

I-75 to Mountain Parkway Corridor Study – Executive Summary

INTRODUCTION

The consulting firm of Parsons Brinckerhoff was contracted by the Kentucky Transportation Cabinet (KYTC) to perform a study to examine ways to improve the route for travelers between I-75 and the Mountain Parkway. Issues such as safety, roadway geometrics, capacity, congestion, environmental and human impacts, in addition to local officials / stakeholders (LO/S) input were all evaluated and documented through the course of the study. Several options were considered as part of the study, ranging from no build (as a baseline for comparison), to improvement alternatives along the existing routes (KY 52 / KY 499 / KY 89 / KY 82), to a new connector route, or a combination of these. The boundary for the overall study area is shown in **Figure ES-1**. This also highlights the existing corridor which is being examined for improvements.

PURPOSE AND NEED

The purpose and need statement for this study was developed from issues identified in field reviews, through LO/S input, as well as from the analysis of deficiencies identified in the existing roadway conditions.

Purpose

The purpose of the I-75 to Mountain Parkway Corridor Study is to improve mobility, connectivity and safety, as well as to address roadway deficiencies between I-75 and the Mountain Parkway.

Need

Supporting the study purpose is the study need. Input was provided by the Project Development Team (PDT) which consisted of KYTC Central Office, District 7 and District 10 staff, Parsons Brinckerhoff, and the Bluegrass Area Development District (BGADD). The LO/S also provided input on the study purpose and need. This input, along with the initial technical analysis, has shown a documented need exists for transportation improvements in the study area. The supporting need is presented below.

Safety – Three intersections throughout the study area have a critical crash rate factor (CCRF) equal to or greater than 1.0. These include:

- KY 52 / US 25 (Eastern Bypass) – CCRF = 1.70 to 0.93
- KY 52 / KY 977 – CCRF = 1.55
- KY 52 / Drowning Creek Road – CCRF = 1.00

Roadway Deficiencies – KY 89 and KY 82 have noted vertical and horizontal deficiencies (52 locations total). Locations are depicted on **Figures ES-2**.

Travel Time Reliability – KY 89 and KY 82 are two lane roads with limited passing opportunities. Numerous deficient horizontal and vertical curves require drivers to slow down to negotiate.

Access – Multiple access points exist near some study area intersections creating a number of conflict points and sight distance issues for turning versus through vehicles.

Connectivity – Currently, the existing roadways in this corridor do not provide a direct southern connection between I-75 and Mountain Parkway. Therefore, there is a need to improve this connectivity by considering routes that are more direct than the existing roadways.

Emergency Management – The Chemical Stockpile Emergency Preparedness Program (CSEPP) was created when the Army was directed to dispose of its aging chemical weapons inventory. The Bluegrass Army Depot is one of five Army installations in the United States that currently stores chemical weapons. In the event of an incident, emergency evacuation plans have been prepared. One route follows the existing study area routes (KY 52 / KY 499 / KY 89 / KY 82).

Goals and Objectives

In accordance with KYTC's policy on purpose and need statements, the following goals and objectives were developed to balance environmental and community issues with transportation issues.

- Provide solutions to meet the purpose of the project while avoiding / minimizing / mitigating impacts to human and natural environmental features.
- Provide improvement options that address identified needs.

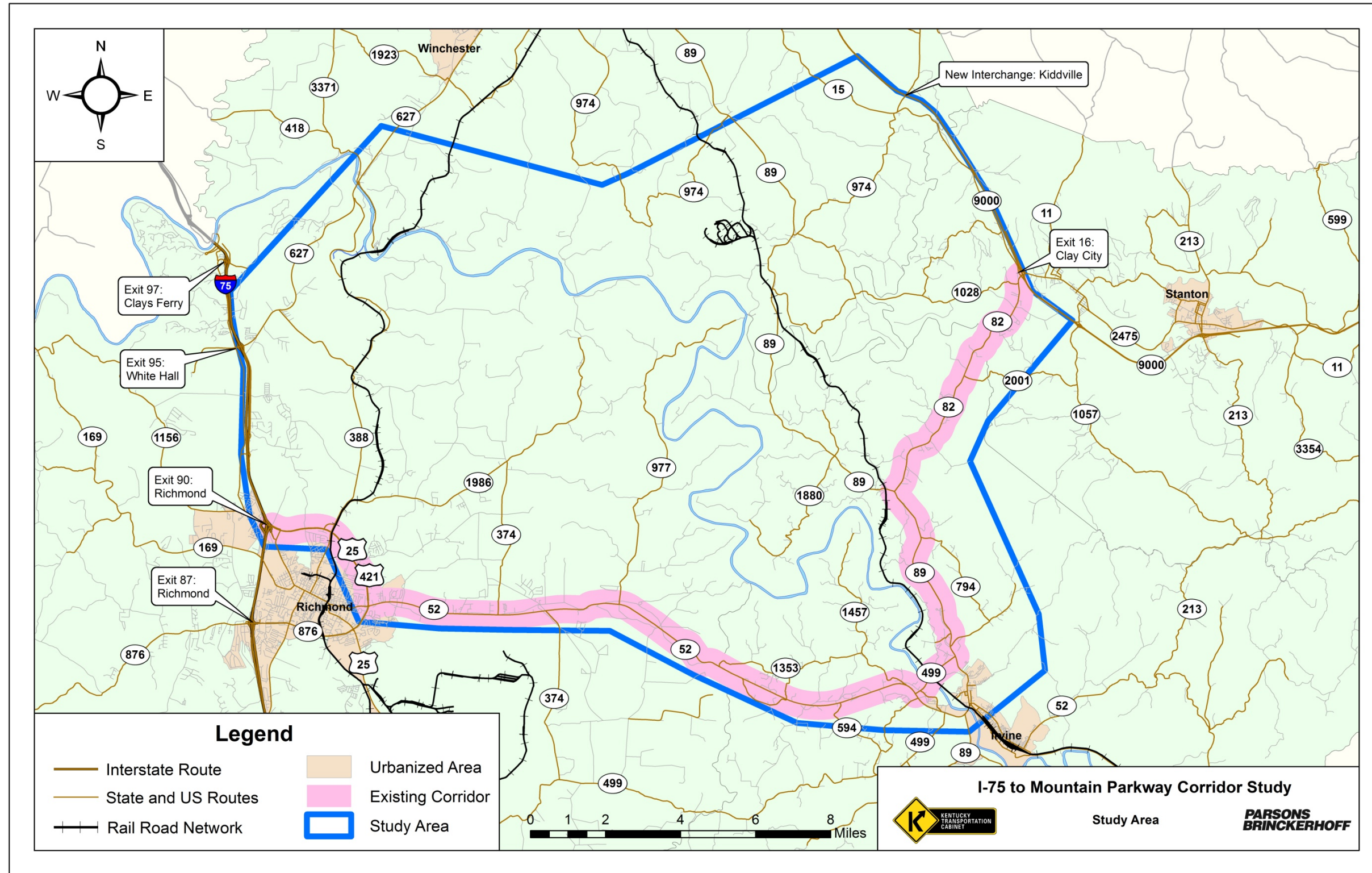
EXISTING CONDITIONS

A detailed inventory was completed to examine existing roadway characteristics, current and future traffic volumes, level of service (LOS), capacity, crash rates, multimodal facilities and environmental features. A summary of key points is as follows:

- The majority of the length of the existing corridor routes (KY 52 / KY 499 / KY 89 / KY 82) is classified as a rural minor arterial or rural major collector. The routes are primarily two-lane facilities with narrow shoulders and a posted speed limit of 55 mph.
- There are a total of 56 locations along the existing routes that have horizontal and vertical curves that do not meet current design standards.
- The existing corridor routes have traffic volumes (average daily traffic) ranging from 18,300 (near Richmond, Kentucky) to 3,000 (on KY 82 between Irvine and the Mountain Parkway). These traffic volumes increase to 27,400 and 4,500, respectively, in the year 2040.
- All segments evaluated along the existing corridor routes are under capacity (a volume to capacity (v/c) ratio of 1.0 is considered capacity). The issue with traffic operations that results in a poor LOS (LOS E) for some sections (primarily segments of KY 52 near KY 499 and KY 82) is the lack of passing opportunities.

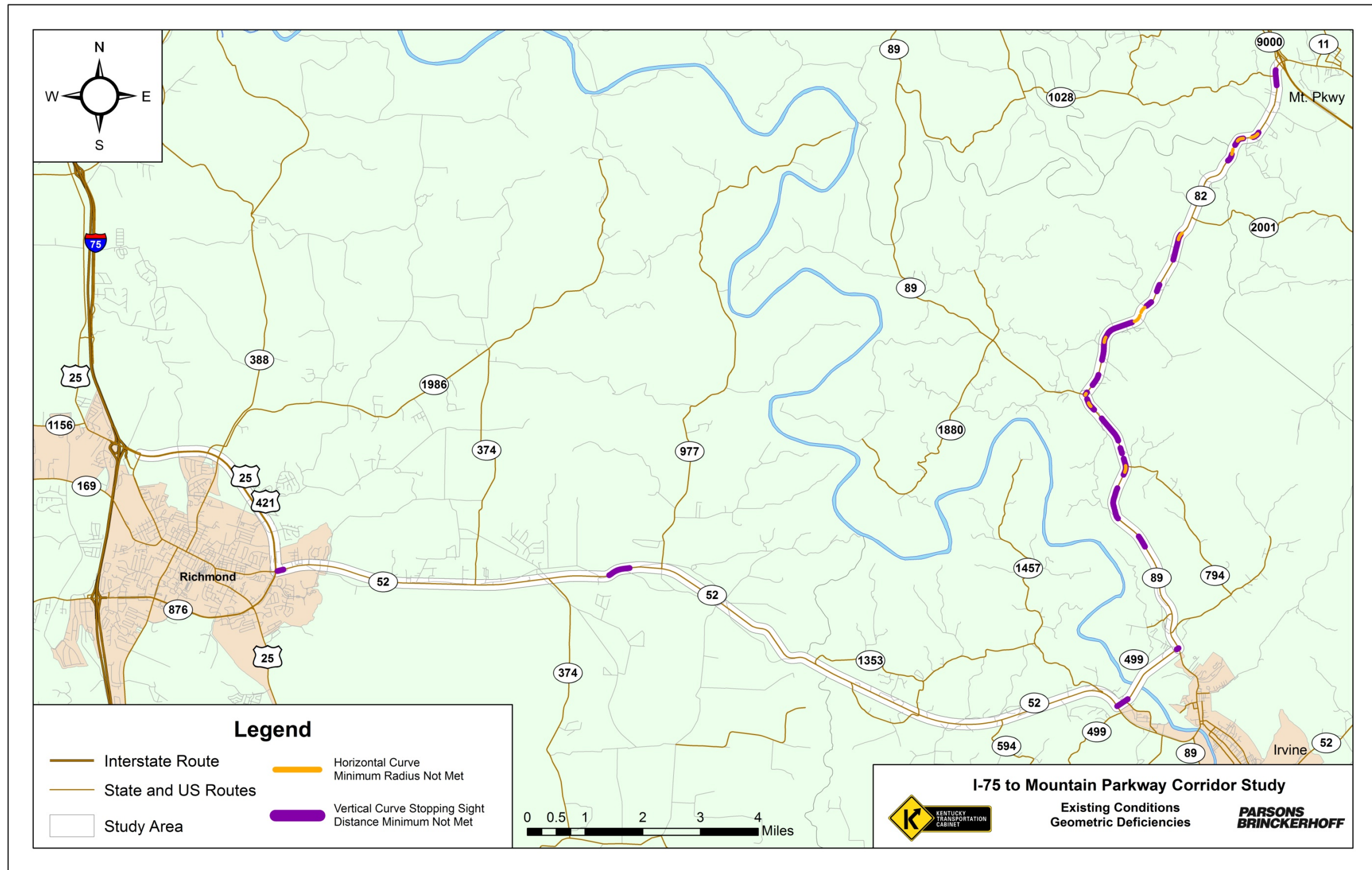
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Figure ES-1: Study Area



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Figure ES-2: Existing Geometric Deficiencies



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- Ten fatal crashes occurred throughout the study area during the course of the three year (January 1, 2011 – December 31, 2013) analysis period. The following intersections with KY 52 were the only locations determined to have crash issues based on an analysis of crashes and rates: the Eastern Bypass, KY 977, and Drowning Creek Road.
- A cluster of identified and potential archaeological resource sites exist north of the Kentucky River, approximately in the middle of the study area.
- Numerous Underground Storage Tanks (UST) / Hazmat sites are located along the existing corridor routes.

and were ranked as lower priorities by the LO/S. As a result, Routes #2 and #3 are not recommended. If it is determined at a later stage that the construction of Route #1 is cost prohibitive, it is recommended to consider implementing the remaining improvements along the existing corridor.

PROJECT DEVELOPMENT AND ANALYSIS

A detailed, multi-step process was used to develop and evaluate potential improvement projects. The process included the technical analysis derived from the existing conditions overview, field reviews, and input from the PDT.

Improvement projects were developed in three categories:

1. Spot Improvement – projects at individual locations along the existing route;
2. Corridor Improvement – improvements to provide a consistent typical section along the existing route; and
3. New Route – new roadway connections.

Also considered were combinations of any of the three categories.

Figures ES-3, 4 and 5 display all alternatives considered.

STUDY RECOMMENDATION AND PRIORITIZATION

Based on the project analysis, discussion with the PDT, input from the LO/S, and referring to the purpose and need established for this project it was determined that the recommendation from this study is to improve the existing corridor with the addition of Route #1.

As a reference, this includes the following improvement options (as shown on **Figures ES-6**):

- 52-A
- 52-B
- 52-C
- 52-E1
- 82-A
- 82-B
- Route #1

Overall, improvements to the existing route plus Route #1 best meet the identified purpose and need for this project. Routes #2 and #3 only met portions of the purpose and need components

Figure ES-3: KY 89 and KY 82 Improvement Projects

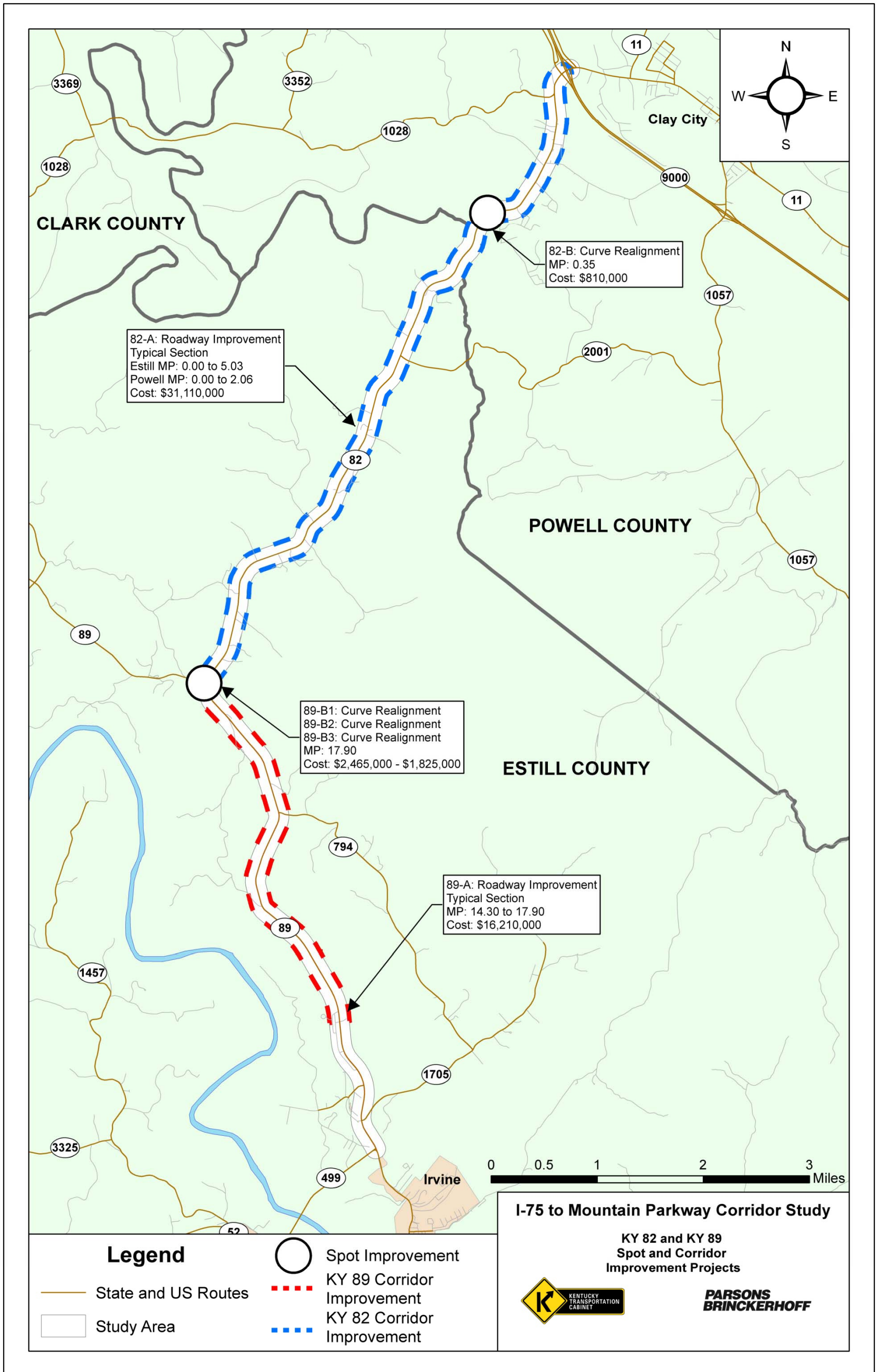
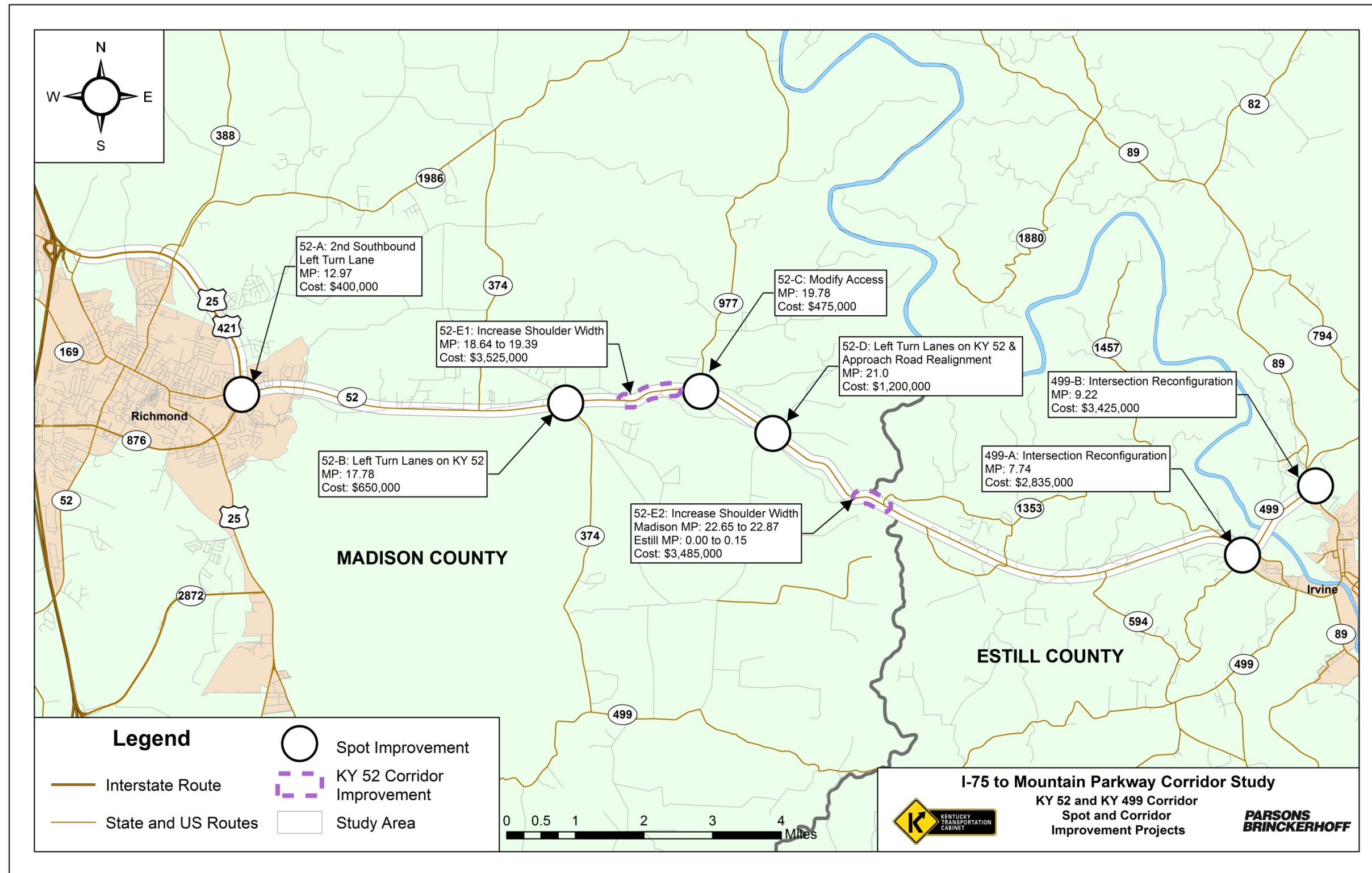


Figure ES-4: KY 52 and KY 499 Improvement Projects



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 KY 52 and KY 499 Corridor
 Spot and Corridor
 Improvement Projects



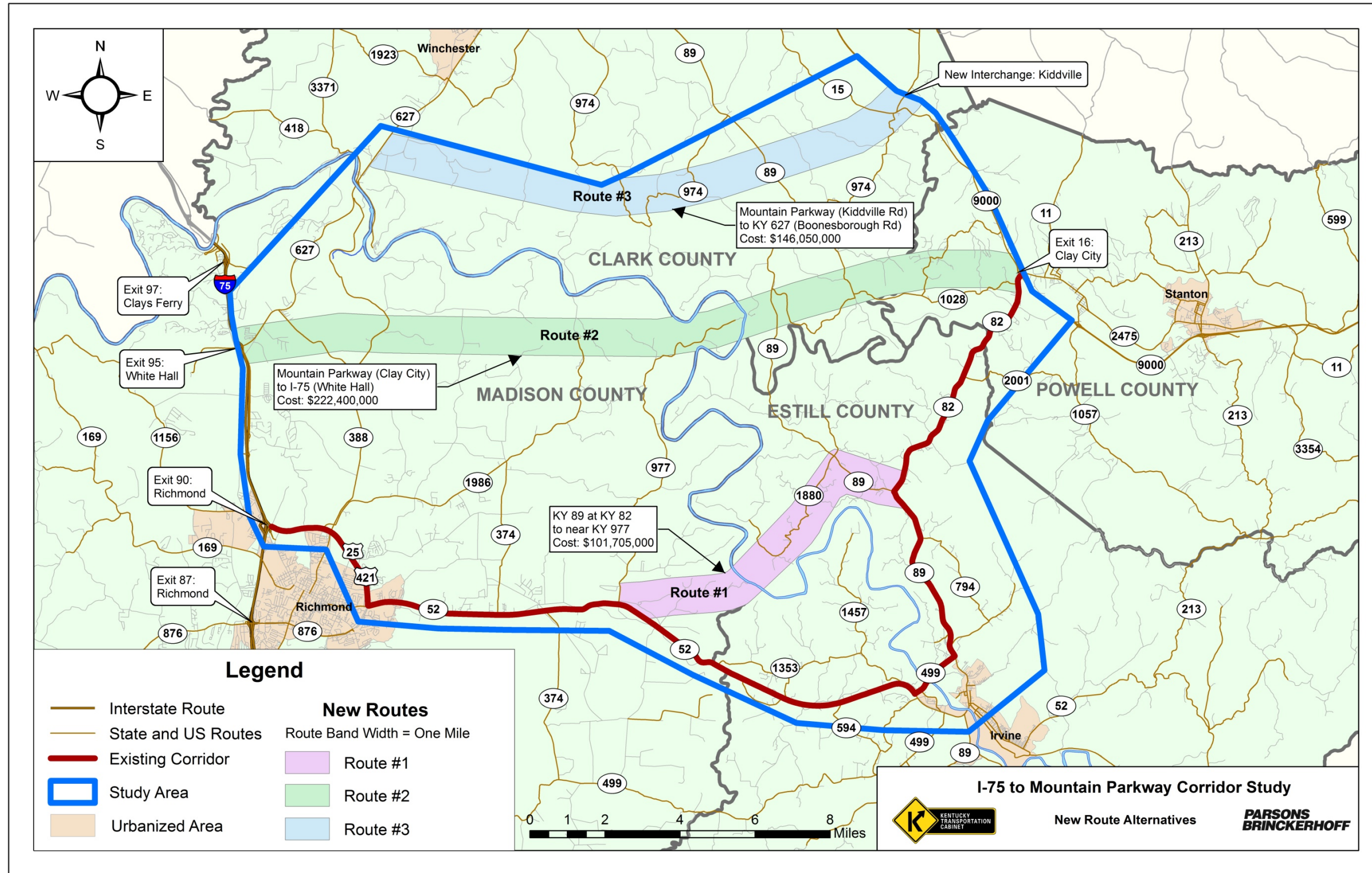



Figure ES-5: New Routes



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Proposed phasing of the study recommendation is provided to assist with future development (see **Figure ES-6**). Three distinct phases were identified considering safety and operations, cost, and LO/S input. The total cost for all phases is \$138,675,000.

Phase 1 – Spot Improvements

- Includes 52-A, 52-B, 52-C, and 82-B
- Total cost = \$2,335,000
- Individually all improvement projects are less than \$1,000,000
- This would address the safety component by improving two intersections with CCRFs that exceed 1.0

Phase 2 – Corridor Improvements

- Includes 52-E1 and 82-A
- Total cost = \$34,635,000
- These improvements would address all geometric deficiencies on KY 82 (42 deficiencies)

Phase 3 – Route #1

- Total cost = \$101,705,000
- This connection would provide the last piece to improve travel time, provide connectivity, and allow for an additional through travel option, removing some traffic from the remaining portion of KY 52 and KY 89

Further ranking of project prioritization was completed within Phase 1 – Spot Improvements and Phase 2 – Corridor Improvements. The methodology for the prioritization of the different projects in each phase considered several factors to determine the order in which each piece is recommended to be constructed (high, medium, low priority). This includes input received from the LO/S, traffic volumes (for the corridor improvements), crash rate factors (CCRF) and the number of geometric deficiencies present.

Phase 1 – Spot Improvements Prioritization

- High Priority: 52-C
 - Total Cost = \$475,000
 - Highest ranking of the spot improvement projects by the LO/S
 - CCRF = 1.55
- Medium Priority: 52-B
 - Total Cost = \$650,000
 - High ranking response of the spot improvement projects by the LO/S
 - CCRF = 0.77
- Medium Priority: 82-B
 - Total Cost = \$810,000

- A split of high and medium ranking response of the spot improvements projects by the LO/S
- CCRF = 0.51
- 3 Geometric Deficiencies

• Low Priority: 52-A

- Total Cost = \$400,000
- Medium ranking response of the spot improvement projects by the LO/S
- CCRF = 0.93 – 1.70
- 1 Geometric Deficiency
- Recent work (less than one year) has been completed to improve southbound left turn queuing issues

Phase 2 – Corridor Improvements Prioritization

- Phase 2A: KY 82 Northern Portion (Estill County MP 4.92: near Powell County Line – Powell County MP 2.06: KY 15)
 - Total Cost = \$10,350,000
 - 22 geometric deficiencies
 - Highest frequency of crashes of KY 82 sections
 - 2040 ADT = 7,300 – 6,000
- Phase 2B: KY 52-E1 (MP 18.64: near Old KY 52 to MP 19.39: near Elliston Rd)
 - Total Cost = \$3,525,000
 - Highest ranking of the corridor improvements by the LO/S
 - 1 geometric deficiency
 - 2040 ADT = 16,100
- Phase 2C: KY 82 Southern Portion (MP 0.00: KY 89 – MP 2.36: OB Stamper Rd)
 - Total Cost = \$10,985,000
 - 15 geometric deficiencies
 - 2040 ADT = 4,500
- Phase 2D: KY 82 Central Portion (MP 2.36: OB Stamper Rd – MP 4.92: near Powell County Line)
 - Total Cost = \$9,775,000
 - 5 geometric deficiencies
 - 2040 ADT = 6,000

Funding / Next Steps

At this time there is no funding in the 2014 Highway Plan for any future phases of project development. Funding would need to be secured for future project development.

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Figure ES-6: Project Phasing

