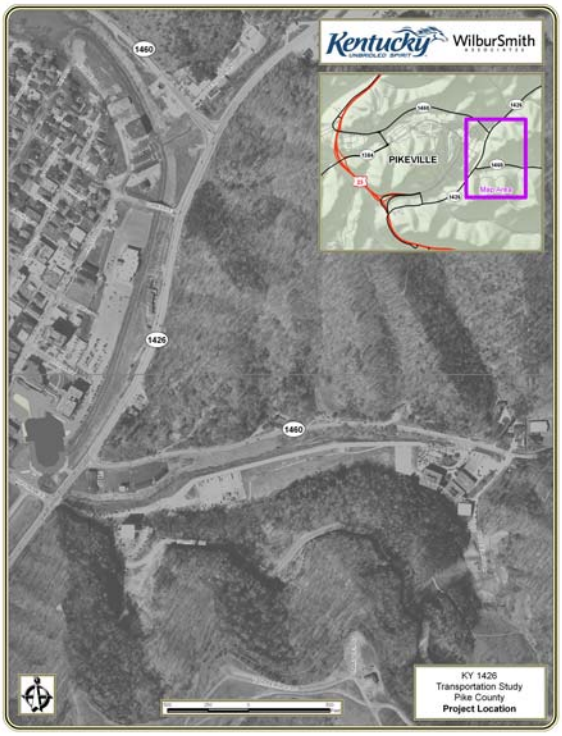
Kentucky Transportation Cabinet
KY 1426 Transportation Study, Pike County
May 2008

The Kentucky Transportation Cabinet (KYTC) has undertaken this Transportation Study to consider improvements to a segment of KY 1426 in Pikeville, Kentucky in Pike County. The purpose of this study is to (1) evaluate catchment systems and/or reconstruction options to mitigate recurring rockfall problems along KY 1426 and (2) identify operational and/or minor reconstructive measures to improve traffic flow and safety at the intersections of (a) KY 1426 with KY 1460 (Chloe Creek Road) and (b) KY 1426 with Summit Drive/Huffman Avenue.

KY 1426 intersection with Chloe Creek Road (KY 1460)

Study Area Conditions



Study Area

The project area lies on the eastern side of the city of Pikeville. KY 1426 provides an eastern bypass of the city. KY 1460 provides rural access to the east of the city and connects to US 460/KY 80 to the southeast. Summit Drive serves one business and several residences on an adjacent ridge, tying into KY 1426 across from Huffman Avenue, which leads downtown.

In the project area, KY 1426 is an undivided, two-lane highway with 12-foot wide lanes and a 45 mph speed limit. Shoulders transition from a 2-foot wide curb with sidewalk to an 11-foot paved cross-section. KY 1460 has two undivided lanes, 10 to 12 feet wide, with narrow shoulders and a 45 mph speed limit. A known rockfall hazard lines the eastern side of KY 1426 between the Chloe Creek Road and Combs Avenue intersections.

Study intersections (KY 1426 with Summit Drive/Huffman Avenue and with KY 1460) are tightly spaced with limited opportunity for roadway growth given the surrounding landscape. Pikeville Elementary School, located along Chloe Creek Road at the eastern edge of the study area, significantly influences peak hour traffic operations along the KY 1426 Bypass. An access road from the school to Summit Drive serves as the drop-off and pick-up point for many children who do not ride the bus system.

Other constraints in the study area include mountainous terrain, Chloe Creek, a historic cemetery and marker, utility lines, and nearby structures, including the Eastern

Kentucky Exposition Center and Pikeville Fire Station.

Traffic Characteristics

Traffic volumes in the study area are 7,300 vehicles per day (vpd) on KY 1460 and range from 9,800 to 12,100 vpd on the bypass (KY 1426). Study intersections operate at level of service (LOS) C or better during the PM peak hour; high peak hour factors due to concentrated school traffic distributions and commuter patterns generate increased delays, worse LOS, and longer queues during the AM peak hour. Analysts relied on additional performance measures – delay time, number of stops, travel time, conflict points, and average speeds – to describe network performance. Assuming a 1% annual growth rate for traffic, study area traffic operations will deteriorate in future years. The KY 1426 intersection with Huffman Avenue may be expected to operate at a LOS F by 2030 during the AM peak period.

Reported crashes occurring during 2002-2006 defined multiple spots and segments with high crash tendencies. The southern and eastern approaches to the KY 1426/KY 1460 intersection showed up as roadway segments with above average crash rates; one 1/10-mile spot (including this intersection and the Huffman Avenue intersection) also had a concentration of crashes.

Project Purpose

The purpose of this project is to improve safety throughout the study area. Both project components - the rockfalls and the intersection traffic operations - relate to this goal independently.

Rockfall

Along portions of KY 1426, debris routinely erodes and falls from an existing rock cut located east of the edge of pavement. In 2007, KY 1426 had to be closed due to a rockfall event.

While improving safety, the rockfall improvement should focus on (1) avoiding negative operational impacts along KY 1426 (e.g., road/lane closures); (2) minimizing negative environmental impacts; (3) avoiding impacts to adjacent businesses; and (4) providing an aesthetically pleasing solution.

Intersection

Both KY 1460 and KY 1426 south of the KY 1460 intersection exhibit a critical rate factor (CRF) greater than 1.00. This means that crashes occur on the study roadways at higher frequencies than on similar roads throughout the state. A 1/10-mile high crash "spot" occurs on KY 1426 which includes the intersections with Huffman Avenue/Summit Drive and KY 1460; this spot has a CRF of 2.47. Within this spot, 21 of 27 reported crashes involve a vehicle stopping on the mainline, resulting in either a rear end crash or a second vehicle being forced to depart the driving lane to avoid impact.

Additional intersection goals supplementing the primary purpose include (1) improving traffic operations; (2) providing adequate storage for school traffic queues; (3) preserving access to surrounding streets and driveways; and (4) minimizing environmental impacts.

Project Purpose and Need: Improve Safety

Rockfall Element
- Avoid negative traffic impacts
- Minimize negative environmental impacts
- Avoid business impacts
- Provide aesthetically pleasing solution

Intersection Element
- Improve traffic operations
- Provide adequate school queue storage
- Preserve access to streets/driveways
- Minimize environmental impacts

Alternatives Development

The project team and key stakeholders met throughout the study process to identify project issues, define the project purpose, gather technical data, and develop and evaluate alternatives.

Three rockfall strategies were developed to address the rockfall hazard:

- Rockwall benching involves cutting the embankment into tiered steps and has major earthwork implications.
- A barrier catchment system resembles a fence running alongside the highway and is designed to catch debris before it enters the roadway.
- A rockfall drape employs a protective material draped along the embankment surface to prevent loose stones from falling.

Eight intersection concepts were also developed to address queuing and safety issues with the existing network. Alternatives were designed which combined Summit Drive, Huffman Drive, and KY 1460 into one intersection with KY 1426, which separated school traffic from Summit Drive, which realigned/widened KY 1460 on or near its alignment, and rerouted school access to KY 1460.

In addition, two small scale improvement elements were evaluated to find a low cost, minimal impact alternative which would offer modest improvements to traffic flow in the project area. Analysts evaluated adding a left turn lane along KY 1426 at Huffman Drive and considered benefits associated with having an officer direct traffic during school peak hours.

A public meeting in November 2007 gave residents of Pikeville and interested parties an opportunity to comment on the issues and vote for a preferred alternative.

Recommendations

Based on public input, technical analysis, and project team concurrence, the preferred alternative was established. This included a rockfall barrier system, pictured below.

A left turn lane along the bypass to serve movements onto Huffman Avenue would also provide operational benefits and could be installed concurrent with the barrier system. Further analysis is recommended for Alternatives 1 and 7 due to public support and the system-wide benefits predicted during simulation exercises. Alternative 1 creates one intersection on KY 1426; Summit Drive and the school access road would tie into KY 1460 opposite one another at a stop-controlled intersection, with Summit Drive bridging above KY 1460. Alternative 7 widens KY 1426 on its existing alignment and moves the school access road to KY 1426, leaving Summit Drive at its current location.

Alternative A - Rockfall Barrier