Executive Summary

Introduction

The Kentucky Transportation Cabinet (KYTC) initiated an interstate deficiencies study to identify and evaluate potential improvement options to upgrade the Edward T. Breathitt (formerly the Pennyrile) Parkway to interstate standards for inclusion into the interstate system. The study area limits are from I-24 in Christian County approximately 34 miles north to the I-69/Wendell H. Ford Western Kentucky Parkway (I-69/WKP) interchange in Hopkins County (see Figure ES 1, p. ES 2).

I-24 south of Hopkinsville extends east-west and I-69 northwest of Hopkinsville extends southwest to due north toward Henderson, Kentucky. The Edward T. Breathitt Parkway (hereinafter ETB Parkway), a fully controlled access facility, would provide interstate connectivity to both of these interstate facilities. Twenty-seven miles of the ETB Parkway was constructed as a 70-miles-per-hour (mph) rural, rolling terrain facility in the 1960s. The remaining seven miles of the ETB Parkway from I-24 north into Hopkinsville (Mile Point [MP] 0.000 to MP 7.500) was constructed from years 2010 to 2011 and opened in March 2011 as a rural arterial. Although a fully controlled access facility, with some segments that have been rehabilitated over time to improve safety, the ETB Parkway needs additional safety improvements. There is a segment between MP 4.800 (southern ramps of Lovers Lane) and MP 11.697 (KY 1682 underpass) that is now classified as urban.

Project Meetings

There were two Local Officials/Stakeholders' Meetings and two Project Team Meetings as a part of this study. With input from these four meetings, it was confirmed that the purpose of this project is to improve safety and to provide for interstate connectivity from I-24 south of Hopkinsville in Christian County to the recently designated I-69 (formerly the Western Kentucky Parkway) in Hopkins County. The stated goals are to make improvements within the existing right-of-way as much as possible, while minimizing environmental impacts to the agricultural characteristics and other environmental features of the area; and making Hopkinsville more economically competitive by being connected to the future I-69 with an interstate spur, built to current interstate standards, rather than the historical parkway standards.

Study Considerations

The ETB Parkway corridor was evaluated for deficiencies based on the current KYTC and Federal Highway Administration (FHWA) interstate design standards and guidelines (see Table ES 1, p. ES 3). Applicable references are listed as follows:

- "A Policy on Geometric Design of Highways and Streets, 4th Edition" (American Association of State Highway and Transportation Officials, 2011 Edition)
- "AASHTO Roadside Design Guide" (American Association of State Highway and Transportation Officials, 4th Edition 2011)

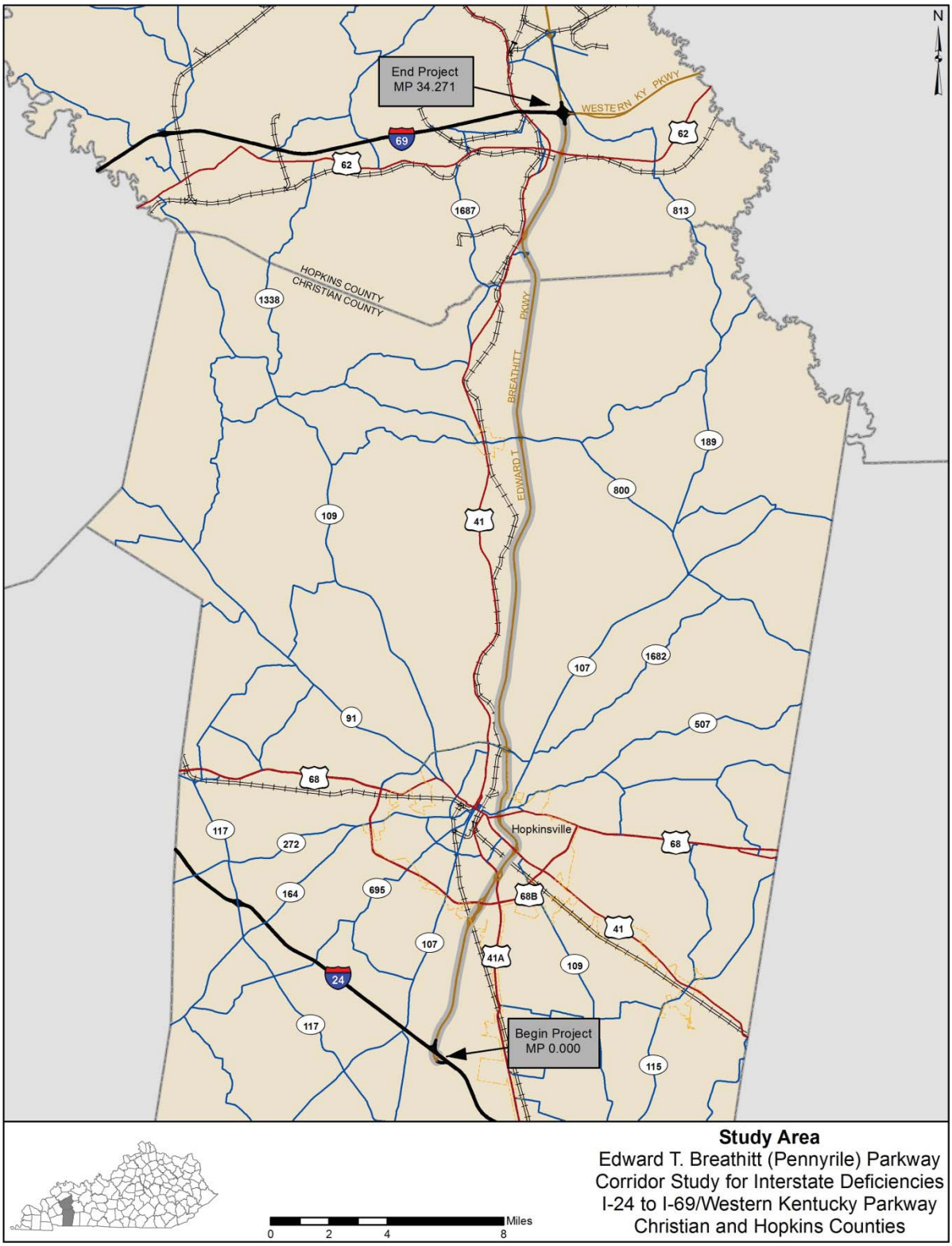

Figure ES 1: Study Area

Table ES 1: Design Criteria for Inclusion into the Interstate System

Area Type			Rural			Urban			Urban/Rural		
Design Element	**2011 AASHTO GUIDE[1]**	**2005 AASHTO POLICY[2]**	**Mainline**	**Ramps**	**Loops**	**Mainline**	**Ramps**	**Loops**	**Directional**	**Entrance**	**Exit**
Design Speed (MPH)	8-1, 8-5, 10-89, 10-89	2	70	35	25	50	25	25	40		
Level of Service (Desirable)	10-89, 2-67	3	B			C					
Driving Lane Width	8-2, 10-102	3	12'	14’	15'	12'	14’	15’			
Inside Shoulder Width	8-3, 10-102	3									
4-lane freeway & ramps	8-3, 8-10, 10-102	3	4'	2'-4'	2'-4'	4'	2'-4'	2'-4'	1'-6'		
Outside Shoulder Width	8-3, 10-102	3									
Truck DDHV <= 250	8-3, 10-102	3	10'	8'-10'	8'-10'	10'	8'-10'	8'-10'	8'-10'		
Truck DDHV > 250	8-3, 10-102	3	12'			12'					
Median Width	8-7, 8-10	4	36'			10'					
Structures											
Over Freeway Vertical Bridge Clearance	8-4		16'								
Over Freeway Vertical Sign Truss Clearance	8-4		17'								
Bridge Width (Horizontal) < 200’ to remain in place		5	Traveled Lanes + 3.5’ inside shoulder and 10’ outside shoulder								
Bridge Width (Horizontal), Length > 200' [1] to remain in place		5	Traveled Lanes + 3.5' shoulders								
Design ADT (vehicles per day)			> 6,000	750-1,500		> 6,000	750-1,500				
Clear Zone (Fill Slope 1V:4H or flatter)	Roadside Design Guide	4	30'-46'	10'-14'		20'-28'	10'-14'				
Clear Zone (Cut Slope 1V:3H or flatter)	Roadside Design Guide		22'-30'	10'-12'		14'-22'	10'-12'				
Superelevation (505) [3]	8-3		+/-8%								
Horizontal Curvature Minimum Radius (8% max SE)[3]	3-47		1810'	314'	134'	758'	134'	134'	444'		
Maximum Grade (upgrade for ramps)	8-4, 10-92		4%	5%-7%	5%-7%	5%	5%-7%	5%-7%	4%-6%		
Stopping Sight Distance	3-4		730'	250'	155'	425'	155'	155'	305'		
Divergence Angle	10-112										2°-5°
Minimum Acceleration Lengths for Ent. Term.	10-110		Variable and Depends on Design Speed of Entrance								
Minimum Deceleration Lengths for Exit Term.	10-115		Variable and Depends on the Design Speed of Exit Curve								
Interchange Spacing	10-68	5	1-mile urban, and 3-mile rural								
Access Control	10-7	2	100 feet urban (300 feet desirable) and 300 feet rural (600 feet desirable)								

[1] Page number references from AASHTO's *A Policy on Geometric Design of Highways and Streets*, 2011
[2] Page number references from AASHTO's A Policy on Design Standards Interstate System, January 2005
[3] Common KYTC Practice is 8% maximum superelevation. KYTC has used 10% maximum superelevation on past projects

- "Highway Capacity Manual" (Transportation Research Board, 2010 Edition)
- Manual of Uniform Traffic Control Devices, Millennium Edition" (Institute of Transportation Engineers, 2009 Edition with Revision Numbers 1 and 2 incorporated, dated May 2012)
- "A Policy on Design Standards Interstate System" (American Association of State Highway and Transportation Officials, 2005)
- Kentucky Transportation Cabinet Highway Design Manual (KYTC, Current Edition)
- Kentucky Transportation Center Analysis of Traffic Crash Data in Kentucky (2008-2012) Research Report KTC-13-13/KSP2-11-1

Also used in the existing conditions analysis of the ETB Parkway were the following:

- As-Built plans provided by KYTC
- KYTC's Division of Planning's Highway Inventory System (HIS) database, http://datamart.business.transportation.ky.gov/EDSB_SOLUTIONS/HISEXTRACTS/default.aspx, referred to as HIS
- Kentucky State Police's Kentucky Collision Analysis for the Public, http://crashinformationky.org/KCAP/KYOPS/SearchWizard referred to as KSP's Collision Database
- As-Built Bridge plans, National Bridge Inventory Kentucky Inventory and Appraisal Reports (NBIS), KYTC Bridge Inspection Reports (BIR), all provided by KYTC
- Field visits

Study Activities

The planning process included a review of the existing conditions along the ETB Parkway to identify locations that do not meet current American Association of State Highway and Transportation Officials (AASHTO) and FHWA interstate highway design guidelines. Evaluations included identifying which criteria were not met and the potential impact of the deficiencies on safety and capacity, and options for making improvements to address identified deficiencies. The overall activities included the following:

- Conduct an inventory of existing conditions and define problem areas.
- Establish purpose and goals.
- Propose and analyze alternative improvement options.
- Prepare cost estimates.
- Prioritize improvements.
- Conduct public involvement throughout the study process.
- Recommend solutions.
- Document study process and results.

Key Findings

Currently, the ETB Parkway operates similarly to an interstate highway though there are areas where it lacks compliance with current FHWA and AASHTO interstate guidelines. The ETB Parkway provides the basic geometric characteristics of an interstate highway, such as full control of access, two travels lanes in each direction, 12-foot-wide lanes, 10-foot-wide outside paved shoulders, 36-foot-wide rural medians, 70-mph rural design speed, and 50-mph urban design speed. However, the parkway lacks compliance with other design features.

Operational Considerations and Safety

The following is a summary of the key findings related to the operational considerations and the safety of the ETB Parkway from I-24 to I-69/WKP interchange:

- **Crash Segment Analysis as a Parkway:** For the crash analysis, a high-crash segment was defined as having a Critical Crash Rate Factor (CCRF) greater than or equal to 1.0. There were no crash segments with a CCRF between 0.89 and 0.99. There are three high-crash segments that are all in Christian County (MP 0.587 to MP 4.80, MP 5.759 to MP 7.500, and MP 11.697 to MP 22.641) where the Actual Crash Rate exceeds the Critical Crash Rate of 1.0.
- **Crash Segment Analysis as an Interstate:** The ETB Parkway analyzed as an interstate has one additional segment (MP 22.641 to MP 32.861) where the CCRF approaches 1.0 (0.95).
- **Crash Spot Analysis as a Parkway:** There are 29 spots that have a CCRF >1.0 and some of these spots overlap. There are 15 additional spots that have a CCRF that approached 1.0 (< 0.89 CCRF < 1.0).
- **Additional Findings Related to Crash Analysis:** There were three crashes coded as median cross-over or head-on collisions and seven fatal crashes during the study period (2008-2012). Neither the fatal crashes nor the head on crashes were in a concentrated area.
- **Commercial Vehicle Standards:** If this corridor becomes an interstate, the weight limitations would have a maximum gross vehicle weight of 80,000 pounds.
- **Current Traffic (2013):** The current traffic volumes range from 8,700 vehicles per day (vpd) (south of US 68 Bypass in Hopkinsville) to 17,200 vpd in Hopkinsville between US 41 (Exit 8) and US 68 (Exit 9).
- **Truck Percentages (2013):** The existing truck percentages on the ETB Parkway range from 15.0% from US 41 in Hopkinsville north to I-69 to 22% between Lovers Lane (Exit 5) and I-24 (MP 0.000).
- **Future Traffic (2040) as a Parkway:** The projected annual growth rate is 1%. This rate results in traffic volumes ranging from 10,700 (vpd) (south of US 68 Bypass in Hopkinsville) to 23,100 vpd in Hopkinsville between US 41 (Exit 8) and US 68 (Exit 9).
- **Future Traffic (2040) as an Interstate:** The future traffic with interstate designation is not expected to increase over the projected normal growth. The only changes for forecasted traffic expected to occur would be if the US 41 interchange (Exit 30) is converted to a full

interchange. This would reduce the projected traffic volumes by 600 vpd between I-69 (Exit 34) and US 62 (Exit 33), and 700 vpd between US 41 (Exit 30) and US 62 (Exit 33).

- **Truck Percentages (2040):** Future truck volumes are not expected to increase over the projected normal growth. The future truck volumes range from 18% to 25%.
- **Level of Service (2013):** The ETB Parkway currently operates at level of service (LOS) A.
- **Level of Service (2040) as a Parkway or Interstate:** The ETB Parkway is expected to operate at an LOS A with interstate designation and the full buildout of all Segments of Independent Utility for I-69 in Kentucky.

Mainline Geometry/Typical Section

The following is a summary of the key findings related to the ETB Parkway geometry and typical section:

- **Design Speed:** The ETB Parkway meets or exceeds the minimum design speed guidelines for interstate highways in rural and urban areas.
- **Lane Width:** The lane width on the ETB Parkway meets the minimum AASHTO guidelines for interstate design.
- **Outside Shoulder Width:** The ETB Parkway meets the AASHTO minimum outside shoulder width based on the current truck directional design hourly volume (DDHV).
- **Inside Shoulder Width:** The ETB Parkway does not comply with the minimum AASHTO design guidelines for inside paved shoulder widths. The AASHTO minimum inside paved shoulder width is 4 feet. The ETB Parkway has a 3-foot-wide inside paved shoulder with the exception of the newer section from MP 0.000 (end of the I-24 ramp) to the CSX Railroad Bridge north of US 41A (MP 7.500) which has 4-foot inside paved shoulders.
- **Striping Issue:** The ETB Parkway from MP 29.561 to MP 34.271 southbound, currently has a striping issue that makes the lane widths and outside shoulder widths less than minimum; however, the inside paved shoulder width is more than adequate in places. This discrepancy is due to striping that appears to be shifted toward the outside. This will be corrected if the inside shoulder width is widened to 4 feet. If not, then, restriping may be required to provide the appropriate lane widths and outside shoulder widths.
- **Median Width:** The ETB Parkway meets the rural 36-foot AASHTO minimum median width in rural areas and the 10-foot minimum median width in urban areas.
- **Clear Zones:** Without field review, it is not possible to identify all items that may be within the clear zone. However, based on a review of the slopes that are presented in the as-built plans for the corridor, there are ditch slopes between MP 7.500 to MP 34.271 and median slopes from MP 29.568 to MP 34.271 that show as 1V:3H. It was concluded that all slopes on the interstate should be a minimum of 1V:4H, including the median slopes.
- **Guardrail Placement and Condition:** The guardrail from MP 16.000 to MP 30.000 has wooden posts. Because field verification of the height and detailed specifications of the characteristics of the guardrail were outside the scope of this study, it was assumed that the dimension of the round wood post is 7” which is consistent with Kentucky Standard Drawing

RBR-015 for single face application. In a question and answer section on FHWA's website with regard to roadway barriers, the following statement was made: *"Some states use 8" round posts for w-beam guardrail, but there is not sufficient performance information to offer a recommendation on whether they may be substituted for steel or rectangular wood posts."* Therefore, given the FHWA's response with regard to the use of 8" round posts and Kentucky's standard drawing for using 7" round posts, for the purposes of this planning document, stretches of guardrail with round wood posts were considered as non-standard and in need of replacement.

On recent Kentucky interstate rehabilitation and reconstruction projects, the majority of the guardrail has been upgraded throughout the project limits on these types of projects. In addition, because field measurement of the top of guardrail was outside the scope of this study, there may be lengths of guardrail, both along the mainline and ramps, that fall below the recommended height for the top of rail and further verification of compliance is recommended as part of any future 3R project.

- **Superelevation:** From the review of as-built plans, horizontal curves along the ETB Parkway, the superelevation is adequate given the actual superelevation rate of the curves, the applicable friction factors, and actual curve radii.
- **Horizontal Alignment:** A review of as-built plans shows horizontal curves along the ETB Parkway meet minimum standards.
- **Vertical Alignment – sag curves:** Two sag vertical curves do not meet the minimum guidelines for the headlight sight distance.
- **Vertical Alignment – crest curves:** The minimum stopping sight distance for crest curves is met for all vertical crest curves.

Bridges and Overpasses

The following is a summary of the key findings related to the bridges and overpasses on the ETB Parkway:

- **Lateral Clearance:** Of the 16 mainline bridges, four do not meet the minimum lateral clearance requirement: Crab Orchard Creek northbound (MP 30.33) and southbound (MP 30.34), and Old White Plains Road and Creek northbound (MP 32.29) and southbound (MP 32.29), all in Hopkins County.
- **Vertical Clearance:** Of the 19 overpass bridges, one does not meet the minimum 16-foot vertical clearance requirement. It is a reinforced box bridge (15.9 feet) and cannot be raised to meet the vertical clearance. The bridge is identified as 024B00095N and is located at mainline MP 15.511 (KY 2641).
- **Functional Adequacy:** Two mainline bridges at First Street, both northbound and southbound (MP 9.728 and MP 9.730) are identified as functionally obsolete.
- **Structurally Deficient:** One overpass bridge was listed as structurally deficient (024B00099N) but with a sufficiency rating of 74.1.
- **Sufficiency Rating:** All mainline and overpass bridges have sufficiency ratings greater than 60.0.

- **Curbs:** Two mainline bridges, located over Drakes Creek at MP 29.448 (northbound) and MP 29.460 (southbound) have curbs. The northbound ramp over US 41 at Exit 30 also has curbs.
- **Overhead Signs and Trusses:** All overhead signs and trusses meet the minimum 17-foot vertical clearance requirement.

Interchanges and Ramps

The following is a summary of the key findings related to the interchanges and ramps on the ETB Parkway:

- **Design Speed:** Design speed was calculated for all ramps and all meet the minimum design speed.
- **Lane Width:** Lane widths for the interchange ramps range from 14 feet to 18 feet, which is compliant with AASHTO guidelines.
- **Shoulder Width:** The US 41 northbound on-ramp at Exit 30 does not meet the minimum criteria for shoulder width. It has rolled curb for its entire length.
- **Horizontal Alignment:** All ramps meet the minimum radius criteria.
- **Vertical Alignment – Vertical Grade:** The minimum vertical grade is met on all interchange ramps.
- **Vertical Alignment – Sag Curves, Headlight Sight Distance:** All vertical curve ramps meet the minimum headlight sight distance for the appropriate design speed.
- **Vertical Alignment – Crest Curves, Stopping Sight Distance:** All curve ramps meet the minimum stopping sight distance.
- **Guardrail**: Two end treatments on the northbound on-ramp of US 41 at Exit 30 do not meet current criteria.
- **Superelevation:** All ramps meet the minimum superelevation criteria.
- **Speed-Change Lanes:** There are seven ramps that do not meet the minimum criteria for acceleration and deceleration lengths: the four ramps at US 62 (Exit 33), the US 41 northbound on-ramp at Exit 30, and the on ramps at KY 800 (Exit 23). All LOS for these movements are LOS A.
- **Weaving Characteristics:** The KY 1682 (Exit 11) interchange has less than minimum weaving distance and currently operates at LOS A. It is expected to operate at LOS A in the design year 2040.
- **Interchange Spacing:** There are two locations where the minimum interchange spacing requirements are not met: between Lovers Lane (Exit 5) and US 68 Bypass (Exit 6) and between US 62 and I-69. For an urban area, the crossroad-to-crossroad distance rule of thumb is 1 mile. Between Exits 5 and 6 (Lovers Lane and US 68 Bypass) the existing distance is 0.610 mile. The southbound exit ramp at Lover's Lane was constructed as a loop ramp in the southeast quadrant to provide more ramp spacing between the ETB Parkway southbound on ramp from US 68B and the ETB Parkway southbound off ramp at Lover's Lane, and to minimize impacts to an existing subdivision. The northbound ramps between

the two interchanges were braided to ramp spacing/separation. All ramps at both interchange locations meet the *2011 Green Book* minimum ramp spacing criteria. However, the minimum interchange spacing requirements (crossroad to crossroad) as defined are not met. To maximize spacing southbound between US 68B and Lover's Lane, an additional lane may be required. There is not a defined weave (no auxiliary lane) at this location that can be analyzed through the Highway Capacity Manual. The second location, between US 62 and I-69 in Hopkins County, does not meet the minimum ramp spacing criteria of 2 (*2011 Green Book*) or 3 miles (*A Policy on Design Standards Interstate System January 2005*) in a rural area. Based on AASHTO requirements, minimum interchange spacing should be 1 mile in urban areas and 3 miles in rural areas. The existing distance is 1.421 miles. The mainline through both areas has a current LOS (2013) of a design year LOS (2040) of A. All merge and diverge movements are also LOS A.

- **Interchange Control of Access:** Two interchanges do not meet the minimum interchange control of access requirements: US 41A (Exit 7), which has the Fort Campbell Memorial Park parking lot access between the ramp terminals and the northeast quadrant of US 62 (Exit 33).
- **Interchange Configuration:** Currently, the ETB Parkway has two service interchanges that do not meet the recommended interstate interchange configuration: KY 1682 (Exit 11) and US 41 (Exit 30). A system interchange at I-69 (Exit 34) does not meet the recommended interstate interchange configuration for the ramps from the ETB Parkway.
- **I-24 Interchange:** The purpose of this study is to determine the improvements necessary to upgrade 34 miles of the ETB Parkway to interstate standards for inclusion as a spur to I-69. Therefore, the I-24 interchange was evaluated as a system interchange. This section of the ETB Parkway was generally designed as a 70 mph fully controlled access rural arterial facility with free flow movements at the I-24 interchange. Because of the relatively low volume of projected traffic, the need to minimize property impacts, and the high cost associated with constructing a flyover ramp for traffic traveling from I-24 EB to ETB Parkway NB, a 35 mph loop ramp was constructed instead. 35 mph is the minimum required loop radius design speed according to the *2011 Green Book*. The flyover ramp from ETB Parkway SB to I-24 EB transitions from 70 mph on the parkway to 50 mph on the ramp then to 70 mph on I-24. The ramp meets all current design standards. The ETB Parkway SB to I-24 WB ramp and the I-24 WB to ETB Parkway NB meet all current design standards.

Design Feature Deficiency and Crash History Analysis

To further evaluate the impact of the roadway feature deficiencies on safety, a high-level crash analysis utilizing Kentucky State Police (KSP) data was conducted to verify whether the deficiencies have an impact on safety. Again, the CCRF is for both directions, and an evaluation of crash reports may reveal more detail.

Mainline Geometry/Typical Section

a. Shoulder Widths

The ETB Parkway has 17 0.3-mile high-crash locations from MP 7.500 to 34.271, where the shoulder width is less than 4 feet paved. For high-crash location detail, refer to Chapter III.

b. Vertical Alignment – Sag Curves – Headlight Sight Distance

A 0.3-mile rolling crash analysis was conducted for the vertical alignment deficiencies, and the results are provided in **Appendix C**. One sag curve is located within a high-crash spot. The sag curve at MP 32.413 has a vertical curve of 600 feet. Crashes were examined from MP 32.300 to MP 32.527 in attempt to isolate the crash issues. There were eight crashes in this vertical curve over a 5-year period—four occurred in dark conditions, six of them were northbound, three were coded collision with animal, all were single-vehicle crashes, and seven of the eight crashes were on dry pavement.

c. Inadequate Pier Protection

Only one of the seven overpass structures (MP 29.131, McIntosh Chapel, KY 2647) with inadequate pier protection is located in a 0.3-mile spot with a CCRF approaching 1.0. This spot had eight crashes, six of which involved single vehicles. Three crashes were coded “ran off the roadway,” two were “collision with fixed object non-intersection,” and one crash each was “collision with non-fixed object,” “other collisions on shoulder,” and “sideswipe collision - same direction.”

d. Clear Zones

The clear zones’ relationship to high-crash locations are shown on Figure 22 (p. 63). There are six 0.3-mile high-crash spots between MP 29.568 and MP 34.271, where the median slopes do not meet minimum criteria. In addition, there are nine additional 0.3-mile high-crash spots for the stretch of the ETB Parkway where ditch slopes do not meet minimum criteria (MP 7.500 to MP 34.271).

Evaluating median slopes, the ETB Parkway had three head-on collisions over 5 years and the directional analysis from KSP indicated they were coded: “ran off roadway” (MP 15.191), “collision with fixed object non intersection” (MP 16.665), and “vehicle parked position, parking lot or driveway” (MP 10.380). The crashes were not located in a concentrated area and they were in a location where median slopes were 1V:4H.

e. Acceleration

There are six ramps where the length of acceleration is less than the minimum criteria. Of those six, three are located in high-crash locations, as follows:

- US 41 Northbound Entrance Ramp – Actual 450 feet and Minimum 580 feet
- US 62 Southbound Entrance Ramp – Actual 0 feet and Minimum 580 feet
- Southbound I-69 from Southbound ETB Parkway – Actual 450 and Minimum 580 feet

f. Deceleration

There are three ramps where the length of deceleration is less than the minimum criteria. Of those three, one located in a high-crash location and they are as follows:

- US 62 Northbound Exit Ramp – Actual 0 feet and Minimum 340 feet

g. Ramps

After evaluation, all ramps meet minimum typical section, vertical and horizontal criteria to become an interstate with the exception of the US 41 and KY 800 ramps that have rolled curb. These ramps did not exhibit any abnormal crash patterns.

Figures ES 2 and ES 3, (pp. ES 12 and ES 13) illustrate those deficiencies in the corridor and their associated interchange deficiencies. Table ES 2 (p. ES 14) lists the deficiencies and their associated costs, whether each would be a design exception or a design variance, and whether it is located in a 0.3-mile high-crash spot. FHWA has identified 13 design features that are important to the operational and safety performance of a highway. These controlling design features are commonly referred to as the 13 controlling criteria. A formal written design exception is required when any of the 13 criteria are not met on the National Highway System (NHS). The Interstate System is part of the NHS. Design exceptions are typically granted on a case by case basis. The results of this study and associated costs assumed that no design exceptions or variances would be granted.

Design variances would be required for the existing conditions that do not meet current AASHTO or KYTC guidelines but are not design exceptions that are deemed appropriate by the KYTC and the FHWA. Table ES2 identifies whether the improvement would require either a design exception or a variance if the improvement is not implemented. The deficiencies, with the exception of an access control issue in the northwest quadrant of Lovers Lane, are north of MP 7.500.

The total estimated cost to upgrade the ETB Parkway without any design exceptions is $161,629,000. Nearly all improvements are north of MP 7.500.

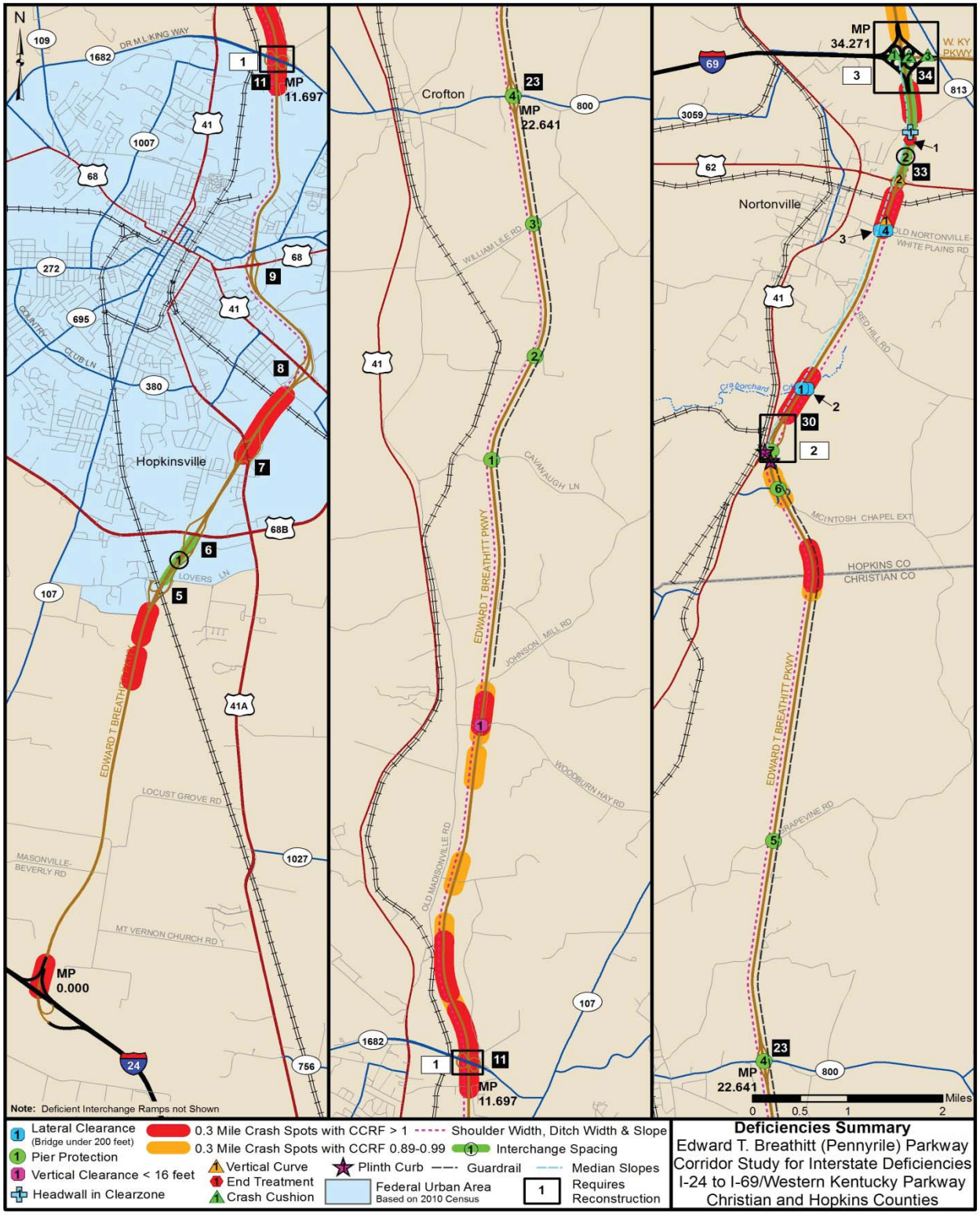

Figure ES 2: Edward T Breathitt Parkway Deficiencies Summary

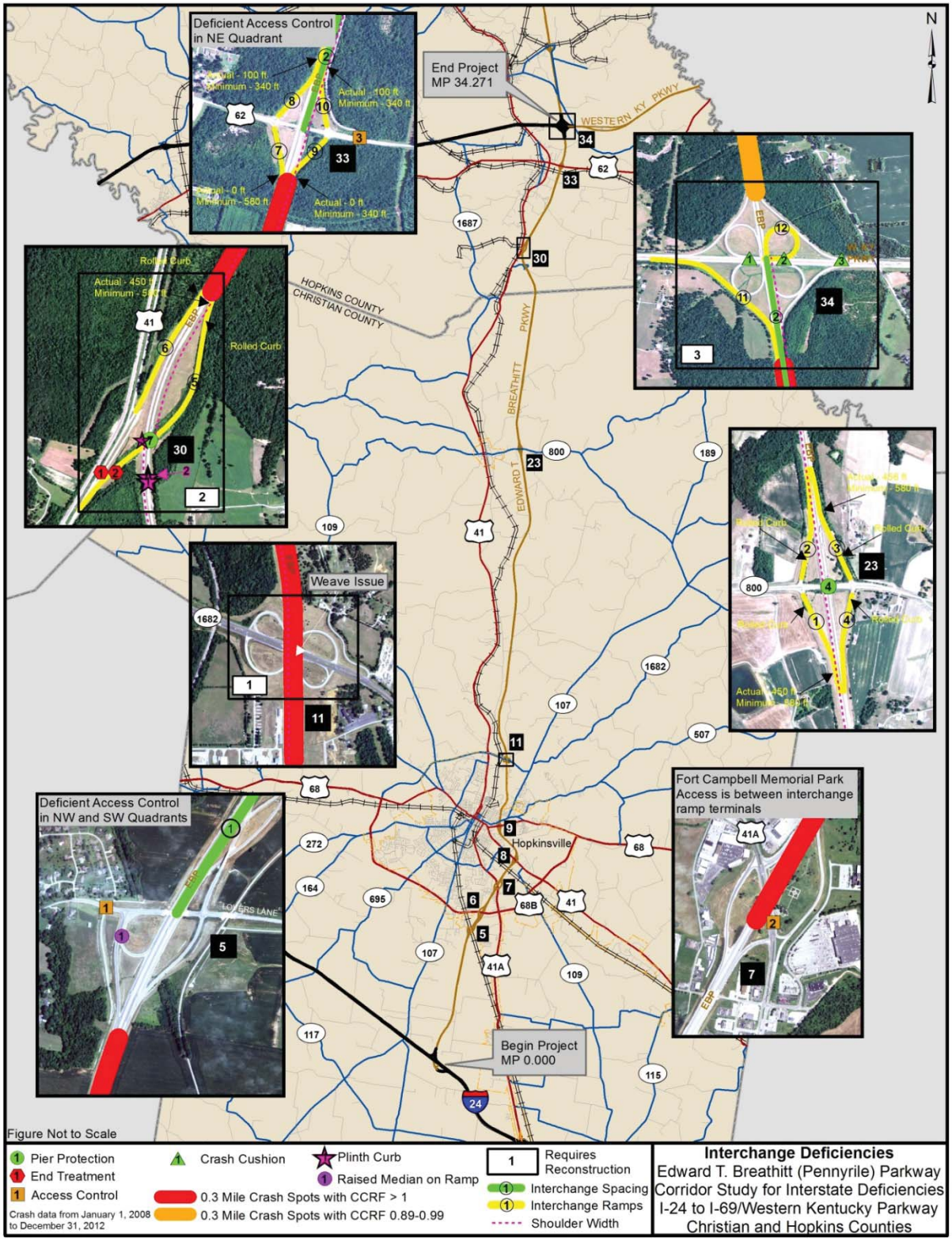

Figure ES 3: Interchange Deficiencies Summary

Table ES 2: Summary of Deficiencies and Costs

Location	Summary Categories	Milepoints or Options	Subtotals	Fully Compliant Reconstruction	Requires a Design Exception	Requires a Design Variance	Within a High Crash 0.3 Mile Spot Yes or No
	STRUCTURES						
	Widen Bridges < 200' with Widths< 38'			$ 738,100			
	Hopkins County						
1	SB Crab Orchard Creek	30.340	$ 191,600		x		Y
2	NB Crab Orchard Creek	30.330	$ 187,300		x		Y
3	NB Old White Plains Rd and Creek	32.290	$ 179,600		x		Y
4	SBOld White Plains Rd and Creek	32.290	$ 179,600		x		Y
	Plinth Curb			$ 243,700			
1	NB Drakes Creek	29.448	$ 62,900			x	N
2	SB Drakes Creek	29.460	$ 62,900			x	N
3	NB Entrance Ramp @ US 41 over EBT	29.550	$ 118,000			x	N
	Vertical Clearance < 16 feet			$ 1,163,700			
	Christian County						
1	KY 2641	15.511	$ 1,163,700		x		Y
	Inadequate Pier Protection			$ 2,448,000			
	Christian County						
1	Cavanaugh Lane (KY 2636)	18.474	$ 334,000		x		N
2	J Knight Road (KY 2640)	19.721	$ 349,000		x		N
3	William Lile Road	21.214	$ 357,000		x		N
4	KY 800	22.649	$ 341,000		x		N
5	Grapevine Road (KY 2637)	25.117	$ 341,000		x		N
	Hopkins County						
6	McIntosh Chapel Road (KY 2647)	29.131	$ 336,000		x		Y
7	NB US 41 On Ramp	29.560	$ 390,000		x		N
	MAINLINE						
	Horizontal		$ -	$ -			
	Vertical			$ 766,900			
1	Sag - MP 32.413	32.413	$ 143,800		x		Y
2	Sag - MP 32.887	32.887	$ 623,100		x		Y
	Widen Inside Shoulders (MP 7.5 to MP 34.247) or						
	Widen inside shoulders from MP 7.5 to MP 34.271	7.500 - 34.271	$ 8,743,600	$ 8,743,600	x		
	Restripe from MP 29.561 to MP 34.271	29.561 to 34.271	$ 78,400				
1	**Guardrail End Treatment near SB MP 33.4**	SB 33.400		$ 5,000		x	Y
	Upgrade Guardrail (MP 16.00 to MP 30.00)	16.000 to 30.000		$ 1,621,700		x	Y
	Fix Headwall @ MP near SB MP 33.5	SB 33.500		$ 5,000		x	Y
	Upgrade Median Slopes	29.568 to 34.271		$ 700,000		x	Y
	Upgrade Normal Ditch Slopes Options	7.500 to 34.271					
	Upgrade to 18' - 6:1 slopes on normal roadway ditches (which addresses clear zone):	7.500 to 34.271	$ 3,770,000	$ 3,770,000		x	Y
	Upgrade to 4:1 slopes on normal roadway ditches (and not address clear zone):	7.500 to 34.271	$ 860,000			x	Y
	INTERCHANGES						
	Interchange Crossroad to Crossroad Spacing						
1	**Exit #5- Lovers Lane to Exit #6 - US 68B Options**	5.175 to 5.759					N
	Close Interchange		$ 300,000	$ -		x	
	SB Braided Ramp		$ 14,600,000	$ 14,600,000		x	
2	**Exit 33 (US 62) to Exit 34 (WKP/I-69) Options**	32.861 to 34.271					Y
	Close Interchange or		$ 300,000	$ -		x	
	Complete CD System between Exits #33 and Exit #34		$ 25,000,000	$ 25,000,000		x	Y
	Remove Rolled Curb from Ramps Options	**Total Ramp**	**1st Curve**	$ 1,447,900			
	Exit #30 - US 41 Partial						
5	NB On Ramp	$ 932,000	$ -			x	N
6	SB Exit Ramp	$ 319,700	$ 145,300			x	N
	Exit #23 - KY 800						
2	SB On Ramp	$ 58,100	N/A			x	N
1	SB Exit Ramp	$ 43,600	N/A			x	N
3	NB On Ramp	$ 50,900	N/A			x	N
4	NB Exit Ramp	$ 43,600	N/A			x	N
2 3	**Guardrail End Treatments (US 41 NB Entrance Ramp)**			$ 10,000		x	N
1 2 3	**Remove & Replace Crash Cushions (Exit 34 at Ramps 38A, 38B & 106B)**			$ 27,000		x	N
1	**Raised Median on Ramp (Exit 5 Lovers Lane)**			$ 50,000		x	N
	Access Control			$ 396,200			
1	Exit #5 - Lovers Lane		$ 164,000			x	N/A
2	Exit #7 - US 41A		$ 82,200			x	N/A
3	Exit #33 - US 62		$ 150,000			x	N/A
	Ramps - Accel/Decel			$ 2,640,000			
	Exit #23 - KY 800		$ 179,600				
1	SB On Ramp - Ramp A	$ 89,800				x	N
3	NB On Ramp - Ramp D	$ 89,800				x	N
	Exit #30 - US 41						
5	US 41 NB On Ramp	$ 89,800	$ 89,800			x	N
	Exit #33 - US 62		$ 2,370,600				
7	SB On Ramp - Ramp A	$ 964,400				x	N
8	SB Exit Ramp - Ramp B	$ 151,800				x	N
9	NB Exit Ramp - Ramp C	$ 1,018,200				x	N
10	NB On Ramp - Ramp D	$ 236,200				x	N
	Interchange Reconstruction			$ 48,433,000			
3	**Exit #34 - WKP/I-69**		$ 27,533,000				
12	NB ETB Exit Ramp to WB I-69 Exit - Ramp H	$ 25,000,000				x	Y
11	NB I-69 to SB ETB	$ 2,400,000				x	Y
11	ETB Entrance Ramp from NB I-69 - Ramp A Increase Acceleration	$ 133,000				x	Y
2	**Exit # 30 US 41**	$ 10,400,000	$ 10,400,000			x	N
	Other Option Close Interchange	$ 900,000					
1	**Exit #11 - KY 1682**		$ 10,500,000			x	Y
	Subtotal			$ 111,468,300	$ 13,860,300	$ 97,608,000	
	Estimated Design and Environmental (15%)			$ 16,720,000	$ 2,079,000	$ 14,641,000	
	Estimated Right of Way and Utilities (30%)			$ 33,440,000	$ 4,158,000	$ 29,282,000	
	GRAND TOTAL			**$ 161,628,300**	**$ 20,097,300**	**$ 141,531,000**	