

Kentucky Transportation Cabinet

Kenton County - Turkeyfoot Road (KY 1303) Planning Study – Executive Summary



Prepared for: Kentucky Transportation Cabinet
District 6 - Covington
Central Office Planning

Prepared by:



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EXECUTIVE SUMMARY

The Kentucky Transportation Cabinet (KYTC) initiated the Turkeyfoot Road (KY 1303) Planning Study to examine opportunities to improve safety and reduce congestion along Turkeyfoot Road (KY 1303) from Barnwood Drive (mile point [MP] 5.085) to the middle of the I-275 bridge (MP 5.685) in Crestview Hills in Kenton County, Kentucky. The KYTC established a Project Team and contracted with Palmer Engineering to assist in this effort to assess safety and congestion needs and to evaluate possible improvement concepts. Potential improvement concepts included spot improvements and consolidation of the adjacent Thomas More Parkway (MP 5.396) and Town Center Boulevard (MP 5.493) intersections, with consideration for pedestrians, bicycles, and transit.

Purpose and Need

The purpose of this study was to assess options to improve safety and reduce congestion along Turkeyfoot Road (KY 1303) from Barnwood Drive to the middle of the I-275 bridge (MP 5.685) with particular focus on the intersections with Thomas More Parkway and Town Center Boulevard. The primary goals of the study were to develop improvement strategies to reduce the potential for crashes and to reduce travel delays.

Turkeyfoot Road (KY 1303) is an urban minor arterial that stretches 6.3 miles between Mt. Zion Road (KY 536) to the south and Dixie Highway (US 25/42/127) to the north. The segment under study is 0.6 miles in length, from Barnwood Drive (MP 5.085) to the middle of the I-275 bridge (MP 5.685). It carries between 26,011 (MP 5.085 to MP 5.396) and 43,112 (MP 5.396 to MP 5.685) vehicles per day, with 2.5% trucks. A total of 290 crashes was reported within the project corridor between January 2014 and December 2016. The total includes crashes on Turkeyfoot Road (KY 1303) (221) and approaches at intersections (69). Of the mainline roadway crashes, approximately two-thirds were classified as rear-end. Long lines of traffic (queues), limited turn-lane capacity, and travel delays are frequently encountered by users.

Project Development

Local Officials and Stakeholder outreach helped guide the process, particularly in identifying potential issues and developing alternatives. KYTC District 6 and Central Office Planning co-hosted two Local Officials / Stakeholders Meetings. Project Team members also held separate information gathering meetings with the representatives of the St. Elizabeth Hospital and Thomas More College. The primary purpose of the first Local Officials / Stakeholders Meeting, held December 13, 2017, at the Crestview Hills City Building, was to present existing conditions within the project corridor and seek input in regard to the accuracy and validity of the existing conditions as described. The primary purpose of the second Local Officials / Stakeholders

Meeting, held on July 11, 2018 at the Crestview Hills City Building, was to present the results of the crash and traffic analyses and to solicit input on the conceptual alternatives.

Improvement Strategies

Three Project Team Meetings were held at the KYTC District 6 Office in Covington, Kentucky, during the development of this study. The crash locations presented in **Figure ES-1** were a primary focus in the development of alternatives. The Project Team discussed typical sections, which evolved to those shown in **Figures ES-2** and **ES-3**, as possible templates for the improvement of Turkeyfoot Road (KY 1303) and the consolidation of the Thomas More Parkway and Town Center Boulevard intersections. Those typical sections were incorporated into the following alternatives:

Alternative A: Spot Improvements / Lower Cost Options (see Figure ES-4)

1. Add a right-turn lane from northbound Turkeyfoot Road (KY 1303) to exit ramp – I-275 eastbound;
2. Eliminate the right-in entrance to TGI Fridays from southbound Turkeyfoot Road (KY 1303);
3. Add right-turn lane on Turkeyfoot Road (KY 1303) from I-275 eastbound ramp to existing Town Center Boulevard;
4. Eliminate access from Fraternity Court to Turkeyfoot Road (KY 1303);
5. Restrict left turns from Villa Madonna Drive to southbound Turkeyfoot Road (KY 1303);
6. Add a right-turn lane on northbound Turkeyfoot Road (KY 1303) approach at Thomas More Parkway intersection.

Alternative A is estimated to cost \$3,250,000 with minor right-of-way impacts to approximately 2 residences and 5 commercial businesses, and no utility impacts. The cost of the spot improvements with Alternative A may increase if the KYTC chooses to implement the improvements as separate maintenance and/or highway plan projects.

Alternative B: Consolidate Town Center Boulevard and Thomas More Parkway Intersections (see Figure ES-5)

1. Include all Spot Improvements from Alternative A;
2. Consolidate the Town Center Boulevard and Thomas More Parkway Intersections to a single intersection by realigning both roads;
3. Add lane to southbound Turkeyfoot Road (KY 1303) from the I-275 eastbound ramp to just beyond relocated Town Center Boulevard;
4. Convert access to existing Town Center Boulevard to right-in / right-out only;

5. Convert frontage road from Turkeyfoot Road (KY 1303) to Thomas More Parkway to a right-in / right-out at Turkeyfoot Road (KY 1303);
6. Extend frontage road / backage road to reconnect with Thomas More Parkway.

Alternative B, which consolidates the Town Center Boulevard and Thomas More Parkway intersections and includes the Spot Improvements / Lower Cost Solutions, is estimated to cost \$17,534,550. The construction of Alternative B would potentially impact up to 9 residential and 18 commercial properties and require the relocation of utilities, including a 24" gas line, sanitary sewer line, and overhead poles paralleling Town Center Boulevard between the College Park neighborhood and commercial development towards the Crestview Hills Town Center.

Traffic Operational Analysis

A traffic microsimulation model was developed to more accurately quantify and analyze traffic operations. A summary of the microsimulation results for Turkeyfoot Road (KY 1303) is presented in **Table ES-1** (page **ES-12**). The microsimulation indicated that each proposed alternative would reduce travel times and queue lengths compared to the existing condition. Travel times and queue lengths for segments of Turkeyfoot Road (KY 1303) between the critical nodes fluctuated between Alternatives A and B, primarily due to the changes in signal timing in the microsimulations and resulting congestion that occurs in critical movements within each alternative. The level of service (LOS) for the intersections in the study corridor improves significantly as the amount of delay for each vehicle is reduced along the corridor. While the LOS letter designation does not indicate a significant change due to the levels of service being significantly below the LOS E threshold, the delays are reduced by 50% for both alternatives. The spot improvements with Alternative A address the immediate needs for improving travel, but the improvements fail as the traffic increases in the future. Alternative B best addresses the congestion in the long term by reducing the overall total travel time for all vehicles in the model by over 2,000 minutes during the peak hour in comparison to Alternative A (see **Table ES-1**). Further improvements to level of service may also occur with the optimization of signal timing.

The queue lengths provided in **Table ES-1** were determined using the averages of ten separate runs in the traffic microsimulation program, VISSIM. Unlike HCS, VISSIM considers the entire roadway network when determining queue lengths as opposed to only considering a single intersection with volumes. Many of the queue lengths are better in Alternative A because the roadway network is causing vehicles to queue at intersections upstream of the movement; therefore, fewer vehicles are able to arrive at the intersection being summarized in that particular time window. With fewer vehicles arriving at the intersection, then fewer cars are able to queue because they are still being queued at an intersection upstream. Specific to this condition, Alternative A has less queue at some centralized intersections in the network



because Alternative B is more efficient up to that point and has allowed its vehicles to make it to the central intersections more quickly, where they are then forced to queue.

The improvements proposed in Alternative A result in a significant reduction in queue length on the ramps and Turkeyfoot Road (KY 1303), along with a reduction in travel time for the various routes in the study corridor. Travel times are reduced as a result of the improvements to the I-275 eastbound off-ramp and by providing an additional through lane for vehicles to travel southbound on Turkeyfoot Road (KY 1303). Alternative A reduces the conflict points along Turkeyfoot Road (KY 1303) by eliminating the left-exiting turns from Villa Madonna Drive and the Fraternity Court approach at Thomas More Parkway. Alternative A is estimated to reduce the annual number of crashes by 8% and reduce the travel time for all of the vehicles in the system by 14.8% (4,329 minutes) in the AM and 29% (15,328 minutes) in the PM relative to the No-Build Alternative in 2040. The combination of these improvements reduces congestion, provides capacity for the traffic demand, and results in the 2040 travel times being similar to existing conditions.

Alternative B improvements expand on the Alternative A lower-cost options by eliminating the signalized intersection at Town Center Boulevard, which keeps traffic continuously flowing, to provide for additional gaps in traffic for the I-275 eastbound right turns. The consolidation of the intersections reduces weaving on northbound Turkeyfoot Road (KY 1303) between Thomas More Parkway and Town Center Boulevard and increases left-turn storage capacity on northbound and southbound Turkeyfoot Road (KY 1303). This alternative improves the southbound Turkeyfoot Road (KY 1303) queue at Thomas More Parkway by providing an additional through lane and adequate storage for the left-turn lanes to Thomas More Parkway. The southbound right-turn lane that is proposed for Alternative A ends at the College Park intersection and is tapered out past the Town Center Boulevard intersection in Alternative B. The termination of the turn lane as shown in Alternative B is preferred to avoid right-of-way impacts associated with the proposed urban typical section.

The alternative also significantly improves the southbound through movement at the I-275 ramp, which is attributed to the elimination of a signal that impacts the flow of traffic due to the queue from downstream signals. Alternative B also reduces the conflict points along Turkeyfoot Road (KY 1303) by eliminating the left-exiting turns from Villa Madonna Drive, eliminating the Fraternity Court approach, and realigning Thomas More Parkway and Town Center Boulevard to provide a single intersection. A two-way-left-turn lane from Thomas More Parkway will be required to provide access to Villa Madonna Drive and the frontage/backage road, with a right-turn-lane-only entrance to replace the existing full access to the second building fronting Thomas More Parkway.

Alternative B is estimated to reduce the annual number of crashes by 19% and reduce the travel time for all of the vehicles in the system by 23.6% (6,976 minutes) in the AM and 32.5% (17,110 minutes) in the PM relative to the No-Build Alternative in 2040. It is estimated that the traveling public would also experience a significant and immediate reduction in travel time of 19% in the PM with Alternative B relative to the existing 2017 traffic due to the consolidation of the Town Center Boulevard and Thomas More Parkway intersections. The combination of these improvements reduces congestion, provides capacity for the traffic demand, and results in a significant reduction in the peak periods for the 2040 travel times. While the travel times fluctuate in the segments due to the signal timing in the microsimulations and resulting congestion, Alternative B best addresses the congestion in the long term by reducing the overall total travel time for all vehicles in the model.

The movements throughout Alternatives A and B that operate at LOS F can be improved to become LOS E or better by improving signal optimization and the addition of more lanes, through and turning, along the major and minor roadways. The addition of lanes would result in significant right-of-way and utility impacts along the study corridor and could require widening the existing bridge over I-275. These improvements were deemed to be beyond the scope of this study.

A comparison matrix of the improvement strategies, which includes the factors of costs, percent crash reduction per year, and travel time reduction, is presented in **Table ES-2** (page **ES-13**).

Conclusions

The conclusions for the Turkeyfoot Road (KY 1303) Planning Study are predicated on the project purpose and need, Project Team input, Local Officials/ Stakeholders feedback, and technical analysis. The Project Team preferred Alternative B as the alternative to improve the safety and mobility along Turkeyfoot Road (KY 1303) as a long-term solution with the following improvements:

1. Implement all Spot Improvements from Alternative A
 - a. Add a right-turn lane to exit ramp – I-275 eastbound
 - b. Eliminate the right-in entrance to TGI Fridays
 - c. Add a right-turn lane on Turkeyfoot Road (KY 1303) from I-275 eastbound ramp to existing Town Center Boulevard
 - d. Eliminate the access from Fraternity Court to Turkeyfoot Road (KY 1303)
 - e. Restrict left turns from Villa Madonna to Turkeyfoot Road (KY 1303) southbound

- f. Add a right-turn lane on Turkeyfoot Road (KY 1303) northbound to Thomas More Parkway
2. Consolidate the Town Center Boulevard and Thomas More Parkway intersections to a single intersection by realigning both roads
3. Add a lane to Turkeyfoot Road (KY 1303) southbound from the I-275 eastbound ramp to just beyond relocated Town Center Boulevard
4. Convert access to the existing Town Center Boulevard to right-in / right-out
5. Convert frontage road from Turkeyfoot Road (KY 1303) to Thomas More Parkway to right-in / right-out at Turkeyfoot Road (KY 1303)
6. Extend the frontage road / backage road to reconnect with Thomas More Parkway

In discussions with KYTC project management, it was later decided that Alternative B include a shared-use path along the east side of Turkeyfoot Road (KY 1303) through the study corridor and on the south side of Thomas More Parkway. Although the Intersection at Dudley Road was outside the limits of the study, the microsimulation model revealed that the intersection of Turkeyfoot Road (KY 1303) and Dudley Road experiences significant queues along the major road (Turkeyfoot Road (KY 1303) in both the northbound and southbound through movements in 2040. Queues along the minor road (Dudley Road) occur in both the eastbound and westbound through movements as well as the westbound left-turn movement. These queues are a result of the increase in demand or traffic volumes along both roadways for the future build scenario.

An Interchange Modification Report (IMR) for the system-to-system interchange at I-75 and I-275 is currently being developed, which could result in modifications to the I-275/KY 1303 interchange. Additional lanes on the ramps and KY 1303 bridge over I-275 would provide capacity that was not evaluated in this study and which could greatly improve the congestion in the area. Alternative B does not propose changes to the KY 1303 bridge and generally uses the ramps in their current locations; therefore, any improvements evolving from the IMR should be compatible with Alternative B.

During the course of this study's undertaking, the Kentucky General Assembly enacted Project Item Number 6-450. The project is for Turkeyfoot Road (KY 1303) with termini beginning at Dudley Road and going northward to US 25, encompassing the entirety of the subject study area. Independent of Item Number 6-450, the Conclusions herein would recommend Alternative A as an immediate improvement and with Alternative B as the ultimate improvement. With Item Number 6-450 established and funds provided, said project will proceed and include the improvements identified as Alternative B.

TURKEYFOOT RD (KY 1303) CRASH MAP

SCALE: 1"=200'

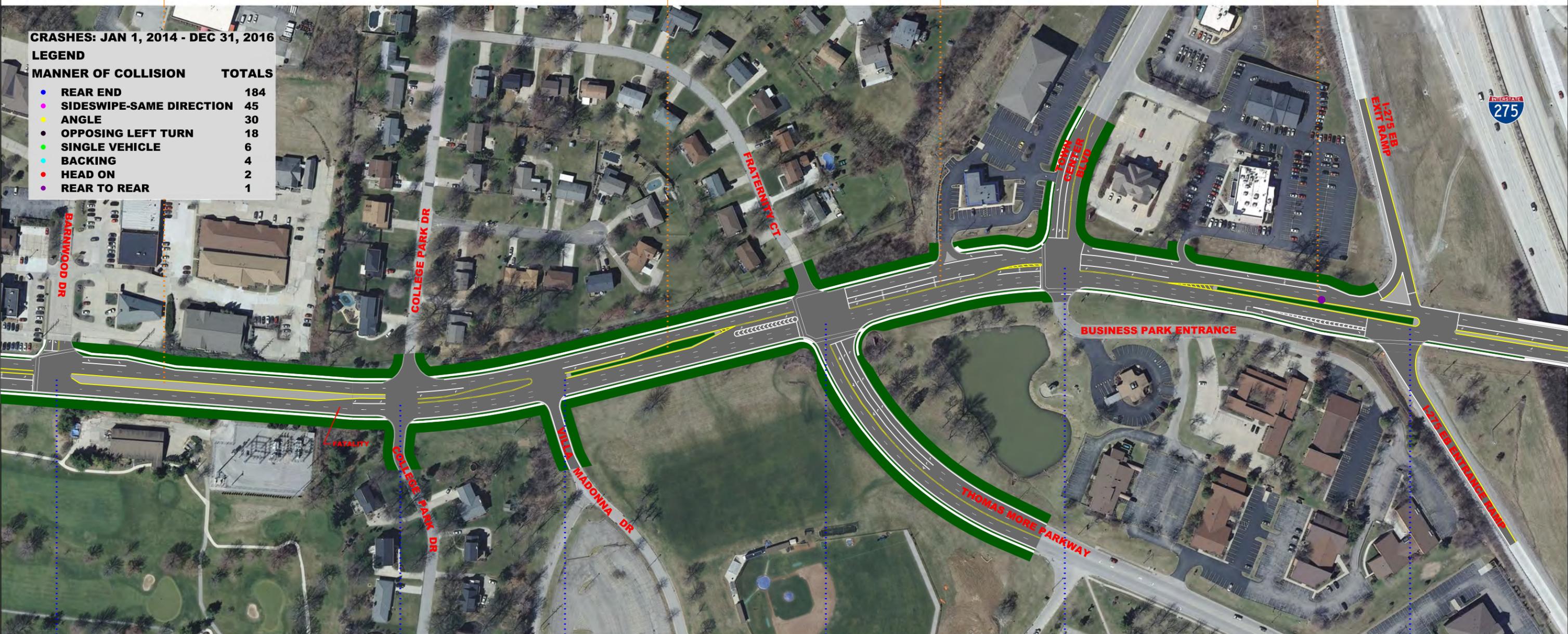


BARNWOOD DR INTERSECTION					FROM BARNWOOD DR TO THOMAS MORE PARKWAY						THOMAS MORE PARKWAY INTERSECTION						TOWN CENTER BOULEVARD INTERSECTION						I-275 RAMPS INTERSECTION							
MANNER OF COLLISION					MANNER OF COLLISION						MANNER OF COLLISION						MANNER OF COLLISION						MANNER OF COLLISION							
REAR END	SIDESWIPE-SAME DIRECTION	ANGLE	OPPOSING LEFT TURN	TOTALS	REAR END	ANGLE	OPPOSING LEFT TURN	SINGLE VEHICLE	HEAD ON	TOTALS	REAR END	SIDESWIPE-SAME DIRECTION	ANGLE	OPPOSING LEFT TURN	HEAD ON	TOTALS	REAR END	SIDESWIPE-SAME DIRECTION	ANGLE	OPPOSING LEFT TURN	BACKING	TOTALS	REAR END	SIDESWIPE-SAME DIRECTION	ANGLE	OPPOSING LEFT TURN	SINGLE VEHICLE	BACKING	REAR TO REAR	TOTALS
12	1	3	2	18	8	6	7	3	1	25	41	19	5	2	1	68	38	20	12	6	2	78	85	5	4	1	3	2	1	101

CRASHES: JAN 1, 2014 - DEC 31, 2016

LEGEND

MANNER OF COLLISION	TOTALS
● REAR END	184
● SIDESWIPE-SAME DIRECTION	45
● ANGLE	30
● OPPOSING LEFT TURN	18
● SINGLE VEHICLE	6
● BACKING	4
● HEAD ON	2
● REAR TO REAR	1



BEGIN MP	END MP	LENGTH (MILES)	ADT	CRITICAL CRASH RATE FACTOR
5.085	5.226	0.141	30,300	0.50
5.226	5.285	0.059	30,300	0.25
5.285	5.396	0.111	30,900	1.08
5.396	5.493	0.097	44,700	1.55
5.493	5.637	0.144	44,500	1.69
5.637	5.685	0.048	26,800	1.09

BARNWOOD DR - COLLEGE PARK DR

COLLEGE PARK DR - VILLA MADONNA DR

VILLA MADONNA DR - THOMAS MORE PKWY/ FRATERNITY CT

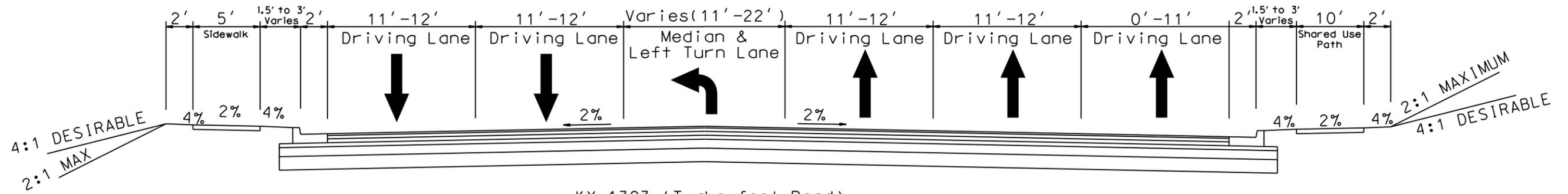
THOMAS MORE PKWY/ FRATERNITY CT - TOWN CENTER BLVD

TOWN CENTER BLVD - I-275 RAMPS

I-275 RAMPS - I-275 OVERPASS

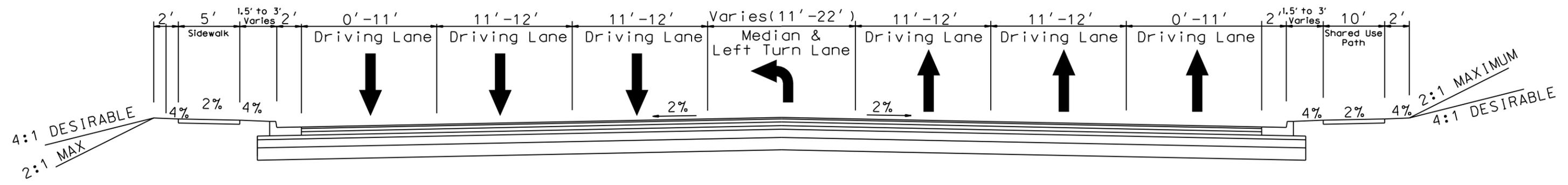
Figure ES-1: Crash Map

TYPICAL SECTIONS



KY 1303 (Turkeyfoot Road)
 5-11' Lanes From College Park Dr. to I-275
 4-12' Lanes from Barnwood Dr. to College Park Dr.

EXISTING / ALTERNATIVE A



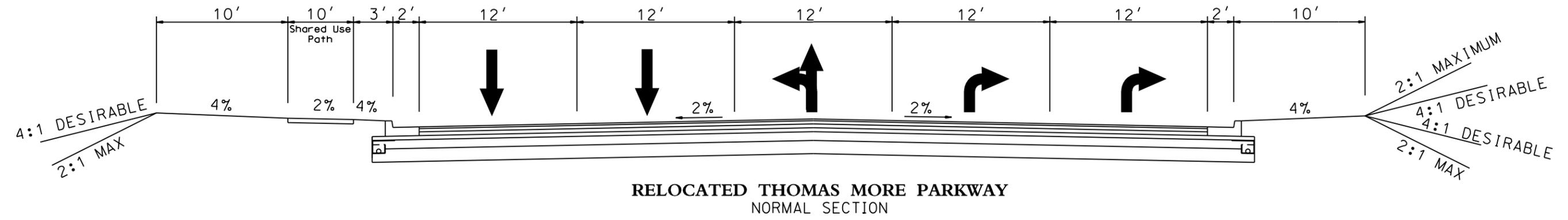
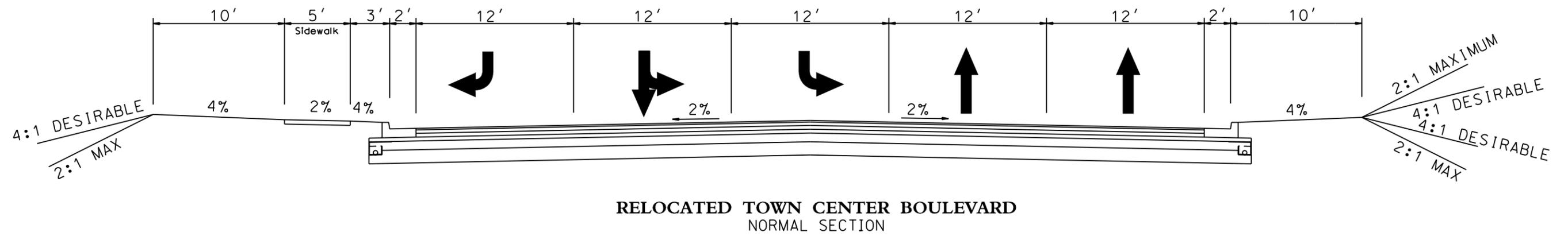
KY 1303 (Turkeyfoot Road)
 6-11' Lanes from Town Center Boulevard to I-275 EB Exit Ramp
 5-11' Lanes From College Park Dr. to Town Center Boulevard
 4-12' Lanes from Barnwood Dr. to College Park Dr.

PROPOSED ALTERNATIVE B

NOT TO SCALE

Figure ES-2: Existing and Proposed Typical Sections for Turkeyfoot Road

TYPICAL SECTIONS



NOT TO SCALE

Figure ES-3: Typical Sections for Town Center Boulevard & Thomas More Parkway



Figure ES-4: Turkeyfoot Road (KY 1303) Alternative A



Figure ES-5: Turkeyfoot Road (KY 1303) Alternative B ES-11

Table ES-1: Traffic Measures of Effectiveness

Travel Times			Existing		No Build		Alternative A				Alternative B			
			2017 AM	2017 PM	2040 AM	2040 PM	2017 AM	2017 PM	2040 AM	2040 PM	2017 AM	2017 PM	2040 AM	2040 PM
Map Nodes	From	To	Time (min:sec)											
1 to 5	I-275 EB	Thomas More Pkwy	4:43	3:31	9:36	8:48	3:23	2:33	2:58	2:25	2:39	2:57	5:01	4:40
1 to 6	I-275 EB	Dudley Road	4:25	5:01	9:15	11:00	2:35	3:26	2:51	4:26	2:30	3:20	3:32	4:54
3 to 5	I-275 WB	Thomas More Pkwy	6:00	4:43	8:40	7:42	4:13	3:36	4:07	5:49	3:35	2:43	5:14	5:46
3 to 6	I-275 WB	Dudley Road	5:16	6:01	8:07	9:51	4:00	4:42	4:16	7:46	2:10	2:23	5:46	6:04
6 to 2	Dudley Road	I-275 EB	2:25	4:04	6:27	13:02	2:20	5:29	4:18	4:52	3:02	2:55	2:52	3:46
6 to 4	Dudley Road	I-275 WB	3:06	5:05	6:40	15:47	2:22	7:27	5:22	6:23	4:05	4:10	2:58	4:07
TOTAL TRAVEL TIME ALL VEHICLES (MIN)			15,100	23,183	29,527	52,695	14,248	22,529	25,135	37,367	13,850	18,769	22,551	35,585

Maximum Queue Lengths		Existing		No Build		Alternative A				Alternative B			
		2017 AM (ft)	2017 PM (ft)	2040 AM	2040 PM	2017 AM (ft)	2017 PM (ft)	2040 AM (ft)	2040 PM (ft)	2017 AM (ft)	2017 PM (ft)	2040 AM (ft)	2040 PM (ft)
NB Turkeyfoot at Thomas More Pkwy (Thru Movement)		908	2293	1644	3921	708	2809	3755	3191	954	724	916	1063
SB Turkeyfoot at Thomas More Pkwy (Left Turn)		675	301	551	613	618	263	631	414	373	412	1045	1144
NB Turkeyfoot at Town Center Blvd (Thru Movement)		557	783	442	812	597	1037	614	1647				
SB Turkeyfoot at Town Center Blvd (Thru Movement)		809	1206	811	2091	716	493	812	531				
SB Turkeyfoot at I-275 EB Ramps (Thru Movement)		873	981	1977	2324	519	1026	1475	1310	557	647	1272	685
EB I-275 Off-Ramp (Right Turn)		1078	1322	1820	1701	380	718	552	455	211	223	726	970

Level of Service/Delay	NO Build				Alternative A				Alternative B			
	2040 AM		2040 PM		2040 AM		2040 PM		2040 AM		2040 PM	
Signalized Intersection	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)
Barnwood Drive	C	33	C	20	C	33	C	20	C	33	C	20
Thomas More Parkway	F	330	F	250	E	75	D	54	F	97	F	125
Town Center Blvd	E	74	F	182	D	52	F	120	NA	NA	NA	NA
I-275 EB Ramps	F	256	F	314	F	129	F	172	F	129	F	172
I-275 WB Ramps	D	41	F	82	D	41	F	82	D	41	F	82



Table ES-2: Comparison Matrix

	Existing	Alternative A	Alternative B
	Current Conditions As - Is	Spot Improvements Lower Cost Solutions	Relocate Town Center and Thomas More Pkwy
Corridor Length (ft.)	3,390	3,390	3,390
Design Speed (mph)	45	45	45
Minimum SSD 360 FT Criteria	350 FT	350 FT	350 FT
Number of Signalized Intersections	5	5	4
Earthwork Fill (cu yd.)	0	7,199	48,437
Right of Way			
Number of Parcels	0	2 Res + 5 Com	9 Res + 18 Com
Residential Relocations	0	0	Potential
Right-of-Way Acquisition (Acre)	0	0.2	11.00
Utility Impacts	NONE	LOW	HIGH
Costs			
Construction (with 30% Contingency)	\$0	\$2,648,000	\$9,897,000
Design (15% Construction)	\$0	\$397,000	\$1,484,550
Right of Way	\$0	\$205,000	\$5,450,000
Utilities	\$0	\$0	\$703,000
Total	\$0	\$3,250,000*	\$17,534,550
Percent Crash Reduction Per Year		8%	19%
Travel Time Reduction			
Relative to Existing 2017 AM		852 min (5.6%)	1,250 min (8.3%)
Relative to Existing 2017 PM		654 min (2.8%)	4,414 min (19%)
Relative to No-Build 2040 AM		4,392 min (14.8%)	6,976 min (23.6%)
Relative to No-Build 2040 PM		15,328 min (29%)	17,110 min (32.5%)

*The cost of the spot improvements with Alternative A may increase if the KYTC chooses to implement the improvements as separate maintenance and/or highway plan projects.