South Limestone Multimodal Transportation Study

Final Report
November 17, 2010

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SOUTH LIMESTONE MULTIMODAL TRANSPORTATION STUDY

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I. INTRODUCTION

Lexington-Fayette Urban County Government initiated the South Limestone Multimodal Transportation Study, in conjunction with the Kentucky Transportation Cabinet and University of Kentucky, to consider improvements to a segment of South Limestone and South Upper Streets. The purpose of the study was to develop improvement projects that will improve safety and convenience for all drivers, bicyclists, transit riders, and pedestrians who utilize this busy and high collision corridor.

A. Background

The South Limestone Corridor is a principal urban arterial. The southern section is a five-lane roadway with a center left-turn lane. The roadway width ranges between 51 and 56 feet. The northern section splits into a one-way pair with roadway widths ranging between 24 and 56 feet. In addition to 35,000 vehicles per day, the corridor provides essential connections for a variety of multimodal users:

- High pedestrian volumes travel along and across the corridor to access the University of Kentucky, UK Hospital, adjoining neighborhoods, and area attractions.
- Bicyclists include students, commuters, and other recreational users.
- LexTran and UK buses rely on the route, frequently traveling along the route and making stops to pick up/drop off passengers.
- Emergency medical service vehicles use South Limestone to access the UK Medical Center, Good Samaritan Hospital, and other medical facilities nearby.
- Freight shippers deliver goods to businesses along the corridor, in addition to using this link to access other destinations in Lexington.

B. Project Location

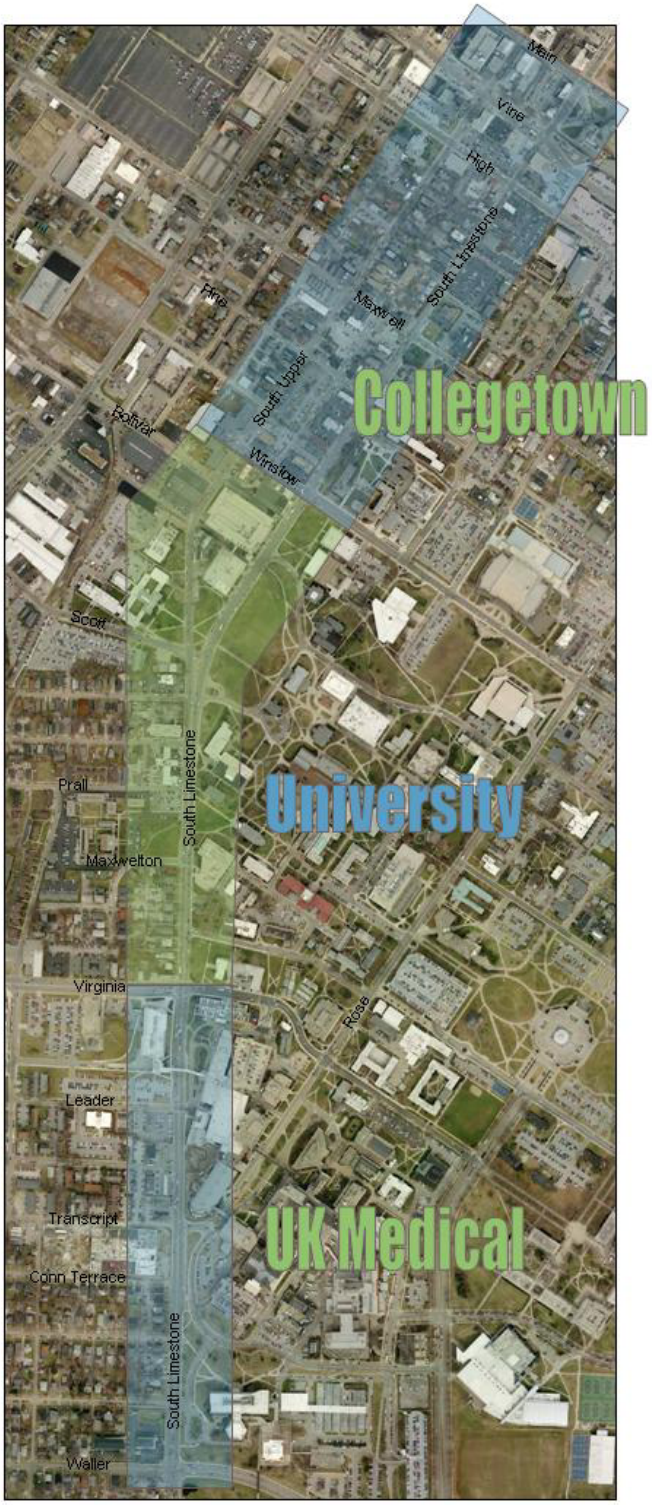
The study corridor for the South Limestone Multimodal Transportation Study consists of two segments. The South Limestone Street (US 27) segment begins at Cooper Drive/Waller Avenue and continues to Avenue of Champions. The South Upper Street segment begins at Main Street and continues to South Limestone at Scott Street. The segment of South Limestone from Avenue of Champions to Main Street was excluded from the analysis because it is already included in an ongoing streetscape improvement project. The corridor is presented in **Figure 1.1**.

The South Limestone/South Upper corridor provides an important link between south Lexington and downtown. Adjacent to the corridor is the University of Kentucky. The corridor connects other areas of Lexington via several intersecting corridors including Virginia Avenue/Huguelet Drive, Scott Street (future Newtown Pike Extension), Avenue of Champions/Winslow Street, Maxwell Street, High Street, and Vine Street.

C. Study Process

A comprehensive process was undertaken as part of the South Limestone Multimodal Transportation Study. The process is illustrated in **Figure 1.2**. The data collection and baseline analysis was completed earlier on in the process and is described in **Chapter II**. Working with a Corridor Advisory Group and seeking input as part of two public forums, a set of goals and objectives were defined and are described in **Chapter III**. The analysis is described in **Chapter IV**, while the implementation plan is presented in **Chapter V**.

Figure 1.1 Study Area

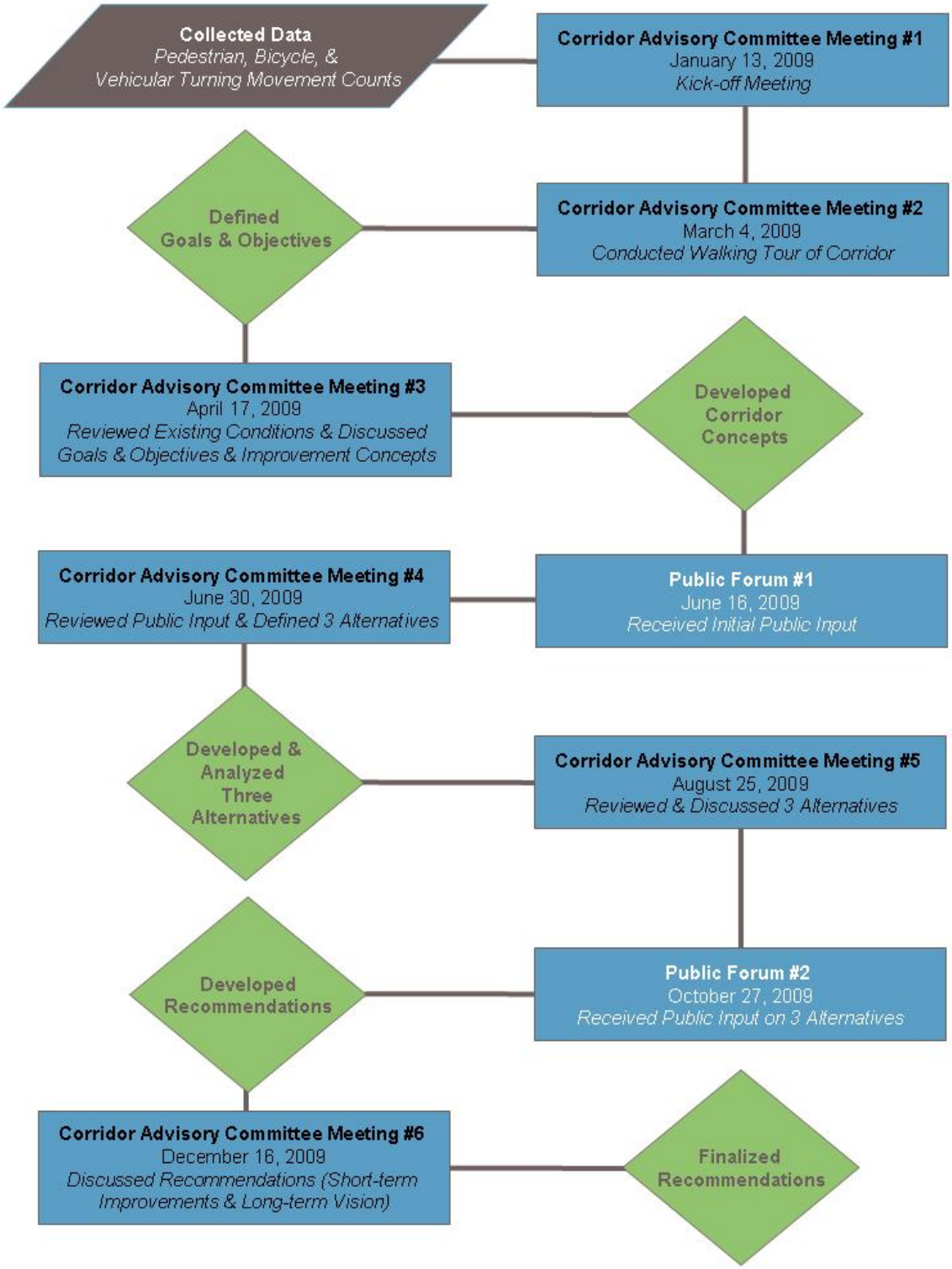


Collegetown: This section includes South Upper from Avenue of Champions/Winslow Street to Main Street. This area is both commercial and residential.

University: This section includes both South Limestone and South Upper and runs from Virginia Avenue/Huguelet Drive to Avenue of Champions/Winslow Street. To the east is the University of Kentucky. To the west is a residential area with limited commercial and additional University of Kentucky facilities.

UK Medical: This section is from Cooper Avenue/Waller Avenue to Virginia Avenue/Huguelet Drive. To the east of the corridor lies the University of Kentucky Hospital (currently under construction) UK Student Health, and Kentucky Clinic. To the west lies a residential area, new UK Hospital Parking Garage, and additional UK Healthcare facilities, including the recently opened College of Pharmacy.

Figure 1.2 Study Process



II. EXISTING CONDITIONS

Roadway characteristics in the study area (US 27, South Limestone and South Upper) are identified in the following sections. Information on transportation systems, geometric characteristics, traffic conditions, vehicle crash history, and adequacy ratings are all included. Applicable features are summarized from field observations and the KYTC Highway Information System (HIS) database as of October 2009 unless otherwise noted.

A. Highway Systems

Major highway systems information is shown in **Table 2.1**, including the State Primary Road System, Functional Classification System, National Highway System (NHS), National Truck Network (NN), Designated Truck Weight Class, lane widths, shoulder widths, roadway type, local terrain and speed limits. Note: South Limestone and South Upper south of Winslow are designated as US 27. South Limestone and South Upper are not part of the state system north of Winslow Street, thus data is more limited.

- State-maintained roads in Kentucky are classified into one of five categories under the State System, ranging from the highest order classification to the lowest as follows: Interstates, Parkways, Other State Primary roads, Rural Secondary roads, and Supplemental roads. US 27 is designated as Other State Primary.
- One of 13 functional classification categories is assigned to each road in Kentucky, based on the function the road provides and whether the location is urban or rural. These are classified from highest to lowest and by geographic designation such as: Rural Interstate, Urban Interstate, Other Rural Freeways and Expressways (Principal Arterial), Other Urban Freeways and Expressways (Principal Arterial), Other Rural Principal Arterial, Other Urban Principal Arterial, Rural Minor Arterial, Urban Minor Arterial, Rural Major Collector, Urban Collector, Rural Minor Collector, Rural Local, and Urban Local. The corridor is classified as Urban Principal Arterial.
- The National Highway System (NHS), first established in 1991 by the Intermodal Surface Transportation Efficiency Act (ISTEA), includes Interstate Highways and other significant Principal Arterials important to the nation's economy, defense, and mobility. US 27 is designated as a NHS route.
- The National Truck Network (NN) includes roads designated for use by commercial trucks with increased dimensions (102 inches wide; 13 feet, 6 inches high; semi-trailers up to 53 feet long; and trailers up to 28 feet long – not to exceed two trailers per truck). No routes within New Circle Road are designated on the NN system.
- Kentucky Revised Statutes require weight limits on the state-maintained highway system. There are three (3) weight classification limits: (1) AAA – 80,000 lbs. maximum gross vehicle weight; (2) AA – 62,000 lbs. maximum gross vehicle weight; and (3) A – 44,000 lbs. maximum gross vehicle weight. For special circumstances, occasional exceptions may be granted for over-dimensional or overweight vehicles. US 27 is designated with a AAA weight classification.
- US 27 is not designated as a bike route or scenic byway.

Table 2.1 South Limestone/South Upper Roadway Characteristics

US 27 (South Limestone) – Cooper Drive to Administration Drive
o Undivided, four lane highway with center turn lane
o 9 to 11 foot lane widths with curb and gutter
o 40 to 35 mph posted speed limit
o Sidewalks on both sides of the road
US 27 (South Limestone) – Administration Drive to Avenue of Champions
o One-Way (northbound), three lane highway
o 12 to 14 foot lane widths with curb and gutter
o 35 mph posted speed limit
o Sidewalks on both sides of the road
US 27 (South Upper) – Winslow Street to Scott Street
o One-Way (southbound), two lane highway
o 12 to 14 foot lane widths with curb and gutter
o 35 mph posted speed limit
o Sidewalks on both sides of the road
South Limestone (CS 7087) – Avenue of Champions to Main Street
o One-Way (northbound), two - three lane highway
o 35 mph posted speed limit
o Sidewalks on both sides of the road
South Upper (CS 4745) – Main Street to Winslow Street
o One-Way (southbound), two lane highway
o 35 mph posted speed limit
o Sidewalks on both sides of the road

B. Roadway and Sidewalk Characteristics

As was illustrated in **Table 2.1**, lane widths along the corridor vary block to block, making HIS information complex. To relieve confusion **Table 2.2** includes approximate curb-to-curb widths. In addition, lane information and parking information have been added for the entire corridor. This information was gathered using 2008 aerial photography.

Table 2.2 South Limestone/South Upper Roadway Characteristics by Section

South Limestone and South Upper						
Beginning Intersection	**Ending Intersection**	**# Lanes***	**Direction**	**Aprox. Curb to Curb Width**	**Sidewalk**	**Parking**
Cooper Dr	University Ave	5	2 way	55 ft	both sides	No
University Ave	State St	5	2 way	55 ft	both sides	No
State St	Conn Terrace	5	2 way	55 ft	both sides	No
Conn Terrace	Transcript Ave	5	2 way	55 ft	both sides	No
Transcript Ave	Gazette Ave	5	2 way	51 ft	both sides	No
Gazette Ave	Leader Ave	5	2 way	51 ft	both sides	No
Leader Ave	Virginia Ave	5	2 way	51 ft	both sides	No
Virginia Ave	Washington Ave	5	2 way	51 ft	both sides	No
Washington Ave	Maxwelton Ct	5	2 way	51 ft	both sides	No
Maxwelton Ct	Prall St	5	2 way	51 ft	both sides	No
Prall St	Montmullin St	5	2 way	56 ft	both sides	No
Montmullin St	Administration Dr	5	2 way	56 ft	both sides	No
Administration Dr	Scott St	5	2 way	90 ft	both sides	No
Scott St	Patterson Dr	3	northbound	56 ft	both sides	both sides
Patterson Dr	Ave of Champions	3	northbound	54 ft	both sides	both sides
Ave of Champions	Keeneland Dr	3	northbound	52 ft	both sides	both sides
Keeneland Dr	Pine St	3	northbound	52 ft	both sides	both sides
Pine St	East Maxwell St	3	northbound	30 ft	both sides	both sides
East Maxwell St	Warren Ct	2	northbound	30 ft	both sides	right side
Warren Ct	Chrysalis Ct	2	northbound	30 ft	both sides	right side
Chrysalis Ct	East High St	2	northbound	26 ft	both sides	right side
East High St	Vine St	2	northbound	26 ft	both sides	No
Vine St	Water St	2	northbound	34 ft	both sides	No
Water St	Main St	3	northbound	37 ft	both sides	right side
Scott St	Dickey Dr	2	southbound	42 ft	both sides	both sides
Dickey Dr	Bolivar St	2	southbound	39 ft	both sides	right side
Bolivar St	Ave of Champions	2	southbound	39 ft	both sides	right side
Ave of Champions	Cedar St	2	southbound	39 ft	both sides	right side
Cedar St	Pine St	2	southbound	39 ft	both sides	both sides
Pine St	East Maxwell St	2	southbound	39 ft	both sides	both sides
East Maxwell St	Macks Alley	2	southbound	24 ft	both sides	left side
Macks Alley	East High St	2	southbound	24 ft	both sides	left side
East High St	Vine St	3	southbound	40 ft	both sides	left side
Vine St	Main St	2	southbound	27 ft	both sides	left side

* Doesn't include turn lanes.

Sidewalk characteristics also vary throughout the corridor. Widths range between four and 10 feet. In some cases a grass utility corridor separates the roadway from the sidewalk. **Table 2.3** illustrates the distance between the roadway (face-of-curb) and back of sidewalk. This dimension includes both the sidewalk width and grass utility strip width (if applicable). This measurement was approximated from aerial photography. Values shown represent minimum values.

The proximity of buildings and other structures will impact alternative feasibility. Similar to the effort undertaken for sidewalks, measurements were taken from the face-of-curb to the nearest structure. Within each block, the closest structure to the roadway was recorded and the results are presented in **Table 2.4**.

Additional roadway and sidewalk characteristics are illustrated in **Figure 2.1** through **Figure 2.3**. These observations were taken from corridor field reviews and illustrate features such as sidewalk condition, ADA noncompliance, tight turning radii, prominent mid-block pedestrian crossing locations, and unsafe egress locations. They also show where each traffic signal, bus stop, and existing bike lane is located.

The information presented above illustrates several deficiencies along the corridor. These include narrow lane widths (less than 10 feet) as illustrated in **Tables 2.1** and **2.2**. While most sidewalks along the corridor meet minimum requirements, they are highly congested given the high volume of pedestrian traffic and the potential for inexperienced bicyclist to use the sidewalk. As illustrated in **Table 2.4**, there exist several barriers to widening lane widths, adding roadway capacity, adding bike lanes, and widening sidewalks.

C. Traffic Volumes

Traffic volumes for cars, trucks, pedestrians, and bicycles were collected along the corridor. These counts were conducted between November 2008 and February 2009, avoiding major holidays. The auto and pedestrian counts are summarized in **Figure 2.4** through **Figure 2.6**. More detailed counts for pedestrians, bicyclist, and vehicles are detailed in **Appendix A**. Turning movement counts were collected from 7:00 am to 9:00 am, 11:00 am to 1:00 pm, and 3:00 pm to 6:00 pm. The three peak periods were determined to be from 7:45 am to 8:45 am, 12:00 pm to 1:00 pm, and 4:30 pm to 5:30 pm.

Traffic volumes generally increased progressing south from downtown. During the AM Peak, the segment between Cooper Drive and Conn Terrace carried the highest through volumes at approximately 2,500 vehicles. During the Midday Peak, the largest volume was at the split where South Limestone and South Upper combine to handle approximately 2,500 vehicles; this is slightly higher than the 2,300 vehicles traveling along the southernmost section during the same period. During the PM Peak, peak volumes increased to approximately 3,000 through vehicles where South Limestone and South Upper combine. The busiest intersection was Cooper Drive/Waller Avenue which handled more than 4,200 vehicles during the PM Peak Hour. Volume decreased slightly during the AM Peak Hour.

Turning movement counts were divided into three vehicle classifications: cars, light trucks, and heavy trucks. Truck percentages, both light and heavy trucks, ranged between one and five percent for through volumes along South Limestone and South Upper. The majority of these trucks were single unit vehicles.

FIGURE 2.1

EXISTING CONDITIONS – UK MEDICAL SECTION

Notes

1. No Sidewalk Ramp
2. Poor Sidewalk Condition
3. No Sidewalk
4. Obstacle in Sidewalk
5. Congested Sidewalk/Intersection
6. Sidewalk Stub
7. Worn Path
8. Undefined Access
9. Tight Radius for Transit/Trucks
10. No Pedway Signal
11. Regularly Observed Pedestrians
12. Egress Concerns

Legend

- Traffic Signal
- Bus Stop
- Construction Zone

FIGURE 2.2

EXISTING CONDITIONS – UNIVERSITY SECTION

Notes

1. No Sidewalk Ramp
2. Poor Sidewalk Condition
3. No Sidewalk
4. Obstacle in Sidewalk
5. Congested Sidewalk/Intersection
6. Sidewalk Stub
7. Worn Path
8. Undefined Access
9. Tight Radius for Transit/Trucks
10. No Pedway Signal
11. Regularly Observed Pedestrians
12. Egress Concerns

Legend

- Traffic Signal
- Bus Stop
- Construction Zone

FIGURE 2.3

EXISTING CONDITIONS – COLLEGETOWN SECTION

Notes

1. No Sidewalk Ramp
2. Poor Sidewalk Condition
3. No Sidewalk
4. Obstacle in Sidewalk
5. Congested Sidewalk/Intersection
6. Sidewalk Stub
7. Worn Path
8. Undefined Access
9. Tight Radius for Transit/Trucks
10. No Pedway Signal
11. Regularly Observed Pedestrians
12. Egress Concerns

Legend

- Traffic Signal
- Bus Stop
- Construction Zone

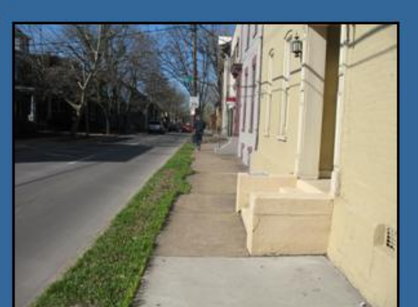


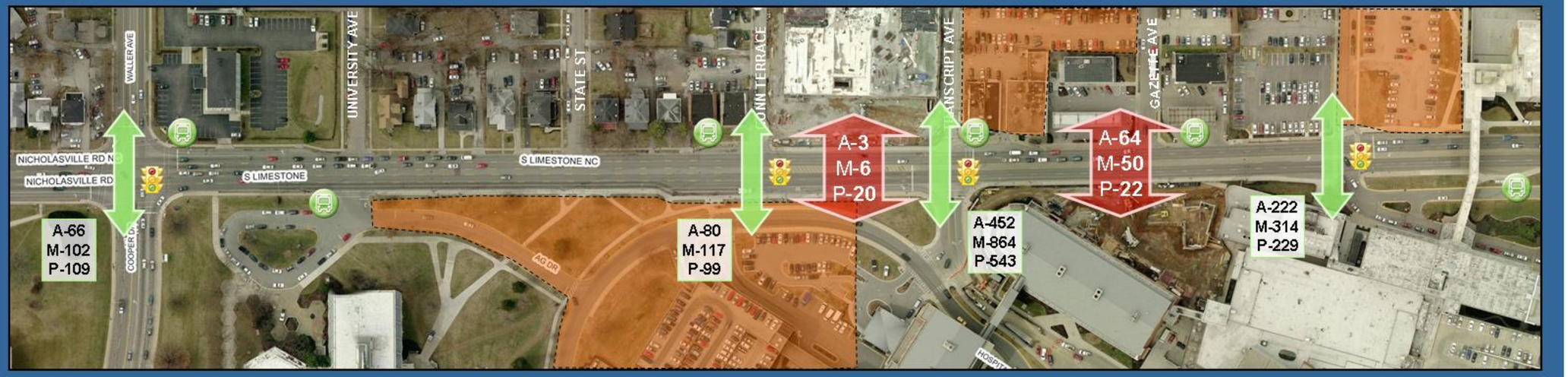
FIGURE 2.4

PEDESTRIAN AND PEAK VOLUMES – UK MEDICAL SECTION

Legend

- Traffic Signal
- Bus Stop
- Construction Zone

Pedestrian Volumes Crossing South Limestone (AM: 7:30 – 9:30, Midday: 10:30 – 1:30, PM: 3:30 – 5:30)



South Limestone Peak Hour Volumes (AM Peak: 7:45 – 8:45, Midday Peak: 12:00 – 1:00, PM Peak: 4:30 – 5:30)

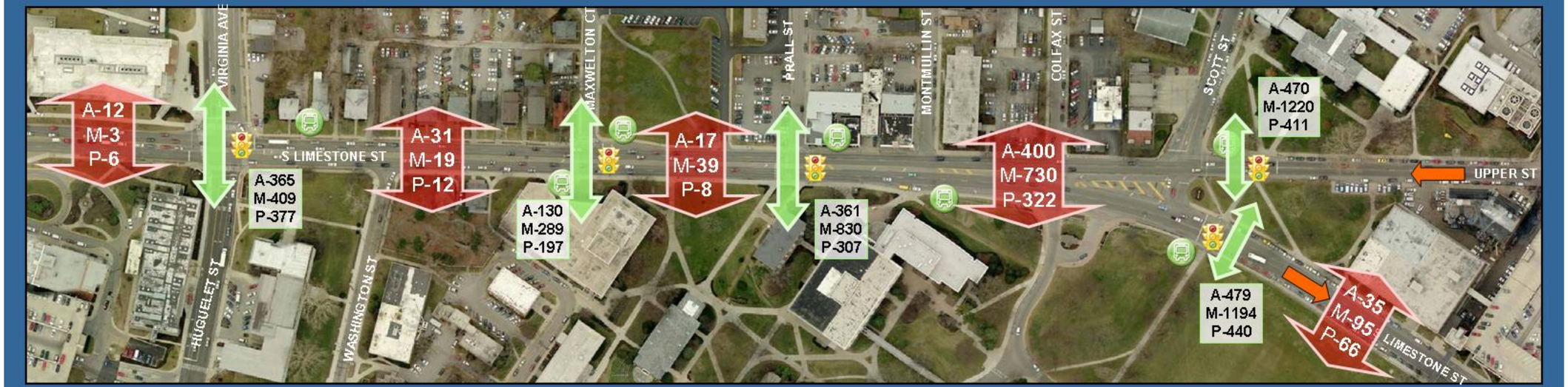
FIGURE 2.5

PEDESTRIAN AND PEAK VOLUMES – UNIVERSITY SECTION

Legend

- Traffic Signal
- Bus Stop
- Construction Zone

Pedestrian Volumes Crossing South Limestone (AM: 7:30 – 9:30, Midday: 10:30 – 1:30, PM: 3:30 – 5:30)



South Limestone Peak Hour Volumes (AM Peak: 7:45 – 8:45, Midday Peak: 12:00 – 1:00, PM Peak: 4:30 – 5:30)

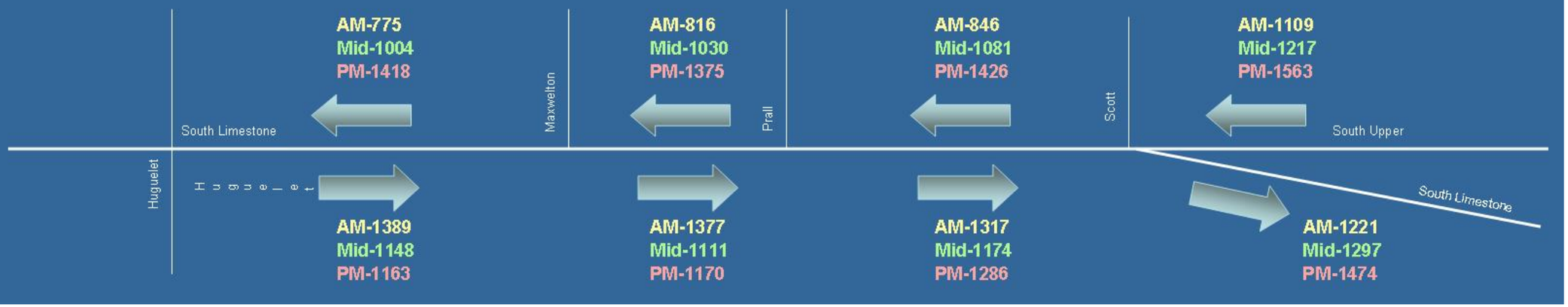


FIGURE 2.6

PEDESTRIAN AND PEAK VOLUMES – COLLEGETOWN SECTION

Legend

- Traffic Signal
- Bus Stop
- Construction Zone

Pedestrian Volumes Crossing South Limestone (AM: 7:30 – 9:30, Midday: 10:30 – 1:30, PM: 3:30 – 5:30)

South Limestone Peak Hour Volumes (AM Peak: 7:45 – 8:45, Midday Peak: 12:00 – 1:00, PM Peak: 4:30 – 5:30)

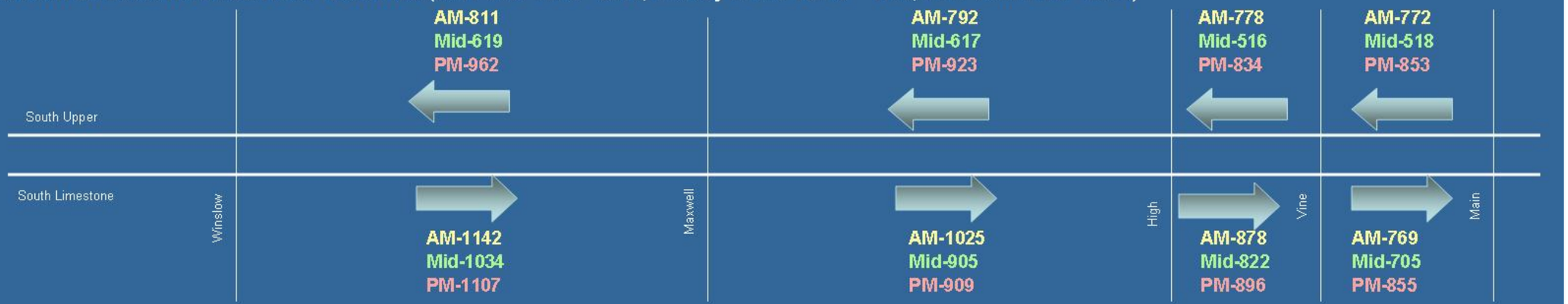


Table 2.3 South Limestone/South Upper Sidewalk Characteristics

Start Intersection	End Intersection	Approximate Width between FOC and BOS	Approximate Width between FOC and BOS
South Limestone			
Two-way		*Northbound*	*Southbound*
Cooper Dr	University Ave	8'	16'
University Ave	State St	9'	10'
State St	Conn Terrace	9'	11'
Conn Terrace	Transcript Ave	18'	7'
Transcript Ave	Gazette Ave	7'	9'
Gazette Ave	Leader Ave	7'	8'
Leader Ave	Virginia Ave	7'	8'
Virginia Ave	Washington Ave	7'	8'
Washington Ave	Maxwelton Ct	9'	8'
Maxwelton Ct	Prall St	9'	8'
Prall St	Montmullin St	9'	9'
Montmullin St	Administration Dr	5'	9'
Administration Dr	Scott St	8'	5'
Northbound One-way		*Left Side*	*Right Side*
Scott St	Patterson Dr	8'	8'
Patterson Dr	Ave of Champions	8'	8'
Ave of Champions	Keeneland Dr	10'	8'
Keeneland Dr	Pine St	9'	8'
Pine St	East Maxwell St	10'	10'
East Maxwell St	Warren Ct	10'	9'
Warren Ct	Chrysalis Ct	9'	8'
Chrysalis Ct	East High St	10'	10'
East High St	Vine St	8'	8'
Vine St	Water St	20'	20'
Water St	Main St	10'	18'
South Upper			
Southbound One-way		*Right Side*	*Left Side*
Main St	Vine St	10'	10'
Vine St	East High St	10'	8'
East High St	Macks Alley	9'	9'
Macks Alley	East Maxwell St	9'	10'
East Maxwell St	Pine St	9'	9'
Pine St	Cedar St	10'	9'
Cedar St	Ave of Champions	20'	9'
Ave of Champions	Bolivar St	19'	10'
Bolivar St	Dickey Dr	10'	6'
Dickey Dr	Scott St	7'	8'

* FOC = Face of Curb; BOS = Back of Sidewalk

Table 2.4 South Limestone/South Upper Structure Obstacles

Start Intersection	End Intersection	Approximate Width between FOC and Major Obstacle	Major Obstacle	Approximate Width between FOC and Major Obstacle	Major Obstacle
South Limestone					
Two-way		*Northbound*		*Southbound*	
Cooper Dr	University Ave	31'	road/parking	25'	parking lot
University Ave	State St	32'	road	35'	house
State St	Conn Terrace	20'	road	40'	house
Conn Terrace	Transcript Ave	30'	road	60'	parking garage
Transcript Ave	Gazette Ave	31'	hospital	22'	building
Gazette Ave	Leader Ave	14'	building (parking)	14'	parking lot
Leader Ave	Virginia Ave	11'	column	16'	column
Virginia Ave	Washington Ave	7'	wall	29'	house
Washington Ave	Maxwelton Ct	16'	Ligon House	32'	house
Maxwelton Ct	Prall St	26'	UK Law Building	18'	parking lot
Prall St	Montmullin St	45'	B&E Building	9'	buildings
Montmullin St	Administration Dr	45'	B&E Building	14'	Whalen Building
Administration Dr	Scott St	10'	wall	13'	parking lot
Northbound One-way		*Left Side*		*Right Side*	
Scott St	Patterson Dr	8'	column	4'	column
Patterson Dr	Ave of Champions	24'	Parking Structure	8'	wall
Ave of Champions	Keeneland Dr	10'	McDonalds	42'	Holmes Hall
Keeneland Dr	Pine St	12'	parking lot	50'	Hamilton House
Pine St	East Maxwell St	18'	building	10'	parking structure
East Maxwell St	Warren Ct	19'	house	12'	parking lot
Warren Ct	Chrysalis Ct	22'	house	19'	parking lot
Chrysalis Ct	East High St	10'	apt/bldg	10'	house
East High St	Vine St	9'	building	8'	building
Vine St	Water St	41'	building	20'	building
Water St	Main St	10'	building	122'	Park Plaza Apts
South Upper					
Southbound One-way		*Right Side*		*Left Side*	
Main St	Vine St	10'	building	10'	building
Vine St	East High St	16'	PNC Bank	8'	retaining wall
East High St	Macks Alley	9'	house	18'	building
Macks Alley	East Maxwell St	9'	house	10'	house
East Maxwell St	Pine St	9'	house	11'	building
Pine St	Cedar St	12'	Mellow Mushroom	18'	parking lot
Cedar St	Ave of Champions	20'	Center Court	9'	parking lot
Ave of Champions	Bolivar St	19'	Center Court	10'	parking lot
Bolivar St	Dickey Dr	10'	S. Hill Station Lofts	22'	Parking Structure
Dickey Dr	Scott St	86'	Taylor Edu. Bldg	8'	building

* FOC = Face of Curb

Pedestrian and bicycle volumes were conducted from 7:30 am to 9:30 am, 10:30 am to 1:30 pm, and 3:30 pm to 5:30 pm. Pedestrian volumes were concentrated around the University of Kentucky main campus and medical center. As illustrated in **Figure 2.5**, more than 2,000 pedestrians crossed South Limestone and South Upper at the pedestrian signals north of Scott Street during the AM, Midday, and PM periods (seven hours of data). An additional 1,400 crossed midblock between Prall Street and the pedestrian signals. More than 1,800 pedestrians crossed South Limestone at Transcript Avenue during the same seven hour period.

Bike volumes were highest in the southern portion of the South Limestone corridor. More specifically, they were consistently highest at the South Limestone/Virginia Avenue intersection. Approximately 400 bicyclists were counted at this intersection during the combined AM, Midday, and PM periods. Bike volumes tapered off significantly north of Avenue of Champions. More detailed volumes are provided in **Appendix A**.

Pedestrian and bike traffic was highest around the university and strengthen the need for higher capacity facilities. In addition, a number of pedestrians and bicyclist were observed not crossing the roadway at designated locations and riding the wrong direction, creating a number of safety concerns. This emphasizes the need for improved facilities that offer mobility and safety enhancements for all users.

According to the latest daily traffic counts conducted by the Kentucky Transportation Cabinet, South Limestone between Cooper Drive and the split carries between 35,000 and 40,000 vehicles daily. South Limestone north of Avenue of Champions handles approximately 12,000 vehicles while South Upper carries between 11,000 and 22,000 vehicles daily. The latest counts are summarized in **Table 2.5**.

Table 2.5 KYTC Average Daily Traffic Volumes

Route	Start Intersection	End Intersection	Count	Year
South Limestone	Cooper Drive	Virginia Avenue	38131	2006
South Limestone	Virginia Avenue	Avenue of Champions	35180	2006
South Limestone	Avenue of Champions	Main Street	11945	2008
South Upper	Main Street	Winslow Street	11174	2006
South Upper	Winslow Street	Bolivar Street	21165	2008
South Upper	Bolivar Street	Scott Street	20530	2008

D. Traffic and Operational Measures

A traffic operations model was developed for the AM Peak, Midday Peak, and PM Peak periods to determine various measures of effectiveness for the corridor. These include Level of Service, total number of stops, delay per vehicle, and average speed. Level of service (LOS) was also tabulated for each intersection within the study area. These measures were based on the traffic volumes described in the previous section. Travel time surveys were conducted in February 2009 to determine how long it takes on average to drive the corridor in each direction. The results are described below.

System-wide performance measures are provided in **Table 2.6** and are based on SimTraffic simulation results. Average speed along the corridor ranges between 12 and 14 miles per hour. Delay per vehicle is highest during the PM Peak Period at greater than two minutes. The AM and Midday periods experience total delay slightly less than two minutes.

Table 2.6 2009 System-wide Performance Measures

Measure	AM	NOON	PM
Travel Distance (mi)	6,881	6,224	7,509
Travel Time (hr)	579	530	711
Average Speed (mph)	14	13	12
Total Delay (hr)	357	323	462
Delay / Vehicle (s)	112	118	140
Total Stops	20,271	17,718	23,375

Level of Service was tabulated for each signalized intersection within study area. The results are shown in **Table 2.7**. Additional detail for each movement and approach is provided in **Appendix B**. The majority of the intersections operate at acceptable LOS. The exceptions are South Limestone at Cooper/Waller and at Virginia/Huguelet. As noted in the previous section, the Cooper/Waller intersection is also processing the highest volume. LOS measures for individual movements presented in **Appendix B** show several LOS E and F movements beyond the two previously mentioned intersections; however, this is not unexpected for a major arterial corridor during the peak hours.

Travel time surveys were conducted along South Limestone and South Upper between Cooper Avenue and Main Street. The results are presented in **Table 2.8**. Travel times for the AM, Midday, and PM periods were consistent ranging between five and seven minutes. The longest individual run was for the Southbound PM period which took nine minutes and 43 seconds. This would equate to an approximate speed of 10 miles per hour. The shortest individual run was for the Northbound AM period which took four minutes 12 seconds equating to 23 miles per hour.

Table 2.7 2009 South Limestone/South Upper Intersection

Seconds of Delay and Level of Service

Intersection	AM	NOON	PM
South Limestone			
Cooper/Waller	77.0/E	69.0/E	77.0/E
Conn Terrace	10.9/B	14.4/B	17.6/B
Transcript	18.1/B	15.1/B	14.2/B
Leader	5.2/A	4.3/A	8.7/A
Virginia	48.5/D	44.0/D	72.8/E
Maxwelton	5.6/A	4.4/A	6.0/A
Prall	3.5/A	4.9/A	5.6/A
Ped Signal	14.0/B	12.7/B	13.3/B
Avenue of Champions	16.6/B	16.4/B	13.7/B
Maxwell & Lime	13.6/B	18.6/B	14.5/B
High	14.7/B	9.1/A	16.0/B
Vine	7.6/A	5.4/A	13.1/B
Main	14.3/B	18.0/B	14.3/B
South Upper			
Main	12.7/B	9.7/A	13.7/B
Vine	14.0/B	13.7/B	16.0/B
High	7.3/A	20.1/C	26.4/C
Maxwell	27.0/C	10.6/B	9.3/A
Euclid	6.5/A	7.9/A	10.7/B
Ped Signal	4.7/A	10.2/B	16.1/B

Table 2.8 2009 South Limestone/South Upper Travel Time Surveys

	Average	High	Low
AM Peak (11 runs)			
Northbound	5 mins 15 secs	8 mins 3 secs	4 mins 12 secs
Southbound	6 mins 51 secs	8 mins 16 secs	5 mins 39 secs
Midday Peak (9 runs)			
Northbound	6 mins 49 secs	7 mins 50 secs	5 mins 38 secs
Southbound	6 mins 44 secs	8 mins 39 secs	5 mins 40 secs
PM Peak (8 runs)			
Northbound	6 mins 46 secs	8 mins 8 secs	5 mins 36 secs
Southbound	7 mins 0 secs	9 mins 43 secs	4 mins 46 secs

E. Crash Analysis

Crash records were collected from KYTC for major state routes in the project area over a nine-year period (Jan 2000 – Oct 2008). The location of crashes with valid milepoint designations, recorded in the KYTC's CRASH database, are shown by corridor segment in **Table 2.9** and by spot locations (0.1 miles in length) in **Table 2.10**. Crashes are mapped by location and provided in **Appendix C**.

A spot location or segment of roadway is considered to be a high crash location when its crash rate is higher than the average crash rate for similar roads in the state. This is measured by the critical rate factor (CRF), the ratio of the crash rate for the spot or segment compared to the average crash rate for similar roads. When the CFR is greater than 1.0, crashes may not be occurring randomly at a given location. The CFRs are based on formulas published by the Kentucky Transporation Center.

As part of the crash analysis process, each crash was classified into one of three categories based on the degree of severity: fatal, injury, or property-damage-only. During the period studied, there were zero fatal, 213 injury, and 1102 property-damage-only crashes reported along the study corridor. Rear-end crashes were the most prevelent, which is to be expected along this type of corridor. Angle collisions were the second highest crash type. These results are detailed in **Table 2.11**. Along the route, there were six segments and one spot identified as high crash spots or segments (CRF > 1.0). Safety measures are needed to address the high crash segments along the corridor.

Table 2.9 South Limestone/South Upper Crash Segment Analysis

Roadway	Location		Location		ADT	Crashes				Critical Rate Factor
	Begin Street	End Street	BMP	EMP		Fatal	Injury	PDO	Total	
US 27 (South Limestone)	Cooper Dr	Virginia Ave	4.674	5.162	37,700	0	121	559	680	**2.22**
US 27 (South Limestone)	Virginia Ave	Scott St	5.162	5.498	35,600	0	41	214	255	**1.24**
US 27 (South Limestone)	Scott St	Avenue of Champions	5.498	5.698	18,500	0	14	62	76	**1.00**
US 27 (Winslow/Upper)	South Limestone	Bolivar St	5.698	5.810	18,500	0	5	34	39	**1.32**
US 27 (South Upper)	Scott St	Bolivar St	5.498	5.672	15,800	0	5	45	50	**1.35**
South Limestone	Avenue of Champions	East Maxwell St	0.000	0.190	11,900	0	6	51	57	**1.80**
South Limestone	East Maxwell St	Main St	0.190	0.500	11,900	0	1	13	14	**0.30**
South Upper	Main St	Winslow Ave	0.000	0.500	11,500	0	6	29	35	**0.51**

* Crashes reported Jan 2000 - Oct 2008

Table 2.10 South Limestone/South Upper Crash Spot Analysis

Roadway	Location		ADT	Crashes				Critical Rate
	BMP	EMP		Fatal	Injury	PDO	Total	
US 27 (South Limestone)	4.674	4.774	37,700	0	53	246	299	**1.47**
US 27 (South Limestone)	4.774	4.874	37,700	0	19	104	123	0.61
US 27 (South Limestone)	4.874	4.974	37,700	0	11	58	69	0.34
US 27 (South Limestone)	4.974	5.074	37,700	0	12	57	69	0.34
US 27 (South Limestone)	5.074	5.174	37,500	0	30	122	152	0.75
US 27 (South Limestone)	5.174	5.274	35,600	0	12	52	64	0.33
US 27 (South Limestone)	5.274	5.374	35,600	0	16	64	80	0.42
US 27 (South Limestone)	5.398	5.498	35,600	0	6	64	70	0.36
US 27 (South Limestone)	5.598	5.698	18,500	0	10	51	61	0.58
US 27 (South Limestone)	5.706	5.806	18,500	0	4	30	34	0.49

* Crashes reported Jan 2000 - Oct 2008

Table 2.11 South Limestone/South Upper Crash Types

Single Vehicle	Angle	Rear End	Sidewipe	Miscellaneous	Total
42	308	519	269	68	1206

A comparison of crash records maintained by the KYTC and the Lexington Police Department showed descrepencies in the number of vehicle crashes involving pedestrians or bicyclists. Review of the two datasets confirmed that data was not consistent between the datasets. The data provided by Lexington Police proved to be more comprehensive. **Table 2.12** illustrates the bicycle/pedestrian crashes by year based on a combined dataset. Over the past nine years, there were 30 automobile collisions with a pedestrian and 25 with a bicyclist. The majority only involved one vehicle and were classified as angle collisions. This would generally represent a vehicle turning at a driveway or intersection and hitting a bicyclist or pedestrian in the crosswalk.

One fatality occurred during this period and occurred midblock. Midblock accidents have the potential to be more severe because of the higher speed of the vehicle. In order to improve pedestrian and bicycle safety, it is important to minimize the number of crossings at undesignated locations. In addition, measures are needed to minimize crossing against the pedestrian signal because these have a tendency to be a higher speed collision as well.

Table 2.12 South Limestone/South Upper Bicycle/Pedestrian Crashes

Automobile Collision	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**Total**
with Pedestrian	4	3	7	3	3	3*	3	3	4	**30**
with Bicylist	2	2	4	2	4	1	3	3	4	**25**

* Pedestrian fatality between Leader Avenue and Virginia Avenue

III. GOALS AND OBJECTIVES

Working with the Corridor Advisory Committee and other stakeholders through the public involvement process, a vision statement along with goals and objectives were developed.

A. Corridor Advisory Committee

The Corridor Advisory Committee (CAC) was established early in the process. The committee met six times over the course of the study and included the following agencies and organizations:

- Lexington-Fayette Urban County Government (LFUCG) Planning
- Lexington Area Metropolitan Planning Organization
- LFUCG Engineering
- LFUCG Traffic Engineering
- Kentucky Transportation Cabinet (KYTC) Planning
- KYTC District 7 Traffic Engineering
- KYTC District 7 Planning
- University of Kentucky
- University of Kentucky Medical Center
- University of Kentucky Parking and Transportation Lexington Police
- LexTran
- Lexington Fire Department
- Lexington Council Office, District 3
- Lexington Parking Authority
- Downtown Development Authority
- North Elizabeth Street Neighborhood Association
- FHWA
- Wilbur Smith Associates
- CDP Engineers

B. Vision

The vision is as follows:

Develop a safe and sustainable transportation corridor that provides a sense of place and encourages travel by bicycling, walking, and public transit.

C. Goals and Objectives

Based on the vision statement, four primary goals were developed:

- Improve Consistency: Inconsistencies were noted for all modes. Sidewalk widths vary throughout the corridor. In some locations there are grass strips separating sidewalks from the roadway and in other locations there are not. Bike facilities are not connected and the types of facilities are inconsistent. Transit stops vary in proximity to the intersection and amenities offered. Travel time along the corridor can vary, which can impact emergency response time and driver expectations.
- Improve Safety: Crash findings and general observations indicate a need for improved safety along the corridor. Pedestrians and transit riders are regularly observed crossing midblock and crossing against the pedestrian walk signal. Bicyclists are observed riding the wrong direction on the roadway or riding along narrower sidewalks. Sidewalks throughout the corridor are in disrepair, lack ADA compatible ramps, and have obstacles in the sidewalk reducing the usable space. Delivery drivers often stop in the median or travel lane and expose themselves to oncoming traffic.

- Improve Mobility: Pedestrian and bicycle mobility can suffer during peak periods when cycle lengths are higher. In particular, pedestrians and bicyclist spend more time waiting to cross South Limestone. Sidewalk condition also can negatively impact pedestrian mobility. Lack of system slows bicyclist travel times between popular destinations. Congestion at major intersections can negatively impact transit operations.
- Enhance Placemaking: The South Limestone corridor has three distinct sections, but lacks gateway features, wayfinding signage, and other amenities that help to define these areas and make them attractive for all modes. In most sections of the corridor, pedestrian buffering is limited and operating space for bicyclist is poorly defined. More transit amenities are needed including more shelters.

Each primary goal was then subdivided by mode (all modes, pedestrian, bicycle, transit, emergency response, freight, and automobile) to establish 50 objectives. The goals and objectives evolved throughout the public involvement process. The final version is illustrated in **Table 3.1**. The goals and objectives were used to develop and evaluate alternatives as described in the next chapter.

Table 3.1 Study Goals and Objectives

Mode	Improve Consistency	Improve Safety	Improve Mobility	Enhance Placemaking
All Modes	- Provide uniform signage and lane markings - Provide uniform facility (lane, sidewalks, and planting strips) widths - Provide uniform intersection design - Improve transitions between modes and facility types	- Reduce conflict points within and between modes - Reduce obstacles - Reduce number and severity of accidents - Improve lighting	- Improve or minimize stops - Improve reliability - Maintain or improve travel time - Reduce vehicular use during peak travel times	- Provide gateway features at intersections - Provide branding features along corridor - Incorporate public art - Improve water quality
Pedestrian	- Provide clearly defined pedestrian ways	- Provide ADA compliant sidewalks and crossings - Define and encourage crossings at preferred locations - Minimize crossing distances - Reduce sidewalk blockage by smokers	- Maximize crossing opportunities - Provide crossings at known generators - Reduce pedestrian delay at crossings	- Maximize buffering from traffic - Provide shade trees - Provide pedestrian scale lighting - Provide seating and gathering areas
Bicycle	- Provide continuous bicycle facilities along the corridor	- Reduce sidewalk and wrong way riding - Provide appropriate bicycle operating space	- Provide connections between known generators and existing bike facilities	- Provide bike parking
Transit	- Provide consistent and timely routing	- Provide ADA compliant access to bus for all users - Reduce midblock crossings associated with bus stops		- Provide comfortable waiting areas - Provide ancillary facilities (trash cans, newspaper racks, maps, etc.) - Reduce noise and air pollution
Emergency Response	- Facilitate consistent emergency response time along corridor		- Provide preferred or alternative emergency routes	
Freight	- Provide consistent loading zones	- Reduce delivery driver exposure to moving traffic - Reduce backing	- Accommodate routine deliveries within the corridor	- Reduce visibility of loading zones - Reduce air and noise pollution
Automobile		- Provide safe parking movements		- Create a view shed that encourages traveling at the legal speed - Reduce air and noise pollution

IV. ALTERNATIVES DEVELOPMENT AND ANALYSIS

Based on the project goals and objectives and identified corridor deficiencies, a number of alternative concepts were developed and presented to stakeholders. This input was used to develop three alternatives. The alternatives were evaluated and further refined. The three refined alternatives were presented to stakeholders. The following sections outline the development and evaluation process.

A. Development of Alternative Concepts

The first Public Forum was held June 16, 2009, to present several alternative concepts that could be applied to the corridor. The first set of concepts considered the two-way section from Cooper Drive to South Upper. Eight total concepts were presented for the two-way section and are described below and illustrated in **Appendix D**.

- Six Lane Roadway with Exclusive Bus and Bike Lanes - This option would provide three lanes in each direction. One of those three would be for the exclusive use of buses. Bike lanes and sidewalks would be provided and a median would be wide enough for left turn lanes at intersections, as needed.
- Four Lane Roadway with Median and Bike Lanes - This option would provide two lanes in each direction. Bike lanes and sidewalks would be provided and a median would be wide enough for left turn lanes at intersections, as needed.
- Four Lane Roadway with Median and Sharrow Lanes - This option would provide two lanes in each direction. The inside lanes would be 11-foot, while the outside lanes would be 14-foot sharrow lanes to accommodate both bikes and autos. An alternative would be to limit the sharrow lane to bus/bike only. Sidewalks would be provided and a median would be wide enough for left turn lanes at intersections, as needed.
- Five Lane Roadway with Bike Lanes - This option would provide two lanes in each direction. Bike lanes and sidewalks would be provided. A center left-turn lane is also provided. Reversible lanes could also be considered as part of this option.
- Five Lane Roadway with Sharrows – This option would provide two lanes in each direction. The inside lanes would be 11-foot, while the outside lanes would be 14-foot sharrow lanes to accommodate both bikes and autos. Sidewalks and a center left-turn lane are also provided.
- Reversible Four Lane Roadway with Bike Lanes – This option would provide two lanes in each direction. Bike lanes and sidewalks are provided. Reversible lanes could also be considered as part of this option.
- Four Lane Roadway with Median Barrier and Sharrow Lanes – This option would provide two lanes in each direction. The inside lanes would be 11-foot, while the outside lanes would be 14-foot sharrow lanes to accommodate both bikes and autos. An alternative would be to limit the sharrow lane to bus/bike only. Left turns would be restricted by a median barrier. Sidewalks would be provided.
- Four Lane Roadway with Bike Lanes – This option would provide two lanes in each direction. Bike lanes and sidewalks would be provided.

The needs of each transportation mode were considered and weighed against right-of-way requirements for each concept. For example, the widest typical section provided dedicated bus lanes, two lanes per direction for vehicles, and bicycle lanes but required 92 feet, where

currently the corridor is generally less than 55 feet wide. The narrowest alternative concept considered could be accommodated within the existing roadway.

For the one-way section, two concepts were presented. The major difference between these two concepts was one presented an exclusive bike lane and the other a sharrow lane. Sharrow lanes are generally wider than a typical lane and have pavement markings installed within travel lanes, reminding motorists that they should expect to see and share the road with cyclists. Both concepts included parking and sidewalks on both sides of the one-way section.

Key comments received at the Public Forum are summarized as follows:

- Bike lanes were considered an improvement, and were generally preferred over sharrow lanes.
- Pedestrian separation from traffic lanes via a grass strip was felt to improve pedestrian safety.
- Concepts that maintained or increased automobile capacity were preferred by some participants; however, others felt too much pavement was unfavorable and encourages faster moving traffic.
- Reversible lanes were generally not preferred.
- Maintaining consistency with Nicholasville Road to the south in terms of capacity was noted.

The alternative concepts were later presented to the Corridor Advisory Committee along with comments from the Public Forum. Comments received from the CAC members are summarized below:

- Five-foot sidewalks are not wide enough along the University of Kentucky's Campus.
- Snow plows will have a hard time seeing a two-foot median.
- A two-foot or four-foot median is not wide enough to be a pedestrian refuge.
- High pedestrian volumes crossing mid-block contribute to the large number of bicycle/pedestrian crashes; this should be addressed.
- Four-foot bike lanes combined with nine-foot driving lanes could be a safety concern. Bicyclists are also likely to continue using the sidewalk under this scenario.
- Are there enough bus routes along the corridor to justify a designated bus/bike sharrow lane? LexTran would evaluate increasing the number of buses per route under this scenario, but it would have to make sense for entire route(s).
- The University of Kentucky will continue to buy property between State Street and Prall Street. As property is bought, streets such as Leader Avenue will be closed. Look at a potential long-term solution as it pertains to this changing land use.
- The reversible lane concept will not provide pedestrian refuge.
- High traffic volumes and a near even directional split make reversible lanes impractical.
- Consider using a combination right turn/bike sharrow lane at major intersections rather than dropping bike lanes prior to intersections.
- Five-foot bike lanes might not be feasible along some sections of South Upper.

- There are safety concerns associated with two-way shared-use paths at intersections and driveways.
- Heavy pedestrian traffic will require a wide shared-use path.
- If paths are used, they should encourage bicycle use in one direction.

B. Development of Alternatives

Considering input from the public, feedback from the CAC, and guidance from the project goals and objectives, the following three alternatives were recommended for further analysis:

- **Alternative 1:** Corridor Spot Improvements, including potential multi-use path on both sides of the roadway. No major widening will be included.
- **Alternative 2:** Maintain the existing roadway width, but add bike facilities by reducing or removing the center turn lane width. This strategy includes intersection, planting strip and sidewalk improvements.
- **Alternative 3:** Widen the existing roadway to maintain five 10 to 11-foot lanes and add two five-foot bike lanes. This strategy includes intersection, planting strip and sidewalk improvements.

The three alternatives presented at the second Public Forum held October 27, 2009 are provided in **Appendix E** and described below.

Alternative 1

For Alternative 1 between Cooper Drive and the split at Upper Street, the footprint of the roadway (curb-to-curb width) remains with raised mountable medians where appropriate. A narrow grass strip for utilities and a pedestrian buffer is provided. A wide path of approximately 16 feet for one-way bike traffic and two-way pedestrian traffic is provided. The typical section for the two-way portion of the corridor is illustrated in **Figure 4.1**. Along the one-way section of the corridor, bike lanes are proposed to be added within the roadway footprint. A 10-foot grass strip and 10-foot sidewalk are recommended, where space allows. Parking is accommodated in place of the grass strip, as needed. The typical section for the one-way portion of the corridor is illustrated in **Figure 4.2**.

Figure 4.1 Alternative 1 Two-Way Typical Section

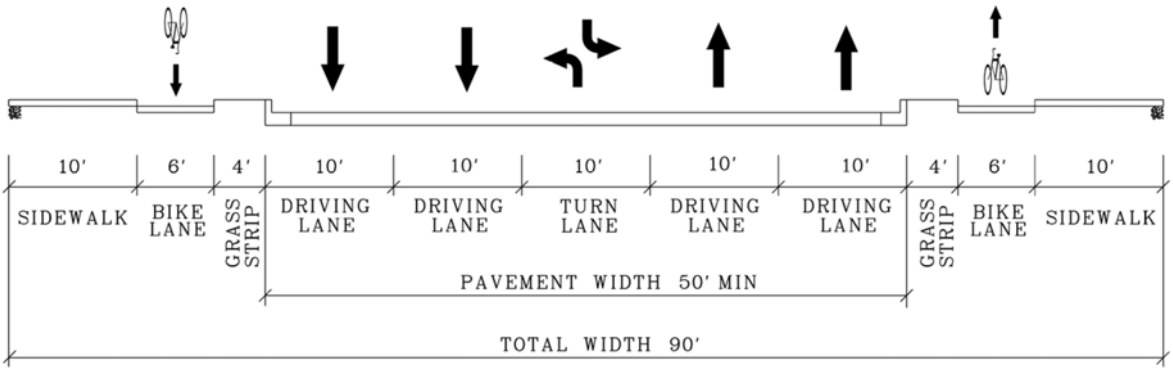
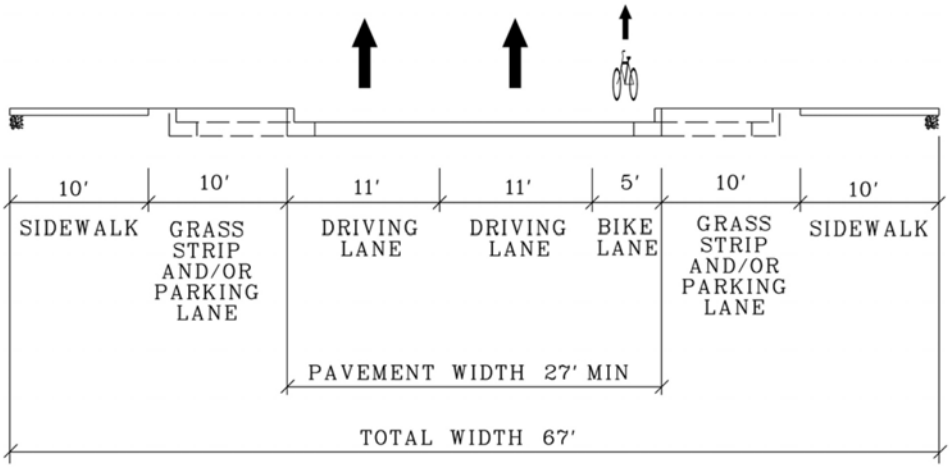


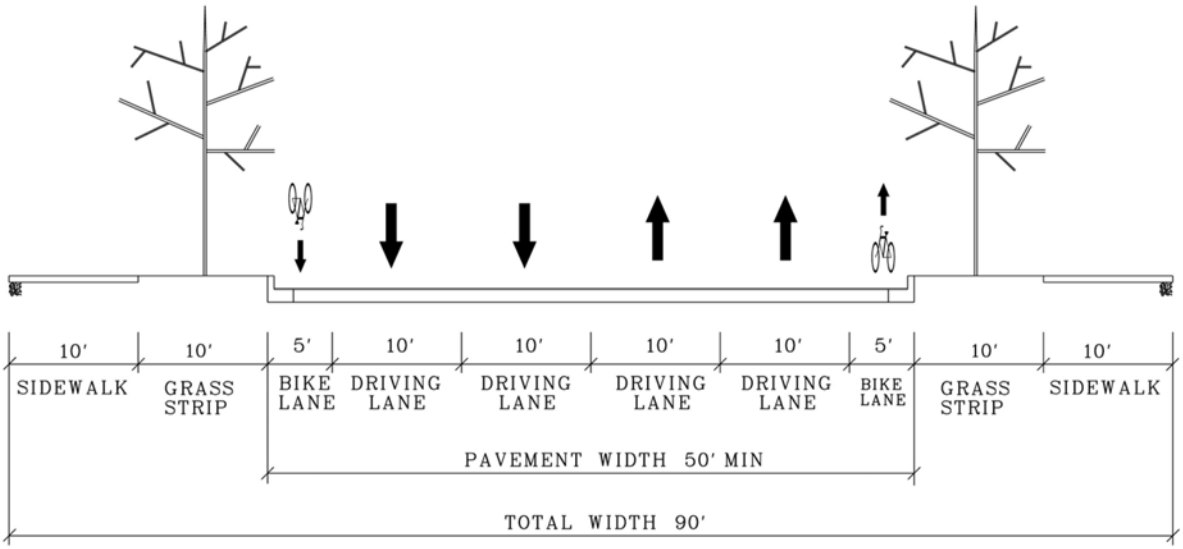
Figure 4.2 Alternative 1 One-Way Typical Section



Alternative 2

For Alternative 2 between Cooper Drive and the split at Upper Street, turn lanes are removed at minor intersections and medians are removed midblock to accommodate bike lanes within the roadway footprint. The section from Cooper Drive and Transcript Drive and the Virginia Drive and Scott Street intersections would be widened to provide bike lanes and turn lanes, as needed. A grass strip is provided between the roadway and sidewalk with sidewalks widened, where practical. The typical section for the two-way section is illustrated in **Figure 4.3**. The one-way section of the corridor is similar to Alternative 1, as presented in **Figure 4.2.**

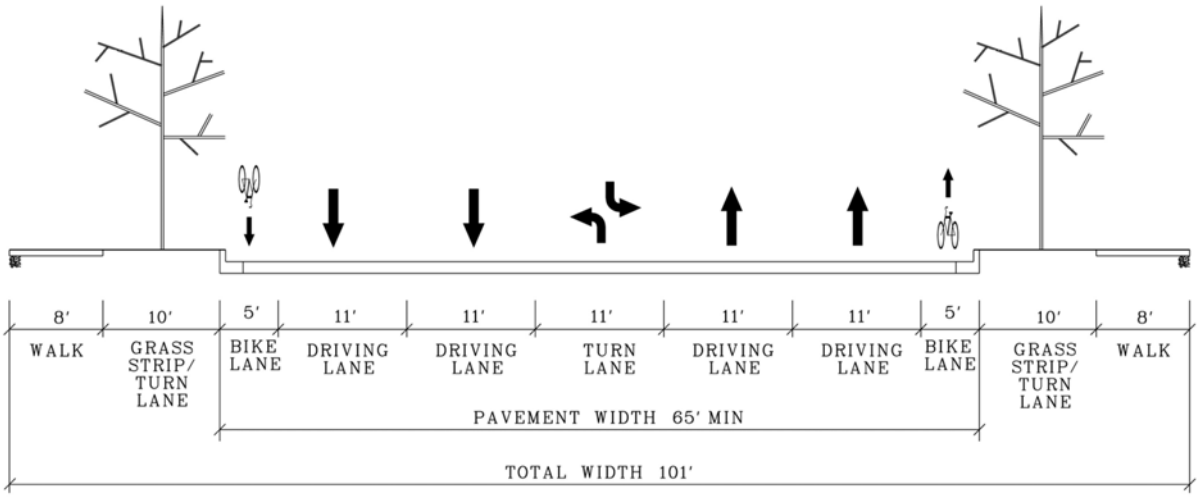
Figure 4.3 Alternative 2 Two-Way Typical Section



Alternative 3

For Alternative 3 between Cooper Drive and the split at Upper Street, the roadway footprint is widened to provide 11-foot lanes and five-foot bike lanes. Medians could be provided. A grass strip is provided between the roadway and sidewalk with sidewalks widened, where practical. The typical section for the two-way portion of the roadway is illustrated in **Figure 4.4**. Along the one-way section, the corridor is similar to Alternatives 1 and 2, as presented in **Figure 4.2.**

Figure 4.4 Alternative 3 Two-Way Typical Section



C. Evaluation of Alternatives

The three recommended alternatives were compared to the existing condition and to one another. Individual components were also evaluated. The alternatives were presented to the Corridor Advisory Committee on August 25, 2009 and to the public on October 27, 2009.

The Project Team identified strengths and weaknesses for each alternative. Key advantages over the existing condition and differences between each alternative are summarized below.

- All Alternatives Compared to the Existing Condition:
  - Strengths:
    - Provides more uniform facility widths for all modes.
    - Improves transitions between modes and facility types.
    - Reduces obstacles for all modes.
    - Provides clearly defined pedestrian ways, encourages pedestrian crossings at preferred locations, and maximizes pedestrian crossing opportunities.
    - Provides continuous bicycle facilities and appropriate operating space along the corridor and provides connections between known generators and existing bike facilities.
    - Reduces midblock crossings associated with bus stops.

        - Enhances placemaking.
    - Weaknesses:
        - Doesn't provide consistent loading zones and reduce delivery driver exposure to moving traffic.

- Alternative 1:
    - Strengths:
        - Minimizes crossing distances for pedestrians.
        - Provides median refuge for pedestrians.
        - Maintains vehicular and transit mobility by minimizing changes to the existing roadway.
        - Creates a viewshed that encourages traveling at the legal speed.
        - Minimizes utility impacts and requires no roadway widening, which reduces project cost.
    - Weaknesses:
        - Less uniform intersection design and complicated transitions between modes and facility types.
        - Narrow width of grass strip reduces options for a pedestrian barrier.
- Alternative 2:
    - Strengths:
        - Reduces conflict points between Virginia Avenue and Scott Street, which should have a positive impact on the number and severity of accidents.
        - Minimizes crossing distances for pedestrians.
        - Providing on-street bicycle facilities should reduce number of bicyclists riding on the sidewalk.
    - Weaknesses:
        - Elimination of medians may impact transit and emergency response reliability.
        - Number of stops and average delay, increased; average speed decreased for vehicular traffic.
        - Requires an increased footprint at key intersections to accommodate U-turns.
        - Eliminates median refuge for pedestrians.
- Alternative 3:
    - Strengths:
        - Provides the most uniform facility widths and intersection design.
        - Provides clearly defined pedestrian ways and encourages pedestrian crossings at preferred locations.
        - Provides continuous bicycle facilities and appropriate operating space.

- Provides additional capacity at Virginia Avenue and Huguelet Drive.

o Weaknesses:

- Widens pedestrian crossing locations.
- Doesn't create a viewshed that encourages traveling at the legal speed.
- Roadway widening results in significant utility impacts and increased costs.

Based on stakeholder input, there was limited support for Alternative 3. Stakeholders generally felt existing lane widths were adequate and it would be difficult to justify the expense of widening the roadway to only accommodate bike lanes. Alternative 3 was dismissed from further consideration; however, three components of Alternative 3 were carried forward for further consideration. In order to accommodate future growth of the UK Healthcare Campus, it was agreed that the Virginia Avenue/Huguelet Drive intersection would need to be widened in the future. The timing of this project will depend on how quickly new UK Healthcare projects are implemented.

The second component brought forward was the Newtown Pike Extension intersection with South Upper and South Limestone. The design presented as part of Alternative 3 was agreed to be the most practical design of the three options presented.

The third component brought forward for further consideration was two-way street conversion along South Upper between Main Street and Winslow Street. This will need to be studied in more detail, but was found to be feasible at the concept level. The biggest barrier to implementation would be accommodation of bike and parking lanes and truck movements.

Based on feedback at the Second Public Forum, opinions were split between Alternatives 1 and 2. Opinions were mixed on whether bike lanes should be provided within the existing curb lines or provided adjacent to the sidewalk outside curb lines. When compared to Alternative 1, Alternative 2 would require minor widening. As with Alternative 3, it would be difficult to justify the expense of widening the roadway to only accommodate bike lanes. There were also concerns over eliminating or reducing capacity for left-turn movements at Kentucky Clinic Drive, Virginia Avenue/Huguelet Drive, Maxwelton Court, Prall Street, Montmullin Street, and Colfax Street.

For the above reasons, Alternative 2 was dismissed from further consideration; however, the University section was seen as feasible in the long term if several other projects were implemented first. These include widening the Virginia Avenue/Huguelet Drive and Scott Street intersections to accommodate u-turns. In addition, a roadway west of South Limestone would be needed to allow traffic to circulate better between Virginia Avenue and Scott Street.

Alternative 1 was recommended for further consideration. It would have the least impact to utilities and right-of-way, while still improving mobility and safety for all modes. Key components from Alternatives 2 and 3, as defined above, would be included in the recommended alternative. In addition, stakeholder input supported a shared path for pedestrians and bicyclist, similar to the approach used throughout the university instead of separated parallel path originally proposed as part of Alternative 1.

D. Additional Traffic Analysis

Three specific components included in all three alternatives were evaluated as separate projects to determine relative impact. The components were (1) removal of reversible lanes

north of Cooper Drive, (2) removal of the third through lane north of Scott Street, and (3) removal of the right turn lane approaching High Street.

The removal of the reversible lanes north of Cooper Drive was initially included in all three alternatives; however, it increases overall delay and the number of stops. Removing the reversible lanes, delay per vehicle increased by 35 percent when compared to the Baseline for PM peak conditions. Stops increased more than 20 percent for the same analysis period. In simulation scenarios, the southbound queue from Cooper Drive backed up through three intersections beyond University Clinic Drive. The project was proposed as a safety improvement; however, the queue spillback through intersections has the potential to have a negative effect on safety. Motorists are more likely to block intersections, impacting both mobility and the safety of pedestrians and bicyclists crossing the street. Therefore, this component was removed from the alternatives being considered.

The reduction of lanes north of Scott Street and the removal of the right turn lane approaching High Street were both found to have no change on overall system performance for the PM peak period when compared to the Baseline. Therefore, these components remained in the alternatives being considered.

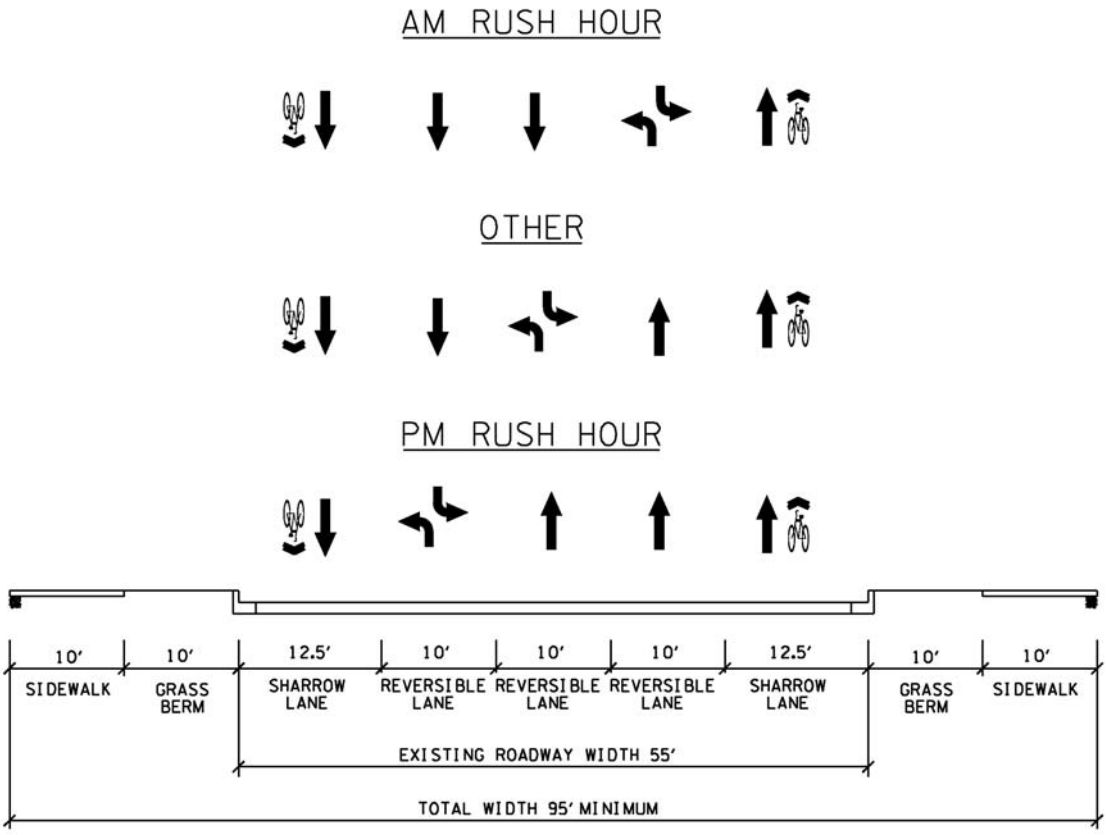
E. Recommendation of a Preferred Alternative

Based on the analysis presented above, a long-term vision for the corridor was developed. The long-term vision includes implementation of the Alternative 1 concept without separation of bike and pedestrian movements in the UK Medical and Collegetown sections and implementation of the Alternative 2 concept in the University section. Finally, it includes the Virginia Avenue/Huguelet Drive and Scott Street (Newtown Pike Extension) intersection improvements from Alternative 3. Reversible lanes would be maintained south of Conn Terrace.

One of the goals for the long-term vision is to minimize roadway widening and right-of-way purchase; however, this would be required in select locations. Roadway widening along South Limestone near Virginia Avenue and Huguelet Drive would require additional right-of-way from the University of Kentucky and private residences west of South Limestone to accommodate a future bike lane and u-turn option and dual left-turn lanes at the intersection. While curb lines would not shift more than five to twenty feet depending on location, significant utility impacts are expected, pushing up the cost for these improvements. In addition, the Newtown Pike Extension would require South Upper to be relocated requiring right-of-way from the University of Kentucky. Another location where minor widening is expected is between Bolivar Street and Dickey Drive to accommodate a bike lane. This would be along University of Kentucky property and would require the curb line to shift approximately 5 feet. These projects are discussed in more detail in **Chapter V**.

Throughout the corridor, sidewalks are recommended to be widened to 10 feet and grass strips proposed between the roadway and sidewalk; however, in most cases, along private right-of-way, these improvements would occur during a redevelopment of the property to minimize impact to existing businesses and residents. A sample typical section is illustrated in **Figure 4.5**. Depending on skill and comfort level, bicyclists could use the roadway or sidewalk.

Figure 4.5 Long-Term Vision - Typical Section
Cooper Drive/Waller Avenue to Conn Terrace



In order to achieve the long-term vision for the University section, several changes would be required. Some of these are addressed as short-term improvements and discussed in **Chapter V**. Other improvements are expected to take longer to implement and are only covered in concept as part of this study. The major difference between the long-term vision and Alternative 2, previously discussed, is the addition of a median barrier along South Limestone to restrict left-turn movements between Virginia Avenue and Scott Avenue. This allows for the elimination of left-turn lanes, which creates the space needed for bike lanes. Also, the elimination of turn movements reduces conflict points which provide a safety enhancement. U-turns would be allowed at either end of this section to access Maxwelton Court, Prall Street, Montmullin Street, and Colfax Street. The concept is illustrated in **Figure 4.6**.

Along other sections, the roadway is proposed to be narrowed. As illustrated in **Figure 4.7** and **Figure 4.8**, curb lines would be moved in to accommodate wider sidewalks and/or grass strips.

Figures 4.9 through **4.11** illustrate the long-term vision for the corridor. The implementation plan for the long-term vision is presented in the following chapter.

Figure 4.6 Long-Term Vision – Typical Section
Maxwelton Court to Prall Street

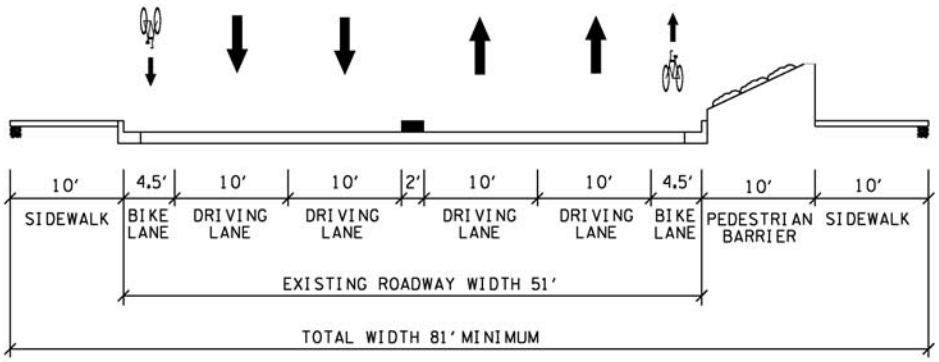


Figure 4.7 Long-Term Vision – Typical Section
Winslow Street to Cedar Street

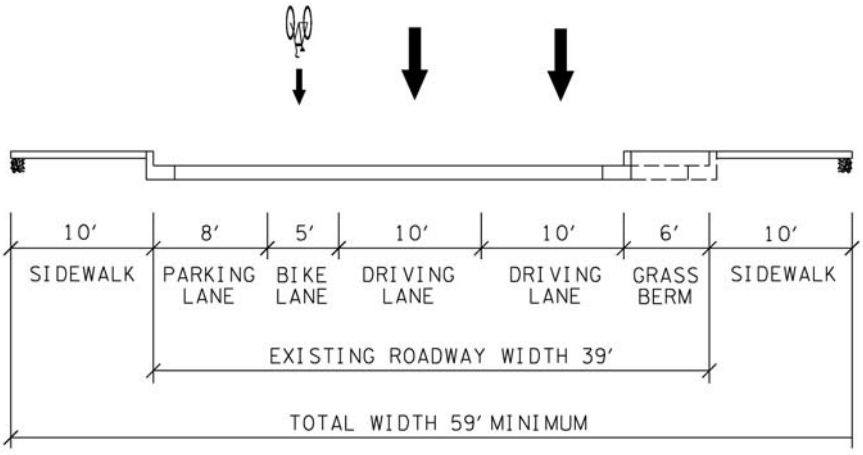


Figure 4.8 Long-Term Vision – Typical Section
Cedar Street to Maxwell Street

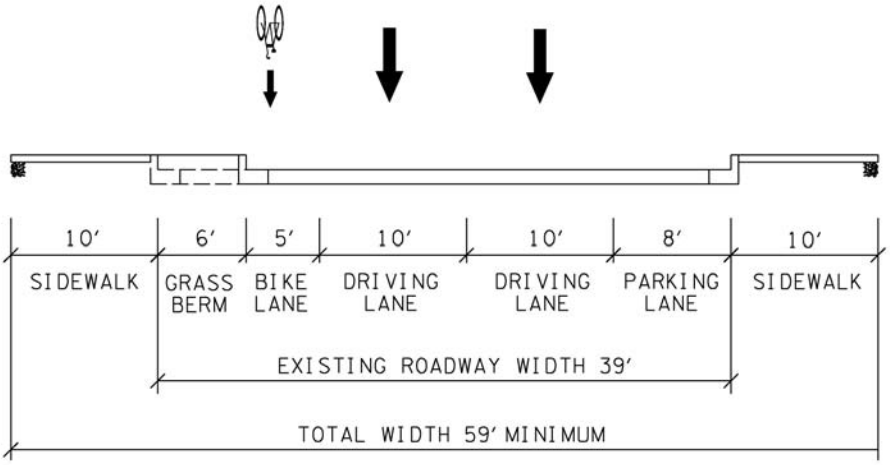


Figure 4.9

Long-Term Vision - UK Medical Section

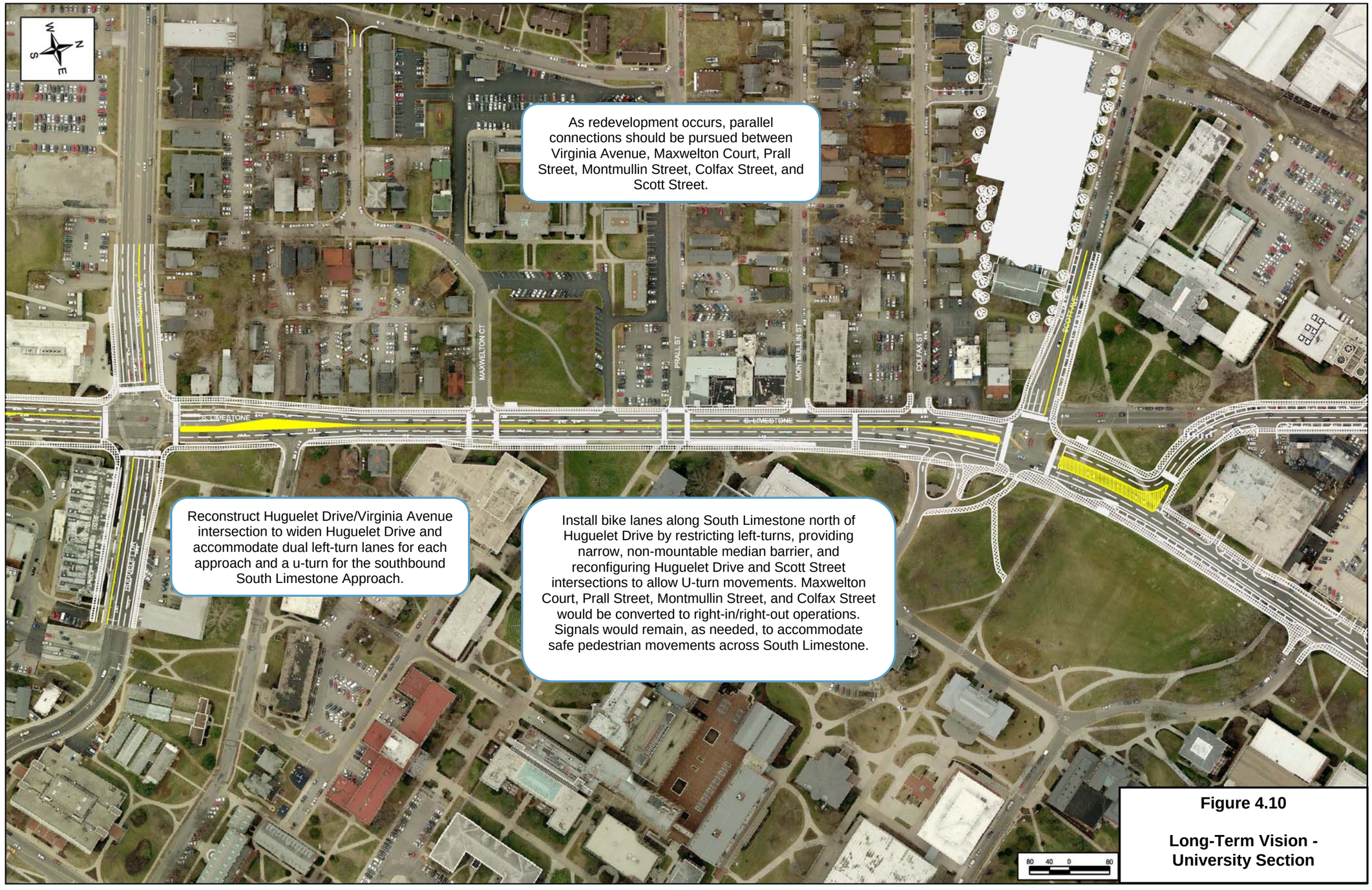


Figure 4.10

Long-Term Vision - University Section

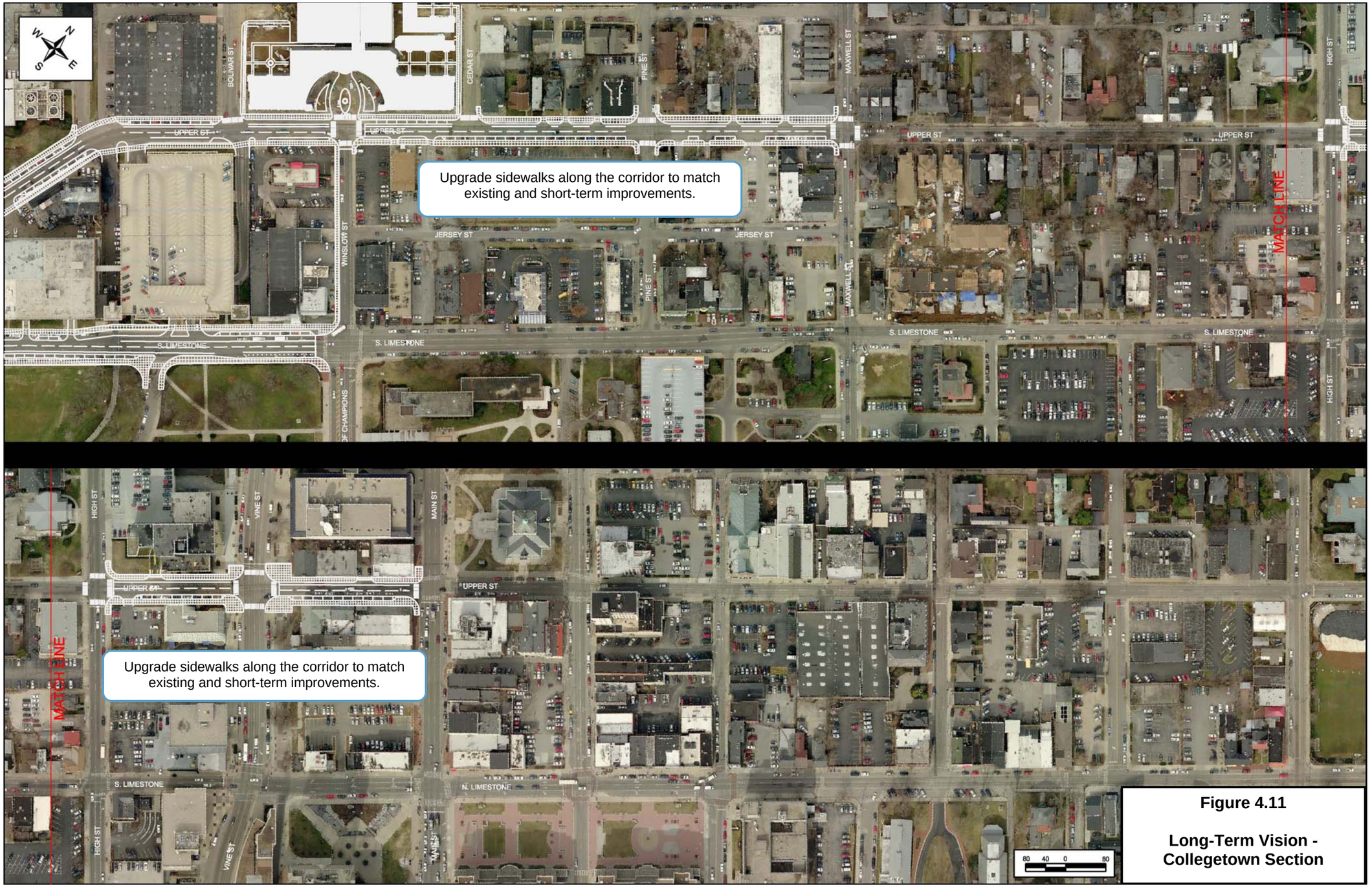


Figure 4.11

Long-Term Vision - Collegetown Section

V. IMPLEMENTATION PLAN

This chapter provides an implementation plan and general recommendations for the South Limestone/South Upper Corridor. The recommendations are based on the technical analysis and stakeholder input described in this report.

A. Goals and Objectives

As discussed in **Chapter III**, the defined vision for the study is to develop a safe and sustainable transportation corridor that provides a sense of place and encourages travel by bicycling, walking, and public transit. Based on the vision statement, four primary goals were developed: improve consistency, safety, mobility, and enhance placemaking.

B. Project Phasing

The following sections discuss the short and long-term implementation of the proposed vision. The recommended alternative is presented as a series of short-term improvements intended to be completed in the next five years, followed by implementation of long-term projects that will evolve as the corridor develops.

Short-Term Improvements

A total of 30 short-term improvements are recommended to create a safer and more sustainable corridor. Recommendations include sidewalk improvements, bus stop enhancements, addition of mountable medians and bike lanes, striping changes, additional signage, and intersection reconstruction. The recommended short-term improvement projects are presented in **Table 5.1**.

Each short-term improvement was prioritized based on its ability to meet the project goals and objectives and stakeholder input within a reasonable implementation timeframe. Planning level cost estimates were developed for each recommended short-term improvement and represent probable construction and Architecture/Engineering costs based on the conceptual designs presented in this chapter. The estimates do not include the costs associated with roadway resurfacing or utility relocations/improvements. The estimates have been developed without the completion of more detailed engineering and with the limitations of available mapping. While these estimates are useful in establishing relative improvement budgets and in pursuing supplemental project funding, additional design will be necessary to predict specific project costs. **Table 5.2** presents each project by priority and includes estimated costs. **Figures 5.1** through **5.10** illustrate each project by section. The corridor is divided into nine sections between Cooper Drive/Waller Avenue and Main Street. Multiple projects within a section are denoted by the section number followed by an alphabet letter.

Complete in the Next Year: The first set of projects is low cost higher priority projects that should be pursued in the next year.

Project 1D recommends installing a far-side bus stop at Conn Terrace to compliment the northbound stop being constructed as part of the UK Hospital project. Far-side stops allow buses to pull out of the bus bay while other through traffic is stopped. At near-side and midblock stops, buses are hesitant to use bus bays, particularly during rush hour traffic, because of the difficulty in merging back into traffic. Mobility and safety are both enhanced through the use of bus pull-off bays. A bus shelter also meets the objective to “provide comfortable waiting areas”.

Table 5.1 Recommended Short-Term Improvement Projects

Projects	Description
1A	Southbound sidewalk improvements from Conn Terrace to Waller Ave.
1B	Northbound sidewalk improvements from Cooper Dr. to UK Hospital entrance
1C	Convert State St. and University Ave. to right-in, right-out access
1D	Provide southbound far-side bus stop at Conn Terrace
1E	Construct raised mountable median south of Conn Terrace
2A	Construct raised mountable median north of Transcript Ave.
2B	Reconstruct southbound sidewalk between Shell gas station and Transcript Ave.
2C	Construct raised mountable median between Gazette Ave. and Kentucky Clinic Dr.
2D	Reconstruct sidewalk in front of UK Student Health
2E	Construct pedestrian barrier from UK Hospital Loop to Kentucky Clinic Entrance
3A	Reconstruct South Limestone between Kentucky Clinic Entrance to Maxwelton Ct.
4A	Open Bonnie Brae Dr. to Winnie St.
4B	Reconstruct northbound sidewalk between Maxwelton Ct. and University Dr.
4C	Provide signalized pedestrian crossing between Montmullin St. and Colfax St.
5A	Relocate University Steps bus stop to the north
5B	Restripe roadway as two-lane roadway with bike lane from University Dr. to Ave. of Champions
5C	Reconstruct southbound sidewalk from Scott Ave. to Montmullin St.
5D	Construct Newtown Pike Extension intersection with South Limestone and South Upper
5E	Reconstruct University Dr entrance to line up with Newtown Pike Extension
6A	Reconstruct east sidewalk between Winslow St. and Bolivar St.
6B	Restripe South Upper between Winslow St. and Dickey Dr. to accommodate bike lanes and parking
6C	Widen South Upper and reconstruct east sidewalk between Bolivar St. and Dickey Dr.
6D	Reconstruct South Upper east sidewalk between pedestrian signal and PPD entrance
7A	Restripe South Upper from Maxwell St. to Winslow St. to include bike lane
7B	Reduce speed to 25 MPH from Maxwell St. to Winslow St.
8A	Reduce speed to 25 MPH from High St. to Maxwell St.
8B	Install "Share the Road" signs
8C	Provide ADA compliant ramp at Maxwell St. intersection (northwest quadrant)
9A	Widen South Upper and reconstruct east sidewalk between Main St. and Vine St.
9B	Restripe South Upper between Vine St. and High St. to include a bike lane

Table 5.2 Prioritized Short-Term Improvement Projects

Projects	Description	Cost[1]	Priority
Complete in Next Year			
1D	Provide southbound far-side bus stop at Conn Terrace	$30,000.00	High
1E	Construct raised mountable median south of Conn Terrace	$30,000.00	High
2D	Reconstruct sidewalk in front of UK Student Health	$40,000.00	High
2E	Construct pedestrian barrier from UK Hospital Loop to Kentucky Clinic Entrance	$300,000.00	High
5A	Relocate University Steps bus stop to the north	$10,000.00	High
5C	Reconstruct southbound sidewalk from Scott Ave. to Montmullin St.	$90,000.00	High
8C	Provide ADA compliant ramp at Maxwell St. intersection (northwest quadrant)	$10,000.00	High
7B	Reduce speed to 25 MPH from Maxwell St. to Winslow St.	$3,000.00	Medium
8A	Reduce speed to 25 MPH from High St. to Maxwell St.	$3,000.00	Medium
8B	Install "Share the Road" signs	$3,000.00	Medium
Complete in Next One to Three Years			
4B	Reconstruct northbound sidewalk between Maxwelton Ct. and University Dr.	$850,000.00	High
5B	Restripe roadway as two-lane roadway with bike lane from University Dr to Ave. of Champions	$10,000.00	High
1B	Northbound sidewalk improvements from Cooper Dr. to UK Hospital entrance	$70,000.00	Medium
1C	Convert State St. and University Ave. to right-in, right-out access	$50,000.00	Medium
2C	Construct raised mountable median between Gazette Ave. and Kentucky Clinic Dr.	$60,000.00	Medium
4A	Open Bonnie Brae Dr. to Winnie St.	$100,000.00	Medium
4C	Provide signalized pedestrian crossing between Montmullin St. and Colfax St.	$180,000.00	Medium
6A	Reconstruct east sidewalk between Winslow St. and Bolivar St.	$40,000.00	Medium
6B	Restripe South Upper between Winslow St. and Dickey Dr. to accommodate bike lanes and parking	N/A	Medium
6C	Widen South Upper and reconstruct east sidewalk between Bolivar St. and Dickey Dr.	$150,000.00	Medium
7A	Restripe South Upper from Maxwell St. to Winslow St. to include bike lane	$10,000.00	Medium
6D	Reconstruct South Upper east sidewalk between pedestrian signal and PPD entrance	$50,000.00	Low
9A	Widen South Upper and reconstruct east sidewalk between Main St. and Vine St.	$340,000.00	Low
9B	Restripe South Upper between Vine St. and High St. to include a bike lane	N/A	Low
Complete in Next Five Years			
5D	Construct Newtown Pike Extension intersection with South Limestone and South Upper	$5,680,000.00	High
5E	Reconstruct University Dr entrance to line up with Newtown Pike Extension	$780,000.00	High
3A	Reconstruct South Limestone between Kentucky Clinic Entrance to Maxwelton Ct.	$2,370,000.00	Medium
Complete in Coordination with Other Projects			
1A	Southbound sidewalk improvements from Conn Terrace to Waller Ave.	$190,000.00	Medium
2A	Construct raised mountable median north of Transcript Ave.	$30,000.00	Medium
2B	Reconstruct southbound sidewalk between Shell gas station and Transcript Ave.	$40,000.00	Low

1) Preliminary estimates do not include cost for resurfacing, utility relocations/improvements, and right-of-way.

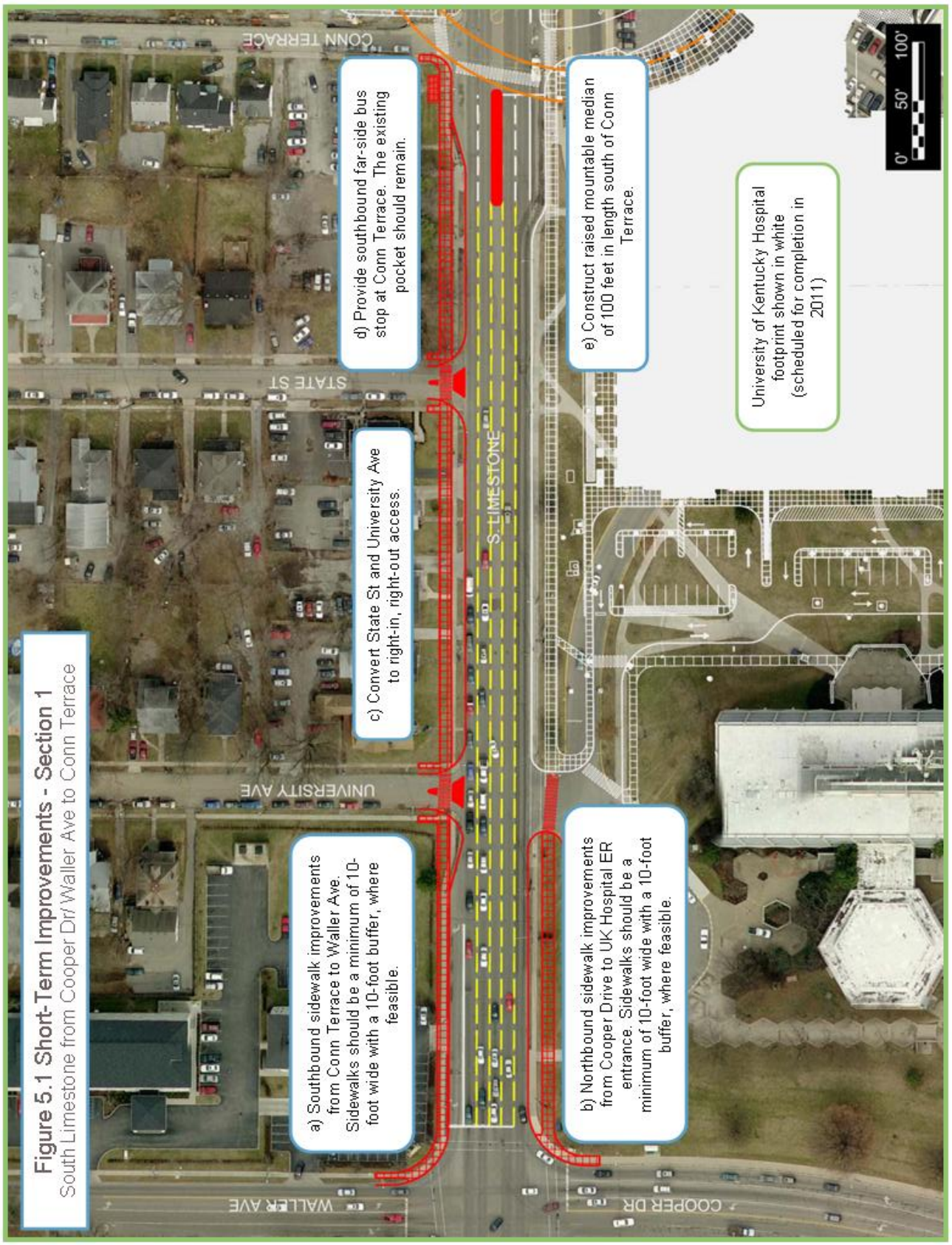


Figure 5.1 Short-Term Improvements - Section 1
South Limestone from Cooper Dr/ Waller Ave to Conn Terrace
a) Southbound sidewalk improvements from Conn Terrace to Waller Ave. Sidewalks should be a minimum of 10-foot wide with a 10-foot buffer, where feasible.
b) Northbound sidewalk improvements from Cooper Drive to UK Hospital ER entrance. Sidewalks should be a minimum of 10-foot wide with a 10-foot buffer, where feasible.
c) Convert State St and University Ave to right-in, right-out access.
d) Provide southbound far-side bus stop at Conn Terrace. The existing pocket should remain.
e) Construct raised mountable median of 100 feet in length south of Conn Terrace.
University of Kentucky Hospital footprint shown in white (scheduled for completion in 2011)
0'
50'
100'
CONN TERRACE
STATE ST
S. LIMESTONE
UNIVERSITY AVE
WALLER AVE
COOPER DR

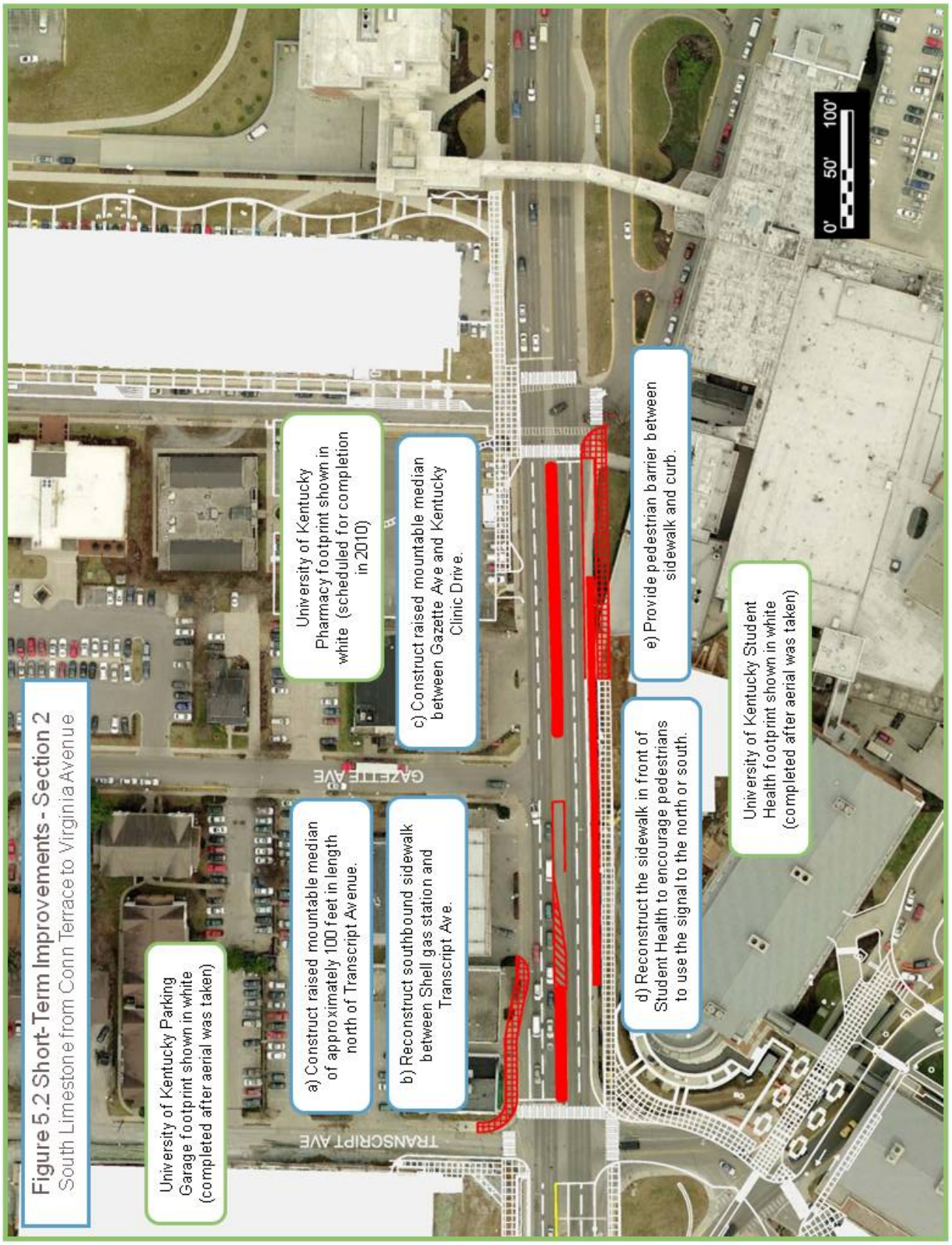


Figure 5.2 Short-Term Improvements - Section 2
South Limestone from Conn Terrace to Virginia Avenue
University of Kentucky Parking Garage footprint shown in white (completed after aerial was taken)
a) Construct raised mountable median of approximately 100 feet in length north of Transcript Avenue.
b) Reconstruct southbound sidewalk between Shell gas station and Transcript Ave.
University of Kentucky Pharmacy footprint shown in white (scheduled for completion in 2010)
c) Construct raised mountable median between Gazette Ave and Kentucky Clinic Drive.
e) Provide pedestrian barrier between sidewalk and curb.
d) Reconstruct the sidewalk in front of Student Health to encourage pedestrians to use the signal to the north or south.
University of Kentucky Student Health footprint shown in white (completed after aerial was taken)
TRANSCRIPT AVE
GAZETTE AVE
0'
50'
100'

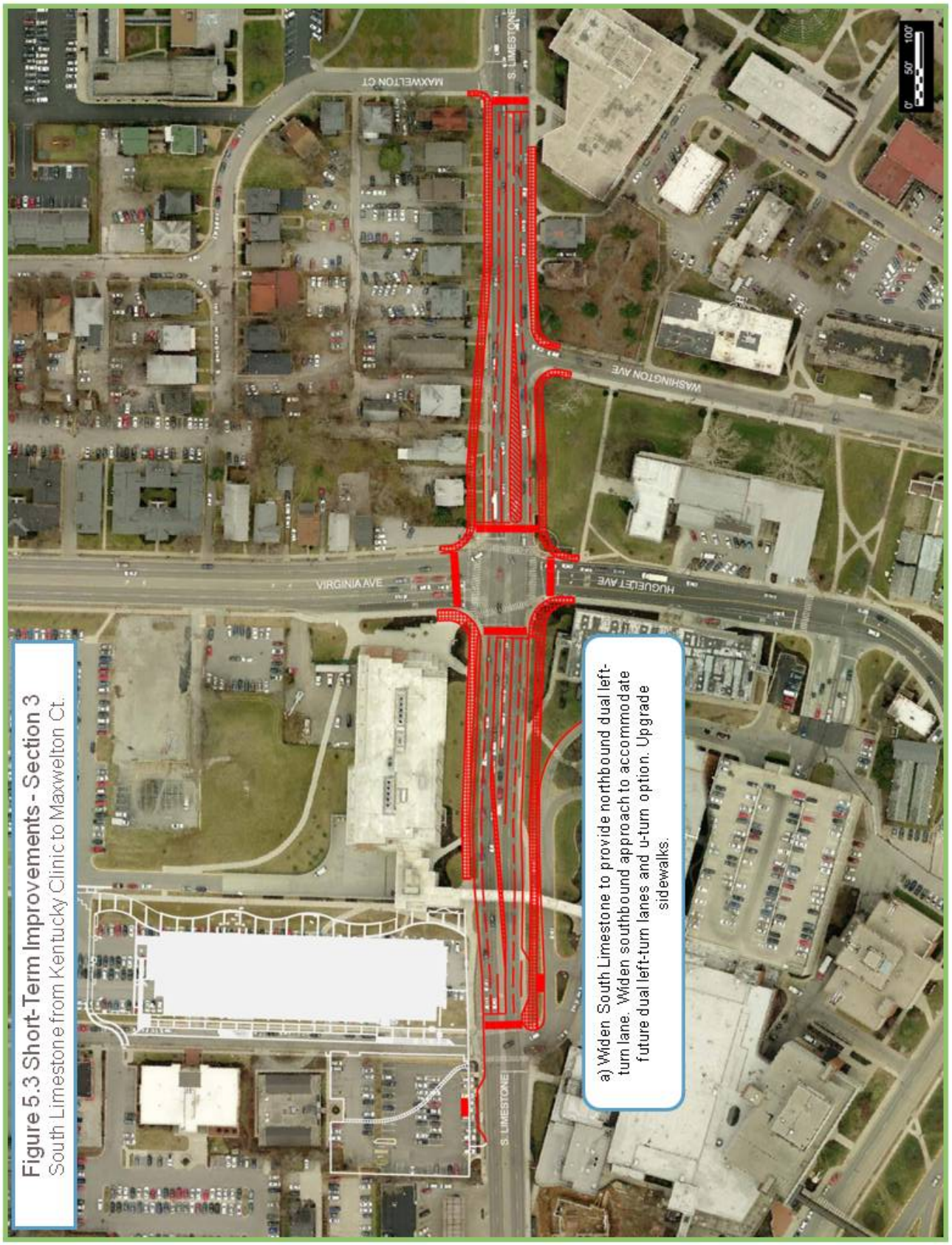


Figure 5.3 Short-Term Improvements - Section 3
South Limestone from Kentucky Clinic to Maxwelton Ct.

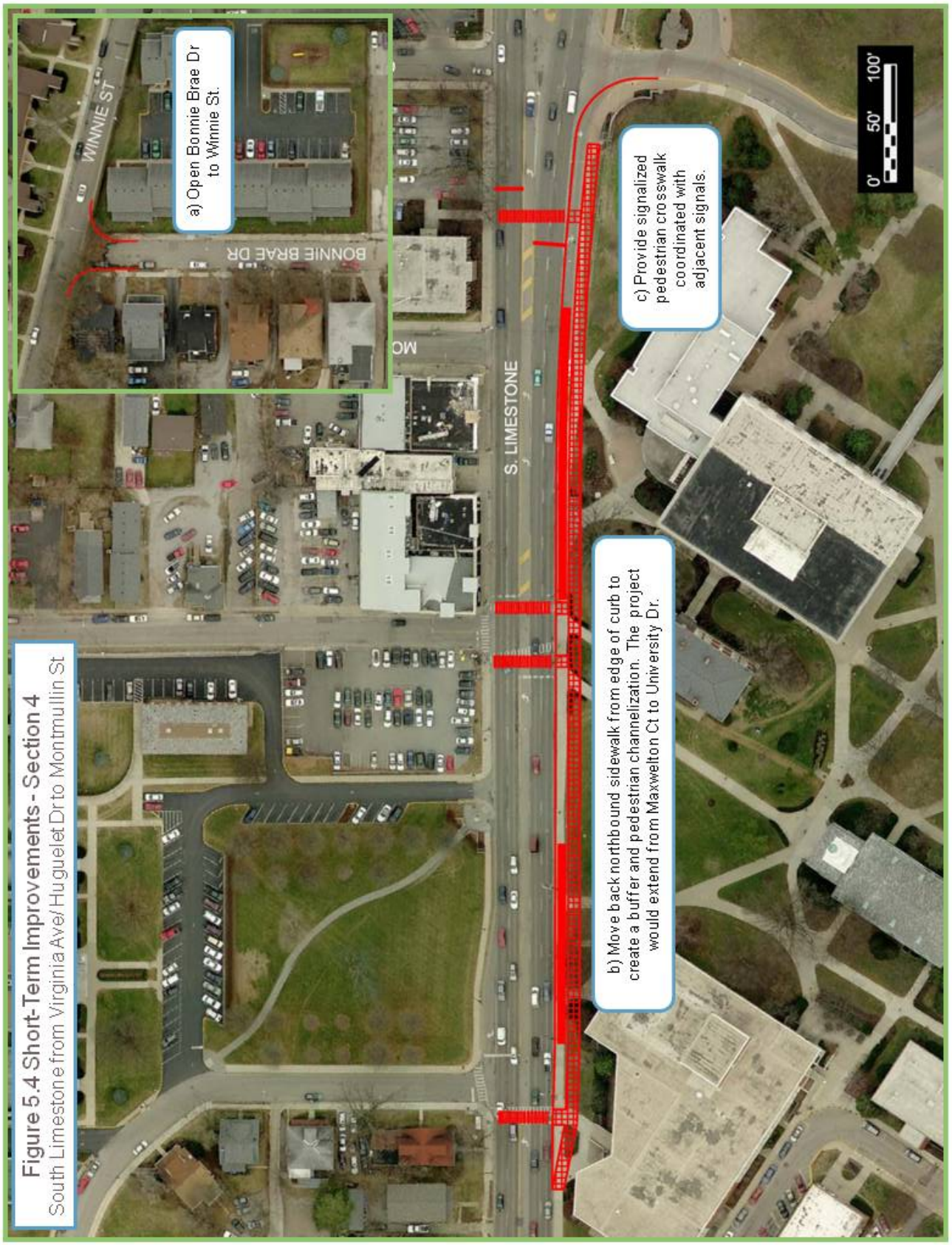


Figure 5.4 Short-Term Improvements - Section 4
South Limestone from Virginia Ave/ Huguelet Dr to Montmullin St

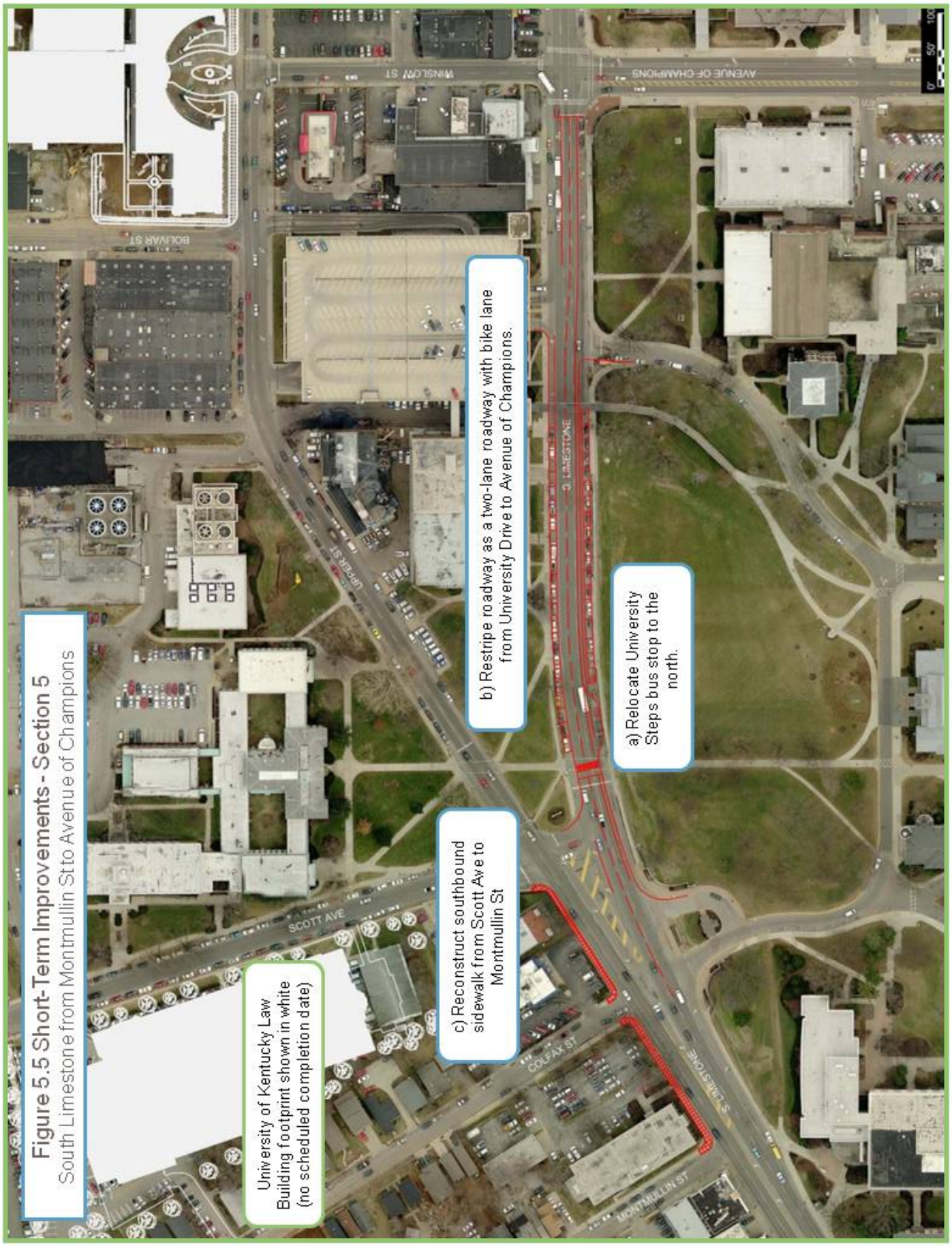


Figure 5.5 Short-Term Improvements - Section 5
South Limestone from Montmullin St to Avenue of Champions
University of Kentucky Law Building footprint shown in white (no scheduled completion date)
c) Reconstruct southbound sidewalk from Scott Ave to Montmullin St
b) Restripe roadway as a two-lane roadway with bike lane from University Drive to Avenue of Champions.
a) Relocate University Steps bus stop to the north.
SCOTT AVE
COLFAX ST
MONTMULLIN ST
S LIMESTONE
UPPER ST
WINSLOW ST
BOLIVAR ST
AVENUE OF CHAMPIONS

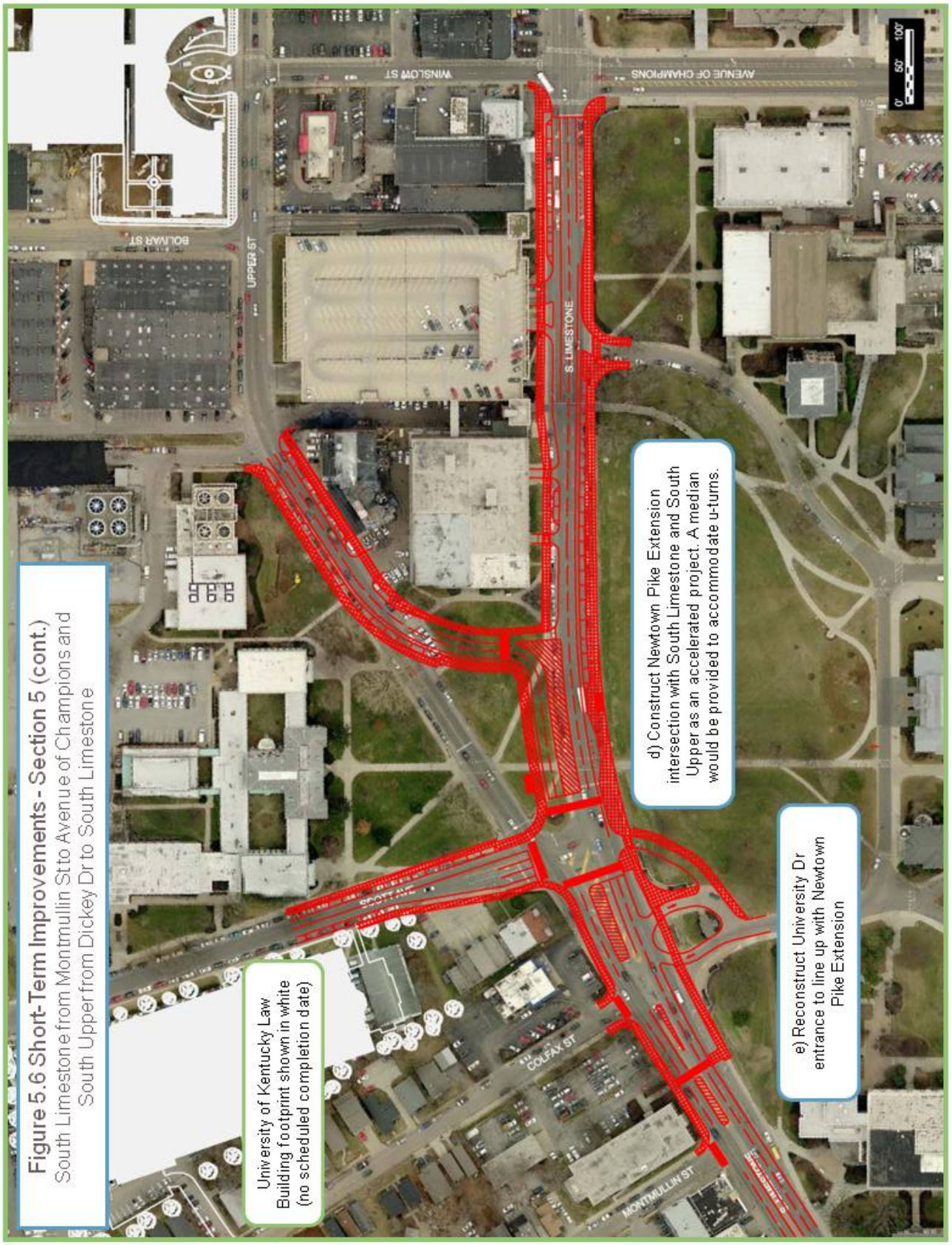


Figure 5.6 Short-Term Improvements - Section 5 (cont.)
South Limestone from Montmullin St to Avenue of Champions and South Upper from Dickey Dr to South Limestone
University of Kentucky Law Building footprint shown in white (no scheduled completion date)
d) Construct Newtown Pike Extension intersection with South Limestone and South Upper as an accelerated project. A median would be provided to accommodate u-turns.
e) Reconstruct University Dr entrance to line up with Newtown Pike Extension
BOLIVAR ST
UPPER ST
WINSLOW ST
AVENUE OF CHAMPIONS
S. LIMESTONE
COLFAX ST
MONTMULLIN ST
0'
50'
100'

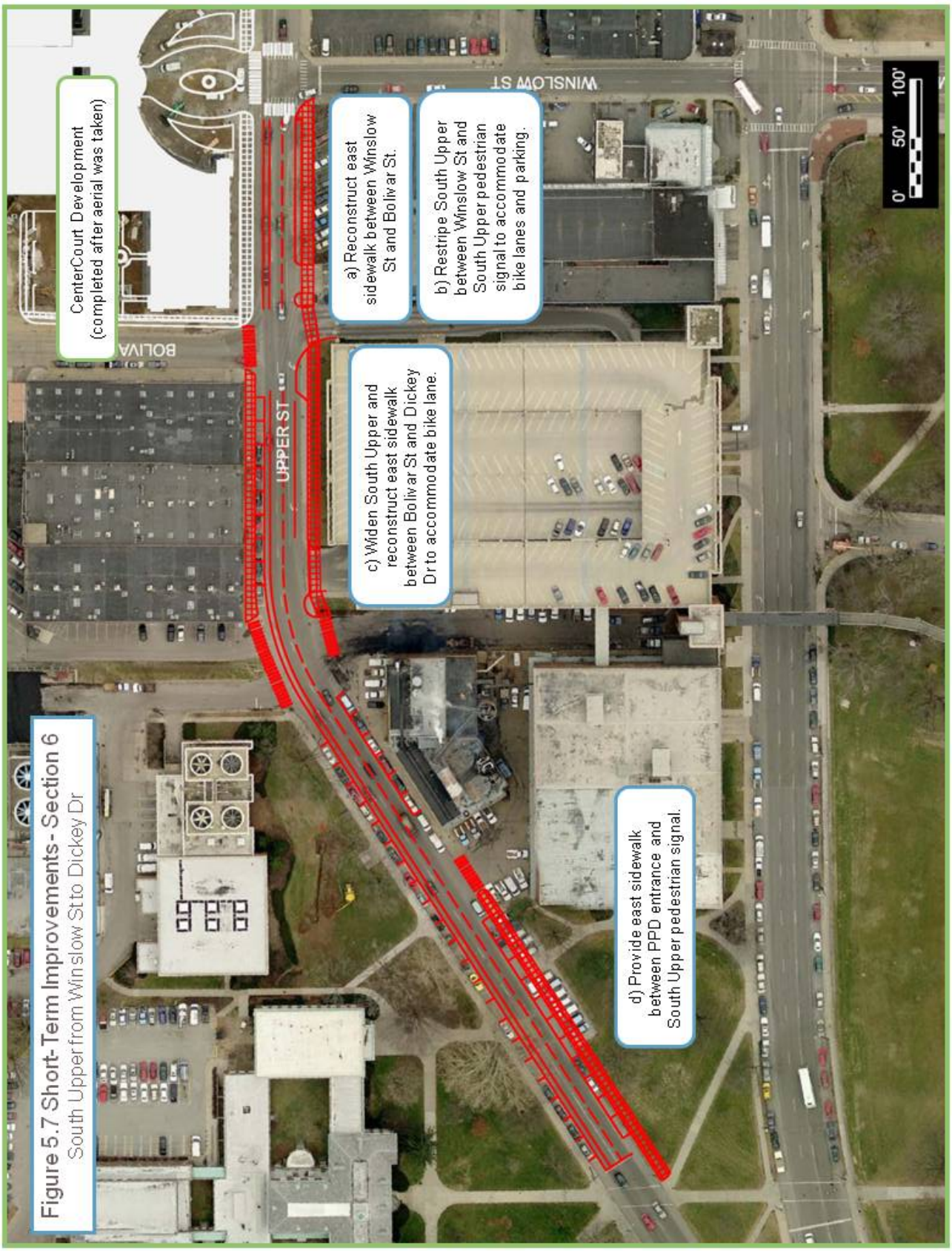


Figure 5.7 Short-Term Improvements - Section 6
South Upper from Winslow St to Dickey Dr
CenterCourt Development
(completed after aerial was taken)
a) Reconstruct east sidewalk between Winslow St and Bolivar St.
b) Restripe South Upper between Winslow St and South Upper pedestrian signal to accommodate bike lanes and parking.
c) Widen South Upper and reconstruct east sidewalk between Bolivar St and Dickey Dr to accommodate bike lane.
d) Provide east sidewalk between PPD entrance and South Upper pedestrian signal.
UPPER ST
WINSLOW ST
0'
50'
100'

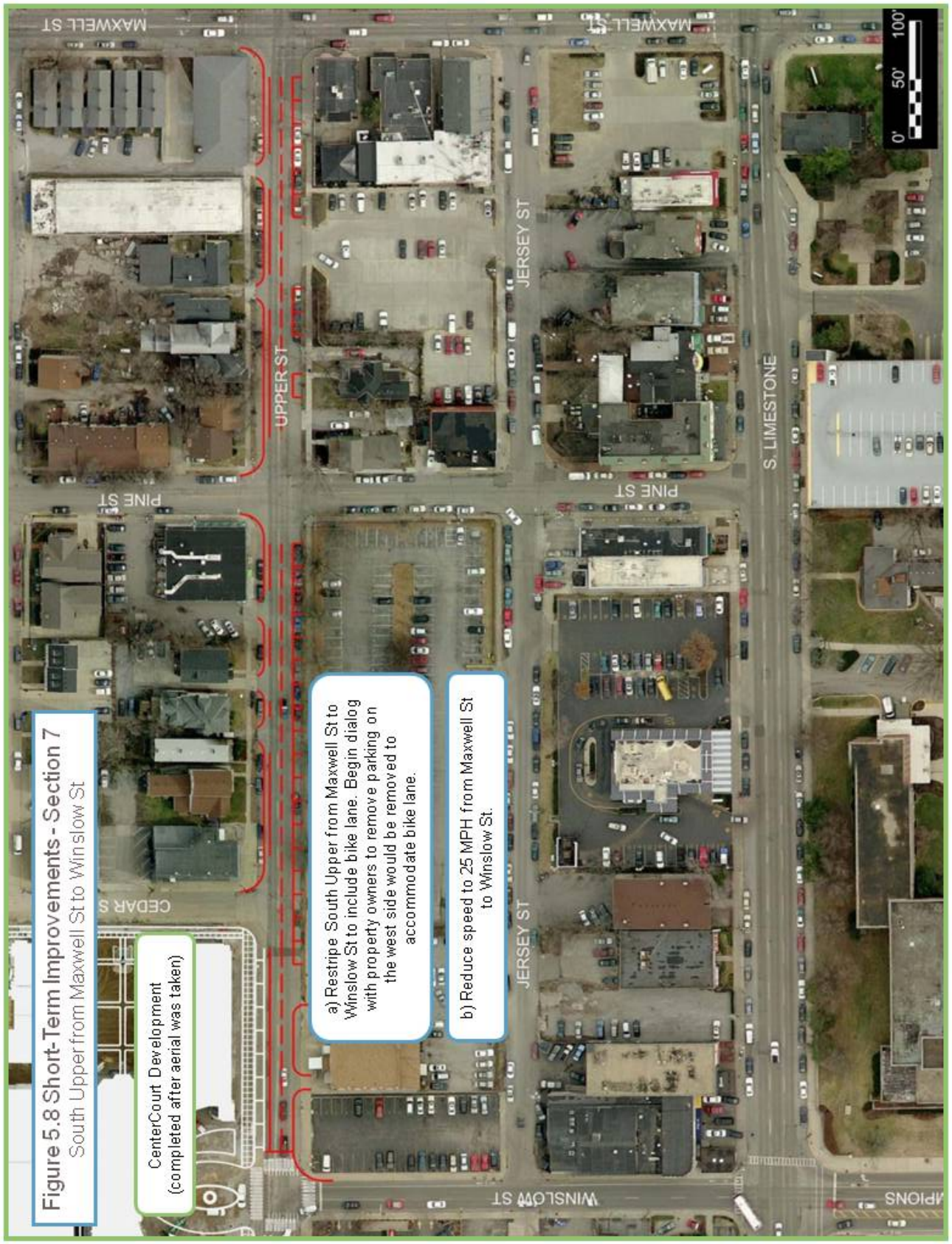


Figure 5.8 Short-Term Improvements - Section 7
South Upper from Maxwell St to Winslow St


HIGH ST
HIGH ST
UPPER ST
UPPER ST
S. LIMESTONE
S. LIMESTONE
MAXWELL ST
0'
50'
100'
Figure 5.9 Short-Term Improvements - Section 8
South Upper from High St to Maxwell St
c) Provide ADA compliant ramp at Maxwell St intersection (northwest quadrant).
a) Reduce speed to 25 MPH from High St to Maxwell St.
b) Install "Share the Road" signs and/or sharrows.

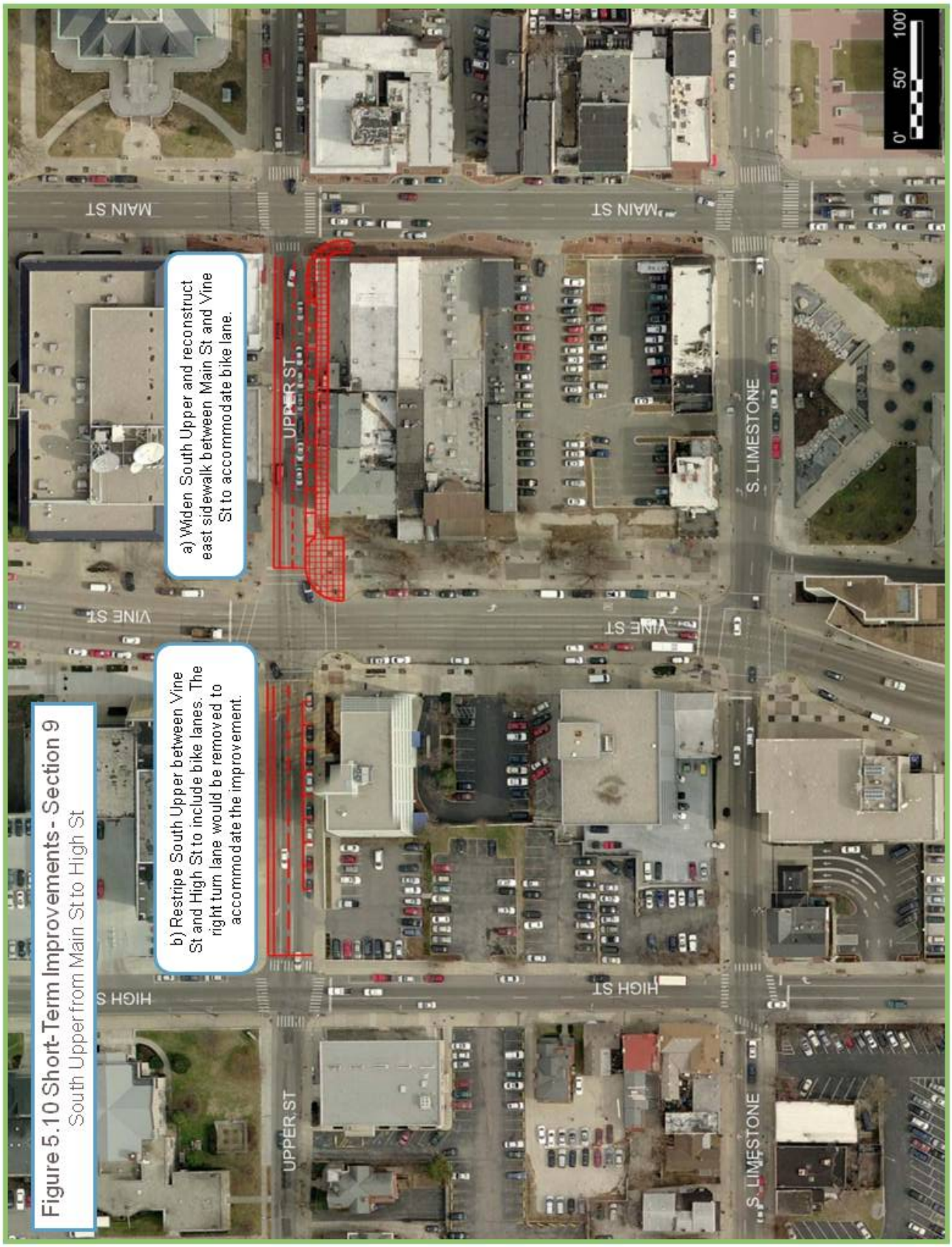


Figure 5.10 Short-Term Improvements - Section 9
South Upper from Main St to High St

Project 1E recommends construction of a raised mountable median south of Conn Terrace. The main purpose of this project is to more clearly define the transition point for the reversible lanes south of this location. It would discourage motorists from transitioning to the third lane too early during the PM peak reversible lane scenario. It also serves as an aesthetic enhancement for the corridor, introducing motorist to the University of Kentucky Medical area. Both *Project 1D* and *Project 1E* are illustrated on **Figure 5.1**.

Project 2D recommends reconstruction of the sidewalk in front of and to the north of UK Student Health to discourage pedestrians from crossing midblock, and instead use signalized crossing locations. *Project 2D* would pull the sidewalk back from the roadway edge to create a buffer area. *Project 2E* would create a pedestrian treatment along a portion of the grass strip to further channelize pedestrians. More detail on these treatments is provided on the following page. Both *Project 2D* and *Project 2E* are illustrated on **Figure 5.2**.

A significant amount of pedestrian congestion was observed near the University Steps LexTran stop. This is due to the amount of pedestrians crossing at the pedestrian signals just north of Scott Street and the presence of the bus stop. *Project 5A*, illustrated on **Figure 5.5**, recommends relocating the bus stop to the north to move transit users further away from the pedestrian signal. It also would function as a far-side stop providing buses an opportunity to use the stop condition of the signal to pull back into traffic. Initially this project would be completed by restriping the area and would result in a reduction of parking spaces.

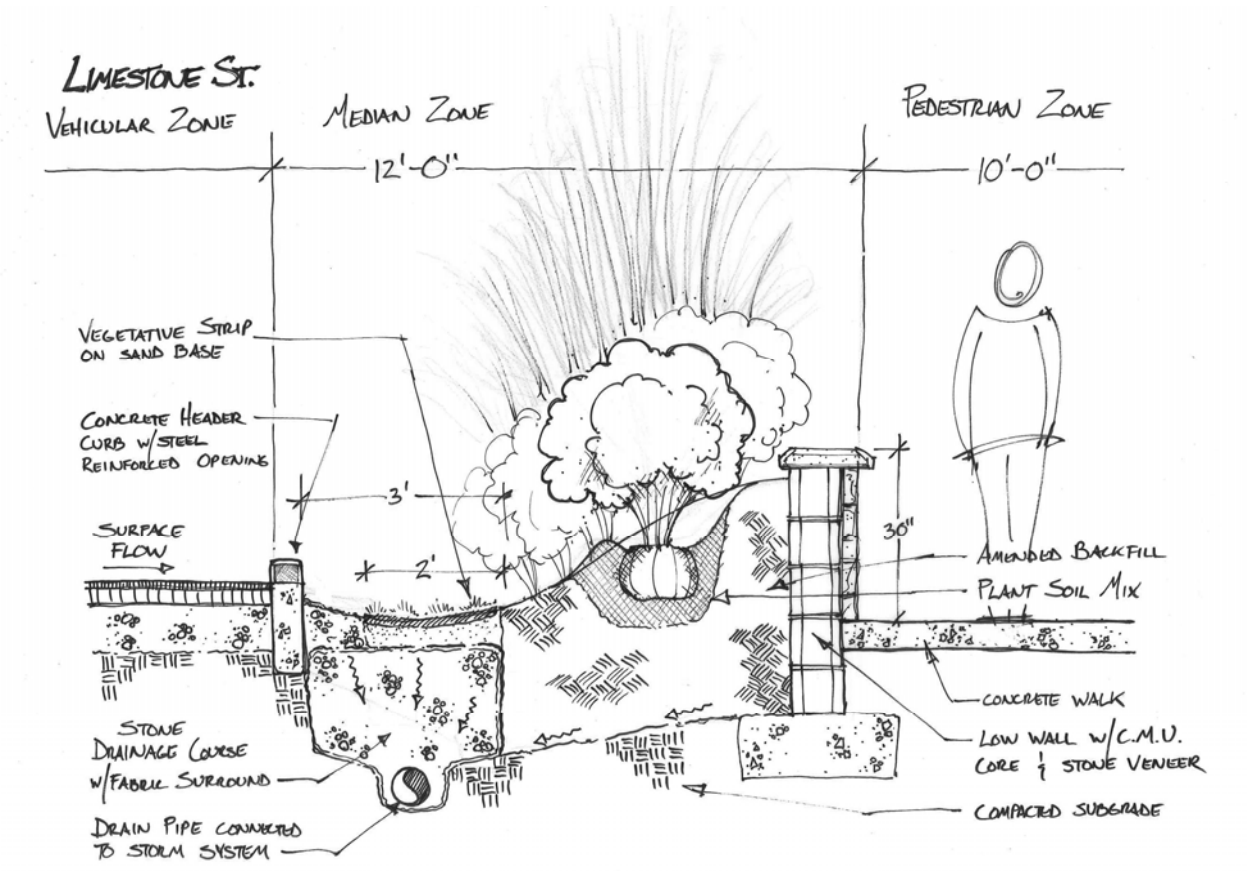
Sidewalk improvements are important to improving pedestrian mobility and safety. *Projects 5C* and 8*C* both provide enhancements to the sidewalk. The first would improve a dilapidated stretch of sidewalk shown in the picture to the right. The second would replace a sidewalk section not equipped with an ADA compliant ramp. Both enhancements would make it easier for pedestrians, particularly those in wheelchairs to safely maneuver the sidewalk. These improvements are illustrated on **Figures 5.5** and **5.9**, respectively.

Concerns regarding speed were raised at the first public forum. It is recommended through *Projects 7B* and 8*A* that speeds be reduced to 25 MPH between High Street and Winslow Street. This section is not part of a designated state or US route and is generally residential with some commercial properties. *Project 8B* recommends “share the road” signs to be added between High Street and Maxwell Street. Bike lanes cannot be added given the current typical section and because of the narrower roadway, dependence on parking, and close proximity of homes to the sidewalk. The likelihood of this section being widened in the future is low. As a result, additional signage would notify motorist of the potential to encounter bicyclists along the corridor. In combination with a reduction in speed, safety would be enhanced along the section.

Complete in the Next One to Three Years: The second set of improvements is either higher priority projects with longer implementation schedules or lower priority projects.

Project 4B is an example of a project that is a high priority, but will take longer to implement. It is also a higher cost project. As illustrated in **Figure 5.4**, the project would reconstruct the northbound sidewalk between Maxwelton Court and University Drive. The sidewalk is recommended to be a minimum of 10 feet wide to accommodate the high volume of pedestrians and the potential for bicyclists to ride on the sidewalk, similar to other designated sidewalks throughout the university. A 10-foot separation between the roadway and sidewalk is recommended, based on comments from the public. The space also provides the opportunity to create a barrier between the roadway and sidewalk to channelize pedestrians to appropriate signalized crossing locations. Various treatments have been considered for this location including one presented in **Figure 5.11**. This treatment is similar to what is provided in front of the UK Healthcare Parking Garage #8 (pictured to the right); however, it provides additional enhancements for stormwater management. The design illustrates the concept, but would need to be further explored to ensure it doesn't conflict with existing underground utilities. In terms of project cost, this option is on the high end. Other options including a decorative fence could be considered if a lower cost solution is desired.

Figure 5.11 Pedestrian Channelization Treatments



Project 5B, illustrated in **Figure 5.5**, would simplify lane assignments and accommodate bike lanes tying into ongoing improvements north of Avenue of Champions. A narrower section should also encourage lower speeds and improved safety, while having minimum effect on mobility. Turn lanes would still be provided as needed at the intersection with Avenue of Champions. This improvement could be handled with only striping and should be coordinated with the existing repaving cycle for South Limestone.

Project 1B is proposed as an extension of the sidewalks being reconstructed as part of the University of Kentucky Hospital project. This is a medium priority project because the sidewalks currently meet minimum requirements and the pedestrian volumes along this section are lower than other sections of the corridor. However, consistency is desired along the corridor and this project is another way to achieve that consistency. It also would provide a safe haven for less experienced bicyclists uncomfortable riding with traffic along South Limestone. This project is currently being analyzed by the University of Kentucky, which may result in the priority being elevated by the UK.

Project 1C, illustrated in **Figure 5.1**, would convert State Street and University Avenue to a right-in right-out configuration. This would reduce turn movements along South Limestone, increasing safety. This project, in combination with *Project 1E*, would simplify movements and reduce confusion sometimes associated with the beginning (PM rush hour) and ending (AM rush hour) of the reversible lanes. This project could be coordinated with *Project 1A*, discussed later in this chapter. If completed before *Project 1A*, additional funds may be needed to make improvements to existing curb and sidewalk.

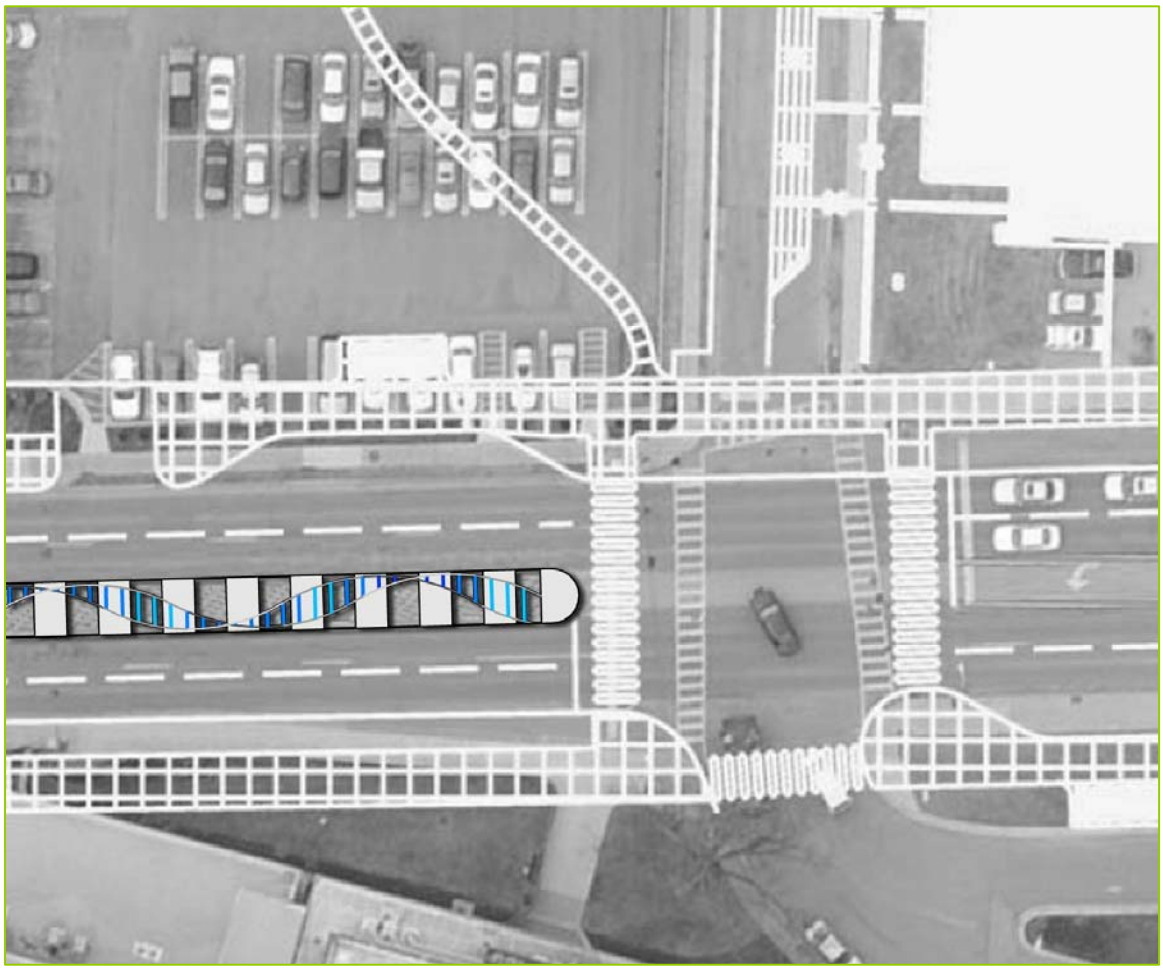
Project 2C, illustrated in **Figure 5.2**, would require the construction of a raised mountable median between Gazette Avenue and Kentucky Clinic Drive. Similar to *Project 1E*, this project provides aesthetic enhancements to the corridor and communicates to motorists they are entering a new section of the corridor. While *Project 2D* should reduce the number of pedestrians crossing midblock, the raised mountable median provides a refuge for those that still choose to cross between Kentucky Clinic Drive and Gazette Avenue. An example of a raised mountable median detail at this location is provided in **Figure 5.12**. It illustrates a “double helix” design tying into the UK Healthcare campus. Incorporating a specific design into the median helps to create a sense of place.

Project 4A, illustrated in **Figure 5.4**, includes a connection from Bonnie Brae Drive to Winnie Street. This would improve connectivity and is one component that will enable Maxwelton Court to be converted to a right-in right-out in the long-term.

Project 4C, could be completed in coordination with *Project 4B* or following the completion of *Project 4B*. It provides an additional signalized pedestrian crossing in a high pedestrian volume area and would reduce the number of pedestrians crossing midblock at unmarked locations.

Projects 6A, 6B, 6C, and 7A would provide sidewalk improvements on both sides of South Upper and/or allow for the addition of a bike lane. The first would improve the sidewalk south of Winslow Street. This would improve safety, pedestrian mobility, and aesthetics. *Projects 6B, 6C,* and *7A* would accommodate a bike lane, improving system connectivity.

Figure 5.12 Raised Mountable Median Detail for Project 2C



The drawback to *Project 7A*, and the reason it is not a higher priority, is the impact to parking. This project is illustrated on **Figure 5.8**. Parking along this section would be limited to one side of the street resulting in a reduction of spaces for businesses. Concerns over parking were expressed by business owners at the second public forum. Conversations with business owners along this section should continue before making a final determination on the striping layout for this section. One project that may directly impact future discussions is the redevelopment of the block bounded by South Upper Street, Pine Street, Jersey Street and the Raising Canes restaurant. There may be the potential to pull back the curb line at this location to accommodate parking on both sides of South Upper Street along with a bike lane.

Projects 6A, 6B, 6C, and *7A* can be completed in coordination or as independent projects. They could also be coordinated with future repaving efforts along this section of South Upper Street. If not completed in the next three years, *Project 6C* could be completed in conjunction with *Project 5D*, described below. In order to accommodate the proposed cross section, the curb line would need to be moved back approximately five feet, requiring additional right-of-way from the University of Kentucky.

Three low priority projects that could be completed in the next three years include *Projects 6D, 9A* and *9B*, illustrated on **Figure 5.7 and Figure 5.10**, respectively. *Project 6D* would provide an east sidewalk along South Upper between the PPD entrance and the pedestrian signal. Tracks show evidence of pedestrians walking along this section of grass. The project would also convert perpendicular parking to parallel parking, which would result in fewer vehicles backing out into oncoming traffic. The reason for the low ranking is because the project does not compliment the Newtown Pike Extension project. If the Newtown Pike Extension is built as conceptually designed, it would require the removal of a large portion of the project.

Project 9A includes the widening of South Upper Street to accommodate bike lanes. This should be coordinated with improvements to the block bounded by South Upper Street, Vine Street, South Limestone Street, and Main Street. *Project 9B* includes restriping South Upper Street to remove the continuous right-turn lane and replacing it with a bike lane. This is a lower priority because, without the completion of other surrounding projects, it provides limited connectivity to other bike facilities.

Complete in the Next Five Years: *Projects 5D* and *5E* are two high priority projects expected to take longer to complete. This is due to the higher cost and more extensive design and construction required. These two projects were originally proposed to be completed as part of the Newtown Pike Extension project. Because of their importance to the corridor and the safety benefits they provide, it is recommended that these two projects be pursued separate from other Newtown Pike Extension phasing.

Projects 5D and 5E provide safety enhancements to this heavily traveled section of the corridor. Pedestrians would be encouraged to cross South Limestone at safer, signalized intersections through sidewalk improvements and pedestrian channelization. The two existing traffic signals are consolidated to one location at Scott Street (future Newtown Pike Extension). Sidewalks would be widened and bike lanes provided north of Scott Street, increasing capacity for both modes. Transit operations would also be enhanced with the addition of a bus shelter for pedestrians on the east side of South Limestone, with a bay to remove the bus from northbound traffic. The signal would be coordinated with the pedestrian signal proposed as *Project 4C* to limit disruption to traffic flow. The University Drive intersection is reconstructed to better align with the intersection improvements. Additional detail is provided in **Figures 5.6** and **5.13**.

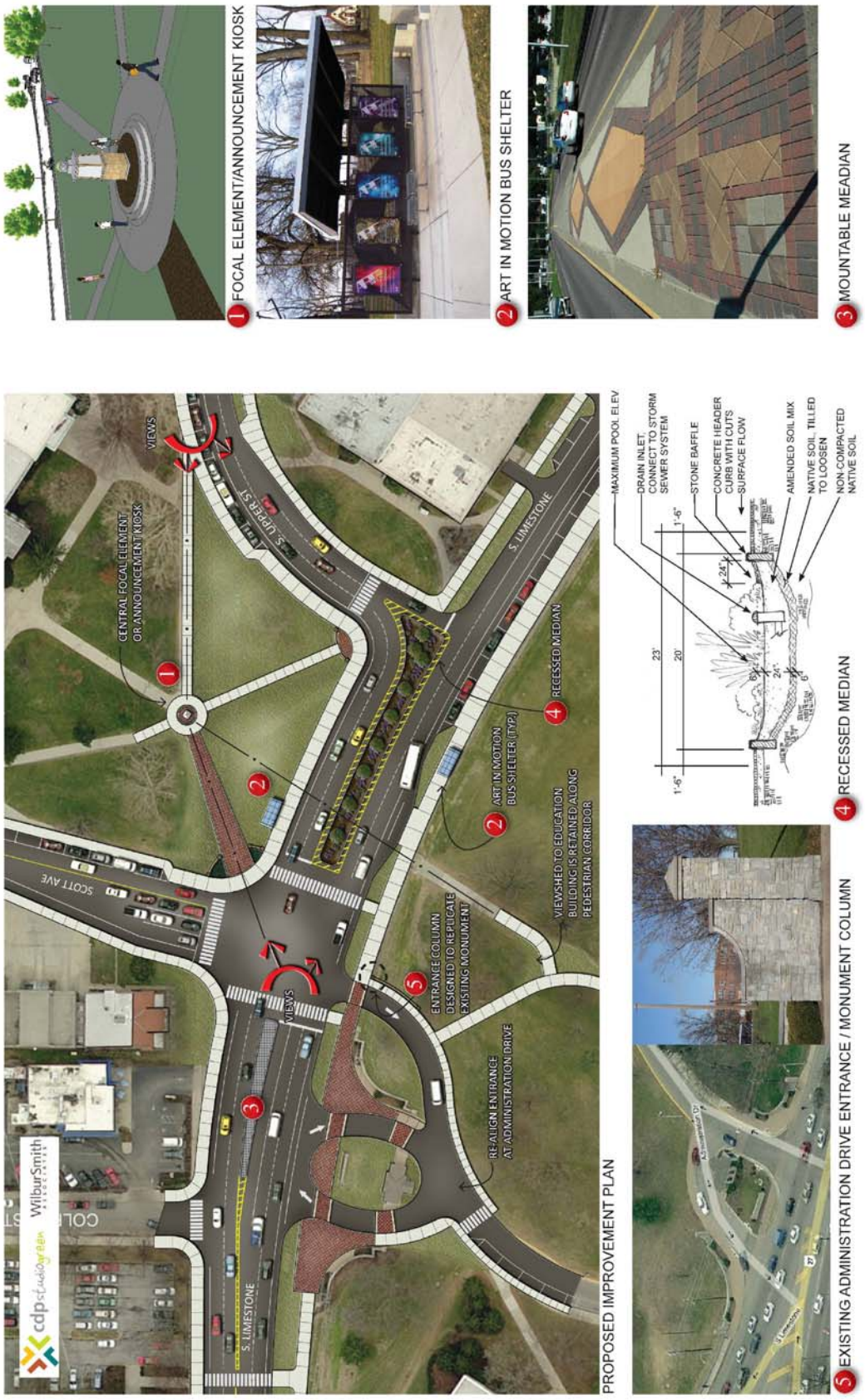


Figure 5.13 Newtown Pike Extension (Project 5D and 5E) Design Elements

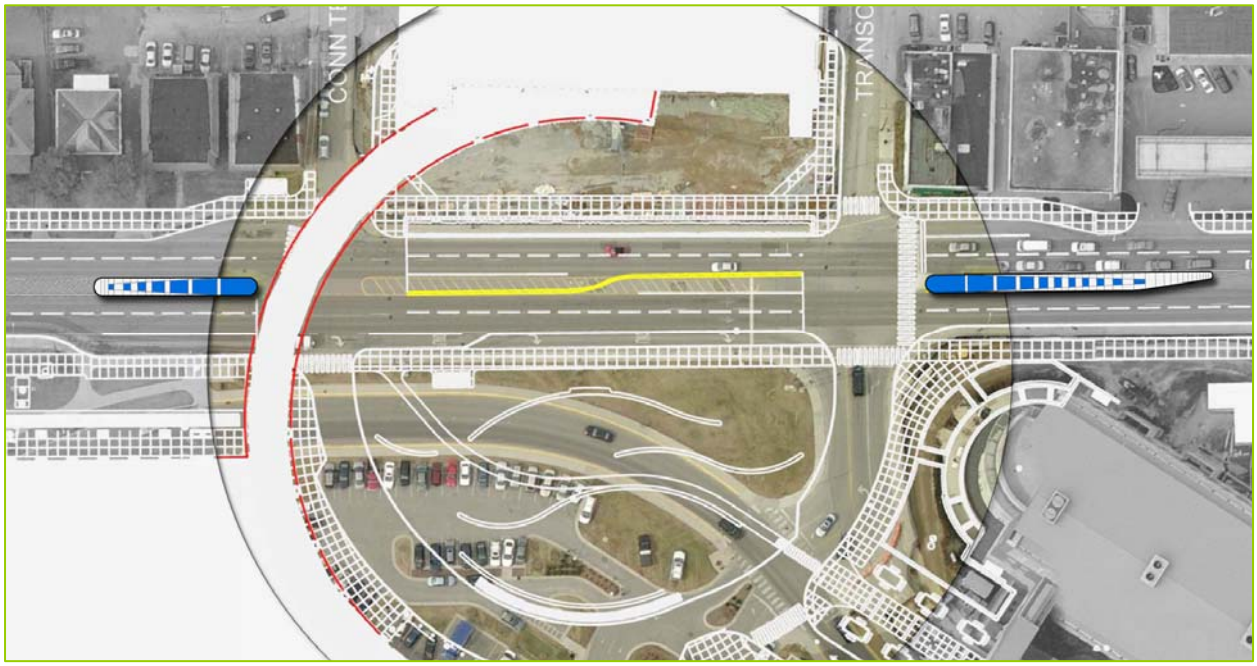
Project 3A would be the first step to add capacity to South Limestone at Virginia Avenue. Dual northbound left-turn lanes would be provided. The long-term vision for Huguelet Drive is to widen to two lanes in each direction. The southbound approach for South Limestone would be reconfigured to accommodate a future u-turn option and dual left-turn lanes onto Huguelet Drive once the widening is completed. The project would also provide wider sidewalks along the project length, particularly the section between Huguelet Drive and Washington Avenue where a retaining wall currently restricts sidewalk width. In addition, one Lextran stop would be relocated and other provided on the west side of South Limestone near the new College of Pharmacy Building. This project would widen South Limestone requiring additional right-of-way from the University of Kentucky and at least two to three private residences on the west side of South Limestone. A detailed design is required to determine the full extent of the impacts.

Complete in Coordination with Other Projects: Three projects are recommended to be completed in coordination with other projects. *Project 1A*, illustrated in **Figure 5.1**, would provide sidewalk enhancements from Conn Terrace to Waller Avenue. Similar to *Project 1B*, the project would provide a safe haven for less experienced bicyclists uncomfortable riding with traffic along South Limestone. The University of Kentucky owns the majority of the two blocks between Conn Terrace and University Avenue. *Project 1A* could be completed as an independent project or completed as part of the future redevelopment of these two blocks. Sidewalk improvements within the third block between University Avenue and Waller Avenue should be completed at the same time to create consistency with sections to the north and sidewalks on the northbound side of South Limestone Street.

Project 2A cannot be completed until the University of Kentucky Hospital is open. The UK Hospital project is expected to be completed and operational in 2011. At that time, the loop drive opposite Conn Terrace and Transcript Avenue will be completed, removing the need for a left-turn lane for southbound South Limestone. A raised mountable median could replace the existing left-turn lane. *Project 2A* has similar aesthetic advantages as *Project 2C*. An example design is presented in **Figure 5.14** and would coordinate with *Project 1E*. The design option presented in **Figure 5.12** could also be considered.

Project 2B, illustrated in **Figure 5.2**, proposes a reconstructed sidewalk between the Shell gas station and Transcript Avenue. This project should be coordinated with the redevelopment of adjacent property. Coordination with the property owner will ensure adequate right-of-way to provide a wider sidewalk consistent with proposed section north and south of this location. This same coordinated approach should be taken with other properties as they redevelop.

Figure 5.14 Raised Mountable Median Detail for Project 1E and Project 2A



Long-Term Improvements

The South Limestone/South Upper corridor is a blend of university, healthcare, commercial, and residential land uses. While the University of Kentucky has a Campus Master Plan in place, it is difficult to know how development will specifically occur over time. As a result, it is important to have a flexible transportation plan in place that can be adapted to land use changes. The long-term vision, illustrated in **Chapter IV**, provides long-term guidance, but is intended to be adaptable as other projects evolve. The key elements of the long-term vision are as follows:

- Sidewalks should maximize capacity by being at least 10-foot wide. Where bike lanes aren't available, inexperienced bicyclists should be allowed to use the sidewalk.
- A grass strip should be provided between sidewalk and roadway where feasible and pedestrian channelization strategies considered, as needed.
- Where roadway width allows, bike lanes should be provided.
- Transit stops should continue to be upgraded. Midblock stops should be removed, where feasible.
- Maintain throughput capacity along the corridor.
- Expand capacity of the Virginia Avenue/Huguelet Drive intersection with South Limestone to enable continued expansion of the UK Healthcare campus in accordance with the Master Plan. Project 3A, discussed earlier is the chapter, would be the beginning of this proposed expansion. Additional expansion could occur once the University of Kentucky widens Huguelet Drive.
- Improve connectivity west of South Limestone between Scott Street and Virginia Avenue to enable the removal of left turns into and out of Maxwelton

Court, Prall Street, Montmullin Street, and Colfax Street. This will allow the median to be replaced with a narrow non-mountable median and bike lanes to be added north of Virginia Avenue. This will improve vehicular and bicycle mobility along the corridor as well as improve safety.

Other Considerations

Lexington-Fayette Urban County Government, University of Kentucky, and the University of Kentucky Medical Center are all designing and/or implementing signage upgrades and wayfinding signage systems. Coordination between the three groups should be maintained in order to produce complimentary systems. Other sign upgrades that should be considered are illuminated street name signs at signalized intersections. These are provided at select intersections and should continue to be added as signal systems are upgraded.

An emphasis on enhancing placemaking should be considered as the short-term improvements and long-term vision for the corridor are implemented. Improvements should consider water quality, buffering of modes, landscaping, bike parking, pedestrian waiting areas, and noise and air pollution among others. For example, water quality has been considered in both the pedestrian channelization feature and the wider median proposed as part of *Project 5D*. Rain gardens can also be considered in sections where wide buffers are provided between sidewalk and roadway. **Figure 5.15** illustrates companion improvements to *Project 4B* that provides additional landscaping and enhanced pedestrian waiting areas near Memorial Hall. Additional landscaping recommendations are provided in **Appendix F**.

The Cooper Drive and South Limestone intersection is an important gateway for the corridor. A gateway feature should be considered for this location. An example is included in **Figure 5.16**. The monument feature design is inspired by Memorial Hall. A complimentary feature could be designed for the northeast quadrant as well and incorporated into *Project 1B*.

The coordination between land use and transportation is important in future design. As properties redevelop, it is important to design the buildings and outdoor surroundings so they enhance placemaking and promote safety along the corridor. Building entrances and exits should be located near intersections to encourage pedestrians to cross South Limestone, South Upper, and other side streets at safer, signalized locations. They should also be located in close proximity to transit stops and bike facilities, where practical. Comfortable and inviting sitting and waiting areas should be provided in front of buildings. Delivery traffic should be accommodated to maximize safety while minimizing visibility of loading zones. Each of these considerations will enhance not only land use, but have a positive impact on transportation safety and mobility.

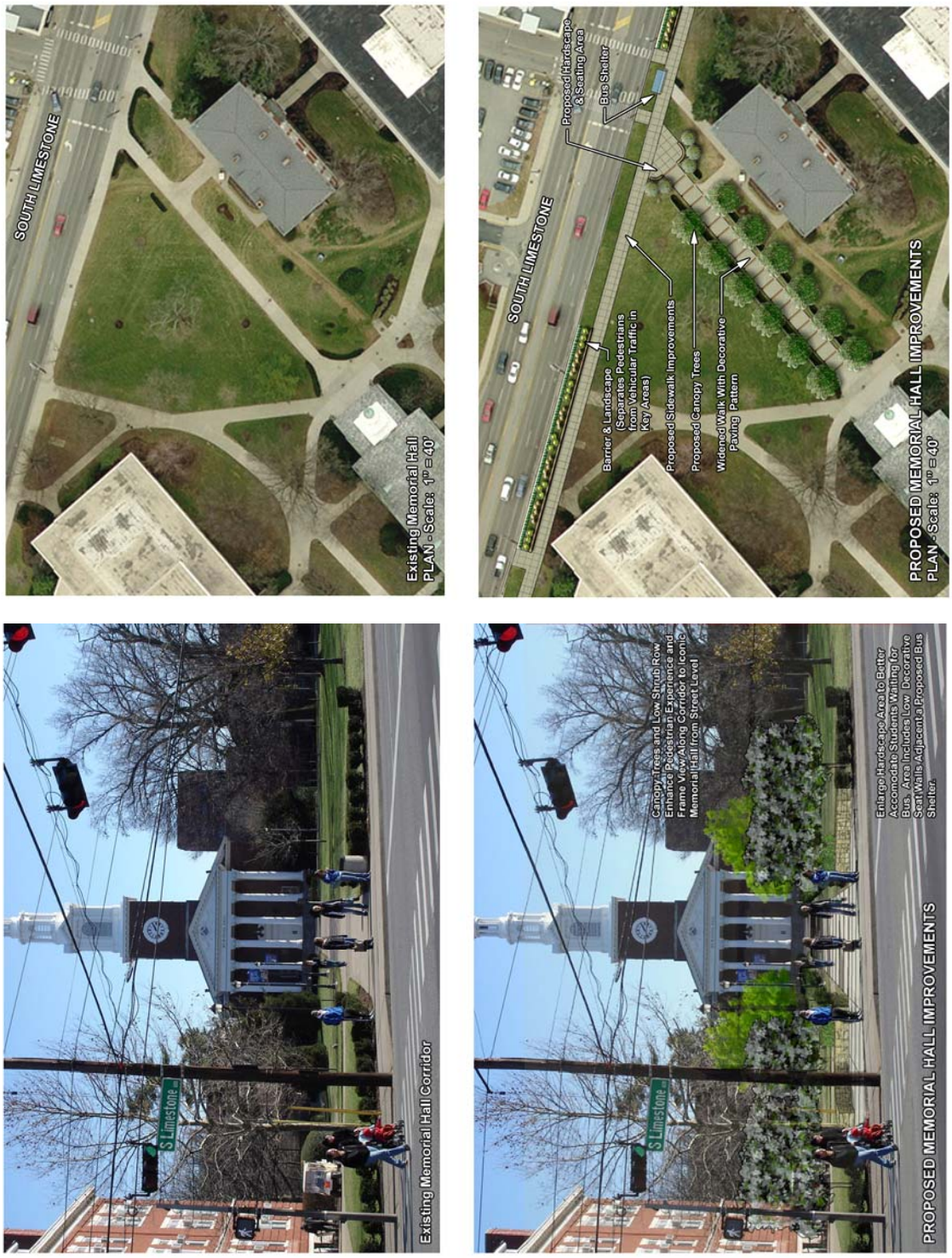


Figure 5.15 Memorial Hall Landscaping Improvements

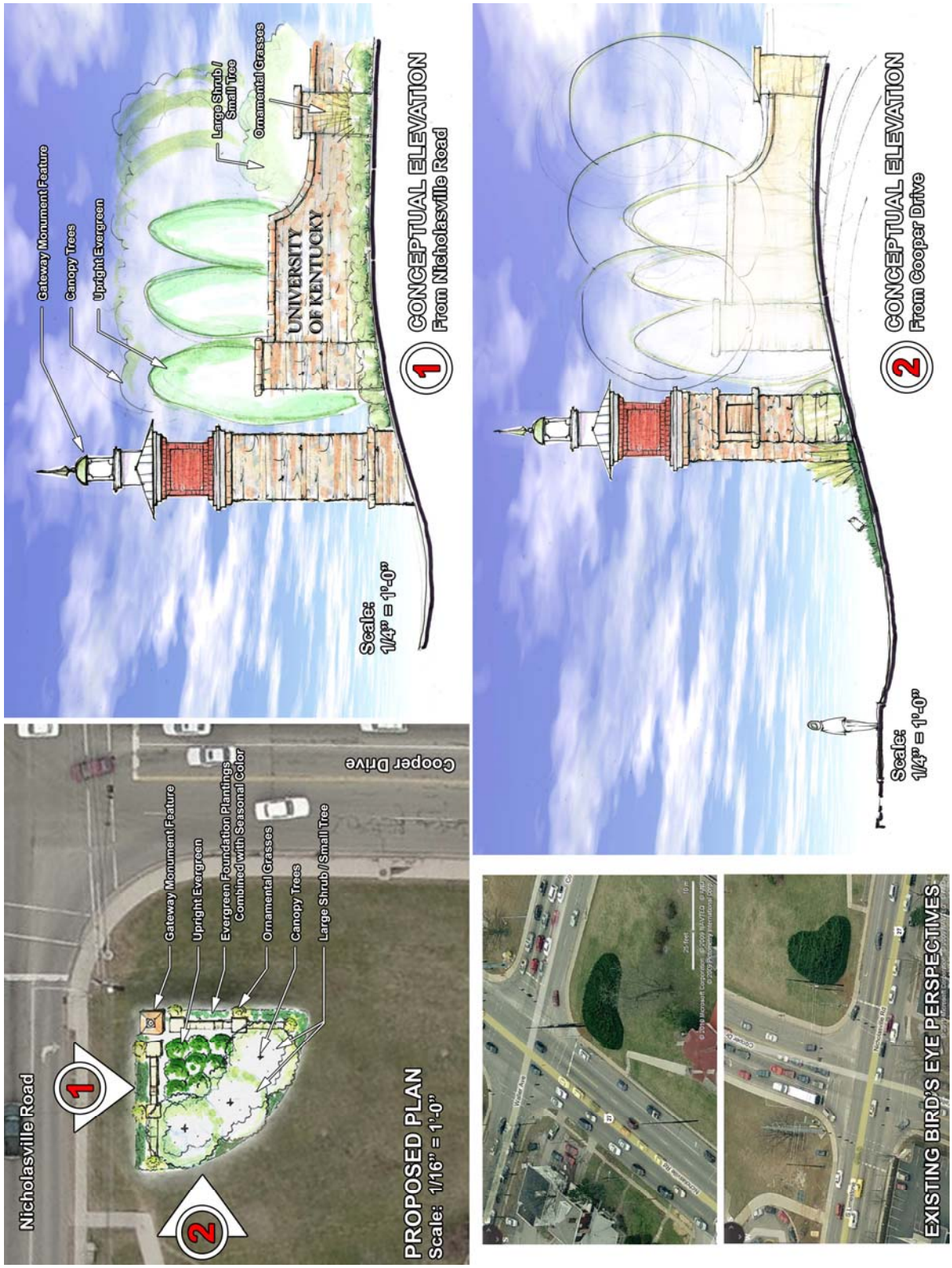


Figure 5.16 Cooper Drive and South Limestone Gateway Landscaping