	/	/	/	5 or 6	Rehabilitation
	/	/	/	>=7	None

1) If the bridge is on a corridor with a recommendation of widening, it will be widened (considered as rehabilitation) as necessary to accommodate the additional proposed lanes.

- **Bridges for Rehab/Widening:** Rehab/widening is recommended for a total of four bridges and four culverts along the entire corridor. Note that the bridge rehab is determined based on the "Methodology for Replacement/Rehabilitation Recommendation" table above. If the bridge has a good condition but is within a bottleneck location with recommended widening, it will be widened as necessary to accommodate the additional proposed lanes and the cost of widening is assumed to be the same as bridge rehab for the planning-level cost estimation purpose.

Bridges for Rehab/Widening	
Bridge ID	Feature Intersect
035B00012N	SAND LICK CREEK
035B00013N	FOX CREEK
035B00015N	CRANE CREEK
088B00021N	WHITE OAK CREEK
035B00089N (Culvert)	MILL CREEK
081B00006N (Culvert)	MARSHALL BRANCH
088B00018N (Culvert)	SPAWS CREEK
088B00019N (Culvert)	WAR CREEK

- **Bridges for Replacement:** Replacement is recommended for a total of one culvert. Note that the bridge replacement is determined based on the "Methodology for Replacement/Rehabilitation Recommendation" table above. If the bridge needs replacement and is within a bottleneck location with recommended widening, it will be widened during the replacement to accommodate the additional proposed lanes and the cost of bridge replacement is used for the planning-level cost estimation purpose.

Bridges for Replacement	
Bridge ID	Feature Intersect
088B00022N (Culvert)	BIG SPRING BRANCH

Pavement Treatment: The overall pavement condition is good (average PDI = 0.34). Proposed additional lanes will consist of full depth asphalt pavement construction. Spot reconstruction and rehabilitation of existing asphalt pavement lanes might be needed based on more detailed evaluation of the corridor's pavement condition.

Potential Safety Improvement: The table below summarizes safety issues for the corridor and is based on KYTC safety data (LOSS value = 4), as well as a cursory review of Google Aerial imagery. The table identifies clusters of links with a LOSS value of 4 based on two categories: 1) clusters located in areas where this study already recommends corridor improvements for mobility reasons and 2) clusters not located in areas previously recommended for corridor mobility improvements. For Category 1, it is assumed any corridor improvement based on mobility needs will be constructed to current KYTC standards and will include the necessary safety improvements. Category 2 is intended to identify corridor segments that may warrant improvement for safety reasons, even though improvement might not be needed for mobility. There may also be isolated links with LOSS value of 4 that are not included in the table. Spot improvements could be warranted for those locations but it is assumed these spot improvements do not rise to the level of a corridor improvement; therefore, these locations are not addressed in this planning study. The table further breaks the clusters down by urban and rural designation (based on KYSTMv18 data) because urban and rural roadways tend to have unique typical crash causes and countermeasures.

Potential Safety Improvements			
Category	Locations	Possible Causes	Recommendations
CAT 1: Major clusters of safety issues covered by proposed improvement concepts	KY 1895 to US 60 in Morehead	Interchange/intersection spacing and bottleneck congestion due to traffic entering and existing at the interchange/intersections	Improve shoulders, access management, widening and intersection improvements described in the tables above
CAT 2: Other major clusters of safety issues	N/A	N/A	N/A

Proposed Phasing: The intersections proposed for spot improvements located within the proposed corridor widening in Morehead between I-64 to US 60 and between KY 32 to KY 519 will be improved at the same time the roadway is widened. The proposed spot improvements at the other six major intersections can be constructed at the same time. Interchange modifications at KY 32 and I-64 in Morehead may be more complex and require a longer project development period; therefore, it is recommended to pursue that in a separate phase.

PRELIMINARY ENVIRONMENTAL RED FLAG ANALYSIS

The table below summarizes the presence of critical environmental red flag concerns identified by KYTC within 1,000 ft of proposed improvement locations (Y=Yes; N=No).

Critical Red Flag Issues/Concerns					
Environmental Red Flag Features	KY 32 (East of Flemingsburg Bypass) to KY 1895	KY 1895 to KY 377	I-64 to US 60	KY 32 to KY 519	KY 172 (in West Liberty) to US 460 (in Salyersville)
Superfunds	N	N	N	N	N
Special Waters ¹	Y	N	N	N	N
Forested Areas	Y	Y	Y	Y	Y
NLEB Habitat Priority	Y	Y	Y	Y	Y
IB Habitat Priority Area	N	N	Y	Y	N
FAA Airport Runways	N	N	N	N	N
Public Hunting Areas	N	N	N	N	N
Wildlife Management Areas	N	N	N	N	N
Local Parks	N	N	N	N	Y
State/ National Parks	N	N	N	N	N
Kentucky Heritage Land Conservation Fund	N	N	N	N	N
Area Landmarks	Y	N	Y	Y	Y
Point Landmarks	Y	Y	Y	Y	Y
National Register of Historic Places Location (Point)	Y	Y	Y	Y	Y
National Register of Historic Places Location (Polygon)	N	N	N	N	N

1) Special Waters are defined as Cold Water Aquatic Habitats, Outstanding State/National Resource Waters, Exceptional Waters, State Wild Rivers, and Federally Designated Wild / Scenic Rivers.

RIGHT OF WAY IMPACTS

The table below summarizes the potential right-of-way (ROW) needs for proposed improvement concepts.

Potential Needs of Additional Right of Way		
Location	Improvement Concepts	Potential Needs of Additional ROW
KY 32 (East of Flemingsburg Bypass) to KY 1895	Improve shoulders	Yes – KY 111 to KY 1895
KY 1895 to KY 377	Improve shoulders and provide access management	Yes
I-64 to US 60	Widen to 6-lanes and provide access management	Yes
KY 32 to KY 519	Widen to a 4-lane divided section with turn lanes at intersections	Minimal
KY 172 (in West Liberty) to US 460 (in Salyersville)	Improve Shoulders	Yes
Modified Interchange KY 32 at I-64	Modified Interchange	Potentially
Intersection Modifications at KY 11, US 460, Bert T Combs – Mountain Pkwy Ext	Improvements, such as additional turn lanes, channelization, and coordinated signal timing	No
Intersection Modifications at E Martin Luther King Hwy, Bypass Ext (Flemingsburg), Tile Storage Ln	Improvements, such as additional turn lanes, channelization, and coordinated signal timing	Potentially

COST ESTIMATION

Design:	7.1 (\$M)
ROW:	6.4 (\$M)
Utility:	6.0 (\$M)
Construction:	<u>72.5 (\$M)</u>
TOTAL =	92.0 (\$M)

Note:

1. The cost estimation may not include additional costs to address the potential impacts of major utilities (e.g., gas line, major water supplier, transmission line) within the proximity of the corridor, due to the lack of data when the report was prepared. Further investigation is recommended in future studies.
2. Cost estimation was based on 2020 dollars. There is a 1-3% inflation rate. Estimated cost could vary -50% to +250% of the actual number (as a rule of thumb).
3. The widening of a 2-lane facility to a 3-lane facility (with TWLTL or alternating passing lane) is considered as "Minor Widening (Undivided Road) - 2 Lane to 4 Lane".
4. The cost estimation does not include bridges outside of the bottleneck locations, as they are not assumed to rise to the level of a corridor improvement. The cost estimation only includes necessary bridge replacement/rehab/widening costs within the bottleneck locations with proposed widening improvement. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
5. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
6. Shoulder widening is not included in the cost estimation, as it is a relatively minor cost.
7. If multiple improvement concepts are recommended for the corridor, only the cost of the larger-scale improvement concept is estimated.

Kentucky Statewide Corridor Plan (Linking Kentucky)

Route: US 127
Segment ID: 33A
From: Tennessee State Line
To: I-64 near Frankfort
Counties: Clinton, Russell, Casey, Lincoln, Boyle, Mercer, Anderson, Franklin
Highway Districts: 5, 7, 8

CORRIDOR SEGMENT OVERVIEW

Segment 33A on US 127 begins at the Tennessee state line in Clinton County and extends north through multiple counties to I-64 in Franklin County. The corridor segment length is approximately 127.5 miles long and currently contains three interchanges at Cumberland Expressway, Bluegrass Parkway, and I-64. This segment includes two bypasses: Danville Bypass in the City of Danville and US 127 Bypass in the City of Harrodsburg.

This segment passes through the residential and commercial areas in multiple cities (Albany in Clinton County, Russell Springs in Russell County, Liberty in Casey County, Hustonville in Lincoln County, Junction City and Danville in Boyle County, Harrodsburg in Mercer County, and Lawrenceburg in Anderson County). These areas would be considered towns (according to KYSTMv18 data) with clusters of homes and commercial buildings adjacent to US 127. The remainder of this segment passes through rural agricultural areas with homes interspersed along US 127.

EXISTING FACILITY

The table below outlines the typical roadway attributes for this section of US 127 by sub-segment.

Typical Roadway Attributes					
Sub-segment	Functional Classification	Number & Width of Lanes	Shoulder & Width	Median Type & Width	Posted Speed Limit
From TN state line to S Danville Bypass (US 150 BYP) south of Danville	Principal Arterial	2, 11'	10'	None	55 mph
From S Danville Bypass (US 150 BYP) south of Danville to I-64 near Frankfort	Principal Arterial	4, 12'	10'	32' depressed	55 mph

Right of Way: The existing right of way is generally 50' – 200' wide.

Pavement: The average PDI (Pavement Distress Index) for this section of US 127 is 0.33, which indicates an overall good pavement condition according to KYTC criteria (Good: 0.00 – 0.35; Fair: 0.36 – 0.65; Poor: 0.66 – 0.99).

Intersections/Interchanges: The tables below outline the existing interchanges, major intersections, and railroad crossings on the corridor.

Interchanges	Interchange Type
Cumberland Expressway	Diamond
Bluegrass Parkway	Partial Cloverleaf
I-64	Partial Cloverleaf

Major Intersections ¹			
KY 3066	KY 969	US 127 BUS	KY 738
KY 553	KY 1590	KY 558	KY 3156
KY 90	KY 639	KY 734	KY 3063
KY 1730	KY 55	KY 619	KY 92
N Main St	KY 3280	KY 430	Maple St
KY 80	Lakeway Dr	KY 1545	KY 76
KY 1640	KY 910	KY 70	KY 2341
KY 817	KY 1552 (Short Town Rd)	KY 1552 (Chelf Ridge Rd)	KY 906
KY 78	KY 1194	KY 300	US 150 BYP
KY 37	KY 34	US 150	US 127 (Harrodsburg Rd)
KY 2168	KY 1915	KY 1896	US 127 (Danville Rd)
E Office St	KY 152	US 68	KY 1989
KY 1160	KY 1988	KY 1987	KY 513
Harrodsburg Rd	KY 3359	US 62	KY 44
Frankfort Rd	KY 512	KY 2820	KY 1665
KY 420			

1) Only crossroads with function classification of Minor Collector or above are included.

At-grade Railroad Crossings
US 127 BYP Mile Point 1.3 in Boyle County

Access Points: This segment is not access controlled. Throughout the corridor, there are residential and commercial driveways and intersecting roadways.

Bridges: The tables below outline the detailed Bridge information for existing bridges on or over this section of US 127.

Mainline Bridge Information										
Bridge ID	Feature Intersect	NBIS Classification	Sufficiency Rating	Substandard	Deck Rating	Superstructure Rating	Substructure Rating	Under Clearance (feet)	Horizontal Clearance (feet)	Culvert Rating
011B00051N (Culvert)	MOCKS BRANCH	Fair	83.3	No	N	N	N	0	50.08	6
023B00071N	GOOSE CREEK	Good	94.1	No	7	7	7	0	40	N
023B00017N (Culvert)	COMBEST BRANCH	Good	92	No	N	N	N	0	38	7
023B00016N	SOUTH FORK CREEK	Fair	59.7	No	5	5	5	0	26	N
023B00002N (Culvert)	CARPENTERS CREEK	Fair	91.7	No	N	N	N	0	44	6
069B00032N (Culvert)	BR OF CARPENTER CREEK	Fair	74.4	No	N	N	N	0	46	6
023B00019N (Culvert)	ALLENS CREEK	Good	88.4	No	N	N	N	0	37.7	7
023B00021N	GREEN RIVER IN LIBERTY	Fair	56	No	5	6	5	0	28	N
023B00001N	FREY CREEK	Fair	90.4	No	7	6	6	0	40	N
069B00076N	HANGING FORK @ HOUSTONVI	Fair	92	No	6	7	7	0	44	N
069B00077N	BAUGHMAN BRANCH	Good	89.7	No	7	7	7	0	44	N
069B00079N (Culvert)	BR.OF HARRIS CREEK	Fair	85	No	N	N	N	0	44	6
069B00080N	HARRIS CREEK	Fair	85	No	6	7	6	0	44	N
069B00081N (Culvert)	BR. OF KNOB LICK CK.	Fair	85	No	N	N	N	0	44	6
069B00082N	KNOB LICK CREEK	Fair	85	No	6	7	7	0	44	N
003B00060N	BG PARKWAY	Good	85	No	7	8	7	16.75	50.5	N
069B00078N	NS (CNO&TP SYSTEM)	Fair	93.9	No	6	7	7	0	44	N
104B00035N	GREASY CREEK	Good	99	No	7	8	8	0	48	N
011B00052R	NORFOLK SOUTHERN	Good	98.4	No	7	7	8	24.58	40	N
003B00054R	NS (CNO&TP) SYSTEM	Fair	97.5	No	6	7	6	22.92	42	N
003B00010L	NS (CNO&TP) SYSTEM	Fair	67.5	No	7	7	5	21.67	30.17	N
084B00041L	SOUTHERN RR	Good	99.8	No	7	8	7	23.25	41.5	N
084B00041R	SOUTHERN RAILROAD	Good	99.8	No	7	8	7	24.16	41.5	N
027B00039N (Culvert)	CHURNTOP BRANCH CREEK	Good	98.8	No	N	N	N	99.99	62	7
003B00053R	NS (CNO&TP) SYSTEM	Fair	97.6	No	6	7	7	22.92	42.5	N
003B00009L	NS (CNO&TP) SYSTEM	Fair	78.5	No	7	6	6	22.25	30.16	N
027B00040N	OLD BURKESVILLE ROAD	Good	96.8	No	8	8	8	17.17	48.5	N
011B00039N (Culvert)	CLARKS RUN CREEK	Fair	81	No	N	N	N	0	38	6
027B00036N	SPRING CREEK	Good	99.5	No	7	8	8	0	48	N
097B00138N	Jimmy Darrell & First cr	Good	81	No	9	9	9	22	90	N
027B00037N	US 127	Good	98.8	No	7	8	8	18.7	34	N
027B00038N	CLEAR FORK CREEK	Good	98.8	No	7	8	8	99.99	48	N
037B00096N	I-64	Fair	93.6	No	6	6	6	17.17	46	N

Mainline Bridge Information										
Bridge ID	Feature Intersect	NBIS Classification	Sufficiency Rating	Substandard	Deck Rating	Superstructure Rating	Substructure Rating	Under Clearance (feet)	Horizontal Clearance (feet)	Culvert Rating
084B00042N (Culvert)	PIONEER CREEK	Fair	84	No	N	N	N	0	0	6
069B00033N (Culvert)	UNNAMED STREAM & ACCESS R	Good	89.9	No	N	N	N	0	17	7
104B00022N	CUMBERLAND PARKWAY	Fair	96.7	No	7	6	6	16.75	47.9	N
011B00038L	NS (CNO&TP) SYSTEM	Fair	84.4	No	6	6	5	26.08	44.33	N
023B00020N	CALHOUN CREEK	Fair	70.4	No	5	6	6	0	26	N

Structures Crossing Over the Corridor
None

Other Noteworthy Conditions: None.

TRAFFIC & OPERATIONS

AADT & AADTT: The table below summarizes the 2015 AADT and daily truck volumes by sub-segment.

Traffic Volumes			
Sub-segment	AADT	AADTT	Truck Percentage
From TN state line to KY 1194 south of Danville	3,600	400	11%
From KY 1194 south of Danville to I-64 near Frankfort	10,600	1,700	16%

Mobility: There are two major traffic bottleneck sections along this corridor segment. See the table below for details. (Note: traffic bottlenecks are identified by Level of Travel Time Reliability (LOTTR) > 1.5 or volume/capacity (v/c) > 0.6.) There are also a few additional isolated traffic bottlenecks along this corridor. Other than the noted traffic bottleneck sections/locations, traffic condition is acceptable along the remainder of this segment.

Existing Typical Roadway Attributes at Major Traffic Bottlenecks					
Locations	Functional Classification	Number & Width of Lanes	Median Width	Shoulder Width	2015 AADT ¹
<u>Major Bottleneck 1:</u> From 0.3 mile south of S Danville BYP in Danville to 0.2 mile north of KY 390 (Industry Rd) north of Harrodsburg	Principal Arterial	4, 12'	28' or 32'	0' or 10'	15,186
<u>Major Bottleneck 2:</u> From 0.7 mile south of US 62 in Lawrenceburg to I-64 near Frankfort	Principal Arterial	4, 12'	32'	0' or 10'	26,889

1) The highest traffic volume within the bottleneck based on KYSTMv18 data.

Safety: 5.2% of the corridor mileage has a Level of Safety of Service (LOSS) of 4, meaning these links have the highest potential to decrease crashes. (Note: LOSS indicates the potential for crash reduction and is broken up into four categories based on Safety Performance Functions (SPFs): LOSS 4 = high; LOSS 3 = moderate to high; LOSS 2 = low to moderate; LOSS 1 = low.) See the table under **Potential Safety Improvement** section for details of locations with LOSS =4, possible causes, and potential safety improvements.

ITS Devices: Approximately 1% of the corridor length will have direct access to fiber from the KentuckyWired project.

PROPOSED IMPROVEMENT CONCEPTS

The improvement options noted in this report are not intended to be all-encompassing. Other potential improvements are possible, including innovative solutions that could be cost-effective and address the reasons for improvement. Further study may be needed as part of the project development process.

Proposed Typical Section & Description of Modification: The table below describes the proposed improvement concepts for the identified bottlenecks. The proposed improvements expect to maintain an overall acceptable traffic condition through 2045 ($v/c < 0.85$ in urban areas and $v/c < 0.7$ in rural areas) and address safety issues at bottlenecks.

Proposed Improvement Concepts			
Locations	Improvement Concepts ¹	Notes ²	Reason for Improvement
<u>Major Bottleneck 1:</u> From 0.3 mile south of S Danville BYP in Danville to 0.2 mile north of KY 390 (Industry Rd) north of Harrodsburg	Spot improvement at major intersections	See the Major Intersections for Potential Modification section below	LOTTR exceeds the established thresholds
<u>Major Bottleneck 2:</u> From 0.7 mile south of US 62 to KY 44 in Lawrenceburg	Widening this section to a 6-lane divided arterial on its existing alignment	Improved Typical Section: 3, 12-foot lanes in each direction with 8-foot shoulders. 8-foot flush median.	The expected v/c in 2045 exceeds the established thresholds
<u>Major Bottleneck 2:</u> From KY 44 in Lawrenceburg to I-64 near Frankfort	Spot improvement at major intersections	See the Major Intersections for Potential Modification section below	LOTTR exceeds the established thresholds

1) The proposed roadway widening concept includes spot improvements at interchanges and major intersections as needed (see details in Interchanges for Potential Modification and Major Intersection for Potential Modification sections below).

2) Improved typical sections are based on KYTC Highway Design Manual.

Potential New Interchanges: None.

Interchanges for Potential Modification: None.

Major Intersections for Potential Modification: Improvements, such as additional turn lanes, channelization, and coordinated signal timing, should be considered at 19 major intersections for this corridor segment. The following is a list of these intersections.

Major Intersections for Potential Modification			
KY 1590	KY 90	KY 619	KY 80
KY 300	S Danville BYP	KY 34	US 150
KY 2168	Danville Rd	KY 152	US 68
KY 390	US 62	KY 44	KY 151
KY 1665	KY 420	KY 3166 (Burlington Ln)	

Bridges: Bridge recommendations are based on ratings of substructure, superstructure and deck using the following methodology.

Methodology for Replacement/Rehabilitation Recommendation					
Structures	Substructure Rating	Superstructure Rating	Deck Rating	Culvert Rating	Recommendations
Bridges	<=4	Any	Any	/	Replacement
	=5	Any	Any	/	Rehabilitation
	>=6	<=5	Any	/	Rehabilitation
	>=6	Any	<=5	/	Rehabilitation
	>=6	>=6	>=6	/	None ¹
Culverts	/	/	/	<=4	Replacement
	/	/	/	5 or 6	Rehabilitation
	/	/	/	>=7	None

1) If the bridge is on a corridor with a recommendation of widening, it will be widened (considered as rehabilitation) as necessary to accommodate the additional proposed lanes.

- **Bridges for Rehab/Widening:** Rehab/widening is recommended for a total of five bridges and seven culverts along the entire corridor. Note that the bridge rehab is determined based on the "Methodology for Replacement/Rehabilitation Recommendation" table above. If the bridge has a good condition but is within a bottleneck location with recommended widening, it will be widened as necessary to accommodate the additional proposed lanes and the cost of widening is assumed to be the same as bridge rehab for the planning-level cost estimation purpose.

Bridges for Rehab/Widening	
Bridge ID	Feature Intersect
011B00051N (Culvert)	MOCKS BRANCH
023B00016N	SOUTH FORK CREEK
023B00002N (Culvert)	CARPENTERS CREEK
069B00032N (Culvert)	BR OF CARPENTER CREEK
023B00021N	GREEN RIVER IN LIBERTY
069B00079N (Culvert)	BR. OF HARRIS CREEK
069B00081N (Culvert)	BR. OF KNOB LICK CK.
003B00010L	NS (CNO&TP) SYSTEM

011B00039N (Culvert)	CLARKS RUN CREEK
084B00042N (Culvert)	PIONEER CREEK
011B00038L	NS (CNO&TP) SYSTEM
023B00020N	CALHOUN CREEK

- **Bridges for Replacement:** None.

Pavement Treatment: The overall pavement condition is good (average PDI = 0.33). Proposed additional lanes will consist of full depth asphalt pavement construction. Spot reconstruction and rehabilitation of existing asphalt pavement lanes might be needed based on more detailed evaluation of the corridor's pavement condition.

Potential Safety Improvement: The table below summarizes safety issues for the corridor and is based on KYTC safety data (LOSS = 4) as well as review of Google Aerial imagery. The table identifies clusters of links with a LOSS value of 4 based on two categories: 1) clusters located in areas where this study already recommends corridor improvements for mobility reasons and 2) clusters not located in areas previously recommended for corridor mobility improvements. For Category 1, it is assumed any corridor improvement based on mobility needs will be constructed to current KYTC standards and will include the necessary safety improvements. Category 2 is intended to identify corridor segments that may warrant improvement for safety reasons, even though improvement might not be needed for mobility. There may also be isolated links with LOSS value of 4 that are not included in the table. Spot improvements could be warranted for those locations but it is assumed these spot improvements do not rise to the level of a corridor improvement; therefore, these locations are not addressed in this planning study. The table further breaks the clusters down by urban and rural designation (based on KYSTMv18 data) because urban and rural roadways tend to have unique typical crash causes and countermeasures.

Potential Safety Improvements			
Category	Locations	Possible Causes	Recommendations
CAT 1: Major clusters covered by proposed mobility improvement	From Danville to Harrodsburg and from Lawrenceburg to Frankfort	Intersection spacing and congestion, geometric deficiencies, sight distance challenges.	Spot improvement at major intersections described above.
CAT 2: Major clusters not covered by proposed mobility improvement	<u>URBAN</u> N/A <u>RURAL</u> From US 127 BUS to KY 1590 in Albany. From KY 1194 (McCormack Church Rd) to KY 300 (Shelby St) in Junction City. From KY 1160 (Talmage-Mayo Rd) to Bluegrass Pkwy <u>Mixed URBAN/RURAL</u> From KY 3280 (French Valley Rd) to KY 76 north of Russel Springs.	<u>URBAN</u> Signal deficiencies, capacity deficiencies, geometric deficiencies, queuing between intersections, excessive curb cuts. <u>RURAL</u> Sight distance challenges, geometric deficiencies, interchange/intersection spacing, lack of safety features/advance warnings, lane drop/merge, run off road, speeding.	<u>URBAN</u> Coordinated signal timing/signal modernization, intersection and signage improvements, improved geometrics, added capacity, access control. <u>RURAL</u> Improved geometrics/sight distance, increased spacing between interchange and adjacent intersections, roadside improvements, install/modernize signage, improved lighting/visibility.

Proposed Phasing: The proposed spot improvements at major intersections can be constructed separately and ahead of the proposed corridor widening in Lawrenceburg; however, since the proposed corridor widening in Lawrenceburg is relatively short (1.5 miles), it may be desirable to construct it at the same time as the spot improvements.

PRELIMINARY ENVIRONMENTAL RED FLAG ANALYSIS

The table below summarizes the presence of critical environmental red flag concerns approved by KYTC within 1,000 ft of proposed improvement locations (Y=Yes; N=No).

Critical Red Flag Issues/Concerns			
Environmental Red Flag Features	Major Bottleneck 1: From 0.3 mile south of S Danville BYP in Danville to 0.2 mile north of KY 390 (Industry Rd) north of Harrodsburg	Major Bottleneck 2: From 0.7 mile south of US 62 to KY 44 in Lawrenceburg	Major Bottleneck 2: From KY 44 in Lawrenceburg to I-64 near Frankfort
Superfunds	N	N	N
Special Waters ¹	N	N	N
Forested Areas	N	N	N
NLEB Habitat Priority	N	Y	Y
IB Habitat Priority Area	N	N	N
FAA Airport Runways	N	N	N
Public Hunting Areas	N	N	N
Wildlife Management Areas	N	N	N
Local Parks	Y	Y	N
State/ National Parks	N	N	N
Kentucky Heritage Land Conservation Fund	N	N	N
Area Landmarks	Y	Y	N
Point Landmarks	Y	Y	Y
National Register of Historic Places Location (Point)	Y	N	N
National Register of Historic Places Location (Polygon)	N	N	N

1) Special Waters are defined as Cold Water Aquatic Habitats, Outstanding State/National Resource Waters, Exceptional Waters, State Wild Rivers, and Federally Designated Wild / Scenic Rivers.

RIGHT OF WAY IMPACTS

The table below summarizes the potential right-of-way (ROW) needs for proposed improvement concepts.

Potential Needs of Additional Right of Way		
Locations	Improvement Concepts	Potential ROW Needs
<u>Major Bottleneck 1:</u> From 0.3 mile south of S Danville BYP in Danville to 0.2 mile north of KY 390 (Industry Rd) north of Harrodsburg	Spot improvement at major intersections	Potentially
<u>Major Bottleneck 2:</u> From 0.7 mile south of US 62 to KY 44 in Lawrenceburg	Widening this section to a 6-lane divided arterial on its existing alignment	Potentially, but much would fit within existing ROW
<u>Major Bottleneck 2:</u> From KY 44 in Lawrenceburg to I-64 near Frankfort	Spot improvement at major intersections	No
Intersection modifications at KY 90	Improvements such as additional turn lanes, channelization, and coordinated signal timing	No
Intersection modifications at KY 1590, KY 619, KY 80, KY 300	Improvements such as additional turn lanes, channelization, and coordinated signal timing	Potentially

COST ESTIMATION

Design:	10.9 (\$M)
ROW:	36.4 (\$M)
Utility:	8.5 (\$M)
Construction:	83.0 (\$M)
TOTAL =	138.8 (\$M)

Note:

1. The cost estimation may not include additional costs to address the potential impacts of major utilities (e.g., gas line, major water supplier, transmission line) within the proximity of the corridor, due to the lack of data when the report was prepared. Further investigation is recommended in future studies.
2. Cost estimation was based on 2020 dollars. There is a 1-3% inflation rate. Estimated cost could vary -50% to +250% of the actual number (as a rule of thumb).
3. The widening of a 2-lane facility to a 3-lane facility (with TWLTL or alternating passing lane) is considered as "Minor Widening (Undivided Road) - 2 Lane to 4 Lane".
4. The cost estimation does not include bridges outside of the bottleneck locations, as they are not assumed to rise to the level of a corridor improvement. The cost estimation only includes necessary bridge replacement/rehab/widening costs within the bottleneck locations with proposed widening improvement.
5. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
6. Shoulder widening is not included in the cost estimation, as it is a relatively minor cost.
7. If multiple improvement concepts are recommended for the corridor, only the cost of the larger-scale improvement concept is estimated.

Kentucky Statewide Corridor Plan (Linking Kentucky)

Route: US 127
Segment ID: 33B
From: I-64 near Frankfort
To: I-71
Counties: Franklin, Owen, Gallatin
Highway Districts: 5, 6

CORRIDOR SEGMENT OVERVIEW

Segment 33B on US 127 begins at I-64 near Frankfort in Franklin County and extends north through Owen County to I-71 in Gallatin County. The corridor segment length is approximately 48.2 miles long and currently contains three interchanges at I-64, US 421 (Wilkinson Blvd), and I-71.

This segment passes through the residential and commercial areas in multiple cities (Frankfort in Franklin County, Owenton in Owen County, and Glencoe in Gallatin County). These areas would be considered towns (according to KYSTMv18 data) with clusters of homes and commercial buildings adjacent to US 127. The remainder of this segment passes through rural agricultural areas with homes interspersed along US 127.

EXISTING FACILITY

The table below outlines the typical roadway attributes for this section of US 127 by sub-segment.

Typical Roadway Attributes					
Sub-segment	Functional Classification	Number & Width of Lanes	Shoulder & Width	Median Type & Width	Posted Speed Limit
From I-64 near Frankfort to US 421 (Wilkinson Blvd) in Frankfort	Principal Arterial	4, 12'	2' or 10'	16' raised non-mountable, 14' Raised Mountable, or 19' Concrete Barrier	45 mph
From US 421 (Wilkinson Blvd) in Frankfort to I-71	Minor Arterial	2, 12'	10'	None	55 mph

Right of Way: The existing right of way is generally 50' – 200' wide.

Pavement: The average PDI (Pavement Distress Index) for this section of US 127 is 0.27, which indicates an overall good pavement condition according to KYTC criteria (Good: 0.00 – 0.35; Fair: 0.36 – 0.65; Poor: 0.66 – 0.99).

Intersections/Interchanges: The tables below outline the existing interchanges, major intersections, and railroad crossings on the corridor.

Interchanges	Interchange Type
I-64	Partial Cloverleaf
US 421 (Wilkinson Blvd)	Partial Cloverleaf
I-71	Diamond

Major Intersections ¹			
KY 676	US 60 (Louisville Rd)	KY 1005	US 421/KY 1211
Wilkinson Blvd	KY 420 (Clinton St)	KY 420 (Mero St)	KY 2261
KY 1900	KY 1262	KY 2919	KY 368
KY 607	KY 355	KY 845	KY 22
KY 227	KY 845	KY 36	KY 35
KY 1316	KY 467	KY 455	

1) Only crossroads with functional classification of Minor Collector or above are included.

At-grade Railroad Crossings
None

Access Points: This segment is not access controlled. Throughout the corridor, there are residential and commercial driveways and intersecting roadways.

Bridges: The tables below outline the detailed Bridge information for existing bridges on or over this section of US 127.

Mainline Bridge Information										
Bridge ID	Feature Intersect	NBIS Classification	Sufficiency Rating	Substandard	Deck Rating	Superstructure Rating	Substructure Rating	Under Clearance (feet)	Horizontal Clearance (feet)	Culvert Rating
094B00035N	EAGLE CREEK	Good	99.6	No	7	7	7	0	35.76	N
037B00067N	US 127	Fair	99	No	5	6	6	16.58	43.25	N
037B00091N	CSX RR, BENSON VALLEY RD	Fair	75.3	No	5	6	5	16.17	40.25	N
037B00092N	BENSON CREEK	Fair	99.7	No	6	7	6	0	36	N
037B00093R	KENTUCKY RIVER	Fair	97.9	No	6	6	6	0	32	N
037B00096N	I-64	Fair	93.6	No	6	6	6	17.17	46	N
037B00094L	KENTUCKY RIVER	Fair	97.5	No	6	6	7	0	32	N
037B00089N (Culvert)	OLD RR TUNNEL	Fair	80.2	No	N	N	N	0	34	6
037B00099N	ELKHORN CREEK	Fair	89.1	No	6	6	7	14.42	44	N
037B00101N (Culvert)	LONG BRANCH	Fair	73	No	N	N	N	0	48.8	5
094B00040N	CEDAR CREEK	Good	99.7	No	7	7	7	0	47.9	N
094B00041N	SEVERN CREEK	Fair	99.7	No	7	8	6	0	47.9	N
037B00090N	KY 3505 (DEVILS HOLLOW)	Fair	93.9	No	6	6	7	15.67	88.25	N
039B00007N	I-71	Fair	68.3	No	5	5	5	18	29.86	N

Structures Crossing Over the Corridor			
Bridge ID	Facility Carried	Under Clearance (feet)	Horizontal Clearance (feet)
037B00095N	Pedestrian Bridge across Wilkinson Blvd.	16.42	24

Other Noteworthy Conditions: None.

TRAFFIC & OPERATIONS

AADT & AADTT: The table below summarizes the 2015 AADT and daily truck volumes by sub-segment.

Traffic Volumes			
Sub-segment	AADT	AADTT	Truck Percentage
From I-64 near Frankfort to US 421 (Wilkinson Blvd) in Frankfort	16,000	1,200	7%
From US 421 (Wilkinson Blvd) in Frankfort to I-71	3,000	400	15%

Mobility: There is one major traffic bottleneck section along this corridor segment. See the table below for details. (Note: bottlenecks are identified by Level of Travel Time Reliability (LOTR) > 1.5 or volume/capacity (v/c) > 0.6.) There are also several additional isolated traffic bottlenecks along this corridor. Other than the noted traffic bottleneck sections/locations, traffic condition is acceptable along the remainder of this segment.

Existing Typical Roadway Attributes at Bottlenecks					
Locations	Functional Classification	Number & Width of Lanes	Median Width	Shoulder Width	2015 AADT ¹
From I-64 near Frankfort to US 421 (Wilkinson Blvd) in Frankfort	Principal Arterial	4, 12'	2' or 10'	16'	38,790

1) The highest traffic volume within the bottleneck based on KYSTMv18 data.

Safety: 2.4% of the corridor mileage has a Level of Safety of Service (LOSS) of 4, meaning these links have the highest potential to decrease crashes. (Note: LOSS indicates the potential for crash reduction and is broken up into four categories based on Safety Performance Functions (SPFs): LOSS 4 = high; LOSS 3 = moderate to high; LOSS 2 = low to moderate; LOSS 1 = low.) See the table under **Potential Safety Improvement** section for details of locations with LOSS =4, possible causes, and potential safety improvements.

ITS Devices: Approximately 3% of the corridor length will have direct access to fiber from the KentuckyWired project.

PROPOSED IMPROVEMENT CONCEPTS

The improvement options noted in this report are not intended to be all-encompassing. Other potential improvements are possible, including innovative solutions that could be cost-effective and address the reasons for improvement. Further study may be needed as part of the project development process.

Proposed Typical Section & Description of Modification: The table below describes the proposed improvement concepts for the identified bottlenecks. The proposed improvements expect to maintain an overall acceptable traffic condition through 2045 ($v/c < 0.85$ in urban areas and $v/c < 0.7$ in rural areas) and address safety issues at bottlenecks.

Proposed improvement concepts			
Locations	Improvement Concept	Notes	Reason for Improvement
From I-64 to US 60 (Louisville Rd) in Frankfort	Spot improvements at major intersections including signal coordination, access management, frontage road extension, etc. ¹	See the Major Intersections for Potential Modification section below	Both LOTTR and the expected v/c in 2045 exceeds the established thresholds.
From US 60 (Louisville Rd) to US 421 (Wilkinson Blvd) in Frankfort	None at this time	The traffic bottleneck on the big curve west of Kentucky River is probably caused by the low speed due to geometry and grade. No improvement is proposed at this time after considering the acceptable v/c expected in 2045. Further study is recommended.	

1) The intersection improvements at US 60 were discussed in the KYTC Small Urban Area (SUA) Study for the city of Frankfort.

Potential New Interchanges: None.

Interchanges for Potential Modification: None.

Major Intersections for Potential Modification: Improvements, such as additional turn lanes, channelization, and coordinated signal timing, should be considered at four major intersections within this corridor segment. The following is a list of these intersections.

Major Intersections for Potential Modification			
KY 676	US 60	KY 22 (east)	KY 22 (west)

Bridges: Bridge recommendations are based on ratings of substructure, superstructure and deck using the following methodology.

Methodology for Replacement/Rehabilitation Recommendation					
Structures	Substructure Rating	Superstructure Rating	Deck Rating	Culvert Rating	Recommendations
Bridges	<=4	Any	Any	/	Replacement
	=5	Any	Any	/	Rehabilitation
	>=6	<=5	Any	/	Rehabilitation
	>=6	Any	<=5	/	Rehabilitation
	>=6	>=6	>=6	/	None ¹
Culverts	/	/	/	<=4	Replacement
	/	/	/	5 or 6	Rehabilitation
	/	/	/	>=7	None

1) If the bridge is on a corridor with a recommendation of widening, it will be widened (considered as rehabilitation) as necessary to accommodate the additional proposed lanes.

- **Bridges for Rehab/Widening:** Rehab/widening is recommended for a total of two bridges and two culverts along the entire corridor. Note that the bridge rehab is determined based on the "Methodology for Replacement/Rehabilitation Recommendation" table above. If the bridge has a good condition but is within a bottleneck location with recommended widening, it will be widened as necessary to accommodate the additional proposed lanes and the cost of widening is assumed to be the same as bridge rehab for the planning-level cost estimation purpose.

Bridges for Rehab/Widening	
Bridge ID	Feature Intersect
037B00067N	US 127
037B00091N	CSX RR, BENSON VALLEY RD
037B00089N (Culvert)	OLD RR TUNNEL
037B00101N (Culvert)	LONG BRANCH

- **Bridges for Replacement:** None.

Pavement Treatment: The overall pavement condition is good (average PDI = 0.27). Spot reconstruction and rehabilitation of existing asphalt pavement lanes might be needed based on more detailed evaluation of the corridor's pavement condition.

Potential Safety Improvement: The table below summarizes safety issues for the corridor and is based on KYTC safety data (LOSS = 4) as well as review of Google Aerial imagery. The table identifies clusters of links with a LOSS value of 4 based on two categories: 1) clusters located in areas where this study already recommends corridor improvements for mobility reasons and 2) clusters not located in areas previously recommended for corridor mobility improvements. For Category 1, it is assumed any corridor improvement based on mobility needs will be constructed to current KYTC standards and will include the necessary safety improvements. Category 2 is intended to identify corridor segments that may warrant

improvement for safety reasons, even though improvement might not be needed for mobility. There may also be isolated links with LOSS value of 4 that are not included in the table. Spot improvements could be warranted for those locations but it is assumed these spot improvements do not rise to the level of a corridor improvement; therefore, these locations are not addressed in this planning study. The table further breaks the clusters down by urban and rural designation (based on KYSTMv18 data) because urban and rural roadways tend to have unique typical crash causes and countermeasures.

Potential Safety Improvements			
Category	Locations	Possible Causes	Recommendations
CAT 1: Major clusters of safety issues covered by proposed improvement concepts	From I-64 near Frankfort to US 421 (Wilkinson Blvd) in Frankfort	Intersection spacing and congestion, sight distance challenges, geometric deficiencies	Spot improvements at major intersections described above
CAT 2: Other major clusters of safety issues	<u>RURAL</u> From Owenton Rd to 0.6 mile north of KY 1262 north of Frankfort and from Beck St to Blanton St in Owenton.	<u>RURAL</u> Sight distance challenges, excessive curb cuts, geometric deficiencies, speeding	<u>RURAL</u> Improving geometrics/sight distance, roadside improvements.

Proposed Phasing: The proposed spot improvements at four major intersections can be constructed at the same time.

PRELIMINARY ENVIRONMENTAL RED FLAG ANALYSIS

The table below summarizes the presence of critical environmental red flag concerns identified by KYTC within 1,000 ft of proposed improvement locations (Y=Yes; N=No).

Critical Red Flag Issues/Concerns	
Environmental Red Flag Features	From I-64 to US 60 (Louisville Rd) in Frankfort
Superfunds	N
Special Waters ¹	N
Forested Areas	N
NLEB Habitat Priority	N
IB Habitat Priority Area	N
FAA Airport Runways	N
Public Hunting Areas	N
Wildlife Management Areas	N
Local Parks	N
State/ National Parks	N
Kentucky Heritage Land Conservation Fund	N
Area Landmarks	Y
Point Landmarks	Y
National Register of Historic Places Location (Point)	N
National Register of Historic Places Location (Polygon)	N

1) Special Waters are defined as Cold Water Aquatic Habitats, Outstanding State/National Resource Waters, Exceptional Waters, State Wild Rivers, and Federally Designated Wild / Scenic Rivers.

RIGHT OF WAY IMPACTS

The table below summarizes the potential needs of additional right-of-way (ROW) for proposed improvement concepts.

Potential Needs of Additional Right of Way		
Locations	Improvement Concepts	Potential Needs of Additional ROW
From I-64 to US 60 (Louisville Rd) in Frankfort	Spot improvements at major intersections including signal coordination, access management, frontage road extension, etc.	Potentially
Intersection modifications at KY 22 (west)	Improvements such as additional turn lanes, channelization, and coordinated signal timing	No
Intersection modifications at KY 22 (east)	Improvements such as additional turn lanes, channelization, and coordinated signal timing	Potentially

COST ESTIMATION

Design:	2.0 (\$M)
ROW:	7.2 (\$M)
Utility:	1.6 (\$M)
Construction:	<u>13.0 (\$M)</u>
TOTAL =	23.7 (\$M)

Note:

1. The cost estimation may not include additional costs to address the potential impacts of major utilities (e.g., gas line, major water supplier, transmission line) within the proximity of the corridor, due to the lack of data when the report was prepared. Further investigation is recommended in future studies.
2. Cost estimation was based on 2020 dollars. There is a 1-3% inflation rate. Estimated cost could vary -50% to +250% of the actual number (as a rule of thumb).
3. The widening of a 2-lane facility to a 3-lane facility (with TWLTL or alternating passing lane) is considered as "Minor Widening (Undivided Road) - 2 Lane to 4 Lane".
4. The cost estimation does not include bridges outside of the bottleneck locations, as they are not assumed to rise to the level of a corridor improvement. The cost estimation only includes necessary bridge replacement/rehab/widening costs within the bottleneck locations with proposed widening improvement.
5. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
6. Shoulder widening is not included in the cost estimation, as it is a relatively minor cost.
7. If multiple improvement concepts are recommended for the corridor, only the cost of the larger-scale improvement concept is estimated.

Kentucky Statewide Corridor Plan (Linking Kentucky)

Route: US 231/US 31 E
Segment ID: 35A
From: TN State Line
To: Natcher Parkway (South of Bowling Green)
Counties: Allen, Warren
Highway Districts: 3

CORRIDOR SEGMENT OVERVIEW

Segment 35A on US 231/US 31 E begins at the Tennessee State Line in Allen County and extends north to Natcher Parkway in Warren County. The corridor segment is approximately 23.8 miles long and currently contains no interchanges.

This segment passes through the residential and commercial areas of the City of Scottsville in Allen County. These areas would be considered town (according to KYSTMv18 data) with clusters of homes and commercial buildings adjacent to US 231/US 31 E. The remainder of this segment passes through rural agricultural areas with homes interspersed along US 231/US 31 E.

EXISTING FACILITY

The table below outlines the typical roadway attributes for this section of US 231/US 31 E by sub-segment.

Typical Roadway Attributes					
Sub-segment	Functional Classification	Number & Width of Lanes	Shoulder & Width	Median Type & Width	Posted Speed Limit
From TN state line to US 31 E (New Glasgow Rd) in Scottsville	Principal Arterial	2, 12'	10'	None	55 mph
From US 31 E (New Glasgow Rd) in Scottsville to Natcher Pkwy	Principal Arterial	4, 12'	10'	32' depressed	65 mph

Right of Way: The existing right of way is generally 50' – 200' wide.

Pavement: The average PDI (Pavement Distress Index) for this section of US 231/US 31 E is 0.20, which indicates an overall good pavement condition according to KYTC criteria (Good: 0.00 – 0.35; Fair: 0.36 – 0.65; Poor: 0.66 – 0.99).

Intersections/Interchanges: The tables below outline the existing interchanges, major intersections, and railroad crossings on the corridor.

Interchanges
None

Major Intersections ¹			
KY 482	KY 1147	KY 100	KY 980
US 31 E (New Glasgow Rd)	KY 3241	KY 1332	KY 240
Natcher Pkwy			

1) Only crossroads with functional classification of Minor Collector or above are included.

At-grade Railroad Crossings
None

Access Points: This segment is not access controlled. Throughout the corridor, there are residential and commercial driveways and intersecting roadways.

Bridges: The tables below outline the detailed Bridge information for existing bridges on or over this section of US 231/US 31 E.

Mainline Bridge Information										
Bridge ID	Feature Intersect	NBIS Classification	Sufficiency Rating	Substandard	Deck Rating	Superstructure Rating	Substructure Rating	Under Clearance (feet)	Horizontal Clearance (feet)	Culvert Rating
002B00012N	LITTLE TRAMMEL CREEK	Fair	80.3	No	6	6	6	0	30	N
002B00044N	TRAMMEL FORK CREEK	Fair	82.7	No	6	6	5	0	44	N
114B00084R	UNNAMED CHANNEL	Fair	100	No	6	7	7	0	41	N
114B00085R	DRAKES CREEK	Fair	89	No	6	5	6	0	41.01	N
114B00084L	UNNAMED CHANNEL	Fair	100	No	6	6	7	0	41	N
114B00085L	DRAKES CREEK	Fair	99	No	5	6	6	0	41	N

Structures Crossing Over the Corridor
None

Other Noteworthy Conditions: None.

TRAFFIC & OPERATIONS

AADT & AADTT: The table below summarizes the 2015 AADT and daily truck volumes by sub-segment.

Traffic Volumes			
Sub-segment	AADT	AADTT	Truck Percentage
From TN state line to KY 100 in Scottsville	5,500	1,400	25% ¹
From KY 100 in Scottsville to Natcher Pkwy	12,500	1,300	10%

1) Truck percentage obtained from KYTC Traffic Count Reporting System

Mobility: There is one major traffic bottleneck section along this corridor segment. See the table below for details. (Note: bottlenecks are identified by Level of Travel Time Reliability (LOTTR) > 1.5 or volume/capacity (v/c) > 0.6.) There is also an isolated bottleneck at the intersection with Natcher Parkway. Other than the noted traffic bottleneck sections/locations, traffic condition is acceptable along the remainder of this segment.

Existing Typical Roadway Attributes at Major Traffic Bottlenecks					
Locations	Functional Classification	Number & Width of Lanes	Median Width	Shoulder Width	2015 AADT ¹
From KY 100 (Franklin Rd) to KY 980 (Veterans Memorial Blvd) in Scottsville	Principal Arterial	2, 12'	12'	10'	18,050

1) The highest traffic volume within the bottleneck based on KYSTMv18 data.

Safety: 9.1% of the corridor mileage has a Level of Safety of Service (LOSS) of 4, meaning these links have the highest potential to decrease crashes. (Note: LOSS indicates the potential for crash reduction and is broken up into four categories based on Safety Performance Functions (SPFs): LOSS 4 = high; LOSS 3 = moderate to high; LOSS 2 = low to moderate; LOSS 1 = low.) See the table under **Potential Safety Improvement** section for details of locations with LOSS =4, possible causes, and potential safety improvements.

ITS Devices: This corridor does not have direct access to fiber optic cable.

PROPOSED IMPROVEMENT CONCEPTS

The improvement options noted in this report are not intended to be all-encompassing. Other potential improvements are possible, including innovative solutions that could be cost-effective and address the reasons for improvement. Further study may be needed as part of the project development process.

Proposed Typical Section & Description of Modification: The table below describes the proposed improvement concepts for the identified bottleneck. The proposed improvements expect to maintain an overall acceptable traffic condition through 2045 (v/c < 0.85 in urban areas and v/c < 0.7 in rural areas) and address safety issues at bottlenecks.

Proposed Improvement Concepts			
Locations	Improvement Concept ¹	Notes ²	Reason for Improvement
From KY 100 (Franklin Rd) to KY 980 (Veterans Memorial Blvd) in Scottsville	Converting to a 2+1 roadway facility (one lane each direction plus an alternating passing lane) on its existing alignment with intersection improvements at KY 100 and KY 980	Improved Typical Section: 1, 12-foot lane in each direction with 8-foot shoulders. In addition, an alternating 12-foot passing lane.	The expected v/c in 2045 exceeds the established thresholds.

1) The proposed roadway widening concept includes spot improvements at interchanges and major intersections as needed (see the Interchanges for Potential Modification and Major Intersection for Potential Modification sections below).

2) Improved typical sections are based on KYTC Highway Design Manual.

Potential New Interchanges: None.

Interchanges for Potential Modification: None.

Major Intersections for Potential Modification: Improvements, such as additional turn lanes, channelization, and coordinated signal timing, should be considered at three major intersections for this corridor segment. The following is a list of these intersections.

Major Intersections for Potential Modification			
KY 100	KY 980	Natcher Pkwy	

Bridges: Bridge recommendations are based on ratings of substructure, superstructure and deck using the following methodology.

Methodology for Replacement/Rehabilitation Recommendation					
Structures	Substructure Rating	Superstructure Rating	Deck Rating	Culvert Rating	Recommendations
Bridges	<=4	Any	Any	/	Replacement
	=5	Any	Any	/	Rehabilitation
	>=6	<=5	Any	/	Rehabilitation
	>=6	Any	<=5	/	Rehabilitation
	>=6	>=6	>=6	/	None ¹
Culverts	/	/	/	<=4	Replacement
	/	/	/	5 or 6	Rehabilitation
	/	/	/	>=7	None

1) If the bridge is on a corridor with a recommendation of widening, it will be widened (considered as rehabilitation) as necessary to accommodate the additional proposed lanes.

- **Bridges for Rehab/Widening:** Rehab/widening is recommended for a total of three bridges along the entire corridor. Note that the bridge rehab is determined based on the "Methodology for Replacement/Rehabilitation Recommendation" table above. If the bridge has a good condition but is within a bottleneck location with recommended widening, it will be widened as necessary

to accommodate the additional proposed lanes and the cost of widening is assumed to be the same as bridge rehab for the planning-level cost estimation purpose.

Bridges for Rehab/Widening	
Bridge ID	Feature Intersect
002B00044N	TRAMMEL FORK CREEK
114B00085R	DRAKES CREEK
114B00085L	DRAKES CREEK

- **Bridges for Replacement:** None.

Pavement Treatment: The overall pavement condition is good (average PDI = 0.20). Proposed additional lanes will consist of full depth asphalt pavement construction. Spot reconstruction and rehabilitation of existing asphalt pavement lanes might be needed based on more detailed evaluation of the corridor's pavement condition.

Potential Safety Improvement: The table below summarizes safety issues for the corridor and is based on KYTC safety data (LOSS value = 4), as well as a cursory review of Google Aerial imagery. The table identifies clusters of links with a LOSS value of 4 based on two categories: 1) clusters located in areas where this study already recommends corridor improvements for mobility reasons and 2) clusters not located in areas previously recommended for corridor mobility improvements. For Category 1, it is assumed any corridor improvement based on mobility needs will be constructed to current KYTC standards and will include the necessary safety improvements. Category 2 is intended to identify corridor segments that may warrant improvement for safety reasons, even though improvement might not be needed for mobility. There may also be isolated links with LOSS value of 4 that are not included in the table. Spot improvements could be warranted for those locations but it is assumed these spot improvements do not rise to the level of a corridor improvement; therefore, these locations are not addressed in this planning study. The table further breaks the clusters down by urban and rural designation (based on KYSTMv18 data) because urban and rural roadways tend to have unique typical crash causes and countermeasures.

Potential Safety Improvements			
Category	Locations	Possible Causes	Recommendations
CAT 1: Major clusters of safety issues covered by proposed improvement concepts	From KY 100 (Franklin Rd) to KY 980 (Veterans Memorial Blvd) in Scottsville	Intersection spacing and capacity deficiencies, sight distance challenges	Converting to a 2+1 facility and intersection improvements described above
CAT 2: Major clusters not covered by proposed mobility improvement	<u>RURAL</u> From KY 2629 (Mt Lebanon Church Rd) to Drakes Blvd in Alvaton	<u>RURAL</u> Sight distance challenges, geometric deficiencies, lack of safety features/advance warnings, speeding	<u>RURAL</u> Improved geometrics/sight distance, install/modernize signage, improved lighting/visibility.

Proposed Phasing: The proposed spot improvements at major intersections can be constructed separately and ahead of the proposed corridor widening in Scottsville; however, since the proposed corridor widening in Scottsville is relatively short (1.2 miles), it may be desirable to construct it at the same time as the spot improvements.

PRELIMINARY ENVIRONMENTAL RED FLAG ANALYSIS

The table below summarizes the presence of critical environmental red flag concerns identified by KYTC within 1,000 ft of proposed improvement locations (Y=Yes; N=No).

Critical Red Flag Issues/Concerns	
Environmental Red Flag Features	From KY 100 (Franklin Rd) to KY 980 (Veterans Memorial Blvd) in Scottsville
Superfunds	N
Special Waters ¹	N
Forested Areas	N
NLEB Habitat Priority	N
IB Habitat Priority Area	N
FAA Airport Runways	N
Public Hunting Areas	N
Wildlife Management Areas	N
Local Parks	Y
State/ National Parks	N
Kentucky Heritage Land Conservation Fund	N
Area Landmarks	Y
Point Landmarks	N
National Register of Historic Places Location (Point)	N
National Register of Historic Places Location (Polygon)	N

1) Special Waters are defined as Cold Water Aquatic Habitats, Outstanding State/National Resource Waters, Exceptional Waters, State Wild Rivers, and Federally Designated Wild / Scenic Rivers.

RIGHT OF WAY IMPACTS

The table below summarizes the potential needs of additional right-of-way (ROW) for proposed improvement concepts.

Potential Needs of Additional Right of Way		
Locations	Improvement Concepts	Potential Needs of Additional ROW
From KY 100 (Franklin Rd) to KY 980 (Veterans Memorial Blvd) in Scottsville	Converting to a 3-lane facility (one lane each direction plus an alternating passing lane) on its existing alignment with intersection improvements at KY 100 and KY 980	No
Intersection modifications at Natcher Pkwy	Improvements such as additional turn lanes, channelization, and coordinated signal timing	No

COST ESTIMATION

Design:	1.6 (\$M)
ROW:	1.1 (\$M)
Utility:	1.0 (\$M)
Construction:	<u>12.8 (\$M)</u>
TOTAL =	16.5 (\$M)

Note:

1. The cost estimation may not include additional costs to address the potential impacts of major utilities (e.g., gas line, major water supplier, transmission line) within the proximity of the corridor, due to the lack of data when the report was prepared. Further investigation is recommended in future studies.
2. Cost estimation was based on 2020 dollars. There is a 1-3% inflation rate. Estimated cost could vary -50% to +250% of the actual number (as a rule of thumb).
3. The widening of a 2-lane facility to a 3-lane facility (with TWLTL or alternating passing lane) is considered as "Minor Widening (Undivided Road) - 2 Lane to 4 Lane".
4. The cost estimation does not include bridges outside of the bottleneck locations, as they are not assumed to rise to the level of a corridor improvement. The cost estimation only includes necessary bridge replacement/rehab/widening costs within the bottleneck locations with proposed widening improvement.
5. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
6. Shoulder widening is not included in the cost estimation, as it is a relatively minor cost.
7. If multiple improvement concepts are recommended for the corridor, only the cost of the larger-scale improvement concept is estimated.

Kentucky Statewide Corridor Plan (Linking Kentucky)

Route: US 231
Segment ID: 35B
From: Natcher Pkwy (South of Bowling Green)
To: US 68 in Bowling Green
Counties: Warren
Highway Districts: 3

CORRIDOR SEGMENT OVERVIEW

Segment 35B on US 231 begins at Natcher Parkway in Warren County and extends northwest to US 68 in Warren County. The corridor segment length is approximately 7.3 miles and currently contains one interchange at I-65.

This segment passes through the residential and commercial areas of the City of Bowling Green in Warren County. These areas would be considered town or city (according to KYSTMv18 data) with moderate densities of homes and commercial buildings adjacent to US 231.

EXISTING FACILITY

The table below outlines the typical roadway attributes for this section of US 231.

Typical Roadway Attributes					
Segment	Functional Classification	Number & Width of Lanes	Shoulder & Width	Median Type & Width	Posted Speed Limit
From Natcher Parkway to US 68	Principal Arterial	4, 12'	10'	16' flush	45 mph

Right of Way: The existing right of way is generally 80' – 120' wide.

Pavement: The average PDI (Pavement Distress Index) for this section of US 231 is 0.27, which indicates an overall good pavement condition according to KYTC criteria (Good: 0.00 – 0.35; Fair: 0.36 – 0.65; Poor: 0.66 – 0.99).

Intersections/Interchanges: The tables below outline the existing interchanges, major intersections, and railroad crossings on the corridor.

Interchanges	Interchange Type
I-65	Single Point Urban Interchange

Major Intersections ¹			
KY 622	KY 2158	KY 884	Cave Mill Rd
KY 880	Westen St	Smallhouse Rd	US 31 W
US 68			

1) Only crossroads with functional classification of Minor Collector or above are included.

At-grade Railroad Crossings
None

Access Points: This segment is not access controlled. Throughout the corridor, there are residential and commercial driveways and intersecting roadways.

Bridges: The tables below outline the detailed Bridge information for existing bridges on or over this section of US 231.

Mainline Bridge Information										
Bridge ID	Feature Intersect	NBIS Classification	Sufficiency Rating	Substandard	Deck Rating	Superstructure Rating	Substructure Rating	Vertical Clearance (feet)	Horizontal Clearance (feet)	Culvert Rating
114B00080N	CSX RAILROAD	Fair	100	No	6	6	7	24.83	66	N
114B00102N	Interstate 65	Fair	85.2	No	7	6	8	16.75	328.05	N

Structures Crossing Over the Corridor
None

Other Noteworthy Conditions: None.

TRAFFIC & OPERATIONS

AADT & AADTT: The table below summarizes the 2015 AADT and daily truck volumes by sub-segment.

Traffic Volumes			
Segment	AADT	AADTT	Truck Percentage
From Natcher Parkway to US 68	20,300	1,400	7%

Mobility: There is one major traffic bottleneck section along this corridor segment. See the table below for details. (Note: bottlenecks are identified by Level of Travel Time Reliability (LOTTR) > 1.5 or volume/capacity (v/c) > 0.6.) Other than the section noted below, the remainder of this segment maintains an acceptable traffic condition.

Existing Typical Roadway Attributes at Major Traffic Bottlenecks					
Locations	Functional Classification	Number & Width of Lanes	Median Width	Shoulder Width	2015 AADT ¹
From KY 622 (Plano Rd) to US 68 in Bowling Green	Principal Arterial	4, 12'	16'	10'	31,742

1) The highest traffic volume within the bottleneck based on KYSTMv18 data.

Safety: 14.2% of the corridor mileage has a Level of Safety of Service (LOSS) of 4, meaning these links have the highest potential to decrease crashes. (Note: LOSS indicates the potential for crash reduction and is broken up into four categories based on Safety Performance Functions (SPFs): LOSS 4 = high; LOSS 3 = moderate to high; LOSS 2 = low to moderate; LOSS 1 = low.) See the table under **Potential Safety Improvement** section for details of locations with LOSS =4, possible causes, and potential safety improvements.

ITS Devices: Less than 1% of the corridor length will have direct access to fiber from the KentuckyWired project.

PROPOSED IMPROVEMENT CONCEPTS

The improvement options noted in this report are not intended to be all-encompassing. Other potential improvements are possible, including innovative solutions that could be cost-effective and address the reasons for improvement. Further study may be needed as part of the project development process.

Proposed Typical Section & Description of Modification: The table below describes the proposed improvement concepts for the identified bottlenecks. The proposed improvements expect to maintain an overall acceptable traffic condition through 2045 ($v/c < 0.85$ in urban areas and $v/c < 0.7$ in rural areas) and address safety issues at bottlenecks.

Proposed Improvement Concepts			
Locations	Improvement Concepts ^{1,3}	Notes ²	Reason for Improvement
From KY 622 (Plano Rd) to US 68 in Bowling Green	Widening this section to a 6-lane divided arterial on the existing alignment	Improved Typical Section: 3, 12-foot lanes in each direction with 10-foot shoulders. 16-foot flush median.	Both LOTTR and the expected v/c in 2045 exceed the established thresholds.

1) The proposed roadway widening concept includes spot improvements at interchanges and major intersections as needed (see the Interchanges for Potential Modification and Major Intersection for Potential Modification sections below).

2) Improved typical sections are based on KYTC Highway Design Manual.

3) KYTC's US 231 Scottsville Road Study (2015) recommended low-cost and short-term spot improvements along the corridor between I-65 and US 231 Business/KY 880 (Campbell Lane/Lovers Lane). The study also recommended a 6-lane widening concept as a long-term solution to address anticipated capacity constraints and existing safety concerns.

Potential New Interchanges: None.

Interchanges for Potential Modification: None. Note that the single-point urban interchange (SPUI) at I-65 has been constructed with three lanes in each direction on the bridge. KYTC has a potential project in CHAF (IP20190040) to adjust signals' locations and improve traffic operation at the interchange.

Major Intersections for Potential Modification: Improvements, such as additional turn lanes, channelization, and coordinated signal timing, should be considered at eight major intersections within this corridor segment. The following is a list of these intersections.

Major Intersections for Potential Modification			
KY 2158	KY 884	Cave Mill Rd	KY 880
Western St	Smallhouse Rd	US 31 W	US 68

Bridges: Bridge recommendations are based on ratings of substructure, superstructure and deck using the following methodology.

Methodology for Replacement/Rehabilitation Recommendation					
Structures	Substructure Rating	Superstructure Rating	Deck Rating	Culvert Rating	Recommendations
Bridges	<=4	Any	Any	/	Replacement
	=5	Any	Any	/	Rehabilitation
	>=6	<=5	Any	/	Rehabilitation
	>=6	Any	<=5	/	Rehabilitation
	>=6	>=6	>=6	/	None ¹
Culverts	/	/	/	<=4	Replacement
	/	/	/	5 or 6	Rehabilitation
	/	/	/	>=7	None

1) If the bridge is on a corridor with a recommendation of widening, it will be widened (considered as rehabilitation) as necessary to accommodate the additional proposed lanes.

- **Bridges for Rehab/Widening:** Rehab/widening is recommended for a total of one bridge along the entire corridor. Note that the bridge rehab is determined based on the "Methodology for Replacement/Rehabilitation Recommendation" table above. If the bridge has a good condition but is within a bottleneck location with recommended widening, it will be widened as necessary to accommodate the additional proposed lanes and the cost of widening is assumed to be the same as bridge rehab for the planning-level cost estimation purpose.

Bridges for Rehab/Widening	
Bridge ID	Feature Intersect
114B00080N	CSX RAILROAD

- **Bridges for Replacement:** None.

Pavement Treatment: The overall pavement condition is good (average PDI = 0.27). Proposed additional lanes will consist of full depth asphalt pavement construction. Spot reconstruction and rehabilitation of existing asphalt pavement lanes might be needed based on more detailed evaluation of the corridor's pavement condition.

Potential Safety Improvement: The table below summarizes safety issues for the corridor and is based on KYTC safety data (LOSS value = 4), as well as a cursory review of Google Aerial imagery. The table identifies clusters of links with a LOSS value of 4 based on two categories: 1) clusters located in areas where this study already recommends corridor improvements for mobility reasons and 2) clusters not located in areas previously recommended for corridor mobility improvements. For Category 1, it is assumed any corridor improvement based on mobility needs will be constructed to current KYTC standards and will include the necessary safety improvements. Category 2 is intended to identify corridor segments that may warrant improvement for safety reasons, even though improvement might not be needed for mobility. There may also be isolated links with LOSS value of 4 that are not included in the table. Spot improvements could be warranted for those locations but it is assumed these spot improvements do not rise to the level of a corridor improvement; therefore, these locations are not addressed in this planning study. The table further breaks the clusters down by urban and rural designation (based on KYSTMv18 data) because urban and rural roadways tend to have unique typical crash causes and countermeasures.

Potential Safety Improvements			
Category	Locations	Possible Causes	Recommendations
CAT 1: Major clusters covered by proposed mobility improvement	From KY 884 (Three Springs Rd) to US 31 W (Nashville Rd) in Bowling Green	Intersection spacing and congestion, geometric deficiencies	Widening to a 6-lane facility described above
CAT 2: Major clusters not covered by proposed mobility improvement	N/A	N/A	N/A

Proposed Phasing: Since all intersections proposed for spot improvements are located within the proposed corridor widening in Bowling Green, they will be improved at the same time the roadway is widened.

PRELIMINARY ENVIRONMENTAL RED FLAG ANALYSIS

The table below summarizes the presence of critical environmental red flag concerns identified by KYTC within 1,000 ft of proposed improvement locations (Y=Yes; N=No).

Critical Red Flag Issues/Concerns	
Environmental Red Flag Features	From KY 622 (Plano Rd) to US 68 in Bowling Green
Superfunds	N
Special Waters ¹	N
Forested Areas	N
NLEB Habitat Priority	Y
IB Habitat Priority Area	N
FAA Airport Runways	N
Public Hunting Areas	N
Wildlife Management Areas	N
Local Parks	Y
State/ National Parks	N
Kentucky Heritage Land Conservation Fund	N

Critical Red Flag Issues/Concerns	
Environmental Red Flag Features	From KY 622 (Plano Rd) to US 68 in Bowling Green
Area Landmarks	Y
Point Landmarks	N
National Register of Historic Places Location (Point)	N
National Register of Historic Places Location (Polygon)	N

1) Special Waters are defined as Cold Water Aquatic Habitats, Outstanding State/National Resource Waters, Exceptional Waters, State Wild Rivers, and Federally Designated Wild / Scenic Rivers.

RIGHT OF WAY IMPACTS

The table below summarizes the potential needs of additional right-of-way (ROW) for proposed improvement concepts.

Potential Needs of Additional Right of Way		
Locations	Improvement Concepts	Potential Needs of Additional ROW
From KY 622 (Plano Rd) to US 68 in Bowling Green	Widening this section to a 6-lane divided arterial on the existing alignment	Yes

COST ESTIMATION

Design:	7.3 (\$M)
ROW:	8.9 (\$M)
Utility:	7.3 (\$M)
Construction:	<u>68.0 (\$M)</u>
TOTAL =	91.4 (\$M)

Note:

1. The cost estimation may not include additional costs to address the potential impacts of major utilities (e.g., gas line, major water supplier, transmission line) within the proximity of the corridor, due to the lack of data when the report was prepared. Further investigation is recommended in future studies.
2. Cost estimation was based on 2020 dollars. There is a 1-3% inflation rate. Estimated cost could vary -50% to +250% of the actual number (as a rule of thumb).
3. The widening of a 2-lane facility to a 3-lane facility (with TWLTL or alternating passing lane) is considered as "Minor Widening (Undivided Road) - 2 Lane to 4 Lane".
4. The cost estimation does not include bridges outside of the bottleneck locations, as they are not assumed to rise to the level of a corridor improvement. The cost estimation only includes necessary bridge replacement/rehab/widening costs within the bottleneck locations with proposed widening improvement.
5. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
6. Shoulder widening is not included in the cost estimation, as it is a relatively minor cost.
7. If multiple improvement concepts are recommended for the corridor, only the cost of the larger-scale improvement concept is estimated.

Kentucky Statewide Corridor Plan (Linking Kentucky)

Route: KY 536
Segment ID: 36A
From: US 42 in Union
To: KY 17
Counties: Boone, Kenton
Highway Districts: 6

CORRIDOR SEGMENT OVERVIEW

The 36A segment on KY 536 begins at US 42 in Boone County and extends east to KY 17 in Kenton County. The corridor segment length is approximately 8.4 miles and currently contains one interchange at I-75.

This segment passes through the residential and commercial areas of Union in Boone County and Independence in Kenton County. These areas would be considered towns or suburban (according to KYSTMv18 data) with clusters of homes and commercial buildings adjacent to KY 536.

EXISTING FACILITY

The table below outlines the typical roadway attributes for this section of KY 536.

Typical Roadway Attributes					
Segment	Functional Classification	Number & Width of Lanes	Shoulder & Width	Median Type & Width	Posted Speed Limit
From US 42 in Union to KY 17	Minor Arterial	2, 12'	11'	None	35 mph or 45 mph

Right of Way: The existing right of way is generally 50' – 100' wide.

Pavement: The average PDI (Pavement Distress Index) for this section of KY 536 is 0.46, which indicates an overall fair pavement condition according to KYTC criteria (Good: 0.00 – 0.35; Fair: 0.36 – 0.65; Poor: 0.66 – 0.99).

Intersections/Interchanges: The tables below outline the existing interchanges, major intersections, and railroad crossings on the corridor.

Interchanges	Interchange Type
I-75	Diamond

Major Intersections ¹			
US 42	KY 237	KY 3503	US 25
KY 1303	KY 2043	Madison Pike	KY 17

1) Only crossroads with function classification of Minor Collector or above are included.

At-grade Railroad Crossings
None

Access Points: This segment is not access controlled. Throughout the corridor, there is access to residential and commercial driveways and intersecting roadways.

Bridges: The tables below outline the detailed Bridge information for existing bridges on or over this section of KY 536.

Mainline Bridge Information										
Bridge ID	Feature Intersect	NBIS Classification	Sufficiency Rating	Substandard	Deck Rating	Superstructure Rating	Substructure Rating	Under Clearance (feet)	Horizontal Clearance (feet)	Culvert Rating
059B00105N	BANKLICK CREEK & CSX RR	Good	99	No	7	8	7	23.12	41.25	N
059B00032N (Culvert)	BRUSHY CREEK	Good	80.1	No	N	N	N	0	21.98	7
008B00088N	South Fork Gunpowder Ck	Good	71.5	No	7	7	7	0	19.69	N
008B00091N	CSX RAILROAD	Good	100	No	7	8	8	23.18	62	N

Structures Crossing Over the Corridor			
Bridge ID	Facility Carried	Under Clearance (feet)	Horizontal Clearance (feet)
008B00080L	I-75 NC	18.56	72.50
008B00080R	I-75	18.02	72.51

Other Noteworthy Conditions: None.

TRAFFIC & OPERATIONS

AADT & AADTT: The table below summarizes the 2015 AADT and daily truck volumes by sub-segment.

Traffic Volumes			
Sub-segment	AADT	AADTT	Truck Percentage
From US 42 in Union to US 25	12,200	1,500	12% ¹
From US 25 to KY 17	8,300	500	6% ²

1,2) Truck percentages obtained from KYTC Traffic Count Reporting System

Mobility: The entirety of this corridor segment is a major traffic bottleneck. (Note: bottlenecks are identified by Level of Travel Time Reliability (LOTTR) > 1.5 or volume/capacity (v/c) > 0.6.) Typical roadway attributes of the bottleneck area can be found above for the entire segment.

Existing Typical Roadway Attributes at Major Traffic Bottlenecks					
Locations	Functional Classification	Number & Width of Lanes	Median Width	Shoulder Width	2015 AADT ¹
Entire corridor	Refer to the Existing Facility section above				23,694

1) The highest traffic volume within the bottleneck based on KYSTMv18 data.

Safety: 14.7% of the corridor mileage has a Level of Safety of Service (LOSS) of 4, meaning these links have the highest potential to decrease crashes. (Note: LOSS indicates the potential for crash reduction and is broken up into four categories based on Safety Performance Functions (SPFs): LOSS 4 = high; LOSS 3 = moderate to high; LOSS 2 = low to moderate; LOSS 1 = low.) See the table under **Potential Safety Improvement** section for details of locations with LOSS =4, possible causes, and potential safety improvements.

ITS Devices: This corridor does not have direct access to fiber optic cable.

PROPOSED IMPROVEMENT CONCEPTS

The improvement options noted in this report are not intended to be all-encompassing. Other potential improvements are possible, including innovative solutions that could be cost-effective and address the reasons for improvement. Further study may be needed as part of the project development process.

Proposed Typical Section & Description of Modification: The table below describes the proposed improvement concepts for the identified bottlenecks. The proposed improvements expect to maintain an overall acceptable traffic condition through 2045 ($v/c < 0.85$ in urban areas and $v/c < 0.7$ in rural areas) and address safety issues at bottlenecks.

Proposed Improvement Concepts			
Locations	Proposed Improvement ¹	Notes ²	Reason for Improvement
From US 42 in Union to I-75	Widening this section to a 5-lane divided arterial on its existing alignment	Improved Typical Section: 2, 11-foot lanes in each direction with a 14-foot flush TWLTL median. 2-foot curb. This project is currently under construction as of 2020 ³ .	The expected v/c in 2045 exceeds the established thresholds.
From I-75 to KY 17	Widening and realigning this section to a 5-lane divided arterial.	Improved Typical Section: 2, 11-foot lanes in each direction with a 14-foot flush TWLTL median. 2-foot curb. 9 lanes wide at KY 3503 (Sam Neace Dr.). The section between I-75 and US 25 is currently under construction ⁴ . The section between US 25 and KY 1303 (KY 536 Priority Section 1) has been recently awarded a BUILD grant as of 2020 ⁵ .	The expected v/c in 2045 exceeds the established thresholds.

1) The proposed roadway widening concept includes improvements at interchanges and major intersections as needed (see the Interchanges for Potential Modification and Major Intersection for Potential Modification sections below).

2) Improved typical sections are based on input from KYTC D6 and KY 536 BUILD Grant Application.

3) Item Number: 6-158.01.

4) Item Number: 6-14. This project involves reconstructing the interchange with I-71/75 as a Double Crossover Diamond and widening KY 536 from just west of the interchange to US 25 and adding multi-use paths on both sides. Expected completion date is Fall of 2022.

5) Item Number: 6-162.20.

Potential New Interchanges: None.

Interchanges for Potential Modification: The existing traditional diamond interchange at I-75 is being converted to a double crossover diamond interchange (Item Number 6-14) with expected completion in Fall 2022.

Major Intersections for Potential Modification: Improvements, such as additional turn lanes, channelization, and coordinated signal timing, should be considered at 10 major intersections for this corridor segment. The following is a list of these intersections.

Major Intersections for Potential Modification			
US 42 ¹	KY 237 ²	KY 3503 ³	US 25 ⁴
KY 1303 ⁵	KY 2043	Calvary Rd	KY 2045 (north)
Madison Pike	KY 17		

1,2,3,4,5) These intersections are part of the KY 536 project currently being constructed and will not be included in the Cost Estimation in this report.

Bridges: Bridge recommendations are based on ratings of substructure, superstructure and deck using the following methodology.

Methodology for Replacement/Rehabilitation Recommendation					
Structures	Substructure Rating	Superstructure Rating	Deck Rating	Culvert Rating	Recommendations
Bridges	<=4	Any	Any	/	Replacement
	=5	Any	Any	/	Rehabilitation
	>=6	<=5	Any	/	Rehabilitation
	>=6	Any	<=5	/	Rehabilitation
	>=6	>=6	>=6	/	None ¹
Culverts	/	/	/	<=4	Replacement
	/	/	/	5 or 6	Rehabilitation
	/	/	/	>=7	None

1) If the bridge is on a corridor with a recommendation of widening, it will be widened (considered as rehabilitation) as necessary to accommodate the additional proposed lanes.

- **Bridges for Rehab/Widening:** Rehab/widening is recommended for a total of three bridges and one culvert along the entire corridor. Note that the bridge rehab is determined based on the "Methodology for Replacement/Rehabilitation Recommendation" table above. If the bridge has a good condition but is within a bottleneck location with recommended widening, it will be widened as necessary to accommodate the additional proposed lanes and the cost of widening is assumed to be the same as bridge rehab for the planning-level cost estimation purpose.

Bridges for Rehab/Widening	
Bridge ID	Feature Intersect
059B00105N	BANKLICK CREEK & CSX RR
059B00032N (Culvert)	BRUSHY CREEK
008B00088N	South Fork Gunpowder Ck
008B00091N	CSX RAILROAD

- **Bridges for Replacement:** None.

Pavement Treatment: The overall pavement condition is fair (average PDI = 0.46). Proposed additional lanes for the entire segment will consist of full depth asphalt pavement construction.

Potential Safety Improvement: The table below summarizes safety issues for the corridor and is based on KYTC safety data (LOSS value = 4), as well as a cursory review of Google Aerial imagery. The table identifies clusters of links with a LOSS value of 4 based on two categories: 1) clusters located in areas where this study already recommends corridor improvements for mobility reasons and 2) clusters not located in areas previously recommended for corridor mobility improvements. For Category 1, it is assumed any corridor improvement based on mobility needs will be constructed to current KYTC standards and will include the necessary safety improvements. Category 2 is intended to identify corridor segments that may warrant improvement for safety reasons, even though improvement might not be needed for mobility. There may also be isolated links with LOSS value of 4 that are not included in the table. Spot improvements could be warranted for those locations but it is assumed these spot improvements do not rise to the level of a corridor improvement; therefore, these locations are not addressed in this planning study. The table further breaks the clusters down by urban and rural designation (based on KYSTMv18 data) because urban and rural roadways tend to have unique typical crash causes and countermeasures.

Potential Safety Improvements			
Category	Locations	Possible Causes	Recommendations
CAT 1: Major clusters covered by proposed mobility improvement	From US 42 in Union to KY 17	Intersection spacing and congestion, sight distance challenges, geometric deficiencies, speeding	Widening to a 5-lane facility described above
CAT 2: Major clusters not covered by proposed mobility improvement	N/A	N/A	N/A

Proposed Phasing: Since all intersections proposed for spot improvements are located within the proposed corridor widening for the entire segment, they could be improved at the same time the roadway is widened. The interchange modification at I-75 got underway in December 2019.

PRELIMINARY ENVIRONMENTAL RED FLAG ANALYSIS

The table below summarizes the presence of critical environmental red flag concerns identified by KYTC within 1,000 ft of proposed improvement locations (Y=Yes; N=No).

Critical Red Flag Issues/Concerns		
Environmental Red Flag Features	From US 42 in Union to I-75	From I-75 to KY 17
Superfunds	N	N
Special Waters ¹	N	N
Forested Areas	N	N
NLEB Habitat Priority	N	N
IB Habitat Priority Area	N	N
FAA Airport Runways	N	N
Public Hunting Areas	N	N
Wildlife Management Areas	N	N
Local Parks	N	N
State/ National Parks	N	N
Kentucky Heritage Land Conservation Fund	N	N
Area Landmarks	N	N
Point Landmarks	Y	Y
National Register of Historic Places Location (Point)	N	N
National Register of Historic Places Location (Polygon)	N	N

1) Special Waters are defined as Cold Water Aquatic Habitats, Outstanding State/National Resource Waters, Exceptional Waters, State Wild Rivers, and Federally Designated Wild / Scenic Rivers.

RIGHT OF WAY IMPACTS

The table below summarizes the potential needs of additional right-of-way (ROW) for proposed improvement concepts.

Potential Needs of Additional Right of Way		
Locations	Improvement Concepts	Potential Needs of Additional ROW
From US 42 in Union to I-75	Widening this section to a 5-lane divided arterial on its existing alignment	Yes
From I-75 to KY 17	Widening and realigning this section to a 5-lane divided arterial.	Yes

COST ESTIMATION

Design:	8.7 (\$M)
ROW:	18.1 (\$M)
Utility:	4.0 (\$M)
Construction:	<u>74.1 (\$M)</u>
TOTAL =	104.9 (\$M)

Note:

1. The cost estimation may not include additional costs to address the potential impacts of major utilities (e.g., gas line, major water supplier, transmission line) within the proximity of the corridor, due to the lack of data when the report was prepared. Further investigation is recommended in future studies.
2. Cost estimation was based on 2020 dollars. There is a 1-3% inflation rate. Estimated cost could vary -50% to +250% of the actual number (as a rule of thumb).
3. The widening of a 2-lane facility to a 3-lane facility (with TWLTL or alternating passing lane) is considered as "Minor Widening (Undivided Road) - 2 Lane to 4 Lane".
4. The cost estimation does not include bridges outside of the bottleneck locations, as they are not assumed to rise to the level of a corridor improvement. The cost estimation only includes necessary bridge replacement/rehab/widening costs within the bottleneck locations with proposed widening improvement.
5. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
6. Shoulder widening is not included in the cost estimation, as it is a relatively minor cost.
7. If multiple improvement concepts are recommended for the corridor, only the cost of the larger-scale improvement concept is estimated.

Kentucky Statewide Corridor Plan (Linking Kentucky)

Route: KY 536
Segment ID: 36B
From: KY 17
To: US 27 near Alexandria
Counties: Kenton, Campbell
Highway Districts: 6

CORRIDOR SEGMENT OVERVIEW

The 36B segment on KY 536 begins at KY 17 in Kenton County and extends east to US 27 in Campbell County. The corridor segment length is approximately 10 miles and currently contains no interchange.

This segment passes through the residential and commercial areas of the City of Independence in Kenton County. These areas would be considered town (according to KYSTMv18 data) with clusters of homes and commercial buildings adjacent to KY 536. The remainder of this segment passes through rural agricultural areas with homes interspersed along KY 536.

EXISTING FACILITY

The table below outlines the typical roadway attributes for this section of KY 536.

Typical Roadway Attributes					
Segment	Functional Classification	Number & Width of Lanes	Shoulder & Width	Median Type & Width	Posted Speed Limit
From KY 17 to US 27 near Alexandria	Major Collector	2, 9'	2'	None	45 mph or 55 mph

Right of Way: The existing right of way is generally 30' – 50' wide.

Pavement: The average PDI (Pavement Distress Index) for this section of KY 536 is 0.25, which indicates an overall good pavement condition according to KYTC criteria (Good: 0.00 – 0.35; Fair: 0.36 – 0.65; Poor: 0.66 – 0.99).

Intersections/Interchanges: The tables below outline the existing interchanges, major intersections, and railroad crossings on the corridor.

Interchanges
None

Major Intersections ¹			
KY 17	KY 16 (south)	KY 16 (north)	KY 177 (south)
KY 177 (north)	KY 915	US 27	

1) Only crossroads with function classification of Minor Collector or above are included.

At-grade Railroad Crossings
KY 536 Mile Point 10.3 in Kenton County

Access Points: This segment is not access controlled. Throughout the corridor, there is access to residential and commercial driveways and intersecting roadways.

Bridges: The tables below outline the detailed Bridge information for existing bridges on or over this section of KY 536.

Mainline Bridge Information										
Bridge ID	Feature Intersect	NBIS Classification	Sufficiency Rating	Substandard	Deck Rating	Superstructure Rating	Substructure Rating	Under Clearance (feet)	Horizontal Clearance (feet)	Culvert Rating
059B00070N	LICKING RIVER	Fair	92.4	No	7	6	7	0	43.96	N
019B00030N	POND CREEK	Fair	77.5	No	6	6	6	0	23.95	N

Structures Crossing Over the Corridor
None

Other Noteworthy Conditions: None.

TRAFFIC & OPERATIONS

AADT & AADTT: The table below summarizes the 2015 AADT and daily truck volumes by sub-segment.

Traffic Volumes			
Segment	AADT	AADTT	Truck Percentage
From KY 17 to US 27 near Alexandria	4,300	300	6%

Mobility: There are two major traffic bottleneck sections along this corridor segment. See the table below for details. (Note: bottlenecks are identified by LOTTR > 1.5 or volume/capacity (v/c) > 0.6.) Other than the noted traffic bottleneck sections/locations, traffic condition is acceptable along the remainder of this segment.

Existing Typical Roadway Attributes at Major Traffic Bottlenecks					
Locations	Functional Classification	Number & Width of Lanes	Median Width	Shoulder Width	2015 AADT ¹
Major Bottleneck 1: From KY 17 to KY 16 (north)	Major Collector	2, 10'	None	2'	7,301
Major Bottleneck 2: From Lauren Ln to US 27 near Alexandria	Major Collector	2, 12'	None	8'	5,959

1) The highest traffic volume within the bottleneck based on KYSTMv18 data.

Safety: 7.2% of the corridor mileage has a Level of Safety of Service (LOSS) of 4, meaning these links have the highest potential to decrease crashes. (Note: LOSS indicates the potential for crash reduction and is broken up into four categories based on Safety Performance Functions (SPFs): LOSS 4 = high; LOSS 3 = moderate to high; LOSS 2 = low to moderate; LOSS 1 = low.) See the table under **Potential Safety Improvement** section for details of locations with LOSS =4, possible causes, and potential safety improvements.

ITS Devices: This corridor does not have direct access to fiber optic cable.

PROPOSED IMPROVEMENT CONCEPTS

The improvement options noted in this report are not intended to be all-encompassing. Other potential improvements are possible, including innovative solutions that could be cost-effective and address the reasons for improvement. Further study may be needed as part of the project development process.

Proposed Typical Section & Description of Modification: The table below describes the proposed improvement concepts for the identified bottlenecks. The proposed improvements expect to maintain an overall acceptable traffic condition through 2045 ($v/c < 0.85$ in urban areas and $v/c < 0.7$ in rural areas) and address safety issues at bottlenecks.

Proposed Improvement Concepts			
Locations	Improvement Concepts ¹	Notes ²	Reason for Improvement
Major Bottleneck 1: From KY 17 to KY 16 (south)	Spot improvement at major intersections	See the Major Intersections for Potential Modification section below	LOTTR exceeds the established thresholds
Major Bottleneck 1: From KY 16 (south) to KY 16 (north)	<p><u>Concept 1:</u> Constructing a new 2-lane undivided facility nearby south of existing alignment to bypass the section overlapped by KY 536 and KY 16. Further study is needed to finalize the new alignment.</p> <p><u>Concept 2:</u> Widening to a 3-lane facility on its existing alignment by adding a TWLTL.</p>	<p>Improved Typical Section:</p> <p><u>Concept 1:</u> 1, 11-foot lane in each direction with 6-foot shoulders.</p> <p><u>Concept 2:</u> 1, 11-foot lane in each direction with 6-foot shoulders. A 14' flush TWLTL median.</p>	The expected v/c in 2045 exceeds the established thresholds
Major Bottleneck 2: From Lauren Ln to US 27 near Alexandria	Spot improvement at major intersections	See the Major Intersections for Potential Modification section below	LOTTR exceeds the established thresholds

1) The proposed roadway widening concept includes spot improvements at interchanges and major intersections as needed (see the Interchanges for Potential Modification and Major Intersection for Potential Modification sections below).

2) Improved typical sections are based on KYTC Highway Design Manual.

Potential New Interchanges: None.

Interchanges for Potential Modification: None.

Major Intersections for Potential Modification: Improvements, such as additional turn lanes, channelization, and coordinated signal timing, should be considered at five major intersections for this corridor segment. The following is a list of these intersections.

Major Intersections for Potential Modification			
KY 17	KY 16 (south)	KY 16 (north)	KY 915
US 27			

Bridges: Bridge recommendations are based on ratings of substructure, superstructure and deck using the following methodology.

Methodology for Replacement/Rehabilitation Recommendation					
Structures	Substructure Rating	Superstructure Rating	Deck Rating	Culvert Rating	Recommendations
Bridges	<=4	Any	Any	/	Replacement
	=5	Any	Any	/	Rehabilitation
	>=6	<=5	Any	/	Rehabilitation
	>=6	Any	<=5	/	Rehabilitation
	>=6	>=6	>=6	/	None ¹
Culverts	/	/	/	<=4	Replacement
	/	/	/	5 or 6	Rehabilitation
	/	/	/	>=7	None

1) If the bridge is on a corridor with a recommendation of widening, it will be widened (considered as rehabilitation) as necessary to accommodate the additional proposed lanes.

- **Bridges for Rehab/Widening:** None.
- **Bridges for Replacement:** None.

Pavement Treatment: The overall pavement condition is good (average PDI = 0.25). Proposed additional lanes will consist of full depth asphalt pavement construction. Spot reconstruction and rehabilitation of existing asphalt pavement lanes might be needed based on more detailed evaluation of the corridor's pavement condition.

Potential Safety Improvement: The table below summarizes safety issues for the corridor and is based on KYTC safety data (LOSS value = 4), as well as a cursory review of Google Aerial imagery. The table identifies clusters of links with a LOSS value of 4 based on two categories: 1) clusters located in areas where this study already recommends corridor improvements for mobility reasons and 2) clusters not located in areas previously recommended for corridor mobility improvements. For Category 1, it is assumed any corridor improvement based on mobility needs will be constructed to current KYTC standards and will include the necessary safety improvements. Category 2 is intended to identify corridor segments that may warrant improvement for safety reasons, even though improvement might not be needed for mobility. There may also be isolated links with LOSS value of 4 that are not included in the table. Spot improvements could be warranted for those locations but it is assumed these spot

improvements do not rise to the level of a corridor improvement; therefore, these locations are not addressed in this planning study. The table further breaks the clusters down by urban and rural designation (based on KYSTMv18 data) because urban and rural roadways tend to have unique typical crash causes and countermeasures.

Potential Safety Improvements			
Category	Locations	Possible Causes	Recommendations
CAT 1: Major clusters covered by proposed mobility improvement	From Oliver Rd to 0.3 mile east of Oliver Rd	Sight distance challenges, multiple access points	Intersection improvements described above
CAT 2: Major clusters not covered by proposed mobility improvement	<u>RURAL</u> From KY 16 (north) to Mann Rd in Visalia	<u>RURAL</u> Sight distance challenges, geometric deficiencies, speeding, lack of safety features/advance warnings	<u>RURAL</u> Improved geometrics/sight distance, improved lighting/visibility.

Proposed Phasing: The proposed spot improvements at major intersections can be constructed separately and ahead of the proposed new bypass/corridor widening in Kenton County; however, since the proposed new bypass/corridor widening in Kenton County is relatively short (< 0.5 miles), it may be desirable to construct it at the same time as the spot improvements.

PRELIMINARY ENVIRONMENTAL RED FLAG ANALYSIS

The table below summarizes the presence of critical environmental red flag concerns identified by KYTC within 1,000 ft of proposed improvement locations (Y=Yes; N=No).

Critical Red Flag Issues/Concerns			
Environmental Red Flag Features	Major Bottleneck 1: From KY 17 to KY 16 (south)	Major Bottleneck 1: From KY 16 (south) to KY 16 (north)	Major Bottleneck 2: From Lauren Ln to US 27 near Alexandria
Superfunds	N	N	N
Special Waters ¹	N	N	N
Forested Areas	N	N	N
NLEB Habitat Priority	N	N	Y
IB Habitat Priority Area	N	N	N
FAA Airport Runways	N	N	N
Public Hunting Areas	N	N	N
Wildlife Management Areas	N	N	N
Local Parks	N	N	N
State/ National Parks	N	N	N
Kentucky Heritage Land Conservation Fund	N	N	N
Area Landmarks	N	N	N
Point Landmarks	N	Y	Y
National Register of Historic Places Location (Point)	N	N	N
National Register of Historic Places Location (Polygon)	N	N	N

1) Special Waters are defined as Cold Water Aquatic Habitats, Outstanding State/National Resource Waters, Exceptional Waters, State Wild Rivers, and Federally Designated Wild / Scenic Rivers.

RIGHT OF WAY IMPACTS

The table below summarizes the potential needs of additional right-of-way (ROW) for proposed improvement concepts.

Potential Needs of Additional Right of Way		
Locations	Improvement Concepts	Potential Needs of Additional ROW
Major Bottleneck 1: From KY 17 to KY 16 (south)	Spot improvement at major intersections	No
Major Bottleneck 1: From KY 16 (south) to KY 16 (north)	<u>Concept 1:</u> Constructing a new 2-lane undivided facility nearby in south to bypass the section overlapped by KY 536 and KY 16. Further study is needed to finalize the new alignment. <u>Concept 2:</u> Widening to a 3-lane facility on its existing alignment by adding a TWLTL.	<u>Concept 1:</u> Potentially <u>Concept 2:</u> Potentially
Major Bottleneck 2: From Lauren Ln to US 27 near Alexandria	Spot improvement at major intersections	Potentially

COST ESTIMATION

Design:	2.3 (\$M)
ROW:	7.5 (\$M)
Utility:	1.7 (\$M)
Construction:	<u>15.5 (\$M)</u>
TOTAL =	27.0 (\$M)

Note:

1. The cost estimation may not include additional costs to address the potential impacts of major utilities (e.g., gas line, major water supplier, transmission line) within the proximity of the corridor, due to the lack of data when the report was prepared. Further investigation is recommended in future studies.
2. Cost estimation was based on 2020 dollars. There is a 1-3% inflation rate. Estimated cost could vary -50% to +250% of the actual number (as a rule of thumb).
3. The widening of a 2-lane facility to a 3-lane facility (with TWLTL or alternating passing lane) is considered as "Minor Widening (Undivided Road) - 2 Lane to 4 Lane".
4. The cost estimation does not include bridges outside of the bottleneck locations, as they are not assumed to rise to the level of a corridor improvement. The cost estimation only includes necessary bridge replacement/rehab/widening costs within the bottleneck locations with proposed widening improvement.
5. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
6. Shoulder widening is not included in the cost estimation, as it is a relatively minor cost.
7. If multiple improvement concepts are recommended for the corridor, only the cost of the larger-scale improvement concept is estimated.

Kentucky Statewide Corridor Plan (Linking Kentucky)

Route: US 431
Segment ID: 38
From: Tennessee State Line
To: US 60 in Owensboro
Counties: Logan, Muhlenberg, McLean, Daviess
Highway Districts: 2, 3

CORRIDOR SEGMENT OVERVIEW

Segment 38 on US 431 begins at the Tennessee state line in Logan County and extends north through Muhlenberg County and McLean County to US 60 in Daviess County. The corridor segment length is approximately 84.4 miles and currently contains two interchanges at Western Kentucky Parkway and US 60. This segment includes one bypass: US 68/US 431 Bypass in the City of Russellville.

This segment passes through the residential and commercial areas in multiple cities (Adairville, Russellville and Lewisburg in Logan County, Drakesboro and Central City in Muhlenberg County, Livermore and Owensboro in McLean County). These areas would be considered towns (according to KYSTMv18 data) with clusters of homes and commercial buildings adjacent to US 431. The remainder of this segment passes through rural agricultural areas with homes interspersed along US 431.

EXISTING FACILITY

The table below outlines the typical roadway attributes for this section of US 431 by sub-segment.

Typical Roadway Attributes					
Sub-segment	Functional Classification	Number & Width of Lanes	Shoulder & Width	Median Type & Width	Posted Speed Limit
From Tennessee state line to US 79 (Clarksville Rd) in Russellville	Minor Arterial	2, 11'	3'	None	55 mph
From US 79 (Clarksville Rd) in Russellville to KY 3519 north of Russellville	Principal Arterial or Minor Arterial	4, 12'	6' or 10'	24' depressed	55 mph
From KY 3519 north of Russellville to US 60 in Owensboro	Minor Arterial	2, 11'	3'	None	55 mph

Right of Way: The existing right of way is generally 30' – 150' wide.

Pavement: The average PDI (Pavement Distress Index) for this section of US 431 is 0.30, which indicates an overall good pavement condition according to KYTC criteria (Good: 0.00 – 0.35; Fair: 0.36 – 0.65; Poor: 0.66 – 0.99).

Intersections/Interchanges: The tables below outline the existing interchanges, major intersections, and railroad crossings on the corridor.

Interchanges	Interchange Type
Western Kentucky Parkway	Former Tollbooth Interchange
US 60	Diamond

Major Intersections ¹			
KY 591	KY 663	KY 664	Russellville Bypass
KY 96	KY 3240 & KY 2146	KY 3233	US 68
KY 178	US 68 Bypass	KY 3519	KY 106
KY 107	KY 1293	KY 973	KY 949
KY 246	KY 70	KY 176	US 62
KY 304	KY 277	KY 81	KY 175
KY 85	KY 138	KY 136	KY 140
KY 298	KY 554	Martin Luther King Jr Loop	Southtown Blvd
KY 2699			

1) Only crossroads with function classification of Minor Collector or above are included.

At-grade Railroad Crossings
US 431 Mile Point 0.6 in McLean County
US 431 Mile Point 15.7 in Muhlenberg County
US 431 Bypass Mile Point 12.2 in Logan County

Access Points: This segment is not access controlled. Throughout the corridor, there is access to residential and commercial driveways and intersecting roadways.

Bridges: The table below outlines the detailed Bridge information for existing bridges on or over this section of US 431.

Mainline Bridge Information										
Bridge ID	Feature Intersect	NBIS Classification	Sufficiency Rating	Substandard	Deck Rating	Superstructure Rating	Substructure Rating	Under Clearance (feet)	Horizontal Clearance (feet)	Culvert Rating
030C00180N	UN-NAMED ROADWAY DITCH	Good	97	No	7	8	8	0	31.5	N
030C00181N	UN-NAMED RDWY DITCH	Good	96	No	7	8	8	0	31.5	N
030B00050N (Culvert)	BRANCH OF PANTHER CREEK	Good	83	No	N	N	N	0	43.96	7
071B00104N (Culvert)	UNNAMED STREAM	Fair	100	No	N	N	N	0	99	6

Mainline Bridge Information										
Bridge ID	Feature Intersect	NBIS Classification	Sufficiency Rating	Substandard	Deck Rating	Superstructure Rating	Substructure Rating	Under Clearance (feet)	Horizontal Clearance (feet)	Culvert Rating
071B00005N	RAWHIDE CREEK	Fair	54.7	No	5	6	5	0	23	N
071B00021N	SOUTH FORK OF RED RIVER	Fair	67.8	No	6	6	6	0	24	N
071B00020N	NORTH FORK OF RED RIVER	Fair	68.5	No	6	6	6	0	24	N
071B00074N (Culvert)	PITMANS CREEK	Fair	90.8	No	N	N	N	0	39.7	6
089B00013N (Culvert)	BRANCH OF HAZEL CREEK	Fair	89.6	No	N	N	N	0	23.5	6
089B00135N	POND CREEK	Fair	91	No	6	7	7	0	43.96	N
089B00057N (Culvert)	BR CYPRESS CRK	Fair	95.7	No	N	N	N	0	26.9	6
089B00132L	WESTERN KY PKWAY	Fair	82.5	No	6	6	5	16.67	32	N
089B00132R	WESTERN KY PKWAY	Fair	93.6	No	6	7	6	16.67	32	N
075B00019N	DRAIN TO CYPRESS CREEK	Poor	42.7	No	6	4	4	0	23.95	N
075B00020N (Culvert)	SWAMP OPPOSITE L & N.R.R	Fair	75.1	No	N	N	N	0	30.24	6
075B00021N	UNNAMED STREAM TO GREEN	Fair	59.5	No	6	5	5	0	25.92	N
075B00018N	GREEN RIVER & ROUGH RIVER	Fair	37.9	Yes	7	5	6	25.1	23.95	N
075B00015N	BUCK CREEK	Fair	69	No	6	6	6	0	29.86	N
075B00013N (Culvert)	BRANCH BUCK CREEK	Fair	44.7	No	N	N	N	0	23.95	5
089B00139N (Culvert)	BRANCH OF HAZEL CREEK	Good	96.2	No	N	N	N	0	30	7
030B00049N	PANTHER CREEK	Fair	52.3	No	6	5	6	0	29.86	N
030B00048N	BRANCH OF PANTHER CREEK	Fair	88.1	No	6	7	7	0	43.96	N
089R00601N (Culvert)	PEABODY RAILROAD	Fair	73.9	No	N	N	N	17.9	39.75	6
075B00014N (Culvert)	BRANCH BUCK CREEK	Fair	89.3	No	N	N	N	0	25.92	6
089B00009N	MINE HAUL ROAD	Fair	88.3	No	7	6	6	20	44.26	N
089B00017N	ROCKY CREEK	Fair	66.8	No	6	6	6	0	19.79	N
071B00098N (Culvert)	TOWN BRANCH	Good	79.6	No	N	N	N	0	59.71	7
071B00002N	WOLF LICK CREEK	Fair	54.1	No	5	5	5	0	23	N
071B00003N	WOLF LICK SWAMP	Fair	55.5	No	6	5	5	0	23	N
089B00015N (Culvert)	BR HAZEL CRK	Fair	81.6	No	N	N	N	0	24	5
089B00099N (Culvert)	PLUM CRK	Fair	86.1	No	N	N	N	0	21.98	5
089B00016N	BRANCH OF ROCKY CREEK	Fair	52.8	No	5	5	6	0	19	N

Structures Crossing Over the Corridor			
Bridge ID	Facility Carried	Under Clearance (feet)	Horizontal Clearance (feet)
030B00075R	OWENSBORO BYP	15.92	39.5
030B00075L	WENDELL FORD EXPY	15.92	39.5
089R00603N	P&L RAILWAY	11.68	23.95

Other Noteworthy Conditions: None.

TRAFFIC & OPERATIONS

AADT & AADTT: The table below summarizes the 2015 AADT and daily truck volumes by sub-segment.

Traffic Volumes			
Sub-segment	AADT	AADTT	Truck Percentage
From TN state line to US 68 BYP north of Russellville	4,900	900	18% ¹
From US 68 BYP north of Russellville to KY 176 south of Drakesboro	2,600	300	12% ²
From KY 176 south of Drakesboro to US 60 in Owensboro	6,700	800	12%

1,2) Truck percentages obtained from KYTC Traffic Count System

Mobility: There are two major traffic bottleneck sections along this corridor segment. See the table below for details. (Note: traffic bottlenecks are identified by Level of Travel Time Reliability (LOTTR) > 1.5 or volume/capacity (v/c) > 0.6.) There are also a few additional isolated traffic bottlenecks along this corridor. Other than the noted traffic bottleneck sections/locations, traffic condition is acceptable along the remainder of this segment.

Existing Typical Roadway Attributes at Major Traffic Bottlenecks					
Locations	Functional Classification	Number & Width of Lanes	Median Width	Shoulder Width	2015 AADT ¹
<u>Major Bottleneck 1:</u> From Perry St. in Russellville to Humane Society Dr north of Russellville	Principal Arterial	2, 12' or 4, 12'	None or 32' depressed	6'	9,914
<u>Major Bottleneck 2:</u> From 0.8 mile south of US 60 to US 60 in Owensboro	Principal Arterial	4, 12'	25'	10'	46,246

1) The highest traffic volume within the bottleneck based on KYSTMv18 data.

Safety: 3.9% of the corridor mileage has a Level of Safety of Service (LOSS) of 4, meaning these links have the highest potential to decrease crashes. (Note: LOSS indicates the potential for crash reduction and is broken up into four categories based on Safety Performance Functions (SPFs): LOSS 4 = high; LOSS 3 = moderate to high; LOSS 2 = low to moderate; LOSS 1 = low.) See the table under **Potential Safety Improvement** section for details of locations with LOSS =4, possible causes, and potential safety improvements.

ITS Devices: Less than 1% of the corridor length will have direct access to fiber from the KentuckyWired project.

PROPOSED IMPROVEMENT CONCEPTS

The improvement options noted in this report are not intended to be all-encompassing. Other potential improvements are possible, including innovative solutions that could be cost-effective and address the reasons for improvement. Further study may be needed as part of the project development process.

Proposed Typical Section & Description of Modification: The table below describes the proposed improvement concepts for the identified bottlenecks. The proposed improvements expect to maintain an overall acceptable traffic condition through 2045 ($v/c < 0.85$ in urban areas and $v/c < 0.7$ in rural areas) and address safety issues at bottlenecks.

Proposed Improvement Concepts			
Locations	Improvement Concepts	Notes	Reason for Improvement
<u>Major Bottleneck 1:</u> From Perry St. in Russellville to Humane Society Dr north of Russellville	Spot improvements at major intersections	See the Major Intersections for Potential Modification section below	LOTTR exceeds the established thresholds
<u>Major Bottleneck 2:</u> From 0.8 mile south of US 60 to US 60 in Owensboro	Spot improvements at major intersections	See the Major Intersections for Potential Modification section below	LOTTR exceeds the established thresholds

Potential New Interchanges: None.

Interchanges for Potential Modification: None.

Major Intersections for Potential Modification: Improvements, such as additional turn lanes, channelization, and coordinated signal timing, should be considered at eight major intersections for this corridor segment. The following is a list of these intersections.

Major Intersections for Potential Modification			
KY 2146	US 79	Hopkinsville Rd	US 68 Bypass
US 62	KY 138	Southtown Blvd	Goetz Dr

Bridges: Bridge recommendations are based on ratings of substructure, superstructure and deck using the following methodology.

Methodology for Replacement/Rehabilitation Recommendation					
Structures	Substructure Rating	Superstructure Rating	Deck Rating	Culvert Rating	Recommendations
Bridges	<=4	Any	Any	/	Replacement
	=5	Any	Any	/	Rehabilitation
	>=6	<=5	Any	/	Rehabilitation
	>=6	Any	<=5	/	Rehabilitation
	>=6	>=6	>=6	/	None ¹
Culverts	/	/	/	<=4	Replacement
	/	/	/	5 or 6	Rehabilitation
	/	/	/	>=7	None

1) If the bridge is on a corridor with a recommendation of widening, it will be widened (considered as rehabilitation) as necessary to accommodate the additional proposed lanes.

- **Bridges for Rehab/Widening:** Rehab/widening is recommended for a total of eight bridges and 10 culverts along the entire corridor. Note that the bridge rehab is determined based on the "Methodology for Replacement/Rehabilitation Recommendation" table above. If the bridge has a good condition but is within a bottleneck location with recommended widening, it will be widened as necessary to accommodate the additional proposed lanes and the cost of widening is assumed to be the same as bridge rehab for the planning-level cost estimation purpose.

Bridges for Rehab/Widening	
Bridge ID	Feature Intersect
071B00104N (Culvert)	UNNAMED STREAM
071B00005N	RAWHIDE CREEK
071B00074N (Culvert)	PITMANS CREEK
089B00013N (Culvert)	BRANCH OF HAZEL CREEK
089B00057N (Culvert)	BR CYPRESS CRK
089B00132L	WESTERN KY PKWAY
075B00020N (Culvert)	SWAMP OPPOSITE L & N.R.R
075B00021N	UNNAMED STREAM TO GREEN
075B00018N	GREEN RIVER & ROUGH RIVER
075B00013N (Culvert)	BRANCH BUCK CREEK
030B00049N	PANTHER CREEK
089R00601N (Culvert)	PEABODY RAILROAD
075B00014N (Culvert)	BRANCH BUCK CREEK
071B00002N	WOLF LICK CREEK
071B00003N	WOLF LICK SWAMP
089B00015N (Culvert)	BR HAZEL CRK
089B00099N (Culvert)	PLUM CRK
089B00016N	BRANCH OF ROCKY CREEK

- **Bridges for Replacement:** Replacement is recommended for a total of one bridge along the entire corridor. Note that the bridge replacement is determined based on the "Methodology for Replacement/Rehabilitation Recommendation" table above. If the bridge needs replacement and is within a bottleneck location with recommended widening, it will be widened during the replacement to accommodate the additional proposed lanes and the cost of bridge replacement is used for the planning-level cost estimation purpose.

Bridges for Replacement	
Bridge ID	Feature Intersect
075B00019N	DRAIN TO CYPRESS CREEK

Pavement Treatment: The overall pavement condition is good (average PDI = 0.30). Spot reconstruction and rehabilitation of existing asphalt pavement lanes might be needed based on more detailed evaluation of the corridor's pavement condition.

Potential Safety Improvement: The table below summarizes safety issues for the corridor and is based on KYTC safety data (LOSS value = 4), as well as a cursory review of Google Aerial imagery. The table identifies clusters of links with a LOSS value of 4 based on two categories: 1) clusters located in areas where this study already recommends corridor improvements for mobility reasons and 2) clusters not located in areas previously recommended for corridor mobility improvements. For Category 1, it is assumed any corridor improvement based on mobility needs will be constructed to current KYTC standards and will include the necessary safety improvements. Category 2 is intended to identify corridor segments that may warrant improvement for safety reasons, even though improvement might not be needed for mobility. There may also be isolated links with LOSS value of 4 that are not included in the table. Spot improvements could be warranted for those locations but it is assumed these spot improvements do not rise to the level of a corridor improvement; therefore, these locations are not addressed in this planning study. The table further breaks the clusters down by urban and rural designation (based on KYSTMv18 data) because urban and rural roadways tend to have unique typical crash causes and countermeasures.

Potential Safety Improvements			
Category	Locations	Possible Causes	Recommendations
CAT 1: Major clusters covered by proposed mobility improvement	In Russellville and in Owensboro	Intersection spacing and congestion	Intersection improvements described above
CAT 2: Major clusters not covered by proposed mobility improvement	<u>RURAL</u> From Vine St to Old Russellville Rd in Adairville. From KY 1293 (Dunmor Deer Lick Rd) to Western Kentucky Pkwy in Central City. From E Harmons Ferry Road to KY 140 south of Owensboro.	<u>RURAL</u> Sight distance challenges, geometric deficiencies, excessive curb cuts, lack of safety features/advance warnings, speeding	<u>RURAL</u> Improved geometrics/sight distance, roadside improvements, improved lighting/visibility.

Proposed Phasing: The proposed spot improvements at eight major intersections can be constructed at the same time.

PRELIMINARY ENVIRONMENTAL RED FLAG ANALYSIS

The table below summarizes the presence of critical environmental red flag concerns identified by KYTC within 1,000 ft of proposed improvement locations (Y=Yes; N=No).

Critical Red Flag Issues/Concerns		
Environmental Red Flag Features	Major Bottleneck 1: From Perry St. in Russellville to Humane Society Dr north of Russellville	Major Bottleneck 2: From 0.8 mile south of US 60 to US 60 in Owensboro
Superfunds	N	N
Special Waters ¹	N	N
Forested Areas	N	N
NLEB Habitat Priority	N	N
IB Habitat Priority Area	N	N
FAA Airport Runways	N	N
Public Hunting Areas	N	N
Wildlife Management Areas	N	N
Local Parks	Y	N
State/ National Parks	N	N
Kentucky Heritage Land Conservation Fund	Y	N
Area Landmarks	N	N
Point Landmarks	Y	N
National Register of Historic Places Location (Point)	Y	N
National Register of Historic Places Location (Polygon)	N	N

1) Special Waters are defined as Cold Water Aquatic Habitats, Outstanding State/National Resource Waters, Exceptional Waters, State Wild Rivers, and Federally Designated Wild / Scenic Rivers.

RIGHT OF WAY IMPACTS

The table below summarizes the potential needs of additional right-of-way (ROW) for proposed improvement concepts.

Potential Needs of Additional Right of Way		
Locations	Improvement Concepts	Potential Needs of Additional ROW
Major Bottleneck 1: From Perry St. in Russellville to Humane Society Dr north of Russellville	Spot improvements at major intersections	Potentially
Major Bottleneck 2: From 0.8 mile south of US 60 to US 60 in Owensboro	Spot improvements at major intersections	Potentially
Intersection modifications at US 62, KY 138	Improvements such as additional turn lanes, channelization, and coordinated signal timing	Potentially

COST ESTIMATION

Design:	0.8 (\$M)
ROW:	1.3 (\$M)
Utility:	1.8 (\$M)
Construction:	<u>26.0 (\$M)</u>
TOTAL =	29.9 (\$M)

Note:

1. The cost estimation may not include additional costs to address the potential impacts of major utilities (e.g., gas line, major water supplier, transmission line) within the proximity of the corridor, due to the lack of data when the report was prepared. Further investigation is recommended in future studies.
2. Cost estimation was based on 2020 dollars. There is a 1-3% inflation rate. Estimated cost could vary -50% to +250% of the actual number (as a rule of thumb).
3. The widening of a 2-lane facility to a 3-lane facility (with TWLTL or alternating passing lane) is considered as "Minor Widening (Undivided Road) - 2 Lane to 4 Lane".
4. The cost estimation does not include bridges outside of the bottleneck locations, as they are not assumed to rise to the level of a corridor improvement. The cost estimation only includes necessary bridge replacement/rehab/widening costs within the bottleneck locations with proposed widening improvement.
5. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
6. Shoulder widening is not included in the cost estimation, as it is a relatively minor cost.
7. If multiple improvement concepts are recommended for the corridor, only the cost of the larger-scale improvement concept is estimated.

Kentucky Statewide Corridor Plan (Linking Kentucky)

Route: KY 100/US 31E/KY 90
Segment ID: 39
From: I-65 Exit 6
To: US 27 near Somerset
Counties: Simpson, Allen, Barren, Metcalfe, Cumberland, Clinton, Wayne, Pulaski
Highway Districts: 3, 8

CORRIDOR SEGMENT OVERVIEW

Segment 39 on KY 100/US 31E/KY 90 begins at the I-65 Exit 6 in Simpson County and extends east through multiple counties to US 27 in Pulaski County. The corridor segment is approximately 134.4 miles long and currently contains four interchanges at I-65, Cumberland Expressway (west), Cumberland Expressway (east), and US 27.

This segment passes through the residential and commercial areas in multiple cities (Franklin in Simpson County, Scottsville in Allen County, Glasgow in Barren County, Burkesville in Cumberland County, Monticello in Wayne County, and Burnside in Pulaski County). These areas would be considered towns (according to KYSTMv18 data) with clusters of homes and commercial buildings adjacent to KY 100/US 31E/KY 90. The remainder of this segment passes through rural agricultural areas with homes interspersed along the corridor segment.

EXISTING FACILITY

The table below outlines the typical roadway attributes for this section of KY 100/US 31E/KY 90 by sub-segment.

Typical Roadway Attributes					
Sub-segment	Functional Classification	Number & Width of Lanes	Shoulder & Width	Median Type & Width	Posted Speed Limit
From I-65 Exit 6 to US 231/KY 980 in Scottsville	Major Collector	2, 10'	5'	None	55 mph
US 231/KY 980 in Scottsville to US 27 near Somerset	Minor Arterial	2, 12'	10'	None	55 mph

Right of Way: The existing right of way is generally 50' – 150' wide.

Pavement: The average PDI (Pavement Distress Index) for this corridor segment is 0.28, which indicates an overall good pavement condition according to KYTC criteria (Good: 0.00 – 0.35; Fair: 0.36 – 0.65; Poor: 0.66 – 0.99).

Intersections/Interchanges: The tables below outline the existing interchanges, major intersections, and railroad crossings on the corridor.

Interchanges	Interchange Type
I-65	Diamond
Cumberland Expressway (west)	Diamond
Cumberland Expressway (east)	Diamond
US 27	Partial Cloverleaf

Major Intersections ¹			
KY 622	KY 2601	New Roe Rd	Stoney Point Rd
KY 482	KY 585	US 31 E (New Gallatin Rd)	KY 100
KY 980	KY 101	Maxwell Dr	KY 252 (Barren River Dam Rd)
KY 87	KY 1318 (Tobacco Rd)	KY 1318 (Lucas Rd)	KY 252 (Finney Rd)
KY 1330	KY 839	KY 640	KY 163
KY 496	KY 100	KY 691	KY 61
KY 449	KY 1880	KY 1590	KY 639
KY 734	KY 558	KY 2063	KY 350
KY 829	KY 1009	KY 834	KY 858
Albany St	Worsham Ln	KY 92	KY 1275
KY 1568	KY 790	US 27	

1) Only crossroads with function classification of Minor Collector or above are included.

At-grade Railroad Crossings
None

Access Points: This segment is not access controlled. Throughout the segment, there are residential and commercial driveways and intersecting roadways.

Bridges: The tables below outline the detailed Bridge information for existing bridges on or over this section of KY 100/US 31E/KY 90.

Mainline Bridge Information										
Bridge ID	Feature Intersect	NBIS Classification	Sufficiency Rating	Substandard	Deck Rating	Superstructure Rating	Substructure Rating	Under Clearance (feet)	Horizontal Clearance (feet)	Culvert Rating
002B00043N	WEST BAYS FK	Fair	97	No	6	7	7	0	40.5	N
002B00042N	BAYS FORK CREEK	Good	97.9	No	7	7	7	0	44	N
107B00004N	SULPHUR FORK CREEK	Poor	40.8	No	5	4	5	0	22	N
002B00016N	MIDDLE FORK DRAKES CREEK	Fair	65	No	7	5	5	0	19	N
002B00015N	LONG HOLLOW BRANCH	Fair	65.3	No	6	5	7	0	19	N
005B00024L	SOUTH FORK OF BEAVER CRK	Fair	99	No	6	6	6	0	41.5	N
005B00066R	SOUTH FORK BEAVER CREEK	Fair	99	No	6	6	7	0	37.5	N
005B00063N	CUMBERLAND Expressway	Fair	84.6	No	7	6	6	17.25	38	N
005B00009N	BRUSHY FORK CREEK	Fair	93.7	No	6	6	6	0	35	N
005B00010N	BR OF GLOVER CREEK	Fair	95.9	No	6	6	6	0	34	N
005B00011N	BR OF GLOVER CREEK	Fair	92.8	No	7	6	7	0	34	N
005B00012N	BR OF GLOVER CREEK	Fair	83.2	No	7	5	7	0	33.5	N
002B00007N	BARREN RIVER LAKE	Fair	69	No	7	6	6	0	30	N
005B00026N (Culvert)	COON CREEK	Fair	63.9	No	N	N	N	0	26	6
005B00025N	SKAGGS CREEK EMBAYMENT	Fair	78	No	7	6	7	0	30	N
027B00027N (Culvert)	HAYES CREEK	Good	99.5	No	N	N	N	0	44	7
029B00019N	ALLEN CREEK	Fair	48.9	No	5	5	6	0	23.95	N
029B00021N (Culvert)	BR OF MARROWBONE CREEK	Fair	88.5	No	N	N	N	0	24	6
029B00027N	Cumberland River	Poor	20.6	Yes	5	4	5	0	24	N
029B00043N (Culvert)	CEDAR CREEK	Fair	73.5	No	N	N	N	0	43.96	5
029B00044N (Culvert)	CARTER BRANCH CREEK	Fair	86	No	N	N	N	0	44	6
085B00011N	GLOVER CREEK	Fair	84.3	No	6	5	5	0	34	N
085B00053N (Culvert)	STILLHOUSE BRANCH	Fair	98.6	No	N	N	N	0	29.86	6
085B00050N (Culvert)	GARMAN BRANCH	Fair	99.1	No	N	N	N	0	29.86	6
085B00055N	SLATE CREEK	Fair	95.5	No	7	8	6	0	35.76	N
116B00044N	BEAVER CREEK	Fair	79	No	6	7	6	0	39.7	N
116B00001N	MEADOW CREEK	Fair	85	No	6	6	6	0	44	N
029B00022N	WISDOM CREEK	Fair	62.9	No	5	6	6	0	23.75	N
029B00048N	PITMAN CREEK	Fair	92.8	No	6	7	6	0	40	N
029B00049N	FERRIS FORK CR	Fair	92.8	No	6	7	7	0	40	N
100B00115N	US 27 & KY 1247	Fair	100	No	6	8	6	20.08	94	N
002B00054N	TRAMMEL FORK	Good	97.9	No	7	7	7	0	40	N
100B00110N	CUMBERLAND RIVER	Fair	75.6	No	6	6	6	0	40	N
005B00108N	BOYD CREEK	Good	98.2	No	7	7	7	0	49	N
029B00041N (Culvert)	BEAR CREEK	Fair	86	No	N	N	N	0	44	6

Mainline Bridge Information										
Bridge ID	Feature Intersect	NBIS Classification	Sufficiency Rating	Substandard	Deck Rating	Superstructure Rating	Substructure Rating	Under Clearance (feet)	Horizontal Clearance (feet)	Culvert Rating
005B00073N	SOUTH FORK BEAVER CREEK	Fair	83	No	6	5	7	0	31	N
005B00074N	SO FK BEAVER CREEK	Fair	97	No	7	6	6	0	25	N
005B00027N	PETER CREEK EMBAYMENT	Fair	78.4	No	6	6	7	0	30	N
005B00008N	FALLEN TIMBER CREEK	Fair	92.5	No	7	7	6	0	34	N
029B00020N	DUTCH CREEK	Fair	51.9	No	5	5	6	0	23.75	N
029B00042N (Culvert)	SLATE FORK CREEK	Fair	83	No	N	N	N	0	88	6
005B00007N	ELBOW SPRING CREEK	Fair	91.7	No	6	6	6	0	41	N
116B00036N	OTTER CREEK	Fair	87.2	No	6	7	7	0	43.96	N
107B00053N	Lick Creek	Good	100	No	8	8	7	0	40	N
029B00018N (Culvert)	NORRIS BRANCH	Good	88.5	No	N	N	N	0	42	7

Structures Crossing Over the Corridor			
Bridge ID	Facility Carried	Under Clearance (feet)	Horizontal Clearance (feet)
107B00047N	I-65	16.52	62
005B00071R	Cumberland Expressway	17.50	30
005B00071L	Cumberland Expressway	17.50	30
005B00065N	KY-249	17.42	30
005B00064N	KY 63	17.42	30

Other Noteworthy Conditions: None.

TRAFFIC & OPERATIONS

AADT & AADTT: The table below summarizes the 2015 AADT and daily truck volumes by sub-segment.

Traffic Volumes			
Segment	AADT	AADTT	Truck Percentage
From I-65 Exit 6 to US 27 near Somerset	6,100	1,100	19%

Mobility: There are four major traffic bottlenecks along this corridor segment. See the table below for details. (Note: bottlenecks are identified by Level of Travel Time Reliability (LOTR) > 1.5 or volume/capacity (v/c) > 0.6.) There are also a few additional isolated traffic bottlenecks along this corridor. Other than the noted traffic bottleneck sections/locations, traffic condition is acceptable along the remainder of this segment.

Existing Typical Roadway Attributes at Major Traffic Bottlenecks					
Locations	Functional Classification	Number & Width of Lanes	Median Width	Shoulder Width	2015 AADT ¹
Major Bottleneck 1: From KY 100 to KY 980 in Scottsville ²	Principal Arterial	2, 12'	12'	10'	18,050
Major Bottleneck 2: From Dockery Heights Rd to Cumberland Expressway in Glasgow	Minor Arterial	2, 12'	None or 12' flush or 16' Raised Mountable	8'	15,501
Major Bottleneck 3: From Gregory St to Guinn Dr in Monticello	Minor Arterial	2, 12'	None or 14' Raised Mountable	10'	9,389
Major Bottleneck 4: From Tucker Rd to US 27 near Somerset	Minor Arterial	4, 12'	14' flush	12'	11,219

1) The highest traffic volume within the bottleneck based on KYSTMv18 data.

2) This bottleneck is the same one on Segment 35A.

Safety: 2.3% of the corridor mileage has a Level of Safety of Service (LOSS) of 4, meaning these links have the highest potential to decrease crashes. (Note: LOSS indicates the potential for crash reduction and is broken up into four categories based on Safety Performance Functions (SPFs): LOSS 4 = high; LOSS 3 = moderate to high; LOSS 2 = low to moderate; LOSS 1 = low.) See the table under **Potential Safety Improvement** section for details of locations with LOSS =4, possible causes, and potential safety improvements.

ITS Devices: Approximately 2% of the corridor length will have direct access to fiber from the KentuckyWired project.

PROPOSED IMPROVEMENT CONCEPTS

The improvement options noted in this report are not intended to be all-encompassing. Other potential improvements are possible, including innovative solutions that could be cost-effective and address the reasons for improvement. Further study may be needed as part of the project development process.

Proposed Typical Section & Description of Modification: The table below describes the proposed improvement concepts for the identified bottlenecks. The proposed improvements expect to maintain an overall acceptable traffic condition through 2045 ($v/c < 0.85$ in urban areas and $v/c < 0.7$ in rural areas) and address safety issues at bottlenecks.

Proposed Improvement Concepts			
Locations	Improvement Concepts ¹	Notes ²	Reason for Improvement
<u>Major Bottleneck 1:</u> From KY 100 to KY 980 in Scottsville	Converting to a 2+1 roadway facility (one lane each direction plus an alternating passing lane) on its existing alignment with intersection improvements at KY 100 and KY 980	Improved Typical Section: 1, 12-foot lane in each direction with 8-foot shoulders. In addition, an alternating 12-foot passing lane.	The expected v/c in 2045 exceeds the established thresholds.
<u>Major Bottleneck 2:</u> From Dockery Heights Rd to Cumberland Expressway in Glasgow	Widening this section to a 4-lane divided arterial on its existing alignment with intersection improvements and bridge modification	Improved Typical Section: 2, 12-foot lanes in each direction with 8-foot shoulders. 32-foot depressed median.	The expected v/c in 2045 exceeds the established thresholds.
<u>Major Bottleneck 3:</u> From Gregory St to Guinn Dr in Monticello	Spot improvement at major intersections	See the Major Intersections for Potential Modification section below	LOTTR exceeds the established thresholds.
<u>Major Bottleneck 4:</u> From Tucker Rd to US 27 near Somerset	None at this time.	Both LOTTR and the expected v/c in 2045 are within the established thresholds.	

1) The proposed roadway widening concept includes spot improvements at interchanges and major intersections as needed (see the Interchanges for Potential Modification and Major Intersection for Potential Modification sections below).

2) Improved typical sections are based on KYTC Highway Design Manual.

Potential New Interchanges: None.

Interchanges for Potential Modification: None.

Major Intersections for Potential Modification: Improvements, such as additional turn lanes, channelization, and coordinated signal timing, should be considered at eight major intersections for this corridor segment. The following is a list of these intersections.

Major Intersections for Potential Modification			
KY 100 ¹	KY 980 ²	KY 2207	KY 61 (N Main St)
KY 639	Albany Rd	KY 92	KY 1275

1,2) These intersections are also proposed for potential modification for Segment 35A.

Bridges: Bridge recommendations are based on ratings of substructure, superstructure and deck using the following methodology.

Methodology for Replacement/Rehabilitation Recommendation					
Structures	Substructure Rating	Superstructure Rating	Deck Rating	Culvert Rating	Recommendations
Bridges	<=4	Any	Any	/	Replacement
	=5	Any	Any	/	Rehabilitation
	>=6	<=5	Any	/	Rehabilitation
	>=6	Any	<=5	/	Rehabilitation
	>=6	>=6	>=6	/	None ¹
Culverts	/	/	/	<=4	Replacement
	/	/	/	5 or 6	Rehabilitation
	/	/	/	>=7	None

1) If the bridge is on a corridor with a recommendation of widening, it will be widened (considered as rehabilitation) as necessary to accommodate the additional proposed lanes.

- **Bridges for Rehab/Widening:** Rehab/widening is recommended for a total of 12 bridges and eight culverts along the entire corridor. Note that the bridge rehab is determined based on the "Methodology for Replacement/Rehabilitation Recommendation" table above. If the bridge has a good condition but is within a bottleneck location with recommended widening, it will be widened as necessary to accommodate the additional proposed lanes and the cost of widening is assumed to be the same as bridge rehab for the planning-level cost estimation purpose.

Bridges for Rehab/Widening	
Bridge ID	Feature Intersect
107B00004N	SULPHUR FORK CREEK
002B00016N	MIDDLE FORK DRAKES CREEK
002B00015N	LONG HOLLOW BRANCH
005B00012N	BR OF GLOVER CREEK
005B00026N (Culvert)	COON CREEK
029B00019N	ALLEN CREEK
029B00021N (Culvert)	BR OF MARROWBONE CREEK
029B00027N	Cumberland River
029B00043N (Culvert)	CEDAR CREEK
029B00044N (Culvert)	CARTER BRANCH CREEK
085B00011N	GLOVER CREEK
085B00053N (Culvert)	STILLHOUSE BRANCH
085B00050N (Culvert)	GARMAN BRANCH
029B00022N	WISDOM CREEK
029B00041N (Culvert)	BEAR CREEK
005B00073N	SOUTH FORK BEAVER CREEK
029B00020N	DUTCH CREEK
029B00042N (Culvert)	SLATE FORK CREEK
005B00071R	US 31-E
005B00071L	US 31-E

- **Bridges for Replacement:** None.

Pavement Treatment: The overall pavement condition is good (average PDI = 0.28). Proposed additional lanes will consist of full depth asphalt pavement construction. Spot reconstruction and rehabilitation of existing asphalt pavement lanes might be needed based on more detailed evaluation of the corridor's pavement condition.

Potential Safety Improvement: The table below summarizes safety issues for the corridor and is based on KYTC safety data (LOSS value = 4), as well as a cursory review of Google Aerial imagery. The table identifies clusters of links with a LOSS value of 4 based on two categories: 1) clusters located in areas where this study already recommends corridor improvements for mobility reasons and 2) clusters not located in areas previously recommended for corridor mobility improvements. For Category 1, it is assumed any corridor improvement based on mobility needs will be constructed to current KYTC standards and will include the necessary safety improvements. Category 2 is intended to identify corridor segments that may warrant improvement for safety reasons, even though improvement might not be needed for mobility. There may also be isolated links with LOSS value of 4 that are not included in the table. Spot improvements could be warranted for those locations but it is assumed these spot improvements do not rise to the level of a corridor improvement; therefore, these locations are not addressed in this planning study. The table further breaks the clusters down by urban and rural designation (based on KYSTMv18 data) because urban and rural roadways tend to have unique typical crash causes and countermeasures.

Potential Safety Improvements			
Category	Locations	Possible Causes	Recommendations
CAT 1: Major clusters covered by proposed mobility improvement	In Scottsville and Monticello	Intersection spacing and congestion, speeding	Mobility improvements described above: converting to a 2+1 roadway facility in Scottsville, and intersection improvements in Scottsville and Monticello
CAT 2: Major clusters not covered by proposed mobility improvement	<u>RURAL</u> From I-65 to KY 482 (Pleasant Ridge) east of Franklin. From Old Scottsville Loop 2 Road to Gorby Rd in Haywood. From Koger Road to KY 790 in Bronston	<u>RURAL</u> Signal deficiencies, sight distance challenges, lack of safety features/advance warnings, geometric deficiencies, lane drop/merge, speeding	<u>RURAL</u> Improved geometrics/sight distance, install/modernize signage, improved lighting/visibility, roadside improvements.

Proposed Phasing: The proposed spot improvements at major intersections can be constructed separately and ahead of the proposed corridor widenings in Scottsville and Glasgow; however, since the proposed corridor widenings in Scottsville and Glasgow are relatively short (1.2 miles and 0.9 mile, respectively), it may be desirable to construct the widenings at the same time as the spot improvements.

PRELIMINARY ENVIRONMENTAL RED FLAG ANALYSIS

The table below summarizes the presence of critical environmental red flag concerns identified by KYTC within 1,000 ft of proposed improvement locations (Y=Yes; N=No).

Critical Red Flag Issues/Concerns			
Environmental Red Flag Features	<u>Major Bottleneck 1:</u> From KY 100 to KY 980 in Scottsville	<u>Major Bottleneck 2:</u> From Dockery Heights Rd to Cumberland Expressway in Glasgow	<u>Major Bottleneck 3:</u> From Gregory St to Guinn Dr in Monticello
Superfunds	N	N	N
Special Waters ¹	N	N	N
Forested Areas	N	N	Y
NLEB Habitat Priority	N	N	Y
IB Habitat Priority Area	N	N	N
FAA Airport Runways	N	N	Y
Public Hunting Areas	N	N	Y
Wildlife Management Areas	N	N	Y
Local Parks	Y	N	N
State/ National Parks	N	N	N
Kentucky Heritage Land Conservation Fund	N	N	N
Area Landmarks	Y	N	Y
Point Landmarks	N	Y	Y
National Register of Historic Places Location (Point)	N	Y	N
National Register of Historic Places Location (Polygon)	N	N	N

1) Special Waters are defined as Cold Water Aquatic Habitats, Outstanding State/National Resource Waters, Exceptional Waters, State Wild Rivers, and Federally Designated Wild / Scenic Rivers.

RIGHT OF WAY IMPACTS

The table below summarizes the potential needs of additional right-of-way (ROW) for proposed improvement concepts.

Potential Needs of Additional Right of Way		
Locations	Improvement Concepts	Potential Needs of Additional ROW
Major Bottleneck 1: From KY 100 to KY 980 in Scottsville	Converting to a 3-lane facility (one lane each direction plus an alternating passing lane) on its existing alignment with intersection improvements at KY 100 and KY 980	No
Major Bottleneck 2: From Dockery Heights Rd to Cumberland Expressway in Glasgow	Widening this section to a 4-lane divided arterial on its existing alignment with intersection improvements and bridge modification	Yes, but much would fit within existing ROW
Major Bottleneck 3: From Gregory St to Guinn Dr in Monticello	Spot improvement at major intersections	No
Intersection modifications at KY 61	Improvements such as additional turn lanes, channelization, and coordinated signal timing	Potentially
Intersection modifications at KY 639	Improvements such as additional turn lanes, channelization, and coordinated signal timing	No

COST ESTIMATION

Design:	3.1 (\$M)
ROW:	2.1 (\$M)
Utility:	1.7 (\$M)
Construction:	24.4 (\$M)
TOTAL =	31.3 (\$M)

Note:

1. The cost estimation may not include additional costs to address the potential impacts of major utilities (e.g., gas line, major water supplier, transmission line) within the proximity of the corridor, due to the lack of data when the report was prepared. Further investigation is recommended in future studies.
2. Cost estimation was based on 2020 dollars. There is a 1-3% inflation rate. Estimated cost could vary -50% to +250% of the actual number (as a rule of thumb).
3. The widening of a 2-lane facility to a 3-lane facility (with TWLTL or alternating passing lane) is considered as "Minor Widening (Undivided Road) - 2 Lane to 4 Lane".
4. The cost estimation does not include bridges outside of the bottleneck locations, as they are not assumed to rise to the level of a corridor improvement. The cost estimation only includes necessary bridge replacement/rehab/widening costs within the bottleneck locations with proposed widening improvement.
5. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
6. Shoulder widening is not included in the cost estimation, as it is a relatively minor cost.
7. If multiple improvement concepts are recommended for the corridor, only the cost of the larger-scale improvement concept is estimated.

Kentucky Statewide Corridor Plan (Linking Kentucky)

Route: US 641
Segment ID: 40
From: Tennessee State Line
To: US 60 in Marion
Counties: Calloway, Marshall, Livingston, Lyon, Caldwell, Crittenden
Highway Districts: 1, 2

CORRIDOR SEGMENT OVERVIEW

Segment 40 on US 641 begins at the Tennessee State Line in Calloway County and extends north through multiple counties to US 60 in Crittenden County. The corridor segment is approximately 70.3 miles long and currently contains three interchanges at US 62, KY 453, and I-24.

This segment passes through the residential and commercial areas of multiple cities (Hazel and Murray in Calloway County, Hardin and Benton in Marshall County, Kuttawa and Eddyville in Lyon County, Fredonia in Caldwell County, and Marion in Crittenden County). These areas would be considered towns or cities (according to KYSTMv18 data) with clusters of homes and commercial buildings adjacent to US 641. The remainder of this segment passes through rural agricultural areas with homes interspersed along US 641.

EXISTING FACILITY

The table below outlines the typical roadway attributes for this section of US 641 by sub-segment.

Typical Roadway Attributes					
Sub-segment	Functional Classification	Number & Width of Lanes	Shoulder & Width	Median Type & Width	Posted Speed Limit
From the TN State Line to KY 1550 (Glendale Rd) in Murray	Principal Arterial	2, 10'	3'	None	55 mph
From KY 1550 (Glendale Rd) in Murray to KY 1824/US 641 BUS south of Benton	Principal Arterial	4, 12'	5' or 10'	12' flush or 34' or 52' depressed	65 mph
From KY 1824/US 641 BUS south of Benton to US 60 in Marion	Minor Arterial	2, 10' or 12'	4' or 10'	None	55mph

Right of Way: The existing right of way is generally 50' – 150' wide.

Pavement: The average PDI (Pavement Distress Index) for this corridor segment is 0.22, which indicates an overall good pavement condition according to KYTC criteria (Good: 0.00 – 0.35; Fair: 0.36 – 0.65; Poor: 0.66 – 0.99).

Intersections/Interchanges: The tables below outline the existing interchanges, major intersections, and railroad crossings on the corridor.

Interchanges	Interchange Type
US 62	Partial Cloverleaf
KY 453	Diamond
I-24	Diamond

Major Intersections ¹			
KY 893	Gilbert St	Midway Rd	Glendale Rd
Sycamore St	Main St (KY 94)	Chestnut St	KY 121
Utterback Rd	KY 80	KY 1824 (south)	KY 464
KY 1346	KY 402	KY 1824 (north)	E 14th St
E 12th St	W 8th St	W 5th St	KY 795
US 68	KY 1422	US 62	KY 282
KY 453	KY 952	KY 810	KY 93
KY 295	KY 373	KY 93	Riley Rd
KY 70 (south)	KY 902	KY 70 (north)	US 60

1) Only crossroads with function classification of Minor Collector or above are included.

At-grade Railroad Crossings
US 641 Mile Point 0.3 in Calloway County

Access Points: This segment is not access controlled. Throughout the segment, there are residential and commercial driveways and intersecting roadways.

Bridges: The tables below outline the detailed Bridge information for existing bridges on or over this section of US 641.

Mainline Bridge Information										
Bridge ID	Feature Intersect	NBIS Classification	Sufficiency Rating	Substandard	Deck Rating	Superstructure Rating	Substructure Rating	Under Clearance (feet)	Horizontal Clearance (feet)	Culvert Rating
018B00105N	TRIB-MID.FK.CLARKS RIVER	Good	79	No	7	8	7	0	39.7	N
018B00106N	CLARKS RIVER	Good	79	No	7	7	7	0	39.7	N
018B00112N	BRUSHY CREEK	Fair	80	No	6	7	7	0	43.96	N
018B00027N (Culvert)	COLBURN BRANCH	Fair	77	No	N	N	N	0	23.95	6
018B00031N (Culvert)	MORRIS BRANCH	Fair	77	No	N	N	N	0	22.97	6
018B00030N (Culvert)	POYNER BRANCH	Fair	77	No	N	N	N	0	21	6
018B00095R	ROCKHOUSE CREEK	Fair	100	No	7	7	6	0	39.7	N

Mainline Bridge Information										
Bridge ID	Feature Intersect	NBIS Classification	Sufficiency Rating	Substandard	Deck Rating	Superstructure Rating	Substructure Rating	Under Clearance (feet)	Horizontal Clearance (feet)	Culvert Rating
018B00096R	ROCKHOUSE CRK OVERFLOW	Good	100	No	7	7	7	0	39.7	N
018B00095L	ROCKHOUSE CREEK	Fair	100	No	7	7	6	0	39.7	N
018B00096L	ROCKHOUSE CREEK	Fair	100	No	7	7	6	0	39.7	N
017B00042N	EASLEY CREEK	Fair	51.7	No	6	6	5	0	22.97	N
017B00071N	LIVINGSTON CREEK	Fair	84.4	No	6	8	7	0	40.08	N
028B00065N (Culvert)	Unnamed Creek	Good	97	No	N	N	N	0	58	9
028B00061N	CROOKED CREEK	Good	96.2	No	7	8	8	0	44.95	N
070B00065N	CUMBERLAND RIVER	Fair	48	No	7	6	5	0	25.92	N
079B00053N (Culvert)	BRANCH CYPRESS CREEK	Good	90.5	No	N	N	N	0	23.95	7
079B00054N (Culvert)	CYPRESS CREEK	Good	90.5	No	N	N	N	0	23.95	7
079B00055N (Culvert)	STICE CREEK	Fair	92	No	N	N	N	0	23.95	6
079B00148N	TOWN CREEK	Good	72.3	No	7	8	8	0	27.56	N
079B00026N (Culvert)	FORK OF OLD BEE CREEK	Poor	57.4	No	N	N	N	0	27.89	4
072B00001N	P&L RAILWAY	Fair	65.2	No	6	7	6	23.5	28.22	N
072B00002N	BRANCH OF SKINFRAME CREEK	Fair	62	No	6	6	6	0	22.97	N
072B00003N	SKINFRAME CREEK	Fair	53	No	5	5	6	0	22.97	N
079B00129N	MARSH-CLARKS R. OVERFLOW	Good	90.2	No	7	7	7	0	40.03	N
072B00018N (Culvert)	FLAT CREEK	Fair	78.5	No	N	N	N	0	28	6
072B00017N (Culvert)	BRANCH OF FLAT CR.	Fair	78.5	No	N	N	N	0	29.86	6
079B00128N	CLARKS RIVER OVERFLOW	Good	90.2	No	7	8	8	0	40.03	N
079B00005N (Culvert)	CHESTNUT CREEK	Fair	69.8	No	N	N	N	0	20	5
079B00099N	TOWN CREEK	Fair	62.1	Yes	6	6	6	0	23.95	N
079B00151N	TENNESSEE RIVER	Good	100	No	7	8	8	0	48	N
079B00127N	CLARKS RIVER	Good	90.2	No	7	7	7	0	40.03	N
079B00120R	WADES CREEK	Good	100	No	7	8	7	0	39.7	N
079B00120L	WADES CREEK	Good	100	No	7	8	7	0	39.7	N
079B00121N (Culvert)	MYERS CREEK	Fair	71.7	No	N	N	N	0	80	5
079B00056N	KY 282	Fair	57.9	No	6	6	7	14.17	27.89	N
070B00082N	P&L RAILWAY	Good	96	No	7	8	7	23.06	60	N
018B00111N	BEE CREEK	Fair	94.6	No	6	7	8	0	81.69	N
070B00040N	P&L RR & REED HAUL ROAD	Fair	80.7	No	6	6	6	22.05	30	N

Structures Crossing Over the Corridor			
Bridge ID	Facility Carried	Under Clearance (feet)	Horizontal Clearance (feet)
070B00043L	KY-453-10 NC	18.20	31.17
070B00043R	KY-453	18.20	31.17
072B00037R	I-24	16.50	39.70
072B00037L	I-24 NC	16.08	39.70
072R00016N	P&L Railway	32.00	40.42

Other Noteworthy Conditions: None.

TRAFFIC & OPERATIONS

AADT & AADTT: The table below summarizes the 2015 AADT and daily truck volumes by sub-segment.

Traffic Volumes			
Sub-segment	AADT	AADTT	Truck Percentage
From TN state line to Glendale Rd (KY 1550) in Murray	6,400	800	12% ¹
From Glendale Rd (KY 1550) in Murray to Coles Campground Rd (KY 1429) north of Murray	12,200	1,200	10% ²
From Coles Campground Rd (KY 1429) north of Murray to US 60 in Marion	4,800	700	14%

1,2) Truck percentages obtained from KYTC Traffic Counts System.

Mobility: There is one major traffic bottleneck section along this corridor segment. See the table below for details. (Note: bottlenecks are identified by Level of Travel Time Reliability (LOTR) > 1.5 or volume/capacity (v/c) > 0.6.) There are also a few additional isolated traffic bottlenecks along this corridor. Other than the noted traffic bottleneck sections/locations, traffic condition is acceptable along the remainder of this segment.

Existing Typical Roadway Attributes at Major Traffic Bottlenecks					
Locations	Functional Classification	Number & Width of Lanes	Median Width	Shoulder Width	2015 AADT ¹
Major Bottleneck 1: From Sycamore St in Murray to KY 80 in Murray	Principal Arterial	4, 12'	12'	2'	18,532

1) The highest traffic volume within the bottleneck based on KYSTMv18 data.

Safety: 5.6% of the corridor mileage has a Level of Safety of Service (LOSS) of 4, meaning these areas have the highest potential to decrease crashes. (Note: LOSS indicates the potential for crash reduction and is broken up into four categories based on Safety Performance Functions (SPFs): LOSS 4 = high; LOSS 3 = moderate to high; LOSS 2 = low to moderate; LOSS 1 = low.) See the table under **Potential Safety**

Improvement section for details of locations with LOSS =4, possible causes, and potential safety improvements.

ITS Devices: Approximately 2% of the corridor length will have direct access to fiber from the KentuckyWired project.

PROPOSED IMPROVEMENT CONCEPTS

The improvement options noted in this report are not intended to be all-encompassing. Other potential improvements are possible, including innovative solutions that could be cost-effective and address the reasons for improvement. Further study may be needed as part of the project development process.

Proposed Typical Section & Description of Modification: The table below describes the proposed improvement concepts for the identified bottlenecks. The proposed improvements expect to maintain an overall acceptable traffic condition through 2045 ($v/c < 0.85$ in urban areas and $v/c < 0.7$ in rural areas) and address safety issues at bottlenecks. Also note that, while the US 641 corridor between Fredonia and Marion is currently a 2-lane facility and only spot improvements are recommended due to identified isolated bottlenecks, this section of US 641 has adequate right-of-way and is easy to potentially upgrade to a 4-lane facility to accommodate increased traffic in future as needed.

Proposed Improvement Concepts			
Locations	Improvement Concepts ¹	Notes ²	Reason for Improvement
From the TN state line to south Murray	Constructing a new 4-lane divided facility that is parallel to the existing US 641 on the west side.	<p>Improved Typical Section: 2, 11-foot lanes in each direction with 4-foot shoulders. 48-foot depressed median.</p> <p>This project is funded by BUILD grant with the construction starting in fall 2020³.</p>	
<u>Major Bottleneck 1:</u> From Sycamore St in Murray to KY 80 in Murray	Spot improvements at intersections		LOTTR exceeds the established thresholds
From Eddyville north to Fredonia	Widening to a 4-lane divided facility on its existing alignment.	<p>Improved Typical Section: 2, 12-foot lanes in each direction with 12-foot shoulders. 60-foot depressed median.</p> <p>This project is in KYTC's Six-Year Plan (SYP)⁴.</p>	

1) The proposed roadway widening concept includes spot improvements at interchanges and major intersections as needed (see details in Interchanges for Potential Modification and Major Intersection for Potential Modification sections below).

2) Improved typical sections are based on KYTC Highway Design Manual.

3) Item Number 1-314.20.

4) Item Number 1-187.31. This project is currently under preliminary line & grade phase with expected completion in May 2021. The final design and other phases are funded in the SYP under 1-187.50 and 1-187.60.

Potential New Interchanges: None.

Interchanges for Potential Modification: Improvements are proposed for one existing interchange at I-24.

Interchanges for Potential Modification	
I-24	

Major Intersections for Potential Modification: Improvements, such as additional turn lanes, channelization, and coordinated signal timing, should be considered at 14 major intersections for this corridor segment. The following is a list of these intersections.

Major Intersections for Potential Modification			
Sycamore St	Main St (KY 94)	Chestnut St	KY 121
N 4th St	KY 80	US 641 BUS	E 12th St (KY 408)
W 5th St (KY 348)	US 68 (south)	US 68 (north)	KY 93
KY 70	US 60		

Bridges: Bridge recommendations are based on ratings of substructure, superstructure and deck using the following methodology.

Methodology for Replacement/Rehabilitation Recommendation					
Structures	Substructure Rating	Superstructure Rating	Deck Rating	Culvert Rating	Recommendations
Bridges	≤ 4	Any	Any	/	Replacement
	$= 5$	Any	Any	/	Rehabilitation
	≥ 6	≤ 5	Any	/	Rehabilitation
	≥ 6	Any	≤ 5	/	Rehabilitation
	≥ 6	≥ 6	≥ 6	/	None ¹
Culverts	/	/	/	≤ 4	Replacement
	/	/	/	5 or 6	Rehabilitation
	/	/	/	≥ 7	None

1) If the bridge is on a corridor with a recommendation of widening, it will be widened (considered as rehabilitation) as necessary to accommodate the additional proposed lanes.

- **Bridges for Rehab/Widening:** Rehab/widening is recommended for a total of seven bridges and eight culverts along the entire corridor. Note that the bridge rehab is determined based on the "Methodology for Replacement/Rehabilitation Recommendation" table above. If the bridge has a good condition but is within a bottleneck location with recommended widening, it will be widened as necessary to accommodate the additional proposed lanes and the cost of widening is assumed to be the same as bridge rehab for the planning-level cost estimation purpose.

Bridges for Rehab/Widening	
Bridge ID	Feature Intersect
018B00027N (Culvert)	COLBURN BRANCH
018B00031N (Culvert)	MORRIS BRANCH
018B00030N (Culvert)	POYNER BRANCH
017B00042N	EASLEY CREEK
070B00065N	CUMBERLAND RIVER
079B00055N (Culvert)	STICE CREEK
072B00003N	SKINFRAME CREEK
072B00018N (Culvert)	FLAT CREEK
072B00017N (Culvert)	BRANCH OF FLAT CR.
079B00005N (Culvert)	CHESTNUT CREEK
079B00121N (Culvert)	MYERS CREEK
018B00106N	CLARKS RIVER
072B00001N	P&L RAILWAY
072B00002N	BRANCH OF SKINFRAME CREE
072B00003N	SKINFRAME CREEK

- **Bridges for Replacement:** Replacement is recommended for a total of one culvert along the entire corridor. Note that the bridge replacement is determined based on the "Methodology for Replacement/Rehabilitation Recommendation" table above. If the bridge needs replacement and is within a bottleneck location with recommended widening, it will be widened during the replacement to accommodate the additional proposed lanes and the cost of bridge replacement is used for the planning-level cost estimation purpose.

Bridges for Replacement	
Bridge ID	Feature Intersect
079B00026N (Culvert)	FORK OF OLD BEE CREEK

Pavement Treatment: The overall pavement condition is good (average PDI = 0.22). Proposed additional lanes will consist of full depth asphalt pavement construction. Spot reconstruction and rehabilitation of existing asphalt pavement lanes might be needed based on more detailed evaluation of the corridor's pavement condition.

Potential Safety Improvement: The table below summarizes safety issues for the corridor and is based on KYTC safety data (LOSS value = 4), as well as a cursory review of Google Aerial imagery. The table identifies clusters of links with a LOSS value of 4 based on two categories: 1) clusters located in areas where this study already recommends corridor improvements for mobility reasons and 2) clusters not located in areas previously recommended for corridor mobility improvements. For Category 1, it is assumed any corridor improvement based on mobility needs will be constructed to current KYTC standards and will include the necessary safety improvements. Category 2 is intended to identify corridor segments that may warrant improvement for safety reasons, even though improvement might not be needed for mobility. There may also be isolated links with LOSS value of 4 that are not included in the table. Spot improvements could be warranted for those locations but it is assumed these spot improvements do not rise to the level of a corridor improvement; therefore, these locations are not

addressed in this planning study. The table further breaks the clusters down by urban and rural designation (based on KYSTMv18 data) because urban and rural roadways tend to have unique typical crash causes and countermeasures.

Potential Safety Improvements			
Category	Locations	Possible Causes	Recommendations
CAT 1: Major clusters covered by proposed mobility improvement	From the TN state line to south Murray, from Sycamore St in Murray to KY 80 in Murray, and From Eddyville north to Fredonia	Intersection spacing and congestion, lack of shoulder, sight distance challenges	Mobility improvements described above: constructing a new 4-lane facility parallel to US 641 from the TN state line to south Murray, intersection improvements in Murray, and widening to 4-lane from Eddyville north to Fredonia
CAT 2: Major clusters not covered by proposed mobility improvement	<u>URBAN</u> N/A <u>RURAL</u> From Terrace Hills Rd to US 62 in Marshall County. From I-24 to KY 93 in Eddyville <u>Mixed URBAN/RURAL</u> From KY 1518 (Church Grove Rd) south of Benton to US 68 in Draffenville.	<u>URBAN</u> Signal deficiencies, capacity deficiencies, geometric deficiencies, excessive curb cuts. <u>RURAL</u> Sight distance challenges, geometric deficiencies, lack of safety features/advance warnings, speeding.	<u>URBAN</u> Coordinated signal timing/signal modernization, intersection and signage improvements, improved geometrics, added capacity, access control. <u>RURAL</u> Improved geometrics/sight distance, roadside improvements, install/modernize signage, improved lighting/visibility.

Proposed Phasing: The proposed spot improvements at major intersections and interchange modification at I-24 can be constructed ahead of the proposed corridor widening from Eddyville north to Fredonia. The new 4-lane divided facility parallel to US 641 near TN State line is funded by BUILD grant with construction starting in fall 2020.

PRELIMINARY ENVIRONMENTAL RED FLAG ANALYSIS

The table below summarizes the presence of critical environmental red flag concerns identified by KYTC within 1,000 ft of proposed improvement locations (Y=Yes; N=No).

Critical Red Flag Issues/Concerns			
Environmental Red Flag Features	From the TN state line to south Murray	<u>Major Bottleneck 1</u> : From Sycamore St in Murray to KY 80 in Murray	From Eddyville north to Fredonia
Superfunds	N	N	N
Special Waters ¹	N	N	Y
Forested Areas	Y	N	N
NLEB Habitat Priority	N	N	Y
IB Habitat Priority Area	N	N	N
FAA Airport Runways	N	N	N
Public Hunting Areas	N	N	N
Wildlife Management Areas	N	N	N
Local Parks	N	Y	Y
State/ National Parks	N	N	N
Kentucky Heritage Land Conservation Fund	N	N	N
Area Landmarks	N	Y	N
Point Landmarks	N	Y	Y
National Register of Historic Places Location (Point)	N	N	Y
National Register of Historic Places Location (Polygon)	N	N	N

1) Special Waters are defined as Cold Water Aquatic Habitats, Outstanding State/National Resource Waters, Exceptional Waters, State Wild Rivers, and Federally Designated Wild / Scenic Rivers.

RIGHT OF WAY IMPACTS

The table below summarizes the potential needs of additional right-of-way (ROW) for proposed improvement concepts.

Potential Needs of Additional Right of Way		
Locations	Improvement Concepts	Potential Needs of Additional ROW
From the TN state line to south Murray	Constructing a new 4-lane divided facility that is parallel to the existing US 641 on the west side (BUILD grant project).	Potentially
<u>Major Bottleneck 1:</u> From Sycamore St in Murray to KY 80 in Murray	Spot improvements at intersections	Potentially
From Eddyville north to Fredonia	Widening to a 4-lane divided facility on its existing alignment (KYTC Six-Year Plan project).	Yes, but much would fit within existing ROW
Interchange modifications at I-24	Interchange modifications	Potentially
Intersection modifications at KY 408, KY 348, US 68 (south), US 68 (north)	Improvements such as additional turn lanes, channelization, and coordinated signal timing	Potentially
Intersection modifications at KY 93, US 60	Improvements such as additional turn lanes, channelization, and coordinated signal timing	No

COST ESTIMATION

Design:	11.7 (\$M)
ROW:	8.8 (\$M)
Utility:	8.0 (\$M)
Construction:	<u>92.5 (\$M)</u>
TOTAL =	120.9 (\$M)

Note:

1. The cost estimation may not include additional costs to address the potential impacts of major utilities (e.g., gas line, major water supplier, transmission line) within the proximity of the corridor, due to the lack of data when the report was prepared. Further investigation is recommended in future studies.
2. Cost estimation was based on 2020 dollars. There is a 1-3% inflation rate. Estimated cost could vary -50% to +250% of the actual number (as a rule of thumb).
3. The widening of a 2-lane facility to a 3-lane facility (with TWLTL or alternating passing lane) is considered as "Minor Widening (Undivided Road) - 2 Lane to 4 Lane".
4. The cost estimation does not include bridges outside of the bottleneck locations, as they are not assumed to rise to the level of a corridor improvement. The cost estimation only includes necessary bridge replacement/rehab/widening costs within the bottleneck locations with proposed widening improvement.
5. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
6. Shoulder widening is not included in the cost estimation, as it is a relatively minor cost.
7. If multiple improvement concepts are recommended for the corridor, only the cost of the larger-scale improvement concept is estimated.

Kentucky Statewide Corridor Plan (Linking Kentucky)

Route: US 421 (Leestown Rd)
Segment ID: 41A
From: US 27 in Lexington
To: KY 341 (I-64 Exit 65)
Counties: Fayette, Scott, Woodford
Highway Districts: 7

CORRIDOR SEGMENT OVERVIEW

Segment 41A on US 421 begins at US 27 in Fayette County and extends northwest through Scott County to KY 341 (I-64 Exit 65) in Woodford County. The corridor segment is approximately 12.4 miles long and currently contains one interchange at KY 4 (New Circle Rd).

This segment passes through the residential and commercial areas of the Lexington in Fayette County. These areas would be considered suburban or city (according to KYSTMv18 data) with moderate to high densities of homes and commercial buildings adjacent to US 421. The remainder of this segment passes through rural agricultural areas with homes interspersed along US 421.

EXISTING FACILITY

The table below outlines the typical roadway attributes for this section of US 421 by sub-segment.

Typical Roadway Attributes					
Sub-segment	Functional Classification	Number & Width of Lanes	Shoulder & Width	Median Type & Width	Posted Speed Limit
From US 27 to Newtown Pike in Lexington	Principal Arterial	4, 12'	None	None	35 mph
From Newtown Pike to Taylor Dr in Lexington	Principal Arterial	2, 12'	2'	None	35 mph
From Taylor Dr to Ruffian Way in Lexington	Minor Arterial	4, 12'	2'	24' raised non-mountable	45 mph
From Ruffian Way in Lexington to KY 341 (I-64 Exit 65)	Minor Arterial	2, 11'	3' or 10'	None	55 mph

Right of Way: The existing right of way is generally 50' – 120' wide.

Pavement: The average PDI (Pavement Distress Index) for this corridor segment is 0.45, which indicates an overall fair pavement condition according to KYTC criteria (Good: 0.00 – 0.35; Fair: 0.36 – 0.65; Poor: 0.66 – 0.99).

Intersections/Interchanges: The tables below outline the existing interchanges, major intersections, and railroad crossings on the corridor.

Interchanges	Interchange Type
KY 4 (New Circle Rd) ¹	Diamond

1) This interchange is slated to be reconstructed as a Diverging Diamond in the future.

Major Intersections ¹			
US 27	Jefferson St	Newtown Pike	S Forbes Rd
Greendale Rd	Citation Blvd	Masterson Station Dr	KY 1977
US 62	KY 341		

1) Only crossroads with function classification of Minor Collector or above are included.

At-grade Railroad Crossings
None

Access Points: This segment is not access controlled. Throughout the segment, there are residential and commercial driveways and intersecting roadways.

Bridges: The tables below outline the detailed Bridge information for existing bridges on or over this section of US 421.

Mainline Bridge Information										
Bridge ID	Feature Intersect	NBIS Classification	Sufficiency Rating	Substandard	Deck Rating	Superstructure Rating	Substructure Rating	Under Clearance (feet)	Horizontal Clearance (feet)	Culvert Rating
034B00018N (Culvert)	FORK OF TOWN BRANCH	Fair	93.1	No	N	N	N	0	25.33	6
105B00020N	S.FK ELKHORN CREEK	Fair	63.6	No	6	5	5	0	26	N
034B00123N	CSX RAILROAD	Fair	95.7	No	6	7	7	22.93	67	N
034B00163N	SOUTHERN RR	Good	91.5	No	7	8	7	16.5	36.67	N

Structures Crossing Over the Corridor			
Bridge ID	Facility Carried	Under Clearance (feet)	Horizontal Clearance (feet)
034B00037L	W NEW CIRCLE RD OL	16.08	30.33
034B00037R	NEW CIRCLE ROAD-IL	16.1	30.33
034R00604N	CSX RR	13.58	24.17
034X00009N	PEDWAY	17.42	33
120R00600N	CSX RR	14.5	28.87

Other Noteworthy Conditions: None.

TRAFFIC & OPERATIONS

AADT & AADTT: The table below summarizes the 2015 AADT and daily truck volumes by sub-segment.

Traffic Volumes			
Sub-segment	AADT	AADTT	Truck Percentage
From US 27 to Citation Blvd in Lexington	19,300	2,700	14%
From Citation Blvd in Lexington to KY 341 (I-64 Exit 65)	11,500	1,200	11%

Mobility: The entirety of this corridor segment is a major traffic bottleneck. (Note: bottlenecks are identified by Level of Travel Time Reliability (LOTTR) > 1.5 or volume/capacity (v/c) > 0.6.) Typical roadway attributes of the bottleneck area can be found above for the entire segment.

Existing Typical Roadway Attributes at Major Traffic Bottlenecks					
Locations	Functional Classification	Number & Width of Lanes	Median Width	Shoulder Width	2015 AADT ¹
Entire corridor	Refer to the Existing Facility section above				27,868

1) The highest traffic volume within the bottleneck based on KYSTMv18 data.

Safety: 7.0% of the corridor mileage has a Level of Safety of Service (LOSS) of 4, meaning these areas have the highest potential to decrease crashes. (Note: LOSS indicates the potential for crash reduction and is broken up into four categories based on Safety Performance Functions (SPFs): LOSS 4 = high; LOSS 3 = moderate to high; LOSS 2 = low to moderate; LOSS 1 = low.) See the table under **Potential Safety Improvement** section for details of locations with LOSS =4, possible causes, and potential safety improvements.

ITS Devices: Approximately 1% of the corridor length will have direct access to fiber from the KentuckyWired project. Lexington-Fayette Urban County Government (LFUCG) has a fiber network around the Lexington portion of the corridor with CCTV cameras.

PROPOSED IMPROVEMENT CONCEPTS

The improvement options noted in this report are not intended to be all-encompassing. Other potential improvements are possible, including innovative solutions that could be cost-effective and address the reasons for improvement. Further study may be needed as part of the project development process.

Proposed Typical Section & Description of Modification: The table below describes the proposed improvement concepts for the identified bottlenecks. The proposed improvements expect to maintain an overall acceptable traffic condition through 2045 ($v/c < 0.85$ in urban areas and $v/c < 0.7$ in rural areas) and address safety issues at bottlenecks.

Proposed Improvement Concepts			
Locations	Improvement Concepts ¹	Notes ²	Reason for Improvement
From US 27 to Newtown Pike	Spot improvements at intersections	This section passes through an urbanized area with high densities of residential and commercial buildings adjacent to this corridor. Existing constraints limit improvement opportunities.	Both LOTTR and the expected v/c in 2045 exceeds the established thresholds.
From Newtown Pike to Forbes Road	None at this time	This section passes through a cemetery site with bridges over railroad at both ends. Existing constraints limit improvement opportunities.	
From Forbes Road to KY 4 (New Circle Rd) ³	Widening this section to a 4-lane undivided arterial on its existing alignment with access management and intersection improvements	Improved Typical Section: 2, 12-foot lanes in each direction with 2-foot shoulders.	Both LOTTR and the expected v/c in 2045 exceeds the established thresholds.
From KY 4 (New Circle Rd) to Citation Blvd ⁴	Widening this section to a 6-lane divided arterial on its existing alignment with intersection improvements	Improved Typical Section: 3, 12-foot lanes in each direction with 2-foot shoulders and a 16-foot median.	Both LOTTR and the expected v/c in 2045 exceeds the established thresholds.
From Citation Blvd to Ruffian Way	Widening this section to a 6-lane divided arterial on its existing alignment with intersection improvements	Improved Typical Section: 3, 12-foot lanes in each direction with 2-foot shoulders and a 16-foot median.	The expected v/c in 2045 exceeds the established thresholds.
From Ruffian Way to KY 341 (I-64 Exit 65)	Widening this section to a 4-lane divided arterial on its existing alignment	Improved Typical Section: 2, 12-foot lanes in each direction with 8-foot shoulders and a 40-foot median.	The expected v/c in 2045 exceeds the established thresholds.

1) The proposed roadway widening concept includes spot improvements at interchanges and major intersections as needed (see the Interchanges for Potential Modification and Major Intersection for Potential Modification sections below).

2) Improved typical sections are based on KYTC Highway Design Manual.

3,4) The existing New Circle Rd bridge might be further studied to accommodate the potential widening on US 421.

Potential New Interchanges: None.

Interchanges for Potential Modification: None. Note that the interchange with New Circle is slated to be reconstructed as a Diverging Diamond Interchange in the future (Item Number 7-113.02).

Major Intersections for Potential Modification: Improvements, such as additional turn lanes, channelization, and coordinated signal timing, should be considered at 10 major intersections for this corridor segment. The following is a list of these intersections.

Major Intersections for Potential Modification			
US 68 ¹	Jefferson St	Newtown Pike	S Forbes Rd
Greendale Rd	Citation Blvd	Masterson Station Dr	N Yarnallton Pike
US 62	KY 341		

1) One-way couplet of West Main Street and West Vine Street at US 68.

Bridges: Bridge recommendations are based on ratings of substructure, superstructure and deck using the following methodology.

Methodology for Replacement/Rehabilitation Recommendation					
Structures	Substructure Rating	Superstructure Rating	Deck Rating	Culvert Rating	Recommendations
Bridges	<=4	Any	Any	/	Replacement
	=5	Any	Any	/	Rehabilitation
	>=6	<=5	Any	/	Rehabilitation
	>=6	Any	<=5	/	Rehabilitation
	>=6	>=6	>=6	/	None ¹
Culverts	/	/	/	<=4	Replacement
	/	/	/	5 or 6	Rehabilitation
	/	/	/	>=7	None

1) If the bridge is on a corridor with a recommendation of widening, it will be widened (considered as rehabilitation) as necessary to accommodate the additional proposed lanes.

- **Bridges for Rehab/Widening:** Rehab/widening is recommended for a total of five bridges and one culvert along the entire corridor. Note that the bridge rehab is determined based on the "Methodology for Replacement/Rehabilitation Recommendation" table above. If the bridge has a good condition but is within a bottleneck location with recommended widening, it will be widened as necessary to accommodate the additional proposed lanes and the cost of widening is assumed to be the same as bridge rehab for the planning-level cost estimation purpose.

Bridges for Rehab/Widening	
Bridge ID	Feature Intersect
034B00018N (Culvert)	FORK OF TOWN BRANCH
105B00020N	S.FK ELKHORN CREEK
034B00123N	CSX RAILROAD
034B00163N	SOUTHERN RR
034B00037R	NEW CIRCLE ROAD-IL
034B00037L	W NEW CIRCLE RD OL

- **Bridges for Replacement:** None.

Pavement Treatment: The overall pavement condition is fair (average PDI = 0.45). Proposed additional lanes will consist of full depth asphalt pavement construction. Reconstruction and rehabilitation of existing asphalt pavement lanes are needed based on more detailed evaluation of the corridor's pavement condition.

Potential Safety Improvement: The table below summarizes safety issues for the corridor and is based on KYTC safety data (LOSS value = 4), as well as a cursory review of Google Aerial imagery. The table identifies clusters of links with a LOSS value of 4 based on two categories: 1) clusters located in areas where this study already recommends corridor improvements for mobility reasons and 2) clusters not located in areas previously recommended for corridor mobility improvements. For Category 1, it is assumed any corridor improvement based on mobility needs will be constructed to current KYTC standards and will include the necessary safety improvements. Category 2 is intended to identify corridor segments that may warrant improvement for safety reasons, even though improvement might not be needed for mobility. There may also be isolated links with LOSS value of 4 that are not included in the table. Spot improvements could be warranted for those locations but it is assumed these spot improvements do not rise to the level of a corridor improvement; therefore, these locations are not addressed in this planning study. The table further breaks the clusters down by urban and rural designation (based on KYSTMv18 data) because urban and rural roadways tend to have unique typical crash causes and countermeasures.

Potential Safety Improvements			
Category	Locations	Possible Causes	Recommendations
CAT 1: Major clusters covered by proposed mobility improvement	Intersection with US 27 and from Forbes Rd to KY 341 (I-64 Exit 65)	Intersection/interchange spacing and congestion, geometric deficiencies, lane drop, sight distance challenges	Intersection improvements and widening described above
CAT 2: Major clusters not covered by proposed mobility improvement	N/A	N/A	N/A

Proposed Phasing: The proposed spot improvements at major intersections can be constructed separately and ahead of the proposed corridor widening from Lexington to KY 341 (I-64 Exit 65).

PRELIMINARY ENVIRONMENTAL RED FLAG ANALYSIS

The table below summarizes the presence of critical environmental red flag concerns identified by KYTC within 1,000 ft of proposed improvement locations (Y=Yes; N=No).

Critical Red Flag Issues/Concerns					
Environmental Red Flag Features	From US 27 to Newtown Pike	From Forbes Road to KY 4 (New Circle Rd)	From KY 4 (New Circle Rd) to Citation Blvd	From Citation Blvd to Ruffian Way	From Ruffian Way to KY 341 (I-64 Exit 65)
Superfunds	N	N	N	N	N
Special Waters ¹	N	N	N	N	N
Forested Areas	N	N	N	N	N
NLEB Habitat Priority	N	N	N	N	N
IB Habitat Priority Area	N	N	N	N	N
FAA Airport Runways	N	N	N	N	N
Public Hunting Areas	N	N	N	N	N
Wildlife Management Areas	N	N	N	N	N
Local Parks	Y	N	N	Y	Y
State/ National Parks	N	N	N	N	N
Kentucky Heritage Land Conservation Fund	N	N	N	N	N
Area Landmarks	Y	Y	Y	Y	Y
Point Landmarks	Y	Y	Y	Y	Y
National Register of Historic Places Location (Point)	N	N	N	N	Y
National Register of Historic Places Location (Polygon)	N	N	N	N	N

1) Special Waters are defined as Cold Water Aquatic Habitats, Outstanding State/National Resource Waters, Exceptional Waters, State Wild Rivers, and Federally Designated Wild / Scenic Rivers.

RIGHT OF WAY IMPACTS

The table below summarizes the potential needs of additional right-of-way (ROW) for proposed improvement concepts.

Potential Needs of Additional Right of Way		
Locations	Improvement Concepts	Potential Needs of Additional ROW
From US 27 to Newtown Pike	Spot improvements at intersections	No
From Forbes Road to KY 4 (New Circle Rd)	Widening this section to a 4-lane undivided arterial on its existing alignment with access management and intersection improvements	Potentially, but much would fit within the existing ROW
From KY 4 (New Circle Rd) to Citation Blvd	Widening this section to a 6-lane divided arterial on its existing alignment with intersection improvements	No
From Citation Blvd to Ruffian Way	Widening this section to a 6-lane divided arterial on its existing alignment with intersection improvements	Yes, but much would fit within the existing ROW
From Ruffian Way to KY 341 (I-64 Exit 65)	Widening this section to a 4-lane divided arterial on its existing alignment	Yes, but much would fit within the existing ROW

COST ESTIMATION

Design:	18.7 (\$M)
ROW:	51.8 (\$M)
Utility:	11.5 (\$M)
Construction:	<u>151.4 (\$M)</u>
TOTAL =	233.4 (\$M)

Note:

1. The cost estimation may not include additional costs to address the potential impacts of major utilities (e.g., gas line, major water supplier, transmission line) within the proximity of the corridor, due to the lack of data when the report was prepared. Further investigation is recommended in future studies.
2. Cost estimation was based on 2020 dollars. There is a 1-3% inflation rate. Estimated cost could vary -50% to +250% of the actual number (as a rule of thumb).
3. The widening of a 2-lane facility to a 3-lane facility (with TWLTL or alternating passing lane) is considered as "Minor Widening (Undivided Road) - 2 Lane to 4 Lane".
4. The cost estimation does not include bridges outside of the bottleneck locations, as they are not assumed to rise to the level of a corridor improvement. The cost estimation only includes necessary bridge replacement/rehab/widening costs within the bottleneck locations with proposed widening improvement.
5. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
6. Shoulder widening is not included in the cost estimation, as it is a relatively minor cost.
7. If multiple improvement concepts are recommended for the corridor, only the cost of the larger-scale improvement concept is estimated.

Kentucky Statewide Corridor Plan (Linking Kentucky)

Route: US 421
Segment ID: 41B
From: KY 341 (I-64 Exit 65)
To: Indiana State Line
Counties: Woodford, Franklin, Henry, Shelby, Trimble
Highway Districts: 5, 7

CORRIDOR SEGMENT OVERVIEW

Segment 41B on US 421 begins at KY 341 (I-64 Exit 65) in Woodford County and extends northwest through Franklin County, Henry County, and Shelby County to the Indiana state line in Trimble County. The corridor segment is approximately 72.5 miles long and currently contains three interchanges at US 60/KY 676, US 127/KY 2261, and I-71.

This segment passes through the residential and commercial areas in multiple cities (Midway in Woodford County, Frankfort in Franklin County, Pleasureville, New Castle and Campbellsburg in Henry County, and Bedford and Milton in Trimble County). These areas would be considered towns (according to KYSTMv18 data) with clusters of homes and commercial buildings adjacent to US 421. The remainder of this segment passes through rural agricultural areas with homes interspersed along US 421.

EXISTING FACILITY

The table below outlines the typical roadway attributes for this section of US 421 by sub-segment.

Typical Roadway Attributes					
Sub-segment	Functional Classification	Number & Width of Lanes	Shoulder & Width	Median Type & Width	Posted Speed Limit
From KY 341 (I-64 Exit 65) to Chenault Rd east of Frankfort	Minor Arterial	2, 11'	6' or 10'	None	55 mph
From Chenault Rd east of Frankfort to KY 1211 (Taylor Ave) in Frankfort	Principal Arterial	4, 12'	2'	16' raised non-mountable	45 mph
From KY 1211 (Taylor Ave) in Frankfort to the Indiana state line	Minor Arterial	2, 10'	2' or 10'	None	55 mph

Right of Way: The existing right of way is generally 50' – 110' wide.

Pavement: The average PDI (Pavement Distress Index) for this corridor segment is 0.32, which indicates an overall good pavement condition according to KYTC criteria (Good: 0.00 – 0.35; Fair: 0.36 – 0.65; Poor: 0.66 – 0.99).

Intersections/Interchanges: The tables below outline the existing interchanges, major intersections, and railroad crossings on the corridor.

Interchanges	Interchange Type
US 60/KY 676	Single Point Urban Interchange
US 127/KY 2261	Partial Cloverleaf
I-71	Diamond

Major Intersections ¹			
KY 341	US 62	KY 1685	Chenault Rd
KY 676	Georgetown Rd	Schenkel Ln	Holmes St
Taylor Ave	KY 1665	KY 12	KY 561
KY 1922	KY 43	KY 241	Point Pleasant Rd
KY 55	KY 573	KY 202	KY 193
KY 574	KY 55 (Campbellsburg Rd)	KY 997	KY 1606
US 42	KY 625 (Mount Pleasant Rd)	KY 1226	KY 1492
Peck Pike	KY 36		

1) Only crossroads with function classification of Minor Collector or above are included.

At-grade Railroad Crossings
None

Access Points: This segment is not access controlled. Throughout the segment, there are residential and commercial driveways and intersecting roadways.

Bridges: The tables below outline the detailed Bridge information for existing bridges on or over this section of US 421.

Mainline Bridge Information										
Bridge ID	Feature Intersect	NBIS Classification	Sufficiency Rating	Substandard	Deck Rating	Superstructure Rating	Substructure Rating	Under Clearance (feet)	Horizontal Clearance (feet)	Culvert Rating
037B00067N	US 127	Fair	99	No	5	6	6	16.58	43.25	N
037B00106N (Culvert)	LITTLE FLAT CREEK	Good	99.3	No	N	N	N	0	26.08	7
037B00093R	KENTUCKY RIVER	Fair	97.9	No	6	6	6	0	32	N
037B00094L	KENTUCKY RIVER	Fair	97.5	No	6	6	7	0	32	N
037B00089N (Culvert)	OLD RR TUNNEL	Fair	80.2	No	N	N	N	0	34	6
037B00084N (Culvert)	TUCKER CREEK	Fair	99.6	No	N	N	N	0	42	6
037B00085N (Culvert)	STONE CREEK	Fair	70.9	No	N	N	N	0	38	5
037B00109N (Culvert)	FLAT CREEK	Good	99.3	No	N	N	N	0	23.08	7
037B00108N	FLAT CREEK	Good	96.8	No	7	8	7	0	30.5	N
052B00018N	BR OF DRENNON CREEK	Fair	65.6	No	5	6	5	0	22	N
052B00017N (Culvert)	BR OF DRENNON CREEK	Fair	78.2	No	N	N	N	0	22	6
052B00057N (Culvert)	TOWN CREEK	Fair	83.4	No	N	N	N	0	44.5	5
052B00038N	I-71	Fair	80.4	No	6	6	5	16	32.25	N
052B00081N	CSX RAILROAD	Fair	98.8	No	7	8	6	23.33	36	N
112B00023N	LITTLE KENTUCKY RIVER	Fair	87.1	No	6	8	5	0	34	N
112B00024N	TOWN BRANCH	Fair	96.9	No	6	7	6	0	34	N
112B00025N (Culvert)	TOWN BRANCH	Good	99.2	No	N	N	N	0	24	7
120B00001N (Culvert)	LEE BRANCH	Good	99.5	No	N	N	N	0	0	7
052B00079N	SIX MILE CREEK	Good	99.8	No	7	7	7	0	35.43	N
037B00010N (Culvert)	HICKMAN BRANCH	Fair	90.4	No	N	N	N	0	36	6
037B00009N (Culvert)	SLICKAWAY BRANCH	Fair	70	No	N	N	N	0	60	6
037B00078N	KY 676 (E-W CONN)	Fair	85	No	6	6	6	17	116	N
112B00040N	OHIO RIVER	Good	74.6	No	7	7	7	11.92	40	N
037B00107N (Culvert)	HUDSON CREEK	Good	98.1	No	N	N	N	0	31.42	7
052B00082N	BR OF DRENNON CREEK	Good	93.5	No	8	8	7	0	30	N
052B00080N (Culvert)	DRENNON CREEK	Good	94	No	N	N	N	0	30	7

Structures Crossing Over the Corridor			
Bridge ID	Facility Carried	Under Clearance (feet)	Horizontal Clearance (feet)
120B00022R	I-64 (EAST)	15	39.67
120B00022L	I-64 (WEST)	14.42	39.67
037B00095N	PEDESTRIAN BRIDGE	16.42	24
037B00070N	PEDESTRIAN BRIDGE	16.83	40

Other Noteworthy Conditions: None.

TRAFFIC & OPERATIONS

AADT & AADTT: The table below summarizes the 2015 AADT and daily truck volumes by sub-segment.

Traffic Volumes			
Sub-segment	AADT	AADTT	Truck Percentage
From KY 341 (I-64 Exit 65) to KY 676/US 60 in Frankfort	2,400	300	12%
From KY 676/US 60 to KY 1211 (Taylor Ave) in Frankfort	14,500	1,000	7%
From KY 1211 (Taylor Ave) in Frankfort to the Indiana state line	2,100	300	12%

Mobility: There is one major traffic bottleneck section along this corridor segment. See the table below for details. (Note: bottlenecks are identified by Level of Travel Time Reliability (LOTTR) > 1.5 or volume/capacity (v/c) > 0.6.) There are also a few additional isolated traffic bottlenecks along this corridor. Other than the noted traffic bottleneck sections/locations, traffic condition is acceptable along the remainder of this segment.

Existing Typical Roadway Attributes at Major Traffic Bottlenecks					
Locations	Functional Classification	Number & Width of Lanes	Median Width	Shoulder Width	2015 AADT ¹
From KY 676/US 60 to KY 1211 (Taylor Ave) in Frankfort	Principal Arterial	4, 12'	16'	2'	15,569

1) The highest traffic volume within the bottleneck based on KYSTMv18 data.

Safety: 3.1% of the corridor mileage has a Level of Safety of Service (LOSS) of 4, meaning these areas have the highest potential to decrease crashes. (Note: LOSS indicates the potential for crash reduction and is broken up into four categories based on Safety Performance Functions (SPFs): LOSS 4 = high; LOSS 3 = moderate to high; LOSS 2 = low to moderate; LOSS 1 = low.) See the table under **Potential Safety Improvement** section for details of locations with LOSS =4, possible causes, and potential safety improvements.

ITS Devices: Approximately 1% of the corridor length will have direct access to fiber from the KentuckyWired project.

PROPOSED IMPROVEMENT CONCEPTS

The improvement options noted in this report are not intended to be all-encompassing. Other potential improvements are possible, including innovative solutions that could be cost-effective and address the reasons for improvement. Further study may be needed as part of the project development process.

Proposed Typical Section & Description of Modification: The table below describes the proposed improvement concepts for the identified bottlenecks. The proposed improvements expect to maintain an overall acceptable traffic condition through 2045 ($v/c < 0.85$ in urban areas and $v/c < 0.7$ in rural areas) and address safety issues at bottlenecks.

Proposed Improvement Concepts			
Locations	Improvement Concepts	Notes	Reason for Improvement
From KY 676/US 60 to KY 1211 (Taylor Ave) in Frankfort	Spot improvements at major intersections		LOTTR exceeds the established threshold.

Potential New Interchanges: None.

Interchanges for Potential Modification: None.

Major Intersections for Potential Modification: Improvements, such as additional turn lanes, channelization, and coordinated signal timing, should be considered at 12 major intersections for this corridor segment. An innovative intersection is needed at US 60 (E Main St) in Frankfort. The following is a list of these intersections.

Major Intersections for Potential Modification			
KY 341 (I-64 Exit 65)	KY 676 (Leestown Pike)	Lyons Dr	US 60 (E Main St)
Schenkel Ln	Mero St	Clinton St	Taylor Ave
KY 146 (West Cross Main St)	US 42 (south)	US 42 (north)	KY 625 (Mount Pleasant Rd)

Bridges: Bridge recommendations are based on ratings of substructure, superstructure and deck using the following methodology.

Methodology for Replacement/Rehabilitation Recommendation					
Structures	Substructure Rating	Superstructure Rating	Deck Rating	Culvert Rating	Recommendations
Bridges	≤ 4	Any	Any	/	Replacement
	$= 5$	Any	Any	/	Rehabilitation
	≥ 6	≤ 5	Any	/	Rehabilitation
	≥ 6	Any	≤ 5	/	Rehabilitation
	≥ 6	≥ 6	≥ 6	/	None ¹
Culverts	/	/	/	≤ 4	Replacement
	/	/	/	5 or 6	Rehabilitation
	/	/	/	≥ 7	None

1) If the bridge is on a corridor with a recommendation of widening, it will be widened (considered as rehabilitation) as necessary to accommodate the additional proposed lanes.

- **Bridges for Rehab/Widening:** Rehab/widening is recommended for a total of four bridges and seven culverts along the entire corridor. Note that the bridge rehab is determined based on the "Methodology for Replacement/Rehabilitation Recommendation" table above. If the bridge has a good condition but is within a bottleneck location with recommended widening, it will be widened as necessary to accommodate the additional proposed lanes and the cost of widening is assumed to be the same as bridge rehab for the planning-level cost estimation purpose.

Bridges for Rehab/Widening	
Bridge ID	Feature Intersect
037B00067N	US 127
037B00089N (Culvert)	OLD RR TUNNEL
037B00084N (Culvert)	TUCKER CREEK
037B00085N (Culvert)	STONE CREEK
052B00018N	BR OF DRENNON CREEK
052B00017N (Culvert)	BR OF DRENNON CREEK
052B00057N (Culvert)	TOWN CREEK
052B00038N	I-71
112B00023N	LITTLE KENTUCKY RIVER
037B00010N (Culvert)	HICKMAN BRANCH
037B00009N (Culvert)	SLICKAWAY BRANCH

- **Bridges for Replacement:** None.

Pavement Treatment: The overall pavement condition is good (average PDI = 0.32). Spot reconstruction and rehabilitation of existing asphalt pavement lanes might be needed based on more detailed evaluation of the corridor's pavement condition.

Potential Safety Improvement: The table below summarizes safety issues for the corridor and is based on KYTC safety data (LOSS value = 4), as well as a cursory review of Google Aerial imagery. The table identifies clusters of links with a LOSS value of 4 based on two categories: 1) clusters located in areas where this study already recommends corridor improvements for mobility reasons and 2) clusters not located in areas previously recommended for corridor mobility improvements. For Category 1, it is assumed any corridor improvement based on mobility needs will be constructed to current KYTC standards and will include the necessary safety improvements. Category 2 is intended to identify corridor segments that may warrant improvement for safety reasons, even though improvement might not be needed for mobility. There may also be isolated links with LOSS value of 4 that are not included in the table. Spot improvements could be warranted for those locations but it is assumed these spot improvements do not rise to the level of a corridor improvement; therefore, these locations are not addressed in this planning study. The table further breaks the clusters down by urban and rural designation (based on KYSTMv18 data) because urban and rural roadways tend to have unique typical crash causes and countermeasures.

Potential Safety Improvements			
Category	Locations	Possible Causes	Recommendations
CAT 1: Major clusters covered by proposed mobility improvement	From KY 676/US 60 to KY 1211 (Taylor Ave) in Frankfort	Intersection spacing and congestion, sight distance challenges	Intersection improvements described above
CAT 2: Major clusters not covered by proposed mobility improvement	<u>RURAL</u> From KY 341 (I-64 Exit 65) to 1.4 mile east of KY 676/US 60. From KY 55 to 1 mile west of I-71/US 421 near Campbellsburg. From US 42 in Bedford to KY 1226 (Palmyra Rd).	<u>RURAL</u> Sight distance challenges, geometric deficiencies, lack of safety features/advance warnings, lane drop/merge, run off road, speeding.	<u>RURAL</u> Improved geometrics/sight distance, roadside improvements, install/modernize signage, improved lighting/visibility.

Proposed Phasing: The proposed spot improvements at major intersections could be phased geographically: one phase for Trimble, Henry, and Woodford counties, and another phase for Franklin County. Because the Franklin County intersections are all located in Frankfort and have an urban and complex setting, grouping them in a separate phase is reasonable.

PRELIMINARY ENVIRONMENTAL RED FLAG ANALYSIS

The table below summarizes the presence of critical environmental red flag concerns identified by KYTC within 1,000 ft of proposed improvement locations (Y=Yes; N=No).

Critical Red Flag Issues/Concerns	
Environmental Red Flag Features	From KY 676/US 60 to KY 1211 (Taylor Ave) in Frankfort
Superfunds	N
Special Waters ¹	N
Forested Areas	Y
NLEB Habitat Priority	N
IB Habitat Priority Area	N
FAA Airport Runways	N
Public Hunting Areas	N
Wildlife Management Areas	N
Local Parks	Y
State/ National Parks	N
Kentucky Heritage Land Conservation Fund	Y
Area Landmarks	Y
Point Landmarks	Y
National Register of Historic Places Location (Point)	Y
National Register of Historic Places Location (Polygon)	Y

1) Special Waters are defined as Cold Water Aquatic Habitats, Outstanding State/National Resource Waters, Exceptional Waters, State Wild Rivers, and Federally Designated Wild / Scenic Rivers.

RIGHT OF WAY IMPACTS

The table below summarizes the potential right-of-way (ROW) needs for proposed improvement concepts.

Potential Needs of Additional Right of Way		
Locations	Improvement Concepts	Potential ROW Needs
From KY 676/US 60 to KY 1211 (Taylor Ave) in Frankfort	Spot improvement at major intersections	Potentially
Intersection modifications at KY 146, US 42 (south), US 42 (north)	Improvements such as additional turn lanes, channelization, and coordinated signal timing	No
Intersection modifications at KY 625	Improvements such as additional turn lanes, channelization, and coordinated signal timing	Potentially

COST ESTIMATION

Design:	6.1 (\$M)
ROW:	22.3 (\$M)
Utility:	5.1 (\$M)
Construction:	<u>40.5 (\$M)</u>
TOTAL =	73.9 (\$M)

Note:

1. The cost estimation may not include additional costs to address the potential impacts of major utilities (e.g., gas line, major water supplier, transmission line) within the proximity of the corridor, due to the lack of data when the report was prepared. Further investigation is recommended in future studies.
2. Cost estimation was based on 2020 dollars. There is a 1-3% inflation rate. Estimated cost could vary -50% to +250% of the actual number (as a rule of thumb).
3. The widening of a 2-lane facility to a 3-lane facility (with TWLTL or alternating passing lane) is considered as "Minor Widening (Undivided Road) - 2 Lane to 4 Lane".
4. The cost estimation does not include bridges outside of the bottleneck locations, as they are not assumed to rise to the level of a corridor improvement. The cost estimation only includes necessary bridge replacement/rehab/widening costs within the bottleneck locations with proposed widening improvement.
5. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
6. Shoulder widening is not included in the cost estimation, as it is a relatively minor cost.
7. If multiple improvement concepts are recommended for the corridor, only the cost of the larger-scale improvement concept is estimated.

Kentucky Statewide Corridor Plan (Linking Kentucky)

Route: US 421
Segment ID: 42A
From: Virginia State Line
To: I-75 (Exit 97) north of Richmond
Counties: Harlan, Leslie, Clay, Jackson, Rockcastle, Madison
Highway Districts: 7, 8, 11

CORRIDOR SEGMENT OVERVIEW

Segment 42A on US 421 begins at the Virginia state line in Harlan County and extends northwest through multiple counties to I-75 (Igo Rd) in Madison County. The corridor segment is approximately 154.4 miles long and currently contains two interchanges at I-75 (Exit 90 and 97).

This segment passes through the residential and commercial areas in multiple cities (Harlan in Harlan County, Hyden in Leslie County, Manchester in Clay County, McKee in Jackson County, and Richmond in Madison County). These areas would be considered towns (according to KYSTMv18 data) with clusters of homes and commercial buildings adjacent to US 421. The remainder of this segment passes through rural agricultural areas with homes interspersed along US 421.

EXISTING FACILITY

The table below outlines the typical roadway attributes for this section of US 421 by sub-segment.

Typical Roadway Attributes					
Sub-segment	Functional Classification	Number & Width of Lanes	Shoulder & Width	Median Type & Width	Posted Speed Limit
From VA state line to KY 876 (Eastern BYP) in Richmond ¹	Minor Arterial	2, 10'	3'	None	55 mph
From KY 876 (Eastern BYP) to I-75 (Lexington Rd) in Richmond	Principal Arterial	4, 12'	5'	32' depressed	55 mph
From I-75 (Lexington Rd) to I-75 (Igo Rd)	Minor Arterial	2, 11'	4'	None	55 mph

1) US 421 is a 4-lane divided facility with 16' flush median for approximately 4 miles long in the City of Harlan.

Right of Way: The existing right of way is generally 30' – 120' wide.

Pavement: The average PDI (Pavement Distress Index) for this corridor segment is 0.32, which indicates an overall good pavement condition according to KYTC criteria (Good: 0.00 – 0.35; Fair: 0.36 – 0.65; Poor: 0.66 – 0.99).

Intersections/Interchanges: The tables below outline the existing interchanges, major intersections, and railroad crossings on the corridor.

Interchanges	Interchange Type
I-75 (Exit 90)	Partial Cloverleaf
I-75 (Exit 97)	Diamond

Major Intersections ¹			
Sawmill Hollow Rd	KY 1003	KY 72	KY 38
W Clover St	W Central St	KY 840	KY 72 (north)
US 119 (west)	US 119 (east)	KY 221 (west)	KY 221 (east)
KY 1780 (Middle Fork Rd)	KY 2009 (Greasy Creek Rd)	KY 406	KY 80
KY 257 (Dryhill Rd)	KY 118	KY 1482	KY 66 (north)
KY 66 (south)	Elk Mountain Rd	KY 1524	KY 149
KY 1999	KY 11	KY 80	Town Br Rd
KY 638	Fox Hollow Rd	KY 11	KY 472
KY 1350	KY 577	KY 3443	KY 30
KY 1431	KY 3630	KY 30	KY 1071
KY 587	KY 290	KY 89 (east)	KY 89 (west)
KY 3446	KY 2004	KY 1955	KY 1912
KY 21	KY 594	KY 1016	Dreyfus Rd
Crooksville Rd	US 25	Duncannon Ln	Eastern BYP
Irvine Rd	Four Mile Rd	KY 1986	Old Wilderness Trl
Lexington Rd	S Keeneland Dr	KY 1156	KY 2878
KY 627	KY 2338		

1) Only crossroads with function classification of Minor Collector or above are included.

At-grade Railroad Crossings
US 421 Mileage Point 15.9 in Harlan County
US 421 Mileage Point 15.3 in Clay County
US 421 Mileage Point 16.5 in Clay County

Access Points: This segment is not access controlled. Throughout the segment, there are residential and commercial driveways and intersecting roadways.

Bridges: The tables below outline the detailed Bridge information for existing bridges on or over this section of US 421.

Mainline Bridge Information										
Bridge ID	Feature Intersect	NBIS Classification	Sufficiency Rating	Substandard	Deck Rating	Superstructure Rating	Substructure Rating	Under Clearance (feet)	Horizontal Clearance (feet)	Culvert Rating
076B00108N (Culvert)	JOE LICK CREEK	Good	79.9	No	N	N	N	0	27	7
076B00018N (Culvert)	JOE LICK FORK	Fair	97.1	No	N	N	N	0	20.5	6
076B00121N (Culvert)	Cowbell Creek	Good	98	No	N	N	N	0	38.5	8

Mainline Bridge Information										
Bridge ID	Feature Intersect	NBIS Classification	Sufficiency Rating	Substandard	Deck Rating	Superstructure Rating	Substructure Rating	Under Clearance (feet)	Horizontal Clearance (feet)	Culvert Rating
076B00100N	BLUE LICK CREEK	Fair	99.1	No	7	7	6	0	43.42	N
076B00014N (Culvert)	BR OF HAYS FORK	Fair	94.7	No	N	N	N	0	40	6
076B00095N	HAYS FORK	Fair	96.3	No	7	7	6	0	36	N
076B00017N (Culvert)	BR OF HAYS FORK	Fair	86.1	No	N	N	N	0	22	5
076B00011N	CSX RAILROAD SPUR	Fair	58.5	No	5	5	5	19.6	25.92	N
055B00002N	SAND LICK CREEK	Fair	59.8	No	6	5	6	0	22.97	N
055B00001N	INDIAN CREEK	Fair	49.1	Yes	5	5	6	0	24.93	N
055B00048N	_PIGEON ROOST CREEK	Good	69.5	No	8	8	8	0	37.6	N
055B00044N	Mccamon cr.	Good	90.6	No	7	7	7	0	40	N
076B00093N	I-75 @ 089.800	Good	96.6	No	7	7	7	17.5	50	N
076B00092L	KY 388,CSX RR,DREA MING C	Good	97.4	No	7	7	7	22.16	42	N
076B00092R	KY 388,CSX RR,DREA MING C	Good	95.4	No	7	7	7	24.83	42	N
076B00039N	I-75	Fair	76.9	No	5	6	5	17.33	29.86	N
026B00009N	HORSE CREEK	Fair	61.4	No	5	5	6	0	23.95	N
026B00116N	Island Creek	Good	98	No	7	8	7	0	34	N
026B00108N	LITTLE GOOSE CREEK	Fair	87.5	No	6	7	7	0	39.7	N
026B00002N	BRANCH OF ISLAND CREEK	Fair	47.8	Yes	5	5	5	0	19	N
026B00011N (Culvert)	GRANNA BRANCH	Fair	76	No	N	N	N	0	27.89	5
026B00096N	GOOSE CREEK	Fair	67.2	No	6	7	7	0	30	N
026B00015N (Culvert)	LOCKARD CREEK	Fair	89	No	N	N	N	0	27.89	6
066B00011N (Culvert)	SIMMS BRANCH	Fair	87.7	No	N	N	N	0	21.98	6
066B00012N (Culvert)	CAWOOD BRANCH	Fair	88.8	No	N	N	N	0	21.98	6
026B00012N (Culvert)	RICE BRANCH	Poor	62.7	No	N	N	N	0	26.9	4
026B00104N	RED BIRD RIVER	Fair	90.3	No	6	7	7	0	27.89	N
026B00014N (Culvert)	SPENCERS BRANCH	Fair	88	No	N	N	N	0	27.23	5
066B00016N (Culvert)	HENRYS FORK	Poor	51.7	No	N	N	N	0	21	3
066B00059N	BEAR BRANCH	Fair	84.6	No	6	6	6	0	25.5	N
066B00010N (Culvert)	PETER BRANCH	Fair	88.6	No	N	N	N	0	23.95	6

Mainline Bridge Information										
Bridge ID	Feature Intersect	NBIS Classification	Sufficiency Rating	Substandard	Deck Rating	Superstructure Rating	Substructure Rating	Under Clearance (feet)	Horizontal Clearance (feet)	Culvert Rating
066B00013N	MIDDLE FORK OF KY. RIVER	Fair	53.1	No	7	6	6	0	21.5	N
066B00072N (Culvert)	HONEY SUCKLE BRANCH	Good	98.1	No	N	N	N	0	38	7
066B00009N (Culvert)	JOHN H MORGAN RD	Fair	95.1	No	N	N	N	0	21	6
066B00008N (Culvert)	STINNETT CREEK	Poor	40.5	No	N	N	N	0	20	4
066B00015N (Culvert)	ROCK HOUSE BRANCH	Fair	74.9	No	N	N	N	0	21	6
066B00007N (Culvert)	MUNCY CREEK	Fair	80.6	No	N	N	N	0	20	6
066B00006N (Culvert)	MUNCY CREEK	Poor	40.5	No	N	N	N	0	20	4
066B00005N (Culvert)	SHORT CREEK	Fair	55.1	No	N	N	N	0	21.98	5
066B00014N	ROCKHOUSE CREEK	Fair	67	No	6	6	6	0	19.03	N
026C00101N	LAUREL CREEK	Fair	59.9	No	6	6	6	0	10.83	N
026B00105N	LAUREL CREEK	Fair	94.8	No	6	7	7	0	40.68	N
048B00167N	POOR FK CUMBERLAND AND RIVER	Good	84.7	No	7	7	7	0	44	N
048B00180N	MARTIN FK-CUMBERLAND AND R	Good	84.7	No	7	7	7	0	44	N
048B00189N	MARTINS FK CSX , KY-3001	Good	99.5	No	7	7	7	40	47.1	N
048B00190N (Culvert)	ENOCH BRANCH	Good	97.7	No	N	N	N	0	47	7
048B00188N	KY 1556 & BOBS CREEK	Good	99.1	No	7	7	8	99.99	47	N
048B00186N	MARTINS FK CUMBERLAND AND R	Good	99.1	No	7	7	8	70	99	N
048B00187N	CSX RAILROAD	Good	99.1	No	7	7	7	53.67	47	N
048B00130N	CLOVER FK CUMBERLAND AND RVR	Fair	97.3	No	7	6	7	0	74	N
048B00131N	CLOVER FORK & L.&N. R.R.	Fair	77.9	No	6	7	7	24	75.46	N
048B00132N	CSX RR-KY 480-CLOVER FK	Fair	97.3	No	6	6	6	22	59.71	N
048B00129N	POOR FORK-CUMBERLAND AND R	Fair	98.7	No	7	7	6	0	43.96	N
048B00023N	CRANKS CREEK	Fair	52.2	Yes	6	5	6	0	18.7	N
048B00024N (Culvert)	MILLS BRANCH	Fair	64.4	No	N	N	N	0	21	5

Structures Crossing Over the Corridor			
Bridge ID	Facility Carried	Under Clearance (feet)	Horizontal Clearance (feet)
026B00072N	HR-9006	15.5	43.96
026B00106N	MIDDLE SCHOOL WALK	18.4	33

Other Noteworthy Conditions: None.

TRAFFIC & OPERATIONS

AADT & AADTT: The table below summarizes the 2015 AADT and daily truck volumes by sub-segment.

Traffic Volumes			
Sub-segment	AADT	AADTT	Truck Percentage
From VA state line to US 25 south of Richmond	2,900	300	12%
From US 25 south of Richmond to S Keeneland Dr in Richmond	13,500	1,800	13%
From S Keeneland Dr in Richmond to I-75 (Igo Rd) north of Richmond	1,600	100	9%

Mobility: There are two major traffic bottleneck sections along this corridor segment. See the table below for details. (Note: bottlenecks are identified by Level of Travel Time Reliability (LOTTR) > 1.5 or volume/capacity (v/c) > 0.6.) There are also a few additional isolated traffic bottlenecks along this corridor. Other than the noted traffic bottleneck sections/locations, traffic condition is acceptable along the remainder of this segment.

Existing Typical Roadway Attributes at Bottlenecks					
Locations	Functional Classification	Number & Width of Lanes	Median Width	Shoulder Width	2015 AADT ¹
<u>Major Bottleneck 1:</u> From Duncannon Ln to S Keeneland Dr in Richmond	Principal Arterial or Minor Arterial	4, 12' or 2, 11'	32' or 0'	5'	24,341
<u>Major Bottleneck 2:</u> From Derby Chase Dr to Francis Dr north of Richmond	Major Collector	2, 11'	None	4'	2,474

1) The highest traffic volume within the bottleneck based on KYSTMv18 data

Safety: 2.6% of the corridor mileage has a Level of Safety of Service (LOSS) of 4, meaning these areas have the highest potential to decrease crashes. (Note: LOSS is broken up into four categories based on SPFs and indicates the potential for crash reduction. LOSS 4 - high; LOSS 3 - moderate to high; LOSS 2 - low to moderate; LOSS 1 - low.) See the table under **Potential Safety Improvement** section for details of locations with LOSS =4, possible causes, and potential safety improvements.

ITS Devices: Approximately 5% of the corridor length will have direct access to fiber from the KentuckyWired project.

PROPOSED IMPROVEMENT CONCEPTS

The improvement options noted in this report are not intended to be all-encompassing. Other potential improvements are possible, including innovative solutions that could be cost-effective and address the reasons for improvement. Further study may be needed as part of the project development process.

Proposed Typical Section & Description of Modification: The table below describes the proposed improvement concepts for the identified bottlenecks. The proposed improvements expect to maintain an overall acceptable traffic condition through 2045 ($v/c < 0.85$ in urban areas and $v/c < 0.7$ in rural areas) and address safety issues at bottlenecks.

Proposed Improvement Concepts			
Locations	Improvement Concepts	Notes	Reason for Improvement
<u>Major Bottleneck 1:</u> From Duncannon Ln to S Keeneland Dr in Richmond	Modification at the interchange with I-75 (Exit 90) and spot improvement at major intersections	See the Major Intersections for Potential Modification section below	LOTTR exceeds the established threshold
<u>Major Bottleneck 2:</u> From Derby Chase Dr to Francis Dr north of Richmond	None at this time	There's relatively less congestion and traffic on this section. Further study on geometry and traffic engineering might be needed.	

Potential New Interchanges: None.

Interchanges for Potential Modification: Improvements are proposed for one existing interchange at I-75 (Exit 90).

Interchanges for Potential Modification
I-75 (Exit 90)

Major Intersections for Potential Modification: Improvements, such as additional turn lanes, channelization, and coordinated signal timing, should be considered at 15 major intersections for this corridor segment. The following is a list of these intersections.

Major Intersections for Potential Modification			
US 119 (south)	KY 80	KY 118	KY 66
KY 1999	KY 11	KY 2076/KY 80	KY 1071
Duncannon Ln	Big Hill Ave	Irvine Rd	Four Mile Rd
Old Wilderness Trl S	Lexington Rd	S Keeneland Dr	

Bridges: Bridge recommendations are based on ratings of substructure, superstructure and deck using the following methodology.

Methodology for Replacement/Rehabilitation Recommendation					
Structures	Substructure Rating	Superstructure Rating	Deck Rating	Culvert Rating	Recommendations
Bridges	<=4	Any	Any	/	Replacement
	=5	Any	Any	/	Rehabilitation
	>=6	<=5	Any	/	Rehabilitation
	>=6	Any	<=5	/	Rehabilitation
	>=6	>=6	>=6	/	None ¹
Culverts	/	/	/	<=4	Replacement
	/	/	/	5 or 6	Rehabilitation
	/	/	/	>=7	None

1) If the bridge is on a corridor with a recommendation of widening, it will be widened (considered as rehabilitation) as necessary to accommodate the additional proposed lanes.

- **Bridges for Rehab/Widening:** Rehab/widening is recommended for a total of seven bridges and 14 culverts along the entire corridor. Note that the bridge rehab is determined based on the "Methodology for Replacement/Rehabilitation Recommendation" table above. If the bridge has a good condition but is within a bottleneck location with recommended widening, it will be widened as necessary to accommodate the additional proposed lanes and the cost of widening is assumed to be the same as bridge rehab for the planning-level cost estimation purpose.

Bridges for Rehab/Widening	
Bridge ID	Feature Intersect
076B00018N (Culvert)	JOE LICK FORK
076B00014N (Culvert)	BR OF HAYS FORK
076B00017N (Culvert)	BR OF HAYS FORK
076B00011N	CSX RAILROAD SPUR
055B00002N	SAND LICK CREEK
055B00001N	INDIAN CREEK
076B00039N	I-75
026B00009N	HORSE CREEK
026B00002N	BRANCH OF ISLAND CREEK
026B00011N (Culvert)	GRANNA BRANCH
026B00015N (Culvert)	LOCKARD CREEK
066B00011N (Culvert)	SIMMS BRANCH
066B00012N (Culvert)	CAWOOD BRANCH
026B00014N (Culvert)	SPENCERS BRANCH
066B00010N (Culvert)	PETER BRANCH
066B00009N (Culvert)	JOHN H MORGAN RD
066B00015N (Culvert)	ROCK HOUSE BRANCH
066B00007N (Culvert)	MUNCY CREEK
066B00005N (Culvert)	SHORT CREEK
048B00023N	CRANKS CREEK
048B00024N (Culvert)	MILLS BRANCH

- **Bridges for Replacement:** Replacement is recommended for a total of 4 culverts along the entire corridor. Note that the bridge replacement is determined based on the "Methodology for Replacement/Rehabilitation Recommendation" table above. If the bridge needs replacement and is within a bottleneck location with recommended widening, it will be widened during the replacement to accommodate the additional proposed lanes and the cost of bridge replacement is used for the planning-level cost estimation purpose.

Bridges for Replacement	
Bridge ID	Feature Intersect
026B00012N (Culvert)	RICE BRANCH
066B00016N (Culvert)	HENRYS FORK
066B00008N (Culvert)	STINNETT CREEK
066B00006N (Culvert)	MUNCY CREEK

Pavement Treatment: The overall pavement condition is good (average PDI = 0.32). Spot reconstruction and rehabilitation of existing asphalt pavement lanes might be needed based on more detailed evaluation of the corridor's pavement condition.

Potential Safety Improvement: The table below summarizes safety issues for the corridor and is based on KYTC safety data (LOSS = 4) as well as review of Google Aerial imagery. The table identifies clusters of links with a LOSS value of 4 based on two categories: 1) clusters located in areas where this study already recommends corridor improvements for mobility reasons and 2) clusters not located in areas previously recommended for corridor mobility improvements. For Category 1, it is assumed any corridor improvement based on mobility needs will be constructed to current KYTC standards and will include the necessary safety improvements. Category 2 is intended to identify corridor segments that may warrant improvement for safety reasons, even though improvement might not be needed for mobility. There may also be isolated links with LOSS value of 4 that are not included in the table. Spot improvements could be warranted for those locations but it is assumed these spot improvements do not rise to the level of a corridor improvement; therefore, these locations are not addressed in this planning study. The table further breaks the clusters down by urban and rural designation (based on KYSTMv18 data) because urban and rural roadways tend to have unique typical crash causes and countermeasures.

Potential Safety Improvements			
Category	Locations	Possible Causes	Recommendations
CAT 1: Major clusters covered by proposed mobility improvement	From US 25 (Big Hill Ave) to S Keeneland Dr in Richmond	Intersection/interchange spacing and congestion, lane drop	Interchange modification and intersection improvements described above
CAT 2: Major clusters not covered by proposed mobility improvement	<u>RURAL</u> From KY 1912 to Sandgap Springs Rd in Jackson County. From 0.5 mile south of KY 11 to Collins Cemetery Rd in Clay County.	<u>RURAL</u> Sight distance challenges, geometric deficiencies, lack of safety features/advance warnings, run off road, speeding.	<u>RURAL</u> Improved geometrics/sight distance, install/modernize signage, improved lighting/visibility.

Proposed Phasing: The proposed spot improvements at major intersections can be constructed separately and ahead of the proposed interchange modification at I-75 (Exit 90) in Richmond. The I-75 interchange in Richmond is an urban interchange modification that may be more complex and require a longer project development period; therefore, it is recommended to pursue it in a separate phase.

PRELIMINARY ENVIRONMENTAL RED FLAG ANALYSIS

The table below summarizes the presence of critical environmental red flag concerns approved by KYTC within 1,000 ft of proposed improvement locations (Y=Yes; N=No).

Critical Red Flag Issues/Concerns	
Environmental Red Flag Features	<u>Major Bottleneck 1: From Duncannon Ln to S Keeneland Dr in Richmond</u>
Superfunds	N
Special Waters ¹	N
Forested Areas	N
NLEB Habitat Priority	Y
IB Habitat Priority Area	N
FAA Airport Runways	N
Public Hunting Areas	Y
Wildlife Management Areas	N
Local Parks	N
State/ National Parks	N
Kentucky Heritage Land Conservation Fund	N
Area Landmarks	N
Point Landmarks	Y
National Register of Historic Places Location (Point)	Y
National Register of Historic Places Location (Polygon)	Y

1) Special Waters are defined as Cold Water Aquatic Habitats, Outstanding State/National Resource Waters, Exceptional Waters, State Wild Rivers, and Federally Designated Wild / Scenic Rivers.

RIGHT OF WAY IMPACTS

The table below summarizes the potential right-of-way (ROW) needs for proposed improvement concepts.

Potential Needs of Additional Right of Way		
Locations	Improvement Concepts	Potential ROW Needs
<u>Major Bottleneck 1:</u> From Duncannon Ln to S Keeneland Dr in Richmond	Modification at the interchange with I-75 and spot improvement at major intersections	Potentially
Interchange modifications at I-75 (Exit 90)	Interchange modifications	Potentially
Intersection modifications at US 119 (Exit 90), KY 1999, KY 11, KY 2076/KY 80, KY 1071	Improvements such as additional turn lanes, channelization, and coordinated signal timing	Potentially
Intersection modifications at KY 80, KY 118, KY 66	Improvements such as additional turn lanes, channelization, and coordinated signal timing	No

COST ESTIMATION

Design:	9.9 (\$M)
ROW:	30.2 (\$M)
Utility:	8.6 (\$M)
Construction:	70.5 (\$M)
TOTAL =	119.2 (\$M)

Note:

1. The cost estimation may not include additional costs to address the potential impacts of major utilities (e.g., gas line, major water supplier, transmission line) within the proximity of the corridor, due to the lack of data when the report was prepared. Further investigation is recommended in future studies.
2. Cost estimation was based on 2020 dollars. There is a 1-3% inflation rate. Estimated cost could vary -50% to +250% of the actual number (as a rule of thumb).
3. The widening of a 2-lane facility to a 3-lane facility (with TWLTL or alternating passing lane) is considered as "Minor Widening (Undivided Road) - 2 Lane to 4 Lane".
4. The cost estimation does not include bridges outside of the bottleneck locations, as they are not assumed to rise to the level of a corridor improvement. The cost estimation only includes necessary bridge replacement/rehab/widening costs within the bottleneck locations with proposed widening improvement.
5. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
6. Shoulder widening is not included in the cost estimation, as it is a relatively minor cost.
7. If multiple improvement concepts are recommended for the corridor, only the cost of the larger-scale improvement concept is estimated.

Kentucky Statewide Corridor Plan (Linking Kentucky)

Route: US 421 (Richmond Road) / KY 418 (Athens Boonesboro Road)
Segment ID: 42B
From: I-75 (Exit 104) in Lexington
To: US 27 in Lexington
Counties: Fayette
Highway Districts: 7

CORRIDOR SEGMENT OVERVIEW

Segment 42B begins with KY 418 (Athens Boonesboro Road) at I-75 (Exit 104) in Fayette County and extends northwest in Fayette County. The corridor then turns into US 421 (Richmond Road) north of Old Richmond Rd and travels northwest into downtown Lexington. The corridor segment is approximately 8.6 miles long and currently contains two interchanges at I-75 and KY 4 (New Circle Rd).

This segment passes through the residential and commercial areas of the city of Lexington in Fayette County. These areas would be considered urban or suburban (according to KYSTMv18 data) with moderate to high densities of homes and commercial buildings adjacent to US 421.

EXISTING FACILITY

The table below outlines the typical roadway attributes for this section of US 421/KY 418 by sub-segment.

Typical Roadway Attributes					
Sub-segment	Functional Classification	Number & Width of Lanes	Shoulder & Width	Median Type & Width	Posted Speed Limit
From I-75 (Exit 104) to Man O War Blvd in Lexington	Principal Arterial	4, 12'	10'	20' depressed or 16' raised non-mountable	55 mph
From Man O War Blvd to KY 4 (New Circle Rd)	Principal Arterial	6, 10'	None	26' raised non-mountable	45 mph
From KY 4 (New Circle Rd) to Midland Ave in Lexington	Principal Arterial	4, 12'	None	None or 32' raised non-mountable	35 mph
From Midland Ave to US 27 in Lexington	Principal Arterial	6, 12'	None	None	35 mph

Right of Way: The existing right of way is generally 50' – 150' wide.

Pavement: The average PDI (Pavement Distress Index) for this corridor segment is 0.32, which indicates an overall good pavement condition according to KYTC criteria (Good: 0.00 – 0.35; Fair: 0.36 – 0.65; Poor: 0.66 – 0.99).

Intersections/Interchanges: The tables below outline the existing interchanges, major intersections, and railroad crossings on the corridor.

Interchanges	Interchange Type
I-75	Diamond
KY 4(New Circle Rd)	Diamond

Major Intersections ¹			
Hays Blvd	US 25 (Old Richmond Rd)	Squires Rd	Yorkshire Blvd
Man O War Blvd	Mt Tabor Rd	Old Todds Rd	Fontaine Rd
Lakeshore Dr	Chinoe Rd	S Ashland Ave	Walton Ave
Woodland Ave	US 60 (Midland Ave)	Rose St	S Martin Luther King Blvd
S Limestone	S Upper St	US 27 (S Broadway)	

1) Only crossroads with function classification of Minor Collector or above are included.

At-grade Railroad Crossings
None

Access Points: This segment is not access controlled. Throughout the segment, there are residential and commercial driveways and intersecting roadways.

Bridges: The tables below outline the detailed Bridge information for existing bridges on or over this section of US 421/KY 418.

Mainline Bridge Information										
Bridge ID	Feature Intersect	NBIS Classification	Sufficiency Rating	Substandard	Deck Rating	Superstructure Rating	Substructure Rating	Under Clearance (feet)	Horizontal Clearance (feet)	Culvert Rating
034B00151N	I-75	Fair	92.3	No	7	6	6	16.83	48	N

Structures Crossing Over the Corridor			
Bridge ID	Facility Carried	Under Clearance (feet)	Horizontal Clearance (feet)
034B00031L	NEW CIRCLE RD-OL	16.75	31.58
034B00031R	NEW CIRCLE ROAD-IL	14.7	31.58
034X00003N	RADISON PED.BRIDGE	17.5	49
034X00005N	PEDESTRIAN WALKWAY	16.33	48.3

Other Noteworthy Conditions: None.

TRAFFIC & OPERATIONS

AADT & AADTT: The table below summarizes the 2015 AADT and daily truck volumes by sub-segment.

Traffic Volumes			
Sub-segment	AADT	AADTT	Truck Percentage
From I-75 (Exit 104) to US 25/Old Richmond Rd	14,800	2,000	14%
From US 25/Old Richmond Rd to Man O War Blvd	31,900	4,300	13%
From Man O War Blvd to US 27 (N Broadway)	30,300	2,200	7%

Mobility: There is one major traffic bottleneck section along this corridor segment. See the table below for details. (Note: bottlenecks are identified by Level of Travel Time Reliability (LOTTR) > 1.5 or volume/capacity > 0.6.) Other than the section noted below, traffic condition is acceptable along the remainder of this segment.

Existing Typical Roadway Attributes at Major Traffic Bottlenecks					
Locations	Functional Classification	Number & Width of Lanes	Median Width	Shoulder Width	2015 AADT ¹
From Hays Blvd to US 27 in Lexington	Principal Arterial	4 or 6, 12'	None or 32' raised non-mountable	None	44,019

1) The highest traffic volume within the bottleneck based on KYSTMv18 data.

Safety: 7.4% of the corridor mileage has a Level of Safety of Service (LOSS) of 4, meaning these areas have the highest potential to decrease crashes. (Note: LOSS is broken up into four categories based on SPFs and indicates the potential for crash reduction. LOSS 4 - high; LOSS 3 - moderate to high; LOSS 2 - low to moderate; LOSS 1 - low.) See the table under **Potential Safety Improvement** section for details of locations with LOSS =4, possible causes, and potential safety improvements.

ITS Devices: Approximately 1% of the corridor length will have direct access to fiber from the KentuckyWired project. Lexington-Fayette Urban County Government (LFUCG) has a fiber network surrounding the corridor with CCTV cameras.

PROPOSED IMPROVEMENT CONCEPTS

The improvement options noted in this report are not intended to be all-encompassing. Other potential improvements are possible, including innovative solutions that could be cost-effective and address the reasons for improvement. Further study may be needed as part of the project development process.

Proposed Typical Section & Description of Modification: The table below describes the proposed improvement concepts for the identified bottlenecks. The proposed improvements expect to maintain an overall acceptable traffic condition through 2045 ($v/c < 0.85$ in urban areas and $v/c < 0.7$ in rural areas) and address safety issues at bottlenecks.

Proposed Improvement Concepts			
Locations	Improvement Concepts ¹	Notes ²	Reason for Improvement
From Hays Blvd to Man O War Blvd	Widening this section to a 6-lane divided arterial on its existing alignment	Improved typical section: 3, 11-foot lanes in each direction with 20-foot raised median.	The expected v/c in 2045 exceeds the established thresholds.
From Man O War Blvd to KY 4 (New Circle Rd)	Spot improvements at major intersections including signal coordination, access management, frontage road extension, etc.	See the Major Intersections for Potential Modification section below	Both LOTTR and he expected v/c in 2045 exceeds the established thresholds.
From KY 4 (New Circle Rd) to Hanover Ave	Spot improvements at major intersections	See the Major Intersections for Potential Modification section below	The expected v/c in 2045 exceeds the established thresholds.
From Hanover Ave to US 27	Spot improvements at major intersections	See the Major Intersections for Potential Modification section below	LOTTR exceeds the established threshold.

1) The proposed roadway widening concept includes spot improvements at interchanges and major intersections as needed (see details in Interchanges for Potential Modification and Major Intersection for Potential Modification sections below).

2) Improved typical sections are based on KYTC Highway Design Manual.

Potential New Interchanges: None.

Interchanges for Potential Modification: Improvements are proposed for one existing interchange at I-75.

Interchanges for Potential Modification
I-75

Major Intersections for Potential Modification: Improvements, such as additional turn lanes, channelization, and coordinated signal timing, should be considered at 18 major intersections for this corridor segment. The following is a list of these intersections.

Major Intersections for Potential Modification			
Hays Blvd	US 25	Squires Rd	Man O War Blvd
Mt Tabor Rd	Old Todds Rd	Fontaine Rd	Lakeshore Dr
Chinoe Rd	S Ashland Ave	Walton Ave	Woodland Ave
Midland Ave	Rose St	S Martin Luther King Blvd	S Limestone
S Upper St	US 27		

Bridges: Bridge recommendations are based on ratings of substructure, superstructure and deck using the following methodology.

Methodology for Replacement/Rehabilitation Recommendation					
Structures	Substructure Rating	Superstructure Rating	Deck Rating	Culvert Rating	Recommendations
Bridges	<=4	Any	Any	/	Replacement
	=5	Any	Any	/	Rehabilitation
	>=6	<=5	Any	/	Rehabilitation
	>=6	Any	<=5	/	Rehabilitation
	>=6	>=6	>=6	/	None ¹
Culverts	/	/	/	<=4	Replacement
	/	/	/	5 or 6	Rehabilitation
	/	/	/	>=7	None

1) If the bridge is on a corridor with a recommendation of widening, it will be widened (considered as rehabilitation) as necessary to accommodate the additional proposed lanes.

- **Bridges for Rehab/Widening:** Rehab/widening is recommended for a total of one bridge along the entire corridor. Note that the bridge rehab is determined based on the "Methodology for Replacement/Rehabilitation Recommendation" table above. If the bridge has a good condition but is within a bottleneck location with recommended widening, it will be widened as necessary to accommodate the additional proposed lanes and the cost of widening is assumed to be the same as bridge rehab for the planning-level cost estimation purpose.

Bridges for Rehab/Widening	
Bridge ID	Feature Intersect
034B00151N	I-75

- **Bridges for Replacement:** None.

Pavement Treatment: The overall pavement condition is good (average PDI = 0.32). Proposed additional lanes will consist of full depth asphalt pavement construction. Spot reconstruction and rehabilitation of existing asphalt pavement lanes might be needed based on more detailed evaluation of the corridor's pavement condition.

Potential Safety Improvement: The table below summarizes safety issues for the corridor and is based on KYTC safety data (LOSS = 4) as well as review of Google Aerial imagery. The table identifies clusters of links with a LOSS value of 4 based on two categories: 1) clusters located in areas where this study already recommends corridor improvements for mobility reasons and 2) clusters not located in areas previously recommended for corridor mobility improvements. For Category 1, it is assumed any corridor improvement based on mobility needs will be constructed to current KYTC standards and will include the necessary safety improvements. Category 2 is intended to identify corridor segments that may warrant improvement for safety reasons, even though improvement might not be needed for mobility. There may also be isolated links with LOSS value of 4 that are not included in the table. Spot improvements could be warranted for those locations but it is assumed these spot improvements do not rise to the level of a corridor improvement; therefore, these locations are not addressed in this planning study. The table further breaks the clusters down by urban and rural designation (based on KYSTMv18 data) because urban and rural roadways tend to have unique typical crash causes and countermeasures.

Potential Safety Improvements			
Category	Locations	Possible Causes	Recommendations
CAT 1: Major clusters covered by proposed mobility improvement	From Hays Blvd to US 27 in Lexington	Intersection/interchange spacing and congestion, sight distance challenges, geometric deficiencies	Widening and intersection improvements described above
CAT 2: Major clusters not covered by proposed mobility improvement	N/A	N/A	N/A

Proposed Phasing: The proposed improvements can be constructed in three phases: one phase for spot improvements at major intersections, one for corridor widening in Lexington, and one for interchange modifications at I-75. However, since the proposed corridor widening in Lexington is relatively short (1.8 miles), it may be desirable to construct it at the same time as the spot improvements. The I-75 interchange in Lexington is an urban interchange modification that may be more complex and require a longer project development period; therefore, it is recommended to pursue it in a separate phase.

PRELIMINARY ENVIRONMENTAL RED FLAG ANALYSIS

The table below summarizes the presence of critical environmental red flag concerns approved by KYTC within 1,000 ft of proposed improvement locations (Y=Yes; N=No).

Critical Red Flag Issues/Concerns				
Environmental Red Flag Features	From Hays Blvd to Man O War Blvd	From Man O War Blvd to KY 4 (New Circle Rd)	From KY 4 (New Circle Rd) to Hanover Ave	From Hanover Ave to US 27
Superfunds	N	N	N	N
Special Waters ¹	N	N	N	N
Forested Areas	N	N	N	N
NLEB Habitat Priority	N	N	N	N
IB Habitat Priority Area	N	N	N	N
FAA Airport Runways	N	N	N	N
Public Hunting Areas	N	N	N	N
Wildlife Management Areas	N	N	N	N
Local Parks	N	N	Y	Y
State/ National Parks	N	N	N	N
Kentucky Heritage Land Conservation Fund	N	N	N	N
Area Landmarks	Y	N	Y	Y
Point Landmarks	Y	Y	Y	Y
National Register of Historic Places Location (Point)	N	N	N	Y
National Register of Historic Places Location (Polygon)	N	N	Y	Y

1) Special Waters are defined as Cold Water Aquatic Habitats, Outstanding State/National Resource Waters, Exceptional Waters, State Wild Rivers, and Federally Designated Wild / Scenic Rivers.

RIGHT OF WAY IMPACTS

The table below summarizes the potential right-of-way (ROW) needs for proposed improvement concepts.

Potential Needs of Additional Right of Way		
Locations	Improvement Concepts	Potential ROW Needs
From Hays Blvd to Man O War Blvd	Widening this section to a 6-lane divided arterial on its existing alignment	Potentially, but much would fit within existing ROW
From Man O War Blvd to KY 4 (New Circle Rd)	Spot improvements at major intersections including signal coordination, access management, frontage road extension, etc.	Potentially
From KY 4 (New Circle Rd) to Hanover Ave	Spot improvements at major intersections	No
From Hanover Ave to US 27	Spot improvements at major intersections	No
Interchange modifications at I-75	Interchange modifications	Potentially

COST ESTIMATION

Design:	17.8 (\$M)
ROW:	63.8 (\$M)
Utility:	14.8 (\$M)
Construction:	<u>118.6 (\$M)</u>
TOTAL =	215.0 (\$M)

Note:

1. The cost estimation may not include additional costs to address the potential impacts of major utilities (e.g., gas line, major water supplier, transmission line) within the proximity of the corridor, due to the lack of data when the report was prepared. Further investigation is recommended in future studies.
2. Cost estimation was based on 2020 dollars. There is a 1-3% inflation rate. Estimated cost could vary -50% to +250% of the actual number (as a rule of thumb).
3. The widening of a 2-lane facility to a 3-lane facility (with TWLTL or alternating passing lane) is considered as "Minor Widening (Undivided Road) - 2 Lane to 4 Lane".
4. The cost estimation does not include bridges outside of the bottleneck locations, as they are not assumed to rise to the level of a corridor improvement. The cost estimation only includes necessary bridge replacement/rehab/widening costs within the bottleneck locations with proposed widening improvement.
5. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
6. Shoulder widening is not included in the cost estimation, as it is a relatively minor cost.
7. If multiple improvement concepts are recommended for the corridor, only the cost of the larger-scale improvement concept is estimated.

Kentucky Statewide Corridor Plan (Linking Kentucky)

Route: KY 44
Segment ID: 44A
From: I-65
To: KY 1319
Counties: Bullitt
Highway Districts: 5

CORRIDOR SEGMENT OVERVIEW

Segment 44A on KY 44 begins at I-65 in Bullitt County and extends east to KY 1319 in Bullitt County. The corridor segment is approximately 12.4 miles long and currently contains one interchange at I-65.

This segment passes through the residential and commercial areas of the City of Shepherdsville and the City of Mt. Washington in Bullitt County. These areas would be considered suburban (according to KYSTMv18 data) with clusters of homes and commercial buildings adjacent to KY 44. The remainder of this segment passes through rural agricultural areas with homes interspersed along KY 44.

EXISTING FACILITY

The table below outlines the typical roadway attributes for this section of KY 44.

Typical Roadway Attributes					
Sub-segment	Functional Classification	Number & Width of Lanes	Shoulder & Width	Median Type & Width	Posted Speed Limit
From I-65 to KY 1319 east of Mt. Washington	Minor Arterial	2, 10'	4'	None	45 mph or 55 mph

Right of Way: The existing right of way is generally 40' – 100' wide.

Pavement: The average PDI (Pavement Distress Index) for this corridor segment is 0.26, which indicates an overall good pavement condition according to KYTC criteria (Good: 0.00 – 0.35; Fair: 0.36 – 0.65; Poor: 0.66 – 0.99).

Intersections/Interchanges: The tables below outline the existing interchanges, major intersections, and railroad crossings on the corridor.

Interchanges	Interchange Type
I-65	Partial Cloverleaf

Major Intersections ¹			
KY 1526	Greenbriar Rd	Stringer Ln	N Bardstown Rd
US 31 E/US 150	KY 1319		

1) Only crossroads with function classification of Minor Collector or above are included.

At-grade Railroad Crossings
None

Access Points: This segment is not access controlled. Throughout the segment, there are residential and commercial driveways and intersecting roadways.

Bridges: The tables below outline the detailed Bridge information for existing bridges on or over this section of KY 44.

Mainline Bridge Information										
Bridge ID	Feature Intersect	NBIS Classification	Sufficiency Rating	Substandard	Deck Rating	Superstructure Rating	Substructure Rating	Under Clearance (feet)	Horizontal Clearance (feet)	Culvert Rating
015B00077N	I-65	Fair	83.7	No	5	5	5	16.75	43.58	N
015B00090N	FLOYDS FORK	Fair	94.4	No	6	7	6	0	39.37	N

Structures Crossing Over the Corridor
None

Other Noteworthy Conditions: None.

TRAFFIC & OPERATIONS

AADT & AADTT: The table below summarizes the 2015 AADT and daily truck volumes by sub-segment.

Traffic Volumes			
Sub-segment	AADT	AADTT	Truck Percentage
From I-65 to US 31 E in Mt. Washington	15,800	2,000	12%
From US 31 E to KY 1319 east of Mt. Washington	8,700	1,600	18%

Mobility: The entirety of this corridor segment is a major traffic bottleneck. (Note: bottlenecks are identified by Level of Travel Time Reliability (LOTTR) > 1.5 or volume/capacity (v/c) > 0.6.) Typical roadway attributes of the bottleneck area can be found above for the entire segment.

Existing Typical Roadway Attributes at Major Traffic Bottlenecks					
Locations	Functional Classification	Number & Width of Lanes	Median Width	Shoulder Width	2015 AADT ¹
Entire corridor	Refer to the Existing Facility section above				28,377

1) The highest traffic volume within the bottleneck based on KYSTMv18 data.

Safety: 13.6% of the corridor mileage has a Level of Safety of Service (LOSS) LOSS of 4, meaning these areas have the highest potential to decrease crashes. (Note: LOSS is broken up into four categories based on SPFs and indicates the potential for crash reduction. LOSS 4 - high; LOSS 3 - moderate to high; LOSS 2 - low to moderate; LOSS 1 - low.) See the table under **Potential Safety Improvement** section for details of locations with LOSS =4, possible causes, and potential safety improvements.

ITS Devices: Less than 1% of the corridor length will have direct access to fiber from the KentuckyWired project.

PROPOSED IMPROVEMENT CONCEPTS

The improvement options noted in this report are not intended to be all-encompassing. Other potential improvements are possible, including innovative solutions that could be cost-effective and address the reasons for improvement. Further study may be needed as part of the project development process.

Proposed Typical Section & Description of Modification: The table below describes the proposed improvement concepts for the identified bottlenecks. The proposed improvements expect to maintain an overall acceptable traffic condition through 2045 ($v/c < 0.85$ in urban areas and $v/c < 0.7$ in rural areas) and address safety issues at bottlenecks.

Proposed Improvement Concepts			
Locations	Improvement Concepts ¹	Notes ²	Reason for Improvement
From I-65 to KY 1319 east of Mt. Washington	<p>Upgrade KY 44 to a 3-lane arterial facility with a TWLTL or an alternating passing lane and construct a 4-lane divided arterial connector on a new alignment starting west of Mt. Washington.</p> <p>This concept is similar as the Alternative 5 described in KYTC's 65-71 Regional Connector Study³, but only includes the segment between I-65 and KY 44 (Section 1 and partial Section 2a).</p>	<p>Improved Typical Section: <u>Upgraded KY 44:</u> 1, 12-foot lane in each direction with 8-foot shoulders. In addition, an alternating 12-foot passing lane. <u>New Connectors:</u> 2, 12-foot lanes in each direction with 10-foot shoulders. 56-foot depressed median.</p>	<p>The expected v/c in 2045 exceeds the established thresholds.</p> <p>To be consistent with KYTC's recent study.</p>

1) The proposed roadway widening concept includes spot improvements at interchanges and major intersections as needed (see details in Interchanges for Potential Modification and Major Intersection for Potential Modification sections below).

2) Improved typical sections are based on KYTC Highway Design Manual.

3) Item Number: 5-564.00 (2020).

Potential New Interchanges: None.

Interchanges for Potential Modification: Improvements are proposed for one existing interchange at I-65.

Interchanges for Potential Modification
I-65

Major Intersections for Potential Modification: Improvements, such as additional turn lanes, channelization, and coordinated signal timing, should be considered at six major intersections for this corridor segment. The following is a list of these intersections.

Major Intersections for Potential Modification			
KY 1526 (Bells Mill Rd)	Greenbriar Rd	Stringer Ln	North Bardstown Rd
US 31 E	KY 1319		

Bridges: Bridge recommendations are based on ratings of substructure, superstructure and deck using the following methodology.

Methodology for Replacement/Rehabilitation Recommendation					
Structures	Substructure Rating	Superstructure Rating	Deck Rating	Culvert Rating	Recommendations
Bridges	≤ 4	Any	Any	/	Replacement
	$= 5$	Any	Any	/	Rehabilitation
	≥ 6	≤ 5	Any	/	Rehabilitation
	≥ 6	Any	≤ 5	/	Rehabilitation
	≥ 6	≥ 6	≥ 6	/	None ¹
Culverts	/	/	/	≤ 4	Replacement
	/	/	/	5 or 6	Rehabilitation
	/	/	/	≥ 7	None

1) If the bridge is on a corridor with a recommendation of widening, it will be widened (considered as rehabilitation) as necessary to accommodate the additional proposed lanes.

- **Bridges for Rehab/Widening:** Rehab/widening is recommended for a total of two bridges along the entire corridor. Note that the bridge rehab is determined based on the "Methodology for Replacement/Rehabilitation Recommendation" table above. If the bridge has a good condition but is within a bottleneck location with recommended widening, it will be widened as necessary to accommodate the additional proposed lanes and the cost of widening is assumed to be the same as bridge rehab for the planning-level cost estimation purpose.

Bridges for Rehab/Widening	
Bridge ID	Feature Intersect
015B00077N	I-65
015B00090N	FLOYDS FORK

- **Bridges for Replacement:** None.

Pavement Treatment: The overall pavement condition is good (average PDI = 0.26). Proposed additional lanes will consist of full depth asphalt pavement construction. Spot reconstruction and rehabilitation of existing asphalt pavement lanes might be needed based on more detailed evaluation of the corridor's pavement condition.

Potential Safety Improvement: The table below summarizes safety issues for the corridor and is based on KYTC safety data (LOSS = 4) as well as review of Google Aerial imagery. The table identifies clusters of links with a LOSS value of 4 based on two categories: 1) clusters located in areas where this study already recommends corridor improvements for mobility reasons and 2) clusters not located in areas previously recommended for corridor mobility improvements. For Category 1, it is assumed any corridor improvement based on mobility needs will be constructed to current KYTC standards and will include the necessary safety improvements. Category 2 is intended to identify corridor segments that may warrant improvement for safety reasons, even though improvement might not be needed for mobility. There may also be isolated links with LOSS value of 4 that are not included in the table. Spot improvements could be warranted for those locations but it is assumed these spot improvements do not rise to the level of a corridor improvement; therefore, these locations are not addressed in this planning study. The table further breaks the clusters down by urban and rural designation (based on KYSTMv18 data) because urban and rural roadways tend to have unique typical crash causes and countermeasures.

Potential Safety Improvements			
Category	Locations	Possible Causes	Recommendations
CAT 1: Major clusters covered by proposed mobility improvement	From I-65 to KY 1319 east of Mt. Washington (whole segment)	Intersection/interchange spacing and congestion, geometric deficiencies, lane drop	Upgrading KY 44 and constructing a new connector described above.
CAT 2: Major clusters not covered by proposed mobility improvement	N/A	N/A	N/A

Proposed Phasing: Refer to available information in the 65-71 Regional Corridor Study (Item No. 5-564.00 (2020)).

PRELIMINARY ENVIRONMENTAL RED FLAG ANALYSIS

Refer to available information in the 65-71 Regional Corridor Study (Item No. 5-564.00 (2020)).

RIGHT OF WAY IMPACTS

Refer to available information in the 65-71 Regional Corridor Study (Item No. 5-564.00 (2020)).

COST ESTIMATION

Design:	26.4 (\$M)
ROW:	46.4 (\$M)
Utility:	10.1 (\$M)
Construction:	<u>175.7 (\$M)</u>
TOTAL =	258.7 (\$M)

Note:

1. The cost estimation may not include additional costs to address the potential impacts of major utilities (e.g., gas line, major water supplier, transmission line) within the proximity of the corridor, due to the lack of data when the report was prepared. Further investigation is recommended in future studies.
2. Cost estimation was based on 2020 dollars. There is a 1-3% inflation rate. Estimated cost could vary -50% to +250% of the actual number (as a rule of thumb).
3. The widening of a 2-lane facility to a 3-lane facility (with TWLTL or alternating passing lane) is considered as "Minor Widening (Undivided Road) - 2 Lane to 4 Lane".
4. The cost estimation does not include bridges outside of the bottleneck locations, as they are not assumed to rise to the level of a corridor improvement. The cost estimation only includes necessary bridge replacement/rehab/widening costs within the bottleneck locations with proposed widening improvement.
5. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
6. Shoulder widening is not included in the cost estimation, as it is a relatively minor cost.
7. If multiple improvement concepts are recommended for the corridor, only the cost of the larger-scale improvement concept is estimated.

Kentucky Statewide Corridor Plan (Linking Kentucky)

Route: KY 44
Segment ID: 44B
From: KY 1319
To: KY 55
Counties: Bullitt, Spencer
Highway Districts: 5

CORRIDOR SEGMENT OVERVIEW

Segment 44B on KY 44 begins at KY 1319 in Bullitt County and extends east to KY 55 in Spencer County. The corridor segment is approximately 10 miles long and currently contains no interchange.

This segment passes through the residential and commercial areas of the City of Taylorsville in Spencer County. These areas would be considered town (according to KYSTMv18 data) with clusters of homes and commercial buildings adjacent to KY 44. The remainder of this segment passes through rural agricultural areas with homes interspersed along KY 44.

EXISTING FACILITY

The table below outlines the typical roadway attributes for this section of KY 44.

Typical Roadway Attributes					
Sub-segment	Functional Classification	Number & Width of Lanes	Shoulder & Width	Median Type & Width	Posted Speed Limit
From KY 1319 east of Mt. Washington to KY 55 in Taylorsville	Minor Arterial	2, 10'	None	None	35 – 55 mph

Right of Way: The existing right of way is generally 50' – 100' wide.

Pavement: The average PDI (Pavement Distress Index) for this corridor segment is 0.48, which indicates an overall fair pavement condition according to KYTC criteria (Good: 0.00 – 0.35; Fair: 0.36 – 0.65; Poor: 0.66 – 0.99).

Intersections/Interchanges: The tables below outline the existing interchanges, major intersections, and railroad crossings on the corridor.

Interchanges
None

Major Intersections ¹			
KY 1319	KY 1060	KY 623	KY 1633
KY 55 (Bloomfield Rd)	KY 55 (Taylorsville Rd)		

1) Only crossroads with function classification of Minor Collector or above are included.

At-grade Railroad Crossings
None

Access Points: This segment is not access controlled. Throughout the segment, there are residential and commercial driveways and intersecting roadways.

Bridges: The tables below outline the detailed Bridge information for existing bridges on or over this section of KY 44.

Mainline Bridge Information										
Bridge ID	Feature Intersect	NBIS Classification	Sufficiency Rating	Substandard	Deck Rating	Superstructure Rating	Substructure Rating	Under Clearance (feet)	Horizontal Clearance (feet)	Culvert Rating
108B00009N (Culvert)	DUTCHMAN CREEK	Fair	82.7	No	N	N	N	0	23	5
108B00008N	PLUM CREEK	Poor	44.3	No	5	5	4	0	19	N
108B00007N	ELK CREEK	Fair	61.2	No	5	5	5	0	19	N
108B00010N	BRASHEARS CREEK	Fair	61	No	5	6	5	0	28	N

Structures Crossing Over the Corridor
None

Other Noteworthy Conditions: None.

TRAFFIC & OPERATIONS

AADT & AADTT: The table below summarizes the 2015 AADT and daily truck volumes by sub-segment.

Traffic Volumes			
Sub-segment	AADT	AADTT	Truck Percentage
From KY 1319 east of Mt. Washington to KY 55 in Taylorsville	3,200	300	9% ¹

1) Truck percentage obtained from KYTC Traffic Count Reporting System.

Mobility: There is one isolated traffic bottleneck at the intersection with KY 55 in Taylorsville. (Note: bottlenecks are identified by Level of Travel Time Reliability (LOTTR) > 1.5 or volume/capacity > 0.6.) Other than the intersection noted above, traffic condition is acceptable along the remainder of this segment.

Existing Typical Roadway Attributes at Major Traffic Bottlenecks					
Locations	Functional Classification	Number & Width of Lanes	Median Width	Shoulder Width	2015 AADT ¹
Intersection with KY 55	Minor Arterial	2, 12'	None	None	6,220

1) The highest traffic volume within the bottleneck based on KYSTMv18 data.

Safety: 2.8% of the corridor mileage has a Level of Safety of Service (LOSS) of 4, meaning these areas have the highest potential to decrease crashes. (Note: LOSS is broken up into four categories based on SPFs and indicates the potential for crash reduction. LOSS 4 - high; LOSS 3 - moderate to high; LOSS 2 - low to moderate; LOSS 1 - low.) See the table under **Potential Safety Improvement** section for details of locations with LOSS =4, possible causes, and potential safety improvements.

ITS Devices: Less than 1% of the corridor length will have direct access to fiber from the KentuckyWired project.

PROPOSED IMPROVEMENT CONCEPTS

The improvement options noted in this report are not intended to be all-encompassing. Other potential improvements are possible, including innovative solutions that could be cost-effective and address the reasons for improvement. Further study may be needed as part of the project development process.

Proposed Typical Section & Description of Modification: The table below describes the proposed improvement concepts for the identified bottlenecks. The proposed improvements expect to maintain an overall acceptable traffic condition through 2045 ($v/c < 0.85$ in urban areas and $v/c < 0.7$ in rural areas) and address safety issues at bottlenecks.

Proposed Improvement Concepts			
Locations	Improvement Concepts ¹	Notes ²	Reason for Improvement
Entire corridor	Construct a 4-lane divided arterial connector on a new alignment between KY 44 and KY 55. This concept is similar as the Alternative 5 described in KYTC's 65-71 Regional Connector Study ³ , but only includes the segment between KY 44 and KY 55 (partial Section 2a).	Improved Typical Section: 2, 12-foot lanes in each direction with 10-foot shoulders. 56-foot depressed median.	To be consistent with KYTC's recent study.

1) The proposed roadway widening concept includes spot improvements at interchanges and major intersections as needed (see details in Interchanges for Potential Modification and Major Intersection for Potential Modification sections below).

2) Improved typical sections are based on KYTC Highway Design Manual.

3) Item No. 5-564.00 (2020).

Potential New Interchanges: None.

Interchanges for Potential Modification: None.

Major Intersections for Potential Modification: Improvements, such as additional turn lanes, channelization, and coordinated signal timing, should be considered at one major intersection at KY 55 in Taylorsville.

Major Intersections for Potential Modification			
KY 55			

Bridges: Bridge recommendations are based on ratings of substructure, superstructure and deck using the following methodology.

Methodology for Replacement/Rehabilitation Recommendation					
Structures	Substructure Rating	Superstructure Rating	Deck Rating	Culvert Rating	Recommendations
Bridges	<=4	Any	Any	/	Replacement
	=5	Any	Any	/	Rehabilitation
	>=6	<=5	Any	/	Rehabilitation
	>=6	Any	<=5	/	Rehabilitation
	>=6	>=6	>=6	/	None ¹
Culverts	/	/	/	<=4	Replacement
	/	/	/	5 or 6	Rehabilitation
	/	/	/	>=7	None

1) If the bridge is on a corridor with a recommendation of widening, it will be widened (considered as rehabilitation) as necessary to accommodate the additional proposed lanes.

- **Bridges for Rehab/Widening:** Rehab/widening is recommended for a total of two bridges and one culvert along the entire corridor. Note that the bridge rehab is determined based on the "Methodology for Replacement/Rehabilitation Recommendation" table above. If the bridge has a good condition but is within a bottleneck location with recommended widening, it will be widened as necessary to accommodate the additional proposed lanes and the cost of widening is assumed to be the same as bridge rehab for the planning-level cost estimation purpose.

Bridges for Rehab/Widening	
Bridge ID	Feature Intersect
108B00009N (Culvert)	DUTCHMAN CREEK
108B00007N	ELK CREEK
108B00010N	BRASHEARS CREEK

- **Bridges for Replacement:** Replacement is recommended for a total of 1 bridge along the entire corridor. Note that the bridge replacement is determined based on the "Methodology for Replacement/Rehabilitation Recommendation" table above. If the bridge needs replacement and is within a bottleneck location with recommended widening, it will be widened during the replacement to accommodate the additional proposed lanes and the cost of bridge replacement is used for the planning-level cost estimation purpose.

Bridges for Replacement	
Bridge ID	Feature Intersect
108B00008N	PLUM CREEK

Pavement Treatment: The overall pavement condition is fair (average PDI = 0.48). Proposed additional lanes and new alignment will consist of full depth asphalt pavement construction. Reconstruction and rehabilitation of existing asphalt pavement lanes might be needed based on more detailed evaluation of the corridor's pavement condition.

Potential Safety Improvement: The table below summarizes safety issues for the corridor and is based on KYTC safety data (LOSS = 4) as well as review of Google Aerial imagery. The table identifies clusters of links with a LOSS value of 4 based on two categories: 1) clusters located in areas where this study already recommends corridor improvements for mobility reasons and 2) clusters not located in areas previously recommended for corridor mobility improvements. For Category 1, it is assumed any corridor improvement based on mobility needs will be constructed to current KYTC standards and will include the necessary safety improvements. Category 2 is intended to identify corridor segments that may warrant improvement for safety reasons, even though improvement might not be needed for mobility. There may also be isolated links with LOSS value of 4 that are not included in the table. Spot improvements could be warranted for those locations but it is assumed these spot improvements do not rise to the level of a corridor improvement; therefore, these locations are not addressed in this planning study. The table further breaks the clusters down by urban and rural designation (based on KYSTMv18 data) because urban and rural roadways tend to have unique typical crash causes and countermeasures.

Potential Safety Improvements			
Category	Locations	Possible Causes	Recommendations
CAT 1: Major clusters covered by proposed mobility improvement	From 0.4 mile west of Dutchmans Creek Rd to 0.2 mile east of Dutchmans Creek Rd	Geometric deficiencies, sight distance challenges	Improved geometrics/sight distance, improved lighting/visibility.
CAT 2: Major clusters not covered by proposed mobility improvement	N/A	N/A	N/A

Proposed Phasing: Refer to available information in the 65-71 Regional Corridor Study (Item No. 5-564.00 (2020)).

PRELIMINARY ENVIRONMENTAL RED FLAG ANALYSIS

Refer to available information in the 65-71 Regional Corridor Study (Item No. 5-564.00 (2020)).

RIGHT OF WAY IMPACTS

Refer to available information in the 65-71 Regional Corridor Study (Item No. 5-564.00 (2020)).

COST ESTIMATION

Design:	8.8 (\$M)
ROW:	14.4 (\$M)
Utility:	2.9 (\$M)
Construction:	<u>67.5 (\$M)</u>
TOTAL =	93.6 (\$M)

Note:

1. The cost estimation may not include additional costs to address the potential impacts of major utilities (e.g., gas line, major water supplier, transmission line) within the proximity of the corridor, due to the lack of data when the report was prepared. Further investigation is recommended in future studies.
2. Cost estimation was based on 2020 dollars. There is a 1-3% inflation rate. Estimated cost could vary -50% to +250% of the actual number (as a rule of thumb).
3. The widening of a 2-lane facility to a 3-lane facility (with TWLTL or alternating passing lane) is considered as "Minor Widening (Undivided Road) - 2 Lane to 4 Lane".
4. The cost estimation does not include bridges outside of the bottleneck locations, as they are not assumed to rise to the level of a corridor improvement. The cost estimation only includes necessary bridge replacement/rehab/widening costs within the bottleneck locations with proposed widening improvement.
5. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
6. Shoulder widening is not included in the cost estimation, as it is a relatively minor cost.
7. If multiple improvement concepts are recommended for the corridor, only the cost of the larger-scale improvement concept is estimated.

Kentucky Statewide Corridor Plan (Linking Kentucky)

Route: KY 245
Segment ID: 46A
From: I-65 in Clermont
To: Bluegrass Parkway
Counties: Bullitt, Nelson
Highway Districts: 4, 5

CORRIDOR SEGMENT OVERVIEW

Segment 46A on KY 245 begins at I-65 in Bullitt County and extends southeast to Bluegrass Parkway in Nelson County. The corridor segment is approximately 19 miles long and currently contains two interchanges at I-65 and Bluegrass Parkway.

This segment passes through the residential and commercial areas of the City of Bardstown in Nelson County. These areas would be considered town (according to KYSTMv18 data) with clusters of homes and commercial buildings adjacent to KY 245. The remainder of this segment passes through rural agricultural areas with homes interspersed along KY 245.

EXISTING FACILITY

The table below outlines the typical roadway attributes for this section of KY 245.

Typical Roadway Attributes					
Sub-segment	Functional Classification	Number & Width of Lanes	Shoulder & Width	Median Type & Width	Posted Speed Limit
From I-65 to Highland Dr west of Bardstown	Minor Arterial	2, 12'	10'	None	55 mph
From Highland Dr west of Bardstown to Bluegrass Pkwy	Minor Arterial	4, 12'	2' or 10'	12' flush	55 mph

Right of Way: The existing right of way is generally 100' – 200' wide.

Pavement: The average PDI (Pavement Distress Index) for this corridor segment is 0.25, which indicates an overall good pavement condition according to KYTC criteria (Good: 0.00 – 0.35; Fair: 0.36 – 0.65; Poor: 0.66 – 0.99).

Intersections/Interchanges: The tables below outline the existing interchanges, major intersections, and railroad crossings on the corridor.

Interchanges	Interchange Type
I-65	Diamond
Bluegrass Parkway	Diamond

Major Intersections ¹			
Chapeze Ln	KY 1604 (Lotus Rd)	Deatsville Rd	Samuels Loop
KY 332	KY 1430	Chambers Blvd	US 31 E/US 150
US 62	Spencer Mattingly Rd	Springfield Rd	

1) Only crossroads with function classification of Minor Collector or above are included.

At-grade Railroad Crossings
KY 245 Mileage Point 1.7 in Nelson County
KY 245 Mileage Point 3.8 in Nelson County

Access Points: This segment is not access controlled. Throughout the segment, there are residential and commercial driveways and intersecting roadways.

Bridges: The tables below outline the detailed Bridge information for existing bridges on or over this section of KY 245.

Mainline Bridge Information										
Bridge ID	Feature Intersect	NBIS Classification	Sufficiency Rating	Substandard	Deck Rating	Superstructure Rating	Substructure Rating	Under Clearance (feet)	Horizontal Clearance (feet)	Culvert Rating
015B00072N	I-65	Fair	85	No	6	6	6	16.58	24	N
090B00122N	Bluegrass Parkway	Good	99	No	8	8	8	17.9	82	N

Structures Crossing Over the Corridor
None

Other Noteworthy Conditions: None.

TRAFFIC & OPERATIONS

AADT & AADTT: The table below summarizes the 2015 AADT and daily truck volumes by sub-segment.

Traffic Volumes			
Sub-segment	AADT	AADTT	Truck Percentage
From I-65 to Chambers Blvd in Bardstown	7,600	1,200	16%
From Chambers Blvd in Bardstown to Bluegrass Pkwy	12,600	2,100	17%

Mobility: According to the Kentucky Statewide Travel Demand Model (KYSTM), there is one traffic bottleneck from Chambers Blvd to Bluegrass Pkwy. (Note: bottlenecks are identified by Level of Travel Time Reliability (LOTTR) > 1.5 or volume/capacity (v/c) > 0.6.) However, this section (mainline) is not considered as a traffic bottleneck based on a closer examination of the recently completed widening project on KY 245, area type, geometry, and roadway attributes.

There are two additional major traffic bottlenecks along this corridor (from Chapeze Ln to Happy Hollow Rd and at the intersection with Samuels Loop). Other than the noted sections/locations above, traffic condition is acceptable along the remainder of this segment.

Existing Typical Roadway Attributes at Major Traffic Bottlenecks					
Locations	Functional Classification	Number & Width of Lanes	Median Width	Shoulder Width	2015 AADT ¹
Major Bottleneck 1: from Chapeze Ln to Happy Hollow Rd	Minor Arterial	2, 12'	None	10'	11,909
Major Bottleneck 2: intersection with Samuels Loop	Minor Arterial	2, 12'	None	None	7,443

1) The highest traffic volume within the bottleneck based on KYSTMv18 data.

Safety: 3.8% of the corridor mileage has a Level of Safety of Service (LOSS) 4, meaning these areas have the highest potential to decrease crashes. (Note: LOSS is broken up into four categories based on SPFs and indicates the potential for crash reduction. LOSS 4 - high; LOSS 3 - moderate to high; LOSS 2 - low to moderate; LOSS 1 - low.) See the table under **Potential Safety Improvement** section for details of locations with LOSS =4, possible causes, and potential safety improvements.

ITS Devices: This corridor will not have direct access to fiber from the KentuckyWired project.

PROPOSED IMPROVEMENT CONCEPTS

The improvement options noted in this report are not intended to be all-encompassing. Other potential improvements are possible, including innovative solutions that could be cost-effective and address the reasons for improvement. Further study may be needed as part of the project development process.

Proposed Typical Section & Description of Modification: The table below describes the proposed improvement concepts. The proposed improvements expect to provide better passing opportunities to the existing facility, maintain an overall acceptable traffic condition through 2045 (v/c < 0.85 in urban areas and v/c < 0.7 in rural areas), and address safety issues at bottlenecks.

Proposed Improvement Concepts			
Locations	Improvement Concepts ¹	Notes ²	Reason for Improvement
From I-65 to CR 1135 (Happy Hollow Rd)	Widening to a 2+1 roadway facility on existing alignment by adding an alternating passing lane along with spot improvements at major intersections.	Improved Typical Section: 1, 12-foot lane in each direction with 10-foot shoulders. In addition, an alternating 12-foot passing lane.	The expected v/c in 2045 exceeds the established thresholds. Address safety issues near I-65. Provide better passing opportunities to the existing rural 2-lane highway.
From Deatsville to 1 mile east of Samuels			LOTTR exceeds the established threshold.

1) The proposed roadway widening concept includes spot improvements at interchanges and major intersections as needed (see details in Interchanges for Potential Modification and Major Intersection for Potential Modification sections below).

2) Improved typical sections are based on KYTC Highway Design Manual.

Potential New Interchanges: None.

Interchanges for Potential Modification: None.

Major Intersections for Potential Modification: Improvements, such as additional turn lanes, channelization, and coordinated signal timing, should be considered at six major intersections for this corridor segment. The following is a list of these intersections.

Major Intersections for Potential Modification			
KY 509 (Samuels Loop)	Chambers Blvd	US 31 E ¹	US 62 ¹
Springfield Rd ¹	West junction at Bluegrass Pkwy ¹		

1) Intersection modifications are recommended to address travel time reliability issues at these locations, according to available KYTC LOTTR data (2015 – 2017). Further analysis is needed to justify the proposed improvements at these locations upon the completion of the recent KY 245 widening project.

Bridges: Bridge recommendations are based on ratings of substructure, superstructure and deck using the following methodology.

Methodology for Replacement/Rehabilitation Recommendation					
Structures	Substructure Rating	Superstructure Rating	Deck Rating	Culvert Rating	Recommendations
Bridges	<=4	Any	Any	/	Replacement
	=5	Any	Any	/	Rehabilitation
	>=6	<=5	Any	/	Rehabilitation
	>=6	Any	<=5	/	Rehabilitation
	>=6	>=6	>=6	/	None ¹
Culverts	/	/	/	<=4	Replacement
	/	/	/	5 or 6	Rehabilitation
	/	/	/	>=7	None

1) If the bridge is on a corridor with a recommendation of widening, it will be widened (considered as rehabilitation) as necessary to accommodate the additional proposed lanes.

- **Bridges for Rehab/Widening:** None.
- **Bridges for Replacement:** None.

Pavement Treatment: The overall pavement condition is good (average PDI = 0.25). Proposed additional lanes will consist of full depth asphalt pavement construction. Spot reconstruction and rehabilitation of existing asphalt pavement lanes might be needed based on more detailed evaluation of the corridor's pavement condition.

Potential Safety Improvement: The table below summarizes safety issues for the corridor and is based on KYTC safety data (LOSS = 4) as well as review of Google Aerial imagery. The table identifies clusters of links with a LOSS value of 4 based on two categories: 1) clusters located in areas where this study already recommends corridor improvements for mobility reasons and 2) clusters not located in areas previously recommended for corridor mobility improvements. For Category 1, it is assumed any corridor improvement based on mobility needs will be constructed to current KYTC standards and will include the necessary safety improvements. Category 2 is intended to identify corridor segments that may warrant improvement for safety reasons, even though improvement might not be needed for mobility. There may also be isolated links with LOSS value of 4 that are not included in the table. Spot improvements could be warranted for those locations but it is assumed these spot improvements do not rise to the level of a corridor improvement; therefore, these locations are not addressed in this planning study. The table further breaks the clusters down by urban and rural designation (based on KYSTMv18 data) because urban and rural roadways tend to have unique typical crash causes and countermeasures.

Potential Safety Improvements			
Category	Locations	Possible Causes	Recommendations
CAT 1: Major clusters covered by proposed mobility improvement	From I-65 to Audobon Dr	Intersection/interchange spacing, geographic deficiencies, lack of safety features	Mobility improvements described above: Widening to a 2+1 roadway facility and intersection improvements.
CAT 2: Major clusters not covered by proposed mobility improvement	<u>Urban</u> From 0.2 mile west of US 31 E/US 150 to Bluegrass Pkwy	<u>Urban</u> Signal deficiencies, capacity deficiencies, geometric deficiencies, queuing between intersections	<u>Urban</u> Coordinated signal timing/signal modernization, intersection and signage improvements, improved geometrics, added capacity.

Proposed Phasing: The proposed spot improvements at major intersections can be constructed separately and ahead of the proposed corridor widenings from I-65 to CR 1135 (Happy Hollow Rd) and from Deatsville to 1 mile east of Samuels; however, since the proposed corridor widening from I-65 to CR 1135 is relatively short (1.7 miles), it may be desirable to construct it at the same time as the spot improvements.

PRELIMINARY ENVIRONMENTAL RED FLAG ANALYSIS

The table below summarizes the presence of critical environmental red flag concerns approved by KYTC within 1,000 ft of proposed improvement locations (Y=Yes; N=No).

Critical Red Flag Issues/Concerns		
Environmental Red Flag Features	From I-65 to CR 1135 (Happy Hollow Rd)	From Deatsville to 1 mile east of Samuels
Superfunds	N	N
Special Waters ¹	N	Y
Forested Areas ²	Y	Y
NLEB Habitat Priority	Y	N
IB Habitat Priority Area	Y	Y
FAA Airport Runways	N	N
Public Hunting Areas	N	N
Wildlife Management Areas	N	N
Local Parks	N	N
State/ National Parks	N	N
Kentucky Heritage Land Conservation Fund	N	N
Area Landmarks	N	N
Point Landmarks	N	Y
National Register of Historic Places Location (Point)	N	N
National Register of Historic Places Location (Polygon)	N	N

1) Special Waters are defined as Cold Water Aquatic Habitats, Outstanding State/National Resource Waters, Exceptional Waters, State Wild Rivers, and Federally Designated Wild / Scenic Rivers.

2) Bernheim Forest is located along the corridor in Bullitt County.

RIGHT OF WAY IMPACTS

The table below summarizes the potential right-of-way (ROW) needs for proposed improvement concepts.

Potential Needs of Additional Right of Way		
Locations	Improvement Concepts	Potential ROW Needs
From I-65 to CR 1135 (Happy Hollow Rd)	Widening to a 3-lane facility on existing alignment by adding an alternating passing lane along with spot improvements at major intersections.	Potentially, but much would fit within the existing ROW
From Deatsville to 1 mile east of Samuels		Potentially, but much would fit within the existing ROW
Intersection modifications at US 31 E, US 62, Springfield Rd, West junction at Bluegrass Pkwy	Improvements such as additional turn lanes, channelization, and coordinated signal timing	Potentially
Intersection modifications at Chambers Blvd	Improvements such as additional turn lanes, channelization, and coordinated signal timing	No

COST ESTIMATION

Design:	6.3 (\$M)
ROW:	5.6 (\$M)
Utility:	3.1 (\$M)
Construction:	<u>44.8 (\$M)</u>
TOTAL =	59.7 (\$M)

Note:

1. The cost estimation may not include additional costs to address the potential impacts of major utilities (e.g., gas line, major water supplier, transmission line) within the proximity of the corridor, due to the lack of data when the report was prepared. Further investigation is recommended in future studies.
2. Cost estimation was based on 2020 dollars. There is a 1-3% inflation rate. Estimated cost could vary -50% to +250% of the actual number (as a rule of thumb).
3. The widening of a 2-lane facility to a 3-lane facility (with TWLTL or alternating passing lane) is considered as "Minor Widening (Undivided Road) - 2 Lane to 4 Lane".
4. The cost estimation does not include bridges outside of the bottleneck locations, as they are not assumed to rise to the level of a corridor improvement. The cost estimation only includes necessary bridge replacement/rehab/widening costs within the bottleneck locations with proposed widening improvement.
5. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
6. Shoulder widening is not included in the cost estimation, as it is a relatively minor cost.
7. If multiple improvement concepts are recommended for the corridor, only the cost of the larger-scale improvement concept is estimated.

Kentucky Statewide Corridor Plan (Linking Kentucky)

Route: US 150
Segment ID: 46B
From: Bluegrass Parkway
To: I-75
Counties: Nelson, Washington, Boyle, Lincoln, Rockcastle
Highway Districts: 4, 7, 8

CORRIDOR SEGMENT OVERVIEW

Segment 46B on US 150 begins at Bluegrass Parkway in Nelson County and extends southeast to I-75 in Rockcastle County. The corridor segment is approximately 77 miles long and currently contains two interchanges at Bluegrass Parkway and I-75. This segment includes one bypass: US 150 Bypass in the City of Danville.

This segment passes through the residential and commercial areas in multiple cities (Springfield in Washington County, Perryville in Boyle County, Danville in Boyle County, Stanford in Lincoln County, Crab Orchard in Lincoln County, Brodhead in Rockcastle County, and Mount Vernon in Rockcastle County). These areas would be considered towns (according to KYSTMv18 data) with clusters of homes and commercial buildings adjacent to KY US 150. The remainder of this segment passes through rural agricultural areas with homes interspersed along US 150.

EXISTING FACILITY

The table below outlines the typical roadway attributes for this section of US 150.

Typical Roadway Attributes					
Sub-segment	Functional Classification	Number & Width of Lanes	Shoulder & Width	Median Type & Width	Posted Speed Limit
From Bluegrass Pkwy to N Danville BYP west of Danville	Minor Arterial	2, 12'	10'	None	55 mph
From N Danville BYP west of Danville to US 27 in Stanford	Principal Arterial	4, 12'	4' or 8'	32' depressed	55 mph
From US 27 in Stanford to I-75	Minor Arterial	2, 12'	10'	None	55 mph

Right of Way: The existing right of way is generally 40' – 200' wide.

Pavement: The average PDI (Pavement Distress Index) for this corridor segment is 0.34, which indicates an overall good pavement condition according to KYTC criteria (Good: 0.00 – 0.35; Fair: 0.36 – 0.65; Poor: 0.66 – 0.99).

Intersections/Interchanges: The tables below outline the existing interchanges, major intersections, and railroad crossings on the corridor.

Interchanges	Interchange Type
Bluegrass Parkway	Diamond
I-75	Diamond

Major Intersections ¹			
Poplar Flats Rd	KY 605	US 150 BUS	KY 55
KY 528	KY 555	N Walnut St	KY 152
Perryville Rd	Short Line Rd	Deep Creek Rd	KY 1920
S Buell St	N Bragg St	KY 1822	Perryville Rd
Lebanon Rd	Stewarts Ln	Hustonville Rd	Gose Pike
Stanford Rd	KY 1273	Danville Ave	US 27
KY 78	KY 1770	KY 1369	KY 643
KY 39	Copper Creek Rd	W Main St	S Main St
KY 70	Spiro Rd	Lake Cumberland Rd	Richmond St

1) Only crossroads with function classification of Minor Collector or above are included.

At-grade Railroad Crossings
None

Access Points: This segment is not access controlled. Throughout the segment, there are residential and commercial driveways and intersecting roadways.

Bridges: The tables below outline the detailed Bridge information for existing bridges on or over this section of US 150.

Mainline Bridge Information										
Bridge ID	Feature Intersect	NBIS Classification	Sufficiency Rating	Substandard	Deck Rating	Superstructure Rating	Substructure Rating	Under Clearance (feet)	Horizontal Clearance (feet)	Culvert Raring
011B00043N	NS RR AND HARDING ST	Fair	74.6	No	7	7	6	23.83	30	N
011B00059N	DOCTOR'S FORK	Good	99.5	No	7	7	7	0	47.5	N
011B00042N	CHAPLIN RIVER	Fair	68.2	No	6	6	5	0	24	N
011B00015N	QUIRKS RUN	Fair	91.4	No	6	6	6	0	43.96	N
011B00016N	SALT RIVER	Fair	72.7	No	6	6	6	0	29.86	N
069B00083N	LOGAN BRANCH	Good	84.3	No	7	7	7	0	44	N
069B00093N	WALNUT FLAT CREEK	Good	92.8	No	7	7	7	0	44	N
069B00094N (Culvert)	TRIBUTARY OF DIX RIVER	Good	97.7	No	N	N	N	0	48	7
090B00122N	Bluegrass Parkway	Good	99	No	8	8	8	17.9	82	N
115B00063N	EAST FORK SALT RIVER	Good	94.9	No	8	8	7	0	47.2	N
115B00021N (Culvert)	PARKER RUN	Good	93.9	No	N	N	N	0	40.68	7
115B00023N	CARTWRIGHT CREEK	Fair	77.9	No	5	5	5	0	31.82	N
115B00058N	BEECH FORK	Good	92.3	No	7	8	8	0	48.56	N
115B00056N	MILL CREEK	Good	91.2	No	7	8	7	0	48.56	N
115B00057N	PLEASANT RUN	Good	85.6	No	7	8	7	0	48.56	N
011B00009N	CLARKS RUN	Fair	77.4	No	6	6	6	0	22.17	N
069B00096N (Culvert)	Tributary of Dix River	Fair	95.4	No	N	N	N	0	44.6	6
069B00097N	Flax Creek	Good	99.8	No	7	8	7	0	47	N
069B00098N	Turkey Creek	Good	98.4	No	7	8	7	0	42	N
102B00068N (Culvert)	Unnamed Creek	Good	81.5	No	N	N	N	0	99.9	7
102B00066N	NEGRO CREEK	Good	82.4	No	7	8	8	0	42	N
115B00068N (Culvert)	Shay Branch	Good	100	No	N	N	N	0	60	7
102B00067N	Negro Creek	Good	81.5	No	7	8	7	0	48	N
115B00067N	Road Run Creek	Good	100	No	7	8	7	99.99	60	N
090B00027N (Culvert)	SLOUGH BEECH FORK	Good	94.3	No	N	N	N	0	40	7
090B00117N	Beech Fork River	Good	99	No	8	8	8	0	40	N
115B00071N	Cartwright Creek	Good	99	No	8	8	8	0	41	N
011B00040L	BALLS FORK BRANCH	Fair	97.7	No	7	7	6	0	39.5	N
011B00040R	BALLS FORK BRANCH	Fair	97.7	No	7	7	6	0	39.58	N
069B00004N (Culvert)	HAWKINS BRANCH	Fair	70	No	N	N	N	0	70	6
069B00001N (Culvert)	RANKINS CREEK	Fair	69.8	No	N	N	N	0	70	6
069B00002N	HANGING FORK CREEK	Fair	78.3	No	6	6	6	0	29	N
069B00002R	HANGING FORK CREEK	Fair	80.3	No	6	6	6	0	29	N
069B00003N (Culvert)	SLOUGH OF HANGING FRK	Fair	50.5	No	N	N	N	0	70	6
090B00026N (Culvert)	MILL CREEK	Fair	77.7	No	N	N	N	0	26.9	5

Structures Crossing Over the Corridor			
Bridge ID	Facility Carried	Under Clearance (feet)	Horizontal Clearance (feet)
102B00038L	I-75 S NC	16.83	37.7
102B00038R	I-75	21.75	37.73

Other Noteworthy Conditions: None.

TRAFFIC & OPERATIONS

AADT & AADTT: The table below summarizes the 2015 AADT and daily truck volumes by sub-segment.

Traffic Volumes			
Sub-segment	AADT	AADTT	Truck Percentage
From Bluegrass Pkwy to N Danville BYP in Danville	5,100	700	14%
From N Danville BYP in Danville to US 27 in Stanford	9,600	1,600	16%
From US 27 in Stanford to I-75	4,700	500	10%

Mobility: There is one major traffic bottleneck along this corridor segment. See the table below for details. (Note: bottlenecks are identified by Level of Travel Time Reliability (LOTTR) > 1.5 or volume/capacity (v/c) > 0.6.) There are also a few additional isolated traffic bottlenecks along this corridor. Other than the noted traffic bottleneck sections/locations, traffic condition is acceptable along the remainder of this segment.

Existing Typical Roadway Attributes at Major Traffic Bottlenecks					
Locations	Functional Classification	Number & Width of Lanes	Median Width	Shoulder Width	2015 AADT ¹
From N Danville BYP/Perryville Rd to Gose Pike in Danville	Principal Arterial	4, 12'	28'	6-10'	12,592

1) The highest traffic volume within the bottleneck based on KYSTMv18 data.

Safety: 2.3% of the corridor mileage has a Level of Safety of Service (LOSS) of 4, meaning these areas have the highest potential to decrease crashes. (Note: LOSS indicates the potential for crash reduction and is broken up into four categories based on Safety Performance Functions (SPFs): LOSS 4 = high; LOSS 3 = moderate to high; LOSS 2 = low to moderate; LOSS 1 = low.) See the table under **Potential Safety Improvement** section for details of locations with LOSS =4, possible causes, and potential safety improvements.

ITS Devices: Approximately 1% of the corridor length will have direct access to fiber from the KentuckyWired project.

PROPOSED IMPROVEMENT CONCEPTS

The improvement options noted in this report are not intended to be all-encompassing. Other potential improvements are possible, including innovative solutions that could be cost-effective and address the reasons for improvement. Further study may be needed as part of the project development process.

Proposed Typical Section & Description of Modification: The table below describes the proposed improvement concepts for the identified bottlenecks. The proposed improvements expect to maintain an overall acceptable traffic condition through 2045 ($v/c < 0.85$ in urban areas and $v/c < 0.7$ in rural areas) and address safety issues at bottlenecks.

Proposed Improvement Concepts			
Locations	Improvement Concepts	Notes	Reason for Improvement
From N Danville BYP/Perryville Rd to Gose Pike in Danville	Spot improvement at major intersections	See the Major Intersections for Potential Modification section below	LOTTR exceeds the established thresholds

Potential New Interchanges: None.

Interchanges for Potential Modification: The interchange at I-75 Exit 59. The modification of this interchange is currently under construction as part of a KYTC I-75 widening project (Item No. 8-6.10).

Major Intersections for Potential Modification: Improvements, such as additional turn lanes, channelization, and coordinated signal timing, should be considered at eight major intersections for this corridor segment. The following is a list of these intersections.

Major Intersections for Potential Modification			
Bluegrass Pkwy (east ramp terminal)	KY 555	N Danville BYP /Perryville Rd	KY 34 (Lebanon Rd)
US 127 (Hustonville Rd)	US 27	KY 461	US 25

Bridges: Bridge recommendations are based on ratings of substructure, superstructure and deck using the following methodology.

Methodology for Replacement/Rehabilitation Recommendation					
Structures	Substructure Rating	Superstructure Rating	Deck Rating	Culvert Rating	Recommendations
Bridges	≤ 4	Any	Any	/	Replacement
	$= 5$	Any	Any	/	Rehabilitation
	≥ 6	≤ 5	Any	/	Rehabilitation
	≥ 6	Any	≤ 5	/	Rehabilitation
	≥ 6	≥ 6	≥ 6	/	None ¹
Culverts	/	/	/	≤ 4	Replacement
	/	/	/	5 or 6	Rehabilitation
	/	/	/	≥ 7	None

1) If the bridge is on a corridor with a recommendation of widening, it will be widened (considered as rehabilitation) as necessary to accommodate the additional proposed lanes.

- **Bridges for Rehab/Widening:** Rehab/widening is recommended for a total of two bridges and five culverts. along the entire corridor. Note that the bridge rehab is determined based on the "Methodology for Replacement/Rehabilitation Recommendation" table above. If the bridge has a good condition but is within a bottleneck location with recommended widening, it will be widened as necessary to accommodate the additional proposed lanes and the cost of widening is assumed to be the same as bridge rehab for the planning-level cost estimation purpose.

Bridges for Rehab/Widening	
Bridge ID	Feature Intersect
011B00042N	CHAPLIN RIVER
115B00023N	CARTWRIGHT CREEK
069B00096N (Culvert)	Tributary of Dix River
069B00004N (Culvert)	HAWKINS BRANCH
069B00001N (Culvert)	RANKINS CREEK
069B00003N (Culvert)	SLOUGH OF HANGING FRK
090B00026N (Culvert)	MILL CREEK

- **Bridges for Replacement:** None.

Pavement Treatment: The overall pavement condition is good (average PDI = 0.34). Spot reconstruction and rehabilitation of existing asphalt pavement lanes might be needed based on more detailed evaluation of the corridor's pavement condition.

Potential Safety Improvement: The table below summarizes safety issues for the corridor and is based on KYTC safety data (LOSS = 4) as well as review of Google Aerial imagery. The table identifies clusters of links with a LOSS value of 4 based on two categories: 1) clusters located in areas where this study already recommends corridor improvements for mobility reasons and 2) clusters not located in areas previously recommended for corridor mobility improvements. For Category 1, it is assumed any corridor improvement based on mobility needs will be constructed to current KYTC standards and will include the necessary safety improvements. Category 2 is intended to identify corridor segments that may warrant improvement for safety reasons, even though improvement might not be needed for mobility. There may also be isolated links with LOSS value of 4 that are not included in the table. Spot improvements could be warranted for those locations but it is assumed these spot improvements do not rise to the level of a corridor improvement; therefore, these locations are not addressed in this planning study. The table further breaks the clusters down by urban and rural designation (based on KYSTMv18 data) because urban and rural roadways tend to have unique typical crash causes and countermeasures.

Potential Safety Improvements			
Category	Locations	Possible Causes	Recommendations
CAT 1: Major clusters covered by proposed mobility improvement	From N Danville BYP/Perryville Rd to Gose Pike in Danville	Intersection spacing and congestion, lack of safety features/advance warnings	Intersection improvements described above
CAT 2: Major clusters not covered by proposed mobility improvement	<u>URBAN</u> N/A <u>RURAL</u> From KY 55 to KY 555 near Springfield. From KY 3248 (Carmens Ln) west of Stanford to KY 78 east of Stanford. From Progress Dr west of Mt Vernon to Floyd St in Mt Vernon. Mixed URBAN/RURAL From Nancy Ave west of Danville to N Danville Bypass/Perryville Rd in Danville.	<u>URBAN</u> Signal deficiencies, geometric deficiencies. <u>RURAL</u> Sight distance challenges, geometric deficiencies, lack of safety features/advance warnings, lane drop/merge, run off road, speeding.	<u>URBAN</u> Coordinated signal timing/signal modernization, intersection and signage improvements, improved geometrics. <u>RURAL</u> Improved geometrics/sight distance, roadside improvements, install/modernize signage, improved lighting/visibility.

Proposed Phasing: The proposed spot improvements at major intersections can be constructed at the same time. The interchange modification at I-75 Exit 59 is currently under construction as part of a KYTC I-75 widening project (Item No. 8-6.10).

PRELIMINARY ENVIRONMENTAL RED FLAG ANALYSIS

The table below summarizes the presence of critical environmental red flag concerns approved by KYTC within 1,000 ft of proposed improvement locations (Y=Yes; N=No).

Critical Red Flag Issues/Concerns	
Environmental Red Flag Features	From N Danville BYP/Perryville Rd to Gose Pike in Danville
Superfunds	N
Special Waters ¹	N
Forested Areas	N
NLEB Habitat Priority	N
IB Habitat Priority Area	N
FAA Airport Runways	N
Public Hunting Areas	N
Wildlife Management Areas	N
Local Parks	N
State/ National Parks	N
Kentucky Heritage Land Conservation Fund	N
Area Landmarks	Y
Point Landmarks	Y
National Register of Historic Places Location (Point)	Y
National Register of Historic Places Location (Polygon)	N

1) Special Waters are defined as Cold Water Aquatic Habitats, Outstanding State/National Resource Waters, Exceptional Waters, State Wild Rivers, and Federally Designated Wild / Scenic Rivers.

RIGHT OF WAY IMPACTS

The table below summarizes the potential right-of-way (ROW) needs for proposed improvement concepts.

Potential Needs of Additional Right of Way		
Locations	Improvement Concepts	Potential ROW Needs
From N Danville BYP/Perryville Rd to Gose Pike in Danville	Spot improvement at major intersections	Potentially
Interchange modifications at I-75 Exit 59 ((under construction-2020) Item No. 8-6.10)	Interchange modifications	Potentially
Intersection modifications at east ramp terminal at Bluegrass Parkway, KY 555, KY 461	Improvements such as additional turn lanes, channelization, and coordinated signal timing	Potentially
Intersection modifications at US 27, US 25	Improvements such as additional turn lanes, channelization, and coordinated signal timing	No

COST ESTIMATION

Design:	2.3 (\$M)
ROW:	7.2 (\$M)
Utility:	2.2 (\$M)
Construction:	<u>24.0 (\$M)</u>
TOTAL =	35.7 (\$M)

Note:

1. The cost estimation may not include additional costs to address the potential impacts of major utilities (e.g., gas line, major water supplier, transmission line) within the proximity of the corridor, due to the lack of data when the report was prepared. Further investigation is recommended in future studies.
2. Cost estimation was based on 2020 dollars. There is a 1-3% inflation rate. Estimated cost could vary -50% to +250% of the actual number (as a rule of thumb).
3. The widening of a 2-lane facility to a 3-lane facility (with TWLTL or alternating passing lane) is considered as "Minor Widening (Undivided Road) - 2 Lane to 4 Lane".
4. The cost estimation does not include bridges outside of the bottleneck locations, as they are not assumed to rise to the level of a corridor improvement. The cost estimation only includes necessary bridge replacement/rehab/widening costs within the bottleneck locations with proposed widening improvement.
5. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
6. Shoulder widening is not included in the cost estimation, as it is a relatively minor cost.
7. If multiple improvement concepts are recommended for the corridor, only the cost of the larger-scale improvement concept is estimated.

Kentucky Statewide Corridor Plan (Linking Kentucky)

Route: US 60
Segment ID: 50A
From: Illinois State Line
To: KY 425 BYP in Henderson
Counties: Ballard, McCracken, Livingston, Crittenden, Union, Henderson
Highway Districts: 1, 2

CORRIDOR SEGMENT OVERVIEW

Segment 50A on US 60 begins at the Illinois State Line in Ballard County and extends northeast through multiple counties to KY 425 BYP in Henderson County. The corridor segment is approximately 130.4 miles long and currently contains one interchange at I-24.

This segment passes through the residential and commercial areas in multiple cities (Wickliffe, Barlow, LaCenter, and Kevil in Ballard County, Paducah in McCracken County, Smithland and Salem in Livingston County, Marion in Crittenden County, Sturgis and Waverly in Union County, Corydon and Henderson in Henderson County). These areas would be considered towns or cities (according to KYSTMv18 data) with clusters of homes and commercial buildings adjacent to US 60. The remainder of this segment passes through rural agricultural areas with homes interspersed along US 60.

EXISTING FACILITY

The table below outlines the typical roadway attributes for this section of US 60.

Typical Roadway Attributes					
Sub-segment	Functional Classification	Number & Width of Lanes	Shoulder & Width	Median Type & Width	Posted Speed Limit
From IL State line to KY 1154 (Hobbs Rd) west of Paducah	Principal Arterial	2, 11'	4'	None	55 mph
From KY 1154 (Hobbs Rd) west of Paducah to 1 mile east of the US 60/US 62 junction near Ledbetter	Principal Arterial	4, 11' or 12'	2' - 10'	None or 16' raised non-mountable or 32' depressed	45 mph or 55 mph
From 1 mile east of the US 60/US 62 junction near Ledbetter to KY 425 BYP in Henderson ¹	Minor Arterial	2, 10' or 12'	4' or 10'	None	55 mph

¹ US 60 is a 4-lane divided facility for approximately 0.7 mile before the intersection with KY 425 BYP in Henderson.

Right of Way: The existing right of way is generally 50' – 150' wide.

Pavement: The average PDI (Pavement Distress Index) for this corridor segment is 0.41, which indicates an overall fair pavement condition according to KYTC criteria (Good: 0.00 – 0.35; Fair: 0.36 – 0.65; Poor: 0.66 – 0.99).

Intersections/Interchanges: The tables below outline the existing interchanges, major intersections, and railroad crossings on the corridor.

Interchanges	Interchange Type
I-24	Diamond

Major Intersections ¹			
US 51	KY 1105	Coffee Dr	Bluegrass Dr
Broadway	KY 310	Gage Rd	New Liberty Church Rd
Hobbs Rd	KY 3520	Kelly Rd	Metropolis Lake Rd
KY 305	Maxon Rd	KY 3520	Olivet Church Rd
New Holt Rd	James-Sanders Blvd	Coleman Rd	Friedman Ln
KY 731	US 60 BUS	US 45	Jefferson St
Broadway	Washington St	Jackson St	South 21st St
Mayfield Rd	Mallory St	Broad St	Bridge St
Locust Dr	Wayne Sullivan Dr	Pugh Rd	US 62
Adair St	Cutoff Rd	KY 453	Tiline Rd
Brummitte Rd	River Rd	Maxfield Rd	Carrsville Rd
Cedar Grove Rd	Lola Rd	N Hayden Ave	KY 855
KY 297	KY 1668	S Main St	E Depot St
E Bellville St	KY 654	KY 365	KY 109
KY 141	KY 109	KY 270 (south)	KY 270 (north)
KY 950	KY 3393	KY 56	US 60
KY 141 (west)	KY 141 (east)	KY 145	KY 266
KY 425			

1) Only crossroads with function classification of Minor Collector or above are included.

At-grade Railroad Crossings
US 60 Mile Point 16.3 in McCracken County
US 60 Mile Point 1.4 in Union County

Access Points: This segment is not access controlled. Throughout the segment, there are residential and commercial driveways and intersecting roadways.

Bridges: The tables below outline the detailed Bridge information for existing bridges on or over this section of US 60.

Mainline Bridge Information										
Bridge ID	Feature Intersect	NBIS Classification	Sufficiency Rating	Substandard	Deck Rating	Superstructure Rating	Substructure Rating	Under Clearance (feet)	Horizontal Clearance (feet)	Culvert Rating
004B00021N	OHIO RIVER - IC (SOU) RR	Fair	25	No	5	5	5	40	20	N
004B00066N	WILLOW SLOUGH	Good	80	No	8	7	8	0	42.98	N
004B00063N	MINOR SLOUGH	Good	80	No	7	7	7	0	43.96	N
004B00056N	SOUTH FORK-CANE CREEK	Good	90.5	No	7	7	7	0	39.7	N
004B00061N	BIG CANE CREEK	Good	90.5	No	7	8	8	0	43.96	N
004B00062N	LITTLE SHAWNEE CREEK	Good	90.5	No	7	8	7	0	46.26	N
004B00005N (Culvert)	DRAINAGE DITCH	Fair	90.5	No	N	N	N	0	22.31	6
004B00059N	SHAWNEE CREEK	Good	90.5	No	7	7	7	0	43.96	N
004B00064N	W.FK. HUMPHREY CREEK	Good	83.9	No	7	8	8	0	42.98	N
004B00057N	FORK OF HUMPHREY CR	Fair	83.9	No	6	7	7	0	39.7	N
004B00058N	HUMPHREY CREEK	Good	83.9	No	7	7	7	0	39.7	N
004B00011N (Culvert)	FRAZIER CREEK	Fair	70.9	No	N	N	N	0	22	5
004B00012N (Culvert)	BRANCH FRAZIER CREEK	Fair	52.4	No	N	N	N	0	22	5
004B00013N (Culvert)	PAGE BRANCH	Fair	81.9	No	N	N	N	0	22	6
073B00159R	W. FORK MASSAC CREEK	Good	100	No	7	8	7	0	42	N
073B00159L	W. Fork Massac Creek	Good	100	No	7	8	7	0	42	N
073B00160R	W. FR. MASSAC CR OVER FL	Good	100	No	7	7	8	0	42	N
073B00160L	W. FK. MASSAC CR OV. FLO	Good	100	No	7	7	7	0	42	N
073B00161R	W. FK. MASSAC CR. OV. FLO	Good	100	No	7	8	7	0	42	N
073B00161L	W. FR. MASSAC CR OV. FLO	Good	100	No	7	8	7	0	42	N
073B00162N (Culvert)	UNNAMED STREAM	Good	84.4	No	N	N	N	0	39	7
073B00154R	IC RAILROAD	Good	100	No	7	7	7	23.5	37.73	N
073B00154L	IC RAILROAD	Good	100	No	7	7	7	23.5	37.73	N
073B00155N (Culvert)	BLACKS BRANCH	Good	83.4	No	N	N	N	0	40	7
073B00156R (Culvert)	W.Fork Massac overflow	Good	100	No	7	7	8	0	41.99	N
073B00156L	WEST FK- MASSAC CK OVRFLO	Good	100	No	7	7	7	0	41.99	N
073B00164R	OVER MASSAC CREEK	Fair	100	No	7	6	8	0	41.99	N
073B00164L	OVER W. FORK MASSAC CR	Good	100	No	7	7	8	0	41.99	N

Mainline Bridge Information										
Bridge ID	Feature Intersect	NBIS Classification	Sufficiency Rating	Substandard	Deck Rating	Superstructure Rating	Substructure Rating	Under Clearance (feet)	Horizontal Clearance (feet)	Culvert Rating
073B00165L	OVER MASSAC CR. OVERFLOW	Good	100	No	7	7	8	0	41.99	N
073B00165R	OVER MASSAC CR. OVERFLOW	Good	100	No	7	7	8	0	41.99	N
073B00106N	PERKINS CREEK CHANNEL CH	Fair	83.7	No	7	6	7	0	90.88	N
073B00124N	P&L RAILWAY	Good	85	No	7	7	7	23	87.93	N
073B00135N (Culvert)	Perkins Creek	Fair	73.1	No	N	N	N	0	71.85	6
073B00093N	P&L RAILWAY & CLEVELAND S	Fair	79	No	7	6	6	23.58	49.87	N
073B00095N	ISLAND CREEK	Fair	58.5	No	7	7	5	0	43.96	N
073B00094N	P&L RAILWAY & CALDWELL A	Fair	81	No	7	7	6	23.33	49.87	N
073B00128R	CLARKS RIVER	Good	100	No	8	7	7	0	39.7	N
073B00005L	CLARKS RIVER	Fair	83	No	8	6	6	0	29.8	N
073B00062N	P&L RAILWAY	Poor	37	No	5	4	5	23.8	23.95	N
073B00061N	P&L RAILWAY	Fair	60.5	No	6	7	5	22.4	30	N
073B00059N	US 62	Fair	83.7	No	6	6	5	14.1	41.99	N
073B00173N	Tenn. River/P&L Railroad	Good	76	No	8	8	7	32.32	32.6	N
070B00017N	CUMBERLAND RIVER	Poor	26.8	No	4	4	5	0	20.01	N
070B00076N	DRYER CREEK	Good	83.7	No	7	8	8	0	42.98	N
070B00074N (Culvert)	MITCHELL'S BRANCH	Good	85.6	No	N	N	N	0	44.95	7
070B00075N	SANDY CREEK	Good	83.9	No	7	8	7	0	43.96	N
028B00056N (Culvert)	NEW SALEM CREEK	Good	77	No	N	N	N	0	40.35	7
028B00057N	CROOKED CREEK	Good	80	No	7	8	7	0	41.34	N
028B00058N	RUSH CREEK	Good	80	No	7	8	7	0	41.34	N
028B00062N	WINLOW CREEK	Fair	80	No	6	6	6	0	44.62	N
028B00063N	REPTON CREEK	Fair	80	No	6	7	7	0	44.62	N
028B00064N	MEADOW CREEK	Fair	80	No	6	7	6	0	44.62	N
028B00053N	TRADEWATER RIVER	Good	79	No	7	7	8	0	30	N
113B00027N	CYPRESS CREEK	Good	80	No	7	8	7	0	43.96	N
113B00028N	SMITH DITCH	Good	79	No	7	7	7	0	43.5	N
113B00026N	CYPRESS CREEK	Fair	79	No	6	8	6	0	44	N
113B00029N	EAGLE CREEK	Fair	78	No	5	7	8	0	45	N
113B00104N	LOST CREEK	Good	100	No	7	7	8	0	53.48	N
113B00012N (Culvert)	BR OF CASEY CREEK	Fair	92.5	No	N	N	N	0	42	6
113B00013N (Culvert)	BR OF CASEY CREEK	Fair	91.4	No	N	N	N	0	44.25	6
051B00038N	HIGHLAND CREEK	Fair	66.4	No	6	6	5	0	25.92	N

Structures Crossing Over the Corridor			
Bridge ID	Facility Carried	Under Clearance (feet)	Horizontal Clearance (feet)
073B00105L	I 24 NC	16	40.25
073B00105R	I-24	16.25	40.25

Other Noteworthy Conditions: None.

TRAFFIC & OPERATIONS

AADT & AADTT: The table below summarizes the 2015 AADT and daily truck volumes by sub-segment.

Traffic Volumes			
Sub-segment	AADT	AADTT	Truck Percentage
From the IL state line to US 51 (N 4th St) in Wickliffe	6,300	2,100	34% ¹
From US 51 (N 4th St) in Wickliffe to KY 305 (Cairo Rd) west of Paducah	3,300	900	26%
From KY 305 (Cairo Rd) west of Paducah to the US 60/US 62 junction east of Paducah	11,400	1,600	14%
From the US 60/US 62 junction east of Paducah to KY 266 (2nd St) in Corydon	4,200	600	13%
From KY 266 (2nd St) in Corydon to KY 425 BYP in Henderson	12,800	1,200	9%

1) Truck percentage obtained from KYTC Traffic Count Reporting System

Mobility: There is one major traffic bottleneck along this corridor segment. See the table below for details. (Note: bottlenecks are identified by Level of Travel Time Reliability (LOTTR) > 1.5 or volume/capacity (v/c) > 0.6.) There are also a few additional isolated traffic bottlenecks along this corridor. Other than the noted traffic bottleneck sections/locations, Traffic condition is acceptable along the remainder of this segment.

Existing Typical Roadway Attributes at Major Traffic Bottlenecks					
Locations	Functional Classification	Number & Width of Lanes	Median Width	Shoulder Width	2015 AADT ¹
From KY 998 (Olivet Church Rd) in Paducah to the US 62/US 60 junction east of Paducah	Principal Arterial	4, 11' or 12'	0' - 16'	2' or 10'	30,507

1) The highest traffic volume within the bottleneck based on KYSTMv18 data.

Safety: 4.6% of the corridor mileage has a Level of Safety of Service (LOSS) of 4, meaning these areas have the highest potential to decrease crashes. (Note: LOSS indicates the potential for crash reduction and is broken up into four categories based on Safety Performance Functions (SPFs): LOSS 4 = high; LOSS 3 = moderate to high; LOSS 2 = low to moderate; LOSS 1 = low.) See the table under **Potential Safety Improvement** section for details of locations with LOSS =4, possible causes, and potential safety improvements.

ITS Devices: Approximately 3% of the corridor length will have direct access to fiber from the KentuckyWired project.

PROPOSED IMPROVEMENT CONCEPTS

The improvement options noted in this report are not intended to be all-encompassing. Other potential improvements are possible, including innovative solutions that could be cost-effective and address the reasons for improvement. Further study may be needed as part of the project development process.

Proposed Typical Section & Description of Modification: The table below describes the proposed improvement concepts for the identified bottlenecks. The proposed improvements expect to maintain an overall acceptable traffic condition through 2045 ($v/c < 0.85$ in urban areas and $v/c < 0.7$ in rural areas) and address safety issues at bottlenecks.

Proposed Improvement Concepts			
Locations	Improvement Concepts	Notes	Reason for Improvement
From KY 998 (Olivet Church Rd) to John Puryear Dr/US 60 BUS in Paducah	Spot improvements at major intersections		LOTTR exceeds the established threshold. Narrow lanes and shoulders for this truck corridor.
From John Puryear Dr/US 60 BUS in Paducah to the US 62/US 60 junction east of Paducah	Access management and spot improvements at major intersections		The expected v/c in 2045 exceeds the established thresholds. Narrow lanes and shoulders for this truck corridor.

It is noted that KYTC Item Number 1-330 relocates US 60 from east of the Tennessee River bridge to east of Rudd-Spees Road in Livingston County as a four-lane divided facility.

Potential New Interchanges: None.

Interchanges for Potential Modification: None. The US 60/I-24 interchange in Paducah was recently rebuilt as a Diverging Diamond interchange.

Major Intersections for Potential Modification: Improvements, such as additional turn lanes, channelization, and coordinated signal timing, should be considered at 22 major intersections for this corridor segment. The following is a list of these intersections.

Major Intersections for Potential Modification			
US 51 (N 4th St)	KY 998 (Olivet Church Rd)	New Holt Rd	James-Sanders Blvd
Coleman Rd	Friedman Ln	KY 731	Park Ave
HC Mathis Dr	Jefferson St	Broadway St	Washington St
US 45 (Jackson St)	Mayfield Rd	Mallory St	Bridge St
John Puryear Dr/US 60 BUS	Pugh Rd	US 62	US 641 (S Main St)
KY 3393/S Morgan St	US 60/US 60 BYP		

Bridges: Bridge recommendations are based on ratings of substructure, superstructure and deck using the following methodology.

Methodology for Replacement/Rehabilitation Recommendation					
Structures	Substructure Rating	Superstructure Rating	Deck Rating	Culvert Rating	Recommendations
Bridges	<=4	Any	Any	/	Replacement
	=5	Any	Any	/	Rehabilitation
	>=6	<=5	Any	/	Rehabilitation
	>=6	Any	<=5	/	Rehabilitation
	>=6	>=6	>=6	/	None ¹
Culverts	/	/	/	<=4	Replacement
	/	/	/	5 or 6	Rehabilitation
	/	/	/	>=7	None

1) If the bridge is on a corridor with a recommendation of widening, it will be widened (considered as rehabilitation) as necessary to accommodate the additional proposed lanes.

- **Bridges for Rehab/Widening:** Rehab/widening is recommended for a total of eight bridges and seven culverts along the entire corridor. Note that the bridge rehab is determined based on the "Methodology for Replacement/Rehabilitation Recommendation" table above. If the bridge has a good condition but is within a bottleneck location with recommended widening, it will be widened as necessary to accommodate the additional proposed lanes and the cost of widening is assumed to be the same as bridge rehab for the planning-level cost estimation purpose.

Bridges for Rehab/Widening	
Bridge ID	Feature Intersect
004B00021N	OHIO RIVER -IC (SOU) RR
004B00005N (Culvert)	DRAINAGE DITCH
004B00011N (Culvert)	FRAZIER CREEK
004B00012N (Culvert)	BRANCH FRAZIER CREEK
004B00013N (Culvert)	PAGE BRANCH
073B00135N (Culvert)	Perkins Creek
073B00095N	ISLAND CREEK
073B00062N	P&L RAILWAY
073B00061N	P&L RAILWAY
073B00059N	US 62
070B00017N	CUMBERLAND RIVER
113B00029N	EAGLE CREEK
113B00012N (Culvert)	BR OF CASEY CREEK
113B00013N (Culvert)	BR OF CASEY CREEK
051B00038N	HIGHLAND CREEK

- **Bridges for Replacement:** None.

Pavement Treatment: The overall pavement condition is fair (average PDI = 0.41). Rehabilitation and reconstruction of existing asphalt pavement lanes are needed based on more detailed evaluation of the corridor's pavement condition.

Potential Safety Improvement: The table below summarizes safety issues for the corridor and is based on KYTC safety data (LOSS = 4) as well as review of Google Aerial imagery. The table identifies clusters of links with a LOSS value of 4 based on two categories: 1) clusters located in areas where this study already recommends corridor improvements for mobility reasons and 2) clusters not located in areas previously recommended for corridor mobility improvements. For Category 1, it is assumed any corridor improvement based on mobility needs will be constructed to current KYTC standards and will include the necessary safety improvements. Category 2 is intended to identify corridor segments that may warrant improvement for safety reasons, even though improvement might not be needed for mobility. There may also be isolated links with LOSS value of 4 that are not included in the table. Spot improvements could be warranted for those locations but it is assumed these spot improvements do not rise to the level of a corridor improvement; therefore, these locations are not addressed in this planning study. The table further breaks the clusters down by urban and rural designation (based on KYSTMv18 data) because urban and rural roadways tend to have unique typical crash causes and countermeasures.

Potential Safety Improvements			
Category	Locations	Possible Causes	Recommendations
CAT 1: Major clusters covered by proposed mobility improvement	From James-Sanders Blvd to Mallory St in Paducah	Intersection/interchange spacing and congestion, geometric deficiencies, signal deficiencies	Intersection improvements described above
CAT 2: Major clusters not covered by proposed mobility improvement	<u>RURAL</u> From Moore Rd in La Center to Clarkline Rd in Kevil. From Clarks Ferry Rd to McCain Dr in Ledbetter. From KY 1901 to 3.7 mile north of KY 1901 in Crittenden County. <u>Mixed URBAN/RURAL</u> From Country Club Dr to Harmon Dr in Marion.	<u>URBAN</u> Signal deficiencies, capacity deficiencies, geometric deficiencies, excessive curb cuts. <u>RURAL</u> Sight distance challenges, geometric deficiencies, lack of safety features/advance warnings, lane drop/merge, run off road, speeding.	<u>URBAN</u> Coordinated signal timing/signal modernization, intersection and signage improvements, improved geometrics, access control. <u>RURAL</u> Improved geometrics/sight distance, roadside improvements, install/modernize signage, improved lighting/visibility.

Proposed Phasing: The proposed spot improvements at major intersections could be phased geographically: one phase for Ballard, Livingston, Crittenden, and Union Counties and another for McCracken County. Because the McCracken County intersections are all located in or near Paducah and have an urban and complex setting, grouping them in a separate phase is reasonable.

PRELIMINARY ENVIRONMENTAL RED FLAG ANALYSIS

The table below summarizes the presence of critical environmental red flag concerns approved by KYTC within 1,000 ft of proposed improvement locations (Y=Yes; N=No).

Critical Red Flag Issues/Concerns		
Environmental Red Flag Features	From KY 998 (Olivet Church Rd) to John Puryear Dr/US 60 BUS in Paducah	From John Puryear Dr/US 60 BUS in Paducah to the US 62/US 60 junction east of Paducah
Superfunds	N	N
Special Waters ¹	N	Y
Forested Areas	Y	Y
NLEB Habitat Priority	Y	Y
IB Habitat Priority Area	Y	Y
FAA Airport Runways	N	N
Public Hunting Areas	N	N
Wildlife Management Areas	N	N
Local Parks	Y	N
State/ National Parks	N	N
Kentucky Heritage Land Conservation Fund	Y	N
Area Landmarks	Y	N
Point Landmarks	Y	Y
National Register of Historic Places Location (Point)	Y	N
National Register of Historic Places Location (Polygon)	Y	N

1) Special Waters are defined as Cold Water Aquatic Habitats, Outstanding State/National Resource Waters, Exceptional Waters, State Wild Rivers, and Federally Designated Wild / Scenic Rivers.

RIGHT OF WAY IMPACTS

The table below summarizes the potential right-of-way (ROW) needs for proposed improvement concepts.

Potential Needs of Additional Right of Way		
Locations	Improvement Concepts	Potential ROW Needs
From KY 998 (Olivet Church Rd) to John Puryear Dr/US 60 BUS in Paducah	Spot improvements at major intersections	Potentially
From John Puryear Dr/US 60 BUS in Paducah to the US 62/US 60 junction east of Paducah	Access management and spot improvements at major intersections	Potentially
Intersection modifications at US 51 (N 4th St)	Improvements such as additional turn lanes, channelization, and coordinated signal timing	Yes
Intersection modifications at KY 3393/S Morgan St	Improvements such as additional turn lanes, channelization, and coordinated signal timing	Potentially
Intersection modifications at US 641 (S Main St), US 60/US 60 BYP	Improvements such as additional turn lanes, channelization, and coordinated signal timing	No

COST ESTIMATION

Design:	2.2 (\$M)
ROW:	4.0 (\$M)
Utility:	5.8 (\$M)
Construction:	<u>80.0 (\$M)</u>
TOTAL =	92.0 (\$M)

Note:

1. The cost estimation may not include additional costs to address the potential impacts of major utilities (e.g., gas line, major water supplier, transmission line) within the proximity of the corridor, due to the lack of data when the report was prepared. Further investigation is recommended in future studies.
2. Cost estimation was based on 2020 dollars. There is a 1-3% inflation rate. Estimated cost could vary -50% to +250% of the actual number (as a rule of thumb).
3. The widening of a 2-lane facility to a 3-lane facility (with TWLTL or alternating passing lane) is considered as "Minor Widening (Undivided Road) - 2 Lane to 4 Lane".
4. The cost estimation does not include bridges outside of the bottleneck locations, as they are not assumed to rise to the level of a corridor improvement. The cost estimation only includes necessary bridge replacement/rehab/widening costs within the bottleneck locations with proposed widening improvement.
5. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
6. Shoulder widening is not included in the cost estimation, as it is a relatively minor cost.
7. If multiple improvement concepts are recommended for the corridor, only the cost of the larger-scale improvement concept is estimated.

Kentucky Statewide Corridor Plan (Linking Kentucky)

Route: US 60
Segment ID: 50B
From: KY 425 BYP in Henderson
To: I-165 (Formerly Natcher Parkway) in Owensboro
Counties: Henderson, Daviess
Highway Districts: 2

CORRIDOR SEGMENT OVERVIEW

Segment 50B on US 60 begins at the KY 425 BYP in Henderson County and extends east to I-165 (Formerly Natcher Parkway) in Daviess County. The corridor segment is approximately 38.4 miles long and currently contains seven interchanges at US 41 in Henderson, Audubon Parkway, KY 81 (West Parrish Ave), Carter Rd, US 431 (Frederica St), US 231 (New Hartford Rd), and I-165 in Owensboro.

This segment passes through the residential and commercial areas of Henderson in Henderson County and Owensboro in Daviess County. These areas would be considered towns or cities (according to KYSTMv18 data) with clusters of homes and commercial buildings adjacent to US 60. The remainder of this segment passes through rural agricultural areas with homes interspersed along US 60.

EXISTING FACILITY

The table below outlines the typical roadway attributes for this section of US 60 by sub-segment.

Typical Roadway Attributes					
Sub-segment	Functional Classification	Number & Width of Lanes	Shoulder & Width	Median Type & Width	Posted Speed Limit
From KY 425 BYP to 2 miles east of the US 41/US 60 interchange in Henderson	Principal Arterial	4, 12'	None	None or 12' flush	45 mph
From 2 miles east of the US 41/US 60 interchange in Henderson to Henderson Rd (KY 331) in Owensboro	Minor Arterial	2, 11'	3' or 4'	None	55 mph
From Henderson Rd (KY 331) to I-165 in Owensboro	Other Freeways and Expressways	4, 12'	6' or 10'	36' depressed	65 mph

Right of Way: The existing right of way is generally 50' – 130' wide.

Pavement: The average PDI (Pavement Distress Index) for this corridor segment is 0.31, which indicates an overall good pavement condition according to KYTC criteria (Good: 0.00 – 0.35; Fair: 0.36 – 0.65; Poor: 0.66 – 0.99).

Intersections/Interchanges: The tables below outline the existing interchanges, major intersections, and railroad crossings on the corridor.

Interchanges	Interchange Type
US 41	Partial Cloverleaf
Audubon Parkway	Trumpet
KY 81 (West Parrish Ave)	Diamond
Carter Rd	Diamond
US 431 (Frederica St)	Diamond
US 231 (New Hartford Rd)	Diamond
I-165	Trumpet

Major Intersections ¹			
KY 425	US 41 ALT	KY 136 (Sand Ln)	KY 351 (2nd St)
12th St	Marywood Dr	Green River Rd	Watson Ln
Wathen Ln	KY 1078 (north)	KY 1078 (south)	Spring St
KY 811 (west)	KY 811 (east)	KY 3344	Innovative Way
KY 1554	KY 279	KY 2120	

1) Only crossroads with function classification of Minor Collector or above are included.

At-grade Railroad Crossings
US 60 Mile Point 9.52 in Henderson County
US 60 Mile Point 9.53 in Henderson County
US 60 Mile Point 4.3 in Daviess County

Access Points: This segment is fully access controlled between Audubon Parkway and I-165 in Owensboro. The remainder of this segment is not access controlled with access to residential and commercial driveways and intersecting roadways.

Bridges: The tables below outline the detailed Bridge information for existing bridges on or over this section of US 60.

Mainline Bridge Information										
Bridge ID	Feature Intersect	NBIS Classification	Sufficiency Rating	Substandard	Deck Rating	Superstructure Rating	Substructure Rating	Under Clearance (feet)	Horizontal Clearance (feet)	Culvert Rating
030B00074R	TAMARACK RD	Fair	98	No	7	7	6	16.2	39.37	N
030B00074L	TAMARACK RD	Fair	98	No	7	7	6	16.2	39.37	N
030B00075R	US431	Fair	95.2	No	7	6	6	15.92	39.5	N
030B00075L	US431	Fair	95.2	No	7	7	6	15.92	39.5	N
030B00077R	J.R.MILLER BLVD	Fair	87	No	7	7	5	24.44	39.37	N
030B00077L	J.R.MILLER BLVD	Fair	79	No	7	6	7	24.11	29.86	N
030B00076R	SUTHERLAND RD	Fair	98	No	7	7	6	14.96	39.37	N
030B00076L	SUTHERLAND RD	Fair	79	No	7	6	7	14.67	29.86	N
030B00078R	HORSE FORK CK	Fair	100	No	6	7	6	0	39.7	N
030B00078L	HORSE FORK CK	Fair	82	No	7	5	7	0	33.98	N
030B00068L	KY298	Fair	91	No	6	6	7	15.08	33.75	N
030B00068R	KY298	Fair	99	No	5	7	6	15.08	40	N
051B00039N (Culvert)	WASHBURN DITCH	Good	83	No	N	N	N	0	68.25	7
051B00158N	CANOE CREEK	Good	98.4	No	8	8	8	0	68	N
051B00010N	US 41 BY PASS	Fair	75.7	No	5	5	5	16.66	58	N
051B00011N	US 41A	Fair	77.9	No	7	5	6	18.25	34	N
051B00155N (Culvert)	RACE CREEK-DRAIN DITCH	Fair	94	No	N	N	N	0	43.96	6
051B00124N	RACE CREEK	Good	99.6	No	7	7	7	0	40	N
051B00015N	GREEN RIVER	Poor	30.3	Yes	6	4	5	0	19.83	N
051B00156N	IPSOM DITCH & CSX RR	Good	100	No	8	8	8	24	40	N
030B00096N	KATIE MEADOW SLOUGH	Poor	41.8	No	5	6	4	0	25.92	N
030B00095N (Culvert)	HORSEMAN CRK DRAIN	Fair	95.1	No	N	N	N	0	26.5	6
030B00072R	BITTLE RD	Good	96	No	7	7	7	15.7	39.37	N
030B00072L	BITTLE RD	Good	96	No	7	7	7	15.7	39.37	N

Structures Crossing Over the Corridor			
Bridge ID	Facility Carried	Under Clearance (feet)	Horizontal Clearance (feet)
030B00058L	AU-9005	16.14	26.21
030B00058R	AU-9005	17.51	26.16
030B00071N	WEST 5TH STREET RD	15.62	44
030B00053N	CALHOUN ROAD	15.91	88.25
030B00156N	KY-2698	15.55	78.31
030B00163N	US-231	16.96	74.06
030B00085L	WN-9007	16.65	24.93
030B00085R	WN-9007	16.65	24.93
051R00600N	CSX RR	14.18	46

Other Noteworthy Conditions: None.

TRAFFIC & OPERATIONS

AADT & AADTT: The table below summarizes the 2015 AADT and daily truck volumes by sub-segment.

Traffic Volumes			
Sub-segment	AADT	AADTT	Truck Percentage
From KY 425 BYP to KY 3 (Green River Rd) in Henderson	22,800	2,700	12%
From KY 3 (Green River Rd) in Henderson to KY 331 (Henderson Rd) in Owensboro	2,700	500	17%
From KY 331 (Henderson Rd) to I-165 in Owensboro	20,700	2,200	10%

Mobility: There is one major traffic bottleneck along this corridor segment. See the table below for details. (Note: bottlenecks are identified by Level of Travel Time Reliability (LOTTR) > 1.5 or volume/capacity (v/c) > 0.6.) There are also several additional isolated traffic bottlenecks along this corridor. Other than the noted traffic bottleneck sections/locations, traffic condition is acceptable along the remainder of this segment.

Existing Typical Roadway Attributes at Major Traffic Bottlenecks					
Locations	Functional Classification	Number & Width of Lanes	Median Width	Shoulder Width	2015 AADT ¹
From KY 136 (Sand Ln) to 0.5 mile east of the US 41/US 60 interchange in Henderson	Principal Arterial	4, 12'	0' or 12'	None	43,604

1) The highest traffic volume within the bottleneck based on KYSTMv18 data.

Safety: 17.4% of the corridor mileage has a Level of Safety of Service (LOSS) of 4, meaning these areas have the highest potential to decrease crashes. (Note: LOSS indicates the potential for crash reduction and is broken up into four categories based on Safety Performance Functions (SPFs): LOSS 4 = high; LOSS 3 = moderate to high; LOSS 2 = low to moderate; LOSS 1 = low.) See the table under **Potential Safety Improvement** section for details of locations with LOSS =4, possible causes, and potential safety improvements.

ITS Devices: Approximately 3% of the corridor length will have direct access to fiber from the KentuckyWired project.

PROPOSED IMPROVEMENT CONCEPTS

The improvement options noted in this report are not intended to be all-encompassing. Other potential improvements are possible, including innovative solutions that could be cost-effective and address the reasons for improvement. Further study may be needed as part of the project development process.

Proposed Typical Section & Description of Modification: The table below describes the proposed improvement concepts for the identified bottlenecks. The proposed improvements expect to maintain an overall acceptable traffic condition through 2045 ($v/c < 0.85$ in urban areas and $v/c < 0.7$ in rural areas) and address safety issues at bottlenecks.

Proposed Improvement Concepts			
Locations	Improvement Concepts	Notes	Reason for Improvement
From KY 136 (Sand Ln) to 0.5 mile east of the US 41/US 60 interchange in Henderson	Spot improvements at major intersections	The existing right-of-way constraints limit the improvement opportunities. Spot improvements are proposed, and further study is recommended.	The expected v/c in 2045 and LOTTR at major intersections exceed the established thresholds.

Potential New Interchanges: None.

Interchanges for Potential Modification: None.

Major Intersections for Potential Modification: Improvements, such as additional turn lanes, channelization, and coordinated signal timing, should be considered at six major intersections for this corridor segment. The following is a list of these intersections.

Major Intersections for Potential Modification			
KY 425/KY 136	KY 136 (Sand Ln)	KY 351 (2nd St)	12th St
Marywood Dr	Henderson Rd (KY 331)		

Bridges: Bridge recommendations are based on ratings of substructure, superstructure and deck using the following methodology.

Methodology for Replacement/Rehabilitation Recommendation					
Structures	Substructure Rating	Superstructure Rating	Deck Rating	Culvert Rating	Recommendations
Bridges	≤ 4	Any	Any	/	Replacement
	$= 5$	Any	Any	/	Rehabilitation
	≥ 6	≤ 5	Any	/	Rehabilitation
	≥ 6	Any	≤ 5	/	Rehabilitation
	≥ 6	≥ 6	≥ 6	/	None ¹
Culverts	/	/	/	≤ 4	Replacement
	/	/	/	5 or 6	Rehabilitation
	/	/	/	≥ 7	None

1) If the bridge is on a corridor with a recommendation of widening, it will be widened (considered as rehabilitation) as necessary to accommodate the additional proposed lanes.

- **Bridges for Rehab/Widening:** Rehab/widening is recommended for a total of six bridges and two culverts along the entire corridor. Note that the bridge rehab is determined based on the "Methodology for Replacement/Rehabilitation Recommendation" table above. If the bridge has a good condition but is within a bottleneck location with recommended widening, it will be widened as necessary to accommodate the additional proposed lanes and the cost of widening is assumed to be the same as bridge rehab for the planning-level cost estimation purpose.

Bridges for Rehab/Widening	
Bridge ID	Feature Intersect
030B00077R	J.R. MILLER BLVD
030B00078L	HORSE FORK CK
030B00068R	KY298
051B00010N	US 41 BYPASS
051B00011N	US 41A
051B00155N (Culvert)	RACE CREEK-DRAIN DITCH
051B00015N	GREEN RIVER
030B00095N (Culvert)	HORSEMAN CRK DRAIN

- **Bridges for Replacement:** Replacement is recommended for a total of one bridge along the entire corridor. Note that the bridge replacement is determined based on the "Methodology for Replacement/Rehabilitation Recommendation" table above. If the bridge needs replacement and is within a bottleneck location with recommended widening, it will be widened during the replacement to accommodate the additional proposed lanes and the cost of bridge replacement is used for the planning-level cost estimation purpose.

Bridges for Replacement	
Bridge ID	Feature Intersect
030B00096N	KATIE MEADOW SLOUGH

Pavement Treatment: The overall pavement condition is good (average PDI = 0.31). Spot reconstruction and rehabilitation of existing asphalt pavement lanes might be needed based on more detailed evaluation of the corridor's pavement condition.

Potential Safety Improvement: The table below summarizes safety issues for the corridor and is based on KYTC safety data (LOSS = 4) as well as review of Google Aerial imagery. The table identifies clusters of links with a LOSS value of 4 based on two categories: 1) clusters located in areas where this study already recommends corridor improvements for mobility reasons and 2) clusters not located in areas previously recommended for corridor mobility improvements. For Category 1, it is assumed any corridor improvement based on mobility needs will be constructed to current KYTC standards and will include the necessary safety improvements. Category 2 is intended to identify corridor segments that may warrant improvement for safety reasons, even though improvement might not be needed for mobility. There may also be isolated links with LOSS value of 4 that are not included in the table. Spot improvements could be warranted for those locations but it is assumed these spot improvements do not rise to the level of a corridor improvement; therefore, these locations are not addressed in this planning study. The table

further breaks the clusters down by urban and rural designation (based on KYSTMv18 data) because urban and rural roadways tend to have unique typical crash causes and countermeasures.

Potential Safety Improvements			
Category	Locations	Possible Causes	Recommendations
CAT 1: Major clusters covered by proposed mobility improvement	From KY 136 (Sand Ln) to 0.5 mile east of the US 41/US 60 interchange in Henderson	Intersection spacing and congestion, geometric deficiencies, sight distance challenges, signal deficiencies	Intersection improvements described above
CAT 2: Major clusters not covered by proposed mobility improvement	<u>URBAN</u> From US 431 to US 231 in Owensboro.	<u>URBAN</u> Geometric deficiencies, speeding.	<u>URBAN</u> Improved geometrics, police enforcement.
	<u>RURAL</u> From Pebble Creek Dr to Spring St east of Henderson. From 4.2 mile west of KY 1554 to 0.6 mile west of KY 1554 in Daviess County.	<u>RURAL</u> Sight distance challenges, geometric deficiencies, lack of safety features/advance warnings, lane drop/merge, run off road, speeding.	<u>RURAL</u> Improved geometrics/sight distance, roadside improvements, install/modernize signage, improved lighting/visibility.

Proposed Phasing: The proposed spot improvements at six major intersections can be constructed at the same time.

PRELIMINARY RED FLAG ANALYSIS

The table below summarizes the presence of critical environmental red flag concerns approved by KYTC within 1,000 ft of proposed improvement locations (Y=Yes; N=No).

Critical Red Flag Issues/Concerns	
Environmental Red Flag Features	From KY 136 (Sand Ln) to 0.5 mile east of the US 41/US 60 interchange in Henderson
Superfunds	N
Special Waters ¹	N
Forested Areas	N
NLEB Habitat Priority	Y
IB Habitat Priority Area	Y
FAA Airport Runways	N
Public Hunting Areas	N
Wildlife Management Areas	N
Local Parks	N
State/ National Parks	N
Kentucky Heritage Land Conservation Fund	N
Area Landmarks	Y
Point Landmarks	Y
National Register of Historic Places Location (Point)	Y
National Register of Historic Places Location (Polygon)	Y

1) Special Waters are defined as Cold Water Aquatic Habitats, Outstanding State/National Resource Waters, Exceptional Waters, State Wild Rivers, and Federally Designated Wild / Scenic Rivers.

RIGHT OF WAY IMPACTS

The table below summarizes the potential right-of-way (ROW) needs for proposed improvement concepts.

Potential Needs of Additional Right of Way		
Locations	Improvement Concepts	Potential ROW Needs
From KY 136 (Sand Ln) to 0.5 mile east of the US 41/US 60 interchange in Henderson	Spot improvements at major intersections	Potentially
Intersection modifications at KY 425/KY 136, Henderson Rd (KY 331)	Improvements such as additional turn lanes, channelization, and coordinated signal timing	No

COST ESTIMATION

Design:	0.6 (\$M)
ROW:	1.2 (\$M)
Utility:	1.8 (\$M)
Construction:	<u>24.0 (\$M)</u>
TOTAL =	27.6 (\$M)

Note:

1. The cost estimation may not include additional costs to address the potential impacts of major utilities (e.g., gas line, major water supplier, transmission line) within the proximity of the corridor, due to the lack of data when the report was prepared. Further investigation is recommended in future studies.
2. Cost estimation was based on 2020 dollars. There is a 1-3% inflation rate. Estimated cost could vary -50% to +250% of the actual number (as a rule of thumb).
3. The widening of a 2-lane facility to a 3-lane facility (with TWLTL or alternating passing lane) is considered as "Minor Widening (Undivided Road) - 2 Lane to 4 Lane".
4. The cost estimation does not include bridges outside of the bottleneck locations, as they are not assumed to rise to the level of a corridor improvement. The cost estimation only includes necessary bridge replacement/rehab/widening costs within the bottleneck locations with proposed widening improvement.
5. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
6. Shoulder widening is not included in the cost estimation, as it is a relatively minor cost.
7. If multiple improvement concepts are recommended for the corridor, only the cost of the larger-scale improvement concept is estimated.

Kentucky Statewide Corridor Plan (Linking Kentucky)

Route: US 60
Segment ID: 50C
From: I-165 (Formerly Natcher Parkway) in Owensboro
To: US 31 W north of Radcliff
Counties: Daviess, Hancock, Breckinridge, Meade
Highway Districts: 2, 4

CORRIDOR SEGMENT OVERVIEW

Segment 50C on US 60 begins at the I-165 (Formerly Natcher Parkway) in Daviess County and extends east through Hancock County and Breckinridge County to US 31 W in Meade County. The corridor segment is approximately 79.9 miles long and currently contains four interchanges at I-165, KY 54, Pleasant Valley Rd, and KY 144 in Owensboro.

This segment passes through the residential and commercial areas in multiple cities (Owensboro in Daviess County, Lewisport and Hawesville in Hancock County, and Cloverport, Hardinsburg and Irvington in Breckinridge County. These areas would be considered towns (according to KYSTMv18 data) with clusters of homes and commercial buildings adjacent to US 60. The remainder of this segment passes through rural agricultural areas with homes interspersed along US 60.

EXISTING FACILITY

The table below outlines the typical roadway attributes for this section of US 60 by sub-segment.

Typical Roadway Attributes					
Sub-segment	Functional Classification	Number & Width of Lanes	Shoulder & Width	Median Type & Width	Posted Speed Limit
From I-165 to US 231 (Rockport Ferry Rd) east of Owensboro	Principal Arterial or Other Freeways and Expressway	4, 12'	6' or 12'	36' depressed	55 mph or 65 mph
From US 231 (Rockport Ferry Rd) east of Owensboro to KY 657 (4th St) in Lewisport	Minor Arterial	2, 12'	10'	None	55 mph
From KY 657 (4th St) in Lewisport to KY 2181 in Hawesville	Minor Arterial	4, 12'	4' or 10'	50'- 99' depressed	55 mph
From KY 2181 in Hawesville to US 31 W north of Radcliff	Minor Arterial	2, 11' or 12'	6' or 10'	None	55 mph

Right of Way: The existing right of way is generally 60' – 220' wide.

Pavement: The average PDI (Pavement Distress Index) for this corridor segment is 0.33, which indicates an overall good pavement condition according to KYTC criteria (Good: 0.00 – 0.35; Fair: 0.36 – 0.65; Poor: 0.66 – 0.99).

Intersections/Interchanges: The tables below outline the existing interchanges, major intersections, and railroad crossings on the corridor.

Interchanges	Interchange Type
I-165	Trumpet
KY 54	Partial Cloverleaf
Pleasant Valley Rd	Diamond
KY 144	Diamond

Major Intersections ¹			
US 231	KY 657	KY 1605	KY 3543
KY 271	KY 1389	KY 2181	KY 69
KY 1406	KY 144 (west)	KY 105	KY 144 (east)
KY 992	KY 259	KY 79	KY 1401
KY 86 (west)	KY 86 (east)	KY 333	Webster-Basin Springs Rd
KY 428	KY 941	Stith Valley Rd	Garrett Rd
KY 313	KY 1882	US 31 W	

1) Only crossroads with function classification of Minor Collector or above are included.

At-grade Railroad Crossings
None

Access Points: This segment is fully access controlled between Natcher Parkway and KY 144 in Owensboro. The remainder of this segment is not access controlled with access to residential and commercial driveways and intersecting roadways.

Bridges: The tables below outline the detailed Bridge information for existing bridges on or over this section of US 60.

Mainline Bridge Information										
Bridge ID	Feature Intersect	NBIS Classification	Sufficiency Rating	Substandard	Deck Rating	Superstructure Rating	Substructure Rating	Under Clearance (feet)	Horizontal Clearance (feet)	Culvert Rating
030B00069L	OLD ICRR BED	Fair	83	No	7	7	6	0	30.69	N
030B00069R	OLD ICRR BED	Fair	100	No	6	7	7	0	39.37	N
030B00170R	Trib. to Yellow Creek	Good	99.6	No	8	8	7	0	43.83	N
030B00170L	Trib. to Yellow Creek	Good	99.6	No	7	8	7	0	42	N
030B00171L	Daniels Lane	Fair	99.6	No	7	6	6	18.29	42	N
030B00171R	Daniels Lane	Fair	99.6	No	8	6	7	18.29	42	N
030B00172R	KY 1456	Fair	99.6	No	6	8	7	17.14	42	N
030B00172L	KY 1456	Fair	99.6	No	6	8	7	17.14	42	N
030B00175L	Yellow Creek	Good	99.6	No	8	7	7	0	45	N
030B00175R	Yellow Creek	Good	99.6	No	8	7	8	0	42	N
030B00176L	Ky 2830 & CSX RR	Good	99.6	No	7	8	7	24.55	42	N
030B00176R	Ky 2830 & CSX RR	Good	99.6	No	7	8	7	24.55	42	N
030B00152L	PUP CREEK	Fair	96.2	No	6	6	7	0	41.99	N
030B00152R	PUP CREEK	Fair	99.5	No	6	6	6	0	41.99	N
030B00153N (Culvert)	KELLY CREEK	Fair	80.9	No	N	N	N	0	38	6
030B00154N (Culvert)	TRIB- KELLY CREEK	Fair	71.9	No	N	N	N	0	38	6
030B00023N	CSX RR-KY 334-BLACKFORD	Fair	84.8	No	6	7	6	22.45	43.96	N
046B00030N	BLACKFORD CREEK	Fair	98.9	No	6	6	6	0	43.96	N
046B00034L	YELLOW CREEK	Fair	100	No	6	7	6	0	39.7	N
046B00034R	YELLOW CREEK	Fair	100	No	6	6	7	0	43.96	N
046B00035R	LEAD CREEK	Fair	100	No	6	6	7	0	43.96	N
046B00035L	LEAD CREEK	Fair	95	No	6	7	7	0	40.03	N
046B00033N	INDIAN CREEK	Fair	88.7	No	6	7	7	0	44.95	N
014B00060N	CLOVER CREEK	Good	99.1	No	7	7	8	0	44	N
014B00065N	HITES RUN	Good	93.7	No	8	8	8	0	47.57	N
014B00053N	SINKING CREEK	Good	86.9	No	7	7	7	0	39.7	N
082B00015N	TANK TRAIL	Good	85.1	No	7	7	7	0	55.77	N
082B00014N	OTTER CREEK	Good	90.7	No	7	8	7	0	43.96	N

Structures Crossing Over the Corridor			
Bridge ID	Facility Carried	Under Clearance (feet)	Horizontal Clearance (feet)
082B00016N	PINWHEEL RD	17.08	23.95
030B00169N	Ky 603/Pleasant Val	18.06	86
030B00173N	KY 144	17.99	85.95
030B00157N	KY-54	16.92	74
030B00085R	WN-9007	16.65	24.93
030B00085L	WN-9007	16.65	24.93

Other Noteworthy Conditions: None.

TRAFFIC & OPERATIONS

AADT & AADTT: The table below summarizes the 2015 AADT and daily truck volumes by sub-segment.

Traffic Volumes			
Sub-segment	AADT	AADTT	Truck Percentage
From I-165 to US 231 (Rockport Ferry Rd) east of Owensboro	16,200	2,500	15%
From US 231 (Rockport Ferry Rd) east of Owensboro to KY 2181 in Hawesville	9,100	1,400	15%
From KY 2181 in Hawesville to US 31 W north of Radcliff	6,100	700	11%

Mobility: There is no traffic bottleneck section along this corridor segment. (Note: bottlenecks are identified by Level of Travel Time Reliability (LOTTR) > 1.5 or volume/capacity (v/c) > 0.6.) There are a few isolated traffic bottlenecks along this corridor. Other than these isolated locations, traffic condition is acceptable along the remainder of this segment.

Safety: 3.9% of the corridor mileage has a Level of Safety of Service (LOSS) of 4, meaning these areas have the highest potential to decrease crashes. (Note: LOSS indicates the potential for crash reduction and is broken up into four categories based on Safety Performance Functions (SPFs): LOSS 4 = high; LOSS 3 = moderate to high; LOSS 2 = low to moderate; LOSS 1 = low.) See the table under **Potential Safety Improvement** section for details of locations with LOSS =4, possible causes, and potential safety improvements.

ITS Devices: Approximately 53% of the corridor length will have direct access to fiber from the KentuckyWired project.

PROPOSED IMPROVEMENT CONCEPTS

The improvement options noted in this report are not intended to be all-encompassing. Other potential improvements are possible, including innovative solutions that could be cost-effective and address the reasons for improvement. Further study may be needed as part of the project development process.

Proposed Typical Section & Description of Modification: Spot improvement at major intersections (see the **Major Intersections for Potential Modification** section below). The proposed improvements expect to maintain an overall acceptable traffic condition through 2045 (v/c < 0.85 in urban areas and v/c < 0.7 in rural areas) and address safety issues at bottlenecks.

Potential New Interchanges: None.

Interchanges for Potential Modification: None.

Major Intersections for Potential Modification: Improvements, such as additional turn lanes, channelization, and coordinated signal timing, should be considered at five major intersections for this corridor segment. The following is a list of these intersections.

Major Intersections for Potential Modification			
US 231	KY 657 (4th St)	KY 2181	KY 313
US 31 W			

Bridges: Bridge recommendations are based on ratings of substructure, superstructure and deck using the following methodology.

Methodology for Replacement/Rehabilitation Recommendation					
Structures	Substructure Rating	Superstructure Rating	Deck Rating	Culvert Rating	Recommendations
Bridges	<=4	Any	Any	/	Replacement
	=5	Any	Any	/	Rehabilitation
	>=6	<=5	Any	/	Rehabilitation
	>=6	Any	<=5	/	Rehabilitation
	>=6	>=6	>=6	/	None ¹
Culverts	/	/	/	<=4	Replacement
	/	/	/	5 or 6	Rehabilitation
	/	/	/	>=7	None

1) If the bridge is on a corridor with a recommendation of widening, it will be widened (considered as rehabilitation) as necessary to accommodate the additional proposed lanes.

- **Bridges for Rehab/Widening:** Rehab/widening is recommended for a total of 2 culverts along the entire corridor. Note that the bridge rehab is determined based on the "Methodology for Replacement/Rehabilitation Recommendation" table above. If the bridge has a good condition but is within a bottleneck location with recommended widening, it will be widened as necessary to accommodate the additional proposed lanes and the cost of widening is assumed to be the same as bridge rehab for the planning-level cost estimation purpose.

Bridges for Rehab/Widening	
Bridge ID	Feature Intersect
030B00153N (Culvert)	KELLY CREEK
030B00154N (Culvert)	TRIB- KELLY CREEK

- **Bridges for Replacements:** None.

Pavement Treatment: The overall pavement condition is good (average PDI = 0.33). Spot reconstruction and rehabilitation of existing asphalt pavement lanes might be needed based on more detailed evaluation of the corridor's pavement condition.

Potential Safety Improvement: The table below summarizes safety issues for the corridor and is based on KYTC safety data (LOSS = 4) as well as review of Google Aerial imagery. The table identifies clusters of links with a LOSS value of 4 based on two categories: 1) clusters located in areas where this study already recommends corridor improvements for mobility reasons and 2) clusters not located in areas previously recommended for corridor mobility improvements. For Category 1, it is assumed any corridor

improvement based on mobility needs will be constructed to current KYTC standards and will include the necessary safety improvements. Category 2 is intended to identify corridor segments that may warrant improvement for safety reasons, even though improvement might not be needed for mobility. There may also be isolated links with LOSS value of 4 that are not included in the table. Spot improvements could be warranted for those locations but it is assumed these spot improvements do not rise to the level of a corridor improvement; therefore, these locations are not addressed in this planning study. The table further breaks the clusters down by urban and rural designation (based on KYSTMv18 data) because urban and rural roadways tend to have unique typical crash causes and countermeasures.

Potential Safety Improvements			
Category	Locations	Possible Causes	Recommendations
CAT 1: Major clusters covered by proposed mobility improvement	N/A	N/A	N/A
CAT 2: Major clusters not covered by proposed mobility improvement	<u>RURAL</u> From US 60 BUS in Hardinsburg to Freedom Church Rd east of Hardinsburg.	<u>RURAL</u> Sight distance challenges, geometric deficiencies, lack of safety features/advance warnings, lane drop/merge, run off road, speeding.	<u>RURAL</u> Improved geometrics/sight distance, roadside improvements, install/modernize signage, improved lighting/visibility.

Proposed Phasing: The proposed spot improvements at five major intersections can be constructed at the same time.

PRELIMINARY ENVIRONMENTAL RED FLAG ANALYSIS

Information is not available for proposed spot improvements at isolated intersections.

RIGHT OF WAY IMPACTS

The table below summarizes the potential right-of-way (ROW) needs for proposed improvement concepts.

Potential Needs of Additional Right of Way		
Locations	Improvement Concepts	Potential ROW Needs
Intersection modifications at US 231, KY 2181	Improvements such as additional turn lanes, channelization, and coordinated signal timing	No
Intersection modifications at KY 657 (4th St), KY 313, US 31 W	Improvements such as additional turn lanes, channelization, and coordinated signal timing	Potentially

COST ESTIMATION

Design:	0.5 (\$M)
ROW:	0.8 (\$M)
Utility:	1.1 (\$M)
Construction:	<u>16.0 (\$M)</u>
TOTAL =	18.4 (\$M)

Note:

1. The cost estimation may not include additional costs to address the potential impacts of major utilities (e.g., gas line, major water supplier, transmission line) within the proximity of the corridor, due to the lack of data when the report was prepared. Further investigation is recommended in future studies.
2. Cost estimation was based on 2020 dollars. There is a 1-3% inflation rate. Estimated cost could vary -50% to +250% of the actual number (as a rule of thumb).
3. The widening of a 2-lane facility to a 3-lane facility (with TWLTL or alternating passing lane) is considered as "Minor Widening (Undivided Road) - 2 Lane to 4 Lane".
4. The cost estimation does not include bridges outside of the bottleneck locations, as they are not assumed to rise to the level of a corridor improvement. The cost estimation only includes necessary bridge replacement/rehab/widening costs within the bottleneck locations with proposed widening improvement.
5. Cost estimation does not account for KYTC projects that are included in the proposed improvement concepts and are already under construction.
6. Shoulder widening is not included in the cost estimation, as it is a relatively minor cost.
7. If multiple improvement concepts are recommended for the corridor, only the cost of the larger-scale improvement concept is estimated.