

Appendix G:

Traffic Operational Analysis

Traffic Operational Analysis

Although Table 10 displays the Level of Service to be F for many of the 2040 intersections, additional improvements may be made to reduce the delay and improve the resulting Level of Service of individual movements at the intersections (see HCS Summary Table in this Appendix).

Below is the list of the intersections and the individual movements at those intersections that are operating at Level of Service (LOS) F. The suggested countermeasures range from adjustments to the cycle lengths and green times to constructing additional through and turn lanes. The addition of lanes could require widening the existing bridge over I-275 and result in significant right-of-way and utility impacts. These were deemed to be beyond the scope of this study.

Alternative A:

- I-275 Westbound Ramps - [Westbound Left (PM) and Northbound Left (PM)]
 - Countermeasures include increasing the overall intersection cycle length, adjusting the maximum green time for those movements, and widening the bridge over I-275 for adding a third westbound left-turn lane. Given the potential for backups to I-275 on the ramp, queue detection could be implemented.
- I-275 Eastbound Ramps - [Eastbound Right (AM/PM)]
 - The HCS software is limited in how it analyzes the benefit of changing the northbound right turn from a permitted to a free-flowing right turn. While the free-flowing right-turn lane will improve the delay time, the HCS software shows the right turn to remain LOS F when analyzed as a signalized intersection with a stopped condition and provides no delay measurement when analyzed as an unsignalized free-flowing condition. Given the potential for backups to I-275 on the ramp, queue detection could be implemented.
- Town Center Blvd - [Westbound Through (PM), Northbound Left (AM/PM), Northbound Through (PM) and Northbound Right (PM)]
 - The westbound through and northbound rights are relatively small movements to the medical office park. Countermeasures for the northbound left and northbound through include increasing the overall intersection cycle length, adjusting the maximum green time, and adding a northbound through lane, a southbound through lane, and a northbound left-turn lane. A two-lane exit from the medical office park could be implemented to improve those movements.
- Thomas More Parkway – [Northbound Through (AM), Westbound Left (PM), and Westbound Right (PM)]
 - Countermeasures include decreasing westbound left and right maximum green and providing this green time to the northbound and southbound through movements during the AM peak hour and increasing the westbound split maximum green during the PM peak hour.

- Barnwood – [Northbound Through (AM)]
 - A countermeasure would be to decrease the maximum green time for the eastbound left- and right-turn movements to increase the green time for the northbound and southbound through movements.

Alternative B:

- I-275 Westbound Ramps - [Westbound Left (PM) and Northbound Left (PM)]
 - Countermeasures include increasing the overall intersection cycle length, adjusting the maximum green time, and widening the bridge over I-275 for adding a third westbound left-turn lane. Given the potential for backups to I-275 on the ramp, queue detection could be implemented.
- I-275 Eastbound Ramps - [Eastbound Right (AM/PM) and Northbound Right (PM)]
 - The HCS software is limited in how it analyzes the benefit of changing the northbound right turn from a permitted to a free-flowing right turn. While the free-flowing right-turn lane will improve the delay time, the HCS software shows the right turn to remain LOS F when analyzed as a signalized intersection with a stopped condition and provides no delay measurement when analyzed as an unsignalized free-flowing condition. A countermeasure for improving the delay would be to increase the eastbound through maximum green time during the AM and PM peak hours. Given the potential for backups to I-275 on the ramp, queue detection could be implemented.
- Thomas More Parkway – [Northbound Through (AM/PM), Northbound Right (AM/PM), Northbound Left (PM), Southbound Left (AM), Southbound Through (PM), Eastbound Left (PM), and Westbound Through (PM)]
 - Countermeasures include adjusting the green time for specific movements. The following lanes would need to be added for both the AM and PM peaks for all movements to operate at LOS E or better:
 - A third southbound left-turn lane
 - A fourth northbound through lane
 - A second eastbound left-turn lane
 - Two eastbound designated through lanes
 - A second westbound left-turn lane
 - Two westbound through lanes
 - Altering the eastbound and westbound left/through lane to be a designated left-turn lane
- Barnwood – [Northbound Through (AM)]
 - A countermeasure would be to decrease the maximum green time for the eastbound left- and right-turn movements and to increase green time for the northbound and southbound through movements.

2040 AM PEAK NO BUILD (Delay in sec/LOS)													
AM Peak	Eastbound			Westbound			Northbound			Southbound			Total Intersection
Intersection	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
KY 1303 & I-275 WB Ramps	-	-	-	37/D	-	32/C	37/D	23/C	-	-	61/E	57/E	36/D
KY 1303 & I-275 EB Ramps	65/E	-	914/F	-	-	-	-	9/A	16/B	4/A	3/A	-	105/F
KY 1303 & Town Center Blvd	43/D	43/D	47/D	-	67/E	-	239/F	34/C	36/D	68/E	35/D	20/B	40/D
KY 1303 & Thomas More Pkwy	-	72/E	-	47/D	46/E	23/C	66/E	177/F	188/F	329/F	26/C	26/C	166/F
KY 1303 & Barnwood Dr	46/D	-	46/D	-	-	-	11/B	16/B	-	-	9/A	7/A	14/B
2040 PM PEAK NO BUILD (Delay in sec/LOS)													
PM Peak	Eastbound			Westbound			Northbound			Southbound			Total Intersection
Intersection	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
KY 1303 & I-275 WB Ramps	-	-	-	45/D	-	34/C	60/E	21/C	-	-	50/D	46/D	45/D
KY 1303 & I-275 EB Ramps	65/E	-	1252/F	-	-	-	-	10/B	25/C	7/A	4/A	-	142/F
KY 1303 & Town Center Blvd	47/D	43/D	48/D	-	159/F	-	842/F	39/D	43/D	67/E	57/E	22/C	78/E
KY 1303 & Thomas More Pkwy	-	68/E	-	68/E	46/D	248/F	67/E	62/E	71/E	81/F	39/D	39/D	103/F
KY 1303 & Barnwood Dr	49/D	-	49/D	-	-	-	28/C	10/B	-	-	13/B	7/A	14/B
2040 AM PEAK Alternative A (Delay in sec/LOS)													
AM Peak	Eastbound			Westbound			Northbound			Southbound			Total Intersection
Intersection	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
KY 1303 & I-275 WB Ramps	-	-	-	42/D	-	33/C	40/D	28/C	-	-	66/E	58/E	41/D
KY 1303 & I-275 EB Ramps	66/E	-	876/F	-	-	-	-	10/B	38/D	7/A	4/A	-	129/F
KY 1303 & Town Center Blvd	44/D	43/D	48/D	-	70/E	-	435/F	48/D	56/E	71/E	33/C	21/C	52/D
KY 1303 & Thomas More Pkwy	-	-	-	48/D	-	22/C	24/C	120/F	41/D	75/E	16/B	-	75/E
KY 1303 & Barnwood Dr	46/D	-	46/D	-	-	-	15/B	43/F	-	-	10/A	7/A	33/C
2040 PM PEAK Alternative A (Delay in sec/LOS)													
PM Peak	Eastbound			Westbound			Northbound			Southbound			Total Intersection
Intersection	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
KY 1303 & I-275 WB Ramps	-	-	-	77/F	-	36/D	139/F	26/C	-	-	60/E	46/D	82/F
KY 1303 & I-275 EB Ramps	66/E	-	1146/F	-	-	-	-	13/B	108/F	37/D	5/A	-	172/F
KY 1303 & Town Center Blvd	48/D	43/D	51/D	-	376/F	-	1245/F	94/F	103/F	69/E	47/D	24/C	120/F
KY 1303 & Thomas More Pkwy	-	-	-	134/F	-	93/F	25/C	46/D	33/C	32/C	21/C	-	54/D
KY 1303 & Barnwood Dr	50/D	-	50/D	-	-	-	78/E	13/B	-	-	22/C	8/A	20/C
2040 AM PEAK Alternative B (Delay in sec/LOS)													
AM Peak	Eastbound			Westbound			Northbound			Southbound			Total Intersection
Intersection	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
KY 1303 & I-275 WB Ramps	-	-	-	42/D	-	33/C	40/D	28/C	-	-	66/E	58/E	41/D
KY 1303 & I-275 EB Ramps	66/E	-	876/F	-	-	-	-	10/B	38/D	7/A	4/A	-	129/F
KY 1303 & Town Center Blvd	N/A			N/A			N/A			N/A			
KY 1303 & Thomas More Pkwy	60/E	61/E	62/E	-	52/D	21/C	63/E	637/F	679/F	140/F	41/D	34/C	337/F
KY 1303 & Barnwood Dr	46/D	-	46/D	-	-	-	15/B	43/F	-	-	10/A	7/A	33/C
2040 PM PEAK Alternative B (Delay in sec/LOS)													
PM Peak	Eastbound			Westbound			Northbound			Southbound			Total Intersection
Intersection	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
KY 1303 & I-275 WB Ramps	-	-	-	77/F	-	36/D	139/F	26/C	-	-	60/E	46/D	82/F
KY 1303 & I-275 EB Ramps	66/E	-	1146/F	-	-	-	-	13/B	108/F	37/D	5/A	-	172/F
KY 1303 & Town Center Blvd	N/A			N/A			N/A			N/A			
KY 1303 & Thomas More Pkwy	84/F	63/E	66/E	-	552/F	35/D	131/F	335/F	343/F	51/D	101/F	39/D	193/F
KY 1303 & Barnwood Dr	50/D	-	50/D	-	-	-	78/E	13/B	-	-	22/C	8/A	20/C

2040 AM PEAK Alternative A with Additional Optimization (Delay in sec/LOS)													
AM Peak	Eastbound			Westbound			Northbound			Southbound			Total Intersection
Intersection	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
KY 1303 & I-275 WB Ramps	-	-	-	42/D	-	0/A	40/D	28/C	-	-	66/E	0/A	38/D
KY 1303 & I-275 EB Ramps	66/E	-	*	-	-	-	-	10/B	38/D	7/A	3/A	-	14/B
KY 1303 & Town Center Blvd	44/D	43/D	48/D	-	70/E	-	73/E	48/D	56/E	71/E	43/D	26/C	48/D
KY 1303 & Thomas More Pkwy	-	-	-	57/E	-	28/C	19/B	55/D	32/C	73/E	11/B	-	46/D
KY 1303 & Barnwood Dr	55/D	-	55/D	-	-	-	9/A	20/C	-	-	6/A	4/A	16/B
2040 PM PEAK Alternative A with Additional Optimization (Delay in sec/LOS)													
PM Peak	Eastbound			Westbound			Northbound			Southbound			Total Intersection
Intersection	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
KY 1303 & I-275 WB Ramps	-	-	-	55/D	-	47/D	78/E	22/C	-	-	66/E	52/D	57/E
KY 1303 & I-275 EB Ramps	66/E	-	*	-	-	-	-	13/B	**	37/D	3/A	-	7/A
KY 1303 & Town Center Blvd	53/D	48/D	58/E	-	69/E	-	80/E	56/E	68/E	74/E	57/E	40/D	58/E
KY 1303 & Thomas More Pkwy	-	-	-	70/E	-	54/D	30/C	64/E	39/D	37/D	27/C	-	47/D
KY 1303 & Barnwood Dr	50/D	-	50/D	-	-	-	78/E	13/B	-	-	22/C	8/A	20/C
2040 AM PEAK Alternative B with Additional Optimization (Delay in sec/LOS)													
AM Peak	Eastbound			Westbound			Northbound			Southbound			Total Intersection
Intersection	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
KY 1303 & I-275 WB Ramps	-	-	-	42/D	-	33/C	40/D	28/C	-	-	66/E	58/E	41/D
KY 1303 & I-275 EB Ramps	45/D	-	67/E	-	-	-	-	25/C	25/C	20/C	11/B	-	27/C
KY 1303 & Town Center Blvd	N/A			N/A			N/A			N/A			
KY 1303 & Thomas More Pkwy	64/E	67/E	68/E	-	67/E	32/C	22/C	53/D	40/D	75/E	29/C	24/C	51/D
KY 1303 & Barnwood Dr	53/D	-	53/D	-	-	-	10/A	23/C	-	-	6/A	5/A	18/B
2040 PM PEAK Alternative B with Additional Optimization (Delay in sec/LOS)													
PM Peak	Eastbound			Westbound			Northbound			Southbound			Total Intersection
Intersection	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
KY 1303 & I-275 WB Ramps	-	-	-	47/D	-	40/D	62/E	22/C	-	-	72/E	51/D	51/D
KY 1303 & I-275 EB Ramps	62/E	-	*	-	-	-	-	16/B	**	44/D	6/A	-	12/B
KY 1303 & Town Center Blvd	N/A			N/A			N/A			N/A			
KY 1303 & Thomas More Pkwy	68/E	65/E	74/E	60/E	57/E	65/E	61/E	69/E	40/D	67/E	47/D	29/C	59/E
KY 1303 & Barnwood Dr	50/D	-	50/D	-	-	-	78/E	13/B	-	-	22/C	8/A	20/C

*Consists of one free flow lane and one stop controlled lane. Cannot be accurately analyzed with HCS.

**Consists of one channelized lane with yield. Cannot be accurately analyzed with HCS.