

1 1. ACCIDENT ANALYSIS

METHODOLOGY

A review of accidents in the Dixie Highway Corridor, from Pike Street in Covington, Kentucky to Turfway Road in Florence, Kentucky, was conducted to assess causes and potential remedies.

Crash reports were reviewed for the years 2001-2003 were obtained from the police departments in the cities listed below:

- Covington
- Crestview Hills
- Edgewood
- Elsmere
- Erlanger
- Florence
- Fort Mitchell
- Fort Wright
- Lakeside Park
- Park Hills

Accidents at both intersections and mid-block locations were analyzed. The crash reports were collated to provide detailed accident information for each intersection. These summaries were used to prioritize intersections based on accident frequency, crash rate, and EPDO (Equivalent Property Damage Only) rate. A collision diagram was drawn for each intersection and mid-block location to provide a visual account of the total accidents over a three-year period. Collision summaries are provided in the Field Inventory Report (October 25, 2004).

The crash rate was calculated for each intersection and mid-block where accidents occurred. The Crash Rate is calculated as follows:

Rate per million entering vehicles:

$$[\# \text{ of accidents} * 1,000,000] / [365 \text{ days} * \# \text{ of Years studied} * \text{ADT}]$$

Rate per million vehicles miles:

$$[\# \text{ of accidents} * 1,000,000] / [365 \text{ days} * \# \text{ of Years studied} * \text{ADT} * \text{Length of Section (miles)}]$$

The Average Daily Traffic (ADT) was calculated by utilizing the manual traffic counts. Manual counts were completed to obtain the PM peak hour traffic volumes. It was estimated that the PM peak hour volumes were approximately 9.5% of the Average Daily Traffic (ADT). Traffic count information is provided in the Field Inventory Report (October 25, 2004).

The average intersection crash rate for the Commonwealth of Kentucky is 0.57 Accidents per Million Entering Vehicles. The average mid-block crash rate for the Commonwealth of Kentucky is 4.84 Accidents per Million Vehicle Miles. These rates were supplied by the Kentucky Transportation Cabinet.

The intersection crash patterns were assessed to determine probable causes with respect to the existing physical features on and near the roadway. As stated previously, field observations and inventories were performed to check the existing physical conditions of the intersections, including pavement markings and other roadway features. Traffic signal timing and phasing, signage, and general signal operations were also inventoried. Photos for each intersection approach were also taken and provided in the Field Inventory Report (October 25, 2004).

Crash data help identify crash patterns which are indicative of possible safety problems. The crash reports were examined to provide detailed accident information. The crash data for each intersection is summarized by crash type, severity, contributing factors, environmental conditions, and time periods.

An additional crash statistic utilized to review crash data is the Equivalent Property Damage Only (EPDO). The Equivalent Property Damage Only (EPDO) Rate weights crashes by property damage only, injury, and fatality. Crashes are weighted as follows:

$$[\# \text{ of PDO crashes} * 1] + [\# \text{ of B or C Injuries} * 3.5] + [\# \text{ of A Injuries or } \# \text{ of Fatal crashes} * 9.5] = \text{EPDO value}$$

A, B and C Injuries are defined as follows:

“A Injury – The person experienced serious, incapacitating, nonfatal injuries during the accident. Broken bones, massive blood loss, or more serious injuries are rated A.

B Injury – The person experienced a visible but not serious or incapacitating injury during the accident.

C Injury – The person complained of pain or momentary loss of consciousness due to an injury during the accident, but no visible sign of injury was evident to the investigator.”[2]

Due to a lack of information, all injury accidents were assumed to be B or C injuries. The EPDO Rate was then calculated as the EPDO value per million vehicles for intersections and the EPDO value per million vehicle miles for sections of roadway.

After reviewing the number of accidents in the midblock region from Edgewood Road to Kenton Lands Road, an accident recording system was installed on this midblock segment. The accident recording system is a combination of microphones and cameras installed at an intersection or midblock region. The system constantly records, but immediately deletes the recording. The system is also constantly “listening” for accidents. If the system hears a sound that would normally be associated with an accident, such as glass breaking or tires squealing, the system will save 4 seconds before and 4 seconds after the sound.

This system was installed on Dixie Highway from August 12, 2004 until October 20, 2004. The results of this installation are further discussed in the Mid-Term Recommendations Section (Section 15) of this report.

CRASH DATA ANALYSIS

The top 10 intersections and mid-block locations based on crash rate and EPDO rate are provided in Tables 34 & 35. For the top five intersections and top five mid-block accident locations, the accident patterns are analyzed.

TABLE 34: INTERSECTION CRASH DATA

Intersection	Crash Freq	Crash Rate	EPDO Rate
Kyles Lane	71	2.38	3.57
Sunset/Main	40	1.62	2.63
McAlpin/Garvey	39	1.70	2.46
Commonwealth/Stevenson	33	0.98	1.35
Winding Way	27	1.03	3.06
Kenton Lands	23	0.63	0.76
Dudley/Summit	23	0.61	1.01
Beechwood	20	0.85	1.81
Cave Run	20	0.83	1.04
Kentaboo/Eastern	20	0.83	1.35
Montgomery	20	0.62	0.93

TABLE 35: MID-BLOCK CRASH DATA

Mid-block	Crash Freq	Crash Rate	EPDO Rate
Edgewood & Kenton Lands	126	19.11	22.52
Bustetter/Goodridge & Turfway	63	16.47	25.61
Summit/Dudley & Edgewood	27	5.46	7.48
Kyles & Sleepy Hollow	25	8.10	8.91
Commonwealth & Graves	20	10.51	15.76
Montgomery & Erlanger TC	19	8.58	11.96
Erlanger TC & Clover	19	7.86	10.97
Erlanger Rd & Commonwealth	18	8.57	9.76
Cave Run & Dry Creek	15	4.64	8.50
St. Joseph's to St. James	13	3.56	5.34
Kenton Lands & Montgomery	13	3.10	5.49

The following five intersections have the highest number of accidents for intersections along Dixie Highway.

Kyles Lane

The intersection of Kyles Lane and Dixie Highway has the highest number of accidents (71) and the highest crash rate (2.38) within the project limits. Of these accidents, 92% (65) were property damage only, 8% (6) involved injuries, and there were no fatalities. The most prevalent accident type at this intersection during the three-year study period was rear-end collisions, representing 41% (29) of the total number of accidents. The remainder of the accidents break down as follows: 25% (18) side swipes, 21% (15) angle accidents, and 13% (9) left turning accidents.

Sunset/Main

The intersection of Sunset/Main and Dixie Highway has the second highest number of accidents (40) and a crash rate of 1.62. Of these accidents, 75% (30) were property damage only, 25% (10) involved injuries, and there were no fatalities. The most prevalent accident type at this

intersection during the three-year study period was angle accidents, representing 38% (15) of the total. The remainder of the accidents break down as follows: 27% (11) rear-end accidents, 20% (8) left turning accidents, 13% (5) side swipe accidents, and 2% (1) head-on accident.

McAlpin/Garvey

The intersection of McAlpin/Garvey and Dixie Highway is third on the list for accidents. This intersection is an offset intersection that operates as one intersection. This intersection has 39 accidents over the past three years, with a crash rate of 1.70. Of these accidents, 82% (32) were property damage only, 18% (7) involved injuries, and there were no fatalities. The most prevalent accident type at this intersection was rear-end accidents, representing 48% (19) of the total number of accidents. The remainder of the accidents break down as follows: 36% (14) angle accidents, 7% (3) sideswipe accidents, and left turning accidents, head-on accidents and fixed object accidents each making up 3% (1).

Commonwealth/Stevenson

The intersection of Commonwealth/Stevenson and Dixie Highway is fourth on the list. This intersection has 33 accidents over the past three years, with a crash rate of 0.98 Accidents per Million Entering Vehicles. Of these accidents, 85% (28) were property damage only, 15% (5) involved injuries, and there were no fatalities. The most prevalent accident type at this intersection was rear-end accidents, representing 55% (18) of the total number of accidents. The remainder of the accidents break down as follows: 21% (7) angle accidents, 12% (4) side swipe accidents, 6% (2) left turning accidents, 3% (1) head-on accident, and 3% (1) backing accident.

Winding Way/Crestview Hills

The intersection of Winding Way/Crestview Hills and Dixie Highway has 27 accidents over the past three years, with a crash rate of 1.03 Accidents per Million Entering Vehicles. Of these accidents, 67% (18) were property damage only, 33% (9) involved injuries, and there were no fatalities. The most prevalent accident type at this intersection was rear-end accidents, representing 44% (12) of the total number of accidents. The remainder of the accidents break down as follows: 33% (9) angle accidents, 11% (3) left turning accidents, 4% (1) side swipe accident, 4% (1) fixed object, and 4% (1) control related accident.

The following five midblock locations have the highest number of accidents for midblock locations along Dixie Highway.

Edgewood Road & Kenton Lands Road

The crash records show that the mid-block between Edgewood and Kenton Lands on Dixie Highway has the highest number of accidents (126). Of these 126 accidents, 93% (117) were property damage only, 7% (9) involved injuries, and there were no fatalities. The most prevalent accident type during the three-year study period was the angle collision, representing 38% (48) of the total number of accidents. The remainder of the accidents break down as follows: 32% (40) rear-end accidents, 13% (17) side swipe accidents, 11% (14) left turning accidents, 4% (4) backing accidents, and 2% (3) head-on accidents.

Bustetter/Goodridge & Turfway Road

The crash records show that the mid-block between Bustetter/Goodridge and Turfway Road on Dixie Highway has the second highest number of accidents (63) over the past three years, with a

crash rate of 16.47 Accidents per Million Vehicle Miles. Of these accidents, 78% (49) were property damage only, 22% (14) involved injuries and there were no fatalities. The most prevalent type of accident was angle accidents, representing 48% (30) of the total number of accidents. The remainder of the accidents break down as follows: 27% (17) rear-end accidents, 14% (9) left turning accidents, 8% (5) side swipe accidents, and 3% (2) fixed object accidents.

Dudley/Summit & Edgewood Road

The mid-block between Dudley/Summit and Edgewood Road on Dixie Highway has experienced 27 accidents over the past three years, with a crash rate of 5.46 Accidents per Million Vehicle Miles. Of these accidents, 85% (23) were property damage only, 15% (4) involved injuries and there were no fatalities. The most prevalent type of accident was rear-end accidents, representing 70% (19) of the total number of accidents over the past three years. The remainder of the accidents break down as follows: 19% (5) angle accidents, 7% (2) left turning accidents, and 4% (1) side swipe accidents.

Kyles Lane & Sleepy Hollow Road

The mid-block between Kyles Lane and Sleepy Hollow Road on Dixie Highway has experienced 25 accidents over the past three years, with a crash rate of 8.10 Accidents per Million Vehicle Miles. Of these accidents, 96% (24) were property damage only, 4% (1) involved injury and there were no fatalities. The most prevalent type of accident was rear-end accidents and angle accidents, both contributing to 28% (7) each of the accidents at this location. The remainder of the accidents break down as follows: 20% (5) left turning accidents, 16% (4) side swipe accidents, 4% (1) fixed object accidents, and 4% (1) backing accidents.

Commonwealth/Stevenson & Graves

The mid-block between Commonwealth/Stevenson and Graves Avenue has experienced 20 accidents over the past three years, with a crash rate of 10.51 Accidents per Million Vehicle Miles. Of these accidents, 80% (16) were property damage only, 20% (4) involved injury and there were no fatalities. The most prevalent type of accident was rear-end accidents, representing 50% (10) of the total accidents over the past three years. The remainder of the accidents break down as follows: 25% (5) angle accidents, 20% (4) side swipe accidents, and 5% (1) left turning accident.

ACCIDENT ANALYSIS OF PRIORITY LOCATIONS

The worst 5 intersections and worst 5 midblock locations were selected for specific analysis and recommendations, as follows. The following accident recommendations are offered to reduce the number of accidents at the selected locations. Many of these recommendations are addressed by the mid-term and long term recommendations discussed in Sections 14 and 15, respectively.

CLEARANCE INTERVAL TIMING

The clearance interval timing was reviewed during the study and recommendations were made regarding the yellow and all-red times. Often, discrepancies in the clearance interval can lead to an increase in intersection related accidents. The clearance interval was calculated based on the conflict points. The all-red time was calculated to allow a vehicle in the intersection to clear the last conflict point. These values are provided in Table 36. Prior to implementation, all timing should be reviewed by the maintaining agency, the Kentucky Transportation Cabinet.

TABLE 36 – PROPOSED CLEARANCE INTERVAL TIMING

Constants			Yellow	All red				
	$t = 1$ sec		$t + (V/2a)$	$(W+L)/V$				
	$a = 10$ ft/sec/sec							
	$g = 0$							
	$L = 20$ ft							
Intersection	Dir	Speed Lim	Y	W	Y	AR	CP	
US 25 & I75/Willow Run	SB	35	51.33	90	3.567	2.143	5.71	
	WB	45	66.00	75	4.300	1.439	5.74	
US25 & I75/Bullock ST	NB	35	51.33	90	3.567	1.948	5.51	
	WB	45	66.00	90	4.300	1.667	5.97	
US25 & Westem ave	NB	35	51.33	67	3.567	1.695	5.26	
	WB	35	51.33	59	3.567	1.539	5.11	
US 25 & Arlington Rd (east)	SB	35	51.33	60	3.567	1.558	5.13	
	WB	25	36.67	95	2.933	2.964	5.70	
US 25 & Arlington Rd (west)	SB	35	51.33	60	3.567	1.558	5.13	
	EB	25	36.67	90	2.933	2.727	5.56	
US 25 & Ent. Cov. Cath.	NB	35	51.33	100	3.567	2.338	5.90	
	EB	25	36.67	105	2.933	3.409	6.24	
US 25 & St. Joseph's Ln	NB	35	51.33	95	3.567	2.240	5.81	
	WB	25	36.67	75	2.933	2.591	5.42	
US25 & St. James	NB	35	51.33	120	3.567	2.727	6.29	
	EB	25	36.67	100	2.933	3.273	6.11	
US 25 & Sleepy Hollow	NB	35	51.33	110	3.567	2.532	6.10	
	EB	25	36.67	85	2.933	2.964	5.70	
US 25 & Kyles Ln	NB	35	51.33	75	3.567	1.851	5.42	
	WB	35	51.33	60	3.567	1.558	5.13	
US 25 & Ashwood	NB	35	51.33	80	3.567	1.948	5.51	
	EB	25	36.67	75	2.933	2.591	5.42	
US 25 & Fortside Dr	NB	35	51.33	70	3.567	1.753	5.32	
	WB	25	36.67	65	2.933	2.318	5.15	
US 25 & St. Johns Ridge	NB	35	51.33	105	3.567	2.435	6.00	
	WB	25	36.67	65	2.933	2.318	5.15	
US 25 & Orchard	NB	35	51.33	75	3.567	1.851	5.42	
	EB	25	36.67	70	2.933	2.455	5.29	
US 25 & I71/75 SB exit 188	NB	35	51.33	75	3.567	1.851	5.42	
	WB	45	66.00	65	4.300	1.298	5.59	
US 25 & I71/75 NB exit 188	SB	35	51.33	85	3.567	2.045	5.61	
	EB	45	66.00	90	4.300	1.667	5.97	
US 25 & Expressway Plaza	SB	35	51.33	85	3.567	2.045	5.61	
	EB	25	36.67	70	2.933	2.455	5.29	
US 25 & Beechwood Rd	SB	35	51.33	80	3.567	1.948	5.51	
	EB	25	36.67	75	2.933	2.591	5.42	
US 25 & Highland	SB	35	51.33	85	3.567	2.045	5.61	
	WB	25	36.67	75	2.933	2.591	5.42	
US 25 & Pleasant Ridge	SB	35	51.33	85	3.567	2.045	5.61	
	WB	25	36.67	65	2.933	2.318	5.15	
US 25 & Orphanage	SB	35	51.33	82	3.567	1.987	5.55	
	WB	25	36.67	80	2.933	2.727	5.56	
US 25 & Buttermilk/Huckleberry	NB	35	51.33	115	3.567	2.630	6.20	
	WB	35	51.33	90	3.567	2.143	5.71	
US 25 & Arcadia	NB	35	51.33	65	3.567	1.656	5.22	
	WB	25	36.67	75	2.933	2.591	5.42	
US 25 & Turkey Foot/Hudson	NB	35	51.33	80	3.567	1.948	5.51	
	WB	35	51.33	75	3.567	1.851	5.42	
US 25 & Carran Dr	NB	45	66.00	80	2.933	1.515	4.35	
	EB	25	36.67	80	4.300	2.727	7.03	
US 25 & Lookout Farm	NB	45	66.00	115	2.933	2.045	4.88	
	EB	25	36.67	110	4.300	3.545	7.85	
US 25 & I275 EB	SB	45	66.00	85	4.300	1.591	5.89	
	EB	45	66.00	120	4.300	2.121	6.42	
US 25 & Winding Way/Dillard's	NB	35	51.33	115	3.567	2.630	6.20	
	EB	25	36.67	115	2.933	3.682	6.52	
US 25 & Rosemont/Crestview	NB	35	51.33	80	3.567	1.948	5.51	
	EB	25	51.33	90	3.567	2.143	5.71	
US 25 & Dudley/Summit	NB	35	51.33	96	3.567	2.260	5.83	
	WB	25	51.33	96	3.567	2.260	5.83	
US 25 & Edgewood	NB	35	51.33	95	3.567	2.240	5.81	
	EB	25	51.33	100	3.567	2.338	5.90	
US 25 & Kenton Lands	NB	35	51.33	70	3.567	1.753	5.32	
	WB	25	51.33	85	3.567	2.045	5.61	
US 25 & Montgomery	NB	35	51.33	110	3.567	2.532	6.10	
	WB	25	51.33	122	3.567	2.766	6.33	
US 25 & Silver Lake	NB	35	51.33	80	3.567	1.948	5.51	
	EB	25	51.33	100	3.567	2.338	5.90	
US 25 & Hallam	NB	35	51.33	70	3.567	1.753	5.32	
	WB	25	51.33	100	3.567	2.338	5.90	
US 25 & Common Wealth/ Stevenson	NB	35	51.33	100	3.567	2.338	5.90	
	WB	35	51.33	100	3.567	2.338	5.90	
US 25 & Bartlett	SB	35	51.33	60	3.567	1.558	5.13	
	EB	25	51.33	70	3.567	1.753	5.32	
US 25 & May St	SB	35	51.33	70	3.567	1.753	5.32	
	WB	25	51.33	70	3.567	1.753	5.32	
US 25 & McAlpin/Garvey	SB	35	51.33	180	3.567	2.922	6.49	
	EB	25	51.33	105	3.567	2.435	6.00	
US 25 & Sunset/Main	NB	35	51.33	85	3.567	1.656	5.22	
	WB	25	51.33	70	3.567	1.753	5.32	
US 25 & Cave Run	NB	35	51.33	85	3.567	2.045	5.61	
	EB	25	51.33	80	3.567	1.948	5.51	
US 25 & Kentaboo/Eastern	SB	35	51.33	80	3.567	1.948	5.51	
	EB	25	51.33	70	3.567	1.753	5.32	
US 25 & Bustetter	SB	35	51.33	70	3.567	1.753	5.32	
	EB	25	51.33	70	3.567	1.753	5.32	
Conflict Time US 25 & Rose/Turfway/Main	SB	35	51.33	173	3.567	3.760	7.33	
	NB	35	51.33	195	3.567	4.198	7.75	
	EB	35	51.33	110	3.567	2.532	6.10	
	NB2	35	51.33	144	3.567	3.195	6.76	
	WB	35	51.33	90	3.567	2.143	5.71	
	NB Left	35	51.33	110	3.567	2.532	6.10	

INTERSECTIONS

Kyles Lane

The most prevalent accident type at this intersection during the three-year study period was rear-end collisions, representing 41% of the total number of accidents. A significant number of these accidents occurred on the westbound approach. These accidents most likely occurred because of the geometry and nature of this approach. The majority of vehicles entering the intersection have recently exited I-71/75 onto Kyles Lane. Several vehicles are attempting to enter the Dixie Highway corridor by making a left turn at the intersection. The distance between the ramp signal and the Dixie Highway intersection is minimal and thus results in congestion and the rear-end accidents.

The remainder of the rear-end accidents are on the northbound and southbound approaches. These accidents are most likely caused by a lack of turning lanes at the intersection. Several vehicles traveling southbound at this intersection turn left onto Kyles Lane. The lack of a left turn lane increases the likelihood of rear-end accidents. The northbound rear-end accidents are caused by vehicles making left turns at this intersection into the businesses located on the west side of the intersection. The accesses to these businesses are discussed in more detail in Appendix A: Access Management.

Side swipe accidents account for 25% of the accidents at this intersection. The majority of side swipe accidents occur on the westbound approach. These accidents appear to be caused during the left turn movement onto southbound Dixie Highway. Deviation from the travel lane is most likely due to the angle of this intersection. Kyles Lane intersects Dixie Highway at an acute angle and westbound left turning vehicles are required to make an almost 270 degree turn onto southbound Dixie Highway.

The remaining accidents are comprised of angle accidents (21%) and left turning accidents (13%). These accidents are caused by two main factors. First, several drivers turning into or out of the businesses located on the west side of the intersection cause several of these accidents. This issue is discussed in more detail in Appendix A: Access Management. Second, several left turning accidents are caused by southbound left turning vehicles.

The traffic signals at the I-71/75 on/off ramps on Kyles Lane should be tied into the Dixie Highway system, so that they can be coordinated with the signal at Dixie Highway. This would work to more efficiently move the traffic off of the freeway and onto Dixie Highway and reduce the number of rear-end and side swipe accidents on the westbound approach. It is recommended that a southbound left turn lane be installed at this intersection to move the left turning vehicles out of the through lane and create a safer intersection. This would reduce the number of southbound rear-end accidents. This issue is addressed by the realignment of the intersection, discussed in the Long Term Recommendations Section (Section 15).

Sunset/Main

The most prevalent accident type at this intersection during the three-year study period was angle accidents, representing 38% of the accidents. It appears that the angle accidents occurred as a result of vehicles running a red light and causing a collision. This type of collision is normally caused by an inadequate clearance interval. The existing clearance interval for both Dixie

Highway and Sunset Avenue/Main Street, as supplied by the Kentucky Transportation Cabinet, appears to be slightly shorter than necessary based on the arterial speeds and intersection size.

Rear-end accidents account for 27% of the accidents at this intersection. All of these accidents have occurred on Dixie Highway and not on the side street. There are several possible causes for the rear end accidents. First, this intersection does not provide left turn lanes. The left turning vehicles must turn from the leftmost through lane. This requires all vehicles in the leftmost through lane to stop unexpectedly. Second, as stated above, the clearance interval for Dixie Highway appears to be slightly shorter than necessary based on the arterial speeds and intersection size.

Left turning accidents account for 20% of the accidents at this intersection. These left turning accidents appear to be the result of either a lack of left turn lanes or the clearance interval.

Side swipe angles account for 13% of the accidents at this intersection. These accidents are most likely caused by the lack of left turn lanes at this intersection. Vehicles in the leftmost lane realize that they will have to stop because of a left turning vehicle, and quickly attempt to get into the right hand lane.

An increase of the clearance interval would result in a decrease in the number of angle accidents and rear-end accidents. Left turn lanes should be provided at this intersection; however, there is not room to construct left turn lanes at this intersection due to the location of the adjacent buildings. Therefore, left turn lanes should be planned for this intersection with any redevelopment. In order to ensure that there is room in the future for these turn lanes, a future plan for the corridor should be developed stating specific building setbacks. These improvements will work to reduce the number and severity of accidents at this intersection

McAlpin/Garvey

The most prevalent accident type at this intersection was rear-end accidents, representing 48% of the total number of accidents. It appears that these accidents are the result of the complexity of the intersection. The Dixie Highway and McAlpin/Garvey intersection is complex because Garvey and McAlpin are offset. This requires that the intersection must operate as split phase.

Angle accidents account for 36% of the accidents at this intersection. Again, these accidents are probably the result of the complexity of this intersection. In addition, it appears that the existing clearance interval, based on the information provided by KYTC, is slightly shorter than necessary. This results in vehicles entering the intersection and not clearing before the opposing traffic enters the intersection, thus resulting in angle accidents.

Side swipe accidents account for 7% of the accidents at this location. These accidents are most likely the result of the lack of left turn lanes. Drivers wishing to turn left must utilize the leftmost through lane. This causes vehicles in the leftmost through lane to attempt to change lanes. Often this lane change is made rapidly resulting in the accidents.

The realignment of this intersection is discussed in the Long Term Recommendations Section (Section 15) of this report. This improvement would greatly improve the operation of this

intersection and reduce the number of accidents. In addition, during the design of the realignment, left turn lanes should be considered at this intersection. Left turn lanes would work to allow this intersection to operate better by moving the left turning vehicles out of the through lane. This improvement would also work to reduce the side swipe accidents. The existing clearance interval should be reviewed and adjusted as necessary to reduce the number of accidents at this location.

Commonwealth/Stevenson

The most prevalent accident type at this intersection was rear-end accidents, representing 55% of the total number of accidents. The majority of these accidents occurred on Dixie Highway. The rear-end accidents most likely result from the congestion that occurs near this intersection. This intersection services a large amount of traffic, especially during the peak hours. This is complicated by the railroad bridge located just to the north of the intersection. This bridge causes a sight distance problem.

Angle accidents account for 21% of the accidents at this location. These accidents could be caused by the clearance interval at this intersection. Based on the signal timing provided by KYTC, the clearance interval appears to be slightly shorter than necessary. This results in vehicles entering the intersection and not clearing before the opposing traffic enters the intersection, thus resulting in angle accidents.

Side swipe accidents account for 12% of the accidents at this intersection. These accidents are most likely caused by the sight distance problem on the southbound approach.

The redesign of the railroad bridge would greatly improve the sight distance for the southbound approach. This would reduce the number of accidents at this intersection and the number of accidents preceding this intersection. This improvement will be very costly and is outlined in the Long Term Recommendations Section (Section 15). In addition, reviewing and adjusting the clearance interval at this intersection will improve the safety of the intersection and reduce the number and severity of accidents.

This intersection is greatly under-designed to handle the amount of traffic utilizing it on a daily basis. Mainly, the eastbound approach must have dual left turn lanes. The adjacent building locations prohibit adding another lane, so the intersection must operate split phase to allow for a through lane/left turn lane, in addition to the left turn lane. This forces the intersection to work very inefficiently. An eastbound left turn lane should be planned for this intersection in the future when redevelopment occurs.

Winding Way/Crestview Hills

The most prevalent accident type at this intersection was rear-end accidents, representing 44% of the total number of accidents. These accidents are mainly concentrated on the northbound approach. After reviewing the signal timing at this location, based on the charts provided by KYTC, the clearance intervals at this intersection are slightly lower than required based on the yellow and all-red calculations. This may result in leading vehicles attempting to stop at the intersection, while following vehicles may be attempting to go through the intersection, thus resulting in the rear-end accidents.

Angle accidents account for 33% of the accidents at this intersection. Again, reviews have revealed that the existing clearance interval at this intersection may be too short. This results in vehicles entering the intersection and not clearing before the opposing traffic enters the intersection, thus resulting in angle accidents.

The clearance interval at this intersection should be increased to provide an adequate amount of time for vehicles to safely stop and/or proceed through the intersection.

MID-BLOCKS

Edgewood Road & Kenton Lands Road

The most prevalent accident type on this segment was angle accidents, representing 38% of the total number of accidents. This section of roadway has several curb cuts and business driveways. Vehicles turning into and out of the businesses pose unexpected obstacles to through traffic, resulting in the high number of angle accidents. Solutions for these driveways are covered in more detail in the Long Term Recommendations Section (Section 15) of this report, as well as Appendix A: Access Management.

Rear-end accidents account for 32% of the accidents on this segment. As stated above, there are a number of driveways in this section of roadway. Several of the drivers on Dixie Highway will slow or stop to allow a vehicle to exit driveways. Often, the following drivers do not expect to be confronted with these sudden stops, and thus they result in rear-end accidents.

Side swipe accidents account for 13% of the accidents on this segment of roadway. This type of accident often results from drivers in the right hand lane being surprised by vehicles slowing to enter commercial drives and quickly changing lanes without looking.

Left turning accidents account for 11% of the accidents on this segment. This type of accident is most likely caused as vehicles make left turns into or out of the commercial driveways.

For this section of roadway, most accidents are caused by the large number of commercial driveways located on Dixie Highway. Recommendations to remedy this problem are presented in the Long Term Recommendations Section (Section 15) of this report, as well as Appendix A: Access Management.

Due to the high volume of accidents on this section of roadway, a new accident recording system was installed to further study the corridor. The system was installed at the intersection of Dixie Highway and Kenton Lands Road in order to monitor accidents at this intersection. The accident recording system is a network of cameras and microphones. The system constantly records, but immediately deletes the recording. The system is also constantly “listening” for accidents. If the system hears a sound that would normally be associated with an accident, such as glass breaking or tires squealing, the system will save 4 seconds before and 4 seconds after the sound.



This system was installed on Dixie Highway from August 12, 2004 until October 20, 2004. During this time, several near accidents were recorded, but no actual accidents. Please review the accident recording system videos included with this report. Several of the near accidents were the result of the commercial driveways along the corridor. Vehicles entering and exiting these driveways produced several of the near accidents recordings.

Bustetter/Goodridge & Turfway Road

The most prevalent accident type on this segment of roadway was angle accidents, representing 48% of the accidents at this location. Similar to the previous section, this section of roadway has several curb cuts and business driveways. Vehicles turning into and out of the businesses pose unexpected obstacles to through traffic, resulting in the high number of angle accidents. Solutions for these driveways are covered in more detail in the Long Term Recommendations Section (Section 15) of this report, as well as Appendix A: Access Management.

Rear-end accidents account for 27% of the accidents on this segment of roadway. Several of the drivers on Dixie Highway will slow or stop to allow a vehicle to exit driveways. Often, the following drivers do not expect to be confronted with these sudden stops, and thus they result in rear-end accidents.

Left turning accidents account for 14% of the accidents on this segment of roadway. This type of accident is most likely caused as vehicles make left turns into or out of the commercial driveways.

For this section of roadway, most accidents are caused by the large number of commercial driveways located on Dixie Highway. Recommendations to remedy this problem are presented in the Long Term Recommendations Section (Section 15) of this report, as well as Appendix A: Access Management.

Dudley/Summit & Edgewood Road

The most prevalent accident type on this segment of roadway was rear-end accidents, representing 70% of the accidents at this location. The majority of the rear-end accidents on this segment occur on the northbound approach. This segment of roadway experiences a great deal of congestion, especially in the northbound right lane. At the intersection of Dixie Highway and Summit/Dudley several vehicles turn right causing congestion in the right turn lane. Dudley Road is used to access Turkeyfoot Road. A right turn lane would greatly improve the operation of this intersection.

This improvement will be discussed further in the Long Term Recommendations Section (Section 15) of this report.

Angle accidents accounted for 19% of the accidents on this segment. A review of the clearance intervals of each intersection based on the information provided by KYTC was conducted. Based on this review, the clearance interval for this intersection appears to be slightly shorter than necessary. This causes some drivers to decide to stop and could lead to rear-end accidents, and some drivers to proceed through the intersection, resulting in angle accidents.

At this intersection, a northbound right turn lane would greatly improve the operation of this intersection. In addition, if a left turn phase is provided for the side streets, the northbound right turn movement could be overlapped with the westbound left turn phase. This improvement will be very costly and will be outlined in the Long Term Recommendations Section (Section 15). In addition, the clearance interval at this intersection should be increased to provide an adequate amount of time for vehicles to safely stop and/or proceed through the intersection.

Kyles Lane & Sleepy Hollow Road

The most prevalent accident types on this segment of roadway were rear-end accidents and angle accidents, both representing 28% of the accidents. Both types of accidents are most likely related to the high number of access points located on this segment of roadway. Many of the angle accidents occur as vehicles turn into and out of the commercial driveways. Similarly, many of the rear-end accidents occur as vehicles stop to turn into the driveways and the following vehicles are not expecting this movement. In addition, rear-end accidents are often caused by leading vehicles stopping to allow a car to exit a driveway, and the following vehicle not expecting this movement.

Left turning accidents account for 20% of the accidents on this stretch of roadway. These accidents are most likely related to the high number of access points also, with vehicles attempting to turn left into or out of the commercial driveways. Solutions for these driveways are covered in more detail in the Long Term Recommendations Section (Section 15) of this report, as well as Appendix A: Access Management.

Commonwealth/Stevenson & Graves

The most prevalent accident type on this segment of roadway was rear-end accidents, representing 50% of the total number of accidents. This section of roadway experiences congestion, especially during the peak hours. In addition, this section of roadway has several commercial driveways located on both sides of Dixie Highway. Many of the rear-end accidents occur as vehicles stop to turn into the driveways and the following vehicles are not expecting this movement. In addition, rear-end accidents are often caused by leading vehicles stopping to allow a car to exit a driveway, and the following vehicle not expecting this movement.

Angle accidents account for 25% of the accidents on this section of roadway. Again these accidents are most likely attributed to the commercial driveways. Many of the angle accidents occur as vehicles turn into and out of the commercial driveways.

Side swipe accidents account for 20% of the accidents on this section of roadway. These accidents can most likely be attributed to leading vehicles stopping to turn into commercial driveways and the following vehicles attempting to quickly move to the right through lane to pass then colliding with a vehicle in the right lane. In addition, vehicles often will stop to allow vehicles out of the driveways, and the following vehicles attempt to quickly move to the right through lane to pass and then collide with a vehicle in the right lane. Solutions for these driveways are covered in more detail in Appendix A: Access Management.