

## EXECUTIVE SUMMARY

The Danville-Pittsylvania Metropolitan Planning Organization (MPO) in cooperation with the Virginia Department of Transportation (VDOT), the City of Danville, and Pittsylvania County engaged URS Corporation to conduct the Mount Cross Road (Route 750) Improvement Study. The goal of the improvement study is to define the optimal method for improving the existing two-lane section between the intersection with Lowes Drive to the east and the intersection with Whitmell School Road to the west.

The corridor through which Mount Cross Road passes is located in both the City of Danville to the east and Pittsylvania County to the west. Planning for improvements to this corridor has evolved up to and including the *Year 2035 Long-Range Transportation Plan* (August 2010 adoption), which recommended an improvement in the form of widening the existing pavement section in Danville to 4 lanes from the existing 2 lanes. The planned widening begins at Lowes Drive and ends at the Pittsylvania County line.

This improvement study is intended to provide the MPO and local governments with a detailed planning level assessment of the options for improving the roadway by providing conceptual alternatives for the MPO to consider.

### EXISTING CONDITIONS

**Volumes and Service Levels:** Morning and afternoon peak hour turning movement traffic counts were conducted at 9 intersections. Volumes were estimated at an additional 16 intersections. Automated daily directional counts were also conducted at three corridor locations.

Capacity analysis results show that during the AM peak hour all of the intersections operate with adequate service levels, and during the PM peak hour two intersections exhibit deficiencies: 1) The Mill Creek intersection operates with LOS E; and, 2) the West Parker Road intersection operates with LOS F. These poor service levels are primarily a product of heavy through volumes on Mount Cross Road and not a product of insufficient capacity on the minor street approaches.

Queuing analysis shows that no major deficiencies occur at the unsignalized intersections. At the signalized intersection with Lowes Drive, queues become moderately lengthy during the heaviest (95<sup>th</sup> percentile) traffic volume conditions but do not extend beyond available storage during average (50<sup>th</sup> percentile) traffic volume conditions.

**Safety:** A three-year history of crash records was reviewed, and the results showed that the most frequent types of crashes involved rear end collisions and angle collisions. Crash locations are evenly distributed along the corridor.

When compared with statewide average crash rates for an urban minor arterial roadway, the rates on Mount Cross Road between Lowes Drive and Golf Club Road are substantially higher.

### ENVIRONMENTAL RESOURCES

A detailed scan of environmental resources in the Mount Cross Road corridor study area was conducted, and known resources were mapped. This inventory does not indicate the presence of any constraints that are likely to compromise the ability of either VDOT or the County to implement recommended actions. In contrast, along the segment in the City of Danville, four sites of potential hazardous materials will need further documentation as design activities are initiated.

Four previously recorded cultural resource sites are located near the Mount Cross Road Improvement Study project area, but they are unlikely to be designated as significant historic resources. They may require more detailed evaluation associated with project development activities.

During the field reconnaissance, the archaeological sensitivity of the project area was also assessed. Generally, the project area is considered to have a low potential for containing intact archaeological sites.

### YEAR 2035 FORECASTED CONDITIONS

**No Build Alternative:** Forecasts of year 2035 traffic volumes were developed. A major factor in the high rate of forecasted volume growth is the Mega Park, a major economic development site located along Berry Hill Road south of U.S. Route 58 West and west of the Danville Expressway.

When compared with existing conditions, forecasted service analyzed under the year 2035 No Build Alternative deteriorates by several levels. The most severe deterioration is forecast to occur at Whitmell School Road, Fox Trail Road, Oakland Drive, Mill Creek Road, West Parker Road, and Moorefield Bridge Road. Poor service levels are due to forecasted traffic volumes on Mount Cross Road becoming sufficiently high so that adequate gaps in the traffic stream will be less frequent, and motorists on the minor street approaches will encounter increased delay before safely entering the traffic stream.

Queuing analysis indicates that although vehicle queue lengths will increase, average queues at unsignalized intersections will not exceed storage capacity.

### STATEMENT OF PURPOSE AND NEED

State regulation define Access Management as *"...the systematic control of the location, spacing, design, and operation of entrances, median openings, traffic signals, and interchanges for the purpose of providing vehicular access to land development in a manner that preserves the safety and efficiency of the transportation system"* (See 24VAC30-72-10).

The goals of access management are to:

1. Reduce traffic congestion;
2. Help maintain levels of service;

3. Enhance public safety;
4. Support economic development;
5. Reduce the need for new highways;
6. Preserve investment in new highways; and,
7. Coordinate transportation and land use decisions.

After applying these goals within the regulatory definition of Access Management and considering the results of the analysis of existing and forecasted conditions, the statement of purpose and need for the Mount Cross Road Improvement Study is defined as addressing the following issues:

1. Along the segment Mount Cross Road located within the City of Danville, the *FY2012 Six-Year Transportation Improvement Program* provides for spot safety and access management improvements. These should be defined so that the City may pursue final design;
2. Pittsylvania County needs a guide to assist property owners and developers to understand the impacts of the application of access management regulations along a Urban Minor Arterial and a Rural Major Collector;
3. Frequencies of crashes along Mount Cross Road have the potential to increase as traffic volumes and development activity increases;
4. Service levels in the area of six intersections are forecast to deteriorate to inadequate levels unless improvements are developed and installed; and,
5. Capacity along the corridor should be preserved so that it can adequately serve traffic volumes associated with commuters to and from the Mega Park.

**IMPROVEMENT ALTERNATIVES**

As recommended in the *Long Range Transportation Plan*, the segment of Mount Cross Road in the City of Danville is to be widened. Initially, a 4-lane section (Alternative 1) with a divided median and a 5-lane section (Alternative 2) with a center two-way left turn lane were developed and presented to the study team. An interim improvement, Alternative 3, was also developed in order to have a design that might be implemented in the short term. Finally, a hybrid alternative, Alternative 4, was developed to control costs by widening only as far as the programmed \$6 million would finance. Instead of widening to the County limits, Alternative 4 terminates widening near Salem Road. West of Salem Road Alternative 4 provides for paved shoulders, each with a width of 8 feet, on the existing two-lane section.

For the segment of Mount Cross Road in Pittsylvania County, improvement alternatives focused on access management and safety measures. No widening is planned.

**EVALUATION CRITERIA:** Eight evaluation criteria were used to evaluate the improvement alternatives:

1. Capacity
2. System Performance
3. Safety
4. Cost
5. Right Of Way Impacts
6. Environmental Impacts
7. Financial Impacts
8. Consistency with Local Plans

**COST ESTIMATES:** Cost estimates were prepared for each proposed improvements related to the access management segments of the corridor (in Pittsylvania County)

Each of the proposed new traffic signals will cost approximately \$170,000 (in 2011 dollars). Traffic signals were warranted (based on 2035 volumes) at the following intersections:

- Whitmell School Road
- Moorefield Bridge Road
- Golf Club Road
- Mill Creek Road

Several turn lanes were warranted at study area intersections, and each of these will cost approximately \$120,000. Turn lanes were warranted at the following Mount Cross Road intersections based on forecasted 2035 volumes:

- Westbound right turn lane @ Whitmell School Road
- Westbound left turn lane @ Moorefield Bridge Road
- Eastbound left turn lane @ Moorefield Bridge Road
- Northbound left turn lane @ Moorefield Bridge Road
- Westbound left turn lane @ Pinecroft Road
- Westbound left turn lane @ Golf Club Road
- Westbound left turn lane @ Mill Creek Road

Cost estimates for the alternative improvements to Mount Cross Road in the City of Danville are as follows:

- Alternatives 1 & 2           \$7,500,000
- Alternative 3               \$2,030,000
- Alternative 4               \$6,000,000

In addition to the widening improvements on Mount Cross Road, a separate right turn lane with an estimated cost of \$190,000 was recommended on the westbound Mount Cross Road approach to Lowes Drive.

**BUILD ALTERNATIVE:** Capacity analysis of the Build Alternative was conducted for both a 4-lane (Alternative 1) and a 5-lane section (Alternative 2) on Mount Cross Road for the segment in the City. In the County, the Build Alternative consisted of turn lane improvements and the installation of traffic signals.

Based on the 4-hour traffic signal volume warrant, four intersections will meet the warrants for a traffic signal under forecasted year 2035 traffic volumes: Whitmell School Road, Moorefield Bridge Road, Golf Club Road, and Mill Creek Road. Based on the need for a traffic signal at the Moorefield Bridge Road intersection, left turn lanes will be required to achieve optimal signal operation on all approaches with the exception of the southbound approach.

**CAPACITY ANALYSIS:** The results of capacity analysis of the intersection of Lowes Drive and Mount Cross Road forecast adequate levels with level service at B and C in the AM and PM peak hours, respectively. Improvement over the No Build Alternative was achieved by applying a shorter traffic signal cycle length and by the reconfiguration of the westbound Lowes Drive approach lanes.

At the unsignalized intersections, with only one exception capacity analysis forecasts operations at service levels no lower D. The exception is the intersection of West Parker Road and Mount Cross Road. The low service level is a result of heavy through volumes on Mount Cross Road making it difficult for motorists on the minor street desiring to turn left to complete their maneuver. This intersection does not appear to have sufficient forecasted volumes to meet traffic signal warrants.

Finally, the results of the queuing analysis of the forecast year 2035 Build Alternative volumes indicate that no lengthy vehicle queues are likely to form on any of the intersection approaches.

***PREFERRED ALTERNATIVE***

After reviewing the impacts of the four improvement alternatives in the City of Danville and the safety improvements in Pittsylvania County, evaluating traffic operations and cost estimates, and considering concerns expressed by citizens, URS Corporation recommended to the Project Management Team that for the segment of Mount Cross Road in the City of Danville Alternative 4, providing for widening Mount Cross Road and shoulder improvements (shown in **Figures 12-A and 12-B** be selected as the Preferred Alternative. URS Corporation further recommended that for the segment of Mount Cross Road in Pittsylvania County the improvements shown in **Figures 13-16** be selected as the Preferred Alternative.

When compared with the other alternatives, including the No Build Alternative, the Preferred Alternative was selected because of the following principal reasons:

1. It (the Preferred Alternative) provides for the greatest extent of improvements within the budget for improvements as detailed in the current VDOT *FY2012-2017 Six-Year Improvement Program*;

2. It addresses all existing and forecasted deficiencies along the corridor, with emphasis on addressing safety and access management;
3. The environmental impacts of the Preferred Alternative are not anticipated to be either severe or extensive;
4. It provides the MPO and VDOT with the option to extend the length of the widening section to the Pittsylvania County limits if additional funding becomes available;
5. It provides the option to include added improvements (such as the northbound right turn lane on the Lowes Drive approach) either concurrently with the widening or at a later date; and,
6. It is consistent with the 2035 Long-Range Transportation Plan and the Six-Year Improvement Program.

***FINANCIAL IMPACTS***

Implementing the Preferred Alternative (including the westbound right turn lane) on the Mount Cross Road segments in the City of Danville will require that financing be provided to cover the estimated \$6.2 million cost.

The *Danville-Pittsylvania Area Long-Range Transportation Plan* identifies anticipated funding resources on an annual basis beginning in Fiscal Year 2010<sup>1</sup>. The funding resources indicate that beginning in Fiscal Year 2016, construction funding for roadway improvements in the Danville-Pittsylvania urbanized area is anticipated to be approximately \$2.4 million per year. Of that total, \$75,658 is allocated for the secondary road system in Pittsylvania County, leaving approximately \$2.3 million for other improvements on the primary, secondary or urban system.

For the improvements to Mount Cross Road in Pittsylvania County, construction funding may be allocated from the secondary roadway fund, the MPO funds or from safety funds. Moreover, unlike the improvements in the City, the individual improvements in the County can be implemented at different times. With this flexibility, the improvements can be individually implemented when they achieve a sufficient level of priority relative to other needed improvements that the MPO in cooperation with Pittsylvania County and VDOT program the funds in the appropriate *SYIP* fiscal year.

***PERMIT EVALUATION***

For the segment of Mount Cross Road in Pittsylvania County, the data produced by the environmental resource scan does not indicate the presence of any constraints that are likely to compromise the ability of either VDOT or the County to implement recommended actions.

<sup>1</sup> *Danville-Pittsylvania Area Long-Range Transportation Plan*. Danville-Pittsylvania MPO. August 16, 2010. p.55.

In contrast, along the segment in the City of Danville, four sites of potential hazardous materials will need further documentation as design activities are initiated. Moreover, no significant cultural resource sites have been found to be located in the study area. Finally, the Preferred Alternative does not appear to involve activities in state waters and wetlands, so a permit will not be required.

### ***PUBLIC INVOLVEMENT***

The public involvement program conducted as part of the corridor study provided two opportunities for interested citizens to participate in the process.

The first Citizens Information Meeting was held on Monday, July 11, 2011 between 4 p.m. and 7 p.m. at Park Avenue Elementary School in Danville, Virginia. A total of twenty citizens signed the attendance sheet.

The second Citizen Information Meeting was conducted on Monday, September 19, 2011, between 4 p.m. and 6 p.m. at Park Avenue Elementary School in Danville, Virginia. A total

of nine citizens signed the attendance sheet. Four written comments were submitted, with one requesting more detail on the impacts the proposed improvements would have on a particular site, and the remaining three comments suggesting operational improvements (signals, warning signs, for example). No written or verbal comments expressed opposition to improvements to Mount Cross Road.

A summary presentation and discussion was conducted at an informal meeting of the Danville City Council on November 15, 2011 at Danville City Hall. Finally, an additional opportunity for citizen comment was provided at the public hearing, which was held immediately prior to the meeting of the MPO Board on January 19, 2012 at the Danville Regional Airport.