Alternatives Planning Study for KY 1006 (5th Street)

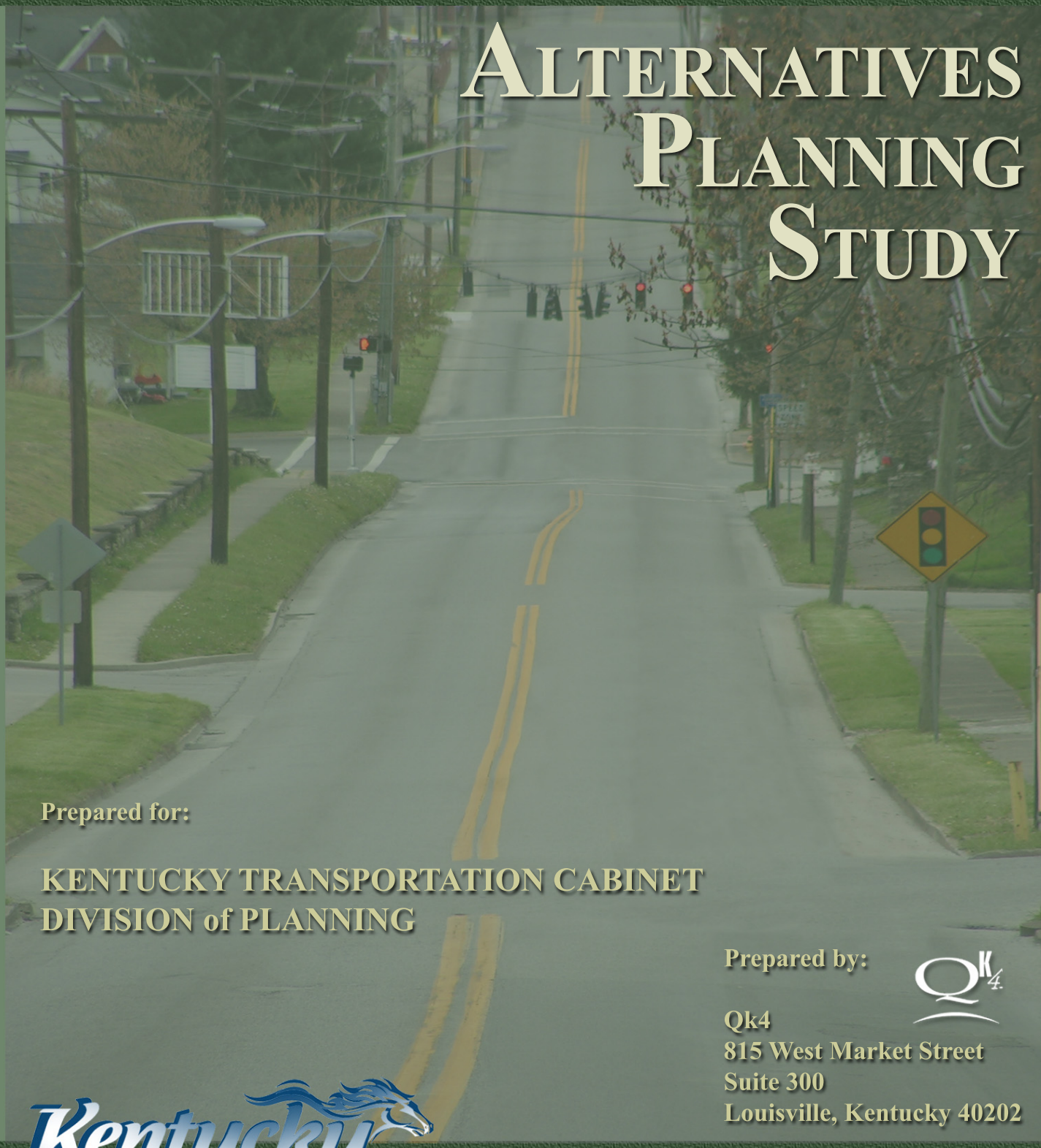
from KY 192 to US 25 (Main Street), City of London

Laurel County

Item Number 11-8304.00

KENTUCKY TRANSPORTATION CABINET

Final Report



ALTERNATIVES PLANNING STUDY

Prepared for:

KENTUCKY TRANSPORTATION CABINET
DIVISION of PLANNING

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October 2008

ALTERNATIVES PLANNING STUDY

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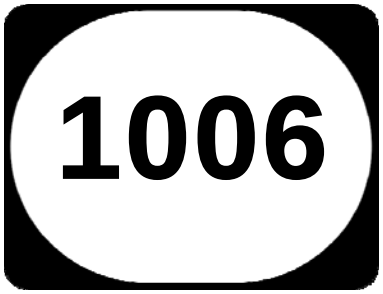

Kentucky 1006 (5th Street)

From KY 192 to US 25 (Main Street) in the City of London

Laurel County, Kentucky

Item No. 11-8304

Prepared for:

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EXECUTIVE SUMMARY

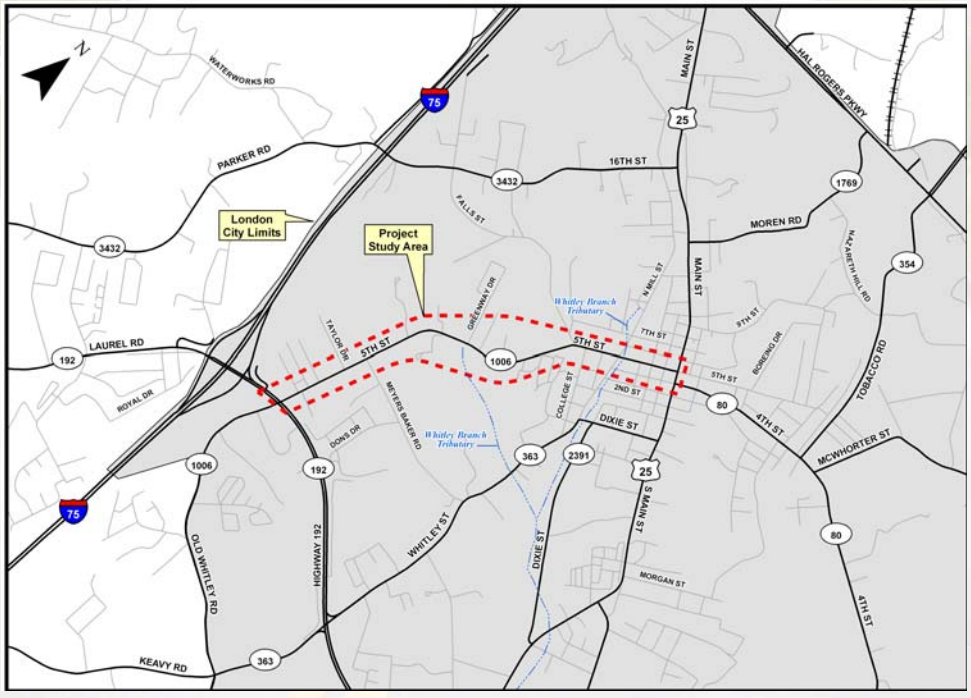
Study Background and Purpose

This report documents a transportation alternatives study examining feasible improvement opportunities for 5th Street (KY 1006) in the city of London, Kentucky, beginning near KY 192 and extending north to US 25 (Main Street). The Kentucky Enacted Six-Year Highway Plan FY 2007-2012 identified this study as Item No. 11-8304. This project candidate was prioritized highly in the 2001 *London-Laurel County Transportation Study* and has been identified as a high local priority in the KYTC Statewide Transportation Planning process. 5th Street was recently scored with an Adequacy Rating percentile of 55 on the KYTC Project Identification Form (PIF). This PIF identified horizontal alignment, access, capacity, and safety issues with a particular concern for sight distance restrictions near the former Sue Bennett College.

This current study examines existing and forecasted conditions on 5th Street with standard transportation metrics to determine whether there are current or projected future deficiencies and to evaluate the extent of any deficiencies that may be identified. Alternative improvement concepts were considered for six sub-segments of this highway facility. The alternative concepts were evaluated by a KYTC Project Team, local officials, and the public at large. The result of the study presented herein is a recommended set of highway improvements for future implementation.

Study Location and Limits

KY 1006 is a state-maintained highway located entirely within Laurel County that begins at the entrance to Levi Jackson Wilderness Road State Park, intersects with US 25, KY 2069, and KY 363 before its junction with KY 192, then terminates at US 25 (Main Street) in London. The 1.55-mile section of KY 1006 (5th Street) from KY 192 to Main Street is the subject of this study.



Conditions Analysis

Fifth Street, which is in the study area, is an undivided 2-lane highway functionally classified on the Kentucky highway system as an Urban Minor Arterial Street. Average daily traffic volumes (ADT) peak south of Mill Street at nearly 8,200 vehicles per day (vpd), but decline to approximately 5,500 vpd north of that point. Truck percentages are negligible (less than 2%). After significant increases in the late 1980s, traffic growth on 5th Street has been modest. Traffic volumes south of Mill Street have grown 30% since 1991, while those north of Mill Street have grown 6% in this same period—which represent an annual growth rates of less than 2% for the entire corridor. Future growth was projected at 1.5%, resulting in an estimate for the Year 2030 of 13,700 vpd south of Mill Street and an estimate of 8,800 vpd north of Mill Street. The intersections of 5th Street at KY 192 and US 25 are signalized. The only other traffic signal between these highways is at the 5th Street/Mill Street intersection.

Several geometric and other deficiencies were identified along 5th Street. While the road's average 11-foot lane width is adequate, there are several significant horizontal and vertical curvature deficiencies. Intersection geometrics at the junctions with Falls Street and with Mill Street are deficient. There is a sidewalk along either the north or south (or, at times, each) side of 5th Street throughout the entire length of the project corridor; however, some stretches of sidewalk are in disrepair.

Project Issues and Goals

The goals for this project include:

- **Improve safety on 5th Street**
- **Improve traffic flow on 5th Street**
- **Accommodate historic preservation**
- **Implement context sensitive design solutions**
- **Provide "Americans with Disabilities" (ADA) design accommodations**
- **Enhance economic development**

Alternatives Development and Evaluation

There are discrete transportation issues that vary by location along the 5th Street corridor. Thus, the corridor was segmented into six analysis sections plus two locations of emphasis within one of those segments. Analysis sections and alternative improvements considered for each follow:

1. **KY 192 to Meyers-Baker Road (0.35 mile):**
   a. **Three Lanes with Center Two-Way Left Turn Lane**
   b. **Five Lanes with Center Two-Way Left Turn Lane**
2. **Meyers-Baker Road to Bennett Hill (0.70 mile):**
   a. **Three Lanes with Center Two-Way Left Turn Lane**
   b. **Five Lanes with Center Two-Way Left Turn Lane**

2.1. Forest Lane/Stivers Lane (milepost [MP] 5.99): Spot Improvements

2.2. Entrances to First Baptist Church (MP 6.15 to 6.30): Spot Improvements

3. **Bennett Hill (0.15 mile):**
   a. **Relocate Falls Street to south side of Community Christian Church**
   b. **Lower Hill / Improve Vertical Alignment**
   c. **Relocate 5th Street to the west in the vicinity of Falls Street**
4. **Bennett Hill to Mill Street (0.10 mile):**
   a. **3 Lanes with Center Two-Way Left Turn Lane**
   b. **5 Lanes with Center Two-Way Left Turn Lane**
5. **Mill Street Intersection:**
   a. **Add Left-Turn Lane on Northbound 5th Street, plus construct a slight realignment of Mill Street on the west side of 5th Street to line up with the east side**
   b. **Add Left-Turn Lanes on Northbound 5th Street and on Westbound Mill Street by widening Mill toward the north**
   c. **Add Left-Turn Lanes on Northbound 5th Street and Westbound Mill by shifting both legs of Mill Street to the south**
   d. **Construct Roundabout**
6. **Mill Street to US 25 (Main Street) (0.25 mile):**
   a. **Streetscape Improvements**
   b. **Do Nothing**

Recommendations

The following project improvements are recommended in each of three time periods:

1. **AS SOON AS POSSIBLE—**

   - **Section 2: Spot Improvement 2.1, first phase—**Cut back hill at Forest Lane/Stivers Lane. Cost estimate: $1.50 million.

   - **Section 5: Alternative Concept C—**Reconstruct northbound 5th Street at Mill Street to realign Mill Street and to add left-turn lanes on northbound 5th and westbound Mill Streets. Cost estimate: $800,000.

   - **Section 3: Alternative Concept B—**Reconstruct 5th/ Falls Streets intersection by lowering the grade of the existing alignment; *or* **Section 3: Alternative Concept C—** Reconstruct 5th Street by shifting its alignment slightly to the west. Cost estimate: $1.03 million *or* $1.41 million, respectively.

     If both of the above options become problematical, consider **Section 3: Alternative Concept A—**Relocating Falls Street to the south side of the Community Christian Church. Cost estimate: $1.50 million.

2. **PRIOR TO CONSTRUCTION OF "CORRIDOR BORDER"[1]—**

   - **Section 1: Alternative Concept B—**From KY 192 to Meyers-Baker Road, widen 5th Street to 5 lanes with center two-way left-turn lane and construct sidewalks as shown on the typical section (Figure 6). Cost estimate: $4.24 million.

3. **AFTER CONSTRUCTION OF "CORRIDOR BORDER"—**

   - **Section 2: Alternative Concept A—**From Meyers-Baker Road to YMCA Entrance, widen 5th Street to 3 lanes with center two-way left-turn lane and construct sidewalks as shown on the typical section (Figure 5)**.** Cost estimate: $4.99 million.

The total estimated cost of the recommended improvements ranges from approximately **$13.44 million to 13.91 million**. Exhibit 1 in Appendix A shows the locations of the improvement options. Appendix B contains photographs of existing conditions and features along 5th Street through the study area.

[1] The Corridor Border (KYTC Item No. 11-139.01) is a proposed new route paralleling the east side of I-75. It will begin with a new intersection on 5th Street across from Myers-Baker Road and continue north to US 25. It is currently in the design phase. The project is programmed for partial funding in the KYTC 2008 Highway Plan.

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1.0 INTRODUCTION

In 2001, the Kentucky Transportation Cabinet (KYTC) completed the *London-Laurel County Transportation Study*, which evaluated the need for short-term operational and long-term future transportation system improvements in London and surrounding portions of Laurel County, Kentucky. The transportation study is provided in Appendix C. That study recommended improvements to 5th Street (KY 1006) between KY 192 and US 25 (Main Street). Particular emphasis was placed on the intersection of 5th Street and Falls Street near the former Sue Bennett College. (Through this area 5th Street is locally known as "Bennett Hill.") Subsequent articulation of candidate project priorities through the KYTC Statewide Transportation Planning process confirmed the high importance placed by local officials on these locations for improvements to 5th Street. The Kentucky Enacted Six-Year Highway Plan FY 2007-2012 included a *Scoping Study for 5th Street* (the *Alternatives Planning Study for KY 1006/5th Street,* hereafter called the *5th Street Study*) as Item No. 11-8304.00. KYTC retained the consulting firm of Qk4 to conduct the study.

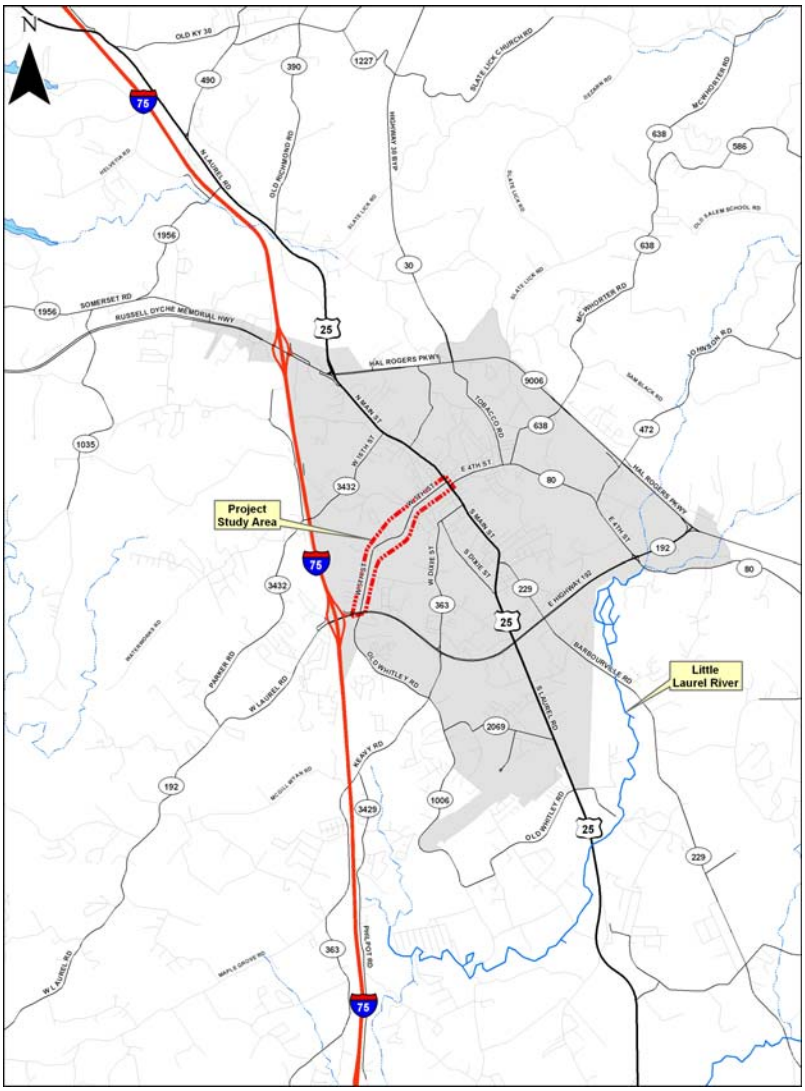


Figure 1: Project Location Map

1.1 Project Location and Study Area

The city of London is located in southeastern Kentucky (see Figure 1), approximately 75 miles south of Lexington and 98 miles north of Knoxville, Tennessee. London, the county seat of Laurel County, has a population of 5,692, according to the 2000 Census. Laurel County's population is 52,517. London is located along Interstate 75 (I-75), a major north-south route. Major east-west highways include KY 80, the Daniel Boone Parkway (KY 9006), and US 25. The project study area is 152 acres extending northwest from just south of the intersection of 5th Street and KY 192 to its terminus at the intersection of 5th Street and Main Street. Figure 2 identifies the study area.

1.2 Study Process

The *5th Street Study* in London has consisted of four major steps:

- **Define the project issues and goals.**
- **Develop alternative solutions to the identified transportation issues that reflect the project goals.**
- **Evaluate the alternatives through discussions with a KYTC Project Team, local officials, and other project stakeholders in the London community, and the public at large.**
- **Recommend alternative solutions.**

The subsequent chapters in this report follow these steps.

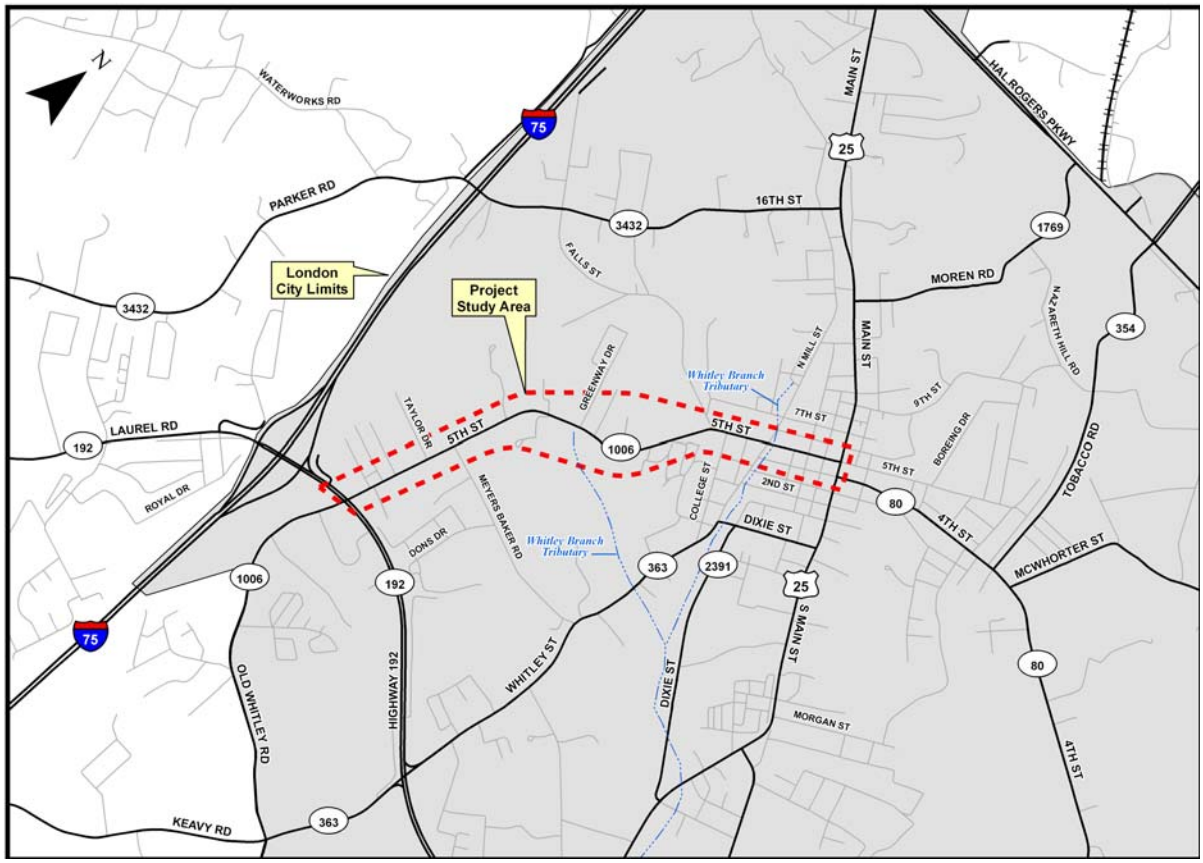


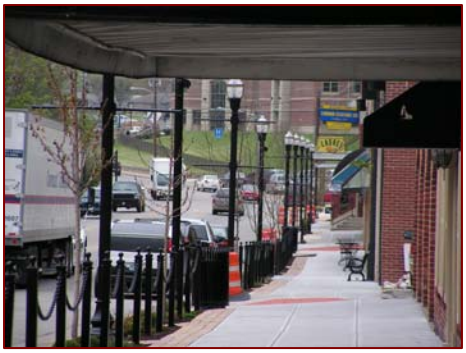
Figure 2: Study Area Map

2.0 STUDY ISSUES AND GOALS

2.1 Project Issues

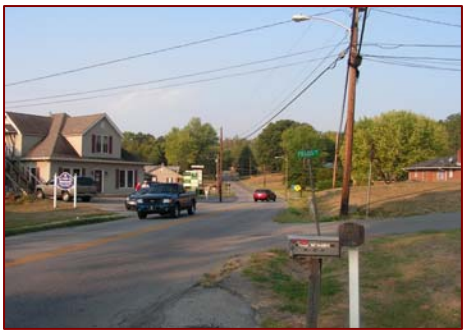
Discussions were held with the Project Team, local officials, and other project stakeholders in the London area (see Chapter 6), during which a number of important issues were identified for consideration in examining 5th Street. A summary of the issues and photographic examples, where available, are below.

- **London Downtown, Inc. wants to develop Main Street into a retail economic center (some streetscape improvements have already been implemented), and transform Broad Street (a parallel route between Maple Avenue and 1st Street) into an improved transportation corridor.**



- **On-street parking in the vicinity of 5th Street and Main Street limits traffic flow and speed.**

- **Fifth Street is transitioning from a predominantly residential corridor to a commercial corridor.**



- **Sidewalks at Bennett Hill are narrow, overgrown with vegetation, and provide poor visibility.**

- **Recommended improvements should be aesthetically pleasing and appropriate to the surrounding area.**

- **Safety is a serious issue, especially in the vicinity of "Bennett Hill" and Falls Street intersection.**

- **Provisions for joggers and bicyclists should be considered.**

- **Sections 106 and 4(f)—historic properties issues are likely.**

- **The traffic volume on 5th Street decreases by more than one third north of the Mill Street intersection.**
- **The Bennett Center/Union College experiences most of its commuter activity in the evening, while the neighboring YMCA center is mostly active during day/business hours.**
- **Residential relocations are anticipated but no "last resort housing" issues.**
- **The existing hospital is relocating to new facilities west of I-75 between Exits 38 and 41, which may alter existing traffic flow patterns.**
- **Turning lanes should be considered as a spot improvement.**
- **If the proposed typical section consists of a 3-lane roadway, then it will probably encourage new commercial development along the 5th Street corridor.**

2.2 Project Goals

The project goals to be evaluated in the *5th Street Study* result from the project issues discussed above. These goals were developed in consultation with the Project Team, local officials, and other project stakeholders. The general public also had opportunities to propose and comment on the goals (see Chapter 6). The project goals include:

3.0 EXISTING AND FUTURE NO-BUILD CONDITIONS

3.1 Highway and Traffic Characteristics

Existing conditions on 5th Street were compiled from the KYTC Highway Information System (HIS) database and from KYTC crash records. Recent (2007) traffic counts conducted by KYTC revealed an average daily traffic volume (ADT) of 8,180 vehicles per day (vpd) at a count station on 5th Street near the intersection with Houser Road, while a second station just north of the intersection with Mill Street showed an ADT of 5,520 vpd. The percentage of single unit and combination trucks in the traffic mix was slight (1.4%). In 2030, ADT volumes at these two count stations are projected to be 13,700 vpd and 8,800 vpd, respectively.

The highway has adequate lane widths of approximately 11 feet in the study area. Shoulder widths average between 4 and 7 feet south of the Bennett Center. Access control appears to be unregulated, and there are utility poles and other objects near the travel lanes. The posted speed limit is 35 miles per hour (mph) south of the intersection at Long Street and 25 mph north from that location. Right-of-way widths average 40 to 60 feet. Sidewalks are present on the north or south side (and in some locations on each side) of 5th Street for the entire length of the project corridor; however, in some locations they are in disrepair. There are sight distance restrictions near the Forest Lane/Stivers Lane intersection and in front of the First Baptist Church due to horizontal and vertical curve deficiencies. North of the First Baptist Church is a steep hill cresting just before the intersection with Falls Street. There are three signalized intersections in the study area: Fifth Street at KY 192, at Mill Street, and at US 25 (Main Street). Table 1 summarizes 5th Street's roadway characteristics.

Table 1: Fifth Street Roadway Characteristics

Roadway Characteristics	Begin MP 5.344 to End MP 5.691 KY 192 to Meyers-Baker Road	Begin MP 5.691 to End MP 6.382 Meyers-Baker Road to Bennett Hill	Begin MP 6.382 to End MP 6.666 Bennett Hill to Mill Street	Begin MP 6.666 to End MP 6.879 Mill Street to US 25
Driving Lanes	2	2	2	2
Lane Width	11	11	11	11
Shoulder Type	Combination	Combination	Curbed	Combination
Shoulder Width	4-7	4	2	0 – 2
2007 ADT	8180	8180	8180	5520
Posted Speed Limit	35	35	35	25
Average R/W Width	40 – 60	40 – 60	40	40 – 45
Type Road	Undivided Highway	Undivided Highway	Undivided Highway	Undivided Highway
Median	None	None	None	None
Functional Class	Urban Minor Arterial Street	Urban Minor Arterial Street	Urban Minor Arterial Street	Urban Minor Arterial Street
State Primary Road System	State Secondary	State Secondary	State Secondary	State Secondary
National Hwy System	NO	NO	NO	NO
National Truck Network	NO	NO	NO	NO
Truck Weight Class	A	A	A	A
Terrain	Rolling	Rolling	Rolling	Rolling
Pavement Type	High Flexible	High Flexible	High Flexible	High Flexible

3.2 Intersection Level of Service and Delay

For purposes of capacity and level-of-service analysis, the focus was on three key intersections:

- Fifth Street and Falls Street
- Fifth Street and Mill Street
- Fifth Street and Main Street

Morning and afternoon (AM and PM) peak-hour traffic operating conditions for both current and future (2030) years were calculated. For each intersection, average vehicle delays were calculated as well as the resulting levels of service.

Level of service (LOS) is a qualitative measure of expected traffic conflicts, delay, driver discomfort, and congestion. Levels of service are described according to a letter rating system (similar to school grades) ranging from LOS A (free flow, minimal or no delays – best conditions) to LOS F (stop and go conditions, very long delays – worst conditions). For intersections the Highway Capacity Manual defines levels of service based on the average delay due to the signal or stop control. LOS C is often considered the threshold for desirable traffic conditions in smaller cities such as London. In this study, levels of service below this threshold are noted as undesirable and warrant improvement. LOS C corresponds to less than 35 seconds of delay per vehicle at a signalized intersection and less than 25 seconds of delay at an unsignalized intersection.

Traffic projections were developed for the year 2030 to determine how 5th Street would function if no improvements (beyond normal maintenance) were made during that time period. This scenario is referred to as the No-Build Scenario.

3.3 Future Traffic Volumes

After significant increases in the late 1980s, traffic growth on 5th Street in London has been modest. As shown in Table 2 (p. 8), traffic volumes south of Mill Street have grown 30% since 1991, while those north of Mill Street have grown only 6% in this same period. These are annual growth rates of less than 2%. Future growth was projected at 1.5%, resulting in an estimate for the year 2030 of 13,700 vehicles daily south of Mill Street and an estimate of 8,800 vehicles daily north of Mill Street.

3.4 Future Intersection LOS and Delay

Levels of service for the three key intersections on KY 1006 were evaluated using the projected traffic volumes. Table 3 (p. 9) illustrates the current and 2030 intersection LOS for each of the three study intersections. Exhibit 2 in Appendix A shows the intersection locations and traffic volume/LOS data.

Table 2: Historical and Projected Traffic Volumes

Year	Between KY 192 & Mill Street	Between Mill Street & Main Street
1964	1,280	
1966	1,370	3,530
1969	1,620	
1972	2,480	3,840
1973	2,870	
1975	3,340	
1978	4,600	5,540
1982	3,660	4,610
1985	3,320	4,360
1991	6,260	5,200
1995	6,910	5,870
2001	7,990	5,950
2004	9,490	5,960
2007	8,180	5,520
Forecasted Average Annual Growth Rate	**<2%**	**<2%**
% Change from 1991 to 2007	**30%**	**6%**
2010	10,180	6,500
2020	11,820	7,550
2030	13,700	8,760
Average Annual Growth Rate	**1.5%**	**1.5%**
Projected % Change from 2007 to 2030	**67%**	**59%**

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Table 3: 2007 and 2030 Intersection LOS Summary

Fifth Street @ Falls Street—Year 2007								
	V/C Ratio		95% Queue		Delay		LOS	
Movement	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
Eastbound, Left	0.04	0.03	0	0	7.3	7.3	A	A
Northbound, Left	0.44	0.51	2	3	14.0	16.0	B	C
Northbound, Right	0.26	0.43	1	2	11.7	13.2	B	B
Fifth Street @ Falls Street—Year 2030								
	V/C Ratio		95% Queue		Delay		LOS	
Movement	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
Eastbound, Left	0.05	0.12	0	1	7.3	7.3	A	A
Northbound, Left	0.70	0.87	6	10	22.5	41.2	C	E
Northbound, Right	0.41	0.65	2	5	14.1	19.1	B	C
Fifth Street @ Mill Street—Year 2007								
	V/C Ratio		95% Queue		Delay		LOS	
Movement	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
Eastbound, Left/Through/Right	0.45	0.43	7	6	15.1	16.3	B	B
Westbound, Left/Through/Right	0.24	0.29	4	4	13.7	15.4	B	B
Northbound, Left/Through/Right	0.60	0.59	12	11	12.1	10.9	B	B
Southbound, Left/Through/Right	0.26	0.48	5	10	9.0	9.4	A	A
Fifth Street @ Mill Street—Year 2030								
	V/C Ratio		95% Queue		Delay		LOS	
Movement	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
Eastbound, Left/Through/Right	0.65	0.62	11	10	18.4	19.2	B	B
Westbound, Left/Through/Right	0.36	0.42	5	6	14.4	16.3	B	B
Northbound, Left/Through/Right	0.87	0.94	21	23	24.5	36.1	C	D
Southbound, Left/Through/Right	0.37	0.68	7	16	9.7	12.6	A	B
Fifth Street @ US 25—Year 2007								
	V/C Ratio		95% Queue		Delay		LOS	
Movement	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
Eastbound Left	0.04	0.06	0	0	5.4	5.8	A	A
Eastbound, Through/ Right	0.71	0.73	16	17	15.9	16.0	B	B
Westbound, Left	0.10	0.14	1	1	6.0	6.0	A	A
Westbound, Through/Right	0.63	0.72	14	17	14.0	15.7	B	B
Northbound, Left/Through/Right	0.56	0.25	6	2	22.4	20.1	C	C
Southbound, Left/Through/Right	0.38	0.52	4	6	20.2	21.2	C	C
Fifth Street @ US 25—Year 2030								
	V/C Ratio		95% Queue		Delay		LOS	
Movement	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
Eastbound Left	0.08	0.12	1	1	7.7	9.9	A	A
Eastbound, Through/ Right	1.01	1.03	34	38	50.4	57.3	D	E
Westbound, Left	0.21	0.26	1	1	9.8	10.7	A	B
Westbound, Through/Right	0.89	1.02	24	37	26.9	52.2	C	D
Northbound, Left/Through/Right	0.90	0.40	11	4	51.1	21.6	D	C
Southbound, Left/Through/Right	0.54	0.77	6	9	21.9	33.6	C	C

3.5 Crash Analysis

KYTC provided crash data for a five-year period from January 1, 2002, through December 31, 2006. During this period, 94 crashes occurred on 5th Street between milepost (MP) 5.344 (KY 192) and MP 6.879 (US 25). Crash rates were computed for four specific segments of 5th Street within the study area:

- From KY 192 (MP 5.344) to Meyers-Baker Road (MP 5.691)
- From Meyers-Baker Road (MP 5.691) to Falls Street (MP 6.505)
- From Falls Street (MP 6.505) to Mill Street (MP 6.666)
- From Mill Street (MP 6.666) to Main Street (MP6.879)

Crash rates are typically expressed in terms of crashes per 100 million vehicle miles to take into account the volume of traffic on a particular highway segment. A segment's crash rate is then compared to a statewide critical crash rate for the same type of roadway to identify high crash locations. Highway sections with a crash rate higher than the critical crash rate are considered statistically significant high crash locations and are potential candidates for safety improvements. Results of this analysis are provided on Table 4. As shown, the corridor in its entirety, and three of the four segments within the corridor analyzed are high crash locations.

Table 4: Corridor / Segment Crash Analysis

Beginning MP	Ending MP	Total Number of Crashes	Crash Rate	Critical Crash Rate	Critical Crash Rate Factor
Corridor					
5.344	6.879	95	369.710	329.970	**1.200**
Segment					
5.344	5.691	34	567.402	405.387	**1.400**
5.692	6.505	26	182.536	343.802	0.531
6.506	6.666	19	1.084	0.762	**1.422**
6.667	6.879	15	1.339	1.075	**1.246**

NOTE: *Yellow highlighted sections indicate high crash locations.*

4.0 HUMAN ENVIRONMENT OVERVIEW

4.1 Environmental Justice

An *Environmental Justice and Community Impact Report* that was prepared for this *5th Street Study* examined feasible improvement opportunities for 5th Street in London by the Cumberland Valley Area Development District (CVADD). The full report is included in Appendix D and is summarized in this chapter.

An *Environmental Justice and Community Impact Report* (EJ Report) is an assessment of community demographics within the study area and a comparison of these demographics with those of the surrounding area, particularly regarding low income, minority, and elderly populations. The goal of such an effort is to ascertain if any of these populations might be disproportionately impacted by improvements to the 5th Street corridor.

Census data for four Block Groups (1, 2, 3, and 4) in Tract 9706 represented the study area. Census data for seven additional Block Groups, as listed below, represented the surrounding area:

- Census Tract 9704 – Block Groups 1 & 2
- Census Tract 9705 – Block Groups 2 & 3
- Census Tract 9707 – Block Group 1, 2, & 3

Comparison of the demographic characteristics of the Block Groups representing the study area to the Block Groups surrounding the study area and to state and national averages revealed the following:

- Minority Population: The percentage of minority population in the study area is below both state and national averages. Discussions held by CVADD with local elected officials and other community members confirmed that significant concentrations of minority population are not located in or surrounding the study area.
- Low-Income Population: The percentage of the population with income below the poverty level in and surrounding the study area significantly exceeds state and national averages. CVADD noted that these percentages in and surrounding the study area are comparable to those in areas surrounding London and Laurel County.
- Population Age 62 and Older: Although the percentage of persons age 62 and older in Laurel County modestly surpasses state and national averages, discussions held by CVADD with local elected officials and the Laurel County Senior Citizens Center Director indicated that no significant concentrations of persons aged 62 and older are located in or surrounding the study area.

CVADD concluded that no defined Environmental Justice community exists within the project study area and hence no disproportionate impacts on minority, low-income, or elderly populations would occur as a result of any improvements to the 5th Street corridor.

4.2 Underground Storage Tanks/Hazardous Materials

A former Dairy Mart store previously located at the southwest corner of 5th and Mill Streets (see Exhibit 3 in Appendix A) was the site of a leaking underground storage tank (UST) for gasoline. A record search of environmental data for the 5th Street corridor indicates that this storage tank was removed in 1996. However, the Division of Waste Management in the Kentucky Environmental and Public Protection Cabinet (EPPC) indicates that issues of soil and groundwater contamination at this site are unresolved. Elevated levels of benzene are a concern at this location.

4.3 Cultural Historic and Archeological Resources

Cultural Historic Resources

The *Cultural Historic Resource Overview* prepared for this study identified the following resources on or potentially eligible for the National Register of Historic Places (NRHP). Exhibit 3, Appendix A, shows their locations. Historic resources along the 5th Street corridor that are **listed on the NRHP** are as follows:

- Sue Bennett Memorial School Building (Administration, at right), located in the southwest quadrant of the intersection of 5th Street with College Street
- A cluster of three other buildings associated with the former Sue Bennett College:
  - Belle Bennett Building
  - Helm Hall
  - Little Rock Cottage

Properties along the 5th Street corridor that appear to be **eligible for listing on the NRHP** are:

- Potential Historic Commercial District in downtown London (see photos below) including, among other buildings, the Laurel County Courthouse, commercial buildings on the west side of Main between West 5th and West 6th Streets, buildings in the northeast quadrant of the intersection of Main and East 5th Streets, and buildings on the north side of West 5th Street between Broad and Main Streets.

- Adams Signs and Graphics, 1211 West 5th Street
- Dwelling, 1109 West 5th Street
- Dwelling, 1009 West 5th Street
- Dwelling, 1005 West 5th Street
- Dwelling, 803 West 5th Street
- Dwelling, 502 Houser Road
- On West 5th Street from the vicinity of Long Street to the vicinity of Dyche Street, five dwellings and one church that may constitute a historic district.

- Another cluster of significant dwellings that occurs in the vicinity of the intersection of College and 5th Streets.

- Sue Bennett College Historic District: In addition to the four buildings on the campus are listed on the National Register as individuals, the campus constitutes a potential district that would include the listed buildings, grounds, other contributing structures, and elements such as the steps (see photo at right) connecting from 5th Street to the top of the hill and college buildings. If the nearby dwellings described above also have a historic association with the college, the proposed boundary would extend to include these structures.

Archaeological Resources

The *Archaeological Resource Overview Report* prepared for the study noted that three archaeological surveys have previously been conducted in the project study area and an additional eight such surveys have been identified in the area surrounding the project corridor. The entire area has a high potential to contain archaeological resources. A Phase 1 Archaeological Survey will be required if future project development phases for 5th Street improvements are initiated.

4.4 Land Use and Zoning

Within the project corridor, there is a mix of commercial, residential, and institutional land uses. In the south, along 5th Street between KY 192 and Forest Lane, newer commercial developments now occupy either previously undeveloped land or lots formerly occupied by residences. In addition, some older residences have been converted to commercial uses. There is also commercial development located just north of Forest Lane in the vicinity of Greenway Drive.

In the recent past, the London-Laurel County Joint Planning Commission rezoned for commercial use all land adjacent to 5th Street and extending 100 feet back from the road right-of-way. Preserving 100-foot-deep, commercially zoned corridors north and south along the length of the road has resulted in the recent commercial development, and more development is projected.

Along the corridor there are five churches three of which are of considerable size and are major traffic generators: First Baptist Church, St. Williams Catholic Church, and Community Christian Church. At Bennett Hill, Union College and the YMCA are also major traffic generators. Closer to US 25, the land uses include several governmental buildings such as a new public parking garage that houses the local transit company, and the Laurel County Courthouse (corner of 5th Street and Main Street).

Appendix B contains selected photographs showing the roadway and land uses along the 5th Street study corridor from KY 192 to US 25 (Main Street).

5.0 NATURAL ENVIRONMENT OVERVIEW

An ecological overview conducted for this study in August 2007 provided a preliminary review of existing environmental conditions in the study area, potential impacts to the aquatic and terrestrial ecology including threatened and endangered species, and measures to minimize the impacts.

5.1 Aquatic Ecology

Streams

Jurisdictional waters, as defined by the U.S. Army Corps of Engineers (USACE), are located within the study area. Streams were located and field verified using the London and Lily U. S. Geologic Survey (USGS) quadrangle maps. Only one stream, an unnamed tributary to Whitley Branch, was identified within the study area on USGS mapping. However, field verification revealed there are four intermittent streams within the study area—three unnamed tributaries to Whitley Branch and one roadside ditch (see Figure 3). The northernmost unnamed tributary to Whitley Branch runs parallel to South Mill Street and then passes under the Mill Street/5th Street intersection.

Figure 3: Unnamed Tributary to Whitley Branch Crossing under South Mill Street / 5th Street Intersection

Although ephemeral streams may also be considered jurisdictional, their evaluation did not fall within the scope of this overview. All streams located or partially located within the study area may be impacted by any proposed road construction or improvements associated with this project. None of the streams located within the study area have mapped Federal Environmental Management Agency (FEMA) 100-year floodplains.

Aquatic Species

No aquatic macro invertebrate, fishes, or water quality sampling was completed for this ecological overview. The Water Quality Branch of the Kentucky Division of Water (KDOW) provided stream and fish data for the Laurel County area and indicated there are no Outstanding State Resource Waters or Wild Rivers within the study area. Aquatic species in or near the study area are sensitive to increased turbidity, sediment, and other adverse influences on water quality. The Kentucky State Nature Preserves Commission (KSNPC) recommended that, should any recommended improvement be implemented, an erosion control plan be developed with stringent erosion control methods. Streams that may be impacted should be surveyed by a qualified biologist prior to in-stream disturbance.

Regulatory Issues

Any stream channelization, culverting, and/or filling of jurisdictional waters may require notification and/or permitting with the USACE and certification from the KDOW. USACE, Louisville Regulatory District, Louisville, Kentucky, is the agency responsible for regulating waters, waterways, and wetlands ("Waters of the United States").

USACE—Depending on the specific roadway construction design, this project may be permitted under Nationwide Permit 14 (NWP 14), Linear Transportation Crossings. For public linear transportation crossings constructed in non-tidal waters of the United States, the acreage limit is one-half acre. The permittee must notify the District Engineer in accordance with General Condition 27 if the work involves discharges of dredged or fill material into wetlands and/or results in the loss of greater than 0.1 acre of Waters of the United States. This permit does not authorize stream channelization, and the authorized activities must not cause more than minimal changes to the hydraulic flow characteristics of the stream, increase flooding, or cause more than minimal degradation of water quality of any stream in accordance with General Conditions 9 and 21. This nationwide permit only authorizes activities with minimal adverse effects on the aquatic environment.

KDOW—Projects involving work in a stream, such as bank stabilization, road culverts, utility line crossings, and stream alteration will require a Water Quality Certification and a Floodplain Construction Permit from the KDOW. Projects that involve filling in the 100-year floodplain will also require a Floodplain Construction Permit. NWP 14 (referenced above) is "certified with conditions" by KDOW and subject to KDOW conditions in addition to the conditions of NWP 14. Permittees must furnish the District Engineer with an individual Water Quality Certification and/or copy of the application package to KDOW. KDOW requires a Groundwater Protection Plan for all construction activities. Any area disturbed due to construction should be managed for stream siltation from stormwater runoff. Construction sites greater than five acres will require the filing of a Notice of Intent to be covered under the Kentucky Pollution Discharge Elimination System's General Stormwater Permit. This permit requires the creation of an Erosion Control Plan. The contractor will be required by the KDOW to prepare a plan to control non-point source pollution and to effectively implement the erosion and control program.

Rigid application of the KYTC's Specific Specifications for Road and Bridge Construction and the Federal Highway Administration's (FHWA) Best Management Practices (BMP) for Erosion and Sediment Control should be used to alleviate most sedimentation problems.

5. 2 Terrestrial Ecology and Threatened & Endangered Species

Kentucky Division of Forestry (KDOF)—KDOF indicated there are no current state forests or champion trees located within the study area. KDOF recommended protection of trees that will remain after completion of any proposed construction. Heavy equipment should not come into contact with the base of trees to prevent harm to the trunk and surface roots. Construction traffic should also stay away from the drip lines of trees. This will reduce the amount of soil compaction around trees that are to remain. Soil compaction leads to a reduction in the amount of available water for the trees, which can lead to increased stress. Stressed trees are more susceptible to disease and insect infestation. KDOF also recommends that additional trees be planted after construction. Any proposed planting should be selected according to trees already existing within the site.

U.S. Fish and Wildlife Service (USFWS)—USFWS provided a list of endangered, threatened, and candidate species for Laurel County. The list identifies federally protected species that may potentially occur in Laurel County and federally protected species that have known occurrences in Laurel County. There are no occurrence records for any federally protected species within the defined study area.

Federally protected species that may potentially occur in Laurel County

❖ Indiana bat (*Myotis sodalist*)	Federally endangered
❖ Gray bat (*M. grisescens*)	Federally endangered

Federally protected species that have known occurrences in Laurel County

❖ Cumberland bean (*Villosa trabalis*)	Federally endangered	❖ Fluted kidneyshell (*Ptychobranchus subtentum*)	Federally threatened
❖ Cumberland elktoe (*Alasmidonta atropurpurea*)	Federally endangered	❖ Virginia spiraea (*Spiraea virginiana*)	Federally threatened
❖ Cumberland combshell (*Epioblasma brevidens*)	Federally endangered	❖ Blackside dace (*Phoxinus cumberlandensis*)	Federally threatened
❖ Littlewing pearlymussel (*Pegias fabula*)	Federally endangered	❖ White fringeless orchid (*Platanthera integrilabia*)	Federal candidate
❖ Oyster mussel (*Epioblasma capsaeformis*)	Federally endangered	❖ Bald eagle (*Haliaeetus leucocephalus*,)	Removed from "federally threatened" list in June 2007; now protected by Bald and Golden Eagle Protection Act and Migratory Bird Treaty Act

USFWS expressed concern over erosion and sedimentation control, stream bank stabilization, and maintaining water quality for this and other highway projects during and post-construction. Recommendations were made to reduce impacts to aquatic resources and endangered species and habitat. If recommendations cannot be followed, it was suggested that surveys be conducted for the federally listed species in the project vicinity.

Kentucky Department of Fish and Wildlife Resources (KDFWR)—Coordination of this project with the KDFWR indicated no federally endangered species within the study area. KSNPC reviewed its Natural

Heritage Program Database to determine if any endangered, threatened, or special concern plants and animals or exceptional communities monitored by the KSNPC occurred within or near the project area. KSNPC applied three buffers to analyze the project area:

1. One-mile for all records
2. Five-mile for aquatic records and federally listed species
3. Ten-mile for monitored mammals and birds

One historic record was found within the 1-mile buffer. Within the 5-mile buffer, one extirpated aquatic species was identified. Ten records for mammals and birds were found within the 10-mile buffer (see Table 5).

Table 5: KSNPC Natural Heritage Program Database Results

Buffer Distance (mi)	Status *	Scientific Name	Common Name	Water Body/Habitat
1	-	*Lobelia nuttallii*	Nuttall's Lobelia	South Fork of Rockcastle River
5	SOMC	*Anodontioides denigratus*	Cumberland Papershell	Little Laurel River
10	-	*Accipiter striatus*	Sharp-shinned Hawk	Craig Creek
10	-	*Ardea Herodias*	Great Blue Heron	Craig Creek
10	-	*Cistothorus platensis*	Sedge Wren	Goose Creek
10	SOMC	*Corynorhinus rafinesquii*	Rafinesque's Big-eared Bat	Sinking Creek/Big Branch, Cane Creek, Rockcastle River/Line Creek
10	-	*Mustela nivalis*	Least Weasel	Little Laurel River
10	SOMC	*Myotis leibii*	Eastern Small-footed Myotis	Rockcastle River/ Line Creek

* *SOMC = Species of Management Concern*

5. 3 Special Designation Lands

No state nature preserves or wildlife management areas are present within the project corridor. No state or national parks and forests are located in the corridor.

6.0 PUBLIC INVOLVEMENT AND AGENCY COORDINATION

6.1 Public Involvement Program Summary

Project Team—A KYTC Project Team was created for the *5th Street Study*. Representatives of the Planning, Design, Environmental Analysis, Traffic, and Construction functions of KYTC and the Transportation Planning staff of the CVADD met with the project consultant on three occasions to provide guidance and decision-making. Minutes of these meetings are included in Appendix E.

Meetings with Local Officials and Other Project Stakeholders—Meetings with local officials and other project stakeholders were held twice during the course of the study. The first meeting was held to introduce local officials to the study and to inform them regarding the study process. The second meeting was held to review preliminary improvement options. Minutes of these meeting are also included in Appendix E.

Public Meeting—One public meeting was held to present preliminary improvement alternative and solicit public feedback on those proposals. Thirty-seven people signed in at the public meeting. Questionnaires were distributed to those in attendance, and nineteen completed surveys were returned either at the meeting or by mail in the following weeks. A summary of the meeting and questionnaire results is included in Appendix E.

6.2 Agency Coordination

Two agency mailings were prepared during this study. The first (dated August 27, 2007) was prepared and distributed after base information had been collected and the second (dated February 18, 2008) was prepared and distributed after preliminary improvement options had been identified and agreed to by the Project Team. A copy of the mailings and the list of recipients are included in Appendix F for reference.

Responses were received from a variety of agencies. Many of the responses indicated that their agency did not anticipate any significant project-related issues in the study area. Others outlined standard requirements and guidance related to project planning, design, and construction. A third set of agencies expressed specific concerns or identified issues to be considered in the study. A summary of the substantive responses received is provided below. A summary of all agency comments and copies of all agency correspondence received are included in Appendix F.

<u>First Mailing</u>

- Division of Waste Management: Identified UST issue at 5th and Mill Streets.
- KYTC Office of Special Programs: Encouraged bicycle and pedestrian accommodations.
- Laurel County Judge-Executive: Preferred 3-lane segment with 5-lanes south of Meyers-Baker Road with sidewalks, bike lanes, proper drainage, and lighting.

<u>Second Mailing</u>

- Kentucky Airport Zoning Commission: Concerned about any impacts, e.g. construction cranes exceeding a height of 107 feet.
- KYTC Office of Special Programs: Encouraged bicycle and pedestrian accommodations.

- CVADD: Noted that improvements to 5th Street will positively impact the area's economic and residential quality of life.

- St. William Catholic Church: Recognized that 5th Street needs improvements, but expressed hope that any improvement that involves removing the rock wall parallel to 5th Street on church property include relocating that rock wall to another place on church property.

- Laurel County Judge-Executive: Recommended right-turn lane northbound on 5th Street at the First Baptist Church and southbound at the Community Christian Church; preferred 5 lanes on 5th Street between KY 192 and Meyers-Baker Road and 3 lanes from Meyers-Baker Road to Mill Street; recommended spot improvements at Forest Lane/Stivers Lane and at entrances to the First Baptist Church; preferred lowering the grade at Falls Street; preferred adding a left-turn lane northbound on 5th Street at Mill Street and westbound on Mill Street at 5th Street; and preferred streetscape improvements on 5th Street north of Mill Street.

7.0 ALTERNATIVES DEVELOPMENT AND EVALUATION

7.1 Analysis Sections

Fifth Street between KY 192 and US 25 is a distance of only 1.55 miles, yet there are discrete transportation issues that vary by location along the corridor. Thus, the corridor was segmented into six analysis sections (see Figure 4) plus two "spot" locations within one of those segments.

ANALYSIS SECTION 1
KY 192 to Meyers-Baker Road
Length: 0.35 mi.

Though data that differentiated traffic characteristics on this segment from those farther north on 5th Street was not available, it seemed clear that both current and future characteristics changed at Meyers-Baker Road. Meyers-Baker Road provides alternate access to a major commercial center, which includes a Super Wal-Mart, that fronts KY 192 between 5th Street and KY 363. Future highway systems development proposed for the London area would extend Meyers-Baker Road to the west and then northward paralleling I-75 and providing a direct connection to KY 80 between I-75 and US 25. This road extension, known locally as the "Corridor Border" frontage road project, is programmed for partial funding in the KYTC 2008 Highway Plan.

ANALYSIS SECTION 2
Meyers-Baker Road to Bennett Hill
Length: 0.70 mi.

In addition to the nearly three-fourths mile segment between Meyers-Baker Road and Bennett Hill, two spot locations of particular concern were identified: **Spot Improvement 2.1**—the 5th Street junction with Forest Lane to the northwest, which is offset slightly from the junction with Stivers Lane to the southeast; and **Spot Improvement 2.2**—the vicinity of the two entrances to the First Baptist Church near MP 6.18 and MP 6.26.

ANALYSIS SECTION 3
Bennett Hill
Length: 0.15 mi.

This segment includes several transportation challenges, including a steep grade (greater than 8.5%), limited vehicular sight distance especially at the intersection with Falls Street, discontinuities and deficiencies in provisions for pedestrian travel, and adjacent historic properties.

ANALYSIS SECTION 4
Bennett Hill to Mill Street
Length: 0.10 mi.

This segment lies between the Bennett Hill segment (including the Falls Street intersection) described above and the Mill Street intersection. Improvements to the segment would likely impact adjacent properties that include historic structures, high-value residences, and a church. Tansportation issues within this segment are less intensive than along other segments of 5th Street.

ANALYSIS SECTION 5
Mill Street Intersection
Length: NA

Mill Street intersects 5th Street at significantly less than a 90° angle, exacerbating the difficulty with certain left-/right-turn movements. There are many left-turn movements from northbound 5th Street onto westbound Mill Street and from westbound Mill Street onto southbound 5th Street. Further, there are numerous right-turn movements from eastbound Mill Street onto southbound 5th Street. The geometrics of this intersection, the high volume of turning movements, and the presence of the tributary running beneath the intersection (see Figure 3, p. 15) result in transportation challenges at this location.

ANALYSIS SECTION 6:
Mill Street to US 25 (Main Street)
Length: 0.25 mi.

Traffic volumes on 5th Street decrease 36% north of Mill Street. Transportation issues in this segment generally relate to the existing transportation systems management techniques, i.e. parking, rather than to traffic volumes or congestion.

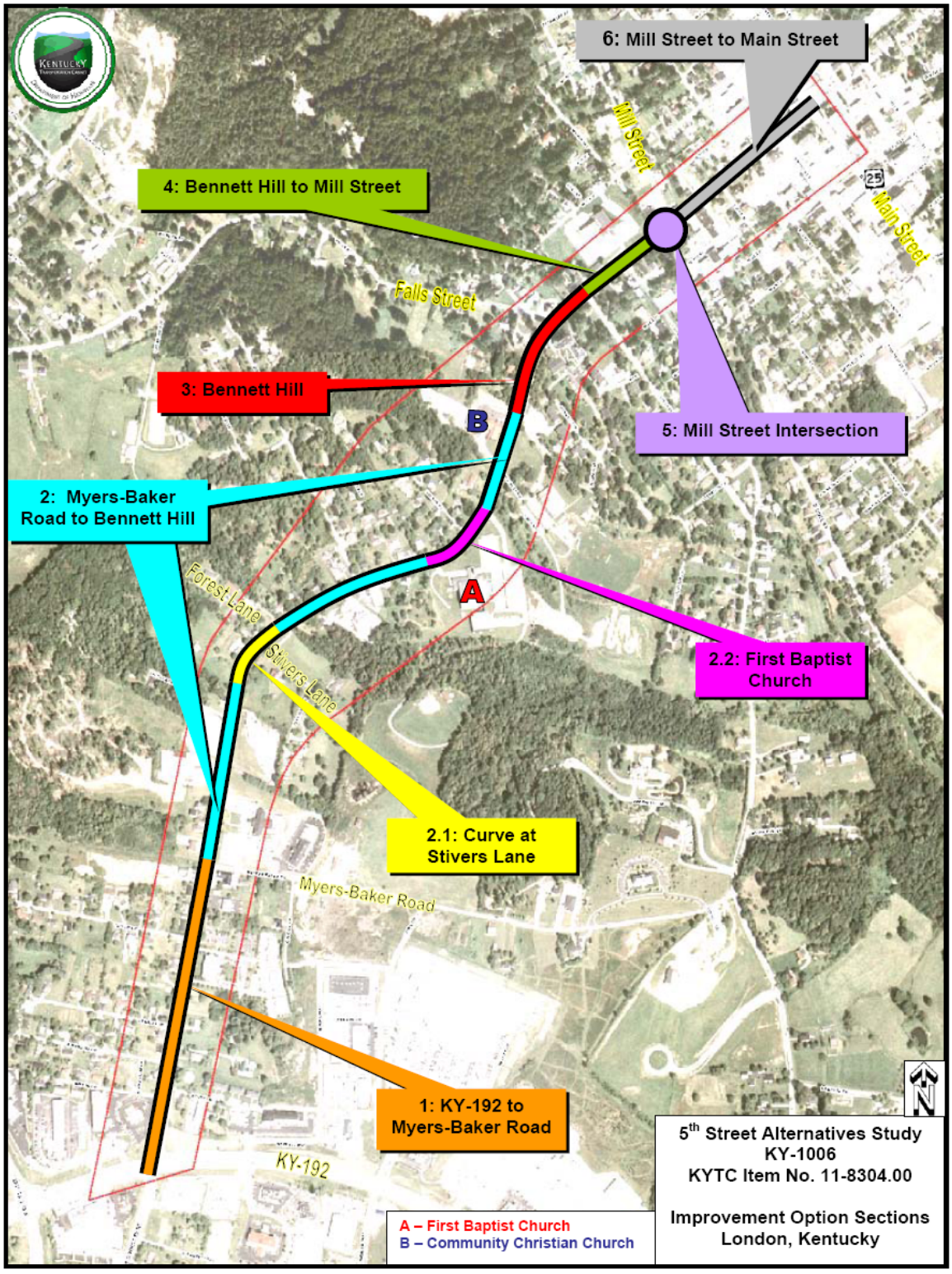

Figure 4: 5th Street Study Analysis Sections

7.2 Alternative Development

While some stated project goals include improving safety and traffic flow along 5th Street, other goals stress the importance of ensuring that any improvements to the transportation system are made in a balanced fashion to:

- Accommodate historic preservation
- Implement context sensitive design solutions
- Provide "Americans with Disabilities" (ADA) design accommodations
- Enhance economic development

Furthermore, the current KYTC Highway Plan reflects a budget squeeze that does not portend well for recommendation and inclusion of additional projects requiring major investments. Improvements to 5th Street, while highly valued by local officials, other project stakeholders, and the general public, do not appear to be the community's highest priority transportation improvement project—that distinction apparently being held by the "Corridor Border" frontage road project. Thus, alternative transportation improvements for the 5th Street corridor were conceived with emphasis on context sensitive solutions that were fiscally responsible. The discussion below is structured around the analysis sections discussed in Section 7.1. The Analysis Section locations are shown on Figure 4 and the recommended alternative concepts are illustrated on Exhibit 1 in Appendix A. Table 6 (Section 7.3, p. 29) provides cost estimates for the Section Analysis alternatives, and Table 7 (Section 7.3, p. 31) compares the alternatives' costs, right-of-way, relocation, impacts/benefits, and public rankings.

Analysis Section 1: KY 192 to Meyers-Baker Road (0.35 mile)

- **Alternative Concept A:** 3 Lanes with Center Two-Way Left-Turn Lane—As shown in Figure 5, this alternative typical section encompasses an 80-foot-wide average right-of-way width with two 12-foot-wide driving lanes, a center 14-foot-wide two-way left-turn lane, a 4-foot-wide bicycle lane on each side, curbs and gutters, a 5-foot-wide sidewalk on each side, and a 15-foot-wide utility easement on one side. Studies at the Kentucky Transportation Center at the University of Kentucky (UK) have indicated that the addition of a two-way left-turn lane can reduce the occurrence of all crashes by 30% and left-turn related crashes by 50%. Such an improvement in Analysis Section 1 would require up to five relocations and the purchase of approximately 0.7 acre of right-of-way (R/W).

  Relocations: Up to 5 **R/W:** 0.7 acre **Estimated Cost:** $2.44 million

- **Alternative Concept B:** 5 Lanes with Center Two-Way Left-Turn Lane—As shown in Figure 6, this alternative typical section encompasses a 100-foot-wide average right-of-way width with four 12-foot-wide driving lanes, a center 14-foot-wide two-way left-turn lane, a 4-foot-wide bicycle lane on each side, curbs and gutters, a 5-foot-wide sidewalk on each side, and a 15-foot-wide utility easement on one side. Studies at UK have indicated that the addition of a two-way left-turn lane can reduce the occurrence of all crashes by 30% and left-turn related crashes by 50%. Such an improvement in Analysis Section 1 would require as many as eleven relocations and the purchase of approximately 1.4 acres of right-of-way.

  Relocations: Up to 11 **R/W:** 1.4 acres **Estimated Cost:** $4.24 million

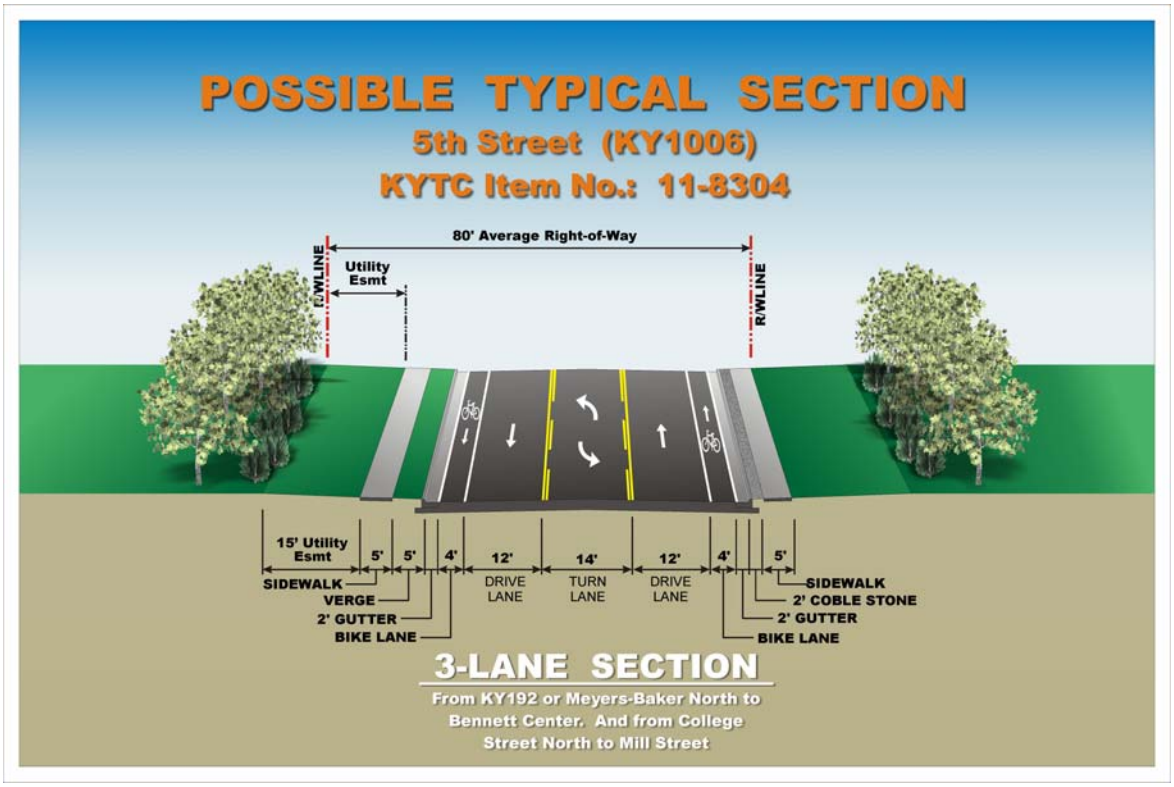

Figure 5: Typical Section—3 Lanes With Two-Way Center Left-Turn Lane

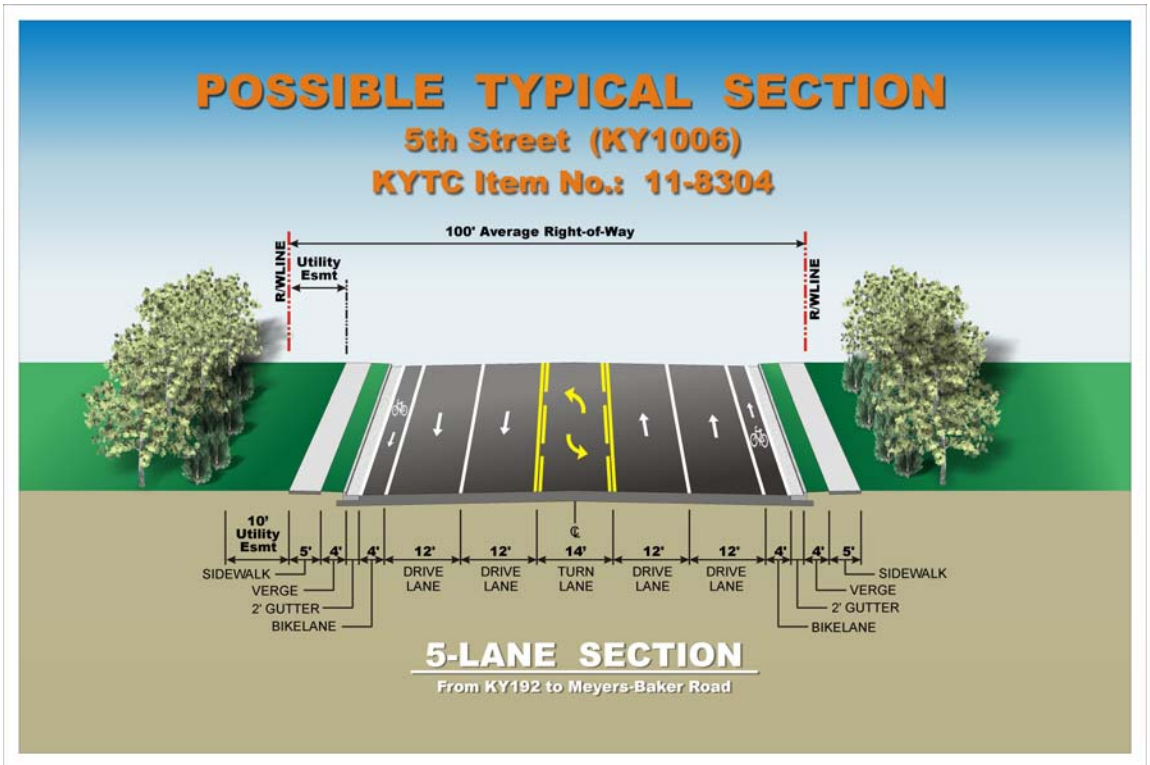

Figure 6: Typical Section—5 Lanes With Two-Way Center Left-Turn Lane

Analysis Section 2: Meyers-Baker Road to Bennett Hill (0.70 mile)

- **Alternative Concept A:** 3 Lanes with Center Two-Way Left-Turn Lane—This alternative typical section is shown in Figure 5. Studies at UK have shown this type of improvement can reduce the occurrence of all crashes by 30% and left-turn related crashes by 50%. Such an improvement in Analysis Section 2 would require up to ten relocations and the purchase of approximately 2.8 acres of right-of-way.

  Relocations: Up to 10 **R/W:** 2.8 acres **Estimated Cost:** $4.99 million

- **Alternative Concept B:** 5 Lanes with Center Two-Way Left-Turn Lane—This alternative typical section is shown in Figure 4. Studies at UK have shown this type of improvement can reduce the occurrence of all crashes by 30% and left-turn related crashes by 50%. Such an improvement in Analysis Section 2 would require as many as sixteen relocations and the purchase of approximately 3.5 acres of right-of-way.

  Relocations: Up to 16 **R/W:** 3.5 acres **Estimated Cost:** $7.08 million

- **Spot Improvement 2.1:** At Forest Lane/ Stivers Lane (MP 5.99)—Comments from the public at the public meeting indicated this area to be a primary concern along the 5th Street corridor. While the development of either Alternative Concept A or B in Analysis Section 2 would result in improvements at this site, consideration was also given to implementation of spot improvements at this location to accelerate a positive change to the transportation system. These proposed spot improvements could be implemented in two phases if necessary. First phase: "cut back" the side hill to improve sight distance around the existing horizontal curve. Second phase: reconstruct the horizontal curve to reduce the degree of curvature. These actions could be taken consecutively or concurrently. Studies at UK indicated the realignment/ reconstruction of a horizontal curve can reduce the occurrence of all crashes by 40%. Such an improvement in Analysis Section 2 would potentially require two relocations and the purchase of approximately 0.5 acre of right-of-way.

  Relocations: 2 **R/W:** 0.5 acre **Estimated Cost:** $2.38 million

- **Spot Improvement 2.2:** At First Baptist Church—While the development of either Alternative Concept A or B in Analysis Section 2 would result improvements at this site, consideration was also given to implementation of transportation system improvements between MP 6.15 and MP 6.30. These proposed improvements would address sight distance restrictions at the two entrances to the First Baptist Church and could be implemented in addition to or independent of other Analysis Section 2 improvements between Meyers-Baker Road and Bennett Hill. Three concepts were considered at this location:

  - Improve Curve and Hill as Spot Improvement
  - 3 Lanes with Center Two-Way Left-Turn Lane (see Figure 5)
  - 5 Lanes with Center Two-Way Left-Turn Lane (see Figure 6)

  Studies at UK indicated the realignment/reconstruction of a horizontal curve can reduce the occurrence of all crashes by 40%. The implementation of spot improvements at this location could involve approximately 1.1 acres of right-of-way acquisition and six relocations, possibly including two historic properties near Houser Street (MP 6.23).

  Relocations: 6 **R/W:** 1.1 acres **Estimated Cost:** $2.70 million

Analysis Section 3: Bennett Hill (0.15 mile)

- **Alternative Concept A:** Relocate Falls Street to south side of Community Christian Church—This concept would eliminate the problems caused by sight distance restrictions at the Falls Street intersection with 5th Street by relocating Falls Street to the south. A new intersection with 5th Street would be developed approximately 0.2 mile south of the existing Falls Street intersection, opposite the entrance to the YMCA. The existing Falls Street access to 5th Street would be closed and converted to a cul-de-sac near the multi-family dwelling unit at the northwest corner of Falls Street and 5th Street. Studies at UK have shown this type of improvement could provide as much as a 50% reduction in crashes at this location. This concept would require approximately 2.2 acres of right-of-way and potentially three relocations.

  Relocations: 3 **R/W:** 2.2 acres **Estimated Cost:** $1.50 million

- **Alternative Concept B:** Improve Vertical Alignment—This alternative concept would improve safety along Bennett Hill and at the Falls Street intersection by lowering the grade and increasing the sight distance to meet current design standards. This concept could impact adjacent historic properties; however, a detailed design developed in subsequent project phases might be able to avoid or minimize this impact. This concept would require closure of 5th Street to through traffic during construction. It is the least costly alternative concept in Analysis Section 3, with an estimated cost of just over $1.0 million. Studies at UK have shown this type of improvement could provide as much as a 40% reduction in crashes at this location. This concept would likely require two relocations and the purchase of approximately 0.5 acre of right-of-way.

  Relocations: 2 **R/W:** 0.5 acre **Estimated Cost:** $1.03 million

- **Alternative Concept C:** Relocate 5th Street to the west in the vicinity of Falls Street—Comments from the public at the November 13, 2007, public meeting suggested this as an alternative to the two previously described concepts. This concept would avoid relocating Falls Street, and could likely be implemented without closing 5th Street for as long a period of time as would be necessary using the Alternative Concept B. Studies at UK have shown this type of improvement could provide as much as a 40% reduction in crashes at this location. This alternative concept would improve safety by increasing sight distance to meet design standards. It would involve approximately three relocations and 0.8 acre of right-of-way acquisition from potentially historic properties along the west side of 5th Street near Falls Street.

  Relocations: 3 **R/W:** 0.8 acre **Estimated Cost:** $1.41 million

Analysis Section 4: Bennett Hill to Mill Street (0.10 mile)

- **Alternative Concept A:** 3 Lanes with Center Two-Way Left-Turn Lane—This alternative typical section is shown in Figure 5. Studies have shown this type of improvement can reduce the occurrence of all crashes by 30% and left-turn related crashes by 50%. Such an improvement in Analysis Section 4 might require one relocation and the purchase of approximately 0.4 acre of right-of-way from potentially historic properties.

  Relocations: 1 **R/W:** 0.4 acre **Estimated Cost:** $800,000

- **Alternative Concept B:** 5 Lanes with Center Two-Way Left-Turn Lane—This alternative concept was recommend for consideration during the November 13, 2007, public meeting. The typical section for this concept is shown in Figure 6. Studies have shown this type of improvement can

reduce the occurrence of all crashes by 30% and left-turn related crashes by 50%. Such an improvement in Analysis Section 4 might require four relocations and the purchase of 0.5 acre of right-of-way from potentially historic properties.

Relocations: 4 **R/W:** 0.5 acre **Estimated Cost:** $1.72 million

Analysis Section 5: Mill Street Intersection

- **Alternative Concept A:** Add left-turn lane on northbound 5th Street, plus construct a slight realignment of Mill Street on the west side of 5th Street to align with the east side. Studies at UK have indicated the addition of a left-turn lane can reduce the occurrence of all crashes by 25-35% and left-turn related crashes by 45-50%. Such improvements in Analysis Section 5 might require one relocation and the acquisition of approximately 0.4 acre of right-of-way.

  Relocations: 1 **R/W:** 0.4 acre **Estimated Cost:** $420,000

- **Alternative Concept B:** Add left-turn lanes on northbound 5th Street and on westbound Mill Street by widening Mill Street toward the north. This concept might require two relocations and the purchase of approximately 0.3 acre of right-of-way.

  Relocations: 2 **R/W:** 0.3 acre **Estimated Cost:** $1.27 million

- **Alternative Concept C:** Add left-turn lanes on northbound 5th Street and westbound Mill Street by shifting both legs of Mill Street to the south. This concept might require two relocations and the purchase of approximately 0.4 acre of right-of-way.

  Relocations: 2 **R/W:** 0.4 acre **Estimated Cost:** $800,000

- **Alternative Concept D:** Construct Roundabout—The Insurance Institute for Highway Safety has estimated that roundabouts exhibit 40% fewer crashes than traditional intersections and 80% fewer injury crashes due to a reduction in vehicular speed and the number of vehicular conflict points. This concept might require three relocations and the purchase of approximately 1.2 acres of right-of-way.

  Relocations: 3 **R/W:** 1.2 acres **Estimated Cost:** $1.54 million

Analysis Section 6: Mill Street to US 25 (Main Street) (0.25 mile)

- **Alternative Concept A**: Streetscape Improvements—The City of London could apply for a grant to fund streetscape improvements similar to those along Main Street. These improvements could be implemented for less than **$80,000.**

- **Alternative Concept B:** Do Nothing—Due to the decrease in traffic volumes on 5th Street north of Mill Street, transportation system improvements between Mill Street and Main Street are not a critical near-term or long-term need.

7.3 Public Commentary

The general public was given the opportunity to comment on, as well as recommend additions to, the initial list of alternative concepts that was presented at the public meeting held on November 13, 2007. A brief review of comments and recommendations is provided below. The public workshop summary is

included in Appendix E. Table 7 (p. 31) includes the public rankings of alternatives in the comparison of alternatives.

Analysis Section 1: KY 192 to Meyers-Baker Road (0.35 mile)—Alternative Concept B, 5 lanes with two-way center left-turn lane, was the preferred concept in Section 1 and ranked **2nd highest** priority among all alternatives reviewed at the meeting.

Analysis Section 2: Meyers-Baker Road to Bennett Hill (0.70 mile)—Immediate implementation of the Spot Improvements at the Forest Lane/Stivers Lane intersection was deemed the **highest** priority among all alternatives reviewed at the meeting. Alternative Concept A, 3-lanes with two-way center left-turn lane, was preferred over the 5-lane Concept B alternative. Spot improvements in front of the First Baptist Church were deemed a very low priority; some felt nothing was needed in that area.

Analysis Section 3: Bennett Hill (0.15 mile)—Preference was expressed for Alternative Concept B, lowering the grade of 5th Street instead of relocating Falls Street (Concept A). Concept B was ranked the **3rd highest** priority among all alternatives reviewed at the meeting. Members of the public also suggested consideration be given to relocating 5th Street in the vicinity of Mill Street. This recommendation was included as Alternative Concept C among the alternatives evaluated in this study

Analysis Section 4: Bennett Hill to Mill Street (0.10 mile)—One commentator suggested that a 5-lane segment with two-way center left-turn lane be considered. Following the public meeting, this concept was included as Alternative Concept B among those evaluated in this study. No improvements to this segment were ranked with a high priority.

Analysis Section 5: Mill Street Intersection—The public did not support the roundabout concept, but otherwise was fairly evenly divided among the other three alternative improvement concepts at this location. It was generally agreed that this was a priority site for implementing improvements. Overall, improvements at this location were ranked **4th highest** priority among all alternatives reviewed at the meeting.

Analysis Section 6: Mill Street to US 25 (Main Street) (0.25 mile)—This segment was viewed as the lowest overall priority segment. Streetscape improvements were deemed an adequate, though not a critically needed improvement.

7.4 Comparison of Alternative Concepts

Table 6 provides a comparison of the estimated design, right-of-way, utility, and construction costs, in Year 2008 dollars, that are associated with each of the Analysis Section alternative concepts evaluated in this study. Table 7 compares the alternatives' right-of-way, relocation, impacts/benefits, public rankings, and total estimated costs.

Table 6: Cost Estimates (Year 2008 Dollars)—Alternative Concepts and Spot Improvements

Analysis Section	Alternative Concept	Cost Estimates (in Millions)				
		Design	R/W	Utility	Construction	Total
SECTION 1 **KY 192 to Meyers-Baker Road**	**Alt Concept A**: 3 lanes w/ 2-way center left-turn lane	$0.08	$1.28	$0.25	$0.83	**$2.44**
	Alt Concept B: 5 lanes w/2-way center left-turn lane	$0.11	$2.81	$0.26	$1.05	**$4.24**
SECTION 2 **Meyers-Baker Road to Bennett Hill**	**Alt Concept A**: 3 lanes w/ 2-way center left-turn lane	$0.17	$2.63	$0.53	$1.67	**$4.99**
	Alt Concept B: 5 lanes w/2-way center left-turn lane	$0.21	$4.16	$0.60	$2.12	**$7.08**
Curve @ Forest Lane/ Stivers Lane	**Spot Improvement 2.1** Improve Curve and Hill	$0.07	$0.52	$1.13	$0.66	**$2.38**
Entrances to First Baptist Church	**Spot Improvement 2.1** Improve Curve and Hill	$0.10	$1.55	$0.08	$0.98	**$2.70**
SECTION 3 **Bennett Hill**	**Alt Concept A**: Relocate Falls Street to the south side of Community Christian Church	$0.08	$0.85	$0.05	$0.52	**$1.50**
	Alt Concept B: Improve Vertical Alignment	$0.12	$0.05	$0.06	$0.80	**$1.03**
	Alt Concept C: Relocate 5th Street to the west in the vicinity of Falls Street	$0.08	$0.80	$0.04	$0.50	**$1.41**
SECTION 4 **Bennett Hill to Mill Street**	**Alt Concept A**: 3 lanes w/ 2-way center left-turn lane	$0.04	$0.27	$0.09	$0.40	**$0.80**
	Alt Concept B: 5 lanes w/2-way center left-turn lane	$0.05	$1.02	$0.19	$0.53	**$1.72**

Table 6: Cost Estimates—Alternative Concepts and Spot Improvements (*Continued*)

Analysis Section	Alternative Concept	Cost Estimates (in Millions)				
		Design	R/W	Utility	Construction	Total
SECTION 5 **Mill Street Intersection**	**Alt Concept A**: Add Left-Turn Lane on Northbound 5th Street	$0.01	$0.26	$0.05	$0.10	**$0.42**
	Alt Concept B: Add Left-Turn Lanes on Northbound 5th Street and on Westbound Mill Street	$0.03	$1.02	$0.04	$0.18	**$1.27**
	Alt Concept C: Left-Turn Lanes on Northbound 5th and Westbound Mill plus shift both legs of Mill Street to the south	$0.03	$0.53	$0.06	$0.19	**$0.80**
	Alt Concept D: Construct Roundabout	$0.05	$1.04	$0.10	$0.35	**$1.54**
SECTION 6 **Mill Street to US 25 (Main Street)**	**Alt Concept A**: Streetscape Improvements	$0.01	$0.00	$0.00	$0.07	**$0.07**
	Alt Concept B: Do Nothing	$0.00	$0.00	$0.00	$0.00	**$0.00**

Table 7: Comparison of Alternative Concepts and Spot Improvements

Analysis Section	Section Length (Miles)	Alternative Concept	Comparison of Alternative Concepts				
			R/W (Acres)	Relocations (Approx.)	Benefits / Impacts	Cost Estimate (millions)	Public Ranking
SECTION 1 **KY 192 to Meyers-Baker Road**	0.35	**Alt Concept A**: 3 lanes w/ 2-way center left-turn lane	0.7	5	Crash reduction	**$2.44**	--
		Alt Concept B: 5 lanes w/2-way center left-turn lane	1.4	11	Crash reduction	**$4.24**	**2nd among all**
SECTION 2 **Meyers-Baker Road to Bennett Hill**	0.70	**Alt Concept A**: 3 lanes w/ 2-way center left-turn lane	2.8	10	Crash reduction	**$4.99**	**Preferred over B**
		Alt Concept B: 5 lanes w/2-way center left-turn lane	3.5	16	Crash reduction	**$7.08**	--
Curve @ Forest Lane/ Stivers Lane	--	**Spot Improvement 2.1** Improve Curve and Hill	0.5	2	Improved sight distance Crash reduction	**$2.38**	**1st among all**
Entrances to First Baptist Church	--	**Spot Improvement 2.2** Improve Curve and Hill	1.1	6	Improved sight distance Impact to 2 historic properties	**$2.70**	**Lowest in Sect. 2**
SECTION 3 **Bennett Hill**	0.15	**Alt Concept A**: Relocate Falls Street to the south side of Community Christian Church	2.2	3	Improved sight distance Crash reduction	**$1.50**	**Lowest in Sect. 3**
		Alt Concept B: Improve Vertical Alignment	0.5	2	Improved sight distance Impact historic properties	**$1.03**	**3rd among all**
		Alt Concept C: Relocate 5th Street to the west in the vicinity of Falls Street	0.8	3	Improved sight distance Crash reduction Impact historic properties	**$1.41**	Added based on public input
SECTION 4 **Bennett Hill to Mill Street**	0.10	**Alt Concept A**: 3 lanes w/ 2-way center left-turn lane	0.4	1	Crash reduction Impact historic properties	**$0.80**	**Low**
		Alt Concept B: 5 lanes w/2-way center left-turn lane	0.5	4	Crash reduction Impact historic properties	**$1.72**	**Low** Added based on public input

Table 7: Comparison of Alternative Concepts and Spot Improvements (*Continued*)

Analysis Section	Section Length (Miles)	Alternative Concept	Comparison of Alternative Concepts				
			R/W (Acres)	Relocations (Approximate)	Benefits / Impacts	**Cost Estimate (millions)**	Public Ranking
SECTION 5 **Mill Street Intersection**	Not applicable	**Alt Concept A**: Add Left-Turn Lane on Northbound 5th Street	0.4	1	Crash reduction	**$0.42**	**4th among all** Public evenly divided in favor of A, B, C
		Alt Concept B: Add Left-Turn Lanes on Northbound 5th Street and on Westbound Mill Street	0.3	2	Crash reduction	**$1.27**	
		Alt Concept C: Left-Turn Lanes on Northbound 5th and Westbound Mill plus shift both legs of Mill Street to the south	0.4	2	Crash reduction	**$0.80**	
		Alt Concept D: Construct Roundabout	1.2	3	Crash reduction	**$1.54**	**Lowest**
SECTION 6 **Mill Street to US 25 (Main Street)**	Not applicable	**Alt Concept A**: Streetscape Improvements	None	None	Pedestrian safety Aesthetics	**$0.07**	**Section 6 Lowest among all**
		Alt Concept B: Do Nothing	None	None	No improvements	**$0.00**	

8.0 RECOMMENDATIONS

8.1 Recommended Alternatives

Based on the following considerations, project improvements identified on page 34 are recommended for each of the three time periods.

- The existing and projected future transportation system conditions along 5th Street in London
- The project goals
- The preferences of the KYTC Project Team, local officials and other local project stakeholders, and the general public
- The alternative concepts
- The desire for a set of fiscally responsible recommendations that would result in the greatest chance of implementation

It should be noted that, because of their low ranking in the overall evaluations and prioritization of alternative concepts, Analysis Section 4 and Section 6 alternatives were not included in this study's recommendations for roadway improvements.

Exhibit 1, Appendix A, shows these recommended improvements.

1. **AS SOON AS POSSIBLE—**

   ❖ **Section 2 Spot Improvement 2.1, first phase:** Cut back hill at Forest Lane/Stivers Lane. Cost estimate $1.50 million.

   ❖ **Section 5 Alternative Concept C:** Reconstruct northbound 5th Street at Mill Street to realign Mill Street and to add left-turn lanes on northbound 5th and westbound Mill Streets. Cost estimate: $800,000.

   ❖ **Section 3 Alternative Concept B:** Reconstruct 5th/ Falls Streets intersection by lowering the grade of the existing alignment; *or* **Section 3 Alternative Concept C:** Reconstruct 5th Street by shifting its alignment slightly to the west. Cost estimate: $1.03 million *or* $1.41 million, respectively.

   If both of the above options become problematical, consider **Section 3 Alternative Concept A**: Relocating Falls Street to the south side of the Community Christian Church. Cost estimate: $1.50 million.

2. **PRIOR TO CONSTRUCTION OF "CORRIDOR BORDER"—**

   ❖ **Section 1 Alternative Concept B:** From KY 192 to Meyers-Baker Road, widen 5th Street to 5 lanes with center two-way left-turn lane and construct sidewalks as shown on the typical section (Figure 6). Cost estimate: $4.24 million.

3. **AFTER CONSTRUCTION OF "CORRIDOR BORDER"—**

   ❖ **Section 2 Alternative Concept A:** From Meyers-Baker Road to YMCA Entrance, widen 5th Street to 3 lanes with center two-way left-turn lane and construct sidewalks as shown on the typical section (Figure 5). Cost estimate: $4.99 million.

The total estimated cost of the recommended improvements ranges from approximately **$13.44 million to $13.91 million**.

8.2 Comparison of Recommendation to Project Goals

Each recommended alternative was reviewed in comparison to the project goals and qualitatively "scored" based on the degree to which satisfaction of each project goal would likely be achieved through implementation of that recommendation. Results of this qualitative scoring are shown in Table 8.

Based on research by the Kentucky Transportation Center at UK, it was determined that each of the five recommendations would improve safety on 5th Street by reducing the occurrence of crashes by between 25% and 40%. Traffic flow would be improved by improving sight distance, adding vehicular capacity, or providing storage for left-turning vehicles.

Avoiding significant impacts to historic properties may be challenging with some of these recommendations. Though particular design features would be finalized in future project development phases, context sensitive solutions and accommodation of Americans with Disabilities Act (ADA) design standards are possible in at least three of the five recommendations.

Finally, while only two recommendations could be said to enhance economic development potential along the 5th Street corridor, the others would not discourage such economic development potential.

Table 8: Goal Satisfaction of Recommended Improvements

GOAL	Section 2 Spot 1.2 Cut Back Hill at Forest Lane/Stivers Lane Intersection	Section 5 Concept C Reconstruct 5th / Mill Streets Intersection	Section 3 Concept B Reconstruct 5th / Falls Streets Intersection	Section 1 Concept B Widen 5th Street to 5 Lanes with Center TWLTL from KY 192 to Meyers-Baker Road	Section 2 Concept A Widen 5th Street to 3 Lanes with Center TWLTL from Meyers-Baker Road to YMCA Entrance
Improve Safety on 5th Street	*Good*	*Good*	*Good*	*Good*	*Good*
Improve Traffic Flow on 5th Street	*Good*	*Good*	*Good*	*Good*	*Good*
Accommodate Historic Preservation	*Good*	*Challenging*	*Challenging*	*Good*	*Poor*
Implement Context Sensitive Solutions	*Good*	*Challenging*	*Challenging*	*Good*	*Good*
Provide ADA Design Accommodations	*Neutral*	*Good*	*Good*	*Good*	*Good*
Enhance Economic Development	*Neutral*	*Fair*	*Neutral*	*Good*	*Good*

TWLTL = 2-way left-turn lane
ADA = Americans with Disabilities Act