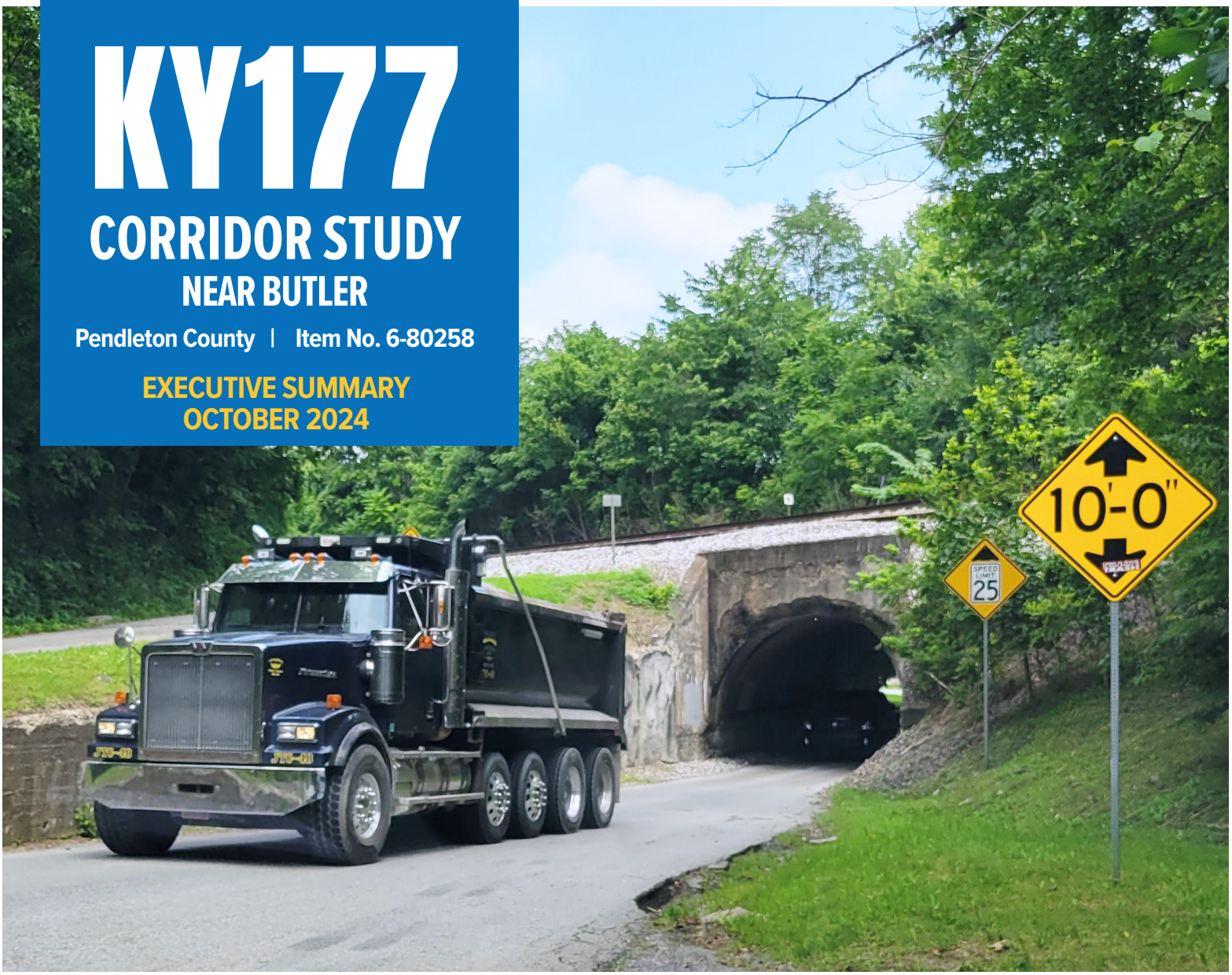
KY177

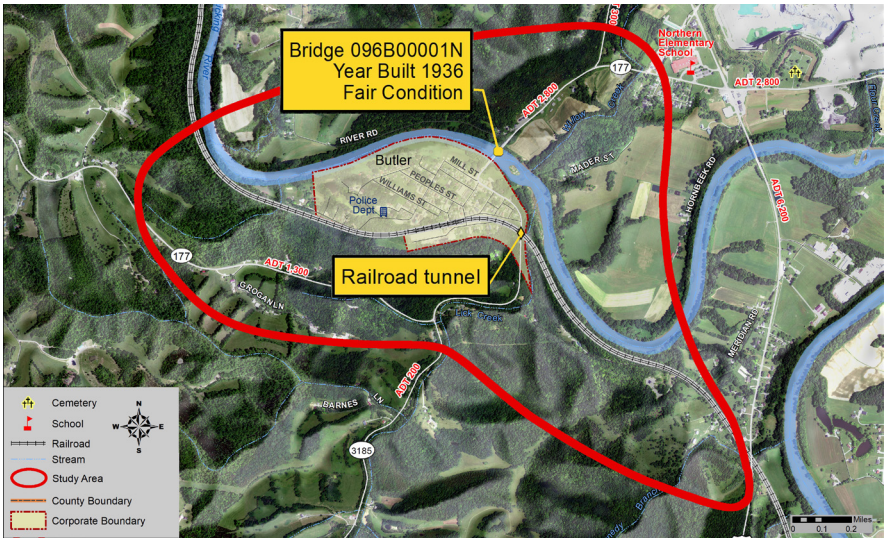
CORRIDOR STUDY

NEAR BUTLER

Pendleton County | Item No. 6-80258

EXECUTIVE SUMMARY
OCTOBER 2024





PREPARED BY

TEAM KENTUCKY®
TRANSPORTATION CABINET

IN PARTNERSHIP WITH

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EXECUTIVE SUMMARY

The Kentucky Transportation Cabinet (KYTC) initiated a corridor study for the KY 177 corridor near Butler in northern Pendleton County. Regionally, the corridor represents the sole east-west connection over a roughly 15-mile stretch in the rural highway network. However, two key constraints—a bridge over the Licking River and a tunnel beneath a railroad line—limit mobility along the corridor, especially for truck traffic. A large quarry and asphalt plant along KY 177 east of US 27 contribute to the number of commercial vehicles traveling throughout the area. The study area (**Figure ES-1**) encompasses milepoints (MP) 4.2 to 7.0 of KY 177, plus a buffer around the community to consider new alignment connections.

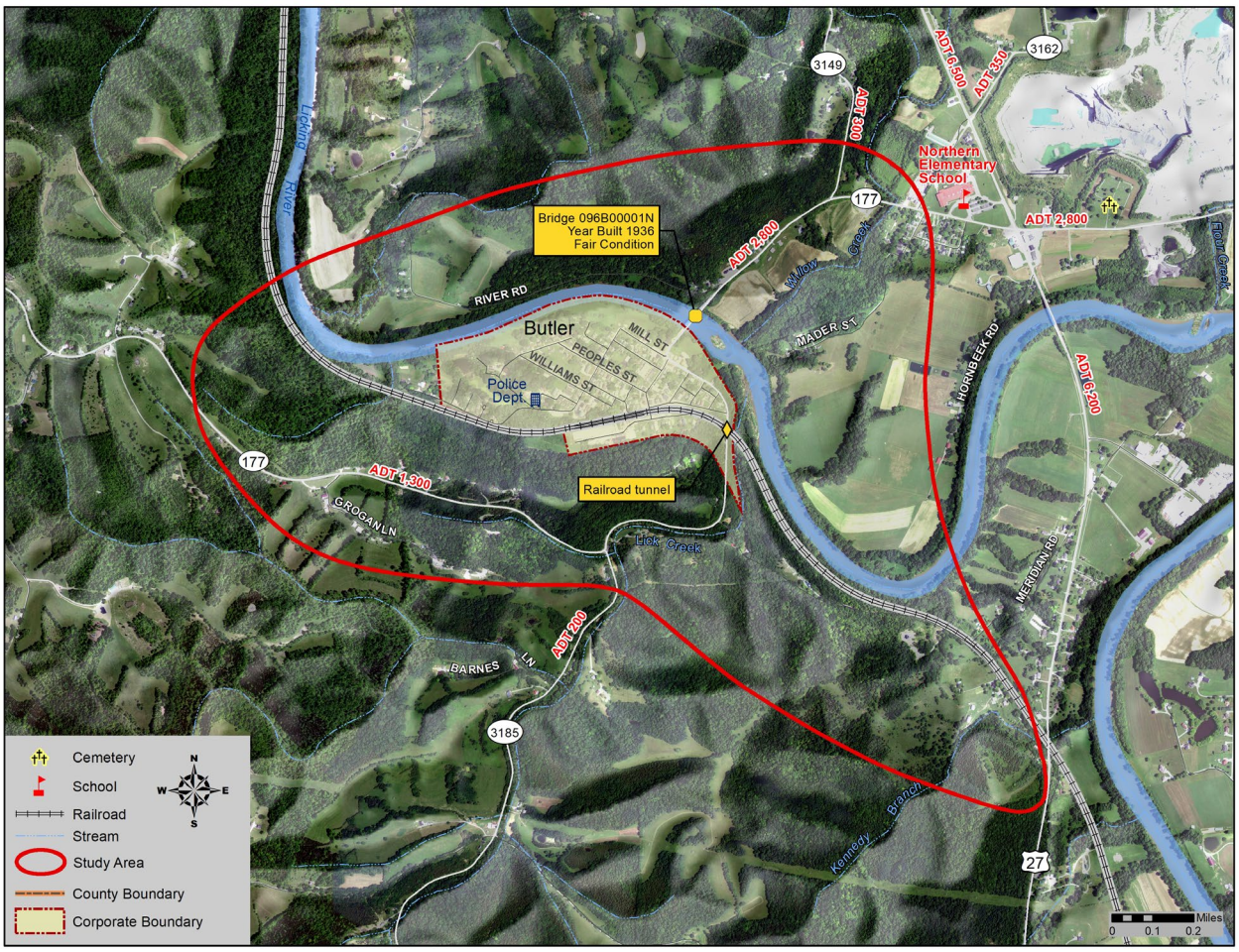

Figure ES-1: Study Area Limits

Two funded projects in Kentucky's 2024-2030 Enacted Highway Plan overlap the 6-80258 study area. **Table ES-1** provides key facts for each, including current funding allocations.

Table ES-1: Funded KY 177 Projects in Study Area

Location	Description	Source	Phase	Year	Amount
KY 177 MP 5.8-9.2	**Item No. 6-80258**: Reconstruct KY 177 from KY 3185 in Butler to KY 467	SPP	Design	2025	$2.0M
KY 177 MP 5.0-5.9	**Item No. 6-80310**: Reconstruct KY 177 from Licking River Bridge in Butler to KY 3185	SPP	Design ROW Utility Const.	2025 2027 2027 2028	$2.0M $0.6M $1.1M $26.4M

This 6-80258 study area also overlaps a small portion of a larger, long-term vision to create an improved east-west connection in northern Kentucky, which has been discussed for decades. Most recently, KYTC's 2021 *Northern Kentucky Outer Loop* planning study (Item No. 6-458)[1] explored new east-west connectors in southern Boone, Kenton, and Campbell counties or northern Gallatin, Owen, Grant, Pendleton, and Bracken counties. The purpose was "to stimulate economic opportunities through regional mobility by providing a safer and more efficient east-west corridor between I-71 and the AA Highway (KY 9)."

Existing Conditions

KY 177 is classified as a rural major collector route, providing one of few east-west corridors for the region. The nearest east/west freight routes between US 27 and I-75 are I-275 to the north or US 62 to the south. KY 177 has two 11-foot-wide driving lanes with one-foot paved shoulders for most of its length. The speed limit varies: posted at 25 mph in town, 35 mph between US 27 and the river, and 55 mph continuing south/west.

The steepest section in the study area follows the hill west of the KY 177/KY 3185 intersection. At this location, eastbound KY 177 travels down an 11.5% grade with a stop-control intersection in a horizontal curve at the bottom. The sharpest KY 177 curve in the study area is at the bottom of the Licking River bridge coming into town.

Two structures limit mobility for larger vehicles.

- Bridge 096B00001N carries KY 177 over the Licking River. It stretches between KY 177 MP 4.85-4.97. It is in Fair condition but is weight posted to limit loads—restricted to 20-32 tons, depending on axle configuration. It is 24 feet wide (curb to curb) and approximately 15 feet above the river.

[1] Online at https://transportation.ky.gov/Planning/Pages/Planning-Studies-and-Reports.aspx

- A quarter mile south, KY 177 runs below the CSX railroad via a low-clearance, narrow tunnel near MP 5.3. It lies in the floodplain and floods during high water events.

KY 177 carried up to 2,800 vehicles per day (vpd) in 2023, with the busiest stretch near the school, northeast of the study area. Truck traffic comprised 10-20% of peak hour volumes. No cyclists and few pedestrians were observed. Based on population projections and the statewide travel demand model, traffic is projected to increase to 3,000 in the 2045 No-Build scenario, including 13% trucks. No capacity concerns were identified in either scenario.

During 2018-2022, 32 crashes were reported on state routes in the study area. There were no fatalities, but six crashes resulted in injuries. Single vehicle crashes are the leading crash type, accounting for 75% of all reported crashes. Overall, 34% of crashes occurred during nighttime, 41% occurred in wet or icy conditions, and 44% were roadway departures, which tend to be more severe than other crash types. The highest cluster of crashes was at the KY 177/KY 3185 intersection, where eastbound KY 177 descends a steep grade to a stop-condition in a horizontal curve. The segment south of the Licking River Bridge (MP 5.0-7.0) and the KY 177/KY 3149 intersection result in a poor Level of Service of Safety (LOSS) rating, indicating crash frequencies greater than predicted by mathematical formulas.

Build Concepts Considered

Any Build concepts developed should address both local and regional transportation demands: local access for the community of Butler and regional freight access as part of the larger highway network.

Traffic forecasts estimate up to 3,400 vpd may use a new bypass around Butler in 2045. If part of a larger regional connection from I-75 to US 27, improved KY 177 could carry up to 4,500 vpd in 2045. A two-lane highway provides adequate capacity for either forecast daily traffic volume.

The team explored a wide range of corridors to ensure all possible/practical solutions were considered before any were eliminated. Build concepts represent high-level corridors with broad assumptions rather than an alignment-level decision. Regional connectors were organized geographically, with the most competitive in each category advancing for LO/S input. Small-scale spot improvements at key intersections were initially considered, but do not satisfy both study goals unless joined with a larger corridor solution. The initial range of Build corridors considered are presented in **Figure ES-2**.

Corridors north and south of town effectively bypass Butler, requiring a river crossing at or near the current truss to preserve local access. Corridors in town lead to more home and business relocations, especially for options that create a grade separated rail crossing. Lower design speeds reduce curve radii but may be less suited for regional freight trips. Corridors crossing in or near town tend to be lower in elevation with shorter span lengths, raising concerns about emergency access during high-water events. Construction costs ranged from $16-80 million in 2023 dollars.

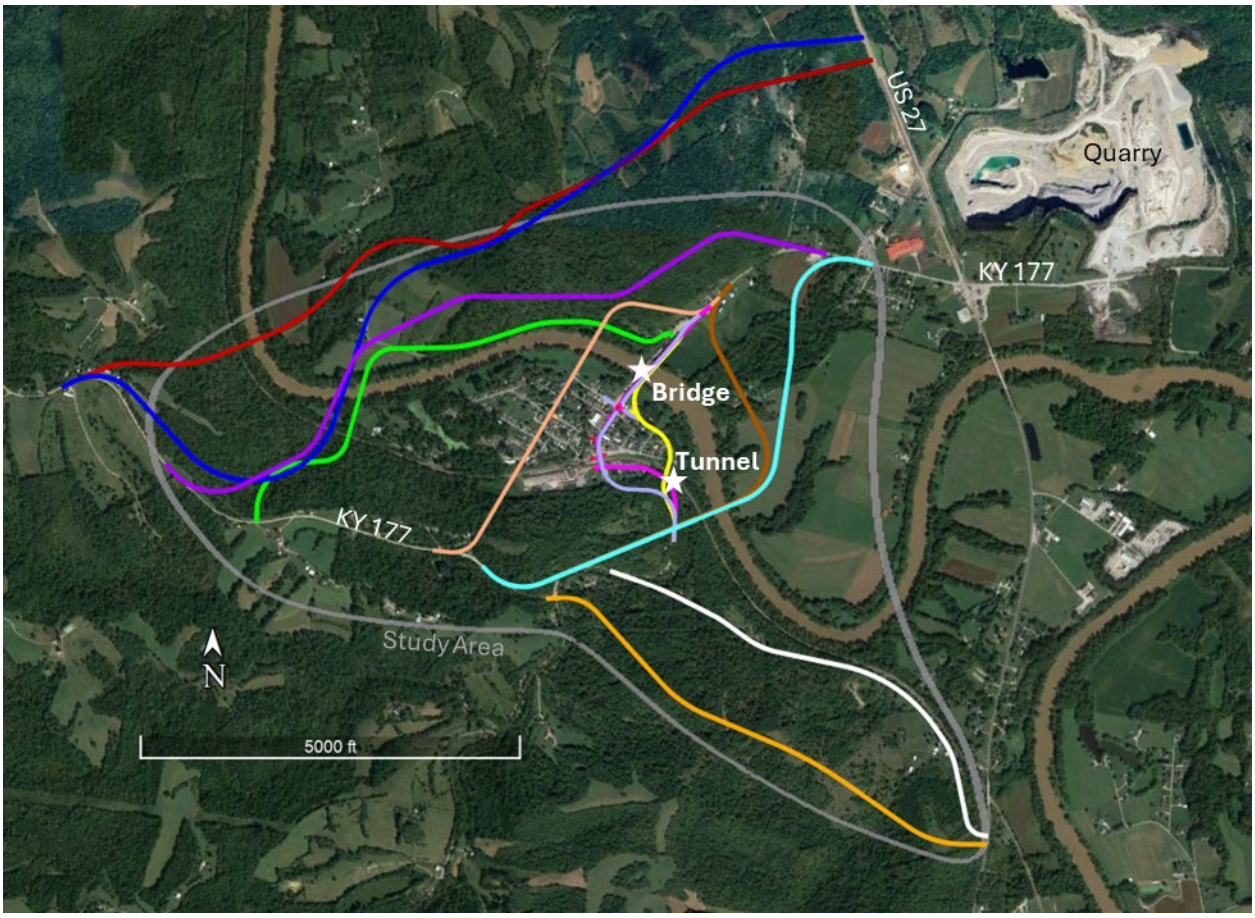

Figure ES-2: Initial Build Corridors

Meetings

The project team met at three milestones throughout the study process and presented a subset of Build corridors to local officials/stakeholders (LO/S) during June 2024. Key local input included concerns about economic impacts of a bypass, access during high-water events, and preservation of the historic truss. Most attendees preferred the Yellow corridor as it balances local access without major disruptions for the city. However, safety improvements at the KY 177/KY 3185 intersection are also important.

Recommendations

The initial set of 12 corridors was screened down to a combination of two Build concepts recommended for further consideration. Variations of the Yellow and Teal corridors merit further exploration during future project development phases.

- **Yellow Base** constructs a new bridge east of the existing truss, follows KY 177 around the eastern edge of town, overpasses the railroad, and ties back to existing KY 177 near MP 5.4.

The total length is 0.7 miles. The replacement river crossing is similar to the existing, which does not span the entire floodway. This option could be paired with the spot improvement at KY 177/KY 3185 (**Figure ES-3**) to address local concerns.

- **Yellow + Tail** mirrors Yellow Base but extends the southern end up the hill, connecting to existing KY 177 near MP 6.0. The length totals 1.1 miles.
- **Yellow/Teal Hybrid** combines the Teal bypass with a shortened version of Yellow, relying on a new bypass to provide cross-river connectivity for the city. Together, it is 1.9 miles long. The new river crossing is longer and higher to span the entire floodway; the existing truss would no longer be a necessary component of the state highway system. This option has a higher design speed, more consistent with the vision of a regional freight connector.

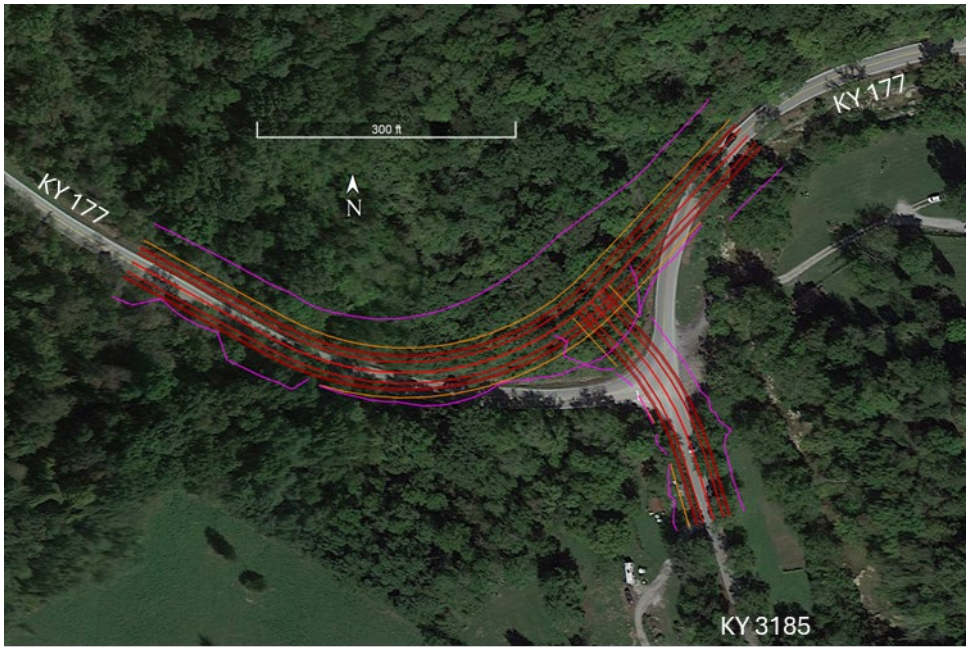

Figure ES-3: KY 177/KY 3185 Curve Realignment

Cost estimates for the detailed study options are summarized in **Table ES-2**.

Table ES-2: Cost Estimates by Phase

Concept	D	R	U	C	TOTAL
Yellow Base	$2M	$5M	$6M	$20M	$33 million
KY 177/KY 3185 Intersection	$0.2M	$0.2M	$0.1M	$1.3M	$1.8 million
Yellow + Tail	$4M	$5.5M	$6M+	$40M	$55 million
Yellow/Teal Hybrid	$3M	$9M	$7.5M	$30M	$50 million

Alongside costs, impacts to the human and natural environment are another consideration when evaluating Build options. With similar corridors for the detailed study concepts, the type of impacts is

similar for each. **Figure ES-4** overlays the three detailed study options on the environmental overview map for reference.

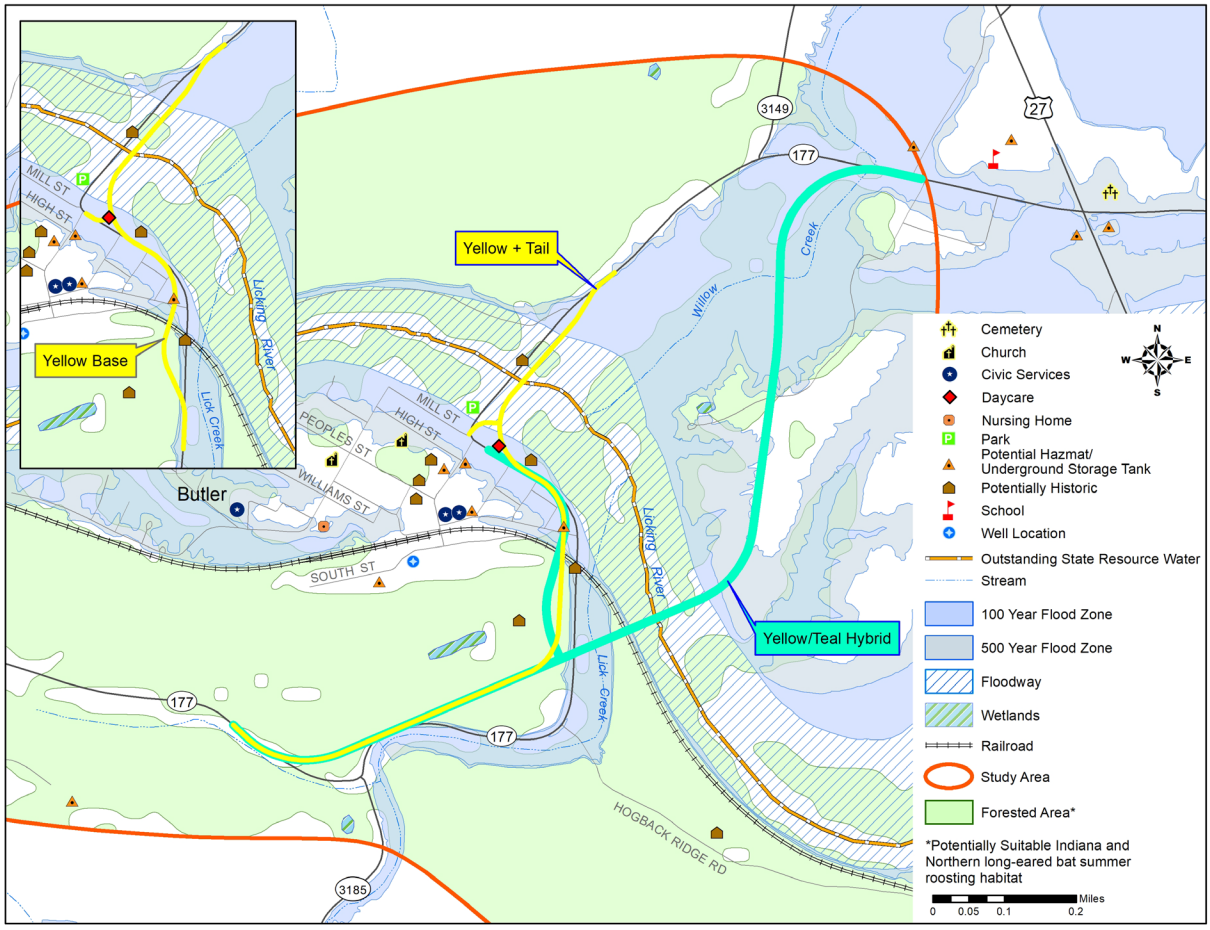

Figure ES-4: Detailed Study Options with Environmental Overview

- Each detailed study option impacts groundwater resources. Bridge work will require coordination with the US Army Corps of Engineers (USACE), the US Coast Guard (USCG), and Kentucky Division of Water (KDOW) for permits. While design-level decisions will determine elevations and explore specific impacts, floodplains cover much of the study area and will play a major role in project decision-making.

- The Licking River represents suitable habitat for protected mussel species; impacts will likely require a Biological Assessment. Seasonal survey restrictions may impact future project timelines. Impacts to endangered bat species can likely be processed through KYTC's Programmatic Agreement with seasonal clearing restrictions.

- KYTC's Geotech Branch identified "significant concerns" based on the terrain and underlying geology of the study area that will require consideration throughout any future design process.

- The Yellow corridors skirt around the eastern edge of Butler, reducing disruptions to the city center and more densely developed areas. However, any Build corridor in this area will result in an estimated 6-8 relocations. This includes a preschool-age daycare facility, which may be one of the only childcare service providers in the local community. Windshield surveys also suggest households near the railroad tracks and floodplain may represent low-income populations. Census data also indicates the region may contain concentrations of minority, age 65+, and/or disabled populations. Traditionally underserved populations should be provided opportunities for meaningful engagement throughout the decision-making process.

- Three potentially historic resources are near the detailed study corridors: the 1936 truss bridge, an I-House and outbuilding at 302 Mill Street, and the Alec Caldwell House (PD-2) which was not visible from public right-of-way. Measures should be taken to avoid or minimize impacts; should a Build concept advance with federal funding, formal field surveys and coordination with SHPO will be required to assess project effects to cultural historic resources.

Each of the three detailed study concepts warrant consideration during preliminary design.

Limited public involvement has occurred to date; engaging with key stakeholders and impacted property owners will be important during the design process. Engagement measures should be sensitive to potentially impacted environmental justice populations to ensure equal opportunities are provided.

CONCEPTS